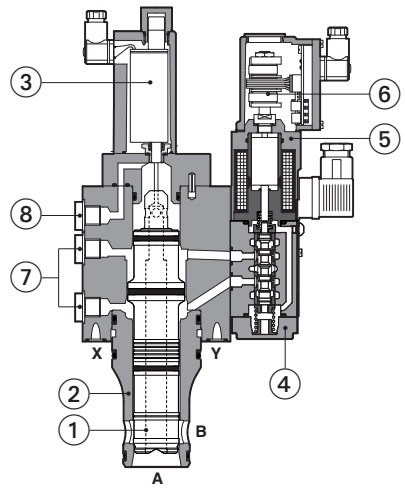
Proportional 2-way cartridges high performance

piloted, with two LVDT transducers, ISO 7368 sizes from 16 to 100



① Poppet
② Sleeve
③ Main stage LVDT transducer
④ Pilot valve
⑤ Proportional solenoid
⑥ Pilot valve LVDT transducer
⑦ Air bleeding
⑧ Air suction port

LIQZO-L-322L4

LIQZO-L, LIQZP-L

High performance 2-way proportional cartridge valves specifically designed for high speed closed loop controls.

The valves operate in association with digital off-board divers, see section 2.

They are equipped with two LVDT position transducers for best dynamics in not compensated flow regulations.

The cartridge execution for blocks installation grants high flow capabilities and minimized pressure drops.

Spool regulation characteristics: L = linear

LIQZO: Size: **16** ÷ **40** - ISO 7368
Max flow: **600** ÷ **2500 l/min**
Max pressure: **350 bar**

LIQZP: Size: **50** ÷ **100** - ISO 7368
Max flow: **4000** ÷ **16000 l/min**
Max pressure: **420 bar**

1 MODEL CODE

LIQZO	-	L	-	32	2	L4	/	*	/	*

LIQZO
Proportional cartridge, piloted
LIQZO = size 16 to 40, Pmax 350 bar
LIQZP = size 50 to 100, Pmax 420 bar

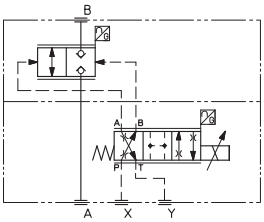
L = two LVDT transducers

Valve size ISO 7368, see section 4:

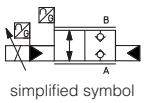
LIQZO =	**16**	**25**	**32**	**40**
l/min	250	500	800	1200
LIQZP =	**50**	**63**	**80**	**100**
l/min	2000	3000	4500	7200

Nominal flow (l/min) at Δp 5 bar

Configuration: **2** = 2 way



functional symbol



simplified symbol

Seals material, see section 6:
- = NBR
PE = FKM
BT = HNBR

Series number

Spool type, regulating characteristics:

L4 = linear

2 OFF-BOARD ELECTRONIC DRIVERS

Please include in the driver order also the complete code of the connected proportional valve.

Drivers model	E-BM-LID	E-BM-LEB	E-BM-LES
Type	digital	digital	digital
Format	DIN-rail panel	DIN-rail panel	DIN-rail panel
Tech table	GS235	GS230	GS240

WARNING

To avoid overheating and possible damage of the electronic driver, the valves must be never energized without hydraulic supply to the pilot stage.
In case of prolonged pauses of the valve operation during the machine cycle, it is always advisable to disable the driver.

3 GENERAL CHARACTERISTICS

Assembly position	Any position
Subplate surface finishing to ISO 4401	Acceptable roughness index: Ra ≤ 0,8, recommended Ra 0,4 – Flatness ratio 0,01/100
MTTFd valves according to EN ISO 13849	75 years, see technical table P007
Ambient temperature range	**Standard** = -20°C ÷ +60°C **/PE** option = -20°C ÷ +60°C **/BT** option = -40°C ÷ +60°C
Storage temperature range	**Standard** = -20°C ÷ +70°C **/PE** option = -20°C ÷ +70°C **/BT** option = -40°C ÷ +70°C
Surface protection	Zinc coating with black passivation
Corrosion resistance	Salt spray test (EN ISO 9227) > 200 h
Compliance	CE according to EMC directive 2014/30/EU (Immunity: EN 61000-6-2; Emission: EN 61000-6-3) RoHS Directive 2011/65/EU as last update by 2015/65/EU REACH Regulation (EC) n°1907/2006

