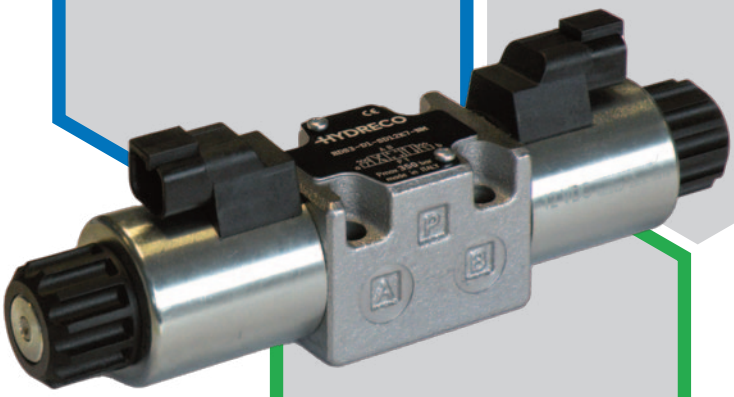
HYDRECO

HDS3

DIRECTIONAL SOLENOID VALVE

350 bar 80 l/min



TECHNICAL CATALOGUE

INTRODUCTION

The HDS3 valves are solenoid directional valves, direct operated, with porting pattern compliant to ISO 4401-03 standards.

These valves are supplied with a zinc-nickel plating making them the perfect choice for mobile and environmental applications that require better protection.
Salt spray resistance up to120 hours (test according to UNI EN ISO 9227 and UNI EN ISO 10289 tests and standards).

The valve body is made with high strength iron castings with internal passages designed to minimize pressure drop.

FLUIDS

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. For fluids HFDR type (phosphate esters) use FPM seals (code V). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department.

Using fluids at temperatures higher than 80 °C (180 °F) causes the accelerated degradation of seals as well as the fluid physical and chemical properties.

From a safety standpoint, temperatures above 55 °C (130 °F) are not recommended.

OPERATING PARAMETERS

MAXIMUM OPERATING PRESSURE	P - A - B ports	350 bar	5000 psi
	T port	210 bar	3000 psi
FLOW RATE		80 l/min	21.1 gpm
MOUNTING SURFACE		ISO 4401-03-02-0-05 NFPA D03	

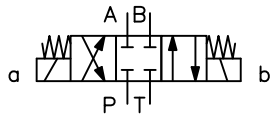
STEP RESPONSE	0 → 100%	25 ÷ 75 ms
	100 →0%	15 ÷ 25 ms

WEIGHT	single solenoid	1.4 kg	3.0 lbs
	double solenoid	2 kg	4.4 lbs

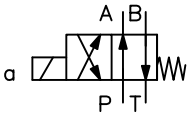
RANGE TEMPERATURES	ambient	-20 to +54 °C	-4 to +130 °F
	fluid	-20 to +82 °C	-4 to +180 °F
FLUID VISCOSITY	range	10 - 400 cSt	60 -1900 SUS
	recommended	25 cSt	120 SUS
FLUID CONTAMINATION		ISO 4406:1999 class 20/18/15	

HYDRAULIC SYMBOLS (TYPICAL)

HDS3-D1

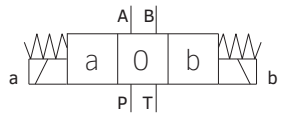
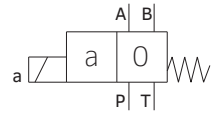
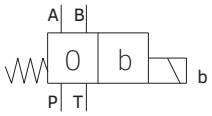
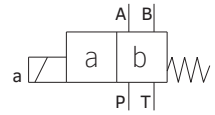
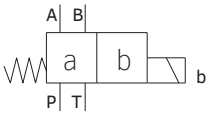
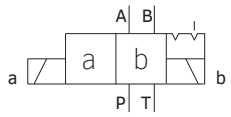


HDS3-TA1



HDS3 - ▢▢ - ▢▢ - ▢▢ - 2

design mark

FUNCTION	
D	 double solenoid 3 positions - spring centered
A	 single solenoid at side A 2 positions - spring return
B	 single solenoid at side B 2 positions - spring return
TA	 single solenoid at side A 2 positions - spring return
TB	 single solenoid at side B 2 positions - spring return
K	 double solenoid and detent 2 positions

