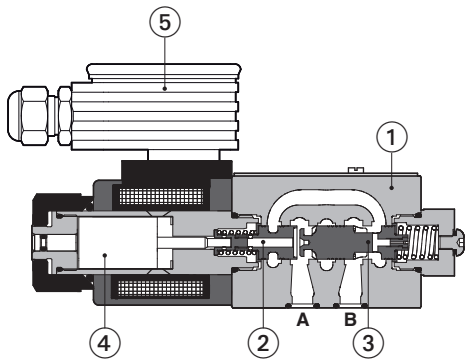
Proportional flow valves

direct, pressure compensated, without transducer



QVHZE-A

① Valve body
② Throttle
③ Compensator
④ Proportional solenoid
⑤ E-MI-AS-IR digital driver (to be ordered separately)

QVHZE-A, QVKZE-A

Proportional flow control valves, direct operated, pressure compensated, without position transducer, for load independent flow regulations.

They operate in association with off-board drivers, which supply the proportional valves with proper current to align the valve regulation to the reference signal supplied to the driver.

The solenoids are certified according to North American standard **cURus**.

QVHZE:	**QVKZE**:
Size: **06** - ISO 4401	Size: **10** - ISO 4401
Max flow: **45 l/min**	Max flow: **90 l/min**
Max pressure: **210 bar**	Max pressure: **210 bar**

1 MODEL CODE

QVKZE	-	A	-	10	/	65	/	*	-	*	/	*	/	*	/	*

QVKZE
Pressure compensated flow control valves, direct
QVHZE = size 06
QVKZE = size 10

A = for off-board driver, see section 3

Valve size ISO 4401: **06** = 06 **10** = 10

Max regulated flow:

QVHZE		QVKZE:
3 = 3,5 l/min	**36** = 35 l/min	**65** = 65 l/min
12 = 12 l/min	**45** = 45 l/min	**90** = 90 l/min
18 = 18 l/min		

Hydraulic options - see section 11 :
D = quick venting of port B

Hand lever options, only for **QVHZE** - see section 12 :
MO = horizontal hand lever
MV = vertical hand lever

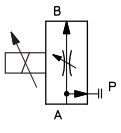
Series number

Seals material, see section 8 :
- = NBR
PE = FKM
BT = NBR low temp.

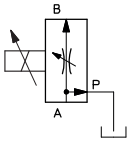
Coil voltage, see section 13 :
- = standard coil for 24VDC Atos drivers
6 = optional coil for 12VDC Atos drivers
18 = optional coil for low current drivers

Coil with special connectors, see section 14 :
- = omit for standard DIN connector
J = AMP Junior Timer connector
K = Deutsch connector
S = Lead Wire connection

2 HYDRAULIC SYMBOLS



2 way connection



3 way connection

The valves can be used in 2 or 3 way connection, depending to the application requirements.

In **2 way** the P port must not be connected (blocked)
In **3 way** the P port has to be connected to tank or to other user lines
The port T must be always not connected (blocked)

For application examples of 2 and 3 way connections, see section 10

3 OFF-BOARD ELECTRONIC DRIVERS

Drivers model	E-MI-AC-01F		E-MI-AS-IR		E-BM-AS-PS		E-BM-AES
Type	Analog		Digital				
Voltage supply (VDC)	12	24	12	24	12	24	24
Valve coil option	/6	std	/6	std	/6	std	std
Format	plug-in to solenoid				DIN-rail panel		
Tech table	G010		G020		G030		GS050

4 GENERAL NOTES

Atos digital proportionals valves are CE marked according to the applicable directives (e.g. Immunity and Emission EMC Directive).
Installation, wirings and start-up procedures must be performed according to the general prescriptions shown in tech table **FS900** and in the user manuals included in the E-SW-* programming software.

