CATALOGUE

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Automation

VACUUM COMPONENTS

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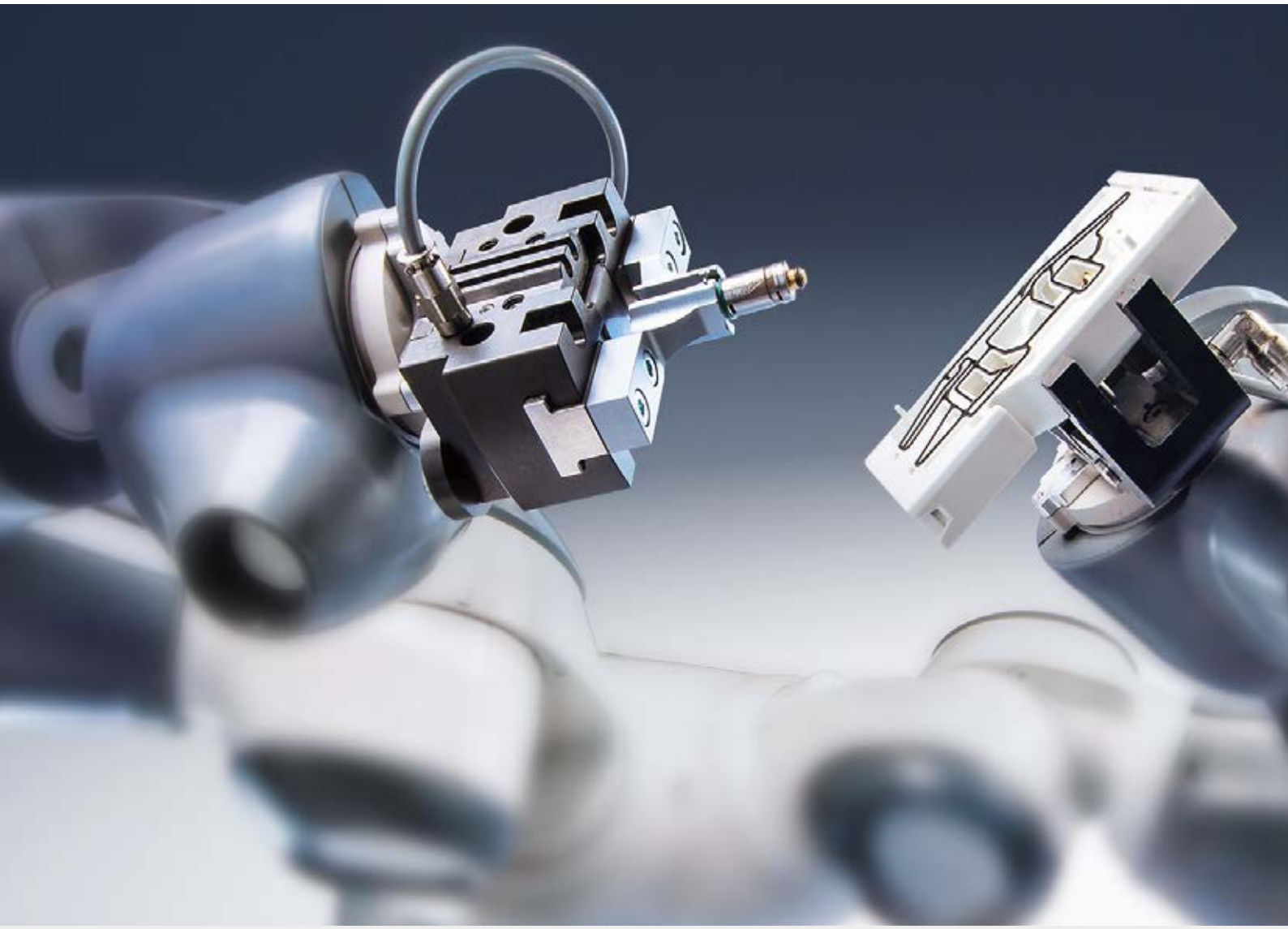

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CAMOZZI
Automation

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General index

1 Suction pads

2 Ejectors based on Venturi principle

3 Accessories

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Series VTCF flat suction pads (round)

Universal suction pads in NBR or Silicone.
Diameters from 3.5 to 95 mm with thread size M3, M5, G1/8, G1/4, both male and female.

- Wide range of diameters, all available in materials NBR or Silicone.
- Low profile, with reduced intrinsic volume which enables short cycle times and/or the use of smaller vacuum generators.
- Compact design for good resistence towards transversal forces at high accelerations, thus suitable for application with fast movements.
- Negligible movement of the piece in suction phase.

Series VTCF flat suction pads consist of a nipple and rubber part which are delivered separately. In fact, both components can be ordered separately as spare parts. From diameter 60 mm and up a mounting plate is vulcanised into the rubber part to which the nipple should be mounted.

These suction pads are generally used for handling of objects with smooth or slightly curved surfaces such as sheets of different materials, extruded profiles, cardboard boxes, plastic components, wood panels etc.

Applications:
- Handling of flat parts with smooth or slight rough surfaces
- Silicone version for the handling of parts at high temperatures

GENERAL DATA

Description	robust hard-wearing suction pads consisting of suction pad VTCF and connection nipple
Constuction	- nipples and suction pads are supplied not assembled - diameters of 60 mm and more: nipple screwed into supporting plate vulcanised to the pad
Maintenance	it is possible to replace the soft element
Working temperature	NBR version: -30°C ÷ +120°C (for short time <30 sec.); -10°C ÷ +70°C (long-term) SILICONE version: -50°C ÷ +220°C (for short time <30 sec.); -30°C ÷ +180°C (long-term)

TECHNICAL DATA

Mod./Diameter	Suction force (N)*	Int. volume (cm^3)	Min. convex curvature radius (mm)	Internal tube diameter (mm)
VTCF-0035	0,42	0,002	2	2
VTCF-0050	0,75	0,005	4	2
VTCF-0080	2,3	0,03	5	2
VTCF-0100	4	0,07	6	2
VTCF-0150	9	0,4	9	4
VTCF-0200	15,5	0,8	13	4
VTCF-0250	26,5	1,3	18	4
VTCF-0300	34	1,3	26	4
VTCF-0350	44	2,7	31	4
VTCF-0400	57,7	3,8	37	4
VTCF-0500	91	7	41	4
VTCF-0600	125	10	70	6
VTCF-0800	260	25	100	6
VTCF-0950	350	35	150	6

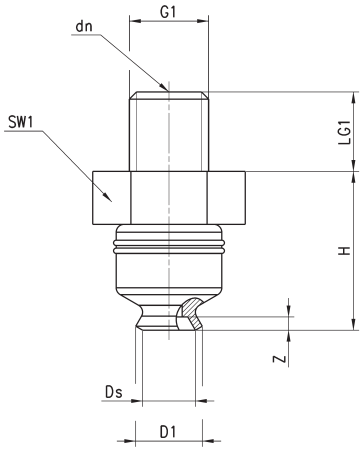
CODING EXAMPLE

VT	C	F	-	0035	N	-	M3	M

VT	SERIES VT = Suction pad
C	SHAPE C = round
F	VERSION F = flat
0035	DIAMETERS 0035= 3,5 mm 0050 = 5,0 mm 0080 = 8,0 mm 0100 = 10,0 mm 0150 = 15,0 mm 0200 = 20,0 mm 0250 = 25,0 mm 0300 = 30,0 mm 0350 = 35,0 mm 0400 = 40,0 mm 0500 = 50,0 mm 0600 = 60,0 mm 0800 = 80,0 mm 0950 = 95,0 mm
N	MATERIALS N = NBR S = Silicone
M3	THREAD SIZE M3 = M3 M5 = M5 1/8 = G1/8 1/4 = G1/4
M	THREAD M = male F = female

Suction pad VTCF-0035 - male thread

* = N for suction pad in NBR - S for suction pad in Silicone (add the required letter when placing an order)

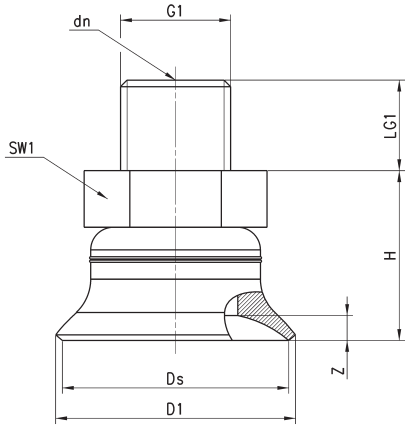


Tolerances for elastomer parts
according to M3 - DIN 7715

DIMENSIONS										
Suction pad with nipple	D1	dn	Ds	G1	H	LG1	SW1	Z	Suction pad	Nipple
VTCF-0035*-M3M	3,9	1	3,5	M3 M	6	3	5	0,5	VTCF-0035*	NPV-A-M3-M

Suction pad VTCF-0050 to 0500 - male thread

* = N for suction pad in NBR - S for suction pad in Silicone (add the required letter when placing an order)

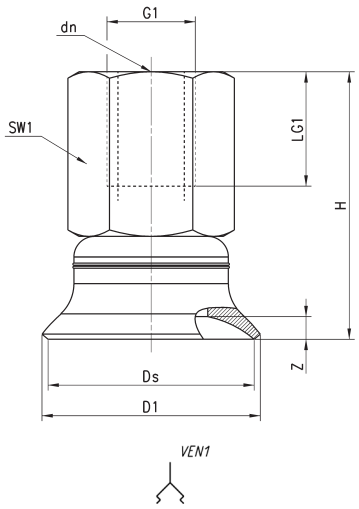


Tolerances for elastomer parts
according to M3 - DIN 7715

DIMENSIONS										
Suction pad with nipple	D1	dn	Ds	G1	H	LG1	SW1	Z	Suction pad	Nipple
VTCF-0050*-M5M	5,4	2	5	M5 M	11,5	4,5	8	0,9	VTCF-0050*	NPV-B-M5-M
VTCF-0080*-M5M	8,5	2	8	M5 M	12	4,5	8	1,4	VTCF-0080*	NPV-B-M5-M
VTCF-0100*-M5M	10,7	2	10	M5 M	12,5	4,5	8	1,3	VTCF-0100*	NPV-B-M5-M
VTCF-0150*-1/8M	15,8	2	15	G1/8 M	13	8	14	1,9	VTCF-0150*	NPV-G-1/8-M
VTCF-0200*-1/8M	21,2	2,4	20	G1/8 M	15	8	14	2,3	VTCF-0200*	NPV-H-1/8-M
VTCF-0250*-1/8M	25,8	2,4	25	G1/8 M	19	8	14	3	VTCF-0250*	NPV-L-1/8-M
VTCF-0300*-1/8M	29,6	2,4	28,5	G1/8 M	17	8	14	2	VTCF-0300*	NPV-L-1/8-M
VTCF-0350*-1/8M	35,6	2,4	35	G1/8 M	19	8	14	3	VTCF-0350*	NPV-L-1/8-M
VTCF-0400*-1/8M	41,6	2,4	40	G1/8 M	19	8	14	3,5	VTCF-0400*	NPV-L-1/8-M
VTCF-0500*-1/8M	51,1	2,4	50	G1/8 M	20	8	14	4	VTCF-0500*	NPV-M-1/8-M

Suction pad VTCF-0050 to 0500 - female thread

* = N for suction pad in NBR - S for suction pad in Silicone (add the required letter when placing an order)



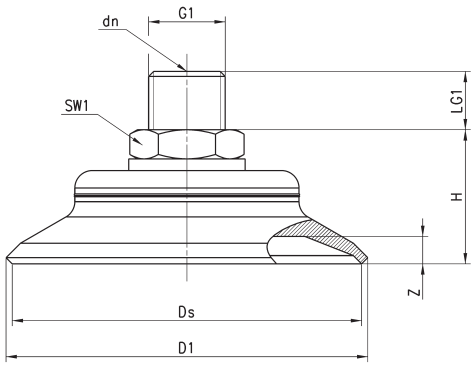
Tolerances for elastomer parts according to M3 - DIN 7715

DIMENSIONS

Suction pad with nipple	D1	dm	Ds	G1	H	LG1	SW1	Z	Suction pad	Nipple
VTCF-0100*-1/8F	10,7	2	10	G1/8 F	23,5	9	14	1,3	VTCF-0100*	NPV-F-1/8-F
VTCF-0150*-1/8F	15,8	2	15	G1/8 F	24	9	14	1,9	VTCF-0150*	NPV-G-1/8-F
VTCF-0200*-1/8F	21,2	2	20	G1/8 F	26	9	14	2,3	VTCF-0200*	NPV-H-1/8-F
VTCF-0250*-1/8F	25,8	2,4	25	G1/8 F	30	9	14	3	VTCF-0250*	NPV-L-1/8-F
VTCF-0300*-1/8F	29,6	2,4	28,8	G1/8 F	28	9	14	2	VTCF-0300*	NPV-L-1/8-F
VTCF-0350*-1/8F	35,6	2,4	35	G1/8 F	30	9	14	3	VTCF-0350*	NPV-L-1/8-F
VTCF-0400*-1/8F	41,6	2,4	40	G1/8 F	30	9	14	3,5	VTCF-0400*	NPV-L-1/8-F
VTCF-0500*-1/8F	51,1	2,4	50	G1/8 F	31	9	14	4	VTCF-0500*	NPV-M-1/8-F

Suction pad VTCF-0600 to 0950 - male thread

* = N for suction pad in NBR - S for suction pad in Silicone (add the required letter when placing an order)



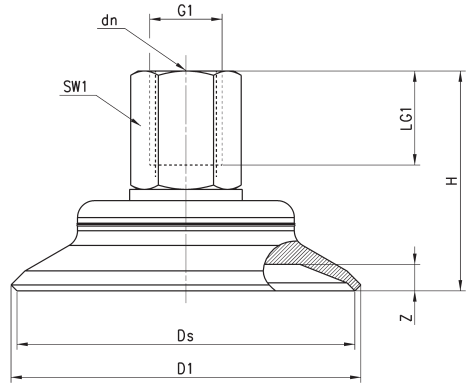
Tolerances for elastomer parts according to M3 - DIN 7715

DIMENSIONS

Suction pad with nipple	D1	dm	Ds	G1	H	LG1	SW1	Z	Suction pad	Nipple
VTCF-0600*-1/4M	62,1	5,5	60	G1/4 M	23	10	17	5	VTCF-0600*	NPV-N-1/4-M
VTCF-0800*-1/4M	82,8	5,5	80	G1/4 M	25	10	17	6	VTCF-0800*	NPV-N-1/4-M
VTCF-0950*-1/4M	97,8	5,5	95	G1/4 M	25,5	10	17	6	VTCF-0950*	NPV-N-1/4-M

Suction pad VTCF-0600 to 0950 - female thread

* = N for suction pad in NBR - S for suction pad in Silicone (add the required letter when placing an order)



Tolerances for elastomer parts according to M3 - DIN 7715

DIMENSIONS

Suction pad with nipple	D1	dm	Ds	G1	H	LG1	SW1	Z	Suction pad	Nipple
VTCF-0600* 1/4F	62,1	5,5	60	G1/4 F	39	11	17	5	VTCF 0600*	NPV-N-1/4-F
VTCF-0800* 1/4F	82,2	5,5	80	G1/4 F	41	11	17	6	VTCF 0800*	NPV-N-1/4-F
VTCF-0950* 1/4F	97,8	5,5	95	G1/4 F	41,5	11	17	5	VTCF 0950*	NPV-N-1/4-F

Series VTOF flat suction pads (oval)

Flat suction pads in NBR or Silicone which, thanks to their oval shape, can be used to handle narrow and long workpieces. Diameters from 7x3,5 to 60x20 mm with thread size M3, M5, G1/8, G1/4, both male and female.

- Wide range of diameters, all available in materials NBR or Silicone.
- Low profile with reduced intrinsic volume which enables short cycle times and/or the use of smaller vacuum generators.
- Optimised shape for high suction force with reduced size.
- Support on the bottom to avoid permanent deformation on the workpiece.
- Size 30x10 and up equipped with a special clip to prevent unwanted rotation.

Series VTOF flat oval suction pads consist of a nipple and rubber part. The nipples are inserted directly into the rubber part. Pads size 30x10 and larger are further equipped with a special clip in order to avoid unwanted rotation during operation.
The suction pads can also be ordered separately without nipples as spare parts.

Applications:
- Handling of narrow workpieces with small undulated gripping surface such as plates, extruded profiles plastic components, etc
- Handling of frame elements as for example doors, windows, etc
- Silicone version for the handling of pieces at high temperatures

GENERAL DATA

Description	robust and wear resistant pad consisting of rubber part and connection nipple
Construction	- nipples and suction pads are supplied not pre-assembled - size 30x10 mm and up equipped with a clip to avoid rotation
Maintenance	it is possible to replace the rubber part
Working temperature	NBR version: -30°C ÷ +120°C (for short time <30 sec.); -10°C ÷ +70°C (long-term) SILICONE version: -50°C ÷ +220°C (for short time <30 sec.); -30°C ÷ +180°C (long-term)

TECHNICAL DATA

Mod./Diameter	Suction force (N)*	Volume (cm^3)	Min. convex curve radius (mm)	Recommended internal tube diameter (mm)
VTOF-0070-035	1	0,019	3	2
VTOF-0150-050	3,1	0,036	5	2
VTOF-0180-060	4,5	0,058	7	2
VTOF-0300-100	12,2	0,28	10	4
VTOF-0450-150	28,2	0,98	18	6
VTOF-0600-200	50,1	2,3	25	6

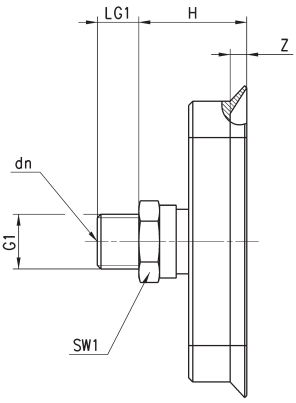
CODING EXAMPLE

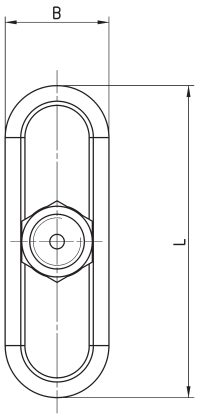
VT	O	F	-	0070-035	N	-	M3	M

VT	SERIES: VT = suction pad
O	SHAPE: O = oval
F	VERSION: F = FLAT
0070-035	DIMENSIONS: 0070-035 = 7,0 x 3,5 mm 0150-050 = 15,0 x 5,0 mm 0180-060 = 18,0 x 6,0 mm 0300-100 = 30,0 x 10,0 mm 0450-150 = 45,0 x 15,0 mm 0600-200 = 60,0 x 20,0 mm
N	MATERIALS: N= NBR S = Silicone
M3	THREAD SIZE: M3 = M3 M5 = M5 1/8 = G1/8 1/4 = G1/4
M	THREAD: M = male F = female

Series VTOF suction pad - male thread

* = N for suction pad in NBR - S for suction pad in Silicone (add the required letter when placing an order)

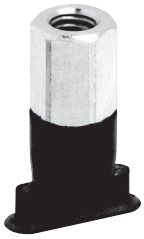




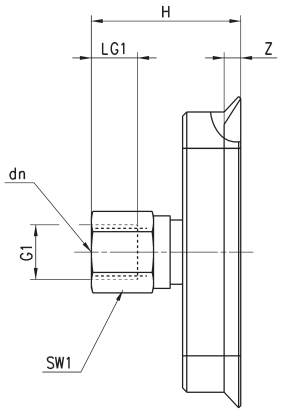
Tolerances on dimensions for elastomer parts according to M3 - DIN 7715

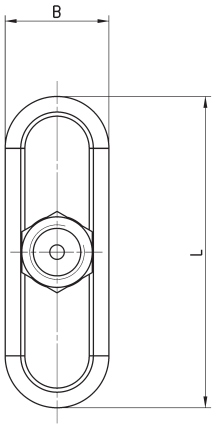
DIMENSIONS										
Suction pad with nipple	B	dn	G1	H	L	LG1	SW1	Z	Suction pad	Nipple
VTOF-0070-035*-M3M	3,5	1	M3M	8	7	3	5	08	VTOF-0070-035*	NPV-A-M3-M
VTOF-0150-050*-M5M	5	2	M5M	17	15	5	8	07	VTOF-0150-050*	NPV-C-M5-M
VTOF-0180-060*-M5M	6	2	M5M	17	18	5	8	08	VTOF-0180-060*	NPV-C-M5-M
VTOF-0300-100*-1/8M	10	3,5	G1/8 M	17	30	8	14	1,5	VTOF-0300-100*	NPV-P-1/8-M
VTOF-0450-150*-1/4M	15	3,5	G1/4 M	26	45	10	17	2	VTOF-0450-150*	NPV-Q-1/4-M
VTOF-0600-200*-1/4M	20	3,5	G1/4 M	26	60	10	17	2,5	VTOF-0600-200*	NPV-Q-1/4-M

Series VTOF suction pad - female thread



* = N for suction pad in NBR - S for suction pad in Silicone (add the required letter when placing an order)





Tolerances on dimensions for elastomer parts according to M3 - DIN 7715

DIMENSIONS										
Suction pad with nipple	B	dm	G1	H	L	LG1	SW1	Z	Suction pad	Nipple
VTOF-0150-050*-M5F	5	2	M5 F	22	15	5,5	8	0,7	VTOF-0150-050*	NPV-C-M5-F
VTOF-0180-060*-M5F	6	2	M5 F	22	18	5,5	8	0,8	VTOF-0180-060*	NPV-C-M5-F
VTOF-0300-100*-1/8F	10	3,5	G1/8 F	25	30	9	14	1,5	VTOF-0300-100*	NPV-P-1/8-F
VTOF-0450-150*-1/4F	15	3,5	G1/4 F	36	45	12	17	2	VTOF-0450-150*	NPV-Q-1/4-F
VTOF-0600-200*-1/4F	20	3,5	G1/4 F	36	60	12	17	2,5	VTOF-0600-200*	NPV-Q-1/4-F

Series VTCL bellows suction pads (round) - 1,5 folds

Series VTCL bellows suction pads available in NBR or Silicone which allow an optimal damping when placed on the workpiece. Diameters from 11 to 53 mm with thread size M5, G1/8, G1/4, both male and female.

