

TAL 049

Low Voltage Alternator - 4 pole

730 to 1000 kVA - 50 Hz / 915 to 1250 kVA - 60 Hz
Electrical and mechanical data

LEROY-SOMER[™]

IMC | INTERNATIONAL
MACHINERY
& GENERATORS

Nidec
All for dreams

Adapted to needs

The TAL alternator range is designed to meet the needs of general applications such as prime power and stand-by.

Compliant with international standards

The TAL range complies with international standards and regulations: IEC 60034 and derivative.

The range is designed, manufactured and marketed in an ISO 9001 and 14001 environment.

Electrical design

- Class H insulation
- Shunt excitation
- Low voltage winding:
 - Three-phase 50 Hz: 380V - 400V - 415V - 440V / 220V - 230V - 240V
 - 60 Hz: 380V - 416V - 440V - 480V / 220V - 208V - 240V
- 6-terminal plates in 6-wire version or suitable for 12-wire option
- Optimized performance

Robust design

- 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
- Sealed for life bearing
- Direction of rotation: clockwise and counterclockwise without derating



Excitation and regulation system suited to the application

	Excitation system				Regulation options		
	AVR	Shunt	AREP	PMG	ULc/US	Remote voltage potentiometer	C.T. for paralleling
Three-phase 6-wire	R150	Standard				√	
	R180		Standard	Standard		√	√
	R450		Option	Option	√	√	√
Three-phase 12-wire*	R250	Standard			√	√	
	R180		Standard	Standard		√	√
	R450		Option	Option	√	√	√

√ : Possible option *with larger terminal box

Compact terminal box

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

Environment and protection

- IP Code IP 23
- Standard winding protection for non-harsh environments with relative humidity ≤ 95%

Available options

- Three-phase 12-wire with 8-terminal plates
- Excitation AREP & PMG with auxiliary winding
- ULc/us
- Customized painting (machine not painted as standard)
- Space heaters
- Droop kit for alternator paralleling
- Stator sensors
- Winding 8 optimized for three-phase 380V - 416 V / 60 Hz
- Winding protection for harsh environments and relative humidity greater than 95% (system 2 - 4 without derating)

General characteristics

Insulation class	H	Excitation system 6-wire	SHUNT	AREP / PMG
Winding pitch	2/3 (wind.6S - 6-wire / wind.6 - 12-wire)	AVR type	R150	R180
Number of wires	6-wire (12-wire option)	Excitation system 12-wire (option)	SHUNT	AREP / PMG
Protection	IP 23	AVR type	R250	R180
Altitude	≤ 1000 m	Voltage regulation (*)		± 1 %
Overspeed	2250 R.P.M.	Total Harmonic Distortion THD (**) in no-load		< 3.5 %
Air flow (m ³ /s)	1	Total Harmonic Distortion THD (**) in linear load		< 5 %
Air flow (m ³ /s)	1.2	Waveform: NEMA = TIF (**)		< 50
AREP Short-circuit current = 2.7 In : 5 second		Waveform: I.E.C. = THF (**)		< 2%

(*) 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 (*)				220V				220V				220V				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