5 GENERAL CHARACTERISTICS

Assembly position	Any position
Subplate surface finishing to ISO 4401	Acceptable roughness index: Ra ≤ 0,8, recommended Ra 0,4 – Flatness ratio 0,01/100
MTTFd valves according to EN ISO 13849	150 years, see technical table P007
Ambient temperature range	**Standard** = -20°C ÷ +70°C **/PE** option = -20°C ÷ +70°C **/BT** option = -40°C ÷ +60°C
Storage temperature range	**Standard** = -20°C ÷ +80°C **/PE** option = -20°C ÷ +80°C **/BT** option = -40°C ÷ +70°C
Surface protection	Body: zinc coating with black passivation Coil: zinc nickel coating
Corrosion resistance	Salt spray test (EN ISO 9227) > 200 h
Compliance	CE according to EMC directive 2014/30/EU (Immunity: EN 61000-6-2; Emission: EN 61000-6-3) RoHS Directive 2011/65/EU as last update by 2015/863/EU REACH Regulation (EC) n°1907/2006

6 HYDRAULIC CHARACTERISTICS - based on mineral oil ISO VG 46 at 50 °C

Valve model		QVHZE					QVKZE	
		3	**12**	**18**	**35**	**45**	**65**	**90**
Max regulated flow	[l/min]	3,5	12	18	35	45	65	90
Min regulated flow	[cm³/min]	15	20	30	50	60	85	100
Max flow on port A	[l/min]	40			50	55	70	100
Max pressure	[bar]	210						
Response time 0-100% step signal	[ms]	≤ 30					≤ 45	
Hysteresis		≤ 5 [% of the regulated max flow]						
Linearity		≤ 3 [% of the regulated max flow]						
Repeatability		± 1 [% of the regulated max flow]						

Note: above performance data refer to valves coupled with Atos electronic drivers, see section 3

7 ELECTRICAL CHARACTERISTICS

Valve model	QVHZE			QVKZE		
Coil voltage code	standard	option /6	option /18	standard	option /6	option /18
Max. solenoid current	2,2 A	2,7 A	1,1 A	2,2 A	2,7 A	1,1 A
Coil resistance R at 20°C	3,1 Ω	2,1 Ω	13,1 Ω	3,2 Ω	2,1 Ω	13,7 Ω
Insulation class	H (180°) Due to the occuring surface temperatures of the solenoid coils, the European standards ISO 13732-1 and EN982 must be taken into account					
Protection degree to DIN EN60529	IP65 with mating connectors					
Duty factor	Continuous rating (ED=100%)					
Certification	**cURus** North American Standard					

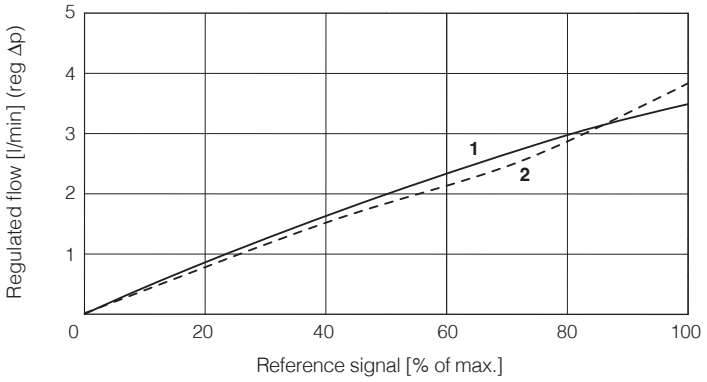
8 SEALS AND HYDRAULIC FLUIDS - for other fluids not included in below table, consult our technical office

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 NBR low temp (/BT option) = -40°C ÷ +60°C, with HFC hydraulic fluids = -40°C ÷ +50°C		
Recommended viscosity		20 ÷ 100 mm²/s - max allowed range 15 ÷ 380 mm²/s		
Max fluid contamination level	normal operation	ISO4406 class 18/16/13 NAS1638 class 7		see also filter section at www.atos.com or KTF catalog
	longer life	ISO4406 class 16/14/11 NAS1638 class 5		
Hydraulic fluid		**Suitable seals type**	**Classification**	**Ref. Standard**
Mineral oils		NBR, FKM, NBR low temp.	HL, HLP, HLPD, HVLP, HVLPD	DIN 51524
Flame resistant without water		FKM	HFDU, HFDR	ISO 12922
Flame resistant with water		NBR, NBR low temp.	HFC	

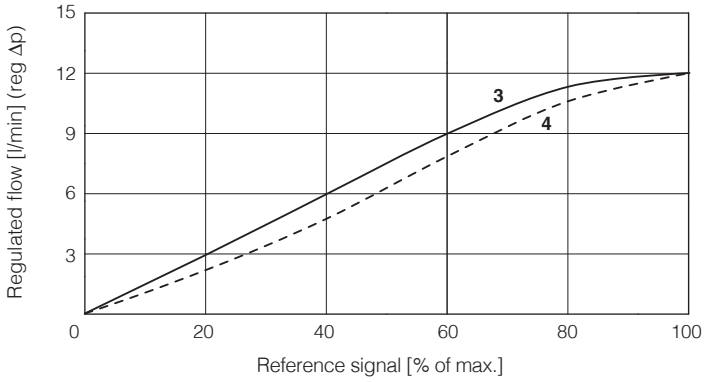
9 DIAGRAMS - based on mineral oil ISO VG 46 at 50 °C

