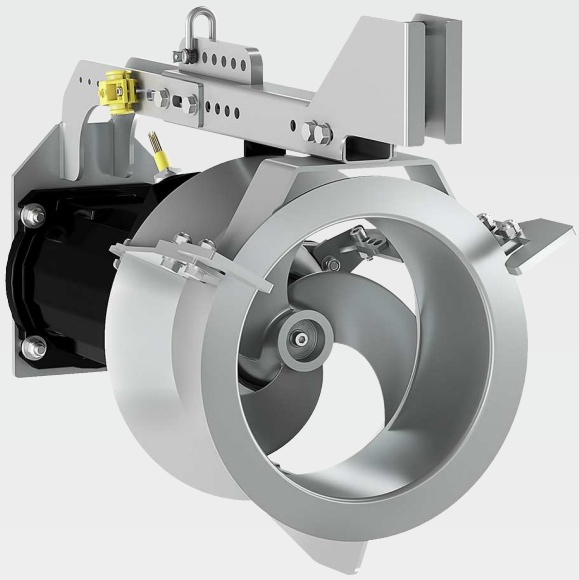
Pioneering for You

Wilo-Flumen OPTI-RZP 20-1 ... 40-1
Wilo-Flumen EXCEL-RZPE 20-1 ... 40-1



zh-CHS 安装及操作说明

en Installation and operating instructions

6092600 • Ed.01/2021-10

目录表

1 概述

1.1 关于本说明书

此安装及操作说明是 RZP 系列潜水搅拌器现有说明书的扩展版本。作业前请阅读本说明书。请妥善保管说明书，以备随时使用。合规使用和正确处理再循环泵，遵从所有数据。遵守产品上的所有数据和标志。

原版操作说明书以德语撰写。所有其它语种的说明书均为其翻译件。

1.2 数字版说明书

本说明书的数字版本请参见以下产品页面：
Flumen OPTI-RZP: https://qr.wilo.com/923, Flumen EXCEL-RZPE: https://qr.wilo.com/924

2 运输和存放

2.1 挂好提升设备：Wilo-Flumen OPTI-RZP/EXCEL-RZPE 20-1

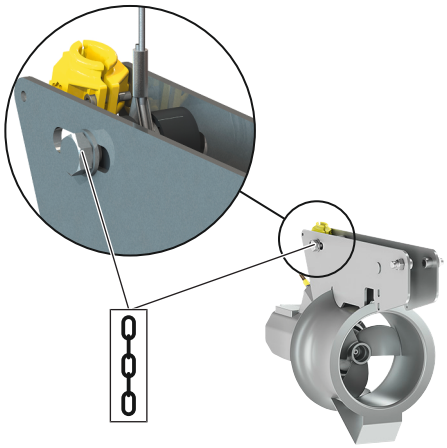


Fig. 1: Flumen OPTI-RZP/EXCEL-RZPE 20-1 吊装孔

✓ 将提升设备直接吊挂在螺栓上。
✓ 提升设备必须带有吊索套环。**注意！ 不得使用 U 形环！**
✓ 通过长孔调整重心。再循环泵的倾角约 5° 向下。
1. 松开螺栓上的六角螺母。
2. 抽出螺栓并取下塑料套管。
3. 将提升设备套到螺栓上。
4. 用塑料套管盖住。
   ⇒ 提升设备固定在两个塑料套管之间的螺栓上。
5. 螺栓通过插孔与六角螺母固定。

► 提升设备已固定完毕。

2.2 挂好提升设备：Wilo-Flumen OPTI-RZP/EXCEL-RZPE 25-3 … 40-1

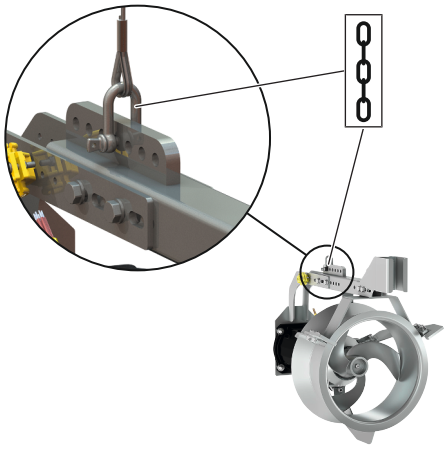


Fig. 2: Flumen OPTI-RZP/EXCEL-RZPE 25-3 … 40-1 吊装孔

✓ 将提升设备直接挂在机架上。
✓ 提升设备必须带有吊索套环。
✓ 通过各孔调整重心。再循环泵的倾角约 5° 向下。
1. 将卸扣从机架摘下。
2. 将卸扣插入索套中。
3. 将卸扣插入机架的对应孔中并固定好。

► 提升设备已固定完毕。

3 应用/使用

3.1 规定用途

在商业环境中泵送：
→ 含有粪便的污水
→ 回流污泥
→ 生产用水

4 产品说明

4.1 结构

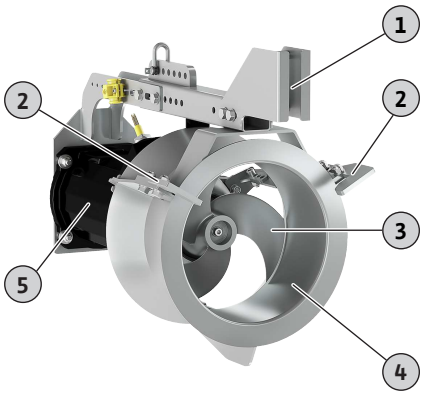


Fig. 3: Flumen OPTI-RZP/EXCEL-RZPE概览

重复循环泵：潜水搅拌器，直驱型，装有流动式壳体。

1	导向爪
2	法兰爪
3	螺旋桨
4	流动式壳体
5	电机

电机 (Flumen OPTI-RZP)

表面冷却式三相潜水电机带有永久润滑式大尺寸滚子轴承。电机绕组配备温度监控装置。余热通过电机外壳直接排放至周围的流体中。接线电缆采用耐重型机械负荷设计，经过密封处理，不但防高压水，而且防流体，此外还具有纵向防水性。连接电缆标配裸露电缆端部，长度为 10 m (33 ft)。

电机 (Flumen EXCEL-RZPE)

表面冷却式三相潜水电机带有永久润滑式大尺寸滚子轴承。电机绕组配备温度监控装置。余热通过电机外壳直接排放至周围的流体中。接线电缆采用耐重型机械负荷设计，经过密封处理，不但防高压水，而且防流体，此外还具有纵向防水性。连接电缆标配裸露电缆端部，长度为 10 m (33 ft)。

潜水式电动机满足 IE3 电机能效等级（根据 IEC 60034-30 标准）。

密封件

大容积密封室采用双重轴封。密封壳体灌注有白矿油，用于收集流体侧密封件的泄漏物。流体侧装入防腐蚀并且耐磨损机械密封。电机侧密封通过一个径向轴封或机械密封实现。

水力部件

实心材质的螺旋桨采用防堵塞的螺旋桨形状设计。耐堵塞流动式壳体带导向爪和两个法兰爪。导向爪的作用是在抬放再循环泵时保持过程顺畅。法兰爪可以调整，确保能理想地与压力管道保持同心，当处于高工作压力下时，可保持再循环泵的稳固。

带法兰连接的替代版本，用于直接拧到压力管道上。

	OPTI-RZP 20-1 ...	EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ...	EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ...	EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ...	EXCEL-RZPE 40-1 ...
螺旋桨额定直径，单位： mm (in)	200 (8)	200 (8)	250 (10)	250 (10)	300 (11.5)	300 (11.5)	400 (16)	400 (16)
连接尺寸	DN 200 DN 250	DN 200 DN 250	DN 250	DN 250	DN 300	DN 300	DN 400	DN 400
标准规格	•	•	•	•	•	•	•	•
带法兰连接的型号	•	•	•	•	•	•	•	•

• = 可用，– = 不可用

4.2 材料

	OPTI-RZP 20-1 ...	EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ...	EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ...	EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ...	EXCEL-RZPE 40-1 ...
电机壳体								
EN-GJL-250 (ASTM A48 Class 35/40B)	–	–	•	•	•	•	•	•

