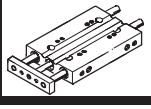
Mini guided cylinders DFC

FESTO

- Miniature guided cylinder
- Minimal space requirement
- Drive and guide in a single housing – with either plain-bearing guide or recirculating ball bearing guide
- For contactless end-position sensing
- Sturdy and precise

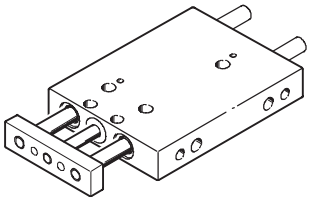
Mini guided cylinders DFC

Product range and peripherals overview

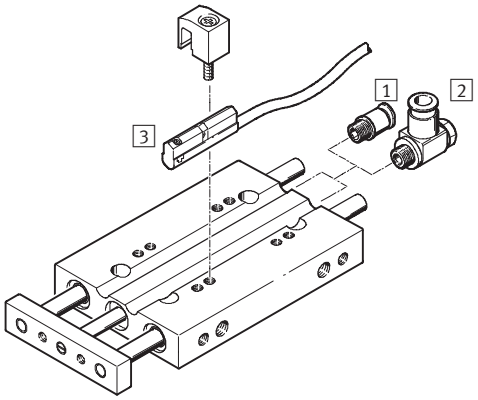
Function	Version	Type	Piston ∅ [mm]	Stroke [mm]
Double-acting		DFC	4	5, 10, 15, 20
			6	5, 10, 15, 20, 25, 30
			10	5, 10, 15, 20, 25, 30

Piston ∅ 4 mm

Integrated push-in/threaded fitting



Piston ∅ 6, 10 mm

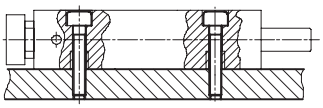


Accessories

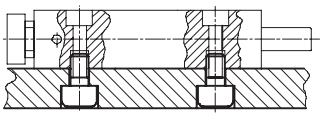
	Brief description	Piston ∅ 4 mm	Piston ∅ 6 mm	Piston ∅ 10 mm	➔ Page
1 Push-in/threaded fitting QSM	For connecting compressed air tubing with standard O.D.	–	■	■	Volume 3
2 One-way flow control valve GRLZ	For speed regulation	–	–	■	1 / 6.2-62
3 Proximity sensor SME/SMT-10		–	■	■	1 / 6.2-62

