

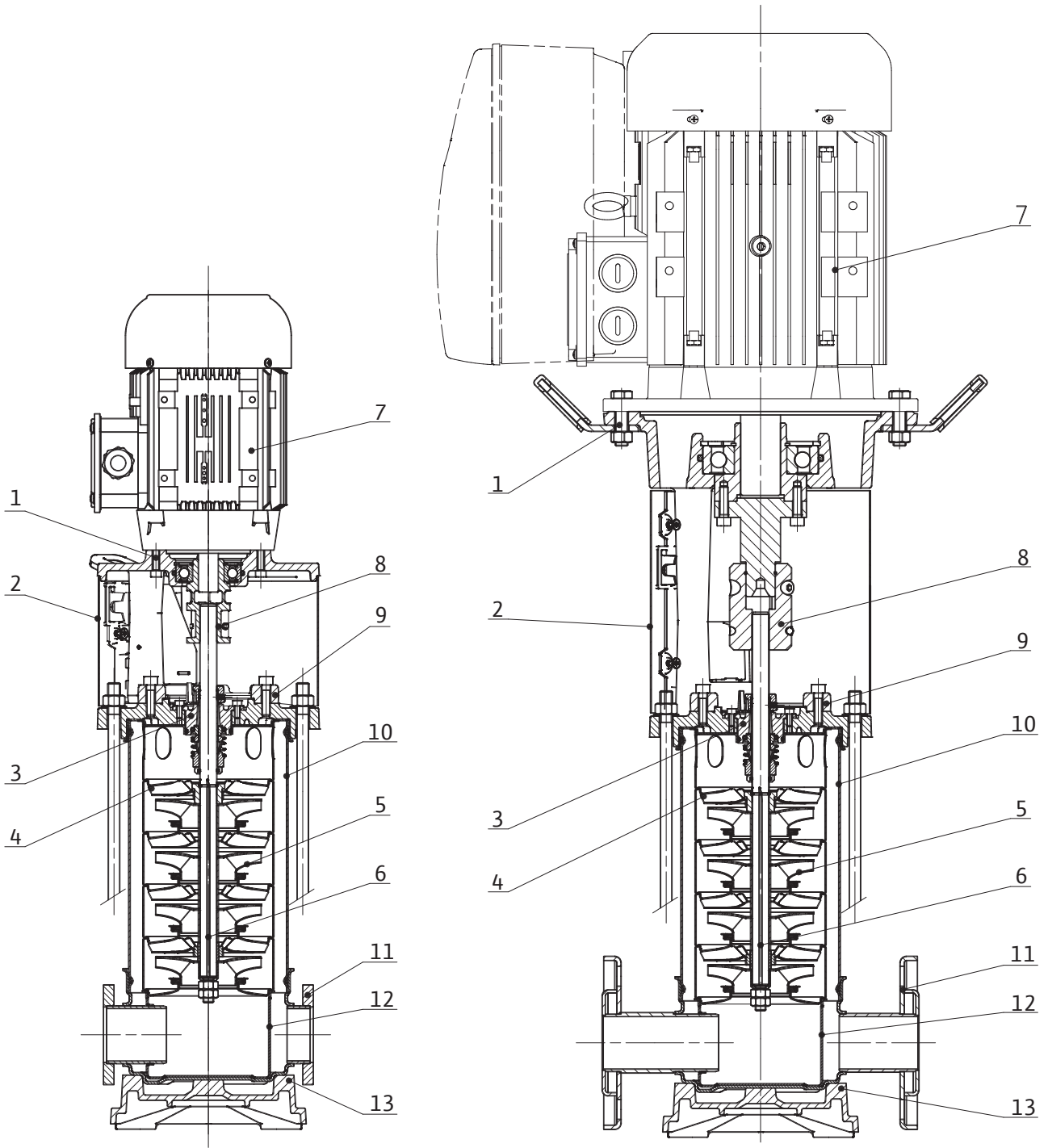
**wilo**



## **Wilo-HELIX-V 2-4-6-10-16**

中 产品操作维护手册

**GB Installation and operating instructions**



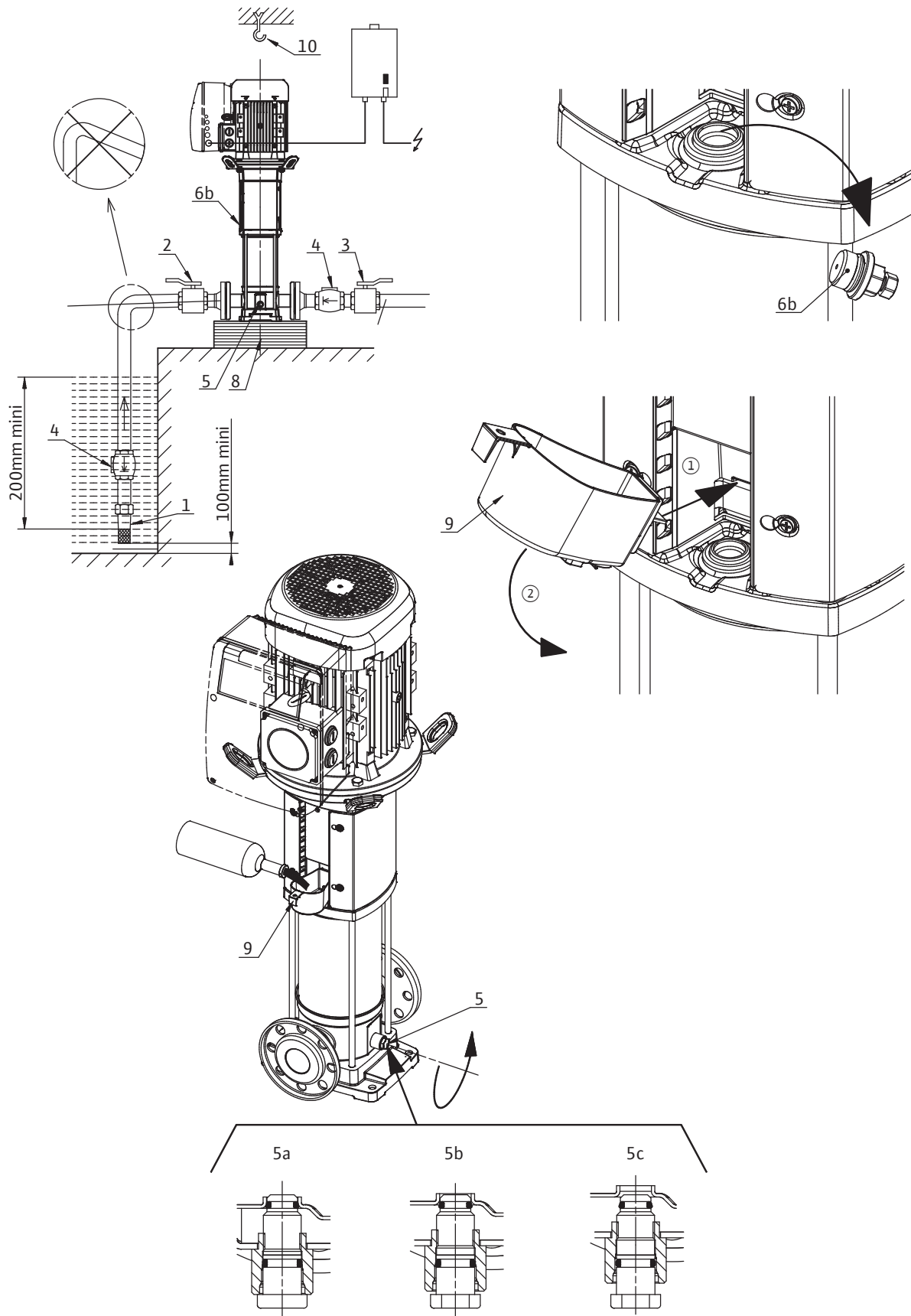


