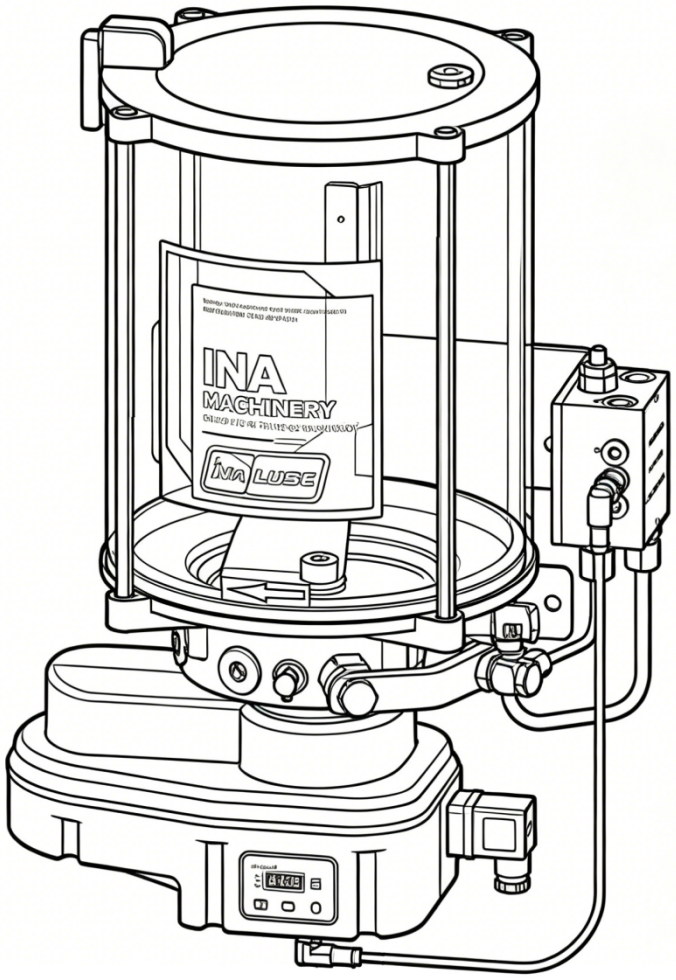
LUBElite™菁英系列双线式
集中润滑系统操作手册



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

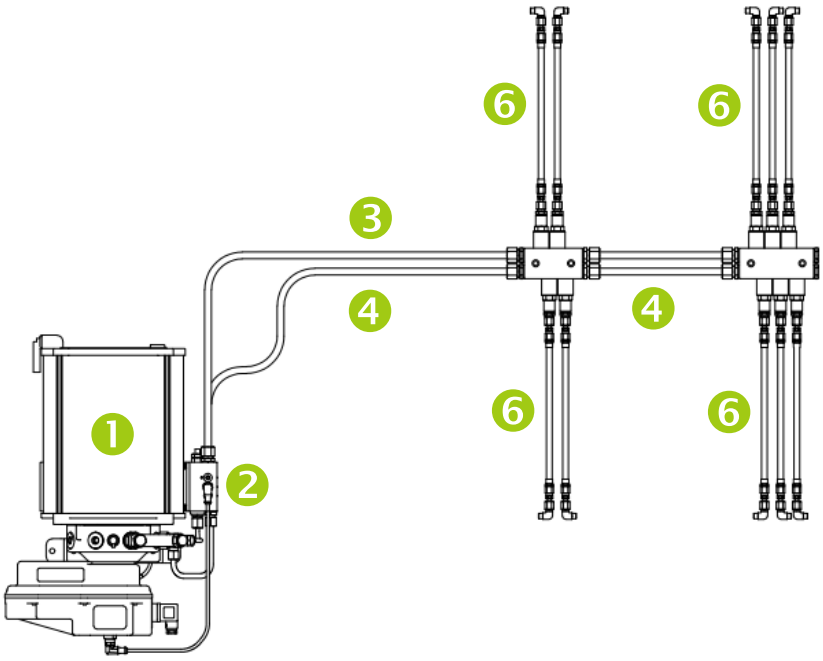
LUBElite 21 系列电动双线润滑泵适用于黏度等级最高达 NLGI 2 的润滑脂。适用润滑脂等级最高可达 NLGI 2。每台润滑泵配备两个出油口，可配套一套双线润滑回路。

该泵站主要由油箱、无刷直流电机总成、泵芯、换向阀、控制器及其他附件组成。

当泵①开始工作时，润滑脂经换向阀②的 P 口泵入 A 主油管③。润滑脂经双线分配器⑤定量分配后，通过润滑点管路⑥输送至各润滑点位。同时，B 主油管④内的润滑脂经由换向阀②的 R 口回流至泵①的油箱。

当 A 主油管③内压力达到换向阀②的设定值（如 150 bar）时，换向阀自动切换油脂流向；此时泵①向 B 主油管④加压供油，经双线分配器⑤送至各润滑点，直至再次达到换向阀②的设定压力，同时 A 主油管③进行泄压。

如此循环往复换向供油，直至换向阀②的传感器向泵控制器发送预设数量的脉冲信号，泵①随即停止工作，进入待机状态；等待间隔时间结束后，自动开启下一个润滑循环。



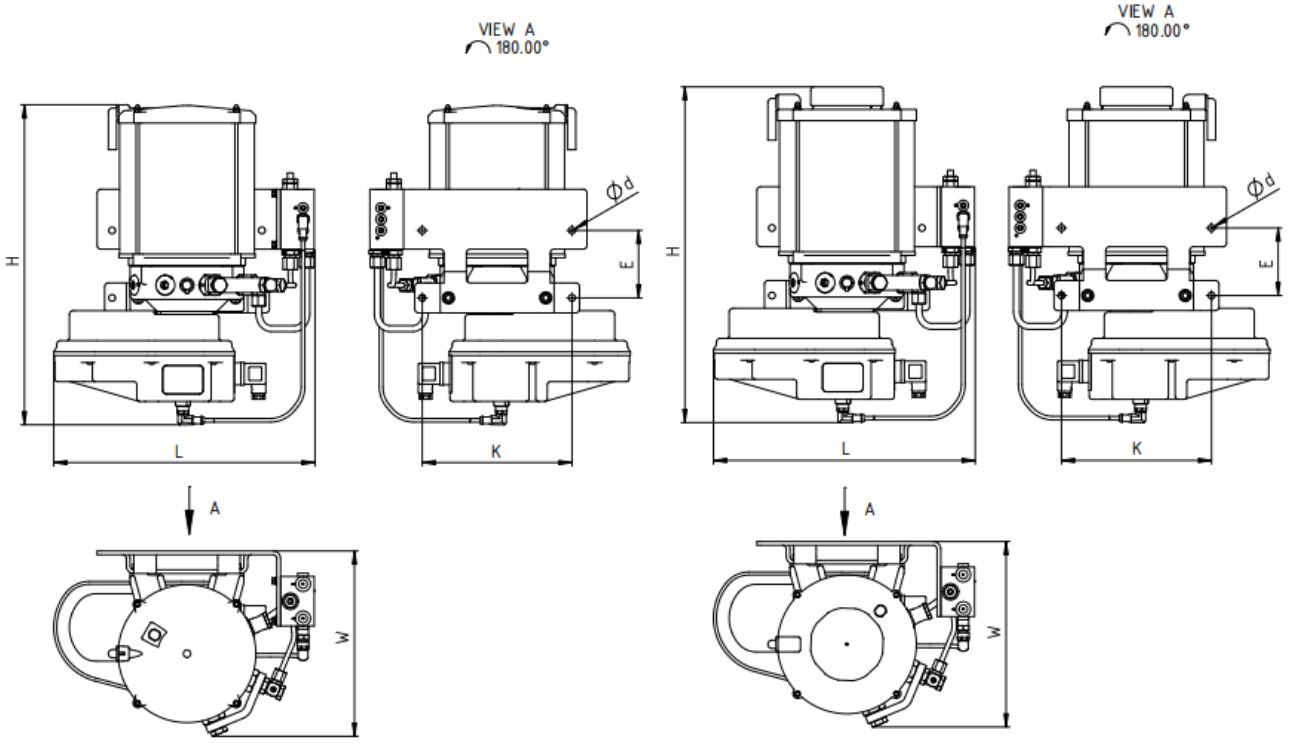
① 润滑泵
② 换向阀
③ 主管路 A
④ 主管路 B
⑤ 双线分配器
⑥ 润滑点管路

技术参数

工作电压	DC 24 V 或 AC 230V/50 Hz
额定功率	< 100 W
电源连接	DIN 43650 A
防护等级	IP 66
泵出油量	12 cm^3/min
出口螺纹	2 x G 1/4
工作压力	130 ~ 250 bar 可调，预设 150 bar
油箱容积	4, 6, 8, 10 L
补油口	DIN 71412 A 和、或顶盖加油
润滑剂	NLGI 0, 1, 2
工作温度	-41 °C ~ +70 °C
安装方式	竖直安装

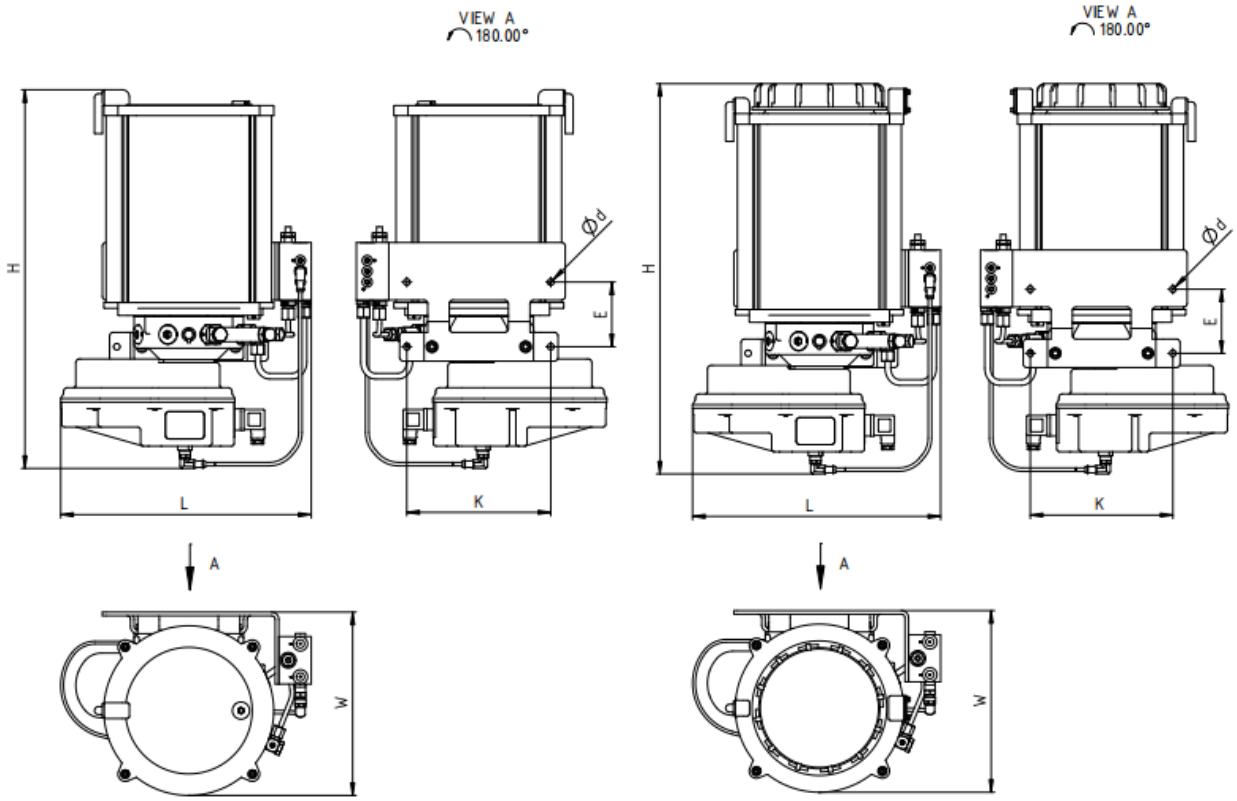
润滑泵外形尺寸

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



型号	油箱 (L)	顶盖加油	工作电压	H (mm)	W (mm)	L (mm)	K (mm)	E (mm)	Ød (mm)
LEP212D...	4	/	DC 24V 或 AC 230V/50Hz	430	250	350	200	90	9
LEP212DT...		有		450					
LEP212PD...	6	/		520					
LEP212PDT...		有		540					

