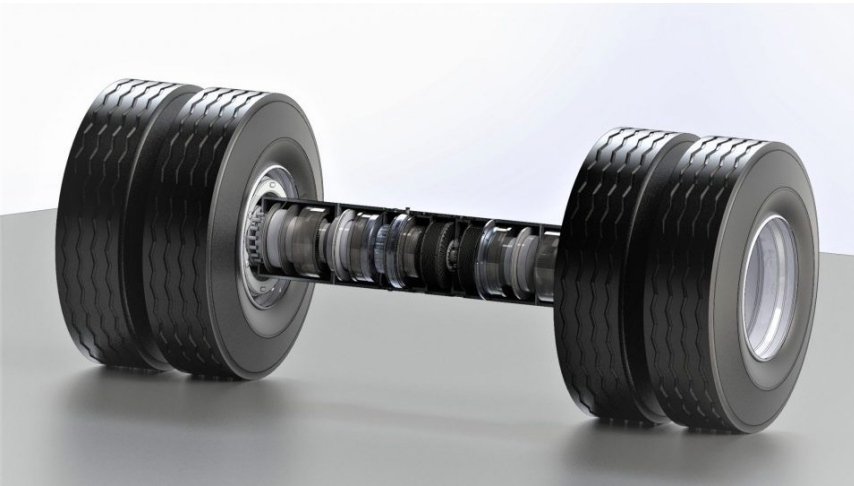


Tiro

Electric Axle



Tech Spec.
60-980 kW

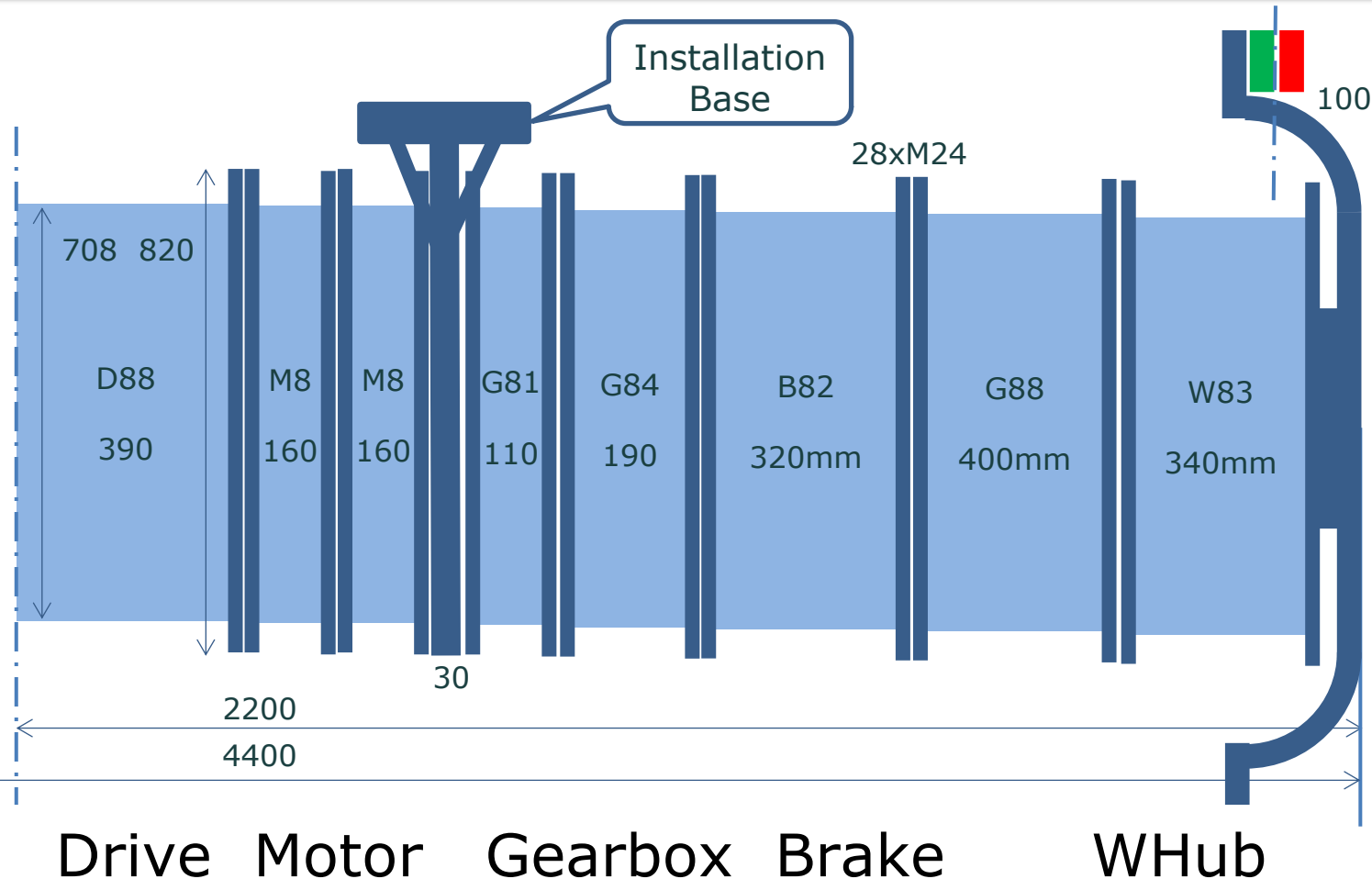
Belaz 136t