- Wide range of diameters, available in NBR or Silicone.
- Soft, tapered sealing lip for very good adaption to curved or uneven workpiece surfaces in general.
- High suction force and optimal damping when placed on the workpiece.
- Support on the bottom to avoid permanent deformation of the workpiece.
- Very stiff top fold for good stability and good resistance towards transversal forces at high accelerations.
- Good compensation of possible height differences on the workpiece.
- Optimised shape with 1,5 folds.

Series VTCL bellows suction pads (1,5 folds) have a rugged design and consist of a nipple and rubber part.
The nipples are inserted directly into the rubber part.
The rubber parts can also be ordered separately without nipples as spare parts.
Materials: NBR or Silicone

Applications:
- Handling of even or uneven workpieces such as planels for car bodies, tubes, cardboard boxes
Handling of fragile workpieces such as electronics components, injection moulded pieces, etc
- Handling of welded pieces
- Silicone version for handling high temperatures pieces

GENERAL DATA

Description	wear resistant suction pad consisting of rubber part VTCL with 1,5 folds and connection nipple
Construction	nipples and suction pads are supplied not pre-assembled
Maintenance	it is possible to replace the rubber part
Working temperature	NBR version: -30°C ÷ +120°C (for short time <30 sec.); -10°C ÷ +70°C (long-term) SILICONE version: -50°C ÷ +220°C (for short time <30 sec.); -30°C ÷ +180°C (long-term)

TECHNICAL DATA

Mod./Diameter	Suction force (N)*	Pull-off force (N)* (convex)	Volume (cm^3)	Min. curve radius (mm)	Recommended internal tube diam. (mm)
VTCL-110	0,95	3,8	0,225	5	4
VTCL-140	1,2	5	0,42	6	4
VTCL-160	2,3	6,7	0,75	7	4
VTCL-200	4,7	10,7	1,15	9	4
VTCL-250	7,3	17,3	3,15	11	4
VTCL-330	13,6	39,6	4,75	15	6
VTCL-430	22,8	64,5	9,25	30	6
VTCL-530	51,3	95	26,25	40	6

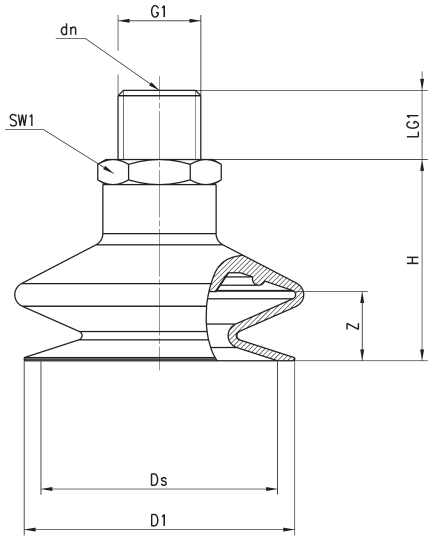
CODING EXAMPLE

VT	C	L	-	110	N	-	M5	M

VT	SERIES VT = Suction pad
C	SHAPE C = round
L	VERSION L = bellows 1,5 folds
110	DIAMETERS 110 = 11,0 mm 140 = 14,0 mm 160 = 16,0 mm 200 = 20,0 mm 250 = 25,0 mm 330 = 33,0 mm 430 = 43,0 mm 530 = 53,0 mm
N	MATERIALS N = NBR S = Silicone
M5	THREAD SIZE M5 = M5 1/8 = G1/8 1/4 = G1/4
M	THREAD M = male F = female

Series VTCL suction pad - male thread

* = N for suction pad in NBR
S for suction pad in Silicone
(add the required letter when placing an order)

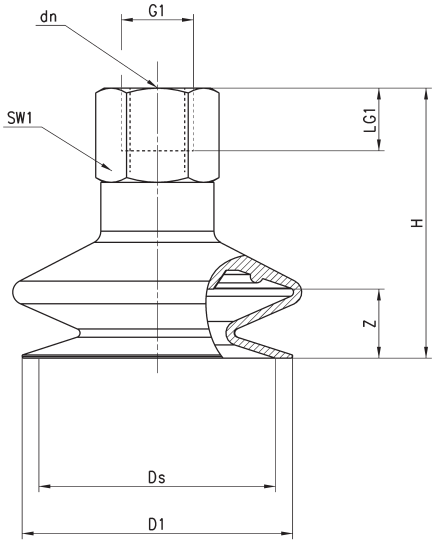


DIMENSIONS										
Suction pad with nipple	D1	dn	Ds	G1	H	LG1	SW1	Z	Suction pad	Nipple
VTCL-110*-1/8M	11	3,5	10,4	G1/8 M	22	7,5	14	4	VTCL-110*	NPV-R-1/8-M
VTCL-110*-M5M	11	2,5	10,4	M 5 M	21	5	7	4	VTCL-110*	NPV-D-M5-M
VTCL-140*-1/8M	13	3,5	12,5	G1/8 M	22	7,5	14	5	VTCL-140*	NPV-R-1/8-M
VTCL-140*-M5M	13	2,5	12,5	M 5 M	21	4,5	7	5	VTCL-140*	NPV-D-M5-M
VTCL-160*-1/8M	16,5	3,5	15,6	G1/8 M	25	7,5	14	6	VTCL-160*	NPV-R-1/8-M
VTCL-160*-M5M	16,5	2,5	15,6	M 5 M	24	5	7	6	VTCL-160*	NPV-D-M5-M
VTCL-200*-1/8M	18,3	3,5	18,1	G1/8 M	21,5	7,5	14	5	VTCL-200*	NPV-R-1/8-M
VTCL-200*-M5M	18,3	2,5	18,1	M 5 M	20,5	4,5	7	5	VTCL-200*	NPV-D-M5-M
VTCL-250*-1/8M	23,7	3,5	22,5	G1/8 M	29	7,5	14	12	VTCL-250*	NPV-R-1/8-M
VTCL-330*-1/4M	33	4,4	30	G1/4 M	31	11	17	12	VTCL-330*	NPV-S-1/4-M
VTCL-430*-1/4M	43	4,4	38	G1/4 M	32	11	17	10	VTCL-430*	NPV-S-1/4-M
VTCL-530*-1/4M	53	4,4	50	G1/4 M	38	11	17	15	VTCL-530*	NPV-S-1/4-M

Tolerances for elastomer parts
according to M3 - DIN 7715

Series VTCL suction pad - female thread

* = N for suction pad in NBR
S for suction pad in Silicone
(add the required letter when placing an order)



DIMENSIONS										
Suction pad with nipple	D1	dm	Ds	G1	H	LG1	SW1	Z	Suction pad	Nipple
VTCL-110*-1/8F	11	3,5	10,4	G1/8 F	28	8,5	14	4	VTCL-110*	NPV-R-1/8-F
VTCL-140*-1/8F	13	3,5	12,5	G1/8 F	28	8,5	14	5	VTCL-140*	NPV-R-1/8-F
VTCL-160*-1/8F	16,5	3,5	15,6	G1/8 F	31	8,5	14	6	VTCL-160*	NPV-R-1/8-F
VTCL-200*-1/8F	18,3	3,5	18,1	G1/8 F	27,5	8,5	14	5	VTCL-200*	NPV-R-1/8-F
VTCL-250*-1/8F	23,7	3,5	22,5	G1/8 F	35	8,5	14	12	VTCL-250*	NPV-R-1/8-F
VTCL-330*-1/4F	33	4,4	30	G1/4 F	42	12	17	12	VTCL-330*	NPV-S-1/4-F
VTCL-430*-1/4F	43	4,4	38	G1/4 F	43	12	17	10	VTCL-430*	NPV-S-1/4-F
VTCL-530*-1/4F	53	4,4	50	g1/4 F	49	12	17	15	VTCL-530*	NPV-S-1/4-F

Tolerances for elastomer parts
according to M3 - DIN 7715)

Series VTCN bellows suction pads (round) - 2,5 folds

Series VTCN bellows suction pads, available in NBR or Silicone, are suitable to handle uneven workpiece surfaces or workpiece major height differences. Diameters from 5 to 52 mm with thread size M5, G1/8, G1/4, both male and female.

Series VTCN bellows suction pads (2,5 folds) have a rugged design and consist of a nipple and rubber part.
The nipples are inserted directly into the rubber part.
The rubber parts can also be ordered separately without nipples as spare parts.
Materials: NBR or Silicone

Applications:
- Handling of even or uneven workpieces such as plates for car bodies, tubes, cardboard boxes
- Handling of fragile workpieces such as electronics components, injection moulded pieces, etc
- Handling of welded pieces
- Silicone version for handling of pieces at high temperatures

- Wide range of diameters, in NBR or Silicone versions.
- Soft, tapered sealing lip for very good adaption to curved or uneven workpiece surfaces in general.
- High suction force and optimal damping when placed on the workpiece.
- Support on the bottom to avoid permanent deformation of the workpiece.
- Very stiff top fold for good stability and good resistance towards transversal forces at high accelerations.
- Very good compensation of possible height differences on the workpiece.
- Optimised shape with 2,5 folds.

GENERAL DATA

Description	wear resistant suction pad consisting of rubber part VTCN with 2,5 folds and connection nipple
Construction	nipples and suction pads are supplied not pre-assembled
Maintenance	it is possible to replace the rubber part
Working temperature	NBR version: -30°C ÷ +120°C (for short time <30 sec.); -10°C ÷ +70°C (long-term) SILICONE version: -50°C ÷ +220°C (for short time <30 sec.); -30°C ÷ +180°C (long-term)

TECHNICAL DATA

Mod./Diameter	Suction force (N)*	Pull-off force (N)**	Volume (cm^3)	Min. curve radius (mm) (convex)	Recommended internal tube diameter (mm)
VTCN-050	0,1	0,8	0,033	2	2
VTCN-070	0,1	0,9	0,043	3	4
VTCN-090	0,7	2,3	0,15	5	4
VTCN-120	0,9	3,5	0,6	6	4
VTCN-140	1,2	5,7	0,975	7	4
VTCN-180	2,3	8,5	1,35	9	4
VTCN-200	3,8	12,1	2	10	4
VTCN-250	4,5	19	5,4	12	4
VTCN-320	12	36,9	10	17	6
VTCN-420	13,6	44	19,5	24	6
VTCN-520	27	96	62	35	6

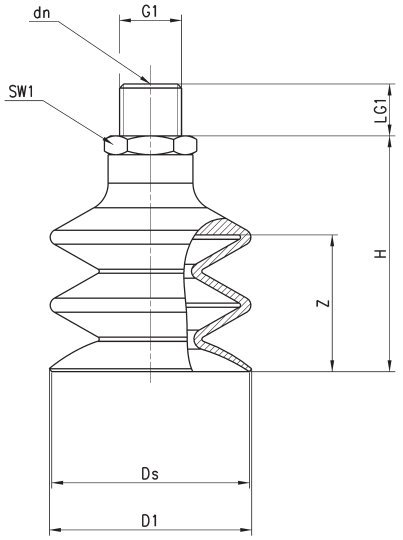
CODING EXAMPLE

VT	C	N	-	050	N	-	M5	M

VT	SERIES VT = Suction pad
C	SHAPE C = round
N	VERSION N = bellows, 2,5 folds
050	DIAMETERS 050= 5,0 mm 070 = 7,0 mm 090 = 9,0 mm 120 = 12,0 mm 140 = 14,0 mm 180 = 18,0 mm 200 = 20,0 mm 250 = 25,0 mm 320 = 32,0 mm 420 = 42,0 mm 520 = 52,0 mm
N	MATERIALS N = NBR S = Silicone
M5	THREAD SIZE M5 = M5 1/8 = G1/8 1/4 = G1/4
M	THREAD M = male F = female

Series VTCN suction pad - male thread

* = N for suction pad in NBR
S for suction pad in Silicone
(add the required letter when placing an order)



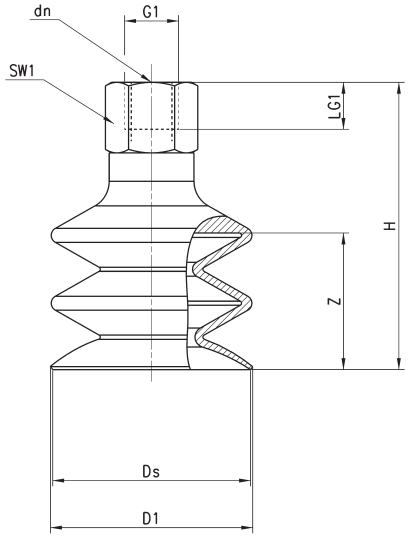
Tolerances for elastomer parts according to M3 - DIN 7715

DIMENSIONS

Suction pad with nipple	D1	dn	Ds	G1	H	LG1	SW1	Z	Suction pad	Nipple
VTCN-050*-M5M	5,5	2	5	M 5 M	18,5	5	8	3	VTCN-050*	NPV-E-M5-M
VTCN-070*-1/8M	6,5	3,5	5,9	G1/8 M	20	7,5	14	4	VTCN-070*	NPV-R-1/8-M
VTCN-070*-M5M	6,5	2,5	5,9	M 5 M	19	5	7	4	VTCN-070*	NPV-D-M5-M
VTCN-090*-1/8M	9,3	3,5	9	G1/8 M	21	7,5	14	3	VTCN-090*	NPV-R-1/8-M
VTCN-090*-M5M	9,3	2,5	9	M 5 M	20	5	7	3	VTCN-090*	NPV-D-M5-M
VTCN-120*-1/8M	12,7	3,5	12	G1/8 M	27	7,5	14	7	VTCN-120*	NPV-R-1/8-M
VTCN-120*-M5M	12,7	2,5	12	M 5 M	26	5	7	7	VTCN-120*	NPV-D-M5-M
VTCN-140*-1/8M	15	3,5	14,5	G1/8 M	28	7,5	14	9	VTCN-140*	NPV-R-1/8-M
VTCN-140*-M5M	15	2,5	14,5	M 5 M	27	5	7	9	VTCN-140*	NPV-D-M5-M
VTCN-180*-1/8M	18,5	3,5	17,2	G1/8 M	28	7,5	14	9	VTCN-180*	NPV-R-1/8-M
VTCN-180*-M5M	18,5	2,5	17,2	M 5 M	27	5	7	9	VTCN-180*	NPV-D-M5-M
VTCN-200*-1/8M	20	3,5	20	G1/8 M	28	7,5	14	9	VTCN-200*	NPV-R-1/8-M
VTCN-200*-M5M	20	2,5	20	M 5 M	27	5	7	9	VTCN-200*	NPV-D-M5-M
VTCN-250*-1/8M	24,7	3,5	23	G1/8 M	40	7,5	14	18	VTCN-250*	NPV-R-1/8-M
VTCN-320*-1/4M	32,6	4,4	32	G1/8 M	41,5	11	17	15	VTCN-320*	NPV-S-1/4-M
VTCN-420*-1/4M	43,5	4,4	42,6	G1/4 M	50	11	17	20	VTCN-420*	NPV-S-1/4-M
VTCN-520*-1/4M	52,5	4,4	52,5	G1/4 M	53	11	17	25	VTCN-520*	NPV-S-1/4-M

Series VTCN suction pad - female thread

* = N for suction pad in NBR
S for suction pad in Silicone
(add the required letter when placing an order)



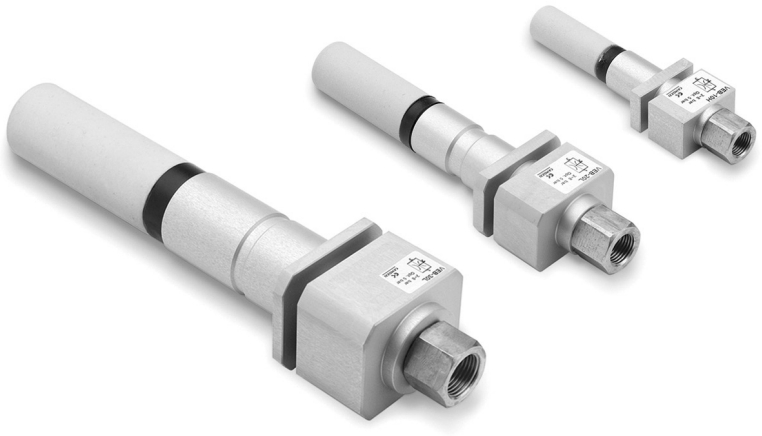
Tolerances for elastomer parts according to M3 - DIN 7715

DIMENSIONS

Suction pad with nipple	D1	dn	Ds	G1	H	LG1	SW1	Z	Suction pad	Nipple
VTCN-050*-M5F	5,5	2	5	M 5 F	18,5	5	8	3	VTCN-050*	NPV-E-M5-F
VTCN-070*-1/8F	6,5	3,5	5,9	G1/8 F	26	8,5	14	4	VTCN-070*	NPV-R-1/8-F
VTCN-090*-1/8F	9,3	3,5	9	G1/8 F	27	8,5	14	3	VTCN-090*	NPV-R-1/8-F
VTCN-120*-1/8F	12,7	3,5	12	G1/8 F	33	8,5	14	7	VTCN-120*	NPV-R-1/8-F
VTCN-140*-1/8F	15	3,5	14,5	G1/8 F	34	8,5	14	9	VTCN-140*	NPV-R-1/8-F
VTCN-180*-1/8F	18,5	3,5	17,2	G1/8 F	34	8,5	14	9	VTCN-180*	NPV-R-1/8-F
VTCN-200*-1/8F	20	3,5	20	G1/8 F	34	8,5	14	9	VTCN-200*	NPV-R-1/8-F
VTCN-250*-1/8F	24,7	3,5	23	G1/8 F	46	8,5	14	18	VTCN-250*	NPV-R-1/8-F
VTCN-320*-1/4F	32,6	4,4	32	G1/4 F	52,5	12	17	15	VTCN-320*	NPV-S-1/4-F
VTCN-420*-1/4F	43,5	4,4	42,6	G1/4 F	61	12	17	20	VTCN-420*	NPV-S-1/4-F
VTCN-520*-1/4F	52,5	4,4	52,5	G1/4 F	64	12	17	25	VTCN-520*	NPV-S-1/4-F

Series VEB basic ejectors

Basic ejectors with no moving parts, based on the Venturi principle.
Version “L” for porosive workpieces.
Version “H” for high vacuum value.



