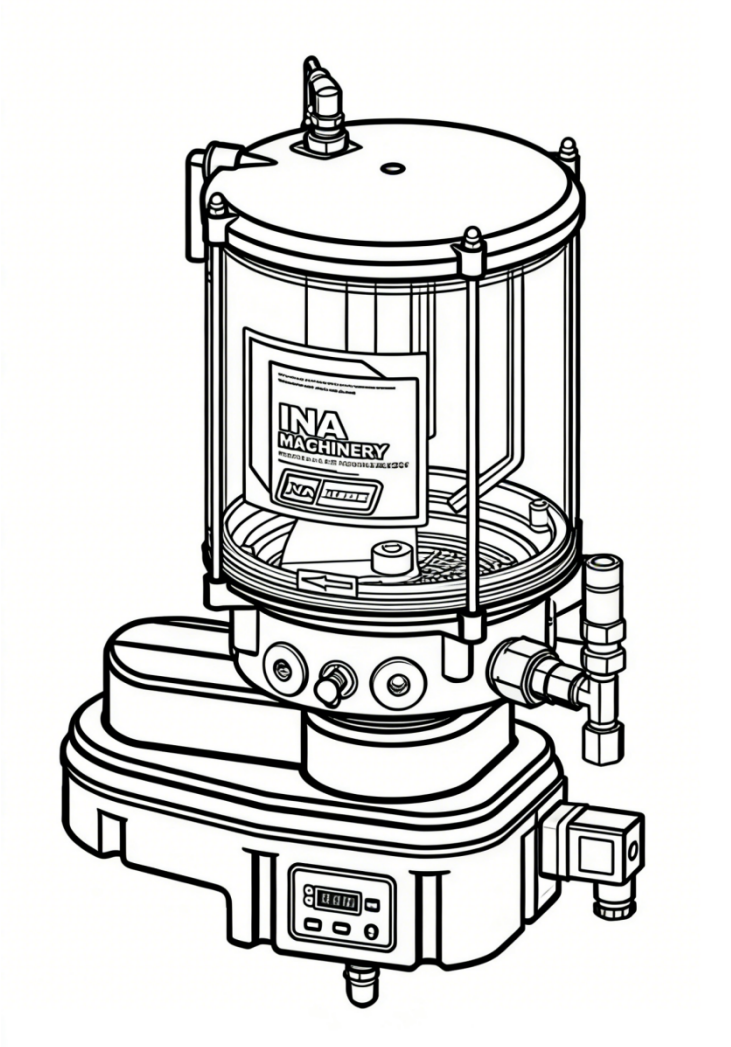
LUBElite™菁英系列递进式
集中润滑系统操作手册



上海毅那机械科技有限公司

目录

安全

本装置仅可由熟悉本使用说明的人员进行安装、维护与维修作业。

设备闲置不用时，务必切断所有动力源（电力、气源或液压源）。

本设备会产生高压。操作设备时须极度谨慎，若零部件松动或破裂发生介质泄漏，高压流体可穿透皮肤进入人体。一旦发现有流体渗入皮肤，必须立即就医，切勿将伤情当作普通割伤处理，并需如实告知接诊医生侵入体内的流体类型。

凡未按本说明书规定进行违规使用，将自动丧失保修及追责索赔权利。

- 严禁违规使用、超压运行、私自改装零部件，禁止使用不相容的化学介质、流体，以及磨损或损坏的零部件。
- 不得超过设备额定最大工作压力，也不得超过系统中最低额定值部件的工作压力。
- 务必阅读并遵循制造商关于流体相容性、防护服装及防护用具使用的相关建议。
- 若未遵守上述要求，可能造成人身伤害和、或设备损坏。
- 必须严格遵守国家法律法规及各项安全防事故管理规定。

安全警示用语释义

须知

本项内容着重提供实用提示与建议，同时说明相关注意事项，用以防止财产损失，并保障设备高效、无故障平稳运行。

注意

表示若忽视防护措施，将可能引发出现轻微人身伤害的危险状况。

警告

表示若忽视防护措施，将可能引发造成严重人身伤害的危险情形。

危险

表示若忽视防护措施，会导致造成死亡或重伤的危险状况。

警告

未阅读并完全理解安全警示及操作说明前，严禁操作本设备。

未遵守安全警示和操作说明，可能导致严重人身伤害。

注意

未佩戴个人防护装备，严禁操作设备。

必须佩戴护目镜。根据工况佩戴防尘口罩、防滑安全鞋、安全帽、听力防护用品等防护装备，可有效降低人身伤害风险。

未按要求执行，可能造成轻微人身伤害。

警告

严禁超过设备标定的最大工作压力，亦不得超过系统中额定等级最低部件的工作压力。

本设备会产生极高油脂压力，操作时务必格外谨慎。

若未遵守本要求，可能造成轻微人身伤害。

警告

严禁使用本设备输送、转运或存放危险物质及混合物。

通用须知

- 在工程机械、道路车辆、通用机械、机床等工业设备上进行安装作业时，必须遵守当地安全防事故规程及相关设备操作与维护说明书。
- 安全防护装置
  - ✧ 严禁因安装润滑系统而擅自改动任何安全防护装置，不得永久拆除设备及设施原有防护装置（如防护栏、防护罩、安全锁等）。
  - ✧ 仅可在安装润滑系统时，按作业要求并获得相关许可后，临时拆除安全防护装置；润滑系统安装完毕后，须立即恢复原有安全防护装置。
- 润滑系统须远离热源，不得在允许工作温度范围以外（高温或低温环境）放置和使用。
- 必须使用原厂配件或授权合规配件。
- 系统可能处于带压状态，进行维护、调节及相关作业前，必须先释放系统压力。
- 务必使用洁净润滑脂。
- 本系统为自动运行，但强烈建议用户每两周定期检查一次，确保润滑脂能够正常输送至各润滑点。

合规润滑剂

- 润滑脂稠度等级为 NLGI 2 及以下。
- 若需选用不符合上述要求的润滑剂，或无法确定所选润滑剂中的特殊添加剂是否会对润滑部件产生影响，请咨询厂家。

运输与储存

- LUBElite 菁英系列润滑泵站按相关国际标准进行销售与包装，符合危险品公路、铁路、航空及海运的国际设计运输要求。
- 包装完好的润滑泵站在搬运、运输过程中须轻拿轻放，避免造成不必要的损坏。
- 润滑泵站可存放于-40 ℃ ～ +70 ℃的干燥环境中。

免责声明

对于因下列情形造成的损坏，我方不承担任何直接、间接及连带责任与相关义务：

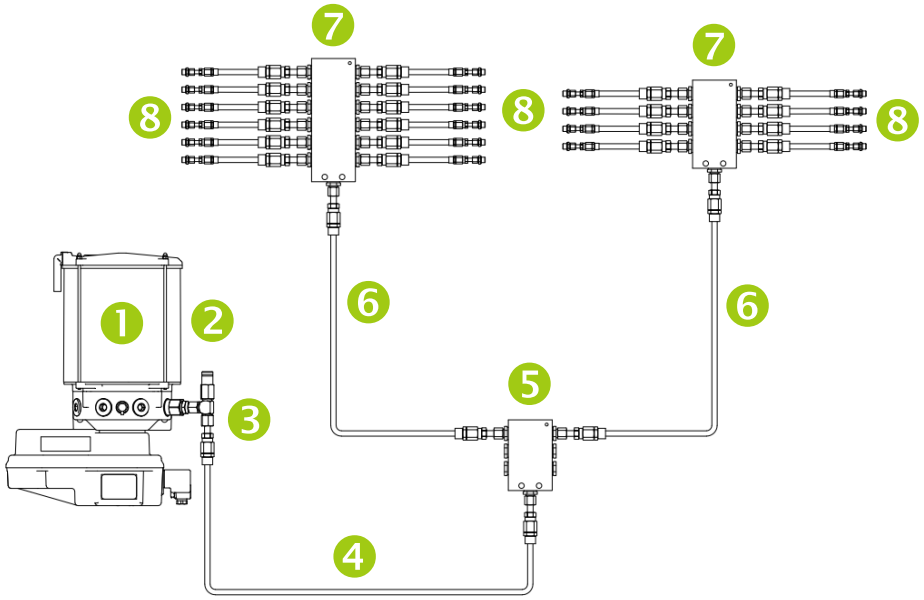
- 因润滑脂缺失造成的损坏。
- 因选用不合规润滑脂造成的损坏。
- 因安装、使用非授权配件造成的损坏。
- 因擅自改装润滑系统部件造成的损坏。

- 因未按规范工况使用设备造成的损坏。
- 因安装错误或管路连接不当造成的损坏。
- 因电气接线错误造成的损坏。
- 因程序设置错误造成的损坏。
- 因故障排查及处理操作失误造成的损坏。

概述

LUBElite 21 菁英系列电动润滑泵适用于工程机械、道路车辆、通用机械、机床及其他工业设备。适用润滑剂最高为 NLGI 2 润滑脂。单台润滑泵最多可同时安装 6 个泵芯，组成六路独立润滑回路。

本泵站主要由油箱、无刷电机总成、泵芯、安全阀、控制器及其他附件组成。电机驱动泵装置①内部偏心轮，推动泵芯②柱塞做往复运动，将润滑脂从油箱泵出，经主管路④、分支管路⑥输送至主分配器⑤、次级分配器⑦，再通过润滑点管路⑧送达各润滑点位。泵芯出口处设有安全阀③，限定系统工作压力，保障整个润滑系统安全运行。

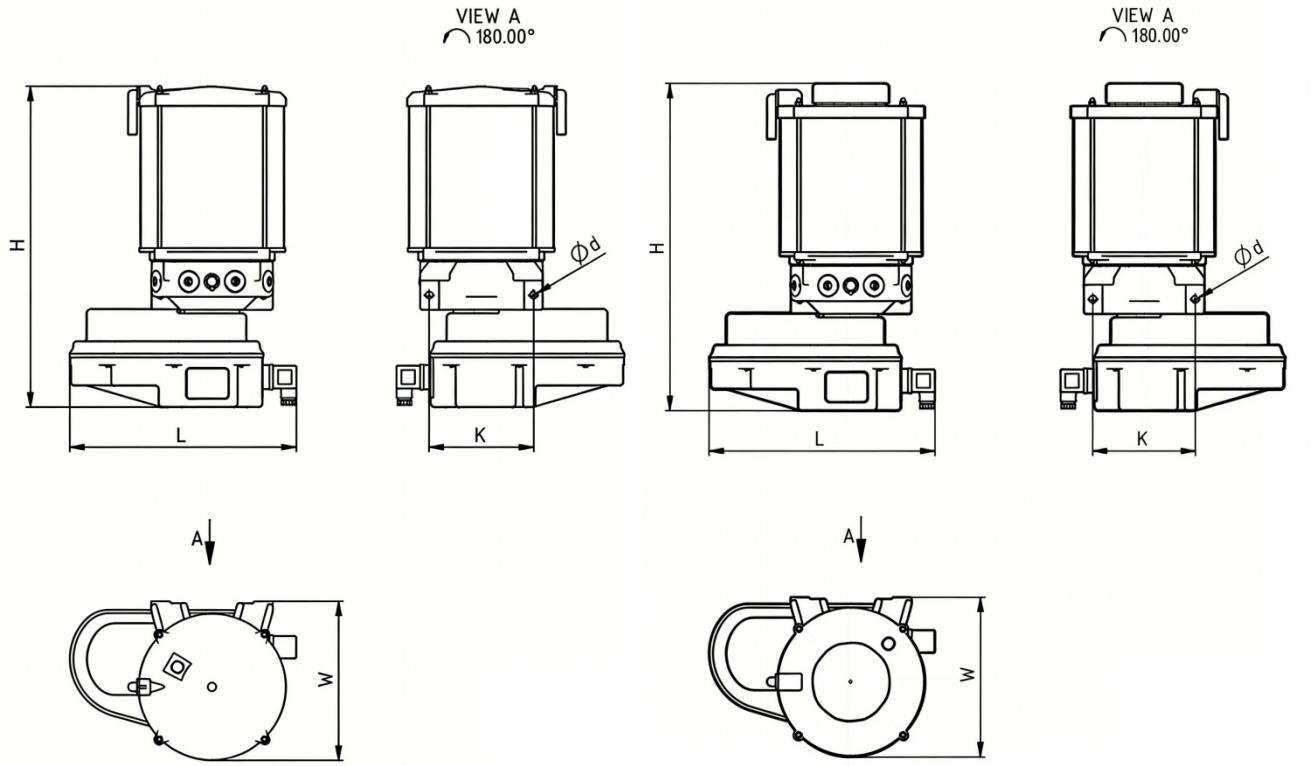


技术参数

工作电压	DC 24 V	AC 230V/50 Hz	AC 380V/50 Hz
额定功率	< 100 W	< 100 W	0.37 kW
电源连接	DIN 43650 A	DIN 43650 A	电缆线连接
防护等级	IP 66	IP 66	IP 55
泵芯安装口	6 出口，M20x1.5	6 出口，M20x1.5	6 出口，M20x1.5
工作压力	最高 350 bar	最高 350 bar	最高 350 bar
油箱容积	2, 4, 6, 8, 10 L	2, 4, 6, 8, 10 L	2, 4, 6, 8, 10 L
补油口	DIN 71412 A 和、或顶盖加油	DIN 71412 A 和、或顶盖加油	DIN 71412 A 和、或顶盖加油
润滑剂	NLGI 0, 1, 2	NLGI 0, 1, 2	NLGI 0, 1, 2
工作温度	-41 °C ~ +70 °C	-41 °C ~ +70 °C	-41 °C ~ +70 °C
安装方式	竖直安装	竖直安装	竖直安装

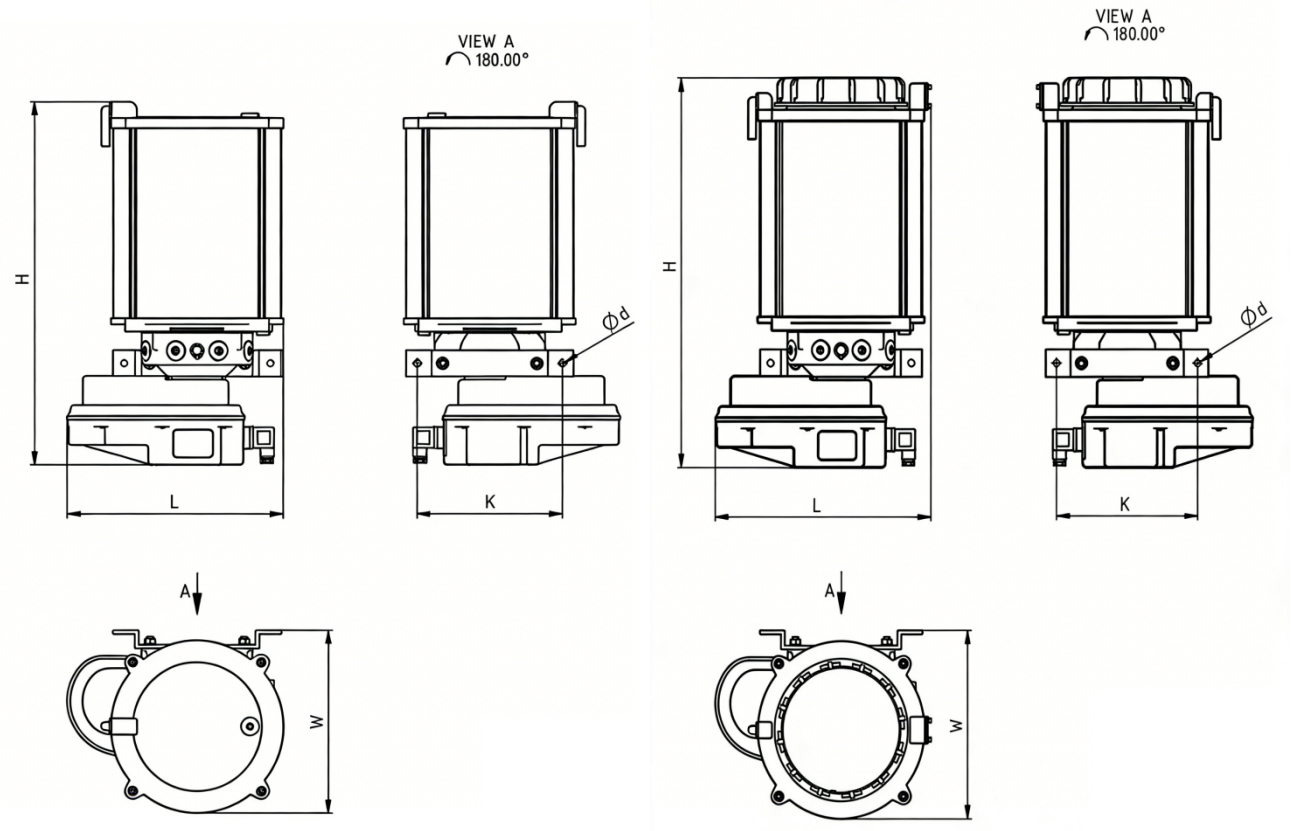
润滑泵外形尺寸

■ ***DC 24V 或 AC 230V/50 Hz，2/4/6 L 油箱***



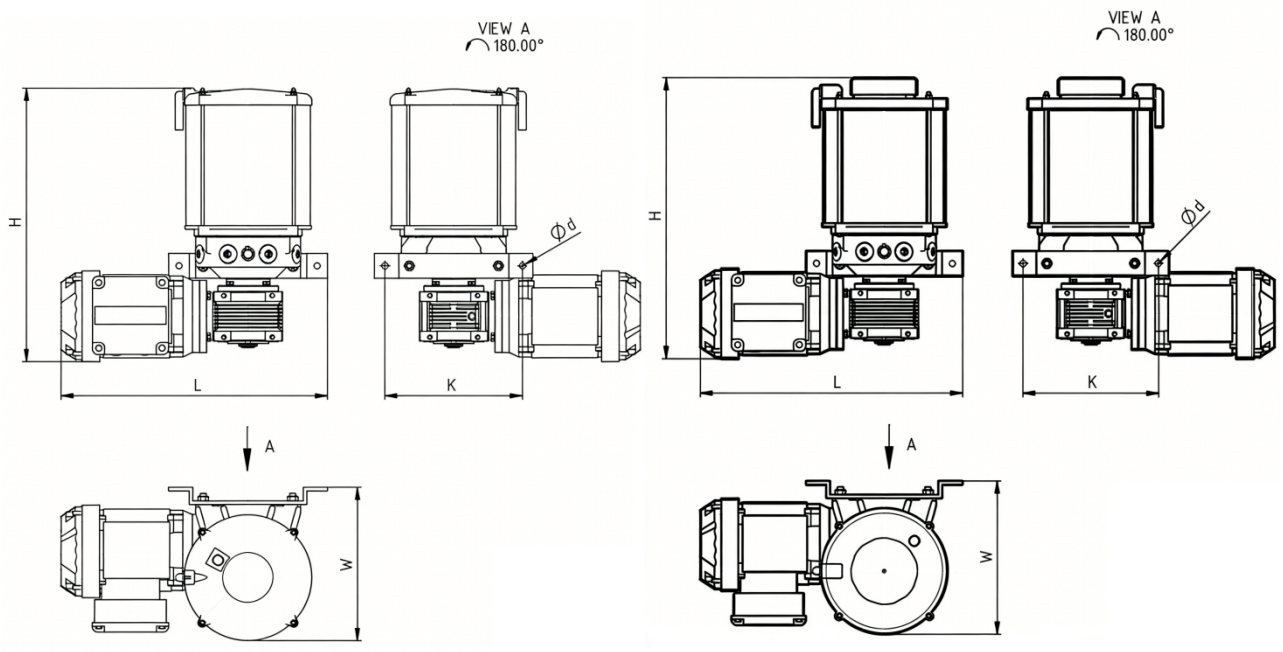
型号	油箱 (L)	顶盖加油	工作电压	H (mm)	W (mm)	L (mm)	K (mm)	Ød (mm)
LEP211...	2	/	DC 24V 或 AC 230V/50Hz	353	197	283	130	9
LEP211T...		有		367				
LEP212...	4	/		393				
LEP212T...		有		406				
LEP212P...	6	/		485				
LEP212PT...		有		498				

