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Exceeding Your Expectations !

PMP Series 201 Pneumatic Actuator

Rack & Pinion, Double acting & Spring return



ISO-9001, QS-9000



PED 97/23/EC



ATEX



AD2000 W0

Made by PMP, a partner of great reputation you can count on
PMP Quality System is accredited to QS-9000, ISO-9001, AD 2000 W0 and PED 97/23/EC

We reserve the right to change at any time without prior notice

Please read the instruction manual carefully and keep for future reference.
Only properly instructed persons disassemble or assemble the actuator.

FEATURES:

- High strength in a light compact anodized body
- Rack & pinion design. Blow-out proof pinion.
- Electroless Nickel (EN) plated pinion for exceptional corrosion resistance.
- Double acting or spring return
- Direct mounting for NAMUR solenoid
- Adjustable stroke control, both inward (option) & outward (standard)
- Zero internal leakage
- All stainless steel fasteners
- Piston is epoxy coated for best internal corrosion protection
- Top side manual override connection
- Comply with ISO 5211, DIN 3337, VDI/VDE 3845, NAMUR
- Various pinion and mounting dimensions upon request
- Special design and/or material upon request
- PMP Quality System is accredited to QS-9000, ISO-9001, AD 2000 W0 and PED 97/23/EC (CE mark)

GENERAL DESCRIPTION:

The PMP Series 201 actuator is a quarter-turn pneumatic operator for remote actuation control of valves etc. The standard rotation is clockwise to close.

PMP Series 201 actuators are rack and pinion, available in two versions: both double acting (air to operate in both directions) and spring return (air to operate in one direction, springs to operate in other direction) for rotation of 90°. They are ideally suitable for actuating ball valves, plug valves and butterfly valves for on/off applications & other devices in need of 90° rotation.

PMP Series 201 actuators are designed for general pneumatic operating pressure from 3 to 10 bar (43.5 to 145 psi) and for temperature ranges of -25°C to +100°C, using clean, dry and non-corrosive air as operating media.

PMP has its own production line for actuators and a professional engineering team. With perfect design, the PMP series 201 actuators are very easy to be disassembled and assembled in safety and can achieve a long life. They are also protected against normal environmental corrosion by using appropriate material and certain surface treatment.

All PMP Series 201 actuators are lubricated during assembly process in the factory to achieve optimum cycle life. No further lubrication is needed under normal operating conditions. The actuator has been tested before delivery to ensure proper operation and are constructed for indoor or outdoor installation.

The features of PMP actuators - high reliability, economical, high strength, long lasting, compactness and simplicity have made PMP actuators the most competitive actuators on the market today.

PMP Actuator Material List

Pos.	Part name	Material	Usage
1	Body	AA6061-T6, anodized	1
1-1	NAMUR pad	Nylon (*1)	1
2	Cap	Alu. A 380, Epoxy coating (*2)	2
3	Pinion	St + Electroless Ni plating	1
4	Piston	Alu. A 380, Epoxy coating (*3)	2
5	Piston guide	POM	2
6	Piston O-ring	NBR	2
7	Piston band	POM	2
8	Cover gasket	NBR	2
9	Nut	SS304	2
10	Nut O-ring	NBR	2
11	Stroke adjusting	SS304	2
12	Thread cap	PE	2
13	Pinion O-ring L	NBR	1
14	Pinion bearing L	POM	1
15	Pinion bearing U	POM	1
16	Pinion O-ring U	NBR	1
17	C circlip	Tool St + Phosphated	1
18	Washer	POM	1
19	Cap screw	SS304	8
20	Spring cartridge	Piano St + Phosphated	N (*4)
22	Pad O-ring	NBR (*1)	1
23	Cap screw	SS304 (*1)	2

*1) Standard version without extra expense.

*2) Engineered Plastic for size 055.

*3) Engineered Plastic for size 055.

*4) Depends on practical application.

- The BODY (1) is precision extruded anodized Aluminum alloy AA6061-T6 for best corrosion resistance.
- The CAPS (2) are die-cast Alu. A380 with epoxy coating for chemical resistance and chip resistant.
- The PINION (3) is made of steel and electroless Ni plating for corrosion resistance, precision machined as one-piece for output driving shaft and gear. Pinion gear features an international standard.
- The PISTONS (4) are die-cast Aluminum A380 with epoxy coating designed to withstand extreme service. Wide piston rack gear teeth provide optimum engagement with pinion, minimizing backlash and maximizing actuator life.
- PISTON GUIDES (5) and BAND (7) is made of wear resisting POM material. They are fully self-lubricated and have a very low friction and absorb the side impacts of the pistons. The body & piston are well protected by them from abrasion. The piston cylinder walls are with fine finish to reduce friction as well. All of this extend the life of the actuator and achieve high efficiency as well.
- PISTON O-RINGS (6) are permanently lubricated seals.
- The STROKE ADJUSTING (11) together with NUT (9) adjust the travel of the actuator to specific degrees of rotation. Adjustment of the counterclockwise and clockwise rotation limits are accomplished by turning the left / right stroke adjusting to reduce or increase output rotation, use the NUT (9) to fix the degrees after adjusting. Bi-directional travel stop is optional function upon requested.
- The LOWER PINION BEARING (14) and UPPER PINION BEARING (15) are made of low-friction POM.
- The C CIRCLIP (17) and PINION WASHER (18) are designed to protect the body from abrasion and to extend the life of the actuator.
- The SPRING CARTRIDGES (20) are self contained spring cartridges allows a simplified and safe conversion from double acting to spring return without any extra extension on cap nor body. PMP spring cartridge adopt the best quality piano steel with phosphate coating which provides excellent corrosion resistance and times of life cycle than normal spring steel adopted by other brands. Spring return actuators are used mainly in a fail-safe operation in the event of air pressure loss.
- The two air inlet and outlet ports are 1/4" thread offering maximum air supply.

WORKING PRINCIPLE

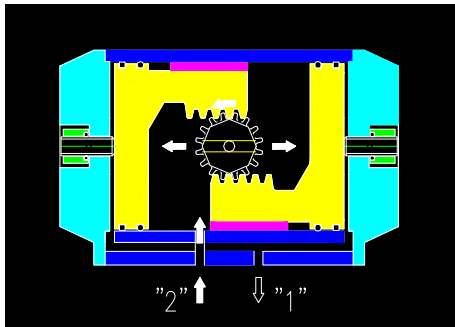
- **Double-Acting Actuators**

The double-acting actuators use air to rotate clockwise and counter clockwise.

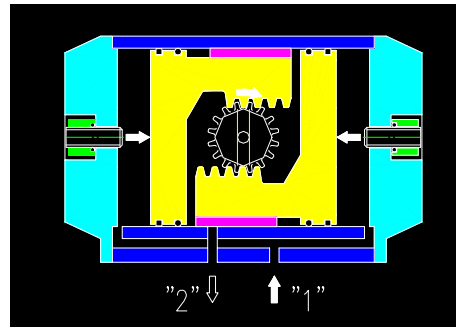
- **Spring Return Actuators (Single-Acting)**

Spring return models use air pressure to rotate in one direction. While the actuator rotates, springs are compressed. When the air pressure is vented, the energy stored in the springs rotates the actuator the other direction. Spring return actuators are used mainly in a fail-safe operation in the event of air pressure loss.

Double-Acting operation function (Top View)

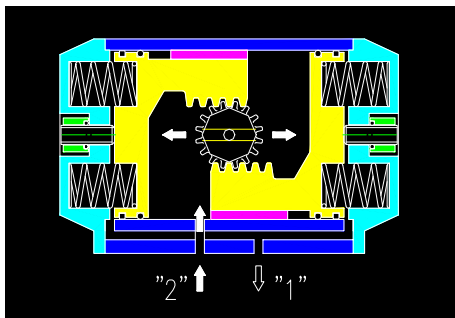


For counterclockwise operation, air supplied to Port 2. The pressure moves the pistons apart. The linear movement of the pistons is converted to rotary motion by the piston racks and the output pinion gear. A counterclockwise rotation is obtained.

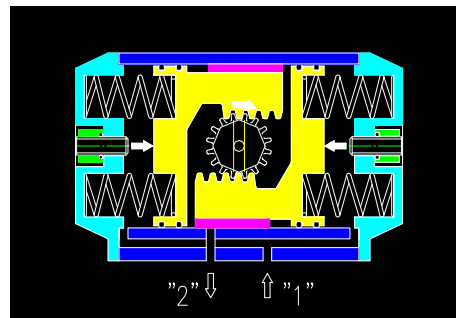


For clockwise operation, air supplied to Port 1. The pressure makes the pistons move together, the pinion rotates clockwise. A clockwise rotation is obtained.

Spring Return operation function (Top View)



For counterclockwise operation, air supplied to Port 2. The pressure moves the pistons apart and compresses the springs. The linear movement of the pistons is converted to rotary motion by the piston racks and the output pinion gear. A counterclockwise rotation is obtained.



For clockwise operation, in the absence of air pressure (by design or system failure), the springs force to move the pistons inward. As the pistons move together, the pinion rotates clockwise. A clockwise rotation is obtained.

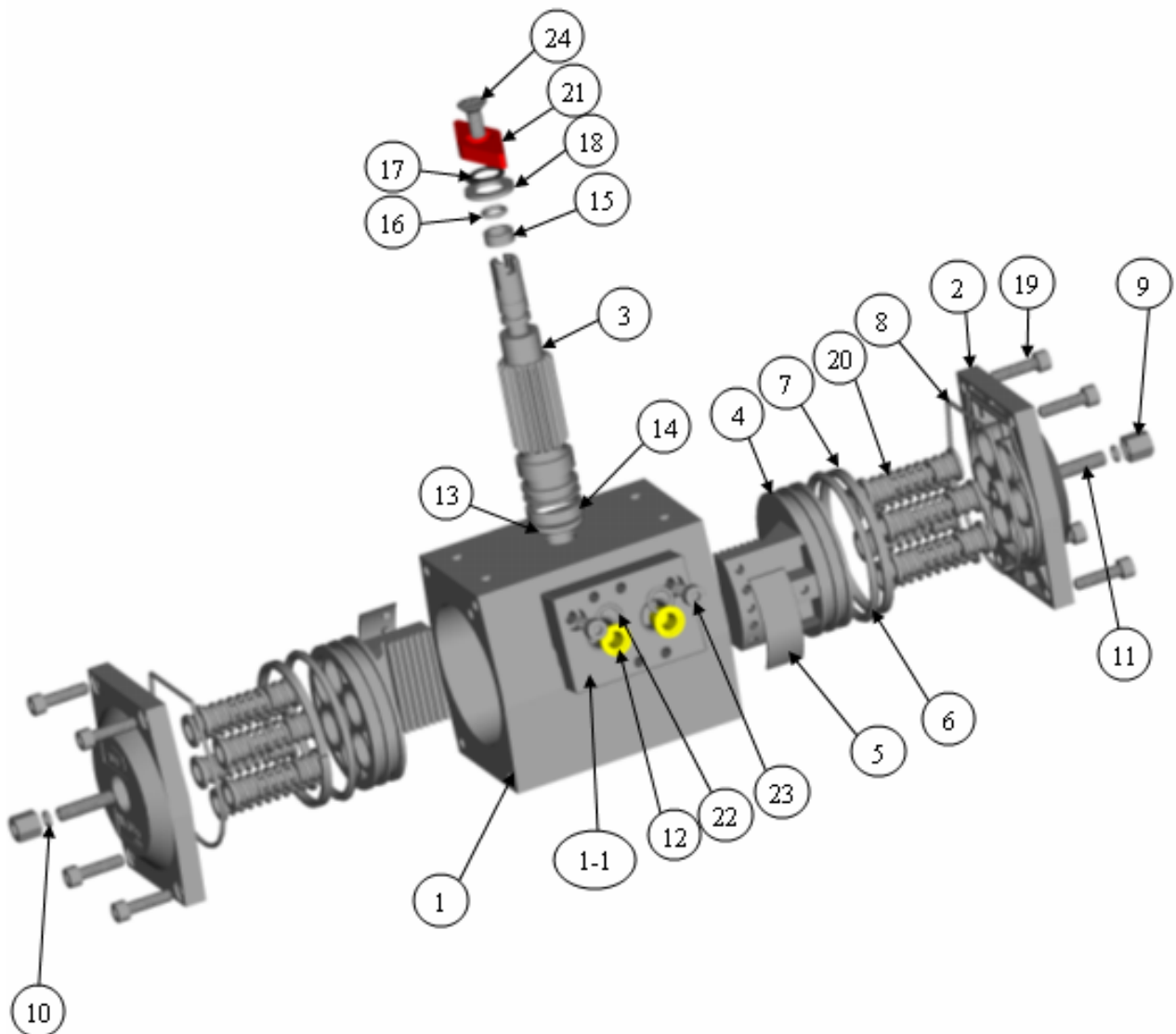
MAINTENANCE

For maintenance, only periodical observation is needed under normal operating conditions. Such as, adjust the screws for proper tightening, check if there is leakage at the ports and adjust it to meet correct rotation orientation.

For repair, the actuator can be rebuilt only by the person is properly instructed. Inspect the parts after disassembling, replace the damaged parts where in needed, clean the remaining parts, grease the parts and re-assemble the actuator. All seals or bearings for replacement are available upon request. Contact with PMP when needed.

For double acting actuators, it may achieve 1,000,000 cycles lifetime depending on operating and/or environmental conditions.

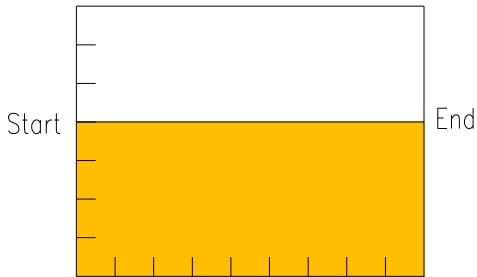
ILLUSTRATION DRAWING FOR ASSEMBLY AND DISASSEMBLY



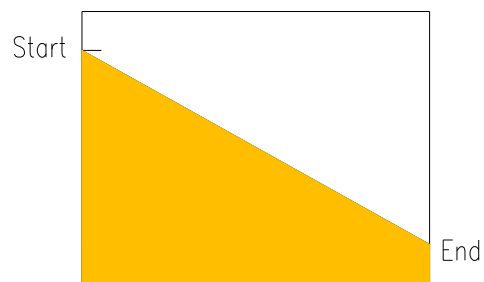
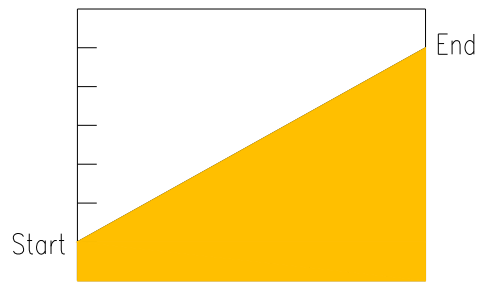
LINEAR TORQUE

The output torque is linear throughout travel.

Double Acting Torque Curve



Spring Return Torque Curve



Torque table (double acting)

unit: Nm

Size	3 bar	3.5 bar	4 bar	4.5 bar	5 bar	5.5 bar	6 bar	6.5 bar	7 bar	8 bar	9 bar	10 bar	Air consumption (liter/stroke)
055	12	14	16	18	20	23	25	27	29	33	37	41	0.13
065	18	21	24	27	30	33	36	39	42	48	55	61	0.18
075	31	36	42	47	52	57	63	68	73	84	94	105	0.30
085	44	51	59	66	74	81	88	96	103	118	133	148	0.43
095	63	73	84	94	105	115	126	136	147	168	189	210	0.55
105	88	103	118	132	147	162	177	191	206	236	265	295	0.93
125	178	208	238	267	297	327	357	386	416	476	535	595	1.80
165	354	413	472	531	590	649	708	767	826	944	1062	1180	3.41

Torque table (double acting)

unit: inch-lbs

Size	44 psi	51 psi	58 psi	65 psi	73 psi	80 psi	87 psi	94 psi	102 psi	116 psi	131 psi	145 psi	Air consumption (liter/stroke)
055	106	124	142	159	177	204	221	239	257	292	328	363	0.13
065	159	186	213	239	266	292	319	345	372	425	487	540	0.18
075	275	319	372	416	461	505	558	602	647	744	833	930	0.30
085	390	452	523	585	655	717	779	850	912	1045	1178	1311	0.43
095	558	647	744	833	930	1019	1116	1205	1302	1488	1674	1860	0.55
105	779	912	1045	1169	1302	1435	1568	1692	1825	2090	2347	2613	0.93
125	1577	1842	2108	2365	2631	2896	3162	3419	3685	4216	4739	5270	1.80
165	3136	3658	4181	4703	5226	5748	6271	6794	7316	8361	9407	10452	3.41

SPRING RETURN ACTUATORS

Spring return actuators are used mainly in a fail-safe operation in the event of air pressure loss. PMP's Series 201 spring return actuators are designed with a self-contained spring cartridge system with below advantages:

1) Compactness

The housing length of the spring return unit is the same as the double acting unit. Converting from double acting to spring return actuation is just to remove the end caps and add a number of spring cartridges.

2) Safety

The spring cartridges made the actuator can be easy disassembled and assembled without danger to the installer due to springs releasing. It's safe for installers when the end caps are removed.

Please see the technical data "Torque table (single acting, spring return)" for information of "useful pneumatic torque at minimum control pressure". If there is any inquiry, consult PMP Precision Ind. Co Ltd.

TRAVEL STOP ADJUSTMENT

Adjusting screws are located in both end caps to precisely adjust the travel of the Actuator to specific degrees of rotation. The travel stop permits readjusting of actuator movement to open or closed positions.

INSTALLATION

PMP actuators comply with ISO 5211 and VDI/VDE 3845 dimensions and can be mounted directly to PMP ISO-5211 series ball valves without using external linkages. Field installation is simple, misalignment is minimized and good rigidity achieved.

PMP can provide linkage for mounting actuators to other devices requiring quarter rotation. PMP actuator, when mounted to other valve body etc, may require a mounting bracket depending upon the type. Also, a shaft coupling for connecting the valve shaft to the actuator shaft may or may not be required depending upon which device is to be connected with as well as the type of actuator.

The actuator should be installed correctly and safely onto valves etc, include:

- Make sure the actuator is not be pressurized during installation.
- Make sure the system is clean and dirt-free.
- The top of the drive shaft should be easy to be accessed in case that whenever manual operation is needed.
- Choose same threads for matching (e.g. Imperil or Metric) when connect with valves etc.
- Choose same threads for matching (e.g. Imperil or Metric) when connect with the air ports.
- Make sure correct orientation obtained for both actuator and valves etc.

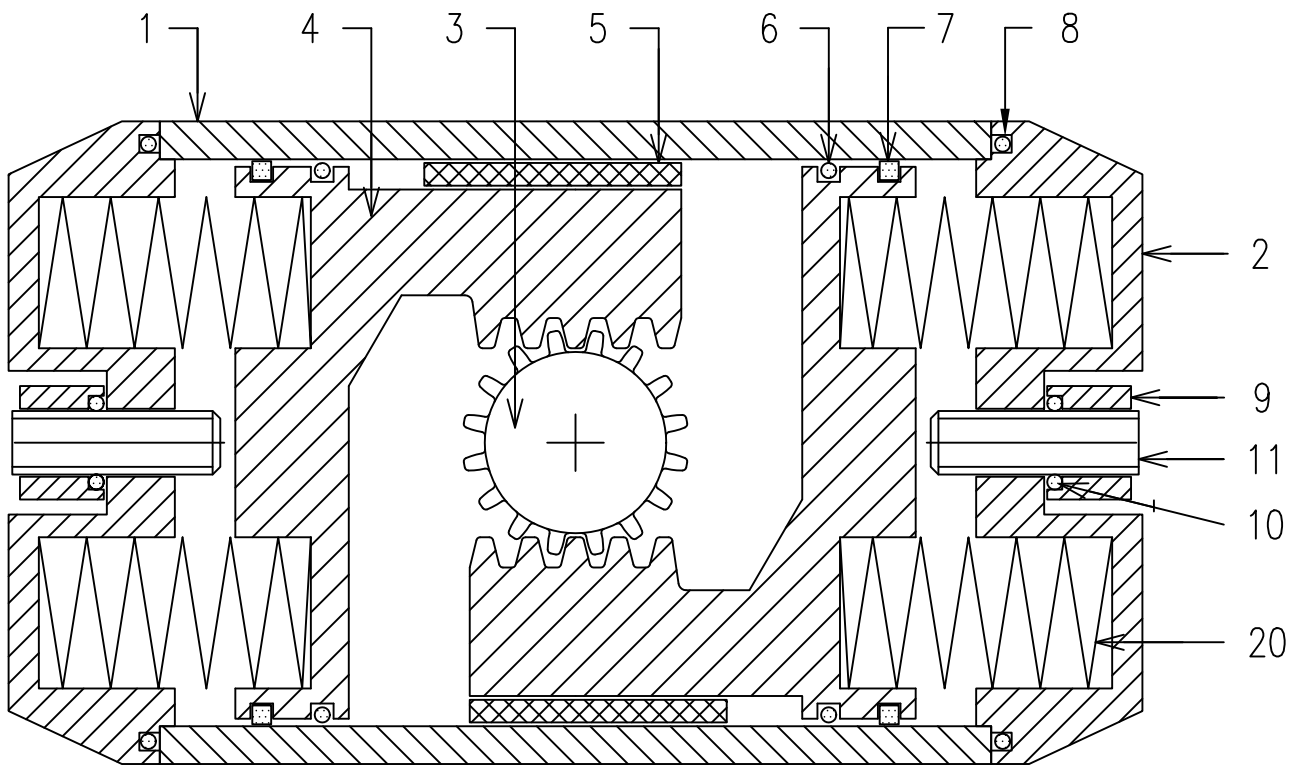
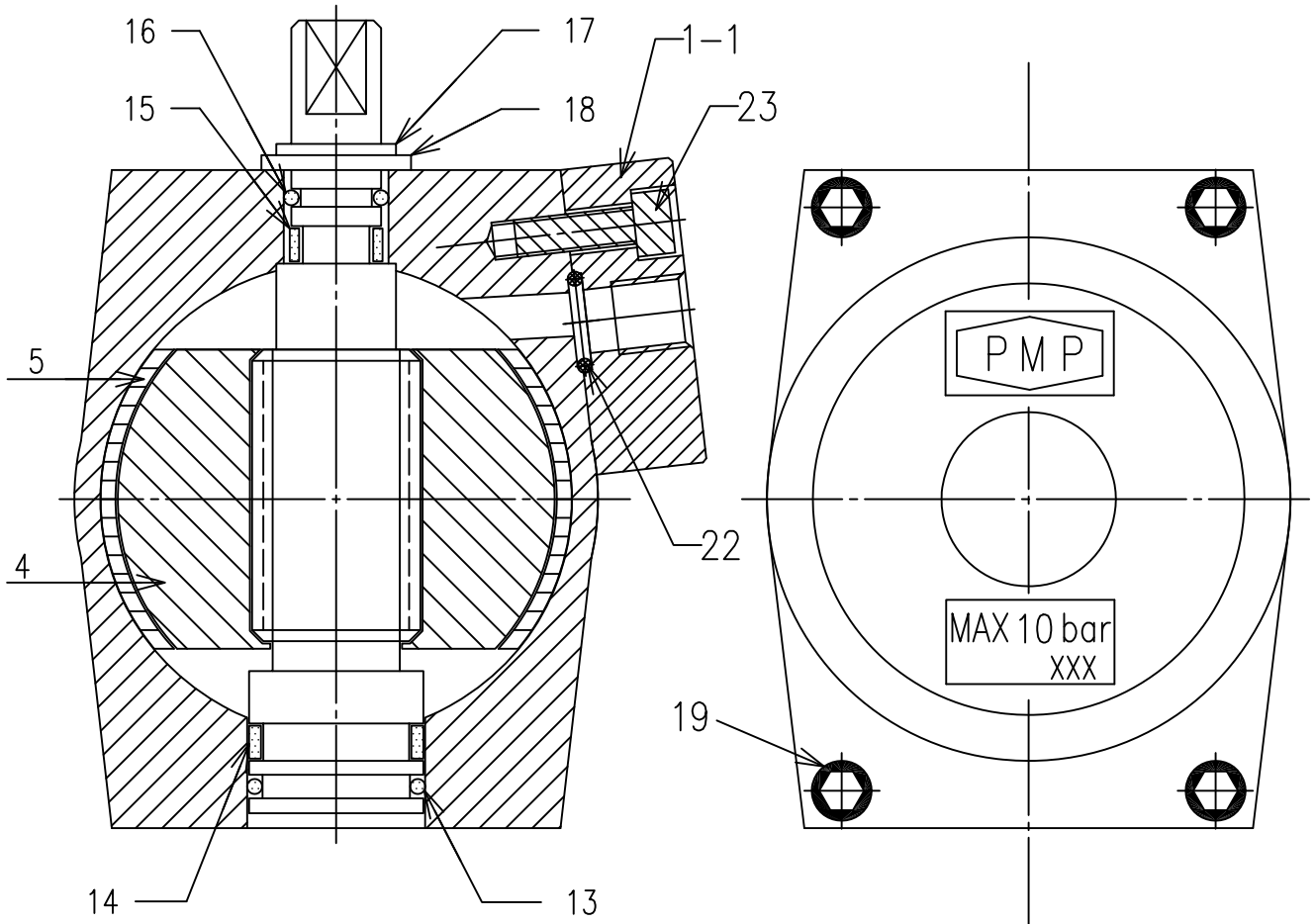
SAFETY NOTICE

- The actuator should be working within its pressure limits – see the technical data in this manual, do not operate it over the limit.
- Operating temperature limits is -25°C to +100°C, do not go beyond.
- Using clean, dry and non-corrosive air as operating media.
- Operating in corrosive environments may damage the internal or external parts.
- Do not disassemble the spring cartridge, it may be dangerous.
- Before installation or disassembly, isolate the air lines and make sure the air connection of the actuator is vented.
- Do not disassemble the actuator caps while it is pressurized.
- Make sure get correct position / orientation where it is connected with valves etc.

STORAGE

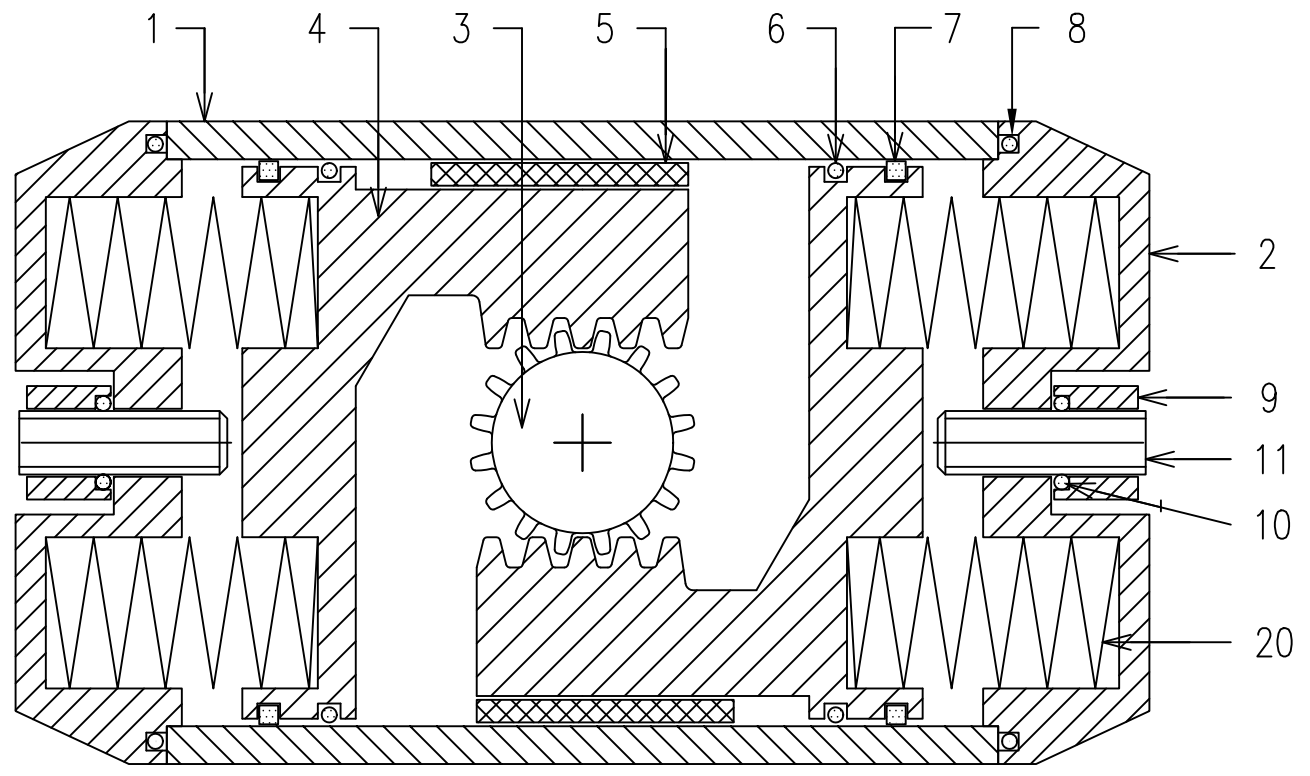
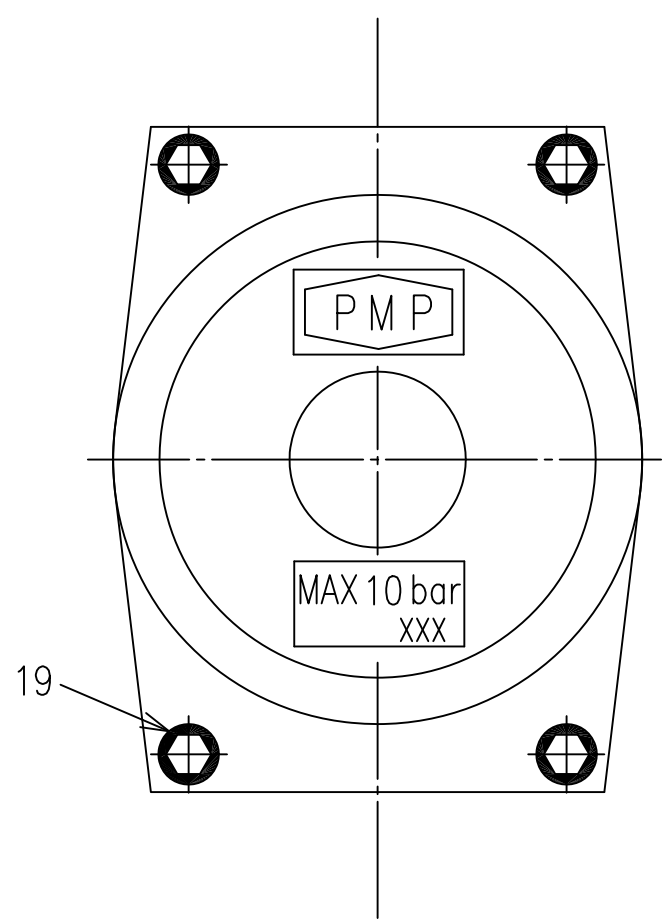
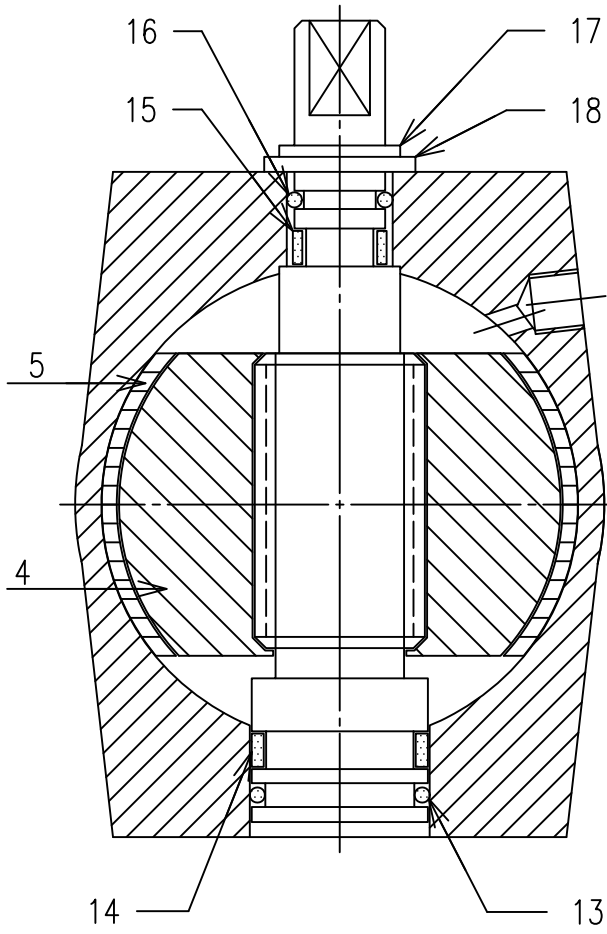
Store the actuators in a dry environment in its original box if the actuators are not be used immediately.

Do not remove the plastic caps on the air supply ports to protect the threads.



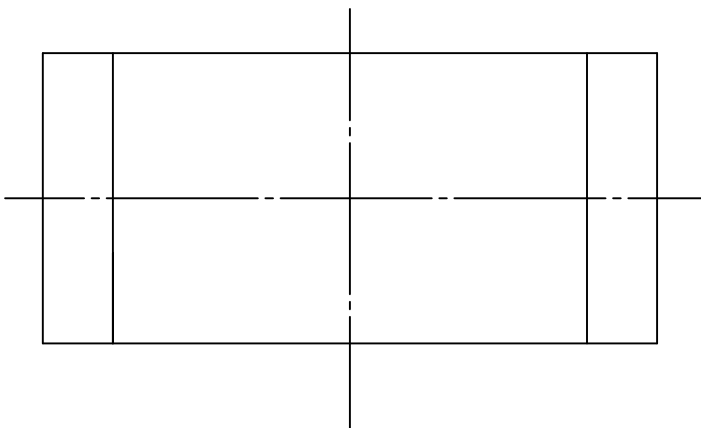
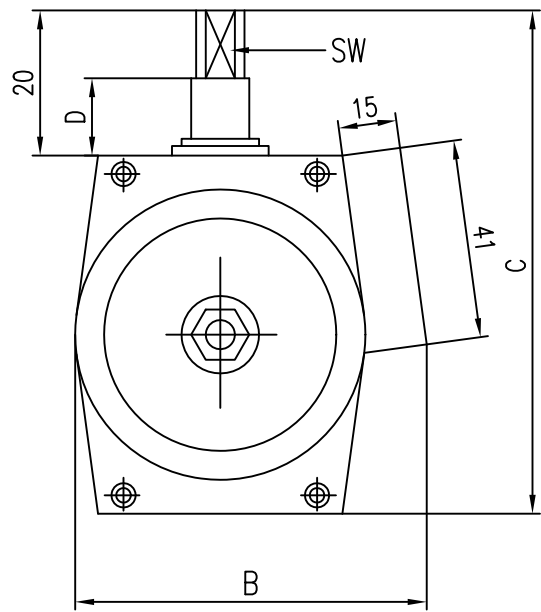
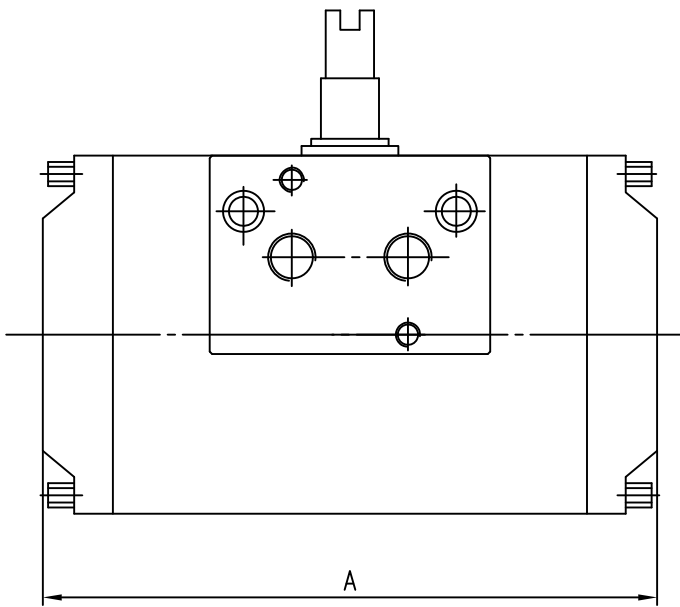
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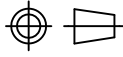


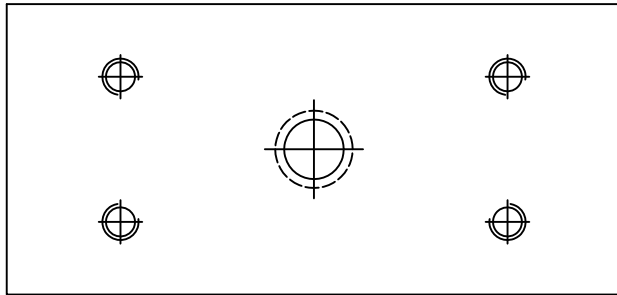
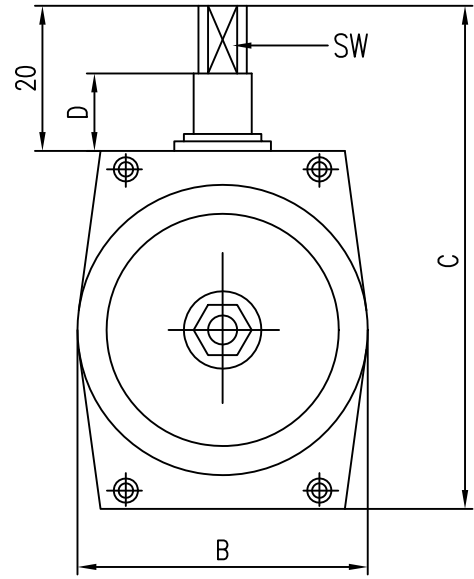
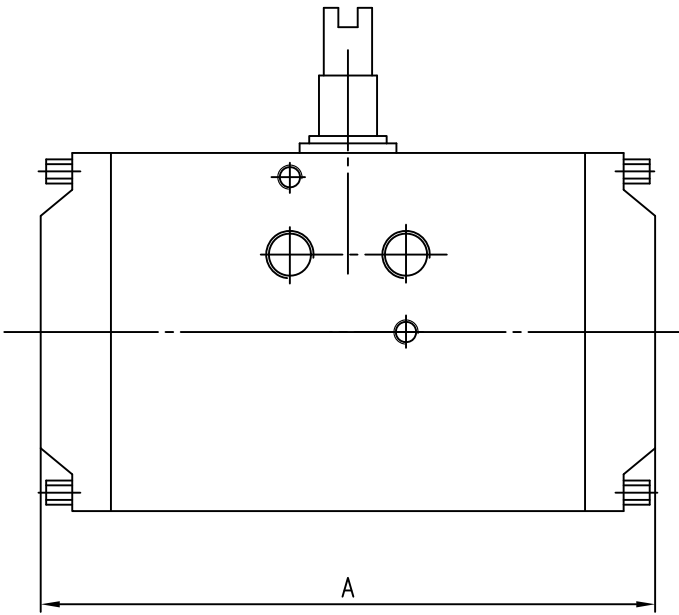
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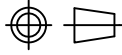


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Unless otherwise Tolerance acc to ISO-2768m Surface acc to ISO-1302				Material:	Scale:	 PMP Precision Ind Co Ltd Able Valve & Casting Ltd Fax: (+886) 769 3315532 E-mail: szpmp@pub.dgnet.gd.cn http://www.pmp.com.tw	
unit : mm					none		
Range	0.5-6	6-30	30-120	120-400		Part name. Pneumatic Actuator	
Tolerance	± 0.1	± 0.2	± 0.3	± 0.5			
					DATE		NAME
					DWN		18.08.2004
					CKD		
					APP		
					Drawing No.		Part No.
					201TYPE-C		
REVISIONS		DATE	NAME				Series 201
							Sheet 3 of 9



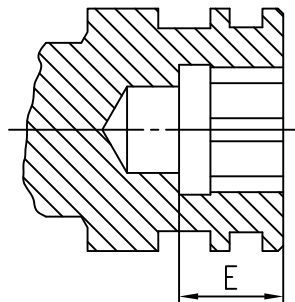
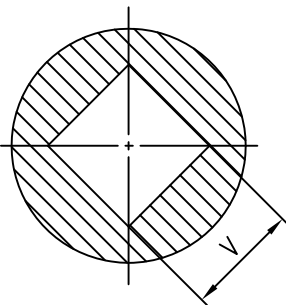
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Unless otherwise Tolerance acc to ISO-2768m Surface acc to ISO-1302				Material:	Scale:	 PMP Precision Ind Co Ltd Able Valve & Casting Ltd Fax: (+886) 769 3315532 E-mail: szpmp@pub.dgnet.gd.cn http://www.pmp.com.tw									
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Range	0.5-6	6-30	30-120	120-400											
Tolerance	± 0.1	± 0.2	± 0.3	± 0.5											
				DATE	NAME	Part name. Pneumatic Actuator									
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				APP											
				Drawing No.		Part No.									
				201TYPE-D			Series 201								
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Dimensional data

Unit:mm

size	Torque Nm	A	B	C	D	E	SW	V	Weight
								◆	(kg)
055	12-41	127	74.9	94	7.5	17	10	11	0.84
065	18-61	133	85	108	7.5	17	10	11	1.35
075	31-105	157	98	120	7.5	17	10	14	2.10
085	44-148	177	105.8	128	7.5	17	10	17	2.60
095	63-210	203	110.9	137	7.5	20	14	17	3.19
105	88-295	216	120	160	7.5	20	14	17	5.02
125	178-595	290	139.5	180	7.5	30	20	22	8.94
165	354-1180	365	174	218	6	33	28	27	15.60



Unless otherwise
Tolerance acc to ISO-2768m
Surface acc to ISO-1302

unit : mm

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Tolerance	± 0.1	± 0.2	± 0.3	± 0.5

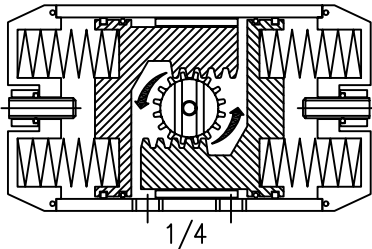
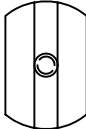
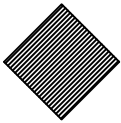
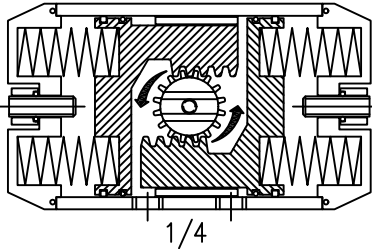
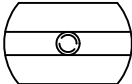

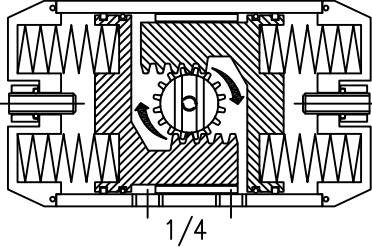
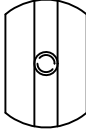
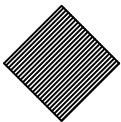
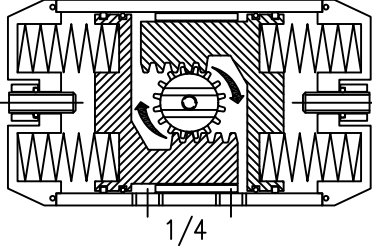
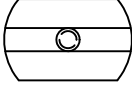

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PMP Precision Ind Co Ltd
Able Valve & Casting Ltd
Fax: (+886) 769 3315532
E-mail: szpmp@pub.dgnet.gd.cn
<http://www.pmp.com.tw>


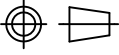
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Part name.	Pneumatic Actuator
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	Series 201
	Sheet 5 of 9

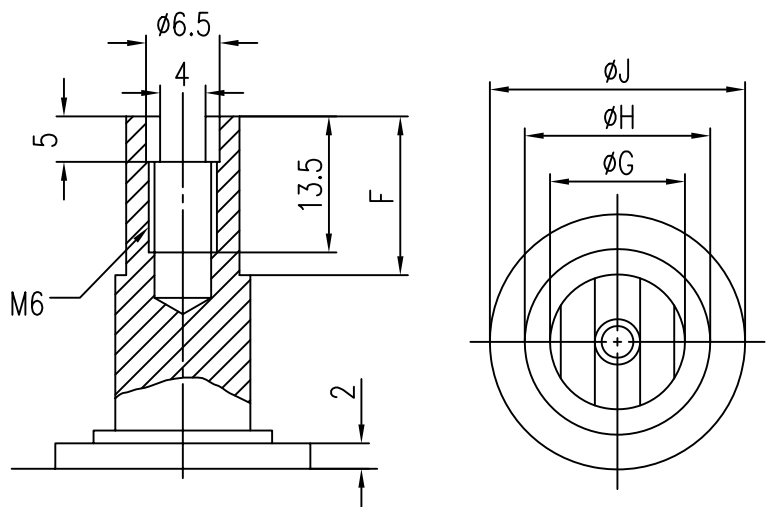
Top View				
Symbol	Rotation Direction	Piston Position	Pinion position	
			Top	Bottom
A	CCW			
B	CCW			
C	CW			
D	CW			

- 說明: 1. 201型起動器根據活塞及齒軸裝配方向的不同有A.B.C.D四種型號,客戶未指定時按A型裝配.
 2. 起動器在全關的位置出廠.(如上圖所示位置)
 3. 一般陽極處理本体黑色拉絲取240#,側蓋黑色無字.
 4. 硬質陽極處理本体亞黑色拉絲取320#.

Unless otherwise Tolerance acc to ISO-2768m Surface acc to ISO-1302				Material: See list	Scale: None	 PMP Precision Ind Co Ltd Able Valve & Casting Ltd Fax: (+886) 769 3315532 E-mail: szpmp@pub.dgnet.gd.cn http://www.pmp.com.tw	
unit : mm					None		
Range	0.5-6	6-30	30-120			120-400	
Tolerance	± 0.1	± 0.2	± 0.3	± 0.5			
				DATE	NAME	Part name. Pneumatic Actuator	
				DWN	18.08.2004		Deng
				CKD			
				APP			
				Drawing No. 201TYPE-F		Part No. Series 201	
REVISIONS		DATE	NAME			Sheet 6 of 9	

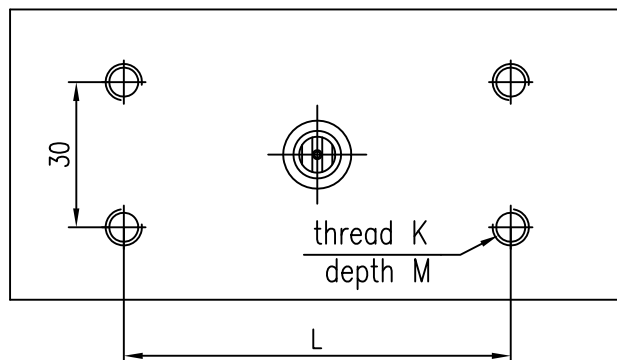
Size	∅J	∅G	∅H	F
055	20.0	12.0	/	12.5
065	20.0	11.9	/	12.5
075	26.5	14.0	17.9	12.5
085	26.5	14.0	17.9	12.5
095	35.0	19.5	25.0	12.5
105	35.0	19.5	25.0	12.5
125	54.5	28.0	39.8	12.5
165	59.0	36.0	45.0	14.0

VDI / VDE Pinion Top



Size	K thread characteristic		M	L
	G Series	NPT Series		
055	M5	UNF 10-32	5.0	80.0
065	M5	UNF 10-32	6.0	80.0
075	M5	UNF 10-32	8.0	80.0
085	M5	UNF 10-32	8.0	80.0
095	M5	UNF 10-32	8.0	80.0
105	M5	UNF 10-32	8.0	80.0
125	M5	UNF 10-32	8.0	80.0
165	M5	UNF 10-32	8.0	130

VDI / VDE Top Mounting



Unless otherwise
Tolerance acc to ISO-2768m
Surface acc to ISO-1302

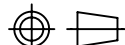
unit : mm

Range	0.5-6	6-30	30-120	120-400
Tolerance	± 0.1	± 0.2	± 0.3	± 0.5

Material:

Scale:

none



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	DATE	NAME
DWN	18.08.2004	Deng
CKD		
APP		

Part name.

Pneumatic Actuator

REVISIONS	DATE	NAME

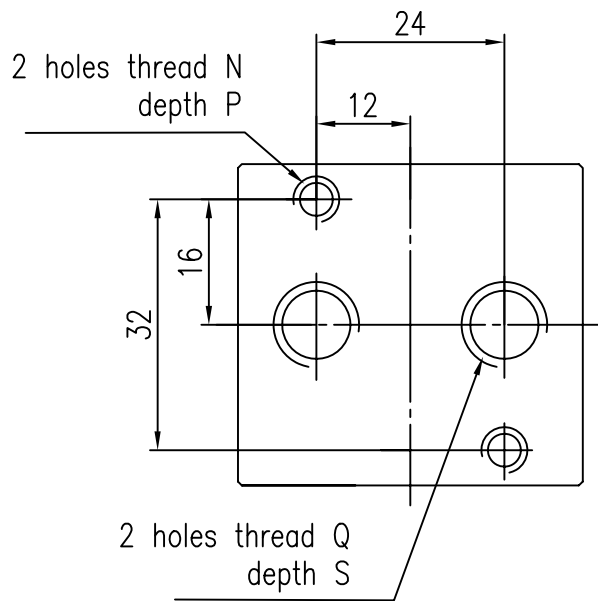
Drawing No.

Part No.

201TYPE-G

Series 201

Sheet 7
of 9



Dimensional data

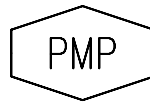
Unit: mm

Size	N thread characteristic		P	Q thread characteristic		S
	G Series	NPT Series		G Series	NPT Series	
055	M5	UNF 10-32	8.0	G 1/4	NPT 1/4	9.0
065	M5	UNF 10-32	8.0	G 1/4	NPT 1/4	9.0
075	M5	UNF 10-32	8.0	G 1/4	NPT 1/4	12.0
085	M5	UNF 10-32	8.0	G 1/4	NPT 1/4	12.0
095	M5	UNF 10-32	8.0	G 1/4	NPT 1/4	9.0
105	M5	UNF 10-32	7.0	G 1/4	NPT 1/4	10.0
125	M5	UNF 10-32	8.0	G 1/4	NPT 1/4	12.0
165	M5	UNF 10-32	8.0	G 1/4	NPT 1/4	14.0

Unless otherwise
Tolerance acc to ISO-2768m
Surface acc to ISO-1302

Material:

Scale:

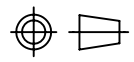


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unit : mm

none

Range	0.5-6	6-30	30-120	120-400
Tolerance	± 0.1	± 0.2	± 0.3	± 0.5



	DATE	NAME
	DWN 18.08.2004	Deng
	CKD	
	APP	
Drawing No. 201TYPE-H		
REVISIONS	DATE	NAME

Part name.

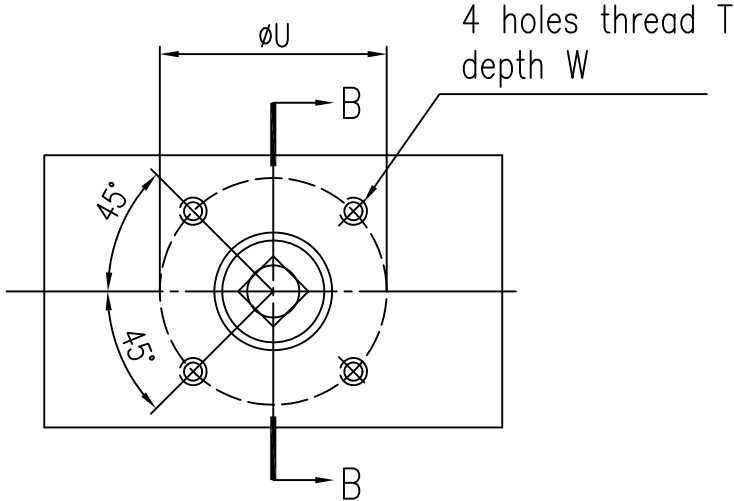
Pneumatic Actuator

Part No.

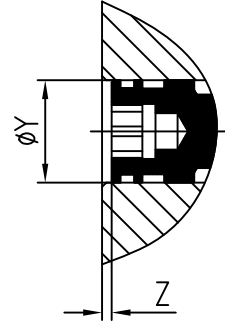
Series 201

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of 9

View from bottom



Section B-B



Dimensional data

Unit: mm

ISO 5211	ϕU	T thread characteristic		W
		G Series	NPT Series	
F03	36.0	M5	UNF 10-32	8.0
F04	42.0	M5	UNF 10-32	9.0
F05	50.0	M6	UNC 1/4-20	9.0
F07	70.0	M8	UNC 5/16-18	10.0
F10	102.0	M10	UNC 3/8-16	14.0
F12	125.0	M12	UNC 1/2-13	16.0

Dimensional data

Unit: mm

Size	ISO-5211	ϕY	Z
055	F03/F05	23.8	1.5
065	F04/F07	23.8	2.0
075	F05/F07	29.3	2.0
085	F05/F07	32.3	2.0
095	F05/F07	37.6	2.5
105	F07/F10	37.6	2.0
125	F07/F10	53.3	3.0
165	F10/F12	66.3	3.5

Unless otherwise
Tolerance acc to ISO-2768m
Surface acc to ISO-1302

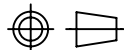
unit : mm

Range	0.5-6	6-30	30-120	120-400
Tolerance	± 0.1	± 0.2	± 0.3	± 0.5

Material:

Scale:

none



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DATE	NAME
DWN 18.08.2004	Deng
CKD	
APP	

Part name.

Pneumatic Actuator

Drawing No.

Part No.

201TYPE-I

Series 201

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of 9

REVISIONS DATE NAME



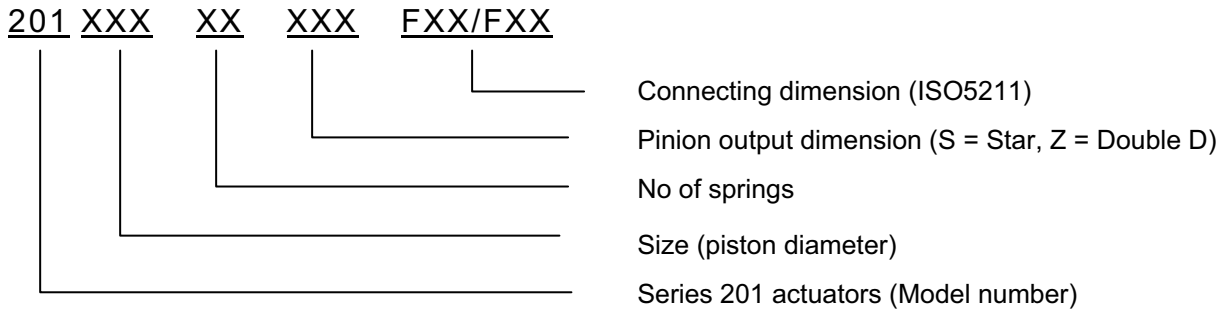
PMP Precision Ind. Co., Ltd.

www.pmp-controls.com
e-mail: shen@pmp-controls.com
Phone (+86) 769 8331 5531
Fax (+86) 769 8331 5532

Exceeding Your Expectations !

ORDERING CODE

PMP coding method is based on piston diameter (the approximate value):



(Threads: Imperil or Metric thread be specified upon ordering.)

Coding example 1:

PMP actuators # **201.075.00.S17 F05/F07** means:

Series **201** quarter turn pneumatic actuator.

Piston diameter = **075** mm.

No of spring = **00** (double acting).

Pinion output dimension: **S14** (star 14 mm)

Connecting dimension: **F05/F07**

Coding example 2:

PMP actuators # **201.125.12.Z20 F07/F10** means:

Series **201** quarter turn pneumatic actuator.

Piston diameter = **125** mm.

No of spring = **12** (spring return, 6 springs per piston).

Pinion output dimension: **Z20** (double D, across two flats 20 mm)

Connecting dimension: **F07/F10**

******: Buyer can specify your own marking on both end caps at free if order quantity of that size over 500 pcs.



ISO-9001, QS-9000



PED 97/23/EC



ATEX



AD2000 W0

Made by PMP, a partner of great reputation you can count on

PMP Quality System is accredited to QS-9000, ISO-9001, AD 2000 W0 and PED 97/23/EC

We reserve the right to change at any time without prior notice