

## Goniometer Stages 30 x 30 1-Axis, 2-Axis



↑ TTS-311



↑ TTS-312



↑ TTD-313

### Features

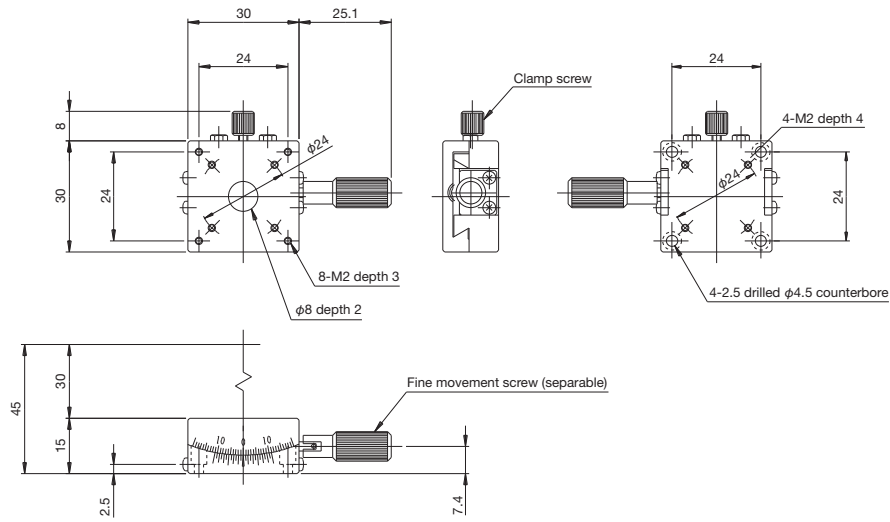
- A 1-axis tilt stage with differing rotation center height and travel amount.
- 1-axis tilt stages with different rotation center heights are available. They can also be combined into a 2-axis tilt stage with a single rotation center height.
- Dovetails (D-T Method) are used for the travel guide.
- Separable knob type.
- Versatile use for positioning of cameras, sensors, etc.

Model number	TTS-311	TTS-312	TTD-313
Model name	Goniometer Stage 30 x 30		2-Axis Goniometer Stage 30 x 30
Travel direction	Tilt single direction		Tilt double direction
Stage surface	30 mm x 30 mm		
Feed method	Worm gear method		
Travel amount	±15°	±10°	Upper axis ±15°/lower axis ±10°
Travel amount/1 knob rotation	Approx. 2° 34'	Approx. 1° 48'	Upper axis approx. 2° 34', lower axis approx. 1° 48'
Scale	Vernier reading: 5'		
Travel guide	Dovetail		
Rotation center (from stage top)	30 mm	45 mm	30 mm
Rotation center accuracy	φ 0.1		
Load capacity	19.6 N (2 kgf)		
Mass	0.1 kg		0.2 kg
Main materials/surface treatment	Brass/hardened black chrome		

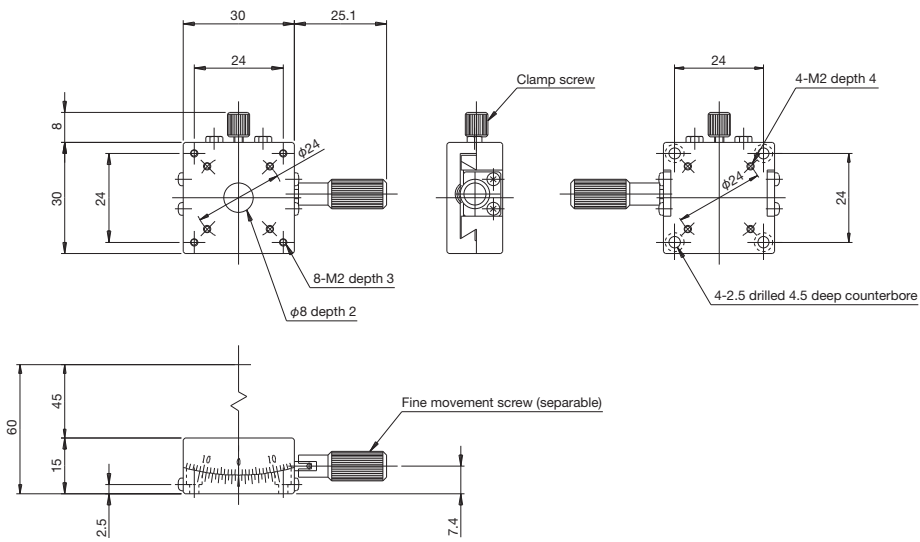


Tilt Stages ◀ Manual Stages ▶

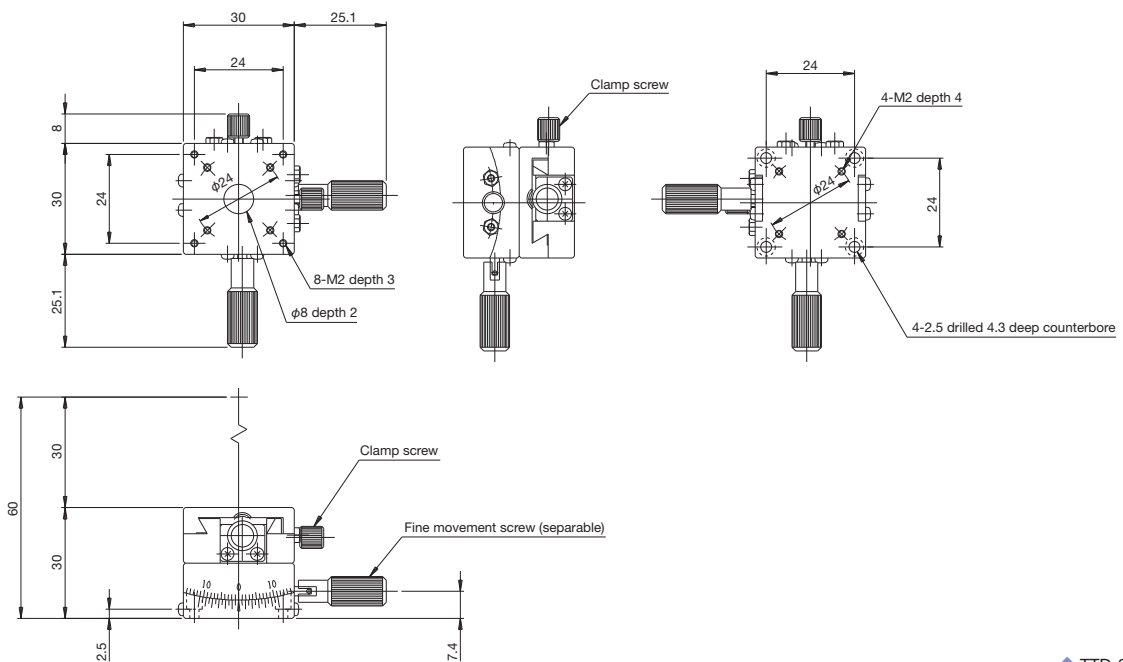
Product Appearance



↑ TTS-311



↑ TTS-312



↑ TTD-313

Motorized Stages	Automated Products for Microscopes	Manual Stages	Fix Stages	Thin VB Stages	Rack & Pinion Stages	High-Grade Stages	Swim Stages, Cross Roller Stages	Z-Like Stages	Rotary Stages	Tilt Stages	Tilt/Rotary Stages	XZ, YZ Stages	XYZ Stages
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## Goniometer Stages 40 x 40 1-Axis, 2-Axis