Mounting options

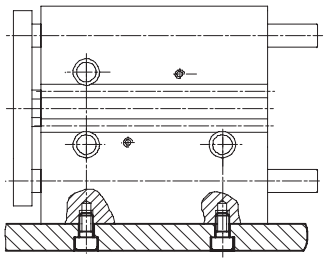
Horizontal mounting from above



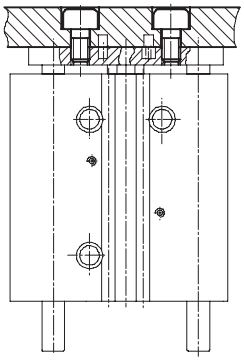
Horizontal mounting from below



Side mounting from below

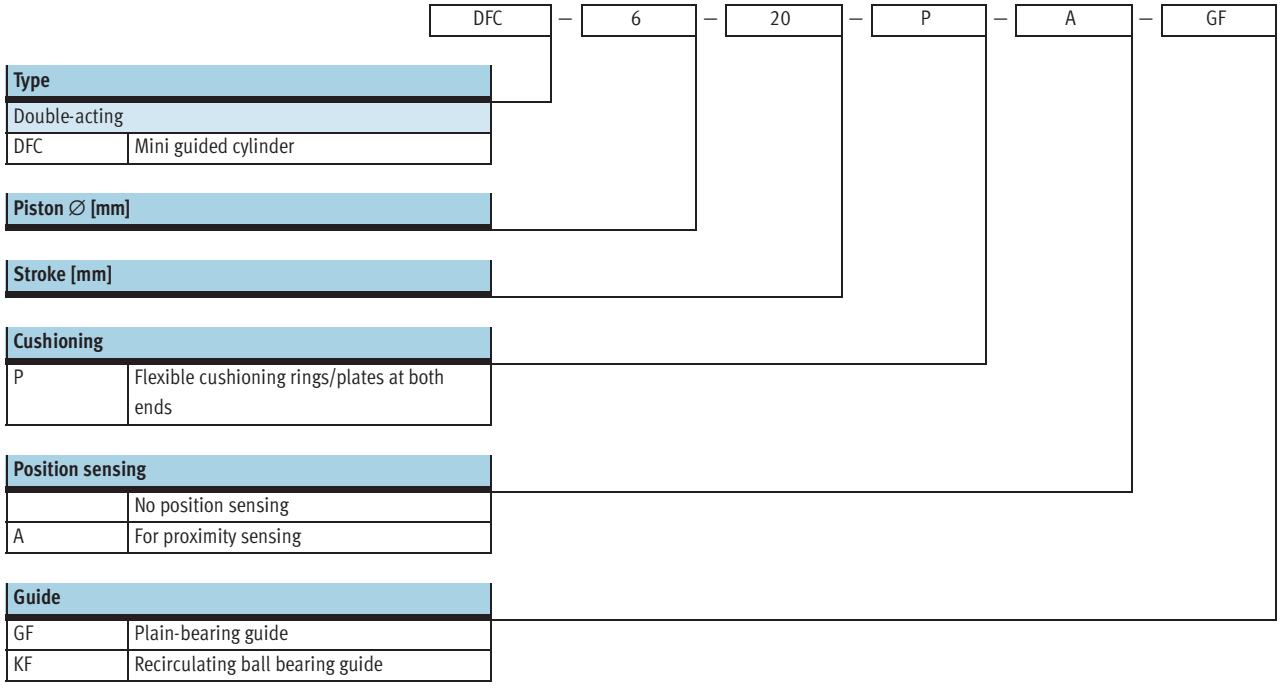


Yoke mounting



Mini guided cylinders DFC

Type code



Type	
Double-acting	
DFC	Mini guided cylinder

Piston ∅ [mm]

Stroke [mm]

Cushioning	
P	Flexible cushioning rings/plates at both ends

Position sensing	
	No position sensing
A	For proximity sensing

Guide	
GF	Plain-bearing guide
KF	Recirculating ball bearing guide

Mini guided cylinders DFC

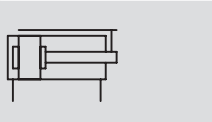
Technical data

FESTO

Function

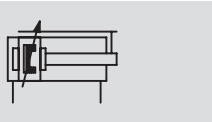
DFC-...

without end-position sensing



DFC-...-A-...

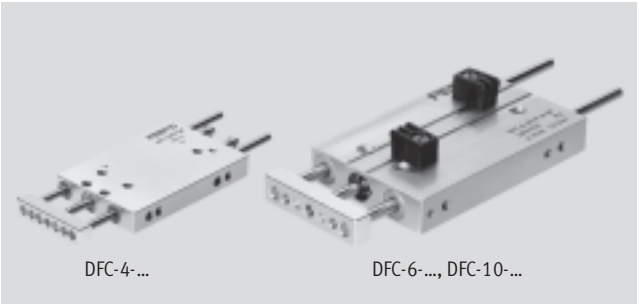
with end position sensing



Diameter
4, 6, 10 mm

Stroke length
5 ... 30 mm

www.festo.com/en/
Spare_parts_service



DFC-4-... DFC-6-..., DFC-10-...

General technical data			
Piston ∅	4	6	10
Pneumatic connection	Barbed fitting PK-3 for 3 mm plastic tubing	M3	M5
Operating medium	Compressed air, filtered, lubricated or unlubricated		
Operating pressure [bar]	3.5 ... 7.0	1.5 ... 10.0	1.0 ... 10.0
Constructional design	Piston		
	Piston rod		
	Guide rods with yoke		
Cushioning	Flexible cushioning rings/plates at both ends		
Position sensing	–	For proximity sensing	
Type of mounting	Via through holes		
	Via female thread		
Mounting position	Any		
Protection against torsion/guide	Guide rod with yoke with plain-bearing guide	Guide rod with yoke with plain-bearing or ball bearing guide	

Ambient conditions		
Variant	Plain-bearing guide GF	Recirculating ball bearing guide KF
Ambient temperature[1] [°C]	–5 ... +60	
Corrosion resistance class CRC[2]	2	–

1) Note operating range of proximity sensors.
2) Corrosion resistance class 2 according to Festo standard 940 070
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a surrounding industrial atmosphere or media such as cooling or lubricating agents.

