

Rotary Table

Series MSU

Vane Type/Sizes 1, 3, 7, 20



High Precision Rotary Table
90° or 180° Rotation With Adjustment Unit
Dowel Pin Holes
Switch Capable

Rotary Table

Series MSU

Vane type/Sizes 1, 3, 7, 20

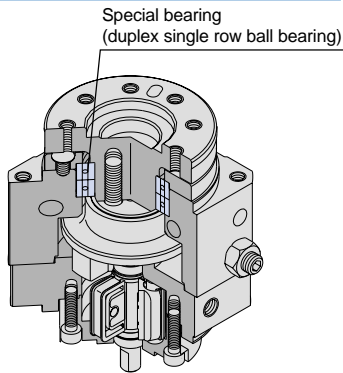


High Precision Type
Sizes 1, 3, 7, 20

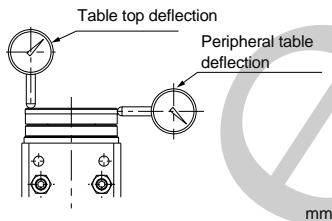
Series MSUA

Improved table deflection accuracy:
0.03mm (0.0012") or less

High precision/High rigidity



Deflection accuracy:
Displacement for 180° rotation

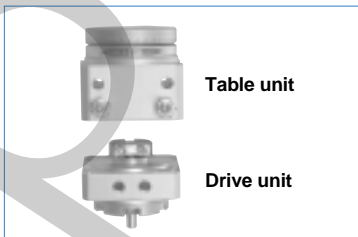


Model	MSUA
Table top deflection	0.03 (0.1 to 0.2)
Peripheral table deflection	0.03 (0.1 to 0.2)

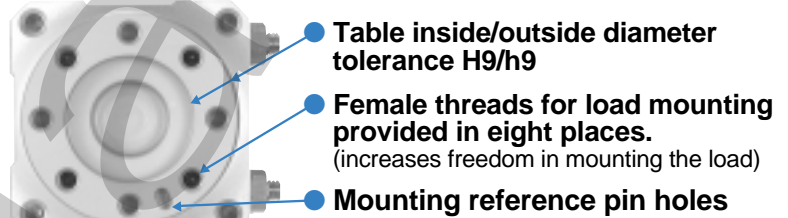
Values inside () are for series MSUB

Disengageable

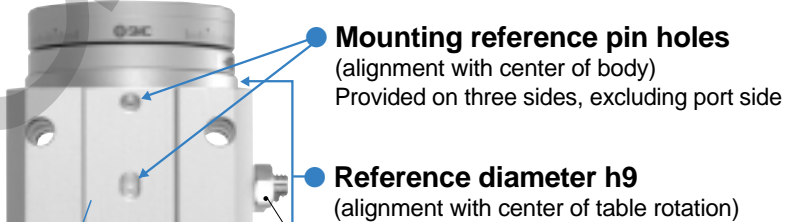
Maintenance work is simplified.
The drive unit can be replaced with the load mounted.



Easy alignment when mounting the load

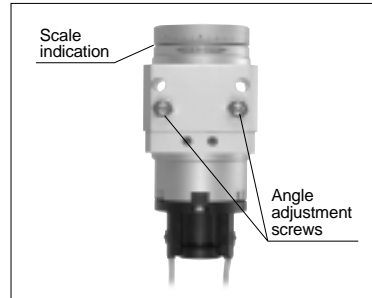


Easy alignment when mounting the body



Angle is adjustable

90°±10°, 180°±10°
Double vane (MSUB only) 90°±5°



Auto switch capable

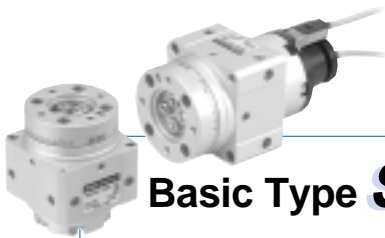
Since switches can be moved anywhere on the circumference, they can be mounted at positions which accommodate the specifications.

Rotary actuator with lightweight, compact table for robotic hands

Free-mount type

Can be mounted from three directions: axial, lateral, perpendicular

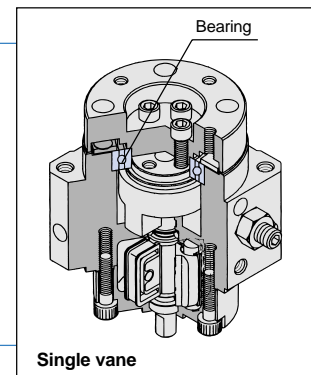
	Axial mounting	Lateral mounting	Perpendicular mounting
MSUA	<p>Bottom mount Tapped holes (4)</p>	<p>Top mount Tapped holes (4)</p>	
MSUB	<p>Through hole (1) Tapped holes (2)</p>	<p>Tapped holes (2) Through hole (1)</p>	



Basic Type *Series MSUB*

Sizes 1, 3, 7, 20

- Single vane and double vane standardized
- Double vane has the same dimensions as single vane (except size 1)



Series variations

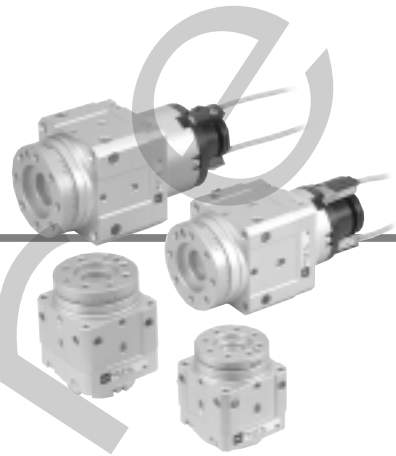
Series	Size	Rotation	Vane type	Applicable auto switch
High precision type MSUA	1	90°	Single vane	D-9, D-T99
	3			D-9□A, D-S99, S9P
	7	180°		D-R73, D-T79
	20			D-R80, D-S79, S7P
MSUB	1	90°	Single vane*	D-9, D-T99
	3		D-9□A, D-S99, S9P	
	7	180°	Double vane	D-R73, D-T79
	20		D-R80, D-S79, S7P	

* Double vane is available with 90° rotation setting only.

Rotary Table/
Vane Type
High Precision

Series MSUA

Sizes 1, 3, 7, 20



How to Order

Without Auto Switch Unit

With Auto Switch Unit

Connection port position

Nil	Side ports
E	Top ports

Available with side ports only, when equipped with switch unit.

Bearing type

A	High precision
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Free-mount

Nominal size (torque)

1	MSUA 1
3	MSUA 3
7	MSUA 7
20	MSUA 20

Rotation

Application	Symbol	Rotation
Single vane	90	90°
	180	180°

Rotation adjustment range
Single vane: Both ends ±5° each

Vane type

S	Single vane
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Number of auto switches

S	1 pc.*
Nil	2 pcs.

* For 1 piece, a right hand auto switch is installed.

