



DIRECT DRIVE SERVO VALVES WITH INTEGRATED ELECTRONICS FOR ANALOG SIGNALS

D633 AND S634 SERIES
SIZES 03 AND 05

Rev. D, November 2024

LINEAR FORCE MOTOR OPERATED SERVO VALVES WITH
HIGH DYNAMICS FOR DEMANDING APPLICATIONS

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Whenever the highest levels of motion control performance and design flexibility are required, you'll find Moog expertise at work. Through collaboration, creativity and world-class technological solutions, we help you overcome your toughest engineering obstacles. Enhance your machine's performance, and help take your thinking further than you ever thought possible.

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This catalog is for users with technical knowledge. To ensure all necessary characteristics for function and safety of the system, the user has to check the suitability of the products described herein. The products described herein are subject to change without notice. In case of doubt, please contact Moog.

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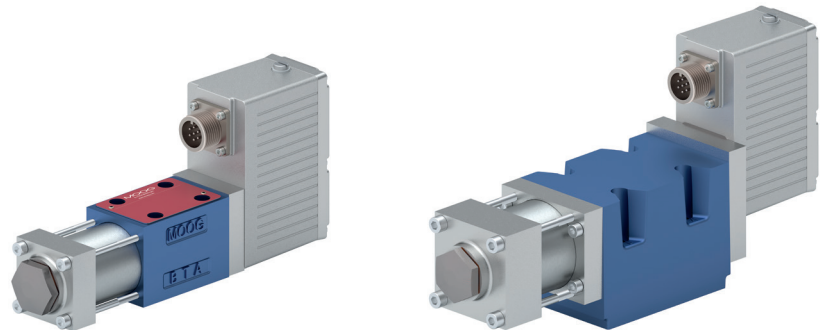
PRODUCT OVERVIEW

Moog D633 and D634 Series are Direct Drive Valves (DDV) equipped with integrated electronics and closed-loop position control of the spool.

These valves are throttle valves for 3-, 4-, and 2x2-way applications. They are suitable for electrohydraulic control of position, speed, pressure and force control systems including those with high dynamic response requirements.

The spool drive device is a permanent magnet linear force motor, which actively moves the spool in both directions against the centering springs. This is an advantage compared with proportional solenoids with one force direction only.

These valves offer analog interfaces for command signal and spool position feedback.



	D633				D634	
Valve design	1 stage, with spool and bushing					
Size according to ISO 4401	Size 03				Size 05	
Mounting pattern	ISO 4401-03-03-0-05 (with or without leakage oil connection Y)				ISO 4401-05-05-0-05 (with or without leakage oil connection Y)	
Rated flow at Δp_N 35 bar (500 psi) per spool land	5 l/min (1.3 gpm)	10 l/min (2.6 gpm)	20 l/min (5.3 gpm)	40 l/min (10.6 gpm)	60 l/min (15.9 gpm)	100 l/min (26.4 gpm)
Maximum flow	75 l/min (19.8 gpm)				180 l/min (47.6 gpm)	
Maximum operating pressure - port P, A, B	350 bar (5,000 psi)					
Step response time for 0 to 100% stroke	≤ 12 ms				≤ 20 ms	

FEATURES AND BENEFITS

Features	Benefits
D633 and D634 Series Servo Valves	
Direct operated servo valves	No pilot oil required; valve dynamics are not dependent on pilot pressure
Linear force motor with high force level and push-pull operation	Precise and dynamic valve operation even at high pressure drops
Precise spool positioning with low hysteresis and threshold	High control accuracy for demanding closed loop control tasks
High valve dynamics	Supports highly dynamic control tasks
Spool slides in precisely manufactured and fully hardened steel bushing	Low internal leakage, high control accuracy and high wear resistance
Many variants available	High application flexibility
Low power demand in and around the spool center position	Low energy consumption during the majority of operating and stand-by times
Fail-safe options available	If the electrical supply fails, a cable breaks or emergency stop is activated, the spool returns to the predefined spring-centered position without passing a fully open control port position increasing safety.

DESCRIPTION OF OPERATION

Design

The spool is driven by a permanent magnet linear force motor. In contrast to proportional solenoid drives, the linear force motor drives the spool in both working directions from the spring-centered middle position. The strong actuating force of the spool provides Moog Servo Valves with excellent static and dynamic characteristics.

Spool Position Control

In this operating mode the command signal is proportional to a desired spool position. A position transducer (LVDT) measures the actual spool position, and transmits this information to the valve electronics. The system electronics compares the actual spool position to the command signal. This generates a signal that drives the linear force motor to move the spool to the correct position.

Optional Valve Features

Moog offers a range of optional features. These include options to ruggedize valves for operation in extremely demanding environments, and valves designed for special applications and fluids. Please contact Moog for more detailed information.

Valves for Operation with Ester Based Fluids

Standard hydraulic seal materials such as NBR and FKM, are frequently incompatible with fire resistant phosphate ester based fluids. In order to use valves with this type of fluid, Moog offers them as special seal versions that are mineral oil and phosphate ester resistant. Please note: These valve types are tested by Moog using mineral oil, remnants of which will remain in the valve after testing.

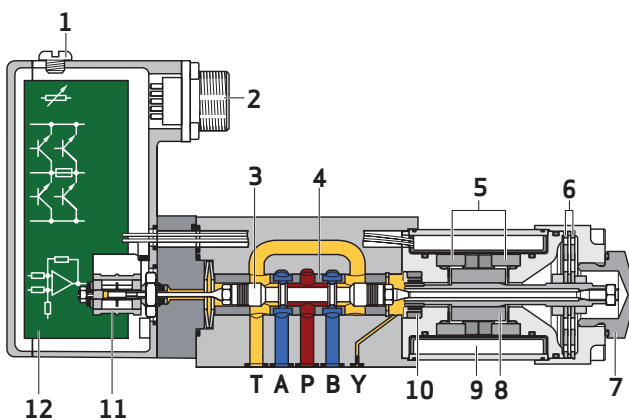


Explosion Protection

Valves D633K and D634K available with explosion protection for **Gas**:

- **Ex II 2G Ex db eb IIB+H2 T* Gb**
according to EN 60079-0, EN 60079-1 and EN 60079-7.
- **Ex db eb IIB+H2 T* Gb**
according to IEC 60079-0, IEC 60079-1 and IEC 60079-7.

Note: Installation dimensions and electric connection altered. For details see manual.



