



marathonTM
Motors



RW Type & CW Type
Screen Protected Drip Proof
Low Voltage Slipring
Induction Motors

A Regal Brand

REGAL

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Types RW & CW – Symbols of versatility

Designed basically for heavy duty use with driven machine imposing overloads and severe mechanical shocks and vibrations. These motors are equally suitable for smooth constant loads since the motors are also designed with high efficiency and power factor. Because of optimum utilisation of materials, with improved ventilation techniques the motors are 10 – 15% lighter in weight and yet more rugged because of their inherent special construction.

Because of high Pull Out Torque and inherent thermal margin kept for high slip operation (with suitable external resistance) these motors are ideally suited for rerolling mills and cane cutter/cane crusher/cane leveller/cane fiberizer applications pertaining to sugar industries. Because of high efficiency and power factor these motors are also suitable for pump/fan compressor applications.

The motors are built at the state of art facilities under strict quality control at all stages of manufacturing.

Specifications :

Type	: Slipring [squirrel cage range is also available]
Protection & Cooling	: IP23 (Screen Protected Drip Proof), IC01
Duties	: The motors are basically rated for S1 (continuous duty) but can be adapted to other duties such as S6, S7, S8 etc.
Insulation	: Class 'F' insulation (temperature rise limited to class 'B')
Supply	: 3 phase, 415 Volt \pm 10%, 50 Hz \pm 5% as standard. Other voltages and frequencies are also catered 3.3/6.6 kV options are available.
Slipring unit and brushgear	: Continuously rated
Winding and enclosure treatment	: Tropicalisation treatment is provided as a standard practice.
Mounting	: a) Horizontal foot mounted – B3 mounting as standard. b) Vertical flange mounting – V1 construction available for frame sizes RW105, RW120, RW136, RW152 and RW168, CW 630, 710



1250HP 8 pole RW 168 motor running at a Rolling Mill

Output chart for 8 pole Rolling Mill duty motors :

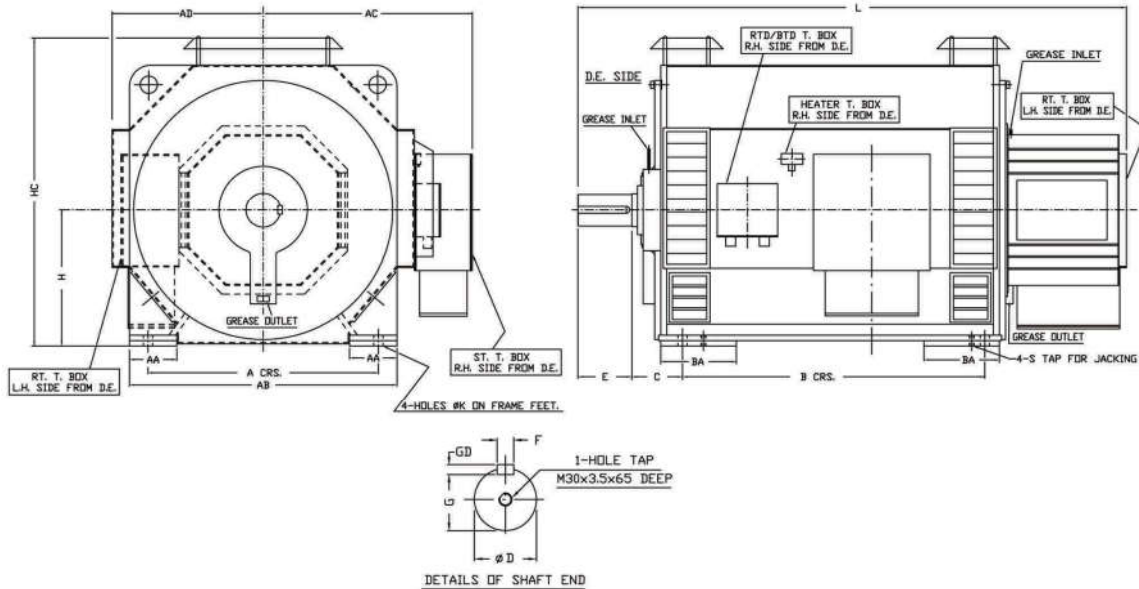
Supply Condition : 415V+/- 10%, 50 Hz +/- 5%; Ambient Temperature : 45°C;
Temperature Rise to Class 'F' unit

