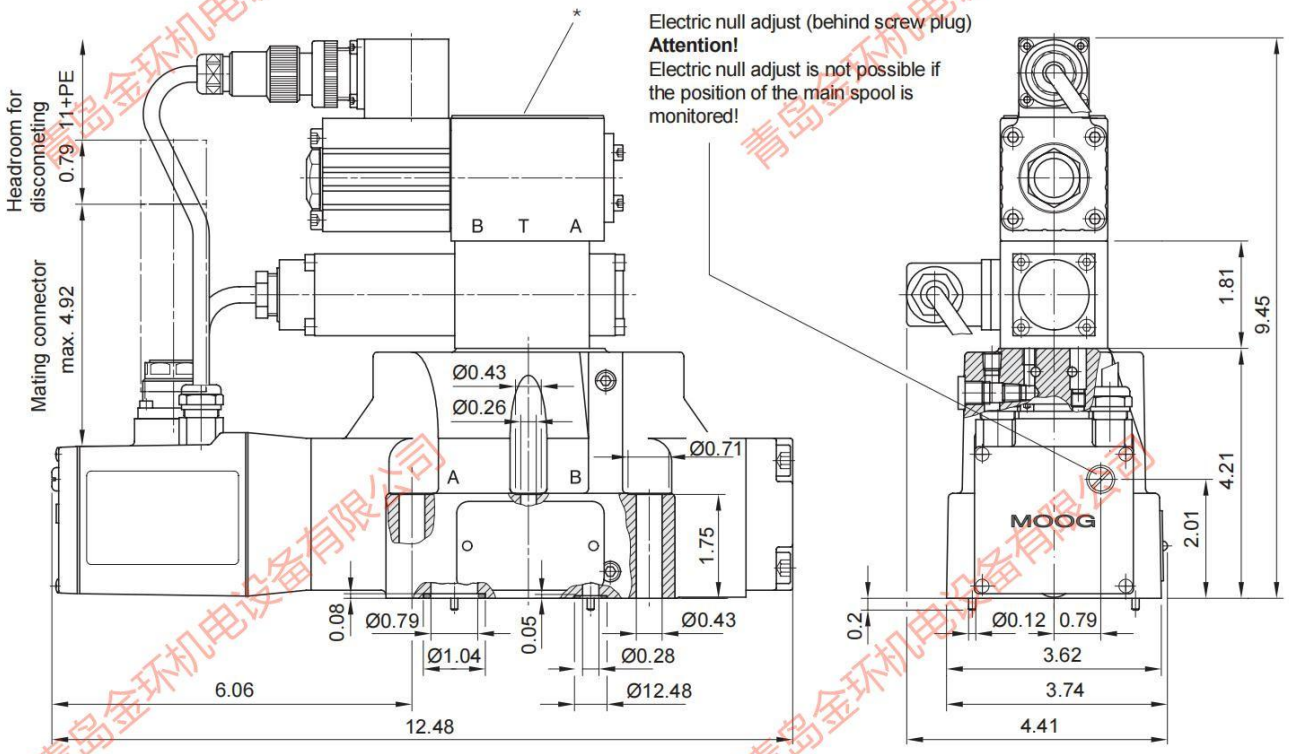
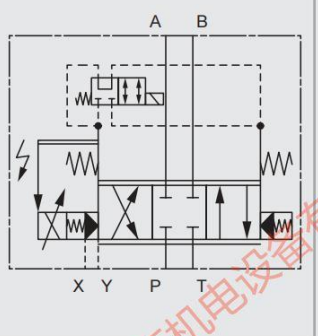
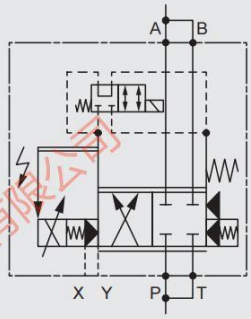
INSTALLATION DRAWING (inch)



* Valves with spool position monitoring in type designation letter G and H, no pilot valve change possible. Replacement must be done at the factory. The mounting manifold must conform to ISO 4401-07-06-0-94 (see page 15).



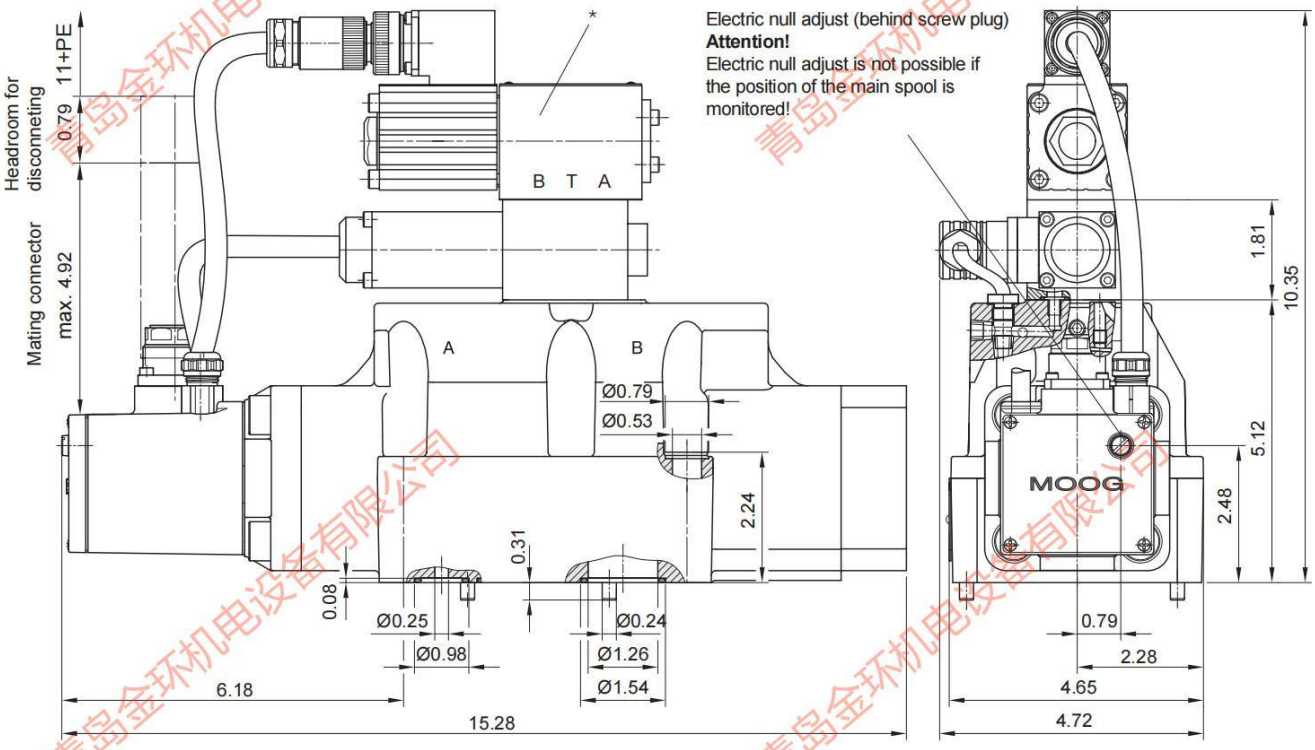
Failsafe
centered position



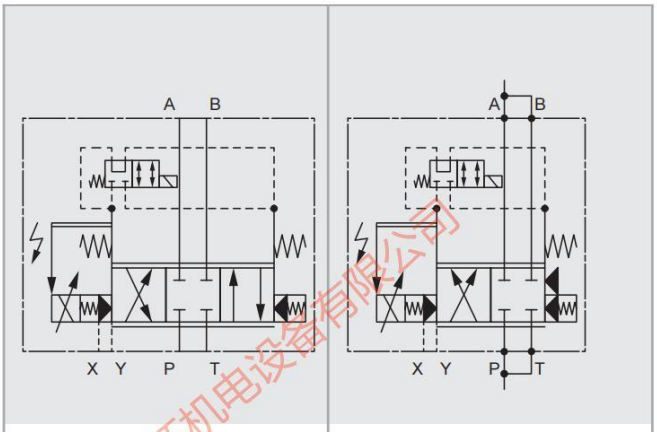
Failsafe
centered position by
mechanical spool stop

See Spare Parts and Accessories on page 14.

INSTALLATION DRAWING (inch)



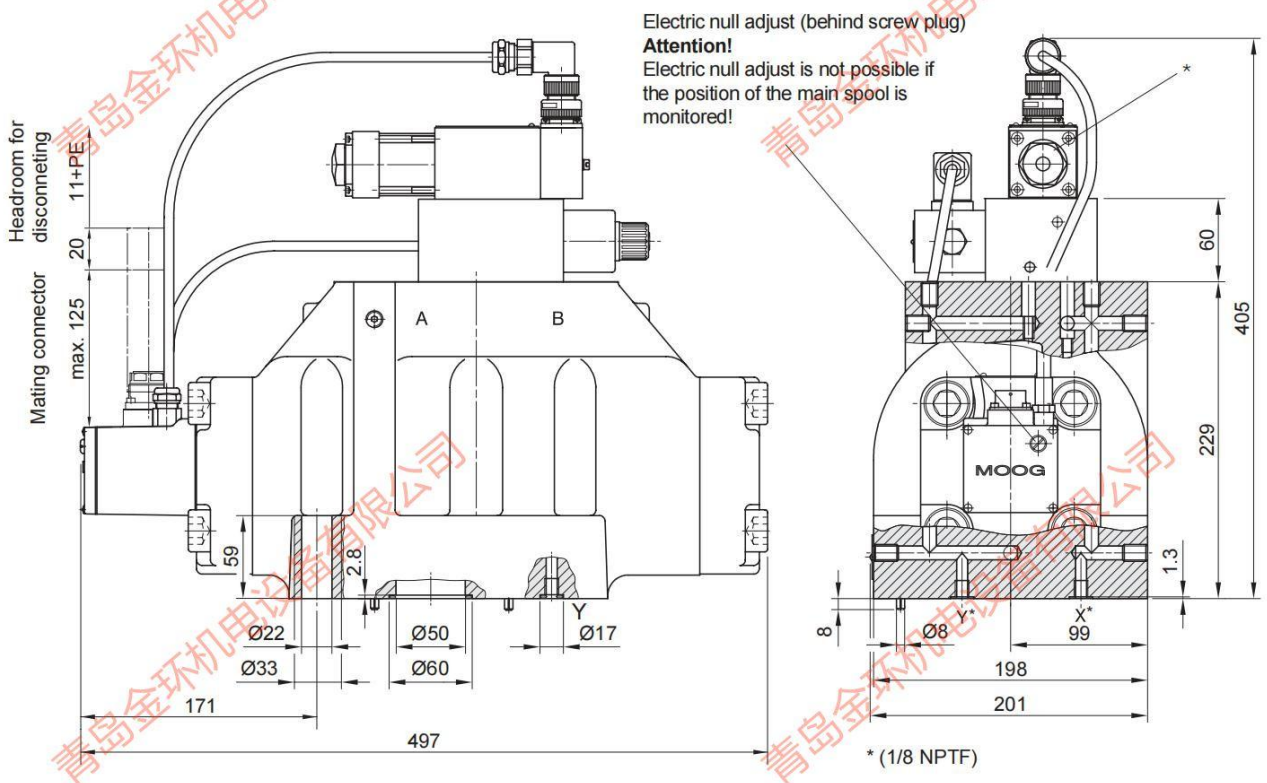
* Valves with spool position monitoring in type designation letter G and H, no pilot valve change possible. Replacement must be done at the factory. The mounting manifold must conform to ISO 4401-08-07-0-94 (see pages 19 and 23).



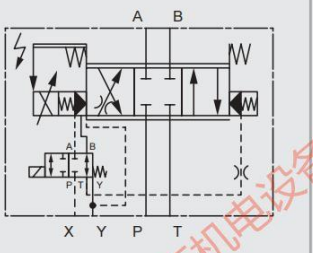
Failsafe centered position	Failsafe centered position by mechanical spool stop

See Spare Parts and Accessories on page 19 and 23.

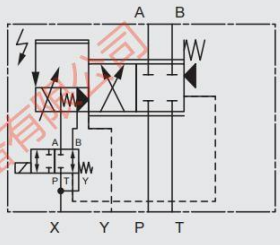
INSTALLATION DRAWING (mm)



* Valves with spool position monitoring in type designation letter G and H, no pilot valve change possible. Replacement must be done at the factory. The mounting manifold must conform to ISO 4401-08-07-0-94 (see page 26).



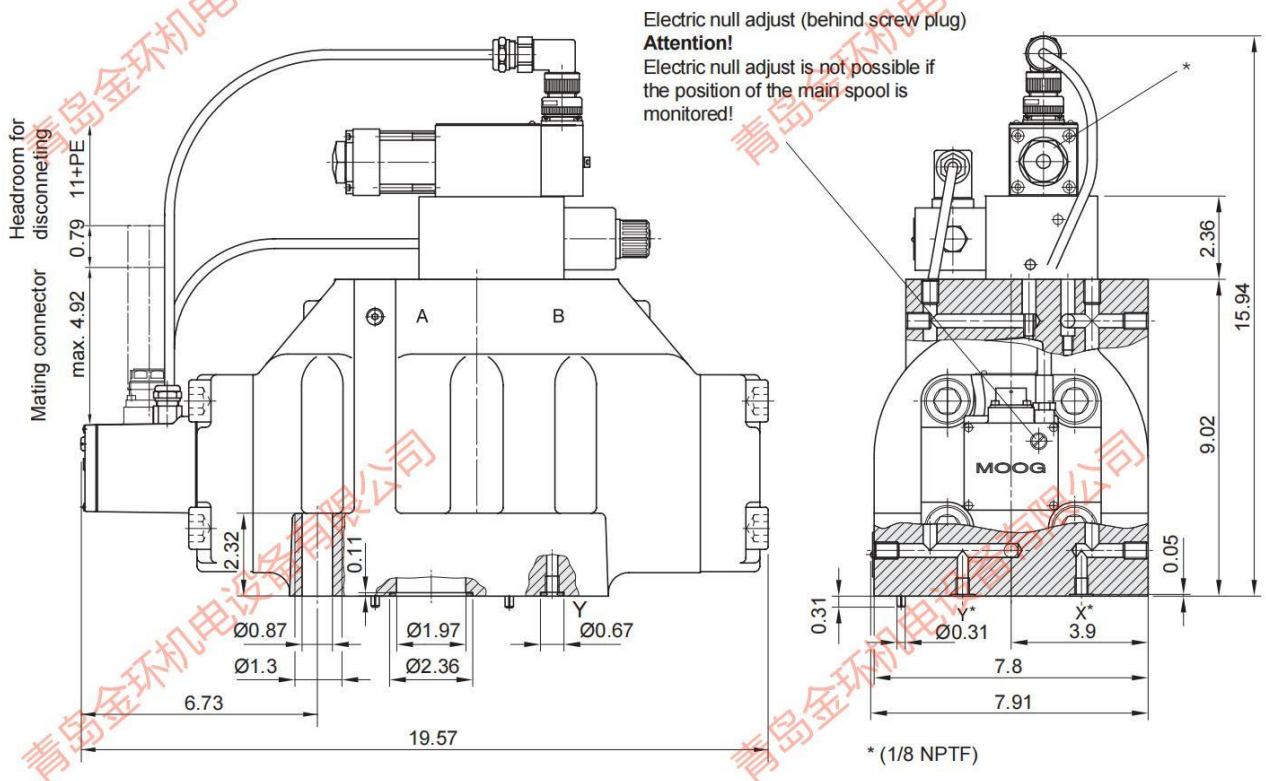
Failsafe position
defined centered position



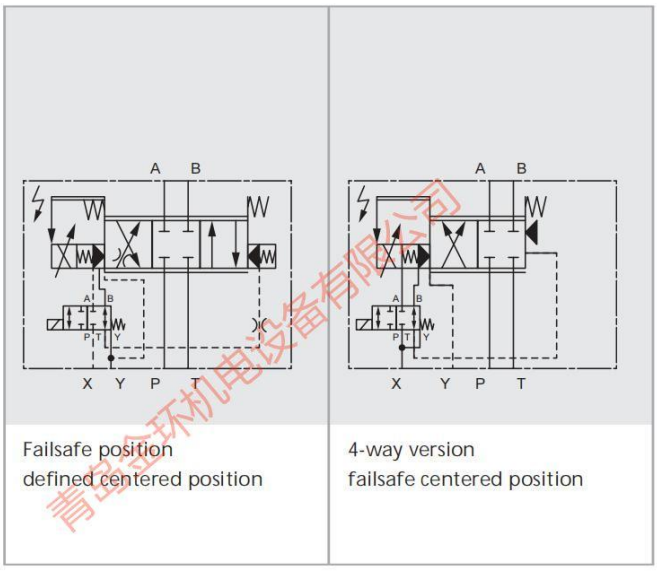
4-way version
failsafe centered position

See Spare Parts and Accessories on page 26.

INSTALLATION DRAWING (inch)



* Valves with spool position monitoring in type designation letter G and H, no pilot valve change possible. Replacement must be done at the factory. The mounting manifold must conform to ISO 4401-08-07-0-94 (see page 27).



Failsafe position defined centered position	4-way version failsafe centered position

See Spare Parts and Accessories on page 27.

ORDERING INFORMATION

D681-D685

Model-Number

D681 to D685 . . . . . .

Type designation

. . . . . 2 - .

Specification status	
–	Series specification
E	Preseries specification
Z	Special specification

Model designation	
	assigned at the factory

Factory identification

Valve version		Series
B	Standard 5 way	D681 ($+P_2$)
P	Standard spool [1]	D681 and D682/D685
N	Stub shaft spool Ø 25 mm	D683 and D684

Rated flow			
	Q_N [l/min] (gpm) at Δp_N = 5 bar (75 psi) per land		Series
30	30	(7.9)	D681
60	60	(15.9)	D681
80	80	(21.1)	D681
01	150	(39.5)	D682
02	250	(65.8)	D682
03	350	(92.1)	D683
05	550	(144.7)	D684
10	1000	(263.1)	D685
15	1500	(394.7)	D685

Maximum operating pressure p_p		
B	70 bar	Pilot valve D633-X ..., $p_{max.}$ = 350 bar
H	280 bar	The integrated valve electronics is adapted
K	350 bar	to the pilot pressure.

Main spool type		
A	4-way:	~ Critical lap, linear characteristic
D	4-way:	10 % overlap, linear characteristic
P	4-way:	P ◗ A, A ◗ T: ~ critical lap, curvilinear characteristic P ◗ B: 60 % overlap, curvilinear characteristic B ◗ T: 50 % underlap, linear characteristic
U	5-way:	P ◗ A, P_2 ◗ B, A ◗ T: ~ critical lap, curvilinear characteristic (D681-B only)
R	4-way:	10 % overlap, curvilinear characteristic
Y	4-way:	~ Critical lap, curvilinear characteristic
Z	2x2-way:	A ◗ T, B ◗ T_2: ~ critical lap, linear characteristic D681 P ◗ T, T ◗ A, D682-D685
X	Special spool upon request	

Direct Drive pilot valve		Series
U	D633-7... / / (80 N Linear motor)	D681-D684
T	D633-1... (200 N Linear motor)	D685
X	Special valve version upon request	

[1] Optional D683-P and D684-P
[2] WV directional valve
[3] VEL valve electronics

For special options, letters not on the information above may be applied.
Options may increase price.
All combinations may not be available.
Preferred configurations are highlighted.
Technical changes are reserved.

Function code		Connector
O	No enable input. Pin C not used.	S
A	Without enable signal applied, the spool moves to adjustable centered position.	S
B	Without enable signal, the spool moves into defined end position A ◗ T or B ◗ T.	S
J	Without enable signal applied, the spool moves to adjustable centered position. Position error monitored (see page 29/30).	E
G	Without enable signal applied, the spool moves to adjustable centered position. Spool position monitored (see page 29/30).	E
H	Without enable signal applied, the spool moves into defined end position A ◗ T or B ◗ T. Spool position monitored (see page 29/30).	E

Supply voltage		
2	24 V DC	(18 to 32 V DC)

Signals for 100% spool stroke			
	Command	Output	Connector
A	± 10 V	± 10 V (diff.)	E
D	± 10 V	2 to 10 V	E / S
M	± 10 V	4 to 20 mA	E / S
T	± 10 V	± 10 V (diff.) with dead band compens.	E
X	± 10 mA	4 to 20 mA potential free nom. value	E / S
Y	Others upon request		

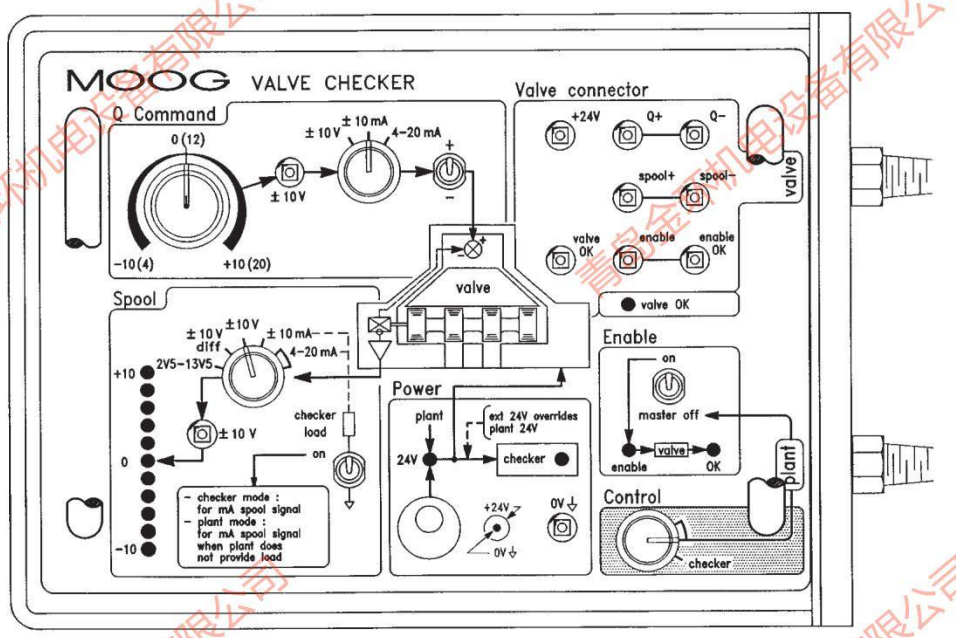
Valve connector		
E	11 + PE pole	EN 175201-804
S	6 + PE pole	EN 175201-804

Seal material	
N	NBR (Buna) Standard
V	FPM (Viton) Special version
S	HNBR-D685-P (Standard)
X	Others upon request

Pilot connections and pilot pressure			
	Supply X	Return Y	
4	Internal	Internal	Parameters of the control electronics are adapted to the pilot pressure. See operating pressure on the nameplate and in this ordering information.
5	External	Internal	
6	External	External	
7	Internal	External	

Spool position of main stage with/without electric or hydraulic supply						
O	Undefined (no failsafe function)					
	Mechanical failsafe version					
	Position	p_p or p_x external [bar]				
F	P ◗ B, A ◗ T	≥ 10				
		< 1				
D	P ◗ A, B ◗ T	≥ 10				
		< 1				
	Electrically controlled failsafe version					
	Position	p_p [bar]	p_x [bar]	WV[2]	VEL[3]	
W	Centered position defined	≥ 1	≥ 1	off	on	
	Undefined	≥ 10	≥ 10	on	off	
U	Centered position defined	≥ 1	≥ 1	off	on	
	P ◗ B, A ◗ T	≥ 10	≥ 10	on	off	
S	P ◗ A, B ◗ T	≥ 1	≥ 1	off	on	
	P ◗ A, B ◗ T	≥ 10	≥ 10	on	off	
X	Special versions upon request					

OPERATING DETAILS



1. **Control:**
Selects "Plant" or "Checker" mode. In plant mode the valve command comes from the plant electronics and the valve checker command section is inoperative. The spool signal is connected back to the plant electronics and is available on the spool test point for monitoring.

In checker mode the valve command comes from the checker. The spool signal is still passed on to the plant and is available on the spool test point for monitoring.

2. **Enable:**
On EFB valves with an "enable" input the source of the enable command to the valve is selected by the control switch. However, the enable can be turned off by the enable on/off switch regardless of the selection of the control switch. This is to ensure the user can disable the valve at any time, during the checking process. The enable OK LED has on/off thresholds of 8.5/6.5 V.

3. **Command:**
This section is active when checker is selected by the control switch. The ±10 V test point beside the command pot provides a standardized 0 to ±10 V monitoring signal, regardless of the signal type selected to drive the valve. The +/– switch reverses the valve flow by electrically interchanging the valve input pins.

4. **Spool:**
The spool test point has the same signal range as the command test point. This signal is also displayed on the LED read-out.

When any "mA" signal is selected the "Checker load" switch is enabled. It is necessary to provide a load for current feedback signals when in checker mode. If the plant electronics does not provide a load for these current signals, then the checker load can be switched on to enable monitoring of the signal.

5. **Valve Connector:**
Test points in this section are wired directly to the valve connector pins. This enables a direct measurement of all signals that the valve receives and sends. This is a very useful fault finding tool.

6. **Power:**
The checker is normally powered from the plant supply.
When the external 24 V supply is connected to a ±15V checker, the valve is powered from the checker internal regulators, which in turn are powered from the external 24 V. For 24 V checkers the external supply powers both the checker and valve, over-riding the plant supply.

The checker LED illuminates when the internal ±15 V is above ±12 V. The 24 V LED illuminates when 24 V is supplied from either the plant connector or the front panel 24 V connector.

ORDERING INFORMATION

Model Dash No.	Supply	Connector	Spool Signal
–001	24 V	6 + PE	Single Ended
–002	24 V	11 + PE	Differential
–003	±15 V	12 pin	Single Ended
–004	±15 V	6 + PE	Single Ended
–005	±15 V	6 pin	Single Ended

Adaptors:

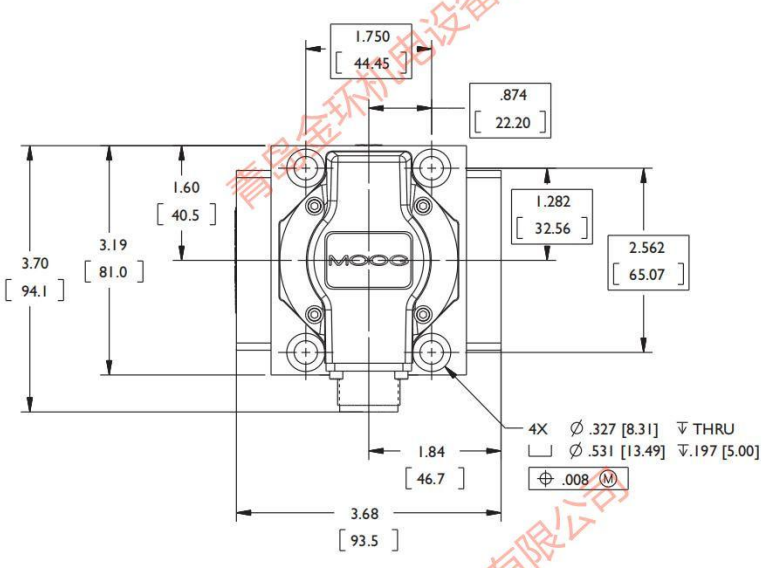
Consult a Moog sales office for details.

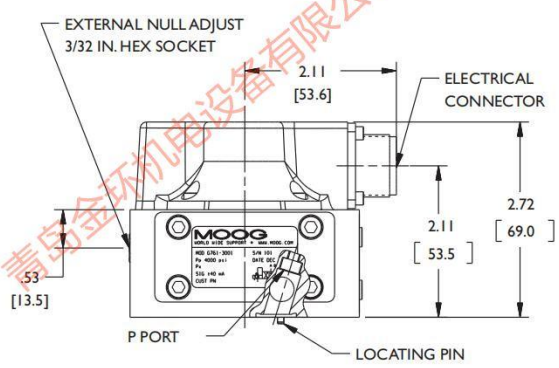
Carry case: B96839

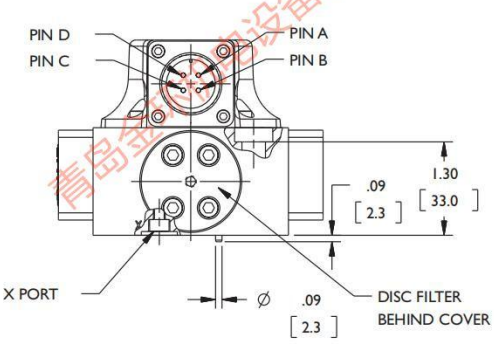
MOOG
Industrial Controls Division
Moog Inc., East Aurora, NY 14052-0018
Telephone: 716/655-3000
Fax: 716/655-1803
Toll Free: 1-800-272-MOOG
www.moog.com

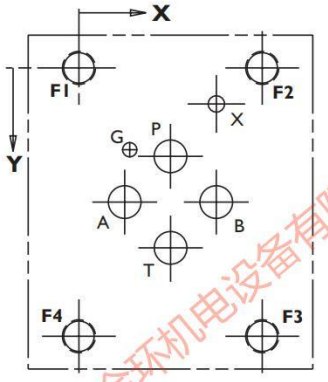
CDL6688 Rev. A 500-392 300

G761 SERIES
INSTALLATION DRAWINGS









U.S.	P	A	B	T	X	G	F1	F2	F3	F4
	Ø.32	Ø.32	Ø.32	Ø.32	Ø.2	Ø.14	5/16-18	5/16-18	5/16-18	5/16-18
X	0.87	0.44	1.31	0.87	1.31	0.48	0	1.75	1.75	0
Y	0.84	1.28	1.28	1.72	0.34	0.78	0	0	2.56	2.56

METRIC	P	A	B	T	X	G	F1	F2	F3	F4
	Ø8.2	Ø8.2	Ø8.2	Ø8.2	Ø5	Ø3.5	M8	M8	M8	M8
X	22.2	11.1	33.3	22.2	33.3	12.3	0	44.4	44.4	0
Y	21.4	32.5	32.5	43.6	8.7	19.8	0	0	65	65

Standard electrical connector mates with MS3106F14S-2S or equivalent.

The mounting manifold must conform to ISO 10372-04-04-0-92.
Surface to which valve is mounted requires a $\sqrt{32}$ [ΔΔ] finish, flat within 0.001 [0.03] TIR.

For external null adjust:
flow out of port B will increase with clockwise rotation of null adjust (3/32 hex key).
Flow bias is continually varied for a given port as the null adjust is rotated.

CONVERSION INSTRUCTION

For operation with internal or external pilot connection.	Pilot flow supply	Screw & Seal Washer Location (M4 X 6 DIN EN ISO 4762)	
		X	**P**
	Internal P*	closed	open
	External X	open	closed

*The standard version of these valves is configured as internal pilot supply.
Changing pilot supply configuration requires model number change.

