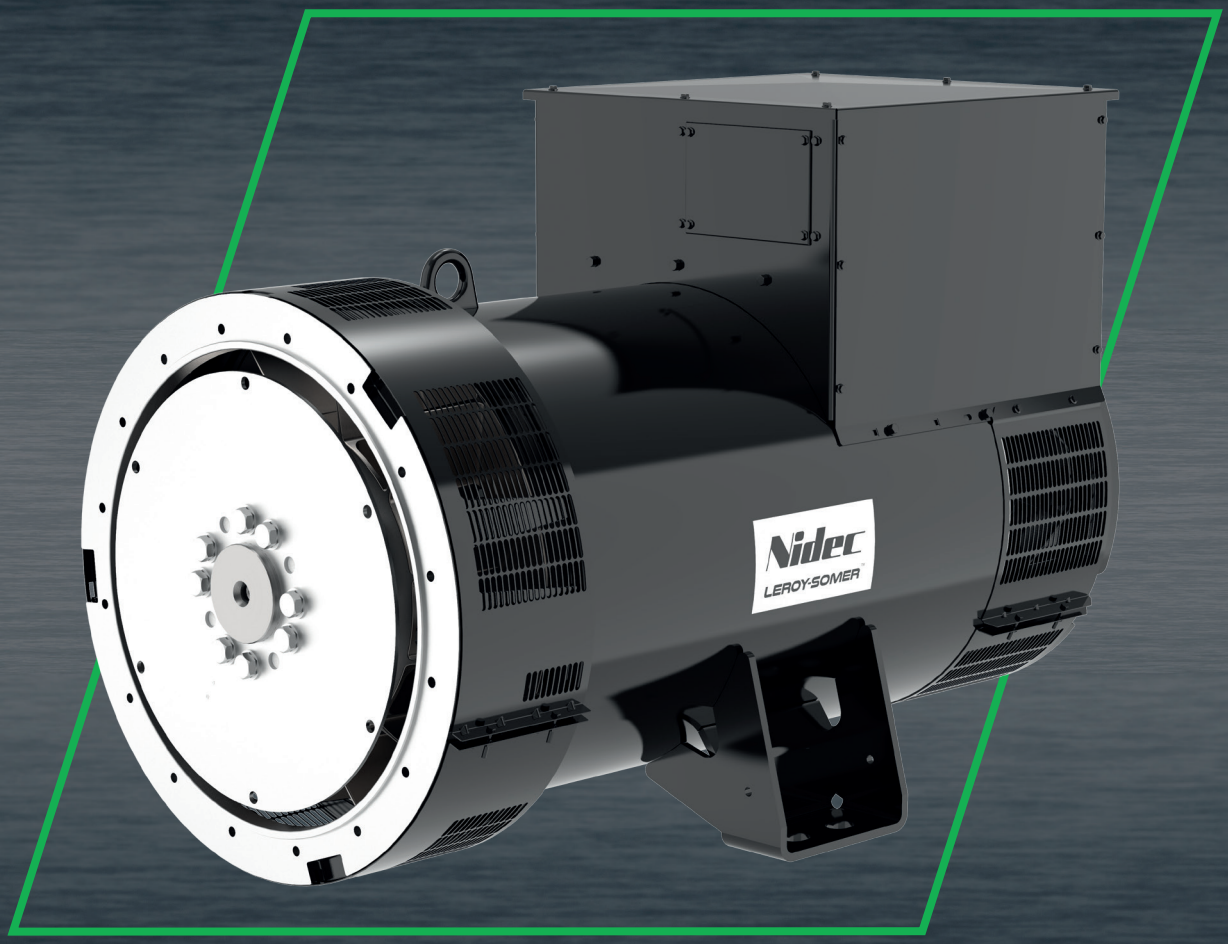
Nidec Power



TAL 049

Low Voltage Alternator - 4 poles

730 to 1000 kVA - 50 Hz / 915 to 1250 kVA - 60 Hz

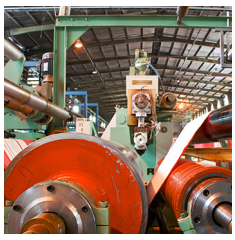
Electrical and mechanical data

LEROY-SOMER™

The best of performance

The Leroy-Somer™ TAL 049 alternator has been designed to offer you the best power generation performances. With its meticulous design and optimized architecture, the TAL 049 strikes the perfect balance between compactness, reliability, performance and longevity.
Whatever your application, the Leroy-Somer™ TAL 049 alternator will meet your needs and will adapt to all situations.





