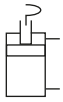
Specifications

Bore size(mm)	12	16	20	25	32	40	50	63
Acting type	Double acting							
Fluid	Air (to be filtered by 40μm filter element)							
Operating pressure	0.15~1.0MPa(22~145psi)(1.5~10bar)							
Proof pressure	1.5MPa(215psi)(15bar)							
Temperature	-20~70℃							
Speed range (mm/s)	50~200							
Rotation angle	90°							
Repeatability	±2°							
Rotation direction	Turn left of turn right							
Rotation stroke (mm)	7.5			9.5		15		19
Clamping stroke (mm)	10 20		10 20 30			10 20 30 50		
Stroke tolerance	$^{+1.0}_{0}$							
Cushion type	Bumper							
Port size Note)	M5×0.8					1/8"		1/4"

Note: PT thread, G thread and NPT thread are available.

Symbol



Product feature

1. It can be used on welding fixture, the QPQ surface treatment prevent piston rod damage by welding slag; better than chrome plated piston rod.
2. The front cover with stainless steel dust scraping ring,can keep the dust and welding slag out, and protect cylinder internal parts.
3. The mounting dimension of body is the same as ACQ series, can use ACQ series accessories.

Ordering code

QCK | L | 32 | × | 10 | S | M | FB | □

Model

QCK	Rotary clamp cylinder

Rotation direction

L	Push and turn left
R	Push and turn right

Bore size

12	12mm
16	16mm
20	20mm
25	25mm
32	32mm
40	40mm
50	50mm
63	63mm

Clamping stroke

Bore size	Clamping stroke
Φ12	10 20
Φ16~25	10 20 30
Φ32~63	10 20 30 50

Magnet

S	With magnet

Rod type

Blank	Taper type(with clamp arm)
M	Across flat position type(without clamp arm)

Mounting type Note 1)

Blank	No bracket
FB	FB type

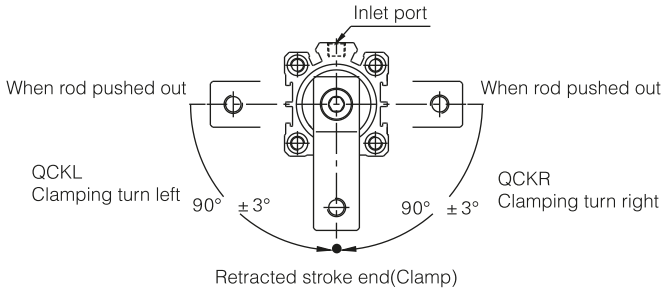
Thread type Note 2)

Blank	PT
G	G
T	NPT

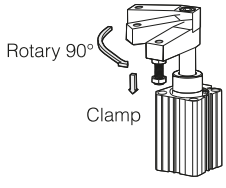
Note: 1. Back flange is same as ACQ series (please refer right table), if need front flange, please contact us.
2. When the thread is standard,the code is blank.

Bore size\Accessories	FB	Material	Bore size\Accessories	FB	Material
12	F-ACQ12FA	Aluminum alloy	32	F-ACQ32FA	Aluminum alloy
26	F-ACQ16FA		40	F-ACQ40FA	
20	F-ACQ20FA		50	F-ACQ50FA	
25	F-ACQ25FA		63	F-ACQ63FA	

The definition of rotation direction and angle

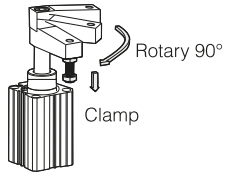


Levorotatory(QCKL):
when the piston of cylinder moves downward,the swivel arms moves anticlockwise,this is called levorotatory.