4 HYDRAULIC CHARACTERISTICS - based on mineral oil ISO VG 46 at 50 °C

Size		**16**	**25**	**32**	**40**	**50**	**63**	**80**	**100**
Nominal flow Δp A-B	[l/min]								
Δp = 5 bar		250	500	800	1200	2000	3000	4500	7200
Δp = 10 bar		350	700	1100	1700	2800	4250	6350	10200
Max permissible flow		600	1200	1800	2500	4000	6000	10000	16000
Max pressure [bar]	**LIQZO**	Ports A, B = **350** X = 350 Y ≤ 10							
	LIQZP	Ports A, B = **420** X = 350 Y ≤ 10							
Nominal flow of pilot valve at Δp = 70 bar	[l/min]	4	8	20	40	40	100	100	100
Leakage of pilot valve at P = 100 bar	[l/min]	0,2	0,2	0,3	0,7	0,7	1	1	1
Piloting pressure	[bar]	min: 40% of system pressure max 350 recommended 140 ÷ 160							
Piloting volume	[cm^3]	1,6	2,2	7,0	9,4	17,7	32,5	39,5	49,5
Piloting flow **(1)**	[l/min]	4	5,3	14	19	35,5	56	60	60
Response time 0 ÷ 100% step signal **(2)**	[ms]	24	25	28	30	30	35	40	50
Hysteresis	[% of the max regulation]	≤ 0,1							
Repeatability	[% of the max regulation]	± 0,1							
Thermal drift		zero point displacement < 1% at ΔT = 40°C							

(1) With step reference input 0÷100%
(2) With pilot pressure = 140 bar, see datailed diagrams in section 7.2

WARNING

The loss of the pilot pressure causes the undefined position of the main spool.
The sudden interruption of the power supply during the valve operation causes the immediate main spool opening A → T or P → A (for option /A).
This could cause pressure surges in the hydraulic system or high decelerations which may lead to machine damages.

5 ELECTRICAL CHARACTERISTICS

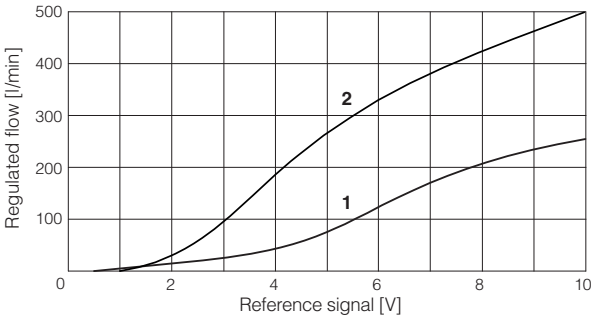
Max power consumption	30 W
Max. solenoid current	2,6 A
Coil resistance R at 20°C	3 ÷ 3,3 Ω
Insulation class	H (180°) Due to the occuring surface temperatures of the solenoid coils, the European standards ISO 13732-1 and EN982 must be taken into account
Protection degree to DIN EN60529	IP65 with mating connectors
Duty factor	Continuous rating (ED=100%)

