



STAIRS



4" OIL FILLED SUBMERSIBLE MOTORS

OPERATING INSTRUCTIONS

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CE STAIRS INDUSTRIAL CO., LTD. CE

EC DECLARATION OF CONFORMITY

We STAIRS INDUSTRIAL CO., LTD.

NO.27, LANE 267, HUACHENG RD., XINZHUANG DIST., NEW TAIPEI CITY 242, TAIWAN (R.O.C.)

declare that the product name: Submersible motor

conform with the essential safety requirements of the relevant European Directive:

- Machinery Directive 2006/42/EC
- Low Voltage Directive 2006/95/EC
- Electromagnetic Compatibility Directive 2004/108/EC

Mounting and connecting instructions defined in catalogues and technical construction files must be respected by the user.

They are based on the following standards :

- EN ISO 12100-1: 2003 + A1: 2009 / Safety of Machinery - Basic Concepts, general principles for design-Part 1: Basic terminology, methodology.
- EN ISO 12100-2: 2003 + A1: 2009/ Safety of machinery - Basic concepts, general principles for design-Part 2: Technical principles and specifications.
- EN ISO 14121-1: 2007 / Safety of Machinery – Risk assessment – Part 1: Principles
- ISO / TR 14121-2: 2007 / Safety of Machinery – Risk assessment – Part 2: Practical guidance and examples of methods
- EN 60204-1: 2006 + A1: 2009 / Safety of machinery – Electrical equipment of machines
- EN 55011: 2001 / Limits and methods of measurement of radio interference characteristics of industrial electrical device.
- EN 61000-6-2: 2005 / Electromagnetic compatibility (EMC)- Part 6-2: Generic standards – Immunity for industrial environments
- EN 61000-6-4: 2007 / Electromagnetic compatibility (EMC)- Part 6-4: Generic standards – Emission standard for industrial environments

Name : K. T. HSIEH

Responsibility : General Manager

Authorized Signature : 

Date : 01/08/2011

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1 Guidelines

The STAIRS series 4R submersible motors are a machine component in accordance with the “machines“ EC guideline. You must not commission the motor until you have:

- manufactured a complete machine
- met the safety requirements stipulated in the applicable EC guidelines and confirmed this by a certificate of conformity

2 Safety

The 4" submersible motor must only be operated in observance of the following safety regulations:


- Operate the motor only under water.
- Take into account the implementation limits of motor and units.
- Check the electrical system and fusing before switching-on.
- Protect electrical and mechanical danger spots against access.
- Vent rising pipe before commissioning in order to avoid water hammers when starting-up.
- Provide a check valve in the pump or rising pipe (max. 7 m away from pump) .
- Maximum water temperature +30° C. (Higher temperatures only with deratedmotors)
- With generator operation always unload the generator first, i.e.
 - Start: First the generator, then the motor.
 - Switch-off: First the motor, then the generator.
- After powering the system check:
 - -Operating current of the motor at each phase
 - -Mains voltage with the motor running
 - -level of the medium to be pumped.
- Switch off the motor immediately if:
 - -Nameplate current is exceeded
 - -Voltage tolerances of more than +6% / -10% compared to the rated voltage on the motor are measured .
 - -Dry run is imminent.

3 Intended use


STAIRS Submersible Motors are specifically designed for submerged operation as drivers of variable torque loads such as pumps for:

- Drinking water supply
- Wells in domestic houses, waterworks and agriculture
- Dewatering, pressure boosting, irrigation systems
- Supply of process water
- Ground water heating systems
- Maximum 20 starts per hour, allow 60 seconds between successive starts.
- The maximum submergence depth is 150 meters.

Improper use of STAIRS Electric Submersible Motors, like pumping of air or explosive media is strictly prohibited.