G81 G84 G88
Ratio=5.50x4.60x4.60
Ratio=116.38

Tiro

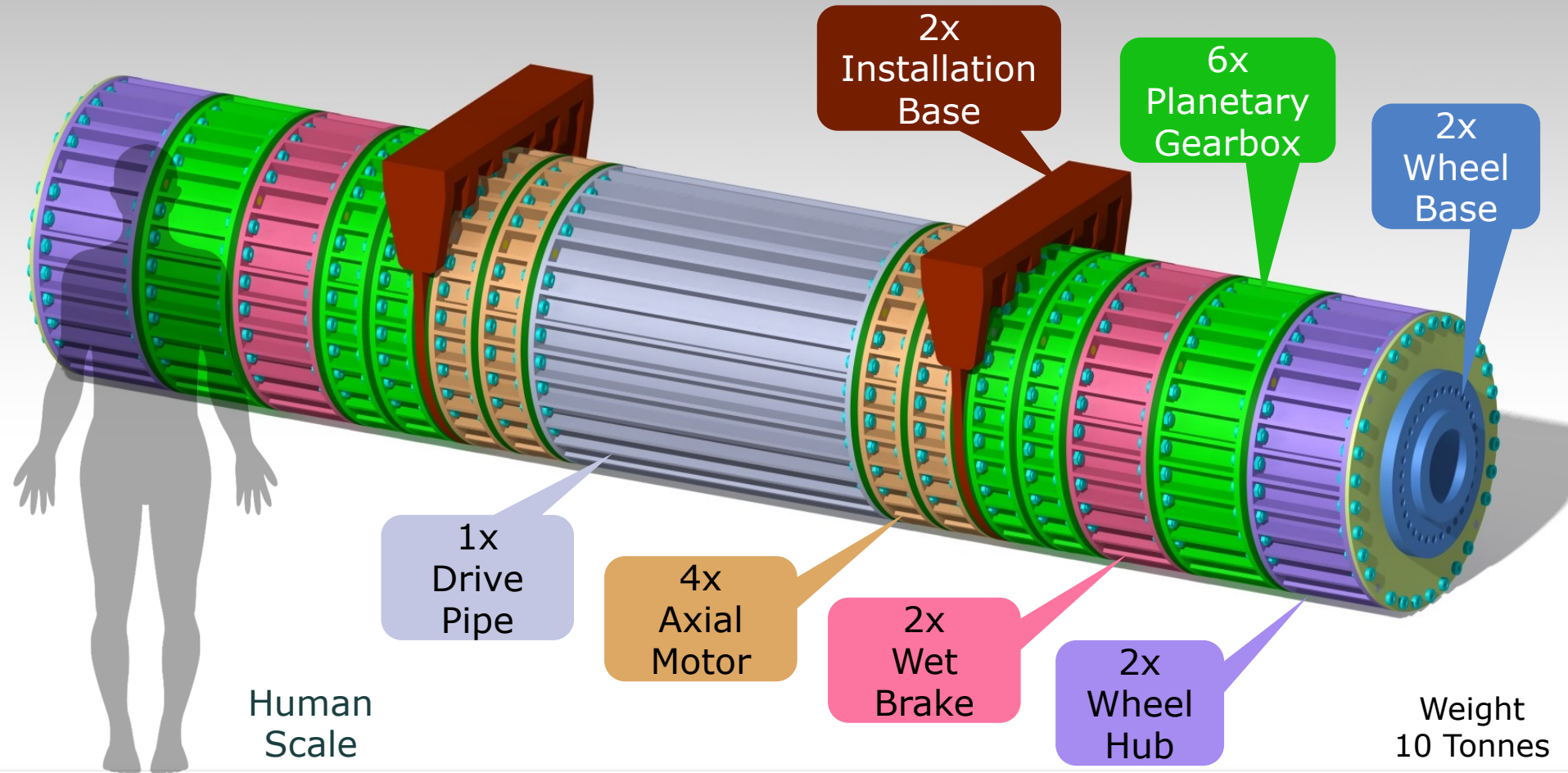
EA81

D88
M88
G81
G84
B82
G88
W83



Hepco eAxle, 160 Tonnes, 4x750 kW