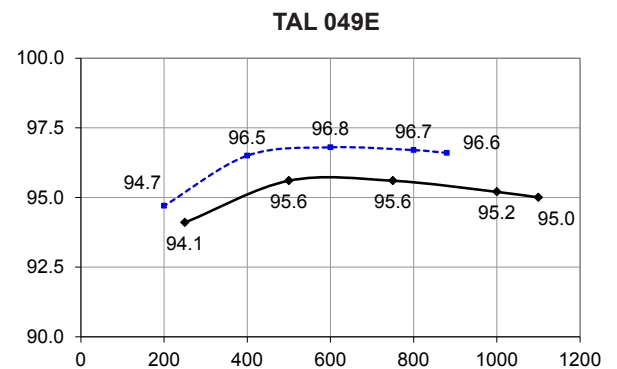
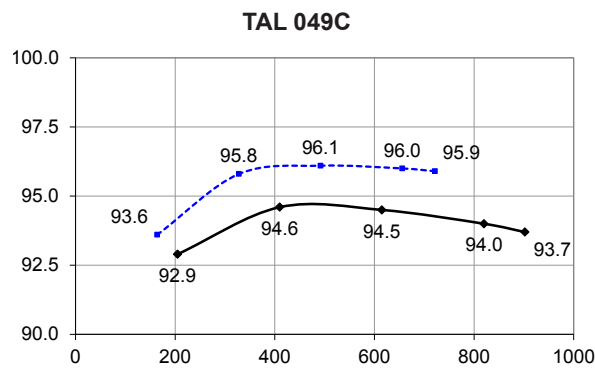
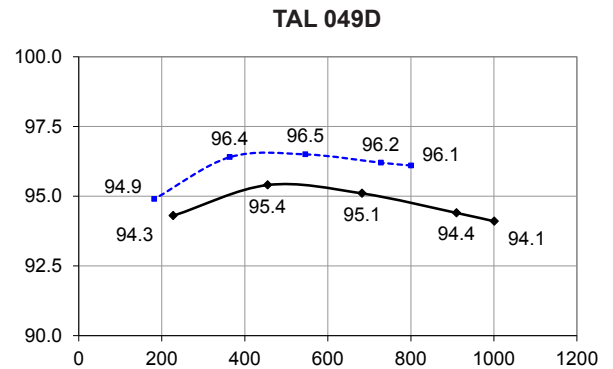
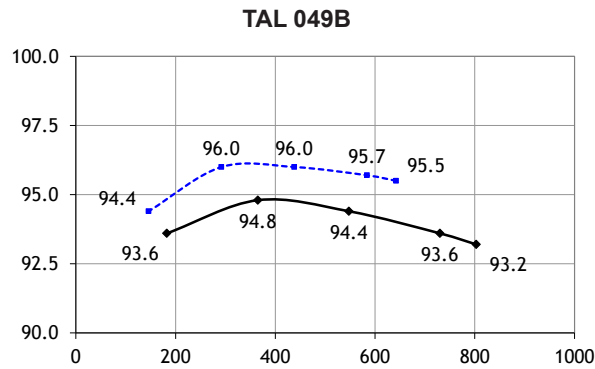
(*) 12-wire option

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

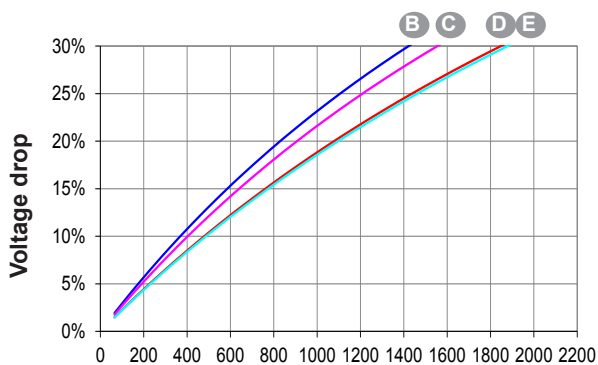
	B	C	D	E
Kcc Short-circuit ratio	0.28	0.37	0.28	0.38
Xd Direct-axis synchro. reactance unsaturated	403	330	402	348
Xq Quadrature-axis synchro. reactance unsaturated	205	168	205	177
T'do No-load transient time constant	2028	2074	2108	2153
X'd Direct-axis transient reactance saturated	19.8	15.9	19	16.1
T'd Short-circuit transient time constant	100	100	100	100
X''d Direct-axis subtransient reactance saturated	15.9	12.7	15.2	12.9
T''d Subtransient time constant	10	10	10	10
X''q Quadrature-axis subtransient reactance saturated	18.3	14.4	16.9	14.1
Xo Zero sequence reactance	0.82	0.66	0.79	0.67
X2 Negative sequence reactance saturated	17.1	13.5	16.1	13.5
Ta Armature time constant	15	15	15	15

