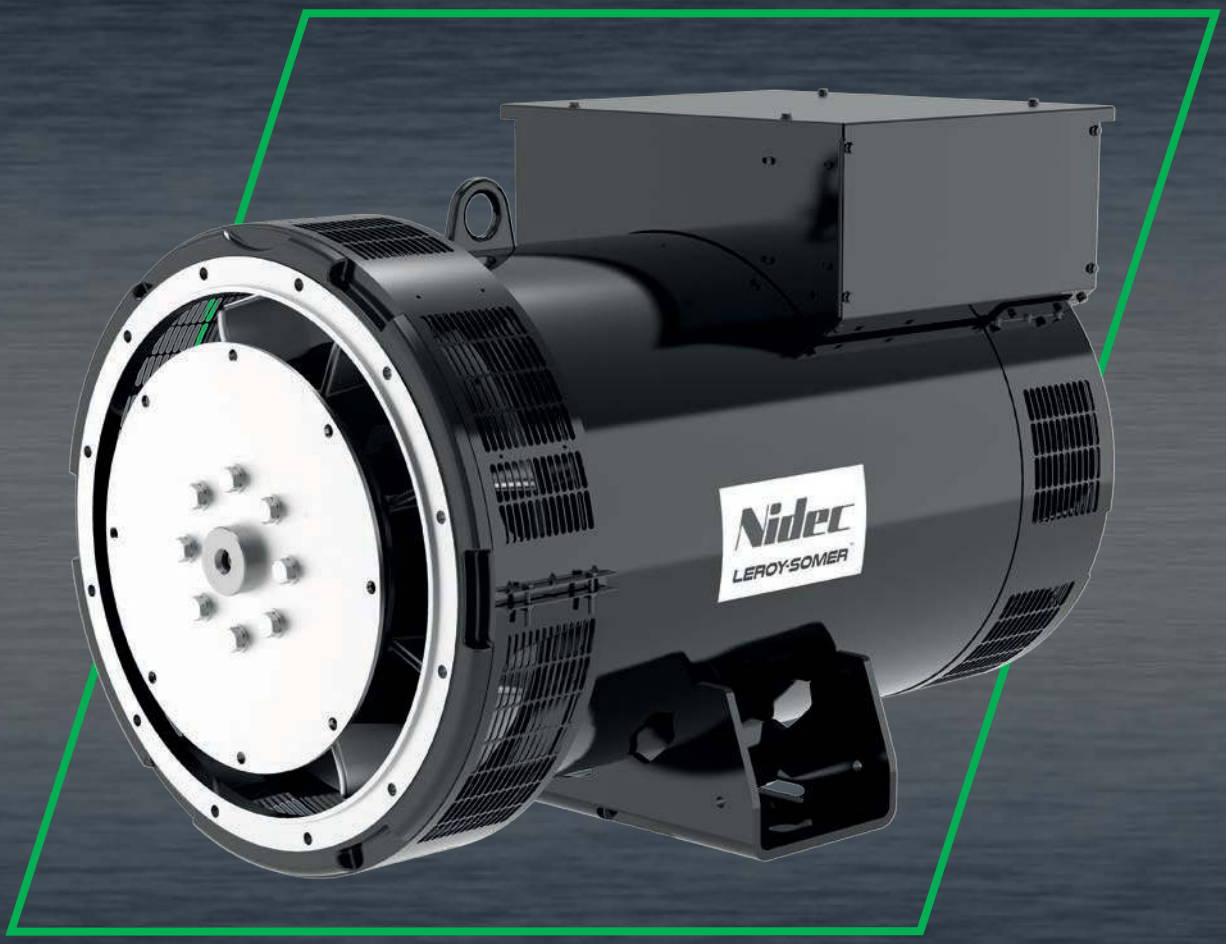
Nidec Power



TAL 0473

Low Voltage Alternator - 4 poles

410 to 660 kVA - 50 Hz / 510 to 825 kVA - 60 Hz

Electrical and mechanical data

LEROY-SOMER™

The best of performance

The Leroy-Somer™ TAL 0473 alternator has been designed to offer you the best power generation performances. With its meticulous design and optimized architecture, the TAL 0473 strikes the perfect balance between compactness, reliability, performance and longevity.
Whatever your application, the Leroy-Somer™ TAL 0473 alternator will meet your needs and will adapt to all situations.







Standards

The Leroy-Somer™ TAL 0473 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 0473 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

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 version 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 / 416V - 60 Hz
  - Reinforced winding protection for harsh environments and relative humidity greater than 95% (system 2 - 4): for TAL 0473 A, D & F apply a derating coefficient of 0.95

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
- Standard direction of rotation: clockwise when looking at the drive end view (for anti-clockwise, derate the machine by 5%)

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	0.9 m³/s
Air flow 60 Hz	1.1 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.				3 ph.				3 ph.				3 ph.			
Y		380V	400V	415V	440V	380V	400V	415V	440V	380V	400V	415V	440V	380V	400V	415V	440V
Δ		220V	230V	240V		220V	230V	240V		220V	230V	240V		220V	230V	240V	
YY (*)			200V		220V		200V		220V		200V		220V		200V		220V
TAL 0473 A	kVA	390	410	410	400	355	375	375	364	413	435	435	424	429	450	450	440
	kW	*312*	***328***	*328*	*320*	*284*	***300***	*300*	*291*	*330*	***348***	*348*	*339*	*343*	***360***	*360*	*352*
TAL 0473 B	kVA	455	455	455	445	415	415	415	405	480	480	480	472	500	500	500	490
	kW	*364*	***364***	*364*	*356*	*332*	***332***	*332*	*324*	*384*	***384***	*384*	*378*	*400*	***400***	*400*	*392*
TAL 0473 C	kVA	500	500	500	455	455	455	455	414	530	530	530	482	550	550	550	500
	kW	*400*	***400***	*400*	*364*	*364*	***364***	*364*	*331*	*424*	***424***	*424*	*386*	*440*	***440***	*440*	*400*
TAL 0473 D	kVA	525	550	550	540	478	500	500	491	557	585	585	572	578	600	600	594
	kW	*420*	***440***	*440*	*432*	*382*	***400***	*400*	*393*	*446*	***468***	*468*	*458*	*462*	***480***	*480*	*475*
TAL 0473 E	kVA	600	600	600	500	545	545	545	455	635	635	635	530	660	660	660	550
	kW	*480*	***480***	*480*	*400*	*436*	***436***	*436*	*364*	*508*	***508***	*508*	*424*	*528*	***528***	*528*	*440*
TAL 0473 F	kVA	645	660	660	630	587	600	600	573	684	700	700	668	710	730	730	693
	kW	*516*	***528***	*528*	*504*	*470*	***480***	*480*	*458*	*547*	***560***	*560*	*534*	*568*	***584***	*584*	*554*

(*) 12-wire option

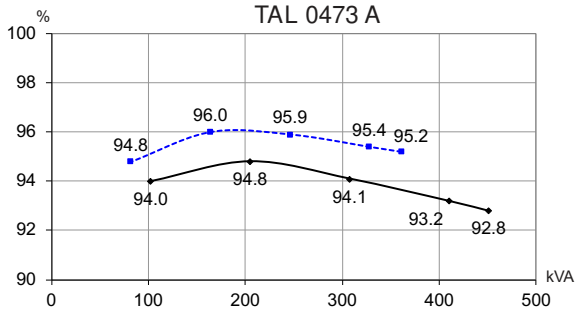
Ratings 60 Hz - 1800 R.P.M.

