

TuffGrip™ Work Supports

Double Acting Top Flange

Double Acting Work Support

B-3

- TuffGrip™ Top Flange models are available in 2750 lb. or 5500 lb. capacities at 5,000 psi.
- Innovative design features a spring advanced work support within a double acting shuttle cylinder.
- TuffGrip™ sleeve design is 2.5 times thicker than other work support models on the market.
- Efficiently closes and uniformly grips making this design superior in precision applications.
- Exclusive Vektek design eliminates part ejection and the need for any ancillary workholding devices.
- Top flange body style allows for hydraulic connection through face sealed o-rings or through SAE ports.
- Sealed design and two wipers keep chips out and your work support running smoothly.
- BHC™ (Black Hard Coat) body, hard chrome plated shuttle piston, and stainless steel plunger to extend life in a harsh machining environment.



U.S. Patent No.
8,444,128

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	Optional Flow Control Model No.**
						Extend	Retract	Extend	Retract		
Double Acting (D/A)						Cylinders, actuated hydraulically both directions					
10-0208-00	2750	3.5-7.0	0.38	0.50	2.12	1.62	0.52	0.81	0.26	70	70-2037-71
10-0212-00	5500	4.4-8.1	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.
 ** In-port flow control requires the use of manifold mount ports.

Optional in-port flow control is a meter-in device with reverse free flow check valve.



Dimensions

Model No.***	A	B*	C**	D	E	F	G	H	J	K	L	M	N	P
Double Acting (D/A)***														
10-0208-00	2.63	0.38	0.50	2.32	1.13	1.75	2.12	1.19	0.75	2.90	1.13	2.25	1.13	0.94
10-0212-00	2.75	0.38	0.5	2.69	1.13	1.75	2.99	1.88	1.25	3.69	1.56	3.13	1.56	1.28

* 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 part in the retracted position.

Note: If you would like to produce your own springs for these Work Supports see dimensions drawing on Page B-6



TuffGrip™ Work Supports

Features, Capacity and Elastic Deformation

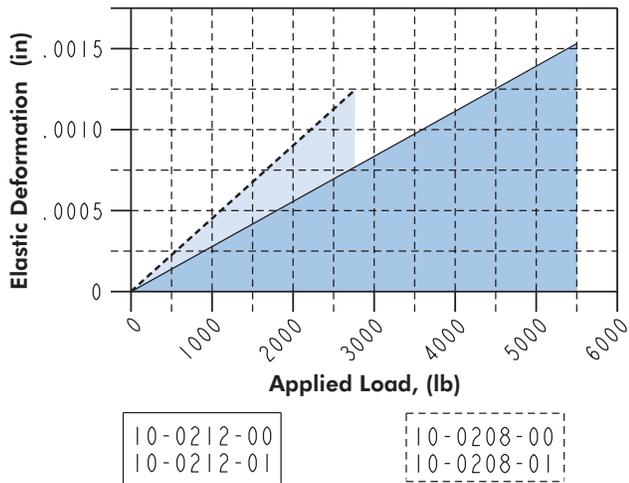
TuffGrip™ Work Support Features

- Exclusive Vektek design eliminates part ejection of any workpiece and the need for ancillary part retention devices.
- All TuffGrip™ styles are available in 2750 lb. and 5,500 lb. capacities at 5,000 psi.
- Innovative design features a spring advanced work support within a double-acting shuttle cylinder.
- A wiper at the shuttle and at the plunger keep chips out and your work support running smoothly.
- TuffGrip™ sleeve design is 2.5 times thicker than other work support models on the market. This sleeve efficiently closes and uniformly grips the plunger making it superior in precision applications.
- BHC™ (Black Hard Coat) body, hardened chrome shuttle piston and stainless steel plunger promote long life in harsh machining environments. The Position Sensing option is an aluminum housing that is Black Anodized for corrosion resistance.



