

# V A C U U M



An important selection of standard vacuum solutions, from vacuum pumps and cups to switches and accessories, including the dual module vacuum generator. At [www.norgren.com](http://www.norgren.com), you can download additional technical information. For more information on a specific actuator or actuator series, simply go to the web address printed under the online icons at the bottom of the following actuator product pages.



Vacuum products

**M/58112**  
Single stage vacuum pumps



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**M/58102**  
Multi stage vacuum pumps



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**VMAA Smart Pump®**  
Dual module vacuum generator



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**M/58300, M/58400**  
Flat and bellows cups  
Ø 6 ... 150 mm



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**M/58028/VB, ... /VF**  
Vacuum switches (pneumatic)



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**M/58024/VB, ... /VF**  
**M/58027/VAP/P../VAN/P**  
Vacuum switches  
(electrical/electronic)



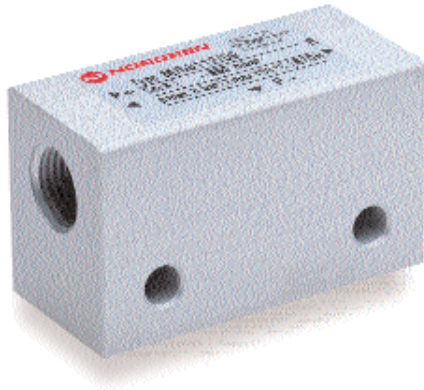
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VACUUM ACCESORIES



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# M/58112 Single stage vacuum pumps



Very high induced air capacity  
 14% lower air consumption than comparable single stage units  
 No wearing parts  
 Compatible with a wide range of vacuum line contaminants  
 Allows direct connection of suction cups and piped exhaust facility

## TECHNICAL DATA

### Medium:

Compressed air, filtered and non-lubricated

### Operating pressure:

5 bar optimum  
 8 bar maximum

### Operating temperature:

-20° ... +150°C

Consult our Technical Service for use below +2°C

### Vacuum:

-0,85 bar maximum (M/58112/09)  
 -0,90 bar maximum (M/58112/11)

## MATERIALS

Housing: anodised aluminium,  
 Nozzles: brass

## Induced air (NL/min), free air

MODELS	0 bar	-0,1 bar	-0,2 bar	-0,3 bar	-0,4 bar	-0,5 bar	-0,6 bar	-0,7 bar	-0,8 bar
M/58112/09	28	24	18	14	11	8	5,5	3	1
M/58112/11	55	47	36	28	23	17	12	6	2,5

## Time (sec) for evacuation of 1 litre volume to vacuum

MODELS	-0,1 bar	-0,2 bar	-0,3 bar	-0,4 bar	-0,5 bar	-0,6 bar	-0,7 bar	-0,8 bar	-0,85 bar	-0,9 bar
M/58112/09	0,27	0,56	0,89	1,44	2,00	2,88	4,31	7,97	14,36	-
M/58112/11	0,15	0,31	0,49	0,72	1,00	1,41	2,08	3,71	5,60	8,11

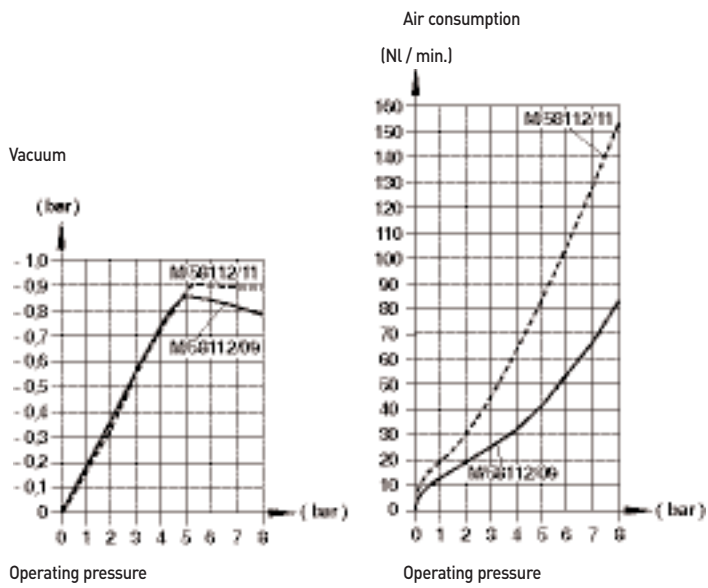
Note: Values given in the tables are theoretical and apply to an operating pressure of 5 bar.

