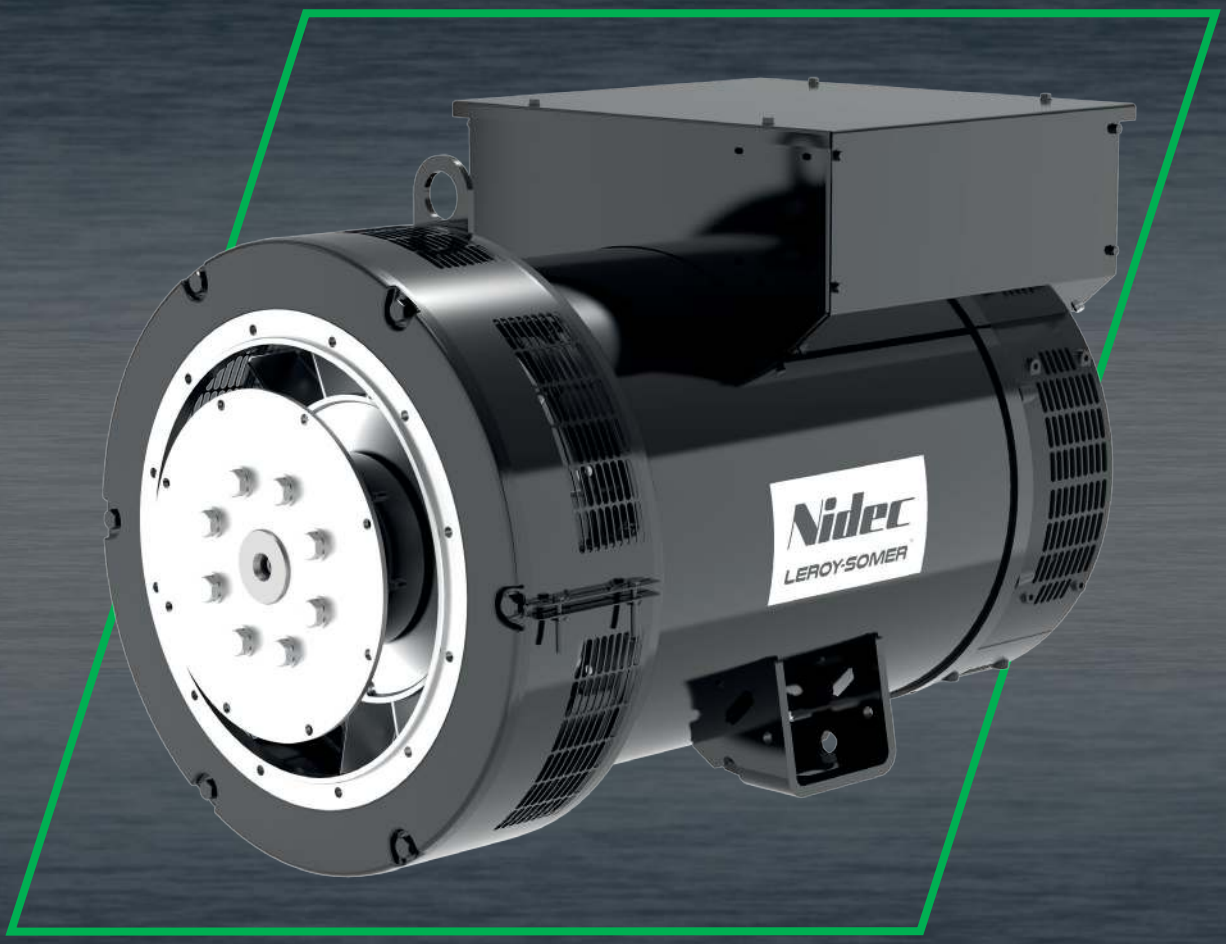
Nidec Power



TAL 046

Low Voltage Alternator - 4 poles

230 to 365 kVA - 50 Hz / 288 to 438 kVA - 60 Hz

Electrical and mechanical data

LEROY-SOMER™

The best of performance

The Leroy-Somer™ TAL 046 alternator has been designed to offer you the best power generation performances. With its meticulous design and optimized architecture, the TAL 046 strikes the perfect balance between compactness, reliability, performance and longevity.
Whatever your application, the Leroy-Somer™ TAL 046 alternator will meet your needs and will adapt to all situations.







Standards

The Leroy-Somer™ TAL 046 alternator meets all key international standards and regulations, including IEC 60034, NEMA MG 1.32-33, ISO 8528-3, CSA C22.2 n°100-14 and UL 1446 (UL 1004 on request).
Also compliant with IEC 61000-6-2, IEC 61000-6-3, IEC 61000-6-4, VDE 0875G, VDE 0875N and EN 55011, group 1 class A for European zone.
The Leroy-Somer™ TAL 046 alternator can be integrated in EC marked generator set, and bears EC, UKCA and CMIM markings.
It is designed, manufactured and marketed in an ISO 9001 and ISO 14001 quality assurance environment.

Electrical characteristics and performances

- Class H insulation
- Shunt excitation
- Low voltage winding:
  Three-phase 50 Hz: 220V - 240V and 380V - 415V (440V)
  60 Hz: 208V - 240V and 380V - 480V
- 6-terminal plates in 6-wire version or suitable for 12-wire option
- Optimized performance

Excitation and regulation system

	Excitation system				Regulation options		
	AVR	**SHUNT**	**AREP+** (option)	**PMG** (option)	**$UL_{c/us}$**	**Remote voltage potentiometer**	**C.T. Current transformer for paralleling**
Three-phase 6-wire	**R150**	Standard				√	
	R180		Standard	Standard		√	√
	D350	Option	Option	Option	√	√	√*
Three-phase 12-wire**	**R150**	Standard				√	
	R250	Option			√	√	
	R180		Standard	Standard		√	√
	D350	Option	Option	Option	√	√	√*

*: only with AREP+ or PMG **: with larger terminal box

Protection system and options

- Degree of protection: IP 23
- Complete winding protection for non-harsh environments with relative humidity ≤ 95%
- Options:
  - Three-phase 12-wire with 9-terminal plates
  - AREP+ or PMG excitation
  - ULc/us
  - Customized painting (unpainted machine as standard)
  - Space heater
  - Droop kit for alternator paralleling
  - Stator sensors
  - Winding 8 optimized for three-phase 380V / 416 V - 60 Hz
  - Reinforced winding protection for harsh environments and relative humidity greater than 95% (system 2 - 4): for TAL 046 H apply a derating coefficient of 0.97

Mechanical construction

- Compact and rugged assembly to withstand engine vibrations
- Steel frame
- Cast iron flanges and shields
- Single-bearing design to be suitable with most diesel engines
- Greased for life bearings
- Direction of rotation: clockwise and counterclockwise without derating

Terminal box design

- Easy access to AVR and terminals
- Standard terminal box with possibility of mounting measurement CTs
- Possibility of current transformer for parallel operation