9.1 Regulation diagrams

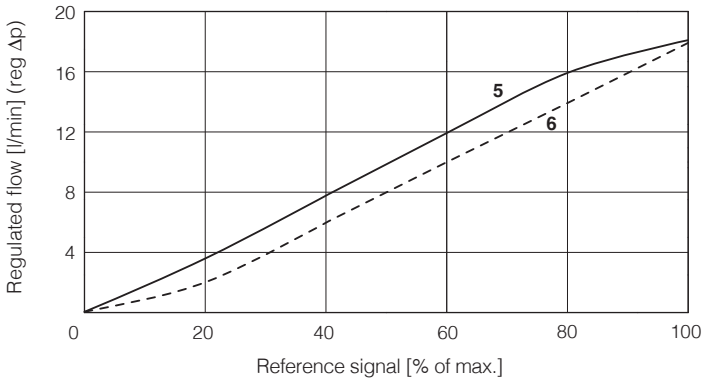
1 = QVHZE-*-06**/3** 2 way
2 = QVHZE-*-06**/3** 3 way



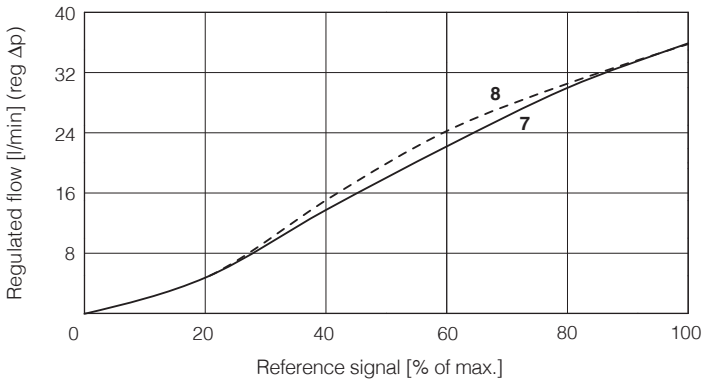
3 = QVHZE-*-06**/12** 2 way
4 = QVHZE-*-06**/12** 3 way



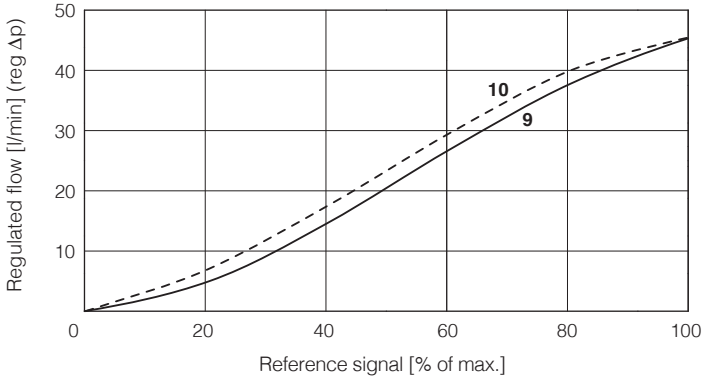
5 = QVHZE-*-06**/18** 2 way
6 = QVHZE-*-06**/18** 3 way



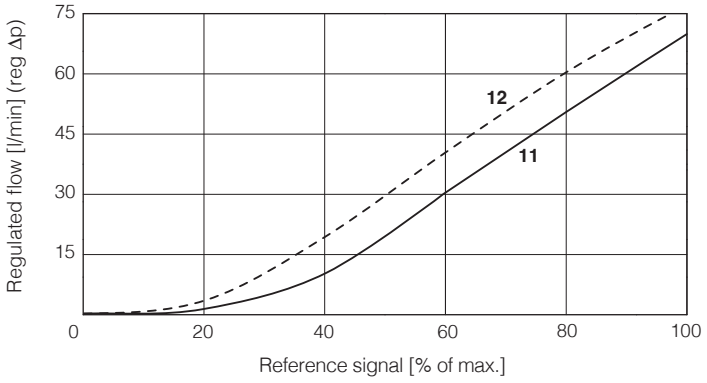
7 = QVHZE-*-06**/36** 2 way
8 = QVHZE-*-06**/36** 3 way