VOLTAGE	
SD12	12 V DC solenoid
SD24	24 V DC solenoid
SD28	28 V DC solenoid
SD00	without coils

SPOOL
See next page

COIL	
K1	DIN 43650
K2	AMP Junior
K7	DT04-2P 'deutsch'

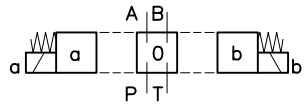
SEAL	
N	NBR (**standard**)
V	Viton

MANUAL OVERRIDE	
M	built-in with the tube, pin (**standard**)
B	built-in with the tube, boot protected
K2	knob, twist and lock

CODE EXAMPLE:

HDS3 - D1 - SD12K7 - NM - 1

FUNCTION D



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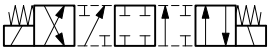
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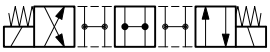
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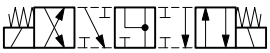
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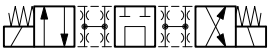
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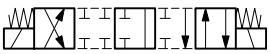
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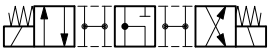
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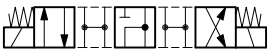
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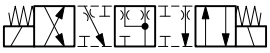
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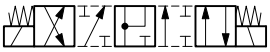
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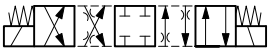
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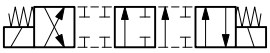
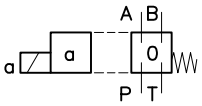


FUNCTION A



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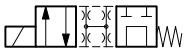
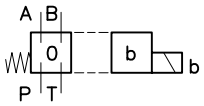


FUNCTION B



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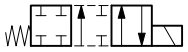
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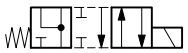
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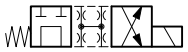
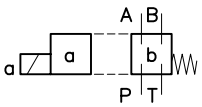


FUNCTION TA



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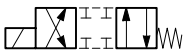
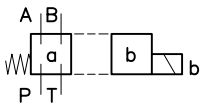

2

3


FUNCTION TB



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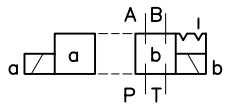
3


FUNCTION K



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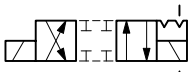
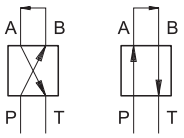
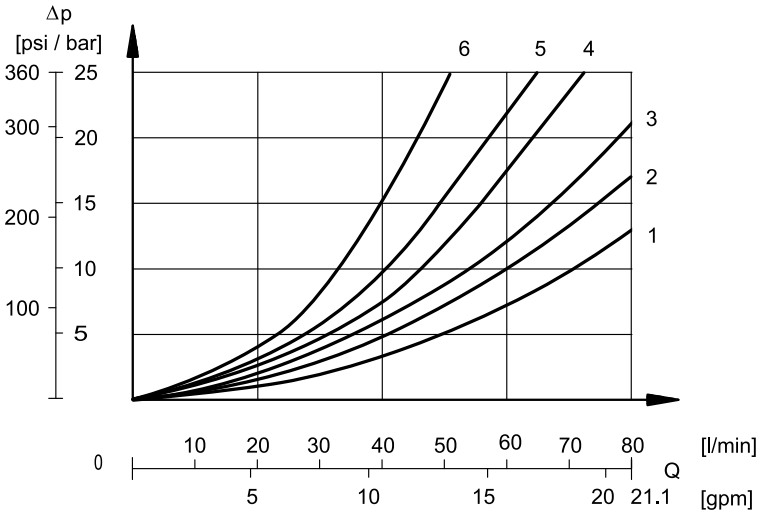


Flow characteristic curves obtained with mineral oil with viscosity of 36 cSt (170 sus) at 50 °C (122 °F) and 24V DC valve; the Δp values are measured between P and T (full loop) valve ports.

The operating limits can be considerably reduced if a 4-port valve is used as 3-port valve with port A or B plugged or without flow.