图 .3

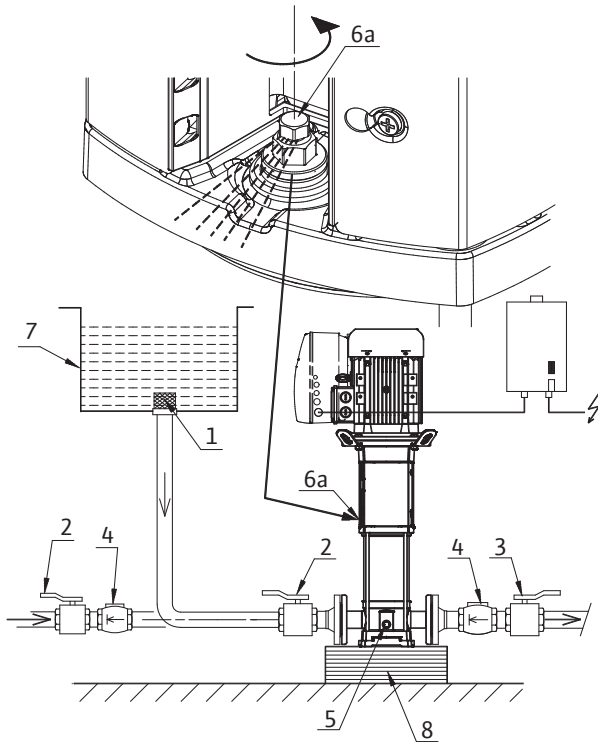


图 .4

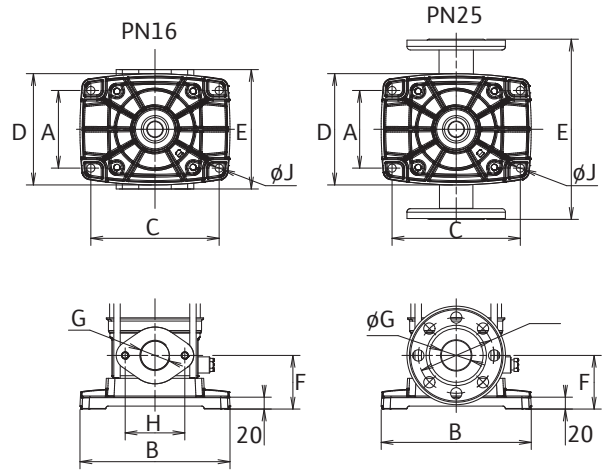
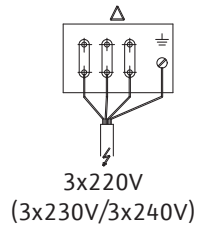
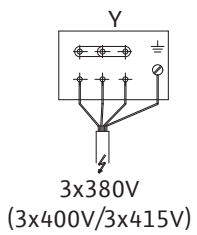