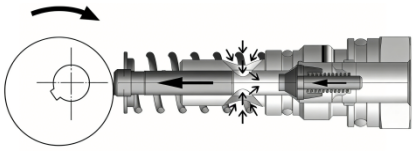
■ ***DC 24V 或 AC 230V/50 Hz, 8/10 L 油箱***



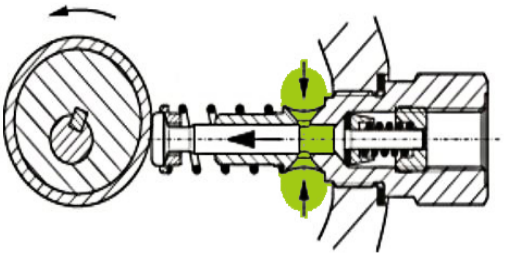
型号	油箱 (L)	顶盖加油	工作电压	H (mm)	W (mm)	L (mm)	K (mm)	E (mm)	Ød (mm)
LEP213...	8	/	DC 24V 或 AC 230V/50Hz	530	255	350	200	90	9
LEP213T...		Yes		550					
LEP2110...	10	/		560					
LEP2110T...		Yes		580					

泵芯

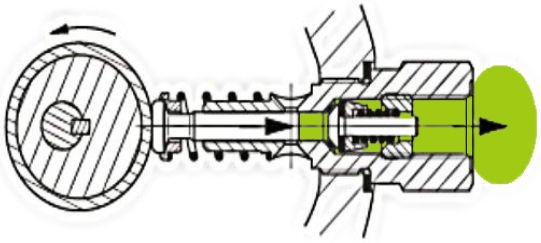
LUBElite 21 系列双线润滑泵配置双泵芯，总输出排量为 12 cm^3/min。两个泵芯出油口通过 V 型并口件汇流连通。泵芯为弹簧复位式结构。泵芯型号规格如下：

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

■ ***工作原理***



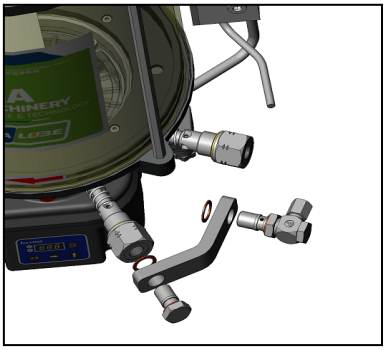
抽油阶段



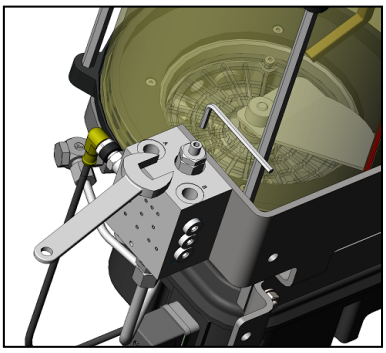
出油阶段

■ ***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。



压力换向阀



压力换向阀是 LEP 双线润滑泵的核心部件之一，其作用是定期切换润滑脂流向，使双线分配器正常工作。若无此阀，双线润滑系统将无法运行。

该阀体设有五个油口，分别标注“**A**”、“**B**”、“**P**”以及两个功能相同的“**R**”口。

各油口含义如下：

A：接入 A 主油管

B：接入 B 主油管

P：出油口（已与泵芯连通）

R：泄压回油口（已连通油箱）

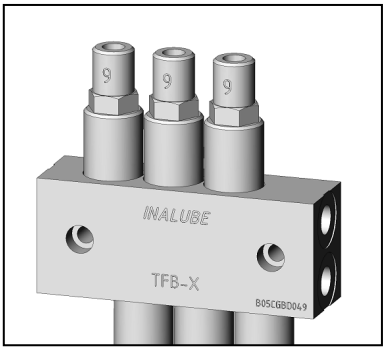
警告

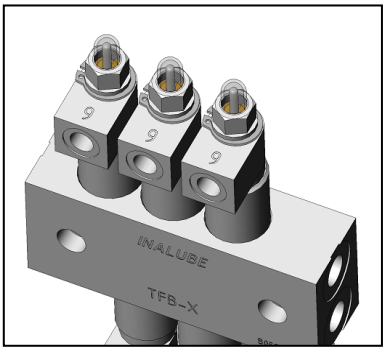
非必要请勿调节压力换向阀的压力设定值，否则会造成润滑泵损坏。

该换向阀出厂默认设定压力为 150 bar，也可按以下步骤调节压力：

1. 用 17 号开口扳手松开锁紧螺母。
2. 用 4 号内六角扳手旋转调节螺钉（顺时针：压力增大；逆时针：压力减小，每旋转一圈压力变化 47 bar），调至所需压力值。
3. 压力调节到位后，拧紧锁紧螺母即可。

TF 双线分配器



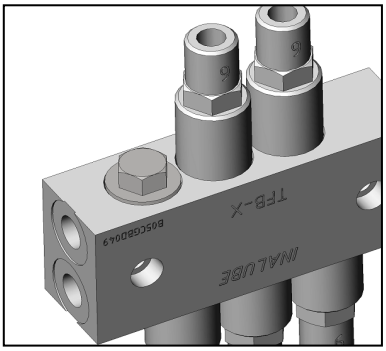


■ ***TF 分配器类型***

TF 型双线分配器分为 TFB 和 TFU 两个系列。两者主要区别在于出油口朝向：TFB 为双侧出油，TFU 为单侧出油。两款型号最高工作压力均可达 250 bar。TFB 与 TFU 均有普通型和监控型两种版本。监控型在出油口内置目视指针，可监控分配器的工作状态。每个出油口有 14 种排量规格可供选择。选定对应排量后，分配器出油口处会标注相应编号，规格如下所示。

TF 系列双线分配器标准型号最多可配置 8 个出油口。用不到的出油口，可直接封堵，不影响设备正常使用。建议采用专用堵头（零件号：81-1020-003）永久替换闲置的计量单元，效果更佳。

标记	单向行程 (cm³/行程)	往复循环 (cm³/循环)
1	0.09	0.18
2	0.18	0.36
3	0.27	0.54
4	0.35	0.70
5	0.45	0.90
6	0.55	1.10
7	0.65	1.30
8	0.70	1.40
9	0.80	1.60
X	0.90	1.80
10	1.00	2.00
15	1.50	3.00
25	2.50	5.00
35	3.50	7.00



警告

严禁使用非专用堵头替代 TF 系列专用堵头，否则将导致润滑系统无法正常工作！

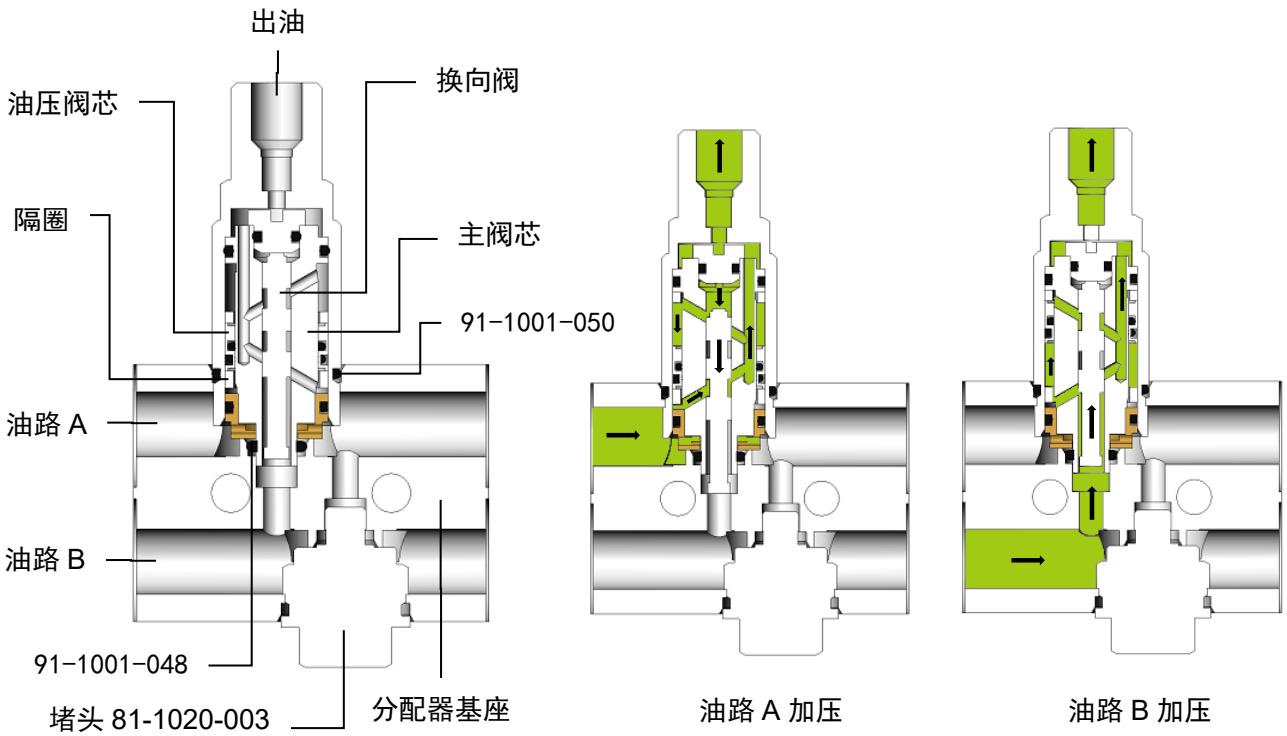
警告

任意堵头（81-1020-003）或计量阀维修更换时，也需要同时更换 2 个配套的 O 型圈，否则有漏油或内泄风险！

O 型圈型号：**91-1001-048、91-1001-050**

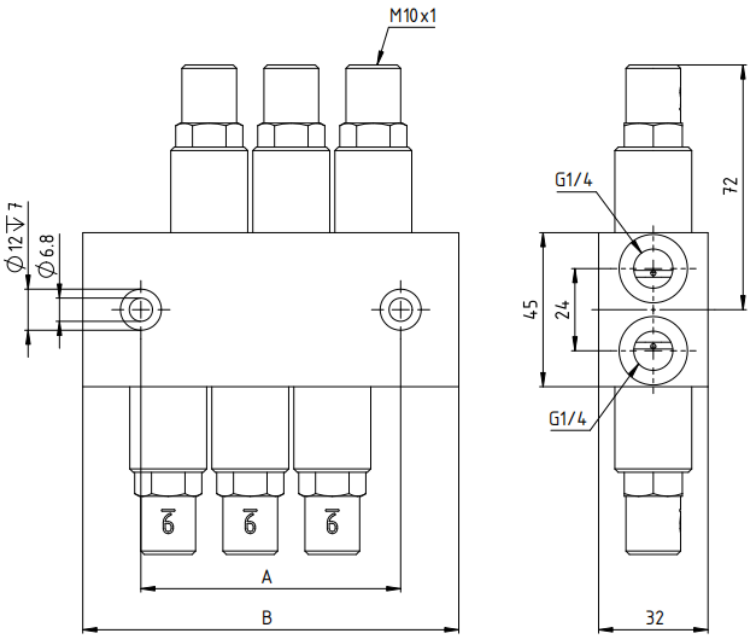
■ *TF 分配器工作原理*

所有 TF 双线分配器的计量阀，内部结构都相同，工作原理也都相同。更换隔圈型号和数量可以得到不同的出油量。任何一个分配器出口堵塞了，其余分配器和整个润滑系统依然能正常工作。