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|  | <p>Attention</p> <p>For required motor cooling, please consult motor nameplate etc. If cooling flow is not sufficient, fit an inducer sleeve.</p> |
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4 Transport and storage

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|  | <p>Attention</p> <p>The motor may be commissioned by trained and instructed personnel only. Electrical connections have only to be carried out by qualified personnel.</p> <ul style="list-style-type: none"> • Store motor in original packaging until assembly. • Under no circumstances may the motor be stored at temperatures above 50°C since this can lead to filling liquid leakage and premature motor failure. |
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5 Extending the motor cable

The cable provided can be extended by the customer, by one of the following means:

1. Use joints with shrink hose, sealing compound or finished cable fittings. Protect joints against penetrating moisture (strictly follow manufacturer’s instructions).


Note

The plumbers themselves are responsible for the correct selection and dimensioning of the drop Cable! Extension cable must be approved for its use in the medium and the prevailing temperatures.

6 Assembly of motor and unit


These instructions refer to the motor only. Please strictly observe the assembly instructions of the pump manufacturer

1. Take out the motors from the packing checking if any bruise or liquid leakage are visible.

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|  | <p>ATTENTION: Never handle the motor by the cable</p> |
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2. Place motor and pump horizontally.
3. Turn motor shaft by hand before assembly. It must turn freely after overcoming the adhesive friction.
4. Apply acid-free, waterproof grease to the coupling internal toothing.
5. Remove hexagon nuts from the studs of the motor.
6. Align the pump so that its cable guard is in line with the lead exit of the motor and guide pump and motor together.
7. Place spring rings on the studs and tighten the nuts crosswise.
8. Protect coupling spot against contact

Strictly observe the tightening torques of the unit manufacturer.

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|  | <p>Attention Check radial and axial clearance of the motor shaft. There must be no rigid connection since otherwise motor and pump will be damaged during commissioning.</p> |
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7 Electrical connection


Please observe the specifications on both the nameplate and the enclosed data sheet.

The following connection examples refer only to the motor itself. They are no recommendation regarding the control elements connected upstream.

7.1 Fusing and motor protection

1. Allow for an external mains switch in order to be able to switch the system dead at any time.
2. Allow for fuses for each individual phase
3. Allow for a motor overload protection in the switchbox
 - Warranty is void without thermal protection
 - Motor protection according to EN 60947-4-1
 - Trip time at 500% IN < 10 sec. (cold bi-metal)
 - overload setting at operation current (max. IN)
4. Allow for an emergency stop.

7.2 Earthing

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|  | <p>Consider motor power rating when dimensioning the earth connection in accordance with IEC 364-5-54 and EN 60034-1.</p> <ul style="list-style-type: none"> • Motor has to be earthed. • Provide good contact of the protective conductor terminal. |
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7.3 Lightning protection

An overvoltage (lightning surges) should be installed on the control box in all the incoming phases

7.4 Single phase connections

On single phase motors both

PSC : Permanent Split Capacitor
PSC+ST Permanent Split Capacitor + Starting Capacitor

Connection should be done following strictly the wiring diagram reported on the motor it self .
Capacitors and capacitors voltage value should be as the ones reported on the motors.



A wrong capacitor value (higher or lower than the rated one) could affect the Start and Running parameters of the motors compromising irremediably its life.
Warranty is void if a capacitor different from the rated one is use.

7.5 Connecting examples

1. 3-phase connection .

Connect motor so that its direction of rotation corresponds to that of the unit. The connection features the usual circuit with a clockwise rotating field and an counter clockwise rotation for the motor shaft.

7.6 Operation with a soft starting device

- Adjust soft starter to 55% of the rated voltage
- Adjust acceleration and deceleration time to max. 3 seconds.
- Soft starting device has to be bridged after acceleration with a contactor.
- Please strictly observe the manufacturer's operating instructions.

7.7 Operation with variable frequency drives

For operation with variable frequency drives please consult Stairs.

8 Work on the motor



Attention

De-energize system to the beginning of the work and protect it against unintended re-energizing

Regarding the trouble shooting and rectification on the entire system please strictly observe the appropriate instructions of the motor and unit manufacturer.

Never open the motor since it can only be shut and adjusted with special tools.

Do not carry out any modifications or conversions to the motor or its electrical connections.