Electrical entry/Lead wire length

Nil	Grommet/lead wire 0.5m
L	Grommet/lead wire 3m
C	Connector/lead wire 0.5m
CL	Connector/lead wire 3m
CN	Connector/without lead wire

* Available only with R73, R80 and T79 type connectors
** Lead wire with connector part nos.
D-LC05: Lead wire 0.5m
D-LC30: Lead wire 3m
D-LC50: Lead wire 5m

Type of auto switch

Nil	Without auto switch
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* Select applicable auto switches from the table below.

Ordering Examples:
Without Auto Switch Unit: MSUA 20-90 S
With Auto Switch Unit: M D SUA 20-90 S-R73 L

Applicable auto switches/Refer to pages 26 through 35 for detailed auto switch specifications.

Applicable model	Type	Electrical entry	Indicator light	Wiring (output)	Load voltage		Auto switch part no.	Lead wire type	Lead wire length (m)*				Applicable loads	
					DC	AC			0.5 (Nil)	3 (L)	5 (Z)	None (N)		
MDSUA1 MDSUA3	Reed	Grommet	No	2 wire	5V, 12V	5V, 12V, 24V	90	Parallel cord	●	●	●	—	IC circuit	
					5V, 12V, 100V	5V, 12V, 24V, 100V	90A	Heavy duty	●	●	●	—		
					—	100V	97	Parallel cord	●	●	●	—		
	Solid state	Grommet	Yes	3 wire (NPN) 3 wire (PNP)	24V	12V	—	Heavy duty	T99	●	●	—	—	Relay, PLC
									T99V	●	●	—	—	
									S99	●	●	—	—	
MDSUA7 MDSUA20	Reed	Grommet Connector	Yes	2 wire	24V	—	Heavy duty	R73	●	●	—	—	Relay, PLC	
								R73C	●	●	●	●		
								R80	●	●	—	—		
	Solid state	Grommet Connector	No	3 wire (NPN) 3 wire (PNP)	12V	5V, 12V	—	Heavy duty	R80C	●	●	●	●	IC circuit
									T79	●	●	—	—	
									T79C	●	●	●	●	
		Grommet	Yes	3 wire (NPN) 3 wire (PNP)	5V, 12V	—		S79	●	●	—	—	IC circuit	
								S7P	●	●	—	—		

Order example: MSUA20 single vane type (connection port side position selected)

- Standard type (without auto switches), rotation 90°, side port position MSUA20-90S
- With switch unit (without auto switches), rotation 180°, side port position MDSUA20-180S
- With switch unit + auto switch R73, rotation 180°, side port position MDSUA20-180S-R73

* Lead wire length symbols 0.5m Nil (Example) R73C
 3m L (Example) R73CL
 5m Z (Example) R73CZ
 None N (Example) R73CN

● Operating time — 1.2ms ● Operating temperature range — 5 to 60°C (41 to 140°F)
 ● Impact resistance — 300m/s² (reed), 1000m/s² (solid state)

Specifications

Model 2*	MSUA1		MSUA3		MSUA7		MSUA20		
Vane type	Single vane		Single vane		Single vane		Single vane		
Rotation 1*	90°±10°	180°±10°	90°±10°	180°±10°	90°±10°	180°±10°	90°±10°	180°±10°	
Fluid	Air (unlubricated)								
Proof pressure MPa (psi)	1.05 (152.25psi)				1.5 (217.5psi)				
Ambient and fluid temperature	5 to 60°C (41 to 140°F)								
Operating pressure range MPa (psi)	0.2 to 0.7 (29 to 101.5)		0.15 to 0.7 (21.75 to 101.5)			0.15 to 1.0 (21.75 to 145)			
Rotation time adjustment range sec/90°	0.07 to 0.3 (seconds per 90°)								
Shaft load	Allowable radial load	20N (4.4lb _f)	40N (8.9lb _f)	50N (11.2lb _f)	60N (13.4lb _f)				
	Allowable thrust load	15N (4.4lb _f)	30N (6.7lb _f)	60N (13.4lb _f)	80N (17.9lb _f)				
	Allowable moment	0.3N-m (2.65lb-in)	0.7N-m (6.19lb-in)	0.9N-m (7.96lb-in)	2.9N-m (25.66lb-in)				
Bearing	Special bearings								
Port position	Side ports or Top ports								
Port size	Side ports	M3 x 0.5		M5 x 0.8 (10-32 nominal)					
	Top ports	M3 x 0.5			M5 x 0.8 (10-32 nominal)				
Deflection accuracy	0.03mm or less (0.0012")								

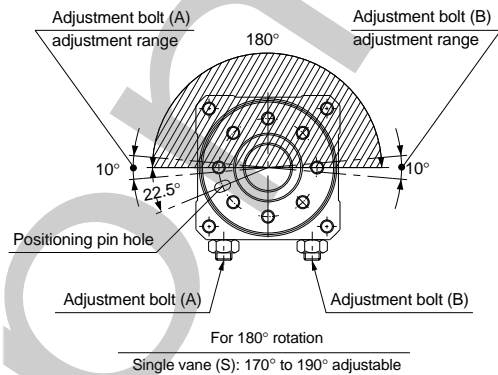
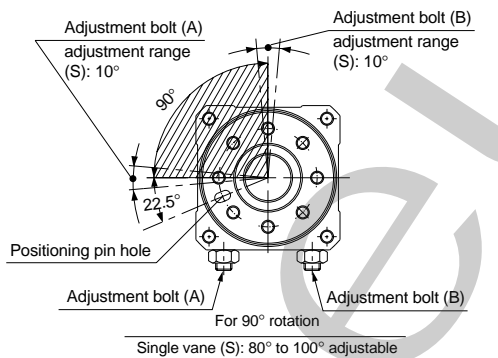
*1. Single vane 90° can be adjusted to 90°±10° (both ends of rotation ±5° each)
 Single vane 180° can be adjusted to 180°±10° (both ends of rotation ±5° each)
 Note) Refer to page 39 for allowable kinetic energy.

*2. Correspondance to equivalent conventional free-mount types

Rotary table	Free-mount/Rotary actuator
MSUA 1	CRBUW10
MSUA 3	CRBUW15
MSUA 7	CRBUW20
MSUA20	CRBUW30

Table Rotation Range

Angle adjustment is possible as shown in the drawings below using adjustment bolts (A) and (B).



Note: 1MPa = 145psi
 1N = 0.2248lb_f
 1N-m = 8.85lb_f-in
 1in = 25.4mm

Applicable Auto Switches

Auto switch type	MDSUB1, 3	MDSUB7, 20
Reed switch	D-90/97, D-90A/93A	D-R7, R8
Solid state switch	D-S99, D-T99, D-S9P	D-S7, S7P, T7

Weights

Unit: g (oz)

Size	Rotation	Basic weight	Auto switch unit + Auto switch 2 pcs.
		Single vane	
1	90	162	25
	180	161	
3	90	261.5	30
	180	259.5	
7	90	440	50
	180	436	
20	90	675	60
	180	670.5	

Allowable Loads

Do not permit the load and moment applied to the table to exceed the allowable values shown in the table below. (Operation above the allowable values can cause adverse effects on service life, such as play in the table and loss of accuracy.)

