

# **SUBMERSIBLE MOTOR 4"**

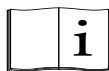
## **Type 40L**



**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 4OL range comprises a number of 4" submersible motors with stator and rotor immersed in oil designed to be coupled to 4" and 6" submersible pumps with NEMA-compliant flange and coupling sizes. They can also be coupled 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 angular ball bearing

## 3. Applications

All the motors in the 4OL 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 0.15 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 0.15 m/s when positioning the motor in wells or tanks.

At water speeds lower than 0.15 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 250 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	1	220-240	-10%, +6%
50	3	230/400 or 400/690	-10%, +6%

f (Hz)	~	UN (V)	± %
60	1	220-240	-10%, +6%
60	3	230/380 or 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 and 110 for impedance strating

#### 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. (30 Hz - 50/60 Hz)

**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 0.15 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.

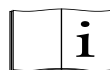
Lift and handle products carefully, using suitable lifting equipment. Observe accident prevention regulations. A  
Do not lift or carry motors by their power cord.

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.

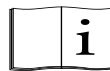
Always refer to current local and/or national regulations, legislation and bylaws governing installation and water and power connections.

### 5.1 Selecting the electrical panel

Motors must be suitably protected against overloads and short circuits.

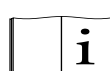
The following starting systems can be used: direct, impedance, autotransformer, soft-start.

**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.

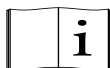
### 5.3 Installing the motor in a well or tank



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.

## 10. Tables and shemes

### 10.1 Technical specification

Insulation Class	F
Degree of protection	IP68
Rated ambient temp.	35 °C
Cooling flow	min. 0.3 m/s
Voltage tolerance	6% / - 10%
Screws and bolts	AISI 304
Max starts	20/h
Max operating depth	250 m
Axial thrust	
- from 0,5 HP up to 1,5 HP	2000 N
- from 2 HP up to 3 HP	3000 N
- from 4 HP up to 10 HP	5000 N

### 10.2 Materials

Int. and external sleeve	Stainless steel	AISI 304 L
Upper bracket	Nickel plated ca	
Shaft end	Stainless steel	AISI 304/Duplex
Upper bracket cover	Stainless steel	AISI 304
Mechanical seal	Ceramic graphit	
Gasket	Rubber	NBR
Lower cover	Stainless steel	AISI 304
Diaphragm	Rubber	EPDM
Pins	Stainless steel	AISI 304
Cable	Rubber	EPDM
Connector plug	Stainless steel	AISI 316
Sand guard (fixed-removable)	Rubber	NBR
Bolts & screws	Stainless steel	AISI 304
Cooling liquid	Mineral oil	

