MINSTER®
THE MINSTER MACHINE COMPANY

ORDER INFORMATION

MINSTER ORDER NO:	030126	**ORDER DATE:**	2-15-2002
PROPOSAL NO:		**REVISION DATE:**	6-12-2002
CUSTOMER ORDER NO:	22-62515	**REVISION LEVEL:**	1.09
SOLD BY:	MINSTER MACHINE	**REG MGR:**	SDH
MKT SEGMENT:	MGH	**APPL SPEC:**	JAW

MINSTER EQUIPMENT SERIAL NUMBERS:

PRESS:	*P2H-160-30126 (Rev 1.02)*
FEED:	18-51072
STRAIGHTENER:	13-50718
REEL:	13-70823
COIL CAR:	*13-90262 (Rev 1.02)*

CUSTOMER INFORMATION

SOLD TO CUSTOMER:
00-005-5020
SIMPSON STRONG TIE CO., INC.
1425 MOONSTONE STREET
BREA, CA 92821

SHIP TO CUSTOMER:
00-005-5020
SIMPSON STRONG TIE CO., INC.
1425 MOONSTONE STREET
BREA, CA 92821

ULTIMATE DESTINATION: SIMPSON STRONG TIE / BREA, CA / USA

NOTES

1. See last page for Payment Terms and Conditions of Sale

GENERAL SPECIFICATIONS

Control Specification	ANSI-B11.1 and NFPA-79
System Voltage	480 V, 3 Phase, 60 Hz
Paint Color	Birch White
Material Direction	*Back-Front, Left-Right (Rev 1.05)*
Legend Plate Language	English
Service Manual Language	English
Service Manuals Provided	(2) Copies

GENERAL SPECIFICATIONS APPLY TO ALL
EQUIPMENT INCLUDED IN THIS PROPOSAL

Customer Specifications

(Customer Provided Information)

DIE SPECIFICATIONS

Maximum R-L x F-B	No Information Available
Minimum R-L x F-B	No Information Available
Maximum Closed Height	No Information Available
Minimum Closed Height	No Information Available
Maximum Weight	No Information Available
Minimum Weight	No Information Available
Maximum Planned SPM	No Information Available
Minimum Planned SPM	No Information Available
Minimum Feedline Height over Bolster	No Information Available
Maximum Feedline Height over Bolster	No Information Available
Maximum Tons	No Information Available
Distance Off Bottom	No Information Available

MATERIAL SPECIFICATIONS

Maximum Width x Thickness	No Information Available
Maximum Thickness x Width	No Information Available
Minimum Width x Thickness	No Information Available
Minimum Thickness x Width	No Information Available
MATERIAL TYPE	No Information Available

SURFACE FINISH	No Information Available

COIL

Maximum Coil Weight	No Information Available
Maximum Coil ID	No Information Available
Maximum Coil OD	No Information Available

PART TO BE MADE SPECIFICATIONS

Part Description	No Information Available
Maximum Progression x SPM	No Information Available
Material Thickness	No Information Available
Maximum SPM x Progression	No Information Available
Material Thickness	No Information Available

*Note: The proposed equipment may not meet this customer specification. Consult Minster for detailed information

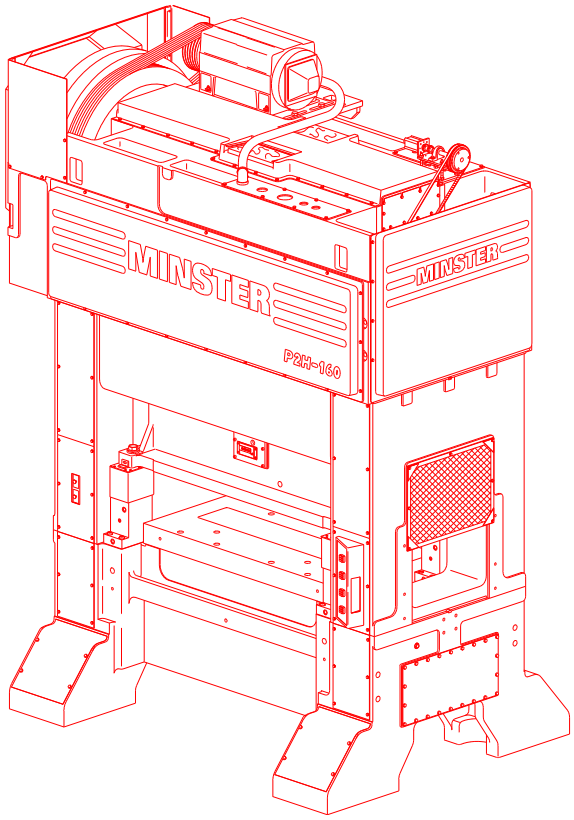
Press and Feed
Integration Specifications

(See attached for individual equipment specification)

Press Floor to Top of Bolster	46.4 in.
Press Pit Depth	N/A
Press Mount Height	Integrated Mounts
Minimum Feed Line Height Over Bolster	*3.6 in. (Rev 1.03)*
Maximum Feed Line Height Over Bolster	*12.6 in. (Rev 1.03)*
Maximum Stock Width	32 in.
Material Loop Pit Depth	N/A

Special Notes

P2H Precision Straight Side Press



NOTE: Above is for reference only and may not be representative of the equipment specified within.

P2H Precision Straight Side Press

Specifications (INCH)

Press Specifications

Model Number	P2H-160-63×33-FW
Force × Distance off Bottom	180 ton × 0.118 in
Crankshaft Extension Length	3.6 in
Crankshaft Extension Location	Opposite Drive Side
Drive Arrangement	Flywheel
Drive Location	Left Hand Side
Lube Unit Location	*Left Hand Side (Rev. 1.06)*
Approximate Press Mass	67,000 lb
Shutheight Indicator Readout	Inch

Press Slide Specifications

Stroke Length, Speed Range	3.94 in, 70 - 250 spm
Adjustment of Shutheight	3.94 in
Quick Access Slide Travel	0.50 - 4.50 in
Area of Slide, R-L × F-B	63.0 × 33.5 in
Slide Face Machining	Standard

Press Bolster Specifications

Bolster Plate Material	Cast Iron
Bolster Plate Thickness	4.92 in
Area of Bolster, R-L × F-B	63.0 × 33.5 in
Opening in Bolster, R-L × F-B	51.2 × 9.8 in
Bolster Plate Machining	Standard