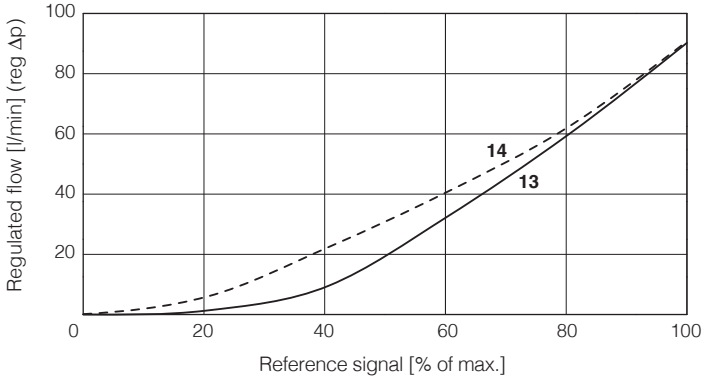
9 = QVHZE-*-06**/45** 2 way
10 = QVHZE-*-06**/45** 3 way



11 = QVKZE-*-10**/65** 2 way
12 = QVKZE-*-10**/65** 3 way



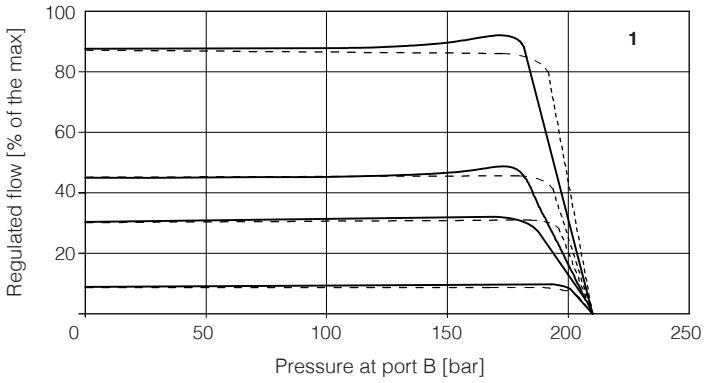
13 = QVKZE-*-10**/90** 2 way
14 = QVKZE-*-10**/90** 3 way