Standards

The Leroy-Somer™ TAL 049 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 049 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 with 7-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 without derating)

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	1 m^3/s
Air flow 60 Hz	1.2 m^3/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	< 3.5 %	
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 049 B	kVA	730	**730**	730	665	665	**665**	665	605	775	**775**	775	705	805	**805**	805	730
	kW	*584*	***584***	*584*	*532*	*532*	***532***	*532*	*484*	*620*	***620***	*620*	*564*	*644*	***644***	*644*	*584*
TAL 049 C	kVA	820	**820**	820	810	745	**745**	745	735	870	**870**	870	860	910	**910**	910	890
	kW	*656*	***656***	*656*	*648*	*596*	***596***	*596*	*588*	*696*	***696***	*696*	*688*	*728*	***728***	*728*	*712*
TAL 049 D	kVA	910	**910**	910	820	830	**830**	830	745	965	**965**	965	870	1010	**1010**	1010	900
	kW	*728*	***728***	*728*	*656*	*664*	***664***	*664*	*596*	*772*	***772***	*772*	*696*	*808*	***808***	*808*	*720*
TAL 049 E	kVA	1000	**1000**	1000	950	910	**910**	910	865	1060	**1060**	1060	1005	1100	**1100**	1100	1045
	kW	*800*	***800***	*800*	*760*	*728*	***728***	*728*	*692*	*848*	***848***	*848*	*804*	*880*	***880***	*880*	*836*

(*) 12-wire option

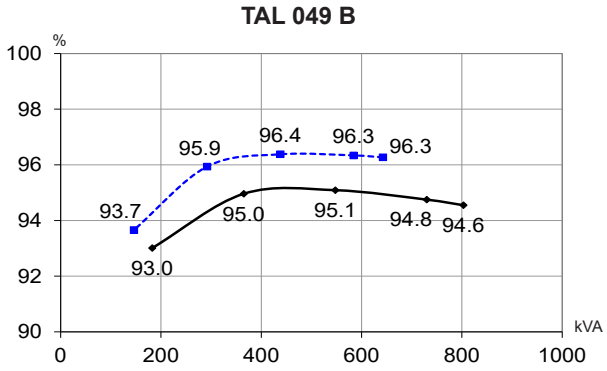
Ratings 60 Hz - 1800 R.P.M.

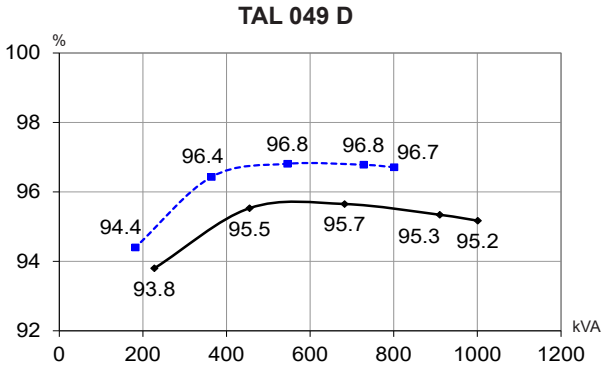
kVA / kW - P.F. = 0.8

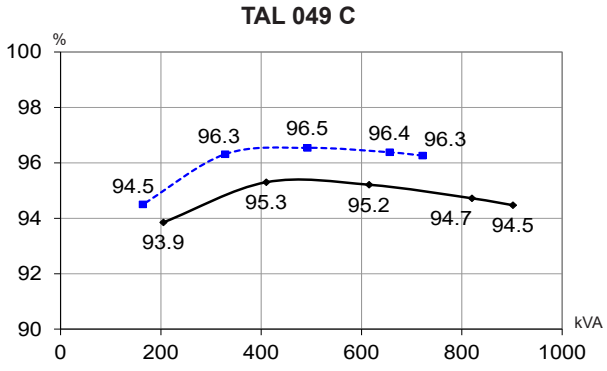
Duty / T° C		Continuous / 40 °C				Continuous / 40 °C				Stand-by / 40 °C				Stand-by / 27 °C			
Class / T° K		H / 125° K				F / 105° K				H / 150° K				H / 163° K			
Phase		3 ph.				3 ph.				3 ph.				3 ph.			
Y		380V	416V	440V	**480V**	380V	416V	440V	**480V**	380V	416V	440V	**480V**	380V	416V	440V	**480V**
Δ		220V	240V			220V	240V			220V	240V			220V	240V		
YY (*)			208V	220V	**240V**		208V	220V	**240V**		208V	220V	**240V**		208V	220V	**240V**
TAL 049 B	kVA	725	795	840	**915**	660	725	765	**835**	770	845	890	**970**	800	875	925	**1005**
	kW	*580*	*636*	*672*	***732***	*528*	*580*	*612*	***668***	*616*	*676*	*712*	***776***	*640*	*700*	*740*	***804***
TAL 049 C	kVA	815	890	940	**1025**	740	810	855	**935**	865	945	995	**1085**	895	980	1040	**1130**
	kW	*652*	*712*	*752*	***820***	*592*	*648*	*684*	***748***	*692*	*756*	*796*	***868***	*716*	*784*	*832*	***904***
TAL 049 D	kVA	905	990	1045	**1140**	825	900	950	**1035**	960	1050	1110	**1210**	1000	1090	1155	**1255**
	kW	*724*	*792*	*836*	***912***	*660*	*720*	*760*	***828***	*768*	*840*	*888*	***968***	*800*	*872*	*924*	***1004***
TAL 049 E	kVA	990	1083	1146	**1250**	900	985	1045	**1140**	1050	1150	1215	**1325**	1089	1192	1260	**1375**
	kW	*792*	*866*	*917*	***1000***	*720*	*788*	*836*	***912***	*840*	*920*	*972*	***1060***	*871*	*954*	*1008*	***1100***

