ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *SMC MSUB3-90S* at our website: *Click HERE*

Rotary Table/Vane Style

Series MSU

Size: 1, 3, 7, 20



Series

Vane Style/

Rotary actuator with lightweight,

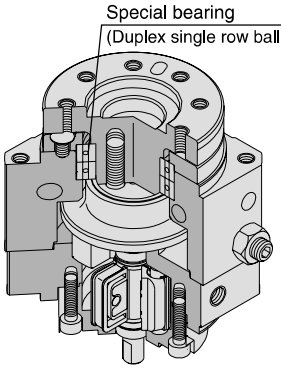


High precision type
Size: 1, 3, 7, 20

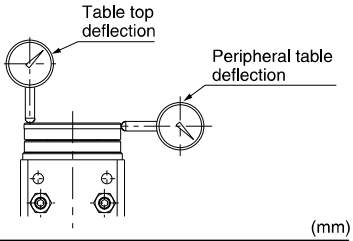
Series MSUA

Improved table deflection accuracy:
0.03 mm or less

High precision/High rigidity



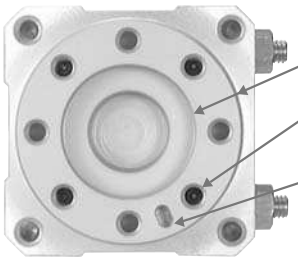
Deflection accuracy: Displacement for 180° rotation



(mm)

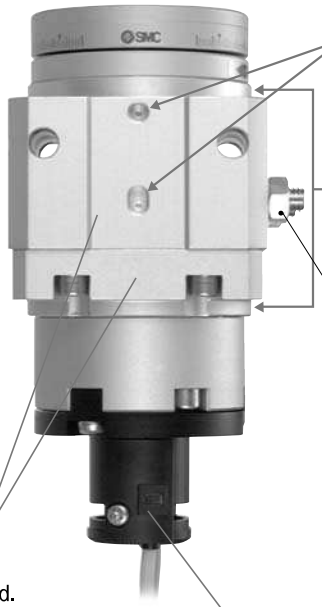
Model	MSUA
Table top deflection	0.03 (0.1 to 0.2)
Peripheral table deflection	0.03 (0.1 to 0.2)

Values inside ( ) are for Series MSUB



Easy alignment when mounting the load

- **Table inside/outside diameter tolerance H9/h9**
- **Female threads for load mounting provided in eight places.**
  (Increases freedom in mounting the load)
- **Mounting reference pin holes**

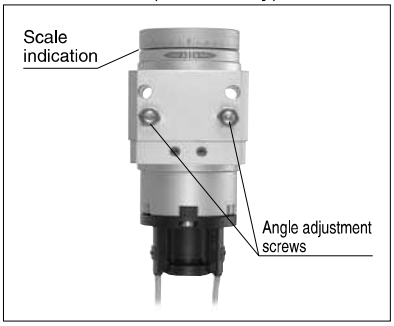


Easy alignment when mounting the body

- **Mounting reference pin holes**
  (Alignment with center of body)
  Provided on three sides, excluding port side
- **Reference diameter h9**
  (Alignment with center of table rotation)

Angle adjustable

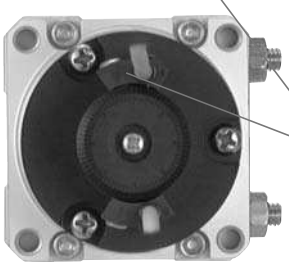
90° ±10°, 180° ±10°
Double vane (MSUB only) 90° ±5°



Disengageable

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





Auto switch capable

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

MSU

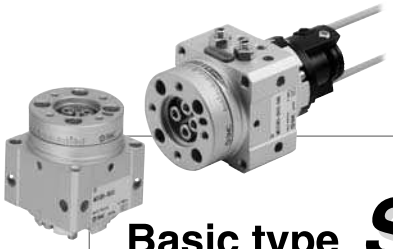
Size: 1, 3, 7, 20

compact table for robotic hands

Free mount type

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

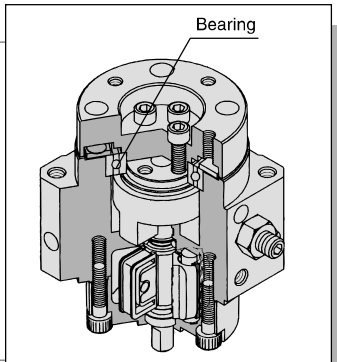
	Axial mounting		Lateral mounting	Vertical mounting
MSUA	Bottom mount Tapped holes (4)	Top mount Tapped holes (4)		
MSUB	Through-holes (2) Tapped holes (2)	Tapped holes (2) Through-holes (2)		



Basic type Series MSUB

Size: 1, 3, 7, 20

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



Single vane

Series Variations

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

Rotary Table: High Precision Type
Vane Style

Series MSUA

Size: 1, 3, 7, 20



How to Order

Connection port location

Nil	Side ported
E	Axial ported

Available with side ported only, when equipped with auto switch unit.

Bearing type

A	High precision type

Free mount type

Without auto switch MSUA 20 – 90 S □

With auto switch M D SUA 20 – 90 S – T79 L □

With auto switch
(Built-in magnet)

Nominal size (Torque)

1	MSUA 1
3	MSUA 3
7	MSUA 7
20	MSUA20

Rotating angle

Applicable	Symbol	Rotating angle
Single vane	90	90°
	180	180°

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

Vane type

S	Single vane

Number of auto switches

S	1 pc. *
Nil	2 pcs. **

* S (1 auto switch) is shipped with a right-hand auto switch.
** Nil (2 auto switches) is shipped with a right-hand and a left-hand switch.

Electrical entry/Lead wire length

Nil	Grommet/Lead wire: 0.5 m
L	Grommet/Lead wire: 3 m
C	Connector/Lead wire: 0.5 m
CL	Connector/Lead wire: 3 m
CN	Connector/Without lead wire

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

Auto switch

Nil	Without auto switch (built-in magnet)

*Refer to the table below for the applicable auto switch model.

Applicable Auto Switch/Refer to pages 761 to 809 for further information on auto swiches.

Applicable model	Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire type	Lead wire length (m) *: 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
MDSUA1	Solid state switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	S99V	S99	Heavy-duty cord	●	●	—	—	○	IC circuit	Relay, PLC
					3-wire (PNP)			S9PV	S9P		●	●	—	—	○		
					2-wire	12 V		T99V	T99		●	●	—	—	○	—	
MDSUA3	Reed switch	—		No		5 V, 12 V	5 V, 12 V, 24 V	—	90	Parallel cord	●	●	●	—	—	IC circuit	
						5 V, 12 V, 100 V	5 V, 12 V, 24 V, 100 V	—	90A	Heavy-duty cord	●	●	●	—			
				Yes		—	—	—	97	Parallel cord	●	●	●	—		—	
						—	100 V	—	93A	Heavy-duty cord	●	●	●	—			
MDSUA7 MDSUA20	Solid state switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	—	S79	Heavy-duty cord	●	●	—	—	○	IC circuit	Relay, PLC
					3-wire (PNP)			—	S7P		●	●	—	—	○		
					2-wire	12 V		—	T79		●	●	—	—	○	—	
			Connector					—	T79C		●	●	●	●	—		
	Reed switch	—	Grommet			—	100 V	—	R73		●	●	—	—	—	—	
			Connector				—	—	R73C		●	●	●	●			
			Grommet	No		48 V, 100 V	100 V	—	R80		●	●	—	—		IC circuit	
			Connector			—	24 V or less	—	R80C		●	●	●	●		—	

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

* Auto switches are shipped together (but not assembled).

* Auto switches marked with "○" are made-to-order specifications.

Made to Order Refer to pages 796 and 797 for detailed solid state auto switches with pre-wired connectors.

Order example: MSUA20 single vane type
(connection port side location selected)
1. Standard type (Without auto switches), Rotation 90°, side port location
MSUA20-90S
2. With auto switch unit (Without auto switches), Rotation 180°, side port location
MDSUA20-180S
3. With auto switch unit + Auto switch R73, Rotation 180°, Side port location

Specifications

Model *2		MSUA1		MSUA3		MSUA7		MSUA20	
Vane type		Single vane							
Rotating angle *1		90° ± 10°	180° ± 10°	90° ± 10°	180° ± 10°	90° ± 10°	180° ± 10°	90° ± 10°	180° ± 10°
Fluid		Air (Non-lube)							
Proof pressure (MPa)		1.05						1.5	
Ambient and fluid temperature		5 to 60°C							
Operating pressure range (MPa)		0.2 to 0.7		0.15 to 0.7				0.15 to 1.0	
Rotation time adjustment range (s/90°)		0.07 to 0.3 (0.5 MPa)							
Shaft load	Allowable radial load	20 N		40 N		50 N		60 N	
	Allowable thrust load	15 N		30 N		60 N		80 N	
	Allowable moment	0.3 N·m		0.7 N·m		0.9 N·m		2.9 N·m	
Bearing		Special bearing							
Port location		Side ported or Top ported							
Port size	Side ported	M3 x 0.5		M5 x 0.8					
	Top ported	M3 x 0.5				M5 x 0.8			
Deflection accuracy		0.03 mm or less							

*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 33 for allowable kinetic energy.

* 2 Correspondence to equivalent conventional free-mount types

Rotary table		Free-mount rotary actuator
MSUA 1	→	CRBU2W10
MSUA 3	→	CRBU2W15
MSUA 7	→	CRBU2W20
MSUA20	→	CRBU2W30

JIS Symbol

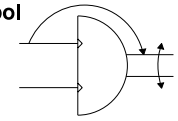
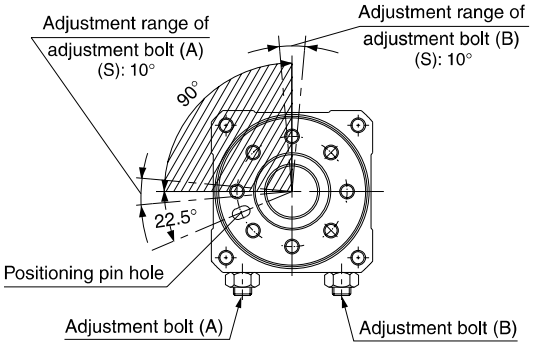
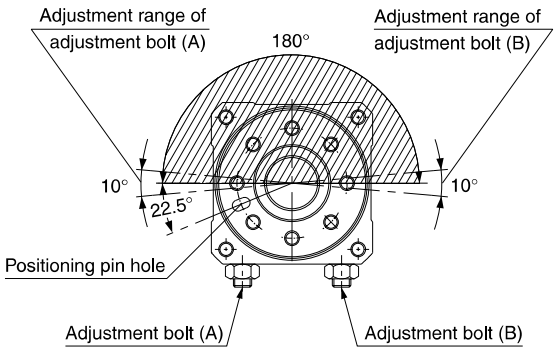


Table Rotation Range

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



For 90° rotation
Single vane (S): 80 to 100° adjustable



For 180° rotation

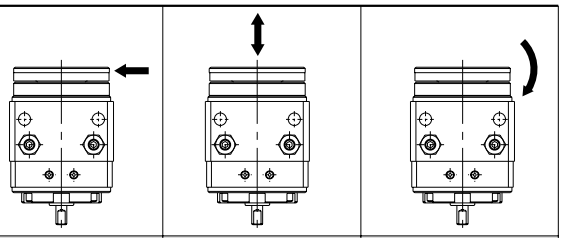
Mass

(g)

Size	Rotating angle	Basic mass Single vane	Auto switch unit + Auto switch 2 pcs.
1	90°	162	25
	180°	161	
3	90°	262	30
	180°	260	
7	90°	440	50
	180°	436	
20	90°	675	60
	180°	671	

Allowable Load

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.)

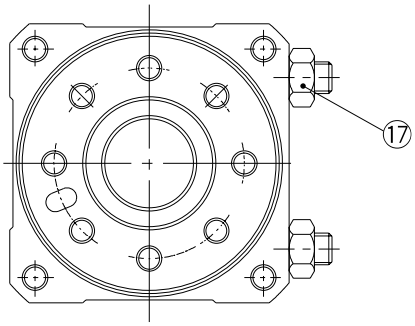


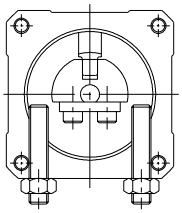
Size	Allowable radial load (N)	Allowable thrust load (N)	Allowable moment (N·m)
1	20	15	0.3
3	40	30	0.7
7	50	60	0.9
20	60	80	2.9

CRB2
CRBU2
CRB1
MSU
CRJ
CRA1
CRQ2
MSQ
MSZ
CRQ2X
MSQX
MRQ
D-□

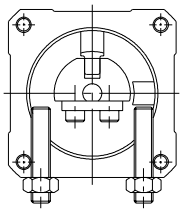
Construction

Internal Construction of Rotary Table

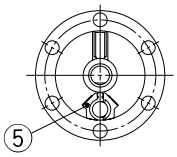




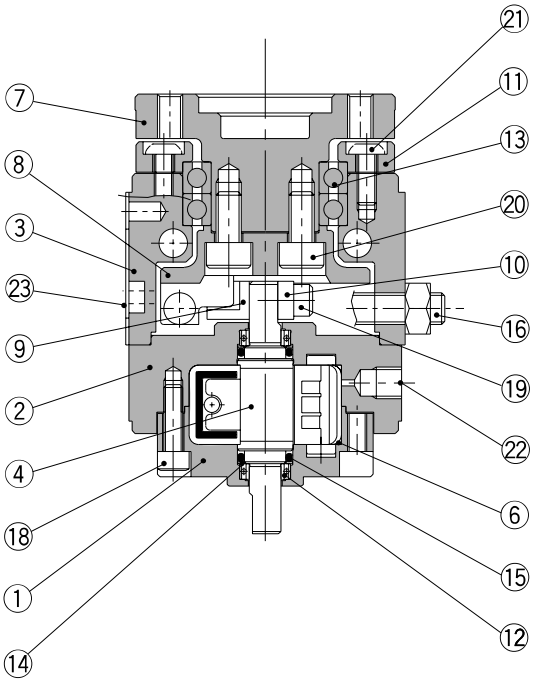
For 180°
(Figure in the middle position)



For 90°
(Figure with pressure to A port)



Single vane
(Figure in the middle position for 180°)

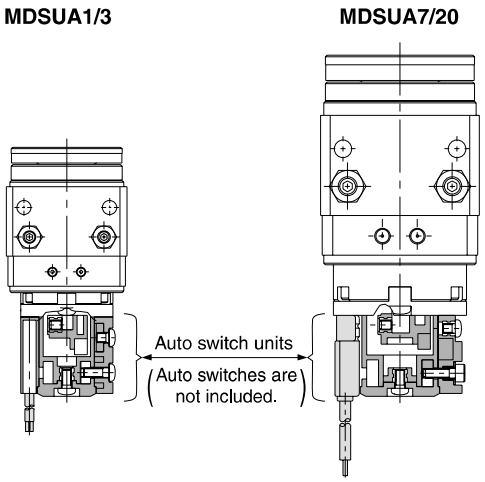


Component Parts

No.	Description	Material	Note
1	**Body A**	Aluminum alloy	Anodized
2	**Body B**	Aluminum alloy	Anodized
3	**Body C**	Aluminum alloy	Anodized
4	**Vane shaft**	Stainless steel (MSUA20 is carbon steel)	Single vane
5	**Stopper**	Resin	Single vane
6	**Stopper seal**	NBR	
7	**Table**	Aluminum alloy	Anodized, Serigraph
8	**Stopper lever**	Carbon steel	Heat treated, Electroless nickel plated
9	**Stopper guide**	Stainless steel	Nitriding
10	**Lever retainer**	Carbon steel	Zync Chromated
11	**Bearing retainer**	Aluminum alloy	Anodized
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	**With adjustment bolt**	Carbon steel	Heat treated, Nickel plated
17	**Hexagon nut**	Carbon steel	Nickel plated
18	**Hexagon socket head cap screw**	Stainless steel	
19	**Hexagon socket head cap screw**	Stainless steel	
20	**Hexagon socket head cap screw**	Carbon steel	Nickel plated
21	**Button bolt**	Carbon steel	Nickel plated
22	**Hexagon socket head cap screw**	Stainless steel	SE type only
23	**Label**		

Construction

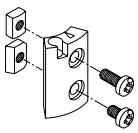
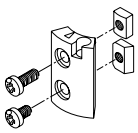
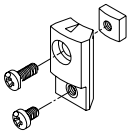
Internal construction with auto switch



∗ Refer to page 55 for the component parts.

