

## Submersible Motors





## GENERAL INFORMATION

### MODEL IDENTIFICATION CODE

#### BOREHOLE SUBMERSIBLE MOTOR

FM XX X - XXX X X

ZIRANTEC ELECTRIC MOTOR

NOMINAL MOTOR DIAMETER

DEEPWELL SUBMERSIBLE MOTOR

W - Water filled

O - Non-toxic fluid filled

MOTOR POWER (kW)

03 = 0,37 05 = 0,55 11 = 1,1 75 = 7,5  
110 = 11 185 = 18,5 A10 = 110 A85 = 185

PHASE / CONNECTION / CONTROL BOX / FREQUENCY

S = 1Ph / CSCR type / 3 wire / 50Hz

N = 1Ph / PSC / 3 wire / 50Hz

M = 1Ph / PSC / 2 wire / 50Hz

D = 3Ph / S.D. / 50Hz

T = 3Ph / DOL / 50Hz

TYPE OF MATERIALS OF CONSTRUCTION (M.O.C)

A / B / N / S / T

DEEPWELL SUBMERSIBLE PUMP SET (Pump + Motor)

MOTOR MODEL

+

CODE

FM XX X - XXX X X

+

FM 4 W - 03 A T

## OIL FILLED SUBMERSIBLE MOTORS

These oil filled motors are one among the proven & successful products from the house of FIPS. These motors are developed with due diligence complying with all safety standards and giving importance to the customers' need. All the components that are in contact with water are made of AISI 304 stainless steel and the motor is pre-filled with edible grade oil, which acts as coolant media as well as lubricant. The freezing point of the oil used is -10°C.

Dynamically balanced rotors equipped with quality ball bearings maintain uniform clearance, thereby giving better efficiency and increase the life cycle. Ball bearings are used to withstand the high axial load and the lower ball bearings are of angular contact type. The shaft extension is made of 300 series stainless steel to increase life

High quality carbon/ceramic mechanical seal and oil seal made of Nitrile rubber are used to ensure better sealing system.

Pressure equalizing rubber diaphragm is provided to balance the pressure and volume variations due to thermal expansion of the oil inside the motor. Motor sealing are made by means of 'O' rings. Shaft seals and sand guard prevents ingress of well water, sand and fiber particles into the motor. Care should be taken to ensure that the motor does not run when it is not submerged in the water. To prevent the motor from dry running, install water level monitor / dry run preventer. The motor needs a constant flow of water passed over it's body to keep it at correct operating temperature. Ideally the motors should be set just above the final yield point of bore well and when the level is not ascertained, fit a "flow inducer pipe" over the pumpset to ensure adequate cooling. It is mandatory to use ZIRANTEC Control boxes for all motors with adequate protection & control systems. Mounting dimensions of these motors are in accordance with NEMA standard.

### Features

- High operating efficiency and lesser power consumption
- Ball & Angular contact bearings to handle maximum radial and axial thrust loads
- Inbuilt TOP for single phase motors
- Can be easily dismantled and repaired

### Applications

These submersible motors are suitable to couple with deepwell submersible pump ends used for

- Residential
- Industrial water supply
- Ponds
- Agricultural & Irrigation
- Sprinkler irrigation systems
- De-watering in mining
- Fountains
- Pressure boosting units
- CBM (coal bed methane)
- Gardens

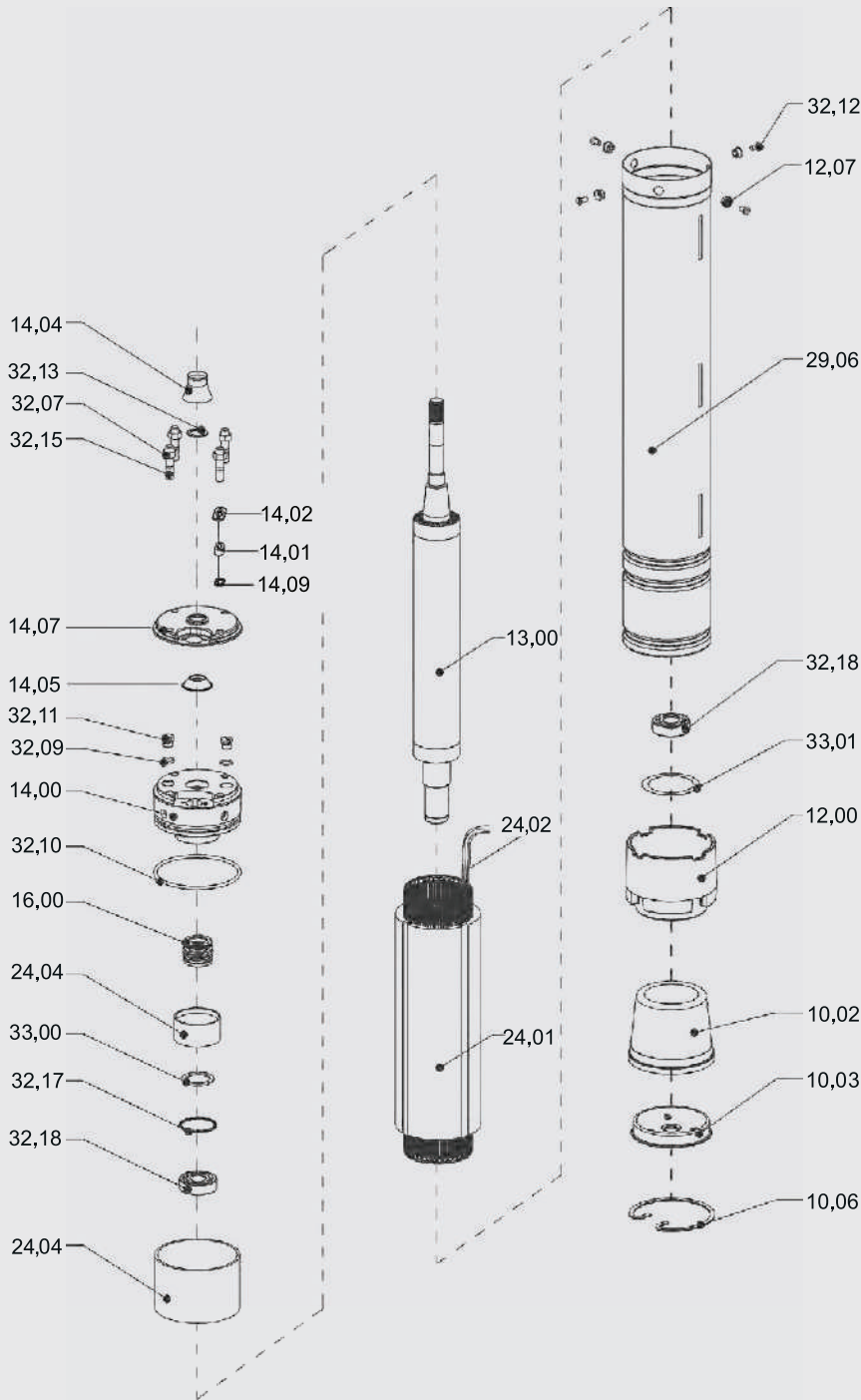


In view of continuous developments, the information / descriptions / specifications / illustrations are subject to change without notice.

# OIL FILLED SUBMERSIBLE MOTORS

Nominal Diameter : 4"

Exploded View



Part No.	Part Name
10,03	Diaphragm Bottom plate
10,02	Diaphragm
10,06	Snap ring
12,00	Lower housing
12,07	Guide bush
13,00	Rotor
14,00	Upper Housing
14,01	Cable Grommet
14,02	Grommet locking plate
14,04	Rubber sand guard
14,05	Sand guard
14,07	Upper housing shell
14,09	Grommet washer
16,00	Mechanical seal
24,01	Wound stator
24,02	Lead out cable
24,04	Winding guard
29,06	Outer shell
32,07	Nut
32,09	O-Ring
32,11	Drain plug
32,12	Screw
32,13	Sand guard washer
32,15	Stud
32,17	Wave washer
32,18	Bearing

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## OIL FILLED SUBMERSIBLE MOTORS

Nominal Diameter : 4"

### Specifications

Nominal Dia	4" (100mm)
Maximum outer diameter	98 mm
Power range	0,37 kW to 2,2 kW Single Phase 0,37 kW to 7,5 kW Three Phase
Speed	2900 rpm
Version	Single Phase 230 V, 50 Hz, A.C Supply Three Phase 380 V, 50 Hz, A.C Supply
Class of Insulation	F
Degree of Protection	IP 68
Direction of Rotation	CCW - Single Phase Electrically Reversible - Three Phase
Type of Duty	S1 (Continuous)
Down Thrust Load	1500 N (0,37 to 0,75 kW) 2500 N (1,1 to 4,0 kW) 4500 N (5,5 to 7,5 kW)
Minimum cooling flow along the motor	0,15 m/sec
Maximum liquid temperature	33°C
Maximum immersion depth	150 m
Starts per hour	30
Shaft Type	Splined as per NEMA
Mounting Standard	NEMA Standard
Method of Starting	Single Phase: Permanent Split Capacitor (PSC) Three Phase: Direct on line (DOL)
Cable Lead out	3 wire permanent type TPE/EPDM rubber flat cable



