

TuffGrip™ Work Supports

Frequently Asked Questions, Position Sensing

We are already using TuffGrip™ double acting Work Supports; why would we need to use the Return Position Sensor?

Use the Return Position Sensor in any automated system where work support retraction is critical before the unload/load cycle begins. Extended Work Supports could cause a crash. Monitor the position of Work Supports and confirm all is clear before unloading/loading the part.

Does the Return Position Sensor also tell me that the work support is extended and locked?

No, the Return Position Sensor only communicates that the Work Supports have retracted. Even though the pressure drops when the supports extend, it does not indicate that all the Work Supports have extended or are locked.

Can I add a Return Position Sensor to my existing double-acting work support?

No, adding the Return Position Sensor requires a specific body, a longer plunger and different contact spring. Adding the Return Position Sensor also increases the work support length from the mounting flange to the contact bolt. Please contact your Vekttek Customer Support Specialist for more information.

How many Work Supports with Return Position Sensors can I put on one pneumatic circuit?

The maximum number of Return Position Sensors in one circuit is a function of the circuit design and pressure drop over the length of the circuit path. Vekttek has tested ten devices plumbed in parallel with excellent results.

Device Operation

The Return Position Sensor unit requires continuous and regulated air pressure. In the retracted position, air pressure will build in the system to the regulated set pressure. An air logic switch detects the "retracted" pressure condition and signals the controller that Work Supports have retracted. When the work support extends, the internal check opens and vents air from the device. The system air pressure falls to the "extended" preset pressure and an air logic switch resets. When the support retracts, the internal check closes and air pressure again builds to the regulated value. The air pressure switch detects "retracted" pressure and again signals the controller that the device is in the retracted position.

What if I want to run a different pneumatic pressure switch than what Vekttek engineers recommend?

Any programmable pneumatic switch that interfaces with the machine tool logic can monitor air pressure in the Return Position Sensor circuit.

Can I design my pneumatic circuit to be a series rather than parallel?

Yes, but it is not recommended. Plumbing the Return Position Sensor in series will create a much greater pressure drop along the length of the circuit and will reduce the ability of the pressure switch to see an extended support at the furthest point in the circuit.

Is it okay to route my air through a rotary union?

Yes, size the rotary union so that there is a separate path for the air circuit.

Do I need a pneumatic pressure switch for each work support on my fixture?

No, connect all the Work Supports (that are on the same hydraulic circuit) with an air circuit feeding the Return Position Sensor to one pneumatic pressure switch.



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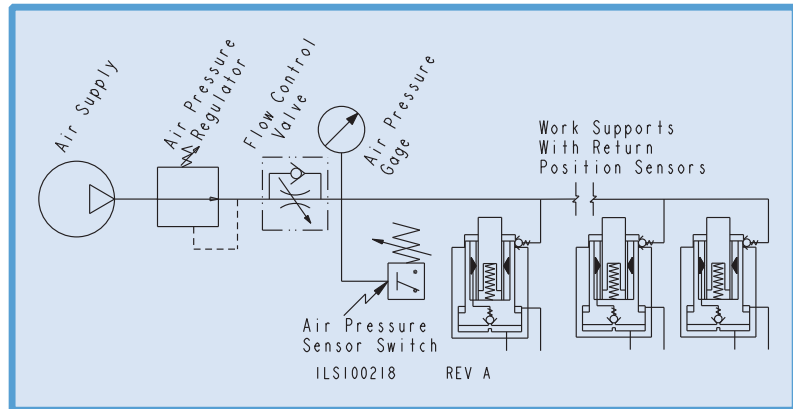


