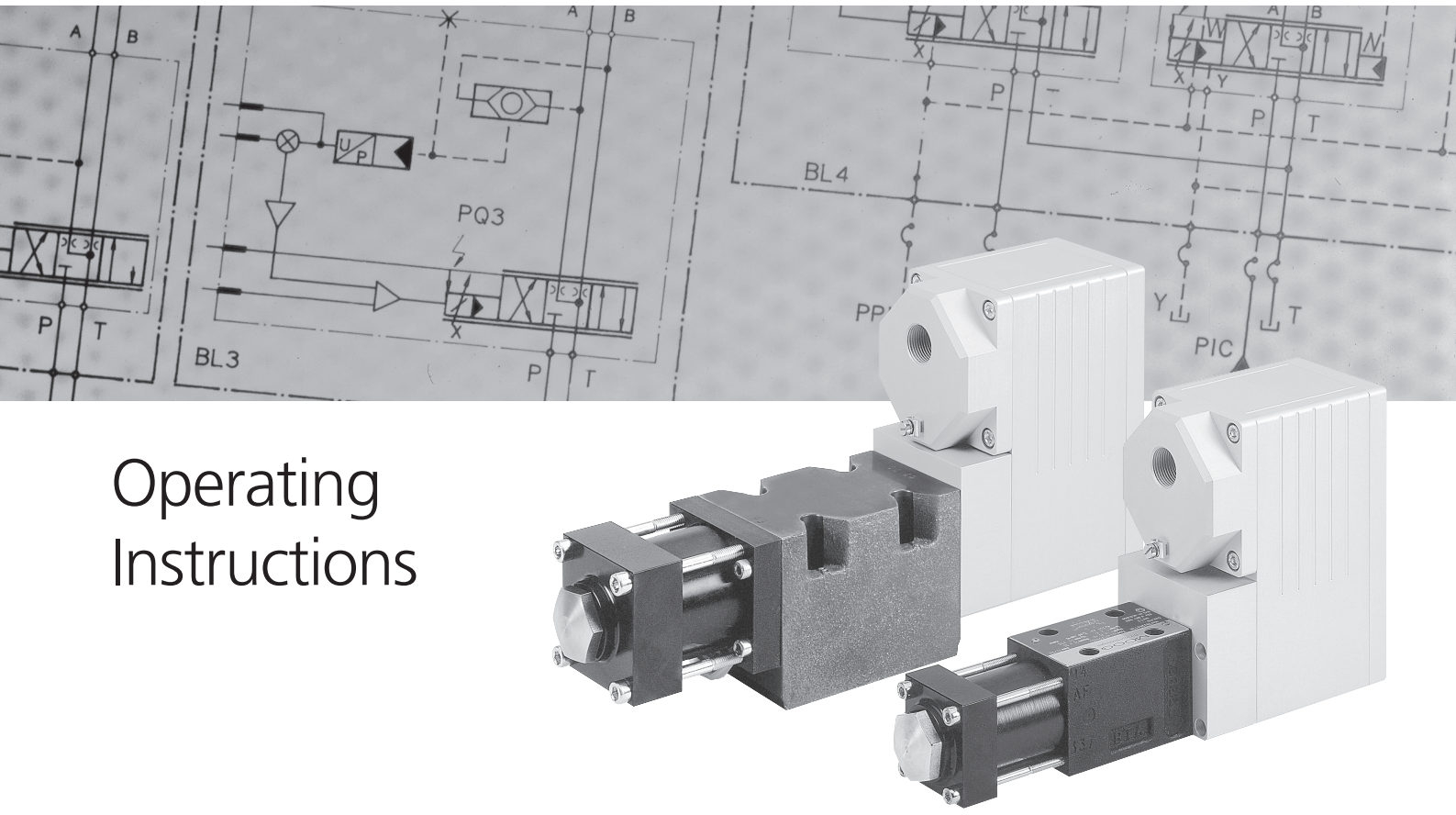
MOOG

Proportional Control Valves with integrated Electronics Explosion protected D633K, D634K, D635K and D636K Series ISO 4401 Size 03 and 05



Operating Instructions

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1. Safety Instructions

1.1 Warnings and symbols

refers to special orders and prohibitions to prevent damage

refers to special orders and prohibitions to prevent injury or property damage

1.2 Correct application

1.2.1 

The valves series D633K, D634K, D635K and D636K are electrical equipment for hazardous areas, type of protection "**de**" (**d** Flameproof enclosure to DIN EN 50018, **e** Increased safety to DIN EN 50019)

Identification D633K/D635K Series:

Approval:	**DMT 00 ATEX E 037, CE 0123**
Identification:	**II 2G EEx de II B+H_2 T4**
Temperature range:	**Ambient - 20 to + 60 °C**
	Fluid - 20 to + 60 °C
alternative allowed	
Identification:	**II 2G EEx de II B+H_2 T3**
Temperature range:	**Ambient - 20 to + 60 °C**
	Fluid - 20 to + 80 °C

Identification D634K/D636K Series:

Approval:	**DMT 00 ATEX E 037, CE 0123**
Identification:	**II 2G EEx de II B+H_2 T3**
Temperature range:	**Ambient - 20 to + 60 °C**
	Fluid - 20 to + 70 °C

1.2.2 The valves are proportional valves intended for directional-, velocity-, pressure- and force control in hydraulic control systems that operate with mineral oil based fluids. Others on request.

