

INSTALLATION & OPERATING INSTRUCTIONS



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6" 8" & 10" SUBMERSIBLE MOTORS

ELECTRICAL EQUIPMENT DESIGNED TO USE WITHIN CERTAIN VOLTAGE LIMITS (73/23/EEC)
ELECTROMAGNETIC COMPATIBILITY (89/336/EEC)
STANDARD USED : EN 61000-6-2 & EN 61000 6-3 | EN 60 335-1 & EN 60 335-2- 51

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EC DECLARATION OF CONFORMITY**IN ACCORDANCE WITH MACHINERY DIRECTIVES UNDER SELF DECLARATION**

Product Designation : SUBMERSIBLE MOTORS 6" 8" & 10" BORE DIAMETER

Model Reference : • SML150 • SML200 • MTSF C 150 • MTSF C200 • MTSF C 10

Intended End Use: for submersible Motor to be used for Clean water lifting application.

Conforming to the requirement of the following European Directive:

a) Machinery Directive -98/37/EC

• Conforming with the requirement of these Directives is testified under self-declaration by complete adherence to the following harmonised standards:

EN 809:1988 EN1050:1996 ENISO 12100-1&2:2003

We hereby declare that Motors is intended to be incorporated into OR assembled with other machinery to constitute relevant machinery to comply with the Essential Health and Safety requirement of the above-mentioned directives.

This machinery, its components and sub-assemblies shall not be put in to service until the machinery into which it is to be incorporated has been declared in conformity with the provision of the applicable Directives.

The criteria for selection, safety requirement of other associated equipment and installation guidelines are detailed in the instruction manual.

The other applicable standards are :

-Electromagnetic compatibility (89/336/EEC). Standard Used : EN 61000-6-2 and EN 61000 6-3

-Electrical equipment designed for use within certain voltage limits (73/23/EEC)

Standards used : EN 60 335-1 and EN 60 335-2- 51

-Applied harmonized standards: EN ISO 12100-12:2003

Date of Manufacturer & First CE marking : 10-Dec-2007.

Place of Manufacturer : Shakti Pumps India Ltd, Pithampur.

Issued at : SHAKTI PUMPS (I) LTD.
Pithampur

Marking : CE

The above Motor must not be put into service/usage for other than specified in the instruction Manual.**On Date** : 10-Dec-2007.

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1 ABOUT THIS DOCUMENT

The assembly and operating instructions form an integral part of the rewindable submersible motor and Describe its safe, intended use in all operating phases.

DOCUMENT RETENTION

- ⇒ Keep the assembly and operating instructions in the immediate vicinity of the motor
- ⇒ Hand the assembly and operating instructions over to every subsequent user of the motor

APPLICATION

- The assembly and operating instructions only apply to the motors described in this booklet

1.1 INSTRUCTIONS AND HIGHLIGHTS

In the assembly and operating instructions we use the following symbols and highlights, for improved Legibility and uniform identification.

- Insulation measuring unit
(this indicates a listing)
- Instructions observed....
(this indicates a condition)
- ⇒ Switch off the motor
(This indicates an instruction to take action)
- Motor has stopped
(This indicates the result of the action)
- Immediately switch off the Motor....
(You can see a highlight in bold here)

NOTE

Specifically important information is given here. You should observe this information to ensure correct and safe operation of the motor.

2 SAFETY

This section describes the safety rules which must be observed for the safe use of submersible motors.

Possible sources of danger and the relevant safety measures are listed here.

2.1 INTENDED USE

Shakti Pumps submersible motors are only intended for integration with a submersible pump in order to drive the relevant pump under water. They must only be put into use if the machine

fulfils the provisions of the applicable directives and statutory provisions.

The submersible motors must only be used in clean, highly fluid media, such as drinking or process water.

The following media are not allowed: air, highly flammable, explosive media and wastewater.

Loss of guarantee and exclusion of liability

Shakti Pumps shall not be liable for the damage resulting from any further, non-intended use. The risk of such use rests solely with the user.

2.2 TARGET GROUP

The electrical system must only be installed by professional staff (qualified electrical engineers or electrical machine technicians).

2.3 GENERAL SAFETY INSTRUCTIONS

The following safety measures must be observed prior to putting the motor into use.

- Do not carry out any other work on the motor other than described in these instructions
- Only use the motor under water (the motor and the short motor cable must be fully submersed)
- Do not implement any changes or conversions to the motor or its electrical connections
- Never open the motor
- Never use the motor in combination with damaged pump units or parts
- Only work on the motor when it is switched off. No work or checks require the motor to be running
- Switch off the power supply to the motor before carrying out any work on it
- Make sure that nobody can switch on the voltage unexpectedly while work is being carried out on the motor
- Never work on electrical systems during a thunderstorm
- Make sure immediately after ending the work that all protective and safety devices have been fitted again and are operational

- Before switching on the motor, make sure that all electrical connections and safety devices have been checked and that all fuses and safeties have been set correctly
- Make sure that no danger zones are freely accessible (e.g. rotating parts, suction locations, pressure output locations, electrical connections)
- Observe the pump manufacturer's commissioning instructions.
- If motors or pump units have been used in contaminated media they must be marked as such before handing them over to a third party (e.g. when submitting them for repair). Pay attention to possible residues in "dead spaces" (diaphragm cover)
- Contaminated motors or pump units must be marked as such before handing them over to a third party (e.g. when submitting them for repair)
- Repairs must only be carried out by authorized professional workshops. Use only original Shakti Electric spare parts

3 STORAGE, TRANSPORT, DISPOSAL

STORAGE

- ⇒ Store the motor in its original packaging until the time of installing it
- ⇒ If the motor is stored standing up, make sure that it cannot topple over (shaft always pointing up!)
- ⇒ Do not store the motor in direct sunlight or within the reach of other heat sources
- ⇒ Observe the storage temperature (-15 +60 °C, see technical specifications).