∗ The auto switch unit can be retrofitted on a rotary actuator.
Auto switches should be ordered separately since they are not included.

Model	Auto switch unit part no.
M(D)SUA 1	P211070-1
M(D)SUA 3	P211090-1
M(D)SUA 7	P211060-1
M(D)SUA20	P211080-1

Auto switch block unit			
MDSUA1/3			**MDSUA7/20**
For reed auto switch		For solid state auto switch	Combination of reed and solid state auto switches
Right-handed	Left-handed	Combination left & right-handed	Combination left & right-handed
			
Part no.: P211070-8	Part no.: P211070-9	Part no.: P211070-13	Part no.: P211060-8

∗ The auto switch block unit is included in the auto switch unit.
∗ Auto switch block unit shows the necessary assembly for mounting 1 piece of auto switch to the auto switch unit.

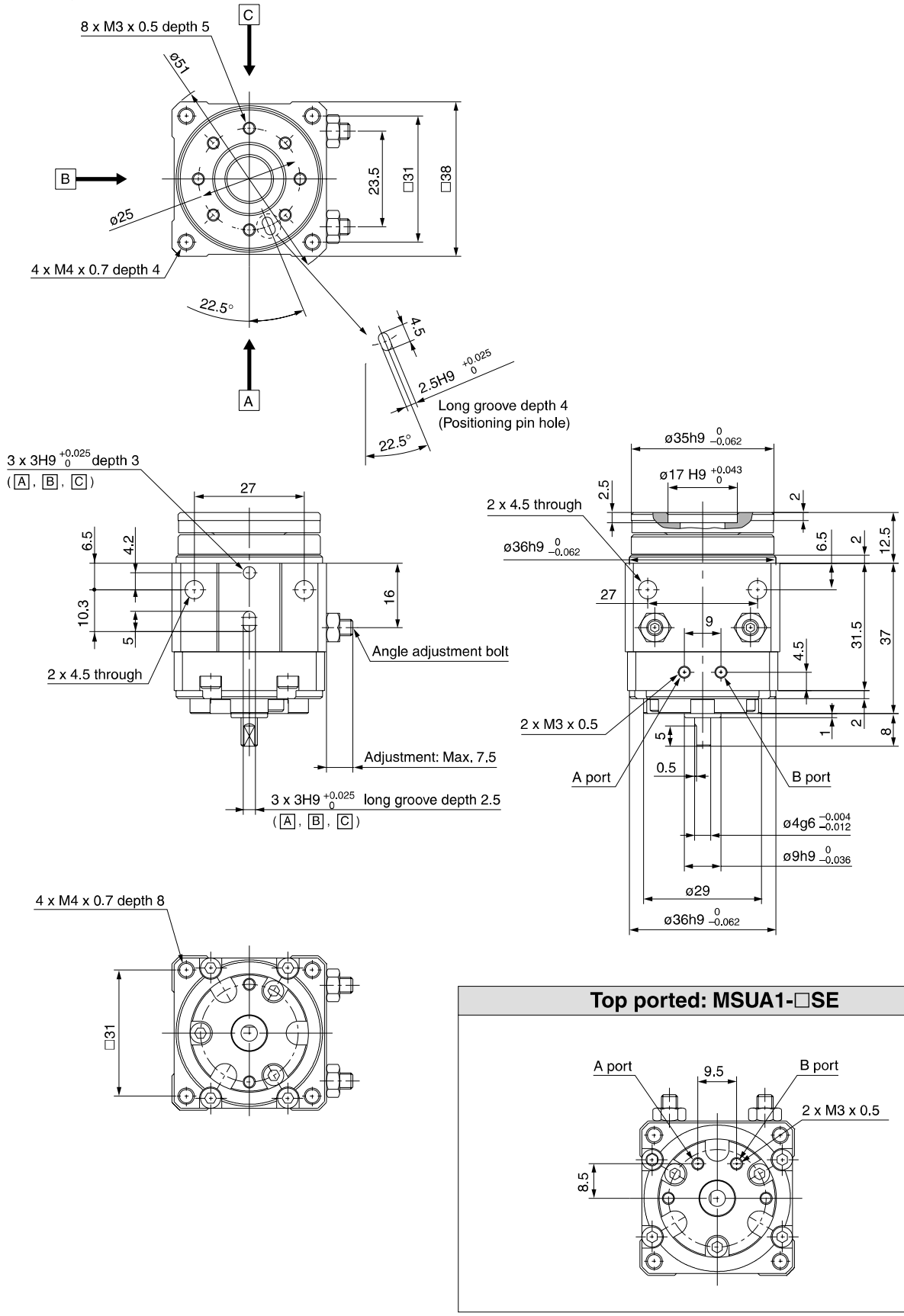
CRB2
CRBU2
CRB1
MSU
CRJ
CRA1
CRQ2
MSQ
MSZ
CRQ2X
MSQX
MRQ

Dimensions

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

MSUA1

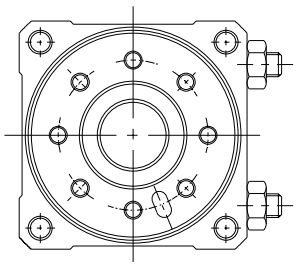
MSUA1-□S,SE



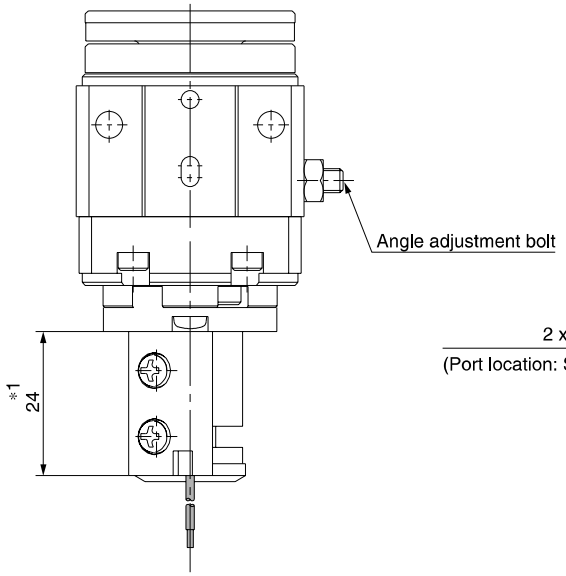
Top ported: MSUA1-□SE

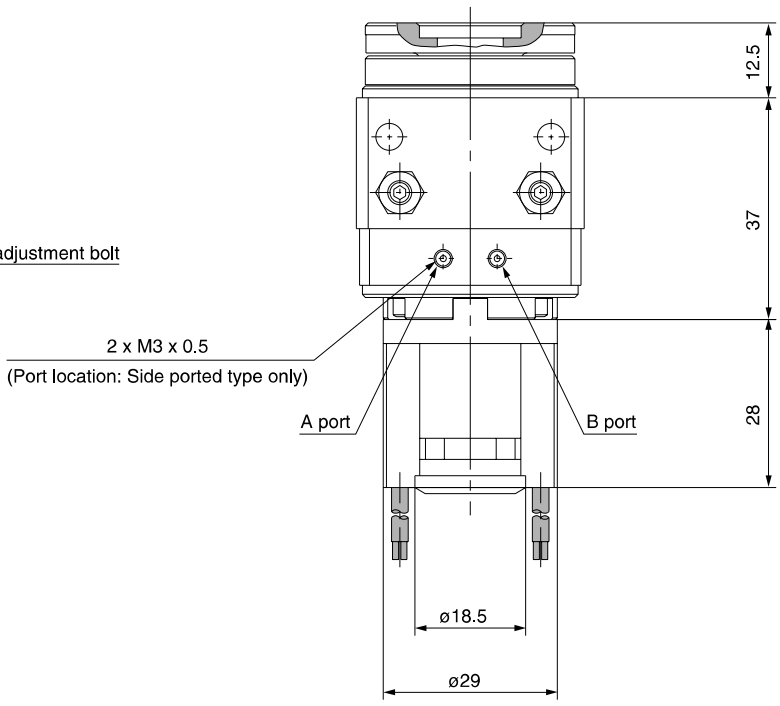
These drawings indicate the condition when the B port is pressurized.

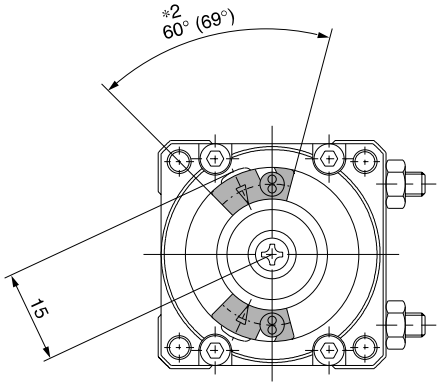
With auto switch: MDSUA1-□S



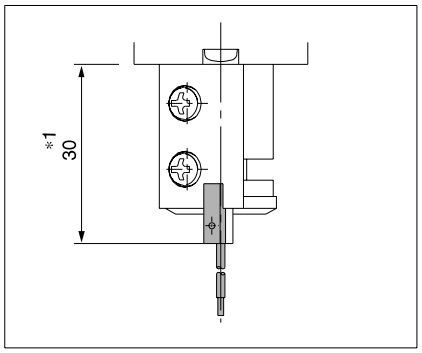
∗1) 24: When using D-90/90A/S99/S99V/S9P/S9PV/T99/T99V
30: When using D-97/93A
∗2) 60°: When using D-90/90A/97/93A
69°: When using D-S99/S99V/S9P/S9PV/T99/T99V







D-97/93A

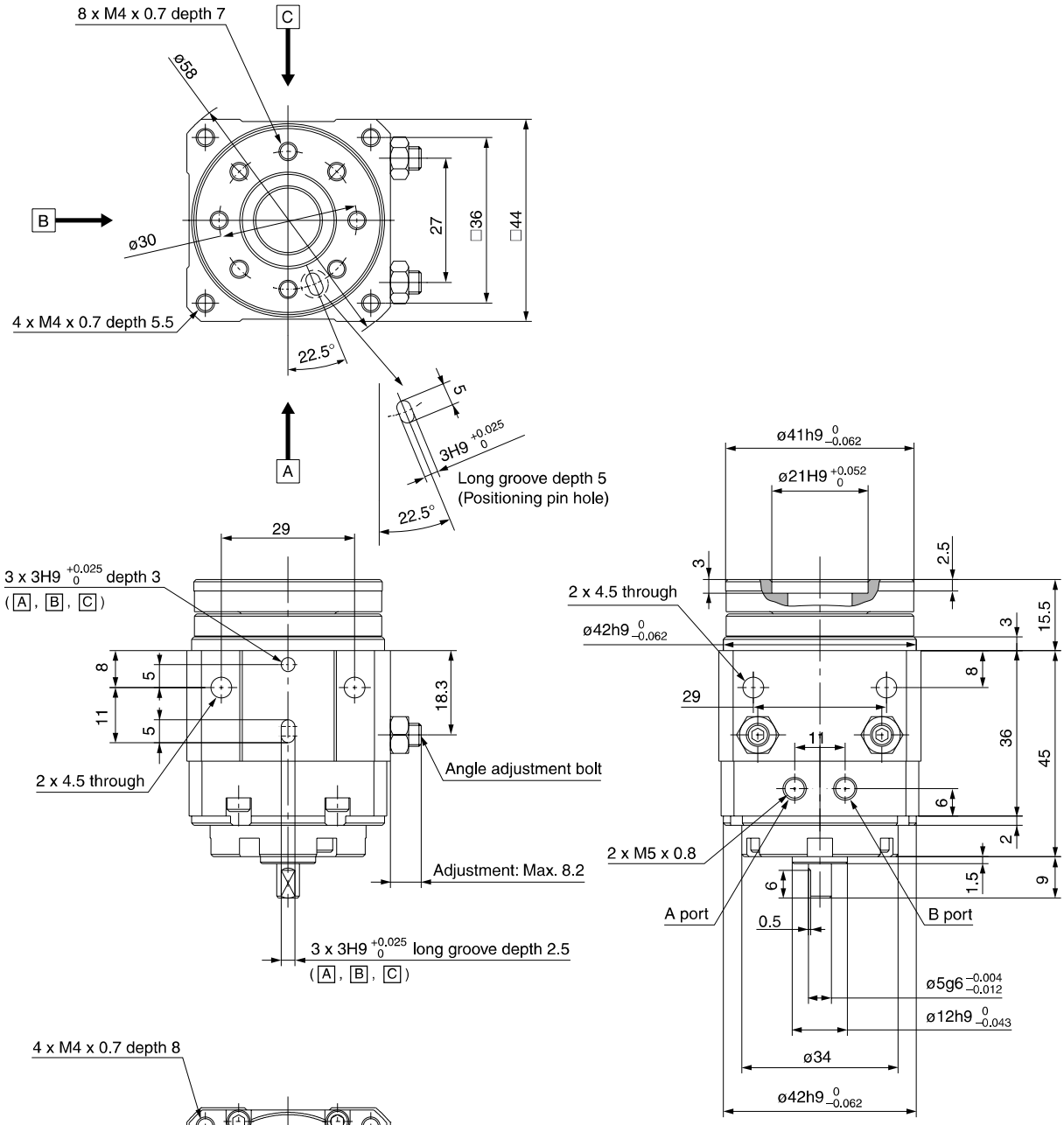


Dimensions

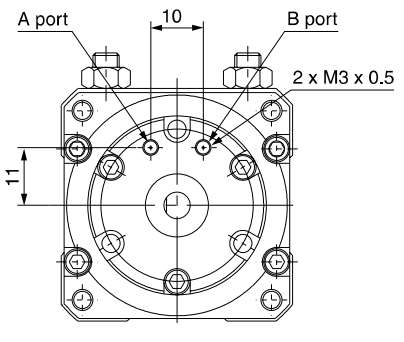
These drawings indicate the condition when the B port is pressurized.

