



 **HyperCyl®**



 **HyperPress®**



 **HyperPierce®**



 **HyperClinchTech®**



 **HyperView-Press®**



HyperCyl Products are Environmentally Friendly.

- They use a fraction of the Hydraulic oil used by traditional cylinder products.
- They use a fraction of the electricity of the electronic presses
- They're constructed using an environmentally friendly process.



130 Aries Drive
P.O. Box 110
Dundee, MI 48131

Ph. 734.529.8855
Fax 734.529.8844
www.hypercyl.com

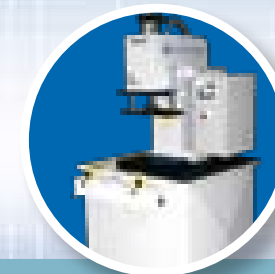
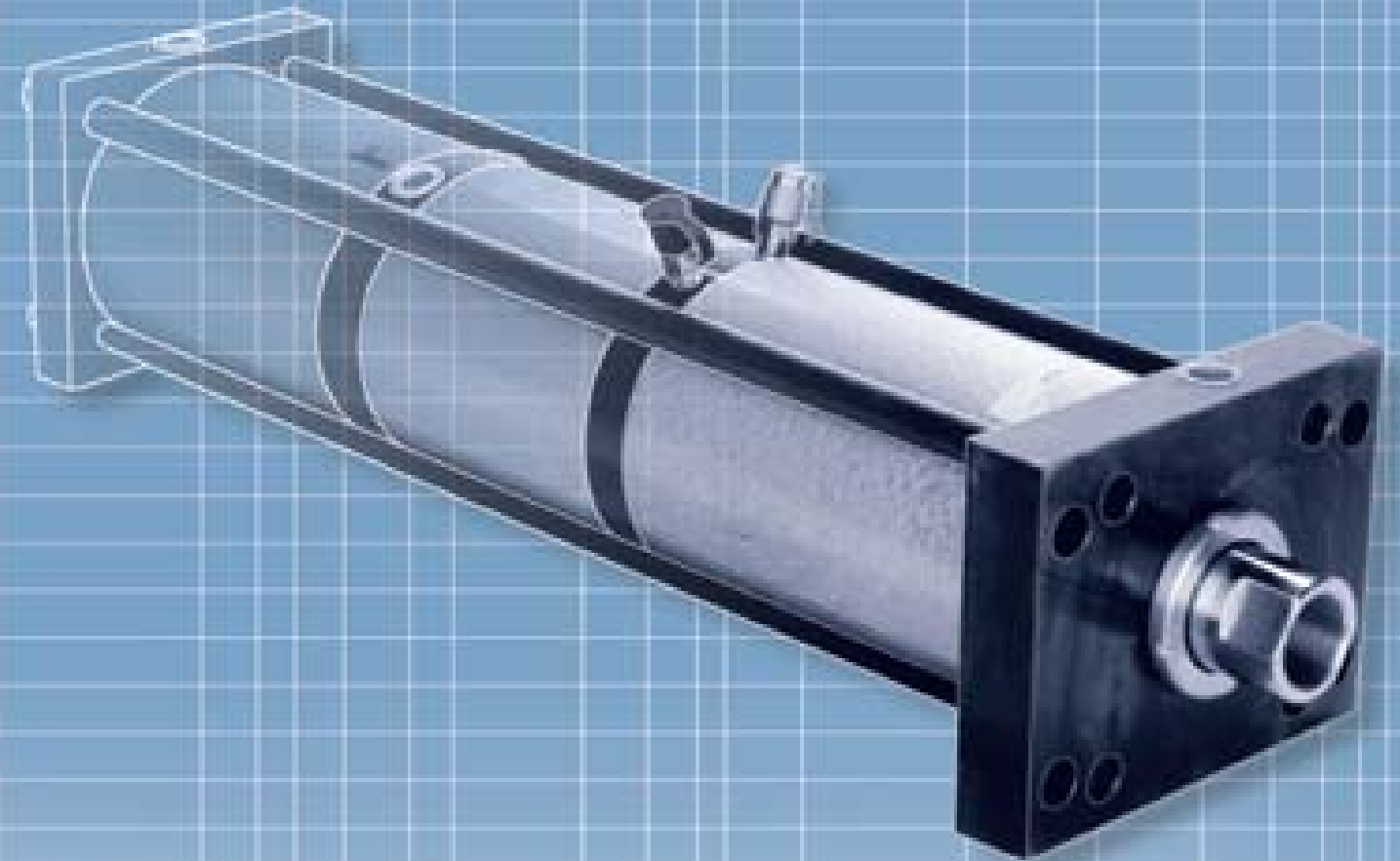
ISO 9001-2000 Registered

HyperCyl®

Aries Engineering Company

www.hypercyl.com

 **HyperCyl®**
Hydra-Pneumatic Cylinders, Presses and Joining Systems



HyperCyl® is a pneumatically powered hydraulic cylinder, ideally suited for a wide variety of assembly and forming applications.

Proprietary seal technology and unique patented design enables HyperCyl® cylinders to equal and exceed conventional hydraulic system performance and reliability without the heat, noise, maintenance and floor space associated with conventional hydraulic power units.

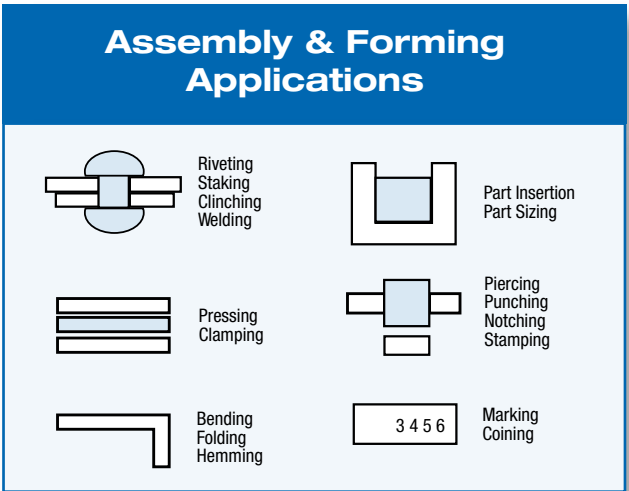
Options and accessories are available to assist you in building machines quickly and cost-effectively. Available in 11 standard sizes from 1 to 100 tons in 3 design configurations, HyperCyl® provides the reliable, high speed, high force power source for your assembly and forming applications.

Special cylinders and turn key packages designed to your specifications are also available. Call your local AEC Representative or contact our technical support at the following phone number or email address for application assistance:

Ph: 1-734-529-8855
Fx: 1-734-529-8844
Email sales@hypercyl.com

Features and Benefits

- Eliminates the need for hydraulic power units
- Clean, quiet, reliable operation
- Environmentally friendly
- Operation in any position or attitude
- Total air/oil separation in reservoir and working sections
- Heavy duty, all CNC machined construction
- Totally self-contained unit – no external reservoir required
- 3 Year warranty



Processor

System Solid State Memory	1 GB*
Data Storage	40 MB* hard disk
Ethernet	10/100 Base-TX
USB (1.1)	2 Ports
RS232 Serial Port	1
External Monitor	SVGA Connector

Options

Display	VGA port or optional 10.4" integrated touch screen display
Mounting	Optional DIN rail, Desk, Machine & Panel Mount
PLC Interfaces	Optional Profi bus, DeviceNet and Interbus

General

Chassis Dimensions	
HyperView-Press® only	7.5 x 9.66 x 4.2 in (191 x 241 x 107 mm), H x W x D
HyperView-Press® with TFT Screen (optional)	8.3 x 11.5 x 6.0 in (211 x 292 x 152 mm), H x W x D
Chassis Weight	
HyperView-Press® only	5 lbs (2.3 kg)
HyperView-Press® with TFT Screen	11 lbs (5 kg)
® with Desk Mount	17 lbs (7.7 kg)
Operating Humidity	8 to 90% relative, non-condensing
Operating Temperature	5 to 40 °C
Environmental	NEMA 12 (IP52) with NEMA Hood
Paint Finish	Black baked powder

Power

Supply Voltage	18 to 36 VDC
Power Consumption	48 W maximum, 30 W typical

* The exact processor type and speed, memory supplied and other technical specifications are subject to change. Solutions for Manufacturing. Defect Detection. Analysis. Traceability.

Analog Inputs

Number of Channels	2 or 4 depending on model
Input Ranges	±10 V, ±2 V, ±100 mV, ±33 mV
Input Accuracy	0.015 % of full scale (0.05% ±33 mV Range)
Resolution	16 bit A/D, ±32,768 counts
Maximum A/D Sample Rate	Up to 60 kHz per channel
Input Impedance	10 MΩ
Input Filter	20 kHz 6 pole and 1 kHz 4 pole selectable
Input Bandwidth	20 kHz maximum 3 dB down (16 kHz ±33 mV Range)
Internal Calibration	Auto-zero
Overload Protection	28 V without damage

Analog Connection

Shunt Calibration	Relay contacts per channel
Excitation Voltage	10 VDC (±0.02%)
Maximum Current	100 mA per channel
Line and load regulation	Accuracy 0.02 %
Excitation Noise	100 µV max
Short Circuit Protection	Continuous
Excitation Remote Sense	Separate input per channel

Encoder Inputs

Number of Channels	2 or 4 depending on model
Sensors	Rotary encoders and linear scales
Input Voltage	5 V TTL or OC (Open Collector)
Signal Type	Quadrature input or single phase pulses
Index Input	Can optionally zero the counter
Frequency	2 MHz maximum pulse rate TTL 50 kHz maximum pulse rate open collector
Counter	(internal pull-up) 32-bit (±2 x 109 counts)
Input Protection	+24 V or -18 V without damage
Sensor Power	+5 VDC @ 150 mA, current limited

Digital Inputs

Number of Channels	8 with common return line
Polarity	Bidirectional
Isolation Voltage	120 VAC or DC (Optically isolated)
Input Current	± 2.5 mA maximum
Input for low state	8 VDC maximum
Input for high state	16 VDC minimum
Maximum Input Voltage	±60 VDC

Digital Outputs

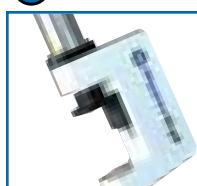
Number of Channels	8 with common return line
Polarity	Bidirectional
Isolation Voltage	120 VAC or DC (Optically isolated)
Switching Capability	±1 A @ ±60 VAC peak or DC
Contact Resistance	>100 MΩ off ; <0.5 Ω on





Applications	1
Cylinder Operation	2
System Comparison	3
Cylinder Selection	4

HPI General Information	5
HPI Cylinders Dimensions & Specifications	6-8
HPS General Information	9
HPS Cylinders Dimensions & Specifications	10-12
HPT General Information	13
HPT Cylinders Dimensions & Specifications	14
HZ General Information	15
HZ Cylinders Dimensions & Specifications	16
IntelliCyl General Information	17
IntelliCyl Cylinders Dimensions & Specifications	18
Cylinder Options & Accessories	19-21
Control Circuits	22
Installation Guidelines	23
Ordering Information	24



HyperPress General Information	25-27
C-Frame Dimensions & Specifications	28-31
CGB Dimensions & Specifications	32
CB Dimensions & Specifications	33-34
H-Frame Dimensions & Specifications	35-38
Control Options	39-40
Engineering Data	41-43
Testing Lab	44
Control Circuits	45-46



HyperPierce General Information	47
Cylinder Selection	48
Equalizing	49
Reverse Equalizing	50
Dual Equalizing	51
Dimensional Data	52-68
Control Circuits	69-70



HyperView-Press General Information	71
HyperView-Press Dimensions & Specifications	72-74

Note: For more detailed information call us at 734.529.8855 or visit our website at www.hypercyl.com

Applications

Inserting

Clinching

Welding

Pressing

Staking

Riveting

Hemming

Crimping

Piercing

Punching

Shearing

Notching

Straightening

Clamping

Clinching

Marking

Coining

Peening

Bending

Forming



Automotive Seat Recliner Assembly

- 8,000 lbf per rivet
- 4 second cycle time
- Force-distance feedback required



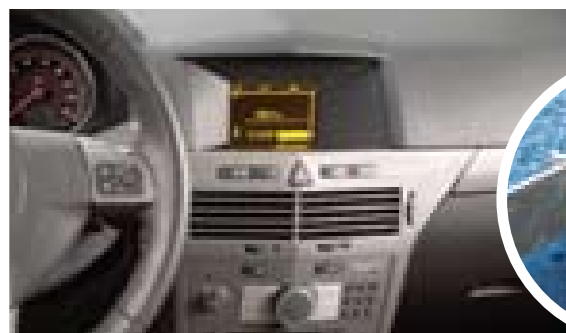
Munitions – US Army

- Press base plug/primer assembly into case
- 2,500–8,000 lbf
- Hydraulics not an option



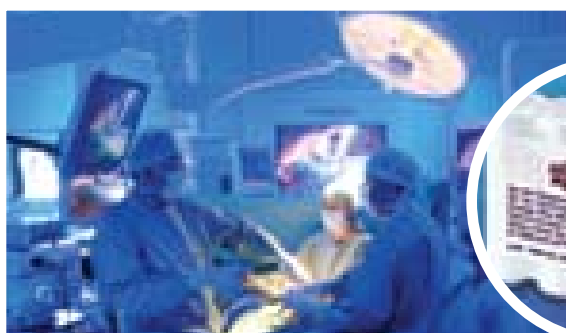
Road Signs

- Pierce mounting holes
- Corner rounding
- Replace conventional hydraulics



Interior Dashboard Support

- Multiple joining operations
- 30 to 40 ton units required
- “Fastenerless” assembly



Medical Power Storage

- Compressing battery components
- 4 to 70 ton
- Extended high pressure cycle



All HyperCyl® cylinders require two (2) pneumatic 4-way directional control valves and a plant air supply for proper operation.

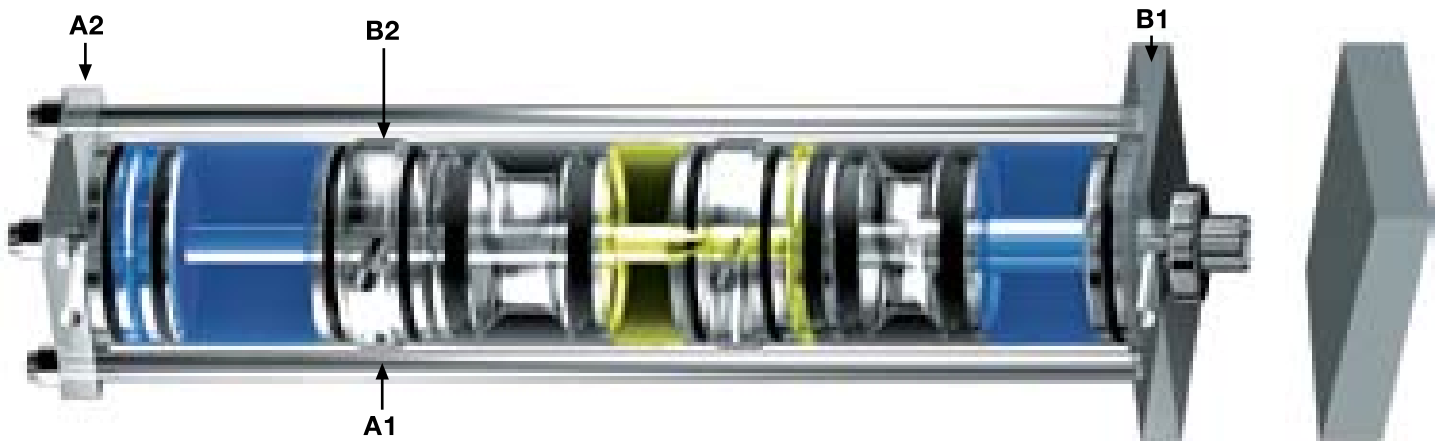


Figure 1. Cylinder Retracted

In this view air is directed to ports B1 and B2, fully retracting the reservoir, working, and high pressure pistons



Figure 2. Approach Stroke

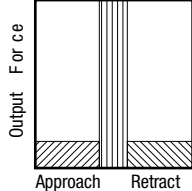
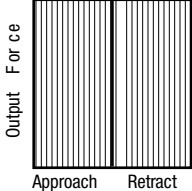
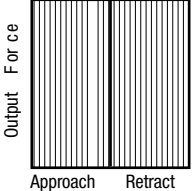
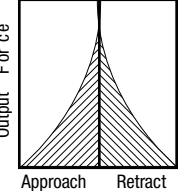
Regulated air is directed to port A1. The reservoir piston advances, displacing the reservoir oil through the valve block to the back of the working piston, advancing the cylinder rod (at low force) until meeting resistance (work surface).



Figure 3. Power Stroke

Regulated air pressure is applied to port A2. High pressure piston and rod advance until contacting the valve block seal, isolating the reservoir oil from the oil contained in the working section. Continued movement intensifies and displaces the trapped oil, developing power stroke. Step 1 returns all three pistons and oil to the retracted position.

Please contact AEC or your local AEC Representative for a working demonstration of the HyperCyl® cylinder.

	HyperCyl®	Air Cylinder	Hydraulic System	Pneumatic Toggle
1 Investment	Low to moderate vs. other systems, low installation and electrical costs.	Low to moderate depending on force required. Limited force.	Moderate to high depending on force and speed required. Requires additional floor space, electrical, and installation costs.	Moderate to high, limited force range.
2 Operation	Linear power curve, user adjustable within size range. Soft contact with tooling prior to power stroke. Self-contained power source. Clean, quiet, compact.	Linear power curve, user adjustable within size range. Full contact force with tooling. Large size, large controls.	Linear power curve, noisy, can run hot without oil cooler. Full contact force with tooling without special circuit. Large floor space required on high force/high speed applications. Multiple components.	Parabolic force curve. Large size, mechanical linkage requires adjustment. Self-contained, clean. Large controls
3 Force Curve				
4 Energy	Very low per lb. of output force. Example: HPI-4 Series with a 4.00" stroke uses .081 SCFM per cycle vs. 1.23 SCFM for an equivalent air cylinder.	High air consumption per lb. of output force.	Electrical costs for system pump(s), motors, coolers, pre-heat elements.	High air consumption per lb. of output force.
5 Maintenance	*Minimal. Cylinder service consists of refilling internal oil reservoir. Only three moving parts.	Very low. May require air supply lubrication.	Very high. Oil and filter changes, oil disposal (hazardous), multiple related components	Moderate to high. Linkage wear may alter force position and output.
6 Setup and Use	Use of power stroke anywhere within stroke of cylinder. Two 4-way air valves and 30-100 PSI air supply required for operation. Soft contact force reduces noise, extends tooling life. Approach, retract, and power stroke speeds and forces fully user adjustable.	High impact forces. Force constant throughout stroke. One air valve and air supply required. Output force and speed user adjustable.	High impact forces without special circuit. Many components to troubleshoot. Multiple electrical and hydraulic lines. May run hot without cooler. Typical pump/motor displaces high dB noise. Requires drip pans to contain oil leakage.	Parabolic force curve requires adjustment of press, tooling, or part stackup to attain proper force. Damage to press/tooling may result from improper setup. Requires constant lubrication.
7 Disadvantages	Some units are longer in length than conventional air or hydraulic cylinders. Standard power stroke limited to 1.00" of travel. Custom power stroke distance available upon request.	Large size, high air consumption.	Many system components, high energy use, oil leakage, high maintenance.	Parabolic force curve, mechanical linkages.

*MTBF reports on file. Usable cylinder service life using a filtered and lubricated air supply is approximately 20 million cycles.

All HyperCyl® cylinders operate on a basis of ratios. Input air pressure (PSI) multiplied by the Working Ratio of a respective cylinder determines the cylinder Output Force.

Minimum Supply Air Pressure:

Fast Approach	50 PSI
High Pressure	30 PSI

Refer to the chart below for performance specifications.

Supply Air Pressure	30-100 PSI
Recommended Air Preparation	40 micron filtration, lubricated
Operating Temperature	10°F-160°F
Maximum Operating Speed	1.5 Foot/second
Usable Cylinder Service Life	20-30 million cycles (lubricated air)*
Recommended Replacement Oil	Chevron ISO 32 Shell Tellus 22 ESSO Nuyo A22 Exxon Spinesstic 22 Mobil Velocite #10 Sunoco Sunvis 822 <i>Please contact the factory prior to use of any other oils.</i>

*Cylinders may require refilling of the internal oil reservoir at 3-6 million cycle intervals. Actual cylinder service life may vary due to plant air supply condition and/or applications.

Model Series/Size	*Approach Force per PSI (lbs.)	*Retract Force per PSI (lbs.)	Minimum H.P Force @30 PSI (lbs.)	Maximum H.P Force @100 PSI (lbs.)	Working Ratio (Force per PSI)	Service Ratio (Hydraulic)	(1) Air Consumption per cycle*
HPI/HPT/HPS-1	3.14	2.35	670	2234	22.34:1	7:1	.136 SCFM
HPI/HPT/HPS-2	4.90	4.11	1636	5454	54.54:1	11:1	.267 SCFM
HPI/HPT/HPS-4	8.29	6.81	2628	8762	87.62:1	10:1	.426 SCFM
HPI/HPS-8	12.56	10.81	4765	15,886	158.86:1	12.6:1	.886 SCFM
HPI/HPT/HPS-10	19.63	16.49	7788	25,963	259.63:1	13:1	1.079 SCFM
HPI/HPS-15	19.63	16.49	9424	31,416	314.16:1	16:1	1.356 SCFM
HPI/HPS-20	19.63	16.49	11,635	38,785	387.85:1	19.7:1	1.568 SCFM
HPI/HPS-30	28.27	23.37	19,543	65,144	651.44:1	23:1	2.510 SCFM
HPI/HPS-50	50.26	43.20	31,503	105,044	1050.44:1	21:1	4.204 SCFM
HPI/HPS-75	78.54	65.97	46,542	155,140	1551.40:1	19.8:1	7.160 SCFM
HPI/HPS-100	78.54	65.97	58,905	196,358	1693.50:1	25:1	8.51 SCFM

NOTE: The above specifications are theoretical forces. Frictional loads and lack of proper air supply may affect cylinder performance. Please multiply application force requirements by 1.25-1.50 to ensure adequate force is available.

* Typical approach/retract break-away air pressure is 35 PSI.

(1) Air consumption values shown are based on 4.00" total stroke, .50" power stroke cylinder operating at 60 PSI. Multiply value by cycles per minute for total SCFM usage.

- Aries Engineering Company, Inc. can provide a detailed evaluation of the forces required for your application. Please contact your local AEC Representative or AEC Technical Support for assistance.
- Piercing/punching applications may require a stripper spring(s) if "punch-thru" is prior to the end of cylinder stroke.
- All cylinders may be operated with non-lubricated air. However, cylinder service life will be reduced by 20%.
- For additional operational information, refer to "Installation Guidelines".

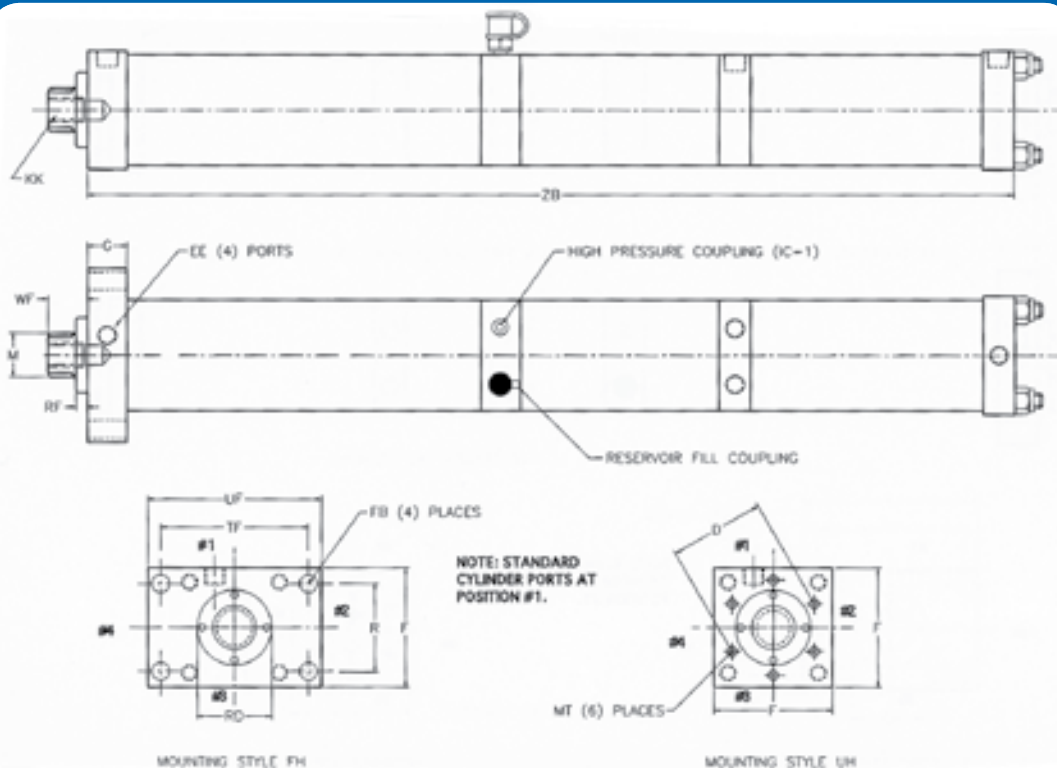
The "HPI" Series in-line cylinder is a totally self-contained, cost-effective power source ideally suited for a wide variety of assembly and forming applications.

Available in sizes from 1 to 100 tons, up to 8.00" stroke, and .50" power stroke, the HPI Series cylinder line provides the greatest force per dollar invested



Standard Features:

- Total air/oil separation
- Linear force output
- Three moving components
- Simple control circuits
- 100,000 PSI tensile tie rods
- NFPA medium duty mounting styles
- Operation in any position or attitude
- 4.7 million MTBF (mean time between failure), 20 million service life
- Field serviceable-seal kits
- Fill units/repair manual
- Heavy-duty construction designed for years of trouble free use
- Numerous options, such as gage kits, sensors, press frames and bases.
- 3 year warranty



Modifications such as rod end styles, port locations, approach and power stroke lengths are options available upon request. Please contact your local AEC Representative for assistance. AEC reserves the right to change specifications. CAD disks (.dwg, .dxf format) are available for the full line of HyperCyl® cylinders.

Model numbers shown are standard cylinders. Other cylinder stroke lengths are available in .50" increments, power stroke lengths in .125" increments. Dimensions shown in inches with metric beneath (mm).

Model No.	Output Force per PSI (lbs.)	Approach/Retract per PSI (lbs.)	D	EE	F	FB	G	UF	TF	KK	M	MT	R	RD	RF	WF	ZB
HPI-1-2.00-.25-FH	22.34	3.14/2.35	N/A	1/8" NPT	2.500 (63.50)	.440 (11.18)	1.250 (31.75)	4.250 (107.95)	3.438 (87.33)	3/4-16 1.0 DP.	1.000 (25.40)	N/A	1.630 (41.40)	1.749 (44.42)	.380 (9.65)	1.250 (31.75)	20.207 (513.26)
HPI-1-4.00-.25-FH	22.34	3.14/2.35	N/A	1/8" NPT	2.500 (63.50)	.440 (11.18)	1.250 (31.75)	4.250 (107.95)	3.438 (87.33)	3/4-16 1.0 DP.	1.000 (25.40)	N/A	1.630 (41.40)	1.749 (44.42)	.380 (9.65)	1.250 (31.75)	27.280 (692.91)
HPI-1-6.00-.25-FH	22.34	3.14/2.35	N/A	1/8" NPT	2.500 (63.50)	.440 (11.18)	1.250 (31.75)	4.250 (107.95)	3.438 (87.33)	3/4-16 1.0 DP.	1.000 (25.40)	N/A	1.630 (41.40)	1.749 (44.42)	.380 (9.65)	1.250 (31.75)	34.260 (870.20)
HPI-2-2.00-.25-FH	54.54	4.90/4.11	N/A	1/4" NPT	3.000 (76.20)	.440 (11.18)	1.250 (31.75)	5.125 (130.18)	4.125 (104.78)	3/4-16 1.0 DP.	1.000 (25.40)	N/A	2.050 (52.07)	1.749 (44.42)	.380 (9.65)	1.250 (31.75)	21.289 (540.74)
HPI-2-4.00-.50-FH	54.54	4.90/4.11	N/A	1/4" NPT	3.000 (76.20)	.440 (11.18)	1.250 (31.75)	5.125 (130.18)	4.125 (104.78)	3/4-16 1.0 DP.	1.000 (25.40)	N/A	2.050 (52.07)	1.749 (44.42)	.380 (9.65)	1.250 (31.75)	30.925 (785.50)
HPI-2-6.00-.50-FH	54.54	4.90/4.11	N/A	1/4" NPT	3.000 (76.20)	.440 (11.18)	1.250 (31.75)	5.125 (130.18)	4.125 (104.78)	3/4-16 1.0 DP.	1.000 (25.40)	N/A	2.050 (52.07)	1.749 (44.42)	.380 (9.65)	1.250 (31.75)	37.780 (959.61)
HPI-2-8.00-.50-FH	54.54	4.90/4.11	N/A	1/4" NPT	3.000 (76.20)	.440 (11.18)	1.250 (31.75)	5.125 (130.18)	4.125 (104.78)	3/4-16 1.0 DP.	1.000 (25.40)	N/A	2.050 (52.07)	1.749 (44.42)	.380 (9.65)	1.250 (31.75)	44.638 (1133.81)
HPI-4-2.00-.25-**	87.62	8.29/6.81	3.000 (76.20)	3/8" NPT	4.250 (107.95)	.562 (14.27)	1.250 (31.75)	5.750 (146.05)	4.688 (119.08)	3/4-16 1.0 DP.	1.375 (34.93)	5/16-18 .75 DP.	2.750 (69.85)	2.374 (60.30)	.380 (9.65)	1.250 (31.75)	23.169 (588.49)
HPI-4-4.00-.50-**	87.62	8.29/6.81	3.000 (76.20)	3/8" NPT	4.250 (107.95)	.562 (14.27)	1.250 (31.75)	5.750 (146.05)	4.688 (119.08)	3/4-16 1.0 DP.	1.375 (34.93)	5/16-18 .75 DP.	2.750 (69.85)	2.374 (60.30)	.380 (9.65)	1.250 (31.75)	32.183 (817.45)
HPI-4-6.00-.50-**	87.62	8.29/6.81	3.000 (76.20)	3/8" NPT	4.250 (107.95)	.562 (14.27)	1.250 (31.75)	5.750 (146.05)	4.688 (119.08)	3/4-16 1.0 DP.	1.375 (34.93)	5/16-18 .75 DP.	2.750 (69.85)	2.374 (60.30)	.380 (9.65)	1.250 (31.75)	38.930 (988.82)
HPI-4-8.00-.50-**	87.62	8.29/6.81	3.000 (76.20)	3/8" NPT	4.250 (107.95)	.562 (14.27)	1.250 (31.75)	5.750 (146.05)	4.688 (119.08)	3/4-16 1.0 DP.	1.375 (34.93)	5/16-18 .75 DP.	2.750 (69.85)	2.374 (60.30)	.380 (9.65)	1.250 (31.75)	46.426 (1179.22)
HPI-8-2.00-.25-**	158.86	12.56/ 11.08	3.999 (101.57)	3/8" NPT	5.000 (127.00)	.656 (16.66)	1.250 (31.75)	6.250 (158.75)	5.314 (134.98)	3/4 -16 1.25 DP.	1.375 (34.93)	1/2 -13 1.375 DP.	3.320 (84.33)	2.374 (60.30)	.380 (9.65)	1.250 (31.75)	24.973 (634.31)
HPI-8-4.00-.50-**	158.86	12.56/ 11.08	3.999 (101.57)	3/8" NPT	5.000 (127.00)	.656 (16.66)	1.250 (31.75)	6.250 (158.75)	5.314 (134.98)	3/4 -16 1.25 DP.	1.375 (34.93)	1/2 -13 1.375 DP.	3.320 (84.33)	2.374 (60.30)	.380 (9.65)	1.250 (31.75)	34.956 (887.88)
HPI-8-6.00-.50-**	158.86	12.56/ 11.08	3.999 (101.57)	3/8" NPT	5.000 (127.00)	.656 (16.66)	1.250 (31.75)	6.250 (158.75)	5.314 (134.98)	3/4 -16 1.25 DP.	1.375 (34.93)	1/2 -13 1.375 DP.	3.320 (84.33)	2.374 (60.30)	.380 (9.65)	1.250 (31.75)	41.779 (1061.19)
HPI-8-8.00-.50-**	158.86	12.56/ 11.08	3.999 (101.57)	3/8" NPT	5.000 (127.00)	.656 (16.66)	1.250 (31.75)	6.250 (158.75)	5.314 (134.98)	3/4 -16 1.25 DP.	1.375 (34.93)	1/2 -13 1.375 DP.	3.320 (84.33)	2.374 (60.30)	.380 (9.65)	1.250 (31.75)	48.603 (1234.52)
HPI-10-2.00-.25-**	259.63	19.63/16.49	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1 1/2-12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	2.999 (76.17)	.380 (9.65)	1.750 (44.45)	26.430 (671.32)
HPI-10-4.00-.50-**	259.63	19.63/16.49	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1 1/2-12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	2.999 (76.17)	.380 (9.65)	1.750 (44.45)	36.437 (925.50)
HPI-10-6.00-.50-**	259.63	19.63/16.49	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1 1/2-12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	2.999 (76.17)	.380 (9.65)	1.750 (44.45)	42.500 (1079.50)
HPI-10-8.00-.50-**	259.63	19.63/16.49	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1 1/2-12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	2.999 (76.17)	.380 (9.65)	1.750 (44.45)	49.313 (1252.55)
HPI-15-2.00-.25-**	314.08	19.63/16.49	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1 1/2-12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	3.000 (76.20)	.380 (9.65)	1.750 (44.45)	28.740 (730.00)
HPI-15-4.00-.50-**	314.08	19.63/16.49	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1 1/2-12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	3.000 (76.20)	.380 (9.65)	1.750 (44.45)	40.505 (1028.83)
HPI-15-6.00-.50-**	314.08	19.63/16.49	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1 1/2-12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	3.000 (76.20)	.380 (9.65)	1.750 (44.45)	43.530 (1105.66)
HPI-15-8.00-.50-**	314.08	19.63/16.49	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1 1/2-12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	3.000 (76.20)	.380 (9.65)	1.750 (44.45)	51.488 (1307.80)

*Dimensions subject to change. Contact Aries Engineering for official drawings.

** UH of FH mounting configuration is standard.

Model numbers shown are standard cylinders. Other cylinder stroke lengths are available in .50" increments, power stroke lengths in .125" increments. Dimensions shown in inches with metric beneath (mm).

