



**TAL 046**

## **Low Voltage Alternator - 4 pole**

180 to 365 kVA - 50 Hz / 225 to 438 kVA - 60 Hz  
Electrical and mechanical data

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# TAL 046 - 180 to 365 kVA - 50 Hz / 225 to 438 kVA - 60 Hz

## 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):  
for TAL 046 H apply a derating coefficient of 0.97

# TAL 046 - 180 to 365 kVA - 50 Hz / 225 to 438 kVA - 60 Hz

## 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	< 2.5 %	
Air flow (m³/s)	0.48	Total Harmonic Distortion THD (**) in linear load	< 5 %	
Air flow (m³/s)	0.58	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.		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					
<b>TAL 046 A</b>	kVA	180	<b>180</b>	180	171	108	164	<b>164</b>	164	156	98	191	<b>191</b>	191	181	114	200	<b>200</b>	200	188	119
	kW	144	144	144	137	86	131	131	131	125	78	153	153	153	145	91	160	160	160	150	95
<b>TAL 046 B</b>	kVA	200	<b>200</b>	200	190	120	182	<b>182</b>	182	173	109	212	<b>212</b>	212	201	127	220	<b>220</b>	220	209	132
	kW	160	160	160	152	96	146	146	146	138	87	170	170	170	161	102	176	176	176	167	106
<b>TAL 046 C</b>	kVA	230	<b>230</b>	230	219	138	209	<b>209</b>	209	199	126	244	<b>244</b>	244	232	146	253	<b>253</b>	253	241	152
	kW	184	184	184	175	110	167	167	167	159	101	195	195	195	186	117	202	202	202	193	122
<b>TAL 046 D</b>	kVA	240	<b>250</b>	250	238	150	218	<b>228</b>	228	217	137	254	<b>265</b>	265	252	159	264	<b>275</b>	275	262	165
	kW	192	200	200	190	120	175	182	182	174	110	204	212	212	202	127	211	220	220	210	132
<b>TAL 046 E</b>	kVA	275	<b>275</b>	275	261	165	250	<b>250</b>	250	238	150	292	<b>292</b>	292	277	175	303	<b>303</b>	303	287	182
	kW	220	220	220	209	132	200	200	200	190	120	234	234	234	222	140	242	242	242	230	146
<b>TAL 046 F</b>	kVA	290	<b>300</b>	300	285	180	264	<b>273</b>	273	259	164	307	<b>318</b>	318	302	191	319	<b>330</b>	330	314	198
	kW	232	240	240	228	144	211	218	218	207	131	246	254	254	242	153	255	264	264	251	158
<b>TAL 046 G</b>	kVA	325	<b>325</b>	325	309	195	296	<b>296</b>	296	281	177	345	<b>345</b>	345	328	207	360	<b>360</b>	360	340	215
	kW	260	260	260	247	156	237	237	237	225	142	276	276	276	262	166	288	288	288	272	172
<b>TAL 046 H</b>	kVA	350	<b>365</b>	365	347	210	318	<b>332</b>	332	316	191	371	<b>387</b>	387	368	223	385	<b>400</b>	400	382	231
	kW	280	292	292	278	168	255	266	266	253	153	297	310	310	294	178	308	320	320	306	185

(\*) 12-wire option

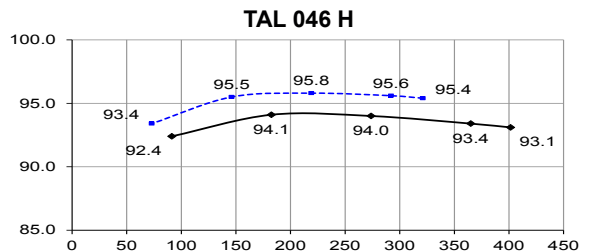
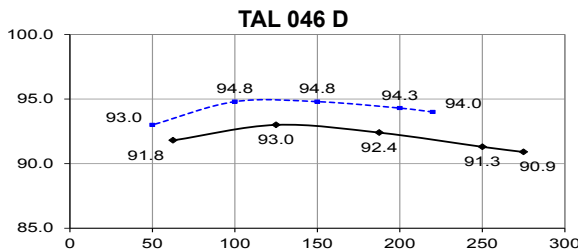
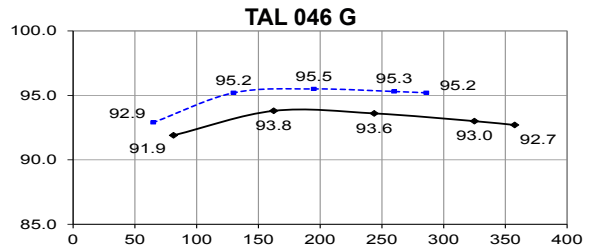
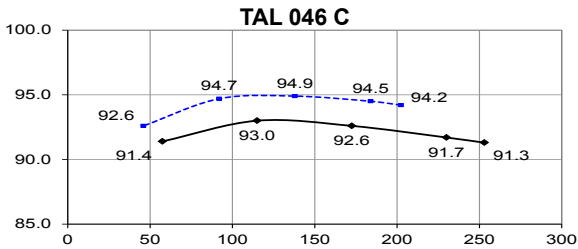
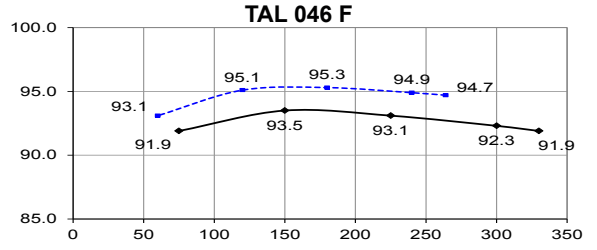
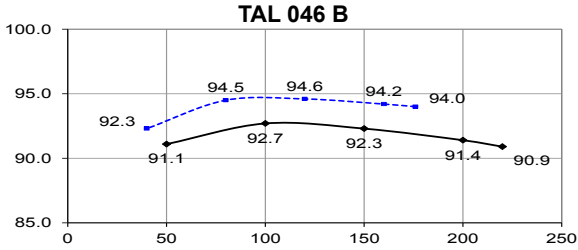
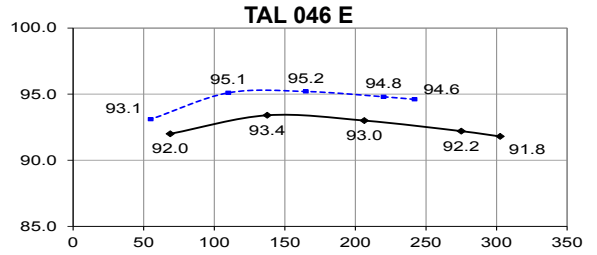
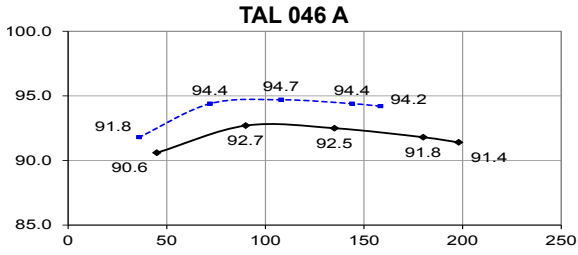
## Ratings 60 Hz - 1800 R.P.M.

