



2/2 LOGIC ELEMENTS AND COVERS

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2/2 CARTRIDGE VALVES LOGIC ELEMENTS ACCORDING TO ISO 7368 (DIN 24342)



ARON cartridge valves are basically composed of a cover and an operating unit insert in the ISO 7368 (DIN 24342) mounting frame. Each cartridge valve is characterized by 2 main way for the nominal flow (up to 350 l/min).

Nominal size (max. diameter)	16mm / 25mm
Max. opening pressure	350 bar
Max. nominal flow rate NG16	150 l/min
Max. nominal flow rate NG25	350 l/min
Fluid temperature	-20°C ÷ 75°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$

By combining the various covers, operating units and connections within the block, many different functions can be obtained like: direct control, non-return, hydraulically piloted non-return, pressure control, flow rate regulation, as well as a combination of these same functions.

Thanks to their design features and operational flexibility, cartridge valves can be used to:

- speed-up machine cycles, and therefore increase productivity and efficiency (better response time compared to traditional valves);
- ensure minimum thermal dissipation (thanks to the passageway dimensions);
- reduce the hydraulic plant weight (thanks to the compact functions block);
- reduce to a minimum any internal leakages;
- provide ease of installation and serving.

The logic units 2/2 (Fig. 1) are formed by a cover (1), a functional unit (2), a spacer (3), a closure spring (4) and a guide bush (5) for each functional unit. Covers can be changed according to the required application and the functional unit can be combined with different springs in order to obtain various opening pressure.

Covers

Covers serve to enclose the functional unit and to house the piloting ports and any incorporated valves or manual adjustment devices. Inside the cover are housed also the seats for the calibrated orifice used to optimize the valve opening/closed response time in according to the type of hydraulic system being implemented.

CETOP 3 interface covers are available, ready to accept solenoid valves or other modular valves for the implementation of particular control functions.

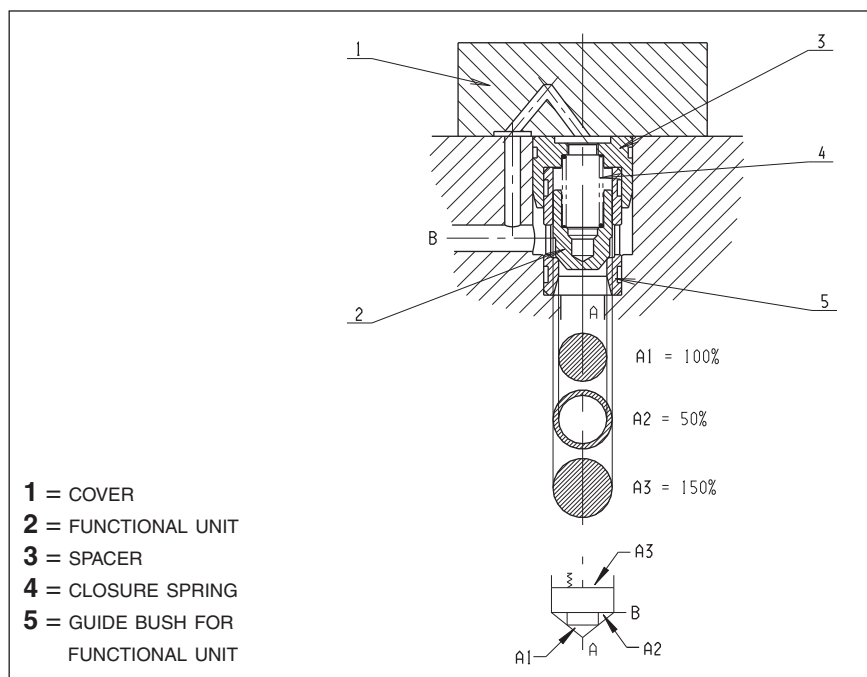
The maximum allowed pressure is a function of the flow rate (max.400 bar).

FIG. 1 - AREA RATIO

A	MAIN FLOW
B	MAIN FLOW
X	EXTERNAL PILOTING
Z1	EXTERNAL PILOTING
Z2	EXTERNAL PILOTING
Y	DRAINAGE
A1	A PORT EFFECTIVE CROSS SECTION
A2	B PORT EFFECTIVE CROSS SECTION
A3	SPRING CHAMBER EFFECTIVE CROSS SECTION

ORIFICE FUNCTIONAL SYMBOLS

	STANDARD ORIFICE (ALREADY INSERTED) Ø 1mm (DIAMETER)
	A GRUB SCREW ORIFICE CAN BE INSERTED IN THE THREADED SEAT
	BLIND



The logic unit operates as a function of the pressures acting on the relevant areas, and different opening pressures are obtained, depending on the dimensions of these areas.

A description of how to interpret the ARON cartridge opening ratios is as follows:

- there are three relevant areas A1, A2, A3;
- area A1 is taken to represent 100%, i.e. it is the reference area;
- area A2, when a 2:1 ratio is shown, is equal to 50% of area A1 and all the other ratios shown in the Table 2 can be calculated on this basis.

As consequence of these area ratios there are different opening pressures whether proceeding from A → B or from B → A.

