

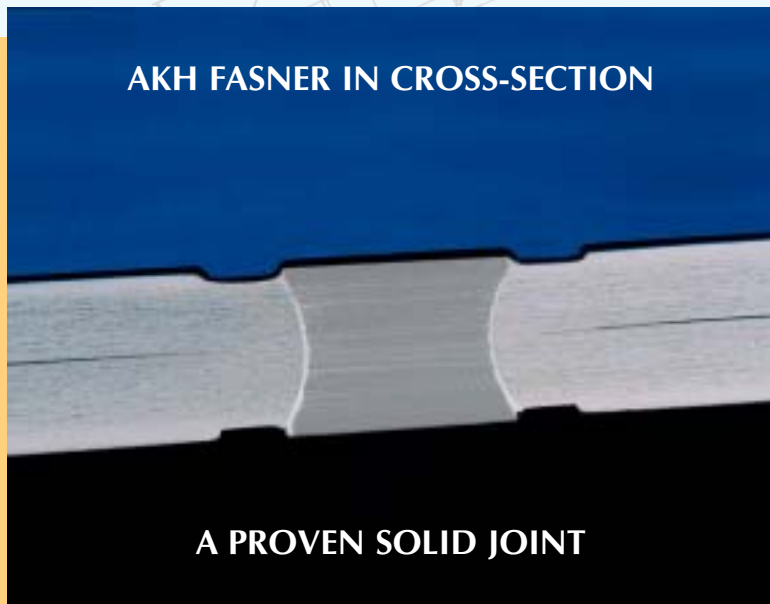


Joining Expertise with Technology

INSERTION PRESSES • SELF PIERCING-FLUSH AKH FAS-NERS™

AKH FAS-NER SYSTEM™

AKH FASNER IN CROSS-SECTION



A PROVEN SOLID JOINT

Since 1981, AKH has provided the engineering and manufacturing support to the growing number of worldwide corporations who have specified the AKH FAS-NER™ into the design and production of their products. We are proud to be a supplier to the automotive, trucking, appliance, leisure, electronics, communications, computer, food service and medical equipment industries.

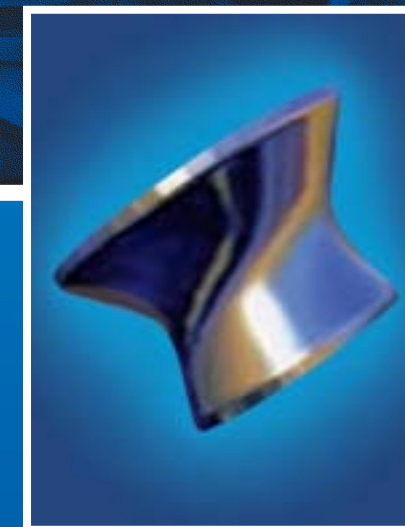
We take pride in our reputation as a leading supplier, committed to the principles of continuous quality improvements in all areas of our manufacturing and service. Our goal is to continue to produce a better quality product which is cost efficient and exceeds customer expectations in product performance.

AKH's commitment is to be the leader in the worldwide market for metal joining processes. Our employees' dedication is to continuously strive for better quality products, for higher standards of service and for being in the forefront of the metal joining industry.

Headquartered in Indianapolis, Indiana, AKH with its' affiliate, maintains manufacturing facilities on the East Coast, as well as in the Midwest.

Contact AKH or your local AKH representative for more information.

U.S. Patent No. 4,130,922. Foreign patents issued in Australia, Belgium, Canada, France, Germany, Great Britain, Holland, Italy, Japan, Sweden, Switzerland. Other patents pending.



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AKH Inc.

