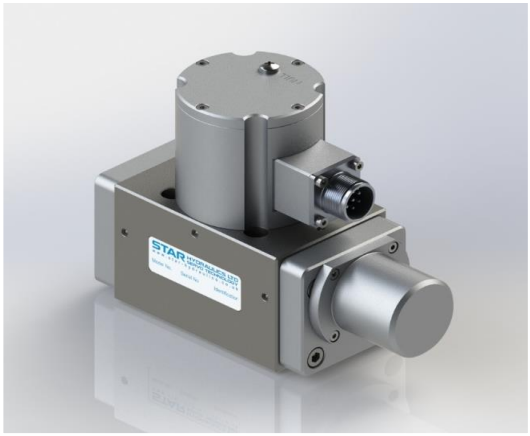
STAR

series

1100

2-Stage Servovalve
Rated flows up to 120 l/m



Features

Maximum operating pressure 350 bar
Electric feedback at main stage spool
ISO 4401-05-05-0-94 mounting pattern (NG10)
Internal or pilot supply & return (4, 5 or 6 port)
Suitable for 3-way or 4-way applications
Low hysteresis & zero point drift
High spool drive forces
Spool in bushing design
Dry torque motor with mechanical feedback
Long life Sapphire Technology

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ST-1100-2016.1-En

Benefits and Features

Sapphire ball in slot design

- Incorporated into Star designs since 1988
- Many billions of cycles per service life
- Increased spool life due to spool rotation
- Ultra low coefficient of friction sapphire to steel
- Feedback mechanism unhindered by spool rotation
- Extended warranties available

Safety

- Flame proof
- Intrinsic safety
- Class, Div & Zone coverage
- Mechanical failsafe
- Double & triple coil redundancy

Quality

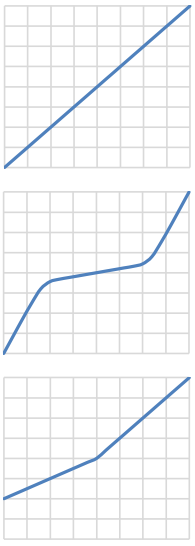
- Independant audit process is our commitment on quality
- Focus on customer needs and expectations
- Delivery schedules on time
- Continual improvements on products and services
- Maintaining design and manufacturing integrity

Special projects

- Compact servo designs
- Special interfaces
- Modular components

Custom spool lap & bushing port geometries

- Zero overlap
- Overlap (closed center)
- underlap (open center)
- Dual gain
- Asymmetric gain



Sealing materials

- Nitrile
- Fluorocarbon (Viton)
- Ethylene-Propylene
- Fluorosilicone

Sapphire flow

- Ensuring first stage stability
- Precisely matched flow properties
- Long life in extreme environments