TuffGrip™ Work Supports

Position Sensing Circuit Design and Parameters

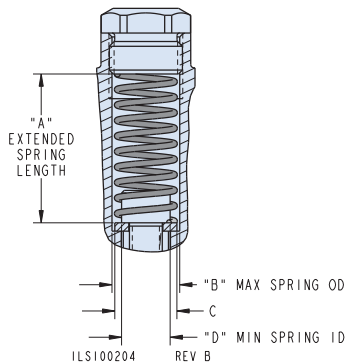
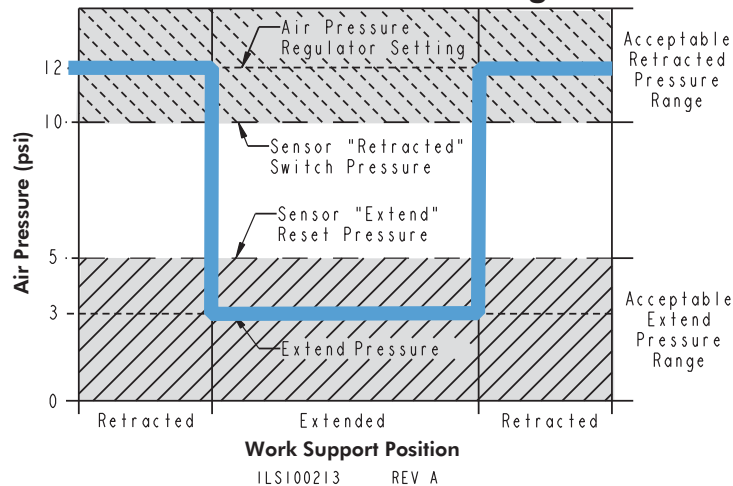
Recommended Pneumatic Circuit Design:

- 0-25 psi Air Pressure Regulator
Model No. 50-0440-01.
- Vekttek Air In-line Flow Control 1/4 NPT,
Model No. 50-4140-00.
- 0-20 psi Pneumatic Pressure Gauge.
- IFM effector brand pressure switch or equivalent.
- Parallel circuit design with minimum of 0.125" inside diameter feed line size.
- Circuit design should be simple and free from flow restrictions that can cause excessive pressure drop.
- The maximum number of Return Position Sensors in one circuit is a function of the circuit design and pressure drop over the length of the circuit path. Vekttek has tested 10 devices plumbed in parallel with excellent results.



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Return Position Sensor Logic



NOTE: Vekttek recommends only 17-7 stainless steel springs. Too light of custom spring force may not actuate the plunger, especially if a custom contact bolt is used. Too heavy of a custom spring may cause damage to the device's internal components. Vekttek cannot guarantee that custom springs will provide proper plunger actuation.

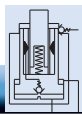
Recommended System Setup:

- Set air pressure regulator to 12 psi when all Work Supports in the system are in the retracted position.
- Adjust and set air flow control so that air pressure falls to 3 psi when the work support at the furthest point of the pneumatic circuit is in the extended position and all other supports in the circuit are retracted.
- Set the air pressure sensor "Retract" switch point to 10 psi.
- Set the air pressure sensor "Extend" reset switch point to 5 psi.

Custom Contact Spring

Work Support Series	Cavity Dimensions				Standard Spring				
	A	B	C	D	OD	WIRE Ø	Free Length	Rate (lb/in)	
10-0208-00	1.13	0.51	0.46	0.38	0.48	0.045	1.50	9.4	
10-0208-01	1.69	0.51	0.46	0.38	0.48	0.051	2.25	9.3	
10-0208-02	1.13	0.51	0.46	0.38	0.48	0.045	1.50	9.4	
10-0208-03	1.69	0.51	0.46	0.38	0.48	0.051	2.25	9.3	
10-0212-00	1.13	0.68	0.62	0.47	0.59	0.055	1.56	10.0	
10-0212-01	1.78	0.68	0.62	0.47	0.60	0.059	2.5	9.6	
10-0212-02	1.13	0.68	0.62	0.47	0.59	0.055	1.56	10.0	
10-0212-03	1.78	0.68	0.62	0.47	0.60	0.059	2.5	9.6	