General characteristics

Insulation class	H
Winding pitch	2/3 (wind.6S - 6-wire / wind.6 - 12-wire)
Number of wires	6 (12 option)
Protection	IP 23
Altitude	≤ 1000 m
Overspeed	2250 R.P.M.
Air flow 50 Hz	0.48 m³/s
Air flow 60 Hz	0.58 m³/s
AREP+/PMG Short-circuit current = 2.7 In: 5 seconds (*)	

Excitation system 6-wire	SHUNT	AREP+ / PMG
AVR type	R150	R180
Excitation system 12-wire (option)	SHUNT	AREP+ / PMG
AVR type	R150	R180
Voltage regulation (**)	± 0.8 %	± 0.5 %
Total Harmonic Distortion THD (***) in no-load	< 2.5 %	
Total Harmonic Distortion THD (***) in linear load	< 5 %	
Waveform: NEMA = TIF (***)	< 50	
Waveform: I.E.C. = THF (***)	< 2%	

(*) D350: 10 seconds (**) Steady state (***) Total harmonic distortion between phases, no-load or on-load (non-distorting)

Ratings 50 Hz - 1500 R.P.M.

kVA / kW - P.F. = 0.8

Duty / T° C		Continuous / 40 °C					Continuous / 40 °C					Stand-by / 40 °C					Stand-by / 27 °C				
Class / T° K		H / 125° K					F / 105° K					H / 150° K					H / 163° K				
Phase		3 ph.				1 ph.	3 ph.				1 ph.	3 ph.				1 ph.	3 ph.				1 ph.
Y		380V	**400V**	415V	440V		380V	**400V**	415V	440V		380V	**400V**	415V	440V		380V	**400V**	415V	440V	
Δ		220V	**230V**	240V		230V	220V	**230V**	240V		230V	220V	**230V**	240V		230V	220V	**230V**	240V		230V
YY (*)			**200V**		220V			**200V**		220V			**200V**		220V			**200V**		220V	
ΔΔ (*)						230V					230V					230V					230V
TAL 046 C	kVA	230	**230**	230	219	138	209	**209**	209	199	126	244	**244**	244	232	146	253	**253**	253	241	152
	kW	*184*	***184***	*184*	*175*	*110*	*167*	***167***	*167*	*159*	*101*	*195*	***195***	*195*	*186*	*117*	*202*	***202***	*202*	*193*	*122*
TAL 046 D	kVA	240	**250**	250	238	150	218	**228**	228	217	137	254	**265**	265	252	159	264	**275**	275	262	165
	kW	*192*	***200***	*200*	*190*	*120*	*174*	***182***	*182*	*174*	*110*	*203*	***212***	*212*	*202*	*127*	*211*	***220***	*220*	*210*	*132*
TAL 046 E	kVA	275	**275**	275	261	165	250	**250**	250	238	150	292	**292**	292	277	175	303	**303**	303	287	182
	kW	*220*	***220***	*220*	*209*	*132*	*200*	***200***	*200*	*190*	*120*	*234*	***234***	*234*	*222*	*140*	*242*	***242***	*242*	*230*	*146*
TAL 046 F	kVA	290	**300**	300	285	180	264	**273**	273	259	164	307	**318**	318	302	191	319	**330**	330	314	198
	kW	*232*	***240***	*240*	*228*	*144*	*211*	***218***	*218*	*207*	*131*	*246*	***254***	*254*	*242*	*153*	*255*	***264***	*264*	*251*	*158*
TAL 046 G	kVA	325	**325**	325	309	195	296	**296**	296	281	177	345	**345**	345	328	207	360	**360**	360	340	215
	kW	*260*	***260***	*260*	*247*	*156*	*237*	***237***	*237*	*225*	*142*	*276*	***276***	*276*	*262*	*166*	*288*	***288***	*288*	*272*	*172*
TAL 046 H	kVA	350	**365**	365	347	210	318	**332**	332	316	191	371	**387**	387	368	223	385	**400**	400	382	231
	kW	*280*	***292***	*292*	*278*	*168*	*254*	***266***	*266*	*253*	*153*	*297*	***310***	*310*	*294*	*178*	*308*	***320***	*320*	*306*	*185*

(*) 12-wire option

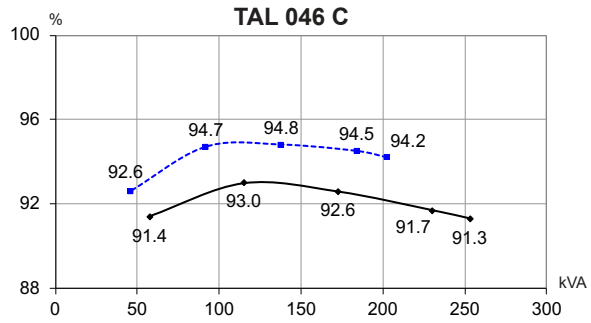
Ratings 60 Hz - 1800 R.P.M.

