SUBMERSIBLE MOTOR 6''
Type 6GF

User's manual

1. Overview

The contents of this manual refer to the standard product, as presented in the sales documentation. Any special versions will be supplied with supplementary instruction sheets. Please refer to the sales contract for the features of variants and special versions. Always specify the exact type of motor and code when requesting our Sales and Service Department for technical information or spare parts

Read this manual carefully before installing and using the product.

Improper use may cause personal injury and/or damage to property, and invalidate the warranty.

2. Product Description

The 6GF range comprises a number of 6» submersible motors with eased stator and rotor immersed in a bath of demineralised water and anti-freeze lubricating liquid, designed to be coupled to 6» and 8» submersible pumps with NEMA-compliant flange and coupling sizes. They can also bemcoupled to 10» submersible pumps after checking the dimensions of the flange and of the pump coupling.
All the metal parts in contact with the water are either made from stainless steel or cast iron.
Each motor includes a cable with removable connector and a Kingsbury pivoted-shoe thrust bearing.

3. Applications

All the motors in the 6GF range can be used to drive submersible pumps in the conditions established in EN 60034-1 (IEC 60034-1) and at the supply voltage / frequency specified on the rating plate.
The shaft extension and flange size of these motors comply with NEMA MG1:2006 REv 1-2007..

WARNING The power of the pumps coupled to these motors must be less than or equal to that of the motors.

3.1 Working Limits

3.1.1 Liquids in which the motor can operate

This motor can be used in cold water.

Do not use this motor with corrosive or explosive liquids, or particularly dirty or hard water (impurities may deposit on the outer casing).

3.1.2 Water temperature

WARNING Minimum water temperature is + 0°C.
Maximum water temperature is + 35°C as long as the flowrate of the water around the motor does not fall below 0.3 m/s.
For temperatures above + 35°C, motor output must be reduced to ensure correct cooling.

3.1.3 Cooling the motor

WARNING To ensure the motor is correctly cooled, make sure the flowrate of the water around the outer casing is at least 0.3 m/s when positioning the motor in wells or tanks.
At water speeds lower than 0.3 m/s mount a cooling jacket.

3.1.4 Installation Position

All the motors in the range can be installed vertically.
All the motors in the range can be installed horizontally as long as the axial thrust of the pump never falls below 250 N while it is

3.1.5 Depth of immersion

The maximum depth of immersion for all motors is 300 m.

3.1.6 Power supply requirements

WARNING Make sure the supply voltage and frequency match those indicated on the rating plate of the motor.
The motors can generally work at the following supply voltage tolerances :

f (Hz)	~	UN (V)	±%
50	3	400	-10%, +6%
50	3	400/690	-10%, +6%

f (Hz)	~	UN (V)	±%
60	3	380	-10%, +6%
60	3	380/660	-10%, +6%

3.1.7 Number of starts per hour

The maximum number of starts per hour allowed is 20 for direct start with a maximum time of 3 seconds at full starting current.

3.1.8 Compatible pumps

WARNING Make sure the motor is compatible with the pump. Incompatible combinations may cause problems.
In particular, before coupling the motor to the pump check that :

– the power of the pump to couple to the motor is less than or equal to that of the motor.
– the supply voltage and frequency match those indicated on the rating plate of the motor
– the motor and pump shafts turn freely

3.1.9 Motor powered by a frequency converter

WARNING Only specially ordered motors can be powered with a frequency converter.

WARNING If the motor is combined with a frequency converter, downgrade power by 10% and make sure you never exceed the rated input frequency of the motor.
To ensure the motor is properly cooled, the minimum water flowrate at the minimum frequency of use must equal the minimum flowrate indicated in the previous points.

3.1.10 Motor powered by a generating set

For information, please contact your retailer

3.1.11 Special applications

WARNING For situations other than those described for the nature of the liquid or installation, please contact your retailer.

3.1.12 Improper Use

Improper use of the motor may create dangerous conditions and cause personal injury and/or damage to property.
Improper use includes:

working with liquids other than water
working at water temperatures higher than 35 °C without downgrading the motor
working with a cooling water flowrate of less than 0.3 m/s
exceeding the maximum number of starts per hour

3.2 Technical specifications

For performance data, please refer to the rating plate attached to the motor. For any requirements, please contact our Sales and Service Department.

