

motralec

4 rue Lavoisier . ZA Lavoisier . 95223 HERBLAY CEDEX

Tel. : 01.39.97.65.10 / Fax. : 01.39.97.68.48

Demande de prix / e-mail : service-commercial@motralec.com

www.motralec.com

tesla
submersible motors



6" - 12"
preliminary
catalogue

TR SERIES 6000
tesla rewindable motors 2

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General data

Tesla TR rewindable motors

The Tesla TR product range is a complete range of submersible, rewindable motors, available in sizes from 3.7 kW 6" up to 250 kW 12" motors.

Three material versions are available. A cast iron version EN-JL1040. For more aggressive liquids with a moderate content of salt, an version made of stainless steel DIN/EN 1.4401 (AISI 316L) is available. For aggressive liquids with more salt content than sea water and temperatures above 15°C, it is recommended to use the version AISI 904L.

Tesla TR submersible motors are designed according to market standards. All Tesla TR motors are designed to fit pump ends manufactured according to NEMA standards. The motors are ideally suited for water supply pumps for irrigation, groundwater regulation, pressure boosting, industrial water transfer and similar applications.

The motor production is in the hands of experts with many years of experience within the manufacture of motors. In order to make the time of delivery as short as possible, components are manufactured for stock, enabling rapid assembly of a few basic components into the finished motor.

The rewindable motor construction means low costs of repair of the motor in case of damage. Moreover, as rewinding can be effected locally, unnecessary time for transportation of the motor can be avoided and possible periods of downtime reduced to a minimum. The construction of the motor, based on few basic components, also facilitates service and repair of the motor.

Fitted with a sturdy MICHELL thrust bearing, which also functions as an upthrust bearing, all motors offer reliable operation.

In order to achieve maximum protection of the motor against burnout, all motors can be fitted with a Pt100 sensor.

General data

Product range, 50 Hz

	TR 6	TR 8	TR 10	TR 12
Motor size	6"	8"	10"	12"
Power range, direct-on-line and star-delta				
- 3 x 200-230 V	3.7-37 kW	22-63 kW	75-100 kW	-
- 3 x 380-415 V	3.7-37 kW	22-110 kW	75-190 kW	147-250 kW
- 3 x 500 V	7.5-37 kW	22-110 kW	75-190 kW	147-250 kW
Allowed installation				
- Vertical	3.7-37 kW	22-110 kW	75-190 kW	147-250 kW
- Horizontal	3.7-30 kW	22-92 kW	75-170 kW	147-190 kW

Product range, 60 Hz

	TR 6	TR 8	TR 10
Motor size	6"	8"	10"
Power range, direct-on-line and star-delta			
- 3 x 220 V	3.7-37 kW	22-75 kW	75-132 kW
- 3 x 380 V	3.7-37 kW	22-110 kW	75-190 kW
- 3 x 460 V	3.7-37 kW	22-110 kW	75-190 kW
Power range, direct-on-line			
- 3 x 575 V	-	22-110 kW	75-190 kW
Allowed installation			
- Vertical	3.7-37 kW	22-110 kW	75-190 kW
- Horizontal	3.7-30 kW	22-92 kW	75-170 kW

Rewindable motors

The two pole TR motors are easily rewinded. The windings of the stator are made of a special water-proof wire of pure electrolytic copper sheathed with special non-hygroscopic thermoplastic material. The high dielectric strength properties of this material allow direct contact between the windings and the liquid for efficient cooling of the windings.

High motor efficiency

The complete motor range offered by Tesla is characterized by high efficiency, which contributes to improve the economy of the total pump system.

Overtemperature protection

For protection against overtemperature, Tesla offers the Pt100 temperature sensor as an optional extra.

General data

Protection against upthrust

In case of a very low counter pressure in connection with start-up, there is a risk that the entire pump body may rise, for instance in connection with fountain applications. This is called upthrust, and it may cause damage to both pump and motor. Therefore, the TR motors are fitted with upthrust spacers, which prevent upthrust in the critical start-up phase.