1. Null adjust cover plug
2. Valve connector
3. Spool
4. Bushing
5. Permanent magnets
6. Centering spring
7. Screw plug
8. Armature
9. Coil
10. Bearing
11. Position transducer
12. Integrated electronics

DESCRIPTION OF OPERATION

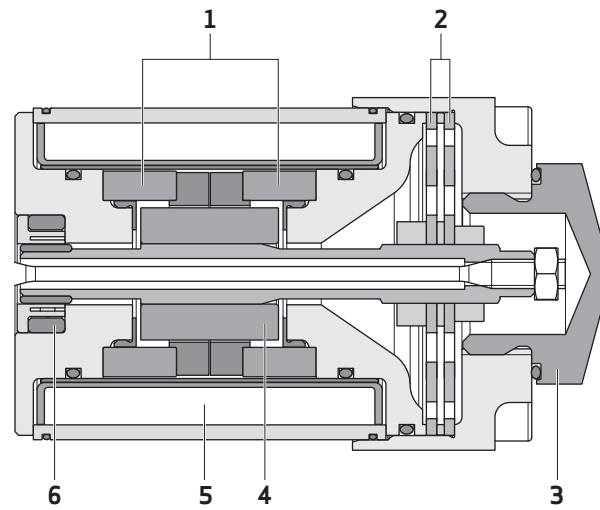
Permanent Magnet Linear Force Motor

The linear force motor (LFM) is a permanent magnet excited differential motor.

The LFM's armature (4) is connected to the valve spool via a rod. Also connected to this rod are the centering springs (2), which keep the LFM in its center position. The permanent magnets (1) supply part of the motor's force. In combination with the force created by the coil (5), the force level of a linear force motor is higher than that of a proportional solenoid of similar size.

The LFM has a neutral mid-position from which it generates force and stroke in both directions. This is an advantage over a proportional solenoid drive, which can only operate in one direction. The LFM's force is roughly proportional to the coil current. To move out of the center position, a PWM current is applied to the coil and the spool is deflected against the centering springs. To move back towards the center position, a reverted PWM current is applied to the coil, which causes the LFM to actively move the spool towards the center. This movement is supported by the centering springs.

Due to the high force levels of the LFM it is able to overcome flow and frictional forces, and still guarantee a precise and dynamic positioning of the spool.



1. Permanent magnets
2. Centering spring
3. Screw plug
4. Armature
5. Coil
6. Bearing

SIZE 03 - D633

General Technical Data

Valve design	1 stage, with spool and bushing
Mounting pattern	ISO 4401-03-03-0-05 (with or without leakage oil connection Y)
Installation position	Any
Weight	2.5 kg (5.51 lb)
Storage temperature range	-40 to +80 °C (-40 to +176 °F)
Ambient temperature range	-20 to +60 °C (-4 to +140 °F)
Vibration resistance	30 g, 3 axis
Shock resistance	50 g, 6 directions, 3 ms
MTTF_d value according to EN ISO 13849-1	150 years

Hydraulic Data

Maximum operating pressure				
Port P, A, B	350 bar (5,000 psi)			
Port T without Y	50 bar (725 psi)			
Port T with Y	350 bar (5,000 psi)			
Port Y	Depressurized to tank ²⁾			
Rated flow at Δp_N 35 bar (500 psi) per spool land	5 l/min (1.3 gpm)	10 l/min (2.6 gpm)	20 l/min (5.3 gpm)	40 l/min (10.6 gpm)
Maximum flow	75 l/min (19.8 gpm)			
Leakage flow (rate) (\approx zero lap), typical ¹⁾	0.15 l/min (0.04 gpm)	0.3 l/min (0.08 gpm)	0.6 l/min (0.16 gpm)	1.2 l/min (0.32 gpm)
Hydraulic fluid	Hydraulic oil as per DIN 52524 parts 1 to 3 and ISO 11158. Other fluids upon request.			
Temperature range	-20 to +80 °C (-4 to +176 °F)			
Viscosity range at 38 °C (100 °F)				
Recommended)	15 to 100 mm ² /s (cSt)			
Maximum permissible	5 to 400 mm ² /s (cSt)			
Recommended cleanliness class according to ISO 4406				
For functional safety	18/15/12			
For longer service life	17/14/11			

1) Measured at 140 bar (2,000 psi) system pressure, oil viscosity 32 mm²/s and oil temperature 40 °C (104 °F).

2) In order to avoid an emptying of the return line, a back-pressure of 2 bar (29 psi) should be maintained on the T and Y connections.

Typical Static and Dynamic Data ¹⁾

Step response time for 0 to 100 % stroke	≤ 12 ms
Threshold, typical	0.05 %
Threshold, maximum	< 0.1 %
Hysteresis, typical	0.1 %
Hysteresis, maximum	< 0.2 %
Null shift at $\Delta T = 55$ K (131 °F)	< 1.5 %
Sample deviation of rated flow	< 10 %

1) Measured at 140 bar (2,000 psi) system pressure, oil viscosity 32 mm²/s and oil temperature 40 °C (104 °F).

SIZE 03 - D633

Electrical Data

Duty cycle	100 %
Degree of protection according to IEC/EN 60529	IP65 with mounted mating connectors
Supply voltage ¹⁾	24 V _{DC} , min. 19 V _{DC} , max. 32 V _{DC}
Permissible ripple of supply voltage ²⁾	±3 V _{RMS}
Maximum current consumption ³⁾	1.2 A
Power consumption of the motor in middle position	9.6 W (0.4 A at 24 V _{DC})
Power consumption maximum	28.8 W (1.2 A at 24 V _{DC})
Fuse protection, external, per valve	1.6 A (slow)
EM compatibility	Immunity to interference as per DIN EN 61000-6-2 (evaluation criterion A)

1) All connected circuits must be isolated from the main supply by „electrical separation“ in accordance with IEC/EN 61558-1 and IEC/EN 61558-2-6. Voltages must be limited to the safety extra-low voltage range in accordance with EN 60204-1. We recommend the use of SELV/PELV power supplies.

2) Frequency from 50 Hz to 10 kHz.

3) Measured at ambient temperature 25 °C (77 °F) and supply voltage 24 V.

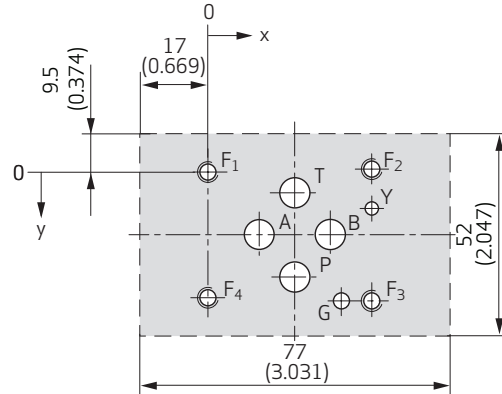
SIZE 03 - D633

Port Pattern of Mounting Surface

The mounting surface must conform to ISO 4401-03-03-0-05. Observe mounting length of minimum 77 mm (3.031 in) and O-ring recesses for Y.

