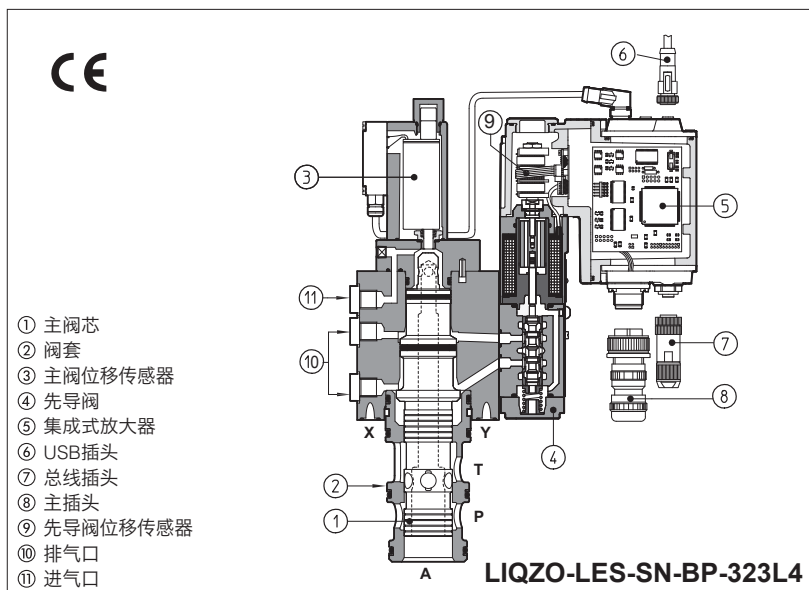


3通比例伺服插装阀

抗震的数字式，带双位置传感器，25到80通径



LIQZO-LEB, LIQZO-LEB LIQZO-LES, LIQZO-LES

3通比例伺服插装阀专门设计用于高速闭环控制。配备LVDT双位置传感器,可实现方向控制的最佳动态响应以及无压力补偿的流量控制。插装阀装配块具有大流量小压降的性能。集成放大器根据指令信号调节主阀开口度,出厂预调可实现阀与阀之间的互换。

此类比例阀有:

LEB基本型, 模拟参考信号输入和USB型接口通过连接软件设置功能参数;

LES全系列型, 除基本型放大器功能以外, 还提供P/Q复合控制多种可选的总线接口, 用于设置功能参数, 参考信号和进行实时诊断功能。

LIQZO: 25到40通径

最大流量: 500 到1050 l/min

最大压力: 350 bar

LIQZP: 50到80通径

最大流量: 2000到5000 l/min

最大压力: 420 bar

1 型号

LIQZO	-	L	-	ES	-	SN	-	NP	-	25	3	L4	/	*	**	/	*
流量控制阀 LIQZO = 25到40通径 最大压力350bar LIQZP = 50到80通径 最大压力420bar																	密封材料, 见第 [6] 节 - = NBR PE = FPM BT = HNBR
L = 闭环控制 LVDT双位置传感器																	设计号
集成式电子放大器: EB = 基本型 (1) ES = 全系列型																	
P/Q复合控制 - 见第 [3] 节 SN = 无 SP = 压力控制 (1个压力传感器) SL = 力控制 (1个负载传感器)																	
现场总线连接, USB接口缺省配置: NP = 无 (1) BP = PROFIBUS DP BC = CANopen EH = EtherCAT																	
阀规格, 见第 [3] 节 LIQZO = 25 32 40 流量 185 330 420 LIQZP = 50 63 80 流量 780 1250 2100 Δp=5bar时的额定流量(l/min)																	
(1) LEB 基本型仅提供SN-NP选项配置 (3) 仅 LES 型提供双电源																	

液压选项, 见第 [10] 节

A = 主阀芯反向液压机能:
不得电时P-A

电子放大器选项, 见第 [11] 节

I = 电流输入信号和监测信号4~20mA
(缺省时为电压型输入信号和监测信号±10V)

仅对 SN (2):

F = 故障信号

Q = 使能信号

Z = 双电源, 使能, 故障和监测信号(12 芯主插头) (3)

仅对 SP, SL:

C = 传感器反馈信号为电流型

阀芯类型

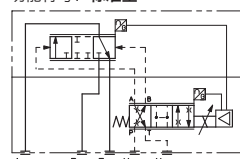
调节特性:

L4 = 线性

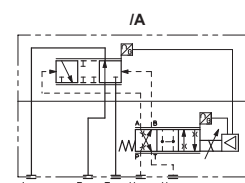
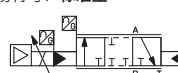


机能: 3= 3通

功能符号: 标准型



简符号: 标准型



简符号: 标准型



(2) F, Q, Z选项为SP, SL的标配

2 综合备注

LIQZO-LEB,LES 和 LIQZP-LEB,LEB 型比例插装阀获得了**CE**认证,符合 EMC 应用规范标准(如抗磁性/抗干扰EMC 指令和低压指令标准)。安装、接线和启动必须按照F003 部分所述步骤操作,并按照相关元件对应的安装说明来安装。禁止使用阀的电子信号(如监测信号)直接作为安全功能的驱动信号,例如用于控制机器安全元件的开/关,这也是欧洲标准规定的(流体系统和元件的安全要求,EN-982)。



警告 如果不能提供先导压力油,阀不能处于工作状态,以免过热对放大器造成损坏。若阀在机器循环运作中长时间处于不工作状态,最好让放大器处于非使能(选项/Q 或/Z)。

推荐每个阀的24VDC供电电源加2.5A的保险丝,见第 9 节的电源备注。



警告 若先导压力失去会导致主阀阀芯位置不确定

阀工作中突然断电会导致主阀阀芯处于A-T或P-A(对于选项/A)状态。这会引起液压系统的压力冲击或动作失控,从而可能造成机器损坏。

3 P/Q复合控制 - 仅对LES

S* 选项在伺服比例换向阀的流量调节基础功能上,增加了压力闭环控制(**SP**)或力闭环控制(**SL**)。根据液压系统的实际状况,进行压力(力)控制的转换。

传感器和电子放大器连接专用插头也可提供(选项SP需另外一个压力传感器,选项SL需1个负载单元)。主配12 芯插头和/Z选项相同,但加上两个模拟信号接线专门用于压力(力)控制。

