Installation and Operating Instructions

NR 4-6-8 05.23.06

WILO – NR 4”- 6“- 8“ series
Stainless Submersibles

Subject to technical changes!

WILO – USA, LLC & WILO Canada Inc. • 2915 10th Ave • Calgary, Alberta CAN • Tel. (403) 276-9456 • Fax (403) 277-9456

NR series 4-6-8 Stainless Submersibles

Contents:

NR series 4-6-8 Stainless Submersibles

1 General Information

Installation and service by qualified personnel only!

1.1. Uses

Submersible pumps of the NR series are suitable for drawing groundwater from deep wells, for industrial use and for supplying water.

1.2 Product data

1.2.1 Rating plate

NR 6 30- 3

Submersible motor pump
Nominal pump diameter
Min. bore-hole diameter = 4"/6"/8"
Nominal volume flow Q (gpm) x 10
Number of stages

1.2.2 Technical characteristics

- Temperature range: +37 °F (3°C) to +86 °F (30°C)
- Max. Flow rate: 1320 [gpm]
- Max. immersion depth: 1148 ft
- Maximum permissible sand content 50 g/m^3
- Pressure pipe connection: 2" to 6", depending on size of pump
- Max. pump lift: 650 ft to 1300 ft, depending on size of pump

2 Safety

These instructions contain important information which must be followed when installing and operating the pump. These operating instructions must therefore be read before assembly and commissioning by the installer and the responsible operator. Both the general safety instructions in the "Safety precautions" section and those in subsequent sections indicated by danger symbols should be carefully observed.

2.1 Danger symbols used in these operating instructions

Safety precautions in these operating instructions which, if not followed, could cause personal injury are indicated by the symbol:

when warning of electrical voltage with

The following symbol is used to indicate that by ignoring the relevant safety instructions, damage could be caused to the pump/machinery and its functions:

ATTENTION!

2.2 Staff training

The personnel installing the pump must have the appropriate qualifications for this work.

2.3 Risks incurred by failure to comply with the safety precautions

Failure to comply with the safety precautions could result in personal injury or damage to the pump or installation. Failure to comply with the safety precautions could also invalidate any claims for damages.
In particular, lack of care may lead to problems such as:

- Failure of important pump or machinery functions,
- Personal injury due to electrical, mechanical and bacteriological causes.
- Damage to property.

2.4 Safety precautions for the operator

Existing regulations for the prevention of accidents must be followed.
Dangers caused by electrical energy are to be excluded. Directives issued by the local electrical code and the local electricity supply companies are to be observed.

2.5 Safety information for inspection and assembly

The operator must ensure that all inspection and installation work is carried out by authorised and qualified specialists who have carefully studied these instructions.
Work on the pump/machinery should only be carried out when the machine has been brought to a standstill.

2.6 Unauthorized modification and manufacture of spare parts

Alterations to the pump or installation may only be carried out with the manufacturer's consent. The use of original spare parts and accessories authorised by the manufacturer will ensure safety. The use of any other parts may invalidate claims invoking the liability of the manufacturer for any consequences.

2.7 Unauthorized operating methods

The operating safety of the pump or installation supplied can only be guaranteed if it is used in accordance with paragraph 1 of the operating instructions. The limiting values given in the catalogue or data sheet must neither be exceeded nor allowed to fall below those specified.

3 Transport and interim storage

Upon delivery, please check that the device has survived the journey undamaged. If you find any damage, the normal routine measures are to be initiated with the shipping company.

ATTENTION! During transport and in storage the pump must be protected against moisture, frost and mechanical damage. Store horizontally in shockproof places.

4 Product and accessory description

4.1. Description (see fig. 1)

1 Pump Wilo-Sub 4"/6"/8"
2 Immerson electrode mass
3 Low-water immerson electrode (off)
4 Immerson electrode upper level (on)
5 Connecting extension cable
6 Dynamic level (pump running)
7 Static level (pump switched off)
8 Switch box (with dry-run protection)
9 Mains connection/power supply
10 Manometer
11 Pressure vessel/reservoir
12 Shut-off valve
13 Non-return valve
14 Motor connecting cable
15 Cable connection between pos. 14 and pos. 5

4.2. Pump

- Multistage submersible pump with radial or semi-axial impellers, depending on size of pump, for use in 4", 6" and 8" bore-holes.
- with built-in check valve.