### Materials of Construction

Part Name	Material (Type-A)
Outer Shell	SS - 304
Shaft Extension	SS - 420
'O' Ring	High Nitrile Rubber
Mechanical seal	Carbon / Ceramic
Diaphragm	High Nitrile Rubber
Cable	TPE / EPDM

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## OIL FILLED SUBMERSIBLE MOTORS

Nominal Diameter : 4"

### Technical Data

Three Phase, 50Hz, 230V

Model	kW	HP	F.L. Current (A)	Starting Current (A)	Efficiency (%)	Power Factor	Capacitor (MFD)	Thrust Load (N)
FM40-03AN	0,37	0,5	3,6	10,4	53	0,92	15	1500
FM40-05AN	0,55	0,75	4,8	13,6	58	0,92	20	1500
FM40-07AN	0,75	1	6,3	17,6	60	0,96	30	1500
FM40-11AN	1,1	1,5	8,6	21,1	64	0,98	40	2500
FM40-15AN	1,5	2	11,5	35	72	0,98	50	2500
FM40-22AN	2,2	3	57	57	70	0,95	60	2500

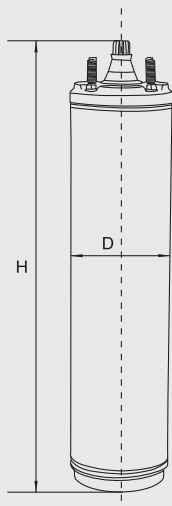
Three Phase, 50Hz, 380V

Model	kW	HP	F.L. Current (A)	Starting Current (A)	Efficiency (%)	Power Factor	Thrust Load (N)
FM40-03AT	0,37	0,5	1,07	5,2	63	0,80	1500
FM40-05AT	0,5	0,75	1,9	9,3	63	0,80	1500
FM40-07AT	0,75	1,0	2,4	11,1	64	0,81	1500
FM40-11AT	1,1	1,5	3,15	13	68	0,82	2500
FM40-15AT	1,5	2,0	4,2	19,5	72	0,82	2500
FM40-22AT	2,2	3,0	6	28	72	0,83	2500
FM40-30AT	3,0	4,0	7,8	40,2	75	0,83	2500
FM40-37AT	3,7	5,0	9,6	48	75	0,83	2500
FM40-40AT	4,0	5,5	10	51	77	0,83	2500
FM40-55AT	5,5	7,5	13,6	71,1	78	0,85	4500
FM40-75AT	7,5	10,0	17,6	87,8	79	0,85	4500

Three Phase, 50Hz, 415V

Model	kW	HP	F.L. Current (A)	Starting Current (A)	Efficiency (%)	Power Factor	Thrust Load (N)
FM40-03AT	0,37	0,5	1,3	7	63	0,74	1500
FM40-05AT	0,55	0,75	2,1	11,2	66	0,73	1500
FM40-07AT	0,75	1,0	2,7	13,8	71	0,75	1500
FM40-11AT	1,1	1,5	3,7	19	72	0,72	2500
FM40-15AT	1,5	2,0	4,9	25	73	0,72	2500
FM40-22AT	2,2	3,0	6,1	30	73	0,73	2500
FM40-30AT	3	4,0	8,0	41	73	0,73	2500
FM40-37AT	3,7	5,0	9,9	49	74	0,73	4500
FM40-40AT	4	5,5	10,5	56	75	0,73	4500
FM40-55AT	5,5	7,5	14,5	73	75	0,74	4500

### Dimensions & Weight



Model	kW	HP	Phase	Dia (mm) D	Height (mm) H	Weight (kg)	Cable Leadouts	
							Cable Size (Sq mm)	Cable Length (m)
FM40-03AN	0,37	0,5	Single	95	357	8	1,5	1,5
FM40-05AN	0,55	0,75	Single	95	377	8	1,5	1,5
FM40-07AN	0,75	1,0	Single	95	402	9	1,5	1,5
FM40-11AN	1,1	1,5	Single	95	432	11	1,5	1,5
FM40-15AN	1,5	2,0	Single	95	475	12	2,0	1,5
FM40-22AN	2,2	3,0	Single	95	520	14	2,3	2,0
FM40-03AT	0,37	0,5	Three	95	392	8	1,5	1,5
FM40-05AT	0,55	0,75	Three	95	407	8	1,5	1,5
FM40-07AT	0,75	1,0	Three	95	427	9	1,5	1,5
FM40-11AT	1,1	1,5	Three	95	447	10	1,5	1,5
FM40-15AT	1,5	2,0	Three	95	482	11	1,5	1,5
FM40-22AT	2,2	3,0	Three	95	542	14	1,5	2,0
FM40-30AT	3,0	4,0	Three	95	602	19	2,0	2,0
FM40-37AT	3,7	5,0	Three	95	602	19	2,0	2,0
FM40-40AT	4,0	5,5	Three	95	642	21	2,0	2,0
FM40-55AT	5,5	7,5	Three	95	762	25	2,3	3,0
FM40-75AT	7,5	10,0	Three	95	882	31	2,3	3,0

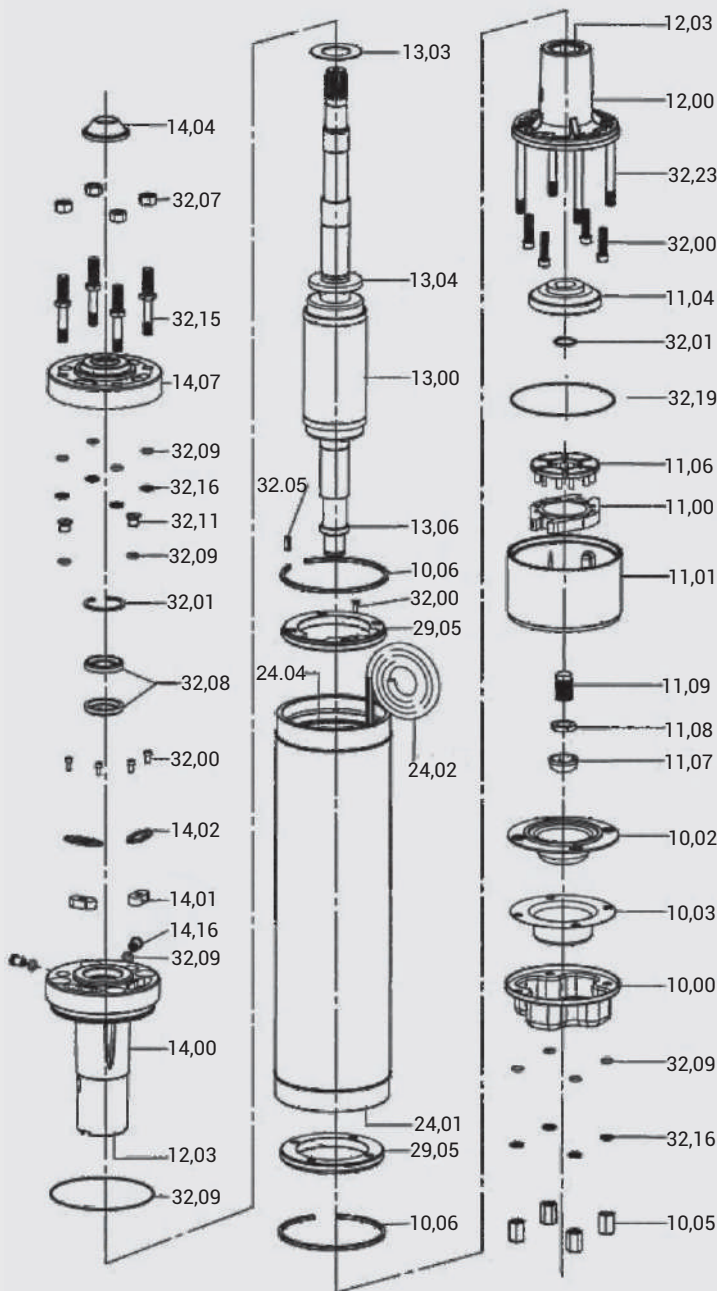
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## WATER FILLED SUBMERSIBLE MOTORS

Nominal Diameter : 6"

Exploded view



Part No.	Part Name
10,00	Motor Base
10,02	Diaphragm
10,03	Diaphragm Bottom Plate
10,05	Doom Nut
10,06	Snap Ring
11,00	Thrust Base
11,01	Thrust Base Housing
11,04	Thrust pad
11,06	Thrust Segment
11,07	Rocker cap
11,08	Rocker Lock Nut
11,09	Rocker Screw
12,00	Lower Housing
12,03	Bush-Carbon
13,00	Rotor
13,03	Up Thrust Washer
13,04	Counter Thrust Pad
13,06	Pad Supporting Ring
14,00	Upper Housing
14,01	Cable Grommet
14,02	Cable Grommet Lock Plate
14,04	Sand Guard Rubber
14,07	Upper Housing Shell
14,16	Inlet / Outlet Valve
24,01	Wound Stator
24,02	Cable
24,04	Winding Guard
29,05	Retaining Ring
32,00	Bolt
32,01	Circlip
32,05	Key
32,07	Nut
32,08	Oil Seal
32,09	O-Ring
32,11	Plug
32,15	Stud
32,16	Washer
32,19	Gasket
32,23	Tie Rod