3.3 Warranty

Please refer to the sales contract for further information.

4. Transport and storage

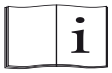
The motors are supplied in various shapes and sizes of cardboard boxes.
Store packed products at an ambient temperature ranging from –5° to +40°C.

WARNING Packed products must be transported, handled and stored horizontally.
Protect products from humidity, heat and physical damage (knocks, falls, ...).
Do not place heavy objects on boxes.

Lift and handle products carefully, using suitable lifting equipment. Observe accident prevention regulations. A
Do not lift or carry motors by their power cord.

On receipt of the motor, check the box for signs of damage. If the product is damaged, inform our dealer within 8 days of delivery. If you cannot reuse the box, dispose of it according to local bylaws governing sorted waste disposal.
Harness the product safely before lifting and handling it.
For further information section 3.1.

5. Installation



Before installing the motor, read this instructions manual and the one supplied with the pump or electric pump to which the motor will be coupled. Keep both manuals with care.

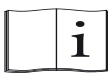
If the product shows clear signs of damage, do not proceed with installation, but contact the Technical Service Centre.

This product may only be installed by qualified and experienced personnel.
Use suitable equipment and protective devices. Observe all accident prevention regulations.
Carefully read the working limits specified in section 31.
Always refer to current local and/or national regulations, legislation and bylaws governing. installation and water and power connections.

5.1 Selecting the electrical panel

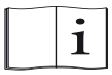
Motors must be suitably protected against overloads and short circuits.
The following starting systems can be used: direct, impedance, autotransformer, soft-start.

WARNING Make sure the panel power ratings match those of the pump. Incompatible combinations may cause faults and fail to fully protect the motor.



Check the working limits specified in section 3.1.
Before installing, carefully read the instructions supplied with the electrical panel.

5.2 Pump connections



Before connecting the motor to the pump, read this instructions manual and the one supplied with the pump or electric pump to which the motor will be coupled. Keep both manuals with care.

5.3 Installing the motor in a well or tank

Follow the instructions in the pump or electric pump manual.

When installing the electric pump vertically, make sure the motor does not rest on the bottom of the well or tank. When installing the electric pump horizontally, make sure the motor does not rest on the bottom of the tank. For further information, please contact our Sales and Service Department.

6. Start-up

Follow the instructions in the pump or electric pump manual.

6.1 Electrical connections to the electric pump

Electrical connections may only be performed by a qualified installer in compliance with current regulations.

WARNING Make sure that the supply voltage and frequency are compatible with the electrical panel. The relative information is shown on the motor rating plate and in the documents supplied with the panel. Provide suitable short circuit protection on the supply line.

Before proceeding, make sure that all the connections (even if they are potential-free) are voltage-free.
Unless otherwise specified in local bylaws, the supply line must be fitted with:
- a short circuit protection device
- a high sensitivity residual current circuit breaker (30mA) for additional protection from electrocution in case of inefficient grounding.
- a general switch with a contact aperture of at least 3 millimetres. Ground the system in compliance with current regulations.

• Three-phase version

Connect the electric pump to a supply line via a suitable electrical control panel .

WARNING Install the electrical panel in a sheltered area.
Refer to the documentation supplied with the electrical panel.

For connections to any external control devices (e.g.: pressure switch, float) follow the instructions supplied with these devices.

7. Maintenance, Service, Spare Parts

Before proceeding, always make sure the motor is disconnected from the supply line.

Maintenance operations may only be performed by expert and qualified people. Use suitable equipment and protective devices. Observe all accident prevention regulations.
Do not attempt to disconnect the connector from the motor head cable.
This may only be done by authorised personnel.

WARNING Only use original spare parts to replace faulty components.

The motor does not require any scheduled routine maintenance.
Users wishing to prepare a maintenance schedule should bear in mind that maintenance frequencies depend on the conditions of use. For any requirements, please contact our Sales and Service Department.

7.1 Spare Parts

WARNING Always specify the exact type of motor and code when requesting our Sales and Assistance Service for technical information or spare parts.

Only use spare parts to replace faulty components. Unsuitable spare parts may cause the product to work incorrectly and cause hazards for people and property.

8. Warranty

Please refer to the sales contract for further information.

