



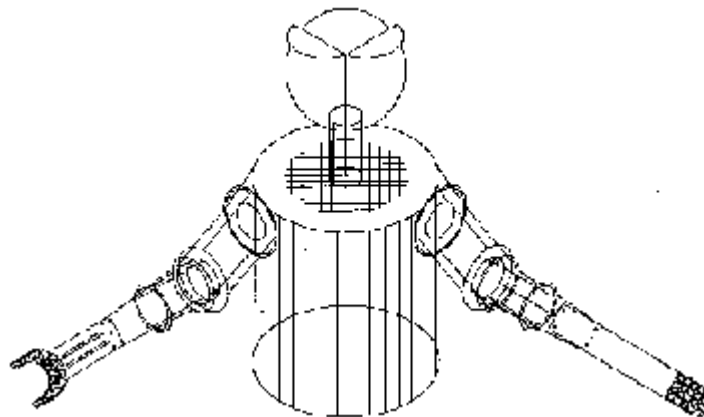
END-
EFFECTORS,
INC.

Giving Robotics A Hand®

Post Office Box 242
Santa Clara, CA 95052-0242
Tel: 408/727-0100
Fax: 408/727-2100

Pneumo Mechanical End-Effectors

Talon I
Talon II
Talon III
Talon IV
Talon V
Talon VI



"Giving Robotics A Hand"

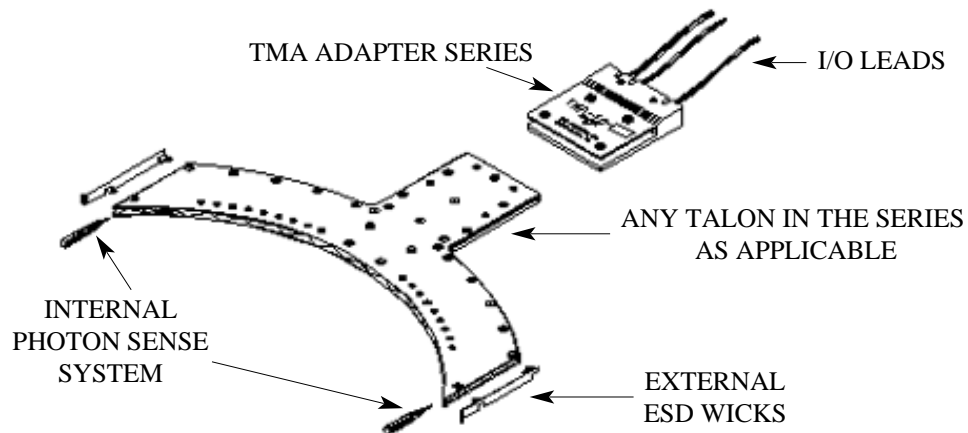


END-
EFFECTORS,
INC.

Talon[®] End-Effector Product Line

The Talon product line consists of pneumo-mechanical products which are designed to provide minimal contact, edge-gripping, side-gripping and non-contact wafer handling, primarily for the world's electronics industry. These devices are patent protected.

The products can be grouped by the shape of the substrates they handle and by the method of actuation. The substrate shapes are round and rectangular and the drive forces are created by vacuum, pressure, or electrical energy. These products meet the standards developed by the semiconductor industry and can be used in cleanroom applications. The products can also be used in atmospheric and vacuum applications dependent on the model selected.



MAJOR BENEFITS

1. NO BACKSIDE DAMAGE OR CONTAMINATION
2. EXCEEDS SEMI[®] SPEC FOR NON-INTRUSION AREA HANDLING
3. WORKS WITH ANY SUBSTRATE HOLDER, CASSETTE OR FOUP
4. POSITIVE HOLDING OF "5Gs" OR GREATER
5. WORKS IN ATMOSPHERE OR VACUUM
6. NO CHUCK CUT-OUT OR ORIENTATION REQUIRED
7. SENSES WAFER IN POSITION PRIOR TO CLAMPING
8. CAN WAFER MAP WITHOUT 180° HEAD ROTATION
9. SMALL TURN RADIUS FOR COMPACT MACHINE DESIGN
10. GUARANTEED ONE MILLION CYCLE PERFORMANCE
11. RECYCLABLE/REFURBISHABLE TO REDUCE USER COST
12. SELECTABLE AND MEASURABLE CLAMPING FORCE

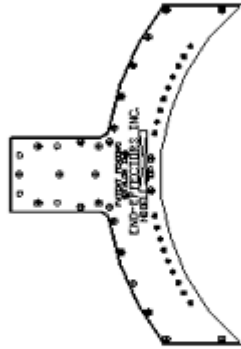
Talon End-Effector Product Line

TALON I
 WAFER TRANSPORT
 EDGE GRIP
 (DISK SUBSTRATE)



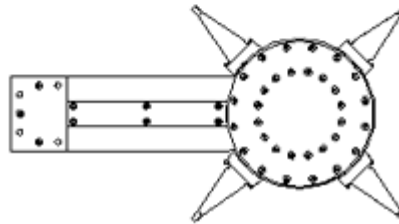
FAIL-SAFE DESIGN
 VAC. OR PRESS. DRIVEN
 (20 inches Hq req'd.
 or 45 PSIG)

TALON II
 WAFER TRANSPORT
 EDGE GRIP
 (DISK SUBSTRATE)



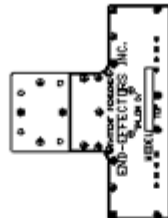
FAIL-SAFE DESIGN
 PRESSURE DRIVEN
 (45 PSIG req'd.)

TALON III
 WAFER TRANSPORT
 SIDE GRIP
 (DISK SUBSTRATE)



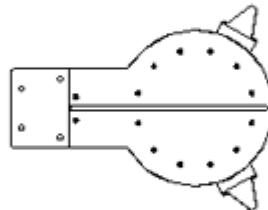
FAIL-SAFE DESIGN
 PRESSURE DRIVEN
 (45 PSIG req'd.)

TALON IV
 MASK TRANSPORT
 EDGE GRIP
 (RECTANGULAR SUBSTRATE)



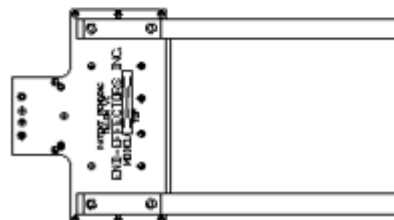
FAIL-SAFE DESIGN
 PRESSURE DRIVEN
 (45 PSIG req'd.)