关于详细信息和用于选项SP,SL的插头接线,请见技术样本**GS212**。

4 现场总线 - 仅对LES

总线连接允许阀直接与机器控制单元直接通讯,对数字参考信号、诊断信号进行控制和设置功能参数。主插头仍可接受模拟型参考信号,便于调试和维护。

关于现场总线的详细信息请见技术样本**GS510**。

5 主要特征 - 基于油温50°C, ISO VG46矿物油

安装位置	任意位置			
安装面粗糙度	粗糙指标Ra0.4, 平面度0.01/100 (ISO 1101)			
MTTFd 值符合 EN ISO 13849	75年, 见技术样本P007			
环境温度范围	标准型 = -20°C ~ +60°C /BT 选项 = -40°C ~ +60°C			
存储温度范围	标准型 = -20°C ~ +70°C /BT 选项 = -40°C ~ +70°C			
20°C时线圈电阻R	3 ~ 3.3 Ω			
电磁线圈最大电流	2.6 A			
最大功耗	50 W			
绝缘等级	H 级(180°C)电磁线圈表面发热必须遵守欧洲标准 ISO 13732-1和EN982规范			
保护等级符合DIN EN60529	IP66/67			
隔热处理	电子器件PCB板加了热涂层			
负载因子	连续工作(ED=100%)			
EMC, 气候和机械负载	见技术样本G004			
通讯接口	USB 接口 Atos ASCII 编码	CANopen EN50325-4 + DS408	PROFIBUS DP EN50170-2/IEC61158	EtherCAT IEC 61158
通讯物理层	非隔离 USB 2.0 + USB OTG	光学隔离 CAN ISO11898	光学隔离 RS485	快速以太网, 隔离 100 Base TX

规格	25	32	40	50	63	80
最大调节流量 [l/min]						
P-T间 $\Delta p = 5 \text{ bar}$ 时	185	330	420	780	1250	2100
$\Delta p = 10 \text{ bar}$ 时	260	470	590	1100	1750	3000
最大流量	500	850	1050	2000	3100	5000
最大压力 [bar]	LIQZO A, B口 = 350 X = 350 Y ≤ 10					
	LIQZP A, B口 = 420 X = 350 Y ≤ 10					
$\Delta p = 70 \text{ bar}$ 时先导阀的额定流量 [l/min]	4	7	28	43	68	76
P = 100 bar时先导阀的泄漏量 [l/min]	0.2	0.2	0.5	0.7	0.7	0.7
先导压力 [bar]	最小:系统压力的40% 最大350 推荐140~160					
先导腔容积 [cm³]	2,16	7,2	8,9	17,7	33,8	42,7
先导流量 (1) [l/min]	6,5	20	25	43	68	76
响应时间0~100%阶跃信号 (2) [ms]	21	22	22	25	30	34
滞环 [最大调节量的%]	≤ 0,1					
重复精度 [最大调节量的%]	± 0,1					
温漂	在 $\Delta T = 40^\circ\text{C}$ 时, 零点漂移 < 1%					

注释:

以上性能参数为配合Atos电子放大器得出, 见第 7 节

(1) 阶跃信号0~100%

(2) 详见 8.2 节图示

6 密封和油液 - 关于表格中不包含的液体，请咨询我们技术部

密封，推荐油液温度	NBR（标准型） = -20°C ~+60°C，对HFC 油液 = -20°C ~+50°C FKM（/PE 选项） = -20°C ~+80°C HNBR（/BT 选项） = -40°C ~+60°C，对HFC 油液 = -40°C ~+50°C		
推荐粘度	20~100mm ² /s- 最大允许范围15~380mm ² /s		
油液清洁度	ISO 4406标准20/18/15 NAS 1638 9级，进口口过滤精度要求10μm，β10 ≥ 75（推荐值）		
油液种类	适合密封类型	种类	参考标准
矿物油	NBR, FKM, HNBR	HL, HLP, HLPD, HVLP, HVLDP	DIN 51524
不含水抗燃油液	FKM	HFDU, HFDR	ISO 12922
含水抗燃油液	NBR,HNBR	HFC	

7 电子放大器

阀型号	LEB	LES	LES-SP, SF, SL
放大器型号	E-RI-LEB-N	E-RI-LES-N	E-RI-LES-S
类型	数字式		
型式	集成到阀上		
样本页码	GS208	GS210	GS212

注释：关于主插头和通讯插头见第 [13]，[14] 节

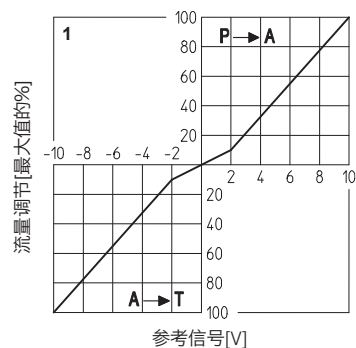
8 曲线（基于油温50°C，ISO VG46 矿物油）

8.1 调节曲线，见注释

1 = LIQZO-L* (所有尺寸)

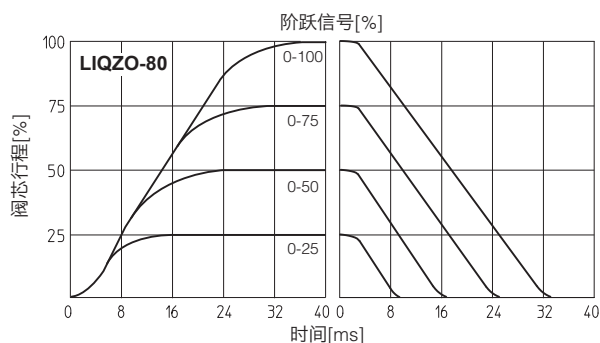
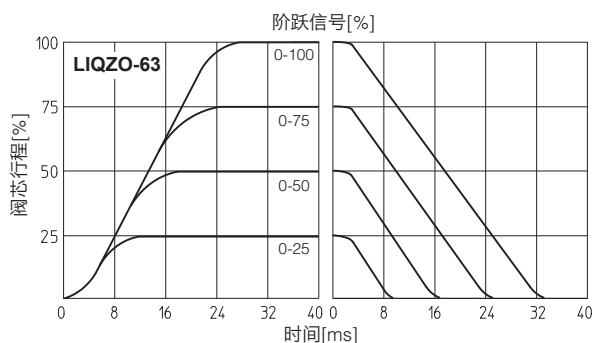
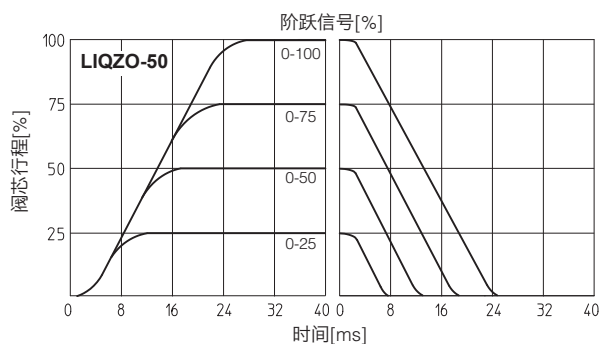
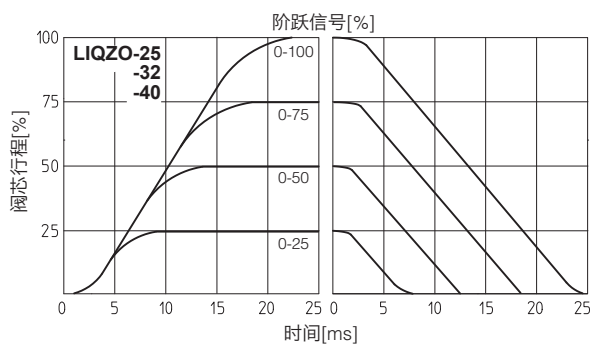
液压机能和输入信号：