图 .5

MOT.220-380V(230-400V/240-415V)≤3kW



MOT.380VΔ(400VΔ/415VΔ)≥4kW

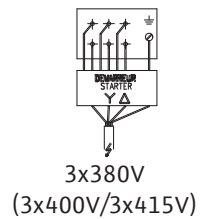
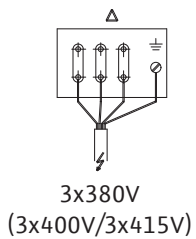
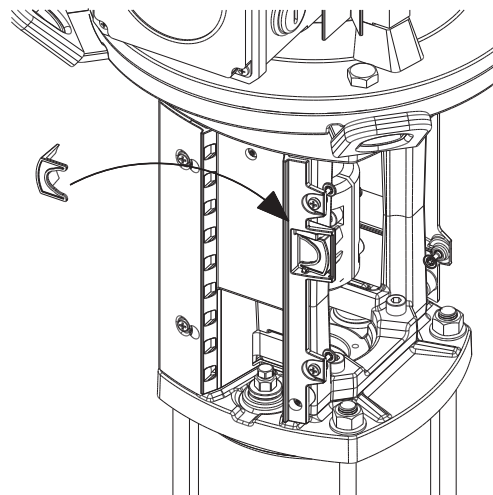


图 .6



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## 1 概述

### 1.1 关于本说明书

安装及操作维护说明书是产品组成的一部分，应随时将其放在产品附近。严格遵守这些说明是正确操作产品的前提。

## 2 安全

本说明书包含了有关本水泵安装、使用所必须遵守的重要内容，因此安装、调试及使用水泵前各有关人员必须认真阅读。

本说明书中的安全事项章节和后面用危险符合标注的有关内容都必须严格遵守。

### 2.1 本说明书中所使用的图标和警示词

图标：



危险图标



电源造成的危险图标



提示

警示词：

**危险：**紧急危险情况，如果不注意，将会导致死亡或重伤

**警告：**可能会受（重）伤。“警告”表明如果不遵守安全提示，可能会导致人员受（重）伤

**小心：**泵 / 设备有受损的危险。“小心”指如果不遵守安全说明可能会造成设备的损坏。

### 2.2 人员资质

安装水泵的人员必需具备相应的资质

### 2.3 不遵守安全说明将会导致的危险

不遵守安全防范措施将引起人身伤害或水泵损坏，厂方不负任何责任，也不承担任何索赔。

不遵守安全防范措施将可能导致：

- 水泵或重要部件将失去其主要或重要功能
- 对人员造成因电气、机械伤害或细菌感染
- 物质损失

### 2.4 操作者的安全防范措施

必需遵守本说明书中的预防事故发生的重要规范。必需遵守国家和本地的电气规程。

### 2.5 检查和安装的安全规范

操作者有责任确保检查和安装水泵必须由有资质的、接受过培训的专业人员进行。只有在水泵 / 设备断电并且完全停止运行时才能进行检查、检修。

### 2.6 自行设备改装和自制备件

自行改装设备必须经过制造商同意，使用原始备件和制造商授权的产品将确保安全。使用其它零件，制造商将不承担由此引起的任何后果和责任。

### 2.7 正确使用

厂方仅保证在说明书第 4 节所述的范围内使用该水泵的可靠性。任何情况下不能超出样本或数据单上的使用范围。

## 3 运输和临时存储

在收到产品时，应立即检查是否有运输损伤。如果确认有运输损伤，须在规定时间内采取必要的步骤予以解决。



**小心：**外部因素可能会导致损伤。如果产品需要以后安装，则须放在一个干燥处存放，采取措施防止冲击或碰撞，并防止外部因素的影响(如潮湿, 结冰等)。

## 4 应用

本水泵主要用于输送冷水或热水，乙二醇水溶液或其它不含矿物油，固体颗粒，研磨剂，或长纤维的低粘度液体。若输送具有腐蚀性的化学物质，须征得生产厂家的许可。



小心：有爆炸危险  
不得使用本水泵输送易燃易爆的介质。

### 4.1 应用范围

- 供水设备和增压设备
- 工业循环系统
- 工艺供水
- 冷却水循环
- 消防设备和洗车设备
- 喷洒和灌溉设备等

## 5 产品相关数据

### 5.1 型号说明

例如： Helix V1603-1/16/E/K/380-50  
Helix V 立式高压多级离心泵

- 16 公称流量 m<sup>3</sup>/h
- 03 叶轮级数
- 1 材质
  - 1= 下泵体不锈钢 304，水力部件不锈钢 304L
  - 2= 下泵体 316L，水力部件 316L
  - 3= 下泵体铸铁，其余水力部件不锈钢 304L
- 16 最大工作压力 bar
  - 16=16bar
  - 25=25bar
  - 30=30bar
- E 密封圈材质
  - E = 乙丙橡胶
  - V = 氟橡胶
- K 集装式机封
- 380 电压 V
- 50 频率 Hz

