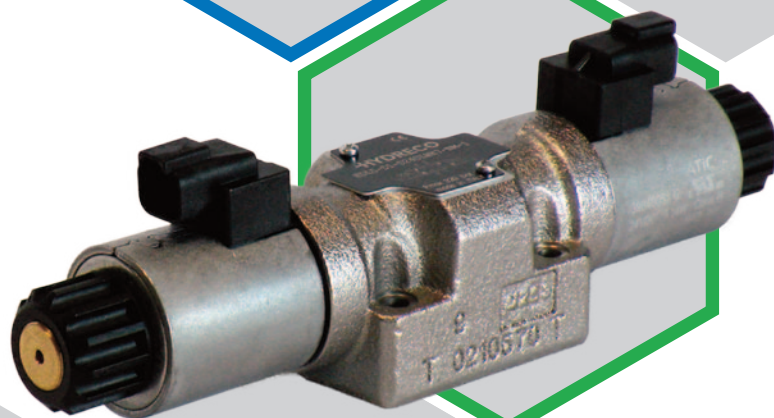




HDL5

DIRECTIONAL
SOLENOID VALVE

320 bar 120 l/min



TECHNICAL CATALOGUE

INTRODUCTION

The HDL5 is a direct operated directional solenoid valve with ISO 4401-05 / NFPA D05 mounting interface, designed for mobile, off-highway and outdoor hydraulic applications.

Multiple coil configurations, electrical connections, and the availability of UL Recognized coils allow the valve to be tailored to different operating conditions and market requirements.

The high-strength cast iron body features optimized internal passages to minimize pressure drop and maximize hydraulic efficiency.

FLUIDS

Use HL or HM mineral oil-based hydraulic fluids according to ISO 6743-4, paired with standard NBR seals.

For HFDR fluids (phosphate esters), specify FPM seals (code V). For other fluid types like HFA, HFB, or HFC, please consult our technical department.

Operating temperatures above 80 °C (180 °F) accelerate fluid and seal degradation.

For mobile application safety, body temperatures should not exceed 55 °C (130 °F).

OPERATING PARAMETERS

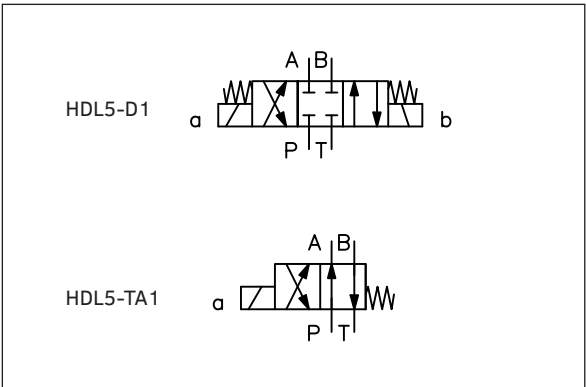
MAXIMUM OPERATING PRESSURE	P - A - B ports	320 bar	4600 psi
	T port	210 bar	3000 psi
FLOW RATE		120 l/min	31.7 gpm
MOUNTING SURFACE	ISO 4401-05-04-0-05 NFPA D05		

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)

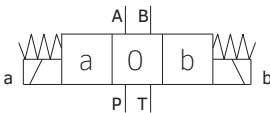


HDL5 - - 1

design mark

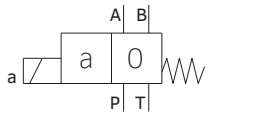
FUNCTION

D



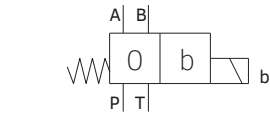
double solenoid
3 positions - spring centred

A



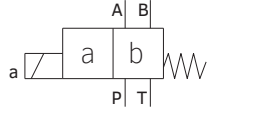
single solenoid at side A
2 positions - spring return

B



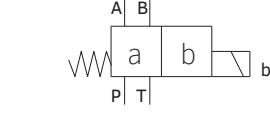
single solenoid at side B
2 positions - spring return