AKH CAN MAKE SPOT WELDING OR RIVETING OBSOLETE

If you still think that welding and riveting are your only options in joining metals, here's a system that can save you dollars and manufacturing headaches . . . the AKH FAS-NER SYSTEM.™

The AKH FAS-NER SYSTEM eliminates: Compared to Spot Welding

- Plating bleed out
- Chemical changes in metals due to heat
- Environmental and safety hazards
- Precleaning of metals
- Costly touch up and refinishing
- High utility useage and costs
- Joint quality inconsistencies

The AKH FAS-NER SYSTEM eliminates: Compared to Riveting

- Prepunching of holes
- Excessive material handling
- Realignment of holes during assembly
- Higher work-in-process inventory
- Unnecessary labor costs



The AKH FAS-NER SYSTEM joins:

- Multiple layers of metal
- Dissimilar thicknesses of material
- Dissimilar metals
- Precoated/preplated assemblies

The AKH FAS-NER SYSTEM provides:

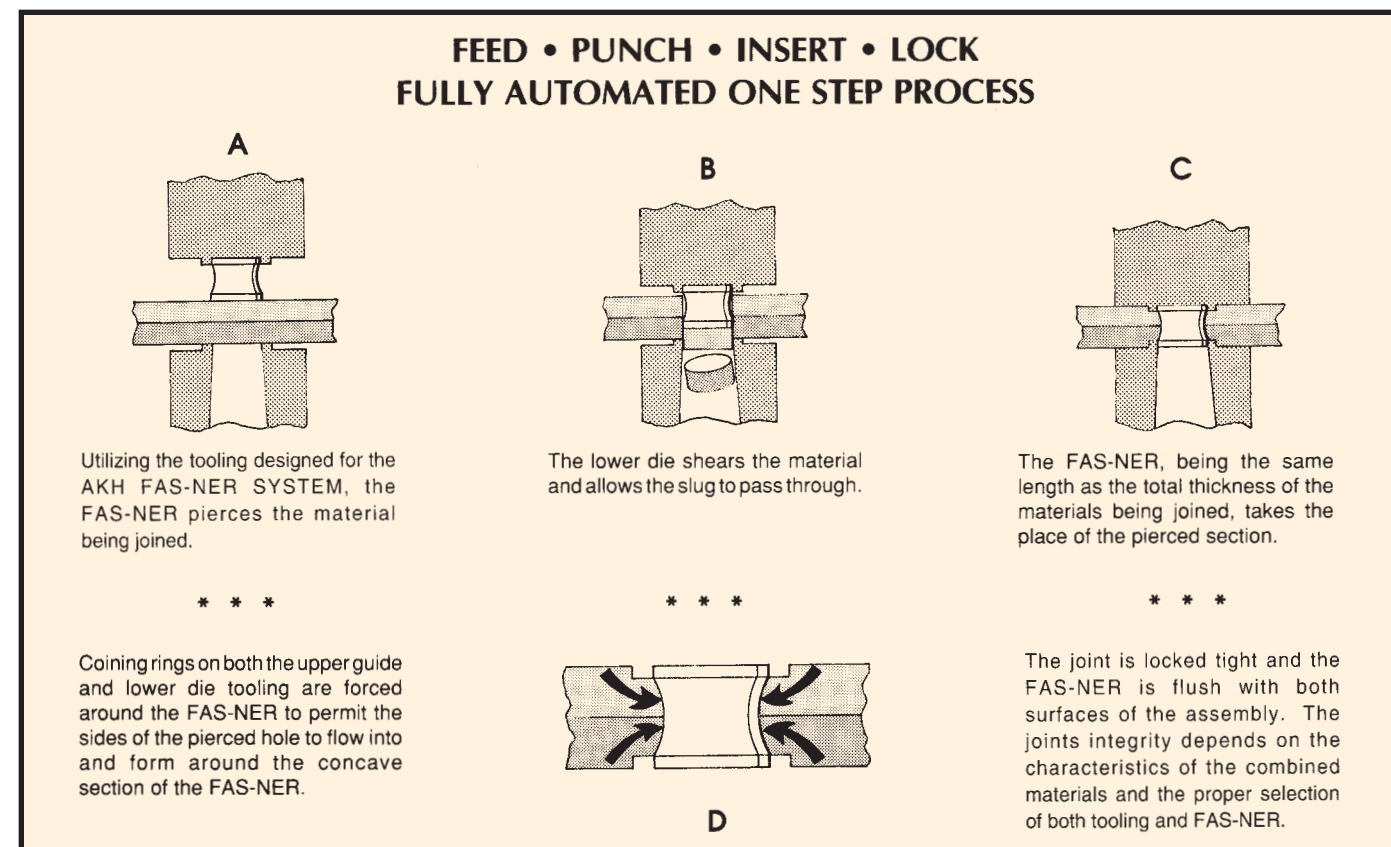
- Consistent quality
- Flush mounted finish
- Increased corrosion resistance
- A virtual air tight and water tight joint
- Aesthetically pleasing appearance
- Vibration resistance
- Minimal material distortion
- Joint strength to material tensile
- Electrical continuity
- Joint quality confirmed visually