### 5.2 技术数据

最大工作压力

— 泵壳体 30bar

— 最大入口压力 10bar

温度范围

— 介质温度 -20 至 120°C

— 环境温度 +40°C

电气数据（标准配置）

— 电机效率 GB18613-2012 3 级能效（等同于 IE2）

— 电机防护等级 IP55

— 绝缘等级 F

— 频率 50Hz

— 电压 380V

### 外形接口尺寸（图 4）

型号		尺寸 (mm)								
		A	B	C	D	E	F	G	H	J
HELIX V 2../4..	PN16	100	215	180	160	204	50	G1	2xM10	4xM12
	PN25				175	250	75	DN25	4xM12	
HELIX V 6..	PN16				160	204	50	G1 <sup>1/6</sup>	2xM10	
	PN25				175	250	75	DN32	4xM16	
HELIX V 10..	PN16	130	255	215	190	250	80	G1 <sup>1/2</sup>	2xM12	4xM12
	PN25					280		DN40	4xM16	
HELIX V 16..	PN16					250	90	G2	2xM12	
	PN25					300		DN50	4xM16	

### 5.3 供货范围

多级泵

安装及操作维护说明书

对于 PN16 的水泵：随泵附带内螺纹铸铁椭圆法兰一对，O 型圈，六角螺栓和平垫圈一套

## 6 产品说明和功能

### 6.1 产品说明 图 1

1—电机连接螺栓

2—联轴器防护罩

3—机械密封

- 4—蜗壳
- 5—叶轮
- 6—泵轴
- 7—电机
- 8—联轴器
- 9—电机支架（灯笼架）
- 10—薄壁桶
- 11—法兰
- 12—下壳体
- 13—底板

图 2 和 3

- 1—过滤器
- 2—进口处截止阀
- 3—出口处截止阀
- 4—止回阀
- 5—排水丝堵
- 6—排气丝堵
- 7—水箱
- 8—安装基础
- 9—注液漏斗
- 10—吊钩

