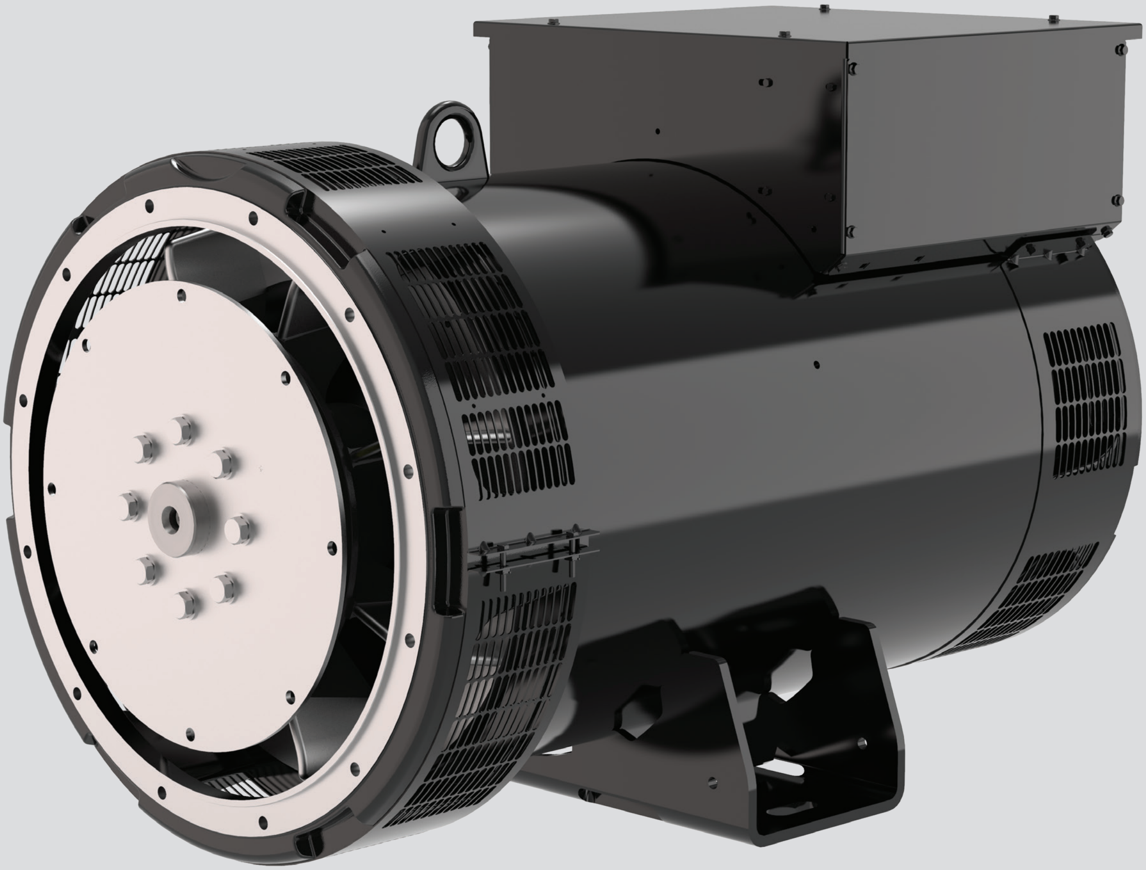


TAL 047

Low Voltage Alternator - 4 pole

410 to 660 kVA - 50 Hz / 510 to 825 kVA - 60 Hz
Electrical and mechanical data

LEROY-SOMER™

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 dérivative.
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
- Complies with EN 61000-6-3, EN 61000-6-2, EN 55011, group 1 class B for European zone (EC marking)

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

Excitation and regulation system suited to the application

	Excitation system				Regulation options		
	AVR	SHUNT	AREP (option)	PMG (option)	UL c/us	Remote voltage potentiometer	C.T. 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	√	√	√

√ : 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 9-terminal plates
- AREP or PMG excitation
- ULc/us
- Customized painting
- 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): for TAL 047 F apply a derating coefficient of 0.97

TAL 047 - 410 to 660 kVA - 50 Hz / 510 to 825 kVA - 60 Hz

General characteristics

Insulation class	H
Winding pitch	2/3 (wind.6S - 6-wire / wind.6 - 12-wire)
Number of wires	6-wire (12-wire option)
Protection	IP 23
Altitude	≤ 1000 m
Overspeed	2250 R.P.M.
Air flow (m^3/s)	0.9
Air flow (m^3/s)	1.1
AREP Short-circuit current = 2.7 In : 5 second	

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 (*)	± 1 %	
Total Harmonic Distortion THD (**) in no-load	< 1.5 %	
Total Harmonic Distortion THD (**) in linear load	< 5 %	
Waveform: NEMA = TIF (**)	< 50	
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 047 A	kVA	390	**410**	410	385	355	**375**	375	350	415	**435**	435	410	430	**450**	450	425
	kW	312	328	328	308	284	300	300	280	332	348	348	328	344	360	360	340
TAL 047 B	kVA	430	**455**	455	430	390	**415**	415	390	455	**480**	480	455	475	**500**	500	475
	kW	344	364	364	344	312	332	332	312	364	384	384	364	380	400	400	380
TAL 047 C	kVA	475	**500**	500	460	430	**455**	455	420	505	**530**	530	490	525	**550**	550	505
	kW	380	400	400	368	344	364	364	336	404	424	424	392	420	440	440	404
TAL 047 D	kVA	525	**550**	550	535	480	**500**	500	485	555	**585**	585	565	580	**600**	600	590
	kW	420	440	440	428	384	400	400	388	444	468	468	452	464	480	480	472
TAL 047 E	kVA	585	**600**	600	570	530	**545**	545	520	620	**635**	635	605	645	**660**	660	625
	kW	468	480	480	456	424	436	436	416	496	508	508	484	516	528	528	500
TAL 047 F (**)	kVA	645	**660**	660	620	585	**600**	600	565	685	**700**	700	655	710	**730**	730	680
	kW	516	528	528	496	468	480	480	452	548	560	560	524	568	584	584	544