TA



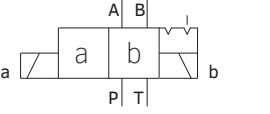
single solenoid at side A
2 positions - spring return

TB



single solenoid at side B
2 positions - spring return

K



double solenoid and detent
2 positions

SEAL

N

NBR (standard)

V

Viton

MANUAL OVERRIDE

M

built-in with the tube,
pin (standard)

B

built-in with the tube,
boot protected

K

knob, turning

COIL VOLTAGE

D12

12 V DC

D14

14 V DC

D24

24 V DC

D26

26.4 V DC

D48

48 V DC

D110

110 V DC

D00

without coils

COIL VERSION

W

corrosion-protected

ULW

UL Recognized,
corrosion-protected

COIL CONNECTION

K1

EN 175301-803
(ex DIN 43650)

K2

AMP Junior

K7

DT04-2P 'deutsch'

K7D

DT04-2P 'deutsch'
with diode

SPPOOL

See next page

COIL AVAILABILITY TABLE

voltage	conn.	W	ULW
D12, D24	K1	■	■
	K2		■
	K7		■
	K7D	■	
D26	K1	■	■
	K7		■
D14, D48, D110	K1		■

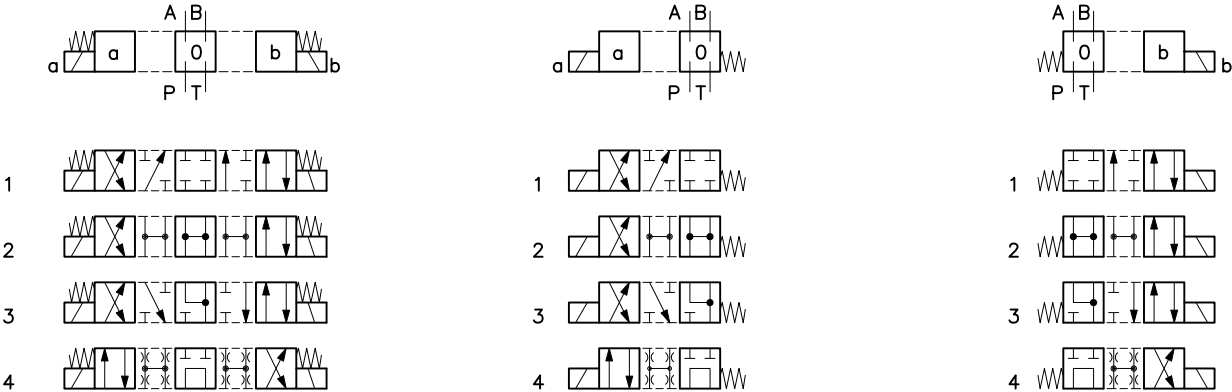
CODE EXAMPLES:

HDL5-D1-D24WK1-NM-1	Corrosion-protected coil, DIN 43650-A electrical connection.
HDL5-D1-D24ULWK1-NB-1	UL Recognized and corrosion-protected coil, DIN 43650-A electrical connection.
HDL5-D1-D24ULWK7-NM-1	UL Recognized and corrosion-protected coil, Deutsch DT04-2P electrical connection.
HDL5-D1-D24WK7D-NB-1	Corrosion-protected coil, Deutsch DT04-2P electrical connection with suppressor diode.