↑ TTS-411



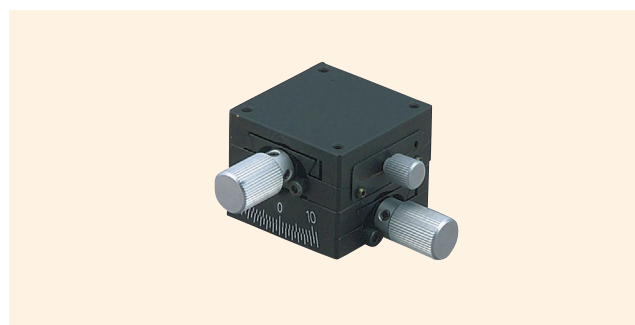
↑ TTS-412



↑ TTS-413



↑ TTD-411



↑ TTD-412

### Features

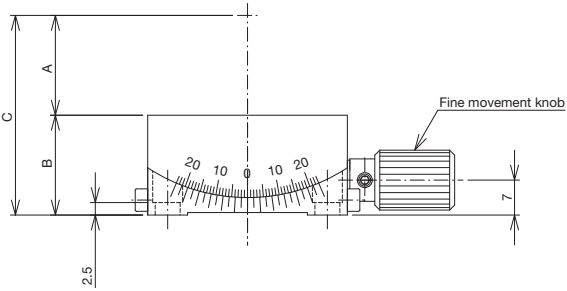
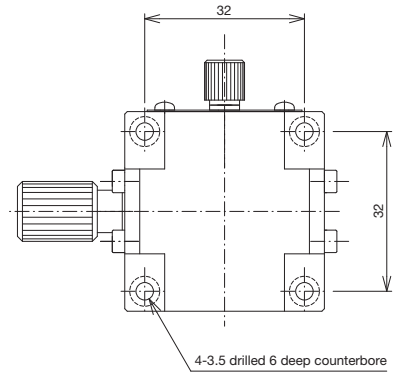
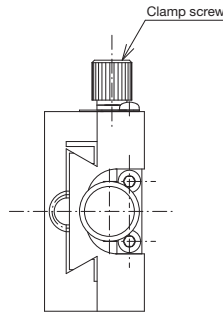
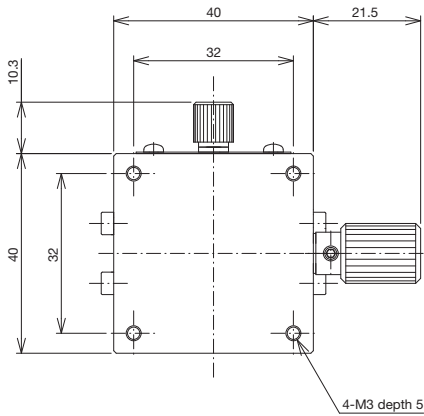
- A 1-axis tilt stage with differing rotation center height and travel amount.
- 1-axis tilt stages with different rotation center heights can be combined into a 2-axis tilt stage with a single rotation center height.
- Dovetails (D-T Method) are used for the travel guide.
- Versatile use for positioning of cameras, sensors, etc.

Model number	TTS-411	TTS-412	TTS-413	TTD-411	TTD-412
Model name	Goniometer Stage 40 x 40			2-Axis Goniometer Stage 40 x 40	
Travel direction	Tilt single direction			Tilt double direction	
Stage surface	40 mm x 40 mm				
Feed method	Worm gear method				
Travel amount	±20°	±15°	±10°	Upper axis ±20°/ lower axis ±15°	Upper axis ±15°/ lower axis ±10°
Travel amount/1 knob rotation	Approx. 2° 8' 34"	Approx. 1° 20'	Approx. 1° 1' 32"	Upper axis approx. 2° 8' 34", lower axis approx. 1° 20'	Upper axis approx. 1° 20', lower axis approx. 1° 1' 32"
Scale	Vernier reading: 5'				
Travel guide	Dovetail				
Rotation center (from stage top)	20 mm	40 mm	57 mm	20 mm	40 mm
Rotation center accuracy	φ0.1				
Load capacity	29.4 N (3 kgf)				
Mass	0.24 kg	0.21 kg	0.19 kg	0.45 kg	0.4 kg
Main materials/surface treatment	Brass/hardened black chrome				

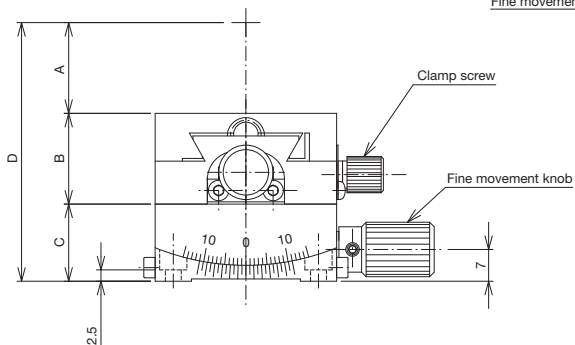
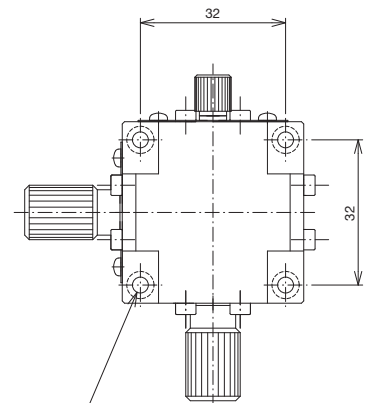
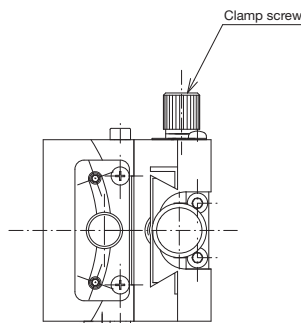
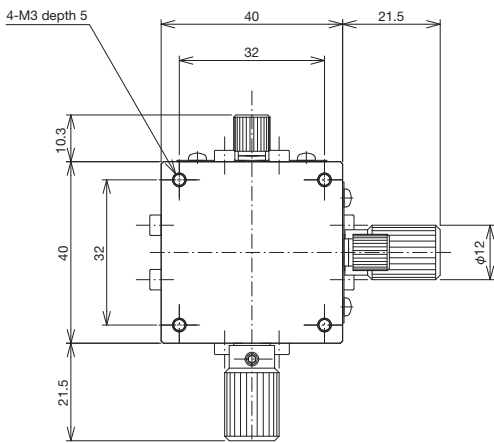