Model No.	Output Force per PSI (lbs.)	Approach/Retract per PSI (lbs.)	D	EE	F	FB	G	UF	TF	KK	M	MT	R	RD	RF	WF	ZB
HPI-20-2.00-.25-**-	387.85	19.63/16.49	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1 1/2-12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	3.000 (76.20)	.380 (9.65)	1.750 (44.45)	30.376 (771.55)
HPI-20-4.00-.50-**-	387.85	19.63/16.49	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1 1/2-12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	3.000 (76.20)	.380 (9.65)	1.750 (44.45)	44.000 (1117.60)
HPI-20-6.00-.50-**-	387.85	19.63/16.49	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1 1/2-12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	3.000 (76.20)	.380 (9.65)	1.750 (44.45)	47.910 (1216.91)
HPI-20-8.00-.50-**-	387.85	19.63/16.49	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1 1/2-12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	3.000 (76.20)	.380 (9.65)	1.750 (44.45)	53.167 (1350.44)
HPI-30-2.00-.25-**-	651.44	28.27/23.37	6.280 (159.51)	3/4" NPT	7.500 (190.50)	1.060 (26.92)	2.000 (50.80)	11.250 (285.75)	9.440 (239.78)	1 7/8-12 3.0 DP.	2.500 (63.50)	3/4-10 1.25 DP.	5.730 (145.54)	3.749 (95.22)	.500 (12.70)	1.750 (44.45)	34.939 (887.45)
HPI-30-4.00-.50-**-	651.44	28.27/23.37	6.280 (159.51)	3/4" NPT	7.500 (190.50)	1.060 (26.92)	2.000 (50.80)	11.250 (285.75)	9.440 (239.78)	1 7/8-12 3.0 DP.	2.500 (63.50)	3/4-10 1.25 DP.	5.730 (145.54)	3.749 (95.22)	.500 (12.70)	1.750 (44.45)	49.125 (1247.78)
HPI-30-6.00-.50-**-	651.44	28.27/23.37	6.280 (159.51)	3/4" NPT	7.500 (190.50)	1.060 (26.92)	2.000 (50.80)	11.250 (285.75)	9.440 (239.78)	1 7/8-12 3.0 DP.	2.500 (63.50)	3/4-10 1.25 DP.	5.730 (145.54)	3.749 (95.22)	.500 (12.70)	1.750 (44.45)	53.090 (1348.49)
HPI-30-8.00-.50-**-	651.44	28.27/23.37	6.280 (159.51)	3/4" NPT	7.500 (190.50)	1.060 (26.92)	2.000 (50.80)	11.250 (285.75)	9.440 (239.78)	1 7/8-12 3.0 DP.	2.500 (63.50)	3/4-10 1.25 DP.	5.730 (145.54)	3.749 (95.22)	.500 (12.70)	1.750 (44.45)	56.811 (1443.00)
HPI-50-2.00-.25-FH	1050.44	50.26/43.20	N/A	3/4" NPT	11.000 (279.40)	1.312 (33.32)	2.000 (50.80)	15.500 (393.70)	13.250 (336.55)	2 1/4-12 3.5 DP.	3.000 (76.20)	N/A	8.500 (215.90)	4.300 (109.22)	.500 (12.70)	2.000 (50.80)	35.710 (907.03)
HPI-50-4.00-.50-FH	1050.44	50.26/43.20	N/A	3/4" NPT	11.000 (279.40)	1.312 (33.32)	2.000 (50.80)	15.500 (393.70)	13.250 (336.55)	2 1/4-12 3.5 DP.	3.000 (76.20)	N/A	8.500 (215.90)	4.300 (109.22)	.500 (12.70)	2.000 (50.80)	48.548 (1233.12)
HPI-50-6.00-.50-FH	1050.44	50.26/43.20	N/A	3/4" NPT	11.000 (279.40)	1.312 (33.32)	2.000 (50.80)	15.500 (393.70)	13.250 (336.55)	2 1/4-12 3.5 DP.	3.000 (76.20)	N/A	8.500 (215.90)	4.300 (109.22)	.500 (12.70)	2.000 (50.80)	53.350 (1355.09)
HPI-50-8.00-.50-FH	1050.44	50.26/43.20	N/A	3/4" NPT	11.000 (279.40)	1.312 (33.32)	2.000 (50.80)	15.500 (393.70)	13.250 (336.55)	2 1/4-12 3.5 DP.	3.000 (76.20)	N/A	8.500 (215.90)	4.300 (109.22)	.500 (12.70)	2.000 (50.80)	57.100 (1450.34)
HPI-75-2.00-.25-**-	1551.40	78.54/65.97	N/A	3/4" NPT	14.000 (355.60)	1.812 (46.02)	3.000 (76.20)	19.000 (482.60)	15.875 (403.23)	2-1/4 -12 3.0 DP.	4.000 (101.60)	N/A	9.620 (244.35)	5.251 (133.38)	.500 (12.70)	1.750 (44.45)	36.680 (931.67)
HPI-75-4.00-.50-**-	1551.40	78.54/65.97	N/A	3/4" NPT	14.000 (355.60)	1.812 (46.02)	3.000 (76.20)	19.000 (482.60)	15.875 (403.23)	2-1/4 -12 3.0 DP.	4.000 (101.60)	N/A	9.620 (244.35)	5.251 (133.38)	.500 (12.70)	1.750 (44.45)	49.733 (1263.22)
HPI-75-6.00-.50-**-	1551.40	78.54/65.97	N/A	3/4" NPT	14.000 (355.60)	1.812 (46.02)	3.000 (76.20)	19.000 (482.60)	15.875 (403.23)	2-1/4 -12 3.0 DP.	4.000 (101.60)	N/A	9.620 (244.35)	5.251 (133.38)	.500 (12.70)	1.750 (44.45)	53.472 (1358.19)
HPI-75-8.00-.50-**-	1551.40	78.54/65.97	N/A	3/4" NPT	14.000 (355.60)	1.812 (46.02)	3.000 (76.20)	19.000 (482.60)	15.875 (403.23)	2-1/4 -12 3.0 DP.	4.000 (101.60)	N/A	9.620 (244.35)	5.251 (133.38)	.500 (12.70)	1.750 (44.45)	57.348 (1456.64)
HPI-100-2.00-.25-**-	1963.5	78.54/65.97	N/A	3/4" NPT	14.000 (355.60)	1.812 (46.02)	3.000 (76.20)	19.000 (482.60)	15.875 (403.23)	2-1/4 -12 3.0 DP.	4.000 (101.60)	N/A	9.620 (244.35)	5.251 (133.38)	.500 (12.70)	1.750 (44.45)	39.298 (998.17)
HPI-100-4.00-.50-**-	1963.5	78.54/65.97	N/A	3/4" NPT	14.000 (355.60)	1.812 (46.02)	3.000 (76.20)	19.000 (482.60)	15.875 (403.23)	2-1/4 -12 3.0 DP.	4.000 (101.60)	N/A	9.620 (244.35)	5.251 (133.38)	.500 (12.70)	1.750 (44.45)	55.445 (1408.30)
HPI-100-6.00-.50-**-	1963.5	78.54/65.97	N/A	3/4" NPT	14.000 (355.60)	1.812 (46.02)	3.000 (76.20)	19.000 (482.60)	15.875 (403.23)	2-1/4 -12 3.0 DP.	4.000 (101.60)	N/A	9.620 (244.35)	5.251 (133.38)	.500 (12.70)	1.750 (44.45)	58.653 (1489.79)
HPI-100-8.00-.50-**-	1963.5	78.54/65.97	N/A	3/4" NPT	14.000 (355.60)	1.812 (46.02)	3.000 (76.20)	19.000 (482.60)	15.875 (403.23)	2-1/4 -12 3.0 DP.	4.000 (101.60)	N/A	9.620 (244.35)	5.251 (133.38)	.500 (12.70)	1.750 (44.45)	62.361 (1583.97)

*Dimensions subject to change. Contact Aries Engineering for official drawings.

** UH of FH mounting configuration is standard.

Air Pressure (PSI)	HPI-1 Ton Series	HPI-2 Ton Series	HPI-4 Ton Series	HPI-8 Ton Series	HPI-10 Ton Series	HPI-15 Ton Series	HPI-20 Ton Series	HPI-30 Ton Series	HPI-50 Ton Series	HPI-75 Ton Series	HPI-100 Ton Series
	Hyd PSI/Force lb.	Hyd PSI/Force lb.	Hyd PSI/Force lb.	Hyd PSI/Force lb.	Hyd PSI/Force lb.	Hyd PSI/Force lb.	Hyd PSI/Force lb.	Hyd PSI/Force lb.	Hyd PSI/Force lb.	Hyd PSI/Force lb.	Hyd PSI/Force lb.
30	210/670	330/16360	316/2626	379/4766	396/7785	480/9422	591/11601	651/19540	630/31663	592/46542	750/58905
40	280/893	440/2181	422/3501	506/6355	528/10380	644/12641	788/15468	921/26053	840/42218	790/62056	1000/78540
50	350/1117	550/2727	528/4377	632/7943	661/12975	805/15802	985/19335	1152/32567	1050/52773	987/77570	1250/98175
60	420/1340	660/3272	633/5252	758/9532	793/15570	966/18962	1182/23202	1382/39080	1260/63327	1185/93084	1500/117810
70	490/1563	770/3817	739/6127	885/11120	925/18165	1127/22123	1379/27069	1612/45593	1470/73882	1382/108598	1750/137445
80	560/1787	880/4363	844/7003	1011/12709	1057/20760	1288/25283	1576/30936	1843/52107	1680/84436	1580/124112	2000/157080
90	630/2010	990/4908	950/7878	1137/14298	1189/23355	1449/28443	1773/34803	2073/58620	1890/94991	1777/139626	2250/176715
100	700/2234	1100/5454	1056/8754	1264/15886	1322/25950	1600/31408	1970/38671	2304/65134	2100/105546	1975/155140	2500/196350

*Typical cylinder break-away pressure is 35 PSI.

(1) Complete cylinder cycle @ 60 PSI.

Multiply value by cycles per minute for total SCFM usage.

NOTE: The above specifications are theoretical forces. Frictional loads and lack of proper air supply may affect cylinder performance. Please multiply application force requirements by 1.25-1.50 to ensure adequate force is available.

	HPI-1 Ton Series	HPI-2 Ton Series	HPI-4 Ton Series	HPI-8 Ton Series	HPI-10 Ton Series	HPI-15 Ton Series	HPI-20 Ton Series	HPI-30 Ton Series	HPI-50 Ton Series	HPI-75 Ton Series	HPI-100 Ton Series
Approach Force per PSI (lbs.)	*3.14	*4.90	*8.29	*12.56	*19.63	*19.63	*19.63	*28.27	*50.26	*78.54	*78.54
Retract Force per PSI (lbs.)	*2.35	*4.11	*6.81	*11.08	*16.49	*16.49	*16.49	*23.37	*43.20	*65.97	*65.97
Output Force Range (lbs.)	670-2234	1636-5454	2626-8754	4766-15,886	7785-25,950	9424-31,408	11,635-38,785	19,540-65,134	31,663-105,546	46,542-155,140	58,905-196,350
Working Ratio (Output per PSI (lbs.))	22.34:1	54.54:1	87.62:1	158.86:1	259.62:1	314.08:1	387.85:1	651.44:1	1055.46:1	1551.40:1	1963.5:1
Service Ratio (Hydraulic PSI (lbs.))	7:01	11:1	10.56:1	12.64:1	13.22:1	16:1	19.7:1	23.04:1	21:1	19.8:1	25:1
Air Consumption per Cycle	.136 SCFM(1)	.267 SCFM(1)	.426 SCFM(1)	1.079 SCFM(1)	1.079 SCFM(1)	1.356 SCFM(1)	1.568 SCFM(1)	2.510 SCFM(1)	4.204 SCFM(1)	7.160 SCFM(1)	8.51 SCFM(1)
Operating Temperature	10°F-160°F	10°F-160°F	10°F-160°F	10°F-160°F	10°F-160°F	10°F-160°F	10°F-160°F	10°F-160°F	10°F-160°F	10°F-160°F	10°F-160°F
Maximum Operating Speed ***	1.5 Ft/sec	1.5 Ft/sec	1.5 Ft/sec	1.5 Ft/sec	1.5 Ft/sec	1.5 Ft/sec	1.5 Ft/sec	1.5 Ft/sec	1.5 Ft/sec	1.5 Ft/sec	1.5 Ft/sec
Recommended Air Filter	40 Micron	40 Micron	40 Micron	40 Micron	40 Micron	40 Micron	40 Micron	40 Micron	40 Micron	40 Micron	40 Micron
Maximum Operating Pressure	100 PSI	100 PSI	100 PSI	100 PSI	100 PSI	100 PSI	100 PSI	100 PSI	100 PSI	100 PSI	100 PSI
Minimum Operating Pressure	30 PSI	30 PSI	30 PSI	30 PSI	30 PSI	30 PSI	30 PSI	30 PSI	30 PSI	30 PSI	30 PSI

*Typical cylinder break-away pressure is 35 PSI.

(1) Complete cylinder cycle @ 60 PSI.

Multiply value by cycles per minute for total SCFM usage.

*** Maximum speed of the seals (not maximum speed of cylinder).

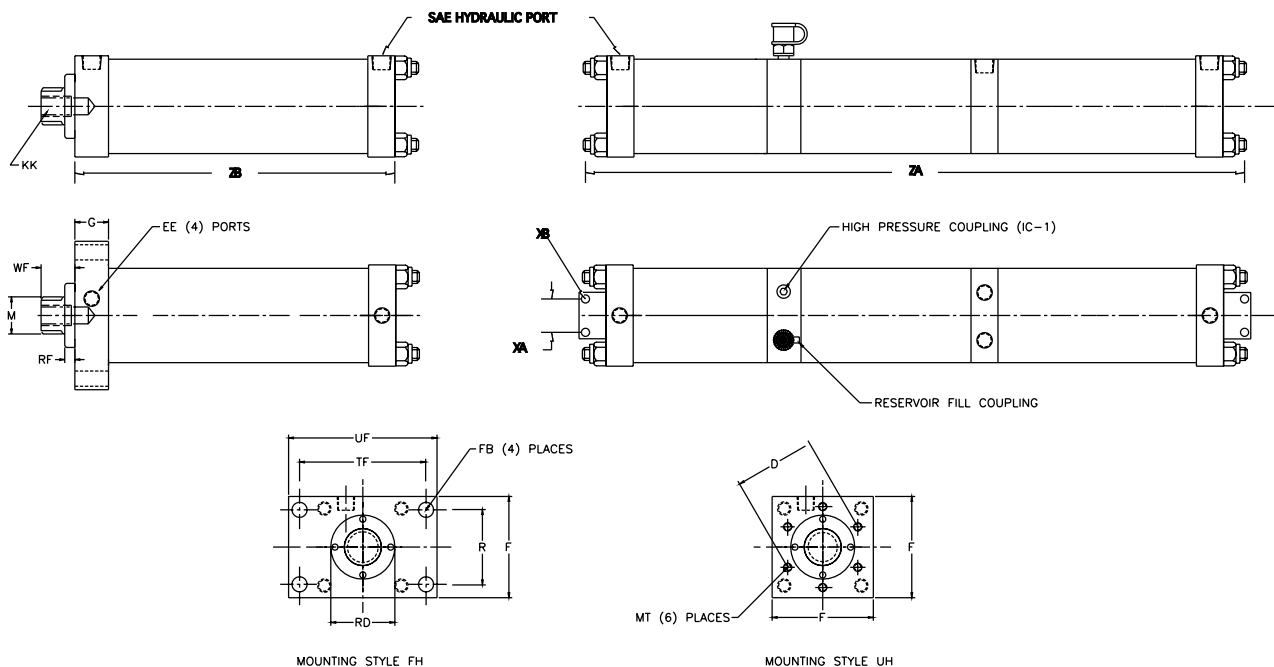
NOTE: The above specifications are theoretical forces. Frictional loads and lack of proper air supply may affect cylinder performance. Please multiply application force requirements by 1.25-1.50 to ensure adequate force is available.

The "HPS" Series satellite cylinder is a totally self-contained, cost-effective power source ideally suited for a wide variety of assembly and forming applications. Available in sizes from 1 to 100 tons, up to 8.00" stroke, and 1.00" power stroke, the HPS Series cylinder design provides a very compact package where space is limited.

The HPS Series cylinders permit the working cylinder to be located up to 10 ft. from the booster/reservoir section. Both components may be mounted in any position or attitude. Multiple working cylinders can also be operated with a single booster/reservoir unit.

Standard Features:

- Total air/oil separation
- Linear force output
- Three moving components
- Internal shock pads
- Fill and high pressure gage couplings
- Hose assembly and disconnect
- Two mounting styles
- Simple control circuits
- 100,000 PSI tensile tie rods
- NFPA medium duty mounting styles
- Operation in any position or attitude
- 4.7 million MTBF, 20 million service life
- Field serviceable-seal kits
- Fill units/repair manual
- Heavy-duty construction designed for years of trouble free use
- Numerous options, such as gage kits, sensors, press frames and bases.
- 3 year warranty



Modifications such as rod end styles, port locations, approach and power stroke lengths are options available upon request. Please contact your local AEC Representative for assistance. AEC reserves the right to change specifications. CAD disks (.dwg, .dxf format) are available for the full line of HyperCyl® cylinders.

All HPS Series cylinders are prefilled and include a hose assembly and “dry-break” style hydraulic disconnect. Standard hydraulic fittings are straight SAE connections on both work cylinder and reservoir/booster unit. Please contact AEC for optional configurations.

Model No.	D	EE	F	FB	G	UF	TF	KK	M	MT	R	RD	RF	WF	ZB	ZA	XA	XB
HPS-1-2.00-.25-FH	N/A	1/8" NPT	2.500 (63.50)	.440 (11.18)	1.250 (31.75)	4.250 (107.95)	3.438 (87.33)	3/4-16 1.0 DP.	1.000 (25.40)	N/A	1.630 (41.40)	1.749 (44.42)	.380 (9.65)	1.250 (31.75)	9.250 (234.95)	18.607 (472.62)	.6250 (15.88)	.281 (7.14)
HPS-1-4.00-.50-FH	N/A	1/8" NPT	2.500 (63.50)	.440 (11.18)	1.250 (31.75)	4.250 (107.95)	3.438 (87.33)	3/4-16 1.0 DP.	1.000 (25.40)	N/A	1.630 (41.40)	1.749 (44.42)	.380 (9.65)	1.250 (31.75)	13.280 (337.31)	21.507 (546.28)	.6250 (15.88)	.281 (7.14)
HPS-1-6.00-.50-FH	N/A	1/8" NPT	2.500 (63.50)	.440 (11.18)	1.250 (31.75)	4.250 (107.95)	3.438 (87.33)	3/4-16 1.0 DP.	1.000 (25.40)	N/A	1.630 (41.40)	1.749 (44.42)	.380 (9.65)	1.250 (31.75)	17.280 (438.91)	24.533 (623.14)	.6250 (15.88)	.281 (7.14)
HPS-1-8.00-.50-FH	N/A	1/8" NPT	2.500 (63.50)	.440 (11.18)	1.250 (31.75)	4.250 (107.95)	3.438 (87.33)	3/4-16 1.0 DP.	1.000 (25.40)	N/A	1.630 (41.40)	1.749 (44.42)	.380 (9.65)	1.250 (31.75)	21.250 (539.75)	31.239 (793.47)	.6250 (15.88)	.281 (7.14)
HPS-2-2.00-.25-FH	N/A	1/4" NPT	3.000 (76.20)	.440 (11.18)	1.250 (31.75)	5.125 (130.18)	4.125 (104.78)	3/4-16 1.0 DP.	1.000 (25.40)	N/A	2.050 (52.07)	1.749 (44.42)	.380 (9.65)	1.250 (31.75)	9.281 (235.74)	21.753 (552.53)	1.000 (25.40)	.343 (8.71)
HPS-2-4.00-.50-FH	N/A	1/4" NPT	3.000 (76.20)	.440 (11.18)	1.250 (31.75)	5.125 (130.18)	4.125 (104.78)	3/4-16 1.0 DP.	1.000 (25.40)	N/A	2.050 (52.07)	1.749 (44.42)	.380 (9.65)	1.250 (31.75)	13.281 (337.34)	30.166 (766.22)	1.000 (25.40)	.343 (8.71)
HPS-2-6.00-.50-FH	N/A	1/4" NPT	3.000 (76.20)	.440 (11.18)	1.250 (31.75)	5.125 (130.18)	4.125 (104.78)	3/4-16 1.0 DP.	1.000 (25.40)	N/A	2.050 (52.07)	1.749 (44.42)	.380 (9.65)	1.250 (31.75)	17.280 (438.91)	33.020 (838.71)	1.000 (25.40)	.343 (8.71)
HPS-2-8.00-1.00-FH	N/A	1/4" NPT	3.000 (76.20)	.440 (11.18)	1.250 (31.75)	5.125 (130.18)	4.125 (104.78)	3/4-16 1.0 DP.	1.000 (25.40)	N/A	2.050 (52.07)	1.749 (44.42)	.380 (9.65)	1.250 (31.75)	21.281 (540.54)	46.992 (1193.60)	1.000 (25.40)	.343 (8.71)
HPS-4-2.00-.25-**	3.000 (76.20)	3/8" NPT	4.250 (107.95)	.562 (14.27)	1.250 (31.75)	5.750 (146.05)	4.688 (119.08)	3/4-16 1.0 DP.	1.375 (34.93)	5/16-18 .75 DP.	2.750 (69.85)	2.374 (60.30)	.380 (9.65)	1.250 (31.75)	10.250 (260.35)	23.230 (590.04)	1.500 (38.10)	.343 (8.71)
HPS-4-4.00-.50-**	3.000 (76.20)	3/8" NPT	4.250 (107.95)	.562 (14.27)	1.250 (31.75)	5.750 (146.05)	4.688 (119.08)	3/4-16 1.0 DP.	1.375 (34.93)	5/16-18 .75 DP.	2.750 (69.85)	2.374 (60.30)	.380 (9.65)	1.250 (31.75)	14.250 (361.95)	31.378 (797.00)	1.500 (38.10)	.343 (8.71)
HPS-4-6.00-.50-**	3.000 (76.20)	3/8" NPT	4.250 (107.95)	.562 (14.27)	1.250 (31.75)	5.750 (146.05)	4.688 (119.08)	3/4-16 1.0 DP.	1.375 (34.93)	5/16-18 .75 DP.	2.750 (69.85)	2.374 (60.30)	.380 (9.65)	1.250 (31.75)	18.250 (463.55)	34.250 (869.95)	1.500 (38.10)	.343 (8.71)
HPS-4-8.00-1.00-**	3.000 (76.20)	3/8" NPT	4.250 (107.95)	.562 (14.27)	1.250 (31.75)	5.750 (146.05)	4.688 (119.08)	3/4-16 1.0 DP.	1.375 (34.93)	5/16-18 .75 DP.	2.750 (69.85)	2.374 (60.30)	.380 (9.65)	1.250 (31.75)	22.250 (565.15)	47.624 (1209.65)	1.500 (38.10)	.343 (8.71)
HPS-8-2.00-.25-**	3.999 (101.57)	3/8" NPT	5.000 (127.00)	.656 (16.66)	1.250 (31.75)	6.250 (158.75)	5.314 (134.98)	3/4-16 1.75 DP.	1.375 (34.93)	1/2-13 .75 DP.	3.320 (84.33)	2.374 (60.30)	.380 (9.65)	1.250 (31.75)	10.502 (266.75)	25.968 (659.59)	1.500 (38.10)	.343 (8.71)
HPS-8-4.00-.50-**	3.999 (101.57)	3/8" NPT	5.000 (127.00)	.656 (16.66)	1.250 (31.75)	6.250 (158.75)	5.314 (134.98)	3/4-16 1.75 DP.	1.375 (34.93)	1/2-13 .75 DP.	3.320 (84.33)	2.374 (60.30)	.380 (9.65)	1.250 (31.75)	14.502 (368.35)	36.646 (930.81)	1.500 (38.10)	.343 (8.71)
HPS-8-6.00-.50-**	3.999 (101.57)	3/8" NPT	5.000 (127.00)	.656 (16.66)	1.250 (31.75)	6.250 (158.75)	5.314 (134.98)	3/4-16 1.75 DP.	1.375 (34.93)	1/2-13 .75 DP.	3.320 (84.33)	2.374 (60.30)	.380 (9.65)	1.250 (31.75)	18.502 (469.95)	38.475 (977.27)	1.500 (38.10)	.343 (8.71)
HPS-8-8.00-1.00-**	3.999 (101.57)	3/8" NPT	5.000 (127.00)	.656 (16.66)	1.250 (31.75)	6.250 (158.75)	5.314 (134.98)	3/4-16 1.75 DP.	1.375 (34.93)	1/2-13 .75 DP.	3.320 (84.33)	2.374 (60.30)	.380 (9.65)	1.250 (31.75)	22.502 (571.55)	53.943 (1370.15)	1.500 (38.10)	.343 (8.71)
HPS-10-2.00-.25-**	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1-1/2 - 12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	2.999 (76.17)	.380 (9.65)	1.750 (44.45)	10.810 (274.57)	27.540 (699.52)	1.500 (38.10)	.343 (8.71)
HPS-10-4.00-.50-**	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1-1/2 - 12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	2.999 (76.17)	.380 (9.65)	1.750 (44.45)	14.810 (376.17)	36.965 (938.91)	1.500 (38.10)	.343 (8.71)
HPS-10-6.00-.50-**	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1-1/2 - 12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	2.999 (76.17)	.380 (9.65)	1.750 (44.45)	18.810 (477.77)	39.790 (1010.67)	1.500 (38.10)	.343 (8.71)
HPS-10-8.00-1.00-**	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1-1/2 - 12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	2.999 (76.17)	.380 (9.65)	1.750 (44.45)	22.810 (579.37)	55.827 (1418.01)	1.500 (38.10)	.343 (8.71)
HPS-15-2.00-.25-**	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1-1/2 - 12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	3.000 (76.20)	.380 (9.65)	1.750 (44.45)	10.810 (274.57)	29.461 (748.31)	1.500 (38.10)	.343 (8.71)
HPS-15-4.00-.50-**	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1-1/2 - 12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	3.000 (76.20)	.380 (9.65)	1.750 (44.45)	14.810 (376.17)	40.247 (1022.27)	1.500 (38.10)	.343 (8.71)

Model numbers shown are standard cylinders. Other cylinder stroke lengths are available in .50" increments, power stroke lengths in .125" increments. Dimensions shown in inches with metric beneath (mm).

** UH of FH mounting configuration is standard.

All HPS Series cylinders include a hose assembly and “dry-break” style hydraulic disconnect. Standard hydraulic fittings are straight SAE connections on both work cylinder and reservoir/booster unit. Please contact AEC for optional configurations.

Model No.	D	EE	F	FB	G	UF	TF	KK	M	MT	R	RD	RF	WF	ZB	ZA	XA	XA
HPS-15-6.00-.50-**-	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1-1/2 - 12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	3.000 (76.20)	.380 (9.65)	1.750 (44.45)	18.810 (477.77)	43.020 (1092.71)	1.500 (38.10)	.343 (8.71)
HPS-15-8.00-1.00-**-	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1-1/2 - 12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	3.000 (76.20)	.380 (9.65)	1.750 (44.45)	22.810 (579.37)	61.794 (1569.57)	1.500 (38.10)	.343 (8.71)
HPS-20-2.00-.25-**-	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1-1/2 - 12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	3.000 (76.20)	.380 (9.65)	1.750 (44.45)	10.810 (274.57)	32.104 (815.44)	1.500 (38.10)	.343 (8.71)
HPS-20-4.00-.50-**-	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1-1/2 - 12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	3.000 (76.20)	.380 (9.65)	1.750 (44.45)	14.810 (376.17)	44.732 (1136.19)	1.500 (38.10)	.343 (8.71)
HPS-20-6.00-.50-**-	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1-1/2 - 12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	3.000 (76.20)	.380 (9.65)	1.750 (44.45)	18.810 (477.77)	47.470 (1205.74)	1.500 (38.10)	.343 (8.71)
HPS-20-8.00-1.00-**-	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1-1/2 - 12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	3.000 (76.20)	.380 (9.65)	1.750 (44.45)	22.810 (579.37)	69.963 (1777.06)	1.500 (38.10)	.343 (8.71)
HPS-30-2.00-.25-**-	6.280 (159.51)	3/4" NPT	7.500 (190.50)	1.06 (26.92)	2.000 (50.80)	11.250 (285.75)	9.440 (239.78)	1-7/8 - 12 3.0 DP.	2.500 (63.50)	3/4-10 1.25 DP.	5.730 (145.54)	3.749 (95.22)	.500 (12.70)	1.750 (44.45)	12.400 (314.96)	30.200 (767.08)	1.500 (38.10)	.343 (8.71)
HPS-30-4.00-.50-**-	6.280 (159.51)	3/4" NPT	7.500 (190.50)	1.06 (26.92)	2.000 (50.80)	11.250 (285.75)	9.440 (239.78)	1-7/8 - 12 3.0 DP.	2.500 (63.50)	3/4-10 1.25 DP.	5.730 (145.54)	3.749 (95.22)	.500 (12.70)	1.750 (44.45)	16.400 (416.56)	51.500 (1308.10)	1.500 (38.10)	.343 (8.71)
HPS-30-6.00-.50-**-	6.280 (159.51)	3/4" NPT	7.500 (190.50)	1.06 (26.92)	2.000 (50.80)	11.250 (285.75)	9.440 (239.78)	1-7/8 - 12 3.0 DP.	2.500 (63.50)	3/4-10 1.25 DP.	5.730 (145.54)	3.749 (95.22)	.500 (12.70)	1.750 (44.45)	20.410 (518.41)	54.240 (1377.70)	1.500 (38.10)	.343 (8.71)
HPS-30-8.00-1.00-**-	6.280 (159.51)	3/4" NPT	7.500 (190.50)	1.06 (26.92)	2.000 (50.80)	11.250 (285.75)	9.440 (239.78)	1-7/8 - 12 3.0 DP.	2.500 (63.50)	3/4-10 1.25 DP.	5.730 (145.54)	3.749 (95.22)	.500 (12.70)	1.750 (44.45)	24.400 (619.76)	79.980 (2031.49)	1.500 (38.10)	.343 (8.71)
HPS-50-2.00-.25-**-	N/A	3/4" NPT	11.000 (279.4)	1.312 (33.32)	2.000 (50.80)	15.500 (393.70)	13.250 (336.55)	2-1/4 - 12 3.5 DP.	3.000 (76.20)	N/A	8.500 (215.90)	4.300 (109.22)	.500 (12.70)	2.000 (50.80)	12.750 (323.85)	37.140 (943.36)	1.500 (38.10)	.410 (10.41)
HPS-50-4.00-.50-**-	N/A	3/4" NPT	11.000 (279.4)	1.312 (33.32)	2.000 (50.80)	15.500 (393.70)	13.250 (336.55)	2-1/4 - 12 3.5 DP.	3.000 (76.20)	N/A	8.500 (215.90)	4.300 (109.22)	.500 (12.70)	2.000 (50.80)	16.750 (425.45)	50.320 (1278.13)	1.500 (38.10)	.410 (10.41)
HPS-50-6.00-.50-**-	N/A	3/4" NPT	11.000 (279.4)	1.312 (33.32)	2.000 (50.80)	15.500 (393.70)	13.250 (336.55)	2-1/4 - 12 3.5 DP.	3.000 (76.20)	N/A	8.500 (215.90)	4.300 (109.22)	.500 (12.70)	2.000 (50.80)	20.750 (527.05)	53.050 (1347.47)	1.500 (38.10)	.410 (10.41)
HPS-50-8.00-1.00-**-	N/A	3/4" NPT	11.000 (279.4)	1.312 (33.32)	2.000 (50.80)	15.500 (393.70)	13.250 (336.55)	2-1/4 - 12 3.5 DP.	3.000 (76.20)	N/A	8.500 (215.90)	4.300 (109.22)	.500 (12.70)	2.000 (50.80)	24.750 (628.65)	76.680 (1947.67)	1.500 (38.10)	.410 (10.41)
HPS-75-2.00-.25-**-	N/A	3/4" NPT	14.000 (355.60)	1.812 (46.02)	3.000 (76.20)	19.000 (482.60)	15.875 (403.23)	2-1/4 - 12 3.0 DP.	4.000 (101.60)	N/A	9.620 (244.35)	5.251 (133.38)	.500 (12.70)	1.750 (44.45)	13.068 (331.93)	37.117 (942.77)	1.500 (38.10)	.410 (10.41)
HPS-75-4.00-.50-**-	N/A	3/4" NPT	14.000 (355.60)	1.812 (46.02)	3.000 (76.20)	19.000 (482.60)	15.875 (403.23)	2-1/4 - 12 3.0 DP.	4.000 (101.60)	N/A	9.620 (244.35)	5.251 (133.38)	.500 (12.70)	1.750 (44.45)	17.068 (433.53)	49.731 (1263.17)	1.500 (38.10)	.410 (10.41)
HPS-75-6.00-.50-**-	N/A	3/4" NPT	14.000 (355.60)	1.812 (46.02)	3.000 (76.20)	19.000 (482.60)	15.875 (403.23)	2-1/4 - 12 3.0 DP.	4.000 (101.60)	N/A	9.620 (244.35)	5.251 (133.38)	.500 (12.70)	1.750 (44.45)	21.068 (535.13)	52.470 (1332.74)	1.500 (38.10)	.410 (10.41)
HPS-75-8.00-.50-**-	N/A	3/4" NPT	14.000 (355.60)	1.812 (46.02)	3.000 (76.20)	19.000 (482.60)	15.875 (403.23)	2-1/4 - 12 3.0 DP.	4.000 (101.60)	N/A	9.620 (244.35)	5.251 (133.38)	.500 (12.70)	1.750 (44.45)	25.068 (636.73)	55.208 (1402.28)	1.500 (38.10)	.410 (10.41)
HPS-100-2.00-.25-**-	N/A	3/4" NPT	14.000 (355.60)	1.812 (46.02)	3.000 (76.20)	19.000 (482.60)	15.875 (403.23)	2-1/4 - 12 3.0 DP.	4.000 (101.60)	N/A	9.620 (244.35)	5.251 (133.38)	.500 (12.70)	1.750 (44.45)	13.068 (331.93)	41.046 (1042.57)	1.500 (38.10)	.410 (10.41)
HPS-100-4.00-.50-**-	N/A	3/4" NPT	14.000 (355.60)	1.812 (46.02)	3.000 (76.20)	19.000 (482.60)	15.875 (403.23)	2-1/4 - 12 3.0 DP.	4.000 (101.60)	N/A	9.620 (244.35)	5.251 (133.38)	.500 (12.70)	1.750 (44.45)	17.068 (433.53)	56.255 (1428.88)	1.500 (38.10)	.410 (10.41)
HPS-100-6.00-.50-**-	N/A	3/4" NPT	14.000 (355.60)	1.812 (46.02)	3.000 (76.20)	19.000 (482.60)	15.875 (403.23)	2-1/4 - 12 3.0 DP.	4.000 (101.60)	N/A	9.620 (244.35)	5.251 (133.38)	.500 (12.70)	1.750 (44.45)	21.068 (535.13)	58.963 (1497.66)	1.500 (38.10)	.410 (10.41)
HPS-100-8.00-.50-**-	N/A	3/4" NPT	14.000 (355.60)	1.812 (46.02)	3.000 (76.20)	19.000 (482.60)	15.875 (403.23)	2-1/4 - 12 3.0 DP.	4.000 (101.60)	N/A	9.620 (244.35)	5.251 (133.38)	.500 (12.70)	1.750 (44.45)	25.068 (636.73)	61.671 (1566.44)	1.500 (38.10)	.410 (10.41)

Model numbers shown are standard cylinders. Other cylinder stroke lengths are available in .50" increments, power stroke lengths in .125" increments. Dimensions shown in inches with metric beneath (mm).

