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Technical Guide

ECP30 4 C

C-TYPE

DDS
Dynamic Data Support

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

Rev. 1

ECP30 4 C

General characteristics

Pole number	4	Insulation class	H
Phase number	3	Protection class	IP23
Number of wires	12	NDE Bearing type	6207-2RS
Execution	Brushless	DE Bearing type	-
Regulator type	DSR	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
ECP30 1M4 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	15
	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
ECP30 2M4 C	**kVA**	27,5	**27,5**	27,5	25,2	25,5	**25,5**	25,5	23,7	25	**25**	25	23	23	**23**	23	21,4	20	**20**	20	18,4
	kW	22	**22**	22	20,2	20,4	**20,4**	20,4	19	20	**20**	20	18,4	18,4	**18,4**	18,4	17,1	16	**16**	16	14,7
ECP30 3M4 C	**kVA**	33	**33**	33	29,5	30,5	**30,5**	30,5	27,8	30	**30**	30	27	26	**26**	26	25,1	24	**24**	24	21,6
	kW	26,4	**26,4**	26,4	23,6	24,4	**24,4**	24,4	22,2	24	**24**	24	21,6	20,8	**20,8**	20,8	20,1	19,2	**19,2**	19,2	17,3
ECP30 1L4 C	**kVA**	38,5	**38,5**	38,5	34,4	35,6	**35,6**	35,6	32,4	35	**35**	35	31,5	30,3	**30,3**	30,3	29,3	28	**28**	28	25,2
	kW	30,8	**30,8**	30,8	27,5	28,5	**28,5**	28,5	25,9	28	**28**	28	25,2	24,2	**24,2**	24,2	23,4	22,4	**22,4**	22,4	20,2
ECP30 2L4 C	**kVA**	44	**44**	44	39	40,7	**40,7**	40,7	37	40	**40**	40	36	34,7	**34,7**	34,7	33,5	32	**32**	32	28,8
	kW	35,2	**35,2**	35,2	31,2	32,6	**32,6**	32,6	29,6	32	**32**	32	28,8	27,8	**27,8**	27,8	26,8	25,6	**25,6**	25,6	23

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
ECP30 1M4 C	**kVA**	23,1	25,3	26,4	**26,4**	21,5	23,6	24,6	**24,6**	21	23	24	**24**	19	20	22	**22**	16,8	18,4	19,2	**19,2**
	kW	18,5	20,2	21	**21**	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**
ECP30 2M4 C	**kVA**	28,6	30,3	33	**33**	27	28	30,6	**30,6**	26	27,5	30	**30**	24	26	27,5	**27,5**	20,8	22	24	**24**
	kW	22,9	24,2	26,4	**26,4**	21,2	22,4	24,5	**24,5**	20,8	22	24	**24**	19,2	20,4	22	**22**	16,6	17,6	19,2	**19,2**
ECP30 3M4 C	**kVA**	36,3	39,6	39,6	**39,6**	34	37	36,6	**36,6**	33	36	36	**36**	29	32	32	**32**	26,4	28,8	28,8	**28,8**
	kW	29	31,7	31,7	**31,7**	26,8	29,3	29,3	**29,3**	26,4	28,8	28,8	**28,8**	23,2	25,6	25,6	**25,6**	21,1	23	23	**23**
ECP30 1L4 C	**kVA**	42,4	46,2	46,2	**46,2**	39	43	42,7	**42,7**	38,5	42	42	**42**	34	37	37,3	**37,3**	30,8	33,6	33,6	**33,6**
	kW	33,9	37	37	**37**	31,3	34,2	34,2	**34,2**	30,8	33,6	33,6	**33,6**	27	29,8	29,8	**29,8**	24,6	26,9	26,9	**26,9**
ECP30 2L4 C	**kVA**	48,4	52,8	52,8	**52,8**	45	49	48,8	**48,8**	44	48	48	**48**	39	43	42,7	**42,7**	35,2	38,4	38,4	**38,4**
	kW	38,7	42,2	42,2	**42,2**	35,8	39	39	**39**	35,2	38,4	38,4	**38,4**	31	34,2	34,2	**34,2**	28,2	30,7	30,7	**30,7**

Reactance & Time constants- Class H / 400V

Unsaturated (ref. EN60034-4)			ECP30 1M4 C	ECP30 2M4 C	ECP30 3M4 C	ECP30 1L4 C	ECP30 2L4 C
Xd	Direct-axis synchronous reactance	%	229,7	226,3	217,4	208,1	197
X'd	Direct-axis transient reactance	%	21,4	19,8	20,3	19,4	18,4
X"d	Direct-axis subtransient reactance	%	12,2	11,2	11,6	11,1	10,5
Xq	Quadrature-axis synchronous reactance	%	99,7	93,1	93,7	89,7	84,9
X'q	Quadrature-axis transient reactance	%	99,7	93,1	93,7	89,7	84,9
X"q	Quadrature-axis subtransient reactance	%	27,9	25,6	25,1	24	22,7
X_2	Negative-sequence reactance	%	19,4	17,8	17,7	16,9	16
X_0	Zero sequence reactance	%	4,2	3,82	3,7	3,55	3,36
Saturated							
Xd	Direct-axis synchronous reactance	%	195,2	192,4	184,8	176,9	167,4
X'd	Direct-axis transient reactance	%	18,2	16,8	17,3	16,5	15,6
X"d	Direct-axis subtransient reactance	%	10,4	9,52	9,86	9,43	8,92
Xq	Quadrature-axis synchronous reactance	%	84,7	79,1	79,6	76,2	72,2
X'q	Quadrature-axis transient reactance	%	84,7	79,1	79,6	76,2	72,2
X"q	Quadrature-axis subtransient reactance	%	23,7	21,8	21,3	20,4	19,3
X_2	Negative-sequence reactance	%	16,5	15,1	15	14,4	13,6
X_0	Zero sequence reactance	%	4,2	3,82	3,7	3,55	3,36
Kcc	Short circuit ratio		0,51	0,52	0,54	0,57	0,6
T'd	Transient time constant	sec	0,061	0,056	0,059	0,057	0,054
T"d	Subtransient time constant	sec	0,017	0,016	0,015	0,015	0,014
T'do	Open circuit time constant	sec	0,66	0,64	0,63	0,61	0,57
Ta	Armature time constant	sec	0,011	0,013	0,009	0,009	0,01