■ ***DC 24V 或 AC 230V/50 Hz，8/10 L 油箱***



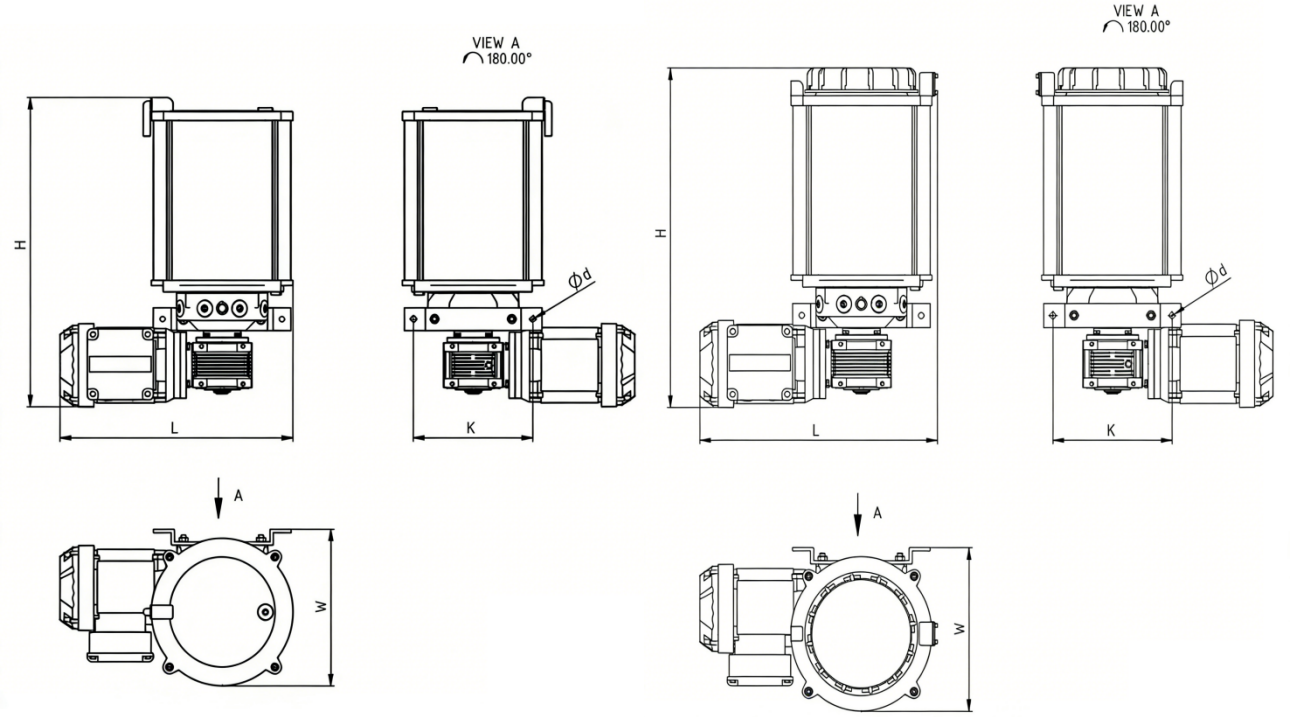
型号	油箱 (L)	顶盖加油	工作电压	H (mm)	W (mm)	L (mm)	K (mm)	Ød (mm)
LEP213...	8	/	DC 24V 或 AC 230V/50Hz	495	250	296	200	9
LEP213T...		有		517		305		
LEP2110...	10	/		525		296		
LEP2110T...		有		547		305		

■ ***AC 380V/50 Hz，2/4/6 L 油箱***



型号	油箱（L）	顶盖加油	工作电压	H (mm)	W (mm)	L (mm)	K (mm)	Ød (mm)
LEP211...	2	/	AC 380V/50Hz	356	224	386	200	9
LEP211T...		有		370				
LEP212...	4	/		396				
LEP212T...		有		410				
LEP212P...	6	/		488				
LEP212PT...		有		502				

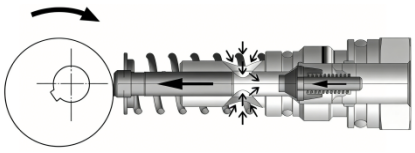
■ ***AC 380V/50 Hz，8/10 L 油箱***



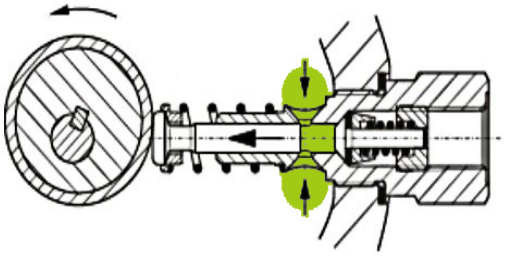
型号	油箱（L）	顶盖加油	工作电压	H (mm)	W (mm)	L (mm)	K (mm)	Ød (mm)
LEP213...	8	/	AC 380V/50Hz	495	250	389	200	9
LEP213T...		有		517		398		
LEP2110...	10	/		525		389		
LEP2110T...		有		547		398		

泵芯

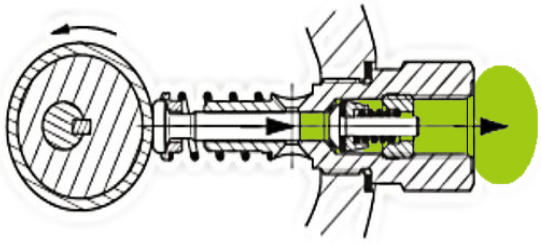
LUBElite 21 型润滑泵最多可同时安装六个 IBX 泵芯。每组泵芯均可连接分配器，构成一路独立润滑油路。不用的闲置接口可用螺塞封堵。泵芯结构形式为弹簧复位式。泵芯型号如下：

泵芯	型号	类型	驱动方式	排量 (cm^3/min)	安装螺纹	出口螺纹
	IBX - 3E	固定排量	弹簧复位	3.3	M20x1.5	G 1/4
	IBX - 4E	固定排量	弹簧复位	6.0	M20x1.5	G 1/4
	IBX - 4A	可调排量	弹簧复位	1.3 ~ 6.2	M20x1.5	G 1/4

■ ***工作原理***



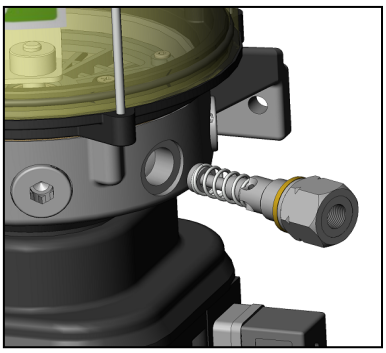
抽油阶段

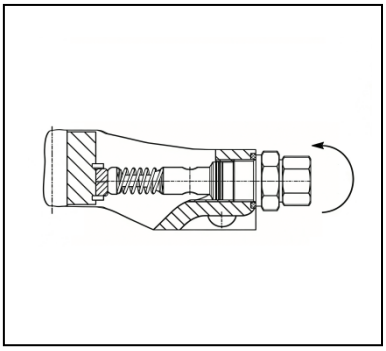


出油阶段

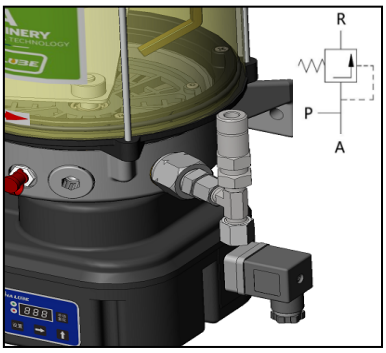
■ ***IBX 泵芯安装步骤***

1. 必须在泵停机非工作状态下，方可进行泵芯的安装与拆卸。
2. 准备配套密封环及扳手工具。
3. 安装时将泵芯水平放置，使泵芯出油口与泵体安装接口保持同心。
4. 将泵芯拧紧固定在泵体接口上，随后开机试运行，观察泵口是否有润滑脂正常排出。
5. 拆卸顺序与安装顺序相反。





安全阀

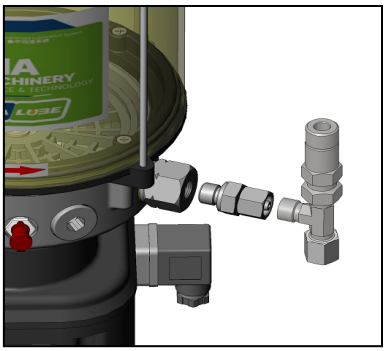


独立安全阀通过接头直接安装在泵芯出油口处，用于保护整个润滑系统免受超压损坏。安全阀开启压力为 350 bar，配有三种出油口规格：Ø6、Ø8、Ø10。当系统中的递进分配器或润滑点发生堵塞、导致系统压力超过安全阀设定压力时，安全阀会自动开启泄油泄压，从而保障整套润滑系统安全。

型号	泄压压力 (bar)	出油口 (mm)
SV-35-06	350	Ø6
SV-35-08	350	Ø8
SV-35-10	350	Ø10

警告

若安全阀泄压口有润滑脂流出，说明系统某处已发生堵塞。请立即全面检查整套润滑系统并及时排除故障，否则将会造成润滑系统及被润滑机械设备损坏。



PF 递进分配器

PF 系列递进式分配器按外形结构可分为整体式分配器与模块式分配器，对应型号分别为 PFB、PFM、PFMS 及 PFG 系列。

PFB 整体式分配器各出油口排量固定为 0.2 cm^3/行程，最大工作压力 350 bar。

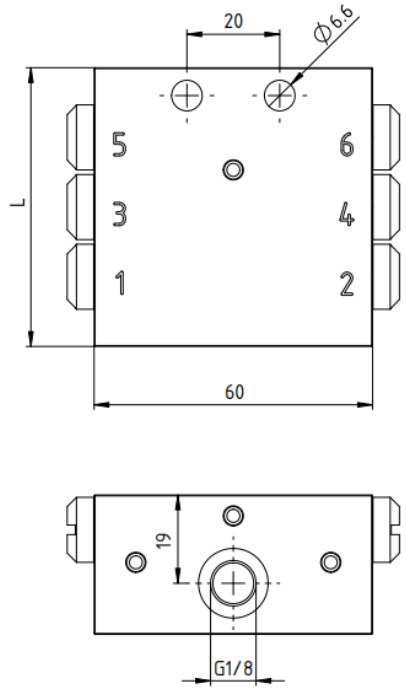
PFM 模块式分配器有 4 种排量可选：0.06 cm^3/行程、0.12 cm^3/行程、0.20 cm^3/行程、0.24 cm^3/行程，最大工作压力 250 bar。

PFMS 模块式分配器有 3 种排量可选：0.045 cm^3/行程、0.075 cm^3/行程、0.105 cm^3/行程，最大工作压力 250 bar。

PFG 模块式分配器有 8 种排量可选：0.100 cm^3/行程、0.155 cm^3/行程、0.225 cm^3/行程、0.305 cm^3/行程、0.400 cm^3/行程、0.505 cm^3/行程、0.625 cm^3/行程、0.755 cm^3/行程，最大工作压力 250 bar。

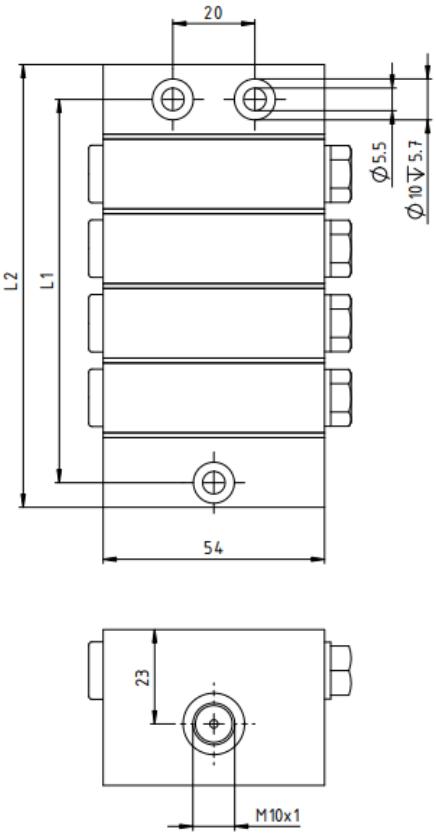
PF 分配器外形尺寸

■ ***PFB***



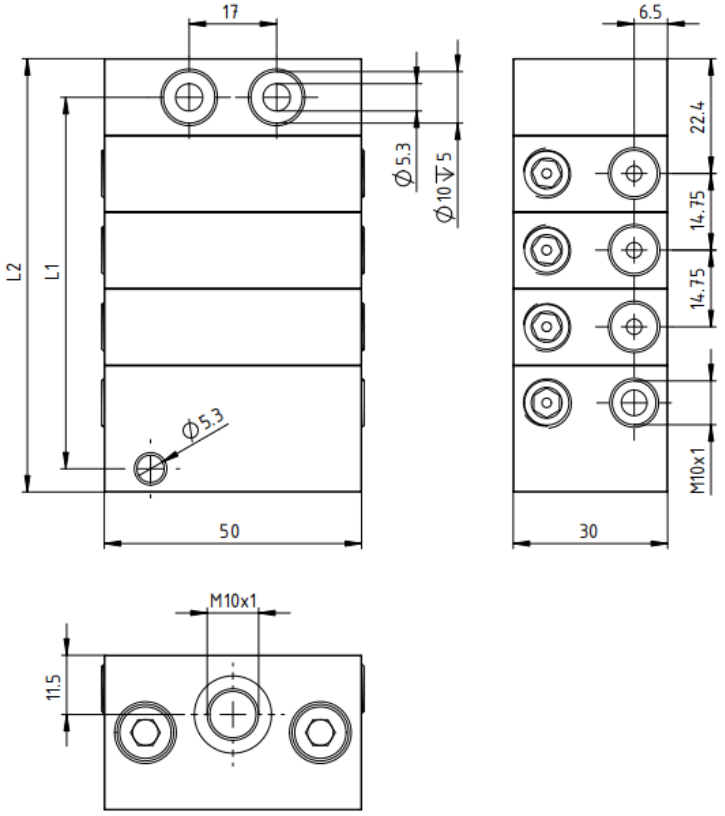
型号	L (mm)
PFB-6-...	60
PFB-8-...	75
PFB-10-...	90
PFB-12-...	105
PFB-14-...	120
PFB-16-...	135
PFB-18-...	150
PFB-20-...	165
PFB-22-...	180

■ ***PFM***



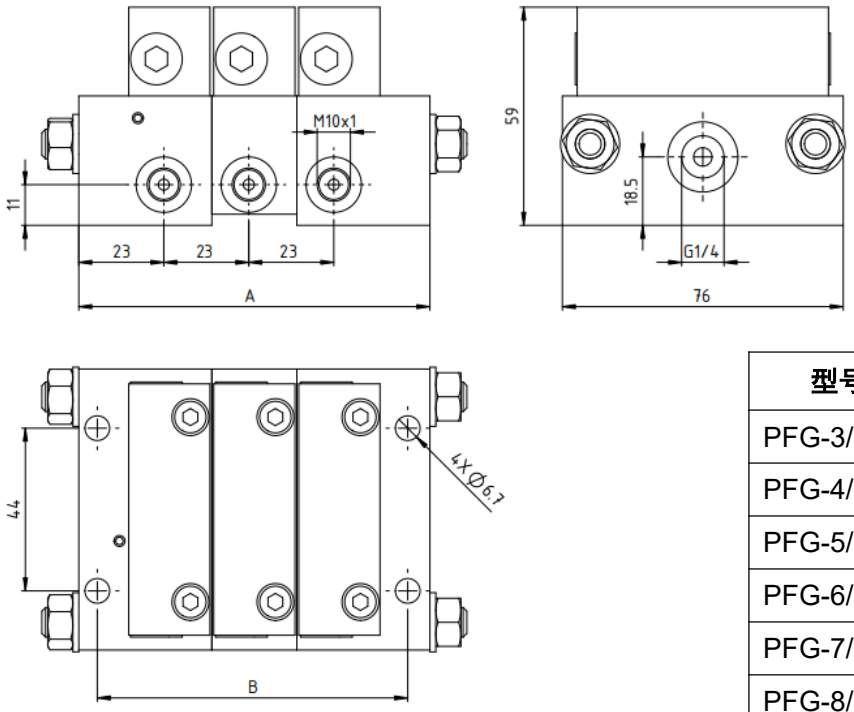
型号	L1 (mm)	L2 (mm)
PFM-3/ -...	75.3	89.8
PFM-4/ -...	93.5	108.0
PFM-5/ -...	111.7	126.2
PFM-6/ -...	129.9	144.4
PFM-7/ -...	148.1	162.6
PFM-8/ -...	166.3	180.8
PFM-9/ -...	184.5	199.0
PFM-10/ -...	202.7	217.2