TRANSPORT



Falling loads may cause lethal injuries or may crush parts of the body!

- ⇒ Nobody is allowed to be located under suspended loads
- ⇒ Only use approved hoisting gear
- ⇒ Select the hoisting gear on the basis of the total weight to be transported

UNPACKING

- ⇒ After unpacking the motor check it for possible damage, e.g. damage to the diaphragm cover, housing, end bell, connection and motor cable
- ⇒ Immediately inform the supplier of any damage found



- ⇒ Danger to life due to electrocution if the motor cable is damaged
- ⇒ Do not install the motor and do not put it into operation

DISPOSAL

In order to avoid environmental damage :

- Avoid contamination by lubricants, detergents etc
- Dispose of the motor and the packaging material in a proper, environmentally sound manner
- Observe local regulations

4 TECHNICAL SPECIFICATIONS

DESCRIPTION	VALUE
Performance/model number	6": 4.0 - 37 kW SML 150, MTSF 150 8": 30 - 93 kW / 7.5 - 37 kW MTSF C200 / SML 200 10": 85 - 185 kW , MTSF C 10.
Winding insulation	Standard: PVC
Voltage range	220 V ... 460V, 3~ 50/60 Hz
Voltage tolerance (on the motor terminals)	-10 to +6 % of UN, i.e. at a nominal voltage of 380/415 V 380 V -10 % = 342 V 415 V + 6 % = 440 V
Speed Start alternatives Starting .60 sequence	Approx. 2900 rpm at 50 Hz Direct starting, delta-starting Max. number of Starts per hour with a minimum off time of 90 seconds 6" : 20 Starts 8", 10" : 10 Starts
Protection	IP 68 according to IEC 60529
Submersion depth Installation location	Max. 350 m Vertical (shaft up) to horizontal (only allowed if the pump size is identical to the motor size, e.g. 6" motor with 6" pump). The pump unit structure has to be able to withstand a sufficient axial motor load
Operating temperature	≥ -30 °C
Sound pressure level	≤70 dB(A)
Maximum axial thrust towards the motor (8" and 10" motors : for clockwise rotation please consult Shakti Pumps)	6": 4 - 26 KW 15.5 kN 30 - 37 KW 27.5 kN 8": all motors 45.0 kN 10": all motors 60.0 kN
Maximum axial thrust away from the motor (only for a short-time load of max. 3 minutes; independent of performance rating)	6": 2.0 KN 8": 3.0 KN 10": 4.4 KN
Material	The person placing the order is responsible for selecting the correct material, specifically as regards its resistance in the medium to be transported. 304: Stator 304, powder-coated castings 316: Stator and castings
Motor fluid	GLYCOL (water-based emulsion) Filling fluid replacement on request
Weight	Technical data sheets (see appendix)
Storage temperature	-15 °C to +60 °C
Motor cable	Short motor cables are included in the deliver 6": Motor cable 4.0 m long 8", 10": Motor cable 6.0 m long
Connection flange	6", 8": NEMA flange (see appendix) 10": Standard flange (see appendix)

MOTOR COOLING

MOTOR SIZE (")	PERFORMANCE RATING (KW)	COOLANT FLOW SPEED (M/S)	MAX. MEDIUM TEMPERATURE FOR WINDING (°C)
			PVC
6	4 - 15	0.2	30
	18.5	0.5	30
	37	0.5	30
8	30 - 52	0.5	30
	55-93	0.5	30
10	85-185	0.5	30

The coolant flow speed is the speed of the medium flowing along the motor casing during normal operation.

In the event of higher media temperatures, operation is only allowed if you

- Use a special winding PE2/PA
- Reduce the performance (De-Rating, See Product Information Service)
- Increase the coolant flow speed

5 PRE-OPERATION CHECKS

5.1 CHECK THE MOTOR PRIOR TO INSTALLATION

If a leak is visible or if the motor is more than one year old (e.g. in the event of re-use or after long storage):

- ⇒ Check the fluid level in the motor prior to installing it.

TOOLS

You need the following tools for assembly and inspection work:

- Insulation measuring unit : As Per testing
- Filling Kit
- ⇒ Determine the age of the motor by checking the type plate (see Figure 5-1).

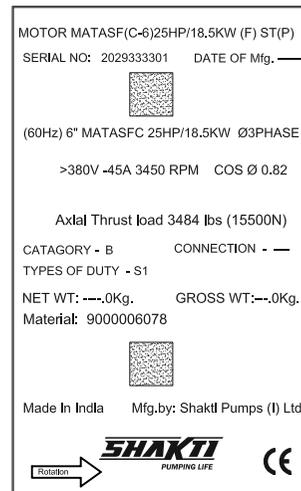


Figure 5-1 Name Plate

5.1.1 CHECKING THE MOTOR FLUID

⚠ CAUTION

Motor damage due to being insufficiently filled!

- ⇒ Fill the motor with sufficient motor fluid
- ⇒ Top up using original motor fluid from Shakti Pumps 5-liter container or clean drinking water

Never use distilled water!

