



END-  
EFFECTORS,  
INC.

*Giving Robotics A Hand®*

Post Office Box 242  
Santa Clara, CA 95052-0242  
Tel: 408/727-0100  
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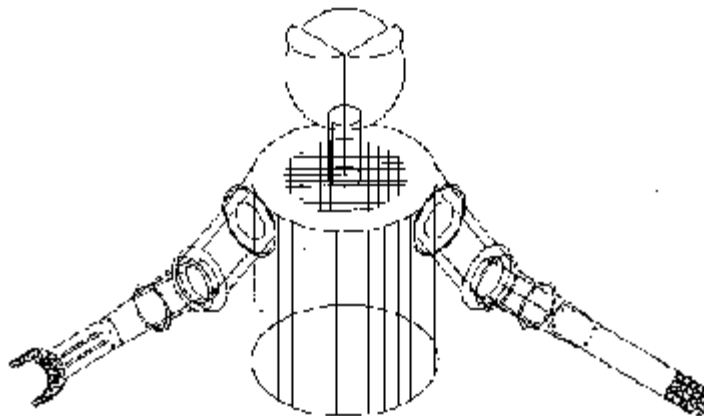
# **End-Effectors Price Lists and Reference Information**

**Ceramic End-Effectors Price List**

**Talon End-Effectors Price List**

**Talon End-Effectors Operating Instructions**

**TMA/CMA End-Effectors Mounting Instructions**



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www.fjaind.com

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## PRICE LIST

### SECTION I - VACUUM CLAMPING

#### Standard Ceramic End-Effectors - Vacuum Clamping:

SC Series products are standard off-the-shelf designs.

<u>Part No.</u>	<u>Price Each</u>	<u>Quantity Discount per shipment</u>
<b>Standard Ceramic Designs:</b>		
SA-10	\$225.00	10-19 pcs. - 10%
SA-11	\$263.00	20-49 pcs. - 20%
SA-20	\$308.00	50+ pcs. - 30%
SA-21	\$345.00	for all SA, SS and SC items
SS-10	\$265.00	
SS-11	\$307.00	
SS-20	\$360.00	
SS-21	\$403.00	

SC-10 (Stock)	\$300.00	
SC-11 (Stock)	\$350.00	
SC-20 (Stock)	\$410.00	
SC-21 (Stock)	\$460.00	

#### **Optional Accessories - Customer installed:**

<b>Load Distribution Plate:</b>		
LDP-10 (Stock)	\$ 75.00	10+ pcs. - 15%

#### **Standard Adapters:**

CMA-10-1(Stock)	\$300.00	
CMA-10-2	\$325.00	
CMA-10-3	\$350.00	
CMA-10-4	\$375.00	
CMA-10-5	\$395.00	
CMA-10-6	\$435.00	10-29 pcs. - 10%
		30-99 pcs. - 20%
CMA-11-1	\$355.00	100+ pcs. - 30%
CMA-11-2	\$380.00	for all standard adapters
CMA-11-3	\$405.00	
CMA-11-4	\$430.00	
CMA-11-5	\$450.00	
CMA-11-6	\$490.00	

<b>Fail Safe Clamp:</b>		
FSC-10	\$460.00	10-19 pcs. - 10%
		20-49 pcs. - 20%
		50+ pcs. - 30%

<u>Part No.</u>	<u>Price Each</u>	<u>Quantity Discount per shipment</u>
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#### **Circular Wafer Stops:**

CWS-10-1(Stock)	\$ 35.00	
CWS-20-1(Stock)	\$ 45.00	

#### **Flatted Wafer Stops:**

FWS-10-1(Stock)	\$ 65.00	
FWS-10-2(Stock)	\$ 75.00	
FWS-10-3(Stock)	\$ 85.00	
FWS-10-4(Stock)	\$ 95.00	10+ pcs. -15%
FWS-20-1(Stock)	\$ 90.00	for all flatted wafer stops
FWS-20-2(Stock)	\$100.00	
FWS-20-3(Stock)	\$125.00	
FWS-20-4(Stock)	\$150.00	