■ *PFMS*



型号	L1 (mm)	L2 (mm)
PFMS-3/ -...	57.2	69.20
PFMS-4/ -...	72.0	83.95
PFMS-5/ -...	86.7	98.70
PFMS-6/ -...	101.5	113.45
PFMS-7/ -...	116.2	128.20
PFMS-8/ -...	131.0	142.95
PFMS-9/ -...	145.7	157.70
PFMS-10/ -...	160.5	172.45

■ *PFG*



型号	L1 (mm)	L2 (mm)
PFG-3/ -...	84	95
PFG-4/ -...	107	118
PFG-5/ -...	130	141
PFG-6/ -...	153	164
PFG-7/ -...	176	187
PFG-8/ -...	199	210
PFG-9/ -...	222	233
PFG-10/ -...	245	256

PF 分配器出口合并

PF 系列递进式分配器为标准机型，出油口数量最少 6 个、最多 22 个。

若现场润滑点数量少于 6 个，或不为偶数时，可通过封堵合并分配器出油口的方式，匹配实际润滑点数量。

■ *PFB 系列出口合并*

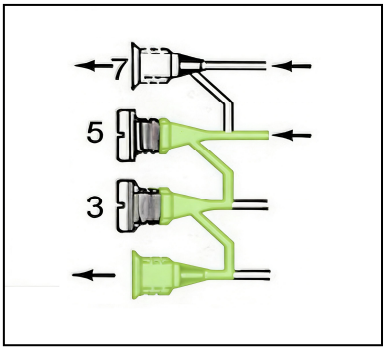
PFB 分配器出油口必须使用专用接头。

若 PFB 分配器需要奇数个出油口，可直接采用堵头封堵出油口来实现。被封堵油口的润滑脂流量会顺延至下一个出油口，详见右侧图示。

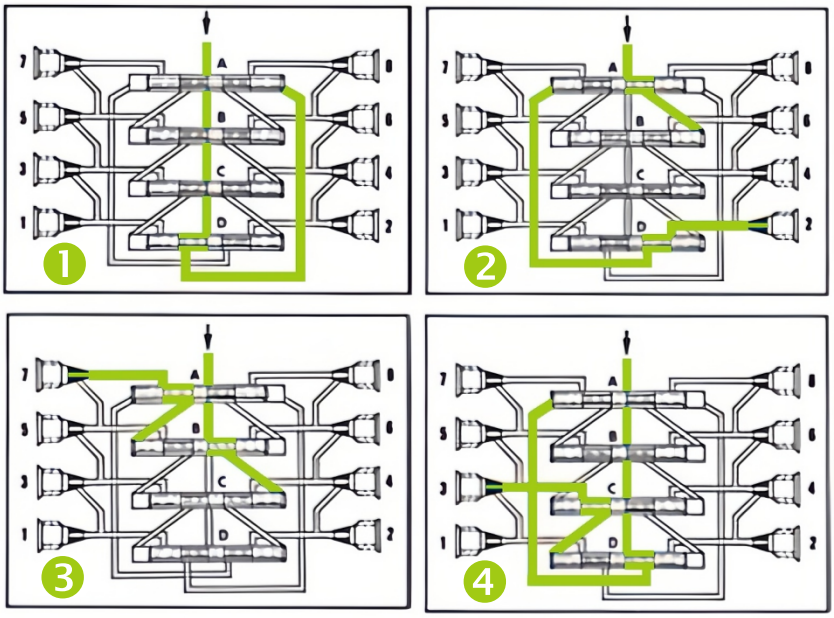
PFB 分配器第 1、2 出油口之间标有“->X<-”标识，表示拆卸中间隔断螺钉即可直接合并这两个油口。

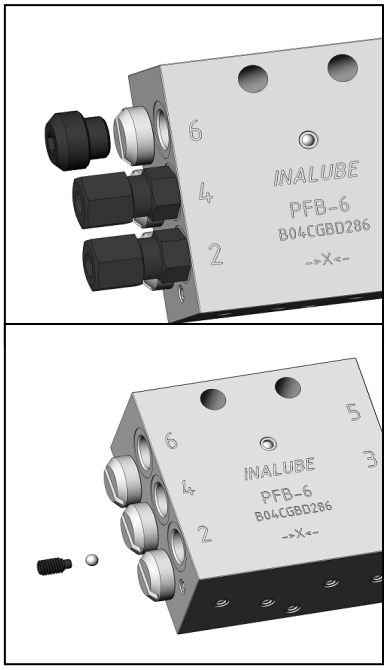
警告

若 PFB 分配器出油口使用普通接头，将会导致出油量计量不准！



■ *PFB 内部结构*

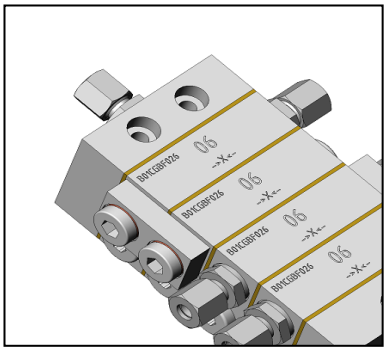


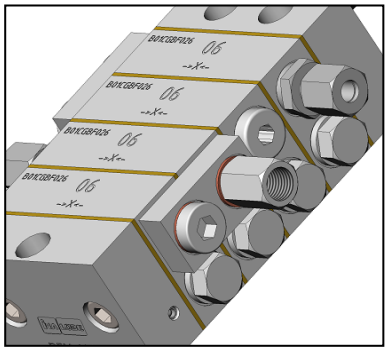


■ ***PFM / PFMS / PFG 系列出口合并***

PFM、PFMS、PFG 系列分配器的油口合并方式一致，共有两种合并形式：1）对侧合并；2）同侧合并，详见右侧图示。进行对侧合并时，需拆下中间隔断螺钉，并用堵头封堵其中一个出油口，对侧油口的出油量将翻倍。

进行同侧合并时，无需拆卸中间隔断螺钉，只需使用专用连通块将同侧两个出油口连通即可。连通块有两种类型：一种为合并后无外接出油口，另一种为合并后保留一个外接出油口。

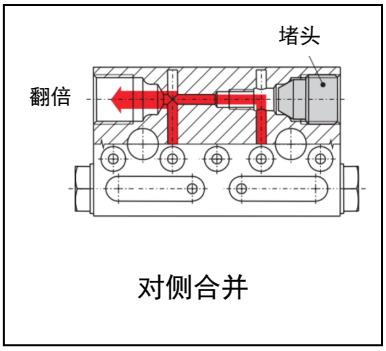




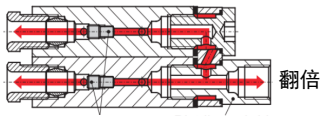
注意

分配器油口合并会改变自身排量，进而影响润滑计量精度，严重时甚至会造成润滑系统停机。

建议在更改分配器出油口数量前，务必咨询供应商专业技术人员。



对侧合并



同侧合并

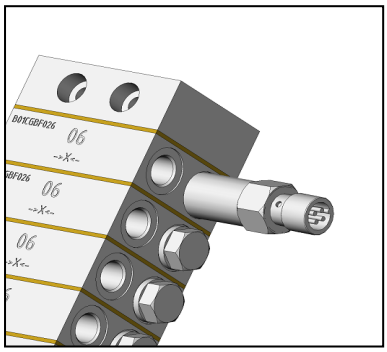
警告

若未拆卸隔断螺钉就直接封堵出油口，分配器将无法正常工作，甚至会造成整个润滑系统瘫痪失效！

PF 分配器监控

可根据需求在分配器上加装柱塞探测器，用于监测整套润滑系统的运行状态。

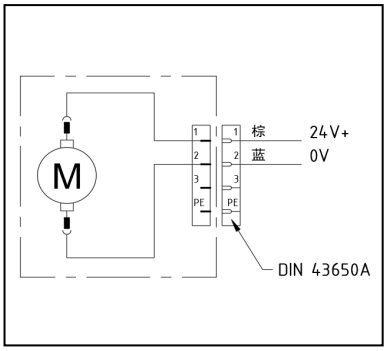
该柱塞探测器为非标配件，如需订购，请参阅 LUBElite 递进式分配器产品样本。

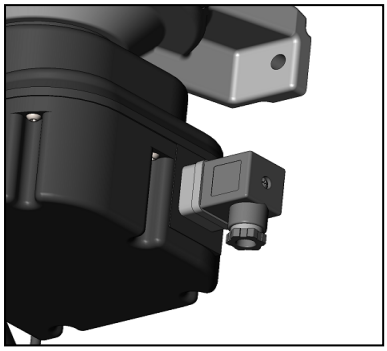


润滑泵电气接线

■ ***电源接线***

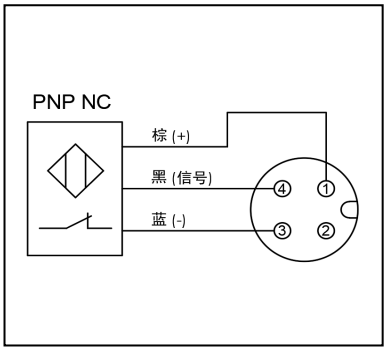
针脚	电线颜色	连接
1	棕	24 V+
2	黑	0V

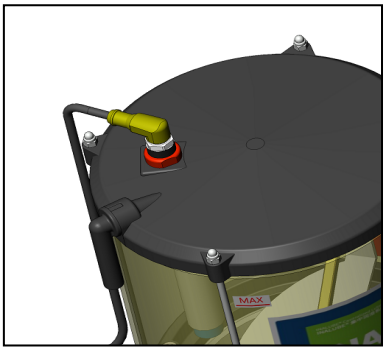




■ ***低液位开关接线（红色螺母）***

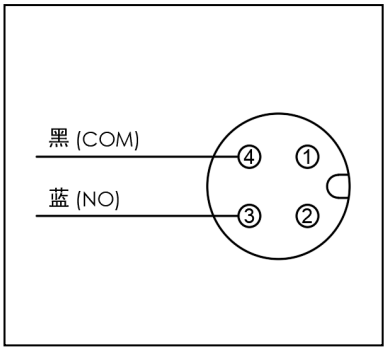
针脚	电线颜色	连接
1	棕	24 V+
3	蓝	0V
4	黑	液位报警 PNP





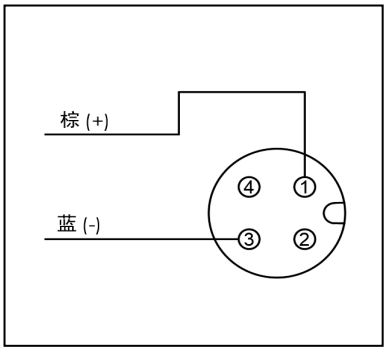
■ ***远程报警接线（橙色螺母）***

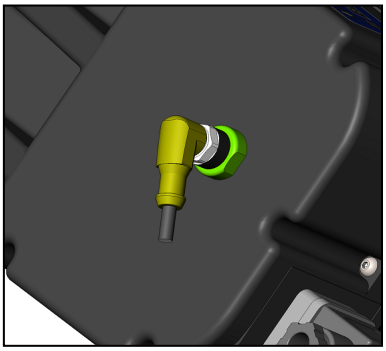
针脚	电线颜色	连接
3	蓝	NO
4	黑	COM



■ ***远程启动接线（绿色螺母）***

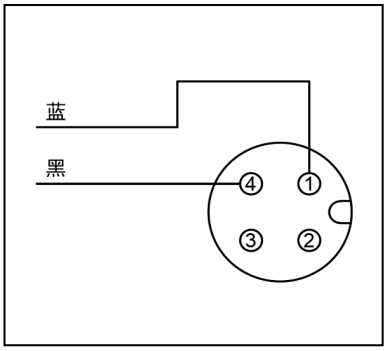
针脚	电线颜色	连接
1	棕	+
3	蓝	-

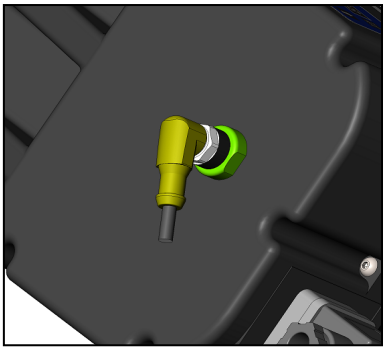




■ ***MODBUS 接线（绿色螺母）***

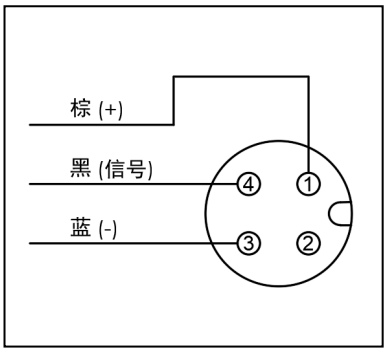
针脚	电线颜色	连接
1	棕	A
4	黑	B

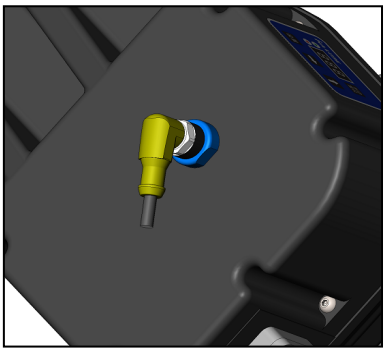




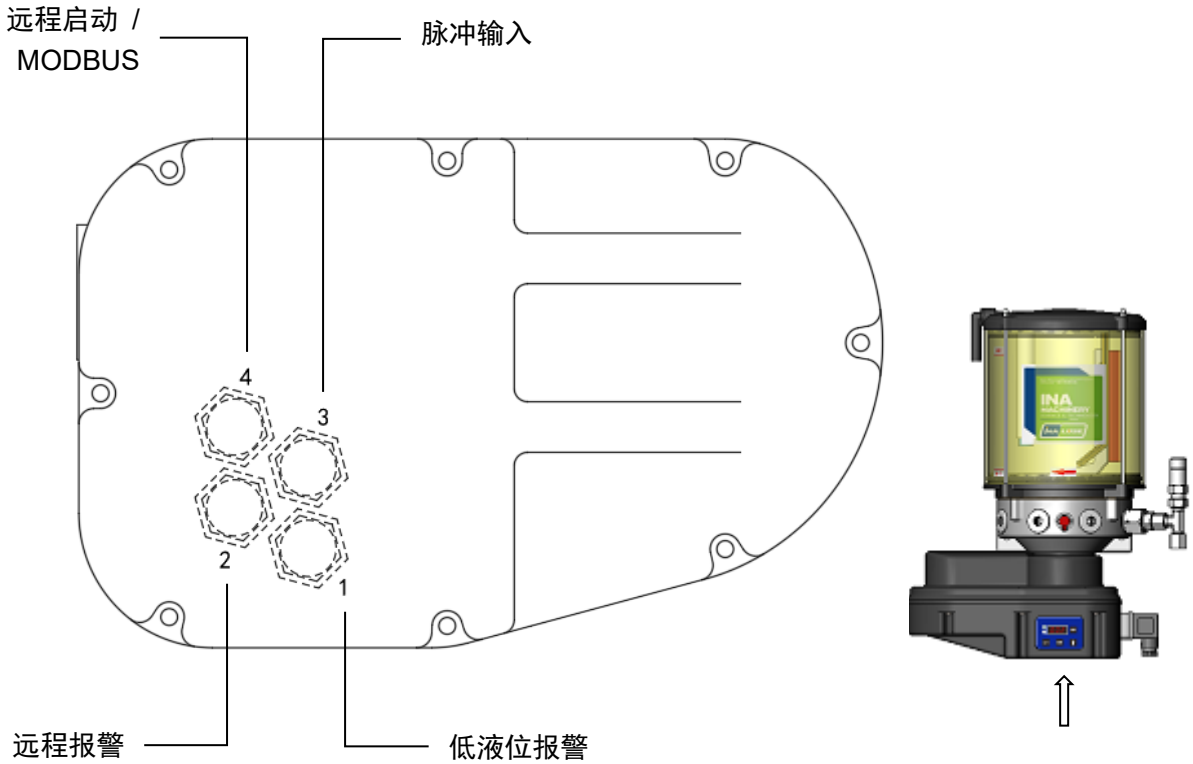
■ ***脉冲输入接线（蓝色螺母）***

针脚	电线颜色	连接
1	棕	24 V+
3	蓝	0V
4	黑	脉冲 PNP





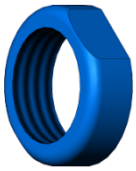
信号端口



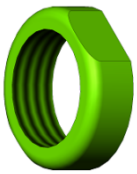
■ ***信号连接端口彩色螺母***

#1 端口：低液位报警连接端

#2 端口：远程报警连接端



#3 端口：脉冲输入连接端



#4 端口：远程启动 / MODBUS 连接端

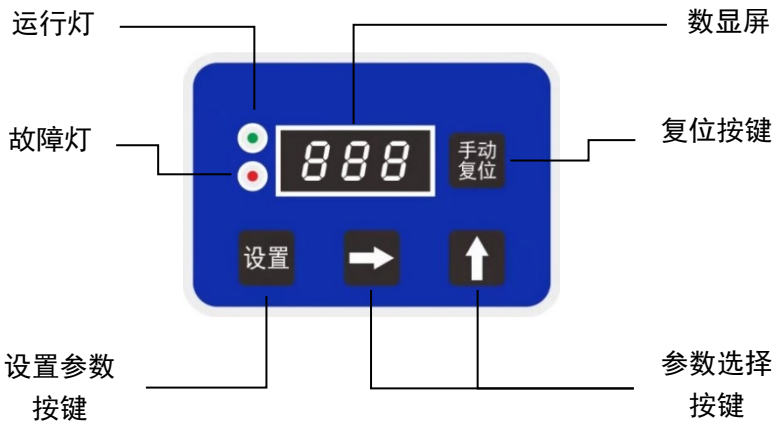
控制系统

■ ***无集成控制器***

无需设置参数，泵接通电源即可启动运行。

■ ***数显按键控制器***

控制器通过面板薄膜实现防潮、防杂质防护。根据控制面板薄膜颜色不同，控制器适配两种程序模式：蓝色面板薄膜代表间隔时间单位为小时；绿色面板薄膜代表间隔时间单位为分钟。



