

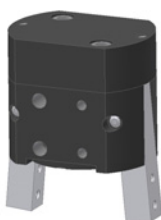


## ANGULAR GRIPPERS

### MH SERIES

#### MINIATURE HEAD

- Compact Design
- Adjustable finger stroke
- Robust design
- Durable construction with few moving parts
- Top and side mounting
- Optional cap styles
- Sensors Available

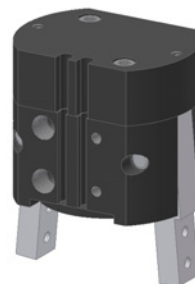


See  
Page **1-2.2**

### GH "A" 2 FINGER SERIES

#### STANDARD 2 FINGER LINE

- Full range of sizes
- Adjustable finger stroke
- Robust design
- Durable construction with few moving parts
- Top and side mounting
- Optional cap styles
- Sensors Available

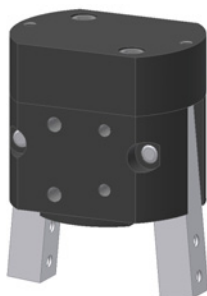


See  
Page **1-2.9**

### GH "B" SERIES

#### NO LUBE ADDED

- Designed for non-lube machinery
- Robust design
- Durable construction with few moving parts
- Top and side mounting
- Optional cap styles
- Sensors Available

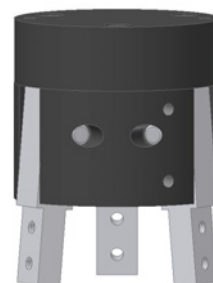


See  
Page **1-2.20**

### GH "A" 3 FINGER SERIES

#### STANDARD 3 FINGER LINE

- Full range of sizes
- Adjustable finger stroke
- Robust design
- Durable construction with few moving parts
- Top and side mounting
- Optional cap styles
- Sensors Available



See  
Page **1-2.26**

### GH-90 SERIES

#### 180° FINGER STROKE

- Adjustable finger stroke
- Robust design
- Durable construction with few moving parts
- Top and side mounting
- Optional cap styles
- Sensors Available



See  
Page **1-2.36**

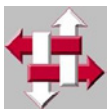
### RB-94 SERIES

#### STACKABLE

- Small center-to-center distance
- Adjustable finger stroke
- Robust design
- Durable construction with few moving parts
- Top and side mounting
- Sensors Available



See  
Page **1-2.42**



### MH-SERIES

**DURA-GRIP MH** Series of Part Placement Devices is designed to provide a low cost miniature gripping unit for use on transfer mechanisms. The units are extremely compact in design for operation in small applications. These air operated units grip parts internally or externally offering the designer a wide latitude in finger tooling arrangements. All units are shipped completely assembled, ready for mounting and attaching tooling.

#### QUALITY CONSTRUCTION

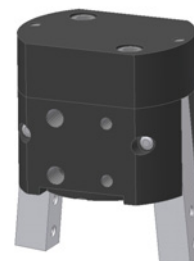
**DURA-GRIP MH** units are ruggedly constructed with a minimum of moving parts. Utility tapped holes permit mounting the unit from the top or the side with additional cap styles for dovetail mounting. The body is anodized high strength aluminum, fingers are hardened tool steel. An optional finger positioning sensor is available on all heads. The built-in proximity switch can be set to indicate either fingers opened or fingers closed.

#### MOUNTING INFORMATION

**DURA-GRIP MH** Series can be mounted in any plane with standard mounting holes on top, front and back of unit. These same holes can be used to mount "stripper" devices too. Additional cap styles for dovetail mounting are also available.

#### MINI-GRIPPER HEAD

#### MH-20A



Formerly MH-020

Use the MH Series of Angular Grippers wherever you need  
durable and precise part placement  
in space limited applications

### TECHNICAL SPECIFICATION

#### Pneumatic Specifications

Pressure Range

40-100 psi

3-7 bar

Cylinder Type

Double Acting

Dynamic Seals

Buna-N

Required Valves

4-way, 2 position

#### Temperature Range

Buna-N Seals (standard)

-30 to 180 F

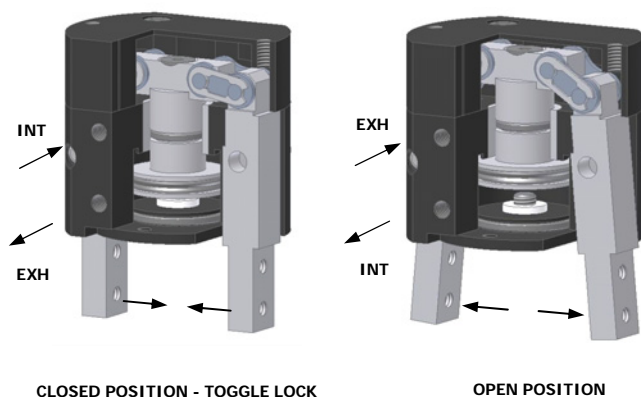
-35 to 80 C

Viton Seals (-V option)

-20 to 300 F

-30 to 150 C

### OPERATING PRINCIPLES - STANDARD UNIT



- Air pressure drives double acting piston.
- Piston drives fingers through double toggle mechanism producing synchronized angular motion.
- Gripper is capable of external gripping with locking and internal gripping without locking

Finger closed position can be adjusted with set screw in the bottom cap of the unit. Open position adjustment is offered on dovetail and flange mount top caps.

Unit ships with toggle lock disabled, set screw must be backed out to enable locking in the closed position. Unit can be run with the toggle lock disabled.



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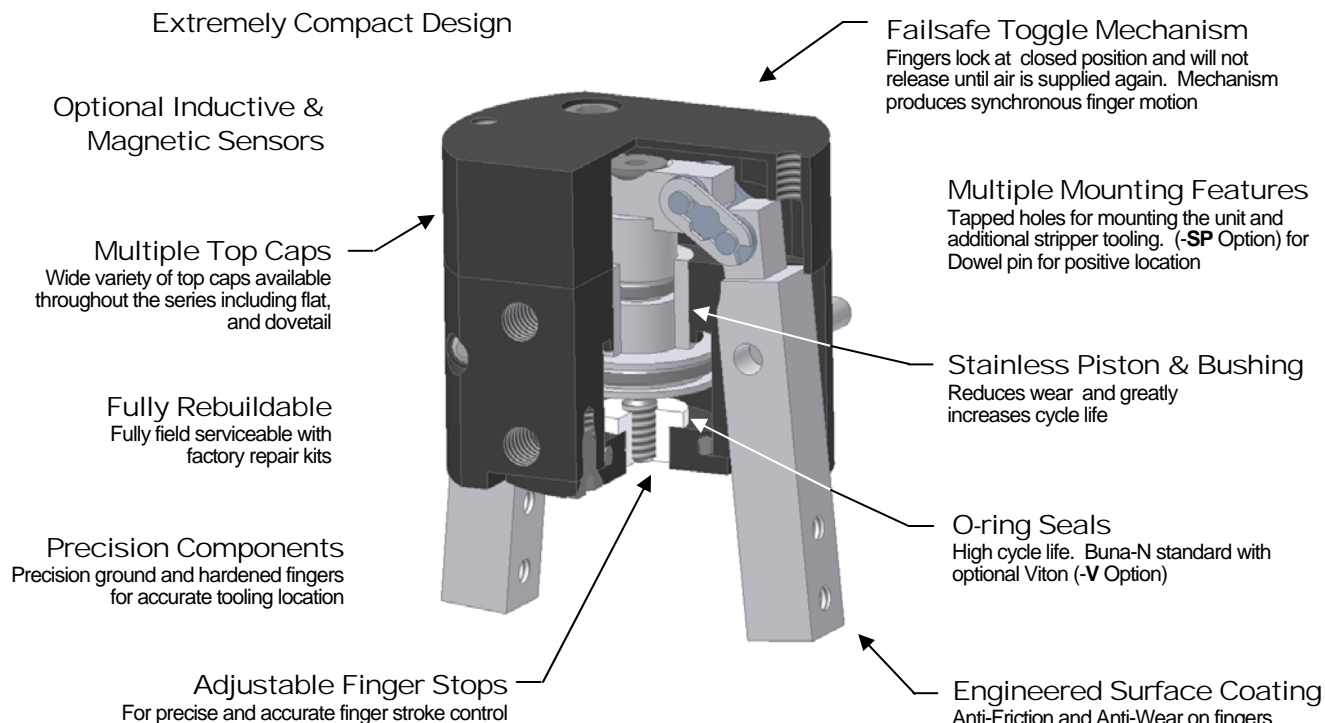
**DURA-GRIP**  
MINI-TWO FINGER  
ANGULAR GRIPPER

**MH-20A**  
**Series**



## PRODUCT FEATURES

- Aircraft Grade Aluminum  
2024 with black anodize
- Simple and Highly Durable  
Time tested, field approved design
- High Grip Force  
High gripping force-to-weight ratio



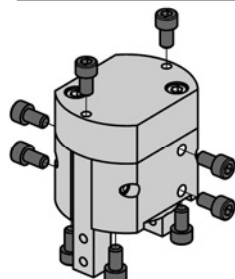
**DESIGNED - MANUFACTURED - ASSEMBLED IN THE USA**



## MOUNTING INFORMATION

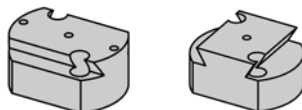
**Mounts and operates in any orientation**

### MAIN BODY

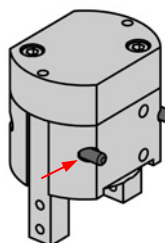


Mount up to Main body utilizing Tapped holes located on back, front, and top.

Additional top caps available for a variety of mounting styles

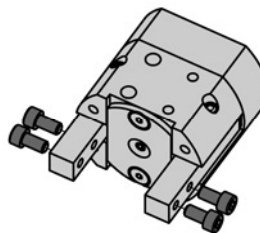


Dovetail



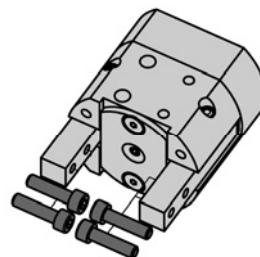
(-SP) Extended Pivot Pins option provides precision dowel pins on the back side of the unit for positive location

### TOOLING



Mount tooling to fingers using Tapped holes

Key tooling to precision ground fingers for positive location.



(-C) Clearance hole option provides thru holes for mounting tooling thru each finger



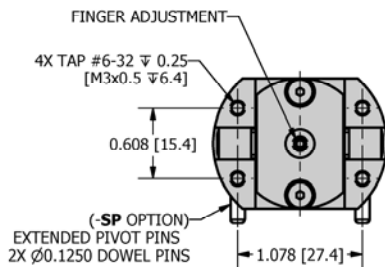
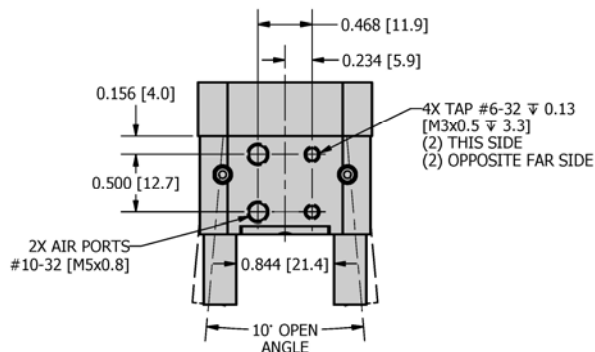
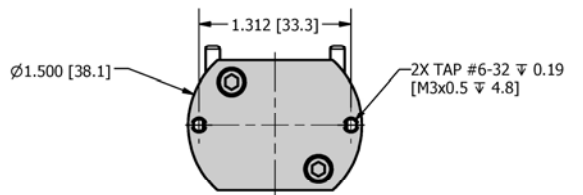
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MINI-TWO FINGER  
ANGULAR GRIPPER

**MH-20A Series**



## DIMENSIONAL DRAWING

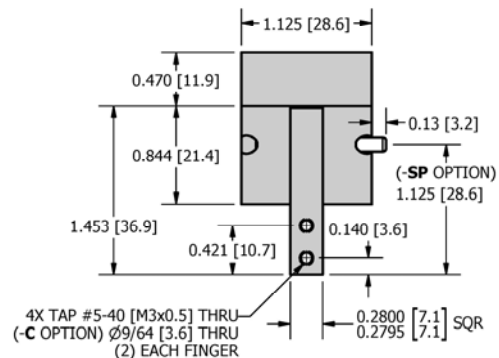


## SPECIFICATIONS

Standard Grip Force @ 100 psi [7 bar] \*  
Standard Stroke  
Base Weight  
Unit Displacement (grip and release)  
Cylinder Bore Diameter  
Actuation Time (no load)

MH-20A	MMH-20A
35 lbf	154 N
5° per finger (10° total)	
0.28 lbs	0.12 kg
0.050 in <sup>3</sup>	0.82 cm <sup>3</sup>
0.625 in	15.9 mm
0.10 sec	

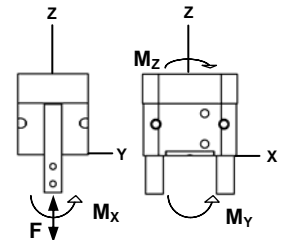
\* Loading between top mounting holes in fingers



## LOADING

	MH-20A		MMH-20A	
	Static	Dynamic	Static	Dynamic
Max Force <b>F</b>	35 lbf	15 lbf	156 N	67 N
Max Moment <b>M<sub>x</sub>, M<sub>z</sub></b>	40 lbf-in	15 lbf-in	4.5 N-m	1.7 N-m
Max Moment <b>M<sub>y</sub></b>	80 lbf-in	25 lbf-in	9.0 N-m	2.8 N-m

NOTE: Loading based on utilization of both fingers



## HOW TO ORDER : BASIC UNIT

METRIC TOP CAP STYLE EXTENDED PINS PISTON OPTIONS

**M** **MH-20A** - **SP** - **V** - **RM** - **D** - **C**

SEALS SENSORS CLEARANCE HOLES

METRIC M

TOP CAP 20 - Standard Flat (shown above)  
21 - Front 60°Dovetail  
22 - Side 60°Dovetail } (see Additional Mounting section for information)

EXTENDED PINS SP - Extended Pivot Pin for dowel pin mounting  
(-RM) Option not available with Extended Pivot Pins

SEALS V - Viton (standard Buna - N)

SENSORS RM - Magnetic Sensor Ready  
Includes Sensor Bracket (MH-20-SB) and Piston Magnet - See Additional Mounting section  
Sensors sold separately - see Magnetic Sensors

PISTON D - Extended Piston with additional output

HOLES C - Clearance Holes in fingers

**CUSTOM DESIGNS ALWAYS AVAILABLE**  
**PLEASE CONTACT US FOR INFORMATION**

Proximity Sensor Available - Consult Factory for more information

**MAGNETIC SENSOR KITS \* (Round track mounted)**

RSK-N - Magnetic Sensor NPN w/ quick disconnect Kit

RSK-P - Magnetic Sensor PNP w/ quick disconnect Kit

\* Requires Sensor Ready (-RM). Sensor kits include (2) sensors and (2) 5 meter cables.

**MAGNETIC SENSORS \* (Round track mounted)**

RS-N - Magnetic Sensor NPN w/ quick disconnect

RS-P - Magnetic Sensor PNP w/ quick disconnect

\* Requires Sensor Ready (-RM). Includes (1) sensor.

**SENSOR CABLE**

SENCAB-5 - Quick Disconnect PUR Cable 5M Length

**SAMPLE ORDER: MH-21A-D**

Ex) MH-21A (front 60° dovetail cap) with Extended Piston option

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VISIT US AT [www.RIMFG.com](http://www.RIMFG.com)



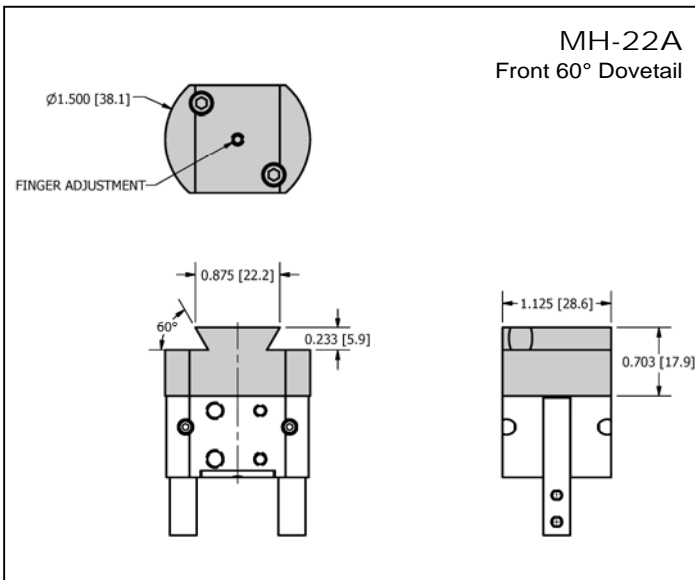
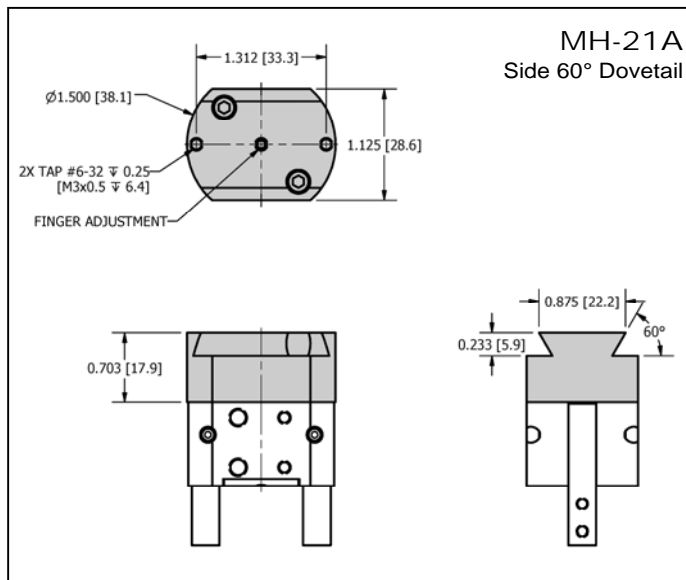
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MANUFACTURING CO.

**DURA-GRIP**  
MINI-TWO FINGER  
ANGULAR GRIPPER

**MH-20A**  
Series

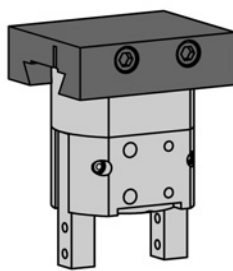
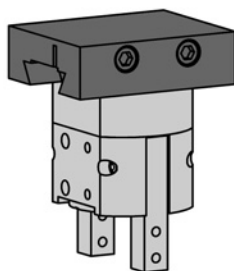


## ADDITIONAL MOUNTING INFORMATION



**MH-21A**

**MH-22A**



See **DURA-GRIP ACCESSORIES** Page  
for the **DP-11** Universal Dovetail receiver

Page  
**1-3.1**

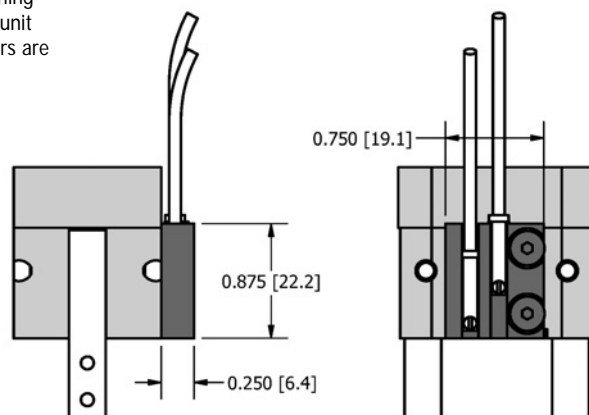
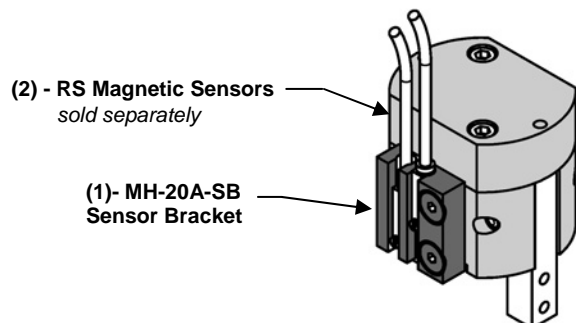
The **DURA-GRIP MH-20A** series offers these additional mounting styles for further flexibility to meet your design requirements. These caps also offer adjustment screws for finger open stroke.

**Top Mount** the MH-21A / MH-22A with custom dovetail tooling or use the DP-11 Universal receiver.

With the MH-21A top cap the gripper is orientated inline with the dovetail. The MH-22A top cap the gripper is orientated 90 degrees to the dovetail.

## MAGNETIC SENSOR READY (-RM OPTION)

The Magnetic Sensor Ready option includes the necessary bracket (MH-20A-SB) for attaching two magnetic sensors to the gripping head. The bracket mounts on the back side of the unit utilizing existing mounting holes. Works with our RS (Round Track) style sensors. Sensors are sold separately. NOTE: (-SP) Extended Pivot Pins option is not available with this option





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**DURA-GRIP**  
MINI-TWO FINGER  
ANGULAR GRIPPER

**MH-20A Series** 

## ADDITIONAL INFORMATION

### GRIP FORCE

The maximum capacity of the gripper is a function of many variables and will change based on the shape of the part, surface finish, accelerations during transfer, the shape of the finger tooling, and air pressures. Use the Grip force calculated below *and* the application variables to determine the proper sizing of the gripper.

The Grip force - **F** is defined as the maximum force that can be applied to the fingers without moving. The force is analytically determined and will vary slightly with friction. This force is calculated when the fingers are parallel.

$$\text{English GRIP FORCE - F (lbf)} = \frac{(P_{\text{AIR}} (\text{psi}) \times G_F)}{D (\text{in})}$$

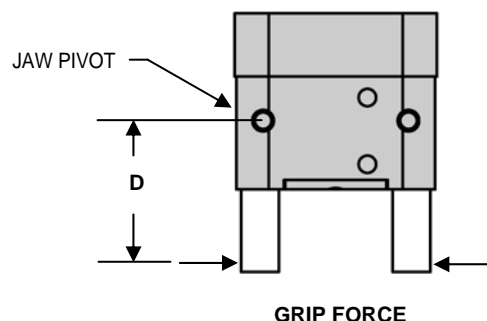
$$\text{Metric GRIP FORCE - F (N)} = \frac{(P_{\text{AIR}} (\text{bar}) \times G_F)}{D (\text{mm})}$$

$P_{\text{AIR}}$  = Air Pressure

$D$  = Distance to pivot (see diagram)

$G_F$  = Grip Factor (see chart)

GRIP FACTOR $G_F$		MH-20A	MMH-20A
Standard Unit	EXTERNAL	<b>0.59</b>	<b>962</b>
	INTERNAL	<b>0.80</b>	<b>1303</b>



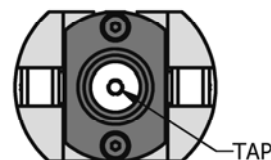
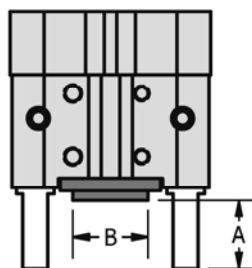
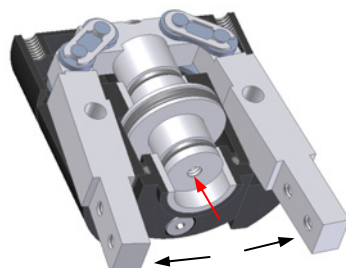
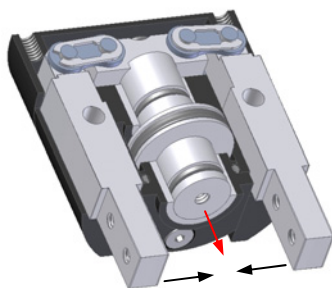
It is recommended that finger tooling be designed to encompass the part as the grip force requirement is lower. If the grip cannot be performed by encompassing the part and a friction grip must be performed, always use a factor of safety of at least 4.

### EXTENDED PISTON (-D OPTION)

The Extended Piston option provides a synchronized additional output for custom tooling. The additional output will extend as the fingers move to the closed position. The additional output can be used for assisting the gripping operation and could be used locating or even clamping the part before the grip occurs.