#### **CUSTOMIZED OPTIONS – Factory Installed:**

##### **Electro-Static Dissipation:**

ESD-10-1	\$ 95.00	10+ pcs. -15%
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##### **Wafer Presence Indicators:**

WPI-10-1	\$135.00 (switch)	10+ pcs. -15%
WPI-10-2	\$ 55.00 (clip only)	for all
WPI-10-3	\$395.00 (clip & sensor)	

##### **Photonic Sensing System:**

PSS-10-1	\$ 75.00 (clips only)	10+ pcs. -15%
PSS-10-2	\$345.00 (clips & sensor)	for all

##### **Substrate Contact Material:** (Minimum purchase 5 pcs.)

SCM-0	N/A	
SCM-1	\$ 90.00	10+ pcs. -15%
SCM-S	Quoted	

#### **Custom Ceramic End-Effectors - Vacuum Clamping:**

CC-SERIES products are designed and fabricated to customer requirements and therefore are quoted on a project basis.

Assigned upon design completion	Quoted per design	1 - 2 pcs. - none 3 - 5 pcs. - 12% 6 - 12 pcs. - 24% 13 - 25 pcs. - 36% 26 - 99 pcs. - 45% 100+ pcs. - 50%
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## PRICE LIST

### SECTION II - PNEUMO-ELECTRO-MECHANICAL

#### Talon End-Effectors - Vacuum & Pressure Driven

<u>Part No.</u>	<u>Price Ea.</u>	<u>Quantity Discount</u> <u>schedule for all Talons</u>
TAL-I-FS-030	Quoted	
TAL-I-FS-100	Quoted	
TAL-I-FS-125	Quoted	
TAL-I-FS-150	Quoted	
TAL-II-FS-150 (Stock)	\$1,740.00	
TAL-II-FS-200 (Stock)	\$2,060.00	
TAL-II-FS-300 (Stock)	\$2,380.00	
TAL-III-125	\$1,920.00	
TAL-III-150	\$2,800.00	
TAL-III-200	\$2,240.00	
TAL-III-300	\$2,400.00	
TAL-IV- 4 - .060		
TAL-IV- 4 - .090	\$2,160.00	
TAL-IV- 4 - .120		
TAL-IV- 5 - .060		1 - 2 pcs. - none
TAL-IV- 5 - .090	\$2,480.00	3 - 5 pcs. - 10 %
TAL-IV- 5 - .120		
TAL-IV- 6 - .060	\$2,720.00	6 - 12 pcs. - 20%
TAL-IV- 6 - .090		
TAL-IV- 6 - .120	\$2,880.00	13 - 25 pcs. - 25%
TAL-IV- 6 - .250		
TAL-IV- 7 - .060	\$3,120.00	26+ pcs. - 30%
TAL-IV- 7 - .090		
TAL-IV- 7 - .120	\$3,280.00	
TAL-IV- 7 - .250		
TAL-IV- 9 - .060	\$3,520.00	
TAL-IV- 9 - .090		
TAL-IV- 9 - .120	\$3,760.00	
TAL-IV- 9 - .250		
TAL-IV- 13 - .060	\$4,080.00	
TAL-IV- 13 - .090		
TAL-IV- 13 - .120	\$4,400.00	
TAL-IV- 13 - .250		
TAL-V-125	\$1,600.00	
TAL-V-150	\$1,760.00	
TAL-V-200	\$1,920.00	
TAL-V-300	\$2,080.00	
TAL-VI-06	\$3,360.00	
TAL-VI-08	\$3,520.00	
TAL-VI-09	\$3,680.00	
TAL-VI-13	\$3,840.00	

#### Options:

ES — ESD Dissipation System	\$ 400.00 ea. installed
PS — Photon Sense System	\$1,100.00 ea. installed

#### Standard Adapters:

<u>Price Ea.</u>	<u>Discount</u>
TMA-10-1(Stock)	\$350.00
TMA-10-2	\$370.00
TMA-10-3	\$420.00 10 pcs. - 10%
TMA-10-4	\$420.00 30 pcs. - 20%
TMA-10-5	\$430.00 100 pcs. - 30%
TMA-10-6	\$430.00
TMA-10-7	\$480.00
TMA-10-8	\$480.00
TMA-20-1	\$2,600.00