	标准型	选项/A
参考信号	0 ~+10 V 12±20 mA	P → A
参考信号	0 ~-10 V 4÷12 mA	A → T

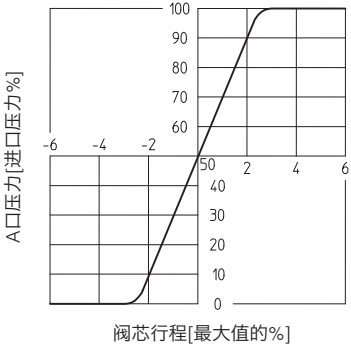
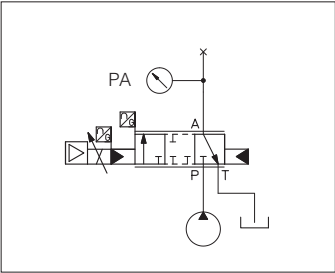


8.2 响应时间

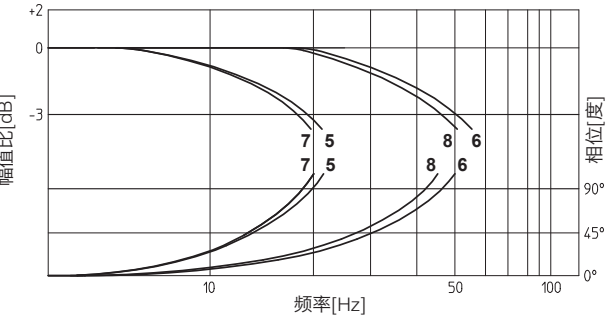
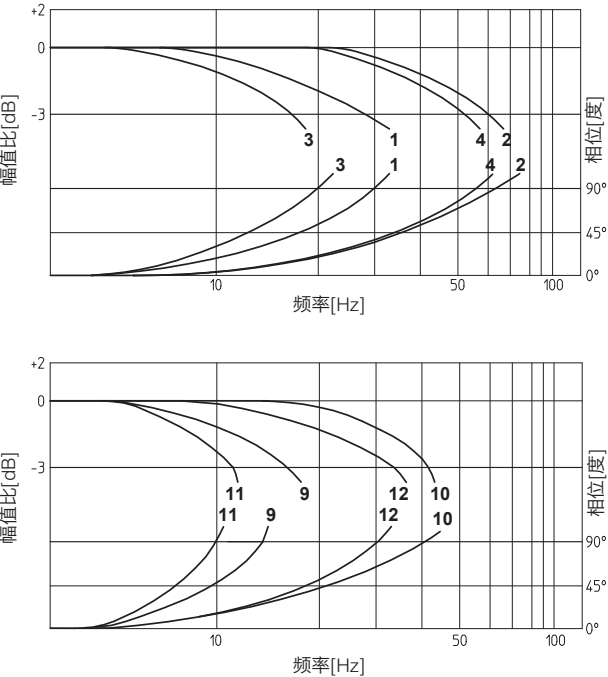
下图中的响应时间是在不同的阶跃输入参考信号下测得的，是多次测量的平均值。带数字放大器的阀的动态特性可通过设定内部的软件参数实现优化。



8.3 压力增益



8.4 博德图



- 1 = LIQZO-L*-253L4: $\pm 90\%$
- 2 = LIQZO-L*-253L4: $\pm 5\%$
- 3 = LIQZO-L*-323L4: $\pm 90\%$
- 4 = LIQZO-L*-323L4: $\pm 5\%$
- 5 = LIQZO-L*-403L4: $\pm 90\%$
- 6 = LIQZO-L*-403L4: $\pm 5\%$
- 7 = LIQZP-L*-503L4: $\pm 90\%$
- 8 = LIQZP-L*-503L4: $\pm 5\%$
- 9 = LIQZP-L*-633L4: $\pm 90\%$
- 10 = LIQZP-L*-633L4: $\pm 5\%$
- 11 = LIQZP-L*-803L4: $\pm 90\%$
- 12 = LIQZP-L*-803L4: $\pm 5\%$

9 排气孔

16到40通径

50通径

63到100通径

① 仅在A口和油箱连接时以及产生负压时使用，详细信息请联系我们技术服务部

② 在机器调试中，建议松开2个塞子如右图所示，通过排气孔放出先导腔内的空气
在低压状态下运作几秒钟后再拧紧塞子。

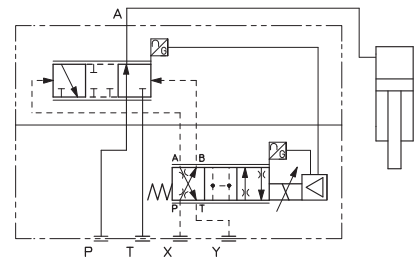
10 液压选项

选项/A

当阀断电时，标准型阀提供主阀芯的液压机能能为A-T。

当阀断电时，选项/A可实现主阀芯反向机能P-A。

立式压机尤其需要此选项，因为在电源故障的情况下，主阀芯P-A机能可阻止压机滑块不受控制和下降的危险。



选项/A

11 电子放大器选项

标准型放大器配用7芯插头

电源 24Vdc电源供电，稳压电源或经过整流滤波，串联2.5A保险丝。若单相整流器，须接10000μF/40V电容滤波；若三相整流器，须接4700μF/40V电容滤波。

