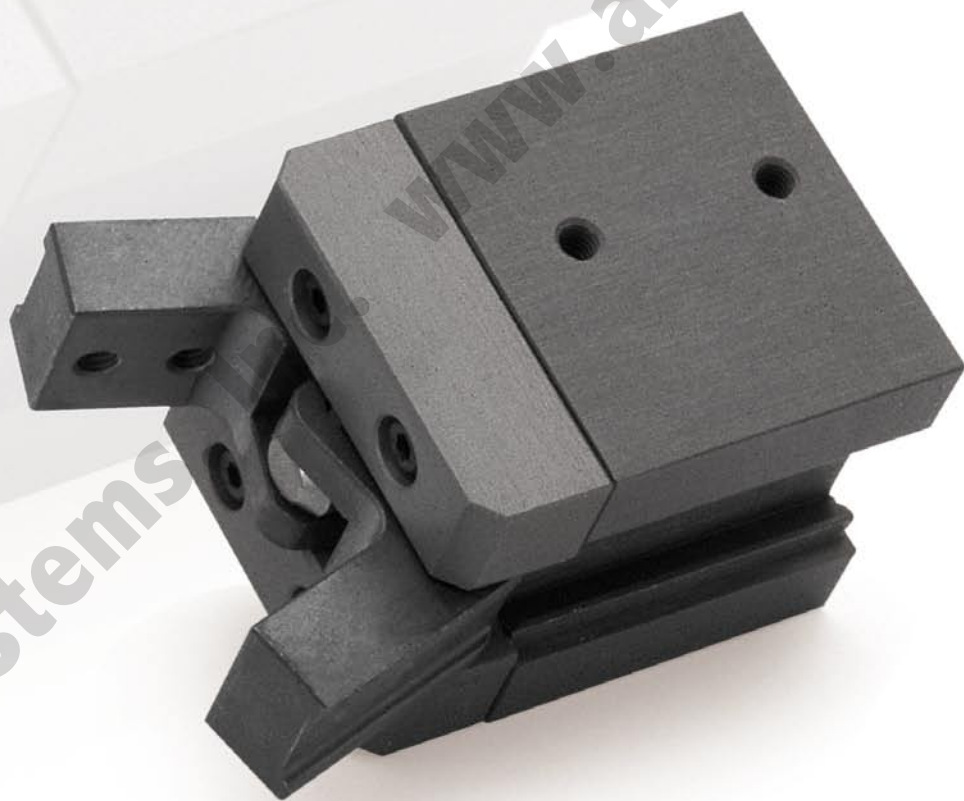


*grippers*

**AG** Series  
Angular Grippers



**NUMATICS**

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**NUMATICS®**

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### AG-Series Angular Grippers

Designed to handle real world angular gripper applications

The Numatics Motion Control AG-Series Angular Gripper utilizes a double acting piston with a dual pivot system. The piston has a single center pivot that drives each gripper jaw open and closed. The gripper jaws have an independent stationary pivot which each jaw arcs about. The ratio between the piston and jaw pivots has been optimized for maximum operating performance.

The Numatics Motion Control AG-Series Angular Gripper is a cartridge style design. The cartridge design utilizes a minimum number of components, seven major components in all. The cartridge design offers the greatest grip force to size ratio over other conventional designs.

#### A. Body:

- Cartridge design produced from extruded alloy aluminum.
- Hardcoat anodized with Teflon®, reduced friction, reduced wear
- High finish bores for increased seal life
- Sensor mounting rail for easy access mounting (not available on AG010)
- Light weight, durable, long life

#### B. Piston:

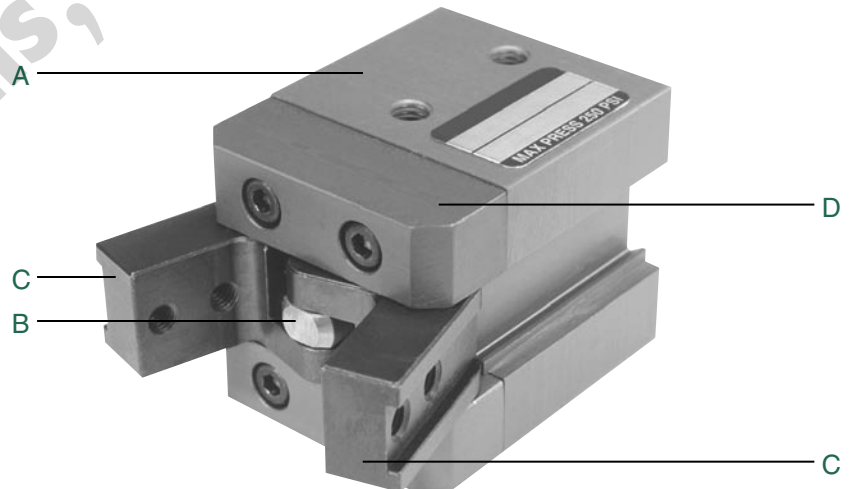
- Single piece, stainless steel design
- Corrosion resistant
- Magnetic sensing band standard ALL sizes