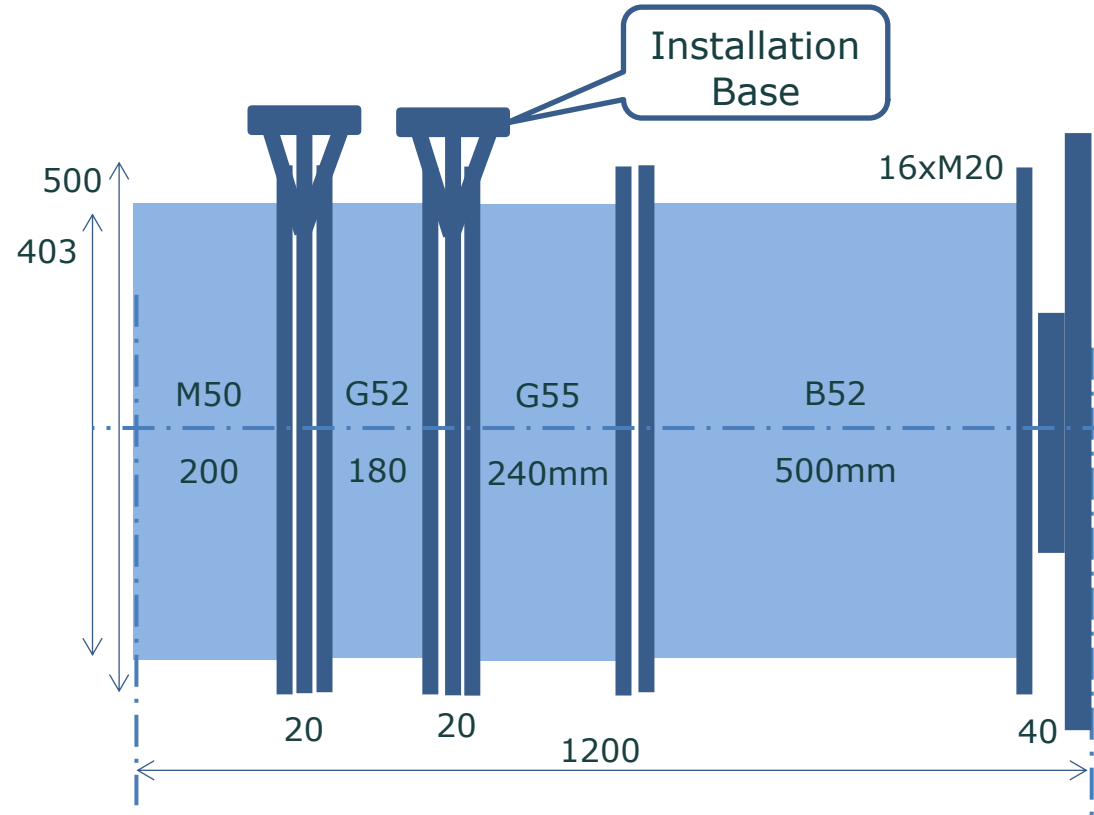
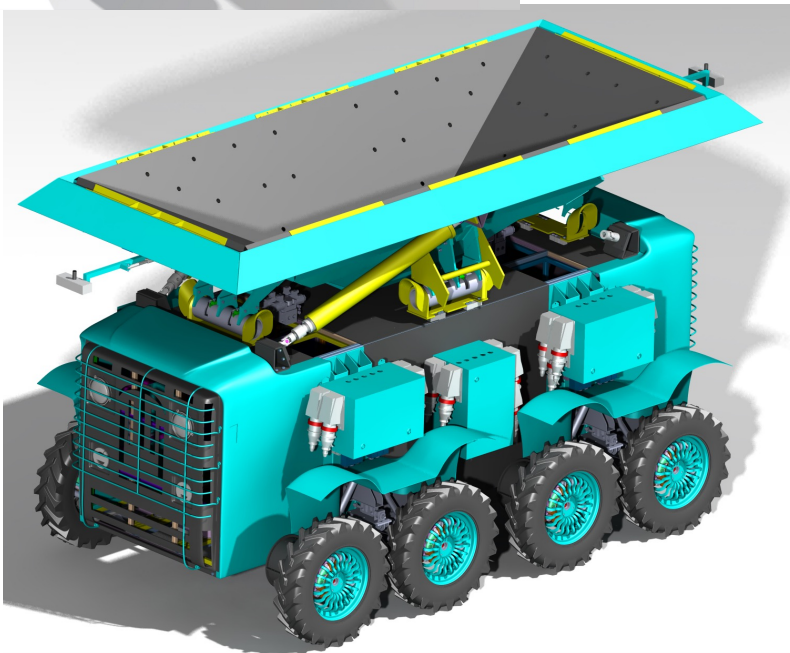
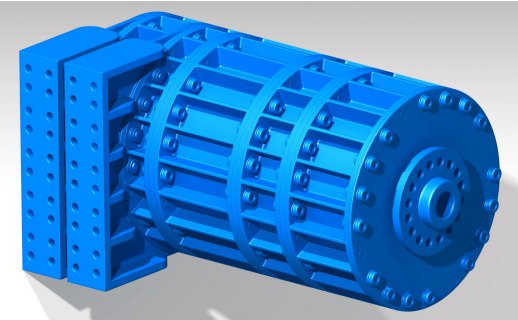
Tiro