Filling volumes

- 6": approx. 5 liters
- 8": approx. 12 liters
- 10": approx. 20 liters

VENTING THE MOTOR

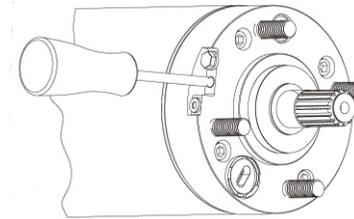


Figure 5-2 : 6" 8", 10" MTSF - 150, SML - 150, MTSF C 200, MTSF C 10

- ⇒ Place the motor horizontally so that the filling valve is located at the highest position
- ⇒ Remove the plug from the filling valve

Carefully push the test pin into the filling valve until air and some fluid escape from it.

CHECKING THE MOTOR

- ⇒ Feed the test pin (A) through the opening in the diaphragm housing (B)

- ⇒ Measure the actual diaphragm distance to the side of the opening in the diaphragm cover

If the measured result is not identical to the target value:

44 mm±2 mm (6"/8" motor) MTSF 150/C200

64 mm±2 mm (10" motor) or MTSF C 10

59 mm±2 mm (6" motor): SML 150

- ⇒ Top up or drain motor fluid.

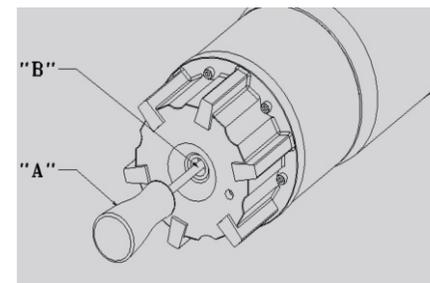


Figure 5-3: Checking the motor fluid

TOPPING UP THE MOTOR

- ⇒ Apply the filling syringe (C) to the filling valve (Green Colour) (D). See Figure (5-4)
- ⇒ Top up the motor filling fluid until the value of the diaphragm position is lower than the target value.

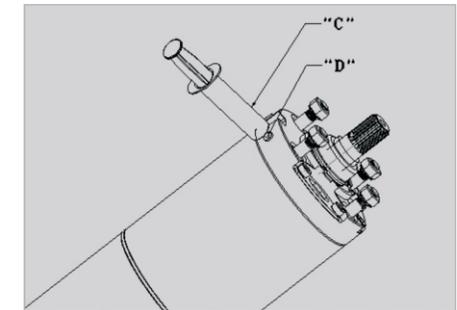


Figure 5-4: Topping up the motor fluid

ADJUSTING THE MOTOR

- ⇒ Adjust the diaphragm position by draining (see Venting) or topping up motor fluid until the target value is reached.

- ⇒ Fit the plug (21) again.

⚠ CAUTION

Risk of injury from pre-tensioned 8"/10" diaphragm cover during disassembly!

- Secure the diaphragm cover : screw the M8 threaded rod through the central cover opening in the diaphragm insert cover
- Lock it from the outside using an M8 locknut

5.2 ASSEMBLING THE MOTOR & PUMP

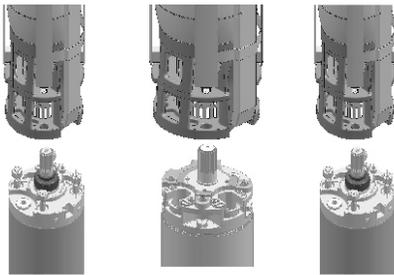
⚠ NOTE

These assembly & operating instructions only describe action steps related to the motor. You should also observe the pump unit manufacturer's instructions in all events.

PREPARATION

- Shaft protector removed
- Motor shaft rotated manually before assembly runs freely after overcoming static friction
- Surfaces of parts to be connected are free from dust and dirt
- Coupling attached to the pump shaft, slides on the motor shaft

ASSEMBLY



- Figure 5-7:6 Figure 5-8:8, 10" Figure 5-9: SML
- ⇒ Apply water resistant, acid - free grease (e.g. Mobile FM 102, Texaco, Cygnus 2661, Gleitmo 746) to the inner part of the coupling to the pump unit
 - ⇒ Make sure that the splined section (with 6" or 8" motors) is encased by and O-ring when the motor & the pump unit are assembled together
 - ⇒ Align the pump kit & motor shaft to each other & connect the pump unit & the motor

NOTE

Only use fixing screws of the relevant grade & dimensions approved by the pump unit manufacturer

Observed the indicated torques.

- ⇒ Screw the motor to the pump unit tighten the fixing screws crosswise and instructed.

6":M12

8":Bore 17.5 mm

10":Bore 22.0 mm

- ⇒ Protect the coupling location against contact

5.3 CONNECTING THE DROP CABLE

CAUTION

Motor damage due to damaged motor cable!

- ⇒ Make sure that the motor cable is not in contact with any sharp edges
- ⇒ Protect the cable against damage using the cable guard

- The unit manufacturer's instructions regarding the cable connection have been observed
- Only extension cable and insulating material used with are suitable for the specific use (specifically drinking water) and which are approved for the temperatures occurring in the relevant medium

- Cable cross-sections: The table in the appendix only save as recommended suggestions. The fitter is responsible for the correct selection & dimensioning of the cable

- ⇒ Lay the cable along the pump
- ⇒ Connect the ground conductor correctly (motors or integrated ground conductors are prepared for external grounding)
- ⇒ Protect the cable connection location against water penetration (shrink hoses, compounds or ready cable sets)
- ⇒ Make sure that the short motor cable is always fully surrounded by transport medium for proper cooling during operation

5.4 MEASURING THE INSULATION RESISTANCE

This measurement is to be carried out using an insulation measuring unit (500 VDC) before and while submersing the fully assembled unit at the place of use.

