

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 work piece, 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.

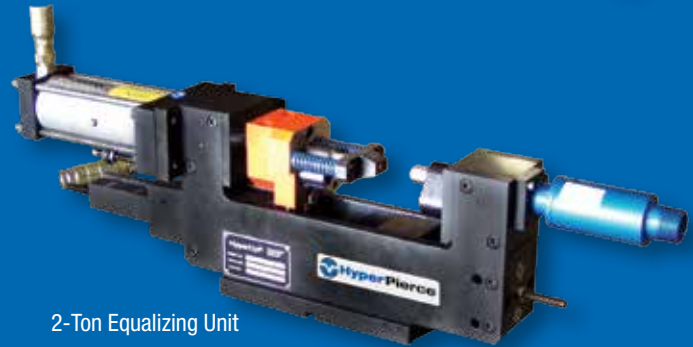
Accessories: non-rotating rod, pressure switches, integral linear transducer and load cell sensors.

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

4-Ton Reverse-Equalizing Unit



2-Ton Equalizing Unit



2-Ton Non-Equalizing Unit



## 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

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  
*Please contact the factory prior to use of any other oils.*

\*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.

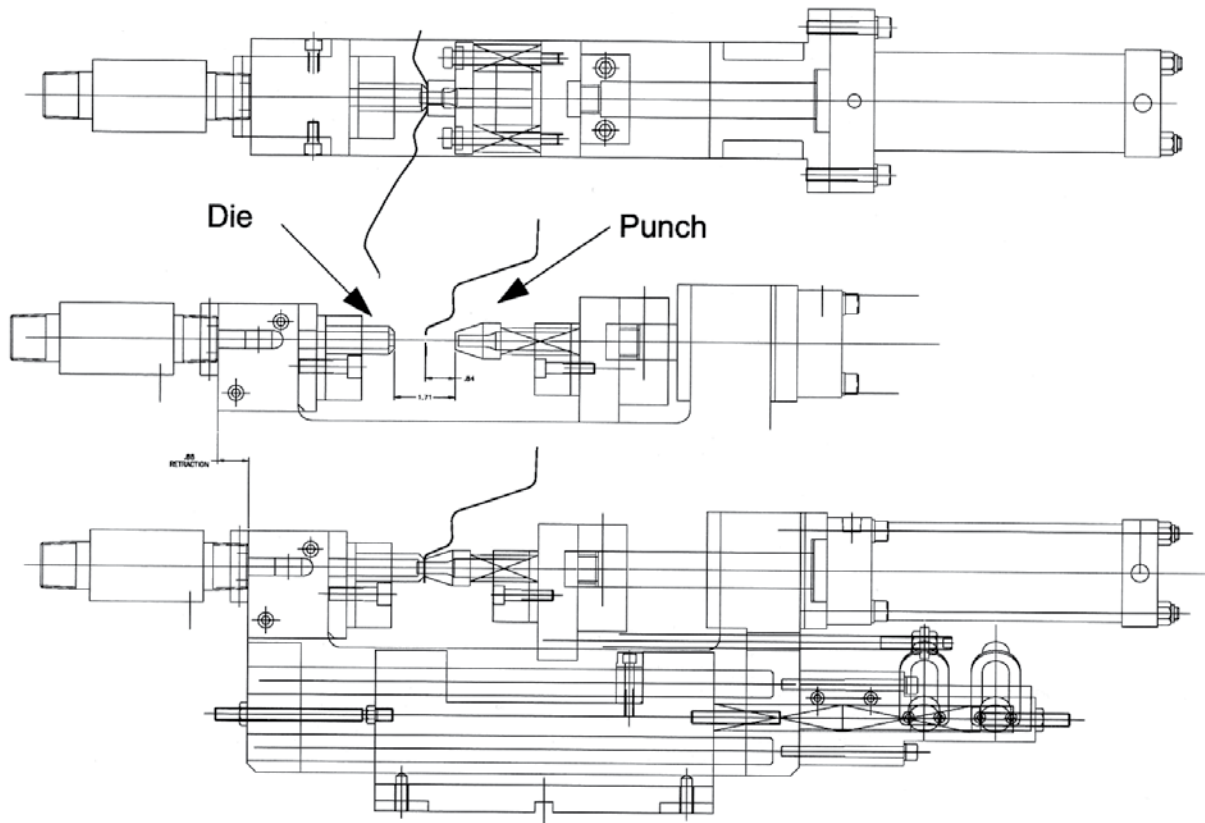
Model Series/Size	*Approach Force per PSI (lbs.)	*Retract Force per PSI (lbs.)	Minimum H.P Force @30 PSI (lbs.)	Maximum H.P Force @100 PSI (lbs.)	Working Ratio (Force per PSI)	Service Ratio (Hydraulic)	(1) Air Consumption per cycle*
HPI/HPT/HPS-1	3.14	2.35	670	2234	22.34:1	7:1	.136 SCFM
HPI/HPT/HPS-2	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.

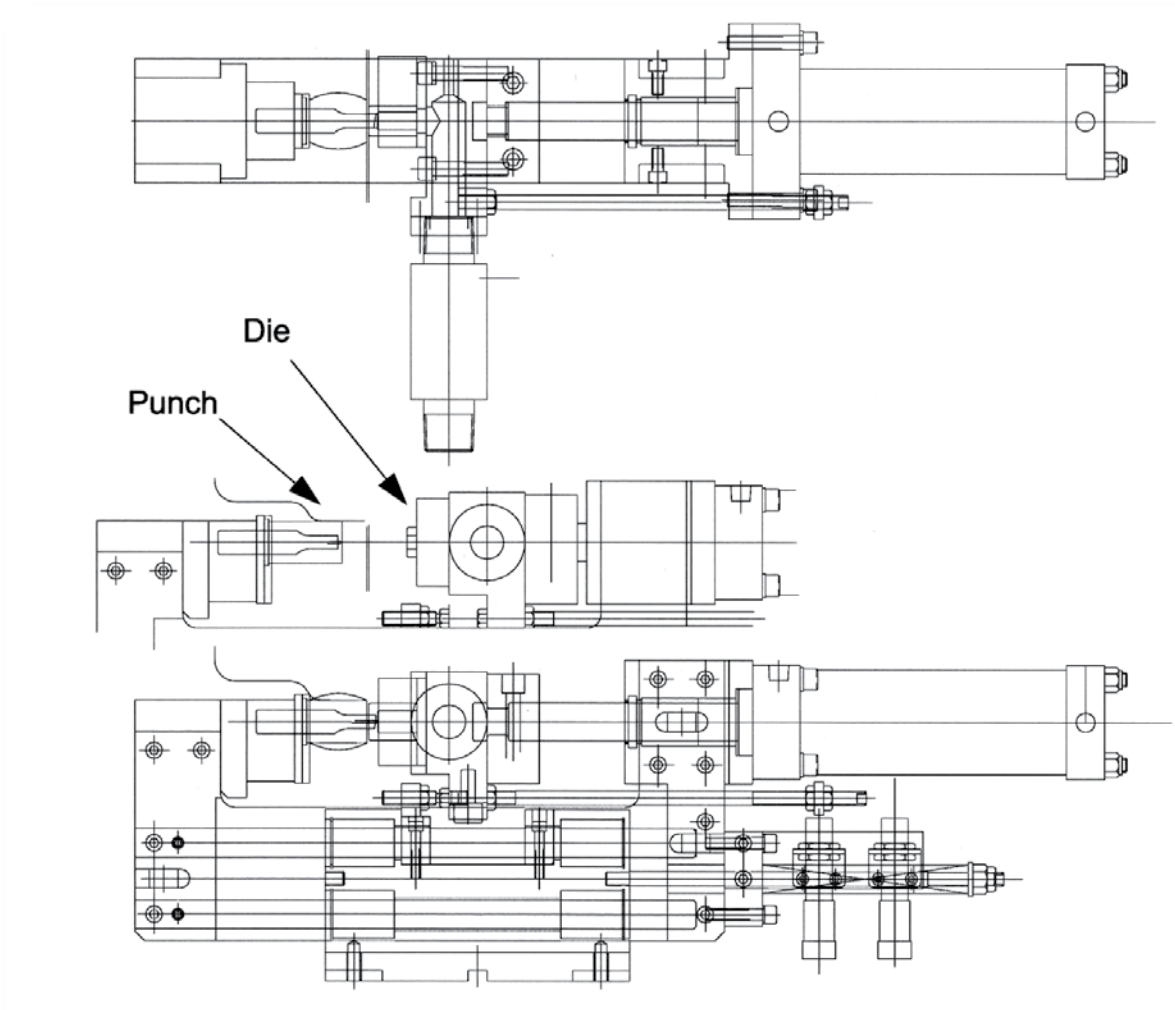
(1) Air consumption values shown are based on 14.00" total stroke, .50" power stroke cylinder operating at 60 PSI. Multiply value by cycles per minute for total SCFM usage.

- 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".