Using the valves for purposes other than those mentioned above is considered contrary to the intended use. The user bears entirely the risk of such misuse.
Correct application involves also observing the operating instruction and complying with the inspection and maintenance directives.

1.3 Organizational measures

1.3.1 We recommend to include this operating instruction into the maintenance plan of the machine / plant.

1.3.2 In addition to the operating instruction, observe also all other generally applicable legal and other mandatory regulations relevant to accident prevention and environmental protection. Instruct the operator accordingly.

1.3.3 All safety and danger prevention instructions of the machine/plant must meet the requirements of EN 982 and DIN EN 50014.

1.4 Selection and qualification of personnel

Service work carried out by the user on explosion protection valves is prohibited, as intervention by third parties renders the explosion protection permit null and void.

1.5 Safety instructions for specific operational phases

1.5.1 Take the necessary precautions to ensure that the valve is used only when in a safe and reliable state.

1.5.2 Check the valve at least once per working shift for obvious damage and defects (i.e. leakage). Report any changes to the responsible group / person immediately. If necessary, stop the machine immediately and secure it.

1.5.3 In the event of malfunctions, stop the machine / plant immediately and secure it. Have any defects rectified immediately.

1.5.4 

If the machine / plant is completely shut down for maintenance and repair work at the valve, it must be secured against inadvertent start up by:

- ❒ Locking the principal control elements and removing the key.
- ❒ attaching a warning sign to the main switch.

1.6 Safety instructions for the operation of hydraulic plants

1.6.1 Work on electrohydraulic equipment must be carried out only by personnel having special knowledge and experience in electrohydraulic controls.

1.6.2 Check all lines, hoses and fittings of the plant regularly for leaks and obvious damage. Repair damage immediately. Splashed oil may cause injury and fire.

1.6.3 

Before removing the valve depressurize all system sections to be opened, pressure lines and accumulators of the hydraulic system in accordance with the specific instructions for the plant.

1.6.4 

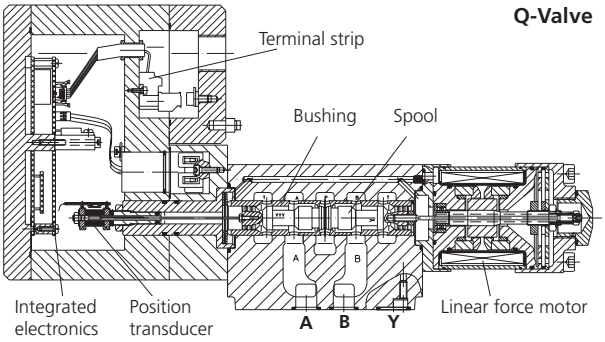
When handling oil, grease and other chemical substances, observe safety regulations valid for each product.

2. Description

2.1 Principle and function of Q-valves D633K and D634K

2.1.1 General

The explosion protected valves D633K / D634K Series are direct driven proportional control valves (DDV) with electrical closed loop spool position control. The spool drive is a permanent magnet linear force motor which actively strokes the spool from its spring centred position in both directions. The closed loop spool position electronics and pulse width modulated (PWM) drive electronics are integrated into the valve. This permits control of the valve directly from, for example, a machine control without the use of additional interface electronics.



2.1.2 Flow function

An electrical signal corresponding to the desired spool position is applied to the integrated electronics and produces a pulse width modulated (PWM) current in the linear force motor coil. The resulting force causes the spool to move. An oscillator excites the spool position transducer (LVDT), producing an electrical 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.

2.2 Principle and function of p-valves D635K and D636K

2.2.1 General

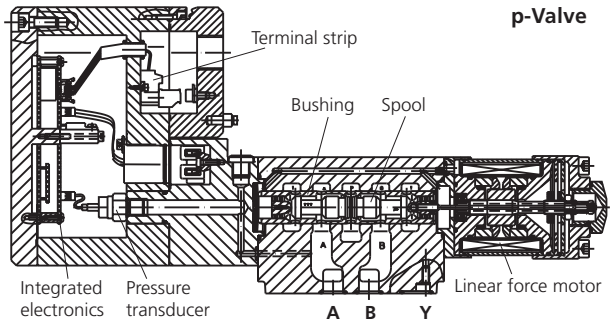
The explosion protection valve D635K / D636K Series consists of direct-controlled proportional pressure control valves with electrical position control of the control piston.

A permanent magnet linear motor is used for drive, moving (in contrast to proportional magnet drives) the control piston out of the spring-centred central position in both working directions. Pressure control and pulse-width modulation (PWM) drive electronics are integrated in the valve, as is a pressure transducer and setpoint ramp. Triggering of the valve is thus direct (e.g. it can be achieved by the machine control system without any interconnected electronics).

2.2.2 Pressure control function

The pressure at connection A is measured with a pressure transducer, converted to actual pressure value in the signal conditioning unit and compared with a pressure setpoint. A difference between the setpoint and actual value is amplified in the pressure controller and transmitted to the PWM drive. This actuating signal has the effect of correcting the difference in the linear motor which drives the control piston. The pressure setpoint signal can be input via a set ramp with 20 second rise/fall time, or directly in the pressure control circuit.

