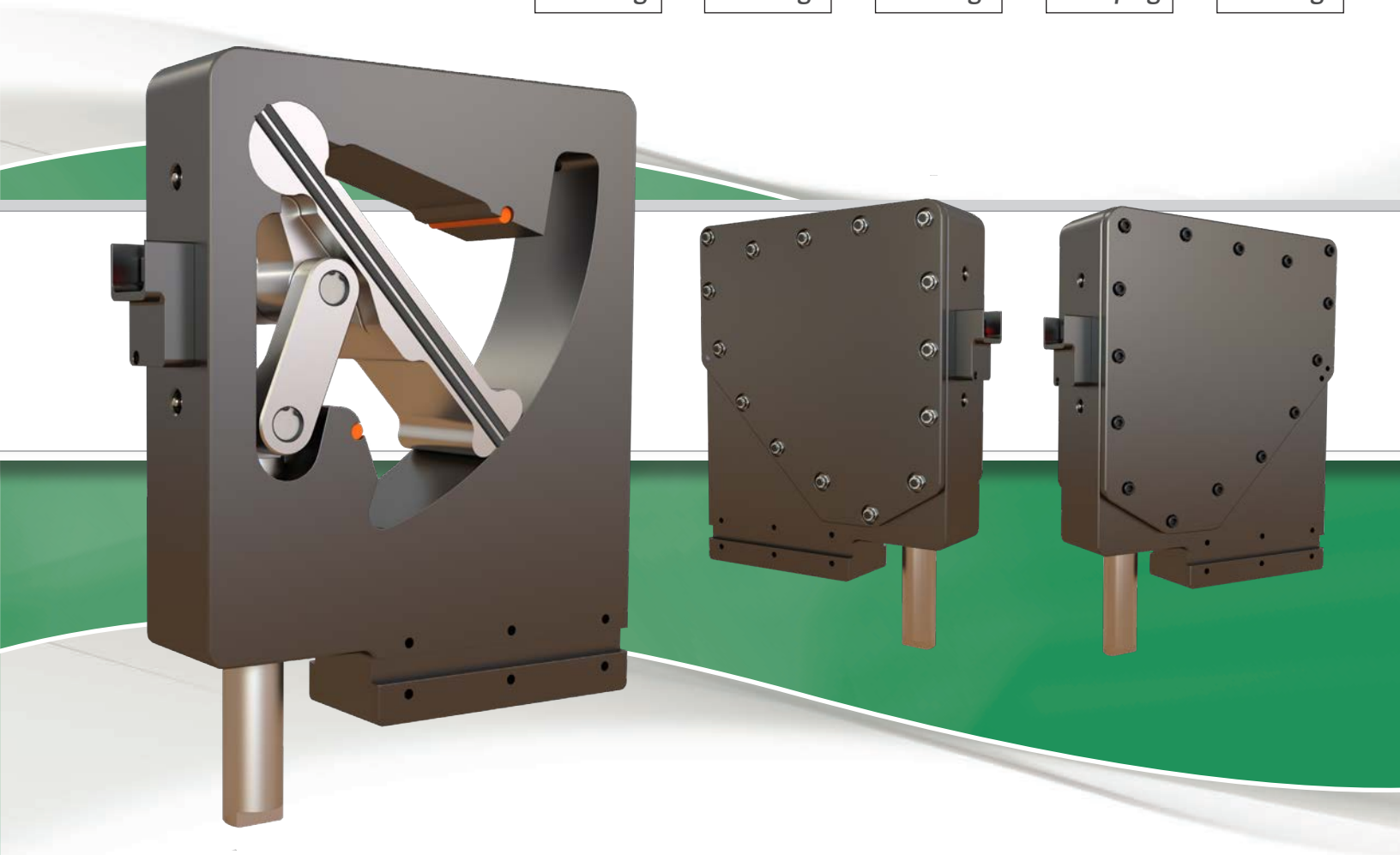
Air Toggle Presses

Clinching | *Piercing* | *Riveting* | *Stamping* | *Bending*



Part of our Presses and Press Units Family of Products

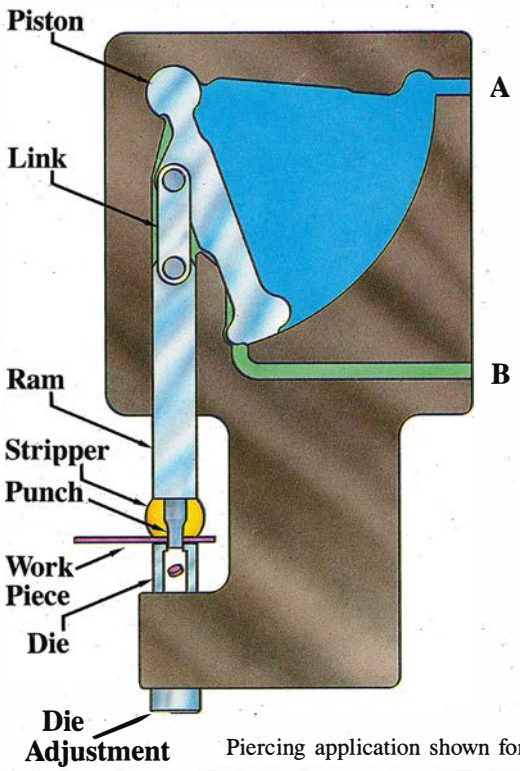
www.btmcomp.com/presses-and-press-units

BTM® KOREA

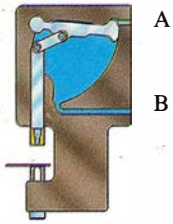
www.BTMKOREA.com

031-477-4202

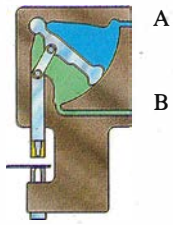
HOW IT WORKS



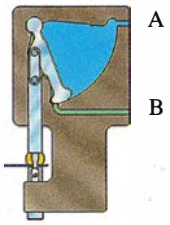
Piercing application shown for reference



Air pressure at port "B" holds the piston and ram in the return position.



Air pressure at port "A" swings the piston through an arc, driving the ram and the toggle linkage.



Maximum force is achieved as the linkage "Toggles" or goes to center.

Advantages & Features

The BTM patented "THIN" air powered toggle presses produce high forces using 80 psi (5.5 bars) air pressure! The "THIN" profile allows for close stacking. These extremely simple and rugged presses have only three moving parts. A unique, pivoting, rectangular, piston drives the non-rotating ram through a force multiplying toggle linkage. This quick acting mechanism drastically reduces air consumption as compared with conventional pneumatic cylinders doing the same work. BTM press bodies are constructed of light weight, aircraft aluminum, hardcoated to a Rockwell C-70 for excellent wear characteristics.

Patented THIN Design

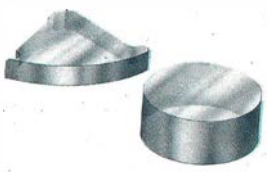


A BTM 1 Ton, Punch & Button Press is only 1.5 inches (38 mm) wide & weighs 15 lbs. (6.8 kg.).

Air consumption of BTM Toggle Press compared with conventional pneumatic cylinders.

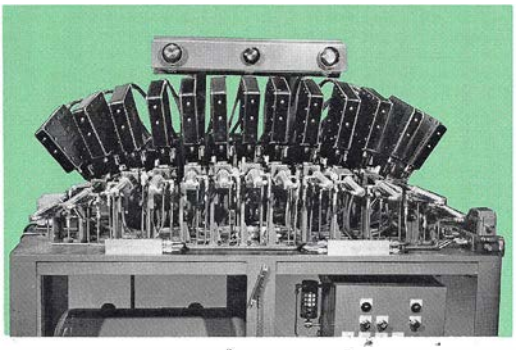
Air Supply	Required Force	Stroke	Device	Air used per complete cycle
80 psi (5.5 bar)	2000 lbs. (8896N)	2.25" (57.15mm)	1 Ton BTM Press	256 in.³ (652 cm³)
80 psi (5.5 bar)	2000 lbs. (8896N)	2.25" (57.15mm)	6" dia. (152.4mm) Cylinder	798 in.³ (2084 cm³)

The BTM Press uses **68% less** air than the cylinder requires in the example. Stroke limiters are available to further reduce air consumption.

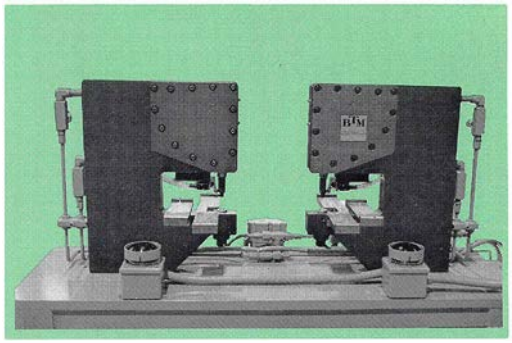


For formula and chart, see page 28

MACHINE BUILDING WITH THIN AIR POWERED TOGGLE PRESSES



BTM Air Toggle Presses may be mounted on close centers for simplified automation and special machine building.



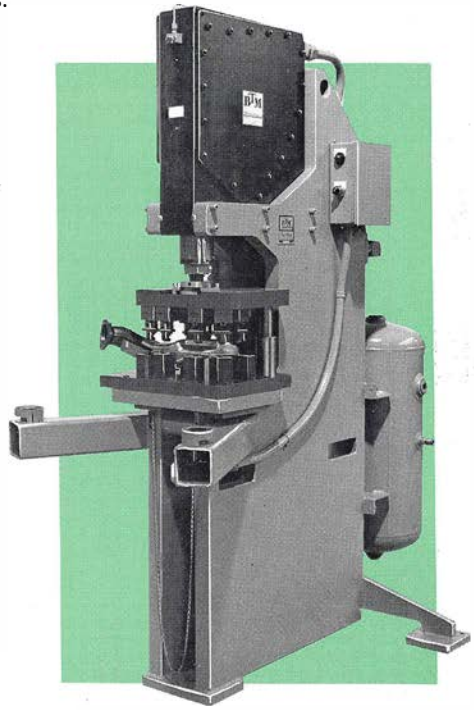
Simple fixtures can be built quickly with BTM presses.

BTM Air Powered Toggle Presses can perform all the typical operations of other presses, but within a smaller space and using only a small amount of air. Presses can be quickly tooled and easily mounted in any position.

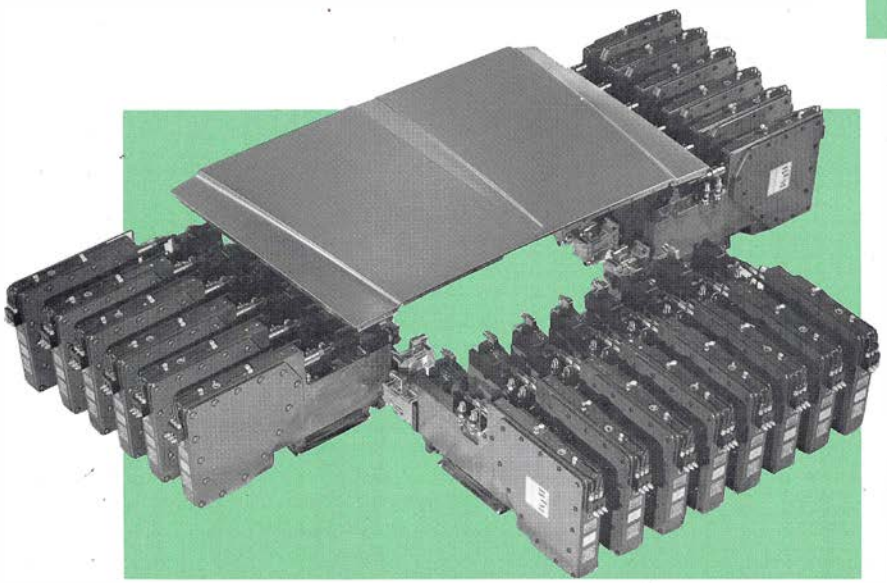
Bench, floor and tooling models can be equipped with die set tooling to quickly accommodate a multitude of applications.

Various options and accessories are available to help you build machines quickly and cost effectively. These include special rams, modified press bodies, control packages, and stroke limiters for improved cycle time with less air consumption. Special presses for unusual applications may also be developed.

BTM Company offers complete design and build services to help you solve your production problems. Call our Sales Department and let us help you apply our presses to your next application.

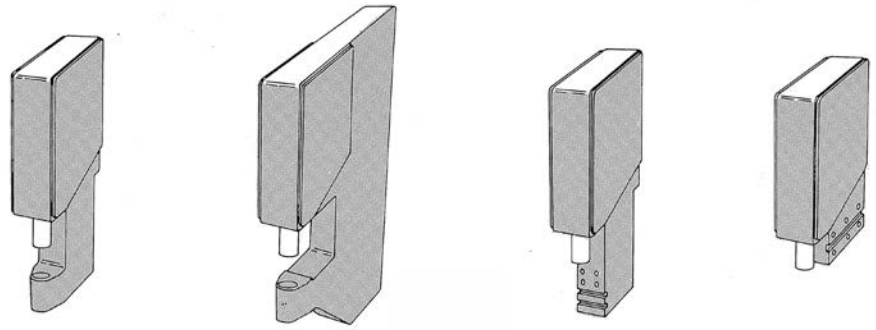


A BTM 20 Ton Foor Press is shown with optional die set tooling and control package.



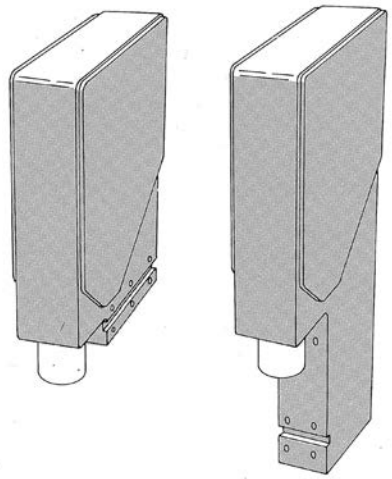
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1 & 2 Ton Presses



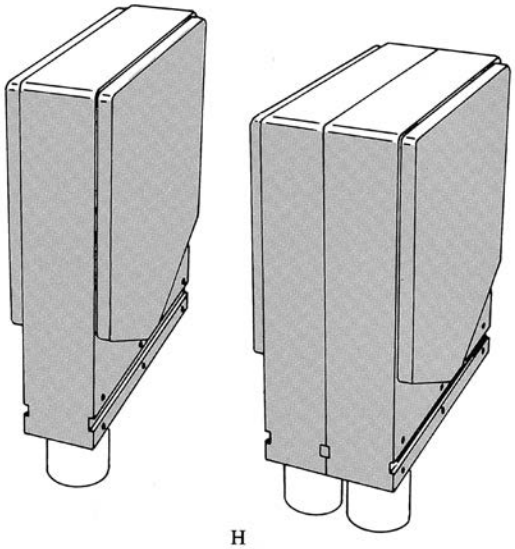
PB (Punch & Button) | PB6 (Punch & Button) | FM (Front Mount) | H (Head)

5 & 10 Ton Presses



H (Head) | FM (Front Mount)

20 & 40 Ton Presses



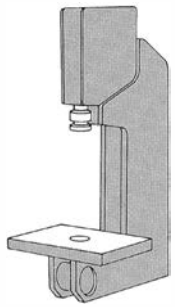
H (Head)

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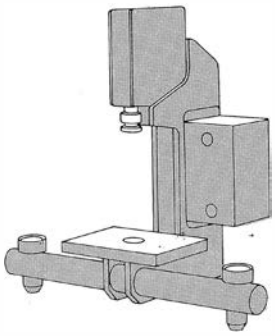
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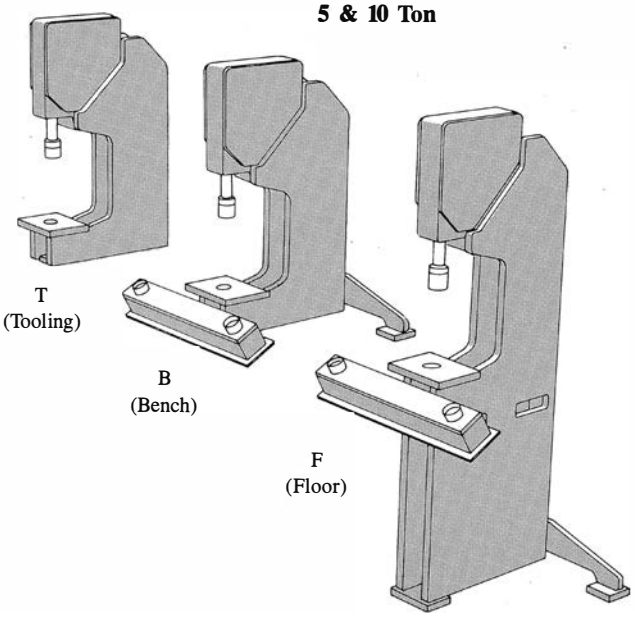


T
(Tooling)



B
(Bench)