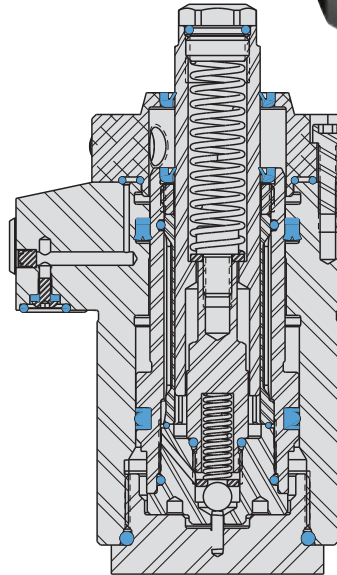
TuffGrip™ Work Supports

Air Position Sensing Top Flange

Return Position Sensing for D/A Top Flange Work Support

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- Exclusive Vekttek design eliminates part ejection and the need for any ancillary workholding devices.
- TuffGrip™ Return Position Sensors use air to communicate that the work support has retracted and is ready to load/unload.
- TuffGrip™ Return Position Sensors monitor work supports to prevent crashes in automated systems.
- Dual wipers and Pressure Relief Vent keep chips and debris out.
- Failsafe design requires air pressure to build before sensing the retracted position.
- Top Flange body style allows for hydraulic connection through face sealed o-rings or through SAE ports.
- Black anodized aluminum sensor housing for superior corrosion resistance.
- Air connection through face sealed o-rings of top flange body or externally plumbed through NPT ports on housing.
- Optional in-port flow control is a meter-in device with reverse free flow check valve.



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Model No.**	Support Capacity (lb)*	Contact Force (lb)	Work Support Stroke (in)	Shuttle Stroke (in)	Body Dia.	Piston Area (sq in)		Oil Capacity (cu in)		Max Oil Flow Rate cu in/min	Optional Flow Control Model No.***
						Extend	Retract	Extend	Retract		
Double Acting (D/A)						Cylinders, actuated hydraulically both directions					
10-0208-01	2750	5.2 - 8.6	0.38	0.50	2.12	1.62	0.52	0.81	0.26	70	70-2037-71
10-0212-01	5500	6.9 - 10.5	0.38	0.50	2.99	3.55	0.79	1.78	0.40	150	70-2037-71

* Support capacities are listed at 5,000 psi maximum operating pressure. Support capacities for other pressures must be determined by consulting the capacity graph on page B-2.
 ** Use Return Position Sensor to monitor retracted position only and not plunger advance or plunger lock.
 *** In-port flow control requires the use of manifold mount ports.

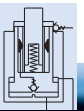
Dimensions

Model No.***	A	B*	C**	D	E	F	G	H	J	K	L	M	N	P	Q
Double Acting (D/A) ***															
10-0208-01	3.19	0.38	0.50	2.32	1.72	1.91	2.12	1.25	0.75	2.90	1.13	2.25	1.13	0.94	2.25
10-0212-01	3.41	0.38	0.50	2.69	1.72	1.91	2.99	2.00	1.25	3.69	1.56	3.13	1.56	1.28	3.12