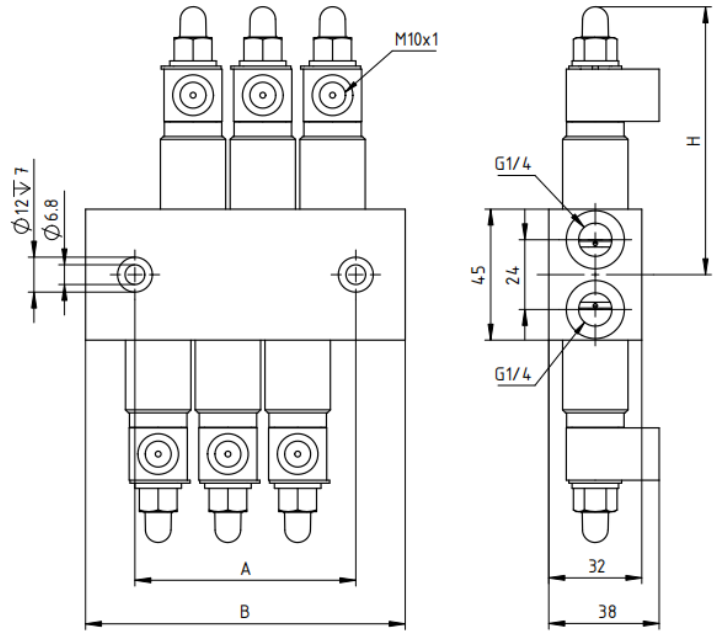
TF 分配器外形尺寸

■ ***TFB（标准型）***



型号	A (mm)	B (mm)
TFB-2-/	28	62
TFB-4-/	52	86
TFB-6-/	76	110
TFB-8-/	100	134

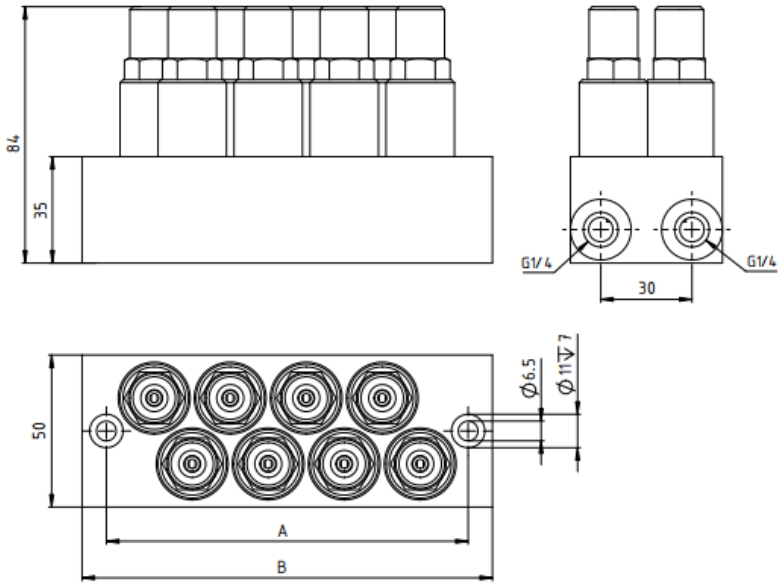
■ ***TFB（指针型）***



型号	计量阀	A (mm	B (mm	H (mm
TFB-2-/	1 - X	28	62	92
TFB-4-/	1 - X	52	86	92
TFB-6-/	1 - X	76	110	92
TFB-8-/	1 - X	100	134	92

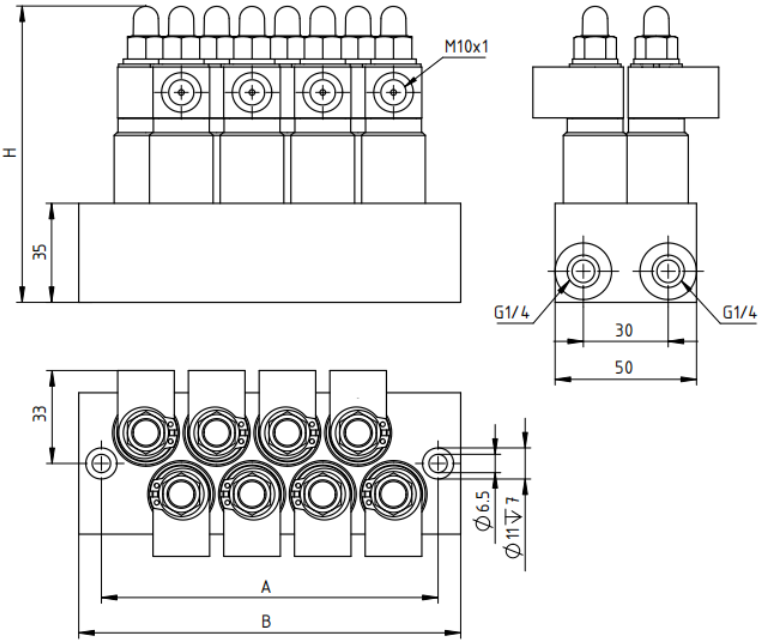
型号	计量阀	A (mm)	B (mm	H (mm
TFB-2-/	10/15/ 25/35	28	62	122
TFB-4-/	10/15/ 25/35	52	86	122
TFB-6-/	10/15/ 25/35	76	110	122
TFB-8-/	10/15/ 25/35	100	134	122

■ *TFU（标准型）*



型号	A (mm)	B (mm)
TFU-2-/	44	60
TFU-4-/	69	85
TFU-6-/	94	110
TFU-8-/	119	135

■ *TFU（指针型）*



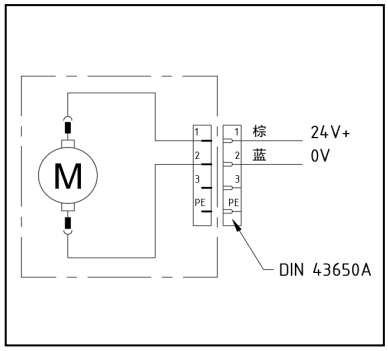
型号	计量阀	A (mm	B (mm	H (mm
TFU-2-/	1 - X	44	60	105
TFU-4-/	1 - X	69	85	105
TFU-6-/	1 - X	94	110	105
TFU-8-/	1 - X	119	135	105

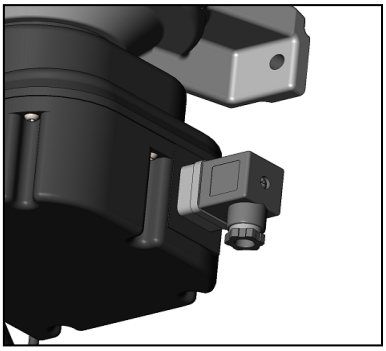
型号	计量阀	A (mm)	B (mm	H (mm
TFU-2-/	10/15/ 25/35	44	60	135
TFU-4-/	10/15/ 25/35	69	85	135
TFU-6-/	10/15/ 25/35	94	110	135
TFU-8-/	10/15/ 25/35	119	135	135

润滑泵电气连接

■ *电源接线*

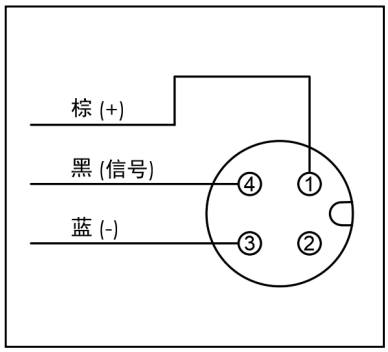
针脚	电线颜色	连接
1	棕	24 V+
2	黑	0V

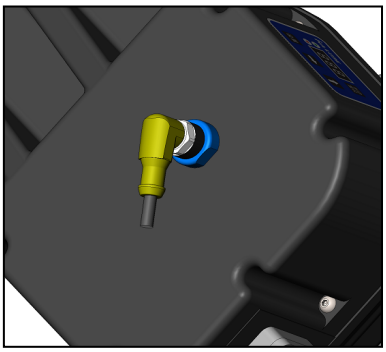




■ *换向阀脉冲输入接线（蓝色螺母）*

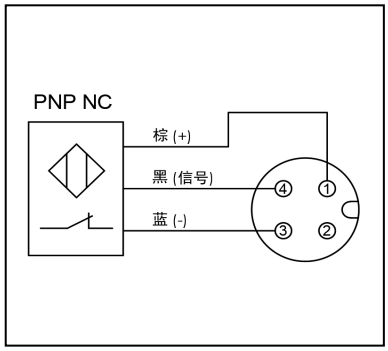
针脚	电线颜色	连接
1	棕	24 V+
3	蓝	0V
4	黑	脉冲 PNP

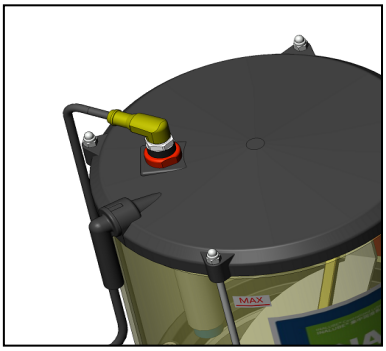




■ *低液位开关接线（红色螺母）*

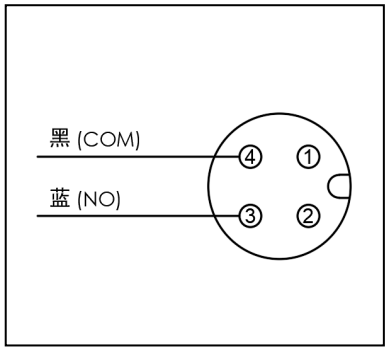
针脚	电线颜色	连接
1	棕	24 V+
3	蓝	0V
4	黑	液位报警 PNP