PRESSURE DROPS Δp-Q



ENERGIZED POSITION

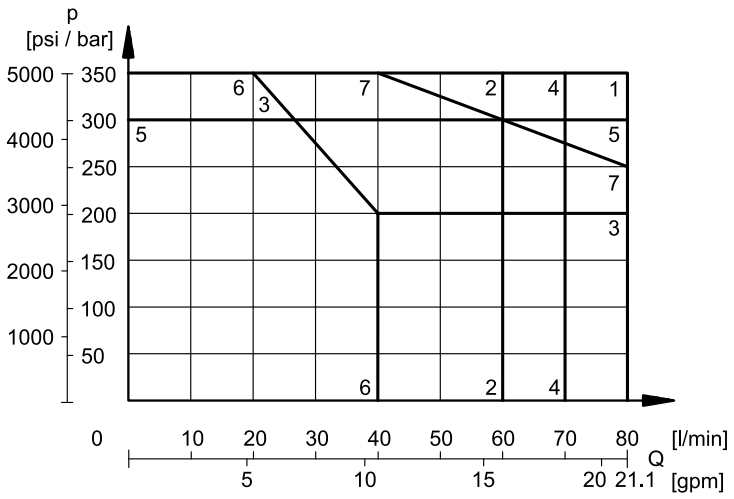
TYPE	FLOW DIRECTION			
	P→A	P→B	A→T	B→T
	CURVES ON GRAPH			
D1, A1, B1	2	2	3	3
D2, A2, B2	1	1	3	3
D3, A3, B3	3	3	1	1
D4, A4, B4	5	5	5	5
D5	2	1	3	3
D6	2	2	3	1
D7, D8	4	5	5	5
D9	2	2	3	3
D10	1	3	1	3
D11	2	2	1	3
D12	2	2	3	3
D18	1	2	3	3
TA1, TB1	3	3	3	3
TA2, TB2	2	2	2	2
TA3, TB3	3	3		
K1	2	2	2	2

Please refer to curve no. 5 for pressure drops between A and B lines of the D10 spool when used in regenerative circuits.

DE-ENERGIZED POSITION

TYPE	FLOW DIRECTION				
	P→A	P→B	A→T	B→T	P→T
	CURVES ON GRAPH				
D2, A2, B2					2
D3, A3, B3			3	3	
D4, A4, B4					3
D5		4			
D6				3	
D7, D8			6	6	3
D10	3	3			
D11			3		
D18	4				

PERFORMANCE CURVES



SPOOL	CURVE	
	P→A	P→B
D1, A1, B1	1	1
D2, A2, B2	2	2
D3, A3, B3	3	3
D4, A4, B4	4	4
D5	5	5
D6	4	6
D7	4	4
D8	4	4
D9	1	1
D10	1	1
D11	4	6
D12	1	1
D18	5	5

SPOOL	CURVE	
	P→A	P→B
TA1, TB1	1	1
TA2, TB2	1	1
TA3, TB3	2	2
K1	7	7

ELECTRICAL DATA

Solenoids are made up of two parts: tube and coil. The tube is threaded into the valve body and includes the armature that moves immersed in oil, without wear. The inner part, in contact with the oil in the return line, ensures heat dissipation.

The coil is fastened to the tube by a retainer, and can be indexed 360°, to suit the clearance space.

Use coil codes in the table below to order spare parts.

DUTY CYCLE		100%
MAXIMUM SWITCH ON FREQUENCY		10,000 cycles/hr
SUPPLY VOLTAGE FLUCTUATION		± 10% Vnom
ELECTROMAGNETIC COMPATIBILITY (EMC)		2014/30/EU
LOW VOLTAGE		2014/35/EU
PROTECTION CLASS FOR INSULATION	copper wire	class H (180 °C)
	coil	class F (155 °C)

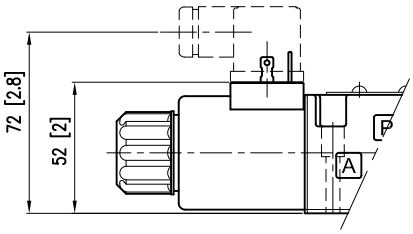
(values ± 10%)

	Nominal voltage [V]	Resistance at 20°C [Ω]	Current consumpt. [A]	Power consumpt. [W]	Coil code		
					K1	**K2**	**K7**
SD12	12	4.5	2.67	32	1903780	1904190	1904050
SD24	24	18.6	1.29	31	1903781	1904191	1904051
SD28	28	25.3	1.07	31	1903782	-	1904052

Declared IP ratings are intended according to EMC 2014/30/EU, only for both valve and connectors of an equivalent IP rating, installed properly.