TALON-V
 WAFER OR MASK TRANSPORT
 DIFFERENTIAL PRESSURE
 GRIP (ROUND OR
 RECTANGULAR SUBSTRATE)

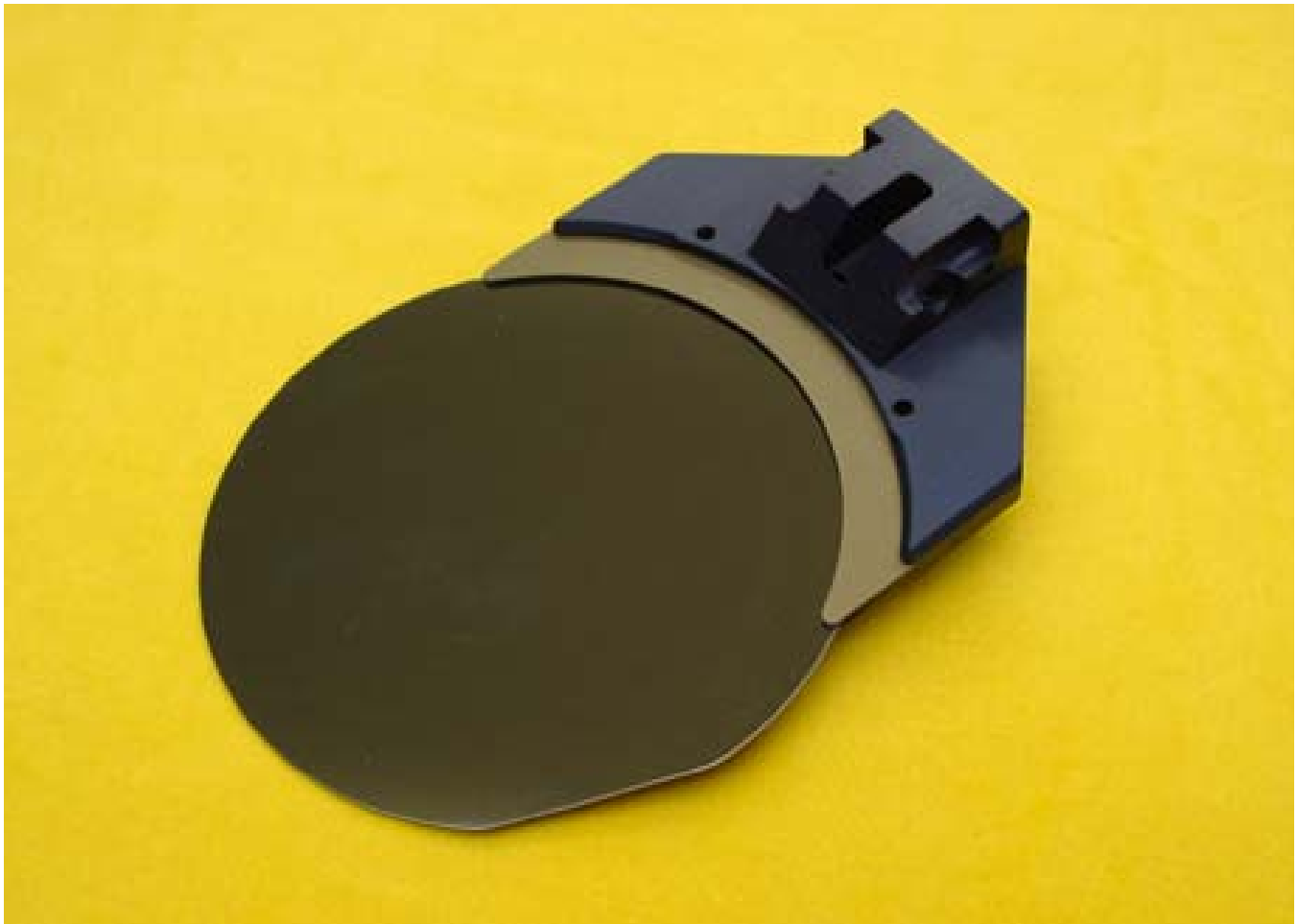


NON-CONTACT
 PRESSURE DRIVEN
 (45 PSIG req'd)

TALON VI
 MASK TRANSPORT
 SIDE GRIP
 RECTANGULAR SUBSTRATE



FAIL-SAFE DESIGN
 PRESSURE DRIVEN
 (45 PSIG req'd)



TALON® I FAIL-SAFE

TAL-I SERIES

WAFER EDGE-GRIPPING SMART END-EFFECTORS

FEATURES

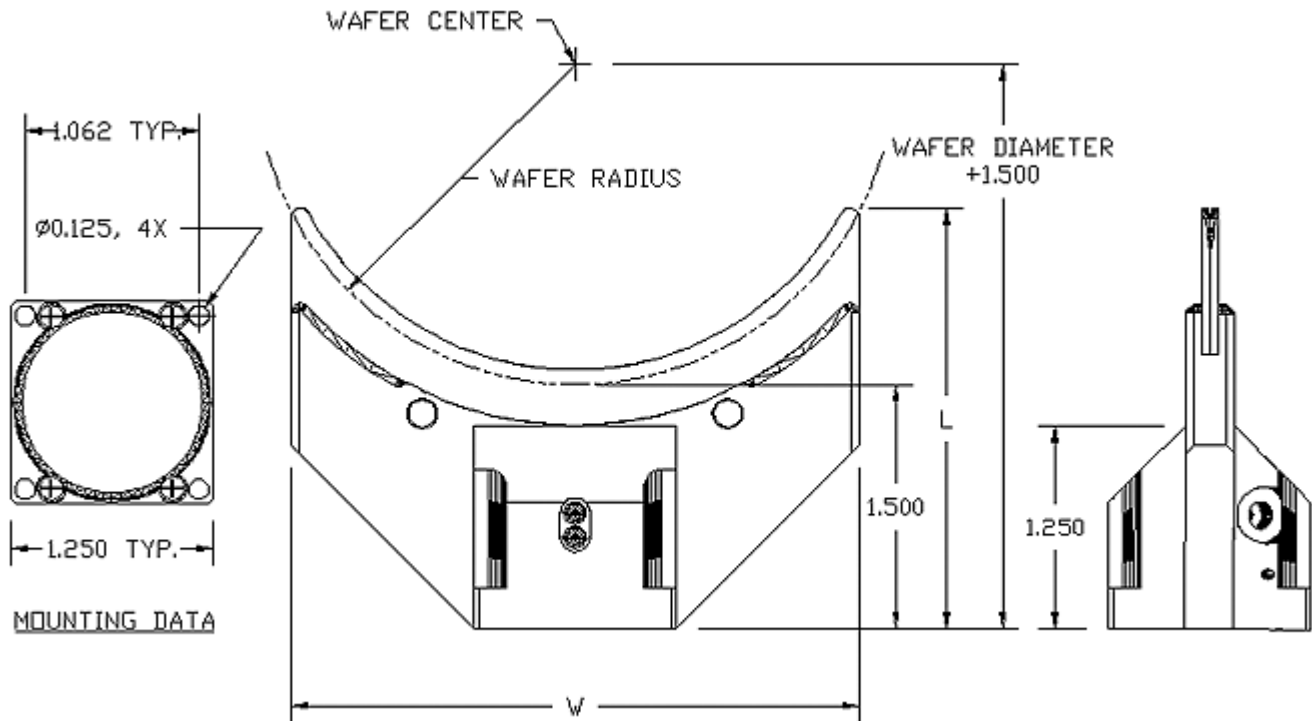
- Surpasses Semi® Specs
- Operates with vacuum or pressure
- 100% fail safe or conventional
- No backside contamination or damage
- Electro-static dissipating
- Optical wafer sense
- Holds flatted & non-flatted wafers
- Works with any wafer carrier
- Adaptable to any robot
- High holding forces - 5 Gs min.
- Light weight construction
- High speed operation
- Patents pending