#### C. Jaws:

- Hardened alloy steel with lubrication
- Keyway slot for tooling location
- 32 degree jaw motion
- Each jaw travels 1 degree beyond center

#### D. Pivot Pins:

- Hardened alloy steel
- Reduced friction, low wear, increased service life
- Supported by polymer bushings

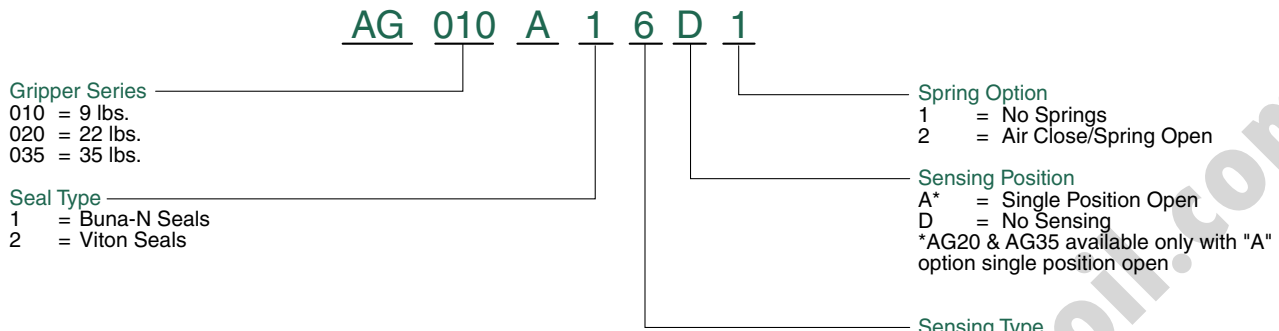




## AG Series Angular Grippers

# NUMATICS®

### How to Order



Example order:

Part Number: AG020A13A1\*

Part Description: 22 pound grip force angular gripper, buna-n s22 pound grip force angular gripper, buna seals, reed switch open position no spring.

\*When ordering, DO NOT use spaces or dashes.

When ordering additional seal kits:

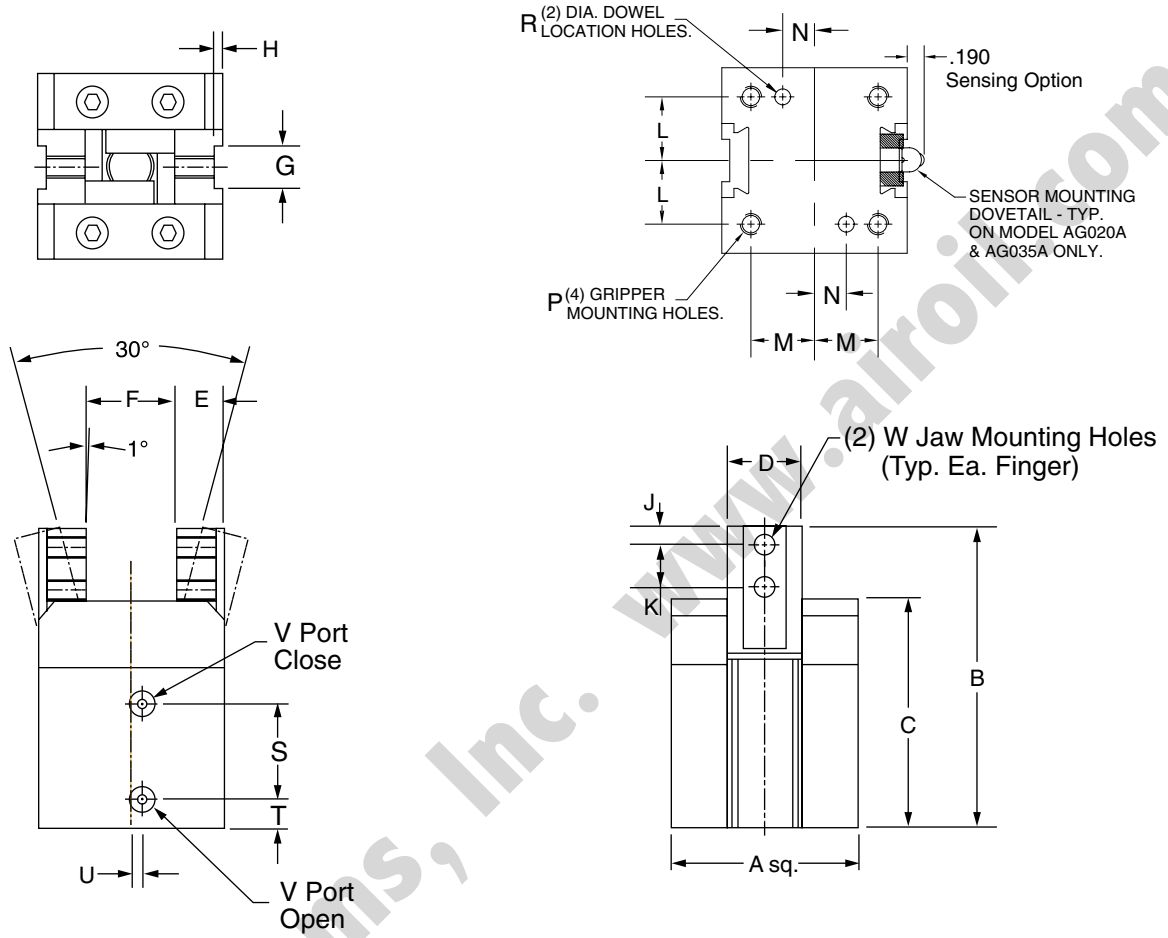
SEAL KIT SERIES	BUNA SEAL KIT	VITON SEAL KIT
AG010A	AGSKB-010A	AGSKV-010A
AG020A	AGSKB-020A	AGSKV-020A
AG035A	AGSKB-035A	AGSKV-035A

When ordering additional switches:

SWITCH DESCRIPTION	STANDARD PART NO.	QUICK DISCONNECT PART NO.
Hall Effect-PNP (Sourcing)	HPNPS31	HPNPQ31
Hall Effect-NPN (Sinking)	HNPNS32	HNPNQ32
Reed Switch	RSS02	RSQ02
90° 5 meter cable	-	PXC90
Straight 5 meter cable	-	PXCST



### AG Series Dimensions



	AG010A		AG020A		AG035A	
	mm	Inches	mm	Inches	mm	Inches
A	20.0	0.78	28.0	1.10	35.0	1.38
B	34.4	1.35	46.5	1.83	57.0	2.24
C	27.0	1.06	35.1	1.38	43.3	1.70
D	7.0	0.28	11.0	0.43	14.0	0.55
E	5.0	0.20	7.0	0.27	9.0	0.35
F	10.0	0.39	14.0	0.55	17.0	0.67
G	4.0	0.16	7.0	0.27	8.0	0.31
H	0.8	0.03	1.0	0.04	1.5	0.06
J	2.0	0.08	3.0	0.12	3.5	0.14
K	4.0	0.16	6.0	0.23	8.0	0.31
L	6.5	0.26	9.5	0.37	12.0	0.47
M	6.5	0.26	9.5	0.37	12.0	0.47
N	2.50	.098	5.00	0.197	6.00	0.236
P	M3x0.5		M3x0.5		M4x0.7	
R	2.0	0.079	3.0	0.118	3.0	0.118
S	10.7	0.42	14.4	0.57	18.1	0.71
T	3.2	0.13	4.7	0.18	6.0	0.23
U	2.0	0.08	2.0	0.08	2.0	0.08
V	M3		M3		M5	
W	M2x0.4		M3x0.5		M4x0.7	

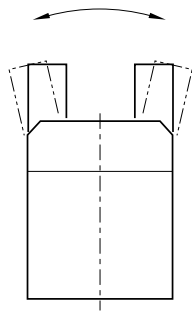


## AG Series Angular Grippers

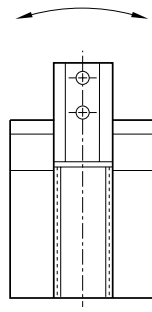
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### AG-Series Gripper Performance Data