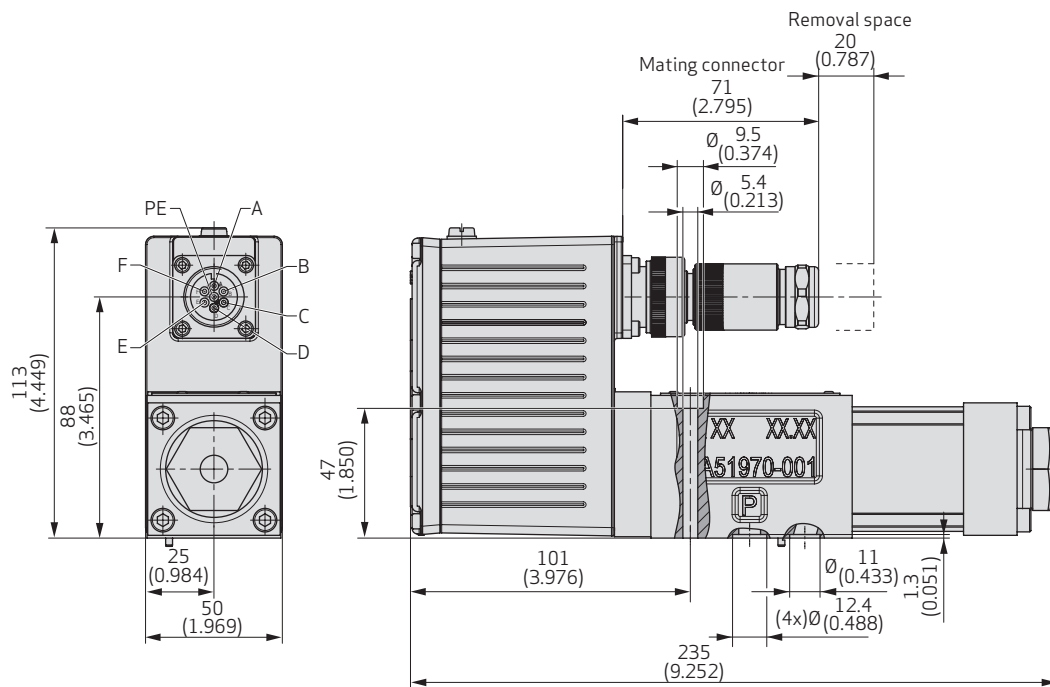
For maximum flow the ports for P, T, A and B must be designed with $\varnothing 7.5$ mm (0.295 in), not according to the standard.

Evenness of connecting surface has to be 0.01 mm (0.0004 in) over 100 mm (3.937 in), average surface finish R_a better than 0.8 μ m (0.0000314 in).



Designation	P	A	B	T	Y	F1	F2	F3	F4	G
Size \varnothing	7.5 mm (0.295 in)				3.3 mm (0.130 in)	M5				4 mm (0.157 in)
Position X	21.5 mm (0.846 in)	12.7 mm (0.500 in)	30.2 mm (1.189 in)	21.5 mm (0.846 in)	40.5 mm (1.594 in)	0	40.5 mm (1.594 in)		0	33 mm (1.299 in)
Position Y	25.9 mm (1.020 in)	15.5 mm (0.610 in)		5.1 mm (0.201 in)	9 mm (0.354 in)	0	-0.75 mm (-0.030 in)	31.75 mm (1.250 in)	31 mm (1.220 in)	31.75 mm (1.250 in)