### 6.2 产品设计

HELIX 泵是一种立式多级、高压、非自吸的离心泵，管道式安装。

HLEIX 泵具备水力模型高效率 and 电机高效率

所有与介质接触的零件材质均为不锈钢

对于 7.5kw 及以上电机，特殊的联轴节中段结构，使得在不拆卸电机的情况下更换机械密封。集装式机械密封更好的易于维修。

人性化的扶手装置能更好的利于安装。

## 7 安装与电气连接

安装和电气连接工作要符合当地规定，由有资质的人员进行操作。



警告！身体伤害

请务必遵守现行的事故预防规范



警告！触电危险

请务必避免触电造成的危险

### 7.1 开箱

拆开水泵包装，将包装物按照环保规定进行清理

### 7.2 安装

水泵必须安装在一个干燥，通风良好且不结冻的地点

小心：有损坏水泵的危险

异物和脏物进入泵体会影响水泵性能

安装水泵前，所有的焊接工作应该完成

安装水泵前，要彻底清洗系统

水泵必须安装在一个易于接近的位置，以便于检修或者更换

对于重量比较大的泵，在泵的上方安装一个吊钩（FIG.2 Item10），以缓解拆卸时的重量。



警告：高温表面有烫伤的危险

水泵必须安装在使人员不会在运行过程中接触到其高温表面的地点。

将水泵安装在一个干燥且防结冻的地方，最好放在混凝土地面上。如果有条件，将隔音材料（软木或加强型橡胶）铺在混凝土下面，以避免噪音或振动传递给设备。



警告：泵有倾覆的危险

水泵必须固定在地面上

为了方便检修和保养工作，必须将水泵安装在易于接近的地方。水泵必须垂直的放在混凝土基座上。





**小心：水泵脏污的危险**  
 请注意，在安装前应将水泵的进出口封堵移除。



**提示：每台泵出厂前都做过水力测试，所以泵内会有一些残留的水。基于卫生方面的考虑，建议每次使用之前用饮用水清洗水泵。**

安装尺寸及接口参见 5.2 节

利用泵上的吊环小心地将泵提起。必要时使用起重机和吊索，并按照起重机操作指南执行。



**警告：泵有倾覆的危险**

在安装水泵过程中，尤其是重心较高的水泵，容易发生危险，需要格外注意。



**警告：泵有倾覆的危险**

使用没有被损坏，腐蚀的吊环。如果有需要，可以替换。



**警告：泵有倾覆的危险**

绝对不能使用电机的吊环来起吊水泵。这些电机上的吊环设计时仅仅考虑了电机的重量。

### 7.3 管路连接

小心

拧紧螺母时的扭矩不能超过 100N·m

介质的流动方向已经标注在水泵的铭牌上。

安装进口管和出口管时应注意不要给泵施加压力。在固定管路时，不要让泵承受管线的重量。

建议在泵的进口和出口侧安装截止阀。

伸缩接头的使用可以减弱泵的噪音和振动。

进口管路的直径至少要和泵进口一样大。

为了保护水泵免受倒流的冲击，可以在出口侧安装 1 个止回阀。

如果水泵直接接到公用自来水网，则进口侧同样要装 1 个止回阀和 1 个截止阀。

如果水泵通过一个水箱间接连接，则进口侧必须装 1 个过滤网，以防止脏物进口水泵和止回阀。

### 7.4 电气连接



**警告：触电危险**  
 必须防范触电造成的危险

电气工作一律由电气专业人员进行。

在接线前必须断电，并确保不会被意外接通。

水泵必须根据当地有关规定接地。

应确保电机的额定电流、电压和频率与电机铭牌保持一致。

水泵必须使用一根带插头或带电源总开关的电缆连接到电源上。

用户必须给三相电机装配一个许可的电机启动器，额定电流设置必须与水泵电机铭牌上的数值一致。

连接电缆要注意，不要碰到管路系统、水泵或电机的外壳。

与电源的接线可以参考图 5。连接方式要与电机铭牌上保持一致（ $\Delta$ -Y）

### 7.5 带变频器运行

电机可以连接到一个变频器上，以便使泵曲线调整到工作点上。

变频器不允许在电机端子上产生超过 850V 的电压峰值和 2500V/ $\mu$ s 以上的电压变化  $dU/dt$ 。

如果出现更高的值，则必须装上一个过滤器：如何正确地选择过滤器，请向变频器生产厂商咨询应严格遵守变频器生产商的操作说明进行操作。

## 8 运行

### 8.1 系统的灌水和排气

小心：有损坏水泵的危险  
水泵不得空转  
系统必须在启动水泵前灌水

#### 8.1.1 排气 - 正压吸入运行 (图 3)

关闭两个截止阀 (2、3)  
打开排气丝堵上面的螺钉 (6a)  
慢慢地打开进口侧截止阀 (2)  
当空气已排净且水泵 (6a) 中有液体流出时，将排气丝堵上的螺钉拧紧，重新关闭



警告：  
当输送的液体很热并且压力很高时，从排水丝堵中喷出来的水有将人烫伤或造成伤害的危险  
将进口侧截止阀 (2) 完全打开  
启动水泵，要保证转动方向与水泵铭牌上标注的方向一致



小心  
如果转动方向错误，则会导致水泵性能下降，还可能使联轴器受损。  
打开出口侧截止阀 (3)

#### 8.1.2 排气 负压吸入运行 (图 2)

- 关闭出口侧截止阀 (3)，打开进口侧截止阀 (2)
- 拧下整个排气丝堵 (6b)
- 将排水丝堵打开一些，不要完全打开。(5b)
- 将水灌入水泵和进口管路
- 此时要确保，无论在水泵还是进口管路中，都不能

存在空气：因此必须一致灌注到空气完全排出为止  
- 拧上排气丝堵和拧紧排气丝堵上面的螺钉。  
- 启动水泵，要保证转动方向与水泵铭牌上标注的方向一致



小心  
如果转动方向错误，则会导致水泵性能下降，还可能使联轴器受损。

- 将出口侧截止阀 (3) 打开一些
- 打开排气丝堵，以确保完全排气 (6a)
- 当空气已排净并且有液体从排气丝堵位置流出时，将排气丝堵关闭



警告  
当输送的液体很热并且压力很高时，从排水丝堵中喷出来的水有将人烫伤或造成伤害的危险  
将进口侧截止阀 (2) 完全打开

- 将出口侧截止阀 (3) 完全打开
- 关闭排水丝堵 (5a)

### 8.2 投入运行



小心：水泵不能以零流量运行 (出口截止阀关闭)



警告：受伤危险  
当水泵运行时，联轴器罩必须安装，相应的螺栓要拧紧



警告：噪音级别高  
大功率水泵的噪音级可能会很高；在水泵附近长时间工作时，必须采取适当的保护措施



警告：  
水泵安装的设计必须要考虑到，在有液体流出的情况下，不会使人受伤 (机械密封失效)

## 9 保养维护

所有保养工作都必须由有授权并且合格的专业人员进行



警告 有触电危险

必须防范触电的危险

水泵在进行电气方面的作业之前必须断电，并锁住确保不被意外接通



警告 有受伤的危险

当水温和系统压力过高时，应关闭出口侧和入口侧的截止阀。首先，使泵冷却下来。

水泵在运行过程中无需进行专门的保养部分型号配置的是集装式机封，易于更换。当机械密封装好后，将机封调整垫片重新放回塑料支架上。

水泵应保持清洁的状态

停机不用的水泵必须在霜冻期将水排

净，以避免受损：关闭进出口截止阀，将排气丝堵和排水丝堵完全打开。

## 10 故障 - 原因 - 排除方法



警告：有触电危险

必须防范触电造成的危险

水泵在进行电气方面的作业之前必须断电，并锁住确保不被意外接通



警告 有受伤的危险

当水温和系统压力过高时，应关闭出口侧和入口侧的截止阀。首先，使泵冷却下来。(如下表)

## 11. 备件

所有备件都必须向威乐公司客户服务中心直接订购。

为了避免反复查询和订错零件，订货时请说明铭牌上的详细数据。

保留技术更改权利。

故障	原因	排除
水泵不运转	没有通电	检查保险丝、电缆及连接状况
	电机安全保护开关动作	排除电机过载因素
水泵工作，但未达到正常工作点	水泵转向错误	检查转动方向，必要时进行纠正
	水泵的组件被异物堵塞	检查并清洁水泵和管路
	进水管路中有空气	拧紧进水管路连接部分，使之密封
	阀门没有完全打开	将阀门按需要的程度打开
水泵输送不稳定	水泵中有空气	给水泵排气，确保进口管路是密封的；必要时，将水泵启动 20~30 秒，打开排气丝堵，使空气能够排出，再关闭排气丝堵。重复该过程，直至排气丝堵处不再有空气泄出。
水泵振动或噪音过大	水泵中有异物	清除异物
	水泵在地面上的固定不正确	拧紧固定螺栓
	轴承损坏	与威乐公司客户服务联系
电机过热，电机保护装置跳闸	某一项断相	检查保险丝、电缆及连接状况
	环境温度过高	冷却
机械密封漏水	机械密封损坏	更换机械密封

如果故障无法排除，请联系威乐公司客户服务中心

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## 1. General

### 1.1 About this document

These Installation and Operating Instructions form an integral part of the unit. They must be kept close to the unit and in readiness whenever required. Precise observance of these instructions is a pre-condition for use of the unit for the intended purpose and for its correct operation.