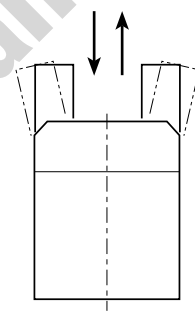
	AG010A		AG020A		AG035A	
Grip Force						
open @ 100 psi	11 lbs	5 kgf	28 lbs	12.5 kgf	44 lbs	20 kgf
close @ 100 psi	9 lbs	4 kgf	22 lbs	10 kgf	35 lbs	16 kgf
Jaw Travel	32 degrees		32 degrees		32 degrees	
Weight	1.3 oz.	.04 kg	5.0 oz.	.14 kg	6.3 oz.	.18 kg
Max Operating Pressure	250 psi		250 psi		250 psi	
Displacement	.01 cuin	.16cm	.04 cuin	.57cm	.06 cuin	1.1cm
Temp Range Buna Seals	-30 F to 180 F	-34 C to 82 C	-30 F to 180 F	-34 C to 82 C	-30 F to 180 F	-34 C to 82 C
Temp Range Viton Seals	-25 F to 400 F	-31 C to 204 C	-25 F to 400 F	-31 C to 204 C	-25 F to 400 F	-31 C to 204 C



Position A



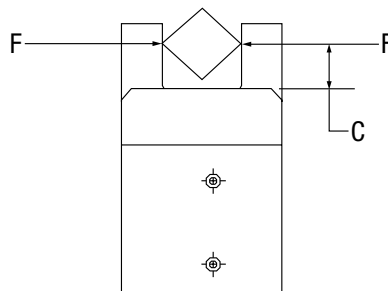
Position B



Position C

### Recommended Maximum Load Ratings

	AG010A		AG020A		AG035A	
Max Load Position A	4 inlb	.45 Nm	15 inlb	1.7 Nm	30 inlb	3.4 Nm
Max Load Position B	4 inlb	.45 Nm	12 inlb	1.4 Nm	25 inlb	2.8 Nm
Max Load Position C	12 lbs	5.5 Kgf	29 lbs	13 Kgf	47 lbs	21 Kgf



### Grip Force VS. Finger Length

	Grip Force (lbs)		Grip Force (Newtons)	
AG010	$F = \frac{(0.024) \times (P)}{(C+0.126)}$	$P = \text{psi}, C = \text{in}$	$F = \frac{(39.328) \times (P)}{(C+3.200)}$	$P = \text{bars}, C = \text{mm}$
AG020	$F = \frac{(0.088) \times (P)}{(C+0.167)}$	$P = \text{psi}, C = \text{in}$	$F = \frac{(144.207) \times (P)}{(C+4.242)}$	$P = \text{bars}, C = \text{mm}$
AG035	$F = \frac{(0.175) \times (P)}{(C+0.233)}$	$P = \text{psi}, C = \text{in}$	$F = \frac{(286.771) \times (P)}{(C+5.918)}$	$P = \text{bars}, C = \text{mm}$

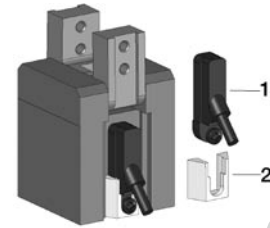
Example AG020: Operating Pressure => P=80 psi, Grip Distance => C=0.75 in

Grip Force (lbs) =  $\{(0.088) \times (80 \text{ psi})\} / \{0.75 \text{ (in)} + 0.167\} = 7.04/0.917 = 7.68 \text{ lbs}$

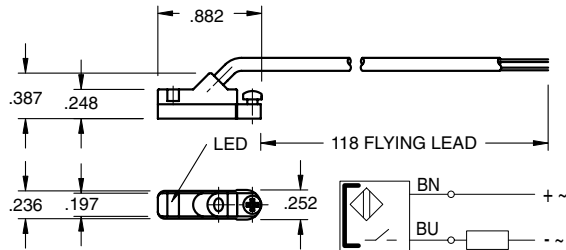


### AG Series Switch Information

SWITCH OR BRACKET DESCRIPTION	STANDARD PART NO.	QUICK DISCONNECT PART NO.
1 Hall Effect - PNP (Sourcing)	HPNPS31	HPNPQ31
1 Hall Effect - NPN (Sinking)	HNPNS32	HNPNQ32
1 Reed Switch	RSS02	RSQ02
2 Dovetail Bracket	DSA	DSA



