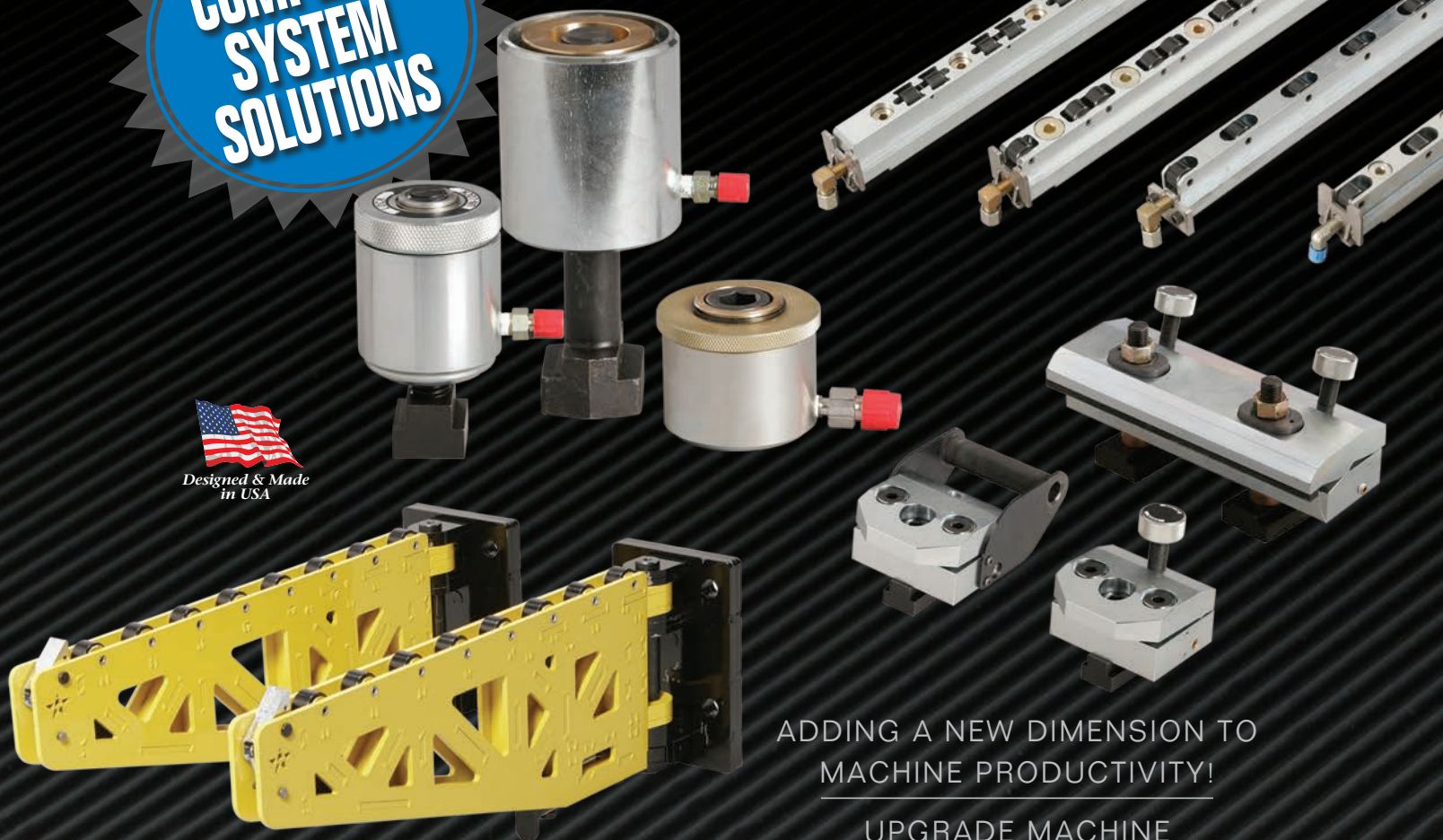


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Bolster Extensions
Hydraulic Power
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NOTE: All products are assumed to be operated by PFA hydraulic sources at standard pressures of 5,000 psi hydraulic. For other pressures and pressure sources, contact PFA for further recommendations. Selection of any product for any application is the responsibility of the customer. PFA assistance and recommendations are not a substitute for proper review and selection by customer. PFA Terms of Sale apply. Dimensions are provided for reference only and subject to change without notice. Contact PFA regarding critical dimensions for any application prior to ordering.

CONTENTS

Hydraulic High Performance Clamping and Lifting Systems

Nut Clamps	4
Ledge Clamps	6
Adjustable Rocker Clamps	8
C Clamps (Slide Clamps)	10
Hydraulic Die Lifters/Rollers	11
(In Line Rollers, Side Load Rollers, Ball Rollers)	

Hydraulic Power for Clamps and Die Lifter Rails

Hydraulic Control Units	15
Mechanical Value Power Units	16
Electronic Valve Power Units	19

Pneumatic Lifting

Pneumatic (Air Bag) Die Lifters	20
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Mechanical Clamping and Lifting Systems

Quick Set Clamps	22
Die Lifters/Rollers	24
Stationary Spring Loaded Die Lifter Rails	25
Spring Loaded Ball Cartridges	26
Hand Operated and Portable Mechanical Die Lifters and Lifter Systems	27
Bolster Extensions	28
Lift-Off Bolster Extensions	29
Swing-Away Bolster Extensions	30
Detachable Bolster Extensions	31
Traveling & Slotless Bolster Extensions	32

HYDRAULIC CYLINDER STYLE NUT CLAMPS



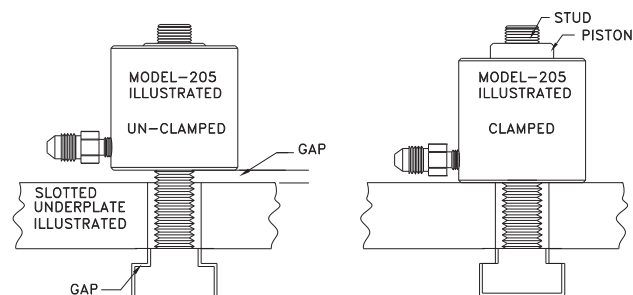
Use Nut Clamps with dies having slotted die plates or U-Slot brackets.

WHEN TO USE NUT CLAMPS:

Use Nut Clamps with dies having slotted die plates and enough clearance for the Nut Clamp body (see chart). U-Slot brackets or ears may also be added to dies in some applications.

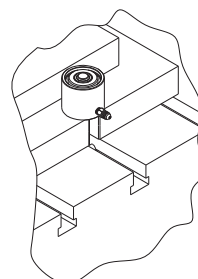
If systems are setup to have hydraulics removed during stamping, Hydra Mechanical (L style) clamps (with a mechanical lock) should be selected. If a dedicated hydraulic system is considered, the Fully Hydraulic clamps (with either multiple upper zone control or check valves) may be the preferred choice.

Clamp model and quantity should be selected to provide a total clamping force greater than the total (static and dynamic) force applied to the system during use.

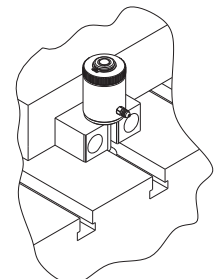


HOW THEY WORK:

Nut Clamps are moved into position in a slot in the die plate (gaps between clamp and die/slot allow movement). When hydraulic pressure is applied, the clamp pulls upward on the T-bolt and the clamp body moves downward to clamp the plate. Hydraulic pressure is maintained during operation, or the Locking Nut (L style) is engaged to allow removal of clamp hydraulic pressure during stamping. To unclamp, hydraulic pressure is removed and clamps open under internal spring force. (Note: Reapplication of hydraulics is required to unlock the Locking Clamps (L) prior to releasing pressure and unclamping). For information on PFA's Hydraulic Control Units, see page 15.

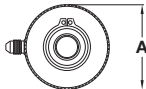
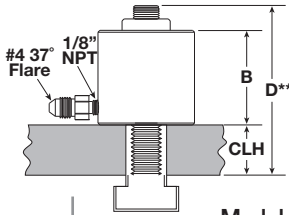
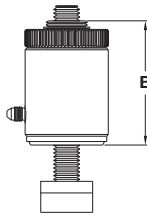
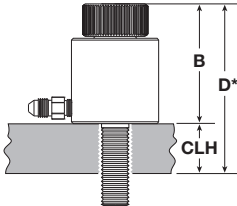












*Series 200:
Full Hydraulic with
slotted clamp plate.*



*Series 200L:
Hydra Mechanical (L) with
added U-Slot bracket.*

STANDARD PFA CONFIGURATIONS

STANDARD PFA CONFIGURATIONS						200/201/205				200L/201L/205L				TH Option			
																	
Model 200/200L						Model 201/201L				Model 205/205L							
Bolster/Ram Interface		T-Slot 3/4" or 1"		Threaded Hole (TH)		T-Slot 1" only		T-Slot 5/8", 3/4" or 1"		Threaded Hole (TH)							
Clamping Force at 5,000 PSI		10,000 lbs.				15,000 lbs.				8,000 lbs.							
Clamping Stroke		.29"				.60"				.25"							
Standard Thread Size		3/4" - 10		Hole Size*** 5/8" - 11x1.85 minimum		1" - 8		5/8" - 11		Hole Size*** 1/2" - 13x1.85 minimum							
A		2.50"				3.12"				2.00"							
B	Full Hydraulic (without lock)	2.20"		3.00"		3.50"		2.00"		2.65"							
	Hydra Mechanical (L) (with lock)	3.20"		4.00"		4.90"		3.00"		3.65"							
D**	CLH*	NO LOCK	LOCK (L)	NO LOCK	LOCK (L)	NO LOCK	LOCK (L)	NO LOCK	LOCK (L)	NO LOCK	LOCK (L)						
	.50"	3.50"	4.00"	3.50"	4.50"	4.00"	6.00"	3.25"	3.75"	3.15"	4.15"						
	.75"	3.50"	4.25"	3.75"	4.75"	4.25"	6.25"	3.25"	4.00"	3.40"	4.40"						
	1.00"	4.00"	4.50"	4.00"	5.00"	4.50"	6.50"	3.75"	4.25"	3.65"	4.65"						
	1.25"	4.00"	4.75"	4.25"	5.25"	4.75"	6.75"	3.75"	4.50"	3.90"	4.90"						
	1.50"	4.50"	5.00"	4.50"	5.50"	5.00"	7.00"	4.25"	4.75"	4.15"	5.15"						
	1.75"	4.50"	5.25"	4.75"	5.75"	5.25"	7.25"	4.25"	5.00"	4.40"	5.40"						
	2.00"	5.00"	5.50"	5.00"	6.00"	5.45"	7.50"	4.75"	5.25"	4.65"	5.65"						
	2.50"	5.50"	6.00"	5.50"	6.50"	5.95"	8.00"	5.25"	5.75"	5.15"	6.15"						
**	**	**	**	**	**	**	**	**	**	**	**						
Weight		3.0 lbs.		5.0 lbs.		8.5 lbs.		2.0 lbs.		3.0 lbs.							
																	

Example: 13,000 lb. die typically uses a 15,000 lb. clamp such as Model 201. Clamp plate thickness (CLH) is 1.0". 1" T-Slot.

Clamp Style	Model Number	Clamp Height*	Slot Type
NC	See chart above	Clamp Plate Thickness (CLH)	5/8" slot = 5/8 3/4" slot = 3/4 1" slot = 1 Threaded Hole = TH***
NC	201	1.0	1

Part No: **NC-200-1.0-3/4**

*Clamp Height (CLH) based on standard JIC T-Slot dimensions. T-Slot dimensions are typically: (Neck height is .750" for 5/8" slot, .875" for 3/4" slot, 1.000" for 1" slot).

**D=Product height installed is related to clamp height needed for clamp plate thickness. Stock sizes listed, but others are easily available. Dimension is worst case based on the smallest slot neck height and includes 1/4" clearance for slot variation.

***For TH models, threaded rod will engage bolster 1.3" minimum and range from 1.35" to 1.75" typical. If application is unique, call PFA for assistance.

HYDRAULIC, FIXED CLAMP HEIGHT, ROCKER STYLE

LEDGE CLAMPS



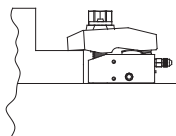
Use Ledge Clamps (Fixed Clamp Height Rocker Clamps) with dies having a clamp plate that sticks out from the die body or has a large slot.