	OPTI-RZP 20-1 ...	EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ...	EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ...	EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ...	EXCEL-RZPE 40-1 ...
1.4408 (ASTM A 351)	•	•	–	–	–	–	–	–
密封壳体								
1.4408 (ASTM A 351)	•	•	•	•	•	•	•	•
流体侧密封件								
SiC/SiC	•	•	•	•	•	•	•	•
电机侧密封件								
NBR（丁腈）	–	–	•	•	•	•	•	•
SiC/SiC	•	•	–	–	–	–	–	–
螺旋桨								
1.4408 (ASTM A 351)	•	•	•	•	•	•	•	•
流动式壳体								
1.4571 (AISI 316Ti)	•	•	•	•	•	•	•	•

• = 标配，– = 不可用

4.3 监控设备

非防爆级再循环泵可能采用的监控设备概览：

	OPTI-RZP 20-1 ...	EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ...	EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ...	EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ...	EXCEL-RZPE 40-1 ...
电机舱	o	o	–	–	–	–	–	–
电机舱/密封室	–	–	o	o	o	o	o	o
密封室（外部铅芯湿度电极）	o	o	o	o	o	o	o	o
电机绕组：温度限制装置	•	•	•	•	•	•	•	•
电机绕组：温度调节和限制装置	o	o	o	o	o	o	o	o

图例

– = 不可能，o = 可选，• = 标配

防爆级再循环泵可能采用的监控设备概览：

	OPTI-RZP 20-1 ...	EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ...	EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ...	EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ...	EXCEL-RZPE 40-1 ...
电机舱	o	o	–	–	–	–	–	–
密封室（外部铅芯湿度电极）	o	o	o	o	o	o	o	o
具有ATEX防爆认证								
电机绕组：温度限制装置	o	o	o	o	o	o	o	o
电机绕组：温度调节和限制装置	•	•	•	•	•	•	•	•
具有FM/CSA防爆认证								
电机绕组：温度限制装置	•	•	•	•	•	•	•	•

	OPTI-RZP 20-1 ...	EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ...	EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ...	EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ...	EXCEL-RZPE 40-1 ...
电机绕组：温度调节和限制装置	o	o	o	o	o	o	o	o

图例

– = 不可能，o = 可选，• = 标配

4.4 在易爆环境中运行

符合标准	OPTI-RZP 20-1 ...	EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ...	EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ...	EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ...	EXCEL-RZPE 40-1 ...
ATEX	o	o	o	o	o	o	o	o
FM	o	o	o	o	o	o	o	o
CSA-Ex	–	–	–	–	–	–	–	–

图例

– = 不可能，o = 可选，• = 标配

4.5 型号代码

Wilo-Flumen OPTI-RZP ...

示例：**Wilo-Flumen OPTI-RZP 40-1.95-6/24Ex S8**

Flumen	潜水搅拌器，卧式
OPTI-RZP	产品系列：重复循环泵装备标准异步电机
40	x10 = 螺旋桨直径，单位 mm
1	结构模型
95	螺旋桨转速，单位 rpm
6	极数
24	x10 = 定子组件长度，单位 mm
Ex	具有防爆认证
S8	特种螺旋桨的螺旋桨代码（不适用标准型螺旋桨）

Wilo-Flumen EXCEL-RZPE ...

示例：**Wilo-Flumen EXCEL-RZPE 40-1.95-6/24Ex S8**

Flumen	潜水搅拌器，卧式
EXCEL-RZPE	产品系列：再循环泵装备IE3异步电机
40	x10 = 螺旋桨直径，单位 mm
1	结构模型
95	螺旋桨转速，单位 rpm
6	极数
24	x10 = 定子组件长度，单位 mm
Ex	具有防爆认证
S8	特种螺旋桨的螺旋桨代码（不适用标准型螺旋桨）

4.6 供货范围

→ 再循环泵装有流动式壳体并带有接线电缆
→ 安装及操作说明

4.7 附件

→ 下降装置
→ 辅助升降装置
→ 用于固定升降绳的系绳柱
→ 附加的绳索张紧装置
→ 固定件套件带地脚螺栓

5 安装

5.1 安装方式

→ 拧到压力管道上
→ 通过下降装置对接到压力管道上

5.2 安装

危险

在安装过程中，危害健康的介质会导致危险！

使安放位置在安装过程中保持干净、无菌。如果可能接触危害健康的介质，注意下面几点：

- 佩戴防护装备：
  ⇒ 封闭式护目镜
  ⇒ 口罩
  ⇒ 防护手套
- 一旦有介质滴落，立刻进行收集。
- 遵守工作规程的相关规定！

危险

独自执行危险作业导致生命危险！

需要在竖井和狭窄空间内完成的工作，以及存在坠落危险的工作，这两个都是危险工种，不允许单人独自作业！

- 作业时必须有另一名工作人员在场！

→ 穿戴防护装备！遵守工作规程。
  – 防护手套：4X42C (uvex C500)
  – 安全鞋：防护等级 S1 (uvex 1 sport S1)
  – 穿戴好防坠落装备！
  – 安全头盔：EN 397 符合标准，防止横向变形 (uvex pheos)
    （使用提升设备的情况下）
→ 准备安放位置：
  – 干净，无大颗粒固体物
  – 干燥
  – 不上冻
  – 已消毒
→ 始终安排两人执行作业。
→ 标记工作区域。
→ 将擅自进入工作区域的人员清理出场。
→ 如果作业高度超过 1 m (3 ft)，需要使用带防坠落安全装置的支架。
→ 工作期间，有毒气体或窒息气体会不断聚集：
  – 遵守工作规程要求的保护措施（随身携带气体测量装置、气体报警设备）。
  – 确保充分的通风。
  – 如果出现有毒气体或窒息气体汇集的情况，立即离开工位！
→ 放置提升设备：平坦的表面，清洁、牢固的地基。存放地点和安放位置必须易于接近。
→ 切勿在升降装置的摆动范围内停留。