# Applicable only for Type - B motors

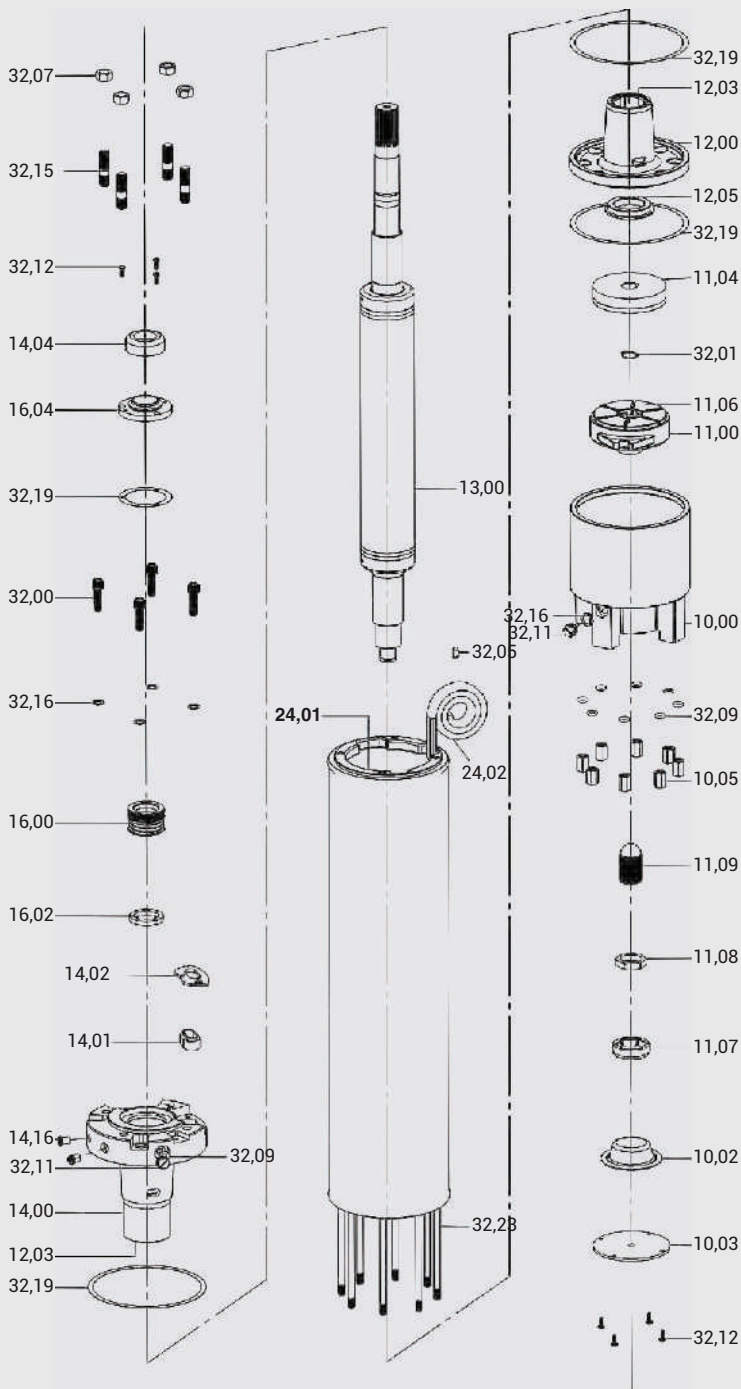
\* Applicable only for Type - A motors

Note : No of bushes varies according to the HP of motor

# WATER FILLED SUBMERSIBLE MOTORS

Nominal Diameter : 8"

Exploded view



Part No.	Part Name
10,00	Motor Base
10,02	Diaphragm
10,03	Diaphragm Bottom Plate
10,05	Doom Nut
11,00	Thrust Base
11,04	Thrust pad
11,06	Thrust Segment
11,07	Rocker cap
11,08	Rocker Lock Nut
11,09	Rocker Screw
12,00	Lower Housing
12,03	Bush-Carbo
12,05	Counter Thrust ring
13,00	Rotor
14,00	Upper Housing
14,01	Cable Grommet
14,02	Cable Grommet Lock Plate
14,04	Sand Guard Rubber
14,16	Inlet / Outlet Valve
16,00	Mechanical Seal
16,02	Mechanical Seal Rest Washer
16,04	Mechanical Seal Guide Plate
24,01	Wound Stator
24,02	Cable
32,00	Bolt
32,01	Circlip
32,05	Key
32,07	Nut
32,09	O-Ring
32,11	Plug
32,12	Screw
32,15	Stud
32,16	Washer
32,19	Gasket
32,23	Tie Rod

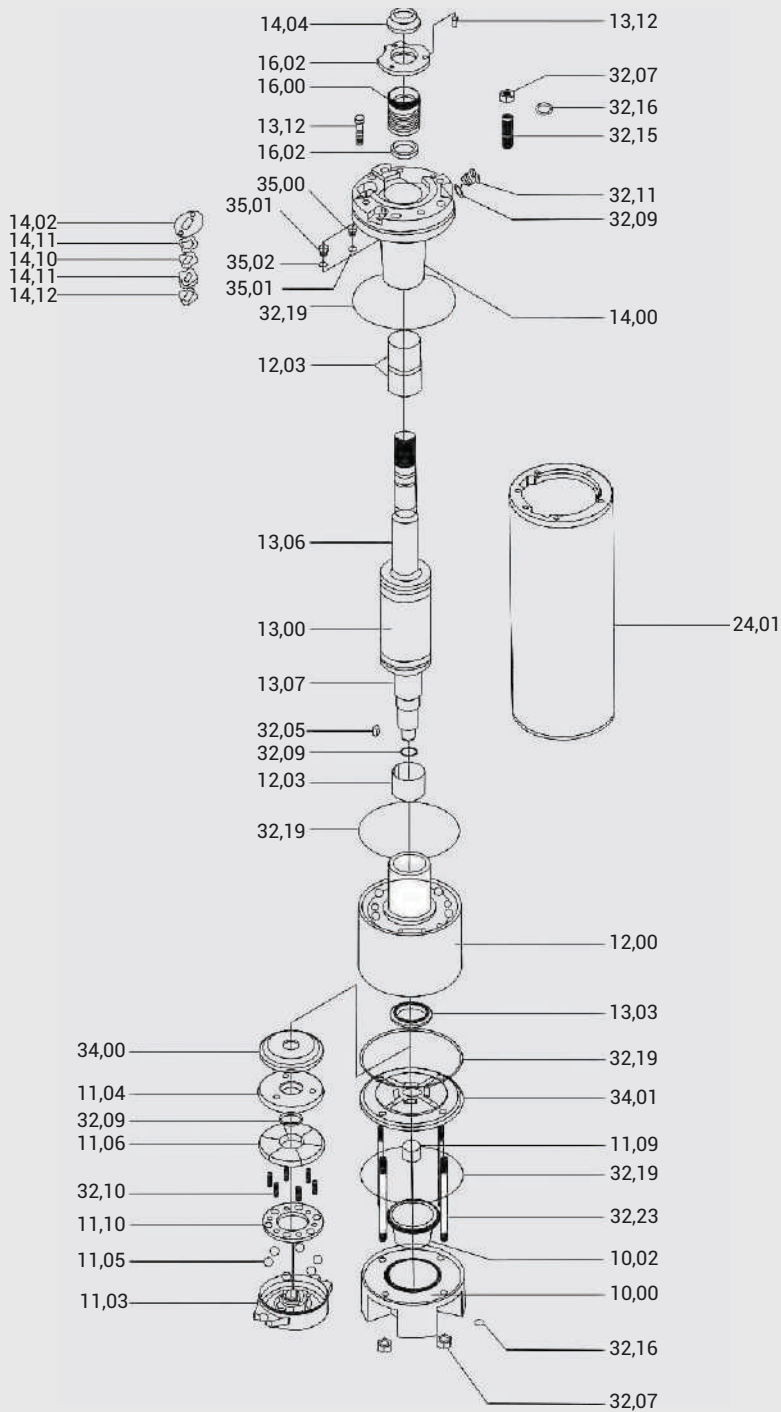
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## OIL FILLED SUBMERSIBLE MOTORS

Nominal Diameter : 10"