MSUA3

MSUA3-□S/SE

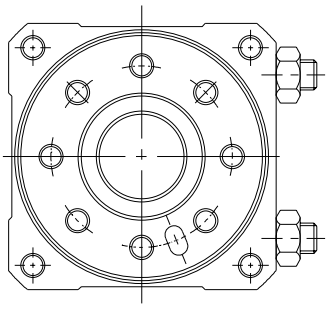


Top ported: MSUA3-□SE

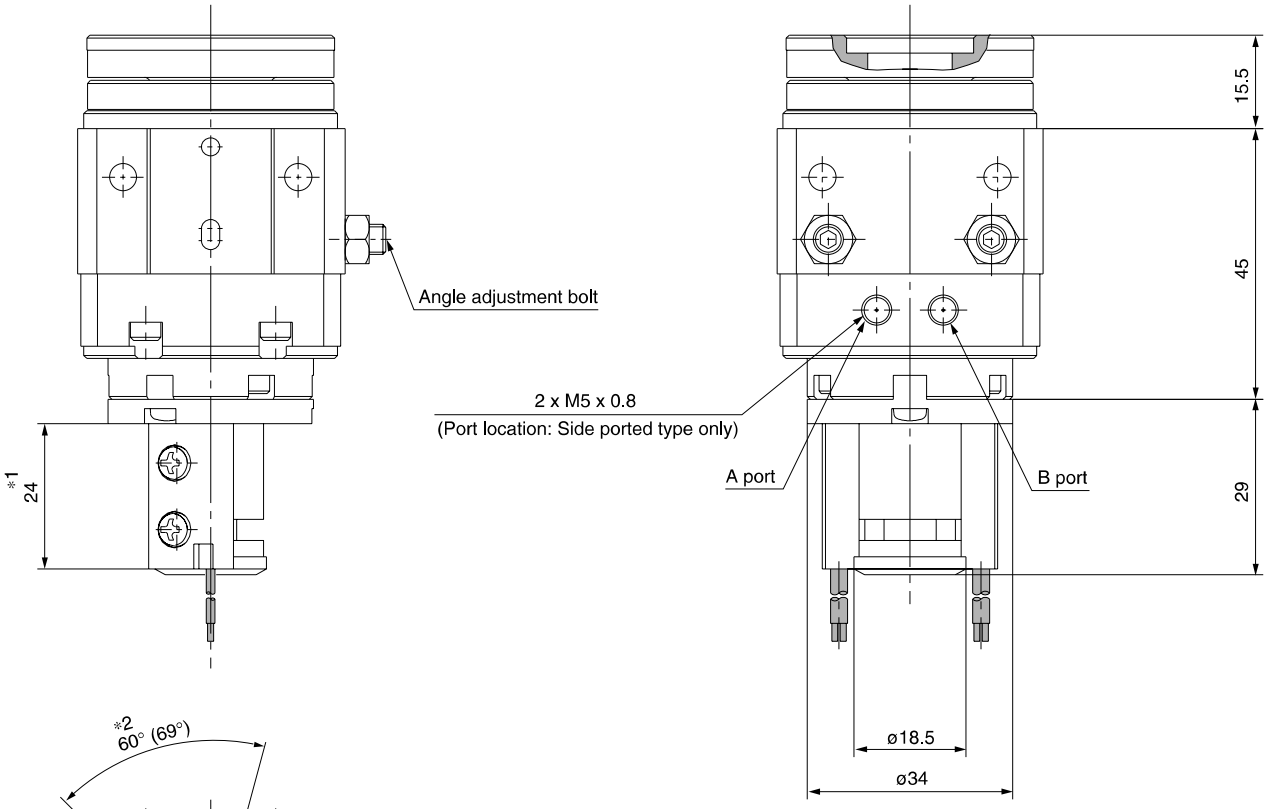


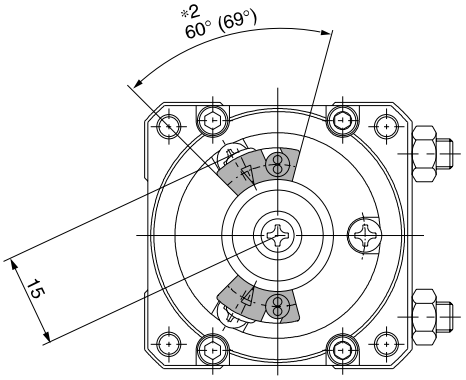
These drawings indicate the condition when the B port is pressurized.

With auto switch: MDSUA3-□S

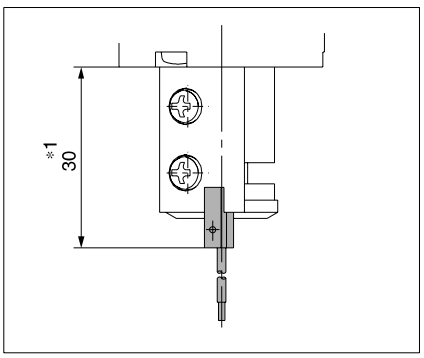


∗ 1) 24: When using D-90/90A/S99/S99V/S9P/S9PV/T99/T99V
30: When using D-97/93A
∗ 2) 60°: When using D-90/90A/97/93A
69°: When using D-S99/S99V/S9P/S9PV/T99/T99V





D-97/93A

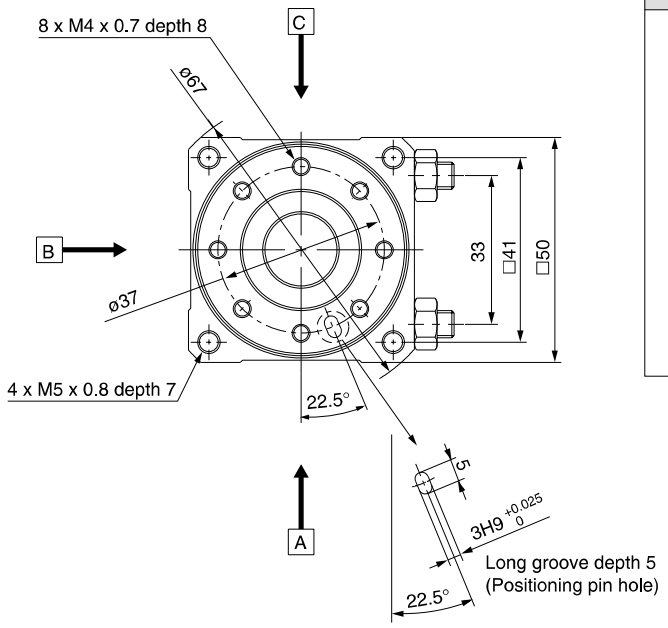


Dimensions

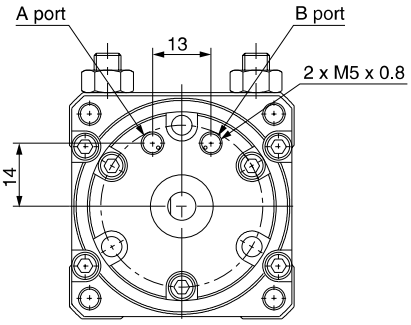
These drawings indicate the condition when the B port is pressurized.

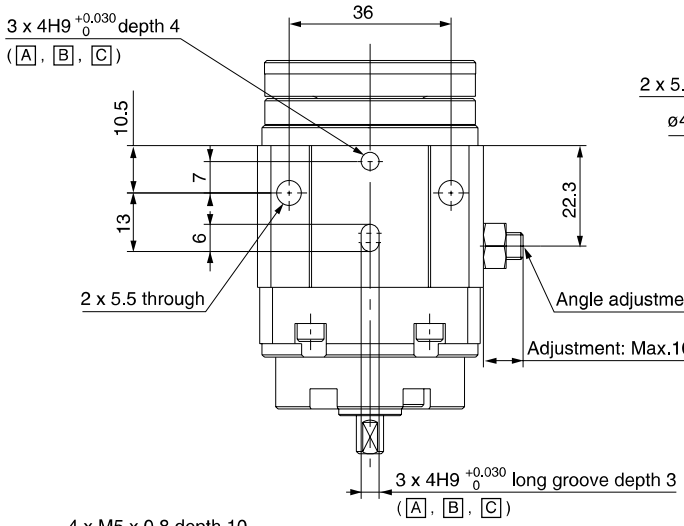
MSUA7

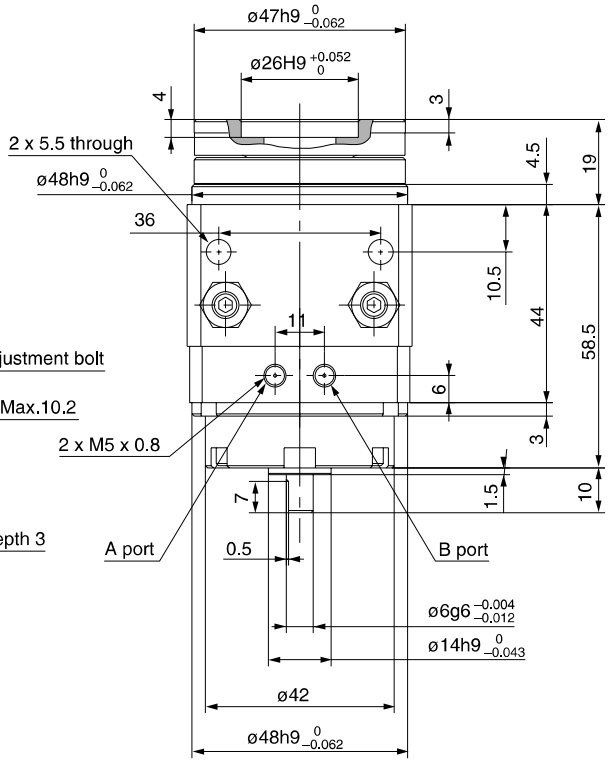
MSUA7-□S/SE

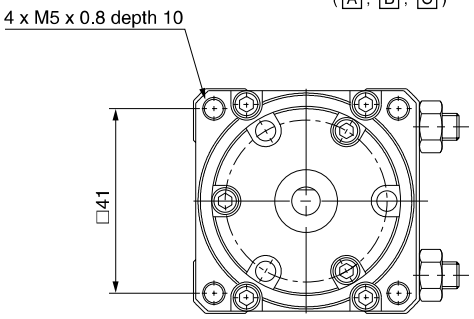


Top ported: MSUA7-□SE



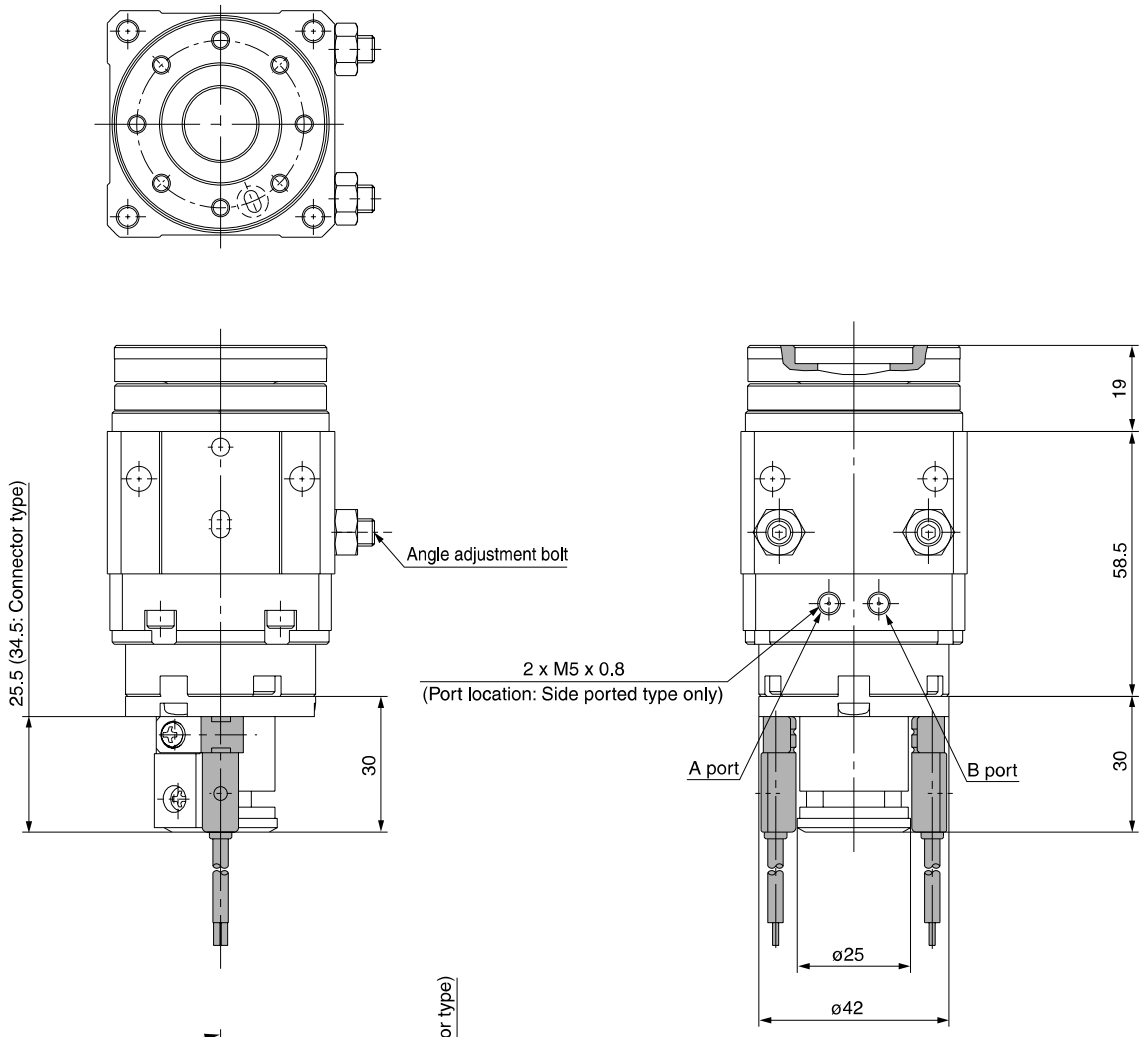




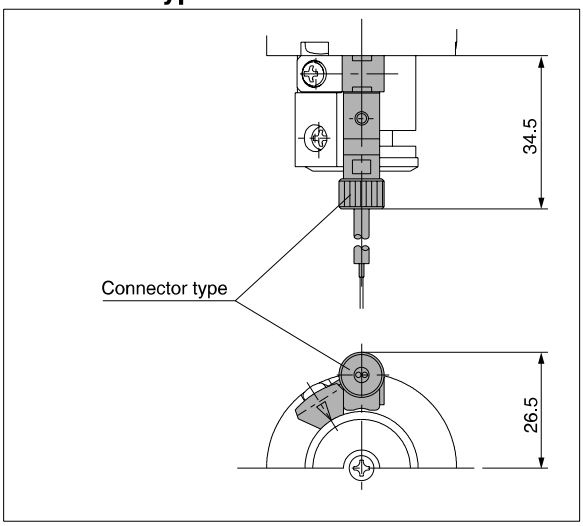


These drawings indicate the condition when the B port is pressurized.

With auto switch: MDSUA7-□S



Connector Type

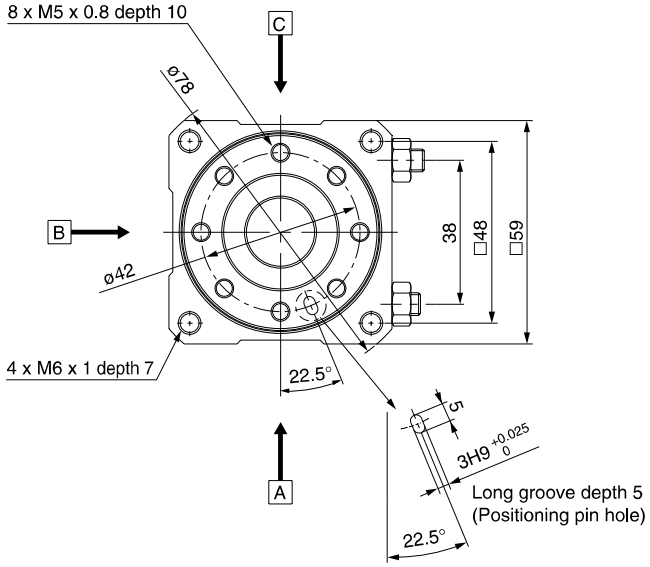


Dimensions

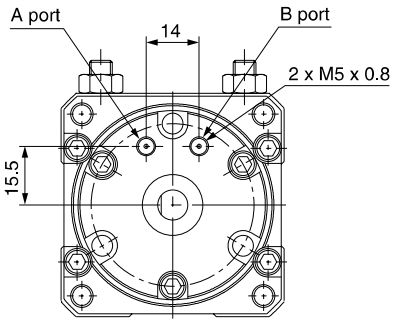
These drawings indicate the condition when the B port is pressurized.