ORDERING CODE

- KEL** Logic element 2/2
- **** 16 = NG16
25 = NG25
- *** Function: see table 1
Areas ratio:
U = 1 : 1
S = 12.5 : 1
B = 2 : 1
(for version with drilled poppet see CF variant)
F = 2 : 1
R = 2 : 1
- *** Opening pressure (bar)
(Tab.1 pressure values)
(Tab.2 spring's colour and code)
- **** Calibrated orifices:
00 = blind
08 = 0.8 mm
09 = 0.9 mm
10 = 1.0 mm
12 = 1.2 mm
14 = 1.4 mm
- **** **00** = No variant
V1 = Viton
CF = With drilled poppet only for KEL.**.B...
- 2** Serial No.

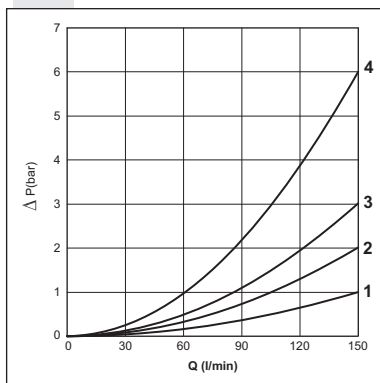
Tab. 1 - SYMBOL, FUNCTION, AREA RATIO AND OPENING PRESSURE

Function	Symbol	Area ratio	Code	Opening pressure (bar)	
				A→B	B→A
Directional (U) (normally used for relief valve)		A1 : A3 1 : 1	KEL*.U.L.00... KEL*.U.M.00... KEL*.U.H.00... KEL*.U.J.00...	L = 0.3 M = 1.6 H = 4 J = 9	
Directional (U) with orifice		A1 : A3 1 : 1	KEL*.U.L.**... KEL*.U.M.**... KEL*.U.H.**...	L = 0.3 M = 1.6 H = 4	
Directional (S)		A1 : A2 12.5 : 1	KEL*.S.L.00... KEL*.S.M.00... KEL*.S.H.00...	L = 0.3 M = 0.6 H = 1.5	L = 4 M = 8 H = 20
Directional (S) with orifice		A1 : A2 12.5 : 1	KEL*.S.L.**... KEL*.S.M.**... KEL*.S.H.**...	L = 0.3 M = 0.6 H = 1.5	L = 4 M = 8 H = 20
Directional (B) (normally used for check valve)		A1 : A2 2 : 1	KEL*.B.L.00... KEL*.B.M.00... KEL*.B.H.00...	L = 0.5 M = 1 H = 2.5	L = 1 M = 2 H = 5
Flow control (F)		A1 : A2 2 : 1	KEL*.F.L.**... KEL*.F.M.**... KEL*.F.H.**...	L = 0.5 M = 1 H = 2.5	L = 1 M = 2 H = 5
With sensitized cover (R)		A1 : A2 2 : 1	KEL*.R.L.00... KEL*.R.M.00... KEL*.R.H.00... KEL*.R.J.00...	A → B	
				NG16	NG25
				L = 0.7 M = 1.5 H = 4	L = 0.6 M = 1.5 H = 3.5 J = 9

Tab. 2 - SPRING'S COLOUR AND CODE

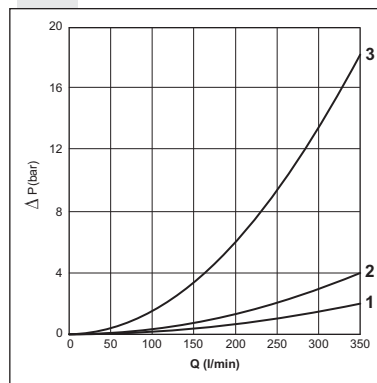
Spring type	U		S		B-F		R	
	NG16	NG25	NG16	NG25	NG16	NG25	NG16	NG25
Cod. L	without colour	red	without colour	red	without colour	red	without colour	red
Cod. M	green	yellow	red	green	red	green	red	green
Cod. H	blue	blue	red	yellow	green	yellow	green	yellow
Cod. J	without colour						green	blue

NG 16 PRESSURE DROP



- 1 = KEL16U
KEL16S
- 2 = KEL16B
- 3 = KEL16R
- 4 = KEL16F

NG25 PRESSURE DROP



- 1 = KEL25U
KEL25B
KEL25R
- 2 = KEL25S
- 3 = KEL25F

The fluid used is a mineral oil with a viscosity of 46 mm²/s at 40°C. The tests were performed at a fluid temperature of 50°C.

COVERS ORDERING CODE

KEC	Covers for logic element 2/2
**	16 = NG16 25 = NG25
**	Type of cover (see Tab. 3) RI = Directional with external piloting CQ = Directional with stroke adjustment RC = Directional with interface NG6 PC = With hydraulic outlet pilot valve SH = With built-in-exchange (shuttle) SP = With built-in-exchange and interface NG6
**	00 = No variant V1 = Viton
2	Serial No.

