

Vacuum Guidance for Stainless Steel Stages

The amount of gas emitted from a vacuum compatible manual stage was measured. According to the analysis of gas, the gas consists mainly of water and hydrocarbon. It is assumed that moisture on the stage surface and part of the grease used as drive lubricating oil evaporated.

Emitted amount of gas

Part Number	Emitted Amount of Gas Q (after 40 minutes of emission)	
	(Torr·ℓ/s/unit)	(Pa·ℓ/s/unit)
TSDS-602S	3.57×10^{-5}	4.76×10^{-3}
TSDS-603	1.65×10^{-5}	2.20×10^{-3}

Evaluation and Device Specifications

Exhaust system: Turbo-Molecular Pump STP-301

Seiyu Instruments Inc. (Now Edwards Japan Limited)

Pumping speed: 300ℓ/sec

Mass spectroscopy: Quad Mass Spectrometer QME200

Pfeiffer Vacuum

Mass range: 1 – 200amu

Emitted amount of gas is found by the following equation:

$$Q = \frac{(P - P') \times V}{t \times N}$$

P : Vacuum immediately after seal off

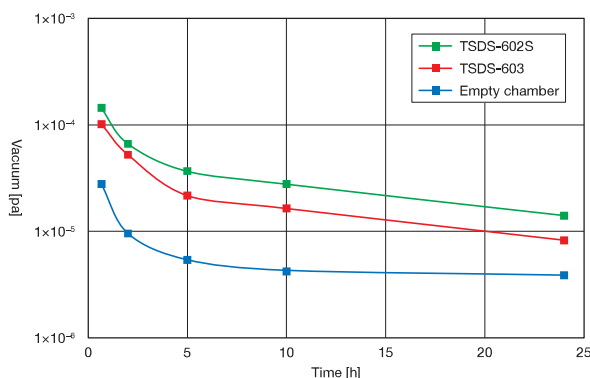
P' : Vacuum after seal-off time has elapsed

N : Number of stage units (1unit)

V : Vacuum chamber volume (ℓ)

t : Seal-off time (600s)

Vacuum of Vacuum Chamber



Mass Component Ratio

Mass Number	Component Ratio [%]		Ion	Gas Molecule
	TSDS-602S	TSDS-603		
1	7.48	8.72	H ⁺	H ₂ , water vapor, hydrocarbon
2	6.56	7.75	H ₂ ⁺	H ₂ , water vapor, hydrocarbon
6	0.01	—	C ⁺	CO, CO ₂ , hydrocarbon
12	0.51	0.66	C ⁺	CO, CO ₂ , hydrocarbon
14	—	2.84	N ⁺ , CO ⁺ , CH ₂ ⁺	N ₂ , NH ₃ , CO, hydrocarbon
15	2.26	3.06	CH ₃ ⁺ , NH ⁺	Hydrocarbon, NH ₃
18	9.7	17.92	H ₂ O ⁺	H ₂ O
20	—	0.13	HF ⁺ , Ar ²⁺	HF, Ar
22	0.01	0.01	CO ₂ ⁺	CO ₂
27	4.9	4.56	C ₂ H ₃ ⁺	Hydrocarbon
28	—	11.46	CO ⁺ , N ₂ ⁺ , C ₂ H ₄ ⁺	CO, CO ₂ , N ₂ , Hydrocarbon
29	7.44	4.94	C ₂ H ₅ ⁺	Hydrocarbon
31	—	0.3	C ₂ H ₅ OH ⁺	C ₂ H ₅ OH
32	0.24	1.65	O ₂ ⁺ , S ⁺	O ₂ , H ₂ S, SO ₂
34	0.13	0.16	H ₂ S ⁺	H ₂ S
36	—	0.19	HCl ⁺	HCl
39	3.19	2.94	C ₃ H ₃ ⁺	Hydrocarbon
41	10.99	6.97	C ₃ H ₅ ⁺	Hydrocarbon
43	11.79	5.56	C ₃ H ₅ ⁺	Hydrocarbon
47	0.04	0.05	CH ₃ S ⁺	CH ₃ SH

Interpretation of Mass Peak

The following list shows major gases that appear for each mass number when mass peaks (mass spectra) of residual gas are measured, and their interpretations.

List of Residual Gas Spectra

Mass Number	Ion	Remarks	Mass Number	Ion	Remarks
1	H ⁺	H ₂ , H ₂ O, hydrocarbons, etc	30	NO ⁺	Appears immediately after emission of dirty vacuum system.
2	H ₂ ⁺	H ₂ , H ₂ O, hydrocarbons, etc	31	CH ₃ O ⁺	Alcohol
3	HD ⁺	Abundance ratio of D is about 0.01%.	32	O ₂ ⁺	Becomes N ₂ : O ₃₂ = 4 : 1 when air leak occurs.
4	He ⁺		35	Cl ⁺	
12	C ⁺	CO, CO ₂ , hydrocarbons	37	Cl ⁺	Cl ₃₅ : Cl ₃₇ = 3 : 1
14	N ⁺ , CH ₂ ⁺ , CO ₂ ⁺	N ₂ , CO ₂ , hydrocarbons	39	K ⁺ , C ₃ H ₃ ⁺	K ⁺ dissociates from filament.
15	CH ₃ ⁺	Molecule that has CH ₄ , CH ₃	40	Ar ⁺ , C ₃ H ₄ ⁺	Ar makes up 1% of the atmosphere.
16	C ⁺ , CH ₄ ⁺	O ₂ , CH ₄ , oxygen compounds	41	C ₃ H ₅ ⁺	Hydrocarbon
17	OH ⁺	H ₂ O	42	C ₃ H ₆ ⁺	Hydrocarbon
18	H ₂ O ⁺	H ₂ O, OH ⁺ : H ₂ O ⁺ ≒ 1 : 5	43	C ₃ H ₇ ⁺	Hydrocarbon
19	F ⁺	Sometimes adsorbed to filaments and electrode surface.	44	CO ₂ ⁺	
20	Ar ⁺ , H ₂ O ⁺ , Ne ⁺	H ₂ O(20) is present about 0.2% of abundance ratio of O ₁₅ .	50	C ₄ H ₂ ⁺	Hydrocarbon
22	CO ₂ ²⁺ , Ne ⁺	Abundance ratio of Ne ₂₂ is 8.8%.	51	C ₄ H ₃ ⁺	Hydrocarbon
23	Na ⁺	Sometimes adsorbed to filaments and electrode surface.	55	C ₄ H ₇ ⁺	Hydrocarbon
27	C ₂ H ₃ ⁺	Hydrocarbon	56	C ₄ H ₈ ⁺	Hydrocarbon
28	N ₂ ⁺ , CO ⁺	Remain till the last.	57	C ₄ H ₉ ⁺	Hydrocarbon
29	C ₂ H ₅ ⁺ , N ₂ ⁺ , CO ⁺	Abundance ratio of N ₁₅ is 0.7%, and that of C ₁₃ is 1.1%.			

X Axis Stainless Steel Extended Contact Translation Stages

Stage Size 25 × 25 mm / 40 × 40 mm / 60 × 60 mm / 65 × 65 mm

TSDS-1

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V Groove Screw

Others

15 × 15 mm

25 × 25 mm

40 × 40 mm

60 × 60 mm

65 × 65 mm

80 × 80 mm

100 × 100 mm

120 × 120 mm

Others

Stainless Steel Linear Stages suitable for hard vacuum and clean room applications.

Same design and performance as TSD stages.

Completely made of stainless steel for excellent corrosion resistance.

Both the stage and the stainless steel micrometer head are lubricated with a high grade vacuum grease (YVAC2).



Guide

► The TSDS series stages are suitable for use in clean rooms or vacuum applications.

[Reference](#) ► Vacuum measurement data E205

Also ideal for use in airtight spaces that have to avoid outgassing.

Attention

► Micrometer brackets may extend above the top surface of some stages. Check drawings for detailed information.

► Note that based upon payload size, rated travel could be reduced.

Specifications

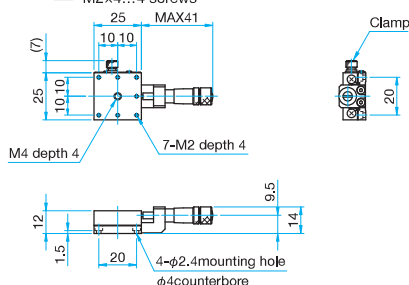
Part Number	METRIC	TSDS-251C	TSDS-251S	TSDS-401C	TSDS-401S	TSDS-601C	TSDS-601S	TSDS-651C-M6	TSDS-651S-M6
	INCH	—	—	TSDS-401CUU	TSDS-401SUU	—	—	TSDS-651CUU	TSDS-651SUU
Stage Size [mm]		25×25	25×25	40×40	40×40	60×60	60×60	65×65	65×65
Axes of Travel		X axis							
Micrometer Position		Center	Side	Center	Side	Center	Side	Center	Side
Travel [mm]		±3	±3	±6.5	±6.5	±6.5	±6.5	±6.5	±6.5
Lead of Actuator [mm/rotation]		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Micrometer Readable Resolution [mm]		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Guide Method		Extended contact ball bearing guide							
Primary Material		Stainless steel							
Finish		None							
Load Capacity [N]		49 (5.0kgf)	49 (5.0kgf)	147 (15.0kgf)	147 (15.0kgf)	343 (35.0kgf)	343 (35.0kgf)	343 (35.0kgf)	343 (35.0kgf)
Travel Accuracy	Straightness [μm]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Pitch ["]	30	30	30	30	25	25	25	25
	Yaw ["]	25	25	25	25	15	15	15	15
Max. Moment Capacity	Pitch [N·m]	3.0	3.0	3.9	3.9	6.4	6.4	8.8	8.8
	Roll [N·m]	3.7	3.7	3.9	3.9	6.4	6.4	9.8	9.8
	Yaw [N·m]	1.5	1.5	2.5	2.5	4.9	4.9	4.9	4.9
Moment Stiffness	Pitch ["/N·cm]	1.8	1.8	0.36	0.36	0.2	0.2	0.2	0.2
	Roll ["/N·cm]	1.6	1.6	0.3	0.3	0.2	0.2	0.2	0.2
	Yaw ["/N·cm]	2.0	2.0	0.4	0.4	0.2	0.2	0.2	0.2
Parallelism [μm]		30	30	15	15	15	15	30	30
Running Parallelism [μm]		10	10	10	10	10	10	10	10
Weight [kg]		0.07	0.07	0.2	0.2	0.5	0.5	0.55	0.55