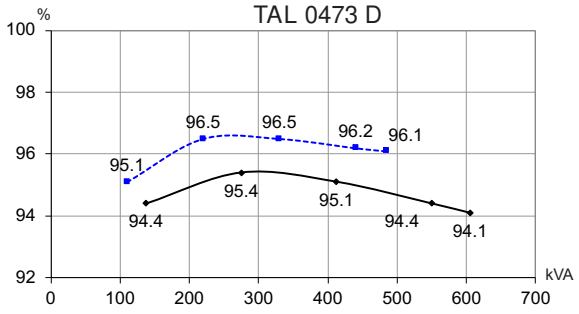
kVA / kW - P.F. = 0.8

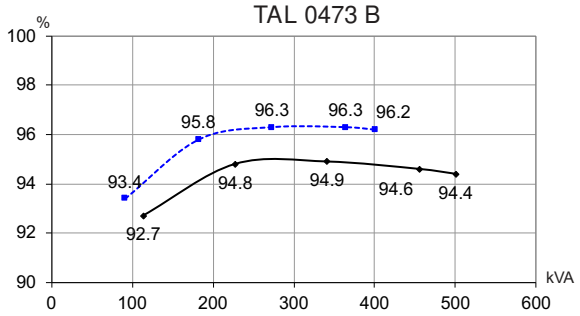
Duty / T° C		Continuous / 40 °C				Continuous / 40 °C				Stand-by / 40 °C				Stand-by / 27 °C			
Class / T° K		H / 125° K				F / 105° K				H / 150° K				H / 163° K			
Phase		3 ph.				3 ph.				3 ph.				3 ph.			
Y		380V	416V	440V	480V	380V	416V	440V	480V	380V	416V	440V	480V	380V	416V	440V	480V
Δ		220V	240V			220V	240V			220V	240V			220V	240V		
YY (*)			208V	220V	240V		208V	220V	240V		208V	220V	240V		208V	220V	240V
TAL 0473 A	kVA	450	480	500	510	410	435	455	465	475	510	530	540	495	530	550	560
	kW	*360*	*384*	*400*	***408***	*328*	*348*	*364*	***372***	*380*	*408*	*424*	***432***	*396*	*424*	*440*	***448***
TAL 0473 B	kVA	475	510	530	570	430	465	480	520	505	540	560	605	525	560	585	625
	kW	*380*	*408*	*424*	***456***	*344*	*372*	*384*	***416***	*404*	*432*	*448*	***484***	*420*	*448*	*468*	***500***
TAL 0473 C	kVA	520	555	590	625	475	505	535	570	550	590	625	665	570	610	650	690
	kW	*416*	*444*	*472*	***500***	*380*	*404*	*428*	***456***	*440*	*472*	*500*	***532***	*456*	*488*	*520*	***552***
TAL 0473 D	kVA	560	610	630	690	510	555	575	630	595	645	670	730	615	670	695	750
	kW	*448*	*488*	*504*	***552***	*408*	*444*	*460*	***504***	*476*	*516*	*536*	***584***	*492*	*536*	*556*	***600***
TAL 0473 E	kVA	600	660	685	750	545	600	625	685	635	700	725	795	660	725	755	825
	kW	*480*	*528*	*548*	***600***	*436*	*480*	*500*	***548***	*508*	*560*	*580*	***636***	*528*	*580*	*604*	***660***
TAL 0473 F	kVA	650	715	755	825	590	650	685	750	690	760	800	875	720	785	830	910
	kW	*520*	*572*	*604*	***660***	*472*	*520*	*548*	***600***	*552*	*608*	*640*	***700***	*576*	*628*	*664*	***728***

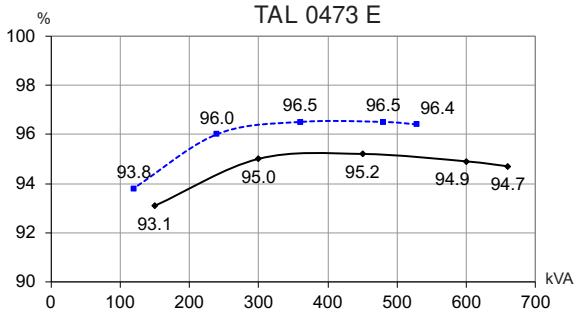
(*) 12-wire option

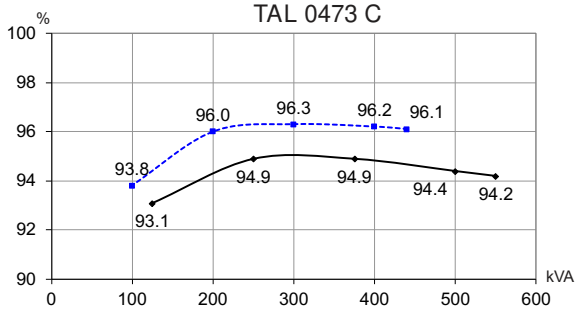
Efficiencies 400 V - 50 Hz (— P.F.: 0.8) (--- P.F.: 1)