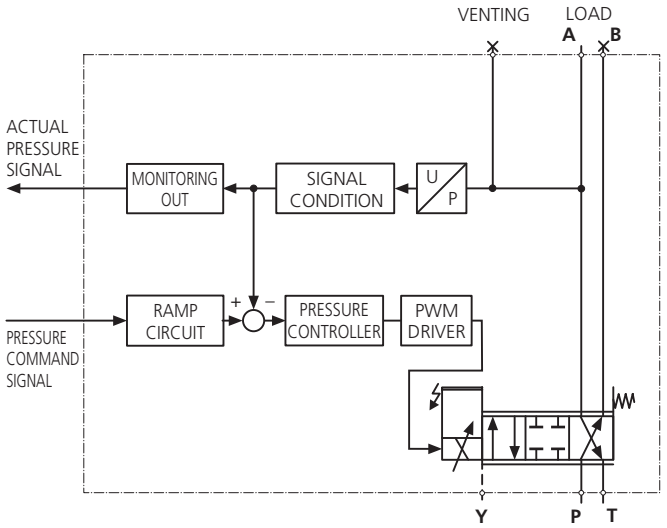
2.2.3 Volumetric flow function



The volumetric flow function is a sub-function within the pressure control valve and cannot be triggered separately. The A ◗ T and P ◗ B connections are, for example, opened to the maximum extent at the linear motor and control piston initial position (coil current = 0). This position is defined as the pressure control valve safety position (e.g. in the event of a power supply voltage failure). The A ◗ T and P ◗ B connections close at an increasing rate relative to rising coil current (eventually closing completely). This occurs after approx. 90 % of the maximum control piston stroke with the 2x2-way function (in auxiliary current), approx. 50 % with the three-way function.

A further rise in coil current causes the P ◗ A and B ◗ T connections in the 3-way function to open to maximum capacity at the control piston limit for maximum volumetric flow.

Block diagram



2.3 Technical data

Series			D633K, D635K	D634K, D636K
Mounting pattern			ISO 4401-03-03-0-94 with or without drain port Y [1])	ISO 4401-05-05-0-94 with or without drain port Y [1])
Mounting direction	⚠ venting pressure control valve		any, fixed or moveable	any, fixed or moveable
Vibration			30 g, 3 axis	30 g, 3 axis
Mass		[kg]	2,5	7
Rated flow at Δp_N = 5 bar per land, tolerance ±10 %		[l/min]	see nameplate of the valve	see nameplate of the valve
Max. valve flow		[l/min]	75	185
Max. operating pressure				
Ports P, A, B [3])		[bar]	350	350
Port T without use of port Y		[bar]	50	50
Port T with Y		[bar]	350	350
Port Y			directly to tank	directly to tank
Temperature range	Ambient	[°C]	⚠ see 1.2.1 on page 2	⚠ see 1.2.1 on page 2
	Fluid	[°C]		
Operating fluid			mineral oil based hydraulic fluid according DIN 51524, part 1 to 3, others upon request	mineral oil based hydraulic fluid according DIN 51524, part 1 to 3, others upon request
Viscosity	recommended	[mm²/s]	15 to 100	15 to 100
	allowable	[mm²/s]	5 to 400	5 to 400
System filter			High pressure filter, without bypass, but with dirt alarm in the main flow, mounted directly in front of the valve	High pressure filter, without bypass, but with dirt alarm in the main flow, mounted directly in front of the valve
Class of cleanliness according to ISO 4406			15 / 12 or better [2])	15 / 12 or better [2])
Filter rating	for normal operation		$\beta_{10} \geq 75$ (10 µm absolute)	$\beta_{10} \geq 75$ (10 µm absolute)
	for longer life		$\beta_6 \geq 75$ (6 µm absolute)	$\beta_6 \geq 75$ (6 µm absolute)

[1]) Drain port Y must be used
- ❒ with 3- and 4-way operation and p_T > 50 bar
- ❒ with 2x2-way operation

[2]) For long life wear protection of metering lands

[3]) Max. operating pressure will be limited by the nominal pressure of the pressure transducer. See nameplate of the valve.

For additional technical information, such as dimensions, ordering information etc. see catalogue D633/D634 and D635/D636 Series.

3. Installation

3.1 General Information

3.1.1 Compare model number and valve type with information from the hydraulic schematic or bill of material.

3.1.2 The valve can be mounted in all directions, fixed or moveable.

3.1.3 Check mounting surface on planeness (0,01 mm for 100 mm) and surface roughness (Ra < 0,8 µm).

3.1.4 Pay attention to cleanliness of mounting surface and surroundings when installing the valve.

3.1.5 Use lint-free tissue to clean!

3.1.6 Before installation, remove protection plate from the valve and keep it for later repair.

3.1.7 Use socket head bolts according to DIN EN ISO 4762, strength class 10.9 for mounting and tighten them diagonally changing according to following table (tolerance ± 10%).

Series	Mounting pattern ISO 4401	Bolts to DIN EN ISO 4762	Qty.	Torque [Nm] 10.9
D633/5K	03-03-0-94	M5 x 55	4	8,5
D634/6K	05-05-0-94	M6 x 60	4	13

3.1.8 Pay attention to correct position of ports and location of o-rings during installation.

3.2 Venting of pressure transducer at D635K and D636K

⚠ ATTENTION

Trapped air can lead to the diesel effect, particularly in the case of high peak pressure levels in the system. This diesel effect can lead to damage to the pressure transducer integrated in the valve (from zero offsetting to complete destruction).

⚠ ATTENTION

The internal connection to the pressure transducer in the valve should for this reason be vented via the venting screw (as described below) when the valve is installed or the hydraulic circuit is opened. If the consumer is at a higher attitude than the P-valve it should also be vented at the highest point.