Outline Drawing

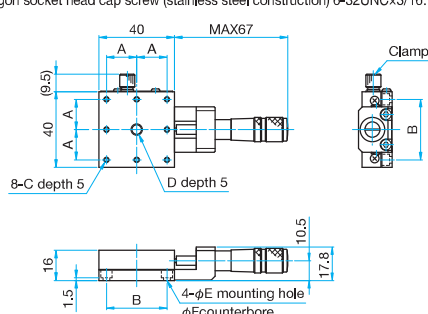
TSDS-251C

Hexagon socket head cap screw (stainless steel construction) M2×4...4 screws



TSDS-401C/401CUU

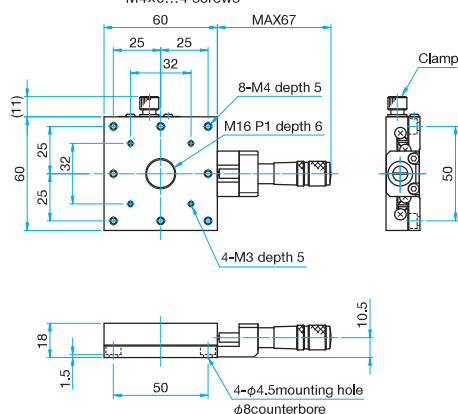
Hexagon socket head cap screw (stainless steel construction) M3×6...4 screws, Spring washers
Hexagon socket head cap screw (stainless steel construction) 6-32UNC×3/16...4 screws (UU)



Part Number	A (mm)	B (mm)	C	D	E (mm)	F (mm)
TSDS-401C	16	32	M3	M6 P1	3.5	6
TSDS-401CUU	15.875	31.75	6-32UNC	1/4-20UNC	4	6.5

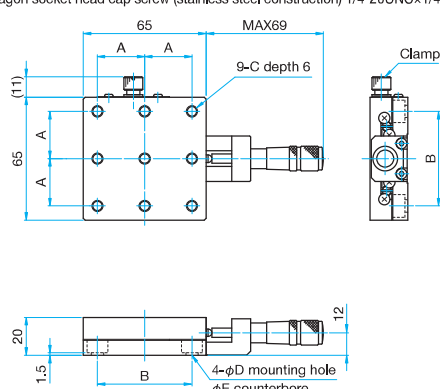
TSDS-601C

Hexagon socket head cap screw (stainless steel construction) M4×6...4 screws



TSDS-651C-M6/651CUU

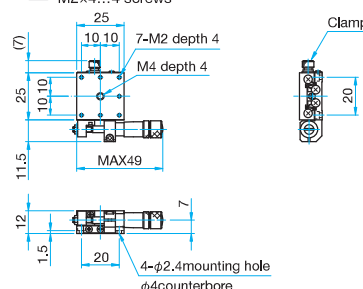
Hexagon socket head cap screw (stainless steel construction) M6×6...4 screws (M6)
Hexagon socket head cap screw (stainless steel construction) 1/4-20UNC×1/4...4 screws (UU)



Part Number	A (mm)	B (mm)	C	D (mm)	E (mm)
TSDS-651C-M6	25	50	M6 P1	6.5	11
TSDS-651CUU	25.4	50.8	1/4-20UNC	7	12

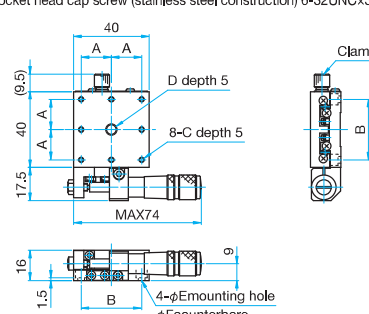
TSDS-251S

Hexagon socket head cap screw (stainless steel construction) M2×4...4 screws



TSDS-401S/401SUU

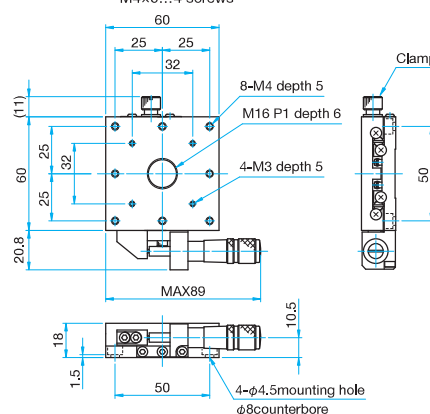
Hexagon socket head cap screw (stainless steel construction) M3×6...4 screws, Spring washers
Hexagon socket head cap screw (stainless steel construction) 6-32UNC×3/16...4 screws (UU)



Part Number	A (mm)	B (mm)	C	D	E (mm)	F (mm)
TSDS-401S	16	32	M3	M6 P1	3.5	6
TSDS-401SUU	15.875	31.75	6-32UNC	1/4-20UNC	4	6.5

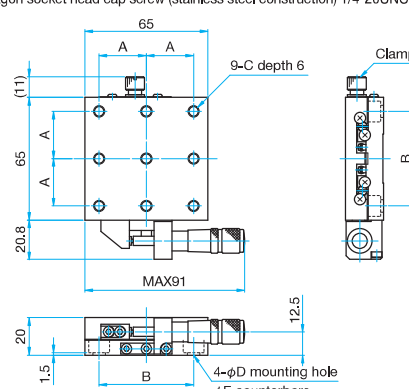
TSDS-601S

Hexagon socket head cap screw (stainless steel construction) M4×6...4 screws



TSDS-651S-M6/651SUU

Hexagon socket head cap screw (stainless steel construction) M6×6...4 screws (M6)
Hexagon socket head cap screw (stainless steel construction) 1/4-20UNC×1/4...4 screws (UU)



Part Number	A (mm)	B (mm)	C	D (mm)	E (mm)
TSDS-651S-M6	25	50	M6 P1	6.5	11
TSDS-651SUU	25.4	50.8	1/4-20UNC	7	12

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Crossed Roller

Dovetail

Lapping

V Groove Screw

Others

15 × 15 mm

25 × 25 mm

40 × 40 mm

60 × 60 mm

65 × 65 mm

80 × 80 mm

100 × 100 mm

120 × 120 mm

Others

XY Axis Stainless Steel Extended Contact Translation Stages

Stage Size 25 × 25 mm / 40 × 40 mm / 60 × 60 mm / 65 × 65 mm

TSDS-2

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V Groove Screw

Others

15 × 15 mm

25 × 25 mm

40 × 40 mm

60 × 60 mm

65 × 65 mm

80 × 80 mm

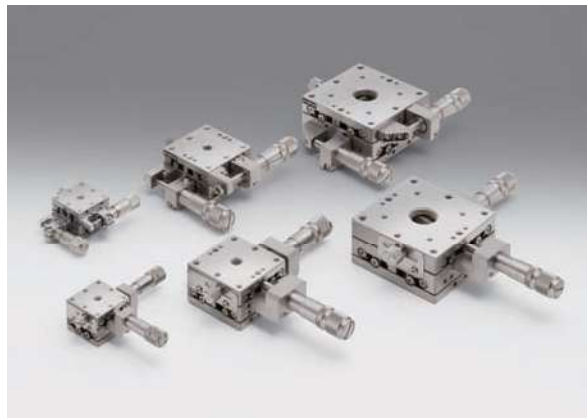
100 × 100 mm

120 × 120 mm

Others

Stainless Steel Linear Stages suitable for hard vacuum and clean room applications.

Made entirely of stainless steel, they yield excellent corrosion resistance. The stage bearingways and the stainless steel micrometer heads are lubricated with a high grade vacuum grease (YVAC2).



Guide

- The TSDS series stages are suitable for use in clean rooms or vacuum applications.

Reference Vacuum measurement data E205

Also ideal for use in airtight spaces that have to avoid outgassing.

Attention

- Micrometer brackets may extend above the top surface of some stages. Check drawings for detailed information.
- Note that based upon payload size, rated travel could be reduced.