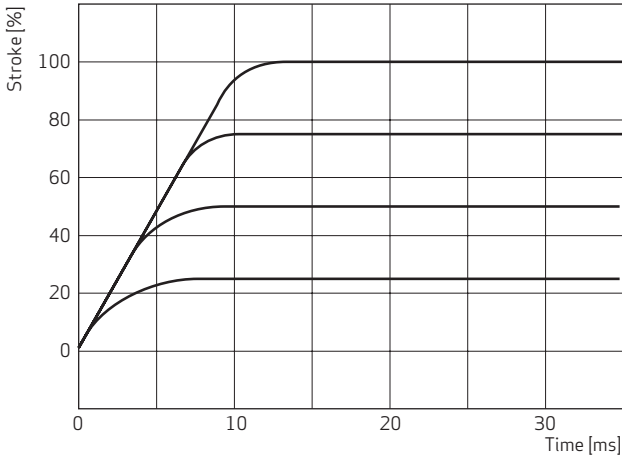
Installation Drawing



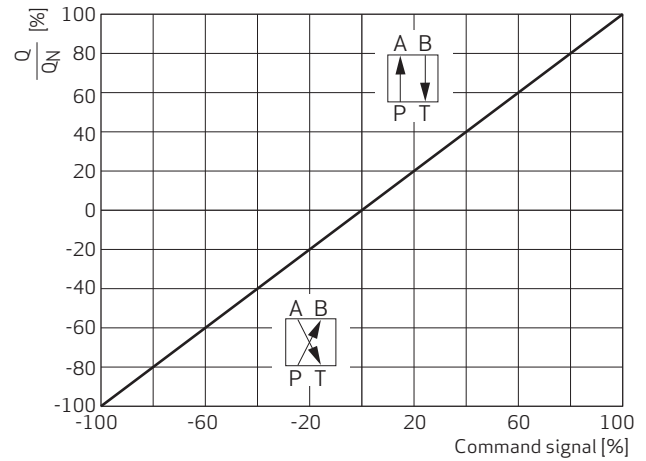
SIZE 03 - D633

Characteristic Curves

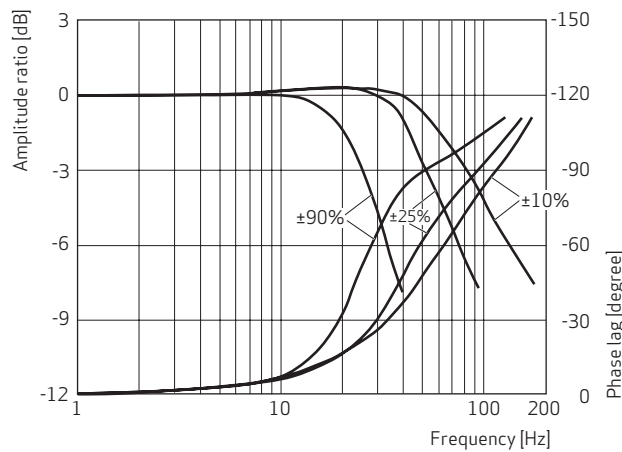
Step Response ¹⁾



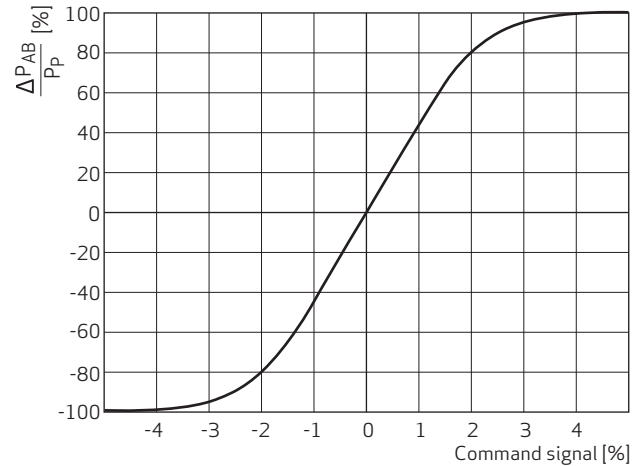
Flow Signal



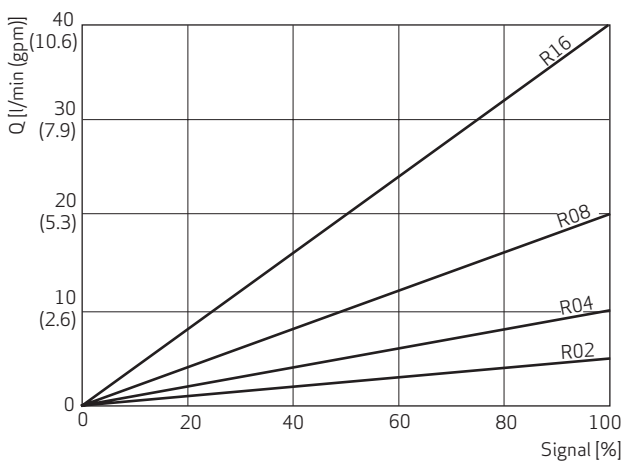
Frequency Response ¹⁾



Pressure Signal for Bushing/Spool Design 0



Flow Signal Curves at $\Delta p_N = 35$ bar (500 psi) per Spool Land for Bushing/Spool Design 0



1) Measured with system pressure p_p of 140 bar (2,000 psi), oil viscosity 32 mm²/s and oil temperature of 40 °C (104 °F).

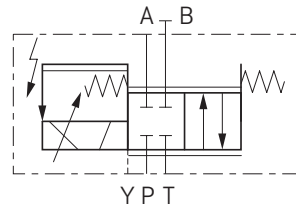
SIZE 03 - D633

Hydraulic Symbols

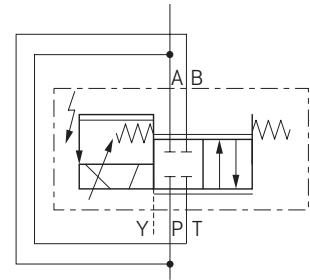
2-way and 2x2-way Operation

In 2-way and 2x2-way operation the servo valves can be used to control the flow in one direction (used as 2-way throttle valves). In 2x2-way operation the valve can be used in 2-way applications for higher flows. It is necessary to connect ports P with B and A with T externally for this purpose. Only the positive signal range (0 to 100 %) is used.

2-way Operation



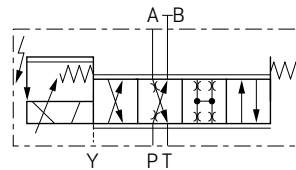
2x2-way Operation



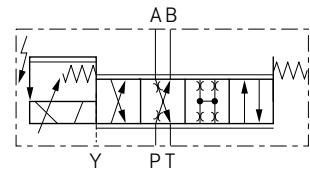
4-way and 3-way Operation

In 4-way operation the servo valves can be used to control the flow in ports A and B (used as 4/3-way throttle valves). Port B must be closed in order to obtain 3-way operation. Leakage port Y must be used if the pressure in tank port T exceeds a value of 50 bar (725 psi). The valves are available with zero lap, less than 3 % or 10 % positive overlap.

3-way Operation with Fail-safe Option F



4-way Operation with Fail-safe Option F



Note: The specified flow directions must be observed.

SIZE 05 - D634

General Technical Data

Valve design	1 stage, with spool and bushing
Mounting pattern	ISO 4401-05-05-0-05 (with or without leakage oil connection Y)
Installation position	Any
Weight	7.9 kg (17.42 lb)
Storage temperature range	-40 to +80 °C (-40 to +176 °F)
Ambient temperature range	-20 to +60 °C (-4 to +140 °F)
Vibration resistance	30 g, 3 axis
Shock resistance	50 g, 6 directions, 3 ms
MTTF_d value according to EN ISO 13849-1	150 years

Hydraulic Data

Maximum operating pressure		
Port P, A, B	350 bar (5,000 psi)	
Port T without Y	50 bar (725 psi)	
Port T with Y	210 bar (3,000 psi)	
Port Y	Depressurized to tank ²⁾	
Rated flow at Δp_N 35 bar (500 psi) per spool land	60 l/min (15.9 gpm)	100 l/min (26.4 gpm)
Leakage flow (rate) (\approx zero lap) ¹⁾	1.2 l/min (0.32 gpm)	2.0 l/min (0.53 gpm)
Maximum flow	180 l/min (47.6 gpm)	
Hydraulic fluid	Hydraulic oil as per DIN 52524 parts 1 to 3 and ISO 11158. Other fluids upon request.	
Fluid temperature range	-20 to +80 °C (-4 to +176 °F)	
Viscosity range at 38 °C (100 °F)		
Recommended	15 to 100 mm ² /s (cSt)	
Maximum permissible	5 to 400 mm ² /s (cSt)	
Recommended cleanliness class as per ISO 4406		
For functional safety	18/15/12	
For longer service life	17/14/11	

1) Measured at 140 bar (2,000 psi) system pressure, oil viscosity 32 mm²/s and oil temperature 40 °C (104 °F).

2) In order to avoid an emptying of the return line, a back-pressure of 2 bar (29 psi) should be maintained on the T, T1 and Y connections.

Typical Static and Dynamic Data ¹⁾

Step response time for 0 to 100 % stroke	\leq 20 ms
Threshold, typical	0.05 %
Threshold, maximum	< 0.1 %
Hysteresis, typical	0.1 %
Hysteresis, maximum	< 0.2 %
Null shift at $\Delta T = 55$ K (131 °F)	< 1.5 %
Sample deviation of rated flow	< 10 %

1) Measured at 140 bar (2,000 psi) system pressure, oil viscosity 32 mm²/s and oil temperature 40 °C (104 °F).

SIZE 05 - D634

Electrical Data

Duty cycle	100 %
Degree of protection according to IEC/EN 60529	IP65 with mounted mating connectors
Supply voltage ¹⁾	24 V _{DC} , min. 18 V _{DC} , max. 32 V _{DC}
Permissible ripple of supply voltage ²⁾	±3 V _{RMS}
Maximum current consumption ³⁾	3.0 A
Power consumption of the motor in middle position	9.6 W (0.4 A at 24 V _{DC})
Power consumption maximum	55.2 W (2.3 A at 24 V _{DC})
Fuse protection, external, per valve	3.15 A (slow)
EM compatibility	Immunity to interference as per DIN EN 61000-6-2 (evaluation criterion A)

1) All connected circuits must be isolated from the main supply by „electrical separation“ in accordance with IEC/EN 61558-1 and IEC/EN 61558-2-6. Voltages must be limited to the safety extra-low voltage range in accordance with EN 60204-1. We recommend the use of SELV/PELV power supplies.

2) Frequency from 50 Hz to 10 kHz.

3) Measured at ambient temperature 25 °C (77 °F) and supply voltage 24 V.