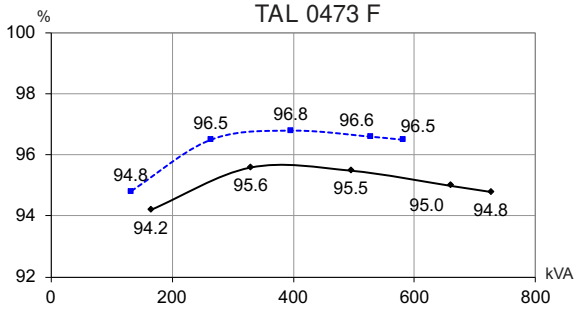










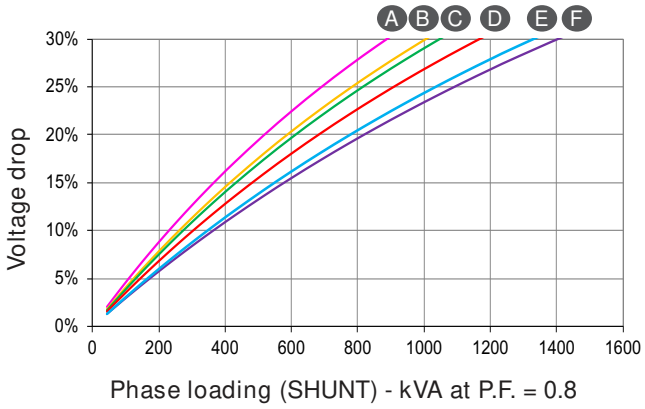


Reactances (%). Time constants (ms) - Class H / 400 V

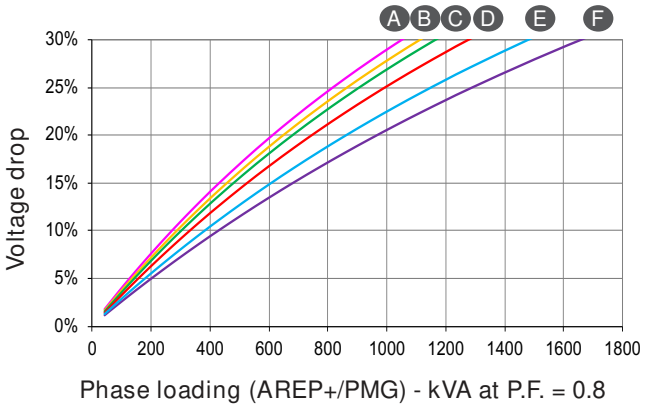
		A	B	C	D	E	F
Kcc	Short-circuit ratio	0.25	0.52	0.47	0.32	0.55	0.41
Xd	Direct-axis synchronous reactance unsaturated	483	302	332	403	294	343
Xq	Quadrature-axis synchronous reactance unsaturated	246	154	169	205	150	175
T'do	No-load transient time constant	1968	1982	1982	1987	1994	1996
X'd	Direct-axis transient reactance saturated	24.5	15.2	16.7	20.3	14.7	17.2
T'd	Short-circuit transient time constant	100	100	100	100	100	100
X"d	Direct-axis subtransient reactance saturated	17.2	10.6	11.7	14.2	10.3	12
T"d	Subtransient time constant	10	10	10	10	10	10
X"q	Quadrature-axis subtransient reactance saturated	19.2	13.6	14.9	18.9	14.7	17.4
Xo	Zero sequence reactance	1.02	0.63	0.69	0.84	0.61	0.71
X2	Negative sequence reactance saturated	18.23	12.15	13.35	16.6	12.52	14.74
Ta	Armature time constant	15	15	15	15	15	15
Other class H / 400 V data							
io (A)	No-load excitation current SHUNT/AREP+	0.68	1.07	1.07	0.8	1.13	0.93
ic (A)	On-load excitation current SHUNT/AREP+	3.63	3.35	3.62	3.5	3.47	3.44
uc (V)	On-load excitation voltage SHUNT/AREP+	37.9	34.9	37.7	36.4	36	35.6
ms	Response time (ΔU = 20% transient)	500	500	500	500	500	500
kVA	Start (ΔU = 20% cont. or ΔU = 30% trans.) SHUNT/AREP+*	697/836	1026/1309	1029/1314	1125/1352	1284/1682	1398/1679
%	Transient ΔU (on-load 4/4) SHUNT/AREP+ - P.F.: 0.8 $_{LAG}$	16.5/14.4	16.3/14.9	17.1/15.6	14.4 /12.5	18/16.8	17.6/16.1
W	No-load losses	3935	6288	6288	5194	7696	6770
W	Heat dissipation	23728	20427	23283	25761	25676	27502

* P.F. = 0.6

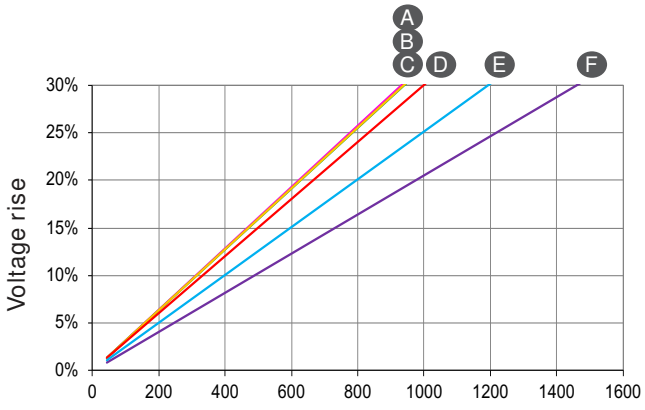
Transient voltage variation 400 V - 50 Hz



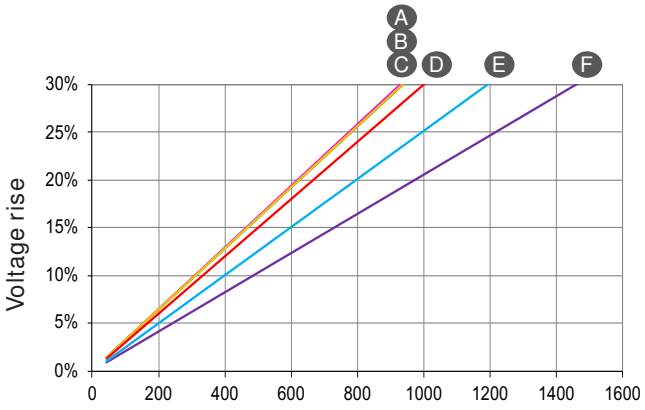
Phase loading (SHUNT) - kVA at P.F. = 0.8



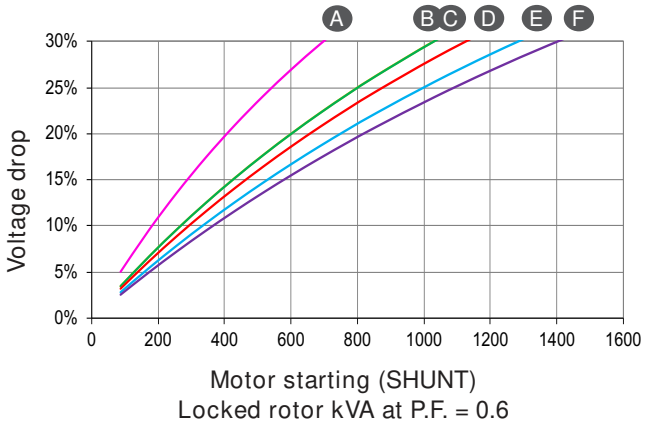
Phase loading (AREP+/PMG) - kVA at P.F. = 0.8