9. Directives

Comply with the provisions of the following European Directives and with the Harmonized standard
- Low Voltage Directive 2006/95/CE and subsequent amendments
- Electrmagnetic Compatibility Directive 2004/108/CE and subsequent amendments
- EN 60034-1, EN 55014-1 technicals standards

10. Tables and shemes

10.1 Tecnhical specification

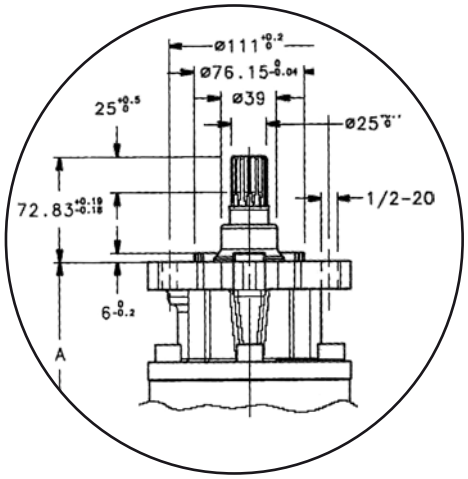
Flange	6" NEMA
Insulation Class	F
Degree of protection	IP68
Rated ambient temp.	35 °C (95°F)
Shaft end	AISI 329
Cooling flow	min. 0.2 m/s
Voltage tolerance	6% / - 10%
Max starts	25/h
Max operating depth	300 m
Working voltage	230V, 230/400V (Y/Δ), 400V, 400/690V (Y/Δ),
Axial thrust	
- from 5,5 HP up to 30 HP	16000 N
- from 40 HP up to 50HP	27000 N

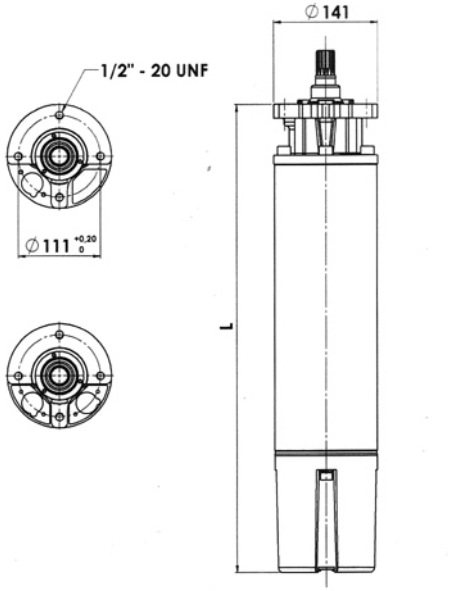
10.2 Materials

Int. and external sleeve	Stainless steel	AISI 304 L
Shaft end	Stainless steel	Duplex
Upper bracket	Painted cast iron	
mechanical seal	carbon-ceramic	Op: SIC/SIC
Gasket	Rubber	NBR
Lower bracket	Painted cast iron	AISI 304
Lower cover	Stainless steel	AISI 304
Diaphragm	Rubber	EPDM
Thrust bearing	Stainless steel-graphite	
Valve	Brass	
Cable	Rubber	EPDM
Connector plug	Stainless steel	AISI 304
Sand guard (fixed-removable)	Rubber	NBR
Bolts & screws	Stainless steel	AISI 304
Cooling liquid	Antifreeze+water	

10.3 Dimensions and weights

Rated Hp	Rated KW	Phase	Axial thrust (N)	L (mm)	Weight (Kg)
5,5	4	3	16000	600	39,5
7,5	5,5	3	16000	631	43,2
10	7,5	3	16000	660	45,5
12,5	9,2	3	16000	685	49
15	11	3	16000	730	53
20	15	3	16000	785	59
25	18,5	3	16000	860	66,5
30	22	3	16000	920	72,5
40	30	3	27000	1050	85
50	37	3	27000	1180	98