TAB. 1 - COVERS HYDRAULIC SYMBOLS


Type	Symbol
KEC.**.RI.**.2 Directional with external piloting	
KEC.**.CQ.**.2 Directional with stroke adjustment	
KEC.**.RC.**.2 Directional with interface NG6	
KEC.**.PC.**.2 With hydraulic outlet pilot valve	
KEC.**.SH.**.2 With built-in-exchange valve (shuttle)	
KEC.**.SP.**.2 With built-in-exchange valve (shuttle) and interface NG6	

HYDRAULIC MOUNTING SCHEMES FOR KEC COVERS AND KEL LOGIC ELEMENTS

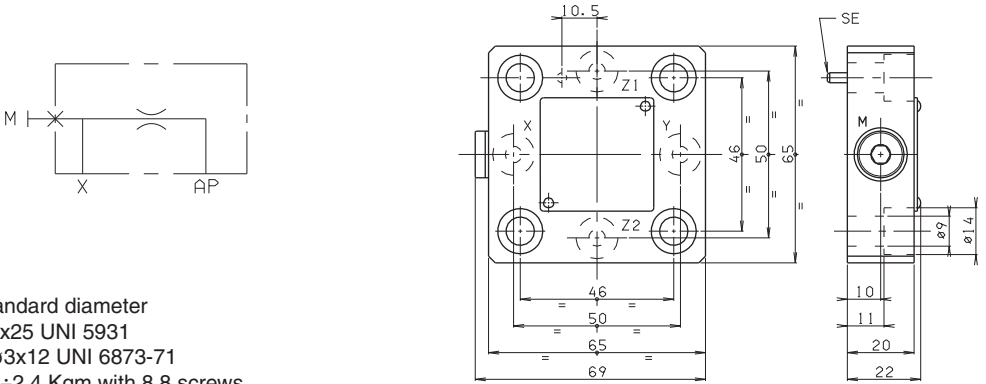
5

<p>KEC.16/25.RI... COVER WITH EXTERNAL PILOTING PORT</p> <p>A = External piloting X allows flow in both directions A → B and B → A. B = For rapid sequence safety circuit; A → B flow is allowed; when pressure reaches X valve closes. Only for CF variant (KEL.**:B... with drilled poppet), with no pressure in X it operates as a check valve between A and B.</p>	
<p>KEC.16/25.CQ... COVER WITH STROKE LIMITATION</p> <p>Allows flow regulation in both directions A → B and B → A. By limiting the spool stroke the flow in both direction can be limited.</p>	
<p>KEC.16/25.RC... COVER WITH INTERFACE NG6</p> <p>These covers have one mounting surface preset for a solenoid pilot valve. Proper connection of Y and Z2 to the A and/or B ports will allowing piloting of the valve opening and closing functions.</p>	
<p>KEC.16/25.PC... COVER WITH HYDRAULIC RELEASE PILOT VALVE</p> <p>This is a cover with external piloting to be connected to B port to obtain the standard unit function. Z1 pressure piloting allows flow transfer from B → A. Normally, in order to ensure the holding condition the main port B is connected to the load; piloting in Z1 should be at least 50% of the load pressure in B.</p>	
<p>KEC.16/25.SH... COVER WITH INTEGRAL CHANGEOVER VALVE</p> <p>The logic element closes as function of the larger pressure in X and Z1, selected by the shuttle valve.</p>	
<p>KEC16/25.SP... COVER WITH INTEGRAL CHANGEOVER VALVE AND INTERFACE NG6</p> <p>The AP branch of the cartridge valve spring is connected with the pilot valve port. External piloting operates from Z2 → A of the pilot valve. An example is shown in the diagram of a type of connection used to keep the conical seat valve closed on both sides (interrupted flow both from A → B and from B → A).</p>	
<p>KRA.16/25... COVER WITH ELECTRICAL CONTROL OF THE CLOSED POSITION AND INTERFACE NG6</p> <p>See cartridge type KRA... next pages</p>	


OVERALL DIMENSIONS KEC.16.RI... CHECK VALVE COVER



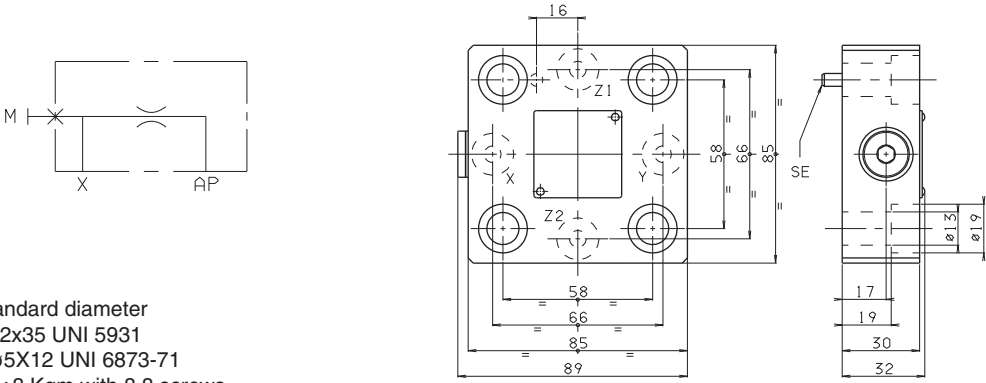
Weight: 0,5 Kg
M = pressure gauge attachment
 Orifice with calibrated $\varnothing 1$ mm standard diameter
 The covers are supplied with M8x25 UNI 5931 fixing screws, reference pin SE $\varnothing 3 \times 12$ UNI 6873-71
 Tightening torque 19÷24 Nm/1.9÷2.4 Kgm with 8.8 screws