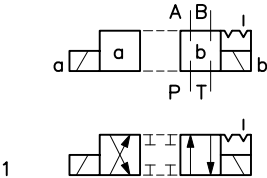
FUNCTION D

FUNCTION A

FUNCTION B

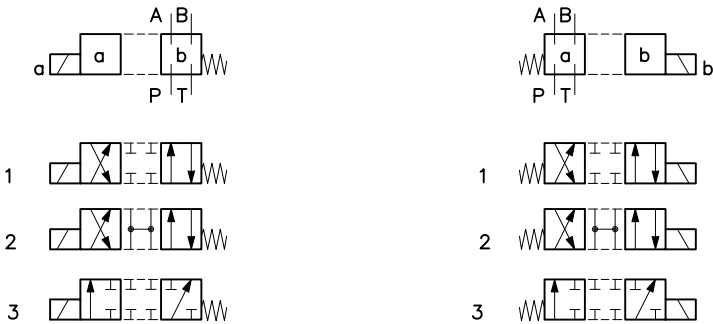


FUNCTION K

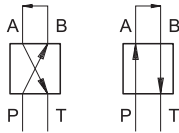


FUNCTION TA

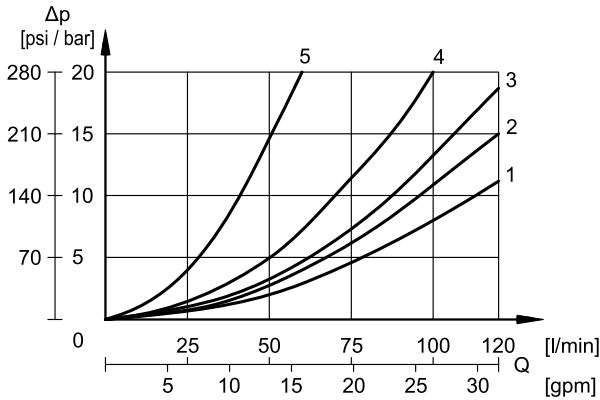
FUNCTION TB



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



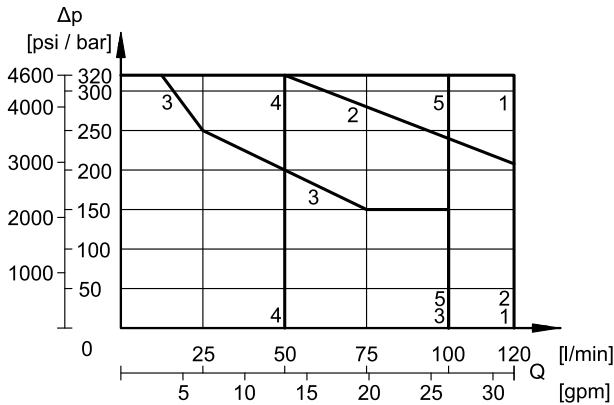
ACTUATED POSITION

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	-	-

NORMAL POSITION

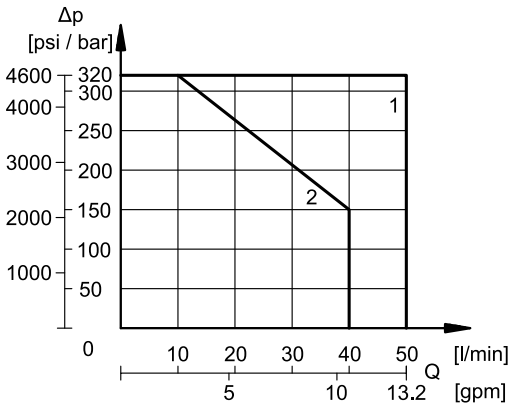
TYPE	CURVE		
	A→T	B→T	P→T
D2	-	-	1
D3	5	5	-
D4	-	-	1

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

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)

The solenoid assembly consists of a tube and a removable coil. The wet-armature design facilitates heat transfer to the hydraulic fluid, while the coil can be indexed through 360° to facilitate installation where space is limited.

Coils can be operated from a 50/60 Hz AC supply by using a mating connector with integrated bridge rectifier, considering a reduction of the operating limits.

The K7D coil includes an integrated suppressor diode to reduce switching voltage peaks and improve protection of the electrical system. During switching, the diode limits the voltage generated by the coil winding to 33 V for the D12 coil and 62 V for the D24 coil.