Additional information - Class H / 400V

Io	Excitation current at no load	A	0,6	0,6	0,6	0,6	0,6
Ic	Excitation current at full load	A	2,8	2,7	3,3	2,8	2,8
Overload					-		
Overload per 20 sec.		%			300		
Heat dissipation		W	2307	2727	3180	3567	3915
Telephone Harmonic Factor - THF		%	<2	<2	<2	<2	<2
Waveform Distors.(THD) full load LL/LN		%	2 / 1,9	2,1 / 2	1,9 / 1,8	2,2 / 2,2	2,3 / 2,2
Waveform Distors.(THD) no load LL/LN		%	2,9 / 2,8	3,1 / 3	2,7 / 2,5	3,3 / 3	3 / 2,9

Reactance & Time constants- Class H / 480V

Unsaturated (ref. EN60034-4)			ECP30 1M4 C	ECP30 2M4 C	ECP30 3M4 C	ECP30 1L4 C	ECP30 2L4 C
Xd	Direct-axis synchronous reactance	%	229,7	226,3	217,4	208,1	197
X'd	Direct-axis transient reactance	%	21,4	19,8	20,3	19,4	18,4
X"d	Direct-axis subtransient reactance	%	12,2	11,2	11,6	11,1	10,5
Xq	Quadrature-axis synchronous reactance	%	99,7	93,1	93,7	89,7	84,9
X'q	Quadrature-axis transient reactance	%	99,7	93,1	93,7	89,7	84,9
X"q	Quadrature-axis subtransient reactance	%	27,9	25,6	25,1	24	22,7
X_2	Negative-sequence reactance	%	19,4	17,8	17,7	16,9	16
X_0	Zero sequence reactance	%	4,2	3,82	3,7	3,55	3,36
Saturated							
Xd	Direct-axis synchronous reactance	%	195,2	192,4	184,8	176,9	167,4
X'd	Direct-axis transient reactance	%	18,2	16,8	17,3	16,5	15,6
X"d	Direct-axis subtransient reactance	%	10,4	9,52	9,86	9,43	8,92
Xq	Quadrature-axis synchronous reactance	%	84,7	79,1	79,6	76,2	72,2
X'q	Quadrature-axis transient reactance	%	84,7	79,1	79,6	76,2	72,2
X"q	Quadrature-axis subtransient reactance	%	23,7	21,8	21,3	20,4	19,3
X_2	Negative-sequence reactance	%	16,5	15,1	15	14,4	13,6
X_0	Zero sequence reactance	%	4,2	3,82	3,7	3,55	3,36
Kcc	Short circuit ratio		0,51	0,52	0,54	0,57	0,6
T'd	Transient time constant	sec	0,061	0,056	0,059	0,057	0,054
T"d	Subtransient time constant	sec	0,017	0,016	0,015	0,015	0,014
T'do	Open circuit time constant	sec	0,66	0,64	0,63	0,61	0,57
Ta	Armature time constant	sec	0,011	0,013	0,009	0,009	0,01

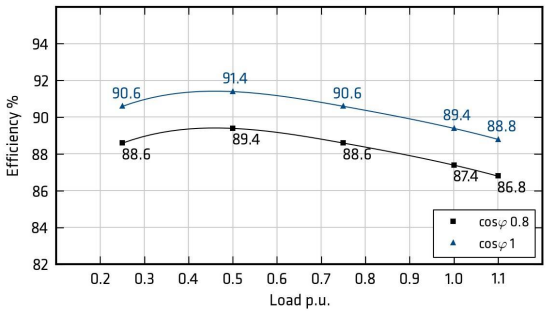
Additional information - Class H / 480V

Io	Excitation current at no load	A	0,6	0,6	0,6	0,6	0,6
Ic	Excitation current at full load	A	2,8	2,7	3,3	2,8	2,8
Overload					-		
Overload per 20 sec.		%			300		
Heat dissipation		W	2301	2816	3271	3651	3937
Telephone Interferance Factor - TIF			<45	<45	<45	<45	<45
Waveform Distors.(THD) full load LL/LN		%	2 / 1,9	2,1 / 2	1,9 / 1,8	2,2 / 2,2	2,3 / 2,2
Waveform Distors.(THD) no load LL/LN		%	2,9 / 2,8	3,1 / 3	2,7 / 2,5	3,3 / 3	3 / 2,9