WHEN TO USE FIXED CLAMP HEIGHT ROCKER CLAMPS:

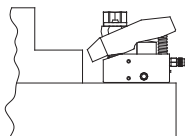
Use Fixed Clamp Height Rocker Clamps with dies having an open ledge clamp plate or a slot in the die large enough to accommodate the clamp nose for full clamp engagement. Ledge brackets, bars, or ears may also be added to dies in some applications to accommodate the clamps and/or plates milled to set a common clamp height.

If systems are setup to have hydraulics removed during stamping, Hydra Mechanical (L style) clamps (with a mechanical lock) should be selected. If a dedicated hydraulic system is considered, the Fully Hydraulic clamps (with either multiple upper zone control or check valves) may be the preferred choice.

Clamp model and quantity should be selected to provide a total clamping force greater than the total (static and dynamic) force applied to the system during use.



Clamp securing die. Pistons are partially extended and providing force before reaching end of stroke.

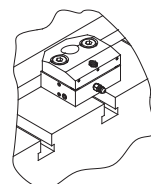


Clamp actuated away from die. Pistons are fully extended.

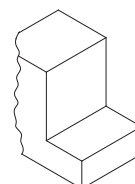
HOW THEY WORK:

Ledge Clamps are moved into position with the lower body stop set against the die plate (gaps between clamp and die/slot allow movement) or may be permanently mounted on one side to act as a side stop.

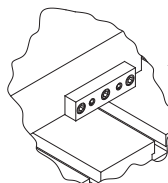
When hydraulic pressure is applied, the clamp nose moves downward onto the plate, clamping the die. Hydraulic pressure is maintained during operation, or the Locking Nut (L style) is engaged to allow removal of clamp hydraulic pressure during stamping. To unclamp, hydraulic pressure is removed and clamps open under internal spring force. (Note: Reapplication of hydraulics is required to unlock the Locking Clamps (L) prior to releasing pressure and unclamping).



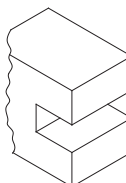
Underplate



Parallel with Ledge

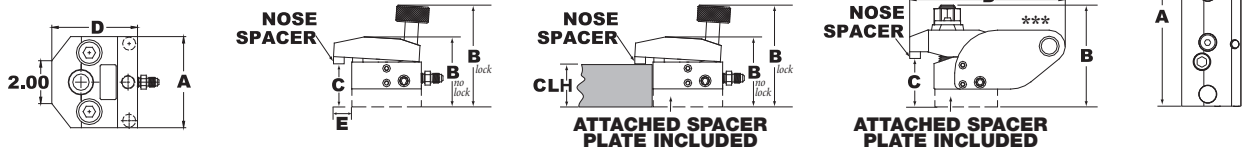


Bolt-on Bar



Parallel with Slot

STANDARD CLAMP CONFIGURATIONS



***HANDLES (H) AVAILABLE ON ALL MODELS		Model 425	Model 425L	Model 428	Model 428L	Model 126	Model 126L	Model 128	Model 128L
Clamping Force at 5,000 PSI		8,000 lbs.		10,000 lbs.		22,000 lbs.		26,000 lbs.	
T-Nut Spacing		N/A		N/A		6"		6"	
A		4.25" no handle 4.50" with handle		4.25" no handle 4.50" with handle		12"		12"	
B**	CLH*	NO LOCK	LOCK (L)	NO LOCK	LOCK (L)	NO LOCK	LOCK (L)	NO LOCK	LOCK (L)
	.50"	2.75"	4.25"	3.75"	4.25"	2.75"	4.25"	3.75"	4.25"
	.75"	2.75"	4.25"	3.75"	4.25"	2.75"	4.25"	3.75"	4.25"
	1.00"	2.75"	4.25"	3.75"	4.25"	2.75"	4.25"	3.75"	4.25"
	1.25"	3.00"	4.50"	3.75"	4.25"	3.00"	4.50"	3.75"	4.25"
	1.50"	3.25"	4.75"	4.00"	4.50"	3.25"	4.75"	4.00"	4.50"
	1.75"	3.50"	5.00"	4.25"	4.75"	3.50"	5.00"	4.25"	4.75"
	2.00"	3.75"	5.25"	4.50"	5.00"	3.75"	5.25"	4.50"	5.00"
	2.50"	4.25"	5.75"	5.00"	5.50"	4.25"	5.75"	5.00"	5.50"
C		Jaw Opening to Match CLH* + .18" gap		Jaw Opening to Match CLH* + .18" gap		Jaw Opening to Match CLH* + .18" gap		Jaw Opening to Match CLH* + .18" gap	
D		4.00" no handle 7.25" with handle		4.75" no handle 7.25" with handle		4.00" no handle 7.25" with handle		4.75" no handle 7.25" with handle	
E		.88" Max.		1.14" Max.		.83" Max		1.12" Max.	
Weight (approx.)		8 lbs. ***		12 lbs.		25 lbs.		35 lbs.	

*CLH= Clamping height – Nominal Clamp Plate Thickness based on clamping plate being within 0.030" of nominal. Clamp plate may be thicker than CLH as desired but less than the 0.18" total gap available. Clamps are provided with "C" open dimension, which is the CLH + 0.18" gap to allow for an option of .090" die lifter rail clearance and .060"-.090" air clearance for moving clamp in and out of position - allows lifting and moving dies under open clamps if necessary. Difference between C dimension and Actual Clamping Height should not exceed 0.18" which is 1/2 of the 0.36" total stroke of the clamp. Clamping height is also based on standard JIC T-Slot dimensions for T-nut sizing. T-Slot dimensions are typically neck height .875" for 3/4" slot and 1.00" for 1" slot.

** B = Product Height Dimension is related to clamp height needed for clamp plate thickness. Stock sizes listed, but others are easily available. Allow 1/2" more for nominal variations.

***Handles (H) available on all models. Contact PFA for details.

Example: 8,000 lb. die. Use 8,000 clamp such as Model 425, clamp plate thickness (CLH) is 1.0" and has 3/4 T-Slot.

Clamp Style	Model Number	Clamp Height*	Slot Type
	See chart above	Clamp Plate Thickness (CLH)	3/4" slot = 3/4 1" slot = 1
RC	425LH	1.0	3/4

Locking (L) and Handle (H) are added directly after the main model number. Examples are 425, 425L, 425H and 425LH.

Part No: **RC-425LH-1.0-3/4**

HYDRAULIC “LEDGE LIKE” AND NARROW STYLE **ADJUSTABLE ROCKER CLAMPS**



Use Adjustable Rocker Clamps with dies having a cutout clamp position, narrow slot, extended clamp plate and/or variable clamp plate thickness.

WHEN TO USE ADJUSTABLE ROCKER CLAMPS:

Use Adjustable Rocker Clamps with dies having a cutout clamp position, narrow slot in the die or for typical clamp plate applications with variable clamp plate thickness across several dies. Also, ledge brackets, blocks, bars, or ears may be added to dies in some applications to accommodate the clamps and/or small slots cut into the dies to accept the smaller clamp nose.

If systems are setup to have hydraulics removed during stamping, Hydra Mechanical (L style) clamps (with a mechanical lock) should be selected. If a dedicated hydraulic system is considered, the Fully Hydraulic clamps (with either multiple upper zone control or check valves) may be the preferred choice.

Clamp model and quantity should be selected to provide a total clamping force greater than the total (static and dynamic) force applied to the system during use.

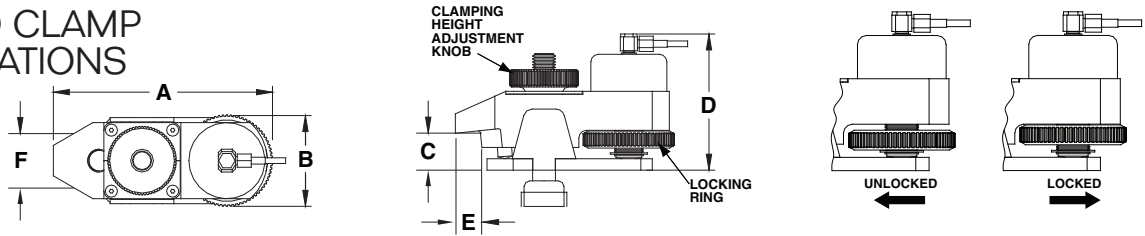
HOW THEY WORK:




The Adjustable Rocker Clamps are moved into position with the lower body stop set against the die plate (gaps between clamp and die/slot allow movement).

The center height adjustment knob is turned clockwise until the nose of the clamp touches the clamp plate.

When hydraulic pressure is applied, the clamp nose moves downward onto the plate, clamping the die. Hydraulic pressure is maintained during operation, or the Locking Nut (L style) is engaged to allow removal of clamp hydraulic pressure during stamping. To unclamp, hydraulic pressure is removed and clamps open under internal spring force. (Note: Reapplication of hydraulics is required to unlock the Locking Clamps (L) prior to releasing pressure and unclamping). After the clamp is released, the adjustment knob is turned to further open the clamp, as desired. For information on PFA's Hydraulic Control Units, see page 15.

STANDARD CLAMP CONFIGURATIONS



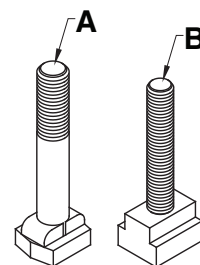
		Model 661	Model 661L	Model 825	Model 825L	Model 835	Model 835L
Clamping Force at 5,000 PSI		3,500 lbs.		8,000 lbs.		17,000 lbs.	
Stud Thread Size		5/8" - 11		3/4" - 10		1" - 8	
T-Nut/Slot Style		3/4" or 1"		3/4" or 1"		1"	
A		5.25"		7.5"		9.6"	
B		1.75"		2.50"		4.00"	
C**	CLH*	<u>Nominal Clamping Range</u>		<u>Nominal Clamping Range</u>		<u>Nominal Clamping Range</u>	
	1.0	3/4" - 1 1/4"		7/8" - 1 3/4"		---	
	2.0	1 3/4" - 2 1/4"		1 7/8" - 2 3/4"		1 1/4" - 2 1/2"	
	3.0	2 3/4" - 3 1/4"		2 7/8" - 3 3/4"		2 1/4" - 3 1/2"	
	*	*		*		*	
D**	CLH*						
	1.0	3.75"		4.75"		6.00"	
	2.0	4.75"		5.75"		7.00"	
	3.0	5.75"		6.75"		8.00"	
E (Nose Over Plate)		.75"		.87"		1.00"	
F (Width at Plate)		1.10"		2.00"		2.60"	
Weight (approx.)		5 lbs.		13 lbs.		32 lbs.	
							

*Nominal clamp height for part number selection. Actual clamp range for selected unit listed in chart. Customs available.

C** and D**= Product clamping range and height dimension is related to nominal Clamping Plate Thickness (CLH) chosen. Allow 1" height clearance for nominal variations and actuation.

Example: 6,000 lb. die. Use 8,000 clamps such as Model 825L, clamp plate thickness (CLH) is 1.0" and has 3/4 T-Slot.

Clamp Style	Model Number	Clamp Height*	Slot Type
	See chart above	Clamp Plate Thickness (CLH)	3/4" slot = 3/4 1" slot = 1
RC	825L	1.0	3/4



Clamps are provided with T-Slot Bolt (A) or Fully Threaded Stud and T-Nut (B), depending on availability.

Part No: **RC-825L-1.0-3/4**

HYDRAULIC, FIXED CLAMP HEIGHT, SLIDING STYLE

C CLAMP

"C" Clamps work in similar applications to our fixed height ledge clamps, but provided a different profile and customer preference. Using small Bolt-on guides, these clamps also work well in "slotless" press applications (bolsters with threaded holes only). Also, by reaching under and over the clamping plate and providing multiple ports, the clamp can be set "deeper" over the plate if needed, resulting in a lower installed profile.

Available in the single piston style Model 283 and double piston style Model 283D, "C" clamps require only 1.25" to 1" of die plate engagement, respectively, and may be modified at the nose to engage plates that have been pocketed to match clamp heights. Ledge brackets, bars, or ears may also be added to dies in some applications to accommodate the clamps. Clamp model and quantity should be selected to provide a total clamping force greater than the total (static and dynamic) force applied to the system during use.