## 2. Safety

These instructions contain important information which must be followed when installing and operating the pump. It is therefore imperative that they be read by both the installer and the operator before the circulator is installed or started up.

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 Symbols and signal words used in these operating instructions



Symbols



General safety symbol.



Hazards from electrical causes.

#### NOTE: ....

#### Signal words:

**DANGER!** Imminently hazardous situation. Will result in death or serious injury if not avoided.

**WARNING!** Risk of (serious) injury. 'Warning' implies that failure to comply with the safety instructions is likely to result in (severe) personal injury.

**CAUTION!** Risk of damage to the pump/installation. 'Caution' alerts to user to potential product damage due to non-compliance with the safety instructions.

### 2.2 Personnel qualification

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

### 2.3 Risks incurred by failure to comply with the safety instructions

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 claim for damages. In particular, failure to comply with these safety instructions could give rise, for example, to the following risks:

- the failure of important parts of the pump or installation.
- personal injury due to electrical and mechanical causes.
- material damage.

### 2.4 Safety instructions for the operator

Existing regulations for the prevention of accidents must be observed.

National Electrical Codes, local codes and regulations must be followed.

### 2.5 Safety instructions for inspection and assembly

The operator must ensure that all inspection and installation work is carried out by authorized and qualified specialists who have carefully reviewed these instructions.

Work on the pump/unit must be carried out only with the pump switched off and at complete standstill.

### 2.6 Unauthorised 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 authorized 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 Improper use

The operational safety of the pump or installation supplied can only be guaranteed if it is used in accordance with paragraph 4 of the operating instructions. The limits given in the catalogue or data sheet must under no circumstances be exceeded.

## 3. Transport and interim storage

When receiving the material, check that there has been no damage during the transport. If shipping damage has occurred, take all necessary steps with the carrier within the allowed time.

**CAUTION!** Outside influences may cause damages.

If the delivered material is to be installed later on, store it in a dry place and protect it from impacts and any outside influences (humidity, frost etc.).

Handle the pump carefully so as not to damage the unit prior to installation.

## 4. Application

This pump's basic function is to pump hot or cold water, water with glycol or other low viscosity fluids that contain no mineral oil, solid or abrasive substances, or materials having long fibres. The manufacturer's approval is required for use to pump corrosive chemicals.

### CAUTION! Risk of explosion!

Do not use this pump to handle flammable or explosive liquids.

#### 4.1 Applications areas

- water distribution and boosting installations,
- industrial circulation systems,
- process fluids,
- cooling water circuits,
- fire-fighting and washing stations,
- watering installations, etc.

## 5. Technical data

### 5.1 Pump designation

#### 5.1.1 Type key for pump with motor

**Example:** Helix V1603-3/16/E/K/380-50

Helix V	Vertical high-pressure multistage centrifugal pump in-inline design
16	Flow rate
03	Number of impellers
1	Pump material
	1 = Pump housing 1.4301 (AISI 304) Hydraulics 1.4307 (AISI 304L);
	2 = Pump housing 1.4409 (AISI 316L) Hydraulics 1.4409 (AISI 316L)
	3 = Pump housing EN-GJL-250 (cataphoretic-coated) Hydraulics 1.4307 (AISI 304L);
16	Maximum operating pressure in bar
	16 = 16 bar (PN 16 flange)
	25 = 25 bar (PN 25 flange)
	30 = 30 bar (PN 40 flange)
E	Gasket type
	E = EPDM
	V = VITON
K	Mechanical seal in cartridge design
380	Connection voltage in V
50	Frequency in Hz

### 5.2 Data table

Maximum operating pressure

- Pump casing: 30 bars
- Maximum suction pressure: 10 bars

Temperature range

- Liquid temperatures: -20 to +120 °C
- Ambient temperature: +40 °C

Electrical data (stourdard)

- Motor efficiency: GB18613-2012 Class 3 (equal to IE2)
- Motor Protection index: IP 55
- Insulation class: F
- Frequency: 50Hz
- Electrical voltage: 380V

### Outline and pipe dimensions (Fig. 4).

Types		dimensions (mm)								
		A	B	C	D	E	F	G	H	J
HELIX V 2../4..	PN16	100	215	180	160	204	50	G1	2xM10	4xM12
	PN25				175	250	75	DN25	4xM12	
HELIX V 6..	PN16				160	204	50	G1 <sup>1/4</sup>	2xM10	
	PN25				175	250	75	DN32	4xM16	
HELIX V 10..	PN16	130	255	215	190	250	80	G1 <sup>1/2</sup>	2xM12	4xM12
	PN25					280		DN40	4xM16	
HELIX V 16..	PN16					250	90	G2	2xM12	
	PN25					300		DN50	4xM16	

### 5.3 Scope of Supply

- Multistage pump.
- Installation and operating instructions.
- Counterflange + screws and o-rings for PN16 configuration.