Special connectors

- MIL-C-5015
- MIL-DTL-38999
- Conduit style male/female
- Hermetic

Technical data

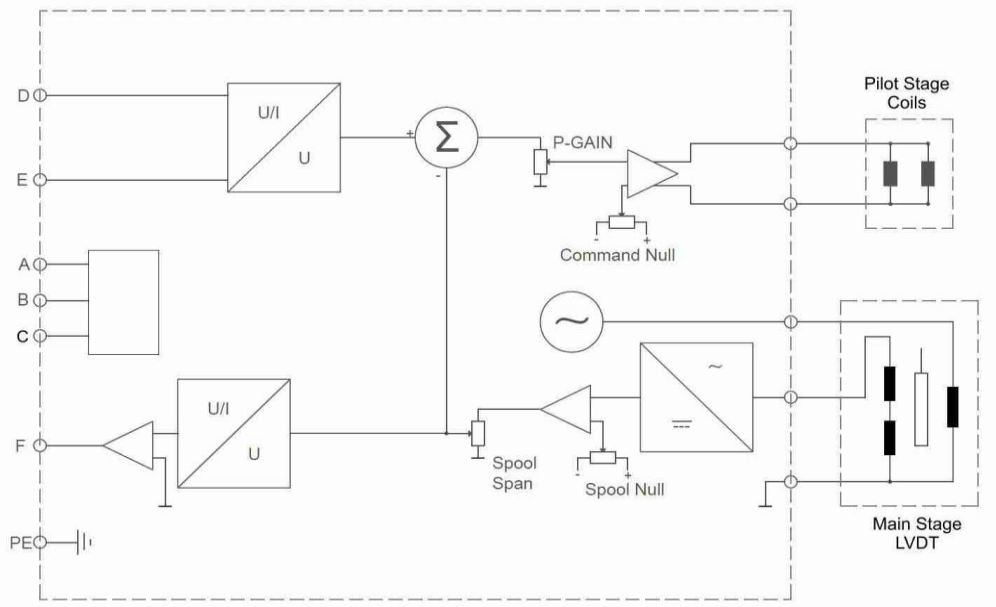
Hydraulic

Nominal flow ratings [±10%]	at 70 bar ∆p	50, 90, 120 l/m	
Operating pressure (max)	Ports	P, C1, C2, X	R, Y
Seal material	*NBR, FPM*	350 bar	315 bar
Fluid viscosity range (recommended)		10 to 100 mm^2/s (cSt)	
Fluid type		Mineral oil to ISO 11158, DIN 51524 or equivalent	
		MIL-H-5606	
		Kerosene	
		Water glycols	
		others on request	
Filter rating (recommended)	Pressure line	Beta 10 = 200 (10 µm abs), non by-pass & indicator	
	Off-line	Beta 2 = 1000 (2 µm abs)	
Fluid cleanliness	ISO 4406: 1999		
	minimum	16/ 14/ 11	
	recommended	15/ 13/ 10	

Operational parameters

Hysteresis		≤ 0.5%
Threshold		≤ 0.1%
Null shift	∆T 40°C	≤ 1.5%
Internal leakage	140 bar supply (0.5% overlap)	≤ 2.0 l/m
Load pressure difference	1% input	≥ 30% of supply pressure can be as high as 100%
Response time	0-100% rated spool stroke	
	50, 90 l/m	23 ms
	120 l/m	30 ms
Mounting pattern		ISO 4401-05-05-0-94 with X & Y port
Mounting position		Any, fixed or movable
Weight	std unit	4.4 kg
Design protection	EN 60529	IP 65
Shipping protection		Sealed base plate
Vibration		30 g all axis, 5 Hz to 2,000 Hz
Shock		30 g all axis
Seal material options		NBR, FPM
Temperature range		-20 to 80 °C

Technical data - Electrical details



Factory set options are as follows

Pin	Function	Dual rail power supply (code 'D')
A	Supply	+15 Vdc (+14.5 Vdc min…+18 Vdc max)
B	Supply	-15 Vdc (-14.5 Vdc min…-18 Vdc max)
C	Supply / signal ground	0 V
D	Input rated command (differential)	See order codes for V or I options
E	*Inverse*	
F	Main stage spool position O/P	See order codes for V or I options
PE	Protective earth	

Pin	Function	Single rail power supply (code 'S')
A	Supply	+24 V (+20 Vdc min…+28 Vdc max)
B	Supply / signal ground	0 V
C	n.c	
D	Input rated command (differential)	See order codes for V or I options
E	*Inverse*	
F	Main stage spool position O/P	See order codes for V or I options
PE	Protective earth	

Power supply

Current (mA)	< 100 each rail (typically 50)
Ripple (mV p-p)	< 100

Command signal

Phasing	When input at pin D = +ve with respect to pin E causes flow from P»A, B»T
Voltage input	impedance 1 Mohm
Current input	impedance 200 ohm
+4…+20 mA	at +12 mA spool is in centred position