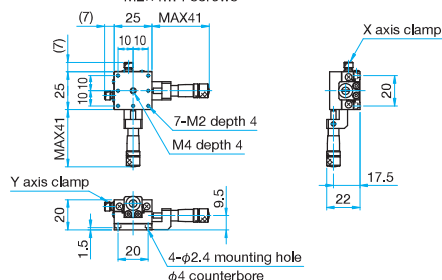
Specifications

Part Number	METRIC	TSDS-252C	TSDS-252S	TSDS-402C	TSDS-402S	TSDS-602C	TSDS-602S	TSDS-652C-M6	TSDS-652S-M6
	INCH	—	—	TSDS-402CUU	TSDS-402SUU	—	—	TSDS-652CUU	TSDS-652SUU
Stage Size [mm]		25×25	25×25	40×40	40×40	60×60	60×60	65×65	65×65
Axes of Travel		XY axis							
Micrometer Position		Center	Side	Center	Side	Center	Side	Center	Side
Travel [mm]		±3	±3	±6.5	±6.5	±6.5	±6.5	±6.5	±6.5
Lead of Actuator [mm/rotation]		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Micrometer Readable Resolution [mm]		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Guide Method		Extended contact ball bearing guide							
Primary Material		Stainless steel							
Finish		None							
Load Capacity [N]		49 (5.0kgf)	49 (5.0kgf)	147 (15.0kgf)	147 (15.0kgf)	343 (35.0kgf)	343 (35.0kgf)	343 (35.0kgf)	343 (35.0kgf)
Travel Accuracy	Straightness [μm]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Pitch ["]	30	30	30	30	25	25	25	25
	Yaw ["]	25	25	25	25	15	15	15	15
Max. Moment Capacity	Pitch [N·m]	3.0	3.0	3.9	3.9	6.4	6.4	8.8	8.8
	Roll [N·m]	3.0	3.0	3.9	3.9	6.4	6.4	8.8	8.8
	Yaw [N·m]	1.5	1.5	2.5	2.5	4.9	4.9	4.9	4.9
Moment Stiffness	Pitch [°/N·cm]	3.4	3.4	0.66	0.66	0.41	0.41	0.41	0.41
	Roll [°/N·cm]	3.4	3.4	0.66	0.66	0.41	0.41	0.41	0.41
	Yaw [°/N·cm]	4.0	4.0	0.8	0.8	0.41	0.41	0.41	0.41
Parallelism [μm]		50	50	30	30	30	30	50	50
Running Parallelism [μm]		20	20	20	20	20	20	20	20
Orthogonality [μm]		10	10	10	10	10	10	10	10
Weight [kg]		0.1	0.1	0.3	0.3	0.9	0.9	1.2	1.2

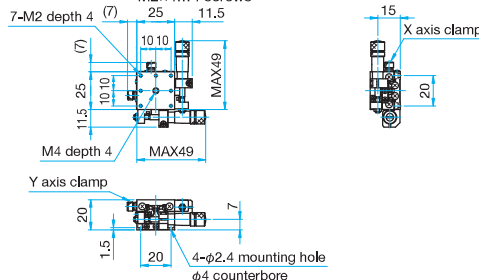


Outline Drawing

TSDS-252C Hexagon socket head cap screw (stainless steel construction) M2×4...4 screws

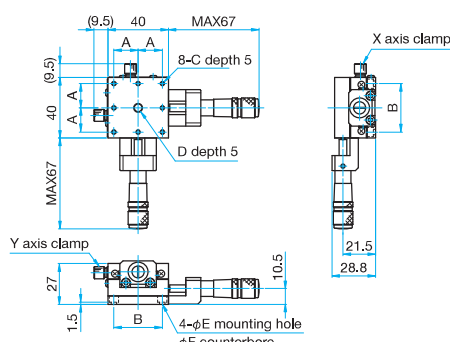


TSDS-252S Hexagon socket head cap screw (stainless steel construction) M2×4...4 screws



TSDS-402C/402CUU

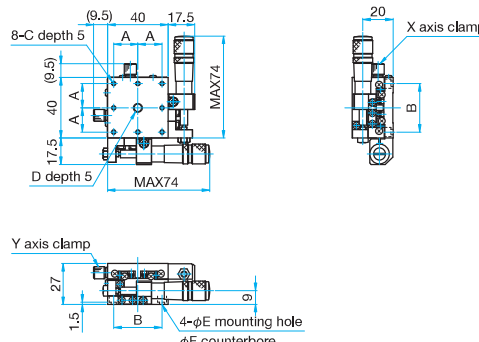
- Hexagon socket head cap screw (stainless steel construction) M3×6...4 screws, Spring washers
 Hexagon socket head cap screw (stainless steel construction) 6-32UNC×3/16...4 screws (UU)



Part Number	A (mm)	B (mm)	C	D	E (mm)	F (mm)
TSDS-402C	16	32	M3	M6 P1	3.5	6
TSDS-402CUU	15.875	31.75	6-32UNC	1/4-20UNC	4	6.5

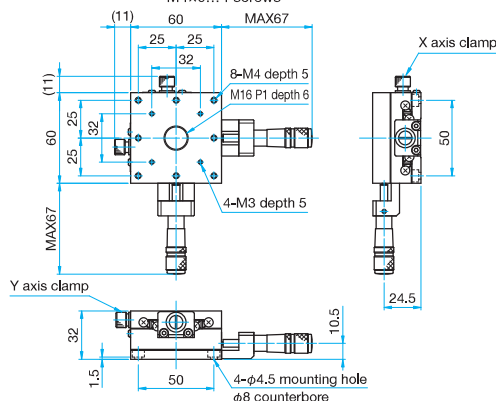
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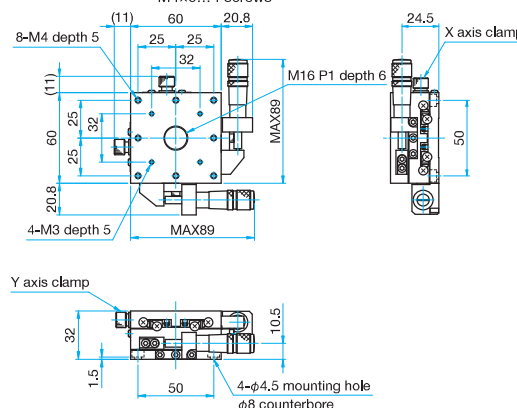


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TSDS-602C Hexagon socket head cap screw (stainless steel construction) M4×6...4 screws

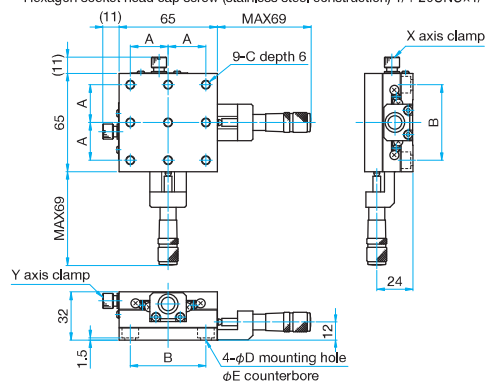


TSDS-602S Hexagon socket head cap screw (stainless steel construction) M4×6...4 screws



TSDS-652C-M6/652CUU

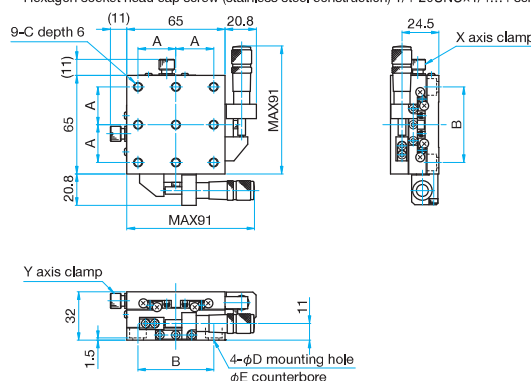
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Part Number	A (mm)	B (mm)	C	D (mm)	E (mm)
TSDS-652C-M6	25	50	M6 P1	6.5	11
TSDS-652CUU	25.4	50.8	1/4-20UNC	7	12

TSDS-652S-M6/652SUU

- Hexagon socket head cap screw (stainless steel construction) M6×6...4 screws (M6)
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Z Axis Stainless Steel Extended Contact Translation Stages

Stage Size 25 × 25 mm / 40 × 40 mm / 60 × 60 mm / 65 × 65 mm

TSDS-3

RoHS

Catalog Code

W7043

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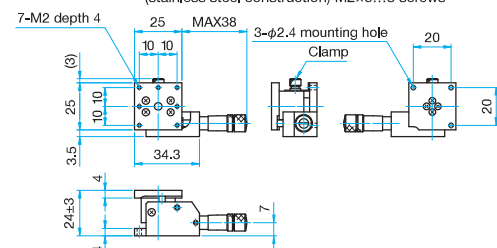
Attention

- This translation stage type is not suitable for inverted use. In this condition, all load would be pulling against the spring.
- These stages use a pivot mechanism to transfer horizontal motion to vertical motion. This mechanism induces a small non-linearity between the distance the micrometer moves and the distance the stage platform moves. Contact our Sales Division for more information.
- Regarding 25 × 25mm and 40 × 40mm size stages, please do not apply heavy load toward the rotating ('yawing') direction, as it may damage the stage.

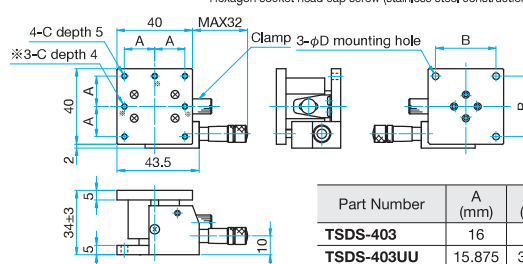


Outline Drawing

TSDS-253 Hexagon socket head cap screw (stainless steel construction) M2×6...3 screws

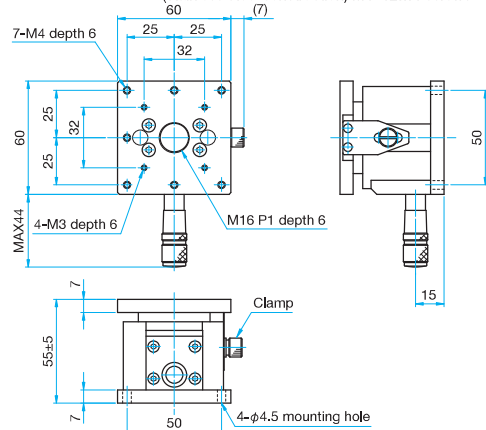


TSDS-403/403UU Hexagon socket head cap screw (stainless steel construction) M3×8...3 screws
Hexagon socket head cap screw (stainless steel construction) 6-32UNC×3/8...3 screws (UU)