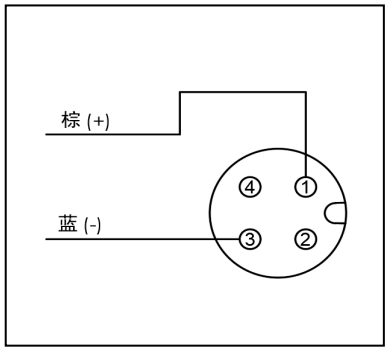
■ *远程报警接线（橙色螺母）*

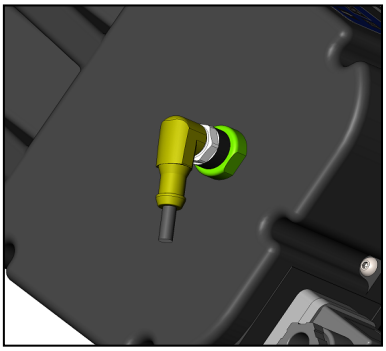
针脚	电线颜色	连接
3	蓝	NO
4	黑	COM



■ *远程启动接线（绿色螺母）*

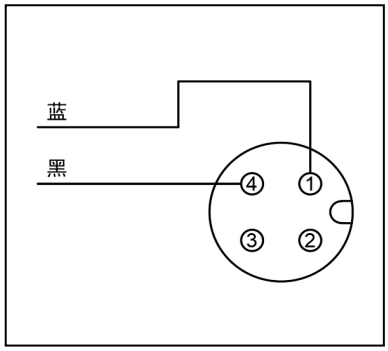
针脚	电线颜色	连接
1	棕	+
3	蓝	-

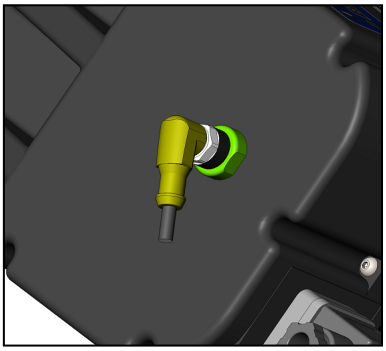




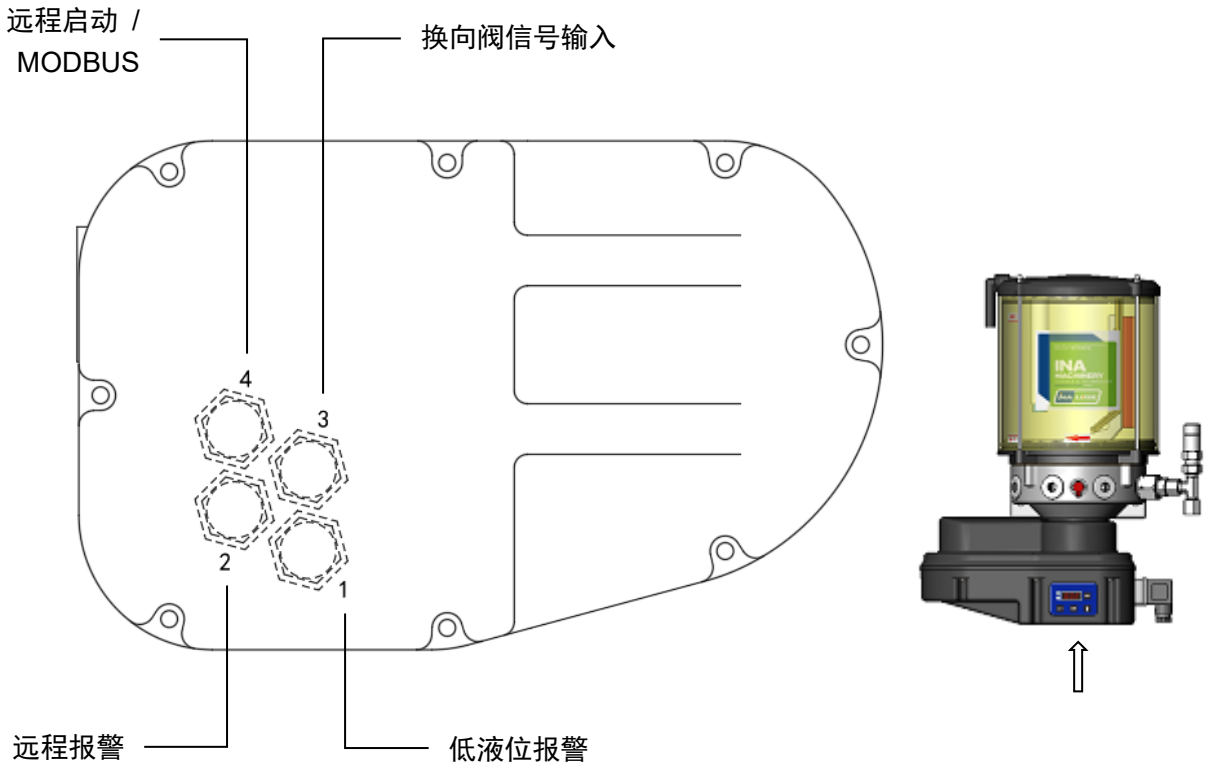
■ *MODBUS 接线（绿色螺母）*

针脚	电线颜色	连接
1	棕	A
4	黑	B





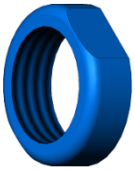
信号端口



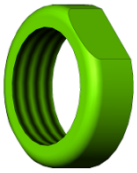
■ ***信号连接端口彩色螺母***

#1 端口：低液位报警连接端

#2 端口：远程报警连接端



#3 端口：换向阀信号输入连接端



#4 端口：远程启动 / MODBUS 连接端

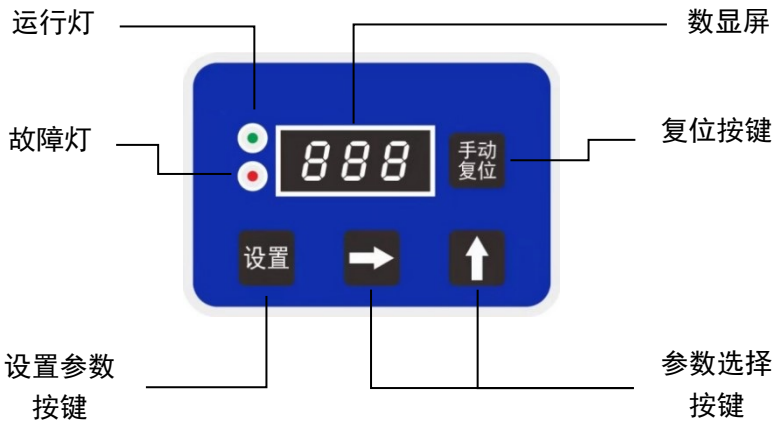
控制系统

■ ***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***

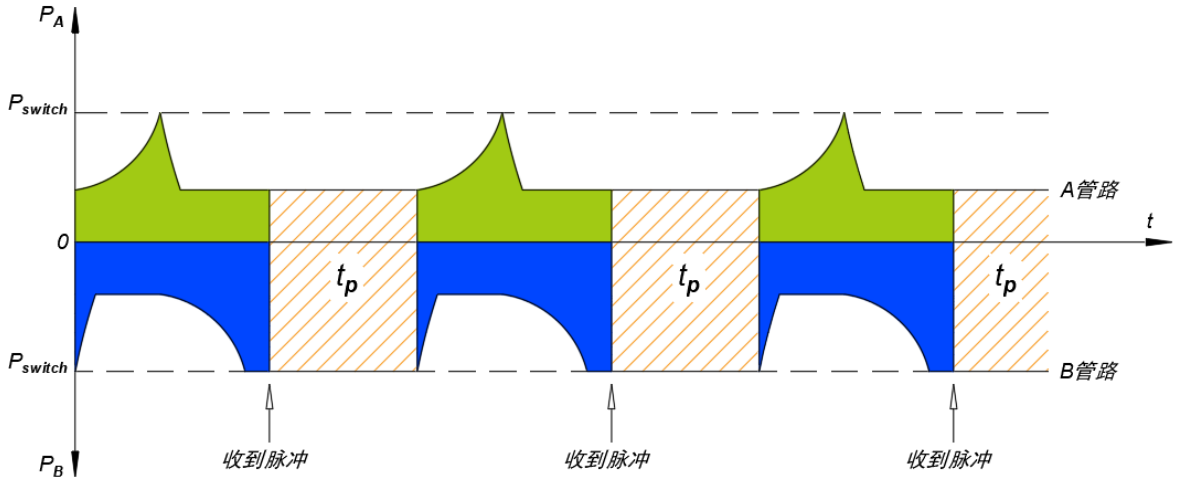
指示灯常亮，代表指示灯持续稳定点亮。指示灯闪烁：以点亮 0.5 秒、熄灭 0.5 秒的频率循环闪烁。

■ ***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***

控制器设有三种工作模式：d-1、d-2、d-3。其中仅 **d-2** 为 LEP 双线润滑泵的正确适用模式。泵启动运行时，A 管路压力升高、B 管路泄压；当 A 管路压力达到换向设定压力（$\mathbf{P_{switch}}$）时，换向阀切换油路。随即转为 B 管路升压、A 管路泄压，直至 B 管路压力同样达到换向设定压力（$\mathbf{P_{switch}}$）。当安装在换向阀上的柱塞探测器触发并向控制器发送脉冲信号后，泵停止运行，进入暂停间隔时间（$\mathbf{t_p}$）。间隔时间结束后，系统自动开启下一个润滑循环。



若直到工作周期结束依然未接收到脉冲信号，系统将自动报警，显示屏显示故障代码 **ErP**，红绿指示灯同时闪烁。按下复位键 手动复位 即可解除报警。

注意！每接收到一次脉冲信号，即代表 A、B 两路上所有的 TF 分配器出口均完成了一次全排量的往复循环，并将对应的油脂定量输送至各润滑点。例如：若分配器标识为“2”，则每触发一次脉冲，对应输出润滑脂量为 0.36 cm³。

■ ***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。

■ ***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。	

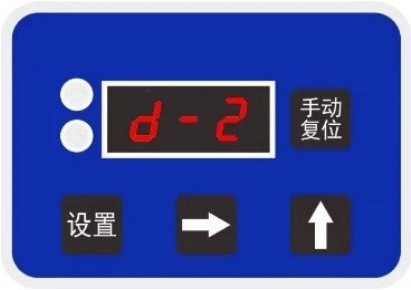
按 → ，可选择需要修改的数码管数位。再按 ↑ ，对应位数数字可在 0-9 之间循环切换。

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。

■ *工作模式设置*

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-2*** 定时工作模式。



第 2 步：

长按 设置 键，进入换向阀柱塞信号最长接收时间设置模式（此时绿灯闪烁）。按 → 切换数位，按 ↑ 调整当前数位数字。长按 ↑ 可快速滚动数值，在 0-9 之间循环切换。设置取值范围：***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换向阀柱塞信号最长接收时间，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！

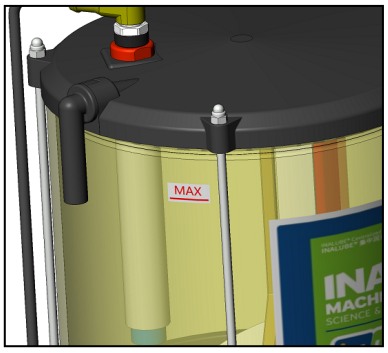
警告

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！

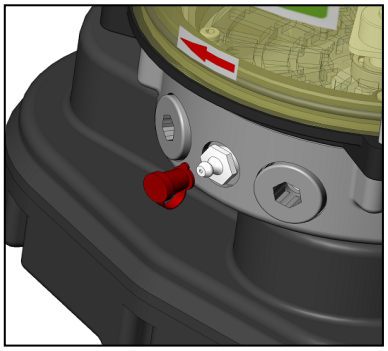
须知

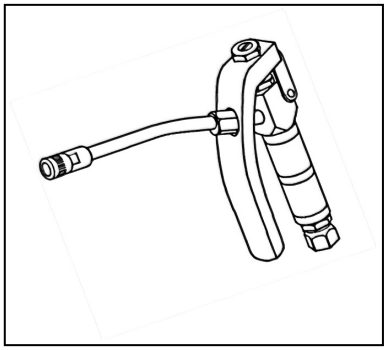
市面上绝大多数润滑脂均不会对润滑系统造成损害。若不确定润滑脂中的特殊添加剂是否会损伤润滑系统，请在加注前联系供应商技术人员进行确认。

■ *补油口*

✧ **DIN 71412 A 锥形黄油嘴**

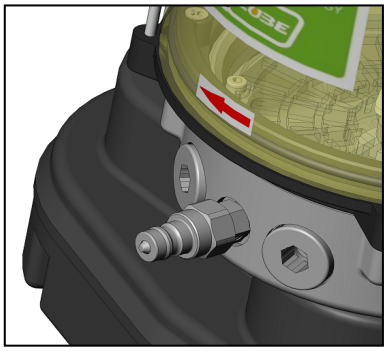
该补油口出厂标准配置，可使用普通黄油枪加注润滑脂。

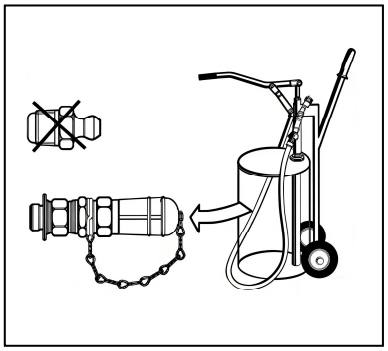




✧ **ISO 7241 A 液压快速接头**

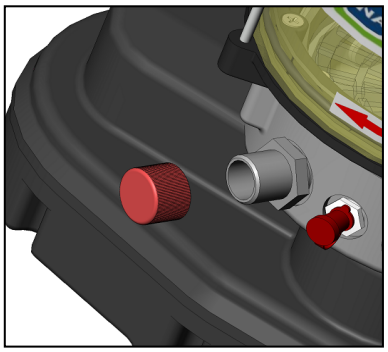
拆下润滑泵上的黄油嘴，换装液压快速接头，通过该液压接头进行润滑脂加注。

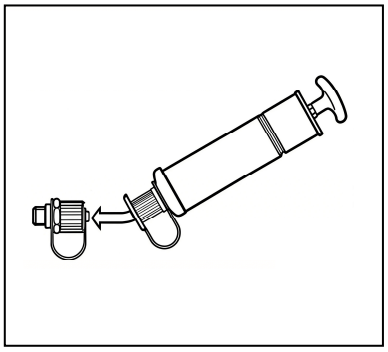




✧ **油脂填充桶**

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*

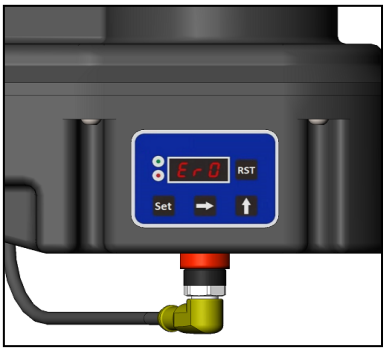
✧ 目视检测

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. 核查运行与间隔时间设置是否准确。如有需要，可重新设定润滑周期。

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。
泵报”ErP”故障码	换向阀不切换	检查换向压力设定值是否高于溢流压力。若是，对其中任一压力值进行调整即可。
		检查换向阀阀芯是否因油污杂质卡滞。如有卡滞，需清洗阀体及阀芯。
		检查双线分配器是否存在内泄漏，如有内泄漏，更换新件。
	换向阀上的柱塞探测器损坏	如有异常，请检查并更换新件。

■ *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，未接收到换向阀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。

声明：

未经许可，不得全部或部分引用、复制本说明书中的内容。我们已尽可能确保该说明书中的内容准确无误。对未经我司认可、使用本说明书中提及的任何技术和相关产品，我司不承担由此带来的任何直接、间接和连带责任。