警告

请勿使用有机溶剂擦拭面板薄膜。如需清洁面板，可用软布蘸取中性洗涤剂擦拭。禁止用尖锐物品刮划，以免损坏面板薄膜。

■ ***显示屏***

888 显示运行参数和运行状态。

■ ***指示灯***

指示灯常亮，代表指示灯持续稳定点亮。指示灯闪烁：以点亮 0.5 秒、熄灭 0.5 秒的频率循环闪烁。

■ ***控制器按键***

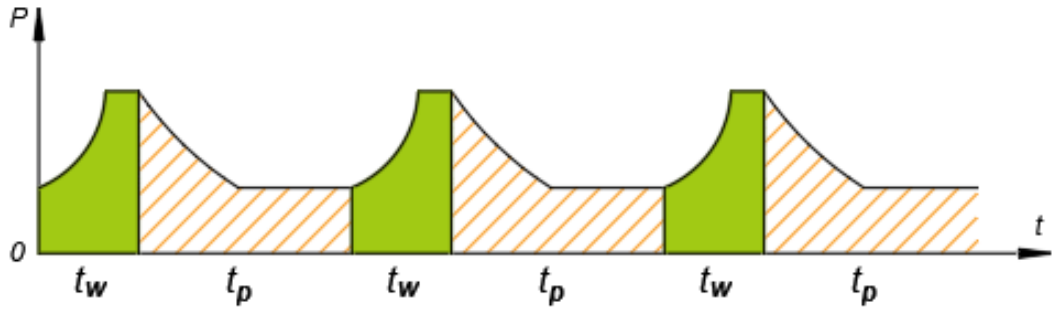
显示屏 888 以数字形式显示时间，单位为分钟或小时。工作时间可调范围：1-999 分钟；间隔时间可调范围：1-999 分钟或小时。当泵运行时，绿灯常亮；当泵停止运行时，红灯常亮；设置参数或报警状态时，红、绿灯同步闪烁。

■ ***工作模式***

✧ **时间模式**

控制面板上显示 **d-1** 代表时间模式。

定时运行是润滑泵及系统的工作基础。泵按照预设的间歇与工作时间，循环执行停机和运行状态。



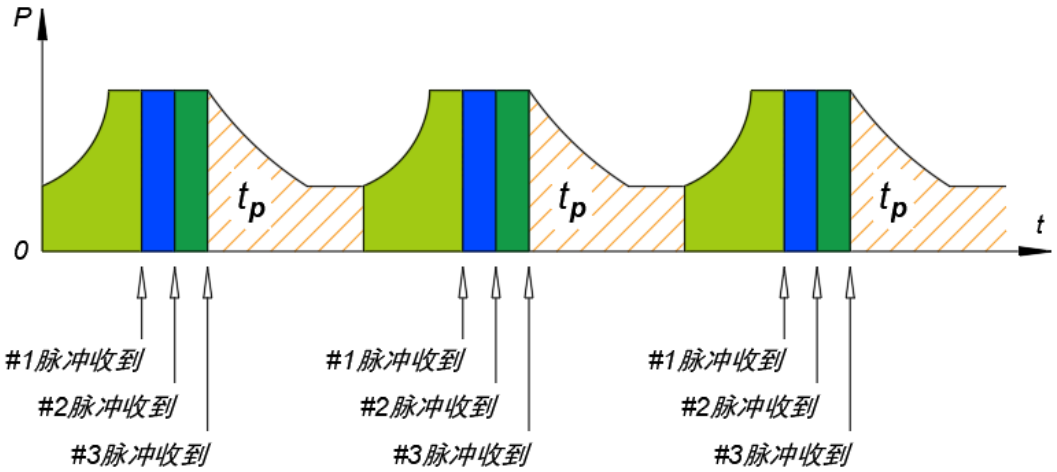
✧ **脉冲模式**

控制面板上显示 **d-3** 代表脉冲模式。

在脉冲模式下，间歇时间等同于时间模式下的间歇时间，工作时间则由接受到的脉冲数量来替换。泵运行时，将接收递进分配器的柱塞探测器所触发的脉冲信号。当接收到设定的脉冲数量后，泵停止运行并进入间歇阶段。

脉冲数量可在 2-999 范围修改。

若泵在 5 分钟内未接收到脉冲信号（该时间为出厂固定设置，不可更改），系统将触发报警。



✧ **强制工作**

按下控制面板上的复位键 手动复位 ，润滑泵将按照运行程序设定的工作模式，强制重新执行一次完整润滑流程。

✧ **系统监控**

控制器可外接柱塞探测器，用于监控递进分配器柱塞的动作状态。系统运行时，若柱塞感测器未检测到柱塞动作信号，系统将自动识别故障并予以显示。

✧ **电源异常保护**

控制器具备断电保护功能。若泵运行过程中断电，再次上电时，泵将从上次工作断点继续运行。若在间歇阶段断电，系统会记录断电时的剩余间歇时长，重新上电后，将接续上次未完成的间歇时间继续计时运行。

参数设置

设置键、移位键、加键用于参数设定。手动复位键用于强制启停控制。指示灯用于显示控制器工作状态，显示时间单位为分钟或小时。

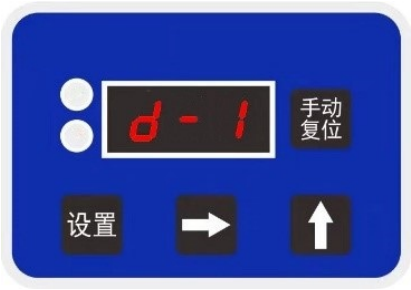
■ ***显示***

泵运行中或设置泵运行时间时，显示屏指示灯为绿色。	
泵处于停歇状态或设置泵停歇时间时，显示屏指示灯为红色。	
按住 设置，红绿指示灯同时熄灭，显示屏进入工作模式选择状态。仅绿灯亮起时，显示屏为工作时间设置状态；仅红灯亮起时，显示屏为间歇时间设置状态。	
按 →，可选择需要修改的数码管数位。再按 ↑，对应位数数字可在 0-9 之间循环切换。	
红绿指示灯同步闪烁时，系统触发故障报警，显示屏将显示报警代码（具体报警代码说明详见故障排查章节）。长按 手动复位 即可解除故障报警。	

■ ***时间模式设置***

第 1 步：

长按 设置 进入润滑系统工作模式设置（红、绿灯同时熄灭），再按 ↑ 选择 ***d-1*** 定时工作模式。



第 2 步：

长按 设置 进入工作时间设置（绿灯闪烁）。按 → 选择调节数位，再按 ↑ 设置该数位数值。长按 ↑，可在 0-9 之间快速循环切换数值。设置范围：***001-999*** 分钟。

第 3 步：

长按 设置 进入间歇时间设置（红灯闪烁），按 → 选择调节数位，再按 ↑ 设置该数位数值。长按 ↑，可在 0-9 之间快速循环切换数值。设置范围：***001-999*** 分钟（或小时）。

第 4 步：

长按 设置 确认设置，显示屏将返回显示已设定的工作时长，设备开始正常运行。若 ***30*** 秒内无任何按键操作，本次设置将自动失效，系统恢复为原有设定参数。

■ ***脉冲模式设置***

第 1 步：

长按 设置 进入润滑系统工作模式设置（红、绿灯同时熄灭），再按 ↑ 选择 ***d-3*** 定时工作模式。

第 2 步：

长按 设置 进入工作脉冲数量设置(绿灯闪烁)。按 → 选择调节数位，再按 ↑ 设置该数位数值。长按 ↑ ，可在 0-9 之间快速循环切换数值。设置范围：***002-999*** 脉冲。

第 3 步：

长按 设置 进入间歇时间设置（红灯闪烁），按 → 选择调节数位，再按 ↑ 设置该数位数值。长按 ↑ ，可在 0-9 之间快速循环切换数值。设置范围：***001-999*** 分钟（或小时）。

第 4 步：

长按 设置 确认设置，显示屏将返回显示已设定的工作脉冲数量，设备开始正常运行。若 ***30*** 秒内无任何按键操作，本次设置将自动失效，系统恢复为原有设定参数。

操作与维护

■ *清洁*

润滑系统的日常必要维护工作：需定期向油箱补充润滑脂，并定期检查润滑脂是否正常输送至各润滑点。同时检查润滑管路有无破损、渗漏，如有损坏请及时更换。

使用集中润滑系统时，应特别保证润滑脂的清洁度。

警告

向油箱加注润滑脂时，须保证作业环境干净整洁，且只能使用专用工具加注洁净润滑脂。否则固体杂质进入系统，将会造成润滑系统堵塞等严重故障！

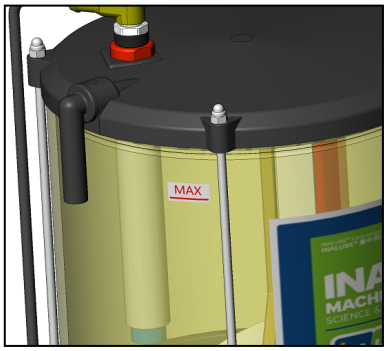
警告

禁止使用全氯乙醚、三氯乙醚及同类溶剂作清洗剂，也不得使用乙醇、甲醇、丙酮等极性有机溶剂及其同类产品。否则将造成油箱开裂。

■ *填充润滑剂*

给泵油箱加注润滑脂时，油位不得超过最高刻度线（MAX 上限刻度线）。所用润滑脂须为 NLGI 2 及以下润滑脂，油品必须洁净无杂质，使用过程中保持粘度稳定。

若油箱完全空了后再补加润滑脂，需静置等待 20 分钟，方能达到设定出油量。



警告

严禁拆卸油箱上盖进行加注！此种方式会导致杂质与气泡混入润滑脂中，造成润滑系统堵塞或供油异常，严重时还会损坏轴承！

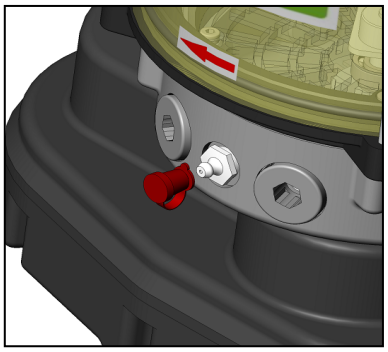
须知

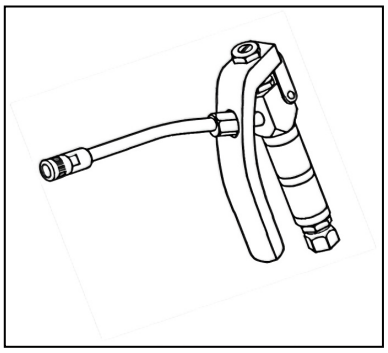
市面上绝大多数润滑脂均不会对润滑系统造成损害。若不确定润滑脂中的特殊添加剂是否会损伤润滑系统，请在加注前联系供应商技术人员进行确认。

■ *补油口*

✧ **DIN 71412 A 锥形黄油嘴**

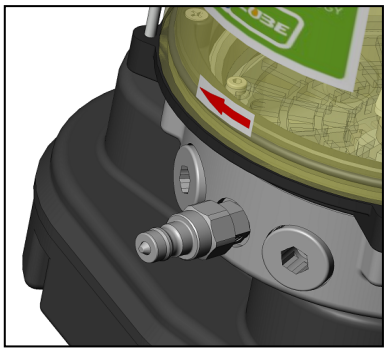
该补油口出厂标准配置，可使用普通黄油枪加注润滑脂。

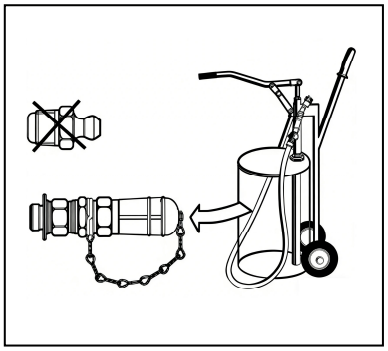




✧ **ISO 7241 A 液压快速接头**

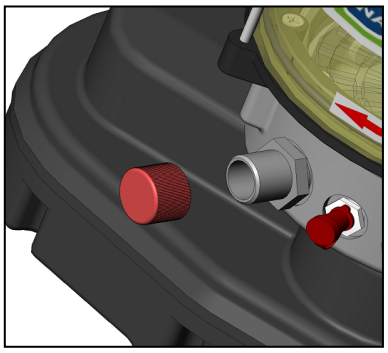
拆下润滑泵上的黄油嘴，换装液压快速接头，通过该液压接头进行润滑脂加注。

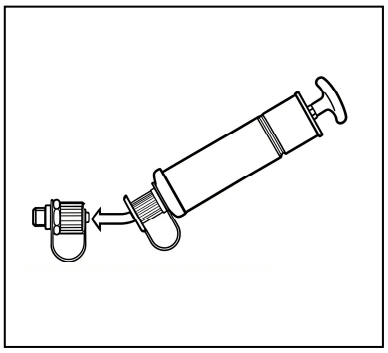




✧ **油脂填充桶**

拆下润滑泵上任意一个泵芯安装口堵头，换装润滑脂加注专用接头。





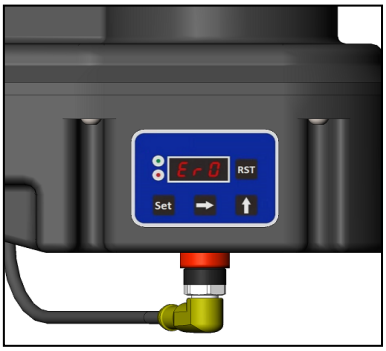
■ ***填充液位确认***

✧ **目视检测**

透明油箱便于进行目视观察。为了润滑系统安全，这种检查需要经常定期进行。

✧ **自动检测**

润滑泵可选配低液位开关。当油箱中润滑剂液位低于 MIN 标记时，润滑泵自动停止工作，数显屏显示  故障信号，红绿灯同时闪烁报警。



警告

当润滑脂油位低于 MIN 最低刻度线时，须立即补加润滑脂；否则空气会混入润滑系统，进而引发系统故障！

须知

当给油箱补充油脂时，不允许超过油桶上标记的最高液位线 MAX。

■ ***系统排气***

1. 拆下润滑泵上的主油管，启动油泵运转，直至排出的润滑脂无气泡后，重新接好主油管。
2. 拆下主分配器入口处的主管道，启动油泵，直至排出的润滑脂无气泡后，重新接好主管道。
3. 拆下主分配器出口处的分支管路，启动油泵，直至排出的润滑脂无气泡后，重新接好分支管路。
4. 按照以上步骤依次对各分支管路、次级分配器以及通往各润滑点的管路进行排气操作。

警告

润滑系统运行前必须进行系统排气，否则将导致润滑系统无法正常工作！

■ ***维修润滑泵***

维修保养必须使用原厂配件。在质保期内或需要大修时，请将润滑泵寄回原厂进行维修。

■ ***更换泵芯***

从泵芯上拆下安全阀。拆卸泵芯时，注意防止零件落入油箱内部，以免妨碍电机运转。若零件不慎落入油箱内，则需先拆下油箱，取出掉落零件，再更换新的泵芯及密封圈。

■ ***系统测试***

通过手动启动附加润滑周期，可检查润滑系统运行是否正常。启动附加润滑周期后，润滑泵将向各润滑点输送润滑脂。

1. 检查各管路有无渗漏。
2. 确认各润滑点是否有润滑脂送达。
3. 核查运行时间与间隔时间设置是否准确。如有需要，可根据现场使用需求重新设定润滑时长与循环周期。

故障排查

■ *电机及泵故障*

故障	可能原因	排除方法
泵不工作	没有供电	检查电源及熔断器，排查故障或更换新熔断器。
		检查从熔断器至润滑泵电源插头之间的线路。
	电机故障	检查电机供电线路，必要时更换电机。
泵工作但不出油	油箱空了	向油箱加注润滑脂，启动油泵，直至润滑点有油脂流出。 *备注：油泵需运行 10-20 分钟才能达到设定排量（与环境温度及润滑脂型号有关）。*
	润滑剂含有气泡	松开溢流阀出油口接头或主油管，启动附加润滑周期，待润滑脂流出无气泡后，重新拧紧接头。 *备注：使用快插接头时，高压软管在带压状态下难以从安全阀上拆卸；需先松开安全阀的堵头或应急油嘴进行泄压。*
	润滑油脂选用不当	更换符合规格要求的润滑脂。
	泵芯吸油口堵塞	拆下泵芯，清除内部杂物污物。
	泵芯磨损	更换泵芯。
	泵芯单向阀损坏或卡滞	更换泵芯。

■ *故障监控与处理*

当控制器检测到系统故障时，控制面板上的红绿指示灯将同时闪烁，提醒用户润滑系统发生故障。此时润滑系统停止运行，等待用户进行故障处理，具体故障原因可通过显示屏查看。

✧ 故障代码含义

	润滑泵运行时，未接收到递进分配器柱塞探测器的脉冲信号。
	润滑泵运行时电机电流低于 0.2A。
	润滑泵运行时电机电流大于 5A。
	润滑泵运行时，润滑脂液位低于最低液位。
	输入电源供电不足或控制器存储容量不足。

✧ 清除故障信号

解决了故障后，按下复位键 手动复位 ，控制器即可清除故障信号，重新进入运行状态。

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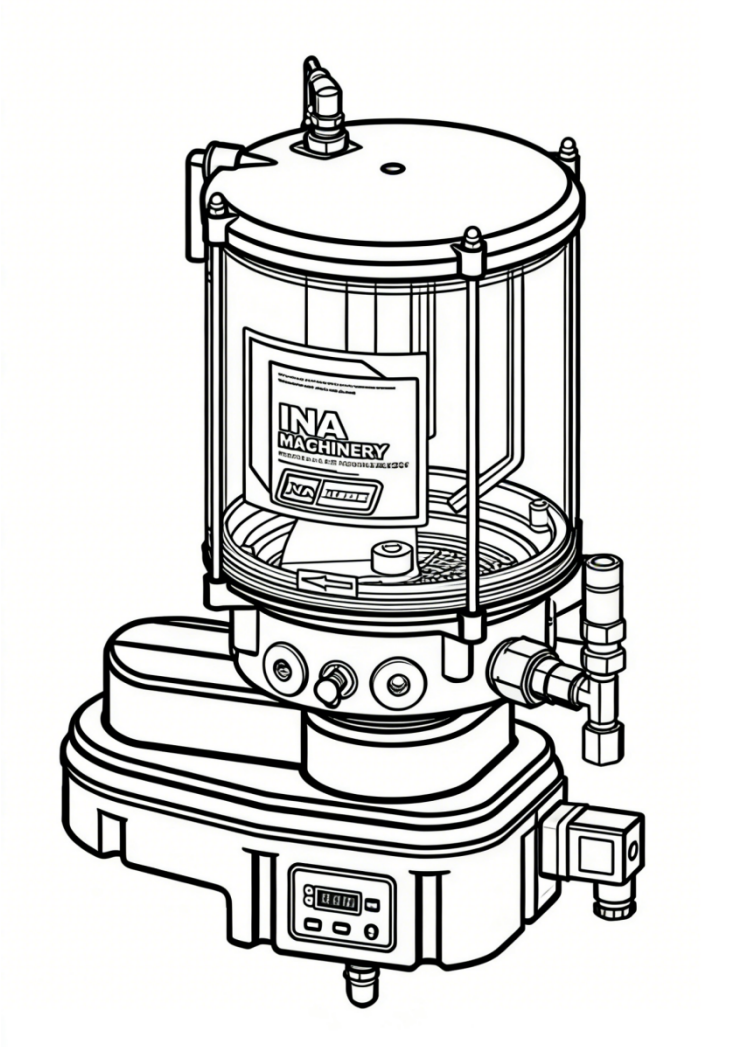
LUBElite™ Progressive
Centralized Lubrication System User Manual



Shanghai INA Machinery Science & Technology Co., Ltd

Content

Safety

The assembly must be installed, maintained and repaired exclusively by persons familiar with the instructions.
Always disconnect power supply (electricity, air or hydraulic) from the equipment when it is not being used.
This equipment generates high pressure. Extreme caution should be used when operating this equipment as material leaks from loose or ruptured components can inject fluid through the skin and into the body. If any fluid appears to penetrate the skin, seek attention from a doctor immediately. Do not treat injury as a simple cut. Tell attending doctor exactly what type of fluid was injected.
Any other use not in accordance with instructions will result in loss of claim for warranty or liability.