5 & 10 Ton

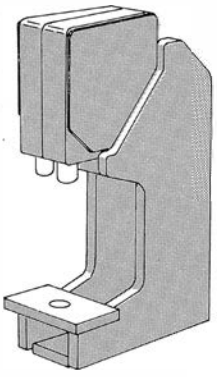


T
(Tooling)

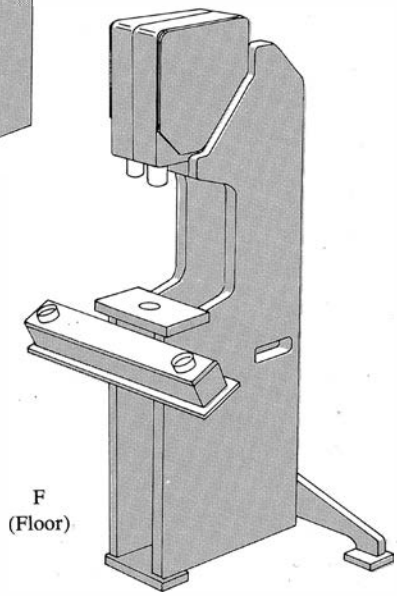
B
(Bench)

F
(Floor)

20 & 40 Ton



T
(Tooling)



F
(Floor)

Specials



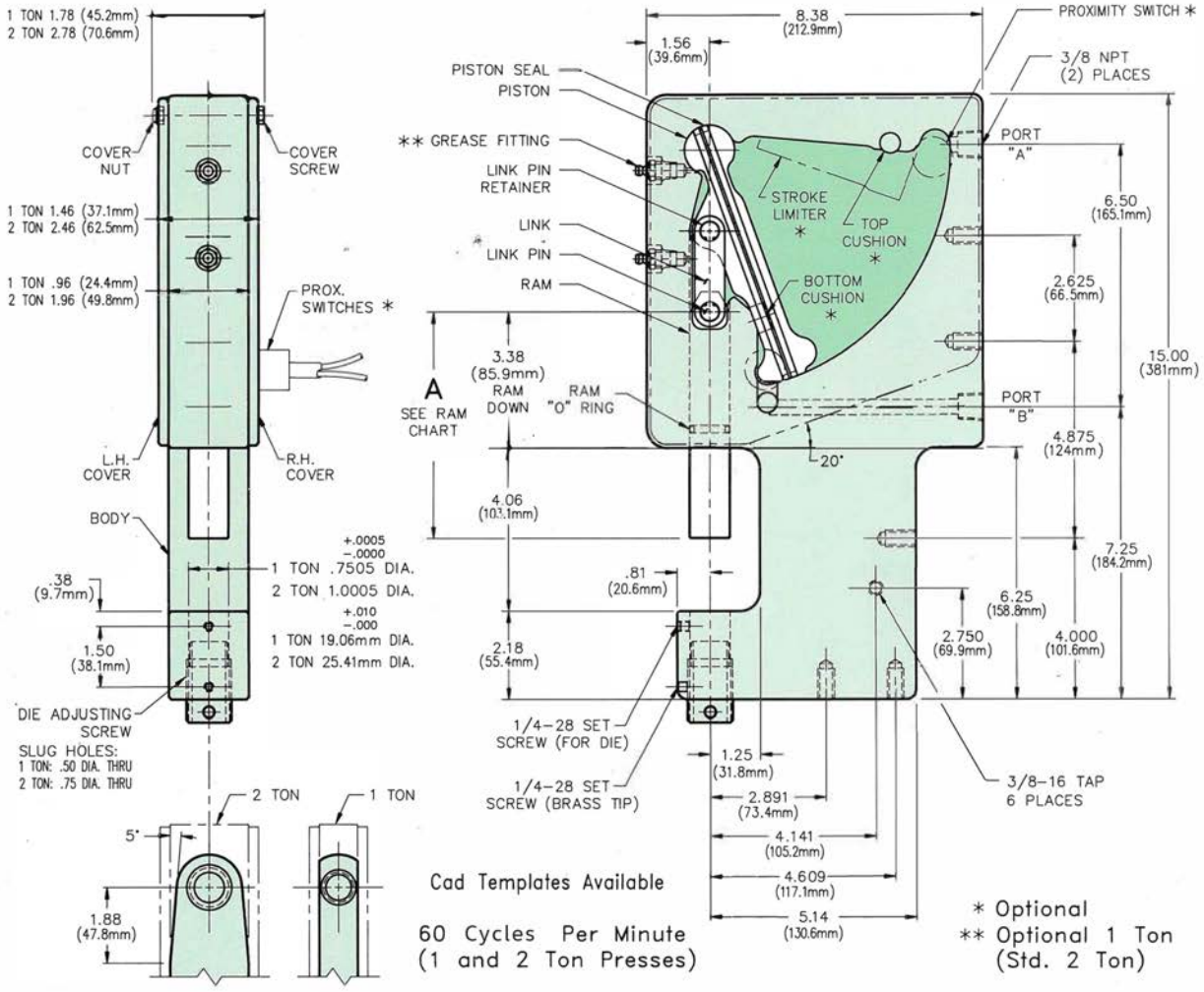
TM
(Top Mount)

Special presses and modifications to standard presses are available. BTM can also supply completely tooled presses. Contact our Sales Department for assistance with your special press requirements.

1 & 2 TON PB PRESSES

PB Models (Punch and Button)

P1PB x 1.50 (38.1mm) Stroke 001495 - 15 lbs. (6.8 kg)
P1PB x 2.25 (57.2mm) Stroke 001498 - 15 lbs. (6.8 kg)
P2PB x 1.50 (38.1mm) Stroke 001497 - 25 lbs. (11.4 kg)
P2PB x 2.25 (57.2mm) Stroke 001500 - 25 lbs. (11.4 kg)



Components P1PB

Description	No. Req'd.	BTM No.
P1PB x 1.5 Body	1	000079
P1PB x 2.25 Body	1	000080
Piston	1	000115
Piston Seal	2	000058
Link	1	000118
Link Pin	2	000122
Ram – 75 Series	1	See Pg. 8
R.H. Cover	1	000125
L.H. Cover	1	000126
Cover Screw	13	000127
Cover Nut	13	000078
Ram "O" Ring	1	000149
Grease Fitting	2	Optional
Sealant	1	000273
Seal Kit	1	000798
Top Cushion	1	001269
Bottom Cushion	1	000829
Stroke Limiter	1	000826
Die Adj. Screw	1	013677
Brass Set Scr.	1	004687
Die Set Scr.	1	000148

How to Order Presses

6 P2PB x 2.25 PT100 EPRL EPEL SS-1 TOOLING

- Quantity
- Model
- Stroke 1.5, 2.25 or Special
- Ram Style See Page 8
- * Proximity Switches See Page 24
- * Strippers See Page 9
- * Consider Tooling See Page 9

How to Order Components

2	P2 Link	000120
Qty.	Description	BTM No.

* Denotes Options

Note: Use "O" Ring No. 000821 in P2PB & PB6.
Use No. 000150 in P2H & FM.

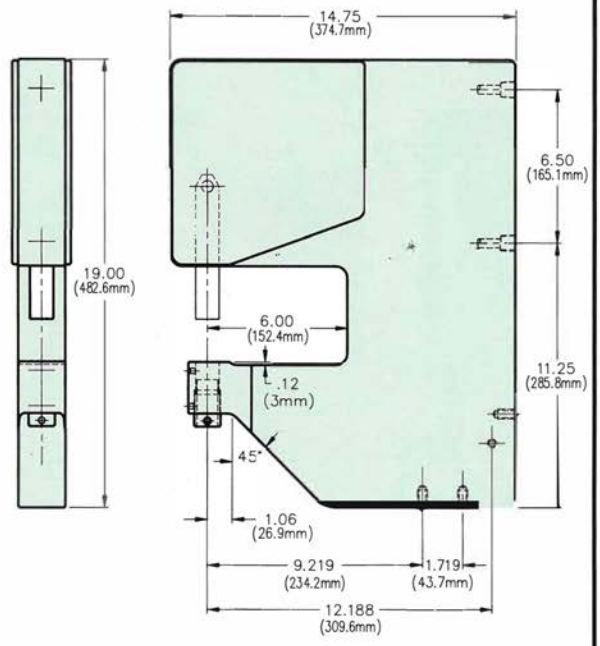
Components P2PB

Description	No. Req'd.	BTM No.
P2PB x 1.5 Body	1	000083
P2PB x 2.25 Body	1	000084
Piston	1	000117
Piston Seal	2	000058
Link	1	000120
Link Pin	2	000124
Link Pin Retainer	2	000121
Ram – 100 Series	1	See Pg. 8
R.H. Cover	1	000125
L.H. Cover	1	000126
Cover Screw	13	000129
Cover Nut	13	000078
Ram "O" Ring	1	See Note
Grease Fitting	2	000050
Sealant	1	000273
Seal Kit	1	000800
Top Cushion	1	001271
Bottom Cushion	1	000591
Stroke Limiter	1	000828
Die Adj. Screw	1	013678
Brass Set Scr.	1	004687
Die Set Scr.	1	000148

1 & 2 TON PB6, FM & H PRESSES

PB6 Models (6 Inch Throat)

For components and dimensions not shown, see P1PB and P2PB on page 6.

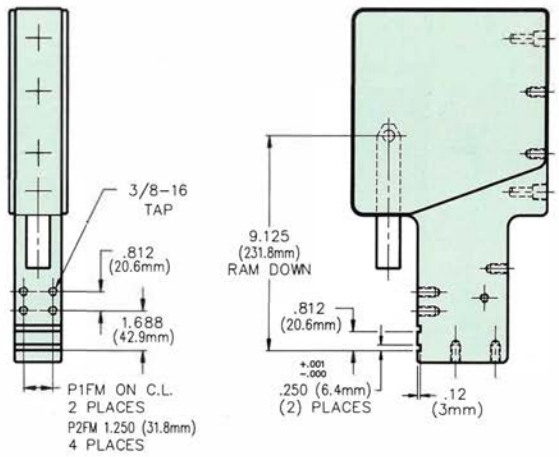


Cad Templates Available

Model	Ass'y. No.	Body No.	Weight
P1PB6 x 1.50 (38.1 mm) Stroke	001501	000085	26.5 lbs. (12 kg.)
P1PB6 x 2.25 (57.2 mm) Stroke	001504	000086	26.5 lbs. (12 kg.)
P2PB6 x 1.50 (38.1 mm) Stroke	001503	000089	48.5 lbs. (22 kg.)
P2PB6 x 2.25 (57.2 mm) Stroke	001506	000090	48.5 lbs. (22 kg.)

FM Models (Front Mount)

For components and dimensions not shown, see P1PB and P2PB on page 6.

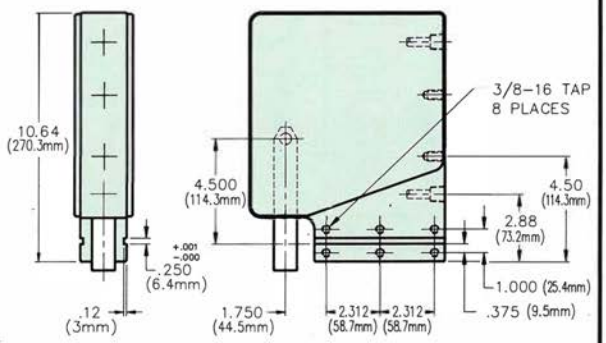


Cad Templates Available

Model	Ass'y. No.	Body No.	Weight
P1FM x 1.50 (38.1mm) Stroke	001507	000948	14 lbs. (6.4 kg.)
P1FM x 2.25 (57.2 mm) Stroke	001510	000951	14 lbs. (6.4 kg.)
P2FM x 1.50 (38.1 mm) Stroke	001509	000950	23 lbs. (10.5 kg.)
P2FM x 2.25 (57.2 mm) Stroke	001512	000953	23 lbs. (10.5 kg.)

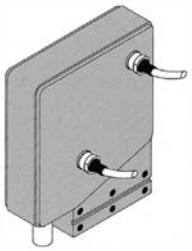
H Models (Head)

For components and dimensions not shown, see P1PB and P2PB on page 6.



Cad Templates Available

Model	Ass'y. No.	Body No.	Weight
P1H x 1.50 (38.1 mm) Stroke	001519	000103	12.5 lbs. (5.7 kg.)
P1H x 2.25 (57.2 mm) Stroke	001522	000104	12.5 lbs. (5.7 kg.)
P2H x 1.50 (38.1 mm) Stroke	001521	000107	20.0 lbs. (9.1 kg.)
P2H x 2.25 (57.2 mm) Stroke	001524	000108	20.0 lbs. (9.1 kg.)



*Options

Electrical Proximity Sensors
See Page 24

Stroke Limiter limits upstroke to suit your requirements
See Page 6

Cushions on up & down strokes
See Page 6

Presses are available with metric threads

For Specials & Tooling, call BTM for quote.

How to Order Presses

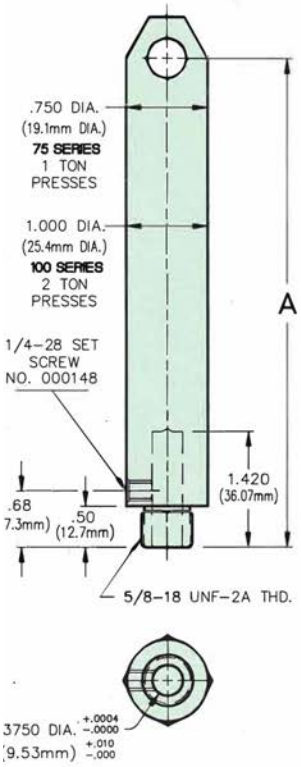
6 P2H x 2.25 PT100 EPRL EPEL SS-1 TOOLING

- Quantity
- Model
- Stroke 1.50, 2.25 or Special
- Ram Style See Page 8
- * Proximity Switches See Page 24
- * Strippers See Page 9
- * Consider Tooling See Page 9

* Denotes Options

75 & 100 SERIES RAMS

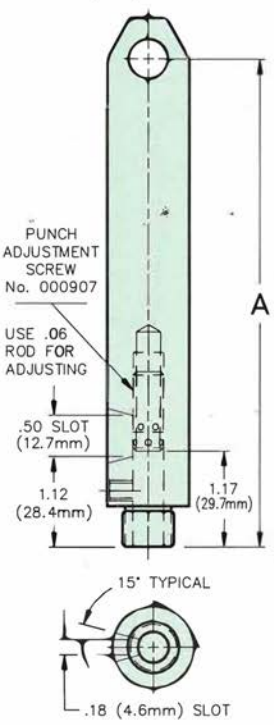
PT - 75
PT - 100



SEE PAGE 9 FOR PUNCHES AND STRIPPERS THAT CAN BE USED WITH THIS RAM
NOTE: A PUNCH LENGTH OF 2.50 (63.5mm) IS REQUIRED

PTA - 75
PTA - 100

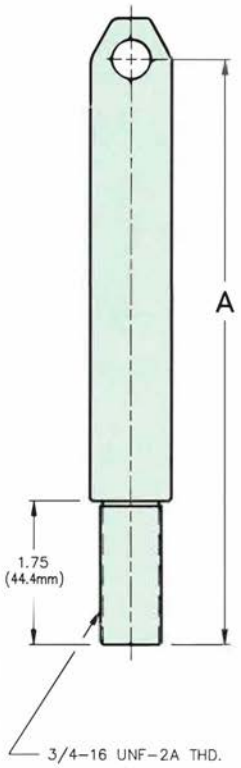
FOR ± .12 (3mm) TOOL ADJUSTMENT



PTA RAMS ARE IDENTICAL TO PT RAMS EXCEPT AS SHOWN

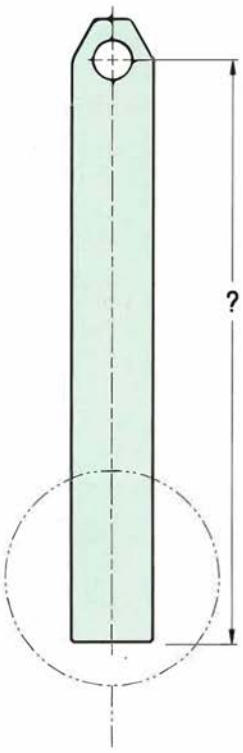
SEE PAGE 9 FOR PUNCHES AND STRIPPERS THAT CAN BE USED WITH THIS RAM
NOTE: A PUNCH LENGTH OF 2.25 (57.2mm) IS REQUIRED