4.3. Motor

- Consult motor manufacturer's documentation for more information.

4.4. Accessories

Accessories must be ordered separately.

• Switching/controlling equipment (motor protection + pump control) • pressure switch assembly • sensor assembly • pressure reducer • float-/diaphragm valve • check valve • shut-off valves • manometer • safety valve • dry-run protection device • immerson electrodes • float switch • motor cable as assembly (incl. plug) or piece goods (without plug) • heat-shrink cable connections • steel cable (stainless steel) • diaphragm pressure vessel • cooling-shroud (stainless steel/PVC) • plug sets for cable connection • etc.

5 Assembly / Installation

The pump can be operated either vertically or horizontally (for horizontal position only with a cooling-shroud). However, in the case of horizontal installation the number of stages is limited, depending on size of pump:

Type of pump	Max. … stages
NR 6-12..	22
NR 6-18..	18
NR 6-24..	15
NR 6-35..	12
NR 6-45..	8
NR 8-42..	14
NR 8-80..	12
NR 8-100..	8
NR 10-170..	6
NR 10-250..	4

ATTENTION! The maximum flows must be respected. Beyond maximum there is risk of damage to the motor.

Type of pump	max. flow gpm
NR 6-12..	70
NR 6-18..	114
NR 6-24..	154
NR 6-35..	216
NR 6-45..	348
NR 8-42..	286
NR 8-80..	506
NR 8-100..	598
NR 10-170..	1056
NR 10-250..	1320

5.1 Assembly

- The bore-holes or pump stations must be created/arranged in accordance with the generally applicable technical rules.
- Please ensure that the flow of water in the bore-hole or well is sufficient for the capacity of the pump.
- The pump is carefully lowered using a double-purchase pulley on the suspension rope and tripod/crane, heavy pumps using a rope winch.
- Ensure that the pump never runs dry and make sure that even in dry periods the water level never falls below the pump's check valve (uppermost position).

ATTENTION! In the case of installation in a deep well (well shaft diameter greater than a bore-hole), a reservoir, horizontal installation or in a deep well, a cooling-shroud (accessory) must be fitted to the unit to ensure the motor is properly cooled (fig. 2, pos. A).

- It must be ensured that the well shaft in the bore-hole has a constant internal diameter to allow the pump to be lowered freely for the entire depth of the shaft.
- Never raise or lower the pump by the electric cable.
- The electrical connection and extension of the motor cable must take place before the pump is lowered and be tested/measured to ensure they are working.
- The final installation position must be guaranteed such that the pump sits at least 1 foot above the bottom of the bore-hole or well (fig. 1).
- The rating plate must be affixed in the immediate vicinity of the well head to allow access at all times to the unit's technical data.
- Before lowering (and while lowering in deep bore-holes) the insulation resistance of the motor and cable must be measured several times (min. 2 MΩ).

5.2 Hydraulic connections (see fig. 1)

- Connections to steel threaded pipes: 2" or 2 ½" , 3", 4" , 5", 6" depending on size of pump.
  If flexible pipework is used, the pump must be held by a chain/steel cable. The two steel loops on the pump head are to be used for this.

In the case of larger types (8" / 10"), the pump is only connected directly to the pipework.

- It is recommended that a check valve be fitted on the pressure side of the pump (between the ascending pipe in the bore-hole and the above-ground pipe installation) at the well head.
- A manometer, pressure switch/gauge and a shut-off valve are to be installed at the head of the bore-hole/well.

5.3 Electrical connection

Electrical work must be carried out by a qualified and licensed electrician in strict compliance with local regulations.

The maximum cable length depends on the nominal motor current and the permissible drop in voltage over the entire cable length. Consult motor manufacturer's documentation for more information.

ATTENTION! A faulty electrical connection will result in damage to the motor.

6. Operation

6.1 Controlling the direction of rotation:

To determine the correct direction of rotation for the pump, only the shutoff pressure at the well head needs to be checked, taking into account that the correct motor direction of rotation generates the greater pressure.