- Do not misuse, over-pressurize, modify parts, use incompatible chemicals, fluids, or use worn and/or damaged parts.
- Do not exceed the stated maximum working pressure of the equipment or of the lowest rated component in your system.
- Always read and follow the manufacturer's recommendations regarding fluid compatibility, and the use of protective clothing and equipment.
- Failure to comply may result in personal injury and/or damage to equipment.
- Strictly follow National laws, regulations, and regulations on accident prevention.

Explanation of signal words for safety

NOTE

Emphasizes useful hints and recommendations as well as information to prevent property damage and ensure efficient trouble-free operation.

CAUTION

Indicates a dangerous situation that can lead to light injury if precautionary measures are ignored.

WARNING

Indicates a dangerous situation that can lead to serious injury if precautionary measures are ignored.

DANGER

Indicates a dangerous situation that can lead to death or serious injury if precautionary measures are ignored.

WARNING

Do not operate equipment without reading and fully understanding safety warnings and instructions.

Failure to follow warnings and instructions may result in serious injury.

CAUTION

Do not operate equipment without wearing personal protective gear. Wear eye protection. Protective equipment such as dust mask, non-skid safety shoes, hard hat, or hearing protection used for appropriate conditions will reduce personal injuries.
Failure to comply may result in light personal injury.

WARNING

Do not exceed the stated maximum working pressure

of the equipment or of the lowest rated component in your system. Use extreme caution when operating equipment as equipment generates very high grease pressure.
Failure to comply may result in light personal injury.

WARNING

Do not use this equipment to supply, transport, or store hazardous substances and mixture.

General reminder

- When carrying out installation on industrial equipment such as construction machinery, road vehicles, general machinery, machine tools, etc., the local accident prevention regulations and the relevant operating and maintenance instructions must be observed.
- Safety equipment
  - ✧ Under no circumstances shall any safety equipment be changed due to the installation of lubrication system, and the original safety equipment (such as fence, protective cover, safety lock, etc.) on equipment and facilities shall not be permanently removed.
  - ✧ Safety equipment may only be temporarily removed when lubrication systems are installed, as required and with relevant permission. After the lubrication system is installed, the original safety equipment should be restored immediately.
- Lubrication systems must be kept away from heat sources and must not be placed outside the allowable operating temperature range (e.g. high or low temperature).
- Original parts or licensed parts must be used.
- The system may be under pressure. The pressure must be relieved before starting maintenance, adjustment or related operations.
- Make sure to use clean grease.
- Although the system works automatically, we strongly recommend that users need periodic checks every two weeks to ensure that lubricants are properly distributed to lubrication points.

Approved lubricant

- Lubrication grease viscosity is NLGI 2 or below
- If you need to choose lubricants that do not meet the above conditions or are uncertain about the influence of special additives in the selected lubricants on lubrication parts, please consult factory.

Transportation & storage

- LUBElite series lubrication pump stations are sold and packaged in accordance with relevant international standards, which meet the international design requirements of road transportation,

railway transportation, air transportation and sea transportation of dangerous goods.

- Packed lubrication pump station in the process of transportation and handling, need to be handled with care, to prevent unnecessary damage.
- The lubrication pump station can be stored in a dry space between -40 °C ~ + 70 °C.

Exemption from liability

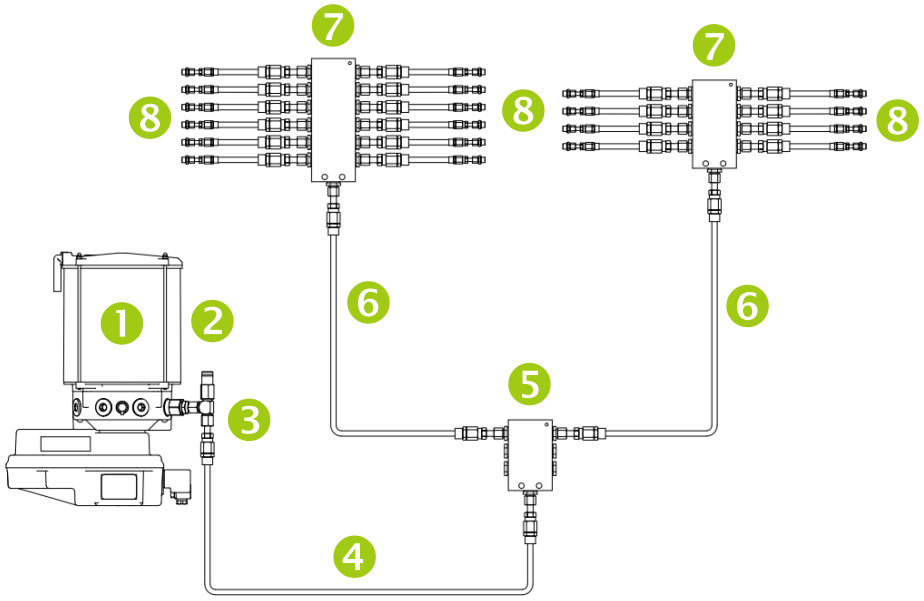
Do not assume any direct or indirect, joint and several liabilities and obligations for the damage caused by the following circumstances:

- Damage caused by lack of lubrication grease.
- Damage caused by the use of inappropriate lubrication grease.
- Damage caused by installation and use of unauthorized parts.
- Damage caused by unauthorized modifications to lubrication system parts.
- Damage caused by use not in accordance with normal use.
- Damage caused by incorrect installation or piping connections.
- Damage caused by incorrect electrical connections.
- Damage caused by program setup error.
- Damage caused by misoperation of troubleshooting.

Overview

LUBElite 21 series electric lubrication pumps are suitable for engineering machinery, road vehicles, general machinery, machine tools and other industrial equipment. Applicable lubricant viscosity up to NLGI 2 grease. Each lubrication pump can be installed at the same time max. six pump elements to form six independent lubrication circuit.

The pump station mainly includes reservoir, BLDC motor assembly, pump element, safety valve, controller and other accessories. The eccentric wheel in pump unit ① driven by the motor pushes the plunger of pump element ② a reciprocating motion, pumping grease out of the reservoir to the main divider ⑤ and secondary dividers ⑦ by main line ④ and branch lines ⑥, then to the lubrication points through lube point pipelines ⑧. The safety valve ③ at the pump element outlet limits the working pressure to ensure the entire system works in a safe condition.



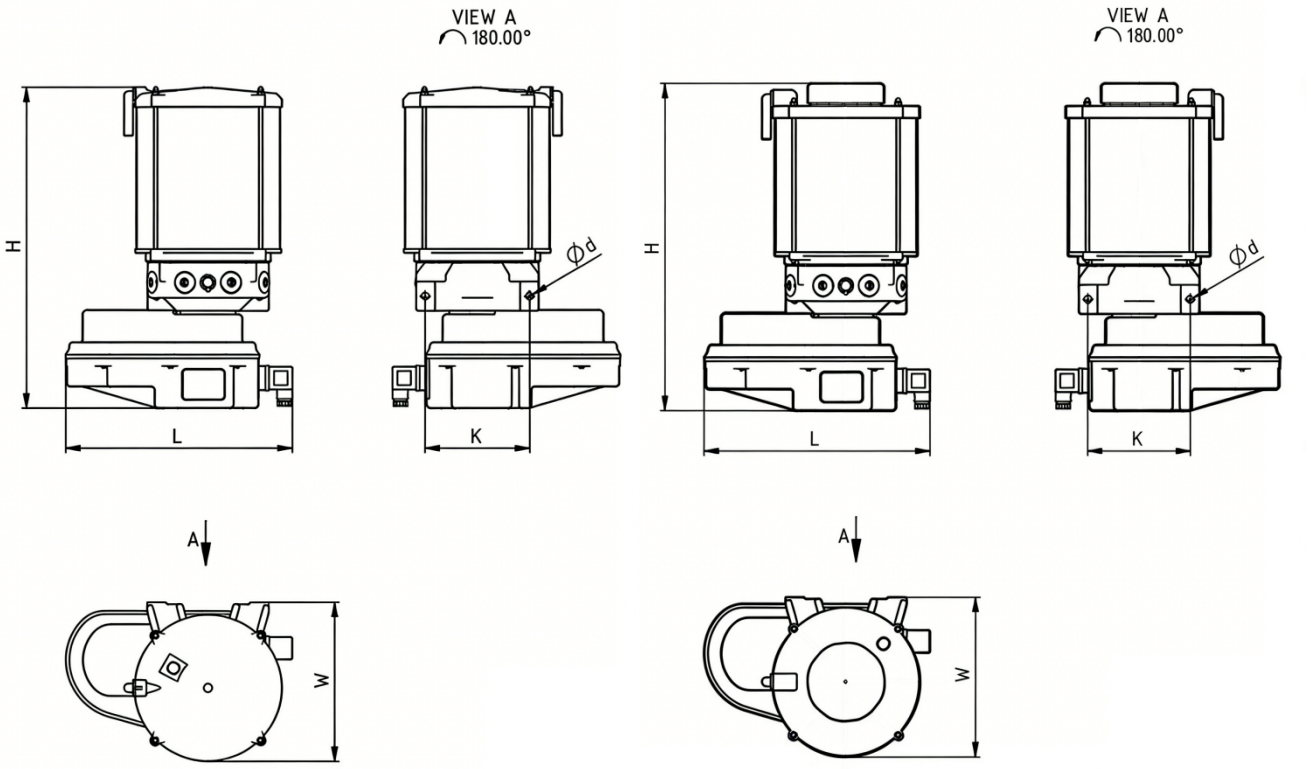
① Pump unit
② Pump element
③ Safety valve
④ Main line
⑤ Main divider
⑥ Branch line
⑦ Secondary divider
⑧ Lube point pipeline

Technical data

Power Supply	DC 24 V	AC 230V/50 Hz	AC 380V/50 Hz
Rated Power	< 100 W	< 100 W	0.37 kW
Power Socket	DIN 43650 A	DIN 43650 A	Wiring connection
IP Class	IP 66	IP 66	IP 55
Pump Element Mounting	6 outlets, M20x1.5	6 outlets, M20x1.5	6 outlets, M20x1.5
Working Pressure	Max. 350 bar	Max. 350 bar	Max. 350 bar
Tank Capacity	2, 4, 6, 8, 10 L	2, 4, 6, 8, 10 L	2, 4, 6, 8, 10 L
Refilling Port	DIN 71412 A and/or top lid	DIN 71412 A and/or top lid	DIN 71412 A and/or top lid
Lubricant	NLGI 0, 1, 2	NLGI 0, 1, 2	NLGI 0, 1, 2
Working Temperature	-41 °C ~ +70 °C	-41 °C ~ +70 °C	-41 °C ~ +70 °C
Mounting	Vertical	Vertical	Vertical

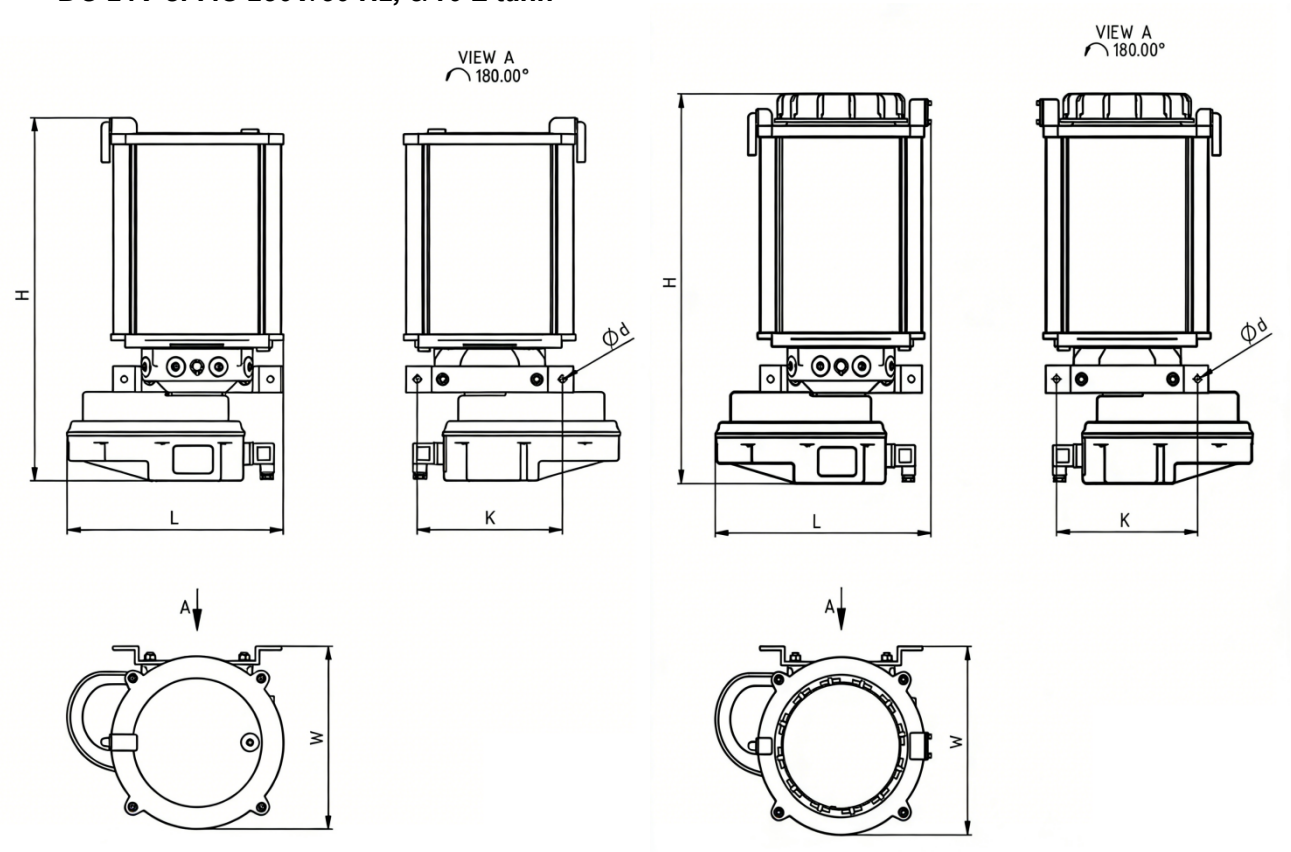
Pump dimension

■ ***DC 24V or AC 230V/50 Hz, 2/4/6 L tank***



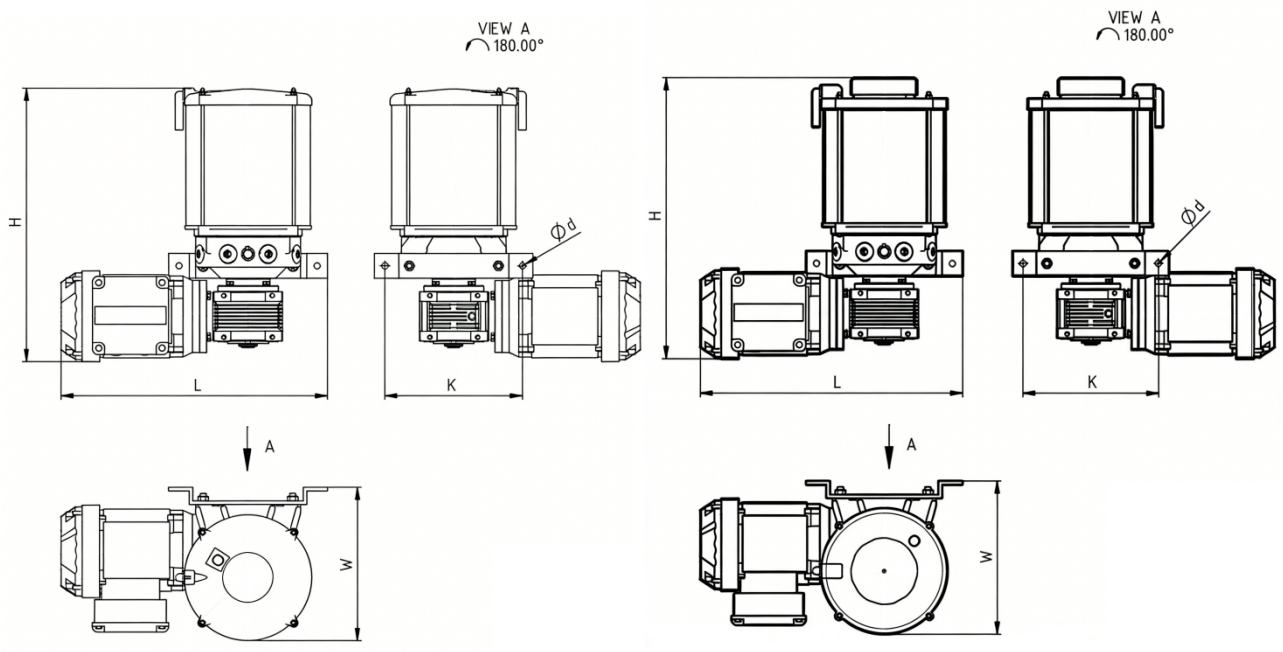
Model	Reservoir (L)	Top Lid	Power Supply	H (mm)	W (mm)	L (mm)	K (mm)	Ød (mm)
LEP211...	2	/	DC 24V or AC 230V/50Hz	353	197	283	130	9
LEP211T...		Yes		367				
LEP212...	4	/		393				
LEP212T...		Yes		406				
LEP212P...	6	/		485				
LEP212PT...		Yes		498				