Other class H / 400 V data

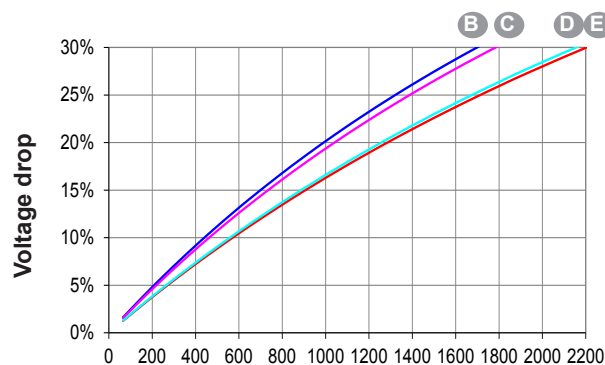
io (A) No-load excitation current SHUNT/AREP	0.81	1.13	0.83	1.01
ic (A) On-load excitation current SHUNT/AREP	4.15	4.76	4.15	3.9
uc (V) On-load excitation voltage SHUNT/AREP	47.1	53.8	46.9	44.1
ms Response time ($\Delta U = 20\%$ transient)	500	500	500	500
kVA Start ($\Delta U = 20\%$ cont. or $\Delta U = 30\%$ trans.) SHUNT*	1084	1387	1412	1671
kVA Start ($\Delta U = 20\%$ cont. or $\Delta U = 30\%$ trans.) AREP*	1301	1664	1695	2002
% Transient ΔU (on-load 4/4) SHUNT - P.F.: 0.8 _{LAG}	18.1	18.5	17.5	18.6
% Transient ΔU (on-load 4/4) AREP - P.F.: 0.8 _{LAG}	16.3	16.6	15.7	16.7
W No-load losses	7774	10303	8702	10355
W Heat dissipation	39606	41702	42589	39986

* P.F. = 0.6

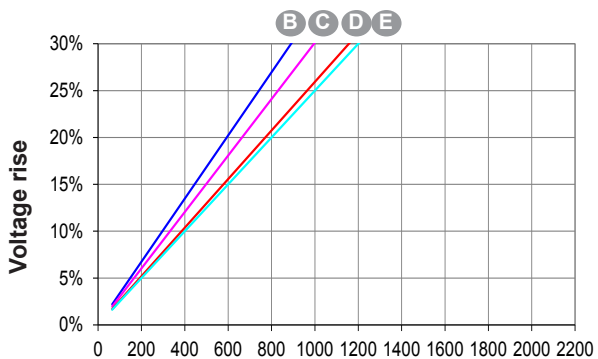
Transient voltage variation 400 V - 50 Hz



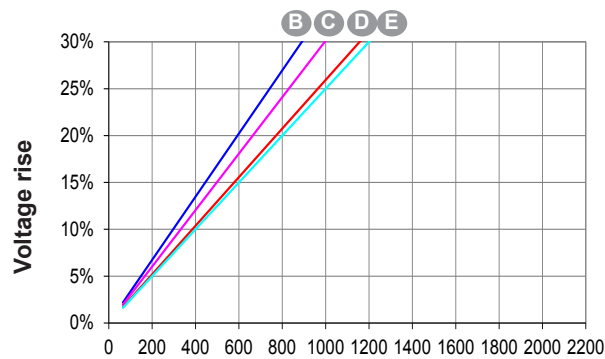
Phase loading (SHUNT) - kVA at P.F. = 0.8



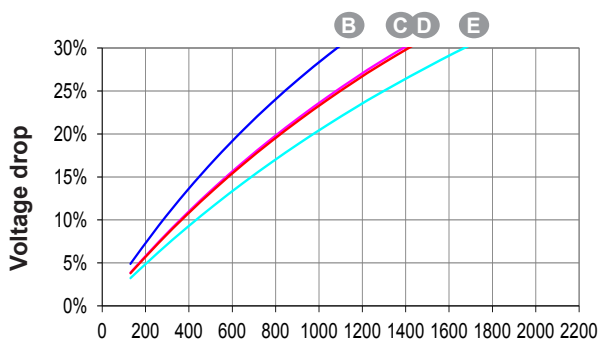
Phase loading (AREP) - kVA at P.F. = 0.8



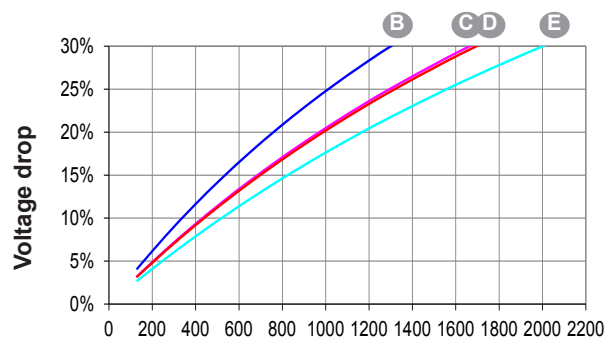
Load shedding (SHUNT) - kVA at P.F. = 0.8