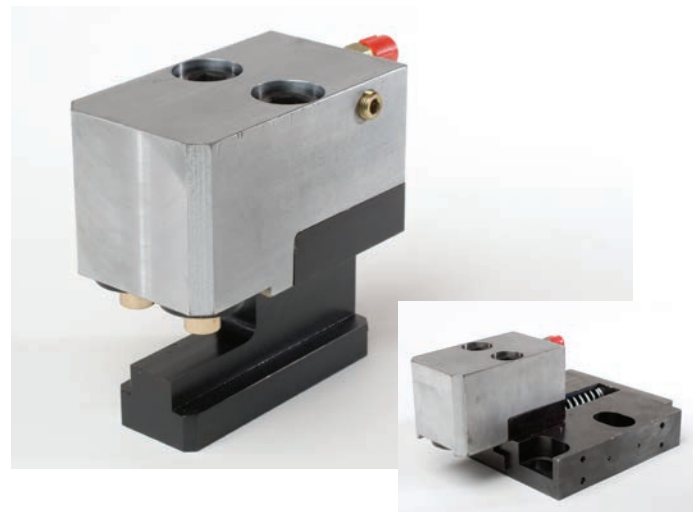
Clamp sizing is done to provide a minimum .060" clearance to the clamp plate and accommodate a wide range of slot neck height and clamp plate height combinations. For a given T-slot neck depth (N) and clamping plate height (CLH) the needed part number can be easily determined.

	Model 283	Model 283D
Clamp Force at 5,000 PSI	6,700 lbs	6,900 lbs.

Clamp Height CLH	Slot Neck Depth (N) Range			
	.50"-.75"	.75"-1.00"	1.00"-1.25"	.25"-1.50"
3/4"	-50	-75	-100	-125
1"	-75	-100	-125	-150
1 1/4"	-100	-125	-150	-175
1 1/2"	-125	-150	-175	-200
1 3/4"	-150	-175	-200	-225
2"	-175	-200	-225	-250
**				

*For a given N and CLH find the correct Dash No. or use H values (exact total clamp opening).

**Other sizes available. Please call PFA for details.



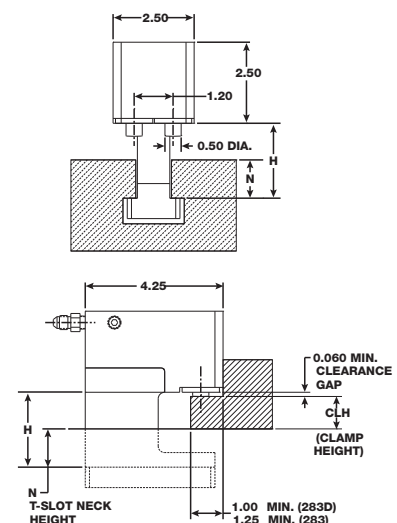
Example:

Application requires clamps with 6,000 lbs. clamp force. T-slot is 3/4" and has a neck (throat) depth of .875". Clamp height (CLH) = 1". Enter top of chart with Neck Depth of .875" (.750-1.00) and side of chart with CLH value (1") to obtain (-100) with an "H" value of 2.06"

Clamp Style	Model Number	Slot Type	Dash No.
	283 or 283D	3/4" slot = 3/4 1" slot = 1	See chart
CC - 283D - 1 - 100			

Part No: **CC-283D-1-100**

Dash No.	H*
-50	1.560"
-75	1.810"
-100	2.060"
-125	2.310"
-150	2.560"
-175	2.810"
-200	3.060"
-225	3.310"
-250	3.560"
**	



HYDRAULIC

DIE LIFTERS/ROLLERS



Use Hydraulic Die Lifters for effort free lifting of medium and heavy duty dies.

WHEN TO USE HYDRAULIC DIE LIFTERS:

Use hydraulic die lifters when die weights are typically standard for medium to large presses. Dies with a small footprint relative to the die weight will typically require Hydraulic Die Lifters.

In addition to a large lifting force, hydraulic actuation allows for easy and controlled movement of the die only when desired, in contrast to spring loaded lifters, typically used in light die applications.

Inline rollers provide for movement along the rail and transverse rollers for movement 90 degrees to the slot direction. Ball roller rails allow for movement in any direction but are generally more limiting in overall die weights.

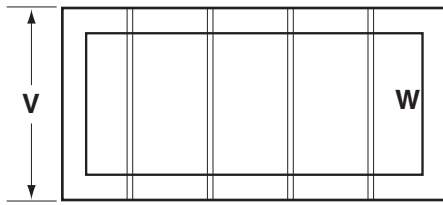
HOW THEY ARE USED:

Hydraulic Die Lifter Rails are secured in the slots via the included mounting bracket. Stand offs ensure the rails are captured in the slots, yet move freely up and down prior to die insertion.

The rails are activated using a PFA Hydraulic Control Unit, placing them in the "lifted" position. The die is then inserted by "rolling" into the press and lowered by rotating the control valve to the "lower" position (venting pressure). After insertion, the die may be indexed into position using an additional pair of transverse rollers lifting the die, alternating use of the transverse lifters and inline lifters, using a single pair of ball roller rails, or by other means. For information on PFA's Hydraulic Control Units (Power Units), see page 15.

HOW TO DETERMINE AVAILABLE DIE LIFTER RAIL OPTIONS

1. List out die sizes and weights. Calculate die load per foot, per pair of lift rails. **(W=WIDTH IN FEET)**



Die 1 Weight _____ ÷ W = _____ lbs./ft./pair

Die 2 Weight _____ ÷ W = _____ lbs./ft./pair

Die 3 Weight _____ ÷ W = _____ lbs./ft./pair

Determine heaviest die per foot.

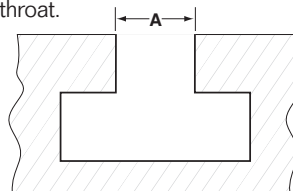
Heaviest die density lb./ft./pair = _____

2. Measure T-Slot or Rectangular channel throat.

If A = .800 to 1.000, use Narrow Rails

If A = 1.000 to 1.25, use Wide Rails

If A = <.800 or >1.25, contact PFA



3. For the heaviest die, check the number of available slots under the die:

Number of available slots = _____

(See Chart Below)

4. Take the die density from Part 1 and find the closest larger lbs./ft./pair from the chart below. Then move across the top to find your desired die lifter style keeping in mind the Narrow or Wide from Part 2 and the number of available slots from Part 3.

5. Record the rail model number and number of needed rails from the chart:

Model _____ Quantity _____

Model _____ Quantity _____

Model _____ Quantity _____

6. Select the Model you desire from the chart on page 13:

7. For the selected model, confirm that the number of rails always supports the dies as follows:

W ft.	Chart lbs./ft./pair	No. of Rails	Lift Capacity	Weight lbs
----------	------------------------	-----------------	------------------	---------------

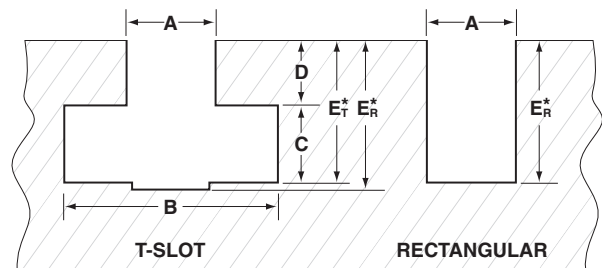
Die 1 _____ x _____ x _____ ÷ 2 = _____ > _____

Die 2 _____ x _____ x _____ ÷ 2 = _____ > _____

Ensure lift capacity is greater than die weight.

8. Use the Model Number and Bolster Length (V) to determine the rail length desired (see page 13). Lifter will be flush with the loading side and should be near the back side but less than length (V). (Continue with Step 9)

9. With the model and length determined, the profile and final shape of the rail must be calculated. Page 14 provides simple calculations to obtain the final information for the part number.








*Rectangular rails are recommended for all slots and are preferred. When calculating part number, be certain to use the proper E_R for rectangular rails or E_T for T-shaped rails.

NOTE: Rail sizing is done for a nominal lift height of the die of approximately .060" - .080" above the bolster surface. If other heights above the surface are desired, contact PFA for easy sizing to those requirements.

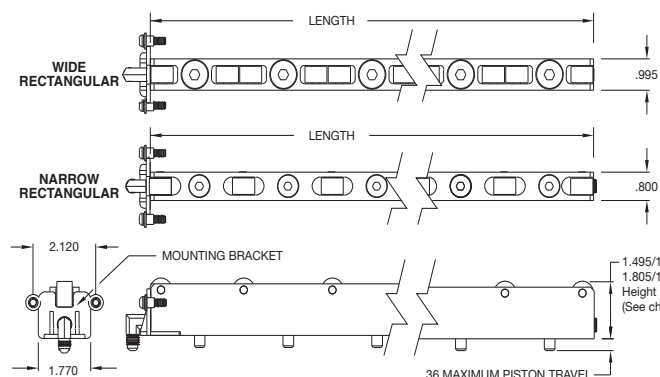
DIE DENSITY (lbs./ft./pair)	NARROW SLOT		WIDE SLOT		
	BALL ROLLERS 317N/318N (1,800 lbs./ft./pr.)	CYLINDER ROLLERS 315N/316N (1,800 lbs./ft./pr.)	BALL 317W/318W (2,150 lbs./ft./pr.)	ROLLERS 315W/316W/322W (4,000 lbs./ft./pr.)	HEAVY DUTY ROLLERS 327W/328W (9,000 lbs./ft./pr.)
1,800	2 Rails	---	2 Rails	---	---
2,150	3 Rails	2 Rails	2 Rails	2 Rails	---
2,700	3 Rails	2 Rails	3 Rails	2 Rails	---
3,225	4 Rails	2 Rails	3 Rails	2 Rails	---
3,600	4 Rails	2 Rails	4 Rails	2 Rails	---
4,000	5 Rails	2 Rails	4 Rails	2 Rails	---
4,300	5 Rails	3 Rails	4 Rails	3 Rails	2 Rails
4,500	5 Rails	3 Rails	5 Rails	3 Rails	2 Rails
5,500	6 Rails	3 Rails	5 Rails	3 Rails	2 Rails
6,000	**	**	**	**	**

**For large die densities, call PFA.

STANDARD RAIL CONFIGURATIONS

CYLINDRICAL ROLLERS	Model No.	Slot	Rectangular or T-Slot	Height Low Profile High Profile	Length	Max Load per foot (lbs./ft./pr.)	Max Load Capacity (lbs./pr.)		Rollers/ Pistons (per rail)							
	315N	3/4" (.800) Narrow	Rectangular	1.495 (LP) 1.805 (HP)	9" 45" 11" 48" 14" 54" 21" 60" 24" 66" 30" 72"	4,000	3,000 15,000 4,000 16,000 4,000 18,000 7,000 20,000 8,000 22,000 10,000 24,000	04/03 15/15 05/04 18/16 05/04 20/18 08/07 22/20 09/08 24/22 11/10 26/24								
	316N		T-Slot		33" 84" 36" 87" 40" 90" 42"		12/11 28/28 13/12 29/29 14/14 30/30 15/14									
	315W	1" (.995) Wide	Rectangular		33" 84" 36" 87" 40" 90" 42"		11,000 28,000 12,000 29,000 13,000 30,000 14,000	12/11 28/28 13/12 29/29 14/14 30/30 15/14								
	316W		T-Slot													
	327W	1" (.995) Wide	Rectangular		1.495 (LP) 1.805 (HP)		24" 66" 30" 72" 36" 78" 42" 84" 48" 96" 54" 108" 60" 120"	9,000		18,000 49,000 22,000 54,000 27,000 58,000 32,000 63,000 36,000 72,000 40,000 81,000 45,000 93,000	16/08 42/22 20/10 46/24 24/12 50/26 28/14 54/28 30/16 60/32 34/18 68/36 38/20 72/40					
	328W		T-Slot													
		322W	1" (.995) Wide				T-Slot			1.495 (LP) 1.805 (HP)	24" 30" 36" 42" 48" 54" 60" 66" 72"		4,000	8,000 10,000 12,000 14,000 16,000 18,000 20,000 22,000 24,000	14/08 18/10 22/12 26/14 30/16 34/18 38/20 42/22 46/24	
BALL ROLLERS	317N	3/4" (.800) Narrow	Rectangular	1.485 (LP) 1.720 (HP)	9" 44" 10" 48" 12" 50" 19" 53" 22" 58" 24" 60" 26" 62" 29" 64" 31" 66" 33" 69" 36" 72" 39" 78" 41"	1,800	1,400 6,600 1,500 7,200 1,800 7,500 2,800 8,200 3,300 8,600 3,600 8,900 3,900 9,200 4,300 9,500 4,600 9,800 4,900 10,300 5,400 10,800 5,800 11,600 6,100	07/02 36/08 08/02 40/08 10/02 42/08 16/03 44/09 18/04 48/10 20/04 50/10 22/04 52/10 24/05 54/10 26/05 56/10 28/05 58/11 30/06 60/12 32/07 64/14 34/07								
			T-Slot													
	317W	1" (.995) Wide	Rectangular		1.485 (LP) 1.720 (HP)		14" 58" 19" 63" 24" 68" 29" 73" 34" 78" 39" 83" 44" 88" 48" 92" 53"	2,150		2,500 10,400 3,400 11,300 4,300 12,200 5,200 13,100 6,100 14,000 7,000 14,900 7,900 15,800 8,600 16,500 9,500	10/03 44/12 14/04 48/13 18/05 52/14 22/06 56/15 26/07 60/16 30/08 64/17 34/09 68/18 36/10 70/19 40/11					
			T-Slot													
	318W															

*Typical lengths - longer rails are available. Contact PFA for details.