⚠ ATTENTION

We recommend that attention be paid to the installation position when installing the valve so that venting can be carried out effectively (venting screw at top).

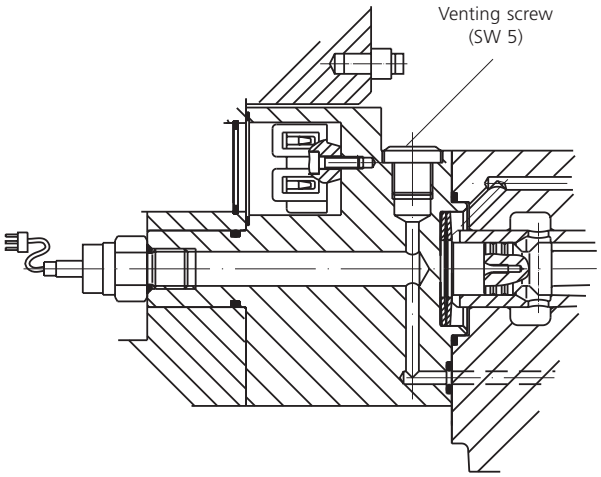
The power supply (24 Volt) should be applied to the valve prior to venting. The pressure setpoint should be set to pro-

duce a pressure of about 10 bar in connection A at **a maximum supply pressure of 15 bar**.

DANGER

Only vent at low system pressure!
Risk of injury!

Venting



With pressure command set and lowered supply pressure, carefully open the venting screw by turning it **approximately one turn**. The entrapped air should escape now together with hydraulic fluid. Wait until no more air bubbles can be seen in the oil. Then close the venting screw and torque it to **10 Nm**.

Venting should be repeated 2 to 3 times at intervals of 2 to 3 hours.

Increase the supply pressure to the rated value and check valve and hydraulic system for external leakage, correct fluid level indication and temperature.

3.3 Electronics information

3.3.1 Characteristic data

ATTENTION

Please note information about input signals on the nameplate!
It must be ensured through correct assembly that a equipotential bonding is possible.

3.3.1.1 Supply voltage U_A = 24 VDC (19 to 32 VDC).

Current consumption I_{Amax}	1,2 A at D633K and 2,2 A at D634K. 1,0 A at D635K and 2,2 A at D636K.
External fuse per valve	D633K/ D635K 1,6 A (slow) D634K/ D636K 2,5 A (slow)

3.3.1.2 Input command signals **at D633K and D634K**

Command signal 0 to ± 10 mA, floating
The spool stroke of the valve is proportional $I_D = -I_E$.
100 % valve opening P ◗ A and B ◗ T is achieved at I_D = +10 mA.
At 0 mA command the spool is in centred position.
The input pins D und E are inverting. Either pin D or E is used according to the required operating direction. The other pin is connected to signal ground at cabinet side.

Command signal 0 to ± 10 V
The spool stroke of the valve is proportional ($U_D - U_E$).
100 % valve opening P ◗ A and B ◗ T is achieved at ($U_D - U_E$) = +10 V.
At 0 V command the spool is in centred position.
The input stage is a differential amplifier. If only one command signal is available, pin D or E is connected to signal ground at cabinet side, according to the required operating direction.

Command signal 4 to 20 mA
The spool stroke of the valve is proportional (I_D - 12 mA).
100 % valve opening P ◗ A and B ◗ T is achieved at I_D = 20 mA.
100 % valve opening P ◗ B and A ◗ T at I_D = 4 mA.
Use pin D as signal input. Pin E is left open.

Measuring output (actual spool position)
For actual spool position signal I_F is available (4 to 20 mA).
100 % valve opening P ◗ A and B ◗ T at 20 mA. 100 % valve opening P ◗ B and A ◗ T at 4 mA.

3.3.1.3 Input command signals **at D635K and D636K**

Command signal 0 to + 10 mA
The controlled load pressure of the valve is proportional I_D.
100 % pressure is achieved at I_D = + 10 mA. Pin E is left open. Either pin D or E is used according to the required direction.

Command signal 0 to + 10 V
The controlled load pressure of the valve is proportional (U_D - U_E). 100 % pressure is achieved at (U_D - U_E) = + 10 V. Pin E is connected to signal ground ⊥. Either pin D or E is used according to the required direction.

Command signal 4 to 20 mA
The controlled load pressure of the valve is proportional I_D.
100 % pressure is achieved at I_D = 20 mA. Use pin D as signal input. Pin E is left open.

Measuring output (actual pressure)
Signal level for actual pressure output I_F = 4 bis 20 mA. See also 3.3.4 „Connector wiring“ at page 6.

3.3.1.4 All signal lines, also those of external transducers, shielded. Shielding connected radially to ⊥ (0 V), power supply side, and connected to the mating connector housing (EMC).

3.3.1.5 **EMC**: Meets the requirements of EN 55011/03.91, class B, EN 50081-1/01.92, and EN 50082-2/03.95, performance criterion class A.

3.3.1.6 Minimum cross-section of all leads ≥ 0,75 mm².
Consider voltage losses between cabinet and valve.

3.3.1.7 Note: When making electric connections to the valve (shield, protective earth) appropriate measures must be taken to ensure that locally different earth potentials do not result in excessive ground currents.
See also Moog Application Note AM 353 E.