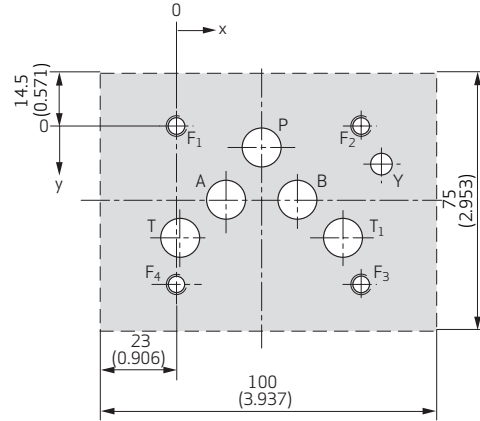
SIZE 05 - D634

Port Pattern of Mounting Surface

The mounting pattern must conform to ISO 4401-05-05-0-05 with additional T1. Observe mounting length of minimum 100 mm (3.937 in) and O-ring recesses for Y. For 4-way valves with Q > 60l/min (15.9 gpm) the second tank port T1 is required.

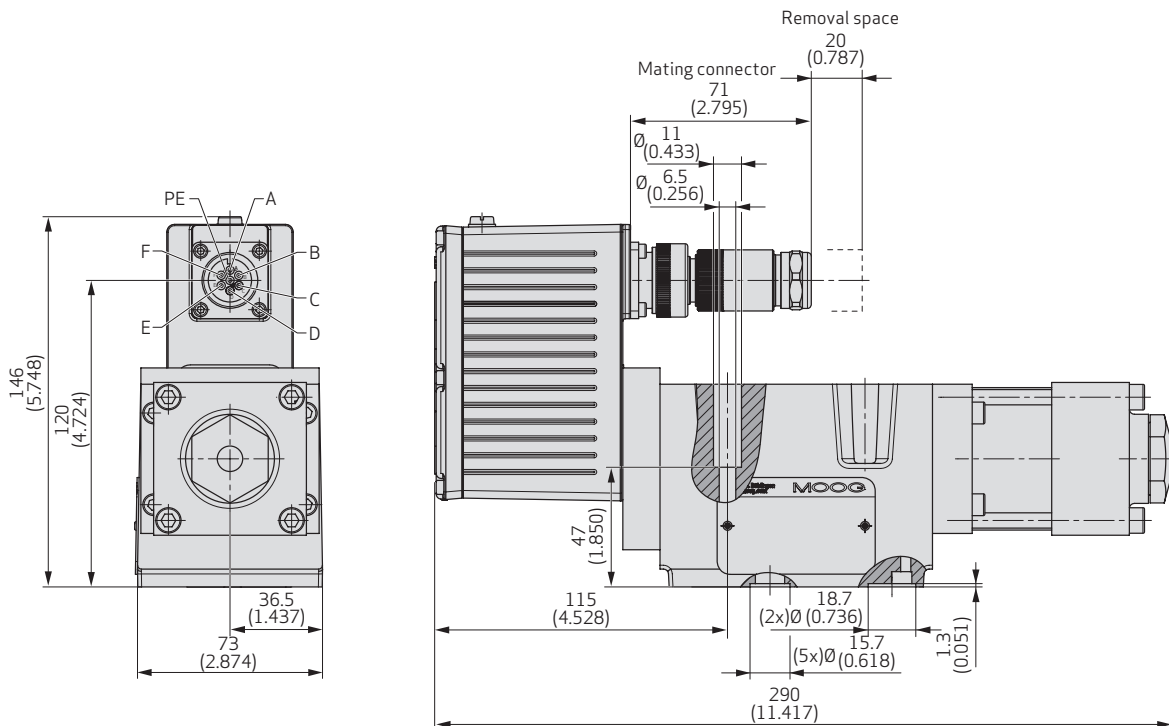
For maximum flow the ports for P, T, T1, A and B must be designed with \varnothing 11.5 mm (0.453 in), in contrast to the standard.

Evenness of connecting surface has to be 0.01 mm (0.0004 in) over 100 mm (3.937 in), average surface finish R_a better than 0.8 μ m (0.0000314 in).



Designation	P	A	B	T	T1	Y	F1	F2	F3	F4
Size \varnothing	11.5 mm (0.453 in)					6.3 mm (0.248 in)	M6			
Position X	27 mm (1.063 in)	16.7 mm (0.657 in)	37.3 mm (1.469 in)	3.2 mm (0.126 in)	50.8 mm (2 in)	62 mm (2.441 in)	0	54 mm (2.126 in)		0
Position Y	6.3 mm (0.248 in)	21.4 mm (0.843 in)		32.5 mm (1.280 in)		11 mm (0.433 in)	0	0	46 mm (1.811 in)	