5.2.1 与墙壁和通风系统保持的最小间距

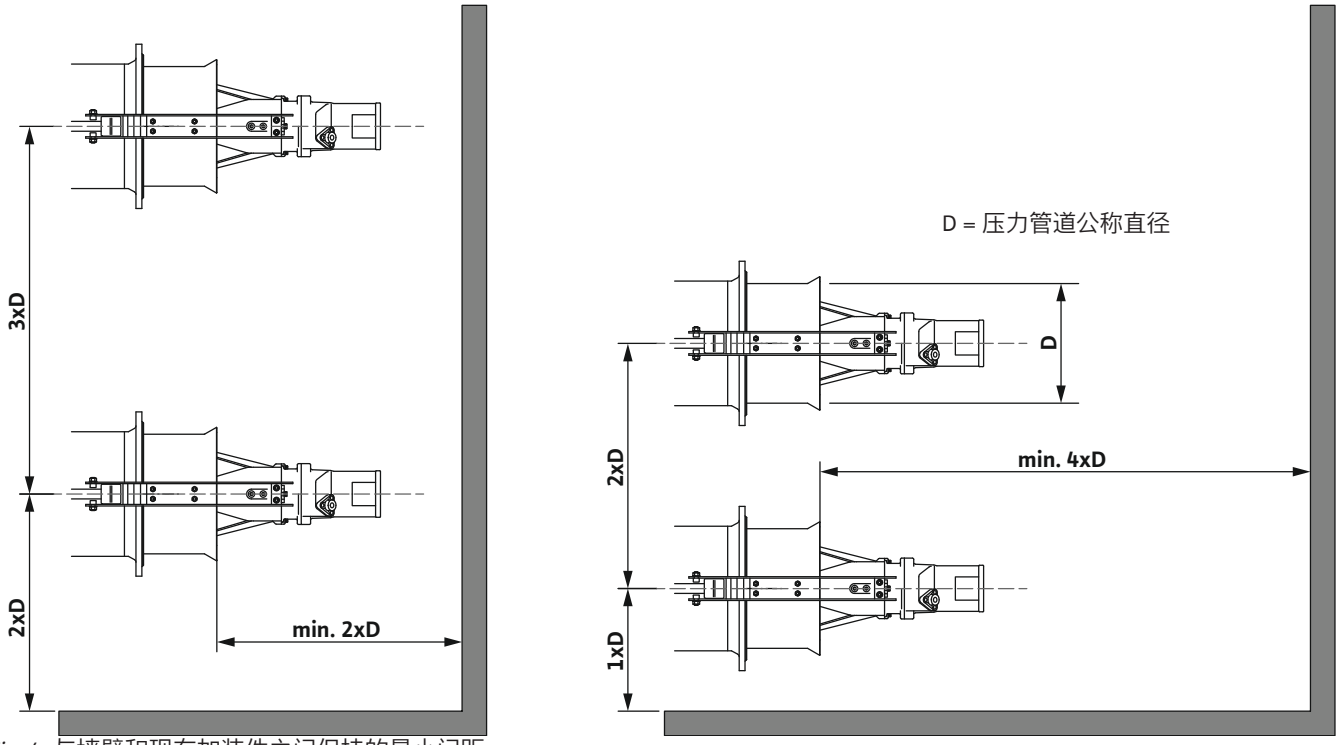


Fig. 4: 与墙壁和现有加装件之间保持的最小间距

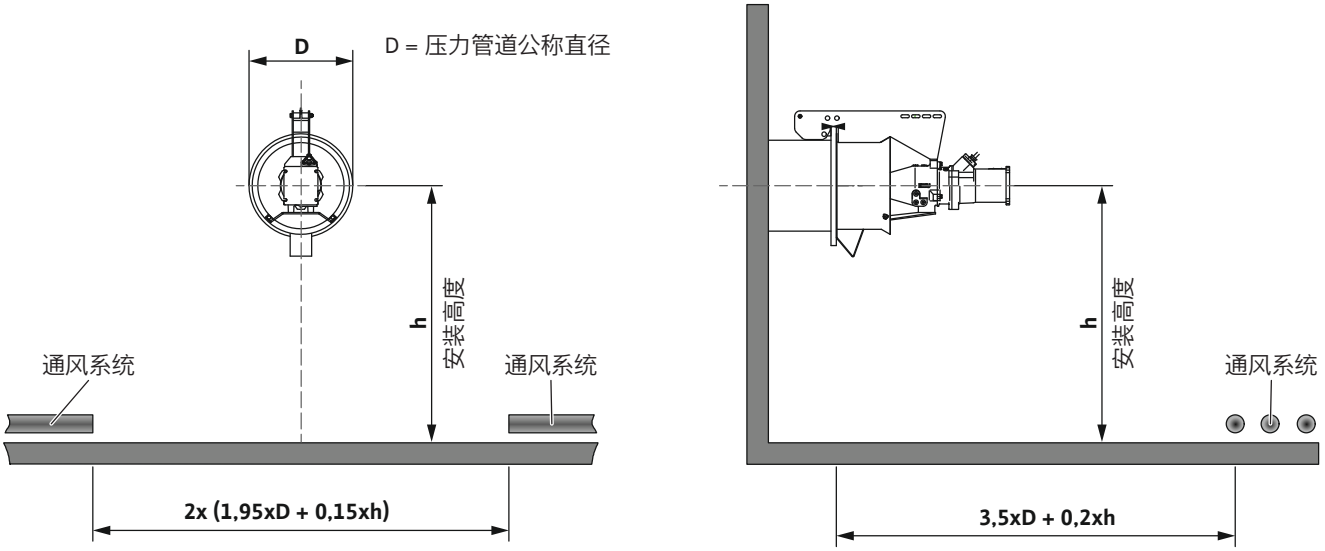


Fig. 5: 与通风系统保持的最小间距

5.2.2 通过下降装置对接到压力管道上

通过下降装置将再循环泵送至压力管道处并对接到压力管道上。通过流动式壳体上的导向爪正确引至压力管道处。为保证再循环泵能正确对接到压力管道上，法兰爪必须要包住压力管道上的法兰。安装时请注意以下几点：

→ 可以在空水池和满水池时安装。
首次安装：建议空水池安装。空水池时可以检查对接和脱开过程，并能调整法兰爪。

→ 再循环泵不能在不同高度上操作。

安装方式类似于潜水搅拌器的安装方式：

✓ 首次安装：排空水池。

✓ 吊装升降装置，再循环泵朝下倾斜约 5°。

✓ 接线电缆敷设完毕。

✓ 电线导向器就位。

1. 抬起再循环泵。
2. 将再循环泵摆动到水池上方。
3. 将导向爪对准下降装置。
4. 缓慢降下再循环泵并将下降装置引入导向爪。
5. 将再循环泵降至压力管道处。
   小心！下降过程中保持接线电缆稍微拉紧！
6. 反复尝试对接和脱开过程：
   - 流动式壳体必须完全靠在压力管道上。
   - 导向爪必须包住压力管道上的法兰。
   - 抬起再循环泵时必须与法兰保持松散式分离。
   对接和脱开过程不顺畅，请重新调整法兰爪（见下章）。
7. 通过现场的电线导向器将水池中的接线电缆稍微拽紧。
   小心！抓住水池边的接线电缆，采取保护措施，防止电缆受损（夹挤，刮擦）！

► 再循环泵安装完毕。

Fig. 6: 用下降装置进行安装

5.2.3 调整导向爪和法兰爪

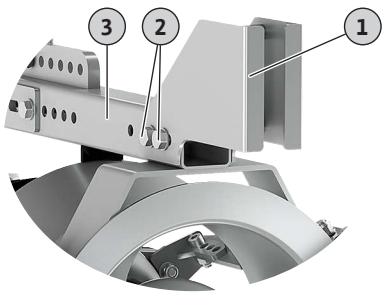
安装后执行功能测试。功能测试可以检查再循环泵是否完全靠在（对接到）压力管道上并能重新轻易松解（脱开）：

→ 如果流动环未完全靠在压力管道上，将达不到工作点。
→ 如果再循环泵无法从压力管道上脱开，就不能将再循环泵从水池中拉出。

为保证与压力管道的对接和脱开过程顺畅，需要做以下调整：

→ 重新校准导向爪：调整流动式壳体与压力管道之间的距离。
→ 重新校准法兰爪：调整法兰爪到压力管道法兰的距离。

5.2.3.1 重新校准导向爪



1	导向爪
2	紧固螺栓
3	机架

Fig. 7: 重新调整导向爪

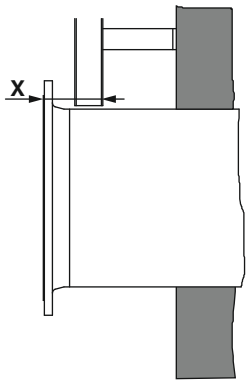


Fig. 8: 距离尺寸“X”

✓ 将再循环泵放置在平稳的工作台面上。
✓ 2x 环形扳手
✓ 扭矩扳手
✓ 螺栓紧固胶，比如Loctite 243
✓ 距离尺寸“X”

1. 松开两颗紧固螺栓。
2. 调整距离：距离尺寸“X”+5 mm。
3. 用手拧紧两颗紧固螺栓。
   小心！ 必须通过紧固螺栓将导向爪始终靠在机架上！
4. 检查对接和脱开过程。
   ⇒ 对接和脱开过程不顺畅：重复调整过程。
   ⇒ 对接和脱开过程不顺畅：进入步骤 5 。
5. 在紧固螺栓上涂上螺栓紧固胶（参阅制造商使用说明）。
6. 按表中规定的紧固力矩拧紧两颗紧固螺栓。