(*) 12-wire option (**) 6-wire only

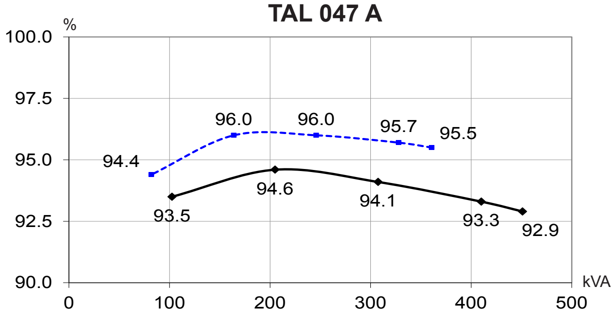
Ratings 60 Hz - 1800 R.P.M.

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 047 A	kVA	450	480	500	**510**	410	435	455	**465**	475	510	530	**540**	495	530	550	**580**
	kW	360	384	400	408	328	348	364	372	380	408	424	432	396	424	440	464
TAL 047 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 047 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 047 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 047 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 047 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

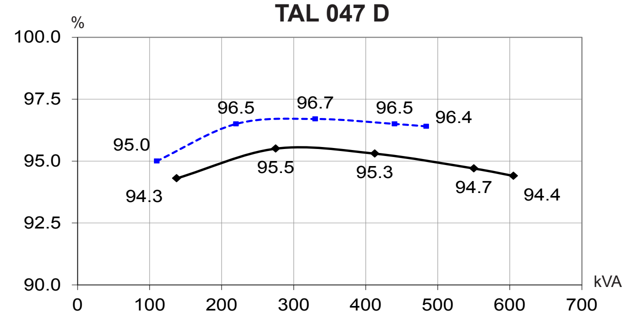
(*) 12-wire option (**) 6-wire only

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

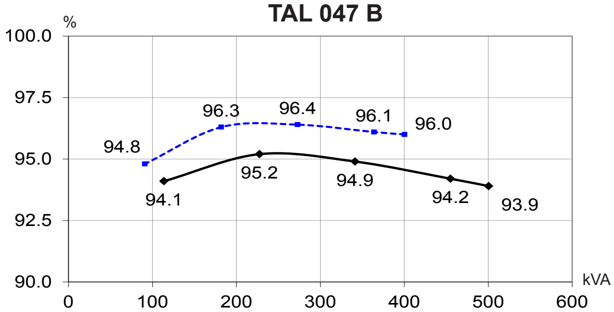
TAL 047 A



TAL 047 D



TAL 047 B



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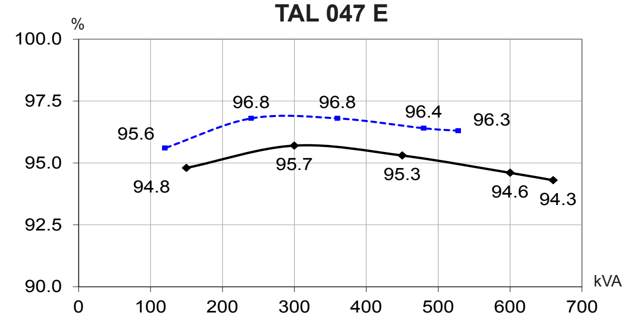

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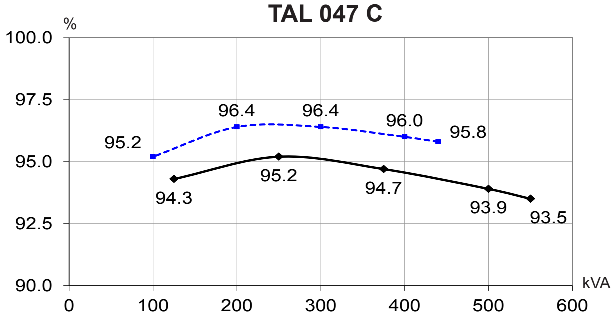
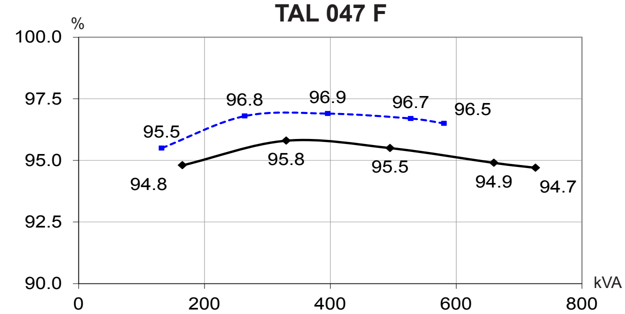