Tilt Stages ◀ Manual Stages ▶

Product Appearance



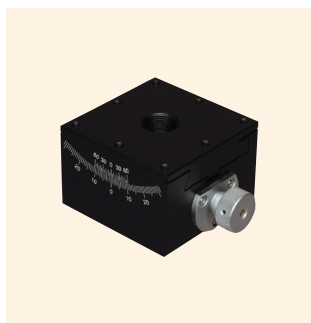
Model number	A (mm)	B (mm)	C (mm)
TTS-411	20	20	40
TTS-412	40	17	57
TTS-413	57	15	72



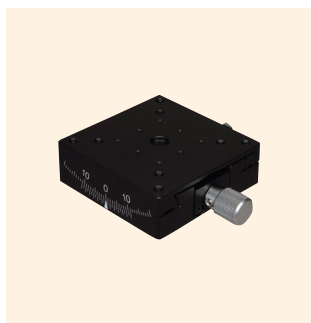
Model number	A (mm)	B (mm)	C (mm)	D (mm)
TTD-411	20	20	17	57
TTD-412	40	17	15	72

- Motorized Stages
- Automated Products for Microscopes
- Manual Stages
- Fix Stages
- Thin VB Stages
- Rack & Pinion Stages
- High-Grade Stages
- Slit Stages, Cross Roller Stages
- Z-Like Stages, Z Stages
- Rotary Stages
- Tilt Stages
- Tilt/Rotary Stages
- XZ, YZ Stages
- XYZ Stages

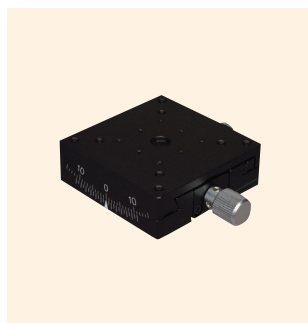
## Goniometer Stages 60 x 60 1-Axis, 2-Axis



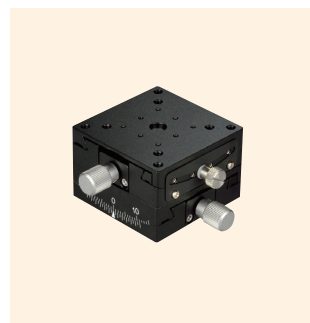
↑ TTS-611



↑ TTS-612



↑ TTS-613



↑ TTD-614

### Features

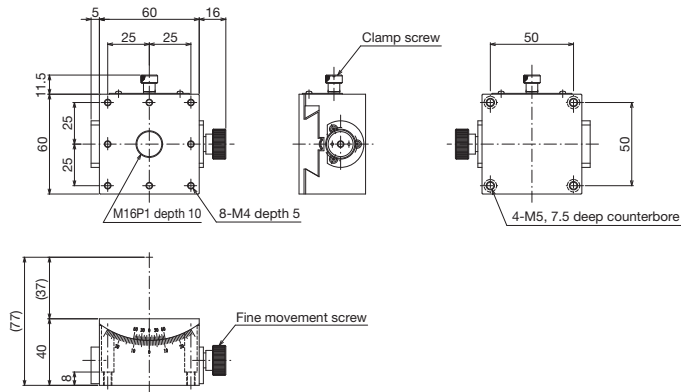
- A 1 axis tilt stage with differing rotation center height and travel amount.
- 1-axis tilt stages with different rotation center heights are available. They can also be combined into a 2-axis tilt stage with a single rotation center height.
- Dovetails (D-T Method) are used for the travel guide.
- Versatile use for positioning of cameras, sensors, etc.
- TTS-611 is a long-distance tilt stage that can become a 2-axis tilt stage with a single rotation center by combining with TTS-211.

Model number	TTS-611	TTS-612	TTS-613	TTD-614
Model name	Goniometer Stage 60 x 60	Goniometer Slim Stage 60 x 60		2-Axis Goniometer Slim Stage 60 x 60
Travel direction	Tilt single direction			Tilt double direction
Stage surface	60 mm x 60 mm			
Feed method	Worm gear method			
Travel amount	±20°	±15°	±10°	Upper axis ±15°/lower axis ±10°
Travel amount/1 knob rotation	Approx. 1° 33'	Approx. 1° 19' 25"	Approx. 1° 1' 22"	Upper axis approx. 1° 19' 25", lower axis approx. 1° 1' 22"
Scale	Vernier reading: 5'			
Travel guide	Dovetail			
Rotation center (from stage top)	37 mm	60 mm	80 mm	60 mm
Rotation center accuracy	φ 0.1 mm			
Load capacity	49 N (5 kgf)			
Mass	0.5 kg	0.2 kg		0.4 kg
Main materials/surface treatment	Aluminum alloy/black satin anodized finish			

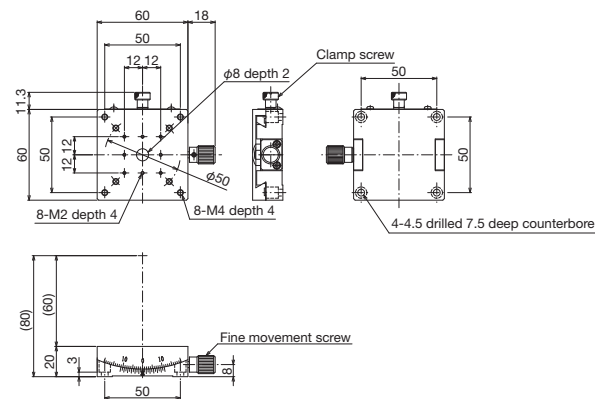


Tilt Stages ◀ Manual Stages ▶

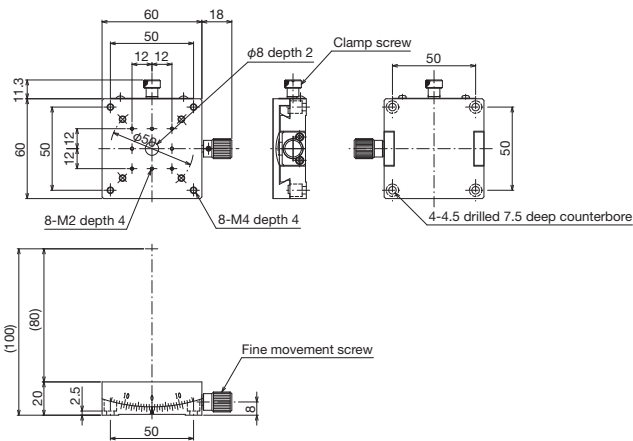
Product Appearance



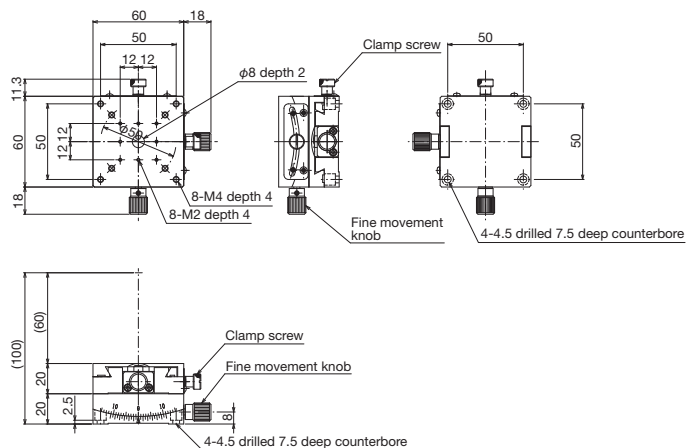
↑ TTS-611



↑ TTS-612



↑ TTS-613



↑ TTD-614

Motorized Stages	Automated Products for Microscopes	Manual Stages
Fx Stages	Thru VB Stages	Rock & Pinion Stages
High-Grade Stages	Swirl Stages, Cross Roller Stages	Z-Like Stages, Z Stages
Rotary Stages	Tilt Stages	Tilt/Rotary Stages
XZ, YZ Stages	XYZ Stages	

