

STS-L Series

Features



- Miniature guide cylinder in slide table feeding method with integrated with Air Cylinder at guide block.
- Cross Roller Guide is applied
- Demonstrate big tolerable moment in small-size
- Auto Switch for the detection of position can be attached (except ST06S)
- Adjustable Stroke → Stopper mount (Option)
- Used for Feeding, positioning, and Up Down in electric and semiconductor industry

Order form

STS 10L - 15 - W - A2 S

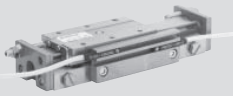

① ② ③ ④ ⑤ ⑥

① Series

②, ③ Bore size & Stroke(mm)

②Name	Bore size(mm)	③Stroke(mm)
06L	6	5, 10
10L	10	10, 15, 20
12L	12	15, 20, 25
16L	16	20, 25, 30, 35

■ Product specification reference table (●mark means possible to mount)

Specification	Auto Switch mounting	Stopper mounting
Model		
STS06L	● (Possible to mount only one on lateral side)	●
STS10L	●	●
STS12L	●	●
STS16L	●	●

• For Shock Absorber and Metal Stopper specification, please inquire separately

④ Sensor bracket quantity

Blank	None
W	mounting

⑤ Auto Switch type

Symbol	Type	Length
A2	DSC PRO-A2 (2-wire)	1m
A2L		3m
B2	PLC PRO-B2 (3-wire)	1m
B2L		3m

⑥ Auto Switch quantity

Blank	2ea
S	1ea

Specification

Model	STS06L	STS10L	STS12L	STS16L
Bore size(mm)	6	10	12	16
Stroke(mm)	5 10	10 15 20	15 20 25	20 25 30 35
Theoretical thrust(kgf)	0.28 × P	0.78 × P	1.13 × P	2.01 × P
P : Air pressure(kgf/cm ²)				
Air port size	M3	M5	M5	M5
Max. load(kgf)	0.4	1.1	1.6	2.8
Main body weight(kgf)	0.1 0.14	0.18 0.23 0.27	0.28 0.33 0.38	0.73 0.85 0.93 1.13
Fluid	Clean air Note 1)			
Air pressure(kgf/cm ²)	1.5 ~ 7 (General resistance pressure: 10.5) Note 2)			
Lubrication	No need (if need, use one sort of turbine oil: SPEC ISOVG 32)			
Temperature(°C)	5 ~ 60			
Motion type	Double-acting type			
Accuracy(mm)	± 0.01			

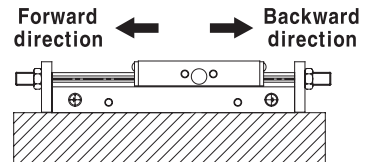
Note 1) Clean air: Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3~10 μ m degree of filtering
 Note 2) Guaranteed capacity of resist pressure: A pressure that does not cause an abnormality in parts when it is applied for 1 minute without any weight loaded.



Unit: kgf

Theoretical thrust

Model	Operation direction	Air pressure(kgf/cm ²)					
		2	3	4	5	6	7
STS06L	Forward/Backward	0.56	0.84	1.12	1.4	1.68	1.96
STS10L	Forward/Backward	1.56	2.34	3.12	3.9	4.68	5.46
STS12L	Forward/Backward	2.26	3.39	4.52	5.65	6.78	7.91
STS16L	Forward/Backward	4.02	6.03	8.04	10.05	12.06	14.07



Technical data by model

■ Mp, My, Mr 3 directions moment calculation formula

Fig1

Pitch Moment(Mp)	Yawing Moment(My)	Rolling Moment(Mr)
$M_p = W \times (A + L_p)$ $M_p = W \times (B + L_p)$	$M_y = W \times (A + L_y)$ $M_y = W \times (C + L_y)$	$M_r = W \times (C + L_r)$ $M_r = W \times (B + L_r)$

* W : Work weight(kgf)

■ Corrections from the central distance of moments

Table1
Unit: mm

Corrections Model	A	B	C
STS06L-05	12.7	6	12
STS06L-10	12.7	6	12
STS10L-10	16.5	7	13.5
STS10L-15	16.5	7	13.5
STS10L-20	23.5	7	13.5
STS12L-15	21.5	7.3	16.3
STS12L-20	21.5	7.3	16.3
STS12L-25	30	7.3	16.3
STS16L-20	25	12.5	23
STS16L-25	25	12.5	23
STS16L-30	35	12.5	23
STS16L-35	35	12.5	23

■ Maximum allowable kinetic energy (Ea)

Table2
Unit: kgf · cm

Model	Maximum allowable kinetic energy
STS06L-05	0.08
STS06L-10	0.08
STS10L-10	0.26
STS10L-15	0.26
STS10L-20	0.26
STS12L-15	0.51
STS12L-20	0.51
STS12L-25	0.51
STS16L-20	0.9
STS16L-25	0.9
STS16L-30	0.9
STS16L-35	0.9

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Maximum allowable moment Table3

Unit: kgf · cm

Model	Allowable moment Pitching moment Mp	Yawing moment My	Rolling moment Mr
STS06L-05	1.79	1.79	3.45
STS06L-10	1.79	1.79	3.45
STS10L-10	2.39	2.39	5.06
STS10L-15	2.39	2.39	5.06
STS10L-20	3.58	3.58	7.08
STS12L-15	10	10	38
STS12L-20	10	10	38
STS12L-25	15	15	55
STS16L-20	17.2	17.2	58
STS16L-25	17.2	17.2	58
STS16L-30	23.8	23.8	62
STS16L-35	23.8	23.8	62

Maximum allowable load (Wa) Table4

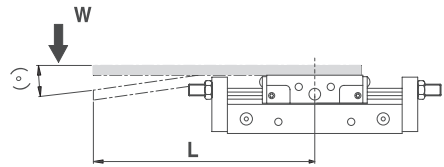
Unit: kgf

Model	Maximum allowable load
STS06L-05	0.4
STS06L-10	0.4
STS10L-10	1.1
STS10L-15	1.1
STS10L-20	1.1
STS12L-15	1.6
STS12L-20	1.6
STS12L-25	1.6
STS16L-20	2.8
STS16L-25	2.8
STS16L-30	2.8
STS16L-35	2.8

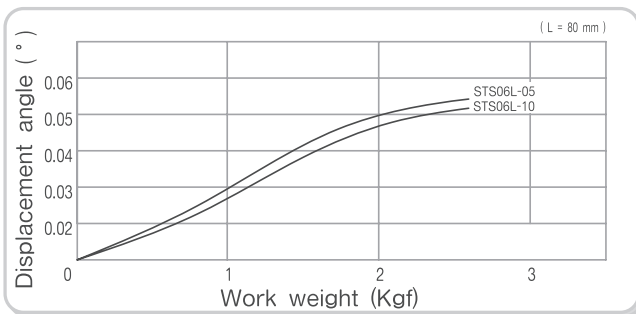
* For vertical installation, loading factor review is not required.