OVERALL DIMENSIONS KEC.25.RI... CHECK VALVE COVER



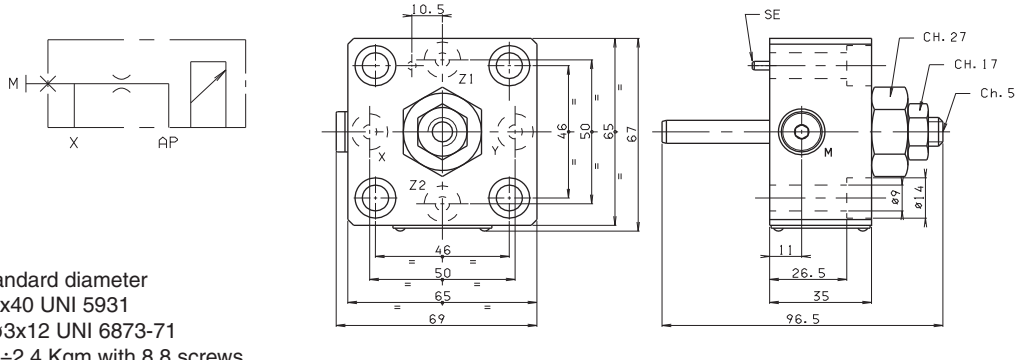
Weight: 1,3 Kg
M = pressure gauge attachment
 Orifice with calibrated $\varnothing 1$ mm standard diameter
 The covers are supplied with M12x35 UNI 5931 fixing screws, reference pin SE $\varnothing 5 \times 12$ UNI 6873-71
 Tightening torque 69÷80 Nm/6.9÷8 Kgm with 8.8 screws




OVERALL DIMENSIONS KEC.16.CQ.. COVER WITH STROKE ADJUSTMENT



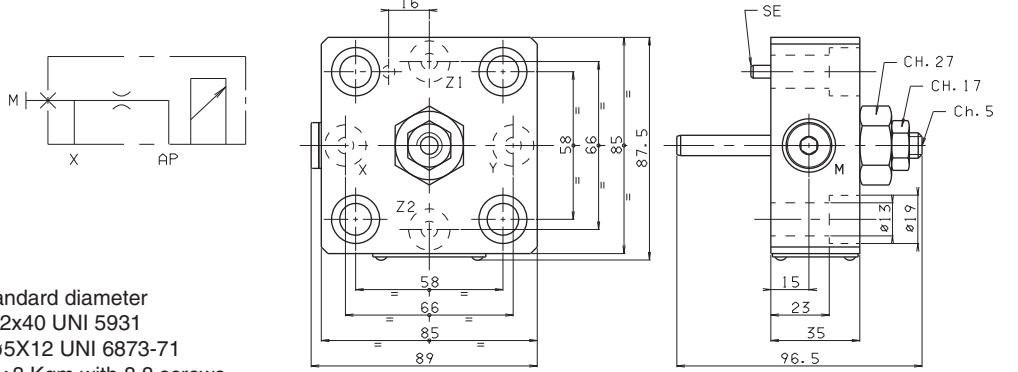
Weight: 0,9 Kg
M = pressure gauge attachment
 Orifice with calibrated $\varnothing 1$ mm standard diameter
 The covers are supplied with M8x40 UNI 5931 fixing screws, reference pin SE $\varnothing 3 \times 12$ UNI 6873-71
 Tightening torque 19÷24 Nm/1.9÷2.4 Kgm with 8.8 screws



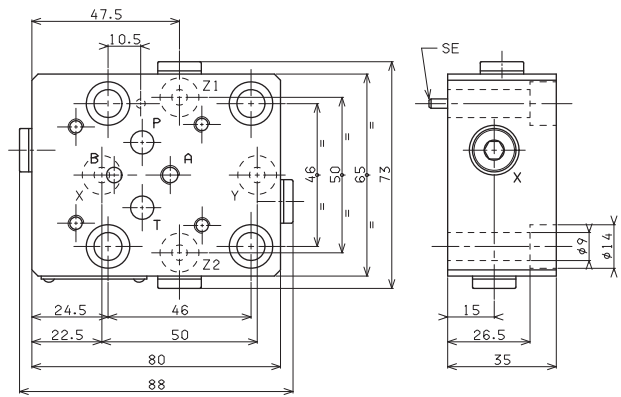
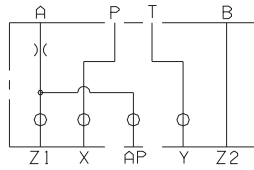
OVERALL DIMENSIONS KEC.25.CQ.. COVER WITH STROKE ADJUSTMENT



Weight: 1,6 Kg
M = pressure gauge attachment
 Orifice with calibrated $\varnothing 1$ mm standard diameter
 The covers are supplied with M12x40 UNI 5931 fixing screws, reference pin SE $\varnothing 5 \times 12$ UNI 6873-71
 Tightening torque 69÷80 Nm/6.9÷8 Kgm with 8.8 screws