Press Frame Specifications

Upright Passline Opening, F-B	24.8 in
Area of Bed, R-L × F-B	63.0 × 33.5 in
Opening in Bed, R-L × F-B	51.2 × 14.6 in
Bed Deflection at 67% of Die Area	0.0012 in/ft
Shutheight, SDAU	17.7 in, on Bolster
Approx Clearance, Mount to Bottom of Bed	11.8 in
Approx. Distance Mount to Top of Bolster	46.4 in
Approx. Distance Mount to Top of Bed	41.5 in
Approx. Floor Area, R-L × F-B	132 × 80.0 in
Approx. Overall Area, R-L × F-B	132 × 80.0 in
Approx. Overall Height, from Mount	160 in

P2H Precision Straight Side Press

Specifications (INCH) continued

Press Control Specifications

Drive Motor Power, Speed	*40 hp, 1500 - 1800 rpm (Rev 1.09)*
Drive Motor Starter	Non-Reversing
Incoming Power Drop	Control Pedestal
Control Pedestal Location	Right Hand Side
Control Station Location	Pedestal Mounted
Run Station Location	Pedestal Mounted
Setup Station Location	Right Hand Upright
Limit Switch Type	Programmable
Control Operation Mode	Inch-Setup-Continuous
PMC Control Language	English
Press Mounted Stop Control PB	(1) Front and (1) Rear

P2H Precision Straight Side Press

Features

Four Piece High Tensile Cast Iron Frame of tie rod construction reduces overall press vibration level. The open top of the frame provides easy access for routine maintenance.

Bed Deflection designed for specified deflection between tie rod centers with maximum press tonnage distributed over the center two-thirds of the R-L bed area.

Die Lubricant Troughs cast integral with bed

Feed Mounting Pads on right and left side of frame may be used for bracket mounted feed or for alignment of a cabinet style feed.

Counterweights on Crankshaft for added stability at higher operating speeds.

Combination Hydraulic Flex Disc Clutch and Brake includes dual clutch valves providing quick starts and faster stopping times for higher production speeds.

Auxiliary Flywheel Belt driven and mounted to top of crown. Unit doubles available energy and increases the rated distance off bottom.

Air Operated Flywheel Brake interlocked with stop circuit eliminates coasting resulting in quicker access to die area.

Pressurized Monitored Lubrication of all main and connection bearings have full film lubrication with pressurized oil supplied to each bearing within the crankshaft. The system is designed to stop the press in the event of reduced oil pressure. The consistent oil film gives the ultimate dynamic bearing stiffness and longevity resulting in better bottom-dead-center repeatability and die life. Includes vacuum switch to monitor condition of filter.

Pass Line Level Slide Guiding System with four (4) hydrodynamic guide posts assures positive centering and resists off-center loads for increased die life.

Wrist Pins designed for 50% of press tonnage snap through.

Special Drive Piston Protection Package (#1168) *(Rev 1.07)*

Hydraulic Motorized Shutheight Adjustment with Digital Readout

P2H Precision Straight Side Press

Features (continued)

Hydraulic Slide Lockup eliminates clearances in slide adjustment parts to reduce the effects of snap-through forces and punch penetration, thus reducing vibration.

Large Hydrostatic Piston Drive for increased tensile stiffness and bottom-dead-center repeatability. Piston drive bearing design promotes prolonged machine accuracy and die life.

Quick Lift Slide for quick die access. Facilitates die inspection and material threading. Ideal when shorter stroke applications are required.

Slide Stabilization Bracket Required option if press is to be shipped horizontal.

Slide Face Machined with 1.0 in. general purpose T-slots F-B on 6.0 in. centers starting on center.

Bolster Plate Machined with 1.0 in. general purpose T-slots F-B on 6.0 in. centers starting on center.

Two (2) Die Safety Blocks Length is equal to the shutheight on the bolster with the stroke up and the adjustment at mid-range. Blocks are mounted on the pedestal.

Integral Press Shock Mounts for vibration dampening and bed leveling.

Die Space Guard A-4 An interlocked, point of operation guard for both front and rear of press. Enclosure is designed for applications in which all part and scrap removal is to be done through the bed opening.
FEATURES:

- Pneumatic powered assist for lifting and lowering the doors within two vertical guides.
- Single paned, mar resistant, polycarbonate windows for press operation viewing.

NOTE: Special panels for upright openings and/ or guard modifications that may be necessary for the customer's application can be provided at additional cost (refer to "Point of Operation Safeguarding" form).

P2H Precision Straight Side Press

Features (continued)

Minster Production Management Press Control V6 includes the following features:

- Color Touch Screen
- Allen Bradley SLC 5/04 PLC
- 16-Pole Programmable Limit Switch
- Brake Monitor / Press Stopping Time Readout
- 75 Tool Storage Capacity with 7-Digit Numeric I.D. Codes
- System Prompts and Diagnostic Messages
- Lube Pump On/Off Indicator
- Motor Start/Stop Control
- Motor Speed Control
- Motor Speed and Load Display
- Slide Adjust Function Indicators
- Dual Clutch Valve Monitor
- Stock Lubricator Interface Output
- Auxiliary output interface for secondary control elements (2nd blowoff, lubricator, divertor tables, etc.)
- Blowoff Valve Interface Output
- Production Counters - Totalizers/Preset/Batch
- Maintenance Reminders - Activated by Predetermined Hours or Clutch Engagements, or Number of Parts Made.
- Press Lifetime Production Record - Hours/Cycles/Clutch Engagements
- Relay Based Primary Machine Control

Pedestal Control Enclosure is ergonomically designed to include illuminated indicators and operator/set-up buttons as well as to use minimal floor space. Also included is the press motor and clutch control circuit with a disconnect switch. The pedestal is wired with rigid standpipe and flexible overhead conduit to junction box on front of crown.

Control Station Includes:

- Clutch Selector Switch to select Control Operator Mode
- Power Off-On Locking Selector Switch
- Supervisory Control Lock Selector Switch (PMC only)
- Function Enable Illuminated Pushbutton (PMC only)

P2H Precision Straight Side Press

Features (continued)

Set-Up Station facilitates material threading and die set-up and includes:

- Slide Adjustment Control Buttons
- Two-Hand Inching Arrangement
- Stop Button
- Quick Lift Selector Switch

Run Station Includes:

- Two Guarded buttons to operate press
- "Arm" Push-button(s)
- Top Stop Button
- Stop Button

Two (2) Die Safety Block Receptacles (less blocks) located on side of control pedestal.

Clutch and Motor Control Circuits including push-buttons, operate on 110 VAC from control transformer.

Eddy Current Main Drive Motor (w/o brake) is a totally enclosed, fan-cooled, variable speed motor providing proven durability and increased torque response.