### 10.3 Electrical data - 50 Hz

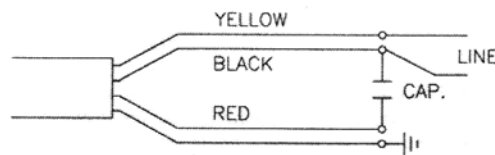
P2	P2	Voltage	I n	I avv	P1	rpm	cosφ	Eff.	C	Axial thrust	Length	Weight	Cable	Cable
HP	KW	V	A	A	W	n		η %	μF	N	mm	Kg	mm2	L m
0,5	0,37	1 ~ 230 V	3,5	9	725	2800	0,9	51	16	2000	325	6,5	4 x 1,5	1,7
0,75	0,55	1 ~ 230 V	4,5	12	950		0,92	58	20	2000	345	7,5	4 x 1,5	1,7
1	0,75	1 ~ 230 V	6,3	20	1275	2820	0,88	59	25	2000	375	8,7	4 x 1,5	1,7
1,5	1,1	1 ~ 230 V	8,5	25	1780	2800	0,91	62	35	2000	395	9,6	4 x 1,5	1,7
2	1,5	1 ~ 230 V	10,8	35	2160	2800	0,87	69	40	2000	440	11,5	4 x 1,5	1,7
3	2,2	1 ~ 230 V	14	45	3060	2800	0,87	78	60	3000	558	15,8	4 x 1,5	1,7
0,5	0,37	3 ~ 230 V	2,8	9	700	2820	0,63	53		2000	325	6,5	4 x 1,5	1,7
0,5	0,37	3 ~ 400 V	1,6	5,2	700	2820	0,63	53		2000	325	6,5	4 x 1,5	1,7
0,75	0,55	3 ~ 230 V	3,8	13	980	2820	0,64	56	-	2000	325	6,5	4 x 1,5	1,7
0,75	0,55	3 ~ 400 V	2,2	7,5	980	2820	0,64	56	-	2000	325	6,5	4 x 1,5	1,7
1	0,75	3 ~ 230 V	4,5	17,3	1200	2820	0,68	62	-	2000	345	7,5	4 x 1,5	1,7
1	0,75	3 ~ 400 V	2,6	10	1200	2820	0,68	62	-	2000	345	7,5	4 x 1,5	1,7
1,5	1,1	3 ~ 230 V	6,2	28	1700	2830	0,68	65	-	2000	375	8,7	4 x 1,5	1,7
1,5	1,1	3 ~ 400 V	3,6	16	1700	2830	0,68	65	-	2000	375	8,7	4 x 1,5	1,7
2	1,5	3 ~ 230 V	7,9	35	2160	2810	0,68	69	-	2000	395	9,6	4 x 1,5	1,7
2	1,5	3 ~ 400 V	4,6	20	2160	2810	0,68	69	-	2000	395	9,6	4 x 1,5	1,7
3	2,2	3 ~ 230 V	10,9	57	3050	2810	0,7	72	-	3000	498	11,5	4 x 1,5	1,7
3	2,2	3 ~ 400 V	6,3	33	3050	2810	0,7	72	-	3000	498	11,5	4 x 1,5	1,7
4	3	3 ~ 230 V	13,6	78	4000	2840	0,73	75	-	4000	558	17,6	4 x 1,5	2,7
4	3	3 ~ 400 V	7,9	45	4000	2840	0,73	75	-	4000	558	17,6	4 x 1,5	2,7
5,5	4	3 ~ 230 V	17,6	95	5260	2850	0,74	76	-	4000	628	23	4 x 2	2,7
5,5	4	3 ~ 400 V	10,2	55	5260	2850	0,74	76	-	4000	628	23	4 x 1,5	2,7
7,5	5,5	3 ~ 230 V	22,6	121	6900	2850	0,76	80	-	5000	698	26,6	4 x 2	2,7
7,5	5,5	3 ~ 400 V	13,1	70	6900	2850	0,76	80	-	5000	698	26,6	4 x 1,5	2,7
10	7,5	3 ~ 400 V	16,9	84	9030	2840	0,77	81	-	5000	778	30,6	4 x 2	3,5

## 10.4 Connections

- Figura 1: Schema di collegamento versione monofase  
 Figure 1: Single-phase wiring diagram  
 Figure 1: Schéma de connexion version monophasée  
 Abbildung 1: Verbindungsschaltplan der einphasigen Version  
 Figura 1: Esquema de conexión versión monofásica  
 Figura 1: Esquema de ligação da versão monofásica



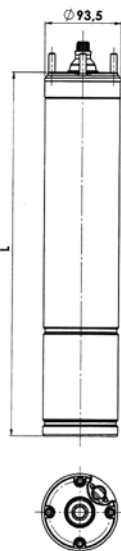
Versione standard - Standard version - Version standard  
 Standardversion - Versión estándar - Versão standard



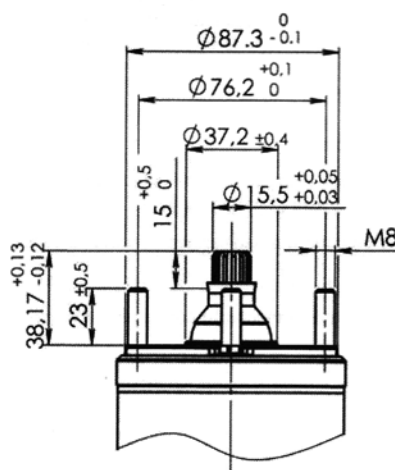
Mercato americano - U.S. market - Marché américain  
 US-Markt - Mercado de EE.UU. - Mercado americano