TAL 047 F



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

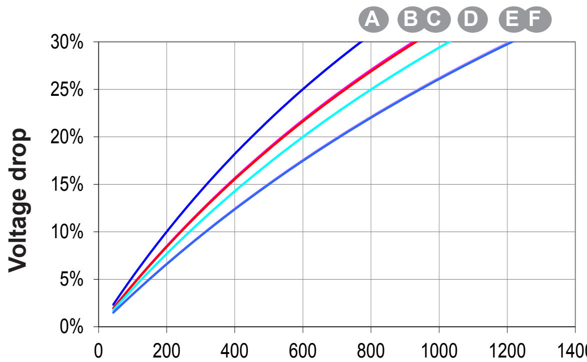
		A	B	C	D	E	F
Kcc	Short-circuit ratio	0.35	0.34	0.31	0.39	0.32	0.36
Xd	Direct-axis synchro. reactance unsaturated	347	338	372	310	361	328
Xq	Quadrature-axis synchro. reactance unsaturated	177	172	189	158	184	167
T'do	No-load transient time constant	1601	1705	1705	1773	1797	1832
X'd	Direct-axis transient reactance saturated	21.6	19.8	21.8	17.5	20	17.9
T'd	Short-circuit transient time constant	100	100	100	100	100	100
X"d	Direct-axis subtransient reactance saturated	15.1	13.9	15.2	12.2	14	12.5
T"d	Subtransient time constant	10	10	10	10	10	10
X"q	Quadrature-axis subtransient reactance saturated	16.6	17.4	19.1	16.5	19.5	18
Xo	Zero sequence reactance	0.9	0.82	0.9	0.72	0.83	0.74
X2	Negative sequence reactance saturated	15.91	15.66	17.21	14.41	16.8	15.31
Ta	Armature time constant	15	15	15	15	15	15

Other class H / 400 V data

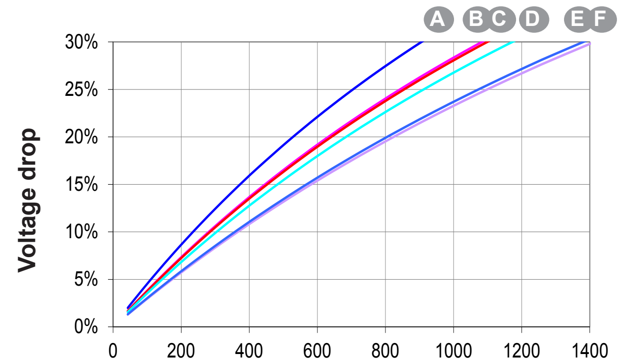
		A	B	C	D	E	F
io (A)	No-load excitation current SHUNT/AREP	0.97	0.87	0.87	0.97	0.85	0.93
ic (A)	On-load excitation current SHUNT/AREP	4.24	3.72	4.06	3.79	3.89	3.87
uc (V)	On-load excitation voltage SHUNT/AREP	44.2	38.7	42.2	39.4	40.3	40.1
ms	Response time (ΔU = 20% transient)	500	500	500	500	500	500
kVA	Start (ΔU = 20% cont. or ΔU = 30% trans.) SHUNT*	612	743	742	947	970	1105
kVA	Start (ΔU = 20% cont. or ΔU = 30% trans.) AREP*	738	891	894	1135	1162	1324
%	Transient ΔU (on-load 4/4) SHUNT - P.F.: 0.8_{LAG}	18.6	17.5	18.7	18.7	17.6	18.9
%	Transient ΔU (on-load 4/4) AREP - P.F.: 0.8_{LAG}	16.3	15.3	16.4	16.8	15.4	17
W	No-load losses	4261	4376	4376	5192	4831	5487
W	Heat dissipation	23451	22295	25923	24391	27055	27875

* P.F. = 0.6

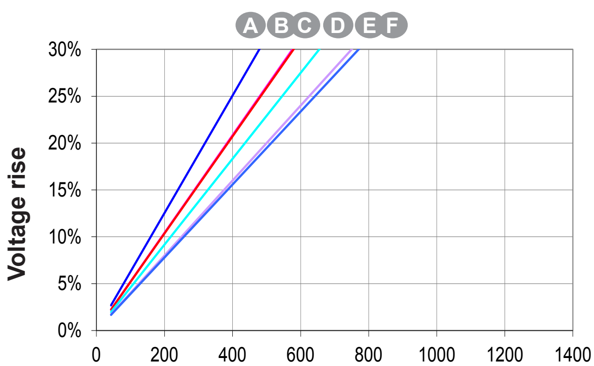
Transient voltage variation 400 V - 50 Hz



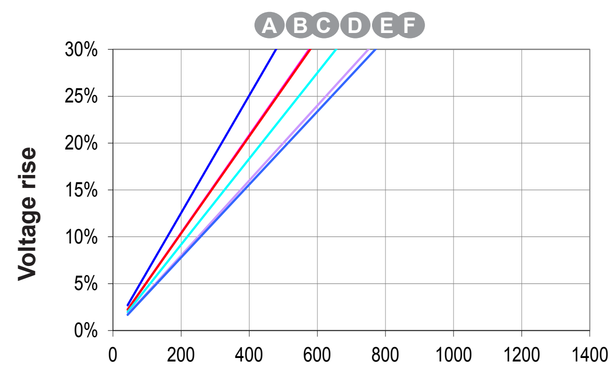
Phase loading (SHUNT) - kVA at P.F. = 0.8