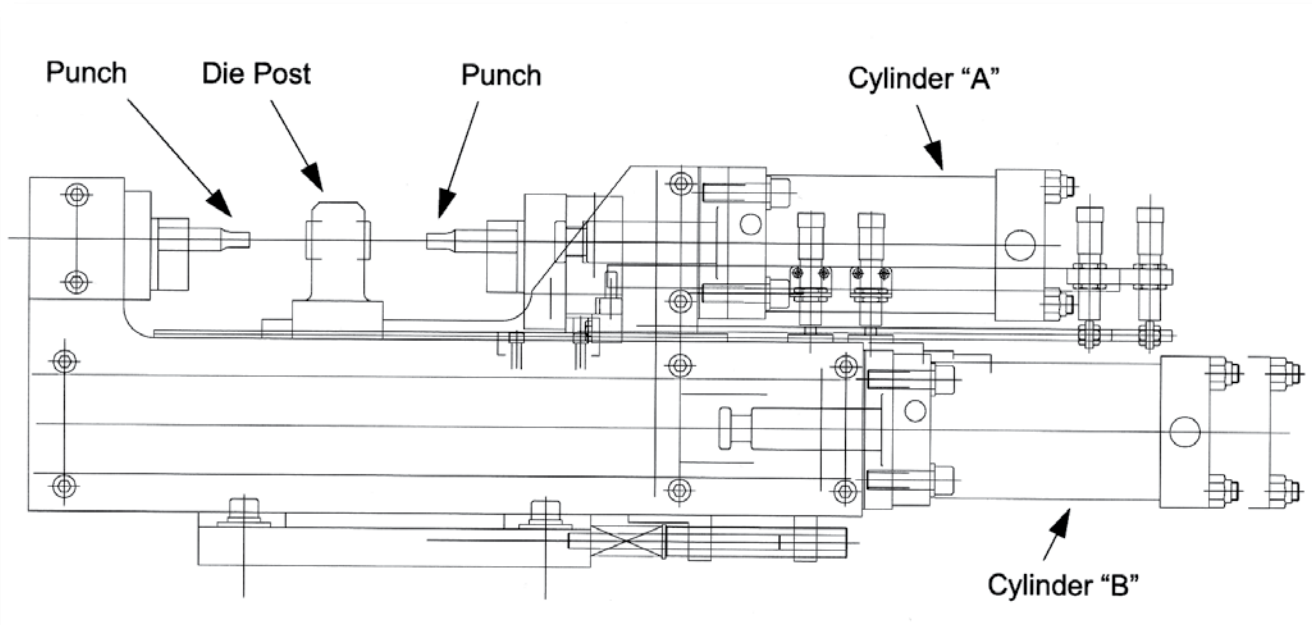
### Sequence of Operation

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.

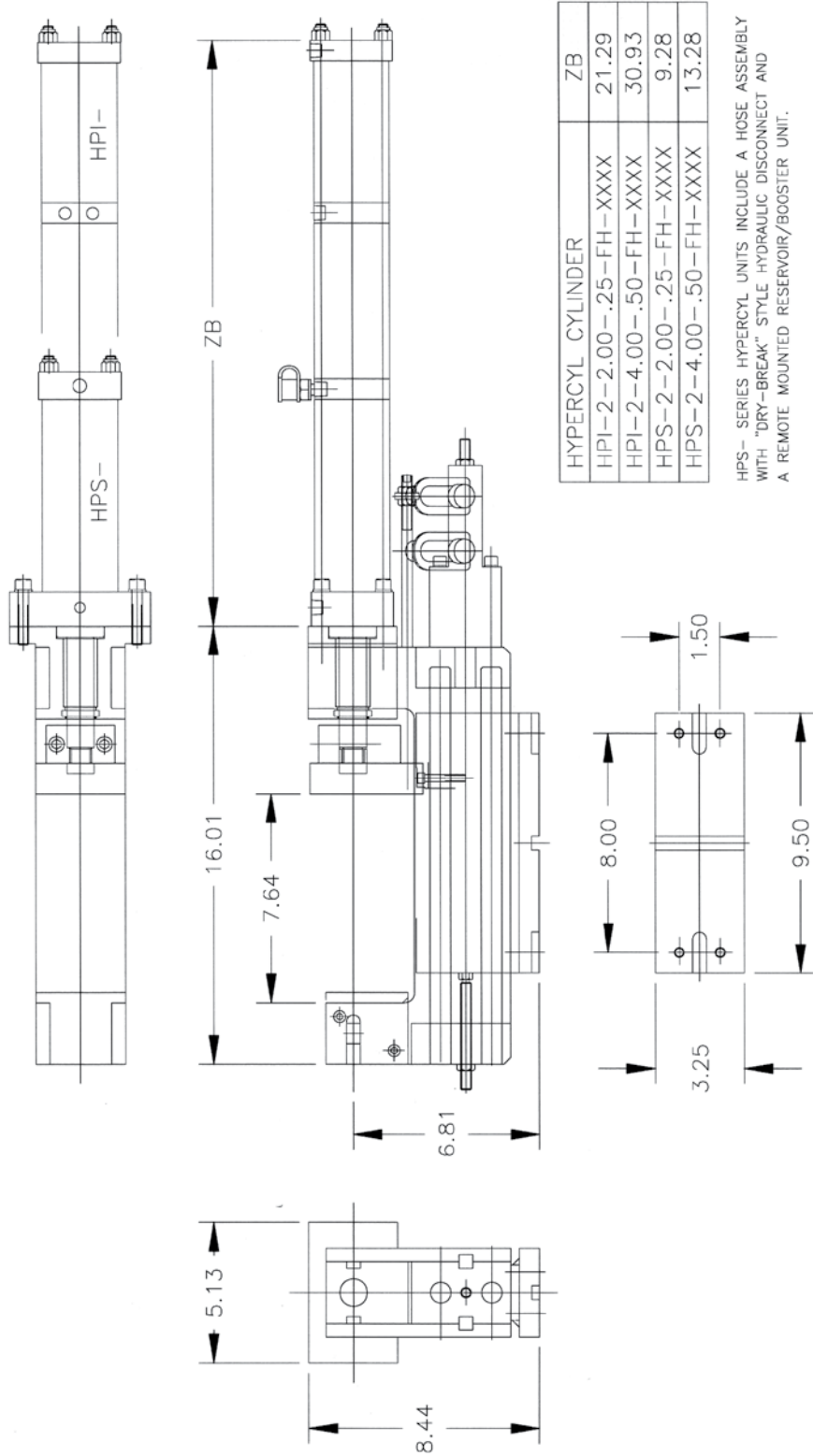


### Sequence of Operation

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



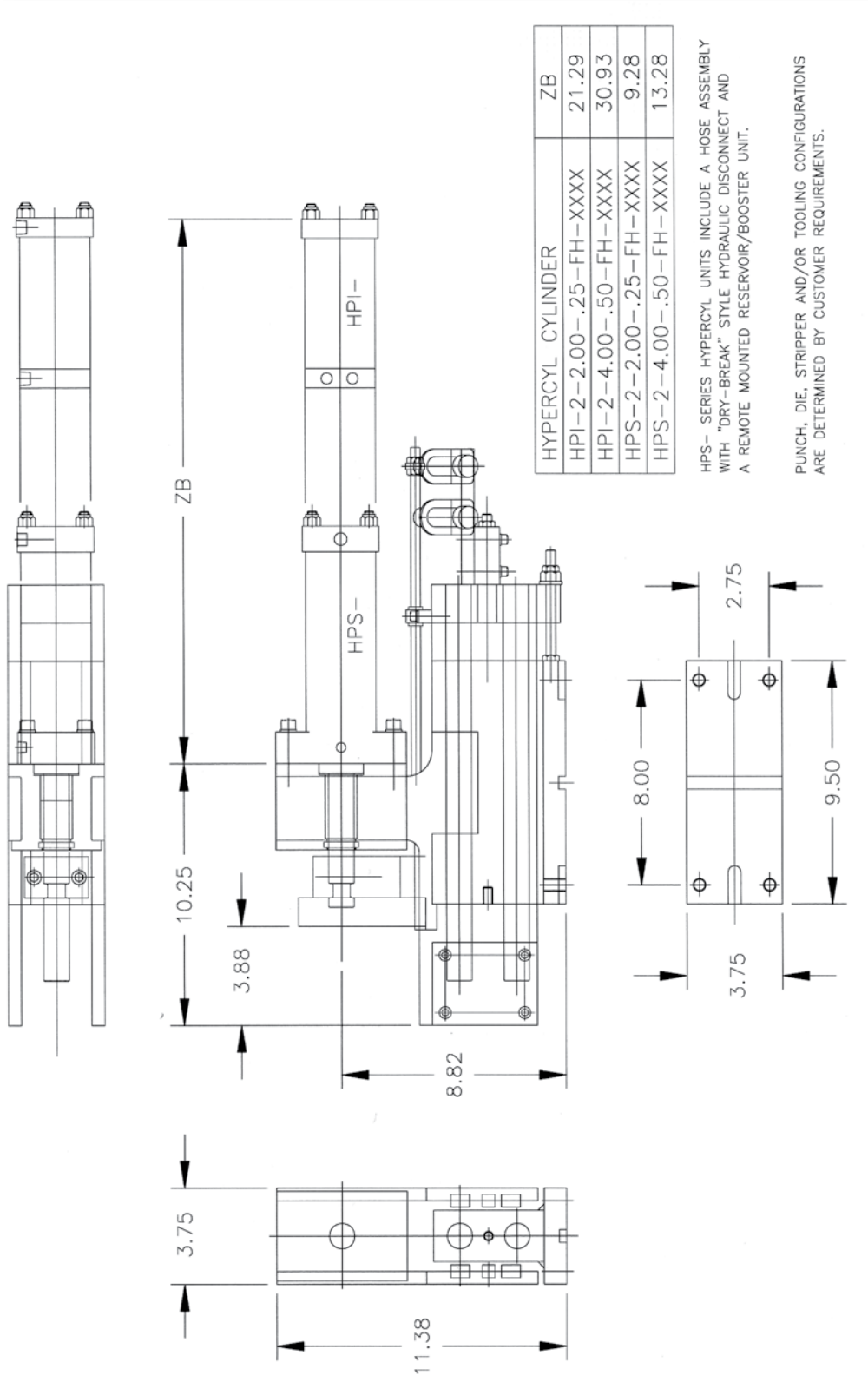
HYPERCYL CYLINDER	ZB
HPI-2-2.00-.25-FH-XXXX	21.29
HPI-2-4.00-.50-FH-XXXX	30.93
HPS-2-2.00-.25-FH-XXXX	9.28
HPS-2-4.00-.50-FH-XXXX	13.28

HPS- SERIES HYPERCYL UNITS INCLUDE A HOSE ASSEMBLY WITH "DRY-BREAK" STYLE HYDRAULIC DISCONNECT AND A REMOTE MOUNTED RESERVOIR/BOOSTER UNIT.