8 Pole

Frame Size	Output		Full Load (RPM)	Full Load Current (Amps)	Efficiency 100%	Cos φ 100%	Pull Out Torque (X FLT)	RA (Amps)	RV (Volts)	GD ² (Kg-m ²)	Weight of motor (Kg)
	KW	HP									
RW13652	373	500	735	682	94.0	0.81	2.4	350	650	140	2485
RW13660	450	600	735	822	94.0	0.81	2.4	365	750	162	2680
RW 15252	550	750	736	993	94.0	0.82	2.3	725	460	185	3200
RW 15260	600	800	739	1059	95.0	0.83	2.7	685	530	213	3300
RW 16860	750	1000	745	1316	95.5	0.83	2.7	570	805	312	4000
RW 168L	930	1250	740	1663	96	0.81	2.5	660	855	397	6800
RW 168100	1120	1500	742	1955	96	0.83	2.5	810	840	513	7000
RW 168112	1270	1700	742	2245	96.0	0.82	2.5	735	1050	578	7800

CW 630	930	1250	741	1716	94.5	0.8	2.7	655	860	530	6500
CW 630	1120	1500	742	2048	95.0	0.8	2.8	650	1050	637	7000
CW 710	1500	2000	744	2731	95.5	0.8	2.6	825	1110	1180	8800

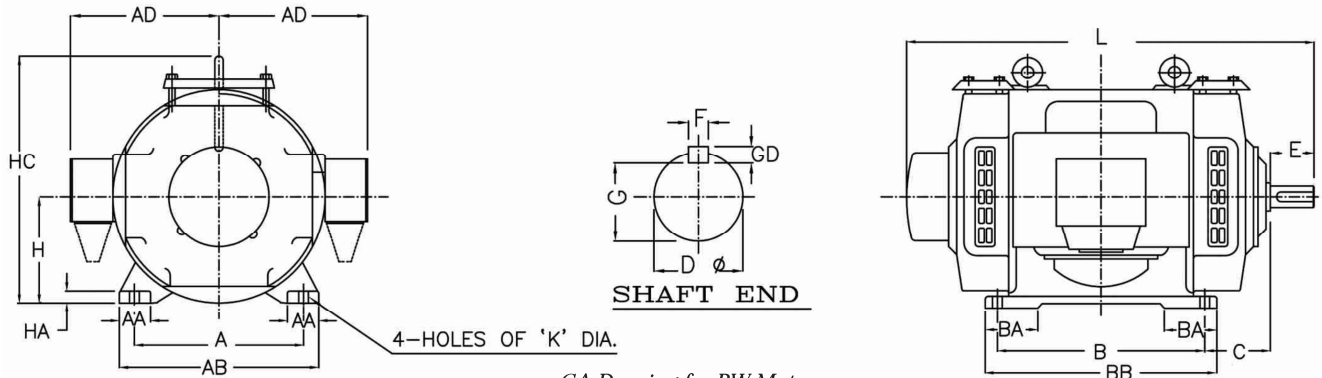
In view of the Company's continuous efforts for improvement/development, the equipment supplied may differ in some details from what has been described here.



GA Drawing for CW Motors

The GA drawings are tentative : please refer to us for the final drawing against each order

FRAME	POLE	D		E	F		GD	G		H		FIXING DIM.				AD	AC	HC	AB	AA	BA	S	L
		NON	TOL	E	NON	TOL	GD	NON	TOL	NON	TOL	A	B	C	K	(MAX.)	(MAX.)	(MAX.)				(MAX.)	
CW630	8	150	+0.040 +0.015	250	36	-0.062	20	138	-0.3	630	-1.5	1067	1250	235	40	825	1050	1500	1240	220	350	M16	2600
CW710	8	160	+0.040 +0.015	250	40	-0.062	22	147	-0.3	710	-1.5	1250	1600	280	48	900	1250	1625	1500	300	400	M24	3050