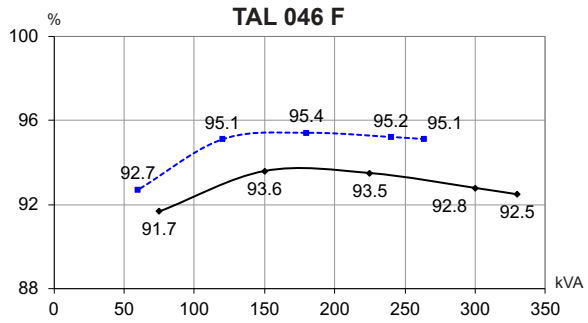
kVA / kW - P.F. = 0.8

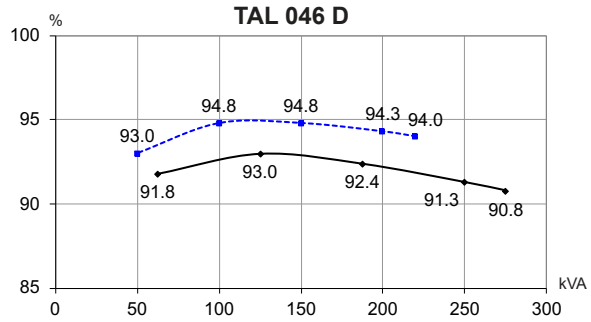
Duty / T° C		Continuous / 40 °C					Continuous / 40 °C					Stand-by / 40 °C					Stand-by / 27 °C				
Class / T° K		H / 125° K					F / 105° K					H / 150° K					H / 163° K				
Phase		3 ph.				1 ph.	3 ph.				1 ph.	3 ph.				1 ph.	3 ph.				1 ph.
Y		380V	416V	440V	**480V**		380V	416V	440V	**480V**		380V	416V	440V	**480V**		380V	416V	440V	**480V**	
Δ		220V	240V			240V	220V	240V			240V	220V	240V			240V	220V	240V			240V
YY (*)			208V	220V	**240V**			208V	220V	**240V**			208V	220V	**240V**			208V	220V	**240V**	
ΔΔ (*)						240V					240V					240V					240V
TAL 046 C	kVA	226	250	262	**288**	152	206	228	238	**262**	138	240	265	278	**305**	161	250	275	288	**316**	167
	kW	*181*	*200*	*210*	***230***	*122*	*165*	*182*	*190*	***210***	*110*	*192*	*212*	*222*	***244***	*129*	*200*	*220*	*230*	***253***	*134*
TAL 046 D	kVA	245	265	280	**313**	165	223	241	255	**285**	150	260	281	297	**332**	175	270	292	308	**344**	182
	kW	*196*	*212*	*224*	***250***	*132*	*178*	*193*	*204*	***228***	*120*	*208*	*225*	*238*	***266***	*140*	*216*	*234*	*246*	***275***	*146*
TAL 046 E	kVA	275	300	315	**344**	182	250	273	287	**313**	166	292	318	334	**365**	193	303	330	347	**378**	200
	kW	*220*	*240*	*252*	***275***	*146*	*200*	*218*	*230*	***250***	*133*	*234*	*254*	*267*	***292***	*154*	*242*	*264*	*278*	***302***	*160*
TAL 046 F	kVA	290	315	340	**360**	200	264	287	309	**328**	182	307	334	360	**382**	212	320	347	374	**400**	220
	kW	*232*	*252*	*272*	***288***	*160*	*211*	*230*	*247*	***262***	*146*	*246*	*267*	*288*	***306***	*170*	*256*	*278*	*299*	***320***	*176*
TAL 046 G	kVA	315	345	365	**406**	215	287	314	332	**369**	196	334	366	387	**430**	228	347	380	402	**447**	237
	kW	*252*	*276*	*292*	***325***	*172*	*230*	*251*	*266*	***295***	*157*	*267*	*293*	*310*	***344***	*182*	*278*	*304*	*322*	***358***	*190*
TAL 046 H	kVA	345	375	400	**438**	231	314	341	364	**399**	210	366	398	424	**464**	245	380	413	440	**480**	254
	kW	*276*	*300*	*320*	***350***	*185*	*251*	*273*	*291*	***319***	*168*	*293*	*318*	*339*	***371***	*196*	*304*	*330*	*352*	***384***	*203*

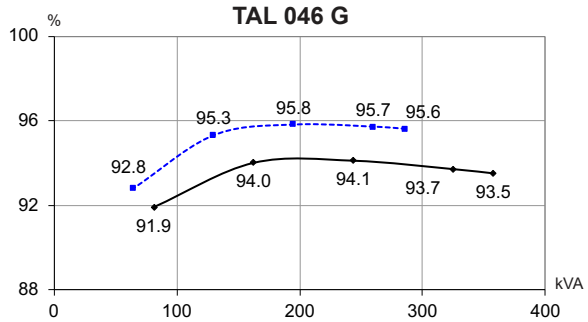
(*) 12-wire option

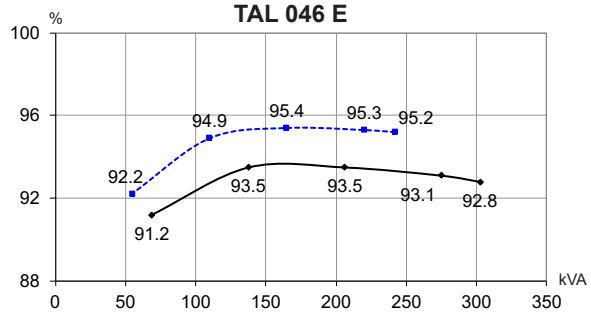
Efficiencies 400 V - 50 Hz (— P.F.: 0.8) (--- P.F.: 1)

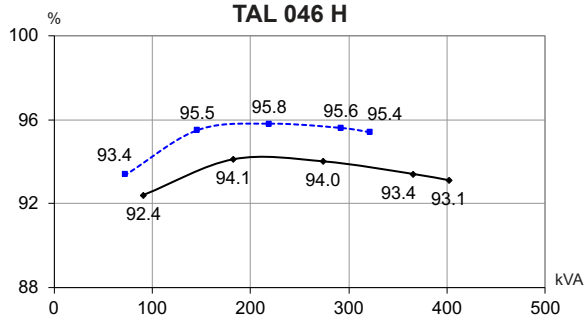












Reactances (%). Time constants (ms) - Class H / 400 V

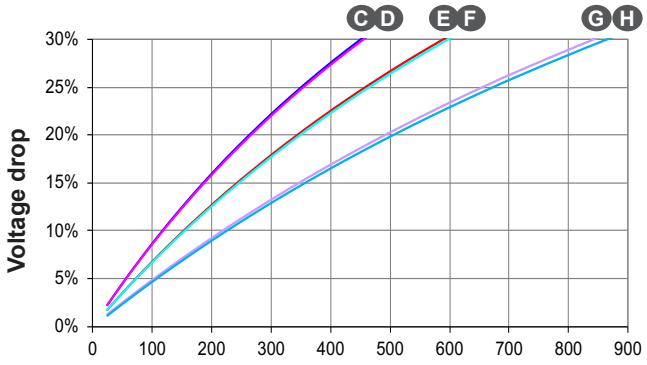
		C	D	E	F	G	H
Kcc	Short-circuit ratio	0.37	0.34	0.49	0.45	0.48	0.43
Xd	Direct-axis synchronous reactance unsaturated	340	370	278	303	270	303
Xq	Quadrature-axis synchronous reactance unsaturated	173	188	142	154	137	154
T'do	No-load transient time constant	1983	1983	2049	2049	2093	2093
X'd	Direct-axis transient reactance saturated	17.1	18.6	13.5	14.8	12.9	14.5
T'd	Short-circuit transient time constant	100	100	100	100	100	100
X"d	Direct-axis subtransient reactance saturated	13.7	14.9	10.8	11.8	10.3	11.6
T"d	Subtransient time constant	10	10	10	10	10	10
X"q	Quadrature-axis subtransient reactance saturated	17.4	18.9	13.5	14.7	12.6	14.2
Xo	Zero sequence reactance	0.71	0.77	0.56	0.61	0.53	0.6
X2	Negative sequence reactance saturated	15.58	16.94	12.19	13.3	11.49	12.9
Ta	Armature time constant	15	15	15	15	15	15