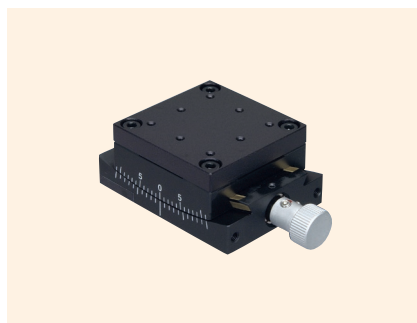
## Goniometer Stages 40 x 40 1-Axis, 2-Axis (Complex Coupling Mechanism)



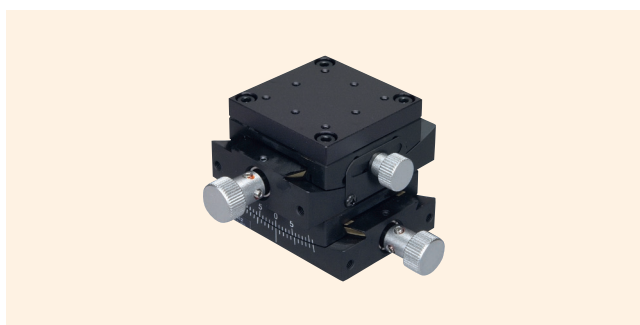
↑ TTS-C411



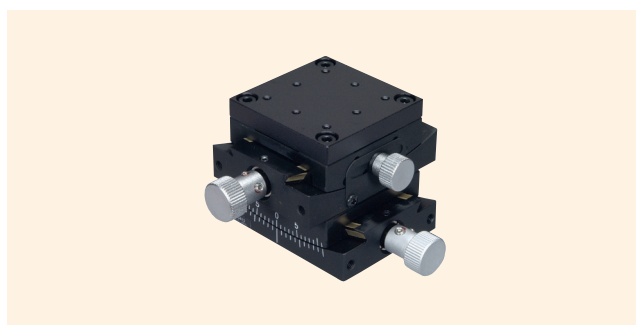
↑ TTS-C412



↑ TTS-C413



↑ TTD-C411



↑ TTD-C412

### Features

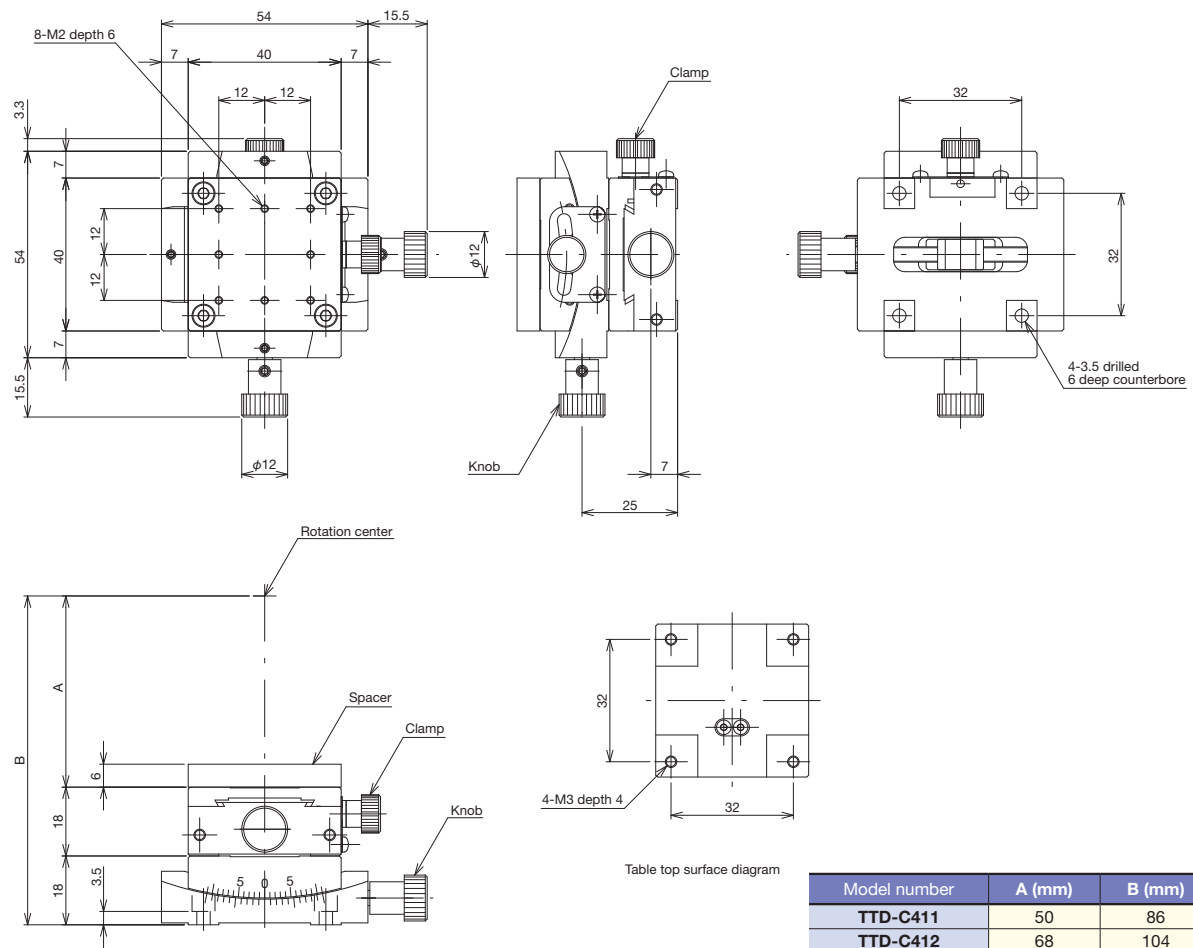
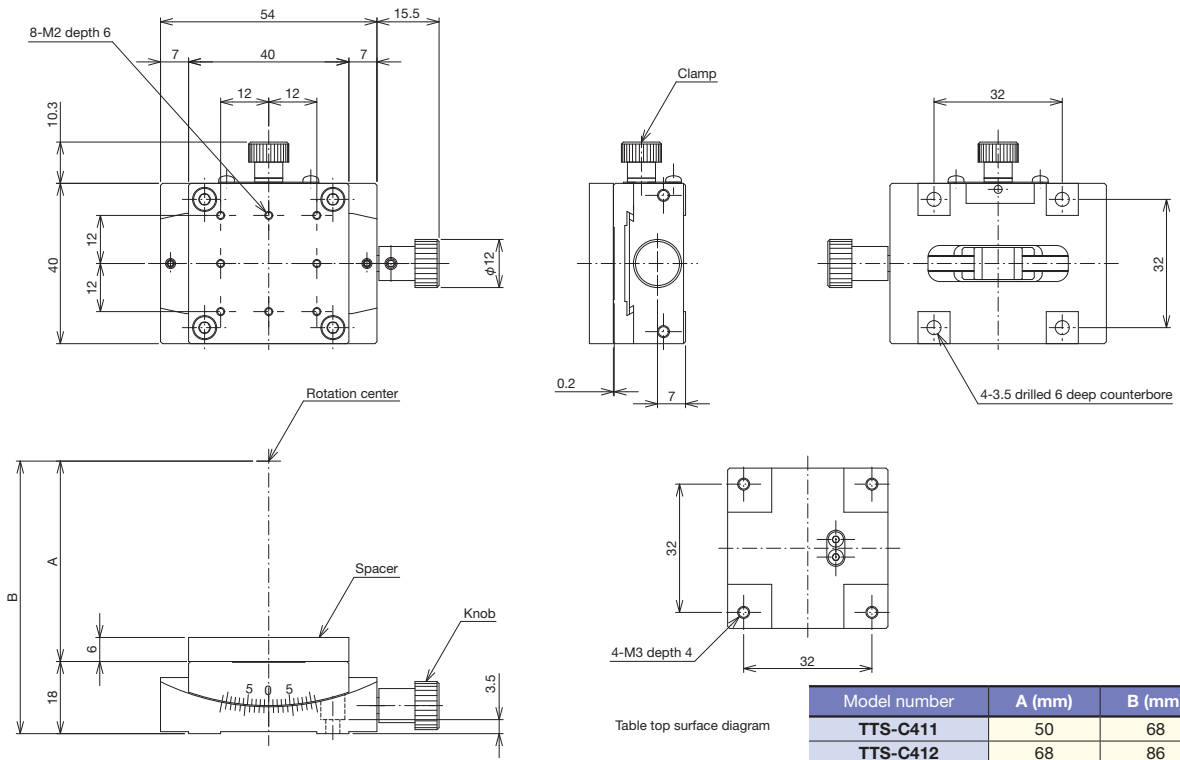
- A 1-axis tilt stage with differing rotation center height and travel amount.
- 1-axis tilt stages with different rotation center heights can be combined into a 2-axis tilt stage with a single rotation center height.
- THK CHUO's proprietary complex coupling structure enables fine movements to be made extraordinarily smoothly.
- Dovetails (D-T Method) are used for the travel guide.
- Versatile use for precision positioning of cameras, sensors, etc.