GA Drawing for RW Motors

The GA drawings are tentative : please refer to us for the final drawing against each order

FRAME	POLE	D		E	F		GD	G		H		FIXING DIMENSIONS				AD	HC	HA	AB	AA	BB	BA	L
		NOM	TOL		NOM	TOL		NOM	TOL	NOM	TOL	A	B	C	K								
RW78	4-10	8.55	+0.02 -0.00	285	22	-0.05	16	74.55	-0.152	311	±0.30	490	488	178	22	605	686	38	592	102	559	97	1331
RW89	4-10	98.425	+0.03 -0.00	210	25.4	-0.05	16	88	-0.152	355.5	±0.30	610	710	178	25.4	645	780	45	689	119	780	126	1450
RW105	4-10	111.125	+0.03 -0.00	210	28.5	-0.05	19	101.625	-0.152	416	±0.50	666	561	209	25.4	705	900	48.2	792	127	642	114	1443
RW120	4-12	111.125	+0.03 -0.00	210	28	-0.05	19	101.625	-0.152	416	±0.50	666	561	209	25.4	705	900	48.2	792	127	642	114	1644
RW136	4-12	111.125	+0.03 -0.00	210	28	-0.05	19	101.625	-0.2	527	±0.50	864	673	212	35	825	1161	59	1016	152	775	152	1640
RW152	6-14	123.82	+0.035 -0.013	222	31.75	-0.05	19	11.82	-0.152	590.5	±0.50	965	724	284.5	35	880	1302	64	1067	152	864	152	2002
RW168	6-14	124	+0.035 -0.013	222	32	-0.05	19	113	-0.15	660.5	±0.50	1067	952.5	215	35	930	1422	55	1220	203	1054	178	2213
RW168L	6-10	124	+0.035 -0.013	222.25	32	-0.062	19	113	-0.15	660.5	+1 -0.5	1067	1120	235	35	1250	1400	55	1210	193	1240	250	2315
RW168100 RW168112	6-10	150	+0.040 +0.015	250	36	-0.062	20	138	-0.3	710	-1.5	1067	1250	235	35	1060	1475	60	1210	203	1370	300	2500

RW and CW range for Rolling Mill Duty

Rolling Mill duty motors are critical prime movers for the rolling mill industry. These motors are designed and manufactured to sustain stringent electrical and mechanical requirements. This fact results from the different modes of operational requirements of the mill, where the load demand varies from traditional continuous duty and contains sustained periodic overloading throughout the operating cycles. Our RW and CW series of Slipring Induction Motors are tailor made to suit above condition of Mill operation. These motors are incorporated with the high torque and variable speed characteristics. To meet the various functional requirements in Rolling Mill Motor, MEMI has improved the design and construction of its SPDP slip ring induction motors in RW frames. This design is able to withstand the extreme dynamic and alternating rolling forces with highest performance. CW range of YEC frame motors are designed with superior cooling system. This range covers outputs beyond 930 kW. Medium voltage version of these motors are also available. We recommend use of slip resistance in the rotor circuit of rolling mill duty motors wherever flywheel is used in the system for better system performance. The same is applicable for Sugar Mill duty motors.

MEMI Rolling Mill duty motors have proved their functional efficiency and operational reliability for decades under

extreme environmental conditions. Because of high pull out torque and inherent thermal margin kept for high slip operation, along with sustained overloading these motors are ideally suited for Rolling Mill operation.

Protection and cooling : IP23 (Screen protected drip proof), IC01

Duties : Continuous duty (S1), can be adapted to other duties like S6, S7, S8 etc.

- 1) 200% load for 10 mins, once in an hour (Minimum Gap between two consecutive O.L. = 50 Mins)
OR
- 2) 150% load for 10 mins, twice in an hour (Minimum Gap between two consecutive O.L. = 30 Mins)
OR
- 3) 200% load for 7 mins (once) - 100% Load for 23 mins (once) - 150% load for 7 mins (once) - 100% Load for 23 Mins

The motors comply with IEC Class IV duty as well. The supply cable size shall be selected in such a way that the voltage drop at motor terminals during overloading period should not exceed 8% of the rated voltage during the peak load.