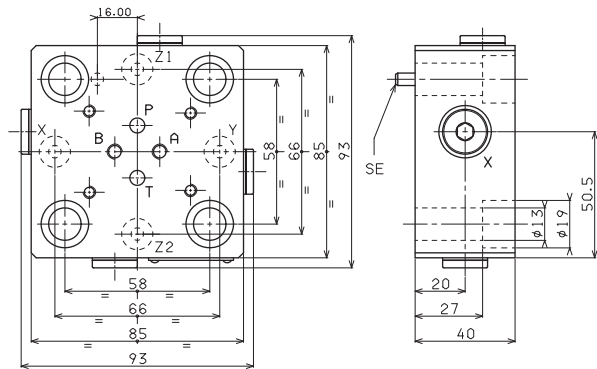
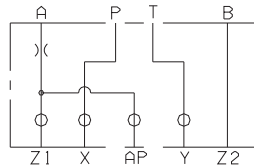
OVERALL DIMENSIONS **KEC.16.RC...** COVER WITH INTERFACE **CETOP 3/NG6**



Weight: 1,2 Kg
M = pressure gauge attachment
 Orifice with calibrated $\varnothing 1$ mm standard diameter
 The covers are supplied with M8x40 UNI 5931
 fixing screws, reference pin SE $\varnothing 3 \times 12$ UNI 6873-71
 tightening torque $19 \div 24$ Nm/1.9 \div 2.4 Kgm with 8.8 screws

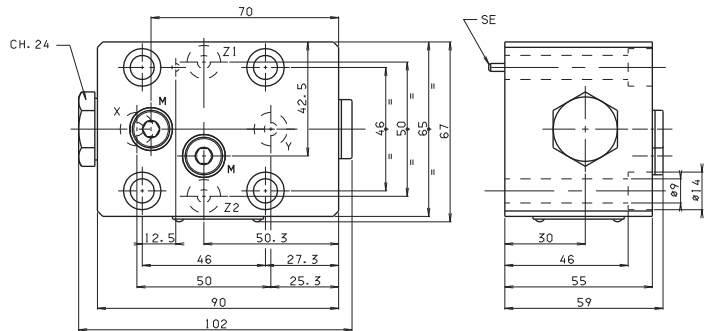
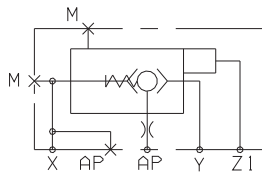
OVERALL DIMENSIONS **KEC.25.RC...** COVER WITH INTERFACE **CETOP 3/NG6**

5



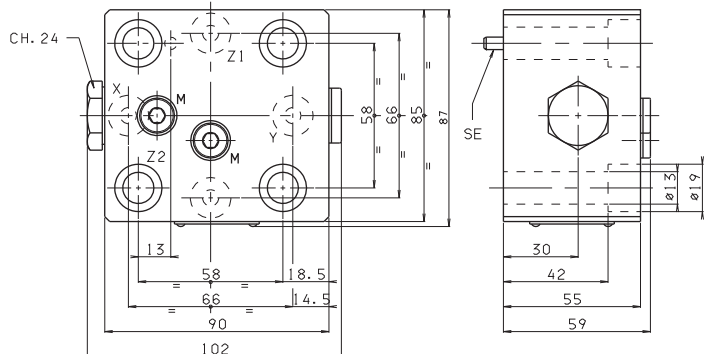
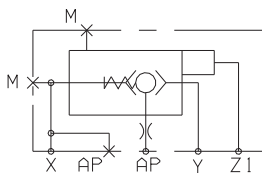
Weight: 1,8 Kg
M = pressure gauge attachment
 Orifice with calibrated $\varnothing 1$ mm standard diameter
 The covers are supplied with M12x45 UNI 5931
 fixing screws, reference pin SE $\varnothing 5 \times 12$ UNI 6873-71
 tightening torque $69 \div 80$ Nm/6.9 \div 8 Kgm with 8.8 screws

OVERALL DIMENSIONS **KEC.16.PC...** COVER WITH HYDRAULIC OUTLET PILOT VALVE




Weight: 2,1 Kg
M = pressure gauge attachment
 Orifice with calibrated $\varnothing 1$ mm standard diameter
 The covers are supplied with M8x60 UNI 5931
 fixing screws, reference pin SE $\varnothing 3 \times 12$ UNI 6873-71
 tightening torque $19 \div 24$ Nm/1.9 \div 2.4 Kgm with 8.8 screws

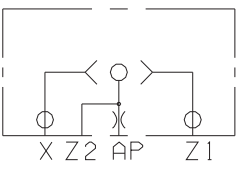
OVERALL DIMENSIONS **KEC.25.PC...** COVER WITH HYDRAULIC OUTLET PILOT VALVE

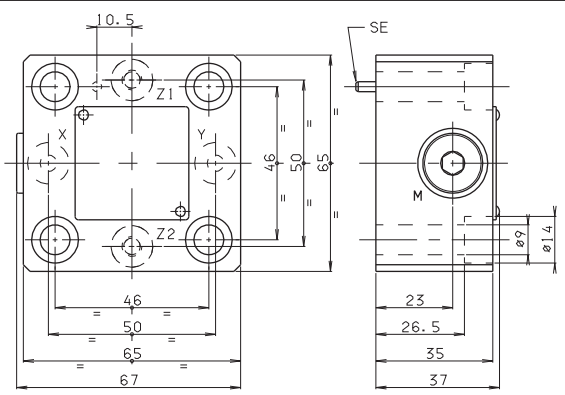


Weight: 2,7 Kg
M = pressure gauge attachment
 Orifice with calibrated $\varnothing 1$ mm standard diameter
 The covers are supplied with M12x60 UNI 5931
 fixing screws, reference pin SE $\varnothing 5 \times 12$ UNI 6873-71
 tightening torque $69 \div 80$ Nm/6.9 \div 8 Kgm with 8.8 screws