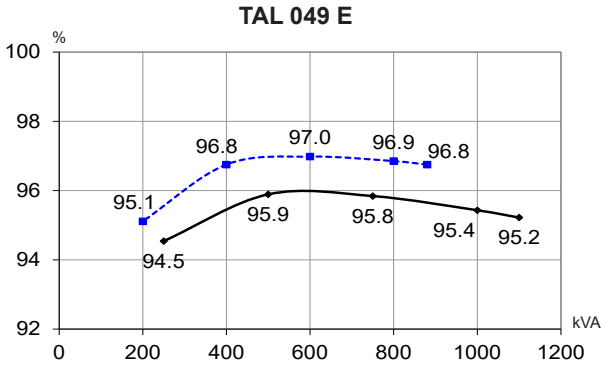
(*) 12-wire option

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









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

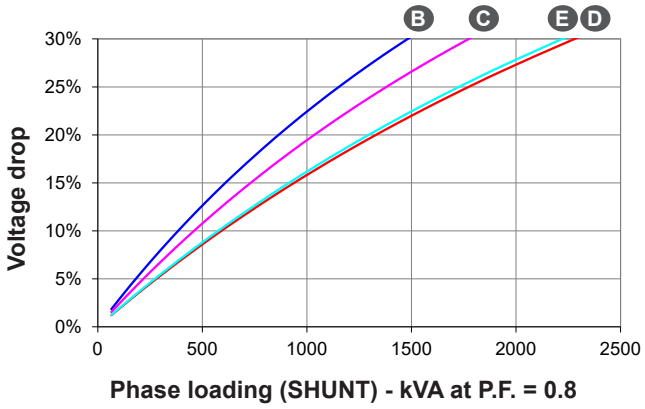
		B	C	D	E
Kcc	Short-circuit ratio	0.42	0.34	0.41	0.34
Xd	Direct-axis synchronous reactance unsaturated	294	348	303	348
Xq	Quadrature-axis synchronous reactance unsaturated	150	177	154	177
T'do	No-load transient time constant	2074	2094	2138	2153
X'd	Direct-axis transient reactance saturated	14.2	16.6	14.1	16.1
T'd	Short-circuit transient time constant	100	100	100	100
X"d	Direct-axis subtransient reactance saturated	11.3	13.3	11.3	12.9
T"d	Subtransient time constant	10	10	10	10
X"q	Quadrature-axis subtransient reactance saturated	12.8	14.9	12.4	14.1
Xo	Zero sequence reactance	0.59	0.69	0.59	0.67
X2	Negative sequence reactance saturated	12.1	14.11	11.92	13.53
Ta	Armature time constant	15	15	15	15

Other class H / 400 V data

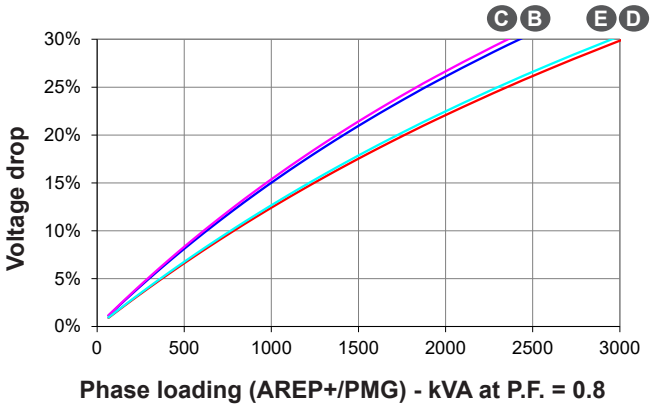
io (A)	No-load excitation current SHUNT/AREP+	1.07	0.96	1.1	0.89
ic (A)	On-load excitation current SHUNT/AREP+	3.73	3.97	3.91	3.69
uc (V)	On-load excitation voltage SHUNT/AREP+	41.9	44.4	43.6	40.9
ms	Response time (ΔU = 20% transient)	500	500	500	500
kVA	Start (ΔU = 20% cont. or ΔU = 30% trans.) SHUNT*	1325	1389	1560	1753
kVA	Start (ΔU = 20% cont. or ΔU = 30% trans.) AREP+*	1849	1920	2156	2402
%	Transient ΔU (on-load 4/4) SHUNT - P.F.: 0.8 $_{LAG}$	17.5	16.5	14.6	16.2
%	Transient ΔU (on-load 4/4) AREP+ - P.F.: 0.8 $_{LAG}$	11.5	13	11.5	12.7
W	No-load losses	9331	8807	10176	9543
W	Heat dissipation	32326	36543	35534	38279

* P.F. = 0.6

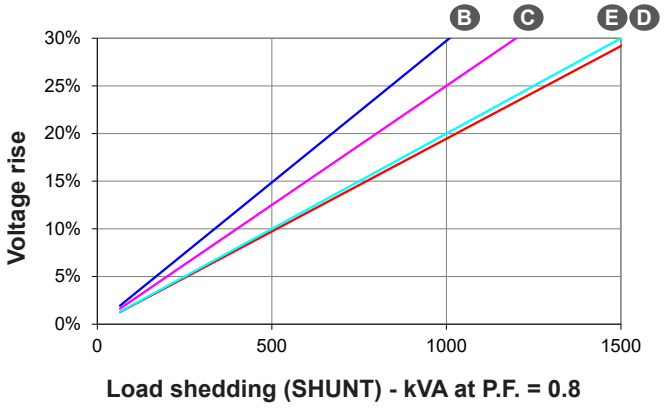
Transient voltage variation 400 V - 50 Hz



