

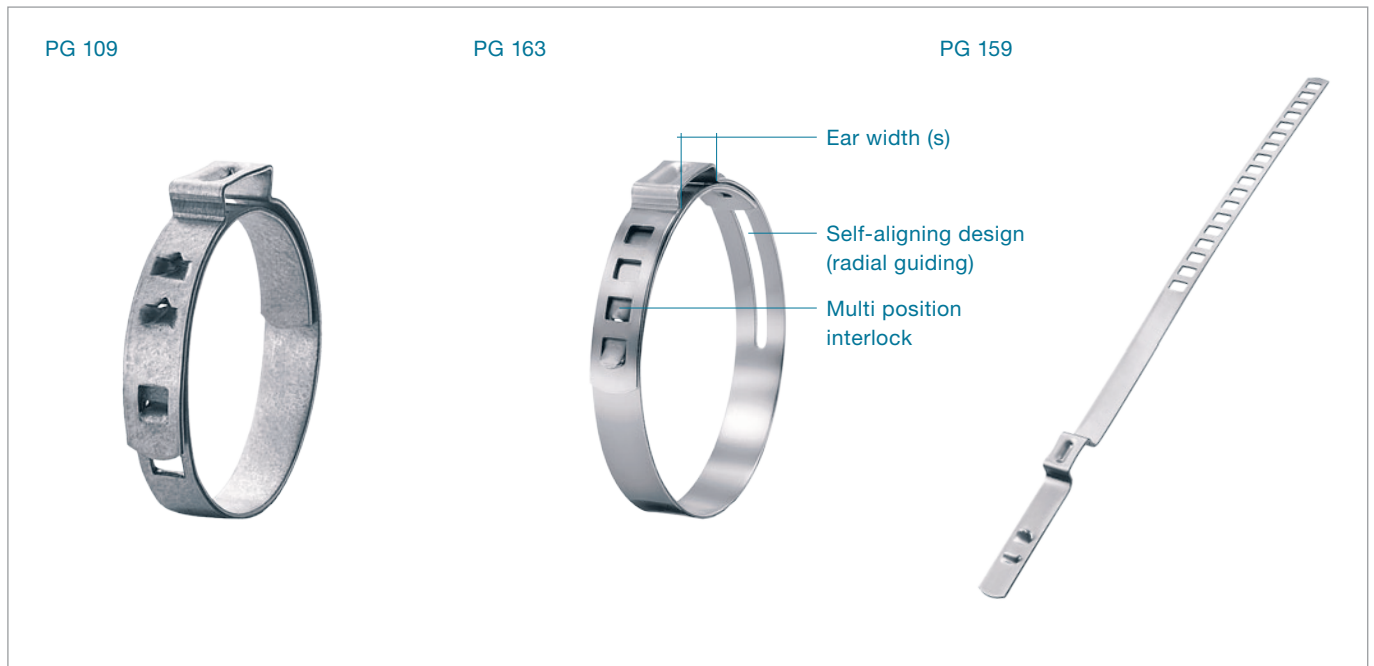
Technical Data Sheet

Adjustable Clamps

Product Group 109, 159 & 163



Connecting Technology



Choice of engagement positions: clamp can be adjusted to several nominal diameters

Inner ring with radial guidance: effective and powerful all-round sealing

Clamp ear: simple and fast installation, visible deformation provides evidence of proper closure

Burr-free strip edges: reduced risk of damage to parts being clamped

Connecting technology: ideal for soft materials

Adjustable Clamps Product Group 109, 159 & 163

Material

PG 109 zinc-plated steel band

PG 159 & 163 Stainless Steel, Material no. 1.4301/UNS S30400

Corrosion resistance according to DIN EN ISO 9227

PG 109 \geq 96 h

PG 159 \geq 1000 h

PG 163 \geq 1000 h

Adjustable Clamps PG 109

Size range width x thickness

29.5 – 122.0 mm 7.0 x 0.75 mm

29.5 – 122.0 mm 9.0 x 0.75 mm

Adjustable Clamps PG 159

Size range width x thickness

25.0 – 50.0 mm 7.0 x 0.8 mm*

40.0 – 110.0 mm 7.0 x 0.8 mm*

Adjustable Clamps with radial guiding PG 163

Size range width x thickness

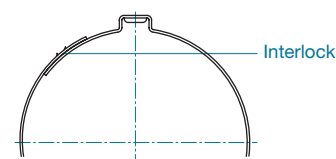
30.0 – 116.0 mm 7.0 x 0.6 mm

72.0 – 132.0 mm 9.0 x 0.6 mm

* Diameter range covered by a single clamp

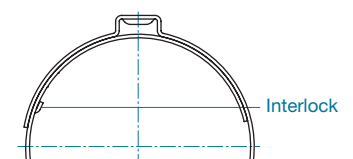
Some sizes are only available if an appropriate minimum quantity is ordered.