Speeds [m/s] at maximum stroke length			
Piston ∅	4	6	10
Maximum speed	1.0	1.0	1.0
Minimum speed	0.1	0.1	0.1

Forces [N]			
Piston ∅	4	6	10
Theoretical force at 6 bar, advancing	7.5	17	47
Theoretical force at 6 bar, retracting	5.5	12.5	35

Mini guided cylinders DFC

Technical data

Impact energy [J]			
Piston ∅	4	6	10
Max. impact energy at end positions	0.006	0.008	0.05

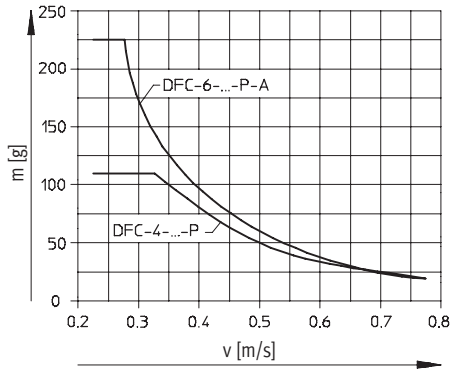
Permissible impact velocity: $v_{perm.} = \sqrt{\frac{2 \times E_{perm.}}{m_{dead} + m_{load}}}$

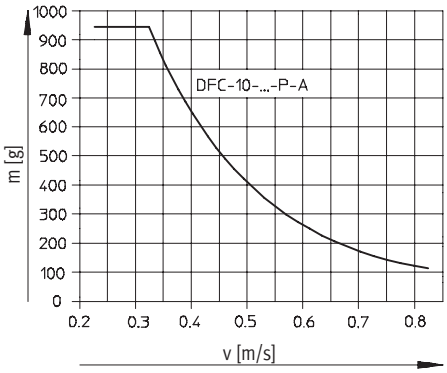
Maximum permissible load: $m_{load} = \frac{2 \times E_{perm.}}{v^2} - m_{dead}$

- Note

This data represents the maximum values which can be achieved. Values fluctuate in practice relative to the size of the effective load. Allowance must also be made for the limits of the cushioning capacity of the drive cylinder and the permissible impact energy.

Maximum permissible load m as a function of the impact speed v

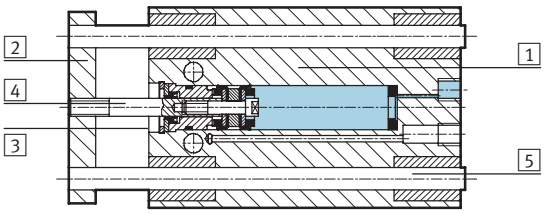




Weights [g]				
Piston ∅		4	6	10
Product weight	at 5 mm stroke	10	28	91
	at 10 mm stroke	12	34	100
	at 15 mm stroke	15	39	108
	at 20 mm stroke	18	44	117
	at 25 mm stroke	–	49	125
	at 30 mm stroke	–	55	134
Moving load at 0 mm stroke		3.2	8.8	27.2
Additional load per 10 mm stroke		1.3	2.8	7.2

Materials

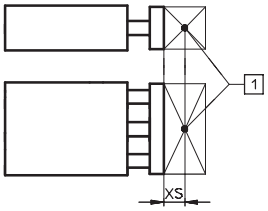
Sectional view



Mini guided cylinder		
1	Housing	Wrought aluminium alloy
2	Yoke plate	Wrought aluminium alloy
3	Cover	Wrought aluminium alloy
4	Piston rod	High-alloy stainless steel
5	Guide rods	Tempered steel
–	Seals	Polyurethane, nitrile rubber

Maximum effective load F [N]

Plain-bearing guide GF and recirculating ball bearing guide KF

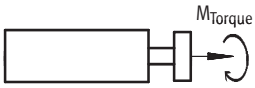


1 Centre of gravity of effective load

Piston ∅ [mm]		XS [mm]	Stroke [mm] 5	10	15	20	25	30
4	GF	5	1.7	1.7	1.7	1.7	–	–
	KF		–	–	–	–	–	–
6	GF	10	4.8	4.8	4.8	4.8	4.8	4.8
	KF		4.6	4.6	4.6	4.6	4.6	4.6
10	GF	15	12.2	12.2	12.2	12.2	12.2	12.2
	KF		9.8	9.8	9.8	9.8	9.8	9.8