Best of all, you have all these benefits from one automatic system!

Here's how it works !!

The AKH FAS-NER SYSTEM utilizes a unique self-piercing, headed or headless fastener called the AKH FAS-NER™ which mounts flush with the material being joined.

The AKH FAS-NER is cylindrically shaped, having concave sides which resemble an hour glass. The AKH FAS-NER is its own punch and is made of either hardened aluminum or high carbon steel.



A FAS-NER TO MEET YOUR NEEDS

| SPECIFICATIONS OF THE AKH FAS-NER | | | | | | |
|-----------------------------------|---|-----|------------------|------|--------------------------|------|
| FAS-NER SIZE # | APPROXIMATE COMBINED MATERIAL THICKNESS | | FAS-NER DIAMETER | | RECOMMENDED FLANGE WIDTH | |
| | INCH | MM | INCH | MM | INCH | MM |
| 1 | .075 | 1.9 | .187 | 4.7 | .375 | 9.5 |
| 2 | .084 | 2.1 | | | | |
| 3 | .099 | 2.5 | | | | |
| 4 | .111 | 2.8 | | | | |
| 5 | .125 | 3.2 | | | | |
| 6 | .138 | 3.5 | | | | |
| 7 | .155 | 3.9 | | | | |
| 8 | .165 | 4.2 | .250 | 6.3 | .500 | 12.5 |
| 9 | .180 | 4.6 | | | | |
| 10 | .195 | 5.0 | | | | |
| 11 | .210 | 5.3 | | | | |
| 12 | .225 | 5.7 | .312 | 7.9 | .675 | 17.0 |
| 13 | .240 | 6.1 | | | | |
| 14 | .255 | 6.5 | | | | |
| 15 | .270 | 6.9 | .375 | 9.5 | .875 | 22.0 |
| 16 | .285 | 7.2 | | | | |
| 17 | .300 | 7.6 | | | | |
| 18 | .315 | 8.0 | .4375 | 11.1 | 1.00 | 25.0 |
| 19 | .330 | 8.4 | | | | |
| 20 | .345 | 8.8 | | | | |
| 21 | .360 | 9.1 | | | | |

The AKH FAS-NER is made from hardened steel or aluminum and available in a range of twenty-one standard sizes. Material with a combined thickness ranging from 0.075 inch to 0.360 inch can be joined using the AKH FAS-NER SYSTEM.

To determine the proper FAS-NER size for your application, select from the chart the FAS-NER which will most closely approximate the total thickness of the materials to be joined.

Example:
If you join one sheet of 18 gauge aluminum, which is 0.0403 inch thick to a sheet of 16 gauge steel, which is 0.0598 inch, you will have a combined material thickness of .1001 inch. The proper application would call for a #3 steel FAS-NER.

The best joint strength will result from piercing the softest and/or the thinnest material first.

Steel FAS-NERS are available with the standard zinc chromate plating at least 0.0003 inch thick. Zinc dichromate for increased corrosion resistance, as well as other platings and coatings are available on request to meet your requirements.