Model number	TTS-C411	TTS-C412	TTS-C413	TTD-C411	TTD-C412
Model name	Goniometer Stage 40 x 40			2-Axis Goniometer Stage 40 x 40	
Travel direction	Tilt single direction			Tilt double direction	
Stage surface	40 mm x 40 mm				
Feed method	Precision screw, complex coupling method				
Travel amount	±8°	±6°	±5°	Upper axis ±8°/lower axis ±6°	Upper axis ±6°/lower axis ±5°
Travel amount/1 knob rotation	Approx. 28' 11"	Approx. 21' 45"	Approx. 17' 43"	Approx 28' 11", lower axis approx. 21' 45"	Upper axis approx. 21' 45", lower axis approx. 17' 43"
Scale	Vernier reading: 6'				
Travel guide	Dovetail				
Rotation center (from stage top)	50 mm	68 mm	86 mm	50 mm	68 mm
Rotation center accuracy	φ0.1 mm				
Load capacity	29.4 N (3 kgf)				
Mass	0.3 kg			0.6 kg	
Main materials/surface treatment	Brass/hardened black chrome				



Tilt Stages ◀ Manual Stages ▶

Product Appearance



- Motorized Stages
- Automated Products for Microscopes
- Manual Stages**
- Fix Stages
- Thin VB Stages
- Rack & Pinion Stages
- High-Grade Stages
- Spin Stages, Cross Roller Stages
- Z-Like Stages, Z Stages
- Rotary Stages
- Tilt Stages
- Tilt/Rotary Stages
- XZ, YZ Stages
- XYZ Stages



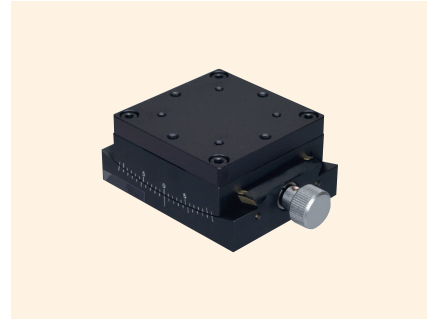
## Goniometer Stages 60 x 60 1-Axis, 2-Axis (Complex Coupling Mechanism)