Size	Allowable radial load N (lb _f)	Allowable thrust load N (lb _f)	Allowable moment N (lb _f)
1	20 (4.49)	15 (3.37)	0.3 (2.65)
3	40 (8.49)	30 (6.74)	0.7 (6.19)
7	50 (11.24)	60 (13.48)	0.9 (7.96)
20	60 (13.48)	80 (17.98)	2.9 (25.66)

Series MSUA

Rotary Table High Precision Type

Dimensions (mm)

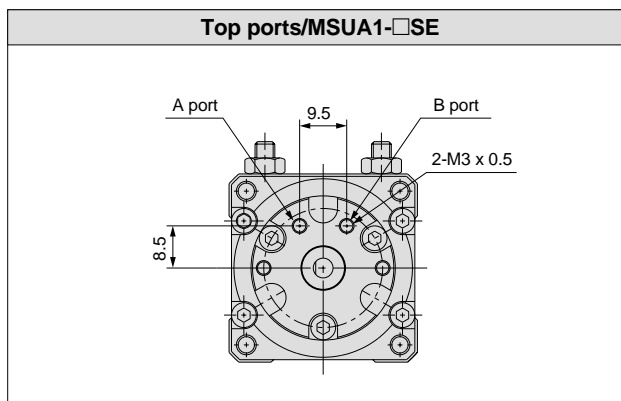
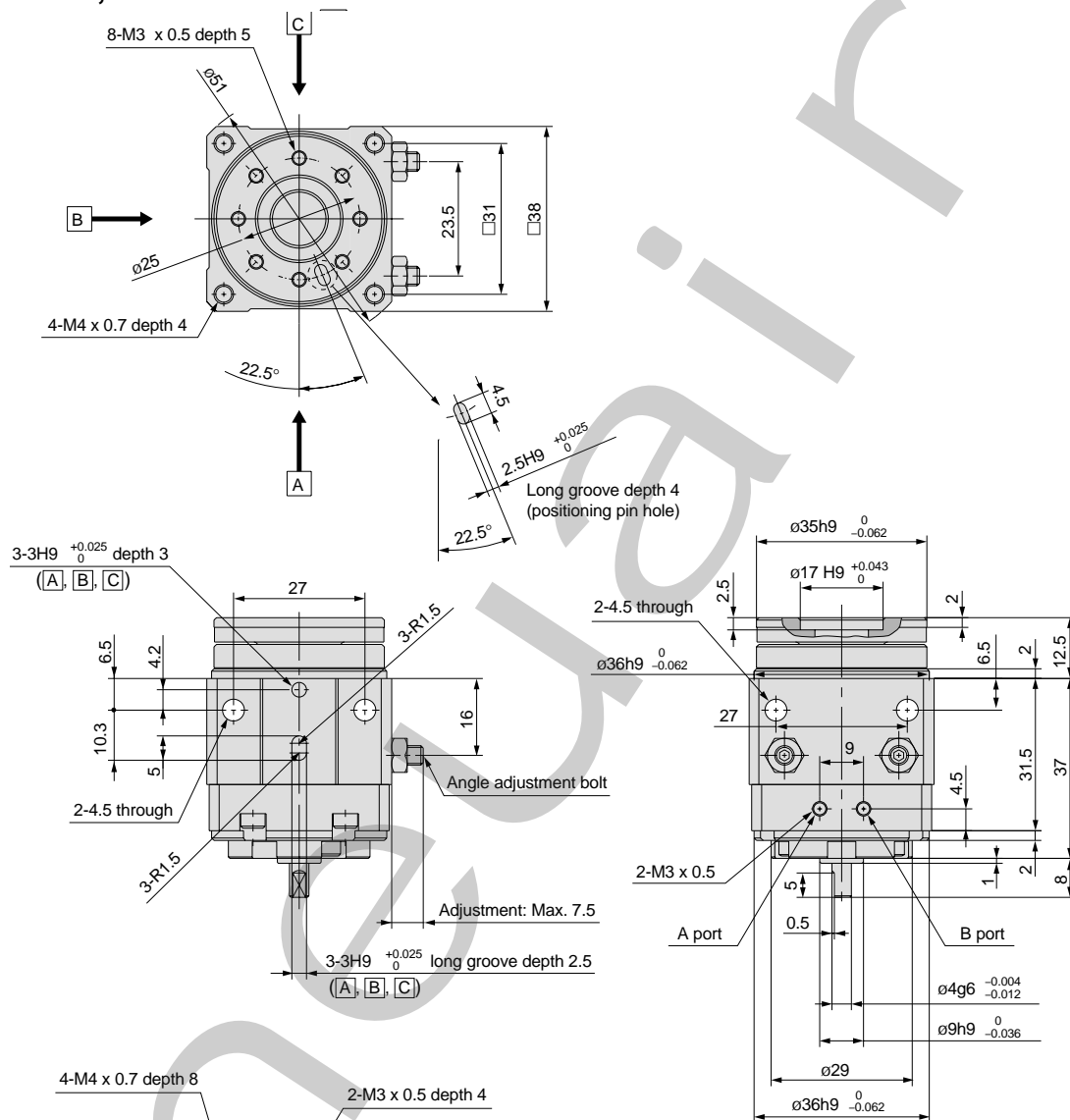
These drawings indicate the condition when the B port is pressurized.

1 in = 25.4mm

Scale: 70%

MSUA1

MSUA1-□S, SE



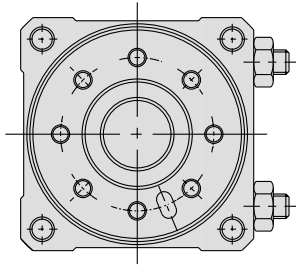
Dimensions (mm)

These drawings indicate the condition when the B port is pressurized.