Construction :

Frame and Endshields : Girder construction, rugged cast iron/M.S. fabricated frame with internally ribbed heavy cast iron/M.S. fabricated endshields with centering spigots and each secured by high tensile bolts. The feet with ample thickness, are cast integrally to the frame and access is available for vertical drilling for dowelling pins to obtain positive location and retention of alignment with driven machine under severe mechanical shock, vibration or thermal expansion/ contraction over a period. Two eye bolts are provided in stator frame. Each endshield is furnished with steel mesh covered ventilation openings except for force ventilated motors where only two openings for fixing the ventilating ducts are provided. CW range of motors cater to higher outputs and frames are of fabricated MS construction, having internal ribs.

Stator and Rotor : Cold rolled (non-oriented) steel sheet is used for stator/rotor laminations. Laminations are held by steel endplates. Stator laminations are keyed and retained in the stator frame through a key ring while the motor laminations are keyed to the shaft and secured by steel endplates. Stator/Rotor are of CW motors are built up with ducted cores, which ensures radial cooling for more efficient heat dissipation.

Winding : Stator is wound either with dual coated superenamelled wire dual coated with glass fibre lapped enamelled strip conductors, depending on size and application of motor.

Rotors for frame sizes upto RW78 are wound with round superenamelled copper wire whereas for higher sizes bar wave windings are provided. Rotor coil overhangs are secured to an internal support ring, while upper portion of the overhang is secured with thermosetting resiglass banding.



Fig. 1 Wound Stator of RW

Insulation/Treatment : Class 'F' to IS 1271. Temperature rise limited to class 'B' limit in accordance with IS 325. The insulating materials, binders, fillers and impregnants used for Class 'F' insulation are the latest and proven to be fully compatible under thermal cycling are ageing, while thicknesses, layers, direct and creepage clearance supporting and securing elements etc. are maintained at a level that only caters to the basic insulation levels governed by the voltage class of the motor but takes care of the mechanical stresses caused by the thermal cycling, short circuit and overloads, overspeeding, frequent starting/braking, forced vibrations, and shocks over the anticipated motor life.



Fig. 2 Rotor of CW

The wound stators and rotors along with their leads are first preheated for expulsion of moisture, cooled to prepolymerisation temperature of the varnish, dipped in thermosetting varnish and baked - the number of dipping and baking cycles depending on the type of environment and service condition.

Ventilation System :

A powerful and effective ventilation system furnishes a large safety margin on temperature rise thereby minimising duration for elevated temperature. Additionally specially designed slots are provided in the large frame sizes for direct cooling of stator conductors. The axial ventilating holes and the specially designed slot system along with the blower capacity and baffle (air guide) system together ensure effective cooling to limit the winding temperature rise to safe value.

A high capacity radial discharge shaft mounted blower alongwith a fixed air guide provides a powerful suction through the motor. The fan blades are specially designed for minimum windage loss. Air is drawn from the non drive end radially and expelled similarly at the drive end. CW motors are having axial and radial cooling circuit . Stator frame has number of ribs while rotor has spider shaft which allows air to flow and circulate radially.

Balancing :

Rotors along with shaft mounted blower are dynamically balanced as per Grade 2.5 to limit vibration to value well within specified limits as per IS:12075. Lower vibration levels when specified by users, may also be provided.

Shaft, Bearing/Lubrication :

■ **Shaft :** Large diameter shaft : For large output the shaft is often moun-ted with 2 bearings at drive/non drive end depending on design.

■ **Bearing/Lubrication :** Ball and roller bearings are standard. Cartridge – type housings exclude foreign matter and facilitate easy maintenance. CW motors are designed with spider shafts to facilitate radial cooling system. The motors are equally suitable for direct coupling through flexible or solid couplings. The ball bearing at non driving end serves as the locating bearing and caters to the axial thrust associated with the most normal drives. However is case of high magnitude of thrust as in the case of vertically mounted motors, a special bearing arrange-ment such as duplex or angular contact, is incorporated. The bearings are housed in cartridges which are spigot located accurately into the endshields, thereby furnishing the facility of motor withdrawal from stator without disturbing the bearings. Bearings for CW motors are mounted directly on the bracket removing the use of cartridge.