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		208V		220V		208V		220V		208V		220V						
ΔΔ (*)				240V				240V				240V				240V					
<b>TAL 046 A</b>	kVA	180	195	210	<b>225</b>	120	164	177	191	<b>205</b>	109	191	207	223	<b>239</b>	127	200	215	230	<b>250</b>	132
	kW	144	156	168	180	96	131	142	153	164	87	153	166	178	191	102	160	172	184	200	106
<b>TAL 046 B</b>	kVA	200	215	230	<b>250</b>	132	182	196	209	<b>228</b>	120	212	228	244	<b>265</b>	140	220	237	253	<b>275</b>	145
	kW	160	172	184	200	106	146	157	167	182	96	170	182	195	212	112	176	190	202	220	116
<b>TAL 046 C</b>	kVA	226	250	262	<b>288</b>	152	206	228	238	<b>262</b>	138	240	265	278	<b>305</b>	161	250	275	288	<b>316</b>	167
	kW	181	200	210	230	122	165	182	190	210	110	192	212	222	244	129	200	220	230	253	134
<b>TAL 046 D</b>	kVA	245	265	280	<b>313</b>	165	223	241	255	<b>285</b>	150	260	281	297	<b>332</b>	175	270	292	308	<b>344</b>	182
	kW	196	212	224	250	132	178	193	204	228	120	208	225	238	266	140	216	234	246	275	146
<b>TAL 046 E</b>	kVA	275	300	315	<b>344</b>	182	250	273	287	<b>313</b>	166	292	318	334	<b>365</b>	193	303	330	347	<b>378</b>	200
	kW	220	240	252	275	146	200	218	230	250	133	234	254	267	292	154	242	264	278	302	160
<b>TAL 046 F</b>	kVA	290	315	340	<b>360</b>	200	264	287	309	<b>328</b>	182	307	334	360	<b>382</b>	212	320	347	374	<b>400</b>	220
	kW	232	252	272	288	160	211	230	247	262	146	246	267	288	306	170	256	278	299	320	176
<b>TAL 046 G</b>	kVA	315	345	365	<b>406</b>	215	287	314	332	<b>369</b>	196	334	366	387	<b>430</b>	228	347	380	402	<b>447</b>	237
	kW	252	276	292	325	172	230	251	266	295	157	267	293	310	344	182	278	304	322	358	190
<b>TAL 046 H</b>	kVA	345	375	400	<b>438</b>	231	314	341	364	<b>399</b>	210	366	398	424	<b>464</b>	245	380	413	440	<b>480</b>	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