Exploded View



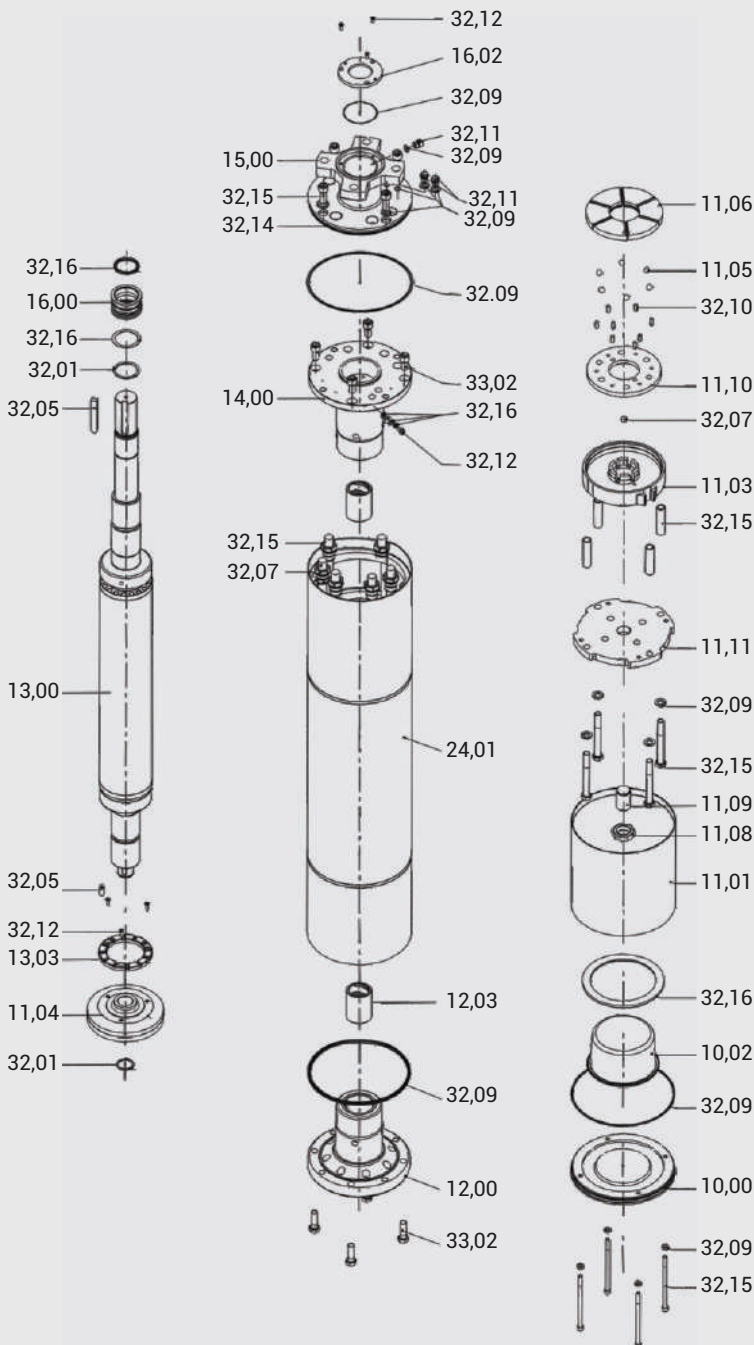
Part No.	Part Name
10,00	Motor Base
10,02	Diaphragm
11,03	Thrust Bearing Bottom
11,04	Thrust Pad
11,05	Ball
11,09	Rocker Screw
12,00	Lower Housing
12,03	Bush
13,00	Rotor
13,03	Upthrust Washer
13,06	Rotor Sleeve
13,07	Rotor Sleeve
14,00	Upper Housing
14,02	Grommat Locking Plate
14,04	Rubber Sand Guard
14,10	Cable clamping Plate
14,11	Cable clamping Plastic
14,12	Cable Clamping Washer
16,00	Mechanical Seal
16,02	Mechanical Seal Clamp Plate
24,01	Wound Stator
32,01	Circlip
32,05	Pad Key
32,07	Nut
32,09	"O" Ring
32,10	Segment Guide Pin
32,11	Drain Plug
32,12	Screw
32,15	Stud
32,16	Washer
32,19	Gasket
32,23	Tie Rod
34,00	Thrust Pad Holder
34,01	Adjustment Cover
35,00	PT Sensor Cap
35,01	PT Sensor Dummy
35,02	'O" Ring

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# OIL FILLED SUBMERSIBLE MOTORS

Nominal Diameter : 12"

Exploded View



Part No.	Part Name
10,00	Motor base
10,02	Diaphragm
11,01	Thrust base housing
11,03	Thrust bearing bottom
11,04	Thrust Pad
11,05	Ball
11,06	Thrust segment
11,08	Rocker screw nut
11,09	Rocker screw
11,10	Ball guide ring
11,11	Thrust bearing base plate
12,00	Lower housing
12,03	Bush
13,00	Rotor
13,03	Upthrust Washer
14,00	Upper housing
15,00	Seal housing
16,00	Mechanical seal
16,02	Mechanical seal clamp plate
24,01	Wound stator
32,01	Circlip
32,05	Key
32,07	Nut
32,09	O - Ring
32,10	Segment guide pin
32,11	Drain plug
32,12	Screw
32,15	Stud
32,16	Washer
32,23	Tie rod
33,02	Bolt

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## WATER FILLED SUBMERSIBLE MOTORS

Nominal Diameter : 6"

### Specifications

Nominal Dia	6" (150mm)
Maximum Outer Diameter	143mm
Power Range	4 kW to 45 kW - 3 Phase
Type of Motor	Asynchronous, Squirrel Cage Induction Motor
Speed	2900 rpm
Versions	400 V & 525 V, 50 Hz, A.C. Supply, ±10%
Class of Insulation	Y / B (PE2 + PA)
Type of Winding	Wet, Rewindable
Insulation Material	Polywrap / PVC / XLPE / PE2 (or) Equivalent
Conductivity	5,8 x 10 <sup>7</sup> Siemens / m (at 20°C)
Degree of Protection	IP 58 / IP 68
Direction of Rotation	Electrical Reversible
Type of Duty	S1 (continuous)
Maximum Down Thrust Load	4 kW to 22 kW - 15500 N 26 kW to 45 kW - 27500 N
Minimum cooling flow	0,15 m/sec / 0.5 m/sec
Maximum Liquid Temperature	45°C / 70°C
Starts per Hour	20 times
Shaft Type	Splined as per NEMA
Mounting Standard	NEMA Standard
Method of Starting	DOL / SD / impedance / Auto-Transformer / Soft Starter
Cable Leadout	Permanently Connected and Sealed 3/4 core TPE / EPDM Flat Cable
Thermal Protection	PT Sensor - Optional



### Materials of Construction

Part Name	Type - A	Type - B	Type - A Premium	Type - S Premium	Type - T Premium
Shaft Seal	Oil Seal (Nitrile Rubber)	Oil Seal (Nitrile Rubber)	Mechanical Seal (Ceramic Carbon)	Mechanical Seal (Ceramic Carbon)	Mechanical Seal (Ceramic Carbon)
Upper & Lower Housings	Cast Iron	Cast Iron	Cast Iron	Casted Steel (SS 304)	Casted Steel (SS 316)
Stator Shell	SS - 304 / SS - 441	SS - 304 / SS - 441	SS - 304 / SS - 441	SS - 304 / SS - 441	SS - 316 / SS - 441
Thrust Pad	Carbon Graphite	Carbon Graphite	Carbon Graphite	Carbon Graphite	Carbon Graphite
Thrust Bearing	SS - 420	SS - 420	SS - 420	SS - 420	SS - 420
Diaphragm	High Nitrile Rubber	High Nitrile Rubber	High Nitrile Rubber	High Nitrile Rubber	High Nitrile Rubber
Motor Base	SS - 304	SS - 304	SS - 304	Casted Steel SS - 304	Casted Steel SS - 316
Upper Housing	SS - 304 Shell Type	NA	SS - 304 Shell Type	NA	NA
Shaft	EN - 8	EN - 8	EN - 8	EN - 8	EN - 8
Shaft Extension	17.4 Ph	17.4 Ph	17.4 Ph	17.4 Ph	17.4 Ph
Sleeves	SS - 431	SS - 431	SS - 431	SS - 431	SS - 431

\*Motor with SS casted housings also can be supplied in SS 304 & SS 316

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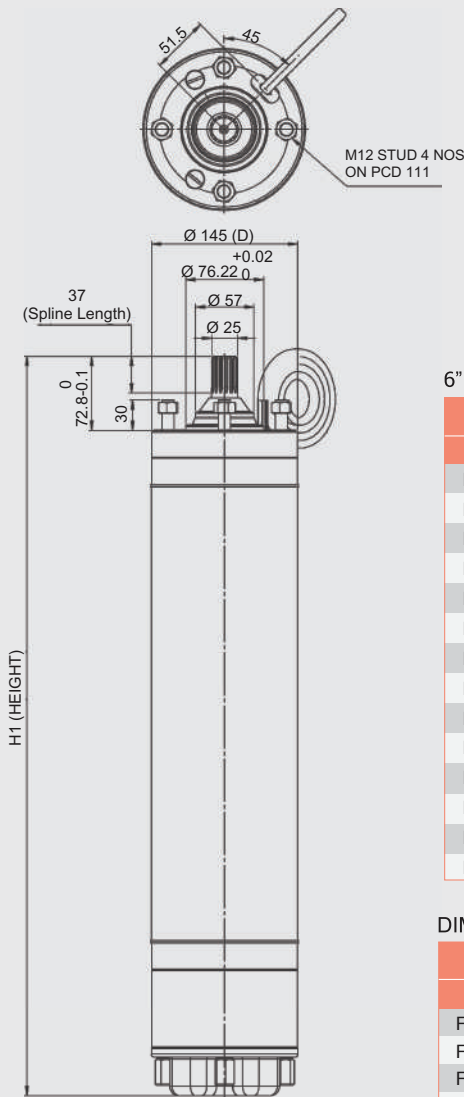
# WATER FILLED SUBMERSIBLE MOTORS