输入参考信号 模拟信号差分输入，额定范围±10Vdc（针脚D, E），与预期的阀芯行程成正比。

输出监测信号 模拟信号输出±10Vdc范围，与实际的阀芯行程成比例。

从电子放大器通24VDC 电源启动到阀开始工作要求最短300ms 到500ms 的时间。在这段时间内，到阀线圈的电流为0。

11.1 选项/F

在输出监测信号端子可输出故障信号，显示放大器的故障状态（阀芯位置传感器电缆断裂或对/I选项的参考信号电缆断裂）：故障信号对应0Vdc，正常工作对应24Vdc。

11.2 选项/I

输入信号和监测信号为4~20mA电流信号，而不是标准的±10Vdc。

输入信号还可通过软件选择电压或电流形式，最大范围分别为±10V或±20mA。

一般在机器电控单元和阀的距离较远时，或在电气信号可能受到电子干扰时采用/I选项。在输入电流信号电缆断裂情况下，阀会停止工作。

11.3 选项/Q

安全选项，它允许在不切断电源的情况下，可驱动阀工作或停止阀工作（阀停止工作时，电子放大器输出仍处于激活状态）。启动放大器需要供给24Vdc使能信号。

11.4 选项/Z

放大器配用12芯主插头，除具有上述特性外，另外还有：

使能输入信号

放大器使能需要在针脚3相对于针脚2输入24Vdc电源：当使能信号为0时，阀停止工作（电磁铁电流为0），但放大器电流输出级仍处于激活状态。

故障输出信号

故障信号显示放大器的故障状态（电磁铁短路/未连接，4~20mA输入信号电缆断线，等等）。故障状态信号为0Vdc，正常工作信号为24Vdc（针脚11对针脚2）：故障状态不受使能信号的影响。

放大器的逻辑和通讯电源-仅对LES阀

此选项分别给电磁铁（针脚1, 2）和数字式电子放大器（针脚9, 10）供电。

切断电磁铁供电电源可以使阀停止工作，但仍保持数字放大器电路通电，以避免机器现场总线控制器出错，这符合紧急情况下欧盟EN13849-1(exEN954-1)标准安全等级的规定，可实现安全型系统。

11.5 选项/C-仅对SP, SF, SL

选项/C时压力（力）传感器输出为4~20mA电流信号，而不是标准的±10V。

输入信号可通过软件选择电流和电压形式，最大范围分别是±10V或±20mA。

11.6 可能组合选项

对**SN**：有/FI, /IQ 和 /IZ选项

对**SP, SF, SL**：有 /CI选项

12 电气连接和指示灯

12.1 主插头信号 -7 芯 - 标准型, /F 和/Q 选项 (A1)

针脚	标准型	/Q	/F	技术描述	注释
A	V+			电源24Vdc	输入- 电源
B	V0			电源0Vdc	地 - 电源
C	地		地	模拟地	地 - 模拟信号
		使能		阀使能 (24Vdc) 或非使能 (0Vdc) , 相对于V0	输入 - 开关信号
D	Q_输入+			流量参考输入信号: $\pm 10\text{Vdc}/\pm 20\text{mA}$ 最大范围 默认设置: 标准型为 $\pm 10\text{Vdc}$, /I 选项为4~20mA	输入 - 模拟信号 可软件选择
E	输入-			负参考输入信号对于Q_输入+	输入 - 模拟信号
F	Q_监测	相对于: 地 V0		流量监测输出信号: $\pm 10\text{Vdc}/\pm 20\text{mA}$ (最大范围) 默认设置: 标准型为 $\pm 10\text{Vdc}$, /I 选项为4~20mA	输出 - 模拟信号 可软件选择
			故障	故障 (0Vdc) 或正常工作 (24Vdc)	输出 - 开/关信号
G	地			内部连接到放大器壳体上	

12.2 主插头信号 - 12 芯 - /Z选项和SP,SL (A2)

针脚	LEB-SN /Z	LES-SN /Z	LES-SP, SF, SL BC, BP, EH	NP	技术描述	注释
1	V+				电源24Vdc	输入- 电源
2	V0				电源0Vdc	地 - 电源
3	使能 V0	相对于: VL0	VL0	V0	阀使能 (24Vdc) 或非使能 (0Vdc)	输入 - 开关信号
4	Q_输入+				流量参考输入信号: $\pm 10\text{Vdc}/\pm 20\text{mA}$ 最大范围 默认设置: 标准型为 $\pm 10\text{Vdc}$, /I 选项为4~20mA	输入 - 模拟信号 可软件选择
5	输入-				对于Q_输入+和F_输入+为负参考输入信号	输入 - 模拟信号
6	Q_监测 地	相对于: VL0	VL0	V0	流量监测输出信号: $\pm 10\text{Vdc}/\pm 20\text{mA}$ 最大调节范围 默认设置: 标准型为 $\pm 10\text{Vdc}$, /I 选项为4~20mA	输出 - 模拟信号 可软件选择
7	地				模拟地	地 - 模拟信号
		NC			不接	
8			F_输入+		压力/力参考输入信号: $\pm 10\text{Vdc}/\pm 20\text{mA}$ (最大范围) 默认设置: 标准型为 $\pm 10\text{Vdc}$, /I 选项为4~20mA	输入 - 模拟信号 可软件选择
	R_使能				重复使能, 输出重现使能输入, 相对于V0	输出 - 开/关信号
		NC			不接	
9			F_监测 VL0	相对于: V0	压力/力监测输出信号: $\pm 10\text{Vdc}/\pm 20\text{mA}$ 最大范围 默认设置: 标准型为 $\pm 10\text{Vdc}$, /I 选项为4~20mA	输出 - 模拟信号 可软件选择
	NC				不接	
		VL+			放大器逻辑级和通讯电源24Vdc	输入- 电源
10				D_IN0	压力/力PID多重选择, 相对于V0	输入- 模拟信号
	NC				不接	
		VL0			放大器逻辑级和通讯电源0Vdc	地- 电源
11				D_IN1	压力/力PID多重选择 (不适用于SF) , 相对于V0	输入- 开/关信号
	故障 V0	相对于: VL0	VL0	VL0	故障 (0Vdc) 或正常工作 (24Vdc)	输出 - 开/关信号
PE	地				内部连接到放大器壳体上	

注: 当放大器连接到PC 的USB 接口时, 在VL+ 连接情况下不要断开VL0。

12.3 通讯插头 (B) - (C)