- No moving parts for long life and low maintenance
- Reduced weight
- Rapid generation of vacuum

Series VEB basic ejectors are universal ejectors suitable for several industrial applications.
They are available in two versions:
- Version “L” for porosive workpieces
- Version “H” for high vacuum value (85%)

Applications:
- Industrial robotics in most sectors
- Wood industry
- Packaging industry
- Food industry

GENERAL DATA

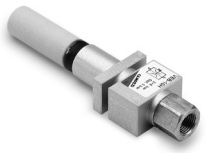
Description	- body in anodized Aluminium - internal nozzle in brass - silencer in technopolymer

CODING EXAMPLE

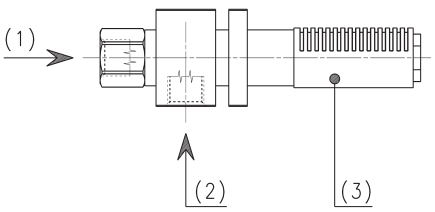
VE	B	-	05	H

VE	SERIES VE = Vacuum ejector
B	VERSION B = basic
05	NOZZLE DIAMETER (MM) 05 = 0,5 mm 07 = 0,7 mm 10 = 1 mm 15 = 1,5 mm 20 = 2 mm 25 = 2,5 mm 30 = 3 mm
H	SUCTION TYPE H = high vacuum L = high suction rate

TECHNICAL DATA



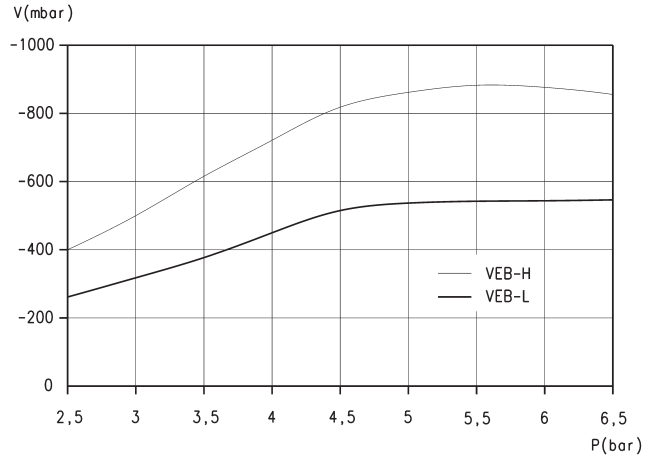
1 = Compressed air inlet
2 = Vacuum inlet
3 = Exhaust



TECHNICAL DATA

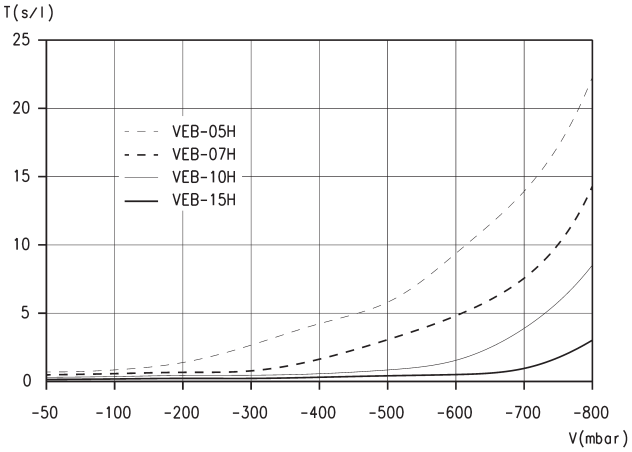
Mod.	Ø nozzle (mm)	Degree of evacuation (%)	Suction rate max. (l/min)	Suction rate max. (m³/min)	Air consumption (l/min)	Air consumption (m³/h)	Working pressure (bar)	Weight (kg)
VEB-05H	0,5	82	7	0,4	13	0,8	4,5	0,011
VEB-07H	0,7	85	14	0,8	21	1,3	4,5	0,045
VEB-10H	1	85	34	2	49	2,9	5	0,05
VEB-15H	1,5	85	69	4,1	102	6,1	4,5	0,11
VEB-20H	2	85	124	7,4	186	11,2	5	0,13
VEB-20L	2	55	170	10,2	186	11,2	5	0,13
VEB-25H	2,5	85	184	11	275	16,5	5	0,295
VEB-25L	2,5	55	260	15,6	275	16,5	5	0,295
VEB-30H	3	85	240	14,4	392	23,5	5	0,404

Diagrams VEB



LEGEND:
V = vacuum values
P = working pressure

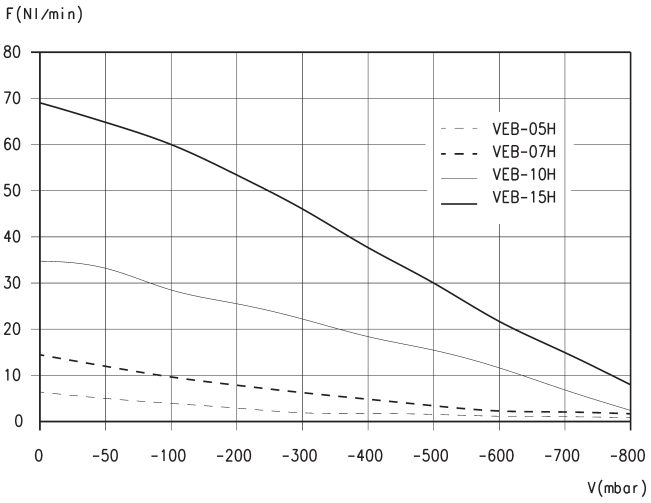
Note: vacuum reachable with different supply pressures



LEGEND:
T = Evacuation time
V = Vacuum values

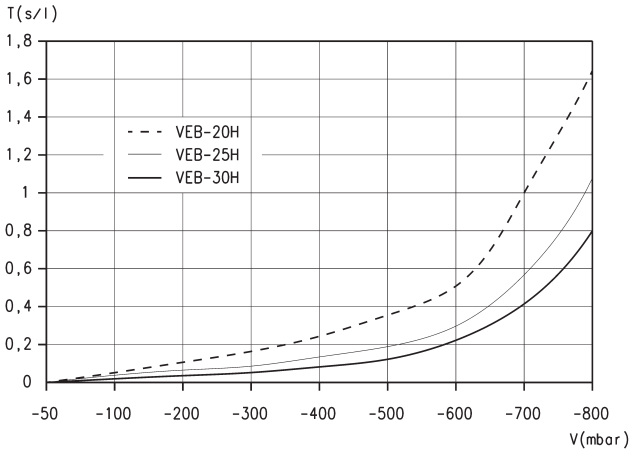
Note: evacuation time for different vacuum values

Diagrams VEB



LEGEND:
F = Suction rate
V = Vacuum values

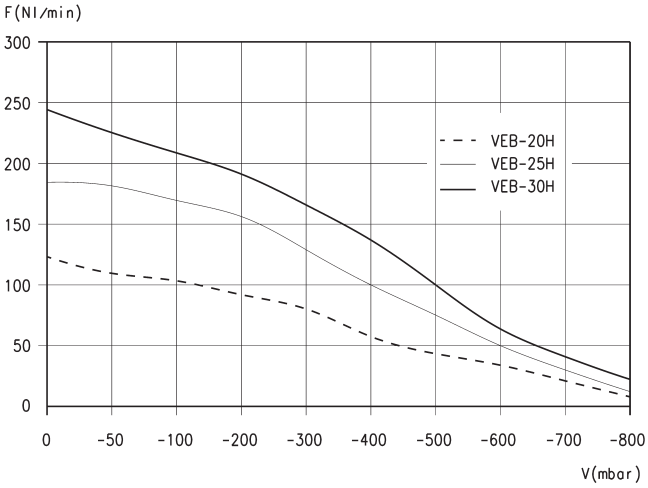
Note: Suction rate with different vacuum values



LEGEND:
T = Evacuation time
V = Vacuum values

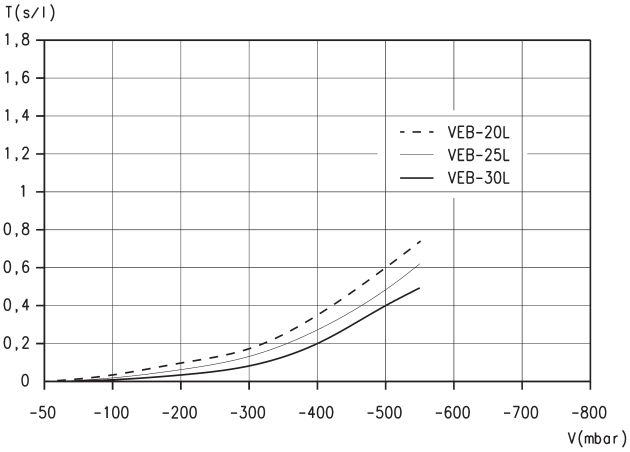
Note: evacuation time for different vacuum values

Diagrams VEB



LEGEND:
F = Suction rate
V = Vacuum values

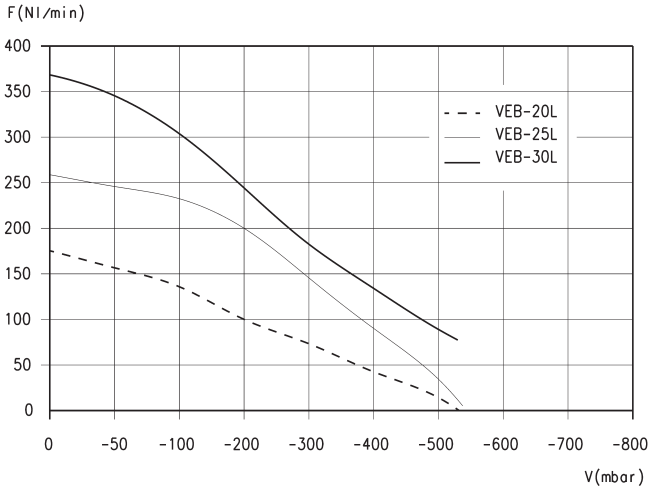
Note: Suction rate with different vacuum values



LEGEND:
T = Evacuation time
V = Vacuum values

Note: evacuation time for different vacuum values

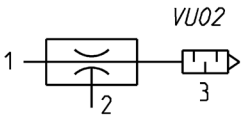
Diagrams VEB

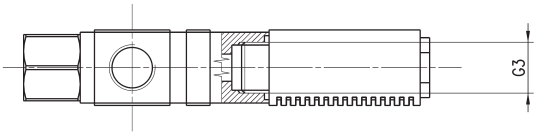


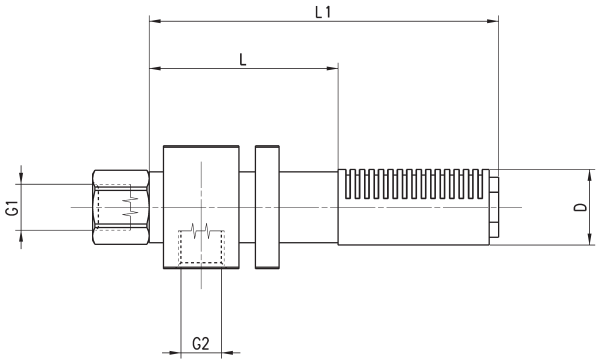
LEGEND:
F = Suction rate
V = Vacuum values

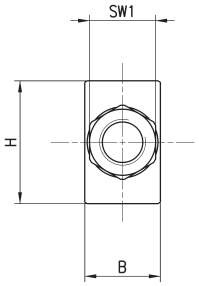
Note: Suction rate with different vacuum values

EJECTORS VEB 05...30









DIMENSIONS									
Mod.	B	D	G1	G2	G3*	H	L	L1	SW1
VEB-05H	10	7	M5	M5	M5	20	32	50	8
VEB-07H	16	16	G1/8	G1/8	G1/8	26	40	74	14
VEB-10H	16	16	G1/8	G1/8	G1/8	26	45	79	14
VEB-15H	22	21	G1/4	G1/4	G1/4	38	60	101,5	17
VEB-20H	26	25	G1/4	G1/4	G3/8	38	75	125,5	17
VEB-20L	26	25	G1/4	G1/4	G3/8	38	75	125,5	17
VEB-25H	32	30	G3/8	G1/2	G1/2	50	100	161,5	22
VEB-25L	32	30	G3/8	G1/2	G1/2	50	100	161,5	22
VEB-30H	42	40	G3/8	G1/2	G3/4	50	110	194,5	22
VEB-30L	42	40	G3/8	G1/2	G3/4	50	110	194,5	22

Series VEBL basic ejectors

Basic ejectors in technopolymer without moving parts, based on the Venturi principle.
Different sizes available, with internal nozzle from 0,5 to 2,5 mm and with suction rate from 8 to 207 l/min.

- No moving parts for long life and low maintenance
- Reduced weight
- Rapid generation of vacuum
- Easy installation, on proper support too
- Optimized dimensions

Series VEBL basic ejectors are universal ejectors made in technopolymer suitable for several industrial applications such as:
- Industrial robotics in most sectors
- Wood industry
- Packaging industry
- Food industry

GENERAL DATA

Description	Basic ejector
Materials	- body in technopolymer - silencier in technopolymer - internal nozzle in brass

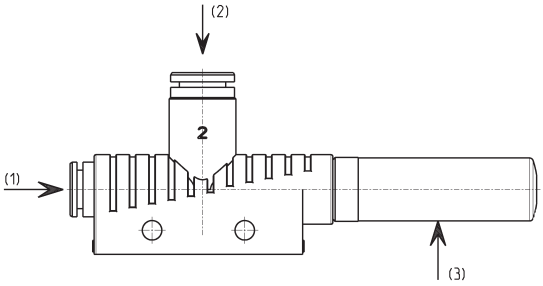
CODING EXAMPLE

VE	BL	-	10H	-	T2

VE	SERIES: VE = Vacuum ejector
BL	VERSION: BL = basic light
10H	NOZZLE DIAMETER: 05H = 0,5 mm 07H = 0,7 mm 10H = 1 mm 15H = 1,5 mm 20H = 2 mm 25H = 2,5 mm
T2	TYPE OF CONNECTION (ON SUPPLY SIDE): T1 = plier - tube Ø4 T2 = plier - tube Ø6 T3 = plier - tube Ø8

TECHNICAL DATA

1 = Compressed air inlet
2 = Vacuum inlet
3 = Exhaust

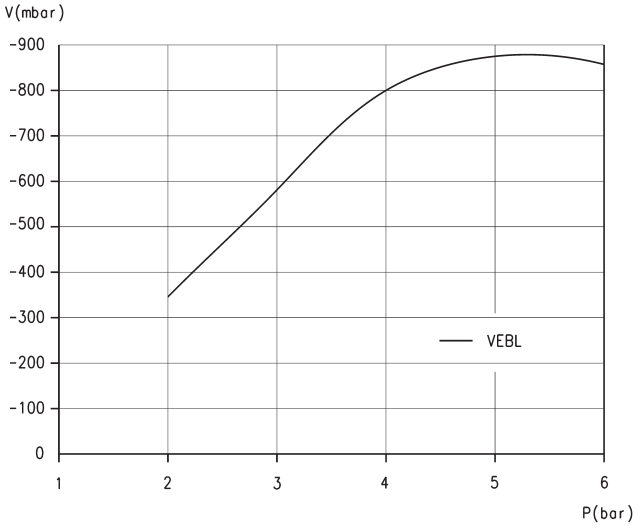


Usable fluids: compressed air, olied and not, according to ISO 8573-1:2001 class 7-4-4

TECHNICAL DATA

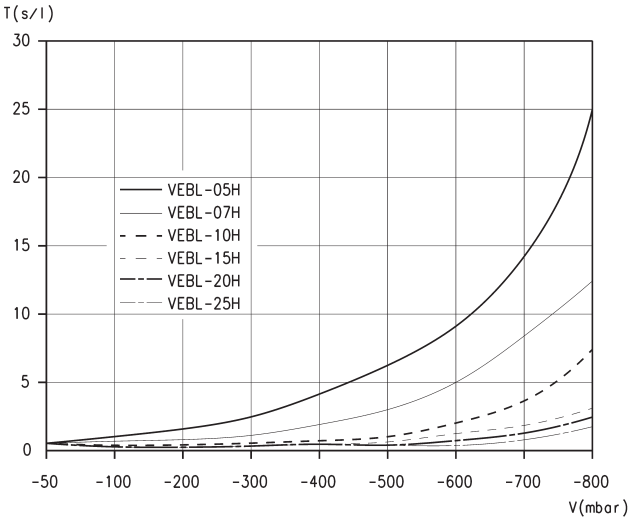
Mod.	Ø nozzle (mm)	Obtainable relative pressure (mbar)	Vacuum flow (l/min)	Air consumption (l/min)	Operating pressure (bar)	Optimum operating pressure (bar)	Operating temperature (bar)	Weight (kg)	Noise level gripped [dB(A)]	Noise level free [dB(A)]	Suggested internal Ø for tubes [mm] up to 2m	Max n° of ejectors for one support
VEBL-05H-T1	0,5	-840	8	13,5	3...6	4,5	0...60	0,0075	53	58	2/2	11
VEBL-07H-T1	0,7	-850	16	22	3...6	4,5	0...60	0,0075	59	65	2/2	11
VEBL-10H-T2	1	-850	38	48	3...6	4,5	0...60	0,022	59	65	4/6	7
VEBL-15H-T2	1,5	-850	71	105	3...6	4,5	0...60	0,022	65	72	4/6	7
VEBL-20H-T3	2	-850	127	197	3...6	4,5	0...60	0,050	68	77	6/8	5
VEBL-25H-T3	2,5	-850	215	311	3...6	4,5	0...60	0,050	70	78	6/8	5

Diagrams VEBL



LEGEND:
V = Vacuum values
P = Working pressure

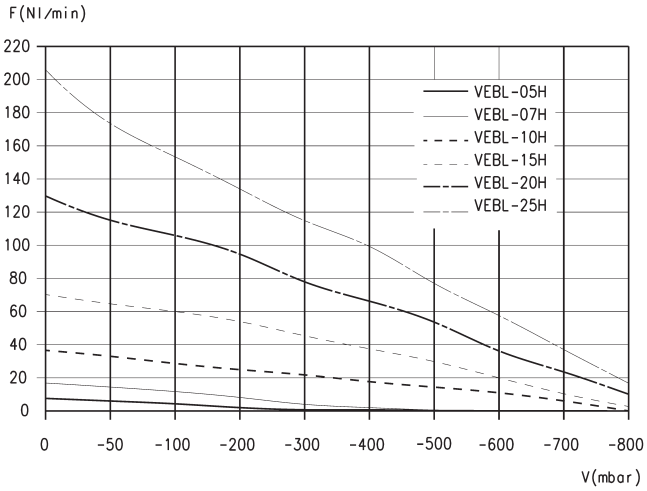
Note: vacuum reachable with different supply pressures



LEGEND:
T = Evacuation time
V = Vacuum values

Note: evacuation time for different vacuum values

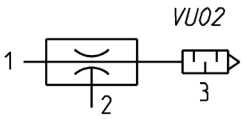
Diagrams VEBL



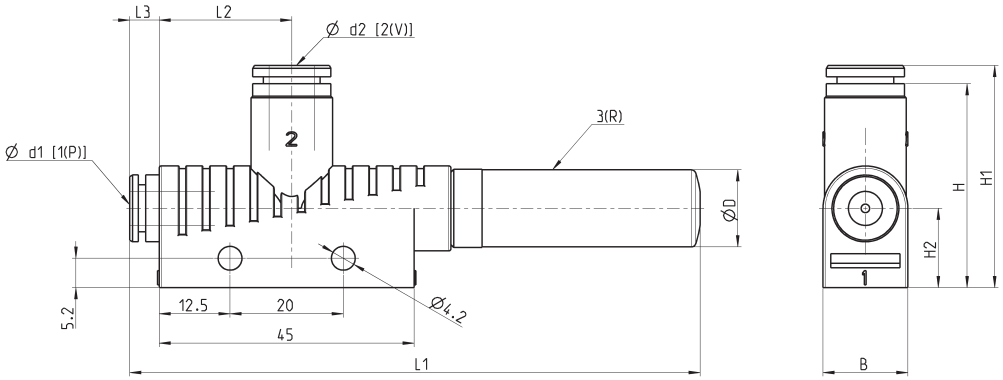
LEGEND:
F = Suction rate
V = Vacuum values

Note: Suction rate with different vacuum values

Ejectors VEBL-05H...25H

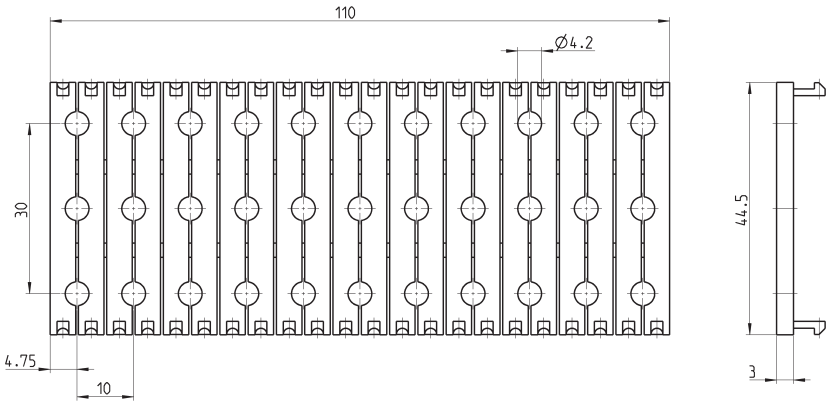


[P] = Pressure
[V] = Vacuum
[R] = Exhaust



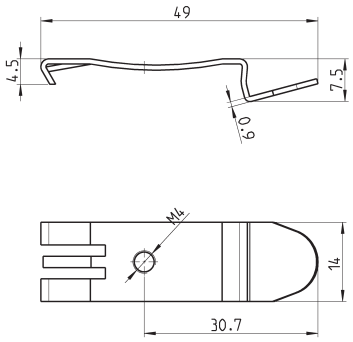
DIMENSIONS										
Mod.	B	d1	d2	D	H	H1	H2	L1	L2	L3
VEBL-05H-T1	10	4	4	9	26	28	12	71	18	2
VEBL-07H-T1	10	4	4	9	26	28	12	71	18	2
VEBL-10H-T2	15	6	8	14	34	40	14	97	22	5,5
VEBL-15H-T2	15	6	8	14	34	40	14	97	22	5,5
VEBL-20H-T3	20	8	10	20	39	45,5	17	168	24,5	5,5
VEBL-25H-T3	20	8	10	20	39	45,5	17	168	24,5	5,5

Accessories VEBL-ST



Mod.
VEBL-ST

Accessories VEBL-PCF



Mod.
VEBL-PCF

Series VED inline ejectors

Vacuum ejectors without moving parts, based on the Venturi principle, used for direct installation on suction pads.