TE - 75
TE - 100



USE WITH DIE SET ADAPTER PAGE 11

S - 75
S - 100

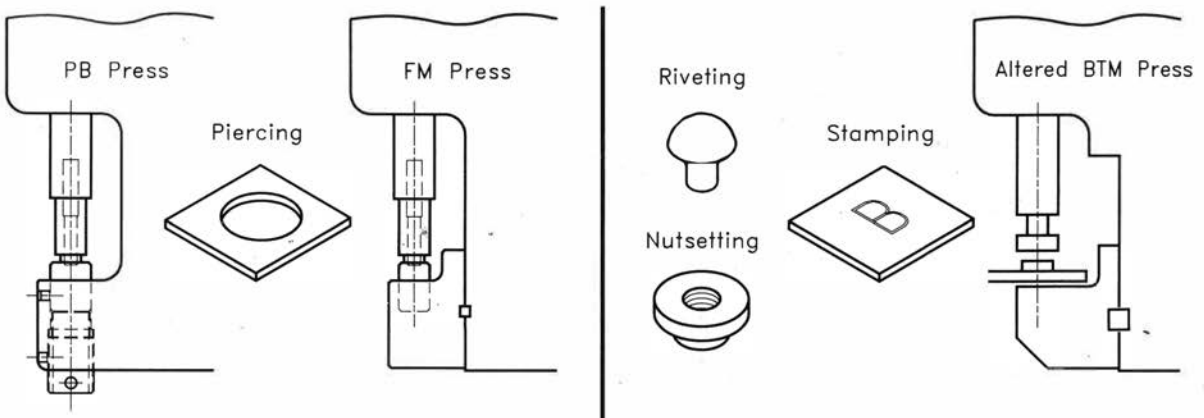


SPECIAL RAM
CUSTOMER TO PROVIDE
RAM END CONFIGURATION
FOR BTM PRICE AND DELIVERY

SERIES	PRESS MODEL	RAM STYLE	STROKE	A DIM.	BTM NO.
75 SERIES RAMS 1 TON PRESSES	PB PB6 FM H	PT	1.50 (38.1mm)	5.94 (150.9mm)	000130
			2.25 (57.2mm)	6.25 (158.8mm)	000131
		PTA	1.50 (38.1mm)	6.25 (158.8mm)	000904
		TE	1.50 (38.1mm)	7.12 (180.8mm)	000144
			2.25 (57.2mm)	7.88 (200.2mm)	000145
		S	1.50 (38.1mm)	PER CUSTOMER	TO BE ASSIGNED
			2.25 (57.2mm)		
100 SERIES RAMS 2 TON PRESSES	PB PB6	PT	1.50 (38.1mm)	5.94 (150.9mm)	000334
			2.25 (57.2mm)	6.25 (158.8mm)	000335
	FM H	PT	1.50 (38.1mm)	5.94 (150.9mm)	000133
			2.25 (57.2mm)	6.25 (158.8mm)	000134
		PTA	1.50 (38.1mm)	6.25 (158.8mm)	000905
		TE	1.50 (38.1mm)	7.12 (180.8mm)	000146
			2.25 (57.2mm)	7.88 (200.2mm)	000147
	ALL	S	1.50 (38.1mm)	PER CUSTOMER	TO BE ASSIGNED
			2.25 (57.2mm)		

STANDARD PIERCE TOOLING

Examples of Tooling Set-Ups

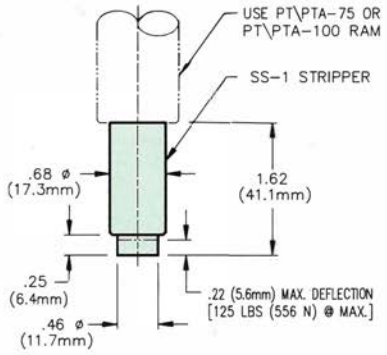


Pierce Tooling
See items below

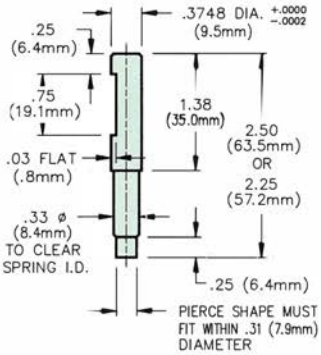
Special Tooling
Call BTM for quote

Standard Strippers, Punches and Dies

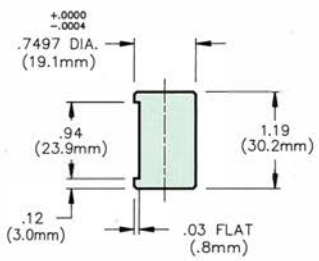
SS-1 STRIPPER
BTM ASS'Y NO. 000157



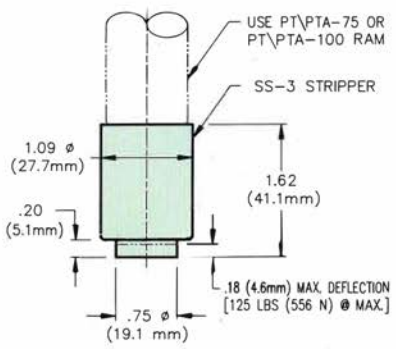
SS-1 PIERCE PUNCH
BTM No. 013137 (2.50 LG.)
013729 (2.25 LG.)



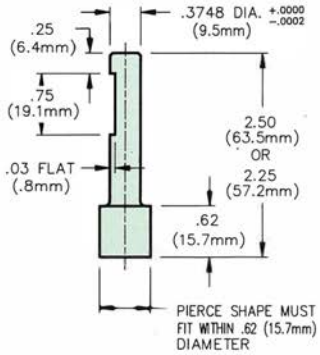
1 TON PIERCE DIE
BTM NO.013138



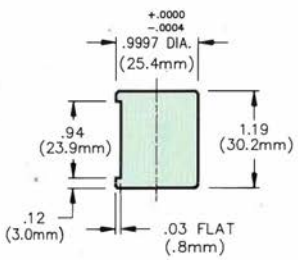
SS-3 STRIPPER
BTM ASS'Y NO. 000168



SS-3 PIERCE PUNCH
BTM No. 013139 (2.50 LG.)
013730 (2.25 LG.)



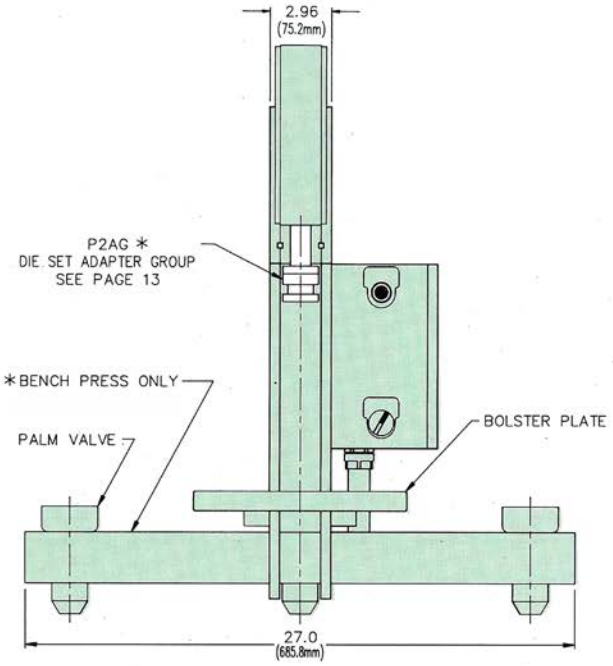
2 TON PIERCE DIE
BTM No. 013140

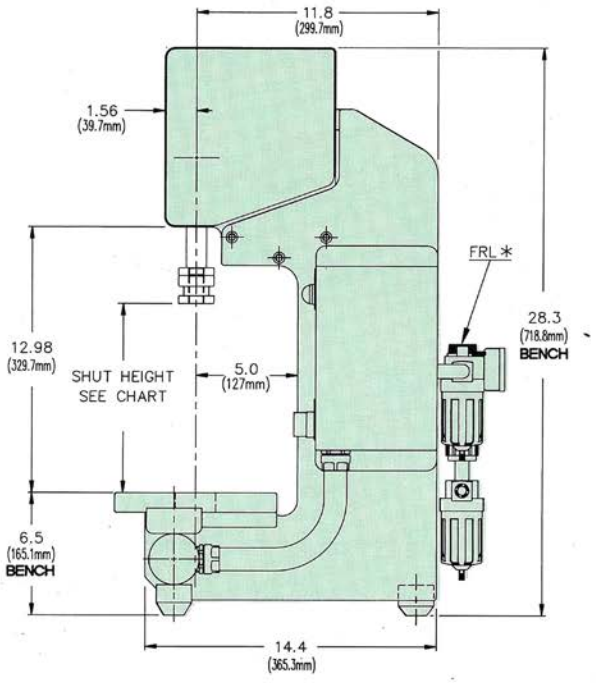


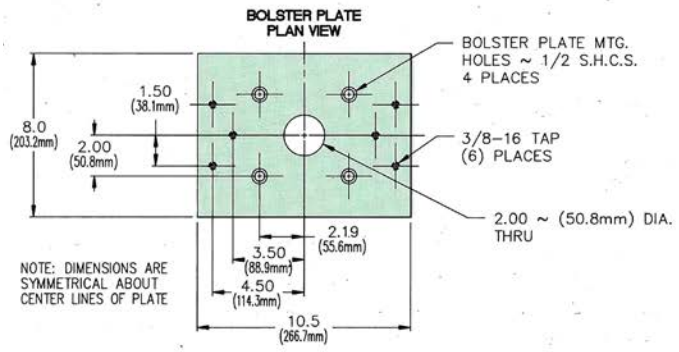
2 TON BENCH & TOOLING PRESSES

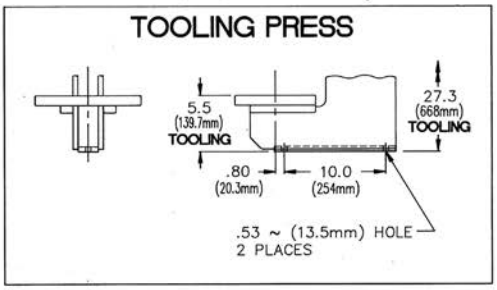
B and T Models (Bench and Tooling)

P2B x 1.50 (38.1mm) Stroke 000842 - 100 lbs. (45 kg)
P2B x 2.25 (57.2mm) Stroke 000843 - 100 lbs. (45 kg)
P2T x 1.50 (38.1mm) Stroke 000844 - 100 lbs. (45 kg)
P2T x 2.25 (57.2mm) Stroke 000845 - 100 lbs. (45 kg)









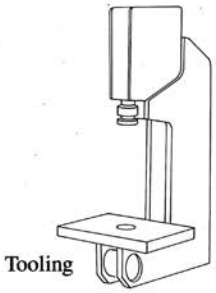
STROKE	SHUT HEIGHT
1.50 STROKE (38.1mm)	9.25 (235mm) MAX. 8.25 (209.5mm) MIN.
2.25 STROKE (57.2mm)	8.50 (216mm) MAX. 7.50 (190.5mm) MIN.

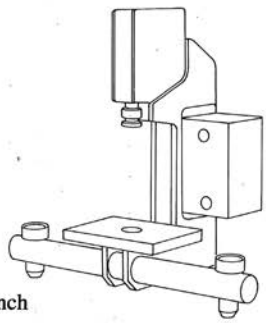
How to Order Presses

6 P2B x 2.25 TE-100 DSAG EPRL EPEL FRL TOOLING

- Quantity
- Model
- Stroke 1.50, 2.25 or Special
- Ram Style See Page 8
- * Die Set Adapter See Page 11
- * Proximity Switches See Page 24
- * Filter, Regulator Lubricator
- * Consider Tooling See Page 9

* Denotes Options


Tooling

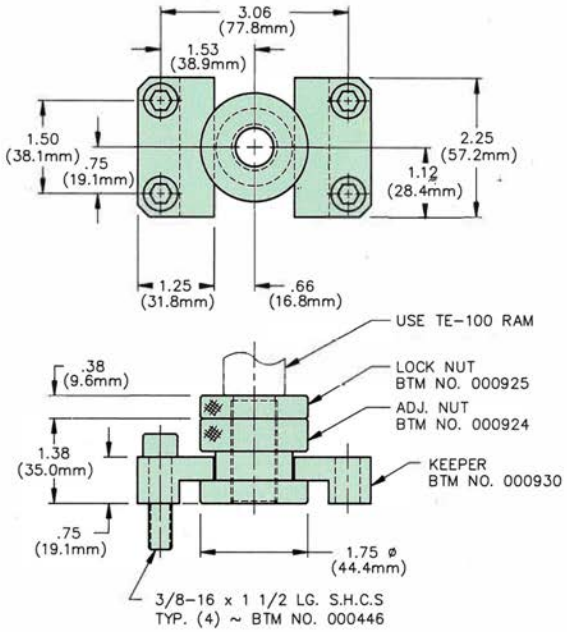

Bench

BTM COMPANY, LLC. | 300 DAVIS ROAD, MARYSVILLE, MI 48040 | +1.810.364.4567 | btmcomp.com

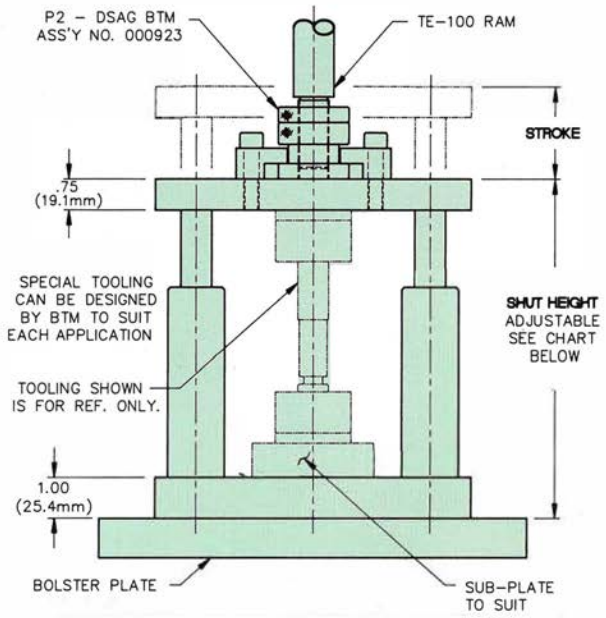
2 TON TOOLING OPTIONS

P2 - DSAG

(DIE SET ADAPTER GROUP)
BTM ASS'Y NO. 000923
(USED TO ADJUST SHUT HEIGHT)



DIE SET INFORMATION

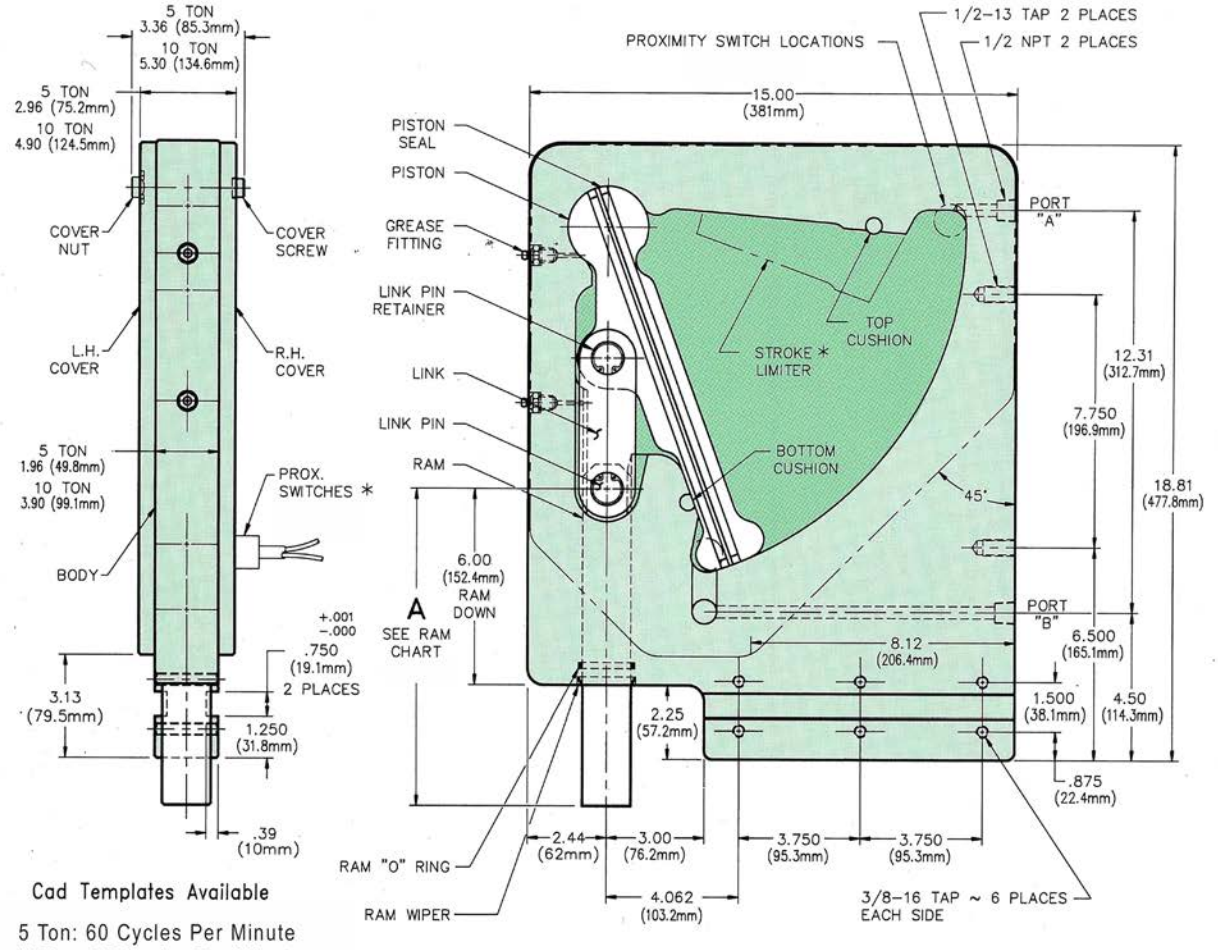


STROKE	SHUT HEIGHT
1.50 STROKE (38.1mm)	9.25 (235mm) MAX. 8.25 (209.5mm) MIN.
2.25 STROKE (57.2mm)	8.50 (216mm) MAX. 7.50 (190.5mm) MIN.