(B) USB 插头-M12-5 芯 缺省配置		
针脚	信号	技术描述(1)
1	+5V_USB	外部USB闪存电源
2	ID	USB闪存识别
3	GND_USB	信号0数据线
4	D-	数据线-
5	D+	数据线+

(C1) (C2) BP 现场总线型, 插头-M12-5 芯		
针脚	信号	技术描述(1)
1	+5V	终端电源信号
2	LINE-A	总线 (高)
3	DGND	信号地
4	LINE-B	总线 (低)
5	屏蔽	

注释(1)建议插头壳体同屏蔽线连接

(C1) (C2) BC 现场总线型, 插头-M12-5 芯		
针脚	信号	技术描述(1)
1	CAN_SHLD	屏蔽
2	NC	不接
3	CAN_GND	CAN地
4	CAN_H	CAN (高)
5	CAN_L	CAN (低)

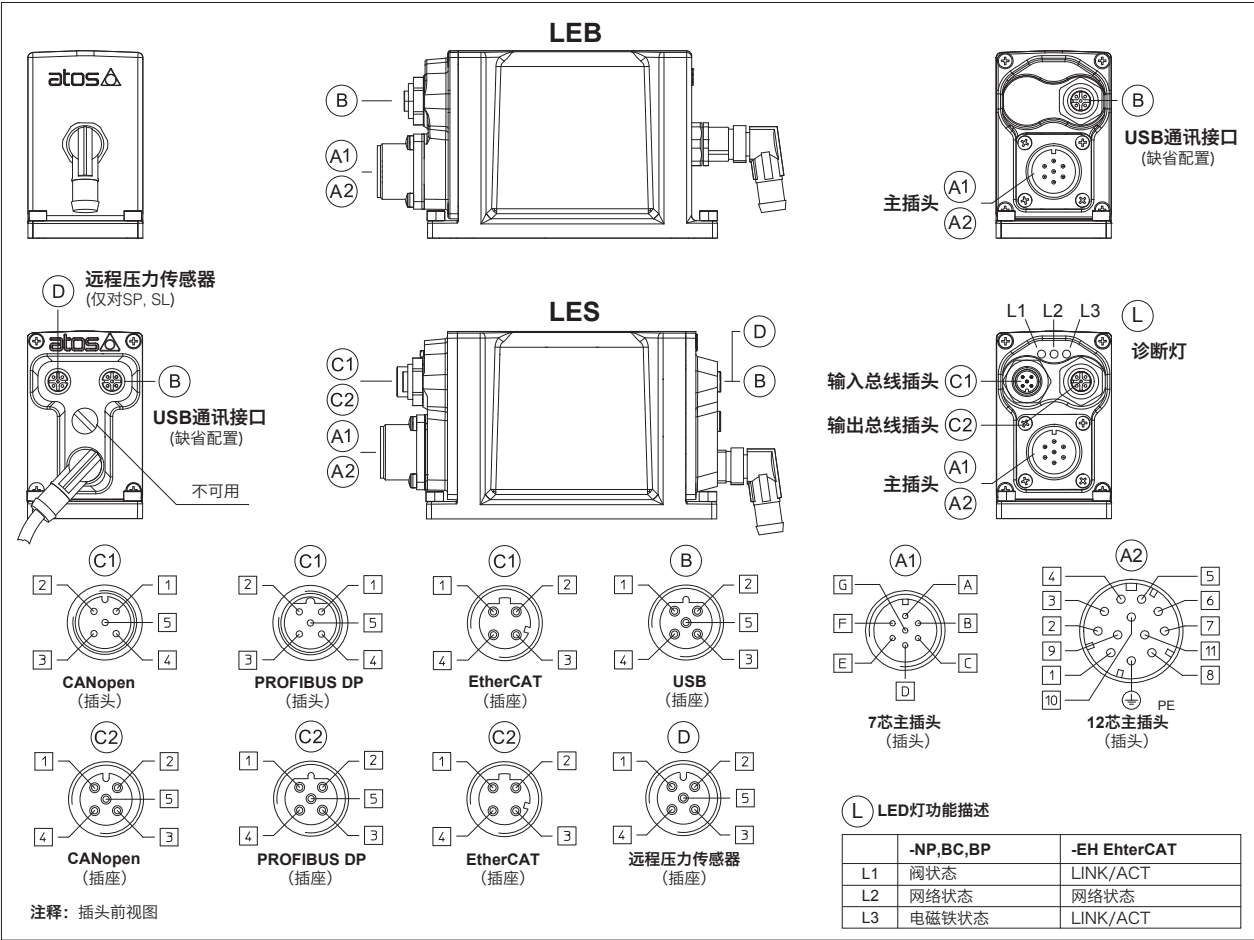
(C1) (C2) EH总线型, 插头-M12-4 芯		
针脚	信号	技术描述(1)
1	TX+	发送+
2	RX+	接收+
3	TX-	发送-
4	RX-	接收-
壳体	屏蔽	

12.4 远程压力/力传感器插头 - M12 - 5 芯 - 仅对SP, SL (D)