M050, eAxle EA51

G52 G55
Ratio=6.00x4.50
Ratio=27.00

Tiro



Motor, 2xGearbox,

Brake

Drive

D88
2xD8 = 2x670 kW

Tiro

Drive, FOC, 0-500 Volts							
D #	Peak Power kW	Input Voltage V DC	Overall Length mm	Overall Width mm	Overall Height mm	Input Cable mm2	Total Weight kg
1	60	500±5%	400	200	100	4x10	16
2	100					4x25	
3	160					4x50	
4	180	500±5%	600	300	150	4x120	41
5	330					4x185	
6	500					4x300	
7	520	500±5%	800	400	200	4x400	64
8	750					4x500	
9	980					4x625	

Peak power only for 30s, Continuous power is 50% of peak.
Brake efficiency is 80%.

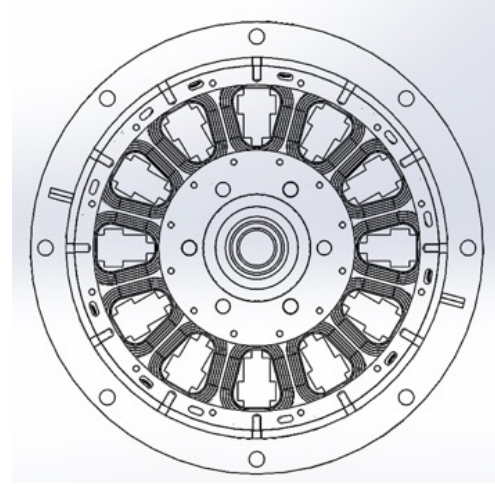


Motor, 9 Sizes

Motor, Axial Flux PMSM, Liquid Cooling, 0-500 Volts, 1 Stator & 2 Rotors												
M #	Peak Power kW	Peak Torque Nm	Peak Speed RPM	Nominal Dia. Inches	External Width mm	Stator Coils #	Rotor Magnets #	Input Cable mm2	O Shaft Ref. Dia. DIN 5480	O Hub Ext. Dia. mm	O Hub Bearing ####	Total Weight kg
1	60	90	6000	Ø06" ST	100	12	10	3x10	20	30	6206	10
2	100	160		Ø08" ST				3x25				18
3	160	260		Ø10" ST				3x50				28
4	180	370	4800	Ø12" XS	120	18	16	3x120	30	40	6208	48
5	330	660		Ø16" XS				3x185				85
6	500	1000		Ø20" XS				3x300				133
7	520	1400	3600	Ø24" 30	140	24	22	3x400	40	60	6212	223
8	750	2000		Ø28" 30				3x500				304
9	980	2600		Ø32" 30				3x625				397

Hub min hadness is 60RC.