G761 SERIES
ORDERING INFORMATION
SPARE PARTS AND ACCESSORIES

STANDARD MODELS

Model	Type Designation	Rated Flow (Δ 1,000 psi)		Internal Leakage (at 3,000 psi)		Rated Current (Single Coil)	Nominal Coil Resistance
		gpm	lpm	gpm	lpm	mA	Ohms
G761-3001	H04JOFM4VPL	1	4	< 0.31	< 1.2	40	80
G761-3002	H10JOFM4VPL	2.5	10	< 0.38	< 1.5	40	80
G761-3003	H19JOGM4VPL	5	19	< 0.60	< 2.3	40	80
G761-3004	H38JOGM4VPL	10	38	< 0.60	< 2.3	40	80
G761-3005	S63JOGM4VPL	16.5	63	< 0.60	< 2.3	40	80

Model Number

G761 • • • • • •

Optional Feature

	Series specification

Model Designation

	Assigned at the factory

Factory Identification (Revision Level)

Valve Version

H	High response 1 gpm/4 lpm - 10 gpm/38 lpm
S	Standard response 16.5 gpm/63 lpm

Rated Flow

	Q_N gpm [lpm] at ΔP_N = 500 psi [35 bar] per land
04	1.0 [4.0]
10	2.5 [10]
19	5.0 [19]
38	10.0 [38]
63	16.5 [63]

Maximum Operating Pressure (P) and Body Material

J	4,500 psi [310 bar] aluminum

Main Spool Type

O	4-way / Axis cut / linear
D	4-way / +/-10% overlap / linear

Type Designation

• • • J • • M • V P •

Signals for 100% Spool Stroke

H	±7.5 mA (series)
L	±20 mA (series)
Z	±100mA (series)

Valve Connector

P	Connector over P-side
B	Connector over B-side

Seal Material

V	Fluorocarbon

Pilot Connections

4	Internal
5	External

Spool Position without Electrical Signal

M	Mid-position

Pilot Stage

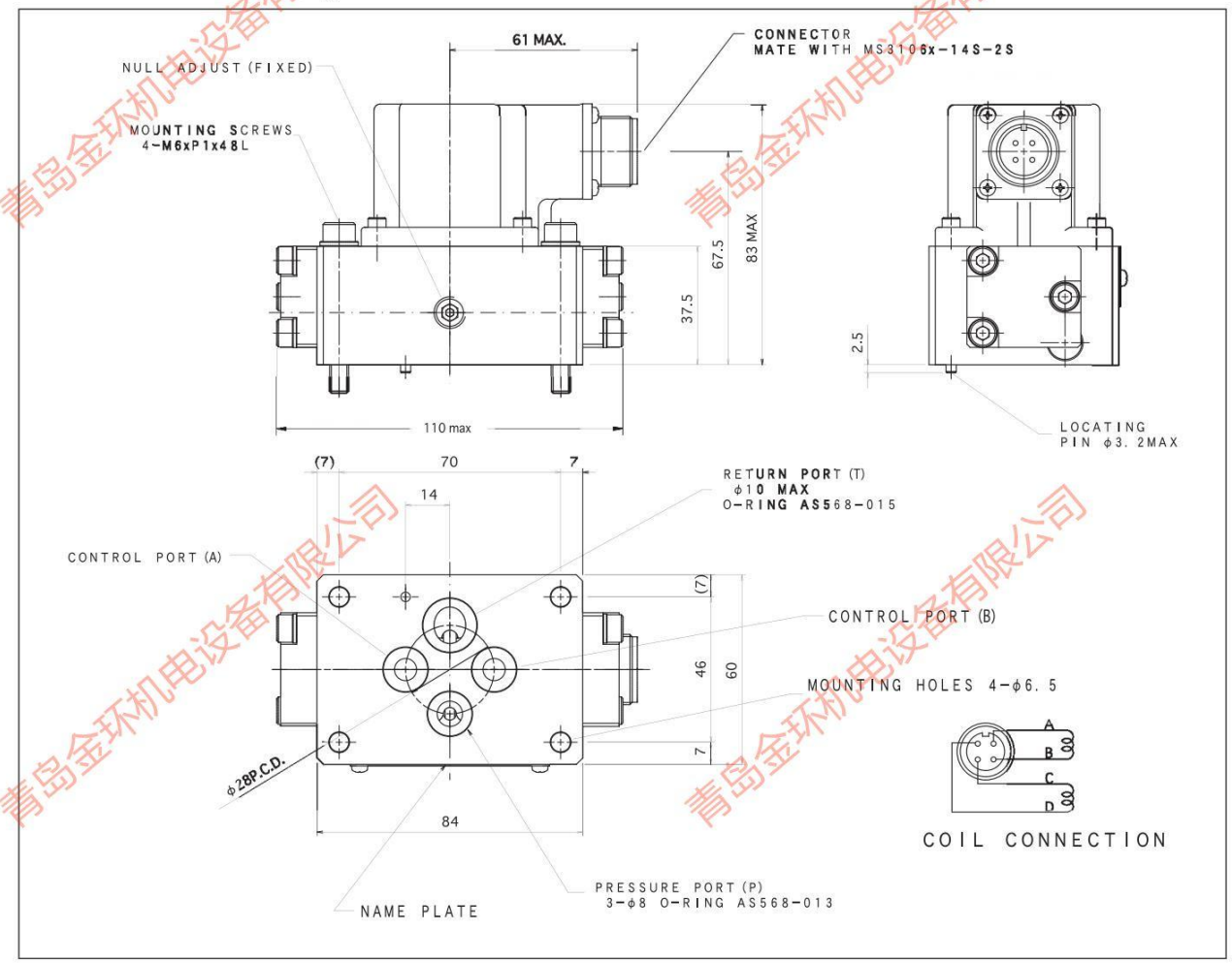
F	Low Flow, Nozzle-Flapper, ≤ 10 lpm
G	High Flow, Nozzle-Flapper, > 10 lpm

SPARE PARTS AND ACCESSORIES

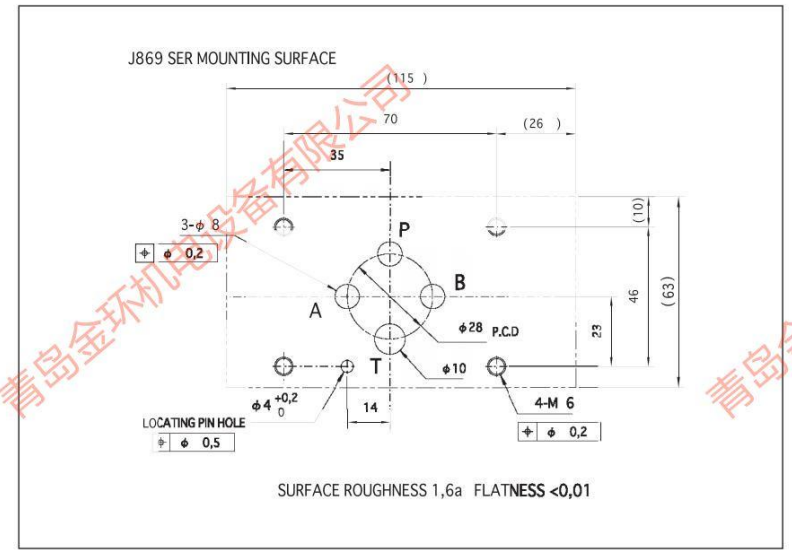
Moog Part	Size	Moog Part Number
FPM 85 Shore O-Rings (included in delivery),		
for P,T,A and B	ID 0.426 x 0.070[10.8 x 1.8]	42082-022
for X	ID 0.364 x 0.070[9.25 x 1.8]	42082-013
Mating Connector, waterproof IP 65 (not included in delivery)		49054F14S2S(MS3106F14S-2S)
Flushing Block (not included in delivery)		55124

Moog Part	Size	Moog Part Number
Mounting Bolts (not included in delivery)		
(4 pieces)	5/16 - 18 NC x 1-3/4 long [M8-1.25 x 45 mm long]	A31324-228B [B64929-8B45]
Field Replaceable Filter Kit (includes service manual)		B52555RK201K1
Pilot Supply Screw	M4 x 6 DIN EN ISO 4762	66098-040-006
Seal for Set Screw		A25528-040

Installation Drawing



Mounting Manifold

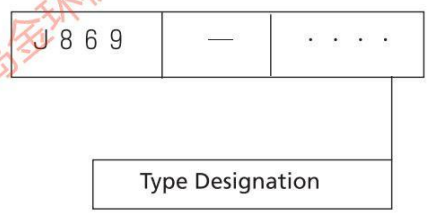


J869 Series
Ordering Information

Standard Models

Model	Rated Flow (Valve Drop7.0MPa)	Internal Leakage (System Pressure 21.0MPa)	Rated Current (Series Connection)	Nominal Coil Resistance
	(L/min)	(L/min)	(mA)	(Ω)
J869-1000A	3.2	1.1	15	200
J869-1001A	5.3	1.2	15	200
J869-1002A	10.6	1.4	15	200
J869-1003A	21.0	1.8	15	200
J869-1004A	32.0	2.1	15	200
J869-1005A	42.0	2.5	15	200
J869-1006A	64.0	3.2	15	200

Model Number



Spare parts and Accessories

Part	Size	Part Number
O-Rings (included in delivery)		
P, A, B	AS568-013	A47622-022
T	AS568-015	A47622-008
Mounting Bolts (included in delivery)	M6×48mm (4pieces)	A04001-006-048
Mating Connector (not included in delivery)		MS3106A14S2S (MS3106A-14S-2S)
Clamp for Mating Connector (not included in delivery)		MS3057-6A
Flushing Block (not included in delivery)		C63761-001 (P-T ONLY)
		C63904-001 (P→B、A→T)
		C63904-002 (P→A、B→T)

Moog Servo Controller MSC	Moog Servo Controller MSC II	Moog Axis Control Software	Analog Module QAIO 2/2	Analog Module QAIO 16/4
				
Digital Module QDIO 16/16	**Extension Module QEBUS-CAN**	**Digital Extension Module RDIO 16/16**	**Operator Panel RDISP 22**	**Dialog Controller Display**
				

M3000 AUTOMATION SYSTEM

M3000 is Moog's digital motion control system, which offers high performance for hydraulic and electric drive products. This easy-to-use system offers rapid implementation and set-up to save users time and money.

M3000 Automation System

Programmable Multi-Axis Controller
- Moog Servo Controller (MSC)
- Extension Modules
- User Displays

Performance
- Cycle time for closed-loop axis control as fast as 100 microseconds
- Complex multi-axis (2 or more) motion control functions
- High performance closed-loop control functions designed by Moog experts

Integration
- Ethernet, USB, CAN bus, EIA/TIA 232 onboard
- Profibus-DP and EtherCAT optional
- Various sensor inputs (e.g. SSI, incremental encoder) plus analog and digital input/output
- Interface to multiple products, including Moog servodrives, servovalves, and pumps
- One easy-to-use software for all M3000 products called MACS
- All programming, debugging, simulation, parameterization, visualization, and tracing with one software tool

Software
- Moog Axis Control Software (MACS)
- Special function blocks for closed-loop control

Use of Standards
- User-friendly programming tool based on CoDeSys, IEC 61131-3
- All five IEC 61131-3 programming languages supported:
  - Function Block Diagram (FBD)
  - Instruction List (IL)
  - Sequential Function Chart (SFC)
  - Structured Text (ST)
  - Ladder Diagram (LD)
- Latest graphical programming language for easy closed-loop design Continuous Function Chart (CFC)
- Standard protocols: CANopen, TCP/IP, DDE, OPC
- A CoDeSys Automation Alliance (CAA) certified product
- Motion control functions according to PLCopen standard

Components
- Servomotors and Servodrives
- Servovalves
- Servo-Proportional Valves
- Radial Piston Pumps RKP

Scope of Supply and Services
- Primary Feature: High Performance Motion Control
- Plus: PLC Automation Solutions
- Plus: Electric Motion Systems
- Plus: Hydraulic Motion Systems
- Plus: Training & Global Support of System Solutions
- Plus: Easy and Quick Implementation

MOOG SERVO CONTROLLER

MSC

BRIEF DESCRIPTION

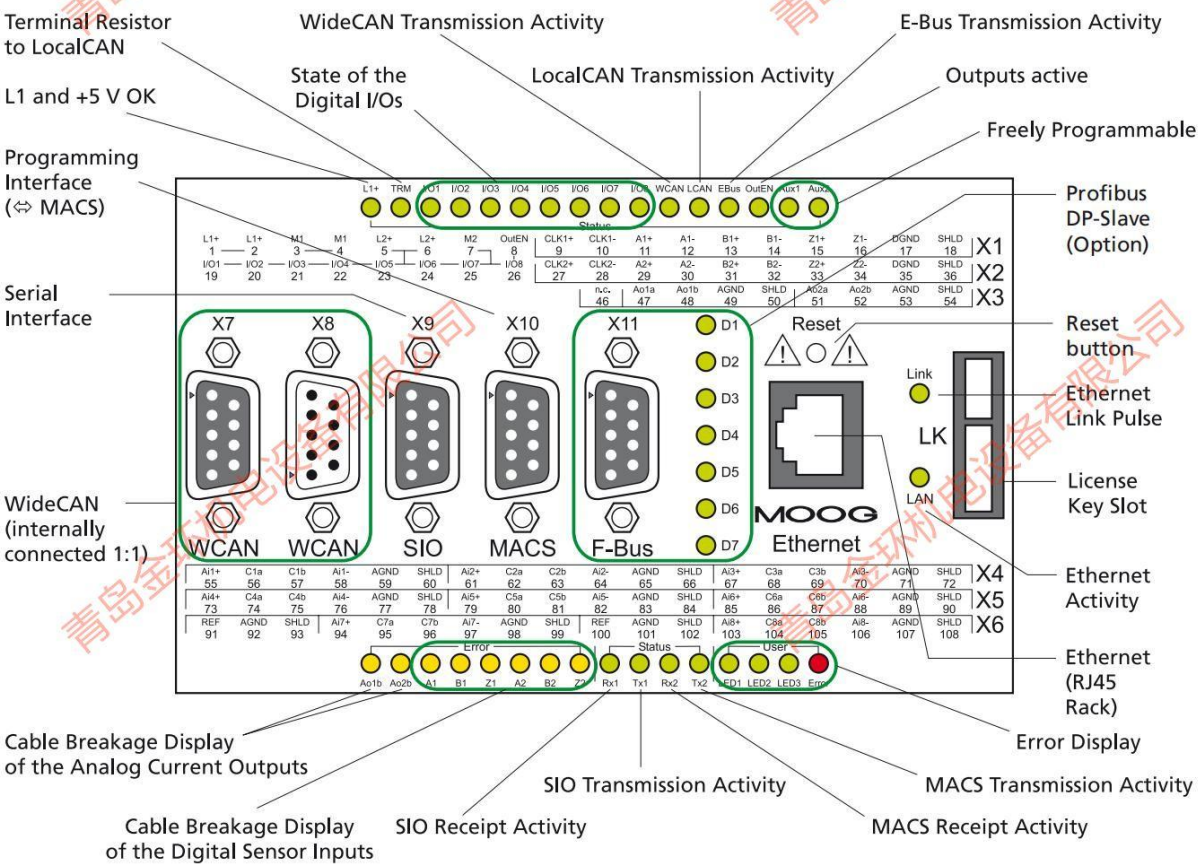
MOOG SERVO CONTROLLER MSC

- Freely programmable multi-axis controller
- Programming with IEC 61131 development environment MACS (Moog Axis Control Software)
- Integrated PLC functionality
- Realization of fast and precise controls (e.g. for position, speed and force)
- Suitable for electrical and hydraulic drives
- Freely definable controller structures with cycle times from 400 µs
- Hardware functionality can be parameterized via MACS software
- PowerPC-based processor
- Memory: 4 MB RAM; 4 MB Flash EEPROM

FEATURES

- Tool-free assembly on DIN top-hat rail mounting
- Simple wiring with terminal strips
- Sustained short circuit protection for analog and digital outputs
- Overvoltage protection up to ±36 V of analog inputs and outputs
- No parts subject to wear, no jumpers, no battery or rechargeable battery
- LEDs for status and error display
- Wire fault monitoring for all digital sensor inputs and analog current outputs
- Additional digital or analog inputs and outputs with M3000 extension modules
- Simple connection of the M3000 modules via extension bus (E-bus)
- Profibus-DP slave as option

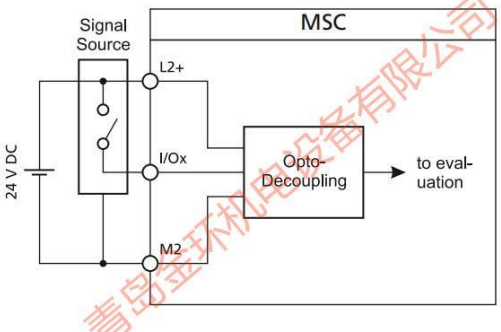
OVERVIEW: INTERFACES, CONNECTIONS AND LED'S



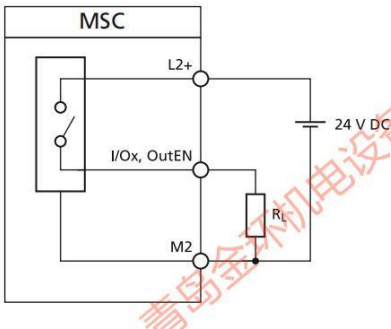
INPUTS/OUTPUTS BASIC CIRCUIT DIAGRAMS

Digital Inputs/Outputs	
Voltage supply of the digital I/O	24 V DC (18-36 V DC) SELV pursuant to DIN EN 60950-1
Current consumption of the digital I/O	0.3 A in idling; all digital outputs active: 4 A
8 digital inputs and outputs	Individually configurable in MACS as input or output. Inputs: type 1 (current-consuming) pursuant to IEC 61131-2 Outputs: max. 0.5 A Sustained short-circuit protection, thermal overload protection
Watchdog output: "Outputs enabled" signal	Analog and digital outputs in operation In the event of a fault, the watchdog output goes to a high impedance state

DIGITAL INPUT

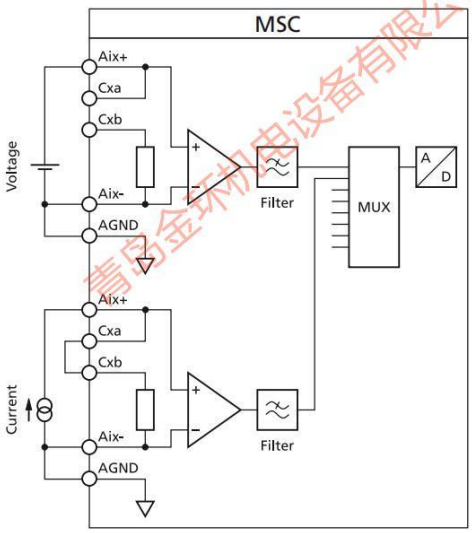


DIGITAL OUTPUT

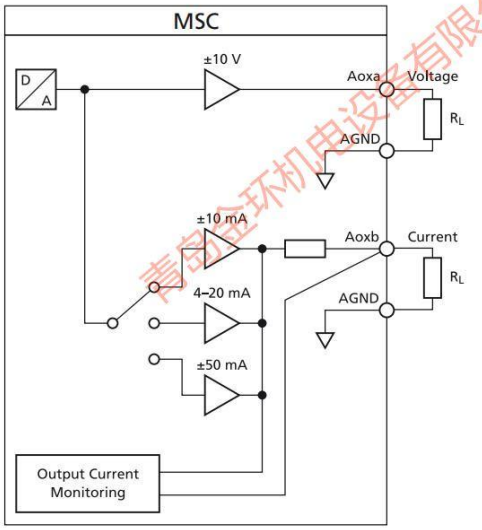


Analog Inputs/Outputs	
Voltage supply to analog I/O	Via internal DC/DC converter
8 analog inputs	16 Bit; individually configurable in the MACS software as ±10 V, ±10 mA or 4–20 mA; overvoltage protection up to ±36 V
2 analog outputs	16 Bit; each ±10 V, additionally individually configurable in the MACS software as ±10 mA, ±50 mA or 4–20 mA Overvoltage protection up to ±36 V; short-circuit protected

ANALOG INPUT (CURRENT/VOLTAGE)



ANALOG OUTPUT (CURRENT/VOLTAGE)

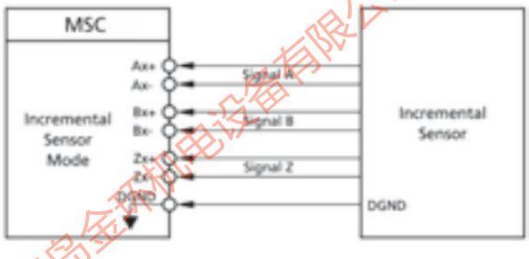


SENSOR INTERFACES DIMENSIONS

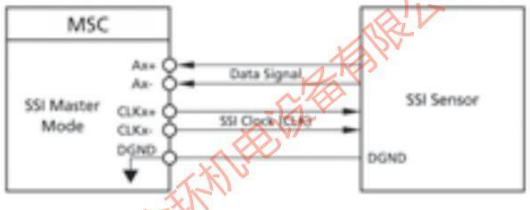
Reference for Sensors	
Reference voltage output	+10 V; can bear up to max. 5 mA overvoltage protection up to ±36 V; short-circuit protected

Sensor Interfaces	
2 Sensor interfaces each configurable as a) Incremental encoder b) SSI transmitter	Signals corresponding to TIA/EIA 422 (previously RS 422) Wire fault monitoring of inputs Configurable in MACS software: a) Incremental encoder four-edge evaluation, max. pulse frequency 8 MHz b) SSI sensor master or slave data format: gray code or binary; data bits 8 to 32 Bit transmission frequency: 78 kHz to 5 MHz

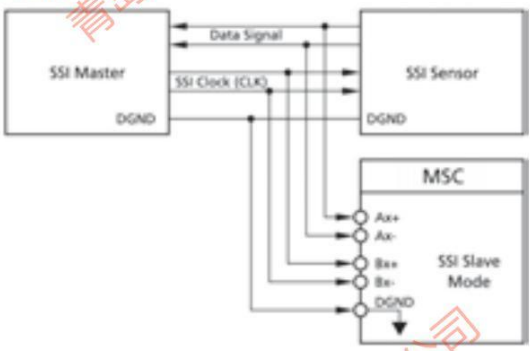
INCREMENTAL ENCODER



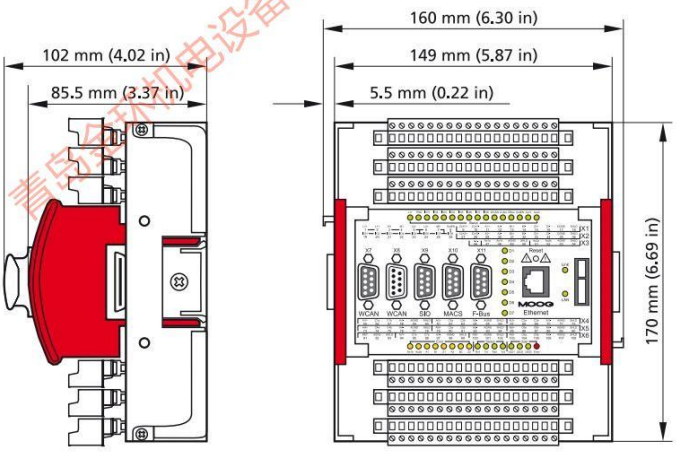
SSI MASTER



SSI SLAVE



DIMENSIONS



MOOG SERVO CONTROLLER

MSC II

BRIEF DESCRIPTION

MOOG SERVO CONTROLLER (MSC II)

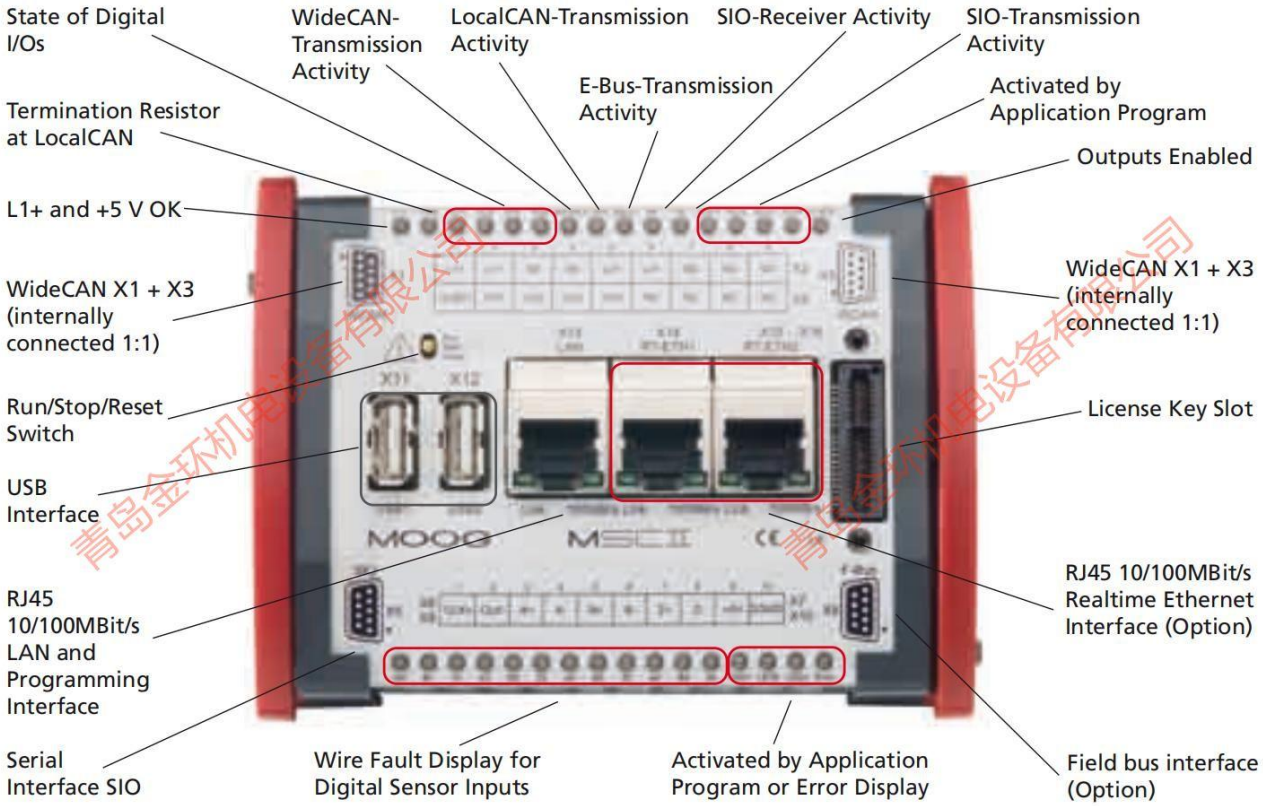
The MSC II is a freely programmable multi-axis controller that facilitates rapid and precise control of process variables such as position, speed, and power. It is suitable for use with both electric and hydraulic drives.
MSC II is offered in addition to MSC. Compared to the MSC it offers higher computation power, shorter cycle times and additional field bus options, such as EtherCAT.

The MSC II does not include analog inputs and outputs. The analog extension modules QAIO 16/4 or QAIO 2/2 are recommended for applications where analog inputs and outputs are required.

FEATURES

- Freely programmable multi-axis motion controller
- Freely definable controller structures with cycle times from 100 µs
- Very low jitter (variation of time base) for optimum closed loop accuracy
- Programming with IEC 61131 development environment MACS (Moog Axis Control Software)
- Integrated PLC functionality
- Hardware functionality can be parameterized via MACS software
- Tool-free assembly on DIN top-hat rail
- Simple wiring with terminal strips
- Sustained short circuit protection for digital outputs
- No parts subject to wear, no jumpers, no battery or rechargeable battery
- LEDs for status and error display
- Wire fault monitoring for all digital sensor inputs
- Additional digital or analog inputs and outputs with M3000 extension modules
- EtherCAT Realtime Ethernet interface as option
- Profibus-DP slave as option

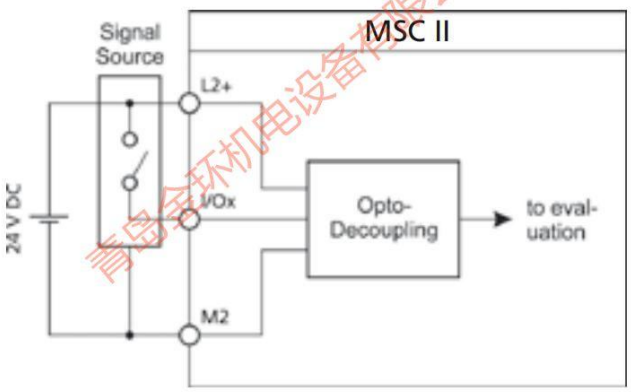
OVERVIEW: INTERFACES, CONNECTIONS AND LED'S



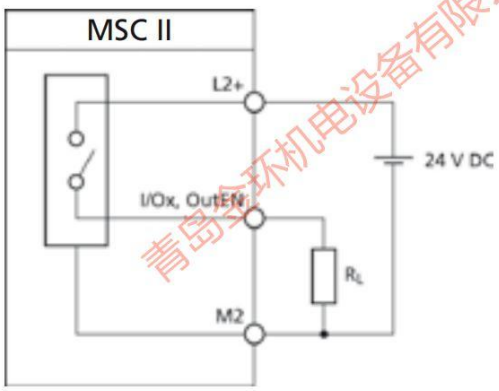
INPUTS/OUTPUTS BASIC CIRCUIT DIAGRAMS

Digital Inputs/Outputs	
Voltage supply of the digital I/O	24 V DC (18-36 V DC) SELV pursuant to DIN EN 60950-1
Current consumption of the digital I/O	0.3 A in idling; all digital outputs active: 2 A
4 digital inputs and outputs	Individually configurable in MACS as input or output Inputs: type 2 (current-consuming) pursuant to IEC 61131-2 Outputs: max. 0.5 A Sustained short-circuit protected, thermal overload protection
Watchdog output: "Outputs enabled" signal	Outputs in operation. In the event of a fault, the watchdog output goes to a high impedance state

DIGITAL INPUT



DIGITAL OUTPUT



SENSOR INTERFACES DIMENSIONS

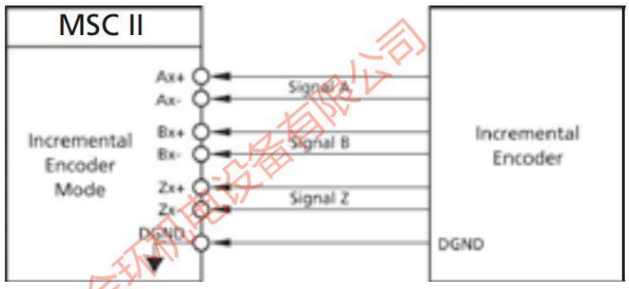
SENSOR INTERFACES

4 Sensor interfaces each configurable as
a) Incremental encoder
- Standard
- Pulse train
- Frequency measurement

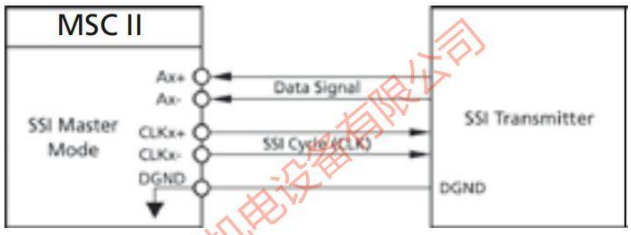
b) SSI transmitter

Signals corresponding to TIA/EIA 422 (previously RS 422) with protection against 24 Volt. Wire fault monitoring of inputs. Configurable in MACS software:
a) Incremental encoder
four-edge evaluation, max. pulse frequency 8 MHz
b) SSI sensor master or slave data format: gray or binary code; data bits 8 to 32 Bit;
transmission frequency: 78 kHz to 5 MHz

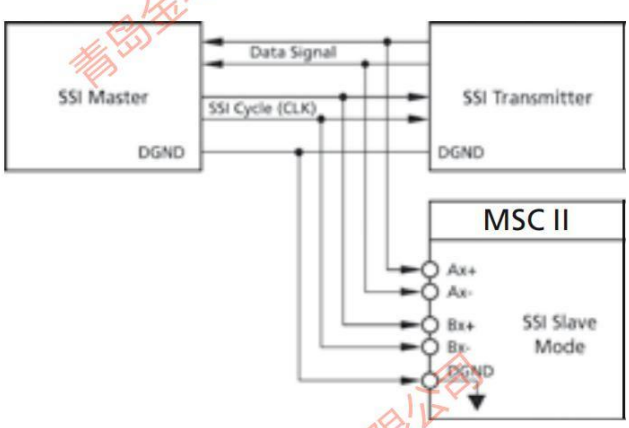
INCREMENTAL ENCODER



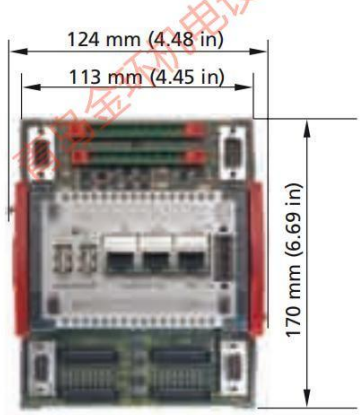
SSI MASTER



SSI SLAVE



DIMENSIONS



Height:
- 85.5 mm (3.37 in) without License Key
- 102 mm (4.02 in) with License Key

ANALOG MODULE

QAIO 2/2

BRIEF DESCRIPTION

GENERAL

The QAIO 2/2 analog module is used for local extension of the inputs and outputs (I/O) of the Moog Servo Controller MSC or MSC II. The analog levels are identical to the levels of the MSC.
The module is mounted on a DIN top-hat rail and directly connected to an MSC or MSC II via the internal extension bus (E-bus).

FEATURES

Analog I/O extension module with pulse input.
- 2 analog inputs
- 2 analog outputs
- 1 reference voltage output +10 V
- Pulse input
- Connection via E-bus

OUTPUTS/INPUTS

- 2 analog inputs, each configurable in the MACS development environment as ±10 V, ±10 mA or 4-20 mA. The inputs are converted in multiplex operation
- 1 reference voltage output:
  The reference voltage source provides a short circuit protected voltage of +10 V
- 2 analog outputs, each ±10 V, additionally individually configurable in the MACS software as ±10 mA, ±50 mA or 4–20 mA with wire fault monitoring
- 1 pulse input 24 V useable as counter input or frequency measurement input

MODULE STATUS LEDS

On the front, 4 LEDs provide information about the status of important module functions.

CONFIGURATION

The configuration of the analog I/O is carried out per software via the central control configuration in the Moog Axis Control Software (MACS) development environment. Either the two analog inputs or the pulse input can be used.

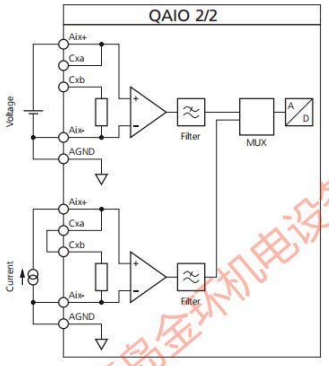
ACTUATION

The I/O of the analog extension module is actuated directly from an MSC or MSC II (not D136X001-001 and D136E001-001) via the extension bus (E-bus). All input- and output-data are transferred within one cycle of the E-bus.

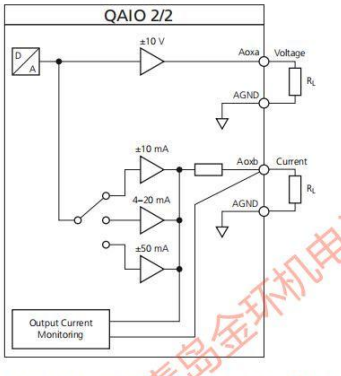
E-BUS

One MSC or MSC II can be extended with a maximum of 7 QAIO 2/2-AV modules. It is not possible to combine it with QAIO 16/4 on one E-bus segment.

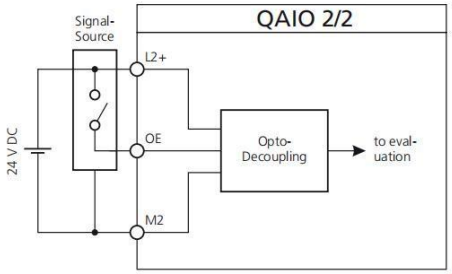
ANALOG INPUT (CURRENT/VOLTAGE)



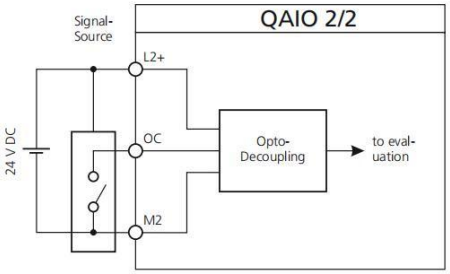
ANALOG OUTPUT (CURRENT/VOLTAGE)



PULSE INPUT POSITIVE SWITCHING



PULSE INPUT GROUND SWITCHING



ANALOG MODULE

QAIO 16/4

BRIEF DESCRIPTION

GENERAL

The QAIO 16/4 analog module is used for local extension of the inputs and outputs (I/O) of the Moog Servo Controller MSC or MSC II.

The module is mounted on a DIN top-hat rail and directly connected to an MSC or MSC II via the internal extension bus (E-bus).

FEATURES

Analog I/O extension module

- QAIO 16/4-V 16 voltage inputs ±10 V; or QAIO 16/4-A 16 current inputs ±20 mA
- 4 voltage outputs, ±10 V
- 1 reference voltage output +10 V
- Connection via E-bus

INPUTS/OUTPUTS

- 16 voltage or current inputs:
  The input channels are converted in multiplex operation. The measurement range is ±10 V (QAIO 16/4-V) or ±20 mA (QAIO 16/4-A)

- 1 reference voltage output:
  The reference voltage source provides a short circuit protected voltage of +10 V

- 4 voltage outputs:
  The output channels provide a voltage signal in the range of ±10 V. The maximum output current is 5 mA (overload protection)

CONFIGURATION

The configuration of the analog I/O is carried out per software via the central control configuration in the Moog Axis Control Software (MACS) development environment.

ACTUATION

The I/O of the analog extension module is actuated directly from an MSC or MSC II via the extension bus (E-bus).

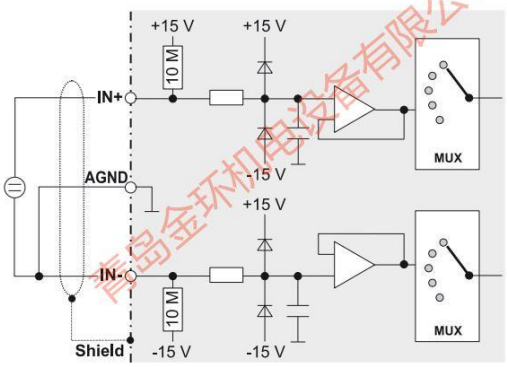
MODULE STATUS LEDS

On the front, 4 LEDs provide information about the status of important module functions.

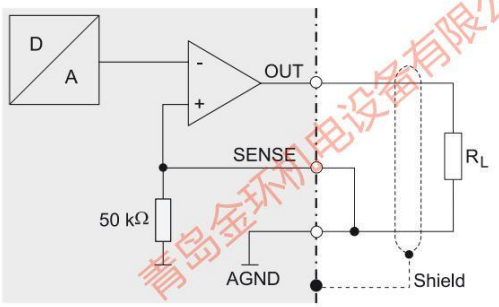
E-BUS

One MSC or MSC II can be extended with a maximum of 7 modules (e.g. QAIO or QDIO).

BASIC CIRCUIT DIAGRAM, ANALOG INPUT



BASIC CIRCUIT DIAGRAM, ANALOG OUTPUT



DIGITAL MODULE

QDIO 16/16

BRIEF DESCRIPTION

GENERAL

The QDIO digital module is used for extension of the local inputs and outputs (I/O) of the Moog Servo Controller MSC or MSC II.

The module is mounted on a DIN top-hat rail and directly connected to an MSC or MSC II, or a remote digital I/O module (RDIO) via the internal extension bus (E-bus).