The order code is L

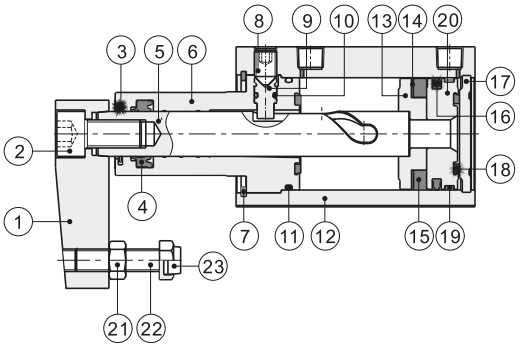
Dextrorotary(QCKR):
When the piston of cylinder moves downward,the swivel arms moves clockwise.this is called dextrorotary.



The order code is R

Inner structure and material of major parts

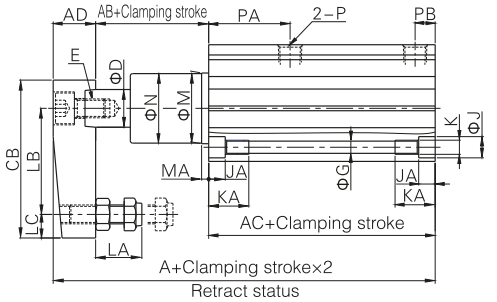
QCK

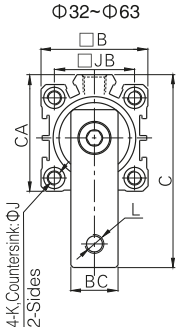


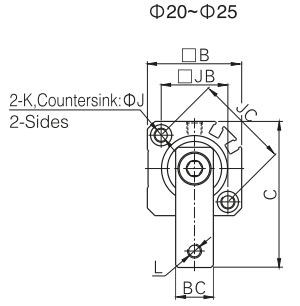
NO.	Item	Material	NO.	Item	Material
1	Rocker	Carbon steel	14	Magnet washer	NBR
2	Screw	Carbon steel	15	Magnet	Sintered metal Neodymium -iron-boron(Φ12~Φ25)
3	Dust scraping ring	No(Φ12, Φ16) Stainless steel(Others)			Plastic(Others)
4	Front cover packing	NBR	16	Piston seal	NBR
5	Piston rod	Scr440	17	Back cover	Aluminum alloy
6	Front cover	Aluminum alloy	18	Bumper	TPU(Φ12~Φ25)\NBR(Others)
7	C Clio	Spring steel	19	Wear ring	No(Φ12~Φ32) Wear resistant material(Others)
8	Screw	Carbon steel			
9	Operating screw	SCr440	20	Piston	Brass(Φ12,Φ16) Aluminum alloy(Others)
10	O-ring	NBR			
11	O-ring	NBR	21	Screw	Carbon steel
12	Body	Aluminum alloy	22	Fixing screw	Carbon steel
13	Magnet holder	Brass(Φ12, Φ16) Aluminum alloy(Others)	23	Bumper	PTFE(Φ12~Φ40POM(Others)

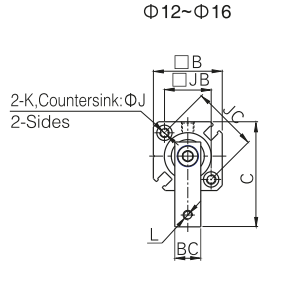
Dimensions

QCK□(Taper type with clamp arm)