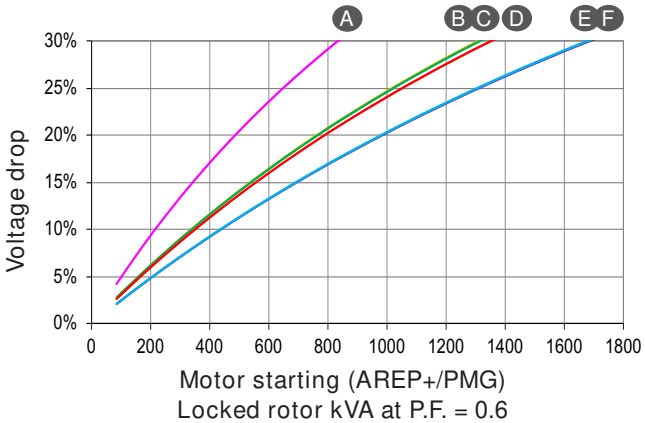
Load shedding (SHUNT) - kVA at P.F. = 0.8



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



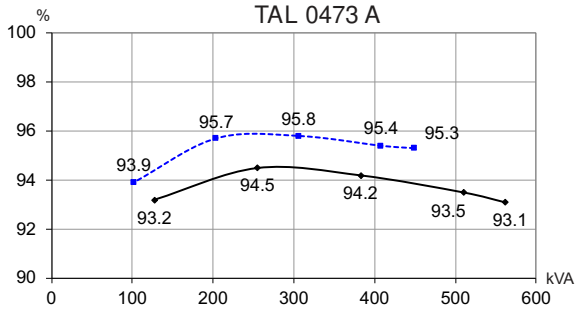
Motor starting (SHUNT)
Locked rotor kVA at P.F. = 0.6

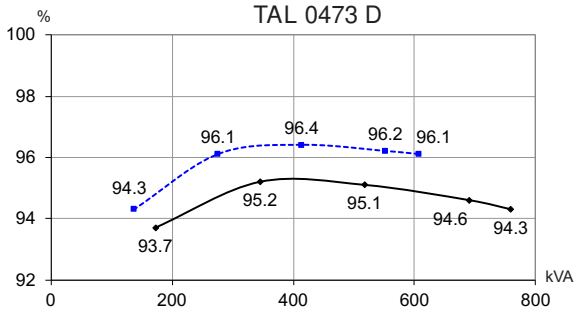


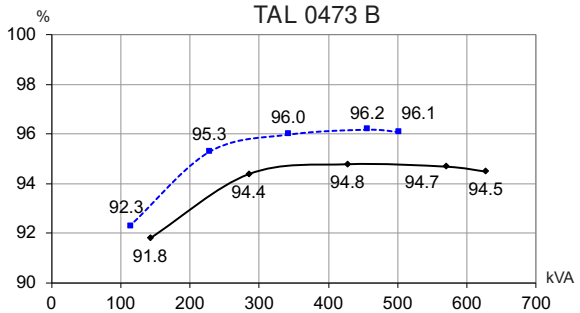
Motor starting (AREP+/PMG)
Locked rotor kVA at P.F. = 0.6

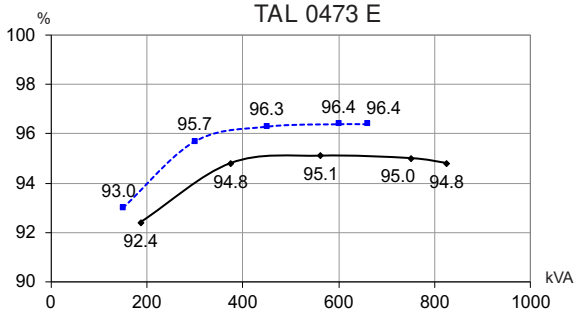
1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by K = Sine P.F. / 0.8
2) For voltages other than 400V (Y), 230V (Δ) at 50 Hz, then kVA must be multiplied by $(400/U)^2$ or $(230/U)^2$.

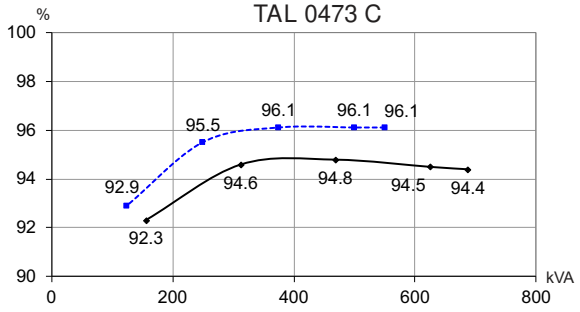
Efficiencies 480 V - 60 Hz (— P.F.: 0.8) (--- P.F.: 1)