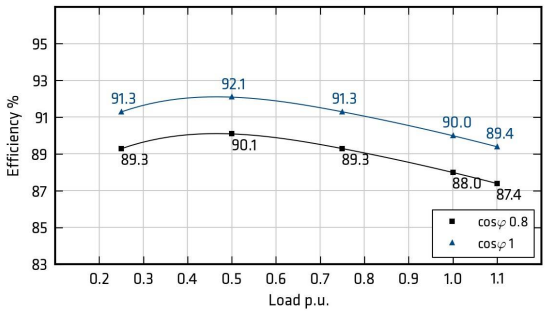
Efficiencies @ 50Hz

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
ECP30 1M4 C	%	88,4	89,3	88,7	87,7	87,2	88,6	89,4	88,6	87,4	86,8	88,8	89,4	88,9	87,7	87,0	89,3	89,5	89,0	87,9	87,5
ECP30 2M4 C	%	89,2	90,2	89,4	88,0	87,5	89,3	90,1	89,3	88,0	87,4	89,3	90,1	89,2	87,7	87,1	88,6	89,8	88,9	87,5	86,9
ECP30 3M4 C	%	89,6	90,6	89,8	88,3	87,8	89,7	90,5	89,7	88,3	87,7	89,7	90,5	89,8	88,6	88,1	89,0	90,2	89,3	87,8	87,2
ECP30 1L4 C	%	90,0	91,1	90,2	88,7	88,2	90,1	91,0	90,1	88,7	88,2	90,1	91,0	90,2	89,0	88,5	89,4	90,6	89,7	88,2	87,6
ECP30 2L4 C	%	90,4	91,4	90,6	89,1	88,6	90,5	91,3	90,5	89,1	88,5	90,5	91,3	90,6	89,4	88,9	89,8	91,0	90,1	88,6	88,0

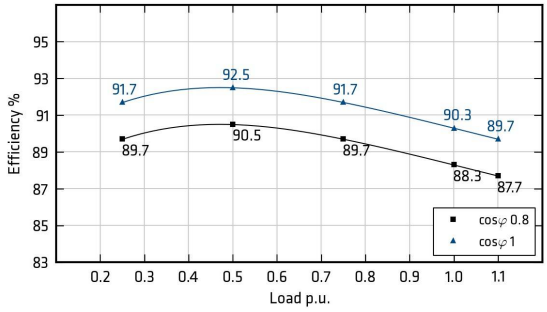
ECP30 1M4 C
400/230 50Hz



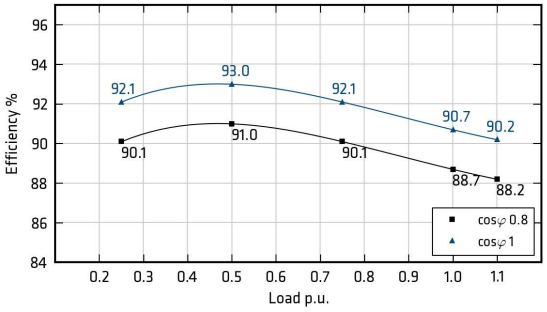
ECP30 2M4 C
400/230 50Hz



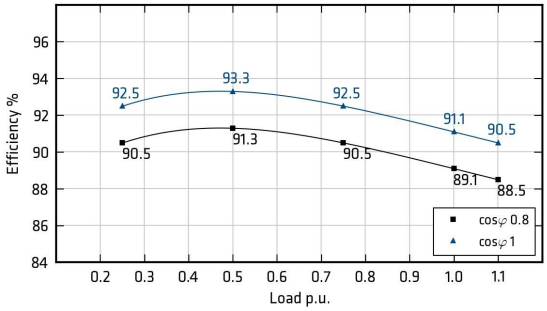
ECP30 3M4 C
400/230 50Hz



ECP30 1L4 C
400/230 50Hz



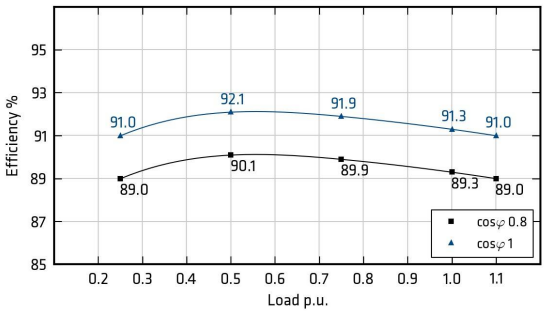
ECP30 2L4 C
400/230 50Hz



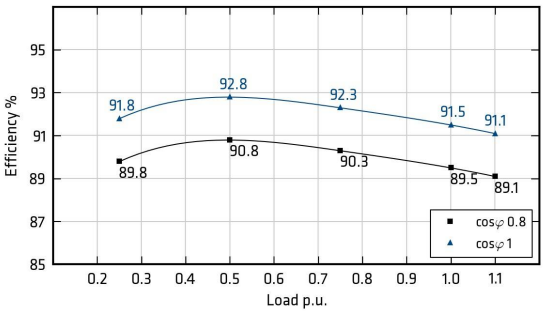
Efficiencies @ 60Hz

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
ECP30 1M4 C	%	89,4	90,2	90,1	89,4	89,0	89,7	90,3	89,8	89,1	88,7	89,1	90,0	90,0	89,4	89,1	89,0	90,1	89,9	89,3	89,0
ECP30 2M4 C	%	90,2	90,9	90,5	89,4	88,9	90,3	91,0	90,2	88,9	88,4	89,9	90,7	90,4	89,3	88,8	89,8	90,8	90,3	89,5	89,1
ECP30 3M4 C	%	90,5	91,4	90,9	89,7	89,2	90,8	91,5	90,6	89,2	88,7	90,1	91,2	90,8	89,6	89,1	90,0	91,3	90,7	89,8	89,4
ECP30 1L4 C	%	91,0	91,9	91,4	90,1	89,6	91,3	92,0	91,1	89,6	89,0	90,5	91,7	91,3	90,0	89,5	90,4	91,8	91,2	90,2	89,8
ECP30 2L4 C	%	91,3	92,2	91,7	90,6	90,1	91,6	92,3	91,4	90,0	89,5	90,9	92,0	91,6	90,5	90,0	90,8	92,1	91,5	90,7	90,3