► 导向爪调整完毕。

5.2.3.2 重新校准法兰爪

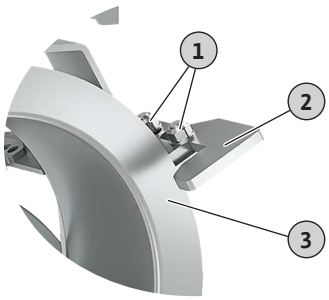


Fig. 9: 重新调整法兰爪

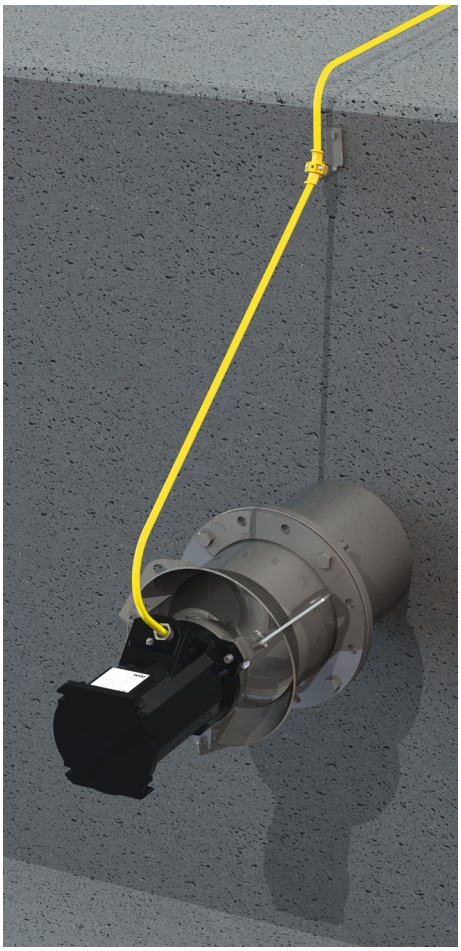
1	紧固螺栓
2	法兰爪
3	流动式壳体法兰爪

✓ 将再循环泵放置在平稳的工作台面上。
✓ 2x 环形扳手
✓ 扭矩扳手
✓ 螺栓紧固胶，比如Loctite 243
✓ 压力管道法兰厚度。

1. 松开两颗紧固螺栓。
2. 调整流动式壳体法兰面到法兰爪内沿的距离：压力管道法兰厚度 +5 mm。
3. 用手拧紧两颗紧固螺栓。
4. 在第二个法兰爪上重复该过程。
5. 检查对接和脱开过程。
   ⇒ 对接和脱开过程不顺畅：重复调整过程。
   ⇒ 对接和脱开过程不顺畅：进入步骤 6。
6. 在紧固螺栓上涂上螺栓紧固胶（参阅制造商使用说明）。
7. 按表中规定的紧固力矩拧紧紧固螺栓。

► 法兰爪调整完毕。

5.2.4 拧到压力管道上



为确保将再循环泵直接拧到压力管道上，流动环要配备一个法兰。用现场技术允许的螺栓将再循环泵拧到压力管道上。只能空水池时进行安装！

✓ 排空水池。
✓ 工作区域已清洁并消毒。
✓ 升降装置
✓ 用于对准和提升再循环泵的运输台面
✓ 支架
✓ 紧固材料

1. 将再循环泵水平放置到运输台面上。
2. 固定再循环泵，防止滑移和翻倒。
3. 提升运输台面，将法律对准压力管道。
4. 将再循环泵拧到压力管道上。
   注意！请注意螺栓的紧固程度！
5. 将水池中的接线电缆稍微拽紧。
   小心！抓住水池边的接线电缆，采取保护措施，防止电缆受损（夹挤，刮擦）！

► 再循环泵安装完毕。

Fig. 10: 带法兰连接的再循环泵

5.2.5 拧紧扭矩

A2/A4 不锈钢螺栓			
螺纹	拧紧扭矩		
	Nm	kp m	ft·lb
M5	5.5	0.56	4
M6	7.5	0.76	5.5
M8	18.5	1.89	13.5
M10	37	3.77	27.5
M12	57	5.81	42
M16	135	13.77	100
M20	230	23.45	170
M24	285	29.06	210
M27	415	42.31	306
M30	565	57.61	417

如果使用 Nord-Lock 螺钉锁紧装置，将拧紧扭矩提高 10 %！

6 试运行

6.1 在变频器上运行

电机可与变频器串联（遵守 IEC 60034-17 标准）运行。如果额定电压超过 415 V/50 Hz 或 480 V/60 Hz，请咨询客户服务部。由于高次谐波会导致电机额外升温，因此电机的额定功率必须高出搅拌器的功率需求 10% 左右。如果变频器配备无高次谐波的输出端，可将功率储备降低 10%。使用输出端滤波器可以减弱高次谐波。变频器和滤波器须相互匹配！

根据电机额定电流对变频器进行配置。请注意，搅拌器在整个调节范围内工作时不得出现抖动和振动（无振动、共振和摆动力矩现象）。否则机械密封会丧失密封性并损坏。电源受谐波影响，导致发动机噪音音量提升，属于正常现象。

为变频器设置参数时，注意遵守潜水式电动机的二次特征曲线（U/f 特征曲线）的设置！U/f 特征曲线确保在频率低于额定频率（50 Hz 或 60 Hz）时，输出端电压能够满足搅拌器的功率需求。新型变频器具有能源自动优化功能 - 这种自动机制的目标是达到相同的效果。进行变频器设置时，请注意变频器的安装及操作说明。

如果电机与变频器同时运行，电机监测可能受到干扰。下列措施可降低或避免干扰：
→ 遵守 IEC 60034-25 标准规定的过电压极值和上升速度极值。必要时安装输出滤波器。
→ 改变变频器的脉冲频率。
→ 如果内部密封室监控设备发生故障，使用外部双杆湿度电极。

下列结构性措施可减少或者避免干扰：
→ 干线和控制电缆具有单独的接线电缆（视电机结构尺寸而定）。
→ 布线时，在干线和控制电缆之间留出足够的间距。
→ 使用已屏蔽的接线电缆。

汇总
→ 连续运行时的最低/最高频率：
  – 异步电动机：30 Hz 至额定频率（50 Hz 或 60 Hz）
  – 永磁电机：30 Hz 至型号铭牌上指定的最高频率
    注意！ 如果频率增大，请联系客户服务部！
→ 注意与电磁兼容性规定有关的附加措施（选择变频器、使用滤波器等）。
→ 不得超出电机的额定电流与额定转速。
→ 连接双金属或 PTC 传感器。

7 维护

7.1 螺旋塞和加注量

Flumen OPTI-RZP/EXCEL-RZPE 20-1
→ **+/-**：密封壳体排油/注油
→ 加注量：
  – Flumen OPTI-RZP 20-1:0.4 l（13.5 US.fl.oz.）
  – Flumen EXCEL-RZPE 20-1:0.4 l（13.5 US.fl.oz.）

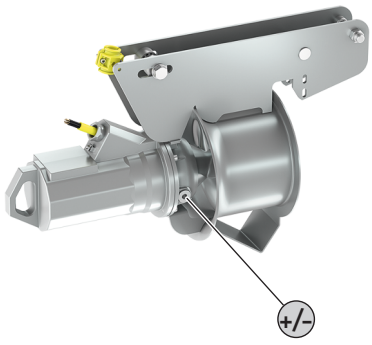


Fig. 11: Flumen OPTI-RZP/EXCEL-RZPE 20-1
螺旋塞

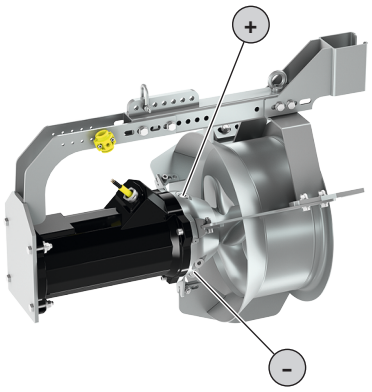


Fig. 12: Flumen OPTI-RZP/EXCEL-RZPE 25-3/30-1/40-1 螺旋塞

Flumen OPTI-RZP/EXCEL-RZPE 25-3/30-1/40-1

→ **+**：密封壳体注油。
→ **–**：密封壳体排油。
→ 加注量：
- Flumen OPTI-RZP 25-3:1.2 l（40.5 US.fl.oz.）
- Flumen OPTI-RZP 30-1:1.2 l（40.5 US.fl.oz.）
- Flumen OPTI-RZP 40-1:1.2 l（40.5 US.fl.oz.）
- Flumen EXCEL-RZPE 25-3:1.2 l（40.5 US.fl.oz.）
- Flumen EXCEL-RZPE 30-1:1.2 l（40.5 US.fl.oz.）
- Flumen EXCEL-RZPE 40-1:1.2 l（40.5 US.fl.oz.）

Table of contents

1 General information

1.1 About these instructions

These installation and operating instructions extend the current instructions for submersible mixers with the RZP series. Read these instructions before commencing work. Keep the instructions in an accessible place at all times. Adherence to all instructions is a requirement for the intended use and correct operation of the recirculation pump. All specifications and markings on the product must be observed.