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



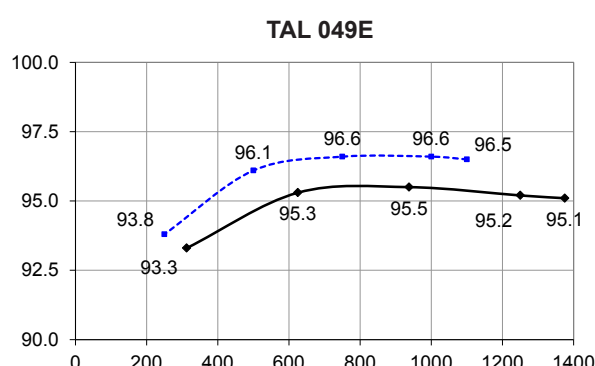
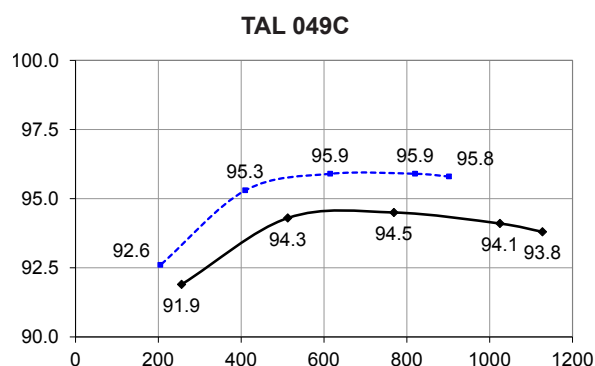
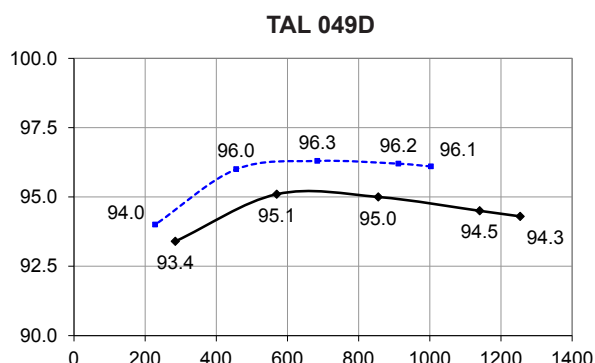
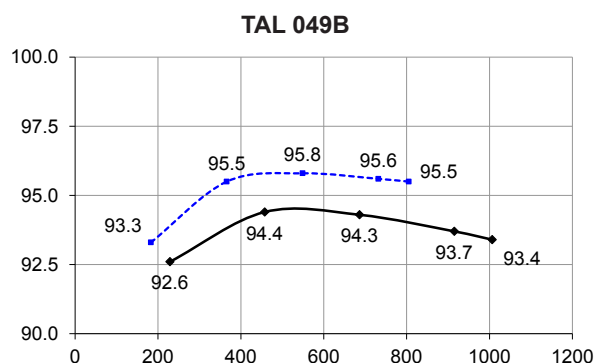
Motor starting (SHUNT)
Locked rotor kVA at P.F. = 0.6



Motor starting (AREP)
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 $K = \text{Sine P.F.} / 0.8$
- 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

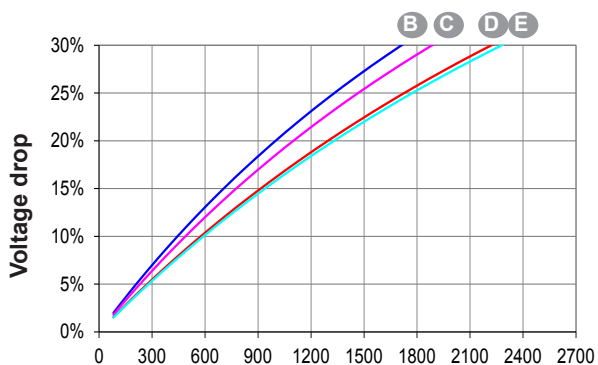
	B	C	D	E
Kcc Short-circuit ratio	0.27	0.36	0.27	0.36
Xd Direct-axis synchro. reactance unsaturated	421	344	419	363
Xq Quadrature-axis synchro. reactance unsaturated	214	175	214	185
T'do No-load transient time constant	2028	2074	2108	2153
X'd Direct-axis transient reactance saturated	20.7	16.6	19.9	16.8
T'd Short-circuit transient time constant	100	100	100	100
X''d Direct-axis subtransient reactance saturated	16.6	13.2	15.9	13.4
T''d Subtransient time constant	10	10	10	10
X''q Quadrature-axis subtransient reactance saturated	19.1	15	17.7	14.7
Xo Zero sequence reactance	0.86	0.69	0.82	0.7
X2 Negative sequence reactance saturated	17.8	14.1	16.8	14.1
Ta Armature time constant	15	15	15	15