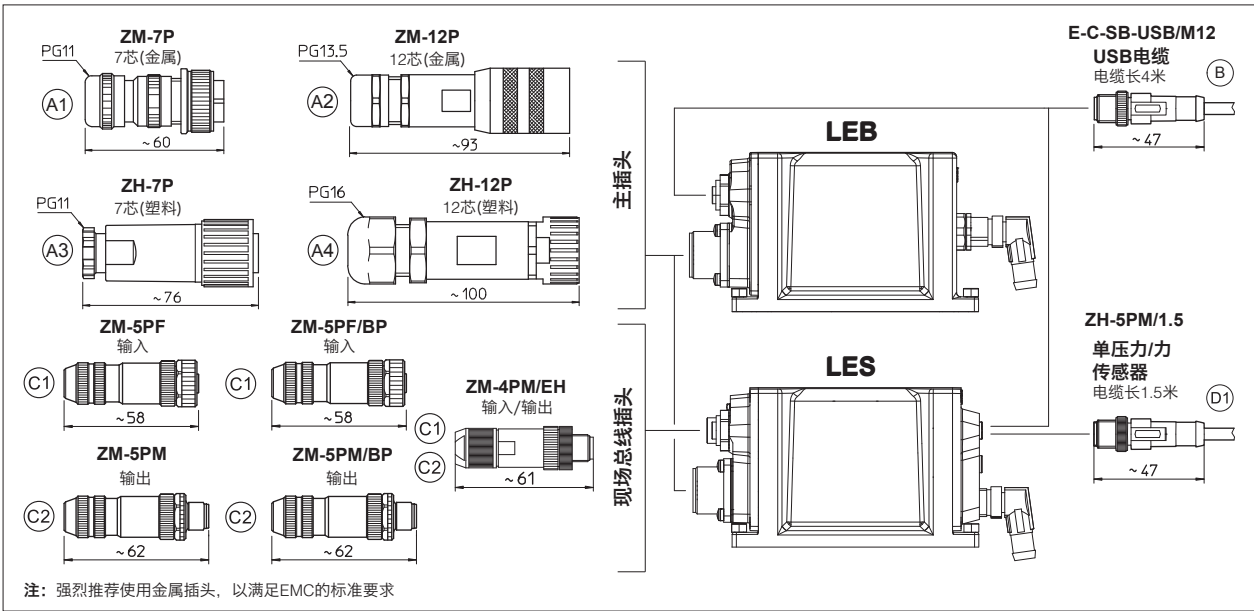
针脚	信号	技术描述(1)	一个传感器 (1)
1	VF +24V	电源24Vdc	连接
2	TR1	第一个传感器信号: $\pm 10\text{Vdc}/\pm 20\text{mA}$ (最大范围), 可软件选择 标准型的默认值为 $\pm 10\text{Vdc}$, /C选项为4~20mA	连接
3	AGND	传感器电源和信号都为GND	连接
4	TR2	第二个传感器信号: $\pm 10\text{Vdc}/\pm 20\text{mA}$ (最大范围), 可软件选择 标准型的默认值为 $\pm 10\text{Vdc}$, /C 选项为4~20mA	连接
5	NC	不接	/

注释(1) 模拟输入范围可通过软件选择

12.5 连接外形图



13 插头



14 头和通讯插头的型号 - 需单独订货

阀型号	LEB LES	LEB /Z LES /Z	CANopen (BC)	PROFIBUS DP (BP)	EtherCat (EH)	P/Q复合控制 SP, SL
插头型号	ZM-7P (A1) ZH-7P (A3)	ZM-12P (A2) ZH-12P (A4)	ZM-5PF (C1) ZM-5PM (C2)	ZM-5PF/BP (C1) ZM-5PM/BP (C2)	ZM-4PM/EH (C1) ZM-4PM/EH (C2)	ZH-5PM/1.5 (1) (D1)
保护等级	IP67					
样本页码	GS208, GS210, GS212, K500					

仅对LES

(1) 仅对SP或SL

15 软件工具包-见技术样本GS500



阀的功能参数和配置易于通过Atos特有的E-SW软件程序设置和优化，E-SW软件可通过USB接口连接到数字放大器上进行通讯。根据放大器的总线接口不同，E-SW有以下不同版本选配：

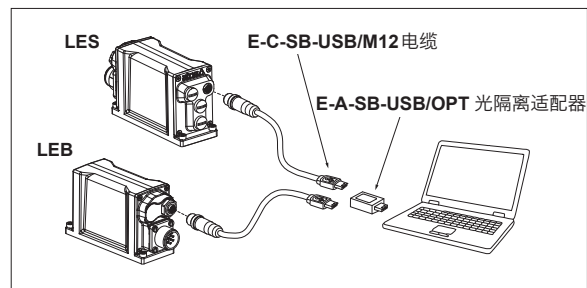
NP（无）E-SW-PS，BC（CANopen）E-SW-BC，BP（PROFIBUS DP）E-SW-BP和EH（EtherCAT）E-SW-EH。

对于总线型，当放大器通过现场总线连接到中央机器单元时，E-SW软件可通过USB通讯接口调节阀的参数设置。

警告：放大器的USB接口不是隔离的！

强烈建议使用E-A-SB-USB/OPT光隔离适配器连接电脑。

USB连接



16 紧固螺钉和阀的质量

LIQZO			
尺寸	紧固螺钉 12.9级	拧紧扭矩	质量(Kg)
25	N°4 M12x100	125 Nm	8,8
32	N°4 M16x60	300 Nm	11,2
40	N°4 M20x70	600 Nm	17,3

LIQZP			
尺寸	紧固螺钉 12.9级	拧紧扭矩	质量(Kg)
50	N°4 M20x80	600 Nm	24,6
63	N°4 M30x120	2100 Nm	44,6
80	N°8 M24x80	1000 Nm	72,2

17 安装界面和插孔 - 详细尺寸见技术样本P006

安装界面

25-63口径																	
尺寸	A	B	C	D	E	F	G	J _{min}	K	L _{min}	M	ØN	ØP _{max}	R	S _{max}	T	V
25	4	13	29	58	62	58	29	-	-	85	M12	6	6	30	8	4	62
32	6	18	35	70	76	70	35	-	-	102	M16	6	8	38	8	6	76
40	7,5	19,5	42,5	85	92,5	85	42,5	-	-	125	M20	6	10	46	8	7,5	92,5
50	8	20	50	100	108	100	50	-	-	140	M20	8	10	46	8	8	108
63	12,5	24,5	62,5	125	137,5	125	62,5	-	-	180	M30	8	12	66	8	12,5	137,5
80	-	-	-	-	-	-	-	250	200	-	M24	10	16	50	8	-	-

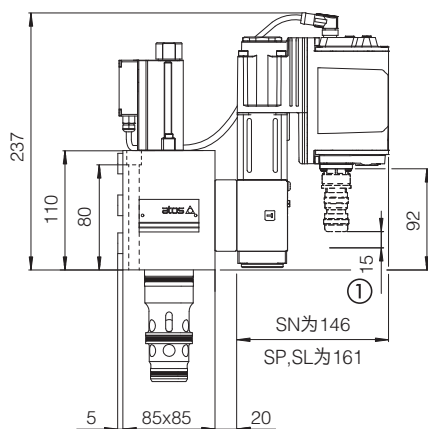
插孔

Technical drawing of a port interface showing dimensions L1 through W and a cross-section view labeled A. The drawing includes a side view and a cross-section view. The side view shows a cylindrical component with a flange. The cross-section view shows the internal structure of the port. Dimensions are labeled as follows:

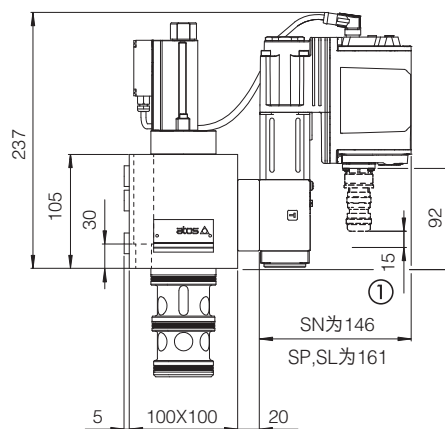
- L1**: Total length of the port.
- L2**: Distance from the front face to the start of the internal thread.
- L3**: Distance from the front face to the start of the internal thread.
- L4**: Distance from the front face to the start of the internal thread.
- L5**: Distance from the front face to the start of the internal thread.
- L6**: Distance from the front face to the start of the internal thread.
- L7**: Distance from the front face to the start of the internal thread.
- L8**: Distance from the front face to the start of the internal thread.
- L9**: Distance from the front face to the start of the internal thread.
- L10**: Distance from the front face to the start of the internal thread.
- L11**: Distance from the front face to the start of the internal thread.
- L12**: Distance from the front face to the start of the internal thread.
- U**: Distance from the front face to the start of the internal thread.
- W**: Distance from the front face to the start of the internal thread.

The drawing also shows a cross-section view labeled A, which is a detail of the internal thread. The cross-section view shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d1H7$ and $\phi d2H7$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d3H7$ and $\phi d4$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d5$ and $\phi d6$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d7$ and $\phi d8$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d9$ and $\phi d10$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d11$ and $\phi d12$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d13$ and $\phi d14$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d15$ and $\phi d16$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d17$ and $\phi d18$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d19$ and $\phi d20$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d21$ and $\phi d22$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d23$ and $\phi d24$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d25$ and $\phi d26$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d27$ and $\phi d28$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d29$ and $\phi d30$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d31$ and $\phi d32$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d33$ and $\phi d34$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d35$ and $\phi d36$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d37$ and $\phi d38$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d39$ and $\phi d40$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d41$ and $\phi d42$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d43$ and $\phi d44$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d45$ and $\phi d46$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d47$ and $\phi d48$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d49$ and $\phi d50$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d51$ and $\phi d52$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d53$ and $\phi d54$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d55$ and $\phi d56$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d57$ and $\phi d58$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d59$ and $\phi d60$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d61$ and $\phi d62$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d63$ and $\phi d64$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d65$ and $\phi d66$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d67$ and $\phi d68$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d69$ and $\phi d70$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d71$ and $\phi d72$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d73$ and $\phi d74$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d75$ and $\phi d76$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d77$ and $\phi d78$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d79$ and $\phi d80$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d81$ and $\phi d82$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d83$ and $\phi d84$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d85$ and $\phi d86$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d87$ and $\phi d88$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d89$ and $\phi d90$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d91$ and $\phi d92$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d93$ and $\phi d94$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d95$ and $\phi d96$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d97$ and $\phi d98$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d99$ and $\phi d100$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d101$ and $\phi d102$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d103$ and $\phi d104$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d105$ and $\phi d106$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d107$ and $\phi d108$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d109$ and $\phi d110$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d111$ and $\phi d112$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d113$ and $\phi d114$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d115$ and $\phi d116$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d117$ and $\phi d118$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d119$ and $\phi d120$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d121$ and $\phi d122$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d123$ and $\phi d124$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d125$ and $\phi d126$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d127$ and $\phi d128$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d129$ and $\phi d130$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d131$ and $\phi d132$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d133$ and $\phi d134$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d135$ and $\phi d136$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d137$ and $\phi d138$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d139$ and $\phi d140$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d141$ and $\phi d142$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d143$ and $\phi d144$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d145$ and $\phi d146$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d147$ and $\phi d148$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d149$ and $\phi d150$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d151$ and $\phi d152$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d153$ and $\phi d154$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d155$ and $\phi d156$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d157$ and $\phi d158$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d159$ and $\phi d160$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d161$ and $\phi d162$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d163$ and $\phi d164$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d165$ and $\phi d166$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d167$ and $\phi d168$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d169$ and $\phi d170$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d171$ and $\phi d172$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d173$ and $\phi d174$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d175$ and $\phi d176$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d177$ and $\phi d178$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d179$ and $\phi d180$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d181$ and $\phi d182$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d183$ and $\phi d184$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d185$ and $\phi d186$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d187$ and $\phi d188$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d189$ and $\phi d190$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d191$ and $\phi d192$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d193$ and $\phi d194$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d195$ and $\phi d196$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d197$ and $\phi d198$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d199$ and $\phi d200$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d201$ and $\phi d202$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d203$ and $\phi d204$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d205$ and $\phi d206$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d207$ and $\phi d208$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d209$ and $\phi d210$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d211$ and $\phi d212$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d213$ and $\phi d214$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d215$ and $\phi d216$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d217$ and $\phi d218$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d219$ and $\phi d220$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d221$ and $\phi d222$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d223$ and $\phi d224$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d225$ and $\phi d226$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d227$ and $\phi d228$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d229$ and $\phi d230$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d231$ and $\phi d232$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d233$ and $\phi d234$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d235$ and $\phi d236$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d237$ and $\phi d238$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d239$ and $\phi d240$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d241$ and $\phi d242$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d243$ and $\phi d244$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d245$ and $\phi d246$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d247$ and $\phi d248$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d249$ and $\phi d250$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d251$ and $\phi d252$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d253$ and $\phi d254$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d255$ and $\phi d256$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d257$ and $\phi d258$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d259$ and $\phi d260$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d261$ and $\phi d262$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d263$ and $\phi d264$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d265$ and $\phi d266$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d267$ and $\phi d268$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d269$ and $\phi d270$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d271$ and $\phi d272$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d273$ and $\phi d274$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d275$ and $\phi d276$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d277$ and $\phi d278$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d279$ and $\phi d280$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d281$ and $\phi d282$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d283$ and $\phi d284$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d285$ and $\phi d286$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d287$ and $\phi d288$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d289$ and $\phi d290$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d291$ and $\phi d292$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d293$ and $\phi d294$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d295$ and $\phi d296$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d297$ and $\phi d298$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d299$ and $\phi d300$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d301$ and $\phi d302$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d303$ and $\phi d304$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d305$ and $\phi d306$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d307$ and $\phi d308$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d309$ and $\phi d310$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d311$ and $\phi d312$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d313$ and $\phi d314$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d315$ and $\phi d316$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d317$ and $\phi d318$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d319$ and $\phi d320$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d321$ and $\phi d322$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d323$ and $\phi d324$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d325$ and $\phi d326$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d327$ and $\phi d328$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d329$ and $\phi d330$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d331$ and $\phi d332$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d333$ and $\phi d334$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d335$ and $\phi d336$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d337$ and $\phi d338$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d339$ and $\phi d340$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d341$ and $\phi d342$. 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The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d355$ and $\phi d356$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d357$ and $\phi d358$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d359$ and $\phi d360$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d361$ and $\phi d362$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d363$ and $\phi d364$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d365$ and $\phi d366$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d367$ and $\phi d368$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d369$ and $\phi d370$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d371$ and $\phi d372$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d373$ and $\phi d374$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d375$ and $\phi d376$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d377$ and $\phi d378$. 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The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d391$ and $\phi d392$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d393$ and $\phi d394$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d395$ and $\phi d396$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d397$ and $\phi d398$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d399$ and $\phi d400$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d401$ and $\phi d402$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d403$ and $\phi d404$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d405$ and $\phi d406$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d407$ and $\phi d408$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d409$ and $\phi d410$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d411$ and $\phi d412$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d413$ and $\phi d414$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d415$ and $\phi d416$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d417$ and $\phi d418$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d419$ and $\phi d420$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d421$ and $\phi d422$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d423$ and $\phi d424$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d425$ and $\phi d426$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5 mm. The thread is labeled as $\phi d427$ and $\phi d428$. The cross-section view also shows a thread with a pitch of 1.5 mm and a major diameter of 1.5