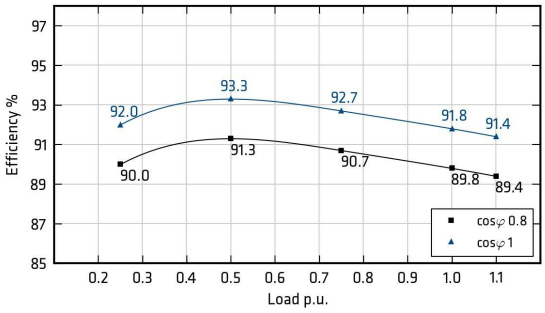
ECP30 1M4 C
480/277 60Hz



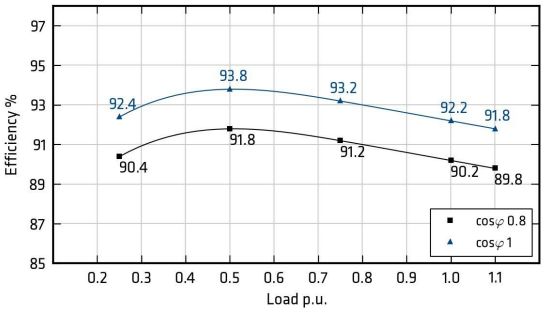
ECP30 2M4 C
480/277 60Hz



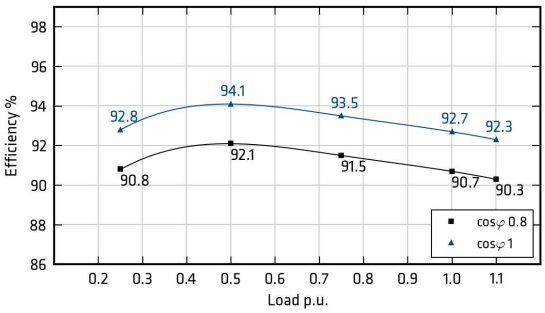
ECP30 3M4 C
480/277 60Hz



ECP30 1L4 C
480/277 60Hz



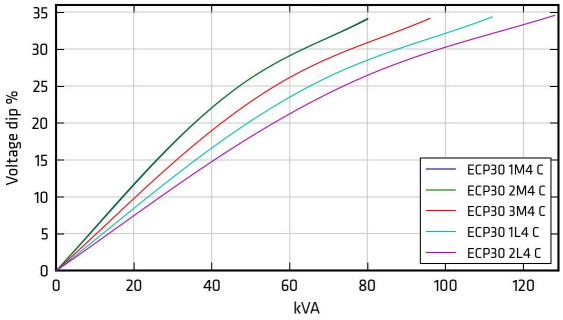
ECP30 2L4 C
480/277 60Hz



Transients voltage

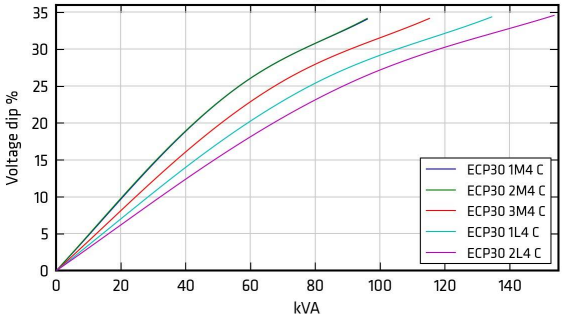
400V - 50Hz

Motor Starting @ P.F. 0,6

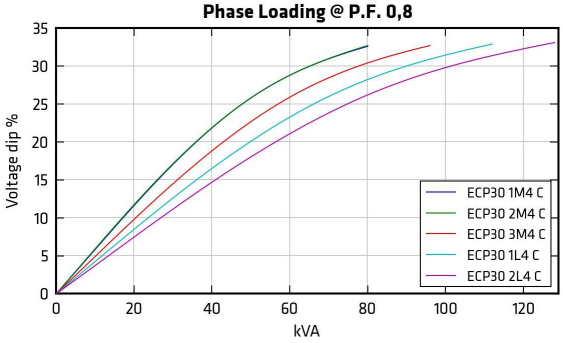


480V - 60Hz

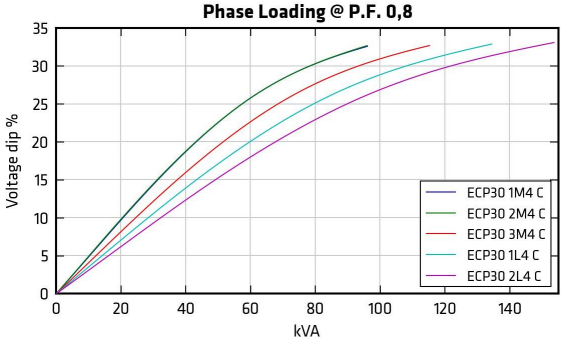
Motor Starting @ P.F. 0,6



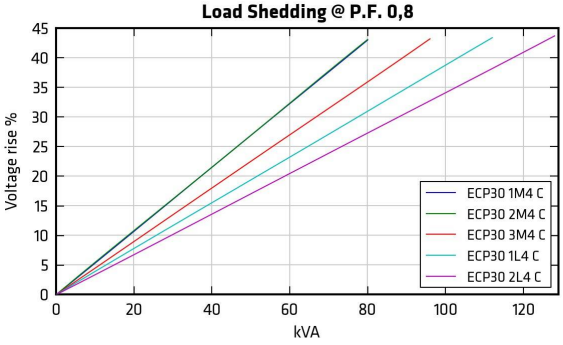
Phase Loading @ P.F. 0,8



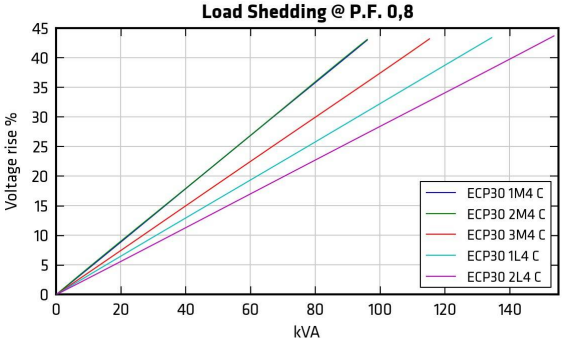
Phase Loading @ P.F. 0,8