## Nominal Diameter : 6"

### 6" THREE PHASE 380V, D.O.L. & S.D MOTORS

#### Technical Data

Models		Motor Power		Full Load Max (A)	Starting Current (A)	Eff.%	Power Factor	Max. Down Thrust Load (N)	Starting Torque (Nm)	Torque (Nm)
D.O.L	S.D	kW	HP							
FM6W-40AT	-	4,0	5,5	11	41	76	0,72	15500N	20	14
FM6W-45AT	-	4,5	6	12,5	46	76	0,77	15500N	21	15
FM6W-55AT	FM6W-55AD	5,5	7,5	13,7	50	78	0,78	15500N	24	18
FM6W-75AT	FM6W-75AD	7,5	10	19	67	82	0,76	15500N	27	25
FM6W-93AT	FM6W-93AD	9,3	12,5	22	81	82	0,8	15500N	35	31
FM6W-110AT	FM6W-110AD	11,0	15	26	99	82	0,81	15500N	43	37
FM6W-130AT	FM6W-130AD	13	17,5	30	115	83	0,81	15500N	51	43
FM6W-150AT	FM6W-150AD	15	20	34	145	83	0,82	15500N	62	49
FM6W-185AT	FM6W-185AD	18,5	25	43	185	83	0,82	15500N	98	61
FM6W-220AT	FM6W-220AD	22	30	50	222	83	0,82	15500N	115	73
FM6W-260AT	FM6W-260AD	26	35	57	267	83	0,83	27500N	130	85
FM6W-300AT	FM6W-300AD	30	40	68	352	83	0,83	27500N	190	97
FM6W-370AT	FM6W-370AD	37	50	84	416	82	0,82	27500N	240	122
FM6W-450AT	FM6W-450AD	45	60	95	461	82	0,82	27500N	390	150



Dimensional Drawing

All dimensions are in mm

Splined shaft 15 Teeth - module 1.5875  
Pressure angle 30° A.N.S.I.B - 92 - 1 - 1970  
Coupling Class 5

### 6" THREE PHASE 415V, D.O.L. & S.D MOTORS

Models		Motor Power		Full Load Max (A)	Starting Current (A)	Full load		Max. Down Thrust Load (N)	Starting Torque (Nm)	Torque (Nm)
D.O.L	S.D	(kW)	HP			Eff.%	Power Factor			
FM6W-40AT	-	4	5,5	10,8	43	76	0,70	15500	20	14
FM6W-45AT	-	4,5	6,0	12	48	76	0,75	15500	21	15
FM6W-55AT	FM6W-55AD	5,5	7,5	13,5	52	78	0,77	15500	24	18
FM6W-75AT	FM6W-75AD	7,5	10,0	18,5	70	82	0,75	15500	27	25
FM6W-93AT	FM6W-93AD	9,3	12,5	21	84	82	0,79	15500	35	31
FM6W-110AT	FM6W-110AD	11	15,0	25	102	82	0,80	15500	43	37
FM6W-130AT	FM6W-130AD	13	17,5	29,5	118	83	0,80	15500	51	43
FM6W-150AT	FM6W-150AD	15	20,0	33	148	83	0,81	15500	62	49
FM6W-185AT	FM6W-185AD	18,5	25,0	42,5	188	83	0,81	15500	98	61
FM6W-220AT	FM6W-220AD	22	30,0	49,2	225	83	0,81	15500	118	74
FM6W-260AT	FM6W-260AD	26	35,0	56,5	270	83	0,82	27500	138	86
FM6W-300AT	FM6W-300AD	30	40,0	67,2	355	83	0,82	27500	196	98
FM6W-370AT	FM6W-370AD	37	50,0	83	420	82	0,83	27500	245	123
FM6W-450AT	FM6W-450AD	45	60,0	93	465	82	0,83	27500	396	151

#### DIMENSIONS AND WEIGHT

Models		Motor Power		*Method of Starting	Dimension (mm)		Nett Weight (Kg) (Approx.)	Cable leadouts		
D.O.L	S.D	kW	HP		D	H1		Cable Size (Sq.mm)		Cable Length (m)
						D.O.L	S.D			
FM6W-40AT	-	4	5,5	T	143	734	42	2,5	-	3
FM6W-45AT	-	4,5	6,0	T	143	754	44	2,5	-	3
FM6W-55AT	FM6W-55AD	5,5	7,5	T / D	143	804	50	4,0	2,5	3
FM6W-75AT	FM6W-75AD	7,5	10,0	T / D	143	854	55	4,0	2,5	3
FM6W-93AT	FM6W-93AD	9,3	12,5	T / D	143	884	58	6,0	2,5	3
FM6W-110AT	FM6W-110AD	11	15,0	T / D	143	924	63	6,0	4,0	3
FM6W-130AT	FM6W-130AD	13	17,5	T / D	143	964	67	6,0	4,0	3
FM6W-150AT	FM6W-150AD	15	20,0	T / D	143	1004	71	10,0	4,0	3
FM6W-185AT	FM6W-185AD	18,5	25,0	T / D	143	1084	80	10,0	4,0	3,5
FM6W-220AT	FM6W-220AD	22	30,0	T / D	143	1154	86	10,0	4,0	3,5
FM6W-260AT	FM6W-260AD	26	35,0	T / D	143	1174	89	10,0	6,0	4,25
FM6W-300AT	FM6W-300AD	30	40,0	T / D	143	1229	94	10,0	6,0	4,25
FM6W-370AT	FM6W-370AD	37	50,0	T / D	143	1304	98	16,0	6,0	5,25
FM4W-450AT	FM6W-450AD	45	60,0	T / D	143	1379	105	16,0	10	5,25

\* METHOD OF STARTING : T - 3P / DOL / 50Hz D - 3P / SD / 50Hz

In view of continuous developments, the information / descriptions / specifications / illustrations are subject to change without notice.

## WATER FILLED SUBMERSIBLE MOTORS

Nominal Diameter : 8"

### Specifications

Nominal Dia	8" (200mm)
Maximum Outer Diameter	194mm
Power Range	37 kW to 93 kW - 3 Phase
Type of Motor	Asynchronous, Squirrel Cage Induction Motor
Speed	2900 rpm
Versions	400 V & 525 V, 50 Hz, A.C. Supply, ±10%
Class of Insulation	Y / B (PE2 + PA)
Type of Winding	Wet, Rewindable
Insulation Material	PVC / XLPE / PE2 (or) Equivalent
Conductivity	5,8 x 10 <sup>7</sup> Siemens / m (at 20°C)
Degree of Protection	IP 68
Direction of Rotation	Electrical Reversible
Type of Duty	S1 (continuous)
Maximum Down Thrust Load	45500 N
Minimum cooling flow	0,15 m/sec / 0.5 m/sec
Maximum Liquid Temperature	45°C / 70°C
Starts per Hour	15 times
Shaft Type	Splined as per NEMA
Mounting Standard	NEMA Standard
Method of Starting	DOL / SD / impedance / Auto-Transformer / Soft Starter
Cable Leadout	Permanently Connected and Sealed 3/4 core TPE / EPDM Flat Cable
Thermal Protection	PT Sensor - Optional



### Materials of Construction

Part Name	Type - B	Type - S
Shaft Seal Housing	Cast Iron	SS - 304 Casted
Shaft Seal / Mechanical Seal	Nitrile Rubber (NBR) / Ceramic - Carbon, SiC - SiC	Nitrile Rubber (NBR) / Ceramic - Carbon, SiC - SiC
Upper & Lower Housings	Cast Iron	SS - 304 Casted
Stator Shell	SS - 304	SS - 304
Thrust Pad	Carbon Graphite	Carbon Graphite
Thrust Bearing	SS - 420	SS - 420
Diaphragm	High Nitrile Rubber	High Nitrile Rubber
Motor Base	Cast Iron	SS - 304 Casted
Shaft	EN-8	EN-8
Shaft Extension	17.4 Ph	17.4 Ph
Sleeves	SS - 431	SS - 431

\*Motor with SS casted housings also can be supplied in SS 304 & SS 316

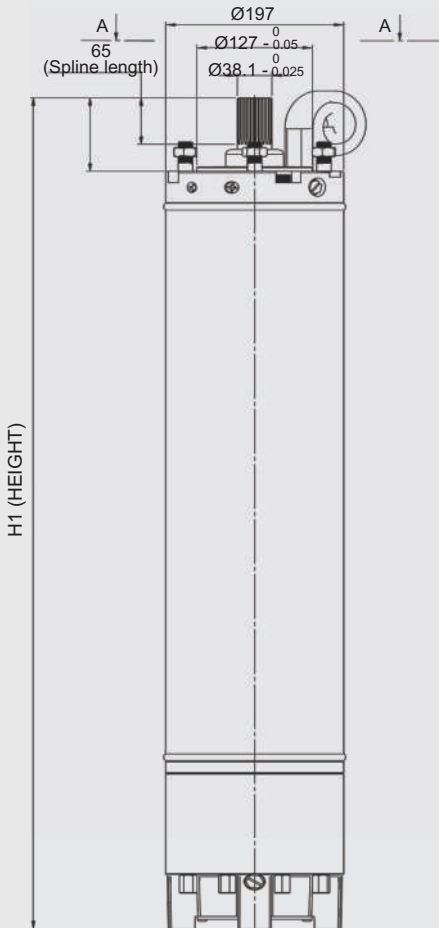
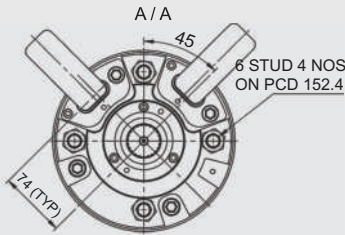
In view of continuous developments, the information / descriptions / specifications / illustrations are subject to change without notice.