出版物编号：INALUBE-LUBElite/Dualline-02

版本号：1.0

日期：2026.03

上海毅那机械科技有限公司

地址：上海市闵行区万芳路 555 号 D 栋 201 室

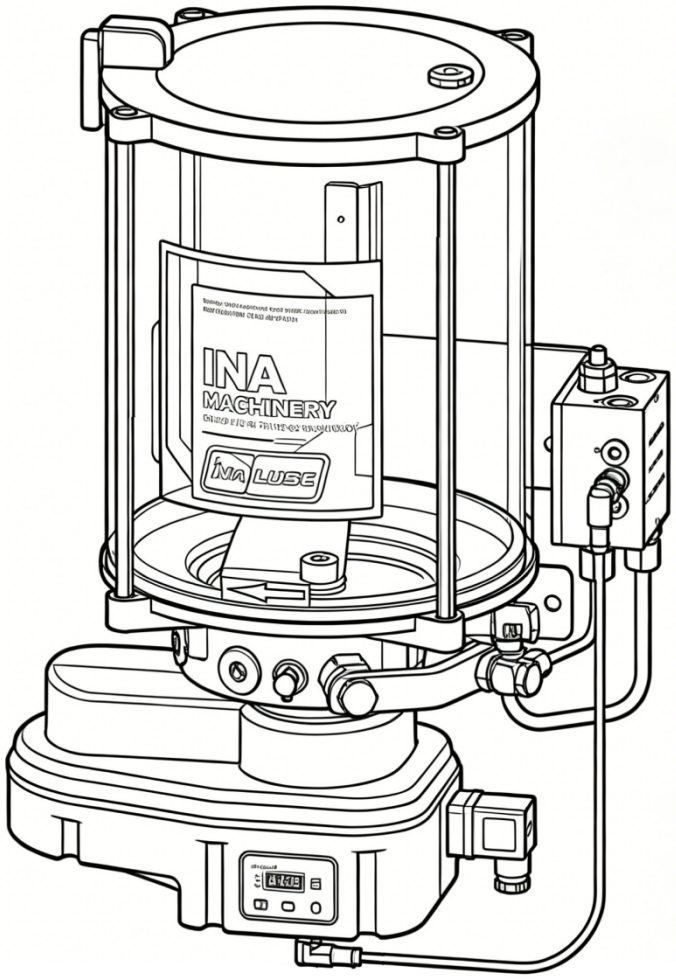
电话：+86 21 2042 2806

手机：+86 187 1781 3303

电邮：sales@inalube.com

网址：www.inalube.com

LUBElite™ Dual-line
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

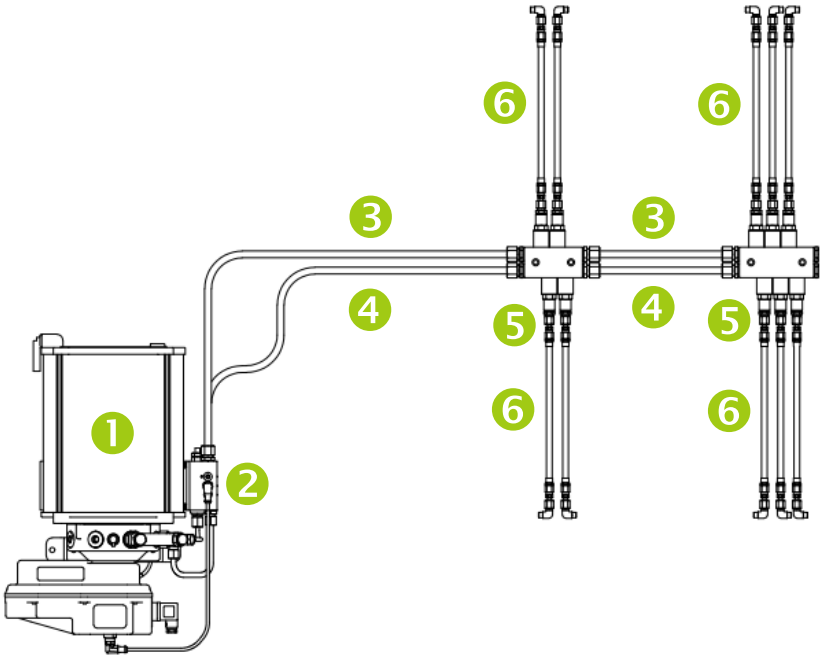
LUBElite 21 series electric dual-line lubrication pumps are applicable of lubricant viscosity up to NLGI 2 grease. Each lubrication pump has two outlets to serve one dual-line lubrication circuit.

The pump station mainly includes reservoir, BLDC motor assembly, pump element, pressurized directional control valve, controller and other accessories.

When pump unit ①begins to operate, pumping grease into main line A ③ through the “P” port of pressurized directional control valve ②. The grease is measured by dual-line dividers ⑤, and delivered to the lubrication points through lube points pipelines ⑥. Meanwhile, the grease in main line B ④ is pushed back to the pump unit ① reservoir through “R” port of pressurized directional control valve ② simultaneously.

When the pressure in the main line A ③ reaches the setting value, for example, 150 bar, of pressurized

directional control valve ②, then the valve changes direction of grease flow, which means grease in main line B ④ is pressurized by pump unit ① to dual-line dividers ⑤ and delivered to lubrication points until reaching the set pressure value of pressurized directional control valve ② again, in same time main line A ③ is pressure decreasing. This cyclic back-and-forth motion will only stop when needed number of pulse signals from the sensor of pressurized directional control valve ② is sent to pump controller. Then pump unit ① will be waiting for next cycle until interval time is end.



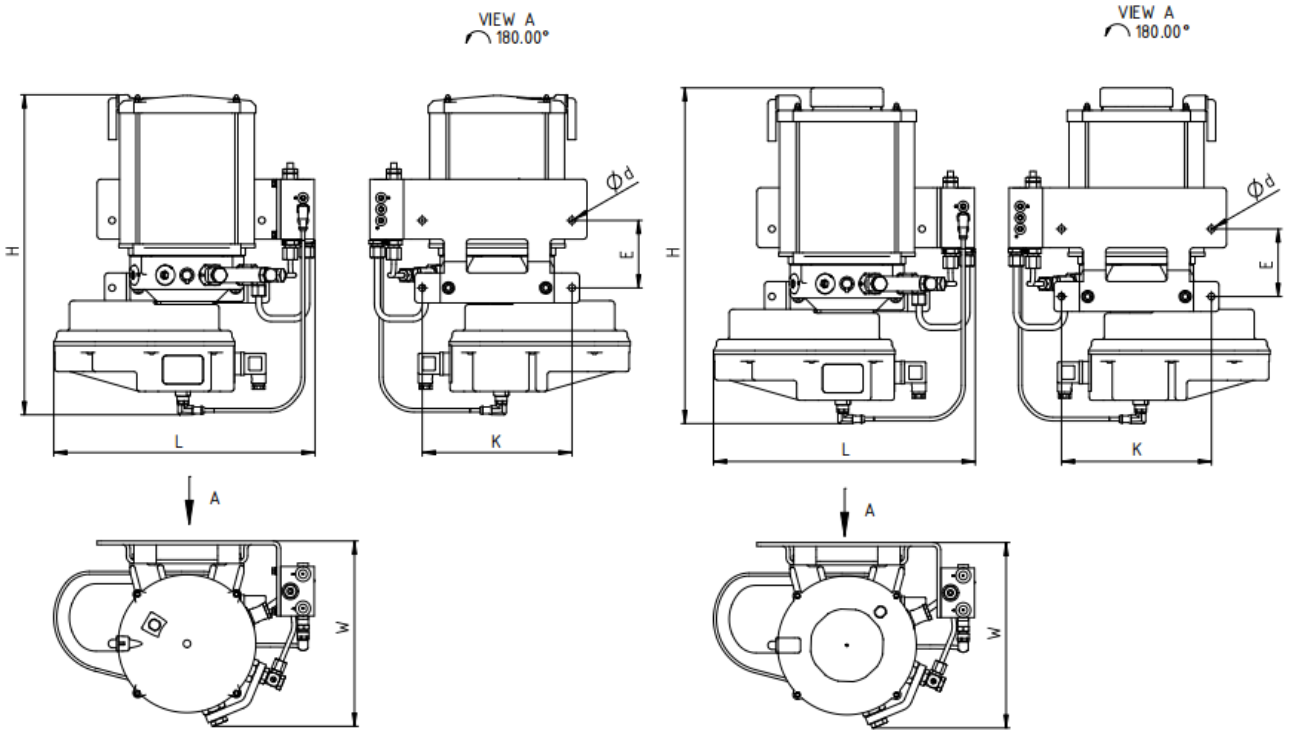
① Pump unit
② Pressurized directional control valve
③ Main line A
④ Main line B
⑤ Dual-line dividers
⑥ Lube point pipeline

Technical data

Power Supply	DC 24 V or AC 230V/50 Hz
Rated Power	< 100 W
Power Socket	DIN 43650 A
IP Class	IP 66
Pump Delivery	12 cm^3/min
Outlet Thread	2 x G 1/4
Working Pressure	130 ~ 250 bar adjustable, preset 150 bar
Tank Capacity	4, 6, 8, 10 L
Refilling Port	DIN 71412 A and/or top lid
Lubricant	NLGI 0, 1, 2
Working Temperature	-41 °C ~ +70 °C
Mounting	Vertical

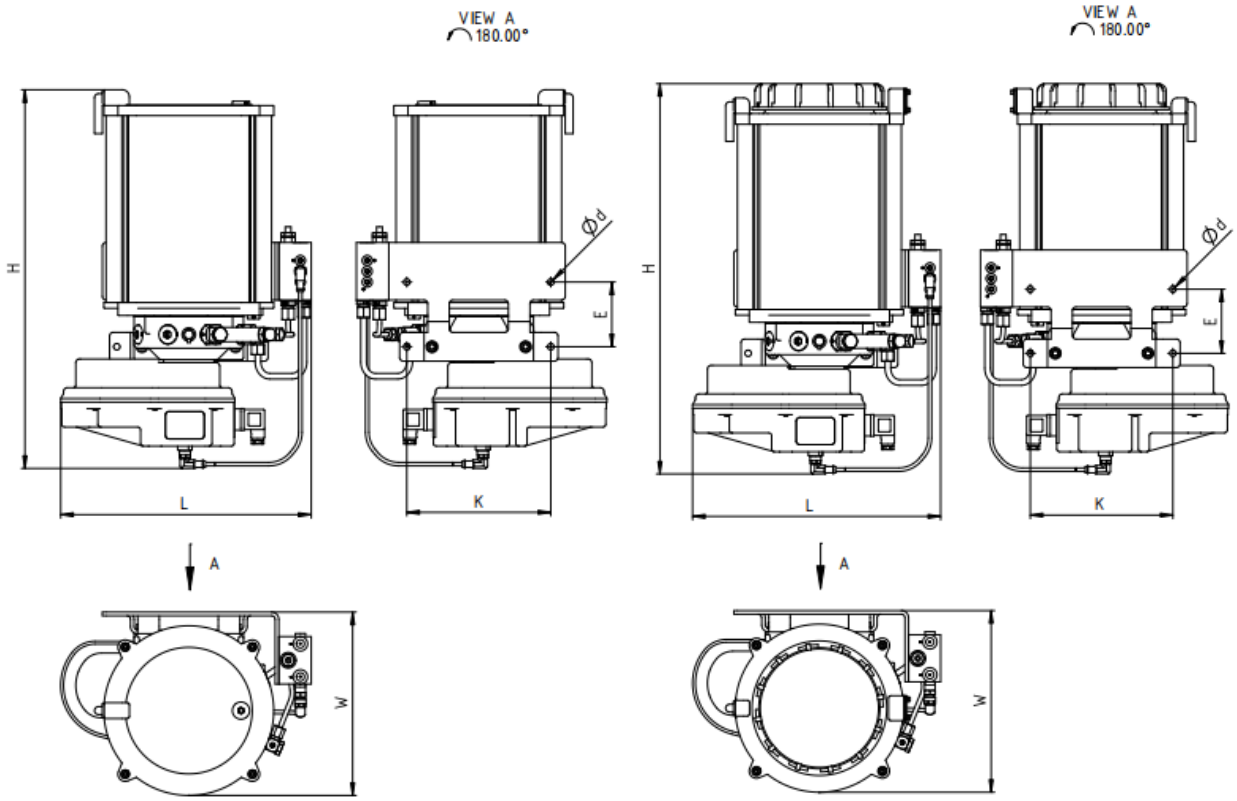
Pump dimension

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



Model	Reservoir (L)	Top Lid	Power Supply	H (mm)	W (mm)	L (mm)	K (mm)	E (mm)	Ød (mm)
LEP212D...	4	/	DC 24V or AC 230V/50Hz	430	250	350	200	90	9
LEP212DT...		Yes		450					
LEP212PD...	6	/		520					
LEP212PDT...		Yes		540					