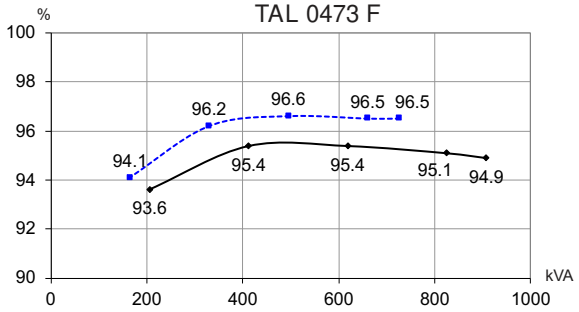










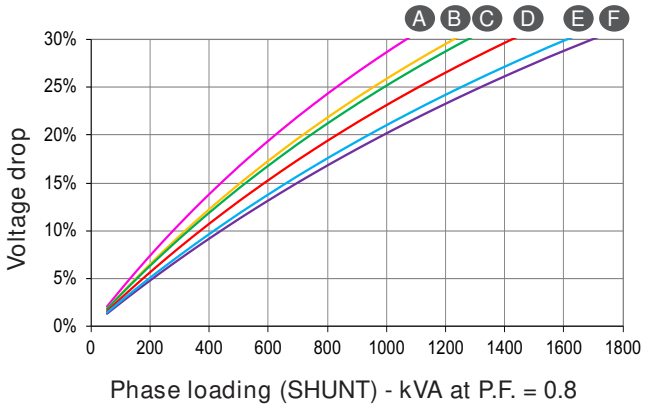


Reactances (%). Time constants (ms) - Class H / 480 V

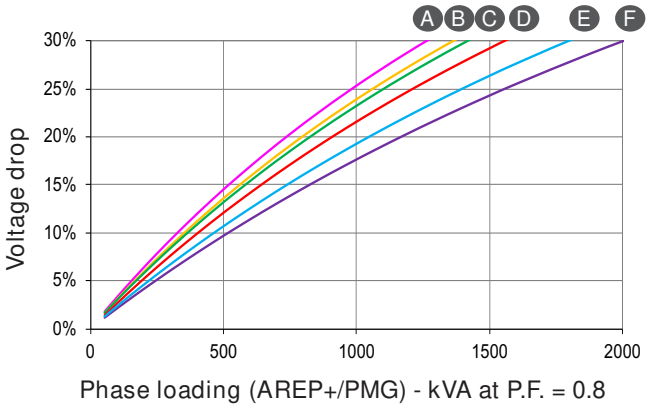
		A	B	C	D	E	F
Kcc	Short-circuit ratio	0.24	0.5	0.45	0.31	0.52	0.39
Xd	Direct-axis synchronous reactance unsaturated	501	315	345	422	309	361
Xq	Quadrature-axis synchronous reactance unsaturated	255	160	176	215	157	184
T'do	No-load transient time constant	1968	1982	1982	1987	1994	1996
X'd	Direct-axis transient reactance saturated	25.4	15.9	17.4	21.2	15.5	18
T'd	Short-circuit transient time constant	100	100	100	100	100	100
X"d	Direct-axis subtransient reactance saturated	17.8	11.1	12.2	14.8	10.8	12.6
T"d	Subtransient time constant	10	10	10	10	10	10
X"q	Quadrature-axis subtransient reactance saturated	19.9	14.2	15.6	19.8	15.4	18.3
Xo	Zero sequence reactance	1.06	0.66	0.72	0.88	0.64	0.75
X2	Negative sequence reactance saturated	18.89	12.68	13.91	17.35	13.15	15.48
Ta	Armature time constant	15	15	15	15	15	15
Other class H / 480 V data							
io (A)	No-load excitation current SHUNT/AREP+	0.68	1.07	1.07	0.8	1.11	0.92
ic (A)	On-load excitation current SHUNT/AREP+	3.7	3.41	3.68	3.58	3.5	3.49
uc (V)	On-load excitation voltage SHUNT/AREP+	38.8	35.7	38.5	37.4	36.5	36.3
ms	Response time (ΔU = 20% transient)	500	500	500	500	500	500
kVA	Start (ΔU = 20% cont. or ΔU = 30% trans.) SHUNT/AREP+*	834/1000	1270/1579	1267/1572	1348/1619	1598/1995	1660/1992
%	Transient ΔU (on-load 4/4) SHUNT/AREP+ - P.F.: 0.8 $_{LAG}$	17/14.8	16.6/15.2	17.4/15.9	14.9/12.9	18.5/17.2	18.1/16.5
%	No-load losses	6155	9429	9429	7916	11204	10008
W	Heat dissipation	28350	25384	28574	31485	31564	33709

* P.F. = 0.6

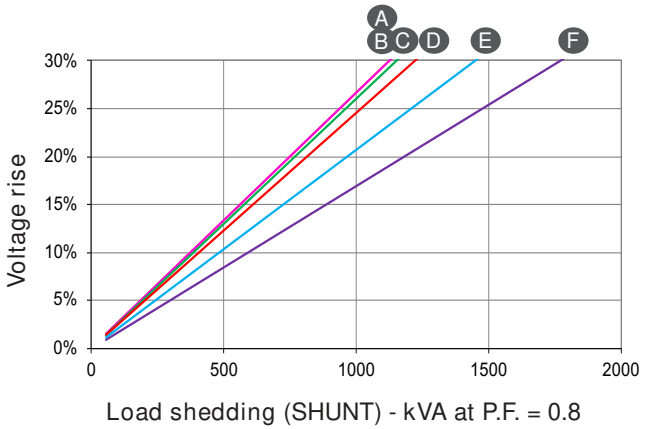
Transient voltage variation 480 V - 60 Hz



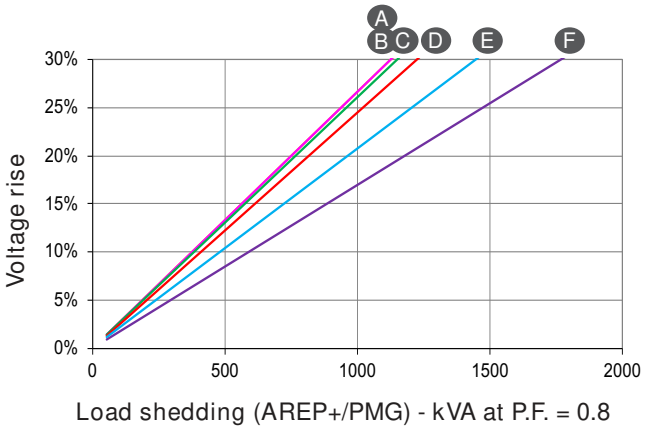
Phase loading (SHUNT) - kVA at P.F. = 0.8



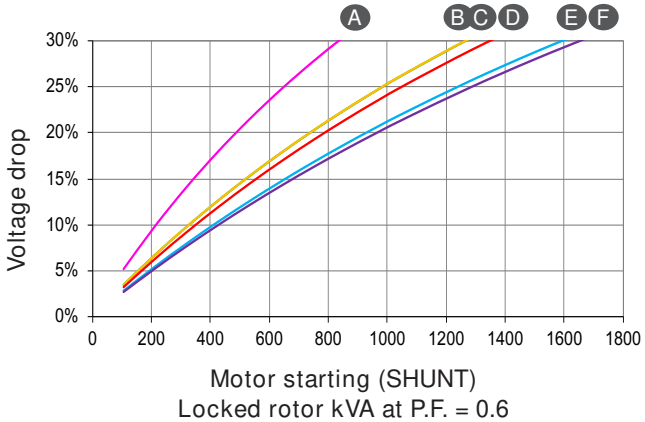
Phase loading (AREP+/PMG) - kVA at P.F. = 0.8