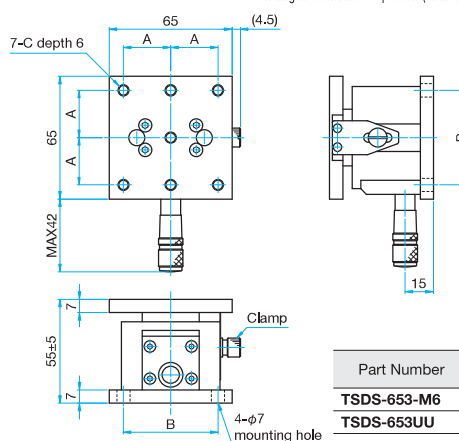


Part Number	A (mm)	B (mm)	C	D (mm)
TSDS-403	16	32	M3	3.5
TSDS-403UU	15.875	31.75	6-32UNC	4

TSDS-603 Hexagon socket head cap screw (stainless steel construction) M4×12...4 screws



TSDS-653-M6/653UU Hexagon socket head cap screw (stainless steel construction) M6×12...3 screws (M6)
Hexagon socket head cap screw (stainless steel construction) 1/4-20UNC×1/2...4 screws (UU)



Part Number	A (mm)	B (mm)	C
TSDS-653-M6	25	50	M6 P1
TSDS-653UU	25.4	50.8	1/4-20UNC

Specifications

Part Number	METRIC	TSDS-253	TSDS-403	TSDS-603	TSDS-653-M6
	INCH	—	TSDS-403UU	—	TSDS-653UU
Stage Size [mm]		25×25	40×40	60×60	65×65
Axes of Travel		Z axis			
Travel [mm]		±3	±3	±5	±5
Lead of Actuator [mm/rotation]		0.5	0.5	0.5	0.5
Micrometer Readable Resolution [mm]		0.01	0.01	0.01	0.01
Guide Method		Extended contact ball bearing guide			
Primary Material		Stainless steel			
Finish		None			
Load Capacity [N]		29.4 (3.0kgf)	88.3 (9.0kgf)	147 (15.0kgf)	147 (15.0kgf)
Travel Accuracy	Straightness [μm]	5	2.5	2.5	2.5
Max. Moment	Pitch [N·m]	1	3.9	6.9	6.9
Capacity	Roll [N·m]	1	3.9	6.9	6.9
Moment Stiffness	Pitch [°/N·cm]	7.14	1.84	0.51	0.51
	Roll [°/N·cm]	7.15	1.84	0.51	0.51
Parallelism [μm]		80	80	80	80
Running Parallelism [μm]		15	20	25	25
Weight [kg]		0.1	0.25	1.0	1.1

Z Axis Stainless Steel Extended Contact Slide Stages (Vertical)

Stage Size 25 × 25 mm / 40 × 40 mm / 60 × 60 mm / 65 × 65 mm

TSDS-3L

RoHS

Catalog Code W7152

Stainless Steel Linear Stages suitable for hard vacuum and clean room applications.
Same design and performance as TSD stages.
Completely made of stainless steel, for excellent corrosion resistance.
Both the stage and the stainless steel micrometer head are lubricated with a high grade vacuum grease (YVAC2).



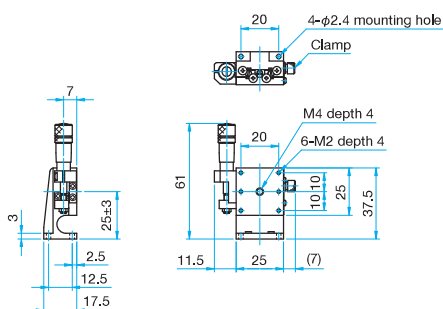
Guide

- The TSDS series stages are suitable for use in clean rooms or vacuum applications.
- Reference** ► Vacuum measurement data E205
- Also ideal for use in airtight spaces that have to avoid outgassing.

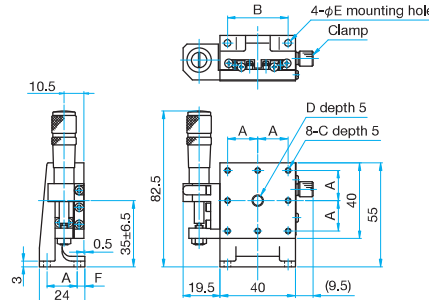


Outline Drawing

TSDS-253L Hexagon socket head cap screw (stainless steel construction) M2×6...4 screws

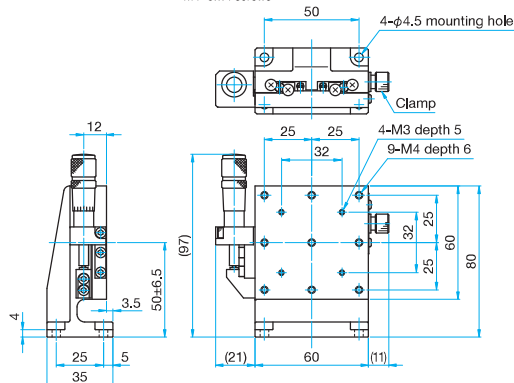


TSDS-403L/403LUU Hexagonal socket head cap screw M3×6...4 screws Hexagonal socket head cap screw 6-32UNC×1/4...4 screws (UU)

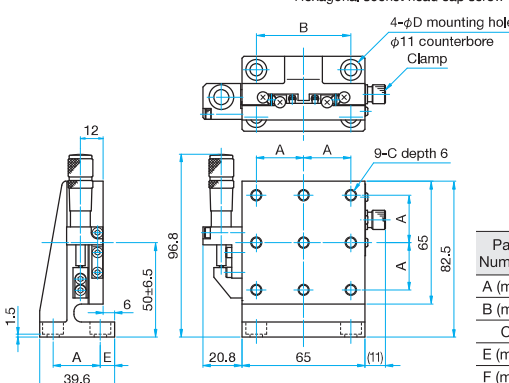


Part Number	TSDS-403L	TSDS-403LUU
A (mm)	16	15.875
B (mm)	32	31.75
C	M3	6-32UNC
D	M6 P1	1/4-20UNC
E (mm)	3.5	4
F (mm)	4	3.625

TSDS-603L Hexagon socket head cap screw (stainless steel construction) M4×8...4 screws



TSDS-653L-M6/653LUU Hexagonal socket head cap screw M6×6...4 screws (M6) Hexagonal socket head cap screw 1/4-20UNC×1/4...4 screws (UU)



Part Number	TSDS-653L-M6	TSDS-653LUU
A (mm)	25	25.4
B (mm)	50	50.8
C	M6 P1	1/4-20UNC
E (mm)	6.5	7
F (mm)	11	12

Specifications

Part Number	METRIC INCH	TSDS-253L	TSDS-403L TSDS-403LUU	TSDS-603L	TSDS-653L-M6 TSDS-653LUU
Stage Size [mm]		25×25	40×40	60×60	65×65
Axes of Travel		Z axis			
Micrometer Position		Side	Side	Side	Side
Travel [mm]		±3	±6.5	±6.5	±6.5
Lead of Actuator [mm/rotation]		0.5	0.5	0.5	0.5
Micrometer Readable Resolution [mm]		0.01	0.01	0.01	0.01
Guide Method		Extended contact ball bearing guide			
Primary Material		Stainless steel			
Finish		None			
Load Capacity [N]		14.7 (1.5kgf)	49.0 (5.0kgf)	49.0 (5.0kgf)	49.0 (5.0kgf)
Travel Accuracy	Straightness [μm]	1	1	1	1
Max. Moment Capacity	Pitch [N·m]	2.2	5	8	8
	Roll [N·m]	2.1	5	8	8
Moment Stiffness	Pitch [°/N·cm]	3.3	0.6	0.25	0.25
Parallelism [μm]		30	30	30	30
Running Parallelism [μm]		20	20	20	20
Weight [kg]		0.1	0.3	0.8	0.9

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V Groove Screw

Ohters

15 × 15 mm

25 × 25 mm

40 × 40 mm

60 × 60 mm

65 × 65 mm

80 × 80 mm

100 × 100 mm

120 × 120 mm

Others

XZ Axis Stainless Steel Extended Contact Translation Stages

Stage Size 25 × 25mm / 40 × 40 mm / 60 × 60 mm / 65 × 65 mm

TSDS-4

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Others

15 × 15 mm

25 × 25 mm

40 × 40 mm

60 × 60 mm

65 × 65 mm

80 × 80 mm

100 × 100 mm

120 × 120 mm

Others

XZ axis Stainless Steel Linear Stages suitable for hard vacuum and clean room applications. Same design and performance as TSD stages.

Completely made of stainless steel for excellent corrosion resistance.

Both the stage and the stainless steel micrometer head are lubricated with a high grade vacuum grease (YVAC2).



Guide

- ▶ The TSDS series stages are suitable for use in clean rooms or vacuum applications.
Reference Vacuum measurement data E205
 Also ideal for use in airtight spaces that have to avoid outgassing.

Attention

- ▶ This translation stage type is not suitable for inverted use. In this condition, all load would be pulling against the spring.
- ▶ These stages use a pivot mechanism to transfer horizontal motion to vertical motion. This mechanism induces a small non-linearity between the distance the micrometer moves and the distance the stage platform moves. Contact our Sales Division for more information.
- ▶ Regarding 25 × 25mm and 40 × 40mm size stages, please do not apply heavy load toward the rotating ('yawing') direction, as it may damage the stage.

