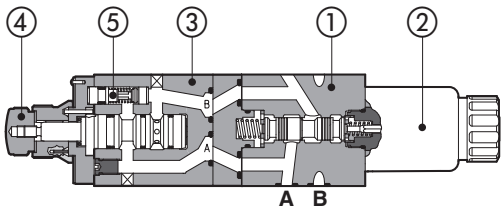
Modular fast/slow valves type DHQ

compensated flow control and by-pass solenoid valve, ISO 4401 size 06



DHQ-013/*-EX*

① by-pass solenoid valve for fast/slow speed switching
② solenoid coil
③ 2 way pressure compensated flow valve for slow speed regulation
④ graduated knob for flow adjustment
⑤ check valve for free reverse flow

DHQ are modular valves for fast/slow speed control of hydraulic actuators.

They combine a pressure compensated flow control valve ③ type QV-06 (Tab. C210) for the slow speed regulation and a solenoid operated by-pass valve ① for the fast/slow speed switching.

Depending on execution **C** or **O**, the low speed is performed with solenoid de-energized or energized.

The low speed regulation is obtained by turning the graduated micrometer knob ④ of flow control valve. Clockwise rotation decreases the flow Optional versions with locking key on the adjustment knob are available on request.

The flow control valve is provided with a built-in check valve ⑤ to allow the free flow in the opposite direction.

Mounting surface: **ISO 4401 size 06**
Max controlled flow: up to **1,5-6-11-16-24 l/min**
Free flow up to **40 l/min**.
Max pressure: up to **250 bar**

1 MODEL CODE

DHQ-0	13	/	C	/	6	/	K	-	E	X	24DC	**	/	*
Modular flow control valve, pressure compensated											**Voltage code**, see section 7	Series number		Seals material, see section 5: **-** = NBR **PE** = FKM **BT** = HNBR

Configuration, see section 2
meter OUT control:
13 = on port A
14 = on port B
16 = on port T
meter IN control:
11 = on port P
23 = on port A
24 = on port B

Execution
C = flow controlled when solenoid is de-energized
O = flow controlled when solenoid is energized

Maximum adjustable flow (low speed)
00 = without flow control valve
1 = 1,5 l/min; **6** = 6 l/min; **11** = 11 l/min;
16 = 16 l/min; **24** = 24 l/min;

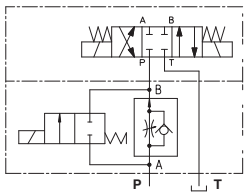
00-AC = AC solenoids without coils
00-DC = DC solenoids without coils
X = without connector
See section 10 for available connectors, to be ordered separately
Coils with special connectors, see section 11
XJ = AMP Junior Timer connector
XK = Deutsch connector
XS = Lead Wire connection

Type of solenoid:
E = solenoid OE for AC and DC supply with **cURus** certification

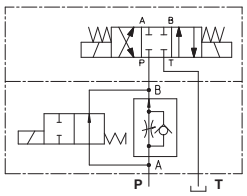
Options:
K = with lock key for the setting knob **V** = without by-pass check valve

2 CONFIGURATIONS

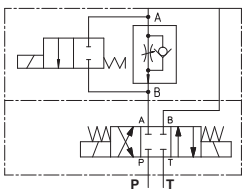
DHQ-11/C



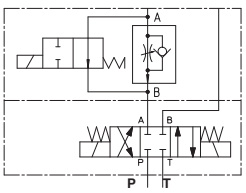
DHQ-11/O



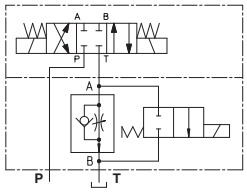
DHQ-13/C



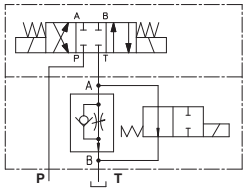
DHQ-13/O



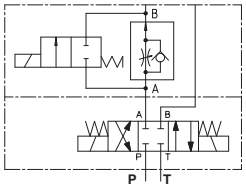
DHQ-16/C



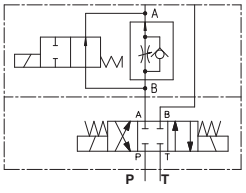
DHQ-16/O



DHQ-23/C



DHQ-23/O



DHQ-014/*, DHQ-024/* are similar to corresponding DHQ-013/*, DHQ-023/* but control the flow through port B of solenoid valve