Other class H / 480 V data

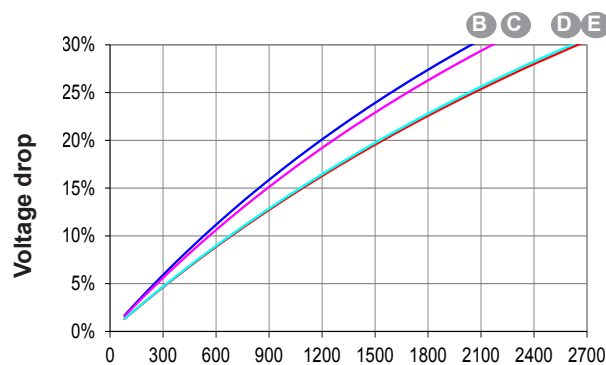
io (A) No-load excitation current SHUNT/AREP	0.81	1.13	0.82	1.01
ic (A) On-load excitation current SHUNT/AREP	4.28	4.87	4.26	3.98
uc (V) On-load excitation voltage SHUNT/AREP	48.6	55.3	48.3	45.1
ms Response time ($\Delta U = 20\%$ transient)	500	500	500	500
kVA Start ($\Delta U = 20\%$ cont. or $\Delta U = 30\%$ trans.) SHUNT*	1300	1673	1693	2002
kVA Start ($\Delta U = 20\%$ cont. or $\Delta U = 30\%$ trans.) AREP*	1560	2007	2031	2414
% Transient ΔU (on-load 4/4) SHUNT - P.F.: 0.8 _{LAG}	18.7	18.9	18.1	19.1
% Transient ΔU (on-load 4/4) AREP - P.F.: 0.8 _{LAG}	16.8	17	16.3	17.1
W No-load losses	12224	15725	13536	15739
W Heat dissipation	48497	51122	52250	49398

* P.F. = 0.6

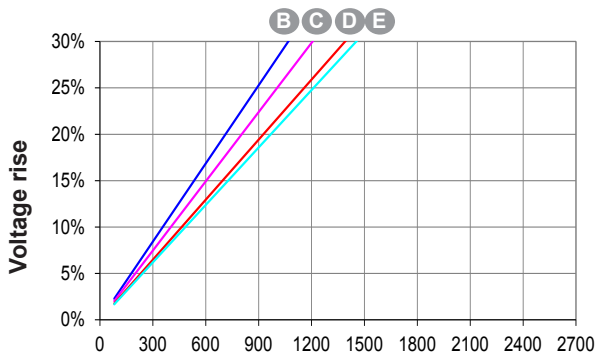
Transient voltage variation 480 V - 60 Hz



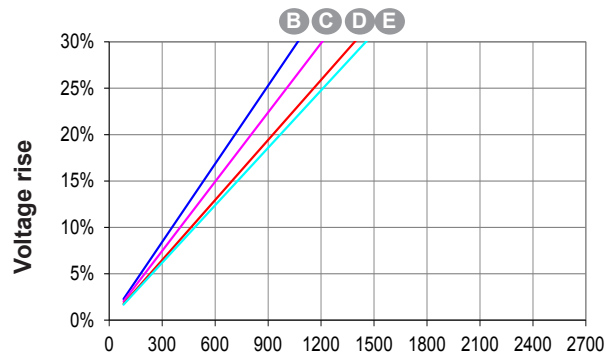
Phase loading (SHUNT) - kVA at P.F. = 0.8



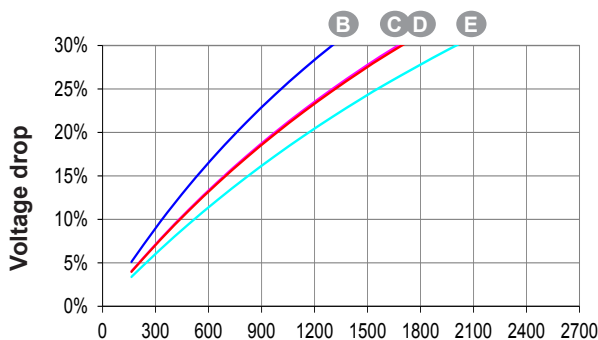
Phase loading (AREP) - kVA at P.F. = 0.8