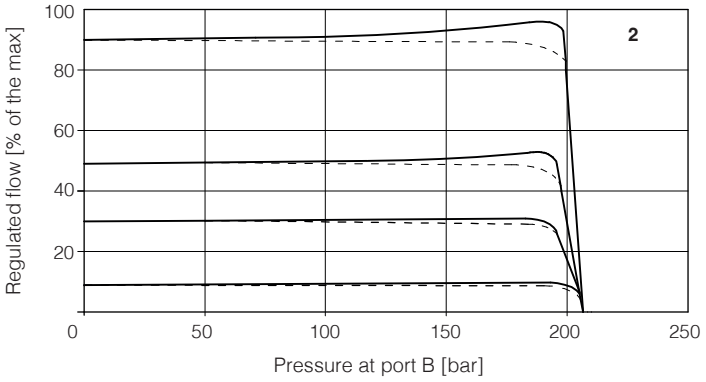


9.2 Regulated flow/outlet pressure diagrams
with inlet pressure = 210 bar

1 = QVHZE
2 = QVKZE

Dotted line for 3-way versions



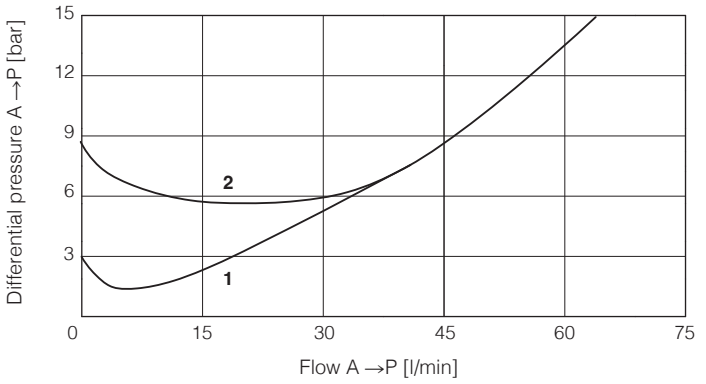


9.3 Flow A →P/Δp diagrams
3-way configuration

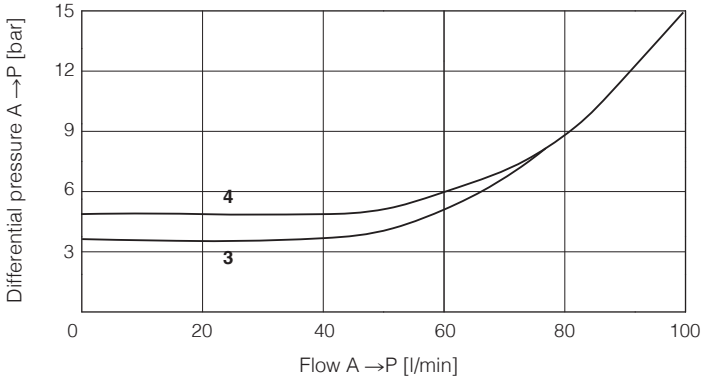
Values in above diagrams are measured without pressure on port B.
If port B is pressurized, the values in the diagrams must be increased by the same value

1 = QVHZE-A-06**/3**
QVHZE-A-06**/12**
QVHZE-A-06**/18**

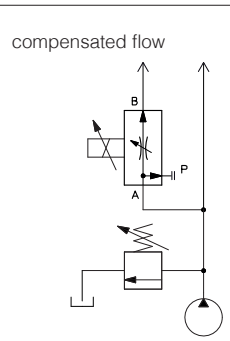
2 = QVHZE-A-06**/36**
QVHZE-A-06**/45**



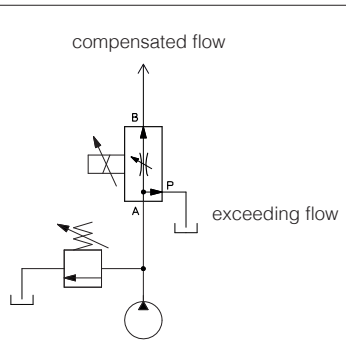
3 = QVKZE-A-10**/65**
4 = QVKZE-A-10**/90**



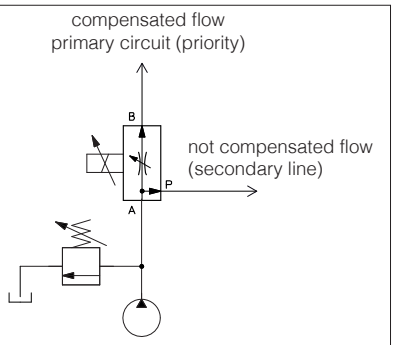
10 APPLICATIONS AND CONNECTIONS



2 way connection



3 way connection



priority connection

2 way connection
The 2 way connection is normally used to control the flow in one part of the hydraulic circuit or to regulate the speed of a specific actuator.
The metered flow in the controlled line is kept constant, independently to the load variations.
If the valve is directly installed on the pump main line, the exceeding flow is returned to tank though the pressure relief valve.

3 way connection
The 3 way connection is normally used when the valve directly controls the pump flow (main line).
The metered flow in the controlled line is kept constant, independently to the load variations.
The exceeding flow (not metered by the valve) it is returned to tank trough the valve P port = T line (3rd way).

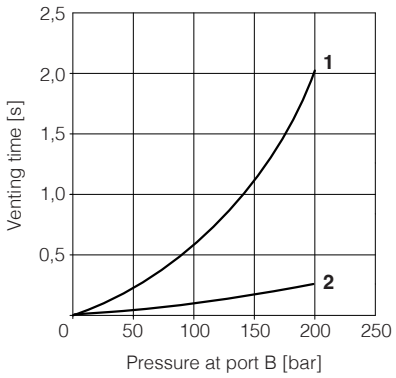
Priority connection
The priority connection guarantees the pressure compensated flow supply to the primary circuit (B port).
The exceeding flow (not required by the primary circuit) is bypassed through the valve P port, to secondary circuit operating at lower pressure and not requiring compensated flow regulations.

11 HYDRAULIC OPTIONS

D = This option provides a quick venting of the use port B when the valve is closed or de-energized.
The valve must be connected in 3 way, with P port connected to tank. When the proportional throttle is fully closed, the valve's port B is internally connected to port P (tank), permitting a quickly decompression of the pressure in the use line.

