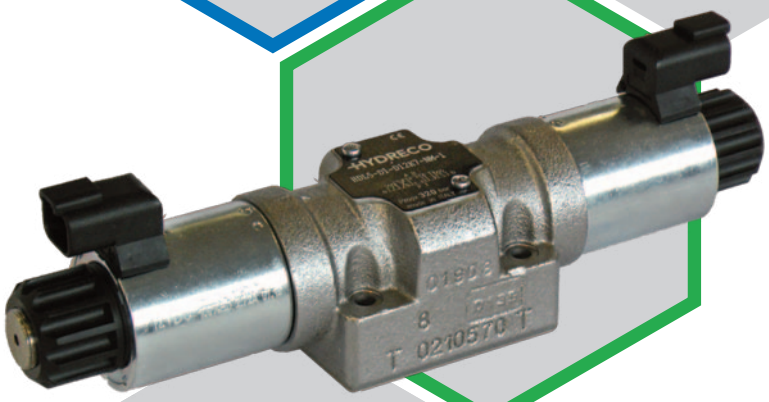
HYDRECO

HDL5

DIRECTIONAL SOLENOID VALVE

320 bar 120 l/min



TECHNICAL CATALOGUE

INTRODUCTION

The HDL5 valves are solenoid directional valves, direct operated, with porting pattern compliant to ISO 4401-05 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 to 600 h (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	320 bar	4600 psi
	T port	210 bar	3000 psi
FLOW RATE		120 l/min	31.7 gpm
MOUNTING SURFACE		ISO 4401-05-04-0-05 NFPA D05	

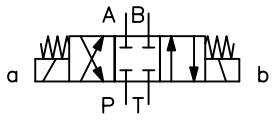
STEP RESPONSE	0 → 100%	70 ÷ 100 ms
	100 →0%	15 ÷20 ms

WEIGHT	single solenoid	2.4 kg	5.3 lbs
	double solenoid	3 kg	6.6 lbs

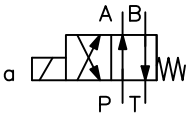
RANGE TEMPERATURES	ambient	-20 to +50 °C	-4 to +122 °F
	fluid	-20 to +82 °C	-4 to +180 °F
FLUID VISCOSITY	range	10 - 400 cSt	60 - 1900 SUS
	recommended	25 cSt	120 SUS
FLUID CONTAMINATION		ISO 4406:1999 class 20/18/15	

HYDRAULIC SYMBOLS (TYPICAL)

HDL5-D1

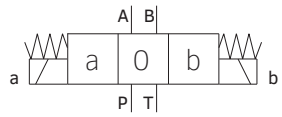
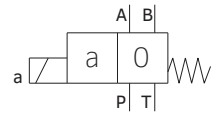
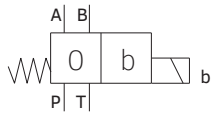
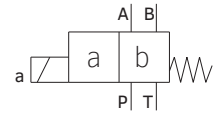
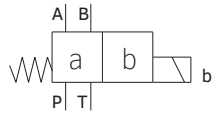
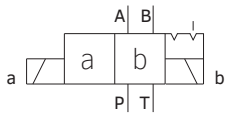


HDL5-TA1



HDL5 - □□ - □□ - □□ - 1

design mark

FUNCTION	
D	 double solenoid 3 positions - spring centred
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	
D12	12 V DC solenoid
D14	14 V DC solenoid
D24	24 V DC solenoid
D26	26 V DC solenoid
D28	28 V DC solenoid
D48	48 V DC solenoid
D110	110 V DC solenoid
D00	without coils

SPOOL
See next page

COIL *	
K1	DIN 43650
K2	AMP Junior
K7	DT04-2P 'deutsch'
WK1	DIN 43650 zinc-nickel plated
WK7	DT04-2P 'deutsch' zinc-nickel plated
WK7D	DT04-2P 'deutsch' zinc-nickel plated with diode

* See table at page 6 for coil availability

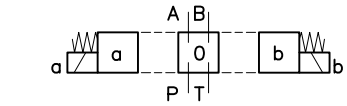
MANUAL OVERRIDE	
M	built-in with the tube, pin (**standard**)
B	built-in with the tube, boot protected (**standard** with WK* coils)
K	knob, turning