# WATER FILLED SUBMERSIBLE MOTORS

Nominal Diameter : 8"

## Technical Data



All Dimensions are in mm  
 Splined Shaft : 23 teeth -  
 Module 1.5875 Pressure Angle 30°  
 A.N.S.I.B92-1 Tolerance Class 5

### 8" THREE PHASE 380V, D.O.L. & S.D MOTORS

Models		Motor Power		Full Load Max (A)	Starting Current (A)	Full load		Max. Down Thrust Load (N)	Starting Torque (Nm)	Torque (Nm)
D.O.L	S.D	kW	HP			Eff.%	Power Factor			
FM8W-370BT	FM8W-370BD	37	50	69	380	83,6	0,86	45500	160	122
FM8W-450BT	FM8W-450BD	45	60	94,5	480	84	0,87	45500	225	148
FM8W-550BT	FM8W-550BD	55	75	116	620	84,5	0,87	45500	310	182
FM8W-630BT	FM8W-630BD	63	85	130	710	85	0,87	45500	350	208
FM8W-750BT	FM8W-750BD	75	100	156	855	85	0,88	45500	420	248
FM8W-930BT	FM8W-930BD	93	125	186	1050	87	0,87	45500	570	308
FM8W-A10BT	FM8W-A10BD	110	150	230	1125	87	0,86	45500	-	-

### 8" THREE PHASE 400V, D.O.L. & S.D MOTORS

Models		Motor Power		Full Load Max (A)	Starting Current (A)	Full load		Max. Down Thrust Load (N)	Starting Torque (Nm)	Torque (Nm)
D.O.L	S.D	kW	HP			Eff.%	Power Factor			
FM8W-370BT	FM8W-370BD	37	50	75	390	84,5	0,85	45500	180	122
FM8W-450BT	FM8W-450BD	45	60	90	490	85	0,86	45500	250	148
FM8W-550BT	FM8W-550BD	55	75	114	650	85,8	0,86	45500	348	181
FM8W-630BT	FM8W-630BD	63	85	127	715	86	0,86	45500	380	207
FM8W-750BT	FM8W-750BD	75	100	148	900	85	0,88	45500	480	247
FM8W-930BT	FM8W-930BD	93	125	188	1200	87	0,88	45500	660	307
FM8W-A10BT	FM8W-A10BD	110	150	227	1135	87	0,83	45500	-	-

### 8" THREE PHASE 415V, D.O.L. & S.D MOTORS

Models		Motor Power		Full Load Max (A)	Starting Current (A)	Full load		Max. Down Thrust Load (N)	Starting Torque (Nm)	Torque (Nm)
D.O.L	S.D	kW	HP			Eff.%	Power Factor			
FM8W-370BT	FM8W-370BD	37	50	80	400	86	0,84	45500	200	122
FM8W-450BT	FM8W-450BD	45	60	92	520	85	0,84	45500	268	149
FM8W-550BT	FM8W-550BD	55	75	112	660	87	0,84	45500	370	180
FM8W-630BT	FM8W-630BD	63	85	126	720	88	0,86	45500	410	206
FM8W-750BT	FM8W-750BD	75	100	151	930	89	0,86	45500	520	246
FM8W-930BT	FM8W-930BD	93	125	188	1250	88	0,86	45500	680	306
FM8W-A10BT	FM8W-A10BD	110	150	225	1150	87	0,81	45500	-	-

### 8" THREE PHASE 525V, D.O.L. & S.D MOTORS

Models		Motor Power		Full Load Max (A)	Starting Current (A)	Full load		Max. Down Thrust Load (N)	Starting Torque (Nm)	Torque (Nm)
D.O.L	S.D	kW	HP			Eff.%	Power Factor			
FM8W-450BTN	FM8W-450BDN	45	60	80	320	85	0,82	45500	320	154
FM8W-550BTN	FM8W-550BDN	55	75	92	365	85	0,84	45500	450	185
FM8W-630BTN	FM8W-630BDN	63	85	103	410	86	0,88	45500	500	211
FM8W-750BTN	FM8W-750BDN	75	100	118	470	87	0,9	45500	620	251
FM8W-930BTN	FM8W-930BDN	93	125	145	580	87	0,88	45500	685	311

### DIMENSIONS AND WEIGHT

Models	Motor Power		*Method of Starting	Dimension (mm)		Nett Weight (Kg) (Approx.)	Cable leadouts		
	kW	HP		D	H1		Cable Size (Sq.mm)		Cable Length (m)
	D.O.L	S.D					D.O.L	S.D	
FM8W-370BT	37	50	T / D	194	1181	153	16	10	4
FM8W-450BT	45	60	T / D	194	1231	164	16	10	4
FM8W-550BT	55	75	T / D	194	1281	180	35	25	5
FM8W-630BT	63	85	T / D	194	1351	193	35	25	5
FM8W-750BT	75	100	T / D	194	1466	215	35	25	5
FM8W-930BT	93	125	T / D	194	1556	235	35	35	5
FM8W-A10BT	110	150	T / D	194	1656	256	35	35	5

\* METHOD OF STARTING : T - 3P / DOL / 50Hz      D - 3P / SD / 50Hz

## WATER FILLED SUBMERSIBLE MOTORS

Nominal Diameter : 10"

### Specifications

Nominal Dia	10" (250mm)
Maximum Outer Diameter	Upto 185 kW - 236 mm / 220 kW - 240 mm
Power Range	81 kW to 220 kW - 3 Phase
Type of Motor	Asynchronous, Squirrel Cage Induction Motor
Speed	2900 rpm
Versions	380 V & 415 V, 50 Hz, A.C. Supply
Class of Insulation	Y / B (PE2 + PA)
Type of Winding	Wet, Rewindable
Insulation Material	PVC / XLPE / PE2 (or) Equivalent
Conductivity	$5,8 \times 10^7$ Siemens / m (at 20°C)
Degree of Protection	IP 68
Direction of Rotation	Electrical Reversible
Type of Duty	S1 (continuous)
Maximum Down Thrust Load	60000 N
Minimum cooling flow	0,15 m/sec / 0.5 m/sec
Maximum Liquid Temperature	45°C / 70°C
Starts per Hour	15 times
Shaft Type	Splined as per NEMA / Keyway
Mounting Standard	NEMA Standard / International
Method of Starting	DOL / SD / impedance / Auto-Transformer / Soft Starter
Cable Leadout	Permanently Connected and Sealed 3/4 core TPE / EPDM Flat Cable
Thermal Protection	PT Sensor - Optional



Type - A/N

Type - B

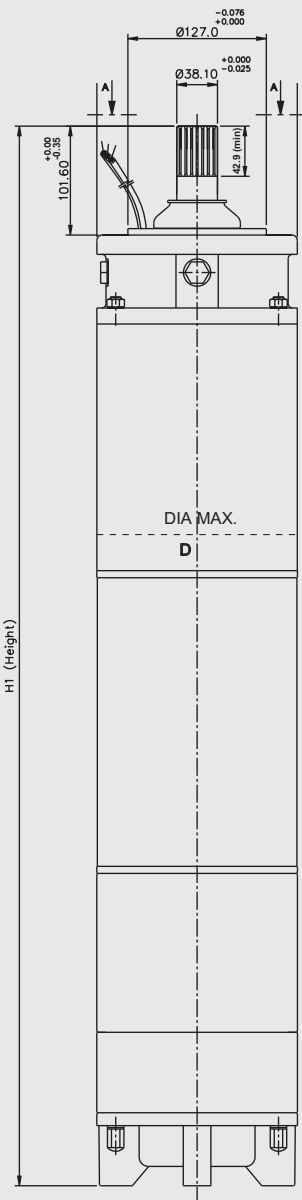
### Materials of Construction

Part Name	Type - A	Type - N	Type - B
Shaft Seal Housing	SS - 304	SS - 316	Cast Iron
Shaft Seal / Mechanical Seal	Nitrile Rubber (NBR) / Ceramic - Carbon, SiC - SiC	Nitrile Rubber (NBR) / Ceramic - Carbon, SiC - SiC	Nitrile Rubber (NBR) / Ceramic - Carbon, SiC - SiC
Upper & Lower Housings	SS - 304	SS - 316	Cast Iron
Stator Shell	SS - 304	SS - 316	SS - 304
Thrust Pad	Carbon Graphite	Carbon Graphite	Carbon Graphite
Thrust Bearing	SS - 420	SS - 420	SS - 420
Diaphragm	Nitrile Rubber (NBR)	Nitrile Rubber (NBR)	Nitrile Rubber (NBR)
Motor Base	SS - 304	SS - 316	Cast Iron