FEATURES

Digital I/O extension module
QDIO 16/16-0.5: I/O positive switching
QDIO 16/16-0.5N: I/O zero switching

- 16 digital inputs 24 V
- 16 digital I/O, 24 V, individually configurable as an input or an output
- Connection via E-bus

CONFIGURATION

The configuration of the digital I/O is carried out per software via the central control configuration in the Moog Axis Control Software (MACS) development environment.

STATUS LEDs

LEDs on the front provide information about the status of the I/O. The arrangement of the LEDs corresponds to the I/O connections.

ACTUATION

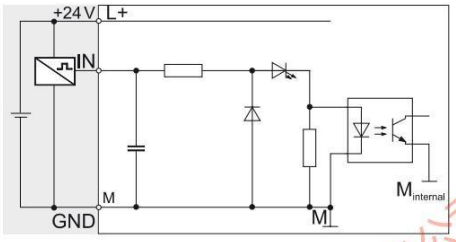
The I/O of the digital extension module are actuated directly from an MSC, MSC II or RDIO via the extension bus (E-bus).

E-BUS

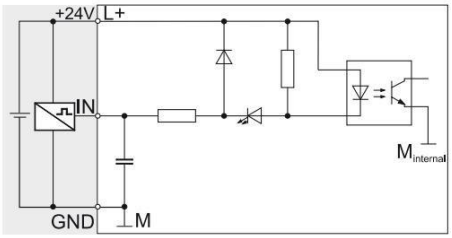
One MSC or MSC II can be extended with a maximum of 7 modules (e.g. QDIO or QAIO). Further digital I/O can be actuated via RDIO modules, which are connected with an MSC or MSC II via CANopen.

BASIC CIRCUIT DIAGRAM, DIGITAL INPUT

Plus switching

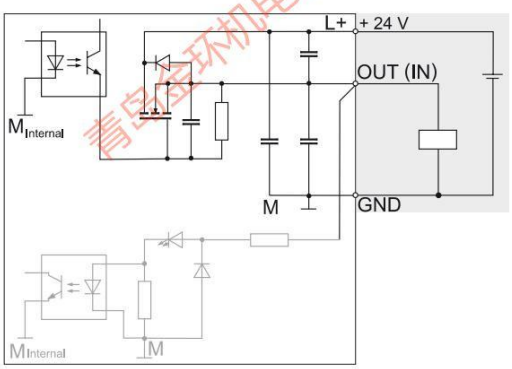


Zero switching

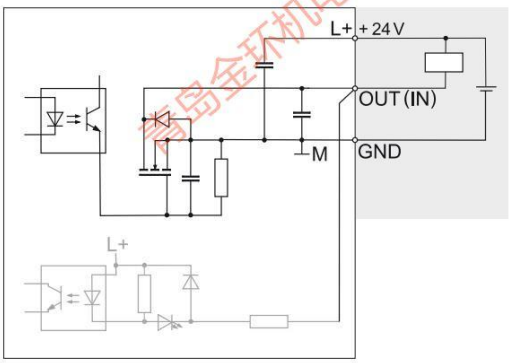


BASIC CIRCUIT DIAGRAM, DIGITAL OUTPUT

Plus switching



Zero switching



EXTENSION MODULE

QEBUS-CAN

BRIEF DESCRIPTION

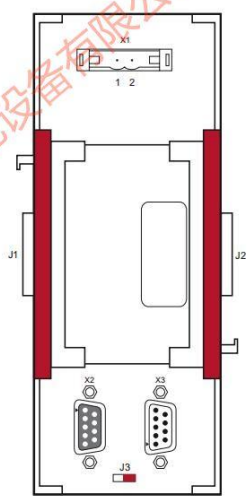
GENERAL

The QEBUS-CAN module is designed for using the LocalCAN bus for external CAN bus nodes.
The LocalCAN bus is integrated in the extension bus plug and is accessed via the QEBUS-CAN module by means of two D-Sub mating connectors.
Furthermore, the QEBUS-CAN module offers the option of using a jumper to connect/disconnect a CAN termination resistor.
The module is mounted onto a DIN top-hat rail and is directly attached to an MSC or MSC II or extension module via the Q-connector.

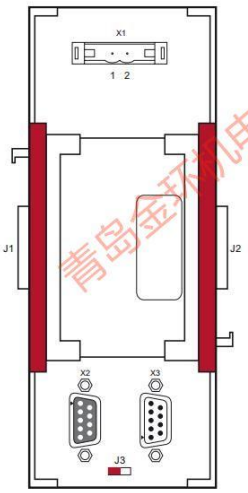
FEATURES

- The QEBUS-CAN module does not count as an E-bus node, it can be used in addition to the maximum number of E-bus modules
- The module can be placed either at the far left or far right in an E-bus segment
- The module has a smaller width than the QDIO, QAIO and RDIO modules
- The module does not need to be configured
- The E-bus does not pass through the module
- Both D-Sub mating connectors are identically wired
- The CAN bus can be connected to a power supply via X1

CONNECTORS



Jumper position
CAN bus not terminated



Jumper position
CAN bus terminated

CONNECTION ASSIGNMENTS

X1 CAN supply connection assignments		
Nr.	**Assignment**	**Connection**
1	CAN_V+	CAN bus supply
2	DGND	Digital ground

Connection assignment LocalCAN X2 and X3		
Nr.	**Assignment**	**Connection**
1		
2	CAN-L	CAN-
3	DGND	Digital ground
4		
5		
6		
7	CAN-H	CAN+
8		
9	CAN_V+	CAN bus supply

Non assigned contacts are not connected.

DIGITAL REMOTE I/O EXTENSION MODULE

RDIO 16/16

BRIEF DESCRIPTION

GENERAL

The RDIO digital module is used as a remote extension of the local inputs and outputs (I/O) of a Moog Servo Controller MSC or MSC II.
The module is mounted on a DIN top-hat rail and connected to an MSC or MSC II via CAN.

FEATURES

Digital I/O extension module
- 16 digital inputs 24 V
- 16 digital I/O 24 V, individually configurable as an input or an output
- CANopen slave complying with CiA DS 401

INTERFACE

The Moog Axis Control Software (MACS) includes a library with function blocks to interface the RDIO via CANopen. This ensures simple integration into the Moog M3000 control system, e.g. to Moog Servo Controller MSC and MSC II.

CANopen INTERFACE

The I/Os are accessed via CANopen interface.
The RDIO can be extended locally by connecting up to 6 QDIO modules. The I/Os of the QDIO modules are also accessed via CANopen interface of the RDIO.

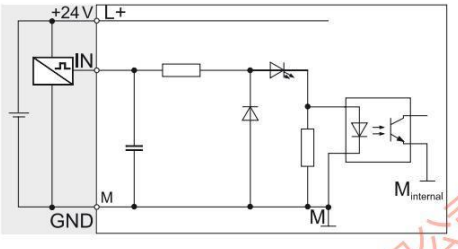
STATUS-LEDs

LEDs on the front provide information about the status of each I/O. The arrangement of the LEDs corresponds to the I/O connections.

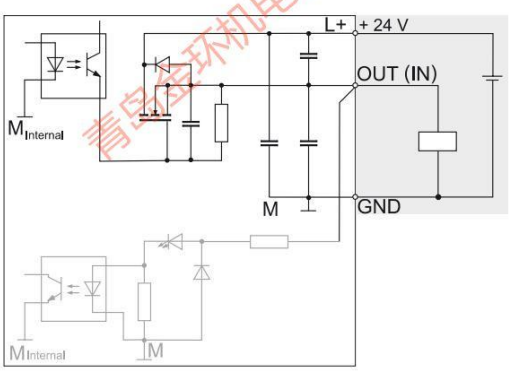
HARDWARE CONFIGURATION

- No modules shall be connected to the left Extension-module-Bus (E-Bus) connector of the module
- The CAN interface is only accessible via the CAN connectors on the front cover
- Up to 6 QDIO modules can be connected to the right E-Bus connector of the module
- Several RDIOs can be connected via CAN connector

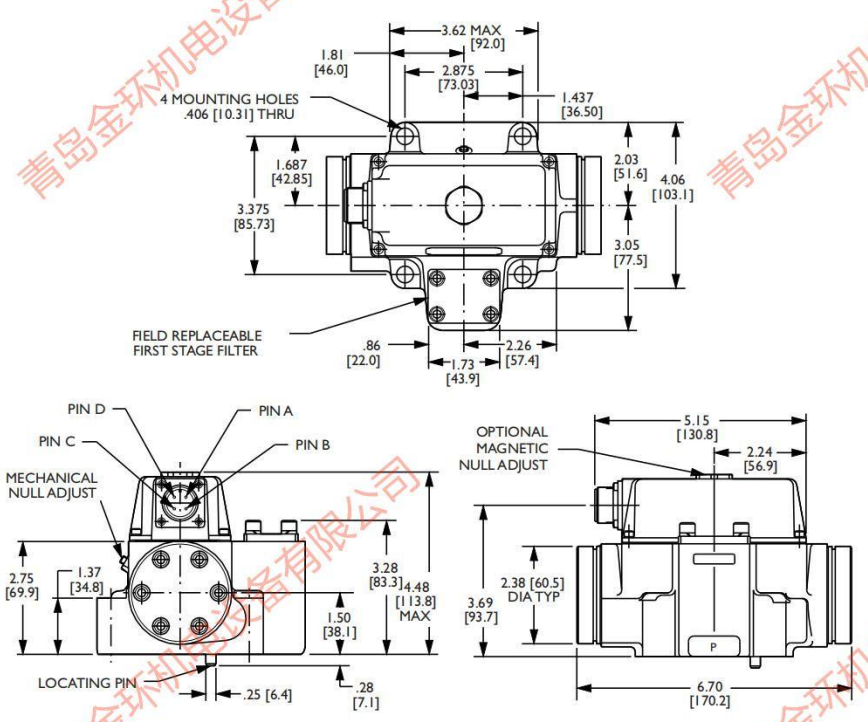
BASIC CIRCUIT DIAGRAM, DIGITAL INPUT



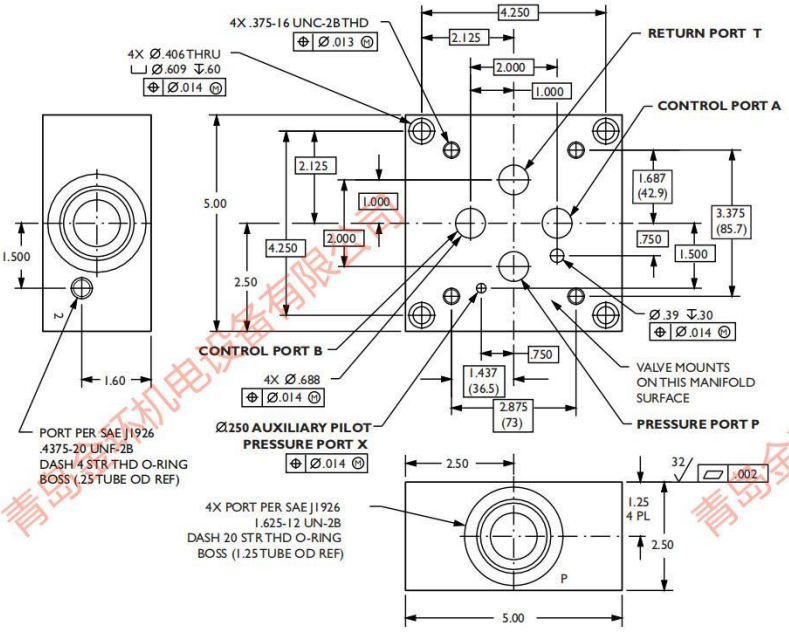
BASIC CIRCUIT DIAGRAM, DIGITAL OUTPUT



72 SERIES
INSTALLATION DRAWINGS



TYPICAL SUBPLATE MANIFOLD



Null Adjust: Flow out of Control Port B will increase with clockwise rotation of null adjust screw (3/32 hex key).

The mounting manifold must conform to ISO 10372-06-05-0-92. Surface to which valve is mounted requires a $\sqrt{32}$ [ΔΔ] finish, flat within 0.002[0.05] TIR.

Standard electrical connector mates with MS3106F14S-2S or equivalent.

72 SERIES
ELECTRICAL CONNECTIONS

Rated current and coil resistance
A variety of coils are available for 72 Series Servovalves, which offer a wide choice of rated current. See Table I.

Coil connections
A four-pin electrical connector (that mates with an MS3106F14S-2S) is standard. All four torque motor leads are available at the connector so external connections can be made for series, parallel or differential operation.

72 Series Servovalves can be supplied on special order with other connectors.

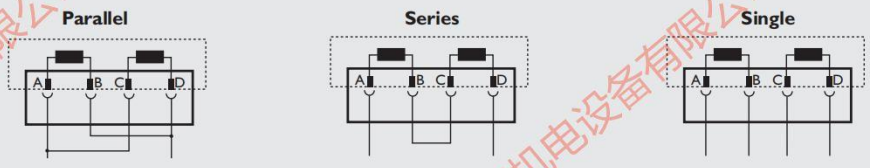
Servoamplifier
The servovalve responds to input current, therefore a servoamplifier that has high internal impedance (as obtained with current feedback) should be used. This will reduce the effects of coil inductance and will minimize changes due to coil resistance variations.

TABLE I

Nominal Resistance Per Coil at 77°F (25°C) Ω	Recommended Rated Current–mA		Approximate Coil Inductance*–Henrys		
	Parallel, Differential or Single Coil Operation	Series Coils	Single Coils	Series Coils	Parallel Coils
80	±40	±20	0.22	0.66	0.18
200	±15	±7.5	0.72	2.20	0.59
1000	±8	±4	3.20	9.70	2.60

* Measured at 50 Hz

ELECTRICAL CONNECTIONS
(Examples with typical 72 series coils)



		Parallel	Series	Single
Coil Resistance	[Ω]	100	400	200
Rated Current	[mA]	±15	±7.5	±15
Electrical Power	[W]	.023	.023	.045
Connections for Valve Opening P ◗ B, A ◗ T		A and C (+) B and D (-)	A (+), D (-) B and C connected	A (+), B (-) or C (+), D (-)

Note: Before applying electrical signals, the pilot stage has to be pressurized.

Procedure to Configure a 72 Series Servovalve for External Pilot Operation

1. Remove the set screw from the "X" port on the base of the valve using a 1/8" Allen wrench.

2. Thread a #2-56 screw into the o-ring plug that is now visible and remove it from the "X" port.

3. Remove the four (4) socket head cap screws and lockwashers that retain the cover plate for the field replaceable filter, using a 3/16" Allen wrench.

4. Use one of the screws to pull the filter and filter housing out of the filter cavity of the body. The filter housing has two (2) o-rings on its O.D. The housing will come part way out, then stop after the second o-ring passes the internal relief in the body. At this time it may be easier to remove the visible o-ring and carefully pry the housing and filter out with two opposing flat blade screw drivers, than to continue pulling on the screw. Be careful not to damage the o-ring groove.

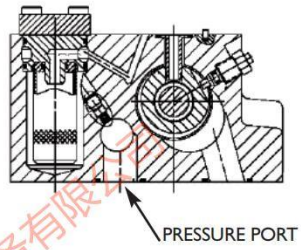
5. A bore will be visible inside the body cavity where the o-ring plug must be inserted.

6. Retain the o-ring plug with the set screw.

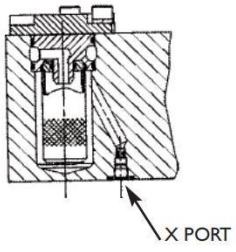
7. Re-install the filter and filter housing in the cavity.

8. Re-install the filter cover, retaining screws and lockwashers. Torque the screws to 85 in-lbs.

External



Internal



72 SERIES

ORDERING INFORMATION
SPARE PARTS AND ACCESSORIES

Model Number

72 • • • • • •

Type Designation

• • • • • • • • • • •

Optional Feature	
	Series specification
K	Intrinsically safe

Model Designation	
	Assigned at the factory

Factory Identification (Revision Level)

Valve Version	
S	Standard response

Rated Flow	
	Q_N[gpm] at Δp_N = 1,000 psi
09	20
15	40
22	60

Maximum Operating Pressure p_p and Body Material	
F	3,000 psi aluminum
K	5,000 psi steel body

Main Spool Type	
O	4-way / axis cut / linear
A	4-way / < =3% overlap / linear
D	4-way / ±10% overlap / linear
M	4-way / axis cut p_C > 80% of p_P / linear (servodrive)
X	Special

Signals for 100% Spool Stroke	
4	-4 mA series (-8 mA parallel)
H	-7.5 mA series (-15 mA parallel)
L	-20 mA series (-40 mA parallel)
Y	Special signal (see spec. sheet)

Valve Connector	
A	Connector over Port A – side (RH)
B	Connector over Port B) – side (LH)
X	Special connector

Seal Material	
V	Fluorocarbon
N	NBR (Buna)
	Others on request

Pilot Connection	
4	Internal
5	External

Spool Position without Electrical Signal	
M	Mid position

Pilot Stage	
F	Standard dynamics

Preferred configurations highlighted.
All combinations may not be available.
Options may increase price and delivery.
Technical changes are reserved.

SPARE PARTS AND ACCESSORIES

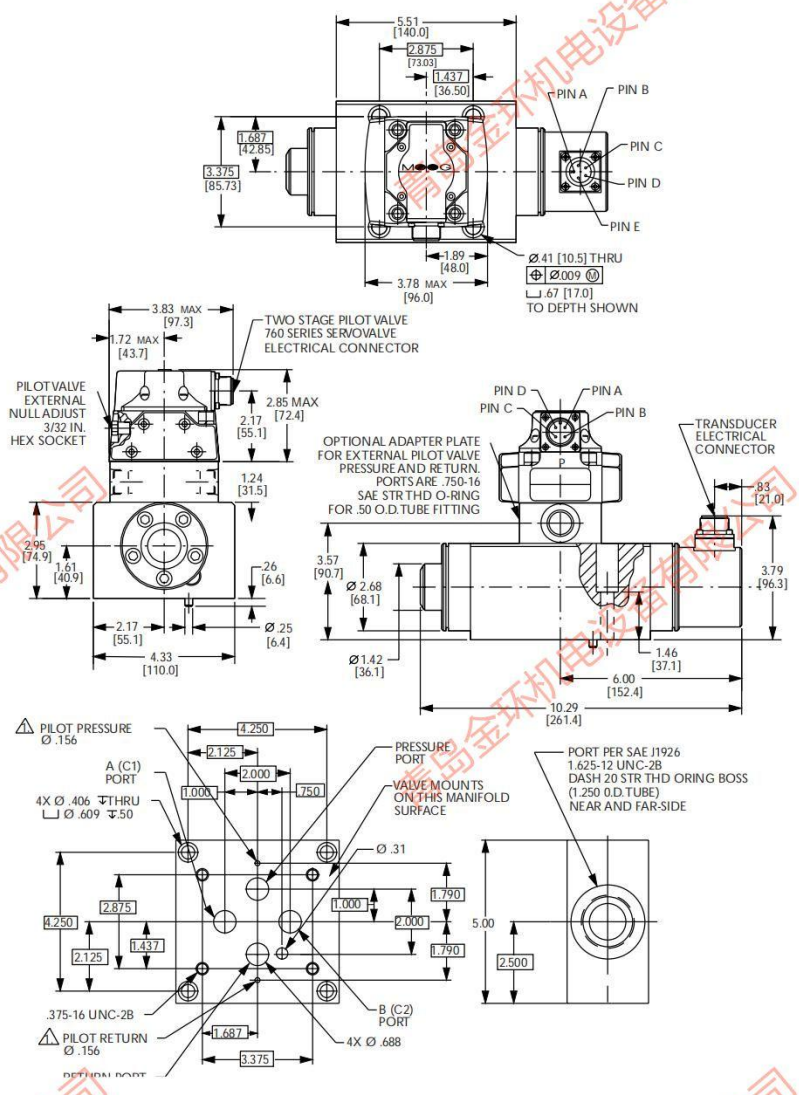
O-Rings (included in delivery),	FPM 85 Shore	Moog P/N
for P,T, A and B	ID 0.801 x 0.070	42082-040
for X	ID 0.364 x 0.070	42082-013
Mating Connector, waterproof IP 65 (not included in delivery)		49054F014S002S (MS3106F14S-2S)
Flushing Block		G4321AM001
Mounting Bolts (not included in delivery)		
3/8 - 16 NC x 2 long (4 pieces)		A31324-332B
Replaceable Filter Cartridge		22050K002
Field Replaceable Filter Kit		B52555RK099K001

79-100 SERIES

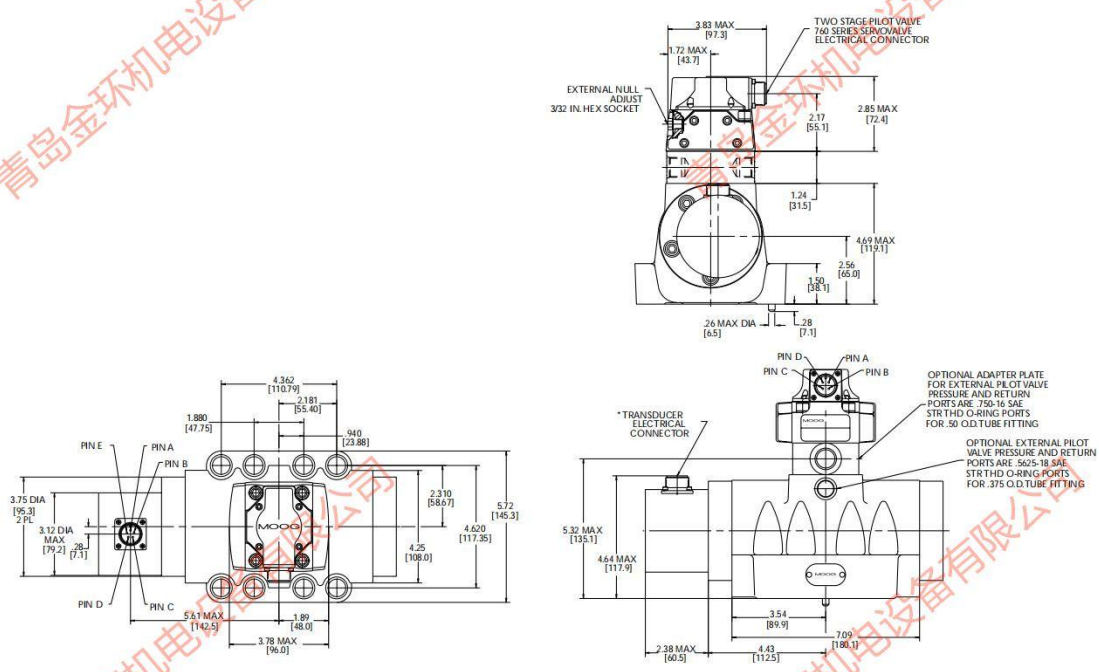
INSTALLATION DRAWINGS WITH PILOT VALVES 760 SERIES

The mounting Manifold must conform to ISO 10372-06-05-0-92.
Note: The X port to ISO Standard must **not** be machined. The X and Y ports of Moog valve body do **not** correspond to ISO Standard.

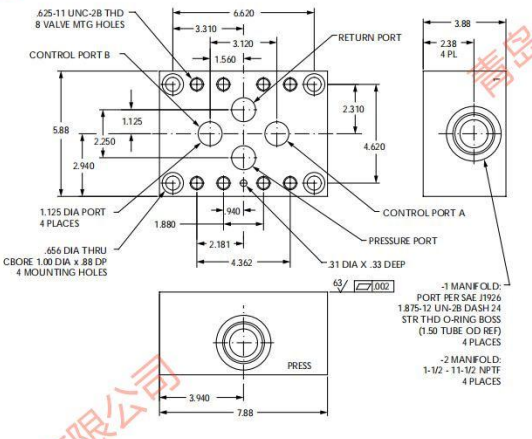
Surface to which valve is mounted requires a $\sqrt{32}$ [ΔΔ] finish, flat within 0.001[0.03] TIR.



79-200 SERIES (STANDARD)
INSTALLATION DRAWING WITH PILOT VALVE 760 SERIES



TYPICAL SUBPLATE MANIFOLD



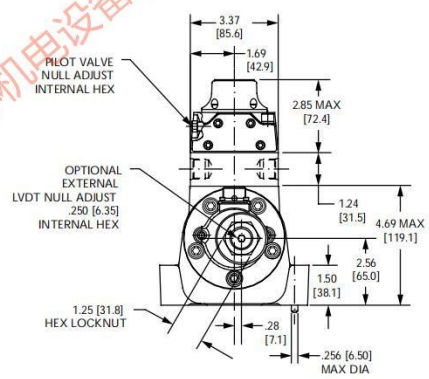
Note: The X and Y tubes have to be connected to the Moog valve body by fittings.

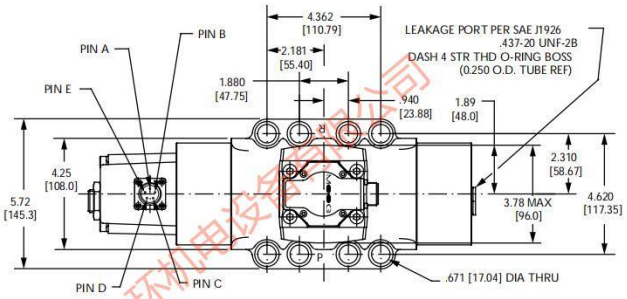
Surface to which valve is mounted requires a $\sqrt{32}$ [ΔΔ] finish, flat within 0.001 [0.03] TIR.

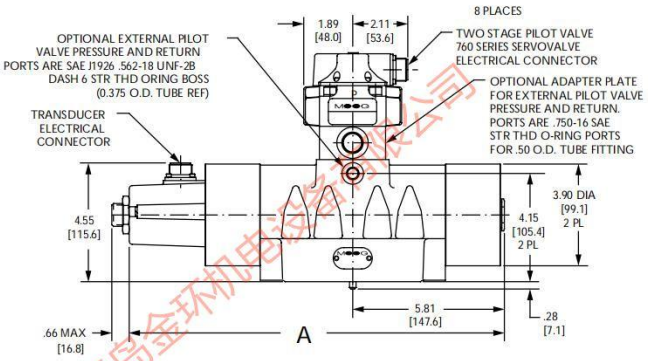
CONVERSION INSTRUCTION

for main stage operation with internal or external pilot connection (externally by tubes)	Pilot flow supply	Set screw 1 NPTF 1/16	Screw plug 2 M14 x 1,5	Pilot flow Return	Set Screw 3 NPTF 1/16	Screw plug 4 M14 x 1,5
	Internal P	open	closed	Internal T	open	closed
	External X	closed	Tube	External Y	closed	Tube

79-200 SERIES (HIGH RESPONSE)
INSTALLATION DRAWINGS WITH PILOT VALVES 760 SERIES







SPARE PARTS AND ACCESSORIES FOR 79-200 SERIES

O-rings (included in delivery)			
for P, T, A, B	4 pieces	ID 1.418 x 0.138	42082-264
Mating connector, waterproof IP 65 (not included in delivery)		pilot valve	49054F14S2S (MS3106F14S-2S)
		LVDT	49054F14S5S (MS3106F14S-5S)
Flushing Block Kit			43949-1K1
Mounting bolts (not included in delivery)			
5/8 - 11 UNC x 2.25	8 pieces	required torque 215 lb.-ft.	B40052-218B

79 SERIES
ORDERING INFORMATION

Model Number

79-1, 79-2 • • • •

Model Designation	
	Assigned at the factory

Response	
	Standard

Type Designation

• • • • • • • • • • • •

Valve Version	
S	Standard response
H	High response (79-2 only)

Rated Flow		
	Q_N[gpm] at Δp_N = 1,000 psi	
	Standard	Series
10	30	79-100
25	60	79-100
04	100	79-200
08	200	79-200
10	260	79-200

Maximum Operating Pressure p_p and Body Material	
F	3,000 psi
K	5,000 psi steel

Main Spool Type	
O	4-way / axis cut / linear characteristic
X	Special spool*

Pilot Stage	
P	760 Standard
Q	760 High response
X	760 Super high response

Valve Electronics	
7	Customer Supplied Electronics

Signal for 100% Spool Stroke	
	Command
A	±10 V

LVDT Electrical Connector	
5	Pin

Seal Material	
N	NBR (Buna)
V	Fluorocarbon
	Others on request*

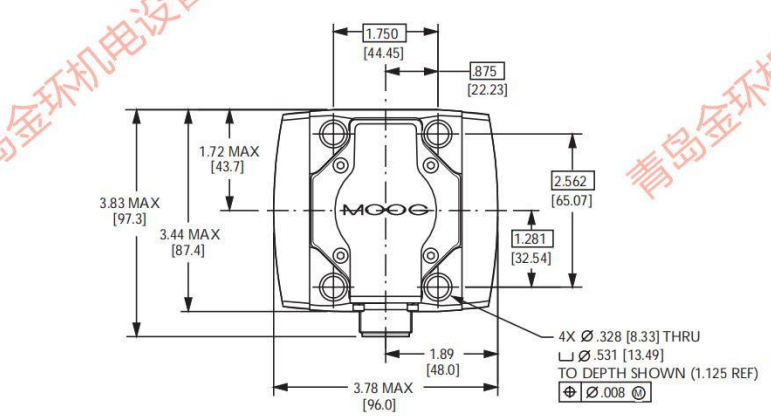
Pilot Connections		
	Supply [X]	Return [Y]
0	internal	internal
1	external	internal
2	external	external

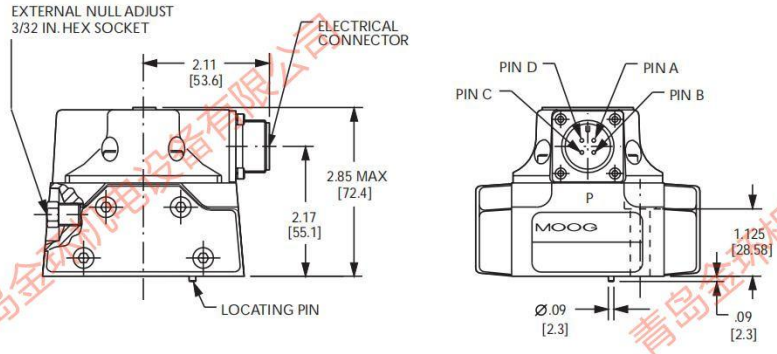
Spool Position without Electrical Signal		
	Position	Pilot Pressure [psi]
O	Undefined	≥ 215
A	P ◗ B, A ◗ T	≥ 215
B	P ◗ B, A ◗ T	≥ 215

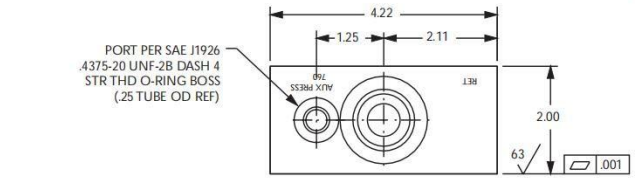
Preferred configurations highlighted.
All combinations may not be available.
Options may increase price and delivery.
Technical changes are reserved.

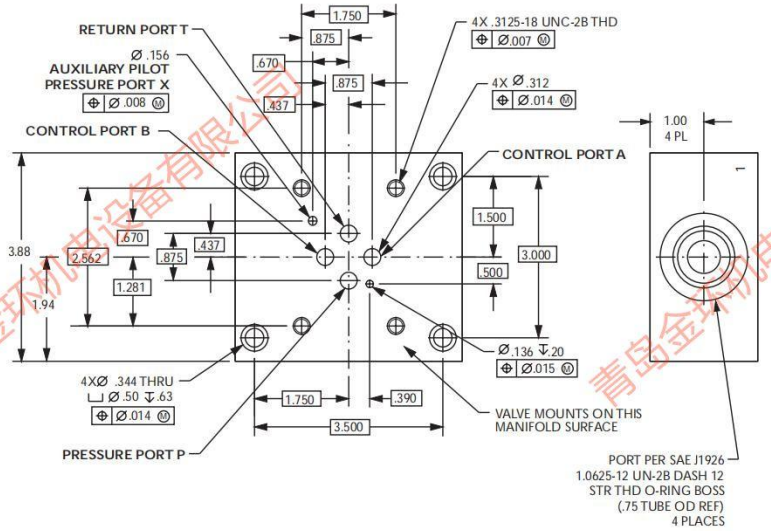
* Optional designs are available with special spool bushing lap configuration.
Available seal materials: Fluorocarbon (Std.), BUNA or EPR.

760 SERIES
INSTALLATION DRAWINGS









The mounting manifold must conform to ISO 10372-04-04-0-92. Surface to which valve is mounted requires a 32 [ΔΔ] finish, flat within 0.001 [0.03] TIR.

Standard electrical connector mates with MS3106F14S-2S or equivalent.

For external null adjust:
Flow out of Port B will increase with clockwise rotation of null adjust (3/32 hex key)

Flow bias is continually varied for a given port as the null adjust is rotated.

760 SERIES
ELECTRICAL CONNECTIONS

Rated current and coil resistance
A variety of coils are available for 760 Series Servovalves, which offer a wide choice of rated current. See Table 1.

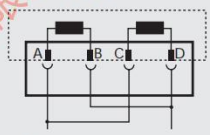
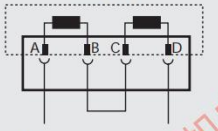
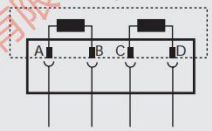
Coil connections
A four-pin electrical connector (that mates with an MS3106/14S/2S) is standard. All four torque motor leads are available at the connector so external connections can be made for series, parallel, or differential operation.

760 Series Servovalves can be supplied on special order with other connectors or a pigtail.

Servoamplifier
The servovalve responds to input current, so a servoamplifier that has high internal impedance (as obtained with current feedback) should be used. This will reduce the effects of coil inductance and will minimize changes due to coil resistance variations.

ELECTRICAL CONNECTIONS
(Examples with typical 760 series coils)

Connector MIL-C-5015/14S-2S

		Parallel	Series	Single
				
Coil Resistance	[Ω]	100	400	200
Rated Current	[mA]	±15	±7.5	±15
Inductance	[H]	0.59	2.20	.72
Electrical Power	[W]	.023	.023	.045
Connectors for Valve Opening P ◗ B, A ◗ T		A and C (+) B and D (-)	A (+), D (-) B and C connected	A (+), B (-) or C (+), D (-)

Note: Before applying electrical signals the pilot stage has to be pressurized.