Other class H / 400 V data

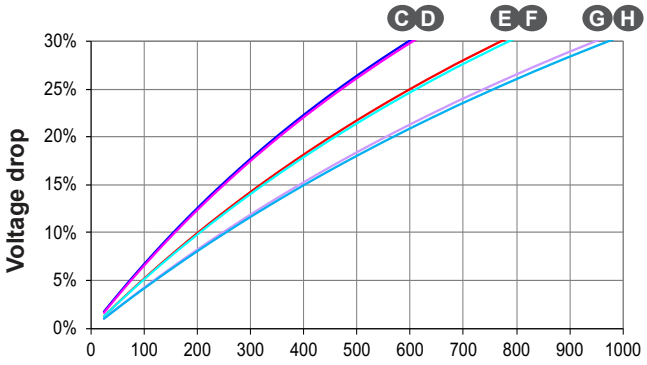
io (A)	No-load excitation current SHUNT/AREP+	1.01	1.01	1.14	1.14	1.06	1.06
ic (A)	On-load excitation current SHUNT/AREP+	3.84	4.14	3.5	3.76	3.3	3.63
uc (V)	On-load excitation voltage SHUNT/AREP+	37.4	40.2	40.6	43.5	38.2	41.9
ms	Response time (ΔU = 20% transient)	500	500	500	500	500	500
kVA	Start (ΔU = 20% cont. or ΔU = 30% trans.) SHUNT*	372	371	496	495	742	741
kVA	Start (ΔU = 20% cont. or ΔU = 30% trans.) AREP+*	524	525	687	688	856	854
%	Transient ΔU (on-load 4/4) SHUNT - P.F.: 0.8 $_{LAG}$	18	19.1	16.7	17.7	14.2	15.4
%	Transient ΔU (on-load 4/4) AREP+ - P.F.: 0.8 $_{LAG}$	14.2	15	13.3	14.1	12.8	13.9
W	No-load losses	3299	3299	4328	4328	4750	4750
W	Heat dissipation	16579	18888	16242	18374	17367	20482

* P.F. = 0.6

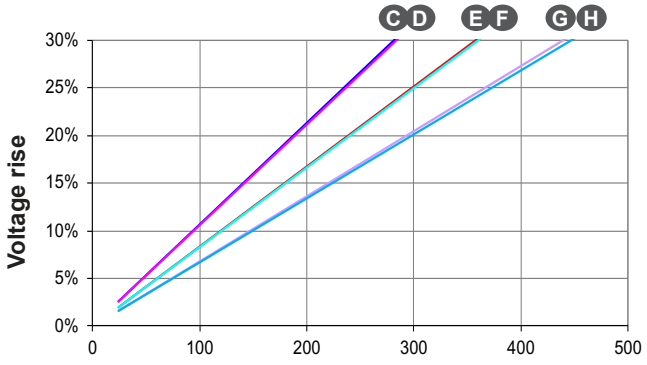
Transient voltage variation 400 V - 50 Hz



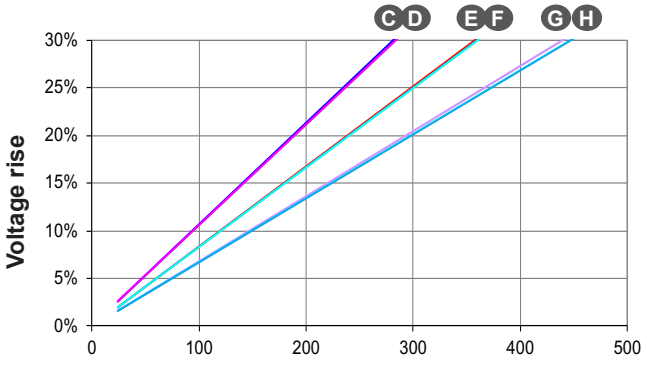
Phase loading (SHUNT) - kVA at P.F. = 0.8



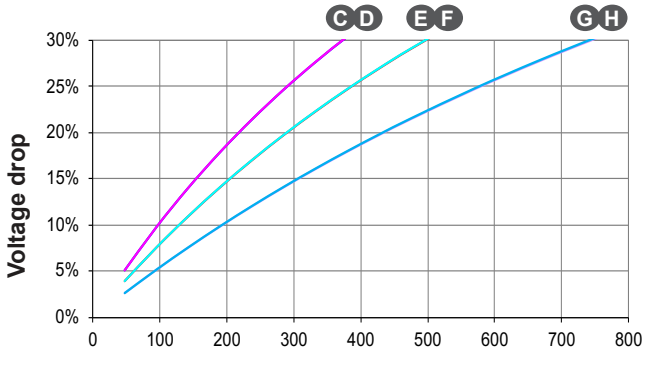
Phase loading (AREP+/PMG) - kVA at P.F. = 0.8



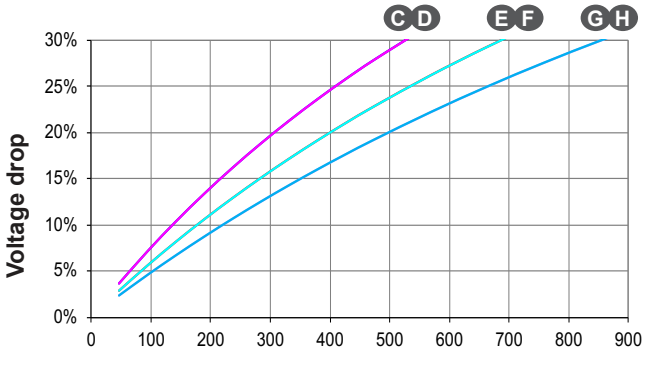
Load shedding (SHUNT) - kVA at P.F. = 0.8



Load shedding (AREP+/PMG) - kVA at P.F. = 0.8



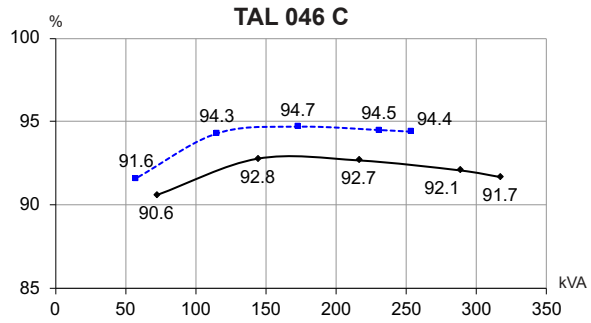
Motor starting (SHUNT)
Locked rotor kVA at P.F. = 0.6

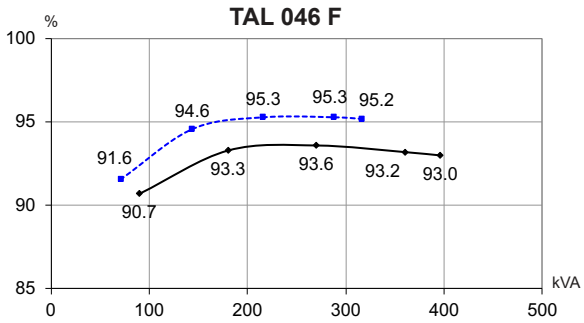


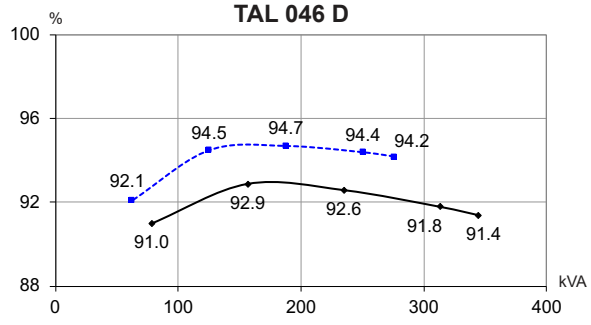
Motor starting (AREP+/PMG)
Locked rotor kVA at P.F. = 0.6