The language of the original operating instructions is German. All other languages of these instructions are translations of the original operating instructions.

1.2 Digital instructions

The digital version of the instructions is available on the following product page: Flumen OPTI-RZP: https://qr.wilo.com/923, Flumen EXCEL-RZPE: https://qr.wilo.com/924

2 Transportation and storage

2.1 Attach lifting equipment: Wilo-Flumen OPTI-RZP/EXCEL-RZPE 20-1

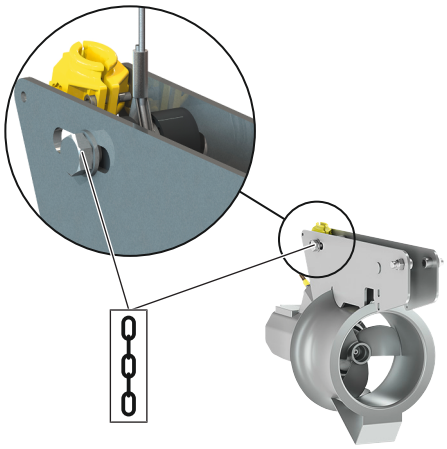


Fig. 1: Flumen attachment point OPTI-RZP/EXCEL-RZPE 20-1

✓ Attach lifting equipment directly to the bolt.

✓ Lifting equipment must have a rope thimble. **NOTICE! Do not use shackles!**

✓ Use the oblong hole to adjust the centre of gravity. Inclination angle of the recirculation pump: approx. 5° downward.

1. Loosen the hexagon nut at the bolt.
2. Pull out the bolt and remove the plastic sleeve.
3. Attach the lifting equipment to the bolt.
4. Fit the plastic sleeve.
   ⇒ Lifting equipment attached at the bolt between two plastic sleeves.
5. Insert bolt into the hole and tighten with the hexagon nut.

► Lifting equipment is attached.

2.2 Attach lifting equipment: Wilo-Flumen OPTI-RZP/EXCEL-RZPE 25-3 ... 40-1

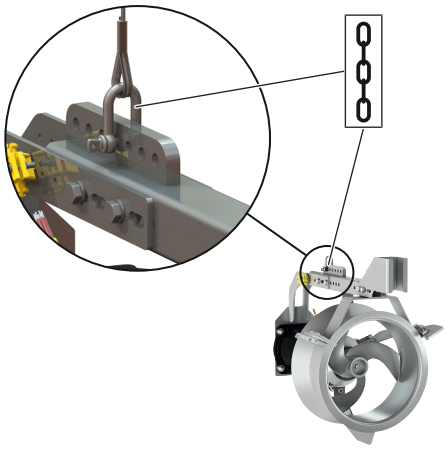


Fig. 2: Flumen attachment point OPTI-RZP/EXCEL-RZPE 25-3 ... 40-1

✓ Attach lifting equipment directly to the frame.

✓ Lifting equipment must have a rope thimble.

✓ Use the holes to adjust the centre of gravity. Inclination angle of the recirculation pump: approx. 5° downward.

1. Remove the shackle from the frame.
2. Insert the shackle into the rope thimble.
3. Insert the shackle into the matching hole on the frame and attach it.

► Lifting equipment is attached.

3 Application/use

3.1 Intended use

For pumping in commercial areas of:
→ Sewage containing faeces
→ Return activated sludge
→ Process water

4 Product description

4.1 Construction

Recirculation pump: Submersible mixer, directly driven with attached flow housing.

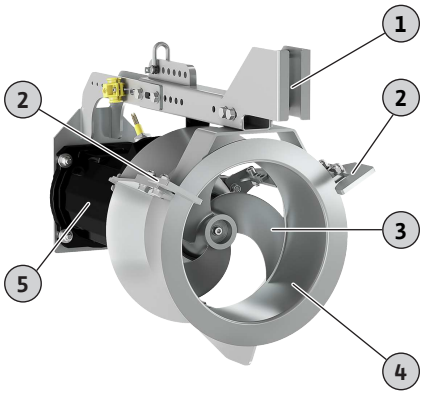


Fig. 3: Flumen overview OPTI-RZP/EXCEL-RZPE

1	Guide claw
2	Flange claw
3	Propeller
4	Flow housing
5	Motor

Motor (Flumen OPTI-RZP)

Surface-cooled submersible motor in three-phase current design with permanently lubricated und large-size rolling bearings. The motor winding is equipped with temperature monitoring. The motor heat is given off directly to the surrounding fluid via the motor housing. The connection cable is designed for heavy mechanical loads, sealed water pressure-tight against the fluid and is sealed longitudinally watertight. The connection cable has bare cable ends and is 10 m (33 ft) long as standard.

Motor (Flumen EXCEL-RZPE)

Surface-cooled submersible motor in three-phase current design with permanently lubricated und large-size rolling bearings. The motor winding is equipped with temperature monitoring. The motor heat is given off directly to the surrounding fluid via the motor housing. The connection cable is designed for heavy mechanical loads, sealed water pressure-tight against the fluid and is sealed longitudinally watertight. The connection cable has bare cable ends and is 10 m (33 ft) long as standard.

The submersible motor meets the IE3 motor efficiency class (according to IEC 60034-30).

Seal

Large-volume sealing chamber with double shaft sealing. The sealing chamber is filled with white oil and absorbs the leakage from the seal on the fluid side. A corrosion- and wear-resistant mechanical seal is used on the fluid side. The seal on the motor side involves either a rotary shaft seal or a mechanical seal.

Hydraulics

Propeller made of solid material with clogging-free propeller geometry. Pump in non-clog design flow housing with guide claw and two flange claws. The guide claw ensures smooth function when lifting and lowering the recirculation pump. The flange claws can be readjusted, ensure optimum centring on the discharge pipe and stabilise the recirculation pump at high operating pressure.

Alternative version with flange connection for direct screwing to the discharge pipe.

	OPTI-RZP 20-1 ...	EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ...	EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ...	EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ...	EXCEL-RZPE 40-1 ...
Propeller nominal diameter in mm (in)	200 (8)	200 (8)	250 (10)	250 (10)	300 (11.5)	300 (11.5)	400 (16)	400 (16)
Connection size	DN 200 DN 250	DN 200 DN 250	DN 250	DN 250	DN 300	DN 300	DN 400	DN 400
Standard version	•	•	•	•	•	•	•	•
Version with flange connection	•	•	•	•	•	•	•	•

• = available , – = not available

4.2 Materials

	OPTI-RZP 20-1 ...	EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ...	EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ...	EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ...	EXCEL-RZPE 40-1 ...
Motor housing								
EN-GJL-250 (ASTM A48 Class 35/40B)	–	–	•	•	•	•	•	•
1.4408 (ASTM A 351)	•	•	–	–	–	–	–	–
Seal housing								
1.4408 (ASTM A 351)	•	•	•	•	•	•	•	•
Seal, on the fluid side								
SiC/SiC	•	•	•	•	•	•	•	•
Seal, on the motor side								
NBR (nitrile)	–	–	•	•	•	•	•	•
SiC/SiC	•	•	–	–	–	–	–	–
Propeller								
1.4408 (ASTM A 351)	•	•	•	•	•	•	•	•
Flow housing								
1.4571 (AISI 316Ti)	•	•	•	•	•	•	•	•