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

CODE EXAMPLES:

HDL5 - D1 - D12K7 - NM - 1
HDL5 - D1 - D12WK7 - NB - 1

FUNCTION D



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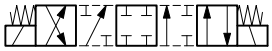

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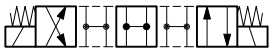

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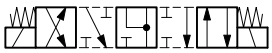

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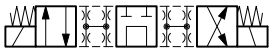
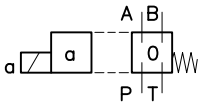


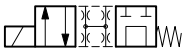
FUNCTION A



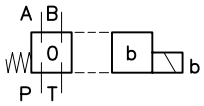
1


2


3


4


FUNCTION B



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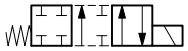

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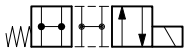

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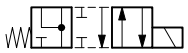

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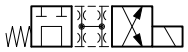
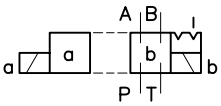
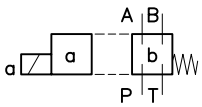


FUNCTION K



1


FUNCTION TA

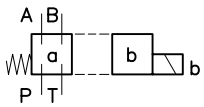


1


2


3


FUNCTION TB



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2


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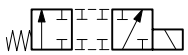
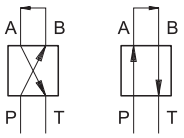
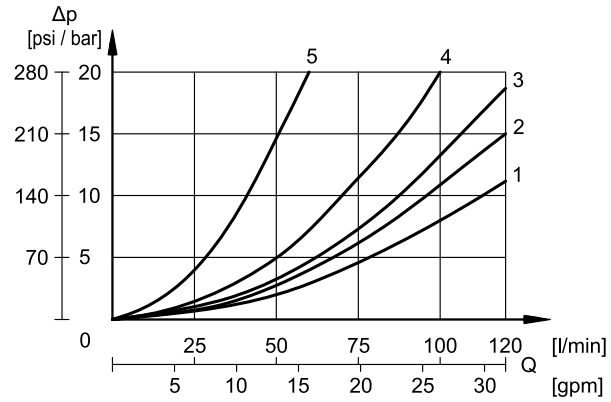


Flow characteristic curves obtained with mineral oil with viscosity of 36 cSt (170 sus) at 50 °C (122 °F) and 24V DC valve; the Δp values are measured between P and T (full loop) valve ports.



PRESSURE DROPS Δp-Q



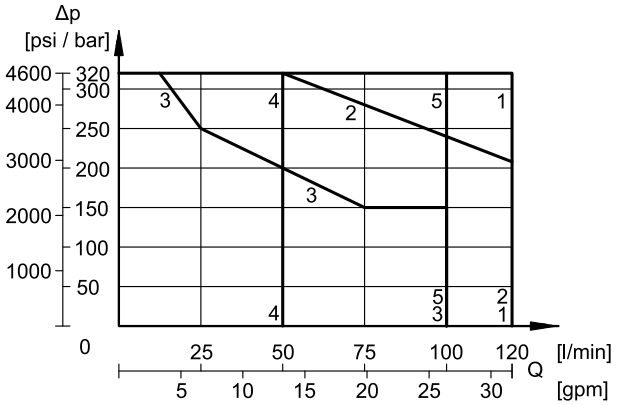
ENERGIZED POSITION

TYPE	CURVE			
	P→A	P→B	A→T	B→T
D1,A1,B1	1	1	2	2
D2, A2, B2	1	1	1	1
D3, A3, B3	1	1	1	1
D4, A4, B4	4	4	4	4
K1	2	2	2	2
TA1	2	2	3	3
TA2	2	2	1	1
TA3	3	3	-	-

DE-ENERGIZED POSITION

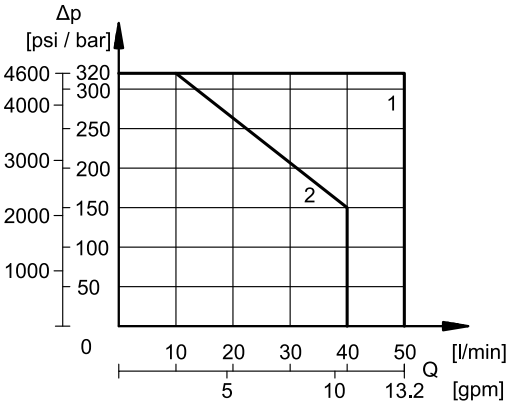
TYPE	CURVE		
	A→T	B→T	P→T
D2	-	-	1
D3	5	5	-
D4	-	-	1

PERFORMANCE CURVES - STANDARD OPERATION



TYPE	CURVE
D1, D2, K1	1
TA2	2
D3	3
D4	4
TA1, TA3	5

PERFORMANCE CURVES - 3-PORTS OPERATION



TYPE	CURVE
TA1	1
TA2	2

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.

It is possible to feed D48 and D110 coils with alternating current (50 or 60 Hz) using connectors with built-in Graetz bridge rectifier. Consider a reduction of the operating limits.

The WK7D coil includes a suppressor diode of pulses for protection from voltage peaks. During the switching the diode significantly reduces the energy released by the winding, by limiting the voltage to 31.4V in the D12 coil and to 58.9 V in the D24 coil.

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%)

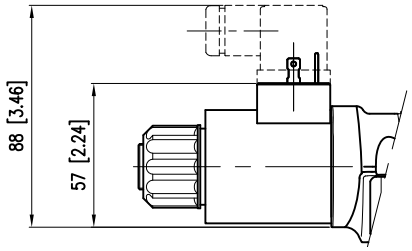
	Nominal voltage [V]	Resistance at 20°C [Ω]	Current consumpt. [A]	Power consumpt [W]	Coil code					
					K1	**K2**	**K7**	**WK1**	**WK7**	**WK7D**
D12	12	4,4	2,72	32,7	1903080	1903100	1902940	1903590	1903580	1903600
D14	14	7,2	1.93	27	1903086					
D24	24	18,6	1,29	31	1903081	1903101	1902941	1903591	1903581	1903601
D26	26,4	21,8	1,21	32				1903599	1903589	
D28	28	26	1,11	31	1903082					
D48	48	78,6	0,61	29,5	1903083					
D110	110	423	0,26	28,2	1903464					

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

WK1, WK7 and WK7D coils reach a better IP degree than standard coils thanks to the zinc-nickel plating and to some constructive measures. The valves with these coils have a salt spray resistance up to 600 hours
(test performed according to UNI EN ISO 9227 and assessment test performed according to UNI EN ISO 10289).

Mating connectors are not included in solenoid valves delivery. Connectors for K1 and WK1 coils can be ordered separately.

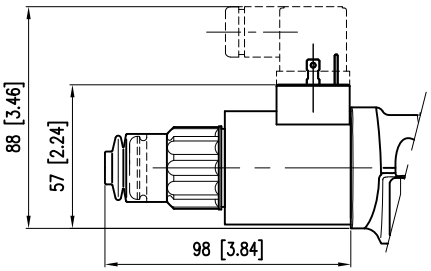
K1



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

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

WK1

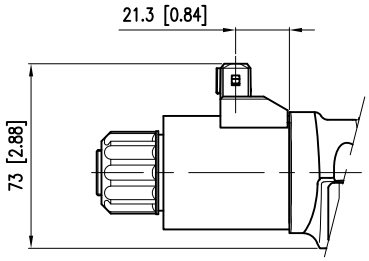


DIN 43650 (EN 175301-803)
Zinc-nickel plated coil.

IP degree of electrical connection: IP66
IP degree of whole valve: IP66

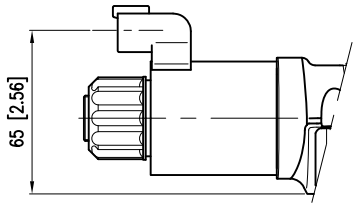
The pin for manual override is boot-protected (code B).

K2



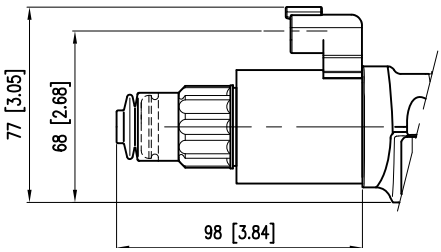
AMP Junior
IP degree of electrical connection: IP65/IP67
IP degree of whole valve: IP65

K7



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

WK7 / WK7D



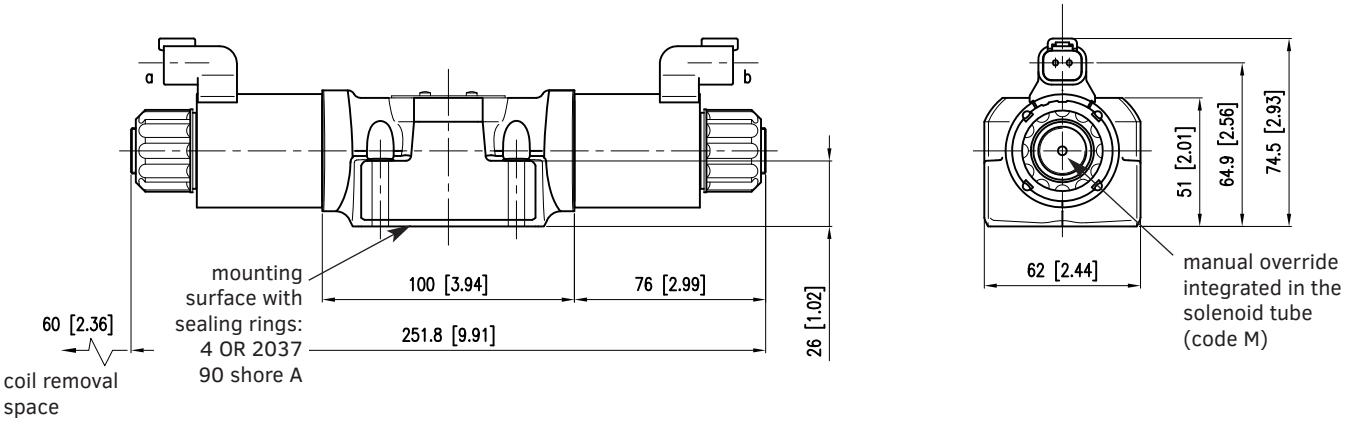
DEUTSCH DT04 MALE
Zinc-nickel plated coil.

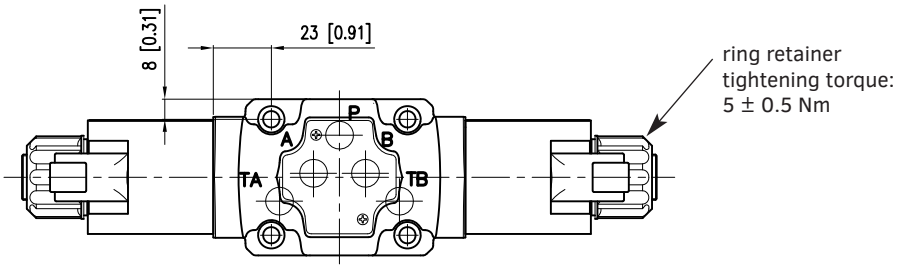
IP degree of electrical connection: IP66/IP68/IP69 -
IP degree of whole valve: IP66/IP68/IP69
IP degree according to ISO 20653: IP69K

The pin for manual override is boot-protected (code B).

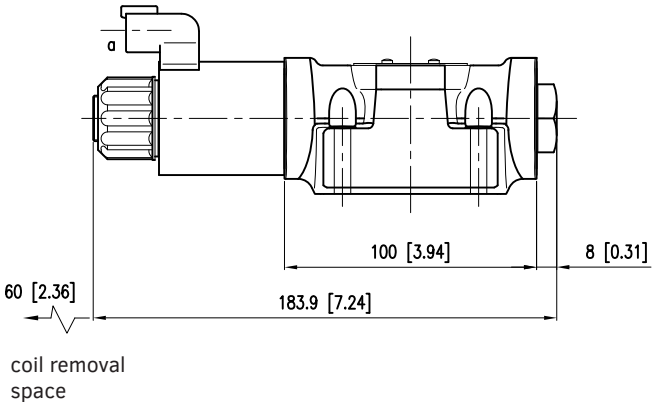
HDL5 DOUBLE SOLENOID (K7 COIL)

dimensions in mm [in]

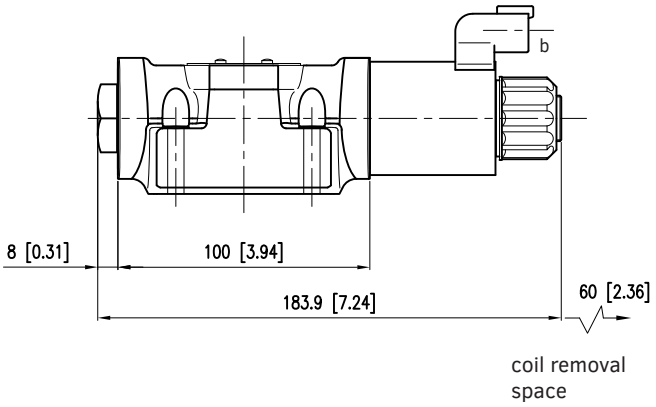




HDL5 SINGLE SOLENOID SIDE A (K7 COIL)



HDL5 SINGLE SOLENOID SIDE B (K7 COIL)



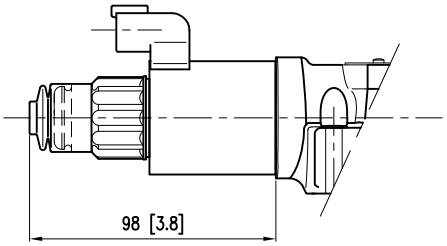
Fastening bolts:
4 SHCS M6x35 - ISO 4762 - torque 8 Nm (A 8.8)
Threads of mounting holes: M6x10

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.

Further manual overrides are available, entering the proper code in the model number.

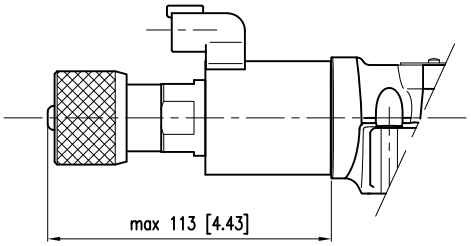
OVERRIDE PINS INTEGRATED THE TUBE, BOOT PROTECTED

Code B



KNOB, TURNING

Code K



IP DEGREE TIPS

The technical reference standard for IP degree is IEC 60529, which classifies and rates the degree of protection provided by equipments and electrical enclosures against intrusions.

The first digit (6) concerns the protection from solid particles (body parts to dust).

The second digit of the IP rating concerns the liquid ingress protection. It indicates three different types of atmospheric agents from which protection is provided:

Values from 1 to 6 → water jets.
Values 7 and 8 → immersion.
Value 9 → high pressure and high temperature water jets.

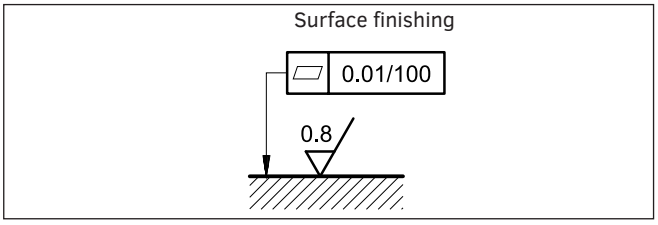
This means that IP66 covers all the lower steps, rating IP68 covers IP67 but not IP66 and lower. Instead, IP69 does not cover any of them. Whether a device meets two types of protection requirements it must be indicated by listing both separated by a slash. (E.g. a marking of an equipment covered both by temporary immersion and water jets is IP66/IP68).

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.



HYDRECO

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Supported by a worldwide network

CONTACT INFORMATION

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