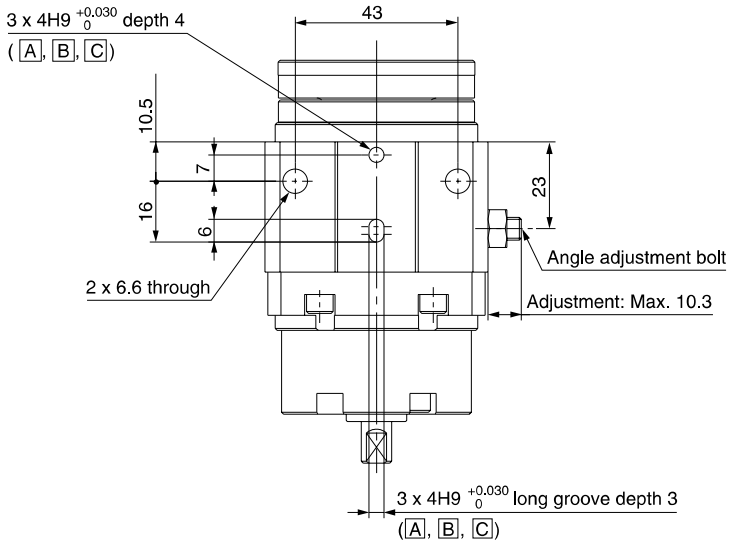
MSUA20

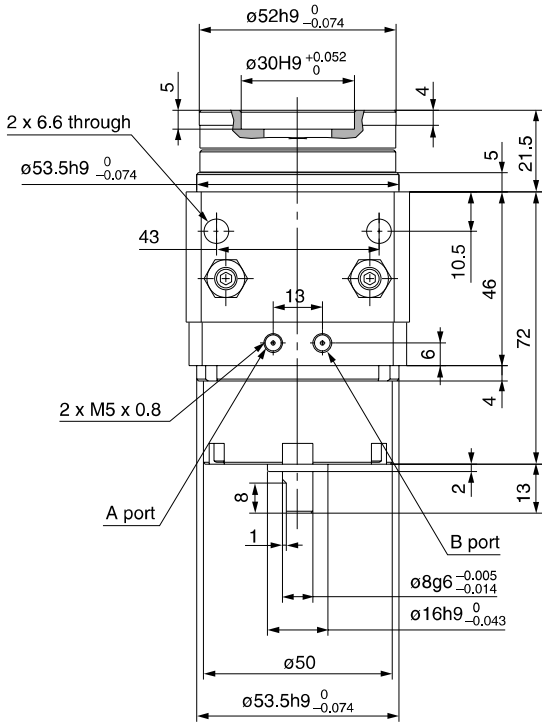
MSUA20-□S/SE

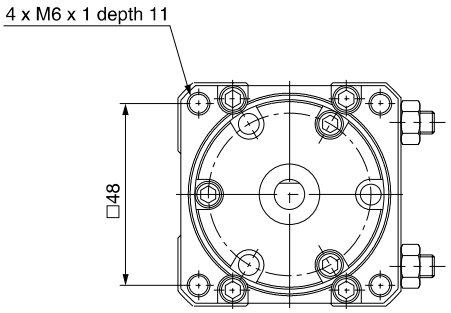


Top ported: MSUA20-□SE



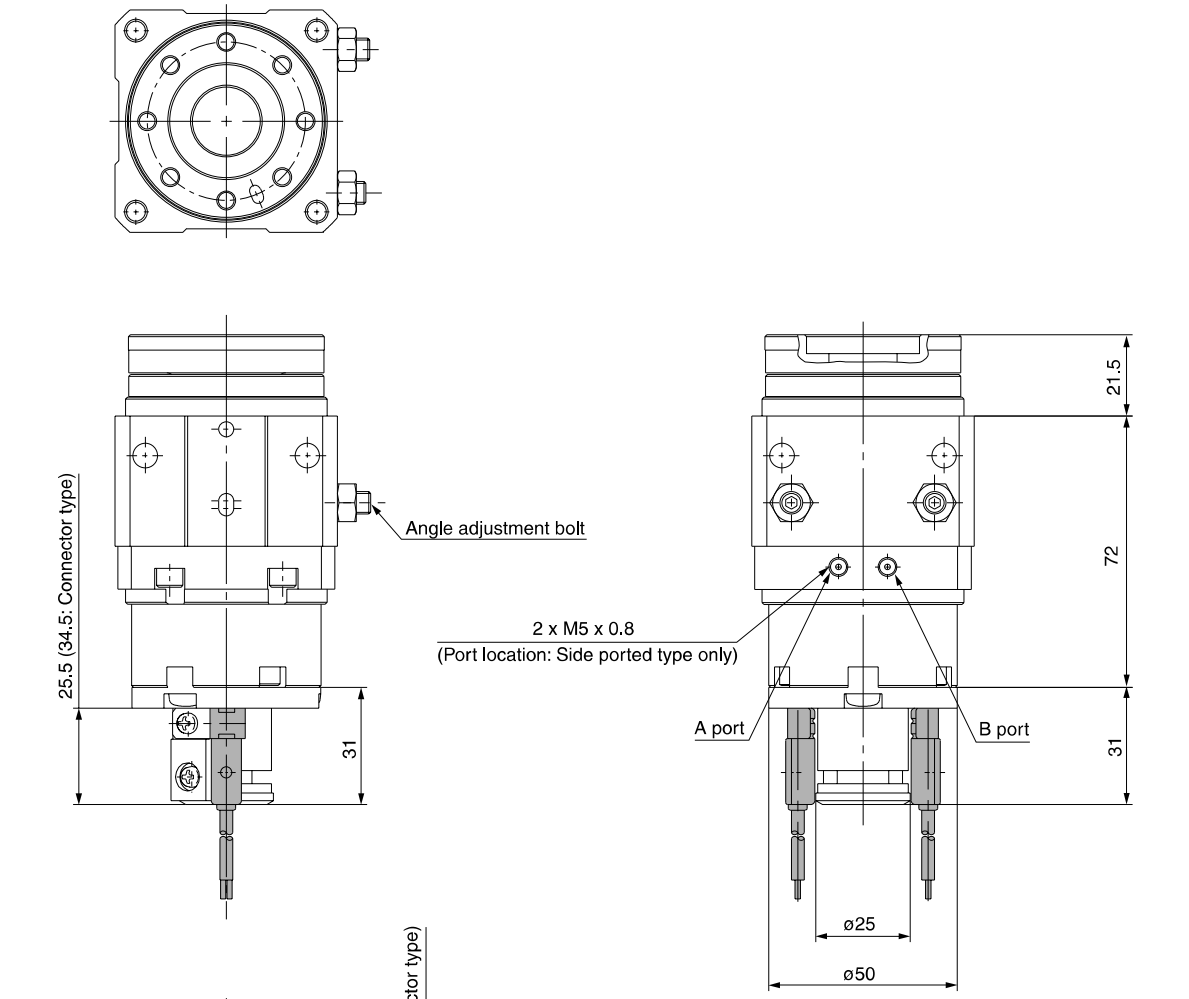




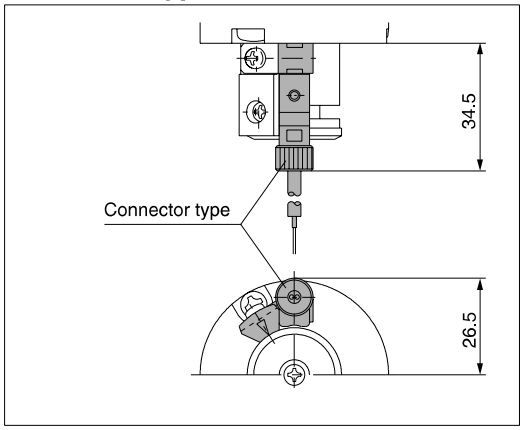


These drawings indicate the condition when the B port is pressurized.

With auto switch: MDSUA20-□S



Connector Type



Rotary Table: Basic Type
Vane Style

Series MSUB

Size: 1, 3, 7, 20



How to Order

Bearing type

B	Basic type

Free mount type

Connection port location

Nil	Side ported
E	Axial ported

Available with side ported only, when equipped with auto switch unit.

Without auto switch MSUB 20 – 90 S □

With auto switch M D SUB 20 – 90 S – T79 L □

With auto switch (Built-in magnet)

Nominal size (Torque)

1	MSUB 1
3	MSUB 3
7	MSUB 7
20	MSUB20

Rotating angle

Application	Symbol	Rotating angle
Single vane	90	90°
	180	180°
Double vane	90	90°

Rotation adjustment range
Single vane: Both ends ±5° each
Double vane: Both ends ±2.5° each

Vane type

S	Single vane
D	Double vane

Number of auto switches

S	1 pc. *
Nil	2 pcs. **

* S (1 auto switch) is shipped with a right-hand auto switch.
** Nil (2 auto switches) is shipped with a right-hand and a left-hand switch.

Electrical entry/Lead wire length

Nil	Grommet/Lead wire: 0.5 m
L	Grommet/Lead wire: 3 m
C	Connector/Lead wire: 0.5 m
CL	Connector/Lead wire: 3 m
CN	Connector/Without lead wire

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

Auto switch

Nil	Without auto switch (built-in magnet)

*Refer to the table below for the applicable auto switch model.

Applicable Auto Switch/Refer to pages 761 to 809 for further information on auto switches.

Applicable model	Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire type	Lead wire length (m) * 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
MDSUB1 MDSUB3	Solid state switch	—	Grommet	Yes	3-wire (NPN)	5V,12V	—	S99V	S99	Heavy-duty cord	●	●	—	—	○	IC circuit	Relay, PLC
					3-wire (PNP)			S9PV	S9P		●	●	—	—	○		
					2-wire	12V		T99V	T99		●	●	—	—	○	—	
	Reed switch	—		No		5 V, 12 V	5 V, 12 V, 24 V	—	90	Parallel cord	●	●	●	—	—	IC circuit	
						5 V, 12 V, 100 V	5 V, 12 V, 24 V, 100 V	—	90A	Heavy-duty cord	●	●	●	—			
				Yes		—	—	—	97	Parallel cord	●	●	●	—		—	
						—	100 V	—	93A	Heavy-duty cord	●	●	●	—			
MDSUB7 MDSUB20	Solid state switch	—	Grommet	Yes	3-wire (NPN)	5V,12V	—	—	S79	Heavy-duty cord	●	●	—	—	○	IC circuit	Relay, PLC
					3-wire (PNP)			—	S7P		●	●	—	—	○		
			Connector		2-wire	12V		—	T79		●	●	—	—	○	—	
	Reed switch	—	Grommet			—	100 V	—	T79C		●	●	●	●	—		
			Connector				—	—	R73		●	●	—	—	—	—	
			Grommet	No		48V,100V	100 V	—	R73C		●	●	●	●			
			Connector			—	24 V or less	—	R80		●	●	—	—		IC circuit	
								—	R80C		●	●	●	●		—	

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

* Auto switches are shipped together (but not assembled).

* Auto switches marked with "○" are made-to-order specifications.

Order example: MSUB20 single vane type (connection port side location selected)
1. Standard type (Without auto switches), Rotation 90°, side port location MSUB20-90S
2. With auto switch unit (Without auto switches), Rotation 180°, Side port location MDSUB20-180S
3. With auto switch unit + Auto switch R73, Rotation 180°, Side port location MDSUB20-180S-R73

Made to Order

Refer to pages 796 to 797 for detailed solid state auto switches with pre-wired connectors.

Specifications

Model *3		MSUB1			MSUB3			MSUB7			MSUB20		
Vane type		Single vane		Double vane	Single vane		Double vane	Single vane		Double vane	Single vane		Double vane
Rotating angle *1		90° ± 10°	180° ± 10°	90° ± 5°	90° ± 10°	180° ± 10°	90° ± 5°	90° ± 10°	180° ± 10°	90° ± 5°	90° ± 10°	180° ± 10°	90° ± 5°
Fluid		Air (Non-lube)											
Proof pressure (MPa)		1.05									1.5		
Ambient and fluid temperature		5 to 60°C											
Operating pressure range (MPa)		0.2 to 0.7			0.15 to 0.7						0.15 to 1.0		
Rotation time adjustment range (s/90°)		0.07 to 0.3 (0.5 MPa)											
Shaft load	Allowable radial load	20 N			40 N			50 N			60 N		
	Allowable thrust load *2	15 N			30 N			60 N			80 N		
		10 N			15 N			30 N			40 N		
	Allowable moment	0.3 N·m			0.7 N·m			0.9 N·m			2.9 N·m		
Bearing		Bearing											
Port location		Side ported or Top ported											
Port size	Side ported	M3 x 0.5			M5 x 0.8								
	Top ported	M3 x 0.5						M5 x 0.8					

*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)
Double vane 90° type can be adjusted to 90° ± 5° (both ends of rotation ± 2.5° each)
• Rotation angles other than 90° and 180° (single vane) are available by special order.

*2 The allowable thrust load is directional. Refer to the allowable load table below for details.

*3 Correspondence to equivalent conventional free-mount types

Rotary table		Free-mount rotary actuator
MSUB 1	→	CRBU2W10
MSUB 3	→	CRBU2W15
MSUB 7	→	CRBU2W20
MSUB20	→	CRBU2W30

JIS Symbol

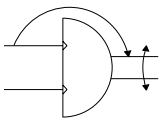
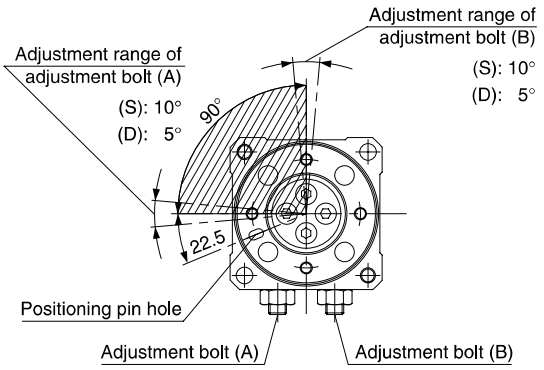
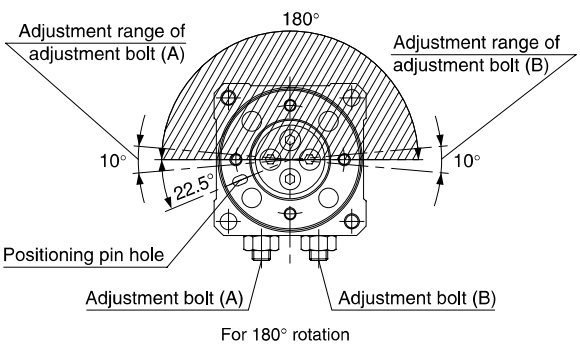


Table Rotation Range

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



For 90° rotation
Single vane (S): 80° to 100° adjustable
Double vane (D): 85° to 95° adjustable



For 180° rotation
Single vane (S): 170° to 190° adjustable

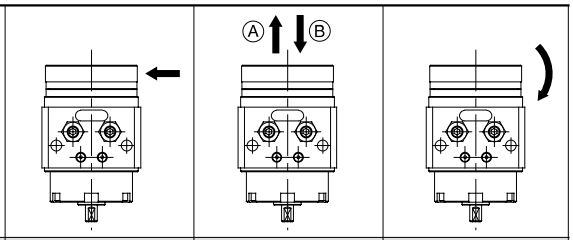
Mass

(g)

Size	Rotation angle	Basic mass		Auto switch unit + Auto switch 2 pcs.
		Single vane	Double vane	
1	90°	145	150	25
	180°	140	—	
3	90°	230	240	30
	180°	225	—	
7	90°	360	375	50
	180°	355	—	
20	90°	510	580	60
	180°	505	—	

Allowable Load

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.)