TABLE 1

Nominal Resistance Per Coil at 77°F (25°C) Ω	Recommended Rated Current–mA		Approximate Coil Inductance*–Henrys		
	Parallel, Differential or Single Coil Operation	Series Coils	Single Coils	Series Coils	Parallel Coils
80	±40	±20	0.22	0.66	0.18
200	±15	±7.5	0.72	2.20	0.59
1000	±8	±4	3.20	9.70	2.60

* Measured at 50 Hz

760 SERIES

ORDERING INFORMATION
SPARE PARTS AND ACCESSORIES

Model Number

760 • • • • • •

Type Designation

• • • • • • • • • • •

Optional Feature	
	Series specification
K	Intrinsically safe

Model Designation	
	Assigned at the factory

Factory Identification (Revision Level)

Valve Version	
S	Standard response
H	High response
V	Super high response

Rated Flow		
	Q_N[gpm] at Δp_N = 1,000 psi	
	Standard	High Response
04	1	1
10	2.5	2.5
19	5.0	5.0
38	10.0	10.0
57	15.0	15.0

Maximum Operating Pressure p_p and Body Material	
F	3,000 psi aluminum
K	5,000 psi steel
Q	8,000 psi steel

Main Spool Type	
O	4-way / axis cut / linear
A	4-way / < +/-3% overlap - critical lap / linear
D	4-way / +/-10% overlap / linear
M	4-way / axis cut p_c > 80% of p_p / linear

Signals for 100% Spool Stroke	
4	±4 mA series
H	±7.5 mA series
L	±20 mA series
N	±30 mA series
Z	±100 mA series
Y	Special signal (see spec. sheet)

Valve Connector	
A	4-G (CA 02 COM) connector C1 (A) – side (RH)
B	4-G (CA 02 COM) connector C2 (B) – side (LH)
P	4-G (CA 02 COM) connector P – side
T	4-G (CA 02 COM) connector R (T) – side

Seal Material	
V	Viton
N	NBR
	Others on request

Pilot Connections and Pressure		
	Pressure [psi]	Supply
A	250 to 3,000	internal
C	250 to 3,000	external
J	250 to 5,000	internal
L	250 to 5,000	external

Spool Position without Electrical Signal	
M	Mid position

Pilot Stage	
F	Standard dynamics
G	Improved dynamics

Preferred configurations highlighted.
All combinations may not be available.
Options may increase price and delivery.
Technical changes are reserved.

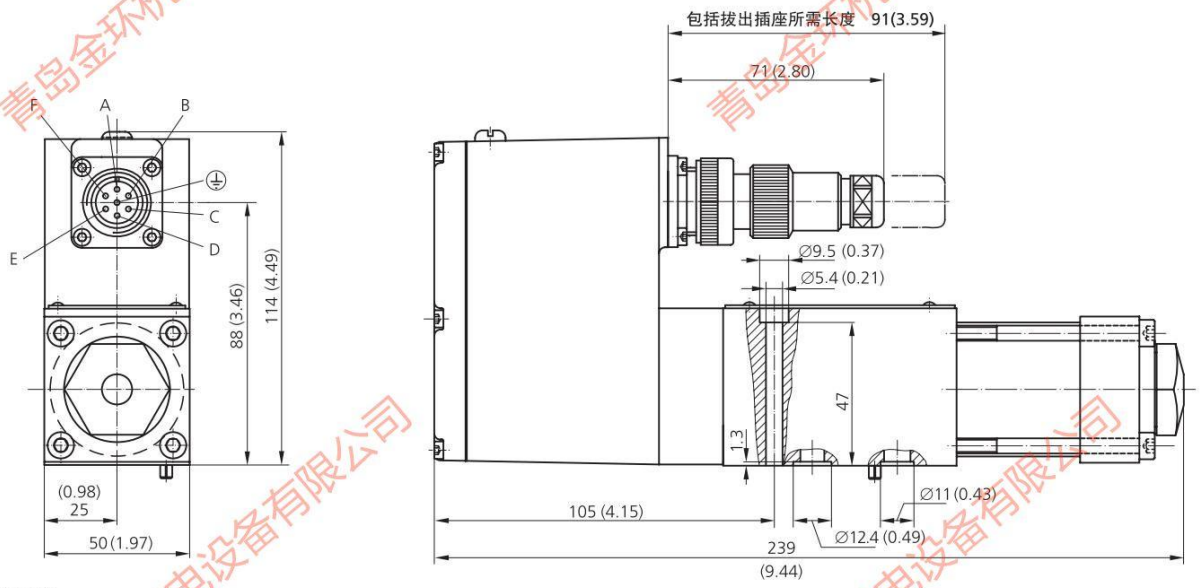
SPARE PARTS AND ACCESSORIES

O-Rings (included in delivery),	FPM 85 Shore	
for P, T, A and B	ID 0.426 x 0.070	42082-022
for X	ID 0.364 x 0.070	42082-013
Mating Connector, waterproof IP 65 (not included in delivery)		
	P/N 49054F14S2S (MS3106F14S2S)	
Flushing Block	P/N 55124	

Mounting Bolts (not included in delivery)	
5/16 - 18 NC x 1-3/4 long (4 pieces)	P/N A31324-228B
Replaceable Filter	P/N A01713-1
Field Replaceable Filter Kit	B52555RK4K1

技术参数

安装图



安装规范

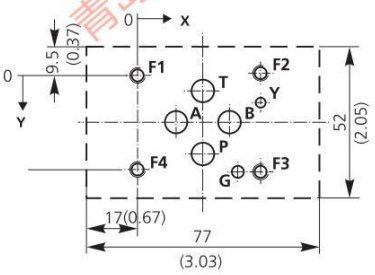
符合 ISO 4401-03-03-0-94 标准，无 X 口

mm

	P	A	B	T	X[1]	Y	F_1	F_2	F_3	F_4	G
	Ø7.5	Ø7.5	Ø7.5	Ø7.5		Ø3.3	M5	M5	M5	M5	4
x	21.5	12.7	30.2	21.5		40.5	0	40.5	40.5	0	33
y	25.9	15.5	15.5	5.1		9	0	-0.75	31.75	31	31.75

inch

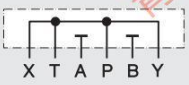
	P	A	B	T	X[1]	Y	F_1	F_2	F_3	F_4	G
	Ø0.30	Ø0.30	Ø0.30	Ø0.30		Ø0.13	M5	M5	M5	M5	0.16
x	0.85	0.50	1.19	0.85		1.60	0	1.60	1.60	0	1.30
y	1.02	0.61	0.61	0.20		0.35	0	-0.03	1.25	1.22	1.25



[1] X 口不能钻孔，阀上无此孔的密封圈。

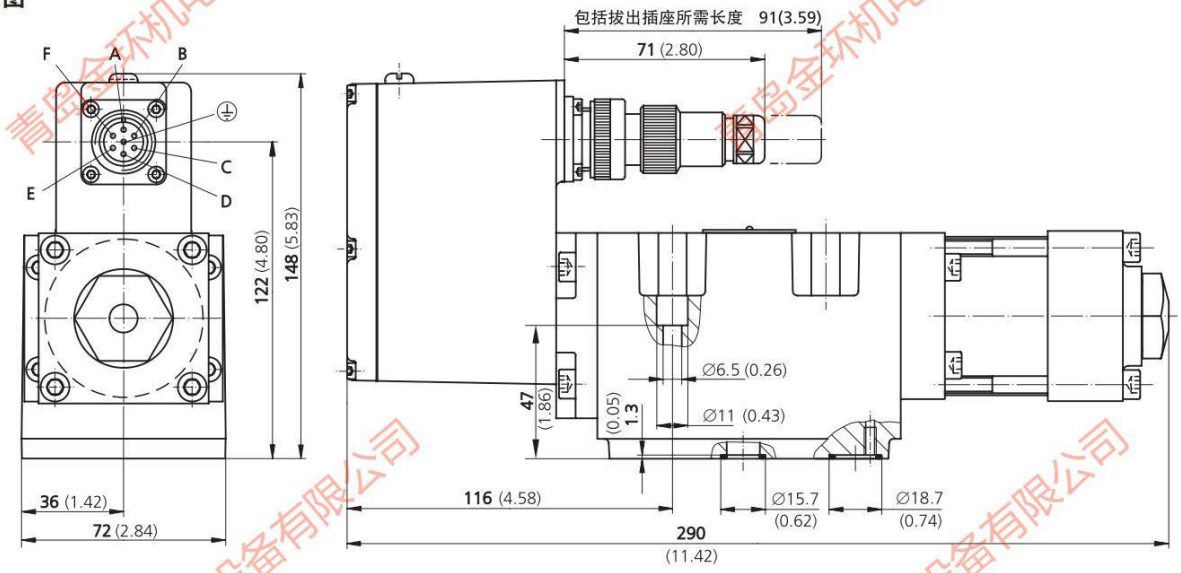
安装面的平面度在 100 mm (3.94 in) 距离内应小于 0.01 mm (0.0004 in)。平均表面粗糙度值 Ra = 0.8 µm。

备件和附件

O 型密封圈（包括在标准供货中）			丁腈橡胶 90 Shore	氟橡胶 90 Shore
用于阀口 P、T、A、B	4 个，ID 9.25 x Ø 1.8 (ID 0.36 x Ø 0.07)		45122-013	42082-013
用于阀口 Y	1 个，ID 7.65 x Ø 1.8 (ID 0.30 x Ø 0.07)		45122-012	42082-012
配套插头，防水等级为 IP65（未包括在标准供货中）			电缆直径	最小为 Ø 10 mm (0.394 in)，最大为 Ø 12 mm (0.472 in)
6+PE	B97007 061	EN 175201 的 804 部分		
清洗板	用于阀口 P、A、B、T、X、Y B46634 002			
安装底板	可根据用户要求选用			
安装螺钉（未包括在标准供货中）		安装时所需扭矩	所需数量	
M 5 x 55 DIN EN ISO 4762-10.9	A03665 050 055	8.5 Nm (75 inch pounds)	4 个	

技术参数

安装图



安装规范

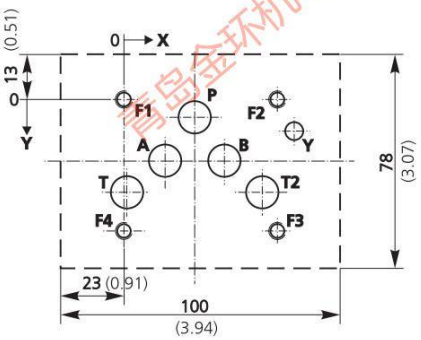
符合 ISO 4401-05-05-0-94 标准，无 X 口

mm

	P	A	B	T	T_2	X[1]	Y	F_1	F_2	F_3	F_4
	Ø11.2	Ø11.2	Ø11.2	Ø11.2	Ø11.2		Ø 6.3	M6	M6	M6	M6
x	27	16.7	37.3	3.2	50.8		62	0	54	54	0
y	6.3	21.4	21.4	32.5	32.5		11	0	0	46	46

inch

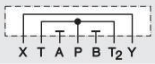
	P	A	B	T	T_2	X[1]	Y	F_1	F_2	F_3	F_4
	Ø0.44	Ø0.44	Ø0.44	Ø0.44	Ø0.44		Ø 0.25	M6	M6	M6	M6
x	1.06	0.66	1.47	0.13	2.00		2.44	0	2.13	2.13	0
y	0.25	0.84	0.84	1.28	1.28		0.43	0	0	1.81	1.81



[1] X 口不能钻孔，阀上无此孔的密封圈。

安装面的平面度在 100 mm (3.94 in) 距离内应小于 0.01 mm (0.0004 in)。平均表面粗糙度值 Ra = 0.8 µm。

备件和附件

O 型密封圈（包括在标准供货中） 用于阀口 P、T、T2、A、B 用于阀口 Y			丁腈橡胶 90 Shore 45122-004 45122-011	氟橡胶 90 Shore 42082-004 42082-011
配套插头，防水等级为 IP65（未包括在标准供货中） 6+PE	B97007 061	EN 175201 的 804 部分	电缆直径	最小为 Ø 10 mm (0.394 in)， 最大为 Ø 12 mm (0.472 in)
清洗板	用于阀口 P、A、B、T、T2、X、Y B67728 001			
清洗板	用于阀口 P、A、B、T、T2、X、Y B67728 002			
清洗板	用于阀口 P、A、B、T、T2、X、Y B67728 003			
安装底板	可根据用户要求选用			
安装螺钉（未包括在标准供货中） M 6 x 60 DIN EN ISO 4762-10.9	A03665 060 060	安装时所需扭矩 13 Nm (115 inch pounds)	所需数量 4 个	

订货信息

订货信息

型号

D 63	.	.	. . .	.

铭牌标识

.	. . .	.	.	.	.	.	.	.	.

系列

3	尺寸 03
4	尺寸 05

规格

-	标准规格
E	预制规格
K	防爆规格 可根据用户要求选用
Z	特殊规格

型号标识

	已在出厂时指定

生产厂家标识

阀的型式

R	带集成放大板

额定流量

	Q_N [l/min] (Δp_N = 35 bar / 每节流边) (gpm)	Δp_N = 5 bar / 每节流边	系列
02	5 (1.3)	2	D633
04	10 (2.6)	4	D633
08	20 (5.3)	8	D633
16	40 (10.6)	16	D633
24	60 (15.8)	24	D634
40	100 (26.3)	40	D634

最大工作压力

K	350 bar (5000 psi)

若要求任意组合订货选项可能会提高阀的售价和延长交付时间。
并非所有订货选项组合均有对应产品。
阴影部分为优选配置。
本公司保留对阀技术参数的修改权。

供电电压

2	24 VDC (19 - 32 VDC)

阀口全开时的电信号*

	指令信号	阀芯位移输出信号
M	±10 VDC	+4 - +20 mA
S	+4 - +20 mA	+4 - +20 mA
X	±10 mA，浮动 可根据用户要求提供其它信号范围	+4 - +20 mA

阀的插座

S	6+PE，EN 175201 的 804 部分

密封件材料

N	丁腈橡胶 (Buna)
V	氟橡胶 (Viton) 可根据用户要求提供其它材料

Y 口

0	由螺塞堵住	p_{Tmax} = 50 bar (715 psi)
3	开，并内置滤油器	p > 50 bar (715 psi)

电源切断时阀芯的位置

M	中位
F	P◗B，A◗T 已连接（最小开口量为全开口的 10%）
D	P◗A，B◗T 已连接（最小开口量为全开口的 10%） 可根据用户要求提供其它开口形式

线性力马达

		系列
1	标准	D633
2	标准	D634

阀套/阀芯类型

0	四通：	零开口，线性增益
A	四通：	1.5 - 3% 正重叠量，线性增益
D	四通：	10% 正重叠量，线性增益
Z	2x2 通：	P◗A，B◗T，Y 口单独接回油箱
X	根据用户要求特制的阀芯	

*（输入电压限制，请参阅第 6 页）

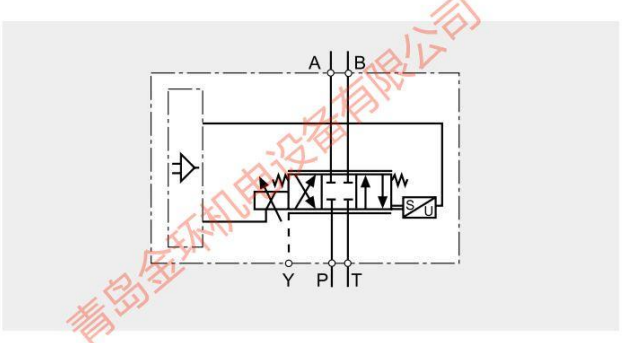
D633,D634 系列
液压职能符号／剖面图

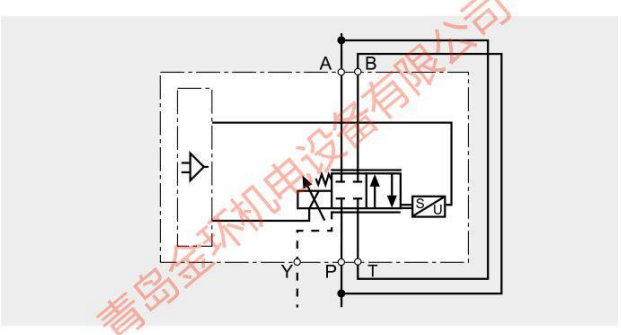
四通阀功能

- 阀口 A 和 B 为流量控制口（节流控制）
- 若阀口 T 的压力 P_T>5Mpa 时，则阀口 Y 必须单独接回油箱
- 用作三通阀时，阀口 A 或 B 须堵死
- 阀芯为零开口，另有 1.5%~3% 或 10% 重叠量的阀芯可供选择

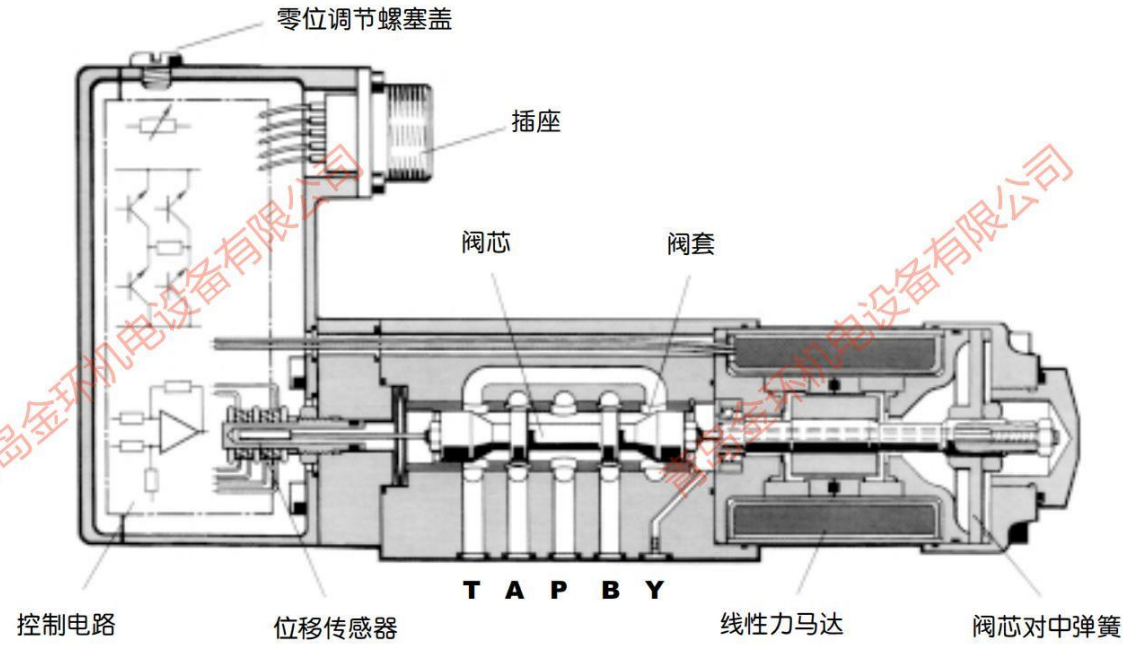
2x2 通外接阀的功能

- 阀口 A 为流量控制口（节流控制）
- 阀口 Y 必须必须单独接回油箱
- 将阀口 P 和阀口 B、阀口 T 和阀口 A 在阀外连接

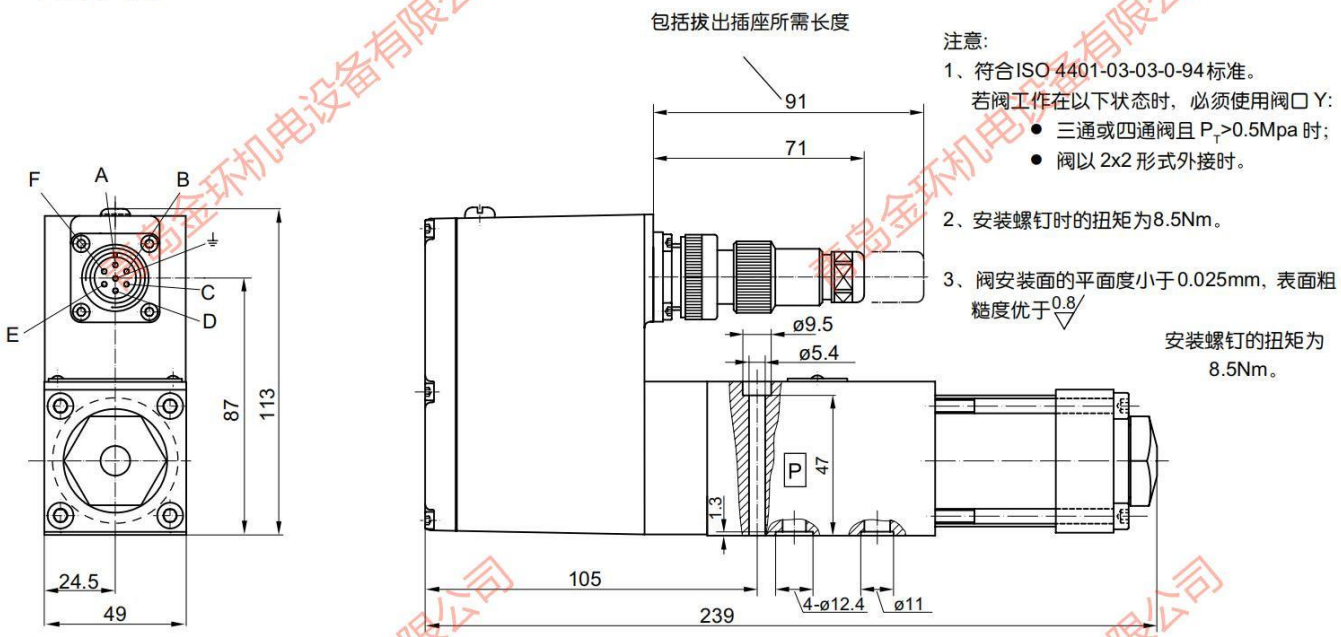




直动式伺服阀（DDV）的剖面图



D633,D634 系列
外形尺寸



注意:

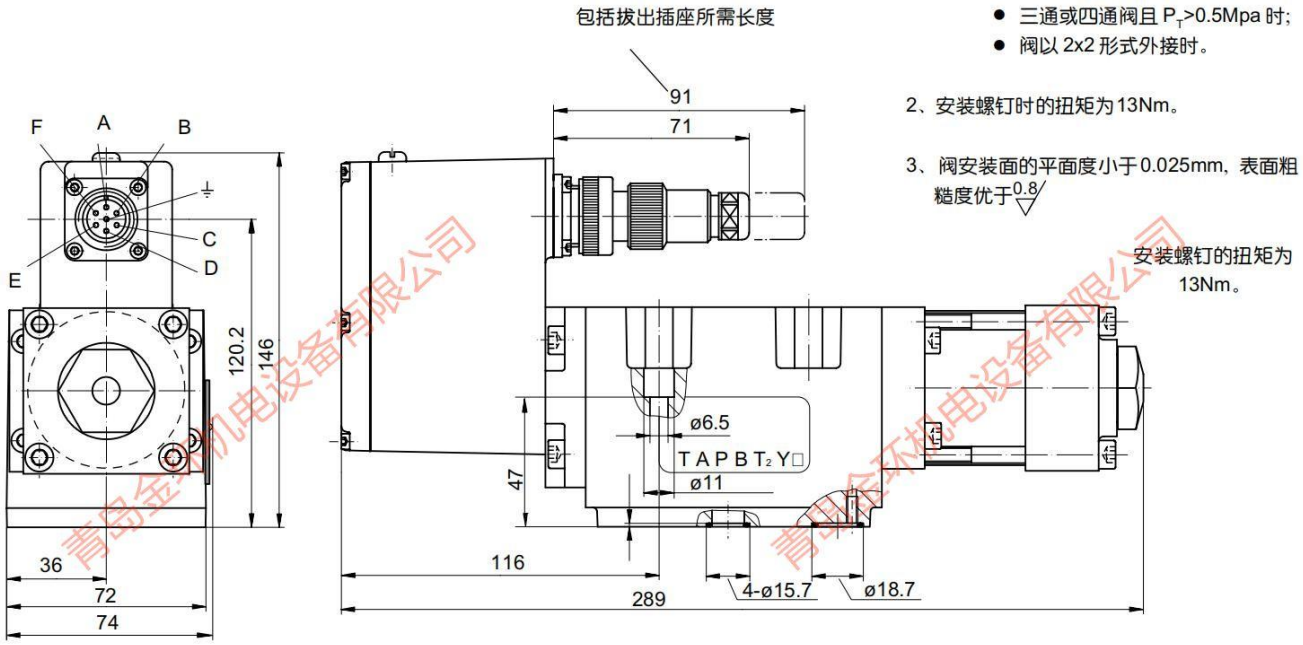
1、符合ISO 4401-03-03-0-94标准。
若阀工作在以下状态时，必须使用阀口 Y:
- 三通或四通阀且 P_T>0.5Mpa 时;
- 阀以 2x2 形式外接时。

2、安装螺钉时的扭矩为8.5Nm。

3、阀安装面的平面度小于0.025mm，表面粗糙度优于$\frac{0.8}{\nabla}$

安装螺钉的扭矩为8.5Nm。

D634 系列



注意:

1、符合 ISO 4401-05-05-0-94 标准。
若阀工作在以下状态时，必须使用阀口 Y:
- 三通或四通阀且 P_T>0.5Mpa 时;
- 阀以 2x2 形式外接时。

2、安装螺钉时的扭矩为13Nm。

3、阀安装面的平面度小于0.025mm，表面粗糙度优于$\frac{0.8}{\nabla}$

安装螺钉的扭矩为13Nm。

D633,D634 系列
安装图 / 附件

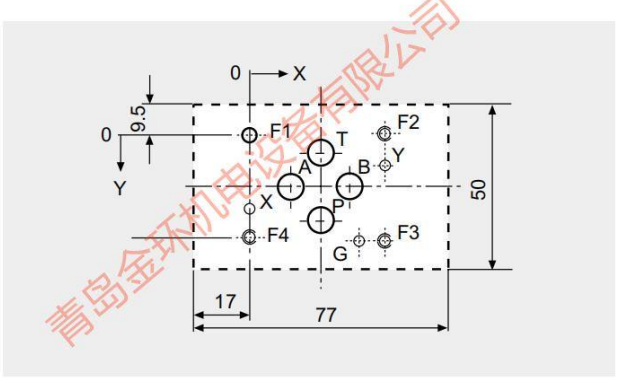
D633 系列安装图
ISO4401-03-03-0-94

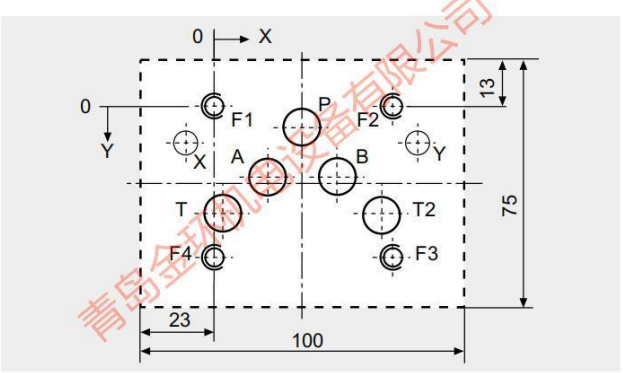
	P	A	B	T	X[1]	Y	F_1	F_2	F_3	F_4	G
	Ø7.5	Ø7.5	Ø7.5	Ø7.5		Ø3.3	M5	M5	M5	M5	4
x	21.5	12.7	30.2	21.5		40.5	0	40.5	40.5	0	33
y	25.9	15.5	15.5	5.1		9	0	-0.75	31.75	31	31.75

D634 系列安装图
ISO4401-05-05-0-94

	P	A	B	T	T_2	X[1]	Y	F_1	F_2	F_3	F_4
	Ø11.2	Ø11.2	Ø11.2	Ø11.2	Ø11.2		Ø11.2	M6	M6	M6	M6
x	27	16.7	37.3	3.2	50.8		62	0	54	54	0
y	6.3	21.4	21.4	32.5	32.5		11	0	0	46	46

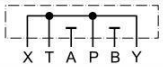
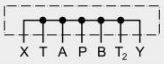
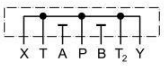
1)X 口不能钻孔，阀上无此孔的密封图。





阀安装面的平面度必须优于0.025mm、平均粗糙度必须优于0.001mm。

附件

MOOG零件号	名称	尺寸 / 注意事项	数量	D633	D634
B97007-061	配套插头、6+PE	保护等级为 IP65		X	X
A03665-050-060	安装螺钉	M5x60,DIN 912-10.9	4 个	X	
A03665-060-060	安装螺钉	M6x60,DIN 912-10.9	4 个		X
B46634-002	清洗板			X	
B67728-001	清洗板				X
B67728-002	清洗板				X
B67728-003	清洗板				X

附件未包括在标准供货中。

D633，D634 系列
技术参数

系列			D633	D634
安装形式			ISO 4401-03-03-0-94 带或不带泄油口 Y[4]）	ISO 4401-05-05-0-94 带或不带泄油口 Y[4]）
阀口直径	阀口 P、A、B 和 T	[mm]	7.9	11.5
阀类型[1]）			单级阀，带阀套的滑阀型， 三通、四通或 2x2 通	单级阀，带阀套的滑阀型， 三通、四通或 2x2 通
阀芯驱动方式			永磁式线性力马达直接驱动	永磁式线性力马达直接驱动
先导级			无	无
安装方向			任意	任意
振动			30g，三轴	30g，三轴
重量		[kg]	2.5	6.3
额定流量 Q_N (ΔP_N=7Mpa，流量误差 ±10%)		[1/min]	5/10/20/40	60/100
阀的最大流量 Q_{max}[3]）		[1/min]	75	185
最大工作压力 P_{max}				
阀口 P、A 和 B		[Mpa]	35	35
阀口 T(未使用泄漏口 Y 时)			5	5
阀口 T(未使用泄漏口 Y 时)			35	35
阀口 Y			直接回油箱	直接回油箱
油液温度范围		[°C]	-20-+80	-20-+80
密封圈材料			丁腈橡胶、氟橡胶	丁腈橡胶、氟橡胶
工作介质			符合 DIN 51524 标准 的石油基液压油，亦可 根据用户要求选用	符合 DIN 51524 标准 的石油基液压油，亦可 根据用户要求选用
粘度	推荐值	[mm^2/s]	15-45	15-45
	允许值	[mm^2/s]	5-400	5-400
系统滤油器			不带旁边阀的高压滤油器， 带污物堵塞报警，安装在 系统主油路中	不带旁通阀的高压滤油 器，带污物堵塞报警， 安装在系统主油路中
清洁度等级				
NAS 1638			6 级或更高要求[5]）	6 级或更高[5]）
ISO 4406			15/12 或更高[5]）	15/12 或更高[5]）
过滤精度	一般使用:		$\beta_6 \geqslant 75$(10 μ m 绝对精度)	$\beta_{10} \geqslant 75$(10 μ m 绝对精度)
	较长寿命使用:		(6 μ m 绝对精度)	$\beta_6 \geqslant 75$(6 μ m 绝对精度)
阶跃响应	0...100%[2）3）]	[ms]	⩽ 12	⩽ 20
分辨率		[%]	<0.1	<0.1
滞环[2]）		[%]	<0.2	<0.2
零漂[2]）	(Δ T=55k)	[%]	<1.5	<1.5
零位泄漏量 Q_L 零开口[2]）		[1/min]	0.15/0.3/0.6/1.2	1.2/2.0

1）见第 4 页中阀的职能符号。

2）在阀的供油压力为 Pp=14Mpa、油液粘度为 v=32mm^2/s 条件下测得。

3）见第 5 页的阀的特性。

4）以下情况必须使用泄油口Y
作三通、四通阀使用且 P_T >5Mpa 时;
作 2 x 2 通形式使用。

5）为防止节流锐边磨损延长阀的使用寿命。

D633，D634 系列
订货信息 / 备件

型号

D63 · · · · · · ·

系列	
3	尺寸 03
4	尺寸 05

说明	
–	标准规格
E	预制规格
Z	特殊规格

型号标识	
	已在出厂时指定

生产厂家标识

阀的型式	
R	安装有控制放大电路

额定流量		
	Q_N[l/min] (Δp_N=7Mpa)	阀系列
02	5	D633
04	10	D633
08	20	D633
16	40	D633
24	60	D634
40	100	D634

最大工作压力	
K	35Mpa

阀芯阀套类型	
O	四通，零开口，线性增益
A	四通，1.5%-3% 正重叠量，线性增益
D	四通，10% 正重叠量，线性增益
Z	2 x 2 通，P → A，　B → T; Y 口单独接回油箱
X	根据用户要求特制的阀芯 / 阀套

铭牌标识

· · · · · · · · · · · · · ·

线性力马达	
1	标准　D633
2	标准　D634

电源切断时阀芯的位置	
M	中位
A	P → B，A → T(最小开口量为全开口的 10%)
B	P → A，B → T(最小开口量为全开口的 10%)
	可根据用户要求提供其它形式

Y 口	
0	由螺塞堵住　$P_{T\ MAX} \leqslant$ 5Mpa
1	开，并内置滤油器　P_T>5Mpa

密封件材料	
N	丁腈橡胶
V	氟橡胶
	可根据用户要求提供其它材料

阀的插座		
S	6+PE	DIN43563

阀口全开时的电信号		
	指令信号	阀芯位移信号输出
M	0...±10VDC	+4...+20mA
P	0...±10mA	+4...+20mA
S	+4...+20mA	+4...+20mA
	另可根据用户要求提供其它信号范围	

供电电压	
2	+24VCD(22-28VDC)

阴影部分为优选规格。
并非所有任意组合均有对应产品。
若要求任意组合可能会提高阀的售价。
本公司保留对阀参数的修改权。

备　件

MOOG零件号	名称	尺寸	材料	数量	D633	D634
45122-013	O 型密封圈，P,T,A 和 B 口用	ID 9.25 x Ø1.8	丁腈橡胶 Sh 90	4 个	x	
45122-012	O 型密封圈，Y 口用	ID 7.65 x Ø1.8	丁腈橡胶 Sh 90	1 个	x	
42082-013	O 型密封圈，P,T,A 和 B 口用	ID 9.25 x Ø1.8	氟橡胶 Sh 90	4 个	x	
42082-012	O 型密封圈，Y 口用	ID 7.65 x Ø1.8	氟橡胶 Sh 90	1 个	x	
45122-004	O 型密封圈，P,T,A 和 B 口用	ID 12.4 x Ø1.8	丁腈橡胶 Sh 90	5 个		x
45122-011	O 型密封圈，X、Y 口用	ID 15.6 x Ø1.8	丁腈橡胶 Sh 90	2 个		x
42082-004	O 型密封圈，P,T,A 和 B 口用	ID 12.4 x Ø1.8	氟橡胶 Sh 90	5 个		x
42082-011	O 型密封圈，Y 口用	ID 15.6 x Ø1.8	氟橡胶 Sh 90	2 个		x

BENEFITS OF DIRECT DRIVE SERVO VALVES (DDV)

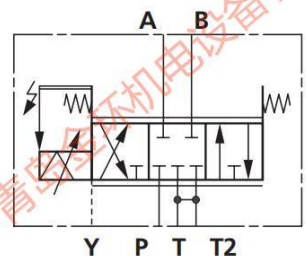
- ❒ Directly driven by a permanent magnet linear force motor with high force level
- ❒ No pilot oil flow required
- ❒ Pressure independent dynamic performance
- ❒ Low hysteresis and low threshold
- ❒ Low current consumption at and near hydraulic null
- ❒ Increased operation at limits (at high pressure drops)
- ❒ Standardized spool position monitoring signal with low residual ripple
- ❒ Electric null adjust
- ❒ With loss of supply voltage, a broken cable, or an emergency stop, the spool returns to its spring centered position without passing a load move position.