## Recommended tube dimensions (internal diameter)

MODELS	Compressed air	Vacuum	Exhaust
M/58112/09	> Ø 3	> Ø 5	> Ø 6
M/58112/11	> Ø 3	> Ø 7	> Ø 9

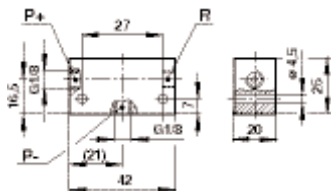
## CHARACTERISTICS

(all values given apply to an atmospheric pressure of 1013 mbar)

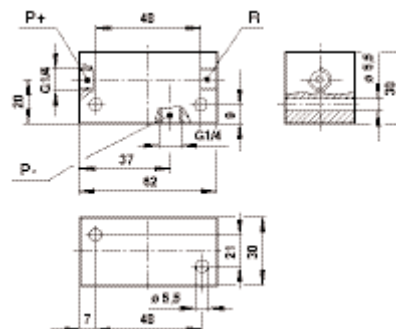


## BASIC DIMENSIONS

M/58112/09 (weight: 0,054 kg)



M/58112/11 (weight: 0,157 kg)



# M/58102 Multi stage vacuum pumps



Fast response  
Compact, lightweight  
Low sound level  
Compressed air driven  
Simple installation  
Standard and non-return valve types

## TECHNICAL DATA

### Medium:

Compressed air, filtered and non-lubricated

### Operating pressure:

6 bar maximum

### Operating temperature:

-20°C ... +80°C for  
M/58102/10 ... M/58102/30  
-20°C ... +60°C for  
M/58102/60 ... M/58102/120

Consult our Technical Service for use below +2°C

### Vacuum:

-0,87 bar maximum

## MATERIALS

M/58102/10 to M/58102/30

Vacuum chips: ABS with 30% fibreglass,

Sub base: aluminium

Seals: nitrile rubber

M/58102/60 to M/58102/120

Housing: aluminium

End caps: ABS

Mountings: steel

Seals: nitrile rubber or polyurethane

	MODELS	Valve type	Silencer** (NI/min)*	Induced air (NI/min)*	Air consumption	kg
	M/58102/10	Standard	Ported	80	49	0,080
	M/58102/20	Standard	Ported	160	98	0,095
	M/58102/30	Standard	Ported	240	144	0,110
	M/58102/60	Standard	Integral	480	285	0,855
	M/58102/90	Standard	Integral	708	471	1,105
	M/58102/120	Standard	Integral	910	528	1,150
	M/58102/N/10	Non-return valve	Ported	80	49	0,080
	M/58102/N/20	Non-return valve	Ported	160	98	0,095
	M/58102/N/30	Non-return valve	Ported	240	144	0,110
	M/58102/N/60	Non-return valve	Integral	480	285	0,855
	M/58102/N/90	Non-return valve	Integral	708	471	1,105
	M/58102/N/120	Non-return valve	Integral	910	528	1,150

\* Values given are theoretical and apply to an operating pressure of 6 bar.

\*\* For models with ported silencer, use silencer number M/58019

## CHARACTERISTICS

Induced air (NI/min), free air

MODELS	0 bar	-0,1 bar	-0,2 bar	-0,3 bar	-0,4 bar	-0,5 bar	-0,6 bar	-0,7 bar	-0,8 bar
M/58102/10	80	55	32	28	25	18	13	5	1,5
M/58102/20	160	110	64	56	50	36	26	10	3
M/58102/30	240	165	96	84	75	54	39	15	4,5
M/58102/60	480	270	182	168	150	108	78	30	9
M/58102/90	708	427	273	252	225	162	117	45	13,5
M/58102/120	910	568	355	336	300	216	156	60	18

Time (sec) for evacuation of 1 litre volume to vacuum

MODELS	-0,1 bar	-0,2 bar	-0,3 bar	-0,4 bar	-0,5 bar	-0,6 bar	-0,7 bar	-0,8 bar	-0,85 bar
M/58102/10	0,070	0,200	0,450	0,750	1,150	1,730	2,610	4,130	5,820
M/58102/20	0,035	0,100	0,230	0,370	0,570	0,860	1,320	2,070	2,920
M/58102/30	0,023	0,070	0,150	0,250	0,380	0,580	0,870	1,380	1,940
M/58102/60	0,012	0,034	0,080	0,120	0,190	0,290	0,440	0,690	0,970
M/58102/90	0,007	0,023	0,050	0,080	0,130	0,190	0,290	0,460	0,650
M/58102/120	0,006	0,017	0,040	0,060	0,100	0,150	0,220	0,350	0,490

Note: Values given in the tables are theoretical and apply to an operating pressure of 6 bar.