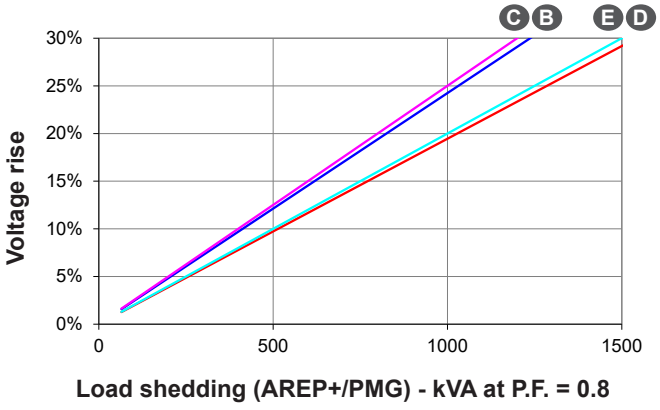
Phase loading (SHUNT) - kVA at P.F. = 0.8



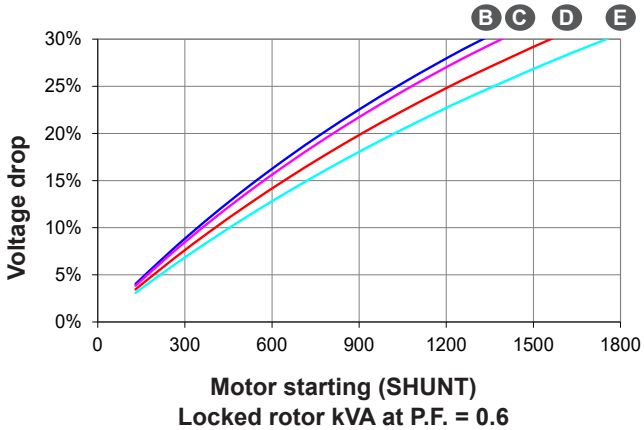
Phase loading (AREP+/PMG) - kVA at P.F. = 0.8



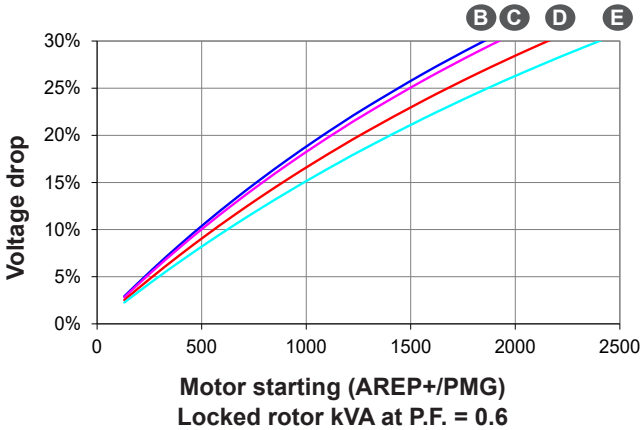
Load shedding (SHUNT) - kVA at P.F. = 0.8



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



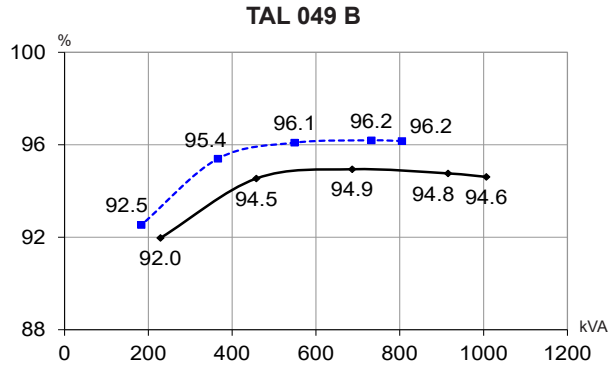
Motor starting (SHUNT)
Locked rotor kVA at P.F. = 0.6

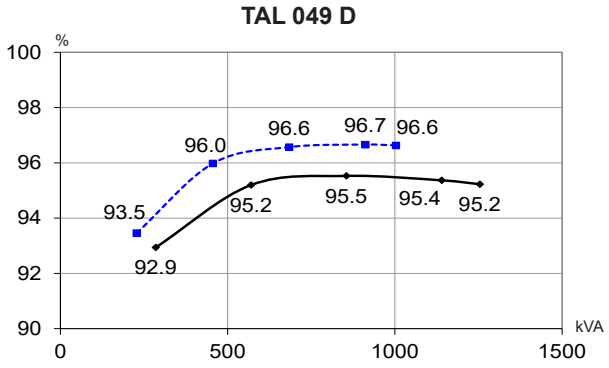


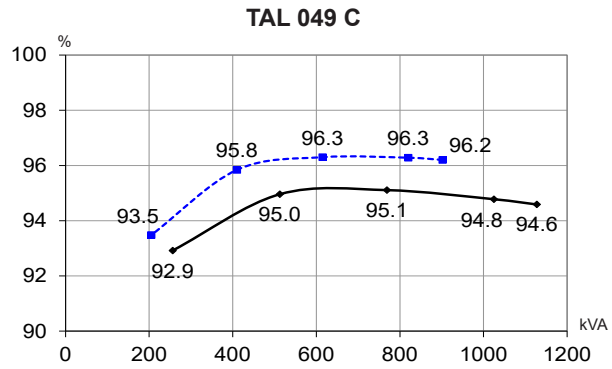
Motor starting (AREP+/PMG)
Locked rotor kVA at P.F. = 0.6