OVERALL DIMENSIONS KEC.16.SH... COVER WITH BUILT-IN EXCHANGE VALVE




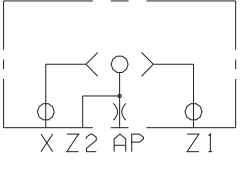


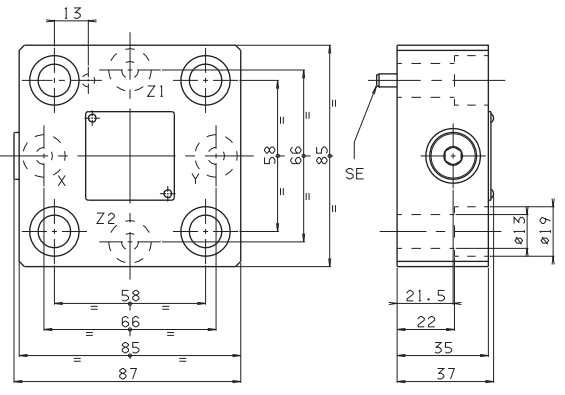


Weight: 0,9 Kg
M = pressure gauge attachment
 Orifice with calibrated $\varnothing 1$ mm standard diameter
 The covers are supplied with M8x40 UNI 5931 fixing screws, reference pin SE $\varnothing 3 \times 12$ UNI 6873-71 tightening torque $19 \div 24$ Nm/1.9 \div 2.4 Kgm with 8.8 screws

OVERALL DIMENSIONS KEC.25.SH... COVER WITH BUILT-IN EXCHANGE VALVE




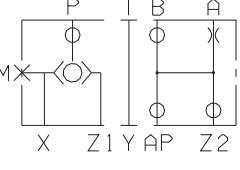


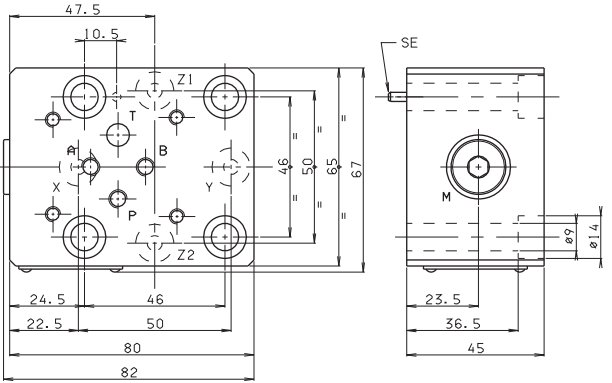


Weight: 1,5 Kg
M = pressure gauge attachment
 Orifice with calibrated $\varnothing 1$ mm standard diameter
 The covers are supplied with M12x40 UNI 5931 fixing screws, reference pin SE $\varnothing 5 \times 12$ UNI 6873-71 tightening torque $69 \div 80$ Nm/6.9 \div 8 Kgm with 8.8 screws

OVERALL DIMENSIONS KEC.16.SP COVER WITH BUILT-IN EXCHANGE VALVE AND INTERFACE CETOP 3/NG6




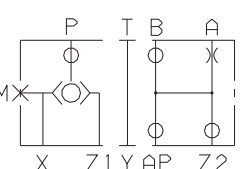


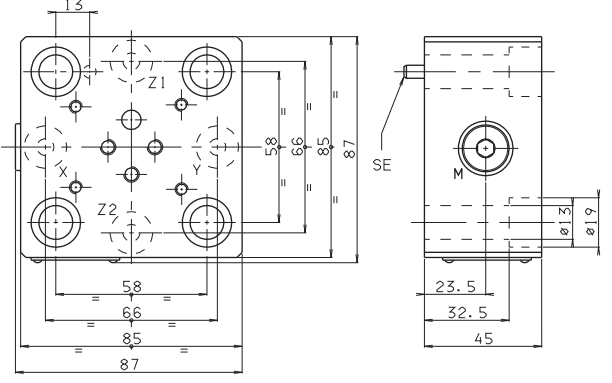


Weight: 1,4 Kg
M = pressure gauge attachment
 Orifice with calibrated $\varnothing 1$ mm standard diameter
 The covers are supplied with M8x50 UNI 5931 fixing screws, reference pin SE $\varnothing 3 \times 12$ UNI 6873-71 tightening torque $19 \div 24$ Nm/1.9 \div 2.4 Kgm with 8.8 screws

OVERALL DIMENSIONS KEC.25.SP COVER WITH BUILT-IN EXCHANGE VALVE AND INTERFACE CETOP 3/NG6







Weight: 2 Kg
M = pressure gauge attachment
 Orifice with calibrated $\varnothing 1$ mm standard diameter
 The covers are supplied with M12x50 UNI 5931 fixing screws, reference pin SE $\varnothing 5 \times 12$ UNI 6873-71 tightening torque $69 \div 80$ Nm/6.9 \div 8 Kgm with 8.8 screws

MAXIMUM PRESSURE CARTRIDGE VALVES



Aron maximum pressure cartridge valves allow control of hydraulic circuit pressures up to 400 bar and 350 l/min maximum flow rate (NG25).