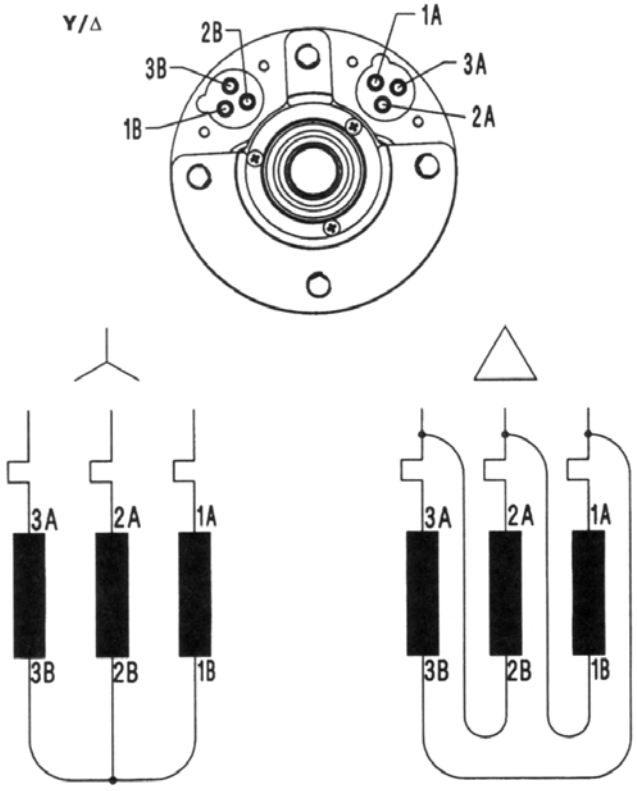




10.4 Cable section direct start

VOLTAGE TENSIONE NOMINALE V	RATED POWER POTENZA NOMINALE kW	Hp	PHASE ~	VOLTAGE DROP CADUTA DI TENSIONE %	Sezione del cavo (section cable) mm^2								
					mm^2	4	6	10	16	25	35	50	70
					A max	29	36	51	67	89	110	138	172
					Lunghezza massima (maximum lenght) mt								
380 - 400	4	5,5	3	4		230	342						
	5,5	7,5				174	259	426					
	7,5	10				130	194	319					
	9,3	12,5				104	155	255	402				
	11	15				88	131	215	339				
	15	20				68	102	168	265	403			
	18,5	25					83	137	215	328	448		
	22	30					69	114	180	275	377		
	30	40						84	132	202	276	382	
	37	50							103	158	217	301	405

10.5 Connection



10.6 Motor resistances

HP	KW	HZ	VOLT	OHM U1-U2 (15-30°C)	HP	KW	HZ	VOLT	OHM U1-U2 (15-30°C)
5,5	4	50	230	0,94-1	5,5	4	60	230	0,72-0,76
5,5	4	50	400	2,9-3,1	5,5	4	60	380	2,2-2,3
5,5	4	50	415	2,9-3,1	5,5	4	60	460	2,9-3,1
5,5	4	50	400/690	2,9-3,1					
7,5	5,5	50	230	0,62-0,66	7,5	5,5	60	230	0,47-0,5
7,5	5,5	50	400	1,9-2,06	7,5	5,5	60	380	1,4-1,5
7,5	5,5	50	415	1,9-2,06	7,5	5,5	60	460	1,9-2,1
7,5	5,5	50	400/690	1,9-2,06					
10	7,5	50	230	0,5-0,53	10	7,5	60	230	0,35-0,37
10	7,5	50	400	1,5-1,7	10	7,5	60	380	1,05-1,1
10	7,5	50	415	1,5-1,7	10	7,5	60	460	1,5-1,64
10	7,5	50	400/690	1,5-1,7					
12,5	9,4	50	230	0,39-0,41	12,5	9,4	60	230	0,29-0,31
12,5	9,4	50	400	1,2-1,3	12,5	9,4	60	380	0,9-0,95
12,5	9,4	50	415	1,2-1,3	12,5	9,4	60	460	1,16-1,26
12,5	9,4	50	400/690	1,2-1,3					
15	11	50	230	0,28-0,3	15	11	60	230	0,21-0,23
15	11	50	400	0,89-0,95	15	11	60	380	0,64-0,68
15	11	50	415	0,89-0,95	15	11	60	460	0,89-0,95
15	11	50	400/690	0,89-0,95					
20	15	50	230	0,19-0,2	20	15	60	230	0,17-0,184
20	15	50	400	0,59-0,61	20	15	60	380	0,45-0,47
20	15	50	415	0,59-0,61	20	15	60	460	0,59-0,61
20	15	50	400/690	0,59-0,61					
25	18,7	50	230	0,14-0,15	25	18,7	60	230	0,14-0,15
25	18,7	50	400	0,44-0,47	25	18,7	60	380	0,33-0,35
25	18,7	50	415	0,44-0,47	25	18,7	60	460	0,44-0,47
25	18,7	50	400/690	0,44-0,47					
30	22	50	230	0,12-0,13	30	22	60	230	0,11-0,12
30	22	50	400	0,39-0,41	30	22	60	380	0,26-0,28
30	22	50	415	0,39-0,41	30	22	60	460	0,39-0,41
30	22	50	400/690	0,39-0,41					
40	30	50							
40	30	50	400	0,32-0,34	40	30	60	380	0,27-0,29
40	30	50	415	0,32-0,34	40	30	60	460	0,32-0,34
40	30	50	400/690	0,32-0,34					