↑ TTS-C611



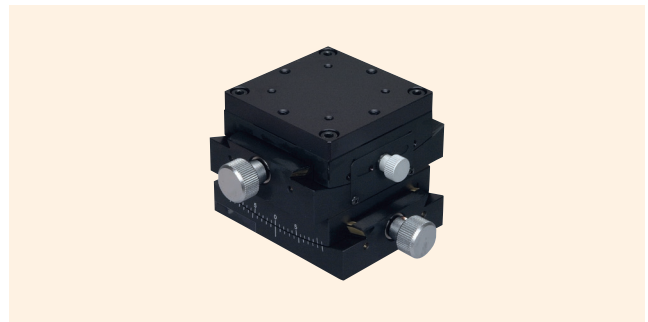
↑ TTS-C612



↑ TTS-C613



↑ TTD-C611



↑ TTD-C612

### Features

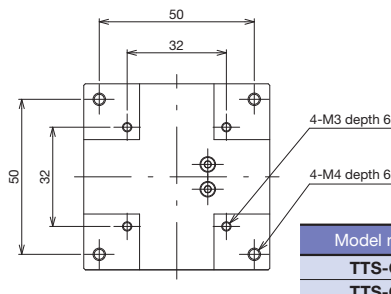
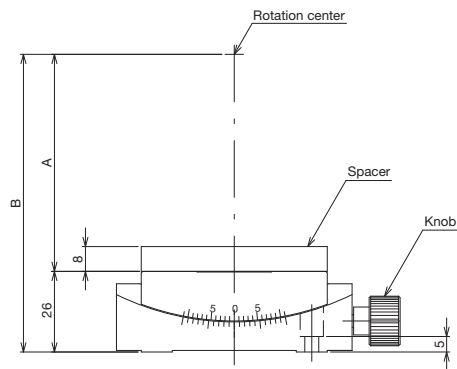
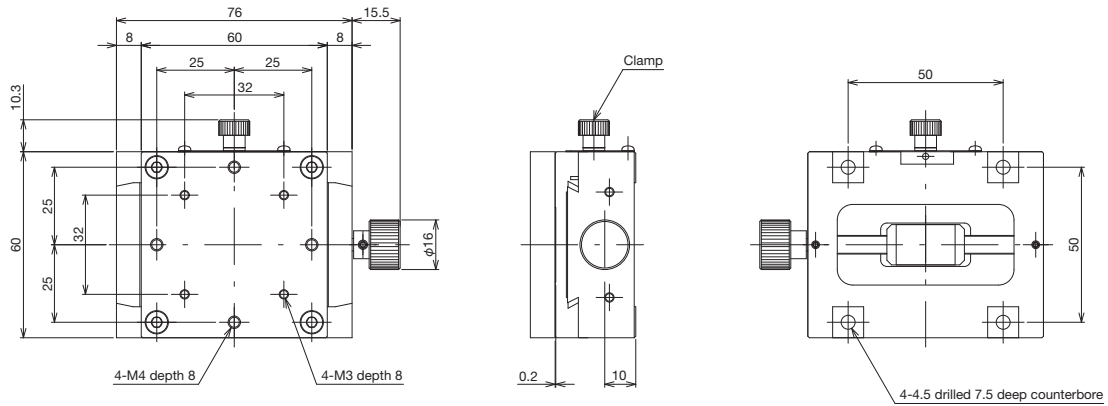
- A 1-axis tilt stage with differing rotation center height and travel amount.
- 1-axis tilt stages with different rotation center heights can be combined into a 2-axis tilt stage with a single rotation center height.
- THK CHUO's proprietary complex coupling structure enables fine movements to be made extraordinarily smoothly.
- Dovetails (D-T Method) are used for the travel guide.
- Versatile use for precision positioning of cameras, sensors, etc.

Model number	TTS-C611	TTS-C612	TTS-C613	TTD-C611	TTD-C612
Model name	Goniometer Stage 60 x 60			2-Axis Goniometer Stage 60 x 60	
Travel direction	Tilt single direction			Tilt double direction	
Stage surface	60 mm x 60 mm				
Feed method	Precision screw, complex coupling method				
Travel amount	±8°	±6°	±5°	Upper axis ±8°/lower axis ±6°	Upper axis ±6°/lower axis ±5°
Travel amount/1 knob rotation	Approx. 19' 59"	Approx. 15' 21"	Approx. 12' 27"	Upper axis approx. 19' 59", lower axis approx. 15' 21"	Upper axis approx. 15' 21", lower axis approx. 12' 27"
Scale	Vernier reading: 6'				
Travel guide	Dovetail				
Rotation center (from stage top)	70 mm	96 mm	122 mm	70 mm	96 mm
Rotation center accuracy	φ 0.1 mm			-	
Load capacity	49 N (5 kgf)			39.2 N (4 kgf)	
Mass	0.7 kg			1.4 kg	
Main materials/surface treatment	Brass/hardened black chrome				



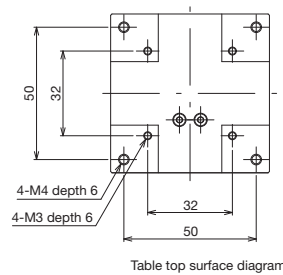
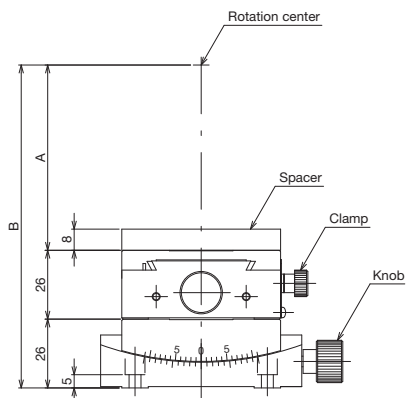
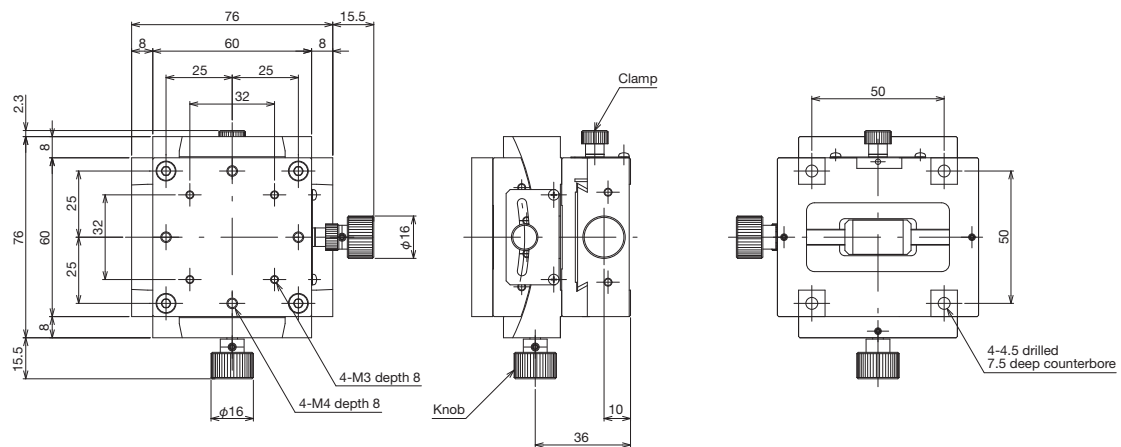
Tilt Stages ◀ Manual Stages ▶

Product Appearance



Model number	A (mm)	B (mm)
TTS-C611	70	96
TTS-C612	96	122
TTS-C613	122	148

Table top surface diagram



Model number	A (mm)	B (mm)
TTD-C611	70	122
TTD-C612	96	148

Table top surface diagram

- Motorized Stages
- Automated Products for Microscopes
- Manual Stages**
- Tilt Stages
- Thin VIB Stages
- Rack & Pinion Stages
- High-Grade Stages
- Stein Stages, Cross Roller Stages
- Z-Like Stages, Z Stages
- Rotary Stages
- Tilt Stages
- Tilt/Rotary Stages
- XZ, YZ Stages
- XYZ Stages

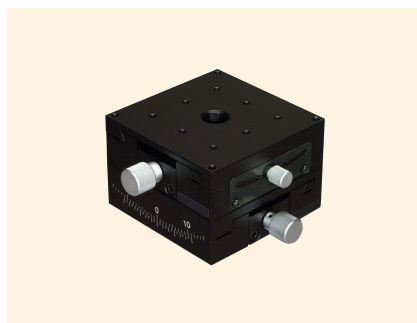
## Goniometer Stages 90 x 90 1-Axis, 2-Axis



↑ TTS-911



↑ TTS-912



↑ TTD-913

### Features

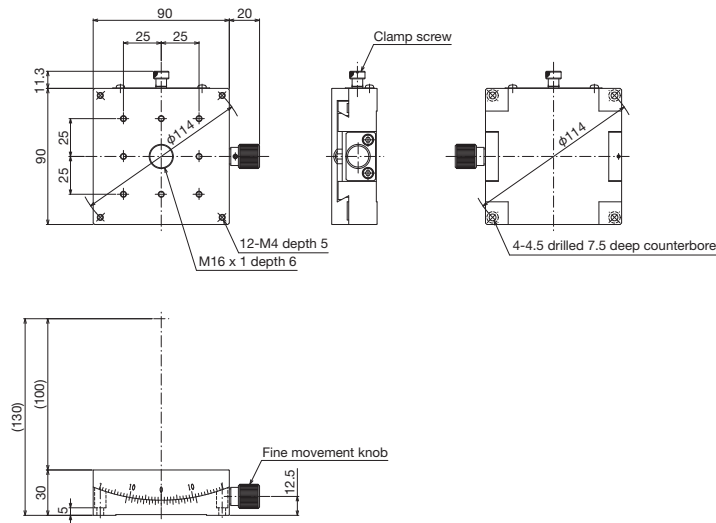
- A 1-axis tilt stage with differing rotation center height and travel amount.
- 1-axis tilt stages with different rotation center heights are available. They can also be combined into a 2-axis tilt stage with a single rotation center height.
- Dovetails (D-T Method) are used for the travel guide.
- Versatile use for positioning of cameras, sensors, etc.