DIM	MH-20A	MMH-20A
A	0.499"	12.7 mm
B	0.562"	14.3 mm
TAP	#5-40	M3x0.5

All other dimensions of individual heads remain the same. See data sheet on specific **DURA-GRIP** model for standard dimensions





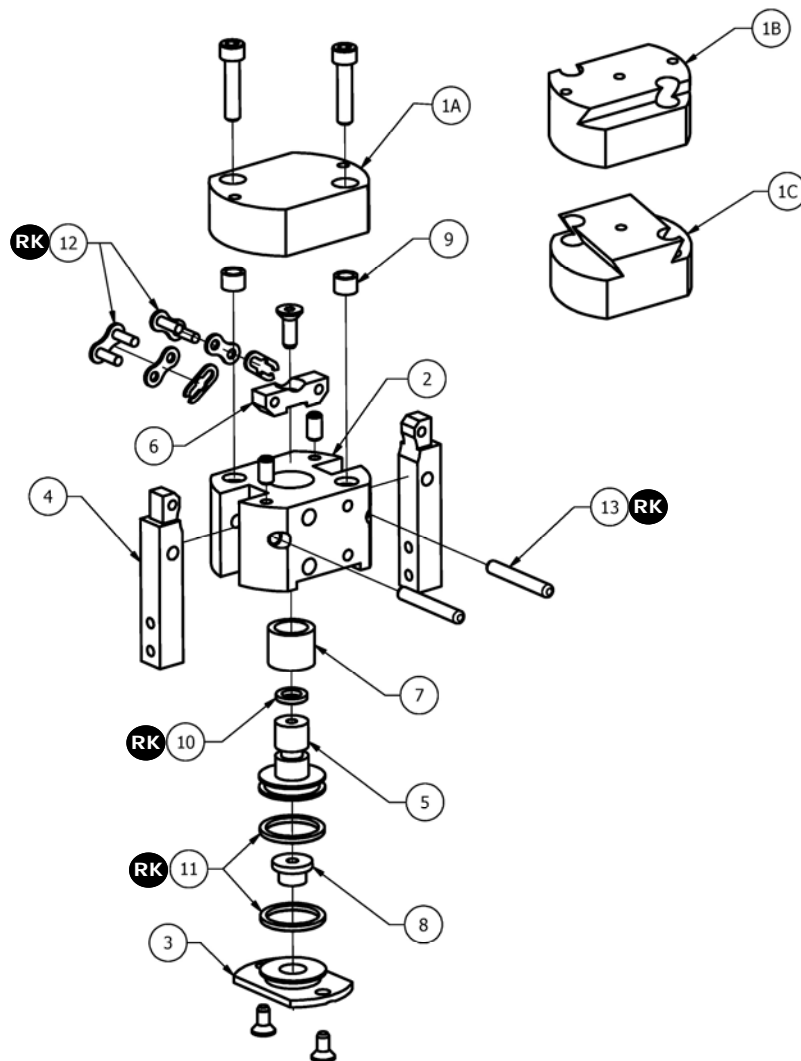


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**DURA-GRIP**  
MINI-TWO FINGER  
ANGULAR GRIPPER

**MH-20A**  
Series

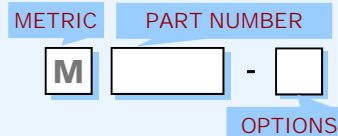
EXPLODED VIEW



## PARTS LIST

## HOW TO ORDER PARTS

ITEM	REQ'D	NAME	MH-20A	OPTIONS
1A	1	Flat Top Cap (20 Style)	MH-20A-1	-RM <sup>4</sup>
1B	1	Front Dovetail Top Cap (21 Style)	MH-21A-1	-RM <sup>4</sup>
1C	1	Side Dovetail Top Cap (22 Style)	MH-22A-1	-RM <sup>4</sup>
2	1	Main Body	MH-20A-2	-RM <sup>4</sup>
3	1	Bottom Cap	MH-20A-3	-D <sup>5</sup>
4	2	Finger	MH-20A-4	-C <sup>2</sup>
5	1	Piston	MH-20A-5	-RM <sup>4</sup> -D <sup>5</sup>
6	1	Connector	MH-20A-6	
7	1	Piston Bushing *	MH-20A-7	
8	1	Stop Bushing	MH-20A-8	-D <sup>5</sup>
9	2	Top Cap Guide	MH-20A-9	
10	1	O-ring (Piston Shank) *	ORG-008	-V <sup>1</sup>
11	2	O-ring (Piston & Bottom Cap) *	ORG-014	-V <sup>1</sup>
12	2	Chain Link Assembly *	CHL-025	
13	2	Pivot Pin *	FPP-100	-SP <sup>3</sup>
RK	1	Repair Kit * #	MH-20A-RK	-V <sup>1</sup> -SP <sup>3</sup>



**SAMPLE ORDER: MMH-21A-1**

Ex) Metric MH-21A Top Cap

**OPTIONS** (see product pages for information)

- 1 - V = Viton
- 2 - C = Clearance Holes
- 3 - SP = Extended Pivot Pins
- 4 - RM = Magnetic Sensor Ready
- 5 - D = Extended Piston

### NOTES

- \* - Metric code not required
- # - Repair Kit includes req'd qty of parts marked with RK

FOR MORE INFORMATION CALL US AT 1-800-588-0174 OR 860-589-6364 FAX: 860-589-6235

VISIT US AT [www.RIMFG.com](http://www.RIMFG.com)



### GH "A" SERIES

**DURA-GRIP GH "A"** Series of Part Placement Devices is designed to provide a low cost gripping unit for use on transfer mechanisms. These air operated units grip parts internally or externally offering the designer a wide latitude in finger tooling arrangements. All units are shipped completely assembled, ready for mounting and attaching tooling.

#### QUALITY CONSTRUCTION

**DURA-GRIP GH "A"** Series is ruggedly constructed with a minimum of moving parts. The body is anodized high strength aluminum, fingers are hardened tool steel. A bottom adjusting screw can be set to stop the downward travel of the piston thereby adjusting the closing of the fingers. On dovetail mounting heads, a top adjusting screw adjusts the opening of the fingers. Maximum finger holder movement 10° between fingers.

#### MOUNTING INFORMATION

**DURA-GRIP GH "A"** Series can be mounted in any plane with standard mounting holes on top, front and back of unit. These same holes can also be used to mount "stripper" devices. Additional cap styles for dovetail mounting are also available.

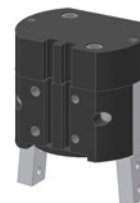
#### OPTIONAL FEATURES

Heavy Duty (-HD) heads are available in all sizes of the GH series. These heads have their toggle linkages arranged to have the inward motion of the finger occur on the full (bore) side of the piston creating high gripping forces. Wide angle (-W) models are also available giving 20° between fingers. Double Extended piston models (-D) have an additional output extending through the bottom cap. This gives greater stability and longer life where tooling loads are heavy. Single Finger heads are also available with either the left or right finger fixed and the other moving (-SFR or -SFL). Optional Magnetic or Inductive sensors are available on all heads. The sensors can be used to indicate finger position.

Use the GH "A" Series of Angular Grippers wherever you need durable and precise part placement.

#### STANDARD DUTY

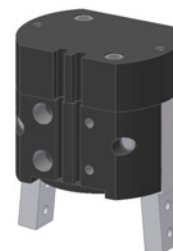
#### GH-20A



See Page **1-3.10**

#### MEDIUM DUTY

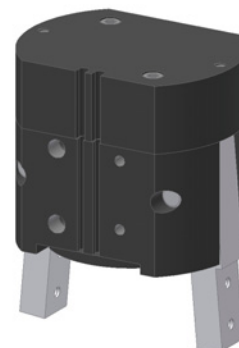
#### GH-200A



See Page **1-3.13**

#### HEAVY DUTY

#### GH-2000A

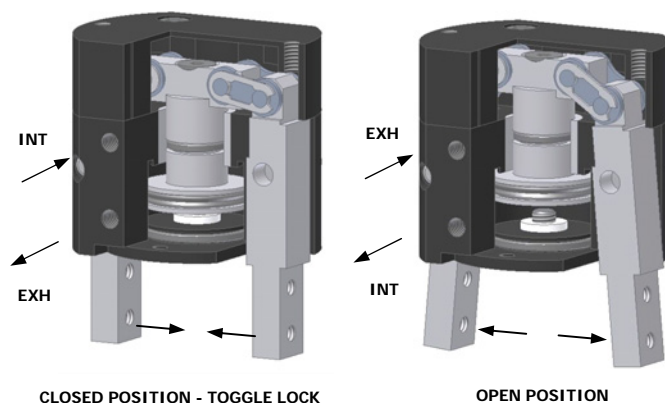


See Page **1-3.16**

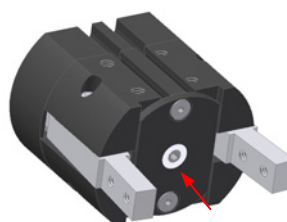
### TECHNICAL SPECIFICATION

Pneumatic Specifications	ENGLISH	METRIC
Pressure Range	40-100 psi	3-7 bar
Cylinder Type	Double Acting	
Dynamic Seals	Buna-N	
Required Valves	4-way, 2 position	
<b>Temperature Range</b>		
Buna-N Seals (standard)	-30 to 180 F	-35 to 80 C
Viton Seals (-V option)	-20 to 300 F	-30 to 150 C

### OPERATING PRINCIPLES - STANDARD UNIT



- Air pressure drives double acting piston.
- Piston drives fingers through double toggle mechanism producing synchronized angular motion.
- Gripper is capable of external gripping with locking and internal gripping without locking



Finger closed position can be adjusted with set screw in the bottom cap of the unit. Open position adjustment is offered on dovetail and flange mount top caps.

Unit ships with toggle lock disabled, set screw must be backed out to enable locking in the closed position. Unit can be run with the toggle lock disabled.





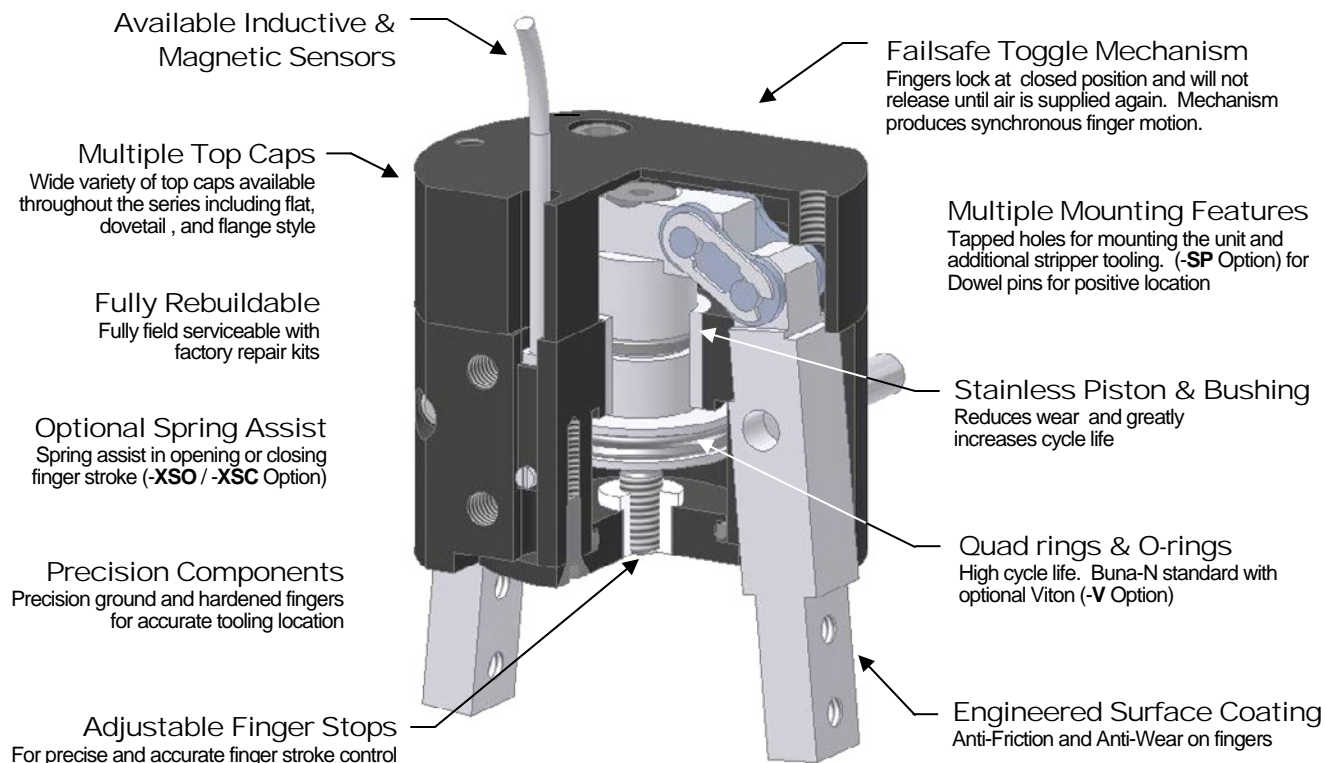
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**DURA-GRIP GH-20/200/2000**  
TWO FINGER  
ANGULAR GRIPPER  
**"A" Series**



## PRODUCT FEATURES

- Aircraft Grade Aluminum 2024 with black anodize
- Simple and Highly Durable Time tested, field approved design
- High Grip Force High gripping force-to-weight ratio



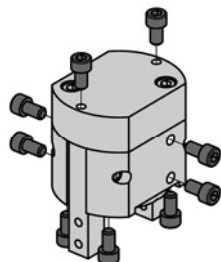
**DESIGNED - MANUFACTURED - ASSEMBLED IN THE USA**



## MOUNTING INFORMATION

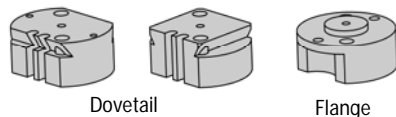
**Mounts and operates in any orientation**

### MAIN BODY

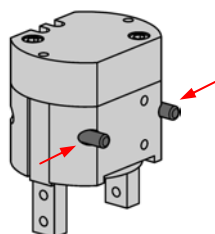


Mount up to Main body utilizing Tapped holes located on back, front, and top.

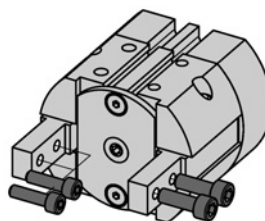
Additional top caps available for a variety of mounting styles. See product pages for more information



(-SP) Extended Pivot Pins option provides precision Dowel pins on the back side of the unit for positive location



### TOOLING



Mount tooling to fingers using Tapped holes or use the next size smaller screw and mount thru finger

Key tooling to precision ground fingers for positive location.

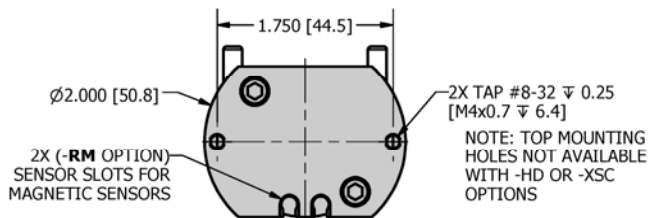


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**DURA-GRIP**  
TWO FINGER  
ANGULAR GRIPPER

**GH-20A**   
Series

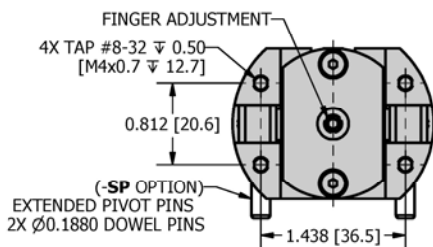
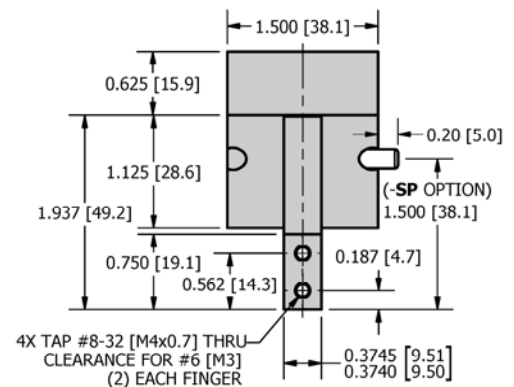
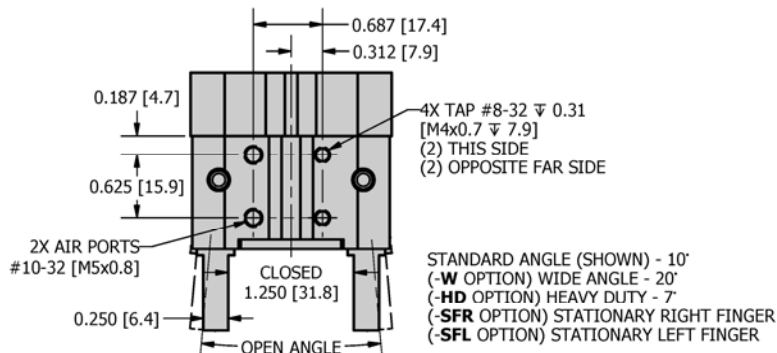
## DIMENSIONAL DRAWING



### SPECIFICATIONS

	GH-20A	MGH-20A
Standard Grip Force @ 100 psi [7 bar] *	75 lbf	330 N
Standard Stroke	5° per finger (10° total)	
Base Weight	0.56 lbs	0.26 kg
Unit Displacement (grip and release)	0.135 in <sup>3</sup>	2.21 cm <sup>3</sup>
Cylinder Bore Diameter	0.875 in	22.2 mm
Actuation Time (no load)	0.15 sec	

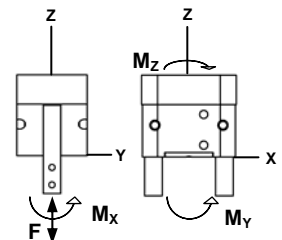
\* Loading between top mounting holes in fingers



### LOADING

	GH-20A		M GH-20A	
	Static	Dynamic	Static	Dynamic
Max Force <b>F</b>	75 lbf	25 lbf	333 N	25 N
Max Moment <b>M<sub>x</sub>, M<sub>z</sub></b>	100 lbf-in	35 lbf-in	11.3 N-m	4.0 N-m
Max Moment <b>M<sub>y</sub></b>	150 lbf-in	50 lbf-in	16.9 N-m	5.6 N-m

NOTE: Loading based on utilization of both fingers



## HOW TO ORDER : BASIC UNIT

## ACCESSORIES (order separately)

METRIC TOP CAP STYLE FINGER OPTIONS EXTENDED PINS PISTON OPTIONS

**M** **GH-20A** - **SP** - **V** - **RM** - **D**

**CUSTOM DESIGNS ALWAYS AVAILABLE**  
**PLEASE CONTACT US FOR INFORMATION**

METRIC M

TOP CAP 20 - Standard Flat (shown above)  
21 - Front 60°Dovetail  
22 - Side 60°Dovetail  
23 - Flange  
(see Additional Mounting section for information)

FINGER OPTIONS W - Wide Angle - 20° between fingers  
HD - Heavy Duty - 7° between fingers, High Grip Force  
SFR - Stationary Right Finger - 5° on opposing finger  
SFL - Stationary Left Finger (air port side) - 5° on opposing finger

SPRING ASSIST XSO - Spring Open (-W, -HD or -D Option) Not available with Spring Assist options  
XSC - Spring Closed Note: Spring assist option affects finger open angle, see Additional information section for more detail

EXTENDED PINS SP - Extended Pivot Pin for dowel pin mounting

SEALS V - Viton (standard Buna - N)

SENSORS RM - Magnetic Sensor Ready  
Includes Sensor slots and Piston Magnet. Sensors sold separately - see Magnetic Sensors

PISTON D - Extended Piston with additional output

### SAMPLE ORDER: GH-22A-HD

Ex) GH-22A (side 60° dovetail cap) with Heavy Duty option

Proximity Sensor Available - Consult Factory for more information

### MAGNETIC SENSOR KITS \* (Round track mounted)

RSK-N - Magnetic Sensor NPN w/ quick disconnect Kit

RSK-P - Magnetic Sensor PNP w/ quick disconnect Kit

\* Requires Sensor Ready (-RM). Sensor kits include (2) sensors and (2) 5 meter cables.

### MAGNETIC SENSORS \* (Round track mounted)

RS-N - Magnetic Sensor NPN w/ quick disconnect

RS-P - Magnetic Sensor PNP w/ quick disconnect

\* Requires Sensor Ready (-RM). Includes (1) sensor.

### SENSOR CABLE

SENCAB-5 - Quick Disconnect PUR Cable 5M Length

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VISIT US AT [www.RIMFG.com](http://www.RIMFG.com)



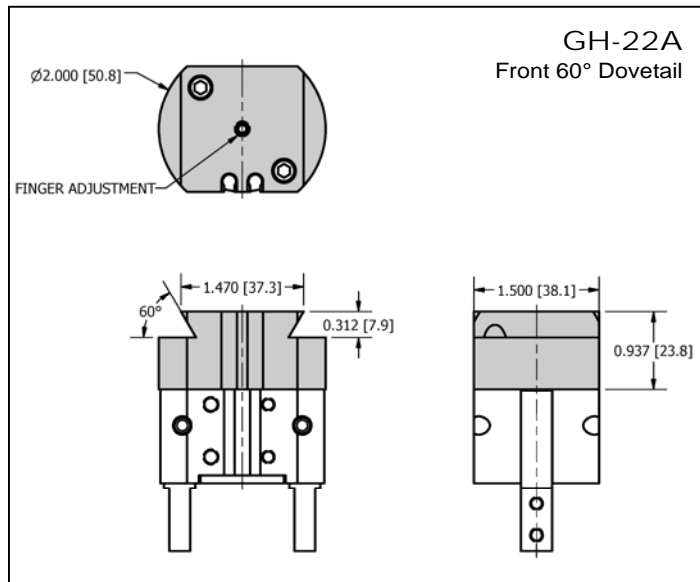
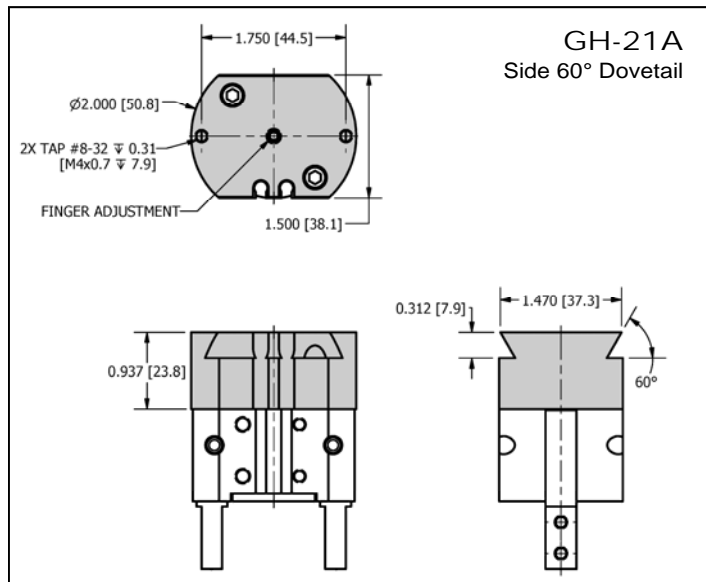
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## DURA-GRIP

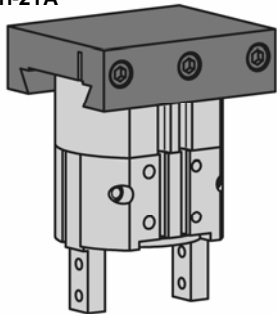
TWO FINGER  
ANGULAR GRIPPER

**GH-20A**   
Series

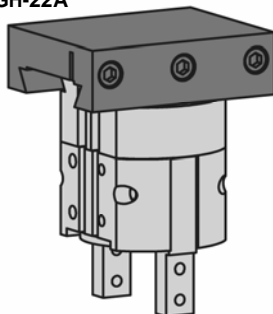
### ADDITIONAL MOUNTING INFORMATION



**GH-21A**



**GH-22A**



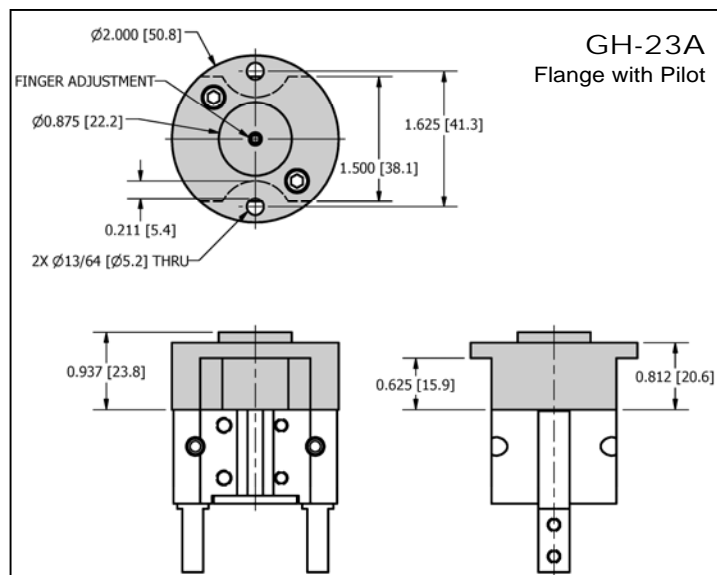
See **DURA-GRIP ACCESSORIES** Page  
for the **DP-21** Universal Dovetail receiver

Page  
**1-3.1**

The **DURA-GRIP GH-20A** series offers these additional mounting styles for further flexibility to meet your design requirements. These caps also offer adjustment screws for finger open stroke.