B-2

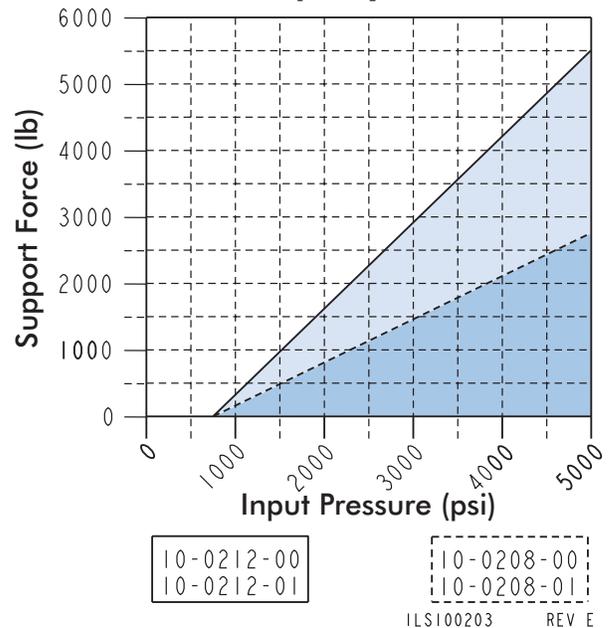
**Elastic Deformation
Double Acting Work Supports**



Elastic deformation is the amount that the work support compresses under an applied load, at an input pressure of 5,000 psi, when measured from the mounting flange to the contact bolt. This value returns to zero when the load is removed.

ILS100205 REV C

**Double Acting Work Support
Capacity Chart**



ILS100203 REV E

Double Acting Work Support Operation

Advance: Hydraulic pressure extends the shuttle cylinder to the full stroke position, moving the work support plunger to the part. The spring advanced plunger will contact the part during the shuttle extension applying only spring force. Internal sequencing occurs after the shuttle is fully extended allowing hydraulic pressure to lock the plunger inside the sleeve.

Retract: The sleeve maintains its locked condition while hydraulic pressure retracts the shuttle. On reaching the full retracted position, the sleeve unclamps and the plunger returns to its spring advance state at least 0.125 inches below the part (may be separated from the part by as much as 0.50 inches).



TuffGrip™ Work Supports

Frequently Asked Questions, Operation

When do I need to use TuffGrip™ double-acting over other Work Supports?

You will want to use TuffGrip™ Work Supports whenever your application requires positive retraction of the work support plunger such as in automatic/unattended applications. The support plunger is retracted when hydraulic pressure reduction pulls back the shuttle cylinder. You will not be relying on a mechanical spring to return the plunger to its initial starting position.

Consider TuffGrip™ Work Supports whenever your application requires extremely tight tolerances. When pressurized, the TuffGrip™ Work Support sets the industry standard for minimizing elastic deformation and maximizing uniformity in clamping surface stability.

You will want to use TuffGrip™ Work Supports in applications where the single acting fluid advanced work support might kick your part out of position when unclamp occurs. The hydraulic pressure on the sleeve gripping the plunger is maintained until the double-acting positioning piston retracts. An internal check valve opens to release the pressure on the sleeve. The plunger is released only after it has been pulled back from the workpiece. This “shuttle” action prevents “workpiece ejection” that might be experienced with single acting fluid advanced Work Supports.

I understand that this work support has two (2) strokes, a shuttle stroke and a work support stroke. Do these strokes add one upon the other resulting in a total stroke of 0.875 inches?

No, the support plunger stroke is contained within the piston shuttle stroke. Because the work support plunger is spring advanced it is extended while the sleeve is unlocked. The shuttle strokes forward causing the extended plunger to contact the part and compress the spring. Finally, the internal sleeve locks the plunger in place.

Does the shuttle extend and stroke the full 0.50 inches every time?

Yes, the advance shuttle will travel a full stroke every time. However, it stops on an internal component allowing the inside sequencing to lock the work support plunger.

Where do I position my part so it is in the work support plunger “working zone”?

Position the part in the middle of the plunger stroke. The catalog chart lists a dimension that represents the fully extended length. For best performance, position your part at the fully extended shuttle stroke minus half of the plunger stroke.



I thought it was wrong to clamp over a column of fluid! How can I clamp over a work support that is inside a cylinder supported by hydraulic fluid?

While it is not the best option to clamp over a column of fluid, neither is it always wrong. Certain considerations must be addressed and adhered to when this is done. In this application, the work support is supported by the advance cylinder which is held firmly against a shoulder inside the body. This positioning is maintained by a 3:1 ratio of seating force verses the support force of the work support plunger. This advance/support ratio has shown to be the most stable combination, and has the least elastic deformation compared to other units on the market.

2750 lb TOP FLANGE DOUBLE ACTING WORK SUPPORT CYCLE