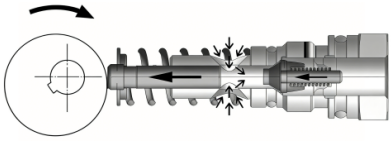
■ ***DC 24V or AC 230V/50 Hz, 8/10 L tank***



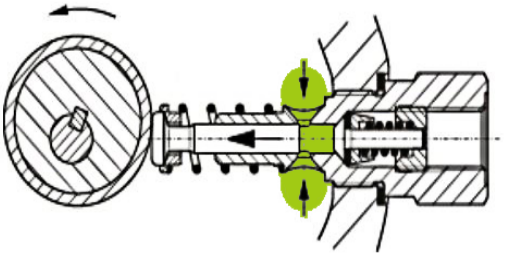
Model	Reservoir (L)	Top Lid	Power Supply	H (mm)	W (mm)	L (mm)	K (mm)	E (mm)	Ød (mm)
LEP213...	8	/	DC 24V or AC 230V/50Hz	530	255	350	200	90	9
LEP213T...		Yes		550					
LEP2110...	10	/		560					
LEP2110T...		Yes		580					

Pump element

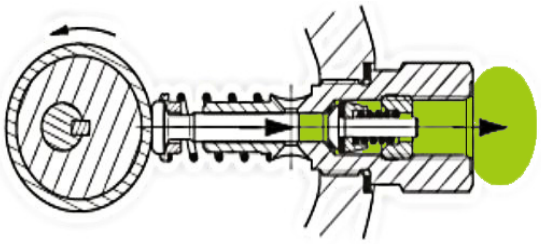
LUBElite 21 dual-line pumps have two pump elements with 12 cm^3/min of pump delivery totally. The outlets of two pump elements have been combined together by a V shape bar. The types of pump element is spring return type. The pump element model as follow:

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

■ ***Work Principle***



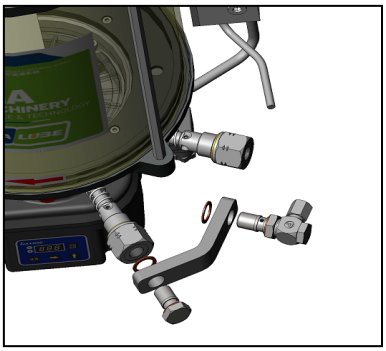
Suction phase



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.



Pressurized directional valve

Pressurized directional valve is one of the key components in LEP dual-line pump unit. Its function is to change the grease flow direction regularly, then make dual-line dividers working in the correct way. Without this valve, the dual-line system is not able to run.

There are five ports in the valve with letters of "**A**", "**B**", "**P**" and two "**R**" (same function).

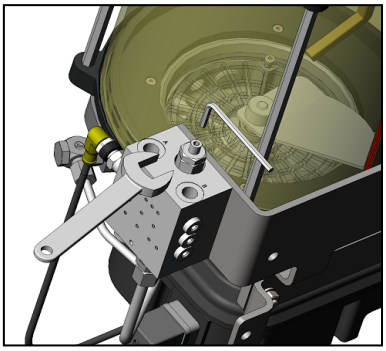
The meaning of letters as below:

A: connect to main line A

B: connect to main line B

P: Pressurized port (connected with pump element already)

R: Pressure relief port (connected with reservoir already)



WARNING

Do not adjust the pressure value of pressurized directional valve if not necessary. Failure to comply will result in pump unit damage.

The default setting pressure value of this valve is 150 bar. This value also can be adjustable according to below steps:

1. Use SW 17 wrench to loosen lock nut.
2. Use 4# Allen key hexagon to rotate the adjusting screw (clockwise: pressure increase, counter-clockwise: pressure decrease, 47 bar of each turn), until reaching the needed value.
3. Tighten the lock nut when the pressure value is needed.

TF dual-line divider

■ *TF divider type*

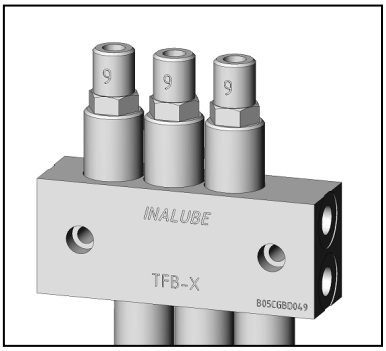
TF dual-line dividers have two kind of series which are TFB and TFU respectively. The main difference between these two types is outlet direction: TFB outlets are bilateral and TFU outlets are unilateral. Both of them are with max. working pressure is 250 bar.

Both TFB and TFU also have two options which are normal and monitoring version. Monitoring version means there is a visual indicator integrated in the outlet to monitor the working status of the divider.

The displacement of each outlet has 14 various for selection. There will be number mark in the divider outlet after selecting one delivery capacity as below.

The TF series dual-line divider is a standard model with a maximum of 8 outlets. Anyone of the outlets can be blocked directly without problem If don't need it. Of course, it's better to use a special plug (P/N: 81-1020-003) to replace the useless metering unit permanently.

Mark	Single stroke (cm3/str)	Reciprocating cycle (cm3/cy)
1	0.09	0.18
2	0.18	0.36
3	0.27	0.54
4	0.35	0.70
5	0.45	0.90
6	0.55	1.10
7	0.65	1.30
8	0.70	1.40
9	0.80	1.60
X	0.90	1.80
10	1.00	2.00
15	1.50	3.00
25	2.50	5.00
35	3.50	7.00



WARNING

Never use other plug to replace TF special plug, otherwise the lubrication system will not work!

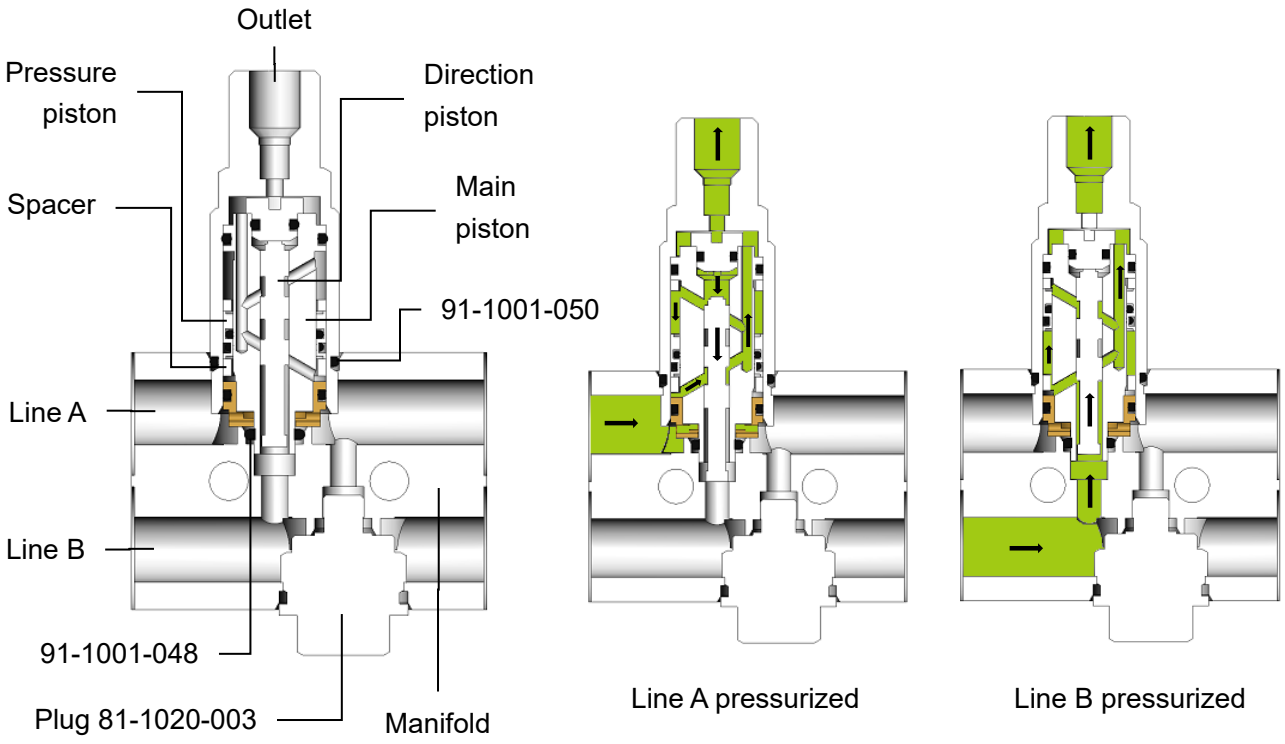
WARNING

When replacing any plug (81-1020-003) or metering valve, two matching O-rings must be replaced simultaneously. Failure to do so may result in grease leakage or internal leakage.

O-ring part numbers: **91-1001-048, 91-1001-050**

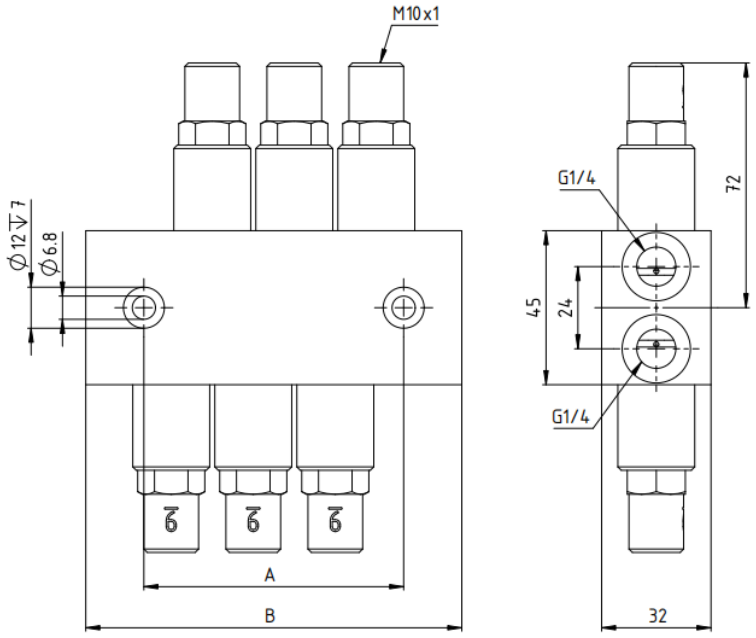
■ ***TF divider work principle***

All metering units of TF dual-line dividers have the same internal structure and identical working principle. Replace different spacers and quantity, the metering volume will changed accordingly. any outlet of divider blocked, other dividers and the entire lubrication system can still operate normally.