# TAL 046 - 180 to 365 kVA - 50 Hz / 225 to 438 kVA - 60 Hz

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



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

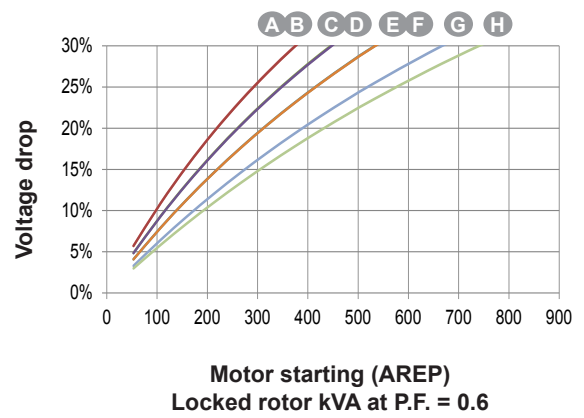
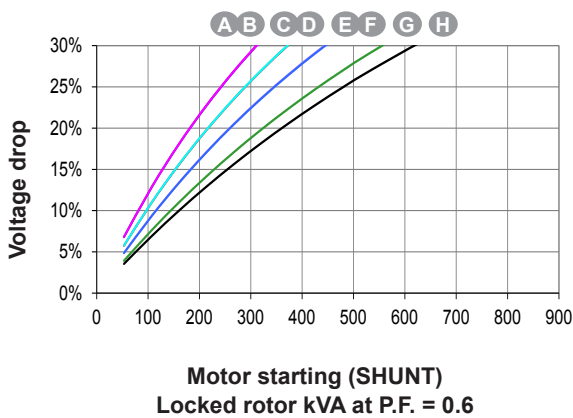
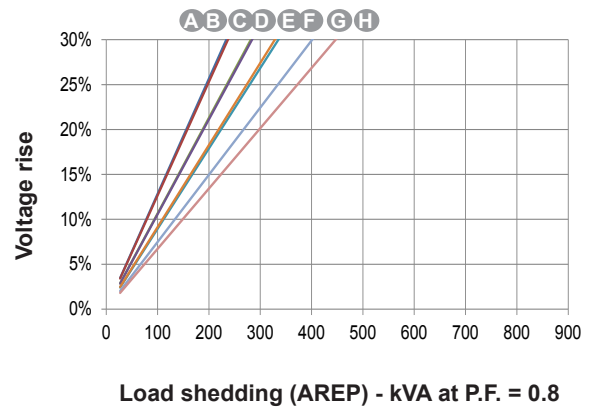
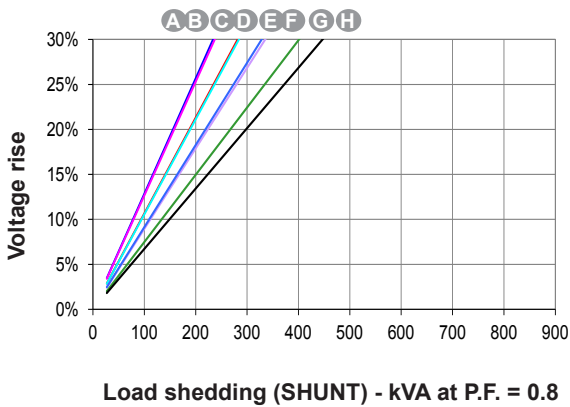
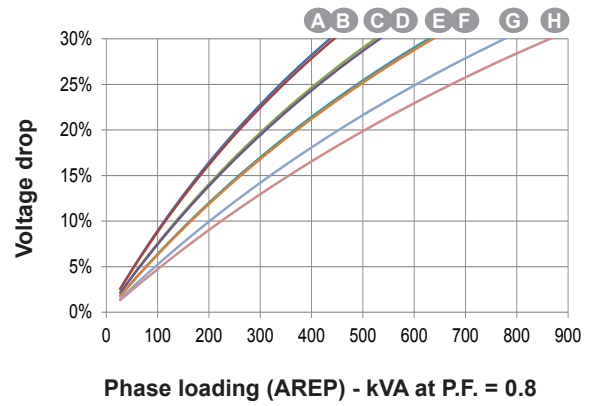
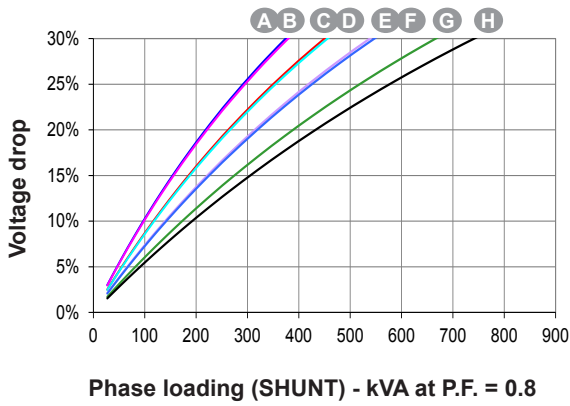
	A	B	C	D	E	F	G	H
<b>Kcc</b> Short-circuit ratio	0.39	0.35	0.37	0.34	0.37	0.4	0.45	0.43
<b>Xd</b> Direct-axis synchro. reactance unsaturated	313	348	340	370	347	335	297	303
<b>Xq</b> Quadrature-axis synchro. reactance unsaturated	159	177	173	188	177	171	151	154
<b>T'do</b> No-load transient time constant	1956	1956	1983	1983	2018	2033	2072	2093
<b>X'd</b> Direct-axis transient reactance saturated	16	17.7	17.1	18.6	17.1	16.5	14.3	14.5
<b>T'd</b> Short-circuit transient time constant	100	100	100	100	100	100	100	100
<b>X''d</b> Direct-axis subtransient reactance saturated	12.8	14.2	13.7	14.9	13.7	13.2	11.4	11.6
<b>T''d</b> Subtransient time constant	10	10	10	10	10	10	10	10
<b>X''q</b> Quadrature-axis subtransient reactance saturated	16.4	18.2	17.4	18.9	17.2	16.4	14.1	14.2
<b>Xo</b> Zero sequence reactance	0.66	0.74	0.71	0.77	0.71	0.68	0.59	0.6
<b>X2</b> Negative sequence reactance saturated	14.6	16.2	15.6	16.9	15.5	14.8	12.8	12.9
<b>Ta</b> Armature time constant	15	15	15	15	15	15	15	15

