

Pneumatic Flat Grips

For tensile testing rubbers, plastics, elastomers, textiles, cloth, and paper, in specimen geometries such as plates, films, and wires, a good option is pneumatic flat grips. Quick clamping and a repeatable clamping force are advantages of pneumatic flat grips.

Available with maximum capacities up to 10 kN (2,200 lbf) for standard grip sets and up to 5 kN (1,100 lbf) for bellows-type grip sets. The main difference between these two types of pneumatic flat grips is their operational temperature range: -10 to 180°C (14 to 356°F) for the standard set and the bellows-type set withstands -70 to 200°C (-94 to 392°F).

1 kN (220 lbf), 5 kN, and 10 kN pneumatic grip sets are supplied with single-side file-teeth grip faces, and the 50 N (11.0 lbf) grip sets come with flat grip faces installed. Additional grip face options, including wave, rubber-coated, and high-strength rubber-coated, are available. See the document on Grip Faces for Pneumatic Flat Grips for further details.

The air pressure range of these grips is 0.2 MPa (2 kgf/cm², 29 psi) to 0.7 MPa (7 kgf/cm², 102 psi). A 0.7 MPa (7 kgf/cm², 102 psi) air compressor is needed to operate the grips. In certain regions, an air compressor is available as an accessory.

Opening and closing of grips can be controlled by: a foot valve unit, an F-type crosshead-linked foot switch, a hand-operated switching unit, the smart controller on AG-X plus models, and the main operation panel on AGS-X 20 kN (4,400 lbf) and above frame capacity models.

The foot valve unit is applicable to all AG-X plus series, AGS-X series, and EZ-X series models and is the most commonly used grip operator. The other grip control options are supplied to fit specific models and are available as part of pneumatic flat grip kits, which include upper and lower grips, grip faces, and a grip controller. Please contact your local Shimadzu representative for information about pneumatic flat grip kits.

In addition, for operator protection, finger guards are available based on the type of grip faces installed. For the bellows-type grip sets, finger guards come as standard. Finger guards for standard grip sets need to be ordered along with the grips because a grip modification is needed.

Additional items needed for operation:

- An external 0.7 MPa (7 kgf/cm², 102 psi) air compressor



Relevant Materials

Rubber, Plastics, Textiles, Cloth, Paper

Relevant Specimens

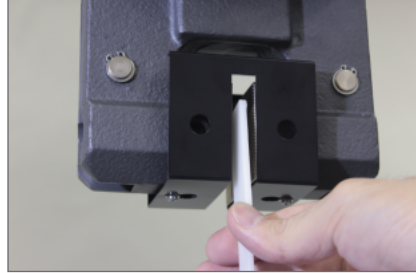
Plates, Films, Wires

Operation

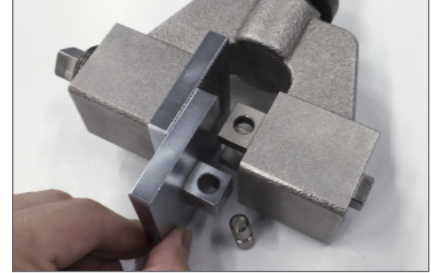
When air is applied to the grips, the operating force of an actuator is multiplied by a lever which simultaneously closes the left and right faces, clamping the test specimen at the centerline of the grip. The clamping force is held constant throughout testing and the clamping force can be tailored by adjusting the air pressure supplied to the grips.



The foot valve unit frees both hands to mount specimens



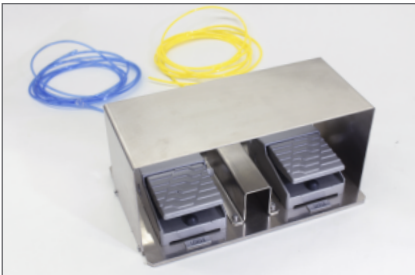
(Option) finger guards avoid pinched fingers during closing of the grips