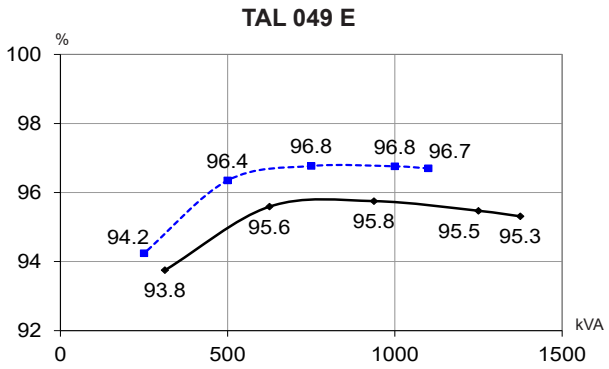
1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by K = Sine P.F. / 0.8
2) For voltages other than 400V (Y), 230V (Δ) at 50 Hz, then kVA must be multiplied by $(400/U)^2$ or $(230/U)^2$.

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







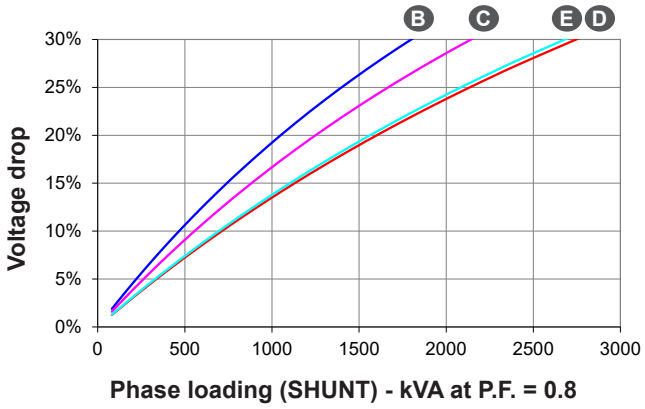


Reactances (%). Time constants (ms) - Class H / 480 V

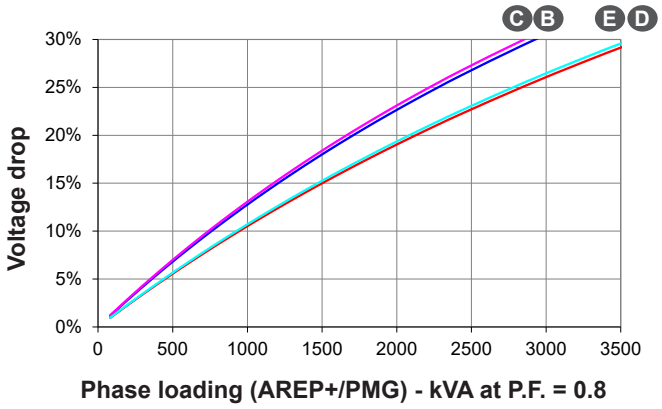
		B	C	D	E
Kcc	Short-circuit ratio	0.4	0.32	0.4	0.33
Xd	Direct-axis synchronous reactance unsaturated	307	362	317	363
Xq	Quadrature-axis synchronous reactance unsaturated	156	185	161	185
T'do	No-load transient time constant	2074	2094	2138	2153
X'd	Direct-axis transient reactance saturated	14.8	17.3	14.8	16.8
T'd	Short-circuit transient time constant	100	100	100	100
X"d	Direct-axis subtransient reactance saturated	11.8	13.8	11.8	13.4
T"d	Subtransient time constant	10	10	10	10
X"q	Quadrature-axis subtransient reactance saturated	13.4	15.5	13	14.7
Xo	Zero sequence reactance	0.61	0.72	0.61	0.7
X2	Negative sequence reactance saturated	12.64	14.7	12.44	14.1
Ta	Armature time constant	15	15	15	15
Other class H / 480 V data					
io (A)	No-load excitation current SHUNT/AREP+	1.07	0.96	1.09	0.89
ic (A)	On-load excitation current SHUNT/AREP+	3.8	4.04	3.97	3.74
uc (V)	On-load excitation voltage SHUNT/AREP+	43	45.5	44.6	41.9
ms	Response time (ΔU = 20% transient)	500	500	500	500
kVA	Start (ΔU = 20% cont. or ΔU = 30% trans.) SHUNT*	1625	1681	1954	2114
kVA	Start (ΔU = 20% cont. or ΔU = 30% trans.) AREP+*	2345	2297	2743	2893
%	Transient ΔU (on-load 4/4) SHUNT - P.F.: 0.8 $_{LAG}$	17.9	17.1	15.1	16.7
%	Transient ΔU (on-load 4/4) AREP+ - P.F.: 0.8 $_{LAG}$	11.9	13.4	11.9	13.1
W	No-load losses	14344	13640	15456	14627
W	Heat dissipation	40438	45078	44272	47348