Peak torque & power only for 30s, Contin. torque & power are 50% of peaks.
The best efficiency is 92% at 50% of max continuous speed with resolver sensor.

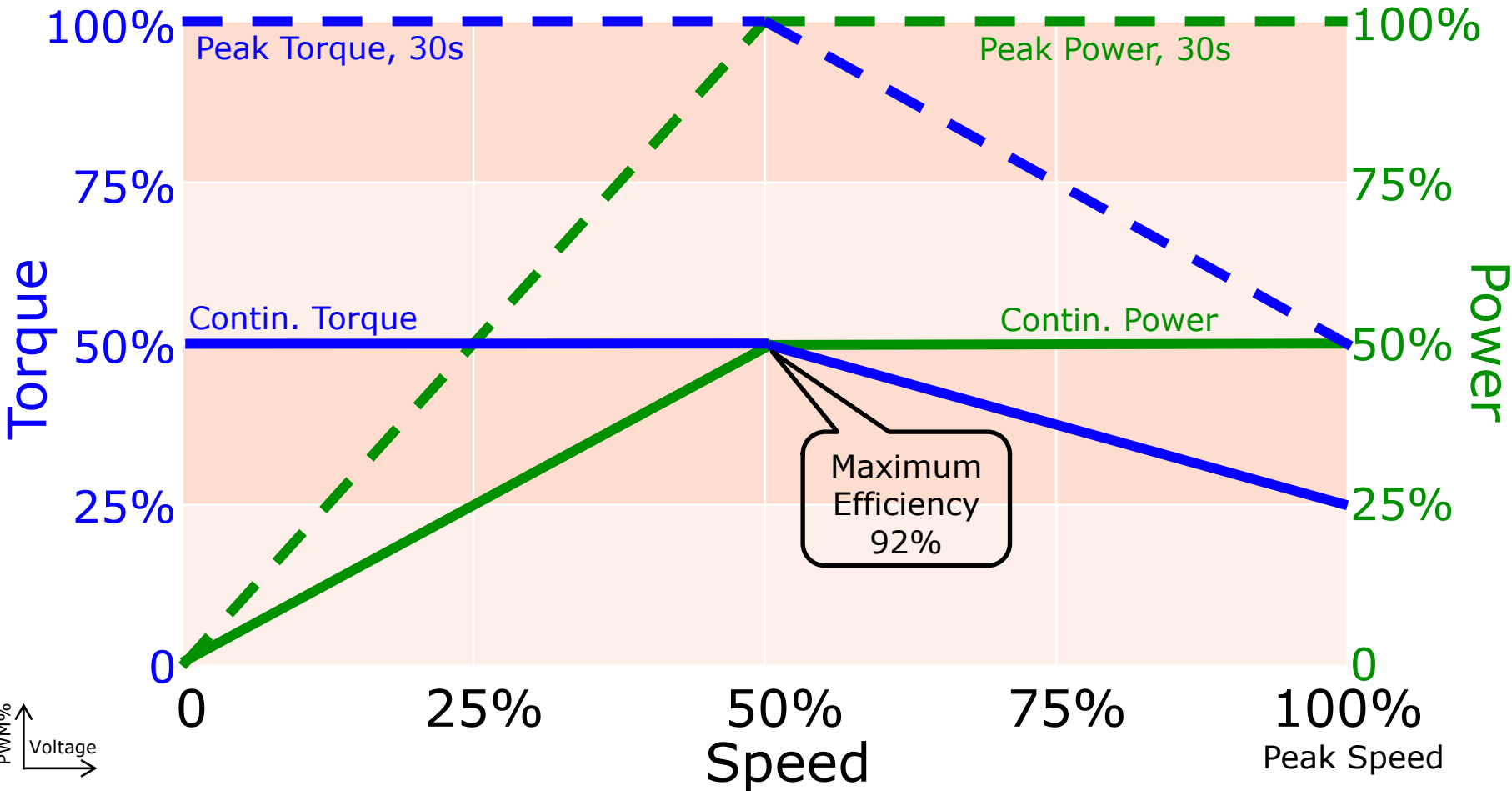


Motor

Tiro



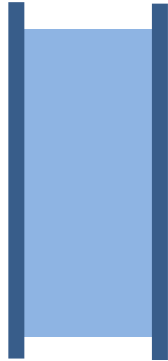
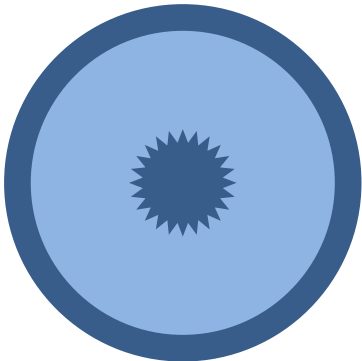
Motor, Performance Chart



Gearbox, Ratios



Gearbox Combi Ratios, G1-3							Gearbox Combi Ratios, G4-7							Gearbox Combi Ratios, G8-9						
Stage 1	Stage 2		-	Stage 3			Stage 1	Stage 2		-	Stage 3			Stage 1	Stage 2		-	Stage 3		
			-	Ratio7	Ratio8	Ratio9				-	Ratio7	Ratio8	Ratio9				-	Ratio7	Ratio8	Ratio9
			-	2.75	3.00	3.33				-	3.13	3.43	3.83				-	3.50	3.86	4.33
-	Ratio4	3.43	1.00	2.75	3.00	3.33	-	Ratio4	4.00	1.00	3.13	3.43	3.83	-	Ratio4	4.57	1.00	3.50	3.86	4.33
	Ratio5	3.83	3.43	9.43	10.29	11.43		Ratio5	4.50	4.00	12.50	13.71	15.33		Ratio5	5.17	4.57	16.00	17.63	19.81
	Ratio6	4.40	3.83	10.54	11.50	12.78		Ratio6	5.20	4.50	14.06	15.43	17.25		Ratio6	6.00	5.17	18.08	19.93	22.39
Ratio1 4.43	Ratio4	3.43	4.40	12.10	13.20	14.67	Ratio1 5.29	Ratio4	4.00	5.20	16.25	17.83	19.93	Ratio1 6.14	Ratio4	4.57	6.00	21.00	23.14	26.00
	Ratio5	3.83	4.43	12.18	13.29	14.76		Ratio5	4.50	5.29	16.52	18.12	20.26		Ratio5	5.17	6.14	21.50	23.69	26.62