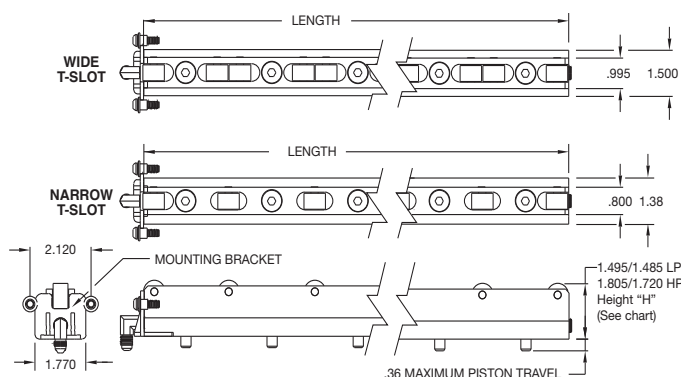


HOW TO SIZE A RECTANGULAR RAIL:

Recommended for all slots.

**Nominal .060" to .080" lift above surface of bolster.*

1. Measure Slot Depth (E_R) to center bottom:
 $E_R =$ _____ (See chart on bottom of page 13)
2. Calculate amount of lift needed by piston to raise die desired amount (.080*) for the chosen rail
 $E_R + .080^* - "H" (LP) =$ _____ Calculated Piston Stroke
3. Can piston stroke that much?
 - a. If calculated piston stroke is less than .36", use LP in part number and enter the calculated stroke. STOP.
 - b. If piston stroke is larger than .36", then try HP calculation:
 $E_R + .080^* - "H" (HP) =$ _____ Piston Stroke
 If less than .36", use HP in part number and the calculated stroke
4. Verify lowered and raised positions fit slot for selected rail.
 - a. Is "H" less than (E_R)? If yes, ok. If no, call PFA
 - b. Is (" $H - .080^* + .36$ ") more than (E_R)?
 If yes, ok. If no, call PFA



HOW TO SIZE A "T" RAIL:

Only for T-Slots - See Page 13

**Nominal .060" to .080" lift above surface of bolster.*

1. Measure Neck Height (D) and Full Width Depth (E_T):
 $D =$ _____
 $E_T =$ _____ (See chart on bottom of page 13)
2. Calculate amount of Flange Height for desired lift (.080*)
 $H (LP) - .080^* - D =$ _____ Anticipated Flange Height
3. Is anticipated flange height adequate?
 If flange is more than .25", then ok.
 If not, use calculation below for HP rail.
 $H (HP) - .080^* - D =$ _____ Anticipated Flange Height
 If more than .25", ok.
4. Verify lowered and raised positions fit slot for selected rail.
 - a. Is "H" less than (E_T)? If yes, ok. If no, call PFA
 - b. Is (" $H - .080^* + .36$ ") more than (E_T)?
 If yes, ok. If no, call PFA

Rail Style	Model Number	Length (L)	T-Slot Tab Height or Rectangular Piston Stroke	Neck Width	Profile (HP or LP)
DR	See chart on pg 13	Choose from Standard Lengths	.XXX = Flange Height or Stroke to three decimal places	Y.YYY = Width to three decimal places	From formula above
DR	315N	36	XXX**	YYYY***	HP

** All flange and stroke dimensions are less than 1.000", thus the decimal is omitted and fraction decimal entered.
 For example, a .310" stroke is XXX=310.

*** Standard widths are shown as .800 and .995 for standard rails. Use 0800 or 0995 for these units or other as desired.
 For example, a 1.020 width is YYYY=1020.

Part No: **DR-315N36-3101020HP**

For free sizing assistance and application support,
 please email or fax application dimensions and information to PFA.

HYDRAULIC POWER FOR CLAMPS & DIE LIFTER RAILS

HYDRAULIC CONTROL UNITS

High Pressure Hydraulic Control Units (HC) are powered with commonly available air pressure and are made in a variety of configurations to optimize all QDC applications. From single valve (zone) carryables to multi-valve units, we've got just what you need to get the job done. Here's a summary.

Hydra-Mechanical (HM) clamps, also known as locking clamps, are hydraulically actuated and then mechanically locked during press operations. They need to be re-pressurized in order for the mechanical locks to be released. HM in the module part number indicates the addition of a hydraulic pressure booster button to make unlocking simple and easy.

Hydraulic Die Lifter Rails provide exceptional lift capacity, but need to be lowered prior to clamping. DL in the part number indicates the addition of a pressure relief valve to help protect the rails in the event dies are clamped before rails are lowered.

Smaller carryable power units are designated as (C) while the larger stationary units can be ordered as Stationary (S) for your own mounting or Mounting Bracket (B), Stationary Pedestal (P) or Rolling Stand (R).

For systems employing hydraulic only (non-locking) clamps it is necessary to, as a minimum, cross connect Ram Clamps with half of them to a separate zone and provide connections to the press control to stop the press on loss of system pressure. Maintaining dedicated controller connections and using the Pressure Switch (PS) option is minimally required/recommended.

MODEL CONFIGURATION OPTIONS

HM	Hydra-Mechanical Clamps
DL	Die Lifter Dedicated Zone with Overpressure Relief
PS	Pressure Switch
S	Stationary
C	Carriable
R	Roll-Around
P	Pedestal
B	Bracket

COMMON SPECIFICATIONS

Air inlet pressure/150 psi maximum/70 psi minimum

Oil temperature range of 50°-120°F

All hydraulic hose fittings are 37 flare

Internal air regulator is pre-set to approximately 70 psi for 5,000 psi hydraulic output to the clamps

0-10,000 psi gauges for each circuit except electrically actuated module

Mechanical valves are low friction with metal to metal seals and check valves to isolate each hydraulic circuit. Electronic valves are 24 VDC poppet valves.

PART COMBINATIONS AND
RECOMMENDED MODULE OPTIONS.

- **HYDRAULIC DIE LIFTERS ONLY** - Choose a single hydraulic circuit (1 zone) carryable module for convenient use and storage. Great for single or multiple systems. Example: HC-105C-DL
- **HYDRA-MECHANICAL LOCKING CLAMPS ONLY** - Choose a two hydraulic circuit (2 zone) carryable or larger roll-around module for greater convenience. HM booster is added for "L" clamp. Typically one hydraulic circuit is connected to the Ram Clamps and the other to the Bolster Clamps. Example: HC-125C-HM; HC-120S-HM
- **HYDRA-MECHANICAL LOCKING CLAMPS AND DIE LIFTER COMBINATION** - Choose a three hydraulic circuit (3 zone) module when Hydra-Mechanical Locking Clamps and Die Lifters are used. Example: HC-130R-HM-DL

- **HYDRAULIC-ONLY CLAMPS*** - Choose a three hydraulic circuit (3 zone) module and cross connect top clamps to two separate zones. Since there are no locks, this will be a dedicated always connected controller with pressure sensing switch. Example: HC-130S-PS
- **HYDRAULIC-ONLY CLAMPS* WITH DIE LIFTERS** - Choose a four hydraulic circuit (4 zone) module when cross connecting a dedicated controller for non-locking clamps with Die Lifters. Example HC-140S-PS-DL

* Clamps may also be secured with check valves to each clamp and operated with pilot control from the power unit Pilot Circuit (PC) option. Call PFA for details.

MECHANICAL VALVE POWER UNITS

HC-105C-DL

ONE ZONE, ONE HYDRAULIC CIRCUIT
WITH DL OPTION

This carryable unit is most often used to supply power to several machines. It may also be mounted for dedicated operation on a specific machine.



HC-105C-DL shown

Weight	25 lbs.
Reservoir Capacity	2 1/2 qts.
Dimensions	14" L x 9" W x 11" H

HC-125C-HM

TWO ZONE, TWO HYDRAULIC CIRCUITS
WITH HM OPTION

This carryable unit is most often used to supply hydraulic power to clamps which are mechanically locked during die operations. Two circuits are provided, one for the Ram Clamps and the other for the Bolster Clamps. It may also be mounted for dedicated operation on a specific machine.



HC-125C-HM shown

Weight	30 lbs.
Reservoir Capacity	2 1/2 qts.
Dimensions	14" L x 9" W x 11" H

MECHANICAL VALVE POWER UNITS

HC-120P-HM

TWO ZONE, TWO HYDRAULIC CIRCUITS WITH HM OPTION

This unit is most often used for the same applications as the HC-125C-HM but dedicated to a single press or rolled to multiple presses. It is available in either the Stationary (S), Pedestal (P), Bracket (B) or Rolling (R) mounting configurations. Typically used with more complex configurations on custom applications, this unit is the first in the large box modules.



HC-120P-HM shown
(Pedestal Unit)

Weight	55 lbs.
Pedestal/Base	adds 40 lbs.
Bracket	adds 10 lbs.
Roll Around	adds 50 lbs.
Reservoir Capacity	4 1/2 qts.
Dimensions:	
Cabinet Only	21" L x 10" W x 16" H
Pedestal/Base	29" H
Bracket	14" L x 10" W x 6" H
Roll Around	34" H

HC-130R-HM-DL

THREE ZONE, THREE HYDRAULIC CIRCUITS WITH HM AND DL OPTIONS

This unit is most often used to supply hydraulic power to Hydra-Mechanical (HM) "Locking" Clamps and Die Lifters. Three circuits are available, one for the top Ram Clamps, one for the Bolster Clamps and a third which supplies hydraulic pressure to the Die Lifters (DL). The unit is placed on a pedestal attached to a base with easy rolling casters. It can also be placed on a customer supplied mount (HC-130S-HM-DL), a shelf bracket (HC-130B-HM-DL) or a pedestal (HC-130P-HM-DL).



HC-130R-HM-DL shown

Weight:	
Cabinet	60 lbs.
Total	110 lbs.
Pedestal/Base	adds 40 lbs.
Bracket	adds 10 lbs.
Roll Around	adds 50 lbs.
Reservoir Capacity	4 1/2 qts.
Dimensions:	
Cabinet Only	21" L x 10" W x 16" H
Pedestal/Base	29" H
Bracket	14" L x 10" W x 6" H
Roll Around	34" H

MECHANICAL VALVE POWER UNITS

HC-130S-PS

THREE ZONE, THREE HYDRAULIC CIRCUITS WITH PS OPTION



HC-130S-PS shown

This unit is most often used as a dedicated always connected power unit for supplying hydraulic-only clamps. Two zones each supply hydraulics to half of the Ram Clamps for cross connected capability, with the third zone powering the Bolster Clamps. The PS option ties into the press control for press shut down on loss of system pressure. Available in B (HC-130B-PS) and P (HC-130P-PS) mounting configurations.

Weight	60 lbs.
Pedestal/Base	adds 40 lbs.
Bracket	adds 10 lbs.
Reservoir Capacity	4 1/2 qts.
Dimensions	
Cabinet Only	21" L x 10" W x 16" H
Pedestal/Base	29"
Bracket	14" L x 10" W x 6" H



HC-140S-PS-DL shown

HC-140S-PS-DL

FOUR ZONE, FOUR HYDRAULIC CIRCUITS WITH PS AND DL OPTIONS

This unit is used in dedicated always connected applications and operates three zones for clamps exactly like the 130S-PS above, but adds a fourth zone to operate the Die Lifters. Available in B (HC-140B-PS-DL) and P (HC-140P-PS-DL) mounting configurations.

Weight	65 lbs.
Pedestal/Base	adds 40 lbs.
Bracket	adds 10 lbs.
Reservoir Capacity	4 1/2 qts.
Dimensions	
Cabinet Only	21" L x 10" W x 16" H
Pedestal/Base	29"
Bracket	14" L x 10" W x 6" H



ELECTRONIC VALVE POWER UNITS

Electronic valve versions of our historically popular Mechanical Valve Power Units, provide for a new approach to QDC control. Removing the control interface and shifting that to a remote location allows customers to create or use any control method they choose to operate, lock out, and/or key control the system, and provides the freedom to locate the box itself in a hidden or out of the way location.

Valves to the clamps are normally open which results in constant system pressure to the clamps regardless of power availability. DL circuits have normally closed valves which must be activated to provide pressure to the Die Lifters.