Table deflection

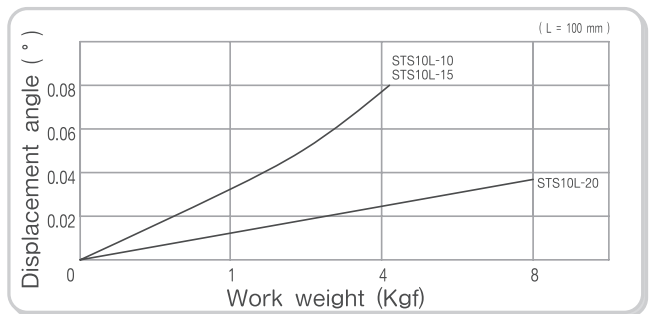
- The graph shows the deflection angle when cylinder moves to forward with certain weight loaded at the end of table end, like right graphic.
- The deflection angle values below graphs show only reference value when any weight loaded. (Please note that those are not maximum value)



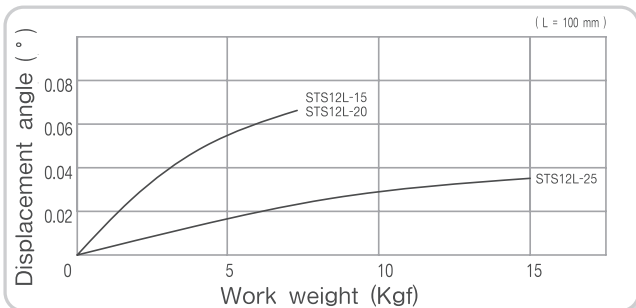
◆ STS06L table displacement



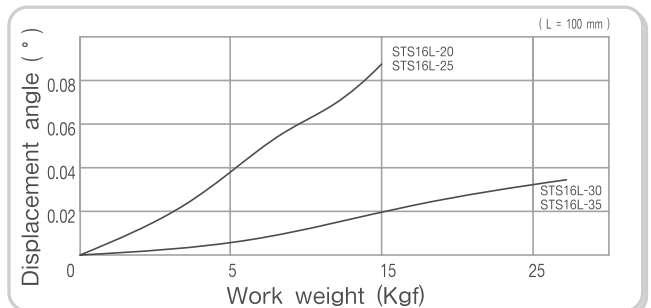
◆ STS10L table displacement



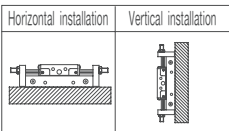
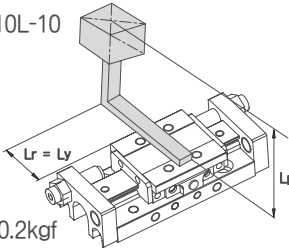
◆ STS12L table displacement



◆ STS16L table displacement



Model selection method

		Applied formula	Selection example
Condition check		<ul style="list-style-type: none"> ■ Cylinder model selection ■ Loaded weight ■ Average speed ■ Distance to the center of gravity of load 	Review target : STS10L-10 Horizontal use, table installation Average speed: $V=300\text{mm/sec}$ $L_p = 30\text{mm}$ $L_y, L_r = 20\text{mm}$ Loading factor $W = 0.2\text{kgf}$
			
Kinetic energy check	<ul style="list-style-type: none"> - The kinetic energy of load should be within the allowable kinetic energy range of cylinder. 	Work kinetic energy(kgf · cm) : $E = \frac{1}{2} \times \frac{W}{980} \times (\frac{1.4V}{10})^2$ W : work weight(kgf) V : average speed(mm/sec) E_a : cylinder allowable kinetic energy (kgf · cm) Applicable only if $E < E_a$	$E = \frac{1}{2} \times \frac{0.2}{980} \times (\frac{1.4 \cdot 300}{10})^2 = 0.18 \text{ kgf} \cdot \text{cm}$ $E_a : 0.26 \text{ kgf} \cdot \text{cm}$ Available as $E(0.18) < E_a(0.26)$
Load factor check	Loading factor	Suitable loading factor(kgf) : $Wt = K \times W$ θ_1 : Loading factor = $\frac{Wt}{W_a}$ W : work weight(kgf) K : speed factor(300mm/sec or less: over 1, 300mm/sec: 1.6) W_a : cylinder Max. load(kgf)	$Wt = 1 \times 0.2 = 0.2 \text{ kgf}$ $W_a = 1.1 \text{ kgf}$ $\theta_1 = \frac{0.2}{1.1} = 0.18$
	Static moment	Rolling moment(kgf · cm) : $M_r = W \times (C + L_r) / 10$ θ_2 : rolling static moment load factor = $\frac{M_r}{M_{ra}}$ C : corrections from the center distance of moments(mm) L_r : distance from the end of table to the center of load(mm) M_{ra} : cylinder allowable moment(kgf · cm)	$M_r = 0.2 \times \frac{(13.5+20)}{10} = 0.67 \text{ kgf} \cdot \text{cm}$ $M_{ra} = 5.06 \text{ kgf} \cdot \text{cm}$ $\theta_2 = \frac{0.67}{5.06} = 0.13$
	Dynamic moment	Pitching moment(kgf · cm) : $M_p = K \times W \times (B+L_p) / 10$ Yawing moment(kgf · cm) : $M_y = K \times W \times (C+L_y) / 10$ θ_3 : pitching dynamic moment load factor = $\frac{M_p}{M_{pa}}$ θ_4 : yawing dynamic moment load factor = $\frac{M_y}{M_{ya}}$ K : speed factor(300mm/sec or less: over 1, 300mm/sec: 1.6) B, C : corrections from the center distance of moments(mm) L_p, L_y : distance from the end of table to the center of load(mm) M_{pa}, M_{ya} : cylinder allowable moment(kgf · cm)	$M_p = 1 \times 0.2 \times \frac{(7+30)}{10} = 0.74 \text{ kgf} \cdot \text{cm}$ $M_{pa} = 2.39 \text{ kgf} \cdot \text{cm}$ $\theta_3 = \frac{0.74}{2.39} = 0.31$ $M_y = 1 \times 0.2 \times \frac{(13.5+20)}{10} = 0.67 \text{ kgf} \cdot \text{cm}$ $M_{ya} = 2.39 \text{ kgf} \cdot \text{cm}$ $\theta_4 = \frac{0.67}{2.39} = 0.28$
Total load factor	$\theta_t = \theta_1 + \theta_2 + \theta_3 + \theta_4 \leq 1$	$\theta_t = 0.18 + 0.13 + 0.31 + 0.28 = 0.9 \leq 1$ STS10L-10 is applicable	

Note 1) Static moment load factor: moment created by the gravity of work
 Dynamic moment load factor: moment created when the work is stopped by stopper