The TALON® I series of 1mm edge gripping, vacuum or pressure driven end-effectors are supplied in configurations for 2 inch to 200 mm wafers. The TALON® I is designed as a *fail-safe* end-effector which surpasses Semi® specifications for non-intrusion, 1mm edge gripping, wafer handling and can also be supplied in a conventional (non-failsafe) configuration. The TALON® I operates on 25 inches of vacuum or 15 psi, permitting operation in *atmosphere or vacuum* and can be employed without any system modifications, except mounting. The fail-safe feature is standard on the TALON® I and will retain the wafer being transported in case of *any* catastrophic system failure. The TALON® I provides a minimum 5 "G" holding force which translates into faster operating speeds for robots. Positive holding, fast operating speeds, operation in atmosphere or vacuum and no back-side contamination all come standard with the TALON® I. The TALON® I can also negate failures from inadequate vacuum supplies and small system leaks when used in the pressure mode and can signal the robot when safe wafer positioning conditions exist; this is a standard supplied feature. Additionally the TALON® I can be supplied with photonic non-contact sensors to determine wafer presence and exact location as well as an ESD dissipation system which will discharge static electric charges to prevent damage to the device being handled.

EEI END-EFFECTORS, INC.

1230 Coleman Avenue, Santa Clara, California 95050-4338
408/727-0100 FAX 408/727-2100 www.fjaind.com

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PART NUMBER FORMAT: TAL - I - TYPE - DRIVE - VERSION - OPTIONS
EXAMPLE: TAL - I - F - 300 - ES - PS

- TYPE:** C — CONVENTIONAL: This configuration permits the use of the Talon I without any changes to the robotic logic system or vacuum supply. It is provided as a directly replaceable and 100% compatible substitute for vacuum gripping end-effectors. Note: This is not fail-safe.
- F — FAIL-SAFE: The fail safe configuration assures that the product being handled is always held securely even though the drive system may fail. This configuration requires a custom vacuum/pressure application routine which is essentially the inverse of a standard vacuum clamping end-effector routine.

DRIVE: 1 — Pressure Driven; 2 — Vacuum Driven

VERSION:

DASH NO.	D	L	W
-020	2.00in./50mm	1.755	1.50in./38.1mm
-025	2.50in./63mm	1.893	2.00in./50.8mm
-030	3.00in./76mm	2.051	2.50in./63.5mm
-100	4.00in./100mm	2.407	3.50in./88.9mm
-125	5.00in./125mm	2.411	4.00in./101.6mm
-150	6.00in./150mm	2.745	5.00in./127.0mm
-200	8.00in./200mm	2.789	6.00in./152.4mm
-300	12.00in./300mm	3.481	9.00.in./228.6mm

OPTIONS: ES — The ES option designation signifies an Electro-Static-Discharge (ESD) System which is built into the Talon end-effector; This system permits the slow discharge of static electricity by contacting the wafer's edge and routing the charge through a dissipation resistor to ground.

PS — The PS option designation signifies a Photon Sense System which is built into the Talon end-effector. This system permits the visual interrogation of the wafer storage or holding device for wafer presence and location. The sensor is located on the Talon's clamping center-line and can also be used for positioning.



TALON® II FAIL-SAFE

TAL-II SERIES

WAFER EDGE-GRIPPING SMART END-EFFECTORS

FEATURES

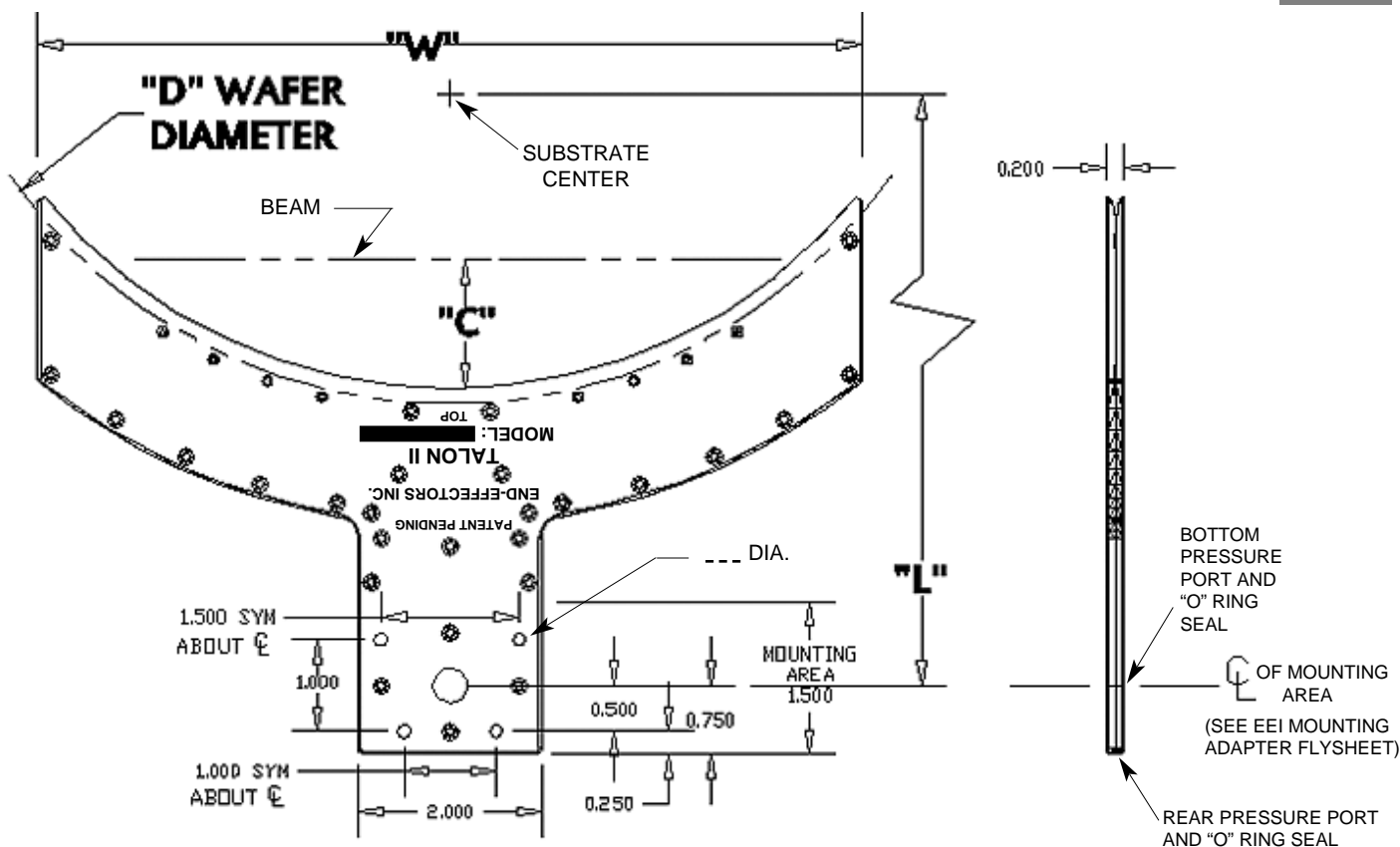
- Surpasses Semi® Specs
- Operates in vacuum and atmosphere
- 100% fail safe, won't drop wafer
- No backside contamination or damage
- Electro-static dissipating
- Optical wafer sense
- Holds flatted & non-flatted wafers
- Works with any wafer carrier
- Adaptable to any robot
- High holding forces - 5G min.
- Light weight construction
- High speed operation
- Patents pending