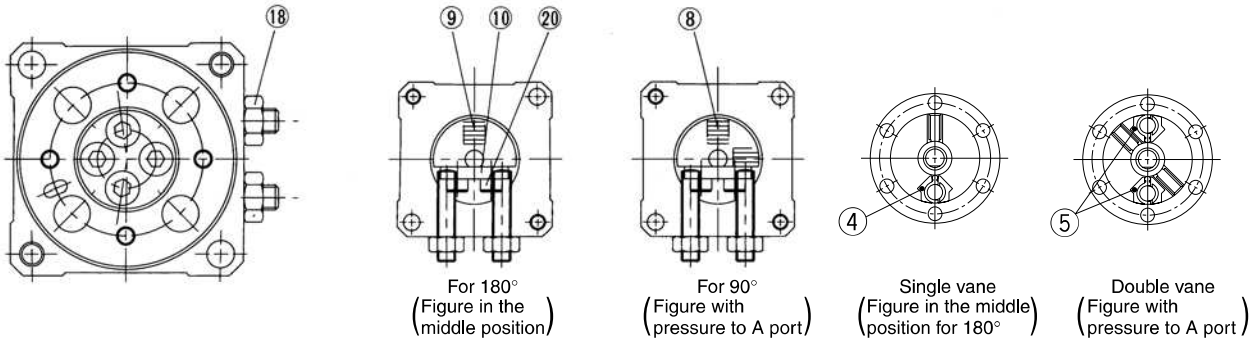


Size	Allowable radial load (N)	Allowable thrust load (N)		Allowable moment (N·m)
1	20	Ⓐ 15	Ⓑ 10	0.3
3	40	30	15	0.7
7	50	60	30	0.9
20	60	80	40	2.9

CRB2
CRBU2
CRB1
MSU
CRJ
CRA1
CRQ2
MSQ
MSZ
CRQ2X
MSQX
MRQ
D-□

Construction

Internal Construction of Rotary Table



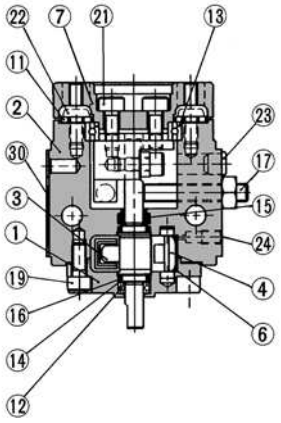
For 180° (Figure in the middle position)

For 90° (Figure with pressure to A port)

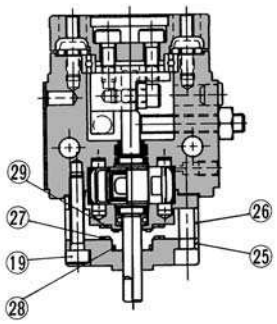
Single vane (Figure in the middle position for 180°)

Double vane (Figure with pressure to A port)

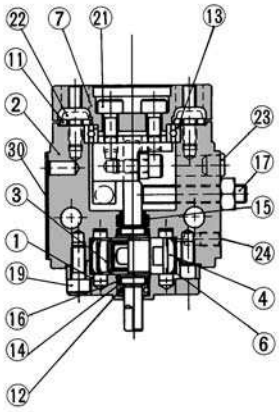
Single vane: Size 1, 3, 7, 20



Double vane: Size 1



Double vane: Size 3, 7, 20



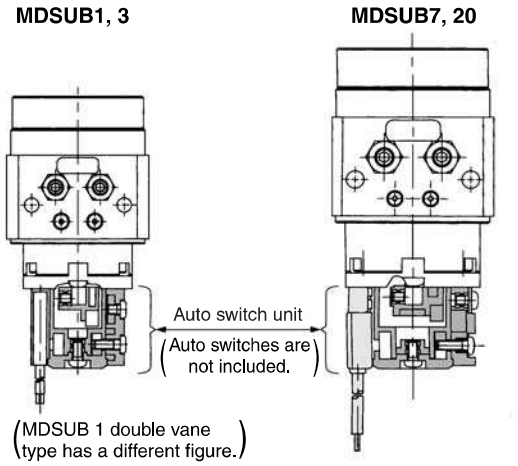
Component Parts

No.	Description	Material	Note
1	**Body (A)**	Aluminum alloy	Anodized
2	**Body (B)**	Aluminum alloy	Anodized
3	**Vane shaft**	Stainless steel (MSUB20: Carbon steel)	Single vane
		Carbon steel	Double vane
4	**Stopper**	Resin	Single vane
5	**Stopper**	Stainless steel	Double vane
6	**Stopper seal**	NBR	
7	**Table**	Aluminum alloy	Anodized, Serigraph
8	**Stopper lever (D)**	Carbon steel	Heat treated, Electroless nickel plated
9	**Stopper lever (S)**	Carbon steel	Heat treated, Electroless nickel plated
10	**Lever retainer**	Carbon steel	Zync Chromated
11	**Ring collar**	Carbon steel	Zync Chromated
12	**Bearing**	High carbon chrome bearing steel	
13	**Bearing**	High carbon chrome bearing steel	
14	**Back-up ring**	Stainless steel	
15	**Scraper**	NBR	
16	**O-ring**	NBR	
17	**Adjustment bolt**	Carbon steel	Heat treated, Nickel plated
18	**Hexagon nut**	Stainless steel	
19	**Hexagon socket head cap screw**	Stainless steel	
20	**Hexagon socket head cap screw**	Stainless steel	
21	**Hexagon socket head cap screw**	Stainless steel	
22	**Button bolt**	Carbon steel	Nickel plated
23	**Rubber cap**	NBR	
24	**Hexagon socket head set screw**	Stainless steel	
25	**Cover**	Aluminum alloy	SE type only
26	**Plate**	Resin	
27	**Gasket**	NBR	
28	**O-ring**	NBR	
29	**O-ring**	NBR	
30	**Label**		

Construction

Internal construction with auto switch

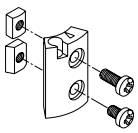
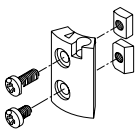
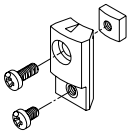
Units are common for both single and double vane.



* Refer to page 55 for the component parts.

* The auto switch unit can be retrofitted on a rotary actuator.
  Auto switches should be ordered separately since they are not included.

Model	Auto switch unit part no.
M(D)SUB 1	P211070-1
M(D)SUB 3	P211090-1
M(D)SUB 7	P211060-1
M(D)SUB20	P211080-1

Auto switch block unit			
MDSUB1/3			**MDSUB7/20**
For reed auto switch		For solid state auto switch	Combination of reed and solid state auto switches
Right-handed	Left-handed	Combination left & right-handed	Combination left & right-handed
			
Part no.: P211070-8	Part no.: P211070-9	Part no.: P211070-13	Part no.: P211060-8

* The auto switch block unit is included in the auto switch unit.
* Auto switch block unit shows the necessary assembly for mounting 1 piece of auto switch to the auto switch unit.

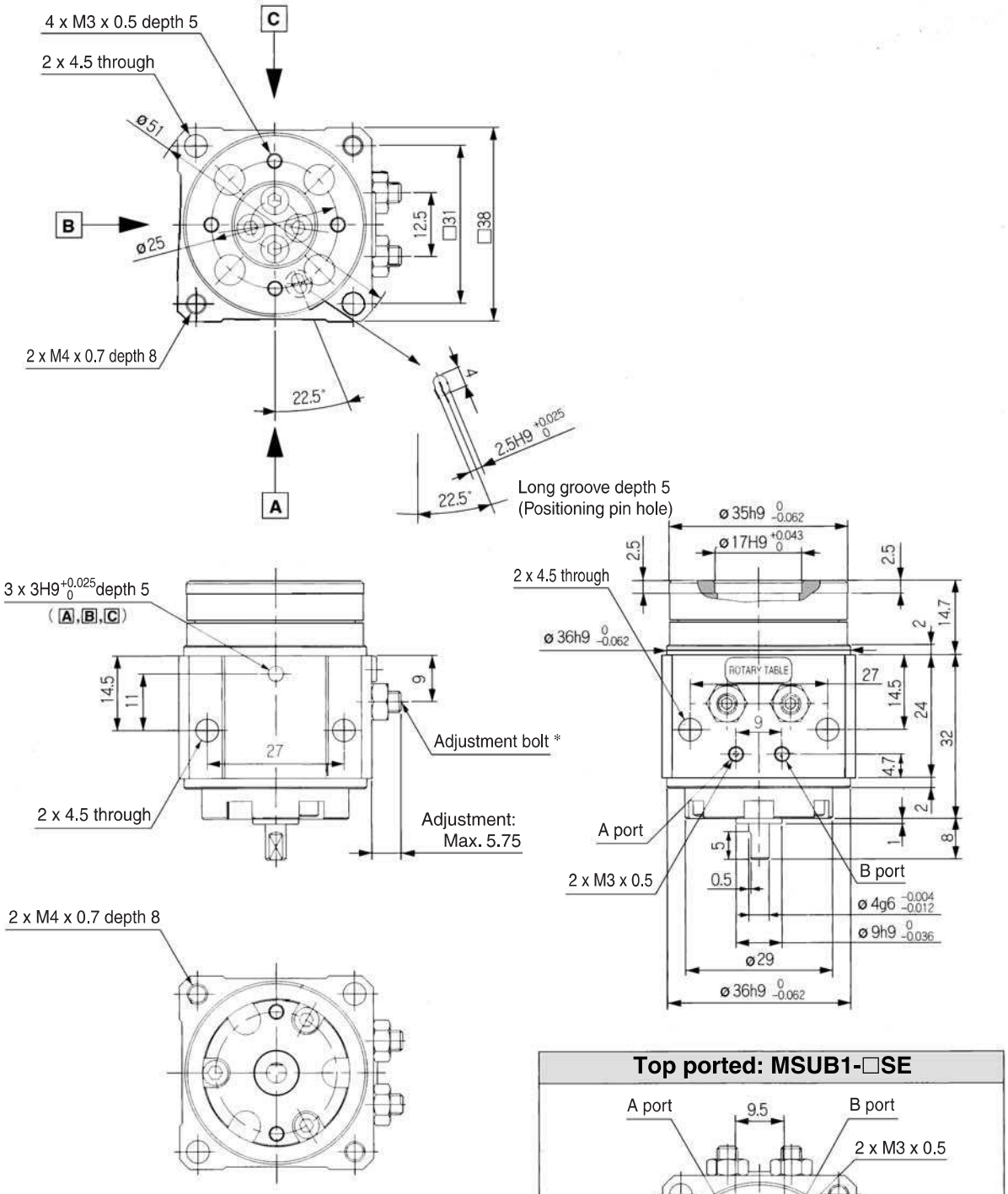
CRB2
CRBU2
CRB1
MSU
CRJ
CRA1
CRQ2
MSQ
MSZ
CRQ2X
MSQX
MRQ

Dimensions

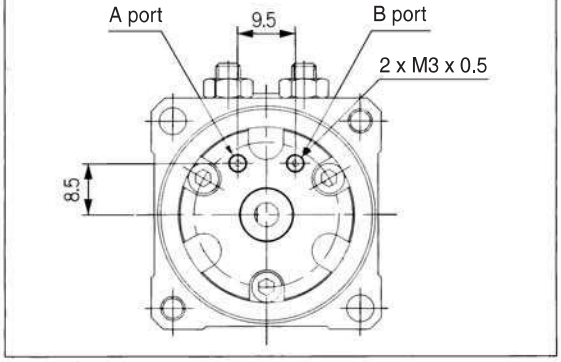
These drawings indicate the condition when the B port is pressurized.

MSUB1 (Single vane)

MSUB1-□S/SE



Top ported: MSUB1-□SE

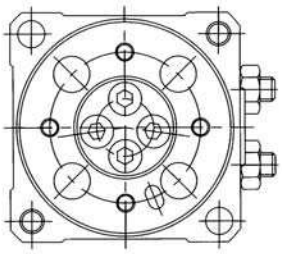


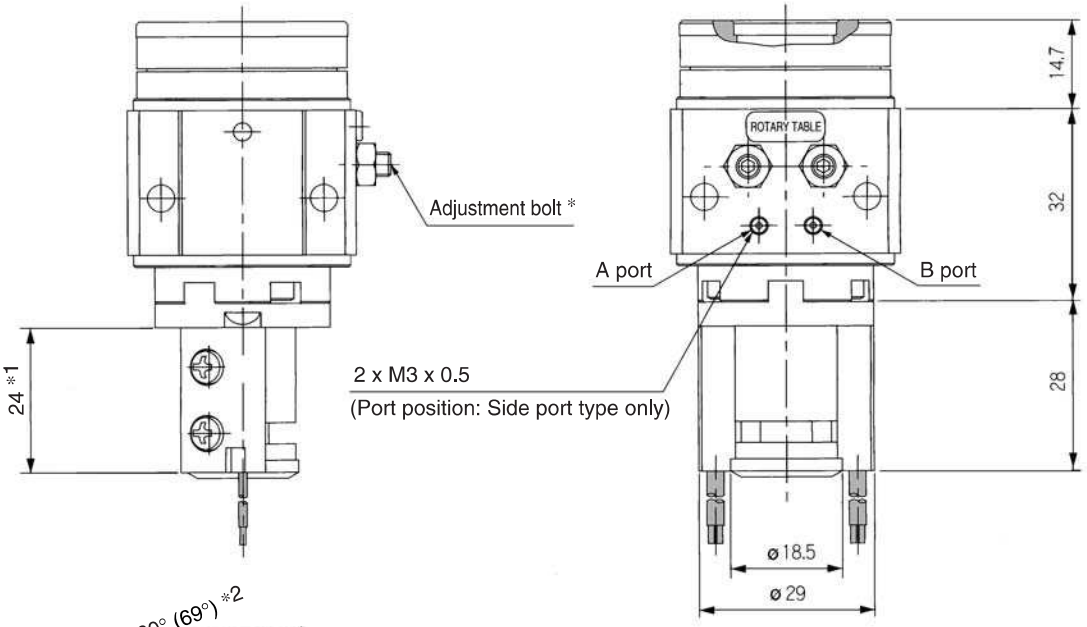
* If the adjustment bolt is removed, rotation will be approximately 270° for the single vane type and 100° for the double vane type. Since this will make it impossible to satisfy the specifications, operate with adjustment within the range of maximum values.

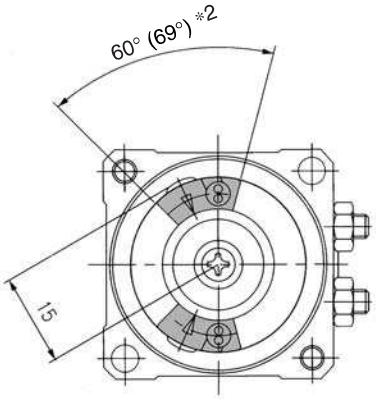
These drawings indicate the condition when the B port is pressurized.