## Other class H / 400 V data

<b>io (A)</b> No-load excitation current SHUNT/AREP	0.95	0.95	1.01	1.01	1.1	1.1	1.06	1.06
<b>ic (A)</b> On-load excitation current SHUNT/AREP	3.4	3.72	3.84	4.14	3.99	3.64	3.63	3.63
<b>uc (V)</b> On-load excitation voltage SHUNT/AREP	48	52.4	37.4	40.2	55.6	46.2	42.1	41.9
<b>ms</b> Response time ( $\Delta U = 20\%$ transient)	500	500	500	500	500	500	500	500
<b>kVA</b> Start ( $\Delta U = 20\%$ cont. or $\Delta U = 30\%$ trans.) SHUNT*	311	311	372	371	444	445	556	618
<b>kVA</b> Start ( $\Delta U = 20\%$ cont. or $\Delta U = 30\%$ trans.) AREP*	374	376	446	447	533	534	667	741
<b>%</b> Transient $\Delta U$ (on-load 4/4) SHUNT - P.F.: 0.8 <sub>Lag</sub>	17.1	18.4	18	19.1	18	19.1	17.4	17.4
<b>%</b> Transient $\Delta U$ (on-load 4/4) AREP - P.F.: 0.8 <sub>Lag</sub>	15.1	16.2	15.8	16.8	16.2	17.2	17.3	15.4
<b>W</b> No-load losses	2977	2977	3297	3297	3625	4013	4541	4750
<b>W</b> Heat dissipation	12841	15040	16562	18869	18504	19800	19303	20484

\* P.F. = 0.6

Transient voltage variation 400 V - 50 Hz

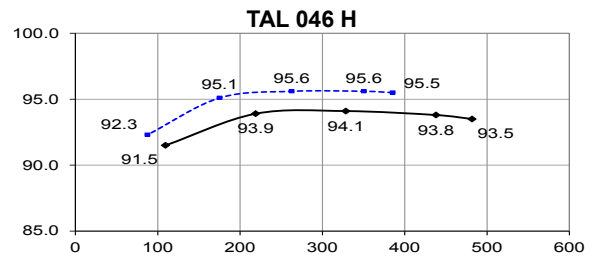
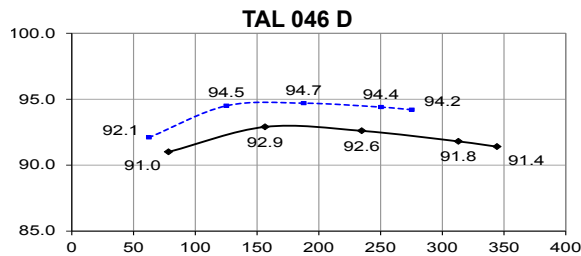
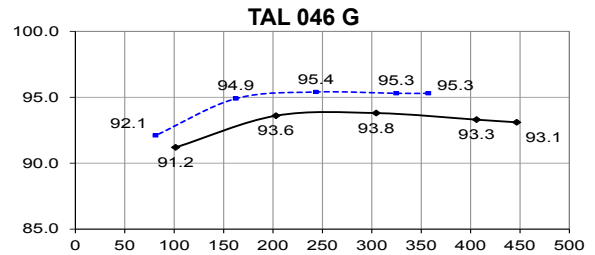
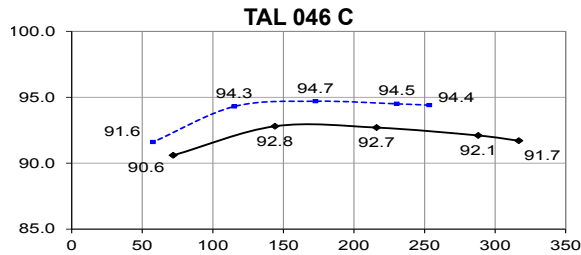
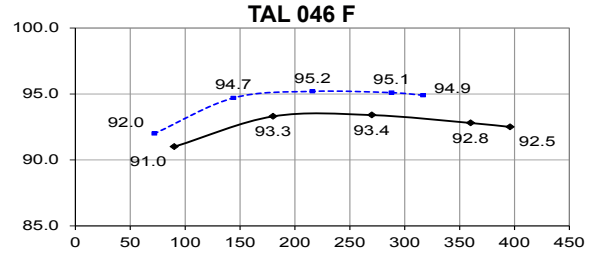
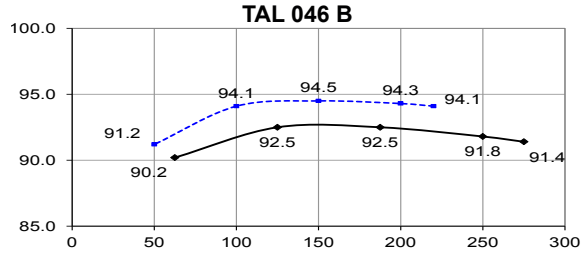
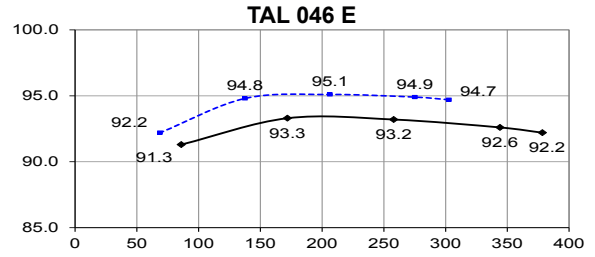
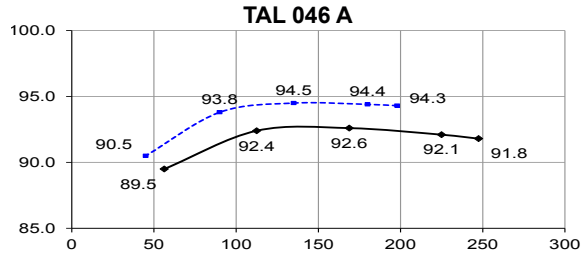


- 1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by  $K = \text{Sine P.F.} / 0.8$
- 2) For voltages other than 400V (Y), 230V (Δ) at 50 Hz, then kVA must be multiplied by  $(400/U)^2$  or  $(230/U)^2$ .