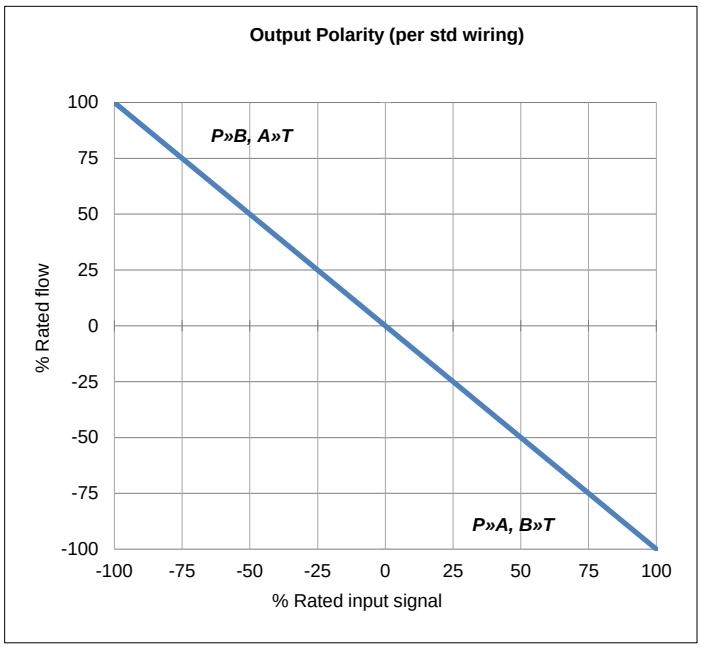
Spool position output

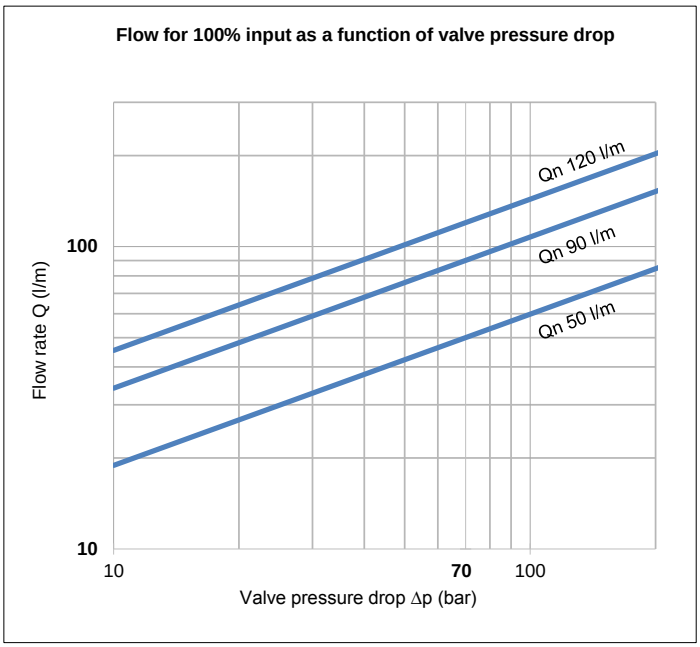
Voltage output	Output impedance <10 ohm, minimum receiver impedance 1 kohm
Current output	Output impedance > 100k ohm, minimum receiver impedance 30 ohm, maximum receiver impedance 400 ohm