* P.F. = 0.6

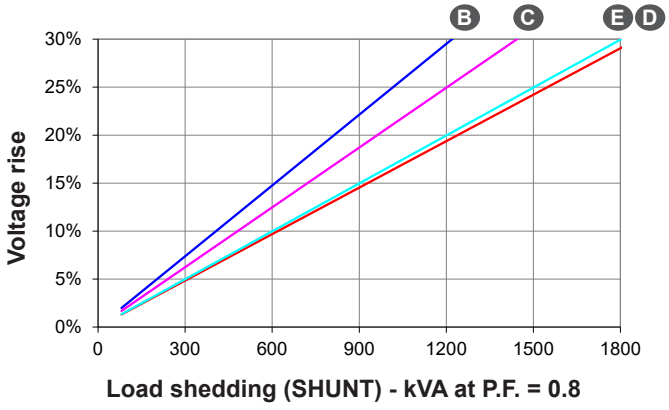
Transient voltage variation 480 V - 60 Hz



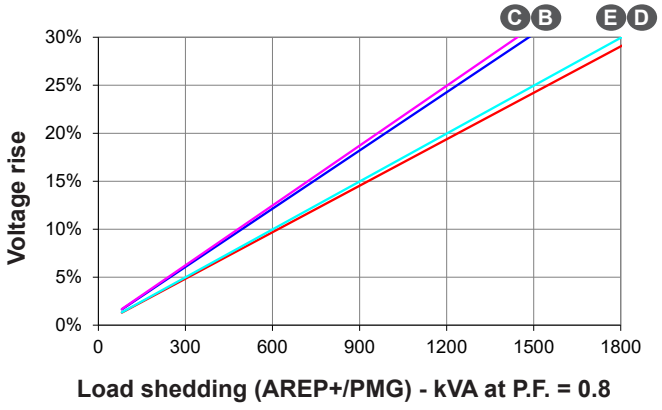
Phase loading (SHUNT) - kVA at P.F. = 0.8



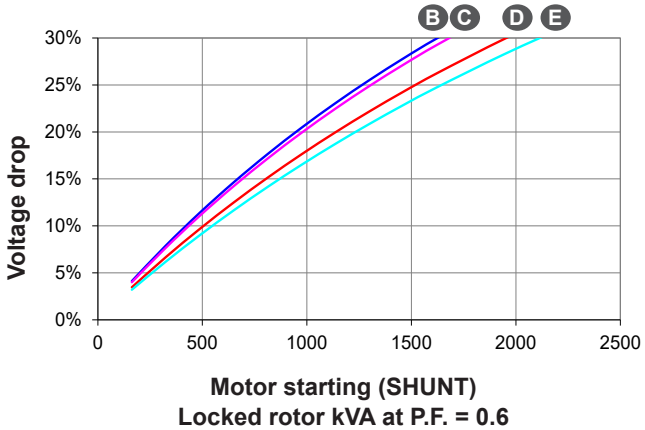
Phase loading (AREP+/PMG) - kVA at P.F. = 0.8



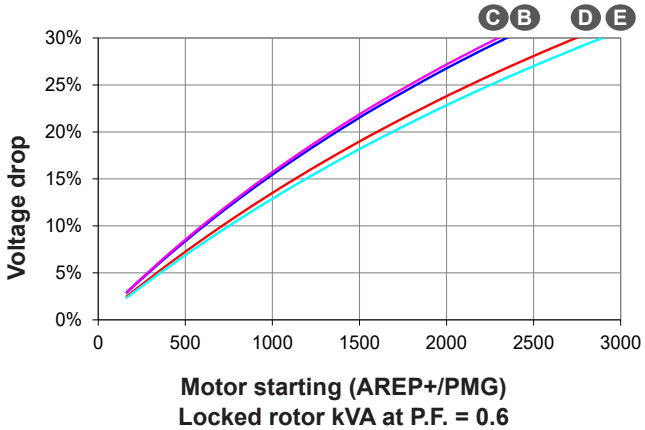
Load shedding (SHUNT) - kVA at P.F. = 0.8



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



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



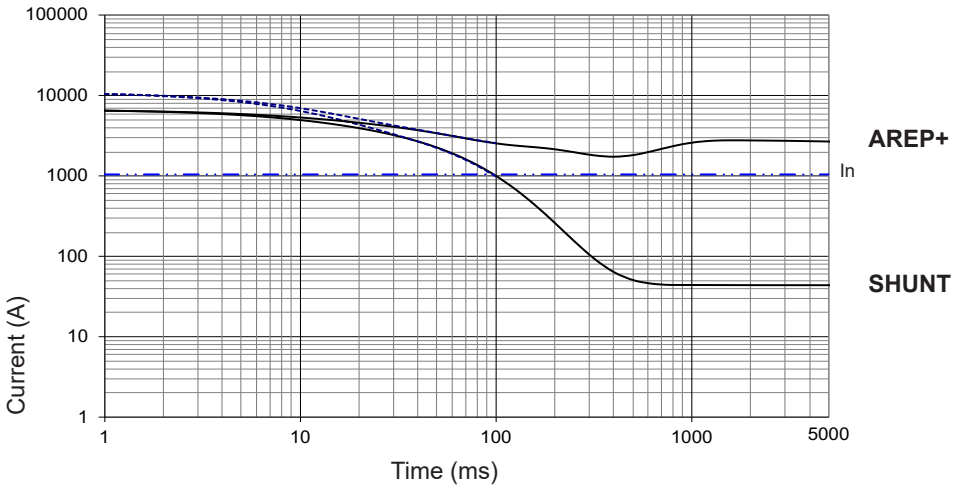
Motor starting (AREP+/PMG)
Locked rotor kVA at P.F. = 0.6