HC-173S-PS

THREE ZONE ELECTRONIC VALVES THREE HYDRAULIC CIRCUITS

This unit is used as a dedicated always connected power unit for supplying hydraulic-only clamps. Two zones each supply hydraulics to half of the Ram Clamps for cross connected capability with the third zone powering the Bolster Clamps. The PS option ties into the press control for press shut down on loss of system pressure. Available in B (HC-173B-PS) and P (HC-173P-PS) mounting configurations.

Weight Pedestal/Base Bracket	60 lbs. adds 40 lbs. adds 10 lbs.
Reservoir Capacity	4 1/2 qts.
Dimensions Cabinet Only Pedestal/Base Bracket	21" L x 10" W x 16" H 29" 14" L x 10" W x 6" H

HC-174S-PS-DL

FOUR ZONE ELECTRONIC VALVES FOUR HYDRAULIC CIRCUITS

This unit is used in dedicated always connected applications and operates three zones for clamps exactly like the HC-173S-PS above, but adds a fourth zone to operate the Die Lifters. Available in B (HC-174B-PS-DL) and P (HC-174P-PS-DL) mounting configurations.

Weight Pedestal/Base Bracket	65 lbs. adds 40 lbs. adds 10 lbs.
Reservoir Capacity	4 1/2 qts.
Dimensions Cabinet Only Pedestal/Base Bracket	21" L x 10" W x 16" H 29" 14" L x 10" W x 6" H

PNEUMATIC (AIR BAG) DIE LIFTERS



WHEN TO USE PNEUMATIC DIE LIFTERS:

Use pneumatic die lifters for lighter dies in small to medium presses. Load capacity is approximately 1/2 of a hydraulic rail, but slot size can be much smaller and overall cost much lower. In many applications, performance is astounding.

Fitting in slots as small as 1.250" total depth, very large lift capacities are produced with readily available 85 psi shop air. 1,800 lbf/ft/pair for narrow rails and 2,600 lbf/ft/pair for wide rails is exceptional performance. Using shop Air eliminates the need for hydraulics and the associated complexities of adding hydraulic systems to the press. Simple hand operated air valves (or electrically operated valves integrated with other press controls) can be used to actuate the lifters.

Designed for standard 3/4" and 1" T slots and available in an unlimited variety of lengths, PFA Pneumatic Die Lifters provide a low cost, easy to order, and simple to install option to be used in standalone or integrated applications. Simply add clamps and/or bolster extensions for a complete QDC system.

HOW THEY ARE USED:

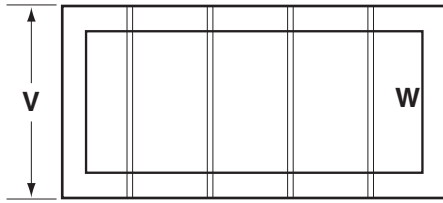
Pneumatic Lifting bars with installed rollers are inserted into the T slots and captured between the separate air lift system installed on the front of the press and the guard attached to the back side of the T slot. The air lift bag or hose occupies the space under the rail in the wider slot section providing the lift force when pressurized. If the rail is sized shorter than the slot, a filler bar is added to maintain rail position in the slot. Rails are made to specific dimensions to match the T-slot and achieve the desired lifting height.

Air rail lifting height is specified by the customer to match the insertion height of other components, such as bolster extensions. Activating with 85 psi air, places the lifter "up" ready to receive the die. The die is loaded with the weight transferring from the bolster extensions to the lifters. Once the die is in the press, the lifters are lowered by closing the supply pressure and venting the lines (typically the valve both secures and vents the line).

Systems are provided with rails, guards, the pneumatic fittings, and hose to connect them together along with a relief valve. Customers provide any desired control valves for air and connect to an NPT port and mount the air system to the sides of the bolster.

HOW TO DETERMINE AVAILABLE DIE LIFTER RAIL OPTIONS

- List out die sizes and weights. Calculate die load per foot, per pair of lift rails. (**W=WIDTH IN FEET**)



Die 1 Weight _____ ÷ W = _____ lbs./ft./pair

Die 2 Weight _____ ÷ W = _____ lbs./ft./pair

Die 3 Weight _____ ÷ W = _____ lbs./ft./pair

Determine heaviest die per foot.

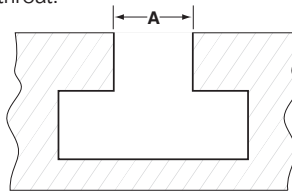
Heaviest die density lb./ft./pair = _____

- Measure T-Slot or Rectangular channel throat.

If A = .800 to 1.000, use Narrow Rails

If A = 1.000 to 1.25, use Wide Rails

If A = <.800 or >1.25, contact PFA



- For the heaviest die, check the number of available slots under the die:

Number of available slots = _____

- Take the die density from Part 1 and find the closest larger lbs./ft./pair from the chart below. Then move across the top to find your desired die lifter style keeping in mind the Narrow or Wide from Part 2 and the number of available slots from Part 3. (*Assume 85psi air available)

DIE DENSITY (lbs./ft./pair)	NARROW SLOT 948N (1,800 lbs./ft./pr.)	WIDE SLOT 948W (2,600 lbs./ft./pr.)
1,800	2 Rails	2 Rails
2,600	3 Rails	2 Rails
3,600	4 Rails	3 Rails
3,900	5 Rails	3 Rails
4,500	5 Rails	4 Rails

For larger die weights or fewer available slots mechanical or hydraulic die lifters are recommended.

Example:

Rail Style Model	Length (L)	Tab Height (T)	Neck Width (W)	Lifter Height (H)	Filler Length (F)
PR948N PR948W	12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72	.XXX	.0800 or 1000	H.HHH	F.FFF or NONE
PR948W	36	XXX	1000	HHHH	FFFF

Part No: **PR948W36-375-1000-1500-NONE**

- Record the rail model number and number of needed rails from the chart:

Model _____ Quantity _____

- For the selected model, confirm that the number of rails always supports the dies as follows:

W ft.	Chart lbs./ft./pair	No. of Rails	Lift Capacity	Weight lbs
----------	------------------------	-----------------	------------------	---------------

Die 1 _____ x _____ x _____ ÷ 2 = _____ > _____

Die 2 _____ x _____ x _____ ÷ 2 = _____ > _____

Ensure lift capacity is greater than die weight.

- With model number and quantity determined, select the rail length desired. Lifter will be flush with the loading side and should be near the back side but not longer than the bolster slot. Nominal lengths are 12", 18", 24", 30", 36", 42", 48", 54", 60", 66", 72", + + + Length = _____

If slot is longer than nominal, add filler bar length

to end of part number. Filler = _____

- Finally, the profile and final shape of the rail must be calculated below.

HOW TO SIZE A "T" SLOT:

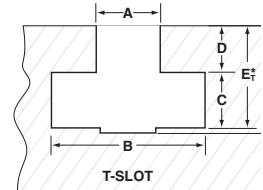
- Measure Neck Height (D), Full Width Depth (E_T) and B:

D = _____

E_T = _____

B = _____

C = E_T - D = _____



- Determine Nominal Lift (N)

Typically N = .085" or .125" (1/8" max)

Choose N = _____

- Calculate Tab Height (T)

T = C - N - .250" = _____ (.xxx)

- Calculate Rail Height (H)

H = E_T - .250 = _____ (H.HHH)

For Narrow Rail (.800 < A < 1.00) confirm slot fit

B ≥ 1.300" C ≥ .500" E_T ≥ 1.250"

For Wide Rail (1.00 < A < 1.25) confirm slot fit

B ≥ 1.700" C ≥ .575" E_T ≥ 1.300"

MECHANICAL 1/4 TURN

QUICK SET CLAMPS



WHEN TO USE QUICK SET CLAMPS:

Use mechanical quick set clamps with dies having slotted die plates and enough over slot clearance for the set clamp body. U-Slot brackets or ears may also be added to the dies or a heel block added to the back of the clamp for some applications.

HOW THEY WORK:

To use, move clamp into position and manually hand tighten nut using the large diameter knurled surface. Use a wrench to torque to the desired preload. The large bronze alloy nut acts as an easy turning, anti-galling, large surface thrust bearing arrangement for superior performance.

Model 255 clamps require approximately 125 ft.-lbs. of torque to preload the clamp to 10,000 lbs. clamping force. Model 259 clamps require approximately 350 ft.-lbs. to preload clamp to 20,000 lbs. clamping force (unlubricated threads). Clamp preload should be limited to 20,000 lbs. and 40,000 lbs. respectively.

OPTIONS AND FEATURES:

ARA vs. FRA. Free Rotation (FRA) clamps use standard threaded bolts, while Anti-Rotation (ARA) models use modified threads to prevent the clamping plate from spinning about the bolt.

TSB vs. STN. Forged T-Slot Bolts (TSB) are standard for production units. In the case where a larger than standard clamp range is desired, the stud and T-Nut option (STN) is available.

HB Option. In cases where customers desire to use the clamp in applications without slotted die plates, a heel block may be added to the clamp to support the back of the clamp. (Clamping force is 50% of rating.) For this option specify HBX.XX at the end of the part number. (X.XX = clamping plate height in inches.)

Nut Retention Option. In cases where customer desires to prevent the nut from coming off the bolt. A stop mechanism is added to the top of the bolt. Use TSL in place of TSB in the part number for this option.

STANDARD PFA CONFIGURATIONS

Model 255 clamps are designed for 3/4" T-Slots and Model 259 for 1" T-Slots. The part number references the "bolt length", which is not the clamping height, but rather the complete length of the bolt. The charts show nominal clamping height for standard T-Slots. The bolt length can be selected for the part number below.

Model 255 TSB Nominal Clamp Height**	Clamp Range B* (Standard 3/4" Slot)		A+B*		C	D	E
	Min	Max	Min	Max			
0 - 1	0"	1.125"	.75"	2.0"	2.0"	2.5"	4.0"
1 - 2	.875"	2.125"	1.75"	3.0"		2.5"	5.0"
2 - 3	1.875"	3.125"	2.75"	4.0"		2.5"	6.0"
2 1/2 - 4	2.375"	4.125"	3.25"	5.0"		3.0"	7.0"
3 - 5	2.875"	5.125"	3.75"	6.0"		3.5"	8.0"
3 1/2 - 6	3.375"	6.125"	4.25"	7.0"		4.0"	9.0"

Model 259 TSB Nominal Clamp Height**	Clamp Range B* (Standard 1" Slot)		A+B*		C	D	E
	Min	Max	Min	Max			
0 - 1/2	0"	.6"	.75"	1.6"	2.4"	2.5"	4.0"
3/4 - 1 1/2	.75"	1.6"	1.75"	2.6"		2.5"	5.0"
1 3/4 - 2 1/2	1.75"	2.6"	2.75"	3.6"		2.5"	6.0"
2 1/4 - 3 1/2	2.25"	3.6"	3.25"	4.6"		3.0"	7.0"
2 3/4 - 4 1/2	2.75"	4.6"	3.75"	5.6"		3.5"	8.0"
3 1/4 - 5 1/2	3.25"	5.6"	4.25"	6.6"		4.0"	9.0"

* T-Slot neck height (dimension A) is assumed to be .875" for 3/4" slots and 1" for 1" slot.

** TSL Style with retaining ring incur a 1/4" reduction in maximum clamp height.

Suffix - STN may replace - TSB if fully threaded stock and T-Nut is cleared for no minimum clamping heights. Maximum clamping height for STN is calculated as follows:

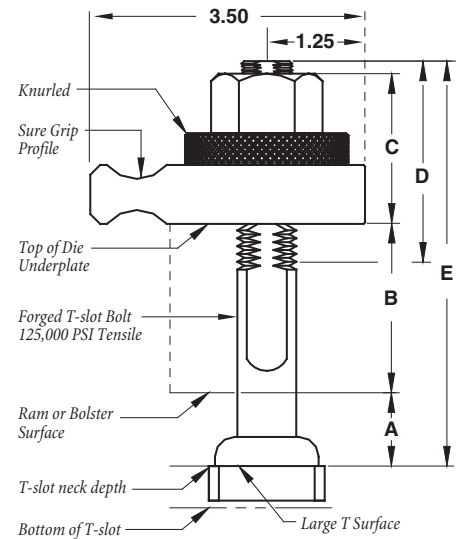
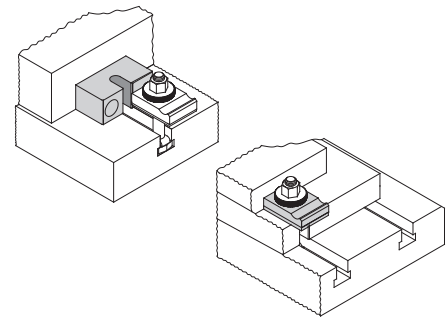
Model 255 B_{MAX} = E - 3.25

Model 259 B_{MAX} = E - 4.00

Example:

Clamp Style	Model Number		Bolt Length	Bolt Style	Heel Block Option
MC	255 (3/4" T-Slot) 259 (1" T-Slot)	Free Rotation (FRA) Anti-Rotation (ARA)	E	TSB (std.), TSL or STN	HBX.XXX
MC	259	ARA	5.0	TSB	

Part No: **MC-259ARA5.0TSB**



DIMENSIONS ARE IN INCHES

MECHANICAL (PORTABLE AND STATIONARY)

DIE LIFTERS/ ROLLERS



*Stationary Die Lifter Rails and
Stationary Spring Loaded Ball Cartridges*

WHEN TO USE:

Stationary Spring Loaded Die Lifter Rails. Providing multi-directional movement, these rails are used for medium to lightweight dies when die density is low. They are also used when the need for mechanical only or unique layouts drive the decision process. Springs automatically lift die when clamping is removed from the die.