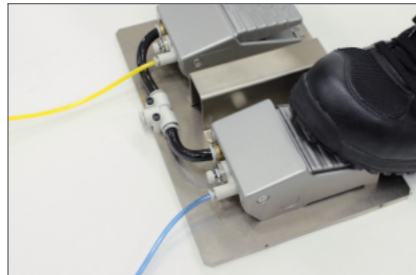
Change grip faces to suit your sample

• Foot Valve Unit

The foot valve unit is a switch for opening and closing pneumatic grips, and is compatible with various Shimadzu pneumatic grips. The left and right foot switches control the upper and lower grips, respectively. Once you activate a switch, pressurized air is continually supplied to close the grips and apply a constant clamping force. Stepping on the switch a second time deactivates it and opens the grips. The chucking force can be controlled by adjusting the air pressure using the adjusting screw, meaning the force can be adjusted for a particular material.



Foot valve unit with cover. Switches for upper and lower grips are separated



Open and close the grips by the foot switch (Alternate type switch)



Grip force is changeable by air pressure adjusting screw

• Hand-operated Switching Unit

The hand-operated switching unit has two switches, one for the upper grip and another for the lower grip. Activating and deactivating the switches by hand closes and opens each grip, respectively.



• Smart Controller Operation

You can control the opening and closing of pneumatic grips with the smart controller of the AG-X plus series 20 kN and above frame capacity models. The button for gripping is a two stage switch, pressing once closes the upper grip and pressing again closes the lower grip. The button for opening the grips is a one stage switch. One press of the switch opens the upper and lower grips at the same time.



Smart Controller for AG-X plus Series

• F-type Crosshead-linked Foot Switch

Using the F-type crosshead-linked foot switch, after you grip a specimen in the upper and lower grips, the test automatically starts after a few seconds. In addition, this function can be turned off so that it acts like a standard foot switch. The foot switch is divided into gripping and opening pedals. The pedal for gripping is two stage, one push closes the upper grip and another push closes the lower grip. Whereas, the grip opening peddle is a one stage switch. Pushing once opens the upper and lower grips together. Furthermore, it is possible to automate opening of the grips after the end of a test.