- No moving parts for long life and maintenance
- Easy and fast installation directly at the gripping point
- Reduced dimensions and weight

These ejectors are used for direct installation inline between the suction pad compressed air supply.
This substantially reduces the volume to be evacuated and allows therefore shorter cycle times.

GENERAL DATA

Description	- body in anodized Aluminium - internal nozzle in brass

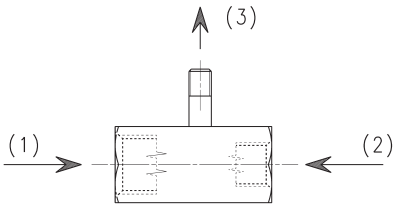
CODING EXAMPLE

VE	D	-	07

VE	SERIES VE = Vacuum ejectors
D	VERSION D = in-line
07	NOZZLE DIAMETER 07 = 0,7 mm 09 = 0,9 mm

TECHNICAL DATA

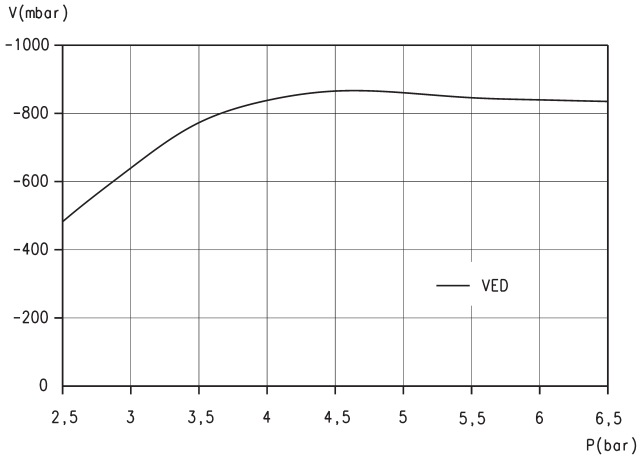
1 = Compressed Air Inlet
2 = Vacuum Inlet
3 = Exhaust



TECHNICAL DATA

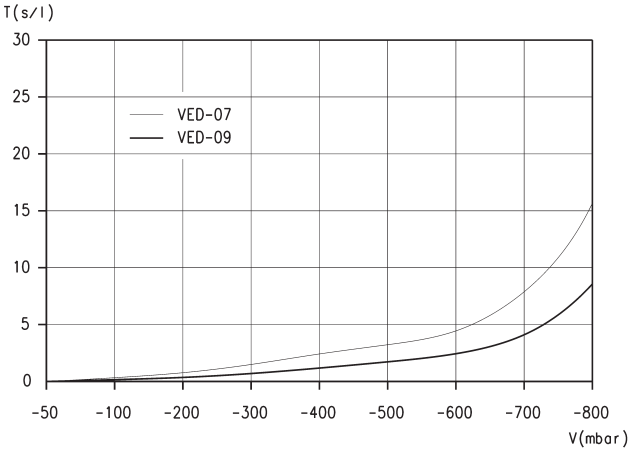
Mod.	Ø nozzle (mm)	Degree of evacuation (%)	Suction rate max. (l/min)	Suction rate max. (m^3/h)	Air consumption (l/min)	Air consumption (m^3/h)	Optimum supply pressure (bar)	Weight (kg)
VED-07	0,7	90	14	0,8	21	1,3	5	0,015
VED-09	0,9	89	21	1,3	36	2,2	5	0,015

Diagrams VED



LEGEND:
V = Vacuum values
P = Working pressure

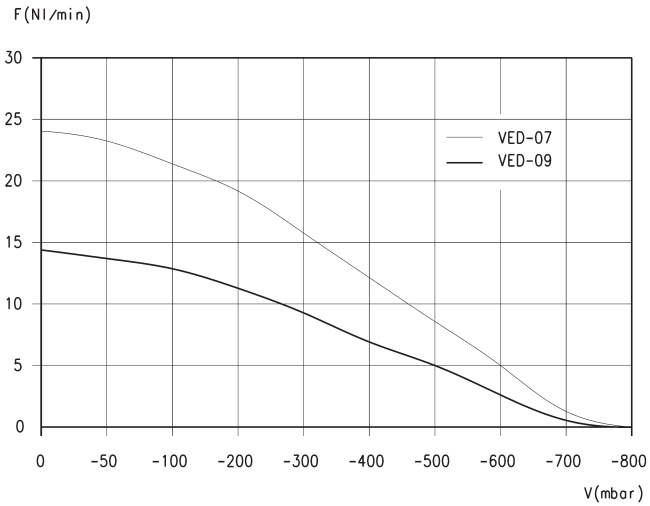
Note: vacuum reachable with different supply pressures



LEGEND:
T = Evacuation time
V = Vacuum values

Note: evacuation time for different vacuum values

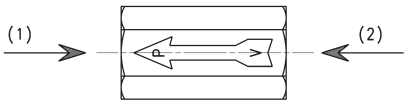
Diagrams VED

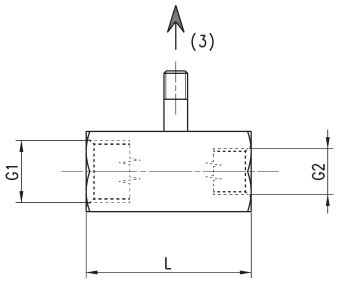


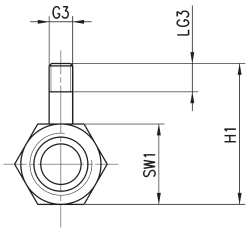
LEGEND:
F = Suction rate
V = Vacuum values

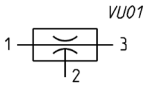
Note: Suction rate with different vacuum values

EJECTOR VED 07 and 09









DIMENSIONS							
Mod.	G1	G2	G3*	H1	L	LG3	SW1
VED-07	G1/4	G1/8	M5	29,8	35	5	17
VED-09	G1/4	G1/8	M5	29,8	35	5	17

Series VEDL inline ejectors

Vacuum compact ejectors in technopolymer without moving parts, based on the Venturi principle, used for direct installation on suction pads. Available in two sizes with internal nozzle of 0,5 and 0,7 mm and with suction rate from 8 to 16 l/min.

- No moving parts for long life and maintenance
- Easy and fast installation directly at the gripping point
- Optimized dimensions
- Reduced weight, 5 g only, ideal for dynamic applications
- Low air consumption

Generally, these vacuum compact ejectors are used for direct installation inline between the suction pad and compressed air supply.
This substantially reduces the volume to be evacuated and allows therefore shorter cycle times.

GENERAL DATA

Description	Inline ejectors
Materials	- body in technopolymer - internal nozzle in brass

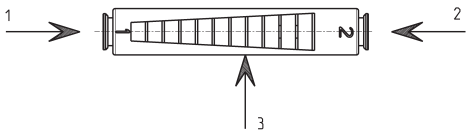
CODING EXAMPLE

VE	DL	-	05	-	T1

VE	SERIES: VE = Vacuum ejector
DL	VERSION: DL = inline light
05	NOZZLE DIAMETER: 05 = 0,5 mm 07 = 0,7 mm
T1	TYPE OF CONNECTION (ON SUPPLY SIDE): T1 = plier - tube Ø4

TECHNICAL DATA

1 = Compressed air inlet
2 = Vacuum inlet
3 = Exhaust

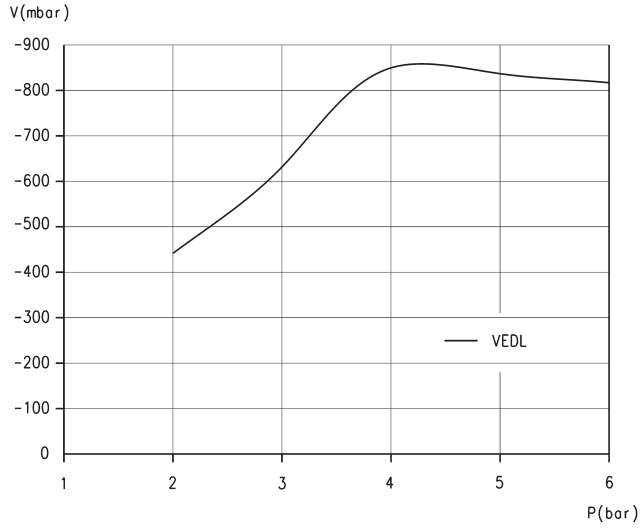


Usable fluids: compressed air, oiled and not, according to ISO 8573-1:2001 class 7-4-4

TECHNICAL DATA

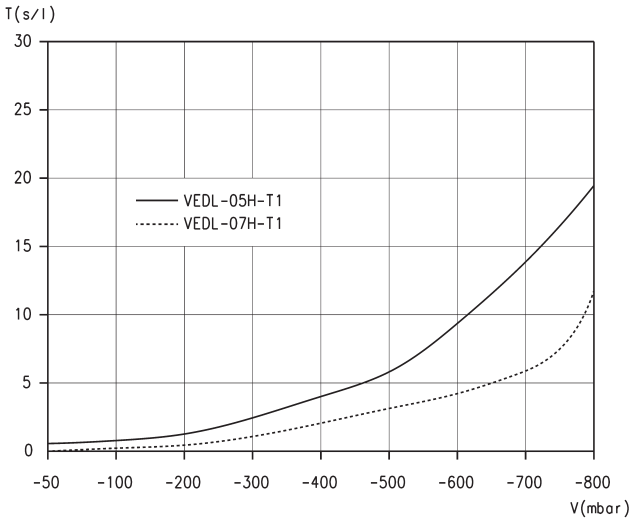
Mod.	Ø nozzle (mm)	Obtainable relative pressure (mbar)	Vacuum flow (l/min)	Air consumption [l/min]	Operating pressure	Optimum operating pressure (bar)	Operating temperature (°C)	Weight (kg)	Noise level gripped [dB(A)]	Noise level free [dB(A)]	Suggested internal Ø for tubes (mm) up to 2 m
VEDL-05-T1	0,5	-830	8	13	3...6	4,5	0...60	0,005	52	60	2/2
VEDL-07-T1	0,7	-850	15	25	3...6	4,5	0...60	0,005	55	63	2/2

Diagrams VEDL



LEGEND:
V = Vacuum values
P = Working pressure

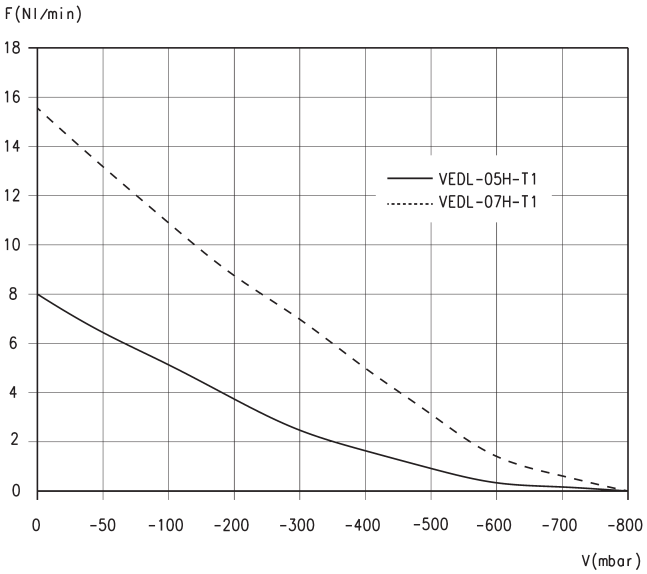
Note: Vacuum reachable with different supply pressures



LEGEND:
T = Evacuation time
V = Vacuum values

Note: Evacuation time for different vacuum values

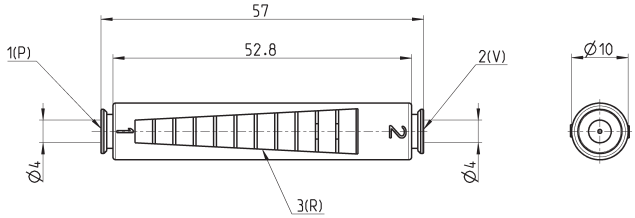
Diagrams VEDL



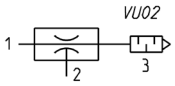
LEGEND:
F = Suction rate
V = Vacuum values

Note: Suction rate with different vacuum values

Inline ejector VEDL



[P] = Pressure
[V] = Vacuum
[R] = Exhaust



Mod.
VEDL-05-T1
VEDL-07-T1

Series VEC compact ejectors

Vacuum generators with integrated valves and monitoring system. Possibility to command suction and blow-off individually without using external valves.

- Wide range of nozzle sizes, covering a great number of applications.
- Modularity for easy installation
- Available with automatic air saving system (optional) for reduced operations costs.
- Easy monitoring of the vacuum level through integrated vacuum switch (available with or without digital display).

Vacuum generators with integrated suction and blow-off valves, as well as a monitoring system (vacuum switch). Series VEC compact ejectors allow to control suction and blow-off individually without using external valves.

Versions with integrated air saving functions are available on request. These ejectors are particularly suitable for usein automatic handling systems.

GENERAL DATA

Description	- body in anodized aluminium - valve function for the suction available in normally open (NO) or normally closed (NC) version - blow-off valve (NC), integrated silencer and non-return valve
Options	- mechanic/electronic vacuum switch - automatic air-saving system - mounting fitting plate for the battery mounting

CODING EXAMPLE

VE	C	-	10	C	2	-	RD

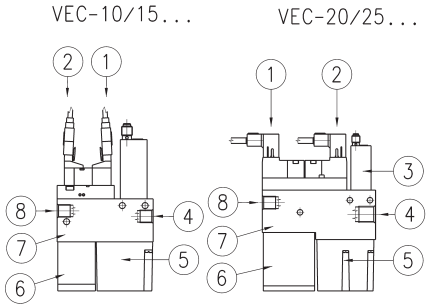
VE	SERIES VE = Vacuum ejector
C	VERSION C = compact
10	NOZZLE DIAMETER (MM) 10 = 1,0 mm 15 = 1,5 mm 20 = 2,0 mm 25 = 2,5 mm
C	VALVE FUNCTION C = NC (suction OFF when not activated) A = NO (suction ON when not activated)
2	VERSION 2 = with Blow-off valve
RD	VERSION * RD = with air saving system and digital vacuum switch (with display). It is supplied complete with connectors and cables. * RE = with air saving system and electronic vacuum switch. It is supplied complete with connectors and cables. VD = without air saving system, digital vacuum switch (with display) VE = without air saving system, with electronic vacuum switch

* The air saving circuit, where used, switches the suction signal to "ON" apart from the fact that the jector is NC or NO; this means that, in order to swtch the internal loop back to "OFF", it is necessary to activate the signal on the coil controlling it (green cable).

TECHNICAL DATA

EJECTOR SYSTEM:

1 = Suction valve
2 = Blow-off valve
3 = Vacuum switch
4 = Vacuum inlet
5 = Filter
6 = Silencer
7 = Body
8 = Compressed air inlet



TECHNICAL DATA

Mod.	Nozzle Ø (mm)	Degree of evacuation (%)	Suction rate max. (l/min)	Suction rate max. (m³/h)	Air consumption (l/min)	Air consumption (m³/h)	Air cons. blow-off (l/min)	Noise level workp. gripped [db(A)]	Noise level free [db(A)]	Optimum working pressure (bar)	Weight (kg)	Temperature range
VEC-10	1	85	37	2,2	53	3,2	200	66	68	5	0,275	0 / 45°C
VEC-15	1,5	85	65	3,9	117	7	200	68	68	5	0,275	0 / 45°C
VEC-20	2	85	116	7	190	11,4	200	76	78	5 - 6	0,465	0 / 45°C
VEC-25	2,5	85	161	9,7	310	18,6	200	72	82	5 - 6	0,465	0 / 45°C

Air-saving system

When gripping an object, the ejector remains active until a preset vacuum value is reached. Once reached the preset vacuum value, the ejector is shut OFF. If the vacuum level drops below the preset limit value, the ejector is re-activated by the electronic control circuit until the preset vacuum value is reached again.

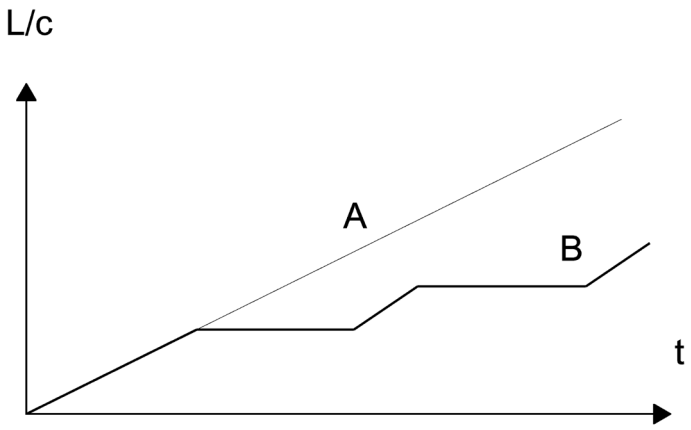
The air saving circuit, where used, switches the suction signal to "ON" apart from the fact that the jector is NC or NO; this means that, in order to swtch the internal loop back to "OFF", it is necessary to activate the signal on the coil controlling it (green cable).

Note: VEC ejectors with air-saving system are delivered complete with connectors and cables.

Mod.	
VEC-10/15-A	A = Version Normally Open
VEC-10/15-C	C = Version Normally Closed
VEC-20/25-A	A = Version Normally Open
VEC-20/25-C	C = Version Normally Closed

Applications example

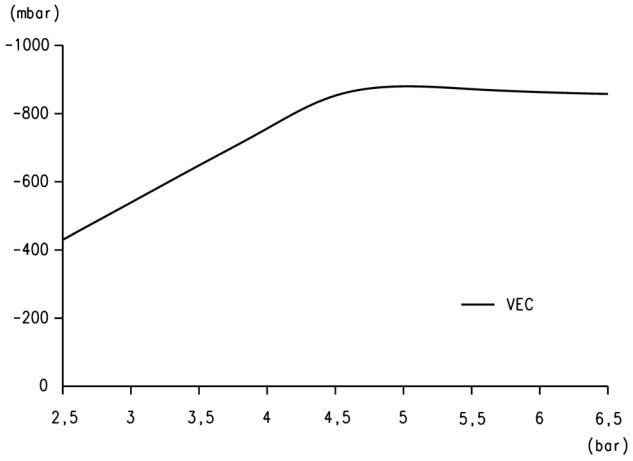
- * Evacuation time = time necessary for the ejector to reach a vacuum level of -600 mbar
- ** Air consumption l/cycle = (105/60) x 5 (105 / 60) x 0,05
- *** Prod. cycles/day = 8 hours x 3600 s = 28.800/20 s per cycle = 1440 cycles x 2 shifts = 2880 cycles



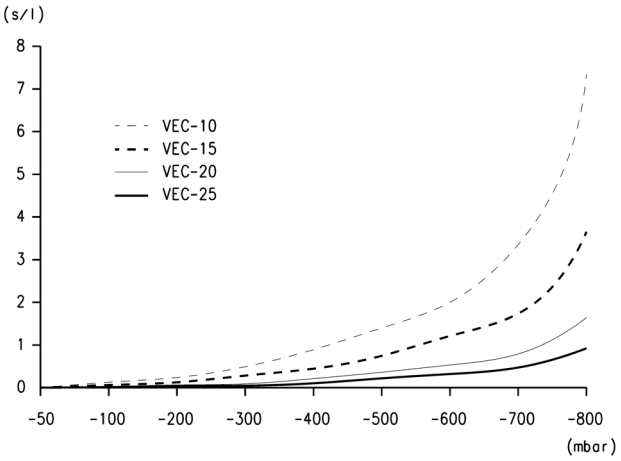
Operating conditions	without air-saving "A"	With air-saving "B"
Model	VEC-15C2-VE	VEC-15C2-RE
Air consumption l/min	105	105
Transport time (sec.)	5	5
Evac. time to -600 mbar (sec.)*	0,05	0,05
Total time vacuum ON (sec.)	5	0,05
Air consumption (l/cycle)**	8,8	0,087
Cycle time (sec.)	20	20
Prod. cycles/day (2-shifts)***	2880	2880
Daily air consumption (l)	25.361	250

In this example the air-saving system saves around 99% of the air.