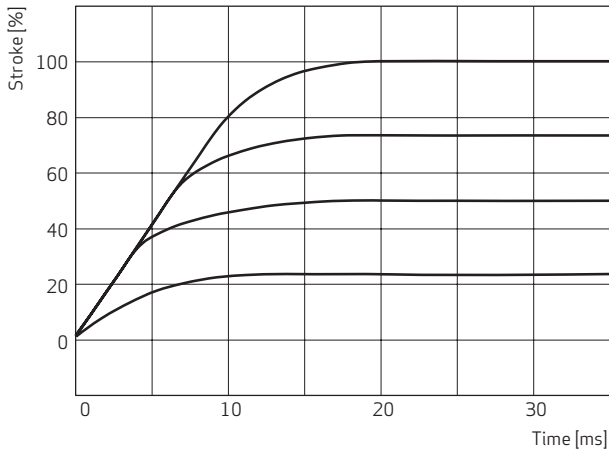
Installation Drawing



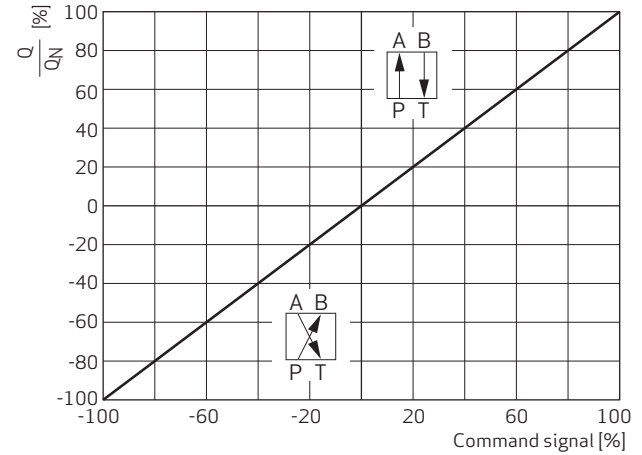
SIZE 05 - D634

Characteristic Curves

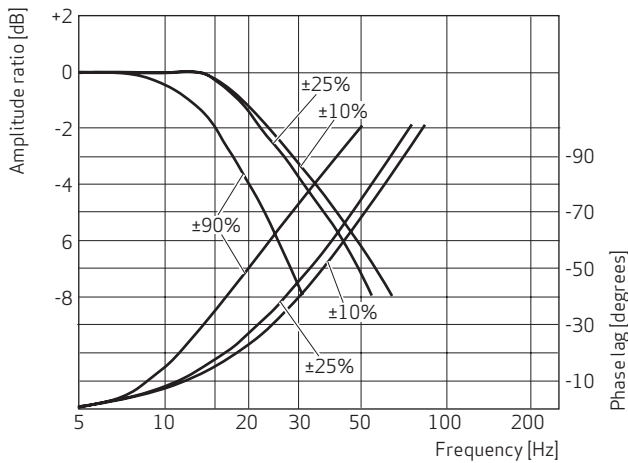
Step Response ¹⁾



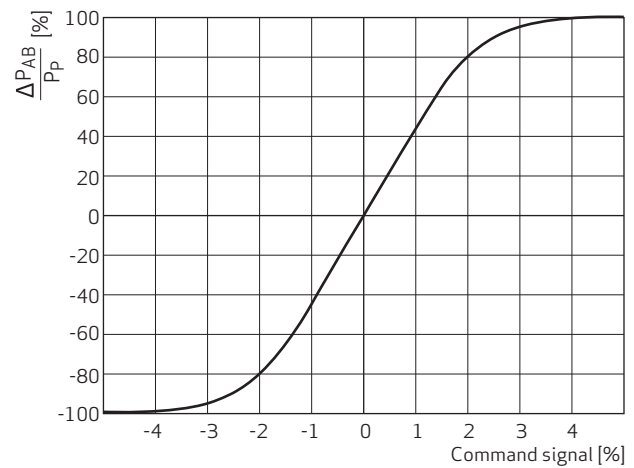
Flow Signal



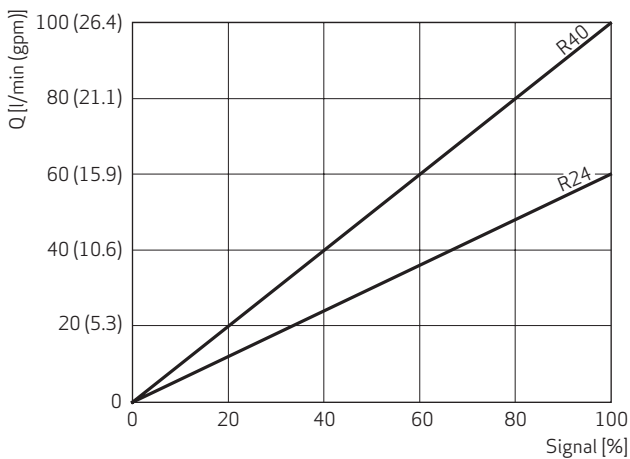
Frequency Response ¹⁾



Pressure Signal for Bushing/Spool Design 0



Flow Signal Curves at $\Delta p_N = 35$ bar (500 psi) per Spool Land for Bushing/Spool Design 0



1) Measured with system pressure p_p of 140 bar (2,000 psi), oil viscosity 32 mm²/s and oil temperature of 40 °C (104 °F).

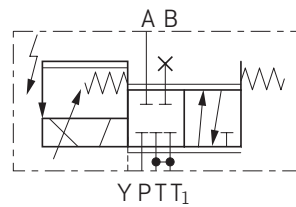
SIZE 05 - D634

Hydraulic Symbols

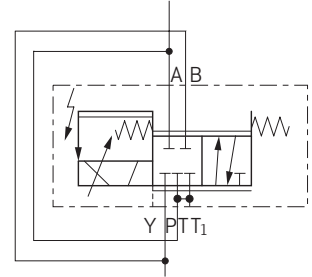
2-way and 2x2-way Operation

In 2-way and 2x2-way operation the servo valves can be used to control the flow in one direction (used as 2-way throttle valves). In 2x2-way operation the valve can be used in 2-way applications for higher flows. It is necessary to connect ports P with B and A with T externally for this purpose. Only the positive signal range (0 to 100 %) is used.

2-way Operation



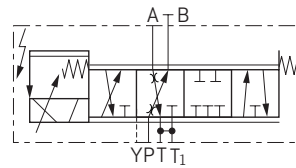
2x2-way Operation



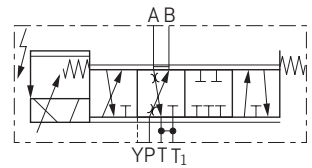
4-way and 3-way Operation

In 4-way operation the servo valves can be used to control the flow in ports A and B (used as 4/3-way throttle valves). Port B must be closed in order to obtain 3-way operation. Leakage port Y must be used if the pressure in tank port T exceeds a value of 50 bar (725 psi). The valves are available with zero lap, less than 3 % or 10 % positive overlap.

3-way Operation with Fail-safe Option F



4-way Operation with Fail-safe Option F

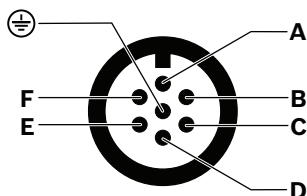


Note: The specified flow directions must be observed.

ELECTRONICS

Pin Assignment for Valves with 6-pole + PE Connector, Pin Contacts (X1)

According to EN 175201-804, mating connector (type R or S, metal) with leading protective earth pin (⊕).



Pin	Pin Assignment	Signal Type ¹⁾	
		Voltage Floating	Current Floating ²⁾
A	Supply voltage	$U_{\text{Supply}} = 24 V_{\text{DC}}$ (18 to 32 V_{DC}) referenced to GND (reverse polarity protected against GND)	
B	GND	Power ground/signal ground	
C	Not used		
D	Command signal - spool position	$U_{\text{in}} = U_{\text{DE}}$ $R_{\text{in}} = 10 \text{ k}\Omega$	$I_{\text{in}} = I_{\text{D}} = -I_{\text{E}}$ $R_{\text{in}} = 200 \Omega$ $I_{\text{max}} = \pm 25 \text{ mA}$
E	Reference point input rated command	Reference for pin D ²⁾	
F	Actual value - spool position	$U_{\text{F-B}} = 2 \text{ to } 10 \text{ V}$; $U_{\text{F-B}}$ is proportional to the spool position; 6 V corresponds to the spool center position	$I_{\text{out}} = 4 \text{ to } 20 \text{ mA}$ referenced to GND; I_{out} is proportional to the spool position; 12 mA corresponds to the spool center position; the output is short-circuit-proof; $R_{\text{L}} = 300 \text{ to } 500 \Omega$
⊕	Protective earth (PE)	Connected with valve body	

1) Signal ranges see next page.

2) The potential difference between pins D or E referenced to pin B must be between -15 V and +32 V.