PUNCH, DIE, STRIPPER AND/OR TOOLING CONFIGURATIONS ARE DETERMINED BY CUSTOMER REQUIREMENTS.

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

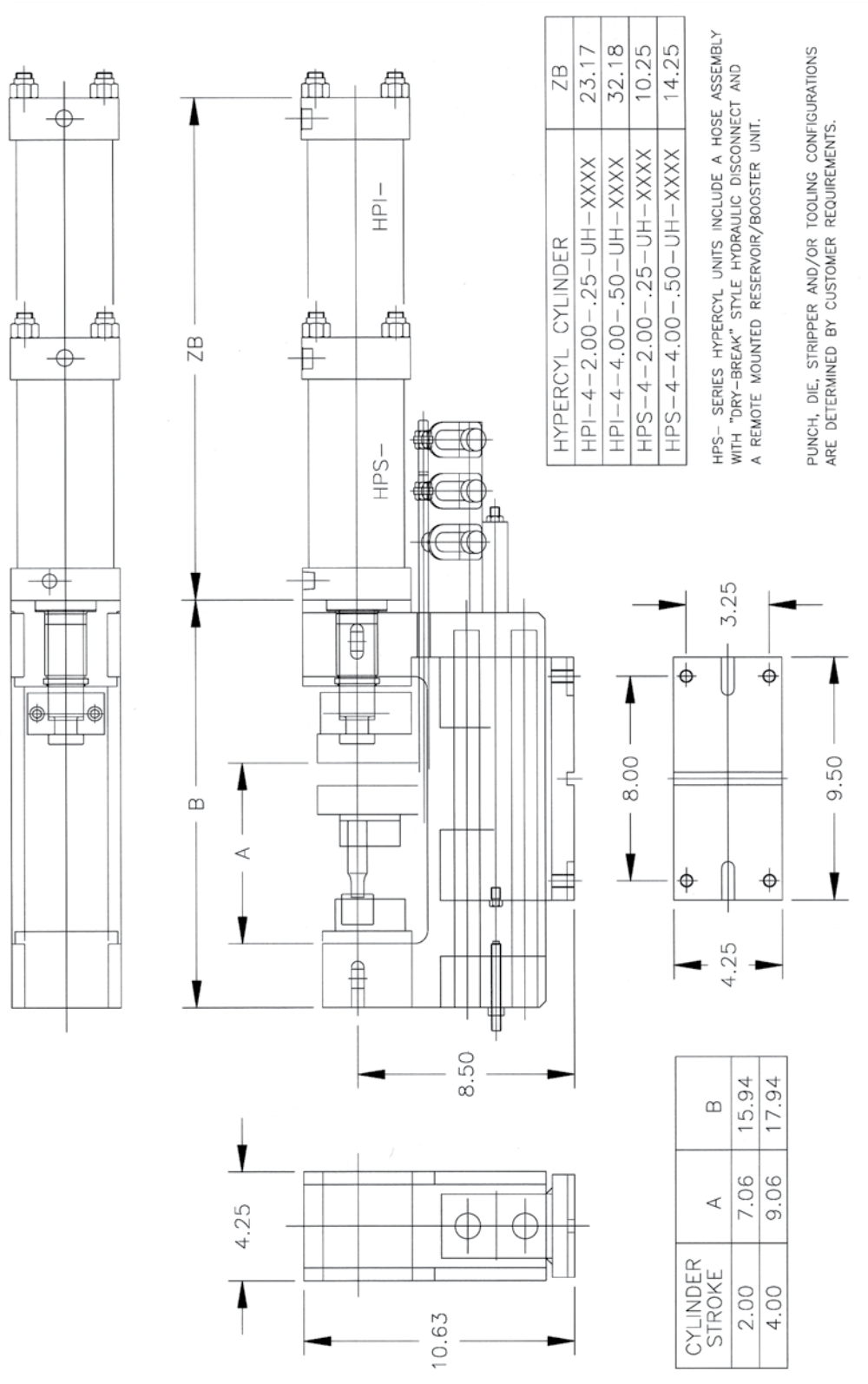
2-Ton Equalizing



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



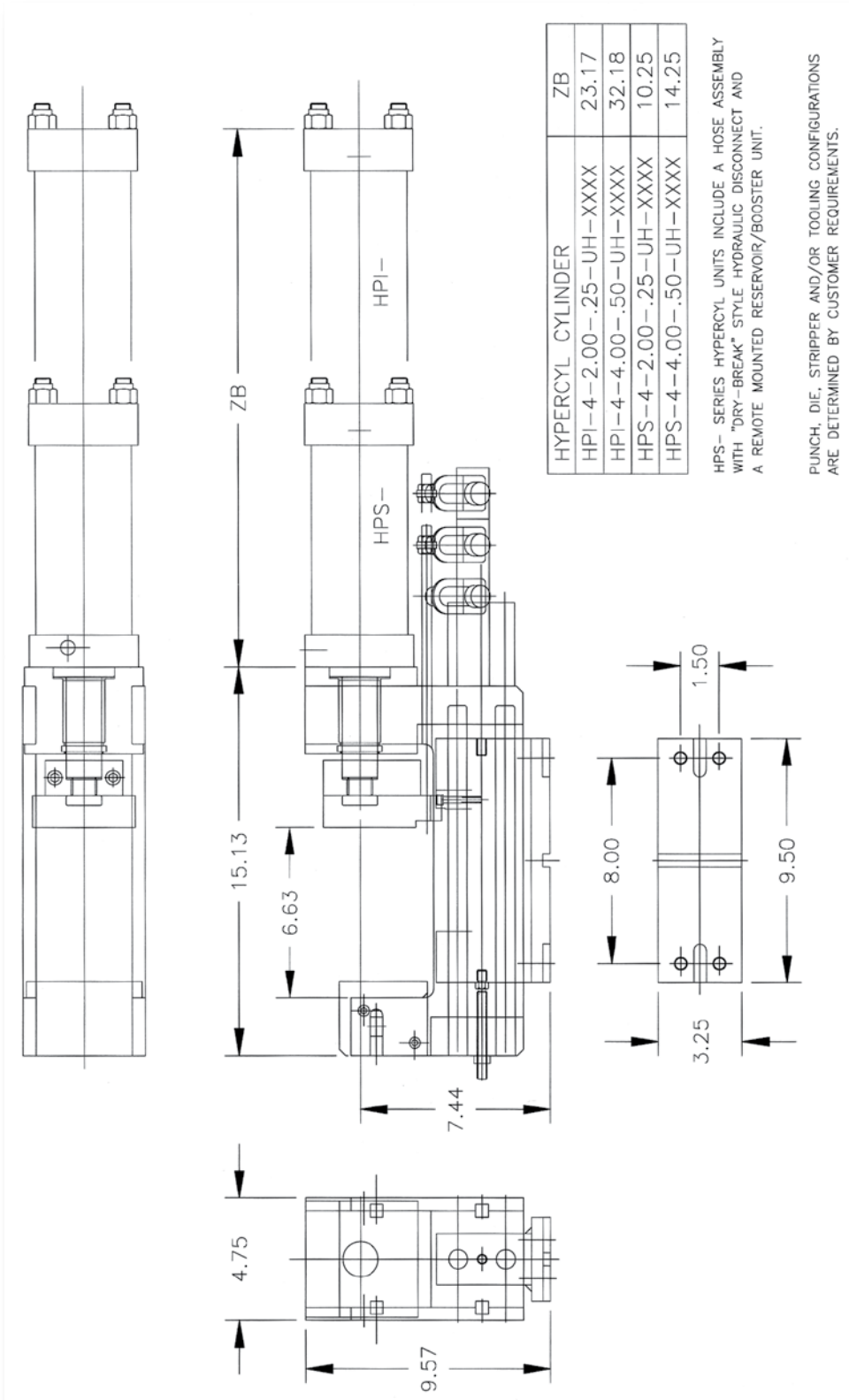
4-Ton Equalizing



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