3.3.2 Connector wiring
See information tag on the valve and 3.3.4 „Connector wiring“ on page 7.

3. 3.3 Cable assembly

ATTENTION The temperature stability of the cable used has to be > 90 °C.

3.3.3.1 Preparation of cable
Prepare length of cable (see figure 1)
Attention: Avoid damaging protective layer during the process of removing insulation layers. You have to repair cable that has any damaged insulation layers.

3.3.3.2 Removal of protective layer
Cut insulation layer to a lenght of 125 mm. Cut the insulation layer on this end to 161 mm and 175 mm.
Remove insulation layer at cut lenght of 125 mm.

3.3.3.3 Preparation of shielding mesh
Cut shielding mesh to lenght at 161 mm and remove.
Remove the rest of the insulation layer (161 mm).

3.3.3.4 Remove insulation layer up to lenght of 161 mm. Cut the shielding mesh directly at the layer. Remove the second layer and the protective foil.

3.3.3.5 Cut stranded wires (see figure 1).

3.3.3.6 Cut insulation layer on stranded wire (see figure 1) and remove layer parts.

3.3.3.7 Cut shielding mesh surrounding insulation layer.

3.3.3.8 Cut glas filling surrounding insulation layer.

3.3.3.10 Tin cables No. 1 to No. 6 and the yellow-green multicore cable.

3.3.3.9 Fix cable shoe and multicore cable end.
Strip (see fig. 1). Crimp cable eylet on to grounding strand (see fig. 2). Crimp tubes on all stranded wires.

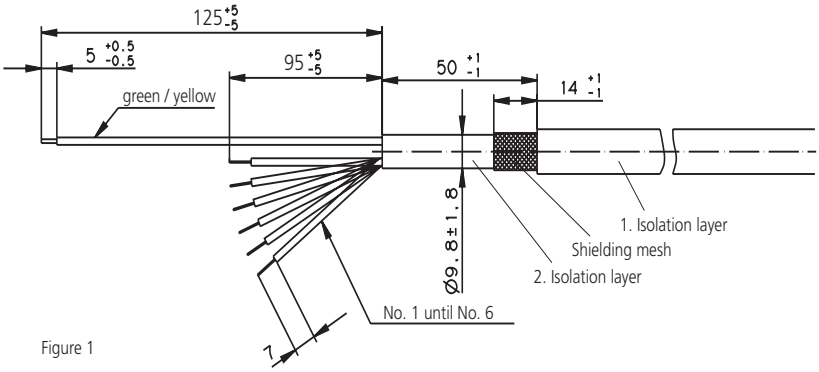


Figure 1

3.3.4 Place shielding on cable inlet (see figure 3)

ATTENTION The temperature stability of the used cable inlet has to be > 90 °C. Dimensions of cable and cable inlet have to fit together!

3.3.4.1 Unscrew the cable gland between parts 6 and 9 so that you can see part 8 (brass housing case) and part 7 (knurled shield mounting cone).

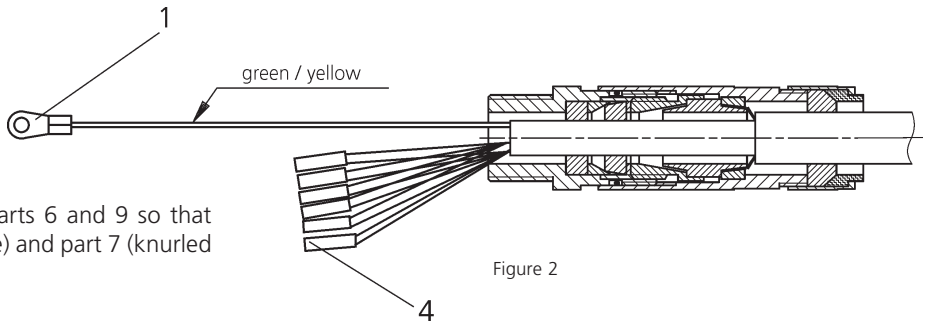
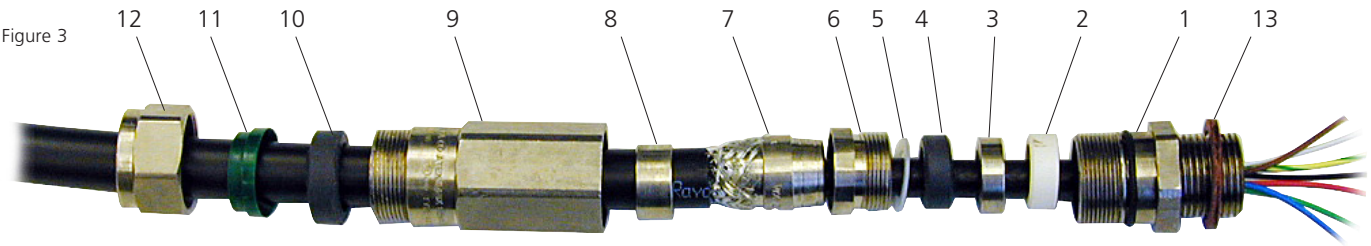


Figure 2

Figure 3



3.3.4.2 Slide parts 8 to 12 up the cable past the shielding mesh.

3.3.4.3 Spread the shielding mesh out from the insulation layer. Next slide the cable gland components (parts 1 to 6) up the cable to the shielding until the cone fits into the shielding mesh.