ELECTRONICS

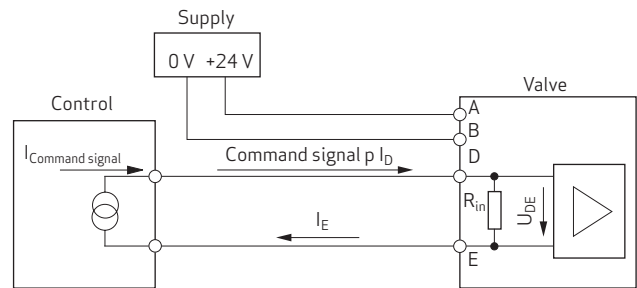
Ordering Codes and Signals for Valves with 6-pole + PE Connector (X1)

Ordering Code	Command Signal ±100 % Spool Position	Actual Value ±100 % Spool Position		
M	$U_D - U_E$	-10 to +10 V	I_F	4 to 20 mA
X	I_D	-10 to +10 mA	I_F	4 to 20 mA
E	I_D	4 to 20 mA	I_F	4 to 20 mA
D	$U_D - U_E$	-10 to +10 V	$U_F - U_B$	2 to 10 V

Note: See inside back cover for complete ordering information.

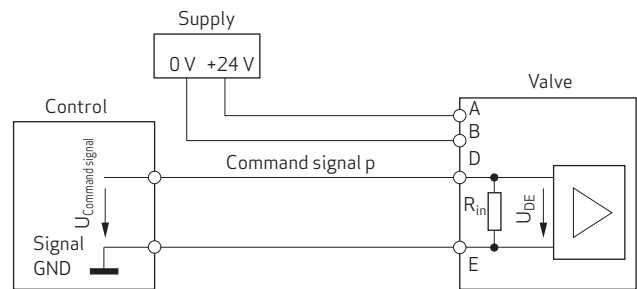
Command Signal Current Floating, Ordering Code X or E

The spool position is proportional to $I_D = -I_E$. For a command signal $I_D = 20\text{ mA}$ (code E) or $+10\text{ mA}$ (code X) the spool moves to 100 % P → A and B → T. For a command signal $I_D = 12\text{ mA}$ (code E) or 0 mA (code X) the spool is in the defined center position.



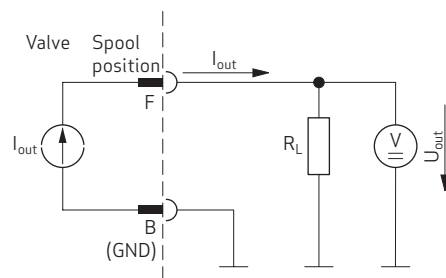
Command Signal Voltage Floating, Ordering Code D or M

The spool position is proportional to $U_D - U_E$. For a command signal $U_D - U_E = +10\text{ V}$ the spool moves to 100 % P → A and B → T. For a command signal $U_D - U_E = 0\text{ V}$ the spool is in the defined center position.



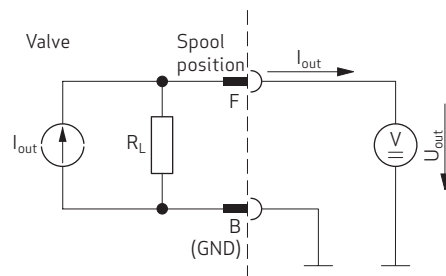
Actual Value 4 to 20 mA, Ordering Code M, X or E

The signal can be used for monitoring and fault detection purposes. The spool position is proportional to I_{out} . The spool position corresponds to 4 to 20 mA. At 12 mA the spool is in center position. 20 mA corresponds to 100 % valve opening P → A and B → T. Optional use: Actual value $U_{out} = 2\text{ to }10\text{ V}$ with resistor $R_L = 500\ \Omega$ (0.25 W) provided by customer.



Actual Value 2 to 10 V, Ordering Code D

The signal can be used for monitoring and fault detection purposes. The spool position is proportional to U_{out} . The spool position corresponds to 2 to 10 V. At 6 V the spool is in center position. 10 V corresponds to 100 % valve opening P → A and B → T. $R_L = 500\ \Omega$ (0.25 W).



Note: For more information see Technical Notes TN 353 „Protective Grounding and Electrical Shielding of Valves“ and TN 494 „Maximum Permissible Length of Electric Cables for Valves with Integrated Electronics“. Visit www.moog.com/industrial/literature to download document.

FLOW CALCULATION

When the valve is open, the prevailing flow is dependent not only on the spool position, (i.e. the opening cross section of the valve), but also on the pressure drop at the individual lands. When the valve is deflected at 100 %, it delivers the rated flow with the rated pressure drop.

The rated flow of a servo valve corresponds to a pressure drop of 35 bar (500 psi) per land, equating to 70 bar (1,000 psi) for two lands. When a valve is opened at 100 %, the flow can be calculated as a function of the actual pressure drop with the aid of the formula below or taken from the diagram.

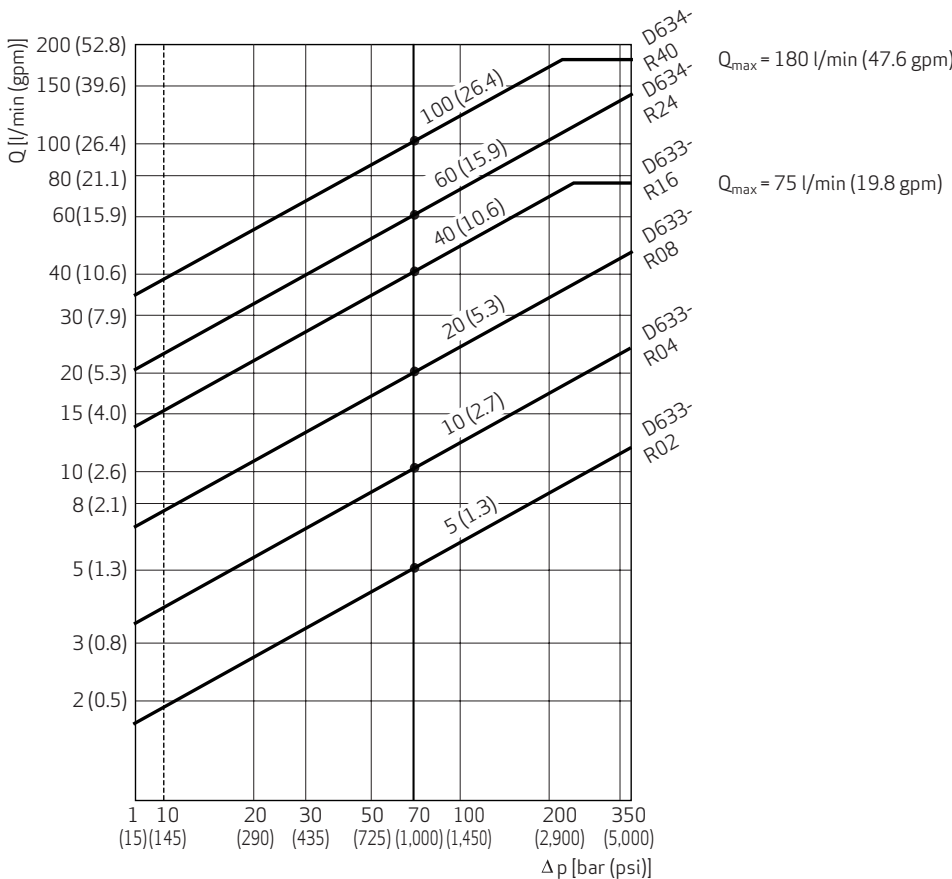
$$Q = Q_N \cdot \sqrt{\frac{\Delta p}{\Delta p_N}}$$

- Q [l/min (gpm)] actual flow
- Q_N [l/min (gpm)] rated flow
- Δp [bar (psi)] actual pressure drop per spool land
- Δp_N [bar (psi)] rated pressure drop per spool land

The actual flow in the valve ports must not exceed a mean flow velocity of approximately 30 m/s (96.5 ft/s) due to the risk of cavitation. When operating the valves close to these application limits, it is necessary to drill the ports to the maximum possible diameters (see specifications for the respective valve).