- ⇒ Before submersing the unit, connect a measuring cable to the ground conductor
- ⇒ Make sure that the contact points are clean
- ⇒ Connect the other measuring cable to every core of the connected motor cable in succession

The insulation resistance is shown on the insulation measuring unit.

Minimum insulation resistance with extension cable :

- For a new motor > 2 MΩ
- For a used motor > 0.5 MΩ

FOR YOUR INFORMATION

Minimum insulation resistance without extension cable :

- For a new motor > 200 MΩ
- For a used motor > 20 MΩ

5.5 POWERING THE MOTOR

DANGER

DANGER TO LIFE DUE TO ELECTROCUTION!

- ⇒ Prior to making the electrical motor connection make sure that there is no more voltage on the entire plant and that nobody can accidentally switch on the voltage again while the work is being carried out.

- ⇒ Observe the instructions on the motor type plate and dimension the electrical system accordingly. The connection examples in this chapter concern the actual motor and do not serve as recommendation for the upstream control elements.

- ⇒ All action steps of the previous chapter have been carried out properly

ENERGY SUPPLY BY GENERATOR

NOTE

We urgently recommend that you discuss the plant dimensions with the generator manufacturer.

The voltage tolerance -10 % to +6 % (on the motor terminals) and the deviation of a motor current from the mean value of all three currents must not be more than 5 %.

- Generator selected on the basis of the motor start behaviour, i.e. starting current with a mean cos of 0.5
- Sufficient continuous generator power available
- Starting voltage at least 55 % of the nominal voltage

- ⇒ You must follow the following switch-on sequences unconditionally:

First switch on the generator and then the motor.

First switch off the motor and then the generator.

FUSING AND MOTOR PROTECTION

- ⇒ Provide an external mains switch (1) enabling the voltage to be removed from the system

- ⇒ Provide fuses (2) for every single phase on site

- ⇒ Provide a motor starting & protection switch (3) (see connection alternatives)

- ⇒ Provide an emergency stop system, if required for your specific application

- ⇒ Ground the motor (4) (exterior grounding possible with all motors)

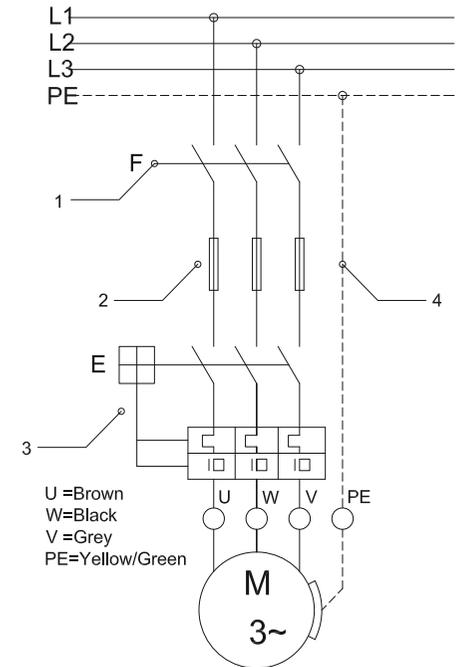


Figure 5-10: Fusing and motor protection

OVERLOAD PROTECTOR

⇒ Integrate an overload protector in accordance with IEC 60099 in the power supply (lightning safety (5)).

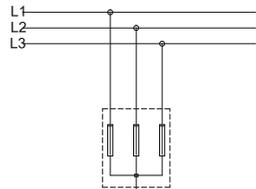


Figure 5-12: Overload protector

CONNECTION ALTERNATIVES

The motors can be used for clockwise and anti clockwise rotation. When using 8"/10" motors with anticlockwise rotation, please first consult Shakti Pumps.

The connection example shows the usual circuit with a right-hand field and an anti-clockwise direction of rotation:

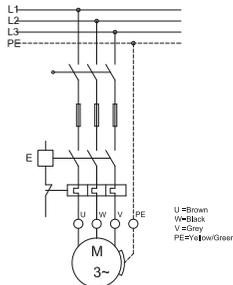


Figure 5-13: Direct starting

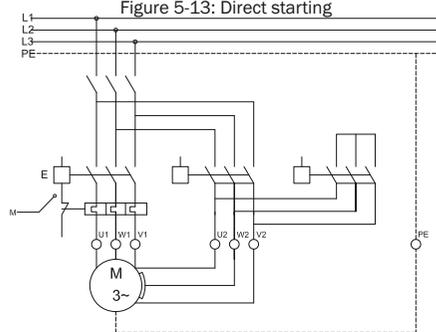


Figure 5-14: Delta-starting

MOTOR SAFETY SWITCH

A motor safety switch (overload relay) is absolutely necessary!

Only use thermal trips of tripping categories 10A or 10, with

- ⇒ Tripping time <math>< 10\text{ s}</math> at 500 % I_N (nominal current)
- ⇒ Phase sensitivity
- ⇒ Temperature compensation
- ⇒ Set the motor protection unit to the value of the operating current measured without exceeding the rated motor current I_N (as indicated on the type plate); recommendation: 90 % of the nominal motor current.