** UH of FH mounting configuration is standard.

Air Pressure (PSI)	HPS-1 Ton Series	HPS-2 Ton Series	HPS-4 Ton Series	HPS-8 Ton Series	HPS-10 Ton Series	HPS-15 Ton Series	HPS-20 Ton Series	HPS-30 Ton Series	HPS-50 Ton Series	HPS-75 Ton Series	HPS-100 Ton Series
	Hyd PSI/Force lb.	Hyd PSI/Force lb.	Hyd PSI/Force lb.	Hyd PSI/Force lb.	Hyd PSI/Force lb.	Hyd PSI/Force lb.	Hyd PSI/Force lb.	Hyd PSI/Force lb.	Hyd PSI/Force lb.	Hyd PSI/Force lb.	Hyd PSI/Force lb.
30	210/670	330/16360	316/2626	379/4766	396/7785	480/9422	591/11601	651/19540	630/31663	592/46542	750/58905
40	280/893	440/2181	422/3501	506/6355	528/10380	644/12641	788/15468	921/26053	840/42218	790/62056	1000/78540
50	350/1117	550/2727	528/4377	632/7943	661/12975	805/15802	985/19335	1152/32567	1050/52773	987/77570	1250/98175
60	420/1340	660/3272	633/5252	758/9532	793/15570	966/18962	1182/23202	1382/39080	1260/63327	1185/93084	1500/117810
70	490/1563	770/3817	739/6127	885/11120	925/18165	1127/22123	1379/27069	1612/45593	1470/73882	1382/108598	1750/137445
80	560/1787	880/4363	844/7003	1011/12709	1057/20760	1288/25283	1576/30936	1843/52107	1680/84436	1580/124112	2000/157080
90	630/2010	990/4908	950/7878	1137/14298	1189/23355	1449/28443	1773/34803	2073/58620	1890/94991	1777/139626	2250/176715
100	700/2234	1100/5454	1056/8754	1264/15886	1322/25950	1600/31408	1970/38671	2304/65134	2100/105546	1975/155140	2500/196350

*Typical cylinder break-away pressure is 35 PSI.

(1) Complete cylinder cycle @ 60 PSI.

Multiply value by cycles per minute for total SCFM usage.

NOTE: The above specifications are theoretical forces. Frictional loads and lack of proper air supply may affect cylinder performance. Please multiply application force requirements by 1.25-1.50 to ensure adequate force is available.

	HPS-1 Ton Series	HPS-2 Ton Series	HPS-4 Ton Series	HPS-8 Ton Series	HPS-10 Ton Series	HPS-15 Ton Series	HPS-20 Ton Series	HPS-30 Ton Series	HPS-50 Ton Series	HPS-75 Ton Series	HPS-100 Ton Series
Approach Force per PSI (lbs.)	*3.14	*4.90	*8.29	*12.56	*19.63	*19.63	*19.63	*28.27	*50.26	*78.54	*78.54
Retract Force per PSI (lbs.)	*2.35	*4.11	*6.81	*11.08	*16.49	*16.49	*16.49	*23.37	*43.20	*65.97	*65.97
Output Force Range (lbs.)	670-2234	1636-5454	2626-8754	4766-15,886	7785-25,950	9424-31,408	11,635-38,785	19,540-65,134	31,663-105,546	46,542-155,140	58,905-196,350
Working Ratio (Output per PSI (lbs.))	22.34:1	54.54:1	87.62:1	158.86:1	259.62:1	314.08:1	387.85:1	651.44:1	1055.46:1	1551.40:1	1963.5:1
Service Ratio (Hydraulic PSI (lbs.))	7:01	11:1	10.56:1	12.64:1	13.22:1	16:1	19.7:1	23.04:1	21:1	19.8:1	25:1
Air Consumption per Cycle	.136 SCFM(1)	.267 SCFM(1)	.426 SCFM(1)	1.079 SCFM(1)	1.079 SCFM(1)	1.356 SCFM(1)	1.568 SCFM(1)	2.510 SCFM(1)	4.204 SCFM(1)	7.160 SCFM(1)	8.51 SCFM(1)
Operating Temperature	10°F-160°F	10°F-160°F	10°F-160°F	10°F-160°F	10°F-160°F	10°F-160°F	10°F-160°F	10°F-160°F	10°F-160°F	10°F-160°F	10°F-160°F
Maximum Operating Speed***	1.5 Ft/sec	1.5 Ft/sec	1.5 Ft/sec	1.5 Ft/sec	1.5 Ft/sec	1.5 Ft/sec	1.5 Ft/sec	1.5 Ft/sec	1.5 Ft/sec	1.5 Ft/sec	1.5 Ft/sec
Recommended Air Filter	40 Micron	40 Micron	40 Micron	40 Micron	40 Micron	40 Micron	40 Micron	40 Micron	40 Micron	40 Micron	40 Micron
Maximum Operating Pressure	100 PSI	100 PSI	100 PSI	100 PSI	100 PSI	100 PSI	100 PSI	100 PSI	100 PSI	100 PSI	100 PSI
Minimum Operating Pressure	30 PSI	30 PSI	30 PSI	30 PSI	30 PSI	30 PSI	30 PSI	30 PSI	30 PSI	30 PSI	30 PSI

*Typical cylinder break-away pressure is 35 PSI.

(1) Complete cylinder cycle @ 60 PSI.

Multiply value by cycles per minute for total SCFM usage.

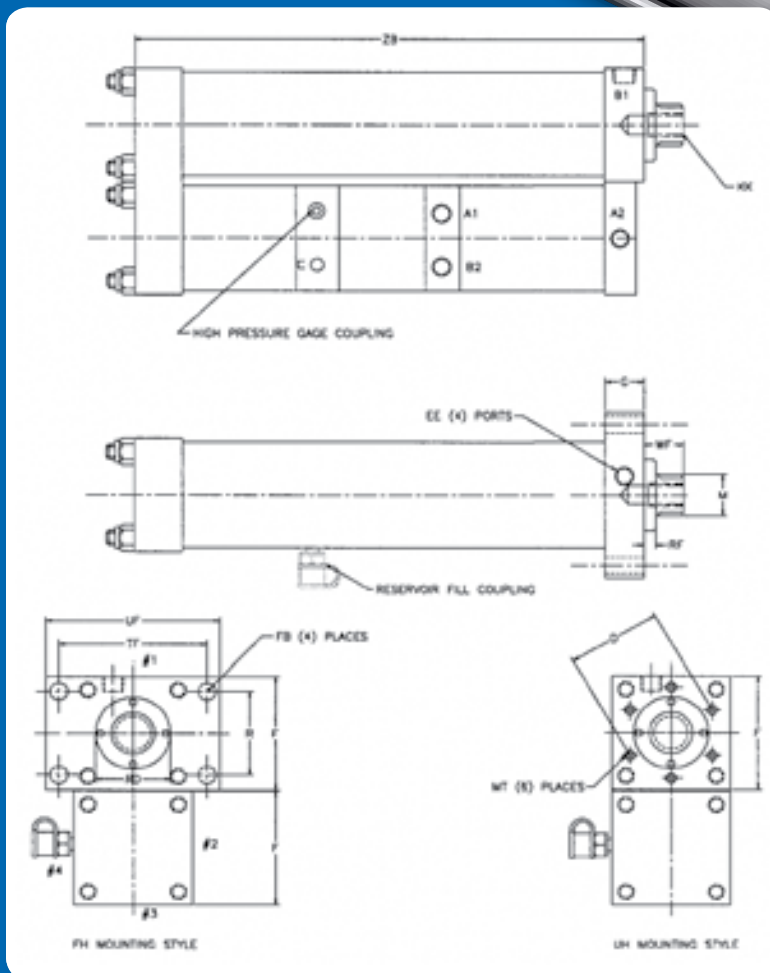
*** Maximum speed of the seals (not maximum speed of cylinder).

NOTE: The above specifications are theoretical forces. Frictional loads and lack of proper air supply may affect cylinder performance. Please multiply application force requirements by 1.25-1.50 to ensure adequate force is available.



The "HPT" Series tandem cylinder is a totally self-contained, cost-effective power source ideally suited for a wide variety of assembly and forming applications.

Available in sizes from 1 to 10 tons, up to 8.00" stroke, and 1.00" power stroke, the HPT Series cylinder line provides a compact package where space is limited.



Standard Features:

- Total air/oil separation
- Linear force output
- Three moving components
- Simple control circuits
- 100,000 PSI tensile tie rods
- NFPA medium duty mounting styles
- Operation in any position or attitude
- 4.7 million MTBF, 20 million service life
- Field serviceable-seal kits
- Fill units/repair manual
- Heavy-duty construction designed for years of trouble free use
- Numerous options, such as gage kits, sensors, press frames and bases.
- 3 year warranty

Modifications such as rod end styles, port locations, approach and power stroke lengths are options available upon request. Please contact your local AEC Representative for assistance. AEC reserves the right to change specifications. CAD disks (.dwg, .dxf format) are available for the full line of HyperCyl® cylinders.

Model numbers shown are standard cylinders. Cylinder stroke lengths are available in .50" increments, power stroke lengths in .125" increments. Dimensions shown in inches with metric beneath (mm).

Model No.	Output Force per PSI (lbs.)	Approach/Retract per PSI (lbs.)	D	EE	F	FB	G	UF	TF	KK	M	MT	R	RD	RF	WF	ZB
HPT-1-2.00-.25-FH	22.34	3.14/2.35	N/A	1/8" NPT	2.500 (63.50)	.440 (11.18)	1.250 (31.75)	4.250 (107.95)	3.438 (87.33)	3/4-16 1.0 DP.	1.000 (25.40)	N/A	1.630 (41.40)	1.749 (44.42)	.380 (9.65)	1.250 (31.75)	15.180 (385.57)
HPT-1-4.00-.25-FH	22.34	3.14/2.35	N/A	1/8" NPT	2.500 (63.50)	.440 (11.18)	1.250 (31.75)	4.250 (107.95)	3.438 (87.33)	3/4-16 1.0 DP.	1.000 (25.40)	N/A	1.630 (41.40)	1.749 (44.42)	.380 (9.65)	1.250 (31.75)	21.790 (553.47)
HPT-1-8.00-.25-FH	22.34	3.14/2.35	N/A	1/8" NPT	2.500 (63.50)	.440 (11.18)	1.250 (31.75)	4.250 (107.95)	3.438 (87.33)	3/4-16 1.0 DP.	1.000 (25.40)	N/A	1.630 (41.40)	1.749 (44.42)	.380 (9.65)	1.250 (31.75)	27.850 (707.39)
HPT-2-2.00-.25-FH	54.54	4.90/4.11	N/A	1/4" NPT	3.000 (76.20)	.440 (11.18)	1.250 (31.75)	5.125 (130.18)	4.125 (104.78)	3/4-16 1.0 DP.	1.000 (25.40)	N/A	2.050 (52.07)	1.749 (44.42)	.380 (9.65)	1.250 (31.75)	17.220 (437.39)
HPT-2-4.00-.50-FH	54.54	4.90/4.11	N/A	1/4" NPT	3.000 (76.20)	.440 (11.18)	1.250 (31.75)	5.125 (130.18)	4.125 (104.78)	3/4-16 1.0 DP.	1.000 (25.40)	N/A	2.050 (52.07)	1.749 (44.42)	.380 (9.65)	1.250 (31.75)	25.600 (650.24)
HPT-2-8.00-.50-FH	54.54	4.90/4.11	N/A	1/4" NPT	3.000 (76.20)	.440 (11.18)	1.250 (31.75)	5.125 (130.18)	4.125 (104.78)	3/4-16 1.0 DP.	1.000 (25.40)	N/A	2.050 (52.07)	1.749 (44.42)	.380 (9.65)	1.250 (31.75)	31.330 (795.78)
HPT-4-2.00-.25-**	87.62	8.29/6.81	3.000 (76.20)	3/8" NPT	4.250 (107.95)	.562 (14.27)	1.250 (31.75)	5.750 (146.05)	4.688 (119.08)	3/4-16 1.0 DP.	1.375 (34.93)	5/16-18 .75 DP.	2.750 (69.85)	2.374 (60.30)	.380 (9.65)	1.250 (31.75)	22.620 (574.55)
HPT-4-4.00-.50-**	87.62	8.29/6.81	3.000 (76.20)	3/8" NPT	4.250 (107.95)	.562 (14.27)	1.250 (31.75)	5.750 (146.05)	4.688 (119.08)	3/4-16 1.0 DP.	1.375 (34.93)	5/16-18 .75 DP.	2.750 (69.85)	2.374 (60.30)	.380 (9.65)	1.250 (31.75)	32.250 (819.15)
HPT-4-6.00-.50-**	87.62	8.29/6.81	3.000 (76.20)	3/8" NPT	4.250 (107.95)	.562 (14.27)	1.250 (31.75)	5.750 (146.05)	4.688 (119.08)	3/4-16 1.0 DP.	1.375 (34.93)	5/16-18 .75 DP.	2.750 (69.85)	2.374 (60.30)	.380 (9.65)	1.250 (31.75)	46.000 (1168.4)
HPT-4-8.00-1.00-**	87.62	8.29/6.81	3.000 (76.20)	3/8" NPT	4.250 (107.95)	.562 (14.27)	1.250 (31.75)	5.750 (146.05)	4.688 (119.08)	3/4-16 1.0 DP.	1.375 (34.93)	5/16-18 .75 DP.	2.750 (69.85)	2.374 (60.30)	.380 (9.65)	1.250 (31.75)	46.000 (1168.4)
HPT-10-2.00-.25-**	259.63	19.63/16.49	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1 1/2-12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	3.000 (76.20)	.380 (9.65)	1.750 (44.45)	26.450 (671.83)
HPT-10-4.00-.50-**	259.63	19.63/16.49	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1 1/2-12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	3.000 (76.20)	.380 (9.65)	1.750 (44.45)	35.980 (913.89)
HPT-10-6.00-.50-**	259.63	19.63/16.49	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1 1/2-12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	3.000 (76.20)	.380 (9.65)	1.750 (44.45)	48.880 (1241.55)
HPT-10-8.00-1.00-**	259.63	19.63/16.49	4.250 (107.95)	1/2" NPT	6.500 (165.10)	.812 (20.62)	1.500 (38.10)	8.000 (203.20)	6.625 (168.28)	1 1/2-12 2.25 DP.	2.000 (50.80)	1/2-13 .75 DP.	4.100 (104.14)	3.000 (76.20)	.380 (9.65)	1.750 (44.45)	48.880 (1241.55)

Air Pressure (PSI)	HPT-1 Ton Series Hyd PSI/Force lb.	HPT-2 Ton Series Hyd PSI/Force lb.	HPT-4 Ton Series Hyd PSI/Force lb.	HPT-8 Ton Series Hyd PSI/Force lb.	HPT-10 Ton Series Hyd PSI/Force lb.
30	210/670	330/16360	316/2626	379/4766	396/7785
40	280/893	440/2181	422/3501	506/6355	528/10380
50	350/1117	550/2727	528/4377	632/7943	661/12975
60	420/1340	660/3272	633/5252	758/9532	793/15570
70	490/1563	770/3817	739/6127	885/11120	925/18165
80	560/1787	880/4363	844/7003	1011/12709	1057/20760
90	630/2010	990/4908	950/7878	1137/14298	1189/23355
100	700/2234	1100/5454	1056/8754	1264/15886	1322/25950

*Typical cylinder break-away pressure is 35 PSI.

(1) Complete cylinder cycle @ 60 PSI.

Multiply value by cycles per minute for total SCFM usage.

** UH of FH mounting configuration is standard.

*** Maximum speed of the seals (not maximum speed of cylinder).

NOTE: The above specifications are theoretical forces.

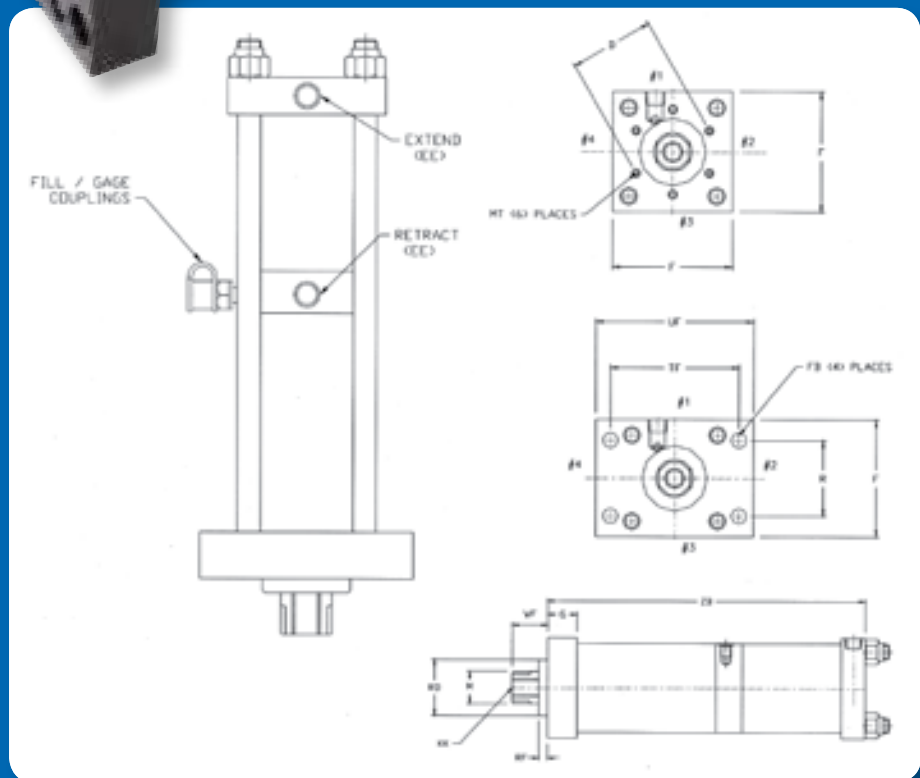
Frictional loads and lack of proper air supply may affect cylinder performance.

Please multiply application force requirements by 1.25-1.50 to ensure adequate force is available.

	HPT-1 Ton Series	HPT-2 Ton Series	HPT-4 Ton Series	HPT-8 Ton Series	HPT-10 Ton Series
Approach Force per PSI (lbs.)	*3.14	*4.90	*8.29	*12.56	*19.63
Retract Force per PSI (lbs.)	*2.35	*4.11	*6.81	*11.08	*16.49
Output Force Range (lbs.)	670-2234	1636-5454	2626-8754	4766-15,886	7785-25,950
Working Ratio (Output per PSI (lbs.))	22.34:1	54.54:1	87.62:1	158.86:1	259.62:1
Service Ratio (Hydraulic PSI (lbs.))	7:01	11:1	10.56:1	12.64:1	13.22:1
Air Consumption per Cycle	.136 SCFM(1)	.267 SCFM(1)	.426 SCFM(1)	1.079 SCFM(1)	1.079 SCFM(1)
Operating Temperature	10°F-160°F	10°F-160°F	10°F-160°F	10°F-160°F	10°F-160°F
Maximum Operating Speed***	1.5 Ft/sec	1.5 Ft/sec	1.5 Ft/sec	1.5 Ft/sec	1.5 Ft/sec
Recommended Air Filter	40 Micron	40 Micron	40 Micron	40 Micron	40 Micron
Maximum Operating Pressure	100 PSI	100 PSI	100 PSI	100 PSI	100 PSI
Minimum Operating Pressure	30 PSI	30 PSI	30 PSI	30 PSI	30 PSI


Standard Features:

- Power-stroke only operation
- High cycle rates
- Linear output force
- Operates in any position
- Hydra-Pneumatic Power Stroke Only Operation
- High Cycle Rates – up to 300 CPM
- Available in 1-20 Ton Size Range
- Total Air/Oil Separation
- Long Service Life
- Compact
- Simple Single Air Valve Control
- Force/Distance Sensor and Monitoring Options
- 3 Year warranty



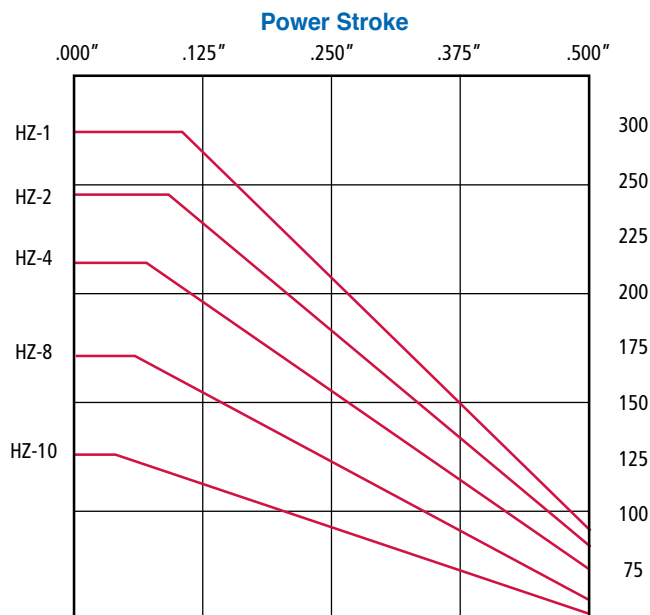
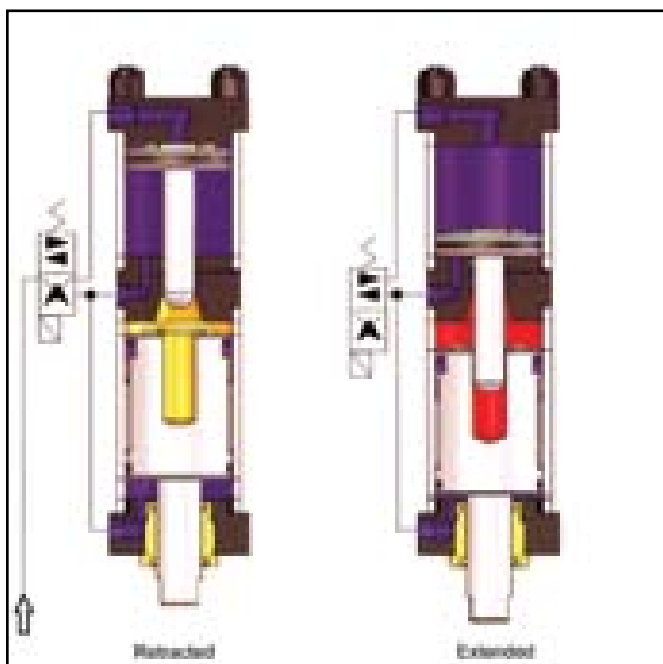
Piercing, riveting, notching, clamping, marking, coining, and assembly applications where short-stroke, high speed, high force operation is desirable.

Operation: the full stroke of the cylinder is power-stroke. Internal oil reservoir provides sufficient capacity for 3 million cycles (at 75% of full stroke) before refilling is required. Complete air-oil separation ensures long seal life and operation in any position. Units include oil refilling and high pressure gage couplings and installation/service manual.

Controls: (1) 2 or 3-position, 4-way pneumatic directional control valve. An air regulator may also be added to control the output force.

Installation: The HZ series drive unit can be installed in any orientation with (4) SHCS. Side loading of the rod is not recommended, use of a flexible coupling between drive unit and fixed tooling is recommended.

Accessories: non-rotating rod, pressure switches, integral linear transducer and load cell sensors.



Cycle speed for HZ Series HyperCyl drive unit at 75% effective force @ 80 PSI air pressure.
Note: Actual CPM rates may vary depending upon air valve flow and tooling weights.

Model No.	Output force Per PSI (lbs)	Retract force Per PSI (lbs)	Model Code: HZ-Series, 1, 2, 4, 8, 10 – Maximum Output (tons), .25, .50 –Stroke** UH or FH Mounting Style.														
			D	EE	F	FB	G	UF	TF	KK	M	MT	R	RD	RF	WF	ZB
HZ-1-.25**	22.34	2.35	2.19	1/8"NPT	2.50	0.440	1.25	4.25	3.438	3/4-16	1.00	1/4-20	1.630	1.749	0.375	1.50	12.121
HZ-1-.50**	22.34	2.35	2.19	1/8"NPT	2.50	0.440	1.25	4.25	3.438	3/4-16	1.00	1/4-20	1.630	1.749	0.375	1.50	13.899
HZ-2-.25**	54.54	4.11	2.25	1/4"NPT	3.00	0.440	1.25	5.125	4.125	3/4-16	1.00	5/16-18	2.050	1.749	0.375	1.50	13.119
HZ-2-.50**	54.54	4.11	2.25	1/4"NPT	3.00	0.440	1.25	5.125	4.125	3/4-16	1.00	5/16-18	2.050	1.749	0.375	1.50	17.987
HZ-4-.25**	87.62	6.81	3.00	3/8"NPT	4.25	0.562	1.25	5.75	4.688	3/4-16	1.375	5/16-18	2.750	2.374	0.375	1.50	13.768
HZ-4-.50**	87.62	6.81	3.00	3/8"NPT	4.25	0.562	1.25	5.75	4.688	3/4-16	1.375	5/16-18	2.750	2.374	0.375	1.50	18.045
HZ-8-.25**	158.86	10.81	4	3/8"NPT	5.00	0.656	1.25	6.25	5.314	3/4-16	1.375	1/2-13	3.320	2.374	0.375	1.50	15.557
HZ-8-.50**	158.86	10.81	4	3/8"NPT	5.00	0.656	1.25	6.25	5.314	3/4-16	1.375	1/2-13	3.320	2.374	0.375	1.50	21.271
HZ-10-.25**	259.63	16.49	4.25	1/2"NPT	6.50	0.812	1.25	8.00	6.625	1 1/2-12	2.00	1/2-13	4.100	2.999	0.375	1.75	17.088
HZ-10-.50**	259.63	16.49	4.25	1/2"NPT	6.50	0.812	1.25	8.00	6.625	1 1/2-12	2.00	1/2-13	4.100	2.999	0.375	1.75	23.450
HZ-15-.25**	259.63	16.49	4.25	1/2"NPT	6.50	0.812	1.25	8.00	6.625	1 1/2-12	2.00	1/2-13	4.100	2.999	0.375	1.75	18.438
HZ-15-.50**	259.63	16.49	4.25	1/2"NPT	6.50	0.812	1.25	8.00	6.625	1 1/2-12	2.00	1/2-13	4.100	2.999	0.375	1.75	26.233
HZ-20-.25**	259.63	16.49	4.25	1/2"NPT	6.50	0.812	1.25	8.00	6.625	1 1/2-12	2.00	1/2-13	4.100	2.999	0.375	1.75	20.359
HZ-20-.50**	259.63	16.49	4.25	1/2"NPT	6.50	0.812	1.25	8.00	6.625	1 1/2-12	2.00	1/2-13	4.100	2.999	0.375	1.75	29.987

*Typical cylinder break-away pressure is 35 PSI.
(1) Complete cylinder cycle @ 60 PSI.
Multiply value by cycles per minute for total SCFM usage.
** UH of FH mounting configuration is standard.

NOTE: The above specifications are theoretical forces. Frictional loads and lack of proper air supply may affect cylinder performance. Please multiply application force requirements by 1.25-1.50 to ensure adequate force is available.



The IntelliCyl® is the successful combination of HyperCyl's hydra-pneumatic cylinder systems and state of the art electronic technology. IntelliCyl® was designed for applications where continuous monitoring of materials and processes is critical to the successful assembly of components. IntelliCyl® consists of two options:

1. Low voltage Linear transducer (LVLT)
2. Fully integrated Load Cell installed on the end of the cylinder rod.

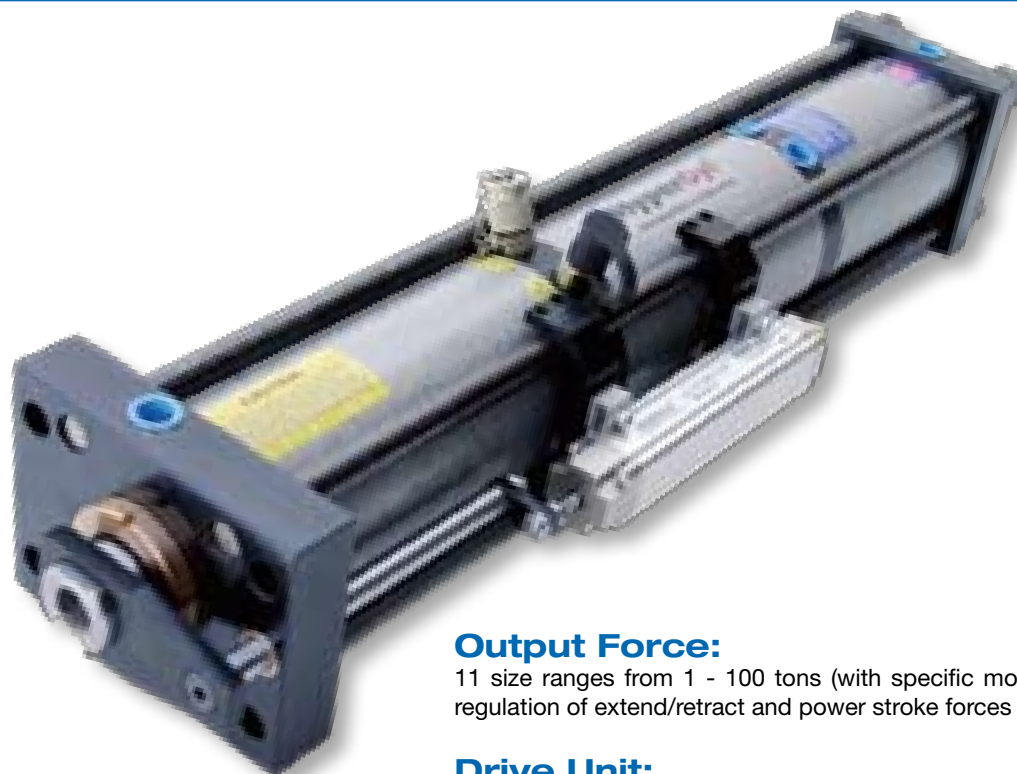
Both devices provide for an analog feedback signal through an analog card to the PLC. The feedback signals indicate distance (cylinder travel) to ± 0.001 " and force(lbs.) applied to the tooling. The ability to monitor cylinder and tooling travel and force during the assembly process allows for:

Quality Improvement through in-process verification

- IntelliCyl, HyperView-Press – verify dimensional stack-ups before you do work, and monitor the assembly process while you do work
- May eliminate costly EOL testing and destructive testing
- Drives quality into your assemblies. Drives out deviation
- Traceability – long-term data collection.

Standard Features:

- | | |
|---|--|
| • Measure a part height (prior to assembly) | • With known distance values, continuously monitored individual and multi-component finished part deviation from user set benchmarks or standards. |
| • Confirm multi-component stack-up dimension(s) | • HPS-LT option |
| • Measure and confirm correct component(s) match-up | • HPI-LTI option |
| • Confirm end of stroke (extend/retract) | • 3 Year Warranty |
| • Control distance travel during approach and power stroke cycles | |
| • Monitor tool wear | |
| • Monitor and confirm I.D./O.D. tolerance fit during assembly | |



Output Force:

11 size ranges from 1 - 100 tons (with specific model sizes), independent air regulation of extend/retract and power stroke forces and speeds.

Drive Unit:

Hydra-pneumatic; Hybrid of pneumatic and hydraulic technologies utilize air to extend and retract the drive unit ram. Auto-sequencing into power stroke anywhere within the total cylinder travel, complete air/oil separation, operation in any attitude. Heavy-duty, continuous use (designed and built to exceed both NFPA and SAE guidelines) and compact design with a three-year warranty (please refer to Warranty Terms contained in catalog). Standard stroke lengths of 2.00", 4.00", 6.00" and 8.00" with power stroke lengths of .25", .50" and 1.00", (non-standard stroke and power stroke lengths are available). Note: all drive units require (2) pneumatic air valves and minimum 40 micron pneumatic filter and regulator for operation.

Sensors:

Distance – Low Voltage Linear Transducers - Magnetostrictive technology with Auto Tuning, non-contact, wear free, Analog, Digital, SSI, Pulse, CANopen, Profibus and Quadrature output, .0001" resolution capable, 7-pin connector/cable.

Resolution	≤0.66μA
Non-linearity	+/- 0.02% over full scale
Repeatability	Resolution/ min 2μm
Hysteresis	≤ 5μm
Sampling Rate	2KHz
Operating Voltage	24 Vdc or 15 Vdc

Force – Strain bridge design load cell. Load cell O.D. matches drive unit ram O.D. for a compact, integrated design. Mini Brad-Harrison style four 4-pin connector. Signal conditioner is required.

Rated Output	2mV/ V
Combined Error	0.25% of full scale
Non-repeatability	0.05%
Zero Balance	1%
Excitation Voltage	10VDC
Maximum Load	150% of full scale (safe) 200% of full scale (ultimate)

PSL Power Stroke Limiter

The “PSL” option limits the travel of the high pressure piston and rod assembly independent of the fast approach stroke of the cylinder. Precise control ($\pm.004$ ”) of the high pressure stroke is desirable for applications such as marking and part assembly.



TSL Total Stroke Limiter

The “TSL” option limits the total stroke of the cylinder, including the power stroke. Adjustment is accomplished by rotating the adjustment barrel and locking ring. Not available on HPI or HZ units



PB Pressure Block

The “PB” Pressure Block can be used to remotely monitor/control the hydraulic oil pressure of all HyperCyl® cylinders.

Includes gage. IC-1 coupling must be ordered separately.



IC-1 Pressure Coupling

Standard on all cylinders, the IC-1 coupling is required to connect a “PHA” hose assembly to the “PB” pressure block.



GA-1 Gage Adapter Coupling

The GA-1 adapter coupling is required when installing a customer supplied hydraulic gage (1/4” NPT)

High Pressure Hose Assemblies

PHA hose assemblies connect the cylinder to a PB Pressure Block. Available in various lengths.

Working pressure: 0-6000 PSI

PHA-12”	PHA-24”
PHA-36”	PHA-48”
PHA-60”	PHA-72”



Hydraulic Gage Kits

Hydraulic gage kits allow monitoring of the internal hydraulic oil pressure.

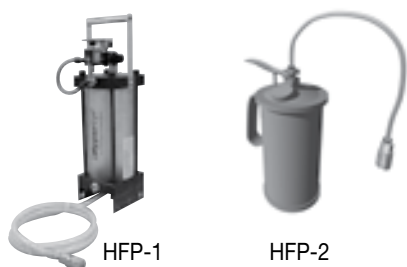
Kits include a gage, GA-1 coupling and T-fitting.

All cylinder series: G-01

(0-3000 PSI liquid filled)



All options can be installed at the factory. If options are customer installed, refilling and venting of the reservoir may be necessary before cylinder operation.



HFP-1, HFP- 2 Hyperfill Units

HyperFill refilling units are self-contained devices used to replenish oil in the reservoir section of all HyperCyl® cylinders. The HFP-1 includes the fill unit, fill coupling, 3' hose assembly and complete instructions. Refilling is a simple 3-step process. The HFP-2 unit is manually operated.

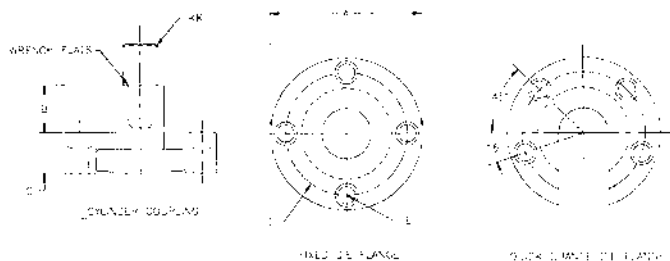
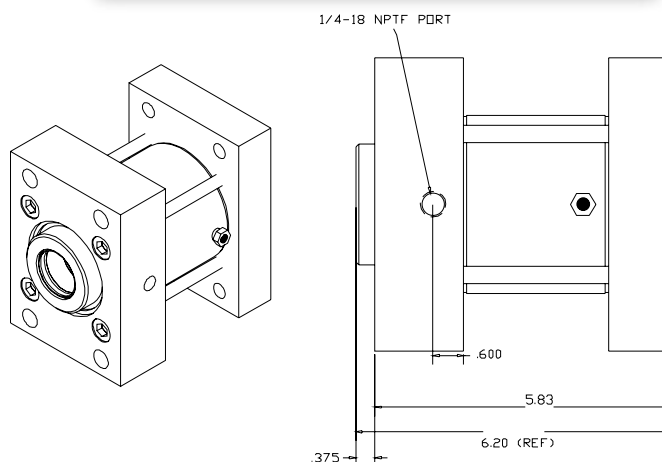
PT/ELT sensors

PT/ELT series sensors provide a pneumatic (PT) or electrical (ELT) output signal when the cylinder work rod and tooling have contacted the work surface. Typically used to sequence HyperCyl® cylinders into high pressure. Sensor installs into the "B1" port.