# TAL 046 - 180 to 365 kVA - 50 Hz / 225 to 438 kVA - 60 Hz

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



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

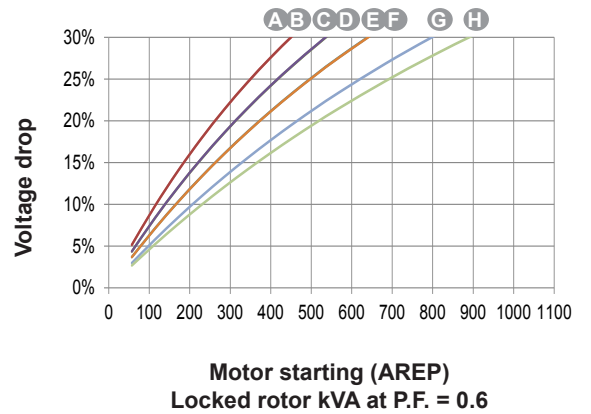
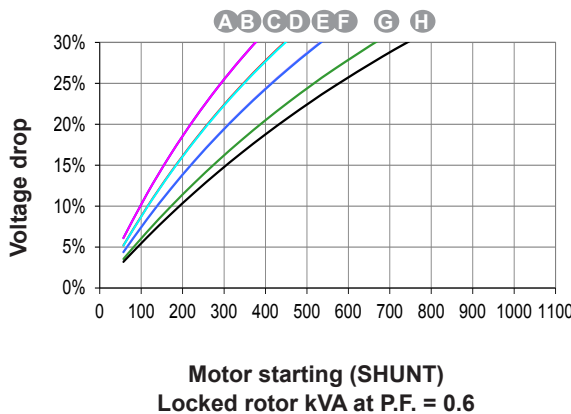
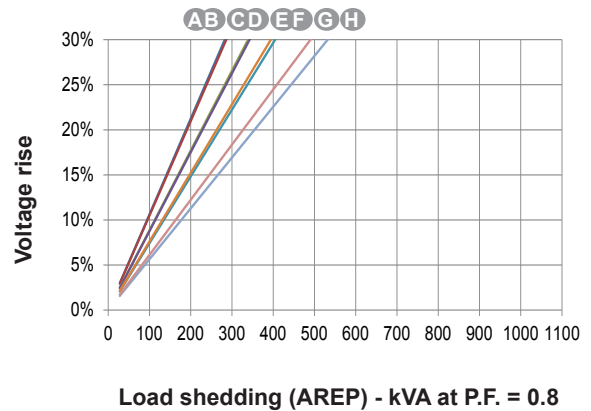
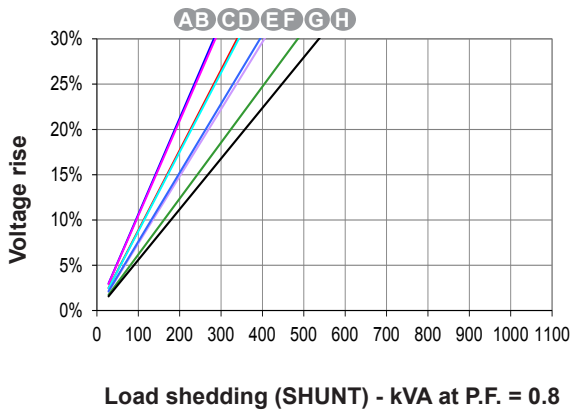
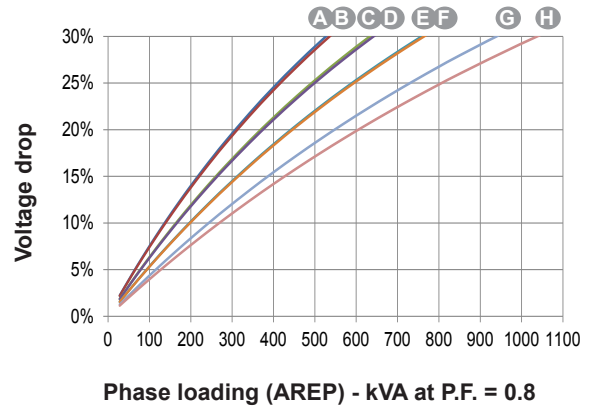
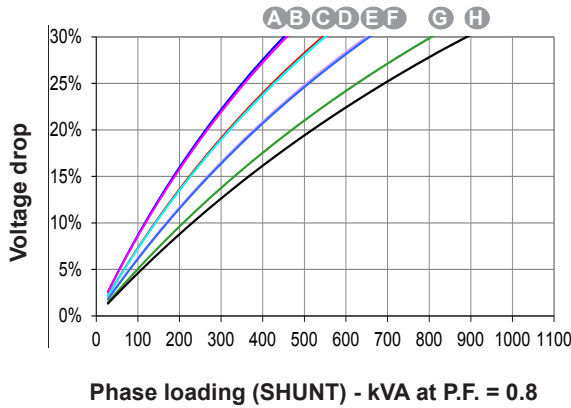
	A	B	C	D	E	F	G	H
<b>Kcc</b> Short-circuit ratio	0.37	0.34	0.36	0.33	0.35	0.4	0.43	0.43
<b>Xd</b> Direct-axis synchro. reactance unsaturated	326	362	355	386	361	335	309	303
<b>Xq</b> Quadrature-axis synchro. reactance unsaturated	166	185	181	197	184	171	157	154
<b>T'do</b> No-load transient time constant	1956	1956	1983	1983	2018	2033	2072	2093
<b>X'd</b> Direct-axis transient reactance saturated	16.6	18.5	17.9	19.4	17.9	16.5	14.9	14.5
<b>T'd</b> Short-circuit transient time constant	100	100	100	100	100	100	100	100
<b>X''d</b> Direct-axis subtransient reactance saturated	13.3	14.8	14.3	15.5	14.3	13.2	11.9	11.6
<b>T''d</b> Subtransient time constant	10	10	10	10	10	10	10	10
<b>X''q</b> Quadrature-axis subtransient reactance saturated	17	18.9	18.1	19.7	18	16.4	14.7	14.2
<b>Xo</b> Zero sequence reactance	0.69	0.77	0.74	0.81	0.74	0.68	0.62	0.6
<b>X2</b> Negative sequence reactance saturated	15.2	16.9	16.2	17.6	16.2	14.8	13.3	12.9
<b>Ta</b> Armature time constant	15	15	15	15	15	15	15	15