Regreasing nipples are provided and are fully accessible for grease replenishment when the motor is in service. Bearing cartridges are machine grooved to prevent ingress of excess grease into the motor. 'Shekk' Gadus 3 grease in used as standard.

Bearing sizes, are as follows (Table 1) :

Frame Size	D.E.	N.D.E.
RW 78	N317	6315
RW 89	N320	6317
RW 105	N224	6320
RW 120	N224	6320
RW 136	N224	6320
RW 152 – RW 168L	N326	N224 & 6224
RW 168100 & RW 168112	NU332	6332
CW 630	NU232C3 + 6232C3	NU232C3
CW 710	NU232C3 + 6234C3	NU234C3

Slipring Unit, Brushes and Brushgear :

Sliprings of hard wearing Copper alloy are mounted outside endshield at nondriving end. Collector is keyed to shaft and secured to withstand thermal cycling shock and vibration. Carbon brushes are of a grade specially selected to provide satisfactory wear life. The brush holders are amply rated, the design of tension spring and associated levers permit only a small change in brush pressure for a large amount of brush wear, thereby minimising the frequency of tension

adjustment. All brushes are fully bedded on the collector and run in before the motors are despatched from the works.

Slipring chamber is designed for rapid access to the brushgear and sliprings. Sliprings and brushgears are continuously rated for motors requiring speed regulations (with external rotor resistance) or with frequent starting and stopping.

Slipring chamber is having provision for ventilation for cooler operation. Slipring assembly for higher Rotor Voltages (>1000V) are specially manufactured by providing phase separators. Carbon brush size used are tabulated as follows. (Table 2)

Frame size	W	B	H	R
RW 78	31.75	15.88	31.75	69.85
RW 89	31.75	15.88	31.75	69.85
RW 105	31.75	22.225	35.56	101
RW 120	31.75	22.225	35.56	101
RW 136	31.75	22.225	35.56	101
RW 152	38.1	31.75	44.45	127
RW 168	38.1	31.75	44.45	127
CW 630/710	50.00	25.00	45.00	160

Terminal Box :

Two terminal box seats are furnished on opposite sides of the frame enabling a choice of position (right or left hand side) of the terminal box. For PW136 frame sizes and above two terminal boxes are provided as standard. The leads fitted with thimbles are connected to non hygroscopic single stud type terminal bars which are staggermounted to permit easy handling and termination of highly derated Aluminium conductor cables. The terminal boxes are of larger sizes to suit the cable sizes. All current carrying parts and their associated fastners are sutiably plated.



Fig. 4 Termination arrangement

Table 1

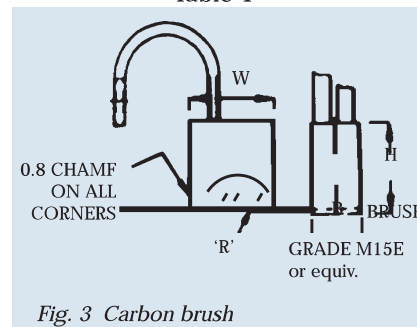


Fig. 3 Carbon brush

Large size terminal box of fabricated steel are used for easy access. The terminal box is mounted on an adaptor plate. Cable boxes and glands to suit the motor users cable may be provided.