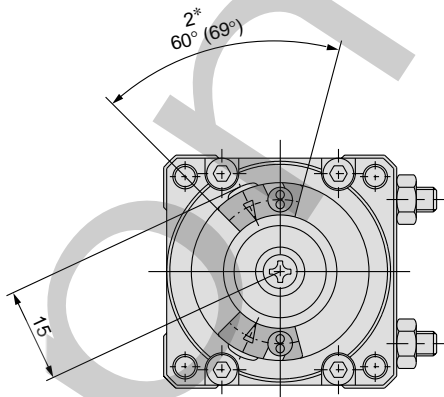
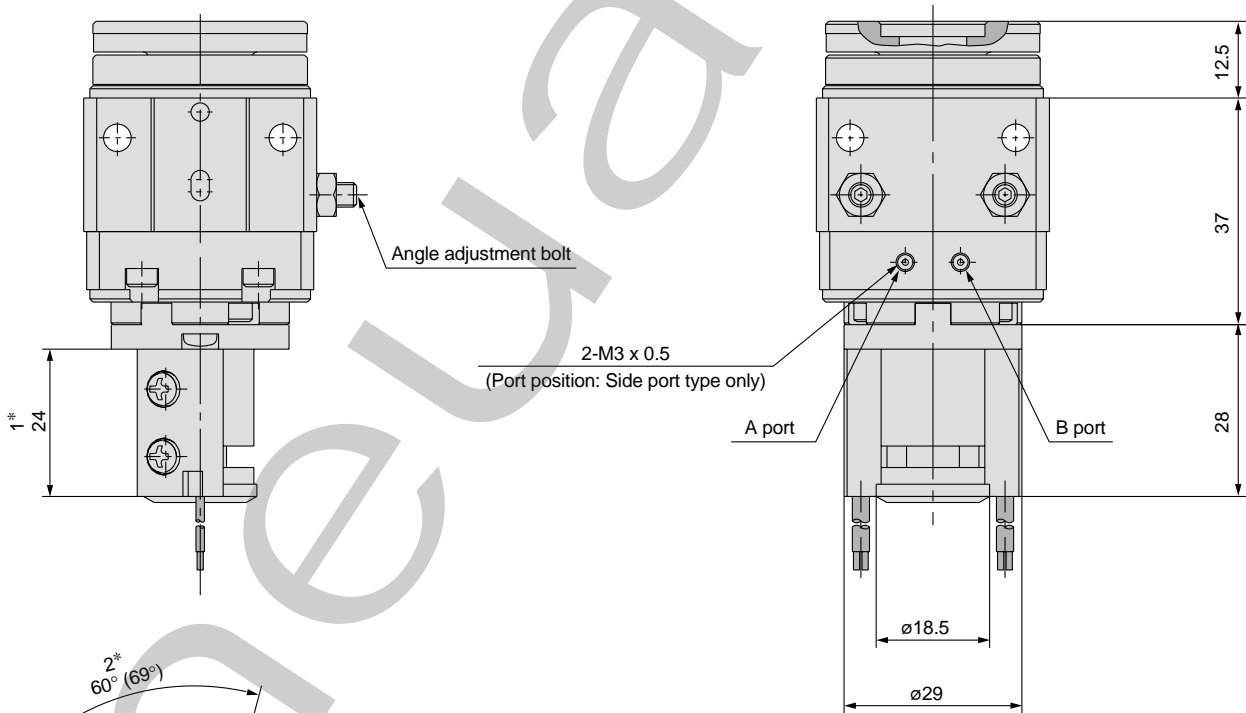
1in = 25.4mm

Scale: 80%

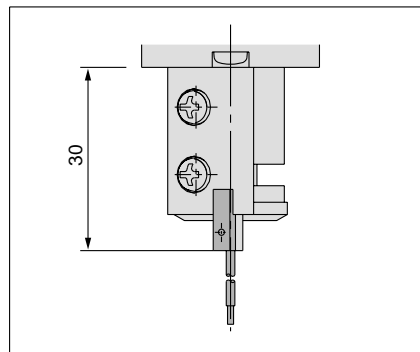
With auto switch: MSUA1-□S



- *1) 24 : When using D-90, 90A, S99, S99V, S9P, S9PV, T99, T99V
- 30 : When using D-97, 93A
- *2) 60° : When using D-90, 90A, 97, 93A
- 69° : When using D-S99, S99V, S9P, S9PV, T99, T99V



For D-97, 93A



Series MSUA

Rotary Table High Precision Type

Dimensions (mm)

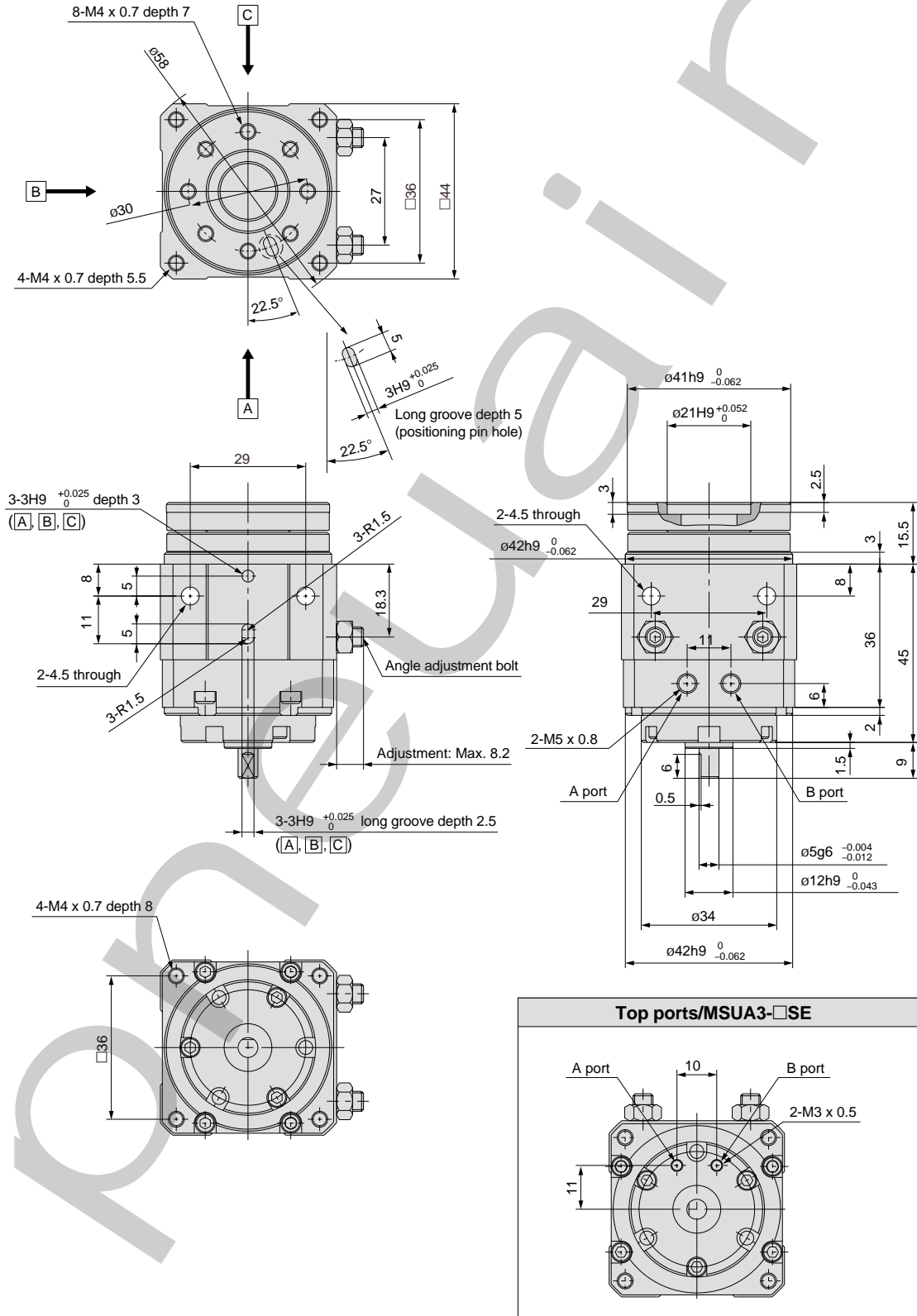
These drawings indicate the condition when the B port is pressurized.