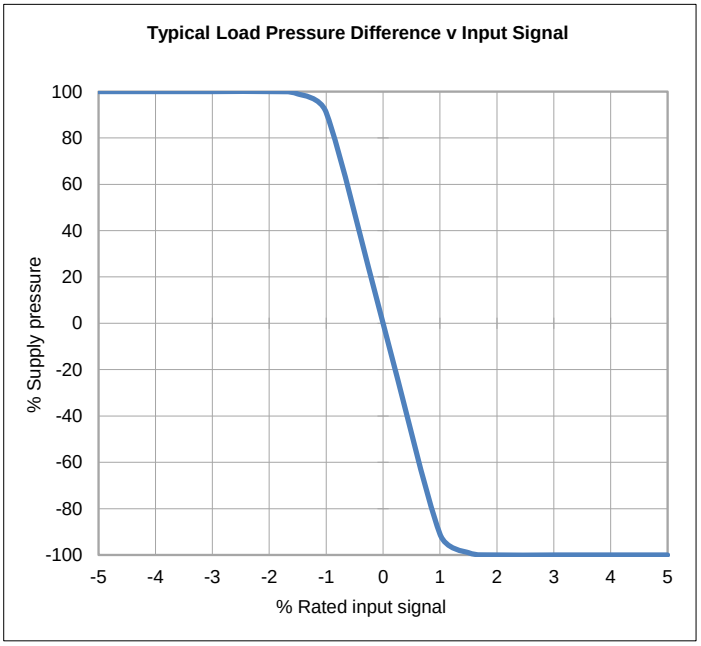
Protection

Reverse Polarity	Indefinite
Over-voltage	Absolute max +/- 20 V DC

Technical data







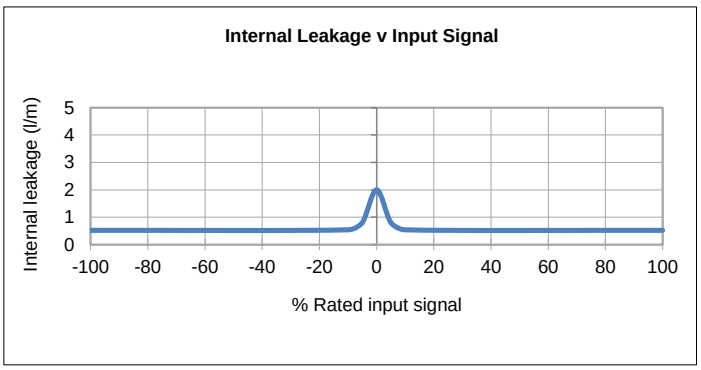
The flow tolerance for standard servovalves is ±10% of the rated flow at 100% rated input signal.

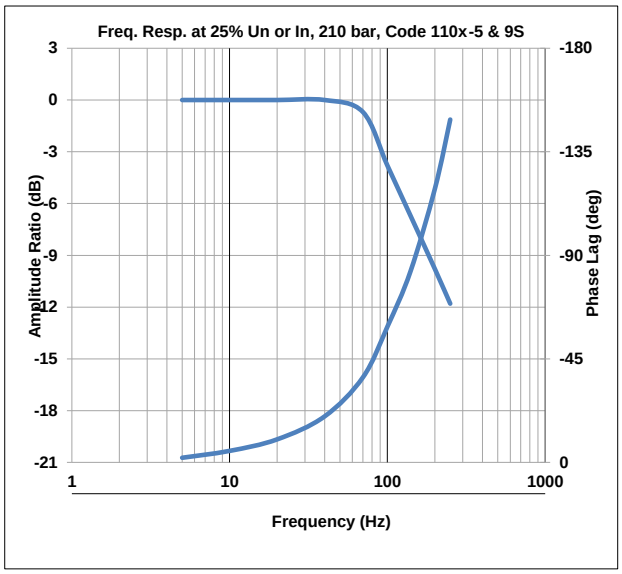
Rated Signal [In] is the specified input voltage or current of either polarity to produce rated flow. Rated input does not include null bias values.