Model Series	Size	Part Number (PT or ELT)
HPI/HPT/HPS-1	1/8" NPT	PT/ELT-1
HPI/HPT/HPS-2	1/4" NPT	PT/ELT-2
HPI/HPT/HPS-4, 8	3/8" NPT	PT/ELT-3
HPI/HPT/HPS-10, 15, 20	1/2" NPT	PT/ELT-4
HPI/HPT/HPS-30	3/4" NPT	PT/ELT-5

Rod Lock Option

The "AL" Rod Lock option is a locking device installed on the head end of the cylinder that provides a positive locking of the cylinder rod when air is removed from the lock. The locking action is designed where safety considerations require positive locking of the tooling/actuator when air pressure is removed from the circuit. The rod lock option is available for all 1 through 30 ton HyperCyl® cylinders. Rod Lock - 60 PSI minimum air pressure required.



Die Set Couplings

The PAF/Q Series alignment coupling is a flexible, quick-change connection for use with all HyperCyl® cylinders and conventional die sets. The coupling provides an axial float between the cylinder and customer supplied die set, minimizing side loading of the cylinder rod, extending cylinder life. Alloy steel (Rockwell "C" 58/60) construction with black oxide finish. All coupling sets include 1 cylinder coupling, 1 PAF or PAQ die flange, and socket head cap screws.

Cylinder	Model No.	A	B	C	D	E	KK
HPI/HPT/HPS-1, 2	PAF-1, PAQ-1	3.250	1.000	.875	2.610	1/4-20 x 1.50 SHCS	3/4-16 x 1.00"
HPI/HPT/HPS-4, 8	PAF-4, PAQ-4	3.500	1.500	1.125	2.930	5/16-18 x 2.00 SHCS	3/4-16 x 1.00"
HPI/HPS-10, 15, 20	PAF-10, PAQ-10	5.000	2.000	1.500	4.280	3/8-16 x 2.00 SHCS	1 1/2-12 x 2.00"
HPI-30	PAF-30, PAQ-30	6.000	2.750	1.500	5.030	1/2-13 x 2.00 SHCS	1 7/8-12 x 2.75"
HPI-50	PAF-50, PAQ-50	6.000	2.750	1.500	5.030	1/2-13 x 2.00 SHCS	2 1/4-12 x 2.75"

All options can be installed at the factory. If options are customer installed, refilling and venting of the reservoir may be necessary before cylinder operation.

Hydraulic pressure switches are used to confirm the internal hydraulic pressure during the power stroke of the cylinder. Pressure switches are user adjustable and provide a contact closure (output signal) to confirm cycle complete.

SW Pressure Switch

SW series switches provide a dry contact, manually adjusted set point way to monitor the internal hydraulic pressure of all HyperCyl® cylinders during the power stroke. Once pressure has been achieved (confirming cylinder force) contact closure output can be utilized to retract the cylinder.

SW-01 (suitable for all series cylinders except 100 ton)

- Adjustable range from 150-2300 PSI
- Repeatability of 3%
- Maximum switching rate of 100 CPM
- Electrical protection NEMA 4
- Electrical rating AC/DC 5A
- Electrical connection: 3-Pin (DIN) connector, included



SW Pressure Switch

SWD series digital pressure switches provide a four-digit display in the programming of the switch points and an accurate readout of cylinder pressure and set points. SWD series switches also provide a 4-20ma output signal which may be used for data collection, remote display or alarm functions.

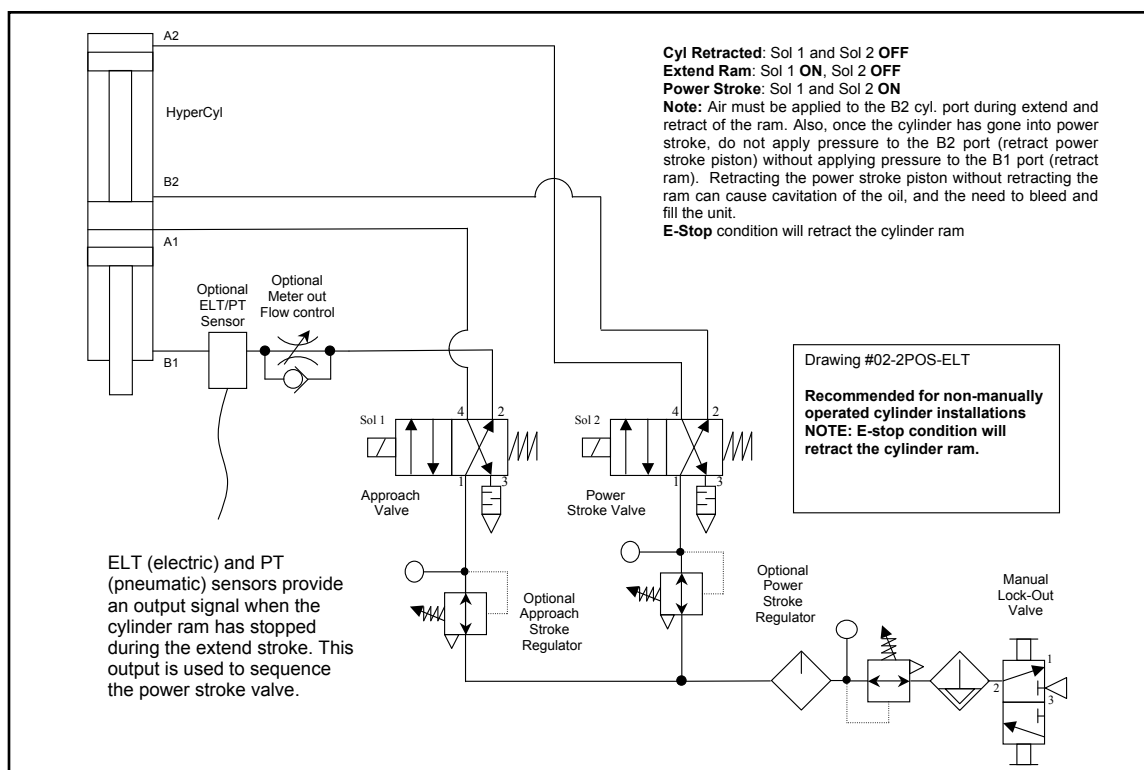
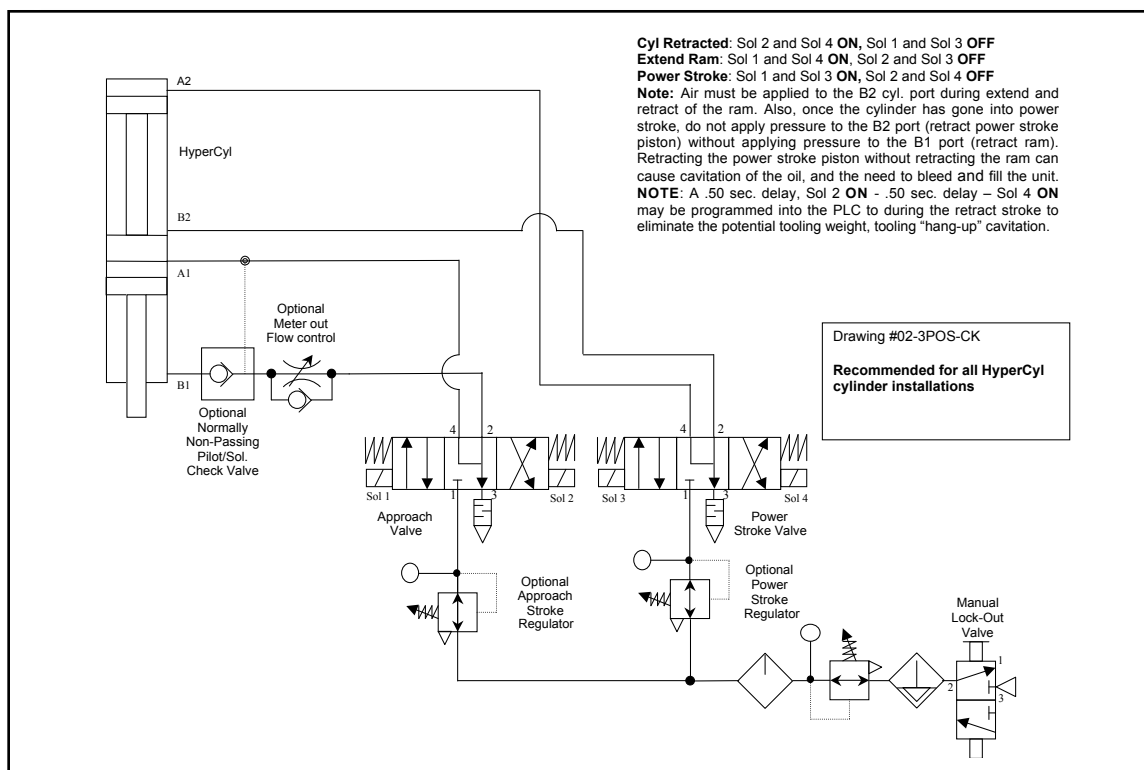
SWD-01 (0-1450 PSI, 20-30 VDC, PNP or NPN Output)

SWD-02 (15-3625 PSI, 20-30 VDC, PNP or NPN Output)

- Repeatability $\pm 0.25\%$ of range
- Switching frequency is adjustable
- Switch point accuracy of $\pm 2\%$ of full range
- Electrical connection: 4-Pin Micro DC



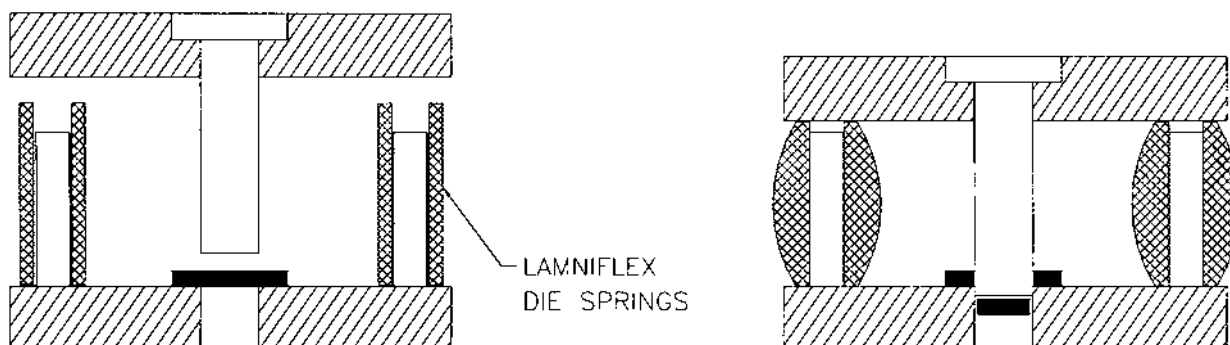
Note: Please contact AEC for appropriate cable set.



WARNING! All HyperCyl® cylinders are capable of providing high forces with little or no noise. Please use caution. Use of external safeguarding is mandatory.

- Attach the cylinder to the mounting surface using Grade 8 bolts of the largest diameter possible, with a lock washer or locking type material. (Locktite)
- Provide a way to reduce or eliminate side loading the cylinder rod. Failure to do so will cause excessive wear on the guide bearings, seals and wear strips. Cylinders returned for repair in this condition will not be covered under warranty.
- All cylinders are provided with a high pressure (hydraulic-gage port) coupling, and fill coupling as standard. Allow room to access for future options and service.
- Punching and piercing applications must provide an external resistance to the rod and tooling prior to breaking through (refer to drawing below). Failure to do so can cause a vacuum inside the cylinder, adversely affecting performance.
- For best cylinder performance, air directional control valves should be mounted within five (5) feet of the cylinder.
- Use of nylon or equivalent tubing is recommended for all connections from the air directional control valves to the cylinder. Tubing diameter should be at least equal to the cylinder port size, i.e. 3/8" N.P.T. cylinder ports – 3/8" diameter tubing.
- For safety, install a lockout valve prior to the F.R.L. unit.
- A 40 micron filtration system is recommended. Air line lubrication is at the customer's option. However, be advised that air lubrication will extend cylinder life approx. 20%.
- Pneumatic flow control valves can be installed (meter out) at any port to control the respective cycle speed. Port "B1" to control cylinder advance, port "A1" to control cylinder retract speeds.
- Do not exceed 100 PSI air pressure to the cylinder.
- If required, fully extending the cylinder before sequencing into high pressure is acceptable.
- If the air supply is to be shut off for an extended period of time and tooling weight exceeds 25% of the cylinder approach force, mechanically block tooling in the retracted position.

Punching/Piercing Stroke Limiter



In many applications, the forward travel of the cylinder during high pressure is limited by the application itself, such as resistance welding, staking, etc. However, for punching and piercing applications the forward travel of the cylinder must be limited after punching through the material. If external resistance is not provided, the cylinder rod will continue to travel causing a potential vacuum in the high pressure reservoir sections of the cylinder, adversely affecting performance. If a single point punch is used on the application, a single spring may be located around the punch, which will also act as a stripper spring. We recommend use of LamniFlex Polyurethane Die Springs. Please contact AEC for additional information.

Options such as sensors, HyperFill Units and switches must be ordered separately. refer to pages 19-20.

HPI Series Ordering Information

HPI - - . - . - **FH** -

HPI (Inline) _____

Cylinder Size ("10" = 10 ton rating) _____

Total Cylinder Stroke (including Power Stroke) _____

Power Stroke _____

Mounting Style _____

Options ("PSL", etc.) Refer to pages 19-21 for descriptions _____



HPS Series Ordering Information

HPS - - . - . - **FH** -

HPS Satellite) _____

Cylinder Size ("10" = 10 ton rating) _____

Total Cylinder Stroke (including Power Stroke) _____

Power Stroke _____

Mounting Style _____

Options ("PSL", etc.) Refer to pages 19-21 for descriptions _____



HPT Series Ordering Information

HPT - - . - . - **FH** -

HPT (Tande,) _____

Cylinder Size ("10" = 10 ton rating) _____

Total Cylinder Stroke (including Power Stroke) _____

Power Stroke _____

Mounting Style _____

Options ("PSL", etc.) Refer to pages 19-21 for descriptions _____



HZ Series Ordering Information

HZ - - . - **FH** -

HPT (Tande,) _____

Cylinder Size ("10" = 10 ton rating) _____

Power Stroke _____

Mounting Style _____

Options ("PSL", etc.) Refer to pages 19-21 for descriptions _____





Standard Features

- 1 – 100 tons
- 5 – Press design configurations
- 3 year warranty

Design...

At the heart of all HyperCyl Presses is a self-contained hydra-pneumatic cylinder system providing from 1-100 tons of output force using an ordinary plant air supply.

Designed as an alternative power source to conventional hydraulic systems. HyperCyl is a clean, quiet and safe power source for all forms of assembly and forming applications.

With over 25,000 press installations world-wide, HyperCyl systems provide the reliability, speed and precision expected from today's production based assembly and forming equipment.

Versatile...

A unique feature of all HyperCyl presses is the ability to use the power stroke (high force) anywhere within the total stroke of the press.

Advance the ram pneumatically, make contact with the part or tooling and auto sequence into the power stroke.

This feature permits easier set-ups or part change-over, and the low force/high speed contact with the tooling reduces noise and vibration, extending tooling service life.

A wide range of press options, such as LVL (Low Voltage Linear Transducers), load cells, pressure transducers, stroke limiters, Touch Screen HMI Press controls and tooling-ready bolsters, provide a complete assembly cell for a wide variety of assembly and forming applications.

Safe...

All HyperCyl press systems, when supplied with controls, are fully OSHA and ANSI compliant with redundancy relays, light curtains, tag-outs and mechanical guarding for operator safety. Standard Opto-Safe two hand operator control for press cycle initiate, minimizes CTS and operator fatigue.



Clean, Lean and Green



Clean, Lean and Green

Reliable...

With only three moving components, HyperCyl is a simple device designed for continuous industrial use. A patented internal air/oil separation system, u-cup design, urethane seals and large internal reservoir provide for millions of press cycles before servicing is required. In addition, the plant air supply is totally isolated from the primary hydraulic seals, extending cylinder service life.

All press frames and bases are constructed of welded steel, normalized and finished machined. Designed for years of heavy, high cycle rate use. HyperCyl press systems are a welcome integration into your assembly and forming processes.

Cost Effective...

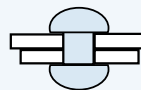
HyperCyl Press systems are sized for force output only vs. hydraulics requiring larger pumps, motors, reservoirs and special circuits for speed to close the tooling.

HyperCyl Press systems consume no energy when not in use vs. electric motors, cooler fans and circulation pumps required for hydraulic based presses.

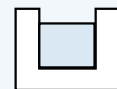
HyperCyl Presses typically use a fraction of the total energy costs for equal force output associated with pure pneumatic or hydraulic systems.

HyperCyl Press systems are virtually maintenance free, requiring no oil and filters to change and/or EPA requirements for the disposal of the used hydraulic oil.

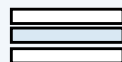
Assembly & Forming Applications



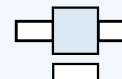
Riveting
Staking
Clinching
Welding



Part Insertion
Part Sizing



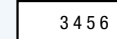
Pressing
Clamping



Piercing
Punching
Notching
Stamping



Bending
Folding
Hemming



Marking
Coining



HyperCyl® C-Frame (gap frame) design presses are primarily used for assembly and forming applications requiring an open front for ease of part loading and unloading. Constructed of welded steel, all frames are normalized, bead-blasted, primed and painted to customer specifications. All cylinder mounting plates, upper and lower bolsters and tooling plates are blanchard ground and zinc black. The lower tooling plate is removable for customer modifications. Standard C-Frames are available in 1 through 50 ton sizes with unguided, two column and four column guided upper bolsters.

From the small 1 and 2 ton standard presses to a custom 100 ton, four column C-Frame press, all HyperCyl products feature the latest in safety compliance, hydra-pneumatic technology and mechanical design. Options include safety light curtains, stroke limiters, IntelliCyl® distance/force monitoring systems and tooling-ready bolsters and beds.

Left: CG2-4 Four Ton press with MB base, PLC1 control and IntelliCyl – IMS options.

Model/Size (Ton)	C**-01	C**-02	C**-04	C**-08	C**-10	C**-15	C**-20	C**-30	C**-50
Output Force (lb.) (30-100 PSI)	670-2234	1636-5454	2626-8754	4765-15886	7788-25963	9424-31416	11635-38785	19543-65144	31503-105044
Total Ram Stroke ⁽¹⁾ (Including Power Stroke)	6.00"	6.00"	6.00"	6.00"	6.00"	6.00"	6.00"	6.00"	6.00"
Total Ram Power Stroke ⁽²⁾	.50"	.50"	.50"	.50"	.50"	.50"	.50"	.50"	.50"
Maximum Tooling Weight (lb.)	55	105	170	375	575	575	575	820	1510
Air Consumption (CFM @ 60 PSI) per complete cycle	.136	.267	.426	.886	1.079	1.356	1.568	2.510	4.204
Maximum Operating Speed (in./sec.)***	18	18	18	18	18	18	18	18	18
Min./Max. Operating Pressure (air)	30/100	30/100	30/100	30/100	30/100	30/100	30/100	30/100	30/100
A	34.500	34.500	37.000	37.000	56.750	56.750	56.750	65.375	66.500
B	10.00	10.00	11.500	11.500	15.00	15.00	15.00	22.500	24.500
C	22.750	22.750	22.750	22.750	30.00	30.00	30.00	43.00	43.00
D	12.00	12.00	12.00	12.00	18.00	18.00	18.00	18.00	18.00
E	10.00	10.00	10.00	10.00	14.00	14.00	14.00	16.00	16.00
F2	6.00	6.00	6.00	6.00	10.00	10.00	10.00	10.00	10.00
F4	6.00	6.00	8.00	8.00	14.00	14.00	14.00	16.00	16.00
G	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	3.500
H	6.750	6.750	7.00	7.00	9.250	9.250	9.250	11.500	11.500
J - Unguided/Guided	11.00/16.00	11.00/16.00	12.50/17.00	12.50/17.00	16.00/23.00	16.00/23.00	16.00/23.00	25.50/33.00	25.50/35.00
K	16.250	16.250	16.250	16.250	23.500	23.500	23.500	36.500	36.500
M	3.250	3.250	3.250	3.250	3.250	3.250	3.250	3.250	3.250
N	5.500	5.500	6.00	6.00	8.500	8.500	8.500	15.00	14.500
P	6.00	6.00	6.00	6.00	8.00	8.00	8.00	9.00	9.00

1. Optional Total Ram Stroke Length – 2.00", 4.00" and 8.00"

2. Optional Ram Power Stroke Lengths – .250", .750" and 1.00"

Please contact factory for custom applications or for information on non-standard frame dimensions.

Refer to pages 39-40 for Press Control Options.

All dimensions are shown in inches (in.)

*** Maximum speed of the seals (not maximum speed of cylinder).

C-Frame Presses

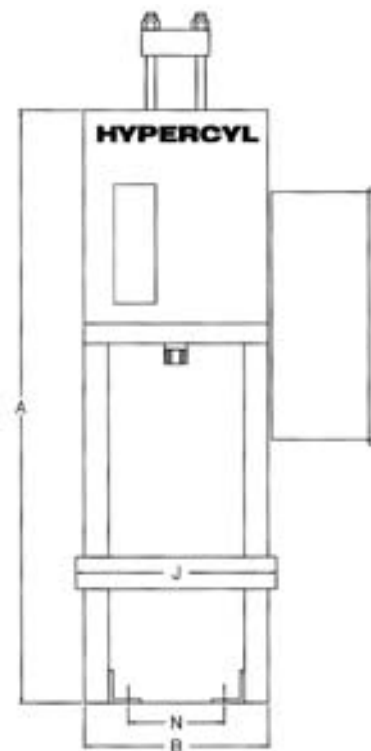
Model C -**

Standard construction includes A36 blanchard ground and zinc black plates, full length back web. Frame is bead blasted, primed and painted AEC White or finished to customer paint specifications. Lower plate may be modified at the factory for customer supplied tooling. (Guarding shown removed)

Frame Options:

T-Slots
Center Trough Hole
Daylight Opening and Plate Dimensions

All C-Frame presses may be bench, machine base or pedestal mounted.



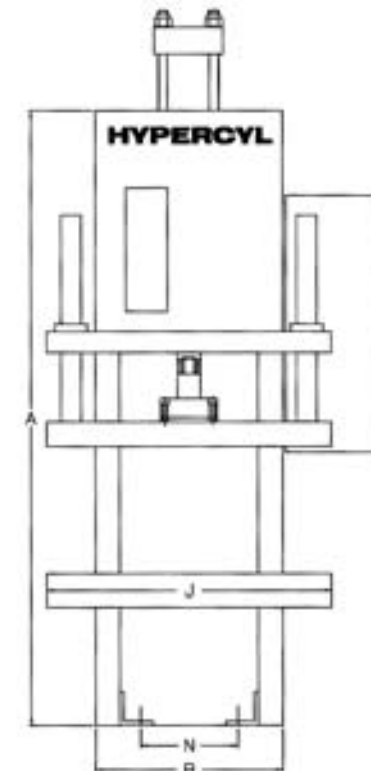
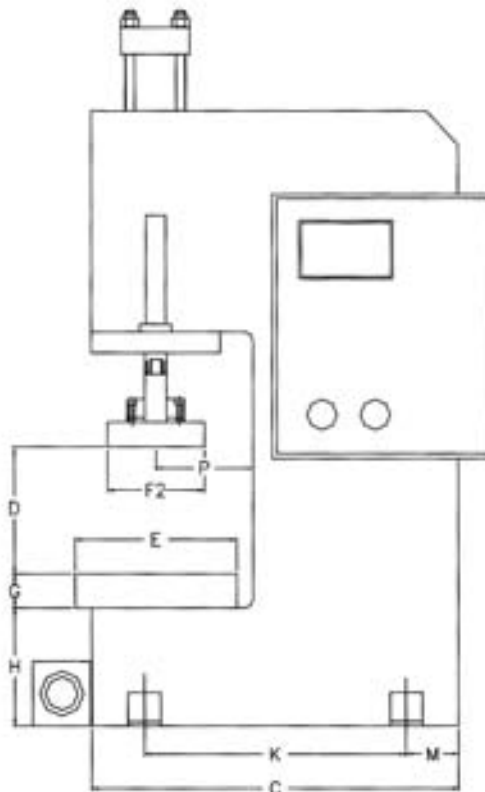
Model CG2 -**

Standard construction includes A36 blanchard ground and zinc blackened plates, 1045 ground, polished and hard chromed columns, replaceable bronze guide bearings and PAF series die set coupling. Frame is bead blasted, primed and painted AEC White or finished to customer paint specifications. Upper and lower plates may be modified at the factory for customer supplied tooling. (Guiding shown removed)

Frame Options:

T-Slots
Center Through Hole
Daylight Opening and Plates Dimensions

All C-Frames may be bench, machine base or pedestal mounted.

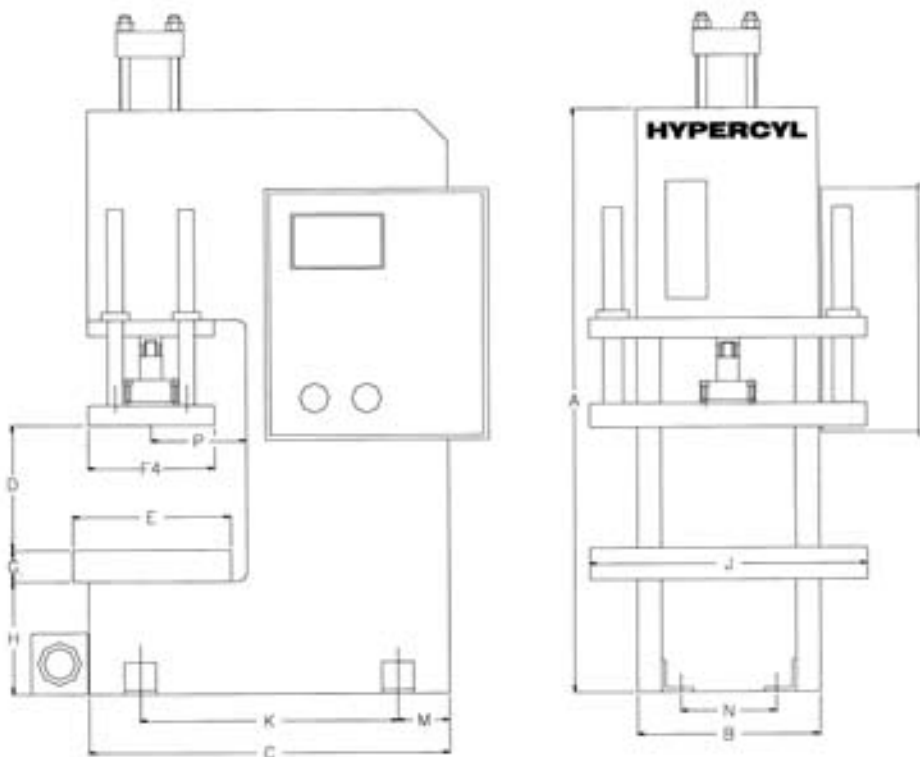


Model CG4 -**

Standard construction includes A36 blanchard ground and zinc blackened plates, 1045 ground, polished and hard chromed columns, replaceable bronze guide bearings and PAF series die set coupling. Frame is bead blasted, primed and painted AEC White or finished to customer paint specifications. Upper and lower plates may be modified at the factory for customer supplied tooling. (Guiding shown removed)

Frame Options:

T-Slots
Center Through Hole
Daylight Opening and Plates
Dimensions

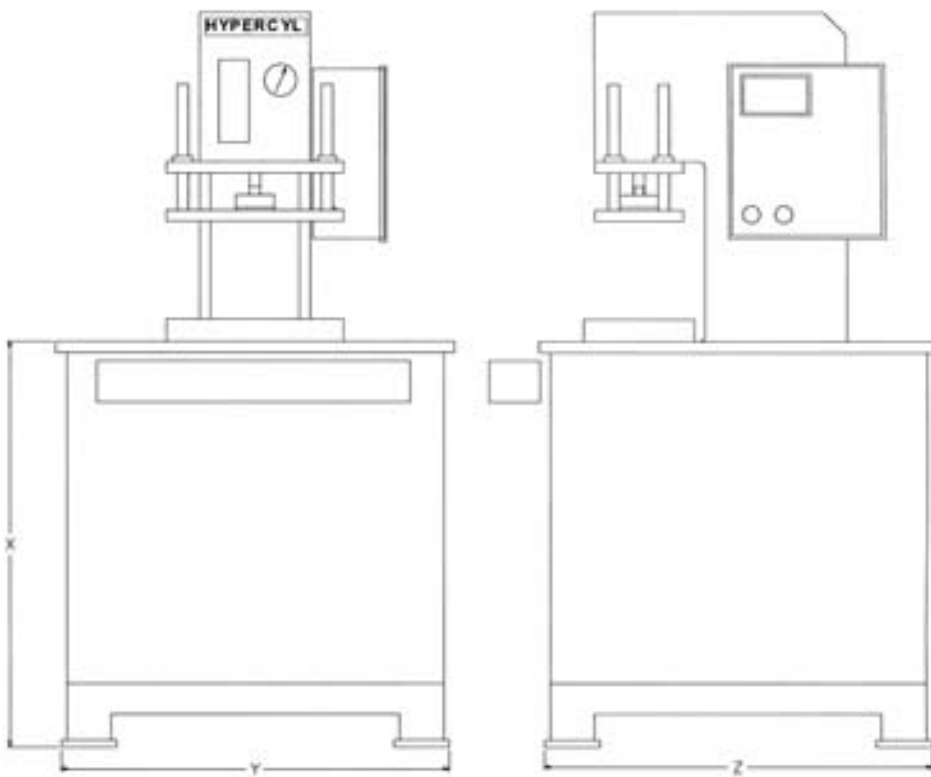


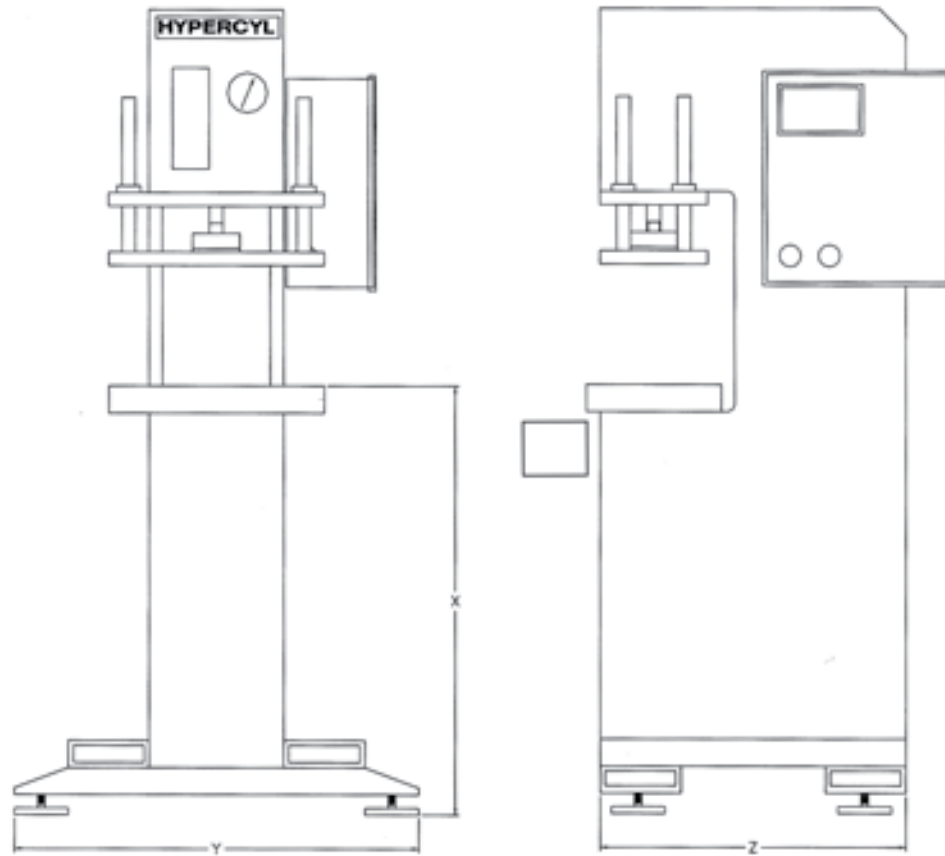
Model MB -**

Standard construction is heavy square steel tube or roll formed uprights and cross bracing with 1.00" blanchard ground top, (3) removable access panels, leveling screws. Bases are primed and painted AEC White or finished to customer paint specifications.

Size	X*	Y	Z
MB-01/02	37.00	36.00	36.00
MB-04/08	37.00	36.00	36.00
MB-10/15/20	37.00	42.00	48.00
MB-30	37.00	48.00	48.00
MB-50	37.00	48.00	48.00

*Operator work height. Specify if other dimension is required.





Model Base PB -**

Standard construction includes full frame (side panels) to floor or square steel tube. With leveling screws and lag down holes. Base is bead blasted, primed and painted AEC White or finished to customer paint specifications.

Size	X*	Y	Z
PB-01/02	42.00	36.00	22.75
PB-04/08	42.00	36.00	22.75
PB-10/15/20	42.00	42.00	30.00
PB-30	42.00	48.00	43.00
PB-50	42.00	48.00	43.00

*Operator work height. Specify if other dimension is required.

Model CGB

The CGB is a compact, high-performance press. Available in 2 to 30 tons, this bench-top design offers outstanding force and performance in a footprint just a few inches wide.

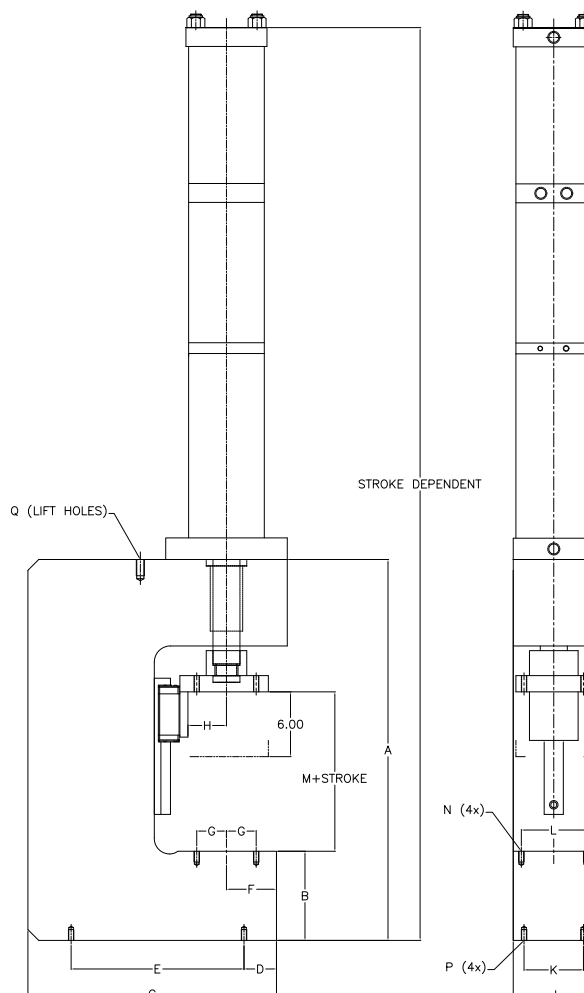
The upper bolster incorporates a high precision rail system for precise motion and rigidity. The removeable machined tooling base comes with four tapped holes ready for user's tooling. All HyperCyl cylinder versions are available on the CGB. All the benefits of hydra-pneumatics—cleanliness, medium to high forces, reduced contact shock, energy efficiency, low noise, and environmentally friendly—enhance the value of the CGB press.