• = standard, – = not available

4.3 Monitoring devices

Overview of possible monitoring devices for recirculation pumps **without Ex rating**:

	OPTI-RZP 20-1 ...	EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ...	EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ...	EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ...	EXCEL-RZPE 40-1 ...
Motor compartment	o	o	–	–	–	–	–	–
Motor compartment/sealing chamber	–	–	o	o	o	o	o	o
Sealing chamber (external pencil electrode)	o	o	o	o	o	o	o	o
Motor winding: Temperature limiter	•	•	•	•	•	•	•	•
Motor winding: Temperature controller and limiter	o	o	o	o	o	o	o	o

Key

– = not possible, o = optional, • = standard

Overview of possible monitoring devices for recirculation pumps **with Ex rating**:

	OPTI-RZP 20-1 ...	EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ...	EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ...	EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ...	EXCEL-RZPE 40-1 ...
Motor compartment	o	o	–	–	–	–	–	–
Sealing chamber (external pencil electrode)	o	o	o	o	o	o	o	o

	OPTI-RZP 20-1 ...	EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ...	EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ...	EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ...	EXCEL-RZPE 40-1 ...
With ATEX approval								
Motor winding: Temperature limiter	o	o	o	o	o	o	o	o
Motor winding: Temperature controller and limiter	•	•	•	•	•	•	•	•
With FM-/CSA-Ex rating								
Motor winding: Temperature limiter	•	•	•	•	•	•	•	•
Motor winding: Temperature controller and limiter	o	o	o	o	o	o	o	o

Key

– = not possible, o = optional, • = standard

4.4 Operation in an explosive atmosphere

Approval according to	OPTI-RZP 20-1 ...	EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ...	EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ...	EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ...	EXCEL-RZPE 40-1 ...
ATEX	o	o	o	o	o	o	o	o
FM	o	o	o	o	o	o	o	o
CSA-Ex	–	–	–	–	–	–	–	–

Key

– = not possible, o = optional, • = standard

4.5 Type key

Wilo-Flumen OPTI-RZP ...

Example: **Wilo-Flumen OPTI-RZP 40-1.95-6/24Ex S8**

Flumen	Submersible mixer, horizontal
OPTI-RZP	Series: Recirculation pump with standard asynchronous motor
40	x10 = nominal propeller diameter in mm
1	Model
95	Rated propeller speed in rpm
6	Number of poles
24	x10 = stator pack length in mm
Ex	Ex-rated
S8	Propeller code for special propeller (omitted for standard propeller)

Wilo-Flumen EXCEL-RZPE ...

Example: **Wilo-Flumen EXCEL-RZPE 40-1.95-6/24Ex S8**

Flumen	Submersible mixer, horizontal
EXCEL-RZPE	Series: Recirculation pump with IE3 asynchronous motor
40	x10 = nominal propeller diameter in mm
1	Model
95	Rated propeller speed in rpm

6	Number of poles
24	x10 = stator pack length in mm
Ex	Ex-rated
S8	Propeller code for special propeller (omitted for standard propeller)

4.6 Scope of delivery

- → Recirculation pump with attached flow housing and connection cable
- → Installation and operating instructions

4.7 Accessories

- → Lowering device
- → Auxiliary lifting device
- → Cable bollard to secure the hoist cable
- → Additional rope anchoring
- → Fixation sets with anchor bolts

5 Installation

5.1 Installation types

- → Screwed to the discharge pipe
- → Docked to the discharge pipe by means of the lowering device

5.2 Installation

DANGER

Danger due to fluids hazardous to health during installation!

Ensure that the installation site is clean and disinfected during installation. If contact with fluids that are hazardous to health is possible, observe the following points:

- Wear protective equipment:
  - ⇒ sealed safety goggles
  - ⇒ mouth protection
  - ⇒ protective gloves
- Wipe up drips immediately.
- Observe the specifications of the work regulations.

DANGER

Risk of fatal injury due to dangerous lone working practices!

Work in chambers and narrow rooms as well as work involving risk of falling are dangerous work. Such work may not be carried out autonomously!

- Only carry out work with another person!

→ Wear protective equipment! Observe the work regulations.
  – Protective gloves: 4X42C (uvex C500)
  – Safety shoes: Protection class S1 (uvex 1 sport S1)
  – Wear a safety harness.
  – Safety helmet: EN 397 Conforms to standards, protection against lateral deformation (uvex pheos)
  (When using lifting equipment)
→ Prepare the installation site:
  – Clean, free of coarse solids
  – Dry
  – Frost-free
  – Disinfected
→ Work must always be carried out by two persons.
→ Demarcate the working area.
→ Keep unauthorised persons away from the working area.
→ From a working height of more than 1 m (3 ft) above the ground, use scaffolding with a safety harness.
→ Toxic or asphyxiating gases may build up during work:
  – Observe protective measures in accordance with work regulations (gas measurement, carry a gas detector with you).
  – Ensure adequate ventilation.
  – If toxic or asphyxiating gases accumulate, leave the workplace immediately!
→ Install lifting equipment: even surface, clean, firm base. Warehouse and installation location must be easily accessible.
→ Do not stay within the swivel range of the hoisting gear.