■ ***DC 24V or AC 230V/50 Hz, 8/10 L tank***



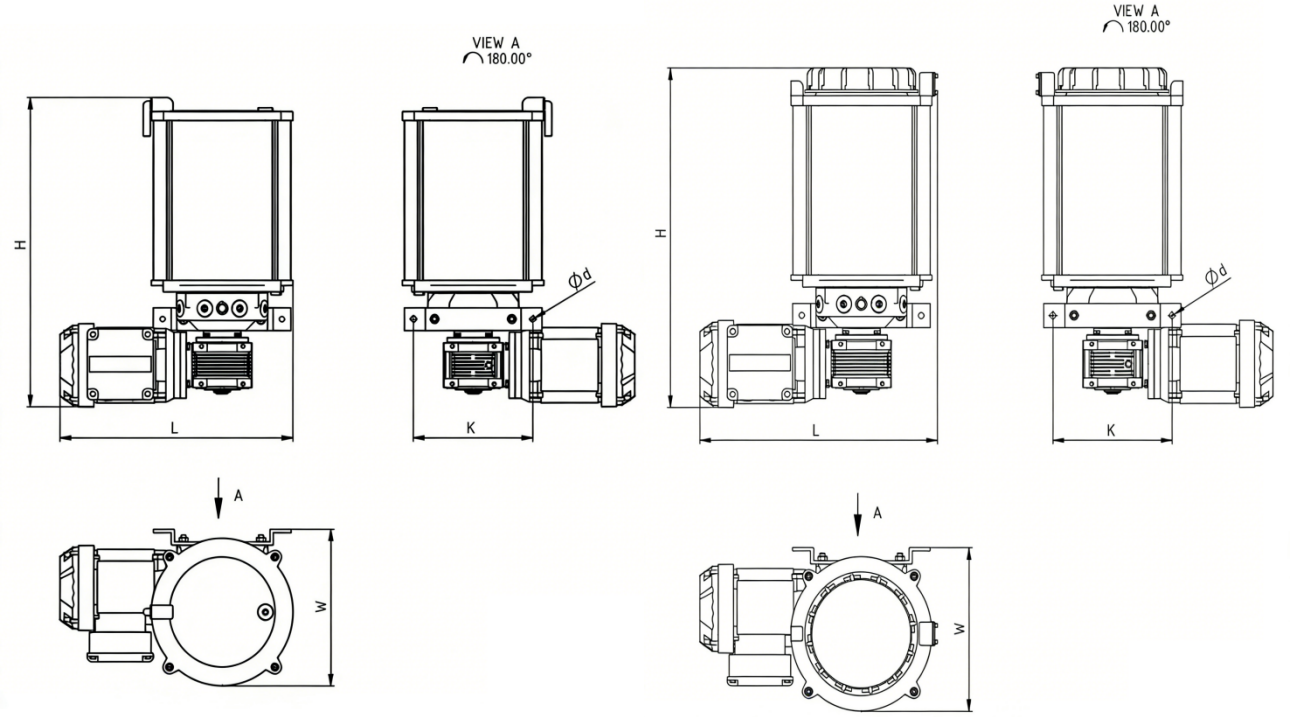
Model	Reservoir (L)	Top Lid	Power Supply	H (mm)	W (mm)	L (mm)	K (mm)	Ød (mm)
LEP213...	8	/	DC 24V or AC 230V/50Hz	495	250	296	200	9
LEP213T...		Yes		517		305		
LEP2110...	10	/		525		296		
LEP2110T...		Yes		547		305		

■ ***AC 380V/50 Hz, 2/4/6 L tank***



Model	Reservoir (L)	Top Lid	Power Supply	H (mm)	W (mm)	L (mm)	K (mm)	Ød (mm)
LEP211...	2	/	AC 380V/50Hz	356	224	386	200	9
LEP211T...		Yes		370				
LEP212...	4	/		396				
LEP212T...		Yes		410				
LEP212P...	6	/		488				
LEP212PT...		Yes		502				

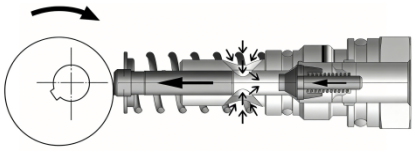
■ ***AC 380V/50 Hz, 8/10 L tank***



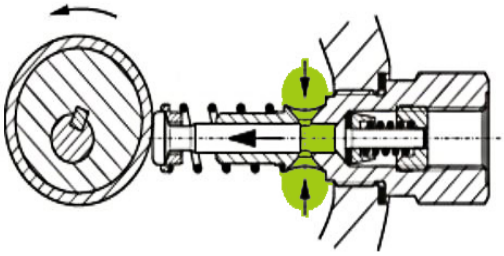
Model	Reservoir (L)	Top Lid	Power Supply	H (mm)	W (mm)	L (mm)	K (mm)	Ød (mm)
LEP213...	8	/	AC 380V/50Hz	495	250	389	200	9
LEP213T...		Yes		517		398		
LEP2110...	10	/		525		389		
LEP2110T...		Yes		547		398		

Pump element

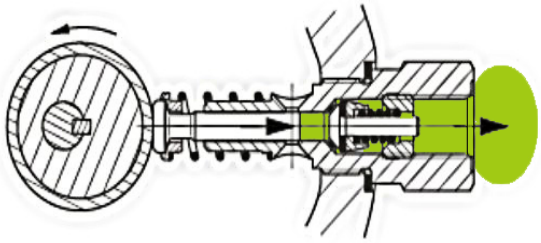
LUBElite 21 pumps have six lubrication outlets and can be installed with max. six IBX pump elements at the same time. Each group of pump element can be connected with the divider to form an independent lubrication oil circuit. When the six lubrication outlets are not all used, the surplus outlets can be plugged with screw plugs. The types of pump element is spring return type. The pump element model as follow:

Pump Element	Model	Type	Drive Type	Displace-ment (cm^3 / min)	Mounting Thread	Outlet Thread
	IBX - 3E	Normal	Spring return	3.3	M20x1.5	G 1/4
	IBX - 4E	Normal	Spring return	6.0	M20x1.5	G 1/4
	IBX - 4A	Adjust able	Spring return	1.3 ~ 6.2	M20x1.5	G 1/4

■ ***Work Principle***



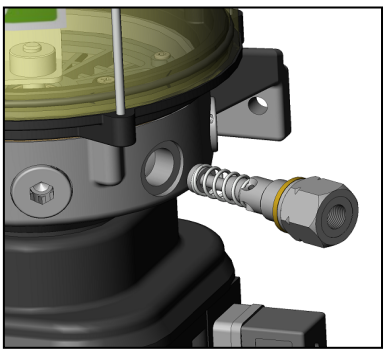
Suction phase



Delivery phase

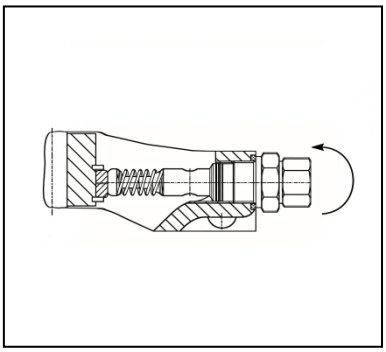
■ ***Installation of IBX pump element***

1. Only when the pump is in a non-working state can the pump element be installed or disassembled.
2. Prepare matching sealing rings and wrench tools
3. When installing, the pump element is placed horizontally, and the outlet of the pump element is kept concentric with the installation port on the pump body.
4. Tighten the pump element to the outlet of the pump body,

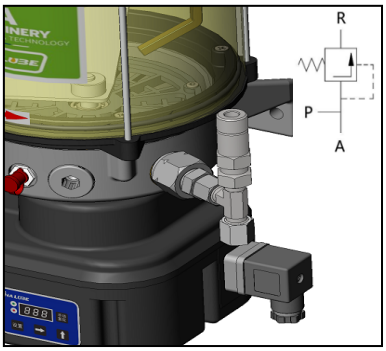


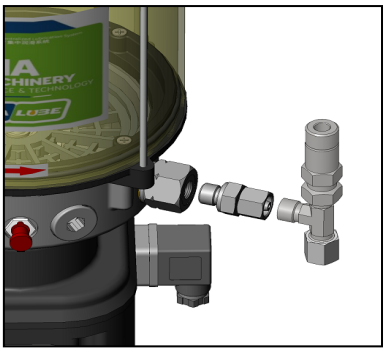
and start the machine to observe whether lubricant is discharged from the pump outlet.

5. The order of disassembly is reversed.



Safety valve





Separate safety valves are installed directly at the pump element's outlet through a fitting to protect the entire lubrication system from over-pressure. The opening pressure of the safety valve is 350 bar with three different outlet diameters: Ø6, Ø8, Ø10. If the progressive distributor or lubrication point in the system is blocked, causing the system pressure to be higher than safe pressure valve, the safety valve automatically opens the grease drain to release the pressure, thus protecting the safety of the whole lubrication system.

Model	Relief pressure (bar)	Outlet (mm)
SV-35-06	350	Ø6
SV-35-08	350	Ø8
SV-35-10	350	Ø10

WARNING

When the grease is flowing out of the relief port of safety valve, it means the system is stuck somewhere. Please check entire lubrication system to solve the problem as soon as possible. Otherwise the lubrication system and lubricated machinery will be damaged.

PF progressive divider

PF series progressive dividers can be divided into block dividers and modular dividers according to their external structure. The corresponding models are PFB, PFM, PFMS and PFG series respectively.

The displacement of each outlet of the PFB block divider is fixed at 0.2 cm^3 / stroke and the max. working pressure is 350 bar.

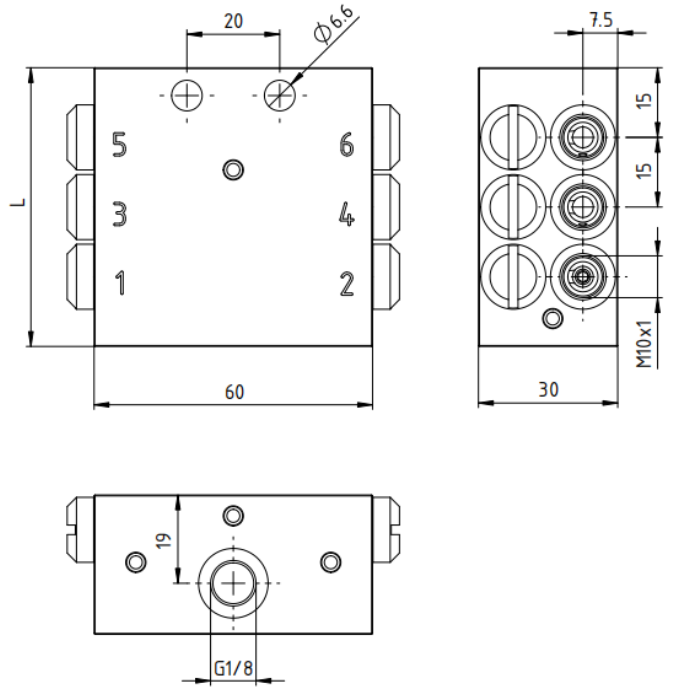
The PFM modular divider is available with 4 displacement options: 0.06 cm^3 / stroke, 0.12 cm^3 / stroke, 0.20 cm^3 / stroke and 0.24 cm^3 / stroke, with max. operating pressure of 250 bar.

The PFMS modular divider is available with 3 displacement options: 0.045 cm^3 / stroke, 0.075 cm^3 / stroke, 0.105 cm^3 / stroke, with max. operating pressure of 250 bar.

The PFG modular divider is available with 8 displacement options: 0.100 cm^3 / stroke, 0.155 cm^3 / stroke, 0.225 cm3 / stroke, 0.305 cm3 / stroke, 0.400 cm3 / stroke, 0.505 cm3 / stroke, 0.625 cm3 / stroke, 0.755 cm3 / stroke, with max. operating pressure of 250bar.

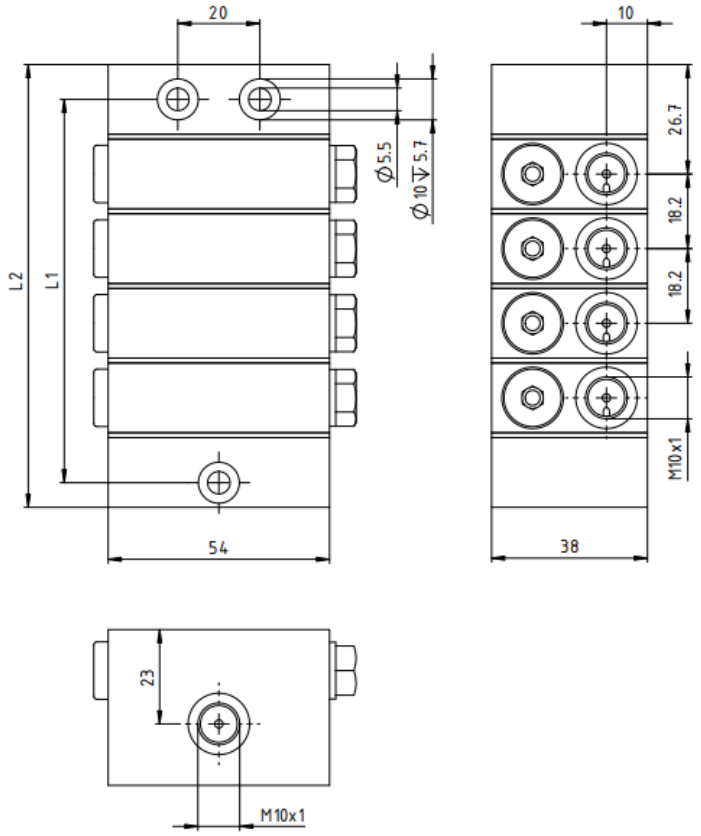
PF divider dimension

■ ***PFB***



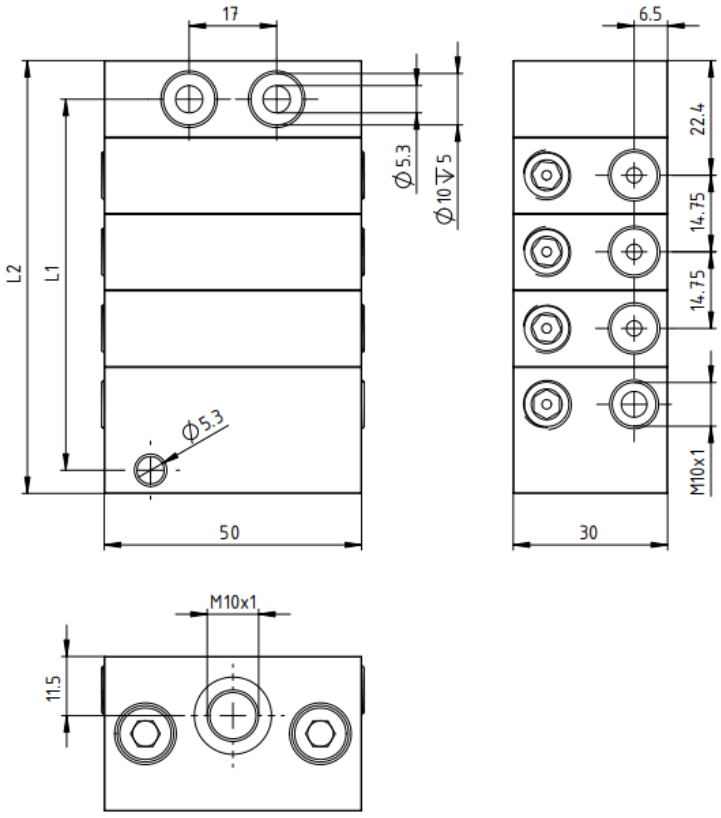
Model	L (mm)
PFB-6-...	60
PFB-8-...	75
PFB-10-...	90
PFB-12-...	105
PFB-14-...	120
PFB-16-...	135
PFB-18-...	150
PFB-20-...	165
PFB-22-...	180

■ *PFM*



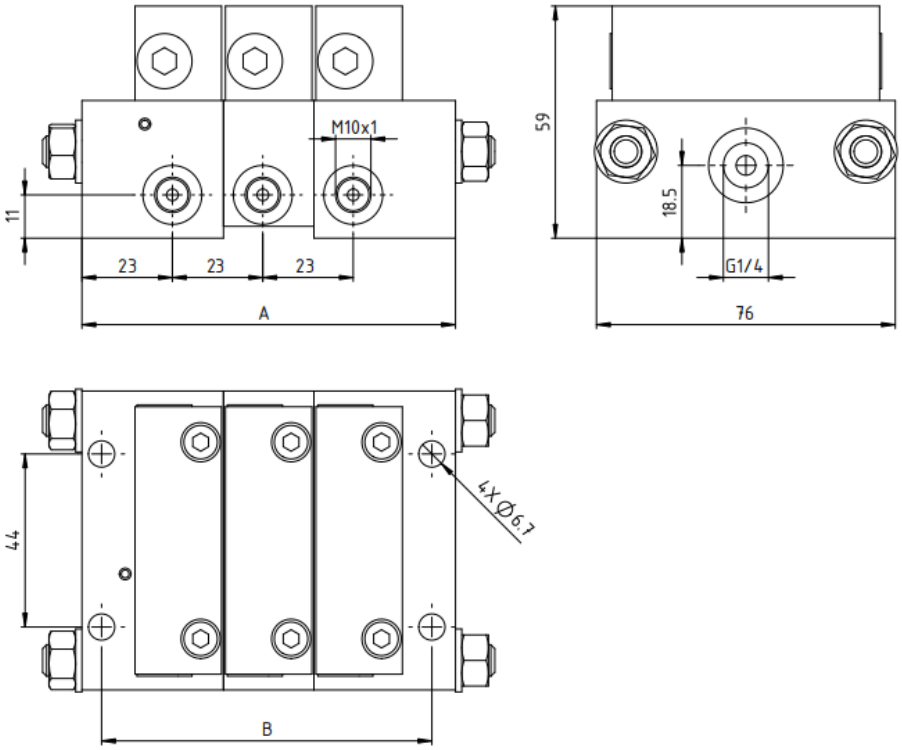
Model	L1 (mm)	L2 (mm)
PFM-3/ -...	75.3	89.8
PFM-4/ -...	93.5	108.0
PFM-5/ -...	111.7	126.2
PFM-6/ -...	129.9	144.4
PFM-7/ -...	148.1	162.6
PFM-8/ -...	166.3	180.8
PFM-9/ -...	184.5	199.0
PFM-10/ -...	202.7	217.2

■ *PFMS*



Model	L1 (mm)	L2 (mm)
PFMS-3/ -...	57.2	69.20
PFMS-4/ -...	72.0	83.95
PFMS-5/ -...	86.7	98.70
PFMS-6/ -...	101.5	113.45
PFMS-7/ -...	116.2	128.20
PFMS-8/ -...	131.0	142.95
PFMS-9/ -...	145.7	157.70
PFMS-10/ -...	160.5	172.45

■ ***PFG***



Model	L1 (mm)	L2 (mm)
PFG-3/ -...	84	95
PFG-4/ -...	107	118
PFG-5/ -...	130	141
PFG-6/ -...	153	164
PFG-7/ -...	176	187
PFG-8/ -...	199	210
PFG-9/ -...	222	233
PFG-10/ -...	245	256

PF divider outlet combination

The PF series progressive divider is a standard model with a minimum of 6 outlets and a maximum of 22 outlets. If the number of lubrication points is less than 6 or is not even number, it is possible to match the number of lubrication points by merging the divider's outlets.