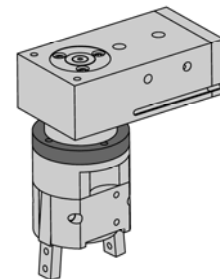
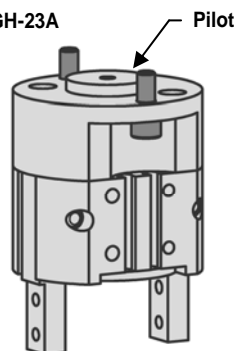
**Top Mount** the GH-21A / GH-22A with custom dovetail tooling or use the DP-21 Universal receiver.

With the GH-21A top cap the gripper is orientated inline with the dovetail. The GH-22A top cap the gripper is orientated 90 degrees to the dovetail.



**Top Mount** thru the GH-23A top cap with Clearance holes. Use pilot for positive location.

**GH-23A**



See **DURA-GRIP ACCESSORIES** Page  
The **MD-JG** to mount to the **JG-1000**

Page  
**1-3.1**



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**DURA-GRIP**  
TWO FINGER  
ANGULAR GRIPPER

**GH-20A**   
**Series**

## ADDITIONAL INFORMATION

### GRIP FORCE

The maximum capacity of the gripper is a function of many variables and will change based on the shape of the part, surface finish, accelerations during transfer, the shape of the finger tooling, and air pressures. Use the Grip force calculated below *and* the application variables to determine the proper sizing of the gripper.

The Grip force - **F** is defined as the maximum force that can be applied to the fingers without moving. The force is analytically determined and will vary slightly with friction. This force is calculated when the fingers are parallel.

When using the Spring Assist option see the section below for proper factors when calculating grip force.

$$\text{English GRIP FORCE - F (lbf)} = \frac{(P_{\text{AIR}} (\text{psi}) \times G_F) + S_F}{D (\text{in})}$$

$$\text{Metric GRIP FORCE - F (N)} = \frac{(P_{\text{AIR}} (\text{bar}) \times G_F) + S_F}{D (\text{mm})}$$

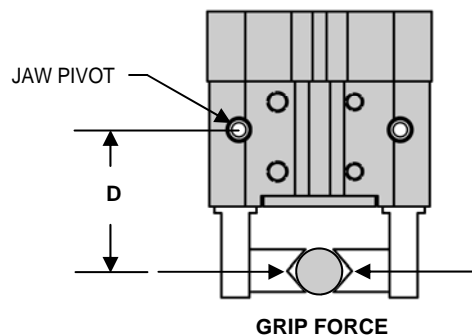
**P<sub>AIR</sub>** = Air Pressure

**D** = Distance to pivot (see diagram)

**G<sub>F</sub>** = Grip Factor (see chart)

**S<sub>F</sub>** = Spring Factor (see chart below)

GRIP FACTOR <b>G<sub>F</sub></b>		GH-20A	MGH-20A
Standard Unit	EXTERNAL	<b>1.40</b>	<b>2290</b>
	INTERNAL	<b>2.09</b>	<b>3416</b>
Heavy Duty (-HD)	EXTERNAL	<b>2.84</b>	<b>4643</b>
	INTERNAL	<b>1.90</b>	<b>3113</b>



It is recommended that finger tooling be designed to encompass the part as the grip force requirement is lower. If the grip cannot be performed by encompassing the part and a friction grip must be performed, always use a factor of safety of at least 4.

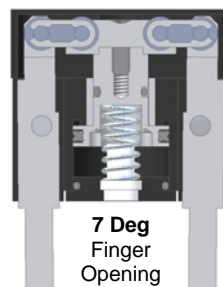
### SPRING ASSIST OPTION (-XSO OPTION) Assist OPEN (-XSC OPTION) Assist CLOSE

The Spring Assist option provides the following benefits:

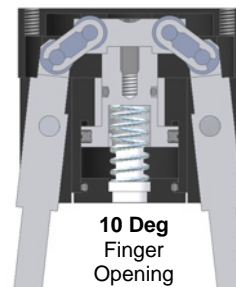
- Provides additional grip force
- Allows the gripper to function in a single acting manner  
ex) Air open - Spring close or Spring open - Air close
- Clear gripped part when air is lost

SPRING FACTORS *		GH-20A	MGH-20A
EXTERNAL GRIP (-XSC)	<b>G<sub>F</sub></b>	<b>2.84</b>	<b>4643</b>
	<b>S<sub>F</sub></b>	<b>39.8</b>	<b>4538</b>
INTERNAL GRIP (-XSO)	<b>G<sub>F</sub></b>	<b>2.09</b>	<b>3416</b>
	<b>S<sub>F</sub></b>	<b>54.1</b>	<b>6169</b>

\* You must use both the **G<sub>F</sub>** and **S<sub>F</sub>** list above when making grip force calculations



**ASSIST CLOSED (-XSC OPTION)**



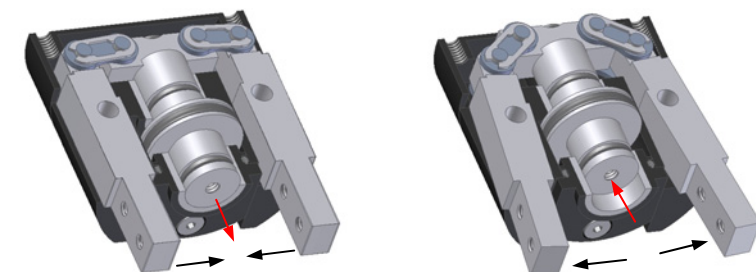
**ASSIST OPEN (-XSO OPTION)**

NOTE: 1) Bottom finger Adjustment screw is not available with the Spring Assist Option. 2) (-XSO) will not toggle lock in the closed position

### EXTENDED PISTON (-D OPTION)

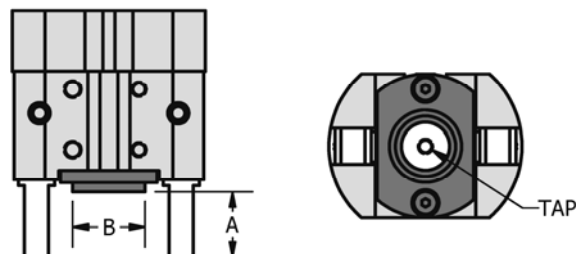
The Extended Piston option provides a synchronized additional output for custom tooling. The additional output will extend as the fingers move to the closed position. The additional output can be used for assisting the gripping operation and could be used for locating or even clamping the part before the grip occurs.

To reverse the operation order the Heavy Duty (-HD) model in conjunction with the extended piston. The additional output will retract as the fingers move to the closed position



<b>DIM</b>	GH-20A	MGH-20A
<b>A</b>	0.684"	17.4 mm
<b>B</b>	0.750"	19.1 mm
<b>TAP</b>	#8-32	M4x0.7

All other dimensions of individual heads remain the same. See data sheet on specific **DURA-GRIP** model for standard dimensions





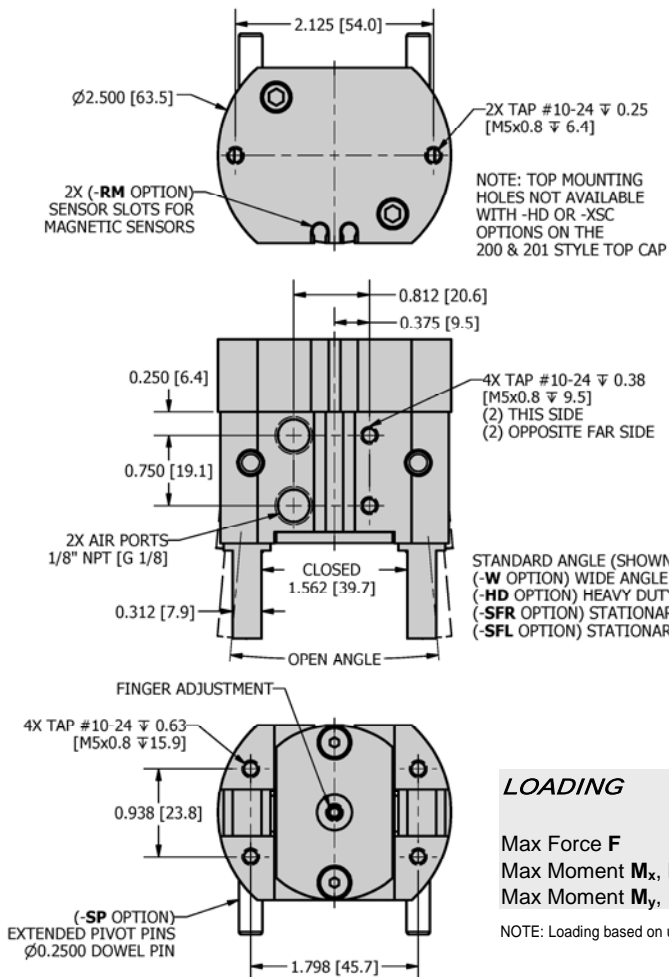


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**DURA-GRIP**  
TWO FINGER  
ANGULAR GRIPPER

**GH-200A**   
**Series**

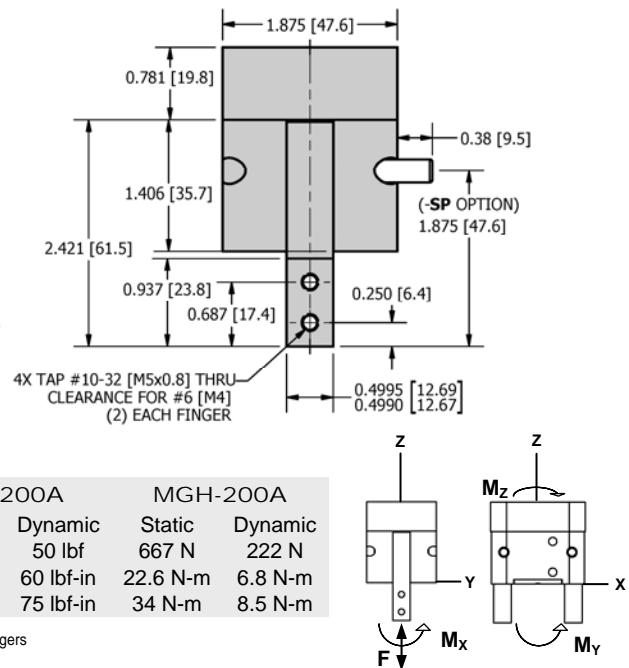
## DIMENSIONAL DRAWING



## SPECIFICATIONS

	GH-200A	MGH-200A
Standard Grip Force @ 100 psi [7 bar] *	145 lbf	649 N
Standard Stroke	5° per finger (10° total)	
Base Weight	1.08 lbs	0.48 kg
Unit Displacement (per stroke)	0.333 in <sup>3</sup>	5.45 cm <sup>3</sup>
Cylinder Bore Diameter	1.187 in	30.2 mm
Actuation Time (no load)	0.20 sec	

\* Loading between top mounting holes in fingers



## LOADING

	GH-200A		MGH-200A	
	Static	Dynamic	Static	Dynamic
Max Force F	150 lbf	50 lbf	667 N	222 N
Max Moment M <sub>x</sub> , M <sub>z</sub>	200 lbf-in	60 lbf-in	22.6 N-m	6.8 N-m
Max Moment M <sub>y</sub>	300 lbf-in	75 lbf-in	34 N-m	8.5 N-m

NOTE: Loading based on utilization of both fingers

## HOW TO ORDER : BASIC UNIT

## ACCESSORIES (order separately)

METRIC TOP CAP STYLE FINGER OPTIONS EXTENDED PINS PISTON OPTIONS

**M** **GH-200A** - **SP** - **V** - **RM** - **D**

CUSTOM DESIGNS ALWAYS AVAILABLE  
PLEASE CONTACT US FOR INFORMATION

SPRING ASSIST SEALS SENSORS

METRIC M

TOP CAP 200 - Standard Flat (shown above)  
201 - Front 60°Dovetail  
202 - Side 60°Dovetail } (see Additional Mounting section for information)

FINGER OPTIONS W - Wide Angle - 20° between fingers  
HD - Heavy Duty - 7° between fingers, High Grip Force  
SFR - Stationary Right Finger - 5° on opposing finger  
SFL - Stationary Left Finger (air port side) - 5° on opposing finger

SPRING ASSIST XSO - Spring Open (-W, -HD or -D Option) Not available with Spring Assist options  
XSC - Spring Closed Note: Spring assist option affects finger open angle, see Additional information section for more detail

EXTENDED PINS SP - Extended Pivot Pin for dowel pin mounting

SEALS V - Viton (standard Buna - N)

SENSORS RM - Magnetic Sensor Ready Includes Sensor slots and Piston Magnet. Sensors sold separately - see Magnetic Sensors

PISTON D - Extended Piston with additional output

## SAMPLE ORDER: GH-202A-HD

Ex) GH-202A (side 60° dovetail cap) with Heavy Duty option

Proximity Sensor Available - Consult Factory for more information

## MAGNETIC SENSOR KITS \* (Round track mounted)

RSK-N - Magnetic Sensor NPN w/ quick disconnect Kit

RSK-P - Magnetic Sensor PNP w/ quick disconnect Kit

\* Requires Sensor Ready (-RM). Sensor kits include (2) sensors and (2) 5 meter cables.

## MAGNETIC SENSORS \* (Round track mounted)

RS-N - Magnetic Sensor NPN w/ quick disconnect

RS-P - Magnetic Sensor PNP w/ quick disconnect

\* Requires Sensor Ready (-RM). Includes (1) sensor.

## SENSOR CABLE

SENCAB-5 - Quick Disconnect PUR Cable 5M Length

FOR MORE INFORMATION CALL US AT 1-800-588-0174 OR 860-589-6364 FAX: 860-589-6235

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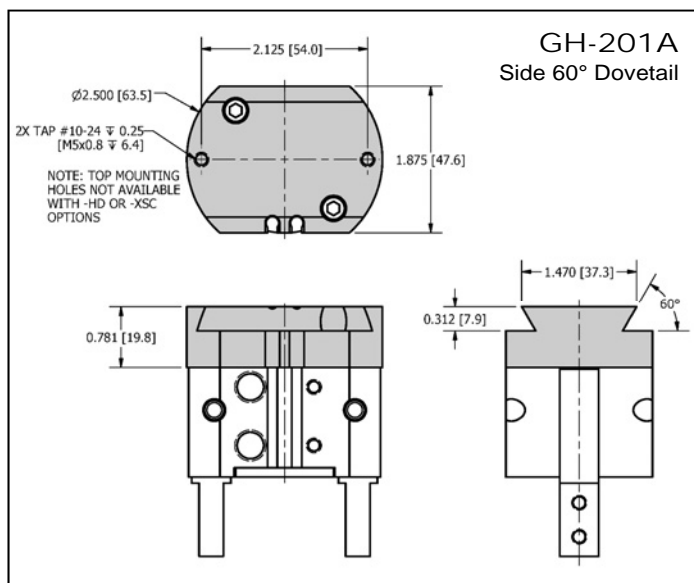
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TWO FINGER  
ANGULAR GRIPPER

**GH-200A**   
**Series**

## ADDITIONAL MOUNTING INFORMATION

The **DURA-GRIP GH-200A** series offers these additional mounting styles for further flexibility to meet your design requirements. The GH-202A cap also offers adjustment screws for finger open stroke.



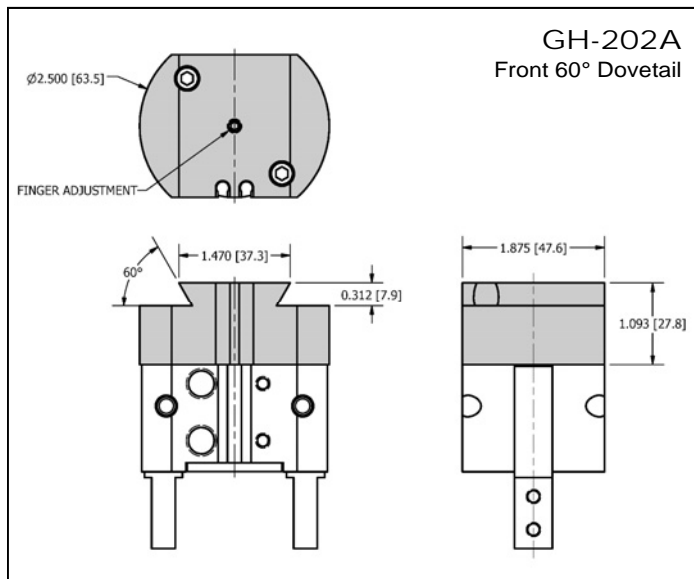
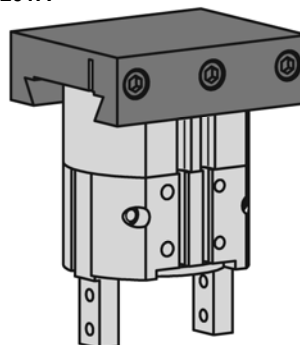
**Top Mount** the GH-201A / GH-202A with custom dovetail tooling or use the DP-21 Universal receiver.

With the GH-201A top cap the gripper is orientated inline with the dovetail. The GH-202A top cap the gripper is orientated 90 degrees to the dovetail.

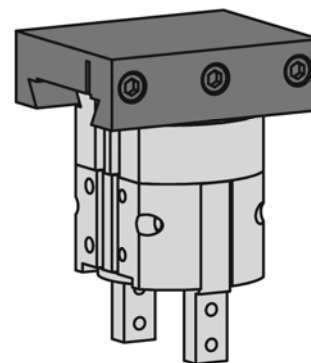
See **DURA-GRIP ACCESSORIES** Page for the DP-21 Universal Dovetail receiver

Page  
**1-3.1**

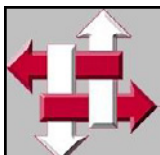
**GH-201A**



**GH-202A**







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**DURA-GRIP**  
TWO FINGER  
ANGULAR GRIPPER

**GH-200A**   
**Series**

## ADDITIONAL INFORMATION

### GRIP FORCE

The maximum capacity of the gripper is a function of many variables and will change based on the shape of the part, surface finish, accelerations during transfer, the shape of the finger tooling, and air pressures. Use the Grip force calculated below *and* the application variables to determine the proper sizing of the gripper.

The Grip force - **F** is defined as the maximum force that can be applied to the fingers without moving. The force is analytically determined and will vary slightly with friction. This force is calculated when the fingers are parallel.

When using the Spring Assist option see the section below for proper factors when calculating grip force.

$$\text{English GRIP FORCE - F (lbf)} = \frac{(P_{\text{AIR}} (\text{psi}) \times G_F) + S_F}{D (\text{in})}$$

$$\text{Metric GRIP FORCE - F (N)} = \frac{(P_{\text{AIR}} (\text{bar}) \times G_F) + S_F}{D (\text{mm})}$$

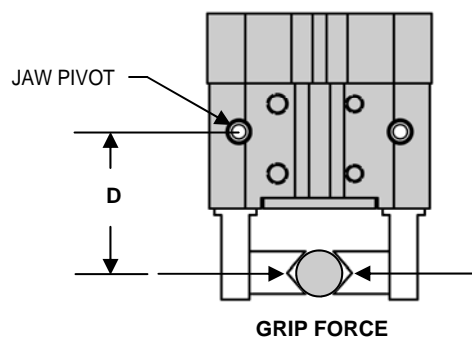
**P<sub>AIR</sub>** = Air Pressure

**D** = Distance to pivot (see diagram)

**G<sub>F</sub>** = Grip Factor (see chart)

**S<sub>F</sub>** = Spring Factor (see chart below)

GRIP FACTOR $G_F$		GH-200A	MGH-200A
Standard Unit	EXTERNAL	3.48	5688
	INTERNAL	4.32	7061
Heavy Duty (-HD)	EXTERNAL	5.84	9554
	INTERNAL	4.71	7696



It is recommended that finger tooling be designed to encompass the part as the grip force requirement is lower. If the grip cannot be performed by encompassing the part and a friction grip must be performed, always use a factor of safety of at least 4.

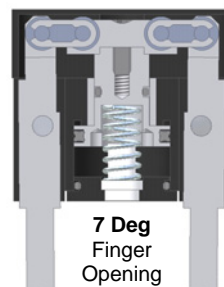
### SPRING ASSIST OPTION (-XSO OPTION) Assist OPEN (-XSC OPTION) Assist CLOSE

The Spring Assist option provides the following benefits:

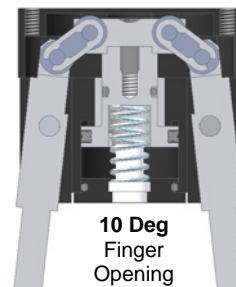
- Provides additional grip force
- Allows the gripper to function in a single acting manner  
ex) Air open - Spring close or Spring open - Air close
- Clear gripped part when air is lost

SPRING FACTORS *		GH-200A	MGH-200A
EXTERNAL GRIP (-XSC)	$G_F$	5.84	9554
	$S_F$	49.4	5632
INTERNAL GRIP (-XSO)	$G_F$	4.32	7061
	$S_F$	66.8	7621

\* You must use both the  $G_F$  and  $S_F$  list above when making grip force calculations



ASSIST CLOSED (-XSC OPTION)



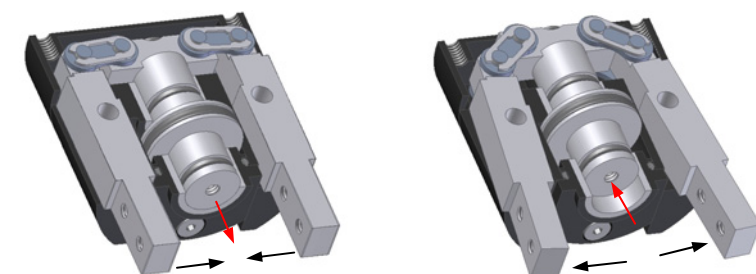
ASSIST OPEN (-XSO OPTION)

NOTE: 1) Bottom finger Adjustment screw is not available with the Spring Assist Option. 2) (-XSO) will not toggle lock in the closed position

### EXTENDED PISTON (-D OPTION)

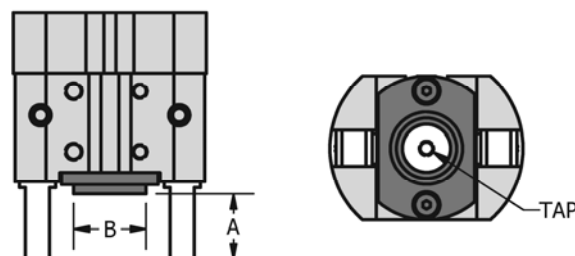
The Extended Piston option provides a synchronized additional output for custom tooling. The additional output will extend as the fingers move to the closed position. The additional output can be used for assisting the gripping operation and could be used for locating or even clamping the part before the grip occurs.