Load Shedding @ P.F. 0,8



Load Shedding @ P.F. 0,8



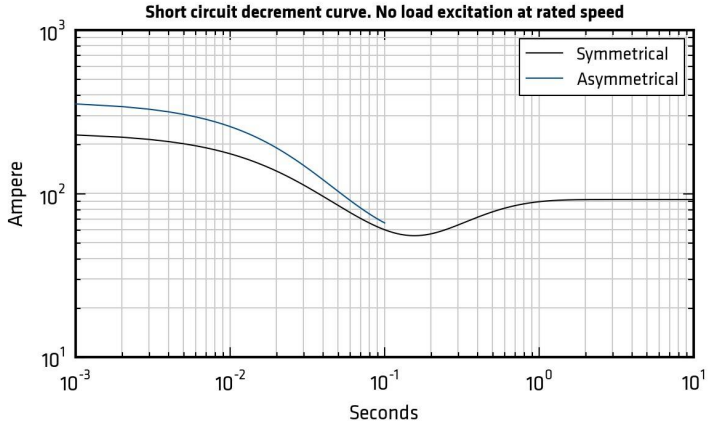
In order to scale transient curves as a function of a power factor or voltage if not indicated, please proceed as follows:

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.

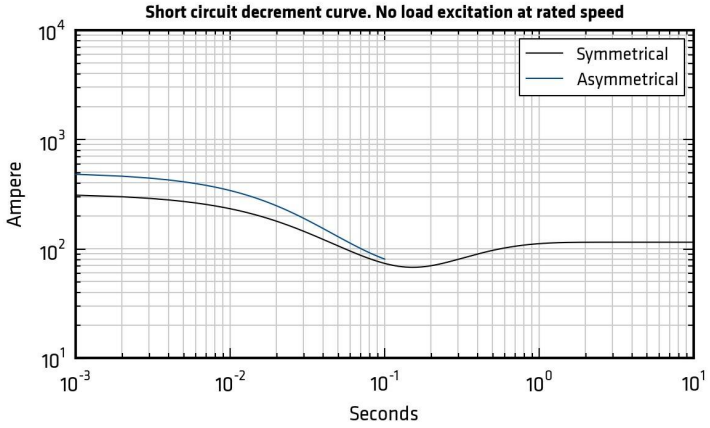
Voltage coefficient corrector (VCC):
VCC=(400/Vnew)2 if 50 Hz; VCC=(480/Vnew)2 if 60 Hz
Example. VCC at 415V 60 Hz is 1.338 [VCC=(480/415)^2]. This means that the voltage fall at a given power at 415V is equivalent to the one that can be read on the power factor 0.6 curve if the load is considered 1.338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