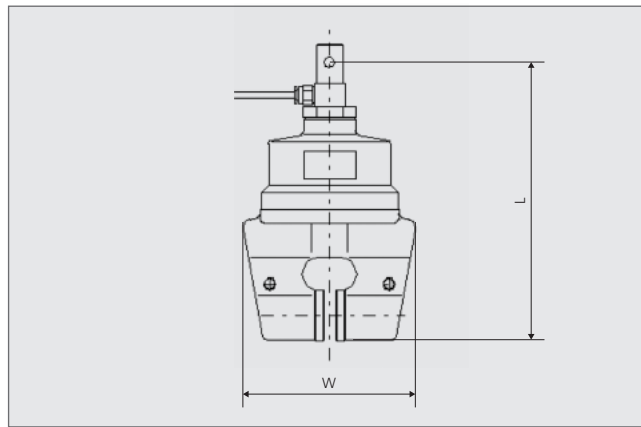
Specification



Maximum Grip Capacity			Applicable Specimen Thickness Note 1	Grip Face Size		Temperature Range Note 2	Grip Size		Upper Grip Mass	Upper Grip Ø Fitting (Ø pin)	Lower Grip Ø Fitting (Ø pin)
				Width	Length		Width	Length			
N	kgf	lbf	mm (in)	mm (in)	mm (in)	°C (°F)	mm (in)	mm (in)	kg (lb)	mm	mm
Standard pneumatic flat grips											
10,000	1,000	2,200	0 to 10 (0 to 0.39)	60 (2.4)	50 (2.0)	-10 to 180 (14 to 356)	154 (6.1)	278.5 (11.0)	16.5 (36.4)	25 (10)	25 (10)
5,000	500	1,100	0 to 6 (0 to 0.24)	60 (2.4)	50 (2.0)	-10 to 180 (14 to 356)	154 (6.1)	235 (9.3)	5.7 (12.6)	16 (6.5)	16 (6.5)
1,000	100	220	0 to 6 (0 to 0.24)	50 (2.0)	30 (1.2)	-10 to 180 (14 to 356)	102 (4.0)	174 (6.9)	1.7 (3.7)	16 (6.5)	16 (6.5)
50	5.0	11.0	0 to 6 (0 to 0.24)	35 (1.4)	25 (0.98)	-10 to 180 (14 to 356)	64 (2.5)	135 (5.3)	0.4 (0.9)	10 (4)	16 (6.5)
Bellows type pneumatic flat grips											
5,000	500	1,100	0 to 6 (0 to 0.24)	85 (3.3)	50 (2.0)	-70 to 200 (-94 to 392)	180 (7.1)	346 (13.6)	6.5 (14.3)	16 (6.5)	16 (6.5)
1,000	100	220	0 to 6 (0 to 0.24)	50 (2.0)	30 (1.2)	-70 to 200 (-94 to 392)	120 (4.7)	241 (9.5)	2 (4.4)	16 (6.5)	16 (6.5)
50	5.0	11.0	0 to 6 (0 to 0.24)	35 (1.4)	25 (0.98)	-70 to 200 (-94 to 392)	80 (3.1)	192 (7.6)	0.6 (1.3)	10 (4)	16 (6.5)

Note 1: The applicable specimen thickness is valid only for grip faces supplied with the grips and may change when other grip faces are used.

Note 2: The operational temperature range of pneumatic flat grips is reduced to between 0 and 60°C (0 and 140°F) when rubber-coated grip faces are installed.

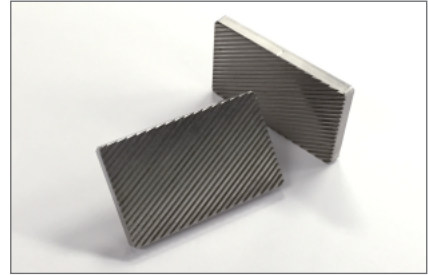


Ordering Information

P/N	Description
Standard Pneumatic Flat Grip Sets Includes: upper and lower standard pneumatic flat grips and grip faces	
346-52350-04	10 kN standard pneumatic flat grip set with single-side file-teeth grip faces (model PFG-10kNA)
346-52349-01	5 kN standard pneumatic flat grip set with single-side file-teeth grip faces (model PFG-5kNA)
346-52348-01	1 kN standard pneumatic flat grip set with single-side file-teeth grip faces (model PFG-1kNA)
346-52347-01	50 N standard pneumatic flat grip set with flat grip faces (model PFG-50NA)
Bellows Type Pneumatic Flat Grip Sets Includes: upper and lower bellows type pneumatic flat grips and grip faces	
346-55003	5 kN bellows type pneumatic flat grip set with single-side file-teeth grip faces (model PFG-5kNSA)
346-53385	1 kN bellows type pneumatic flat grip set with single-side file-teeth grip faces (model PFG-1kNSA)
346-53386	50 N bellows type pneumatic flat grip set with flat grip faces (model PFG-50NSA)
Accessories	
346-59687-01	Foot valve unit without cover to operate grips with air hoses to connect to grips (RoHS compliant)
346-59687-02	Foot valve unit with cover to operate grips with air hoses to connect to grips (RoHS compliant)
346-59687-51	Foot valve cover
Finger Guard Sets for Pneumatic Flat Grips with Standard Grip Faces Includes: two finger guards (two finger guard sets are needed for a pair of grips)	
346-55251-06	Finger guard set for 10 kN pneumatic flat grips
346-55251-05	Finger guard set for 5 kN pneumatic flat grips
346-55251-04	Finger guard set for 1 kN pneumatic flat grips
346-55251-03	Finger guard set for 50 N pneumatic flat grips

Grip Faces

Single-side file-teeth grip faces are standard accessories of 10 kN, 5 kN and 1 kN pneumatic flat grip sets. 50 N pneumatic flat grips are supplied with flat grip faces. If you require another type of grip face, please refer to the document "Grip Faces for Manual Screw and Pneumatic Flat Grips."



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