Riveting, clinching, piercing, joining, marking, and coining are just a few applications suited for this press solution.

Numerous controls options and modifications are possible upon request. Made in the U. S. A.

Frame Options:

- T-Slots
- Center Through Hole
- Daylight Opening and Plate Dimensions



Model/Size (Ton)	CGB-02	CGB-04	CGB-08	CGB-10	CGB-15	CGB-20	CGB-30
Output Force (lb.) (30-100 PSI)	1636-5454	2626-8754	4765-15886	7785-25950	9424-31416	11601-38671	19543-65144
Total Ram Stroke(1) (Including Pwr. Stroke)	6.00"	6.00"	6.00"	6.00"	6.00"	6.00"	6.00"
Total Ram Power Stroke(2)	.50"	.50"	.50"	.50"	.50"	.50"	.50"
Air Consumption (CFM @ 60 PSI) per complete cycle	0.267	0.426	0.886	1.079	1.356	1.568	2.510
Max. Operating Speed (in./sec.)***	18	18	18	18	18	18	18
Min./Max. Operating Pressure (air)	30/100	30/100	30/100	30/100	30/100	30/100	30/100
A	20.87	22.50	25.50	29.75	29.75	29.75	35.25
B	3.50	3.50	4.50	6.75	6.75	6.75	8.25
C	12.00	14.50	15.75	20.75	20.75	20.75	23.00
D	2.00	2.00	2.00	2.00	2.00	2.00	3.00
E	7.25	10.00	11.00	15.00	15.00	15.00	16.00
F	2.56	2.25	2.63	3.50	3.50	3.50	4.63
G	1.750	1.750	2.125	2.500	2.500	2.500	2.750
H	2.10	2.38	3.38	3.50	3.50	3.50	3.56
J	3.00	4.25	5.00	6.50	6.50	6.50	7.50
K	2.00	3.25	3.50	5.25	5.25	5.25	5.50
L	2.00	3.00	3.50	5.00	5.00	5.00	6.00
M	3.75	5.88	6.88	7.00	7.00	7.00	8.75
N	5/16-18 x .63	5/16-18 x .63	5/16-18 x .63	3/8-16 x .75	3/8-16 x .75	3/8-16 x .75	1/2-13 x 1.00
P	3/8-16 x .75	3/8-16 x .75	1/2-13 x 1.00	1/2-13 x 1.00	1/2-13 x 1.00	1/2-13 x 1.00	3/4-10 x 1.50
Q	1/2-13 x 1.00	1/2-13 x 1.00	1/2-13 x 1.00	5/8-11 x 1.25	5/8-11 x 1.25	5/8-11 x 1.25	3/4-10 x 1.50

(1)Optional Total Ram Stroke Lengths - 2.00", 4.00", and 8.00

(2)Optional Ram Power Stroke Lengths - .25", .75", and 1.00"

Please contact factory for custom applications or for information on non-standard frame dimensions.

Hole pattern on ram plate identical to frame.

All dimensions shown are in inches (in.)

*** Maximum speed of the seals (not maximum speed of cylinder).

Model CB

An affordable, quality-built bench-top press designed for small-part assembly and forming operations. Typical operations include; part insertion and assembly, clinching, staking and piercing - metal, plastics and composites.

Standard Features

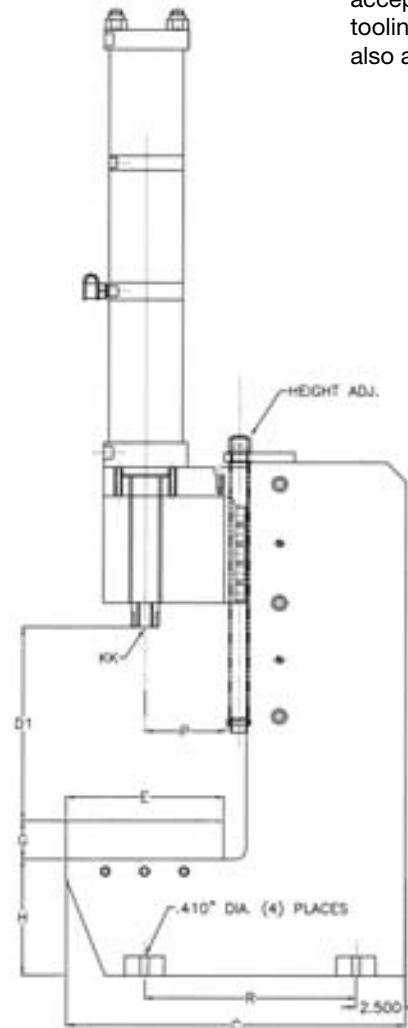
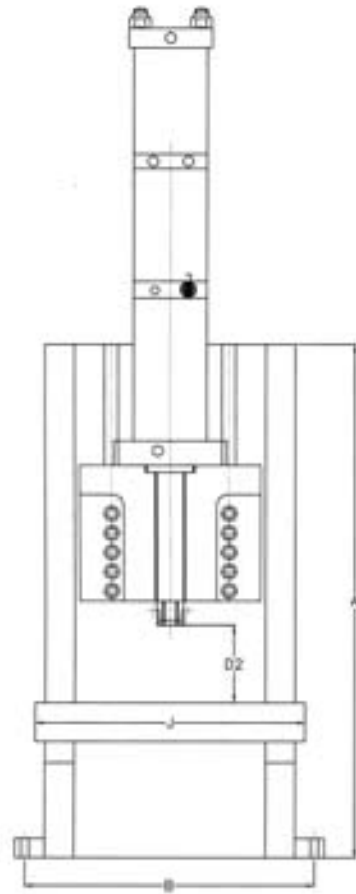
- Available in 1– 8 ton sizes with 2.00" or 4.00" ram travel
- Pinned, keyed and bolted, CNC machined construction for minimum deflection and long service life
- Robust one-piece CNC machine head design
- Adjustable daylight opening
- Uses 30 – 100 PSI plant air supply
- Fast cycle time, low noise, low air consumption
- Auto-sequence power stroke
- Removable lower bed for customer modification
- Includes standard PN1 all pneumatic two-hand, non-repeat/non-tiedown control package with filter, regulator and lockout valve

CB Series Press Options

- Pressure achieved ram retract
- Non-rotating ram
- Oil pressure gage
- Cycle counter with reset
- SE-1 Opto-safe electric two-hand control
- PAF or PAQ Series die set couplings



Lower bolster plates are available pre-machined to accept customer supplied tooling. Custom presses are also available.



	A	B	C	D1	D2	E	G	H	J	P	R	KK
CB-01	21.50	12.00	17.250	10.00	4.00	8.00	1.50	4.00	11.00	4.00	10.750	3/4-16 1.00"
CB-02	21.50	12.00	17.250	10.00	4.00	8.00	1.50	4.00	11.00	4.00	10.750	3/4-16 1.00"
CB-04	26.500	14.750	17.250	10.00	4.00	8.00	2.00	6.00	13.750	4.00	10.750	3/4-16 1.00"
CB-08	26.500	14.750	17.250	10.00	4.00	8.00	2.00	6.00	19.750	4.00	10.750	3/4-16 1.00"

H-Frame Presses



HyperCyl® H-Frame design presses are primarily used for assembly and forming applications requiring a pass-through design for ease of part loading and unloading. Constructed of A36 steel, all cylinder mounting plates, upper and lower bolsters and tooling plates are blanchard ground and zinc blackened. Columns are made from 100,000 tensile, 1045 ground polished and chromed steel. The Frames may be disassembled for customer machining or modifications. Standard H-Frames are available in 1 through 50 ton sizes with unguided, two column and four column guided bolsters.

From the small 1 and 2 ton standard presses to a custom H-Frame press, all HyperCyl products feature the latest in safety compliance, hydra-pneumatic technology and mechanical design. Options include safety light curtains, stroke limiters, IntelliCyl® IMS distance/force monitoring systems and tooling ready bolsters and beds.

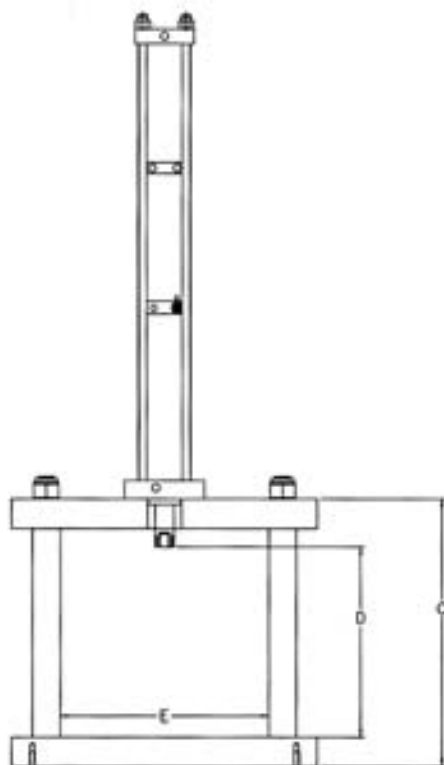
Model/Size (Ton)	H**-01	H**-02	H**-04	H**-08	H**-10	H**-15	H**-20	H**-30	H**-50
Output Force (lb.) (30-100 PSI)	670-2234	1636-5454	2626-8754	4765-15886	7788-25963	9424-31416	11635-38785	19543-65144	31503-105044
Total Ram Stroke ⁽¹⁾	6.00"	6.00"	6.00"	6.00"	6.00"	6.00"	6.00"	6.00"	6.00"
Total Ram Power Stroke ⁽²⁾	.50"	.50"	.50"	.50"	.50"	.50"	.50"	.50"	.50"
Maximum Tooling Weight (lb.)	55	105	170	375	575	575	575	820	1510
Air Consumption (CFM @ 60 PSI) per complete cycle	.136	.267	.426	.886	1.079	1.356	1.568	2.510	4.204
Maximum Operating Speed (in./sec.)***	18	18	18	18	18	18	18	18	18
Min./Max. Operating Pressure (air)	100	100	100	100	100	100	100	100	100
A	12.00	12.00	14.00	14.00	18.00	18.00	18.00	21.00	24.00
A4	16.00	16.00	22.00	22.00	27.00	27.00	27.00	30.500	35.00
B	16.00	16.00	22.00	22.00	27.00	27.00	27.00	30.500	35.00
B4	16.00	16.00	22.00	22.00	27.00	27.00	27.00	30.500	35.00
C	14.250	14.250	17.250	17.250	21.750	21.750	21.750	25.750	32.00
C1	17.625	17.625	21.615	21.615	27.485	27.485	27.485	32.615	41.00
D	10.00	10.00	12.00	12.00	15.00	15.00	15.00	18.00	21.00
E	11.00	11.00	15.00	15.00	18.00	18.00	18.00	21.00	24.00
F	10.00	10.00	12.00	12.00	14.00	14.00	14.00	19.00	22.00
F4	15.500	15.500	21.500	21.500	26.500	26.500	26.500	30.00	34.813
G	13.00	13.00	19.00	19.00	24.00	24.00	24.00	27.500	32.00
G4	13.00	13.00	19.00	19.00	24.00	24.00	24.00	27.500	32.00
H	9.00	9.00	11.00	11.00	15.00	15.00	15.00	18.00	21.00
H4	13.00	13.00	19.00	19.00	24.00	24.00	24.00	27.50	32.00
Ram Thread (unguided)	3/4-16 1.00 DP.	3/4-16 1.00 DP.	3/4-16 1.00 DP.	3/4-16 1.00 DP.	1 1/2-12 2.25 DP.	1 1/2-12 2.25 DP.	1 1/2-12 2.25 DP.	1 7/8-12 3.00 DP.	2 1/4-12 3.50 DP.
K	3/8-16x1.00	3/8-16x1.00	3/8-16x1.00	3/8-16x1.00	1/2-13x1.00	1/2-13x1.00	1/2-13x1.00	5/8-11x1.00	3/4-10x1.50

1. Optional Total Ram Stroke Length – 2.00", 4.00" and 8.00"

2. Optional Ram Power Stroke Lengths – .250", .750" and 1.00"

Please contact factory for custom applications or for information on 75, 100 ton and non-standard frame dimensions.

*** Maximum speed of the seals (not maximum speed of cylinder).

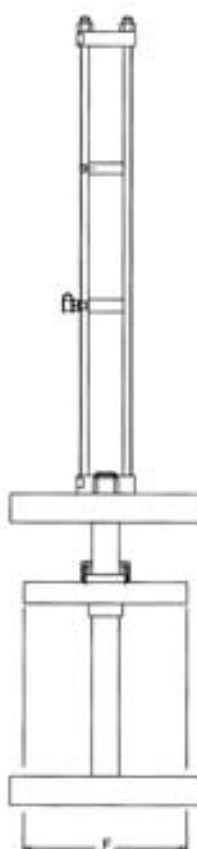
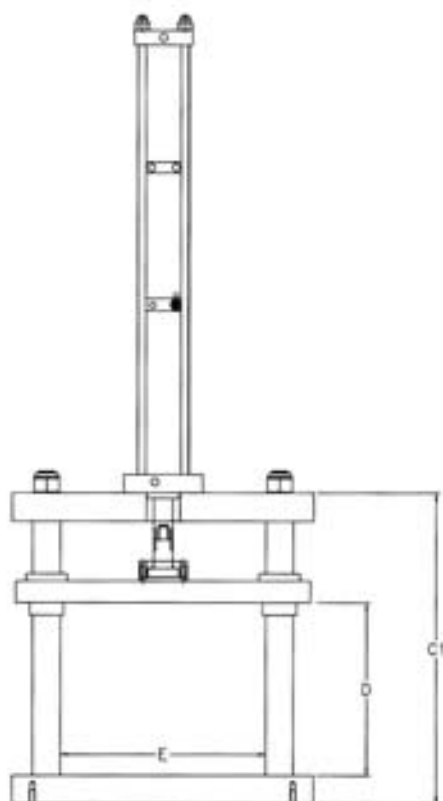
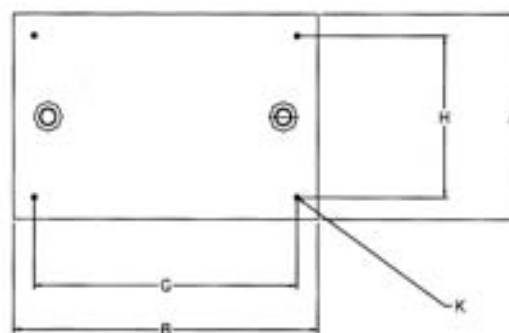


Model HD2 -**

Standard construction includes A36 blanchard ground and zinc black plates, 1045 ground, polished and hard chromed columns. Lower plate may be modified at the factory for customer supplied tooling.

Frame Options:

- T-Slots
- Center Through Hole
- Die Set Couplings
- Daylight Opening and Plate Dimensions

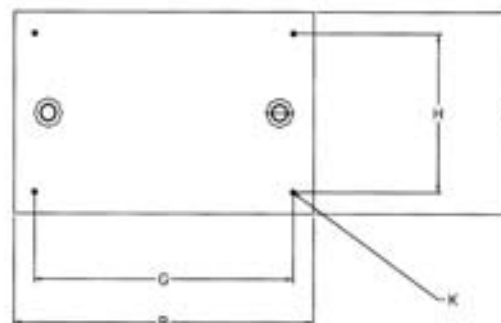


Model HD2G -**

Standard construction includes A36 blanchard ground and zinc black plates, 1045 ground, polished and hard chromed columns, replaceable bronze guide bearings and PAF series die set coupling. Lower plate may be modified at the factory for customer supplied tooling.

Frame Options:

- T-Slots
- Center Through Hole
- Daylight Opening and Plate Dimensions



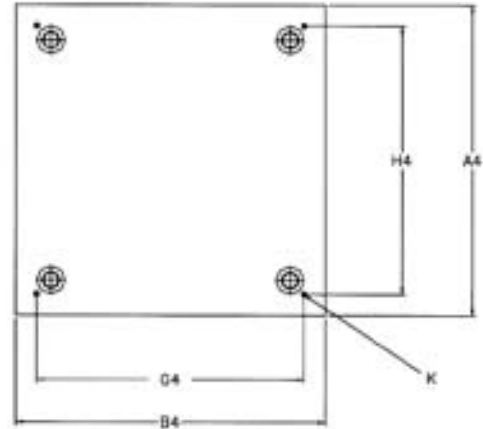
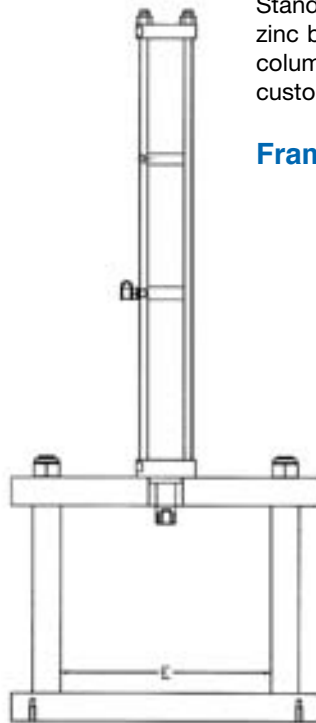
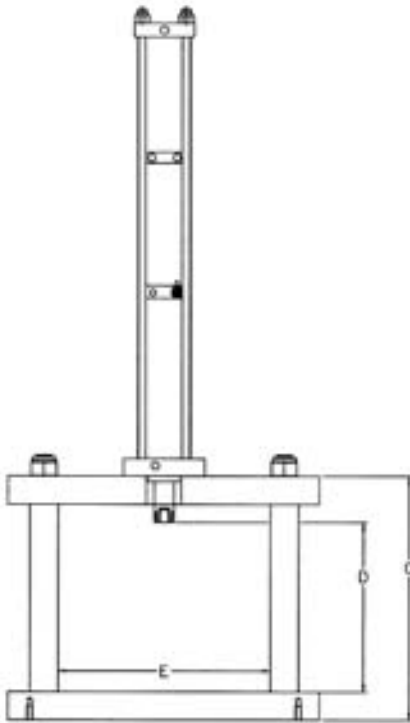
H-Frame Presses

Model HD4 -**

Standard construction includes A36 blanchard ground and zinc black plates, 1045 ground, polished and hard chromed columns. Lower plate may be modified at the factory for customer supplied tooling.

Frame Options:

- T-Slots
- Center Through Hole
- Daylight Opening and Plate Dimensions

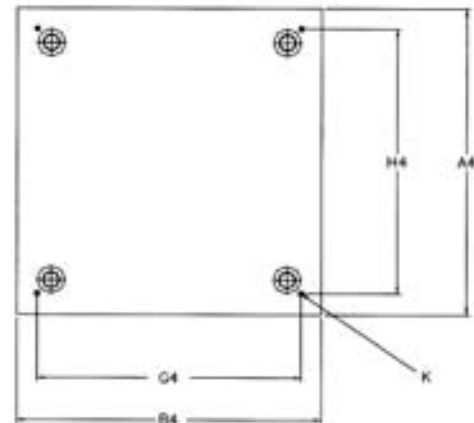
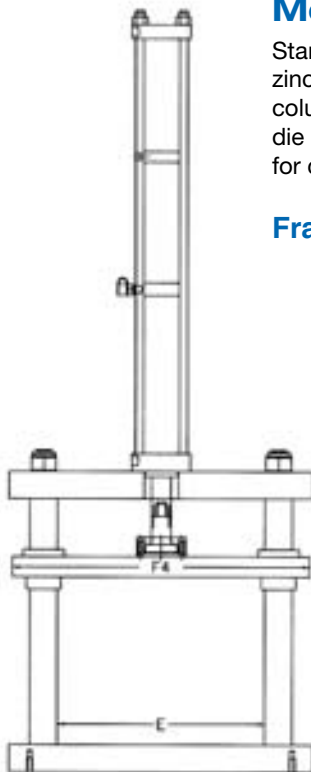
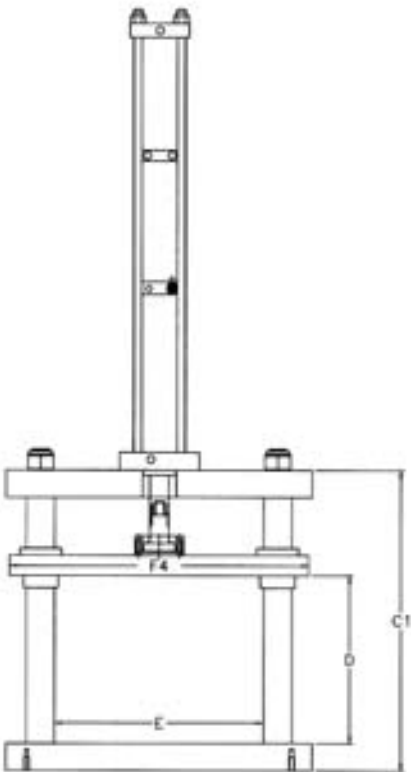


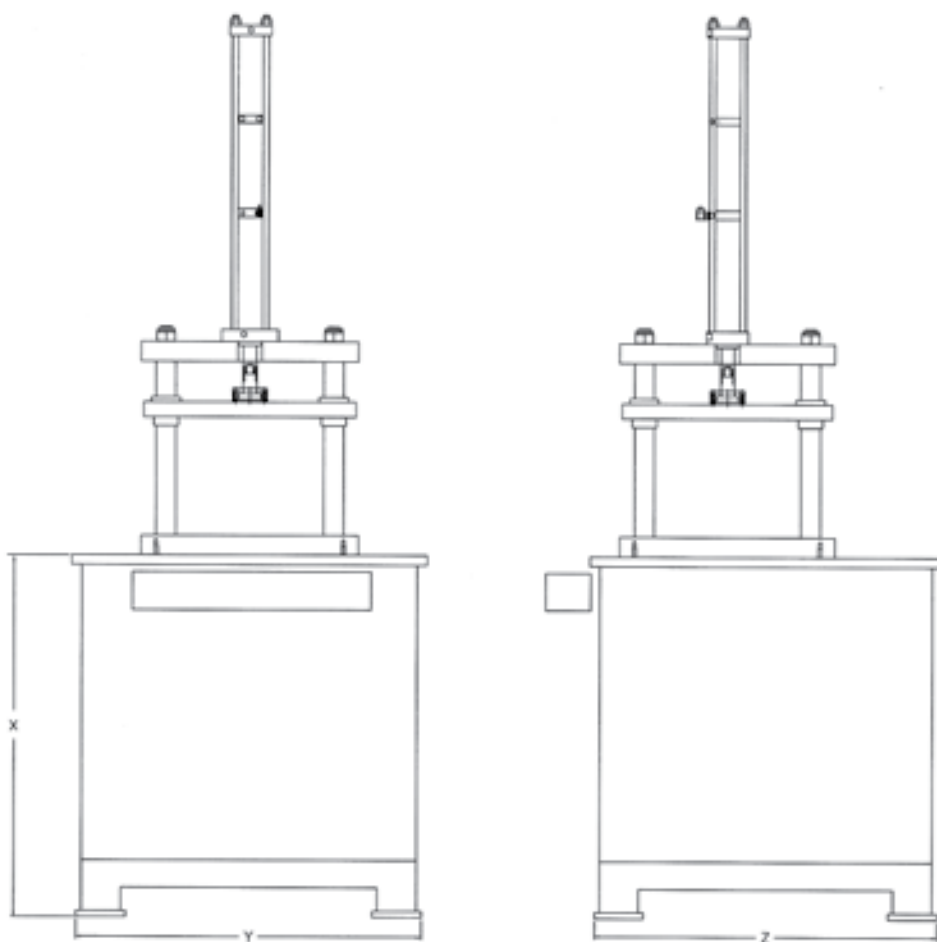
Model HD4G -**

Standard construction includes A36 blanchard ground and zinc black plates, 1045 ground, polished and hard chromed columns, replaceable bronze guide bearings and PAF series die set coupling. Lower plate may be modified at the factory for customer supplied tooling.

Frame Options:

- T-Slots
- Center Through Hole
- Daylight Opening and Plate Dimensions





Model MB -**

Standard construction is heavy square steel tube or roll formed uprights and cross bracing with 1.00" blanchard ground top, (3) removable access panels, leveling screws. Bases are primed and painted AEC White or finished to customer paint specifications.

Frame Options:

- T-Slots
- Center Through Hole
- Daylight Opening and Plate Dimensions

Size	X*	Y	Z
MB-01/02	37.00	36.00	36.00
MB-04/08	37.00	36.00	36.00
MB-10/15/20	37.00	42.00	48.00
MB-30	37.00	48.00	48.00
MB-50	37.00	48.00	48.00

*Operator work height. Specify if other dimension is required.



PLC1 Control Package

The PLC1 press control package is the most versatile control system for all HyperCyl® presses. Easily upgradeable with various options, the PLC1 control package permits an unlimited amount of press functionality and program changes to accommodate different applications.

- PLC Controller with 24 VDC Power Supply
- Control Redundancy Relay
- Optical Opto-Touch Two Handed Non-Tiedown-Anti-Repeat Press Initiate
- E-Stop, Power On/Off Push Buttons
- Auto Run/Jog Push Buttons
- User Adjustable Pressure Achieved Ram Retract Control
- Complete Pneumatic Controls with Main Air Filter, Regulator, Lubricator and Lock-Out/Tag-Out Valve
- Ram Speed Flow Control

PLC1 Options

- 6.00" Monochromatic MMI TouchScreen Panel
- 6.00" Color HMI TouchScreen
- Panel Mounted Cycle Counter
- Panel Mounted Digital Pressure /Force Meter
- Ram Position/Force Monitoring and Control – IntelliPress® IMS *in-process* quality system
- Remote Force Control Adjustment
- Safety Light Curtains
- Foot Switch Control



EC1 Control Package

The EC1 press control package provides basic, dedicated electric press control for all HyperCyl press systems. All control logic operator push buttons are contained within the two-hand control enclosure.



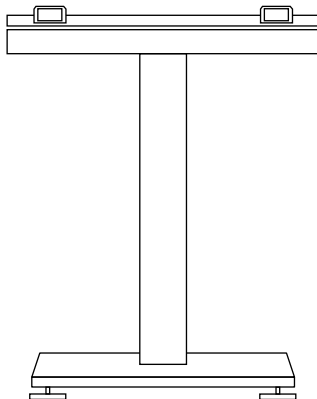
- Self-contained, Dedicated Logic Control with 110VAC Power Cord
- Photo-Optic Sensors for Press Initiate (insert finger(s) within .3 sec). Non-Tie Down, Anti-Repeat
- User Adjustable Pressure Achieved Ram Retract Control
- Complete Pneumatic Controls with Main Air Filter, Regulator, Lubricator and Lock-Out/Tag-Out Valve
- Part Contact (tooling closed) Power Stroke Sequence Sensor
- Ram Speed Flow Control



PN1 Control Package

The PN1 press control package provides basic, dedicated pneumatic press control for HyperCyl press systems. All control logic and operator push buttons are contained within the two-hand control enclosure.

- Self-contained, Dedicated Logic Control
- Light Actuation, Recessed Push Buttons for Press Initiate (insert finger(s) within .3 sec).
- Non-Tie Down, Anti-Repeat
- User Adjustable Time Achieved Ram Retract Control
- Complete Pneumatic Controls with Main Air Filter, Regulator, Lubricator and Lock-Out/Tag-Out Valve
- Part Contact (tooling closed) Power Stroke Sequence Sensor
- Ram Speed Flow Control

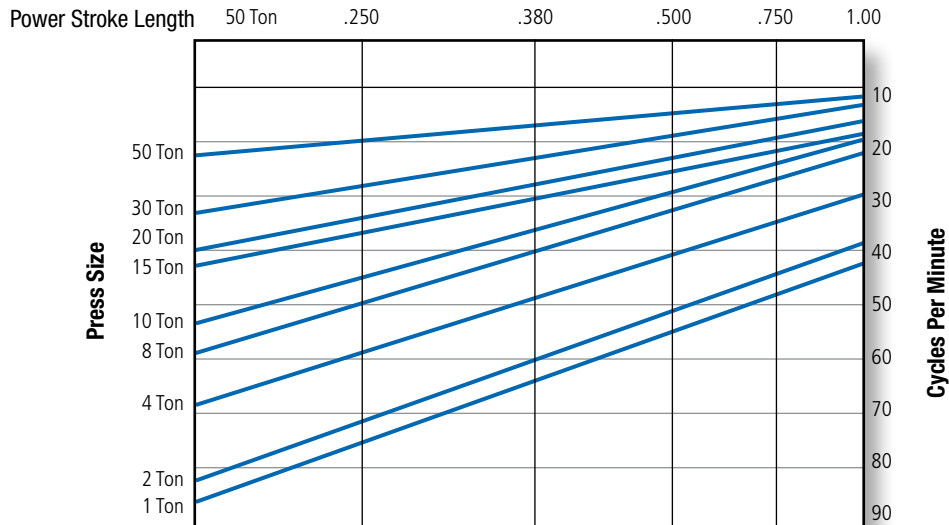


Remote Operation Station

Where assembly processes, part size or operator safety and ergonomics do not permit the operator control to be located on the press, the remote operator station option places the operator two-hand control and E-Stop function controls on a remote stand. The stand can be positioned anywhere within 6 ft. of the press and is height adjustable from 30.00" to 40.00". All control lines are protected by heavy nylon sleeve, strain relieved. Connection by single plug-in to back of main control panel.

- Multiple station operation – two operators required for press actuation
- Ergonomically designed
- Height adjustable, easily positioned for various applications

Cycle Rates - HyperCyl® Presses



Values shown above assume a nominal 4.00" total ram stroke operating at 75% of rated press capacity. Changes in total stroke, main air supply volume and tooling weight can alter these ratings up to 35%. Please contact AEC/HyperCyl for specific application assistance. Values are approximate.

Air Consumption - HyperCyl® Presses

The following chart may be useful when planning your plant air requirements for HyperCyl® press systems. To solve for total air consumption in CFM, find the appropriate size press and multiply the "Air Consumption" value times the cycles per minute. Values are approximate and may vary depending on air pressure.

Press Size	Air Consumption @ 60 PSI per Cycle (CFM)
1 Ton	.136
2 Ton	.267
4 Ton	.426
8 Ton	.886
10 Ton	1.079
15 Ton	1.356
20 Ton	1.568
30 Ton	2.510
50 Ton	4.204

Process Cycle Time/Production Rates

The following chart may be useful when determining machine cycle times. All rates are based upon a 52 week year with 40 hour, single shift work weeks operating at 100% efficiency. Adjust final value to suit your own holidays, shutdowns, efficiencies and multiple shifts.

Time (Seconds)	Rate Per Minute	Rate Per Hour	Rate Per 8 Hour Day	Rate Per 40 Hour Week	Rate Per Month (4.33 Weeks Per Month)	Rate Per Year (52 Weeks)
0.5	120.00	7,200	57,600	288,000	1,247,040	14,964,480
1	60.00	3,600	28,800	144,000	623,520	7,482,240
2	30.00	1,800	14,400	72,000	311,760	3,741,120
3	20.00	1,200	9,600	48,000	207,840	2,494,080
4	15.00	900	7,200	36,000	155,880	1,870,560
5	12.00	720	5,760	28,800	124,704	1,496,448
6	10.00	600	4,800	24,000	103,920	1,247,040
7	8.57	514	4,114	20,571	89,074	1,068,891
8	7.50	450	3,600	18,000	77,940	935,280
9	6.67	400	3,200	16,000	66,280	831,360
10	6.00	360	2,880	14,400	62,352	748,224
11	5.45	327	2,618	13,091	56,684	680,204
12	5.00	300	2,400	12,000	51,960	623,520
13	4.62	277	2,215	11,077	47,963	575,557
14	4.29	257	2,057	10,286	44,537	534,446
15	4.00	240	1,920	9,600	41,568	498,816
16	3.75	225	1,800	9,000	38,970	467,640
17	3.53	212	1,694	8,471	36,678	440,132
18	3.33	200	1,600	8,000	34,640	415,680
19	3.16	189	1,516	7,579	32,817	393,802
20	3.00	180	1,440	7,200	31,176	374,112
21	2.86	171	1,371	6,857	29,691	356,297
22	2.73	164	1,309	6,545	28,342	340,102
23	2.61	157	1,252	6,261	27,110	325,315
24	2.50	150	1,200	6,000	25,980	311,760
25	2.40	144	1,152	5,760	24,941	299,290
26	2.31	138	1,108	5,538	23,982	287,778
27	2.22	133	1,067	5,333	23,093	277,120
28	2.14	129	1,029	5,143	22,269	267,223
29	2.07	124	993	4,966	21,501	258,008
30	2.00	120	960	4,800	20,784	249,408
40	1.50	90	720	3,600	15,588	187,056
50	1.20	72	576	2,880	12,470	149,645
60	1.00	60	480	2,400	10,392	124,704

Note: The above table is for reference purpose only and does not include values for dwell, part load/unload, part indexing or cold form dwell times. Please contact factory for additional information or application engineering.

Metal Forming

Forces required for metal piercing can be calculated as follows:

L = Length of Cut

T = Thickness of Material

S = Shear Strength of Material

$$L \times T \times S = \text{Force Required}$$

(stripping force = 10% of Pierce Force)

Stripping force is the force required to typically remove or retract the punch after it has pierced the material.

Example:

3/8" (.375") hole through .032" thick CRS (cold rolled steel)

L = 1.178 (.375 x 3.141)

T = .032

S = 55,000

$$1.178 \times .032 \times 55,000 = 2090 \text{ lbs.}$$

Approximate Force Required to Pierce Mild Steel

Metal Thickness	.032" .81 mm	.035" .89 mm	.049" 1.24 mm	.065" 1.65 mm	.072" 1.83 mm	.095" 2.41 mm	.109" 2.77 mm	.120" 3.05 mm	.148" 3.76 mm	.180" 4.57 mm	.259" 6.58 mm
Hole Diameter	Pierce Force (lbs.) Not Including Stripping Force										
.250" 6.3 mm	1382	1512	2117	2808	3110	4104	4708	5184	6393	7775	11,188
.312" 7.9 mm	1725	1887	2642	3504	3882	5121	5876	6469	7979	9704	13,964
.375" 9.5 mm	2073	2268	3175	4212	4665	6156	7063	7775	9590	11,663	16,782
.437" 11.1 mm	2416	2643	3700	4908	5437	7173	8230	9061	11,175	13,592	19,557
.500" 12.7 mm	2765	3024	4233	5616	6220	8207	9417	10,367	12,786	15,551	22,376
.562" 14.3 mm	3107	3399	4758	6312	6992	9225	10,585	11,653	14,372	17,479	25,151
.625" 15.9 mm	3456	3780	5292	7020	7775	10,259	11,771	12,959	15,983	19,439	27,970
.687" 17.4 mm	3799	4155	5817	7716	8547	11,277	12,939	14,245	17,568	21,367	30,745
.750" 19.1 mm	4147	4536	6350	8423	9331	12,311	14,125	15,551	19,179	23,326	33,564
.812" 20.6 mm	4490	4911	6875	9120	10,102	13,329	15,293	16,836	20,765	25,255	36,339
.875" 22.2 mm	4838	5292	7408	9827	10,886	14,363	16,480	18,143	22,376	27,214	39,158
1.00" 25.4 mm	5529	6048	8467	11,231	12,441	16,415	18,834	20,735	25,573	31,102	44,752

Approximate Force Required to Upset (cold heading) Mild Steel Rivets*

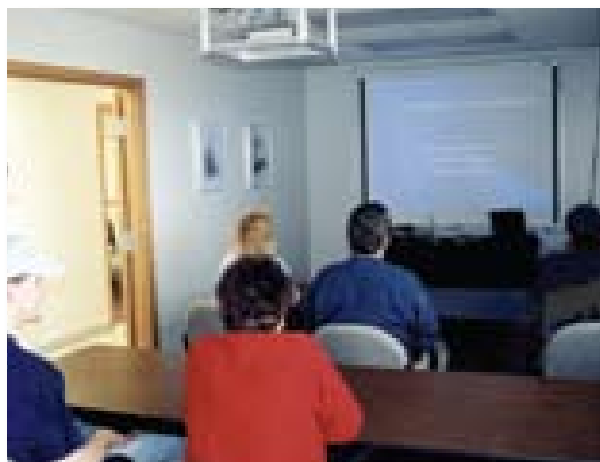
Diameter	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"
Tons	4.25	7.5	11.5	16.5	22.5	29.5	46	66	90

Please contact AEC/HyperCyl for specific application assistance.