In the diagram aside are represented the venting times of **QVHZE** and **QVKZE** with option /D respect to standard versions:

1 = standard version **2** = option /D



12 HAND LEVER OPTION - only for QVHZE

It allows to operate the valve in absence of electrical power supply.

MO = Horizontal hand lever **MV** = Vertical hand lever

13 COIL VOLTAGE OPTIONS

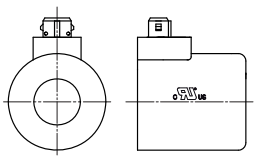
6 = Optional coil to be used with Atos drivers with power supply 12 VDC.

18 = Optional coil to be used with electronic drivers not supplied by Atos.

14 COILS WITH SPECIAL CONNECTORS

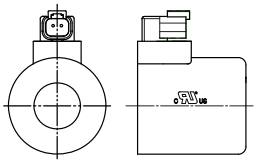
J option

Coil type COZEJ (QVHZE)
Coil type CAZEJ (QVKZE)
AMP Junior Timer connector
Protection degree IP67



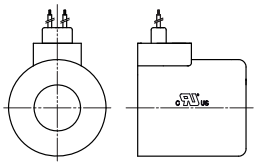
K option

Coil type COZEK (QVHZE)
Coil type CAZEK (QVKZE)
Deutsch connector, DT-04-2P male
Protection degree IP67

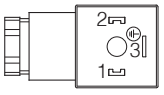


S option

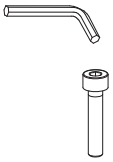
Coil type COZES (QVHZE)
Coil type CAZES (QVKZE)
Lead Wire connection
Cable lenght = 180 mm



15 SOLENOID CONNECTION

PIN	SIGNAL	TECHNICAL SPECIFICATION	Connector code 666
1	**COIL**	Power supply	
2	**COIL**	Power supply	
3	**GND**	Ground	

16 FASTENING BOLTS AND SEALS

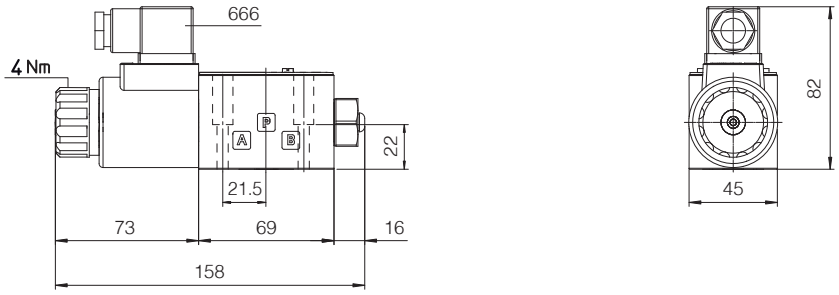
	QVHZE	QVKZE
	**Fastening bolts:** 4 socket head screws M5x30 class 12.9 Tightening torque = 8 Nm	**Fastening bolts:** 4 socket head screws M6x40 class 12.9 Tightening torque = 15 Nm
	**Seals:** 4 OR 108 Diameter of ports A, B, P, T: Ø 7,5 mm	**Seals:** 5 OR 2050 Diameter of ports A, B, P, T: Ø 11,2 mm

17 INSTALLATION DIMENSIONS FOR QVHZE [mm]

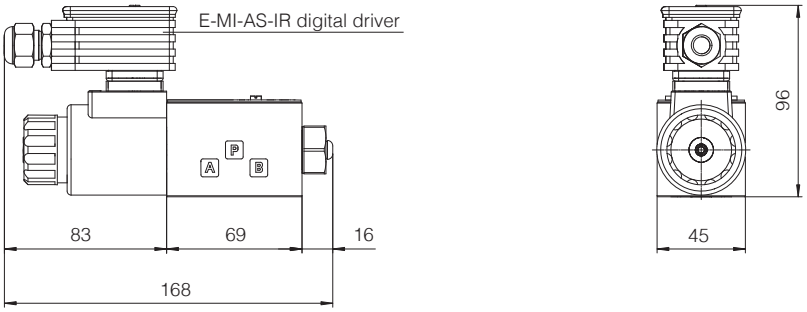
ISO 4401: 2005
Mounting surface: 4401-03-02-0-05 (see tab. P005)