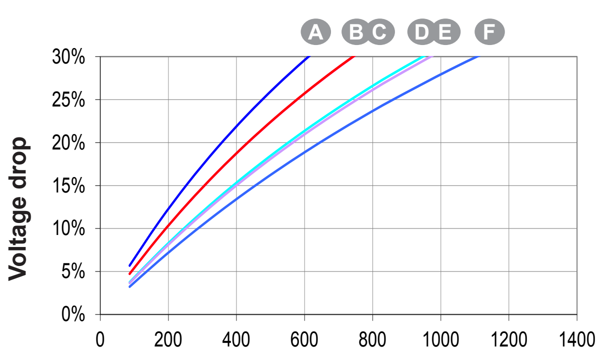
Phase loading (AREP) - kVA at P.F. = 0.8



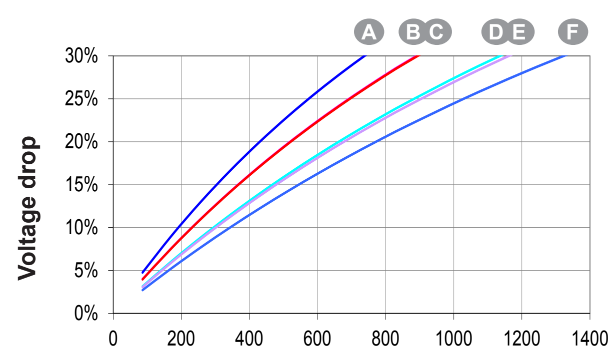
Load shedding (SHUNT) - kVA at P.F. = 0.8



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



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

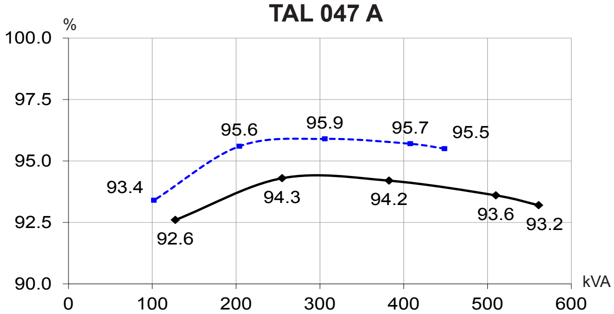


Motor starting (AREP)
Locked rotor kVA at P.F. = 0.6

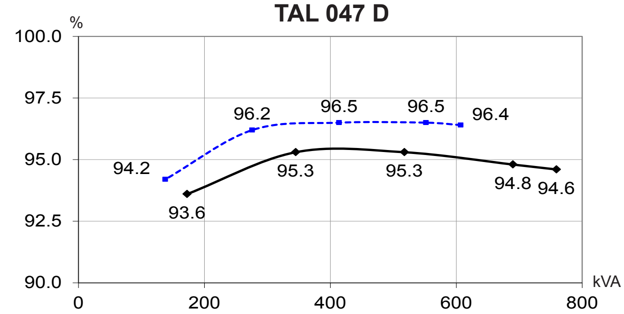
1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by K = Sine P.F. / 0.8
2) For voltages other than 400V (Y), 230V (Δ) at 50 Hz, then kVA must be multiplied by $(400/U)^2$ or $(230/U)^2$.