6 MOTOR OPERATION

6.1 PROPER MOTOR COOLING



Damage to the motor and the motor cable due to overheating

- ⇒ Make sure that the coolant flow speed along the motor is sufficient
- ⇒ Make sure that the short motor cable is always fully surrounded by transport medium for proper cooling



Figure 6-1: Cooling tube

If the required minimum coolant flow speed cannot be reached (e.g. if the inlet opening of the well is located above the motor or if using large-diameter wells):

- ⇒ Fit a cooling tube (see figure 6-1)
- ⇒ Make sure that the cooling tube encases the entire motor and the pump water inlet opening. The motor is force-cooled

6.2 PROVIDING A CHECK VALVE & LEVEL SENSOR

- ⇒ Provide at least one spring-loaded check valve in the production tube in case no such check valve has been fitted in the pump
- ⇒ Ensure that the first check valve is no further than 7 meters away from the pump
- ⇒ Further install check valves at mutual distances of 50 meters
- ⇒ Install a level sensor for wells with a highly varying water inflow

6.3 SWITCHING ON THE MOTOR

- All action steps of the previous chapter have been carried out properly
- ⇒ Switch on the motor using the mains switch in the control cabinet.

Measure the following values after switching on:

- ⇒ Motor operating current in every phase
- Mains voltage when motor is running
- Level of the medium to be transported
- ⇒ Immediately switch off the motor if:
 - The nominal current as specified on the type plate is exceeded
 - Voltage tolerances of more than -10 % / +6 % relative to the nominal voltage are measured on the motor
 - There is a risk of the motor running dry
 - Motor current deviates from the mean value of all three currents by more than 5 %

6.4 MOTOR OPERATION WITH FREQUENCY CONVERTER



When operating a motor with a frequency converter, the relevant operating manual must be observed!

- ⇒ Make sure that the motor current in all operating levels of the regulating range does not exceed the nominal motor current indicated on the type plate

- ⇒ Adjust the frequency converter so that the limit values for the nominal motor frequency of min. 30 Hz and max. the value of the nominal motor frequency (50 or 60 Hz) are observed
- ⇒ Limit any voltage peaks on the motor when using a frequency converter to the following values : max. voltage rise 500 V/ μs , max. voltage peak 1000 V
- ⇒ Make sure that the running up time from 0 to 30 Hz and the deceleration time from 30 to 0 Hz is maximum one second
- ⇒ Dimension the cable such that power loss due to additional filters is taken into consideration
- ⇒ Make sure that the required coolant flow speed along the motor is also observed with frequency converter operation

6.5 MOTOR OPERATION WITH SOFT STARTER



When operating a motor with a soft starter, the relevant operating manual must be observed!
Set the starting voltage of the soft starter to 55 % of the nominal voltage and set the running up and delay times to max. three seconds.
Bridge the soft starter after running up, using a contractor.

7 MAINTENANCE AND SERVICE

The motor is maintenance-free, no maintenance or service activities are necessary.

8 TROUBLESHOOTING

FAULT	REMEDY
Unusual noises, problems with the proper running of the pump or the pump switching on and off too frequently.	⇒ Try to find the cause of the fault on the pump unit.
The pump repeatedly switches off	⇒ Have the insulation resistance checked by a professional Service Personal ⇒ If no cause can be found in the motor or the motor cable: Have the electrical system checked.

9 SERVICE

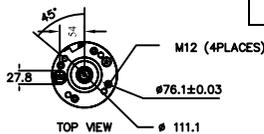
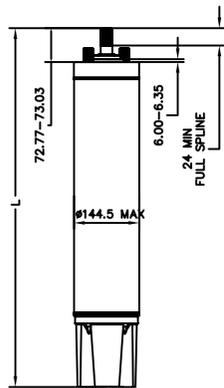
Repairs must only be carried out by authorised professional workshops (only use original Shakti Pumps spare parts).

If you have any questions or problems, please contact your dealer or contact Shakti Pumps mail to info@shaktipumps.com, ho@shaktipumps.com

10 APPENDIX

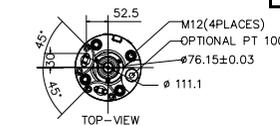
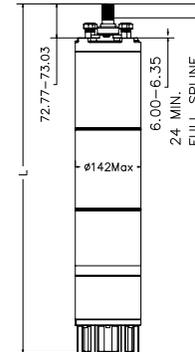
PAGE	EXPLANATION
Page 11, 12	Outline drawing 6"/MTSF 150/SML 150
Page 12, 13	Outline drawing MTSF C200 / MTSF C 10
Page 13	Cable Selection Cross section Table

6-REWINDABLE SML 150



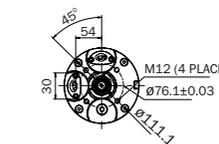
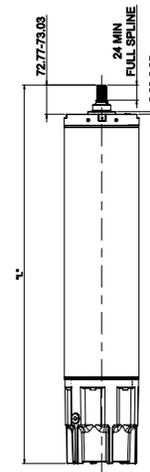
SR. NO.	P _N	L	SIZE	MOTOR WEIGHT
	[HP/Kw]			
1	3.0/2.2	590	850X175X175	36
2	5.5/4.0	625	850X175X175	36
3	7.5/5.5	665	850X175X175	39
4	10.0/7.5	715	1000X175X175	44
5	12.5/9.3	755	1000X175X175	48
6	15.0/11.0	775	1000X175X175	50
7	17.5/13.0	820	1150X175X175	56
8	20.0/15.0	890	1150X175X175	60
9	25.0/18.5	980	1260X175X175	70