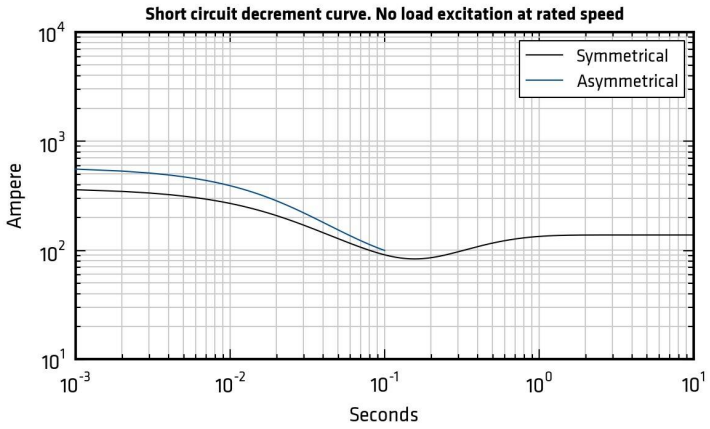
ECP30 1M4 C



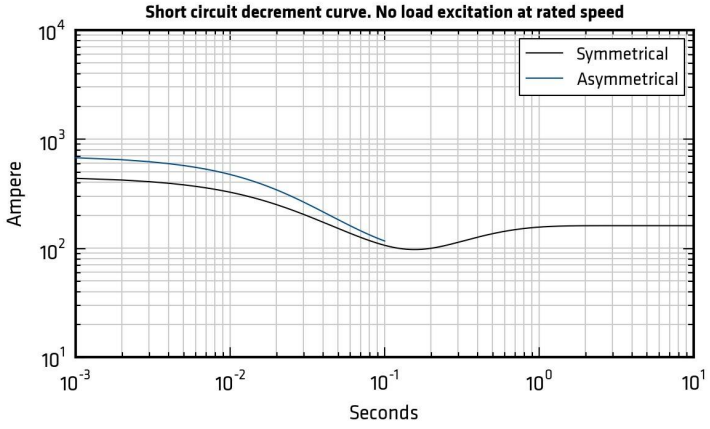
ECP30 2M4 C



ECP30 3M4 C



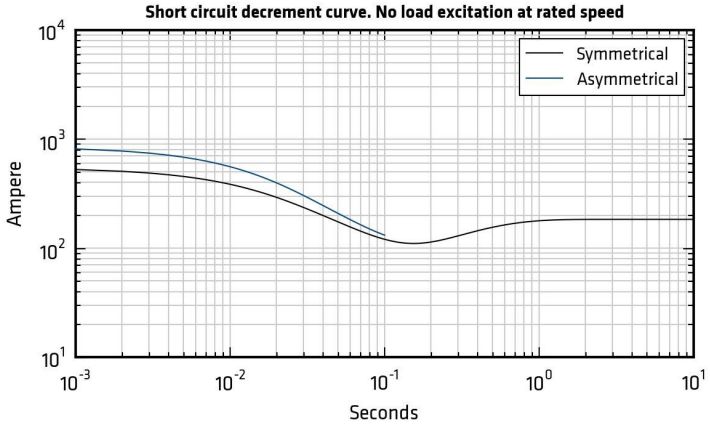
ECP30 1L4 C



*Please refer to tables at page 6

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

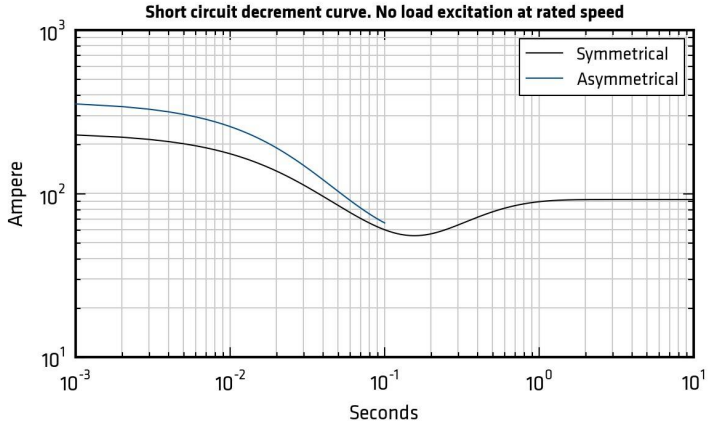
ECP30 2L4 C



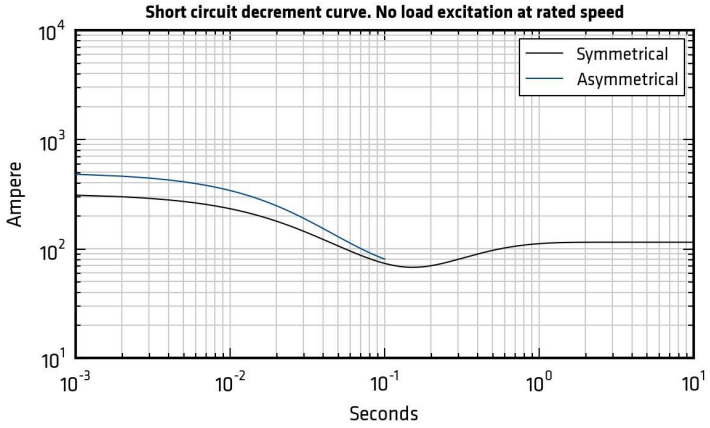
*Please refer to tables at page 6

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

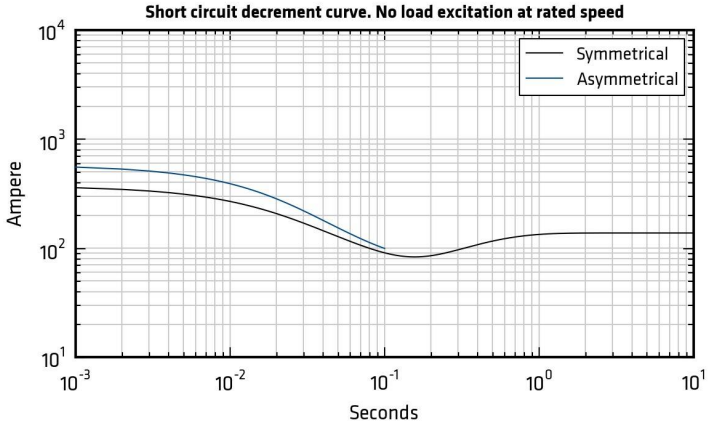
ECP30 1M4 C



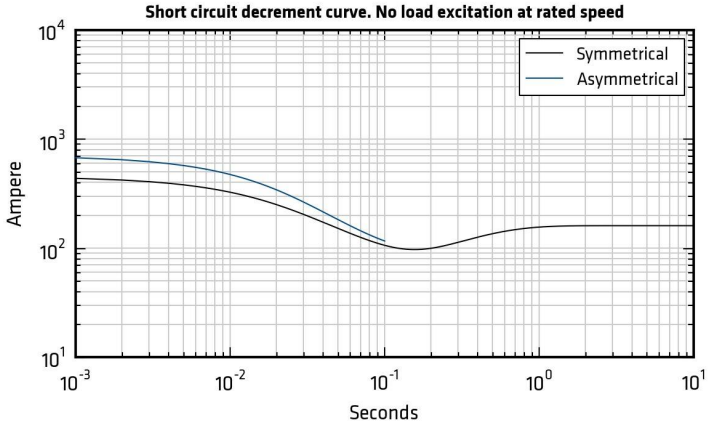
ECP30 2M4 C



ECP30 3M4 C



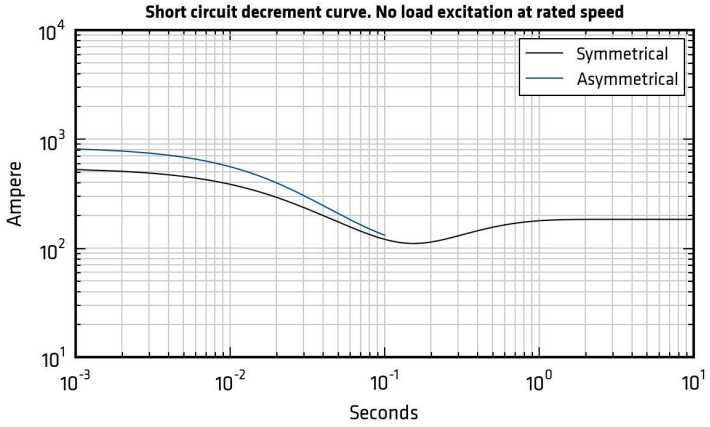
ECP30 1L4 C



*Please refer to tables at page 6

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

ECP30 2L4 C

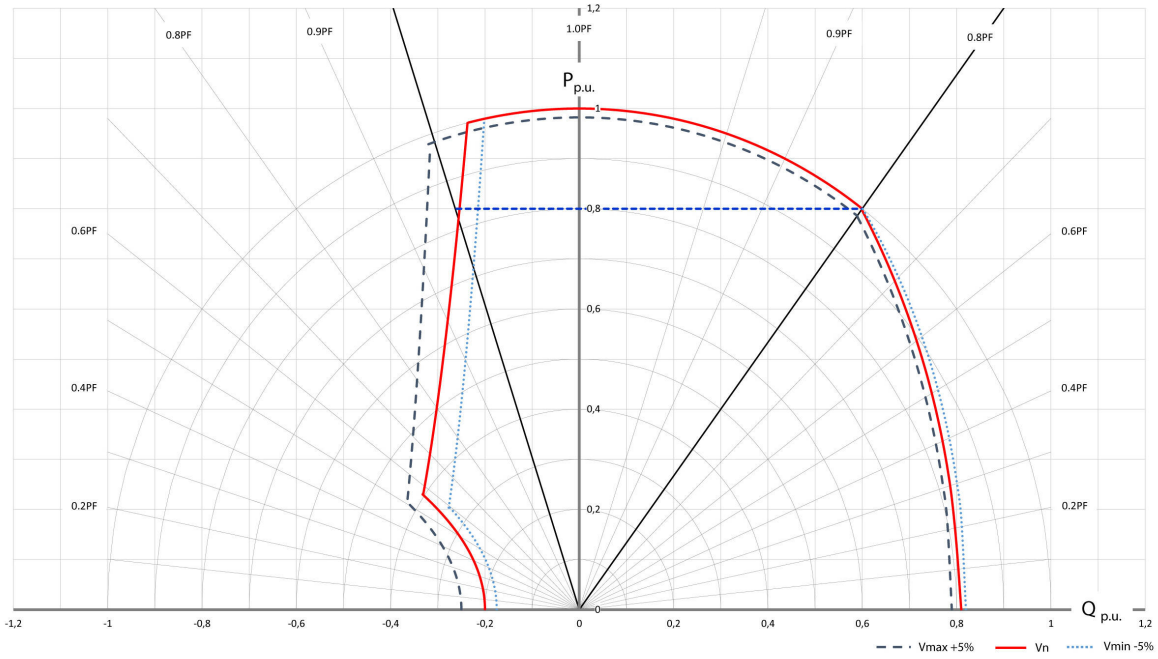