Stationary Spring Loaded Ball Cartridges. Installing an array of single ball cartridges also provides multi-directional die movement without operator involvement. Cartridges can be placed anywhere in the bolster to avoid taking up slots needed for clamps. Cartridges work great in Non-Slotted Bolster applications.

Portable Die Lifters. Hand operated lifters work well with common slots among presses, providing maximum ROI by allowing a single set of lifters to serve die changes on an entire group of presses.



Portable Die Lifters

HOW THEY WORK:

Spring loaded ball cartridges and spring loaded die lifter rails are permanently installed in the bolster. During clamping, the clamp force compresses the springs and forces the balls below the surface. When clamps are released, the spring forces lift the balls and the die with them. The die is now ready for removal/repositioning.

Portable die lifters provide a large mechanical advantage by multiplying hand/handle motion to lift the die. The large lever action easily lifts the die for either (1) die lifting only - insert in slot and lift the die allowing the die to be rolled onto a cart, etc. or (2) die lifting and movement onto a bolster extension, allowing die pickup with forks.

STATIONARY SPRING LOADED DIE LIFTER RAILS

HOW TO DETERMINE AVAILABLE DIE LIFTER RAIL OPTIONS

- List out die sizes and weights. Calculate die load per foot, per pair of lift rails. **(W=WIDTH IN FEET)**

Die 1 Weight _____ ÷ W = _____ lbs./ft./pair

Die 2 Weight _____ ÷ W = _____ lbs./ft./pair

Die 3 Weight _____ ÷ W = _____ lbs./ft./pair

Determine heaviest die per foot.

Heaviest die density lb./ft./pair = _____

- Measure T-Slot or Rectangular channel throat.

If A = .800 to 1.000, use Narrow Rails

If A = 1.000 to 1.25, use Wide Rails

If A = <.800 or >1.25, contact PFA

- For the heaviest die, check the number of available slots under the die: Number of available slots = _____

- Take the die density from Part 1 and find the closest larger lbs./ft./pair in the chart to the right. Then move across the chart to find the minimum number of slots, keeping in mind the Narrow or Wide from Part 2 and the number of available slots from Part 3. If your application does not support the number of slots needed, see page 11 (Hydraulic Die Lifters/Rollers) or call PFA for assistance.

- Record the rail model number and number of needed rail slots from the chart:

Model _____ No. of Slots _____

- For the selected model, confirm that the number of rails always supports the dies as follows:

W ft.	Chart lbs./ft./pair	No. of Rails	Lift Capacity	Weight lbs
----------	------------------------	-----------------	------------------	---------------

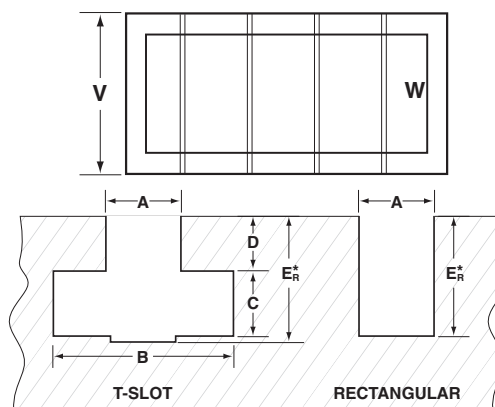
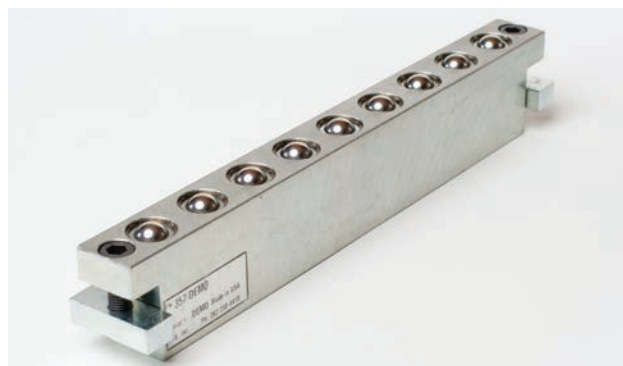
Die 1 _____ x _____ x _____ ÷ 2 = _____ > _____

Die 2 _____ x _____ x _____ ÷ 2 = _____ > _____

Ensure lift capacity is greater than die weight.

- Use the Model Number and Bolster Length (V) to determine the slot length to fill. Lifters should start at the loading side of the bolster and end near the other side for maximum versatility.

- Use slot dimensions to determine rail part numbers. Use of multiple 7", 10" or 12" rail sections versus one long rail is recommended to take advantage of stock parts and flexible installations.



DIE DENSITY (lbs./ft./pair)	NARROW SLOT	WIDE SLOT
	357N (1,800 lbs./ft./pr.)	357W (2,000 lbs./ft./pr.)
1,800	2 Rail Slots	2 Rail Slots
2,000	3 Rail Slots	2 Rail Slots
2,700	3 Rail Slots	3 Rail Slots
3,000	4 Rail Slots	3 Rail Slots
3,600	4 Rail Slots	4 Rail Slots
4,000	5 Rail Slots	4 Rail Slots

Length (in)	357N Max Load Capacity (each section)	357W Max Load Capacity (each section)	Ball Rollers (each section)
7	600 lbs.	690 lbs.	6
10	800 lbs.	920 lbs.	8
12	900 lbs.	1035 lbs.	9

Other sizes available. Please contact PFA for details.

Example:

3/4" slot with Depth = 1.520"

Style	Model No.	Length	Rail Height*	Rail Width
MR	357N 357W	inches	$E_R = X.XXX$	Narrow = 0.800" std Width = 1.000" std
MR-357N		10-1520		0800

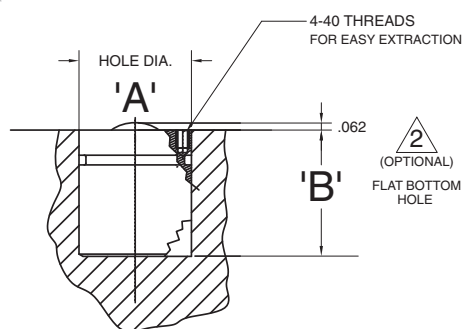
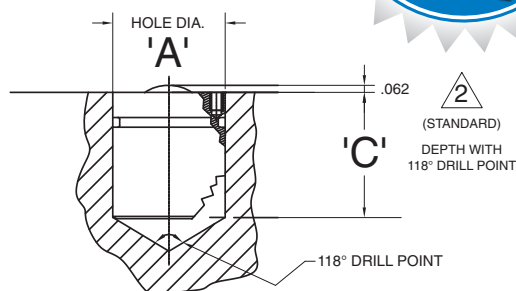
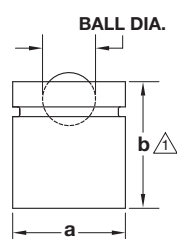
Part No: **MR-357N10-15200800**

*357N E_R min. = 1.30"; E_R max. = 2.0" std.
357W E_R min. = 1.75"; E_R max. = 2.0" std.

SPRING LOADED BALL CARTRIDGES



MANY NON-STANDARD & CUSTOM SIZES AVAILABLE



Part No.	Allowable Load lbs. per Cartridge	Ball Diameter	a	b	Hole A +.005 -.000	Hole B +.005 -.000	Hole C +.005 -.000
MR-305-12	45 lbs.	3/8	3/4	1-1/8	.750"	1.130"	1.110"
MR-305-13	45 lbs.	3/8	13/16	1-1/8	.813"	1.130"	1.110"
MR-305-15	70 lbs.	15/32	15/16	1-1/8	.937"	1.130"	1.110"
MR-305-16	70 lbs.	15/32	1	1-1/8	1.000"	1.130"	1.110"
MR-305-19	115 lbs.	5/8	1-3/16	1-3/8	1.187"	1.375"	1.355"
MR-305-21	115 lbs.	5/8	1-5/16	1-3/8	1.312"	1.375"	1.355"
MR-305-25	150 lbs.	7/8	1-9/16	1-3/4	1.562"	1.770"	1.750"
MR-305-26	200 lbs.	7/8	1-5/8	1-3/4	1.625"	1.770"	1.750"

¹ Use hole information for mode exact dimensions and proper bolster modifications.

² Please note difference in hole depth. Drill point allows cartridge to sit deeper due to chamfer on bottom of cartridge housing.

Damaged cartridges can readily be extracted and replaced. Thread a 4-40 UNC screw into the thread hole and pull cartridge out.

Model 305 allows movement of dies in any direction. A push of about 2-4% of die weight is usually required to move a die.

Install a pattern of Model 305 on a press bolster. Keep die weight and footprint in mind to ensure that a die can be adequately supported. When a die is clamped, the die lifter cartridges under the die will compress.

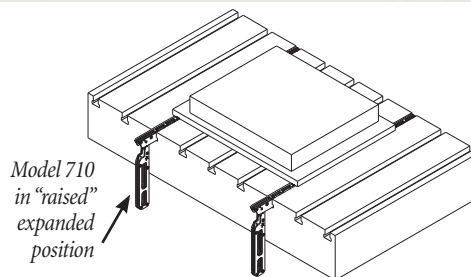
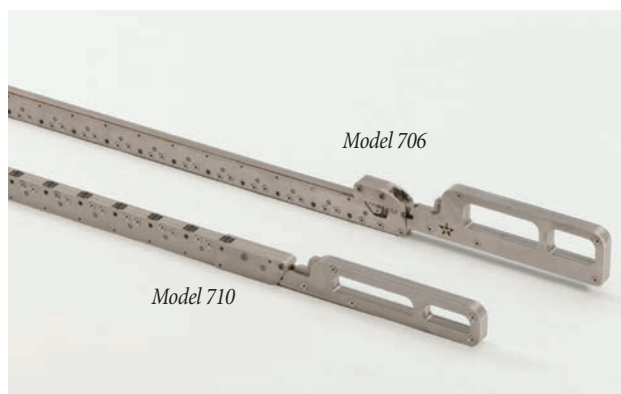
HAND OPERATED AND PORTABLE, MECHANICAL DIE LIFTERS AND LIFTER SYSTEMS

Model 710. The popular and portable Mechanical Die Lifter Rail is typically installed in a slot in the bolster with rollers up. The lifters are mechanically actuated by hand to the lifted position prior to die insertion and then released to lower the die. (Note: The amount of force required to elevate the die varies with handle position and is in the range of 1.5% to 2.5% of die weight. 2,000 lb. die = 30-50 lbs.) To allow portable lifters to be taken from press to press, slots are shimmed to a common slot depth among presses. Model 710 lifters are used with standard Bolster Extensions.

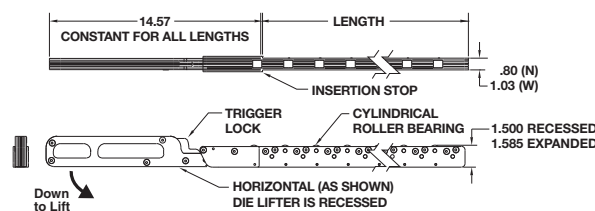
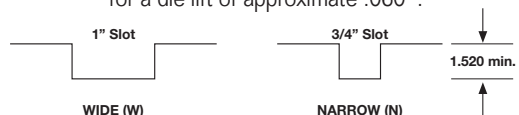
The lifter is inserted, handle up, under the die. When the handle is moved to the horizontal position the die lifter expands .085" to lift the die approximately .060" above the bolster surface. Available in .80" Narrow (N) 3/4" slot and 1.03" Wide (W) 1" slot versions, these portable units can be used in multiple presses, greatly reducing QDC equipment costs.