To reverse the operation order the Heavy Duty (-HD) model in conjunction with the extended piston. The additional output will retract as the fingers move to the closed position



DIM	GH-200A	MGH-200A
A	0.812"	20.6 mm
B	0.875"	22.2 mm
TAP	#10-32	[M5x0.8]

All other dimensions of individual heads remain the same. See data sheet on specific DURA-GRIP model for standard dimensions



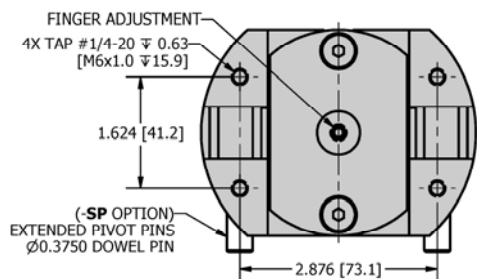
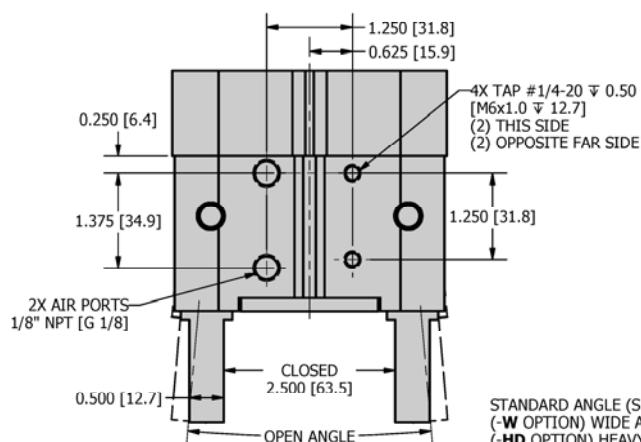
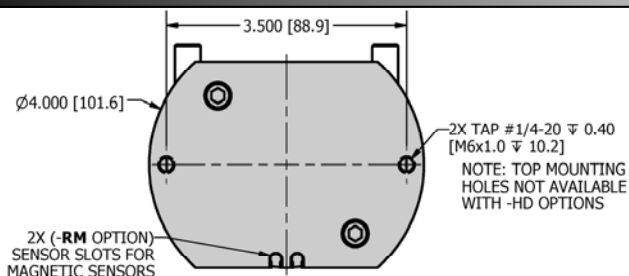


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TWO FINGER  
ANGULAR GRIPPER

**GH-2000A**   
**Series**

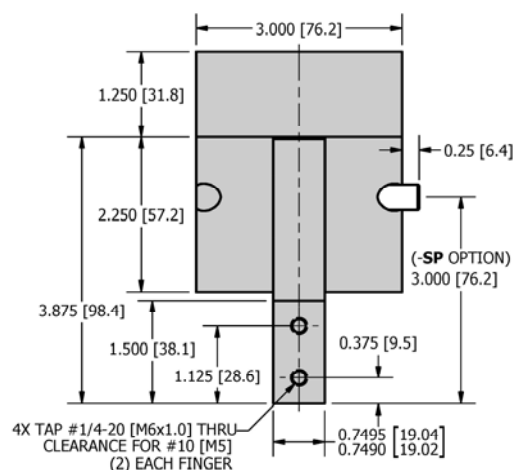
## DIMENSIONAL DRAWING



## SPECIFICATIONS

	GH-2000A	MGH-2000A
Standard Grip Force @ 100 psi [7 bar] *	287 lbf	1275 N
Standard Stroke	5° per finger (10° total)	
Base Weight	4.56 lbs	2.07 kg
Unit Displacement (grip and release)	1.075 in <sup>3</sup>	17.62 cm <sup>3</sup>
Cylinder Bore Diameter	1.750 in	44.5 mm
Actuation Time (no load)	0.30 sec	

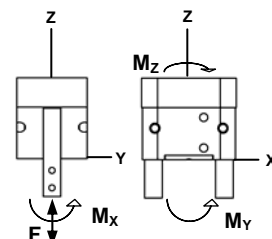
\* Loading between top mounting holes in fingers



## LOADING

	GH-2000A		MGH-2000A	
	Static	Dynamic	Static	Dynamic
Max Force <b>F</b>	250 lbf	80 lbf	1111 N	355 N
Max Moment <b>M<sub>x</sub>, M<sub>z</sub></b>	250 lbf-in	75 lbf-in	28.2 N-m	8.5 N-m
Max Moment <b>M<sub>y</sub></b>	350 lbf-in	90 lbf-in	39.5 N-m	10.2 N-m

NOTE: Loading based on utilization of both fingers



## HOW TO ORDER : BASIC UNIT

## ACCESSORIES (order separately)

METRIC BASE MODEL EXTENDED PINS PISTON OPTIONS

**M** **GH-2000A** - **SP** - **V** - **RM** - **D**

FINGER OPTIONS SEALS SENSORS

METRIC M

FINGER OPTIONS W - Wide Angle - 20° between fingers  
HD - Heavy Duty - 7° between fingers, High Grip Force

EXTENDED PINS SP - Extended Pivot Pin for dowel pin mounting

SEALS V - Viton (standard Buna - N)

SENSORS RM - Magnetic Sensor Ready  
Includes Sensor slots and Piston Magnet. Sensors sold separately - see Magnetic Sensors

PISTON D - Extended Piston with additional output

CUSTOM DESIGNS ALWAYS AVAILABLE  
PLEASE CONTACT US FOR INFORMATION

Proximity Sensor Available - Consult Factory for more information

MAGNETIC SENSOR KITS \* (Round track mounted)

RSK-N - Magnetic Sensor NPN w/ quick disconnect Kit

RSK-P - Magnetic Sensor PNP w/ quick disconnect Kit

\* Requires Sensor Ready (-RM). Sensor kits include (2) sensors and (2) 5 meter cables.

MAGNETIC SENSORS \* (Round track mounted)

RS-N - Magnetic Sensor NPN w/ quick disconnect

RS-P - Magnetic Sensor PNP w/ quick disconnect

\* Requires Sensor Ready (-RM). Includes (1) sensor.

SENSOR CABLE

SENCAB-5 - Quick Disconnect PUR Cable 5M Length

**SAMPLE ORDER: GH-2000A-V**

Ex) GH-2000A with Viton Seals

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**DURA-GRIP**  
TWO FINGER  
ANGULAR GRIPPER

**GH-2000A**   
**Series**

## ADDITIONAL INFORMATION

### GRIP FORCE

The maximum capacity of the gripper is a function of many variables and will change based on the shape of the part, surface finish, accelerations during transfer, the shape of the finger tooling, and air pressures. Use the Grip force calculated below *and* the application variables to determine the proper sizing of the gripper.

The Grip force - **F** is defined as the maximum force that can be applied to the fingers without moving. The force is analytically determined and will vary slightly with friction. This force is calculated when the fingers are parallel.

$$\text{English GRIP FORCE - F (lbf)} = \frac{(P_{\text{AIR}} (\text{psi}) \times G_F)}{D (\text{in})}$$

$$\text{Metric GRIP FORCE - F (N)} = \frac{(P_{\text{AIR}} (\text{bar}) \times G_F)}{D (\text{mm})}$$

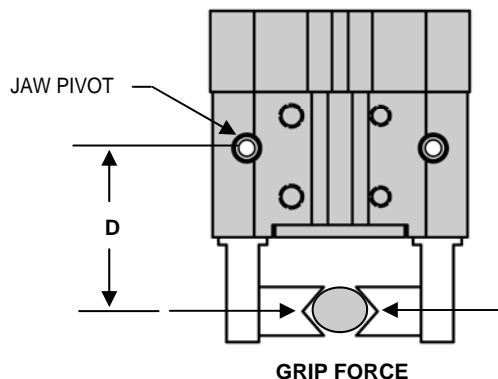
**P<sub>AIR</sub>** = Air Pressure

**D** = Distance to pivot (see diagram)

**G<sub>F</sub>** = Grip Factor (see chart)

**S<sub>F</sub>** = Spring Factor (see chart below)

GRIP FACTOR <b>G<sub>F</sub></b>		GH-2000A	MGH-2000A
Standard Unit	EXTERNAL	<b>10.78</b>	<b>17628</b>
	INTERNAL	<b>13.38</b>	<b>21887</b>
Heavy Duty (-HD)	EXTERNAL	<b>18.09</b>	<b>29584</b>
	INTERNAL	<b>14.57</b>	<b>23827</b>



It is recommended that finger tooling be designed to encompass the part as the grip force requirement is lower. If the grip cannot be performed by encompassing the part and a friction grip must be performed, always use a factor of safety of at least 4.

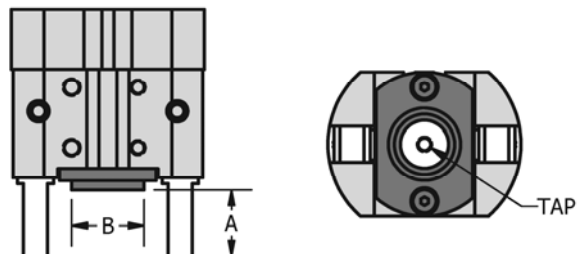
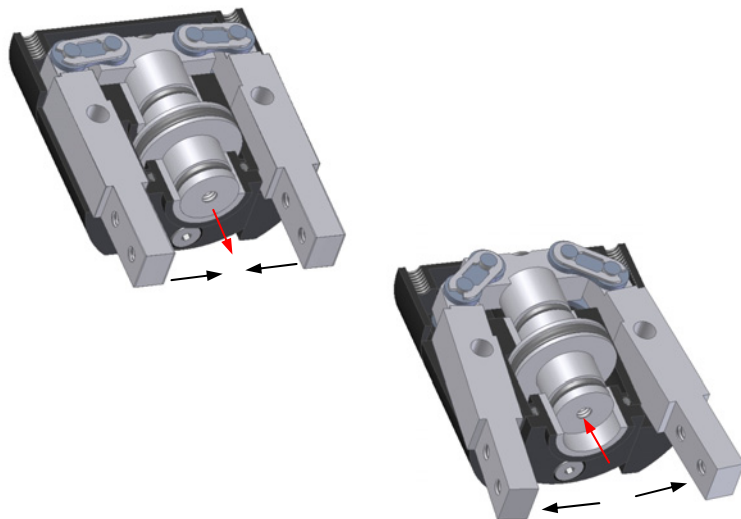
### EXTENDED PISTON (-D OPTION)

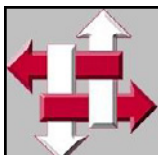
The Extend Piston option provides a synchronized additional output for custom tooling. The additional output will extend as the fingers move to the closed position. The additional output can be used for assisting the gripping operation and could be used for locating or even clamping the part before the grip occurs.

To reverse the operation order the Heavy Duty (-HD) model in conjunction with the extended piston. The additional output will retract as the fingers move to the closed position

<b>DIM</b>	GH-2000A	MGH-2000A
A	1.375"	34.9 mm
B	0.875"	22.2 mm
TAP	#1/4-20	[M6x1.0]

All other dimensions of individual heads remain the same. See data sheet on specific **DURA-GRIP** model for standard dimensions





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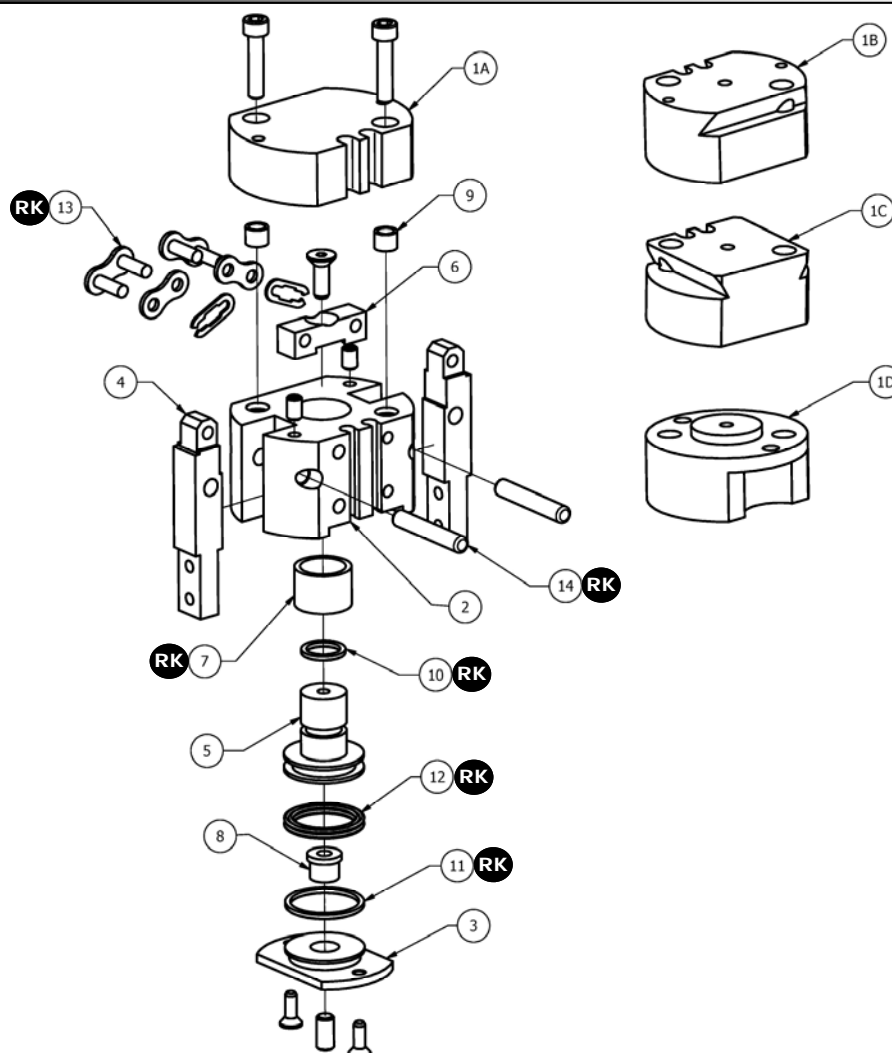
**DURA-GRIP GH-20/200/2000**

TWO FINGER  
ANGULAR GRIPPER

**"A" Series**



EXPLODED VIEW



## PARTS LIST

ITEM	REQ'D	NAME	GH-20A	GH-200A	GH-2000A	OPTIONS
1A	1	Flat Top Cap	GH-20A-1	GH-200A-1	GH-2000A-1	-W <sup>1</sup> -HD <sup>2</sup> -RM <sup>5</sup>
1B	1	Front Dovetail Top Cap	GH-21A-1	GH-201A-1		-W <sup>1</sup> -HD <sup>2</sup> -RM <sup>5</sup>
1C	1	Side Dovetail Top Cap	GH-22A-1	GH-202A-1		-W <sup>1</sup> -HD <sup>2</sup> -RM <sup>5</sup>
1D	1	Flange Top Cap	GH-23A-1			-W <sup>1</sup> -HD <sup>2</sup>
2	1	Main Body	GH-20A-2	GH-200A-2	GH-2000A-2	-W <sup>1</sup> -RM <sup>5</sup>
3	1	Bottom Cap	GH-20A-3	GH-200A-3	GH-2000A-3	-XSO <sup>4</sup> -XSC <sup>4</sup> -D <sup>8</sup>
4	2	Finger	GH-20A-4	GH-200A-4	GH-2000A-4	-HD <sup>2</sup> -SFL <sup>3</sup> -SFR <sup>3</sup>
5	1	Piston	GH-20A-5	GH-200A-5	GH-2000A-5	-W <sup>1</sup> -XSO <sup>4</sup> -XSC <sup>4</sup> -RM <sup>5</sup> -D <sup>8</sup>
6	1	Connector	GH-20A-6	GH-200A-6	GH-2000A-6	-W <sup>1</sup>
7	1	Piston Bushing *	GH-20A-7	GH-200A-7	GH-2000A-7	-W <sup>1</sup>
8	1	Stop Bushing	GH-20A-8	GH-200A-8	GH-2000A-8	-XSO <sup>4</sup> -XSC <sup>4</sup>
9	2	Top Cap Guide *	GH-20A-9	GH-200A-9	GH-2000A-9	
10	1	O-ring *	ORG-012			-V <sup>7</sup>
11	1	Bottom Cap O-ring *	ORG-018	ORG-023	ORG-030	-V <sup>7</sup>
12	1	Piston Seal *	QDG-150	ORG-120	ORG-222	-V <sup>7</sup>
13	2	Chain Link Assembly *	CHL-035	CHL-041	CHL-060	
14	2	Pivot Pin *	FPP-200	FPP-300	FPP-400	-SP <sup>6</sup>
RK	1	Repair Kit * #	GH-20A-RK	GH-200A-RK	GH-2000A-RK	-W <sup>1</sup> -SP <sup>6</sup> -V <sup>7</sup>

## HOW TO ORDER PARTS

METRIC PART NUMBER

**M**  -

OPTIONS

**SAMPLE ORDER: GH-20A-1**

Ex) GH-20A Flat Top Cap

**OPTIONS** (see product pages for information)

- 1 - W = Wide Angle
- 2 - HD = Heavy Duty
- 3 - SFR / -SFL = Stationary Fingers Right or Left
- 4 - XSO / -XSC = Spring Assist Open or Close
- 5 - RM = Magnetic Sensor Ready
- 6 - SP = Extended Pivot Pins
- 7 - V = Viton
- 8 - D = Extended Piston

### NOTES

\* - Metric code not required

# - Repair Kits include req'd qty of parts marked with

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VISIT US AT [www.RIMFG.com](http://www.RIMFG.com)



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TECH NOTES



### GH "B" SERIES - NO LUBE ADDED

**DURA-GRIP GH "B"** Series of Part Placement Devices is designed to provide a low cost gripping unit that meets the requirements of non-lubricated machinery. These air operated units grip parts internally or externally offering the designer a wide latitude in finger tooling arrangements. All units are shipped completely assembled, ready for mounting and attaching tooling.

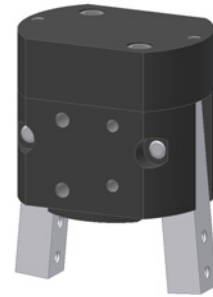
#### QUALITY CONSTRUCTION

**DURA-GRIP GH "B"** Series units are ruggedly constructed with a minimum of moving parts. The body is anodized high strength aluminum, fingers are hardened tool steel. The piston is solid Delrin and all pivot points are lined with Delrin bushings. These features eliminate the need for re-lubrication and permit the use on non-lubricated machinery. A bottom adjusting screw can be set to stop the downward travel of the piston thereby adjusting the closing of the fingers. On dovetail mounting heads, a top adjusting screw adjusts the opening of the fingers. Maximum finger holder movement 10° between fingers.

#### MOUNTING INFORMATION

**DURA-GRIP GH "B"** Series can be mounted in any plane with standard mounting holes on top, front and back of unit. These same holes can also be used to mount "stripper" devices. Additional cap styles for dovetail mounting are also available. Optional Magnetic sensors are available on all heads. The sensors can be used to indicate finger position.

**GH-20B**

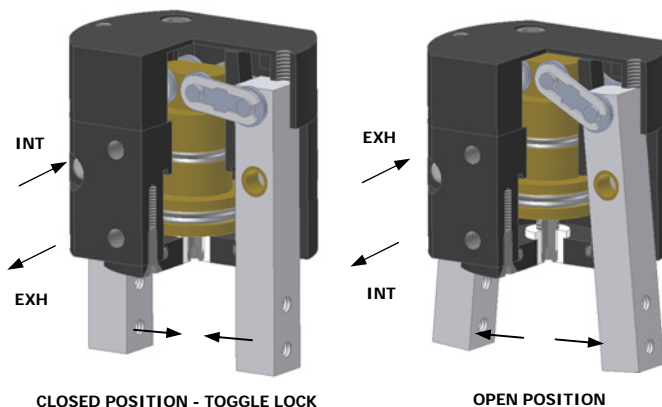


Use the GH "B" Series of Angular Grippers wherever you need durable and precise part placement in non-lubricated applications.

#### TECHNICAL SPECIFICATION

Pneumatic Specifications	ENGLISH	METRIC
Pressure Range	40-100 psi	3-7 bar
Cylinder Type	Double Acting	
Dynamic Seals	Buna-N	
Required Valves	4-way, 2 position	
<b>Temperature Range</b>		
Buna-N Seals (standard)	-30 to 180 F	-35 to 80 C
Viton Seals (-V option)	-20 to 300 F	-30 to 150 C

#### OPERATING PRINCIPLES - STANDARD UNIT



- Air pressure drives double acting piston.
- Solid Delrin piston drives fingers through double toggle mechanism producing synchronized angular motion.
- Gripper is capable of external gripping with locking and internal gripping without locking

Finger closed position can be adjusted with set screw in the bottom cap of the unit. Open position adjustment is offered on dovetail and flange mount top caps.

Unit ships with toggle lock disabled, set screw must be backed out to enable locking in the closed position. Unit can be run with the toggle lock disabled.





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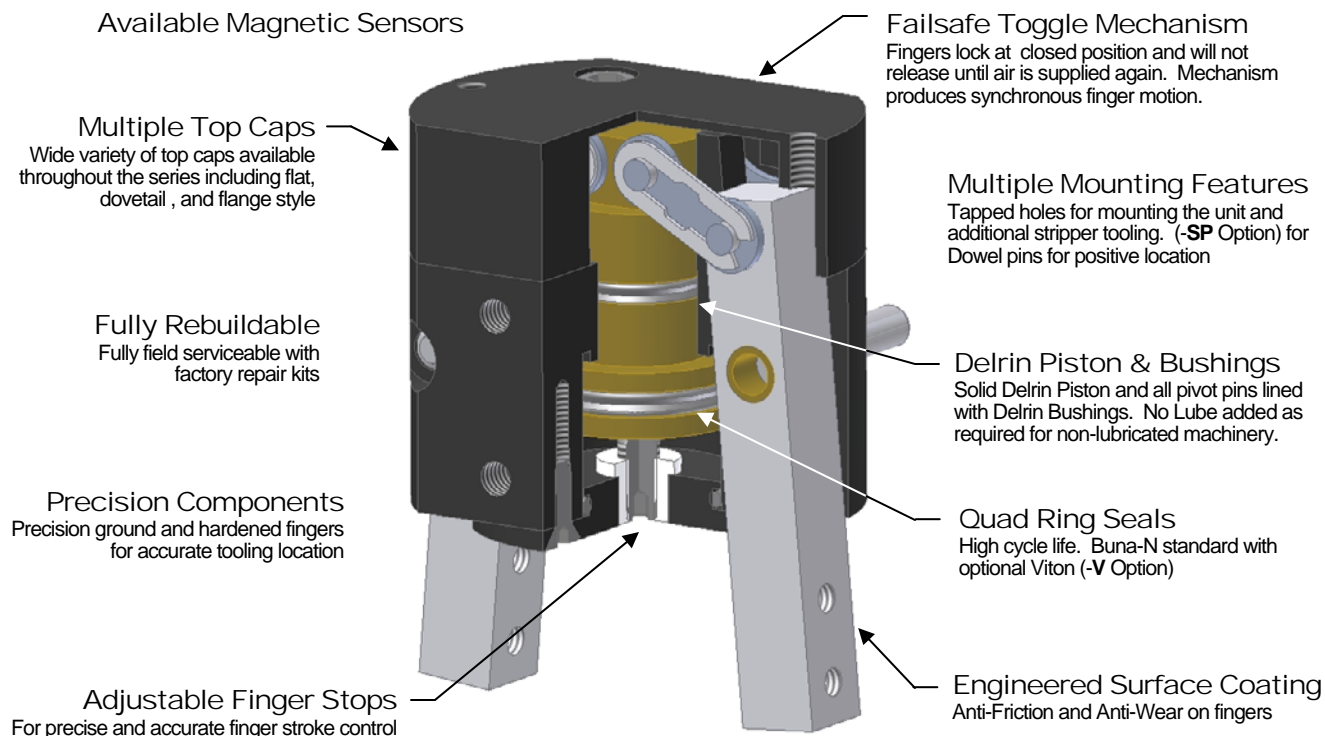
**DURA-GRIP**

NO LUBE ADDED  
ANGULAR GRIPPER

**GH-20**   
"B" Series

## PRODUCT FEATURES

- Aircraft Grade Aluminum  
2024 with black anodize
- Simple and Highly Durable  
Time tested, field approved design
- High Grip Force  
High gripping force-to-weight ratio

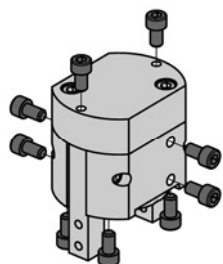


**DESIGNED - MANUFACTURED - ASSEMBLED IN THE USA** 

## MOUNTING INFORMATION

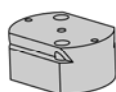
**Mounts and operates in any orientation**

### MAIN BODY

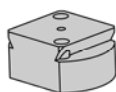


Mount up to Main body utilizing Tapped holes located on back, front, and top.

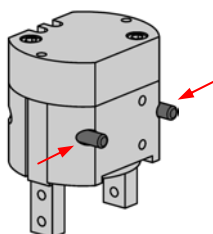
Additional top caps available for a variety of mounting styles. See product pages for more information



Dovetail

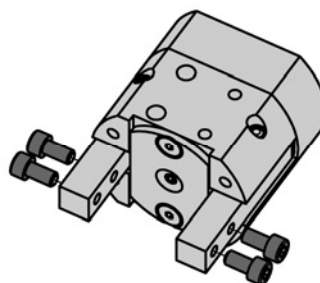


Flange



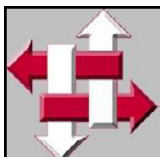
(-SP) Extended Pivot Pins option provides precision Dowel pins on the back side of the unit for positive location

### TOOLING



Mount tooling to fingers using Tapped holes or use the next size smaller screw and mount thru finger

Key tooling to precision ground fingers for positive location.