5 & 10 TON H PRESSES

H Models (Head)

P5H x 3.00 (76.2mm) Stroke 001541 - 70 lbs. (32 kg)
P5H x 4.50 (114.3mm) Stroke 001542 - 70 lbs. (32 kg)
P10H x 3.00 (76.2mm) Stroke 001543 - 120 lbs. (55 kg)
P10H x 4.50 (114.3mm) Stroke 001544 - 120 lbs. (55 kg)



Cad Templates Available

5 Ton: 60 Cycles Per Minute
10 Ton: 30 Cycles Per Minute

Components
P5H

Description	No. Req'd	BTM No.
P5H x 3.00 (76.2mm) Body	1	000247
P5H x 4.50 (114.3mm) Body	1	000248
Piston	1	000259
Piston Seal	2	000051
Link	1	000261
Link Pin	2	000264
Link Pin Retainer	2	000263
Ram - 150 Series	1	See Pg. 14
R.H. Cover	1	000266
L.H. Cover	1	000267
Cover Screw	15	000268
Cover Nut	15	000270
Ram Wiper	1	000272
Ram "O" Ring	2	000271
Grease Fitting	2	000050
Sealant - Cover	1	000273
Seal Kit	1	000804
Top Cushion	1	004315
Bottom Cushion	1	004315
Stroke Limiter *	1	000814

How to Order Presses

6 P10H x 4.50 P175 EPRL EPEL RL SS-4 TOOLING

- Quantity
- Model
- Stroke 3.00, 4.50 or Special
- Ram Style See Page 14
- Proximity Switches See Page 24 *
- Ram Latch See Page 15 *
- Strippers See Page 15 *
- Consider Tooling See Page 15 *

How to Order Components

2	P5 Piston	000259
Qty.	Description	BTM No.

* Denotes Options

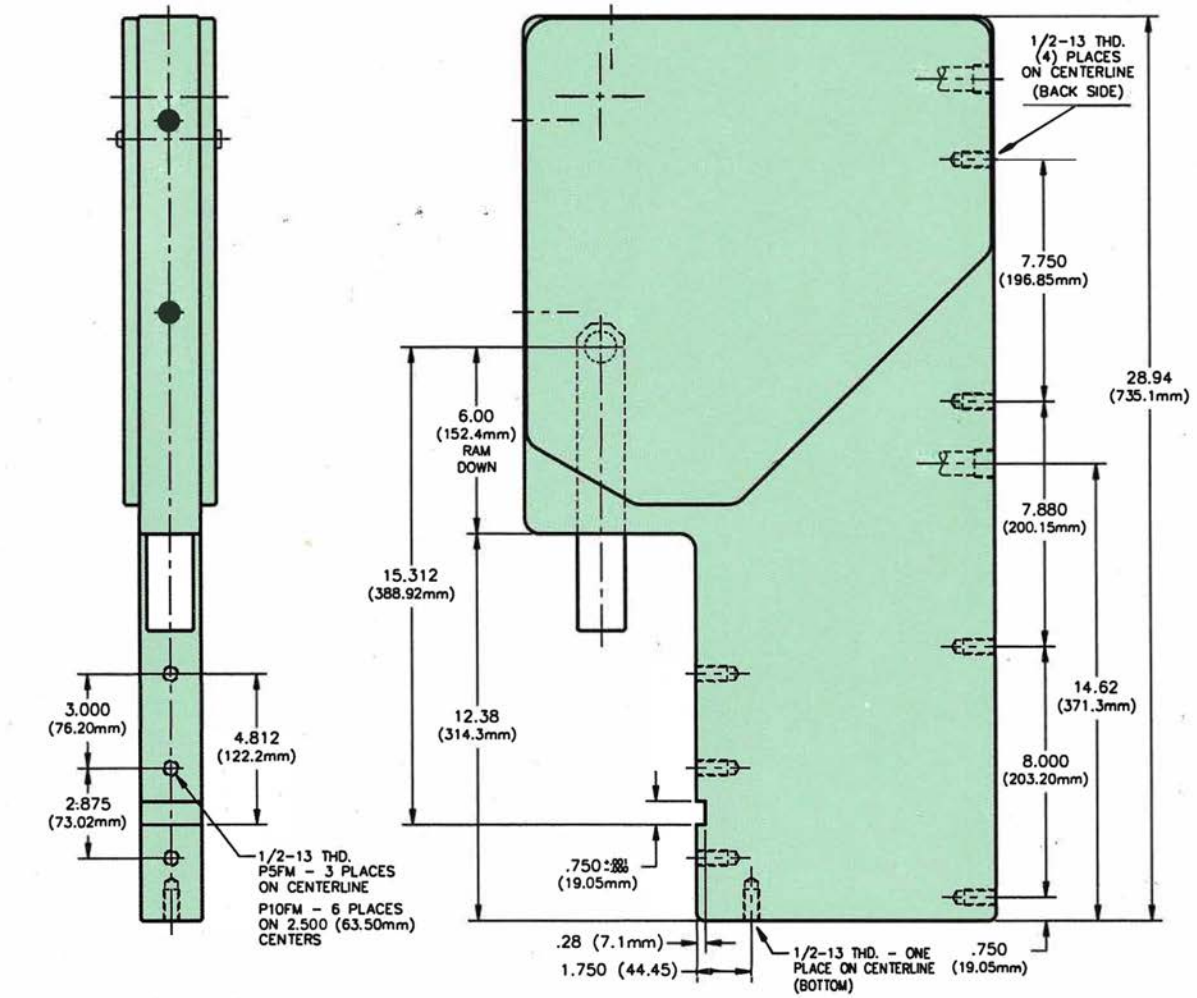
Components
P10H

Description	No. Req'd	BTM No.
P10H x 3.00 (76.2mm) Body	1	000249
P10H x 4.50 (114.3mm) Body	1	000250
Piston	1	000260
Piston Seal	2	000060
Link	1	003203
Link Pin	2	000265
Link Pin Retainer	2	000263
Ram - 175 Series	1	See Pg. 14
R.H. Cover	1	000266
L.H. Cover	1	000267
Cover Screw	15	000269
Cover Nut	15	000270
Ram Wiper	1	006731
Ram "O" Ring	1	006732
Grease Fitting	2	000050
Sealant - Cover	1	000273
Seal Kit	1	000805
Top Cushion	1	004316
Bottom Cushion	1	004316
Stroke Limiter *	1	000815

5 & 10 TON FM PRESSES

FM Models (Front Mount)

P5FM x 3.00 (76.2mm) Stroke 001549 - 90 lbs. (41 kg)
P5FM x 4.50 (114.3mm) Stroke 001550 - 90 lbs. (41 kg)
P10FM x 3.00 (76.2mm) Stroke 001551 - 155 lbs. (70 kg)
P10FM x 4.50 (114.3mm) Stroke 001552 - 155 lbs. (70 kg)



Components
P5FM

Description	No. Req'd.	BTM No.
P5FM x 3.00 (76.2mm) Body	1	000255
P5FM x 4.50 (114.3mm) Body	1	000256

Components
P10FM

Description	No. Req'd.	BTM No.
P10FM x 3.00 (76.2mm) Body	1	002571
P10FM x 4.50 (114.3mm) Body	1	003804

For components not shown, see P5H & P10H on page 12.

How to Order Presses

6 P5FM x 4.50 P175 EPRL EPEL RL SS-4 TOOLING

- Quantity
- Model
- Stroke 3.00, 4.50 or Special
- Ram Style See Page 14
- * Proximity Switches See Page 24
- * Ram Latch See Page 15
- * Strippers See Page 15
- * Consider Tooling See Page 15



*Options

Ram Latch
See Page 15

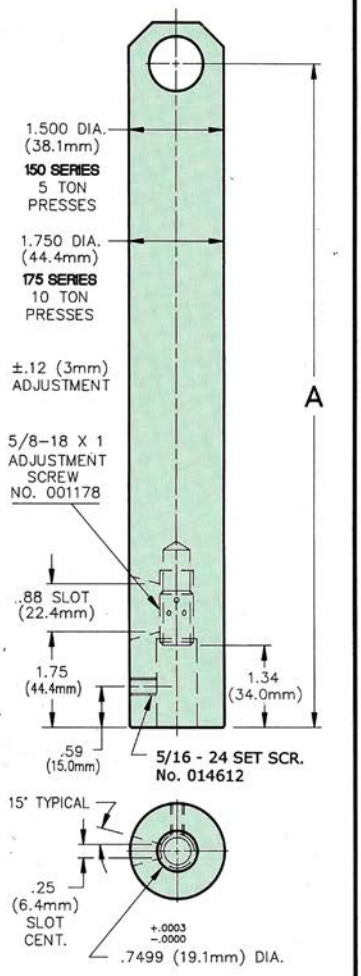
Electrical Proximity Switch
See Page 24

Stroke Limiter limits upstroke to suit your requirements
See Page 12

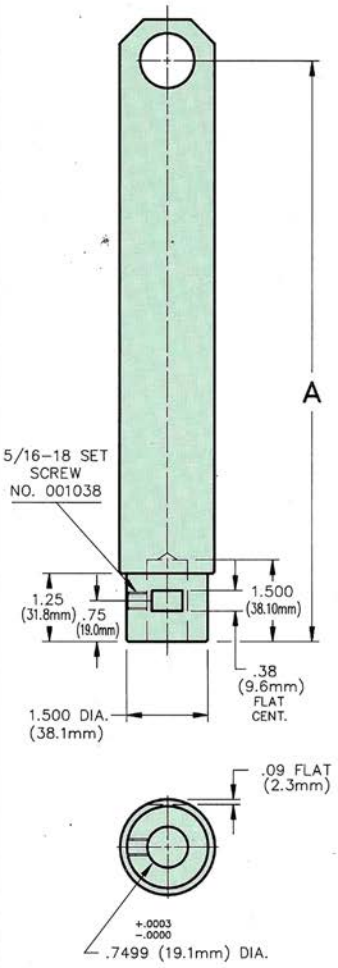
Presses are available with metric threads

150 & 175 SERIES RAMS

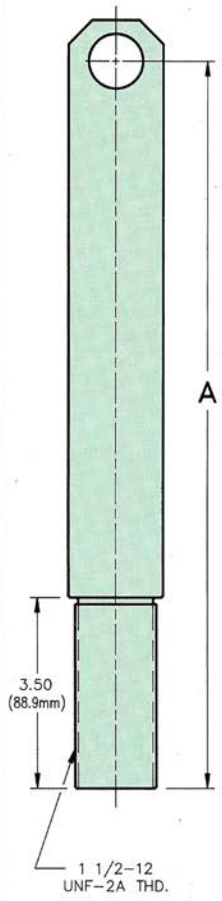
PA - 150
PA - 175



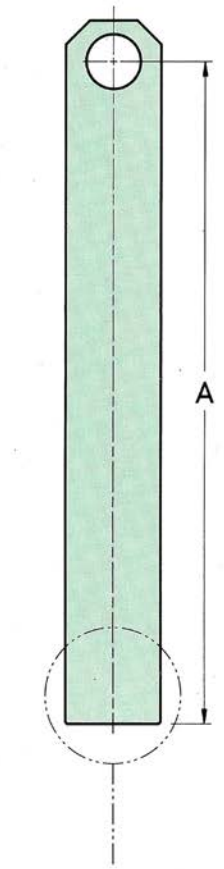
P - 150*
P - 175



TE - 150
TE - 175

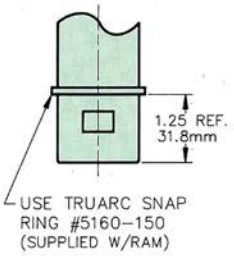


S - 150
S - 175



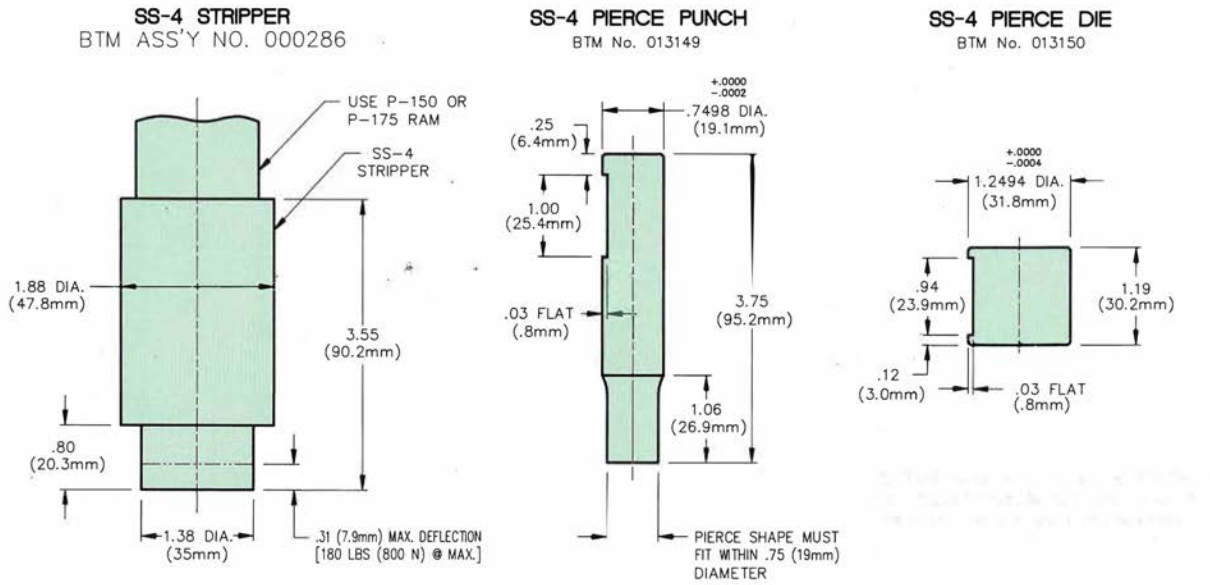
SERIES	PRESS MODEL	RAM STYLE	STROKE	A DIM.	BTM NO.
150 SERIES RAMS 5 TON PRESSES	H FM	PA	3.00 (76.2mm)	11.97 (304.0mm)	001177
			4.50 (114.3mm)	13.47 (342.1mm)	002773
		P*	3.00 (76.2mm)	10.62 (269.7mm)	000274
			4.50 (114.3mm)	12.12 (307.8mm)	000275
		TE	3.00 (76.2mm)	13.30 (337.8mm)	000283
			4.50 (114.3mm)	14.80 (375.9mm)	000284
	ALL	S	3.00 (76.2mm)	PER CUSTOMER	TO BE ASSIGNED
			4.50 (114.3mm)		
175 SERIES RAMS 10 TON PRESSES	H FM	PA	3.00 (76.2mm)	11.97 (304.0mm)	013109
			4.50 (114.3mm)	13.47 (342.1mm)	013110
		P	3.00 (76.2mm)	10.62 (269.7mm)	004886
			4.50 (114.3mm)	12.12 (307.8mm)	004887
		TE	3.00 (76.2mm)	13.30 (337.8mm)	005687
			4.50 (114.3mm)	14.80 (375.9mm)	004893
	ALL	S	3.00 (76.2mm)	PER CUSTOMER	TO BE ASSIGNED
			4.50 (114.3mm)		

* P-150 RAMS USE A SNAP RING TO BACK UP STRIPPER.