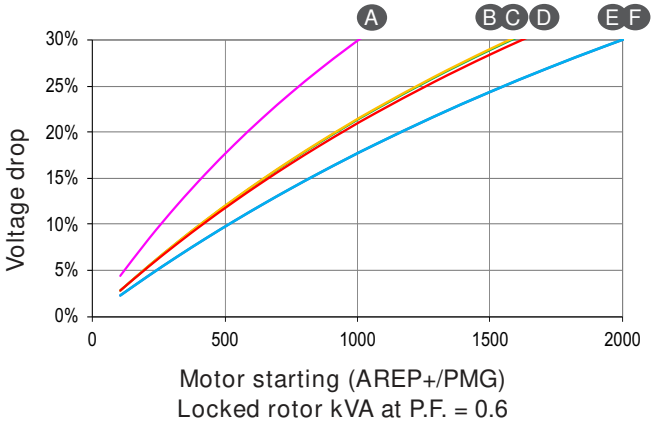
Load shedding (SHUNT) - kVA at P.F. = 0.8



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



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



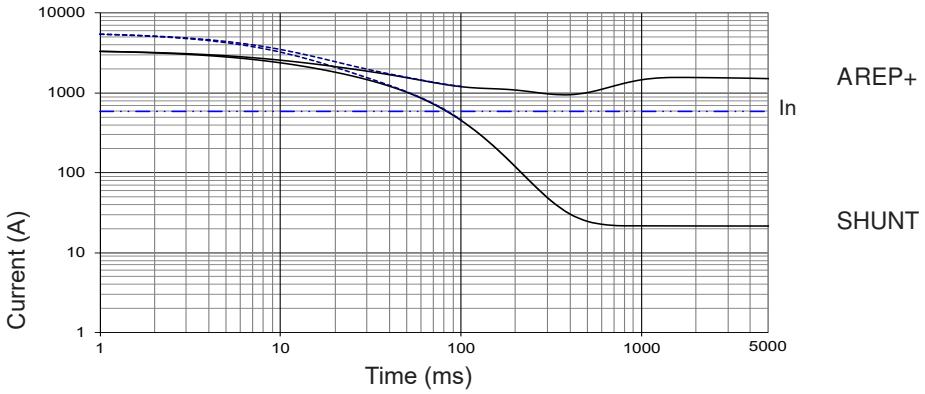
Motor starting (AREP+/PMG)
Locked rotor kVA at P.F. = 0.6

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)

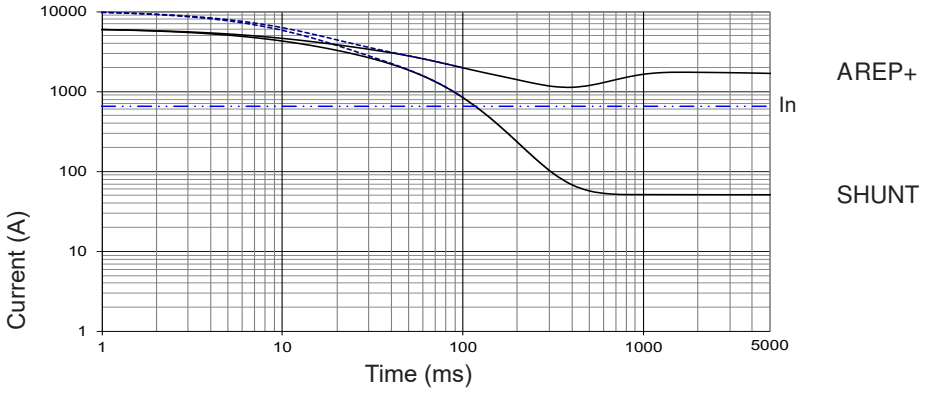
TAL 0473 A

Symmetrical ——
Asymmetrical - - -



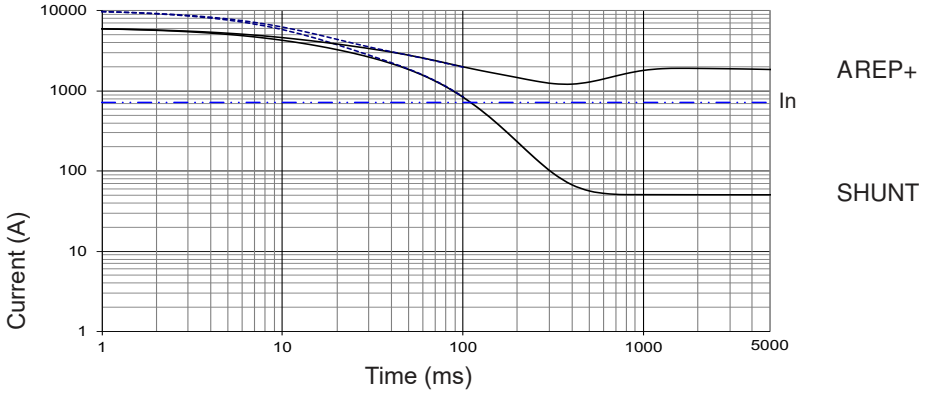
TAL 0473 B

Symmetrical ——
Asymmetrical - - -



TAL 0473 C

Symmetrical ——
Asymmetrical - - -

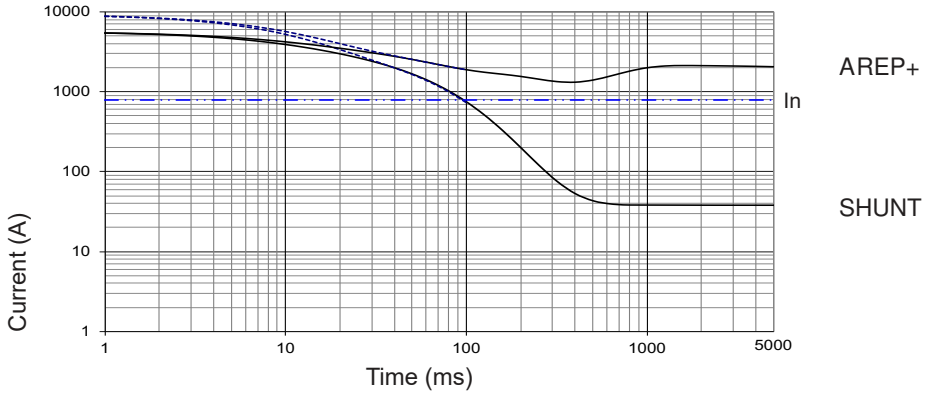


Influence due to connection
For (Δ) connection, use the following multiplication factor:
- Current value x 1.732.