#### RSS02 – Reed Switch (AC/DC NO), flying lead



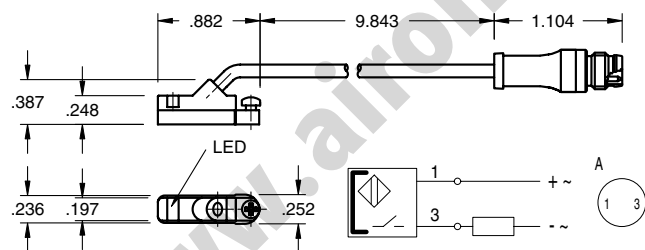
##### Sensing Data

Ambient temperature range $T_a$	(°F/°C)	-4 to 176 (-20 to 80)
Frequency of operating cycles $f$ at $U_e$	(kHz)	0.5
Turn on time $t$	(ms)	$\leq 0.25$
turn off time $t$	(ms)	0.03
LED function indication		yes

##### Electrical Data

Rated operational voltage $U_e$	(V)	3...130 AC/DC
Supply voltage $U_B$	(V)	3...130 AC/DC
Voltage drop $U_d$ at $I_e$ Stat./dyn.	(V)	3.5
Rated insulation voltage $U_i$	(V)	2750 DC (EN 60335-1)
Rated supply frequency	(Hz)	AC/DC
Rated operational current $I_e$	(mA)	50 (10W max.)
No-load supply current $I_o$ at $U_e$ d./und.	(mA)	0
Observe polarity for correct LED function		

#### RSQ02 – 8mm connector

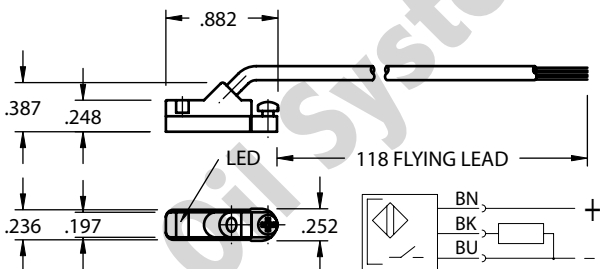


##### Mechanical Data

Housing material	Polyamide
Material of sensing face	Polyamide
Connection	PVC cable
Degree of Protection	IP 67
Rated shock: half-sinus, 50g, 11 ms	
Rated vibration environment: 10g, 10...2000 Hz, 90 min	



#### HPNPS31 – Electronic Switch (PNP NO), flying lead



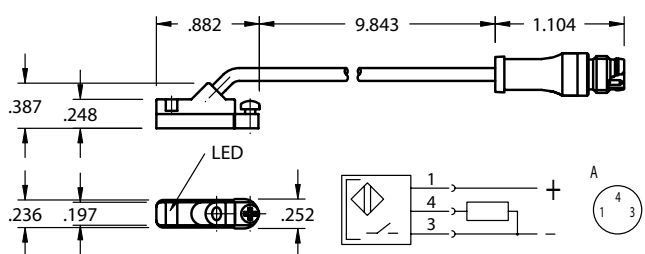
##### Sensing Data

Ambient temperature range $\Delta$	(°F/°C)	-13 to +158 (-25 to +70)
Temperature drift	(% of )	$\leq 0.3\%/^{\circ}\text{C}$
Frequency of operating cycles $f$ at $U_e$	(kHz)	10
Turn on time $t$	(ms)	.05
turn off time $t$	(ms)	.05
Utilization categories		DC13
Function-/supply voltage indication		YES

##### Electrical Data

Rated operational voltage $U_e$	(V)	24 DC
Supply voltage $U_B$	(V)	10...30 DC
incl. ripple	(% of $U_e$ )	15
Voltage drop $U_d$ at $I_e$ Stat./dyn.	(V)	1/-
Rated insulation voltage $U_i$	(V)	75 AC
Rated supply frequency	(Hz)	DC
Rated operational current $I_e$	(mA)	200
No-load supply current $I_o$ at $U_e$ d./und.	(mA)	25/13
Protected against polarity reversal		YES

#### HPNPQ31 – 8mm connector



##### Mechanical Data

Housing material	Polyamide
Material of sensing face	Polyamide
Connection	PVC cable
Degree of Protection	IP 67
Rated shock: half-sinus, 30 g, 11 ms	
Rated vibration environment: 55 Hz, 1mm amplitude, 3 x 30	