After completion of the work apply all safety and protective devices completely and check for their function

8.1 Measuring the insulation resistance

Perform this measurement before and while the assembled units, **lowered** to the place of application.

The motor is ok if the insulation resistance at 20 °C is at least:

Minimum insulation resistance **with extension cable**:

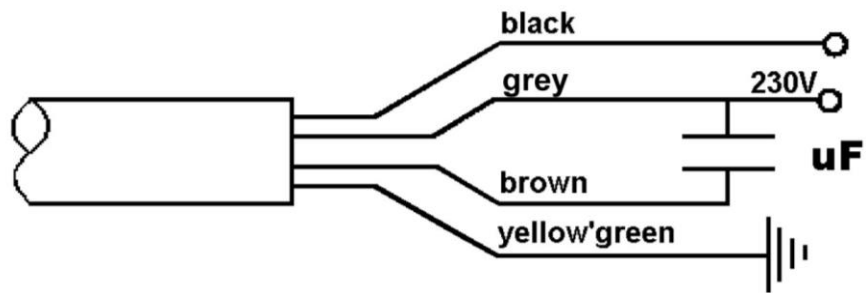
- for a **new** motor >4 MΩ
- for a **used** motor >1 MΩ

Minimum insulation resistance **without extension cable**:

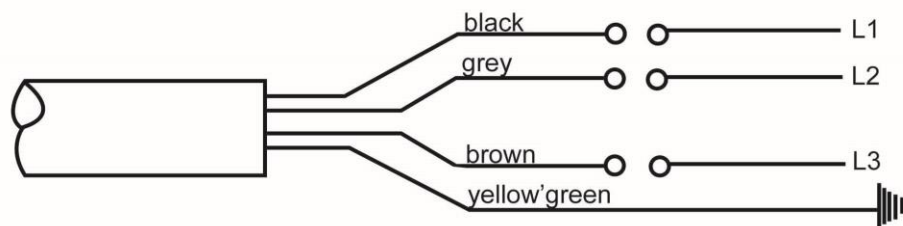
- for a **new** motor >400 MΩ
- for a **used** motor >20 MΩ

9 Wiring diagram(Euro standard)

Single Phase Motor

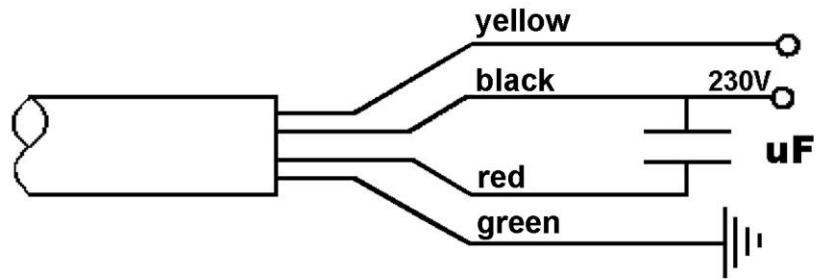


Three Phase Motor

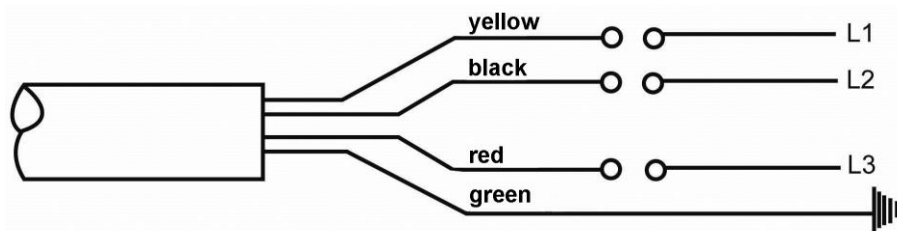


9 Wiring diagram(US standard)

Single Phase Motor



Three Phase Motor





STAIRS INDUSTRIAL CO., LTD.

No. 3-8, Sanchial Tsun, Lutsao Hsiang
Chiai Hsien, Taiwan, R.O.C.

Tel: +886 (0) 53750488

Fax: +886 (0) 53755658

E-Mail: stairs@stairs.com.tw