Model number	TTS-911	TTS-912	TTD-913
Model name	Goniometer Slim Stage 90 x 90		2-Axis Goniometer Slim Stage 90 x 90
Travel direction	Tilt single direction		Tilt double direction
Stage surface	90 mm x 90 mm		
Feed method	Worm gear method		
Travel amount	±12°	±10°	Upper axis ±12°/lower axis ±10°
Travel amount/1 knob rotation	Approx. 1° 17' 25"	Approx. 59'	Upper axis approx. 1° 17' 25", lower axis approx. 59'
Scale	Vernier reading: 5'		
Travel guide	Dovetail		
Rotation center (from stage top)	100 mm	130 mm	100 mm
Rotation center accuracy	φ0.1 mm		-
Load capacity	78.4 N (8 kgf)		68.6 N (7 kgf)
Mass	0.7 kg		1.4 kg
Main materials/surface treatment	Aluminum alloy/black satin anodized finish		

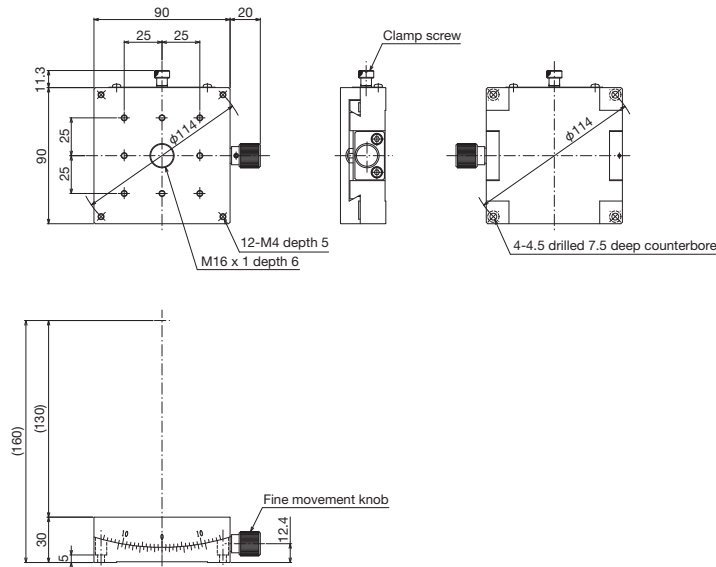


Tilt Stages ◀ Manual Stages ▶

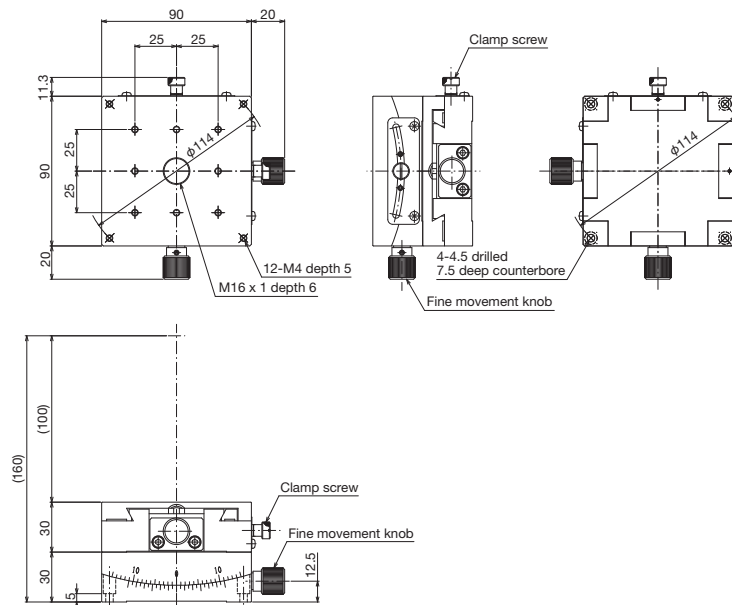
Product Appearance



↑ TTS-911



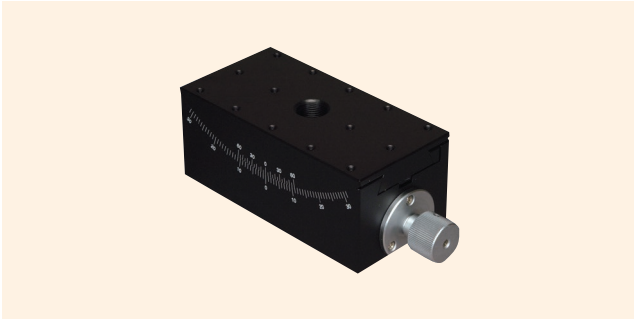
↑ TTS-912



↑ TTD-913

Motorized Stages	Automated Products for Microscopes	Manual Stages
Fix Stages	Thin VB Stages	Rack & Pinion Stages
High-Grade Stages	Swirl Stages, Cross Roller Stages	Z-Like Stages, Z Stages
Thin Stages	Thin/Rotary Stages	XZ, YZ Stages
XZ Stages		XZ Stages