Permissible torque load M [Nm]

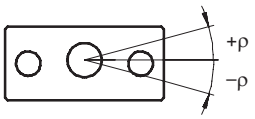
Plain-bearing guide GF and recirculating ball bearing guide KF



Piston ∅ [mm]		Stroke [mm] 5	10	15	20	25	30
4	GF	0.02	0.02	0.02	0.02	–	–
	KF	–	–	–	–	–	–
6	GF	0.1	0.1	0.1	0.1	0.1	0.1
	KF	0.1	0.1	0.1	0.1	0.1	0.1
10	GF	0.4	0.4	0.4	0.4	0.4	0.4
	KF	0.3	0.3	0.3	0.3	0.3	0.3

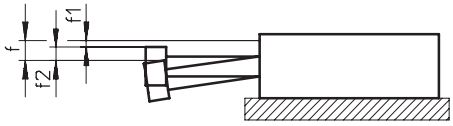
Torsional backlash p

Plain-bearing guide GF and recirculating ball bearing guide KF



Piston ∅		4	6	10
In retracted state				
Torsional backlash [°]	GF	0.07	0.05	0.04
	KF	0.07	0.05	0.03
In advanced state with maximum stroke				
Torsional backlash [°]	GF	0.11	0.07	0.06
	KF	0.12	0.08	0.05

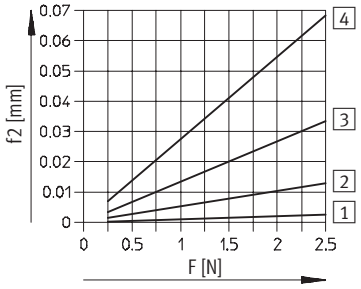
Deflection of piston rod



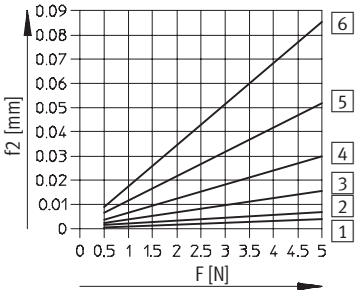
f = f1 + f2
f = Total deflection of piston rod
f1 = Deflection due to bearing backlash = max. 0.02 mm
f2 = Deflection due to lateral force