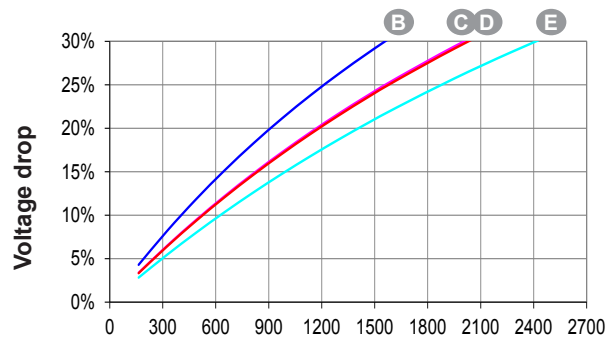
Load shedding (SHUNT) - kVA at P.F. = 0.8



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



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



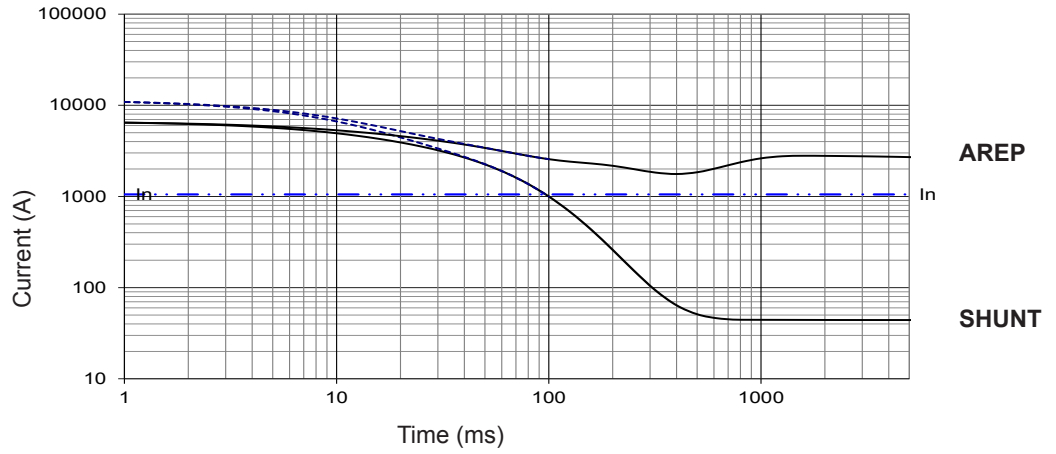
Motor starting (AREP)
Locked rotor kVA at P.F. = 0.6

- 1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by $K = \text{Sine P.F.} / 0.8$
- 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)