## 6. Description and function

### 6.1 Product description

FIG. 1

- 1 - Motor connection bolt
- 2 - Coupling guard
- 3 - Mechanical seal
- 4- Hydraulic stage casing
- 5 - Impeller
- 6 - Pump shaft
- 7 - Motor
- 8 - Coupling
- 9 - Lantern
- 10 - Tube liner
- 11 - Flange
- 12 - Pump housing
- 13 - Base plate

FIG. 2, 3

- 1 - Strainer
- 2 - Pump suction valve
- 3 - Pump discharge valve
- 4 - Check valve
- 5 - Drain + priming plug
- 6 - Air bleed screw + Filling plug
- 7 - Tank
- 8 - Foundation block
- 9 - Filling Funnel
- 10 - Lifting hook

### 6.2 Design of product

- HELIX pumps are vertical high pressure non-self priming pumps with inline connection based on multistage design.
- HELIX pumps combine use of both high efficiency hydraulics and motors.
- All metallic parts in contact with water are made of stainless steel.
- For models equipped with heaviest motor (>40 kgs), a specific coupling allows to change the seal without removing the motor. A cartridge seal is then used in order to ease maintenance.
- Special handling devices are integrated in order to facilitate pump installation.

## 7. Installation and electrical connection

Installation and electrical work in compliance with any local codes and by qualified personnel only.



### **WARNING! Bodily injury!**

Existing regulations for the prevention of accidents must be observed.



### **WARNING! Electrical shock hazard!**

Dangers caused by electrical energy must be excluded.

### **7.1 Commissioning**

Unpack the pump and dispose of the packaging in an environmentally-responsible manner.

### **7.2 Installation**

The pump must be installed in a dry, well-ventilated and frost-free place.



### **CAUTION! Possible damage of the pump!**

Dirt and solder drops in to the pump body can effect the pump operation.

- It is recommended that any welding and soldering work be done before installing the pump.
- Thoroughly flush the system out before installing the pump.

- The pump must be installed in an easily accessible position to facilitate inspection or replacement.
- For heavy pumps, install a lifting hook (Fig.2, item 10) above the pump in order to ease its disassembly.



### **WARNING! Risk of accident by hot surfaces!**

The pump must be positioned so that someone cannot come into contact with the hot pump surfaces while operation.

- Install the pump in a dry place protected from frost, on a flat concrete block using appropriate accessories. If possible, use an insulating material under the concrete block (cork or reinforced rubber) to avoid any noise and vibration transmission into the installation.



### **WARNING! Risk of fall!**

The pump must be correctly screwed to the ground.

- Place the pump where it will be easy to reach, to facilitate inspection and removal work. The pump must always be installed perfectly upright on a sufficiently heavy concrete base.

CAUTION! Risk of parts inside the pump!



Take care to remove closure members of the pump housing before installation.

NOTE: Each pumps could be tested regarding hydraulic features in factory, some water may remain in them.

It is recommended for hygienic purposes, to carry out a rinsing of the pump before any using with potable water supply.

- The installation and connection dimensions are

given – Lift the pump carefully by using the integrated hooks rings, if necessary with a hoist and suitable slings according to the current hoist guidelines.



**WARNING! Risk of fall!**

Take care to pump fixations especially for the highest pumps whose centre of gravity may lead to risk during pump handling.



**WARNING! Risk of fall!**

Use integrated rings only if they are not damaged (no corrosion ...). Replace them if needed.



**WARNING! Risk of fall!**

The pump must be never carried by using motor hooks: these are only designed to lift the motor alone.

### 7.3 Pipe connection

- Connect the pump to the pipes by using only counterflange accessories supplied with the product.



**CAUTION!**

Tightening of screws or bolts must not exceed

10 daN.m.

Use of impact wrench is prohibited.

- The circulation sense of the fluid is indicated on the identification label of the pump.
- Pump must be installed in such a way that it is not stressed by the pipework. The pipes must be attached so that the pump does not bear their weight.
- It is recommended that isolation valves be installed on the suction and discharge side of the pump.
- Use of expansion joints may mitigate noise and vibration of the pump.
- As regards the nominal cross-section of the suction pipe, we recommend a cross-section at least as large as that of the pump connection.
- A check valve could be placed on the discharge pipe in order to protect the pump against hammer shock.
- For direct connection to a public drinking water system, the suction pipe must also have a check valve and a guard valve.
- For indirect connection via a tank, the suction pipe must have a strainer to keep any impurities out of the pump and a check valve.

### 7.4 Motor connection for bare-shaft pump (without motor)

- Remove coupling guards.



NOTE: Coupling guards can be removed without entirely unscrewing screws.



- Install the motor on the pump by using screws (FT lantern size – see product designation) or bolts, nuts and handling devices (FF lantern size – see product designation) provided with the pump : check motor power and dimension in WILO catalogue.

NOTE: Depending on fluid characteristics, motor power could be modified. Contact WILO Customer Services if needed.

- Close the coupling guards by screwing all screws provided with the pump.

### 7.5 Electrical connection

WARNING! Electrical shock hazard!

Dangers caused by electrical energy must be excluded.

- Electrical work by a qualified electrician only!
- All electrical connections must be performed after the electrical supply has been switched off and secured against unauthorized switching.
- For safe installation and operation a proper grounding of the pump to the power supply's grounding terminals is required.

- Check that operating current, voltage and frequency used comply with motor plating data.
- The pump must be connected to the power supply by a solid cable equipped with a grounded plug-connection or a main power switch.
- Three-Phase motors must be connected to an approved motor starter. The set nominal current must correspond to the electrical data on the pump motor name plate
- The supply cable must be laid so that it never touches the pipework and/or the pump and motor casing.
- The pump/installation should be grounded in compliance with local regulations. A ground fault interrupter can be used as extra protection.
- The connection to the network must be in accordance with the connection plan (Fig. 5).