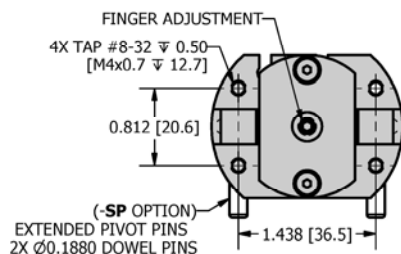
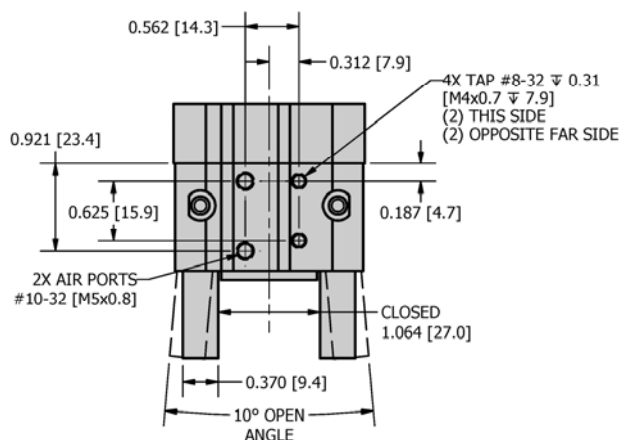
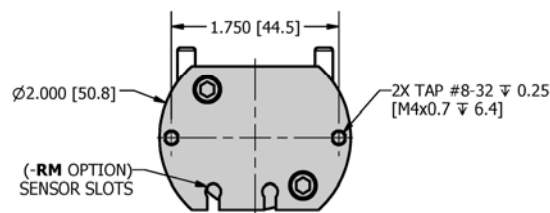


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**DURA-GRIP**  
NO LUBE ADDED  
ANGULAR GRIPPER

**GH-20B**   
Series

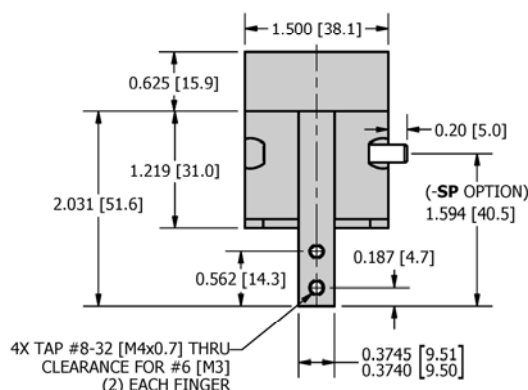
## DIMENSIONAL DRAWING



### SPECIFICATIONS

	GH-20B	MGH-20B
Standard Grip Force @ 100 psi [7 bar] *	75 lbf	330 N
Standard Stroke	5° per finger (10° total)	
Base Weight	0.56 lbs	0.26 kg
Unit Displacement (grip and release)	0.135 in <sup>3</sup>	2.21 cm <sup>3</sup>
Cylinder Bore Diameter	0.875 in	22.2 mm
Actuation Time (no load)	0.15 sec	

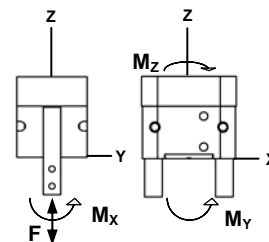
\* Loading between top mounting holes in fingers



### LOADING

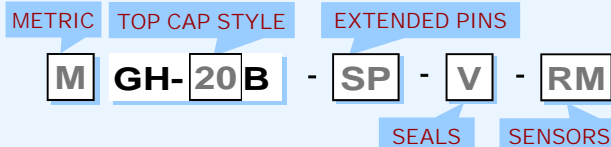
	GH-20B		MGH-20B	
	Static	Dynamic	Static	Dynamic
Max Force <b>F</b>	75 lbf	25 lbf	333 N	25 N
Max Moment <b>M<sub>x</sub>, M<sub>z</sub></b>	100 lbf-in	35 lbf-in	11.3 N-m	4.0 N-m
Max Moment <b>M<sub>y</sub></b>	150 lbf-in	50 lbf-in	16.9 N-m	5.6 N-m

NOTE: Loading based on utilization of both fingers



## HOW TO ORDER : BASIC UNIT

## ACCESSORIES (order separately)



METRIC M

TOP CAP 20 - Standard Flat (shown above)  
21 - Front 60° Dovetail  
22 - Side 60° Dovetail  
23 - Flange  
(see Additional Mounting section for information)

EXTENDED PINS SP - Extended Pivot Pin for dowel pin mounting

SEALS V - Viton (standard Buna - N)

SENSORS RM - Magnetic Sensor Ready  
Includes Sensor slots and Piston Magnet. Sensors sold separately - see Magnetic Sensors

### MAGNETIC SENSOR KITS \* (Round track mounted)

RSK-N - Magnetic Sensor NPN w/ quick disconnect Kit  
RSK-P - Magnetic Sensor PNP w/ quick disconnect Kit

\* Requires sensor magnets (-RM). Sensor kits include (2) sensors and (2) 5 meter cables.

### MAGNETIC SENSORS \* (Round track mounted)

RS-N - Magnetic Sensor NPN w/ quick disconnect  
RS-P - Magnetic Sensor PNP w/ quick disconnect

\* Requires sensor magnets (-RM). Includes (1) sensor.

### SENSOR CABLE

SENCAB-5 - Quick Disconnect PUR Cable 5M Length

**SAMPLE ORDER: GH-22B-SP**

Ex) GH-22B (side 60° dovetail cap) with Extended Pivot Pins

**CUSTOM DESIGNS ALWAYS AVAILABLE  
PLEASE CONTACT US FOR INFORMATION**



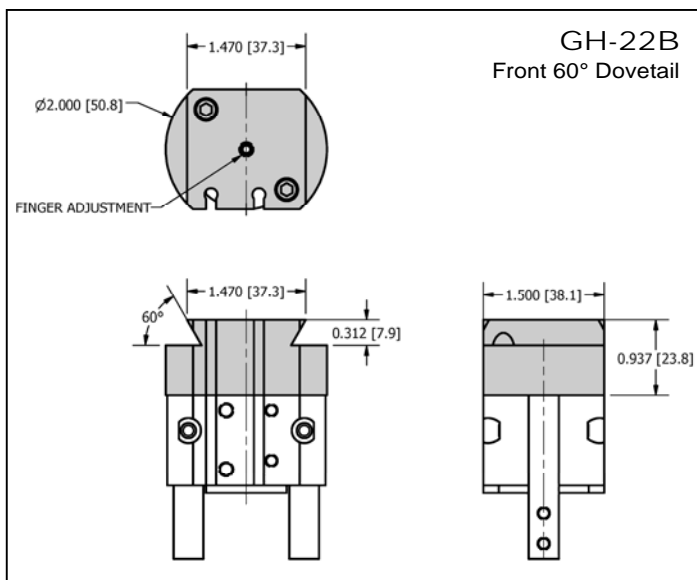
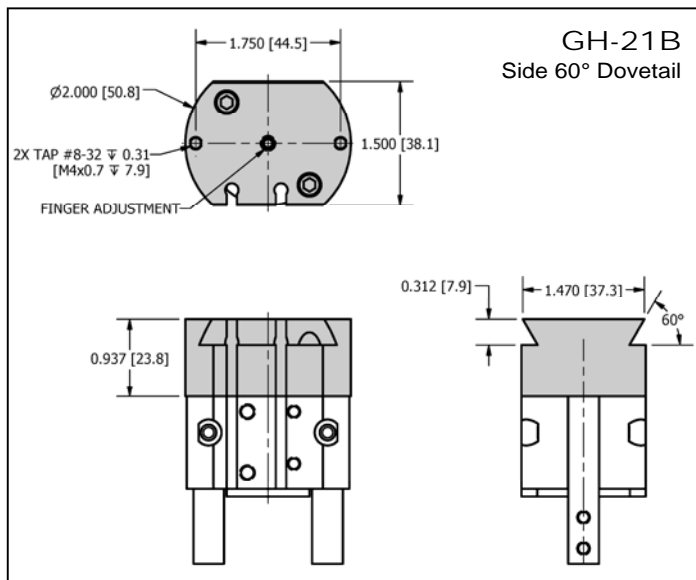
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**DURA-GRIP**  
NO LUBE ADDED  
ANGULAR GRIPPER

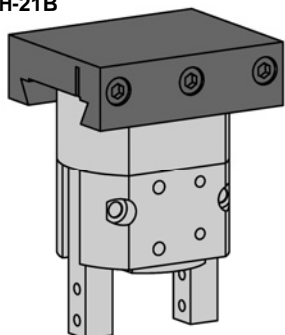
**GH-20B Series**



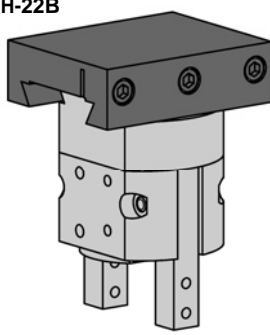
ADDITIONAL MOUNTING INFORMATION



**GH-21B**



**GH-22B**



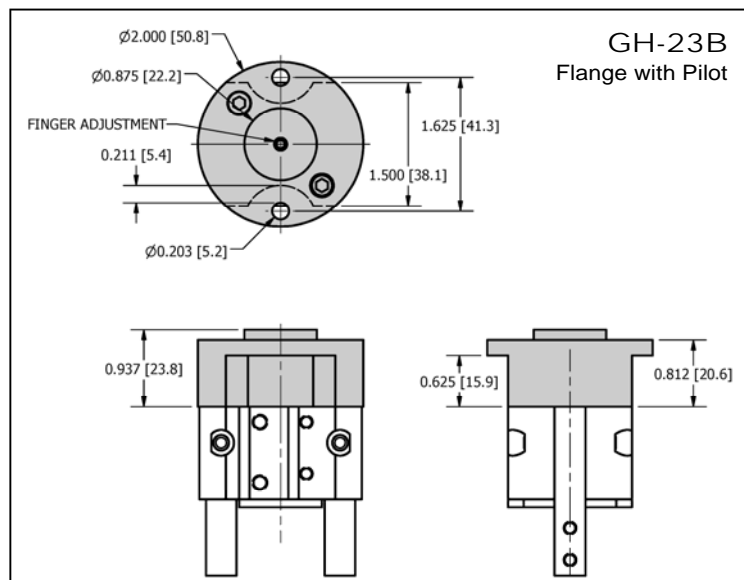
The **DURA-GRIP GH-20B** series offers these additional mounting styles for further flexibility to meet your design requirements. These caps also offer adjustment screws for finger open stroke.

**Top Mount** the GH-21B / GH-22B with custom dovetail tooling or use the DP-21 Universal receiver.

With the GH-21B top cap the gripper is orientated inline with the dovetail. The GH-22B top cap the gripper is orientated 90 degrees to the dovetail.

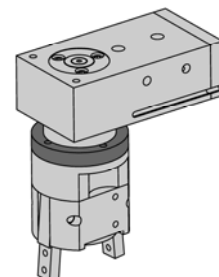
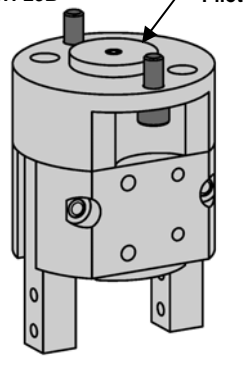
See **DURA-GRIP ACCESSORIES** Page  
for the **DP-21** Universal Dovetail receiver

Page  
**1-3.1**



**Top Mount** thru the GH-23B top cap with Clearance holes. Use pilot for positive location.

**GH-23B**



See **DURA-GRIP ACCESSORIES** Page  
The **MD-JG** to mount to the JG-1000

Page  
**1-3.1**



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## DURA-GRIP

NO LUBE ADDED  
ANGULAR GRIPPER

**GH-20B**  
**Series**



### ADDITIONAL INFORMATION

#### GRIP FORCE

The maximum capacity of the gripper is a function of many variables and will change based on the shape of the part, surface finish, accelerations during transfer, the shape of the finger tooling, and air pressures. Use the Grip force calculated below *and* the application variables to determine the proper sizing of the gripper.

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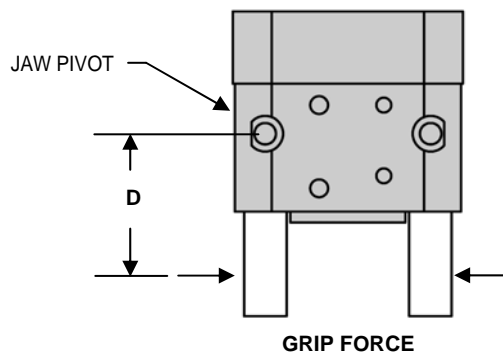
$$\text{Metric GRIP FORCE - F (N)} = \frac{(P_{\text{AIR}} (\text{bar}) \times G_F)}{D (\text{mm})}$$

**P<sub>AIR</sub>** = Air Pressure

**D** = Distance to pivot (see diagram)

**G<sub>F</sub>** = Grip Factor (see chart)

GRIP FACTOR <b>G<sub>F</sub></b>		GH-20B	MGH-20B
Standard Unit	EXTERNAL	<b>1.40</b>	<b>2290</b>
	INTERNAL	<b>2.09</b>	<b>3416</b>



It is recommended that finger tooling be designed to encompass the part as the grip force requirement is lower. If the grip cannot be performed by encompassing the part and a friction grip must be performed, always use a factor of safety of at least 4.



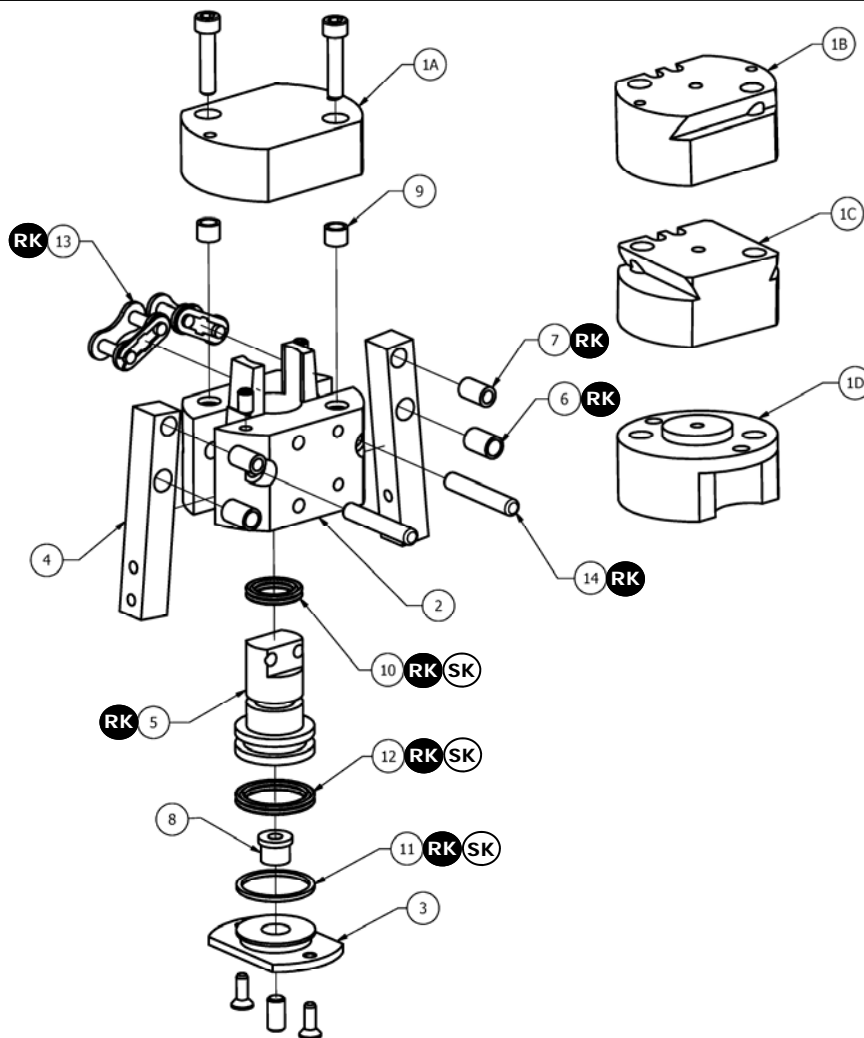
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## DURA-GRIP

NO LUBE ADDED  
ANGULAR GRIPPER

**GH-20**   
"B" Series

### EXPLODED VIEW



### PARTS LIST

ITEM	REQ'D	NAME	GH-20B	OPTIONS
1A	1	Flat Top Cap	GH-20B-1	-RM <sup>3</sup>
1B	1	Front Dovetail Top Cap	GH-21B-1	-RM <sup>3</sup>
1C	1	Side Dovetail Top Cap	GH-22B-1	-RM <sup>3</sup>
1D	1	Flange Top Cap	GH-23A-1	
2	1	Main Body	GH-20B-2	-RM <sup>3</sup>
3	1	Bottom Cap	GH-20A-3	
4	2	Finger	GH-20B-4	
5	1	Piston	GH-20B-5	-RM <sup>3</sup>
6	2	Pivot Bushing *	GH-20B-6	
7	2	Link Bushing *	GH-20B-7	
8	1	Stop Bushing	GH-20A-8	
9	2	Top Cap Guide *	GH-20A-9	
10	1	Shank Seal *	QDG-030	-V <sup>1</sup>
11	1	Bottom Cap O-ring *	ORG-018	-V <sup>1</sup>
12	1	Piston Seal *	QDG-150	-V <sup>1</sup>
13	2	Chain Link Assembly *	CHL-041	
14	2	Pivot Pin *	FPP-200	-SP <sup>2</sup>
RK	1	Repair Kit * <sup>#</sup>	GH-20B-RK	-V <sup>1</sup> -SP <sup>2</sup> -RM <sup>3</sup>
SK	1	Seal Kit * <sup>†</sup>	GH-20B-SK	-V <sup>1</sup>

### HOW TO ORDER PARTS

METRIC

PART NUMBER

M

OPTIONS

**SAMPLE ORDER: GH-20B-1**

Ex) GH-20B Flat Top Cap

OPTIONS (see product pages for information)

1 - V = Viton

2 - SP = Extended Pivot Pins

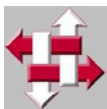
3 - RM = Magnetic Sensor Ready

#### NOTES

\* - Metric code not required

<sup>#</sup> - Repair Kits include req'd qty of parts marked with RK

<sup>†</sup> - Seal Kits include req'd qty of parts marked with SK



### GH "A" SERIES - 3 FINGER

**DURA-GRIP GH "A" - 3 Finger** Series of Part Placement Devices is designed to provide a low cost gripping unit for use on transfer mechanisms. These 3 finger air operated units grip parts internally or externally offering the designer a wide latitude in finger tooling arrangements. All units are shipped completely assembled, ready for mounting and attaching tooling.

#### QUALITY CONSTRUCTION

**DURA-GRIP GH "A" - 3 Finger** Series units are ruggedly constructed with a minimum of moving parts. The body is anodized high strength aluminum, fingers are hardened tool steel. A bottom adjusting screw can be set to stop the downward travel of the piston thereby adjusting the closing of the fingers. Standard finger holder movement is 5° per finger. The series can be mounted in any plane with standard mounting holes on top cap.

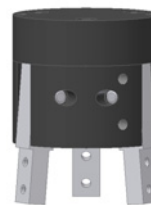
#### OPTIONAL FEATURES

Heavy Duty (-HD) heads are available in all sizes of the series. These heads have their toggle linkages arranged to have the inward motion of the finger occur on the full (bore) side of the piston creating high gripping forces. Wide angle (-W) models are also available giving 10° per finger. Optional Inductive sensors are available on all heads. The sensors can be used to indicate finger position.

Use the GH "A" Series of Angular Grippers wherever you need durable and precise part placement.

#### STANDARD DUTY

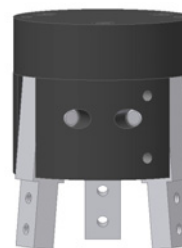
#### GH-30A



See Page **1-3.28**

#### MEDIUM DUTY

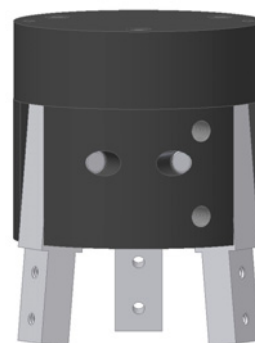
#### GH-300A



See Page **1-3.30**

#### HEAVY DUTY

#### GH-3000A

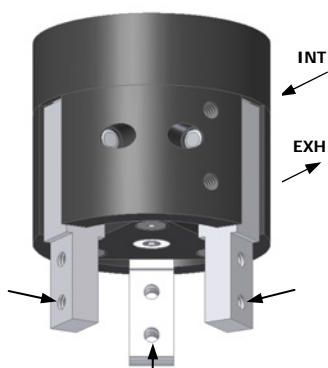


See Page **1-3.32**

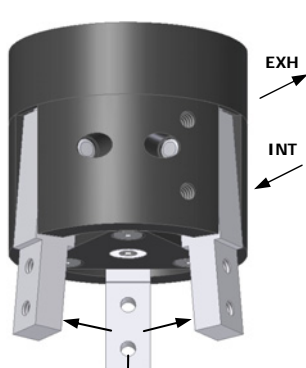
### TECHNICAL SPECIFICATION

Pneumatic Specifications	ENGLISH	METRIC
Pressure Range	40-100 psi	3-7 bar
Cylinder Type	Double Acting	
Dynamic Seals	Buna-N	
Required Valves	4-way, 2 position	
<b>Temperature Range</b>		
Buna-N Seals (standard)	-30 to 180 F	-35 to 80 C
Viton Seals (-V option)	-20 to 300 F	-30 to 150 C

### OPERATING PRINCIPLES - STANDARD UNIT

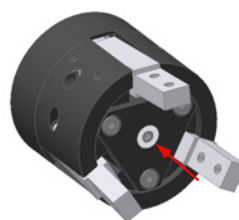


CLOSED POSITION - TOGGLE LOCK



OPEN POSITION

- Air pressure drives double acting piston.
- Piston drives fingers through double toggle mechanism producing synchronized angular motion.
- Gripper is capable of external gripping with locking and internal gripping without locking



Finger closed position can be adjusted with set screw in the bottom cap of the unit. Open position adjustment is offered on dovetail cap.

Unit ships with toggle lock disabled, set screw must be backed out to enable locking in the closed position. Unit can be run with the toggle lock disabled.





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# DURA-GRIP GH-30/300/3000

THREE FINGER  
ANGULAR GRIPPER



**"A" Series**

## PRODUCT FEATURES

- Aircraft Grade Aluminum  
2024 with black anodize
- Simple and Highly Durable  
Time tested, field approved design
- High Grip Force  
High gripping force-to-weight ratio

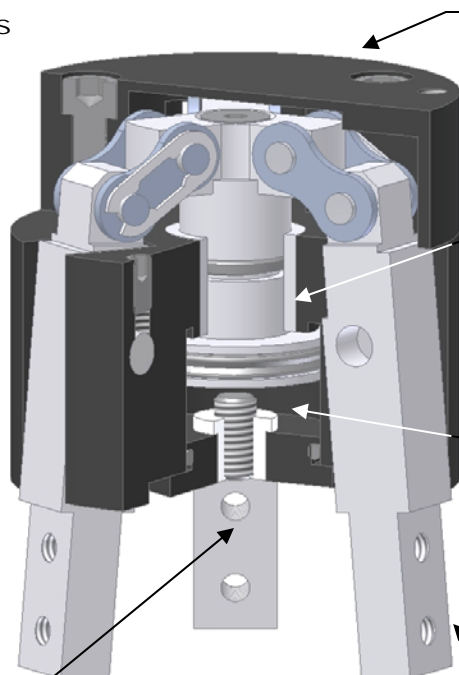
Optional Inductive Sensors

Fully Rebuildable  
Fully field serviceable with  
factory repair kits

Optional Spring Assist  
Spring assist in opening or closing  
finger stroke (-XSO / -XSC Option)

Precision Components  
Precision ground and hardened fingers  
for accurate tooling location

Adjustable Finger Stops  
For precise and accurate finger stroke control



Failsafe Toggle Mechanism  
Fingers lock at closed position and will not  
release until air is supplied again. Mechanism  
produces synchronous finger motion.