The TALON® II series of 1mm edge gripping, pressure driven, end-effectors are supplied in configurations for 100 to 300 mm wafers. The TALON® II is designed as a *fail-safe* end-effector which surpasses Semi® specifications for non-intrusion, edge gripping, wafer handling. The TALON® II operates on 30 to 60 psi of dry nitrogen which permits operation in *both atmosphere and vacuum chambers*. The fail-safe feature is standard on the TALON® II and will retain the wafer being transported in case of *any* catastrophic system failure. The TALON II® provides a minimum 5 "G" holding force which translates into faster operating speeds for robots. Positive holding, fast operating speeds, operation in atmosphere or vacuum and no back-side contamination all come standard with the TALON® II. The TALON® II also negates failures from inadequate vacuum supplies and small system leaks. As with the TALON® I, the TALON® II can signal the robot when safe or unsafe wafer positioning conditions exist, this is a standard supplied feature which can be employed at the user's discretion. Additionally the TALON® II can be supplied with photonic non-contact sensors to determine wafer presence and exact location as well as an ESD dissipation system which will discharge static electric charges without damage to the device being handled.

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PART NUMBER FORMAT: TAL - II - VERSION - PORTING - OPTIONS

EXAMPLE: TAL - II - 300 - 1 - ES - PS

TYPE: FAIL-SAFE, PRESSURE DRIVEN: The fail safe configuration assures that the product being handled is always held securely even though the drive system may fail. The pressure drive permits operation in atmosphere and vacuum. This configuration requires a custom pressure application routine which is essentially the inverse of a vacuum clamping end-effector routine.

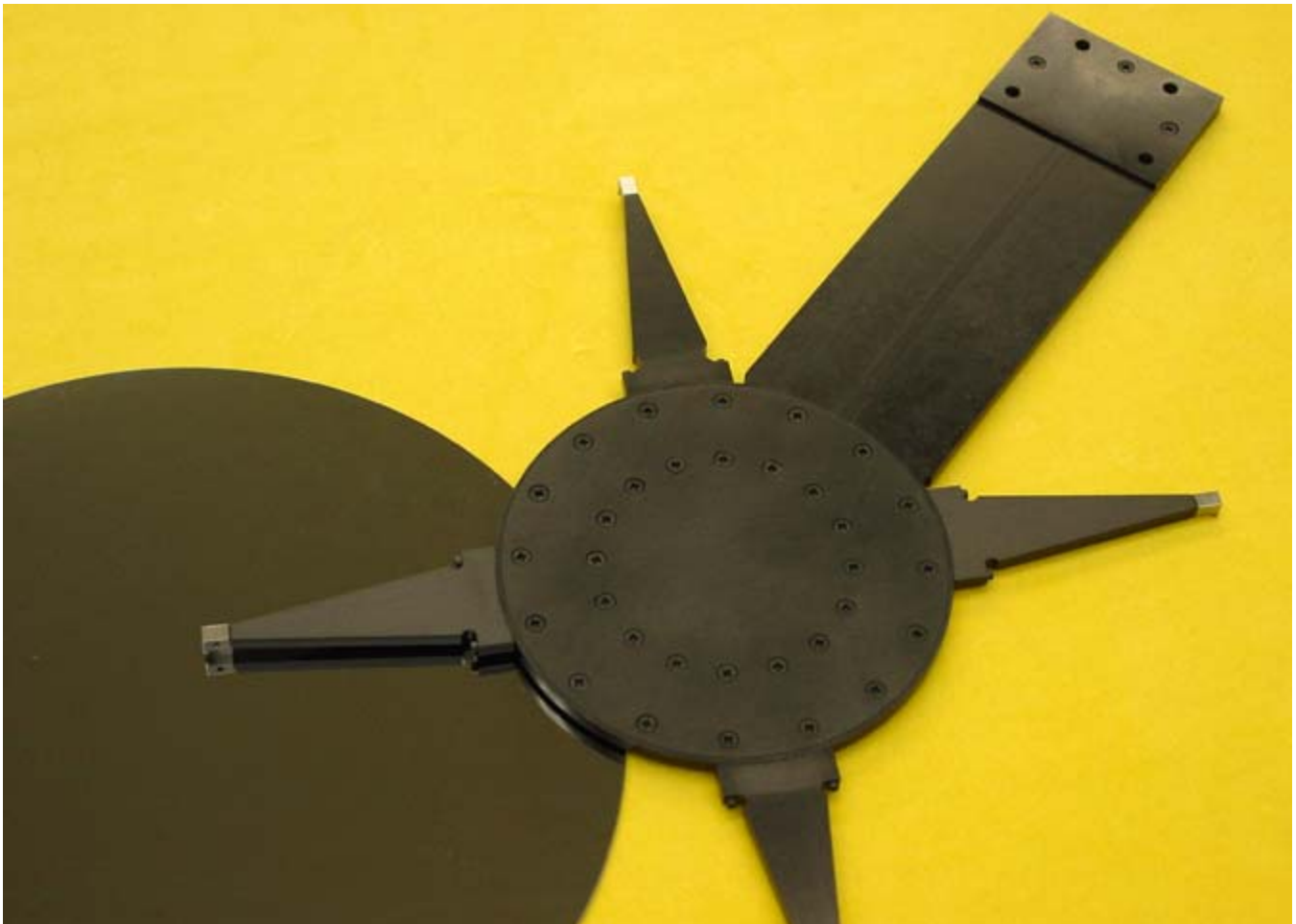
VERSION:

DASH NO.	D	L	W	C
-100	4.00in./100mm	5.039in./128.0mm	3.00in./76.2mm	
-125	5.00in./125mm	5.532in./140.5mm	4.00in./101.6mm	
-150	6.00in./150mm	6.023in./153.0mm	5.00in./127.0mm	.557in./14.2mm
-200	8.00in./200mm	7.007in./178.0mm	6.00in./152.4mm	.676in./17.2mm
-300	12.00in./300mm	8.976in./228.0mm	9.00in./228.6mm	1.362in./34.6mm

PORTING: -1 = Bottom location; -2 = Rear location

OPTIONS: ES — The ES option designation signifies an Electro-Static-Discharge (ESD) System which is built into the Talon end-effector; This system permits the slow discharge of static electricity by contacting the wafer's edge and routing the charge through a dissipation resistor to ground.