Besides the normal manual pressure regulation mode, function like electrical command for discharge to drain, remote control, proportional pressure control or electrically selected dual pressure levels are also available.

Nominal size (max. diameter)	16mm / 25mm
Max. operating pressure	400 bar
Maximum nominal flow rate NG16	150 l/min
Maximum nominal flow rate NG25	350 l/min
Setting ranges	15 ÷ 400 bar

The cover interface allows the mounting of a CETOP 3/NG06 valve. A standard cartridge valve DIN 24342 is used. A cover not according to DIN rules is also available.

The valve response specification may be modified by selection of different internal orifices according to the required application. **The standard version has calibrated orifices of Ø 1 mm in X and AP.**

MAX. PRESSURE COVERS

KEC.16/25... WITH CMP	CH. V PAGE 11
C*.P.16/25...	CH. V PAGE 12
CETOP 3/NG06	CH. I PAGE 8
AD3E...	CH. I PAGE 11
AM3VM...	CH. IV PAGE 9
XP3...	CH. VIII PAGE 26

DIN STANDARDS COVER ORDERING CODE

KEC

DIN standards cover

16 = NG16
25 = NG25

Type of cover

ME = Max. pressure valve with interface CETOP 3
MP = Max. pressure valve
UE = Exclusion valve with interface CETOP 3
UN = Exclusion valve
SL = Sequencing valve

Setting ranges

1 = 15 ÷ 45 bar (**white spring**)
2 = 15 ÷ 145 bar (**yellow spring**)
3 = 60 ÷ 400 bar (**green spring**)

Type of adjustment

M = Plastic knob
C = Grub screw

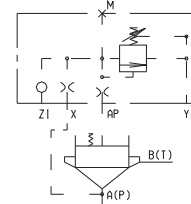
00 = No variant
V1 = Viton

3

Serial No.

MANUAL PRESSURE REGULATION

This regulation facility is incorporated in the cartridge closing cover. A Z1 port is provided on the cover for remote piloting via directional or pressure control valves.

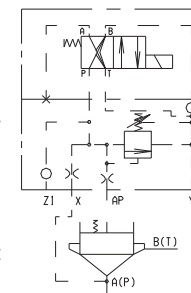


KEC. **. MP. .
CMP. **. .

KEL. **. U. .

MANUAL PRESSURE REGULATION AND ELECTRICAL COMMAND FOR DISCHARGE TO DRAIN

This arrangement uses an electrically controlled valve type AD3E15.. which normally, in the de-energized position, allows discharge to drain of the controlled flow. When energized, the system operates at the pressure set on the piloting unit incorporated in the closing cover.



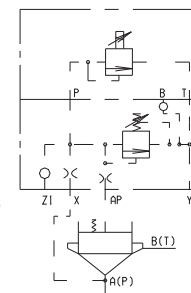
AD. 3. E.

KEC. **. ME. .
CMP. E. **. .

KEL. **. U. .

MANUAL REGULATION AND PROPORTIONAL CONTROL OF THE PRESSURE

This arrangement uses a proportional pressure valve type XP3.. as the pilot, which allows proportional regulation of the controlled system pressure as a function of an electrical command signal.



XP. 3. .

KEC. **. ME. .
CMP. E. **. .

KEL. **. U. .

PLATE MOUNTING COVERS ORDERING CODE

C*P

M = Cover with max. pressure valve
U = Cover with exclusion valve
S = Cover with sequencing valve

E = Presetting for solenoid valve (Omit if not required)

16 = NG16
25 = NG25

Type of adjustment

M = Plastic knob
C = Grub screw

Setting ranges

1 = 15 ÷ 45 bar (**white spring**)
2 = 15 ÷ 145 bar (**yellow spring**)
3 = 60 ÷ 400 bar (**green spring**)

00 = No variant
V1 = Viton

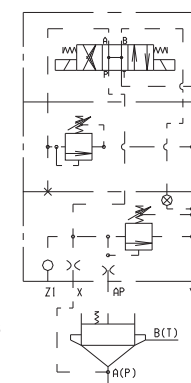
2

Serial No.

MANUALLY ADJUSTABLE AND ELECTRICALLY SELECTED TWO LEVEL PRESSURE UNIT

This arrangement uses a dual solenoid electrically controlled valve type AD3E02C.. and a modular maximum pressure valve type AM3VMA... which, when combined, allow implementation of an electrically selected two level pressure system.

Normally, with the solenoid valve de-energized, the controlled flow is discharged to drain.




AD. 3. E.

AM. 3. VM. . .

KEC. **. ME. .
CMP. E. **. .

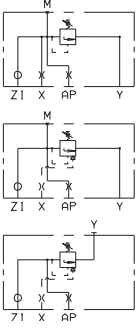
KEL. **. U. .