Deflection f2 due to lateral force F as a function of the stroke

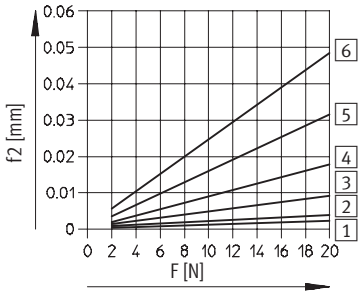
Piston ∅ 4 mm



Piston ∅ 6 mm



Piston ∅ 10 mm

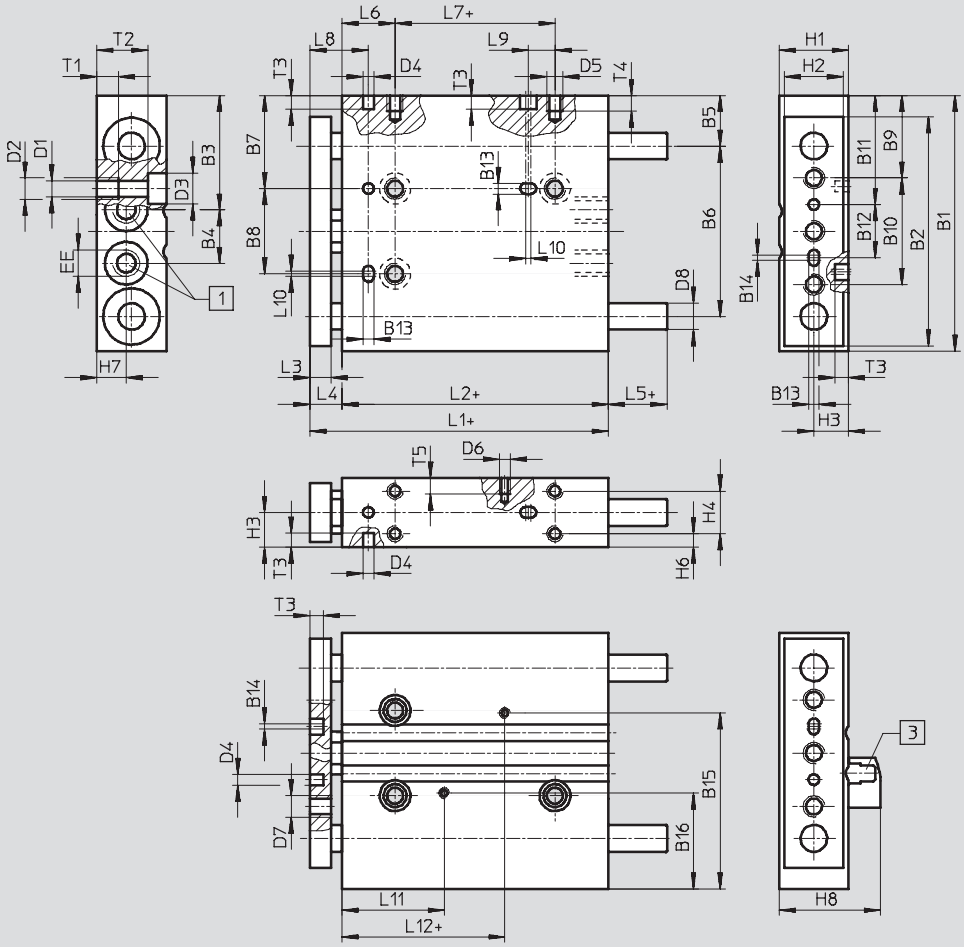


1 5 mm stroke
2 10 mm stroke
3 15 mm stroke
4 20 mm stroke
5 25 mm stroke
6 30 mm stroke

Mini guided cylinders DFC

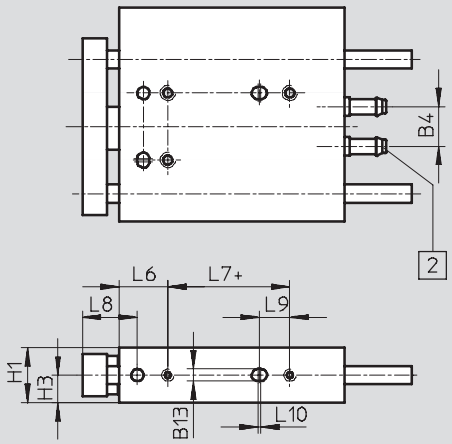
Technical data

Dimensions Download CAD data ➔ **www.festo.com/en/engineering**



1 Supply port
3 Sensor bracket
+ = plus stroke length

Piston ∅ 4 mm



2 Barbed fitting PK-3 for 3 mm plastic tubing
+ = plus stroke length

Mini guided cylinders DFC

Technical data

FESTO

∅ [mm]	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13 H8	B14	B15	B16	D1 ∅
4	24	20	9.8	7.4	6	15	9.5	8	8.5	10	11	5	2	–	–	–	2.1
6	35	29	17	6.5	8.5	22	14	11	12	15	15.75	8	2	1	26.2	12.8	2
10	48	43	21.5	10	9.5	32	17.5	16	15.5	20	20.5	10	2	1	33	18	3.2

∅ [mm]	D2	D3 ∅	D4 ∅ H8	D5	D6 ∅	D7	D8 ∅	EE	H1	H2	H3	H4	H6	H7	H8	L1	L2
4	–	–	2	M2	–	M2	2	–	5.5	4.5	2.75	–	2.75	2.75	–	24	18
6	M2.5	4	2	M2.5	M2	M2.5	3	M3	9	7	4.5	–	4.5	3.5	15	34	27
10	M4	5.8	2	M3	M2	M4	5	M5	13	11	6.5	8	2.5	5.5	19	48	40

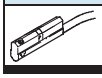
∅ [mm]	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	T1	T2	T3	T4	T5
4	4	6	1	8	3	11	3.5	0.5	–	–	–	5.5	2	4	–
6	5	7	1	8	10	10	5	0.5	16	19.35	3	6.1	2.6	5	2.5
10	6	8	1	10	20	13	5	1	22.2	25.6	4	9.6	2.6	3	3