# Goniometer Stages 60 x 120



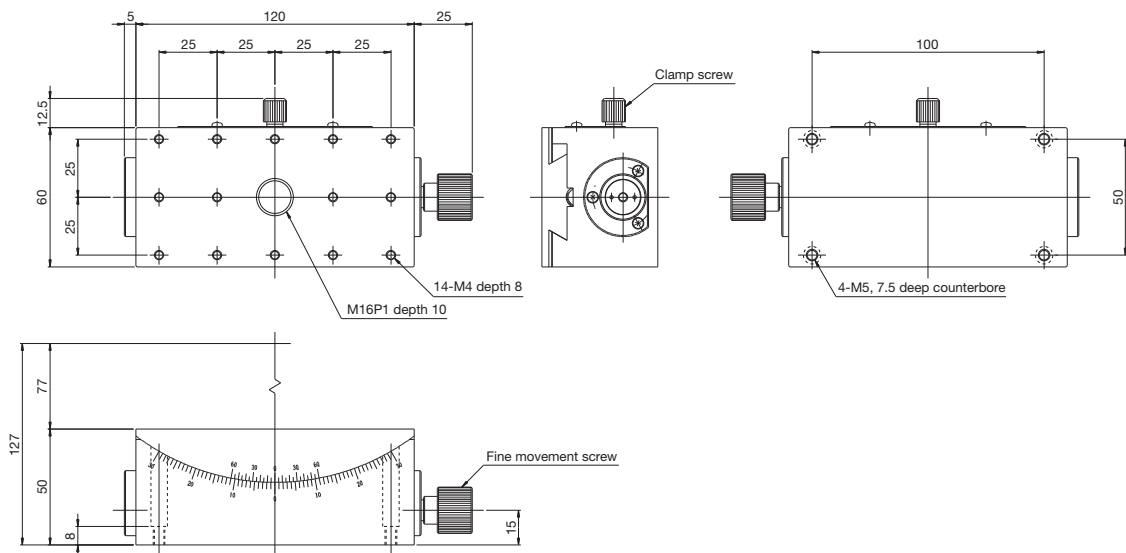
↑ TTS-211

## Features

- A 1-axis tilt stage possessing a rotation center and supporting long travel distances and high load capacity.
- Combine with TTS-611, which has a differing rotation center height, to form a 2-axis tilt stage with a single rotation center.
- Dovetails (D-T Method) are used for the travel guide.
- Versatile use for positioning of cameras, sensors, and various experiment jigs.

Model number	TTS-211
Model name	Goniometer Stage 60 x 120
Travel direction	Tilt single direction
Stage surface	60 mm x 120 mm
Feed method	Worm gear method
Travel amount	±20°
Travel amount/1 knob rotation	Approx. 49'
Scale	Vernier reading: 5'
Travel guide	Dovetail
Rotation center (from stage top)	77 mm
Rotation center accuracy	φ 0.1
Load capacity	98 N (10 kgf)
Mass	1 kg
Main materials/surface treatment	Aluminum alloy/black satin anodized finish

## Product Appearance



↑ TTS-211

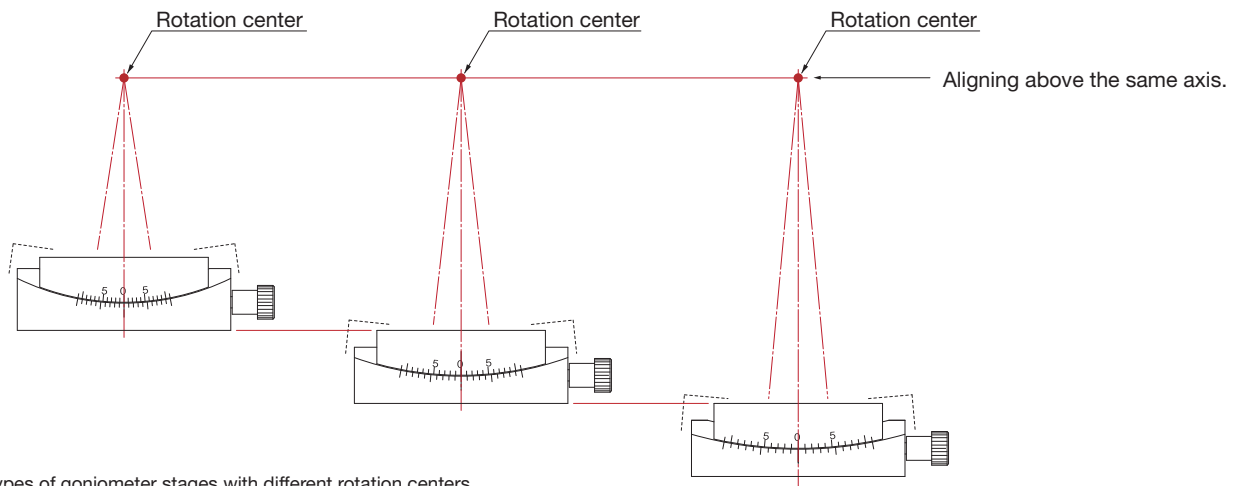


**Goniometer Stage Features**

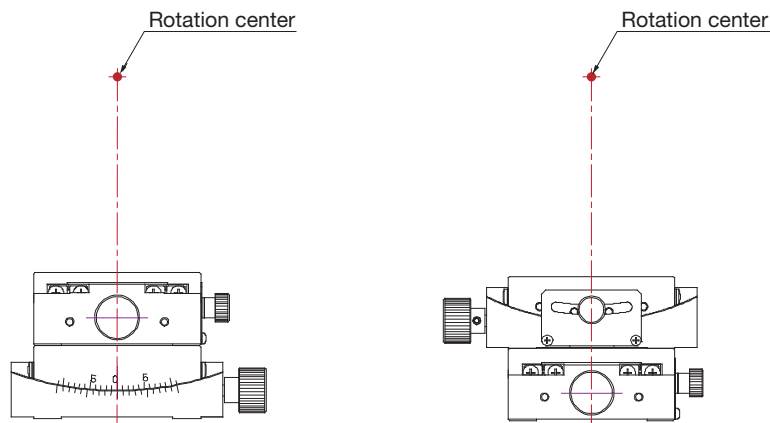
THK CHUO's goniometer stages are designed so that the center of rotation aligns in the same position as the rest of the lineup, as shown in the figure below.

The 2-axis goniometer stage product has lower and upper axes positioned orthogonally (at 90° to each other), but they can also be combined in the same direction in order to extend the travel distance.

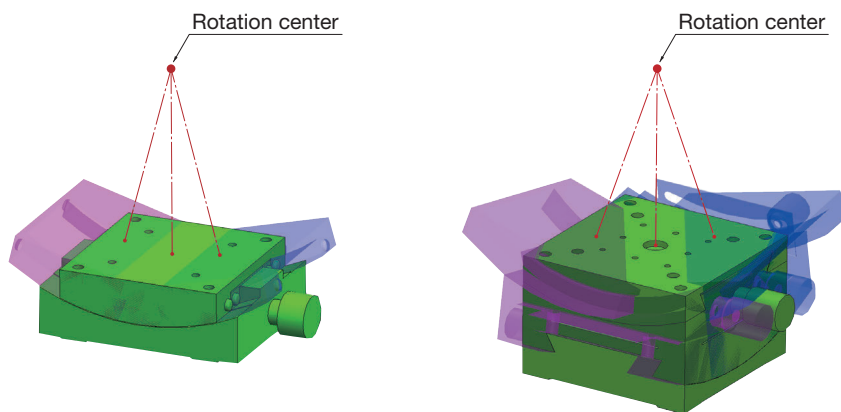
Check the product appearance for details.



■ 3 types of goniometer stages with different rotation centers



■ 2-axis goniometer stage combination example



■ 1-axis goniometer stage travel example

■ 2-axis goniometer stage travel example

- Motorized Stages
- Automated Products for Microscopes
- Manual Stages
- Fx Stages
- Thru V8 Stages
- Rack & Pinion Stages
- High-Grade Stages
- Spin Stages, Cross Roller Stages
- Z Lift Stages, Z Stages
- Rotary Stages
- Tilt Stages
- Tilt/Rotary Stages
- XZ, YZ Stages
- XYZ Stages