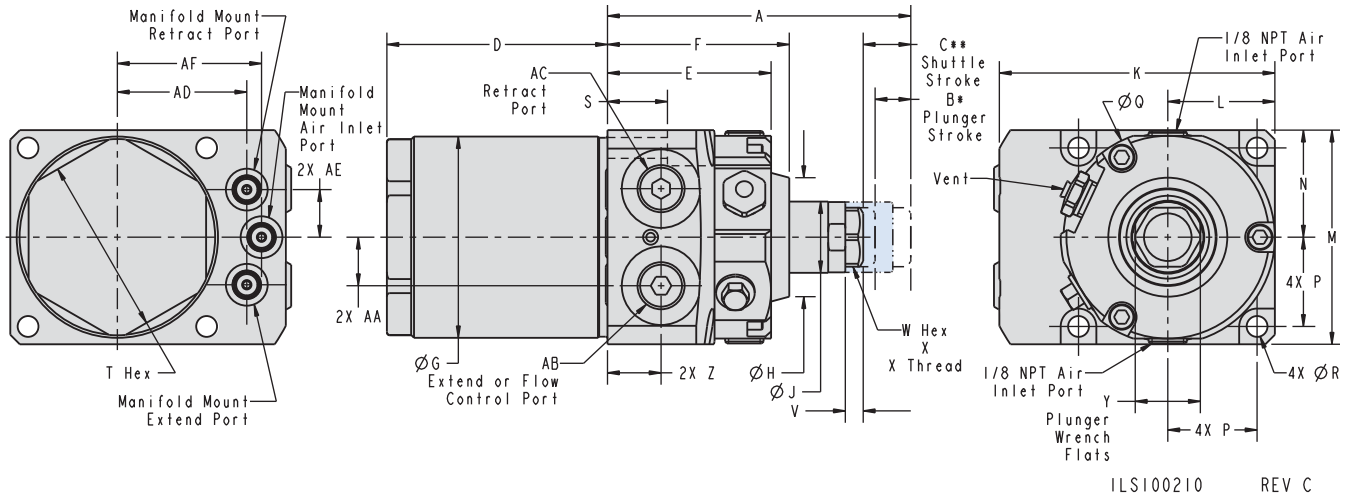
* Plunger Stroke "B" is the available work zone of the plunger. The workpiece must be positioned inside this window to prevent part ejection.
 ** Shuttle Stroke "C" is the stroke the shuttle travels to position the work support plunger relative to the workpiece. The shuttle moves the full range of this stroke every cycle.
 *** The difference between "C" and "B" (C-B) equals the minimum distance the plunger is below the workpiece in the retracted position.



TuffGrip™ Work Supports

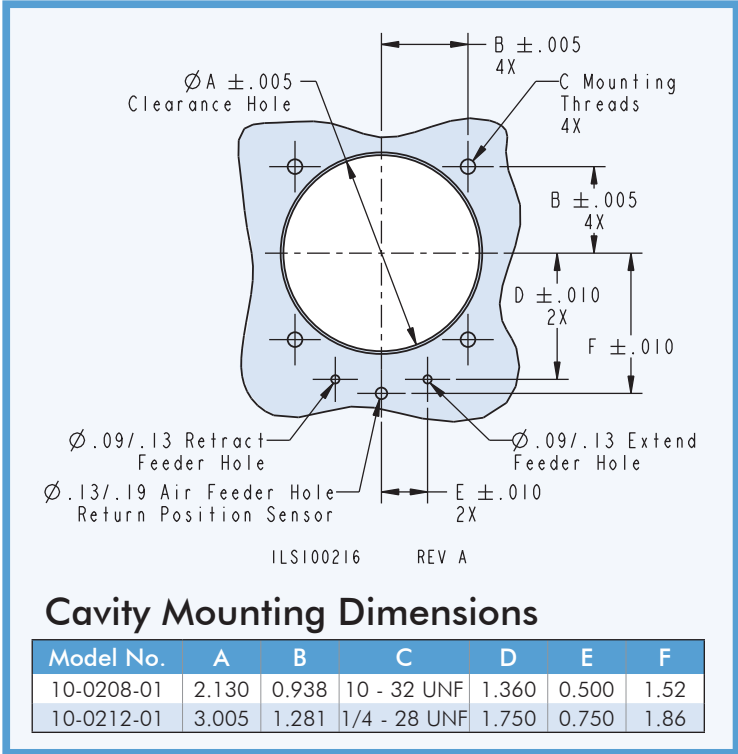


Air Position Sensing Top Flange



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For proper sealing, mating surface must be flat within 0.003 in with a maximum 63 μ in R_a surface finish.