6" - REWINDABLE MTSF C 150



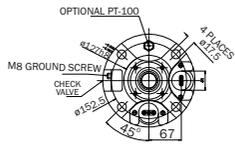
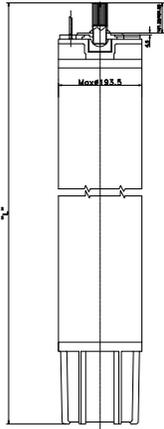
SR. NO.	P _N	L	L	L	SIZE	MOTOR WEIGHT
		CI FG - 260	304SS	304SS		
	[HP/Kw]	MM	MM	MM	LXWXH	KG
1	5.5/4.0	768	772	777	1000X175X175	48
2	7.5/5.5	768	772	777	1000X175X175	48
3	10.0/7.5	788	792	797	1000X175X175	50
4	12.5/9.3	818	822	827	1150X175X175	54
5	15.0/11.0	848	852	857	1150X175X175	56
6	17.5/13.0	898	902	907	1260X175X175	60
7	20.0/15.0	943	947	952	1260X175X175	66
8	25.0/18.5	988	992	997	1260X175X175	69
9	30.0/22.0	1078	1082	1087	1400X175X175	78
10	35.0/26.0	1183	1187	1192	1500X175X175	91
11	40.0/30.0	1283	1287	1292	1300X160X190	100
12	50.0/37.0	1363	1367	1372	1380X160X190	107

8" - REWINDABLE SML 200



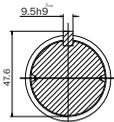
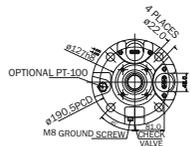
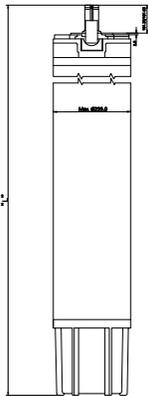
SR. NO.	P _N	L	SIZE	MOTOR WEIGHT
	[HP/Kw]			
1	10/7.5	749	1200X200X290	65
2	15/11.0	799	1200X200X290	77
3	20/15.0	849	1200X200X290	90
4	25/18.5	899	1200X200X290	102
5	30/22.0	959	1300X200X290	115
6	35/40-26/30	999	1300X200X290	130
7	50/37.0	1059	1550X200X290	145

8" - REWINDABLE MTSF C 200



SR. NO.	P _N	L	SIZE	MOTOR WEIGHT
	[HP/Kw]			
1	30/22	1140.6	1550X200X290	146
2	40/50-30/37	1240.6	1550X200X290	146
3	60/45	1330.6	1550X200X290	168
4	70/75-52/55	1440.6	1650X200X290	181
5	80/90-60/67	1570.6	1850X200X290	228
6	100/75	1660.6	2000X200X290	228
7	110/125-83/93	1840.6	2100X200X290	260

10" - REWINDABLE MTSF C 10



SR. NO.	P _N	L	SIZE	MOTOR WEIGHT
	[HP/Kw]			
1	116/85	2641.2	2000X250X350	310
2	150/110	2861.2	2000X250X350	310
3	177/130	3121.2	2250X250X350	320
4	204/150	3341.2	2250X250X350	320
5	252/185	3641.2	2400X250X350	430

SUBMERSIBLE CABLE SELECTION CHART FOR 415V, 50Hz AC POWER SUPPLY

CABLE DIMENSIONS AT 3X415 VOLT, 50 HZ

VOLTAGE DROP - 3 %											
HP	KW	I	CABLE SIZE SQUARE MILLIMETERS								
			1.5	2.5	4	6	10	16	25	35	50
LENGTH IN METERS											
0.50	0.37	1.20	543	879	1396						
0.75	0.55	1.70	383	621	985						
1	0.75	2.20	296	480	761						
1.50	1.10	3.10	210	340	540	819					
2	1.50	4.10	159	257	409	620			889		
3	2.20	6.30	103	167	266	403	659		589	786	
4	3	8.20	79	129	204	310	506	799	337	449	673
5	3.70	9.40	69	112	178	270	441	697			
5.50	4	10.30	63	102	163	247	403	636			
7.50 DOL	5.50	14.20	46	74	118	179	292	461			
7.50 S/D	5.50	14.20	80	129	204	310	506	799			
10 S/D	7.50	17.40	65	105	167	253	413	652			
15 S/D	10	20		91	145	220	359	567	869		
17.50 S/D	13	29.70			98	148	242	382	585	797	
20 S/D	15	33			88	133	218	344	527	718	
25 S/D	18.50	42.50			68	104	169	267	409	558	
30 S/D	22	49.60				89	145	229	351	479	660
35 S/D	26	57.30					125	198	303	414	572
40 S/D	30	67.50					106	168	258	352	485

"NOTE:- Table Showing maximum allowable length of submersible cable for the given full load current where site for other voltage, the cable size is to be selected for the length which is calculated as follows. Calculated length = (415/Actual Voltage) X actual length. 7.5 HP and above are SD Motors. For these motors, the actual current is $1/\sqrt{3}$ times the FL Current. The Cable size and maximum allowable length are arrived at accordingly."