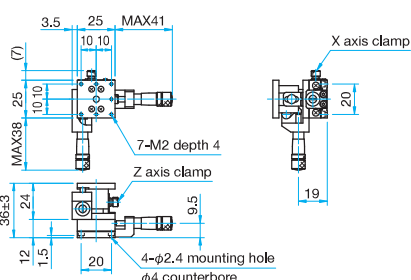
Specifications

Part Number	METRIC	TSDS-254C	TSDS-254S	TSDS-404C	TSDS-404S	TSDS-604C	TSDS-604S	TSDS-654C-M6	TSDS-654S-M6
	INCH	—	—	TSDS-404CUU	TSDS-404SUU	—	—	TSDS-654CUU	TSDS-654SUU
Stage Size [mm]		25×25	25×25	40×40	40×40	60×60	60×60	65×65	65×65
Axes of Travel		XZ axis							
Micrometer Position		Center	Side	Center	Side	Center	Side	Center	Side
Travel [mm]		X axis ±3 Z axis ±3	X axis ±3 Z axis ±3	X axis ±6.5 Z axis ±3	X axis ±6.5 Z axis ±3	X axis ±6.5 Z axis ±5	X axis ±6.5 Z axis ±5	X axis ±6.5 Z axis ±5	X axis ±6.5 Z axis ±5
Lead of Actuator [mm/rotation]		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Micrometer Readable Resolution [mm]		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Guide Method		Extended contact ball bearing guide							
Primary Material		Stainless steel							
Finish		None							
Load Capacity [N]		29.4 (3.0kgf)	29.4 (3.0kgf)	88.3 (9.0kgf)	88.3 (9.0kgf)	147 (15.0kgf)	147 (15.0kgf)	147 (15.0kgf)	147 (15.0kgf)
Travel Accuracy	Straightness [μm]	5	5	2.5	2.5	2.5	2.5	2.5	2.5
Max. Moment Capacity	Pitch [N·m]	1.0	1.0	3.9	3.9	6.9	6.9	6.9	6.9
	Roll [N·m]	1.0	1.0	3.9	3.9	6.9	6.9	6.9	6.9
Moment Stiffness	Pitch [°/N·cm]	8.95	8.95	2.2	2.2	0.75	0.75	0.75	0.75
	Roll [°/N·cm]	8.75	8.75	2.15	2.15	0.75	0.75	0.75	0.75
Parallelism [μm]		110	110	110	110	110	110	110	110
Weight [kg]		0.17	0.17	0.45	0.45	1.5	1.5	1.65	1.65



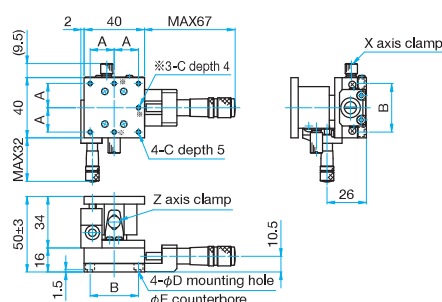
Outline Drawing

TSDS-254C Hexagon socket head cap screw (stainless steel construction) M2×4...4 screws



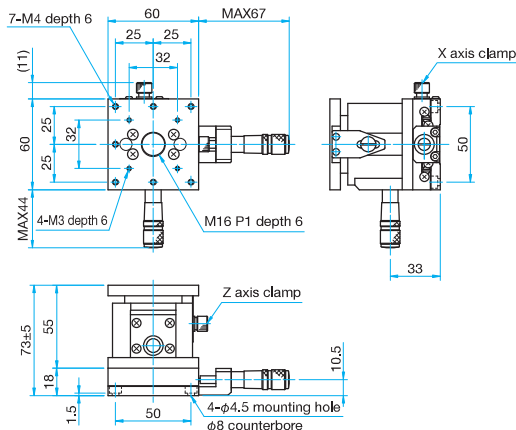
TSDS-404C/404CUU

Hexagon socket head cap screw (stainless steel construction) M3×6...4 screws, Spring washers
 Hexagon socket head cap screw (stainless steel construction) 6-32UNC×3/16...4 screws (UU)



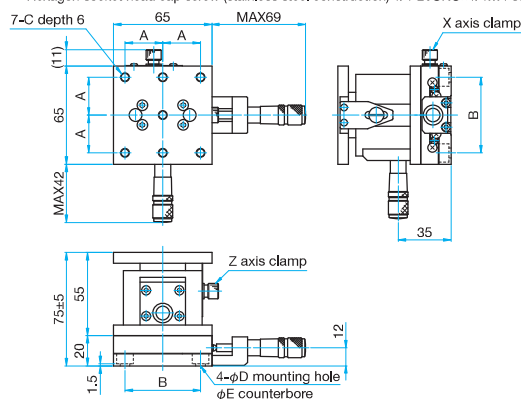
Part Number	A (mm)	B (mm)	C	D (mm)	E (mm)
TSDS-404C	16	32	M3	3.5	6
TSDS-404CUU	15.875	31.75	6-32UNC	4	6.5

TSDS-604C Hexagon socket head cap screw (stainless steel construction) M4×6...4 screws



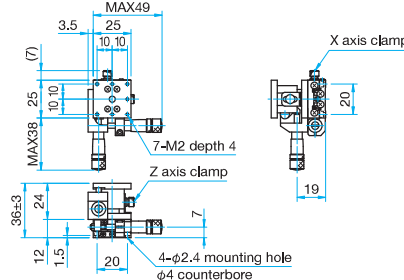
TSDS-654C-M6/654CUU

Hexagon socket head cap screw (stainless steel construction) M6×6...4 screws (M6)
 Hexagon socket head cap screw (stainless steel construction) 1/4-20UNC×1/4...4 screws (UU)



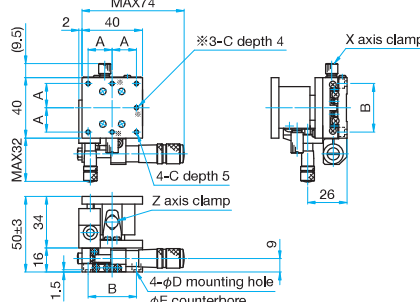
Part Number	A (mm)	B (mm)	C	D (mm)	E (mm)
TSDS-654C-M6	25	50	M6 P1	6.5	11
TSDS-654CUU	25.4	50.8	1/4-20UNC	7	12

TSDS-254S Hexagon socket head cap screw (stainless steel construction) M2×4...4 screws



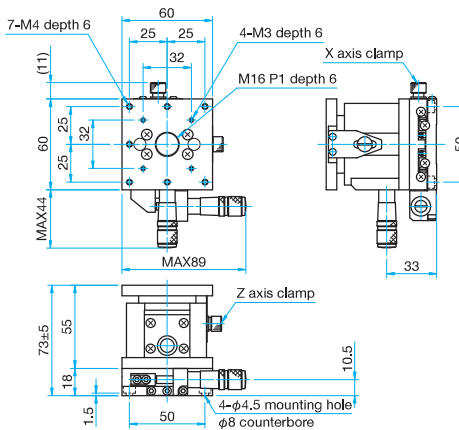
TSDS-404S/404SUU

Hexagon socket head cap screw (stainless steel construction) M3×6...4 screws, Spring washers
 Hexagon socket head cap screw (stainless steel construction) 6-32UNC×3/16...4 screws (UU)



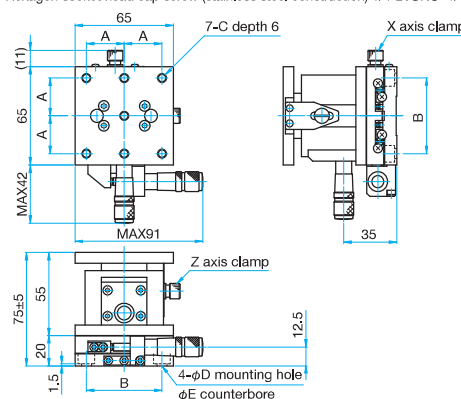
Part Number	A (mm)	B (mm)	C	D (mm)	E (mm)
TSDS-404S	16	32	M3	3.5	6
TSDS-404SUU	15.875	31.75	6-32UNC	4	6.5

TSDS-604S Hexagon socket head cap screw (stainless steel construction) M4×6...4 screws



TSDS-654S-M6/654SUU

Hexagon socket head cap screw (stainless steel construction) M6×6...4 screws (M6)
 Hexagon socket head cap screw (stainless steel construction) 1/4-20UNC×1/4...4 screws (UU)



Part Number	A (mm)	B (mm)	C	D (mm)	E (mm)
TSDS-654S-M6	25	50	M6 P1	6.5	11
TSDS-654SUU	25.4	50.8	1/4-20UNC	7	12

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Lapping

V Groove Screw

Others

15 × 15 mm

25 × 25 mm

40 × 40 mm

60 × 60 mm

65 × 65 mm

80 × 80 mm

100 × 100 mm

120 × 120 mm

Others

XZ Axis Stainless Steel Extended Contact Translation Stages (Vertical)

Stage Size 25 × 25 mm / 40 × 40 mm / 60 × 60 mm / 65 × 65 mm

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Crossed Roller

Dovetail

Lapping

V Groove Screw

Others

15 × 15 mm

25 × 25 mm

40 × 40 mm

60 × 60 mm

65 × 65 mm

80 × 80 mm

100 × 100 mm

120 × 120 mm

Others

XZ axis Stainless Steel Linear Stages suitable for hard vacuum and clean room applications. Same design and performance as TSD stages.

Completely made of stainless steel for excellent corrosion resistance.

Both the stage and the stainless steel micrometer head are lubricated with a high grade vacuum grease (YVAC2).



Guide

► The TSDS series stages are suitable for use in clean rooms or vacuum applications.

Reference Vacuum measurement data E205z

Also ideal for use in airtight spaces that have to avoid outgassing.