6 SEALS AND HYDRAULIC FLUIDS - for other fluids not included in below table, consult our technical office

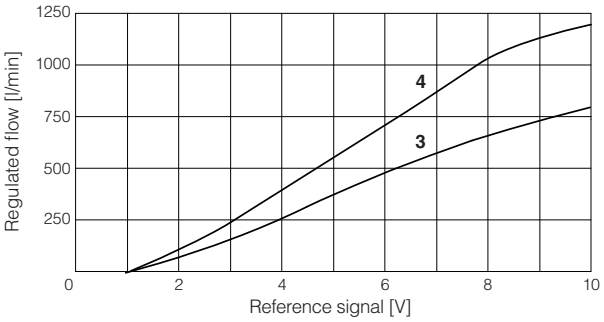
Seals, recommended fluid temperature		NBR seals (standard) = -20°C ÷ +80°C, with HFC hydraulic fluids = -20°C ÷ +50°C FKM seals (/PE option) = -20°C ÷ +80°C HNBR seals (/BT option) = -40°C ÷ +60°C, with HFC hydraulic fluids = -40°C ÷ +50°C		
Recommended viscosity		20÷100 mm²/s - max allowed range 15 ÷ 380 mm²/s		
Max fluid contamination level	normal operation	ISO4406 class 18/16/13 NAS1638 class 7		see also filter section at www.atos.com or KTF catalog
	longer life	ISO4406 class 16/14/11 NAS1638 class 5		
Hydraulic fluid		**Suitable seals type**	**Classification**	**Ref. Standard**
Mineral oils		NBR, FKM, HNBR	HL, HLP, HLPD, HVLP, HVLPD	DIN 51524
Flame resistant without water		FKM	HFDU, HFDR	ISO 12922
Flame resistant with water		NBR, HNBR	HFC	

7 DIAGRAMS (based on mineral oil ISO VG 46 at 50 °C)

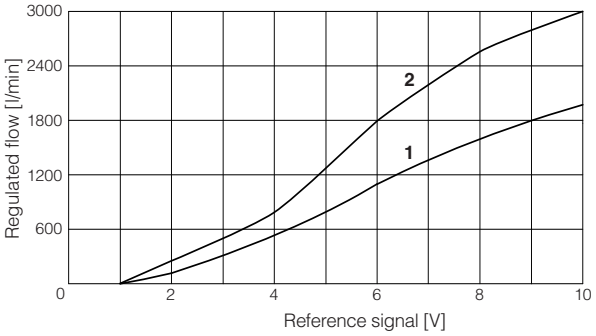
7.1 Regulation diagrams (values measured at Δp 5 bar)