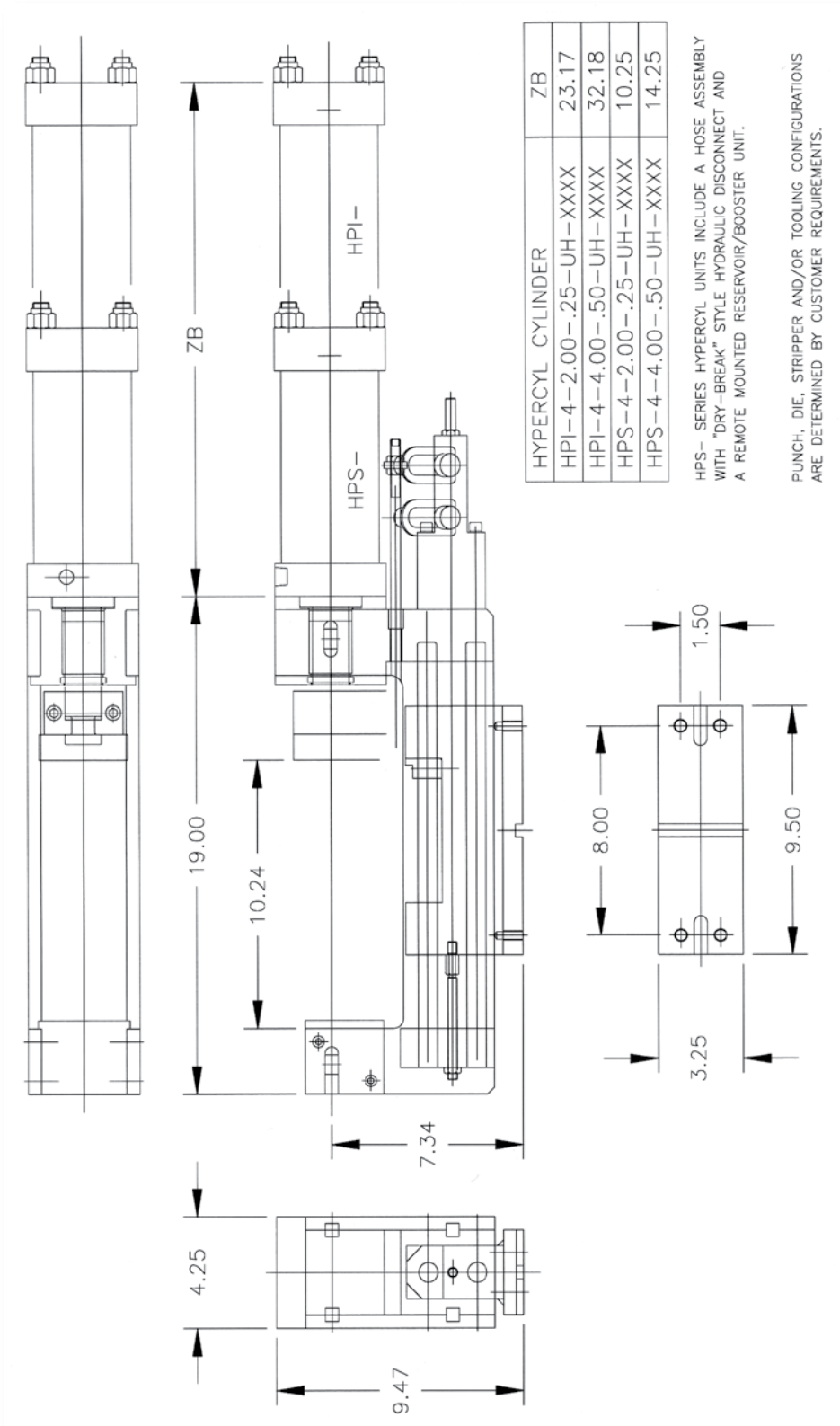


4-Ton Equalizing



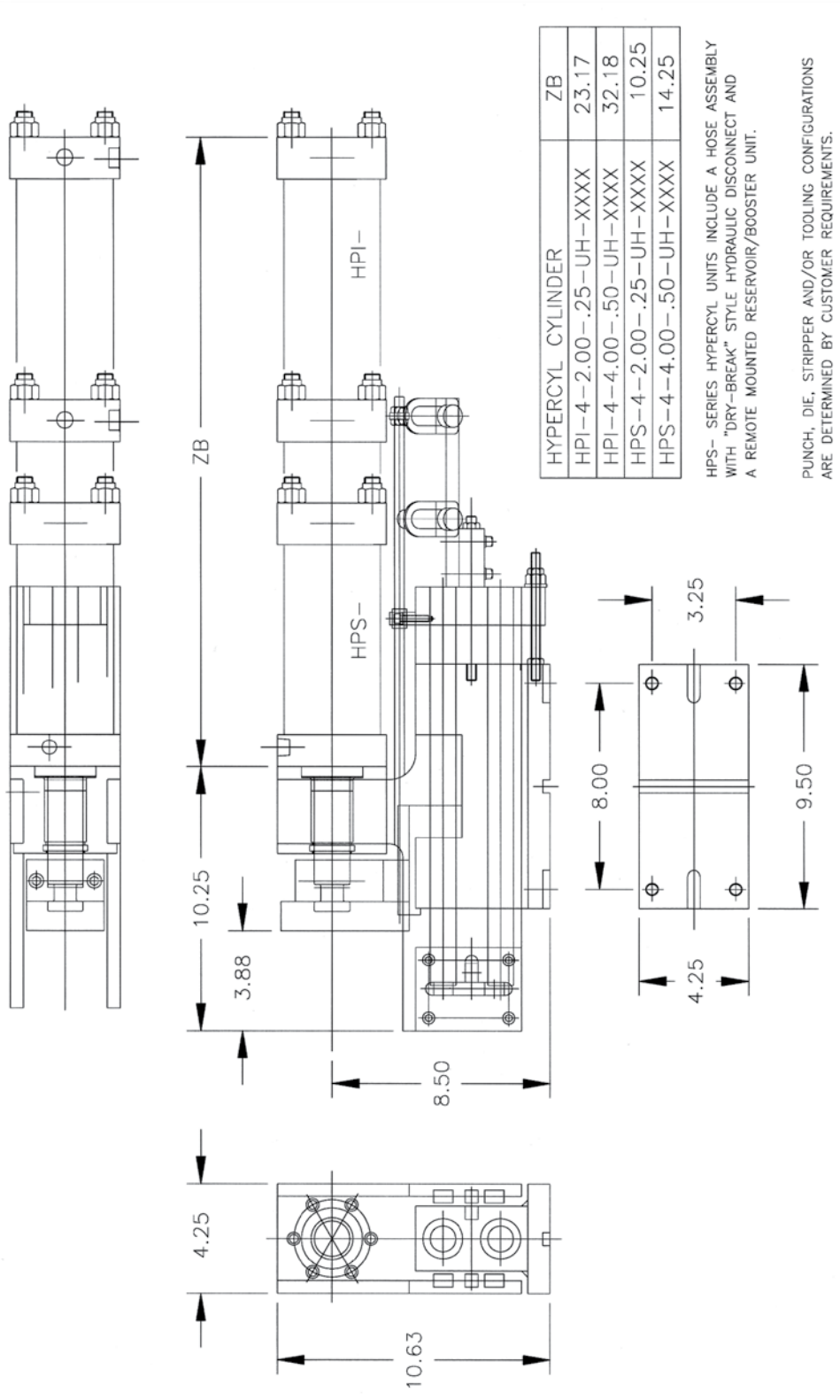
**BASIC EQUALIZING UNIT P-BU02-SE-A-01-0402 CAPACITY 8754 lbs. FORCE @ 100 psi. AIR**

4-Ton Equalizing



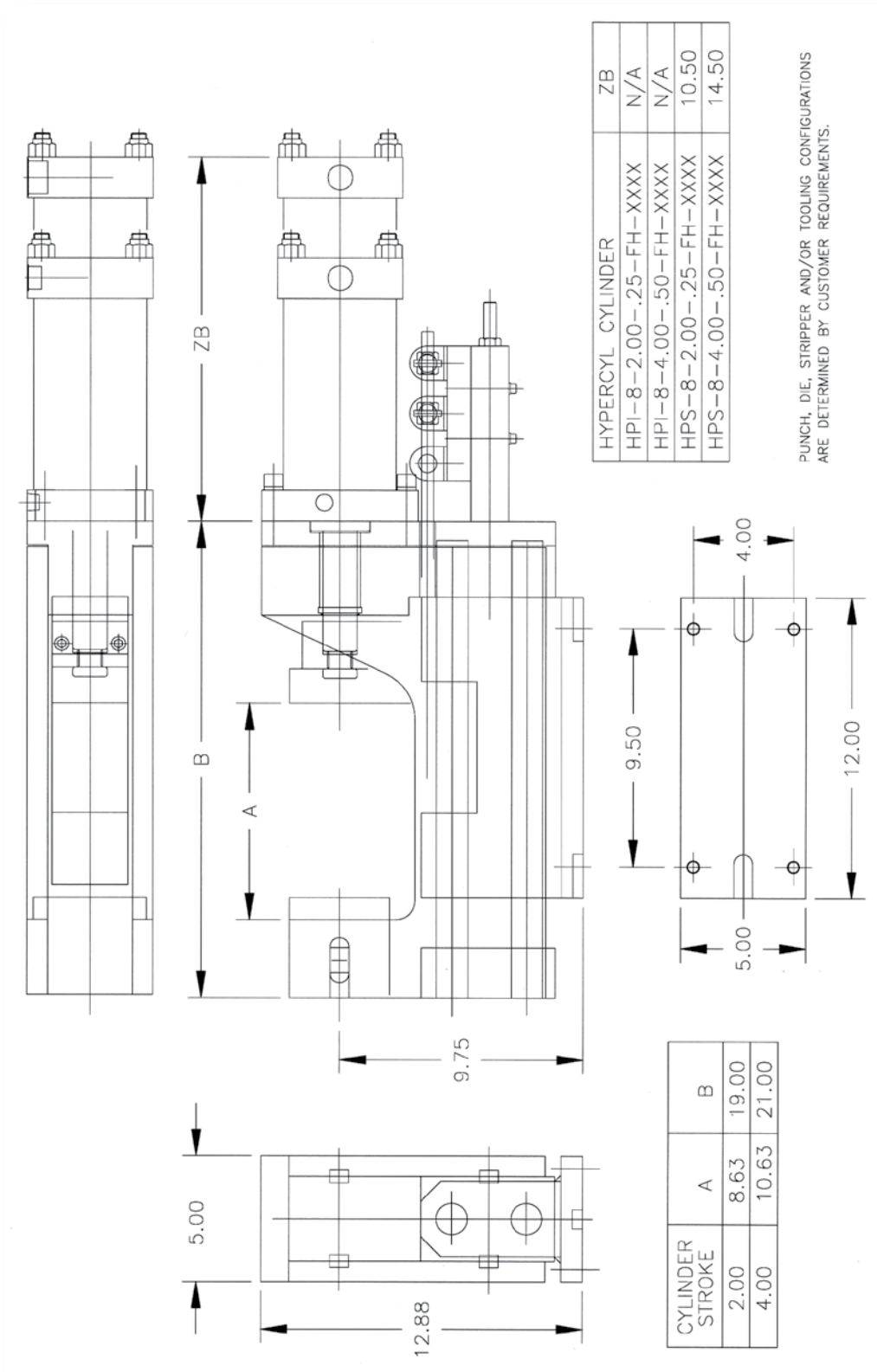
**BASIC EQUALIZING UNIT P-BU04-SE-A-01-0403 CAPACITY 8754 lbs. FORCE @ 100 psi. AIR**