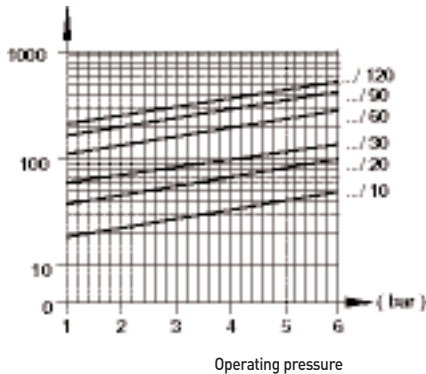
## Recommended tube dimensions (internal diameter)

MODELS	Compressed air	Vacuum	Exhaust
M/58102/10	> Ø 3	> Ø 7	> Ø 9
M/58102/20	> Ø 3	> Ø 7	> Ø 9
M/58102/30	> Ø 4	> Ø 9	> Ø 9
M/58102/60	> Ø 4	> Ø 19	-
M/58102/90	> Ø 5	> Ø 19	-
M/58102/120	> Ø 5	> Ø 22	-

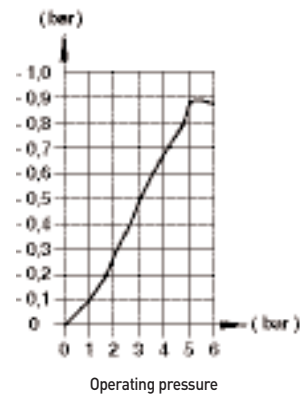
## CHARACTERISTICS

(All values given apply to an atmospheric pressure of 1013 mbar)

Air consumption  
(NL / min.)

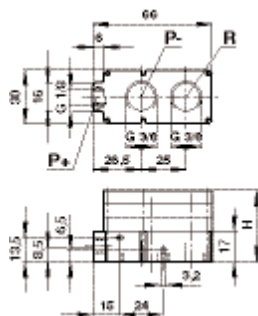


Vacuum

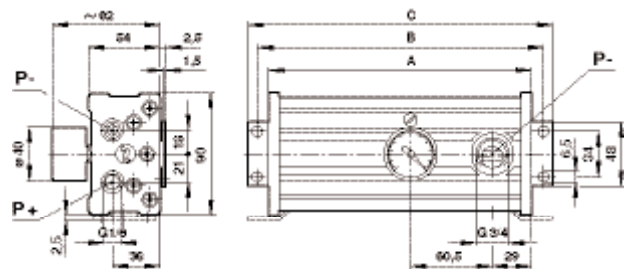


## BASIC DIMENSIONS

M/58102/10 to M/58102/30  
M/58102/N/10 to M/58102/N/30



M/58102/60 to M/58102/120  
M/58102/N/60 to M/58102/N/120



MODELS	H
M/58102/10	24,5
M/58102/20	32
M/58102/30	39,5

MODELS	A	B	C
M/58102/60	136	154	168
M/58102/90	196	214	228
M/58102/120	196	214	228

# VMAA Smart Pump®

Dual module vacuum generator



- High vacuum flow and low air consumption
- Wide operating pressure range
- Modular construction provides application flexibility
- Reduced installation, and maintenance
- Intuitive programming interface
- Automatic blow-off function

## TECHNICAL DATA

### Medium:

Lubricated or non-lubricated air filtered to 40 micron

### Vacuum level range:

0 to 86 kPa, maximum vacuum level attained at 5 bar

### Vacuum flow:

425 l/m at 5 bar  
 Response time (at sea level):  
 Evacuates 28 litres to 50,8 -kPa in 3,3 seconds at 6 bar

### Supply pressure:

Minimum 2,4 bar  
 Maximum 6,9 bar

### Supply requirements:

280 l/m at 5 bar

### Vacuum filter:

180 micron

### Operating temperature:

50°C

Consult our Technical Service for use below +2°C

### Air consumption:

444 l/m at 4 bar, 534 l/m at 5 bar, 630 l/m at 6 bar

### Mounting:

Integral bracket provided for preferred vertical mounting

### Electrical connections:

5 pin M12, male, single key micro connector

### Pneumatic connections:

Vacuum port: 3/4 NPT or ISO 'G'  
 Pressure inlet: 3/8 NPT or ISO 'G'  
 Gauge port: 1/8 NPT