PG 159 – Adjustable Clamps:



Version with interlock outside
May make installation easier

PG 109/159 – Adjustable clamp:



Version with interlock inside

Clamp ear (closing element)

Using tools designed by Oetiker, the clamp is closed by drawing together the lower radii of the “ear”. The maximum diameter reduction is proportional to the open “ear” width (s).

The theoretical maximum reduction in diameter is given by the formula:

$$\text{Max. diameter reduction} = \frac{\text{Ear width (s)}}{\pi}$$

Multi-position interlock

The interlock consists of one or two load-retaining hooks that withstand tensile loading during closure and a lock tab designed to hold the hooks in their windows prior to closure. With both designs the interlock can be engaged in several positions within the published range. This feature allows a single part to cover a range of diameters.

Adjustable Clamps with radial guiding (self-aligning design)

A tab formed on the inner portion of the clamp locates in a slot in the outer band surface. During assembly and closure, the tab slides in the slot and so avoids any step around the inner circumference of the clamp.

Assembly Recommendations**Product Group 163 – Adjustable Clamps with radial guiding**

The clamp can be installed axially on the application prior to assembly or alternatively, radially around the assembled components. For either method, it is important that the hooks and lock tab are engaged in windows giving the smallest possible diameter, so that the maximum clearance between the assembled components and the inside diameter of the clamp before closure is no greater than 1.5 mm. Each incremental step of the interlock reduces the diameter before closure by 1.6 mm on the “3-step” series, and by 1.05 mm on the “6- step” design.

Product Group 109&159 – Adjustable Clamps

PG 109 Adjustable Clamps are supplied pre-shaped and engaged at mid-diameter. PG 159 clamps are supplied flat. The clamp must be shaped prior to assembly. Each incremental step of the interlock reduces the diameter before closure by approximately 1.6 mm. The following assembly steps demonstrate how best to achieve an effective geometry.

The clamp ear of both variants should be closed with constant tool jaw force, this practice is referred to as “force priority closure”. This assembly method ensures that a uniform and repeatable stress is applied to the application with a constant tensile force on the mechanical interlock.

Clamp installation monitoring and process data collection are available by incorporating an “Electronically Controlled Pneumatic Power Tool Oetiker ELK” in the assembly process.

Closing force

The closing force must be chosen to give the required material compression or surface pressure and should be qualified by dimensional evaluation and experiment. The resistance against the clamp equals the applied force, so the closing force is greatly reduced when compressing a soft material. The table below gives the maximum applied closing force for clamp and material dimensions.

Important

Single tool stroke closure only, do not apply secondary crimping force.

Installation data

Material dimensions (mm)	Size (mm)	Closing force max. (N)	Installation tools force-monitored ¹ :			
			Manual	Pneumatic	Cordless	Electronically controlled
PG 109						
7 x 0.75	29.5 – 122.0	1400	HMK 01/S01	HO ME 2000	CP 01	HO EL 2000
9 x 0.75	29.5 – 122.0	1800	HMK 01/S01	HO ME 2000	CP 01	HO EL 2000
PG 159						
7 x 0.8	25.0 – 50.0	2400	HMK 01	HO ME 3000	CP 01	HO EL 3000
7 x 0.8	40.0 – 110.0	2400	HMK 01	HO ME 3000	CP 01	HO EL 3000
PG 163						
7 x 0.6	30.0 – 50.0	1800	HMK 01/S01	HO ME 2000 – 3000	CP 01	HO EL 2000 – 3000
7 x 0.6	56.0 – 116.0	2400	HMK 01	HO ME 3000	CP 01	HO EL 3000
9 x 0.6	72.0 – 132.0	2800	-	HO ME 3000	CP 01	HO EL 3000

For an alternative option, see our manual pincers on page 104

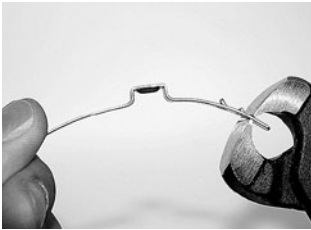
¹ Further information on page 84

Important note

These figures are intended as a guide, they may vary depending on the type and tolerances of parts being clamped. To ensure optimum clamp selection, we recommend making functional tests with several assemblies.