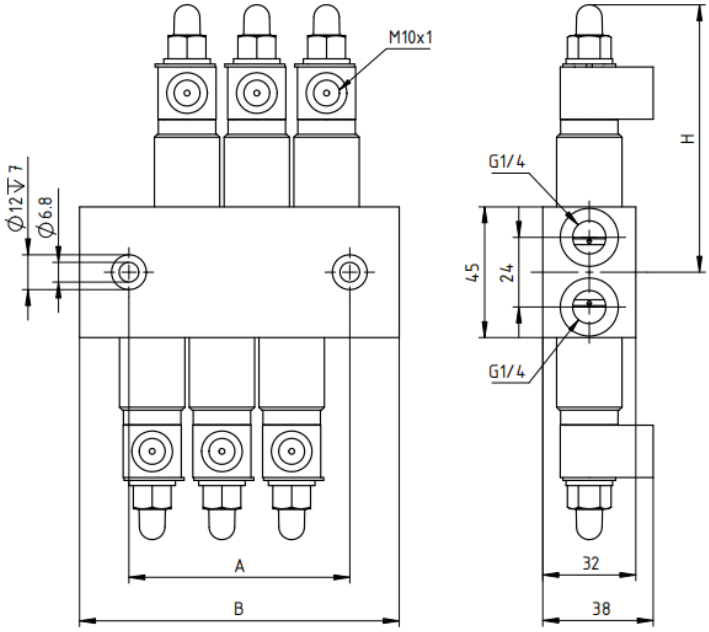
TF divider dimension

■ ***TFB (normal)***



Model	A (mm)	B (mm)
TFB-2-/	28	62
TFB-4-/	52	86
TFB-6-/	76	110
TFB-8-/	100	134

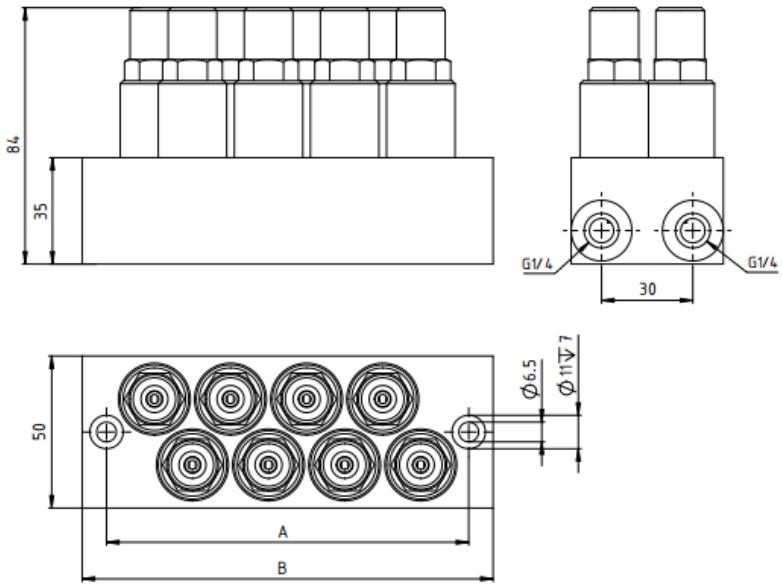
■ *TFB (visual pin)*



Model	Mark	A (m	B (m	H (m
TFB-2-/	1 - X	28	62	92
TFB-4-/	1 - X	52	86	92
TFB-6-/	1 - X	76	110	92
TFB-8-/	1 - X	100	134	92

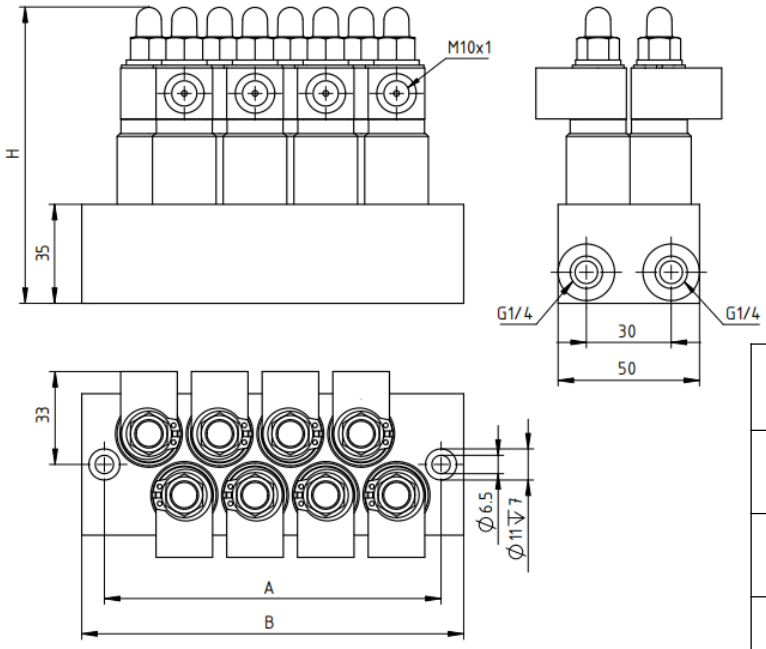
Model	Mark	A (mm)	B (mm)	H (mm)
TFB-2-/	10/15/ 25/35	28	62	122
TFB-4-/	10/15/ 25/35	52	86	122
TFB-6-/	10/15/ 25/35	76	110	122
TFB-8-/	10/15/ 25/35	100	134	122

■ *TFU (normal)*



Model	A (mm)	B (mm)
TFU-2-/	44	60
TFU-4-/	69	85
TFU-6-/	94	110
TFU-8-/	119	135

■ ***TFU (visual pin)***



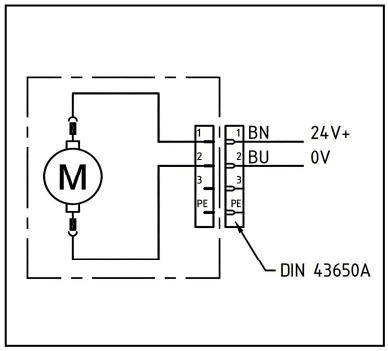
Model	Mark	A (m	B (m	H (m
TFU-2-/	1 - X	44	60	105
TFU-4-/	1 - X	69	85	105
TFU-6-/	1 - X	119	135	105
TFU-8-/	1 - X	100	134	105

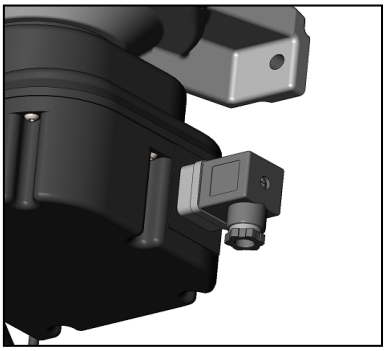
Model	Mark	A (mm)	B (mm)	H (mm)
TFU-2-/	10/15/ 25/35	44	60	135
TFU-4-/	10/15/ 25/35	69	85	135
TFU-6-/	10/15/ 25/35	119	135	135
TFU-8-/	10/15/ 25/35	100	134	135

Pump electric connection

■ ***Power wiring diagram***

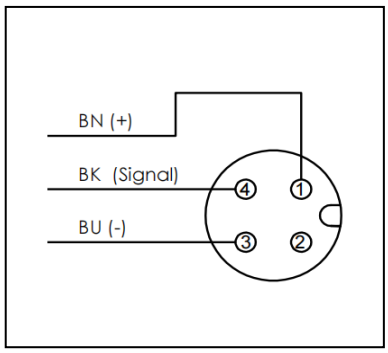
Pin	Wire color	Connection
1	Brown	24 V+
2	Black	0V

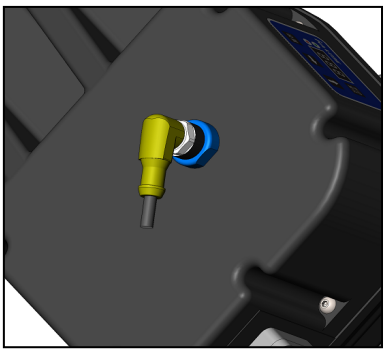




■ ***Directional control valve wiring diagram (blue nut)***

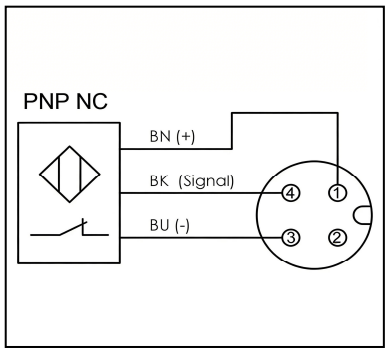
Pin	Wire color	Connection
1	Brown	24 V+
3	Blue	0V
4	Black	Pulse PNP

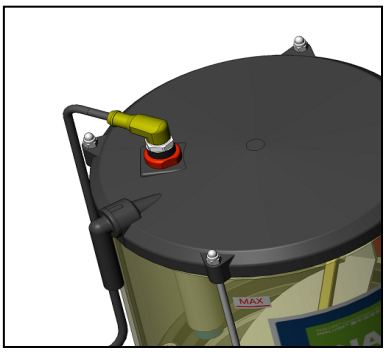




■ *Low level switch wiring diagram (red nut)*

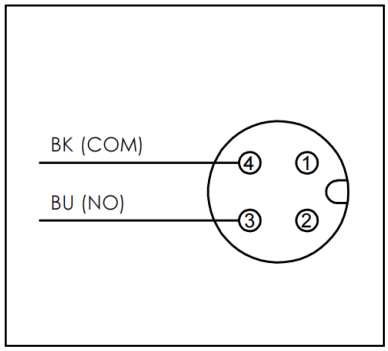
Pin	Wire color	Connection
1	Brown	24 V+
3	Blue	0V
4	Black	Level alarm PNP





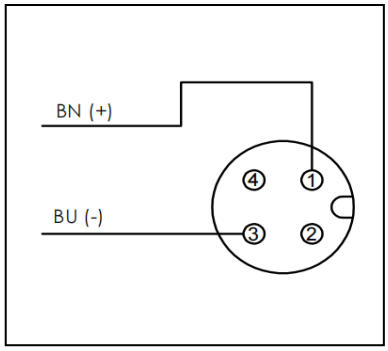
■ *Remote alarm wiring diagram (orange nut)*

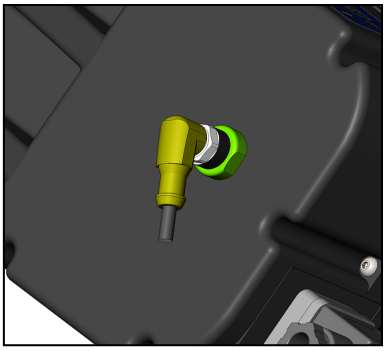
Pin	Wire color	Connection
3	Blue	NO
4	Black	COM



■ *Remote startup wiring diagram (green nut)*

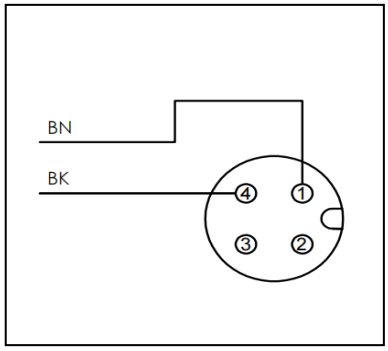
Pin	Wire color	Connection
1	Brown	+
3	Blue	-

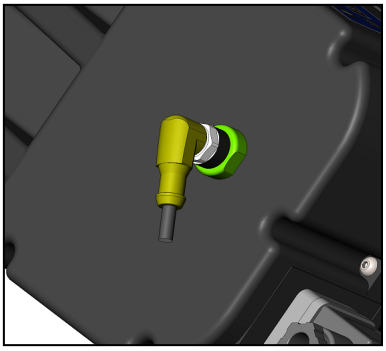




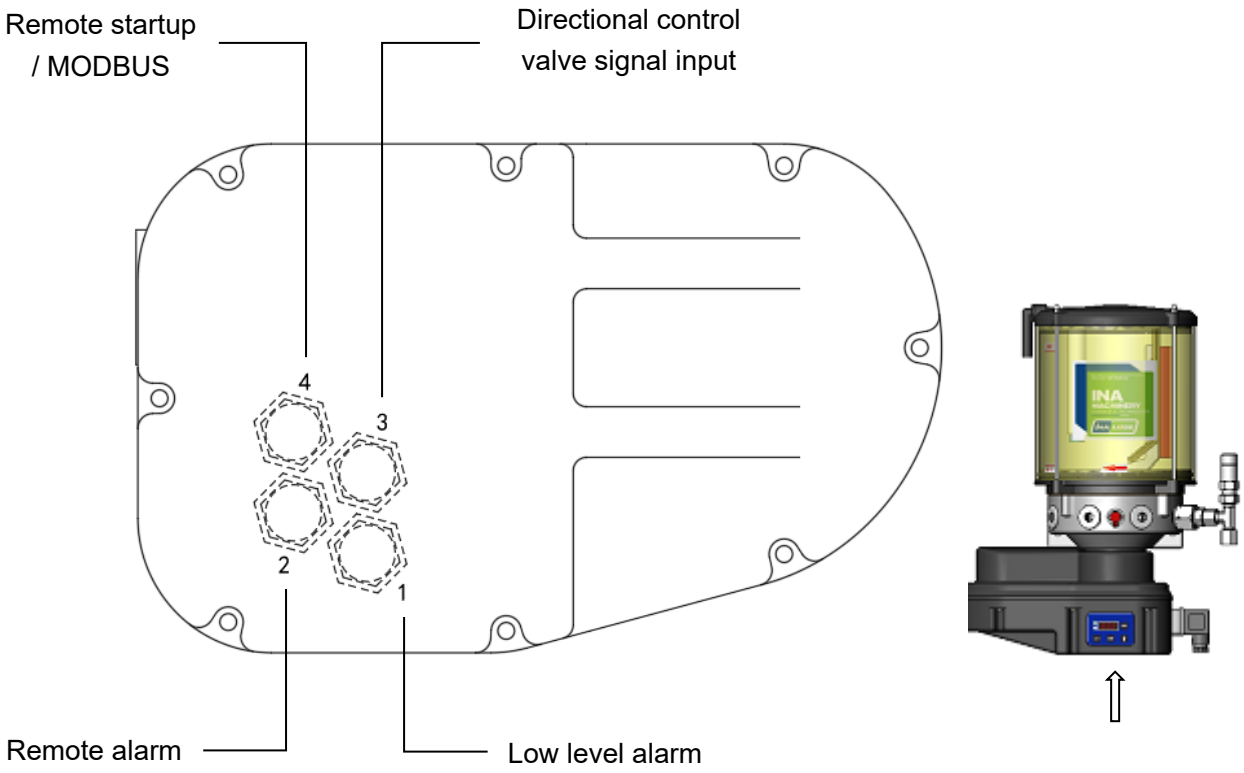
■ *MODBUS wiring diagram (green nut)*

Pin	Wire color	Connection
1	Brown	A
4	Black	B





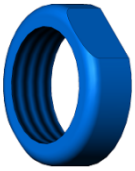
Signal connection interface



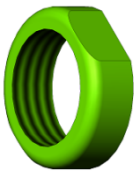
■ ***Colorful nut of signal connection port***