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)

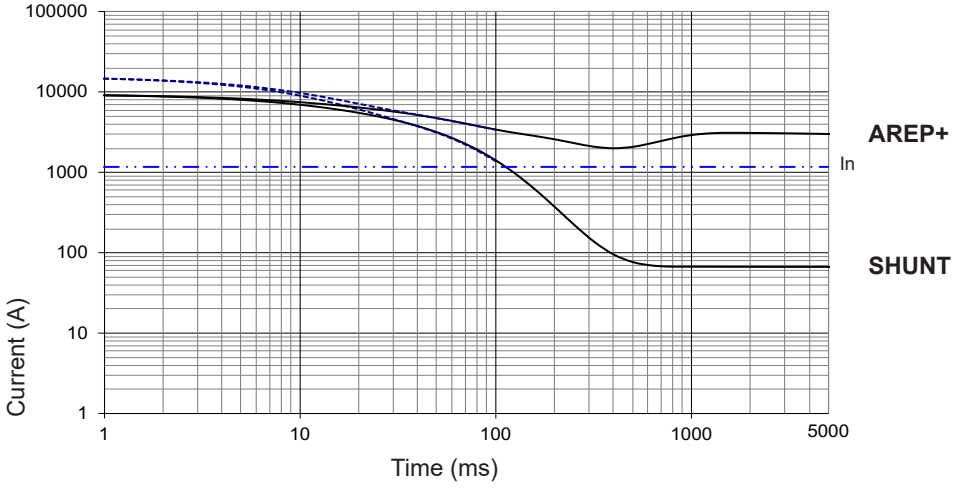
TAL 049 B

Symmetrical ——
Asymmetrical - - -



TAL 049 C

Symmetrical ——
Asymmetrical - - -

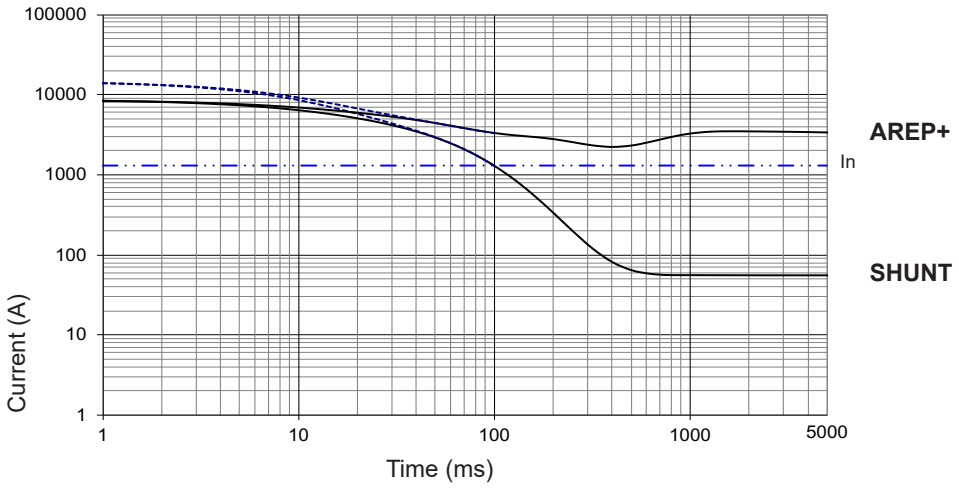


Influence due to connection
For (Δ) connection, use the following multiplication factor:
- Current value x 1.732.