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

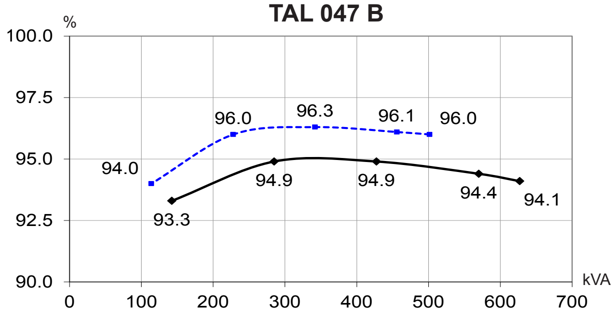
TAL 047 A



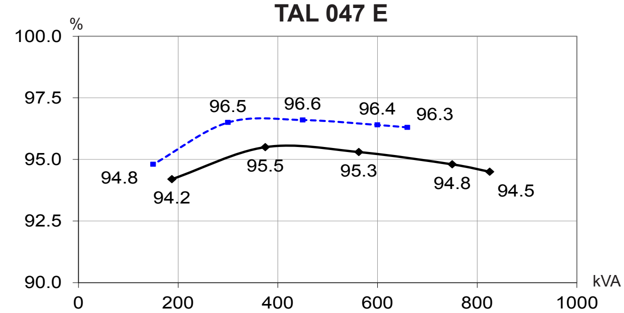
TAL 047 D



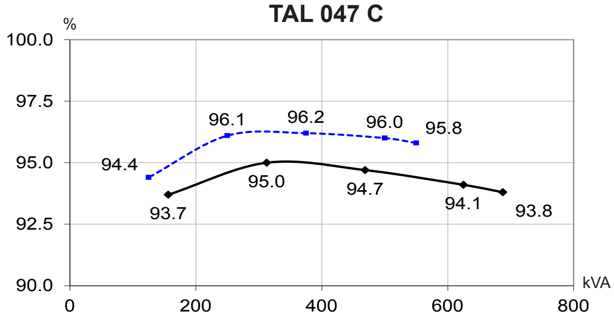
TAL 047 B



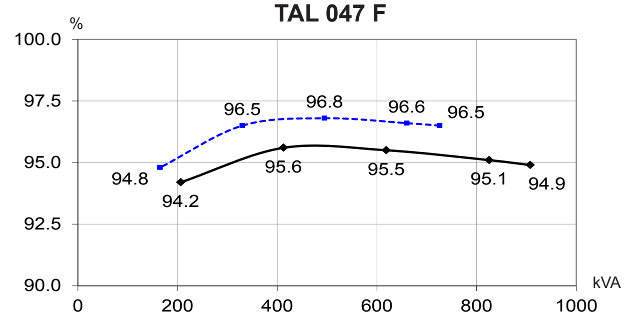
TAL 047 E



TAL 047 C



TAL 047 F



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

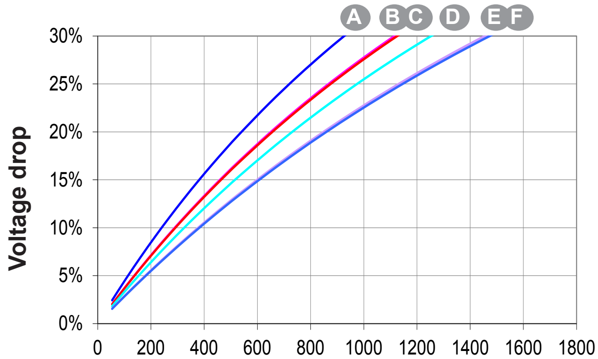
		A	B	C	D	E	F
Kcc	Short-circuit ratio	0.34	0.32	0.3	0.37	0.3	0.35
Xd	Direct-axis synchro. reactance unsaturated	359	353	387	324	376	342
Xq	Quadrature-axis synchro. reactance unsaturated	183	180	197	165	191	174
T'do	No-load transient time constant	1601	1705	1705	1773	1797	1832
X'd	Direct-axis transient reactance saturated	22.4	20.7	22.7	18.3	20.9	18.6
T'd	Short-circuit transient time constant	100	100	100	100	100	100
X"d	Direct-axis subtransient reactance saturated	15.7	14.5	15.9	12.8	14.6	13
T"d	Subtransient time constant	10	10	10	10	10	10
X"q	Quadrature-axis subtransient reactance saturated	17.2	18.1	19.9	17.3	20.3	18.8
Xo	Zero sequence reactance	0.93	0.86	0.94	0.76	0.87	0.77
X2	Negative sequence reactance saturated	16.5	16.35	17.92	15.07	17.5	15.95
Ta	Armature time constant	15	15	15	15	15	15

Other class H / 480 V data

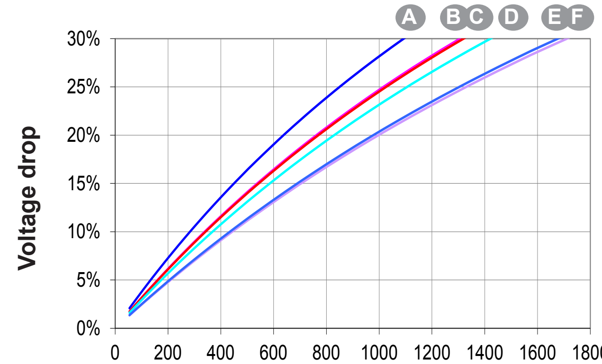
io (A)	No-load excitation current SHUNT/AREP	0.97	0.87	0.87	0.97	0.85	0.93
ic (A)	On-load excitation current SHUNT/AREP	4.31	3.81	4.15	3.88	3.97	3.94
uc (V)	On-load excitation voltage SHUNT/AREP	45.1	39.8	43.3	40.5	41.3	41
ms	Response time (ΔU = 20% transient)	500	500	500	500	500	500
kVA	Start (ΔU = 20% cont. or ΔU = 30% trans.) SHUNT*	738	890	889	1135	1162	1324
kVA	Start (ΔU = 20% cont. or ΔU = 30% trans.) AREP*	883	1074	1071	1360	1391	1597
%	Transient ΔU (on-load 4/4) SHUNT - P.F.: 0.8 $_{LAG}$	19.1	18	19.3	19.2	18.2	19.4
%	Transient ΔU (on-load 4/4) AREP - P.F.: 0.8 $_{LAG}$	16.7	15.8	16.9	17.2	15.9	17.4
W	No-load losses	6583	6766	6766	7888	7408	8312
W	Heat dissipation	27879	27031	31057	29695	32579	33674

* P.F. = 0.6

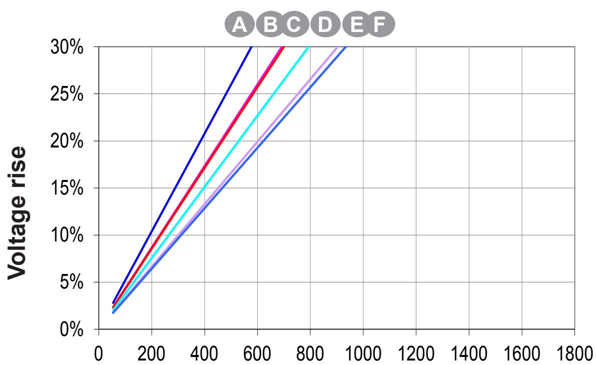
Transient voltage variation 480 V - 60 Hz



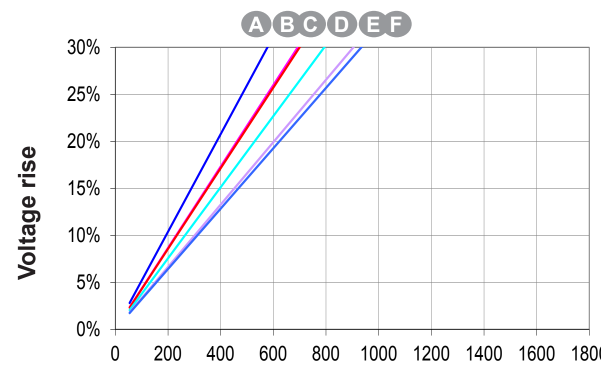
Phase loading (SHUNT) - kVA at P.F. = 0.8