# WATER FILLED SUBMERSIBLE MOTORS

Nominal Diameter : 10"

## 10" THREE PHASE - 380 V - 415 V DOL & SD MOTORS



Model		Motor Power		Full Load Max (A)	Starting Current (A)	Eff. %	Power Factor	Max. Down Thrust Load (N)
DOL	SD	kW	HP					
FM10W-750T	FM10W-750D	75	100	150	1500	86	0,87	60000
FM10W-810T	FM10W-810D	81	110	166	1600	86	0,87	60000
FM10W-930T	FM10W-930D	93	125	181	1810	87	0,89	60000
FM10W-A10T	FM10W-A10D	110	150	220	2200	87	0,89	60000
FM10W-A30T	FM10W-A30D	130	175	255	2550	87	0,89	60000
FM10W-A50T	FM10W-A50D	150	200	290	2900	88	0,89	60000
FM10W-A65T	FM10W-A65D	165	225	325	3250	88	0,89	60000
FM10W-A85T	FM10W-A85D	185	250	355	3550	89	0,90	60000
FM10W-B22T	-	220	300	425	4250	88	0,86	60000

## DIMENSIONS AND WEIGHT

Model		Motor Power		Method of Starting	Dimension (mm)		Nett Weight (Kg) (Approx.)	Cable Leadouts				
DOL	SD	kW	HP		D	H1		Cable Size(Sq.mm)			Cable Length (m)	
								D.O.L	No. of Leadouts	S.D		
FM10W-750T	FM10W-750D	75	100	T/D	236	1226	240	25	1	16	4	
FM10W-810T	FM10W-810D	81	110	T/D	236	1266	260	25	1	16	4	
FM10W-930T	FM10W-930D	93	125	T/D	236	1316	274	25	1	16	4	
FM10W-A10T	FM10W-A10D	110	150	T/D	236	1446	314	25	2	25	4	
FM10W-A30T	FM10W-A30D	130	175	T/D	236	1546	343	25	2	25	4	
FM10W-A50T	FM10W-A50D	150	200	T/D	236	1736	366	35	2	35	4	
FM10W-A65T	FM10W-A65D	165	225	T/D	236	1856	409	35	2	35	4	
FM10W-A85T	FM10W-A85D	185	250	T/D	236	1956	439	35	2	35	4	
FM10W-B20T	FM10W-B20D	220	300	T/D	240	2183	500	70	6	70	-	

\* METHOD OF STARTING : T - 3P / DOL / 50Hz      D - 3P / SD / 50Hz

# Applicable for only DOL Motor.

ALL DIMENSIONS ARE IN mm.

## WATER FILLED SUBMERSIBLE MOTORS

Nominal Diameter : 12"

### Specifications

Nominal Dia	12" (300mm)
Maximum Outer Diameter	273 mm
Power Range	150 kW to 300 kW - Three Phase
Speed	2850 rpm
Version	Three Phase - 380 V, 400 V & 415 V, 50 Hz, A.C Supply
Class of Insulation	Y
Degree of Protection	IP 68
Direction of Rotation	Electrically Reversible - Three Phase
Type of Duty	S1 (Continuous)
Down Thrust Load	60000 N
Minimum Cooling Flow Along the Motor	0,5 m/sec (30°C), 2 m/sec (50°C)
Maximum Liquid Temperature	Standard - 33°C High temp - 50°C Beyond 50°C - Can be supplied with derated motor
Starts per Hour	10 Times
Shaft Type	Key Way Type
Mounting Standard	International Standard
Method of Starting	Direct On Line (DOL) Star Delta (SD)
Cable Lead out	Permanently Connected and Sealed 3/4 Core Rubber Insulated Flat Cable
Thermal Protection	Optional - PT Sensor



Type - A/N    Type - B

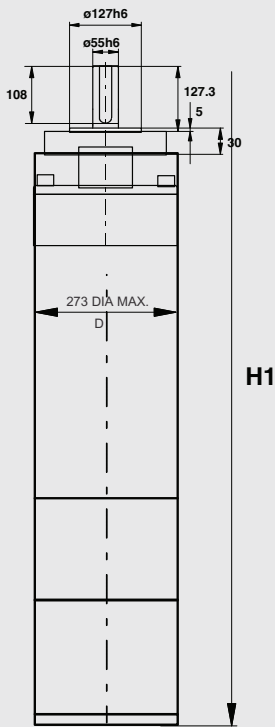
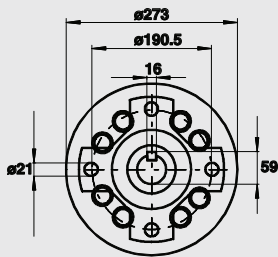
### Materials of Construction

Part Name	Type - A	Type - N	Type - B
Seal Housing	SS - 304	SS - 316	Cast Iron
Mechanical Seal	Carbon / Ceramic SiC - SiC*	SiC - SiC	Carbon / Ceramic SiC - SiC*
Upper & Lower Housings	SS - 304	SS - 316	Cast Iron
Stator Shell	SS - 304	SS - 316	SS - 304
Thrust Pad	SS / Carbon	SS / Carbon	SS / Carbon
Thrust Bearing	SS / Carbon	SS / Carbon	SS / Carbon
Diaphragm	NBR	NBR	NBR
Motor Base	SS - 304	SS - 316	Cast Iron
Shaft	SS - 304	Duplex Steel	SS - 304

\* Optional

## WATER FILLED SUBMERSIBLE MOTORS

Nominal Diameter : 12"



ALL DIMENSIONS ARE IN mm.

### 8" THREE PHASE 380V, D.O.L. & S.D MOTORS

Models		Motor Power		Full Load Max (A)	Starting Current (A)	Full load		Max. Down Thrust Load (N)	Torque Ratio Ma/Mn	Torque Ratio Mk/Mn
D.O.L	S.D	kW	HP			Eff. %	Power Factor			
FM12W-A50T	-	150	200	308	1571	87	0,85	60000	1,0	2,5
FM12W-A85T	-	185	250	380	1862	87	0,85	60000	1,0	2,5
FM12W-B25T	-	225	300	462	2217	87	0,85	60000	1,0	2,6
FM12W-B60T	FM12W-B60D	260	350	540	2700	86	0,85	60000	1,1	2,5
FM12W-C00T	FM12W-C00D	300	400	624	2995	86	0,85	60000	1,0	2,6

### 8" THREE PHASE 415V, D.O.L. & S.D MOTORS

Models		Motor Power		Full Load Max (A)	Starting Current (A)	Full load		Max. Down Thrust Load (N)	Torque Ratio Ma/Mn	Torque Ratio Mk/Mn
D.O.L	S.D	kW	HP			Eff. %	Power Factor			
FM12W-A50T	-	150	200	282	1438	87	0,85	60000	1,0	2,5
FM12W-A85T	-	185	250	348	1705	87	0,85	60000	1,0	2,5
FM12W-B25T	-	225	300	423	2030	87	0,85	60000	1,0	2,6
FM12W-B60T	FM12W-B60D	260	350	495	2475	86	0,85	60000	1,1	2,5
FM12W-C00T	FM12W-C00D	300	400	571	2741	86	0,85	60000	1,0	2,6

### DIMENSIONS AND WEIGHT

Models		Motor Power		*Method of Starting	Dimension (mm)		Nett Weight (Kg) (Approx.)	Cable leadouts			
D.O.L	S.D	kW	HP		D	H1		Cable Size (Sq.mm)		Cable Length (m)	
								D.O.L	*No of Leadouts		S.D
FM12W-A50T	-	150	200	T	273	1699	414	70	3	-	7
FM12W-A85T	-	185	250	T	273	1769	449	95	3	-	7
FM12W-B25T	-	225	300	T	273	1859	495	120	3	-	7
FM12W-B60T	FM12W-B60D	260	350	T/D	273	1934	534	70	6	70	7
FM12W-C00T	FM12W-C00D	300	400	T/D	273	2034	585	70	6	95	7

\* METHOD OF STARTING : T - 3P / DOL / 50Hz      D - 3P / SD / 50Hz

\* Applicable for only DOL Motor.