*The above chart is for reference only.

Application Testing Lab

Beginning in 1994 AEC/HyperCyl recognized the need for evaluating customer assembly and forming applications to determine the force/distance, time and finished product requirements prior to press and fixture design and the purchasing of equipment. For this reason AEC/HyperCyl built an Application Test Lab to evaluate, through actual assembly of customer provided components, a complete finished or sub-assembly part at no charge to the customer. All supplied material accompanied with a complete evaluation documentation report is typically returned to the customer within 24 hours of receipt at AEC's facility. Additionally, AEC/HyperCyl has an extensive database containing hundreds of previous assembly and forming applications available for customers use and access.



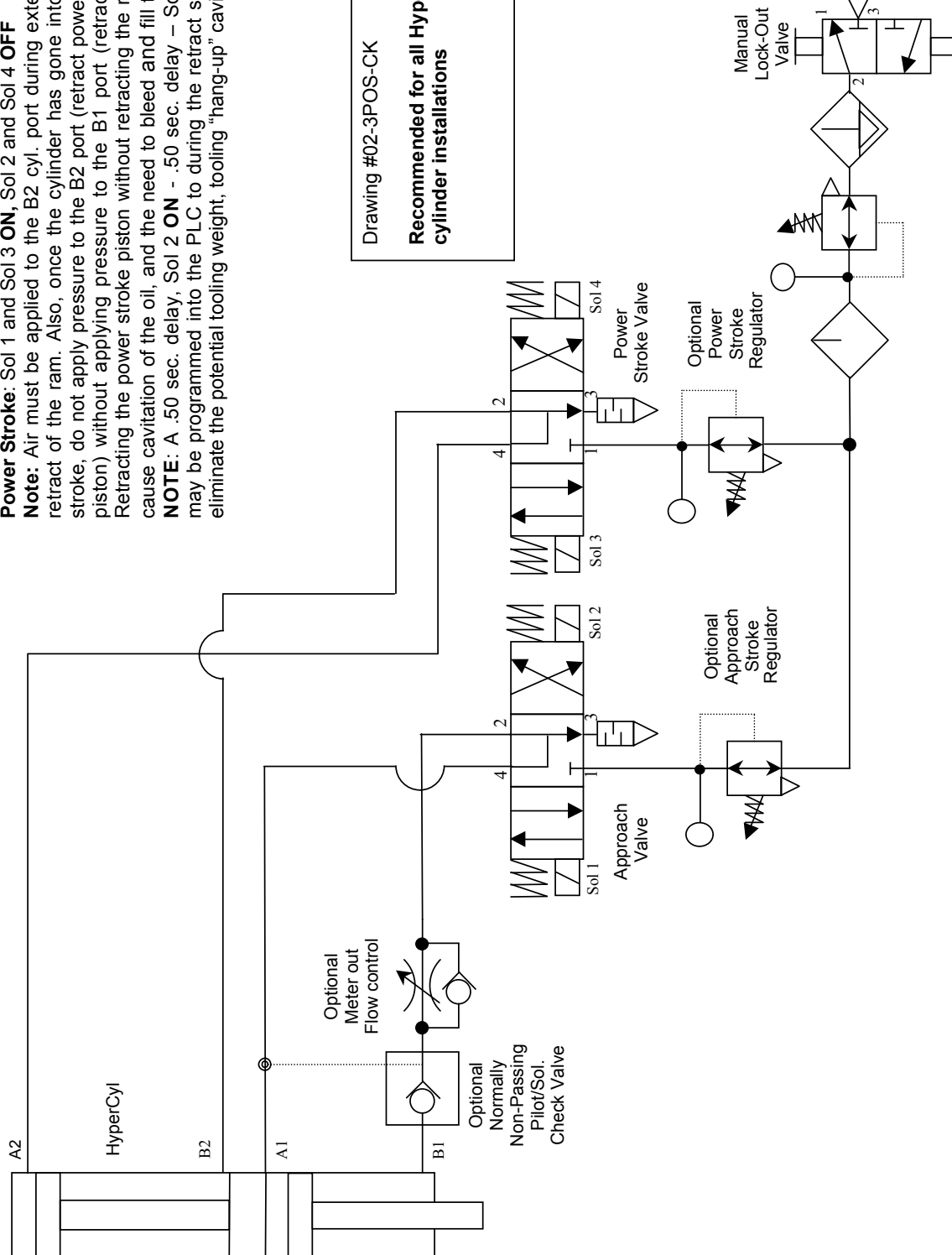
The lab is equipped with a complete range of load cells and meters, precision distance and pressure measurement monitors with testing from 1 to 50 tons of output force in both C-Frame and H-Frame press configurations.

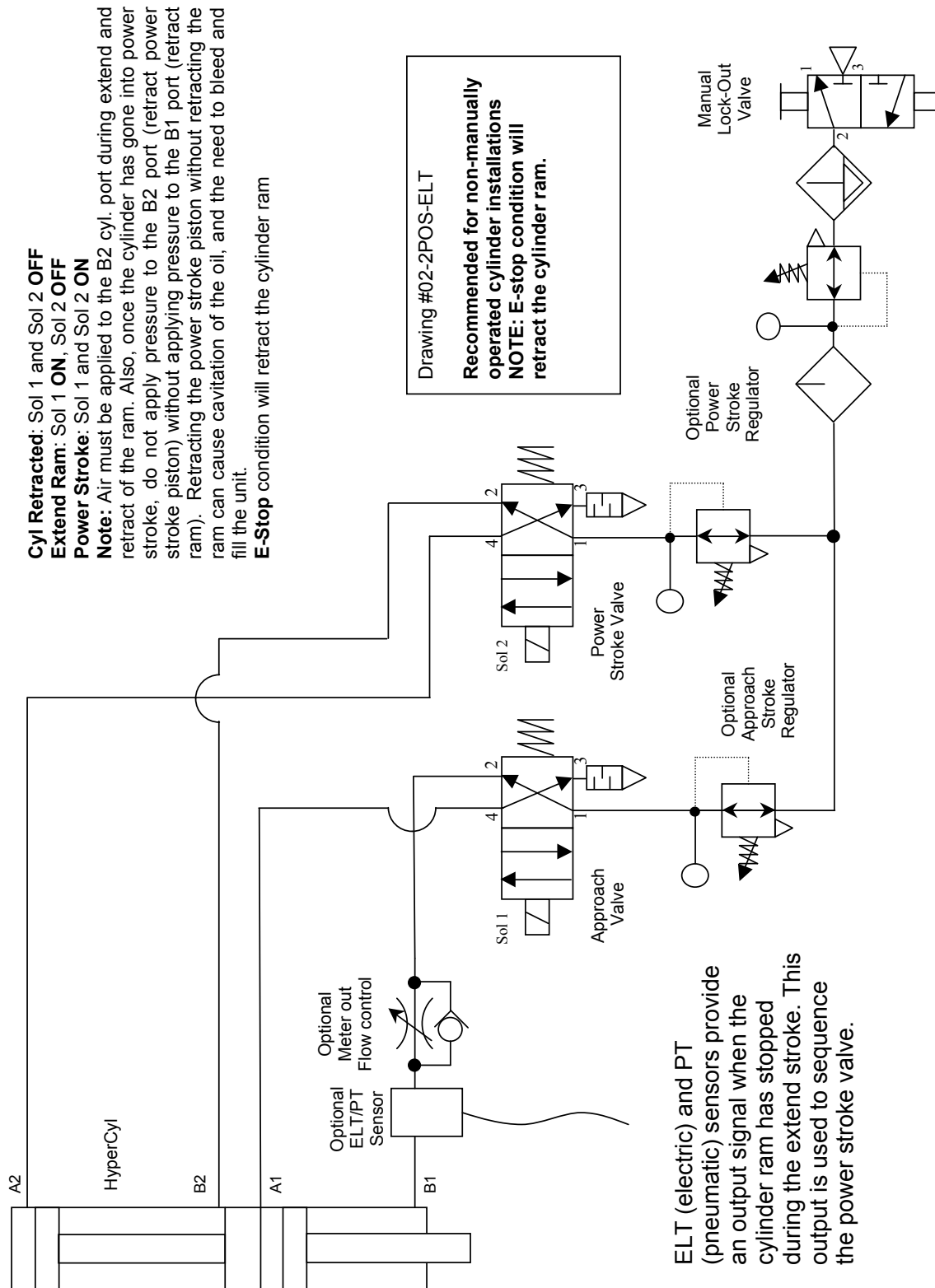
The lab is also equipped with a complete IntelliCyl IMS press for benchmarking specific force distance relationships and signature (deviation monitoring) analysis.

Please contact AEC/HyperCyl applications engineering for more information.

Cyl Retracted: Sol 2 and Sol 4 **ON**, Sol 1 and Sol 3 **OFF**
Extend Ram: Sol 1 and Sol 4 **ON**, Sol 2 and Sol 3 **OFF**
Power Stroke: Sol 1 and Sol 3 **ON**, Sol 2 and Sol 4 **OFF**
Note: Air must be applied to the B2 cyl. port during extend and retract of the ram. Also, once the cylinder has gone into power stroke, do not apply pressure to the B2 port (retract power stroke piston) without applying pressure to the B1 port (retract ram). Retracting the power stroke piston without retracting the ram can cause cavitation of the oil, and the need to bleed and fill the unit.
NOTE: A .50 sec. delay, Sol 2 **ON** - .50 sec. delay - Sol 4 **ON** may be programmed into the PLC to during the retract stroke to eliminate the potential tooling weight, tooling "hang-up" cavitation.

Drawing #02-3POS-CK
 Recommended for all HyperCyl
 cylinder installations





The HyperPierce series units are ideal for:
Metal and composite Piercing, Riveting, Marking,
Clinching, Staking and Assembly applications where
high-speed, high-force operation is desirable.

Operation: Equalizing units extend both ram and anvil to the work piece, reverse equalizing extends the anvil to the workpiece, non-equalizing units extend the ram to the work piece prior to the power stroke (high force) cycle. Units include: oil refilling and high-pressure gage couplings, low-oil indicator and installation/service manual.

Controls: (2) 3-position, 4-way pneumatic directional control valves. An air regulator may also be added to control the output force.

Installation: The HyperPierce series units can be installed in any orientation with (4) or (6) SHCS. Location pin and key-ways are provided.

Accessories: non-rotating rod, pressure switches, integral linear transducer and load cell sensors.

Custom Units: In addition to the standard units shown in this catalog, AEC can build custom HyperPierce units to customer application specifications.

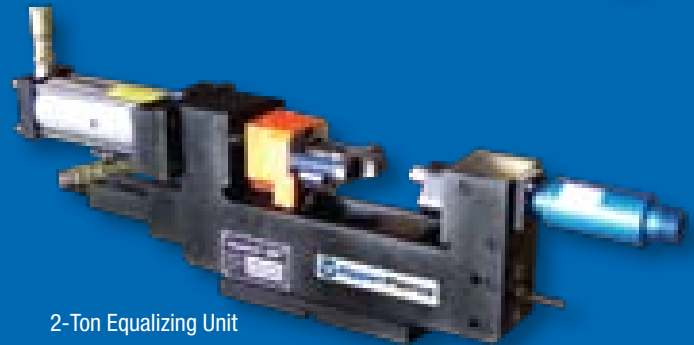
Features and Benefits

- Equalizing, Reverse-Equalizing and Non-Equalizing Designs
- 2-30 Ton Size Range
- Linear Output Force
- Operation in any position
- Compact
- 3 year warranty

4-Ton Reverse-Equalizing Unit



2-Ton Equalizing Unit



2-Ton Non-Equalizing Unit



All HyperCyl® cylinders operate on a basis of ratios. Input air pressure (PSI) multiplied by the Working Ratio of a respective cylinder determines the cylinder Output Force.

Minimum Supply Air Pressure:

Fast Approach 50 PSI
High Pressure 30 PSI

Refer to the chart below for performance specifications.

Supply Air Pressure	30-100 PSI
Recommended Air Preparation	40 micron filtration, lubricated
Operating Temperature	10°F-160°F
Maximum Operating Speed	1 Foot/second
Usable Cylinder Service Life	20-30 million cycles (lubricated air)*
Recommended Replacement Oil	Chevron ISO 32 Shell Tellus 22 ESSO Nuyo A22 Exxon Spinesstic 22 Mobil Velocite #10 Sunoco Sunvis 822 <i>Please contact the factory prior to use of any other oils.</i>

*Cylinders may require refilling of the internal oil reservoir at 3-6 million cycle intervals. Actual cylinder service life may vary due to plant air supply condition and/or applications.

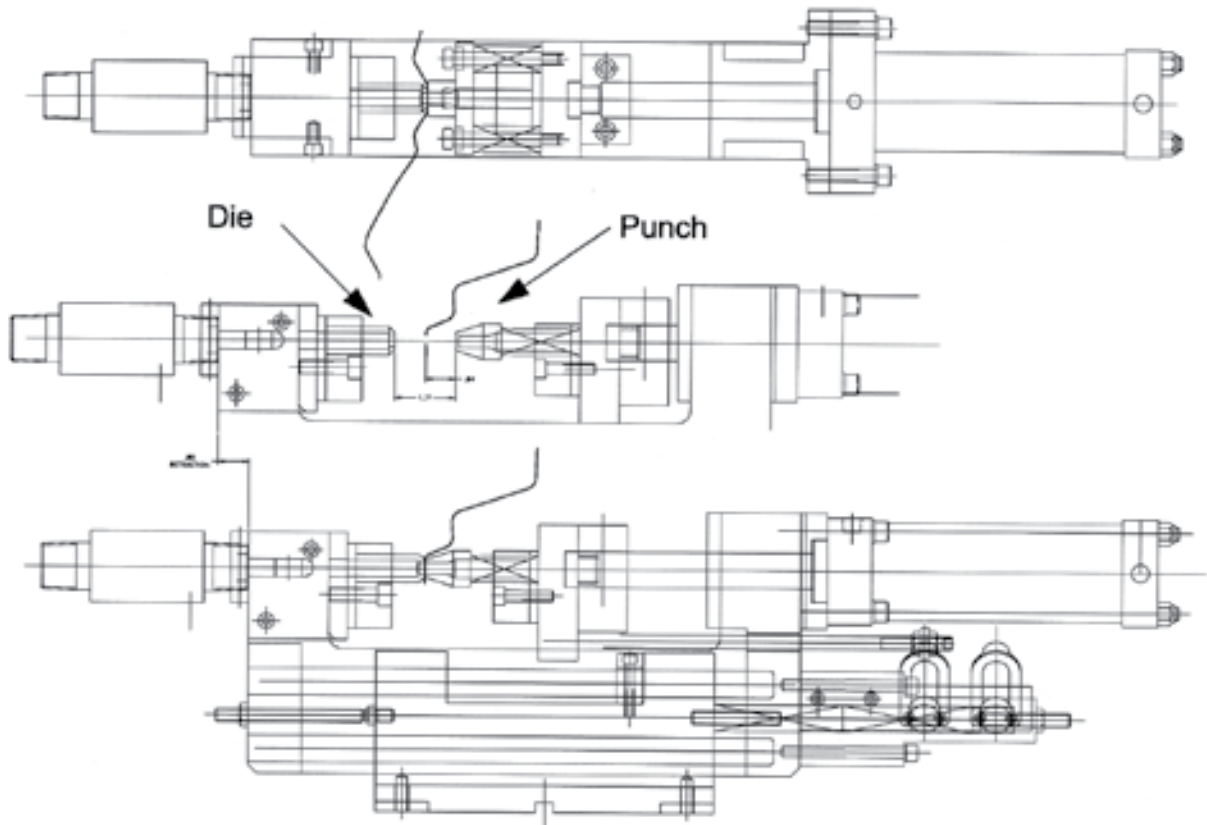
Model Series/Size	*Approach Force per PSI (lbs.)	*Retract Force per PSI (lbs.)	Minimum H.P Force @30 PSI (lbs.)	Maximum H.P Force @100 PSI (lbs.)	Working Ratio (Force per PSI)	Service Ratio (Hydraulic)	(1) Air Consumption per cycle*
HPI/HPT/HPS-1	3.14	2.35	670	2234	22.34:1	7:1	.136 SCFM
HPI/HPT/HPS-2	4.90	4.11	1636	5454	54.54:1	11:1	.267 SCFM
HPI/HPT/HPS-4	8.29	6.81	2628	8762	87.62:1	10:1	.426 SCFM
HPI/HPS-8	12.56	10.81	4765	15,886	158.86:1	12.6:1	.886 SCFM
HPI/HPT/HPS-10	19.63	16.49	7788	25,963	259.63:1	13:1	1.079 SCFM
HPI/HPS-15	19.63	16.49	9424	31,416	314.16:1	16:1	1.356 SCFM
HPI/HPS-20	19.63	16.49	11,635	38,785	387.85:1	19.7:1	1.568 SCFM
HPI/HPS-30	28.27	23.37	19,543	65,144	651.44:1	23:1	2.510 SCFM
HPI/HPS-50	50.26	43.20	31,503	105,044	1050.44:1	21:1	4.204 SCFM
HPI/HPS-75	78.54	65.97	46,542	155,140	1551.40:1	19.8:1	7.160 SCFM
HPI/HPS-100	78.54	65.97	58,905	196,358	1693.50:1	25:1	8.51 SCFM

NOTE: The above specifications are theoretical forces. Frictional loads and lack of proper air supply may affect cylinder performance. Please multiply application force requirements by 1.25-1.50 to ensure adequate force is available.

* Typical approach/retract break-away air pressure is 35 PSI.

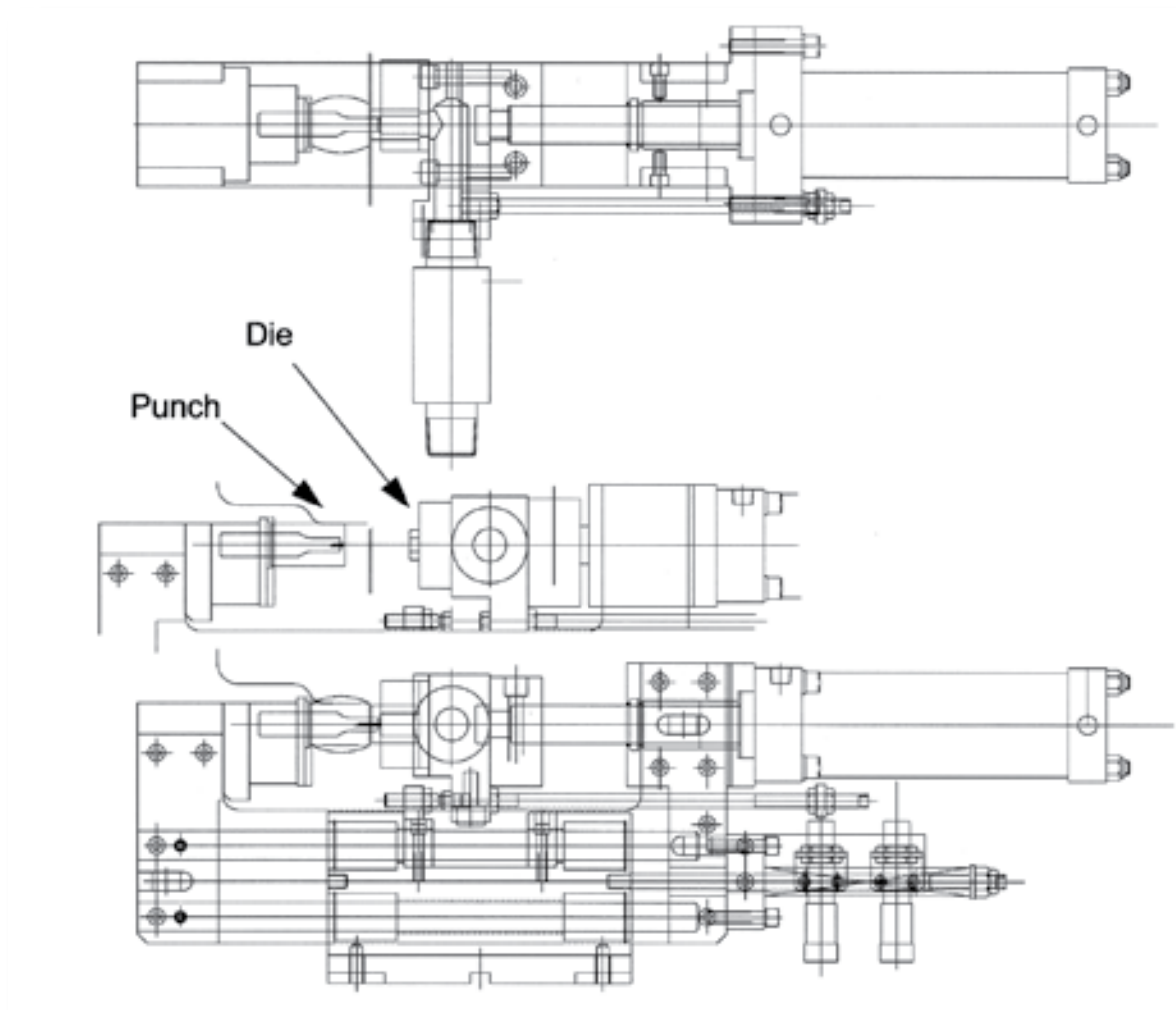
(1) Air consumption values shown are based on 14.00" total stroke, .50" power stroke cylinder operating at 60 PSI. Multiply value by cycles per minute for total SCFM usage.

- Aries Engineering Company, Inc. can provide a detailed evaluation of the forces required for your application. Please contact your local AEC distributor or AEC Technical Support for assistance.
- Piercing/punching applications may require a stripper spring(s) if "punch-thru" is prior to the end of cylinder stroke.
- All cylinders may be operated with non-lubricated air. However, cylinder service life will be reduced by 20%.
- For additional operational information, refer to "Installation Guidelines".



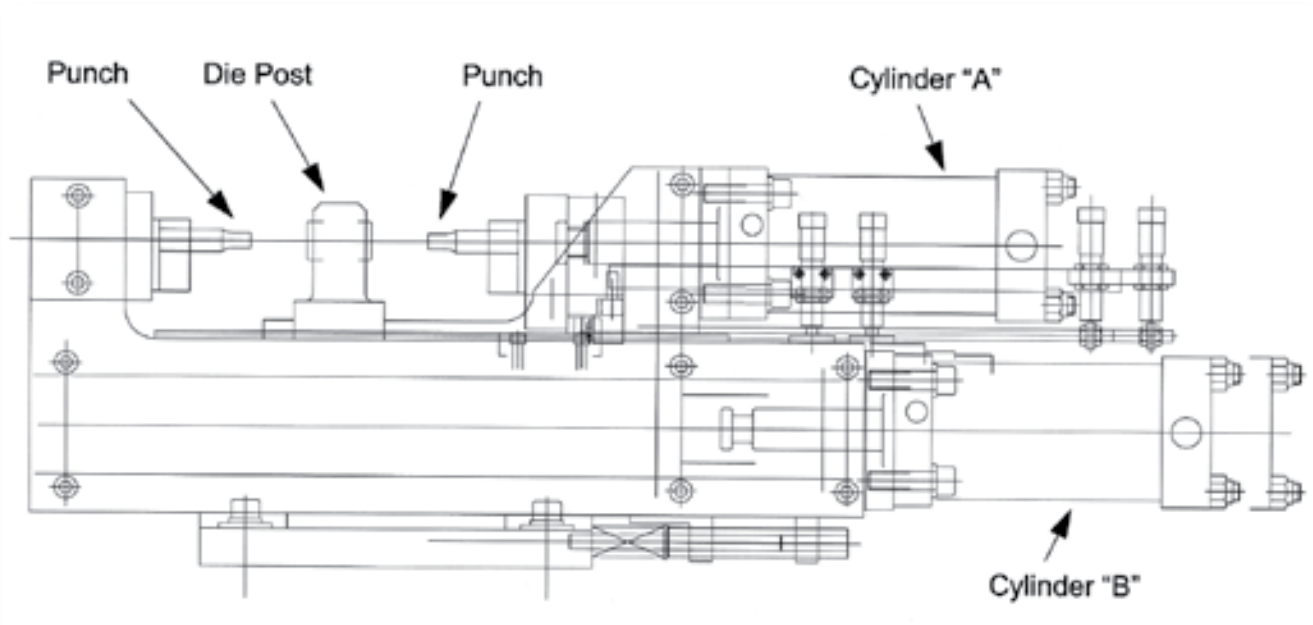
Sequence of Operation

1. **Top:** Overhead view of Equalizing Pierce Unit in fully closed position.
2. **Middle:** Equalizing Pierce Unit in the open position.
3. **Bottom:** Equalizing Pierce Unit in the equalized (pre-pierce) position.
During the approach stroke, both punch and die move to “meet” the part.
Equalizing distance is user adjusted.



Sequence of Operation

1. **Top:** Overhead view of Equalizing Pierce Unit in fully closed position.
2. **Middle:** Equalizing Pierce Unit in the open position.
3. **Bottom:** Equalizing Pierce Unit in the equalized (pre-pierce) position.
During the approach stroke, both punch and die move to “meet” the part.
Equalizing distance is user adjusted.

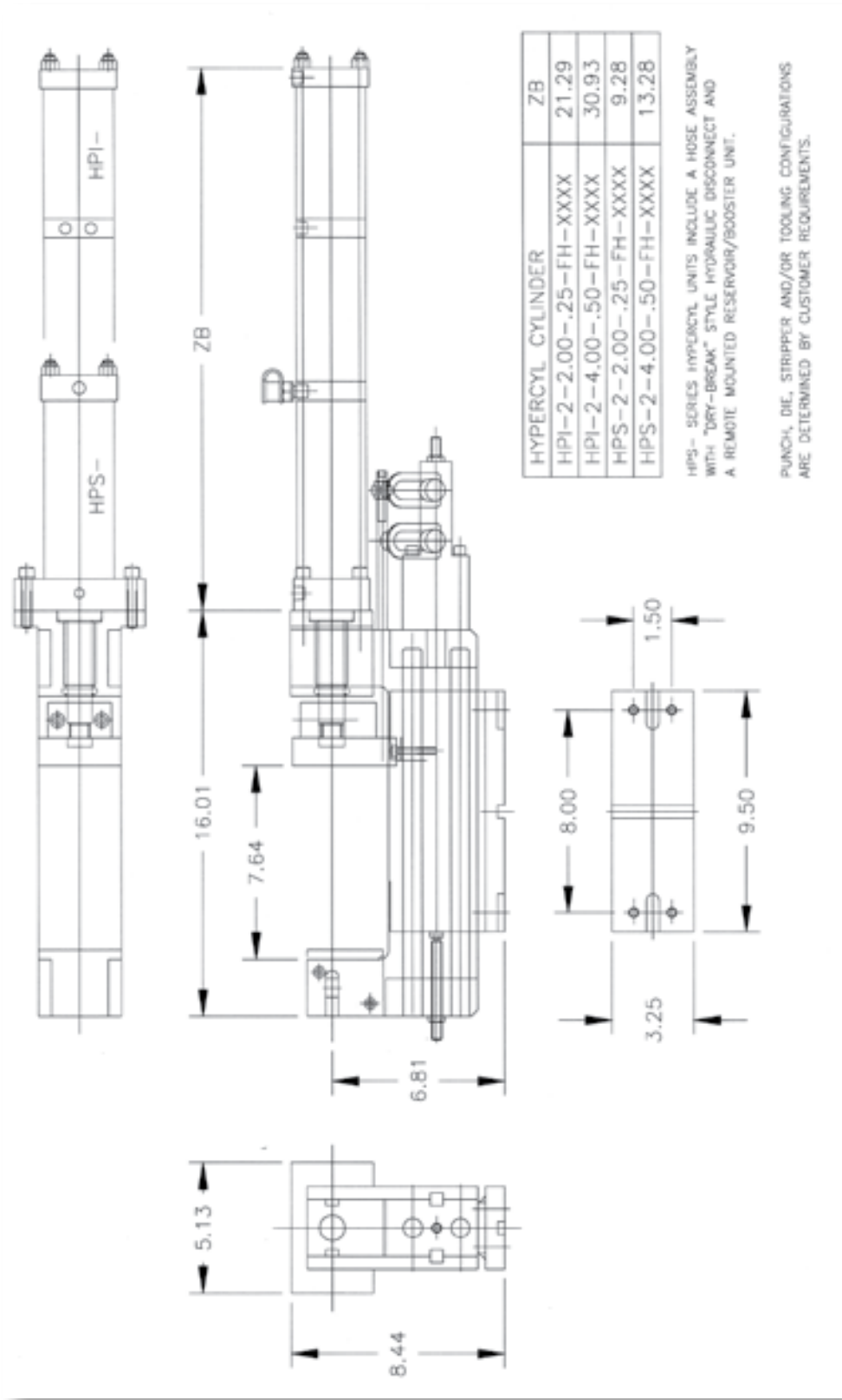


Sequence of Operation

Home/Start position — Cylinder "A" and "B" returned.

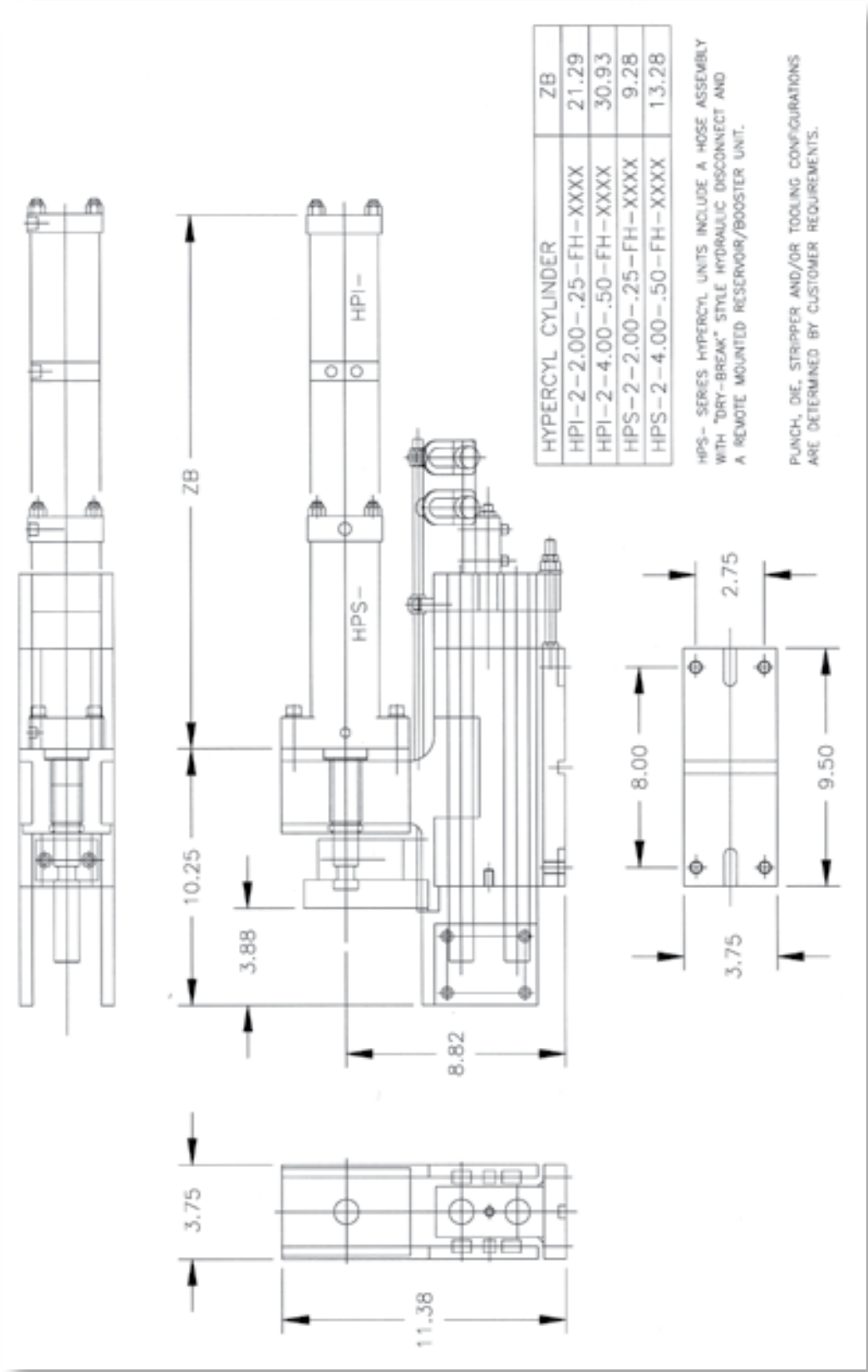
1. **Extended Cylinder "A"** - as cylinder "A" extends, the die post will move towards the punch, contacting the work surface. Cylinder "A" continues to extend until the punch contacts the opposite side of the work surface. Initiating the power stroke sequence will pierce the work surface and the cylinder ending at full stroke.
2. **Retract Cylinder "A"** - as cylinder "A" retracts, the die post will return to the "home/neutral" position (Cylinder "B" must be fully retracted at system pressure throughout the complete cycle of cylinder "A")
3. **Extend Cylinder "B"** - as cylinder "B" extends, the die post will move towards the punch contacting the work surface. Cylinder "B" continues to extend until the punch contacts the opposite side of the work surface. Initiating the power stroke sequence will pierce the work surface and the cylinder ending at full stroke.
4. **Retract Cylinder "B"** - as cylinder "B" retracts the die post will return to the "home/neutral" position. (Cylinder "A" must be fully retracted at system pressure throughout the complete cycle of cylinder "B")