DIAGRAMS VEC

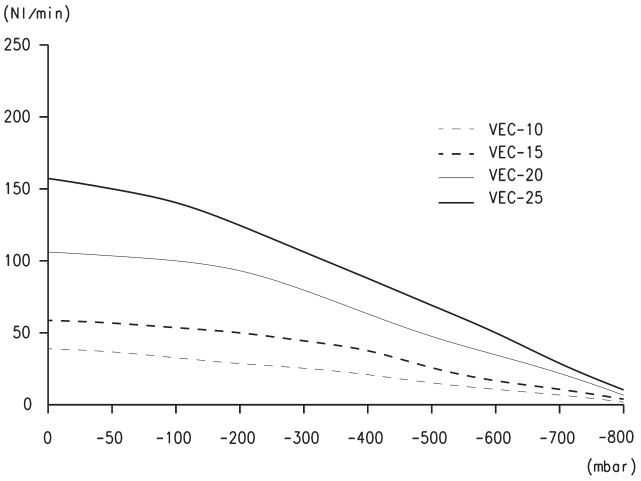


Achievable vacuum at different supply pressures



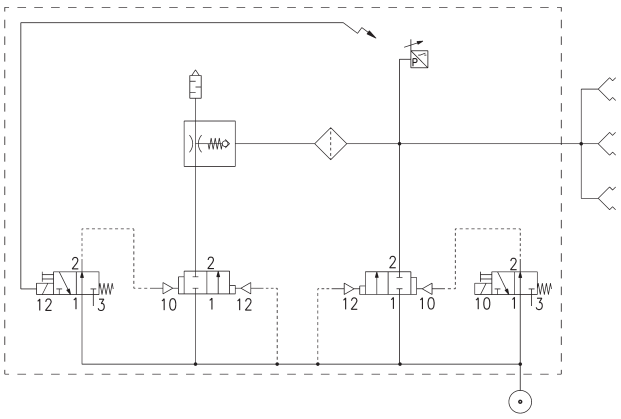
Evacuation time for different vacuum values

DIAGRAMS VEC

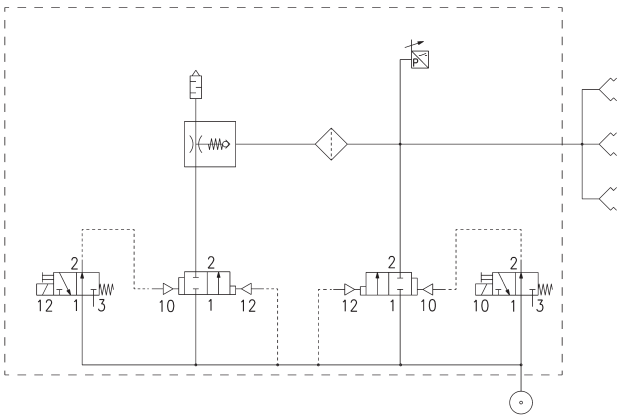


Suction rate for different vacuum values

Normally Closed valve functions

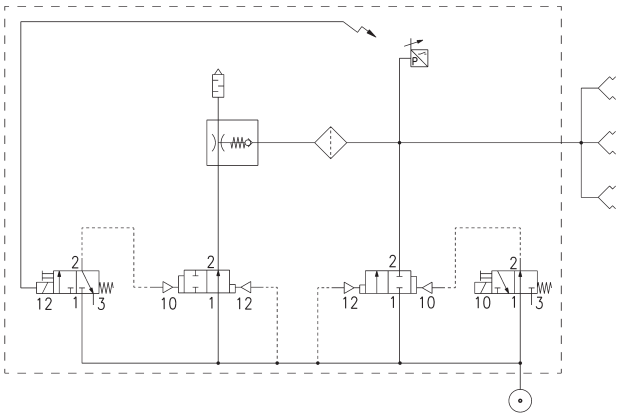


VEC-..C2-RD - VEC-..C2-RE

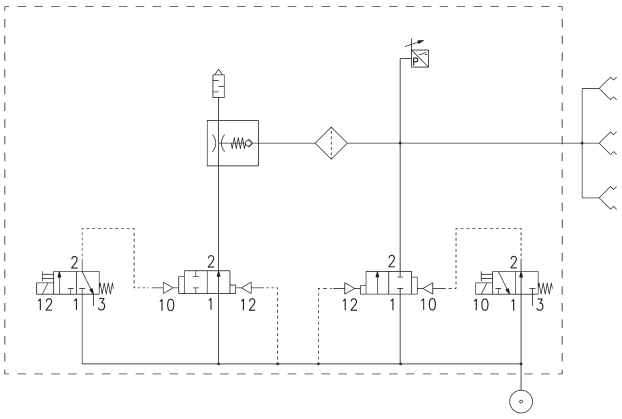


VEC-..C2-VD - VEC-..C2-VE

Normally Open valve functions



VEC-..A2-RD - VEC-..A2-RE



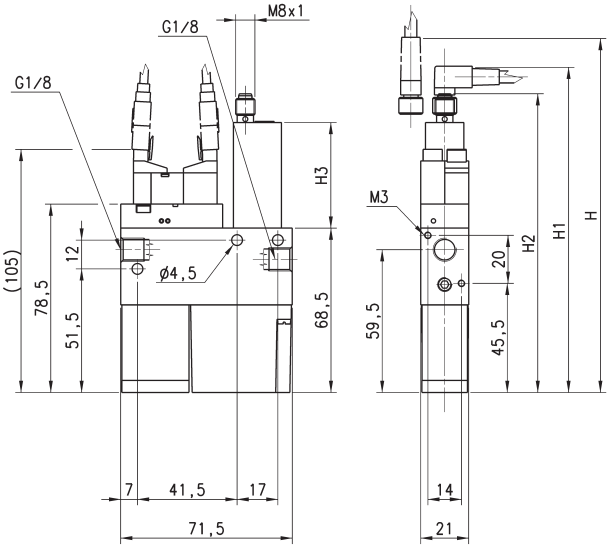
VEC-..A2-VD - VEC-..A2-VE

EJECTORS VEC 10 - 15 - 20 - 25

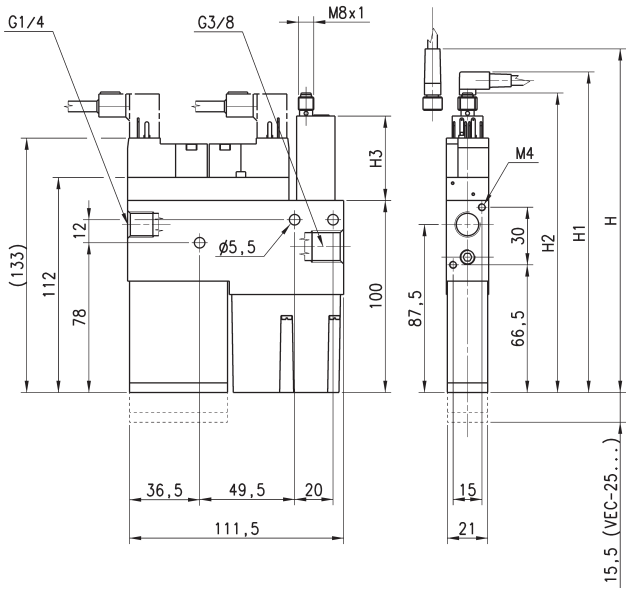
....D = SWD-V00-PA
Electronic digital display; 2 digital outputs

...E = SWE-V00-PA
Electronic without digital display; 1 digital output and 1 analog output.

VEC-10/15...

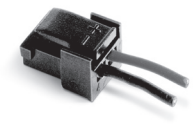


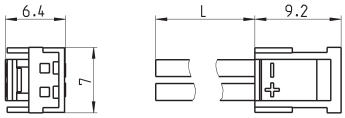
VEC-20/25...



DIMENSIONS						
Mod. [D]	Mod. [E]	R = With air saving	H	H1	H2	H3
VEC-10...-RD	VEC-10...-RE	R	162	150	139	58,5
VEC-15...-RD	VEC-15...-RE	R	162	150	139	58,5
VEC-20...-RD	VEC-20...-RE	R	195,5	183,5	172,5	58,5
VEC-25...-RD	VEC-25...-RE	R	195,5	183,5	172,5	58,5
VEC-10...-VD	VEC-10...-VE	-	147,5	135,5	124,5	44
VEC-15...-VD	VEC-15...-VE	-	147,5	135,5	124,5	44
VEC-20...-VD	VEC-20...-VE	-	181	169	158	44
VEC-25...-VD	VEC-25...-VE	-	181	169	158	44

Connector Mod. 121-8.. for Mod. VEC-10 and VEC-15

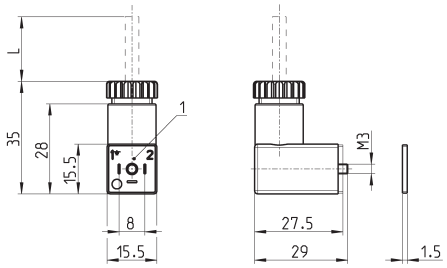




Mod.	description	colour	L = cable length (mm)	cable holding
121-803	crimped cable	black	300	crimping
121-806	crimped cable	black	600	crimping
121-810	crimped cable	black	1000	crimping
121-830	crimped cable	black	3000	crimping

Connector Mod. 126-... DIN 43650 pin spacing 8 mm

For Mod. VEC-20 and VEC-25

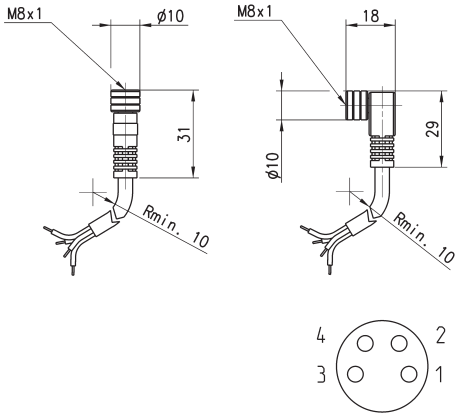


Mod.	description	colour	working voltage	cable length [L]	cable gland	tightening torque
126-550-1	moulded cable, without electronics	black	-	1000 mm	-	0.3 Nm
126-800	connector, without electronics	black	-	-	PG7	0.3 Nm
126-701	connector, varistor + Led	transparent	24 V AC/DC	-	PG7	0.3 Nm

1 = 90° adjustable connector

Circular M8 4-pole connectors, Female

With PU sheathing, non shielded cable.
Protection class: IP65



Mod.	Type of connector	Cable length (m)
CS-DF04EG-E200	straight	2
CS-DF04EG-E500	straight	5
CS-DR04EG-E200	90°	2
CS-DR04EG-E500	90°	5

Series VEM compact ejectors

Miniaturized vacuum generators with integrated valves and monitoring system. Possibility to command suction and blow-off individually without using external valves.

- Extremely compact with further reduced weight.
- Modularity for easy installation.
- Easy monitoring of the vacuum level through integrated vacuum switch.

One of the most important features of Series VEM compact ejector is the extreme compactness.
This compactness and low weight makes them suitable for "dynamic" applications such as robots, when assembled directly on the part in motion (gripper head etc.)

The Compact ejector Series VEM have integrated suction-and blow off individually without using external valves.
With these it is therefore possible to command suction and blow-off individually without using external valves.
The compact ejectors Series VEM are often used in completely automatic handling systems.

GENERAL DATA

Description	- body in anodized Aluminium - valve function for the suction available in normally open (NO) or normally closed (NC) version - blow-off valve (NC), integrated silencer and filter
Options	possibility of mounting fitting plate

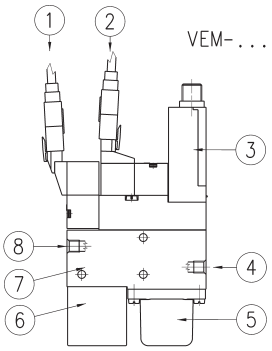
CODING EXAMPLE

VE	M	-	05	C	2	-	VE

VE	SERIES VE = Vacuum ejector
M	VERSION M = compact, mini
05	NOZZLE DIAMETER 05 = 0,5 mm 07 = 0,7 mm 10 = 1,0 mm
C	VALVE FUNCTION C = NC (suction OFF when not activated) A = NO (suction ON when not activated)
2	VERSION 2 = with Blow-off valve
VE	VALVE TYPE VE = without air saving system, with electronic vacuum switch

TECHNICAL DATA

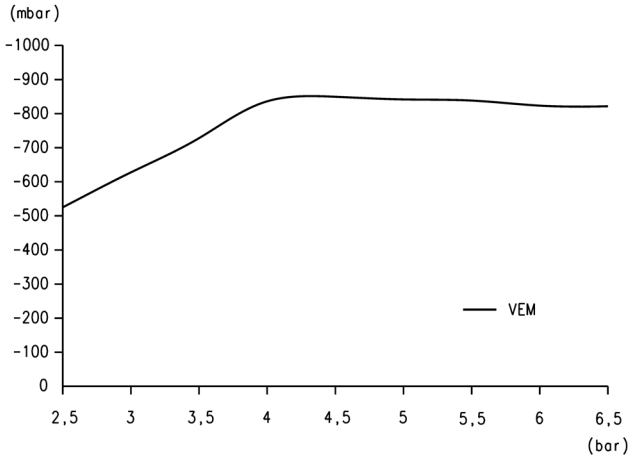
EJECTOR SYSTEM:
1 = Suction valve
2 = Blow-off valve
3 = Vacuum switch
4 = Vacuum inlet
5 = Filter
6 = Silencer
7 = Body
8 = Compressed air inlet



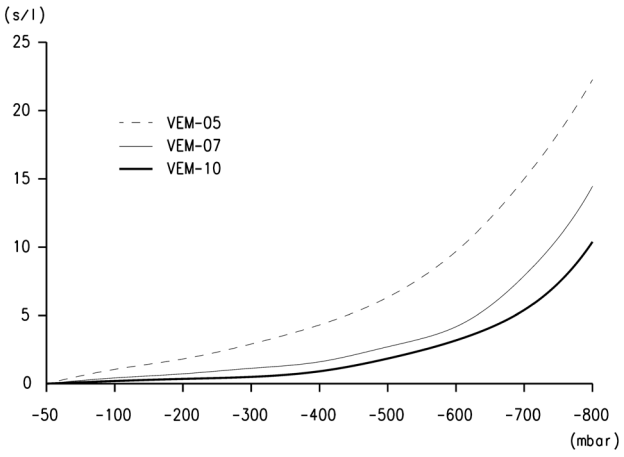
TECHNICAL DATA

Mod.	Ø nozzle (mm)	Degree of evacuation (%)	Max. Suction rate (l/min)	Max. Suction rate (m³/h)	Air consumption (l/min)	Air cons. during evac. (m³/h)	Air cons. during evac. (l/min)	Noise level workp. gripped [db(A)]	Noise level free [db(A)]	Optimum operating pressure (bar)	Weight (kg)	Temperature range
VEM-05	0,5	85	6	0,4	13	0,8	26	62	62	4,5	0,08	0 / 45°C
VEM-07	0,7	85	12	0,7	21	1,3	26	67	70	4,5	0,08	0 / 45°C
VEM-10	1	85	23	1,4	46	2,8	26	73	76	4,5	0,08	0 / 45°C

DIAGRAMS VEM

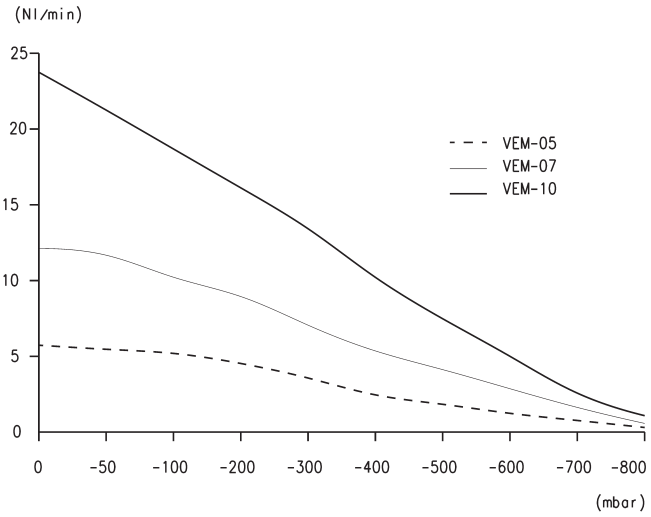


Achievable vacuum at different operating pressures

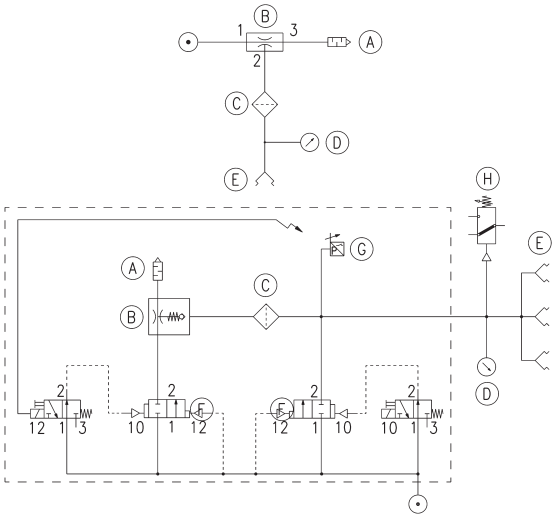


Evacuation time for different vacuum values

DIAGRAMS VEM and EXAMPLES OF PNEUMATIC SCHEME

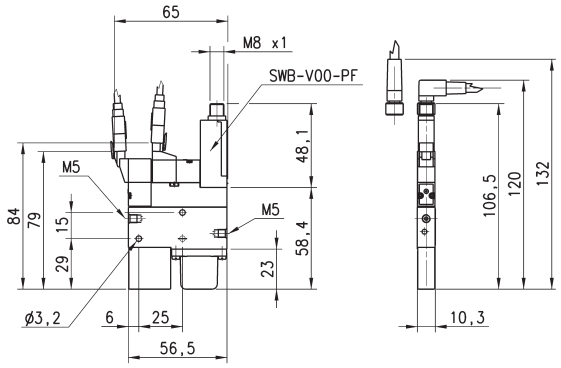


Suction rate for different vacuum values



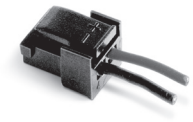
A = Silencer
B = Ejector
C = Vacuum filter
D = Vacuum gauge
E = Suction pad
F = 2/2 valve
G = Adjustable vacuum switch internal signal
H = Adjustable vacuum switch external signal

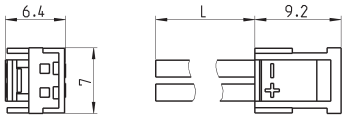
Series VEM compact ejectors



Mod.
VEM-05C2-VE
VEM-05A2-VE
VEM-07C2-VE
VEM-07A2-VE
VEM-10C2-VE
VEM-10A2-VE

Connector Mod. 121-8..

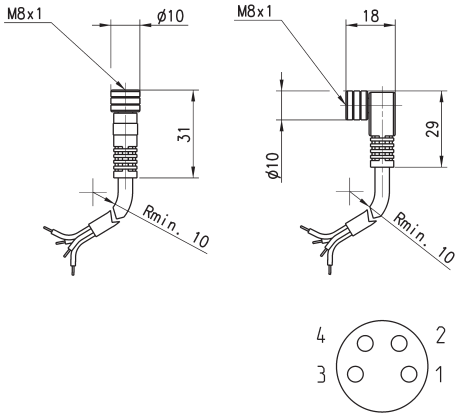




Mod.	description	colour	L = cable length (mm)	cable holding
121-803	crimped cable	black	300	crimping
121-806	crimped cable	black	600	crimping
121-810	crimped cable	black	1000	crimping
121-830	crimped cable	black	3000	crimping

Circular M8 4-pole connectors, Female

Protection class: IP65
Materials: PU non shielded cable



Mod.	Type of connector	Cable length (m)
CS-DF04EG-E200	straight	2
CS-DF04EG-E500	straight	5
CS-DR04EG-E200	90°	2
CS-DR04EG-E500	90°	5

Series NPF
flexible suction pad mountings

The vulcanisation provides flexibility in all directions.
Thread G1/4

- Flexible in all directions for optimal adaption to the workpiece (up to 12°)
- Low pivoting point which reduces the wear on the suction pad.
- Rubber covered (vulcanised) metal connection for heavy loads.

Series NPF flexible suction pad mounting allows a better adaption between the suction pad and the workpiece due to its flexibility in all directions.

Applications:
- Suitable for use in conjunction with larger flat suction pads on bigger workpieces which are either inclined or have a tendency to sag during the lifting operation or simply have a slightly irregular shape.
- They can be used in combination with spring plungers for further compensation in height if needed.