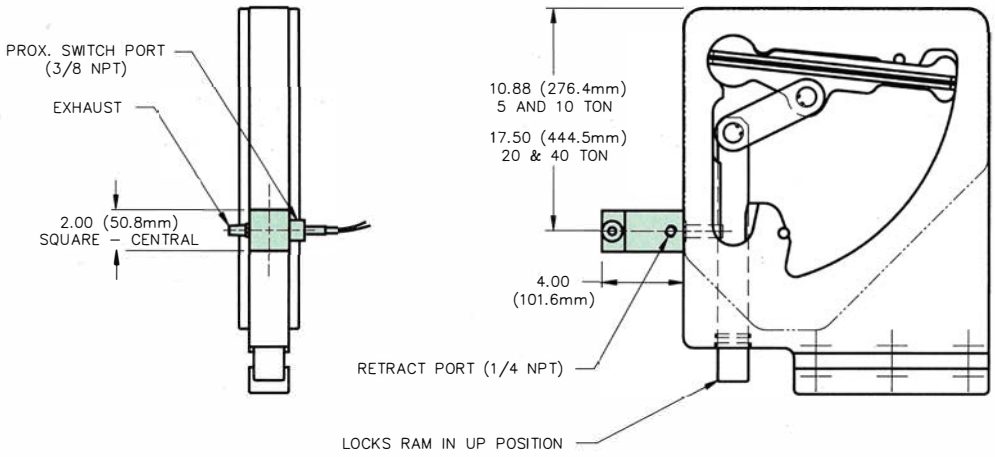


5 & 10 TON STRIPPER, TOOLING & RAM LATCH

Strippers, Punches and Dies



Ram Maintenance Latch with Proximity Switch



The ram maintenance latch prevents the ram from drifting down, and is used to faciliate tool changes with the air off.

Available on 5, 10, 20 and 40 Ton Presses Models: H, FM, T, B or F. (H Shown)

NOTE: 2 Ram Latches are required for 40 ton Presses. Located on center–line of rams.

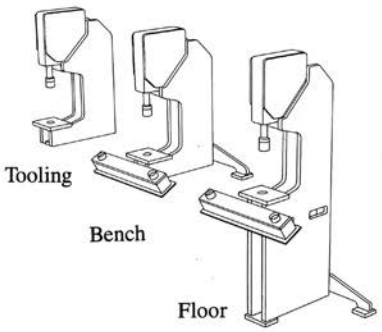
Retract port, and prox. switch location positioned by customer. See page 24.

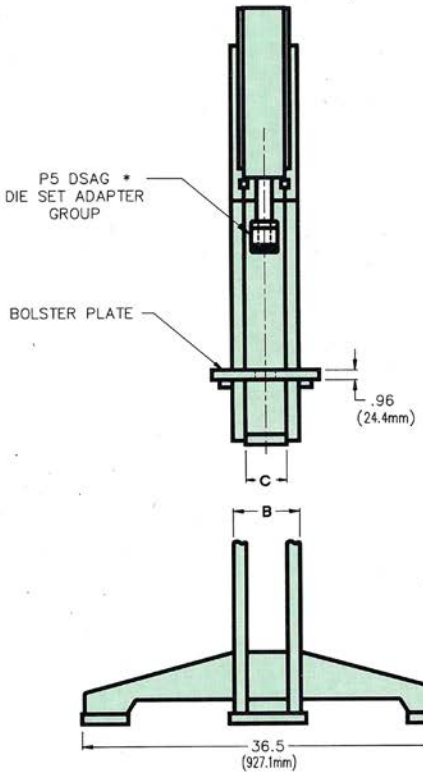
5 & 10 TON BENCH, FLOOR & TOOLING PRESSES

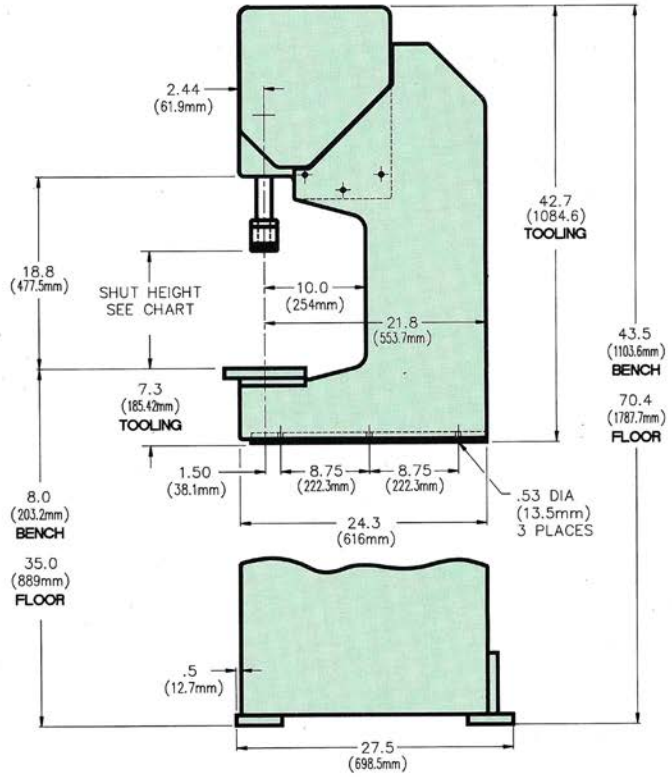
B, F and T Models
(Bench, Floor and Tooling)

P5B x 3.00 (76.2mm) Stroke 000846 - 310 lbs. (141 kg)
P5B x 4.50 (114.3mm) Stroke 000847 - 310 lbs. (141 kg)
P5F x 3.00 (76.2mm) Stroke 000850 - 450 lbs. (205 kg)
P5F x 4.50 (114.3mm) Stroke 000851 - 450 lbs. (205 kg)
P5T x 3.00 (76.2mm) Stroke 000848 - (136 kg)
P5T x 4.50 (114.3mm) Stroke 000849 - (136 kg)

P10B x 3.00 (76.2mm) Stroke 000852 - 700 lbs. (318 kg)
P10B x 4.50 (114.3mm) Stroke 000853 - 700 lbs. (318 kg)
P10F x 3.00 (76.2mm) Stroke 000856 - 835 lbs. (380 kg)
P10F x 4.50 (114.3mm) Stroke 000857 - 835 lbs. (380 kg)
P10T x 3.00 (76.2mm) Stroke 000854 - 560 lbs. (255 kg)
P10T x 4.50 (114.3mm) Stroke 000855 - 560 lbs. (255 kg)

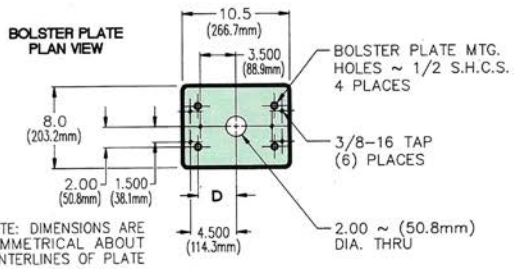






PRESS	B	C	D
5 TON	3.2 81.3mm	1.96 49.8mm	2.19 55.6mm
10 TON	6.4 162.6mm	3.90 99.1mm	3.75 95.3mm

STROKE	SHUT HEIGHT
3.00 STROKE (76.2mm)	11.50 (292.1mm) MAX. 10.50 (266.7mm) MIN.
4.50 STROKE (114.3mm)	10.00 (254.0mm) MAX. 9.00 (228.6mm) MIN.



How to Order Presses

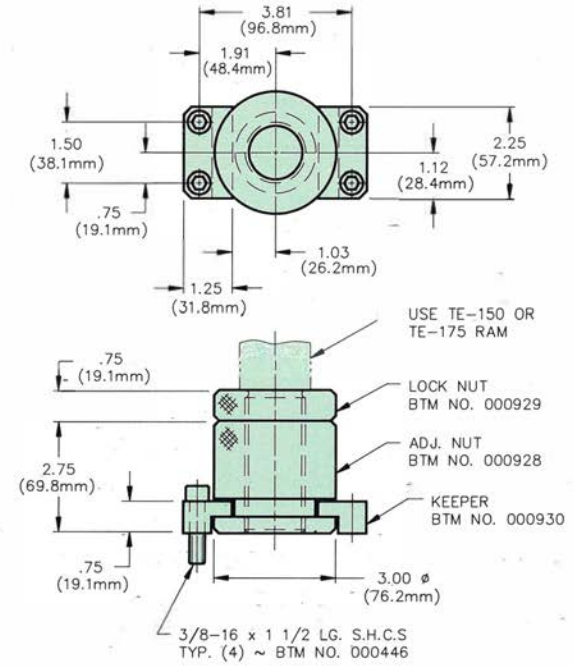
6 P10F 4.50 TE-175 DSAG RL EPRL EPEL TOOLING

- Quantity
- Model
- Stroke 3.00, 4.50 or Special
- Ram Style TE is Standard See Page 14
- * Die Set Adapter See Page 17
- * Ram Latch See Page 15
- * Proximity Switches See Page 24
- * Consider Tooling See Pages 9, 11, 15, 17

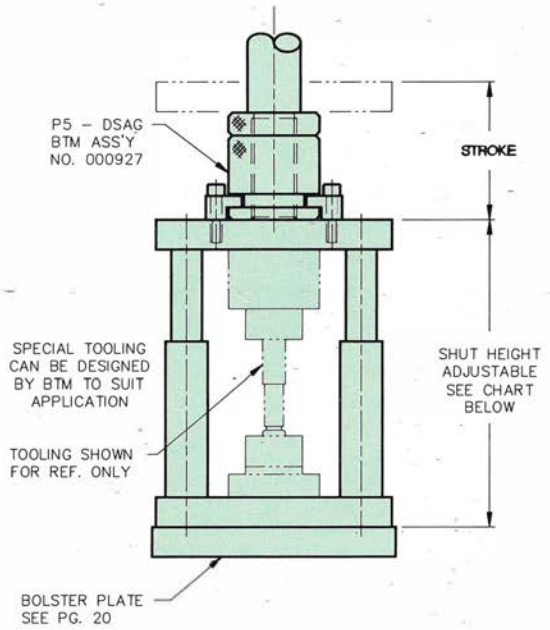
* Denotes Options

5 & 10 TON PRESS OPTIONS

P5 - DSAG
(DIE SET ADAPTER GROUP)
BTM ASS'Y NO. 000927



DIE SET INFORMATION

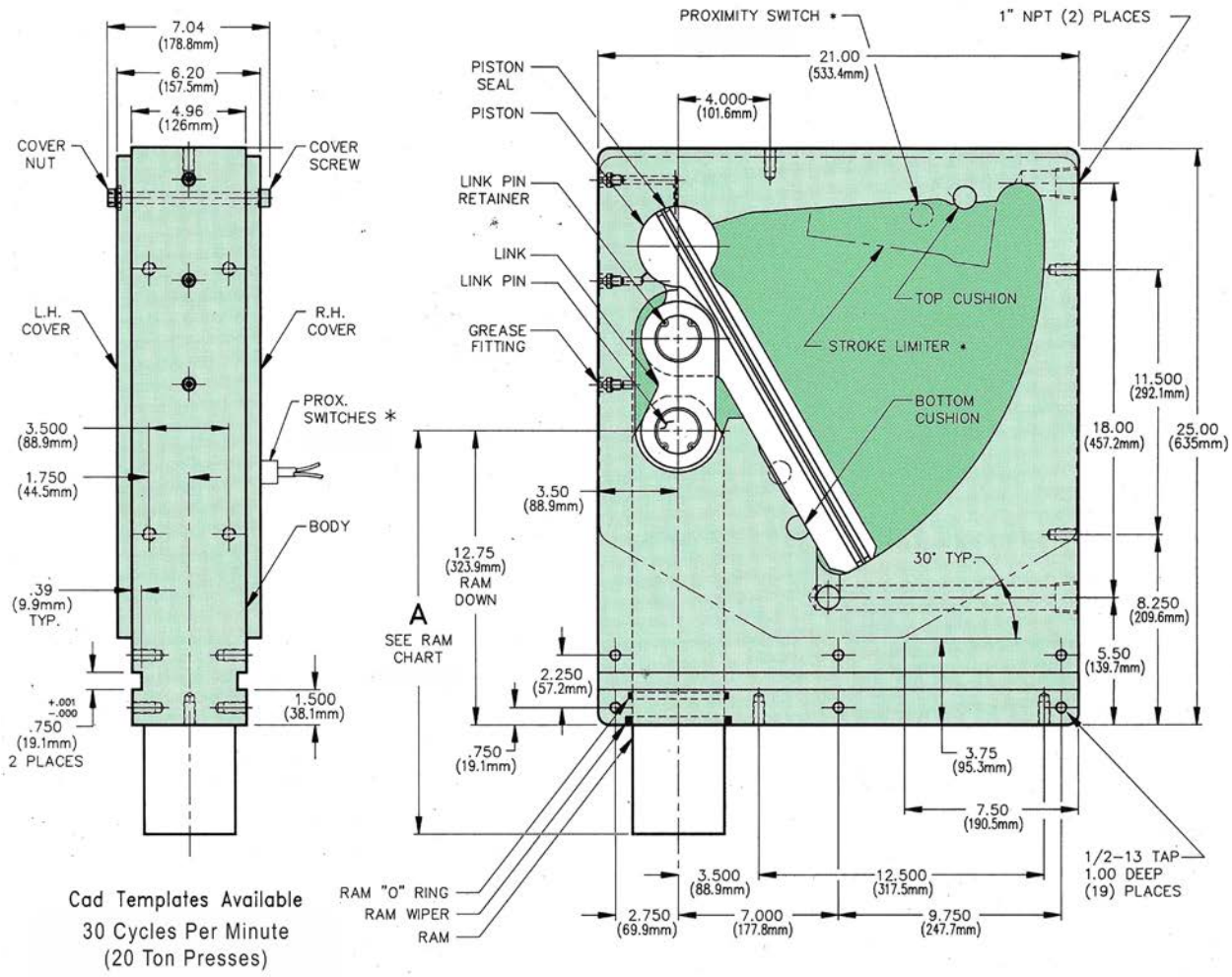


STROKE	SHUT HEIGHT
3.00 STROKE (76.2mm)	11.50 (292.1mm) MAX. 10.50 (266.7mm) MIN.
4.50 STROKE (114.3mm)	10.00 (254.0mm) MAX. 9.00 (228.6mm) MIN.

20 TON H PRESS

H Models (Head)

P20H x 3.00 (76.2mm) Stroke 001556 - 345 lbs. (157 kg)
P20H x 4.50 (114.3mm) Stroke 001557 - 345 lbs. (157 kg)



Cad Templates Available
30 Cycles Per Minute
(20 Ton Presses)

Components
P20H

Description	No. Req'd.	BTM No.
P20H x 3.00 (76.2mm) Body	1	000422
P20H x 4.50 (114.3mm) Body	1	000423
Piston	1	000424
Piston Seal	2	000431
Link	1	000425
Link Pin	2	000426
Link Pin Retainer	2	000432
Ram - 400 Series	1	See Pg. 22
R.H. Cover	1	000429
L.H. Cover	1	000430
Cover Screw	17	000436
Cover Nut	17	000437
Ram Wiper	1	000434
Ram "O" Ring	1	000433
Grease Fitting	3	000050
Sealant - Cover	1	000273
Seal Kit	1	000809
Top Cushion	2	004318
Bottom Cushion	2	004318
Stroke Limiter	1	000823

How to Order Presses

6	P20H x 4.50	T-400	EPRL EPEL	RL	DSAG	TOOLING
Quantity	Model	Stroke 3.00, 4.50 or Special	Ram Style See Page 22	* Proximity Switches See Page 24	* Ram Latch See Page 15	* Die Set Adapter See Page 23	* Consider Tooling See Pgs. 9, 11, 15, 23

How to Order Components

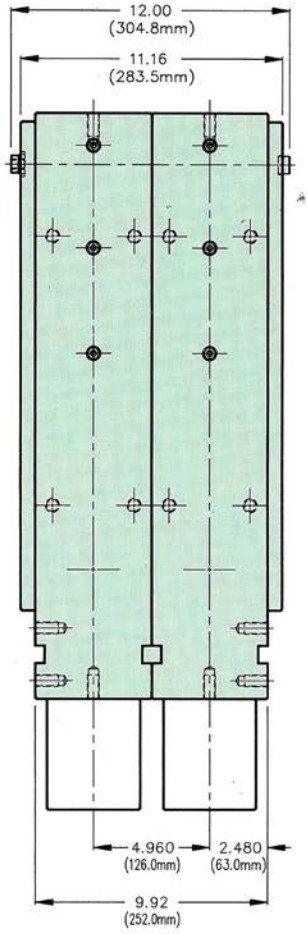
2	P20 Link	000425
Qty.	Description	BTM No.

* Denotes Options

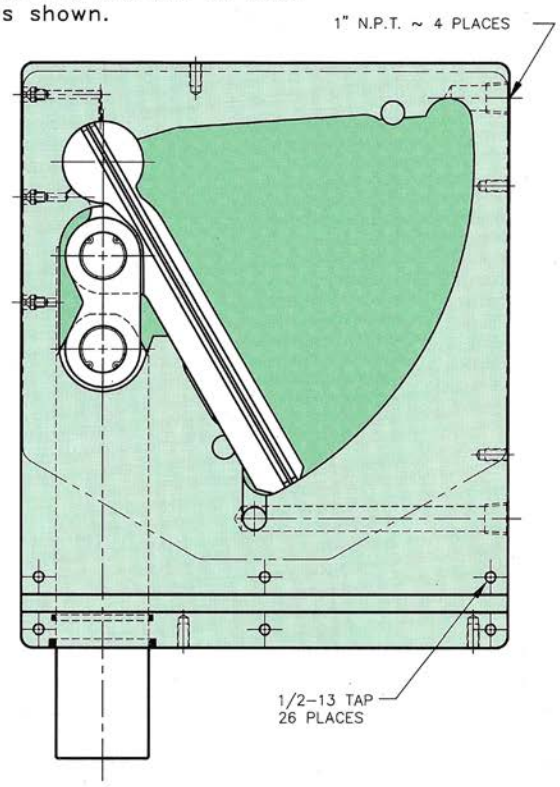
40 TON H PRESSES

H Models
(Head)

P40H x 3.00 (76.2mm) Stroke 003899 - 660 lbs. (300 kg)
P40H x 4.50 (114.3mm) Stroke 003900 - 660 lbs. (300 kg)



NOTE:
Dimensions are identical to P20H except as shown.