2-Ton Equalizing



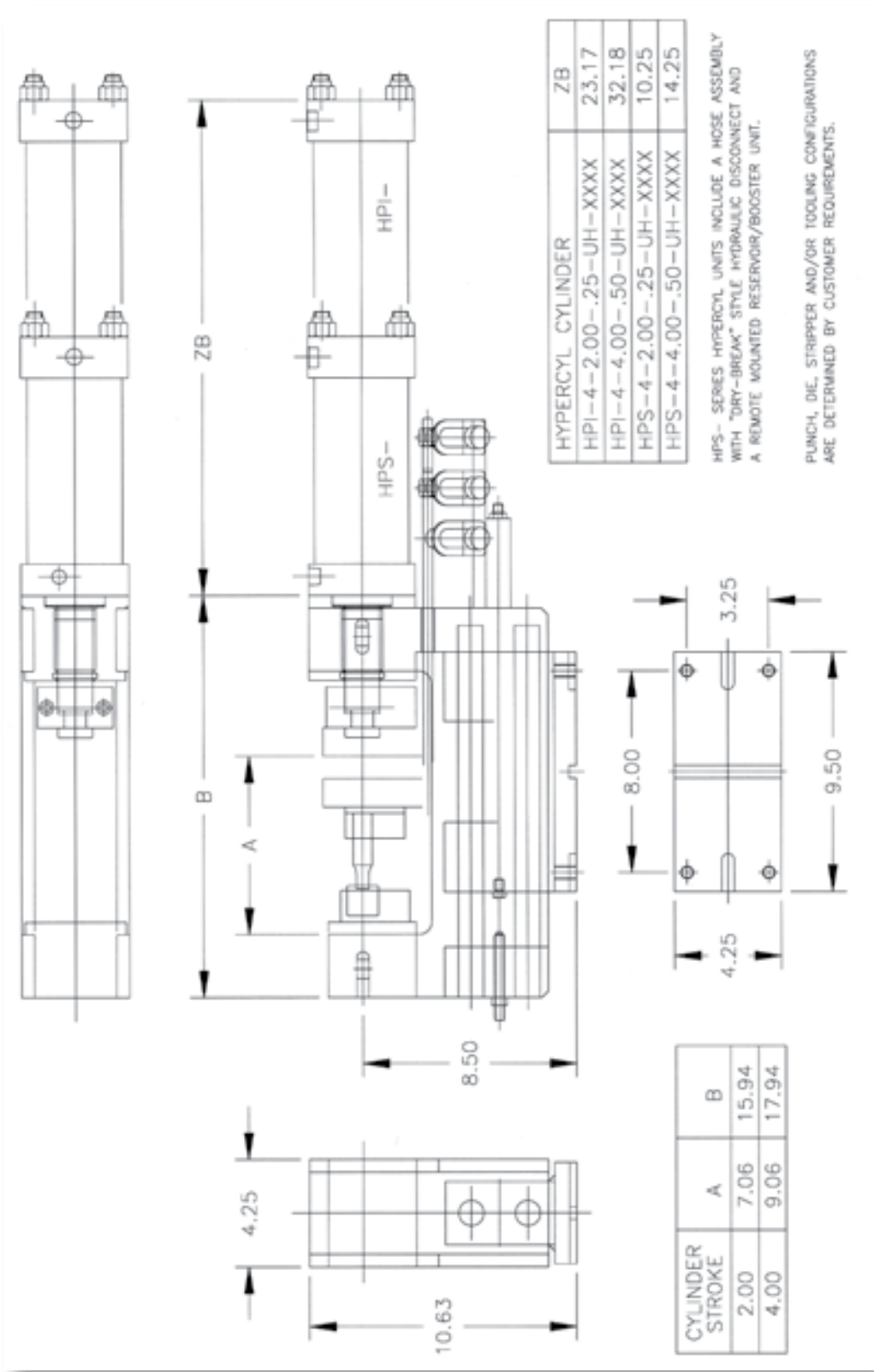
BASIC EQUALIZING UNIT P-BUO2-SE-A-01-0201 CAPACITY 5454 lbs. FORCE @ 100 psi. AIR

2-Ton Equalizing



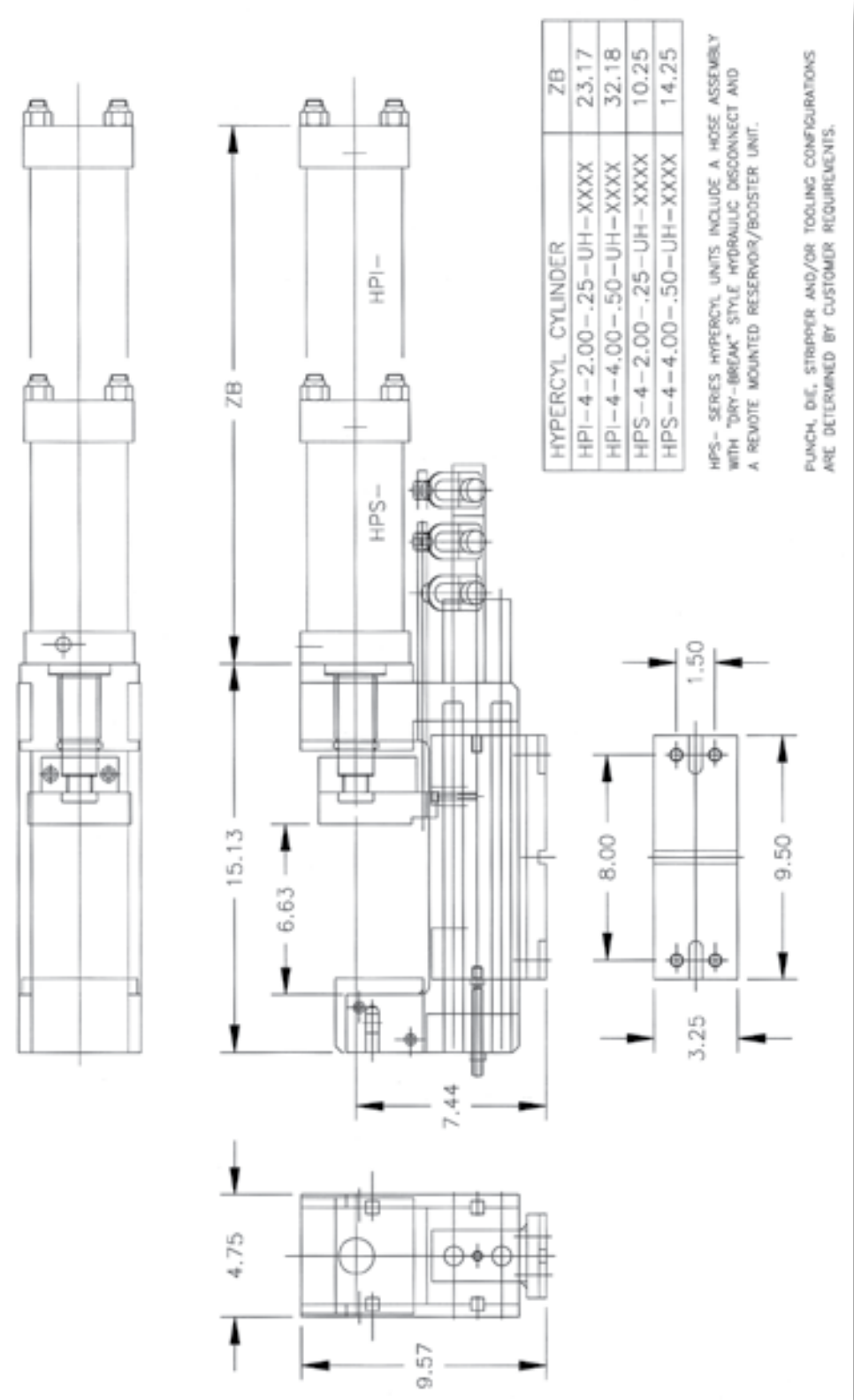
BASIC EQUALIZING UNIT P-BUO2-SE-A-01-0202 CAPACITY 5454 lbs. FORCE @ 100 psi. AIR

4-Ton Equalizing



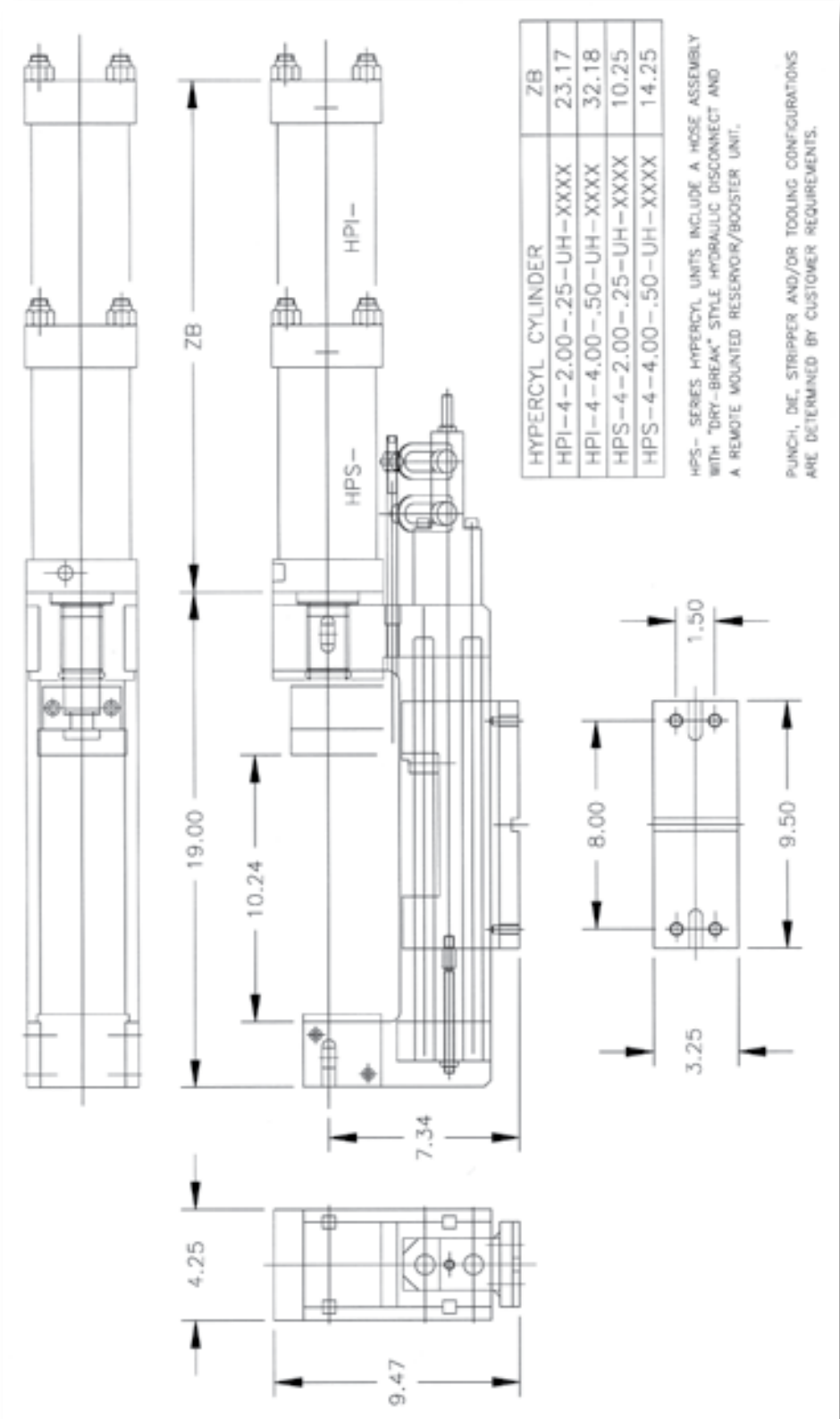
BASIC EQUALIZING UNIT P-BUO2-SE-A-01-0401 CAPACITY 8754 lbs. FORCE @ 100 psi. AIR

4-Ton Equalizing



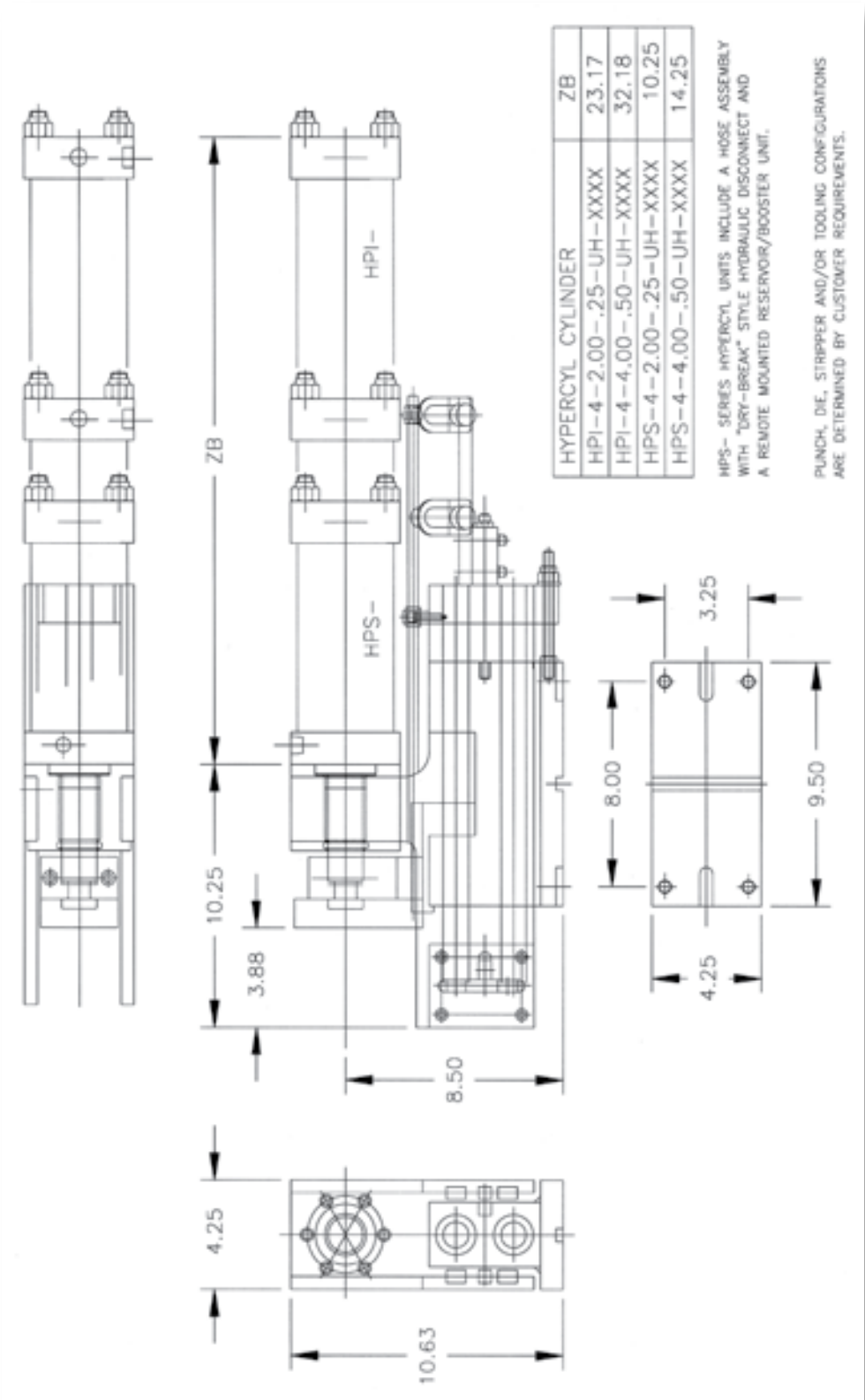
BASIC EQUALIZING UNIT P-BU02-SE-A-01-0402 CAPACITY 8754 lbs. FORCE @ 100 psi. AIR

4-Ton Equalizing



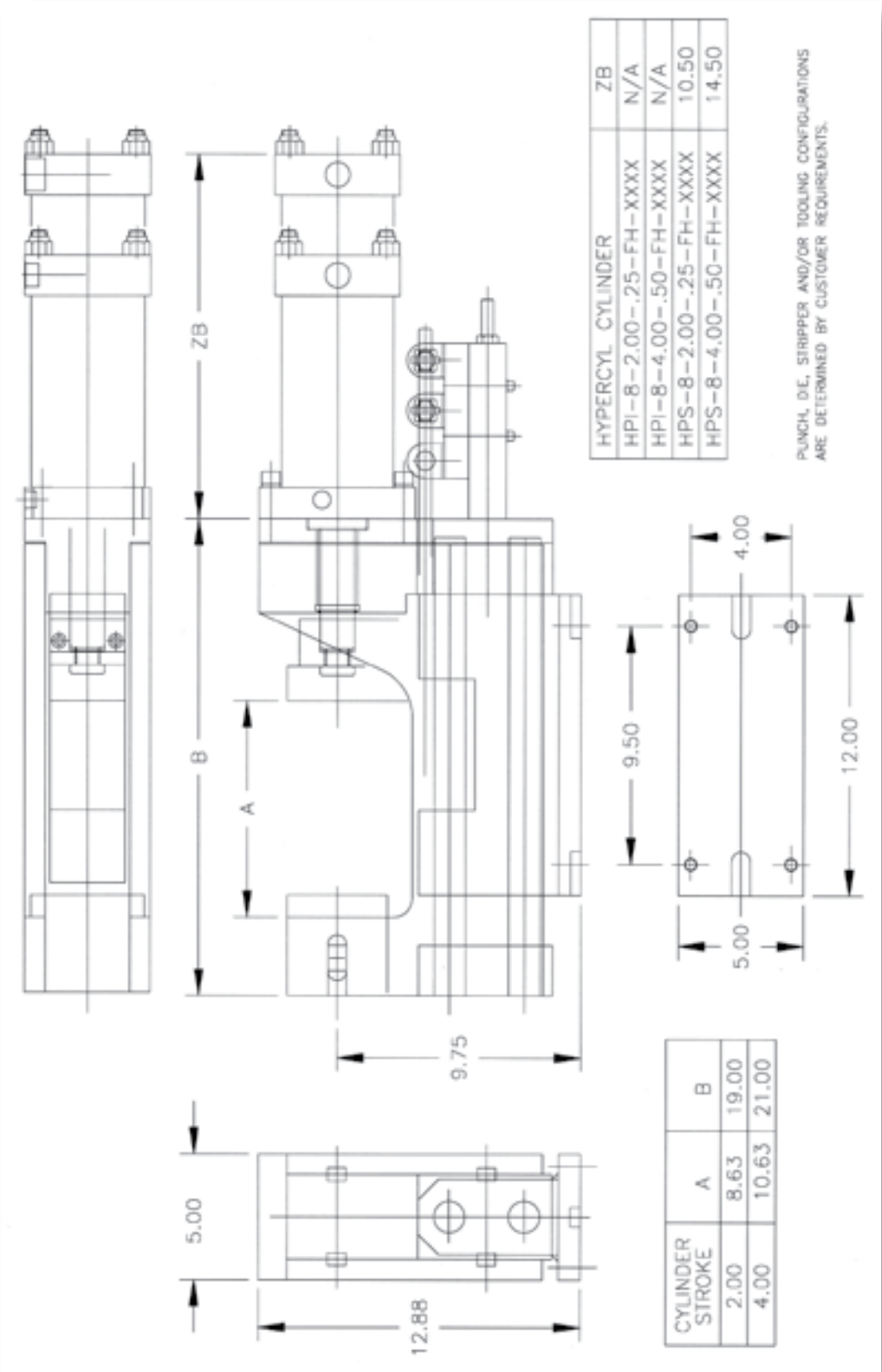
BASIC EQUALIZING UNIT P-BUO4-SE-A-01-0403 CAPACITY 8754 lbs. FORCE @ 100 psi. AIR

4-Ton Equalizing



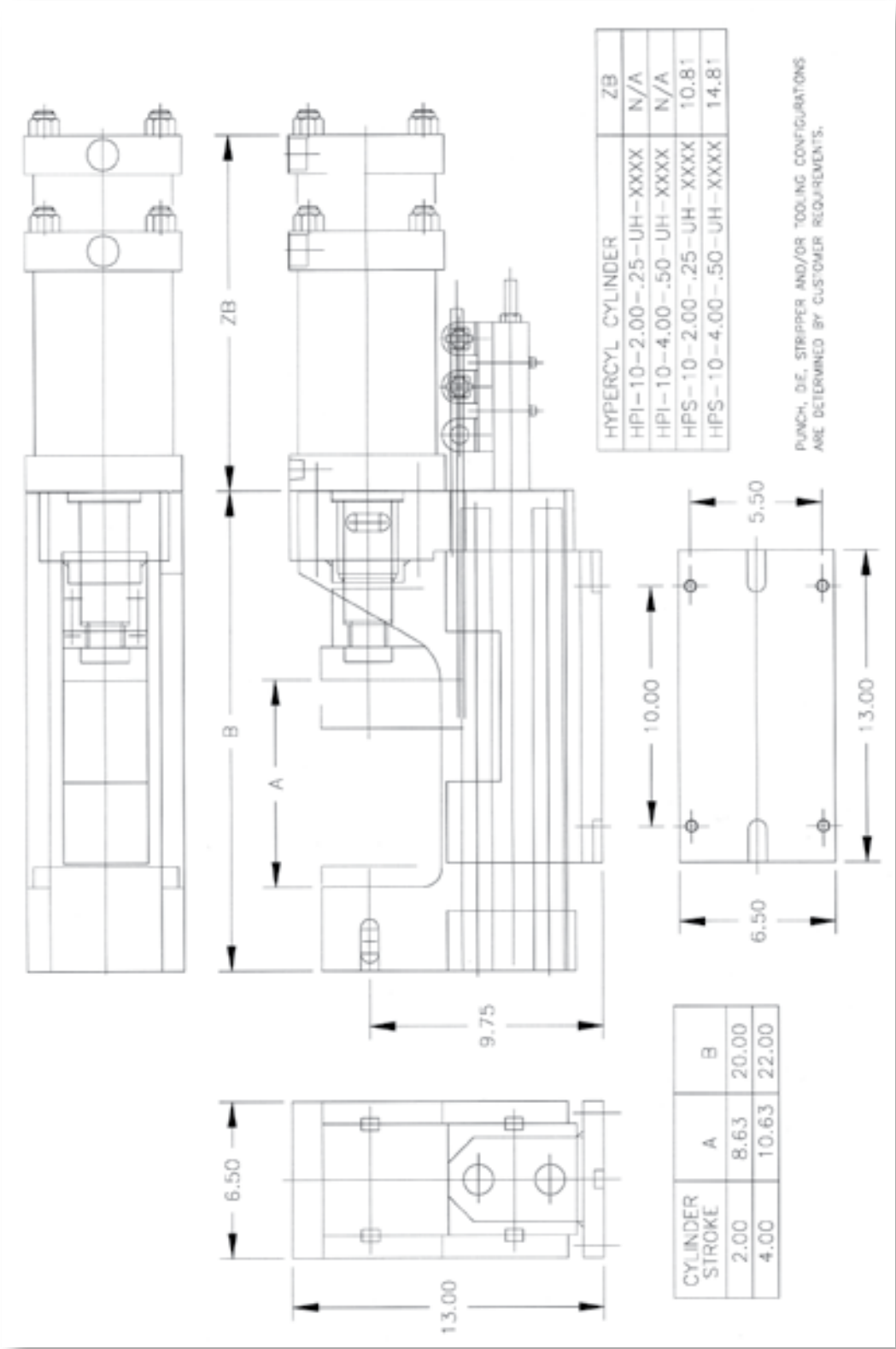
BASIC EQUALIZING UNIT P-BUO4-SE-A-01-0404 CAPACITY 8754 lbs. FORCE @ 100 psi. AIR

8-Ton Equalizing



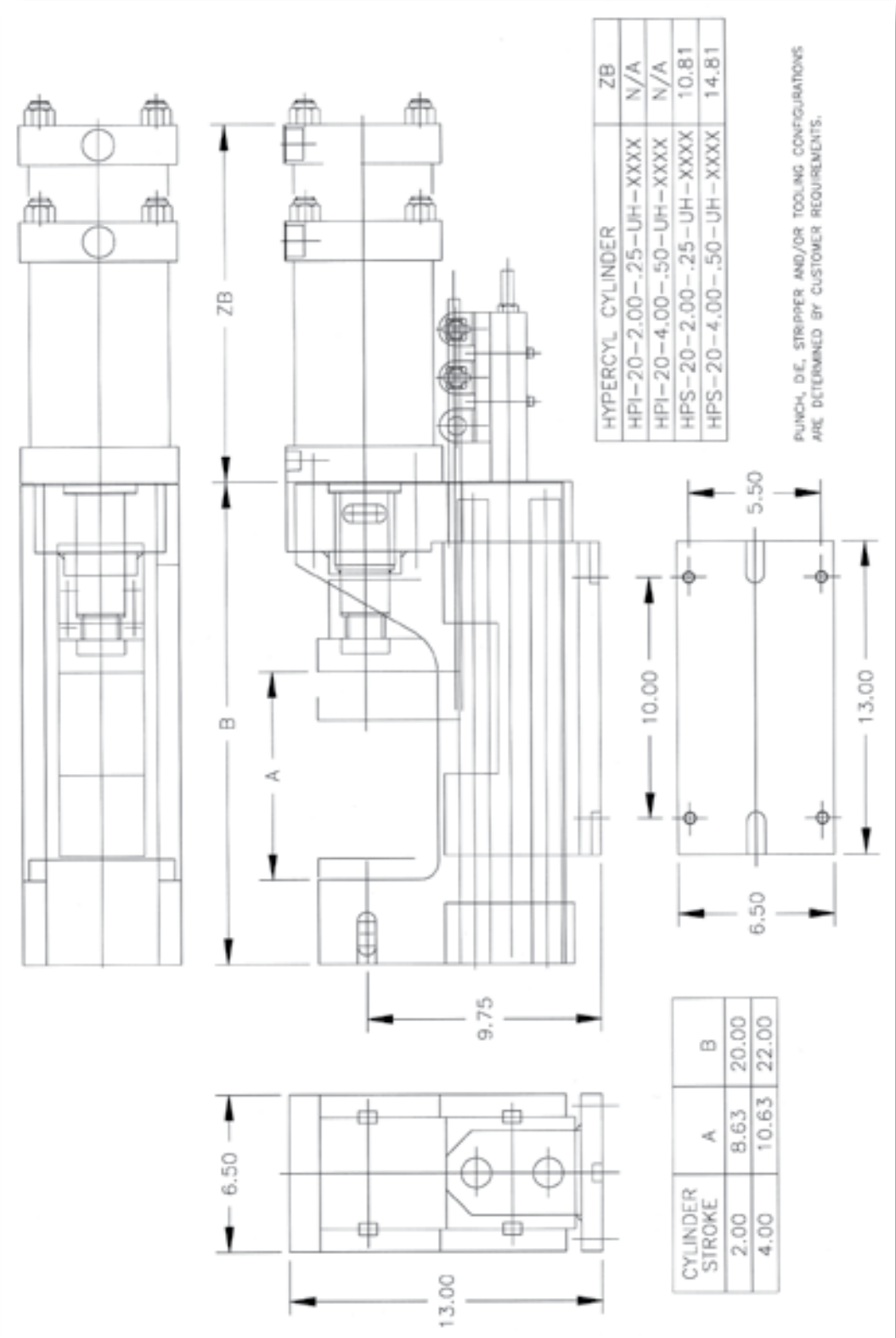
BASIC EQUALIZING UNIT P-BU08-SE-A-01-0801 CAPACITY 15886 lbs. FORCE @ 100 psi. AIR

10-Ton Equalizing



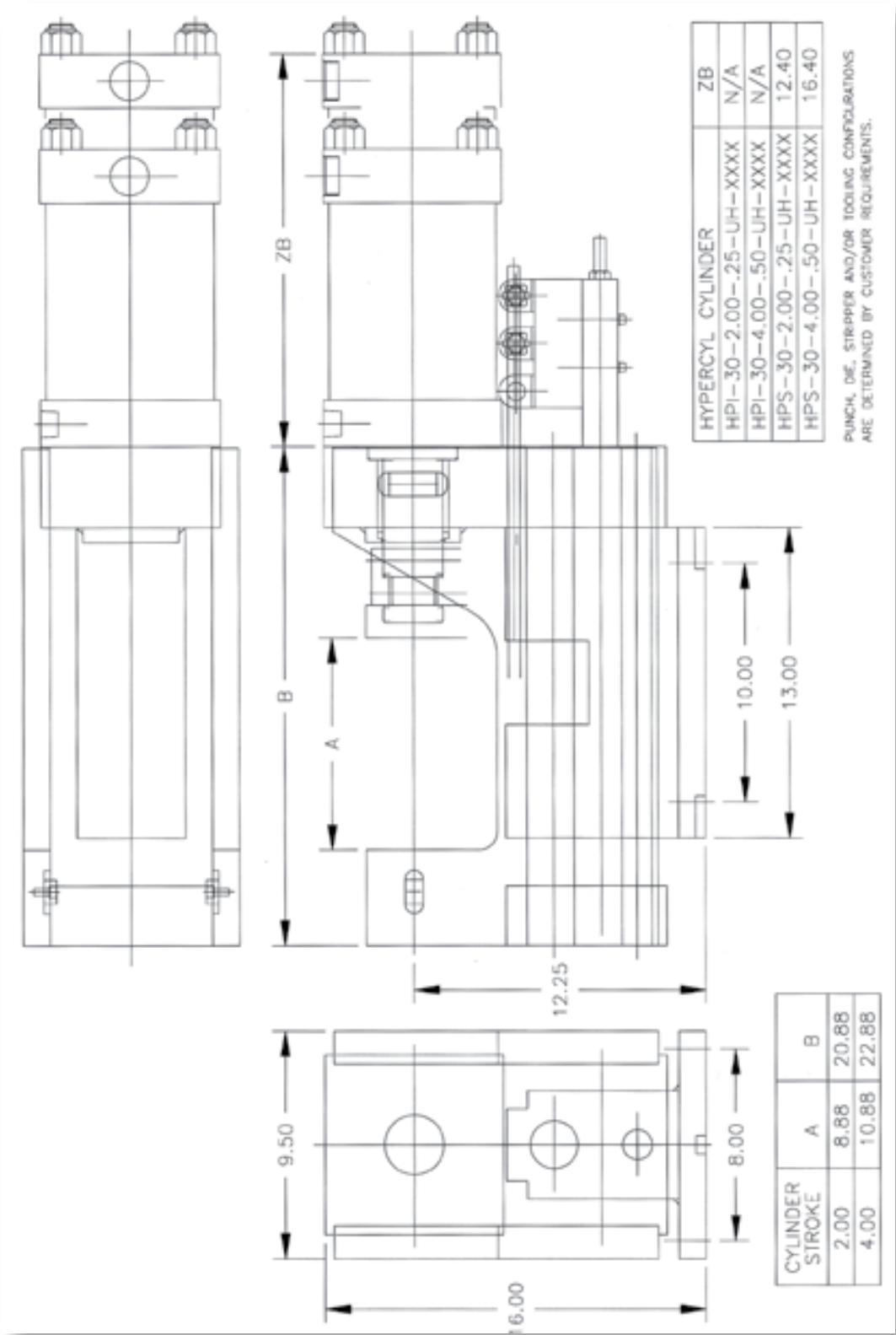
BASIC EQUALIZING UNIT P-BU10-SE-A-01-1001 CAPACITY 25950 lbs. FORCE @ 100 psi. AIR

20-Ton Equalizing



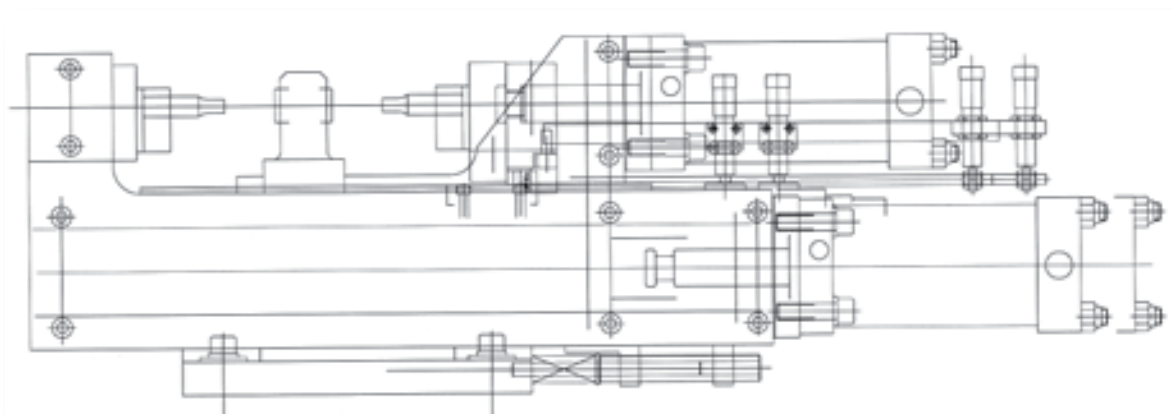
BASIC EQUALIZING UNIT P-BU20-SE-A-01-2001 CAPACITY 38671 lbs. FORCE @ 100 psi. AIR

30-Ton Equalizing



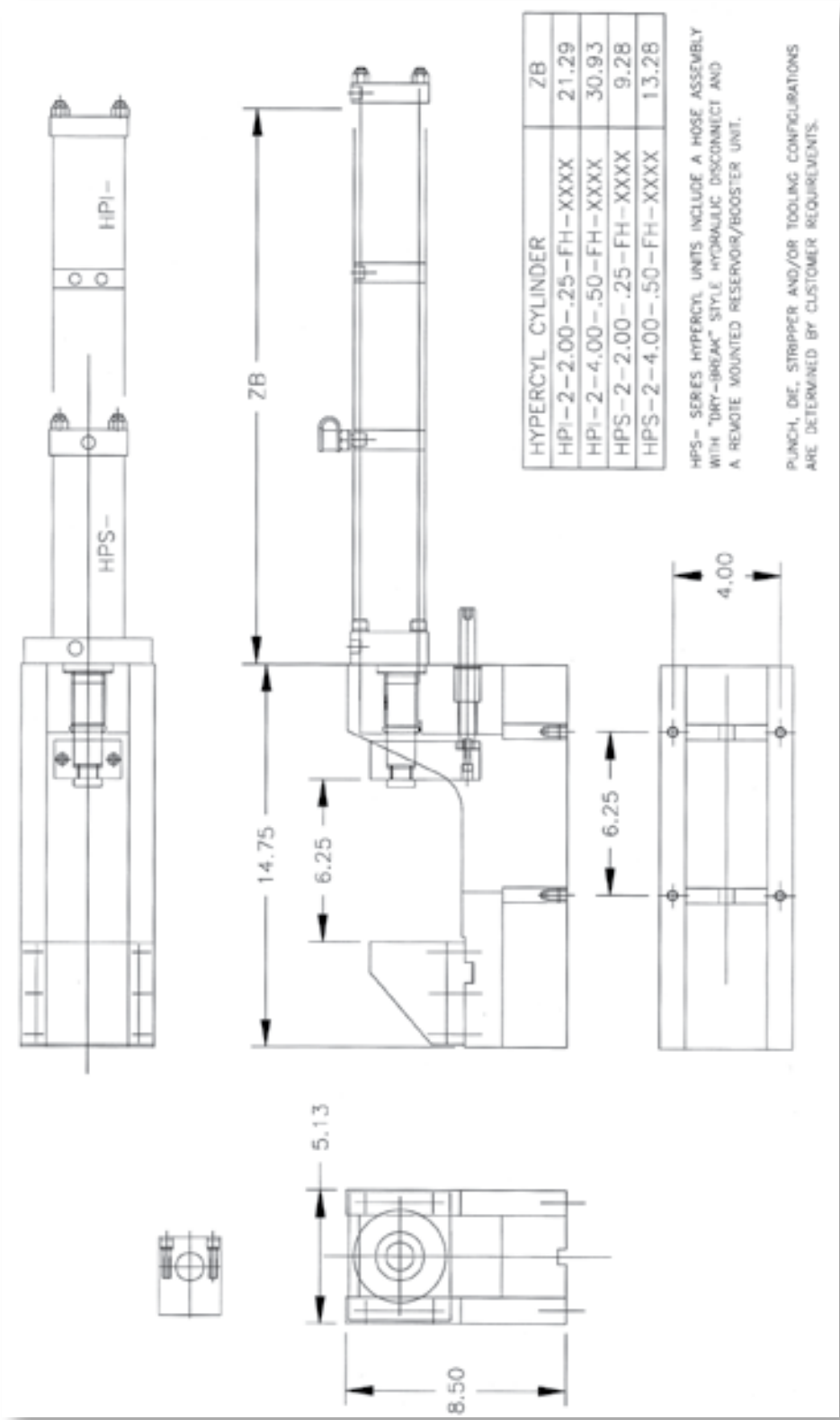
BASIC EQUALIZING UNIT P-BU30-SE-A-01-3001 CAPACITY 65134 lbs. FORCE @ 100 psi. AIR

Dual Equalizing Units



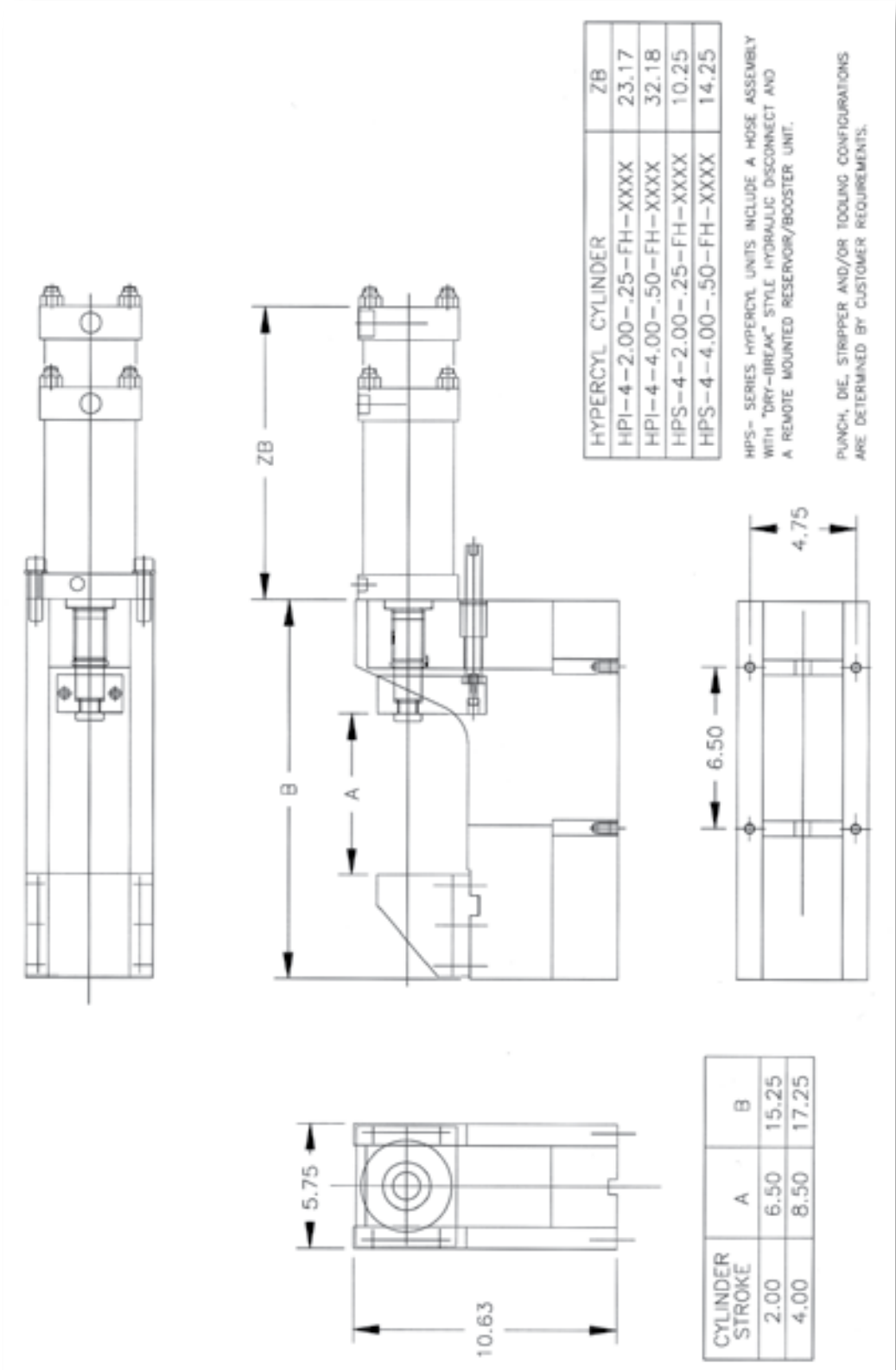
All Dual-Equalizing units are designed and built for a specific application. Please contact Aries Engineering Co., Inc. or your local AEC/HyperCyl Representative for further information.