4-Ton Equalizing



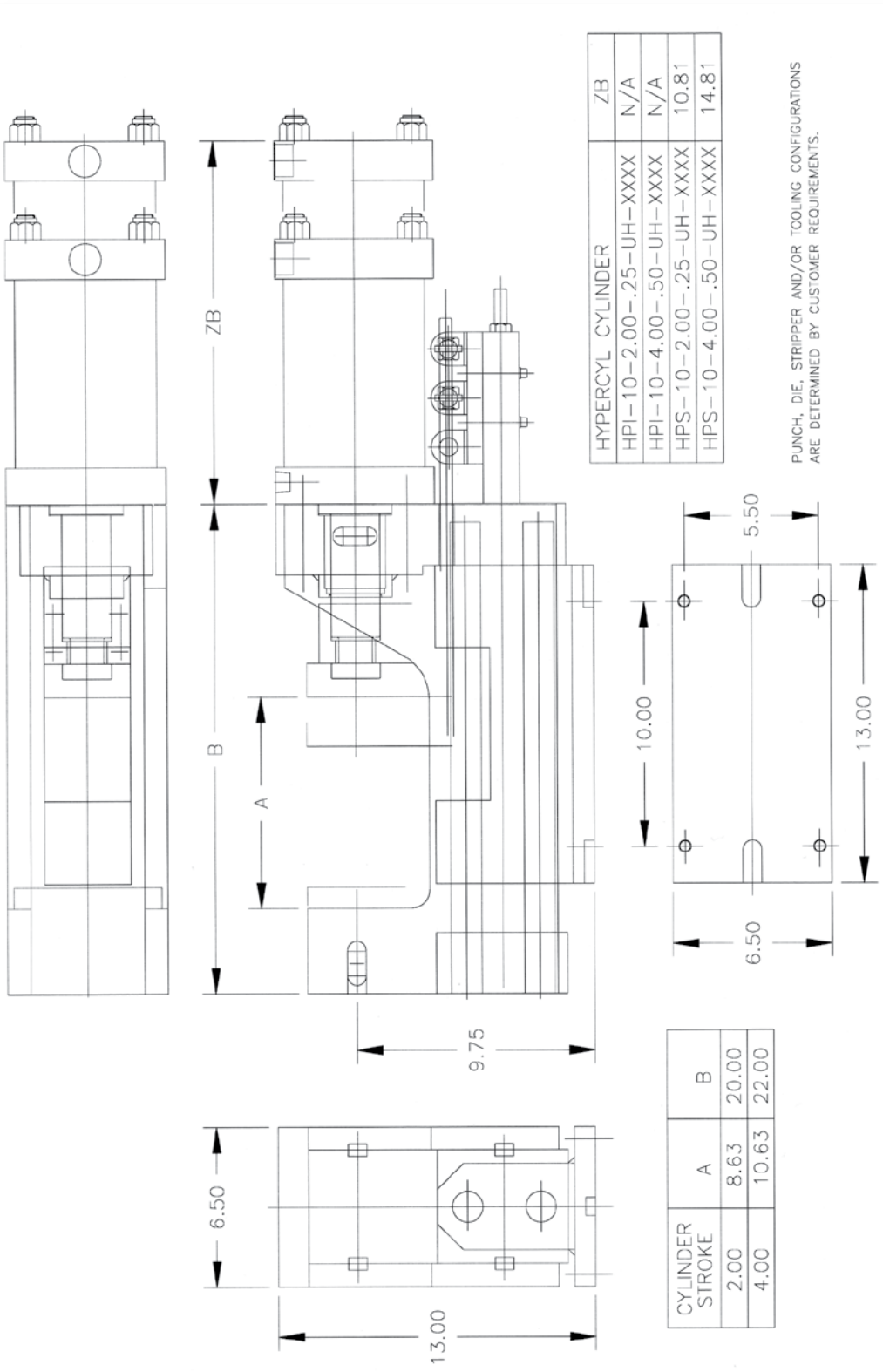
**BASIC EQUALIZING UNIT P-BUO4-SE-A-01-0404 CAPACITY 8754 lbs. FORCE @ 100 psi. AIR**

8-Ton Equalizing



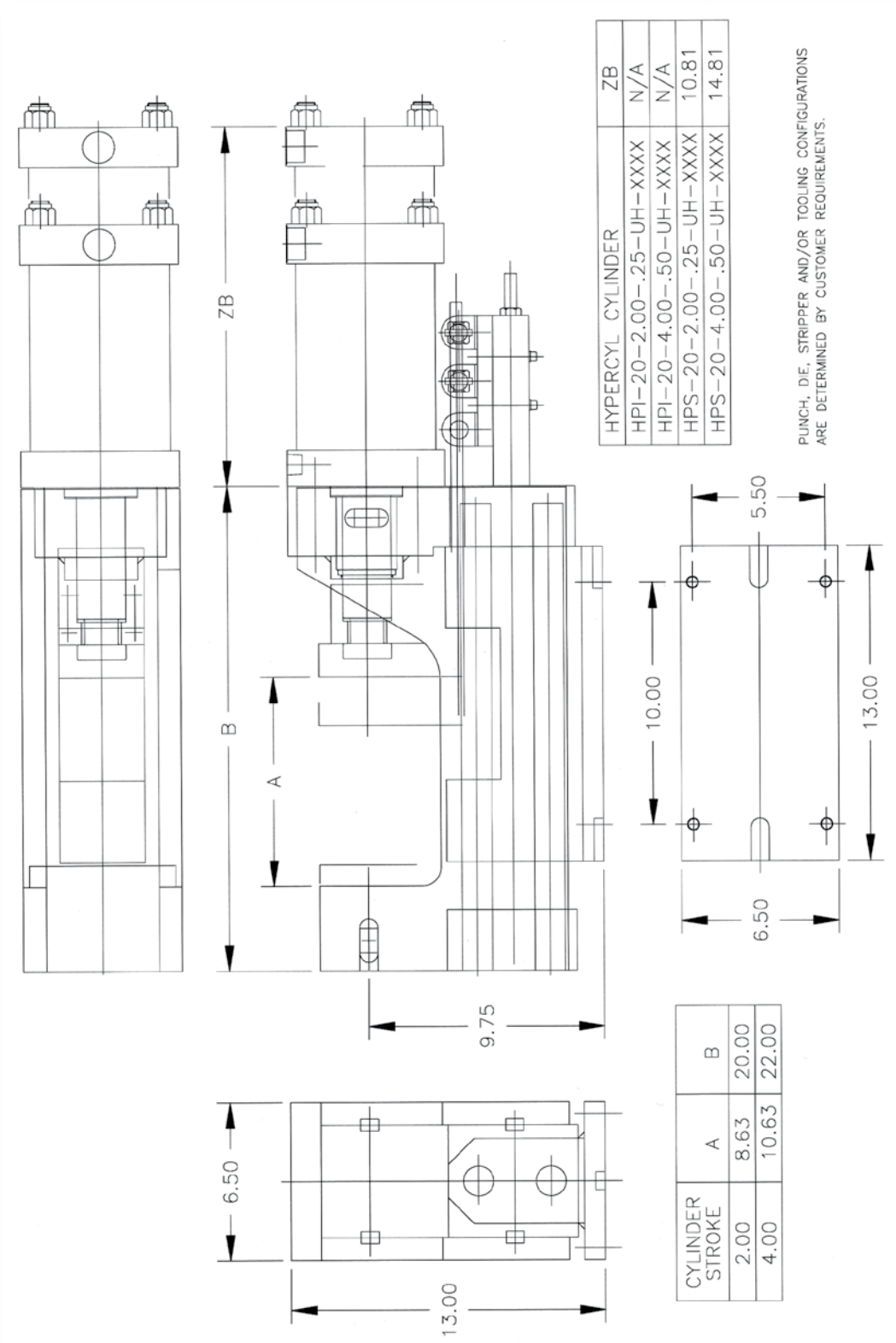
BASIC EQUALIZING UNIT P-BU08-SE-A-01-0801 CAPACITY 15886 lbs. FORCE @ 100 psi. AIR