3.3.4.4 Remove part 1 of the cable inlet (part to be screwed into the valve cover).

3.3.4.5 Apply Loctite® 222 on the outside thread of part 1.
Assemble part 13, ring seal on to the thread of part 1.

3.3.4.6 Screw parts 1 and 13 into the valve cover and tighten to **26 Nm**. Introduce the cable assembly into part 1. Screw parts 6, 5, 4, 3 and 2 into part 1 and tighten to **10 Nm**.

3.3.4.7 Separate parts 10, 11 and 12 away from part 9. Pull part 8 over the shielding mesh to part 7. Screw part 9 onto part 1 and tighten to **26 Nm**.

3.3.4.8 Screw part 12 with parts 11 and 10 onto part 9 and tighten to **26 Nm**.
Pay attention during tightening that parts 10 and 11 fit symmetrically to ensure a correct seal is made.

ATTENTION **During assembly ensure that the sealing face of the cover is not damaged.** (see figure 4)

ATTENTION Pay attention to the cleanliness of the sealing faces. Thighten the 4 mounting screws to **6 Nm**.

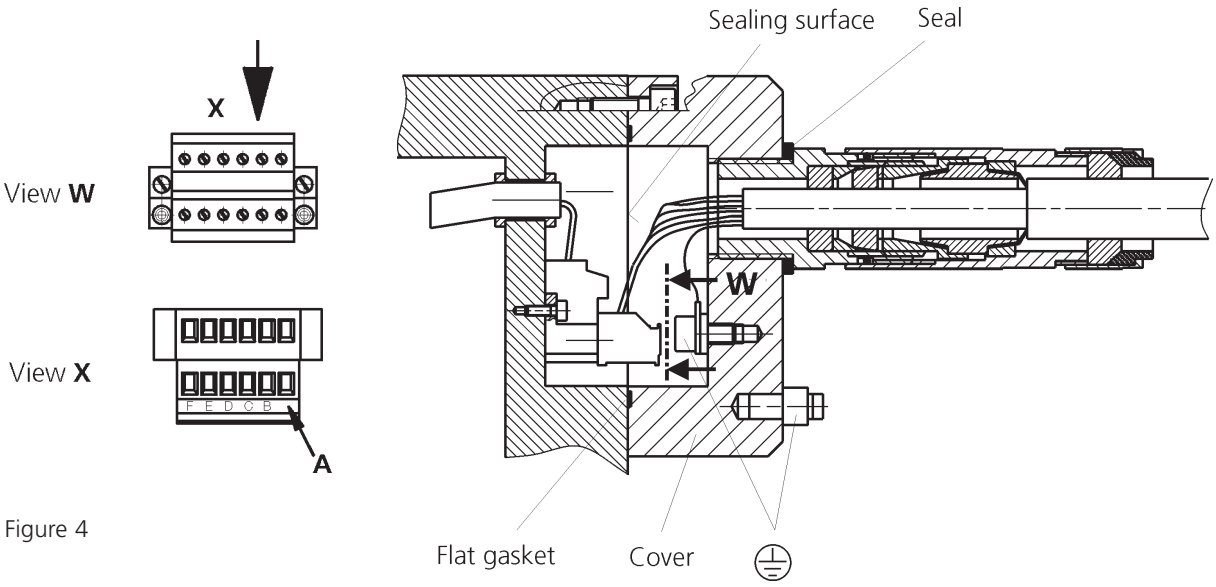
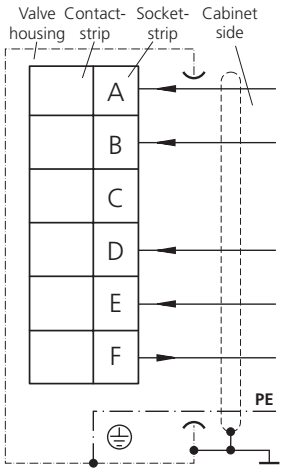


Figure 4

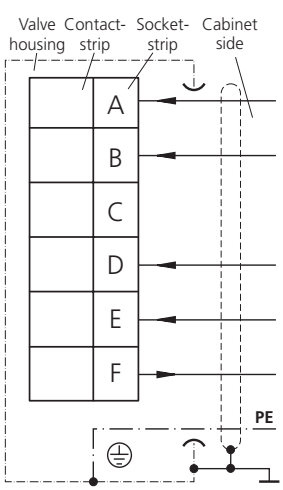
3.4 Connector wiring

For Ex-valves, standard version Q-valves D633K and D634K with protective earth connection ⏚.



Type of signal	Voltage command 0 to ±10 V	Current command 0 to ±10 mA, floating
Supply	24 VDC (19 to 32 VDC)	
Supply	⊥ (0 V)	
not used		
Input rated command (differential)	U_{D-E} = 0 to ± 10 V R_e = 10 kΩ	Input command $I_D = -I_E$: 0 to ± 10 mA Input command (inverted) $I_E = -I_D$: 0 to ± 10 mA (R_e = 200 Ω) Inputs U_{D-B} and U_{E-B} for both signal types limited to min. – 15V and max. + 24V
Output actual spool position	I_{F-B} = 4 to 20 mA. At 12 mA spool is in centred position. Load resistance 300 to 500 Ω.	
Protective ground		

For Ex-valves, standard version P-valves D635K and D636K with protective earth connection ⏚.