#### Accessories:

TWA-10-150	\$490.00
TWA-10-200	\$590.00
TWA-10-300	\$690.00

CEA-10 Quoted  
(Custom designed end-effector adapters require NRE)

### SECTION III - ACCESSORIES

#### End- Effector Bible

<b>EEB-10</b>	\$95.00	10+ pcs. -10%
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#### **CEA-10**

#### **FSC-10**

#### **WTP-10**

<b>MMS-70</b>	\$14.50	1-20
	\$12.50	25-100
	\$11.50	100+



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## TALON END-EFFECTOR

### Operating Instructions

#### **Introduction:**

The Talon series of end-effectors has been designed to exceed SEMI<sup>®</sup> standards for wafer holding. The Talons use a dry gas under pressure as a driving force for actuation, nitrogen is preferred. The Talon I can be driven by pressure or vacuum.

All the products of the Talon series are fail-safe devices with the exception of the TAL-V. In this instance “fail-safe” means they will not release a wafer during a system power failure. Therefore, the actuation routine for a fail-safe device is different from vacuum gripping types. The Talon end-effectors are actuated by applying positive or negative pressure. Actuation opens the clamping jaws to either accept a wafer or release a wafer. The removal of a positive or negative pressure allows the Talon to return to an unactuated quiescent condition which is clamping the object inserted. This is an inverse function to vacuum gripping which requires maintaining a vacuum at all times when the wafer is being held.

#### **Operating Pressure:**

The design operating pressure is 45 psig and the “not to exceed” pressure is 60 psig.

#### **Sensing Switches:**

In addition to wafer clamping the Talon series contains a wafer sensing circuit which interfaces to the robotic intelligence to inform the system of the presence of a properly positioned wafer in the end-effector. There are two circuit configurations in use, a single normally closed switch and a three combination of 3 NC switches. The three switches are arranged in a series parallel circuit configuration and provide both redundancy and flatted wafer operation. The switch plungers are sized to negate notched wafer errors. The electrical interface contacts for the circuit are located at the mounting end of the Talon and mate to EEI supplied adapters or user supplied circuitry contacts. These sense switches are designed to carry 100 MA @ 60VDC and have a typical contact resistance of 75 milli ohms.

#### **Photonic Sensing:**

Should a user wish to scan a cassette or foup for a wafer count or wafer location mapping, the photon sense (PS) option is available. The Talon can be fitted with photonic detectors which will locate and or count wafers. The sensors are interfaced through fiber optic bundles which are a part of the standard mounting adapters options.

#### **ESD Protection:**

When handling finished wafers, electro-static discharge can cause device failure and yield problems. In order to protect the product, the Talon can be furnished with the ES option. The ES option is designed to dissipate an electrostatic charge without damage to the product being held. This option requires an electrical grounding connection for the static wicks and the selection of the ESD dissipating option on the adapter.

#### **Adapter Options:**

In order to facilitate employment of the available utilities of the Talon End-Effectors with a minimum of effort, EEI supplies mounting adapters for the Talon product line. EEI provides the TMA-10 series of adapters which contain all required connections for the Talons based on options selected. The purchaser of any Talon product can also supply these facilities.



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## TMA/CMA END-EFFECTOR ADAPTERS