### Sound level:

82 dBA

## MATERIALS

Body: aluminum and zinc die-casting

Jet housing: polycarbonate

Seals: FPM, polyurethane, Buna-N

Weatherproofing: NEMA 4X protection class IP60

## OPTIONS SELECTOR

VMAA-M200-★★★★★

### Product series

Single channel, modular vacuum generator

### Size/flow of dump

M200 = 2 jet module

### Ports

NPT threaded ports  
 ISO G threaded ports

### Substitute

21  
 11

### Variants

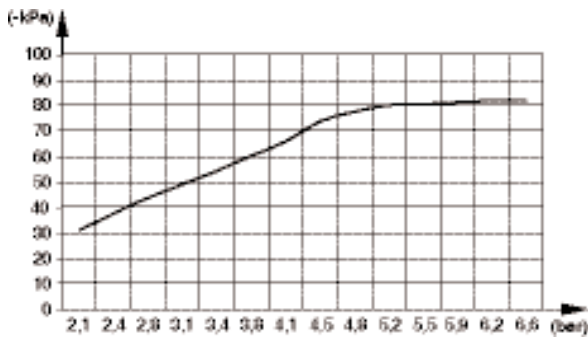
Solenoid controlled vacuum and blow-off  
 Solenoid controlled vacuum and blow-off w/4-20 mA sensor feedback output  
 Fully programmable digital unit