With auto switch: MDSUB1-□S

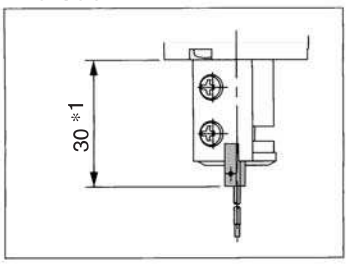
∗1) 24: When using D-90/90A/S99(V)/T99(V)/S9P(V)
30: When using D-97/93A
∗2) 60°: When using D-90/90A/97/93A
69°: When using D-S99(V)/T99(V)/S9P(V)







D-97/93A



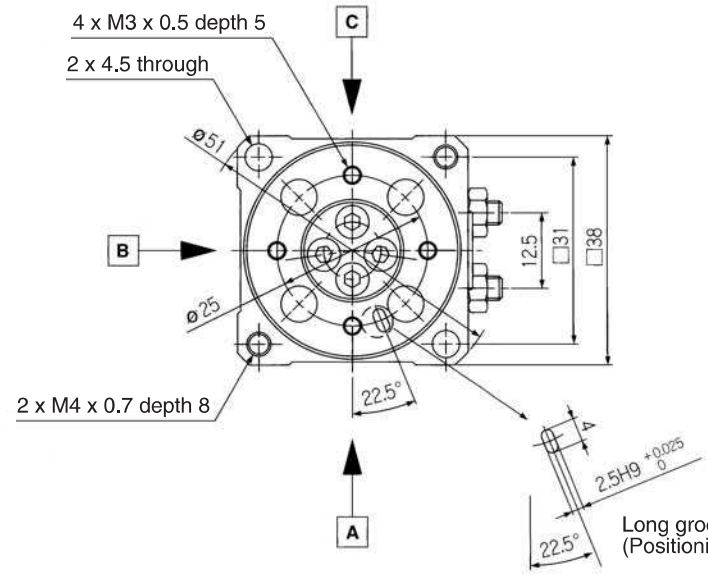
∗ If the adjustment bolt is removed, rotation will be approximately 270° for the single vane type and 100° for the double vane type. Since this will make it impossible to satisfy the specifications, operate with adjustment within the range of maximum values.

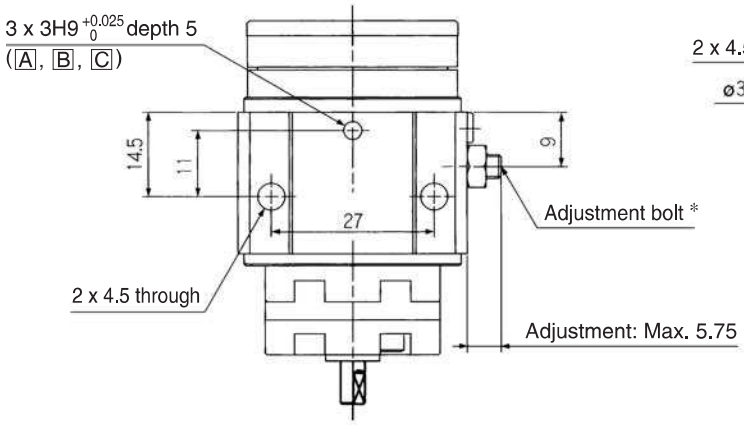
Dimensions

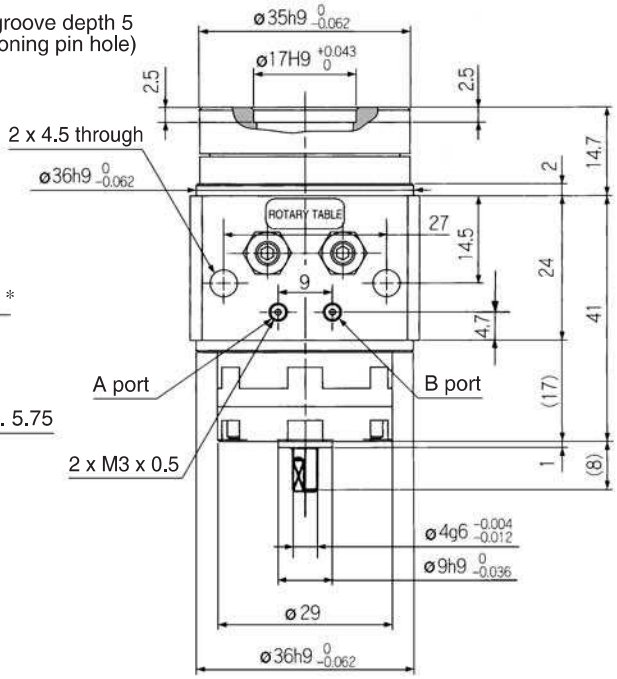
These drawings indicate the condition when the B port is pressurized.

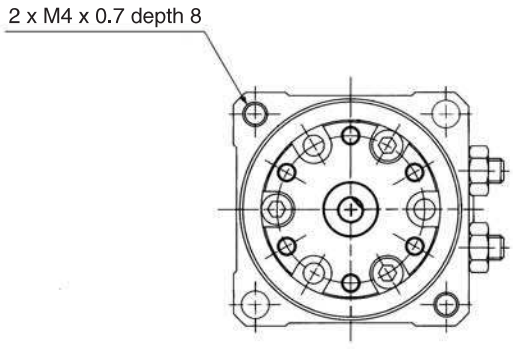
MSUB1 (Double vane)

MSUB1-□D

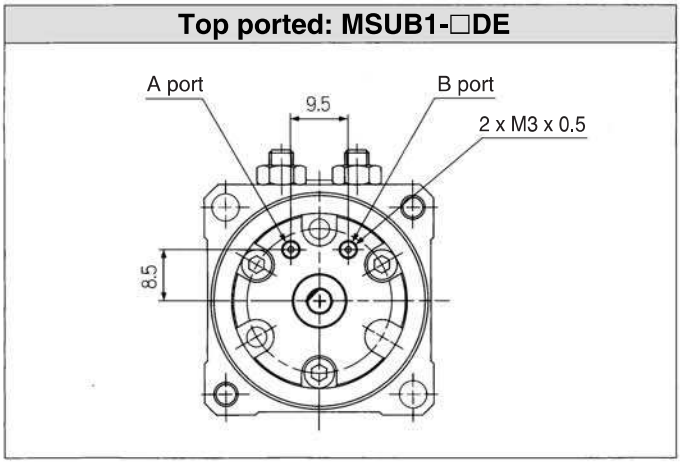








Top ported: MSUB1-□DE

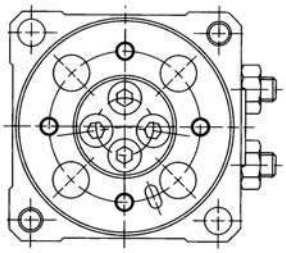


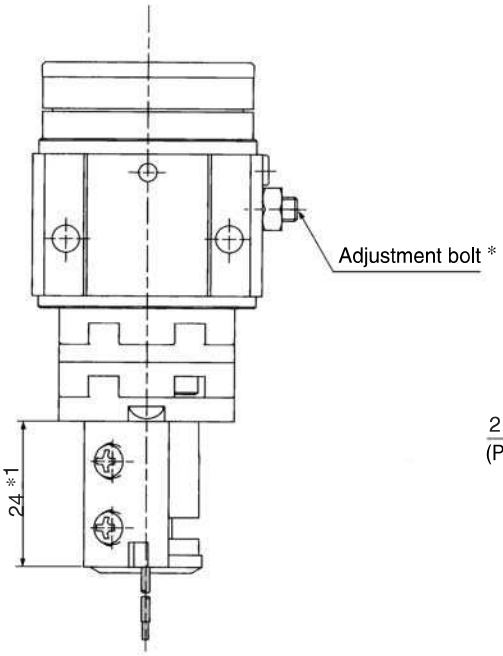
* If the adjustment bolt is removed, rotation will be approximately 270° for the single vane type and 100° for the double vane type. Since this will make it impossible to satisfy the specifications, operate with adjustment within the range of maximum values.

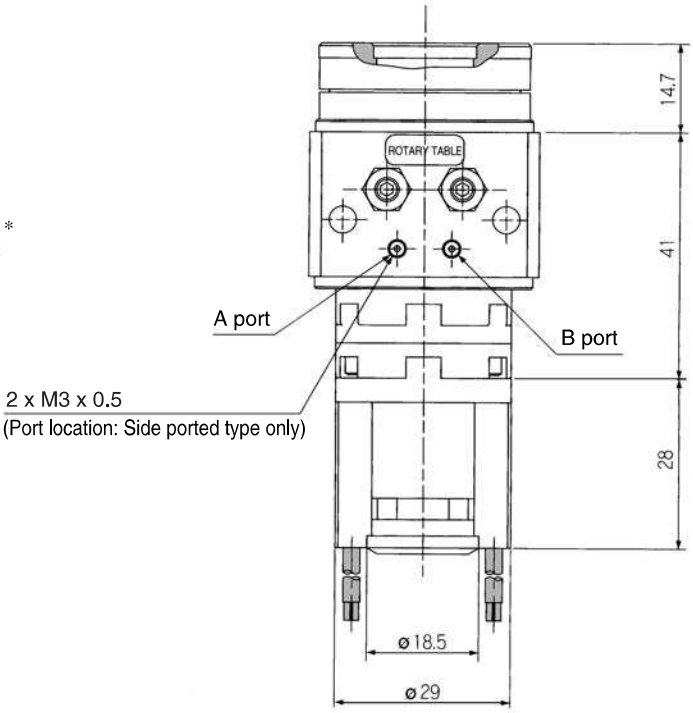
These drawings indicate the condition when the B port is pressurized.

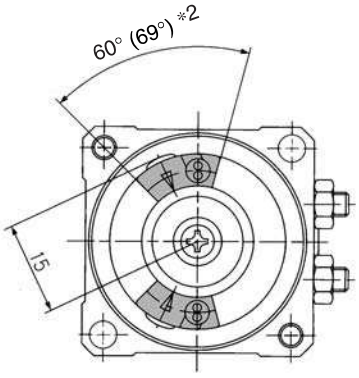
With auto switch: MDSUB1-□D

∗1) 24: When using D-90/90A/S99(V)/T99(V)/S9P(V)
30: When using D-97/93A
∗2) 60°: When using D-90/90A/97/93A
69°: When using D-S99(V)/T99(V)/S9P(V)

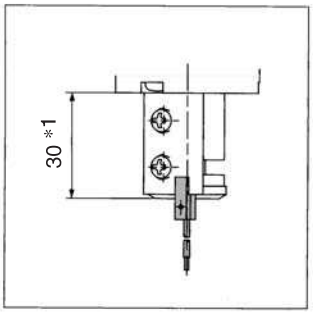








D-97/93A



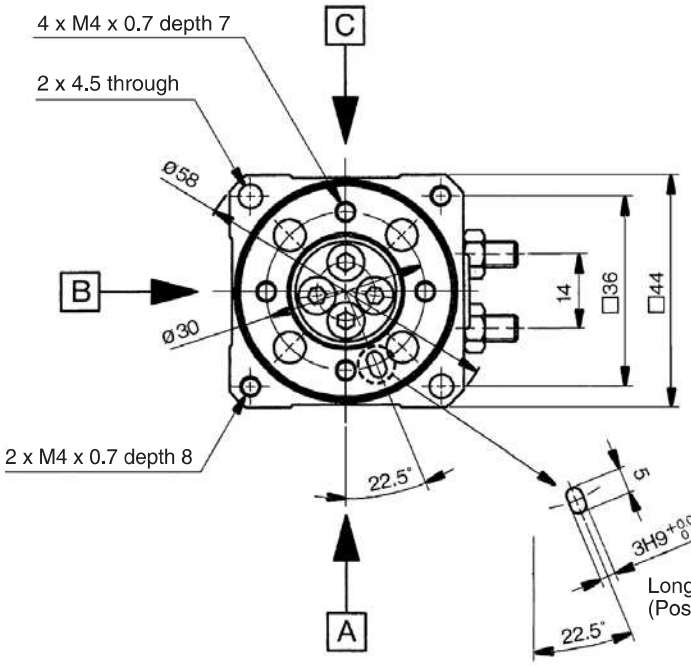
∗ If the adjustment bolt is removed, rotation will be approximately 270° for the single vane type and 100° for the double vane type. Since this will make it impossible to satisfy the specifications, operate with adjustment within the range of maximum values.

Dimensions

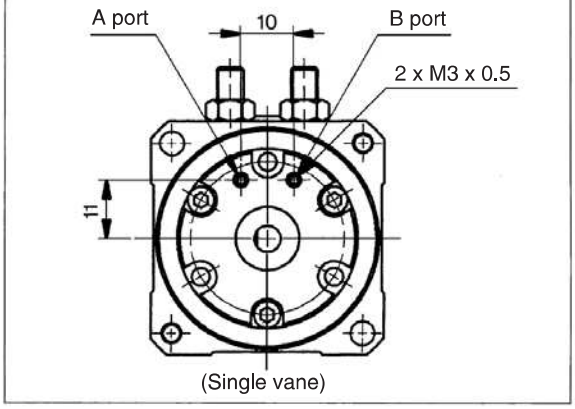
These drawings indicate the condition when the B port is pressurized.

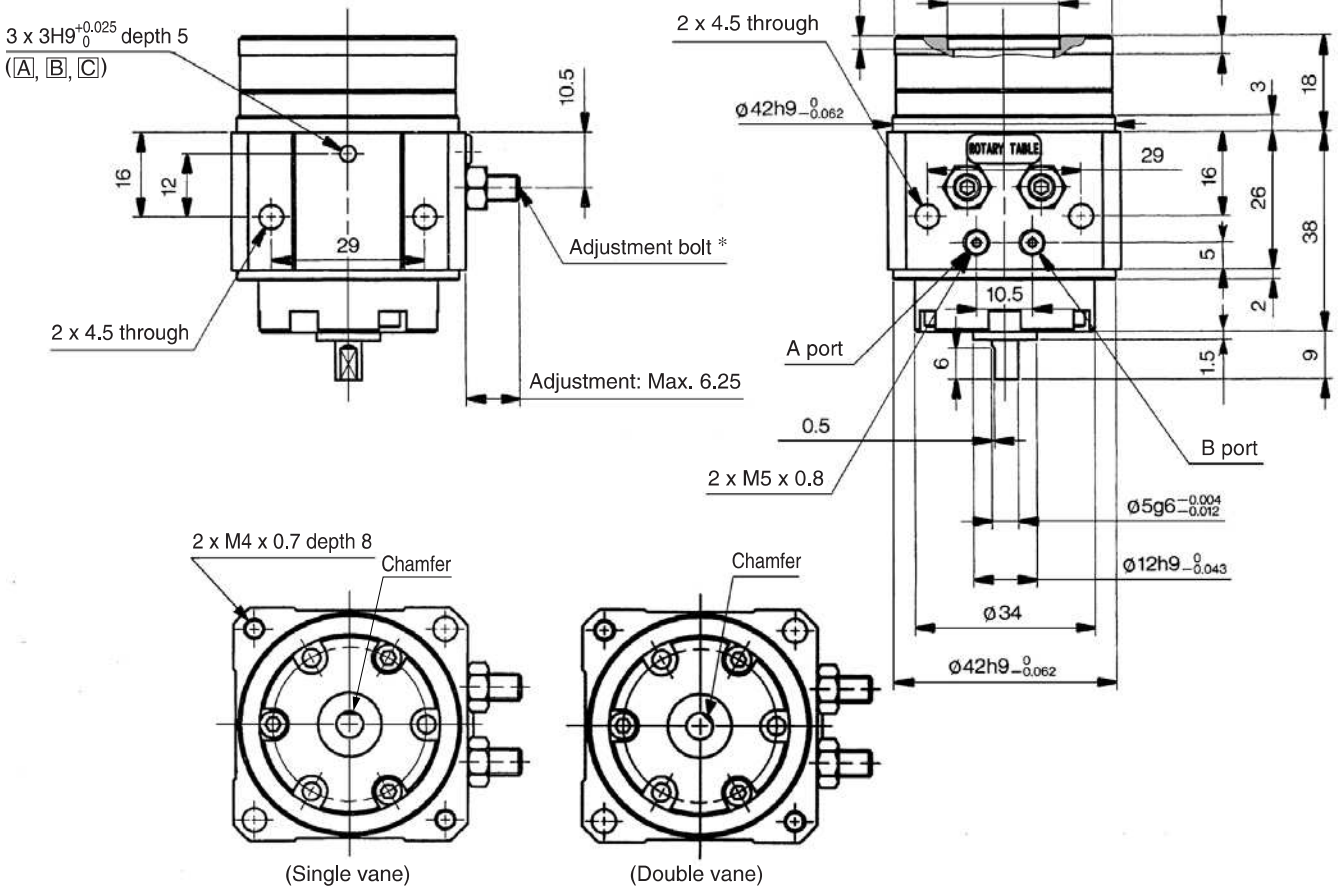
MSUB3 (Single vane/Double vane)

MSUB3-□S/D



Top ported: MSUB3-□SE/DE





The outside drawings show the single vane type, but only the position of the chamfered sections shown in the above drawings differs from single and double vane.