1in = 25.4mm

Scale: 70%

MSUA3

MSUA3-□S, SE



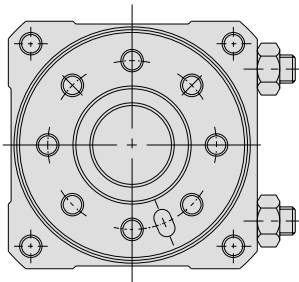
Dimensions (mm)

These drawings indicate the condition when the B port is pressurized.

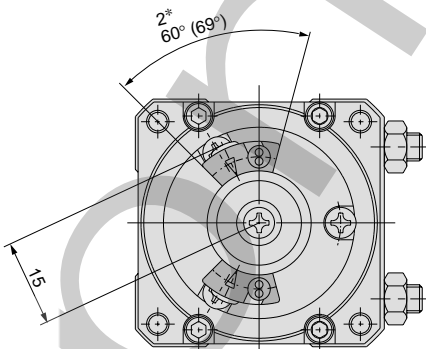
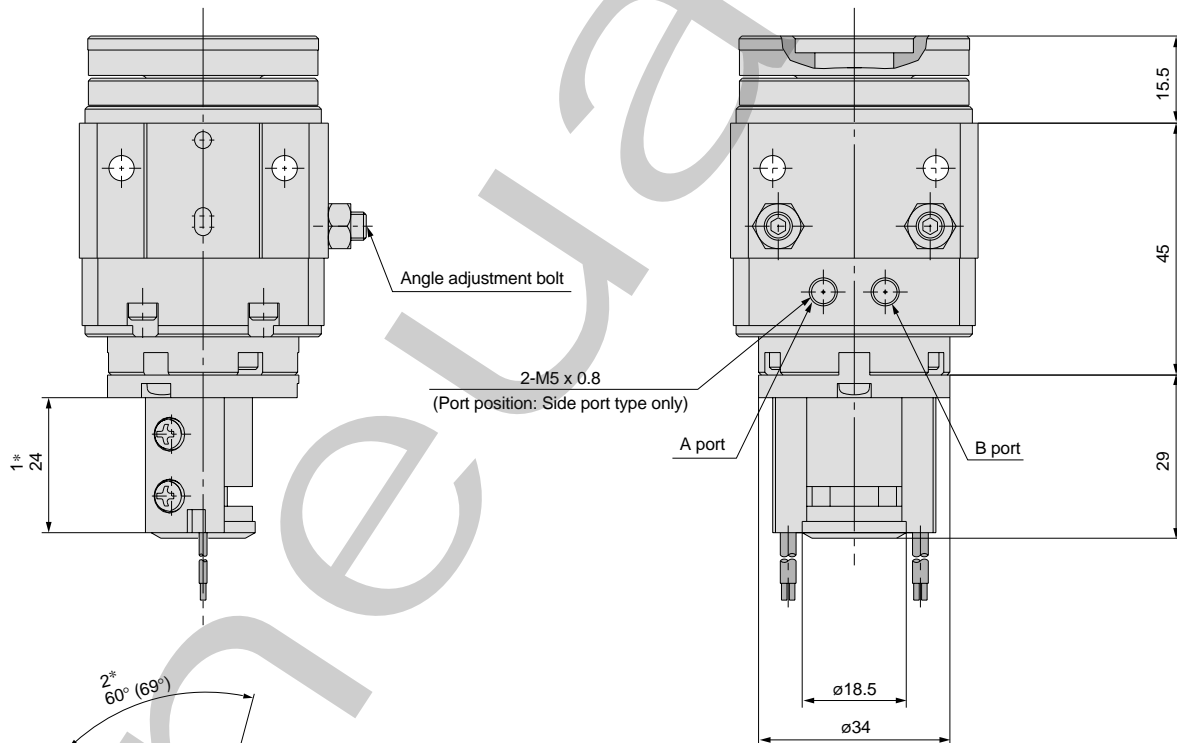
1in = 25.4mm

Scale: 80%

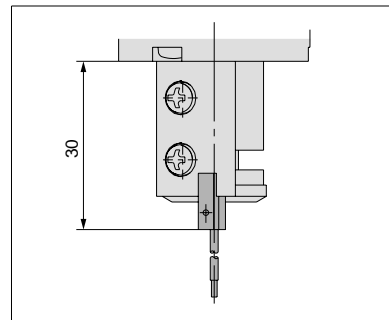
With auto switch: MDSUA3-□S



- *1) 24 : When using D-90, 90A, S99, S99V, S9P, S9PV, T99, T99V
- 30 : When using D-97, 93A
- *2) 60° : When using D-90, 90A, 97, 93A
- 69° : When using D-S99, S99V, S9P, S9PV, T99, T99V



D-97, 93A



Series MSUA

Rotary Table High Precision Type

Dimensions (mm)