Stainless Piston & Bushing  
Reduces wear and greatly  
increases cycle life

Quad rings & O-rings  
High cycle life. Buna-N standard with  
optional Viton (-V Option)

Engineered Surface Coating  
Anti-Friction and Anti-Wear on fingers

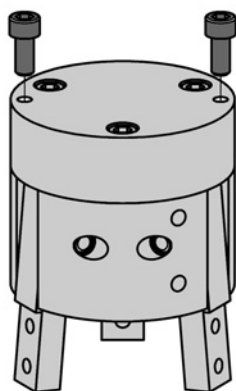
**DESIGNED - MANUFACTURED - ASSEMBLED IN THE USA**



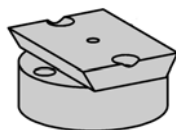
## MOUNTING INFORMATION

**Mounts and operates in any orientation**

### MAIN BODY

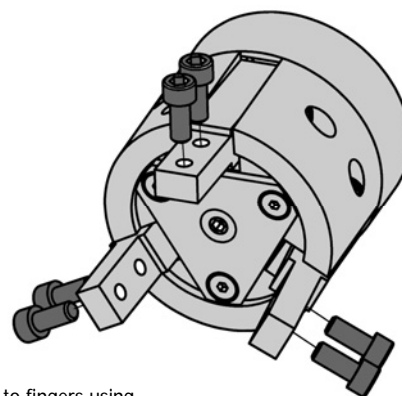


Mount up to Main body utilizing Tapped holes located on top cap



Additional Dovetail top cap available for  
further mounting flexibility. See product  
pages for more information

### TOOLING



Mount tooling to fingers using  
Tapped holes or use the next  
size smaller screw and mount  
thru finger

Key tooling to precision ground  
fingers for positive location.



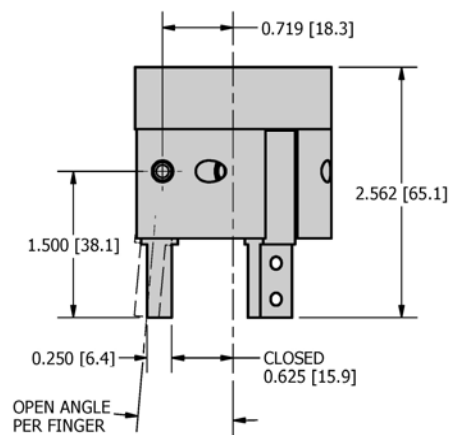
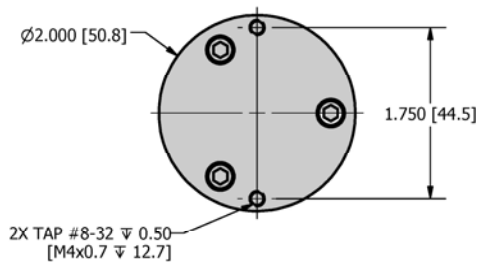
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MANUFACTURING CO.

## DURA-GRIP

THREE FINGER  
ANGULAR GRIPPER

**GH-30A**

### DIMENSIONAL DRAWING

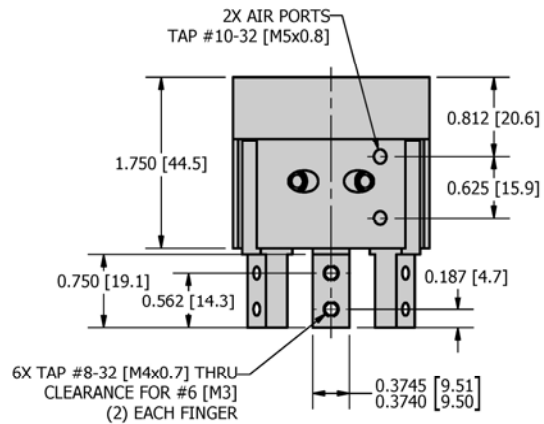


STANDARD ANGLE (SHOWN) - 5°  
(-W OPTION) WIDE ANGLE - 10°  
(-HD OPTION) HEAVY DUTY - 3.5°

#### SPECIFICATIONS

	GH-30A	MGH-30A
Standard Grip Force @ 100 psi [7 bar] *	75 lbf	330 N
Standard Stroke	5° per finger (10° total)	
Base Weight	0.75 lbs	0.34 kg
Unit Displacement (grip and release)	0.135 in <sup>3</sup>	2.21 cm <sup>3</sup>
Cylinder Bore Diameter	0.875 in	22.2 mm
Actuation Time (no load)	0.15 sec	

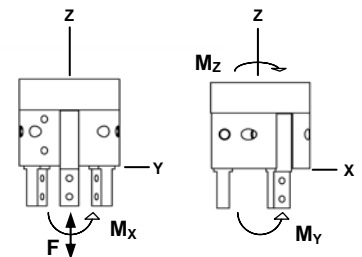
\* Loading between top mounting holes in fingers



#### LOADING

	GH-30A		MGH-30A	
	Static	Dynamic	Static	Dynamic
Max Force F	75 lbf	25 lbf	333 N	25 N
Max Moment M <sub>x</sub> , M <sub>z</sub>	100 lbf-in	35 lbf-in	11.3 N-m	4.0 N-m
Max Moment M <sub>y</sub>	150 lbf-in	50 lbf-in	16.9 N-m	5.6 N-m

NOTE: Loading based on utilization of all fingers



### HOW TO ORDER : BASIC UNIT

METRIC TOP CAP STYLE FINGER OPTIONS SEALS  
**M** **GH-30A** -  -  - **V**  
SPRING ASSIST

METRIC M

TOP CAP 30 - Standard Flat (shown above)  
31 - 60°Dovetail

FINGER OPTIONS W - Wide Angle - 10° per finger  
HD - Heavy Duty - 3.5° per finger, High Grip Force

SPRING ASSIST XSO - Spring Open (-W or -HD) Not available with Spring Assist options  
XSC - Spring Closed Note: Spring assist option affects finger open angle, see Additional information section for more detail

SEALS V - Viton (standard Buna - N)

**CUSTOM DESIGNS ALWAYS AVAILABLE  
PLEASE CONTACT US FOR INFORMATION**

**SAMPLE ORDER: GH-30A-W**

Ex) GH-30A with Wide Angle option

Proximity Sensor Available - Consult Factory for more information



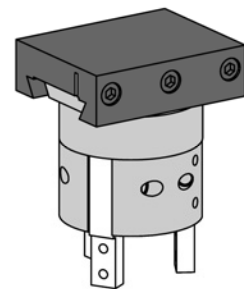
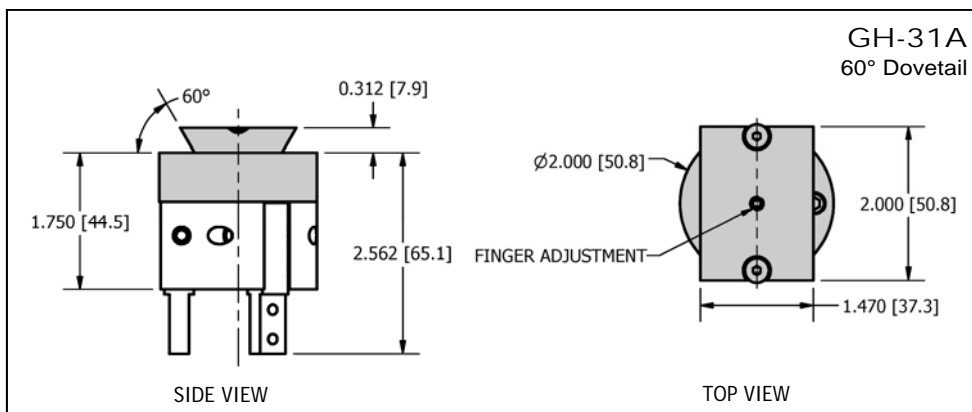
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## DURA-GRIP

THREE FINGER  
ANGULAR GRIPPER

**GH-30A**

### ADDITIONAL MOUNTING INFORMATION



See **DURA-GRIP ACCESSORIES** Page  
for the DP-21 Universal Dovetail receiver

Page  
**1-3.1**

### ADDITIONAL INFORMATION

#### GRIP FORCE

The maximum capacity of the gripper is a function of many variables and will change based on the shape of the part, surface finish, accelerations during transfer, the shape of the finger tooling, and air pressures. Use the Grip force calculated below *and* the application variables to determine the proper sizing of the gripper.

The Grip force - **F** is defined as the maximum force that can be applied to the fingers without moving. The force is analytically determined and will vary slightly with friction. This force is calculated when the fingers are parallel.

When using the Spring Assist option see the section below for proper factors when calculating grip force.

$$\text{English GRIP FORCE - F (lbf)} = \frac{(P_{\text{AIR}} (\text{psi}) \times G_F) + S_F}{D (\text{in})}$$

$$\text{Metric GRIP FORCE - F (N)} = \frac{(P_{\text{AIR}} (\text{bar}) \times G_F) + S_F}{D (\text{mm})}$$

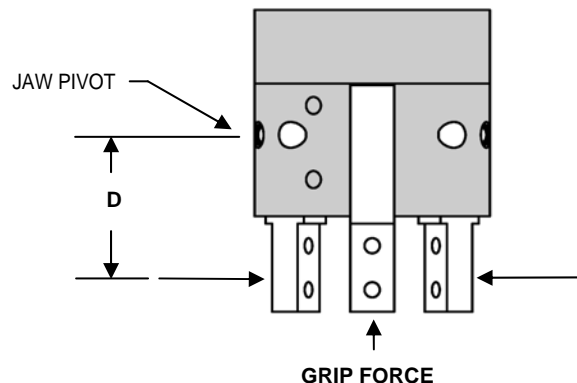
**P<sub>AIR</sub>** = Air Pressure

**D** = Distance to pivot (see diagram)

**G<sub>F</sub>** = Grip Factor (see chart)

**S<sub>F</sub>** = Spring Factor (see chart below)

GRIP FACTOR $G_F$		GH-30A	MGH-30A
Standard Unit	EXTERNAL	<b>1.40</b>	<b>2290</b>
	INTERNAL	<b>2.09</b>	<b>3416</b>
Heavy Duty (-HD)	EXTERNAL	<b>2.84</b>	<b>4643</b>
	INTERNAL	<b>1.90</b>	<b>3113</b>



It is recommended that finger tooling be designed to encompass the part as the grip force requirement is lower. If the grip cannot be performed by encompassing the part and a friction grip must be performed, always use a factor of safety of at least 4.

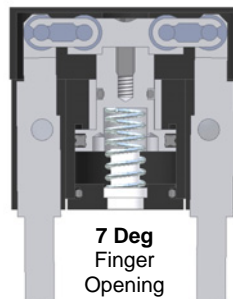
#### SPRING ASSIST OPTION (-XSO OPTION) Assist OPEN (-XSC OPTION) Assist CLOSE

The Spring Assist option provides the following benefits:

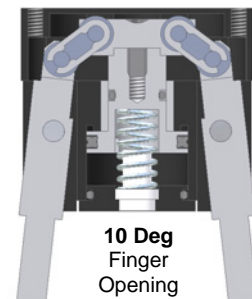
- Provides additional grip force
- Allows the gripper to function in a single acting manner  
ex) Air open - Spring close or Spring open - Air close
- Clear gripped part when air is lost

SPRING FACTORS *		GH-30A	MGH-30A
EXTERNAL GRIP (-XSC)	<b>G<sub>F</sub></b>	<b>2.84</b>	<b>4643</b>
	<b>S<sub>F</sub></b>	<b>39.8</b>	<b>4538</b>
INTERNAL GRIP (-XSO)	<b>G<sub>F</sub></b>	<b>2.09</b>	<b>3416</b>
	<b>S<sub>F</sub></b>	<b>54.1</b>	<b>6169</b>

\* You must use both the  $G_F$  and  $S_F$  list above when making grip force calculations



**ASSIST CLOSED (-XSC OPTION)**



**ASSIST OPEN (-XSO OPTION)**

NOTE: 1) Bottom finger Adjustment screw is not available with the Spring Assist Option. 2) (-XSO) will not toggle lock in the closed position



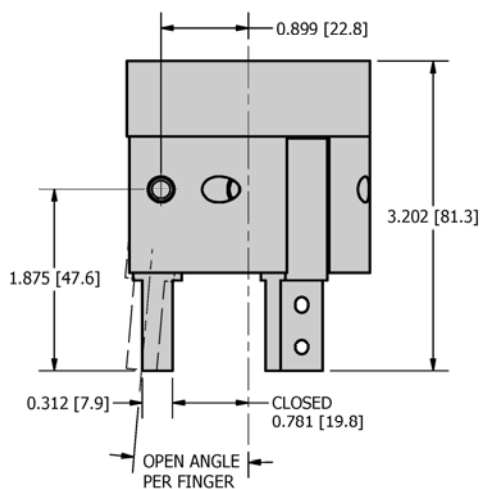
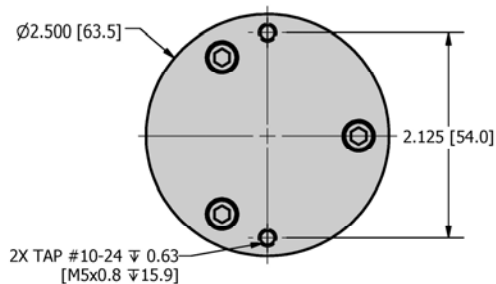
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## DURA-GRIP

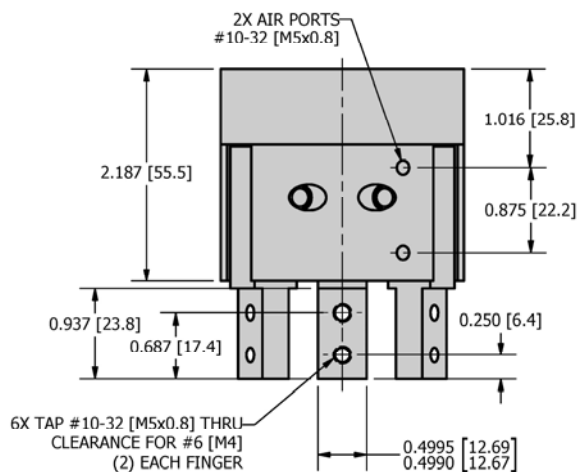
THREE FINGER  
ANGULAR GRIPPER

**GH-300A**

### DIMENSIONAL DRAWING



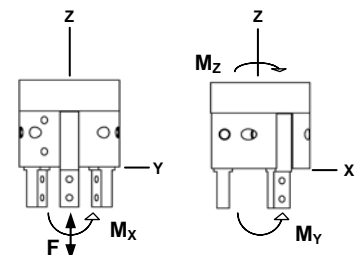
STANDARD ANGLE (SHOWN) - 5°  
(-W OPTION) WIDE ANGLE - 10°  
(-HD OPTION) HEAVY DUTY - 3.5°



### LOADING

	GH-300A		MGH-300A	
	Static	Dynamic	Static	Dynamic
Max Force <b>F</b>	150 lbf	50 lbf	667 N	222 N
Max Moment <b>M<sub>x</sub>, M<sub>z</sub></b>	200 lbf-in	60 lbf-in	22.6 N-m	6.8 N-m
Max Moment <b>M<sub>y</sub></b>	300 lbf-in	75 lbf-in	34 N-m	8.5 N-m

NOTE: Loading based on utilization of all fingers



### HOW TO ORDER : BASIC UNIT

METRIC TOP CAP STYLE FINGER OPTIONS SEALS  
**M** **GH-300A** -  -  - **V**  
 SPRING ASSIST

METRIC M

TOP CAP 300 - Standard Flat (shown above)  
301 - 60° Dovetail

FINGER OPTIONS W - Wide Angle - 10° per finger  
HD - Heavy Duty - 3.5° per finger, High Grip Force

SPRING ASSIST XSO - Spring Open (-W or -HD Option) Not available with Spring Assist options  
XSC - Spring Closed Note: Spring assist option affects finger open angle, see Additional information section for more detail

SEALS V - Viton (standard Buna - N)

**CUSTOM DESIGNS ALWAYS AVAILABLE  
PLEASE CONTACT US FOR INFORMATION**

**SAMPLE ORDER: GH-300A-V**

Ex) GH-300A with Viton Seals

Proximity Sensor Available - Consult Factory for more information

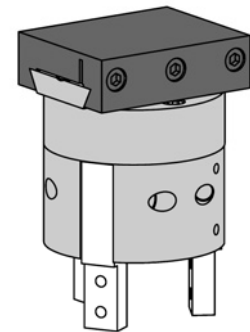
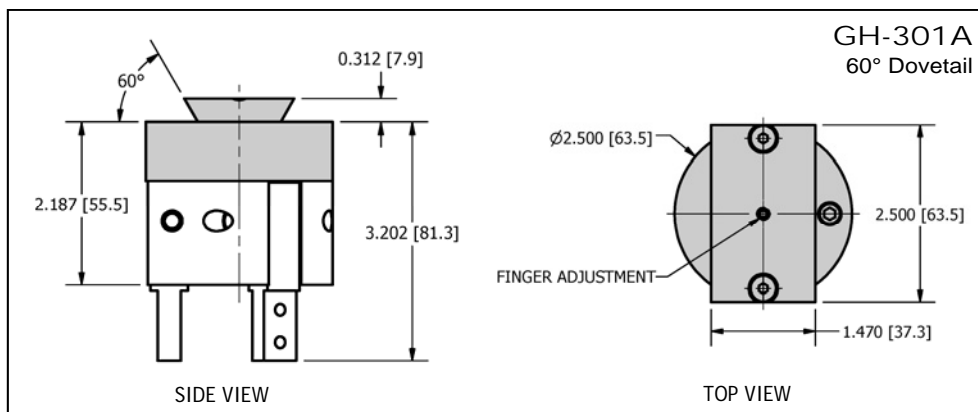


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**DURA-GRIP**  
THREE FINGER  
ANGULAR GRIPPER

**GH-300A**

## ADDITIONAL MOUNTING INFORMATION



See **DURA-GRIP ACCESSORIES** Page  
for the **DP-21** Universal Dovetail receiver Page 1-3.1

## ADDITIONAL INFORMATION

### GRIP FORCE

The maximum capacity of the gripper is a function of many variables and will change based on the shape of the part, surface finish, accelerations during transfer, the shape of the finger tooling, and air pressures. Use the Grip force calculated below *and* the application variables to determine the proper sizing of the gripper.

The Grip force - **F** is defined as the maximum force that can be applied to the fingers without moving. The force is analytically determined and will vary slightly with friction. This force is calculated when the fingers are parallel.

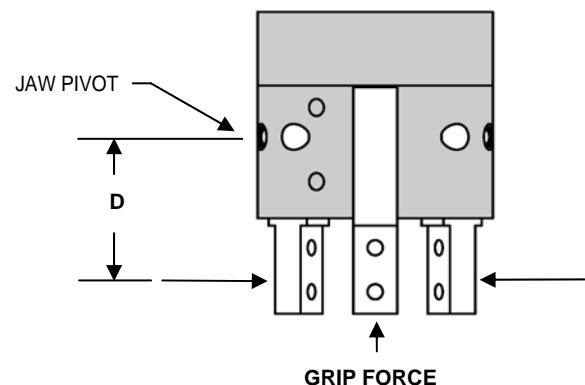
When using the Spring Assist option see the section below for proper factors when calculating grip force.

$$\text{English GRIP FORCE - F (lbf)} = \frac{(P_{\text{AIR}} (\text{psi}) \times G_F) + S_F}{D (\text{in})}$$

$$\text{Metric GRIP FORCE - F (N)} = \frac{(P_{\text{AIR}} (\text{bar}) \times G_F) + S_F}{D (\text{mm})}$$

**P<sub>AIR</sub>** = Air Pressure  
**D** = Distance to pivot (see diagram)  
**G<sub>F</sub>** = Grip Factor (see chart)  
**S<sub>F</sub>** = Spring Factor (see chart below)

GRIP FACTOR <b>G<sub>F</sub></b>		GH-300A	MGH-300A
Standard Unit	EXTERNAL	3.48	5688
	INTERNAL	4.32	7061
Heavy Duty (-HD)	EXTERNAL	5.84	9554
	INTERNAL	4.71	7696



It is recommended that finger tooling be designed to encompass the part as the grip force requirement is lower. If the grip cannot be performed by encompassing the part and a friction grip must be performed, always use a factor of safety of at least 4.

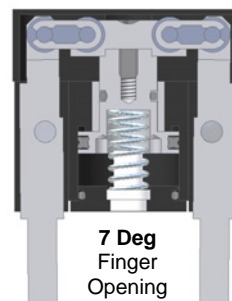
### SPRING ASSIST OPTION (-XSO OPTION) Assist OPEN (-XSC OPTION) Assist CLOSE

The Spring Assist option provides the following benefits:

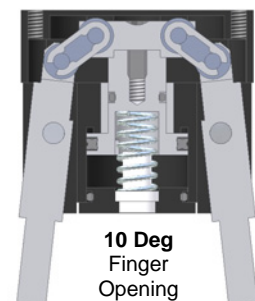
- Provides additional grip force
- Allows the gripper to function in a single acting manner  
ex) Air open - Spring close or Spring open - Air close
- Clear gripped part when air is lost

SPRING FACTORS *		GH-300A	MGH-300A
EXTERNAL GRIP (-XSC)	<b>G<sub>F</sub></b>	5.84	9554
	<b>S<sub>F</sub></b>	49.4	5632
INTERNAL GRIP (-XSO)	<b>G<sub>F</sub></b>	4.32	7061
	<b>S<sub>F</sub></b>	66.8	7621

\* You must use both the **G<sub>F</sub>** and **S<sub>F</sub>** list above when making grip force calculations



ASSIST CLOSED (-XSC OPTION)



ASSIST OPEN (-XSO OPTION)

NOTE: 1) Bottom finger Adjustment screw is not available with the Spring Assist Option. 2) (-XSO) will not toggle lock in the closed position



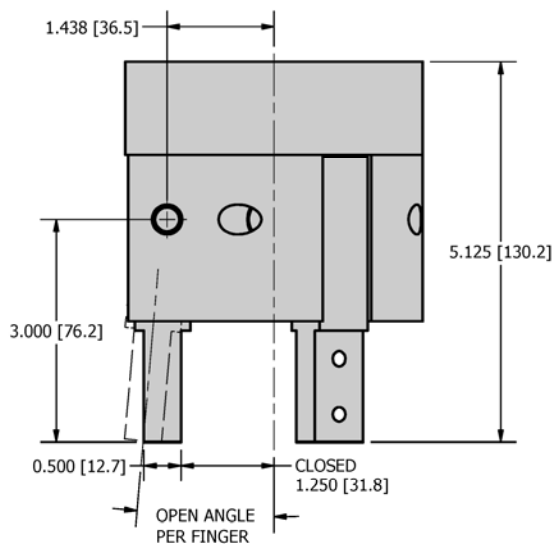
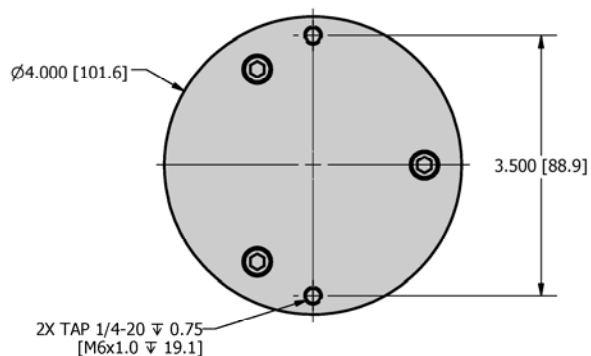
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MANUFACTURING CO.