PS — The PS option designation signifies a Photon Sense System which is built into the Talon end-effector. This system permits the visual interrogation of the wafer storage or holding device for wafer presence and location. The sensor is located on the Talon's clamping center-line and can also be used for positioning.



TALON III FAIL-SAFE

TAL-III SERIES

WAFER SIDE-GRIPPING SMART END-EFFECTORS

FEATURES

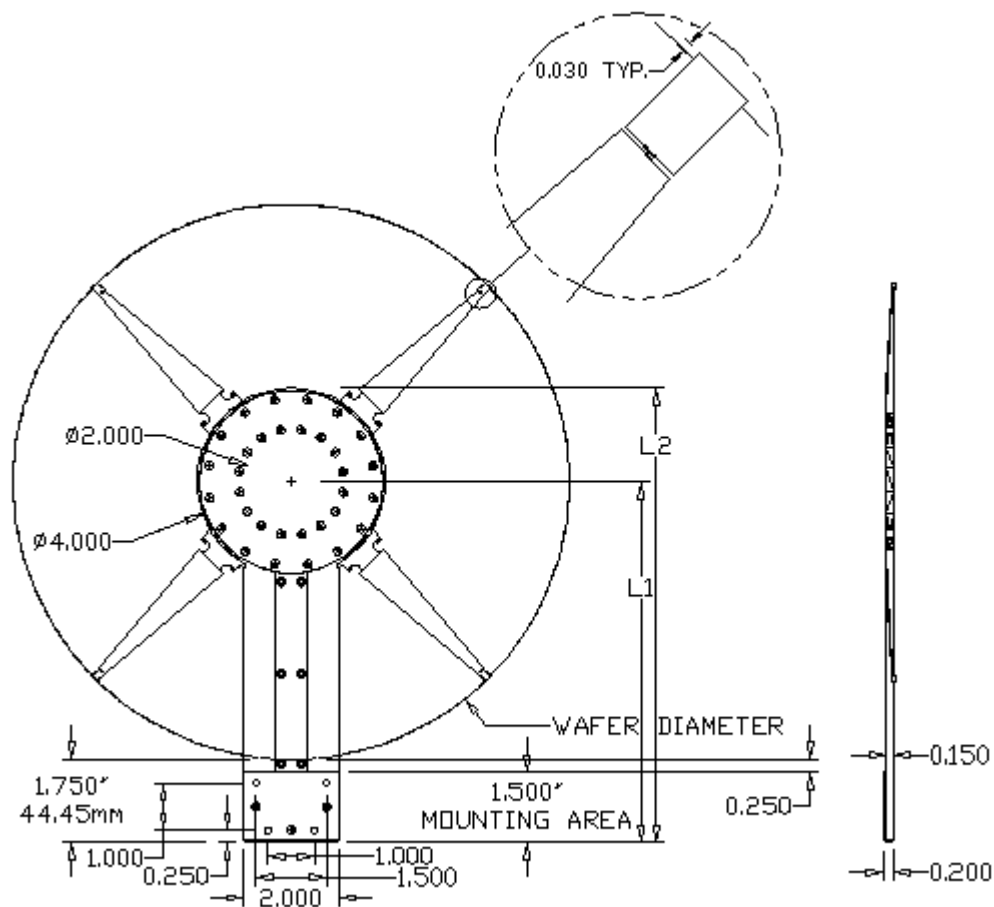
- Fail-safe design
- Will not drop wafer
- Multiple side-gripping styles
- **No** top or bottom contact
- Positive hold, multi-point
- Non contaminating - vacuum flushed
- Minimal wafer sag
- Self centering
- No chuck cut-outs required

The Talon III provides features not found in any end-effector world-wide. The need for an end-effector which eliminates any top or bottom contact, in or out of the non-intrusion zone has now been met. This end-effector surpasses all SEMI® specifications for edge gripping technology. The Talon III is a pressure driven device which is compatible with all Talon accessories and pressure levels. Regardless of your machines' requirements there is a version of the Talon III which can meet your needs or it can be fabricated. Positive side-gripping, self centering, high speed, no top or bottom contact, no chuck cut-outs, fail-safe — there is only one — the Talon III.