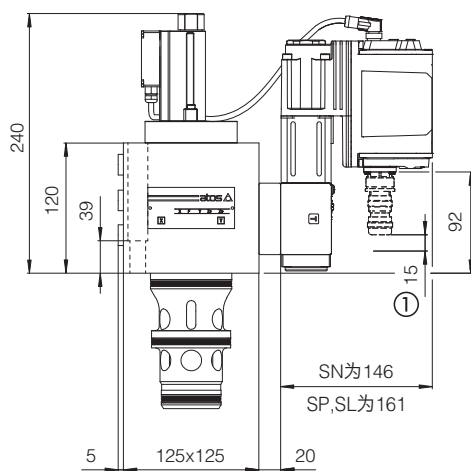
LIQZO-LEB-253
LIQZO-LES-253



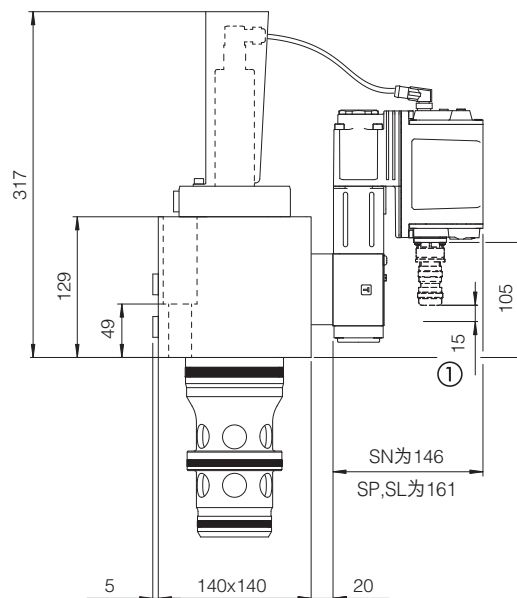
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LIQZO-LES-323



LIQZO-LEB-**-403
LIQZO-LES-**-403



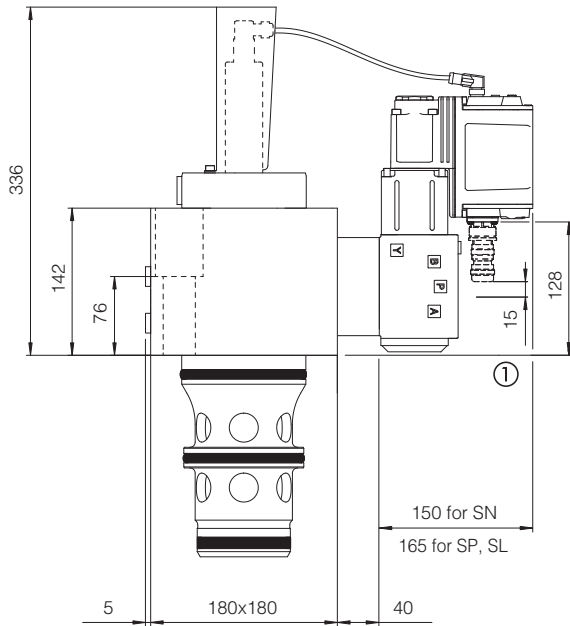
LIQZP-LEB-503
LIQZP-LES-503



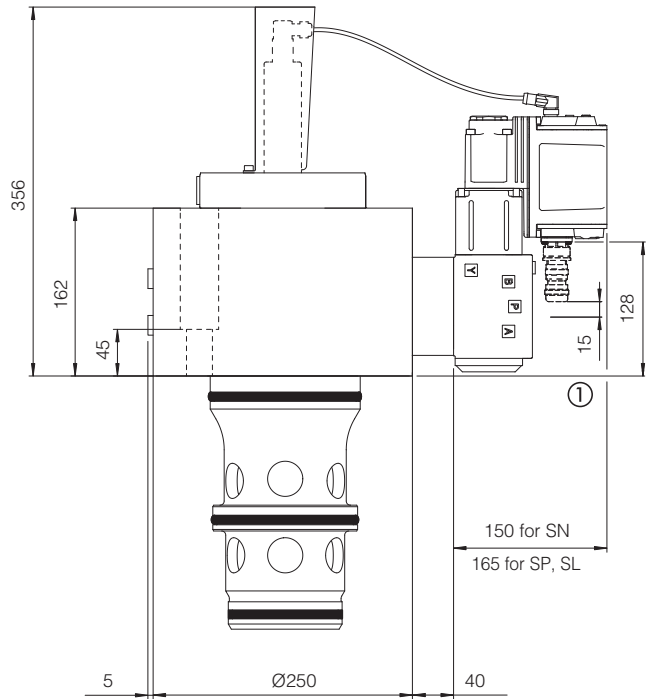
① 拆装7芯或12芯主插头所需留的空间。关于主插头和通讯插头请见第13, 14节

注释：关于安装界面和插孔尺寸见第17节和技术样本P006

LIQZP-LEB-633
LIQZP-LES-633



LIQZP-LEB-803
LIQZP-LES-803



① 拆装7芯或12芯主插头所需留的空间。关于主插头和通讯插头请见第 13, 14 节

注释：关于安装界面和插孔尺寸见第 17 节和技术样本P006