## Other class H / 480 V data

<b>io (A)</b> No-load excitation current SHUNT/AREP	0.94	0.94	1.01	1.01	1.03	1.1	1.1	1.06
<b>ic (A)</b> On-load excitation current SHUNT/AREP	3.46	3.79	3.91	4.21	4.03	3.91	3.69	3.56
<b>uc (V)</b> On-load excitation voltage SHUNT/AREP	49	53.6	38.3	41.1	56.7	45.5	42.9	41.3
<b>ms</b> Response time ( $\Delta U = 20\%$ transient)	500	500	500	500	500	500	500	500
<b>kVA</b> Start ( $\Delta U = 20\%$ cont. or $\Delta U = 30\%$ trans.) SHUNT*	376	376	446	448	532	534	665	742
<b>kVA</b> Start ( $\Delta U = 20\%$ cont. or $\Delta U = 30\%$ trans.) AREP*	450	450	537	536	639	640	798	889
<b>%</b> Transient $\Delta U$ (on-load 4/4) SHUNT - P.F.: 0.8 <sub>LAD</sub>	17.6	19	18.5	19.6	18.5	19.1	17.8	17.4
<b>%</b> Transient $\Delta U$ (on-load 4/4) AREP - P.F.: 0.8 <sub>LAD</sub>	15.5	16.7	16.3	17.3	16.7	17.2	16	15.7
<b>W</b> No-load losses	4522	4522	4958	4958	5412	5935	6673	6978
<b>W</b> Heat dissipation	15376	17830	19674	22244	21910	22085	23012	23141

\* P.F. = 0.6

Transient voltage variation 480 V - 60 Hz

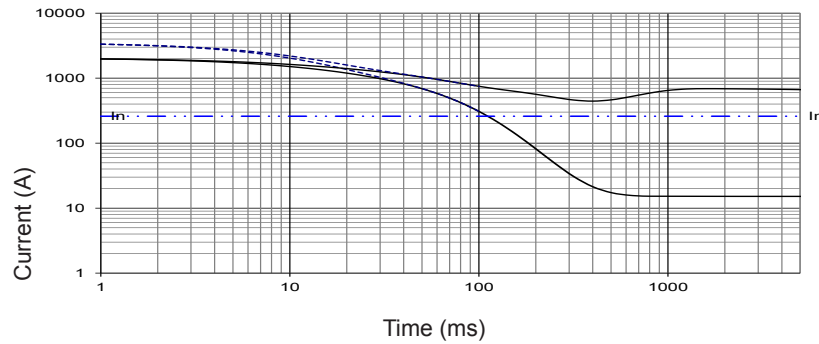


- 1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by  $K = \text{Sine P.F.} / 0.8$
- 2) For voltages other than 480V (Y), 277V (Δ), 240V (YY) at 60 Hz, then kVA must be multiplied by  $(480/U)^2$  or  $(277/U)^2$  or  $(240/U)^2$ .