Model 706. A mechanically actuated die lifter which is used, rollers down, to move dies from "slotted" Bolster Extensions or a die transfer table onto the bolster and vice-versa. With rollers down, this acts to add wheels to the die. (See page 30 for the combined Model 706 lifter and Bolster Extension options).

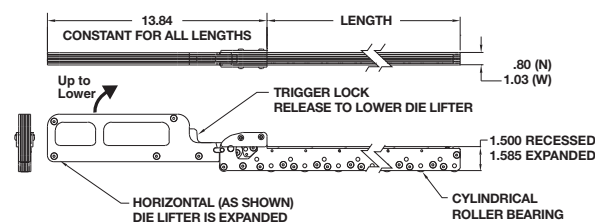
Model No.	Standard Lengths	Max Load Capacity per pair
710N (3/4" slot)	24"/30"/36"/42"/48"	8,000 lbs.
710W (1" slot)		
706N (3/4" slot)	24"/30"/36"/42"/48"	8,000 lbs.
706W (1" slot)		



PFA recommends machining or shimming slots to 1.525"-1.530" for a die lift of approximate .060".



MODEL 710



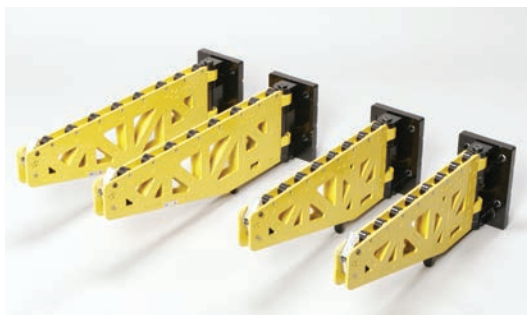
MODEL 706

Example:

Style	Model Number	Slot Requirement	Length
MR	Pull from chart	Narrow = N Wide = W	
MR	710	W	36

Part No: **MR-710W-36**

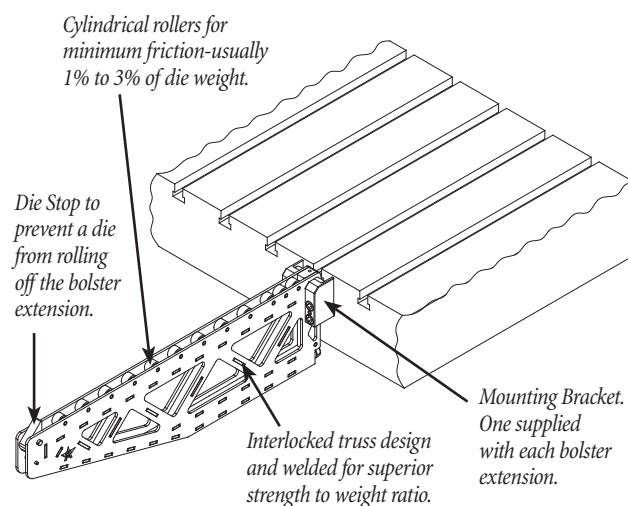
DIE HANDLING MADE EASY WITH UNIQUE DESIGNS IN **BOLSTER EXTENSIONS**



Unlimited Options. Bolster Extensions are available in a variety of types: lift-off, swing-away, detachable, traveling and slotless. PFA can easily customize mountings to meet most applications and can even provide complete custom solutions.

Fast and Easy. Cylindrical rollers on Bolster Extensions typically reduce the force necessary to move a die to about 1 to 3 percent of die weight. Moving the die into the press becomes fast and easy. Loading and unloading dies from Bolster Extensions is also easily done by forklift or crane, making extensions essential components of many Quick Die Change (QDC) systems.

Modular. By reviewing multiple press needs at one time, common QDC components can be selected. Bolster Extensions can often be used on more than one press, greatly saving on the per press cost of QDC.



LIFT-OFF BOLSTER EXTENSIONS

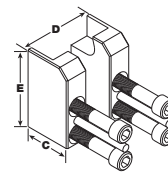
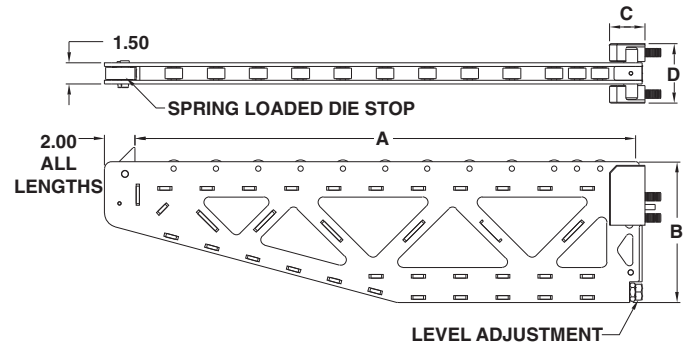
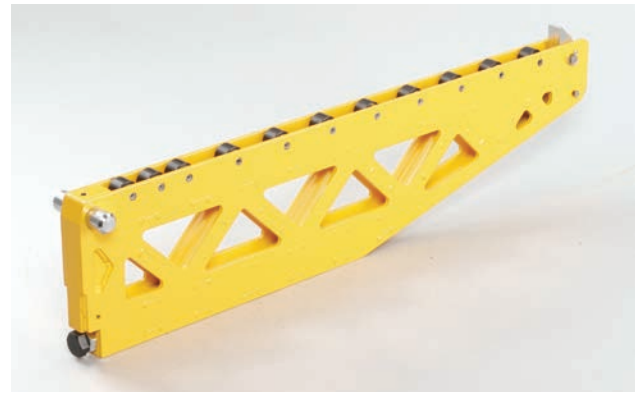
Lift-off Bolster Extensions provide for easy removal during press operations and allow a single pair to be used on multiple presses. For maximum utility, install mounting brackets on several presses and use a single pair of Bolster Extensions. Available in a variety of models for a variety of applications.

Model 520 is a "standard duty" lift-off Bolster Extension with rollers, which allows convenient loading and unloading of dies to/from press bolsters. Die weight capacity per pair is 6,000 pounds. Model 540 is the "heavy duty" version at 8,000 lbs./pair.

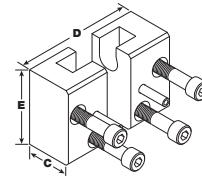
Load/unload dies using forklift, die cart or crane. The force required to roll dies on/off the Bolster Extensions is in the range of 1% to 3% of the die weight.

Lift-Off Bolster Extensions are produced in several other models: 522, 522B and 530 for use with Model 706 Mechanical Die Lifters and bolsters without slots for die lifters. (See page 30).

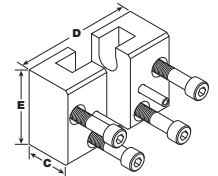
Bracket Height (E Dimension) is the height of the bracket itself - not the distance from the bolster surface. For a typical nominal 0.090" roller height above the bolster surface, the bottom of the mounting bracket would be located at the following distances from the bolster surface: Model 910 Bracket = 4.6", Model 6088 Bracket = 4.0", Model 918 Bracket = 5.2". For complete mounting details contact PFA.



Model 910
Mounting Bracket
for Model 520



Model 6088 Low Profile
Mounting Bracket for
Model 520



Model 918
Mounting Bracket
for Model 540

Example:

Style	Model Number	Length (A)
BE	520	20

Part No: **BE-520-20**

Model No.	Type	Style	A	B	C	D	E	Approximate Weight
520	Lift-Off	Standard 6,000 lbs./pair	14"/16"	6"	910 Bkt 2.50"	910 Bkt 4.20"	910 Bkt 4.25"	15/20 lbs.
			20"/24"/28"/32"	8"	6088 Bkt 2.62"	6088 Bkt 6.80"	6088 Bkt 3.62"	25/35/40/45 lbs.
			36"/40"	10"	910 Bkt ONLY 2.50"	910 Bkt ONLY 4.20"	910 Bkt ONLY 4.25"	60/65 lbs.
540	Lift-Off	Heavy-Duty 8,000 lbs./pair	14"/16"	6"	918 Bkt 3.00"	918 Bkt 7.82"	918 Bkt 5.00"	15/20 lbs.
			20"/24"/28"/32"	8"				25/35/40/45 lbs.
			36"/40"	10"				60/65 lbs.

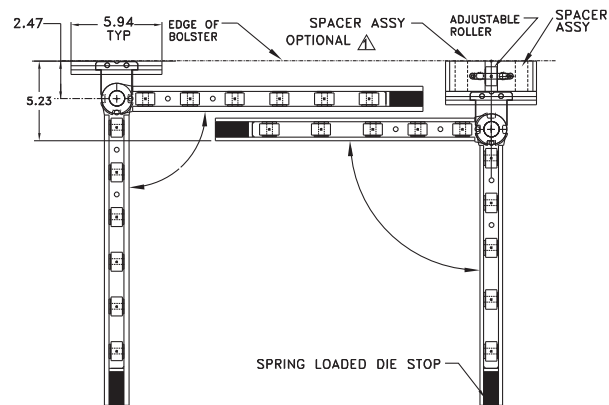
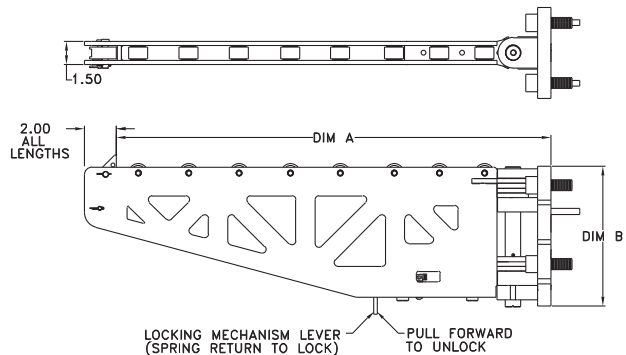
Please order at least one mounting bracket for each extension arm. Bolster extensions are ordered as each. To order a pair, order 2 extensions.



SWING-AWAY BOLSTER EXTENSIONS

Designed as a permanent solution, Swing-Away Bolster Extensions are always available, yet easily moved out of the way, as needed. Extensions are rated for 6,000 lbs per pair and available up to 40 inches in length, fitting comfortably into most die applications where swing-away extensions are practical.

In applications where extension arms will be stored outward or where the extension separation on the press is greater than 2x the length, arms of the same size work nicely. For inward storage where arms need to overlap, ordering the next smaller size extension for one side along with a nesting spacer is recommended*. This makes the hinge location different between the two arms and allows one extension to store closer to the bolster than the other arm (See illustration).



Model No.	Recommended Spacer Assembly*	A	B
527-16	2" Thick P/N: 6580	16.41"	7.20"
527-18		18.41"	
527-20		20.41"	
527-24	4" Thick P/N: 14688	24.41"	9.15"
527-28		28.41"	
527-32		32.41"	
527-36	4" Thick P/N: 14689	36.05"	11.90"
527-40		40.21"	

*When using different model (length) arms in a nesting application, use only arms with matching "B" dimensions.

Example:

Style	Model Number	Length from Model No.
BE	527	24

Part No: **BE-527-24**

For spacer assemblies use style and model number only.
Example: BE-14688

For non-nesting application, order same size extensions.

Example - for 28" application:

Qty. 2 BE-527-28

For nesting application, order one extension shorter with a spacer assembly. Example - for a 28" application:

- Qty. 1 BE-527-28 extension
- Qty. 1 BE-527-24 extension
- Qty. 1 BE-14688 spacer assembly

DETACHABLE BOLSTER EXTENSIONS



Designed for larger load applications, Models 524 and 524HD Detachable Bolster Extensions provide maximum flexibility for press access and easy movement to other presses. A gate latch and lock pin easily secure the bolster extensions to Model 914 mounting brackets for semi-permanent integrity during die loading and unloading operations. Steel wheels allow for strong rigid support of the extensions during use and comfortable rolling to another press, if used as part of a modular multi-press QDC system.

The Detachable Bolster Extensions are custom made to match the application height requirements with a +/- 2 inch height adjustment for leveling and some flexibility for variations in press heights. Extension height from the floor to the top of the rollers is specified by a height dimension in the part number.