10.7 Electrical Data

P_2		Aliment. *Voltage* 50 Hz	In	Ist	P1 Max	Giri 1/min *r.p.m.*	Cosφ *p.f.*	Eff.	Avv. *Starting*	Spinta assiale *Axiak thrust*	Lunghezza *Lenght*	Peso *Weight*	Cavo / *Cable*	
													Sezione / Set.	*Lungh /Lenght*
Hp	**KW**	**V**	**A**	**A**	**W**	**N**		η		**N**	**mm**	**Kg**	**mm²**	**m**
5,5	4	230	18,4	74	5290	2845	0,75	76	Δ	16000	600	39,5	4 x 4	4
		400	10,6	43	5290	2845	0,75	76	Y					
		415	11	47	5500	2860	0,7	73	Y					
		400/690	10,6	14	5290	2845	0,75	76	Y/Δ					
7,5	5,5	230	24,3	112	7270	2845	0,75	76	Δ	16000	631	43,2	4 x 4	4
		400	14	65	7270	2845	0,75	76	Y					
		415	14,6	70	7330	2860	0,71	73	Y					
		400/690	14	22	7220	2845	0,75	76	Y/Δ					
10	7,5	230	31,2	128	9550	2840	0,78	78	Δ	16000	660	45,5	4 x 4	4
		400	18	74	9550	2840	0,78	78	Y					
		415	18,3	80	9700	2850	0,73	77	Y					
		400/690	18	25	9550	2840	0,78	78	Y/Δ					
12,5	9,2	230	37,3	147	11460	2840	0,8	80	Δ	16000	685	49	4 x 4	4
		400	22	85	11460	2840	0,8	80	Y					
		415	22,8	95	11600	2850	0,79	79	Y					
		400/690	22	28	11460	2840	0,8	80	Y/Δ					
15	11	230	44,2	195	13860	2840	0,82	79	Δ	16000	730	53	4 x 6	4
		400	25,5	113	13860	2840	0,82	79	Y					
		415	26	125	14100	2850	0,79	78	Y				4 x 4	
		400/690	25,5	37	13860	2840	0,82	79	Y/Δ					
20	15	230	57,8	277	17960	2840	0,8	83	Δ	16000	785	59	4 x 6	4
		400	33,4	160	17960	2840	0,8	83	Y					
		415	34,2	170	18200	2850	0,76	82	Y				4 x 4	
		400/690	33,4	53	18200	2840	0,8	83	Y/Δ					
25	18,5	230	71	370	22300	2845	0,8	83	Δ	16000	860	66,5	4 x 8	4
		400	41	215	22300	2845	0,8	83	Y					
		415	42	230	22450	2855	0,73	82	Y				4 x 6	
		400/690	41	72	22300	2845	0,8	83	Y/Δ					
30	22	230	81,4	415	26500	2825	0,84	83	Δ	16000	920	72,5	4 x 8	4
		400	47	240	26500	2825	0,84	83	Y					
		415	47,5	257	26850	2835	0,08	82	Y				4 x 6	
		400/690	47	80	26500	2825	0,84	83	Y/Δ					
40	30	400	61,5	280	35130	2830	0,85	85	Y	27000	1050	85	4 x 8	4
		415	63,5	296	35600	2840	0,8	84	Y					
		400/690	61,5	93	35130	2830	0,85	85	Y/Δ					
50	37	400	79,5	296	44200	2820	0,87	0,82	Y	27000	1180	98	4 x 8	4
		415	79,3	310	44200	2830	0,84	0,81	Y					
		400/690	80	320	44200	2840	0,8	0,81	Y/Δ					