## DURA-GRIP

THREE FINGER  
ANGULAR GRIPPER

**GH-3000A**

### DIMENSIONAL DRAWING

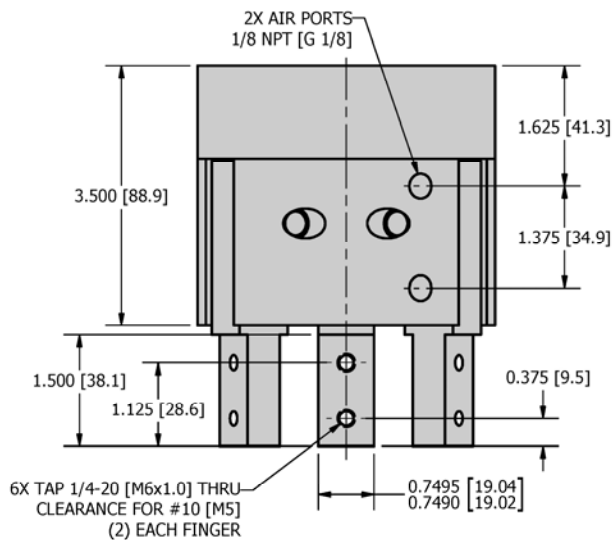


STANDARD ANGLE (SHOWN) - 5°  
(-W OPTION) WIDE ANGLE - 10°  
(-HD OPTION) HEAVY DUTY - 3.5°

### SPECIFICATIONS

	GH-3000A	MGH-3000A
Standard Grip Force @ 100 psi [7 bar] *	287 lbf	1275 N
Standard Stroke	5° per finger (10° total)	
Base Weight	5.63 lbs	2.55 kg
Unit Displacement (grip and release)	1.075 in <sup>3</sup>	17.62 cm <sup>3</sup>
Cylinder Bore Diameter	1.750 in	44.5 mm
Actuation Time (no load)	0.30 sec	

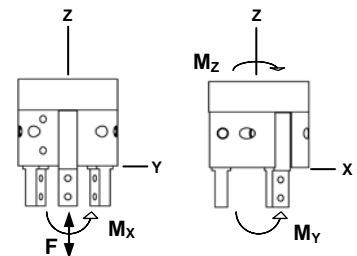
\* Loading between top mounting holes in fingers



### LOADING

	GH-3000A		MGH-3000A	
	Static	Dynamic	Static	Dynamic
Max Force <b>F</b>	250 lbf	80 lbf	1111 N	355 N
Max Moment <b>M<sub>x</sub>, M<sub>z</sub></b>	250 lbf-in	75 lbf-in	28.2 N-m	8.5 N-m
Max Moment <b>M<sub>y</sub></b>	350 lbf-in	90 lbf-in	39.5 N-m	10.2 N-m

NOTE: Loading based on utilization of all fingers



### HOW TO ORDER : BASIC UNIT

METRIC

BASE MODEL

FINGER OPTIONS

**M**

**GH-3000A**

-

**V**

SEALS

METRIC M

FINGER OPTIONS W - Wide Angle - 10° per finger  
HD - Heavy Duty - 3.5° per finger, High Grip Force

SEALS V - Viton (standard Buna - N)

**CUSTOM DESIGNS ALWAYS AVAILABLE**  
**PLEASE CONTACT US FOR INFORMATION**

**SAMPLE ORDER: GH-3000A-HD**

Ex) GH-3000A with Heavy Duty option

Proximity Sensor Available - Consult Factory for more information





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**DURA-GRIP**

THREE FINGER  
ANGULAR GRIPPER

**GH-3000A** 

## ADDITIONAL INFORMATION

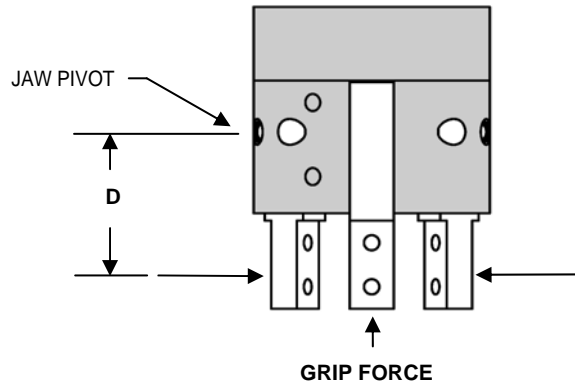
### GRIP FORCE

The maximum capacity of the gripper is a function of many variables and will change based on the shape of the part, surface finish, accelerations during transfer, the shape of the finger tooling, and air pressures. Use the Grip force calculated below *and* the application variables to determine the proper sizing of the gripper.

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It is recommended that finger tooling be designed to encompass the part as the grip force requirement is lower. If the grip cannot be performed by encompassing the part and a friction grip must be performed, always use a factor of safety of at least 4.



<b>GRIP FACTOR <math>G_F</math></b>		GH-3000A	MGH-3000A
Standard Unit	EXTERNAL	<b>10.78</b>	<b>17628</b>
	INTERNAL	<b>13.38</b>	<b>21887</b>
Heavy Duty (-HD)	EXTERNAL	<b>18.09</b>	<b>29584</b>
	INTERNAL	<b>14.57</b>	<b>23827</b>

English **GRIP FORCE - F (lbf) =** 
$$\frac{(P_{AIR} \text{ (psi)} \times G_F)}{D \text{ (in)}}$$

Metric **GRIP FORCE - F (N) =** 
$$\frac{(P_{AIR} \text{ (bar)} \times G_F)}{D \text{ (mm)}}$$

**P<sub>AIR</sub>** = Air Pressure

**D** = Distance to pivot (see diagram)

**G<sub>F</sub>** = Grip Factor (see chart)



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MANUFACTURING CO.

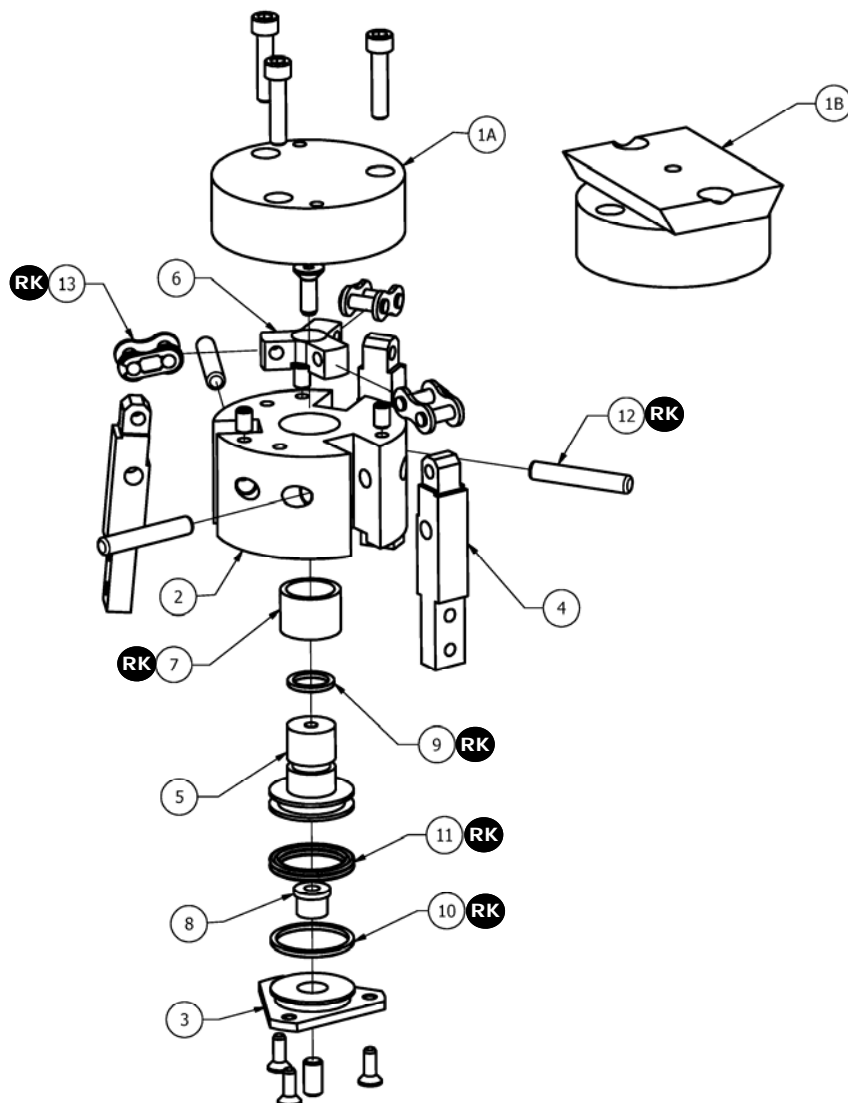
# DURA-GRIP GH-30/300/3000

THREE FINGER  
ANGULAR GRIPPER



**"A" Series**

EXPLODED VIEW



## PARTS LIST

## HOW TO ORDER PARTS

ITEM	REQ'D	NAME	GH-30A	GH-300A	GH-3000A	OPTIONS
1A	1	Flat Top Cap	GH-30A-1	GH-300A-1	GH-3000A-1	-W <sup>1</sup> -HD <sup>2</sup>
1B	1	Dovetail Top Cap	GH-31A-1	GH-301A-1		-W <sup>1</sup> -HD <sup>2</sup>
2	1	Main Body	GH-30A-2	GH-300A-2	GH-3000A-2	-W <sup>1</sup>
3	1	Bottom Cap	GH-30A-3	GH-300A-3	GH-3000A-3	-XSO <sup>3</sup> -XSC <sup>3</sup>
4	3	Finger	GH-20A-4	GH-200A-4	GH-2000A-4	-HD <sup>2</sup>
5	1	Piston	GH-20A-5	GH-200A-5	GH-2000A-5	-W <sup>1</sup> -XSO <sup>3</sup> -XSC <sup>3</sup>
6	1	Connector	GH-30A-6	GH-300A-6	GH-3000A-6	-W <sup>1</sup>
7	1	Piston Bushing *	GH-20A-7	GH-200A-7	GH-2000A-7	-W <sup>1</sup>
8	1	Stop Bushing	GH-20A-8	GH-200A-8	GH-2000A-8	-XSO <sup>4</sup> -XSC <sup>4</sup>
9	1	O-ring *	ORG-012			-V <sup>7</sup>
10	1	Bottom Cap O-ring *	ORG-018	ORG-023	ORG-030	-V <sup>7</sup>
11	1	Piston Seal *	QDG-150	ORG-120	ORG-222	-V <sup>7</sup>
12	3	Pivot Pin *	FPP-200	FPP-300	FPP-400	
13	3	Chain Link Assembly *	CHL-035	CHL-041	CHL-060	
RK	1	Repair Kit * #	GH-30A-RK	GH-300A-RK	GH-3000A-RK	-W <sup>1</sup> -V <sup>7</sup>

METRIC

PART NUMBER

M

OPTIONS

**SAMPLE ORDER: GH-30A-1**

Ex GH-30A Flat Top Cap

**OPTIONS** (see product pages for information)

<sup>1</sup> - W = Wide Angle

<sup>2</sup> - HD = Heavy Duty

<sup>3</sup> - XSO / -XSC = Spring Assist Open or Close

<sup>4</sup> - V = Viton

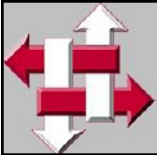
### NOTES

\* - Metric code not required

# - Repair Kits include req'd qty of parts marked with RK

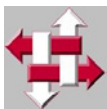
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TECH NOTES



### GH-90 Series

**DURA-GRIP GH-90** Series of Part Placement Devices is designed to provide a low cost 180° gripping unit for use on transfer mechanisms. These air operated units grip parts internally or externally offering the designer a wide latitude in finger tooling arrangements. All units are shipped completely assembled, ready for mounting and attaching tooling.

#### QUALITY CONSTRUCTION

**DURA-GRIP GH-90** Series is ruggedly constructed with a minimum of moving parts and utilizes the same field proven toggle mechanism found in our other angular grippers. The body is anodized high strength aluminum, fingers are hardened tool steel. Both finger opening and closing position can be adjusted on the unit. The series can be mounted in any plane with standard mounting holes on top cap or with optional dovetail top cap. Unit can be ordered sensor ready for use with magnetic sensors.

Use the GH-90 Angular Grippers in some of the following applications or wherever you need durable and precise part placement with 180° finger travel.

- 180° finger travel allows the gripper to swing by workpiece without a linear return stroke
- When used with a rotary table, parts can be handled without having to retract the gripper. When the fingers are in the open position the table can be indexed without contact.

180° FINGER STROKE

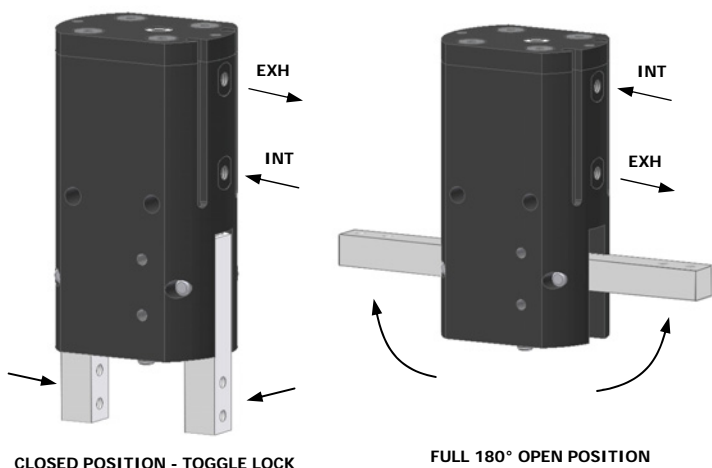
GH-90



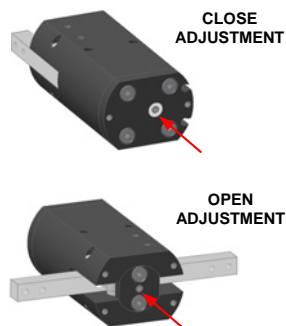
#### TECHNICAL SPECIFICATION

Pneumatic Specifications	ENGLISH	METRIC
Pressure Range	40-100 psi	3-7 bar
Cylinder Type	Double Acting	
Dynamic Seals	Buna-N	
Required Valves	4-way, 2 position	
<b>Temperature Range</b>		
Buna-N Seals (standard)	-30 to 180 F	-35 to 80 C
Viton Seals (-V option)	-20 to 300 F	-30 to 150 C

#### OPERATING PRINCIPLES - STANDARD UNIT



- Air pressure drives double acting piston.
- Piston drives fingers through double toggle mechanism producing synchronized angular motion.
- Gripper is capable of external gripping with locking and internal gripping without locking



Finger closed and open position can be adjusted with set screw in the bottom and top cap of the unit.

Unit ships with toggle lock disabled, set screw must be backed out to enable locking in the closed position. Unit can be run with the toggle lock disabled.



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## DURA-GRIP

180° FINGER STROKE  
ANGULAR GRIPPER

**GH-90**

### PRODUCT FEATURES

- Aircraft Grade Aluminum  
2024 with black anodize
- Simple and Highly Durable  
Time tested, field approved design
- High Grip Force  
High gripping force-to-weight ratio

**Failsafe Toggle Mechanism**  
Fingers lock at closed position and will not release until air is supplied again. Mechanism produces synchronous finger motion.

**Stainless Bushing**  
Reduces wear and greatly increases cycle life

**Precision Components**  
Precision ground and hardened fingers for accurate tooling location

**Fully Rebuildable**  
Fully field serviceable with factory repair kits

**Adjustable Finger Stops**  
On open and closed finger positions for precise and accurate finger stroke control

**Optional Magnetic Sensors**  
Order unit Sensor Ready (-RM). Sensor sold separately

**O-ring Seals**  
High cycle life. Buna-N standard with optional Viton (-V Option)

**Engineered Surface Coating**  
Anti-Friction and Anti-Wear on fingers

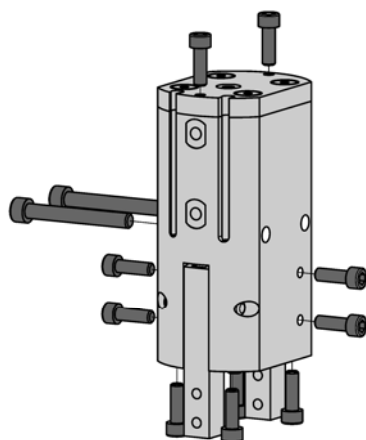
**DESIGNED - MANUFACTURED - ASSEMBLED IN THE USA**



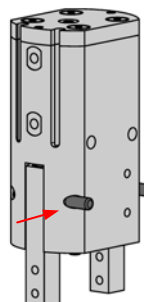
### MOUNTING INFORMATION

**Mounts and operates in any orientation**

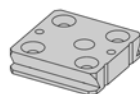
#### MAIN BODY



Mount up to Main body utilizing Tapped holes located on back, front, and top and bottom of unit. Mount thru unit with provided Clearance holes.

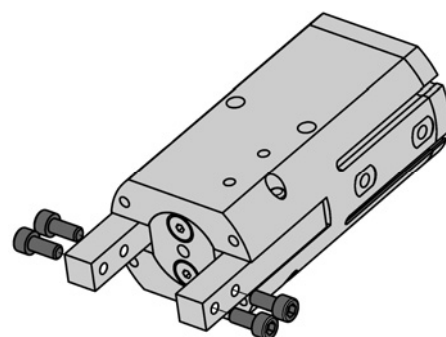


**(-SP) Extended Pivot Pins**  
option provides precision Dowel pins on the back side of the unit for positive location



Dovetail top cap available. See product pages for more information

#### TOOLING



Mount tooling to fingers using Tapped holes or use the next size smaller screw and mount thru finger

Key tooling to precision ground fingers for positive location.



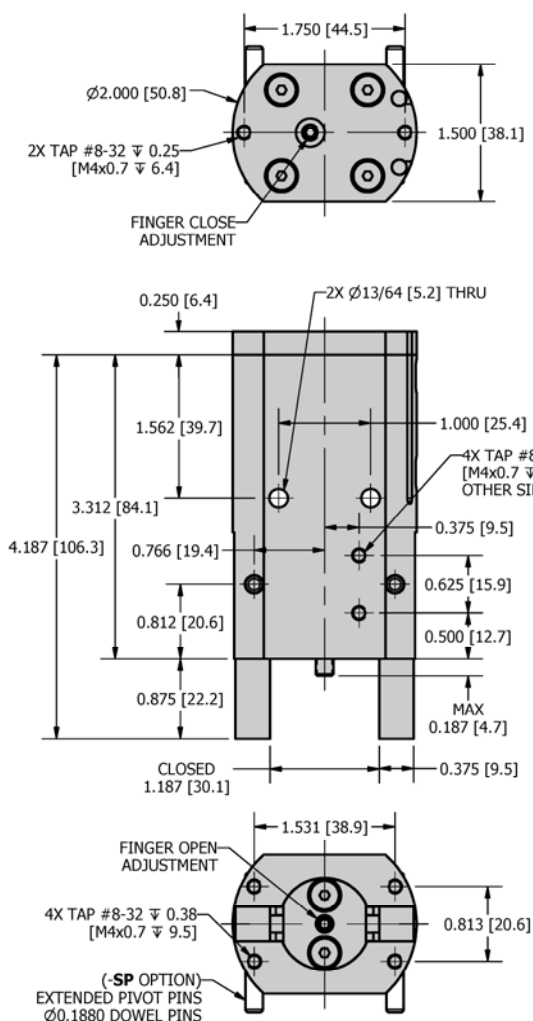
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## DURA-GRIP

180° FINGER STROKE  
ANGULAR GRIPPER

**GH-90**

### DIMENSIONAL DRAWING

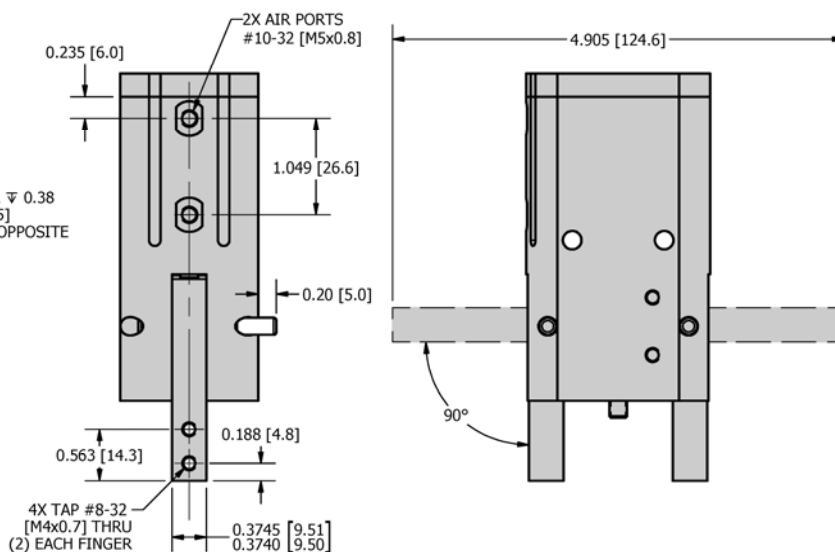


### SPECIFICATIONS

Standard Grip Force @ 100 psi [7 bar] \*  
 Standard Stroke  
 Base Weight  
 Unit Displacement (grip and release)  
 Cylinder Bore Diameter  
 Actuation Time (no load)

GH-90	MGH-90
63 lbf	280 N
90° per finger (180° total)	
1.13 lbs	0.51 kg
1.96 in <sup>3</sup>	33 cm <sup>3</sup>
1.125 in	28.6 mm
0.30 sec	

\* Loading between top mounting holes in fingers



The use of flow controls is highly recommended as excessive finger speed will cause impacting which can damage the unit and decrease service life.

### HOW TO ORDER : BASIC UNIT

### ACCESSORIES (order separately)

METRIC TOP CAP STYLE SENSORS  
**M** **GH-90** - **SP** - **RM** - **V**  
 EXTENDED PINS SEALS

METRIC M

TOP CAP 90 - Standard Flat (shown above)  
 91 - 60°Dovetail

EXTENDED PINS SP - Extended Pivot Pin for dowel pin mounting

SENSORS RM - Magnetic Sensor Ready  
 Includes Sensor slots and Piston Magnet. Sensors sold separately - see Magnetic Sensors

SEALS V - Viton (standard Buna - N)

#### MAGNETIC SENSOR KITS \* (Round track mounted)

RSK-N - Magnetic Sensor NPN w/ quick disconnect Kit  
 RSK-P - Magnetic Sensor PNP w/ quick disconnect Kit

\* Requires sensor magnets (-RM). Sensor kits include (2) sensors and (2) 5 meter cables.

#### MAGNETIC SENSORS \* (Round track mounted)

RS-N - Magnetic Sensor NPN w/ quick disconnect  
 RS-P - Magnetic Sensor PNP w/ quick disconnect

\* Requires sensor magnets (-RM). Includes (1) sensor.

#### SENSOR CABLE

SENCAB-5 - Quick Disconnect PUR Cable 5M Length

**SAMPLE ORDER: GH-90-RM**

Ex) GH-90 with Sensor Ready option

**CUSTOM DESIGNS ALWAYS AVAILABLE  
 PLEASE CONTACT US FOR INFORMATION**





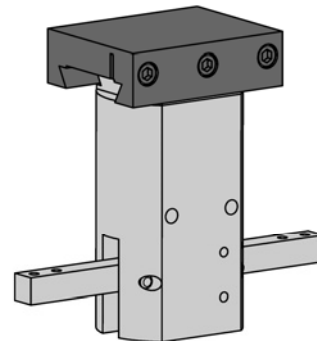
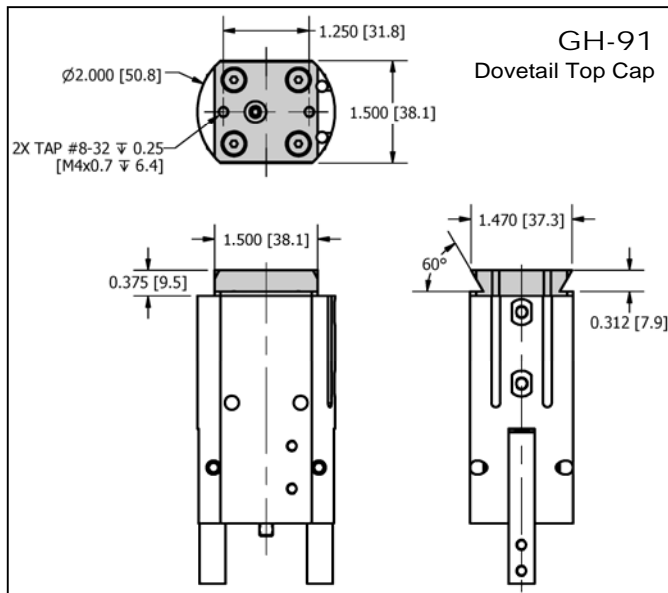
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## DURA-GRIP

180° FINGER STROKE  
ANGULAR GRIPPER

**GH-90**

### ADDITIONAL MOUNTING INFORMATION



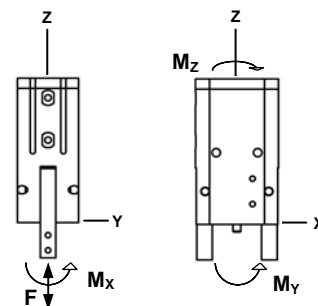
See **DURA-GRIP ACCESSORIES** Page  
for the **DP-21** Universal Dovetail receiver

Page  
**1-3.1**

### ADDITIONAL INFORMATION

LOADING	GH-90		MGH-90	
	Static	Dynamic	Static	Dynamic
Max Force <b>F</b>	75 lbf	25 lbf	333 N	111 N
Max Moment <b>M<sub>x</sub>, M<sub>z</sub></b>	100 lbf-in	35 lbf-in	11.3 N-m	4.0 N-m
Max Moment <b>M<sub>y</sub></b>	150 lbf-in	50 lbf-in	16.9 N-m	5.6 N-m

NOTE: Loading based on utilization of both fingers. When using in application with high moment loads utilize thru holes for mounting body.



### GRIP FORCE

The maximum capacity of the gripper is a function of many variables and will change based on the shape of the part, surface finish, accelerations during transfer, the shape of the finger tooling, and air pressures. Use the Grip force calculated below *and* the application variables to determine the proper sizing of the gripper.