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06L

10L

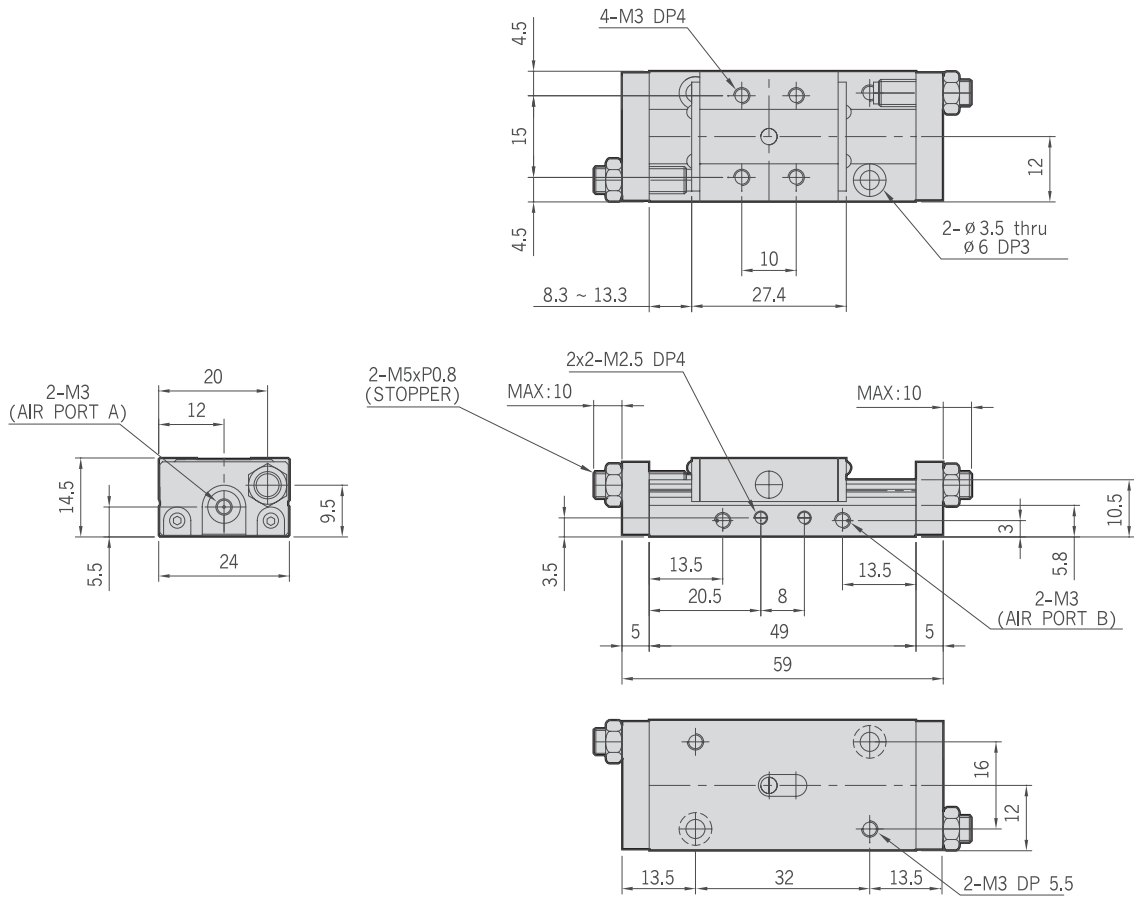
12L

16L

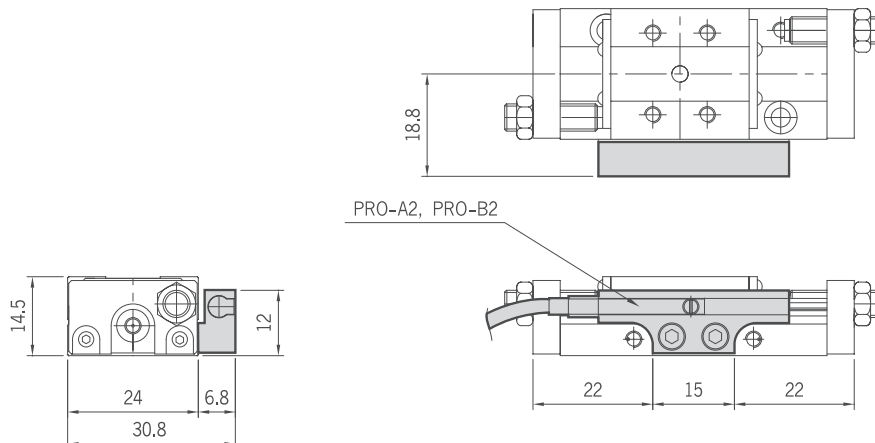
05

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STS06L-05



STS06L-05-Auto Switch



06L

10L

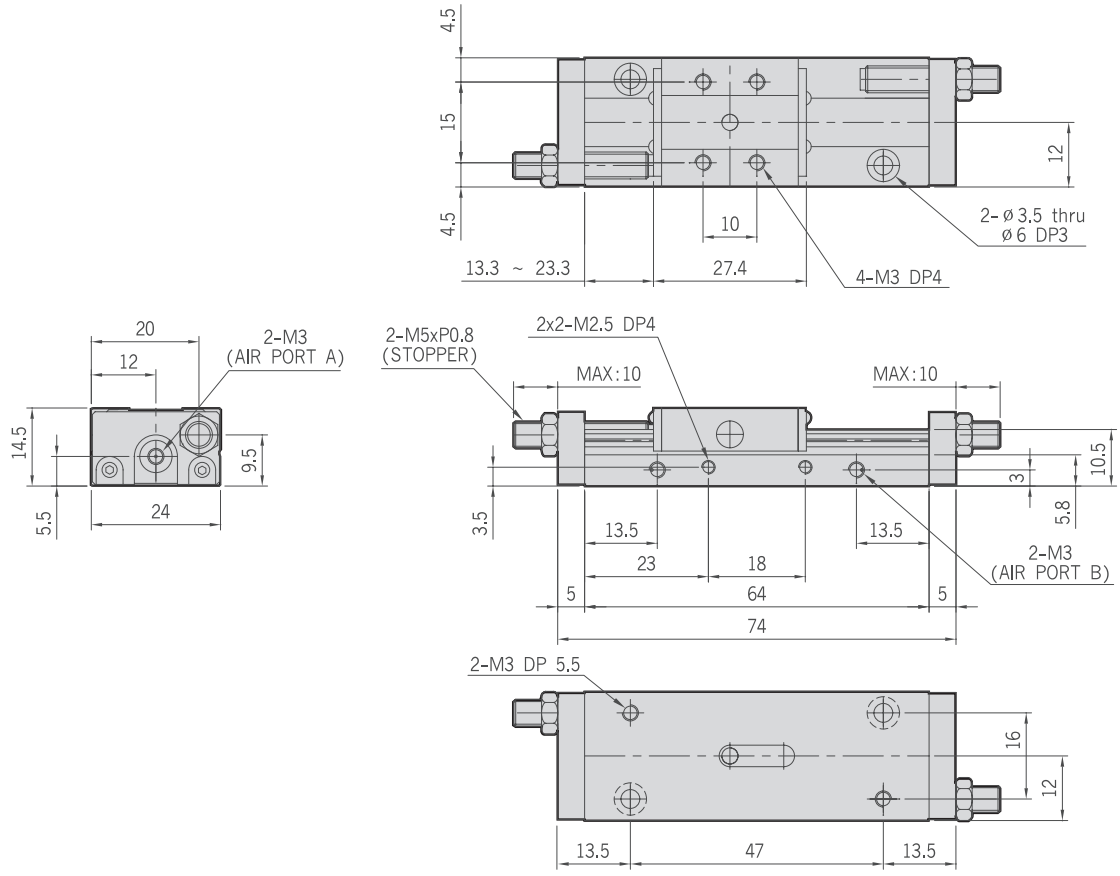
12L