6" - REWINDABLE MOTORS PERFORMANCE DATA 60 Hz

HP	P _N [KW]	Axial Thrust F [N]	U _N [V]	N _n [min-1]	I _N [A]	I _A [A]	η (Eff.)[%]						COS Φ (PF.)			T _N [Nm]	T _A [Nm]	JM [kg m2]			
							at % load			at % load			at % load						at % load		
							50	75	100	50	75	100	50	75	100				50	75	100
5.5	4	15500	230	3520	21	106	0.7	0.75	0.77	0.52	0.64	0.73	12.5	18.6	0.00580						
			380	3530	13.3	61	0.66	0.72	0.77	0.51	0.63	0.71	12.4	15							
			460	3520	10.1	51	0.70	0.76	0.78	0.56	0.67	0.75	12.5	15.3							
7.5	5.5	15500	230	3490	26.1	106	0.74	0.78	0.78	0.61	0.73	0.8	17.3	15.9	0.00580						
			380	3480	15.4	61	0.76	0.78	0.78	0.64	0.75	0.81	17.3	15.0							
			460	3480	12.9	51	0.74	0.77	0.77	0.65	0.76	0.82	17.3	15.1							
10	7.5	15500	230	3490	35.9	146	0.75	0.79	0.79	0.58	0.71	0.78	23.6	22.4	0.00598						
			380	3480	20.8	81	0.76	0.79	0.79	0.64	0.75	0.81	23.6	20.2							
			460	3470	17.2	64	0.75	0.78	0.78	0.67	0.77	0.82	23.7	19.4							
12.5	9.3	15500	230	3490	44.4	183	0.75	0.79	0.79	0.59	0.71	0.78	29.3	28.9	0.00672						
			380	3470	25.6	100	0.77	0.80	0.80	0.64	0.75	0.81	29.4	25.9							
			460	3460	20.8	78	0.78	0.80	0.80	0.67	0.78	0.82	29.4	24.4							
15	11.0	15500	230	3490	51.2	220	0.77	0.8	0.81	0.6	0.72	0.79	34.6	35.6	0.00722						
			380	3490	30.3	129	0.77	0.81	0.81	0.62	0.74	0.80	34.5	34.3							
			460	3480	25.0	98	0.78	0.81	0.80	0.68	0.77	0.83	34.7	31.5							
17.5	13.0	15500	230	3500	62.4	288	0.76	0.8	0.81	0.55	0.68	0.76	40.7	50.5	0.08100						
			380	3500	36.3	164	0.77	0.81	0.82	0.59	0.71	0.78	40.7	47.2							
			460	3490	29.0	125	0.78	0.81	0.81	0.65	0.76	0.82	40.9	43.3							
20	15.0	15500	230	3500	65.9	325	0.8	0.83	0.83	0.63	0.74	0.81	47	49.5	0.00918						
			380	3490	39.1	188	0.81	0.83	0.83	0.66	0.77	0.82	47.2	56.5							
			460	3490	32.1	151	0.80	0.83	0.83	0.68	0.78	0.84	47.1	55.6							
25	18.5	15500	230	3490	85.4	402	0.77	0.81	0.82	0.59	0.71	0.78	58.1	81.8	0.00990						
			380	3490	52.5	249	0.76	0.80	0.81	0.58	0.70	0.77	58.1	83.6							
			460	3480	40.6	184	0.80	0.82	0.82	0.65	0.76	0.81	58.4	74.5							
30	22.0	15500	230	3510	100.2	520	0.82	0.84	0.84	0.65	0.74	0.77	68.8	96.6	0.01163						
			380	3510	59.9	309	0.82	0.84	0.84	0.67	0.75	0.78	68.8	94.9							
			460	3500	47.1	232	0.83	0.84	0.84	0.72	0.79	0.82	69.1	85.8							
35	26	15500	230	3510	118.3	657	0.83	0.85	0.85	0.63	0.72	0.76	81.3	135	0.01326						
			380	3500	67.5	360	0.83	0.85	0.85	0.62	0.74	0.81	81.6	121.4							
			460	3500	55.7	287	0.83	0.85	0.85	0.64	0.76	0.84	81.6	117.2							
40	30.0	27500	230	3510	135.7	758	0.78	0.82	0.83	0.58	0.71	0.78	93.8	139.6	0.01543						
			380	3510	79.6	436	0.79	0.83	0.84	0.64	0.75	0.82	94	126.4							
			460	3500	64.4	346	0.81	0.84	0.83	0.58	0.71	0.78	93.8	139.6							
50	37	27500	230	3510	135.7	758	0.78	0.82	0.83	0.58	0.71	0.78	93.8	139.6	0.01707						
			380	3510	102.8	567	0.77	0.81	0.82	0.59	0.71	0.78	115.8	193.6							
			460	3500	79.1	430	0.82	0.84	0.85	0.63	0.75	0.81	116.0	177.8							

Here UN[V]= Voltage
 Nn [min-1] = RPM
 IN[A] = Rated current
 IA[A] = Lock rotor current
 TN [Nm] = Nominal Torque
 TA [Nm] =Torque
 Jm [Kgm2]-Moment of Inertia