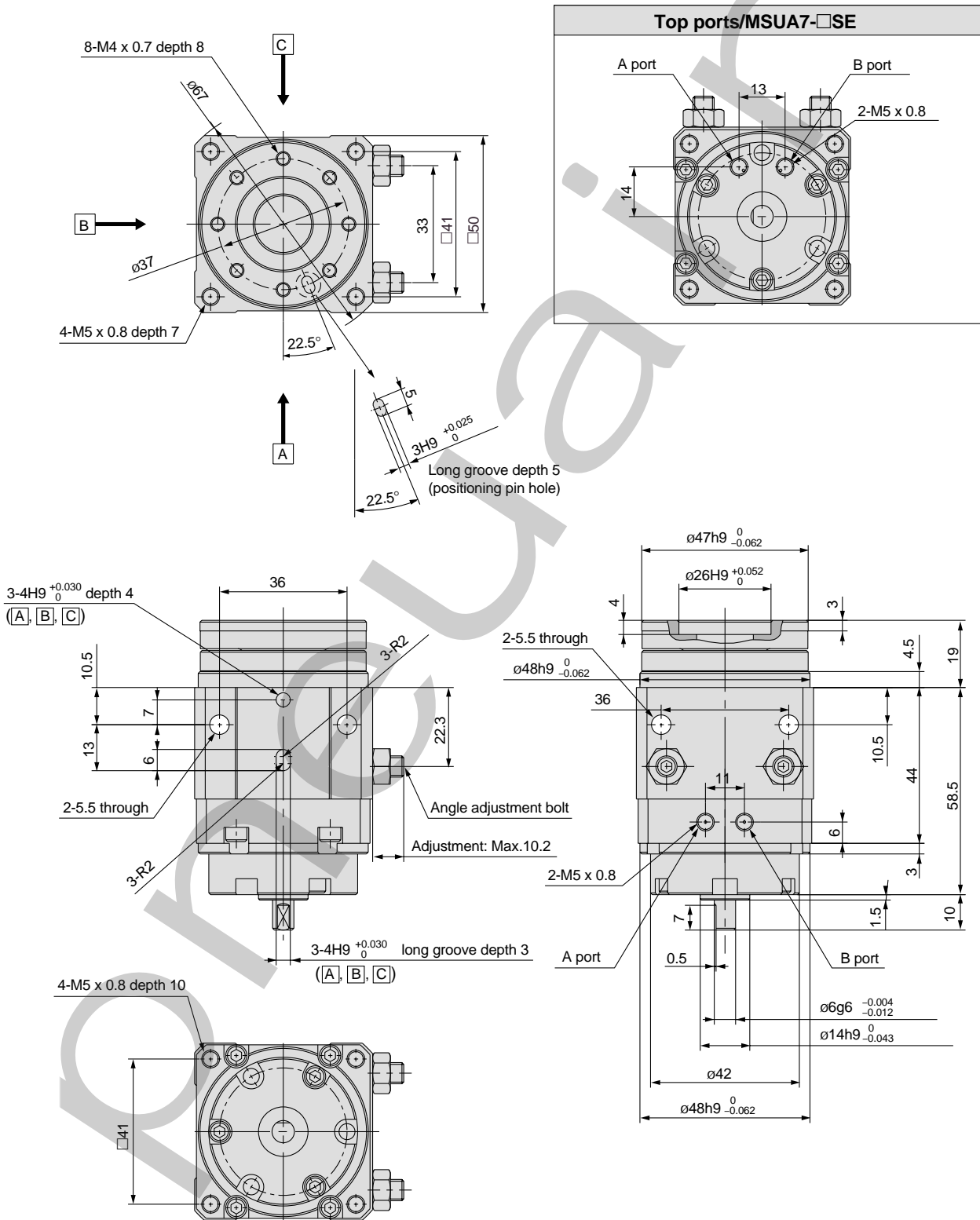
These drawings indicate the condition when the B port is pressurized.

1 in = 25.4mm

Scale: 60%

MSUA7

MSUA7-□S, SE



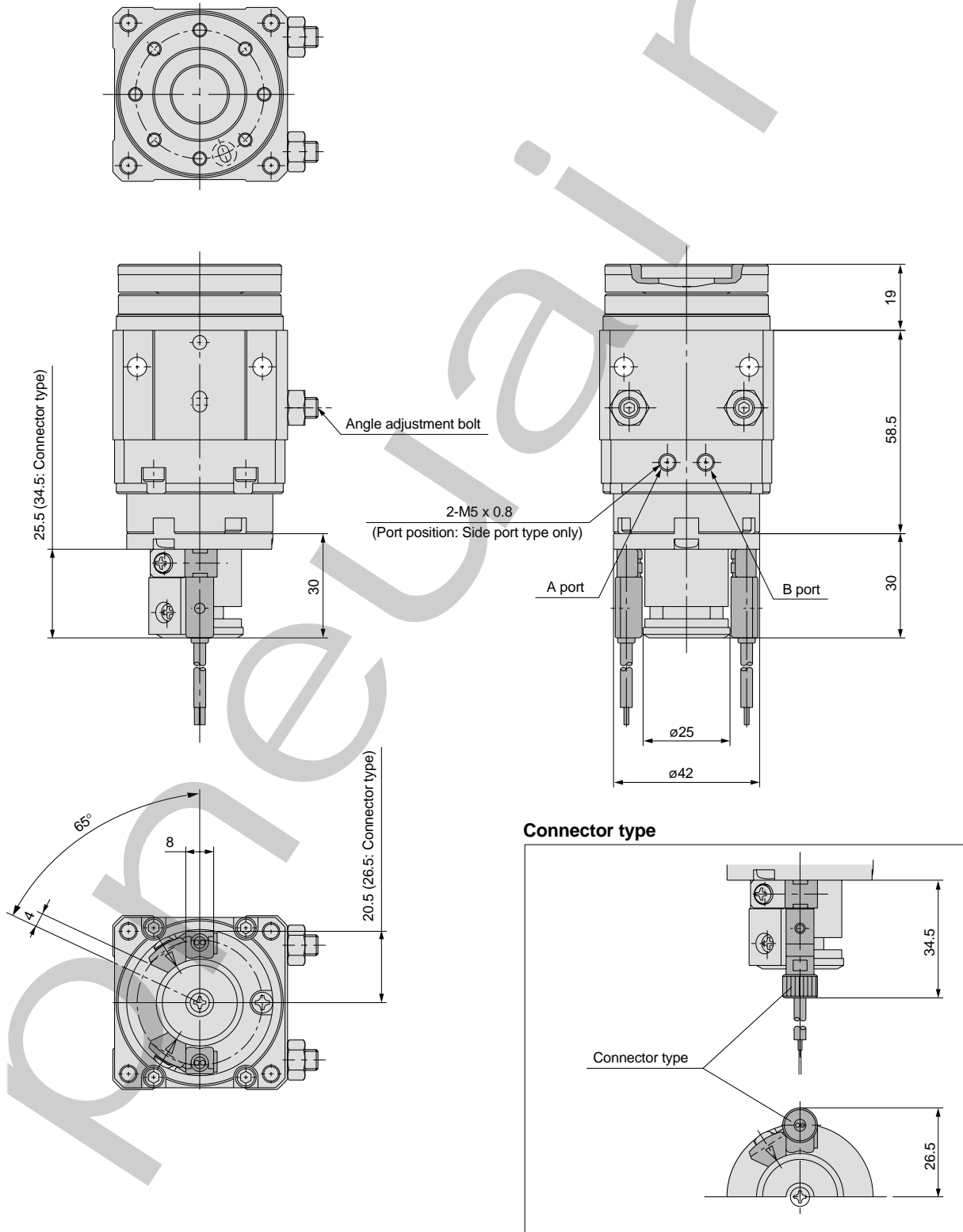
Dimensions (mm)

These drawings indicate the condition when the B port is pressurized.