Contact Hydreco Hydraulics for spare coils.

(values ± 10%)

	Nominal voltage [V]	Resistance at 20°C [Ω]	Current consumpt. [A]	Power consumpt. [W]
D12	12	4.4	2.72	32.7
D14	14	7.2	1.93	27
D24W	24	18.6	1.29	31
D24ULW	24	16.6	1.44	34.7
D26	26.4	21.8	1.21	32
D48	48	78.6	0.61	29.5
D110	110	423	0.26	28.2



ULW type coils are UL Recognized Components (cUR®us Mark).

They are intended for use in machinery and equipment requiring evaluation according to the applicable UL and CSA standards.

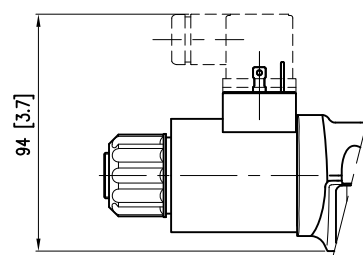
ELECTRICAL CONNECTIONS

Different coil versions are available to suit a wide range of mobile and off-highway applications. Selection depends on the required electrical connection and environmental protection level.

Declared IP ratings apply only when the valve is properly installed with mating connectors providing an equivalent degree of protection.

Mating connectors are not supplied.

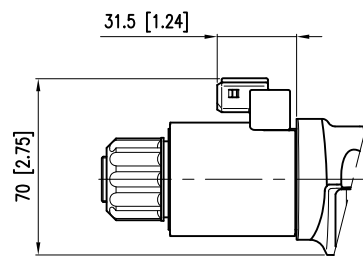
WK1, ULWK1



EN 175301-803 (ex DIN 43650)

Mating connectors according to EN 175301-803 (formerly DIN 43650)

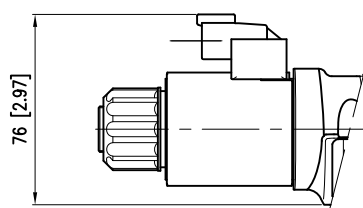
ULWK2



AMP Junior

Compact sealed connector for mobile wiring systems

ULWK7, WK7D



DEUTSCH DT04-2P

Sealed connector designed for demanding applications.

Mating connector male type DEUTSCH DT06-2S

ENVIRONMENTAL PROTECTION

HDL5 valves are supplied with a zinc-nickel plated body as standard.

The valve protection against environmental conditions depends on the combination of its individual components (coils, electrical connection and manual override). This determines both the corrosion resistance level and the IP degree of protection.

IP RATING

The IP degree of protection is defined according to IEC 60529 and indicates the level of protection against the ingress of solid objects and liquids.

The actual IP degree of protection of the valve depends on the type of electrical connection, the solenoid tube protection and the design solutions adopted. The stated IP rating is guaranteed only when a connector with an equivalent degree of protection is correctly wired and installed.

coil version	electrical conn. type	IP rating	
		electrical conn.	valve
W, ULW	K1	IP66	IP65
	K2	IP65/IP67	
	K7	IP66/IP68/IP69 IP69K*	
	K7D	IP66/IP68/IP69 IP69K*	
W, ULW + manual override type B or K	K1	IP66	IP66
	K2	IP65/IP67	IP65/IP67
	K7	IP66/IP68/IP69 IP69K*	IP66/IP68/IP69 IP69K*
	K7D	IP66/IP68/IP69 IP69K*	IP66/IP68/IP69 IP69K*

(*) The IP69K degree of protection is not covered by IEC 60529 but is defined in ISO 20653.

CORROSION RESISTANCE

The combination of a zinc-nickel plated valve body and corrosion-protected W and ULW coils provides corrosion resistance of up to **600 h** in salt spray testing.

Salt spray tests are carried out in accordance with UNI EN ISO 9227, with results evaluated according to UNI EN ISO 10289.