Mating connectors are not included in solenoid valves delivery. Connectors for K1 coils can be ordered separately.

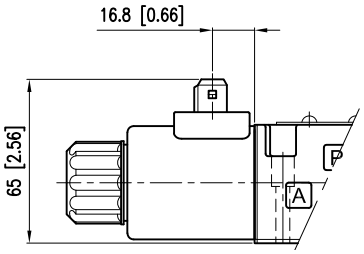
K1



DIN 43650 (EN 175301-803)
Mating connectors type ISO 4400 / DIN 43650 (EN 175301-803).

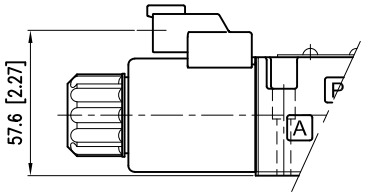
IP rating of electrical connection: IP65
IP rating of whole valve: IP65

K2



AMP Junior
IP rating of electrical connection: IP65
IP rating of whole valve: IP65

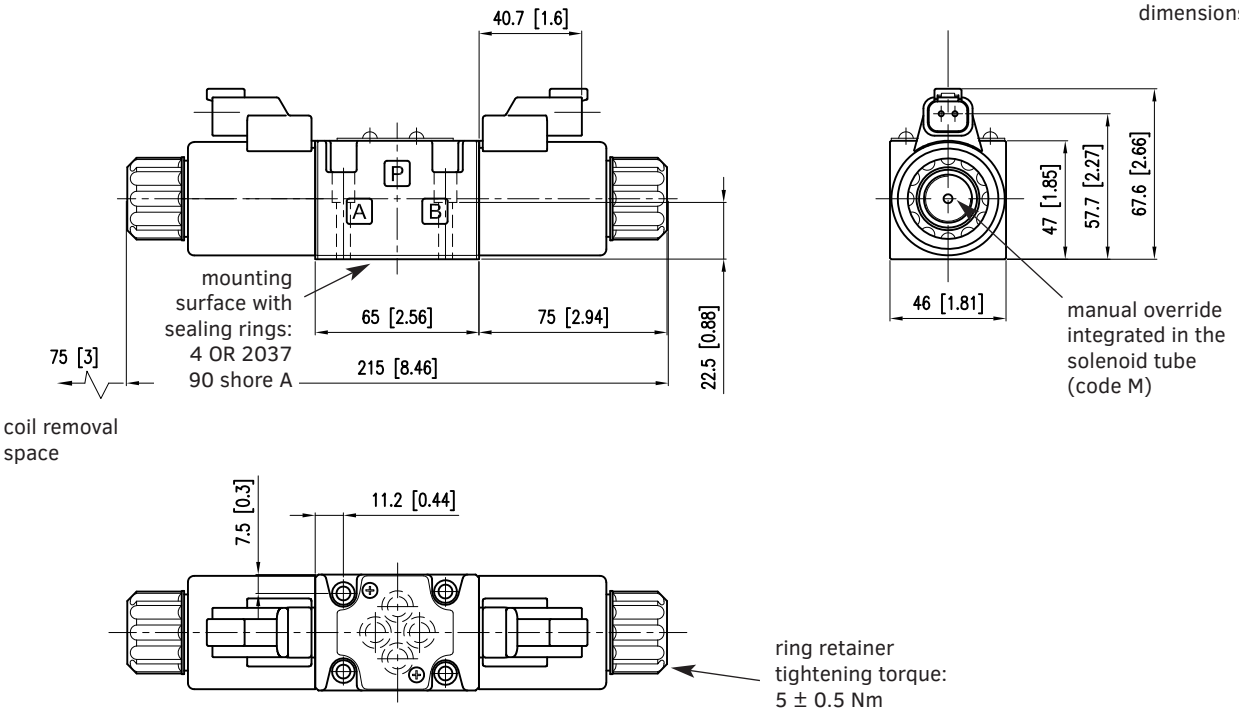
K7



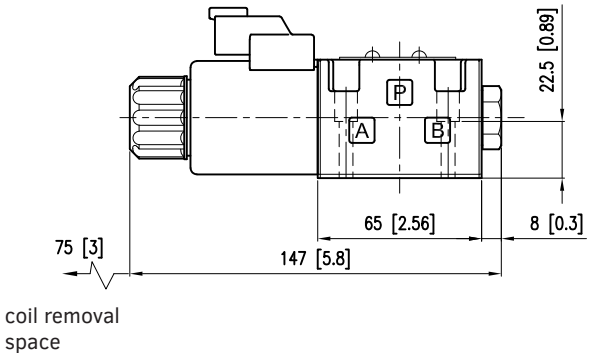
DEUTSCH DT04 MALE
IP rating of electrical connection: IP65/IP67
IP rating of whole valve: IP65

HDS3 DOUBLE SOLENOID (K7 COIL)

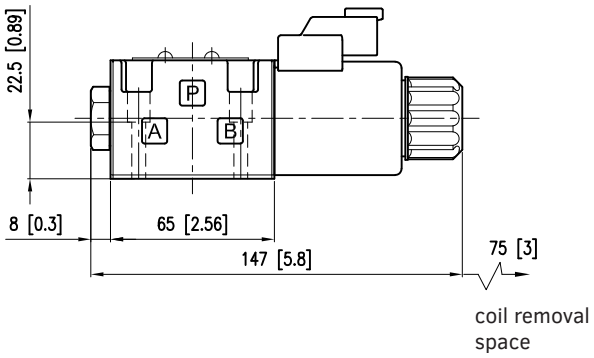
dimensions in mm [in]



HDS3 SINGLE SOLENOID SIDE A (K7 COIL)



HDS3 SINGLE SOLENOID SIDE B (K7 COIL)

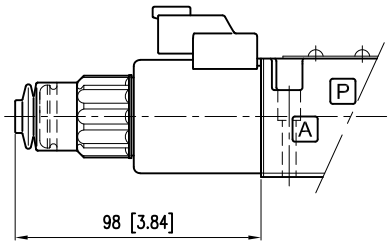


Fastening bolts:
4 SHCS M5x30 - ISO 4762 - torque 5 Nm (A8.8)
Threads of mounting holes: M5x10

The standard valve has override pins integrated in the tube. The operation of this control must be executed with a suitable tool, carefully not to damage the sliding surface.

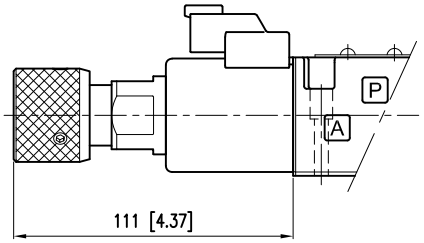
OVERRIDE PIN INTEGRATED THE TUBE, BOOT PROTECTED

Code B



KNOB, TWIST AND LOCK

Code K2

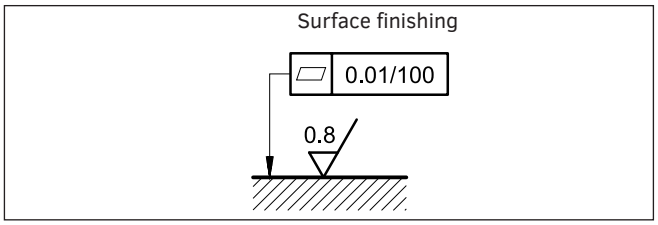


INSTALLATION

These valves can be installed in any position without impairing correct operation.

Ensure that there is no air in the hydraulic circuit.

Valves are fixed by means of screws or tie rods on a flat surface with planarity and roughness equal to or better than those indicated in the relative symbols. If minimum values are not observed, fluid can easily leak between the valve and support surface.



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