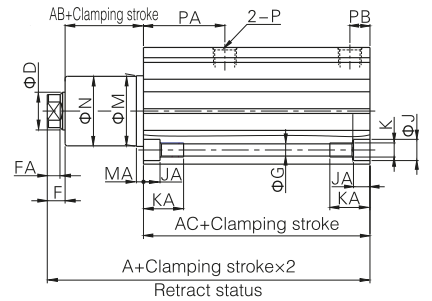


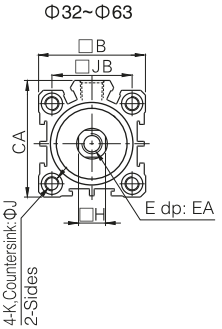


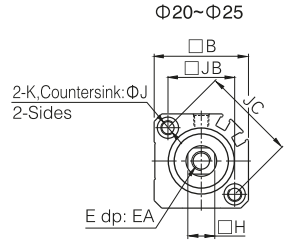


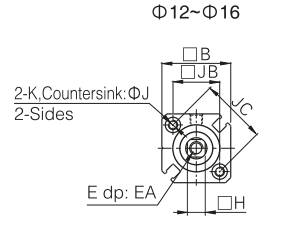
Bore size\Item	A	AB	AC	AD	B	BC	C	CA	CB	D	E	G	J	JA	JB	JC	K	KA	L	LA	LB	LC	M	MA	N	P	PA	PB
12	55	10.5	35.5	9	25	9	36.5	-	29	6	M3×0.5	3.3	6	3.5	15.5	22	M4×0.7	11	M4×0.7	7~13	20	4	11	3	10.8	M5×0.8	13.5	5.5
16	59	10.5	35.5	13	29	11	44.5	-	36	8	M5×0.8	3.3	6	3.5	20	28	M4×0.7	11	M4×0.7	7~13	25	5	14	3	13.8	M5×0.8	15	5.5
20	86	8	62	16	36	16	60	-	51	12	M8×1.25	5	9	5.5	25.5	36	M6×1.0	17	M6×1.0	9.5~20.5	35	7	18	3	17.8	M5×0.8	30	6
25	87	8	63	16	40	16	62	-	51	12	M8×1.25	5	9	5.5	28	40	M6×1.0	17	M6×1.0	9.5~20.5	35	7	23	6	22.5	M5×0.8	30	7
32	108	17.5	71.5	19	45	19	82	49.5	67	16	M10×1.5	5	9	5.5	34	-	M6×1.0	17	M8×1.25	13.5~25.5	45	10	30	7	29.5	1/8"	34.5	8.5
40	109	25	65	19	53	19	85.5	57	67	16	M10×1.5	5	9	5.5	40	-	M6×1.0	17	M8×1.25	13.5~25.5	45	10	30	3	29.5	1/8"	26.5	9
50	133	31	76.5	25.5	64	25.5	114	71	88	20	M12×1.75	6.5	10.5	6.5	50	-	M8×1.25	22	M10×1.5	14.5~30	65	10	37	3.5	36.5	1/4"	34	11.5
63	136	30.5	80	25.5	77	25.5	120.5	84	88	20	M12×1.75	8.5	14	9	60	-	M10×1.5	28.5	M10×1.5	14.5~30	65	10	48	3.5	47.5	1/4"	34.5	11.5

QCK□M(Across flat positon type without clamp arm)





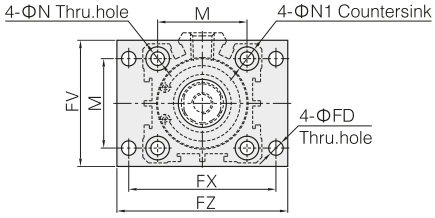




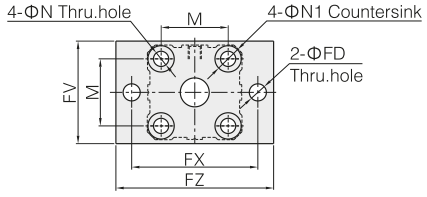
Bore size\Item	A	AB	AC	B	CA	D	F	FA	H	E	EA	G	J	JA	JB	JC	K	KA	M	MA	N	P	PA	PB
12	48	9.5	35.5	25	-	6	3	2.5	5	M3×0.5	6	3.3	6	3.5	15.5	22	M4×0.7	11	11	3	10.8	M5×0.8	13.5	5.5
16	48	9.5	35.5	29	-	8	3	2.5	7	M5×0.8	7	3.3	6	3.5	20	28	M4×0.7	11	14	3	13.8	M5×0.8	15	5.5
20	72.5	6.5	62	36	-	12	4	3	10	M8×1.25	13	5	9	5.5	25.5	36	M6×1.0	17	18	3	17.8	M5×0.8	30	6
25	73.5	6.5	63	40	-	12	4	3	10	M8×1.25	13	5	9	5.5	28	40	M6×1.0	17	23	6	22.5	M5×0.8	30	7
32	93.5	15.5	71.5	45	49.5	16	6.5	5.5	14	M10×1.5	15	5	9	5.5	34	-	M6×1.0	17	30	7	29.5	1/8"	34.5	8.5
40	94.5	23	65	53	57	16	6.5	5.5	14	M10×1.5	15	5	9	5.5	40	-	M6×1.0	17	30	3	29.5	1/8"	26.5	9
50	112	28	76.5	64	71	20	7.5	5.5	17	M12×1.75	20	6.5	10.5	6.5	50	-	M8×1.25	22	37	3.5	36.5	1/4"	34	11.5
63	115	27.5	80	77	84	20	7.5	5.5	17	M12×1.75	20	8.5	14	9	60	-	M10×1.5	28.5	48	3.5	47.5	1/4"	34.5	11.5