2-Ton Non-Equalizing



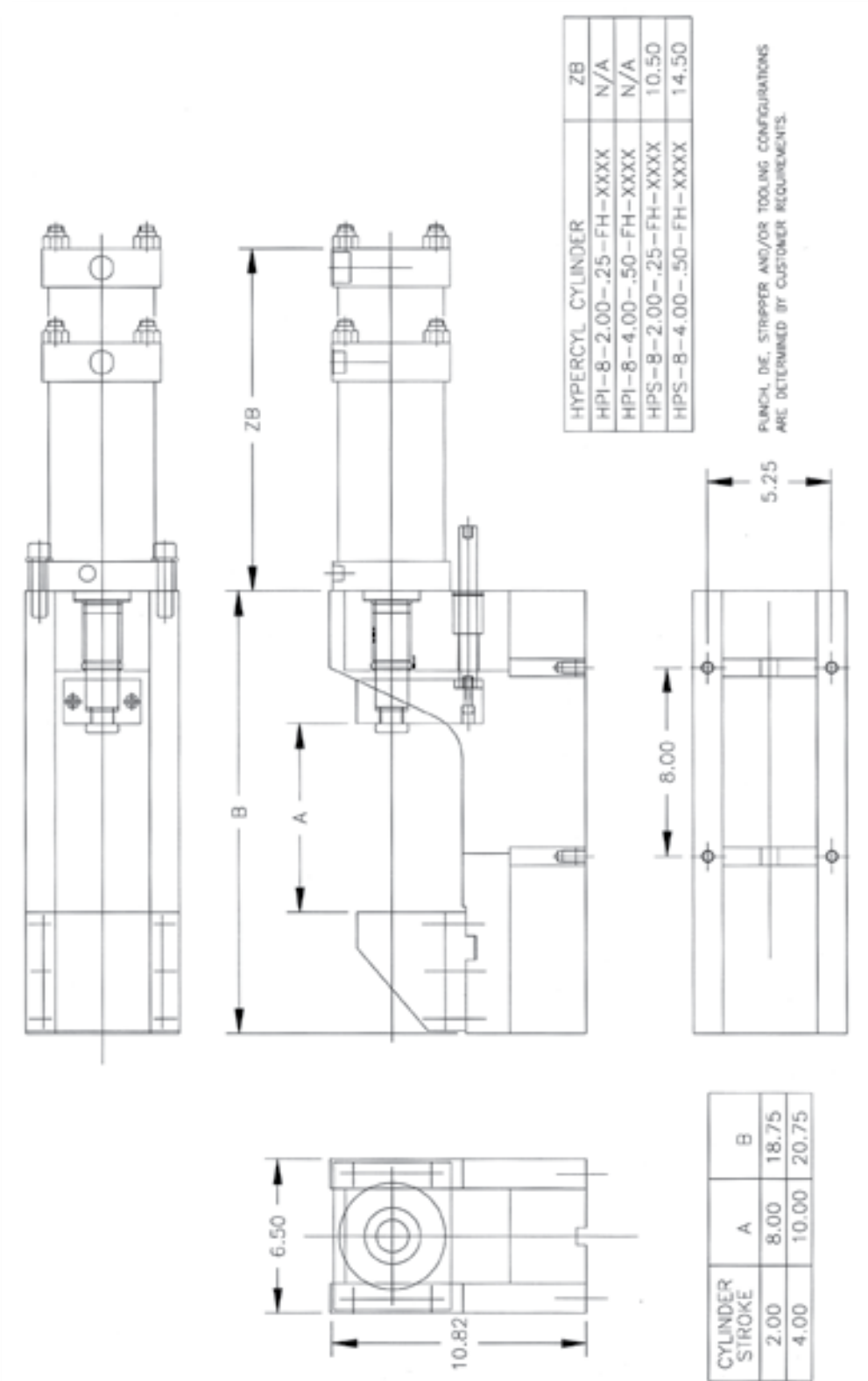
NON-EQUALIZING UNIT P-BU02-NE-A-01-0203 CAPACITY 5454 lbs. FORCE @ 100 psi. AIR

4-Ton Non-Equalizing



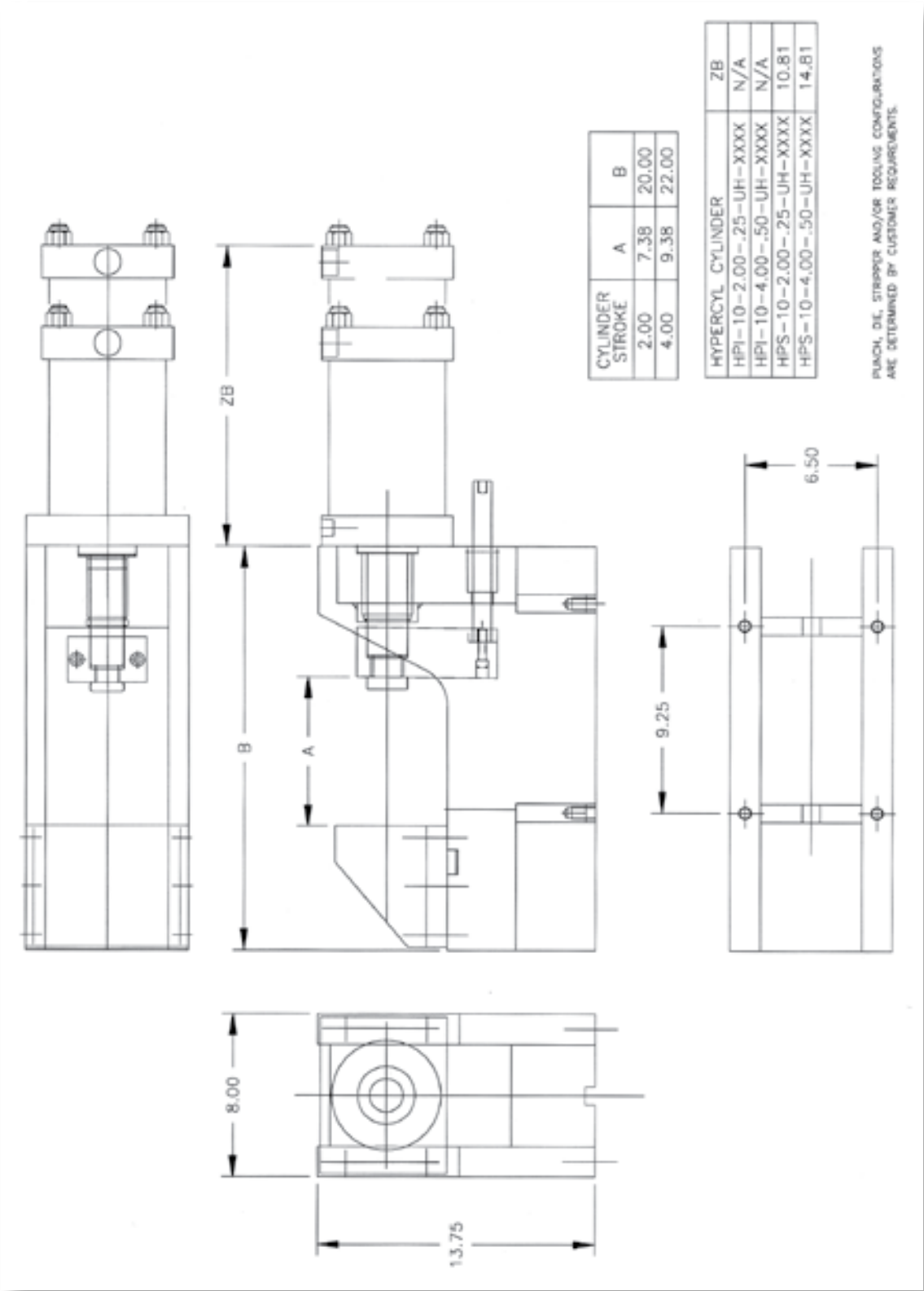
BASIC EQUALIZING UNIT P-BU04-NE-A-01-0405 CAPACITY 8754 lbs. FORCE @ 100 psi. AIR

8-Ton Non-Equalizing



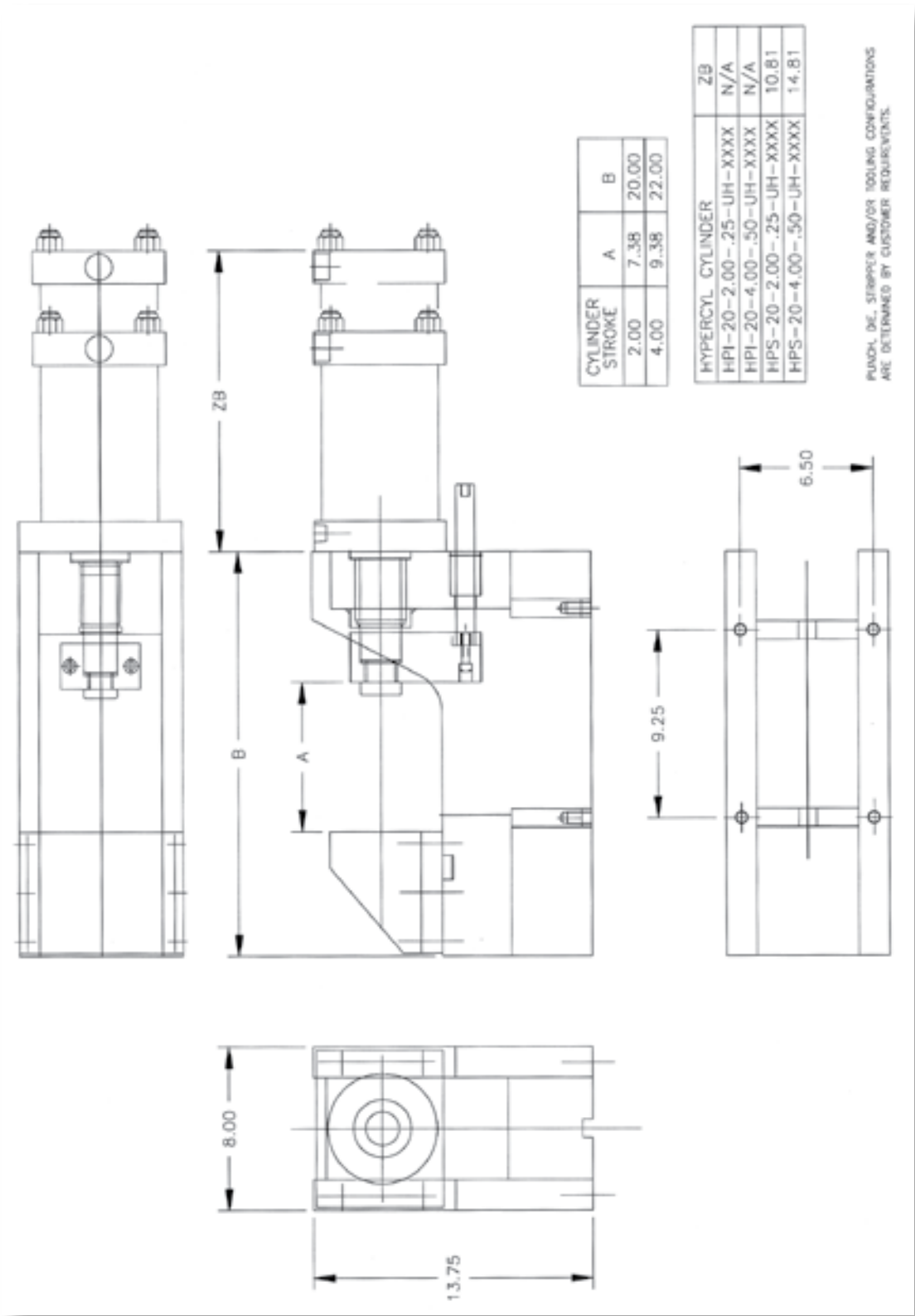
BASIC NON-EQUALIZING UNIT P-BU08-NE-A-01-0802 CAPACITY 15886 lbs. FORCE @ 100 psi. AIR

10-Ton Non-Equalizing



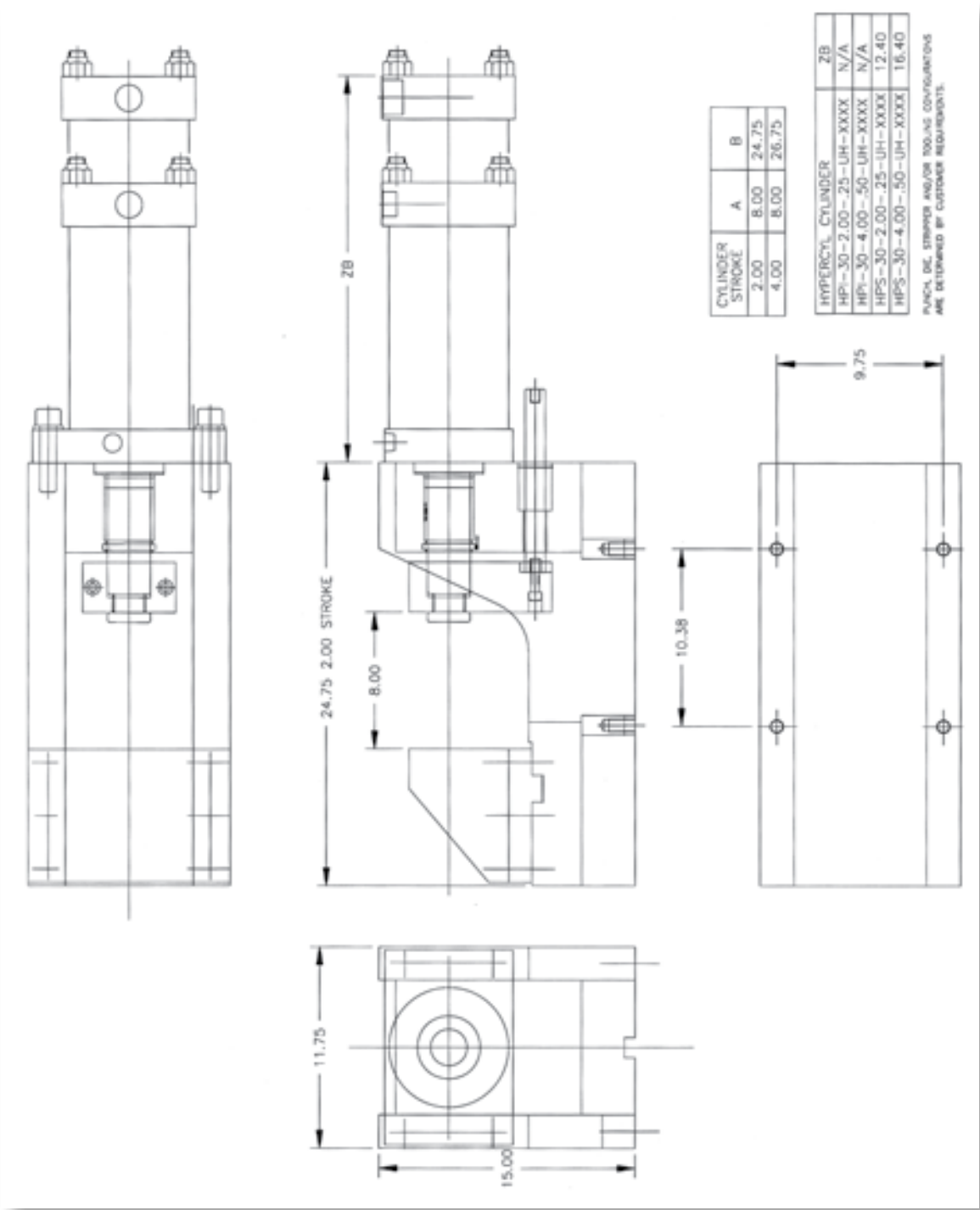
BASIC NON-EQUALIZING UNIT P-BU10-NE-A-01-1002 CAPACITY 25950 lbs. FORCE @ 100 psi. AIR

20-Ton Non-Equalizing



BASIC NON-EQUALIZING UNIT P-BU20-NE-A-01-2002 CAPACITY 38671 lbs. FORCE @ 100 psi. AIR

30-Ton Non-Equalizing

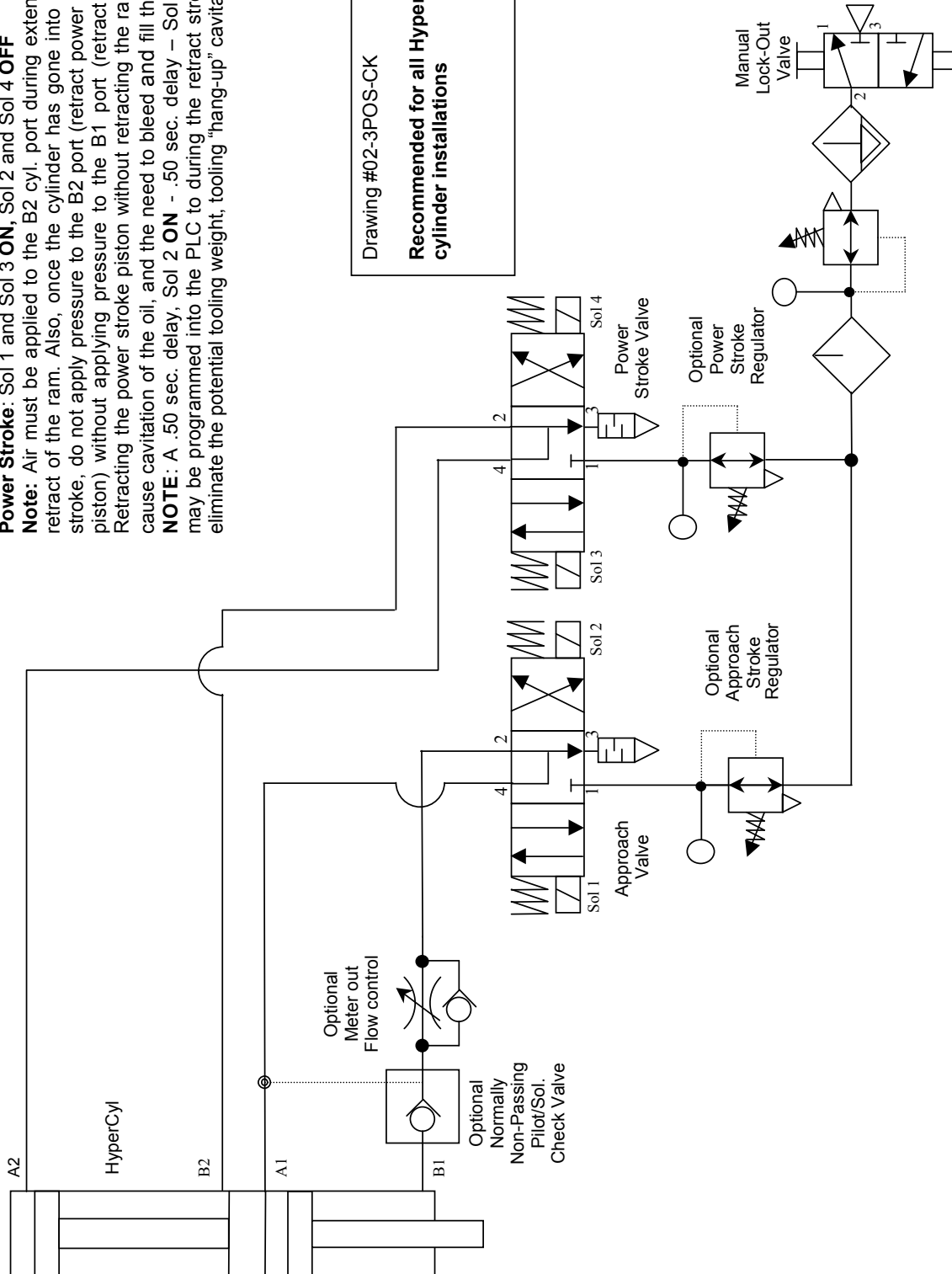


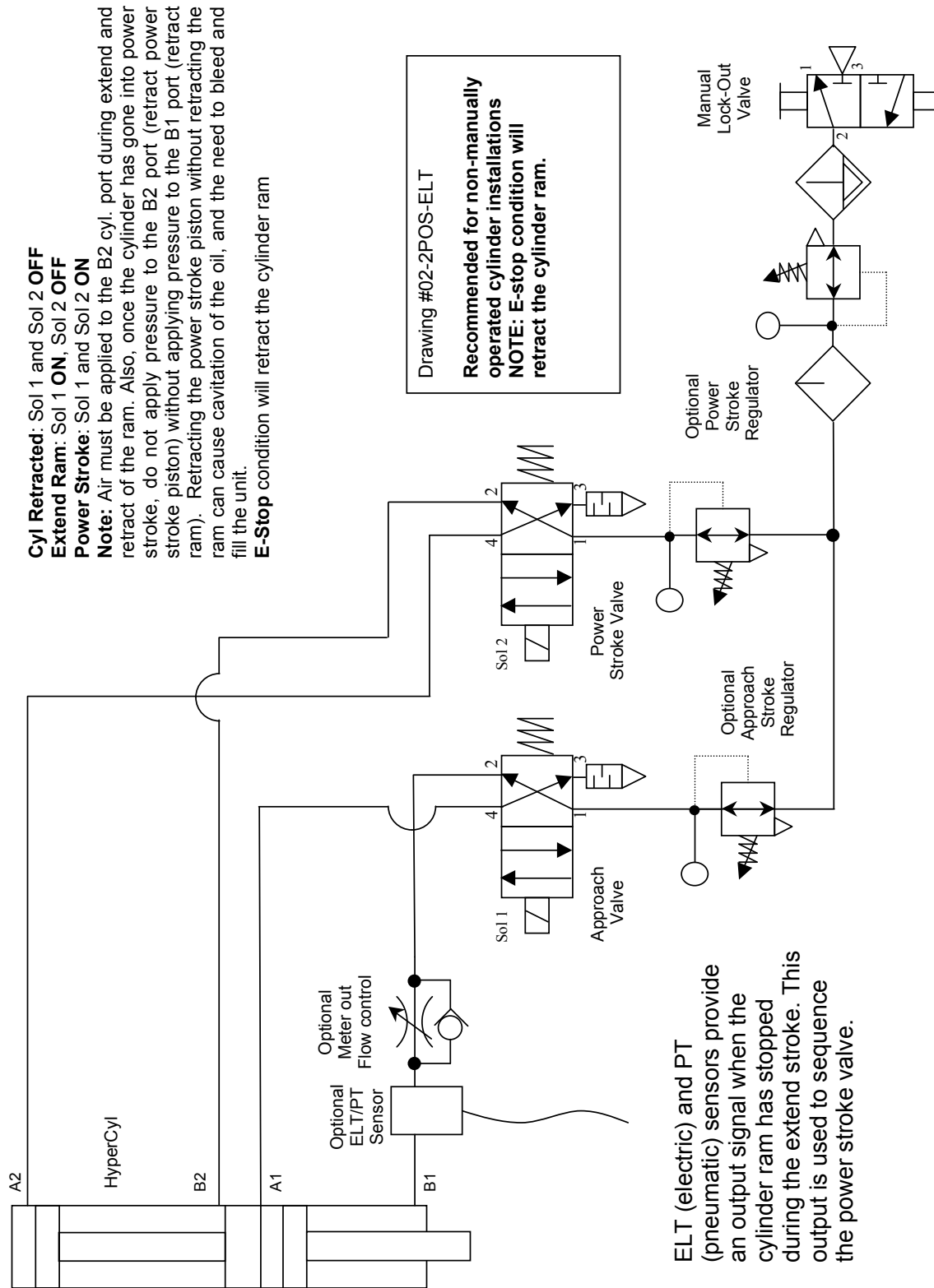
BASIC NON-EQUALIZING UNIT P-BU30-NE-A-01-3002 CAPACITY 65134 lbs. FORCE @ 100 psi. AIR

Cyl Retracted: Sol 2 and Sol 4 **ON**, Sol 1 and Sol 3 **OFF**
Extend Ram: Sol 1 and Sol 4 **ON**, Sol 2 and Sol 3 **OFF**
Power Stroke: Sol 1 and Sol 3 **ON**, Sol 2 and Sol 4 **OFF**
Note: Air must be applied to the B2 cyl. port during extend and retract of the ram. Also, once the cylinder has gone into power stroke, do not apply pressure to the B2 port (retract power stroke piston) without applying pressure to the B1 port (retract ram). Retracting the power stroke piston without retracting the ram can cause cavitation of the oil, and the need to bleed and fill the unit.
NOTE: A .50 sec. delay, Sol 2 **ON** - .50 sec. delay - Sol 4 **ON** may be programmed into the PLC to during the retract stroke to eliminate the potential tooling weight, tooling "hang-up" cavitation.

Drawing #02-3POS-CK

Recommended for all HyperCyl cylinder installations







HyperView-Press® Monitoring System provides the easiest to use, most comprehensive and highest reliability press monitoring available. With the most consistent test results and less false failures, the HyperView-Press® will help you achieve your yield and quality objectives.

Easy Configurable Setup

The system can be set up without an external computer by using the optional touch screen monitor or with the optional mouse and keyboard. The setup is menu driven by a wizard that guides the user through the setup process. This has the benefits of allowing for fast implementation and low start-up costs. Best of all, the wizard configures the HyperView-Press® for your specific press monitoring needs in a matter of minutes unlike other press monitoring solutions that require costly on-site installation by a 3rd party.

Off -The-Shelf Solution

Sciometric's HyperView-Press® Press Monitoring System is a proven off -the-shelf test system that can be quickly set up by the user and automatically configured for your specific requirements.

Press Monitoring Best Practices

The HyperView-Press® comes out of the box with advanced algorithms designed for the simplest to the most complex press monitoring requirements. Sciometric has embedded press monitoring “best practices” into the system based on decades of experience with press applications. During setup, the HyperView-Press® gathers information from the wizard and automatically makes modifications to the software to fit the specific customer implementation requirements. The wizard provides the best of both worlds: the deployment simplicity of an off-the-shelf solution coupled with the benefits of a custom solution tailored to your exact press monitoring requirements.

The best practices used by the HyperView-Press® include Sciometric’s advanced signature analysis methodology. Algorithms find specific features on a press waveform and conduct advanced analysis on those key features (e.g. initial contact point, point of bottom out, point of absolute maximum force, etc.). The analysis does not rely on the waveform’s position on the result grid as the features are identified dynamically and the full feature characteristics are evaluated. This technique yields increased accuracy and better repeatability than conventional methods. Conventional press monitoring systems use basic ‘postage stamp’, ‘box function’, ‘fitting window’ or ‘peak detection’ to determine quality. These older approaches collect a limited sample of data and verify that the waveform correctly enters and exits static windows on the waveform. These approaches yield unreliable results as they fail to fully analyze each waveform feature



The HyperView-Press® uses Sciometric’s advanced signature analysis technology to eliminate false accepts and find more defects than other press monitoring systems.

Advanced Limit Management

Auto-Learn

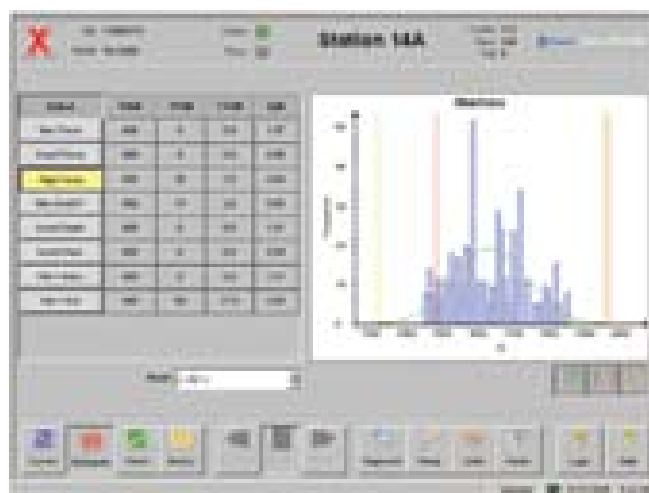
Any manufacturing test system is only as good as the limits that have been set. If limits are set too wide then a manufacturer runs the risk of shipping faulty product. If limits are too stringent then yield is compromised and manufacturing personnel lose confidence in the system. Therefore, HyperView-Press® includes Sciometric’s proprietary Advanced Limit Management System which consists of both auto-learn and maintain functions.

The auto-learn function “suggests” optimal statistically derived limits for the press monitoring system. As manufacturing processes experience normal process variation, the limits of any press monitoring system will require maintenance to avoid creeping in to a “false fail” or “false pass” scenario. Sciometric’s proprietary maintain function is designed to help in this process by using production statistics to continuously calculate optimal test limits and propose new limits that the user has the option of accepting.

The auto-learn and maintain functions have a very significant impact on the integrity of the monitoring system and on its total cost of ownership.

Process Variability Compensation™

All production facilities are subject to normal variations in operation. These variances may be the result of slight differences in pallet dimensions, sub-components or fixtures. To maximize productivity it is imperative that a test system be capable of identifying and addressing normal process variability, while alerting operators of abnormal or harmful variability. The HyperView-Press® uses Process Variability Compensation™ to accommodate for inevitable process variability and minimize false rejects.



The advanced limit management capability of the HyperView-Press® allows for easier limit management and optimal limits to be set.

Most press monitoring systems are triggered by an absolute start. The starting point could be a PLC trigger or when the press starts. The HyperView-Press® Press analyses test results based on the initial point of contact between the ram and the part. Over time the amount of displacement required to press a part will vary.

This variability would confuse other press monitoring systems into believing that less or more displacement was required depending on the pallet dimensions. Press monitoring systems that rely on an absolute start require constant calibration. These conventional press monitoring systems tend to generate numerous false failures and manufacturing personnel lose confidence in them.

Description

Scaleable and Flexible

The HyperView-Press® system is flexible and able to scale according to your specific requirements.

Multi-RAM Monitoring Capability*

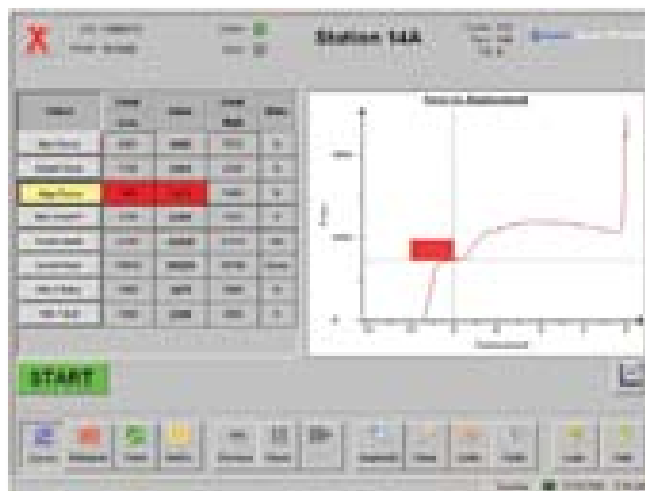
The system scales to support from one to four rams on a single test system, providing flexibility based on your production requirements. Many competitive press monitoring systems can only monitor one or two rams. For multi-ram monitoring requirements you would need to buy multiple test systems from the competition whereas you can accomplish this with one HyperView-Press®, resulting in a lower initial capital expenditure and lower deployment costs.

The HyperView-Press® Monitoring System has advanced synchronous data collection capabilities and supports the collection of analog data for up to four rams.

* Available on select models only. Please consult specifications.

Production Ready

The HyperView-Press® is ideally suited for continuous operation in production. To ensure maximum reliability and up-time the controller is designed to NEMA 12 (IP52) standards to withstand the demands of the harshest manufacturing environments.



The HyperView-Press® test systems can be seamlessly integrated into your manufacturing process. The system supports numerous communication and network options including direct Ethernet and most major fieldbus interfaces such as Interbus, Profibus and DeviceNet.



Front and back view of the HyperView-Press® mounted on the optional desktop stand with an optional TFT display.