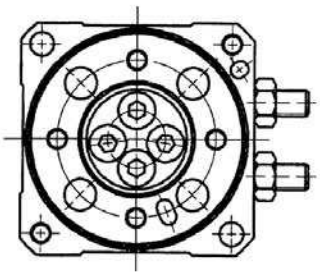
* If the adjustment bolt is removed, rotation will be approximately 270° for the single vane type and 100° for the double vane type. Since this will make it impossible to satisfy the specifications, operate with adjustment within

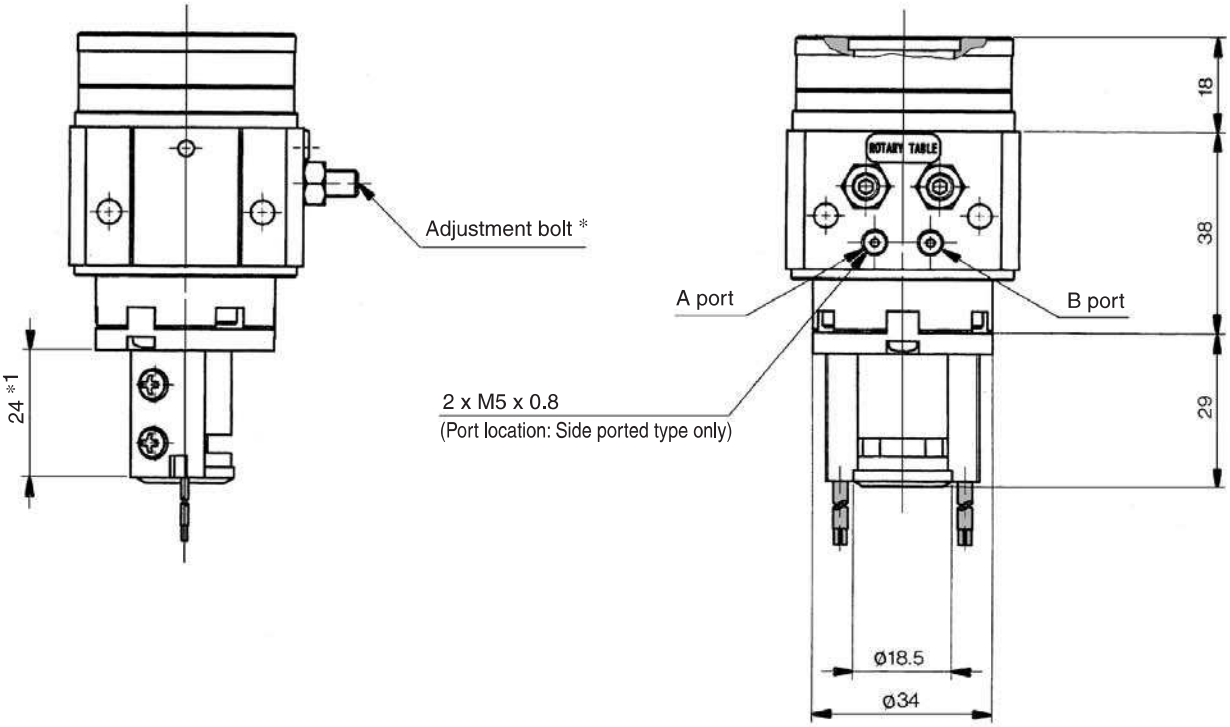
These drawings indicate the condition when the B port is pressurized.

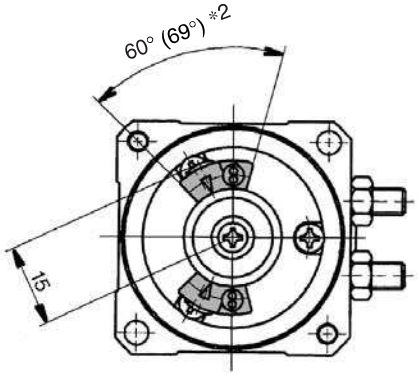
With auto switch: MDSUB3

∗1) 24: When using D-90/90A/S99(V)/T99(V)/S9P(V)
30: When using D-97/93A
∗2) 60°: When using D-90/90A/97/93A
69°: When using D-S99(V)/T99(V)/S9P(V)

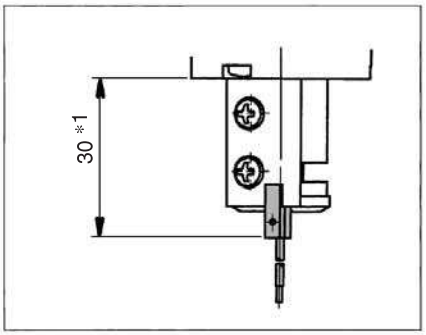
∗ If the adjustment bolt is removed, rotation will be approximately 270° for the single vane type and 100° for the double vane type. Since this will make it impossible to satisfy the specifications, operate with adjustment within the range of maximum values.







D-97/93A

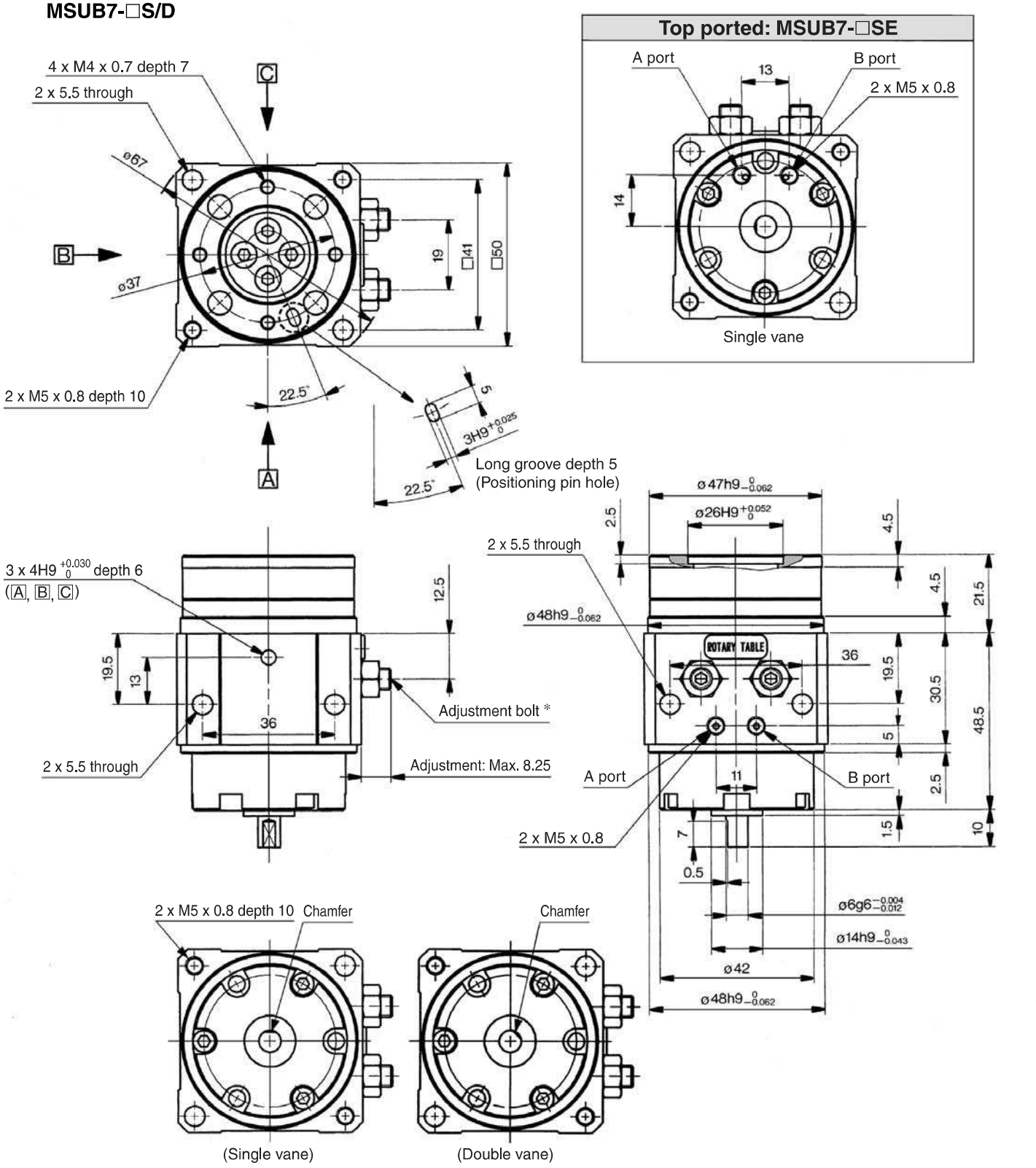


Dimensions

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

MSUB7 (Single vane/Double vane)

MSUB7-□S/D



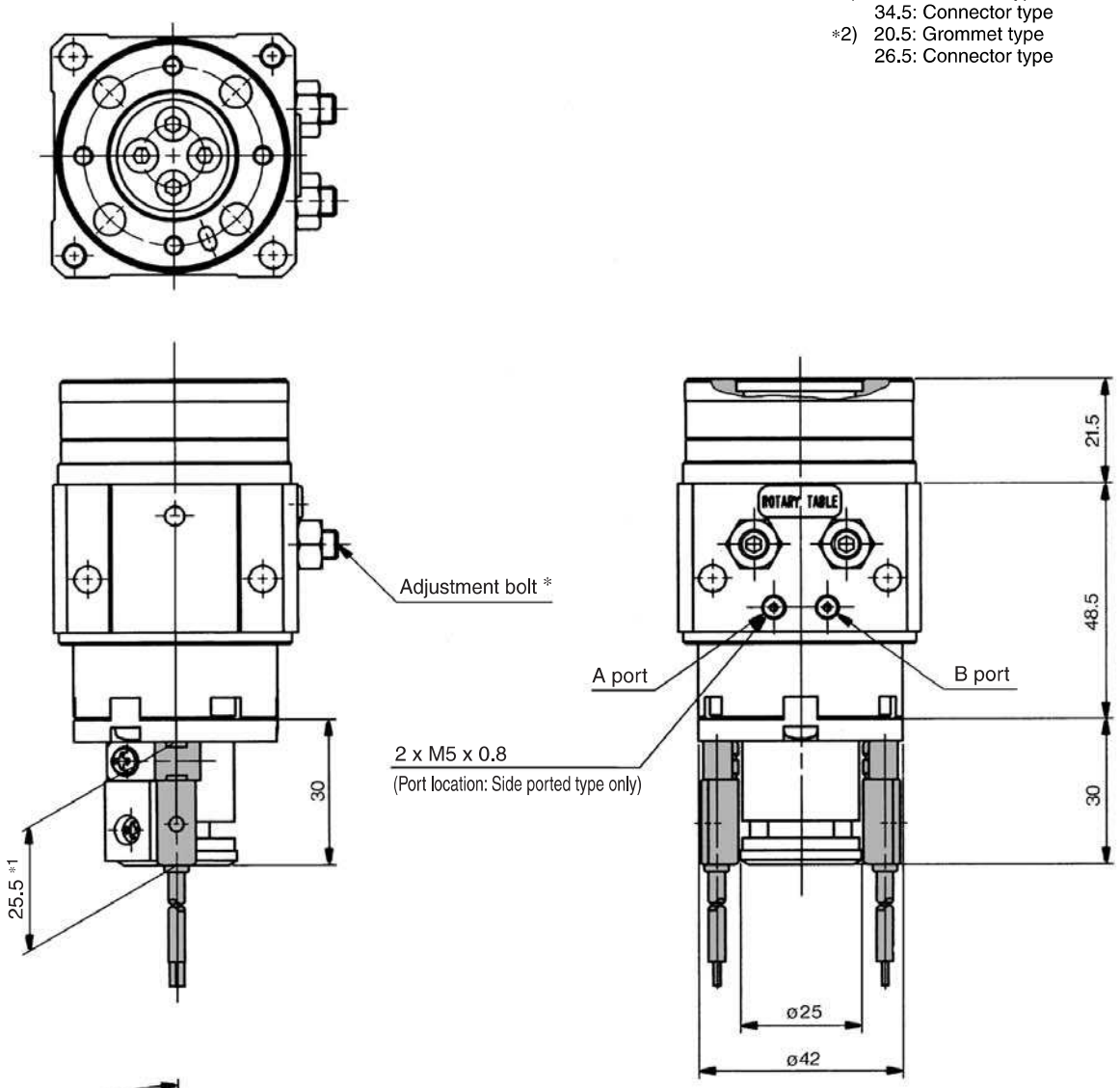
The outside drawings show the single vane type, but only the position of the chamfered sections shown in the above drawings differs from single and double vane.

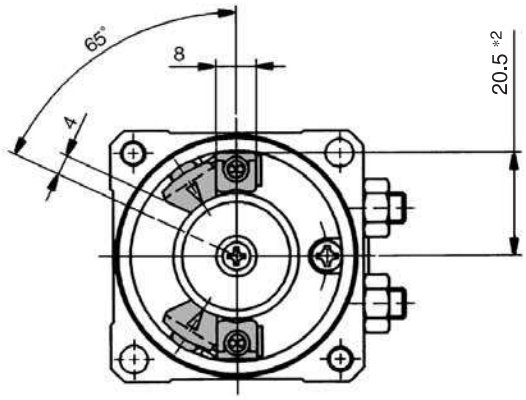
* If the adjustment bolt is removed, rotation will be approximately 270° for the single vane type and 100° for the double vane type. Since this will make it impossible to satisfy the specifications, operate with adjustment within the range of maximum values.