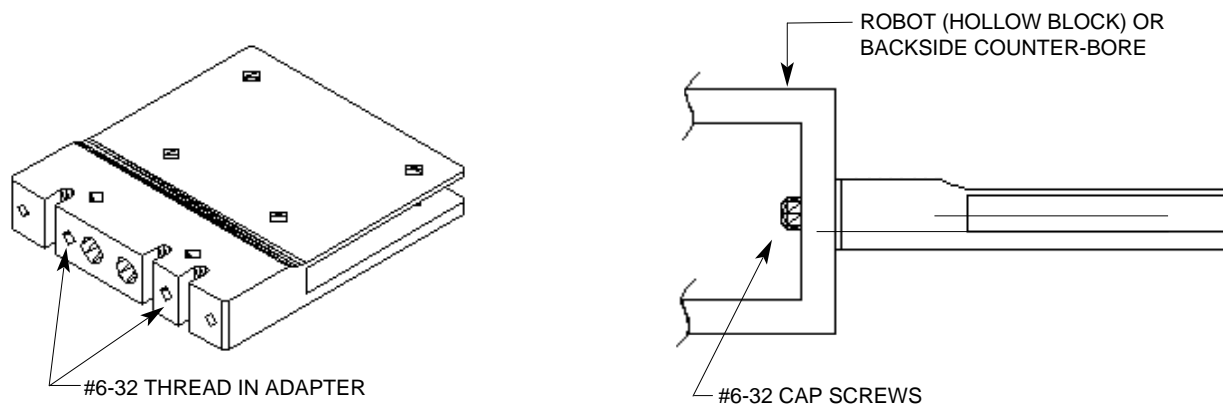
### Mounting Instructions

#### INTRODUCTION:

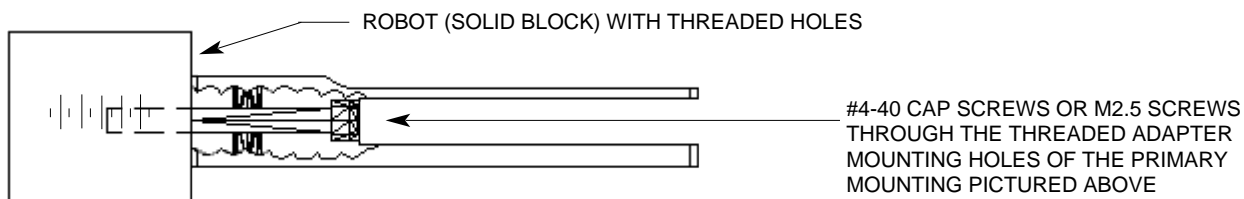
The TMA and CMA adapters have been designed to provide for numerous methods of attachment. The threads used are american but metric screws can also be used for through hole mounting. When clamping the adapter in place, the threaded portions of the adapter have through hole sizes which allow the threaded hole to also act as an unthreaded hole for a mounting bolt. Please see the drawings below for details.

#### BACKSIDE MOUNTING:

Primary:

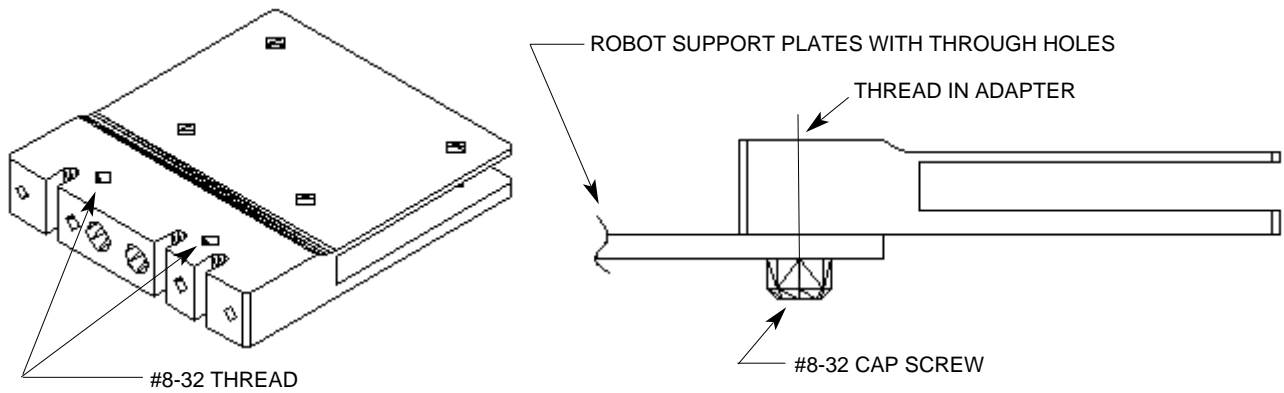


Secondary:

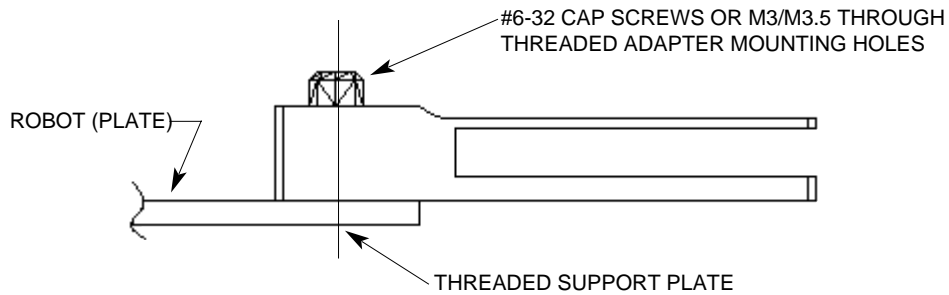


BOTTOM SIDE MOUNTING:

Primary:

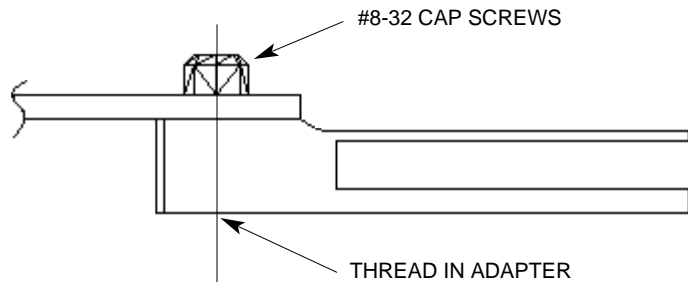


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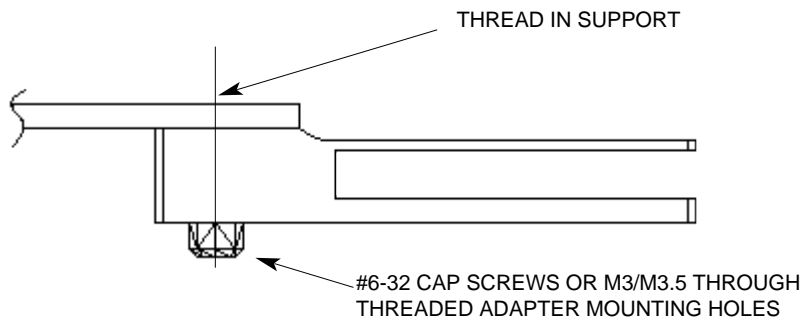


TOPSIDE MOUNTING:

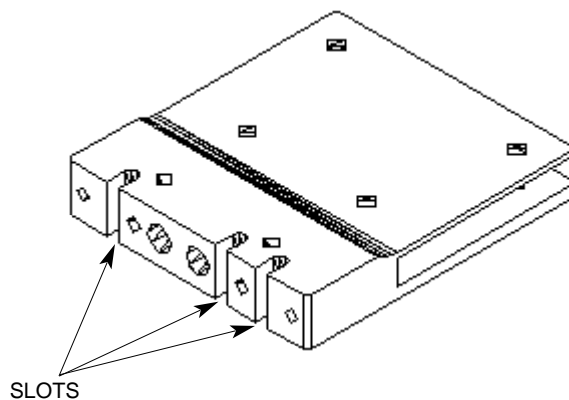
Primary:



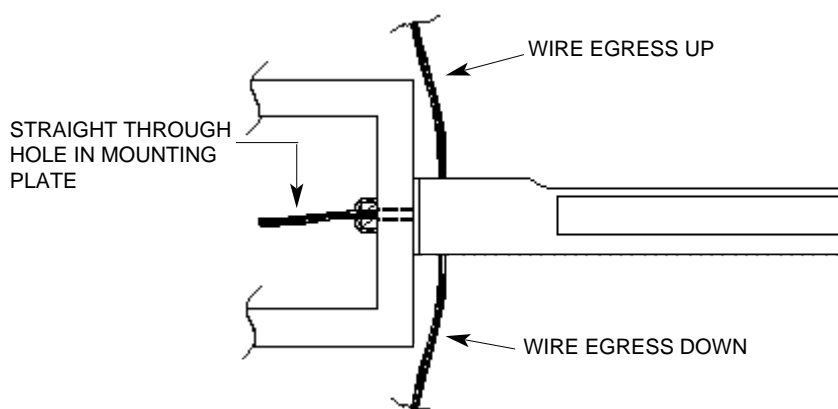
Secondary:



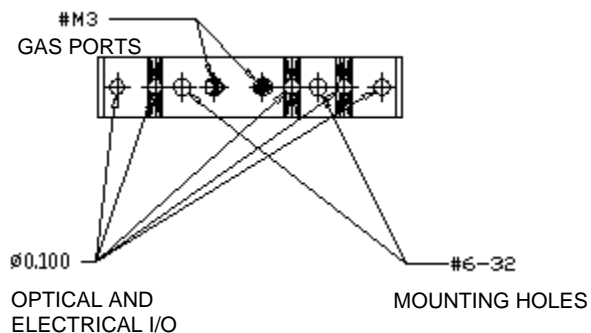
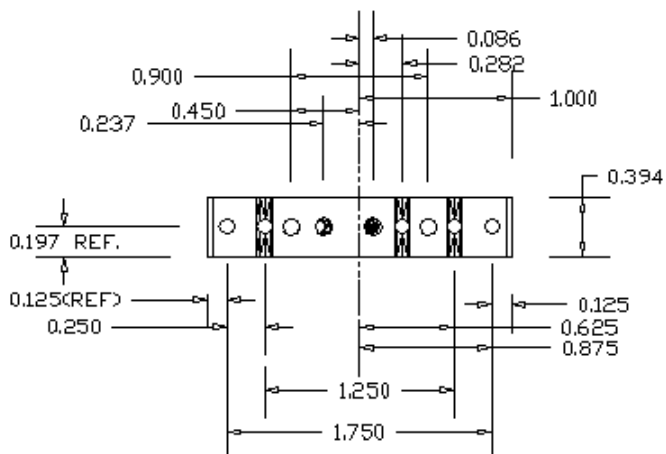
## WHY ARE THERE SLOTS?



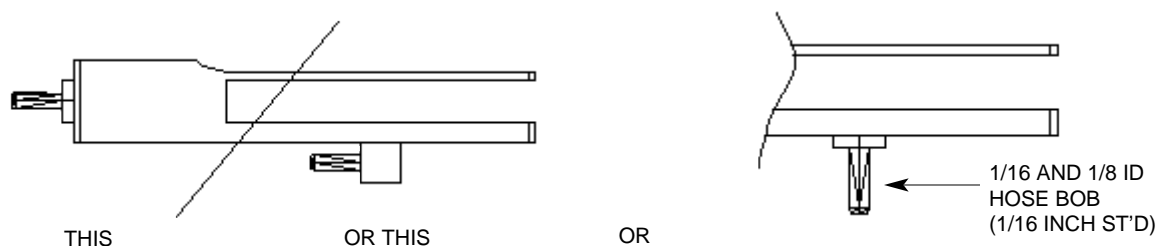
The slots provide egress in either direction (up or down) for the wire leads used for switch sensing and ESD grounding. The wires can also be fed through the mounting surface. The wires are special high-flex silicon insulated #26 AWG leads.



Hole pattern layout as viewed from mounting surface



## WHY MULTIPLE PRESSURE CONNECT POINTS?



Because there are many existing configurations in the robotic world, we have provided for most eventualities. EEI prefers the use of 1/16" I.D. tubing for its products and we supply this size as standard. The 1/16" tubing is flexible and can deliver pressure up to 90 psi as well as provide ample area for rapid vacuum evacuation without the larger volumetric load of 1/8" I.D. tubing or the flex and space problems a 1/4" O.D. tubing causes.

While the backside fitting can be used at any time, it was primarily intended for use when end-effector stacking is required.