### Substitute

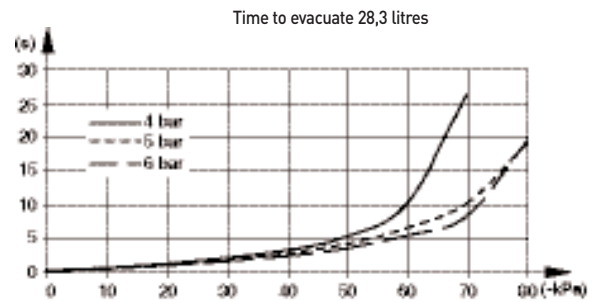
253  
 353  
 453

## CHARACTERISTICS

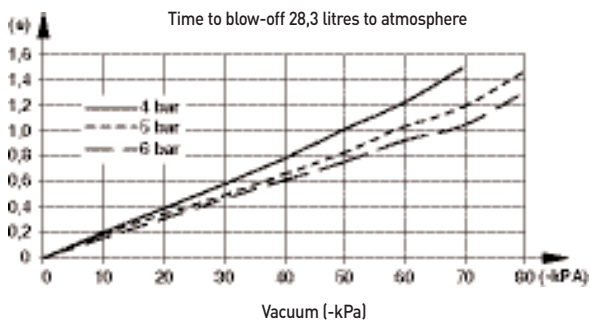
VMAA-M200-353★★



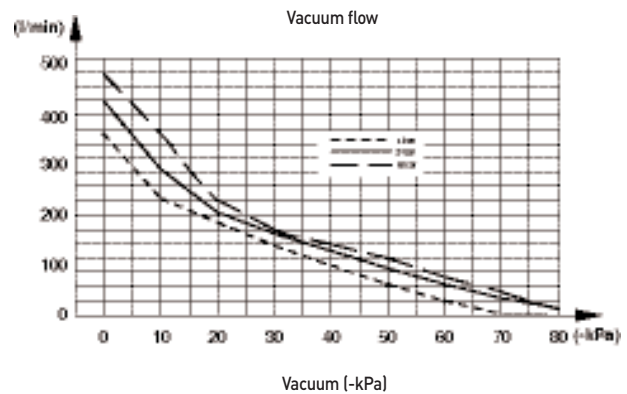
VMAA-M200-353★★



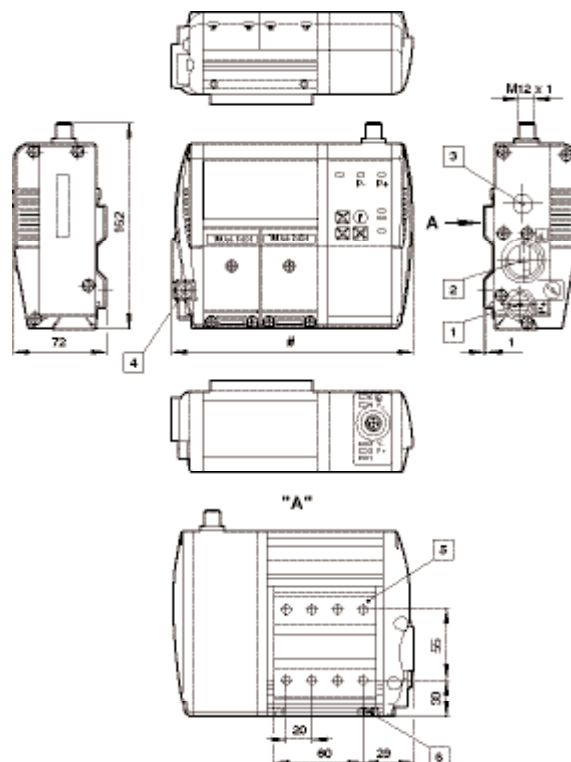
VMAA-M200-353★★



VMAA-M200-353★★



## BASIC DIMENSIONS



- # 188 (VMAA-M200-45311)  
167 (VMAA-M200-25311, -35311)
- 1 Supply port (P+) G 3/8 or 3/8 NPT
- 2 Vacuum port (P-) G 3/4 or 3/4 NPT
- 3 Exhaust
- 4 Vacuum gauge
- 5 Mounting bracket
- 6 Locking screw

# Vacuum switches

M/58028/VB, .../VF (Pneumatic)



Quick easy installation  
 Converts vacuum signal into  
 pneumatic output  
 Fully adjustable switching points

## TECHNICAL DATA

(PNEUMATIC)

### Medium:

Compressed air filtered  
 and non-lubricated

### Operating pressure:

2 ... 6 bar (pressure valve)

Adjustment :

-0,3 ... -0,85 bar

### Operating temperature:

-10°C ... +80°C

Consult our Technical Service for use below +2°C

### Tube:

Ø 4 mm

## MATERIALS

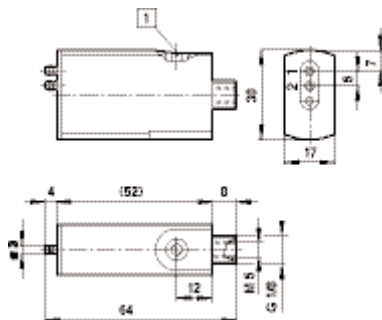
Body: Polyacetal

### Recommended tube dimensions (internal diameter)

	MODELS	Type	Fuction	kg
	M/58028/VB	Pneumatic	Normally open	0,032
	M/58028/VF	Pneumatic	Normally closed	0,032

## BASIC DIMENSIONS

M/58028



1 Adjusting screw

# Vacuum switches

M/58024/VB, .../VF (Electrical) – M/58027/VAP/P../VAN/P (Electronic)



Quick easy installation  
Converts vacuum signal into electronic or electrical output  
Digital and analogue output on electronic type

## TECHNICAL DATA (ELECTRICAL)

**Medium:**  
Vacuum

**Switching voltage:**  
250 V d.c./a.c.

**Switching current:**  
2 A max.

**Adjustment :**  
-0,2 ... -1 bar

**Repeatability:**  
± 0,1 bar

**Differential reset pressure:**  
Up ... 0,2 bar

**Switching frequency:**  
200/min.

**Operating temperature:**  
-20°C ... +80°C  
Consult our Technical Service for use below +2°C

## MATERIALS

Body: zinc plated  
Diaphragm: silicone

## TECHNICAL DATA (ELECTRONIC)

**Medium:**  
Vacuum

**Supply voltage (Ub):**  
10,8 ...30 V d.c.  
(reverse polarity protection)

**Switching voltage:**  
(Ub) -0,7 V

**Quiescent current consumption:**  
25 mA

**Digital output:**  
Normally open, 125 mA max.

**Switching point:**  
Adjustable between 0 and -1 bar

**Analogue output (0 to -1 bar):**  
1 to 5 V d.c. (± 0,004 V)

**Operating temperature:**  
+50°C max.  
Consult our Technical Service for use below +2°C

## MATERIALS

Housing: zinc  
End caps: polycarbonate

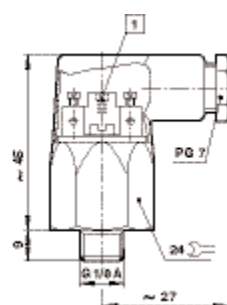
### Recommended tube dimensions (internal diameter)

	MODELS	Type	Fuction	kg
	M/58024/VB	Electrical	Normally open	0,090
	M/58024/VF	Electrical	Normally closed	0,090

MODELS	Type	Fuction	kg	ACCESSORIES Plug in cable	
	M/58027/VAN/P	Electronic	NPN + LED	0,028	M/P72014/5 with 5 m cable length
	M/58027/VAP/P	Electronic	PNP + LED	0,028	M/P72014/5 with 5 m cable length

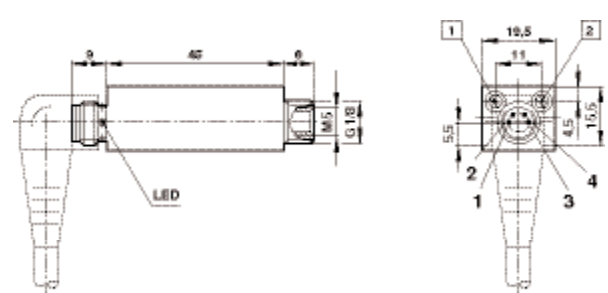
Pin 1: V d.c. cabel + brown  
Pin 2: Analog out, cabel white  
Pin 3: Switch out, cabel black  
Pin 4: 0V, cabel - blue

### BASIC DIMENSIONS M/58024



1 Adjusting screw

### M/58027



1 Switching point trimmer S  
2 Hysteresis setting trimmer H

For further information



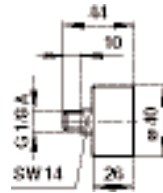
[www.norgren.com/info/en2-009](http://www.norgren.com/info/en2-009)



## VACUUM GAUGE

MODELS	Range
M/58080	0 ... -1 bar

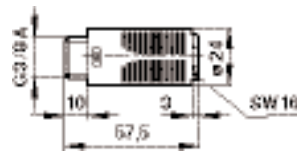
0 to -1 bar calibration  
Accurate vacuum level indication



## SILENCER

MODELS	Port size
M/58019	G3/8

Compact  
Optimum air silencing characteristics



# M/58300, M/58400 Suction cups

Ø 6 to 150 mm



Flat cups ideal where minimal movement is required for pliable materials

Bellows cups ideal where level compensation is required

## TECHNICAL DATA

Medium:

Vacuum

Operating temperature:

-10°C ... +70°C for nitrile rubber cups

-30°C ... +200°C for silicone cups

Consult our Technical Service for use below +2°C

## MATERIALS

M/58000/01

Cups: nitrile rubber

Connection fittings: aluminium

M/58000/02

Cups: silicone

Connection fittings: aluminium

MODELS	Ø mm	-0,2 bar	F <sub>y</sub> (N) -0,6 bar	-0,9 bar	R (mm)	S (mm)	V (cm <sup>3</sup> )	kg
<b>Flat</b>								
M/58301/*	6	0,5	1,5	2,3	5	1,5	0,017	0,001
M/58302/*	8	1	2,5	3,5	7	1,5	0,041	0,001
M/58303/*	10	1,5	4	6	9	2	0,065	0,001
M/58304/*	15	2,7	8	12	12	4	0,330	0,001
M/58305/*	20	5	15,5	23	13	2	0,500	0,008
M/58306/*	25	9	26,5	40	17,5	2,5	0,750	0,010
M/58307/*	30	11	34	51	26	2,5	1,3	0,012
M/58308/*	40	19	57,5	86	37	3,5	3	0,011
M/58309/*	50	30	91	135	41	4	4,2	0,016
M/58310/*	80	86	260	390	100	6	21	0,058
M/58311/*	120	180	540	810	365	6	82	0,359
M/58312/*	150	280	842	1250	380	9	177	0,59
<b>Bellows</b>								
M/58403/*	10	1,5	3,5	5	3	4	0,225	0,003
M/58404/*	15	3	6	8	5	6	0,750	0,004
M/58405/*	20	6	10	14	8	5	1,40	0,005
M/58407/*	30	12	22	28	15	12	4,75	0,013
M/58408/*	40	22	40	50	30	10	9,25	0,017
M/58409/*	50	34	66	84	40	15	26,25	0,026
M/58410/*	75	75	170	230	70	14	76	0,075
M/58411/*	110	140	350	460	85	36	111	0,386
M/58412/*	150	300	700	900	250	38	260	0,918

\* Insert material code. nitrile: 01, silicone: 02

Note: Theoretical values are given in this table. Always allow a safety factor of > 2.

## MATERIAL CHARACTERISTICS

	Nitrile rubber	Silicone
Wear resistance	Good	Fair
Oil resistance	Excellent	Fair
Weather resistance	Good	Excellent
Ozone resistance	Fair	Excellent



$$F_x = \mu \times F_y$$

where  $\mu$  is the frictional coefficient of the material being handled.

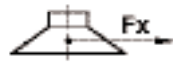
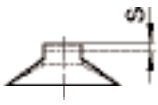
An approximate guide:

Plastic  $\mu = 0,4$  to  $0,5$

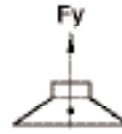
Steel, oiled  $\mu = 0,1$  to  $0,3$

Glass  $\mu = 0,3$  to  $0,5$

## FLAT CUPS LIFTING FORCES



$$F_x = \mu \cdot F_y$$



MODELS	M/58301/0.	M/58302/0.	M/58303/0.	M/58304/0.	M/58305/0.	M/58306/0.	M/58307/0.	M/58308/0.	M/58309/0.	M/58310/0.	M/58311/0.	M/58312
∅	6	8	10	15	20	25	30	40	50	80	120	150
-0,2 bar	0,5	1	1,5	2,7	5	9	11	19	30	86	180	280
Fy (N) -0,6 bar	1,5	2,5	4	8	15,5	26,5	34	57,5	91	260	540	842
-0,9 bar	2,3	3,5	6	12	23	40	51	86	135	390	810	1250
R (mm)	5	7	9	12	13	17,5	26	37	41	100	365	380
S (mm)	1,5	1,5	2	4	2	2,5	2,5	3,5	4	6	6	9
V (cm <sup>3</sup> )	0,017	0,041	0,065	0,330	0,500	0,750	1,3	3	4,2	21	82	177

Note: Theoretical values are given in this table. Always allow a safety factor of > 2.

R = Minimum radius of work surface

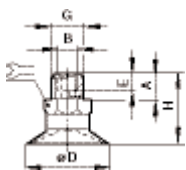
S = Maximum movement

V = Volume inside

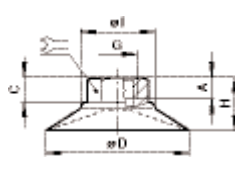
## WEIGHTS

MODELS	M/58301/0.	M/58302/0.	M/58303/0.	M/58304/0.	M/58305/0.	M/58306/0.	M/58307/0.	M/58308/0.	M/58309/0.	M/58310/0.	M/58311/0.	M/58312
∅	6	8	10	15	20	25	30	40	50	80	120	150
Weight (kg)	0,001	0,001	0,001	0,001	0,008	0,010	0,012	0,011	0,016	0,058	0,359	0,590

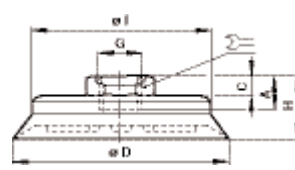
## BASIC DIMENSIONS



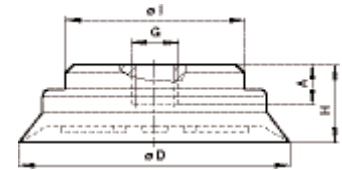
∅ 6 to 30



∅ 40 and 50



∅ 80



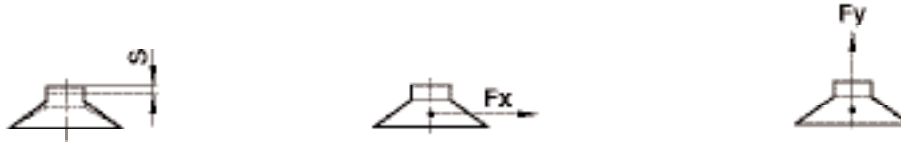
∅ 120 and 150

MODELS	M/58301/0.	M/58302/0.	M/58303/0.	M/58304/0.	M/58305/0.	M/58306/0.	M/58307/0.	M/58308/0.	M/58309/0.	M/58310/0.	M/58311/0.	M/58312
∅ D	6	8	10	15	20	25	30	40	50	80	120	150
A	4,5	4,5	4,5	4,5	8	8	8	6	6	13	9,5	9,5
C	-	-	-	-	-	-	-	9	11	3,5	-	-
G	M 5	M 5	M 5	M 5	G 1/8 A	G 1/8 A	G 1/8 A	G 1/8	G 1/8	G 1/8	G 1/2	G 1/2
H	15	16	20	21	19,5	20	20,5	23	26	21,5	34,5	41,5
∅ I	-	-	-	-	-	-	-	24	26	53	65	65
$\mu$	8	8	8	8	14	14	14	14	14	19	-	-