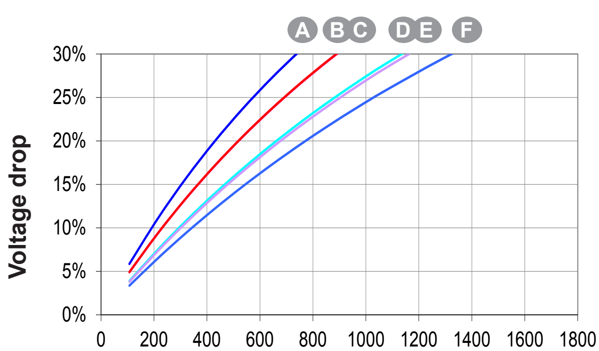
Phase loading (AREP) - kVA at P.F. = 0.8



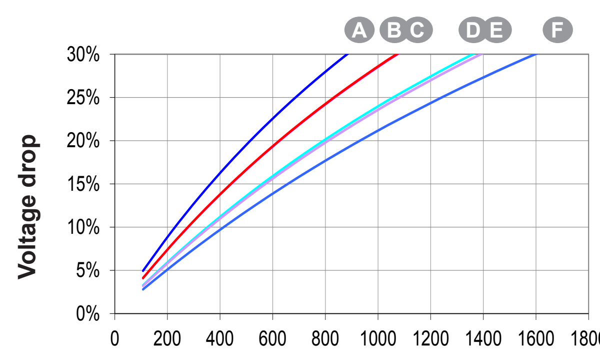
Load shedding (SHUNT) - kVA at P.F. = 0.8



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



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



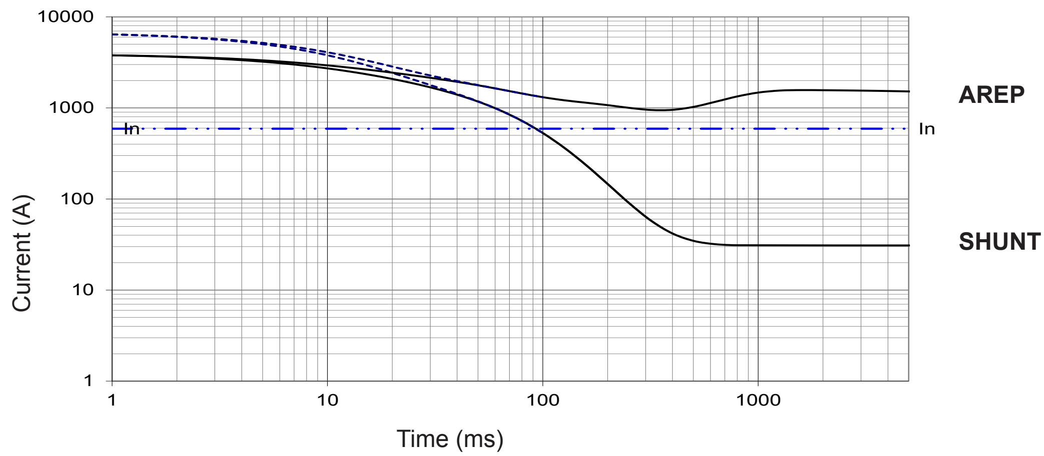
Motor starting (AREP)
Locked rotor kVA at P.F. = 0.6

1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by K = 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)