GENERAL DATA

Description	Flexible suction pad mounting
Materials	- Steel body - Vulcanised rubber connection

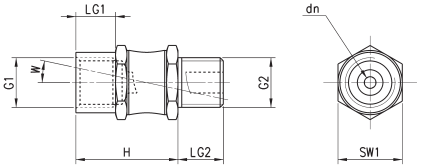
CODING EXAMPLE

NPF	-	FM	-	1/4	-	M10 X 1,25

NPF	SERIES NPF = Flexible suction pad mountings
FM	THREAD VERSION FM = G1 Female / G2 Male
1/4	FEMALE THREAD G1 1/4 = G1/4
M10x1,25	MALE THREAD G2 M10x1,25 = M10x1,25 1/4 = G1/4

Flexible suction pad mountings Series NPF

* G1 = Female thread (F)
** G2 = Male thread (M)



DIMENSIONS

Mod.	dn	G1 *	G2 **	H	LG1	LG2	SW1	W(°)	Vertical load (N)	Bending moment (Nm)	Weight (g)
NPF-FM-1/4-M10X1,25	2,8	G1/4 F	M10X1,25 M	27	10,5	8	17	12	500	8	26
NPF-FM-1/4-1/4	3	G1/4 F	G1/4 M	27	12	12	17	12	750	10	30

Series NPM and NPR (non rotating) spring plungers

These spring plungers are used in situations where significant height differences of the workpiece have to be compensated for.
Thread size M3, M5, G1/8, G1/4, plunger stroke length from 5 to 75 mm.

- Spring plungers with lower pressure for soft contact on delicate surfaces, and good compensation in height
- Wide range of sizes with diferent stroke lengths covering a wide range of applications
- Non rotating version available

The spring plungers are used in situations where significant height differences of the workpieces have to be compensated for. The spring provides furthermore a gentle approach towards the workpiece without further complex controls in fully automated system, which is important when handling sensitive workpieces.

Applications:
- Handling of parts with different heights (for example curved metal sheets)
- Handling of a very fragile parts (for example glass sheets), or parts with a delicate surface

GENERAL DATA

Description	- spring plunger consisting of a high-strength steel rod - guide sleeve - lower spring - threaded fitting (internal thread for suction pads until M5, otherwise external thread)

CODING EXAMPLE

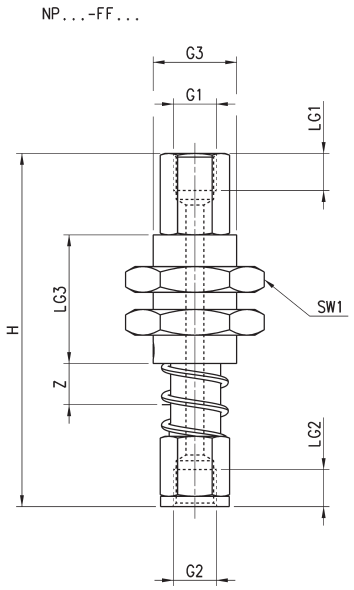
NPM	-	FM	-	1/4	-	75

NPM	SERIES NPM = spring plunger NPR = spring plunger - non-rotating
FM	THREAD VERSION FM = female / male FF = female / female
1/4	THREAD M3 = M3 M5 = M5 1/8 = G1/8 1/4 = G1/4
75	COMPENSATION STROKE 05 = 5 mm 10 = 10 mm 15 = 15 mm 20 = 20 mm 25 = 25 mm 50 = 50 mm 75 = 75 mm

TECHNICAL DATA

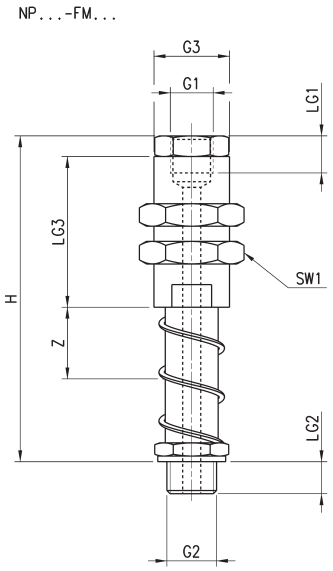
Mod.	Spring force (N/mm)	Spring force in rest position (N)	Spring force at half the stroke length (N)	Plunger stroke length (mm)	Max.vertical static load (N)	Max. horizontal static load (N)	Weight (g)
NPM-FF-M3-05	0,596	1,49	2,98	5	550	47	9
NPM-FF-M5-05	0,508	3,3	4,57	5	1500	132	16
NPM-FF-M5-10	0,323	2,75	4,36	10	1500	97	19
NPM-FF-M5-20	0,209	1,78	3,87	20	1500	63	25
NPM-FM-1/8-15	0,221	3,53	5,19	15	3700	385	80
NPM-FM-1/8-25	0,143	3,57	5,36	25	3700	283	90
NPM-FM-1/8-50	0,097	2,92	5,34	50	3700	173	110
NPM-FM-1/4-25	0,711	6,47	15,36	25	2400	747	145
NPM-FM-1/4-50	0,452	1,4	12,7	50	2400	466	175
NPM-FM-1/4-75	0,262	5,38	15,2	75	2400	340	190
NPR-FF-M3-05	0,596	1,49	2,98	5	550	47	9
NPR-FF-M5-05	0,508	3,30	4,57	5	1500	132	16
NPR-FF-M5-10	0,323	2,75	4,36	10	1500	97	19
NPR-FF-M5-20	0,209	1,78	3,87	20	1500	63	25
NPR-FM-1/8-15	0,221	3,53	5,19	15	3700	385	80
NPR-FM-1/8-50	0,097	2,92	5,34	50	3700	173	110
NPR-FM-1/4-25	0,711	6,47	15,36	25	2400	747	144
NPR-FM-1/4-75	0,262	5,38	15,20	75	2400	340	202

NPM-NPR Female - Female Version



DIMENSIONS									
Mod.	G1	G2	G3	H	LG1	LG2	LG3	SW1	Z
NPM-FF-M3-05	M3F	M3F	M6X0,75	33,5	3,8	6	10	10	5
NPM-FF-M5-05	M5F	M5F	G1/8	41,2	5,5	6,2	15	14	5
NPM-FF-M5-10	M5F	M5F	G1/8	47,2	5,5	6,2	15	14	10
NPM-FF-M5-20	M5F	M5F	G1/8	59,2	5,5	6,2	15	14	20
NPR-FF-M3-05	M3F	M3F	M6X0,75	33,5	3,8	6	10	10	5
NPR-FF-M5-05	M5F	M5F	G1/8	41,2	5,5	6,2	15	14	5
NPR-FF-M5-10	M5F	M5F	G1/8	47,2	5,5	6,2	15	14	10
NPR-FF-M5-20	M5F	M5F	G1/8	59,2	5,5	6,2	15	14	20

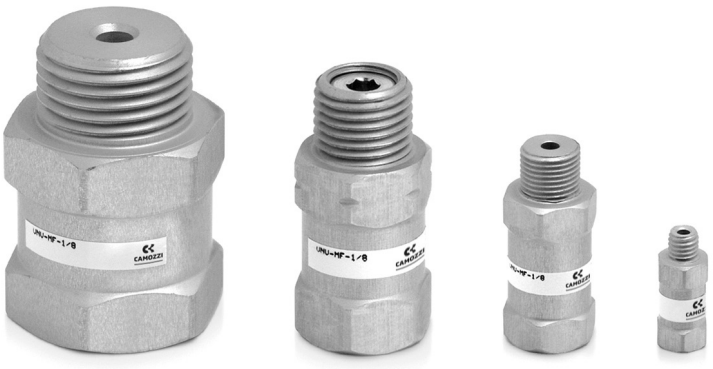
NPM-NPR Female - Male Version



DIMENSIONS									
Mod.	G1	G2	G3	H	LG1	LG2	LG3	SW1	Z
NPM-FM-1/8-15	G1/8	G1/8 M	M16X1	80	8	6,5	30	22	15
NPM-FM-1/8-25	G1/8	G1/8 M	M16X1	93	8	6,5	30	22	25
NPM-FM-1/8-50	G1/8	G1/8 M	M16X1	124	8	6,5	30	22	50
NPM-FM-1/4-25	G1/8	G1/4 M	M20X1,5	95	13	8,5	40	24	25
NPM-FM-1/4-50	G1/8	G1/4 M	M20X1,5	124,5	13	8,5	40	24	50
NPM-FM-1/4-75	G1/8	G1/4 M	M20X1,5	154	13	8,5	40	24	75
NPR-FM-1/8-15	G1/8	G1/8 M	M16X1	80	8	6,5	30	22	15
NPR-FM-1/8-50	G1/8	G1/8 M	M16X1	124	8	6,5	30	22	50
NPR-FM-1/4-25	G1/8	G1/4 M	M20X1,5	95	13	8,5	40	24	25
NPR-FM-1/4-75	G1/8	G1/4 M	M20X1,5	154	13	8,5	40	24	75

Series VNV check valves

These check valves are mainly used on vacuum gripper systems containing multiple suction pads in order to shut off individual suction pads which are not covered.
Thread size M5, G1/8, G1/4, G3/8, G1/2.



» Enable the de-activation of suction pads not in contact with the workpiece, thus makes it possible to create more versatile "multi use" gripping system.

The check valves Series VNV are mainly used on vacuum gripper systems containing multiple suction pads in order to shut off individual suction pads which are not covered or accidently pulled away from the workpiece. In this way the gripper system can operate correctly maintaining the vacuum level necessary for the application.

Applications:
- Handling objects with different shape and dimensions with the same gripping system

GENERAL DATA

Description	- ball seat valve with fixed bypass function - aluminium body with internal elements in brass - integrated dirt filter

TECHNICAL DATA

Max required suction flow and according different pressures

Mod.	- 0,3 bar (m^3/h)	- 0,3 bar (l/min)	- 0,6 bar (m^3/h)	- 0,6 bar (l/min)	Max flow (m^3/h)	Max flow (l/min)	Weight (g)
VNV-MF-M5	0.12	2	0.22	3.7	2.3	38,3	2.2
VNV-MF-1/8	0.22	3.7	0.43	7.2	15.7	261.7	11.2
VNV-MF-1/4	0.24	4	0.47	7.8	21.9	365	17.5
VNV-MF-3/8	0.44	7.3	0.48	8	35.4	590	30.3
VNV-MF-1/2	0.7	11.7	1.4	23.3	37	616.7	47.4
VNV-FM-1/8	0.22	3.7	0.43	7.2	15.7	261.7	11.2
VNV-FM-1/4	0.24	4	0.47	7.8	21.9	365	17.5
VNV-FM-1/2	0.7	11.7	1.4	23.3	37	616.7	47.4

CODING EXAMPLE

VNV	-	MF	-	M5

VNV	SERIES VNV = Check valve
MF	THREAD VERSION MF= G1 male / G2 female FM = G1 female / G2 male
M5	THREAD M5 = M5 1/8 = G1/8 1/4 = G1/4 3/8 = G3/8 (MF version only) 1/2 = G1/2

VNV from M5 to G1/2, Male - Female thread

Drawing note:
A = air flow direction during suction

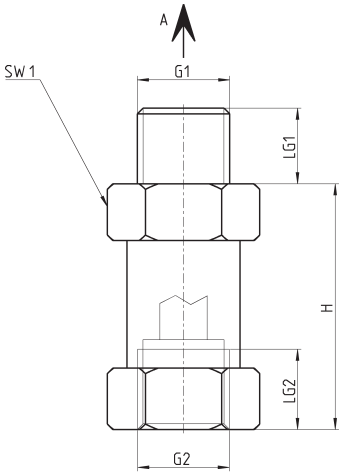
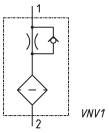


Table note:
* M = Male thread
* F = Female thread



DIMENSIONS						
Mod.	G1*	G2*	H	LG1	LG2	SW1
VNV-MF-M5	M 5 M	M 5 F	15.5	4.5	4.5	8
VNV-MF-1/8	G1/8 M	G1/8 F	26	8.5	8	14
VNV-MF-1/4	G1/4 M	G1/4 F	26	11	10	17
VNV-MF-3/8	G3/8 M	G3/8 F	29	10	12	22
VNV-MF-1/2	G1/2 M	G1/2 F	29	14	12	27

VNV from G1/8 to G1/2 - Female - Male thread

Drawing note:
A = air flow direction during suction

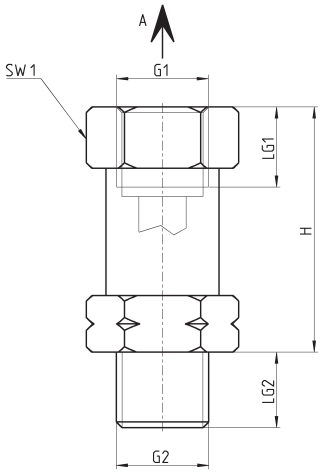
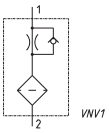


Table note:
* M = Male thread
* F = Female thread



DIMENSIONS						
Mod.	G1*	G2*	H	LG1	LG2	SW1
VNV-FM-1/8	G1/8 F	G1/8 M	26	8	8,5	14
VNV-FM-1/4	G1/4 F	G1/4 M	26	10	11	17
VNV-FM-1/2	G1/2 F	G1/2 M	29	12	14	27

Series FVD inline vacuum filters

For use in vacuum systems with minor to medium levels of dirt.
Direct mounting on the suction pad.

- Hose connection and blocking nut
- Transparent body with an arrow indicating the flow direction
- Replaceable filter element
- Transparent cartridge to check the filter's conditions

These filters can be mounted directly on the suction pad.
The filter element can be easily substituted and its conditions can be checked thanks to its transparent wrapping.

GENERAL DATA

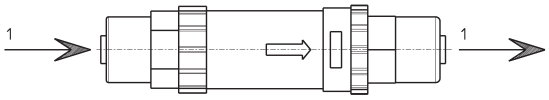
Description	Inline filter
Materials	- body in technopolymer - cloth filter

CODING EXAMPLE

FVD	-	6/4	-	50

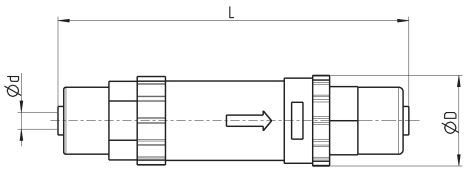
FVD	SERIES: FVD = inline filter
6/4	CONNECTIONS: 6/4 = tube 6 8/6 = tube 8
50	FILTER ELEMENT: 50 = 50 µm

TECHNICAL DATA



TECHNICAL DATA						
Mod.	Filter element (µm)	Nominal flow (l/min)	Max vacuum (mbar)	Max pressure at 25°C (bar)	Max pressure at 50°C (bar)	Weight (kg)
FVD-6/4-50	50	32	-990	7	5	0,006
FVD-8/6-50	50	66	-990	7	5	0,010

Series FVD inline filter



DIMENSIONS			
Mod.	d	D	L
FVD-6/4-50	6	16	61
FVD-8/6-50	8	23	68

Series FVT
vacuum cup filters

Used as pre-filters and fine filters for air with varying amounts of contamination, for the protection of the vacuum generator.
Mounted as protection for the ejector.

- Wide range of sizes
- Recycling filter cartridge
- Replaceable filter element
- Transparent filter cup to check the filter's conditions

These filters can be mounted directly under the ejectors to protect them in case of dusty environmental conditions.
The filter element can be substituted very easily and its conditions can be checked thanks to its transparent wrapping.
These filters can be wall-mounted through a proper bracket.
Filtering of vacuum and air up to 7 bar.

GENERAL DATA

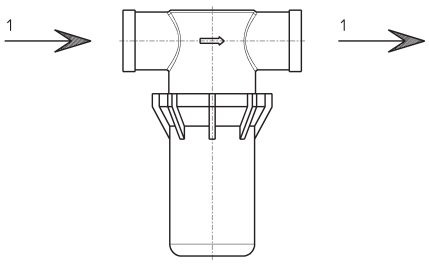
Description	Cup filter
Materials	- body in technopolymer - filter in polyethylene (PE)

CODING EXAMPLE

FVT	-	FF	-	1/4	-	80

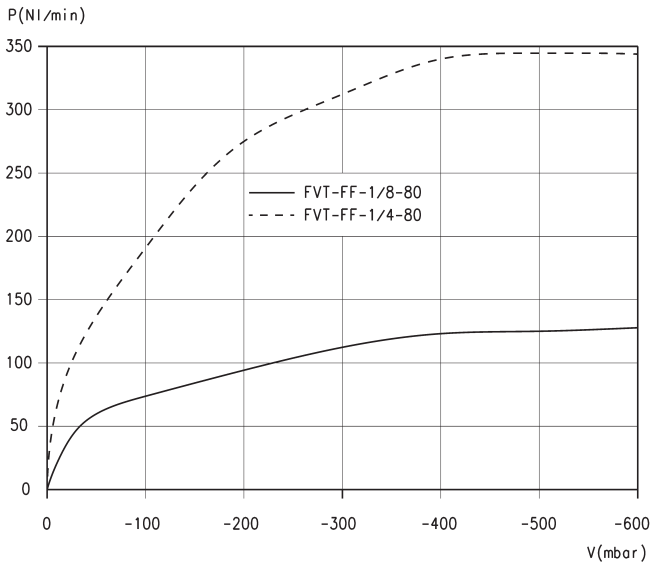
FVT	SERIES: FVT = cup filter
FF	THREAD SIZE: FF = female-female
1/4	CONNECTIONS: 1/8 = G1/8 1/4 = G1/4 3/8 = G3/8 1/2 = G1/2 3/4 = G3/4
80	FILTER ELEMENT: 80 = 80 µm

TECHNICAL DATA



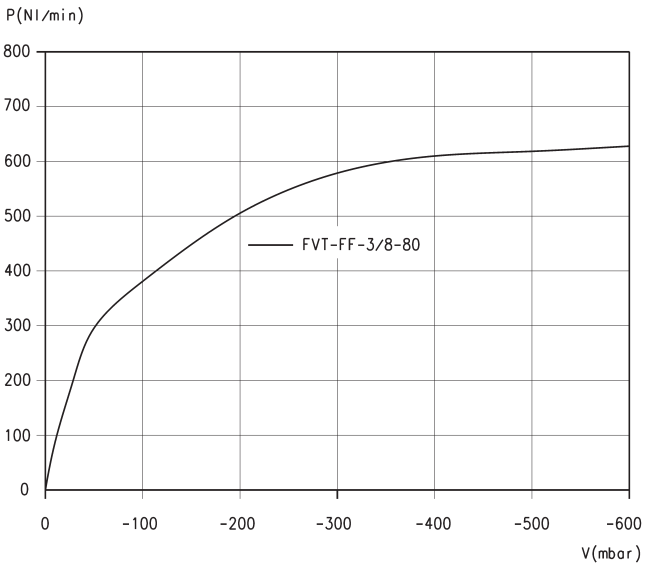
TECHNICAL DATA						
Mod.	Filter element (µm)	Nominal flow (l/min)	Max vacuum (mbar)	Max pressure at 25°C (bar)	Max pressure at 50°C (bar)	Weight (kg)
FVT-FF-1/8-80	80	45	-990	7	5	0,049
FVT-FF-1/4-80	80	110	-990	7	5	0,047
FVT-FF-3/8-80	80	245	-990	7	5	0,079
FVT-FF-1/2-80	80	300	-990	7	5	0,076
FVT-FF-3/4-80	80	600	-990	7	5	0,164

Diagrams FVT



LEGEND:
P = Volumetric flow
V = Vacuum values

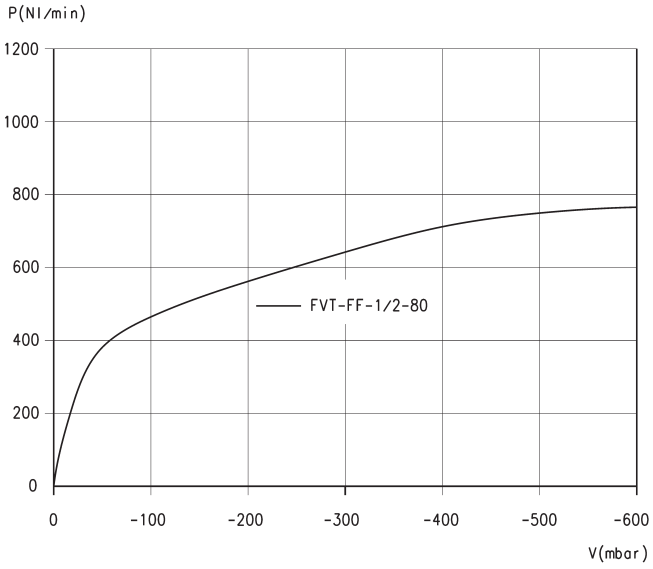
Note: Flow rate for different vacuum values



LEGEND:
P = Volumetric flow
V = Vacuum values

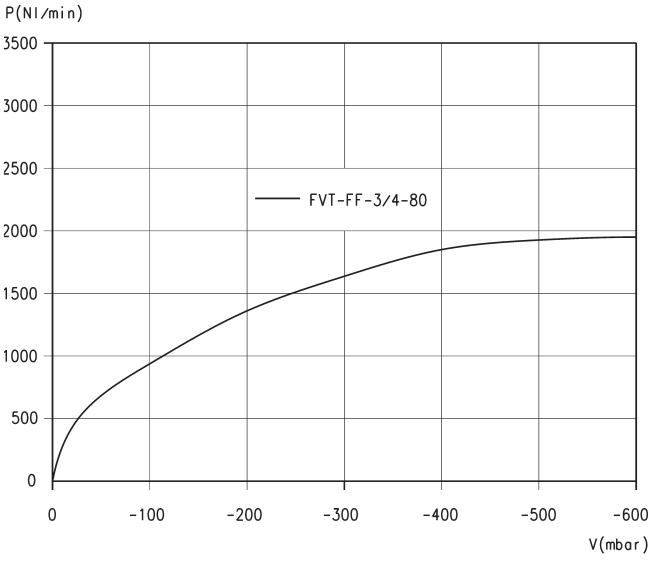
Note: Flow rate for different vacuum values

Diagrams FVT



LEGEND:
P = Volumetric flow
V = Vacuum values

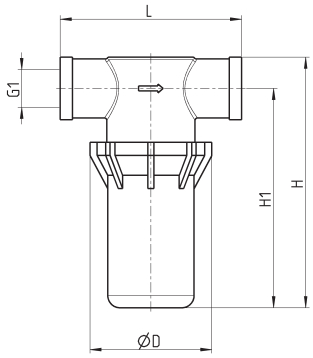
Note: Flow rate for different vacuum values



LEGEND:
P = Volumetric flow
V = Vacuum values

Note: Flow rate for different vacuum values

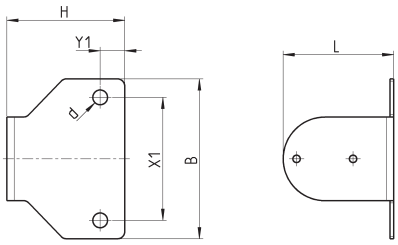
Series FVT cup filter



DIMENSIONS					
Mod.	D	G1	H	H1	L
FVT-FF-1/8-80	48	G1/8-F	60	50	58
FVT-FF-1/4-80	48	G1/4-F	60	50	76
FVT-FF-3/8-80	48,5	G3/8-F	97	84	77,2
FVT-FF-1/2-80	48	G1/2-F	101	88	77,2
FVT-FF-3/4-80	75	G3/4-F	137	118	90,5

Mounting foot bracket

The mod. FVT-FF-1/8-80-B is used on cup filters with ports G1/8, G1/4, G3/8 e G1/2.
The mod. FVT-FF-3/4-80-B is used on cup filters with ports G3/4.