Q□K-FB(With flange)

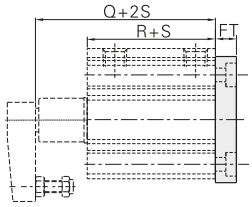
Φ32~Φ63



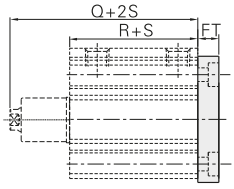
Φ12~Φ25



QCK□-FB
(Taper type with clamp arm)



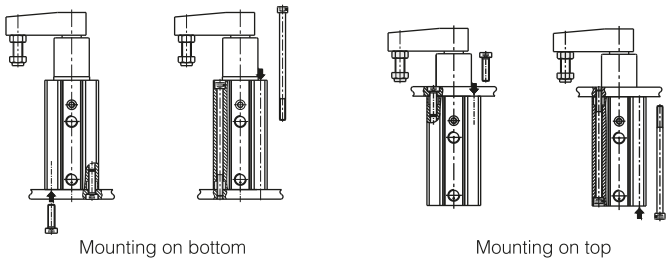
QCK□M-FB
(Across flat position rod without clamp arm)



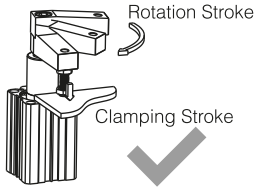
Bore size\Item	R	Q(QCK□)	Q(QCK□M)	M	N	N1	FD	FT	FV	FX	FZ
12	35.5	46	48	15.5	4.5	7.5	4.5	5.5	25	45	55
16	35.5	46	48	20	4.5	7.5	4.5	5.5	30	45	55
20	62	70	72.5	25.5	6.5	10.5	6.5	8	39	48	60
25	63	71	73.5	28	6.5	10.5	6.5	8	42	52	64
32	71.5	89	93.5	34	6.5	10.5	5.5	8	48	56	65
40	65	90	94.5	40	6.5	10.5	5.5	8	54	62	72
50	76.5	107.5	112	50	8.5	13.5	6.5	9	67	76	89
63	80	110.5	115	60	10.5	16.5	9	9	80	92	108

Installation and operation

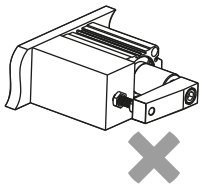
1. To insure the life-span of cylinder and jig, please use flow control valve to control the speed of cylinder.
2. The method of installation are mounted by flange on top of bottom.
3. Before the cylinder is connected to pipeline, sundries in the pipe must be eliminated,or may cause leakage.
4. Please clean the piston-rod and dust scraping ring to protect the cylingder.
5. The cylinder using normal magnet ring can use the same sensor as ACQ series. For the cylinder using strong magnet ring we suggest using CS1-69AM sensor.
6. Because the rotary force is strong when the cylinder's acting, we suggest using flow control valve to control the speed to protect cylinder.
7. Please install the cylinder following the right diagram.
8. The installation method as the diagram below is wrong, and will injure the cylinder and shorten the cylinder life.