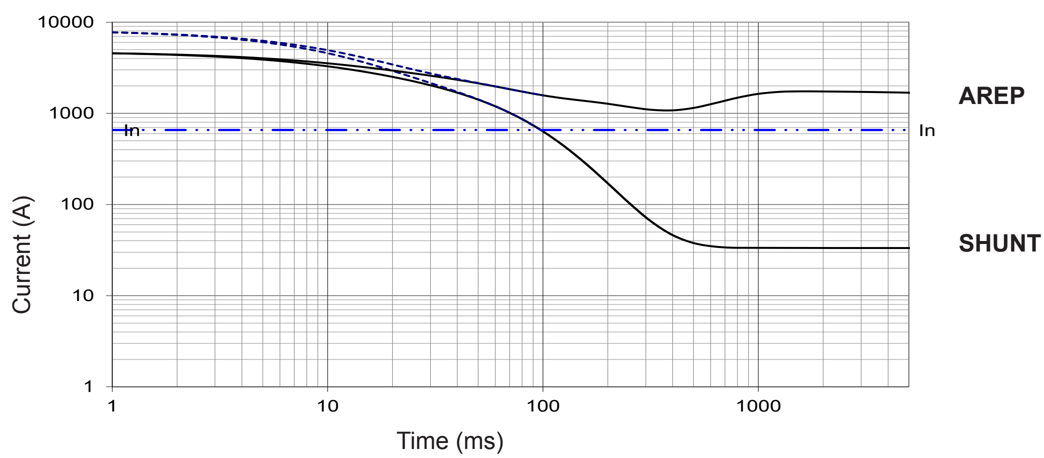
TAL 047 A

Symmetrical ——
Asymmetrical - - -



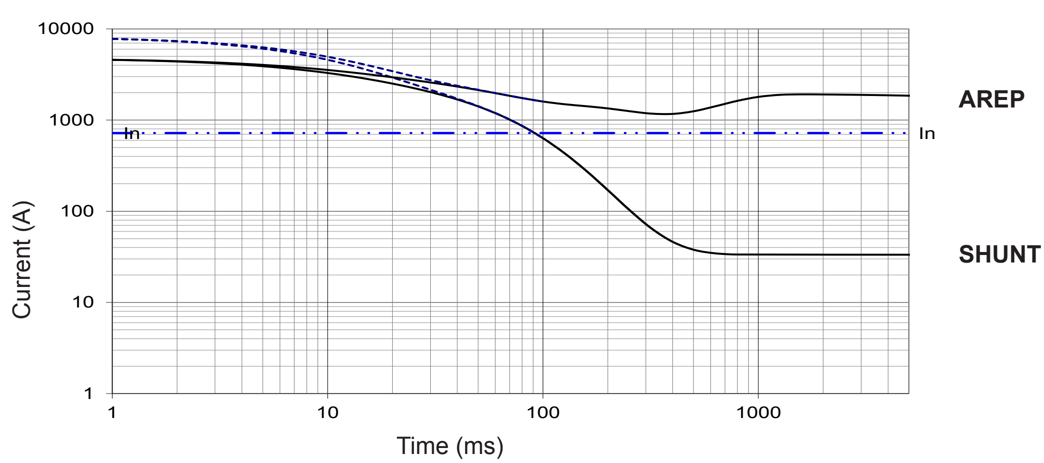
TAL 047 B

Symmetrical ——
Asymmetrical - - -



TAL 047 C

Symmetrical ——
Asymmetrical - - -

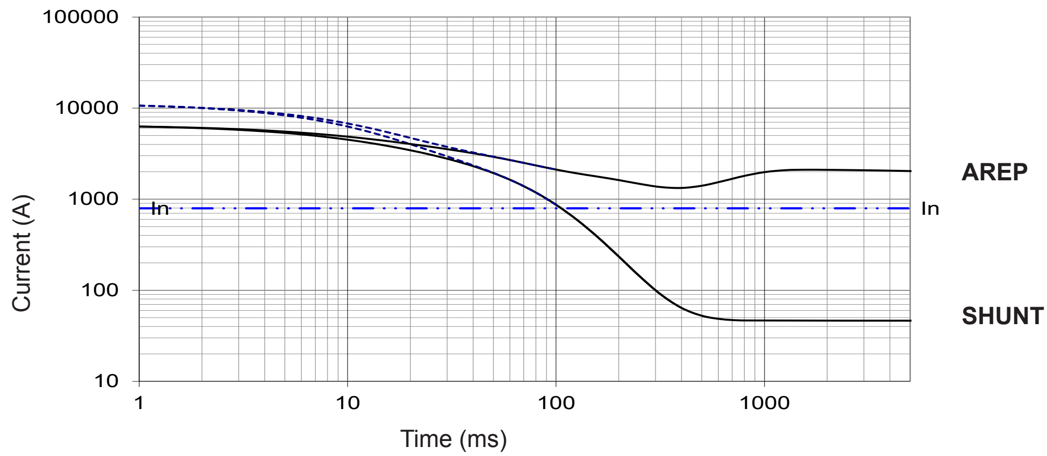


Influence due to connection
For (Δ) connection, use the following multiplication factor:
- Current value x 1.732.