3 GENERAL CHARACTERISTICS

Assembly position	Any position
Subplate surface finishing to ISO 4401	Acceptable roughness index, Ra 0,4 - flatness ratio 0,01/100
Ambient temperature range	**Standard** = -30°C ÷ +70°C **/PE** option = -20°C ÷ +70°C **/BT** option = -40°C ÷ +70°C
Storage temperature range	**Standard** = -30°C ÷ +80°C **/PE** option = -20°C ÷ +80°C **/BT** option = -40°C ÷ +80°C
Surface protection	Body: zinc coating with black passivation Coil: zinc nickel coating (DC version) plastic incapsulation (AC version)
Compliance	CE to Low Voltage Directive 2014/35/EU RoHS Directive 2011/65/EU as last update by 2015/863/EU REACH Regulation (EC) n°1907/2006

4 HYDRAULIC CHARACTERISTICS

Valve model	**/1**	**/6**	**/11**	**/16**	**/24**
Max regulated flow [l/min]	1,5	6	11	16	24
Min regulated flow [cm³/min]	50	50	50	50	50
Regulating Δp [bar]	3	3	5	6,5	8
Max reverse flow through check valve [l/min]	24				
Max free flow through by-pass valve [l/min]	40				
Max pressure [bar]	250				

5 SEALS AND HYDRAULIC FLUID - for other fluids not included in below table, consult our technical office

Seals, recommended fluid temperature	NBR seals (standard) = -20°C ÷ +80°C, with HFC hydraulic fluids = -20°C ÷ +50°C FKM seals (/PE option) = -20°C ÷ +80°C HNBR seals (/BT option)= -40°C ÷ +60°C, with HFC hydraulic fluids = -40°C ÷ +50°C		
Recommended viscosity	15÷100 mm²/s - max allowed range 2,8 ÷ 500 mm²/s		
Max fluid contamination level	ISO4406 class 20/18/15 NAS1638 class 9, see also filter section at www.atos.com or KTF catalog		
Hydraulic fluid	**Suitable seals type**	**Classification**	**Ref. Standard**
Mineral oils	NBR, FKM	HL, HLP, HLPD, HVLP, HVLPD	DIN 51524
Flame resistant without water	FKM	HFDU, HFDR	ISO 12922
Flame resistant with water	NBR	HFC	

6 ELECTRICAL CHARACTERISTICS

Insulation class	**H** (180°C) for DC coils; **F** (155°C) for AC coils Due to the occurring surface temperatures of the solenoid coils, the European standards EN ISO 13732-1 and EN ISO 4413 must be taken into account
Protection degree to DIN EN 60529	**IP 65** (with connectors 666, 667 correctly assembled)
Relative duty factor	100%
Supply voltage and frequency	See section 7
Supply voltage tolerance	± 10%