Mass [kg]	
QVHZE	1,8
QVHZE + E-MI-AS-IR	2,3
Option /MV, /MO	+0,6

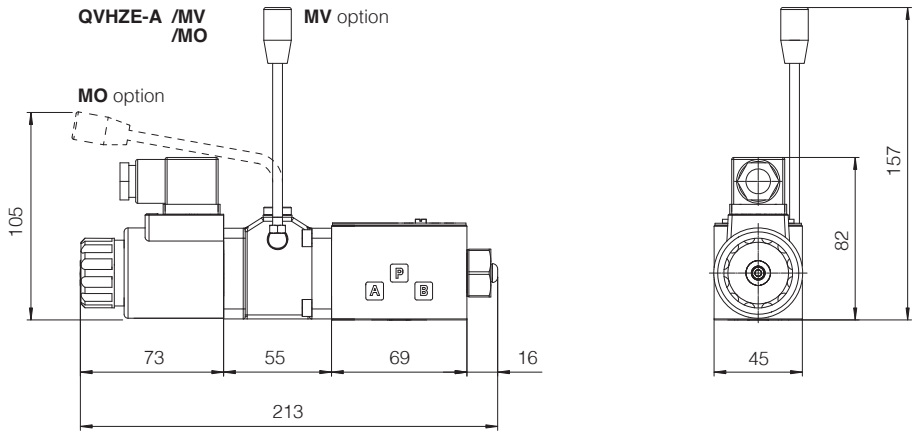
QVHZE-A



QVHZE-A with E-MI-AS-IR digital driver



QVHZE-A /MV /MO

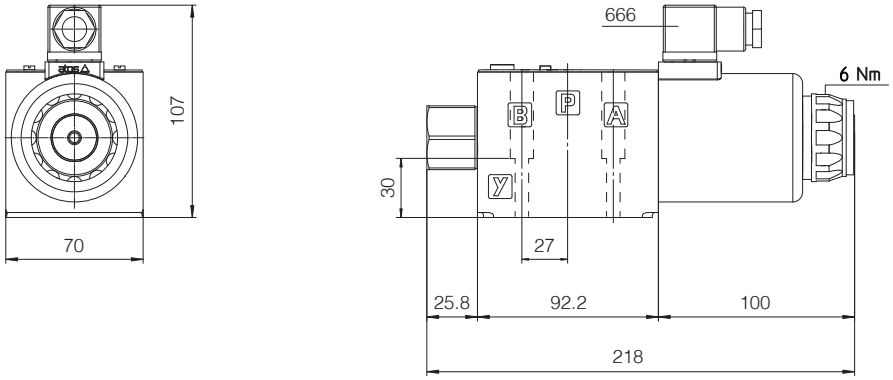


18 INSTALLATION DIMENSIONS FOR QVKZE [mm]

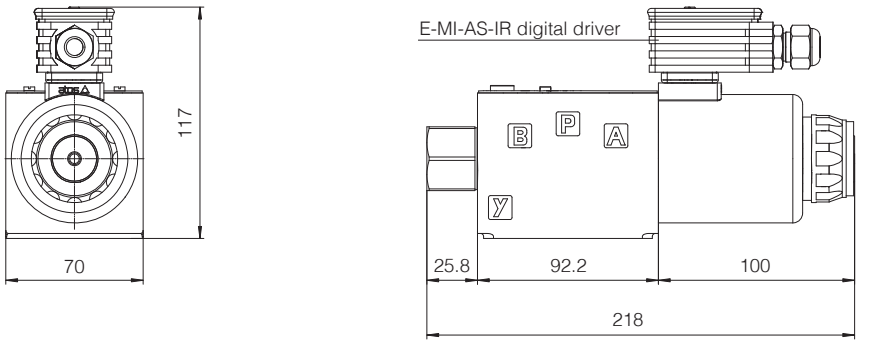
ISO 4401: 2005
Mounting surface: 4401-05-04-0-05 (see tab. P005)

Mass [kg]	
QVKZE	4,8
QVKZE + E-MI-AS-IR	5,3

QVKZE-A



QVKZE-A with E-MI-AS-IR



19 RELATED DOCUMENTATION

FS001	Basics for digital electrohydraulics	**GS050**	E-BM-AES digital driver
FS900	Operating and maintenance information for proportional valves	**GS500**	Programming tools
G010	E-MI-AC analog driver	**GS510**	Fieldbus
G020	E-MI-AS-IR digital driver	**K800**	Electric and electronic connectors
G030	E-BM-AS digital driver	**P005**	Mounting surfaces for electrohydraulic valves