5.2.1 Minimum clearance to the wall and aeration

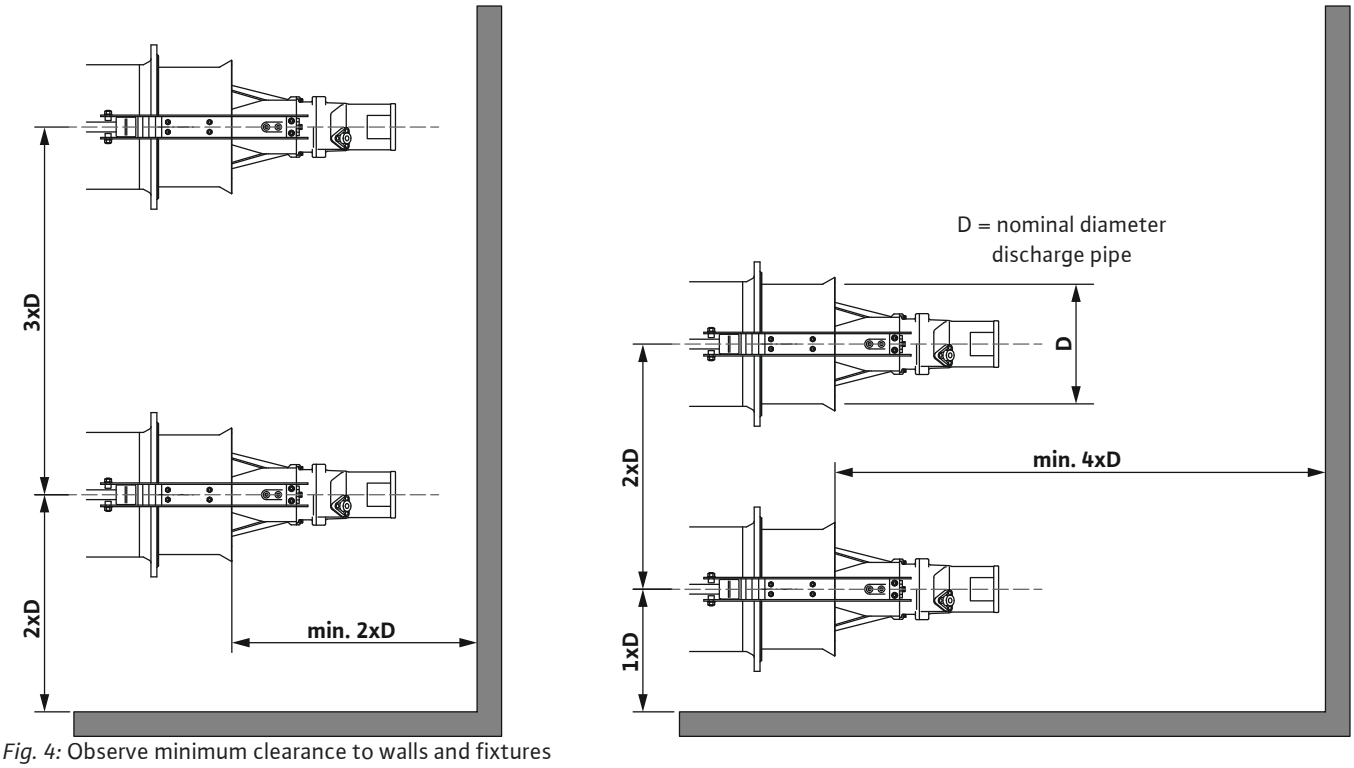


Fig. 4: Observe minimum clearance to walls and fixtures

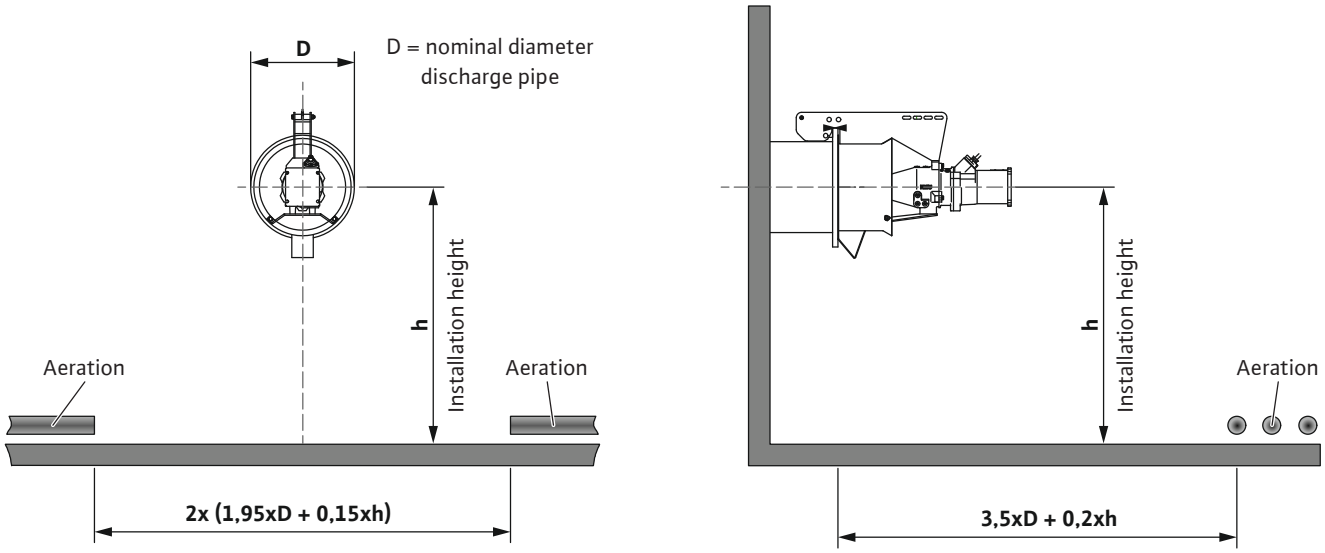


Fig. 5: Minimum clearance to aeration

5.2.2 Docked to the discharge pipe by means of the lowering device

Fig. 6: Installation with lowering device

The recirculation pump is guided to the discharge pipe via a lowering device and docked to the discharge pipe. The guide claw on the flow housing ensures the correct guidance to the discharge pipe. For safe docking of the recirculation pump to the discharge pipe, the flange claws enclose the flange on the discharge pipe. Please observe the following points for installation:

→ Installation can be performed with empty and full basin.
Initial installation: It is recommended to drain the basin. The docking and undocking process as well as adjustment of the flange claws can be checked when the basin is empty.

→ The recirculation pump may not be operated at different heights.

Installation is generally performed in the same manner as installation of a submersible mixer:

✓ Initial installation: Basin is drained.

✓ Hoisting gear attached, tilt angle of the recirculation pump approx. 5° downward.

✓ Connection cable laid out.

✓ Cable routing available.

1. Lift recirculation pump.
2. Swivel the recirculation pump over the basin.
3. Align the guide claw with the lowering device.
4. Slowly drain the recirculation pump and insert the lowering device into the guide claw.
5. Drain the recirculation pump down to the discharge pipe.
CAUTION! Keep the connection cable slightly taut while draining.
6. Repeat docking and undocking process several times:
– The flow housing must fully rest against the discharge pipe.
– The guide claws must enclose the flange on the discharge pipe.
– The recirculation pump must loosely detach from the flange during lifting.
If the docking and undocking process does not run smoothly, readjust the flange claws (see following chapter).
7. Guide the connection cable out of the basin, keeping it slightly taut, via a cable guide provided by the customer.
CAUTION! Catch the connection cable at the edge of the basin and protect it against damage (crushing, abrasions).

► Recirculation pump installed.

5.2.3 Adjust the guide claw und flange claws

Following installation, perform a function test. The function test checks whether the recirculation pump fully rests against the discharge pipe (docks) and simply detaches again (undocks):

→ If the flow ring does not fully rest against the discharge pipe, the duty point is not reached.

→ If the recirculation pump does not detach from the discharge pipe, the recirculation pump cannot be pulled from the basin.

To ensure smooth docking to and undocking from the discharge pipe, adjust the following settings:

→ Readjust the guide claw: Set the clearance between flow housing and discharge pipe.

→ Readjust the flange claws: Adjust the clearance of the flange claws to the discharge pipe flange.

5.2.3.1 Readjust the guide claw

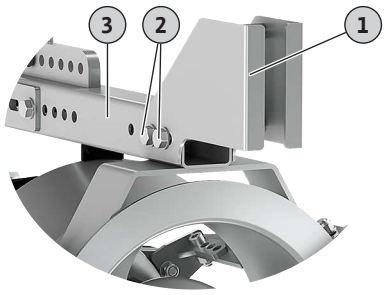


Fig. 7: Readjust guide claw

1	Guide claw
2	Fastening screws
3	Frame

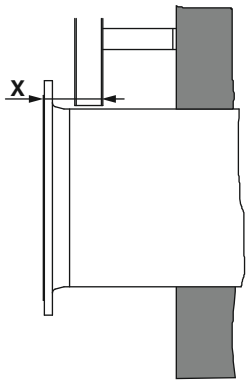


Fig. 8: Clearance “X”

✓ Recirculation pump placed on a level work surface.

✓ 2x ring wrench

✓ Torque wrench

✓ Liquid thread-locking fluid, e.g. Loctite 243

✓ Clearance “X”

1. Loosen both fastening screws.
2. Set clearance: Clearance “X” +5 mm.
3. Tighten both fastening screws by hand.
   CAUTION! The guide claw must always rest against the frame with the fastening screws.
4. Check the docking and undocking process.
   ⇒ The docking and undocking process does not run smoothly: Repeat the adjustment process.
   ⇒ The docking and undocking process runs smoothly: continue with step 5.
5. Wet the fastening screw with thread-locking fluid (see manufacturer's instructions for use).
6. Tighten both fastening screws with the tightening torque according to the table.

► Guide claw set.

5.2.3.2 Readjust the flange claws

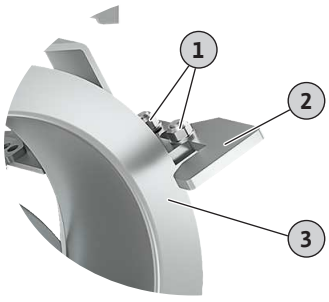


Fig. 9: Readjust the flange claw

1	Fastening screws
2	Flange claw
3	Flange area flow housing

✓ Recirculation pump placed on a level work surface.

✓ 2x ring wrench

✓ Torque wrench

✓ Liquid thread-locking fluid, e.g. Loctite 243

✓ Flange thickness discharge pipe.