7 COIL VOLTAGE

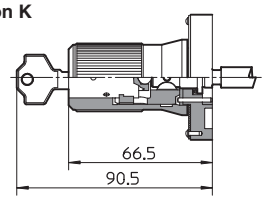
External supply nominal voltage ± 10%	**Voltage code**	Type of connector	Power consumption (2)	Code of spare coil DHE
12 DC	**12 DC**	666 or 667	30 W	COE-12DC
14 DC	**14 DC**			COE-14DC
24 DC	**24 DC**			COE-24DC
28 DC	**28 DC**			COE-28DC
48 DC	**48 DC**			COE-48DC
110 DC	**110 DC**			COE-110DC
125 DC	**125 DC**			COE-125DC
220 DC	**220 DC**			COE-220DC
24/50 AC	**24/50/60 AC**		58 VA (3)	COE-24/50/60AC (1)
48/50 AC	**48/50/60 AC**			COE-48/50/60AC (1)
110/50 AC	**110/50/60 AC**			COE-110/50/60AC (1)
230/50 AC	**230/50/60 AC**			COE-230/50/60AC (1)
115/50 AC	**115/60 AC**		80 VA (3)	COE-115/60AC
230/50 AC	**230/60 AC**			COE-230/60AC
110/50 AC - 120/60 AC	**110 RC**	669	30 W	COE-110RC
230/50 AC - 230/60 AC	**230 RC**			COE-230RC

(1) Coil can be supplied also with 60 Hz of voltage frequency: in this case the performances are reduced by 10 ÷15% and the power consumption is 52 VA.
(2) Average values based on tests preformed at nominal hydraulic condition and ambient/coil temperature of 20°C.
(3) When solenoid is energized, the inrush current is approx 3 times the holding current.

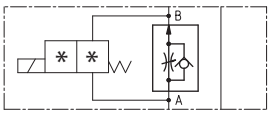
8 OPTIONS

K = lock key for the setting knob
V = without by-pass check valve

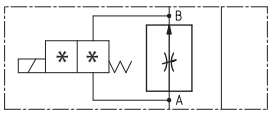
option K



standard version

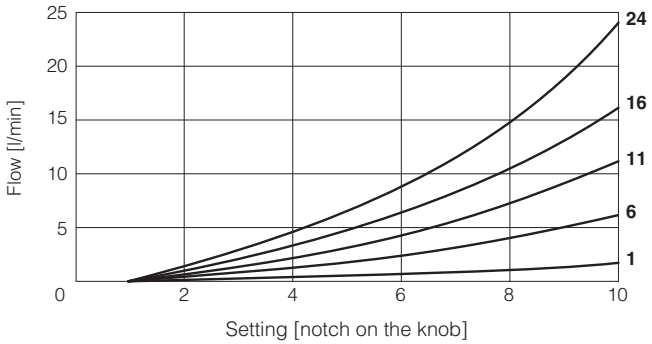


option /V



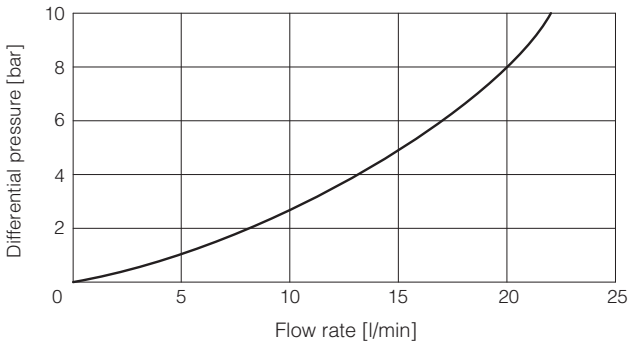
9 DIAGRAMS based on mineral oil ISO VG 46 at 50°C