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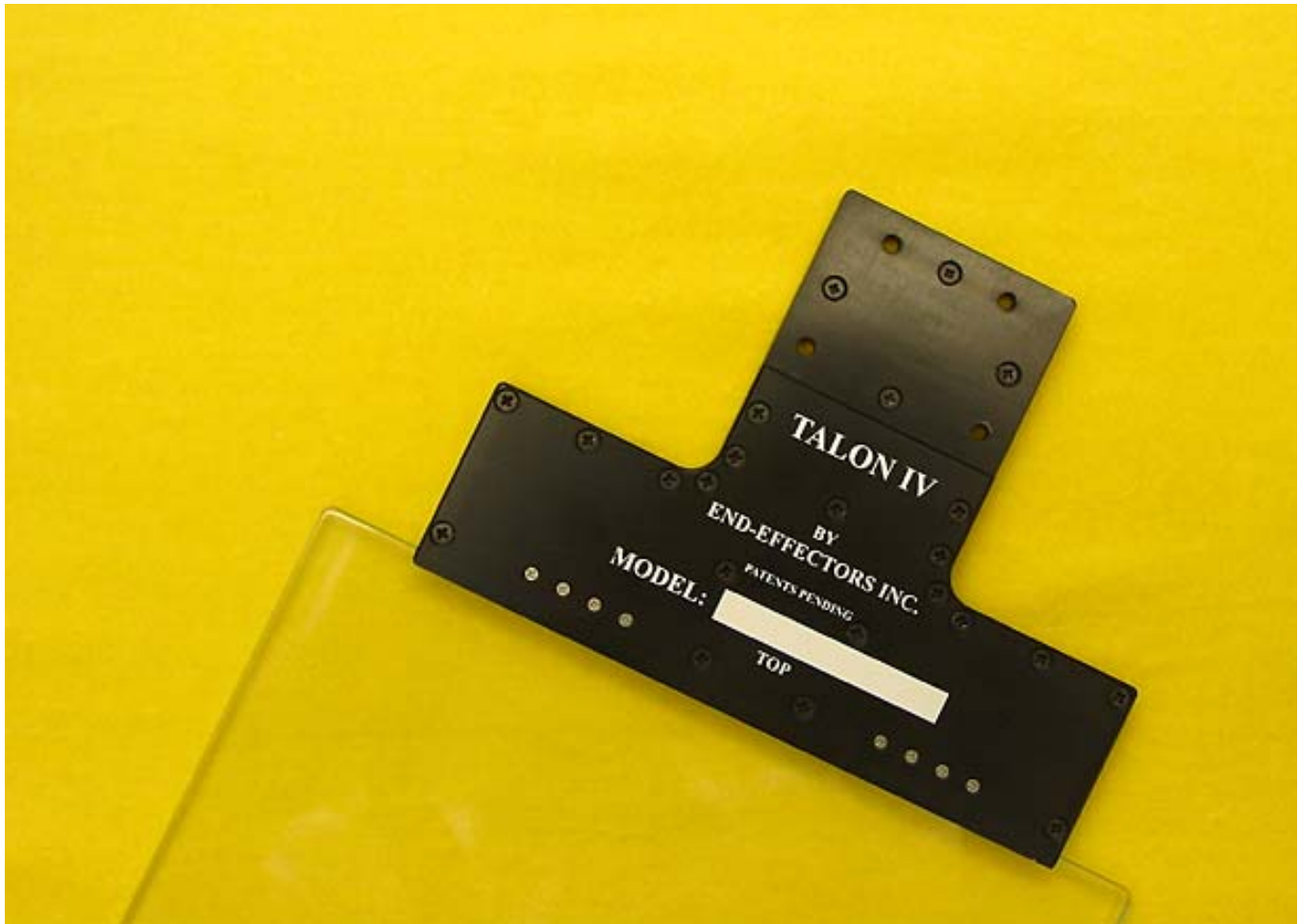


PART NUMBER FORMAT: TAL-III - VERSION - OPTIONS

EXAMPLE: TAL-III-150-10

VERSION:	DASH NO.	WAFER SIZE(DIA.)	L ₁ (INCHES)	L ₁ (MM)	L ₂ (INCH)	L ₂ (MM)
	-125	125 MM (5.0 INCH)	6.210	157.75	4.210	106.95
	-150	150 MM (6.0 INCH)	6.703	170.25	4.703	119.45
	-200	200 MM (8.0 INCH)	7.687	195.25	5.687	144.45
	-300	300 MM (12.0 INCH)	9.656	245.25	9.656	194.45

OPTIONS: -10 : Wafer Presence Indicator (Optical)
 -20 : System Failure Indicator (Pressure Switch)



TALON® IV FAIL-SAFE

TAL-IV SERIES

GLASS MASK EDGE GRIPPING SMART END-EFFECTORS

FEATURES

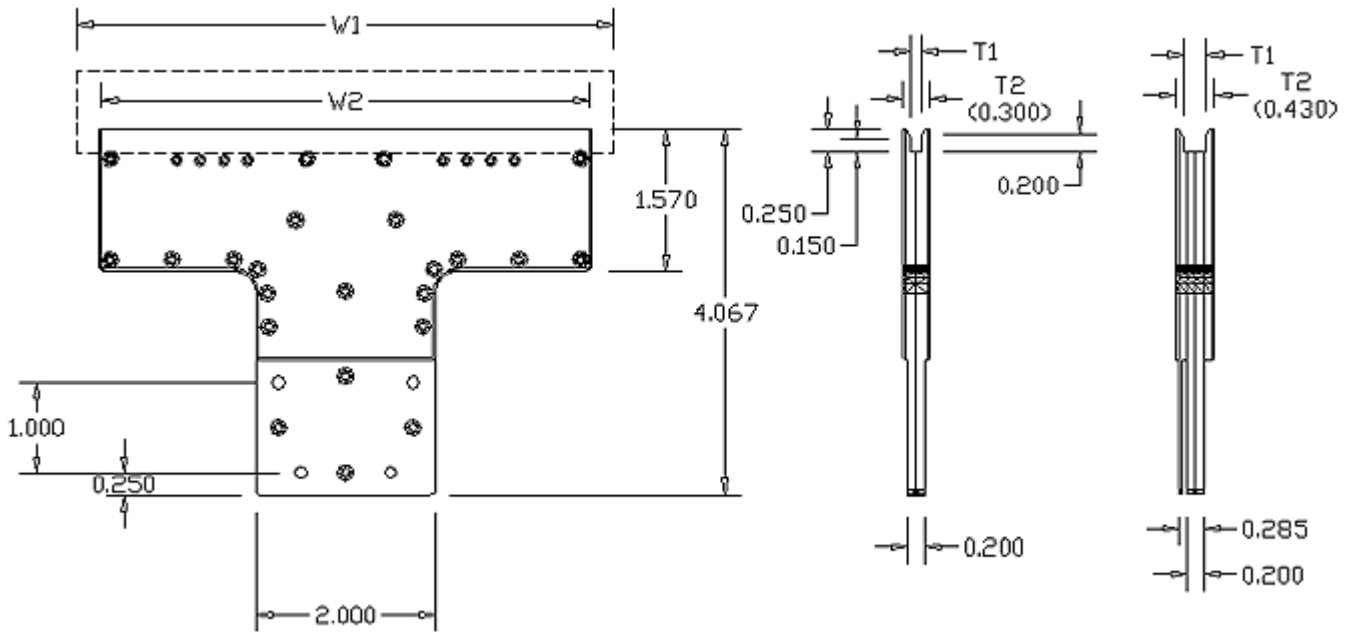
- Handles all standard masks
- 100% fail safe
- Operates in vacuum and atmosphere
- No front or backside contamination
- Optical substrate sensing
- Compatible with any holder
- Adaptable to any robot
- Available for custom sizes
- Light weight construction
- High Speed operation
- High holding forces
- Patents pending

The Talon® IV series of pressure driven, edge gripping end-effectors are designed for rectangular substrate handling such as glass masks and ceramic substrates. The Talon IV is designed with a grip reach of .200 inches (2.5 mm) from the substrate edge. The Talon® IV is a fail-safe device which means it will not release the product being held should a system failure occur. Failures dealt with include electrical power interruption as well as pressure interruption; these can be caused by any form of occurrence including a severed pressure line. The Talon® IV can be produced in any configuration to accommodate product of varying sizes beyond the standards currently produced.