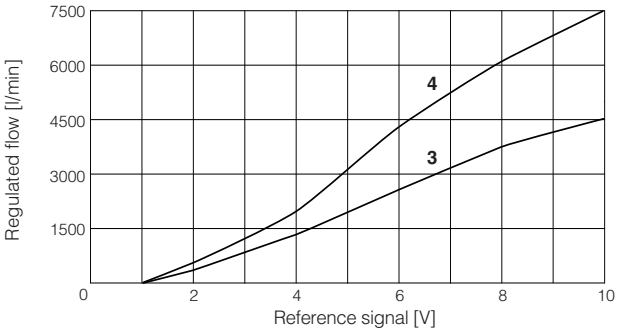
1 = LIQZO-L-162L4
2 = LIQZO-L-252L4



3 = LIQZO-L-322L4
4 = LIQZO-L-402L4



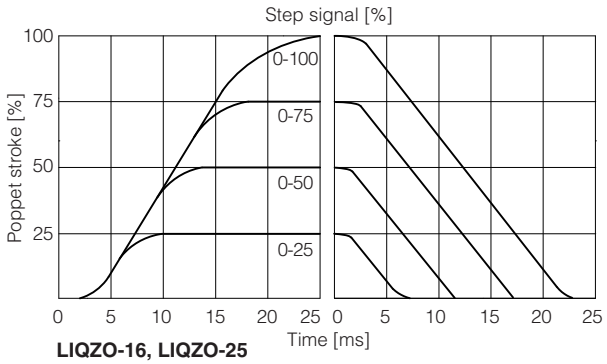
1 = LIQZP-L-502L4
2 = LIQZP-L-632L4



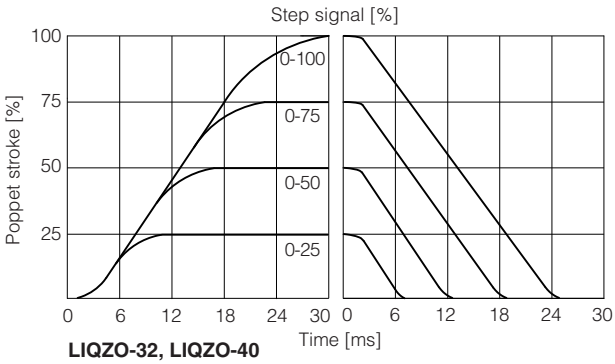
3 = LIQZP-L-802L4
4 = LIQZP-L-1002L4

7.2 Response time

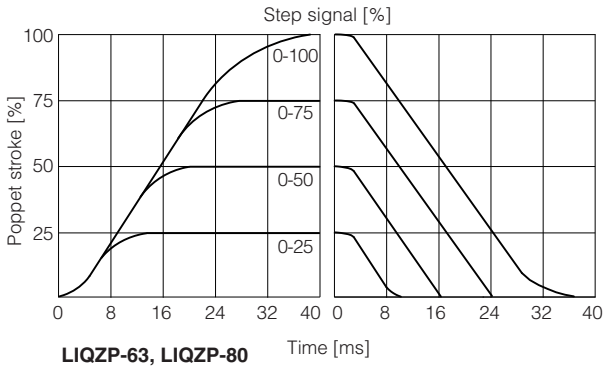
The response times in below diagrams are measured at different steps of the reference input signal. They have to be considered as average values. For the valves with digital electronics the dynamics performances can be optimized by setting the internal software parameters.



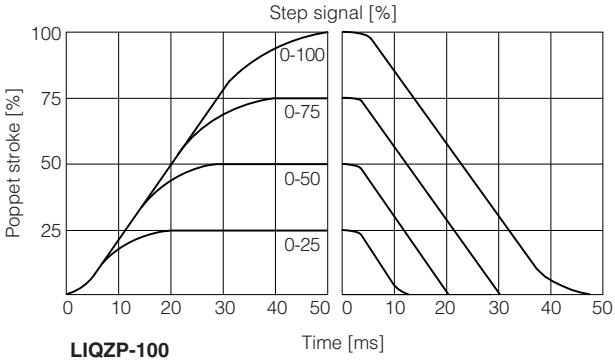
LIQZO-16, LIQZO-25



LIQZO-32, LIQZO-40
LIQZP-50

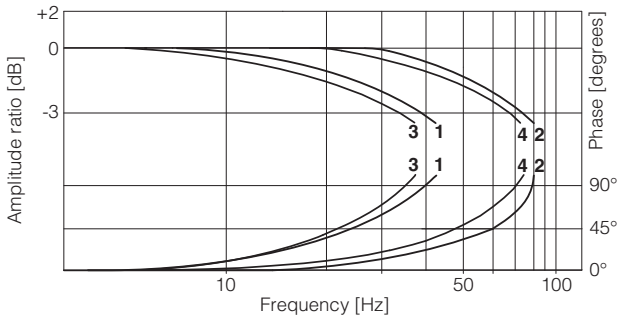


LIQZP-63, LIQZP-80

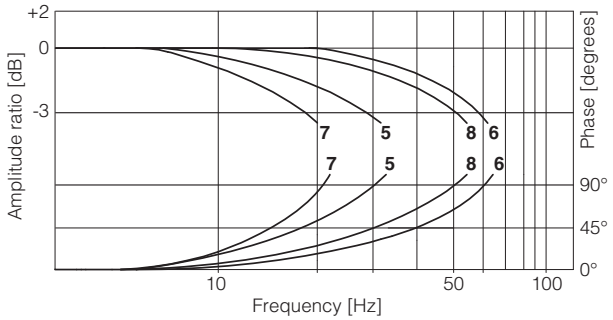


LIQZP-100

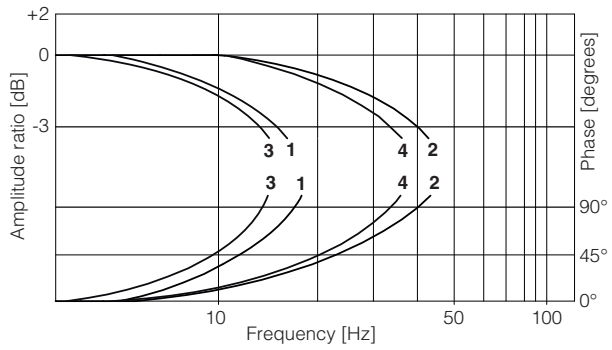
7.3 Bode diagrams - stated at nominal hydraulic conditions