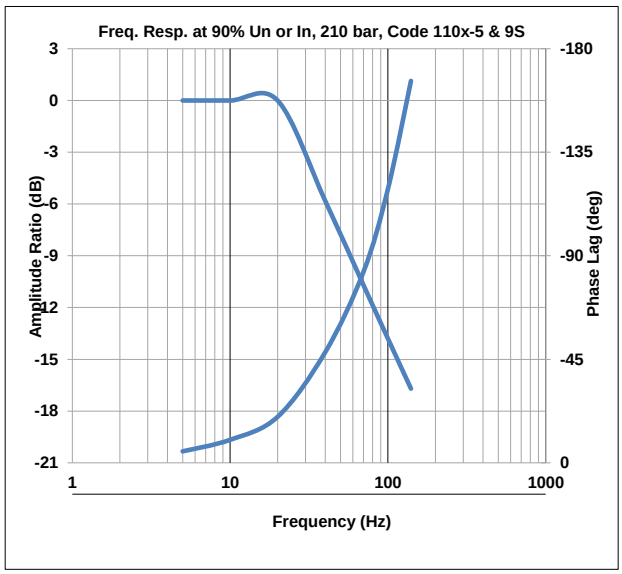
Rated flow corresponds to the flow at rated input at 10 bar or 70 bar, with no load, therefore in 4-way valves there will be a pressure drop of 5 bar or 35 bar respectively across each land.

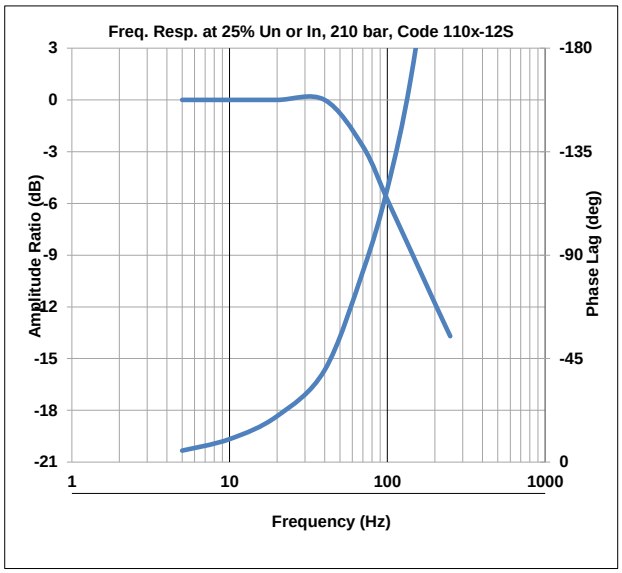
Load pressure difference versus input signal indicates typical differential pressure gain between ports C1 (A) and C2 (B) for standard lap spools. Negative and positive overlap change this characteristic signifcantly.

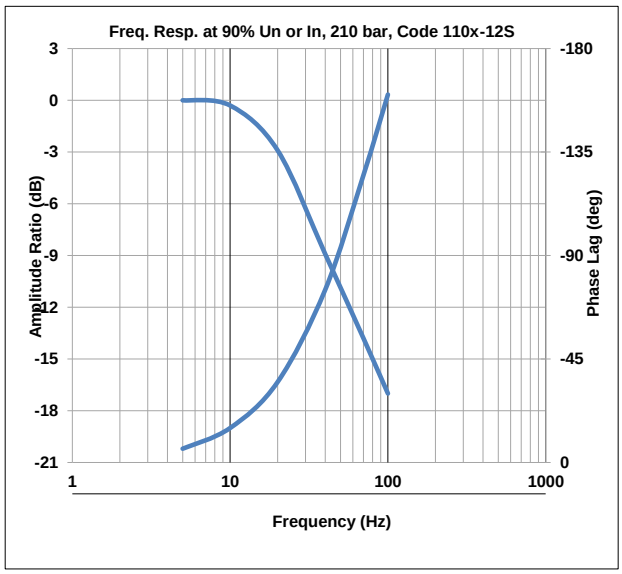
Internal leakage comprises of tare first stage and laminar leakage between spool and sleeve. With critical lap conditions in 4-way designs the leakage peaks through the null region.