■ *PFB series outlets combined*

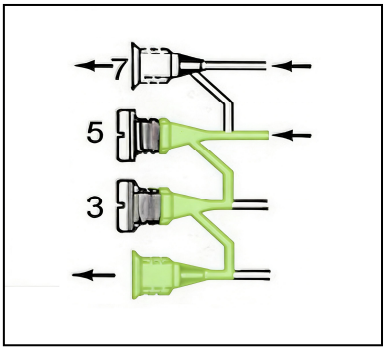
The PFB divider outlet fittings must be made of special fittings.

If a PFB divider needs odd number of outlets, it can be gotten directly by using plugs combined with outlets. The amount of lubricant at the blocked outlet will be postponed to the next outlet, as shown in the right pictures.

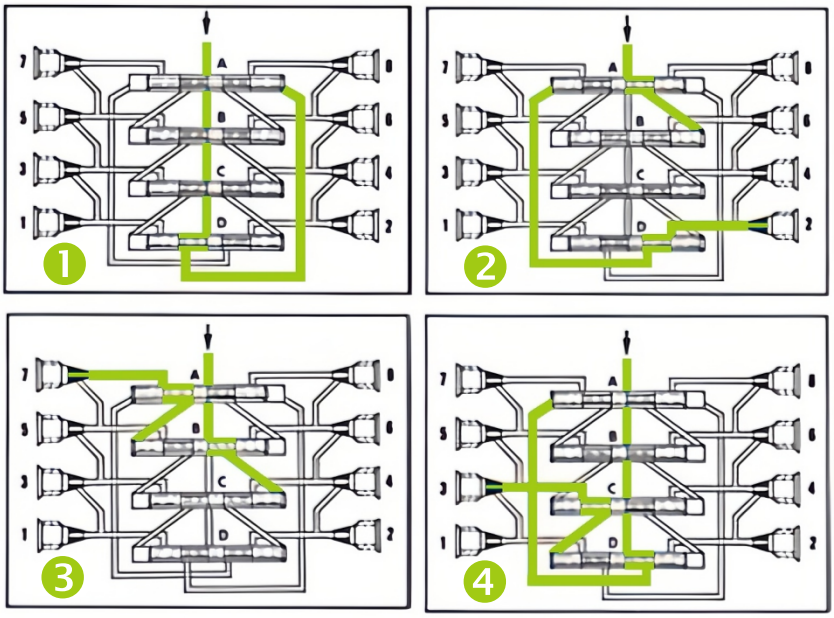
There is a sign of "->X<-" between the 1st and 2nd outlets of PFB divider, which means these two outlets can be directly combined by removing the sealing screw in the middle.

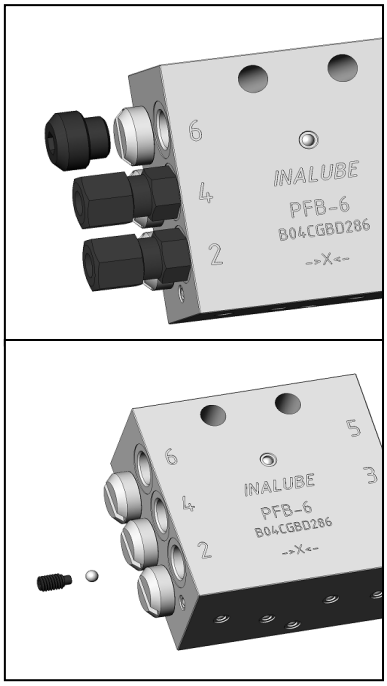
WARNING

If the outlet of PFB divider uses ordinary connector, the grease output may be inaccurate!



■ *PFB Internal Structure*



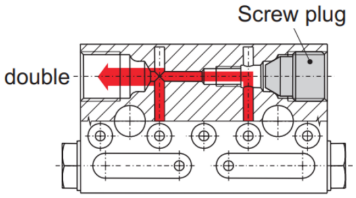


■ ***PFM / PFMS / PFG series outlets combined***

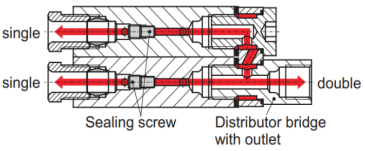
PFM, PFMS and PFG series distributors have the same outlet merging method, and both have the following two outlet merging methods: 1) Contralateral merging; 2) Merge on the same side. Please refer to the picture on the right.

When merging the opposite side, the middle sealing screw needs to be removed, and one of the outlets is blocked with a screw plug, and the output of the opposite side is doubled.

When merging on the same side, there is no need to remove the middle sealing screw, and only need to connect the two outlets on the same side with a special combination bar. There are two types of combination bars: one is no outlet after the merging, and another is one outlet after the merging.



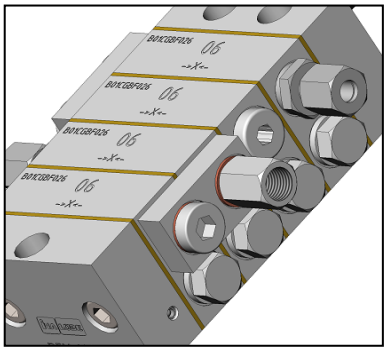
Contralateral merging

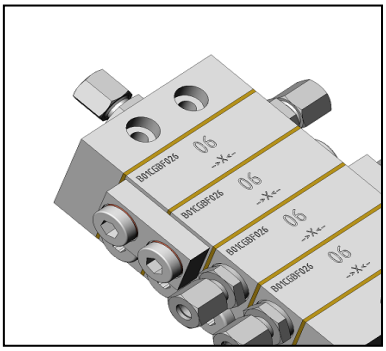


Merge on the same side

CAUTION

The combination of outlets will result in the change of displacement of the divider, which in turn will affect its accuracy and even make the lubrication system shutdown. It is suggested that before changing the outlet quantity of divider, please consult supplier's technician.



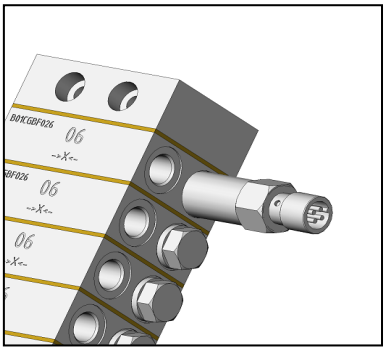


WARNING

If blocked the outlet directly without removing the sealing screw, the divider will not work normally, and even the lubrication system may fail to work!

PF divider monitoring

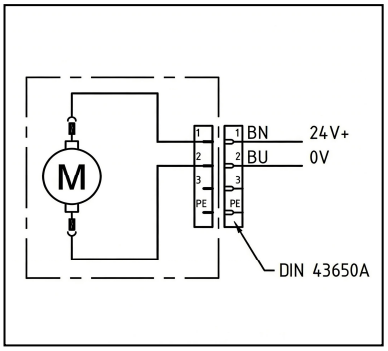
According to the need, the electric piston detector can also be installed on the divider to monitor the working state of the whole lubrication system. This electric piston detector is a non-standard accessory. If you need to order, please refer to the Catalog of LUBElite / Progressive.

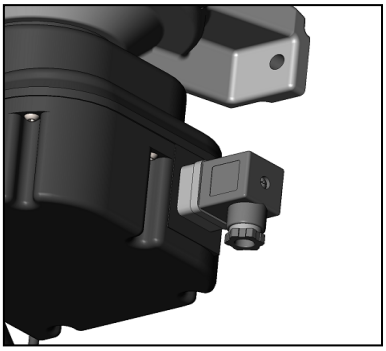


Pump electric connection

■ ***Power wiring diagram***

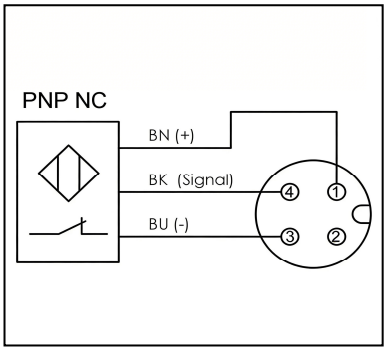
Pin	Wire color	Connection
1	Brown	24 V+
2	Black	0V

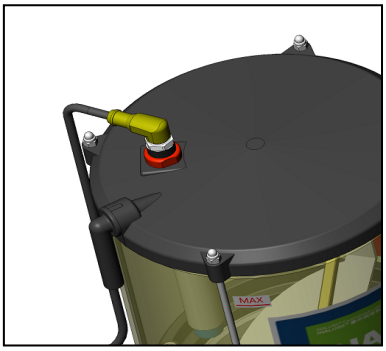




■ ***Low level switch wiring diagram (red nut)***

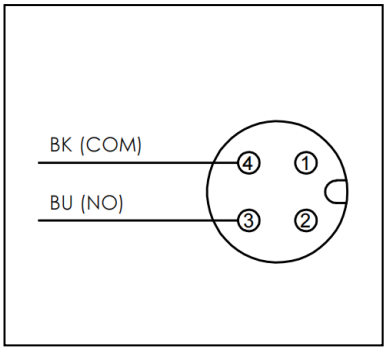
Pin	Wire color	Connection
1	Brown	24 V+
3	Blue	0V
4	Black	Level alarm PNP





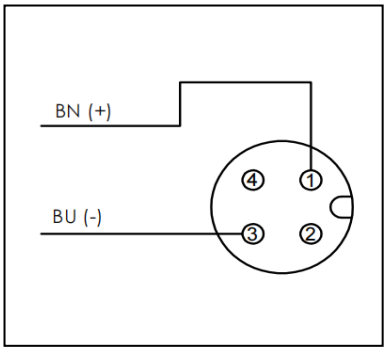
■ ***Remote alarm wiring diagram (orange nut)***

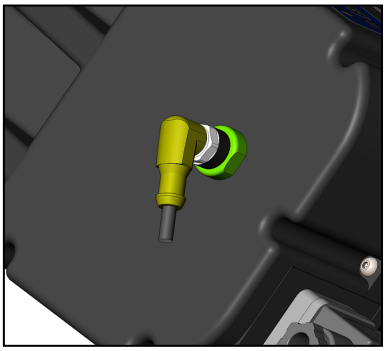
Pin	Wire color	Connection
3	Blue	NO
4	Black	COM



■ ***Remote startup wiring diagram (green nut)***

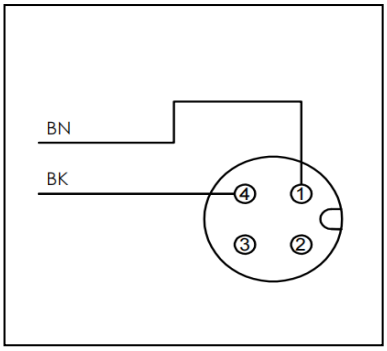
Pin	Wire color	Connection
1	Brown	+
3	Blue	-

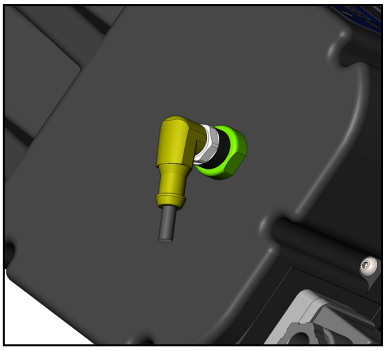




■ ***MODBUS wiring diagram (green nut)***

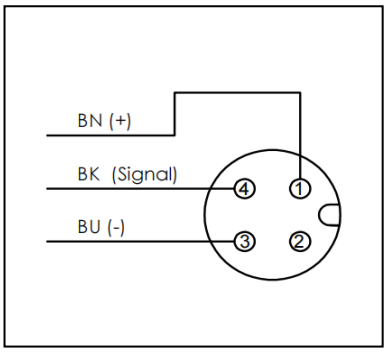
Pin	Wire color	Connection
1	Brown	A
4	Black	B

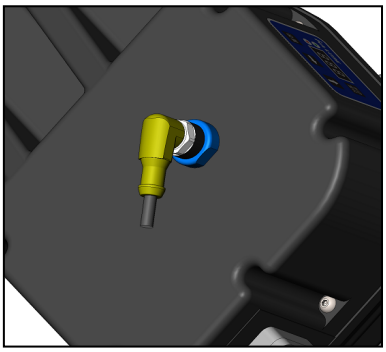




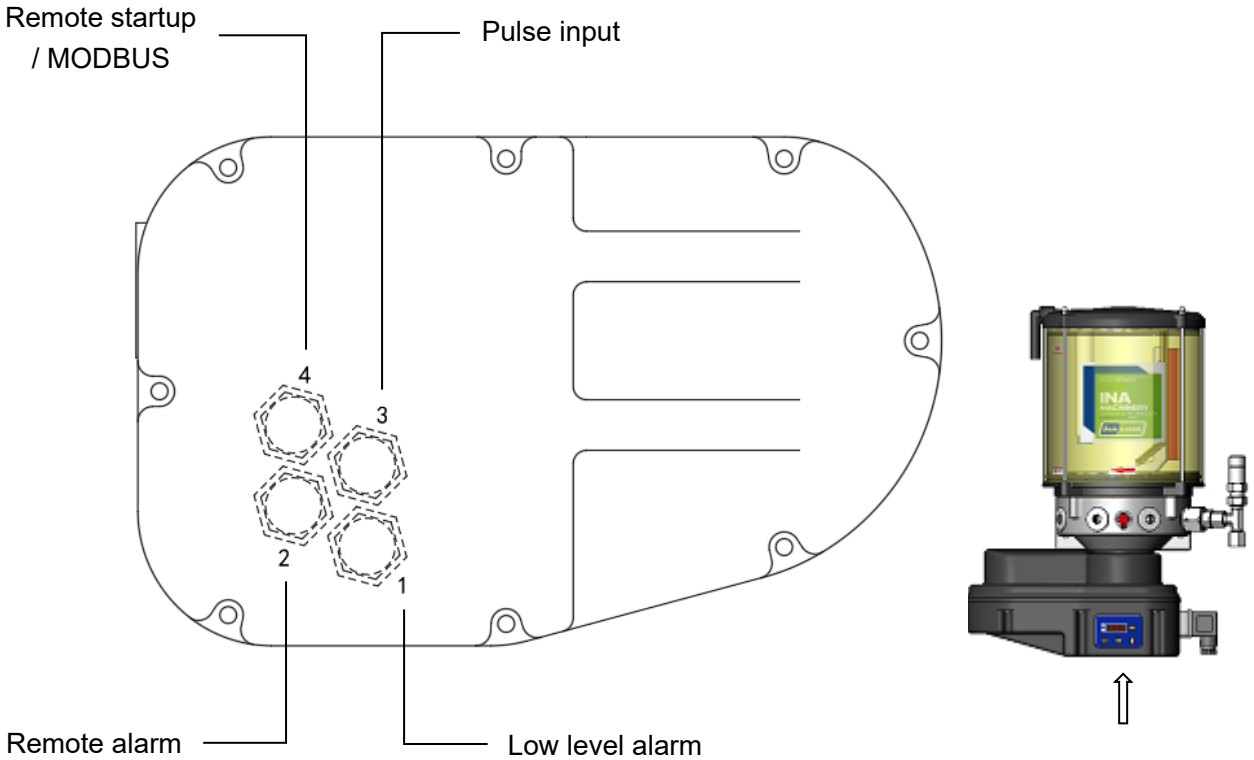
■ ***Pulse input wiring diagram (blue nut)***

Pin	Wire color	Connection
1	Brown	24 V+
3	Blue	0V
4	Black	Pulse PNP





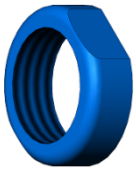
Signal connection interface



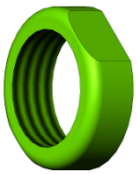
■ ***Colorful nut of signal connection port***

#1 port: Low level alarm terminal

#2 port: Remote alarm terminal



#3 port: Pulse input terminal



#4 port: Remote startup / MODBUS terminal

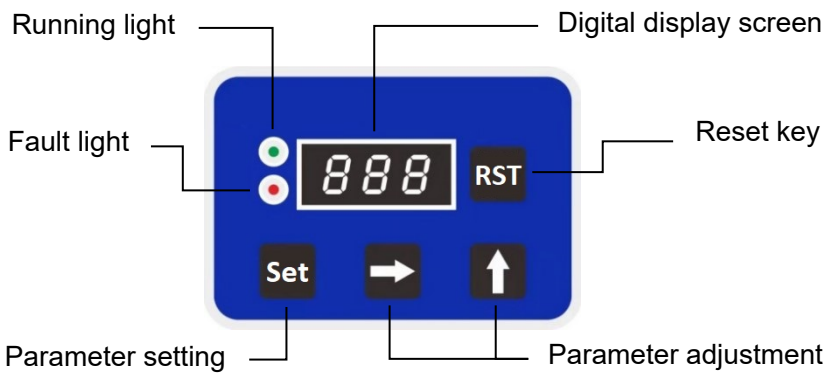
Control system

■ ***No controller integrated***

No need to set parameters, The pump unit can start working by turning on the power supply.