DIRECT DRIVEN PROPORTIONAL VALVE (DDV) OPERATING PRINCIPLE

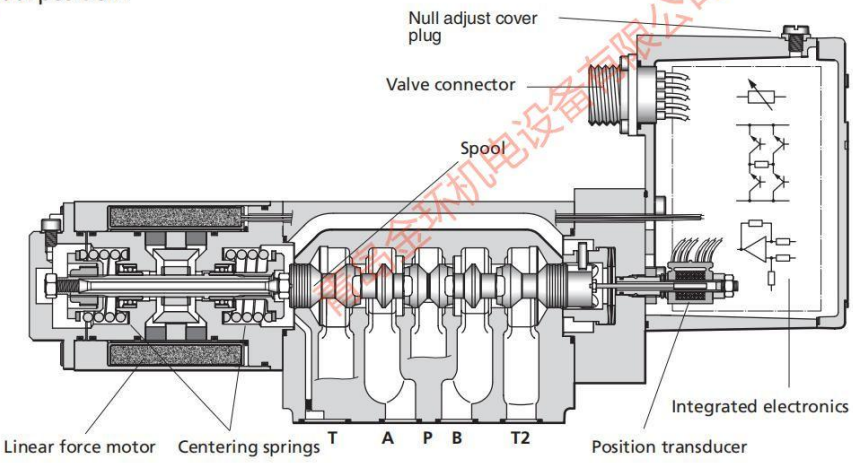
The position control loop for the spool with position transducer and linear force motor is closed by the integrated electronics. An electric signal corresponding to the desired spool position is applied to the integrated electronics and produces a pulse width modulated (PWM) current to drive the linear force motor. An oscillator excites the spool position transducer (LVDT), producing an electric signal proportional to spool position.

The demodulated spool position signal is compared with the command signal, and the resulting spool position error causes current in the force motor coil until the spool has moved to its commanded position, and the spool position error is reduced to zero. The resulting spool position is thus proportional to the command signal.

D634-P Series Single Stage Proportional Valve

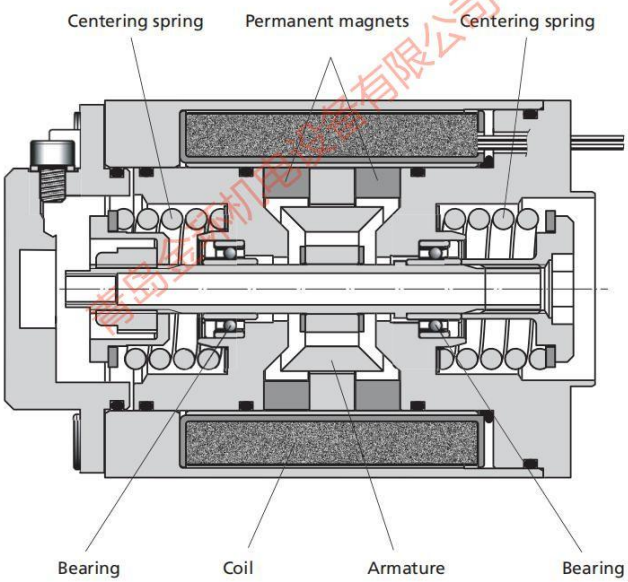


Hydraulic symbol:
Symbol shown with electric supply on and zero command signal.

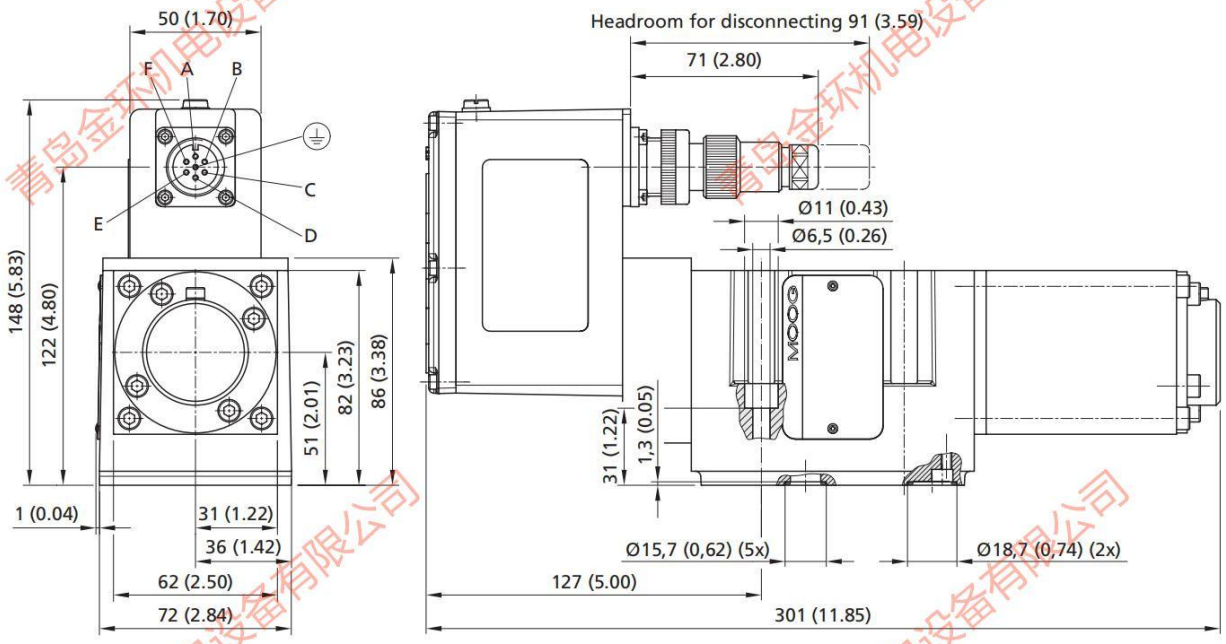


PERMANENT MAGNET LINEAR FORCE MOTOR OPERATION

The linear force motor is a permanent magnet differential motor. The permanent magnets provide part of the required magnetic force. For the linear force motor, the current needed is considerably lower than would be required for a comparable proportional solenoid.The linear force motor has a neutral mid-position from which it generates force and stroke in both directions. Force and stroke are proportional to current.
High spring stiffness and resulting centering force plus external forces (i.e. flow forces, friction forces due to contamination) must be overcome during out-stroking. During backstroking to center position, the spring force adds to the motor force and provides additional spool driving force which makes the valve much less contamination sensitive. The linear force motor needs very low current in the spring centered position.
Proportional solenoid systems require two solenoids with more cabling for the same function. Another solution uses a single solenoid, working against a spring. In case of current loss in the solenoid, the spring drives the spool to the end position by passing through a fully open position. This can lead to uncontrolled load movements.



INSTALLATION DRAWING



Mounting pattern

ISO 4401-03-03-0-94, without X port

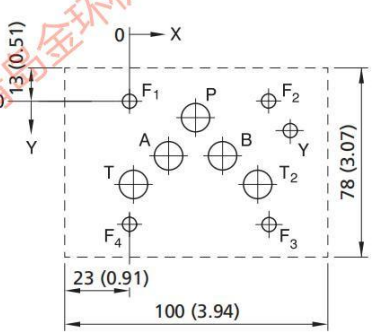
mm

	P	A	B	T	T_2	X[1]	Y	F_1	F_2	F_3	F_4
	Ø11.2	Ø11.2	Ø11.2	Ø11.2	Ø11.2		Ø 6.3	M6	M6	M6	M6
x	27	16.7	37.3	3.2	50.8		62	0	54	54	0
y	6.3	21.4	21.4	32.5	32.5		11	0	0	46	46

inch

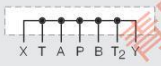
	P	A	B	T	T_2	X[1]	Y	F_1	F_2	F_3	F_4
	Ø0.44	Ø0.44	Ø0.44	Ø0.44	Ø0.44		Ø0,25	M6	M6	M6	M6
x	1.06	0.66	1.47	0.13	2.00		2.44	0	2.13	2.13	0
y	0.25	0.84	0.84	1.28	1.28		0.43	0	0	1.81	1.81

[1]) Port X must not be drilled, not sealed at valve base.



Mounting surface needs to be flat within 0.01 mm (0.0004 inch) over a distance of 100 mm (3.94 inch). Average surface finish value, Ra = 0.8 µm.

Spare parts and Accessories

O-Rings (included in delivery) for ports P,T,T2,A,B for port Y	5 pieces ID 12.4 x Ø 1.8 (ID 0.49 x Ø 0.07) 1 piece ID 15.6 x Ø 1.8 (ID 0.61 x Ø 0.07)		NBR 90 Shore 45122-004 45122-011	FPM 90 Shore 42082-004 42082-011
Mating connector, waterproof IP65 (not included in delivery) 6+PE-pole	B97007-061	EN 175201 Part 804	for cable dia	min. Ø 10 mm (0.394 in), max. Ø 12 mm (0.472 in)
Flushing plates	for P,A,B,T,T_2,X,Y B67728-001			
Flushing plates	for P,A,B,T,T_2,X,Y B67728-002			
Flushing plates	for P,A,B,T,T_2,X,Y B67728-003			
Mounting manifolds	on request			
Mounting bolts (not included in delivery) M 6 x 40 DIN EN ISO 4762-10.9	A03665-060-040	required torque 13 Nm (115 inch pounds)	required 4 pieces	

ORDERING INFORMATION

Model-Number

D 63 4 . . . . .

Type designation

. . . .

Series

4	Size 05

Specification-Status

–	Series specification
E	Preseries specification
Z	Special specification

Model designation

	assigned at the factory

Factory identification

Valve version

P	with integrated electronics ; spool in body

Rated flow

	Q_N / l/min at Δp_N = 35 bar (Q_N / gpm at Δp_N = 500 psi)	Δp_N = 5 bar per land (Δp_N = 71 psi per land)	Series
24	60 (15.9)	24 (6.3)	D634 - P
40	100 (26.3)	40 (10.6)	D634 - P
60	160 (42.3)	60 (15.9)	D634 - P

Maximum operating pressure

K	350 bar (5000 psi)

Bushing / Spool type

A	4-Way: ~ axis cut, linear characteristic
D	4-Way: 10% overlap, linear characteristic
Z	2x2-Way: P ◗ A, B ◗ T, with Y-port only
X	Special spool on request

Options may increase price and delivery.
All combinations may not be available.
Preferred configurations are highlighted.
Technical changes are reserved.

Supply voltage

2	24 V DC (19 to 32 V DC)

Signals for 100% spool stroke [1)]

	Command	Output
M	±10 V DC	+ 4 to + 20 mA
X	±10 mA, floating deadband compensation on request	+ 4 to + 20 mA

Valve connector

S	6+PE pole EN 175201 Part 804

Seal material

V	FPM (Viton)
N	NBR (Buna), others on request

Y-port

0	closed with plug p_{Tmax} = 50 bar (715 psi)
3	open, with filter insert p_T > 50 bar (715 psi)

Spool position without electric supply

M	mid position
F	P ◗ B, A ◗ T connected (10% open)
D	P ◗ A, B ◗ T connected (10% open) other openings on request

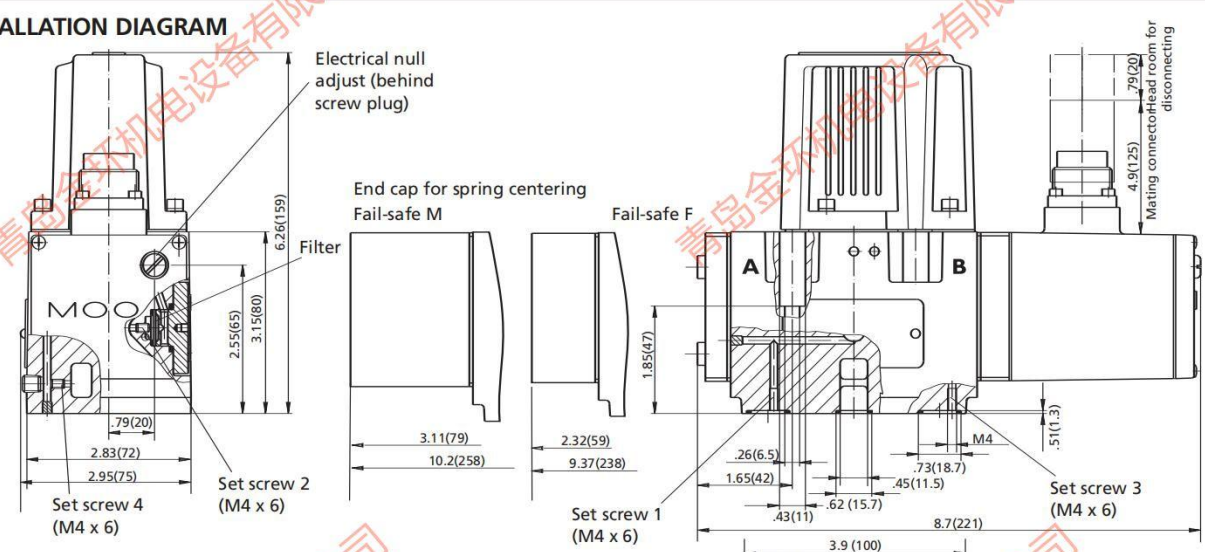
Linear motor

6	Standard

[1)] input voltage limited, see page 6

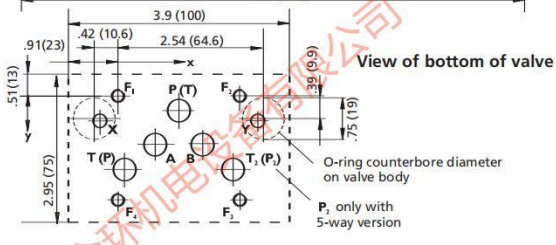
TECHNICAL DATA

INSTALLATION DIAGRAM



The mounting manifold must conform to ISO 4401-05-05-0-94.
Attention: Note O-ring counterbore diameter of X and Y ports. For valves in 4/3-way version with Q_N > 16 gpm [60 l/min] and in 2 x 2-way version the non standard 2nd return port T_2 must be used.

For maximum flow, the manifold ports P, T, A and B require to have **Ø 0.45 in [Ø 11.5 mm]** (deviation from standard). Mounting surface needs to be flat within .001 in [0.02 mm]. Average surface finish value, Ra, better than 32 µin.



	P	A	B	T	T_2	X	Y	F_1	F_2	F_3	F_4
	Ø0.45 [11.5]	**Ø0.45 [11.5]**	**Ø0.45 [11.5]**	**Ø0.45 [11.5]**	**Ø0.45 [11.5]**	Ø0.25 [6.3]	Ø0.25[6.3]	M6	M6	M6	M6
x	1.06 [27.0]	0.66 [16.7]	1.47 [37.3]	0.13 [3.2]	2.0 [50.8]	-0.31 [-8.0]	2.44 [62.0]	0	2.13 [54.0]	2.13 [54.0]	0
y	0.25 [6.3]	0.84 [21.4]	0.84 [21.4]	1.28 [32.5]	1.28 [32.5]	0.43 [11.0]	0.43 [11.0]	0	0	1.81 [46.0]	1.81 [46.0]

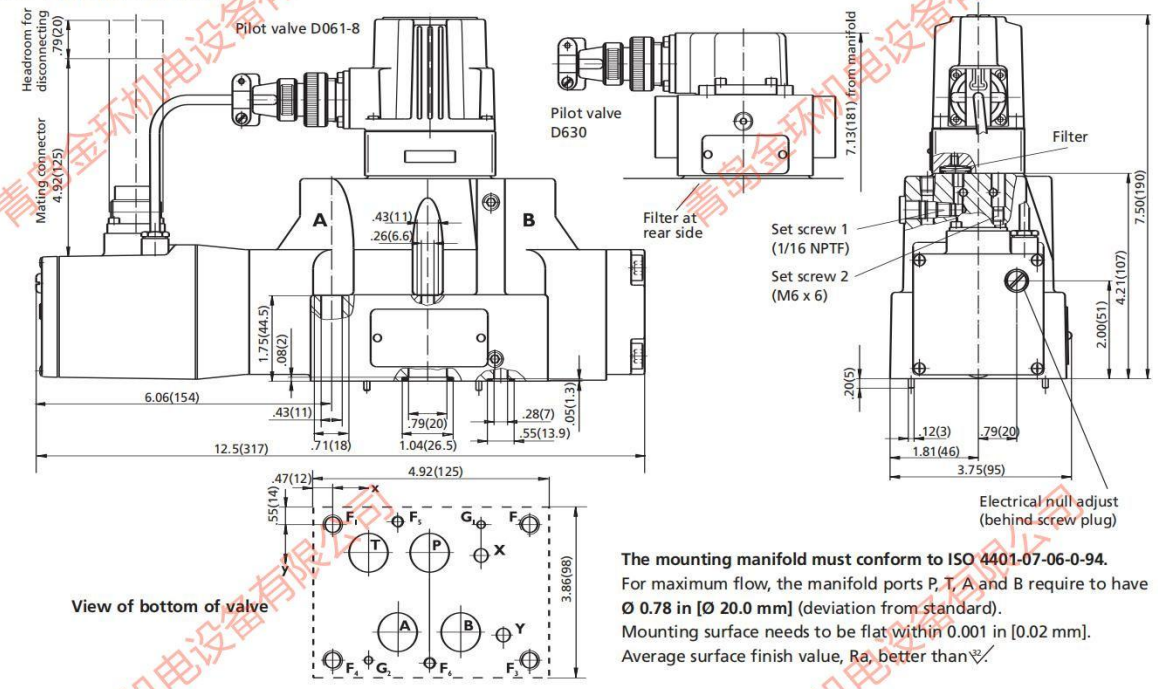
CONVERSION INSTRUCTION

For main stage operation with internal or external pilot connection.	Pilot Flow Supply	Set Screw M4 x 6 bore **1**	bore **2**	Pilot Flow Return	Set Screw M4 x 6 bore **3**	bore **4**
	Internal P	closed	open	Internal T	closed	open
	External X	open	closed	External Y	open	closed

SPARE PARTS AND ACCESSORIES

O-rings (included in delivery)			NBR 85 Shore	FPM 85 Shore
for P, T, T_2, A, B	5 pieces ID 0.49 [12.4] x Ø 0.07 [1.8]		45122-004	42082-004
for X, Y	2 pieces ID 0.61 [15.6] x Ø 0.07 [1.8]		45122-011	42082-011
Mating connector, waterproof IP65 (not included in delivery)			for cable diameter	
6+PE pole	B97007-061	EN 175201 Part 804	min. Ø 0.39 [10.0], max. Ø 0.47 [12.0]	
11+PE pole	B97067-111	EN 175201 Part 804	min. Ø 0.43 [11.0], max. Ø 0.51 [13.0]	
Flushing plates	for P, A, B, T, T_2, X, Y	for P, T, T_2, X, Y	for P, T, T_2, and X, Y	
	B67728-001	B67728-002	B67728-003	
Mounting manifolds	see special data sheet			
Mounting bolts (not included in delivery)		required torque	required	
M6 x 60 DIN EN ISO 4762-10.9	A03665-060-060	115 in-lb [13.0 Nm]	4 pieces	
Replaceable filter	A67999-200	200 µm nominal		
O-rings for filter change		HNBR 85 Shore	NBR 85 Shore	FPM 85 Shore
filter	1 piece ID 0.51 [12.0] x Ø 0.59 [2.0]	—	66117-012-020	A25163-012-020
filter cover	1 piece ID 0.67 [17.1] x Ø 0.78 [2.6]	B97009-080	—	—

INSTALLATION DIAGRAM



The mounting manifold must conform to ISO 4401-07-06-0-94.
For maximum flow, the manifold ports P, T, A and B require to have **Ø 0.78 in [Ø 20.0 mm]** (deviation from standard).
Mounting surface needs to be flat within 0.001 in [0.02 mm].
Average surface finish value, Ra, better than $\sqrt{32}$.

	P	A	T	B	X	Y	G_1	G_2	F_1	F_2	F_3	F_4	F_5	F_6
	Ø0.79 [Ø20]	**Ø0.79 [Ø20]**	**Ø0.79 [Ø20]**	**Ø0.79 [Ø20]**	Ø0.25 [6.3]	Ø0.25 [6.3]	Ø0.16 [4.0]	Ø0.16 [4.0]	M10	M10	M10	M10	M6	M6
X	1.97 [50.0]	1.34 [34.1]	0.72 [18.3]	2.59 [65.9]	3.02 [76.6]	3.47 [88.1]	3.02 [76.6]	0.72 [18.3]	0	4.0 [101.6]	4.0 [101.6]	0	1.34 [34.1]	1.97 [50.0]
y	0.56 [14.3]	2.19 [55.6]	0.56 [14.3]	2.19 [55.6]	0.63 [15.9]	2.25 [57.2]	0	2.75 [69.9]	0	0	2.75 [69.9]	2.75 [69.9]	-0.06 [-1.6]	2.81 [71.5]

CONVERSION INSTRUCTION

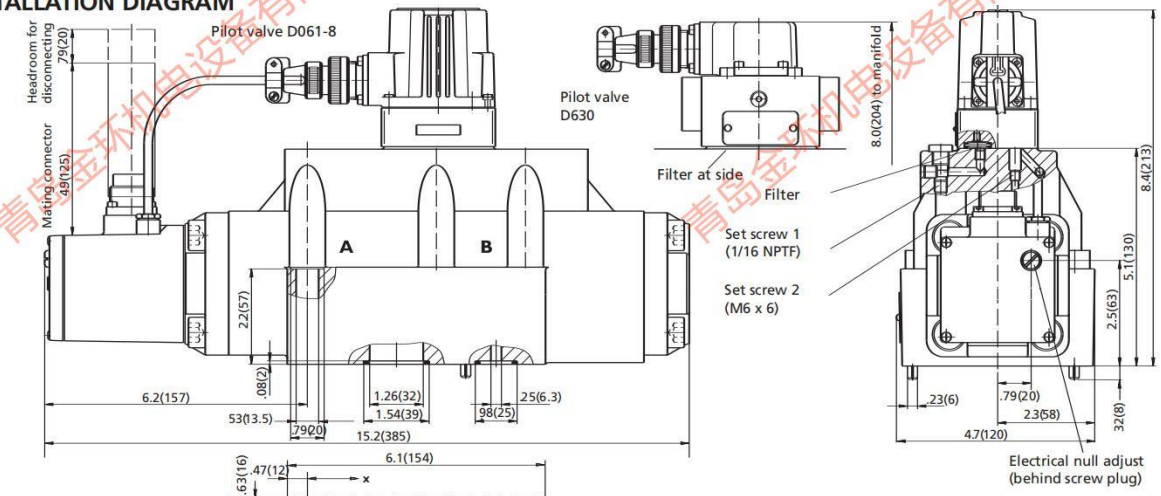
For main stage operation with internal or external pilot connection.	Pilot Flow Supply	Set Screw bore **1** (1/16 NPTF)	Pilot Flow Return	Set Screw bore **2** (M6 x 6)
	Internal P External X	open closed	Internal T External Y	open closed

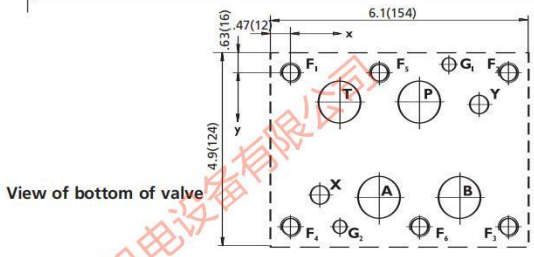
SPARE PARTS AND ACCESSORIES

O-rings (included in delivery)				NBR 85 Shore	FPM 85 Shore
for P, T, A, B		4 pieces ID 0.86 [21.9] x Ø 0.103 [2.6]		45122-129	42082-129
for X, Y		2 pieces ID 0.43 [10.8] x Ø 0.07 [1.8]		45122-022	42082-022
Mating connector, waterproof IP65 (not included in delivery)				for cable diameter	
6+PE pole		B97007-061	EN 175201 Part 804	min. Ø 0.39 [10.0], max. Ø 0.47 [12.0]	
11+PE pole		B97067-111	EN 175201 Part 804	min. Ø 0.43 [11.0], max. Ø 0.51 [13.0]	
Flushing plates		76741			
Mounting manifold		B46891-001			
Mounting bolts (not included in delivery)			required torque	required	
M10 x 60 DIN EN ISO 4762-10.9		A03665-100-060	575 in-lb [65.0 Nm]	4 pieces	
M6 x 55 DIN EN ISO 4762-10.9		A03665-060-055	115 in-lb [13.0 Nm]	2 pieces	
Replaceable filter					
for pilot valve D061-8		A67999-200	200 µm nominal		
for pilot valve D630		A67999-065	65 µm nominal		
O-rings for filter change			HNBR 85 Shore	NBR 85 Shore	FPM 85 Shore
D061-8:	before filter	1 piece ID 0.55 [14.0] x Ø 0.039 [1.0]	A67008-014-010	—	—
	behind filter	1 piece ID 0.51 [13.0] x Ø 0.059 [1.5]	A67008-013-015	—	—
D630:	before and behind	2 piece ID 0.51 [13.0] x Ø 0.059 [1.5]	—	66117-013-015	A25163-013-015

TECHNICAL DATA

INSTALLATION DIAGRAM





View of bottom of valve

The mounting manifold must conform to ISO 4401-08-07-0-94.
For maximum flow, the manifold ports P, T, A and B require to have **Ø 1.10 in [Ø 28.0 mm]** (deviation from standard).
Mounting surface needs to be flat within 0.001 in [0.02 mm].
Average surface finish value, Ra, better than 32 µin.

	P	A	T	B	X	Y	G_1	G_2	F_1	F_2	F_3	F_4	F_5	F_6
	Ø1.1 [28.0]	**Ø1.1 [28.0]**	**Ø1.1 [28.0]**	**Ø1.1 [28.0]**	Ø0.44 [11.2]	Ø0.44 [11.2]	Ø0.30 [7.5]	Ø.30 [7.5]	M12	M12	M12	M12	M12	M12
x	3.03 [77.0]	2.09 [53.2]	1.16 [29.4]	3.98 [100.8]	0.69 [17.5]	4.45 [112.7]	3.72 [94.5]	1.16 [29.4]	0	5.12 [130.2]	5.12 [130.2]	0	2.09 [53.2]	3.03 [77.0]
y	0.69 [17.5]	2.94 [74.6]	0.69 [17.5]	2.94 [74.6]	2.87 [73.0]	0.75 [19.0]	-0.19 [-4.8]	3.63 [92.1]	0	0	3.63 [92.1]	3.63 [92.1]	0	3.63 [92.1]

CONVERSION INSTRUCTION

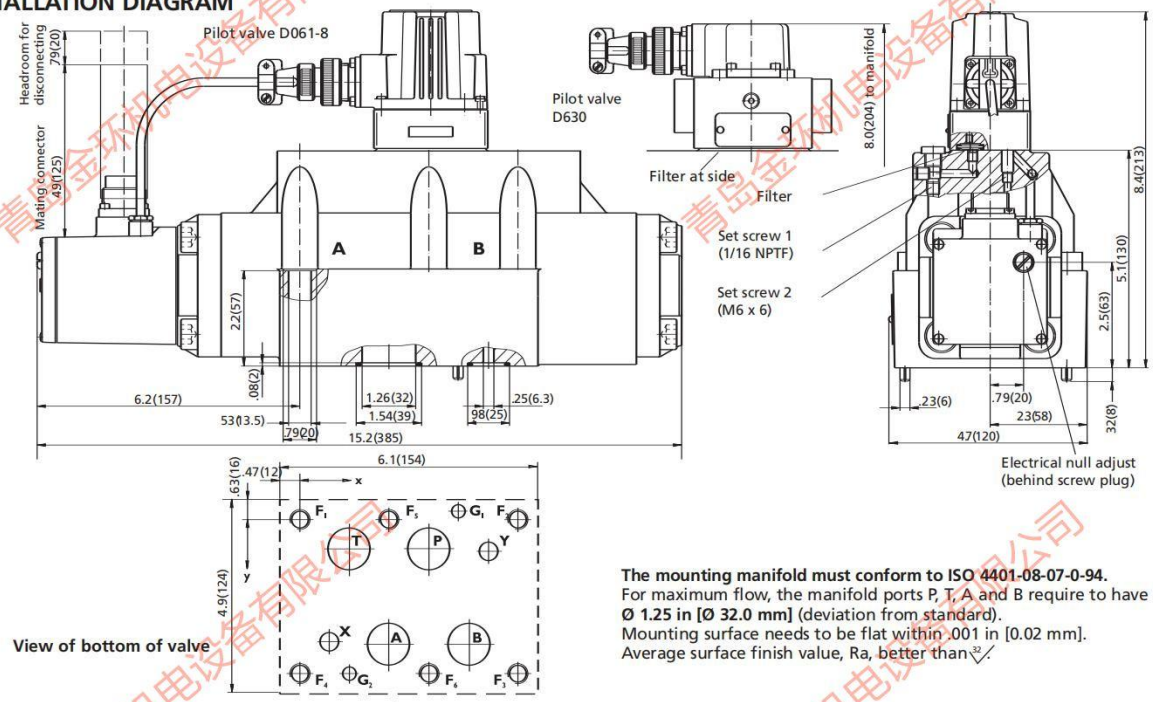
For main stage operation with internal or external pilot connection.	Pilot Flow Supply	Set Screw bore **1** (1/16 NPTF)	Pilot Flow Return	Set Screw bore **2** (M6 x 6)
	Internal P External X	open closed	Internal T External Y	open closed

SPARE PARTS AND ACCESSORIES

O-rings (included in delivery)				NBR 85 Shore	FPM 85 Shore
for P, T, A, B		4 pieces ID 1.36 [34.6] x Ø 0.10 [2.6]		45122-113	42082-113
for X, Y		2 pieces ID 0.80 [20.3] x Ø 0.10 [2.6]		45122-195	42082-195
Mating connector, waterproof IP65 (not included in delivery)				for cable diameter	
6+PE pole		B97007-061	EN 175201 Part 804	min. Ø 0.39 [10.0], max. Ø 0.47 [12.0]	
11+PE pole		B97067-111	EN 175201 Part 804	min. Ø 0.43 in, max. Ø 0.51 [13.0]	
Flushing plate		76047			
Mounting manifold		A25855-009			
Mounting bolts (not included in delivery)			required torque	required	
M12 x 75 EN ISO 4762-10.9		A03665-120-075	970 in-lb [110 Nm]	6 pieces	
Replaceable filter					
for pilot valve D061-8		A67999-200	200 µm nominal		
for pilot valve D630		A67999-065	65 µm nominal		
O-rings for filter change			HNBR 85 Shore	NBR 85 Shore	FPM 85 Shore
D061-8:	before filter	1 piece ID 0.55 [14.0] x Ø 0.04 [1.0]	A67008-014-010	—	—
	behind filter	1 piece ID 0.51 [13.0] x Ø 0.06 [1.5]	A67008-013-015	—	—
D630:	filter before and behind	2 piece ID 0.51 [13.0] x Ø 0.06 [1.5]	—	66117-013-015	A25163-013-015

TECHNICAL DATA

INSTALLATION DIAGRAM



View of bottom of valve

The mounting manifold must conform to ISO 4401-08-07-0-94.
For maximum flow, the manifold ports P, T, A and B require to have **Ø 1.25 in [Ø 32.0 mm]** (deviation from standard).
Mounting surface needs to be flat within .001 in [0.02 mm].
Average surface finish value, Ra, better than $\sqrt{32}$.

	P	A	T	B	X	Y	G_1	G_2	F_1	F_2	F_3	F_4	F_5	F_6
	Ø1.26 [32.0]	**Ø1.26 [32.0]**	**Ø1.26 [32.0]**	**Ø1.26 [32.0]**	Ø0.44 [11.2]	Ø0.44 [11.2]	Ø0.30 [7.5]	Ø0.30 [7.5]	M12	M12	M12	M12	M12	M12
x	3.03 [77.0]	2.09 [53.2]	1.16 [29.4]	3.97 [100.8]	0.69 [17.5]	4.45 [112.7]	3.72 [94.5]	1.16 [29.4]	0	5.13 [130.2]	5.13 [130.2]	0	2.09 [53.2]	3.03 [77.0]
y	0.69 [17.5]	2.94 [74.6]	0.69 [17.5]	2.94 [74.6]	2.87 [73.0]	0.75 [19.0]	-0.19 [-4.8]	3.63 [92.1]	0	0	3.63 [92.1]	3.63 [92.1]	0	3.63 [92.1]

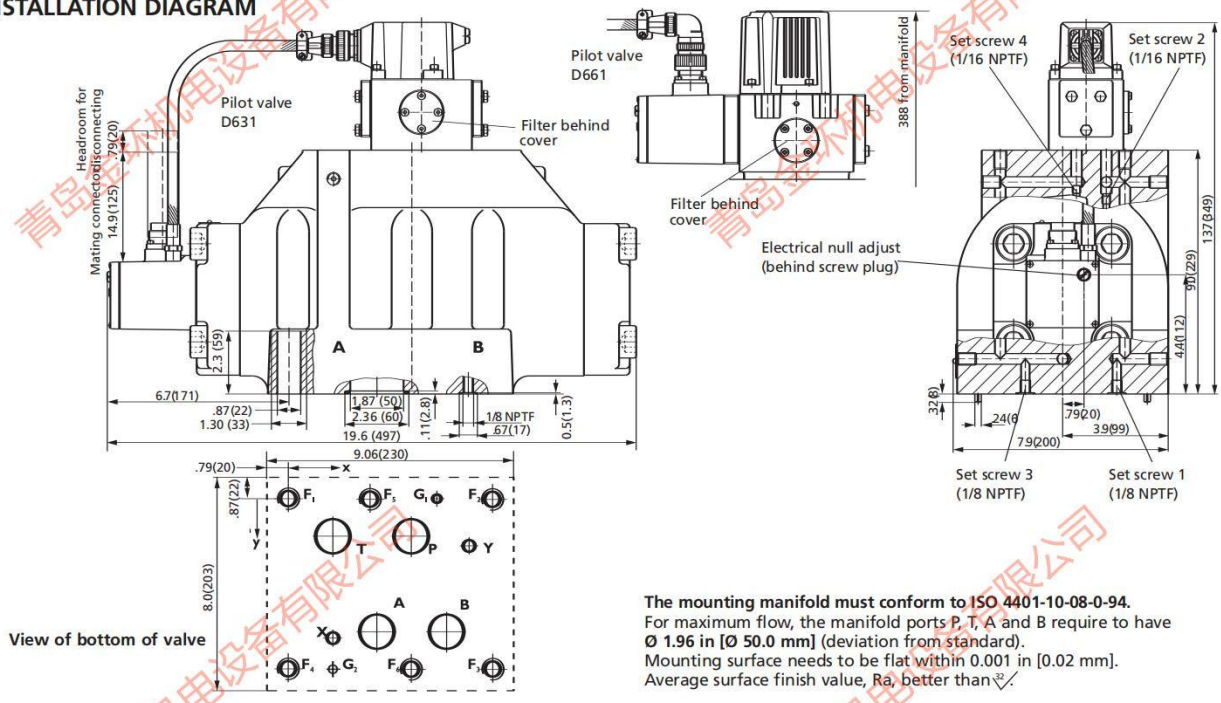
CONVERSION INSTRUCTION

For main stage operation with internal or external pilot connection.	Pilot Flow Supply	Set Screw bore **1** (1/16 NPTF)	Pilot Flow Return	Set Screw bore **2** (M6 x 6)
	Internal P External X	open closed	Internal T External Y	open closed

SPARE PARTS AND ACCESSORIES

O-rings (included in delivery)				NBR 85 Shore	FPM 85 Shore
for P, T, A, B		4 pieces ID 1.36 [34.6] x Ø 0.10 [2.6]		45122-113	42082-113
for X, Y		2 pieces ID 0.80 [20.3] x Ø 0.10 [2.6]		45122-195	42082-195
Mating connector, waterproof IP65 (not included in delivery)				for cable diameter	
6+PE pole		B97007-061	EN 175201 Part 804	min. Ø 0.39 [10.0], max. Ø 0.47 [12.0]	
11+PE pole		B97067-111	EN 175201 Part 804	min. Ø 0.43 [11.0], max. Ø 0.51 [13.0]	
Flushing plate		76047			
Mounting manifold			A25855-009		
Mounting bolts (not included in delivery)			required torque	required	
M12 x 75	DIN EN ISO 4762-10.9	A03665-120 075	970 in-lb [110 Nm]	6 pieces	
Replaceable filter					
for pilot valve D061-8		A67999-200	200 µm nominal		
for pilot valve D630		A67999-065	65 µm nominal		
O-rings for filter change			HNBR 85 Shore	NBR 85 Shore	FPM 85 Shore
D061-8:	before filter	1 piece ID 0.55 [14.0] x Ø 0.04 [1.0]	A67008-014-010	—	—
	behind filter	1 piece ID 0.51 [13.0] x Ø 0.06 [1.5]	A67008-013-015	—	—
D630:	filter before and behind	2 piece ID 0.51 [13.0] x Ø 0.06 [1.5]	—	66117-013-015	A25163-013-015

INSTALLATION DIAGRAM



The mounting manifold must conform to ISO 4401-10-08-0-94.
For maximum flow, the manifold ports P, T, A and B require to have **Ø 1.96 in [Ø 50.0 mm]** (deviation from standard).
Mounting surface needs to be flat within 0.001 in [0.02 mm].
Average surface finish value, Ra, better than $\sqrt{32}$.