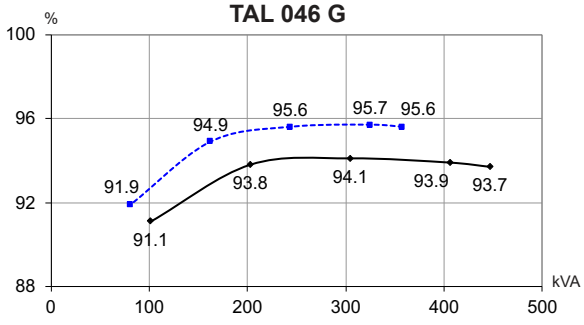
1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by K = Sine P.F. / 0.8
2) For voltages other than 400V (Y), 230V (Δ) at 50 Hz, then kVA must be multiplied by $(400/U)^2$ or $(230/U)^2$.

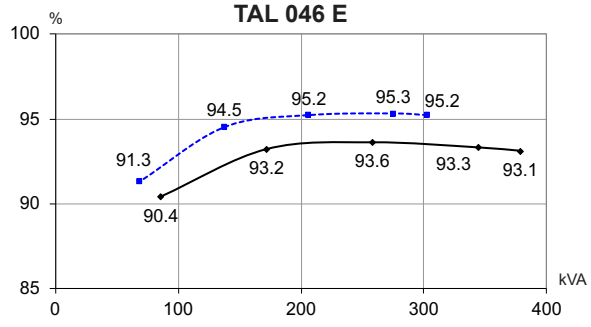
Efficiencies 480 V - 60 Hz (— P.F.: 0.8) (--- P.F.: 1)

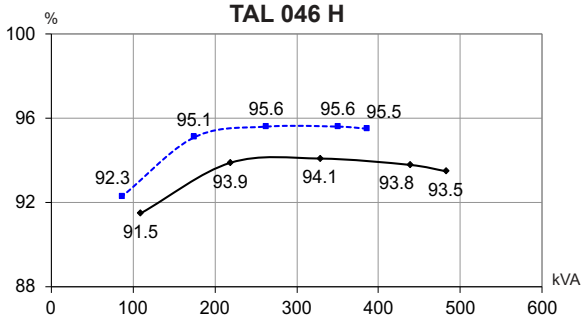












Reactances (%). Time constants (ms) - Class H / 480 V

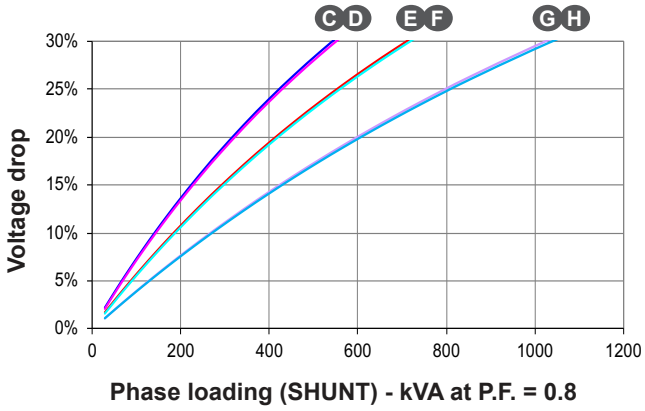
		C	D	E	F	G	H
Kcc	Short-circuit ratio	0.36	0.33	0.47	0.45	0.46	0.43
Xd	Direct-axis synchronous reactance unsaturated	355	386	290	303	281	303
Xq	Quadrature-axis synchronous reactance unsaturated	181	197	148	154	143	154
T'do	No-load transient time constant	1983	1983	2049	2049	2093	2093
X'd	Direct-axis transient reactance saturated	17.9	19.4	14.1	14.8	13.4	14.5
T'd	Short-circuit transient time constant	100	100	100	100	100	100
X"d	Direct-axis subtransient reactance saturated	14.3	15.5	11.3	11.8	10.7	11.6
T"d	Subtransient time constant	10	10	10	10	10	10
X"q	Quadrature-axis subtransient reactance saturated	18.1	19.7	14	14.7	13.1	14.2
Xo	Zero sequence reactance	0.74	0.81	0.59	0.61	0.56	0.6
X2	Negative sequence reactance saturated	16.26	17.67	12.71	13.3	11.96	12.9
Ta	Armature time constant	15	15	15	15	15	15

Other class H / 480 V data

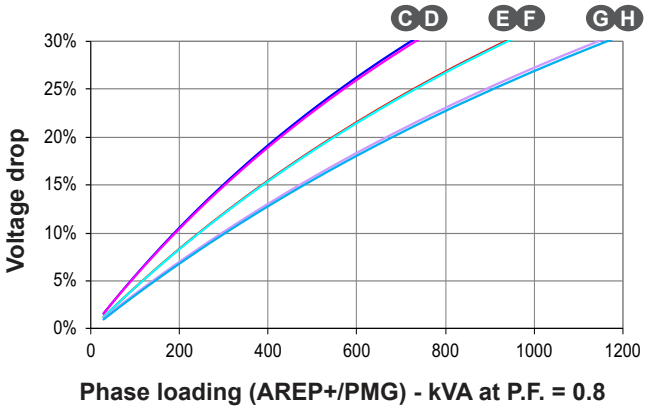
io (A)	No-load excitation current SHUNT/AREP+	1.01	1.01	1.14	1.14	1.06	1.06
ic (A)	On-load excitation current SHUNT/AREP+	3.91	4.21	3.56	3.69	3.35	3.56
uc (V)	On-load excitation voltage SHUNT/AREP+	38.3	41.1	41.5	43	38.9	41.3
ms	Response time (ΔU = 20% transient)	500	500	500	500	500	500
kVA	Start (ΔU = 20% cont. or ΔU = 30% trans.) SHUNT*	446	448	594	593	888	889
kVA	Start (ΔU = 20% cont. or ΔU = 30% trans.) AREP+*	627	629	828	826	1024	1025
%	Transient ΔU (on-load 4/4) SHUNT - P.F.: 0.8 $_{LAG}$	18.5	19.6	17.2	17.7	14.6	15.4
%	Transient ΔU (on-load 4/4) AREP+ - P.F.: 0.8 $_{LAG}$	14.6	15.5	13.7	14.1	13.2	13.9
W	No-load losses	4960	4960	6365	6365	6978	6978
W	Heat dissipation	19692	22264	19530	20731	20941	23137