10-Ton Equalizing



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

20-Ton Equalizing



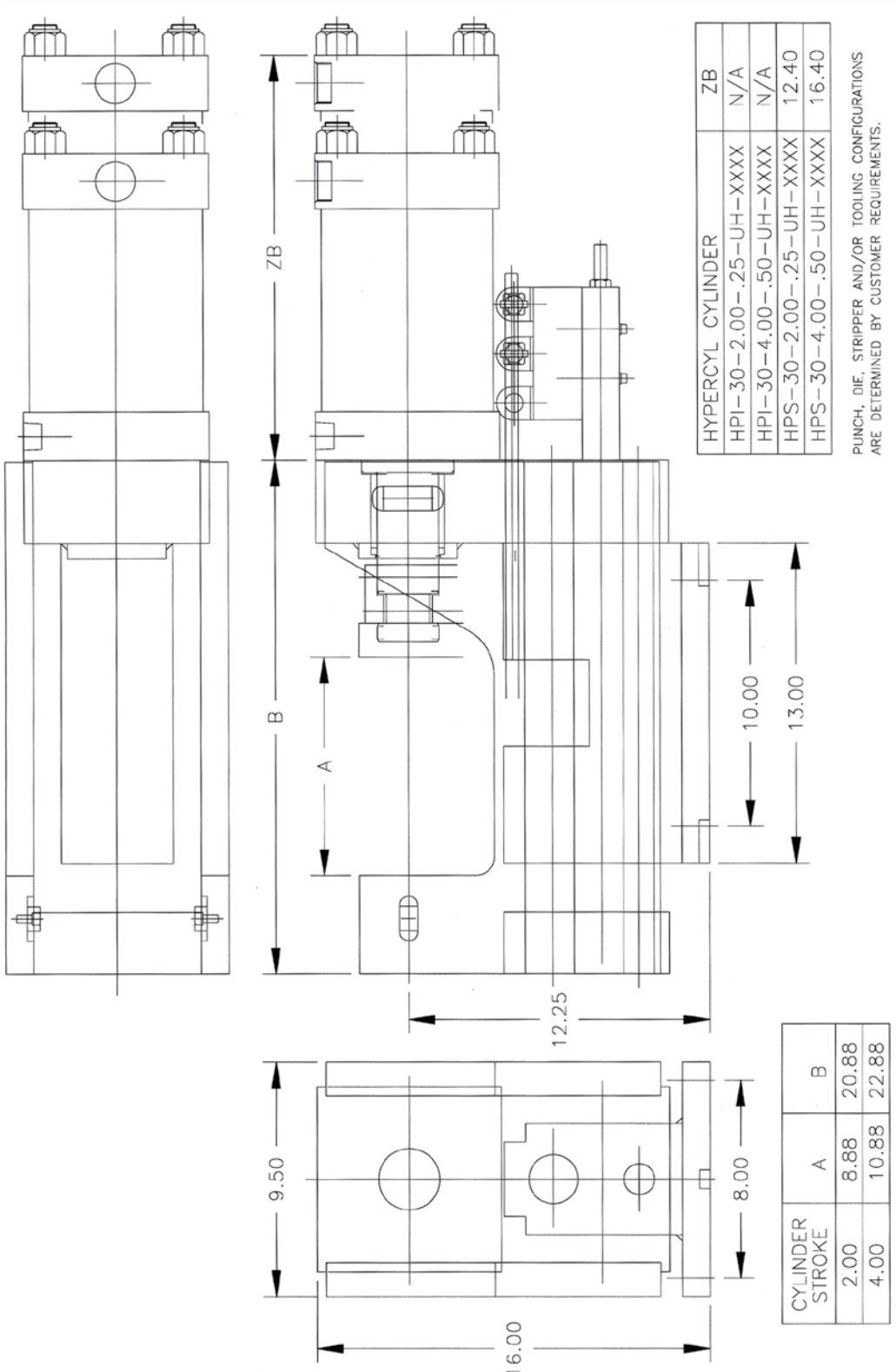
HYPERCYL CYLINDER	ZB
HPI-20-2.00-.25-UH-XXXX	N/A
HPI-20-4.00-.50-UH-XXXX	N/A
HPS-20-2.00-.25-UH-XXXX	10.81
HPS-20-4.00-.50-UH-XXXX	14.81

PUNCH, DIE, STRIPPER AND/OR TOOLING CONFIGURATIONS ARE DETERMINED BY CUSTOMER REQUIREMENTS.