1. Loosen both fastening screws.

2. Set the clearance between flow housing flange surface and flange claw inner edge: Flange thickness discharge pipe =5 mm.
3. Tighten both fastening screws by hand.
4. Repeat the process on the second flange claw.
5. Check the docking and undocking process.
   ⇒ The docking and undocking process does not run smoothly: Repeat the adjustment process.
   ⇒ The docking and undocking process runs smoothly: continue with step 6.
6. Wet the fastening screw with thread-locking fluid (see manufacturer's instructions for use).
7. Tighten all fastening screws with the tightening torque according to the table.

► Flange claws set.

5.2.4 Screwed to the discharge pipe

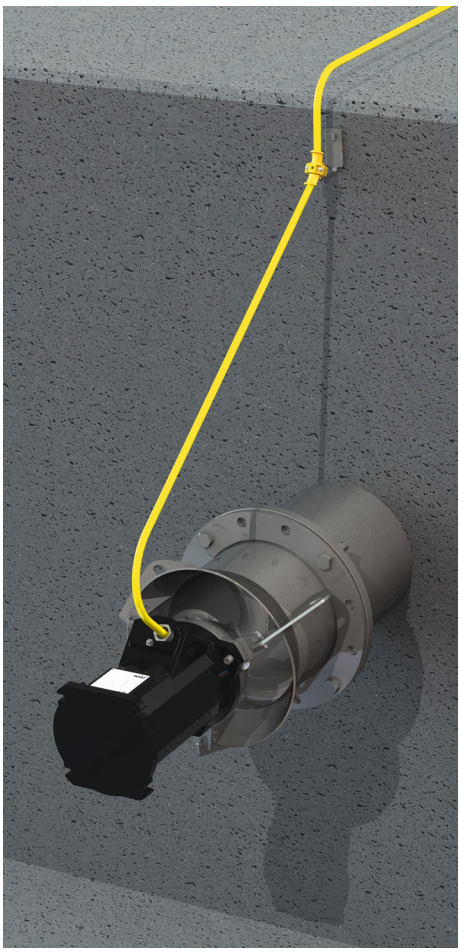


Fig. 10: Recirculation pump with flange connection

The flow ring is fitted with a flange to screw the recirculation pump to the discharge pipe. Screw the recirculation pump to the discharge pipe using technically approved screws. Installation may **only** be performed when the basin is empty.

✓ Basin is drained.
✓ Work area cleaned and disinfected.
✓ Hoisting gear
✓ Transport space for aligning and lifting the recirculation pump
✓ Scaffolding
✓ Fixation material

1. Position the recirculation pump horizontally on the transport space.
2. Secure the recirculation pump against slipping and falling over.
3. Lift the transport space and align the flange with the discharge pipe.
4. Screw the recirculation pump to the discharge pipe.
   NOTICE! Make sure the screws are tight!
5. Guide the connection cable out of the basin, keeping it slightly taut.
   CAUTION! Catch the connection cable at the edge of the basin and protect it against damage (crushing, abrasions).

► Recirculation pump installed.

5.2.5 Tightening torques

Rust-free screws A2/A4			
Threaded	Tightening torque		
	Nm	kp m	ft·lb
M5	5.5	0.56	4
M6	7.5	0.76	5.5
M8	18.5	1.89	13.5
M10	37	3.77	27.5
M12	57	5.81	42
M16	135	13.77	100

Rust-free screws A2/A4			
Threaded	Tightening torque		
	Nm	kp m	ft·lb
M20	230	23.45	170
M24	285	29.06	210
M27	415	42.31	306
M30	565	57.61	417

If a Nord-Lock screw locking device is used, increase the tightening torque by 10 %!

6 Commissioning

6.1 Frequency converter operation

The motor in series design (confirming to IEC 60034-17) can be operated with a frequency converter. Contact customer service if the rated voltage is above 415 V/50 Hz or 480 V/60 Hz. Because of the additional heating caused by harmonics, the rated power of the motor should be around 10 % more than the power requirement of the mixer. For frequency converters with a low-harmonic output, it is possible to reduce the 10 % power reserve. Harmonic waves are reduced by means of output filters. Synchronise the frequency converter and the filter with each other!

The configuration of the frequency converter depends on the rated motor current. Make sure that the mixer operates across the entire control range without jerking or vibrating (without vibrations, resonance, oscillation). Otherwise, the mechanical seals may leak or be damaged. Increased motor noise caused by the harmonics of the power supply is normal.

During parameterisation of the frequency converter, observe the setting of the quadratic characteristic curve (U/f characteristic curve) for submersible motors! The U/f characteristic curve ensures that the output voltage at frequencies less than the rated frequency (50 Hz or 60 Hz) is adjusted to the power requirement of the mixer. More recent frequency converters feature an automatic power optimisation function – this automation achieves the same effect. For the frequency converter setting, refer to its installation and operating instructions.

Motor monitoring faults may occur if the motor is operated with a frequency converter. The following measures can reduce or avoid these faults:
- → Keeping within the limit values stated in IEC 60034-25 for overvoltage and rise speed. If necessary, install output filters.
- → Vary the pulse frequency of the frequency converter.
- → In the event of a fault in the internal sealing chamber monitoring, use the external double-rod electrode.

The following construction measures can help to reduce or prevent faults:
- → Separate connection cables for the main and control cable (depending on the motor size).
- → Keep an adequate distance between main and control cable during routing.
- → Use shielded connection cables.

Summary
- → Min./max. frequency during continuous duty:
  - – Asynchronous motors: 30 Hz up to rated frequency (50 Hz or 60 Hz)
  - – Permanent magnet motors: 30 Hz up to the stated maximum frequency as per rating plate
    NOTICE! Higher frequencies are possible following consultation with customer service!
- → Observe additional measures with regard to EMC regulations (choice of frequency converter, using filters, etc.).
- → Do not exceed the rated current or rated speed of the motor.
- → Connection for bimetallic strip or PTC sensor.

7 Maintenance and repair

7.1 Screw plugs and fill quantities

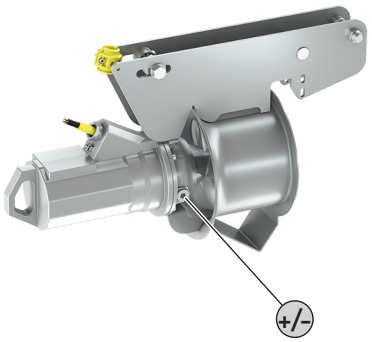


Fig. 11: Flumen screw plugs OPTI-RZP/EXCEL-RZPE 20-1

Flumen OPTI-RZP/EXCEL-RZPE 20-1

→ **+/-:** Drain/fill seal housing oil

→ **Fill quantity:**

- Flumen OPTI-RZP 20-1: 0.4 l (13.5 US.fl.oz.)
- Flumen EXCEL-RZPE 20-1: 0.4 l (13.5 US.fl.oz.)

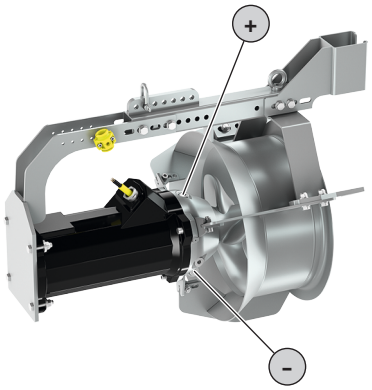


Fig. 12: Flumen screw plugs OPTI-RZP/EXCEL-RZPE 25-3/30-1/40-1

Flumen OPTI-RZP/EXCEL-RZPE 25-3/30-1/40-1

→ **+:** Fill oil into the seal housing.

→ **-:** Drain oil from the seal housing.

→ **Fill quantities:**

- Flumen OPTI-RZP 25-3: 1.2 l (40.5 US.fl.oz.)
- Flumen OPTI-RZP 30-1: 1.2 l (40.5 US.fl.oz.)
- Flumen OPTI-RZP 40-1: 1.2 l (40.5 US.fl.oz.)
- Flumen EXCEL-RZPE 25-3: 1.2 l (40.5 US.fl.oz.)
- Flumen EXCEL-RZPE 30-1: 1.2 l (40.5 US.fl.oz.)
- Flumen EXCEL-RZPE 40-1: 1.2 l (40.5 US.fl.oz.)

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