Cad Templates Available

30 Strokes Per Minute
(40 Ton Presses)

Components
P40H

Description	No. Req'd.	BTM No.
P40H x 3.00 (76.2mm) Body	1	013144
P40H x 4.50 (114.3mm) Body	1	013145
Piston Set	1	004615
Piston Seal	4	000431
Link	1	004614
Link Pin	2	004616
Link Pin Retainer	2	000432
Ram - 400 Series	2	See Pg. 22
R.H. Cover	1	000429
L.H. Cover	1	000430
Cover Screw	17	004618
Cover Nut	17	000437
Ram Wiper	2	000434
Ram "O" Ring	2	000433
Grease Fitting	6	000050
Sealant - Cover	1	000273
Seal Kit	1	004617

How to Order Presses

6	P40H	4.50	T-400	EPRL	EPEL	RL	DSAG	TOOLING
Quantity	Model	Stroke 3.00, 4.50 or Special	Ram Style See Page 22	* Proximity Switches See Page 24		* Ram Latch See Page 15	* Die Set Adapter See Page 23	* Consider Tooling See Pgs. 9, 11, 15, 23

How to Order Components

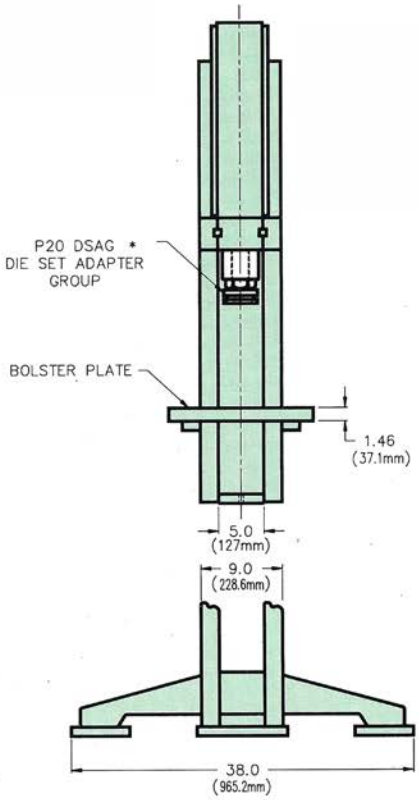
2	P40 Link	004614
Qty.	Description	BTM No.

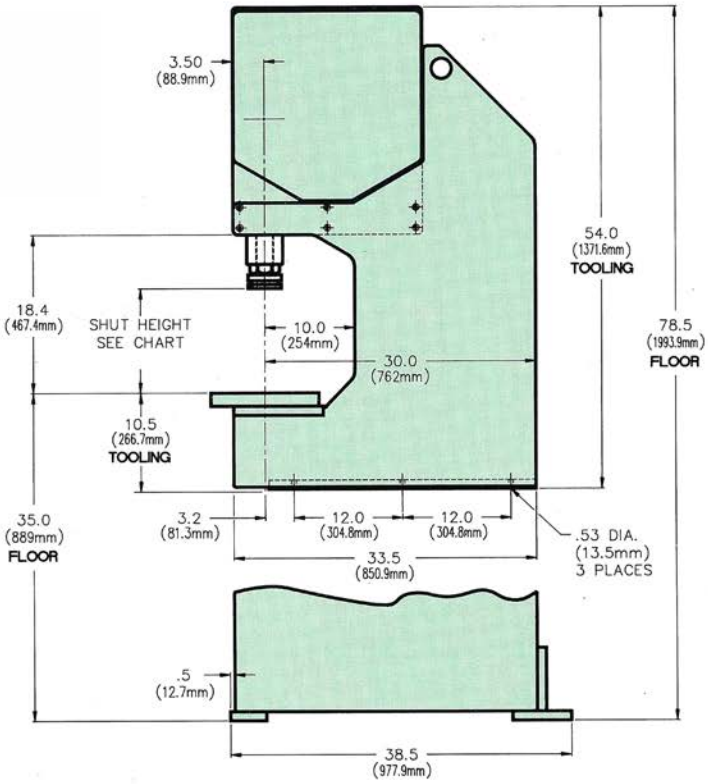
* Denotes Options

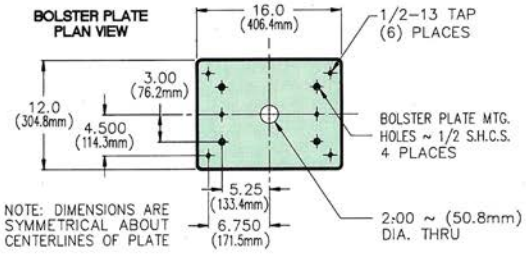
20 TON FLOOR & TOOLING PRESSES

F and T Models
(Floor and Tooling)

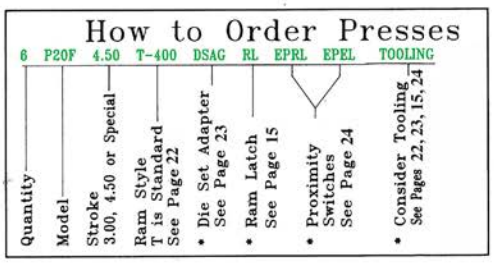
P20F x 3.00 (76.2mm) Stroke 000862 - 2600 lbs. (1182 kg)
P20F x 4.50 (114.3mm) Stroke 000863 - 2600 lbs. (1182 kg)
P20T x 3.00 (76.2mm) Stroke 000860 - 1550 lbs. (705 kg)
P20T x 4.50 (114.3mm) Stroke 000861 - 1550 lbs. (705 kg)

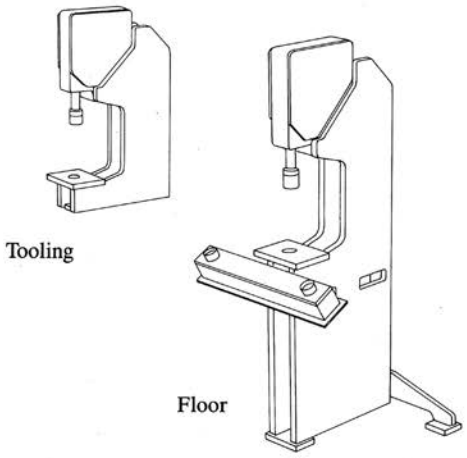






STROKE	SHUT HEIGHT
3.00 STROKE (76.2mm)	12.50 (317.5mm) MAX. 11.50 (292.1mm) MIN.
4.50 STROKE (114.3mm)	11.00 (279.4mm) MAX. 10.00 (254.0mm) MIN.

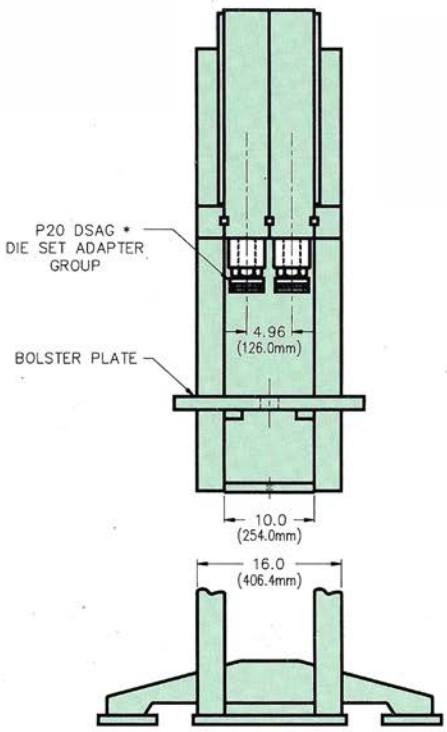


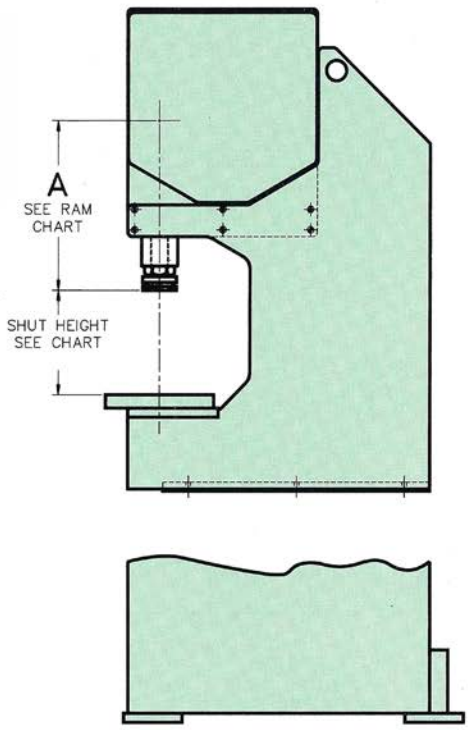


40 TON FLOOR & TOOLING PRESSES

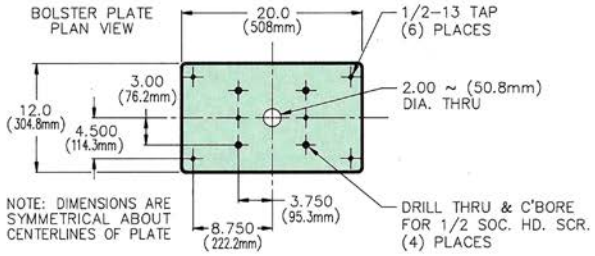
F and T Models
(Floor and Tooling)

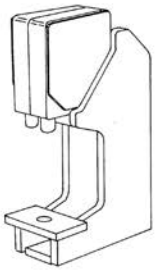
P40F x 3.00 (76.2mm) Stroke 003905 - 2950 lbs. (1338 kg)
P40F x 4.50 (114.3mm) Stroke 003906 - 2950 lbs. (1338 kg)
P40T x 3.00 (76.2mm) Stroke 003903 - 1895 lbs. (860 kg)
P40T x 4.50 (114.3mm) Stroke 003904 - 1895 lbs. (860 kg)



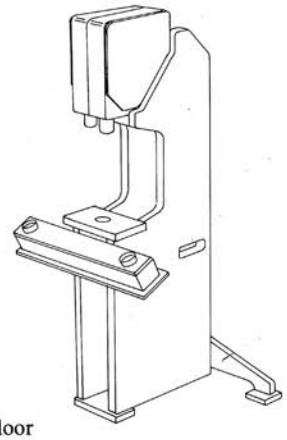


NOTE: DIMENSIONS ARE IDENTICAL TO 20 TON VERSIONS EXCEPT AS SHOWN.





Tooling



Floor

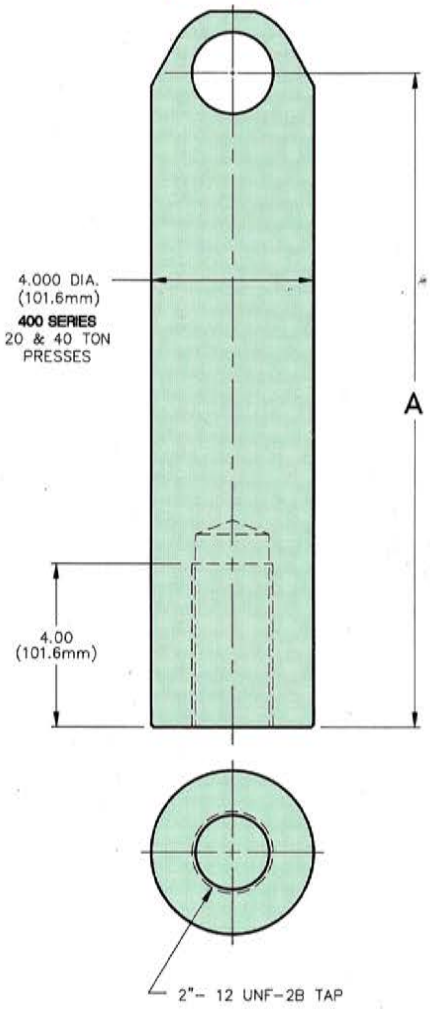
How to Order Presses

6	P40F	4.50	T-400	DSAG	RL	EPRL	EPEL	TOOLING
Quantity	Model	Stroke 3.00, 4.50 or Special	Ram Style T is Standard See Page 22	* Die Set Adapter See Page 23	* Ram Latch See Page 15	* Proximity Switches See Page 24		* Consider Tooling See Pages 9, 11, 15, 23

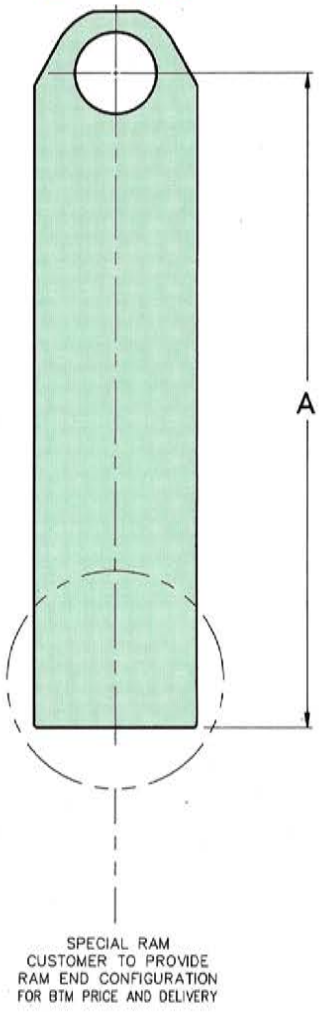
* Denotes Options

400 SERIES RAMS

T - 400



S - 400

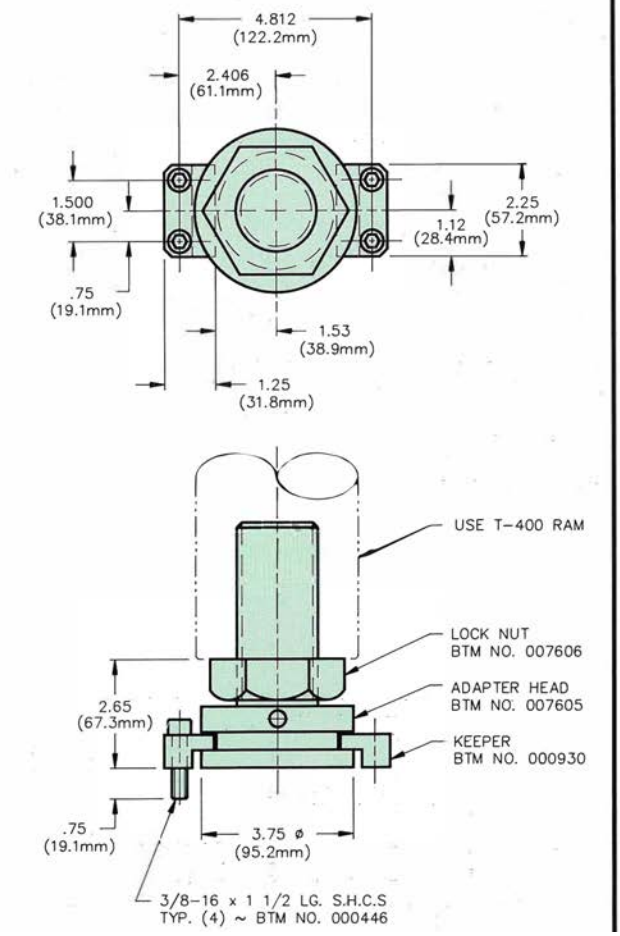


SERIES	PRESS MODEL	RAM STYLE	STROKE	A DIM.	BTM NO.
400 SERIES RAMS FOR 20 & 40 TON PRESSES	ALL	T	3.00 (76.2mm)	16.00 (406.4mm)	007607
			4.50 (114.3mm)	17.50 (444.5mm)	007947
		S	3.00 (76.2mm)	PER CUSTOMER	TO BE ASSIGNED
			4.50 (114.3mm)	PER CUSTOMER	TO BE ASSIGNED