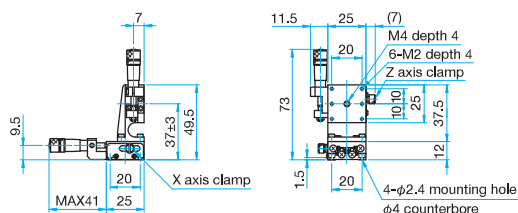
Specifications

Part Number	METRIC	TSDS-254CL	TSDS-254SL	TSDS-404CL	TSDS-404SL	TSDS-604CL	TSDS-604SL	TSDS-654CL-M6	TSDS-654SL-M6
	INCH	—	—	TSDS-404CLUU	TSDS-404SLUU	—	—	TSDS-654CLUU	TSDS-654SLUU
Stage Size [mm]		25×25	25×25	40×40	40×40	60×60	60×60	65×65	65×65
Axes of Travel		XZ axis							
Micrometer Position		Center	Side	Center	Side	Center	Side	Center	Side
Travel [mm]		X axis ±3 Z axis ±3	X axis ±3 Z axis ±3	X axis ±6.5 Z axis ±6.5	X axis ±6.5 Z axis ±6.5	X axis ±6.5 Z axis ±6.5	X axis ±6.5 Z axis ±6.5	X axis ±6.5 Z axis ±6.5	X axis ±6.5 Z axis ±6.5
Lead of Actuator [mm/rotation]		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Micrometer Readable Resolution [mm]		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Guide Method		Extended contact ball bearing guide							
Primary Material		Stainless steel							
Finish		None							
Load Capacity [N]		14.7 (1.5kgf)	14. (1.5kgf)	49 (5kgf)	49 (5kgf)	49 (5kgf)	49 (5kgf)	49 (5kgf)	49 (5kgf)
Travel Accuracy	Straightness [μm]	1	1	1	1	1	1	1	1
	Pitch [N·m]	2.2	2.2	3.9	3.9	8.0	8.0	8.0	8.0
Max. Moment Capacity	Roll [N·m]	2.1	2.1	3.9	3.9	8.0	8.0	8.0	8.0
	Pitch [°/N·cm]	5.1	5.1	0.96	0.96	0.45	0.45	0.45	0.45
Moment Stiffness		5.1	5.1	0.96	0.96	0.45	0.45	0.45	0.45
Weight [kg]		0.17	0.17	0.5	0.5	1.3	1.3	1.45	1.45

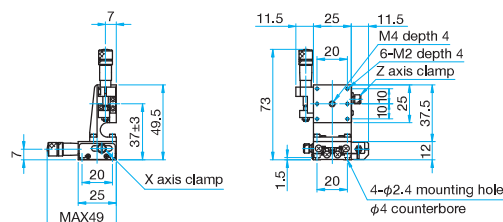


Outline Drawing

TSDS-254CL Hexagon socket head cap screw (stainless steel construction) M2x4...4 screws

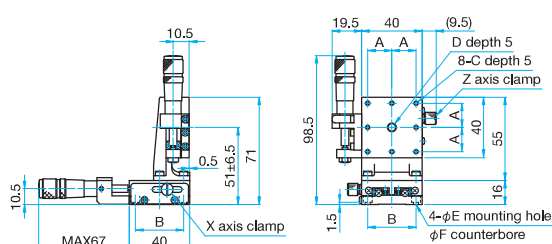


TSDS-254SL Hexagon socket head cap screw (stainless steel construction) M2x4...4 screws



TSDS-404CL/404CLUU

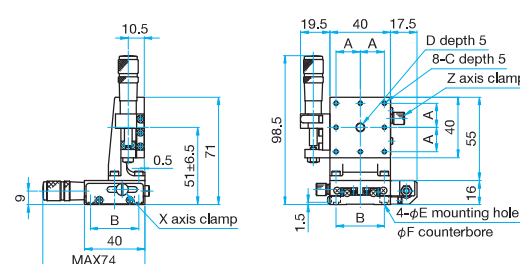
Hexagon socket head cap screw (stainless steel construction) M3x6...4 screws, Spring washers
Hexagon socket head cap screw (stainless steel construction) 6-32UNCx3/16...4 screws (UU)



Part Number	A (mm)	B (mm)	C	D	E (mm)	F (mm)
TSDS-404CL	16	32	M3	M6 P1	3.5	6
TSDS-404CLUU	15.875	31.75	6-32UNC	1/4-20UNC	4	6.5

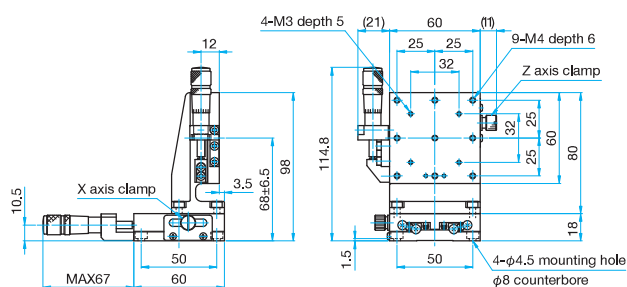
TSDS-404SL/404SLUU

Hexagon socket head cap screw (stainless steel construction) M3x6...4 screws, Spring washers
Hexagon socket head cap screw (stainless steel construction) 6-32UNCx3/16...4 screws (UU)

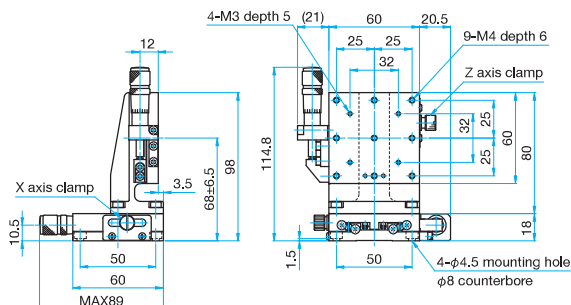


Part Number	A (mm)	B (mm)	C	D	E (mm)	F (mm)
TSDS-404SL	16	32	M3	M6 P1	3.5	6
TSDS-404SLUU	15.875	31.75	6-32UNC	1/4-20UNC	4	6.5

TSDS-604CL Hexagon socket head cap screw (stainless steel construction) M4x6...4 screws

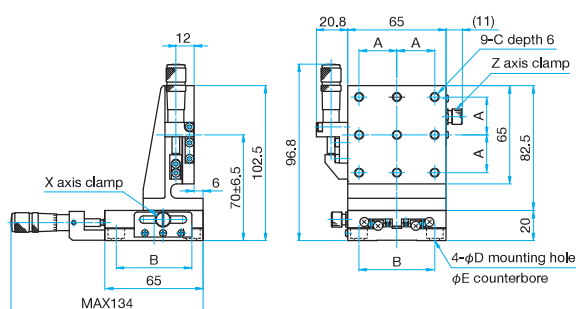


TSDS-604SL Hexagon socket head cap screw (stainless steel construction) M4x6...4 screws



TSDS-654CL-M6/654CLUU

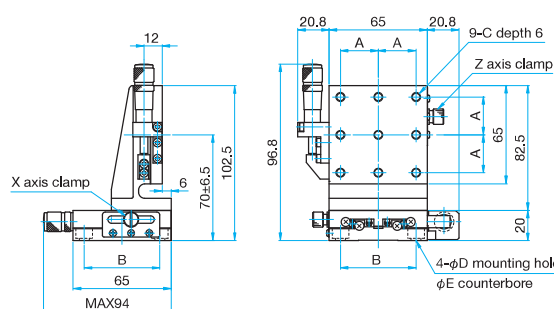
Hexagon socket head cap screw (stainless steel construction) M6x6...4 screws (M6)
Hexagon socket head cap screw (stainless steel construction) 1/4-20UNCx1/4...4 screws (UU)



Part Number	A (mm)	B (mm)	C	D (mm)	E (mm)
TSDS-654CL-M6	25	50	M6 P1	6.5	11
TSDS-654CLUU	25.4	50.8	1/4-20UNC	7	12

TSDS-654SL-M6/654SLUU

Hexagon socket head cap screw (stainless steel construction) M6x6...4 screws (M6)
Hexagon socket head cap screw (stainless steel construction) 1/4-20UNCx1/4...4 screws (UU)



Part Number	A (mm)	B (mm)	C	D (mm)	E (mm)
TSDS-654SL-M6	25	50	M6 P1	6.5	11
TSDS-654SLUU	25.4	50.8	1/4-20UNC	7	12

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Dovetail

Lapping

V Groove Screw

Others

15 × 15 mm

25 × 25 mm

40 × 40 mm

60 × 60 mm

65 × 65 mm

80 × 80 mm

100 × 100 mm

120 × 120 mm

Others

XYZ Axis Stainless Steel Extended Contact Slide Stages

Stage Size 25 × 25 mm / 40 × 40 mm / 60 × 60 mm / 65 × 65 mm

TSDS-5

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Others

15 × 15 mm

25 × 25 mm

40 × 40 mm

60 × 60 mm

65 × 65 mm

80 × 80 mm

100 × 100 mm

120 × 120 mm

Others

XYZ axis Stainless Steel Linear Stages suitable for hard vacuum and clean room applications. Same design and performance as TSD stages.

Completely made of stainless steel for excellent corrosion resistance.

Both the stage and the stainless steel micrometer head are lubricated with a high grade vacuum grease (YVAC2).



Guide

- ▶ The TSDS series stages are suitable for use in clean rooms or vacuum applications.

Reference Vacuum measurement data E205

Also ideal for use in airtight spaces that have to avoid outgassing.

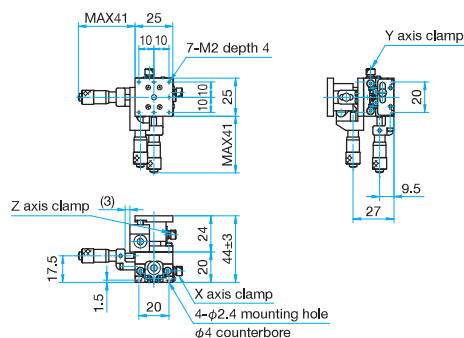
Attention

- ▶ This translation stage type is not suitable for inverted use. In this condition, all load would be pulling against the spring.
- ▶ These stages use a pivot mechanism to transfer horizontal motion to vertical motion. This mechanism induces a small non-linearity between the distance the micrometer moves and the distance the stage platform moves. Contact our Sales Division for more information.
- ▶ Regarding 25 × 25mm and 40 × 40mm size stages, please do not apply heavy load toward the rotating ('yawing') direction, as it may damage the stage.