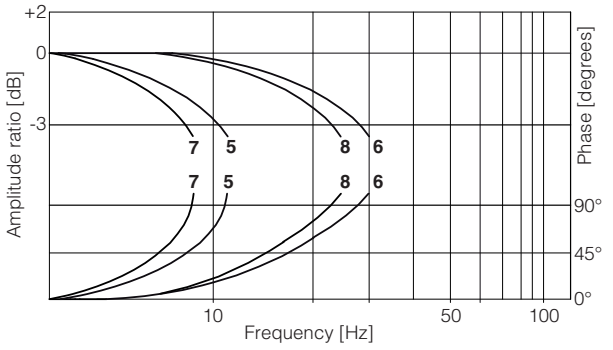
1 = LIQZO-L-162L4: 10% ↔ 90%
2 = LIQZO-L-162L4: 50% ± 5%
3 = LIQZO-L-252L4: 10% ↔ 90%
4 = LIQZO-L-252L4: 50% ± 5%



5 = LIQZO-L-322L4: 10% ↔ 90%
6 = LIQZO-L-322L4: 50% ± 5%
7 = LIQZO-L-402L4: 10% ↔ 90%
8 = LIQZO-L-402L4: 50% ± 5%



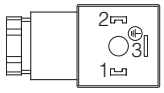
1 = LIQZP-L-502L4: 10% ↔ 90%
2 = LIQZP-L-502L4: 50% ± 5%
3 = LIQZP-L-632L4: 10% ↔ 90%
4 = LIQZP-L-632L4: 50% ± 5%



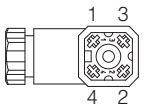
5 = LIQZP-L-802L4: 10% ↔ 90%
6 = LIQZP-L-802L4: 50% ± 5%
7 = LIQZP-L-1002L4: 10% ↔ 90%
8 = LIQZP-L-1002L4: 50% ± 5%

8 ELECTRICAL CONNECTION - connectors supplied with the valve

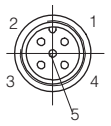
8.1 Solenoid connector

PIN	SIGNAL	TECHNICAL SPECIFICATION	Connector code 666
1	**COIL**	Power supply	
2	**COIL**	Power supply	
3	**GND**	Ground	

8.2 LVDT transducer connector - for LIQZO

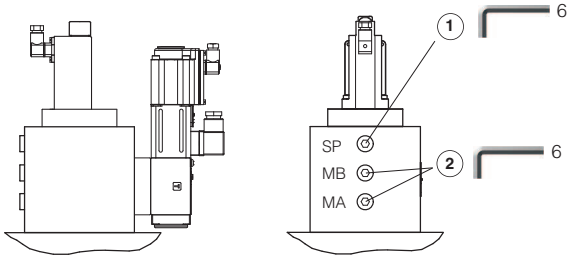
PIN	SIGNAL	TECHNICAL SPECIFICATION	Connector code 345
1	**TR**	Output signal	
2	**VT-**	Power supply -15VDC	
3	**VT+**	Power supply +15VDC	
4	**GND**	Ground	

8.3 LVDT transducer connector - for LIQZP

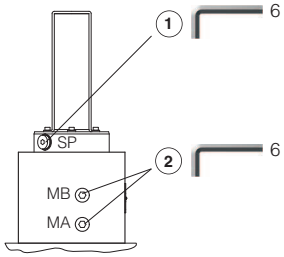
PIN	SIGNAL	TECHNICAL SPECIFICATION	Connector code ZBE-08
1	**PROG**	Do not connect	
2	**VT+**	Power supply +15VDC	
3	**AGND**	Ground	
4	**TR**	Output signal	
5	**VT-**	Power supply -15VDC	

9 AIR BLEEDING

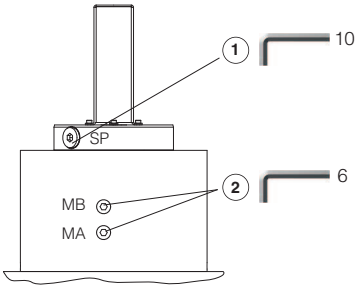
Size 16 to 40



Size 50



Sizes 63 to 100



(1) Air suction port:

N° 1 plug G1/4" for sizes 16 to 50
N° 1 plug G1/2" for sizes 63 to 100

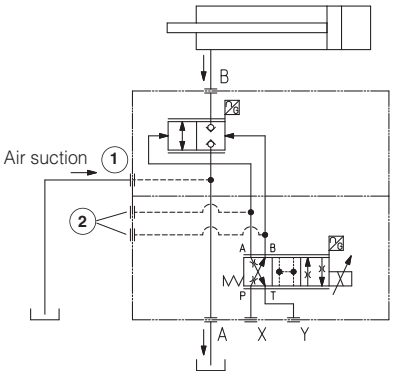
To be used only in case port A is connected to tank and subjected to negative pressure, consult our technical office.

(2) Air bleeding:

N° 2 plugs G1/4"

At the machine commissioning it is advisable to bleed the air from piloting chambers, by loosening the 2 plugs shown in the picture.

Operate the valve for few seconds at low pressure and then lock the plugs.



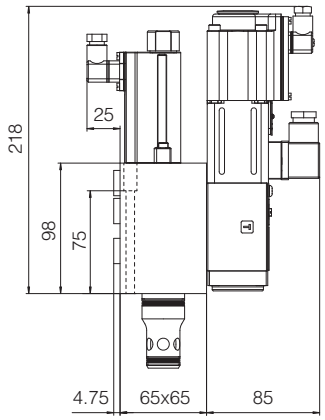
10 FASTENING BOLTS AND VALVE MASS

Type	Size	Fastening bolts (1)	Mass [kg]
LIQZO	16	4 socket head screws M8x90 class 12.9 Tightening torque = 35 Nm	5,6
	25	4 socket head screws M12x100 class 12.9 Tightening torque = 125 Nm	8,2
	32	4 socket head screws M16x60 class 12.9 Tightening torque = 300 Nm	10,9
	40	4 socket head screws M20x70 class 12.9 Tightening torque = 600 Nm	16,7
LIQZP	50	4 socket head screws M20x80 class 12.9 Tightening torque = 600 Nm	23,9
	63	4 socket head screws M30x120 class 12.9 Tightening torque = 2100 Nm	44,0
	80	8 socket head screws M24x80 class 12.9 Tightening torque = 1000 Nm	71,6
	100	8 socket head screws M30x120 class 12.9 Tightening torque = 2100 Nm	122,5

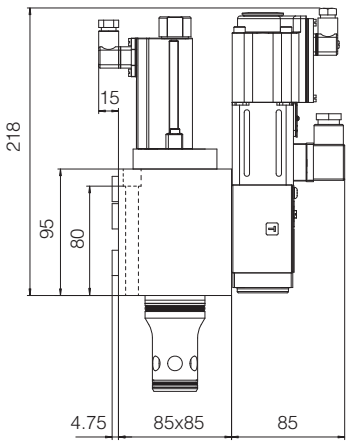
(1) Fastening bolts supplied with the valve

11 INSTALLATION DIMENSIONS [mm]

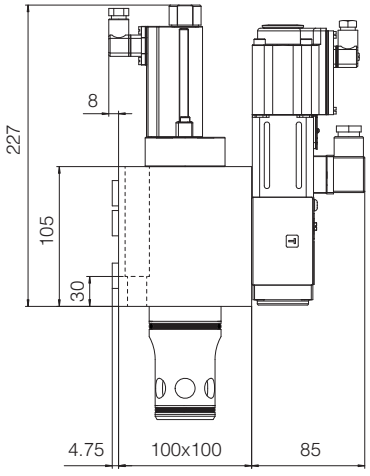
LIQZO-L-162



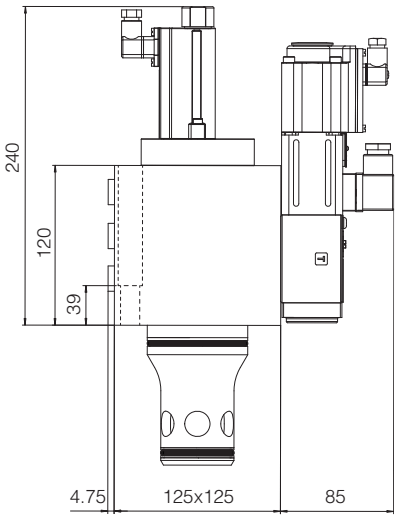
LIQZO-L-252



LIQZO-L-322

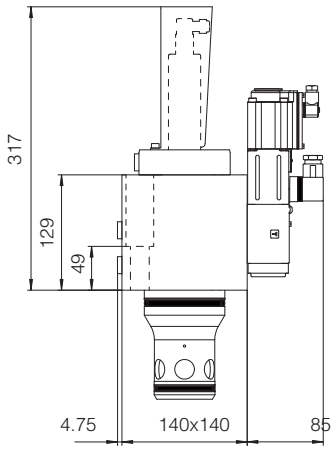


LIQZO-L-402

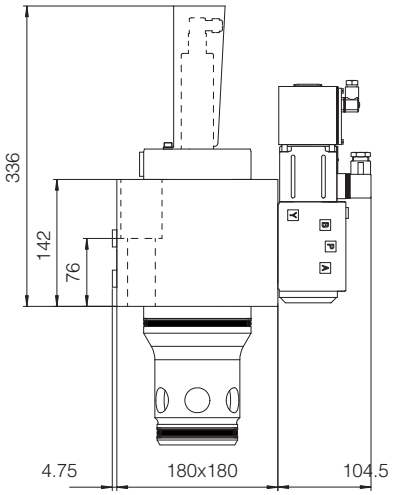


Note: for mounting surface and cavity dimensions, see table P006

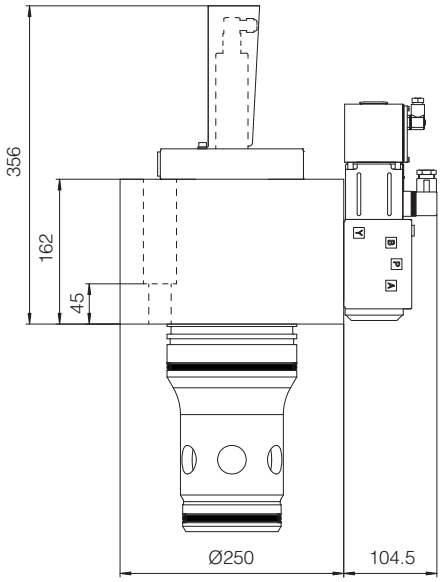
LIQZP-L-502



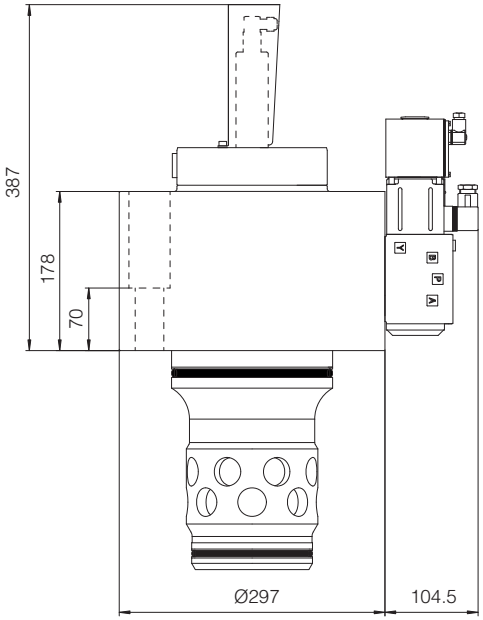
LIQZP-L-632



LIQZP-L-802



LIQZP-L-1002



Note: for mounting surface and cavity dimensions, see table P006

12 RELATED DOCUMENTATION

FS001	Basics for digital electrohydraulics	**GS500**	Programming tools
FS900	Operating and maintenance information for proportional valves	**GS510**	Fieldbus
GS230	E-BM-LEB digital driver	**K800**	Electric and electronic connectors
GS235	E-BM-LID digital driver	**P006**	Mounting surfaces and cavities for cartridge valves
GS240	E-BM-LES digital driver		