* P.F. = 0.6

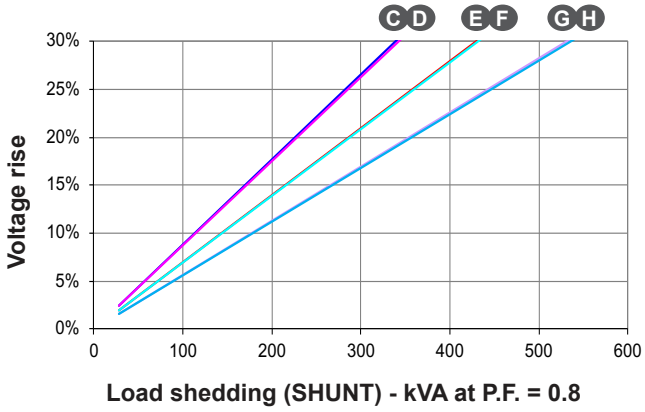
Transient voltage variation 480 V - 60 Hz



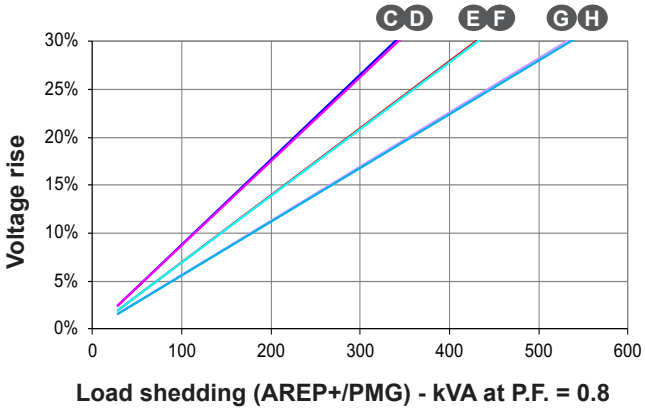
Phase loading (SHUNT) - kVA at P.F. = 0.8



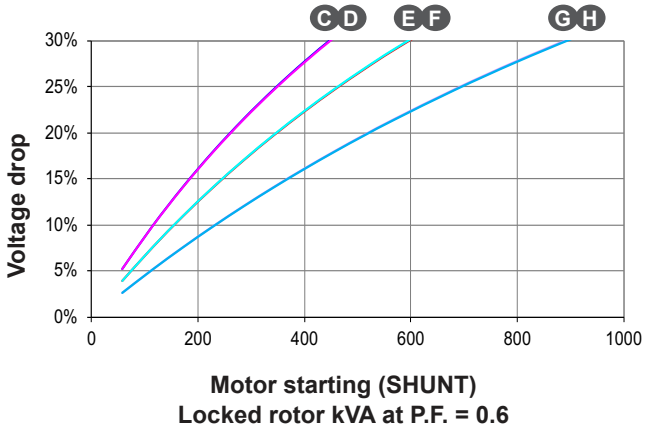
Phase loading (AREP+/PMG) - kVA at P.F. = 0.8



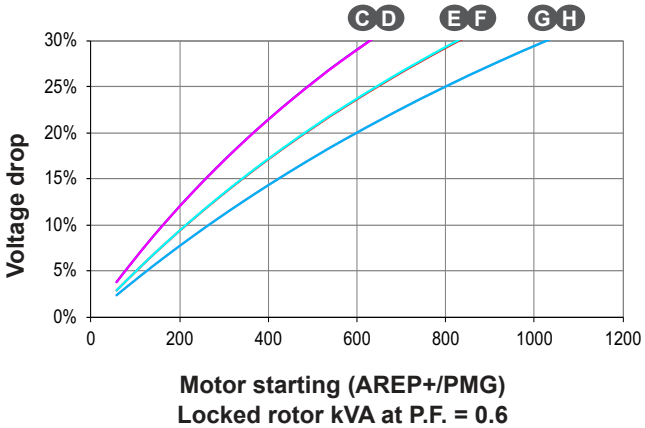
Load shedding (SHUNT) - kVA at P.F. = 0.8



Load shedding (AREP+/PMG) - kVA at P.F. = 0.8



Motor starting (SHUNT)
Locked rotor kVA at P.F. = 0.6



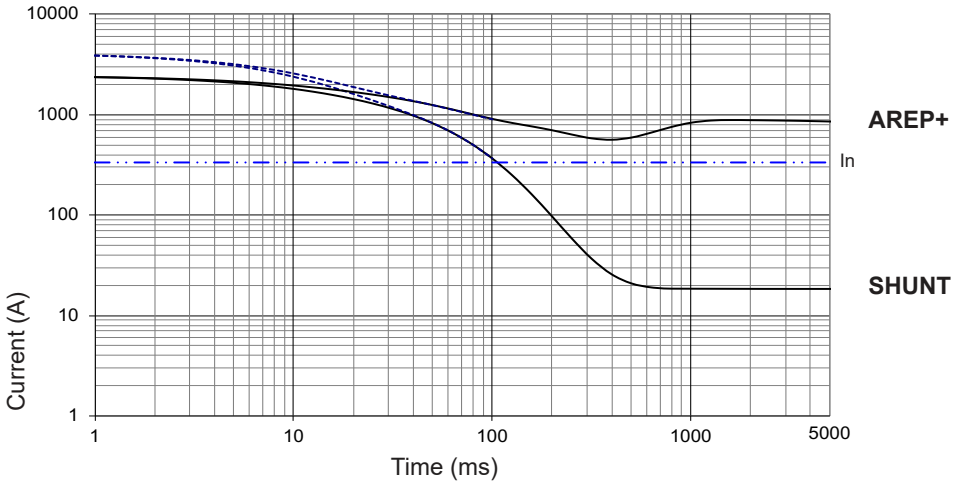
Motor starting (AREP+/PMG)
Locked rotor kVA at P.F. = 0.6

1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by K = Sine P.F. / 0.8
2) For voltages other than 480V (Y), 277V (Δ), 240V (YY) at 60 Hz, then kVA must be multiplied by $(480/U)^2$ or $(277/U)^2$ or $(240/U)^2$.