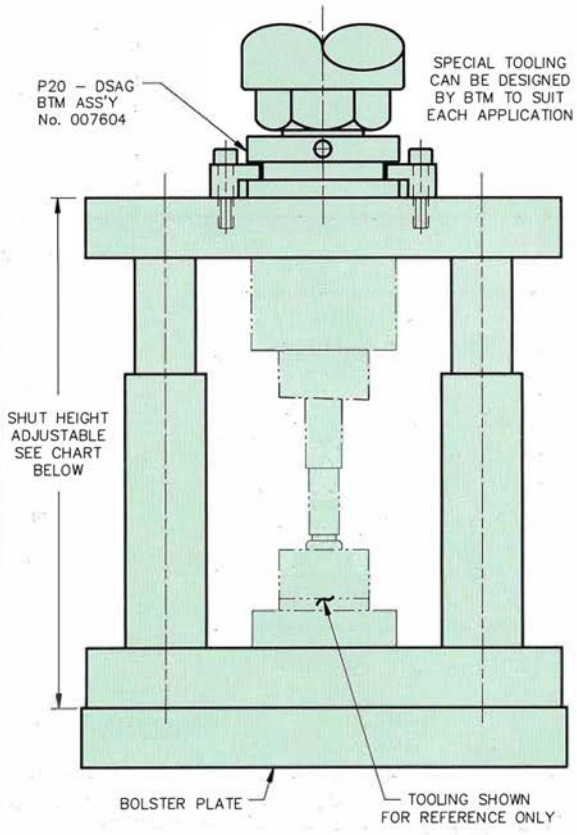
20 & 40 TON FM PRESS OPTIONS

P20 - DSAG

(DIE SET ADAPTER GROUP)
BTM ASS'Y NO. 007604

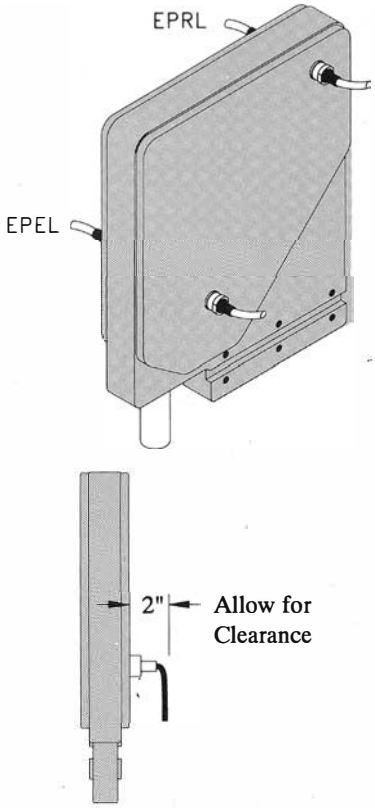


DIE SET INFORMATION

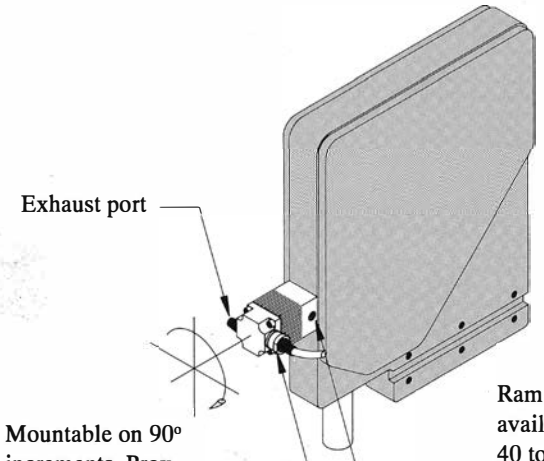


STROKE	SHUT HEIGHT
3.00 STROKE (76.2mm)	12.50 (317.5mm) MAX. 11.50 (292.1mm) MIN.
4.50 STROKE (114.3mm)	11.00 (279.4mm) MAX. 10.00 (254.0mm) MIN.

ELECTRICAL PROXIMITY SWITCHES



Ram Maintenance Latch



Ram Maintenance Latch available for 5, 10, 20, & 40 ton presses only. See page 19.

The Ram Maintenance Latch prevents the ram from drifting down, and is used to facilitate tool changes & Press maintenance with the air off.

Ordering Information

How to Order Proximity Switches

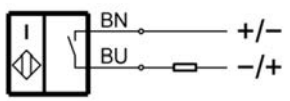
EP	R	L
Electrical Proximity	R = Retracted E = Extended	L = Left Hand R = Right Hand

Components

Proximity Switch

Description	BTM No.
Standard Proximity switch 2 wire, lighted, DC This switch can be used on all press sizes, models, and positions EPRL, EPEL, etc.	021757 includes mounting adapter

Proximity Switch Specifications

DC - Normally Open		
Operating Voltage Range 10-36VDC	Supplied with 3m cable - 2 wire	
Load Current Maximum 600 mA		

SET-UP & MAINTENANCE GUIDE

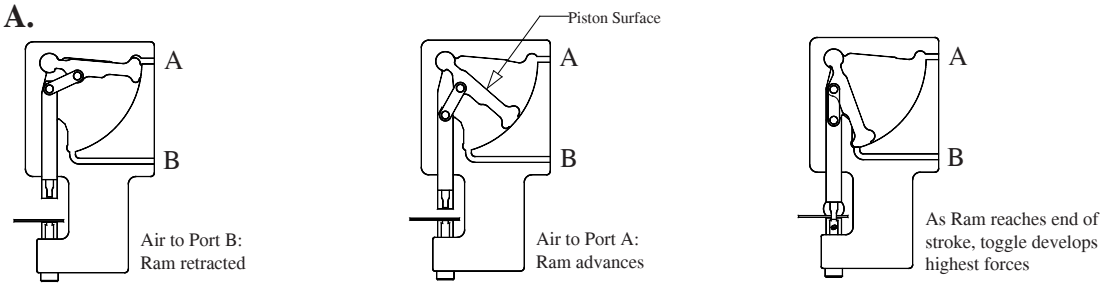
Safety:

User's Responsibility: Each person who is to operate and maintain the unit must be familiar with all safety precautions before attempting to use or service the press equipment. The owner of the machine is responsible to train and supervise all personnel as to safety precautions. The customer must provide proper guarding to protect personnel from moving machinery.

1.0 How It Works:

The BTM Toggle Press produces high forces using 80 psi air pressure. The toggle mechanism multiplies the force of the air pressure acting on the piston surface. **Force is generated on a curve**; as the press ram advances force output increases, with maximum force produced at the end of the stroke. (Figure A.)

Figure A.



1.1 Press Sizing:

Accurate calculation of the *required force* and *work stroke* is necessary in order to perform the work without over-taxing the press. Calculating force for piercing and shearing is relatively straightforward. Calculations for operations such as coining, crimping, clinching and riveting can be more complex, requiring special formulas and/or tryout. BTM Sales Department offers assistance in press sizing. Call BTM at +1.810.364.4567 for information. Chart **1.5** shows *calculated* forces at incremental distances from the end of the stroke for each BTM press model. This chart is to be used with your force calculation and work stroke requirement to select the appropriate press model.

1.2 Determining Work Stroke Required:

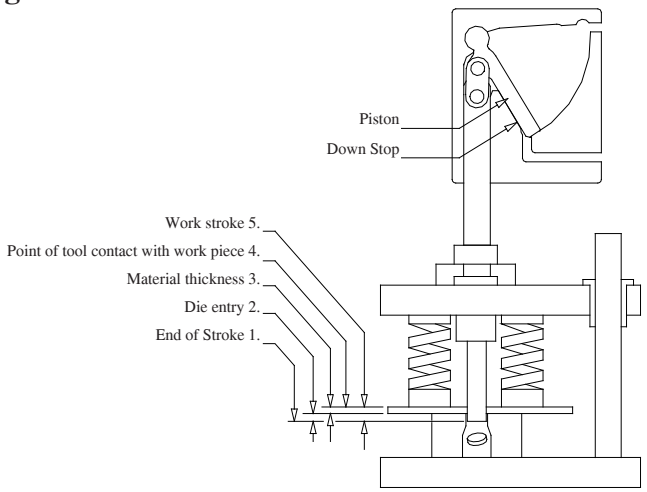
Work Stroke is figured backwards from the fully extended end of the press stroke (piston on down stop). (Figure B.)

1. End of Stroke
2. Entry of the punch into the die beyond the work piece.
3. Material Thickness
4. Point of tool contact with work piece.
5. Distance from point of tool contact with work piece to end of full stroke = work stroke.

Example:

2.	Material Thickness	= .036" (.91 mm)
3.	Punch Penetration	+ .030" (.76 mm)
4.	Work Stroke	= .066" (1.68 mm)

Figure B.



1.3 Force Calculation:

The example below demonstrates press sizing based on *piercing* force requirements and is useful for other operations as well. Several factors must be considered, including the shear strength and thickness of the material to be pierced, length of cut of the pierced hole, and the amount of punch entry or work stroke. Shear strength values for a variety of materials are provided in chart **1.7** for your convenience. BTM recommends adding a *50% safety factor* to the force requirement calculation to compensate for other variables such as friction, die springs, dull cutting tools, lifting of dies (see **3.7**) and operating pressure fluctuations.

A.	Shear Strength of Material	= _____
B.	Thickness of Material	= _____
C.	Length of Cut (circumference)	= _____
	Multiply AxBxCx1.5 (Safety Factor)	=Force Output Required

Example: Force output required to pierce a .25" (6.4mm) diameter hole in .036" (.9mm) thick steel mild low carbon.

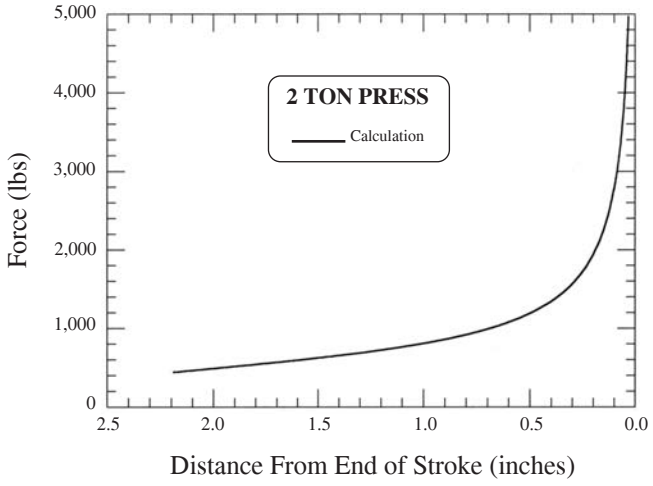
A.	Material Shear Strength (see chart **1.7**)	=50,000 psi	(344.7N/mm^2)
B.	Material Thickness	=.036"	(.9mm)
C.	Length of Cut (.25" diameter hole) (formula = diameter x Pi)	=.78"	(19.8mm)
	Multiply (AxBxC) & add 50% safety factor (x1.5)	=2106 lbs.	(9215N)

Press force output required at the point where tooling contacts the work piece.

1.4 Press Selection:

After determining the force required with safety factor, the work stroke must be considered in selecting the appropriate press model. Use chart **1.5** to verify that the press you are considering produces the required force at the distance from the end of the stroke where your tooling will contact the work piece. If it does not, a larger press is required. *In the example provided in* **1.2** *(work stroke .066" (1.68mm))* **& 1.3** *(force output required 2106 lbs.* (9215N)*), a 2 Ton BTM Press would be an appropriate choice to perform the piercing operation.*

Figure C.



1.5 BTM Toggle Press Force Chart (1.5):

This chart lists forces exerted by the press ram at incremental distances from the end of the stroke. Note that the toggle mechanism develops a force curve (Figure C.), with force increasing as the ram advances. All forces are rated at 80 psi (5.5 bars) air pressure to the BTM press.

Chart 1.5 Force at Stroke Distance

Note: All values in the force chart are calculated and do not include safety factor.

Distance from End of Stroke	BTM Press Model					
	1 Ton	2 Ton	5 Ton	10 Ton	20 Ton	40 Ton
	Force output in pounds and Newtons at 80 psi (5.5 bar)					
.00" .00mm						
.01" 0.25 mm	4483 19,941	8965 39,878	22526 100,201	45053 200,406	122515 544,974	245031 1,089,952
.02" .05 mm	3161 14,061	6321 28,117	15906 70,753	31812 141,507	86297 383,866	172593 767,737
.03" 0.75 mm	2572 11,441	5145 22,886	12960 57,649	25920 115,298	70255 312,510	150509 625,015
.06" 1.5 mm	1804 8,025	3609 16,054	9113 40,537	18225 81,069	49357 219,551	98714 439,102
.12" 3.0 mm	1261 5,609	2523 11,223	6392 28,433	12785 56,870	34594 153,882	69188 307,763
.24" 6.1 mm	878 3,906	1755 7,807	4466 19,866	8933 39,736	24171 107,518	48341 215,031
.50" 12.7 mm	593 2,638	1186 5,276	3041 13,527	6082 27,054	16457 73,204	32914 146,409
.75" 19.0 mm	474 2,108	949 4,221	2452 10,907	4903 21,810	13268 59,019	26536 118,038
1.00" 25.4 mm	402 1,788	804 3,576	2100 9,341	4200 18,683	11364 50,550	22728 101,099
1.25" 31.75 mm	351 1,561	701 3,118	1859 8,269	3717 16,534	10059 44,745	20118 89,489
1.50" 38.1 mm	310 1,379	621 2,762	1679 7,469	3359 14,942	9089 40,430	18178 80,860
1.75" 44.45 mm	276 1,228	552 2,455	1539 6,846	3077 13,687	8326 37,036	16653 74,076
2.00" 50.8 mm	244 1,085	487 2,166	1423 6,330	2847 12,664	7703 34,265	15406 68,529
2.25" 57.15 mm	–	–	1326 5,898	2652 11,797	7176 31,920	14352 63,841
2.50" 63.5 mm	–	–	1242 5,525	2483 11,045	6719 29,888	13438 59,775
3.00" 76.2 mm	–	–	1099 4,889	2197 9,773	5945 26,445	11890 52,889
3.50" 88.9 mm	–	–	976 4,341	1952 8,683	5282 23,495	10565 46,995
4.00" 101.6 mm	–	–	863 3,839	1725 7,673	4669 20,769	9337 41,533
4.50" 114.3 mm	–	–	749 3,332	1497 6,659	4051 18,020	8103 36,925

Chart 1.6 Force Required to Pierce Holes

*Without Safety Factor

Metal Thickness	Hole Diameters							
	.125" 3.0mm	.250" 6.0mm	.375" 9.0mm	.500" 12.0mm	.625" 15.0mm	.750" 21.0mm	.875" 21.0mm	1.000" 25.0mm
	Force In Tons & KiloNewtons Required For Piercing Round Holes In Mild Steel*							
.020" 0.5 mm	.22 2.0	.45 4.0	.7 6.20	.8 7.1	.95 8.5	1.25 11.1	1.5 13.3	1.65 14.7
.030" 0.7 mm	.3 2.7	.6 5.3	.9 8.0	1.2 10.7	1.5 13.3	1.8 16.0	2.1 18.7	2.4 21.4
.040" 1.0 mm	.45 4.0	.82 7.3	1.25 11.1	1.65 14.7	2.1 18.7	2.45 21.8	2.9 25.8	3.2 28.5
.050" 1.2 mm	.52 4.6	1.00 8.9	1.5 13.3	2.0 17.8	2.45 21.8	2.9 25.8	3.4 30.2	3.9 34.7
.060" 1.5 mm	.6 5.3	1.2 10.7	1.8 16.0	2.36 21.0	2.95 26.2	3.54 31.5	4.13 36.7	4.72 42.0
.070" 1.7 mm	.7 6.2	1.45 12.9	2.0 17.8	2.8 24.9	3.5 31.1	4.2 37.4	4.9 43.6	5.5 48.9
.100" 2.5 mm	1.0 8.9	2.0 17.8	3.0 26.7	4.0 35.6	5.0 44.5	6.0 53.4	7.0 62.3	8.0 71.2
.150" 3.7 mm	–	3.0 26.7	4.5 40.0	6.0 53.4	7.5 66.7	9.1 81.0	10.5 93.4	12.2 108.5
.250" 6.0mm	–	4.9 43.6	7.4 65.8	9.8 87.2	12.3 109.4	14.7 130.8	17.2 153.0	19.7 175.3
.500" 12.0 m	–	–	–	19.7 175.3	24.6 218.8	29.5 262.4	34.4 306.0	39.4 350.5

1.6 Piercing Force Requirements:

This chart shows the force required to pierce round holes (of various diameters) in mild steel (of various thickness.) A 50% safety factor should be added to these numbers when sizing your press.

1.7 Piercing Materials Other Than Mild Steel:

Piercing force required for material other than mild steel can be calculated using the rated shear strength (chart **1.7**) and the formula given at **1.3.** The chart **1.7** provides shear strength & multiplication factors for other common materials. Multiply the factor for your material by the force shown in chart **1.6.**

Example:
Piercing a .500" (12mm) hole in .050" (1.2mm) mild steel requires 2 Tons. To pierce the same hole in the same thickness of Aluminum 1060-0 multiply 2 Tons x .14 (chart **1.7**) = .28 Ton.