16L

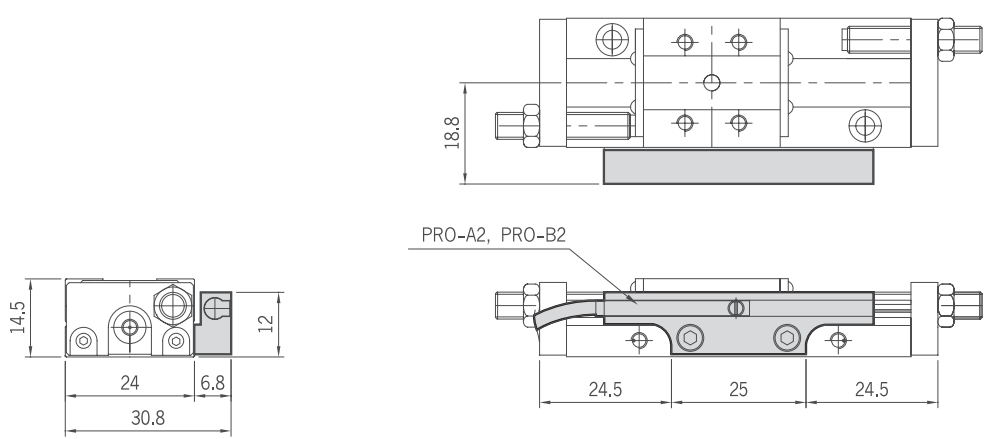
05

10

STS06L-10



STS06L-10-Auto Switch



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12L

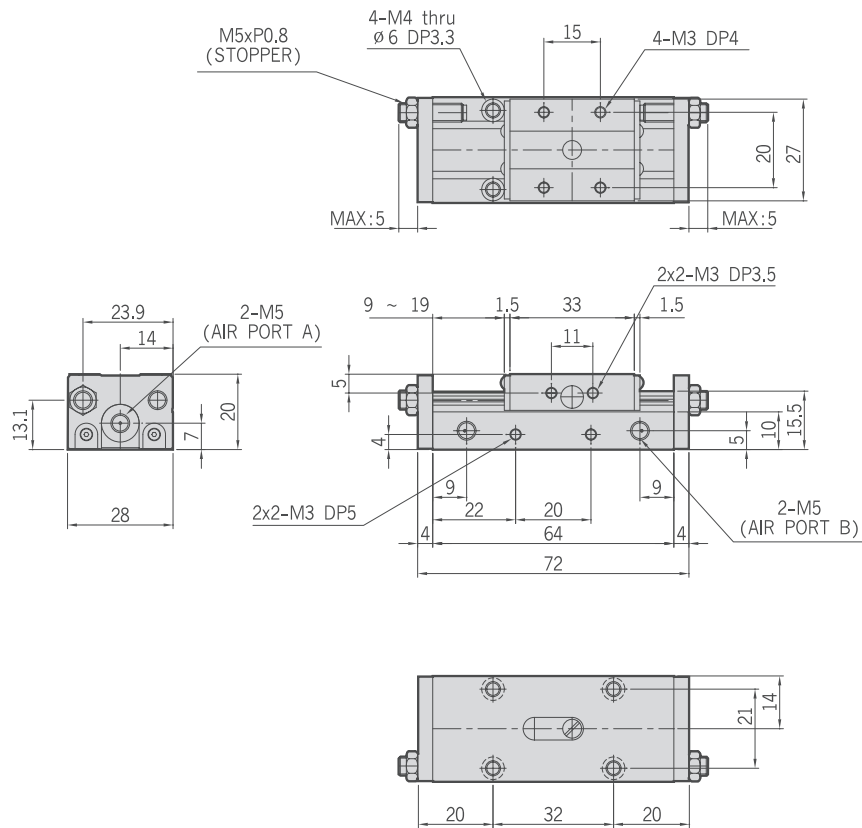
16L

10

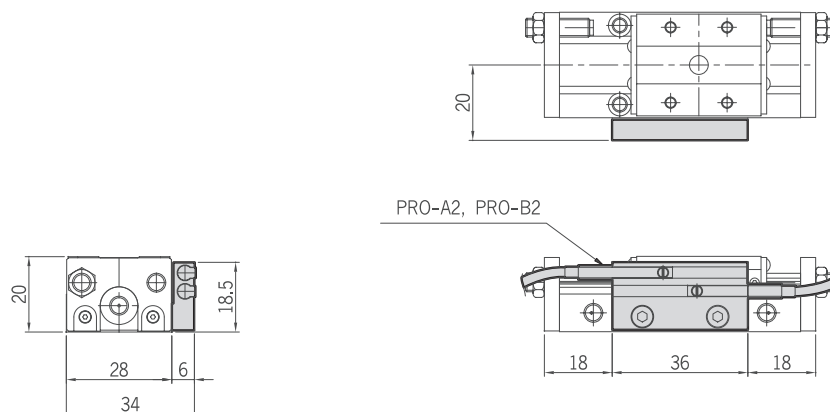
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STS10L-10