## 10.5 Dimensions and weights

	Potenza Rated Puissance Leistung Potencia Potência	Potenza Rated Puissance Leistung Potencia Potência	Frequenza Frequency Fréquence Frequenzwert Frecuencia Frequência	Fase Phase Phase Phase Fase Fase	Spinta assiale Axial thrust Poussée axiale Axialschub Empuje axial Esforço axial	Lunghezza Length Longueur Länge Longitud Comprimento	Peso Weight Poids Gewicht Peso Peso
	(Hp)	(kW)	(Hz)		(N)	(mm)	(Kg)
MONOFASE SINGLE PHASE MONOPHASÉE EINPHASIGE MONOFÁSICA MONOFÁSICA	0,5	0,37	50 - 60	1~	2000	325	6,8
	0,75	0,55	50 - 60			345	7,7
	1	0,75	50 - 60			375	9,1
	1,5	1,1	50 - 60			395	10,1
	2	1,5	50 - 60			440	12
	3	2,2	50		3000	518	14,6
	3	2,2	60			558	15,8
TRIFASE THREE PHASE TRIPHASÉE DREIPHASIGE TRIFÁSICA TRIFÁSICA	0,5	0,37	50 - 60	3~	2000	325	6,8
	0,75	0,55	50 - 60			325	6,8
	1	0,75	50 - 60			345	7,7
	1,5	1,1	50 - 60			375	9,1
	2	1,5	50 - 60			395	10,1
	3	2,2	50 - 60		3000	498	13,8
	4	3	50 - 60		4000	558	17,5
	5,5	4	50 - 60			628	20,8
	7,5	5,5	50 - 60		5000	698	24,1
	10	7,5	50 - 60			778	28



### NEMA FLANGE





# 10.6 Cable sections

Tensione nominale Voltage Tension nominal Nennspannung Tensión nominal Tensão nominal (V)	Potenza nominale Rated power Puissance nominal Nennleistung Potencia nominal Potência nominal (kW) (Hp)		Fase Phase Phase Phase Phase ~	Cadura di tensione Voltage drop Chute de tension Spannungsabfall Caída de tensión Queda de tensão %	Sezione del cavo - Section cable - Section du câble - Anschlussquerschnitt - Sección del cable - Seção do cabo (mm <sup>2</sup> )								
					mm <sup>2</sup>	1	1,5	2,5	4	6	10	16	25
					A max	10	16	25	29	36	51	67	89
					Lunghezza massima - Maximum lenght - Longueur maximum - Maximale länge - Longitud máxima - Comprimento máximo (mt)								
220- 230	0,37	0,5	1	4		63	94	156	250				
	0,55	0,75				45	67	112	179	267			
	0,75	1				39	59	98	156	233			
	1,1	1,5				28	42	69	110	165	273		
	1,5	2				22	32	54	86	128	213	337	
	2,2	3					24	41	65	97	161	256	
	3,7	5						26	42	63	104	166	256
220- 230	0,37	0,5	3	4		94	140	233					
	0,55	0,75				67	100	167	266				
	0,75	1				67	100	166	263				
	1,1	1,5				42	63	104	166	247			
	1,5	2				38	57	98	151	225			
	2,2	3				30	45	75	119	177	292		
	3	4				23	34	56	90	134	220	347	
	4	5,5					25	41	66	98	162	256	
	5,5	7,5						31	49	73	120	189	290
380- 400	0,37	0,5	3	4		270	405						
	0,55	0,75				192	288						
	0,75	1				190	284						
	1,1	1,5				120	180	298					
	1,5	2				109	163	271					
	2,2	3				86	129	214	341				
	3	4				64	96	160	255	381			
	4	5,5				47	71	118	188	280	463		
	5,5	7,5				35	52	87	139	207	342		
	7,5	10					40	66	105	157	260	411	

## 10.7 Electrical Data

P <sub>2</sub>		Aliment. Voltage 50 Hz	In	Ist	P1 Max	Giri 1/min r.p.m.	Cosφ p.f.	Eff.	Avv. Star- ting	Spinta assiale Axiak thrust	Lunghezza Lenght	Peso Weight	Cavo / Cable	
Hp	KW	V	A	A	W	N		η		N	mm	Kg	Sezione / Set. mm²	Lungh / Lenght 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				4 x 4	
		415	26	125	14100	2850	0,79	78	Y					
		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				4 x 4	
		415	34,2	170	18200	2850	0,76	82	Y					
		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				4 x 6	
		415	42	230	22450	2855	0,73	82	Y					
		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				4 x 6	
		415	47,5	257	26850	2835	0,08	82	Y					
		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					