Freq. Resp. at 25% Un or In, 210 bar, Code 110x-5 & 9S
Amplitude Ratio (dB)
Phase Lag (deg)
3
0
-3
-6
-9
-12
-15
-18
-21
-180
-135
-90
-45
0
1
10
100
1000
Frequency (Hz)


Freq. Resp. at 90% Un or In, 210 bar, Code 110x-5 & 9S
Amplitude Ratio (dB)
Phase Lag (deg)
3
0
-3
-6
-9
-12
-15
-18
-21
-180
-135
-90
-45
0
1
10
100
1000
Frequency (Hz)


Freq. Resp. at 25% Un or In, 210 bar, Code 110x-12S
Amplitude Ratio (dB)
Phase Lag (deg)
3
0
-3
-6
-9
-12
-15
-18
-21
-180
-135
-90
-45
0
1
10
100
1000
Frequency (Hz)


Freq. Resp. at 90% Un or In, 210 bar, Code 110x-12S
Amplitude Ratio (dB)
Phase Lag (deg)
3
0
-3
-6
-9
-12
-15
-18
-21
-180
-135
-90
-45
0
1
10
100
1000
Frequency (Hz)

Order code **110** [ ] - [ ][ ][ ][ ][ ][ ][ ][ ][ ] - [ ]

Special order code
Factory defined

Pilot configuration

Description	Code
X internal, Y internal	0
X external, Y internal	2
X external, Y external	7

may be reconfigured in field see page 7 for details

Connector style

Code	Description
6	6-Way (MS3102-14S-6P)
7	6+PE (MS3102-14SA-7P)
X	Special

Rated flow

Qn (10 bar)	Qn (70 bar)	Code
19 l/m	50 l/m	5
35 l/m	90 l/m	9
45 l/m	120 l/m	12

Lap condition

Code	Description	
A	0% to 1% positive, linear	(std)
X	Special	

Response level

Description	Code
Standard	S

De-energized control spool position

Code	Description
A	100% P » B, A » T
B	100% P » A, B » T
X	Not defined

Operating pressure (main stage)

Description	Code
210 bar	21
280 bar	28
350 bar	35

Seal material

Code	Description
N	NBR
V	FPM (Viton)

Connector direction

Description	Code
	B
	A

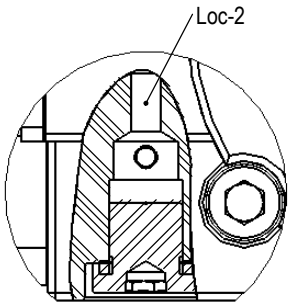
Electronics

Code	Rated signal I/P	Spool O/P
1	±10 Vdc	±10 Vdc
2	±10 mA	±10 mA
4	±10 Vdc	+4…20 mA
5	±10 mA	+4…20 mA

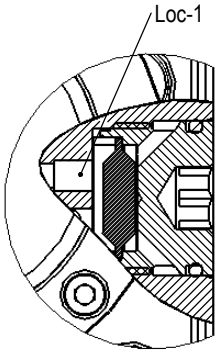
Code	Supply voltage
D	Dual rail +15/0/-15 Vdc (pin outs A, B, C)
S	Single rail +24 Vdc (pin outs A, B)

1100 series
INSTALLATION DETAILS

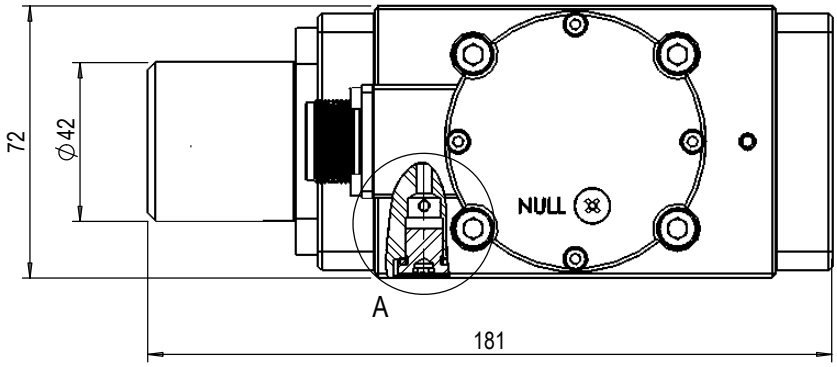
Mounting screws	Skt head cap screws M6 x 60 - 10.9 ISO 4762
Null adjust (Electrical)	Remove button headed screw, insert potentiometer driver & rotate to desired null point
Pilot stage configuration	Internal pilot supply when 'GS1' installed at valve port 'X' External pilot supply when 'GS1' installed at 'Loc-1' Internal pilot return when 'GS2' installed at valve port 'Y' External pilot return when 'GS2' installed at 'Loc-2'
Porting details	P, A, B, T, T2 ports ⌀9.0 ⌴ ⌀15.7 ↧1.40 X, Y ports ⌀3.0 ⌴ ⌀18.7 ↧1.40
Interface seals	Ports P, A, B, T, T2 - ID 12.4 x 1.78 O-Ring Ports X, Y - ID 15.6 x 1.78 O-Ring
Replacement filter	PN: SRS2916. Requires 8 A/F hex key

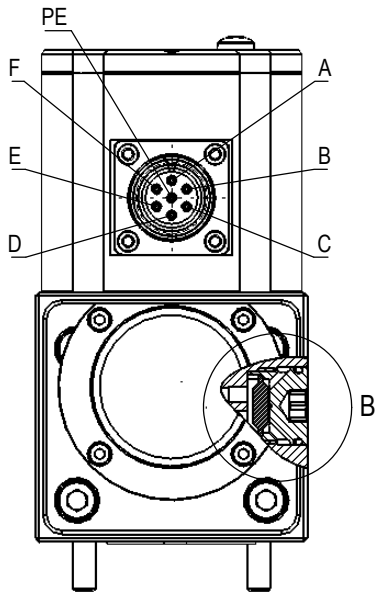


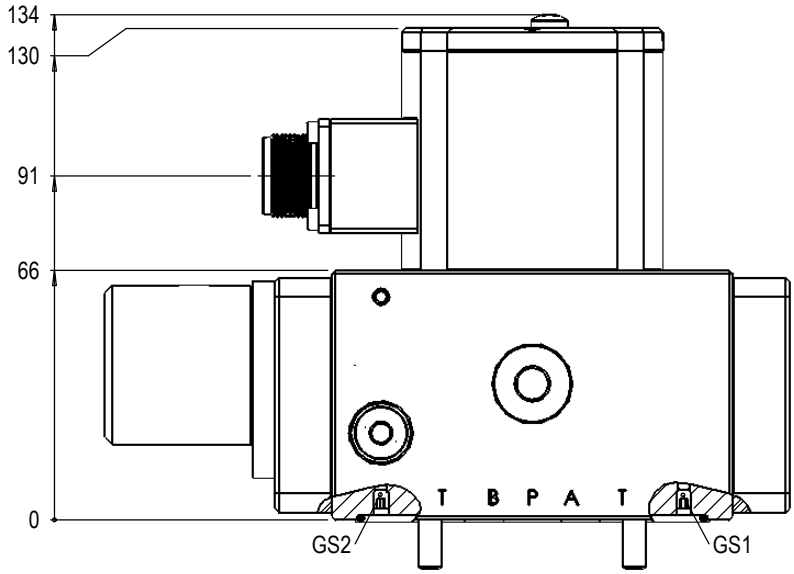
DETAIL A



DETAIL B







⚠ WARNING do not attempt to remove plugs or filter when valve is pressurized

Mounting interface conforms to ISO 4401-05-05-0-94											
	P	A	B	T	T2	X	Y	F1	F2	F3	F4
size	⌀10	⌀10	⌀10	⌀10	⌀10	⌀3	⌀3	M6	M6	M6	M6
x	27	16.7	37.3	3.2	50.8	-8	62	0	54	54	0
y	6.3	21.4	21.4	32.5	32.5	11	11	0	0	46	46
Surface flat within 0.01 / 100 : finish better than 0.8 µm