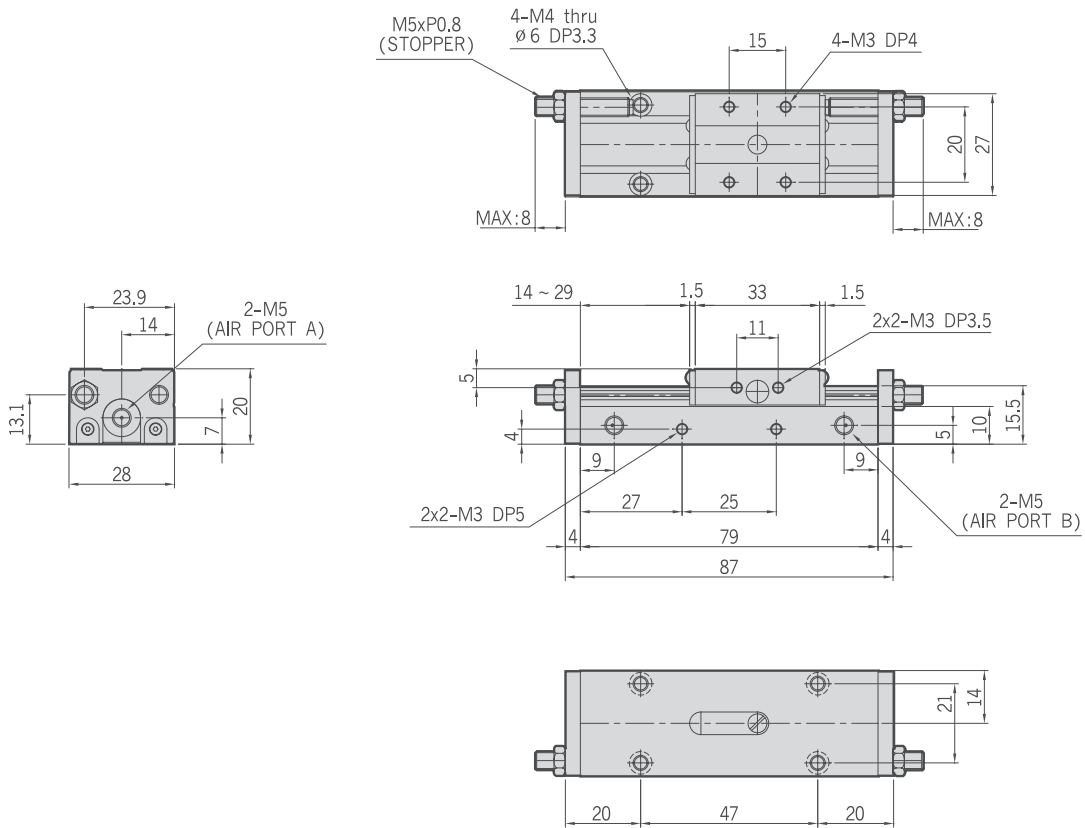
STS10L-10-Auto Switch



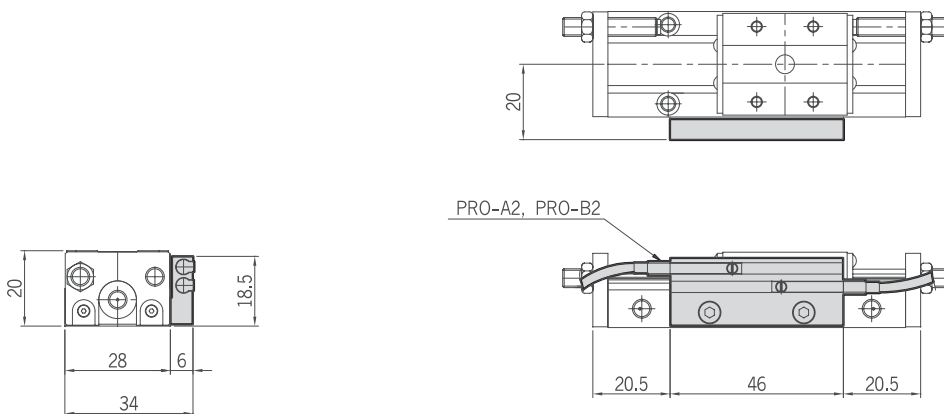
06L 10L 12L 16L

10 15 20

STS10L-15



STS10L-15-Auto Switch



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PSW

➔ STS-L Series

06L

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12L

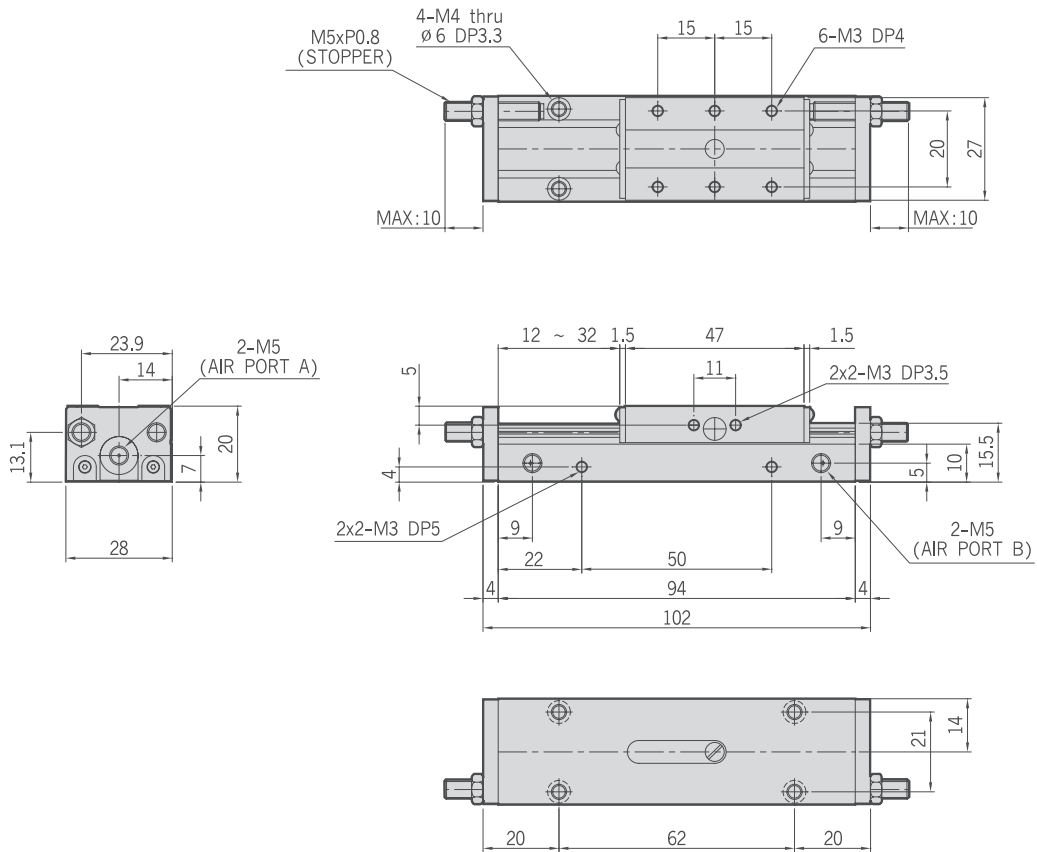
16L

10