DIMENSIONS						
Mod.	B	d	H	L	X1	Y1
FVT-FF-1/8-80-B	65	6	48	45	50	10
FVT-FF-3/4-80-B	85	6	52	70	70	10

New

Series RPA short stroke cylinders with non-rotating rod

Double-effect, magnetic
With hollow through rod and mounting stud
Bores: 20 and 30 mm

The Series RPA short stroke cylinders are double acting actuators with aluminium hollow through rod and mounting stud. Available in two sizes, ø 20 and ø 30 mm, with different strokes and dimensions of the mounting stud, these actuators are equipped with the non-rotating function of the rod.

The Series RPA are prepared for the mounting of magnetic sensors (Series CSD), in fact, on the external profile, along the cylinder tube, you can find sensor positioning slots. Their compact and light design together with the adopted technical solutions make these cylinders suitable to be used, combined with suction pads, in End Of Arm Tooling (EOAT) systems, especially in the sector of plastic injection moulding.

- Clean and robust design
- Light
- Fixing from the body or with mounting stud
- Hard anodized aluminium rod
- Hollow through rod
- Non-rotating rod
- Slots on both sides for the positioning of magnetic proximity switches
- Large range of standard

GENERAL DATA

Type of construction	Short stroke
Operation	Double acting, hollow through rod
Materials	Anodized aluminium body, piston and rod HNBR seals
Operating pressure	2 ÷ 8 bar
Operating temperature	5°C ÷ 60°C
Medium	Filtered air in class 7.4.4 according to ISO 8573-1
Lubrication	Not necessary. A pre-lubrication is performed on the cylinder. In case lubricated air is used, we recommend ISOVG32 oil and to never interrupt lubrication.
Mounting	Stud / threaded holes on the body
Use with external sensors	Slots on both sides for Series CSD sensors
Anti-rotation function	With self-lubricating technopolymer anti-friction pads

Technical specifications

Models	RPA20R010A14	RPA20R010A20	RPA20R025A14	RPA30R015A20	RPA30R030A20	RPA30R050A20
Bore	ø 20 mm	ø 20 mm	ø 20 mm	ø 30 mm	ø 30 mm	ø 30 mm
Force (6 bar)	130 N	130 N	130 N	300 N	300 N	300 N
Stroke	10 mm	10 mm	25 mm	15 mm	30 mm	50 mm
Air consumption	5 cm^3	5 cm^3	12 cm^3	16 cm^3	30 cm^3	46 cm^3
Actuation time	20 ms	20 ms	50 ms	60 ms	150 ms	250 ms
Stud	ø 14 mm	ø 20 mm	ø 14 mm	ø 20 mm	ø 20 mm	ø 20 mm
Weight	50 g	65 g	75 g	110 g	145 g	195 g

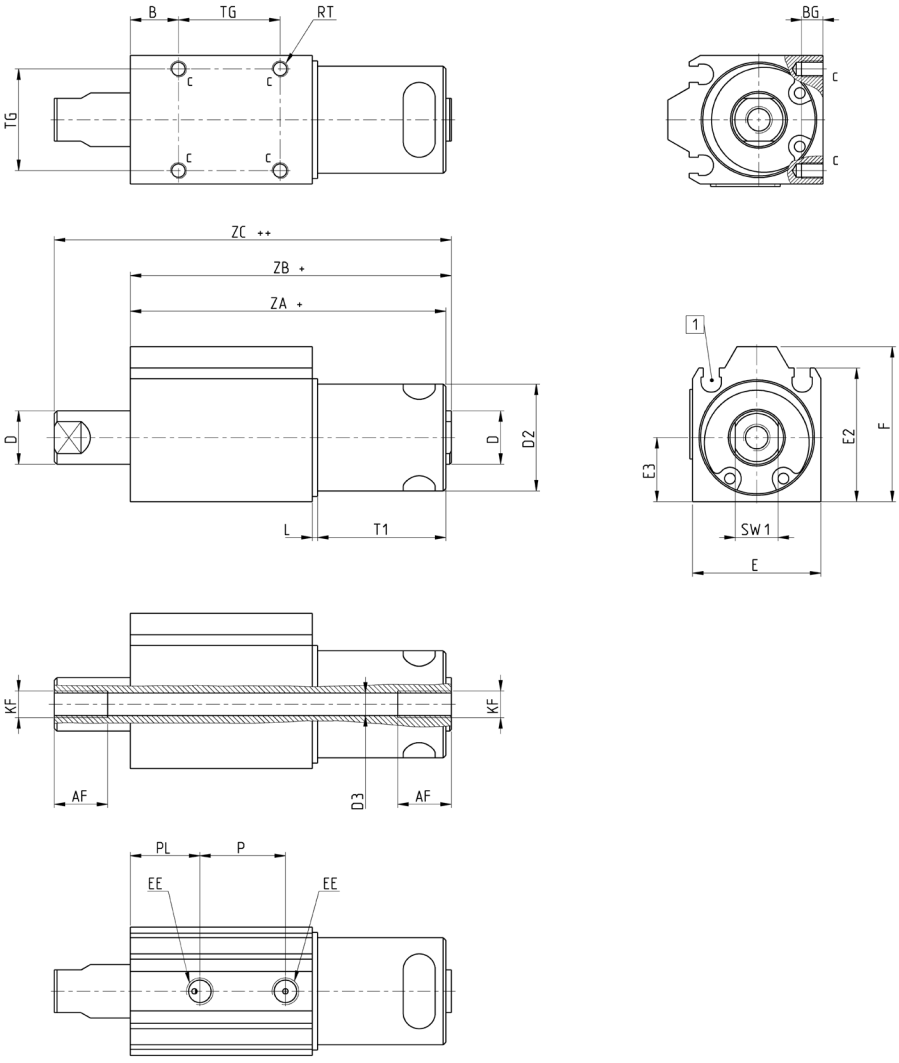
CODING EXAMPLE

RPA	20	R	010	A	20

RPA	SERIES
20	BORE: 020 = 20 mm 030 = 30 mm
R	VERSION: R = non-rotating
010	STROKE: 010 = 10 mm 015 = 15 mm 025 = 25 mm 030 = 30 mm 050 = 50 mm
A	CONSTRUCTION: A = standard
20	STUD: 14 = 14 mm 20 = 20 mm

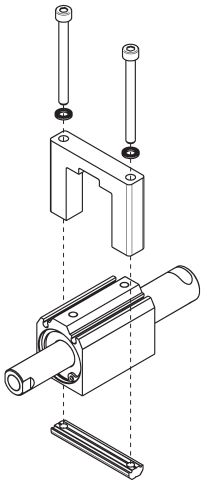
Series RPA short-stroke cylinders

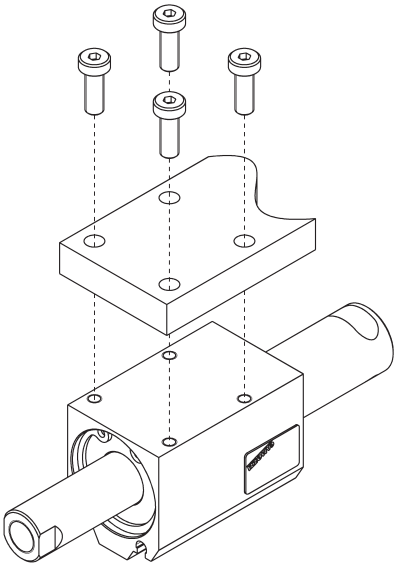
\+ = add the stroke
++ = add the stroke twice

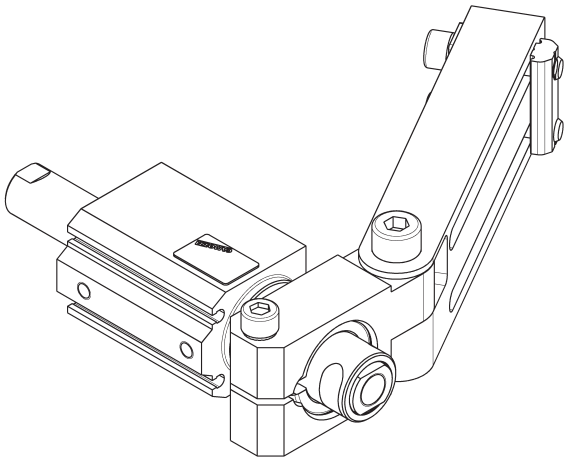


Mod.	Bore	Stroke	AF	B	BG	D	D2	D3	E	E2	E3	EE	F	KF	L	P	PL	RT	SW1	T1	TG	ZA	ZB	ZC
RPA20R010A20	20	10	10	9	4	Ø10	Ø20	Ø4.2	24	25	12	M5	29	M5	1	16	13	M3	8	24	19	59	60	74.2
RPA20R010A14	20	10	10	9	4	Ø10	Ø14	Ø4.2	24	25	12	M5	29	M5	1	16	13	M3	8	24	19	59	60	74.2
RPA20R025A14	20	25	10	24	4	Ø10	Ø14	Ø4.2	24	25	12	M5	29	M5	1	31	13	M3	8	39	19	89	90	119.2
RPA30R015A20	30	15	10	7	6	Ø15	Ø20	Ø8.8	34	35	17	M5	39	G1/8	3	23.3	10.1	M4	13	25	28	67	68	87.2
RPA30R030A20	30	30	10	7	6	Ø15	Ø20	Ø8.8	34	35	17	M5	39	G1/8	3	38.3	10.1	M4	13	38	28	95	96	130.2
RPA30R050A20	30	50	10	27	6	Ø15	Ø20	Ø8.8	34	35	17	M5	39	G1/8	3	58.3	10.1	M4	13	58	28	135	136	190.2

Mounting examples







Series QR
Rotary actuators with rack and pinion system

Magnetic, cushioned
7, 10, 20, 30, 50 mm
Rotation angles: 0 - 190°

- Compact design
- High rotation stability
- Adjustable rotation angle
- Easy to install
- Mechanical or hydraulic shock absorbers
- Can be integrated into manipulation systems

The Series QR rotary actuators are cylinders with a double piston, able to provide high torques while ensuring high stability and a precise rotary movement.
The rotation angle can be easily set as desired between 0° and 190° by means of adjustment bolts or hydraulic absorbers positioned on one side of the rotary table. The use of shock absorbers allows the dampening of two to five times more kinetic energy than with regulation bolts. The rotary table is compact and allows direct mounting of the load. Their compact design, lightness and ease to combine with EOAT make these actuators particularly suitable for use in the assembly and packaging sectors and any application that requires transfer, tilting or rotation of objects.

GENERAL DATA

Type of construction	"Rack & Pinion" system
Operation	double-acting
Materials	profile, end blocks and rotor = aluminium - rack = steel - pinion = steel – rack's guide ring = PTFE - seals = NBR
Type of mounting	by means of screws in the central body
Sizes	07, 10, 20, 30, 50
Operating temperature	0°C ÷ 70°C
Standard rotation angles	0 - 190°
Minimum rotation angle (with shock absorber)	10 = 66°, 20 = 52°, 30 = 46°, 50 = 70° (under these values the rotation is totally cushioned)
Repeatability	<0.2°
Bearings	ball bearings
Operating pressure	1 - 10bar, 1 - 7bar (for 7mm), 1-6bar (for versions with shock absorber)
Medium	filtered air in class 7.8.4 according to ISO 8573-1 standard. If lubricated air is used, it is recommended to use oil ISOVG32. Once applied the lubrication should never be interrupted.

CODING EXAMPLE

QR	20	A

QR	SERIES	PNEUMATIC SYMBOL CD18
20	SIZE: 07 10 20 30 50	
A	TYPE OF CUSHIONING: A = MECHANICAL STOP S = SHOCK ABSORBER	

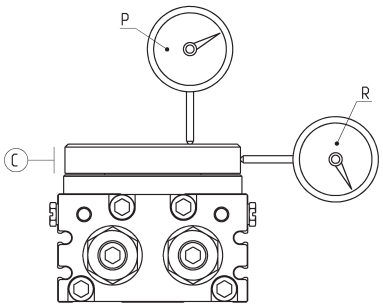
PNEUMATIC SYMBOL

The pneumatic symbol indicated in the CODING EXAMPLE is reported below.

MAXIMUM PERMISSIBLE KINETIC ENERGY AND ROTATION TIMES

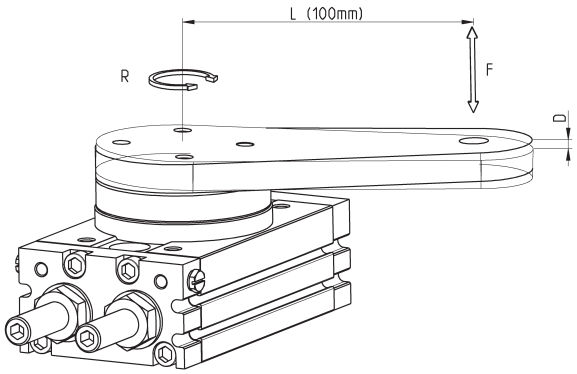
Size	Maximum permissible kinetic energy (J)	Maximum permissible kinetic energy (J)	Setting range of rotation time for stable use (s/90°)	Setting range of rotation time for stable use (s/90°)
	With adjustment bolt	**With shock absorber**	**With adjustment bolt**	**With shock absorber**
07	**0.006**	**-**	**0.2 - 1.0**	**-**
10	**0.01**	**0.04**	**0.2 - 1.0**	**0.2 - 1.0**
20	**0.025**	**0.12**	**0.2 - 1.0**	**0.2 - 1.0**
30	**0.05**	**0.12**	**0.2 - 1.0**	**0.2 - 1.0**
50	**0.08**	**0.30**	**0.2 - 1.0**	**0.2 - 1.0**

GEOMETRIC TOLERANCES OF THE ROTARY TABLE

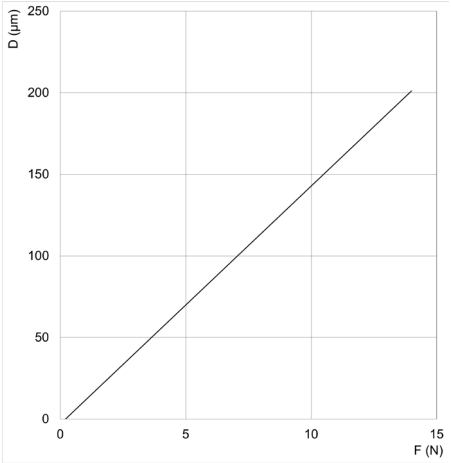


P = Parallelism of the rotary table 0,1mm
R = Roundness of the rotary table 0,1mm
C = Cylindricity of the rotary table 0,1mm