For ISO 4401 size 05 mounting surfaces the second tank port must additionally be connected starting from a flow Q exceeding 60 l/min (15.9 gpm).

Flow Diagram



ACCESSORIES AND SPARE PARTS

Spare Parts

Part Designation	Size	Description	Material	Part Number
Service sealing set	03 -D633	Contains the following O-rings: <ul style="list-style-type: none"> • 4 pieces for P, T, A, B inner Ø 9.25 mm (0.364 in) x Ø 1.8 mm (0.071 in) • 1 piece for Y inner Ø 7.65 mm (0.301 in) x Ø 1.8 mm (0.071 in) 	NBR 90 Shore	B97215-N630F63
			FKM 90 Shore	B97215-V630F63
			HNBR 90 Shore	B97215-H630F61
	05 - D634	Contains the following O-rings: <ul style="list-style-type: none"> • 5 pieces for P, T, T1, A, B inner Ø 12.4 mm (0.488 in) x Ø 1.8 mm (0.071 in) • 2 pieces for X, Y inner Ø 15.6 mm (0.614 in) x Ø 1.8 mm (0.071 in) 	NBR 90 Shore	B97215-N681-10
FKM 90 Shore	B97215-V681-10			

Accessories

Part Designation	Size	Description	Part Number
Shipping plate	03 -D633	1 piece	B46035-001
	05 - D634	1 piece	A40508
Mounting screws	03 -D633	4 pieces M5x55, ISO 4762-10.9, tightening torque 6.8 Nm (60 lbf in)	-
	05 - D634	4 pieces M6x60, ISO 4762-10.9, tightening torque 11 Nm (97 lbf in)	-

Documents ¹⁾

Part Designation	Size	Title	Part Number
Technical note TN 353	03 - D633, 05 - D634	Protective grounding and electrical shielding of hydraulic valves with integrated electronics	CA58437
Technical note TN 494	03 - D633, 05 - D634	Maximum permissible length of electric cables for valves with integrated electronics	CA48851
User manual	03 - D633, 05 - D634	User manual mounting and installation notes D633/4 Series Servo Valves	B97072-633

1) Visit www.moog.com to download a document using the part number in a search

ACCESSORIES AND SPARE PARTS

Accessories

Part Designation	Size	Description	Image	Part Number
Cable with straight mating connector 6-pole + PE	03 - D633, 05 - D634	5, 10, 20 or 25 m, e.g. for 5 m specify 005, other length upon request	-	C21033-xxx-001
Mating connector, elbow 6-pole + PE	03 - D633, 05 - D634	In accordance with EN 175201-804, type S, metal, IP65, cable Ø 8 to 12 mm (0.315 to 0.472 in)		B97069-061
Mating connector, straight 6-pole + PE	03 - D633, 05 - D634	In accordance with EN 175201-804, type R, metal, IP65, crimp contact Ø 0.75 to 1.5 mm ² (0.0012 to 0.0023 in ²), conus Ø 12.2 mm (0.48 in), cable Ø 9 to 12 mm (0.354 to 0.472 in), sealing element Ø 9 to 13 mm (0.354 to 0.512 in)		B97007-061

ORDERING CODE

		Model Number					Type Designation										
		1	2	3	4	5	1	2	3	4	5	6	7	8	9	10	11
D63																	
Size																	
3	Size 03																
4	Size 05																
Specification																	
-	Series specification																
K	Explosion proof version for gas upon request																
Model Designation																	
Assigned at the factory																	
Factory Identification																	
1 Valve Type																	
R	Servo Valve with integrated electronics																
2 Rated Flow per Spool Land [l/min (gpm)]																	
	Size 03 - D633	Size 05 - D634	For $\Delta p_N = 35$ bar (500 psi) per spool land	For $\Delta p_N = 5$ bar (73 psi) per spool land													
02	●	-	5 (1.32)	2 (0.53)													
04	●	-	10 (2.64)	4 (1.06)													
08	●	-	20 (5.28)	8 (2.11)													
16	●	-	40 (10.57)	16 (4.23)													
24	-	●	60 (15.85)	24 (6.34)													
40	-	●	100 (26.42)	40 (10.57)													
3 Maximum Operating Pressure																	
K	350 bar (5,000 psi) (steel body)																
4 Bushing/Spool Design																	
O	4-way: axis cut, linear flow characteristic																
A	4-way: 1.5 to 3 % overlap, linear flow characteristic																
D	4-way: 10 % overlap, linear flow characteristic																
Z	2x2-way: P → A, B → T, with Y-port only																
		Special spool on request															
5 Linear Motor																	
1	D633 standard																
2	D634 standard																
6 Spool Position Without Electric Supply																	
M	Center position																
F	P → B, A → T connected (approximately 10 % open)																
D	P → A, B → T connected (approximately 10 % open)																
		Other openings on request															
7 Y-port																	
0	Closed with screw plug $p_{Tmax} = 50$ bar (725 psi) internal																
3	Open, with filter insert $p_T > 50$ bar (725 psi)																
8 Seal Material																	
N	NBR (for HLP, PAO, HFDU, HEES, HFA, HFC fluids)																
V	FKM (for HLP, PAO, HFD, HFDU, HEES, HFA fluids)																
		Others on request															
9 Valve Connector																	
S	6+PE pole EN 175201-804																
10 Signals for Position Control ¹⁾																	
		Command signal	Actual value														
M		-10 to +10 V	4 to 20 mA														
X		-10 to +10 mA	4 to 20 mA														
E		4 to 20 mA	4 to 20 mA														
D		-10 to +10 V	2 to 10 V														
11 Supply Voltage																	
2	24 V _{DC} , for more information, see section "ELECTRONICS"																

1) Input voltage limited, see section "ELECTRONICS"

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Moog designs a range of motion control products to complement those featured in this document. Moog also provides service and support for all of our products. For more information, contact the Moog facility closest to you.

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D633, D634 Direct Drive Analog Control Servo Valve
KEM/Rev. D, November 2024, CDL 59872-en