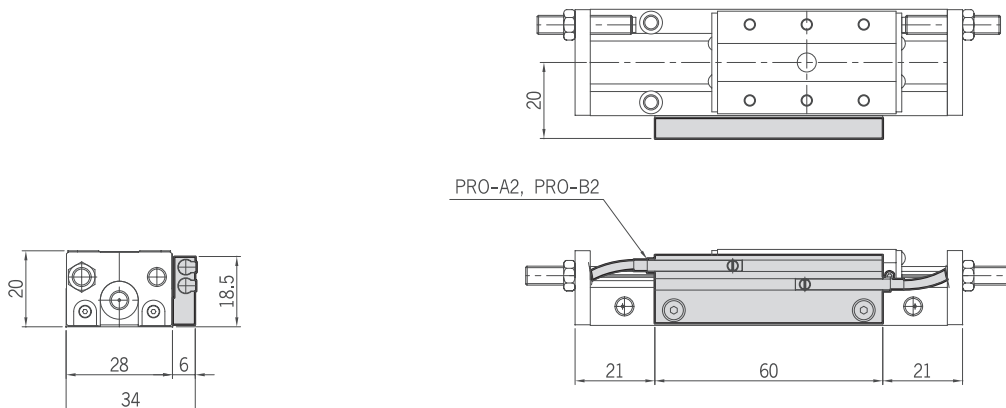
15

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STS10L-20



STS10L-20-Auto Switch



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06L

10L

12L

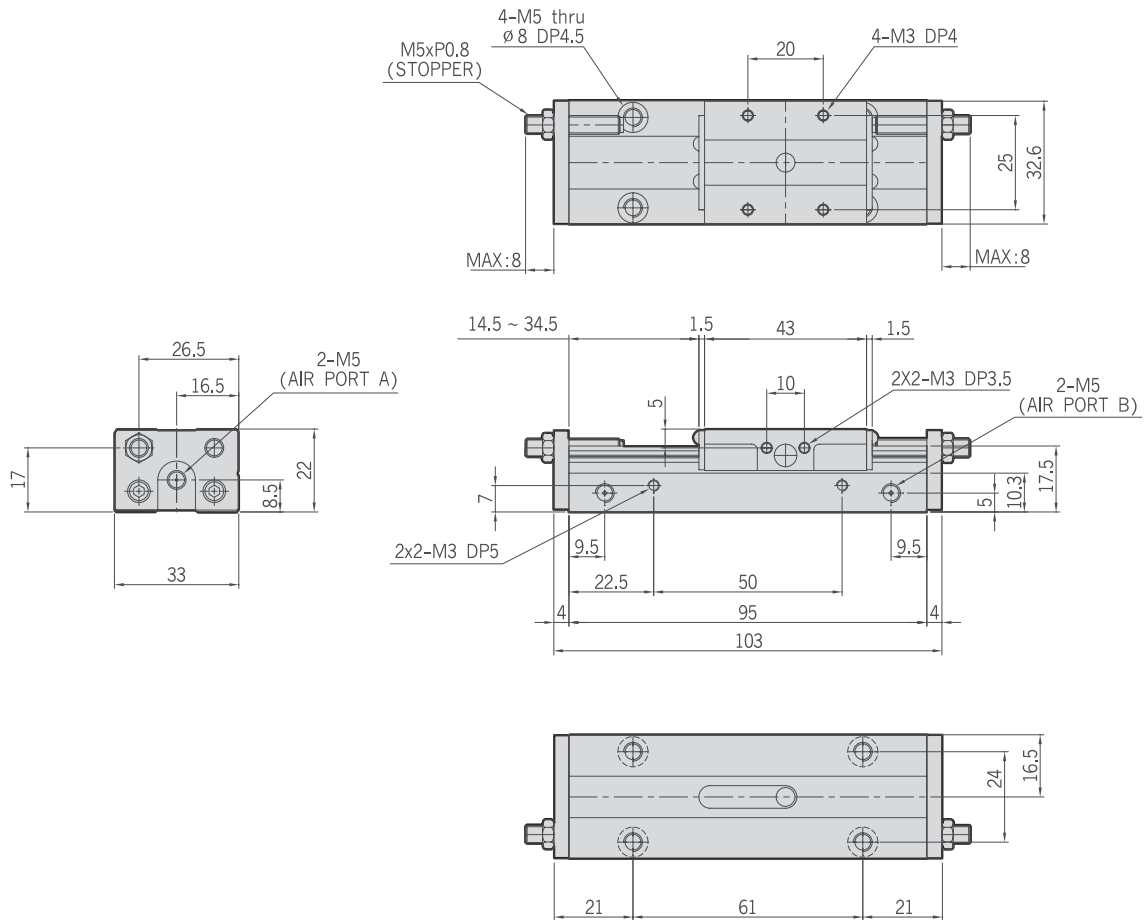
16L

15

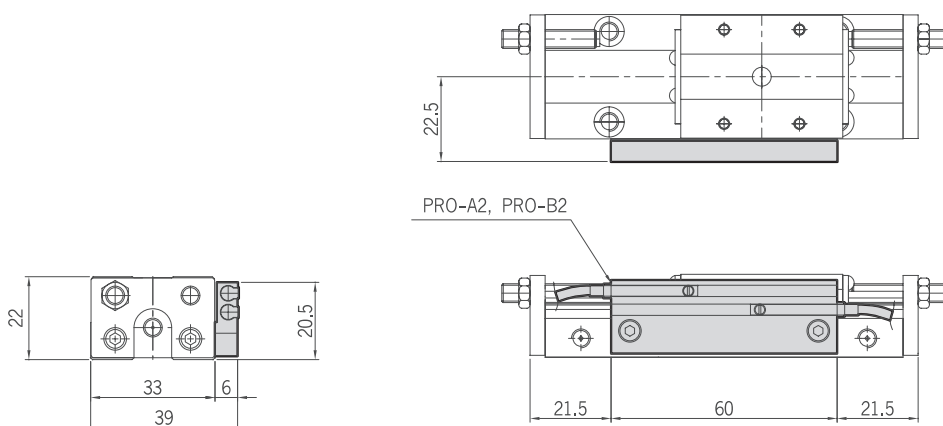
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STS12L-20