## CABLE SELECTION TABLE

### FOR SINGLE PHASE 3 WIRE (D.O.L) MOTOR MAXIMUM LENGTH OF COPPER CABLE

Motor Rating			Cable Size in Square Millimetres						MAXIMUM LENGTH IN METRES
VOLTS	kW	HP	1.5	2.5	4	6	10	16	
230 VOLT 50Hz	0.37	0.5	120	200	320	480	810		
	0.55	0.75	80	130	220	320	550		
	0.75	1	60	100	170	250	430		
	1.1	1.5	40	70	120	180	300		
	1.5	2	30	60	90	130	230	360	
	2.2	3		40	60	90	150	230	

### FOR THREE PHASE 6WIRE (S/D) MOTOR MAXIMUM LENGTH OF COPPER CABLE

Voltage drop - 3%

Motor Rating			Cable Size in Square Millimetres																	MAXIMUM LENGTH IN METRES					
VOLTS	kW	HP	1.5	2.5	4	6	10	16	25	35	50	70	95	120	150	185	240	300	400		500	630			
380-415 VOLT 50Hz	5.5	7.5	91	143	234	351	572	896	1377	1884															
	7.5	10	65	104	169	260	403	650	974	1338															
	9.3	12.5		91	143	221	364	572	870	1182	1624														
	11	15		78	130	182	299	481	714	974	1377	1832													
	13	17.5			104	143	260	403	611	844	1156	1533													
	15	20			91	130	221	351	533	740	1026	1364	1741												
	18.5	25				104	182	273	429	585	799	1065	1364	1624											
	22	30					156	234	364	494	688	922	1169	1403	1650										
	26	35						130	195	299	403	572	792	1000	1221	1429	1650								
	30	40							117	169	273	364	520	675	870	1013	1208	1390	1624						
	37	50								143	221	299	416	546	701	831	974	1117	1312	1494					
	45	60									182	247	338	468	598	727	870	1013	1208	1377					
	55	75										208	286	377	494	611	714	831	987	1137					
	63	85											188	260	299	442	546	637	740	870	1000				
	75	100												208	286	377	455	533	611	727	831	974			
	93	125													234	299	364	429	494	585	662	779			
	110	150														260	312	377	429	520	598	701	786		
	130	175															221	266	325	377	442	520	598	688	760
	150	200																234	279	325	390	455	539	604	669
	166	225																	234	286	338	390	455	520	578
185	250																		260	312	364	429	481	539	
220	300																			247	286	331	372	410	
260	350																				247	286	325	357	
300	400																					214	247	273	312

These are maximum length of cable in METRES from POWER SOURCE to MOTOR. Exceeding these length will void warranty.

# CABLE SELECTION TABLE

FOR THREE PHASE 3 WIRE (D.O.L.) MOTOR MAXIMUM LENGTH OF COPPER CABLE

Voltage drop - 3%

Motor Rating			Cable Size in Square Millimetres																		MAXIMUM LENGTH IN METRES	
VOLTS	kW	HP	1.5	2.5	4	6	10	16	25	35	50	70	95	120	150	185	240	300	400	500		630
380-415 VOLT 50Hz	0.37	0.5	473	788	1260																	
	0.55	0.75	398	660	1050																	
	0.75	1	311	518	825																	
	1.1	1.5	203	338	533	795																
	1.5	2	161	270	428	638																
	2.2	3	113	188	300	450	731															
	3	4	86	143	233	345	566	885														
	3.7	5	71	120	188	285	465	735														
	4	5.5	67	113	176	263	435	683	1043													
	4.5	6	64	105	169	255	420	653	998	1358												
	5.5	7.5	53	83	135	203	330	518	795	1088												
	7.5	10	38	60	98	150	233	375	563	773												
	9.3	12.5		53	83	128	210	330	503	683	938											
	11	15		45	75	105	173	278	413	563	795	1058										
	13	17.5			60	83	150	233	353	488	668	885										
	15	20			53	75	128	203	308	428	593	788	1005									
	18.5	25				60	105	158	248	338	461	615	788	938								
	22	30					90	135	210	285	398	533	675	810	953							
	26	35					75	113	173	233	330	458	578	705	825	953						
	30	40					68	98	158	210	300	390	503	585	698	803	938					
	37	50						83	128	173	240	315	405	480	563	645	758	863				
	45	60							105	143	195	270	345	420	503	585	698	795				
	55	75								120	165	218	285	353	413	480	570	656				
	63	85								109	150	173	255	315	368	428	503	578				
	75	100									120	165	218	263	308	353	420	480	563			
	93	125										135	173	210	248	285	338	383	450			
	110	150											150	180	218	248	300	345	405	454		
	130	175												128	154	188	218	255	300	345	398	439
	150	200													135	161	188	225	263	311	349	386
	166	225														135	165	195	225	263	300	334
185	250															150	180	210	248	278	311	
220	300																143	165	191	215	237	
260	350																	143	165	188	206	
300	400																		124	143	158	180

These are maximum length of cable in METRES from POWER SOURCE to MOTOR. Exceeding these length will void warranty.

## PIPE FRICTION LOSS TABLE

### FRICITION LOSS IN METERS FOR 10 METERS LONG NEW STEEL GALVANIZED PIPE (C = 140)

Nominal Pipe Outer dia In mm / inches	25/ 1"	32/ 1 1/4"	40/ 1 1/2"	50/ 2"	65/ 2 1/2"	80/ 3"	100/ 4"	125/ 5"	150/ 6"
0,50	0,364								
1,00	1,315	0,341							
1,25	1,988	0,516	0,246						
1,60	3,140	0,814	0,388						
2,00		1,231	0,587						
2,50		1,861	0,888	0,282					
3,2		2,940	1,402	0,446	0,126				
4,0			2,120	0,674	0,190				
5,0			3,205	1,019	0,288				
8,0				2,433	0,887	0,313			
10,0				3,678	1,038	0,474	0,131		
12,5					1,570	0,716	0,198		
16					2,479	1,131	0,312	0,111	
20					3,747	1,710	0,472	0,167	
25						2,585	0,713	0,253	0,106
32						4,033	1,127	0,400	0,157
40							1,704	0,605	0,252
50							2,576	0,914	0,351
60								1,281	0,534
80								0,182	0,910
100								3,299	1,376
125									0,051

### FRICITION LOSS IN METERS FOR 10 METERS LONG NEW RPVC PIPE (C = 150)

Nominal Pipe Outer dia In mm / inches	40/ 1 1/2"	50/ 2"	63/ 2 1/2"	75/ 3"	90/ 3 1/2"	110/ 4 1/4"	125/ 5"	140/ 5 1/2"	160/ 6 1/4"
0,50	0,074								
1,00	0,268								
1,25	0,405	0,131							
1,60	0,640	0,211							
2,00	0,967	0,310							
2,50	1,462	0,483	0,150						
3,20	2,309	0,762	0,250	0,106					
4,0	3,491	1,153	0,377	0,160					
5,0		1,742	0,571	0,242					
8,0		4,161	1,363	0,577	0,237				
10,0			2,060	0,873	0,358	0,133			
12,5			3,114	1,319	0,542	0,201			
16			4,919	2,084	0,856	0,317	0,172		
20				3,151	1,293	0,479	0,260		
25					1,955	0,725	0,392	0,225	0,117
32					3,089	1,145	0,020	0,355	0,184
40						1,731	0,937	0,537	0,279
50						2,617	1,416	0,812	0,421
60						3,008	1,985	1,138	0,590
80							3,382	1,939	1,006
100								2,931	1,521
125									2,299

## PIPE FRICTION LOSS TABLE

### PERMISSIBLE RANGE OF VOLUME RATES OF FLOW IN I/S THROUGH GALVANIZED STEEL PIPE TO LIMIT FRICTION LOSSES TO 10 PERCENT OF THE PIPE LENGTH

Grade →	Light	Medium	Heavy
Nominal pipe dia in mm ↓	Rate of flow in Ips	Rate of flow in Ips	Rate of flow in Ips
40	1,90 - 2,74	1,79 - 2,67	1,59 - 2,41
50	2,74 - 5,24	2,67 - 4,95	2,41 - 4,54
65	5,24 - 9,97	4,95 - 9,80	4,54 - 9,17
80	9,97 - 15,54	9,80 - 14,97	9,17 - 14,20
100	15,54 - 30,84	14,97 - 30,0	14,20 - 28,67
125	-	30,0 - 52,50	28,67 - 51,37
150	-	52,50 - 84,18	51,37 - 82,63

### PERMISSIBLE RANGE OF VOLUME RATES OF FLOW IN I/S THROUGH RPVC PIPE TO LIMIT FRICTION LOSSES TO 10 PERCENT OF THE PIPE LENGTH

Grade →	Class (0.25Mpa)	Class (0.4Mpa)	Class (0.6Mpa)
Nominal pipe dia in mm ↓	Rate of flow in Ips	Rate of flow in Ips	Rate of flow in Ips
40	-	-	Up to 2,04
50	-	-	2,04 - 3,70
63	-	3,80 - 7,24	3,70 - 6,77
75	-	7,24 - 11,47	6,77 - 10,76
90	11,50 - 19,58	11,47 - 18,50	10,76 - 17,41
110	19,58 - 33,25	18,59 - 31,71	17,41 - 29,75
125	33,25 - 46,63	31,71 - 44,33	29,75 - 41,44
140	46,63 - 62,92	44,33 - 59,79	41,44 - 55,97
160	62,92 - 89,28	59,79 - 84,95	55,97 - 79,76