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

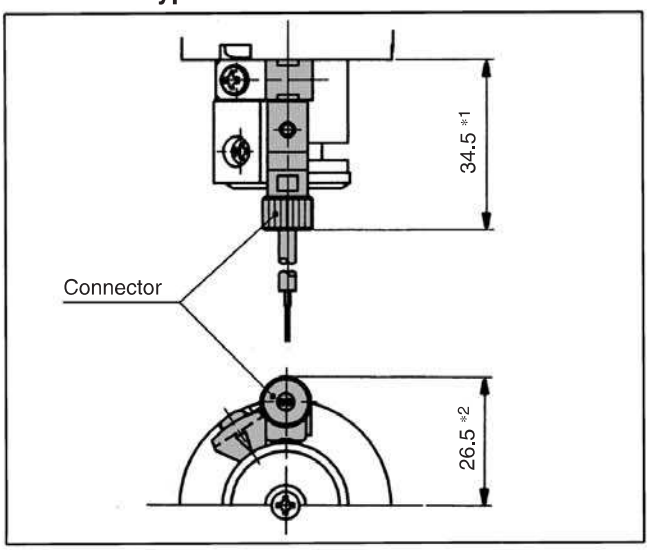
With auto switch: MDSUB7

∗1) 25.5: Grommet type
34.5: Connector type
∗2) 20.5: Grommet type
26.5: Connector type





Connector Type



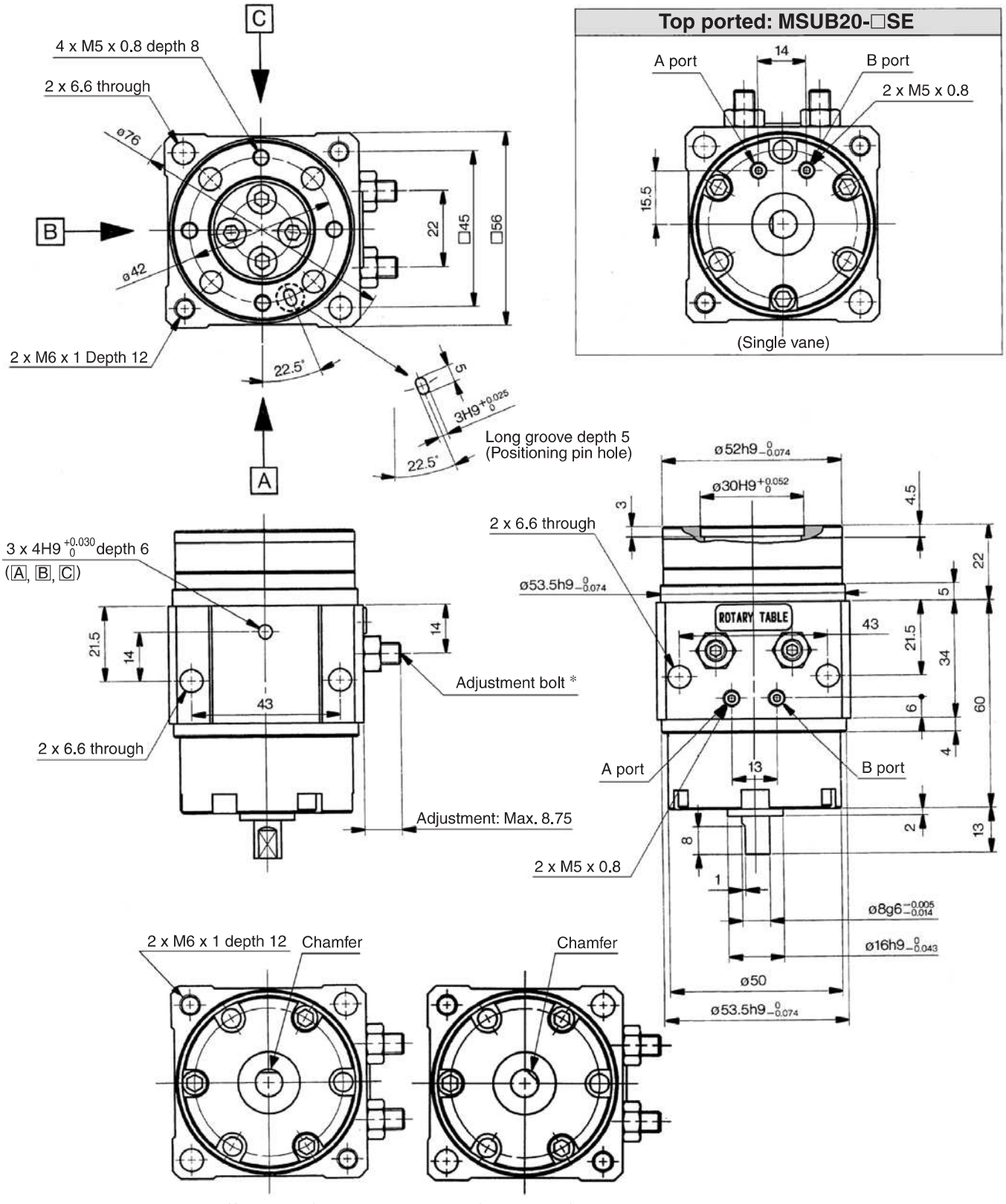
∗ If the adjustment bolt is removed, rotation will be approximately 270° for the single vane type and 100° for the double vane type. Since this will make it impossible to satisfy the specifications, operate with adjustment within the range of maximum values.

Dimensions

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

MSUB20 (Single vane/Double vane)

MSUB20-□S/D



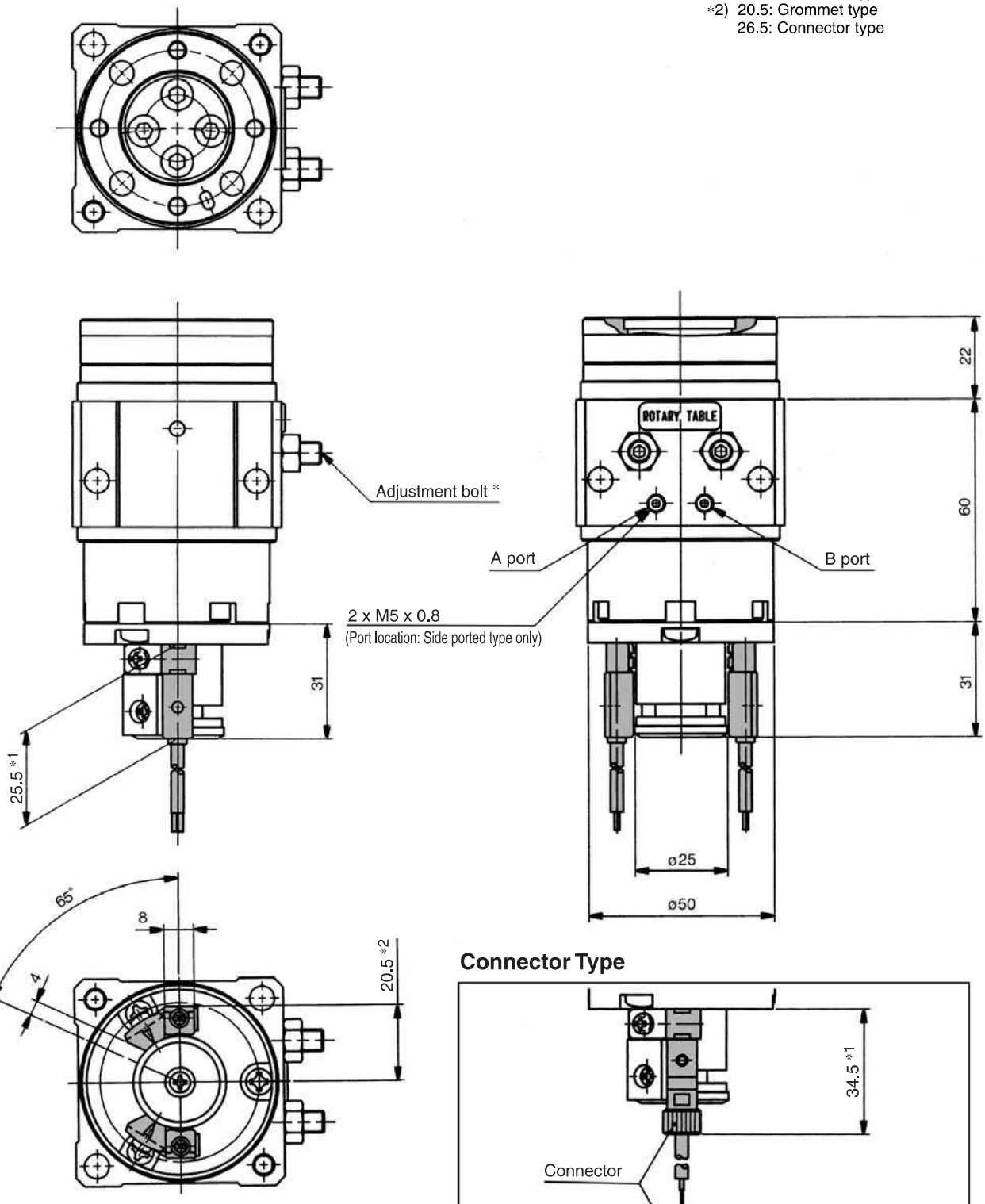
The outside drawings show the single vane type, but only the position of the chamfered sections shown in the above drawings differs from single and double vane.

* If the adjustment bolt is removed, rotation will be approximately 270° for the single vane type and 100° for the double vane type. Since this will make it impossible to satisfy the specifications, operate with adjustment within the range of maximum values.

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

With auto switch: MDSUB20

∗1) 25.5: Grommet type
34.5: Connector type
∗2) 20.5: Grommet type
26.5: Connector type



Connector Type

∗ If the adjustment bolt is removed, rotation will be approximately 270° for the single vane type and 100° for the double vane type. Since this will make it impossible to satisfy the specifications, operate with adjustment within the range of maximum values.

Series MDSU
Adjustment of Auto Switch

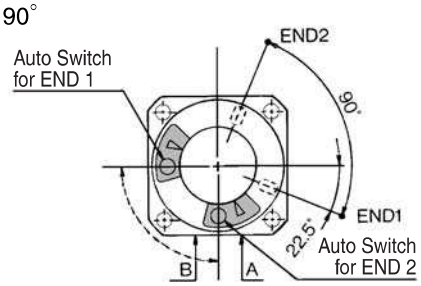


Table Positioning Pin Hole Rotation Range and Auto Switch Mounting Position

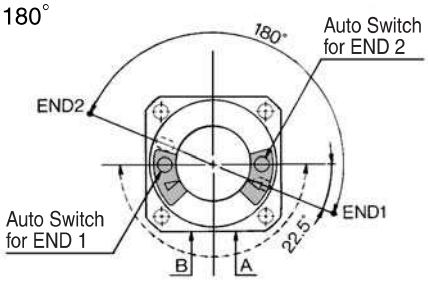
MSU□1/3

Single vane type

90°

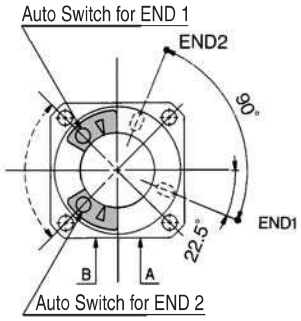


180°



Double vane type (MSUB only)

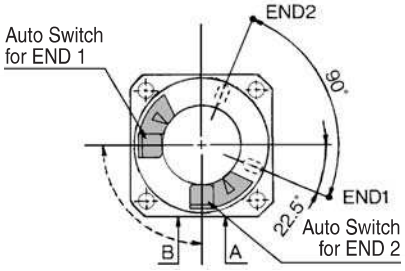
90°



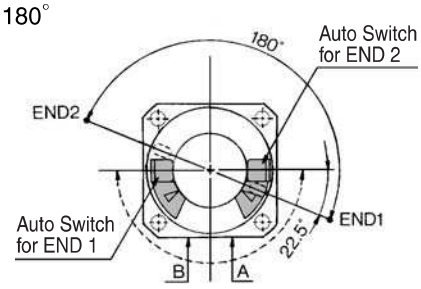
MSU□7/20

Single vane type

90°

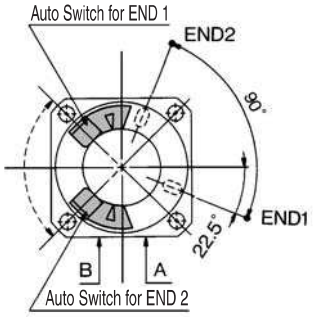


180°

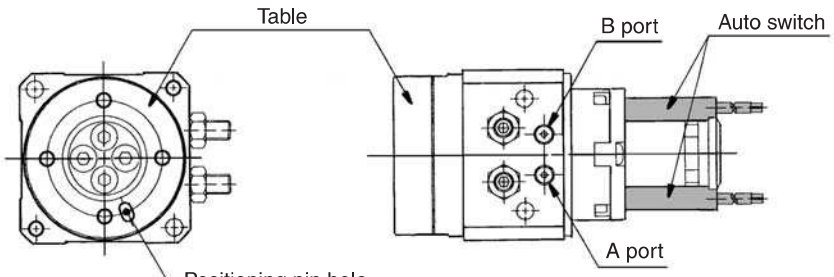


Double vane type (MSUB only)

90°



- In drawings that show the rotation range, the arrows on the solid line 90° (180°) indicate the rotation range of the positioning pin holes on the table surface. When the pin hole is at END1, the END1 auto switch operates, and when the pin hole is at END2, the END2 auto switch operates.
- The arrows on the broken line indicate the rotation range of the internal magnet. The rotation range of each auto switch can be reduced by moving the END1 auto switch clockwise and the END2 auto switch counterclockwise.



Auto Switch Operating Angle and Hysteresis Angle

Model	Operating angle	Hysteresis angle
MDSU□1, 3	110°	10°
MDSU□7, 20	90°	

Note) Since the above values are only provided as a guideline, they are not guaranteed. In the actual setting, adjust them after confirming the auto switch performance.

Refer to page 144 for operating angle of auto switch and angle of hysteresis and the procedure for moving the auto switch detection position.

Series MSU
Specific Product Precautions

Be sure to read before handling. Refer to front matters 38 and 39 for Safety Instructions and pages 4 to 13 for Rotary Actuator and Auto Switch Precautions.

Selection

⚠Warning

1. Ensure the load energy within the product's allowable energy value.

Operation with a load kinetic energy exceeding the allowable value can cause human injury and/or damage to equipment or machinery. (Refer to model section procedures in this catalog.)

⚠Caution

1. When there are load fluctuations, allow a sufficient margin in the actuator torque.

In case of horizontal mounting (operation with product facing sideways), malfunction may occur due to load fluctuations.

Mounting

⚠Caution

1. Adjust the rotation angle within the prescribed ranges.

Single vane type: (90°±10°, 180°±10°) (±5° at end of rotation)
Double vane type: (90°±10°) (±2.5° at end of rotation)

∗ Series MSUB only.

Adjustment outside the prescribed ranges may cause malfunction of the product or failure of switches to operate.

2. Adjust the rotation time within the prescribed values using a speed controller, etc. (0.07 to 0.3 s/90°)

Adjustment to a speed slower than 0.3 s/90° can cause sticking and slipping or stopping of operation.

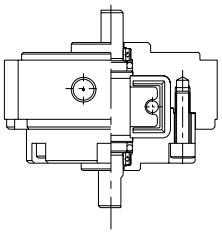
Maintenance

⚠Caution

<High precision type/MSUA>

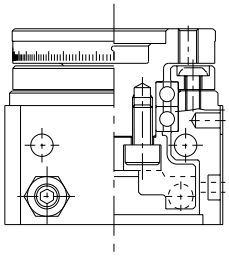
In case a rotary unit and table unit are required for maintenance, order with the unit part numbers shown below.

Rotary unit



Model	Unit part no.
MSUA 1-□S	P402070-2A
MSUA 1-□SE	P402070-2B
MSUA 3-□S	P402090-2A
MSUA 3-□SE	P402090-2B
MSUA 7-□S	P402060-2A
MSUA 7-□SE	P402060-2B
MSUA20-□S	P402080-2A
MSUA20-□SE	P402080-2B

Table unit



Model	Unit part no.
MSUA 1- 90□	P402070-3A
MSUA 1-180□	P402070-3B
MSUA 3- 90□	P402090-3A
MSUA 3-180□	P402090-3B
MSUA 7- 90□	P402060-3A
MSUA 7-180□	P402060-3B
MSUA20- 90□	P402080-3A
MSUA20-180□	P402080-3B

Note 1) Note that the rotation angle should not be changed even though the rotary unit has been changed. For maintenance, order units with a part number suitable for the model being used.

Note 2) Due to the integral construction of the MSUB series, the rotary and table units cannot be ordered separately.

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP