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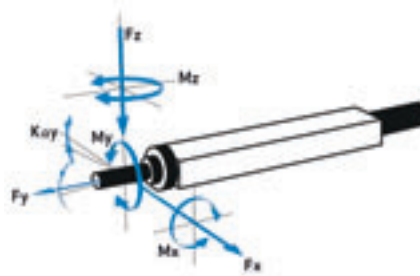
# Vacuum LINEAR Actuators

## 4.116 Micro Actuator MA-35 Vacuum



### FACTS

Load characteristics	$F_x(N)$	$F_y(N)$	$F_z(N)$
FV	10	200	10
HV	10	200	10
UHVG	10	200	10



### KEY FEATURES

- Vacuum up to 10<sup>-9</sup> hPa
- Travel range 52 mm (2")
- Uni-directional repeatability down to 0.2 μm
- Maximum speed 8 mm/sec
- Force max. 300 N
- Integrated limit switches
- High resolution

from the drive. Compared to other pushers, the standard force is very high and can be increased. The MA-35 Vacuum actuators are motorized with a special 2-phase gear-motor vacuum combination or as direct drive 2-phase stepper vacuum motor. The motorized drives can be combined with a ground preloaded recirculating ball screw with 1 mm pitch. Depending on the requirement, the actuator can be configured for high pushing forces, high resolution or higher speed. The travel range is 52 mm (2"). Two integrated limit switches prevent damage from accidental over-travel. All critical elements are made of stainless steel. Please see "GLOSSARY Vacuum Specification" for all vacuum specification.

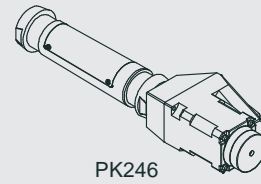
### TECHNICAL DATA

Travel range (mm)	52		
Weight (kg)	2		
<b>Vacuum type</b>	<b>FV</b>	<b>HV</b>	<b>UHVG</b>
Speed max. (mm/sec)	8	3	3
Resolution calculated (μm)	5 (FS)	5 (FS)	5 (FS)
Resolution typical (μm)	0.1	0.1	0.1
Bi-directional Repeatability (μm)	± 1	± 1	± 1
Uni-directional Repeatability (μm)	0.2	0.2	0.2
Nominal Current (A)	1.2	1.2	1.2
Accuracy	on request		
Velocity range (mm/sec)	0.001 ... 6		
Material	Aluminum or Stainless steel, suitable for vacuum		

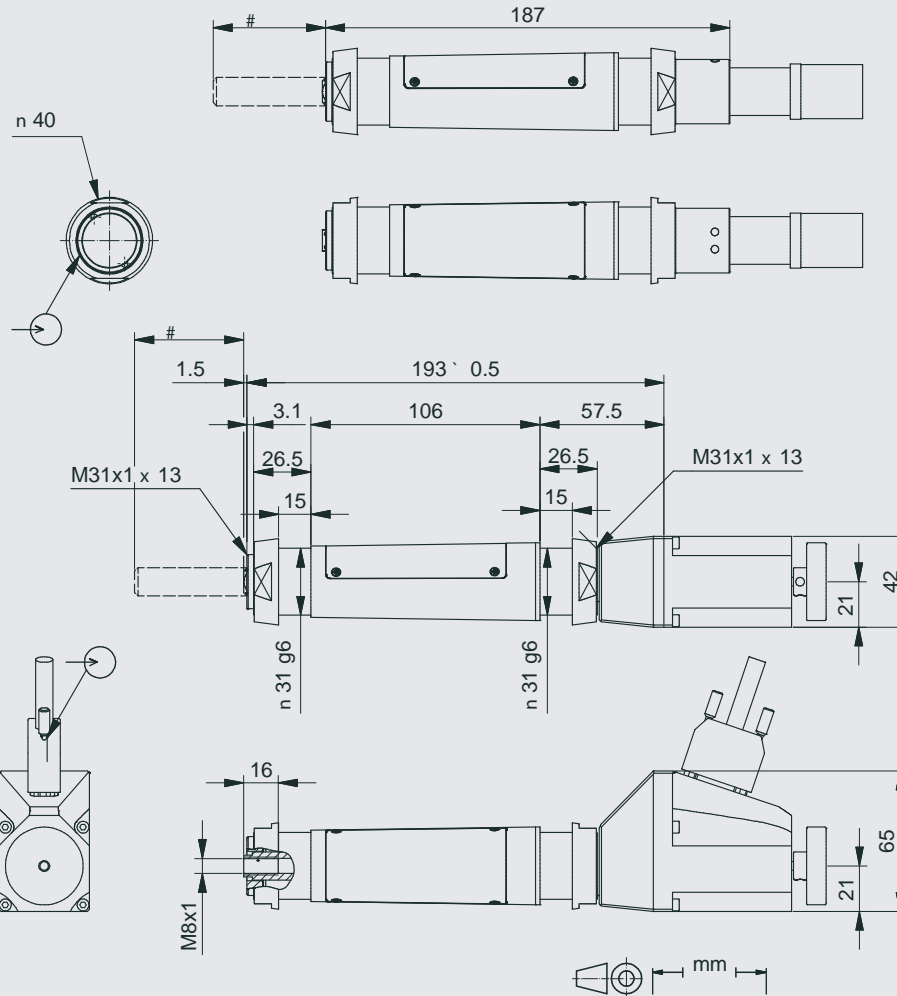
**Vacuum Note:** FS = full step, RE = rotary encoder  
More info: Detailed information concerning motors and encoders, see appendix.

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- MA-35**
- MP-20
- MP-20 B
- MP-15



drawings for the corresponding vacuum class must be requested separately.  
 The installed motor types are:  
 PK246 for FV  
 VSS 43.200.1.2-E for HV & UHVG



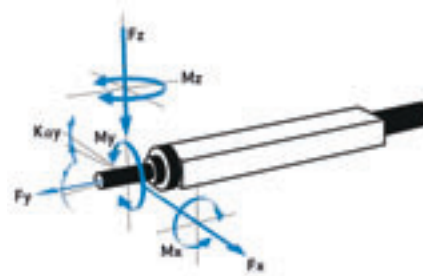
Order No.	5702-V-			0	0	0
FV		1				
HV		2				
UHVG		3				
52 mm (2")		1				

## 4.118 Micro Pusher MP-20 Vacuum



### FACTS

Load characteristics	$F_x(N)$	$F_y(N)$	$F_z(N)$
FV	1	125	1
10-6	1	125	1
HV	1	125	1
UHVG	1	125	1



The new MP-20 Vacuum micro pusher is designed to motorize manual drives or mirror mounts and it is an ideal component for limited space conditions. Small light components such as mirrors and diodes can be directly mounted to the tip. The MP-20 Vacuum micro pusher is equipped with a re-circulating ball screw for a quiet, precise and homogeneous smooth motion and has a non-rotating tip. The MP-20 Vacuum micro pushers are offered with 2-phase geared stepper vacuum motor combination or with a gearless 2-phase stepper vacuum motor. Round or flat ground inserts can be attached to the tip. The side-mounted design of model MP-20 B Vacuum results in much shorter length.



### KEY FEATURES

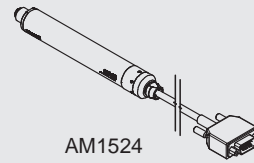
- Vacuum up to 10<sup>-9</sup> hPa
- Travel range up to 72 mm (3")
- Uni-directional repeatability 0.5 μm
- Maximum speed 0.2 mm/sec
- Force max. 125 N
- Integrated limit switches

### TECHNICAL DATA

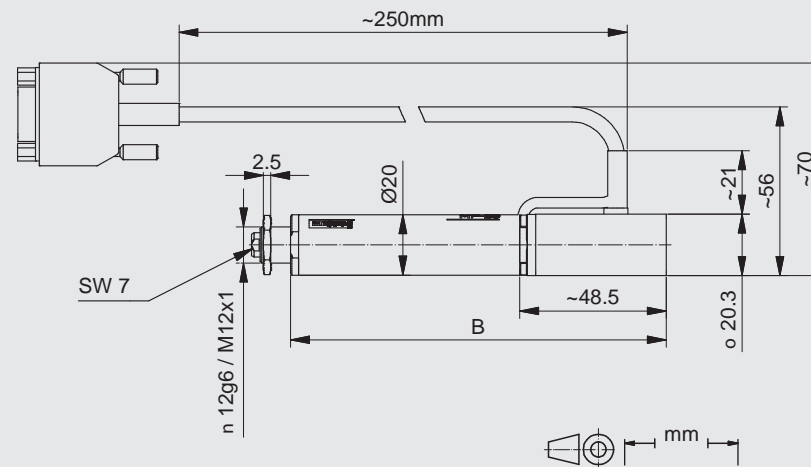
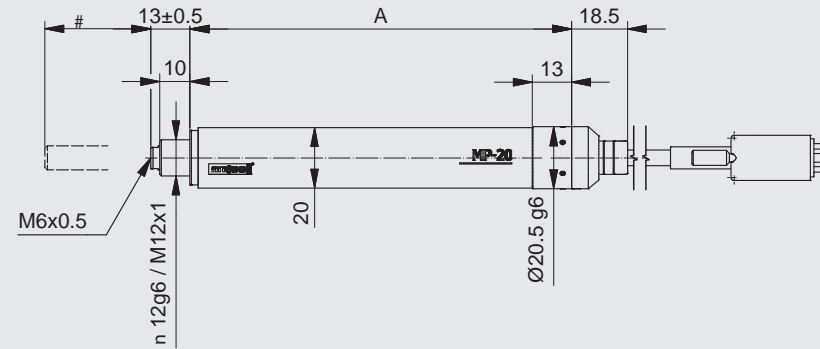
Travel range (mm)	13	26	52	77
Weight (kg)	0.22	0.26	0.28	0.29
<b>Vacuum type</b>	<b>FV</b>	<b>10-6</b>	<b>HV</b>	<b>UHVG</b>
Speed max. (mm/sec)	0.2	0.1	0.1	0.1
Resolution calculated (μm)	0.5490171 (FS)	0.5490171 (FS)	5 (FS)	5 (FS)
Resolution typical (μm)	0.1	0.1	0.1	0.1
Bi-directional Repeatability (μm)	± 1	± 1	± 1	± 1
Uni-directional Repeatability (μm)	0.3	0.3	0.3	0.3
Nominal Current (A)	0.25	0.25	1.2	1.2
Accuracy	on request			
Velocity range (mm/sec)	0.001 ... 4			
Material	Aluminum or Stainless steel, suitable for vacuum			

**Vacuum Note:** FS = full step, RE = rotary encoder  
More info: Detailed information concerning motors and encoders, see appendix.

Travel (mm)	13	26	52	77
A	126	139,5	164,5	189,5
B	124,5	137,7	162,7	187,7



drawings for the corresponding vacuum class must be requested separately.  
 The installed motor types are:  
 AM1524 for FV  
 VSS 32.200.1.2-E for HV & UHVG



Order No.	5701-V-		0	0
FV		1		
HV		2		
UHVG		3		
10-6		6		
13 mm (1/2")		1		
26 mm (1")		2		
52 mm (2")		3		
77 mm (3")		4		
12g6		1		
M12x1		2		

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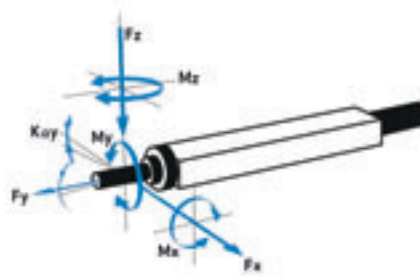
- UPM-160
- HPS-170
- LS-270
- LS-180
- LS-120
- LS-110
- PLS-85
- LS-65
- MTS-65
- MTS-70
- VT-80
- LS-40
- MCS
- NPE-200
- UPL-120
- ES-100
- ES-82
- MA-35
- MP-20**
- MP-20 B
- MP-15

## 4.120 Micro Pusher MP-20 B Vacuum



### FACTS

Load characteristics	$F_x(N)$	$F_y(N)$	$F_z(N)$
FV	1	125	1
10-6	1	125	1



The new MP-20 B Vacuum micro pusher is designed to motorize manual drives or mirror mounts and it is an ideal component for limited space conditions. Small light components such as mirrors and diodes can be directly mounted to the tip. The MP-20 B Vacuum micro pusher is equipped with a re-circulating ball screw for a quiet, precise and homogeneous smooth motion and has a non-rotating tip. The MP-20 B Vacuum micro pushers are offered with a 2-phase geared stepper vacuum motor combination or with a gearless 2-phase stepper vacuum motor. Round or flat ground inserts can be attached to the tip. The side-mounted design of model MP-20 B results in much shorter length.

### KEY FEATURES

- Vacuum up to 10<sup>-6</sup> hPa
- Travel range up to 76 mm ( 3" )
- Uni directional repeatability 0.5  $\mu\text{m}$
- Max. speed 0.2 mm/sec
- Force 125 N
- Integrated limit switches

### TECHNICAL DATA

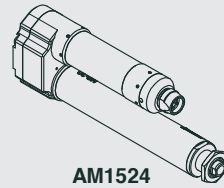
Travel range (mm)	13	26	52	77
Weight (kg)	0.24	0.26	0.28	0.29

Vacuum type	FV	10-6
Speed max. (mm/sec)	0.2	0.07
Resolution calculated ( $\mu\text{m}$ )	0.5490171 (FS)	0.5490171 (FS)
Resolution typical ( $\mu\text{m}$ )	0.2	0.2
Bi-directional Repeatability ( $\mu\text{m}$ )	$\pm 1.5$	$\pm 1.5$
Uni-directional Repeatability ( $\mu\text{m}$ )	0.5	0.5
Nominal Current (A)	0.25	0.25

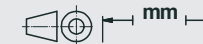
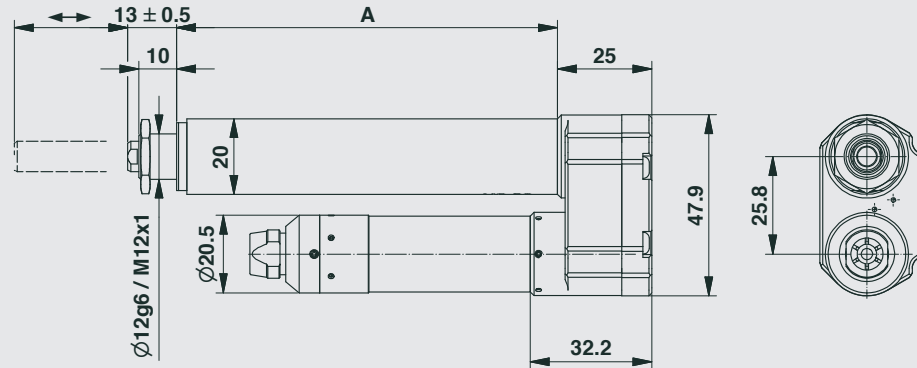
Accuracy	on request
Velocity range (mm/sec)	0.001 ... 0.6
Material	Aluminum or Stainless steel, suitable for vacuum

**Vacuum Note:** FS = full step, RE = rotary encoder  
More info: Detailed information concerning motors and encoders, see appendix.

Travel (mm)	13	26	52	77
A	63	76	101	125,5



drawings for the corresponding vacuum class must be requested separately.  
The installed motor type is:  
AM1524 for FV



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LS-180

LS-120

LS-110

PLS-85

LS-65

MTS-65

MTS-70

VT-80

LS-40

MCS

NPE-200

UPL-120

ES-100

ES-82

MA-35

MP-20

**MP-20 B**

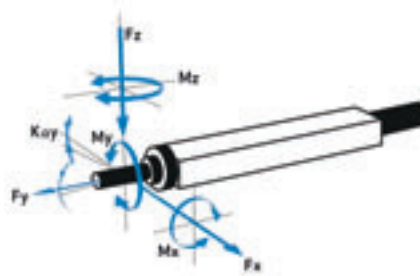
MP-15

Order No.	5696-V-		0	0
FV		1		
10-6		6		
13 mm (1/2")		1		
26 mm (1")		2		
52 mm (2")		3		
77 mm (3")		4		
12g6		1		
M12x1		2		



**FACTS**

Load characteristics	$F_x(N)$	$F_y(N)$	$F_z(N)$
FV	0	10	0
10-6	0	10	0



The MP-15 Vacuum micro pusher was specifically designed to motorize manual drives or mirror mounts. It is an ideal component for limited space conditions. The MP-15 Vacuum micro pusher is equipped with a 0.5 mm fine-pitch screw thread resulting in a quiet and homogeneous smooth motion. The MP-15 is offered with 2-phase geared stepper motor and is delivered with two integrated limit switches.



**KEY FEATURES**

- Vacuum up to 10<sup>-6</sup> hPa
- Travel range up to 12.7 mm
- Uni-directional repeatability down to 0.5 μm
- Maximum speed 0.03 mm/sec
- Force max. 10 N
- Integrated limit switches

**TECHNICAL DATA**

Travel range (mm)	6	12.7
Weight (kg)	0.1	0.17
<b>Vacuum type</b>	<b>FV</b>	<b>10-6</b>
Speed max. (mm/sec)	0.03	0.01
Resolution calculated (μm)	0.0976563 (FS)	0.0976563 (FS)
Resolution typical (μm)	0.2	0.2
Bi-directional Repeatability (μm)	± 10	± 10
Uni-directional Repeatability (μm)	0.5	0.5
Nominal Current (A)	0.25	0.25
Accuracy	on request	
Velocity range (mm/sec)	0.001 ... 0.1	
Material	Aluminum or Stainless steel, suitable for vacuum	

**Vacuum Note:** FS = full step, RE = rotary encoder  
 More info: Detailed information concerning motors and encoders, see appendix.



Travel (mm)	6	12.7
A	33,5	47

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HPS-170

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PLS-85

LS-65

MTS-65

MTS-70

VT-80

LS-40

MCS

NPE-200

UPL-120

ES-100

ES-82

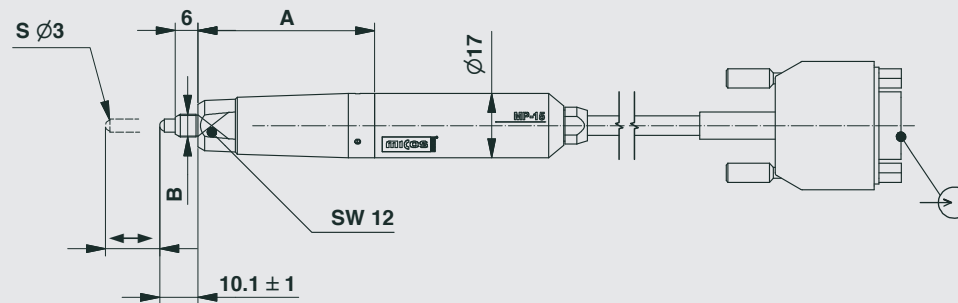
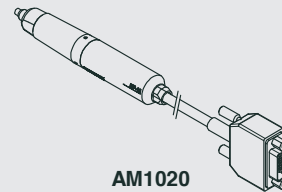
MA-35

MP-20

MP-20 B

MP-15

drawings for the corresponding vacuum class must be requested separately.  
The installed motor type is:  
AM1020 for FV



Order No.	5663-V-			0	0
FV		1			
10-6		6			
6 mm		1			
12.7 mm		2			
Mounting surface B=Ø6 mm		1			
Mounting surface B=Ø9.5 mm		2			
Mounting surface B=M8x0.35 mm		3			
Mounting surface B=M6x0.5 mm		4			



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