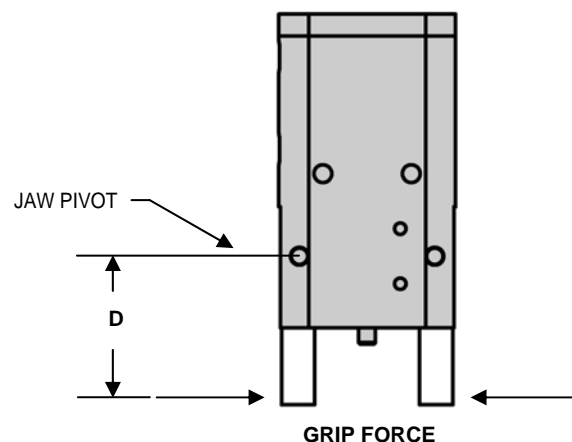
The Grip force - **F** is defined as the maximum force that can be applied to the fingers without moving. The force is analytically determined and will vary slightly with friction. This force is calculated when the fingers are parallel.

$$\text{English GRIP FORCE - F (lbf)} = \frac{(P_{\text{AIR}} (\text{PSI}) \times G_F)}{D (\text{in})}$$

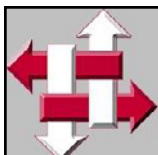
$$\text{Metric GRIP FORCE - F (N)} = \frac{(P_{\text{AIR}} (\text{bar}) \times G_F)}{D (\text{mm})}$$

**P<sub>AIR</sub>** = Air Pressure  
**D** = Distance to pivot (see diagram)  
**G<sub>F</sub>** = Grip Factor (see chart)

GRIP FACTOR <b>G<sub>F</sub></b>		GH-90	MGH-90
Standard Unit	EXTERNAL	1.42	2320
	INTERNAL	1.60	2621



It is recommended that finger tooling be designed to encompass the part as the grip force requirement is lower. If the grip cannot be performed by encompassing the part and a friction grip must be performed, always use a factor of safety of at least 4.



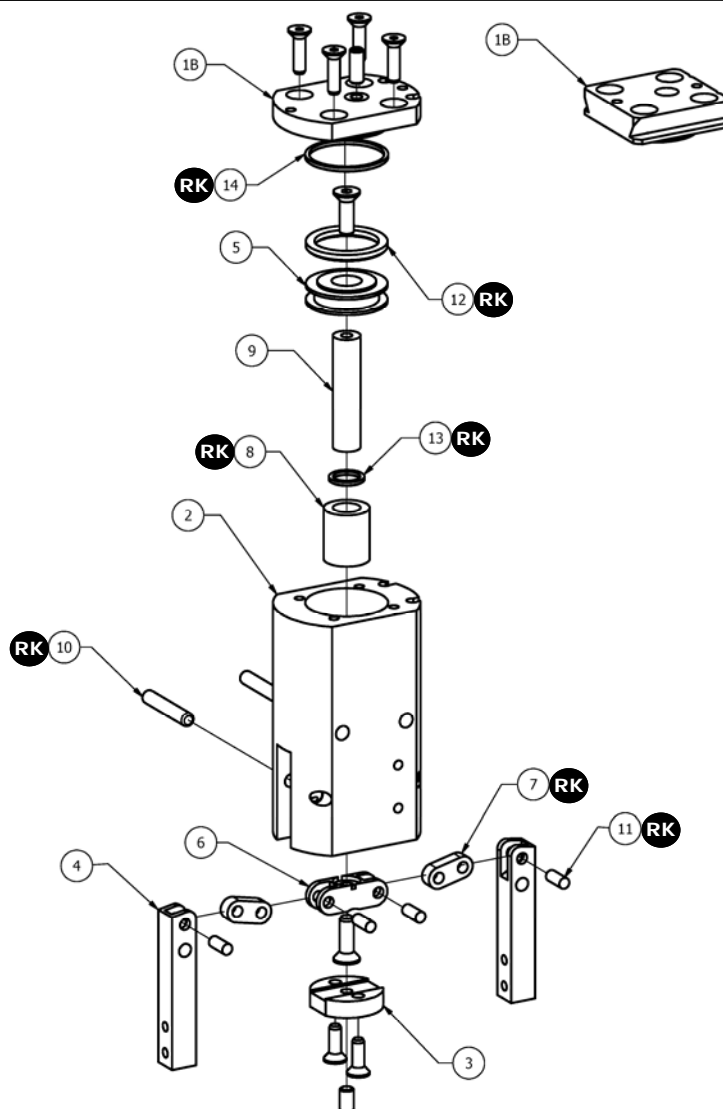
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## DURA-GRIP

180° FINGER STROKE  
ANGULAR GRIPPER

GH-90

EXPLODED VIEW



### PARTS LIST

ITEM	REQ'D	NAME	GH-90	OPTIONS
1A	1	Flat Top Cap (-90 style)	PH-51-1	-RM <sup>2</sup>
1B	1	Dovetail Top Cap (-91 style)	PH-50-1	-RM <sup>2</sup>
2	1	Main Body	GH-90-2	-RM <sup>2</sup>
3	1	Bottom Cap	GH-90-3	
4	2	Finger	GH-90-4	
5	1	Piston	GH-90-5	-RM <sup>2</sup>
6	1	Connector	GH-90-6	
7	2	Link *	GH-90-7	
8	1	Piston Bushing *	GH-90-8	
9	1	Piston Shank	GH-90-9	
10	2	Finger Pivot Pin *	FPP-200	-SP <sup>1</sup>
11	4	Link Pivot Pin *	FPP-50	
12	1	Piston Seal *	ORG-212	-V <sup>3</sup>
13	1	Shank Seal *	ORG-012	-V <sup>3</sup>
14	1	Top Cap Seal *	ORG-022	-V <sup>3</sup>
RK	1	Repair Kit * #	GH-90-RK	-SP <sup>1</sup> -V <sup>3</sup>

### HOW TO ORDER PARTS

METRIC PART NUMBER  
**M**  -   
OPTIONS

**SAMPLE ORDER: MGH-90-2-RM**

Ex) Metric GH-90 Main Body with Sensor Ready Option

OPTIONS (see product pages for information)

<sup>1</sup> - SP = Extended Pivot Pins

<sup>2</sup> - RM = Magnetic Sensor Ready

<sup>3</sup> - V = Viton

#### NOTES

\* - Metric code not required

# - Repair Kits include req'd qty of parts marked with RK

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TECH NOTES



### RB-94 - STACK PACK

**DURA-GRIP RB-94** Part Placement Device is designed to provide a low cost, thin profile, stackable gripping unit for use on transfer mechanisms. The thin profile allows close center distance mounting for multiple head stacking as required in racking/deracking, palletizing/depalletizing or other similar applications. This air operated unit grips parts internally or externally offering the designer a wide latitude in finger tooling arrangements. All units are shipped completely assembled, ready for mounting and attaching tooling.

#### QUALITY CONSTRUCTION

**DURA-GRIP RB-94** is ruggedly constructed with a minimum of moving parts and utilizes the same field proven toggle mechanism found in our other angular grippers. The body is anodized high strength aluminum, fingers are hardened tool steel. Both finger opening and closing positions can be adjusted on the unit. The unit can be mounted in any plane with standard mounting holes or with integral dovetail.

Use the RB-94 Angular Gripper in some of the following applications or wherever you need durable and precise part placement with a thin profile

- Racking / Deracking operations
- Palletizing / Depalletizing operations
- Small workpiece center to center distance

STACKABLE HEAD

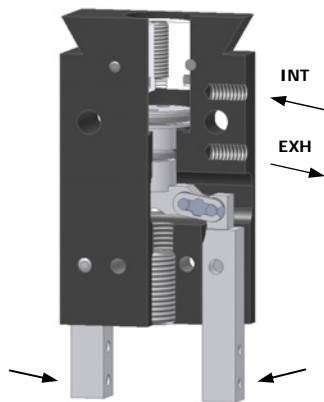
**RB-94**



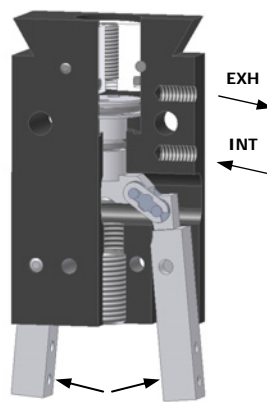
#### TECHNICAL SPECIFICATION

Pneumatic Specifications	ENGLISH	METRIC
Pressure Range	40-100 psi	3-7 bar
Cylinder Type	Double Acting	
Dynamic Seals	Buna-N	
Required Valves	4-way, 2 position	
<b>Temperature Range</b>		
Buna-N Seals (standard)	-30 to 180 F	-35 to 80 C
Viton Seals (-V option)	-20 to 300 F	-30 to 150 C

#### OPERATING PRINCIPLES - STANDARD UNIT

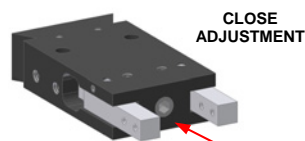


CLOSED POSITION - TOGGLE LOCK

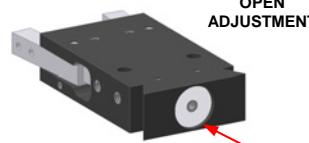


OPEN POSITION

- Air pressure drives double acting piston.
- Piston drives fingers through double toggle mechanism producing synchronized angular motion.
- Gripper is capable of external gripping with locking and internal gripping without locking



CLOSE ADJUSTMENT



OPEN ADJUSTMENT

Finger closed and open positions can be adjusted with set screw in the bottom and top cap of the unit.

Unit ships with toggle lock disabled, set screw must be backed out to enable locking in the closed position. Unit can be run with the toggle lock disabled.



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## DURA-GRIP

STACKABLE  
ANGULAR GRIPPER

**RB-94**

### PRODUCT FEATURES

- Aircraft Grade Aluminum  
2024 with black anodize
- Simple and Highly Durable  
Time tested, field approved design
- High Grip Force  
High gripping force-to-weight ratio

#### Stackable Design

##### Multiple Mounting Features

Tapped and Clearance holes for mounting the unit and additional stripper tooling. Integral Dovetail mounting on body

##### Fully Rebuildable

Fully field serviceable with factory repair kits

##### Precision Components

Precision ground and hardened fingers for accurate tooling location

##### Adjustable Finger Stops

On open and closed finger positions for precise and accurate finger stroke control

#### Extremely Compact Design

##### Stainless Piston

Reduces wear and greatly increases cycle life

##### O-ring Seals

High cycle life. Buna-N standard with optional Viton (-V Option)

##### Failsafe Toggle Mechanism

Fingers lock at closed position and will not release until air is supplied again. Mechanism produces synchronous finger motion

##### Engineered Surface Coating

Anti-Friction and Anti-Wear on fingers

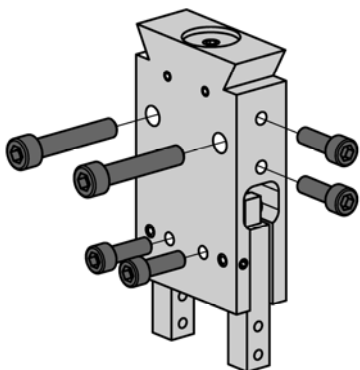
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### MOUNTING INFORMATION

#### Mounts and operates in any orientation

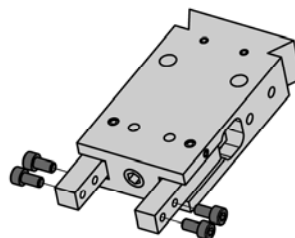
##### MAIN BODY



Mount up to Main body utilizing Tapped holes located on back, front, and side of unit. Mount thru unit with provided Clearance holes.

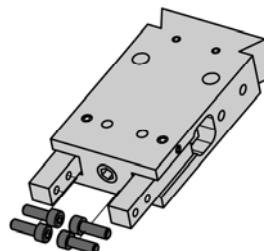
Utilizes integrated Dovetail in body for precision location and mounting

##### TOOLING



Mount tooling to fingers using Tapped holes

Key tooling to precision ground fingers for positive location.



(-C) Clearance hole option provides thru holes for mounting tooling thru each finger



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## DURA-GRIP

STACKABLE  
ANGULAR GRIPPER

**RB-94**

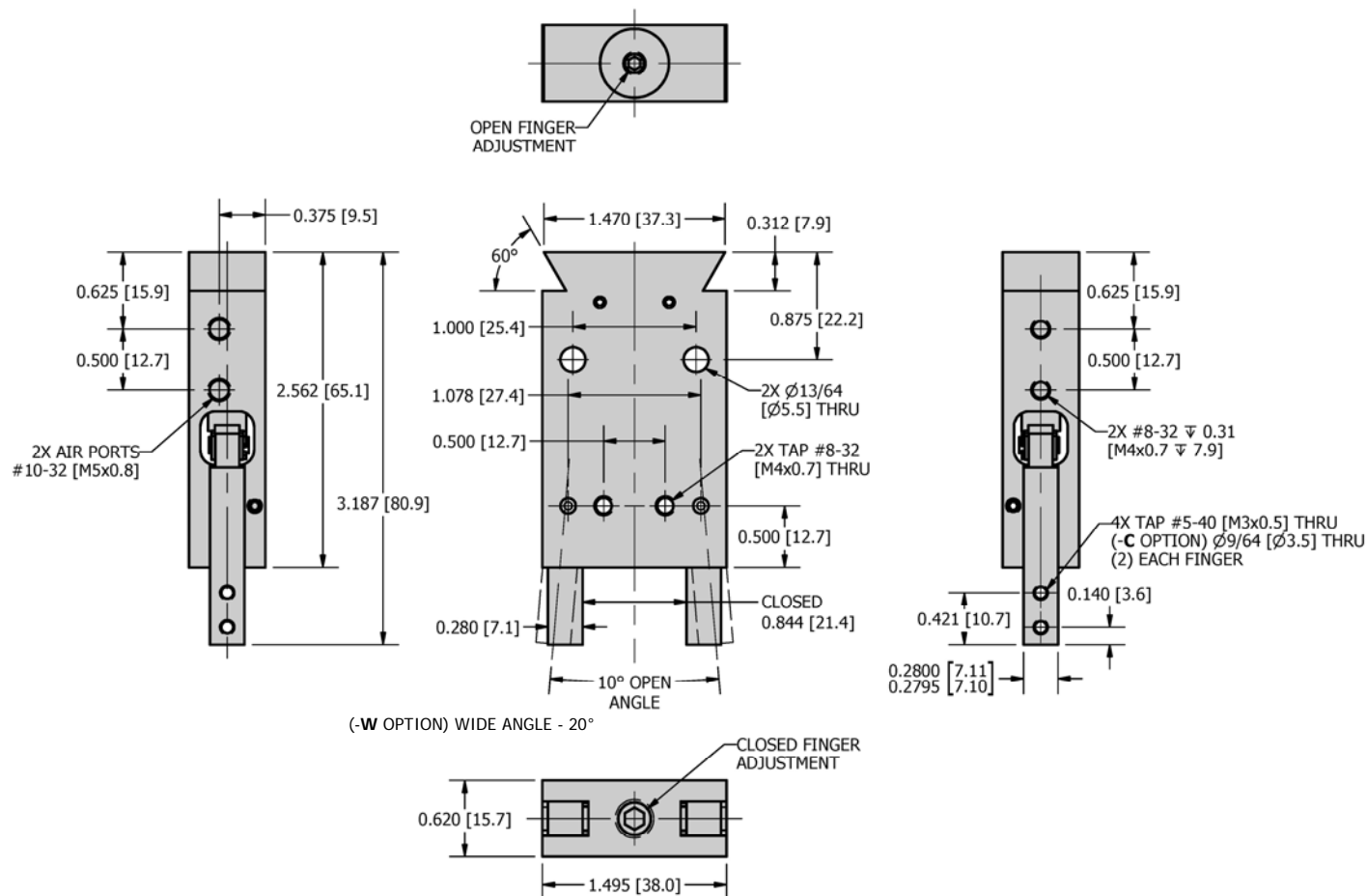
### DIMENSIONAL DRAWING

#### SPECIFICATIONS

Standard Grip Force @ 100 psi [7 bar] \*  
Standard Stroke  
Base Weight  
Unit Displacement (grip and release)  
Cylinder Bore Diameter  
Actuation Time (no load)

RB-94	MRB-94
45 lbf	203 N
5° per finger (10° total)	
0.31 lbs	0.14 kg
0.066 in <sup>3</sup>	1.1 cm <sup>3</sup>
0.562 in	14.3 mm
0.10 sec	

\* Loading between top mounting holes in fingers



### HOW TO ORDER : BASIC UNIT

METRIC BASE MODEL CLEARANCE HOLES  
**M** **RB-94** - **W** - **V** - **C**  
FINGER OPTIONS SEALS

CUSTOM DESIGNS ALWAYS AVAILABLE  
PLEASE CONTACT US FOR INFORMATION

METRIC M  
FINGER OPTIONS W - Wide Angle - 20° between fingers  
SEALS V - Viton (standard Buna - N)  
HOLES C - Clearance Holes in fingers

**SAMPLE ORDER: RB-94-V**

Ex) RB-94 with Viton Seals





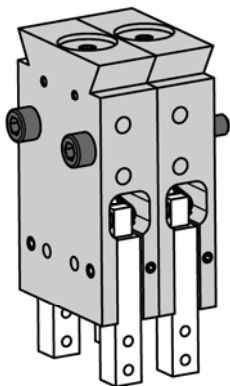
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**DURA-GRIP**

STACKABLE  
ANGULAR GRIPPER

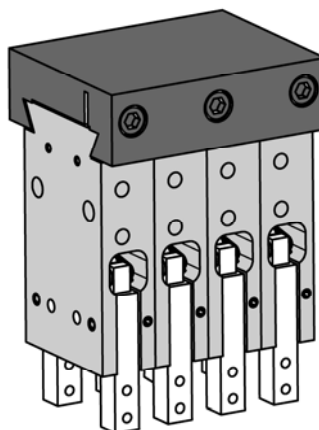
**RB-94**

## ADDITIONAL MOUNTING INFORMATION



### STACKABLE DESIGN

Use the Clearance holes to stack 2 or more gripping heads together.



Use the DP-21 Universal Dovetail receiver to accurately hold and locate up to 4 RB-94 grippers. The DP-21 can then be modified to suit your application

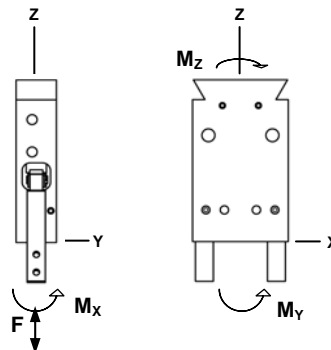
See **DURA-GRIP ACCESSORIES** Page for the **DP-21** Universal Dovetail receiver

Page **1-3.1**

## ADDITIONAL INFORMATION

LOADING	RB-94		MRB-94	
	Static	Dynamic	Static	Dynamic
Max Force <b>F</b>	35 lbf	15 lbf	156 N	67 N
Max Moment <b>M<sub>x</sub>, M<sub>z</sub></b>	40 lbf-in	15 lbf-in	4.5 N-m	1.7 N-m
Max Moment <b>M<sub>y</sub></b>	80 lbf-in	25 lbf-in	9.0 N-m	2.8 N-m

NOTE: Loading based on utilization of both fingers. When using in application with high moment loads utilize thru holes for mounting body.



## GRIP FORCE

The maximum capacity of the gripper is a function of many variables and will change based on the shape of the part, surface finish, accelerations during transfer, the shape of the finger tooling, and air pressures. Use the Grip force calculated below *and* the application variables to determine the proper sizing of the gripper.

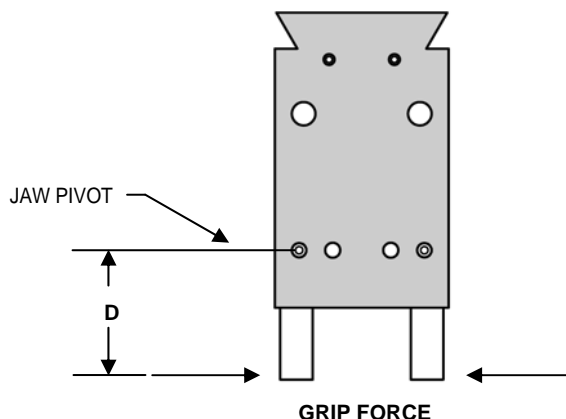
The Grip force - **F** is defined as the maximum force that can be applied to the fingers without moving. The force is analytically determined and will vary slightly with friction. This force is calculated when the fingers are parallel.

$$\text{English GRIP FORCE - F (lbf)} = \frac{(P_{\text{AIR}} (\text{psi}) \times G_F)}{D (\text{in})}$$

$$\text{Metric GRIP FORCE - F (N)} = \frac{(P_{\text{AIR}} (\text{bar}) \times G_F)}{D (\text{mm})}$$

**P<sub>AIR</sub>** = Air Pressure  
**D** = Distance to pivot (see diagram)  
**G<sub>F</sub>** = Grip Factor (see chart)

GRIP FACTOR <b>G<sub>F</sub></b>		RB-94	MRB-94
Standard Unit	EXTERNAL	<b>0.65</b>	<b>1056</b>
	INTERNAL	<b>0.44</b>	<b>719</b>



It is recommended that finger tooling be designed to encompass the part as the grip force requirement is lower. If the grip cannot be performed by encompassing the part and a friction grip must be performed, always use a factor of safety of at least 4.



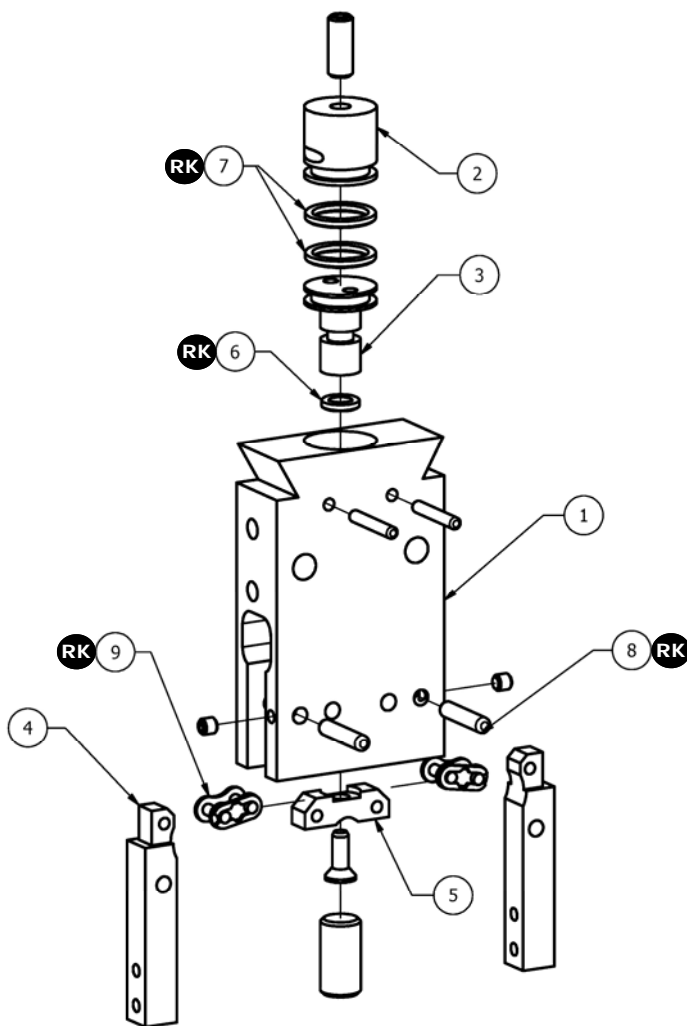
**R&I**  
MANUFACTURING CO.

## DURA-GRIP

STACKABLE  
ANGULAR GRIPPER

**RB-94**

EXPLODED VIEW



### PARTS LIST

### HOW TO ORDER PARTS

ITEM	REQ'D	NAME	RB-94	OPTIONS
1	1	Main Body	RB-94-1	-W <sup>3</sup>
2	1	Top Cap	RB-94-2	
3	1	Piston	RB-94-3	
4	2	Finger	MH-20A-4	-C <sup>2</sup>
5	1	Connector	MH-20A-6	-V <sup>1</sup>
6	1	Piston Shank Seal *	ORG-008	-V <sup>1</sup>
7	2	Piston & Top Cap Seal *	ORG-013	-V <sup>1</sup>
8	2	Pivot Pin *	FPP-105	
9	2	Chain Link Assembly *	CHL-025	
RK	1	Repair Kit * #	RB-94-RK	-V <sup>1</sup>

METRIC

PART NUMBER

M

-

OPTIONS

**SAMPLE ORDER: RB-94-4-C**

Ex) RB-94 Finger with Clearance Holes

OPTIONS (see product pages for information)

1 - V = Viton

2 - C = Clearance Holes

3 - W = Wide angle

#### NOTES

\* - Metric code not required

# - Repair Kits include req'd qty of parts marked with RK