■ ***Digital display key controller***

The controller is protected from moisture and contaminants by a membrane panel. The controller has two options for programmers, depending on the color of the control panel. The blue panel represents the interval time unit is hour. The green panel represents the interval time unit is minute.



WARNING

Do not scrub the film panel with organic solvent. If you want to clean the panel, you can wipe it with a soft cloth dipped in neutral detergent. Do not scratch with sharp objects, so as not to damage the film panel.

■ ***Display screen***

Display working data and working status.

■ ***Indication light***

The indication light is always on, which means that the indication light is on continuously and stably. The indication light flashes, which means that the indication light flashes at the frequency of 0.5 s when it lights up and 0.5 s when it goes out.

■ ***Controller panel keys***

The display 

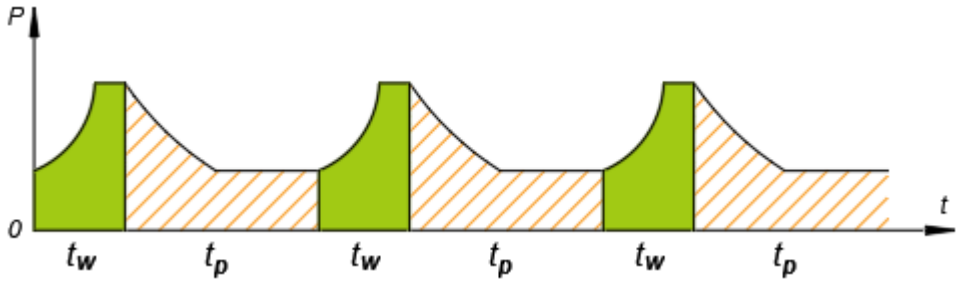
shows the number as time, the unit is minutes or hours, the working time is 1-999 minutes adjustable, intermittent time is 1-999 minutes or hours adjustable. When the pump is running, the green light is on. When the pump is stop running, the red light is on. when setting or alarming, the green and red lights flashes at the same time.

■ ***Working mode***

✧ **Time mode**

d-1 signs in control panel is time mode. Timing is working base of lubrication pump and system.

They repeat the "pause / working" status under management of controller according to the preset pause and working time.



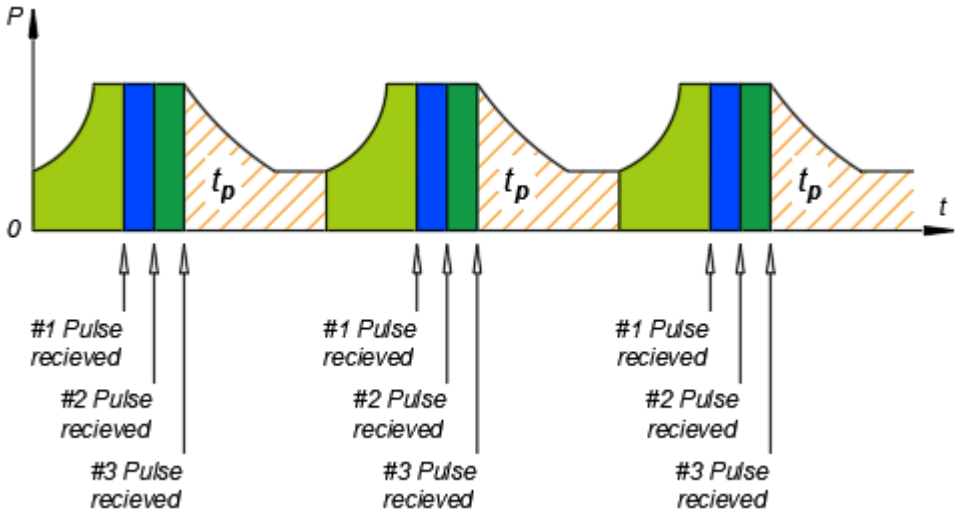
✧ **Pulse mode**

d-3 signs in control panel is pulse mode. In pulse mode, the function of pause time is same as pause time of time mode, but the working time is replaced by quantity of pulse received.

When pump unit starts working, it will receive the signal triggered by piston detector mounted in progressive divider. The pump will stop working and goes into pause time until the certain number of signals are received. This number could be adjustable and settable between 2-999.

If the pump unit doesn’t receive the pulse signal within 5 minutes (this is factory setting and can not be

modified), the system will send alarm.



- ***Forced operation***

Press the key RST on the control panel, the lubrication pump is forced to re-perform the complete lubrication process in accordance with the working mode set by the operating program.

- ***System monitoring***

The controller can connect with piston detector, which is used to monitor the plunger movement of the progressive distributor. If the piston detector does not send the signal of movement of the plunger during lubrication, the fault can be automatically monitored and displayed.

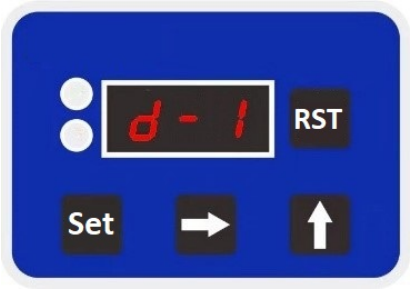
- ***Power fault protection***

The controller has power-off protection function. If power is off at work, then when power is on again, the pump will start working from the last working time. Record the intermittent time when the power is off during the intermittent time, and continue to the time from the last intermittent time when the power is on again.

Parameter setting

Setting key, displacement key and adding key are used to set parameters. The manual reset key is used to force start-stop control. The indication light is used to display the status of the controller, and the displayed time unit is minutes or hours.

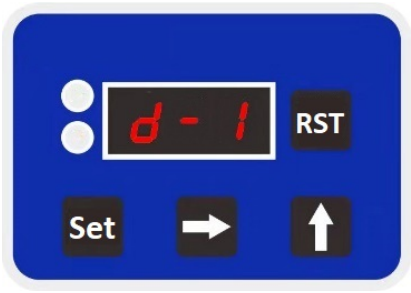
■ ***Display***

When the pump is running or the pump running time is set, the display signal light is green.	
When the pump is in a suspended state or the pump pause time is set, the display signal light is red.	
Press and hold the **Set** key, the green and red lights are off at the same time, the display screen displays the "working mode" selection status. If only the green light is lit, the display screen displays the "working time" setting status, and if the red light is lit, the display screen displays the "intermittent time" setting status.	
Press the key → , select the digital screen location that you want to change. Press the key ↑ , the corresponding quantile digits jump from 0 to 9.	
When the red and green light flash at the same time, the system will have a fault alarm, and the alarm code will be displayed on the display screen (for specific alarm code description, please refer to chapter of Troubleshooting), and long press the **RST** button to cancel the fault alarm.	

■ ***Time mode setting***

Step 1:

Press and hold the key Set to enter the lubrication system working mode setting (red and green light are off at the same time), press the key ↑ to select the ***d-1*** time working mode.



Step 2:

Press and hold the key Set to enter the working time setting (the green light flashes), press the key → to select the quantile, and the key ↑ to select the number of the quantile. Press and hold the key ↑ to quickly change the value of 0-9 cycle. The range can be set: ***001-999*** minutes.

Step 3:

Press and hold the key Set to enter the intermittent time setting (the red light flashes), press the key → to select the quantile, and the key ↑ to select the number of the quantile. Press and hold the key ↑ to quickly change the value of 0-9 cycle. The range can be set: ***001-999*** minutes (or hours).

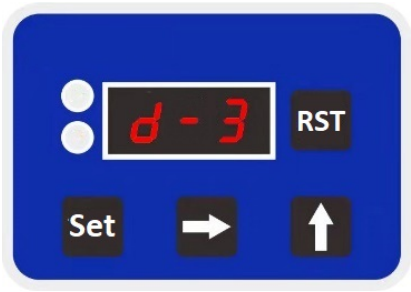
Step 4:

Press and hold the key Set to confirm the setting, and the screen will display the previously set working time and start working normally. If there is no key operation within ***30*** seconds, the current setting will be invalid, and the parameters set before will be automatically restored.

■ ***Pulse mode setting***

Step 1:

Press and hold the key Set to enter the lubrication system working mode setting (red and green light are off at the same time), press the key ↑ to select the ***d-3*** pressure working mode.



Step 2:

Press and hold the key Set to enter the pulse quantity setting (the green light flashes), press the key → to select the quantile, and the key ↑ to select the number of the quantile. Press and hold the key ↑ to quickly change the value of 0-9 cycle. The range can be set: ***002-999*** pulses.

Step 3:

Press and hold the key Set to enter the intermittent time setting (the red light flashes), press the key → to select the quantile, and the key ↑ to select the number of the quantile. Press and hold the key ↑ to quickly change the value of 0-9 cycle. The range can be set: ***001-999*** minutes (or hours).

Step 4:

Press and hold the key Set to confirm the setting, and the screen will display the previously set pulse quantity and start working normally. If there is no key operation within ***30*** seconds, the current setting will be invalid, and the parameters set before will be automatically restored.

Operation & maintenance

■ *Cleaning*

The necessary maintenance work of the lubrication system is to replenish the reservoir regularly, and it is required to check regularly whether the lubricant is actually pumped to each lubrication point. In addition, it is also necessary to check whether the lubrication pipeline is damaged or leaked. If damage is found, please replace it in time.

When using centralized lubrication system, the cleanliness of lubricant should be especially ensured.

WARNING

When filling the reservoir with lubricant, make sure that the operating environment is clean and tidy, and only use appropriate tools to fill clean lubricant. Otherwise, solid contaminants will cause serious faults such as blockage of lubrication system!

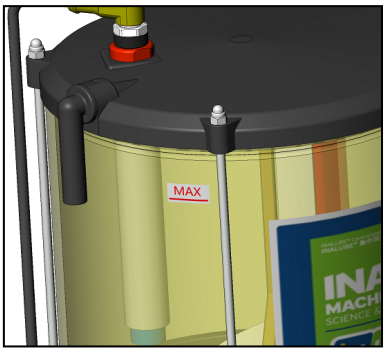
WARNING

Do not use perchloroethyl ether, trichloroethyl ether or similar solvents as cleaning agents, and do not use polar organic solvents such as alcohol, methanol, acetone and similar solvents. Otherwise the pump reservoir will be cracked.

■ *Refilling lubricant*

When refilling the pump reservoir, do not exceed the highest level which is upper mark line (MAX mark line) . The lubricant used shall be grease of NLGI 2 and below. The lubricant used must be clean and free of impurities, and maintain a stable viscosity during usage.

If the pump reservoir is completely empty when refilling the grease, it needs to wait for 20 minutes to reach the set displacement.



WARNING

Strictly prohibited to refill by disassembling the tank top lid! This action can mix contaminants and air bubble into the grease, causing the lubrication system to clog or fail to deliver grease properly, and in severe cases, it can damage the bearings!

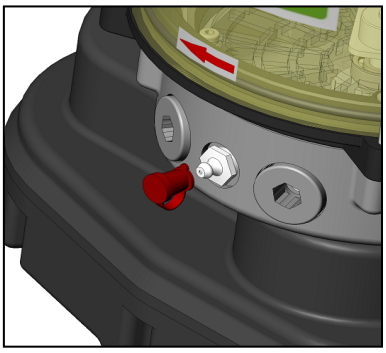
NOTE

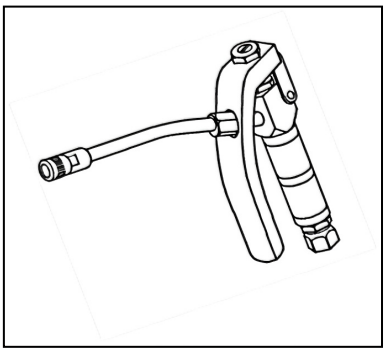
Most lubricants sold on the market will not cause damage to lubrication system. If not sure whether some special additives in grease will damage the lubrication system, please contact the technician of supplier before filling!

■ ***Refilling port***

✧ **DIN 71412 A grease nipple**

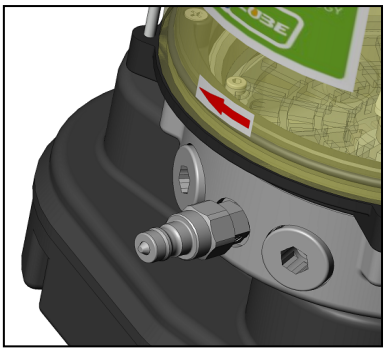
This is the factory configuration. Use a common greasing gun to fill lubricant through a grease nipple on the lubrication pump.

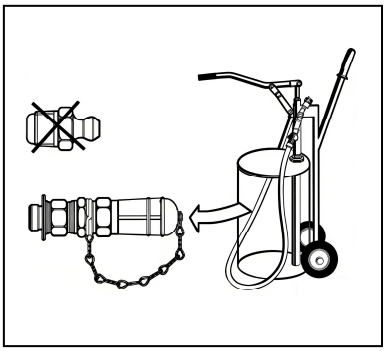




✧ **ISO 7241 A hydraulic coupling**

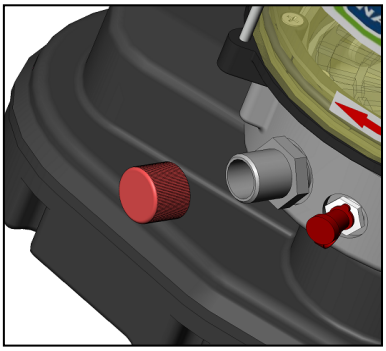
Remove the grease nipple on the lubrication pump and replace it with a hydraulic coupling. Refilling the lubricant through this hydraulic coupling.

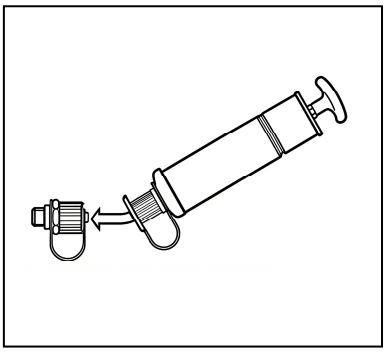




✧ **Grease filling cartridge**

Remove one of pump outlet plugs on the lubrication pump and replace it with a special joint for grease filling cartridge.





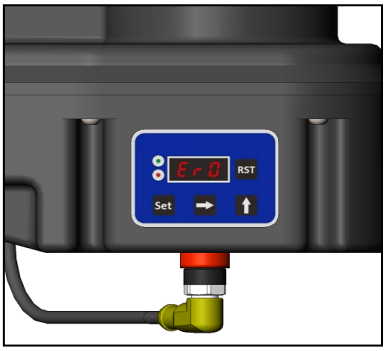
■ ***Filling level confirmation***

✧ **Visual checking**

Transparent reservoir is convenient for observation. For the safety of lubrication system, this kind of checking needs to be carried out frequently and regularly.

✧ **Automatic detection**

The lubrication pump is optional with a low level switch. When the lubricant level is lower than the "MIN" mark, the lubrication pump automatically stops working, the digital display screen Er0 displays the fault signal, and the green and red lights flash to make an alarm.



WARNING

When the lubricant level is lower than the "MIN" mark, then refill grease immediately, otherwise air will mix into the lubrication system, and cause system failure!

NOTE

When refilling grease into the reservoir, do not fill above the MAX level line.

■ ***Air bleeding***

1. Disassemble the main line on the lubrication pump, start the pump to work until the discharged grease no longer contains air bubbles, and then reconnect the main line.
2. Disassemble the main pipe at the main divider inlet, start the pump until the discharged grease no longer contains air bubbles, and then reconnect the main pipe.
3. Disassemble the branch line at the outlet of the main divider, start the pump until the discharged grease no longer contains air bubbles, and then reconnect the branch line.
4. Follow the above method in sequence to perform air bleeding operations on branch pipes, sub-dividers, and pipelines leading to lubrication points.

WARNING

Before operating the lubrication system, it is necessary to perform air bleeding of the system; otherwise, the lubrication system may fail to work properly!

■ ***Repair lubrication pump***

Original accessories must be used for maintenance. During the warranty period or when overhaul is needed, please return the pump to the original factory for maintenance.

■ ***Replace pump element***

Remove the safety valve from the pump element. When removing the pump element, pay attention to prevent the parts from falling into the reservoir, because they will hinder the operation of the motor. Otherwise, it is necessary to remove the reservoir before taking out these parts and replacing them with new pump element and sealing ring.

■ ***System test***

By manually starting the additional lubrication cycle, you can check whether the system is running normally. Once the additional lubrication cycle is started, the lubrication pump begins to pump lubricant to each lubrication point.

1. Check whether the pipeline is leaking.
2. Check whether the lubrication point has grease.
3. Check whether the running and interval time setting are correct. If necessary, please reset the lubrication time and cycle according to the application needs.

Troubleshooting

■ ***Motor and pump fault***

Malfunction	Possible cause	Corrective action
Pump does not operate	No power supply	Check the power supply and fuse, troubleshoot or replace the new fuse.
		Check the circuit from the fuse to the pump power plug.
	Motor fault	Check the motor power supply and replace the motor if necessary.
Pump is working but no lubricant delivered	Empty reservoir	Fill the reservoir and start the pump until the grease flow out from the lubrication point. *Note: It takes 10 ~ 20 minutes for the pump to reach the setting displacement. (Relative to ambient temperature and type of grease)*
	Lubricant mixed with air bubbles	Loosen the relief valve outlet connector or main line, start the additional lubrication cycle until no air bubbles emerge from the grease, and then tighten again. *Note: When using quick plug-in connector, the high pressure hose is not easy to be removed from the safety valve under pressurized state, so it is necessary to loosen the plug or emergency nozzle of the safety valve to release the pressure.*
	Not applicable lubricant	Replace grease that meets the requirements.
	Pump element suction port blocked	Remove the pump element and remove contamination.
	Wear of pump element	Replace the pump element.
	Damage or jamming of check valve in pump element	Replace the pump element.

■ ***Fault monitoring and handling***

When the controller detects the system fault, the red and green indication lights on the control panel will flash at the same time to remind the user that the lubrication system has failed. The lubrication system stops working, waiting for the user to handle the fault. The specific fault cause can be viewed through the display screen.

✧ **Meaning of fault message**

	The pump does not receive pulse signal from the piston detector of progressive divider during operation
	The motor current is less than 0.2 A during the operation of the pump
	The motor current is greater than 5A during the operation of the pump
	When the pump is running, the grease level is lower than the lowest level
	Insufficient input power supply or controller memory capacity

✧ **Clear the fault signal**

After troubleshooting, press the reset key  , and the controller will clear the fault signal and return to the operating state.

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