*Please refer to tables at page 6

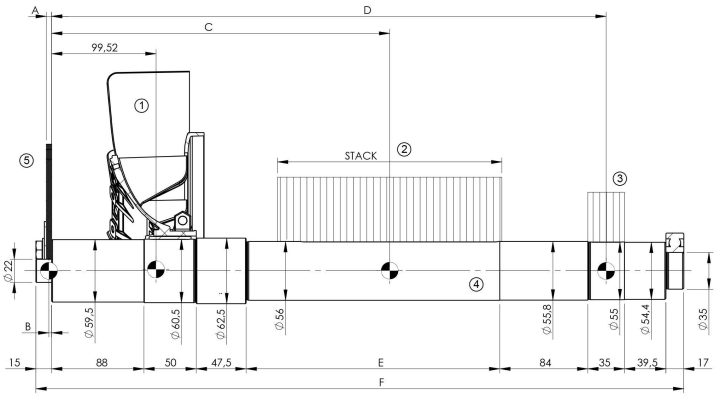
Additional Characteristics

Data		ECP30 1M4 C		ECP30 2M4 C		ECP30 3M4 C		ECP30 1L4 C		ECP30 2L4 C	
		50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
Damper cage		Aluminium									
Stator Winding Resistance (20°C)	Ω	0,235		0,174		0,15		0,134		0,111	
Rotor Winding Resistance (20°C)	Ω	1,295		1,512		1,684		1,867		2,016	
Stator Exciter Resistance (20°C)	Ω	9,6		9,6		9,6		9,6		9,6	
Rotor Exciter Resistance (20°C)	Ω	0,384		0,384		0,384		0,384		0,384	
Weight of complete generator	kg	105,0		118,0		130,0		148,0		158,0	
Unbalanced magnetic pull	kN/mm	-		-		-		-		-	
Air flow	m^3/min	13,5	16,2	13,5	16,2	13,5	16,2	13,5	16,2	13,5	16,2
Noise level at 1m/7m	dB(A)	72/59	78/62	72/59	78/62	72/59	78/62	72/59	78/62	72/59	78/62