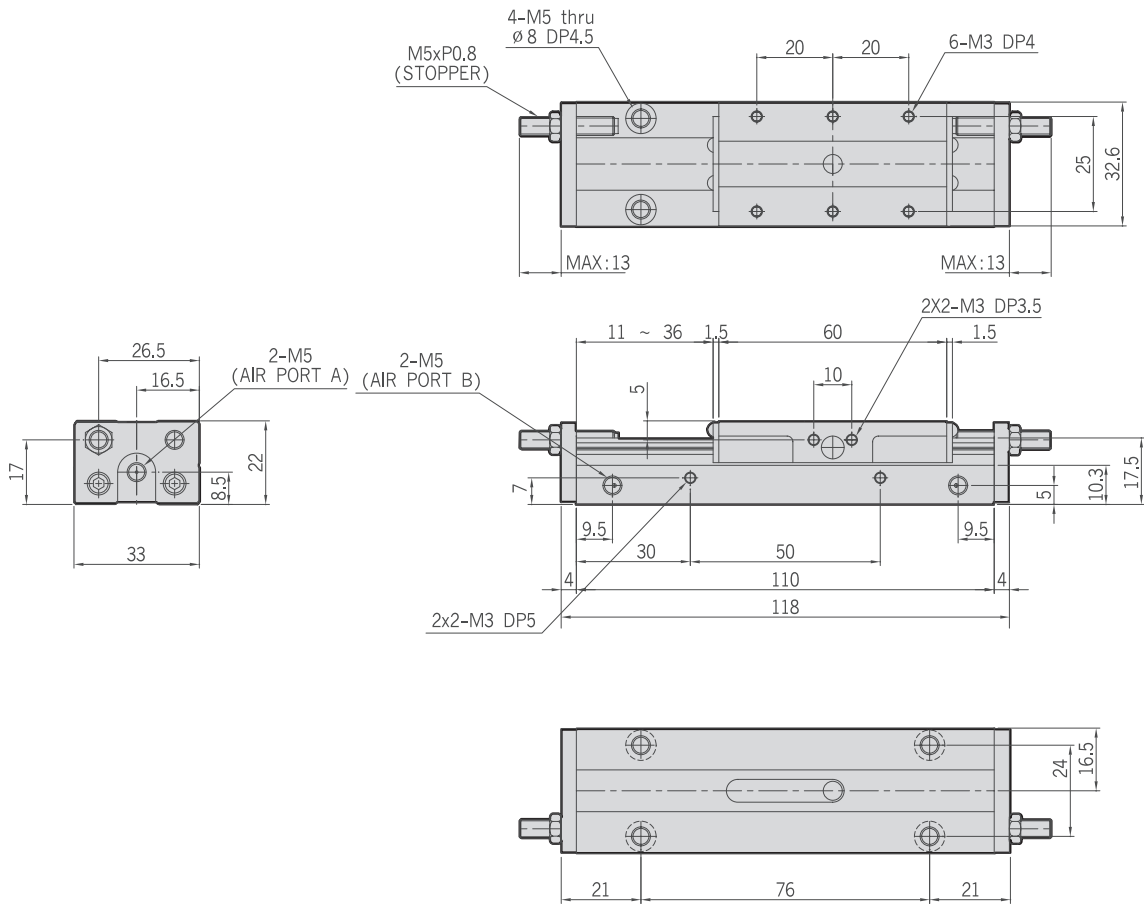
STS12L-20-Auto Switch



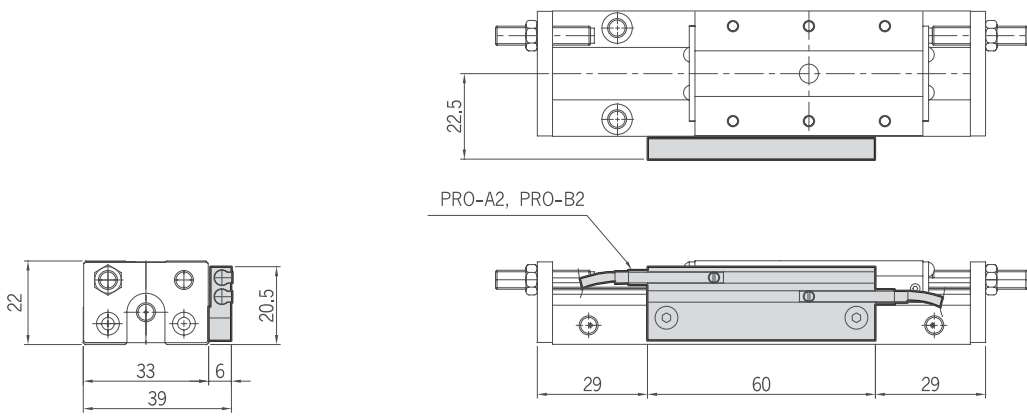
06L 10L **12L** 16L

15 20 **25**

STS12L-25



STS12L-25-Auto Switch



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➔ STS-L Series

06L

10L

12L

16L

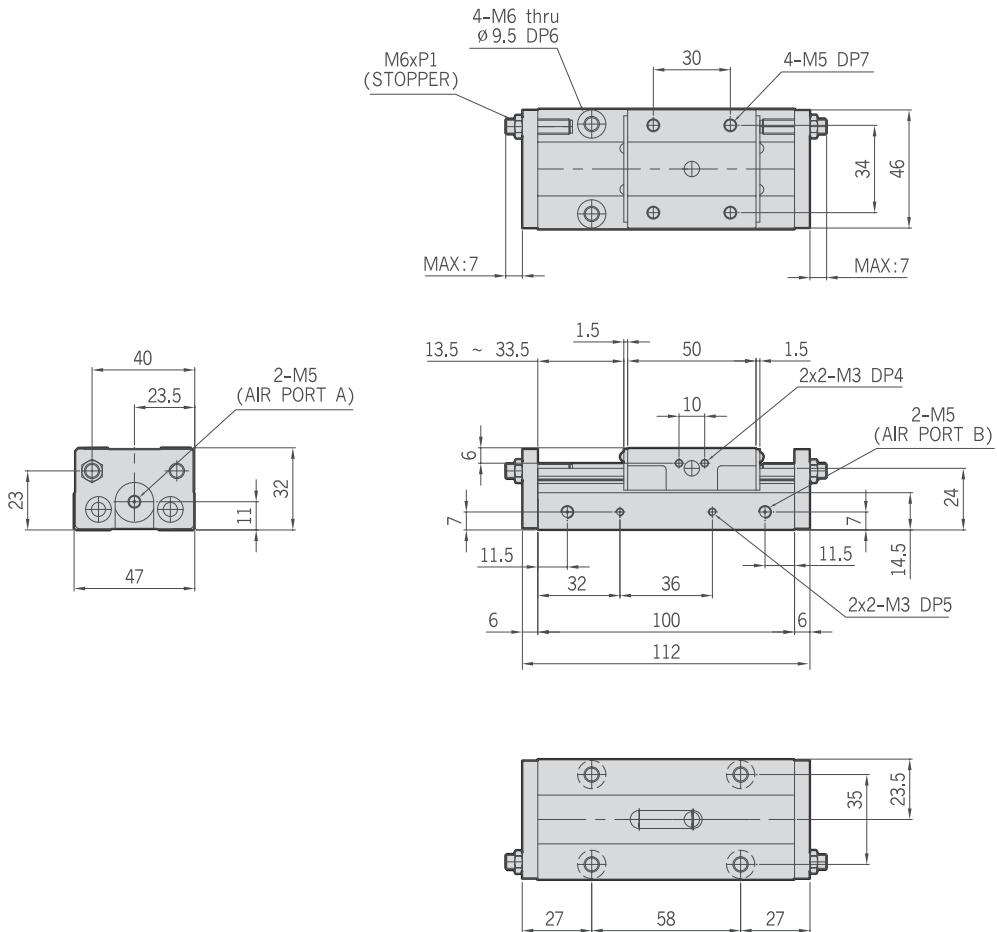
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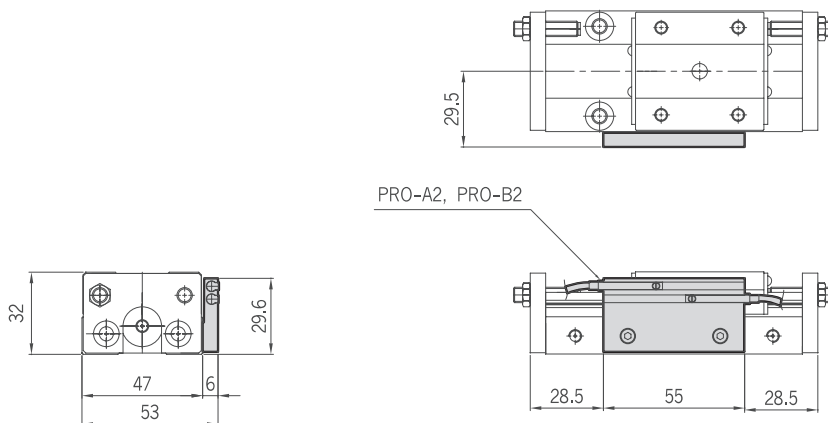
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STS16L-20

