BULLETIN 166C

THE MINSTER MACHINE COMPANY

E2
HEVISTAMPER
200-1600 TONS CAPACITY



E Series Presses

HIGH PERFORMANCE COMBINED WITH DURABILITY RELIABILITY
AND SERVICEABILITY IN TWIN GEARED PRECISION PRESSES

INTRO

The E2 is a Two-Point, Eccentric Shaft, Precision Press That Has Been Designed to Provide Unsurpassed Quality Production in the Following Applications:

High Speed and Close Tolerance Progressive and Transfer Dies

The E2 runs progressive and transfer dies at higher production rates with less down time. A few of the many features that make this possible include:

- The E2 crown, bearings and eccentric shaft are designed to provide **bottom-center repeatability of .0003"** and **precision alignment within .0005"**. This repeatability and reduced punch penetration result in increased die life for close tolerance dies.
- **Superior resistance to off-center loading** as a result of precision slide guiding maintained by full length gibs and Twin Drive Arrangement.
- **Hydraulic Clutch** provides superior stopping time which allows the user the ability to utilize die checking at higher speeds while retaining the capability of stopping prior to the bottom of the stroke.

Severe Blanking Applications

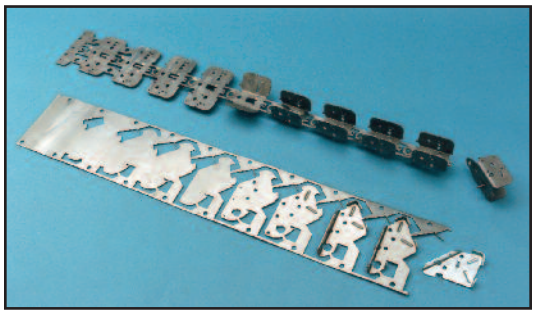
In a blanking application, a press must be able to maintain its precision guiding while being subjected to severe reverse loading and vibration. A few of the features that enable the E2 to perform effectively and consistently under this condition include:

- The slide adjustment mechanism is designed with buttress threads which have a larger area of contact to resist snap-thru forces than standard V-threads.
- Utilization of connections with a Wrist Pin Design: When snap-thru forces are applied, a wrist pin will be subjected to less stress and less bending than a ball socket design.
- To resist vibration, the E2 frame utilizes welds designed for high cycle fatigue; all electrical components attached to the press are shock mounted; and, a brake is built into the slide adjustment mechanism to assure that it does not drift as a result of the snap-thru forces and resulting vibration.

Forming and Precision Transfer Dies

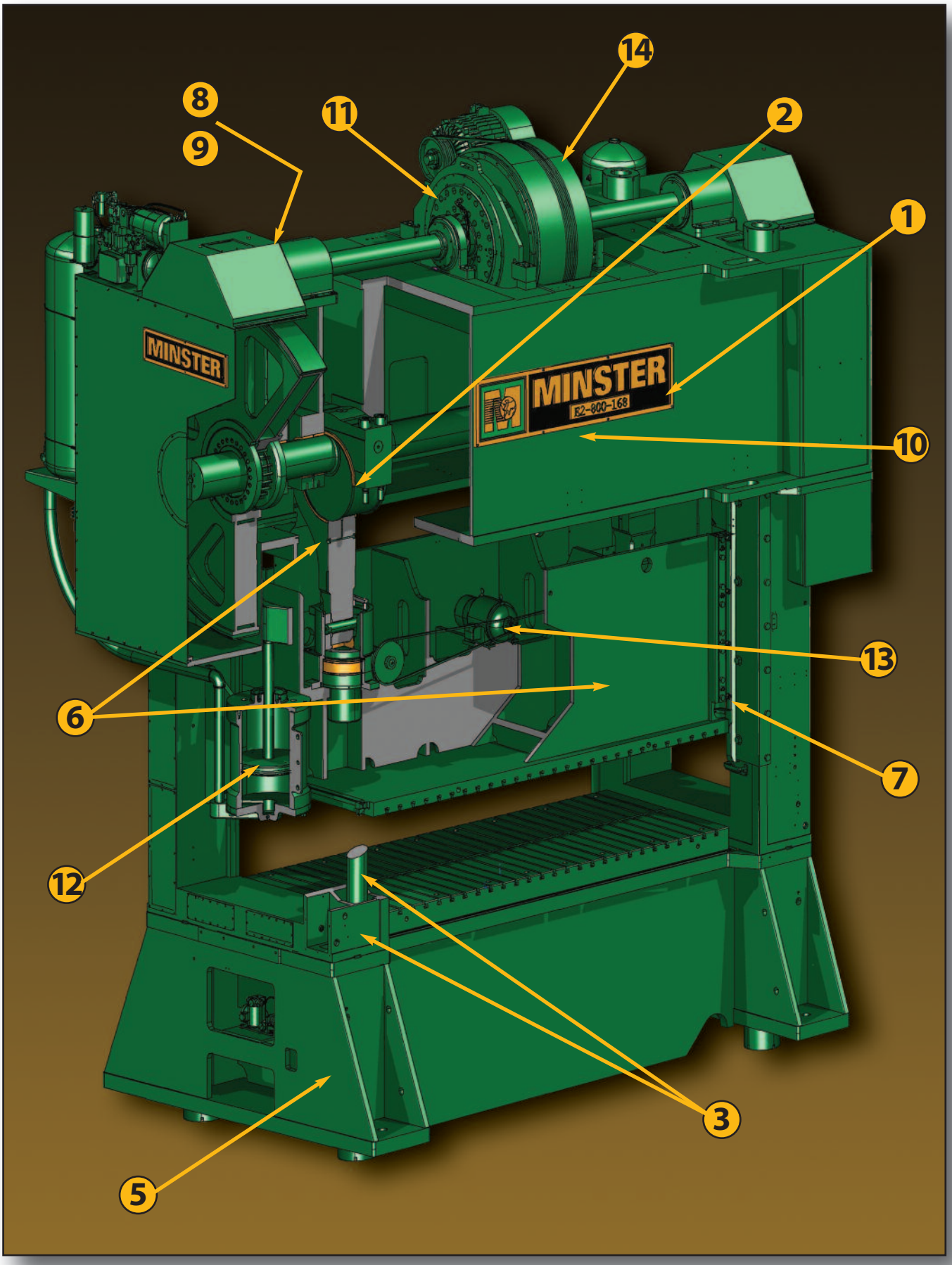
Additional E2 options that provide this machine with increased capability for forming and transfer applications include:

- Double geared and high energy drive arrangements.
- Alternative Slide Motion.

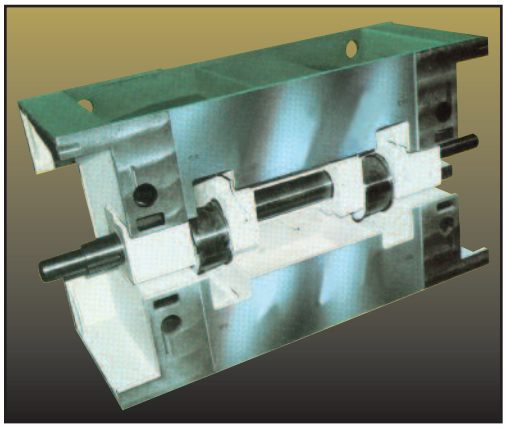


002

Please refer to the following pages for more details on these and the many other features of the E2 press.

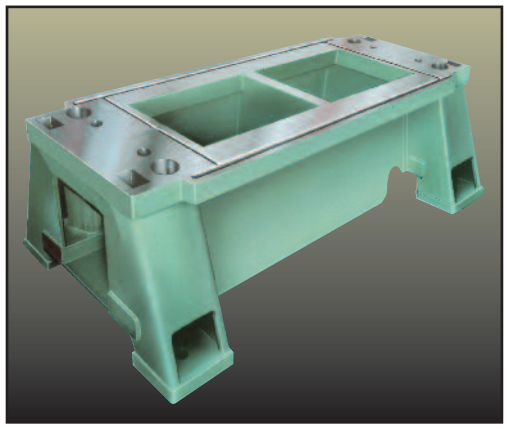

14
8
9
11
2
1
MINSTER
MINSTER
E2-800-168
10
13
6
7
12
3
5

STANDARD FEATURES



Crown & Bed Provide Strength and Accuracy Required in a Precision Press 1 5

A special grade steel is used for the crown and bed to maintain the best strength-to-weight ratio and provide the deflection characteristics required to extend die life. Welds designed for high cycle fatigue life are used in all load bearing areas to maintain durability and reliability. The eccentric shaft bearings are line bored in the crown to hold an alignment tolerance of ±.001" to provide an accurate load bearing support for the eccentric shaft.



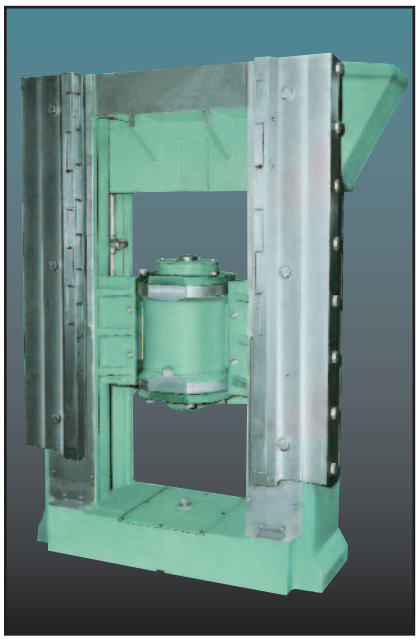
Eccentric Shaft 2

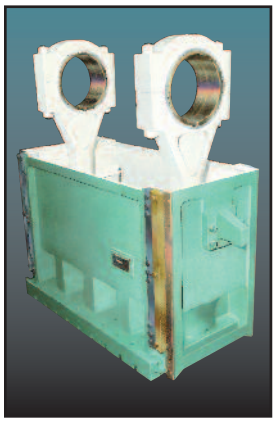
The throw-to-throw accuracy of Minster's one-piece forged eccentric shaft is within .0005" to provide superior dynamic parallelism that results in increased die life in close tolerance dies. Eccentric shafts provide more accuracy and higher rigidity than eccentric gears or crankshafts, and they have approximately 33% more load bearing area and less deflection than a standard crankshaft. This design significantly increases the press's ability to handle snap-thru forces as compared to a crankshaft or eccentric gear design.

Tie Rod Construction With Heavy Uprights For Frame Rigidity 3

To provide increased durability, E2 tie rods and tie rod nuts are designed and manufactured to assure an extremely long life even in non-ideal conditions. For example:

• On standard tie rod nuts, over 90% of the preload force is distributed over the first three threads of the nut. The tie rod nuts on the E2 are machined with a groove in the bottom to permit the lower portion of the nut to flex and **distribute its load over the entire nut**. This allows the nuts to withstand loads that would cause standard nuts to fail.





E2 tie rods are located in the upright's center of gravity to assure that the upright compresses uniformly. High tensile cast iron is used for uprights for presses less than 800 tons to help dampen snap-thru forces. A special grade steel is used for uprights on higher tonnage presses to maintain the best strength-to-weight ratio and provide the required deflection characteristics. All uprights are machined with large upright openings to provide room for material feeding equipment.

Slide, Connections and Saddle 6

The E2 slide is of deep, heavily reinforced box-type construction, designed to withstand deflection and to promote part quality. This design also provides a large die area within the gibs. The saddle bushing, located in a machined pocket in the top of the ductile iron connection screw, is precision fit to be in full contact with the bottom of the connection.

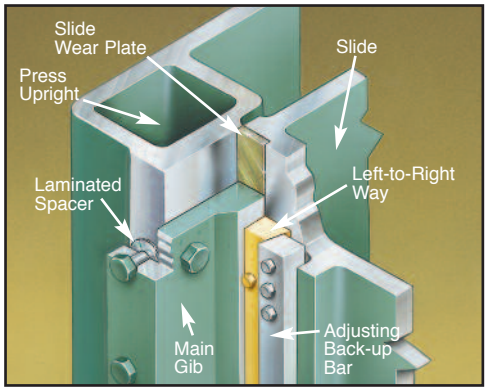
004

STANDARD FEATURES

8-Point Gibbing For Precision Slide Guiding 7

Precision slide guiding is maintained by the close-tolerance, solid bronze, 8-point gibbing arrangement. Front and rear gibs are accurately squared with the press bed and set for proper clearance by laminated spacers under each main gib bolt ... eliminating trial and error adjustment.

Front to back ways have fixed bronze wear plates, machined square with the slide face. Left to right ways are adjusted and supported to their full length by tapered back-up bars. The extra-long gibs guide the slide fully within the gibs throughout the stroke even at maximum shutheight adjustments. This assures excellent slide-to-bed parallelism at all times, promoting clean piece part material fracture, high part accuracy, and increased die life.



Drive Arrangement 8

The Minster E2 HeviStamper utilizes opposing **twin helical gears** in both its single and double geared arrangements. The advantages of Minster's twin drive arrangement include:

- Improved slide parallelism throughout the working portion of the stroke.
- Virtual elimination of any torsional deflection of the eccentric shaft between connections and main bearing maintaining slide parallelism through the work stroke.
- Improved dynamic parallelism when subjected to off-center loading.
- Decreased punch penetration in snap-thru conditions as a result of twin drive having only 1/2 of torsional wind up of a typical center drive press with the same size shaft.

In addition, twin drives provide increased gear life and reduced noise compared to presses utilizing spur gears. Mounting the gears to their shafts without keys provides improved gear timing and serviceability.

Single Geared Twin Drive

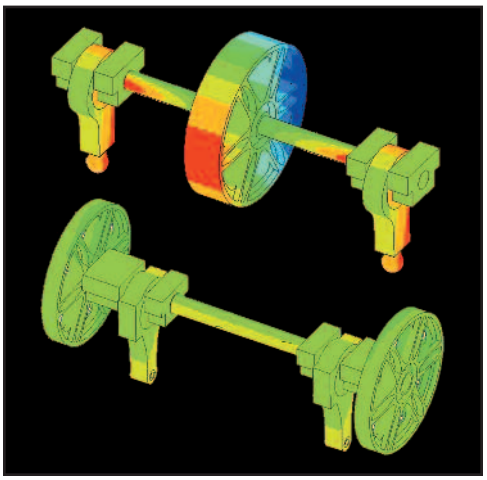
Standard on the E2, this drive is rated at a **minimum** of .25" above bottom of the stroke on 200 thru 600 ton presses; and a **minimum** of .50" on 800 thru 1600 ton machines.

Variable Frequency Drive 9

As a standard, the E2 utilizes a variable frequency drive (VFD) that is integrated with the PMC control panel. As compared to an eddy current drive motor, a VFD is quieter and provides higher performance though out the press's full speed range, resulting in lower energy cost for the user. Integrating the VFD with the operator podium reduces the floor space requirements that are typically associated with VFD drives.

Double Geared Twin Drive

This arrangement is used where slower speeds are required ... in deep drawing or forming operations. A Combination Clutch and Brake on the slow speed intermediate shaft (a patented Minster "first") gives increased single stroke efficiency with less clutch wear than if the clutch were mounted on the higher speed driveshaft.



FEA analysis comparing the torsional wind up of a twin drive press to that of a center drive press with the same size shaft shows that when the maximum rated tonnage is applied evenly to each, the vertical deflection of the center drive press is twice that of the twin drive press. The result is a less stiff press and increased punch penetration in snap-thru applications.

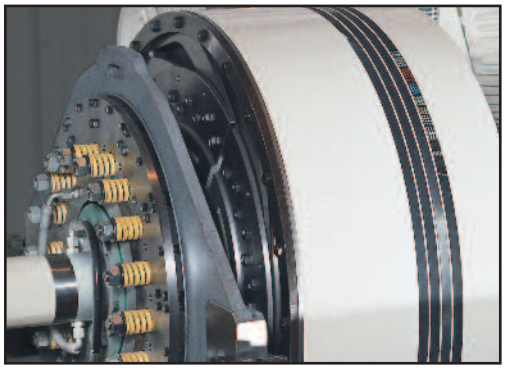
005

STANDARD FEATURES

Minster MonitorFlow® ... Continuous Monitored Press Lubrication 10

The patented Minster MonitorFlow Pressurized Recirculating Oil Lubrication System supplies a continuous flow of filtered oil under pressure to **all** bearing surfaces ensuring reliable operation. It monitors both the flow to these points as well as oil level and pressure in the entire system. If a fault occurs, it protects the bearings by stopping the press operation before damage can occur.

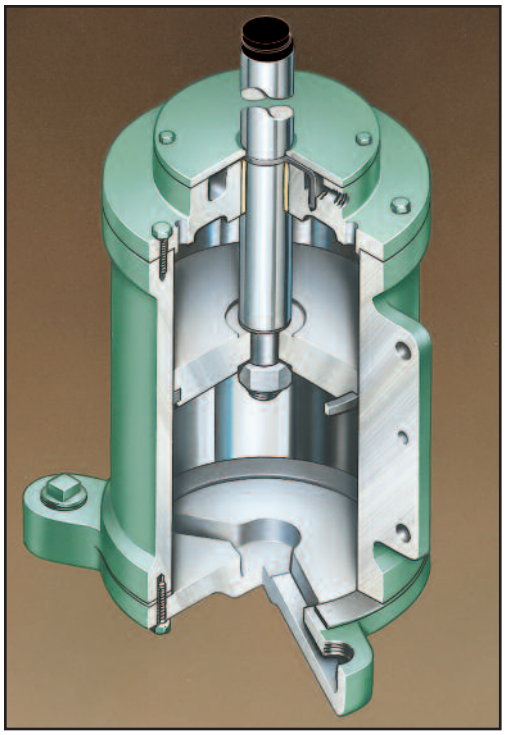
From the **Manifold** in the press crown, oil is channeled to bearings, gibs, gears and counterbalances. Flow switches monitor oil flow to main and connection bearings, gibs, counterbalance cylinders, driveshaft, and through the sump line to the reservoir. **This protects against both broken and plugged lines.** In the event of a lubrication fault, the **Message Screen Within the PMC Control** instantly shows which flow switch (or switches) signalled the fault, helping to pinpoint the problem area.



Patented Minster Hydraulic Clutch & Brake Unit 11

Minster's combination hydraulic clutch and brake produces the maximum torque possible providing for faster starting and stopping, resulting in increased production. A patented segmented drive disc design provides safe and reliable operation, variable clutch torque and easy maintenance. In addition, Minster's clutch and brake unit requires no adjustment and years of maintenance-free operation, resulting in less downtime and higher production rates.

The Minster combination hydraulic clutch and brake provides the ability to single stroke at high rates while simultaneously providing unparalleled stopping time ability that is critical for high speed and in-die sensing applications.



Counterbalances 12

"Push-type" pneumatic counterbalances are utilized in presses that have up to an 180" R-L bolster area. In these presses, the counterbalances are mounted in the press uprights directly on the right-to-left centerline of the slide. Presses greater than 180" R-L utilize four, crown-mounted counterbalance cylinders to maintain seal alignment and maximize seal life. Neither push-type cylinders, nor crown-mounted cylinders are rigidly attached to the slide. Pressure can be quickly adjusted via the PMC Control to suit the weight of tooling being used.

Rapid and Exact Shutheight 13

Shutheight changes on the E2 are made through a heavy, barrel-type mechanism. The two large connection screws are guided within sleeves of the slide and are always supported against angular forces from the connections when work load is contacted above bottom of stroke. **Buttress screw threads** maximize thread area for long term reliable operation. E2 presses feature, as **Standard,** a built-in, motorized shutheight adjustment mechanism. Both connections are adjusted simultaneously, through a chain drive. A brake-type motor automatically holds without drift. The mechanism is self-locking and has limit switches at adjustment extremes, plus anti-jam devices on the screws.

006

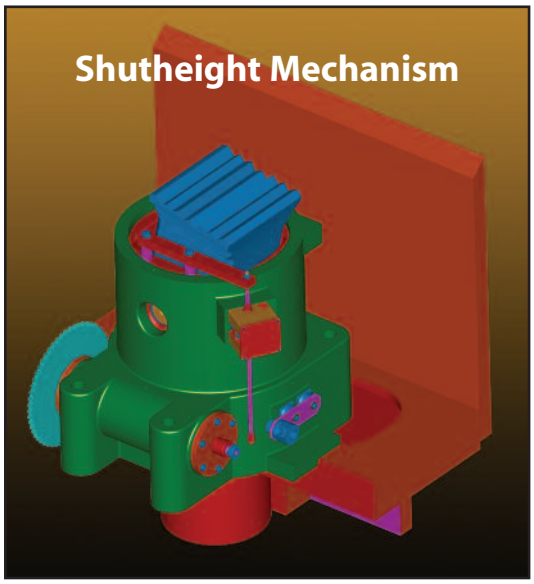
E2 HEVISTAMPER

STANDARD FEATURES

Shutheight Indicator

Also included as Standard is a mechanical Shutheight Indicator located on the slide and tilted at a 30° angle toward the floor to aid operator set up. This indicator provides the operator with a constant read out of the daylight opening between the slide face and bolster, accurate to one-thousandth of an inch. (Metric calibration is also available.)

Optional Automatic Shutheight Adjustment and Electronic Display through Minster's PMC Control is available. (See Options Section for details.)



Flywheel Brake 14

Electrically interlocked with press "Stop" circuit, the flywheel brake acts against the flywheel rim to quickly stop the flywheel. This improves production efficiency by eliminating what would normally be several minutes of flywheel "coasting" after the drive motor has been shut off and allows work in the die area to begin much sooner.

Production Management Control (PMC)

This full featured press control was designed and integrated by Minster and incorporates all press functions including:

- Full machine diagnostics detailing all press and feed line faults.
- Selectable supervisor lockout for each function.
- Clutch/Brake start-stop.
- Motor controls.
- Tool storage.
- Energy saver mode.
- Preventative maintenance monitoring.
- Programmable Limit Switch.
- Counters.
- Stopping time indicator.
- Reason for recent stop.
- Crank position indicator including distance off bottom.
- Multiple Languages.

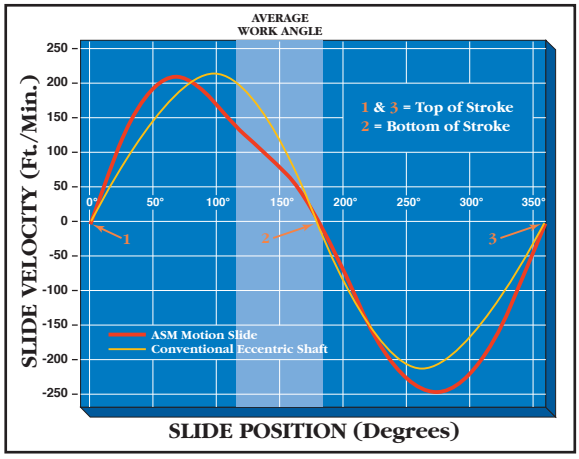
The PMC utilizes open architecture which allows for greater convenience in planning and maintenance. It incorporates a PLC and color touch screen technology; all press and feed line functions can be monitored for efficient diagnosis of production line faults.

Available popular options include:

- Additional tool storage.
- Die protection with Auto Tune technology.
- Load Monitoring.
- Automatic shutheight and counterbalance control.
- Hydraulic overload protection.

007

OPTIONAL FEATURES



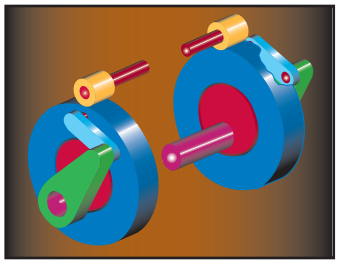
Alternative Slide Motion

Some applications may be better achieved in a press with a slide velocity less than that obtained from a conventional eccentric shaft press. With this in mind, Minster offers Alternative Slide Motion (ASM) as an option on E2 presses.

As shown to the left, the ASM option provides reduced slide velocity through the work portion of the stroke and faster slide velocity through the remaining portion of the stroke as compared to a conventional drive running at the same SPM.

Reducing the slide velocity at the bottom of the stroke may have a positive, negative, or negligible effect on a given application:

Main Benefits of the ASM Drive include: Slower, more consistent slide velocity through the work angle; and reduced heat generation in the die.



Main Disadvantages of the ASM Drive include: Less time to feed material or to transfer parts; and less time to complete die sensing.

If your production can be increased as a result of reduced slide velocity, Minster's ASM was designed to provide you this benefit without changing the overall repeatability, integrity or accuracy of the E2. Features incorporated into the ASM design include: Twin end drive to maintain performance, reliability, durability accessibility and accuracy; and Oil film bearings to assure long life.

Hydraulic Tie Rod Nuts

Hydraulic tie rod nuts are offered as an optional method of pre-stressing the frame. If a die becomes jammed at the bottom of the stroke, tie rod preloading can be quickly released by applying hydraulic pressure to the nuts and removing the spacers. The design of the tie rod nut maintains the frame and drive stiffness for extended die life.

Hydraulic Overload

The Minster Hydraulic Overload is designed to release quickly and uniformly in an overload condition.

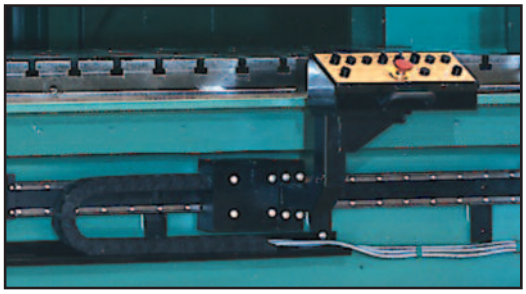
PMCONNECT®

This option provides detailed monitoring of press room production equipment from remote locations and uses the industry standard network and database infrastructure. With an ethernet-based local area network and available Internet connectivity, the open architecture allows for integration into non-PMC type control systems. The relational database allows for easy migration of data to other systems/applications.

Feature views include: press summary; press detail; tool storage; production history; fault history; dial-up access and support; HTML help, etc.

Additional Available Options

- **Feed Pad Arrangements**
- **Crankshaft Extensions**
- **Die Safety Block(s)** • **Press Mounts**
- **Stock Lubrication System**
- **Die Space Enclosures** • **Light Curtains**
- **Special Slide/Bolster Machining**
- **Shutheight Ranges** • **Stroke Lengths**
- **Arrange for Crossbar Knockouts**
- **Bed Deflection of .001"/ft. or .0005"/ft.**
- **Die Clamping Arrangements**
- **Safety Railing** • **Die Cushions**
- **Quick Die Change Solutions**
- **Line Voltage** • **Single Stroke**
- **120 Volt Duplex Receptacle(s)**
- **Tie Rod Heaters** • **Rolling Bolster**



- **Sliding Pendant for Press & Feed Set-Up**
- **Air Blow Off** • **Die Area Lighting**
- **T-Stand, Operator's Station**
- **Pax Die Doors**

008

Single Geared, Twin Drive Specifications & Dimensions

ALL DIMENSION IN INCHES

Ref. Notes	Dim. Pg. 11	PRESS SIZE / Dimensions Common to All Widths		E2-200	E2-300	E2-400	E2-600	E2-800	E2-1000	E2-1200	E2-1600
1		Capacity @ Distance Off Bottom		200/0.25	300/0.25	400/0.25	600/0.25	800/0.50	1000/0.50	1200/0.50	1600/0.50
	A	Dia. of Shaft at Main Bearings		7	8	9	11	12	13.5	14	15
		Maximum Speed (SPM) Per Standard Stroke Length Std. Drive (ASM Drive)	STROKE LENGH 8	100 (N/A)	100 (80)	100 (80)	100 (80)				
			10	100 (N/A)	80 (80)	100 (60)					
			12	100 (N/A)	80 (80)	80 (50)	80 (60)	60 (60)	60 (60)	60 (60)	60 (60)
			14	80 (N/A)	60 (60)	60 (50)					
			16				60 (50)	60 (60)	60 (60)	60 (60)	60 (60)
			20				50 (50)	50 (50)	50 (50)	50 (50)	50 (50)
			24					40 (40)	40 (40)	40 (40)	40 (40)
2		Shutheight Adjustment (Standard)		6	6	6	10	10	12	12	12
	B	Shutheight on Bolster (S.D.A.U.) Std.		24-44	24-44	24-44	24-44	24-44	25-50	25-50	2-50
	C	Bolster Plate Thickness		5	6	6	7	8	9	9	10.5
3	D	Upright Opening		25	33	48	53	63	63	63	63
		Drive Motor Horsepower (Standard)		40	40-50	40-75	50-150	100-150	307-382	150-200	150-300
4	E	Approximate Overall Height - Std.		192-223	198-229	234-260	248-278	293-326	307-382	309-362	363-403
		WIDTH OF PRESS		**72**	**72**						
5		Approximate Weight-Press Only (lbs.)		64,000	90,000						
	J x K	Area of Slide Bed & Bolster (R-L x F-B)		72 x 48	72 x 48						
6	L x M	Opening in Bed - Maximum (R-L x F-B)		66 x 24	66 x 24						
	F	Floor to Top of Bed		35.75	34						
	G x H	Overall Floor Space (R-L x F-B)		108.5 x 72	114 x 82						
		WIDTH OF PRESS		**96**	**96**	**96**					
5		Approximate Weight-Press Only (lbs.)		80,000	108,000	140,000	185,000				
	J x K	Area of Slide Bed & Bolster (R-L x F-B)		96 x 48	96 x 48	96 x 60	96 x 60				
6	L x M	Opening in Bed - Maximum (R-L x F-B)		90 x 24	90 x 24	90 x 24	90 x 26				
	F	Floor to Top of Bed		35.75	34	46	46				
	G x H	Overall Floor Space (R-L x F-B)		132.5 x 72	138 x 82	144.5 x 116	151 x 120				
		WIDTH OF PRESS			**120**	**120**	**120**				
5		Approximate Weight-Press Only (lbs.)			125,000	164,000	225,000				
	J x K	Area of Slide Bed & Bolster (R-L x F-B)			120 x 48	120 x 60	120 x 60				
6	L x M	Opening in Bed - Maximum (R-L x F-B)			112 x 24	114 x 24	114 x 26				
	F	Floor to Top of Bed			34	46	46				
	G x H	Overall Floor Space (R-L x F-B)			162 x 82	168.5 x 116	175 x 120				
		WIDTH OF PRESS				**144**	**144**	**144**	**144**	**144**	
5		Approximate Weight-Press Only (lbs.)				200,000	238,000	277,000	371,000	416,000	
	J x K	Area of Slide Bed & Bolster (R-L x F-B)				144 x 60	144 x 60	144 x 72	144 x 72	144 x 72	
6	L x M	Opening in Bed - Maximum (R-L x F-B)				138 x 24	138 x 26	138 x 30	138 x 30	138 x 30	
	F	Floor to Top of Bed				46	46	59.75	59.75	59.75	
	G x H	Overall Floor Space (R-L x F-B)				192.5 x 116	199 x 120	205 x 146	205 x 146	205 x 146	
		WIDTH OF PRESS					**168**	**168**	**168**	**168**	
5		Approximate Weight-Press Only (lbs.)					263,000	325,000	395,000	430,000	
	J x K	Area of Slide Bed & Bolster (R-L x F-B)					168 x 60	168 x 72	168 x 72	168 x 72	
6	L x M	Opening in Bed - Maximum (R-L x F-B)					162 x 26	162 x 30	162 x 36	162 x 36	
	F	Floor to Top of Bed					46	59.75	59.75	59.75	
	G x H	Overall Floor Space (R-L x F-B)					223 x 120	229 x 146	229 x 146	229 x 146	
		WIDTH OF PRESS							**204**	**204**	**204**
5		Approximate Weight-Press Only (lbs.)							475,000	520,000	720,000
	J x K	Area of Slide Bed & Bolster (R-L x F-B)							204 x 72	204 x 72	204 x 78
6	L x M	Opening in Bed - Maximum (R-L x F-B)							198 x 36	198 x 36	198 x 38
7	F	Floor to Top of Bed							79.75	79.75	88
	G x H	Overall Floor Space (R-L x F-B)							265 x 146	265 x 146	271 x 146
		WIDTH OF PRESS							**240**	**240**	**240**
5		Approximate Weight-Press Only (lbs.)							570,000	600,000	850,000
	J x K	Area of Slide Bed & Bolster (R-L x F-B)							240 x 72	240 x 72	240 x 78
6	L x M	Opening in Bed - Maximum (R-L x F-B)							234 x 36	234 x 36	234 x 40
7	F	Floor to Top of Bed							79.75	79.75	88
	G x H	Overall Floor Space (R-L x F-B)							301 x 146	301 x 146	307 x 146

REFERENCE NOTES

1. For full tonnage high in stroke, consult Minster.
2. Consult Minster for upright openings other than standard.
3. Overall height may be reduced on some presses if headroom problem exists (Special drive mounting can be supplied at extra cost.)
4. All weights listed are based on Single-Geared, Twin-Drive type having standard stroke and shutheight and do not include electrical controls, drive motor or auxiliary equipment.
5. In widths over 72", there will be a front-to-back support rib(s) across bed opening - normally in the center.
6. E2-1000-180 & 216, E2-1200-180 & 240, and E2-1600 will require a pit.

†For sizes, specifications, and dimensions not listed, please consult Minster.

009

Single Geared, Twin Drive Specifications & Dimensions

ALL DIMENSIONS IN MILLIMETERS

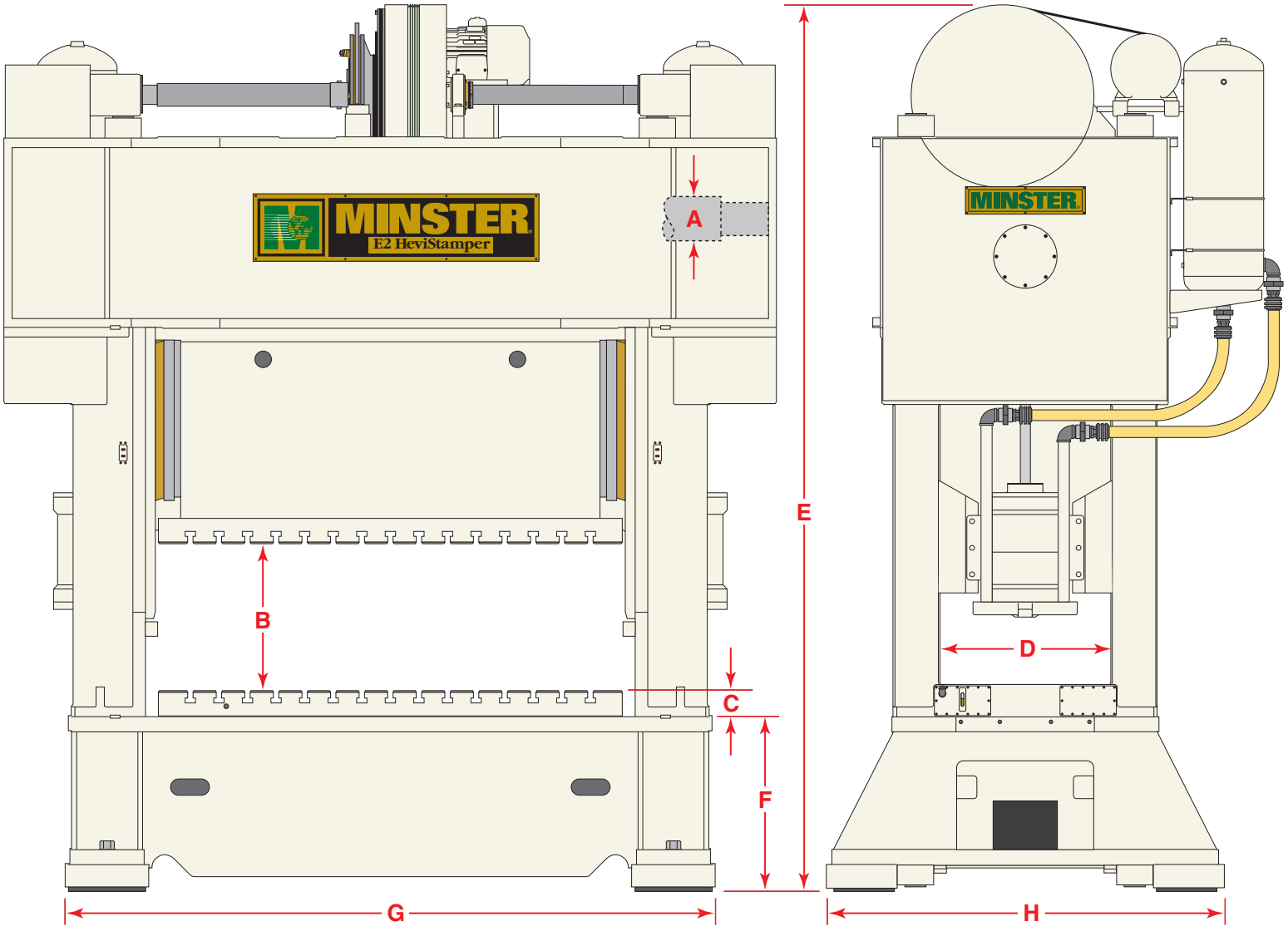
Ref. Notes	Dim. Pg. 11	PRESS SIZE / Dimensions Common to All Widths		E2-200	E2-300	E2-400	E2-600	E2-800	E2-1000	E2-1200	E2-1600
1		Capacity @ Distance Off Bottom		1780 kN/6,4	2670 kN/6,4	3560 kN/6,4	5340 kN/6,4	7120 kN/12,7	8900 kN/12,7	10.675 kN/12,7	14.235 kN/12,7
	A	Dia. of Shaft at Main Bearings		175	205	230	280	305	345	355	380
		Maximum Speed (SPM) Per Standard Stroke Length Std. Drive (ASM Drive)	STROKE LENGH 8	100 (N/A)	100 (80)	100 (80)	100 (80)				
			10	100 (N/A)	80 (80)	100 (60)					
			12	100 (N/A)	80 (80)	80 (50)	80 (60)	60 (60)	60 (60)	60 (60)	60 (60)
			14	80 (N/A)	60 (60)	60 (50)					
			16				60 (50)	60 (60)	60 (60)	60 (60)	60 (60)
			20				50 (50)	50 (50)	50 (50)	50 (50)	50 (50)
			24					40 (40)	40 (40)	40 (40)	40 (40)
2		Shutheight Adjustment (Standard)		150	150	150	255	255	305	305	305
	B	Shutheight on Bolster (S.D.A.U.) Std.		610-1120	610-1120	610-1120	610-1120	610-1120	635-1270	635-1270	635-1270
	C	Bolster Plate Thickness		125	150	150	180	205	230	230	265
3	D	Upright Opening		635	840	1220	1345	1600	1600	1600	1600
		Drive Motor Kilowatts (Standard)		30	30-37	40-56	37-112	75-112	112-150	112-150	112-225
4	E	Approximate Overall Height - Std.		4875-5665	5030-5813	5945-6605	6300-7060	7440-6280	7800-9700	7850-9195	9220-10.235
		WIDTH OF PRESS		**1830**	**1830**						
5		Approximate Weight-Press Only (kgs.)		28.800	40.500						
	J x K	Area of Slide Bed & Bolster (R-L x F-B)		1830 x 1220	1830 x 1220						
6	L x M	Opening in Bed - Maximum (R-L x F-B)		1675 x 610	1675 x 610						
	F	Floor to Top of Bed		910	865						
	G x H	Overall Floor Space (R-L x F-B)		2755 x 1830	2895 x 2080						
		WIDTH OF PRESS		**2440**	**2440**	**2440**					
5		Approximate Weight-Press Only (kgs.)		36.000	48.600	63.000	185,000				
	J x K	Area of Slide Bed & Bolster (R-L x F-B)		2440 x 1220	2440 x 1220	2440 x 1525	2440 x 1525				
6	L x M	Opening in Bed - Maximum (R-L x F-B)		2285 x 610	2285 x 610	2285 x 610	2285 x 660				
	F	Floor to Top of Bed		910	865	1170	1170				
	G x H	Overall Floor Space (R-L x F-B)		3365 x 1830	3505 x 2080	3670 x 2945	3835 x 3050				
		WIDTH OF PRESS			**3050**	**3050**	**3050**				
5		Approximate Weight-Press Only (kgs.)			56.250	73.800	102.000				
	J x K	Area of Slide Bed & Bolster (R-L x F-B)			3050 x 1220	3050 x 1525	3050 x 1525				
6	L x M	Opening in Bed - Maximum (R-L x F-B)			2845 x 610	2895 x 610	2895 x 660				
	F	Floor to Top of Bed			865	1170	1170				
	G x H	Overall Floor Space (R-L x F-B)			4115 x 2080	4280 x 2945	4445 x 3050				
		WIDTH OF PRESS				**3660**	**3660**	**3660**	**3660**	**3660**	
5		Approximate Weight-Press Only (kgs.)				90.000	170.100	124.650	166.950	187.200	
	J x K	Area of Slide Bed & Bolster (R-L x F-B)				3660 x 1525	3660 x 1525	3660 x 1830	3660 x 1830	3660 x 1830	
6	L x M	Opening in Bed - Maximum (R-L x F-B)				3050 x 610	3050 x 660	3050 x 760	3050 x 760	3050 x 760	
	F	Floor to Top of Bed				1170	1170	1520	1520	1520	
	G x H	Overall Floor Space (R-L x F-B)				192.5 x 2945	199 x 3050	205 x 146	205 x 146	205 x 146	
		WIDTH OF PRESS					**4265**	**4265**	**4265**	**4265**	
5		Approximate Weight-Press Only (kgs.)					118.350	146.250	179.000	193.500	
	J x K	Area of Slide Bed & Bolster (R-L x F-B)					4265 x 1525	4265 x 1830	4262 x 1830	4265 x 1830	
6	L x M	Opening in Bed - Maximum (R-L x F-B)					4115 x 660	4115 x 760	4115 x 915	4115 x 915	
	F	Floor to Top of Bed					1170	1520	1520	1520	
	G x H	Overall Floor Space (R-L x F-B)					5665 x 3050	5760 x 3710	5760 x 3710	5760 x 3710	
		WIDTH OF PRESS							**5180**	**5180**	**5180**
5		Approximate Weight-Press Only (kgs.)							215.450	235.900	326.600
	J x K	Area of Slide Bed & Bolster (R-L x F-B)							5180 x 1830	5180 x 1830	5180 x 1980
6	L x M	Opening in Bed - Maximum (R-L x F-B)							5030 x 915	5030 x 915	5030 x 965
7	F	Floor to Top of Bed							2025	2025	2235
	G x H	Overall Floor Space (R-L x F-B)							6730 x 3710	6730 x 3710	6885 x 3710
		WIDTH OF PRESS							**6095**	**6095**	**6095**
5		Approximate Weight-Press Only (kgs.)							258.500	272.200	385.500
	J x K	Area of Slide Bed & Bolster (R-L x F-B)							6095 x 1830	6095 x 1830	6095 x 1980
6	L x M	Opening in Bed - Maximum (R-L x F-B)							5945 x 915	5945 x 915	5945 x 1015
7	F	Floor to Top of Bed							2025	2025	2235
	G x H	Overall Floor Space (R-L x F-B)							7645 x 3710	7645 x 3710	7800 x 3710