The maximum load in connection with thrust and upthrust can be seen in the table below

Motor Type	Motor power [kW] (hp)		Thrust		Up-thrust [N]
	Min.	Max.	(*) [N]	(**) [N]	
6"	3.7 (5)	15 (20)	15000		6000
	18.5 (25)	37 (50)	27500		6000
8"	22 (30)	110 (120)	60000		12500
10"	75 (100)	190 (260)	60000		12500
12"	132 (180)	250 (340)		70000	15000

(*) Double direction of rotation (clockwise and counterclockwise)

(**) Direction of rotation to be specified (counterclockwise)

Operation

Frequency of starts and stops

Motor Type	Number of starts
	PVC windings
TR 6	Minimum 1 per year is recommended
	Maximum 3 per hour
	Maximum 40 per day
TR 8	Minimum 1 per year is recommended
	Maximum 3 per hour
	Maximum 30 per day
TR 10	Minimum 1 per year is recommended
	Maximum 2 per hour
	Maximum 20 per day
TR 12	Minimum 1 per year is recommended
	Maximum 1 per hour
	Maximum 10 per day

PE/PA windings on request

Voltage quality

The required voltage quality for Tesla TR submersible motors, measured at the motor terminals, is $-10\%/+6\%$ of the nominal voltage during continuous operation (including variations in the supply voltage and losses in cables).

Windings temperature

PVC windings: 70° C

PE/PA windings: 90° C

Enclosure class

Enclosure class: IP 58-68

Cables

The 6" and 8" motors are connected by means of three single-core cable, approved for use with drinking water. The cable is flat and length 5.5 mt.

The 10" and 12" motors are connected by means of three single-core cable, approved for use with drinking water. The cable is round and length 8.5 mt.



Fig.1 TR motors

General data

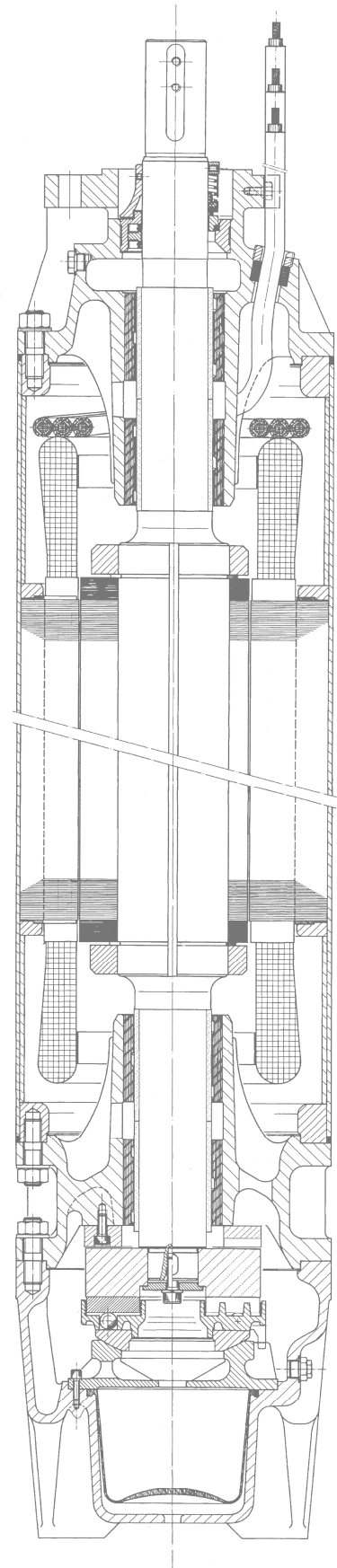
Material specification for TR 6 to TR 12

Cast iron version (Standard)