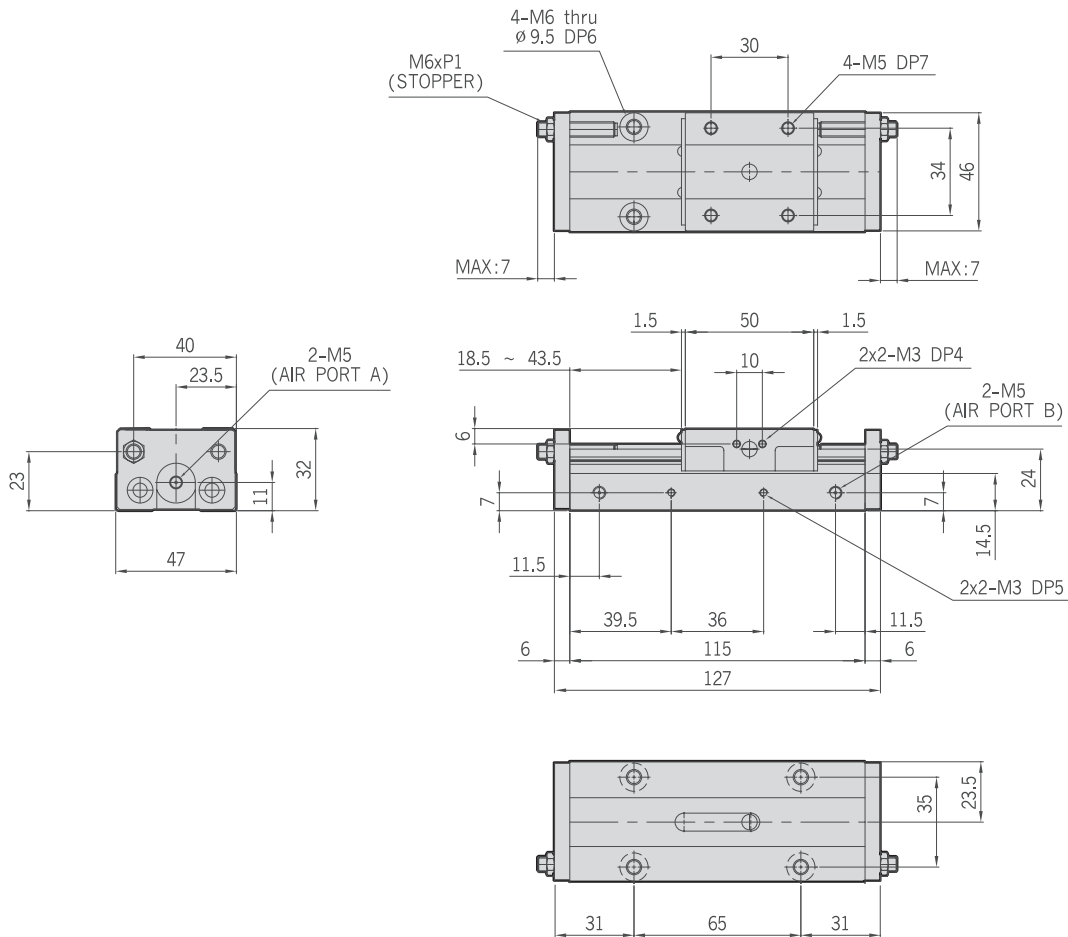


STS16L-20-Auto Switch

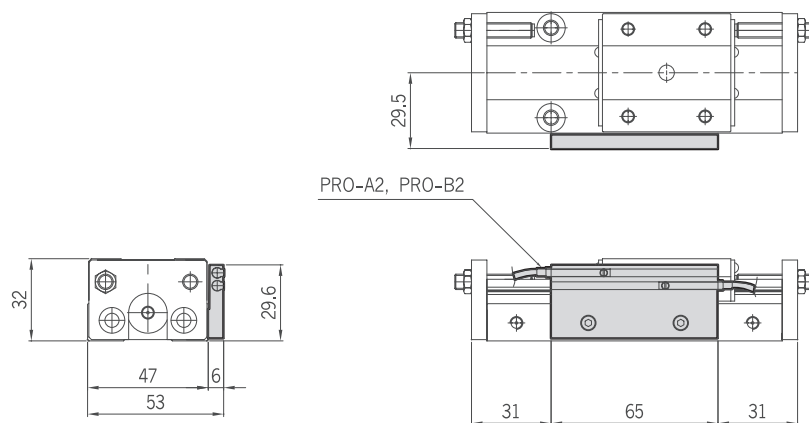


- 06L
 - 10L
 - 12L
 - 16L
- 20
 - 25
 - 30
 - 35

STS16L-25



STS16L-25-Auto Switch



- PRECISION**
- PST-NS
 - PST
 - SC
 - ST
 - STS-L
 - SD
 - PSW

➔ STS-L Series

06L

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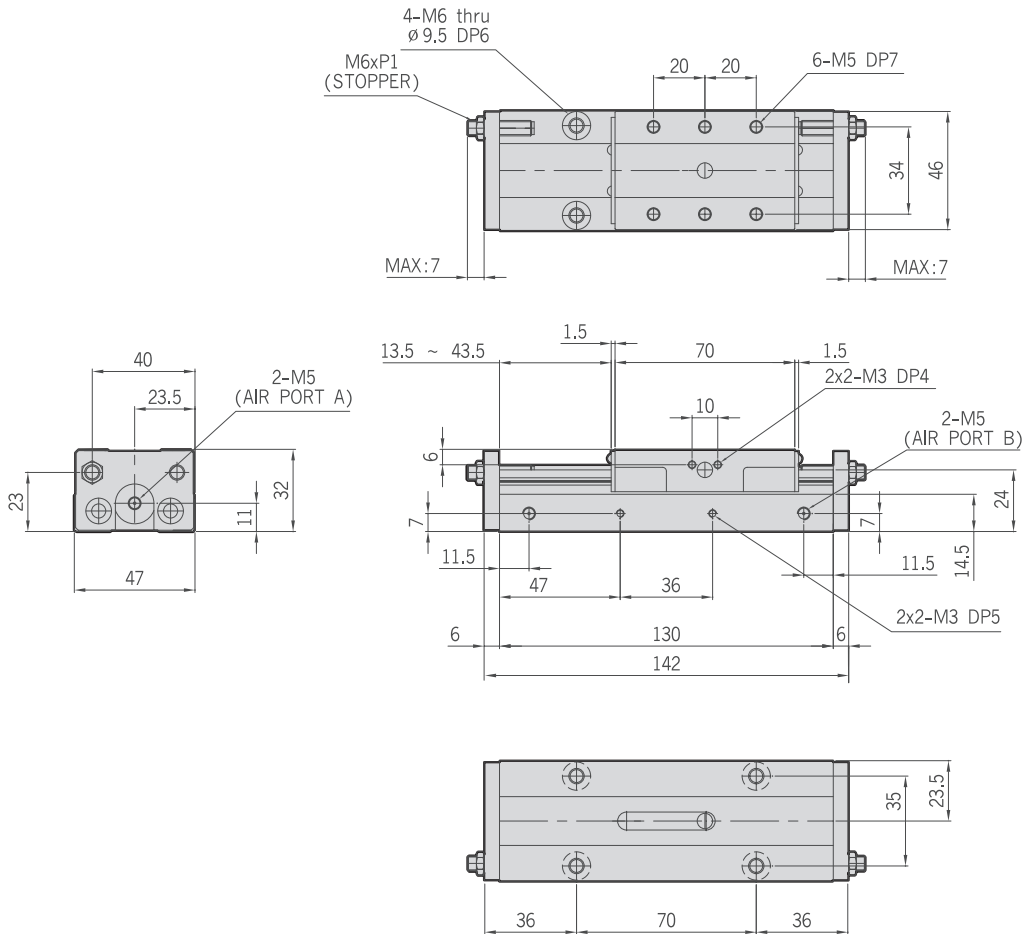
20

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STS16L-30



STS16L-30-Auto Switch