1in = 25.4mm

Scale: 60%

With auto switch: MDSUA7-□S



Series MSUA

Rotary Table High Precision Type

Dimensions (mm)

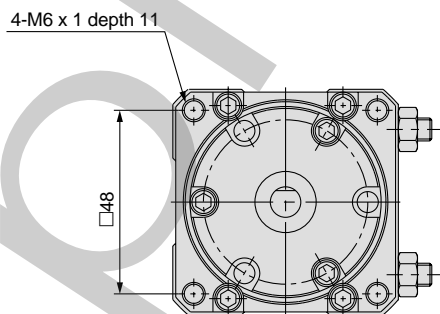
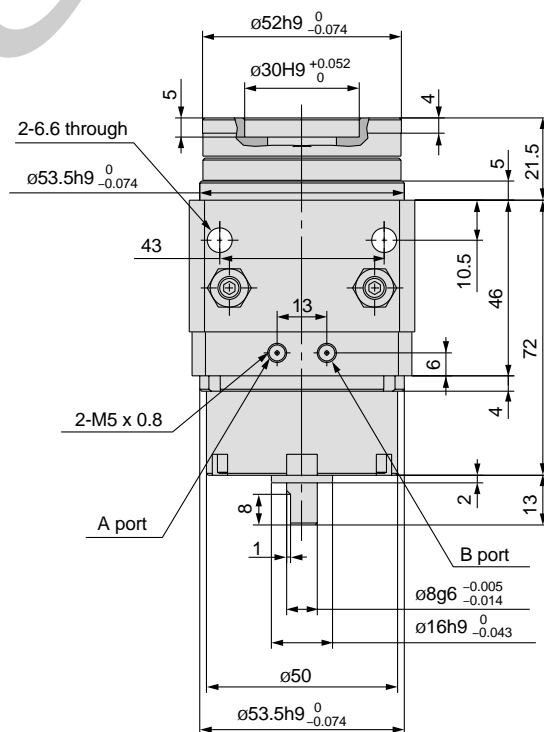
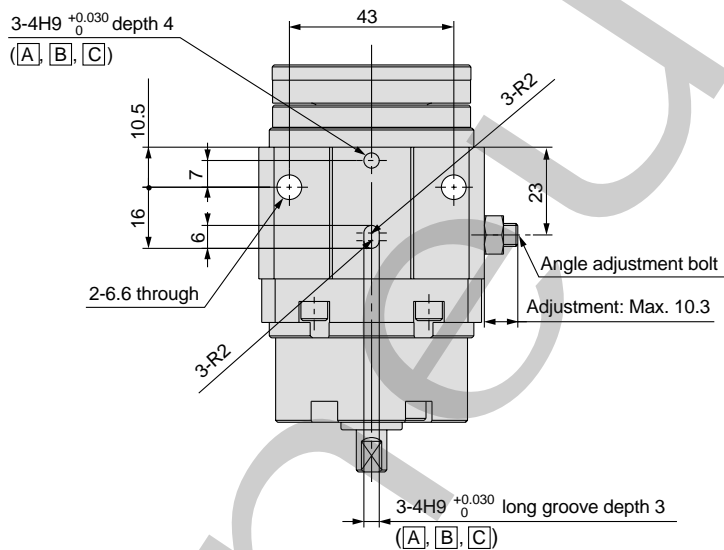
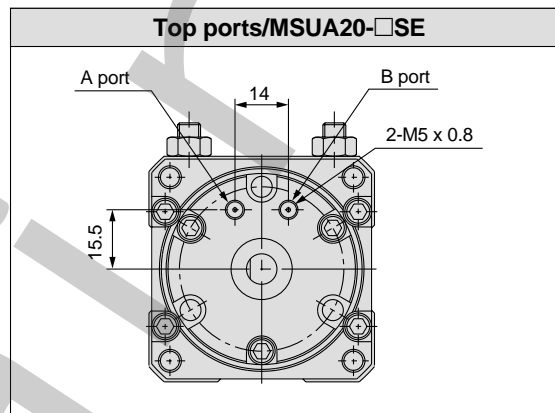
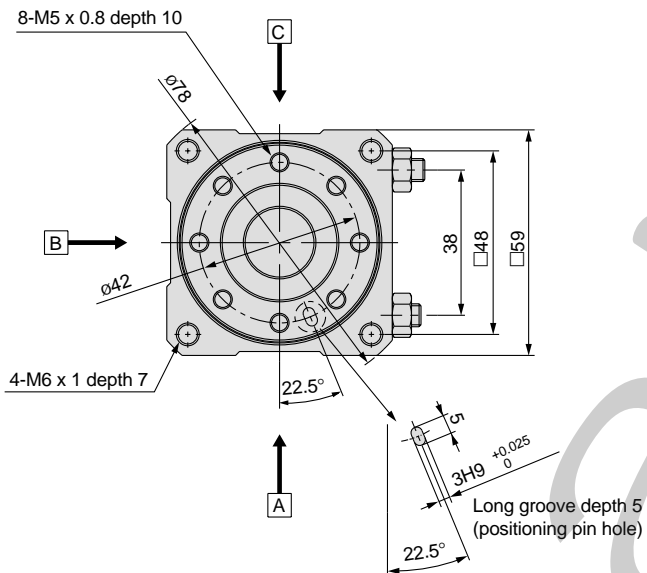
These drawings indicate the condition when the B port is pressurized.

1in = 25.4mm

Scale: 50%

MSUA20

MSUA20-□S, SE



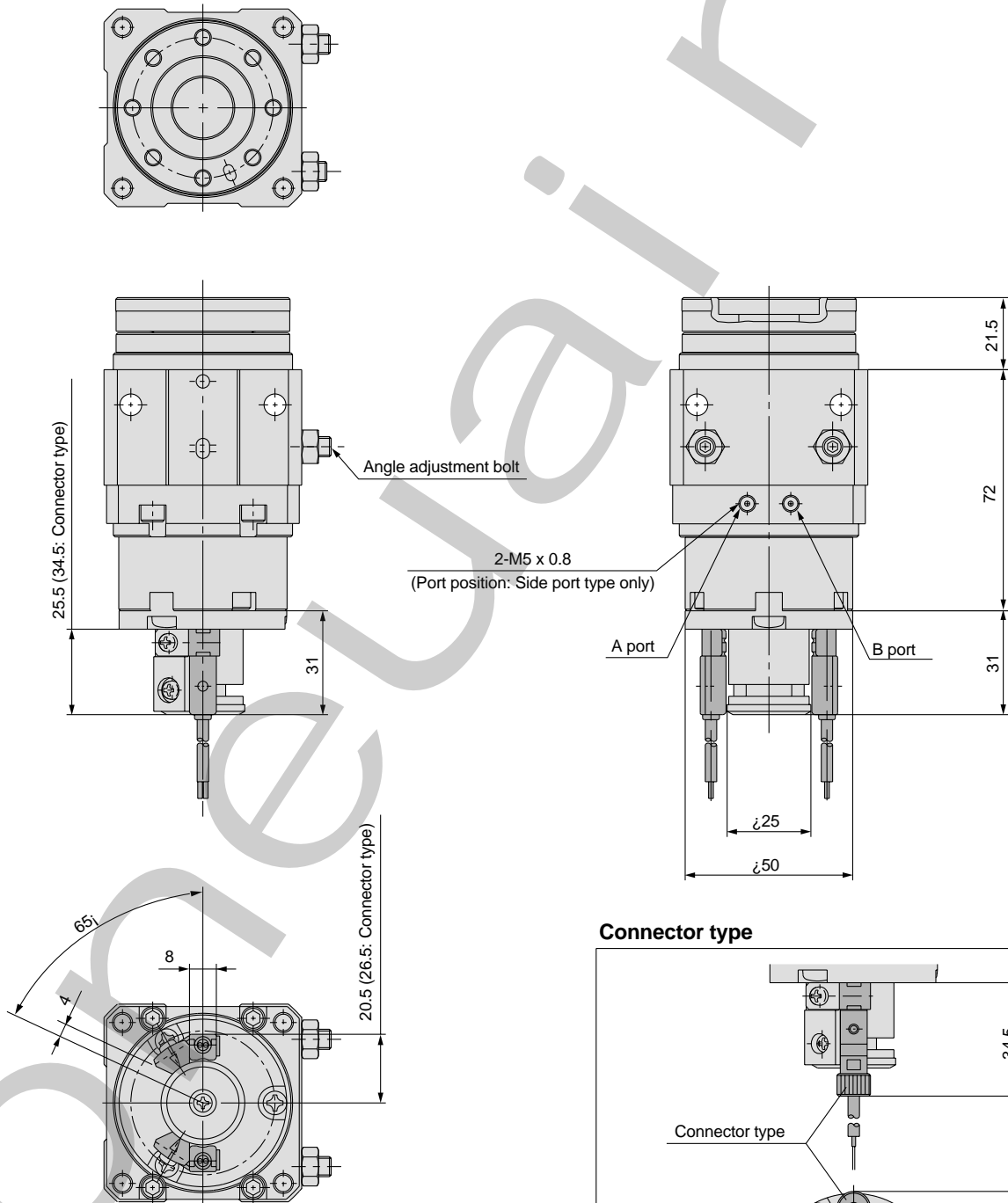
Dimensions (mm)

These drawings indicate the condition when the B port is pressurized.

1in = 25.4mm

Scale: 50%

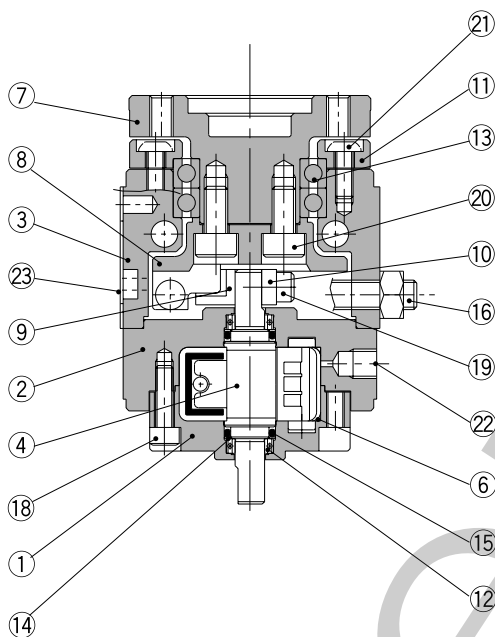
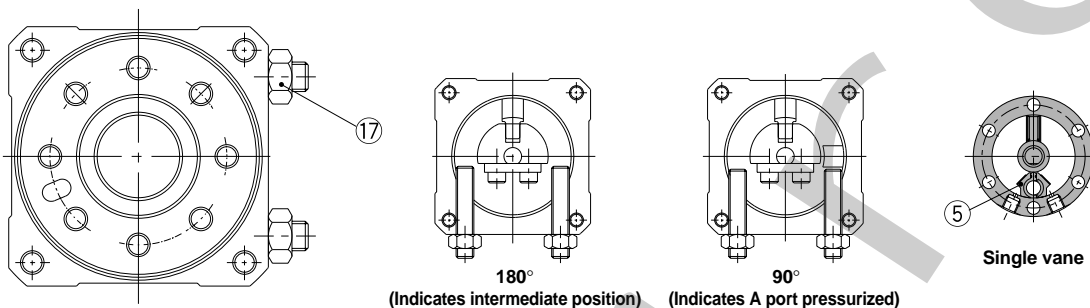
With auto switch: MDSUA20-□S



Series MSUA

Rotary Table High Precision Type

Construction

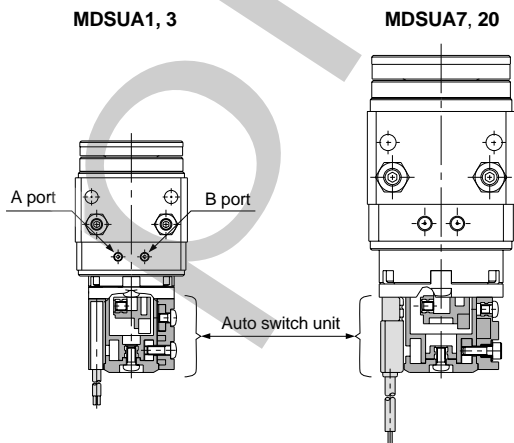


Parts list

No.	Description	Material	Note
1	Body A	Aluminum alloy	Light gray color
2	Body B	Aluminum alloy	Light gray color
3	Body C	Aluminum alloy	Light gray color
4	Vane shaft	Stainless steel (MSUA20 is carbon steel)	Single vane
5	Stopper	Resin	Single vane
6	Stopper seal	NBR	
7	Table	Aluminum alloy	Light gray color
8	Stopper lever	Carbon steel	
9	Stopper guide	Stainless steel	
10	Lever retainer	Carbon steel	
11	Bearing retainer	Aluminum alloy	Light gray color
12	Bearing	High carbon chrome bearing steel	
13	Special bearing	High carbon chrome bearing steel	
14	Back-up ring	Stainless steel	
15	O-ring	NBR	
16	Adjustment bolt	Carbon steel	
17	Hexagon nut	Carbon steel	
18	Hexagon socket head cap screw	Stainless steel	
19	Hexagon socket head cap screw	Stainless steel	
20	Hexagon socket head cap screw	Carbon steel	
21	Button bolt	Carbon steel	
22	Hexagon socket head set screw	Stainless steel	SE type only
23	Label		

* The plug 22 is used only when the connection port is type SE.

Internal construction with auto switch



Model	Auto switch unit part number
MDSUA 1	P211070-1
MDSUA 3	P211090-1
MDSUA 7	P211060-1
MDSUA20	P211080-1

* Auto switches are not included with switch units.

Auto switch block unit		
MDSUA1, 3		MDSUA7, 20
Right-handed	Left-handed	Combination left & right-handed
Part no.: P211070-8	Part no.: P211070-9	Part no.: P211060-8

* A switch block unit is the assembly required to mount one auto switch on a switch unit.