8" - REWINDABLE MOTORS PERFORMANCE DATA 60 Hz

HP	P _N [KW]	Axial Thrust F [N]	U _N [V]	N _n [min - 1]	I _N [A]	I _A [A]	η (Eff.)[%]						COS Φ (PF)			T _N [Nm]	T _A [Nm]	JM [kg m2]			
							at % load			at % load			at % load						at % load		
							50	75	100	50	75	100	50	75	100				50	75	100
40	30	4500	380	3500	74	394	82	85	85	0.8	0.86	0.88	99	141	0.02524						
			460	3490	61	324	82	84	84	0.82	0.87	0.89	99	130							
			380	3510	92	514	83	85	85	0.73	0.81	0.85	122	178							
50	37	4500	460	3490	75	407	84	85	85	0.77	0.84	0.87	123	162	0.02524						
			380	3510	111	660	84	86	86	0.73	0.81	0.85	149	240							
			460	3500	89	524	85	87	86	0.77	0.84	0.87	149	221							
60	45	4500	380	3510	125	765	85	87	87	0.75	0.83	0.87	175	300	0.03929						
			460	3510	102	606	85	87	86	0.79	0.86	0.88	175	276							
			380	3520	138	842	84	87	87	0.71	0.8	0.84	182	321							
70	52	4500	460	3510	109	657	86	87	87	0.77	0.84	0.87	181	287	0.03929						
			380	3510	141	931	86	88	88	0.77	0.84	0.88	198	362							
			460	3510	116	734	85	87	87	0.8	0.86	0.89	198	332							
80	60	4500	380	3510	141	931	86	88	88	0.77	0.84	0.88	198	362	0.04554						
			460	3510	116	734	85	87	87	0.8	0.86	0.89	198	332							
			380	3520	162	1037	84	86	87	0.73	0.82	0.86	220	396							
90	67	4500	460	3510	131	803	86	87	87	0.77	0.85	0.87	220	366	0.04554						
			380	3510	175	1143	86	88	87	0.77	0.85	0.88	247	427							
			460	3510	145	947	86	88	87	0.77	0.85	0.88	247	427							
100	75	4500	380	3520	195	1377	86	88	88	0.75	0.83	0.87	274	532	0.06216						
			460	3510	158	1090	87	88	88	0.8	0.86	0.89	275	489							
			380	3520	223	1586	88	89	88	0.77	0.83	0.85	306	613							
125	93	4500	460	3510	180	1256	87	88	88	0.76	0.83	0.87	306	561	0.06216						

Here UN[V]= Voltage
 Nn [min-1] = RPM
 IN[A] = Rated current
 IA[A] = Lock rotor current
 TN [Nm] = Nominal Torque
 TA [Nm] =Torque
 Jm [Kgm2]-Moment of Inertia

10" - REWINDABLE MOTORS PERFORMANCE DATA 60 Hz

INSTALLATION REPORT

HP	P _N [KW]	Axial Thrust F [N]	U _N [V]	Nn [min - 1]	I _N [A]	I _A [A]	η(Eff.)[%] at% load			COS φ (PF) at% load			T _N [Nm]	T _A [Nm]	JM [kg m2]
							50	75	100	50	75	100			
							116	85	60000	460	3500	172			
			380	3510	216	1120	82	84	85	0.69	0.78	0.83	267	325	
150	110	60000	460	3510	225	1160	84	86	86	0.71	0.8	0.84	345	375	0.08500
			380	3520	275	1430	84	86	86	0.7	0.79	0.84	346	382	
177	130	60000	460	3510	254	1308	86	87	87	0.77	0.74	0.87	408	437	0.09773
			380	3514	314	1710	85	87	86	0.73	0.72	0.86	408	474	
204	150	60000	460	3510	294	1557	85	87	87	0.77	0.74	0.87	469	508	0.10809
			380	3520	354	1980	85	87	87	0.75	0.73	0.87	468	535	
252	185	60000	460	3510	377	2130	85	87	87	0.7	0.79	0.84	585	858	0.12781
			380	3520	465	2690	84	87	87	0.66	0.77	0.83	583	896	

Here UN[V]= Voltage TN [Nm] = Nominal Torque
 Nn [min-1] = RPM TA [Nm] =Torque
 IN[A] = Rated current Jm [Kgm2]-Moment of Inertia
 IA[A] = Lock rotor current

Customer's Name: _____

Customer's Address: _____

Customer's Ph. No.: _____

Dealer's Name: _____

Dealer's Address: _____

Dealer's Ph. No.: _____

Pump Model: _____

Project/Application: _____

Pressure In Kg: _____ Flow in m³/hr: _____

Liquid: _____ Temp.: _____

Voltage: _____ Current: _____

Packing Condition: _____

Remarks: _____

Date: _____

Customer's Signature

WARRANTY CERTIFICATE

Model:- _____ Sr. No.: _____

H.P.:- _____ Date: _____

Above pump and motor are warranted against defects in workman-ship and material under normal use, service & specified duty condition.

Shakti Pump warrants this product to be free from any defects in material and workmanship under normal use and service for 12 months from the date of purchase by the end user or 18 months from date of invoice whichever is earlier.

The warranty does not cover loss or damage /defect for any nature resulting from improper selection/improper installation/sandy condition /dry running & improper use of the pump sets.

The warranty also does not cover consequential losses/damages arising out of failure of pump/motor.

Our obligation is limited to recycling or repairing or replacing Hems ex-factory, purchase has given immediate iffien notice. Equipment for repairs should be returned, free of cost to us.

The foregoing is subject to the provision that the user does not open the unit and make any change or repair without prior approval, during the warranty period.

This warranty excludes every condition whether statutory or other wise , whatsoever not herein expressly set out.

Customer's Name:- _____

Dealer Address:- _____

Date of Delivery:- _____