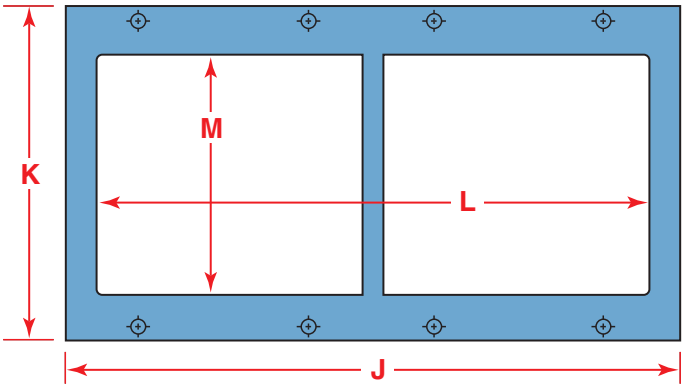
REFERENCE NOTES

1. For full tonnage high in stroke, consult Minster.
2. Consult Minster for upright openings other than standard.
3. Overall height may be reduced on some presses if headroom problem exists (Special drive mounting can be supplied at extra cost.)
4. All weights listed are based on Single-Geared, Twin-Drive type having standard stroke and shutheight and do not include electrical controls, drive motor or auxiliary equipment.
5. In widths over 1830mm, there will be a front-to-back support rib(s) across bed opening - normally in the center.
6. E2-1000-180 & 216, E2-1200-180 & 240, and E2-1600 will require a pit.

†For sizes, specifications, and dimensions not listed, please consult Minster.

STANDARD FEATURES





REFER TO PAGES 9 & 10 FOR DIMENSIONS

011

The Minster Machine Company, Minster OH

The Minster Machine Company, Beaufort, SC

The Minster Machine Company, Halblech, Germany
Telephone: (49) 8368 9134 0

Before You Invest in New Material Forming Technology, You're Invited to Visit Our Manufacturing, Training, Research, Parts and Service Facilities to See How "Minster Quality" is Built Into All of Our Products and Services.

MINSTER®

THE MINSTER MACHINE COMPANY

A Century of Heritage Pressed Into a Lifetime of Quality

240 WEST FIFTH STREET • MINSTER, OHIO 45865-0120 U.S.A. • PHONE: (419) 628-2331 • FAX: 419-628-3517

www.minster.com

Minster Has Sales and Service Offices Located Throughout the World
Contact Minster Direct For The Name of Your Global Representative

1MPP1209