RW-Range Slipping Induction Motors (SPDP)
 Supply Condition : 400/440 Volts, 50 cycles 3 phase (General Purpose)

Frame Size	Output		Full Load RPM	Full Load Current (A mps)	Efficiency			Power factor			Pull Out Torque (X FLT)	RA (Amps)	RV (Volts) (Kg M ²)	GD ² Rotor (Kg-M ²)	Weight of Motor
	KW	HP			100%	75%	50%	100%	75%	50%					
4 POLE															
RW 7828	75	100	1425	140	88.8	88.0	87.0	0.84	0.82	0.79	2.3	120	386	5.8	640
RW 7832	93	125	1440	175	88.9	88.8	88.7	0.84	0.82	0.79	2.3	125	453	5.7	671
RW 7838	110	150	1450	185	91.5	91.0	88.2	0.89	0.82	0.79	2.3	120	539	8.0	715
RW 8036	132	175	1460	225	91.5	91.0	88.7	0.89	0.83	0.79	2.3	122	660	12.2	871
RW 8942	150	200	1462	250	92.0	91.0	89.0	.89	0.83	0.79	2.3	120	770	14.9	925
RW 10531	185	250	1465	315	92.0	91.5	90.0	0.89	0.83	0.79	2.3	258	438	19.9	1250
RW 10536	220	300	1470	365	92.5	91.8	90.0	0.89	0.83	0.79	2.3	268	501	22.4	1350
RW 10542	260	350	1470	435	92.5	91.8	90.0	0.89	0.83	0.79	2.5	273	582	26.0	1450
RW 12038	300	400	1471	524	92.5	92.0	90.0	0.86	0.84	0.79	2.3	328	580	38.0	1700
RW 12044	337	450	1471	587	92.8	92.0	90.0	0.86	0.84	0.79	2.4	324	640	39.0	1750
RW 12048	370	500	1472	638	92.8	92.0	90.0	0.87	0.84	0.79	2.4	332	685	41.0	1850
RW 12052	410	550	1473	698	92.8	92.0	90.0	0.88	0.84	0.79	2.4	350	719	45.0	1800
RW 13640	450	600	1475	760	93.0	92.0	90.0	0.88	0.84	0.79	2.6	366	756	67.0	2200
RW 13644	487	650	1475	820	93.0	92.0	90.0	0.88	0.84	0.79	2.6	370	812	73.6	2350
RW 13648	525	700	1475	880	93.0	92.0	90.0	0.89	0.85	0.79	2.6	378	855	84.0	2500
6 POLE															
RW 7828	55	75	960	102	89.5	89	88	0.83	0.8	0.7	2.3	110	323	7.9	637
RW 7838	75	100	975	136	91.0	90	88	0.83	0.8	0.7	2.3	100	465	10.7	715
RW 8936	93	125	975	170	91.0	90	88	0.83	0.8	0.7	2.3	122	420	18.0	924
RW8949	110	150	975	189	91.0	90	88	.83	.8	.7	2.3	129	543	21.0	980
RW10531	132	175	971	259	91.0	90	88	.78	.75	.7	2.3	249	321	19.3	1250
RW10539	150	200	973	289	92.0	91	88	.79	.77	.7	2.4	230	396	24.3	1360
RW10545	185	250	977	347	92.5	91	88	.8	.78	.7	2.4	237	470	28.0	1430
RW12036	220	300	977	413	92.5	91	88	.8	.78	.7	2.4	280	477	46.0	1672
RW12042	260	350	977	489	92.5	91	88	.8	.78	.7	2.4	284	557	54.0	1760
RW12046	300	400	979	560	92.5	91	88	.81	.78	.7	2.4	300	609	59.0	1850
RW12050	337	450	979	625	92.5	91	88	.81	.78	.7	2.4	306	670	64.0	2000
RW12056	370	500	980	690	92.5	91	88	.82	.78	.7	2.4	302	746	72.0	2100
RW13644	410	550	980	752	92.5	91	88	.82	.78	.7	2.4	464	545	94.5	2300
RW13648	450	600	981	825	92.5	91	88	.82	.78	.7	2.5	445	620	103.0	2400
RW13652	487	650	982	867	93.0	92	89	.84	.82	.72	2.7	456	654	112.0	2500
RW13656	525	700	983	908	93.5	92	89	.86	.83	.78	2.6	413	780	120.0	2600