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PART NUMBER FORMAT: TAL - IV - W_1 - T_1 - OPTIONS
EXAMPLE: TAL - IV - 6 - .090 - PS

VERSIONS:

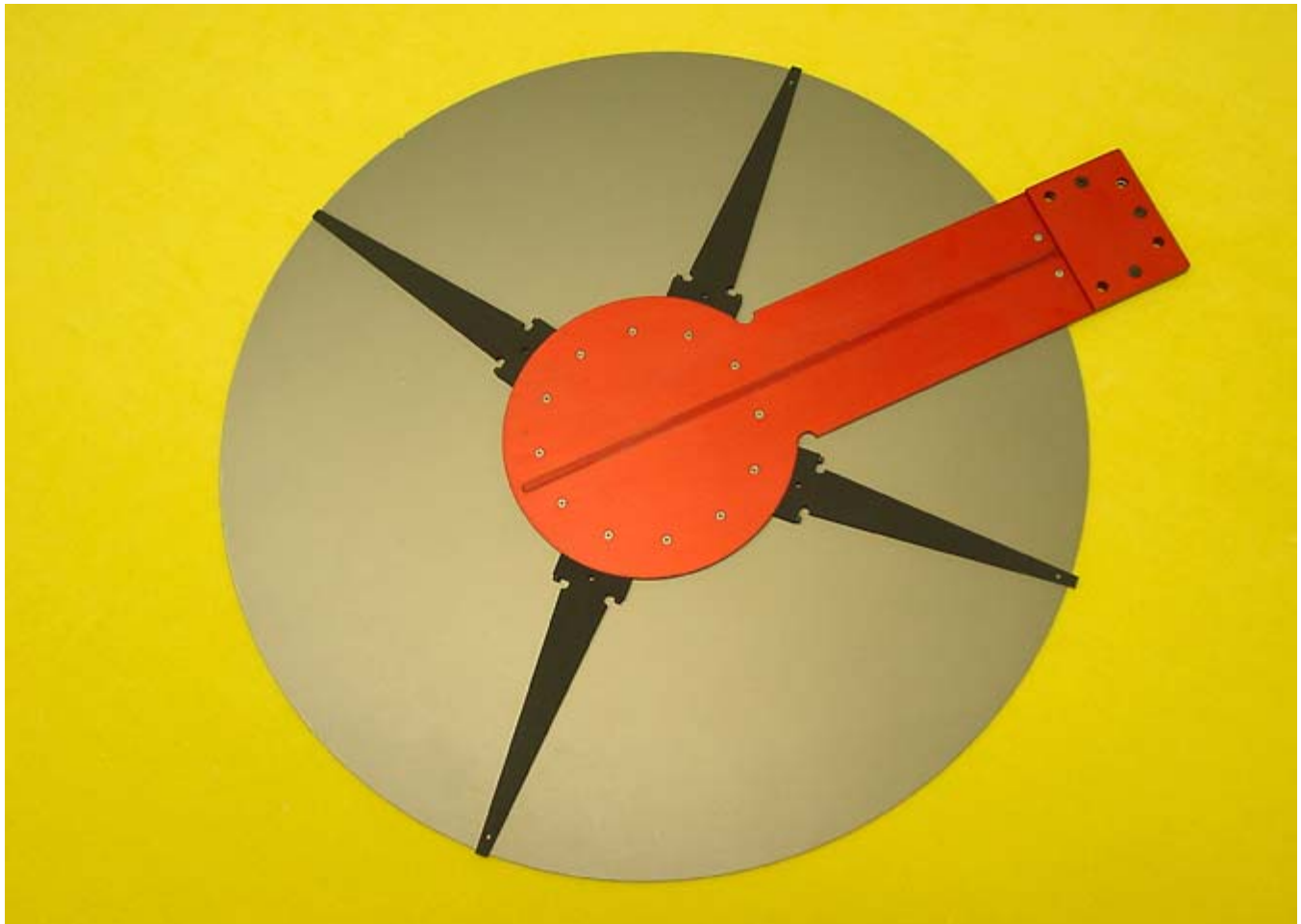
ALL DIMENSIONS IN INCHES			
SUBSTRATE	TALON IV	SUBSTRATE	TALON IV
W_1	W_2	T_1	T_2
4.0	3.5	.060	.300
4.0	3.5	.090	.300
4.0	3.5	.120	.300
5.0	4.5	.060	.300
5.0	4.5	.090	.300
5.0	4.5	.120	.300
6.0	5.5	.060	.300
6.0	5.5	.090	.300
6.0	5.5	.120	.300
6.0	5.5	.250*	.430

ALL DIMENSIONS IN INCHES			
SUBSTRATE	TALON IV	SUBSTRATE	TALON IV
W_1	W_2	T_1	T_2
7.0	6.5	.060	.300
7.0	6.5	.090	.300
7.0	6.5	.120	.300
7.0	6.5	.250	.430
9.0	8.5	.060	.300
9.0	8.5	.090	.300
9.0	8.5	.120	.300
9.0	8.5	.250	.430
13.0	12.5	.060	.300
13.0	12.5	.090	.300
13.0	12.5	.120	.300
13.0	12.5	.250*	.430

*Light weight or hollow frame only.

OPTIONS: ES — The ES option designation signifies an Electro-Static-Discharge (ESD) System which is built into the Talon end-effector; This system permits the slow discharge of static electricity by contacting the substrate's edge and routing the charge through a dissipation resistor to ground.

PS — The PS option designation signifies a Photon Sense System which is built into the Talon end-effector. This system permits the visual interrogation of the substrate storage or holding device for presence and location detection. The sensor is located on the Talon's clamping center-line and can also be used for positioning purposes.