PQ Diagram



MOMENTS OF INERTIA - SINGLE BEARING



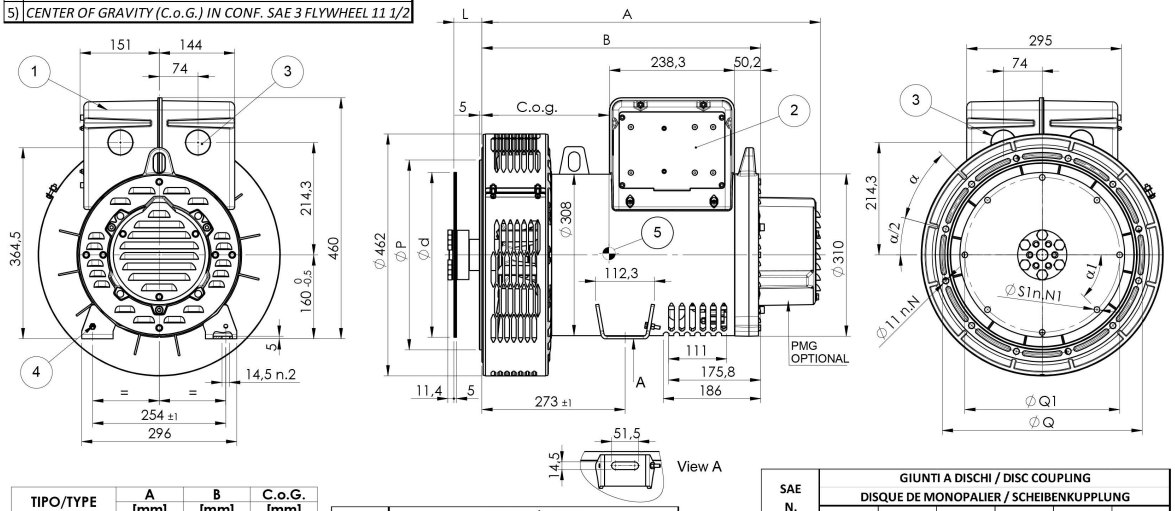
DIMENSION / TYPE	C [mm]	D [mm]	E [mm]	F [mm]
ECP30 1M / 4C	310,0	469,0	182,0	558,0
ECP30 2M / 4C	295,0			
ECP30 3M / 4C	280,0			
ECP30 1L / 4C	322,5	529,0	242,0	618,0
ECP30 2L / 4C	310,0			

POS.	1		2		3		4		TOTAL	
COMPONENT	FAN		MAIN ROTOR		EXCITER ROTOR		SHAFT *			
TYPE	WEIGHT [kg]	J [kgm²]	WEIGHT [kg]	J [kgm²]	WEIGHT [kg]	J [kgm²]	WEIGHT [kg]	J [kgm²]	WEIGHT [kg]	J [kgm²]
ECP30 1M / 4C	0,93	0,0118	17,56	0,0702	4,34	0,0136	10,60	0,0044	33,43	0,1000
ECP30 2M / 4C			21,93	0,0878					37,80	0,1176
ECP30 3M / 4C			26,52	0,1063					42,39	0,1361
ECP30 1L / 4C			30,78	0,1263			11,8	0,0049	47,85	0,1566
ECP30 2L / 4C			34,30	0,1374					51,37	0,1677

SAE N.	5 | SHAFTS COUPLING FLEX PLATE			
	A [mm]	B [mm]	WEIGHT [kg]	J [kgm²]
6 1/2	5,0	2,6	1,68	0,0084
7 1/2	5,0	2,6	2,04	0,0130
8	36,6	29,3	3,30	0,0196
10	28,6	23,7	3,87	0,0379
11 1/2	15,0	11,6	4,58	0,0593

* Shaft mass and inertia also include rotor keys

1)	*REMOVABLE COVER FOR ACCESS TO MAIN TERMINALS*
2)	*REMOVABLE PANEL FOR ACCESS TO AVR*
3)	*PRE-CUT FOR CABLE ENTRY ϕ48 mm*
4)	*SCREW M6 FOR GROUNDING*
5)	*CENTER OF GRAVITY (C.o.G.) IN CONF. SAE 3 FLYWHEEL 11 1/2*



TIPO/TYPE	A [mm]	B [mm]	C.o.G. [mm]
ECP30 1M / 4C	645.7	531.8	282.8
ECP30 2M / 4C			275.0
ECP30 3M / 4C			265.8
ECP30 1L / 4C	705.7	591.8	303.7
ECP30 2L / 4C			295.3

SAE N.	FLANGIA/FLANGE BRIDE/FLANSCH				
	P	Q	S	N	α
5	314,3	333,4	11	8	45°
4	362,0	381,0	11	12	30°
3	409,6	428,6	11	12	30°

SAE N.	GIUNTI A DISCHI / DISC COUPLING DISQUE DE MONOPALIER / SCHEIBENKUPPLUNG					
	d	L	Q1	S1	N1	α 1
6 1/2	215,90	30,2	200,00	9	6	60°
7 1/2	241,30	30,2	222,25	9	8	45°
8	263,52	62,0	244,47	11	6	60°
10	314,32	53,8	295,27	11	8	45°
11 1/2	352,42	39,6	333,37	11	8	45°

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