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

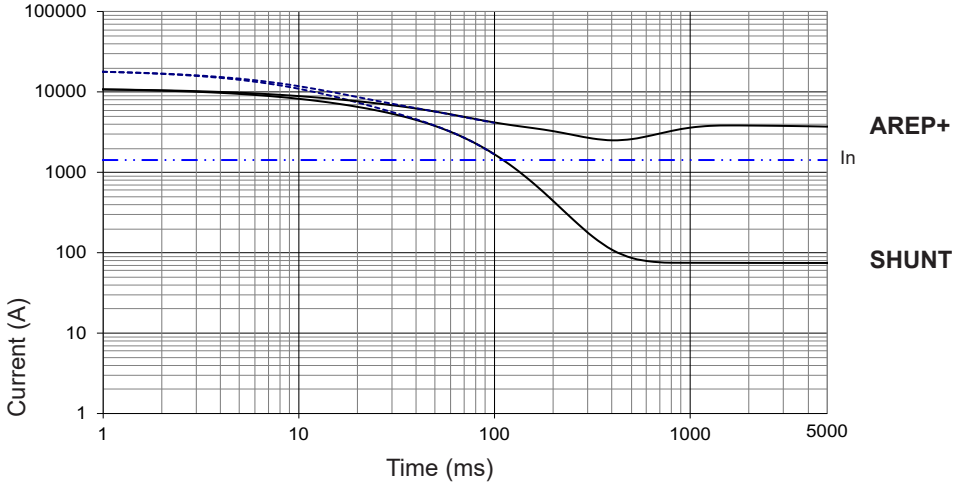
TAL 049 D

Symmetrical ——
Asymmetrical - - -



TAL 049 E

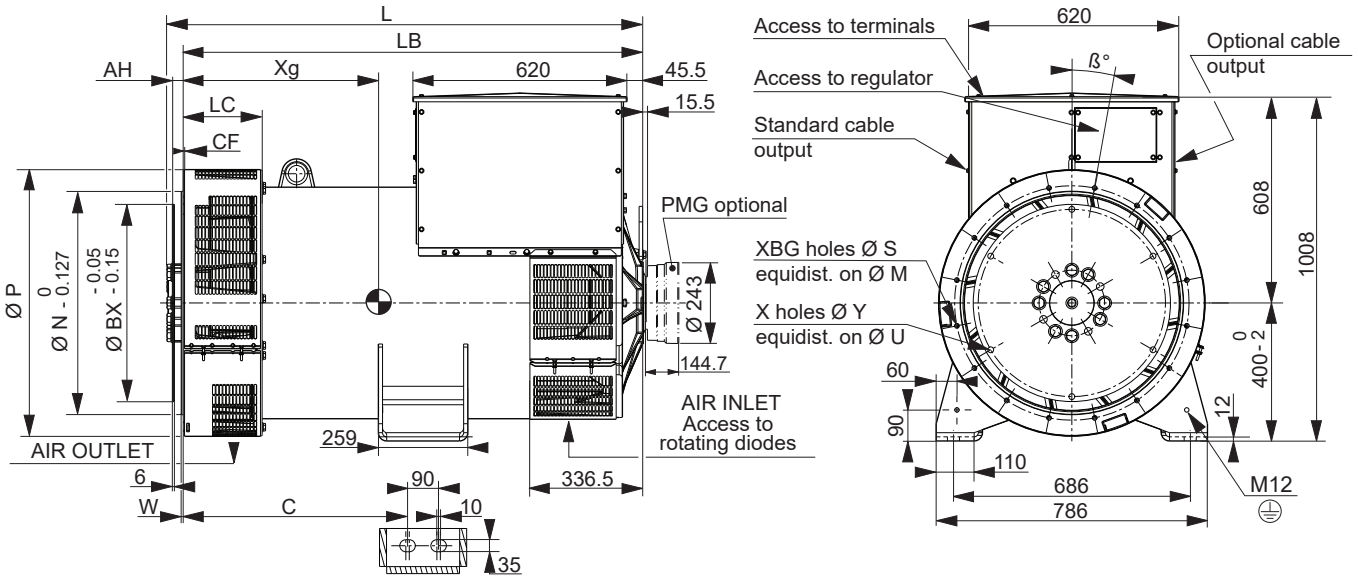
Symmetrical ——
Asymmetrical - - -



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	C	Xg	Weight (kg)
TAL 049 B	1372	1331	650	629	1574
TAL 049 C	1372	1331	650	636	1635
TAL 049 D	1462	1421	650	673	1788
TAL 049 E	1462	1421	650	681	1837

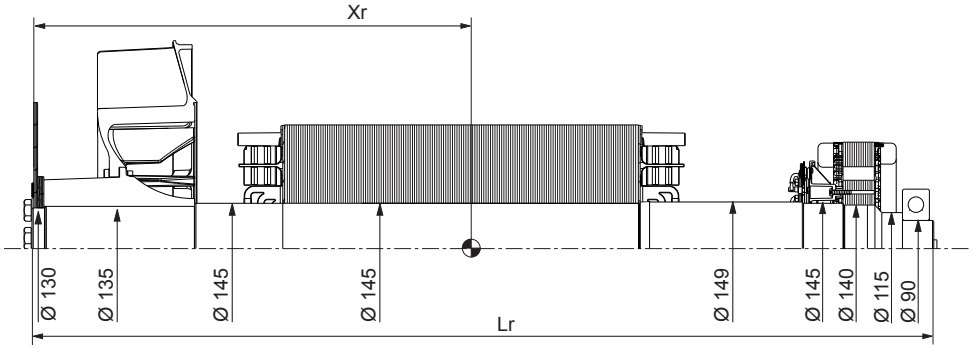
* L maxi = LB + AH maxi + 15.5

Coupling		
Flex plate	**14**	**18**
Flange S.A.E 1	X	
Flange S.A.E ½	X	
Flange S.A.E 0	X	X
Flange S.A.E 00		X

Flange (mm)									
S.A.E.	P	N	M	LC	XBG	S	W	ß°	CF
1	773	511.175	530.225	228.5	12	12	6	15°	38
½	773	584.2	619.125	228.5	12	14	6	15°	17
0	773	647.7	679.45	228.5	16	14	6	11° 15'	37
00	883	787.4	850.9	245	16	14	7	11° 15'	40

Flex plate (mm)					
S.A.E.	BX	U	X	Y	AH
14	466.7	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. 14				S.A.E. 18			
Type	Xr	Lr	M	J	Xr	Lr	M	J
TAL 049 B	625	1351	623	9.99	614	1351	625	10.25
TAL 049 C	633	1351	640	10.35	622	1351	642	10.61
TAL 049 D	671	1441	697	11.34	659	1441	699	11.60
TAL 049 E	679	1441	724	11.92	667	1441	726	12.18

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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