	Ratio6	4.40	15.18	41.76	45.55	50.61		Ratio6	5.20	21.14	66.07	72.49	81.05		Ratio6	6.00	28.08	98.29	108.31	121.69
Ratio2 5.00	Ratio4	3.43	16.98	46.68	50.93	56.59	Ratio2 6.00	Ratio4	4.00	23.79	74.33	81.55	91.18	Ratio2 7.00	Ratio4	4.57	31.74	111.08	122.42	137.53
	Ratio5	3.83	19.49	53.59	58.46	64.95		Ratio5	4.50	27.49	85.89	94.24	105.36		Ratio5	5.17	36.86	129.00	142.16	159.71
	Ratio6	4.40	5.00	13.75	15.00	16.67		Ratio6	5.20	6.00	18.75	20.57	23.00		Ratio6	6.00	7.00	24.50	27.00	30.33
Ratio3 5.80	Ratio4	3.43	17.14	47.14	51.43	57.14	Ratio3 7.00	Ratio4	4.00	24.00	75.00	82.29	92.00	Ratio3 8.20	Ratio4	4.57	32.00	112.00	123.43	138.67
	Ratio5	3.83	19.17	52.71	57.50	63.89		Ratio5	4.50	27.00	84.38	92.57	103.50		Ratio5	5.17	36.17	126.58	139.50	156.72
	Ratio6	4.40	22.00	60.50	66.00	73.33		Ratio6	5.20	31.20	97.50	106.97	119.60		Ratio6	6.00	42.00	147.00	162.00	182.00
	Ratio4	3.43	5.80	15.95	17.40	19.33		Ratio4	4.00	7.00	21.88	24.00	26.83		Ratio4	4.57	8.20	28.70	31.63	35.53
	Ratio5	3.83	19.89	54.69	59.66	66.29		Ratio5	4.50	28.00	87.50	96.00	107.33		Ratio5	5.17	37.49	131.20	144.59	162.44
	Ratio6	4.40	22.23	61.14	66.70	74.11		Ratio6	5.20	31.50	98.44	108.00	120.75		Ratio6	6.00	42.37	148.28	163.41	183.59
			25.52	70.18	76.56	85.07				36.40	113.75	124.80	139.53				49.20	172.20	189.77	213.20