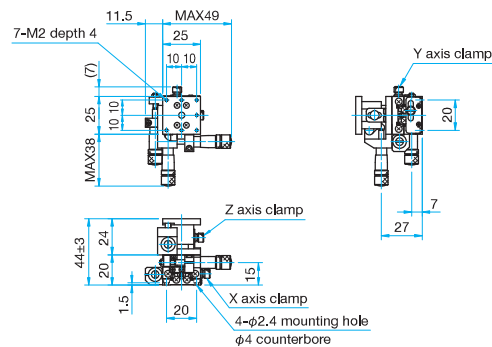


Outline Drawing

TSDS-255C Hexagon socket head cap screw (stainless steel construction) M2×4...4 screws



TSDS-255S Hexagon socket head cap screw (stainless steel construction) M2×4...4 screws



Specifications

Part Number	METRIC	TSDS-255C	TSDS-255S	TSDS-405C	TSDS-405S	TSDS-605C	TSDS-605S	TSDS-655C-M6	TSDS-655S-M6
	INCH	—	—	TSDS-405CUU	TSDS-405SUU	—	—	TSDS-655CUU	TSDS-655SUU
Stage Size [mm]		25×25	25×25	40×40	40×40	60×60	60×60	65×65	65×65
Axes of Travel		XYZ axis							
Micrometer Position		Center	Side	Center	Side	Center	Side	Center	Side
Travel [mm]		XY axis ±3 Z axis ±3	XY axis ±3 Z axis ±3	XY axis ±6.5 Z axis ±3	XY axis ±6.5 Z axis ±3	XY axis ±6.5 Z axis ±5	XY axis ±6.5 Z axis ±5	XY axis ±6.5 Z axis ±5	XY axis ±6.5 Z axis ±5
Lead of Actuator [mm/rotation]		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Micrometer Readable Resolution [mm]		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Guide Method		Extended contact ball bearing guide							
Primary Material		Stainless steel							
Finish		None							
Load Capacity [N]		29.4 (3.0kgf)	29.4 (3.0kgf)	88.3 (9.0kgf)	88.3 (9.0kgf)	147 (15.0kgf)	147 (15.0kgf)	147 (15.0kgf)	147 (15.0kgf)
Travel Accuracy	Straightness [μm]	5	5	2.5	2.5	2.5	2.5	2.5	2.5
Max. Moment Capacity	Pitch [N·m]	1.0	1.0	3.9	3.9	6.9	6.9	6.9	6.9
	Roll [N·m]	1.0	1.0	3.9	3.9	6.9	6.9	6.9	6.9
Moment Stiffness	Pitch [°/N·cm]	10.55	10.55	2.5	2.5	1.0	1.0	1.0	1.0
	Roll [°/N·cm]	10.55	10.55	2.5	2.5	1.0	1.0	1.0	1.0
Parallelism [μm]		130	130	130	130	130	130	130	130
Weight [kg]		0.2	0.2	0.55	0.55	1.9	1.9	2.2	2.2

XYZ Axis Stainless Steel Extended Contact Translation Stages (Vertical)

Stage Size 25 × 25 mm / 40 × 40 mm / 60 × 60 mm / 65 × 65 mm

TSDS-5L

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Others

15 × 15 mm

25 × 25 mm

40 × 40 mm

60 × 60 mm

65 × 65 mm

80 × 80 mm

100 × 100 mm

120 × 120 mm

Others

XYZ axis Stainless Steel Linear Stages suitable for hard vacuum and clean room applications. Same design and performance as TSD stages.

Completely made of stainless steel for excellent corrosion resistance.

Both the stage and the stainless steel micrometer head are lubricated with a high grade vacuum grease (YVAC2).



Guide

► The TSDS series stages are suitable for use in clean rooms or vacuum applications.

[Reference](#) Vacuum measurement data E205

Also ideal for use in airtight spaces that have to avoid outgassing.

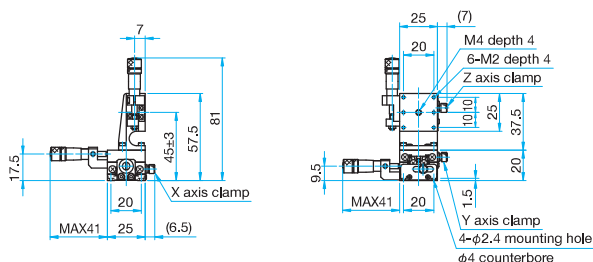
Specifications

Part Number	METRIC	TSDS-255CL	TSDS-255SL	TSDS-405CL	TSDS-405SL	TSDS-605CL	TSDS-605SL	TSDS-655CL-M6	TSDS-655SL-M6
	INCH	—	—	TSDS-405CLUU	TSDS-405SLUU	—	—	TSDS-655CLUU	TSDS-655SLUU
Stage Size [mm]		25×25	25×25	40×40	40×40	60×60	60×60	65×65	65×65
Axes of Travel		XYZ axis							
Micrometer Position		Center	Side	Center	Side	Center	Side	Center	Side
Travel [mm]		XY axis ±3 Z axis ±3	XY axis ±3 Z axis ±3	XY axis ±6.5 Z axis ±6.5	XY axis ±6.5 Z axis ±6.5	XY axis ±6.5 Z axis ±6.5	XY axis ±6.5 Z axis ±6.5	XY axis ±6.5 Z axis ±6.5	XY axis ±6.5 Z axis ±6.5
Lead of Actuator [mm/rotation]		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Micrometer Readable Resolution [mm]		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Guide Method		Extended contact ball bearing guide							
Primary Material		Stainless steel							
Finish		None							
Load Capacity [N]		14.7 (1.5kgf)	14.7 (1.5kgf)	49 (5kgf)	49 (5kgf)	49 (5kgf)	49 (5kgf)	49 (5kgf)	49 (5kgf)
Travel Accuracy	Straightness [μm]	1	1	1	1	1	1	1	1
	Pitch [N·m]	2.2	2.2	3.9	3.9	8.0	8.0	8.0	8.0
Max. Moment Capacity	Roll [N·m]	2.1	2.1	3.9	3.9	8.0	8.0	8.0	8.0
	Pitch [°/N·cm]	6.7	6.7	1.26	1.26	0.58	0.58	0.58	0.58
Moment Stiffness		6.7	6.7	1.26	1.26	0.58	0.58	0.58	0.58
Weight [kg]		0.2	0.2	0.6	0.6	1.7	1.7	2.0	2.0

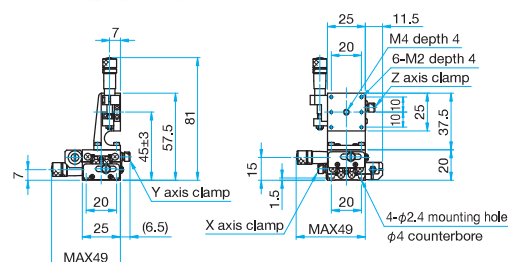


Outline Drawing

TSDS-255CL Hexagon socket head cap screw (stainless steel construction) M2×4...4 screws

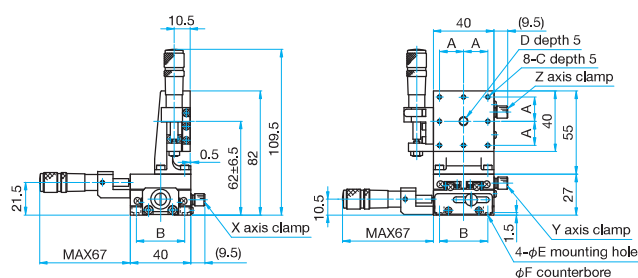


TSDS-255SL Hexagon socket head cap screw (stainless steel construction) M2×4...4 screws



TSDS-405CL/405CLUU

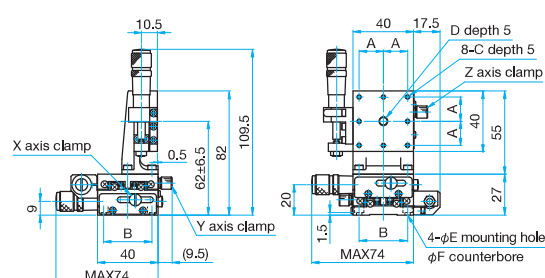
Hexagon socket head cap screw (stainless steel construction) M3×6...4 screws, Spring washers
 Hexagon socket head cap screw (stainless steel construction) 6-32UNC×3/16...4 screws (UU)



Part Number	A (mm)	B (mm)	C	D	E (mm)	F (mm)
TSDS-405CL	16	32	M3	M6 P1	3.5	6
TSDS-405CLUU	15.875	31.75	6-32UNC	1/4-20UNC	4	6.5

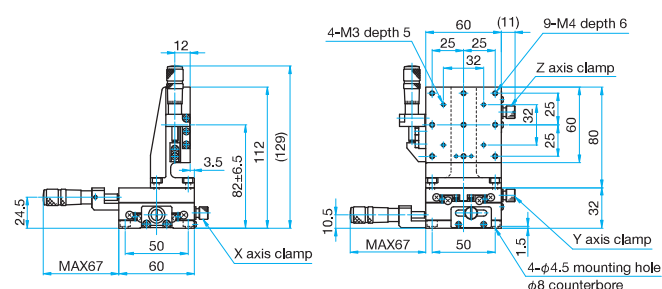
TSDS-405SL/405SLUU

Hexagon socket head cap screw (stainless steel construction) M3×6...4 screws, Spring washers
 Hexagon socket head cap screw (stainless steel construction) 6-32UNC×3/16...4 screws (UU)