9.1 Flow regulation diagram (low speed)

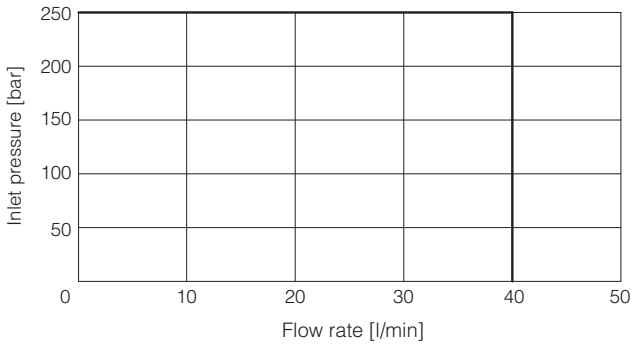


1 = DHQ-0*/*/1 **6** = DHQ-0*/*/6 **11** = DHQ-0*/*/11
16= DHQ-0*/*/16 **24** = DHQ-0*/*/24

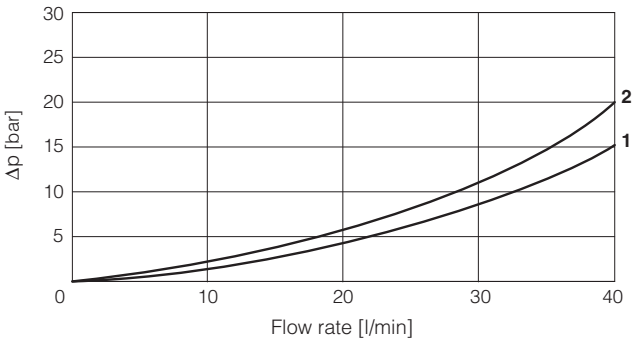
9.2 Q/Δp diagram through the check valve for reverse free flow



9.3 Operating limits of by-pass solenoid valve



9.4 Q/Δp diagram through the by-pass solenoid valve



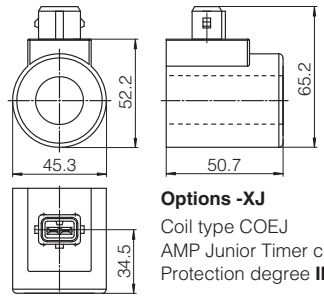
1 = DHQ-013, DHQ-014
2 = DHQ-011, DHQ-016, DHQ-023, DHQ-024

10 ELECTRIC CONNECTORS ACCORDING TO DIN 43650 (to be ordered separately, see tech table K500)

666 = standard connector IP-65, suitable for direct connection to electric supply source
667 = as 666, but with built-in signal led. Available for power supply voltage 24 AC or DC, 110 AC or DC, 220 AC or DC
669 = with built-in rectifier bridge for supplying DC coils by alternate current (AC 110V and 230V - Imax 1A)

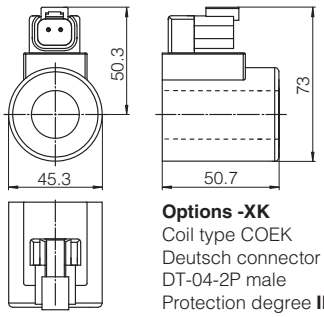
11 COIL WITH SPECIAL CONNECTORS only for voltage supply 12, 14, 24, 28 VDC

AMP Junior timer connector



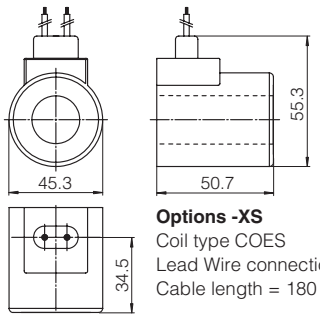
Options -XJ
Coil type COEJ
AMP Junior Timer connector
Protection degree **IP67**

Deutsch connector DT-04-2P



Options -XK
Coil type COEK
Deutsch connector
DT-04-2P male
Protection degree **IP67**

Lead Wire connection



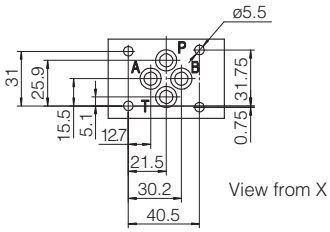
Options -XS
Coil type COES
Lead Wire connection
Cable length = 180 mm

Note: for the electric characteristics refer to standard coils features - see section 7

12 INSTALLATION DIMENSIONS [mm]

ISO 4401: 2005
Mounting surface: 4401-03-02-0-05
Diameter of ports P, A, B, T: Ø = 7,5 mm (max)
Seals: 4 OR 108

Fastening bolts: 4 socket head screws M5.
The length depends on number and type
of modular elements associated