CYLINDER STROKE	A	B
2.00	8.63	20.00
4.00	10.63	22.00

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

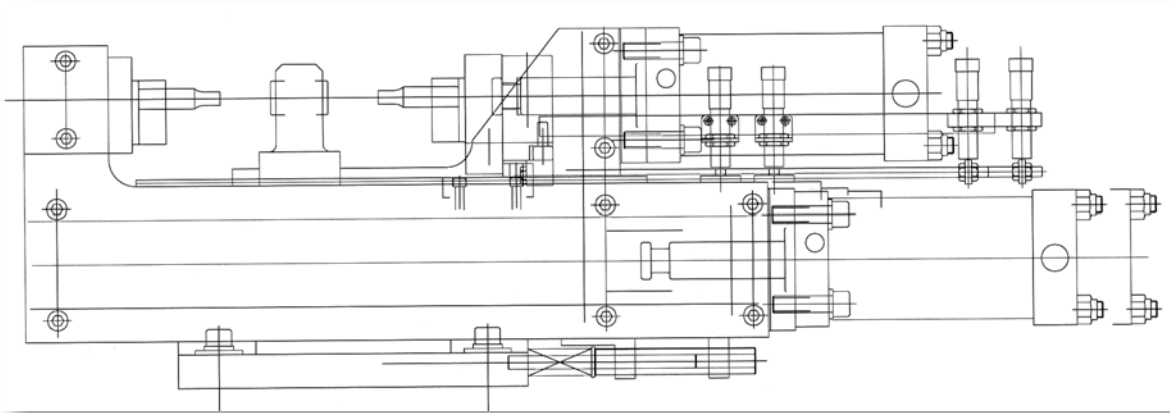
30-Ton Equalizing



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

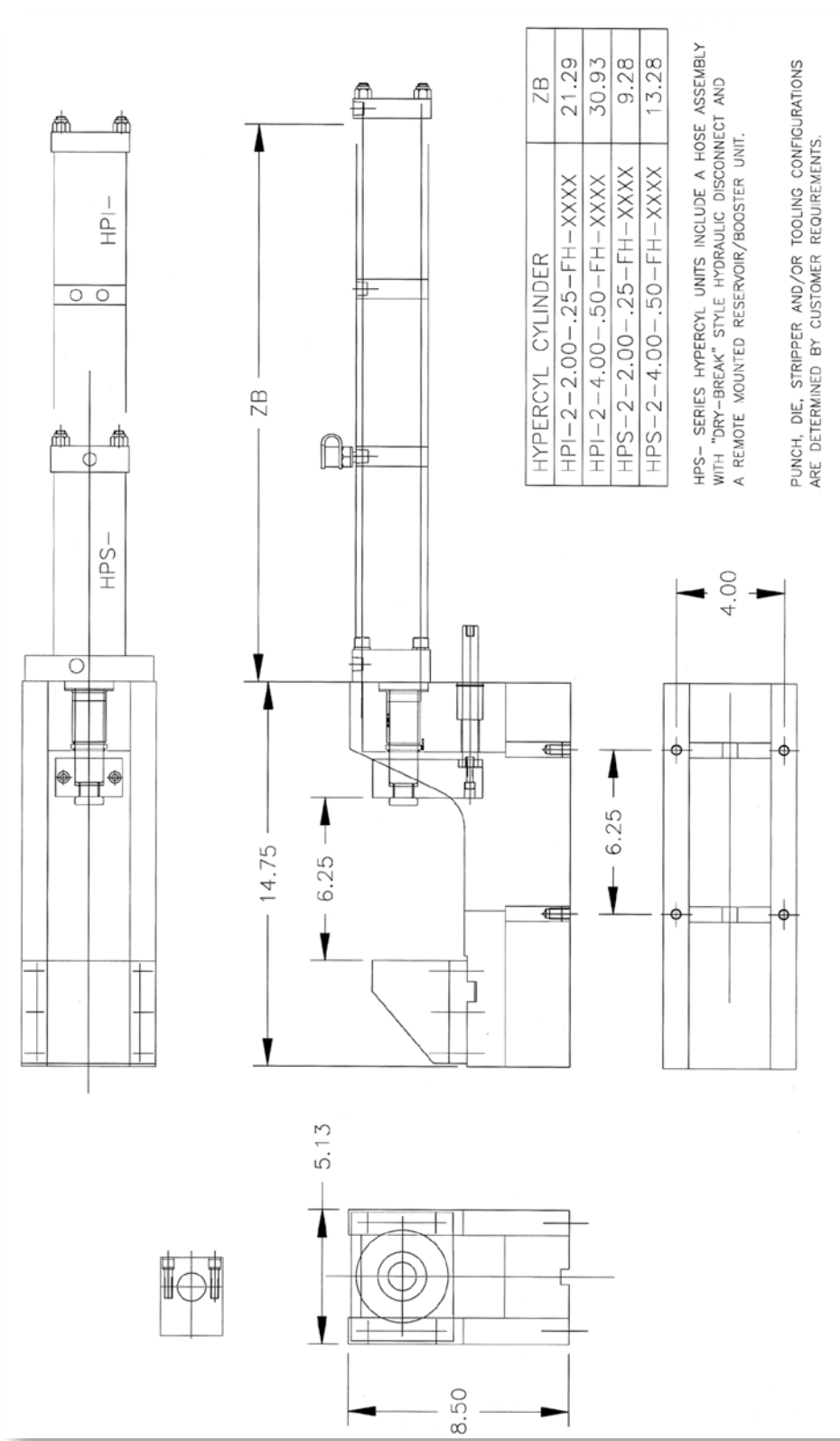


**Dual Equalizing Units**



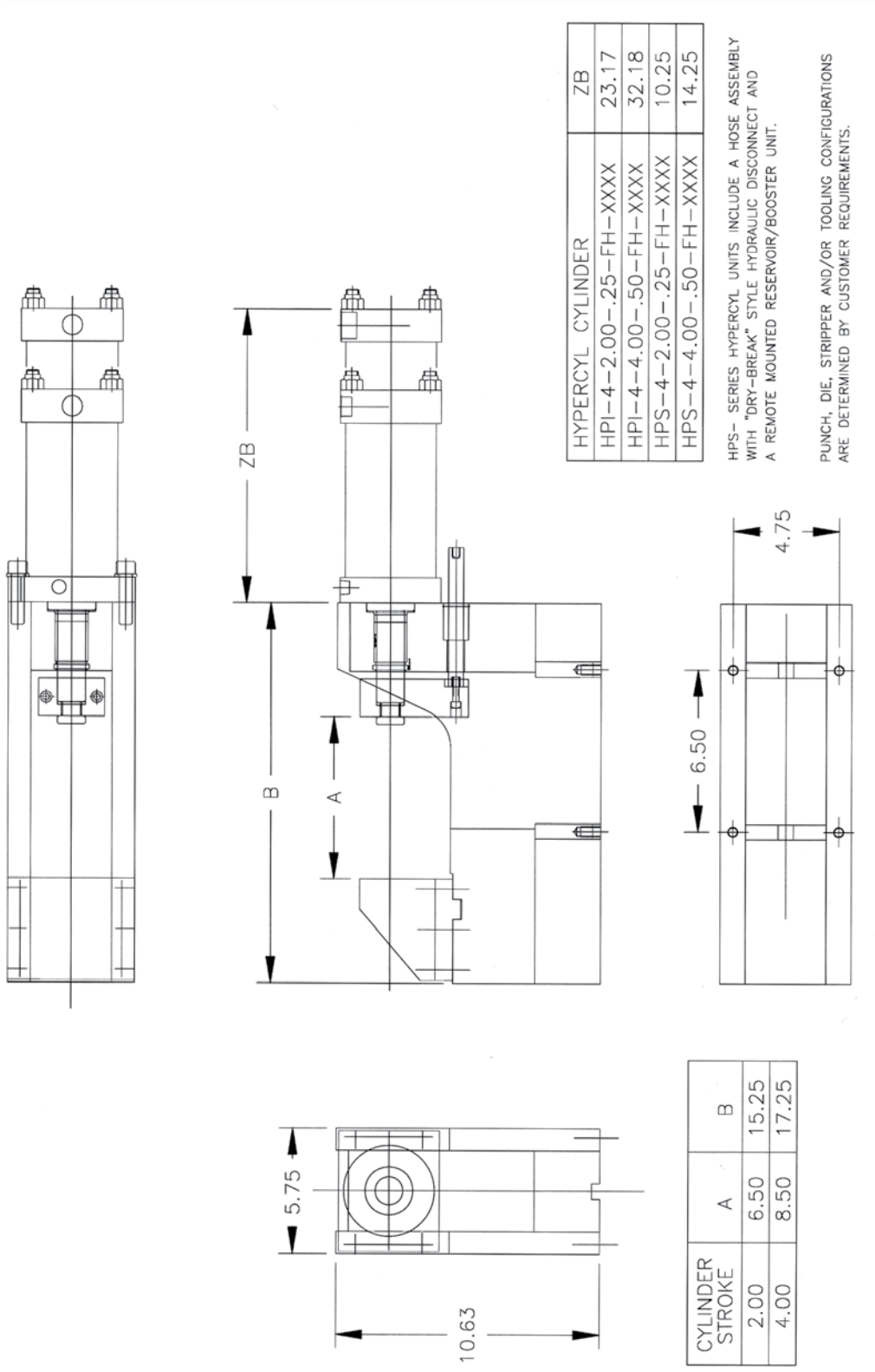
All Dual-Equalizing units are designed and built for a specific application. Please contact Aries Engineering Co., Inc. or your local AEC/HyperCyl Representative for further information.

2-Ton Non-Equalizing



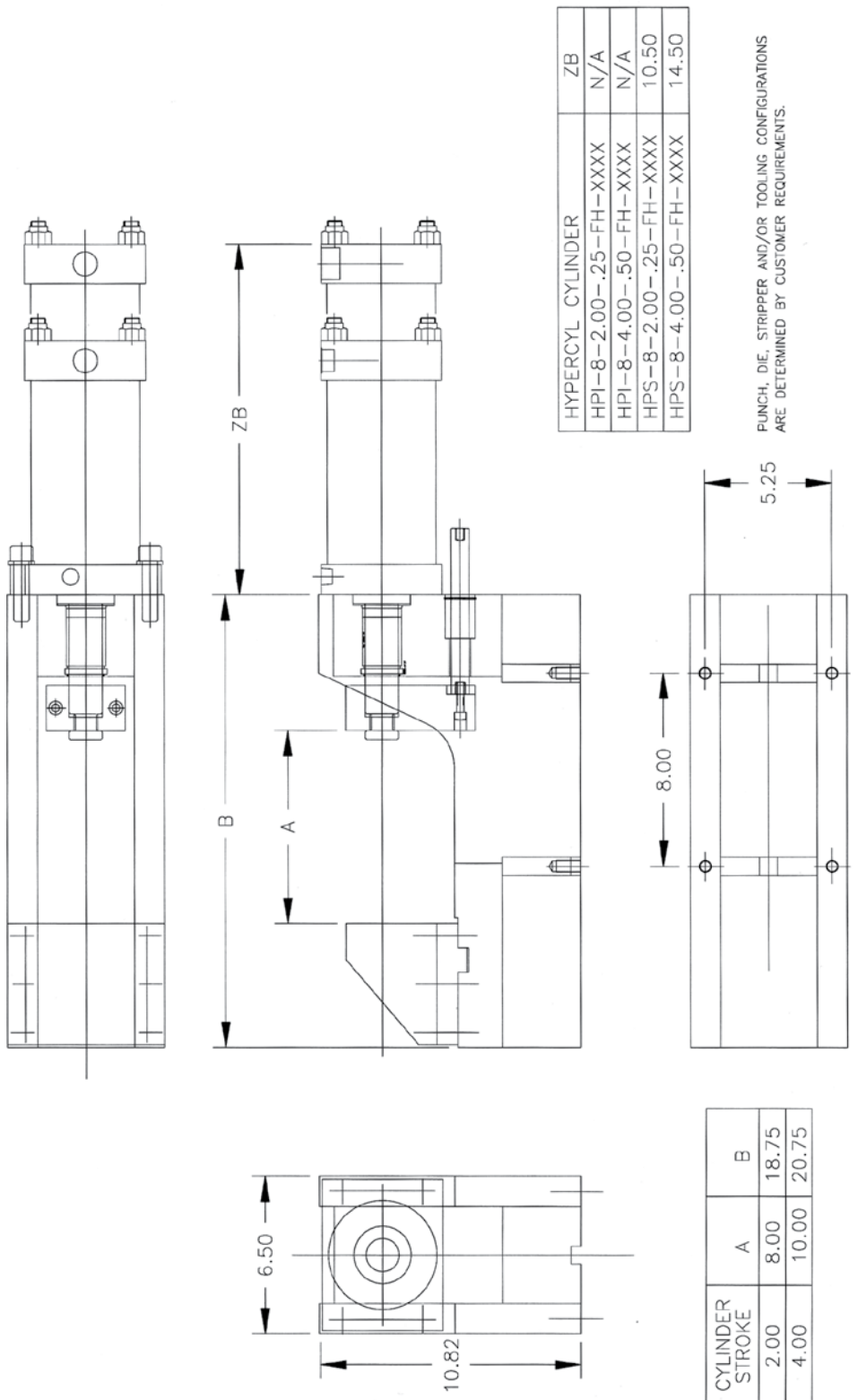
NON-EQUALIZING UNIT P-BU02-NE-A-01-0203 CAPACITY 5454 lbs. FORCE @ 100 psi. AIR

4-Ton Non-Equalizing



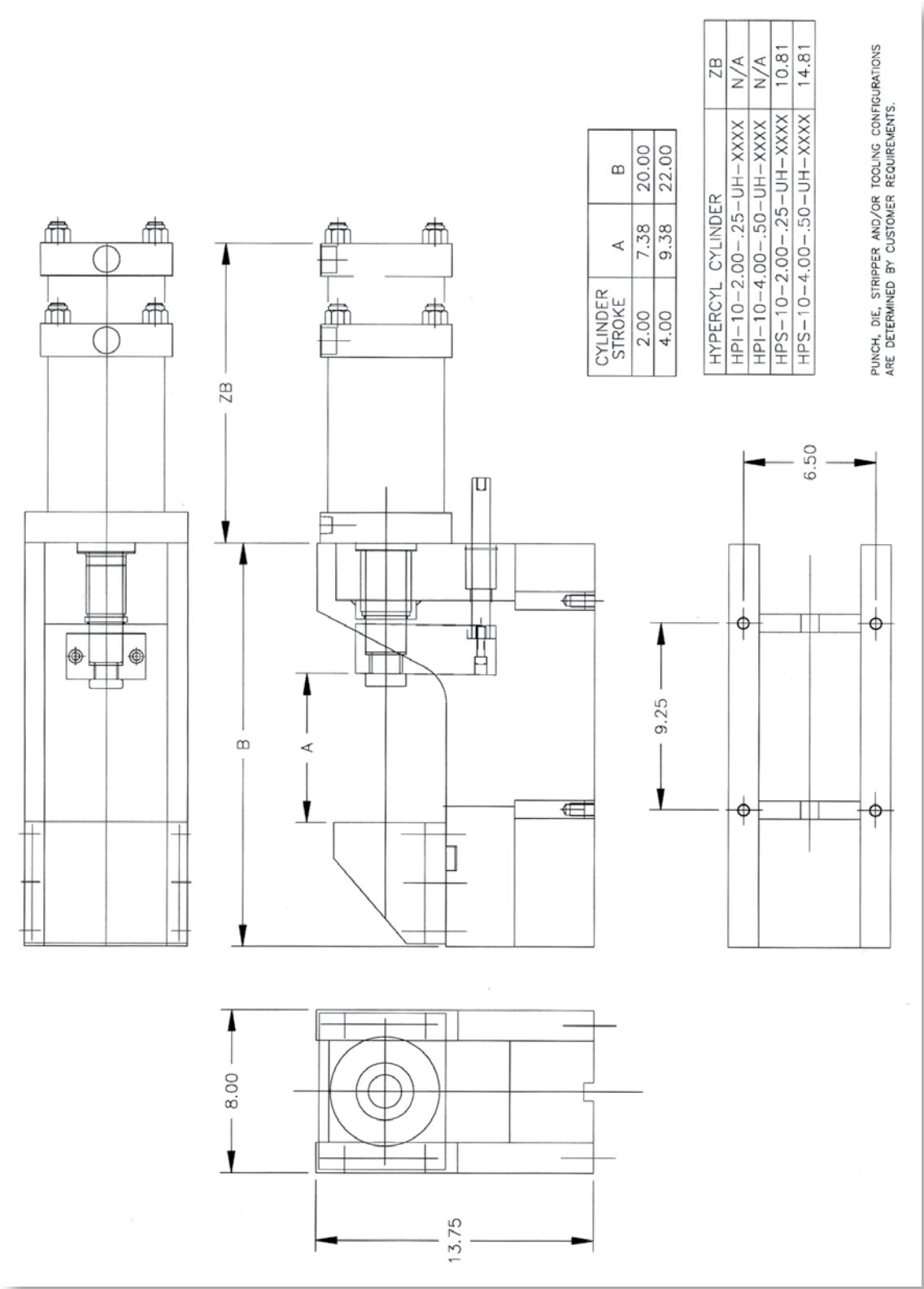
BASIC EQUALIZING UNIT P-BU04-NE-A-01-0405 CAPACITY 8754 lbs. FORCE @ 100 psi. AIR