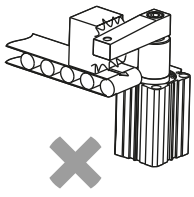
Mounting on bottom　　Mounting on top



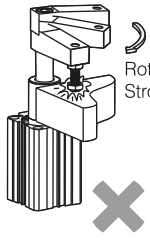
Only can clamping in clamping stroke.



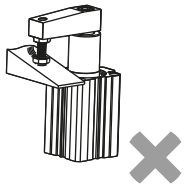
Don't installed horizontally



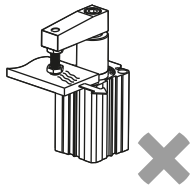
Don't exert horizontally load or force



Please don't clamp when rotating.

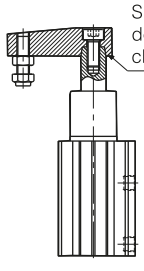


Please don't clamp on bevel

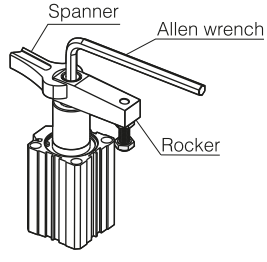


Do not more the workpiece when clamped

9. Rocker
9.1 The design of rocker can keep it stable and can change direction by customer.
9.2 Please follow the diagram below on right side to assemble/disassemble the rocker by spanner and allen wrench; don't hold the body to assemble/disassemble rocker, or will damage the cylinder.
9.3 If need customize rocker, please contact us.



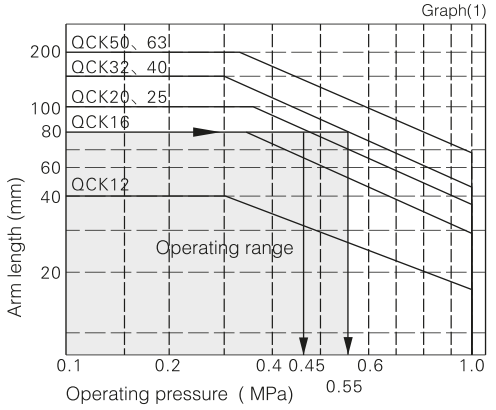
Special conical surface locked design can keep it stable and can change direction by customer.



How to select product

1. When arms are to be made separately, their length and weight should be within the following range.
2. Allowable bending moment:
   Use the arm length and operating pressure within graph(1) for allowable bending moment loaded piston rod.

Graph(1)

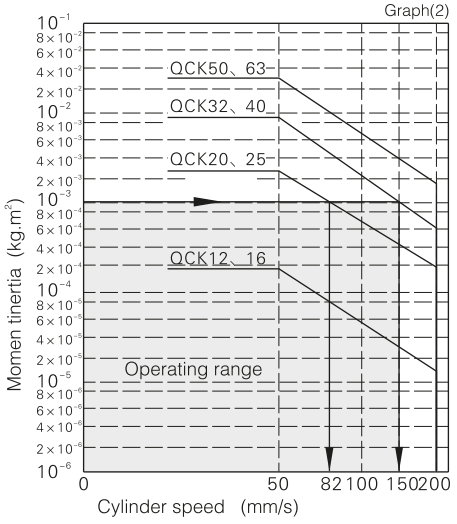


Example: When arm length is 80mm,pressure should be less than: QCK20/25: 0.45MPa, QCK32/40: 0.55MPa

4. Moment of inertia of cylinder's arm when rotating based on its rotary axis, shown in graph(3):

3. Moment of inertia:
When the arm is long and heavy, damage of internal parts may be caused due to inertia. Use the inertia moment and cylinder speed within graph(2) based on arm requirement.