3-phase short-circuit curves at no load and rated speed (star connection Y)

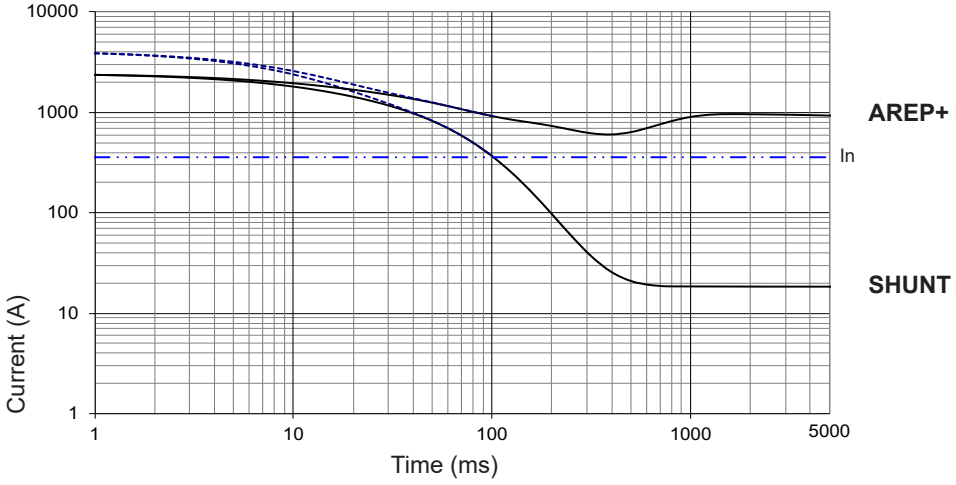
TAL 046 C

Symmetrical ——
Asymmetrical - - -



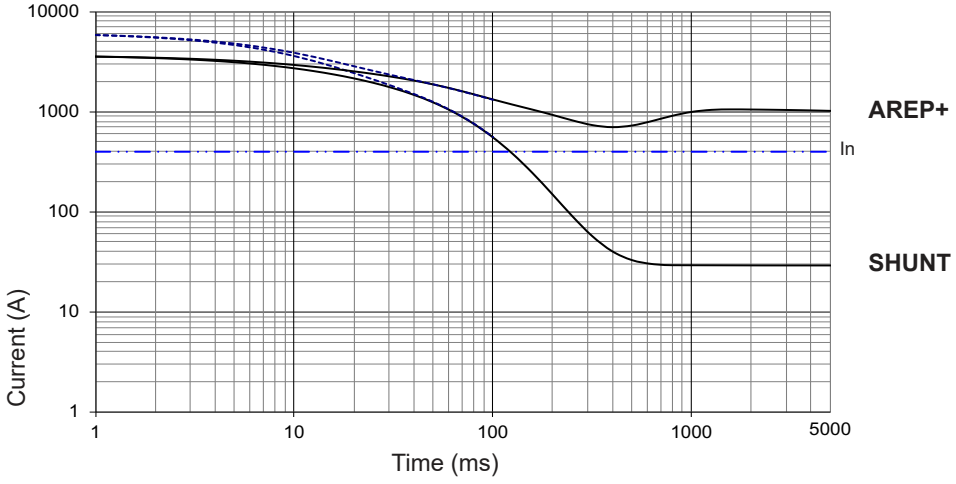
TAL 046 D

Symmetrical ——
Asymmetrical - - -



TAL 046 E

Symmetrical ——
Asymmetrical - - -

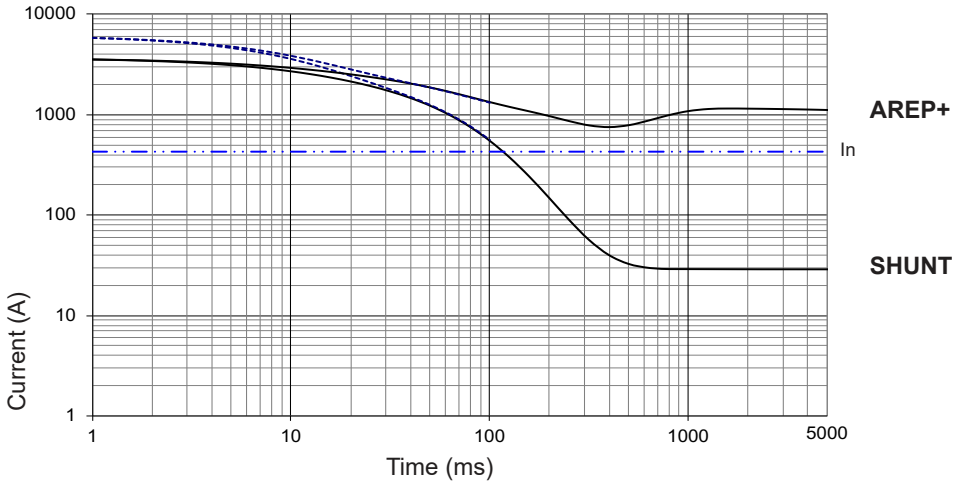


Influence due to connection
For (Δ) connection, use the following multiplication factor:
- Current value x 1.732.

3-phase short-circuit curves at no load and rated speed (star connection Y)