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



CYLINDER STROKE	A	B
2.00	7.38	20.00
4.00	9.38	22.00

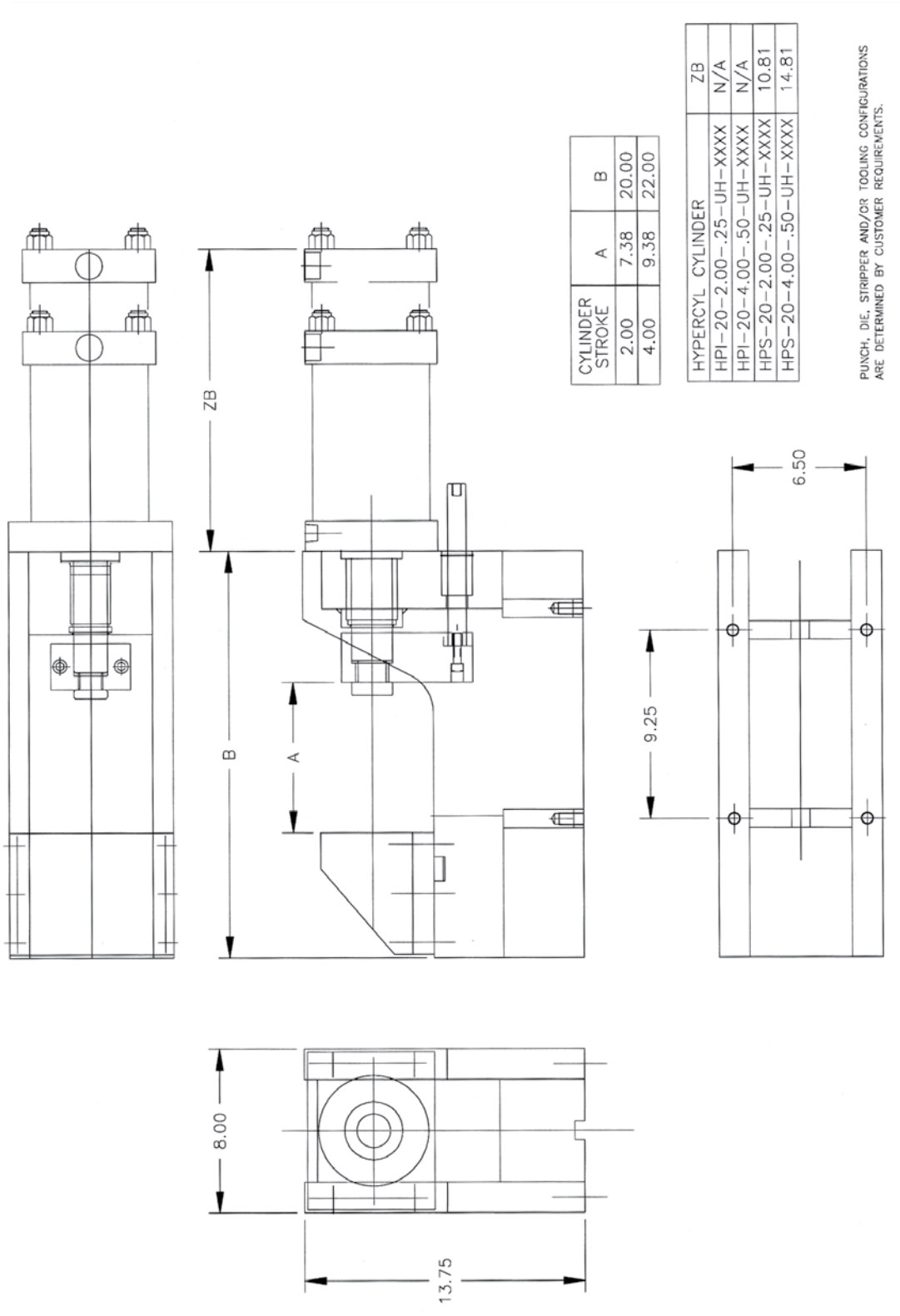
HYPERCYL CYLINDER	ZB
HPI-10-2.00-.25-UH-XXXX	N/A
HPI-10-4.00-.50-UH-XXXX	N/A
HPS-10-2.00-.25-UH-XXXX	10.81
HPS-10-4.00-.50-UH-XXXX	14.81

PUNCH, DIE, STRIPPER AND/OR TOOLING CONFIGURATIONS ARE DETERMINED BY CUSTOMER REQUIREMENTS.

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

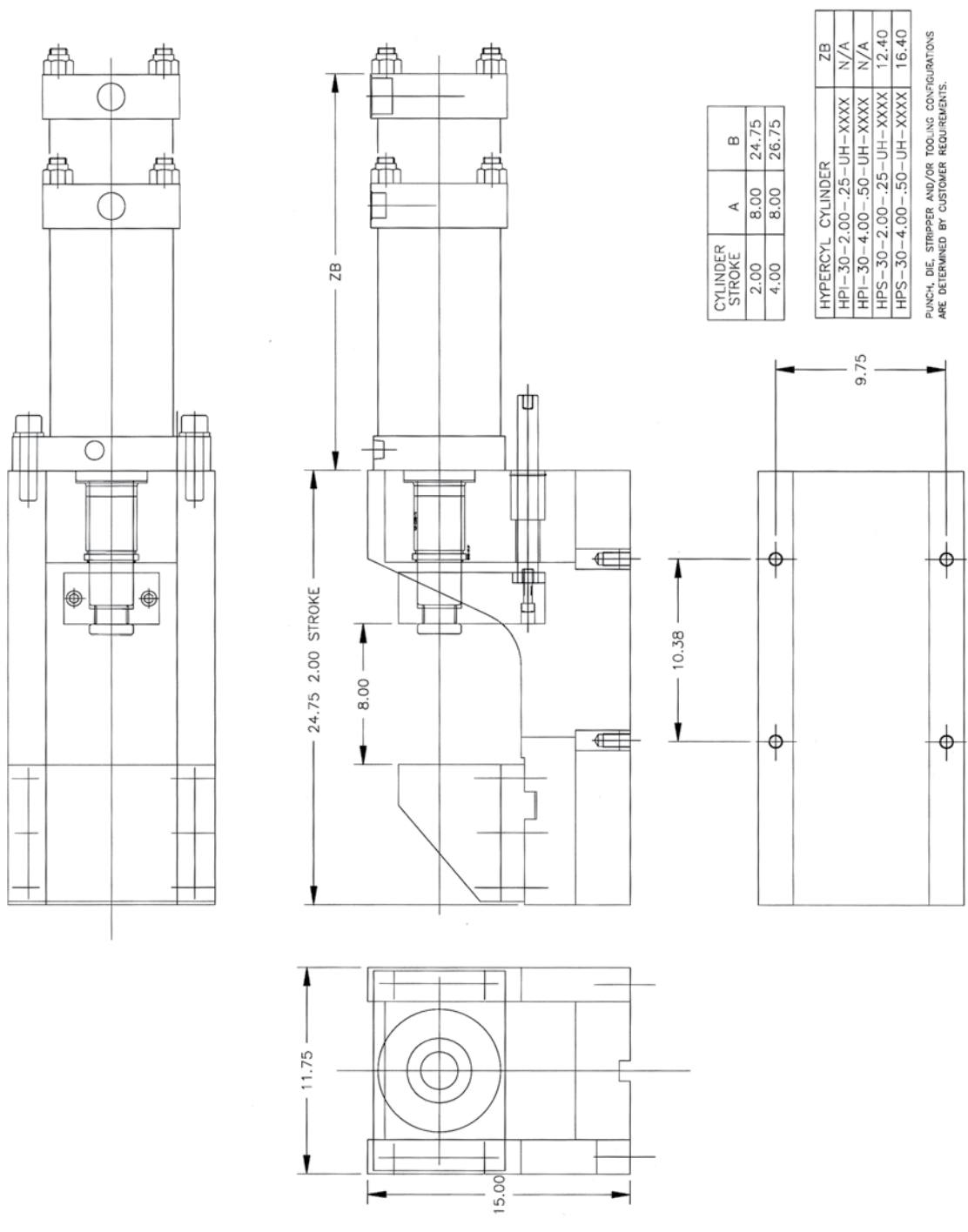
# Dimensional Data

## 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