Type of signal	Voltage command 0 to +10 V	Current command 0 to +10 mA	Current command 4 to 20 mA
Supply	24 VDC (19 to 32 VDC)		
Supply	⊥ (0 V)		
not used			
Input command Pressure	0 to +10 V Input resistance 50 kΩ	0 to +10 mA Load resistance 200 Ω	4 to 20 mA Load resistance 200 Ω
Input inverted command Pressure	0 to +10 V Input resistance 50 kΩ	0 to +10 mA Load resistance 200 Ω	not used
Output Pressure	4 to 20 mA Load resistance 300 to 500 Ω, with respect to ⊥ (0 V)		
Protective ground			

4. Setting up

This information is valid for new installations to be put into operation as well as for repair cases.

4.1 Filling the hydraulic system

ATTENTION

New oil is never clean. Therefore the system should generally be filled by using a filling filter. This fine mesh filter should at least comply with the following requirement: $\beta_{10} \geq 75$ (10 µm absolute).

4.2 Flushing the hydraulic system

ATTENTION

Before the hydraulic system is put into operation for the first time (also after modifications) it has to be flushed carefully according to the manufacturers instructions of the plant / machine.

4.2.1 Before flushing suitable flushing elements have to be inserted in the pressure filters instead of the high pressure elements.

4.2.2 Before flushing the operational temperature of the hydraulic system should be achieved. Observe temperature!

4.2.3 A flushing plate or, if the system allows, a directional valve should be mounted in place of the Moog porportional valve. The P- and T-connections are flushed through the flushing plate. The user A- and B- connections can also be flushed by the directional valve.

ATTENTION

Attention, the directional valve can lead to unpermissable movements in the load (i.e. with parallel drives), which may result in damage of the plant / machine. The manufacturers instructions have to be strictly observed.

Minimum flushing time **t** can be calculated as follows:

$$t = \frac{V}{Q} \cdot 5 \quad [h]$$

V = content of reservoir [liter]
Q = flow rate of the pump [l/min]
t = flushing time [hours]

4.2.4 The flushing process can be considered completed when a system cleanliness of 15/12 according ISO 4406 or better is achieved. A long life of the metering lands of the proportional valve can be expected for this cleanliness class.

4.2.5 Replace flushing elements in the pressure filters by suitable high pressure elements after flushing. Install Moog proportional valve instead of flushing plate or directional valve.

ATTENTION

4.3 Setting up D633K and D634K

4.3.1 Set up machine/plant according to the the manufacturers operation instructions after the valves have been installed. Vent hydraulic system!

ATTENTION

4.3.2 The safety instructions of the machine/plant manufacturer must be observed.

ATTENTION

Especially the safety requirements according DIN EN 50018 and EN 50019.

4.3.3 Observe oil temperature.

4.3.4 Check hydraulic system for external leakage!

4.4 Setting up D635K and D636K

ATTENTION

Set up machine/plant according to the the manufacturers operation instructions after the valves have been installed. Vent hydraulic system and pressure transducer (see also 3.2 page 4/5).

5. Maintenance

Besides regular visual inspection for external leakage, valve maintenance work is not required.

ATTENTION

Service work carried out by the user on explosion protection valves is prohibited, as intervention by third parties renders the explosion protection permit null and void.

ATTENTION

All repairs of Moog explosion protection valves can only performed at MOOG GmbH Service Departement (see adress at back cover).

6. Faults
Origin and trouble-shooting

6.1 Leakage at the mounting surface of the valve

- ❒ Are all seals installed at ports A, B, P and T ok?
- ❒ Is the seal at port Y ok?
- ❒ Are the mounting bolts tightened correctly?

ATTENTION

Pay attention to the required torque!
Tighten bolts crosswise!

6.2 Leakage at the screw plug of the linear force motor

- ❒ Are ports P and T connected properly?
- ❒ Check pressure in ports T and Y.
- ❒ The return pressure in the T port should not exceed 50 bar.

6.3 No hydraulic responce of the valve

- ❒ Check all signals from pin A to pin F.
- ❒ Is supply voltage present?
- ❒ Check the socket strip for corrosion.
- ❒ Is hydraulic pressure present?
- ❒ Are all hydraulic ports connected properly?

6.4 Instability in the system, closed loop oscillates

- ❒ Check, whether output signal at pin F is following exactly the command signal at pin D!
  If so, the external loop is stable.
  If not, the electronics of the valve may be faulty or the control circuit should be retuned.

6.5 Loss of command signal or broken cable

With loss of command signal or broken command cable the spool returns to the position corresponding to command signal "Zero".

6.6 Loss of supply voltage or broken cable

With loss of supply voltage, or broken cable, or emergency stop the spool returns to its spring centred position.

7. Declaration of conformity

A declaration of conformity as defined by machinery directive 89/392/EEC Annex II B and directive 94/9/EC (ATEX), Annex X is issued for proportional valves D633K, D634K, D635K and D636K Series and is shown in this operating instructions.

MOOG

MOOG GmbH
Hanns-Klemm-Str. 28
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Division Industry

Declaration of conformity

as defined by machinery directive 89/392/EEC Annex IIB
and directive 94/9/EC (ATEX), Annex X

We herewith declare that the

Series of Servovalves D63xKxxxx

(detailed model & serial number is referenced on the delivery note)

is intended to be incorporated into machinery or machinery parts, or assembled with other machinery or machinery parts to constitute machinery covered by this directive and must not be put into service until the machinery into which it is to be incorporated has been declared in conformance with the provisions of the directive as amended by 98/37/EC and directive 94/9/EC.