Insure that your material conforms to your specifications and tolerances before selecting the proper FAS-NER size. A FAS-NER oversized or undersized to the combined material thickness of the assembly can be used but may require modifications to the insertion dies.

Insertion press systems designed for productivity !!

AO SERIES PRESS

Three models in this series. Stationary floor mounted presses with an 18 inch throat depth and an adjustable lower arm. Vibratory bowl feed. Operates on normal shop air. Joins material with a combined thickness up to 0.360 inches. Operates at cycle times up to 50 cycles per minute. Model sizes from 8 ton to 30 ton units.

PREPAINTED FAS-NERS

Available to match the particular color and gloss of a prefinished metal. Together the FAS-NER and the metal give the appearance of a part that has been first assembled and then painted. Used on appliances, garage doors and office furniture.

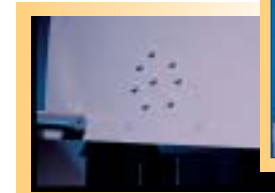
HP SERIES PRESS

Three models in this series utilizing hydraulic self diagnostic control module operating at up to 60 cycles per minute. Depending on your application, the HP Series Press with its 6 inch throat depth can be either bench mounted or counter balanced. Joins material with a combined thickness up to 0.360 inches. Model sizes from 5 ton to 30 ton units.

If your application requirements are unique, AKH can either work with a system design manufacturer of your choice, or help custom design a single or multiple station operation to meet your needs.



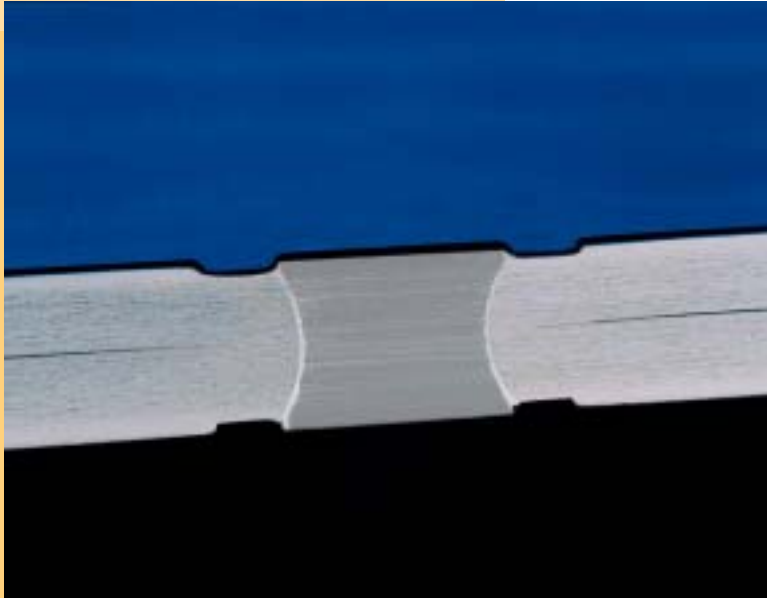
AKH offers a complete line of standard insertion presses designed exclusively to automatically feed, insert and lock the AKH FAS-NER™ into your assembly.





Joining Expertise with Technology

INSERTION PRESSES • SELF PIERCING-FLUSH AKH FAS-NERS™



AKH FAS-NER™

The AKH FAS-NER is the punch die of the AKH FAS-NER system. The hardened FAS-NER provides a new punch for each insertion to insure burr-free joints.