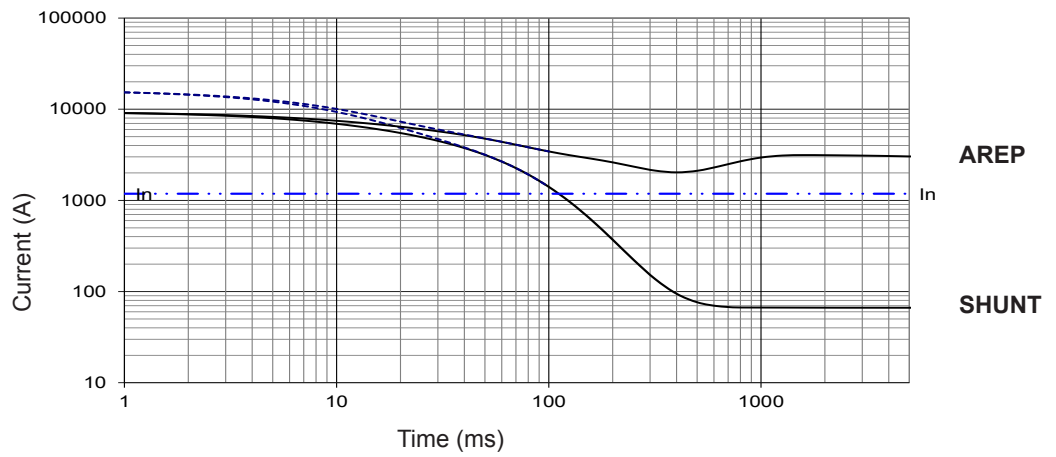
TAL 049 B

Symmetrical —
Asymmetrical - - -



TAL 049 C

Symmetrical —
Asymmetrical - - -



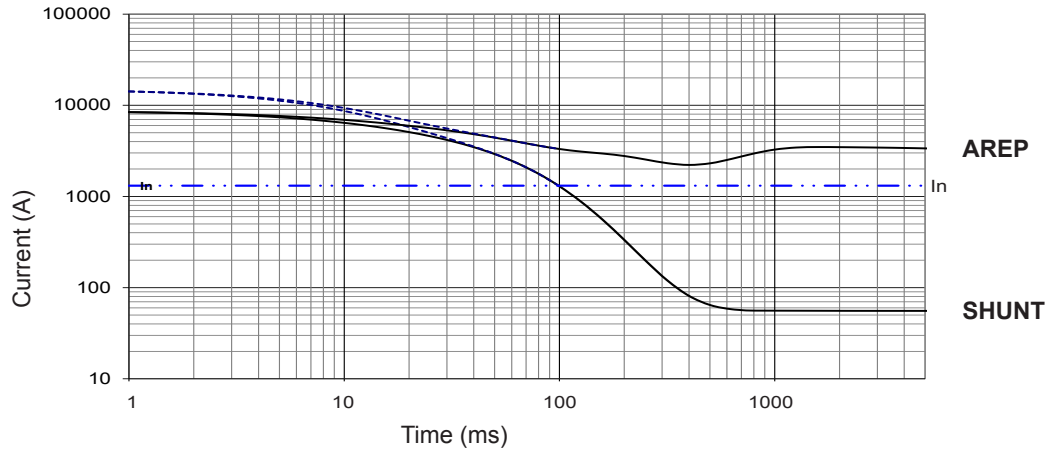
Influence due to connection

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)