IP Ratings: Selection Guide

The IP rating indicates protection against solid objects (first digit) and liquids (second digit). For solid objects, rating 6 is the highest level and provides complete dust protection. Our solenoid valves fall into this category.

For liquids, three types are distinguished:

- degree 1 to 6: protection against water jets;
- degree 7 and 8: protection against immersion;
- degree 9: protection against high-pressure, high-temperature water jets.

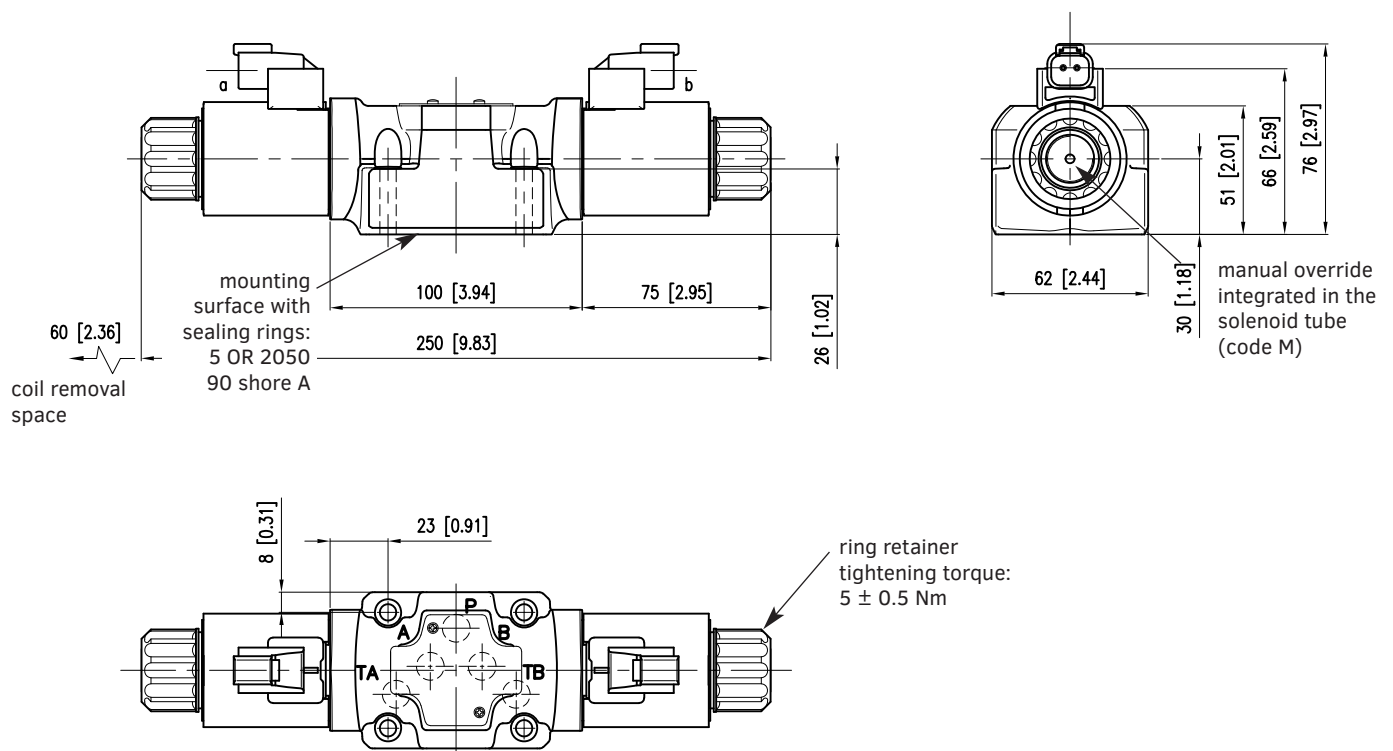
IP ratings are neither equivalent nor cumulative: IP66 covers lower ratings; IP68 covers IP67 only, not IP66, IP65 or lower ratings; IP69 does not cover any other rating.