# M/58300, M/58400 Suction cups

Ø 6 to 150 mm

## BELLOWS CUPS LIFTING FORCES



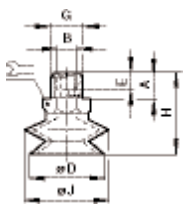
MODELS	M/58403/0.	M/58404/0.	M/58405/0.	M/58407/0.	M/58408/0.	M/58409/0.	M/58410/0.	M/58411/0.	M/58412/0.
Ø	10	15	20	30	40	50	75	110	150
-0,2 bar	1,5	3	6	12	22	34	75	140	300
Fy (N) -0,6 bar	3,5	6	10	22	40	66	170	350	700
-0,9 bar	5	8	14	28	50	84	230	460	900
R (mm)	3	5	8	15	30	40	70	85	250
S (mm)	4	6	5	12	10	15	14	36	38
V (cm <sup>3</sup> )	0,225	0,750	1,40	4,75	9,25	26,25	76	111	260

Note: Theoretical values are given in this table. Always allow a safety factor of > 2.  
 R = Minimum radius of work surface  
 S = Maximum movement  
 V = Volume inside

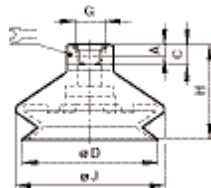
## WEIGHTS

MODELS	M/58403/0.	M/58404/0.	M/58405/0.	M/58407/0.	M/58408/0.	M/58409/0.	M/58410/0.	M/58411/0.	M/58412/0.
Ø	10	15	20	30	40	50	75	110	150
Weight (kg)	0,003	0,004	0,005	0,013	0,017	0,026	0,075	0,386	0,918

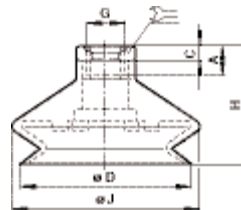
## BASIC DIMENSIONS



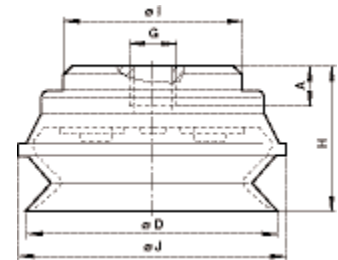
Ø 10 to 30



Ø 40 and 50



Ø 75



Ø 110 and 150

MODELS	M/58403/0.	M/58404/0.	M/58405/0.	M/58407/0.	M/58408/0.	M/58409/0.	M/58410/0.	M/58411/0.	M/58412/0.
Ø	10	15	20	30	40	50	75	110	150
A	5	5	7,5	7,5	6	6	12	9,5	9,5
C	-	-	-	-	9	9	4	-	-
Ø D	11	16	22	33	43	53	78	110	150
G	M 5	M 5	G 1/8 A	G 1/8 A	G 1/8	G 1/8	G 1/8	G 1/2	G 1/2
H	26	29	30,5	39	37	43	50	66,5	85,5
Ø I	-	-	-	-	-	-	-	65	65
Ø J	12	17	24	36	46	59	83	122	167
$\frac{H}{L}$	7	7	14	17	17	17	21	-	-

# “Our commitment to the way we do business”

Norgren, a responsible business

Norgren’s commitment to its shareholders, customers, colleagues, and suppliers is that collectively and individually we aspire to act responsibly and to high standards at all times.

Our commitment to each of our stakeholders and the main corporate responsibility dimensions of marketplace, workplace, community and environment can be summed up as follows:

- » We all share the responsibility for each other’s health and safety. People are the core of Norgren’s business and their well being is the key to future success and prosperity.
- » We will deal openly, fairly and honestly with suppliers and business partners and not demand of them standards that we do not apply to ourselves.

- » We will be honest, fair and open in our dealings with customers, endeavouring to help them at all times. When things go wrong, we will resolve problems as quickly and fairly as we can.
- » We will observe the laws and regulations of all countries in which we operate, not just in the letter but also the spirit. We will not countenance bribery, corruption, insider trading or the concealment of conflicts of interest.
- » We are committed to reducing the environmental impact of our business, and to taking social and environmental issues into account in our processes, practices and the products we supply to customers.

## »» **NORGREN’S MAIN CONTRIBUTION** to society

‘The value of a successful business’