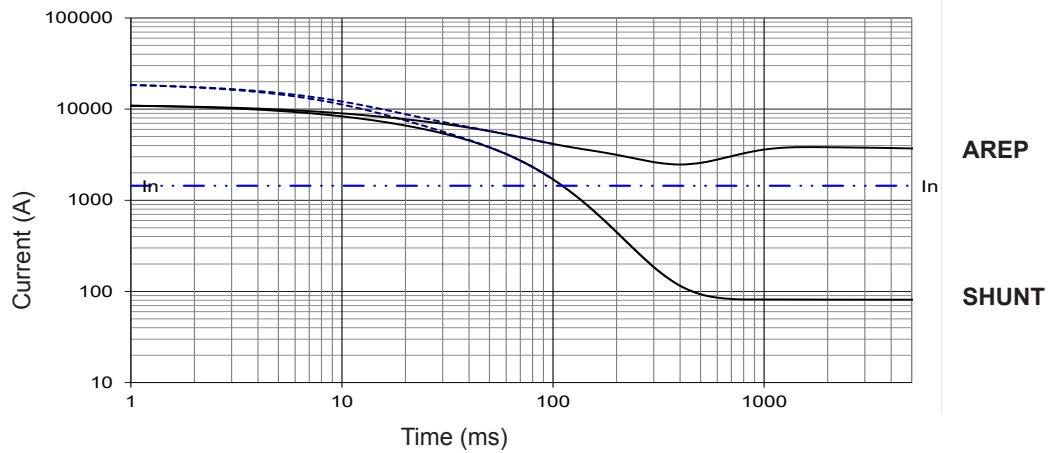
TAL 049 D

Symmetrical —
Asymmetrical - - -



TAL 049 E

Symmetrical —
Asymmetrical - - -

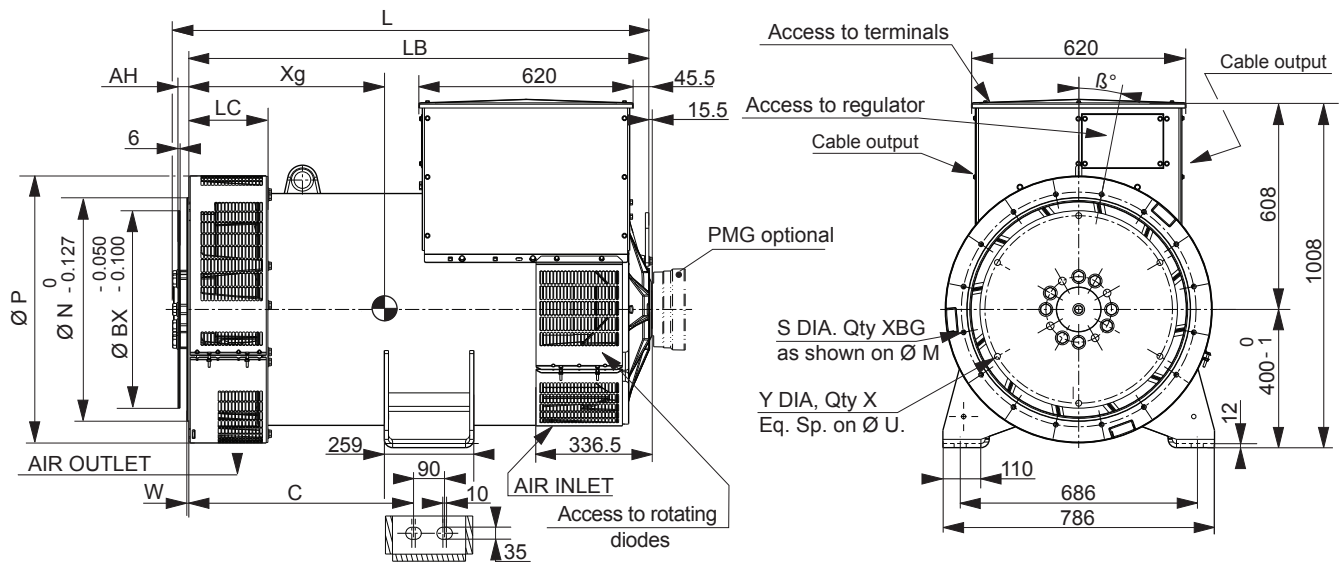


Influence due to short-circuit

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		1.5	

Single bearing general arrangement



Dimensions (mm) and weight

Type	L without PMG	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

Coupling

	Flex plate	14	18
Flange S.A.E 1	X		
Flange S.A.E 1/2	X		
Flange S.A.E 0	X	X	
Flange S.A.E 00			X

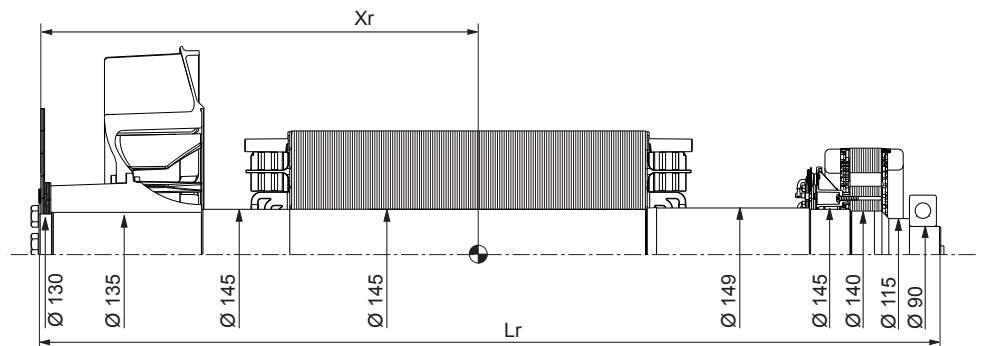
Flange (mm)

S.A.E.	P	N	M	LC	XBG	W	β°
1	773	511.175	530.225	228.5	12	6	15°
1/2	773	584.2	619.125	228.5	12	6	15°
0	773	647.7	679.45	228.5	16	6	11° 15'
00	883	787.4	850.9	245	16	7	11° 15'

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 data



Centre of gravity: Xr (mm), Rotor length: Lr (mm), Weight: M (kg), Moment of inertia: J (kgm²): (4J = MD²)

Type	Flex plate S.A.E. 14				Flex plate S.A.E. 18			
	Xr	Lr	M	J	Xr	Lr	M	J
TAL 049 B	626	1345	602	9.61	614	1345	604	9.87
TAL 049 C	634	1345	628	10.16	622	1345	630	10.42
TAL 049 D	671	1435	684	11.12	659	1435	686	11.38
TAL 049 E	681	1435	701	11.48	669	1435	703	11.74

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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