KEC.16.MP/UN/SL... WITH MAX. PRESSURE VALVE / EXCLUSION / SEQUENCING - IN LINE MOUNTING



DIN STANDARD

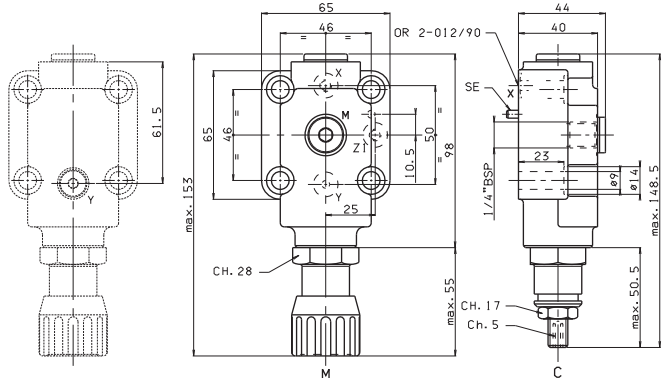
Weight: 1,3 Kg
The covers are supplied with M8x35 UNI 5931 fixing screws and reference pins dia \varnothing 3x12 UNI 6874-71



KEC.16.MP...

KEC.16.UN...

KEC.16.SL...




max. 152

max. 55

max. 50.5

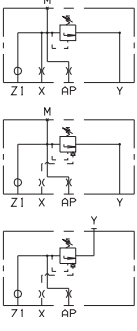
max. 148.5

KEC.25.MP/UN/SL... WITH MAX. PRESSURE / EXCLUSION / SEQUENCING - IN LINE MOUNTING



DIN STANDARD

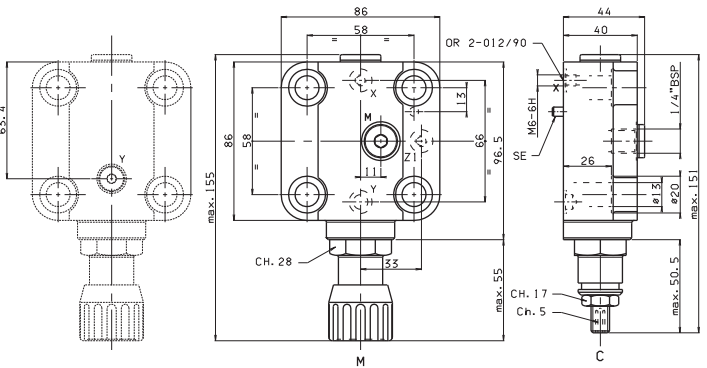
Weight: 1,8 Kg
The covers are supplied with M12x45 UNI 5931 and reference pins dia \varnothing 5x12 UNI 6874-71



KEC.25.MP...

KEC.25.UN...

KEC.25.SL...



max. 155


max. 55

max. 50.5

max. 151

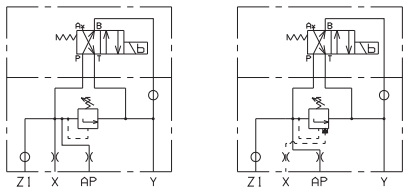
5

KEC.16.ME/UE WITH MAX. PRESSURE VALVE / EXCLUSION WITH INTERFACE CETOP 3 - IN LINE MOUNTING



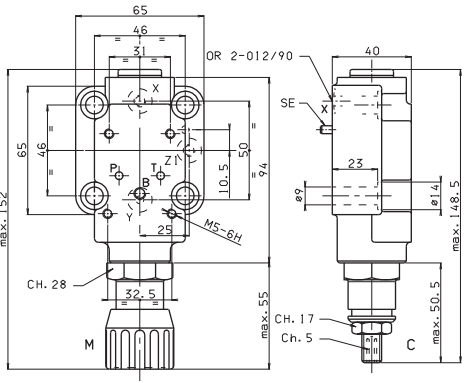
DIN STANDARD

Weight: 1,3 Kg
The covers are supplied with M8x35 UNI 5931 fixing screws and reference pins dia \varnothing 3x12 UNI 6874-71



KEC.16.ME...

KEC.16.UE...




max. 152

max. 55

max. 50.5

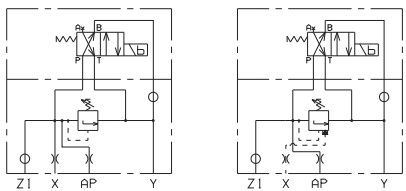
max. 148.5

KEC.25.ME/UE WITH MAX. PRESSURE VALVE / EXCLUSION WITH INTERFACE CETOP 3 - IN LINE MOUNTING



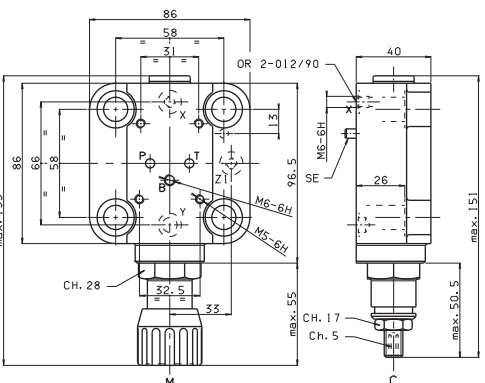
DIN STANDARD

Weight: 1,8 Kg
The covers are supplied with M12x45 UNI 5931 fixing screws and reference pins dia \varnothing 5x12 UNI 6874-71



KEC.25.ME...

KEC.25.UE...



max. 155

max. 55

max. 50.5

max. 151