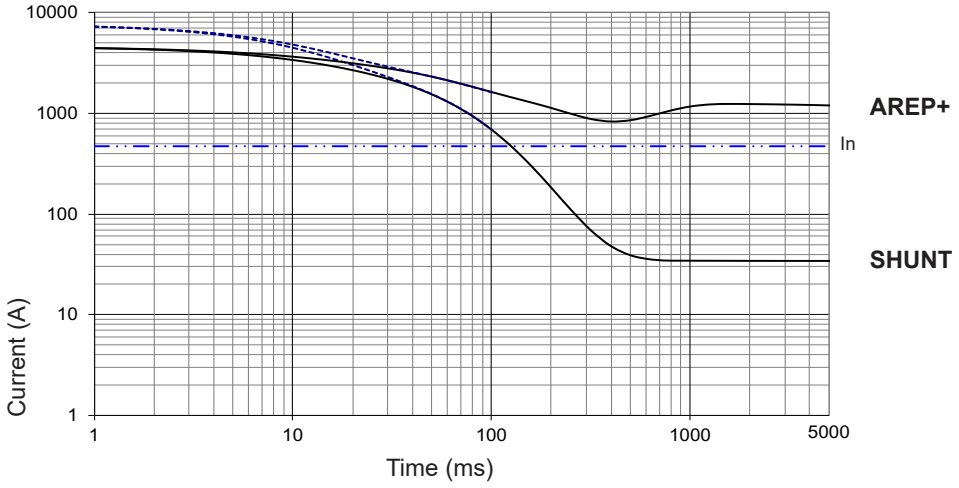
TAL 046 F

Symmetrical ——
Asymmetrical - - -



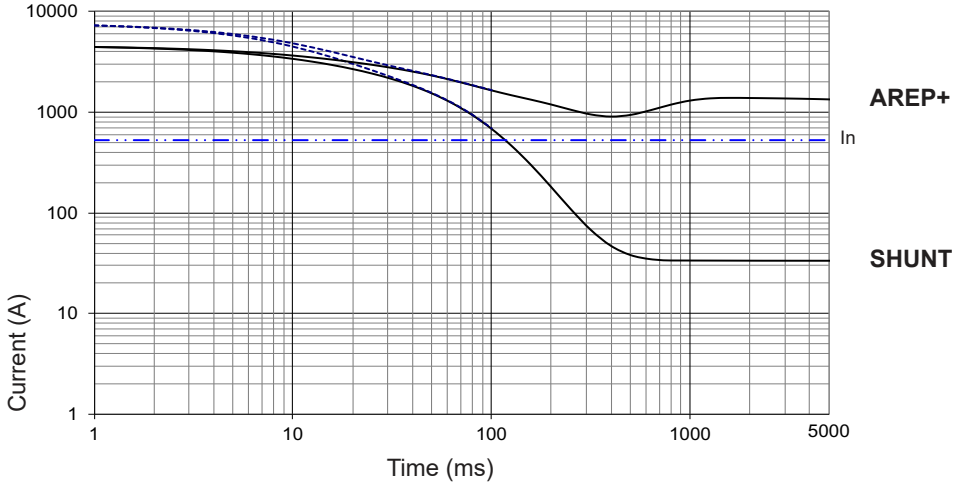
TAL 046 G

Symmetrical ——
Asymmetrical - - -



TAL 046 H

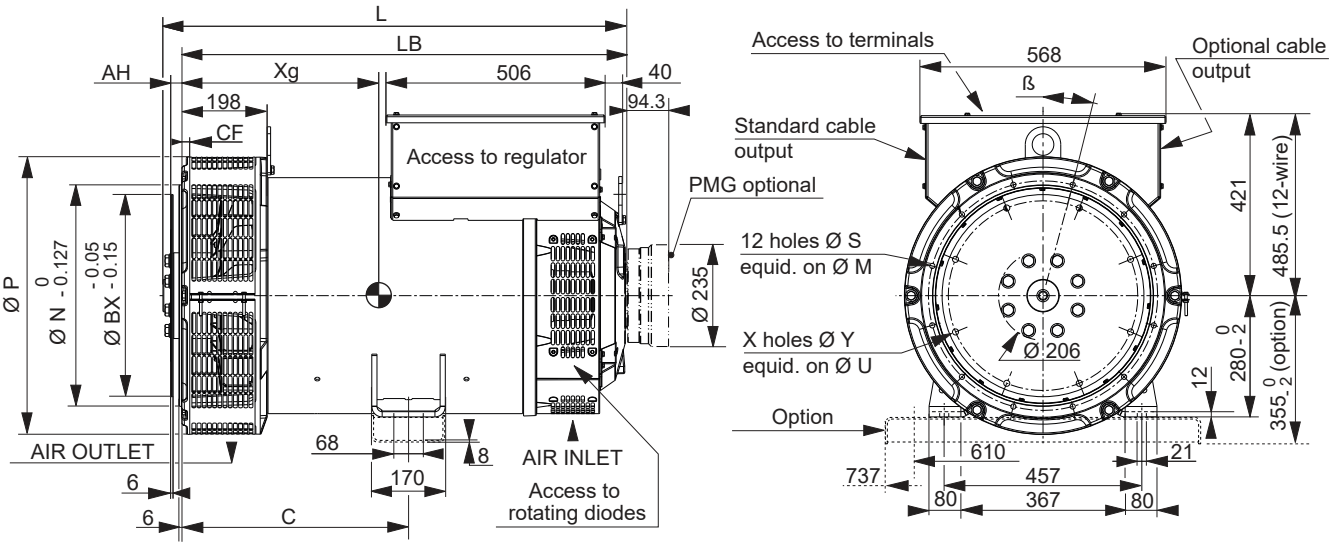
Symmetrical ——
Asymmetrical - - -



Influence due to short-circuit
Curves are based on a three-phase short-circuit.
For other types of short-circuit,
use the following multiplication factors.

	3 - phase	2 - phase L / L	1 - phase L / N
Instantaneous (max.)	1	0.87	1.3
Continuous	1	1.5	2.2
Maximum duration (AREP+/PMG)		1.5	

Single-bearing dimensions



Dimensions (mm) and weight					
Type	L without PMG maxi*	LB	Xg	C	Weight (kg)
TAL 046 C	944	892	423	429	599
TAL 046 D	944	892	423	429	607
TAL 046 E	989	937	445	429	754
TAL 046 F	989	937	445	429	754
TAL 046 G**	1084	1032	493	525	888
TAL 046 H**	1084	1032	493	525	888

* L maxi = LB + AH maxi + 12.4 (only for SAE 11 ½) ** Shaft height = 355 mm optional

Coupling			
Flex plate	**11 ½**	**14**	**18**
Flange S.A.E 3	X		
Flange S.A.E 2	X		
Flange S.A.E 1	X	X	
Flange S.A.E ½		X	
Flange S.A.E 0		X	X

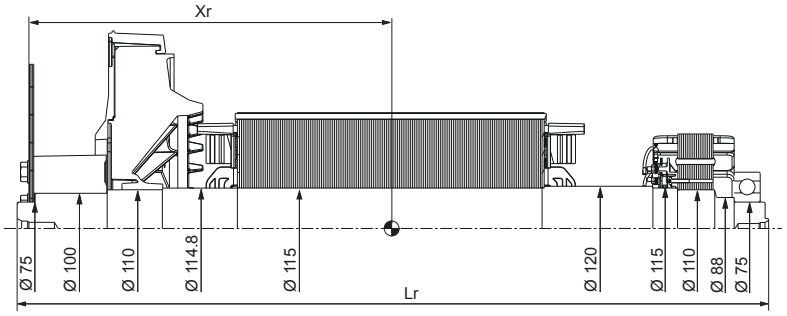
Flange (mm)						
S.A.E.	P	N	M	S	ß°	CF
3	600*/641	409.575	428.625	11	15°	10
2	600*/641	447.675	466.725	11	15°	10
1	600*/641	511.175	530.225	12	15°	10
½	713	584.2	619.125	14	15°	6
0	713	647.7	679.45	14	11° 15'	19

* Specific dimension TAL 046 C

Flex plate (mm)					
S.A.E.	BX	U	X	Y	AH
11 ½	352.42	333.38	8	11	39.6
14	466.72	438.15	8	14	25.4
18*	571.5	542.92	6	17	15.7

* Option

Torsional analysis data



Centre of gravity: Xr (mm), Rotor length: Lr (mm), Weight: M (kg), Moment of inertia: J (kgm²): (4J = MD²)								
Flex plate	S.A.E. 11 ½				S.A.E. 14			
Type	Xr	Lr	M	J	Xr	Lr	M	J
TAL 046 C	420	923	255	2.64	408	923	256	2.8
TAL 046 D	420	923	255	2.64	408	923	256	2.8
TAL 046 E	460	968	304	3.28	448	968	305	3.44
TAL 046 F	460	968	304	3.28	448	968	305	3.44
TAL 046 G	508	1063	358	3.97	497	1063	359	4.13
TAL 046 H	508	1063	358	3.97	497	1063	359	4.13

NOTE : Dimensions are for information only and may be subject to modifications. The torsional analysis of the transmission is imperative. All values are available upon request.

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