#1 port: Low level alarm terminal

#2 port: Remote alarm terminal



#3 port: Directional control valve signal input terminal



#4 port: Remote startup / MODBUS terminal

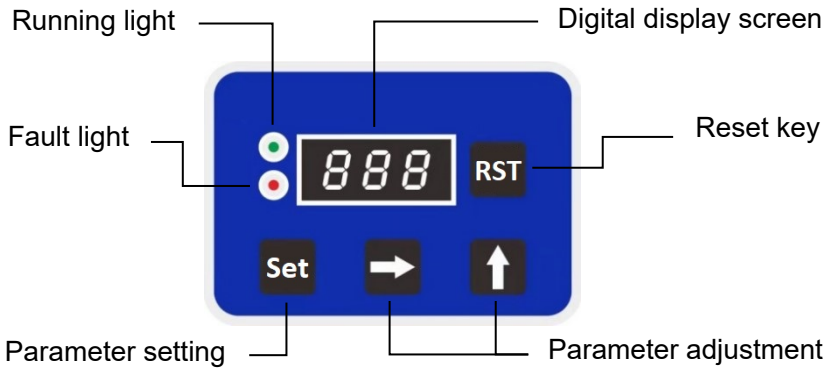
Control system

■ ***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***

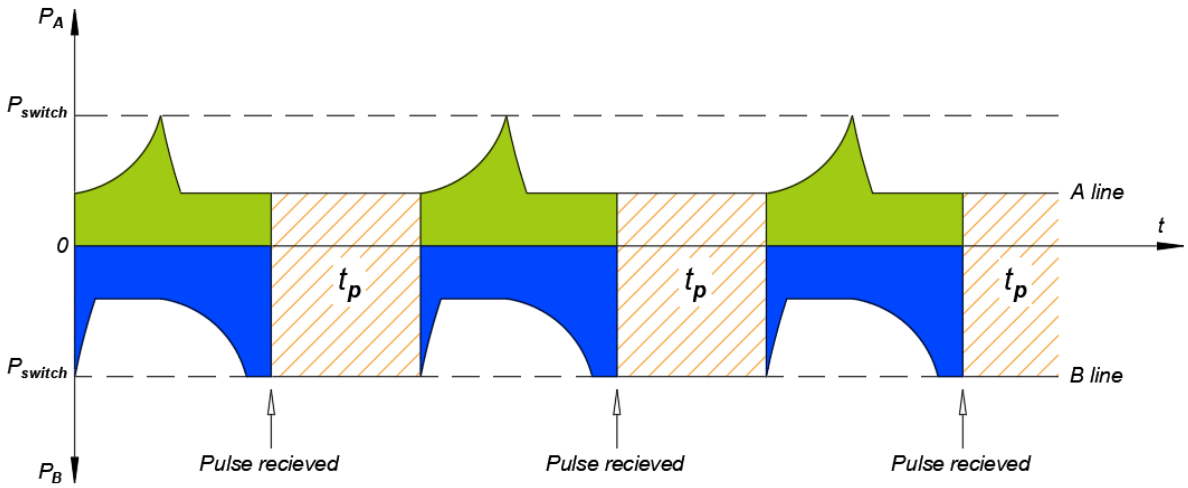
The display 

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***

The controller has three working modes: d-1, d-2, d-3. Only **d-2** is right mode for LEP dual-line pump unit.

When pump unit starts working, A line pressure increasing but B line pressure decreasing. The directional valve switches when pressure in A line reaches the setting valve ($\mathbf{P_{switch}}$), then in reverse, B line pressure increasing but A line pressure decreasing until pressure in B line reaches the setting valve ($\mathbf{P_{switch}}$, equal to the pressure value in B line). The pump unit stops working and goes into pause time ($\mathbf{t_p}$) when the pulse signal triggered by the piston detector mounted in directional valve is received. When pause time is over, the system starts next lubrication cycle.



If the pulse signal was not received at the end of working time, the system will automatically alarm and the screen will display **ErP**. The green and red lights flashes at the same time. Press the RST key to eliminate the alarm.

Note! Each pulse signal received means the grease volume with full displacements (reciprocating cycle) of each TF dividers in both A and B lines are delivered to lubrication points (for example, if divider marks is "2", it means 0.36 cm^3 grease is delivered with each pulse triggered).

■ ***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 pressure switch, and the pressure switch is used to monitor the pipe pressure. If the pressure switch does not detect the build-up of pressure in the pipe during lubrication, the fault can be automatically monitored and displayed. The controller can also 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.

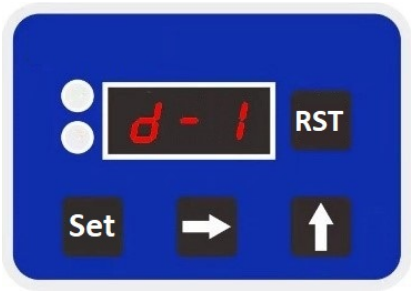
Parameter setting

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.	

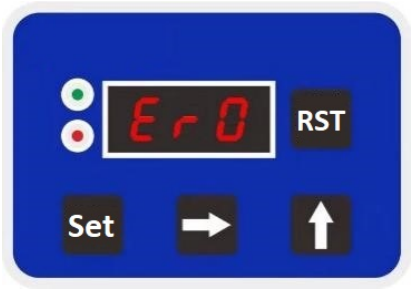
Press and hold the **Set** key, the green and red lights are off at the same time, the display screen displays the "working mode" selection status. If only the green light is lit, the display screen displays the "working time" setting status, and if the red light is lit, the display screen displays the "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.

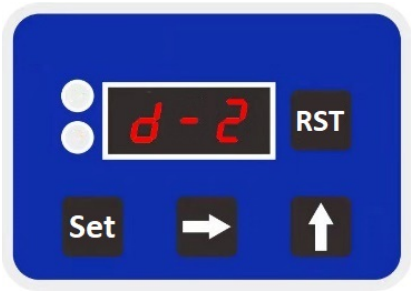
When the red and green light flash at the same time, the system will have a fault alarm, and the alarm code will be displayed on the display screen (for specific alarm code description, please refer to chapter of Troubleshooting), and long press the **RST** button to cancel the fault alarm.



■ *Work 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-2*** pressure working mode.



Step 2:

Press and hold the key Set to enter the max. time setting of directional valve piston pulse signal receiving (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 hours 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!

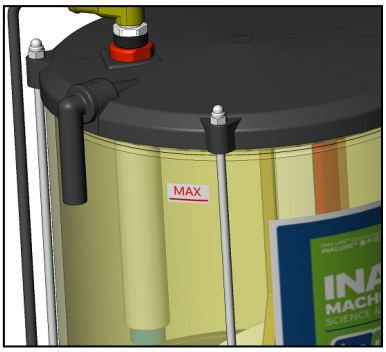
WARNING

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!

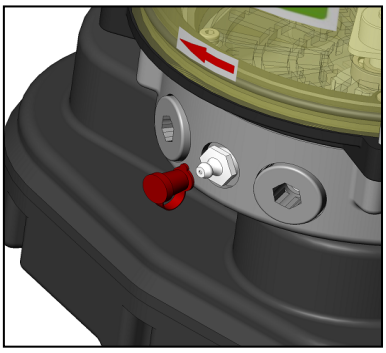
NOTE

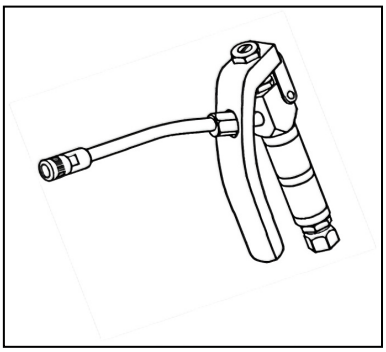
Most lubricants sold on the market will not cause damage to lubrication system. If not sure whether some special additives in grease will damage the lubrication system, please contact the technician of supplier before filling!

■ ***Refilling port***

✧ **DIN 71412 A grease nipple**

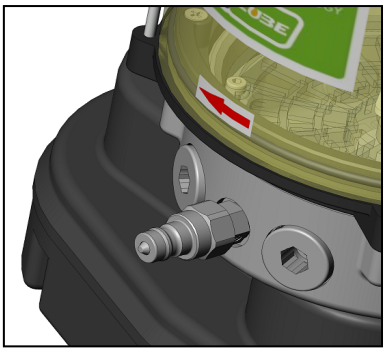
This is the factory configuration. Use a common greasing gun to fill lubricant through a grease nipple on the lubrication pump.

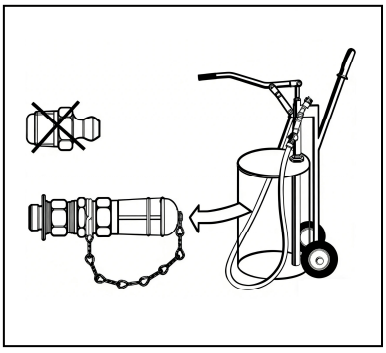




✧ **ISO 7241 A hydraulic coupling**

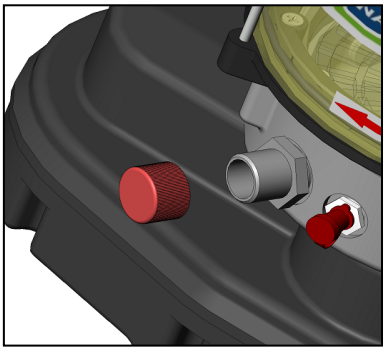
Remove the grease nipple on the lubrication pump and replace it with a hydraulic coupling. Refilling the lubricant through this hydraulic coupling.

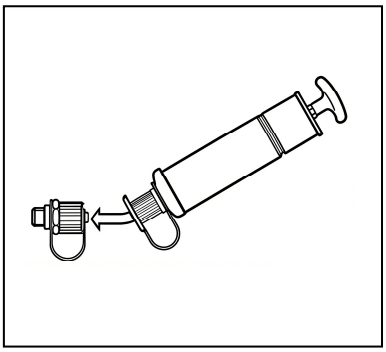




✧ **Grease filling cartridge**

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





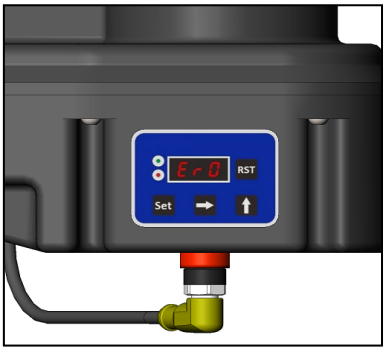
■ ***Filling level confirmation***

✧ **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  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 pump power plug.
	Motor fault	Check the motor power supply and replace the motor if necessary.
Pump does not deliver lubricant	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 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.
Pump shows "ErP" fault	Directional valve does not switch	Check if switch pressure value is higher than relief pressure. If yes, then adjust anyone of them.

		Check if piston of directional valve is stuck due to contamination. If yes, then clean the valve and its piston.
		Check if dual-line dividers leak internally. If yes, then replace with new one.
	Piston detector of directional valve damaged	Check and replace it if yes.

■ ***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 directional valve 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

✧ **Clear the fault signal**

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

Statement:

Publication No.: INALUBE-LUBElite/Dualline-02

Version: 1.0

Date: 2026.03

Shanghai INA Machinery Science & Technology Co., Ltd

Room 201, Building D, No.555 Wanfang Road, Minhang District, Shanghai, China

Tel.: +86 21 2042 2806

Mobile: +86 187 1781 3303

Email: sales@inalube.com

Website: www.inalube.com