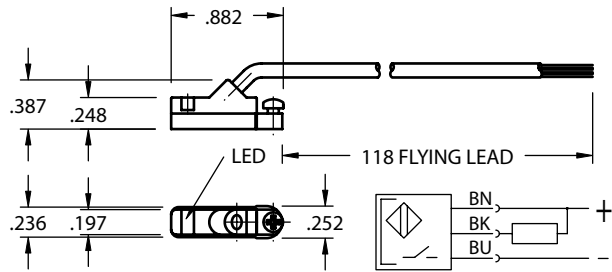




## AG Series Angular Grippers

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### HNPNS32 – Electronic Switch (NPN NO), flying lead



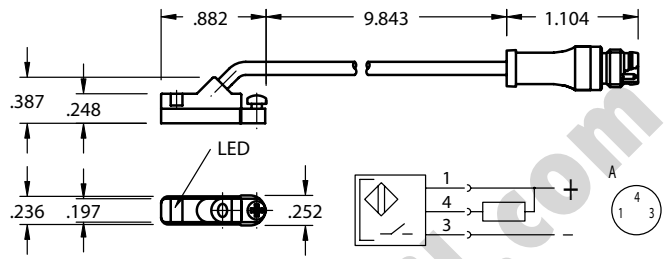
#### Sensing Data

Ambient temperature range $t_d$	(°F/°C)	-13 to +158 (-25 to +70)
Temperature drift	(% of $S_r$ )	$\leq 0.3\%/^{\circ}\text{C}$
Frequency of operating cycles $f$ at $U_e$	(kHz)	10
Turn on time $t$	(ms)	.05
Turn off time $t$	(ms)	.05
Utilization categories		DC13
Function—supply voltage indication		YES

#### Electrical Data

Rated operational voltage $U_e$	(V)	24 DC
Supply voltage $U_B$	(V)	10...30 DC
incl. ripple	(% of $U_e$ )	15
Voltage drop $U_d$ at $I_e$ Stat./dyn.	(V)	1/-
Rated insulation voltage $U_i$	(V)	75 AC
Rated supply frequency	(Hz)	DC
Rated operational current $I_e$	(mA)	200
No-load supply current $I_o$ at $U_e$ d./und.	(mA)	25/13
Protected against polarity reversal		YES

### HNPNQ32 – 8mm connector



#### Mechanical Data

Housing material	Polyamide
Material of sensing face	Polyamide
Connection	PVC cable
Degree of Protection	IP 67
Rated shock: half-sinus, 30 g, 11 ms	
Rated vibration environment: 55 Hz, 1mm amplitude, 3 x 30	

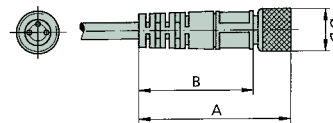


## Female Connectors for Reed Switches and Hall Effect Sensors

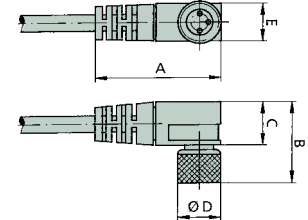
Dimensions (mm)

TYPE	ORDER CODE
Straight, 5 m Cable	PXCST
Elbow, 5 m Calbe	PXC90

#### Straight Type



#### Elbow Type





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## World Headquarters

**Numatics Incorporated**  
Phone: 248-887-4111  
Fax: 248-887-9190

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Phone: 519-452-1777  
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## Quebec

Numatics, Ltd.  
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Fax: 514-332-9273

## British Columbia

Numatics, Ltd.  
Phone: 604-574-0401  
Fax: 604-574-3713

## EUROPE

### Germany – European Headquarters

Numatics GmbH  
Phone: 011-49-22 41-31 60-0  
Fax: 011-49-22 41-31 60 40

### Hungary

Numatics Kft.  
Phone: 011-36-13 82 21 35  
Fax: 011-36-12 04 39 47

## EUROPE

### England

Numatics Limited  
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Fax: 011-44-1525-38 25 67

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Numatics s.a.r.l.  
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### Italy

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Fax: 011-34-93-221 35 14

## AFRICA

### South Africa

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Fax: 011-27-11-8 65 42 90

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Numatics de Mexico S.A. de C.V.  
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Fax: 011-52-222-284 6179

### Brazil

Valvair Comercial Ltda.  
Phone: 011-55-12-351 2874  
Fax: 011-55-12-351 1958

## ASIA & PACIFIC

### Australia

Numatics Australia Pty. Ltd.  
Phone: 011-61-3-95 63 86 00  
Fax: 011-61-3-95 63 85 11

### Taiwan – Asian Headquarters

Numatics Co, Ltd. Asia  
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Fax: 011-886-2-29 14 18 97

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