RW15248	550	750	985	951	93.5	93	92	.86	.83	.78	2.7	467	720	133.0	2900
RW15248	600	800	985	1037	93.5	93	92	.86	.83	.78	2.8	510	720	133.0	2900
RW15260	750	1000	985	1297	93.5	93	92	.86	.83	.78	2.8	508	904	166.0	3000
RW16860	1000	1340	990	1795	94.5	93.7	92.5	.82	.79	.74	2.4	720	850	310	4500
8 POLE															
RW7832	45	60	725	89	88	88	87	.8	.78	.68	2.3	118	248	9	671
RW8930	55	75	725	110	89	89	87	.8	.78	.69	2.3	110	336	15	871
RW8938	75	100	725	145	90.2	89	87	8	78	69	2.3	115	404	19	924
RW10531	93	125	725	177	91.0	89	87	.8	.79	.7	2.4	184	289	22	1250
RW10538	110	150	725	208	91.0	89	87	.8	.79	.71	2.4	189	351	28	1350
RW10544	132	175	725	250	91.0	89	87	.8	.79	.7	2.4	194	411	32	1400
RW10548	150	200	733	288	91.0	89	87	.8	.79	.7	2.4	200	451	35	1450
RW12038	185	250	733	394	92.0	91.5	87	.71	.69	.62	2.4	315	354	64	1550
RW12048	220	300	733	462	92.0	91.5	87	.72	.69	.62	2.5	302	440	77.5	1680
RW12052	260	350	735	538	92.0	91.5	87	.73	.7	.62	2.5	333	472	87.6	1720
RW12056	300	400	735	594	92.0	92	87	.76	.7	.62	2.5	332	546	94.3	1800
RW13648	337	450	736	667	92.5	92	87	.76	.7	.62	2.5	338	600	110.0	2390
RW13652	370	500	736	732	92.5	92	87	.76	.7	.62	2.5	353	645	111.0	2485
RW13656	410	550	736	811	92.5	92	88	.76	.7	.62	2.5	345	724	128.0	2580
RW13660	450	600	737	878	92.5	92	89	.77	.71	.63	2.5	353	772	137.0	2680
RW15248	487	650	738	934	93.0	92	90	.78	.74	.68	2.6	665	450	172.0	3100
RW15252	525	700	738	981	93.0	92	90	.8	.76	.70	2.6	694	460	186	3200
RW15260	550	750	738	1028	93.0	92	90	.8	.76	.7	2.6	640	533	215	3300
RW15260	600	800	738	1121	93.0	92	90	.8	.76	.7	2.6	670	533	215	3300
RW16860	750	1000	738	1353	94.0	93	91	.82	.76	.7	2.7	354	801	251	4000
RW168L	1000	1340	745	1854	95	94	92	0.79	0.73	0.67	2.5	715	855	400	5500
RW168100	1250	1675	742	2280	95.3	94.5	92.5	0.80	0.75	0.68	2.1	910	840	497	7000
RW168112	1500	2000	741	2808	95.3	94.5	92.5	0.78	0.73	0.67	2.6	869	1050	580	7800
10 POLE															
RW12052	185	250	585	382	91.0	90.5	89	.75	.70	.62	2.4	208	553	83	2010
RW13640	220	300	588	445	91.5	91.0	90	.75	.70	.62	2.4	292	454	109	2160
RW13648	260	350	588	517	92.0	91.5	90	.76	.71	.62	2.4	288	546	136	2370
RW13654	300	400	590	585	92.5	92.0	91	.77	.72	.63	2.4	297	611	148	2500
RW13660	337	450	590	656	92.8	92.0	91	.77	.72	.63	2.5	297	685	163	2625
RW13664	370	500	590	710	93.0	92.5	91	.78	.72	.65	2.5	303	738	174	2800
RW15256	410	550	592	786	93.0	92.5	91	.78	.72	.65	2.6	327	762	235	3900
RW15260	450	600	592	858	93.5	93.0	92	.78	.72	.65	2.5	354	801	251	4200
RW168L	500	675	593	1028	94	93.2	92	0.72	0.67	0.60	2.6	610	505	335	5000
RW168L	560	750	594	1151	94	93.2	92	0.72	0.67	0.60	2.6	570	600	410	5500

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