	P	A	T	B	X	Y	G_1	G_2	F_1	F_2	F_3	F_4	F_5	F_6
	Ø1.97 [50.0]	**Ø1.97 [50.0]**	**Ø1.97 [50.0]**	**Ø1.97 [50.0]**	Ø0.44 [11.2]	Ø0.44 [11.2]	Ø0.30 [7.5]	Ø0.30 [7.5]	M20	M20	M20	M20	M20	M20
x	4.49 [114.3]	3.25 [82.5]	1.63 [41.3]	5.81 [147.6]	1.63 [41.3]	6.63 [168.3]	5.81 [147.6]	1.63 [41.3]	0	7.5 [190.5]	7.5 [190.5]	0	3.0 [76.2]	4.5 [114.3]
y	1.38 [35.0]	4.87 [123.8]	1.38 [35.0]	4.87 [123.8]	5.13 [130.2]	1.75 [44.5]	0	6.25 [158.8]	0	0	6.25 [158.8]	6.25 [158.8]	0	6.25 [158.8]

CONVERSION INSTRUCTION

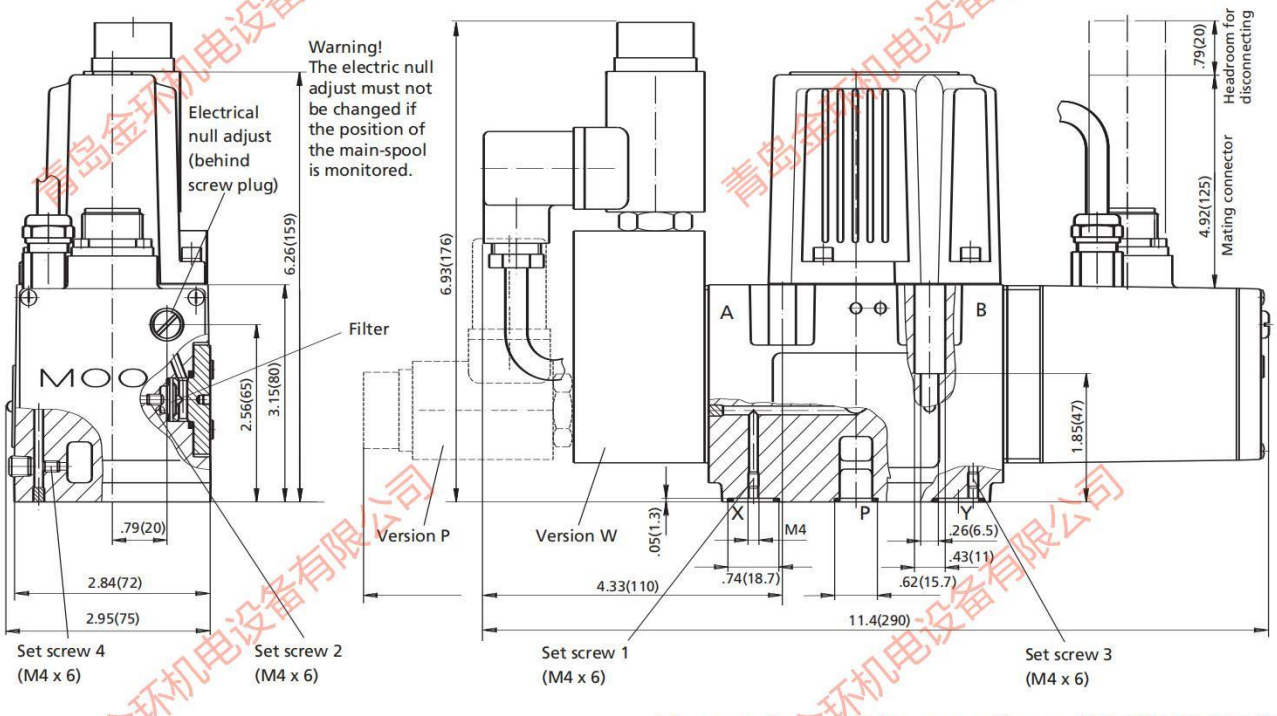
For main stage operation with internal or external pilot connection.	Pilot Flow Supply	Set Screw bore		Pilot Flow Return	Set Screw bore	
		1 (1/8 NPTF)	**2** (1/16 NPTF)		**3** (1/8 NPTF)	**4** (1/16 NPTF)
	Internal P	closed	open	Internal T	closed	open
	External X	open	closed	External Y	open	closed

SPARE PARTS AND ACCESSORIES

O-rings (included in delivery)			NBR 85 Shore	FPM 85 Shore
for P, T, A, B	4 pieces ID 2.11 [53.6] x Ø 0.14 [3.5]		45122-035	42082-035
for X, Y	2 pieces ID 0.55 [14.0] x Ø 0.07 [1.8]		45122-008	42082-008
Mating connector, waterproof IP65 (not included in delivery)			for cable diameter	
6+PE pole	B97007-061	EN 175201 Part 804	min. Ø 0.39 [10.0], max. Ø 0.47 [12.0]	
11+PE pole	B97067-111	EN 175201 Part 804	min. Ø 0.43 [11.0], max. Ø 0.51 [13.0]	
Flushing plate	not available			
Mounting manifold	A25856-001			
Mounting bolts (not included in delivery)		required torque	required	
M20 x 90 DIN EN ISO 4762-10.9	A03665-200-090	385 ft-lb [520 Nm]	6 pieces	
Replaceable filter				
for pilot valve D631	A67999-100	100 µm nominal		
and D661	A67999-200	200 µm nominal		
O-rings for filter change for pilot valves D631 and D661		HNBR 85 Shore	NBR 85 Shore	FPM 85 Shore
filter	1 piece ID 0.47 [12.0] x Ø 0.80 [2.0]	—	66117-012-020	A25163-012-020
filter cover D631	1 piece ID 0.67 [17.0] x Ø 0.80 [2.0]	—	—	A25163-017-020
filter cover D661	1 piece ID 0.67 [17.1] x Ø 0.10 [2.6]	B97009-080	—	—

TECHNICAL DATA FAIL-SAFE VERSION

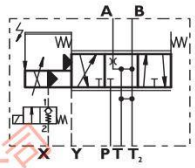
INSTALLATION DIAGRAM



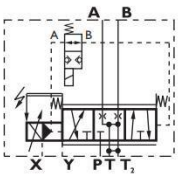
The mounting manifold must conform to ISO 4401-05-05-0-94 (see page 11).

Version with mechanical spring centering **(fail-safe version M)** see page 10 (symbol) and page 11 (installation drawing)

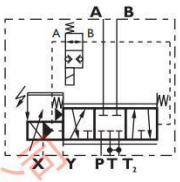
Fail-safe version P
Centered position, underlapped



Fail-safe version W
Centered position, underlapped



Fail-safe version W
Centered position, overlapped



CONVERSION INSTRUCTION

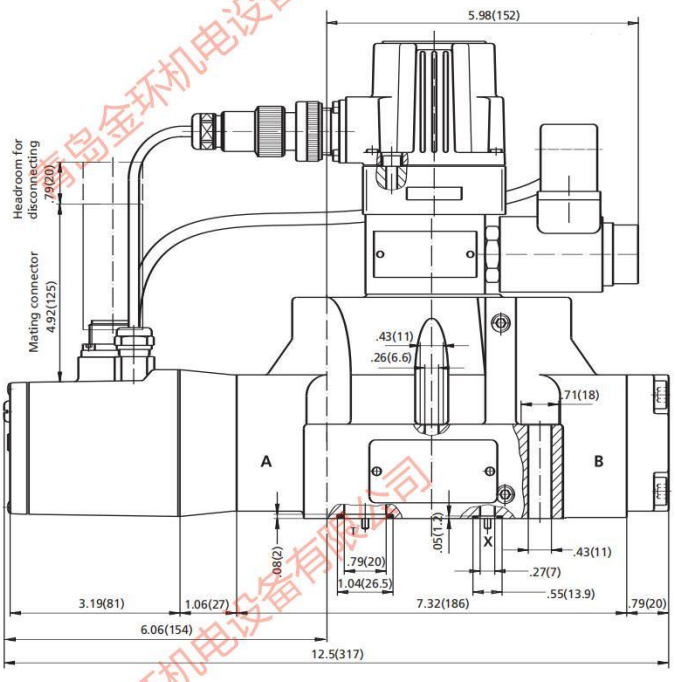
For main stage operation with internal or external pilot connection.	Pilot Flow Supply	Set Screw M4 x 6 bore **1**	bore **2**	Pilot Flow Return	Set Screw M4 x 6 bore **3**	bore **4**
	Internal P External X	closed open	open closed	Internal T External Y	closed open	open closed

SPARE PARTS AND ACCESSORIES

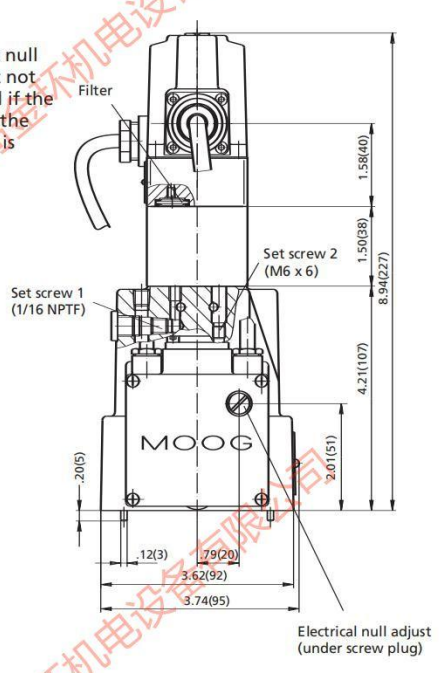
Spare parts and accessories: Page 11

TECHNICAL DATA FAIL-SAFE VERSION

INSTALLATION DIAGRAM



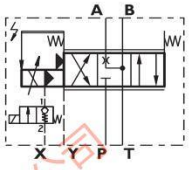
Warning!
The electric null adjust must not be changed if the position of the main-spool is monitored.



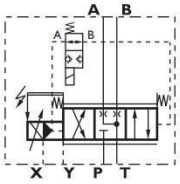
The mounting manifold must conform to ISO 4401-07-06-0-94 (see page 13).

Version with mechanical spring centering (spool position "M") see page 12 (symbol) and page 13 (installation drawing)

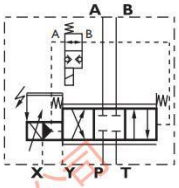
Fail-safe version P
Centered position, underlapped



Fail-safe version W
Centered position, underlapped



Fail-safe version W
Centered position, overlapped



CONVERSION INSTRUCTION

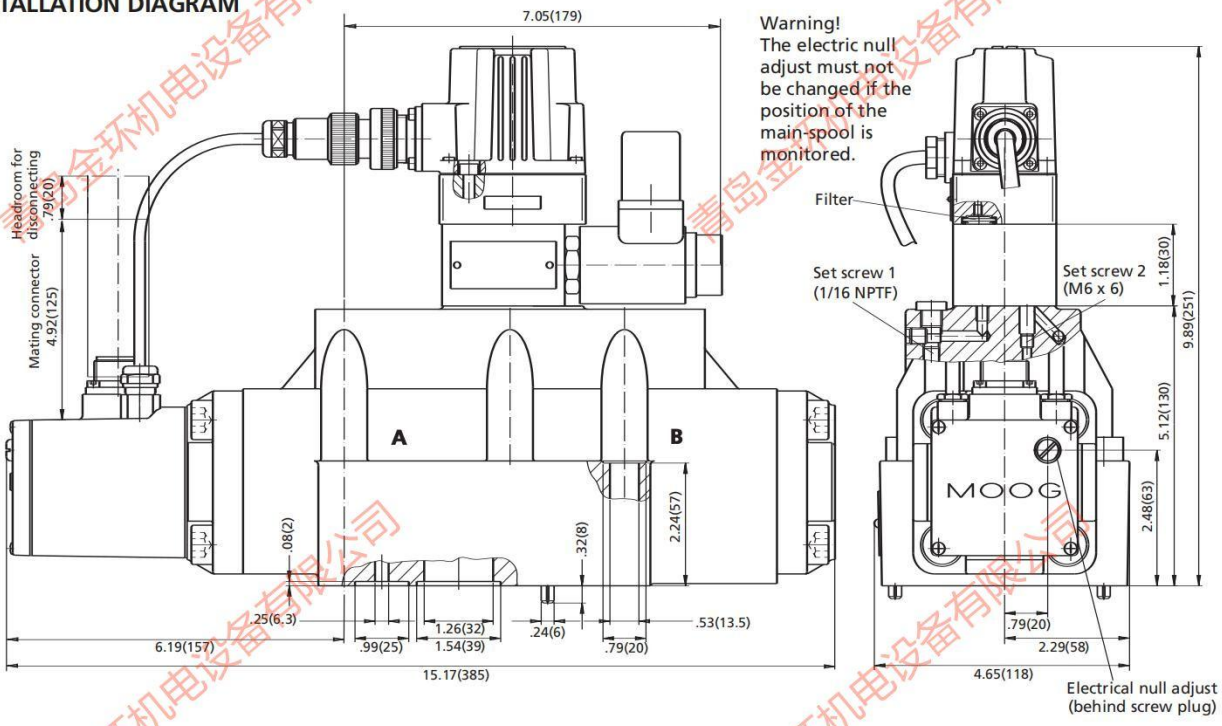
For main stage operation with internal or external pilot connection.	Pilot Flow Supply	Set Screw bore **1** (1/16 NPTF)	Pilot Flow Return	Set Screw bore **2** (M6 x 6)
	Internal P External X	open closed	Internal T External Y	open closed

SPARE PARTS AND ACCESSORIES

Spare parts and accessories: Page 11

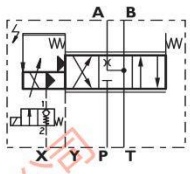
TECHNICAL DATA FAIL-SAFE VERSION

INSTALLATION DIAGRAM

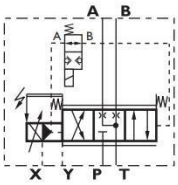


The mounting manifold must conform to ISO 4401-08-07-0-94 (see page 15).

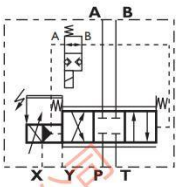
Version with mechanical spring centering **(fail-safe version M)** see page 14 (symbol) and page 15 (installation drawing)



Fail-safe version W
Centered position, underlapped



Fail-safe version W
Centered position, overlapped



CONVERSION INSTRUCTION

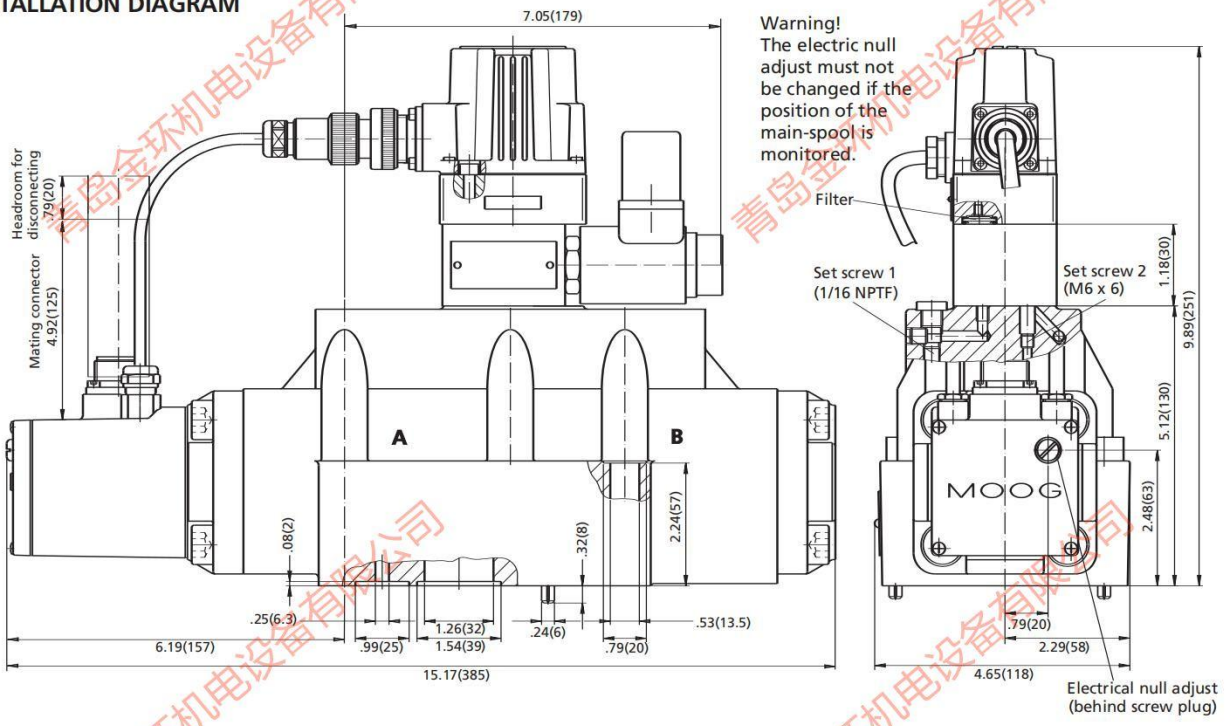
For main stage operation with internal or external pilot connection.	Pilot Flow Supply	Set Screw bore **1** (1/16 NPTF)	Pilot Flow Return	Set Screw bore **2** (M6 x 6)
	Internal P External X	open closed	Internal T External Y	open closed

SPARE PARTS AND ACCESSORIES

Spare parts and accessories: Page 15

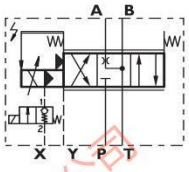
TECHNICAL DATA FAIL-SAFE VERSION

INSTALLATION DIAGRAM

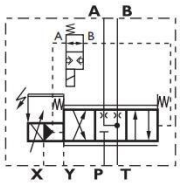


The mounting manifold must conform to ISO 4401-08-07-0-94 (see page 17).

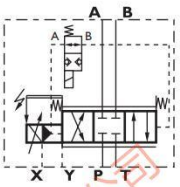
Version with mechanical spring centering (**fail-safe version M**) see page 16 (symbol) and page 17 (installation drawing)



Fail-safe version W
Centered position, underlapped



Fail-safe version W
Centered position, overlapped



CONVERSION INSTRUCTION

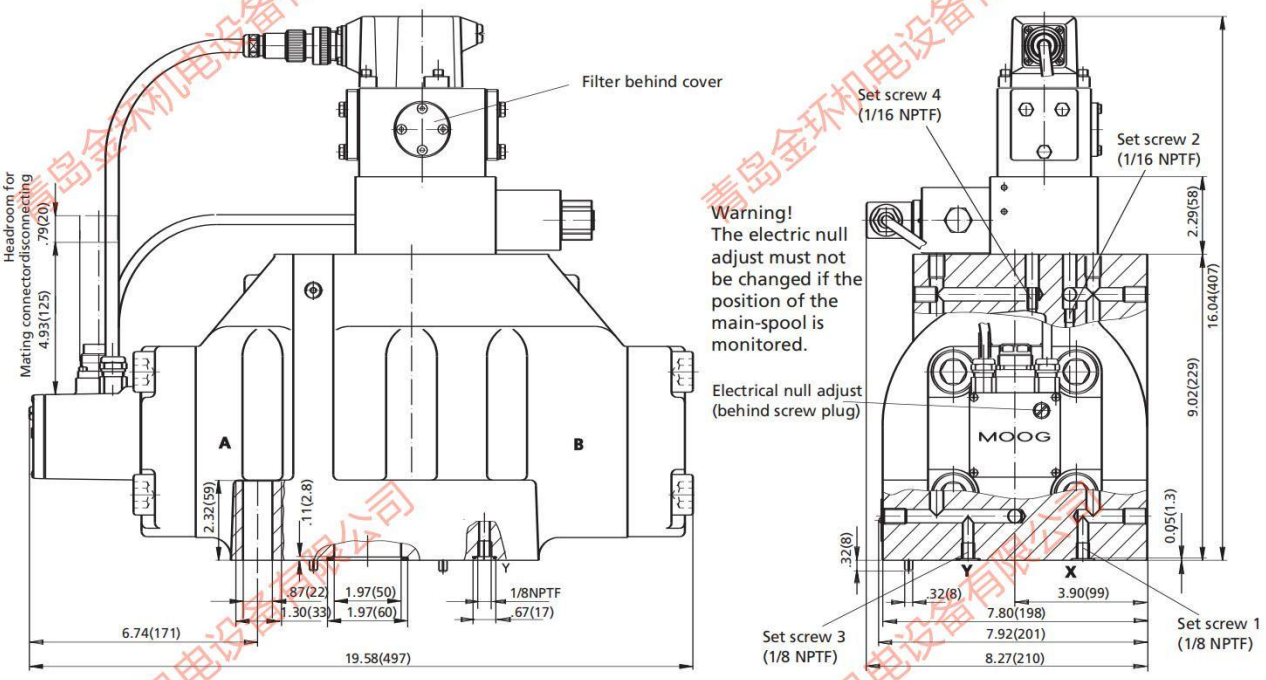
For main stage operation with internal or external pilot connection.	Pilot Flow Supply	Set Screw bore **1** (1/16 NPTF)	Pilot Flow Return	Set Screw bore **2** (M6 x 6)
	Internal P External X	open closed	Internal T External Y	open closed

SPARE PARTS AND ACCESSORIES

Spare parts and accessories: Page 17

TECHNICAL DATA FAIL-SAFE VERSION

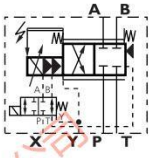
INSTALLATION DIAGRAM



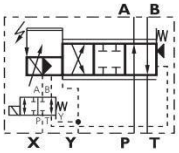
The mounting manifold must conform to ISO 4401-08-07-0-94 (see page 19).

Version with mechanical spring centering (**fail-safe version M**) see page 18 (symbol) and page 19 (installation drawing)

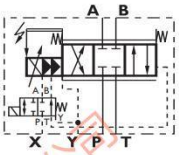
Fail-safe version W
Centered position, overlapped



Fail-safe version S
End position P ◗ A, critical lap



Fail-safe version W
Centered position, overlapped



CONVERSION INSTRUCTION

For main stage operation with internal or external pilot connection.	Pilot Flow Supply	Set Screw bore 1 (1/8 NPTF)	Set Screw bore 2 (1/16 NPTF)	Pilot Flow Return	Set Screw bore 3 (1/8 NPTF)	Set Screw bore 4 (1/16 NPTF)
	Internal P	closed	open	Internal T	closed	open
	External X	open	closed	External Y	open	closed

SPARE PARTS AND ACCESSORIES

Spare parts and accessories: Page 19

ORDERING INFORMATION

ORDERING INFORMATION FOR STANDARD MODELS

Model	Type Designation	Rated Flow gpm [l/min] @ 75 psi [5 bar] per land		Description
D661-2745E	P60HAAM4NSF2	16	60	Spool type: 4-way, critical lap, linear; ServoJet® pilot
D661-4737	P60HDAM4NSF2-O	16	60	Spool type: 4-way, 10% overlap, linear; ServoJet® pilot
D661-2722E	P80HAAM4NSF2	21	80	Spool type: 4-way, critical lap, linear; ServoJet® pilot
D661-4732	P80HDAM4NSF2-O	21	80	Spool type: 4-way, 10% overlap, linear; ServoJet® pilot
D662-2714E	D01HABM6NSF2	40	150	Spool type: 4-way, critical lap, linear; High-flow ServoJet® pilot
D662-4724	D01HDBM6NSF2-O	40	150	Spool type: 4-way, 10% overlap, linear; High-flow ServoJet® pilot
D662-2718E	D02HABM6NSF2	66	250	Spool type: 4-way, critical lap, linear; High-flow ServoJet® pilot
D662-2722E	D02HDBM6NSF2	66	250	Spool type: 4-way, 10% overlap, linear; High-flow ServoJet® pilot
D663-2709E	L03HABM6NSF2	92	350	Spool type: 4-way, critical lap, linear; High-flow ServoJet® pilot
D663-4705	L03HDBM6NSF2-O	92	350	Spool type: 4-way, 10% overlap, linear; High-flow ServoJet® pilot
D664-2708E	L05HABM6NSF2	145	550	Spool type: 4-way, critical lap, linear; High-flow ServoJet® pilot
D664-4714	L05HDBM6NSF2-O	145	550	Spool type: 4-way, 10% overlap, linear; High-flow ServoJet® pilot
D665E2301	K15FAHO6NSF2	400	1500	Spool type: 4-way, critical lap, linear; 2-stage MFB pilot
D665-4602	K15FDHO6NSF2-O	400	1500	Spool type: 4-way, 10% overlap, linear; 2-stage MFB pilot

Notes: All standard models use 24 V supply voltage and ±10 V command signal. Spool position output is 2.5 V to 13.5 V.

ORDERING INFORMATION

Model Number

D661 to D665 . . . . . .

Type Designation

. . . . . 2 - .

Specification Status	
–	Series specification
E	Preseries specification
K	Explosion proof version upon request
Z	Special specification

Model Designation	
	Assigned at the factory

Factory Identification

Valve Version		Series
P	Standard spool	D661 to D665
B	Standard spool	D661 (5-way)
D	Stub shaft spool Ø .63 in. [16mm]	D662
L	Stub shaft spool Ø .75 in. [19mm]	D663 and D664
K	Stub shaft spool Ø 1.38 in. [35mm]	D665

Rated Flow			
	Q_N[gpm] at Δp_N = 75 psi/land	Q_N[l/min] at Δp_N = 5 bar/land	Series
30	8	30	D661
60	16	60	D661
80	21	80	D661
01	40	150	D662
02	66	250	D662
03	92	350	D663
05	145	550	D664
10	265	1000	D665
15	400	1500	D665

Maximum Operating Pressure p_P*		Pilot Valve
F	3,000 psi. At $p_x \leq$ 3,000 psi (external) operating pressure in port P, A, B and T up to 5,000 psi possible.	H
H	4,000 psi. At $p_x \leq$ 4,000 psi (external) operating pressure in port P, A, B and T up to 5,000 psi possible.	A/B/J/M
K	5,000 psi (not with pilot valves D630 and D631)	A/B/J
X	Special version	

*3000 psi = 210 bar, 4000 psi = 280 bar, 5000 psi = 350 bar

Main Spool Type	
A	4-way: ~ critical lap, linear characteristic
D	4-way: 10% overlap, linear characteristic
P	4-way: P ◗ A, A ◗ T: ~ critical lap, curvilinear characteristic P ◗ B: 60% overlap, curvilinear characteristic B ◗ T: 50% underlap, linear characteristic
U	5-way: P ◗ A, P_2 ◗ B, A ◗ T: ~ critical lap, curvilinear characteristic
Y	4-way: ~ critical lap, curvilinear characteristic
Z	2x2-way: A ◗ T, B ◗ T_2: ~ critical lap, linear characteristic
X	Special spool on request

Pilot Stage or Pilot Valve			For Valve Type		
A	ServoJet®	Standard	D661…P		
B	ServoJet®	High flow	D661…P	D662…D	D663/4…L
M	D630	2-stage, MFB	D662/D663/D664…P		
H	D631	2-stage, MFB	D665…P		
J	D661 ServoJet®	2-stage, EFB	D665…K		

Preferred configurations are highlighted. Options may increase price.
Technical changes are reserved.
All combinations may not be available.
Please contact Moog.

Function Code		Connector
O	No enable input. Pin C not used	S
A	Without enable signal applied the spool moves to adjustable centered position (see page 5).	S
B	Without enable signal applied the spool moves into defined end position A ◗ T or B ◗ T (see page 5).	S
E	Without enable signal applied the spool moves to adjustable centered position. Position error monitored (see page 6)	E
F	Without enable signal applied the spool moves into defined end position A ◗ T or B ◗ T Position error monitored (see page 6)	E
G	Without enable signal applied the spool moves to adjustable centered position. Spool position monitored (see page 7)	E
H	Without enable signal applied the spool moves into defined end position A ◗ T or B ◗ T Spool position monitored (see page 7)	E

Supply Voltage	
2	24 V_{DC} (18 to 32 V_{DC})
0	special version ±15 V on request

Signals for 100% Spool Stroke			
	Command	Output	Connector
A	±10 V	±10 V (diff.)	E
D	±10 V	2 to 10 V (6 V centered position)	E/S
F	±10 V	2.5 to 13.5 V	S
M	±10 V	4 to 20 mA	E/S
T	±10 V	±10 V with dead band compens. (diff.)	E
X	±10 mA	4 to 20 mA	E/S
Y	others on request		

Valve Connector			For Supply Voltage	
E	11+PE-pole	EN 175201 Part 804	0	2
S	6+PE-pole	EN 175201 Part 804	—	2

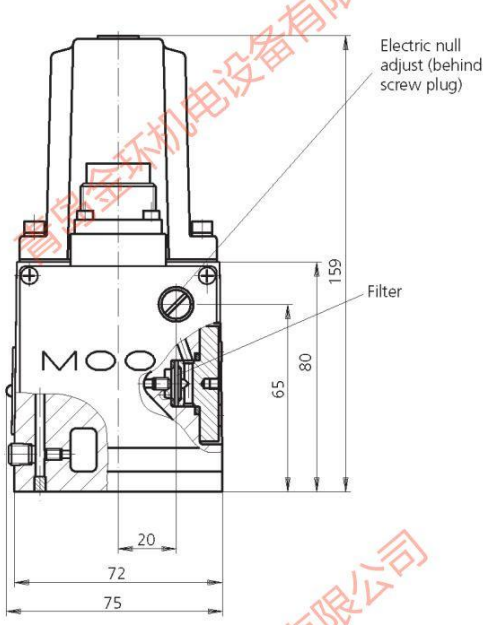
Seal Material	
N	NBR (Buna) Standard
V	FPM (Viton) optional
	Other materials on request

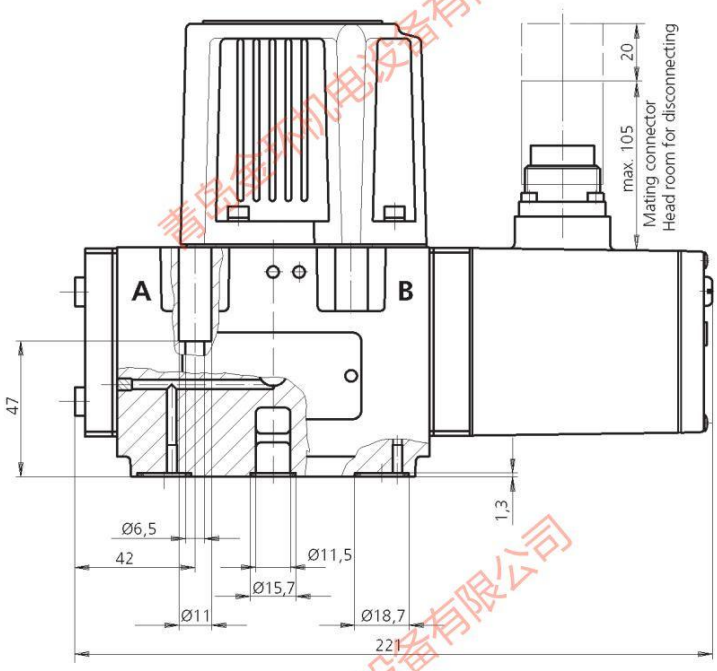
Pilot Connections and Pilot Pressure			
	Supply X	Return Y	
4	internal	internal	Parameters of the control electronics are adapted to the pilot pressure. See operating pressure on the nameplate and in this ordering information.
5	external	internal	
6	external	external	
7	internal	external	

Spool Position of Main Stage with/without Electrical or Hydraulic Supply*						
O	Undefined (no fail-safe function)					for all valve types
	Mechanical fail-safe version					
	Position	p_P[psi]	or p_x external [psi]			for valves with pilot valve
F	P ◗ B, A ◗ T		≥ 360			A and B
			< 15			A and B
D	P ◗ A, B ◗ T		≥ 360			A and B
			< 15			A and B
M	Mid position defined	≥ 15	< 15			A and B
	Mid position undefined	≥ 15	≥ 360			A and B
	Mid position defined	≥ 15	≥ 215			H, J and M (2x2-way only)
	Electrically controlled fail-safe version					
	Position	p_P[psi]	p_x ext	SV*	VE**	for valves with pilot valve
W	Mid position defined	≥ 15	≥ 215	off	on	all types
	Mid position undefined	≥ 15	< 15	on	on	only A and B
	Mid position defined	≥ 15	≥ 215	on	off	all types
S	P ◗ A, B ◗ T	≥ 15	≥ 215	off	on	all types
	P ◗ A, B ◗ T	≥ 15	≥ 215	on	off	all types
P	defined A ◗ T	≥ 15	≥ 215	off	on	only A and B (D661 only with p_x ext)
	P ◗ B, A ◗ T	< 15	< 15	on	off	only A and B

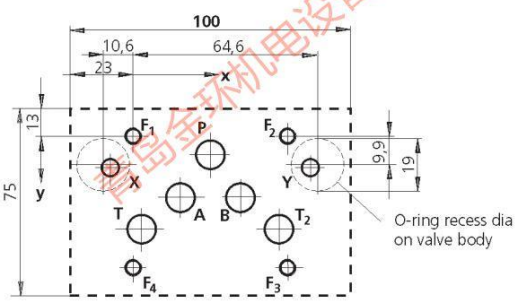
*SV: Solenoid Valve
**VE: Valve Electronics

*15 psi = 1 bar, 215 psi = 15 bar, 360 psi = 25 bar





The mounting manifold must conform to ISO 4401-05-05-0-94.
Attention:
Mounting length min. 100 mm.
Notice O-ring recess dia of X and Y ports.
For valves in 4-way version with $Q_N > 160$ l/min the non standard 2nd return port T_2 must be used.
For maximum flow the manifold ports P, T, A and B require to have **11,5 mm dia** (deviation from standard).
Mounting surface needs to be flat within 0,01 mm over a distance of 100 mm. Average surface finish value, Ra, better than 0,8 µm.