Ordering data

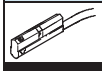
Piston ∅ [mm]	Stroke [mm]	Plain-bearing guide GF Part No.	Type	Recirculating ball bearing guide KF Part No.	Type
4	5	**189 479**	**DFC-4-5-P-GF**	**–**	
	10	**189 452**	**DFC-4-10-P-GF**		
	15	**189 453**	**DFC-4-15-P-GF**		
	20	**189 454**	**DFC-4-20-P-GF**		
6	5	**189 455**	**DFC-6-5-P-A-GF[1)]**	**189 461**	**DFC-6-5-P-A-KF[1)]**
	10	**189 456**	**DFC-6-10-P-A-GF[1)]**	**189 462**	**DFC-6-10-P-A-KF[1)]**
	15	**189 457**	**DFC-6-15-P-A-GF[1)]**	**189 463**	**DFC-6-15-P-A-KF[1)]**
	20	**189 458**	**DFC-6-20-P-A-GF[1)]**	**189 464**	**DFC-6-20-P-A-KF[1)]**
	25	**189 459**	**DFC-6-25-P-A-GF[1)]**	**189 465**	**DFC-6-25-P-A-KF[1)]**
	30	**189 460**	**DFC-6-30-P-A-GF[1)]**	**189 466**	**DFC-6-30-P-A-KF[1)]**
10	5	**189 467**	**DFC-10-5-P-A-GF[1)]**	**189 473**	**DFC-10-5-P-A-KF[1)]**
	10	**189 468**	**DFC-10-10-P-A-GF[1)]**	**189 474**	**DFC-10-10-P-A-KF[1)]**
	15	**189 469**	**DFC-10-15-P-A-GF[1)]**	**189 475**	**DFC-10-15-P-A-KF[1)]**
	20	**189 470**	**DFC-10-20-P-A-GF[1)]**	**189 476**	**DFC-10-20-P-A-KF[1)]**
	25	**189 471**	**DFC-10-25-P-A-GF[1)]**	**189 477**	**DFC-10-25-P-A-KF[1)]**
	30	**189 472**	**DFC-10-30-P-A-GF[1)]**	**189 478**	**DFC-10-30-P-A-KF[1)]**

1) Mounting kits for proximity sensors included in scope of delivery.

Ordering data – Proximity switches for C-slot, magneto-resistive — Technical data ➔ www.festo.com/catalogue/sm

	Type of mounting	Switch output	Electrical connection, connection direction	Cable length [m]	Part No.	Type
N/O contact						
	Insertable in the slot lengthwise	PNP	Plug M8x1, 3-pin, in-line	0,3	**173 220**	**SMT-10-PS-SL-LED-24**
			Cable, 3-wire, in-line	2,5	**173 218**	**SMT-10-PS-KL-LED-24**

Ordering data – Proximity switches for C-slot, magnetic reed — Technical data ➔ www.festo.com/catalogue/sm

	Type of mounting	Switch output	Electrical connection, connection direction	Cable length [m]	Part No.	Type
N/O contact						
	Insertable in the slot lengthwise	Contacting	Plug M8x1, 3-pin, in-line	0,3	**173 212**	**SME-10-SL-LED-24**
			Cable, 3-wire, in-line	2,5	**173 210**	**SME-10-KL-LED-24**

Ordering data – Connecting cables — Technical data ➔ www.festo.com/catalogue/nebu

	Electrical connection, left	Electrical connection, right	Cable length [m]	Part No.	Type
	Straight socket, M8x1, 3-pin	Cable, open end, 3-wire	2,5	**541 333**	**NEBU-M8G3-K-2.5-LE3**
			5	**541 334**	**NEBU-M8G3-K-5-LE3**
	Angled socket, M8x1, 3-pin	Cable, open end, 3-wire	2,5	**541 338**	**NEBU-M8W3-K-2.5-LE3**
			5	**541 341**	**NEBU-M8W3-K-5-LE3**

Ordering data – One-way flow control valves — Technical data ➔ Volume 2

	Connection		Material	Part No.	Type
	Thread	For tubing OD			
	M5	3	Metal design	**193 153**	**GRLZ-M5-QS-3-D**
		4		**193 154**	**GRLZ-M5-QS-4-D**
		6		**193 155**	**GRLZ-M5-QS-6-D**