- To rectify an incorrect direction of rotation swap any two phases in the switchbox or motor protection switch. See motor manufacturer's documentation for more information.

6.2 Operation

ATTENTION! The pump must never run while dry, not even for brief periods.

ATTENTION! Please note that not respecting this information may lead to premature motor failure and or reduced life expectancy!

7 Maintenance

Before carrying out any maintenance work, switch off the pump and ensure that it cannot be switched on again by unauthorized people. Never carry out work on a running pump.

- No special maintenance is required during normal operation.

7.1 Spare parts

Please contact Wilo Customer Service directly for spare parts, standard replacements or repairs to the hydraulic pump parts.

NR series 4-6-8 Stainless Submersibles

8 Problems, Causes and Solutions

Problems	Causes	Solutions
The motor does not run		Consult motor manufacturer's documentation for trouble shooting tips.
No or insufficient capacity	a) Voltage too low	a) Check electrical power supply at switchgear.
	b) Suction filter blocked	b) Lift pump out of bore-hole, clean suction filter.
	c) Incorrect motor direction of rotation	c) Swap any two phases in the switchgear.
	d) Low-water protection or water level in well too low	d) Check water level in bore-hole/well; it must be at least 8" (20" if 8'' motor) above the pump pressure-pipe connection (during operation).
Pump switches on too frequently	a) Insufficient switching difference between on/off pressure in pressure switch/gauge	a) Increase difference between on and off points
	b) Incorrect arrangement of immerson electrodes.	b) Increase gaps between immerson electrodes and thus regulate switching times.
	c) Storage volume of diaphragm pressure vessel too small or prepressure setting too low	c) ▪ Check switching pressure settings and reset ▪ Check vessel prepressure (no water in vessel) ▪ Provide additional pressure vessel or install tank with greater nominal volume.

If the fault cannot be remedied, please contact WILO customer services.

Subject to technical alterations!