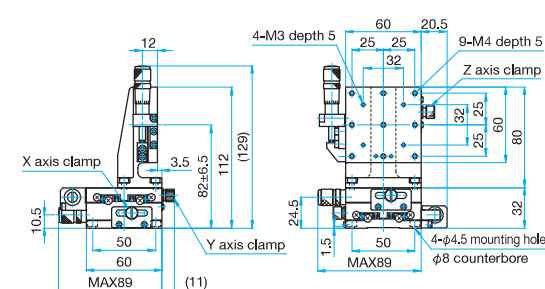


Part Number	A (mm)	B (mm)	C	D	E (mm)	F (mm)
TSDS-405SL	16	32	M3	M6 P1	3.5	6
TSDS-405SLUU	15.875	31.75	6-32UNC	1/4-20UNC	4	6.5

TSDS-605CL Hexagon socket head cap screw (stainless steel construction) M4×6...4 screws

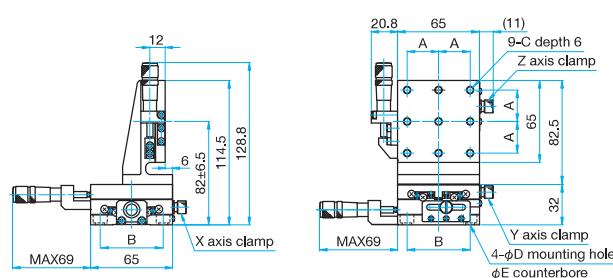


TSDS-605SL Hexagon socket head cap screw (stainless steel construction) M4×6...4 screws



TSDS-655CL-M6/655CLUU

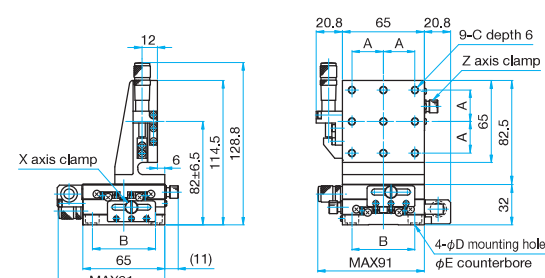
Hexagon socket head cap screw (stainless steel construction) M6×6...4 screws (M6)
 Hexagon socket head cap screw (stainless steel construction) 1/4-20UNC×1/4...4 screws (UU)



Part Number	A (mm)	B (mm)	C	D (mm)	E (mm)
TSDS-655CL-M6	25	50	M6 P1	6.5	11
TSDS-655CLUU	25.4	50.8	1/4-20UNC	7	12

TSDS-655SL-M6/655SLUU

Hexagon socket head cap screw (stainless steel construction) M6×6...4 screws (M6)
 Hexagon socket head cap screw (stainless steel construction) 1/4-20UNC×1/4...4 screws (UU)



Part Number	A (mm)	B (mm)	C	D (mm)	E (mm)
TSDS-655SL-M6	25	50	M6 P1	6.5	11
TSDS-655SLUU	25.4	50.8	1/4-20UNC	7	12

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V Groove Screw

Others

15 × 15 mm

25 × 25 mm

40 × 40 mm

60 × 60 mm

65 × 65 mm

80 × 80 mm

100 × 100 mm

120 × 120 mm

Others

Stainless Steel Rotation Stages

KSPS

RoHS

Catalog
Code

W7087

Low profile rotation stages offer coarse rotation adjustment of 360° and fine adjustment (with either a micrometer head or fine-pitch screw).

Directly rotate the stage upper plate for coarse adjustment, then clamp the clutch screw and use micrometer head or fine-pitch screw ($\pm 5^\circ$) for fine adjustment.

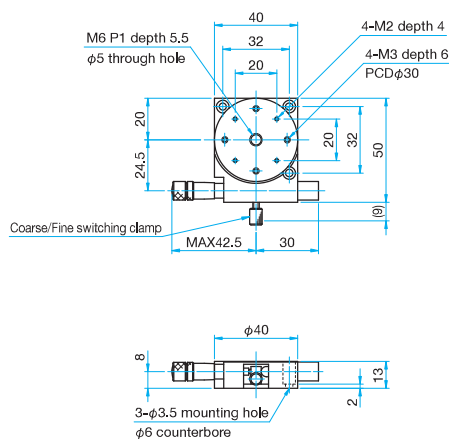


- Designed for use in hard vacuum applications, Both the stage and micrometer are made from stainless steel and come with high grade vacuum grease.

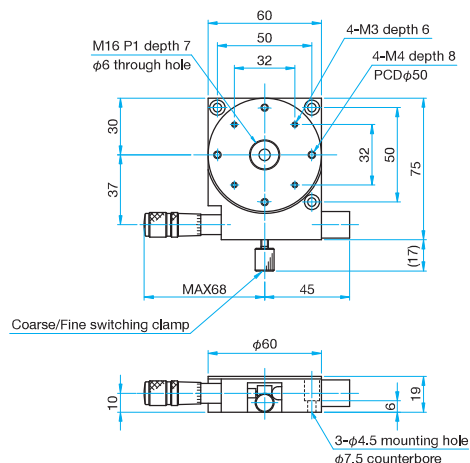


Outline Drawing

KSPS-406M Hexagon socket head cap screw (stainless steel construction)
M3x6...3 screws



KSPS-606M Hexagon socket head cap screw (stainless steel construction)
M4x10...3 screws



Specifications

Part Number	METRIC	KSPS-406M	KSPS-606M
Stage Size [mm]		φ40.0	φ60.0
Angle of Rotation [°]		Coars: 360° Fine: $\pm 5^\circ$	Coars: 360° Fine: $\pm 5^\circ$
Micrometer Position		Center	Side
Scale Readable Resolution		2°	1°
Micrometer Readable Resolution		$\approx 1'24.2''$	$\approx 55.8''$
Guide Method		Lapping method	
Primary Material		Stainless steel	
Finish		None	
Load Capacity [N]		49 (5.0kgf)	68.6 (7.0kgf)
Max. Moment Capacity [N·m]		0.3	0.75
Moment Stiffness ["/N·m]		1.5	1
Parallelism [μm]		30	50
Eccentricity [μm]		20	20
Wobble [μm]		20	20
Weight [kg]		0.3	0.6

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V Groove Screw

Others

15 × 15 mm

25 × 25 mm

40 × 40 mm

60 × 60 mm

65 × 65 mm

80 × 80 mm

100 × 100 mm

120 × 120 mm

Others

α Axis Stainless Steel Goniometers $\alpha\beta$ Axis Stainless Steel Goniometers

GOHS-40A Stage Size 40 × 40 mm

GOHS-40B Stage Size 40 × 40 mm



Catalog Code W7099



Catalog Code W7107

Goniometers with dovetail slide and worm gear construction for angular adjustment of heavy loads.

- Designed for use in hard vacuum applications, Both the stage and micrometer are made from stainless steel and come with high grade vacuum grease.
- Also ideal for use in airtight and contamination sensitive spaces where minimal outgassing is required.



Guide

- The TSDS series stages are suitable for use in clean rooms or vacuum applications.
- Reference** ► Vacuum measurement data E205
- Also ideal for use in airtight spaces that have to avoid outgassing.

Attention

- Locking mechanism is operated using thumbscrew on side of stage.

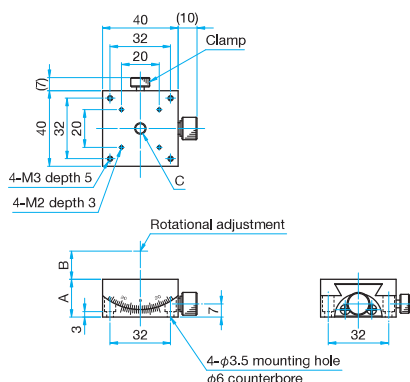


Outline Drawing

GOHS-40A15/35

Hexagon socket head cap screw (stainless steel construction)
M3×6...4 screws

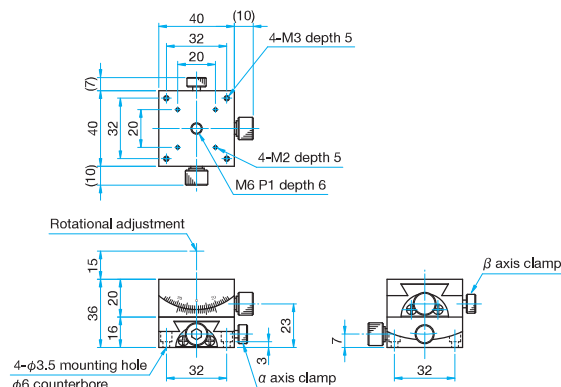
2.5mm



GOHS-40B15

Hexagon socket head cap screw (stainless steel construction)
M3×6...4 screws

2.5mm



Part Number	A (mm)	B (mm)	C
GOHS-40A15	20	15	M6 P1 depth 6
GOHS-40A35	16	35	M4 depth 4

Specifications

Part Number	METRIC	GOHS-40A15	GOHS-40A35	GOHS-40B15
Stage Size [mm]		40×40	40×40	40×40
Axes of Travel		α axis		$\alpha\beta$ axis
Rotation Center Height [mm]		15±0.1	35±0.1	15±0.1
Angle Range [°]		±20	±20	±20
Vernier Readable Resolution		12'	12'	12'
Travel per Knob Rotation [°]	(Upper) β axis (Lower) α axis	— about 2.83°	— about 1.74°	about 2.83° about 1.74°
Rotation Center Displacement [mm]		φ2mm or less	φ2mm or less	φ2mm or less
Guide Method		Dovetail slide method		
Primary Material		Stainless steel		
Finish		None		
Load Capacity [N]		68.7 (7.0kgf)	68.7 (7.0kgf)	68.7 (7.0kgf)
Max. Moment Capacity	Pitch [N·m] Roll [N·m]	0.9 1.2	0.9 1.2	0.9 0.9
Moment Stiffness	Roll ["/N·m]	0.51	0.51	—
Parallelism [μm]		50	50	100
Weight [kg]		0.25	0.2	0.45

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V Groove Screw

Ohters

15 × 15 mm

25 × 25 mm

40 × 40 mm

60 × 60 mm

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80 × 80 mm

100 × 100 mm

120 × 120 mm

Others