Where a component complies with more than one type of protection, all applicable IP ratings shall be stated.

Example: equipment protected against powerful water jets and continuous immersion is marked IP66/IP68.

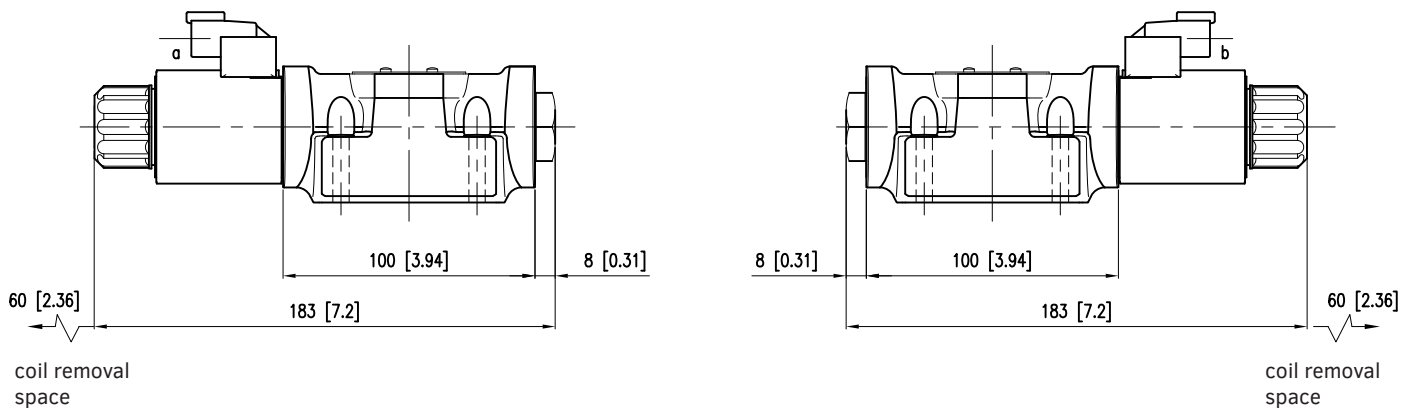
HDL5 DOUBLE SOLENOID (K7 COIL)

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

MANUAL OVERRIDES

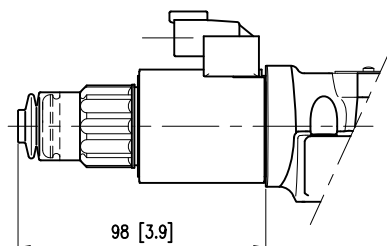
Manual override options allow valve actuation when electrical power is not available, such as during commissioning, maintenance or emergency operation. Different override configurations are available to suit accessibility and environmental conditions.

The standard override (code M) consists of a pin integrated into the solenoid tube and operated using a suitable tool.

Other manual override options enable higher valve IP ratings. The optional configurations are shown below:

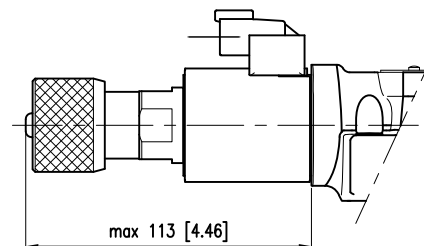
OVERRIDE PINS INTEGRATED THE TUBE, BOOT PROTECTED

Code B



KNOB, TURNING

Code K

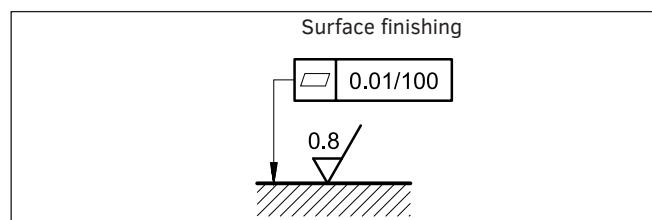


INSTALLATION

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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APAC

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