Pos.	Component	Material	DIN/EN
1	Shaft	Steel	1.4462
2	Shaft ends	Stainless steel	
3/4	Thrust bearing Stationary/ rotating part	6" 3.7-15 kW	Haedened steel/ EPDM
		12" 18.5-37 kW	
		6" 8"-10"	Ceramic/ carbon
		6"-10"	
5	Bearing ring	Carbon	
		12"	Stainless steel/ NBR
6	Bearing housing, upper	Cast iron	EN-JL1040
7	Diaphragm	CR	
8	Motor end shield	Cast iron	EN-JL1040
9	Motor sleeve	Stainless steel	1.4401
10	Motor cable	EPDM	
11	Shaft seal	NBR or Ceramic/carbon	
12	Intermediate housing	Cast iron	EN-JL1040
13	Bearing housing, lower	Cast iron	EN-JL1040

316 L and 904 L version (Special)

Pos.	Component	Material	Version	
			316 L DIN/EN	904 L DIN/EN
1	Shaft	Steel	1.0533	1.0533
2	Shaft ends	Stainless steel	1.4460	1.4462
3/4	Thrust bearing Stationary/ rotating part	6" 3.7-15 kW	Haedened steel/ EPDM	
		12" 18.5-37 kW		
		6" 8"-10"	Ceramic/ carbon	
		6"-10"		
5	Bearing ring	Carbon		
		12"	Stainless steel/NBR	
6	Bearing housing, upper	Stainless steel	1.4401	1.4539
7	Diaphragm	CR		
8	Motor end shield	Stainless steel	1.4401	1.4539
9	Motor sleeve	Stainless steel	1.4401	1.4539
10	Motor cable	EPDM		
11	Shaft seal	Ceramic/carbon		
12	Intermediate housing	Stainless steel	1.4401	1.4539
13	Bearing housing, lower	Stainless steel	1.4401	1.4539



Electrical data

3 x 400 V, 50 Hz

Type	Size	Motor		Rated current I _n [A]	Motor efficiency η [%]			Power factor			I _{start} /I _n	L [mm]	Weight [Kg]
		Power [kW]	Power [hp]		50%	75%	100%	50%	75%	100%			
TR 6	6"	3,7	5	9,85	67	70	70	0,63	0,75	0,81	4	630	45
		5,5	7,5	14	75	76	74	0,62	0,75	0,81	3,7	660	48
		7,5	10	18,4	77	79	77	0,6	0,73	0,8	3,7	690	50
		9,2	12,5	22,4	77	78	77	0,64	0,76	0,81	3,6	720	55
		11	15	26	78	79	78	0,65	0,77	0,82	3,7	780	60
		13	17,5	30	81	81	80	0,64	0,76	0,82	3,8	850	72
		15	20	34	82	82	81	0,66	0,79	0,83	3,8	910	78
		18,5	25	40,5	83	85	84	0,64	0,77	0,83	5,3	1085	90
		22	30	47,5	84	85	84	0,65	0,77	0,83	5,2	1195	100
		26	35	56	85	85	84	0,68	0,79	0,85	4,7	1315	115
		30	40	64	85	85	84	0,67	0,79	0,84	4,8	1425	125
		37	50	80	84	85	83	0,66	0,77	0,83	4,3	1425	125
TR 8	8"	22	30	48	80	82	82	0,72	0,81	0,84	5,3	1010	126
		26	35	56,5	80	82	82	0,76	0,83	0,85	5,1	1050	134
		30	40	64	82	84	84	0,74	0,82	0,85	5,7	1110	146
		37	50	78,5	82	84	84	0,74	0,82	0,85	5,7	1160	156
		45	60	96,5	84	86	86	0,65	0,76	0,82	6	1270	177
		55	75	114	84	86	86	0,72	0,81	0,85	5,9	1350	192
		63	85	132	85	87	87	0,66	0,78	0,83	5,7	1490	218
		75	100	152	86	87	87	0,71	0,82	0,86	5,8	1590	237
		92	125	186	87	88	87	0,72	0,82	0,86	5,9	1830	283
				110	150	224	86	87	87	0,73	0,83	0,87	5,8
TR 10	10"	75	100	156	84	86	87	0,7	0,8	0,84	5,4	1400	280
		92	125	194	84	87	87	0,67	0,78	0,82	5,6	1500	330
		110	150	228	85	87	88	0,7	0,79	0,84	5,7	1690	385
		132	180	270	85	88	88	0,72	0,81	0,84	5,7	1870	435
		147	200	315	84	87	87	0,64	0,75	0,81	6,2	2070	500
		170	230	365	84	86	87	0,64	0,75	0,81	6	2220	540
		190	260	425	83	86	87	0,6	0,72	0,79	5,9	2400	580
TR 12	12"	147	200	305	84	87	88	0,66	0,77	0,83	6,2	1790	565
		170	230	345	85	87	88	0,69	0,79	0,85	6,1	1880	605
		190	260	390	85	87	88	0,68	0,8	0,84	6,2	1980	650
		220	300	445	85	87	88	0,69	0,8	0,85	6,1	2110	700
		250	340	505	85	87	88	0,69	0,8	0,85	5,9	2280	775