Minster Production Management (4) Channel Load Monitor displays press load, allows for peak and reverse tonnage alarm settings and provides trend analysis to help protect the press and dies from potential overload conditions. System includes 'Monitor Parts Mode', which automatically compares each successive press cycle against a stored benchmark allowing for accurate 'real time' part quality and die protection strategies. Adjustable view window provides capability for monitoring specific process within tool such as peak forward load, snap through, or stripper plate impact. Load monitor system is dynamically calibrated through the full operating speed and tonnage range of the press and includes two strain gauge transducers located on press uprights.

Production Management 16-Point Die Protection Module – Standard with sixteen independent high speed inputs to detect event changes within 1 degree at speeds up to 1800 spm enabling quick die protection updates. The Die Protection Auto Tune feature allows for automatic adjustment of die protection sensors, which aids in the debug and set up of die protection programs. This feature is beneficial in eliminating nuisance faults due to sensor hysteresis, speed changes, etc.
Includes two press mounted interfaces for sensor connections consisting of six (6) five-way binding posts and two (2) Brad-Harrison type "Micro-Change" connectors.

P2H Precision Straight Side Press

Features (continued)

Minster Production Management Servo Feed Interface For Minster electric feeds only.

Coil Line Interconnects Coil Line Interconnects reduce equipment installation and startup time. Electrical interconnects are run in flexible conduit with quick disconnect plugs. All coil line interconnects terminate at a press mounted junction box, located on the press base. Interconnects only apply to Minster manufactured products.

Two (2) Fluorescent Die Area Lights

One (1) Air Blowoff activated by a limit switch with On/Off control either in the PMC touchscreen (for PMC only) or a selector switch in the Control Station.

120 VAC Receptacle Mounted on control pedestal, three (3) amps maximum capacity.

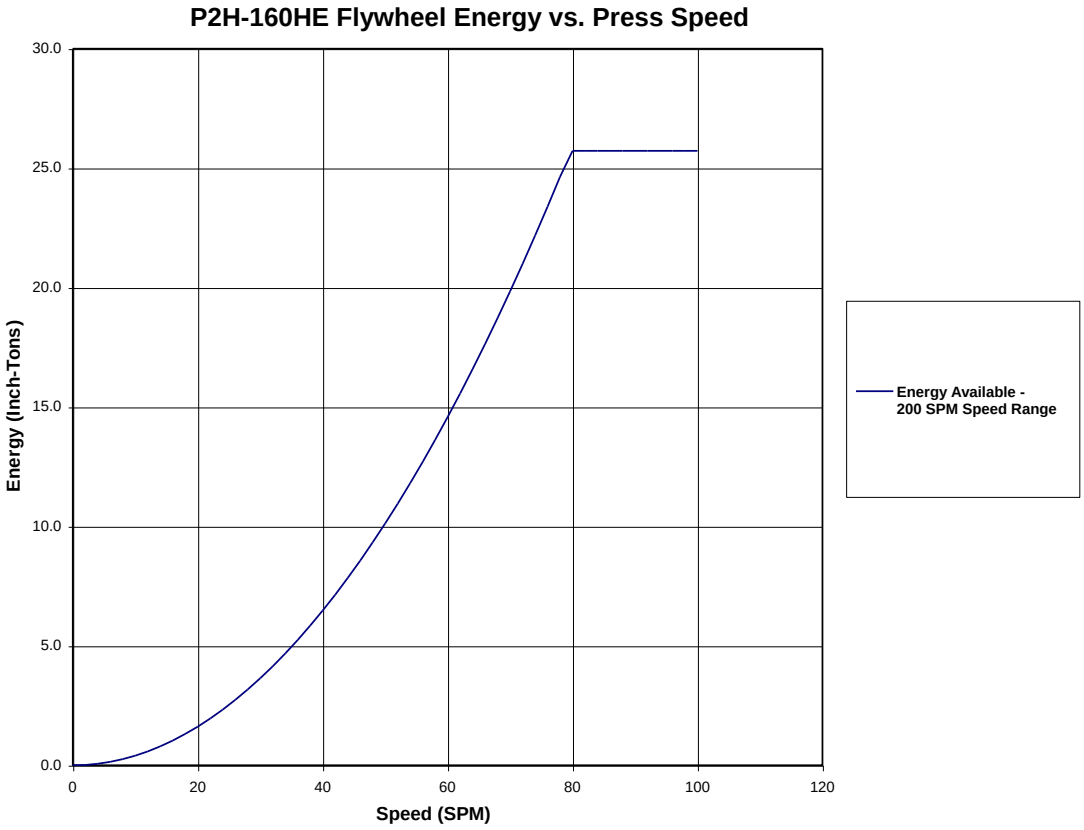
Machine Finish consists of quality Polane Paints for chemical resistance, long life, and highest quality appearance. All parts are primer under coated and castings are pre-coated with a smoothing agent providing the best possible paint adhering surface.

General Equipment Specifications This equipment is built to Minster's electrical, mechanical, hydraulic, and pneumatic standards.

DXF Package Minster will provide final press drawings in DXF format. The files will be provided on a standard CD that will be included with the equipment manuals at the time of shipment. The Minster Machine Company reserves the right to deny requests for any additional DXF drawings that are considered proprietary and/or confidential.

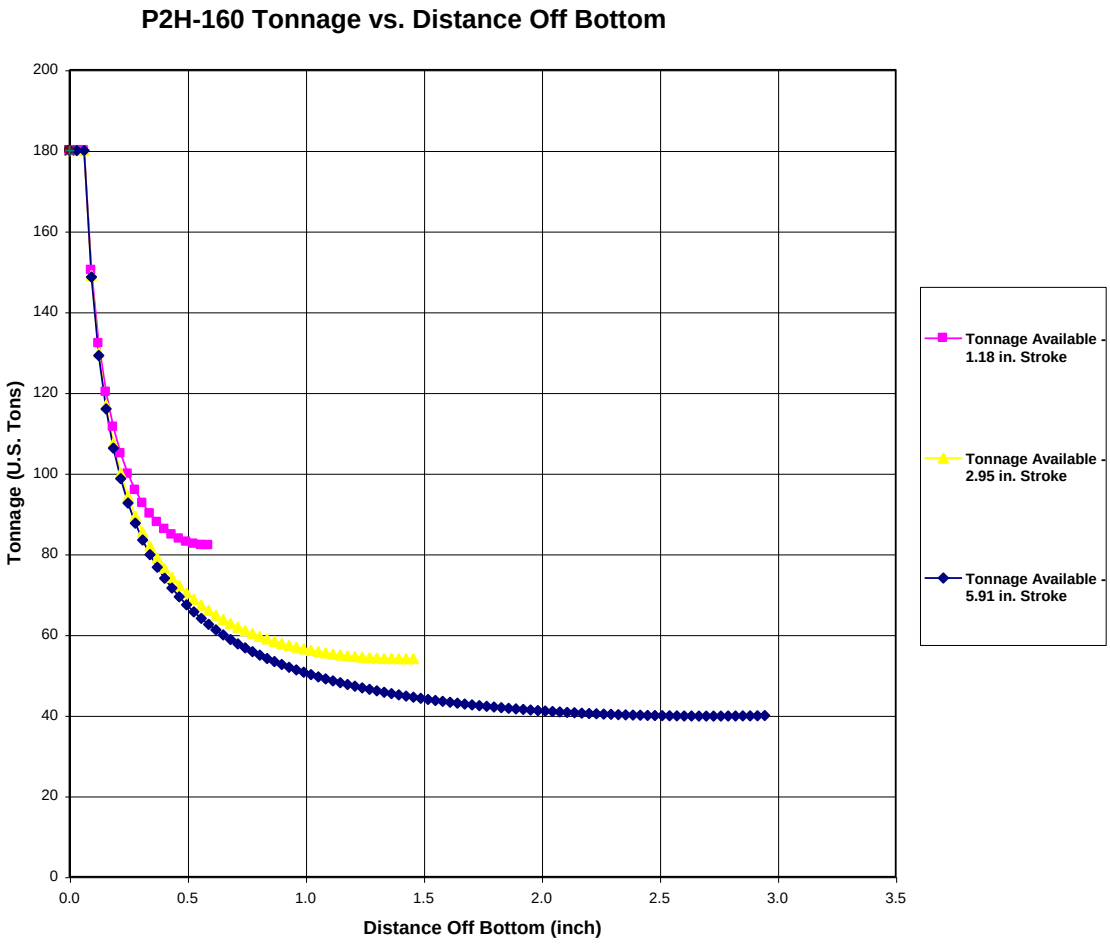
P2H Precision Straight Side Press

Features (continued)

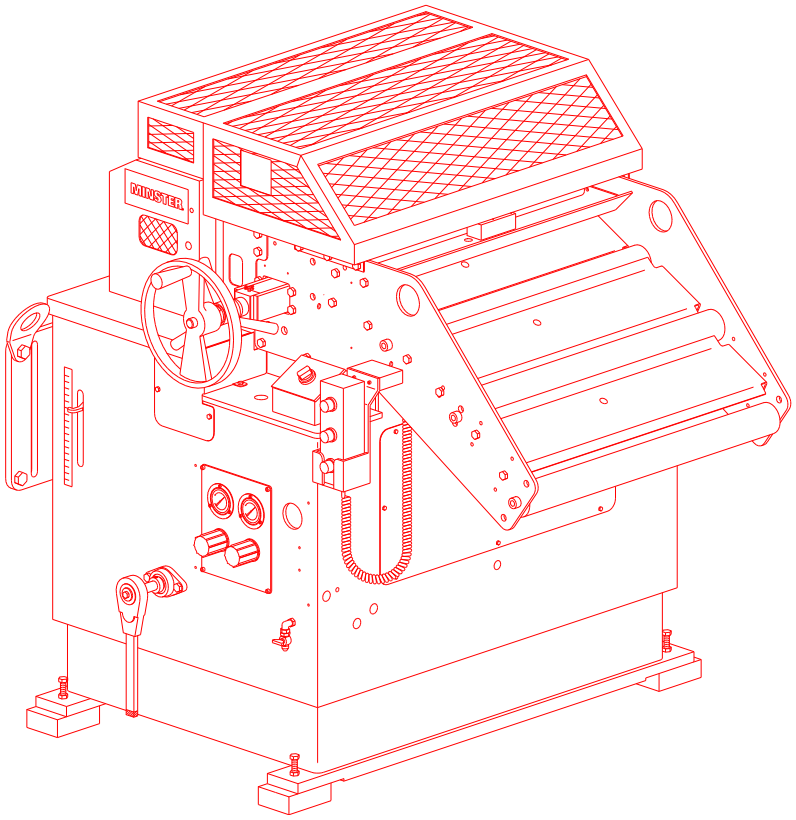


P2H Precision Straight Side Press

Features (continued)



Minster Electric Feed



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Minster Electric Feed

Specifications (INCH)

Feed Specifications

Model Number	MEF5-32S
Feed Line Height	50.*0 - 59.0 in over Floor (Rev 1.03)*
Feed Roll Diameter	5.39 in
Number of Rolls Driven	(2)
Minimum Stock Width	2.00 in
Maximum Stock Width	32.0 in
Minimum Stock Thickness	0.020 in
Maximum Stock Thickness	0.250 in
Maximum Stock Thickness at Full Width	0.125 in
Maximum Stock Width at Full Thickness	16.0 in
Roll Opening for Threading	0.470 in
Feed Repeatability Accuracy	+/- 0.002 in
Maximum Feed Length Preset	100 in
Maximum Roll Lift Rate	300 spm
Scale and Display Units	Inch
PMC Control Language	English
Approximate Feed Mass	6240 lb
Drive Reduction Ratio	Single 4/1
Acceleration	2.05 G

Minster Electric Feed

Features

MEF5-32S

Maximum Strokes per Minute at Given Feed Angle

Feed Length	Feed Angle				
	120 °	**150°**	**180 °**	**210 °**	**240 °**
1"	200	250	300	300	300
2"	152	191	229	267	300
4"	114	142	171	199	228
6"	95	119	143	167	191
8"	84	105	126	147	168
10"	76	95	114	133	152
12"	70	87	104	122	139
18"	56	70	84	98	112
24"	47	59	70	82	94
30"	40	50	60	70	81
36"	35	44	53	62	71

The above rates are based on a stock acceleration rate of 1.80 G's

The above sample rates are based on 0.125 inch thick x 32.0 inch wide, mild steel strip (50,000 PSI Yield Strength) with a 20.0 inch minimum, 60.0 inch maximum loop height and a 180.0 inch Maximum loop length. Actual production rates will vary with any deviation from the above parameters and may be limited by other factors such as roll lift rates and maximum line speed of ancillary equipment.

Free Standing Feed Mounting Cabinet assures long life and consistent feed accuracy by reducing press induced vibration normally experienced with bracket feeds. The feed cabinet is constructed of heavy welded steel, stress relieved to provide maximum rigidity and maintain alignment critical to consistent, reliable feeding. A feed-to-press tie bar maintains spacing and feed alignment to the press.

Minster Electric Feed

Features (continued)

Shock Isolation Mounts provide protection against press induced vibration. The transmission of vibration to the feed is minimized, which extends the life of feed components, thus reducing downtime due to component failure.

Chrome Blast #3 Roll Finish This roll finish is a textured hard chrome surface that is highly durable and provides superior gripping, reducing the chance for a misfeed. This roll finish is an excellent choice for most general stamping applications using hot rolled and cold rolled steels.

Low Inertia Belt Drive System improves production rates by the use of a custom aluminum drive pulley and high strength timing belt. All drive pulleys are mounted using keyless shaft-hub locking devices providing the advantage of a shrink fit, backlash free connection.

Upper Roll Drive, Precision Helical Anti-backlash Gear Set configured in a square gear pattern to maintain full tooth engagement during roll lift and varying material thickness. The zero backlash gear drive is essential in providing maximum material grip and the ultimate in accurate feed progressions.

Feed Passline Adjustment is accomplished through the use of a mechanical jack screw actuator, heavy duty steel guide post and anti-friction bushings for maintaining feed roll parallelism and perpendicularly. A fixed reversible ratchet allows quick and effortless height adjustment. A calibrated scale indicates the feed passline over the press bed for repeatable setup.

Pinch Roll Air Control Panel allows for easy adjustments of the roll lift and pinch pressure without the use of hard stops or wrenches. No set-up is required for a change in strip thickness. The Control Panel includes precision regulators for accurate adjustment, heavy duty liquid filled gauges and operating instructions on the panel for quick reference.

Minster Electric Feed

Features (continued)

High Efficiency Pneumatic Roll Lift Design provides high speed repeatable pilot release roll lift capabilities. Roll lift and dwell position are totally adjustable (with respect to press crankshaft position), through the press limit switch. Self-compensating roll lift allows for changes in material thickness without set-up, thus reducing job changeover time. A fail safe closure spring maintains pinch pressure to hold strip position when power is removed. Electrical control provides the ability to open the pinch roll for threading as well as turning off roll lift for single stroke thread up. All valves have "energized" indicator lights to ease trouble shooting.

Automatic Lubrication from Straightener Lubrication of the feed is interconnected with the Straightener Automatic Lubrication System providing an economical means of providing grease to the feed pinch roll gear train. Automatic Lubrication and Lubrication to the Feed options must be purchased on the Minster Straightener (see Straightener section). Replaces the standard manual lubrication zirks.

Cascading Entry Catenary Rolls provide incoming loop support and stability for smooth operation. The cascading multi-roller catenary provides full loop support preventing material set and providing loop stability. The catenary angle is adjustable by repositioning the rolls.

Hand Crank Adjustable Stock Guides The stock guides consist of harden double rollers which are adjusted by a hand wheel. The guides have independent adjustments for stock width and centerline offset and a calibrated scale is provided for quick repeatable setup. The hand wheel style guides are an enhancement improving the ease of adjustability.

End of Stock Detector Photo Electric Sensor detects the tail of the stock before it passes through the feed rolls and top stops the press. This feature prevents costly tail out miss feeds.

Digital Servo Feed Drive provides repeatable, highly accurate, high-speed feeding capabilities. A single, compact drive unit contains the system power supply, amplifier and intelligent control reducing the number of components resulting in a highly reliable unit with comprehensive diagnostic capabilities. The maintenance-free servo motor includes a cooling fan to take advantage of the motors peak performance. A motor holding brake maintains strip position when the drive power is removed.

Minster Electric Feed

Features (continued)

Production Management Control thru Press (PMC) combines the feed and press operator controls into one, centralized interface reducing control complexity and floor space. MINSTER's state-of-the-art PMC includes complete feed operation, full coil line diagnostics, and coil line tool storage capabilities at the press control. The feed parameters of feed length, feed rate, feed angle, and pilot release can be stored and retrieved through the PMC Tool Storage feature. Controls for thread-up are conveniently located in a hand held pendant allowing ease of operator movement during the die threading process. Remote free standing enclosure for the feed servo drive is located opposite the operator's side of the line.

Feed Mounted Controls include a Pinch Roll control switch and a Thread Table raise/lower switch when a Minster Thread Table is supplied.

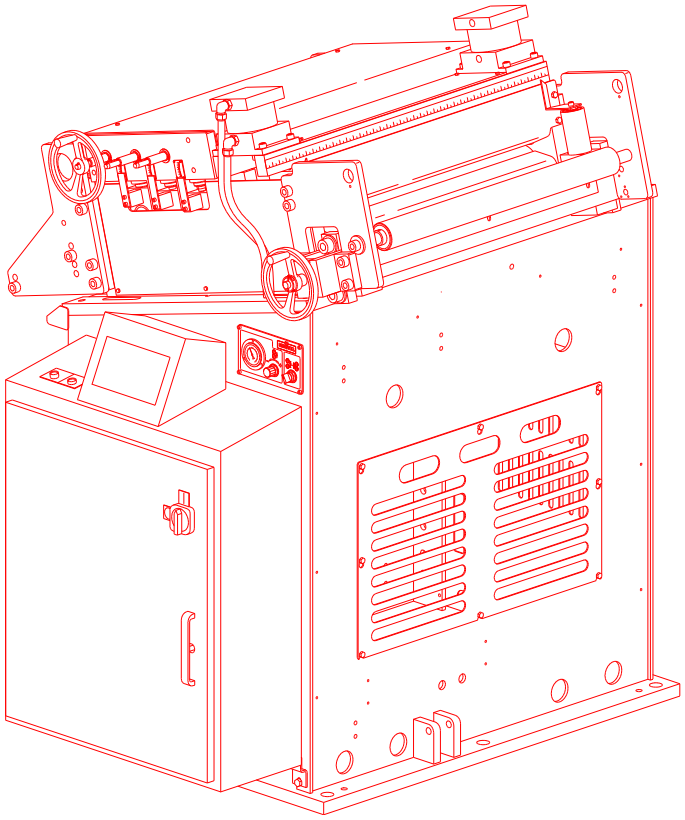
Machine Finish consists of quality Polane Paints for chemical resistance, long life, and highest quality appearance. All parts are primer under coated and castings are pre-coated with a smoothing agent providing the best possible paint adhering surface.

Machine Guarding is designed per Minster's interpretation of ANSI B11.18 and applicable European EN Safety Standards.

Coil Line Interconnects Coil line interconnects reduce equipment installation and start up time. Electrical interconnects are ran in flexible conduit with quick disconnect plugs. Hydraulic and pneumatic lines are provided with standard fittings that terminate to bulkheads on each piece of equipment. All interconnects runs are designed to be laid in floor trenching, or on the customers floor, per the customers approved line layout provided by Minster. Floor trenching and the protection of all surface run interconnects is the responsibility of the customer. Interconnects only apply to Minster manufactured products. NOTE: Equipment interconnects between pieces of equipment, electrical, hydraulic, and pneumatic, are the responsibility of the user unless this option is purchased. Coil Line interconnect option must also be purchased on the Press and Straightener when they are part of the line. This option is not valid on retrofit single piece equipment.

DXF Package Minster will provide final drawings in DXF format. The files will be provided on a standard CD which will be included with the equipment manual at the time of shipment. The Minster Machine Company reserves the right to deny requests for any additional DXF drawings that are considered proprietary and confidential.

Minster Straightener



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Minster Straightener

Specifications (INCH)

Straightener Specifications

Model Number	MSH30-32-7
PMC Control Language	English
Maximum Strip Width	32.0 in
Minimum Strip Width	2.0 in
Minimum Strip Thickness	0.020 in
Maximum Strip Thickness	0.35 in
Line Speed	40 - 1200 in/min
Work Rolls Full Open	0.30 in
Work Rolls Full Close	- 0.30 in
Work Rolls Number Driven	6
Work Rolls Quantity	7
Work Rolls Diameter	3.00 in
Work Rolls Center Distance	4.50 in
Pinch Roll Diameter	5.06 in
Pinch Roll Opening	0.50 in
Pinch Roll Sets	1
Pinch Rolls Number Driven	2
Head Inclination	15 Degrees
Entry Pass Line Height	68.0 in
Exit Pass Line Height	56.0 in
Scale and Display Units	Inch
Straightener Drive Power	15 hp
Power Unit Tank Volume	40 gallon
Pneumatic Supply Pressure	80 PSI
Approximate Straightener Mass	8000 lb
Approx. Overall Area, R-L × F-B	131 × 53.0 in
Approx. Floor Area, R-L × F-B	42.0 × 53.0 in

Minster Straightener

Features

MSH30-32 STRAIGHTENER STRIP CAPACITY

STOCK	YIELD STRENGTH (psi)						
THICKNESS	40,000	50,000	60,000	70,000	80,000	90,000	100,000
(inch)	STOCK WIDTH (inch)						
0.031	32.00	32.00	32.00	32.00	32.00	32.00	32.00
0.062	32.00	32.00	32.00	32.00	32.00	32.00	30.88
0.094	32.00	32.00	32.00	29.00	24.75	21.25	18.00
0.125	32.00	30.75	25.00	20.25	16.25	13.25	10.75
0.156	30.75	23.75	18.25	14.00	10.75	8.38	6.63
0.188	24.75	18.00	13.13	9.75	7.25	5.50	4.25
0.219	20.13	13.88	9.75	6.88	5.00	3.75	2.75
0.250	16.25	10.75	7.25	5.00	3.50	2.50	2.00
0.281	13.25	8.38	5.50	3.75	2.50	2.00	*****
0.312	10.75	6.50	4.25	2.75	2.00	*****	*****
0.375	7.25	4.25	2.50	*****	*****	*****	*****

Note:
Coil Line Awareness Barrier is the customer's responsibility per the ANSI B11.18 Standard and all other applicable safety standards, unless the Coil Line Awareness Barrier Option is purchased on the Minster Feed.
Equipment interconnects between pieces of equipment; electrical, hydraulic, and pneumatic, are the responsibility of the user, unless the Coil Line Interconnect Option is purchased.

Welded Structural Cabinet with Heavy Wall Construction provides a firm foundation for the straightener head, maintaining alignment and rigidity critical to the flattening process. The straightener base inclines the straightener head at an angle improving the pull off angle from the reel and the angle in which material is driven into the accumulation loop.

Heavy Duty Precision End Frames ground and machined to closely held tolerances provide the necessary positioning of the straightener rolls assure the ultimate in roll parallelism.

Minster Straightener

Features (continued)

Seven (7), Close Centered Work Rolls offer two distinct advantages. Seven rolls, better deliver consistent, flat stock regardless of material characteristics that may change throughout a coil or from coil to coil. Close roll spacing improves the machine's ability to straighten a broader range of material thickness and yield strengths.

Driven Upper and Lower Work/Pinch Rolls improve material threading, strip tail purging and reduce slippage. These benefits all result in lighter work roll penetration settings, thus not over working the material or the straightener.

Powered Work Roll Adjustment Individual hydraulic motors adjusts the work rolls while the position of each is displayed at the operator's panel. From the operator's panel, the operator can raise or lower the work rolls via up/ down buttons or directly enter the work roll position. This enhances quick job changeover and improves the accuracy of the work roll settings.

Sealed Heavy Duty Roller Bearings are used throughout the straightener head to achieve minimum roll spacing while maintaining high load capacities.

Solid Hardened and Ground Work/Pinch Rolls provide maximum resistance against deflection and excellent durability. All rolls are machined to exacting tolerances to assure true material tracking.

Spur Gear Drive Train delivers the power from the hydraulic drive motor to the work and pinch rolls providing high strength and a durable means of driving the straightener head.

Pinch Roll Air Actuation Entry Pinch Rolls provide a convenient and simple adjustment of the entry roll pinch pressure along with an open/close switch for strip threading. The control panel includes a heavy duty liquid filled gauge for repeatable setup.

Cascading Exit Cascade Rolls arrangement prevent induced coil set and provide loop support and stability for smooth high stroke rate operation. The catenary angle is adjustable by repositioning the rolls.

Minster Straightener

Features (continued)

Hand Crank Adjustable Stock Guides The stock guides consist of hardened rollers coupled together with a dual direction lead screw. Adjustments are made via a hand wheel and the centering scale allowing easy, repeatable setups. The hand wheel style guides are an enhancement improving the ease of adjustably.

Proportional Hydraulic Straightener Drive provides precise variable speed control and full torque at low speeds allowing quick responses to changes in loop accumulation superior to other drive configurations. A proportional hydraulic valve controls a hydraulic motor coupled directly to the straightener gear train resulting in a simplistic and reliable drive configuration.

Integral Hydraulic Power Unit mounted within the straightener base provides an efficient power source for the straightener head as well as the optional auxiliary functions. The power unit includes a low level switch, dirty filter indicator switch and an over temperature sensor, providing full functionality diagnostics.

Ultrasonic Loop Control provides a precise non-contact speed control of the straightener maintaining the accumulation loop at the optimum height, eliminating the need for external adjustment devices.

Straightener PMC Control mounted in the straightener control panel provides Minster's state-of-the-art Production Management Control System for operation of the Straightener, Thread Table, Reel, and Coil Car. This includes operation of the individual pieces of equipment, coil line diagnostics, coil line tool storage capabilities and full communication with the press and feed. The PMC Tool Storage Feature allows for one point of entry tool storage at the press, feed, or the straightener based on PMC equipment included in the line. The PLC Machine Control expands the functionality of the straightener allowing more sophisticated internal control logic resulting in a more user friendly and safe machine operation.

NOTE: Coil line tool storage and full feed line communications require Press Production Management Control and/ or Feed Production Management Control.

Straightener Mounted Control Cabinet includes the machine operator interface and the straightener electrical controls. This arrangement creates a simple design, saving floor space and interconnect wiring. The control panel includes a through-the-door fused disconnect.

Minster Straightener

Features (continued)

Straightener End of Stock Detector senses the tail of the stock as it exits the straightener and automatically returns the straightener, reel and coil car back into manual. This feature increases production by allowing the operator to begin loading and prepping the next coil while the strip is finishing out through the press and feed.

Machine Finish consists of quality Polane Paints for chemical resistance, long life, and highest quality appearance. All parts are primer under coated and castings are pre-coated with a smoothing agent providing the best possible paint adhering surface.

Machine Guarding is designed per Minster's interpretation of the ANSI B11.18 and applicable European Safety Standards.

Automatic Lubrication System Automatic centralized grease lubrication system provides grease to the straightener gear train. The system includes a grease reservoir, pump, low level indication, and the grease distribution circuit. This option insures an adequate grease supply to the critical straightener components.

Automatic Lubrication to the Feed Lubrication of the feed is interconnected with the Straightener Automatic Lubrication System providing an economical means of providing grease to the feed pinch roll gear train. Note: The Automatic Lubrication System option must be purchased on the Minster Straightener. Replaces the standard manual lubrication zirks.

Minster Straightener

Features (continued)

Driven-Holddown Arm (5" Width), With End Flattener and Peeler Table The driven holddown arm mounts on top of the straightener head and is positioned by a hydraulic cylinder. A knurled wheel on the end of the arm is driven by a hydraulic motor and can be jogged forward or reverse as required to enhance threading operation. The peeler table hinges from entry end of straightener to peel and thread the lead end of strip from the coil to the straightener entry pinch rolls. The peeler table is hydraulically raised, lowered, extended, and retracted. An end flattener integral to the holddown arm works in conjunction with the peeler table to remove stock curvature, easing material threading.

This option is invaluable for retaining outer wrap of the coil during cutting of the coil bands and controlling the lead end of strip as it is threaded into the straightener. Note: The Holddown arm is 5" wide allowing a minimum of a 6" wide coil to be run. For applications requiring a 3" wide holddown arm or a polyurethane holddown wheel, please consult Minster Applications Department.

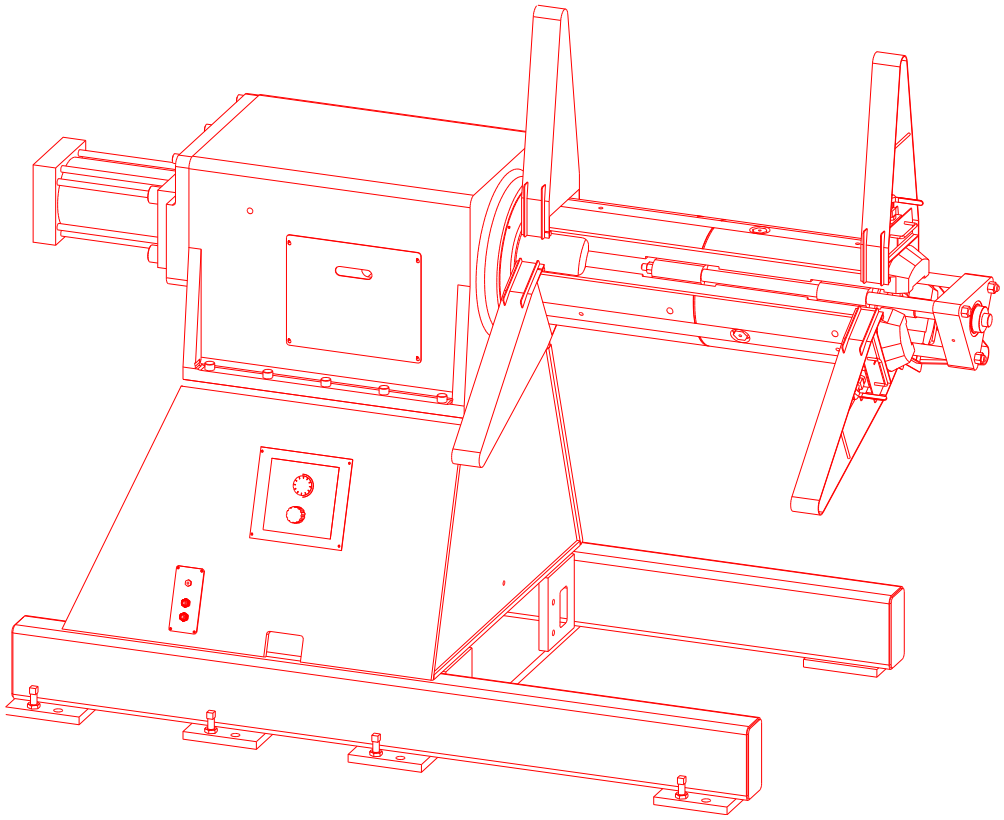
This option is recommended for stock over 1/16" thick or any situation where coil clock spring may be an issue.

Coil Line Interconnects Coil line interconnects reduce equipment installation and start up time. Electrical interconnects are ran in flexible conduit with quick disconnect plugs. Hydraulic and pneumatic lines are provided with standard fittings that terminate to bulkheads on each piece of equipment. All interconnect runs are designed to be laid in floor trenching, or on the customers floor, per the customers approved line layout provided by MINSTER. Floor trenching and the protection of all surface run interconnects is the responsibility of the customer. Interconnects only apply to MINSTER manufactured products.

NOTE: Equipment interconnects between pieces of equipment, electrical, hydraulic, and pneumatic, are the responsibility of the user unless this option is purchased. Coil Line interconnect option must also be purchased on the Press and Feed when they are part of the line.

DXF Package Minster will provide final drawings in DXF format. The files will be provided on a standard CD which will be included with the equipment manual at the time of shipment. The Minster Machine Company reserves the right to deny requests for any additional DXF drawings that are considered proprietary and confidential.

Minster Single Reel



NOTE: Above is for reference only and may not be representative of the equipment specified within.

Minster Single Reel

Specifications (INCH)

Reel Specifications

Model Number	MRH20-38S
Maximum Capacity per Mandrel	24,000 lb
Maximum Strip Width	38.0 in
Minimum Strip Width	2.0 in
Maximum Strip Thickness	0.38 in
Coil I.D. Range	20.0 - 24.0 in
Coil O.D. Maximum	72.0 in
Max Width at Full OD (by wt.)	27.3 in
Max OD at Full Width (by wt.)	62.3 in
Scale and Display Units	Inch
Coil Load Position	Towards Operator
Number of Coil Shoes	(3)
Number of Keeper Arms, per Mandrel	(6)
Approx. Floor Area, R-L × F-B	78.0 × 119 in
Center Mandrel to Floor	72.0 in
Approximate Reel Mass	9500 lb

Minster Single Reel

Features

MRH20-38 Reel Strip Capacity Reel is capable of running all material that falls within the preceding Minster Staightener strip capacity specifications.

Heavy Duty Base construction with extended legs assures a solid anchoring footprint designed to withstand the abuse of coil loading. The mandrel bearing housing is a precision machine casting providing the foundation for the mandrel shaft, bearings and related innerworking mechanisms. All critical mechanisms are enclosed within the base for protection against damage and to provide a clean exterior look.

Three Wide Mandrel Segments provide six gripping points, doubling the support over conventional mandrel systems. This in turn minimizes coil egging and deformation of the inner coil wraps. The mandrel segments are heavy duty cast structural members providing the ultimate in strength and reliability.

Hydraulic Powered Mandrel Expansion with an ingenious design allows the expansion cylinder to be fixed. This eliminates the need for a costly, high-maintenance rotating cylinder.

Wedge-type Mandrel Expansion Mechanism is the strongest and most reliable in the industry. Heavy duty cast wedges with large bearing surfaces work in conjunction with the mandrel segments to provide a sliding wedge expansion design. Manual grease fittings on each wedge provide grease to the critical areas.

Powered Mandrel Jog gives the operator control of mandrel rotation, simplifying stock threading and increasing efficiency and operator safety. A hydraulic motor is coupled to the mandrel shaft via chain drive.

Power-off Mandrel Holding Brake is provided as a standard feature, locking the mandrel in position any time the control power is disabled. This provides added safety, eliminating the possibility of coil clock spring back-driving the mandrel inadvertently. This is accomplished by a spring-set brake designed into the powered mandrel jog mechanism.

Minster Single Reel

Features (continued)

Pneumatic Mandrel Drag Brake provides the pull-off back tension necessary for smooth decoiling, minimizing coil coast and jerk. An oversized pneumatically-actuated drum brake coupled directly to the mandrel shaft proves to be a highly reliable system superior to caliper or electromagnetic brake system.

Drag Brake Pneumatic Control Panel provides an easy and convenient means of adjusting the drag brake tension. The control panel includes a precision regulator, heavy duty liquid filled gage and control valving, all in a single package flush mounted into the reel housing for ease of maintenance and a clean appearance.

Fixed Reel Base w/ Manual Keeper Arm is provided as a standard feature for coil wrap containment and guiding. The keepers are designed to be light weight yet heavy duty. The outboard keepers use a quick release locking handle for operator ease of use, while the rear keepers incorporate a locking jack bolt for the added holding power needed to resist movement during coil loading.

Reel Controls Integrated into the Minster Straightener provides an all-inclusive, operator friendly machine control system incorporating Minster's Production Management Control. The reel operator's push buttons are located on the straightener operator interface, and the reel logic control is handled through the straightener PLC.

Machine Finish consist of quality Polane Paints for chemical resistance, long life, and highest quality appearance. All parts are primer under coated and castings are pre-coated with a smoothing agent providing the best possible paint adhering surface.

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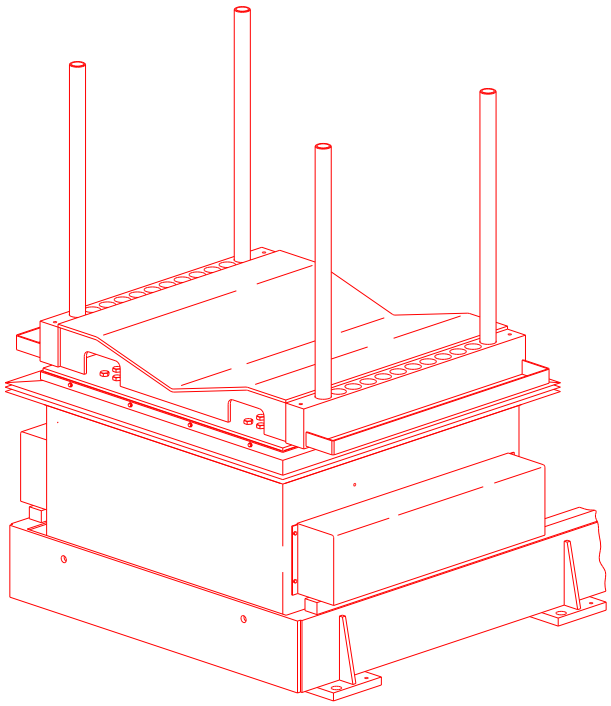
Minster Coil Car



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Minster Coil Car

Specifications (INCH)

Coil Car Specifications

Model Number	MCCH-35
Maximum Capacity	35,000 lb
Maximum Coil Width	72.0 in
Maximum Coil O.D.	72.0 in
Minimum Coil O.D.	42.0 in
Maximum Lift	18 in
Traverse Speed	1.6 in/s
Lift Speed	0.10 in/s

Minster Coil Car

Features

Coil Car provides the opportunity to pre-stage coils reducing the coil changeover time resulting in increased productivity.

Heavy Duty Welded Construction framework and coil deck provide the backbone of the unit, ready to stand-up to the abuse of coil loading with overhead cranes and fork trucks.

Mechanical Screw Jack Lift Mechanism provides a sound lift platform that can not be back driven in the event of power loss under load. Four (4) screw jacks are direct coupled to miter boxes and driven via a hydraulic motor.

Rigid Coil Car Track is attached directly to the reel base providing the necessary alignment with the reel mandrel and load distribution without the requirement of special foundation work.

Coil Restraints provide containment of narrow coils during the loading operation. A simple design of vertical pipes inserted into sockets is user friendly and reliable. Built-in storage trays are provided for the unused pipes.

Hydraulic Driven vertical lift and traverse motions allow for the smooth, controlled motions and power necessary to safely handle heavy loads. The coil car hydraulics are integrated with the Minster Reel and Straightener with the power source being located within the Straightener base.

Coil Car Controls Integrated into the Minster Straightener provide an all inclusive, operator friendly, machine control system incorporating Minster's Production Management Control. The coil car operator's push-buttons are located on the straightener operator interface and the Coil Car logic control is handled thru the straightener PLC.

Machine Finish consists of quality Polane Paints for chemical resistance, long life and highest quality appearance. All parts are primer undercoated and castings are pre-coated with a smoothing agent providing the best possible paint adhering surface.

Machine Guarding is designed per Minster's interpretation of the ANSI B11.18 and applicable European EN Safety Standards.