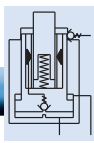
Cavity Mounting Dimensions

Model No.	A	B	C	D	E	F
10-0208-01	2.130	0.938	10 - 32 UNF	1.360	0.500	1.52
10-0212-01	3.005	1.281	1/4 - 28 UNF	1.750	0.750	1.86

	R	S	T	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF
	Cylinders, actuated hydraulically both directions													
	0.22	0.63	1.88	0.19	0.63	9/16 - 18 X 0.31	0.69	0.56	0.51	SAE 4	SAE 4	1.36	0.50	1.52
	0.28	0.70	N/A	0.25	1.00	3/4-16 X 0.50	1.13	0.56	0.63	SAE 4	SAE 4	1.75	0.75	1.86

Note: If you would like to produce your own springs for these Work Supports see dimensions drawing on Page B-8





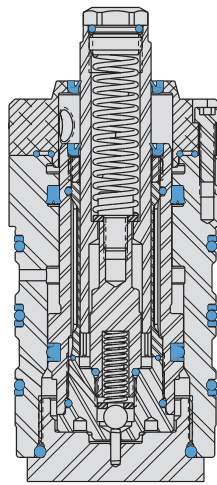
TuffGrip™ Work Supports

Air Position Sensing Cartridge

Double Acting Work Support

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- Exclusive Vekttek design eliminates part ejection and the need for any ancillary workholding devices.
- TuffGrip™ Return Position Sensors use air to communicate that the work support has retracted and is ready to load/unload.
- TuffGrip™ Return Position Sensors monitor supports to prevent crashes in automated system.
- Air Pressure Relief Vent keeps unit sealed and free of foreign material.
- Air connection through the fixture via grooved mounting screw or through NPT ports on sensor housing.
- Cartridge mount body allows hydraulic feed passages to intersect with cavity from any angle.
- Dual wipers keep chips and debris from invading support.
- Failsafe design requires air pressure to build before sensing the retracted position.
- Aluminum sensor housing is Black Anodized for superior corrosion resistance.



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Model No.**	Support Capacity (lb)*	Contact Force (lb)	Work Support Stroke (in)	Shuttle Stroke (in)	Body Dia.	Piston Area (sq in)		Oil Capacity (cu in)		Maximum Oil Flow Rate cu in /min
						Extend	Retract	Extend	Retract	
Double Acting (D/A)						Cylinders, actuated hydraulically both directions				
10-0208-03	2750	5.2 - 8.6	0.38	0.50	2.12	1.62	0.52	0.95	0.40	70
10-0212-03	5500	6.9 - 10.5	0.38	0.50	3.00	3.55	0.79	2.00	0.63	150

* Support Capacities are listed at 5,000 psi maximum operating pressure. Support capacities for other pressures must be determined by consulting the capacity graph on page B-2.

** Use Return Position Sensors to monitor retracted position only and not plunger advance or plunger lock.

Dimensions

Model No.	A	B*	C**	D	E	F	G	H	J	K	L
Double Acting (D/A) ***											
10-0208-03	2.81	0.38	0.50	2.75	1.34	1.54	2.12	1.25	0.75	2.25	1.13
10-0212-03	3.16	0.38	0.50	2.94	1.47	1.66	3.00	2.00	1.25	3.13	1.56

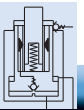
* Plunger Stroke "B" is the available work zone of the plunger. The workpiece must be positioned inside this window.

** Shuttle Stroke "C" is the stroke the shuttle travels to position the work support plunger relative to the workpiece. The shuttle moves the full range of this stroke every cycle.