Graph(2)



Example: When arm's moment of inertia is 10^{-3}Kg · m^2, cylinder speed should be less than
QCK20/25: 82mm/s
QCK32/40: 150mm/s
Note: The average speed of piston=the highest speed of piston/1.6

Graph(3)

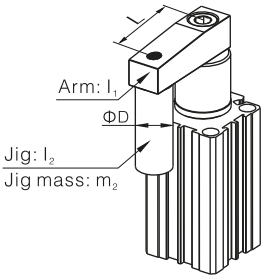
Model	Moment of inertia(Kg·m²)
QCK12	3.555×10^{-6}
QCK16	1.053×10^{-5}
QCK20/25	5.257×10^{-5}
QCK32/40	1.653×10^{-4}
QCK50/63	7.387×10^{-4}

5. Calculation reference:

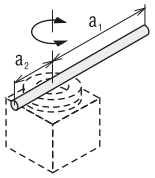
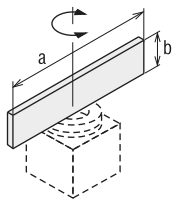
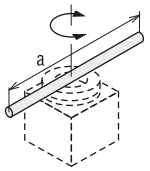
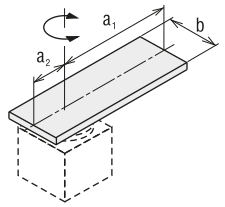
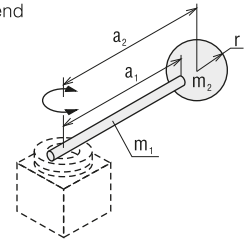
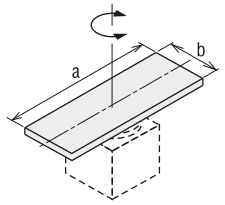
5.1 Moment of inertia of arm (I_1) : Refer to the graph(3) after he cylinder bore diameter is determined.

5.2 Moment of inertia of jig (I_2) : According to shape of the jig and the next item 6 "Calculation for moment of inertia", pick out a proper formula for calculation.
The jig shown on the right graph is a cylinder, its formula of moment of inertia is: $I_2=(m_2*D*D)/8+m_2*L*L$
When QCK32 is selected: L=0.045m(arm length); If D=0.04m m_2=0.4kg
From graph(3): $I_1=1.653\times10^{-4}$(Kg·m^2)

By Calculation: $I_2=(m_2*D*D)/8+m_2*L*L=(0.4*0.04*0.04)/8+0.4*0.045*0.045=8.9\times10^{-4}$(Kg·$m^2$)
Total value: $I=I_1+I_2=10.553\times10^{-4}=1.0553\times10^{-3}$(Kg·$m^2$)
According to graph(2), the highest speed of the cylinder should be less than 150mm/s; According to graph(1), it can be used under a pressure of 0.9Mpa. The average speed of piston=the highest speed of piston/1.6=94mm/s.



6. Calculation for moment of inertia:

Diagram	Calculation formula of moment of inertia	Diagram	Calculation formula of moment of inertia
1. Thin bar Position of rotary axis: Vertical to the bar and through the end 	$I=\frac{m_1a_1^2+m_2a_2^2}{3}$	4. Thin rectangular plate (Cube) Position of rotary axis: Parallel to side b and through the center of gravity 	$I=\frac{ma^2}{12}$
2. Thin bar Position of rotary axis: Vertical to the bar and through the center of gravity 	$I=\frac{ma^2}{12}$	5. Thin rectangular plate (Cube) Position of rotary axis: Vertica to the plate and through the end 	$I=m_1\times\frac{4a_1^2+b^2}{12}+m_2\times\frac{4a_2^2+b^2}{12}$
3. Load at the end of lever arm 	$I=m_1\times\frac{a_1^2}{3}+m_2\times a_2^2+k$ $k=m_2\times\frac{2r^2}{5}$	6. Thin rectangular plate (Cube) Position of rotary axis: Through the center of gravity and vertical to the plate(Same as also thickrectanglaur plate) 	$I=\frac{ma^2+mb^2}{12}$