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

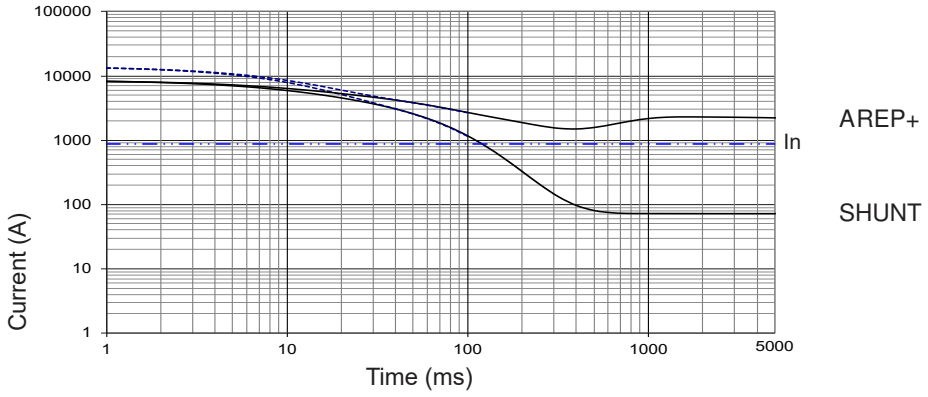
TAL 0473 D

Symmetrical ——
Asymmetrical - - -



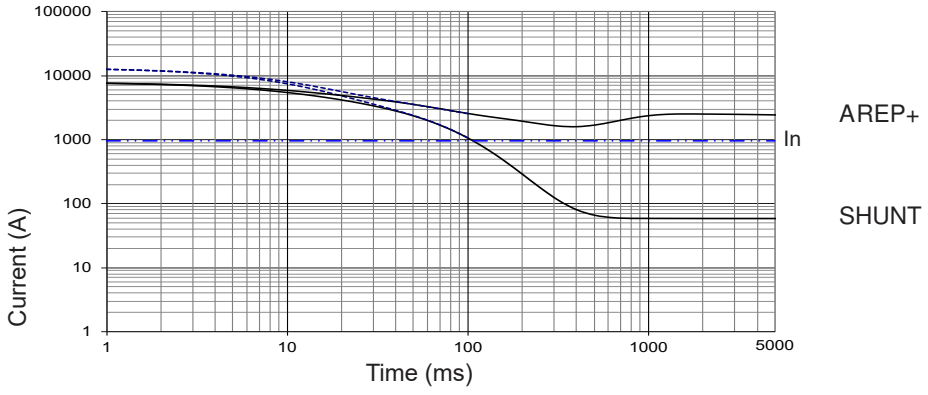
TAL 0473 E

Symmetrical ——
Asymmetrical - - -



TAL 0473 F

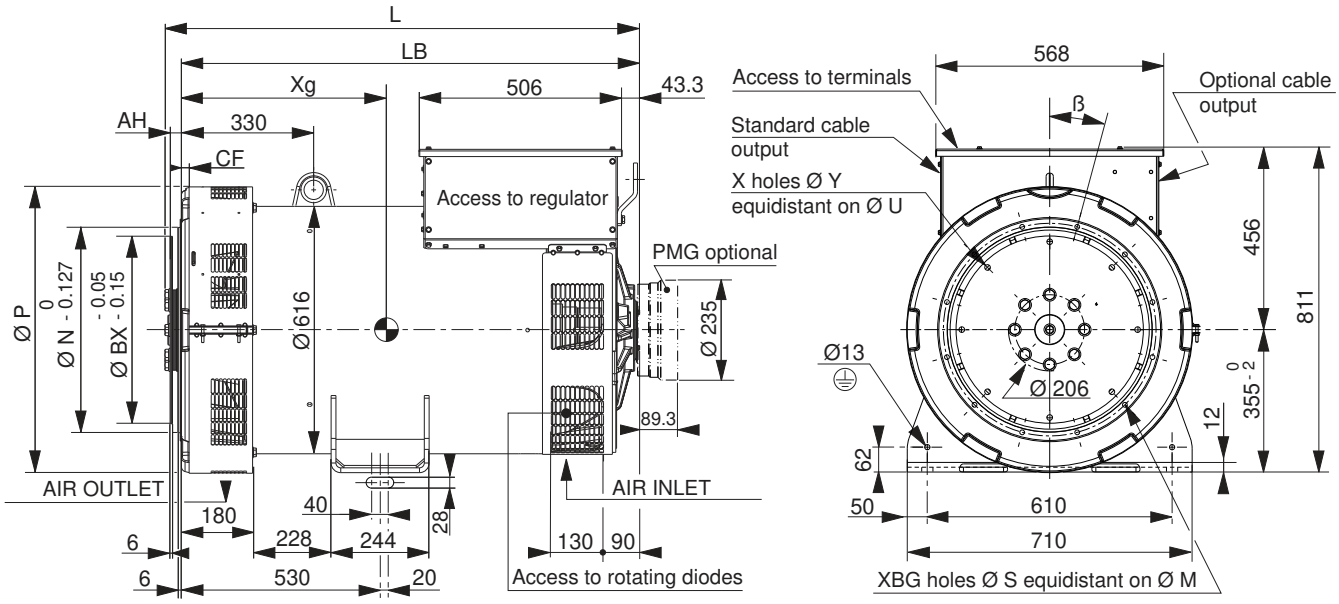
Symmetrical ——
Asymmetrical - - -



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	Weight (kg)
TAL 0473 A	1048	996	451	1013
TAL 0473 B-C	1108	1056	485	1142
TAL 0473 D	1208	1156	515	1230
TAL 0473 E	1228	1176	543	1366
TAL 0473 F	1228	1176	552	1414

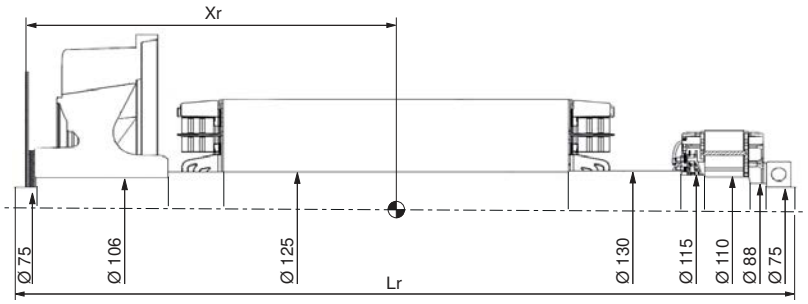
* L maxi = LB + AH maxi + 13

Coupling			
Flex plate	11 ½	14	18
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	XBG	S	β°	CF
1	713	511.175	530.225	12	12	15°	15
½	713	584.2	619.125	12	14	15°	22
0	713	647.7	679.45	16	14	11° 15'	42

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

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				S.A.E. 18			
Type	Xr	Lr	M	J	Xr	Lr	M	J	Xr	Lr	M	J
TAL 0473 A	436	1036	413	6.7	421	1023	414	6.77	411	1015	414	7.03
TAL 0473 B-C	473	1096	456	7.3	457	1083	456	7.41	447	1075	457	7.67
TAL 0473 D	502	1196	491	7.8	487	1183	492	7.88	477	1175	492	8.14
TAL 0473 E	533	1216	545	8.7	518	1203	546	8.83	508	1195	546	9.09
TAL 0473 F	544	1216	563	9.1	529	1203	564	9.18	519	1195	564	9.44

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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TAL A47
455 - 825 kVA

DATA SHEET



Leroy-Somer is a leading global supplier of alternators for emergency power. Our new TAL low voltage alternators, with optimal performance for commercial and industrial applications, are a simple, efficient solution for your onsite power requirements.