TALON® V NON-CONTACT

TAL-V SERIES

DIFFERENTIAL PRESSURE END-EFFECTOR

FEATURES

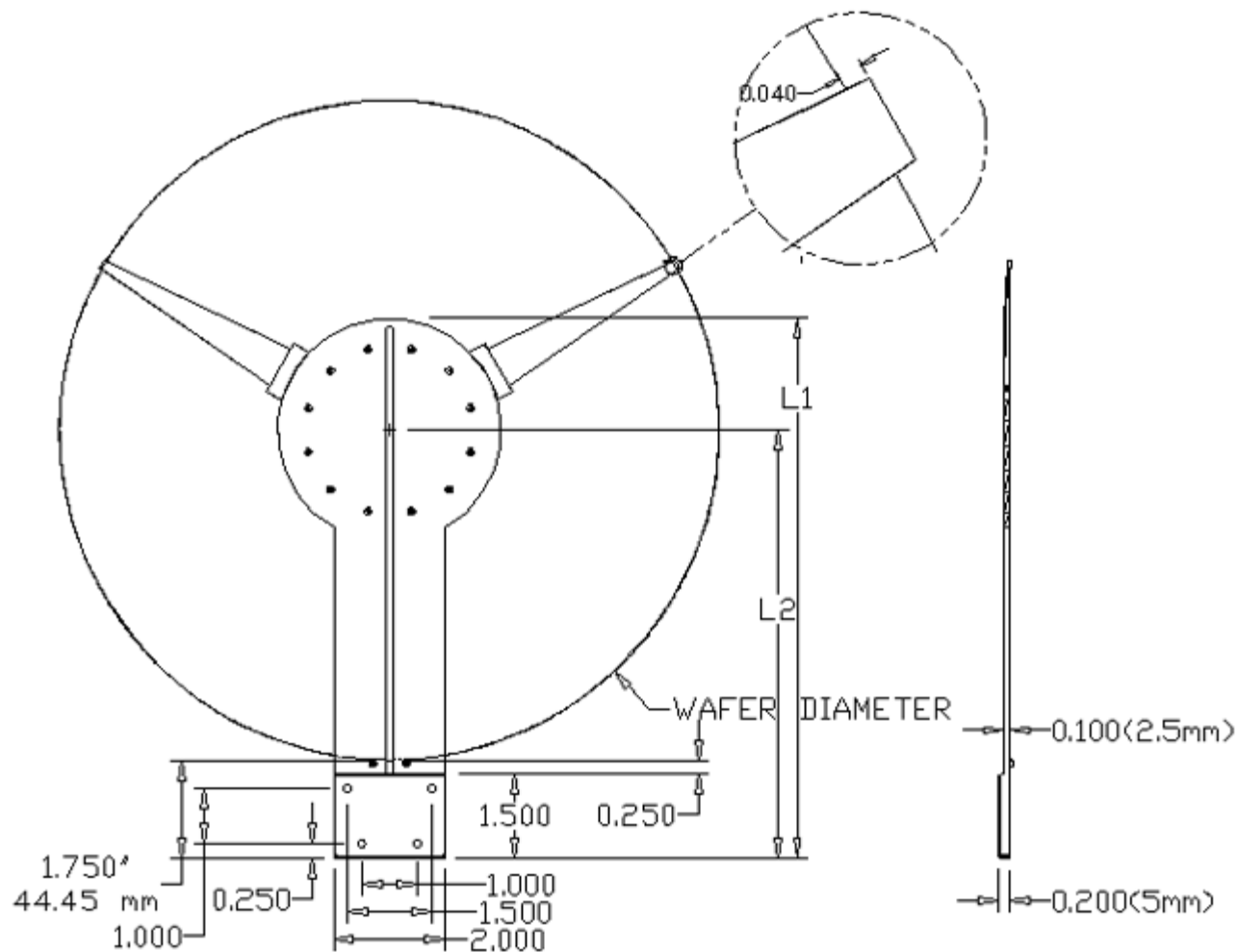
- Non-contact holding
- Handles standard and thin wafers
- Will not bow wafer
- Fits any standard holder
- Compatible with all robots
- Fits Universal Mounting Adapter
- Internal Wafer presence indicator (Optional)
- System Failure Indicator (Optional)
- Fail safe design options (Optional)
- Orientation hold (Optional)

The Talon V® is a non-contact end-effector which can handle standard and thin wafers. This device does not require any mechanical system modification for employment. The Talon V® requires 45 psi of clean dry nitrogen for operation and will hold wafers only when N₂ flows. This end-effector utilizes the Bernoulli principal in conjunction with a minimum three point contact dislocation hold. The Talon V® provides its users the ultimate in performance without front or backside contact and no breakage to fragile parts. Using EEI designed sense systems negates the need for secondary rotational motion and wafer sense systems thereby reducing cost and increasing throughput.

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PART NUMBER FORMAT: TAL-V - VERSION - OPTIONS

EXAMPLE: TAL-V-150-10-40

VERSION:	DASH NO.	WAFER SIZE(DIA.)	L ₁ (INCHES)	L ₁ (MM)	L ₂ (INCH)	L ₂ (MM)
	-125	125 MM (5.0 INCH)	6.210	157.75	4.210	106.95
	-150	150 MM (6.0 INCH)	6.703	170.25	4.703	119.45
	-200	200 MM (8.0 INCH)	7.687	195.25	5.687	144.45
	-300	300 MM (12.0 INCH)	9.656	245.25	9.656	194.45

- OPTIONS:
- 10 : Wafer Presence Indicator (Optical)
 - 20 : System Failure Indicator (Pressure Switch)
 - 30 : Fail-safe Wafer Clamping System
 - 40 : Orientation Hold Clamp



TALON® VI FAIL-SAFE

TAL-VI SERIES

GLASS MASK SIDE GRIPPING SMART END-EFFECTORS

FEATURES

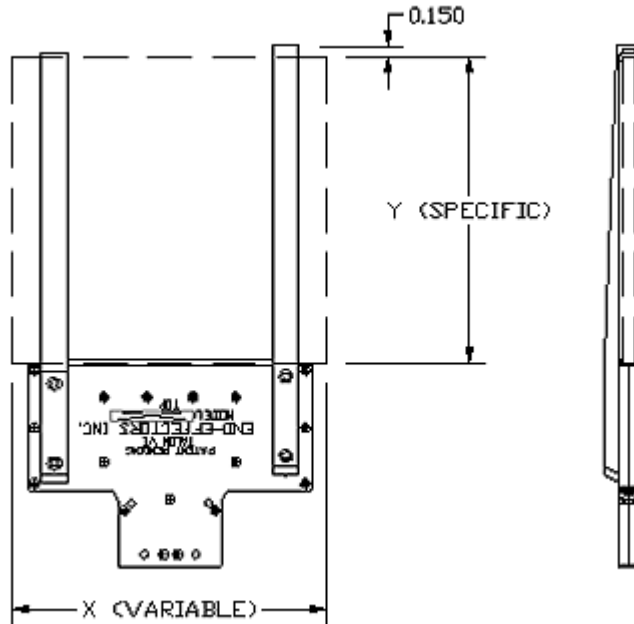
- Fail-safe design - won't drop substrate
- Side gripping - no top or bottom contact
- Pressure activated - high clamping force
- Vacuum purged - particle collection
- Variable clamping force - no substrate damage
- Numerous sizes - virtually any size

The Talon VI® side gripping end-effectors are designed for heavy parts of thick cross-section. This product is an out-growth of previous designs and can handle masks of thickness up to .250 inches and a size of 13.0 inches square. The design permits customization without regard to the exclusion zone size dictated by current specifications. Clamping arms for this device are replaceable and interchangeable. The replaceable arms permit customization of the Talon VI for most applications. Clamping force can also be preset to optimize for the type of part being handled.

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PART NUMBER FORMAT: TAL-VI - VERSION - OPTIONS

EXAMPLE: TAL-VI-09-0

VERSION:	DASH NO.	MASK DEPTH (Y)	X DIMENSION	t DIMENSION
	-06	6.00 INCHES	VARIABLE	
	-08	8.00 INCHES	VARIABLE	
	-09	9.00 INCHES	VARIABLE	
	-13	13.00 INCHES	VARIABLE	

OPTIONS: -0 : None
 -1 : ESD Dissipation