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

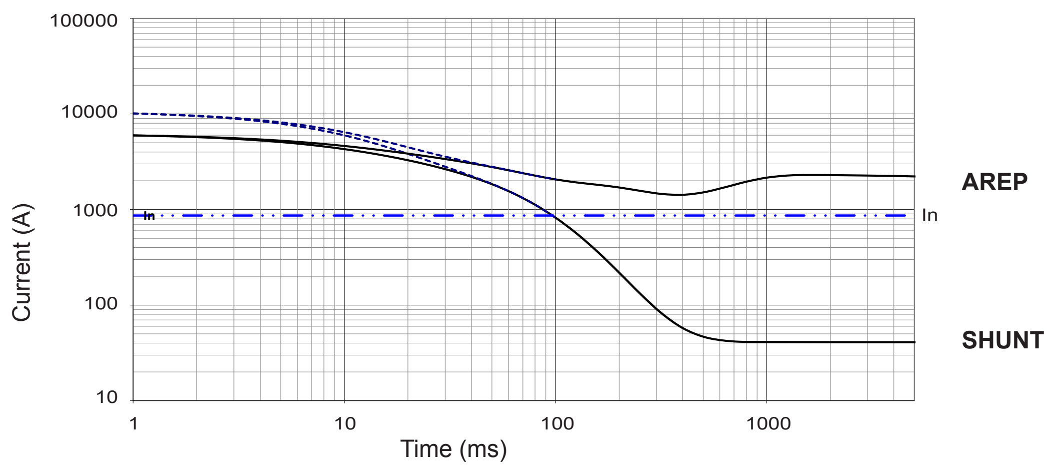
TAL 047 D

Symmetrical ——
Asymmetrical - - -



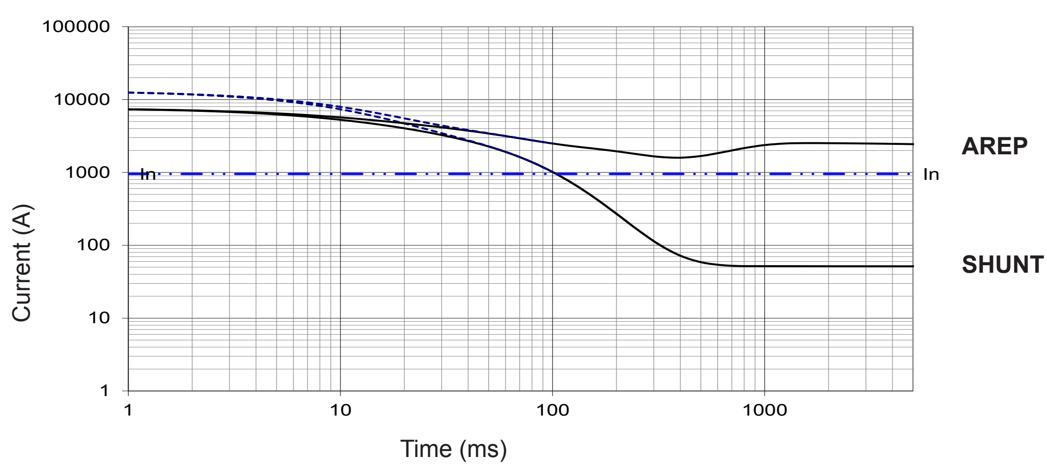
TAL 047 E

Symmetrical ——
Asymmetrical - - -



TAL 047 F

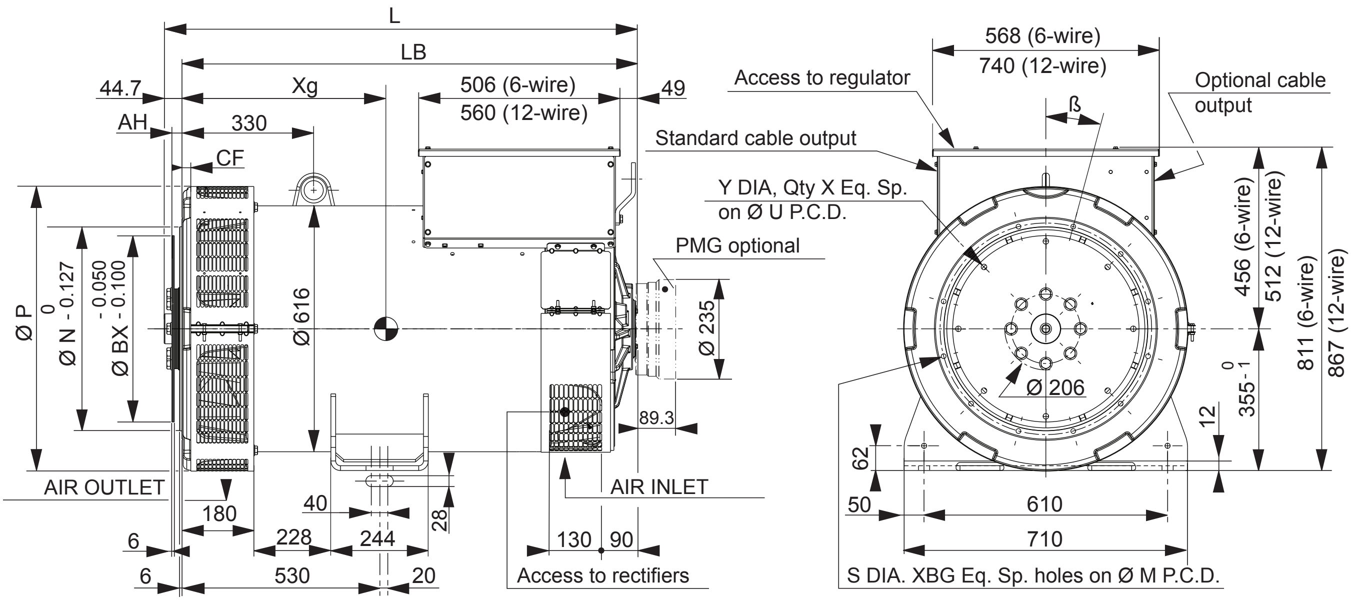
Symmetrical ——
Asymmetrical - - -



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		1.5	

Single bearing general arrangement



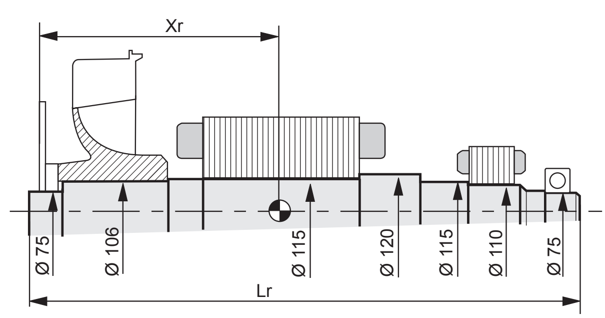
Dimensions (mm) and weight				
Type	L without PMG max.	LB max.	Xg	Weight (kg)
TAL 047 A	1041	996	437	976
TAL 047 B	1101	1056	471	1113
TAL 047 C	1101	1056	471	1113
TAL 047 D	1201	1156	511	1240
TAL 047 E	1201	1156	520	1289
TAL 047 F	1221	1176	545	1372

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 (mm)							
S.A.E.	P	N	M	XBG	S	β°	CF
1	713	511.175	530.225	12	12	15°	15
1/2	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 1/2	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 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 047 A	418.3	1020	374.9	5.92	408.5	1020	376	6.18
TAL 047 B	456	1080	426.6	6.77	446	1080	427.7	7.03
TAL 047 C	456	1080	426.6	6.77	446	1080	427.7	7.03
TAL 047 D	496	1180	477	7.5	486	1180	478.1	7.76
TAL 047 E	507	1180	493.8	7.8	497	1180	494.9	8.06
TAL 047 F	528	1200	525.2	8.32	518	1200	526.3	8.58

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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