### 7.6 Operation with frequency converter

- Motors used can be connected to a frequency converter in order to adapt pump performance to duty point.
- The converter must not generate voltage peaks at motor terminals higher than 850V and dU/dt slope higher than 2500 V/µs.
- In case of higher value, an appropriate filter must



be used : contact converter manufacturer for this filter definition and selection.

- Strictly follow instructions provided by the converter manufacturer data sheet for installation.

## 8. Start up

### 8.1 System filling – Venting



#### **CAUTION! Possible damage of the pump!**

Never operate the pump dry.  
The system must be filled before starting the pump.

#### 8.1.1 Air evacuation process – Pump with sufficient supply

pressure (Fig. 3)

- Close the two guard valves (2, 3).
- Unscrew the air bleed screw from filling plug (6a).
- Slowly open the guard valve on the suction side (2).
- Retighten the air-bleed screw when air escapes at the air bleed screw and the pumped liquid flows (6a).



#### **WARNING!**

When the pumped liquid is hot and the pressure high, the stream escaping at the air bleed screw may cause burns or other injuries.

- Open the guard valve on the suction side completely (2).
- Start the pump and check if direction of rotation matches the one printed on pump plating



#### **CAUTION!**

A wrong direction of rotation will cause bad pump performances and possibly coupling damage.

- Open the guard valve on the discharge side (3).

#### 8.1.2 Air evacuation process – Pump in suction (Fig. 2)

- Close the guard valve on the discharge side (3).  
Open the guard valve on the suction side (2).
- Remove the filling plug (6b).
- Open the drain-priming plug not completely (5b).
- Fill the pump and the suction pipe with water.
- Make sure that there is no air in the pump and in the suction pipe : refilling until complete removal of air is required.
- Close the filling plug with air bleed screw (6b).
- Start the pump and check if direction of rotation matches the one printed on pump plating.



#### **CAUTION!**

A wrong direction of rotation will cause bad pump performances and possibly coupling damage.

- Open the guard valve on the discharge side a little(3).
- Unscrew the air bleed screw from filling plug for air venting (6a).
- Retighten the air-bleed screw when air escapes at the air bleed screw and the pumped liquid flows.



#### **WARNING!**

When the pumped liquid is hot and the pressure high, the stream escaping at the air bleed screw may cause burns or other injuries.

- Open the guard valve on the discharge side completely (3).
- Close the drain-priming plug (5a).

### 8.2 Starting up



#### **CAUTION!**

The pump must not operate at zero flow (closed discharge valve).



#### **WARNING! Risk of injury!**

When the pump runs, coupling guards must be in place, tightened with all appropriate screws.



#### **WARNING! Important noise!**

Noise emitted by most powerful pumps could be very high : protection must be used in case of long stay close to the pump.



#### **WARNING!**

Installation must be designed in order that no one could be hurt in case of fluid leakage (mechanical seal failure ...).

## 9. Maintenance – Service



#### **All servicing should be performed by an authorized service representative!**

#### **WARNING! Electrical shock hazard!**

Dangers caused by electrical energy must be excluded. All electrical work must be performed after the electrical supply has been switched off and secured against unauthorized switching.



#### **WARNING! Risk of scalding!**

At high water temperatures and system pressure close isolating valves before and after the pump.

First, allow pump to cool down.

- These pumps are maintenance free.
- In option, mechanical seal could be easily replace on some models thanks to its cartridge seal design. Insert its adjusting wedge in its housing (Fig. 6) once mechanical seal position is set.
- Always keep the pump perfectly clean.

- Pumps which are not being used during periods of frost should be drained to avoid damage:  
Close the guard valves, open completely the drain-priming plug and the air bleed screw.

## 10. Defects – causes – remedies



### **WARNING! Electrical shock hazard!**

Dangers caused by electrical energy must be excluded.  
All electrical work must be performed after the electrical supply has been switched off and secured against unauthorized switching.



### **WARNING! Risk of scalding!**

At high water temperatures and system pressure close isolating valves before and after the pump.  
First, allow pump to cool down.

Defects	Causes	Remedies
Pump fails to operate	No current	Check the fuses, the wiring, and the connectors
	The thermistor tripping device has tripped out, cutting off power	Eliminate any cause of overloading of the motor
Pump runs but delivers too little	Wrong direction of rotation	Check the direction of rotation of the motor and correct it if necessary
	Parts of the pump are obstructed by foreign bodies	Check and clean the pipe
	Air in suction pipe	Make the suction pipe airtight
	Suction pipe too narrow	Install a larger suction pipe
	The valve is not open far enough	Open the valve properly
Pump delivers unevenly	Air in pump	Evacuate the air in the pump; check that the suction pipe is airtight. If required, start the pump 20-30s – open the air bleed screw in order to move air away – close the air bleed screw and repeat it several times until no more air is going out of the pump
Pump vibrates or is noisy	Foreign bodies in pump	Remove the foreign bodies
	Pump not properly attached to ground	Retighten the screws
	Bearing damaged	Call WILO Customer Service
Motor overheats. Its protection trips out	A phase is open-circuit	Check the fuses, the wiring, and the connectors
	Ambient temperature too high	Provide cooling
Mechanical seal is leaking	Mechanical seal is damaged	Replace the mechanical seal

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

## 11. Spare parts

All spare parts must be ordered through WILO Customer Services.  
In order to avoid any mistakes, please specify the name plate data for orders.

**Subject to technical alterations!**



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