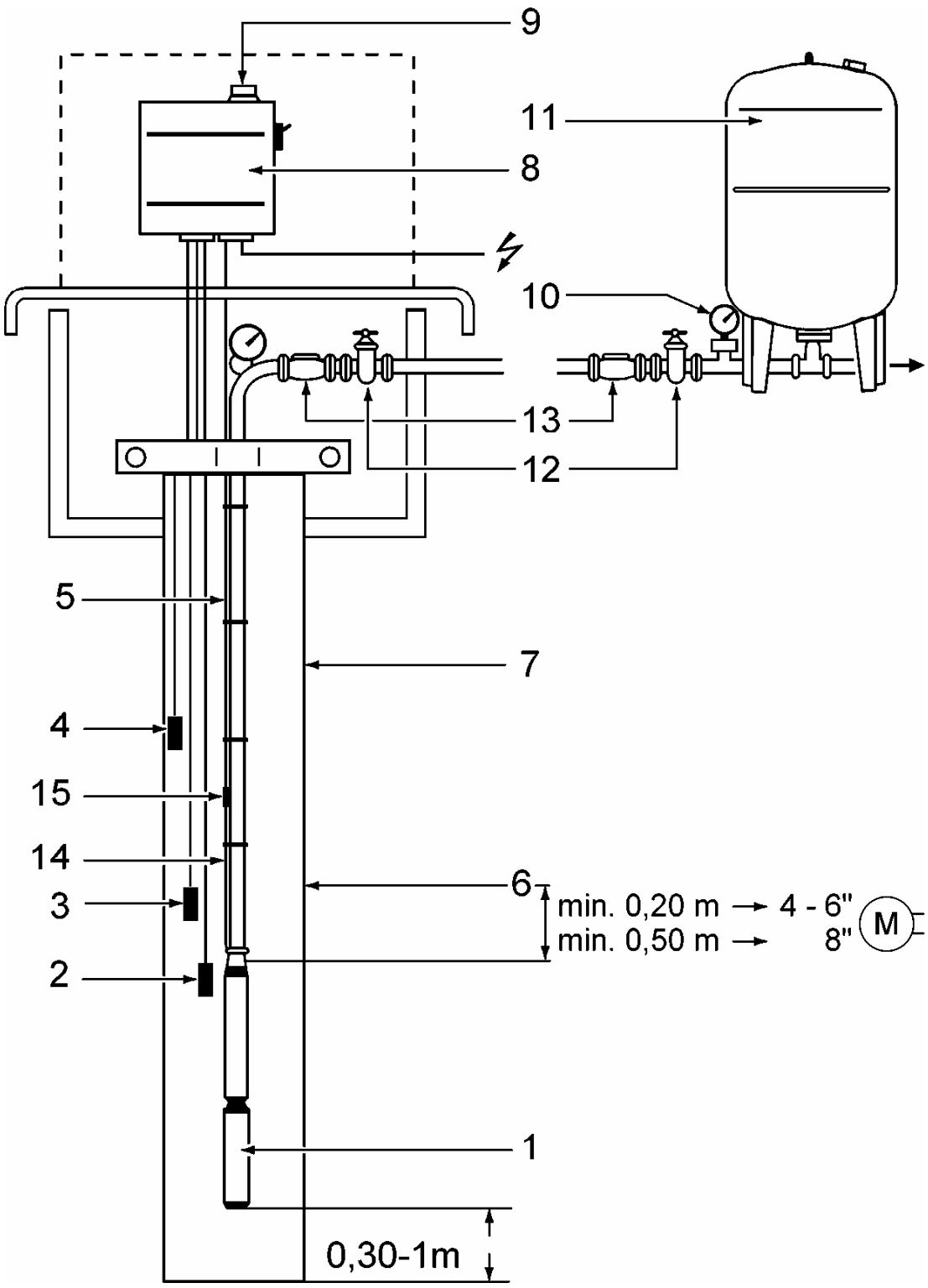
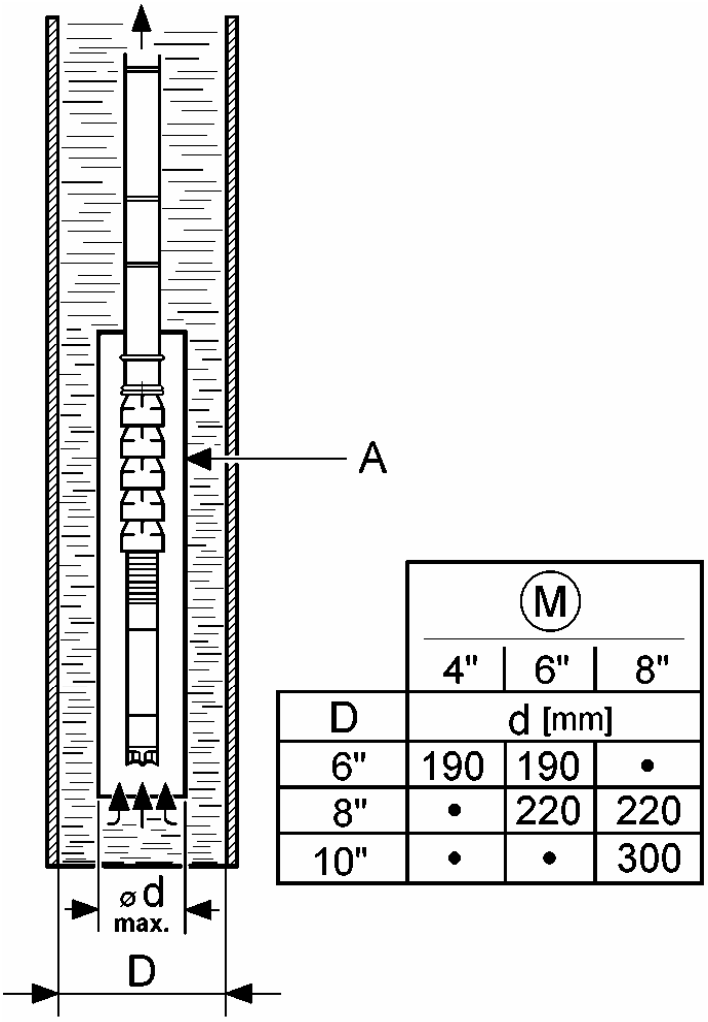


Fig. 1

Refer to clause 4.1



	M		
	4"	6"	8"
D	d [mm]		
6"	190	190	•
8"	•	220	220
10"	•	•	300

Fig. 2