Leroy-Somer's TAL alternators are specially designed to meet the power needs of telecom towers and commercial and industrial buildings. TAL is compatible with most engine brands.

Common Data

Insulation class	H	**Excitation system**	SHUNT	AREP / PMG
Winding pitch	2/3 (Winding 6S)	**AVR type**	R 150	R 180
Number of wires	6	**Voltage regulation (*)**		± 1 %
Protection	IP 23	**Total Harmonic distortion THD (**) in no-load ....:**	< 3.5 % according to C.E.I.	
Altitude	≤ 1000 m	**Total Harmonic distortion THD (**) in linear load:**	< 5 % according to C.E.I.	
Overspeed	2250 R.P.M.	**Waveform: NEMA = TIF (**)**		< 50
Air flow (m³/s)	**50Hz :** 0.9	**Waveform: I.E.C. = THF (**)**		< 2%
	60Hz : 1.1	(*) Steady state. (**) Total harmonic distortion between phases, no-load or on-load (non-distorting)		

Ratings (50 Hz – 1500 r.pm and 60 Hz – 1800 r.p.m.)

kVA / kW - P.F. = 0.8

TAL A47	50 Hz - 1500 R.P.M.						60 Hz - 1800 R.P.M.							
Duty/T°C	Continuous / 40°C			Stand-by / 27°C			Continuous / 40°C				Stand-by / 27°C			
Class/T°K	H / 125°K			H / 163°K			H / 125°K				H / 163°K			
	Rating kVA			**Rating kVA**			**Rating kVA**				**Rating kVA**			
Phase	**3 ph.**			**3 ph.**			**3 ph.**				**3 ph.**			
Y	380V	400V	415V	380V	400V	415V	380V	416V	440V	480V	380V	416V	440V	480V
Δ	220V	230V	240V	220V	230V	240V	220V	240V	254V	277V	220V	240V	254V	277V
TAL-A47-B	420	**455**	455	460	**500**	500	475	510	530	**570**	525	560	585	**625**
TAL-A47-C	465	**500**	500	510	**550**	550	520	555	590	**625**	570	610	650	**690**
TAL-A47-D	510	**550**	550	560	**600**	600	560	610	630	**690**	615	670	695	**750**
TAL-A47-E	555	**600**	600	610	**660**	660	600	660	685	**750**	660	725	755	**825**
TAL-A47-F	610	**660**	660	670	**730**	730	650	715	755	**825**	720	785	830	**910**

Leroy-Somer™

TAL A47
455 - 825 kVA

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Efficiencies (%)

Class H / 40 ° C

Three Phase: 400 V - 50 Hz

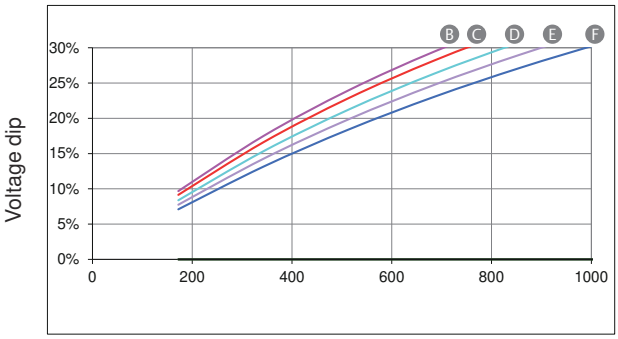
	P.F. = 0.8					P.F. = 1				
	1/4	2/4	3/4	4/4	St.By	1/4	2/4	3/4	4/4	St.By
TAL-A47-B	94.1	94.7	94.0	93.0	92.5	95.0	96.1	95.9	95.4	95.2
TAL-A47-C	94.3	95.2	94.7	93.9	93.5	95.2	96.4	96.4	96.0	95.8
TAL-A47-D	94.2	95.4	95.1	94.5	94.2	95.0	96.5	96.6	96.4	96.2
TAL-A47-E	94.8	95.7	95.3	94.6	94.3	95.6	96.8	96.8	96.4	96.3
TAL-A47-F	94.8	95.8	95.5	94.9	94.7	95.5	96.8	96.9	96.7	96.5

Three Phase: 480 V - 60 Hz

	P.F. = 0.8					P.F. = 1				
	1/4	2/4	3/4	4/4	St.By	1/4	2/4	3/4	4/4	St.By
TAL-A47-B	93.4	94.5	94.1	93.3	92.9	94.2	95.8	95.9	95.5	95.3
TAL-A47-C	93.7	95.0	94.7	94.1	93.8	94.4	96.1	96.2	96.0	95.8
TAL-A47-D	93.5	95.2	95.1	94.7	94.4	94.2	96.2	96.5	96.3	96.2
TAL-A47-E	94.2	95.5	95.3	94.8	94.5	94.8	96.5	96.6	96.4	96.3
TAL-A47-F	94.2	95.6	95.5	95.1	94.9	94.8	96.5	96.8	96.6	96.5

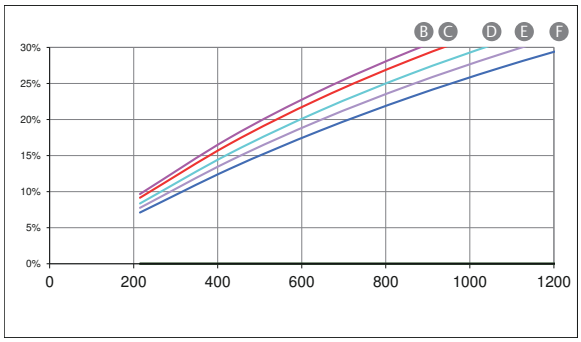
Transient Voltage Variation – Motor Starting

400V - 50 Hz



KVA at P.F=0.6

480V - 60 Hz



KVA at P.F=0.6

Locked Rotor – kVA at Ø 0.6 Power Factor

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