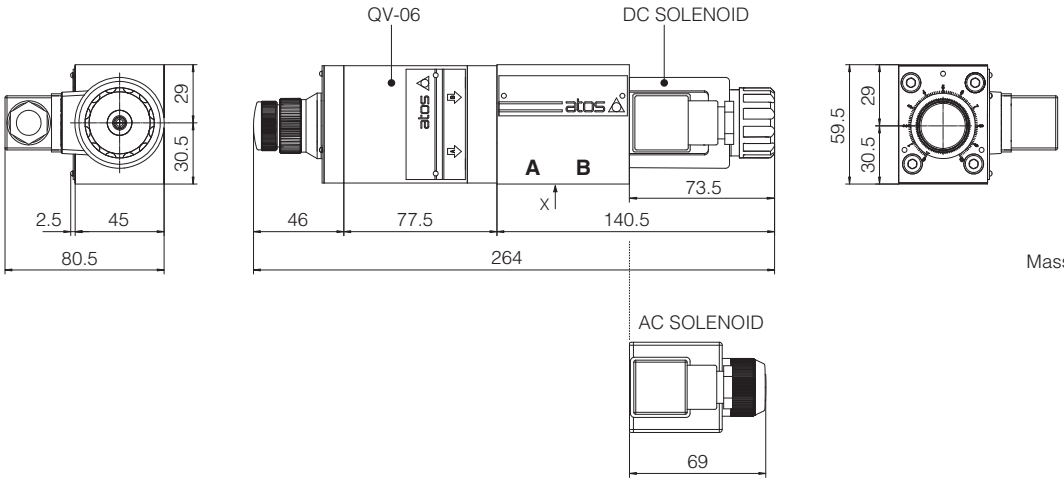


View from X

P = PRESSURE PORT
A, B = USE PORT
T = TANK PORT

DHQ-011/*-EX
DHQ-016/*-EX

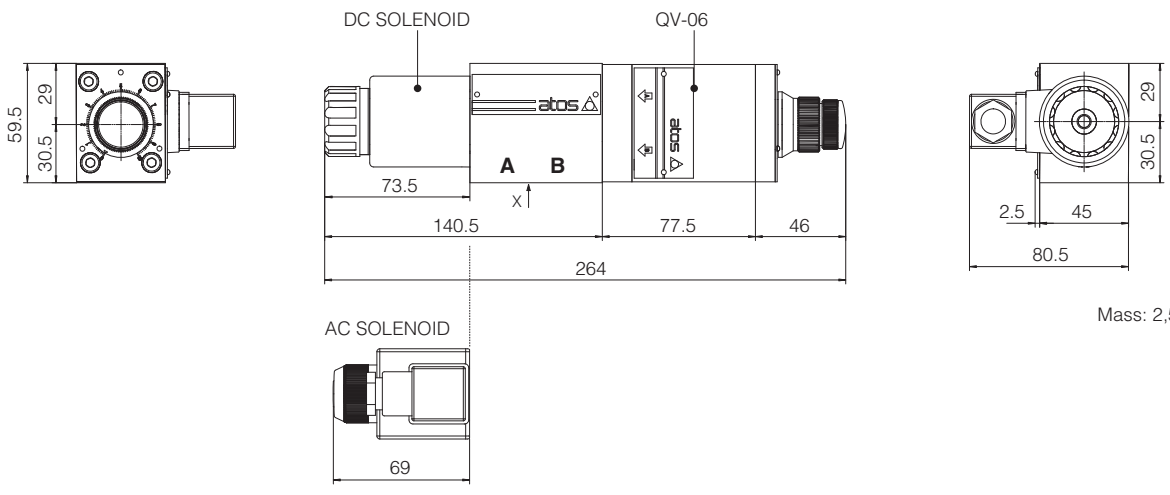
DHQ-013/*-EX
DHQ-023/*-EX



Mass: 2,5 kg

DHQ-014/*-EX

DHQ-024/*-EX



Mass: 2,5 kg

Overall dimensions refer to valves with connectors type 666