	P	A	B	T	T_2	X	Y	F_1	F_2	F_3	F_4
	Ø11,5	**Ø11,5**	**Ø11,5**	**Ø11,5**	**Ø11,5**	Ø6,3	Ø6,3	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

Spare parts and Accessories

O-rings (included in delivery)			NBR 85 Shore	FPM 85 Shore
for P, T, T_2, A, B	5 pieces ID 12,4 x Ø 1,8		45122 004	42082 004
for X, Y	2 pieces ID 15,6 x Ø 1,8		45122 011	42082 011
Mating connector, waterproof IP65	(not included in delivery)		for cable dia	
6+PE pole	B97007 061	EN 175201-804	min. 10 mm, max. 12 mm	
Flushing plates	for P, A, B, T, T_2, X, Y	for P, T, T_2 X, Y	for P, T, T_2, and X, Y	
	B67728 001	B67728 002	B67728 003	
Mounting manifolds	see special data sheet			
Mounting bolts (not included in delivery)		required torque	required	
M 6 x 60 DIN EN ISO 4762-10.9	A03665 060 060	13 Nm	4 pieces	
Replaceable filter	A67999 200	200 µm nominal		
O-rings for filter change		HNBR 85 Shore	NBR 85 Shore	FPM 85 Shore
filter	1 piece ID 12 x Ø 2,0	—	66117 012 020	A25163 012 020
filter cover	1 piece ID 17,1 x Ø 2,6	B97009 080	—	—

D661 Highresponse Series
Ordering information

MOOG

Model-Number Type designation

D661 . . . . . **G** . . . . **C** . . . **S** . **2** **H** .

Specification status

–	Series specification
K	Explosion proof version on request
Z	Special specification

Model designation

	assigned at the factory

Factory identification

Valve version

G	Standard spool

Rated flow

	Q_N [l/min] at Δp_N 70 bar	10 bar	stroke [mm]
08	20	8	±1,3
15	40	15	±2,0
30	80	30	±2,0
35	90	35	±1,3
45	120	45	±3,0
60	160	60	±3,0
75	200	75	±3,0

Maximum operating pressure

B	70 bar
H	280 bar. At $p_X \leq 280$ bar (X and Y external) operating pressure in ports P, A, B and T up to 350 bar allowed.
K	350 bar

Bushing / spool type

O	4- way: critical lap, linear characteristic
S	4- way: critical lap, curvilinear characteristic, > Q_N = 80 l/min
X	Special bushing on request

Pilot stage version

C	ServoJet-Highresponse

Function code

O	No enable input. Pin C not used
A	Without enable signal applied the spool moves to adjustable centred position
B	Without enable signal applied the spool moves to defined position A ◗ T or B ◗ T

Valve dynamics

H	High performance

Electric supply

2	24 V DC (18 to 32 VDC)

Signals for 100% spool stroke

	Command	Output
D	± 10 V	2 to 10 V
M	± 10 V	4 to 20 mA
X	± 10 mA	4 to 20 mA

Valve connector

S	6 + PE - pole EN 175201-804 Type R or S

Seal material

N	NBR Standard
V	FPM (Viton) option

Pilot connections

	Supply	Return
4	internal	internal
5	external	internal
6	external	external
7	internal	external

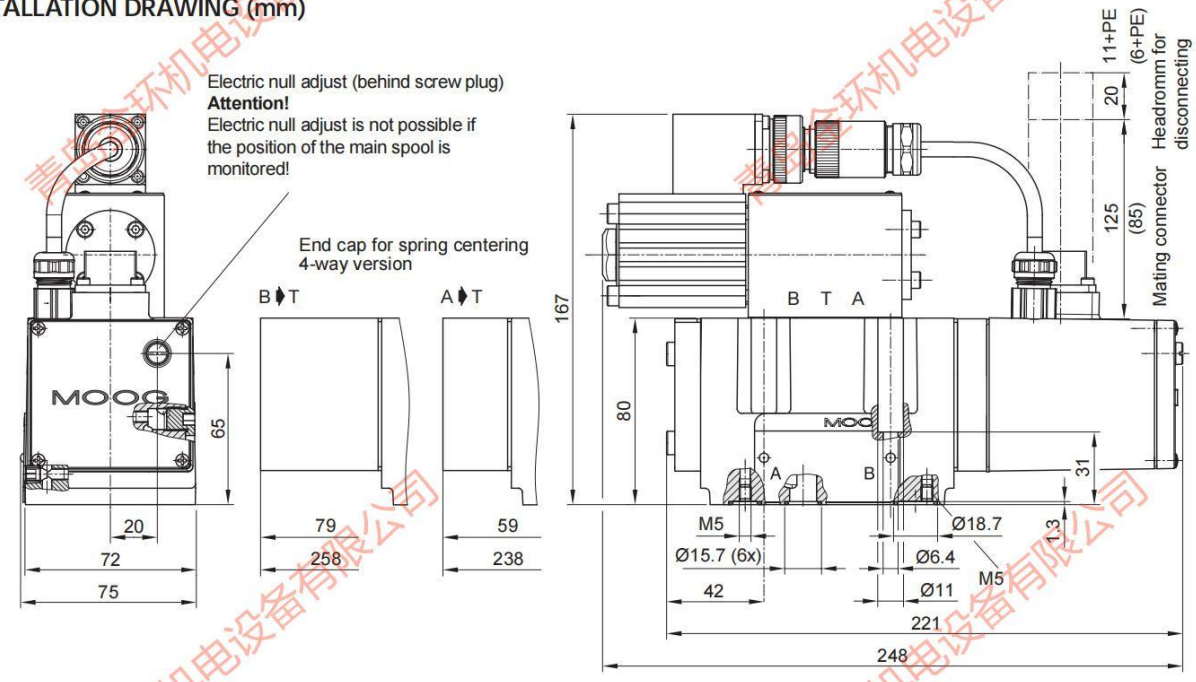
Spool position without electric supply

O	undefined (no fail safe function)	
	Mechanical fail safe versions	achieved at
A	P ◗ B, A ◗ T connected	p_X > 25 bar
B	P ◗ A, B ◗ T connected	p_X > 25 bar

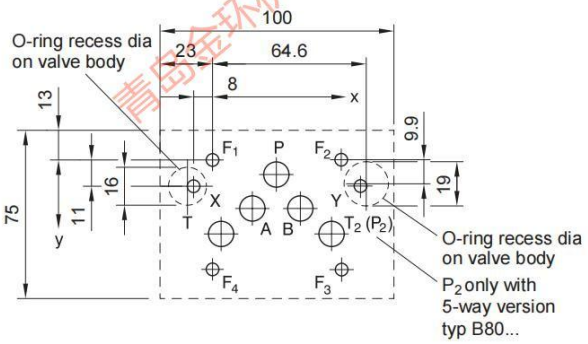
Options may increase price.
All combinations may not be available.

Preferred configuratione are highlighted.
Technical changes are reserved.

INSTALLATION DRAWING (mm)



The mounting manifold must conform to ISO 4401-05-05-0-94.
Attention: Notice O-ring recess dia of X and Y ports.
For valves in 4-way version with Q_N > 60 l/min and in 2x2-way version, the non standard 2nd return port T_2 must be used.
With 5-way version type B80..., replace T_2 to P_2. For maximum flow, the manifold ports P, T, A and B are required to have 11.5 mm dia (deviation from standard).
Mounting surface needs to be flat within 0.01 mm over a distance of 100 mm. Average surface finish value, Ra, better than 0.8 µm.



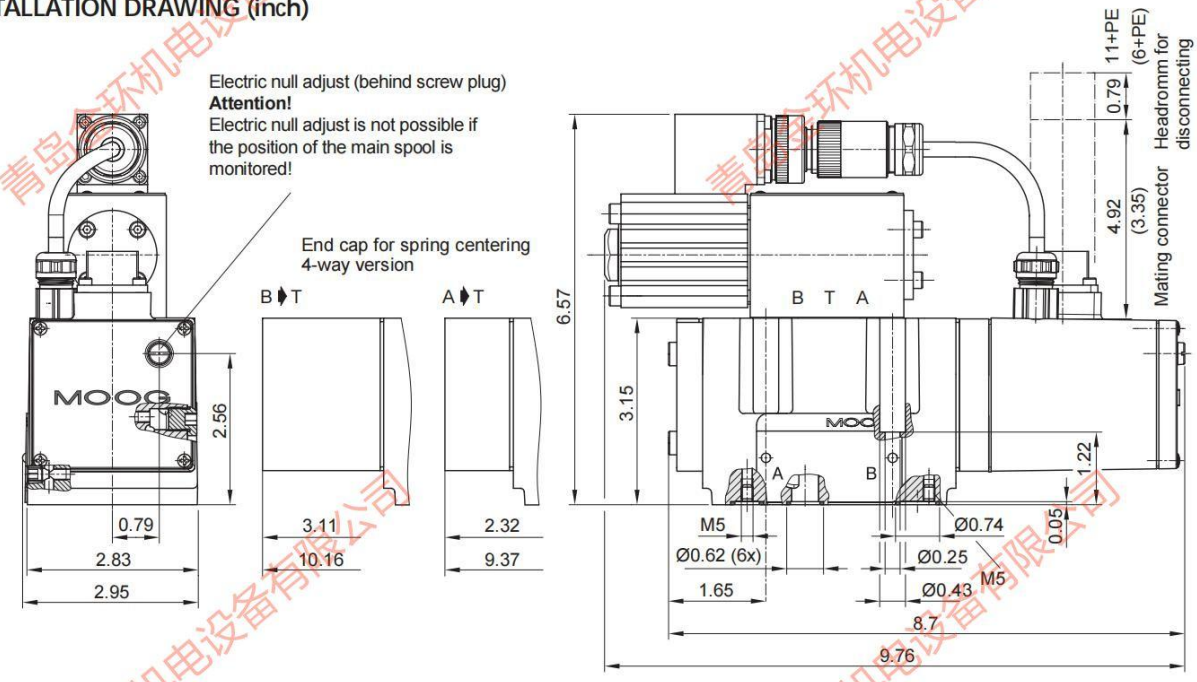
mm

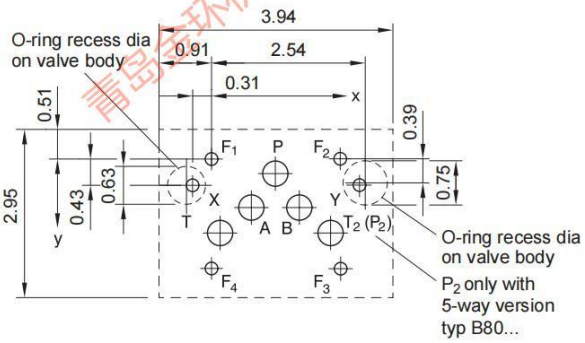
	P	A	B	T	T_2	X	Y	F_1	F_2	F_3	F_4
	Ø11.5	Ø11.5	Ø11.5	Ø11.5	Ø11.5	Ø6.3	Ø6.3	M6	M6	M6	M6
x	27	16.7	37.3	3.2	50.8	8	62	0	54	54	0
y	6.3	21.4	21.4	32.5	32.5	11	11	0	0	46	46

Spare Parts and Accessories

O-rings (included in delivery)			NBR 85 Shore	FPM 85 Shore
for P, T, T2, A, B, X	6 pieces ID 12.4 x Ø 1.8		-45122-004	-42082-004
for Y	1 piece ID 15.6 x Ø 1.8		-45122-011	-42082-011
Mating connector, waterproof IP65	(not included in delivery)		for cable dia	
6+PE-pole	B97007-061	EN 175201 Part 804	min. Ø 10 mm, max. Ø 12 mm	
11+PE-pole	B97067-111	EN 175201 Part 804	min. Ø 11 mm, max. Ø 13 mm	
Flushing plates	for P, A, B,T, T2, X, Y	for P, T, T2, X, Y	for P, T, T2, and X, Y	
	B67728-001	B67728-002	B67728-003	
Mounting manifolds	see special data sheet			
Mounting bolts (not included in delivery)		required torque	required	
M 6 x 40 DIN EN ISO 4762 -10.9	A03665-060-040	11 Nm	4 pieces	
Service Seal Kit	B97215		N681-10	V681-10

INSTALLATION DRAWING (inch)





The mounting manifold must conform to ISO 4401-05-05-0-94.
Attention: Notice O-ring recess dia of X and Y ports.
For valves in 4-way version with Q_N > 15.9 gpm and in 2x2-way version, the non standard 2nd return port T_2 must be used.
With 5-way version type B80..., replace T_2 to P_2. For maximum flow, the manifold ports P, T, A and B are required to have 0.45 inch dia (deviation from standard).
Mounting surface needs to be flat within 0.0004 inch over a distance of 3.94 inch. Average surface finish value, Ra, better than 32 micro inch.

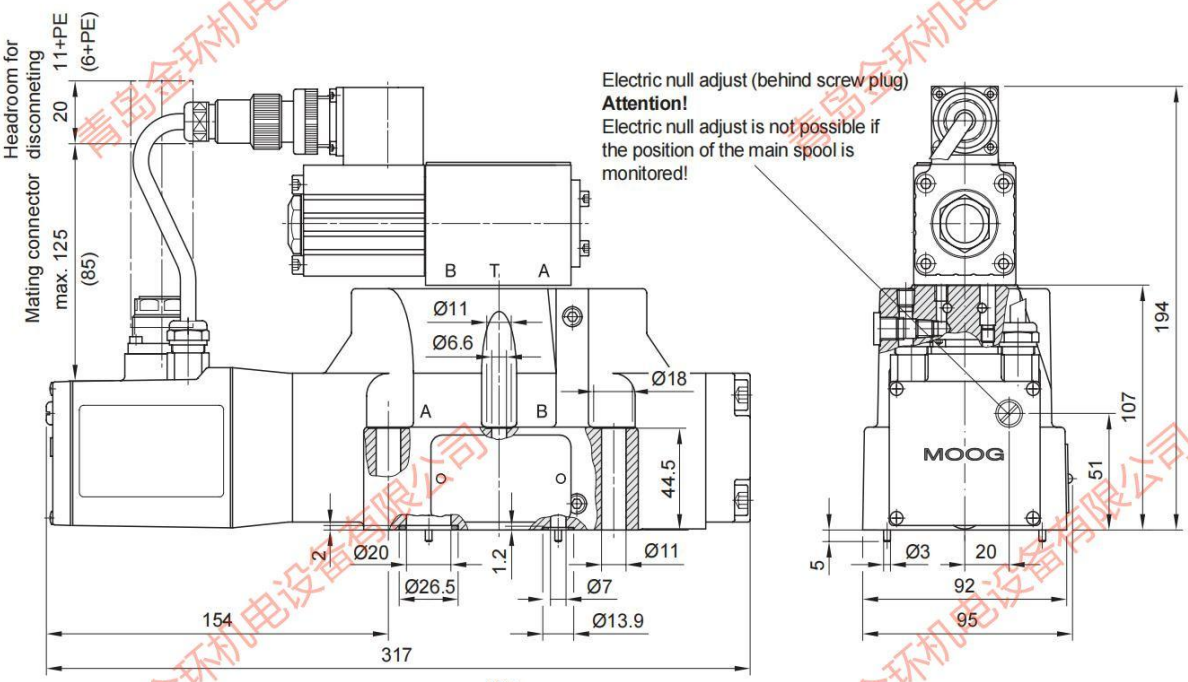
inch

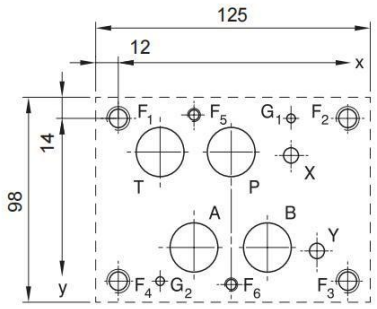
	P	A	B	T	T_2	X	Y	F_1	F_2	F_3	F_4
	Ø0.45	Ø0.45	Ø0.45	Ø0.45	Ø0.45	Ø0.25	Ø0.25	M6	M6	M6	M6
x	1.06	0.66	1.47	0.13	2.0	-0.31	2.44	0	2.13	2.13	0
y	0.25	0.84	0.84	1.28	1.28	0.43	0.43	0	0	1.81	1.81

Spare Parts and Accessories

O-rings (included in delivery)			NBR 85 Shore	FPM 85 Shore
for P, T, T2, A, B, X	6 pieces ID 0.492 x Ø 0.07		-45122-004	-42082-004
for Y	1 piece ID 0.614 x Ø 0.07		-45122-011	-42082-011
Mating connector, waterproof IP65	(not included in delivery)		for cable dia	
6+PE-pole	B97007-061	EN 175201 Part 804	min. Ø 0.39 in, max. Ø 0.47 in	
11+PE-pole	B97067-111	EN 175201 Part 804	min. Ø 0.43 in, max. Ø 0.51 in	
Flushing plates	for P, A, B,T, T2, X, Y	for P, T, T2, X, Y	for P, T, T2, and X, Y	
	B67728-001	B67728-002	B67728-003	
Mounting manifolds	see special data sheet			
Mounting bolts (not included in delivery)		required torque	required	
M 6 x 1.6 DIN EN ISO 4762 -10.9	A03665-060-040	8 ft/lbs	4 pieces	
Service Seal Kit	B97215		N681-10	V681-10

INSTALLATION DRAWING (mm)





The mounting manifold must conform to ISO 4401-07-06-0-94. For maximum flow, the manifold ports P, T, A and B are required to have 20 mm dia (deviation from standard). Mounting surface needs to be flat within 0.01 mm over a distance of 100 mm. Average surface finish value, Ra, better than 0.8 µm.

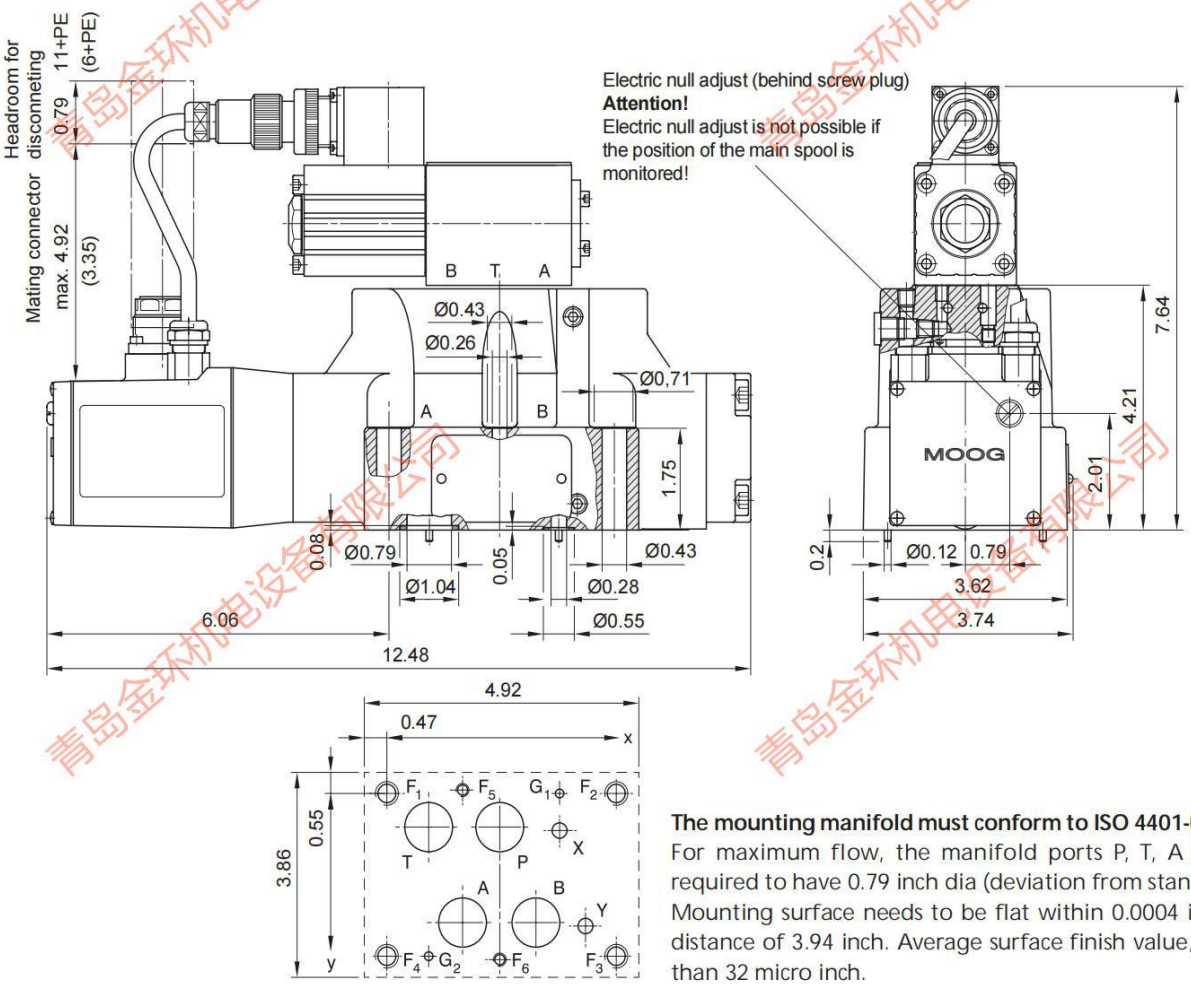
mm

	P	A	T	B	X	Y	G_1	G_2	F_1	F_2	F_3	F_4	F_5	F_6
	Ø20	Ø20	Ø20	Ø20	Ø6.3	Ø6.3	Ø4	Ø4	M10	M10	M10	M10	M6	M6
x	50	34.1	18.3	65.9	76.6	88.1	76.6	18.3	0	101.6	101.6	0	34.1	50
y	14.3	55.6	14.3	55.6	15.9	57.2	0	69.9	0	0	69.9	69.9	-1.6	71.5

Spare Parts and Accessories

O-rings (included in delivery)			NBR 85 Shore	FPM 85 Shore
for P, T, A, B	4 pieces ID 21.89 x Ø 2.6		-45122-129	-42082-129
for X, Y	2 pieces ID 10.82 x Ø 1.8		-45122-022	-42082-022
Mating connector, waterproof IP65 (not included in delivery)			for cable dia	
6+PE-pole	B97007-061	EN175201 Part 804	min. Ø 10 mm, max. Ø 12 mm	
11+PE-pole	B97067-111	EN175201 Part 804	min. Ø 11 mm, max. Ø 13 mm	
Flushing plate	-76741			
Mounting manifolds	B46891-001			
Mounting bolts (not included in delivery)		required torque	required	
M 10 x 60 DIN EN ISO 4762 -10.9	A03665-100-060	54 Nm	4 pieces	
M 6 x 55 DIN EN ISO 4762 -10.9	A03665-060-055	11 Nm	2 pieces	
Service Seal Kit	B97215-		N6x2-16	V6x2-16

INSTALLATION DRAWING (inch)



The mounting manifold must conform to ISO 4401-07-06-0-94. For maximum flow, the manifold ports P, T, A and B are required to have 0.79 inch dia (deviation from standard). Mounting surface needs to be flat within 0.0004 inch over a distance of 3.94 inch. Average surface finish value, Ra, better than 32 micro inch.

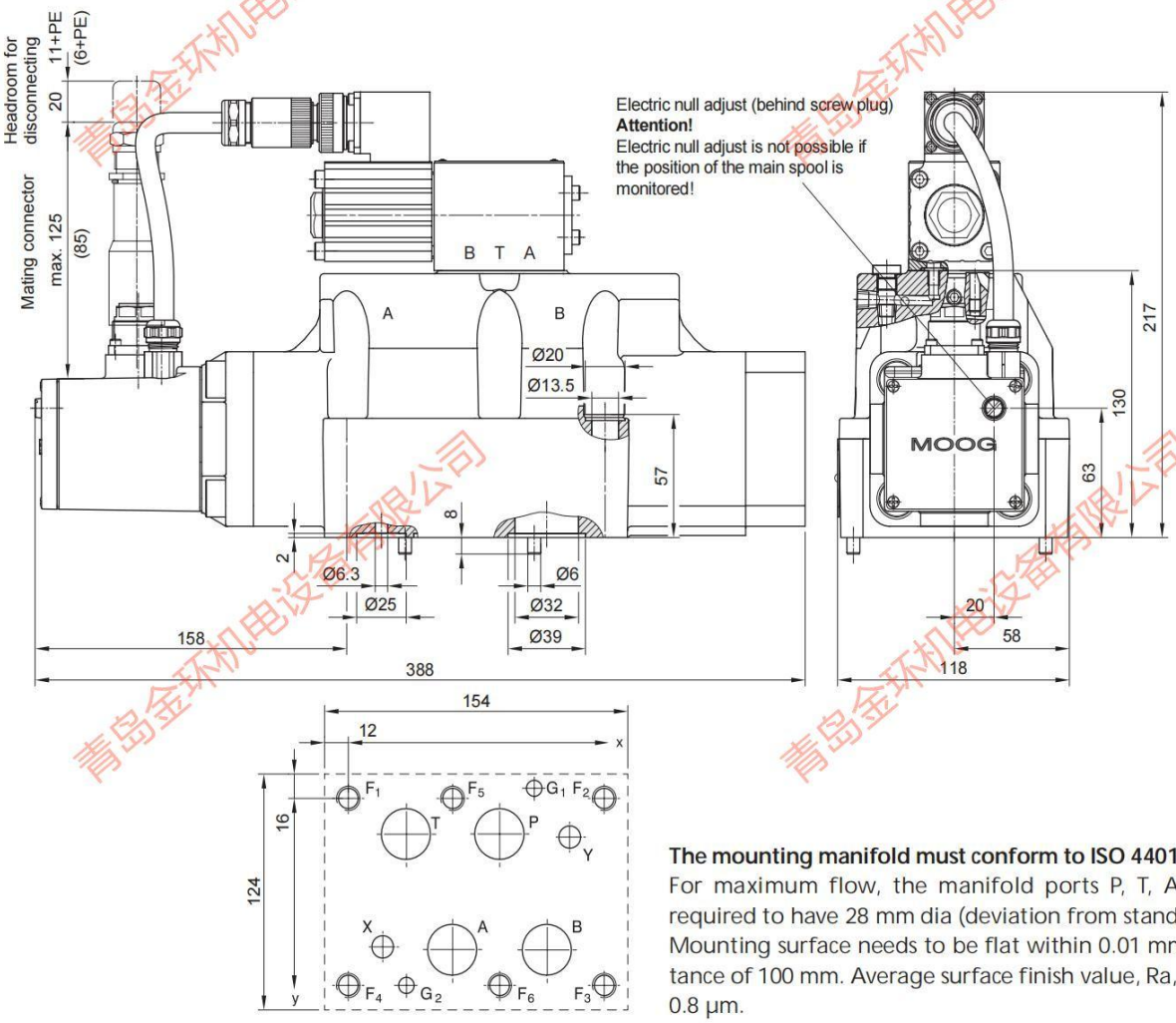
inch

	P	A	T	B	X	Y	G_1	G_2	F_1	F_2	F_3	F_4	F_5	F_6
	Ø0.79	Ø0.79	Ø0.79	Ø0.79	Ø0.25	Ø0.25	Ø0.16	Ø0.16	M10	M10	M10	M10	M6	M6
x	1.97	1.34	0.72	2.59	3.02	3.47	3.02	0,72	0	4.0	4.0	0	1.34	1.97
y	0.56	2.19	0.56	2.19	0.63	2.25	0	2.75	0	0	2.75	2.75	-0.06	2.81

Spare Parts and Accessories

O-rings (included in delivery)			NBR 85 Shore	FPM 85 Shore
for P, T, A, B	4 pieces ID 0.86 x Ø 0.1		-45122-129	-42082-129
for X, Y	2 pieces ID 0.43 x Ø 0.07		-45122-022	-42082-022
Mating connector, waterproof IP65 (not included in delivery)			for cable dia	
6+PE-pole	B97007-061	EN175201 Part 804	min. Ø 0.39 in, max. Ø 0.47 in	
11+PE-pole	B97067-111	EN175201 Part 804	min. Ø 0.43 in, max. Ø 0.51 in	
Flushing plate	-76741			
Mounting manifolds	B46891-001			
Mounting bolts (not included in delivery)		required torque	required	
M 10 x 2.4 DIN EN ISO 4762 -10.9	A03665-100-060	40 ft/lbs	4 pieces	
M 6 x 2.2 DIN EN ISO 4762 -10.9	A03665-060-055	8 ft/lbs	2 pieces	
Service Seal Kit	B97215-		N6X2-16	V6X2-16

INSTALLATION DRAWING (mm)



The mounting manifold must conform to ISO 4401-08-07-0-94. For maximum flow, the manifold ports P, T, A and B are required to have 28 mm dia (deviation from standard).
Mounting surface needs to be flat within 0.01 mm over a distance of 100 mm. Average surface finish value, Ra, better than 0.8 µm.

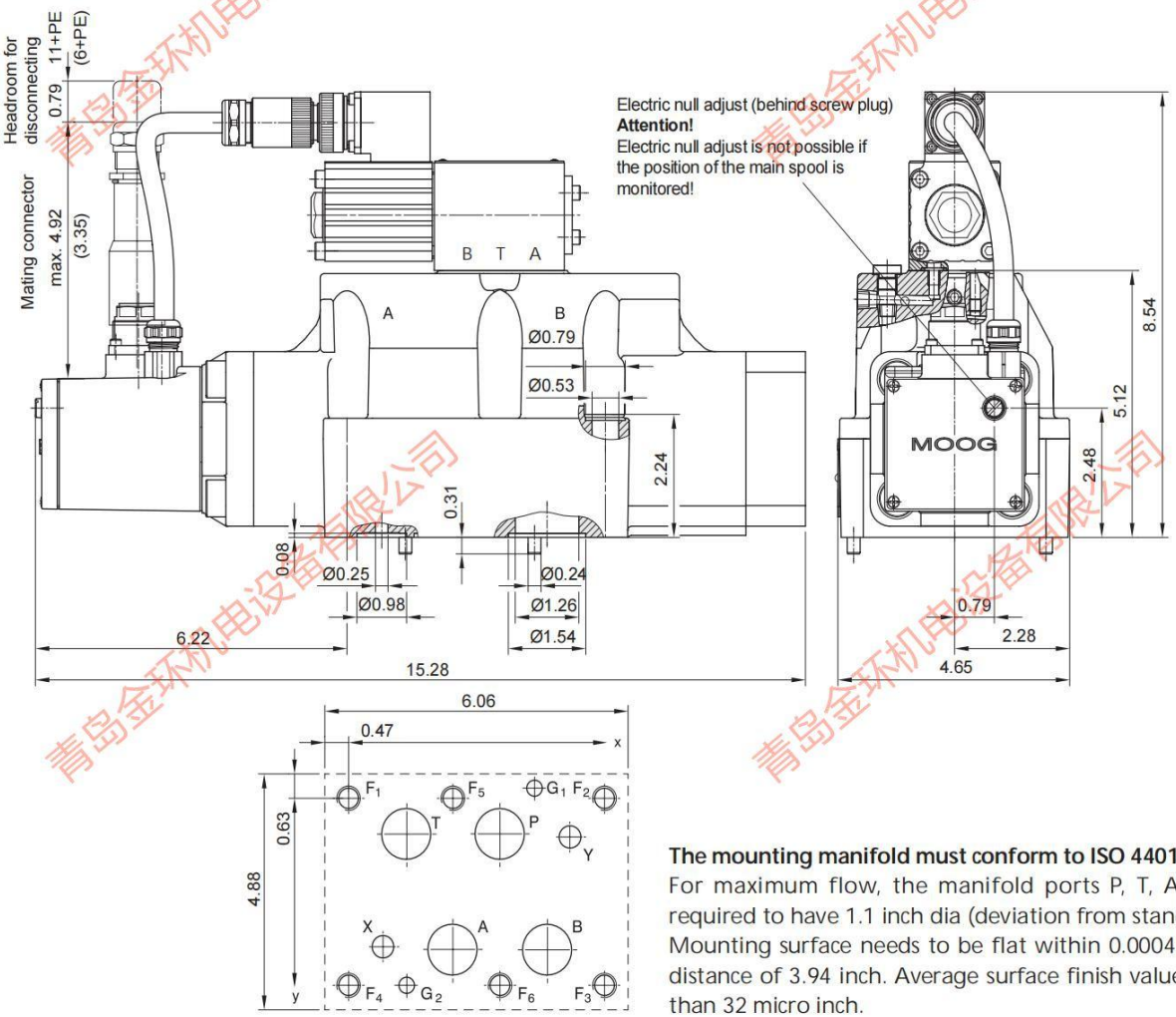
mm

	P	A	T	B	X	Y	G_1	G_2	F_1	F_2	F_3	F_4	F_5	F_6
	Ø28	Ø28	Ø28	Ø28	Ø11.2	Ø11.2	Ø7.5	Ø7.5	M12	M12	M12	M12	M12	M12
x	77	53.2	29.4	100.8	17.5	112.7	94.5	29.4	0	130.2	130.2	0	53.2	77
y	17.5	74.6	17.5	74.6	73	19	-4.8	92.1	0	0	92.1	92.1	0	92.1

Spare Parts and Accessories

O-rings (included in delivery)			NBR 85 Shore	FPM 85 Shore
for P, T, A, B:	4 pieces ID 34.60 x Ø 2.6		-45122-113	-42082-113
for X, Y:	2 pieces ID 20.29 x Ø 2.6		-45122-195	-42082-195
Mating connector, waterproof IP65 (not included in delivery)			for cable dia	
6+PE-pole	B97007-061	EN175201 Part 804	min. Ø 10 mm, max. Ø 12 mm	
11+PE-pole	B97067-111	EN175201 Part 804	min. Ø 11 mm, max. Ø 13 mm	
Flushing plate	-76047-001			
Mounting manifolds	A25855-009			
Mounting bolts (not included in delivery)		required torque	required	
M 12 x 75 DIN EN ISO 4762 -10.9	A03665-120-075	94 Nm	6 pieces	
Service Seal Kit	B97215		N6X4-25	V6X4-25

INSTALLATION DRAWING (inch)



The mounting manifold must conform to ISO 4401-08-07-0-94. For maximum flow, the manifold ports P, T, A and B are required to have 1.1 inch dia (deviation from standard). Mounting surface needs to be flat within 0.0004 inch over a distance of 3.94 inch. Average surface finish value, Ra, better than 32 micro inch.