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

**TAL 046 A**

Symmetrical —  
Asymmetrical - - -

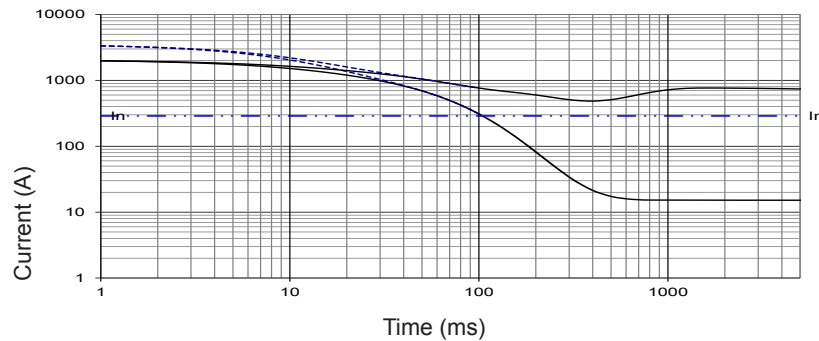


AREP

SHUNT

**TAL 046 B**

Symmetrical —  
Asymmetrical - - -

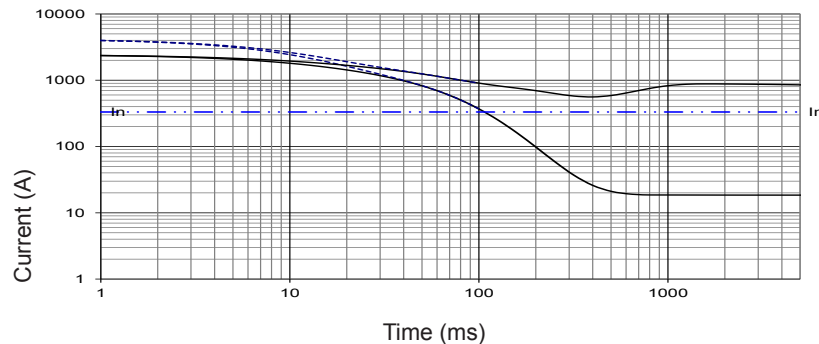


AREP

SHUNT

**TAL 046 C**

Symmetrical —  
Asymmetrical - - -

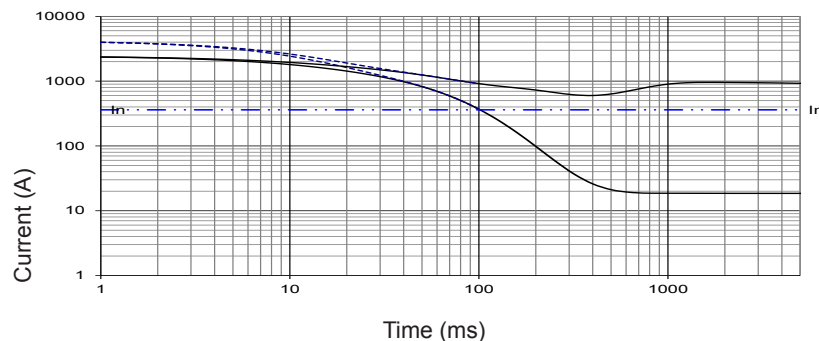


AREP

SHUNT

**TAL 046 D**

Symmetrical —  
Asymmetrical - - -



AREP

SHUNT

**Influence due to connection**

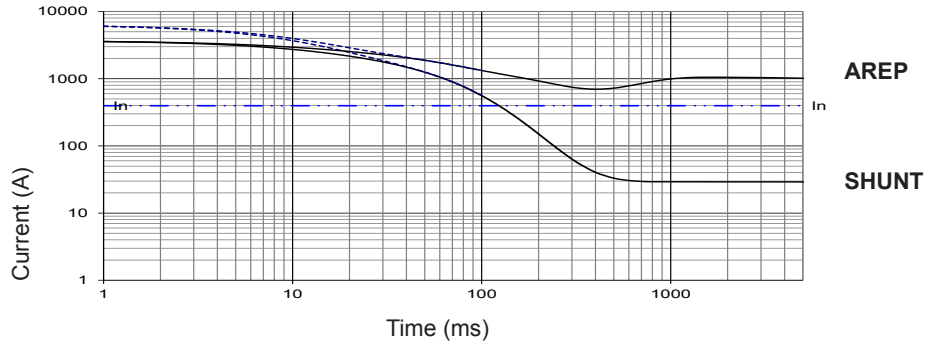
For (Δ) connection, use the following multiplication factor:  
- Current value x 1.732.