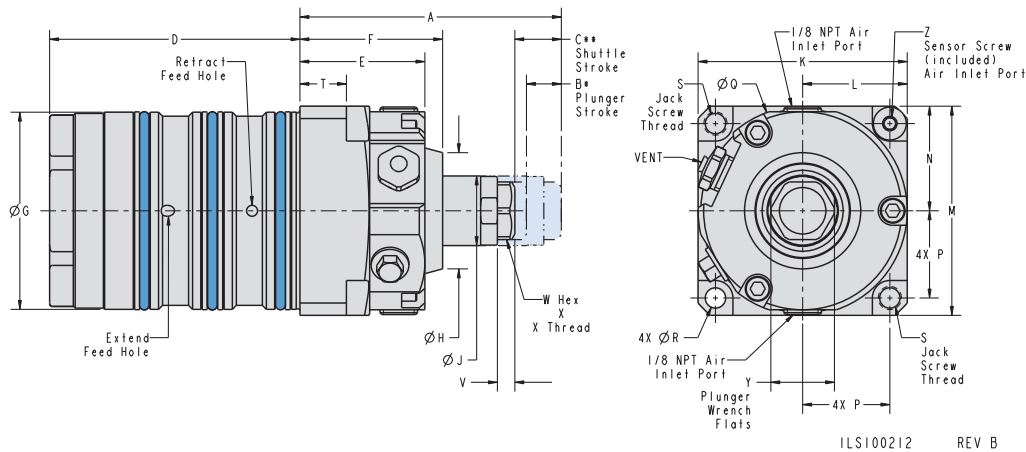
*** The difference between "C" and "B" (C-B) equals the minimum distance the plunger is below the workpiece in the retracted position.

Note: If you would like to produce your own springs for these Work Supports see dimensions drawing on Page B-8





Air Position Sensing Cartridge



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Suggested cavity machining techniques preferred by Vektex Engineering:

- * Roller burnish bore if possible, roundness within 0.001 inches.
- * Ball hone (or equivalent) bore to smooth transitions and round chamfer edges.
- * Lube o-ring seals with grease prior to installation.
- * Vent bottom side of cavity to aid insertion of the Work Support into the cavity.

Cavity Mounting Dimensions

Model No.	A	B	C	D	E	F	G
10-0208-03	2.126	0.938	10 - 32 UNF	1.84	2.156	2.120	2.813
10-0212-03	3.001	1.281	1/4 - 28 UNF	1.84	2.156	2.995	3.000

Model No.	H	J	K	L	M	N	P
10-0208-03	0.317	0.772	1.110	1.565	2.172	0.545	1.338
10-0212-03	0.317	0.772	1.110	1.565	3.047	0.545	1.338

NOTE: Flexible honing of cavity is strongly recommended. Flex-Hone™ is a registered trademark of Brush Research Manufacturing Co. Inc., Los Angeles, CA, 323-261-2193. Please contact Brush Research for additional information.

M	N	P	Q	R	S	T	V	W	X	Y	Z
Cylinders, actuated hydraulically both directions											
2.25	1.13	0.94	2.25	0.22	1/4 - 28 UNF	0.50	0.19	0.63	9/16 - 18 X 0.31	0.69	10 - 32 X 3/4
3.13	1.56	1.28	3.12	0.28	5/16 - 24 UNF	0.50	0.25	1.00	3/4 - 16 X 0.50	1.13	1/4 - 28 X 1

Position Sensor Air Supply:

Connecting air to the Return Position Sensor without using external air lines and fittings.

- 1 Machine an air feeder hole to any one of the four threaded mounting holes in the fixture.
- 2 Install o-ring into groove on bottom side of the work support flange.
- 3 Install the work support into cavity and rotate it so that the mounting hole with the corresponding air passage aligns with the fixture mounting hole that includes the air supply hole.
- 4 Install the bonded seal onto grooved mounting screw, thread into fixture and torque.

Grooved Mounting Screw Torque Chart

Work Support Model No.	Torque (in - lb)
10-0208-03	20
10-0212-03	50

NOTE: Grooved mounting screw, bonded seal and o-ring included.