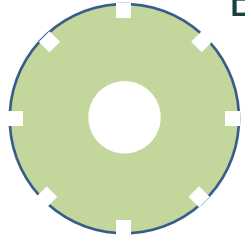
Gearbox

Tiro



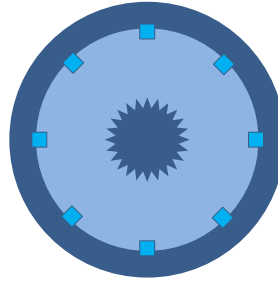
Brake

Tiro



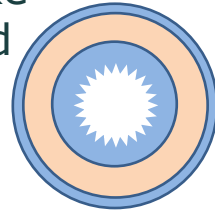
Brake
Disk

Brake
Casing



Wet
Brake
+
Hub
Bearing

Brake
Pad



Brake. Stage 1					
B #	Shaft Ref. Dia. DIN 5480	Hub Ext. Dia. mm	Hub Bearing ####	Total Width mm	Total Weight kg
11	30	40	32208	200	14
21					25
31					40
41	40	60	32212	300	85
51					152
61					237
71	60	100	32220	400	455
81					620
91					809

Install after motor.

Brake. Stage 2					
B #	Shaft Ref. Dia. DIN 5480	Hub Ext. Dia. mm	Hub Bearing ####	Total Width mm	Total Weight kg
12	40	60	32212	300	21
22					38
32					59
42	60	100	32220	400	114
52					202
62					316
72	100	140	32228	500	569
82					775
92					1012

Install after Gearbox Stage1.

Brake. Stage 0 & 1 Spec.						
Peak Power kW	Nominal Dia. Inches	Pad Ext Dia mm	Pad Int Dia mm	Pad Numbers #	Hydraulic Piston mm	Brake Torque kNm
60	006" ST	141	97	04	04x0020	1
100	008" ST	185	128	04	04x0030	2
160	010" ST	232	160	04	04x0035	3
180	012" XS	271	187	06	06x0040	10
330	016" XS	346	238	06	06x0055	25
500	020" XS	437	301	06	06x0070	51
520	024" 30	523	360	08	08x0080	142
750	028" 30	614	423	08	08x0100	261
980	032" 30	706	486	08	08x0110	362

Axial Force Nut: DIN 981, Washer: DIN 5406, Rubber Seal: DIN 3760
Hub min hadness is 60RC.

Brake. Stage 3					
B #	Shaft Ref. Dia. DIN 5480	Hub Ext. Dia. mm	Hub Bearing ####	Total Width mm	Total Weight kg
13	60	100	32220	400	28
23					51
33					79
43	100	140	32228	500	142
53					253
63					395
73	140	200	32240	600	683
83					930
93					1214

Install after Gearbox Stage2.

Brake. Stage 4					
B #	Shaft Ref. Dia. DIN 5480	Hub Ext. Dia. mm	Hub Bearing ####	Total Width mm	Total Weight kg
14	100	140	32228	500	36
24					63
34					99
44	140	200	32240	600	171
54					304
64					474
74	200	300	32260	700	797
84					1085
94					1417

Install after Gearbox Stage3.

Brake. Stage 2 & 3 Spec.						
Peak Power kW	Nominal Dia. Inches	Pad Ext Dia mm	Pad Int Dia mm	Pad Numbers #	Hydraulic Piston mm	Brake Torque kNm
60	006" ST	141	97	06	06x0020	1
100	008" ST	185	128	06	06x0030	4
160	010" ST	232	160	06	06x0035	7
180	012" XS	271	187	08	08x0040	18
330	016" XS	346	238	08	08x0055	44
500	020" XS	437	301	08	08x0070	91
520	024" 30	523	360	12	12x0080	320
750	028" 30	614	423	12	12x0100	586
980	032" 30	706	486	12	12x0110	815

Axial Force Nut: DIN 981, Washer: DIN 5406, Rubber Seal: DIN 3760
Hub min hadness is 60RC.

Competition, Heavy eAxle

Tiro