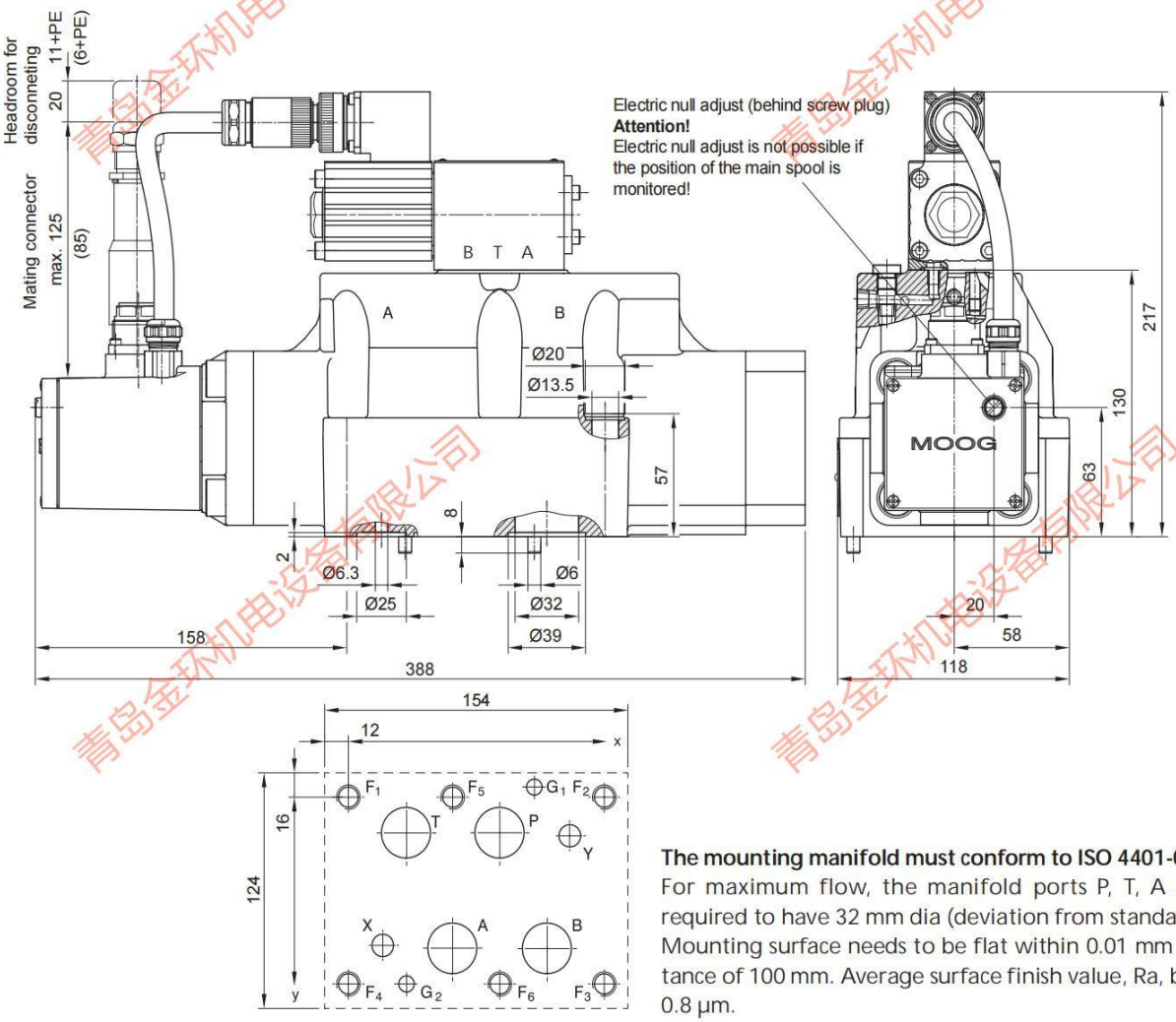
inch

	P	A	T	B	X	Y	G_1	G_2	F_1	F_2	F_3	F_4	F_5	F_6
	Ø1.1	Ø1.1	Ø1.1	Ø1.1	Ø0.44	Ø0.44	Ø0.3	Ø0.3	M12	M12	M12	M12	M12	M12
x	3.03	2.09	1.16	3.97	0.69	4.44	3.72	1.16	0	5.13	5.13	0	2.09	3.03
y	0.69	2.94	0.69	2.94	2.87	0.75	-0.19	3.63	0	0	3.63	3.63	0	3.63

Spare Parts and Accessories

O-rings (included in delivery)			NBR 85 Shore	FPM 85 Shore
for P, T, A, B:	4 pieces ID 1.36 x Ø 0.1		-45122-113	-42082-113
for X, Y:	2 pieces ID 0.8 x Ø 0.1		-45122-195	-42082-195
Mating connector, waterproof IP65 (not included in delivery)			for cable dia	
6+PE-pole	B97007-061	EN175201 Part 804	min. Ø 0.39 in, max. Ø 0.47 in	
11+PE-pole	B97067-111	EN175201 Part 804	min. Ø 0.43 in, max. Ø 0.51 in	
Flushing plate	-76047-001			
Mounting manifolds	A25855-009			
Mounting bolts (not included in delivery)		required torque	required	
M 12 x 3.0 DIN EN ISO 4762 -10.9	A03665-120-075	69.56 ft/lbs	6 pieces	
Service Seal Kit	B97215		N6X4-25	V6X4-25

INSTALLATION DRAWING (mm)



The mounting manifold must conform to ISO 4401-08-07-0-94. For maximum flow, the manifold ports P, T, A and B are required to have 32 mm dia (deviation from standard). Mounting surface needs to be flat within 0.01 mm over a distance of 100 mm. Average surface finish value, Ra, better than 0.8 µm.

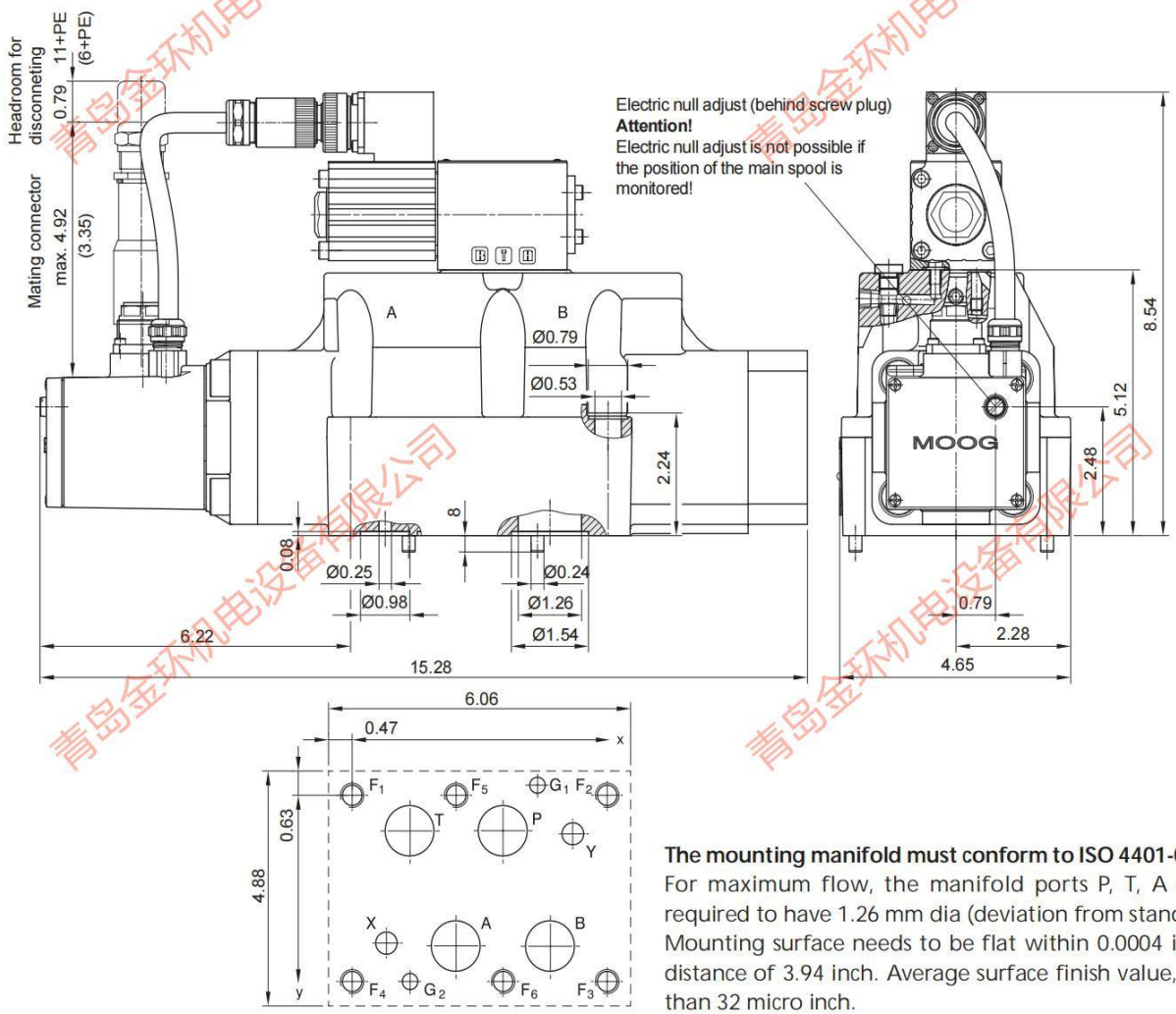
mm

	P	A	T	B	X	Y	G_1	G_2	F_1	F_2	F_3	F_4	F_5	F_6
	Ø32	Ø32	Ø32	Ø32	Ø11.2	Ø11.2	Ø7.5	Ø7.5	M12	M12	M12	M12	M12	M12
x	77	53.2	29.4	100.8	17.5	112.7	94.5	29.4	0	130.2	130.2	0	53.2	77
y	17.5	74.6	17.5	74.6	73	19	-4.8	92.1	0	0	92.1	92.1	0	92.1

Spare Parts and Accessories

O-rings (included in delivery)			NBR 85 Shore	FPM 85 Shore
for P, T, A, B:	4 pieces ID 34.60 x Ø 2.6		-45122-113	-42082-113
for X, Y:	2 pieces ID 20.29 x Ø 2.6		-45122-195	-42082-195
Mating connector, waterproof IP65 (not included in delivery)			for cable dia	
6+PE-pole	B97007-061	EN175201 Part 804	min. Ø 10 mm, max. Ø 12 mm	
11+PE-pole	B97067-111	EN175201 Part 804	min. Ø 11 mm, max. Ø 13 mm	
Flushing plate	-76047			
Mounting manifolds	A25855-009			
Mounting bolts (not included in delivery)		required torque	required	
M 12 x 75 DIN EN ISO 4762 -10.9	A03665-120-075	94 Nm	6 pieces	
Service Seal Kit	B97215		N6X4-25	V6X4-25

INSTALLATION DRAWING (inch)



The mounting manifold must conform to ISO 4401-08-07-0-94. For maximum flow, the manifold ports P, T, A and B are required to have 1.26 mm dia (deviation from standard). Mounting surface needs to be flat within 0.0004 inch over a distance of 3.94 inch. Average surface finish value, Ra, better than 32 micro inch.

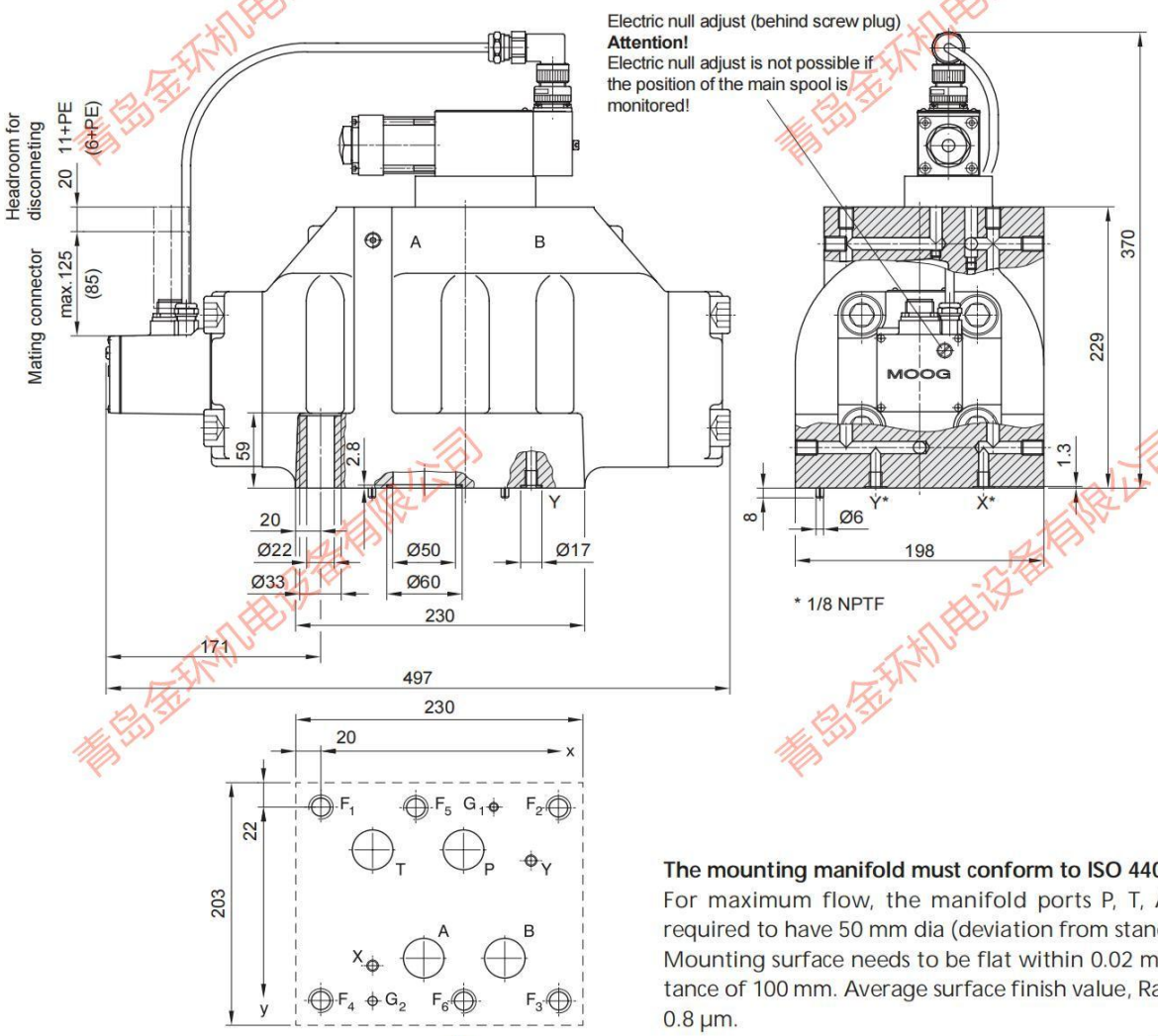
inch

	P	A	T	B	X	Y	G_1	G_2	F_1	F_2	F_3	F_4	F_5	F_6
	Ø1.26	Ø1.26	Ø1.26	Ø0.44	Ø0.44	Ø0.44	Ø0.3	Ø0.3	M12	M12	M12	M12	M12	M12
x	3.03	2.09	1.55	3.97	0.69	4.44	3.72	1.16	0	5.13	5.13	0	2.09	3.03
y	0.69	2.94	0.69	2.94	2.87	0.75	-0.19	3.63	0	0	3.63	3.63	0	3.63

Spare Parts and Accessories

O-rings (included in delivery)			NBR 85 Shore	FPM 85 Shore
for P, T, A, B:	4 pieces ID 1.36 x Ø 0.1		-45122-113	-42082-113
for X, Y:	2 pieces ID 0.8 x Ø 0.1		-45122-195	-42082-195
Mating connector, waterproof IP65	(not included in delivery)		for cable dia	
6+PE-pole	B97007-061	EN175201 Part 804	min. Ø 0.39 in, max. Ø 0.47 in	
11+PE-pole	B97067-111	EN175201 Part 804	min. Ø 0.43 in, max. Ø 0.51 in	
Flushing plate	-76047			
Mounting manifolds	A25855-009			
Mounting bolts (not included in delivery)		required torque	required	
M 12 x 3.0 DIN EN ISO 4762 -10.9	A03665-120-075	70 ft/lbs	6 pieces	
Service Seal Kit	B97215		N6X4-25	V6X4-25

INSTALLATION DRAWING (mm)



The mounting manifold must conform to ISO 4401-10-08-0-94
For maximum flow, the manifold ports P, T, A and B are required to have 50 mm dia (deviation from standard).
Mounting surface needs to be flat within 0.02 mm over a distance of 100 mm. Average surface finish value, Ra, better than 0.8 µm.

mm

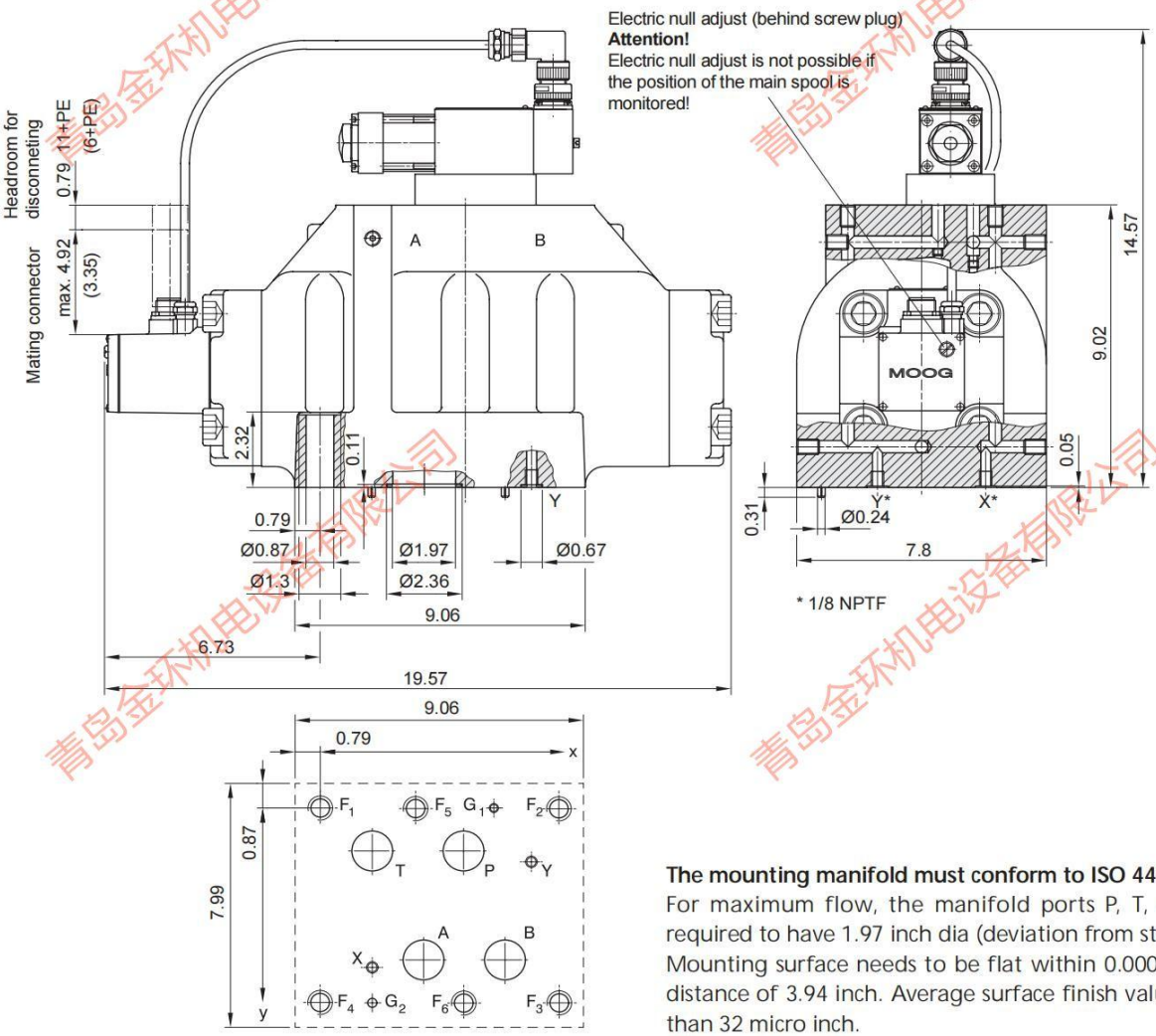
	P	A	T	B	X	Y	G_1	G_2	F_1	F_2	F_3	F_4	F_5	F_6
	Ø50	Ø50	Ø50	Ø50	Ø11.2	Ø11.2	Ø7.5	Ø7.5	M20	M20	M20	M20	M20	M20
x	114.3	82.5	41.3	147.6	41.3	168.3	147.6*	41.3	0	190.5	190.5	0	76.2	114.3
y	35	123.8	35	123.8	130.2	44.5	0	158.8	0	0	158.8	158.8	0	158.8

* Measurement not according to ISO but to DIN 24340.
The guard pin G_1 exists in the valve body. The drilling is at 138.6 mm.

Spare Parts and Accessories

Kantseal O-rings (included in delivery)			HNBR 85 Shore	FPM 85 Shore
for P, T, A, B:	4 pieces ID 53.60 x Ø 3.5		B97217-227H	B97217-227V
for X, Y:	2 pieces ID 14.0 x Ø 1.8		B97217-015H	B97217-015V
Mating connector, waterproof IP65 (not included in delivery)				
6+PE-pole	B97007-061	EN175201 Part 804	min. Ø 10 mm, max. Ø 12 mm	
11+PE-pole	B97024-111	EN175201 Part 804	min. Ø 11 mm, max. Ø 13 mm	
Flushing plate	not available			
Mounting manifolds	A25856-001			
Mounting bolts (not included in delivery)		required torque	required	
M 20 x 90 DIN 912-10.9	A03665-200-090	460 Nm	6 pieces	
Service Seal Kit	B97215-		S6X5-32	K6X5-32

INSTALLATION DRAWING (inch)



The mounting manifold must conform to ISO 4401-10-08-0-94
For maximum flow, the manifold ports P, T, A and B are required to have 1.97 inch dia (deviation from standard).
Mounting surface needs to be flat within 0.0008 inch over a distance of 3.94 inch. Average surface finish value, Ra, better than 32 micro inch.

inch

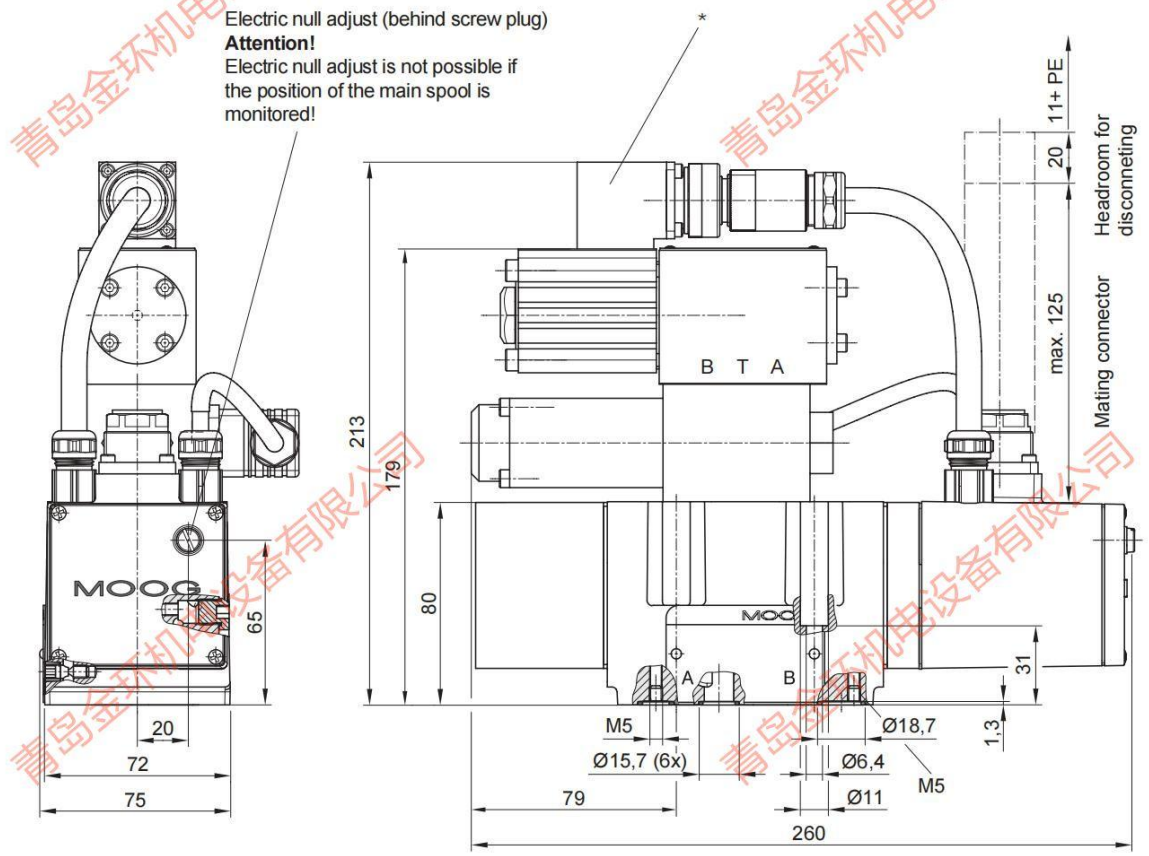
	P	A	T	B	X	Y	G_1	G_2	F_1	F_2	F_3	F_4	F_5	F_6
	Ø1.97	Ø1.97	Ø1.97	Ø1.97	Ø0.44	Ø0.44	Ø0.3	Ø0.3	M20	M20	M20	M20	M20	M20
x	4.5	3.25	1.63	5.81	1.63	6.63	5.81*	1.63	0	7.5	7.5	0	3.0	4.5
y	1.38	4.87	1.38	4.87	5.13	1.75	0	6.25	0	0	6.25	6.25	0	6.25

* Measurement not according to ISO but to DIN 24340.
The guard pin G_1 exists in the valve body. The drilling is at 5.46 inch.

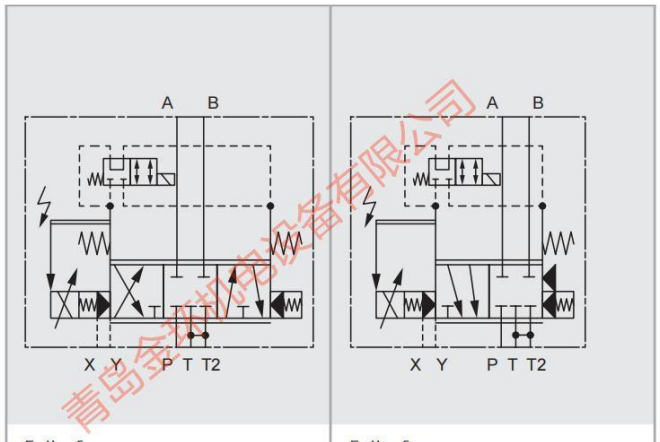
Spare Parts and Accessories

Kantseal O-rings (included in delivery)			HNBR 85 Shore	FPM 85 Shore
for P, T, A, B:	4 pieces ID 2.11 x Ø 0.14		B97217-227H	B97217-227V
for X, Y:	2 pieces ID 0.55 x Ø 0.07		B97217-015H	B97217-015V
Mating connector, waterproof IP65 (not included in delivery)				
6+PE-pole	B97007-061	EN175201 Part 804	min. Ø 0.39 in, max. Ø 0.47 in	
11+PE-pole	B97024-111	EN175201 Part 804	min. Ø 0.43 in, max. Ø 0.51 in	
Flushing plate	not available			
Mounting manifolds	A25856-001			
Mounting bolts (not included in delivery)		required torque	required	
M 20 x 3.6 DIN 912-10.9	A03665-200-090	340.4 ft/lbs	6 pieces	
Service Seal Kit	B97215-		S6X5-32	K6X5-32

INSTALLATION DRAWING (mm)



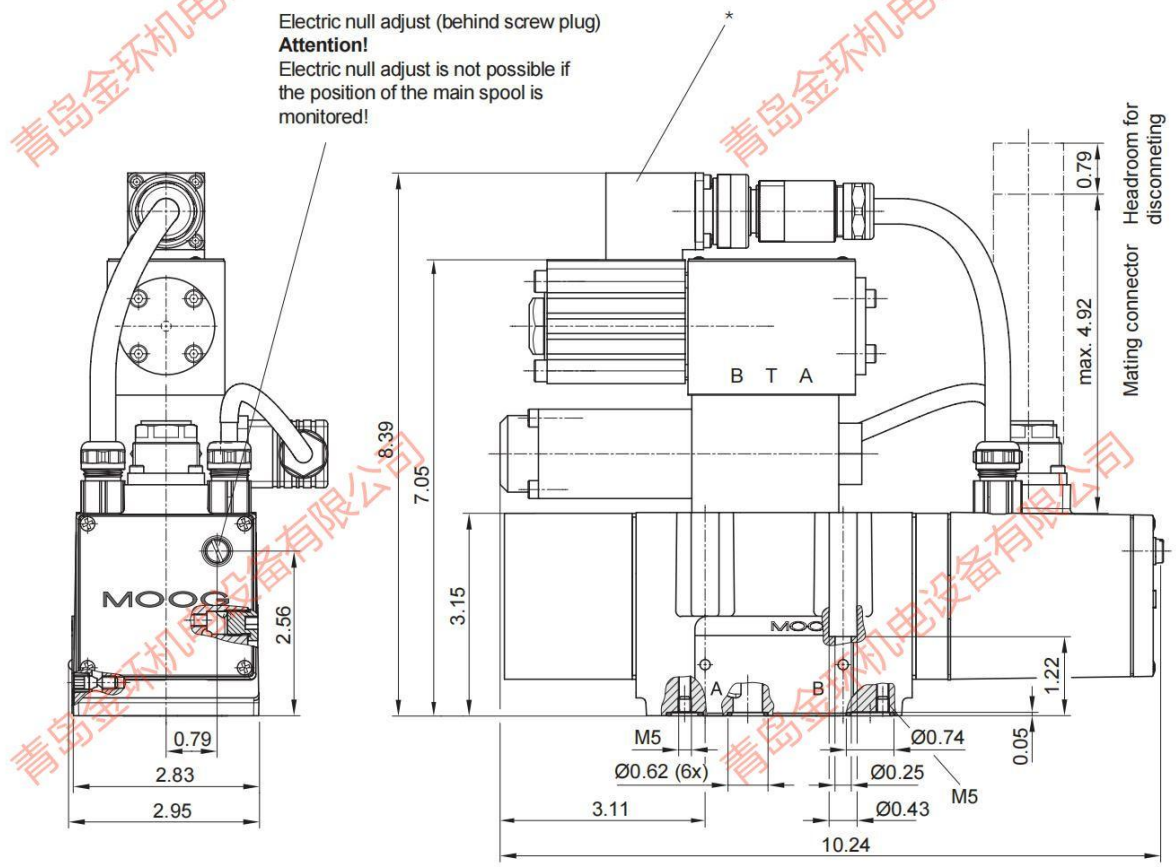
* Valves with spool position monitoring in type designation letter G and H, no pilot valve change possible. Replacement must be done at the factory. The mounting manifold must conform to ISO 4401 - 05 - 05 - 0 - 94 (see page 10).



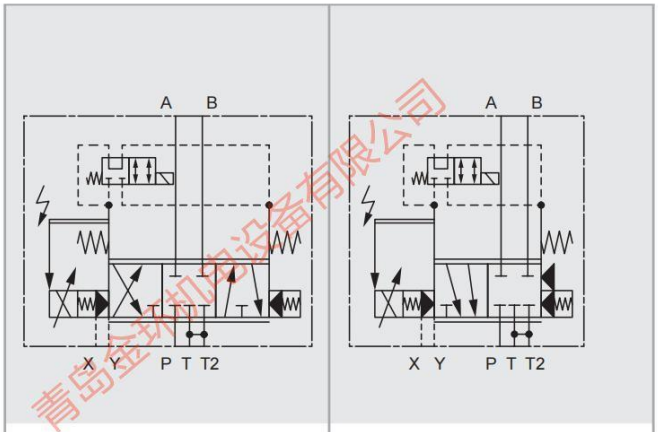
Failsafe centered position	Failsafe centered position by mechanical spool stop

See Spare Parts and Accessories on page 10.

INSTALLATION DRAWING (inch)



* Valves with spool position monitoring in type designation letter G and H, no pilot valve change possible. Replacement must be done at the factory. The mounting manifold must conform to ISO 4401 - 05 - 05 - 0 - 94 (see page 11).

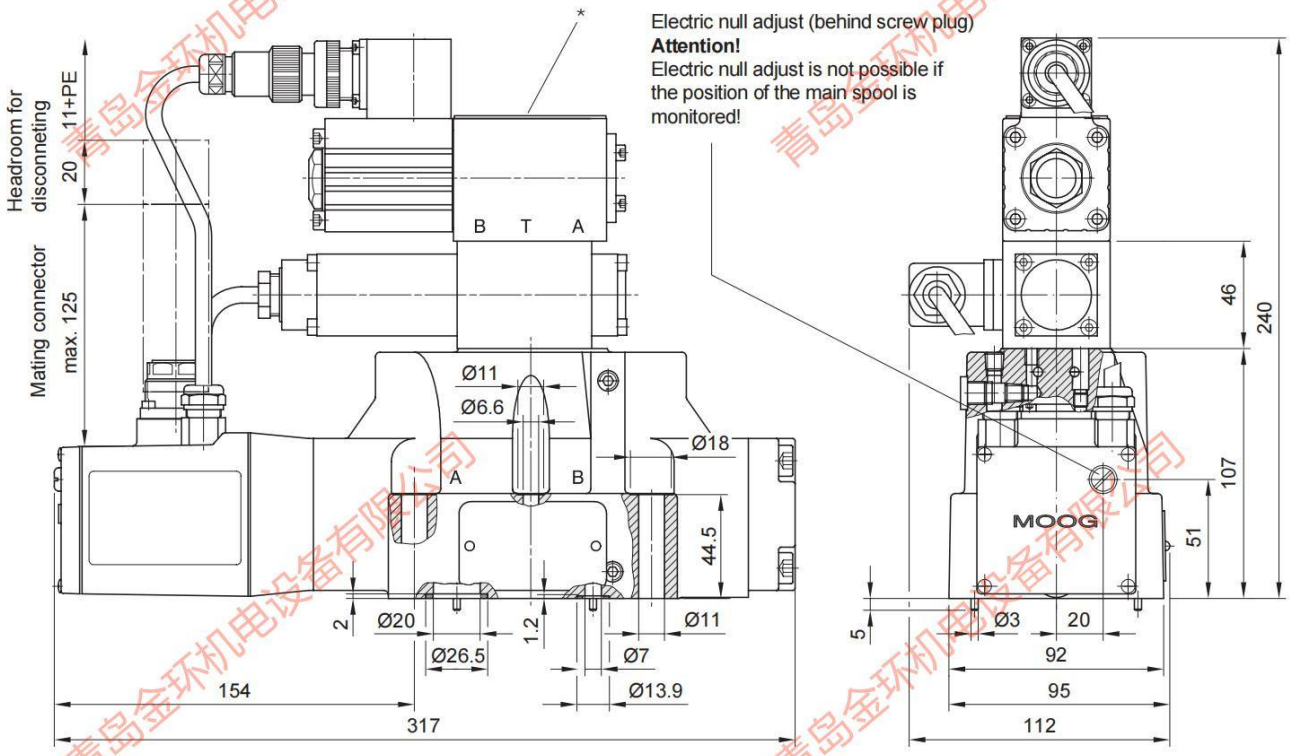


Failsafe
centered position

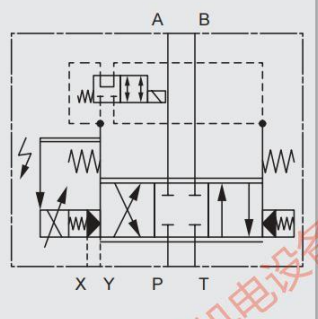
Failsafe
centered position by
mechanical spool stop

See Spare Parts and Accessories on page 10.

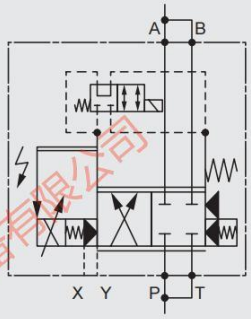
INSTALLATION DRAWING (mm)



* Valves with spool position monitoring in type designation letter G and H, no pilot valve change possible. Replacement must be done at the factory. The mounting manifold must conform to ISO 4401-07-06-0-94 (see page 14).



Failsafe
centered position



Failsafe
centered position by
mechanical spool stop

See Spare Parts and Accessories on page 14.