Assembly instructions

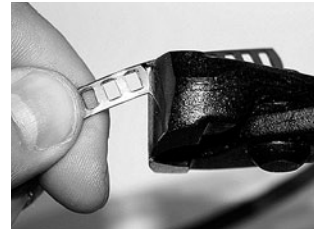
PG 159 – Version with interlock outside



Step 1
Pre-shape clamp.



Step 2
Determine the clamp length.



Step 3
Cut off the remaining material.
To avoid possible injury deburr
cut edges with a file.



Step 4
Place the clamp over object.
Engage interlocking hooks
in tightest window position.
Firmly crimp the ear with
Oetiker pincers.

PG 109 & 159 – Version with interlock inside



Step 1
Pre-shape clamp.



Step 2
Determine the clamp length.
Make sure the end of the
clamp passes the "ear", as
shown.



Step 3
Cut off the remaining material.
To avoid possible injury deburr
cut edges with a file.



Step 4
Place the clamp over object.
Engage interlocking hooks
in tightest window position.
Firmly crimp the ear with
Oetiker pincers.

Order information

Item No.	Ref. size*	Diameter range (mm)	Item No.	Ref. size*	Diameter range (mm)	Diameter range (inch)
Product Group 109			Product Group 163			
Band width 7 mm, thickness 0.75 mm, Ear width 10 mm			3 adjustment positions			
Band width 9 mm, thickness 0.75 mm, Ear width 10 mm			Band width 7 mm, thickness 0.6 mm, Ear width 10 mm			
10900012	29.5	24.5 – 29.5	16300022	30	23.6 – 30.0	0.929 – 1.181
10900016	34.2	29.5 – 36.0	16300179	32	25.6 – 32.0	1.008 – 1.260
10900018	42.3	36.0 – 45.5	16300023	35	28.6 – 35.0	1.126 – 1.378
10900020	55.1	45.5 – 61.5	16300251	37	30.6 – 37.0	1.205 – 1.457
10900022	74.3	61.5 – 85.5	16300024	40	33.6 – 40.0	1.323 – 1.575
10900014	106.1	85.5 – 122.0	16300025	45	38.6 – 45.0	1.520 – 1.772
Band width 9 mm, thickness 0.75 mm, Ear width 10 mm			6 adjustment positions			
10900013	29.5	24.5 – 29.5	Band width 7 mm, thickness 0.6 mm, Ear width 10 mm			
10900017	34.2	29.5 – 36.0	16300027	56	47.5 – 56.0	1.870 – 2.205
10900019	42.3	36.0 – 45.5	16300028	62	53.5 – 62.0	2.106 – 2.441
10900021	55.1	45.5 – 61.5	16300029	68	59.5 – 68.0	2.343 – 2.677
10900023	74.3	61.5 – 85.5	16300030	74	65.5 – 74.0	2.579 – 2.913
10900015	106.1	85.5 – 122.0	16300031	80	71.5 – 80.0	2.815 – 3.150
Product Group PG 159			16300032	86	77.5 – 86.0	3.051 – 3.386
Band width 7 mm, thickness 0.8 mm, Ear width 8.5 mm			16300033	92	83.5 – 92.0	3.287 – 3.622
Version with interlock outside			16300051	94	85.5 – 94.0	3.366 – 3.701
15900002		25.0 – 50.0	16300034	98	89.5 – 98.0	3.524 – 3.858
15900004		40.0 – 110.0	16300035	104	95.5 – 104.0	3.760 – 4.094
Version with interlock inside			16300250	107	98.5 – 107.0	3.878 – 4.213
15900005		25.0 – 50.0	16300036	110	101.5 – 110.0	3.996 – 4.331
15900007		40.0 – 110.0	16300037	116	107.5 – 116.0	4.232 – 4.567
			4 adjustment positions			
			Band width 9 mm, thickness 0.6 mm, Ear width 10 mm			
			16300038	72	64.0 – 72.0	2.520 – 2.835
			16300039	78	70.0 – 78.0	2.756 – 3.071
			16300040	84	76.0 – 84.0	2.992 – 3.307
			16300041	90	82.0 – 90.0	3.228 – 3.543
			16300042	96	88.0 – 96.0	3.465 – 3.780
			16300043	102	94.0 – 102.0	3.701 – 4.016
			16300044	108	100.0 – 108.0	3.937 – 4.252
			16300046	114	106.0 – 114.0	4.173 – 4.488
			16300045	120	112.0 – 120.0	4.409 – 4.724
			16300053	126	118.0 – 126.0	4.645 – 4.961
			16300129	132	124.0 – 132.0	4.882 – 5.197

* Ref. size = Condition as supplied:
Formed and engaged at the mid-diameter.

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