Chart 1.7 Material Strengths

Material	Multiplication Factor	Shear Strength	
Aluminum 1060-0	.14	7,000 psi	48.26 N/mm²
Nylon	.24	12,000 psi	82.74 N/mm²
Copper	.52	26,000 psi	179.26 N/mm²
Aluminum 2011-T3	.64	32,000 psi	220.63 N/mm²
Brass	.72	36,000 psi	248.21 N/mm²
Aluminum 2014-T6	.84	42,000 psi	289.58 N/mm²
Steel Mild Low Carbon	1.00	50,000 psi	344.74 N/mm²
Steel Stainless 409	1.30	65,000 psi	448.16 N/mm²
Steel Stainless 304 L	1.62	81,000 psi	558.47 N/mm²
Steel Stainless 321	1.66	83,000 psi	572.26 N/mm²

2.0 Press Specifications:

BTM Toggle Press bodies are made from 6061-T6 Aluminum (45,000 psi tensile strength) and are hard coat anodized to a Rockwell C70 surface hardness. Pistons, links, pins, and rams are steel. Piston seals are molded V block style.

2.1 Tolerances:

The following are tolerances that can be expected for the dimensions given in this catalog (unless specified otherwise):

2 place decimal (.00).....+/-.010" (+/-0.25m)
3 place decimal (.000)..... +/-.005" (+/-0.13mm)
4 place decimal (.0000)..... +/-.0005" (+/-0.01mm)
Ram rotation..... +/-15'

2.2 Air Consumption
BTM Press Volume Chart:

Volume is shown in cubic inches and cubic centimeters per full cycle.

Amount of Stroke in Use	BTM Press Model					
	1 Ton	2 Ton	5 Ton	10 Ton	20 Ton	40 Ton
.03" 0.75 mm	4.8 78.7	9.6 157.4	18.8 308.1	37.6 616.2	310.0 5080.0	620.0 10160.0
.06" 1.5 mm	6.6 108.2	13.2 216.4	37.4 612.9	74.8 1225.8	378.8 6207.4	757.6 12414.8
.12" 3.0 mm	9.2 150.8	18.4 301.6	56.2 921.0	112.4 1842.0	447.8 7338.1	895.6 14676.2
.24" 6.1 mm	12.2 199.9	24.4 399.8	65.4 1071.7	130.8 2143.4	585.4 9593.0	1170.8 19186.0
.50" 12.7 mm	18.4 301.5	36.8 603.0	84.2 1379.8	168.4 2759.6	723.2 11851.1	1446.4 23702.2
.75" 19.0 mm	22.0 360.5	44.0 721.0	103.0 1687.9	206.0 3375.8	826.6 13545.5	1653.2 27091.0
1.00" 25.4 mm	25.8 422.8	51.6 845.6	121.6 1992.7	243.2 3985.4	929.8 15236.7	1859.6 30473.4
1.25" 31.75 mm	29.0 475.2	58.0 950.4	131.0 2146.7	262.0 4293.0	1033.2 16931.1	2066.4 33862.2
1.50" 38.1 mm	31.8 521.1	63.6 1042.2	149.6 2451.5	299.2 4903.0	1067.6 17494.8	2135.2 3498.6
1.75" 44.45 mm	34.4 563.7	68.8 1127.4	168.4 2759.6	336.8 5519.2	1102.0 18058.5	2204.0 36117.0
2.00" 50.8 mm	37.6 616.2	75.2 1232.4	177.6 2910.3	355.2 5820.6	1171.0 19189.2	2342.0 38378.4
2.25" 57.15 mm	39.8 652.2	79.6 1304.4	187.0 3064.4	374.0 6128.8	1205.4 19753.0	2410.8 39506.0
2.50" 63.5 mm	–	–	196.4 3218.4	392.8 6436.8	1239.8 20316.7	2479.6 40633.4
3.00" 76.2 mm	–	–	205.8 3372.5	411.6 6745.0	1274.2 20880.4	2548.4 41760.8
3.50" 88.9 mm	–	–	215.2 3526.5	430.4 7053.0	1355.2 22207.7	2710.4 44415.4
4.00" 101.6 mm	–	–	224.4 3677.3	488.8 7354.6	1412.0 23138.5	2824.0 46277.0
4.50" 114.3 mm	–	–	261.8 4290.1	523.6 8580.2	1549.8 25396.7	3099.6 50793.4

2.2.1 Calculating Air Consumption:

To determine air consumption in cubic feet or liters per minute use the following formula. Metric versions shown in green.

Formula:

$$CFM = \frac{\text{Press volume x cycles / min}}{1728}$$

$$SCFM = \frac{(14.7 + \text{pressure})}{14.7} \text{ x CFM}$$

Air Volume = press volume x cycles / min

$$\text{Consumption} = \frac{1+ \text{pressure}}{1} \text{ x press volume}$$

Example: 1 ton press with 1.5" (38 mm) stroke
volume = 31.8 in^3 (521.1 cm^3) (Chart **2.2**)
60 cycles / minute
at 80 psi (5.5 bar)

Solution:

$$SCFM = \frac{14.7 + 80}{14.7} \text{ x } \frac{31.8 \text{ x } 60 \text{ cycles / min.}}{1728}$$

SCFM = 7.1

$$\text{Litres / Min} = \frac{1 + 5.5}{1} \text{ x } 0.521 \text{ } dm^3 \text{ x } 60 \text{ cycles / min}$$

Litres / Min = 203

Note: BTM Presses may be ordered with stroke limiters to reduce air consumption. See catalog for your model.

2.3 Air & Valving Requirements:

BTM Toggle Presses are operated by compressed air. The recommended maximum pressure is 80 psi (5.5 bars). Air must be clean, dry and lubricated with a light spindle oil. Valving and piping should be greater than or equal to the press ports, or determined by the air requirements of the total number of presses when multiple presses are piped together. A Filter, Regulator, Lubricator (FRL) must be used to condition the air.

2.4 Surge Tank Sizing:

A surge tank is recommended when operating a 20 or 40 ton press, when piping multiple presses together or when a press is used in an air starved environment. Air supply lines must be adequately sized. (**See 2.3**.) Use the following formula to determine surge tank size:

Formula: $\frac{\text{Press volume in cubic inches (See Chart 2.2)} \times (14.7 + \text{Operating Pressure})}{14.7} \div 231 = \text{Surge Tank volume in Gallons}$

$\frac{\text{PressVolume in cubic centimeters (See Chart 2.2)} \times (1 + \text{Operating Pressure})}{1} \div 1000 = \text{Surge Tank volume in Litres}$

Example:

20 Ton Press x 4.5" (114.3mm) Stroke
Volume = 1549.8 in^3 (25396.7c.c) (Chart **2.2**)
Operating Pressure = 80 psi (5.5 bar)

Solution:

$\frac{1549.8 \times (14.7 + 80)}{14.7} \div 231 = 43$ Gallon Surge Tank

$\frac{25396.7 \times (1+5.5)}{1} \div 1000 = 163$ Litre Surge Tank

3.0 Application of BTM Toggle Presses:

Sound engineering principles should be adhered to when tooling and mounting BTM presses. Some guidelines follow.

3.1 Press Set-Up:

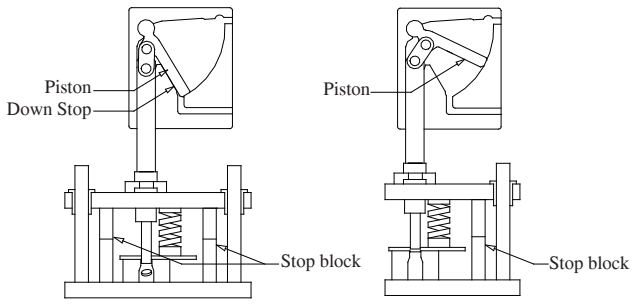
To attain maximum life from an Air Toggle Press, the work must be performed as near the end of the stroke as possible. *In all applications, the press must complete its stroke.* In piercing or shearing applications, the work will be performed above the end of the stroke and the tooling will continue through the work piece to complete the stroke. In other operations such as coining, clinching and riveting, the tooling must be adjusted so that the press reaches the end of the stroke as the work is completed. (Figure D.) *No hesitation of the ram is permissible during the work stroke.*

The recommended method of set-up is to adjust the tooling back so that the press can be fully cycled without contacting the work piece. A series of gradual adjustments are then made using 80 psi (5.5 bar) supply pressure, until the press completes the work. If the press hesitates or stalls above the bottom of the stroke using this method, it is undersized for the operation.

3.2 Stop Blocks:

When using stop blocks in a die, the press piston must be allowed to reach the internal stop. Stop blocks must be set-up so that the press completes the work and contacts the stop blocks when the piston meets the internal stop. The stop blocks are only required to balance the force being applied to the work piece. If installed incorrectly, the stop blocks and press mechanism will absorb the force meant to be applied to the work piece. (Figure D.)

Figure D.



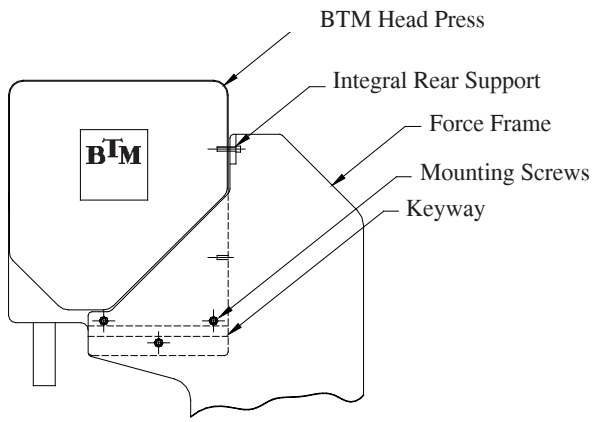
3.3 Press Mounting:

The BTM Air Toggle Press produces high forces which must be contained by the press mounting to ensure maximum life. When constructing force frames for press mounting, rigidity is essential to minimize deflection of the press ram.

Head model (H) presses must be mounted so that both keyways are in direct shear and directly tied to an integral rear support and frame. (Figure E.)

Figure E.

BTM Head "H" Presses



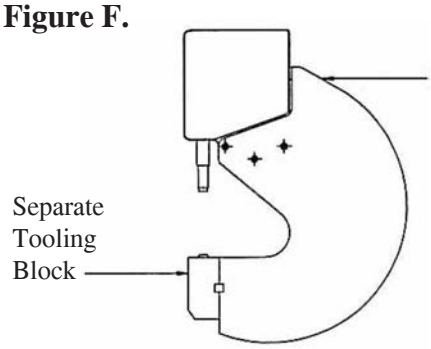
3.4 Throat Depth:

Designs incorporating deep throats must have sufficient force frames to inhibit deflection at the tooling. It is recommended that the tooling be mounted in a separate block affixed to the frame to provide final alignment. (Figure F.)

3.5 Anti-Rotation & Guides:

BTM Toggle Presses feature a ± 15' non-rotating ram. The method of mounting tooling to the ram can affect the life and performance of the press and tooling. Alignment of the tooling and containment of the deflection are imperative. In critical applications, usually where die clearance is less than .0005" (0.012mm) per side, it is recommended that an alignment guide be used. Sliding ways or posts and bushings are good techniques for this purpose.

Figure F.



3.6 Shut Height Adjustment:

Various methods of shut height adjustment are provided with standard BTM components. Rams with built-in adjusting screws (PA & PTA), adjustable die button support (PB models) and die set adapter groups (DSAG) are listed in catalog.

3.7 Lifting With The Toggle Press:

Force produced when retracting the toggle press is reverse of the force curve. However, certain long stroke presses will not perform in accordance with the force curve near the retracted position. Consult BTM when considering the lifting of large tools with the retract stroke.

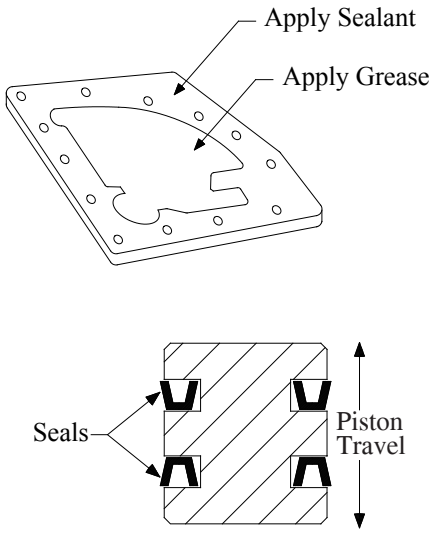
4.0 Maintenance:

Properly sized and applied, BTM Toggle Presses will provide a long service life. They require only regular lubrication and a clean, dry air supply. After extended service, seal replacement may be necessary. This is a relatively simple procedure and is outlined in **4.2.**

4.1 Lubrication:

The BTM Air Toggle Press is a mechanical device using air as its power source and therefore requires clean, dry air. A filter and pressure regulator must be incorporated into the air supply line. Light in-line lubrication is also recommended, but not required, as press seals are lubed for life at assembly. When incorporating in-line lubrication, use a light spindle oil in the lubricator (a reclassifier is also recommended). Lubrication is required every 20,000 cycles at grease fittings only. See lube tags on front of press assembly for specific lubrication instructions. Grease fittings are provided to lubricate the bearing and link pin areas on most presses. Use Chevron Black Pearl Grease EP or Phillips 66 Polytak Grease EP at grease fittings. **Note:** Failure to follow recommended lubrication procedures will void warranty. A video is available upon request detailing general press maintenance and seal replacement procedures.

Figure G.



4.2 Seal Replacement:

Refer to the catalog page showing your press model to order seal kit.

4.2.1 Loosen all the cover plate nuts by two threads only. Apply air to either port (80 psi (5.5 bar) maximum). This will separate one of the cover plates from the press body.

4.2.2 Remove all the cover plates screws & nuts, and the cover plate. The opposite cover plate will usually remain sealed to the body, and may be tapped loose using a wood block and a mallet. Remove the second cover plate.

4.2.3 Position the press body with the ram horizontal to prevent the ram from falling out when the link pin is removed. Remove the retainer ring from the ram link pin. The link pins on P-1 models are pressed into one side of the link and do not have retaining rings. Tap the link pin out and slide the ram out of the body.

4.2.4 Remove the piston and link from the body, and remove the old seals from the piston.

4.2.5 Remove the ram O-Ring from the body. The O-Ring on PB models is located on the ram.

4.2.6 Clean all parts. Inspect all parts for signs of wear or damage.

4.2.7 Check the cover plates to see if a "pencil" outline of the press cavity is visible. (Figure G.) If it is not, align the cover plates with the body and outline the contour with a pencil. Repeat procedure on second cover plate.

4.2.8 Install new piston seals with "V" grooves facing the powered surfaces of the piston. (Figure G.)(opposite each other)

4.2.9 Install new ram O-Ring.

4.2.10 Grease and re-assemble the piston, link and ram into the press body.

4.2.11 Apply a thin layer of grease to the area of the cover plates inside the "pencil" line. Apply a thin layer of SIKAFLEX* Sealant to the area outside the "pencil" line. (Figure G.) Do not apply sealant inside the line.

4.2.12 Assemble the cover plates to the press and torque screws according to the chart in (Figure H). Make sure all threads are free of sealant. A slight bypass of air is normal due to the rectangular seals.

Figure H. Cover Screw Size & Torque

	1 & 2 Ton		5 & 10 Ton	20 & 40 Ton
Screw Size	1/4	5/16	3/8	1/2
Torque in Ft / Lbs	9	23	50	110
Torque in N • m	12.2	31.2	67.8	149.0

*** Note Regarding Sealant**

BTM Air Toggle Presses manufactured after August 2001 use polyurethane sealant to seal the side cover plates. A tube of SIKAFLEX 221 is included with each BTM Seal Kit. Presses manufactured before August 2001 were sealed with RTV-108 silicone sealant. Silicone is no longer provided with BTM Seal Kits. Presses that were originally sealed with silicone can be re-sealed with SIKAFLEX 221.

4.3 Replacing Components:

Worn or damaged component parts may be replaced following the same procedure described in **4.2**. Components are listed in this catalog for each model. Presses may be returned to BTM for factory repair.

WARRANTY

BTM warranties its Air Toggle Presses against defects in material and workmanship for (1) million cycles or a period of (1) year after the ship date from BTM, whichever comes first. This warranty is limited to replacing or repairing at BTM option, F.O.B. BTM factory, any part found by BTM to be defective in materials and/or workmanship. Any application of a BTM product outside the intended use of the product or non-compliant with the application guidelines in this catalog shall not be warranted by BTM. Furthermore, BTM will not be liable for any expenses incurred for repairs or replacement made outside BTM facilities without written consent (or damages arising out of such replacements or repairs). Under no circumstances will BTM be held responsible for any consequential damages. The warranty is limited to the repair or replacement of the defective part(s) and does not include installation. This warranty is the only warranty extended by the seller in connection with any sale made hereunder and is in lieu of all other warranties, express, implied or statutory including warranties of merchant-ability and fitness for purpose.

BTM KOREA

BTM Offers a Range of Production Equipment for Applying our Clinch Tooling.

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BTM hand-held units are an economical approach to fastening sheet metal assemblies. Pneumatic, Hydraulic, and Self-Contained Units in a variety of styles are available. The units can be set up to join a range of thicknesses.

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Universal Presses



Universal presses easily adapt to join a variety of parts.

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BTM provides pneumatic, hydraulic, air/oil, and electrically driven units with single or dual motions for both stationary and robotic applications.

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