The admission of the series is registered under:

DMT 00 ATEX E 037

Applied harmonized standards
in particular:

EN982:	"Safety of machinery - Safety requirements for fluid power systems and their components hydraulics."
EN 60204-1	Safety of machinery, electrical equipment of machines, general requirements.
EN 50081-1	Electromagnetic compability (EMC) - Generic emission standard, part 1
EN 50082-2	Electromagnetic compability (EMC) - Generic immunity standard, part 2
EN 50014:'97	Electrical apparatus for potentially explosive atmospheres - General requirements.
EN 50018:'94	Electrical apparatus for potentially explosive atmospheres - Flameproof enclosures "d".
EN 50019:'94	Electrical apparatus for potentially explosive atmospheres - Increased safety "e".

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Böblingen, 14. 8. 2003

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8. Tools, spare parts and accessories

8.1 Tools

The D633K, D635K, D634K and D636K Series valves do not require maintenance. So tools are only required for installation and set up.

8.1.1 Installation of the valve

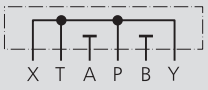
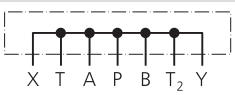
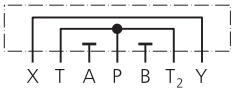
8.1.1.1 Mounting of the D633K and D635K Series requires Allan wrench SW 5

8.1.1.2 Mounting of the D634K and D636K Series requires Allan wrench SW 6

8.2 Spare parts

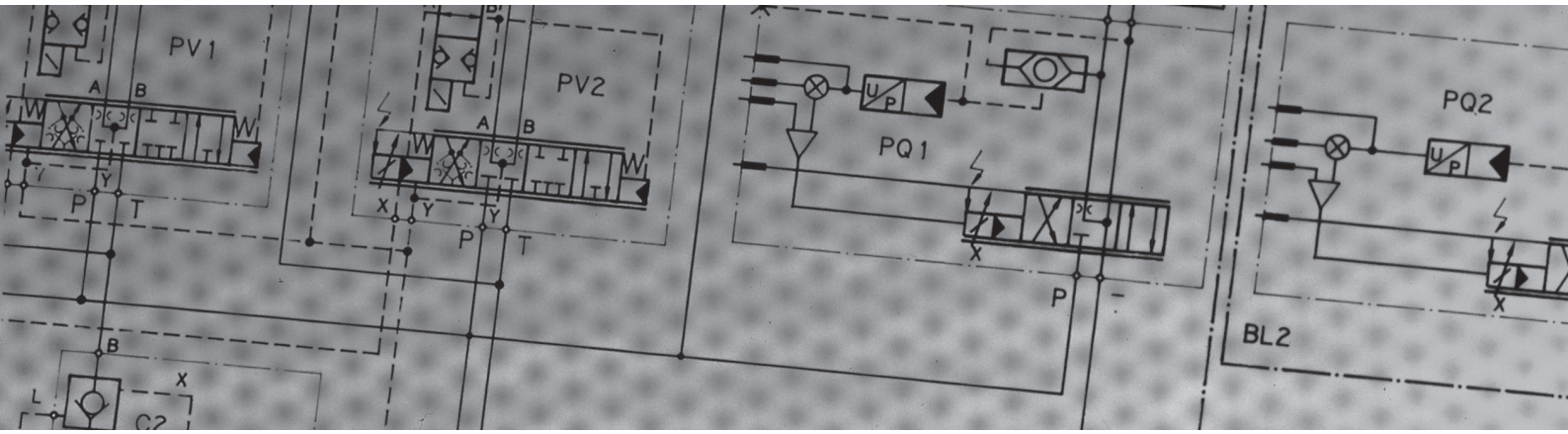
Moog Part No.	Description	D633K/D635K	D634K/D636K	Dimensions	Material	Qty.
-42082-013	O-Ring, ports P, T, A, B	x		ID 9,25 x Ø1,8	FPM Sh 85	4 pcs.
-42082-012	O-Ring, port Y	x		ID 7,65 x Ø1,8	FPM Sh 85	1 pc.
-42082-004	O-Ring, ports P, T, A, B		x	ID 12,40 x Ø1,8	FPM Sh 85	5 pcs.
-42082-011	O-Ring, port Y		x	ID 15,60 x Ø1,8	FPM Sh 85	1 pc.

8.3 **Accessories** (not part of the valve delivery)

Moog Part No.	Description	D633K/D635K	D634K/D636K	Dimensions/Notes	Qty.
A03665-050-055	Mounting bolts	x		M5x55 DIN EN ISO 4762-10.9 or 12.9	4 pcs.
A03665-060-060	Mounting bolts		x	M6x60 DIN EN ISO 4762-10.9 or 12.9	4 pcs.
C55856-001	Cable glant EEx d [1])	x	x	Fa. Stahl: 20S/T3/CDS, nickel-plated	1 pc.
B90624-001	Seal	x	x	Fa. Stahl: 911 005	1 pc.
B97020-001	Cable [1])	x	x	Fa. Sommer: EPD 77202A	1 pc.
	[1])Cable and cable glant must fit together with the dimensions				
B46634-002	Flushing plate	x			
B67728-001	Flushing plate		x		
B67728-002	Flushing plate		x		
B67728-003	Flushing plate		x		

Notes

Argentina
Australia
Austria
Brazil
China
Finland
France
Germany
India



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