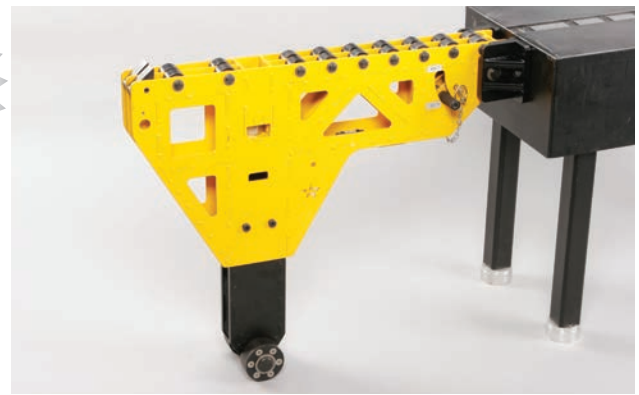
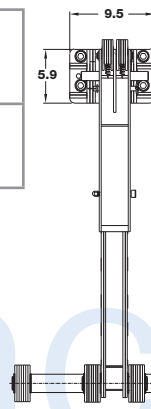
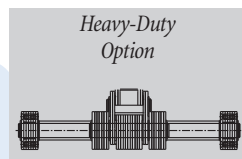
While the 524 series is designed to be ordered and provided as a standardized production part, customizations of the 524 are available for a variety of unique requirements up to 60,000 lbs./pair. Please contact PFA with application details.

Bracket Height is for the bracket only and not the distance from the die lifter roller surface or bolster surface. For a nominal .090" roller height above the surface, the bottom of the mounting bracket will be 6.0" below the surface. Minimum bolster thickness is 5". For complete mounting details contact PFA.

Example:

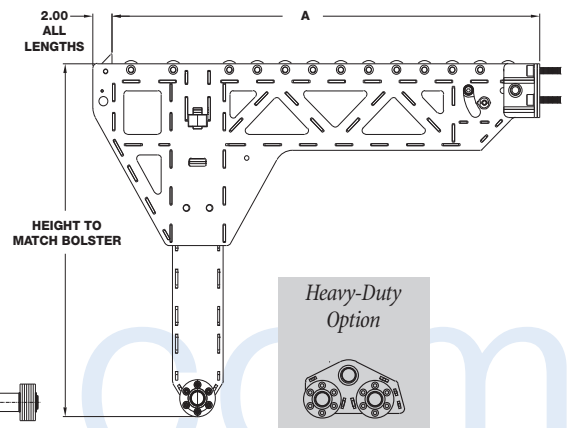
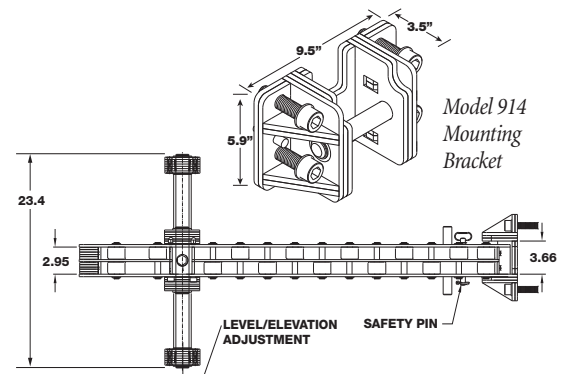
Style	Model Number	Height
BE	524HD-48	30.5

Part No: **BE-524HD-48-30.5**



Model - Length Model No.	A	Die Weight
524-36	36.00"	16,000 lbs./pair
524-42	42.00"	
524-48	48.00"	
524-60	60.00"	
524-72	72.00"	
524-84	84.00"	
**	**	
524HD-36	36.00"	35,000 lbs./pair
524HD-42	42.00"	
524HD-48	48.00"	
524HD-60	60.00"	
524HD-72	72.00"	
524HD-84	84.00"	
**	**	

**Other sizes available. Call PFA for details.



TRAVELING & SLOTLESS BOLSTER EXTENSIONS

Traveling and Slotless Bolster Extensions are unique versions of our standard lift off bolster extensions. As lift-offs, they provide for easy removal during press operations and allow a single pair to be used for multiple presses. They are unique because the traditional rollers are replaced with a slot or channel, very similar to that in the bolster itself. These slots are used with our Model 706 Mechanical Die Lifters (See page 25) to move dies from the bolster extension into the press via one of two methods:

Traveling Bolster Extensions. The first method is named after the ability of the die lifter to “travel” from the bolster extension into a slot in the bolster. The Traveling Bolster Extension Model 522 is mounted using the Model 913 Mounting Bracket so the channel or slot bottom of the bolster extension lines up with the bottom of the shimmed slot in the bolster. With proper alignment and shimming of the slot, the Model 706 travels easily from the extension into the bolster slot. In cases of cutouts in the bolster, an optional “Bridge” shim can often be used to shim the slot, making use of the mechanical die lifter possible in those situations. After die insertion, both the mechanical die lifter AND the bridge shim can be removed to allow normal die operation. If a bridge is used, a “B” is added to the model number, as in 522B.

Slotless Bolster Extensions. The second method is named because of the lack of slots in the bolster on which these are used. Moving dies easily into a press without slots or slots in the “non-preferred” direction has always been a particular challenge for implementing Quick Die Change. With the Model 530 Slotless Bolster Extensions, however, moving a die into a slotless press is fast and easy. The extensions are mounted using the Model 916 Mounting Bracket so the channel or slot bottom of the bolster extension lines up with the top surface of the bolster. Dies are modified with parallels or spacers added between parallels to provide for a gap between the bolster and die surface of 1.520”-1.530”, which allows proper clearance for the Model 706 Mechanical die lifter to both lift the die and be removable after die change.



*Step 1:
Insert Lifter*



*Step 2:
Lifter Fully Under Die*



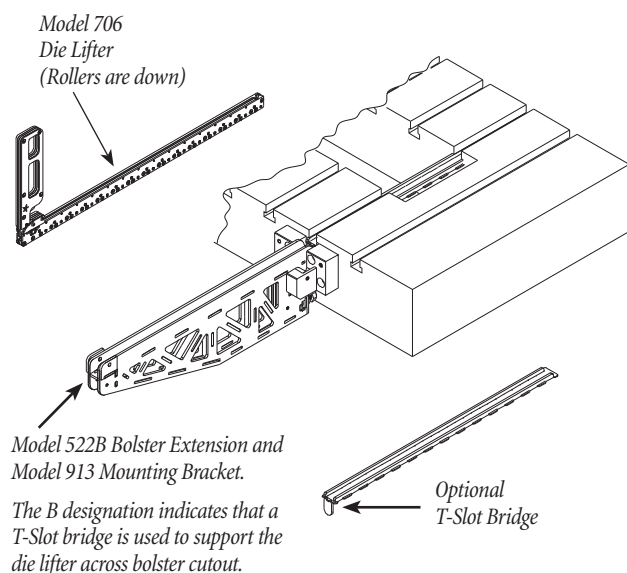
*Step 3:
Lift Die with Handle*



*Step 4:
Move Die Into Press*

TRAVELING BOLSTER EXTENSIONS

Models 522 and 522B



Model No.	A	B	Weight
522	14"	6.00"	15 lbs.
	16"	6.00"	20 lbs.
	20"	8.00"	25 lbs.
	24"	8.00"	35 lbs.
	28"	8.00"	40 lbs.
	32"	8.00"	45 lbs.
	36"	10.00"	60 lbs.
	40"	10.00"	65 lbs.

530	14"	6.00"	15 lbs.
	16"	6.00"	20 lbs.
	20"	8.00"	25 lbs.
	24"	8.00"	35 lbs.
	28"	8.00"	40 lbs.
	32"	8.00"	45 lbs.
	36"	10.00"	60 lbs.
	40"	10.00"	65 lbs.

Example:

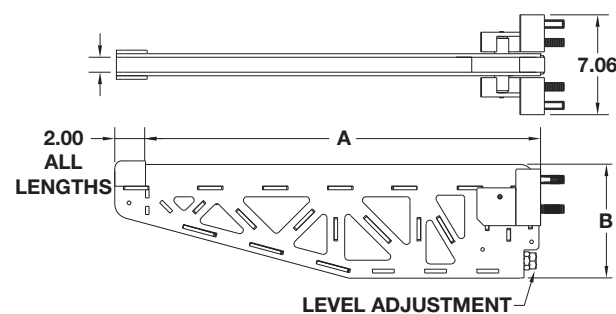
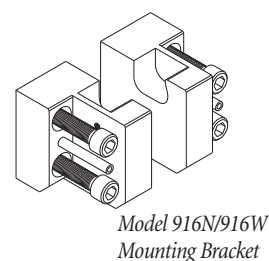
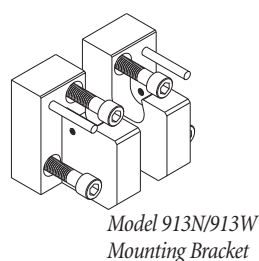
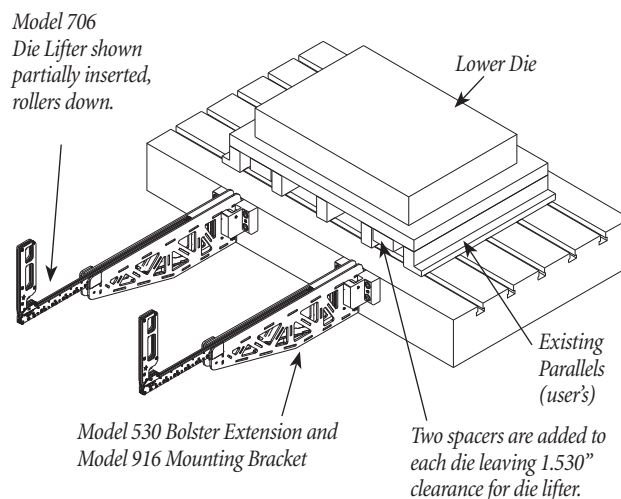
Style	Model Number*	Narrow/Wide (N or W)	Length (A)
BE	522	W	24

Part No: **BE-522W-24**

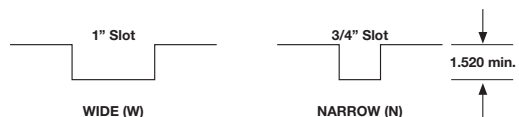
*For Bridge in T-Slot applications, add a "B" to the Model Number. Contact PFA for application assistance.

SLOTTLESS BOLSTER EXTENSIONS

Model 530 for Bolsters without slots for die lifters



PFA recommends machining or shimming slots to 1.525" - 1.530" for a die lift of approximate .060".



CUSTOMER NOTES

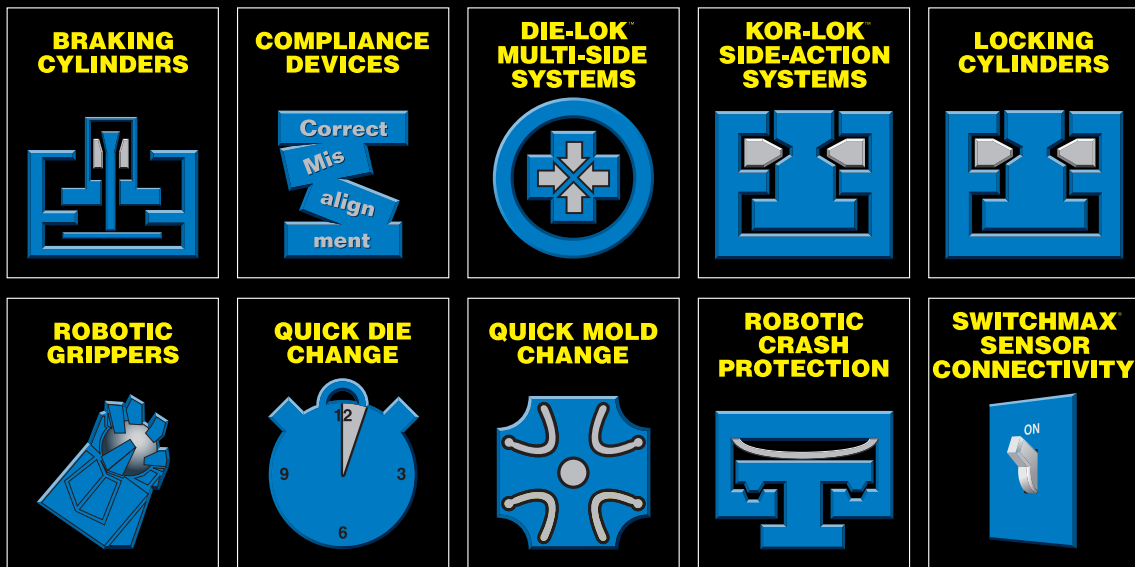
CUSTOMER NOTES

Hydraulic Clamping & Lifting

Hydraulic Control Units

Mechanical Clamping & Lifting

Pneumatic Lifting



N118 W18251 Bunsen Drive
 Germantown, WI 53022
 (262) 250-4410 • Fax (262) 250-4409

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pfa-inc.com