Electrical data

3 x 380 V, 60 Hz

Type	Size	Motor		Rated current I _n [A]	Motor efficiency η [%]			Power factor			I _{start} /I _n	L [mm]	Weight [mm]
		Power [kW]	Power [hp]		50%	75%	100%	50%	75%	100%			
TR 6	6"	3,7	5	11,4	66	72	74	0,69	0,77	0,8	4,2	630	45
		5,5	7,5	16	74	77	75	0,72	0,8	0,83	3,8	660	48
		7,5	10	21,4	77	79	77	0,73	0,81	0,84	3,5	690	50
		9,2	12,5	26	74	78	76	0,75	0,82	0,85	3,5	720	55
		11	15	29,5	79	81	79	0,77	0,84	0,86	3,6	780	60
		13	17,5	35	80	82	80	0,75	0,82	0,85	3,7	850	72
		15	20	40,5	79	82	80	0,78	0,84	0,86	3,5	910	78
		18,5	25	46,5	82	85	83	0,79	0,85	0,87	4,7	1085	90
		22	30	55,5	83	85	84	0,78	0,85	0,87	4,9	1195	100
		26	35	65,5	84	85	84	0,78	0,85	0,87	4,6	1315	115
		30	40	75,5	84	85	84	0,76	0,84	0,87	4,7	1425	125
37	50	94,5	84	85	83	0,76	0,84	0,87	4,5	1425	125		
TR 8	8"	22	30	59	75	79	80	0,8	0,85	0,86	4,4	1010	126
		26	35	69	75	79	80	0,81	0,86	0,87	4,4	1050	134
		30	40	77	77	81	82	0,78	0,84	0,87	5,1	1110	146
		37	50	94	79	83	83	0,79	0,85	0,87	4,9	1160	156
		45	60	110	81	85	85	0,8	0,86	0,88	5,5	1270	177
		55	75	132	82	85	86	0,83	0,88	0,89	5	1350	192
		63	85	152	83	85	85	0,81	0,87	0,89	5,3	1490	218
		75	100	182	84	86	85	0,86	0,89	0,9	4,7	1590	237
		92	125	220	85	87	86	0,85	0,89	0,9	4,8	1830	283
		110	150	260	83	86	86	0,84	0,89	0,9	5	2060	333
TR 10	10"	75	100	182	82	85	86	0,81	0,86	0,88	5	1400	280
		92	125	224	82	86	87	0,77	0,84	0,87	5,1	1500	330
		110	150	265	83	86	87	0,84	0,88	0,89	4,7	1690	385
		132	180	315	84	86	87	0,84	0,88	0,89	4,8	1870	435
		147	200	355	83	86	87	0,78	0,85	0,87	5,6	2070	500
		170	230	415	83	86	87	0,75	0,83	0,86	5,4	2220	540
		190	260	475	82	86	87	0,69	0,79	0,85	5,7	2400	580

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San Germano dei Berici (VI) - Italy
Tel. +39 0444 768511 - Fax. +39 0444 768505
E-mail: info@teslasub.it - <http://www.teslasub.it>

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