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

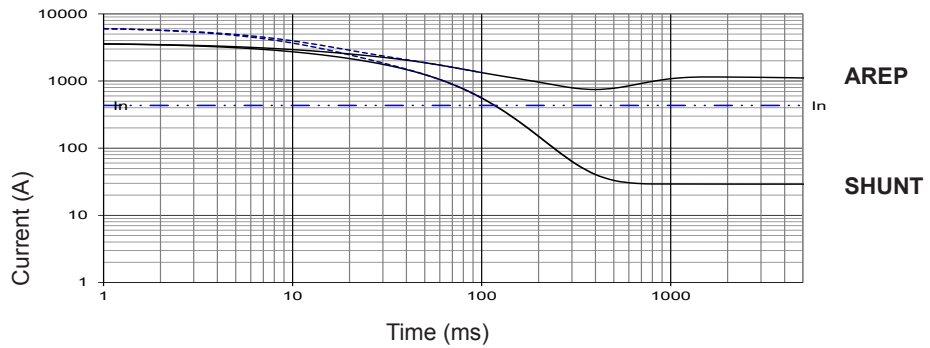
TAL 046 E

Symmetrical —  
Asymmetrical - - -



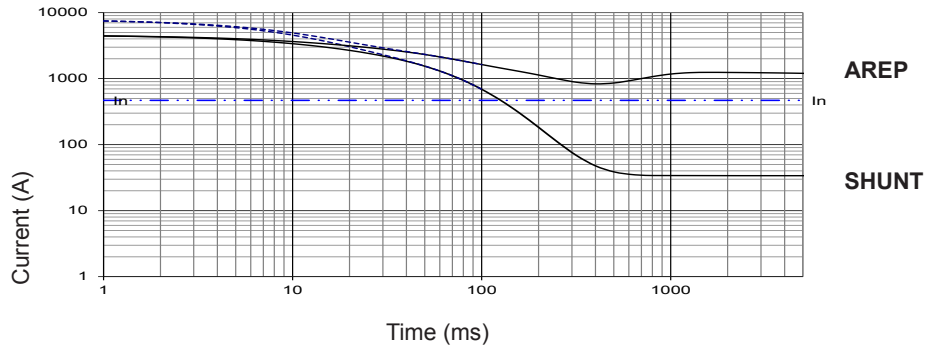
TAL 046 F

Symmetrical —  
Asymmetrical - - -



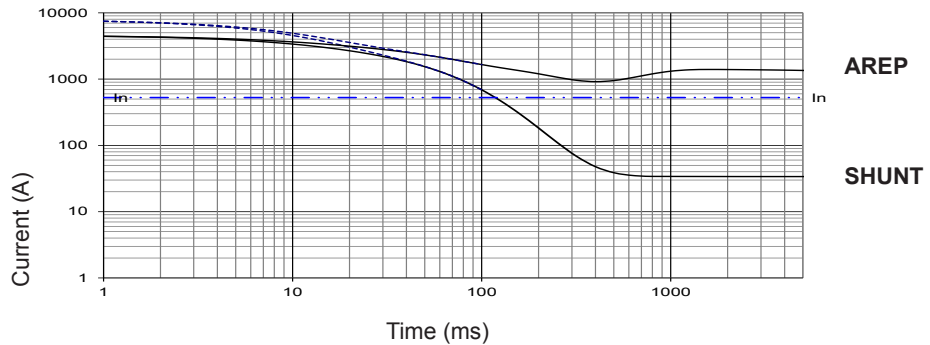
TAL 046 G

Symmetrical —  
Asymmetrical - - -



TAL 046 H

Symmetrical —  
Asymmetrical - - -

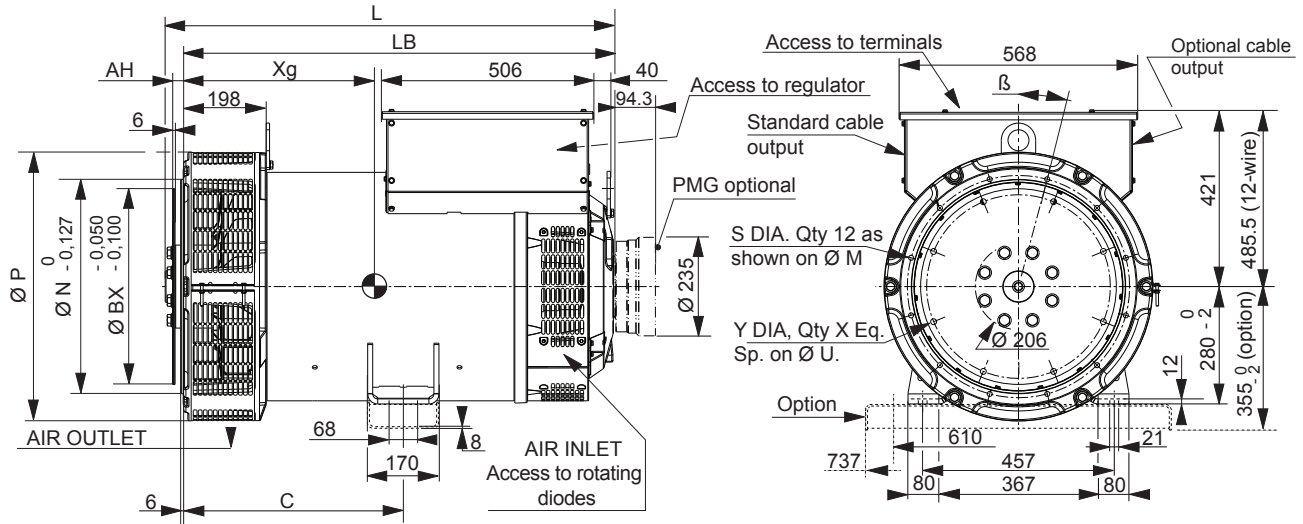


**Influence due to short-circuit**  
Curves are based on a three-phase short-circuit.  
For other types of short-circuit,  
use the following multiplication factors.

	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		1.5	

# TAL 046 - 180 to 365 kVA - 50 Hz / 225 to 438 kVA - 60 Hz

## Single bearing general arrangement



Dimensions (mm) and weight					
Type	L without PMG	LB	Xg	C	Weight (kg)
TAL 046 A	944**/935	892	408	429	569
TAL 046 B	944**/935	892	414	429	599
TAL 046 C	944**/935	892	423	429	674
TAL 046 D	944**/935	892	423	429	682
TAL 046 E	989**/980	937	445	429	754
TAL 046 F	989**/980	937	445	429	754
TAL 046 G*	1084**/1075	1032	493	525	888
TAL 046 H*	1084**/1075	1032	493	525	888

Coupling	Flex plate		
	11 1/2	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 1/2		X	
Flange S.A.E 0		X	X

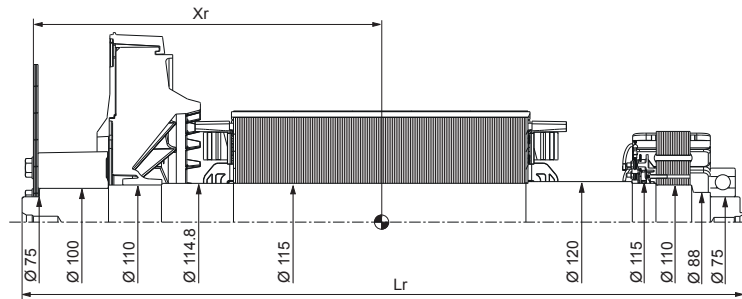
\* Shaft height = 355 mm optional  
\*\* Dimensions with SAE 11 1/2

Flange (mm)					
S.A.E.	P	N	M	S	β °
3	641	409.575	428.625	11	15°
2	641	447.675	466.725	11	15°
1	641 (713 : J)	511.175	530.225	12	15°
1/2	713	584.2	619.125	14	15°
0	713	647.7	679.45	14	11° 15'

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

\*\*\* Option

## Torsional data



Centre of gravity: Xr (mm), Rotor length: Lr (mm), Weight: M (kg), Moment of inertia: J (kgm <sup>2</sup> ): (4J = MD <sup>2</sup> )								
Type	Flex plate S.A.E. 11 1/2				Flex plate S.A.E. 14			
	Xr	Lr	M	J	Xr	Lr	M	J
TAL 046 A	413	923	243	2.46	401	923	244	2.62
TAL 046 B	413	923	243	2.46	401	923	244	2.62
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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