MISALIGNMENT OF THE ROTARY TABLE

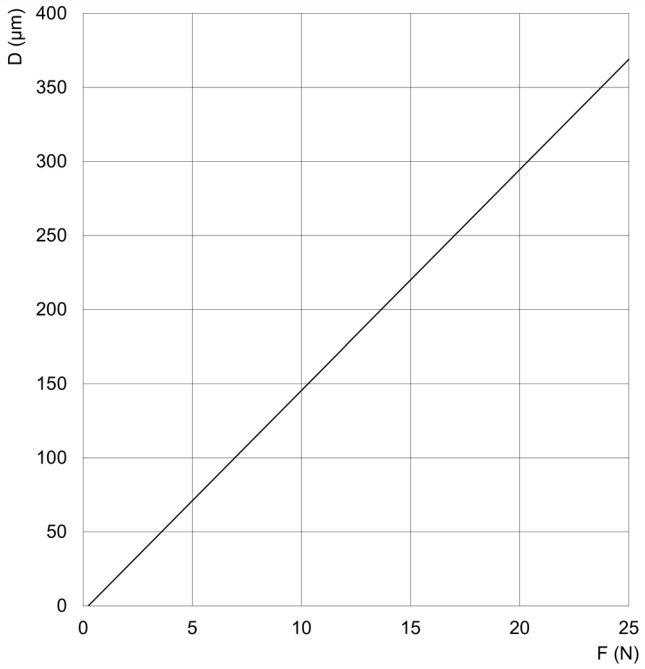


R = Direction of rotation
L = Arm
D = Misalignment table



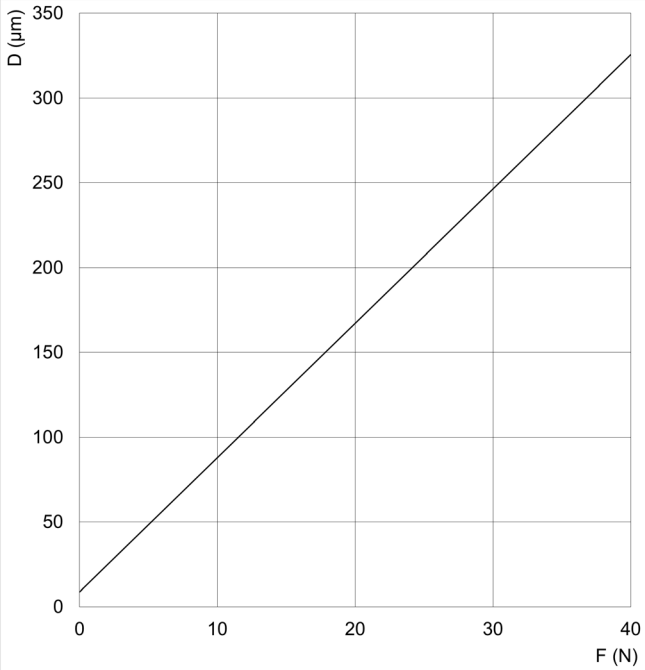
QR07
D = Misalignment
F = Force

MISALIGNMENT OF THE ROTARY TABLE



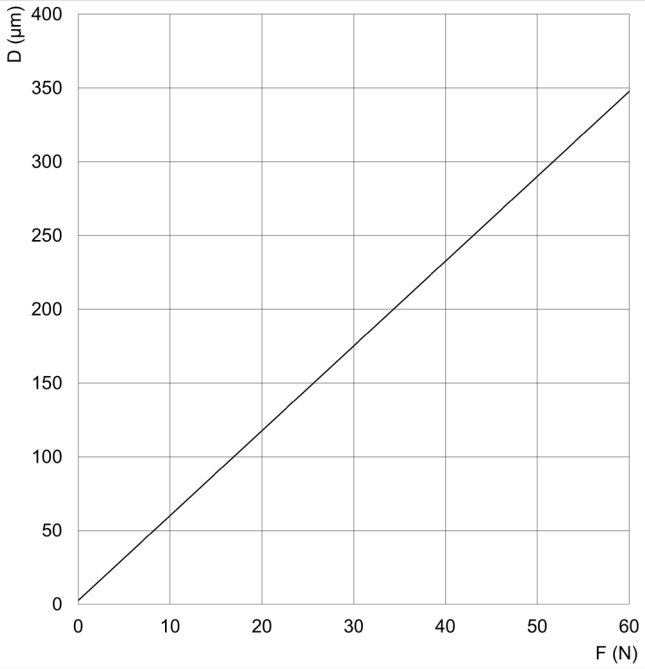
QR10

D = Misalignment
F = Force



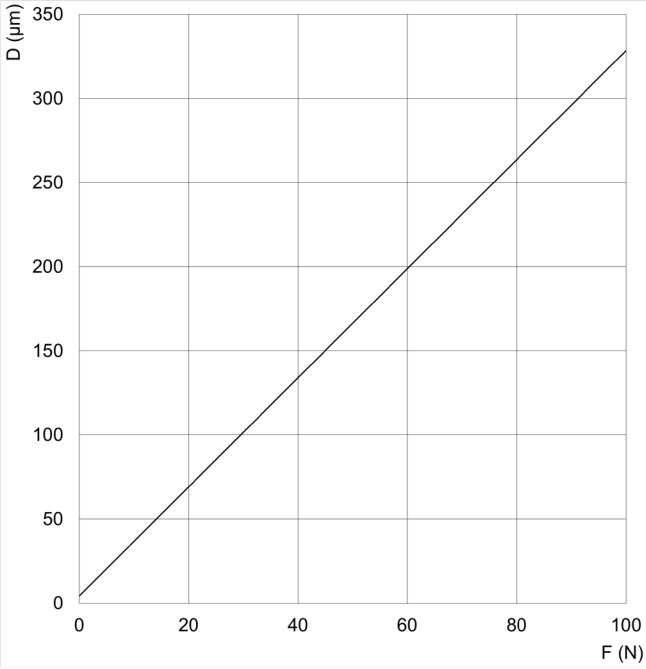
QR20

D = Misalignment
F = Force



QR30

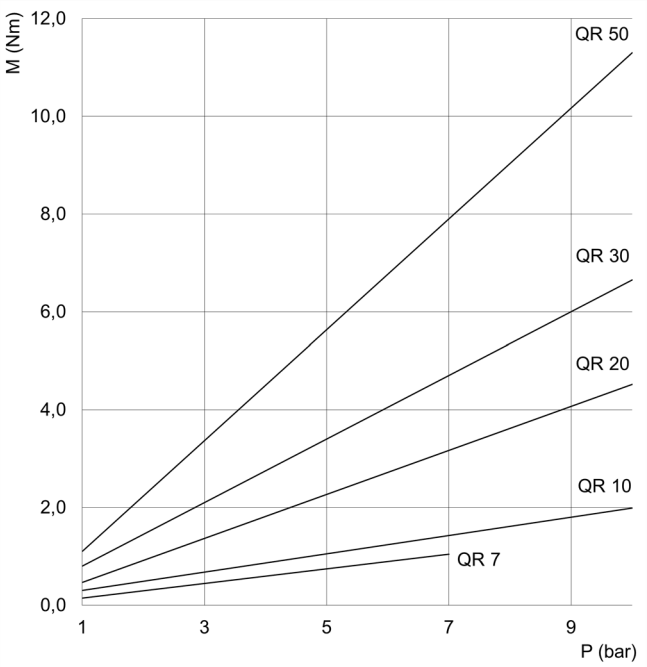
D = Misalignment
F = Force

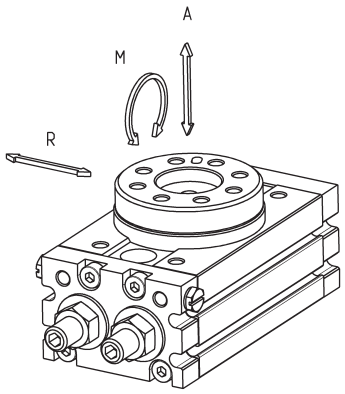


QR50

D = Misalignment
F = Force

OUTPUT TORQUE AND PERMISSIBLE LOADS





M = Output torque
P = Pressure

Maximum permissible load

Size	R radial (N)	A axial (N)	M moment (Nm)
07	47	65	1.3
10	75	73	2.3
20	142	132	3.9
30	192	189	5.1
50	309	291	9.5

SIZING / CHOICE OF THE ACTUATOR

HOW TO CHOOSE THE SUITABLE ROTARY ACTUATOR:

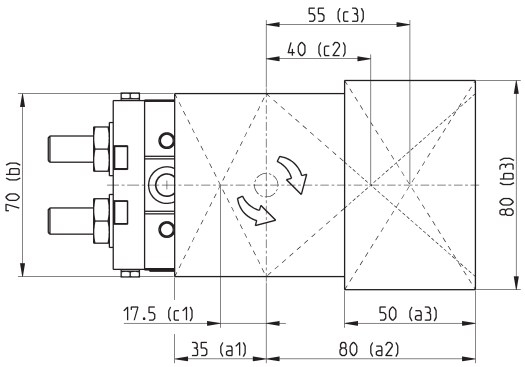
OPERATING CONDITIONS:

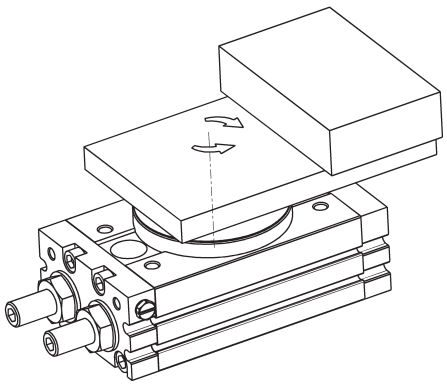
Pressure: 4bar (0.4 MPa)
Rotation angle: 90°
Rotation time: 1.0 second
Load:
P1 = mass of the plate at the left of the centre of rotation 0.066 kg
P2 = mass of the plate at the right of the centre of rotation 0.151 kg
P3 = mass of the load 0.216 kg

1) ROTATION TIME
Check whether the rotation time requested by the application falls within the range of values of the section “kinetic energy and rotation times”.

Requested rotation time: 1.0 s/90°

2) NECESSARY TORQUE
Check whether the torque requested by the application falls within the range of values defined in the section “output torque and permissible loads”.

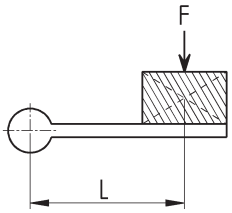




TYPES OF LOAD:

-STATIC LOAD (Ts)
A load that requires pressure force only

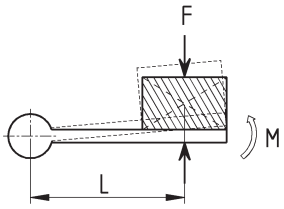
F = pressure force (N)
L = arm between the barycentre of the load and the centre of the axis (mm)



$Ts = F \cdot L$ (Nm)

-RESISTANCE LOAD (Tf)
A load that is affected by external forces such as friction and gravity. Since the aim is to move the load, it is necessary to adjust the speed and leave a margin of 5/6 N of actual torque.

M = actual torque of the actuator (Nm)
μ = friction coefficient
m = mass of the load (kg)
g = gravitational acceleration (m/s²)



$M \geq (3 \div 5) \cdot Tf$ (Nm)

$F = \mu \cdot m \cdot g$ (N)

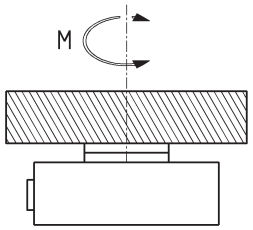
$g = 9.8$ (m/s²)

$Tf = F \cdot L$ (Nm)

- LOAD OF INERTIA (Ta)
The load must be rotated by the actuator, it is necessary to adjust the speed and leave a margin of 10N of actual torque.

M = actual torque of the actuator (Nm)
I = moment of inertia (kgm²)
α = angular acceleration (rad/s²)
θ = rotation angle
t = rotation time (s)

In the example the only force to overcome is the force of inertia as the other two are null.



$M \geq 10 \cdot Ta$ (Nm)

$Ta = I \cdot \alpha$ (Nm)

$\alpha = \frac{2 \cdot \theta}{t^2}$ (rad/s)

Start calculating the moment of inertia (I) based on the load.

I1 - PLATE
I3 - LOAD

$I_1 = m_1 \cdot (4 \cdot a_1^2 + b^2)/12 + m_2 \cdot (4 \cdot a_2^2 + b^2)/12 =$
$0.066 \cdot (4 \cdot 0.035^2 + 0.07^2)/12 + 0.151 \cdot (4 \cdot 0.08^2 + 0.07^2)/12 = 0{,}00044$ Kgm²

$I_3 = m_3 \cdot (4 \cdot a_3^2 + b_3^2)/12 + m_3 \cdot c_3^2 =$
$0.216 \cdot (4 \cdot 0.05^2 + 0.08^2)/12 + 0.216 \cdot 0.055^2 = 0{,}00095$ Kgm²

The total moment of inertia (I) is:

$I = I_1 + I_3 = 0{,}00044 + 0{,}00095 = 0.00139$ Kgm²

Calculate the angular acceleration (α).
Based on the conditions θ=90° =π/2 rad, t=1.0s you will have:
Therefore the load of inertia (Ta) equal to the necessary torque, is given by:
μ= safety coefficient

$\alpha = 2 \cdot \theta / t^2 = (2 \cdot \pi/2)/1^2 = 3.14$ rad/s²

$Ta = \mu \cdot I \cdot \alpha$

$Ta = 5 \cdot 0.00139 \cdot 3.14 = 0.00218$ Nm

3) PERMISSIBLE KINETIC ENERGY
Check whether the kinetic energy requested by the application falls within the range of values of the section "maximum permissible kinetic energy and rotation times"

Kinetic energy (E) is given by:

$E = 0.5 \cdot I \cdot \alpha^2 = 0.5 \cdot 0.00218 \cdot 3.14^2 = 0.0068$ J

4) MAXIMUM PERMISSIBLE LOAD
Check whether the maximum load requested by the application falls within the range of values of the section "output torque and permissible loads" and respects the following relation:

$$\frac{Ws}{MWs} + \frac{Wr}{MWr} + \frac{M}{MM} \leq 1$$

Ws = actual axial load
MWs = max axial load
Wr = actual radial load
MWr = max radial load
M = actual torque
MM = max torque

AXIAL LOAD (Ws)

The axial load (Ws) is given by:

PT=P1+P2+P3 = 0.066+0.151+0.216= 0.43 Kg

Ws= PT · g = 0.43 · 9.81= 4.21 N

RADIAL LOAD (Wr) - there is no radial load (Wr)

ACTUAL TORQUE (M)

F1 = force on the area of the plate at the left of the centre of rotation (N)
c1 = arm of F1 (m)

F1= P1 · g = 0.066 · 9.81= 0.64 N

F2 = force on the area of the plate at the right of the centre of rotation (N)
c2 = arm of F2 (m)
M1 = moment generated by the whole plate (Nm)

F2= P2 · g = 0.151 · 9.81= 1.48 N

M1= F1 · c1 - F2 · c2 = 1.48 · 0.04-0.64 · 0.0175= 0.048 Nm

F3 = force of the weight of the load (N)
M3 = moment generated by the load (Nm)

F3= P3 · g = 0.216 · 9.81= 2.11 N
M3= F3 · c3= 2.11 · 0.055= 0.116 Nm

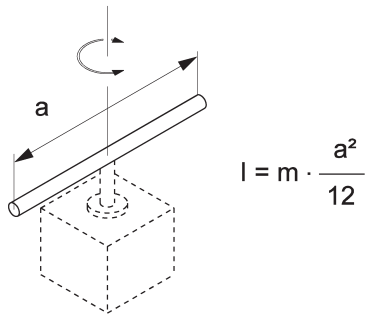
The actual torque (M) is given by summing M1 + M3:

M= M1+M3= 0.048+0.116= 0.164 Nm

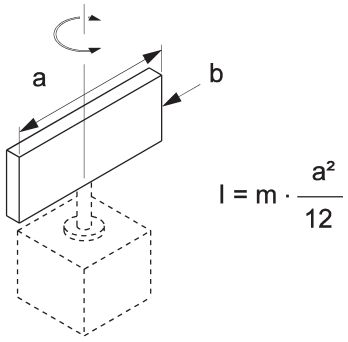
5) CHOICE OF THE SUITABLE ACTUATOR
With the results obtained from the points above, we can say that:
1. Rotation time 1.0s/90° is satisfied by all sizes
2. Total load of 0.0218 Nm at 4bar is already guaranteed by QR07
3. Kinetic energy of 0.0068J is guaranteed by size 10
4. Maximum permissible load of QR10A is major than the one examined.

The most suitable rotary actuator for the application is QR10A

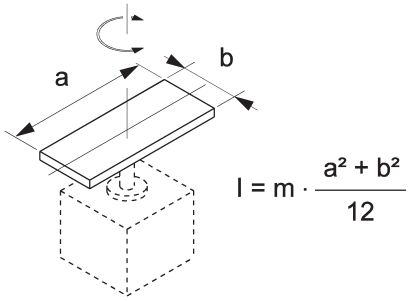
HOW TO CALCULATE THE MOMENT OF INERTIA



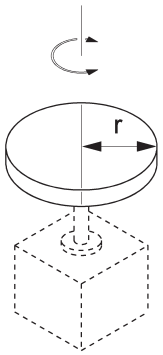
1-THIN SHAFT
Axis of rotation perpendicular to the shaft, aligned to the barycentre



2-THIN RECTANGULAR PLATE
Axis of rotation parallel to side b, aligned to the barycentre

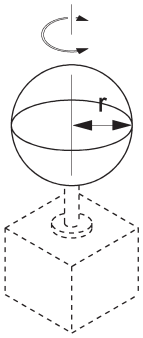


3-THIN RECTANGULAR AND PARALLELEPIPED PLATE
Axis of rotation perpendicular to the plate, aligned to the barycentre



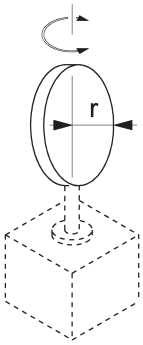
$$I = m \cdot \frac{r^2}{2}$$

4-ROUND PLATE OR COLUMN
Axis of rotation passing through the central axis



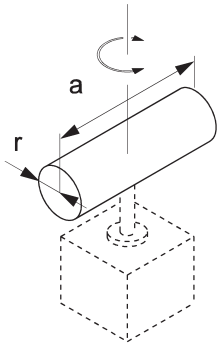
$$I = m \cdot \frac{2r^2}{5}$$

5- SOLID SPHERE
Axis of rotation passing through the centre of the diameter



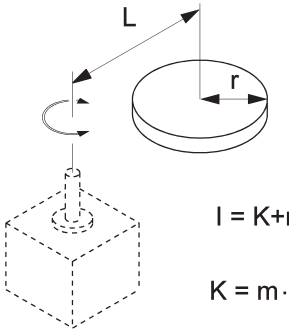
$$I = m \cdot \frac{r^2}{4}$$

6-THIN ROUND PLATE
Axis of rotation passing through the centre of the diameter



$$I = m \cdot \frac{3r^2 + a^2}{12}$$

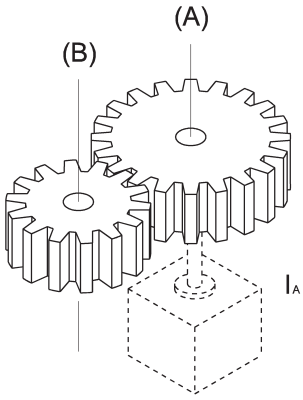
7-CYLINDER
Axis of rotation passing through the central axis and aligned to the barycentre



$$I = K + m \cdot L^2$$

$$K = m \cdot \frac{r^2}{2}$$

8-AXIS OF ROTATION AND BARYCENTRE NOT ALIGNED
K = moment of inertia on the barycentre of the load, to replace with one of the previous figures (for example 4)

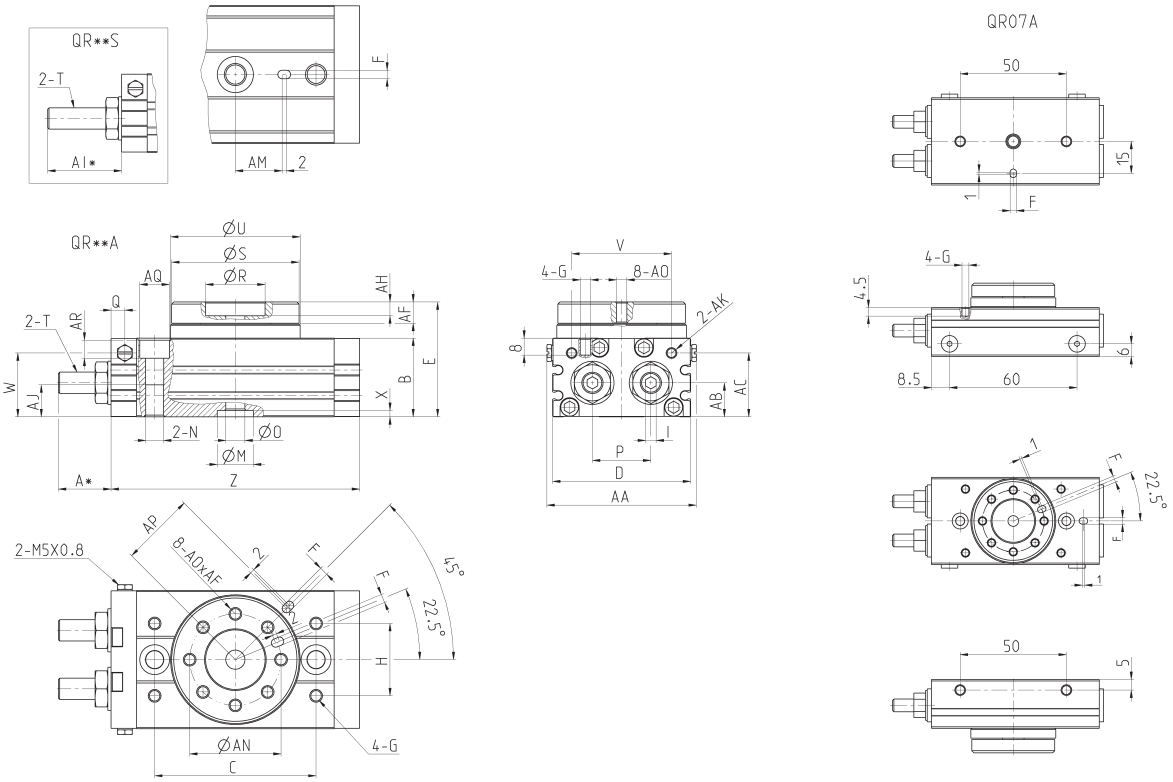


$$I_A = \left(\frac{a}{b}\right)^2 \cdot I_B$$

9-TRANSMISSION THROUGH TOOTHED GEARS
1) Calculate the moment of inertia "IB" for the rotation of shaft "B"
2)"IB" is converted into moment of inertia "IA" for the rotation of shaft "A"
a/b = n° of teeth of toothed gears

SERIES QR ROTARY ACTUATORS

* maximum protrusion, with 190 ° rotation angle adjustment



Mod.	A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
07	18.3	23	45	41	34.5	3	M4X0.7	30	3	-	7	M5x0,8	6	18.4	-	20	39	M4X0.7	40	-	-	-	M5X0.8	79
10	17.3	34	60	50	47	3	M5X0.8	27	4	9.5	15	M8x1,25	5	20	5	20	45	M8X1	46	34.5	28	3.5	M8X1.25	92
20	24.8	37	76	65	54	4	M6X1	34	5	12	17	M10x1,5	9	27.5	6.5	28	60	M10X1	61	47	30	3	M10X1.5	117
30	24.8	40	84	70	57	4	M6X1	37	5	12	22	M10x1,5	10	29	7	32	65	M10X1	67	50	33.5	3.5	M10X1.5	127
50	31.3	46	100	80	66	5	M8X1.25	50	6	15.5	26	M12x1,75	11	38	10	35	75	M14X1.5	77	63	37.5	3.5	M12X1.75	152

Mod.	AA	AB	AC	AF	AH	AI	AJ	AK	AM	AN	AO	AP	AQ	AR
07	42.7	12.2	-	6.3	3	-	-	-	.	29	M4X0.7	32.5	7.5	4.5
10	55.4	15.5	28	8	4.5	30.9	12	M5X0.8	19	32	M5X0.8	27	11	6.5
20	70.4	16	30	10	6.5	34.8	15	M5x0.8	24	43	M6x1	36	14	8.5
30	75	18.5	32	10	5	34.8	15	G1/8	28	48	M6x1	39	14	8.5
50	85	22	37.5	12	5.5	54.3	18	G1/8	33	55	M8x1.25	45	18	10.5

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