- Self-piercing
- Flush-mounted
- Steel or Aluminum
- Symmetrical for Ease of Feed
- Plated, Painted, or Anodized
- UL Continuity

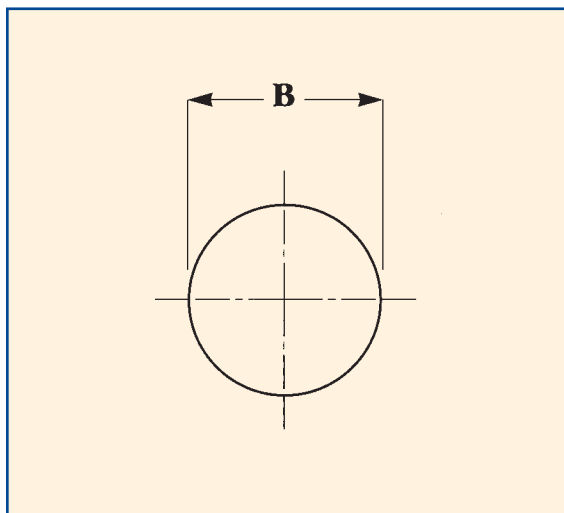
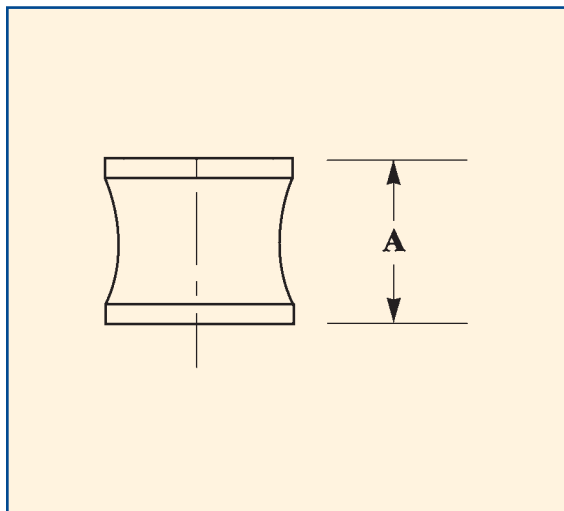


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INSERTION PRESSES • SELF PIERCING-FLUSH AKH FAS-NERS™



| FAS-NER SIZE # | LENGTH "A" | | DIAMETER "B" | |
|----------------------|---------------|-----|-----------------|------|
| | INCH | MM | INCH | MM |
| 1 | .075 | 1.9 | .187 | 4.7 |
| 2 | .084 | 2.1 | | |
| 3 | .099 | 2.5 | | |
| 4 | .111 | 2.8 | | |
| 5 | .125 | 3.2 | | |
| 6 | .138 | 3.5 | | |
| 7 | .155 | 3.9 | | |
| 8 | .165 | 4.2 | .250 | 6.3 |
| 9 | .180 | 4.6 | | |
| 10 | .195 | 5.0 | | |
| 11 | .210 | 5.3 | | |
| 12 | .225 | 5.7 | .312 | 7.9 |
| 13 | .240 | 6.1 | | |
| 14 | .255 | 6.5 | | |
| 15 | .270 | 6.9 | .375 | 9.5 |
| 16 | .285 | 7.2 | | |
| 17 | .300 | 7.6 | | |
| 18 | .315 | 8.0 | .4375 | 11.1 |
| 19 | .330 | 8.4 | | |
| 20 | .345 | 8.8 | | |
| 21 | .360 | 9.1 | | |

FEATURES AND BENEFITS

AKH takes pride in our reputation as a leading supplier of fasteners to the growing number of worldwide corporations who have specified the AKH FAS-NER into the design and production of their products. The AKH FAS-NER is today found in numerous products manufactured by the automotive, trucking, appliance, leisure, electronics, communications, computer, food service and medical industries.

The FAS-NER is specified because the use of it solves problems for the manufacturer. The highest priority is for quality of product. The AKH FAS-NER provides a cost effective method to guarantee consistency and maintain the ability to quantitatively confirm the quality of a joint.

Other benefits to manufacturer include the elimination of costly manufacturing stations and allowing for the AKH FAS-NER to provide a solid joint which will be highly vibration resistant, highly corrosion resistant, eliminate plating bleed-out problems, resistant to shock load under thermal cycling and will provide holding strength equal to the tensile of the assembly metals.

SPECIFICATIONS

AKH FAS-NERS are manufactured of aluminum or steel in twenty one (21) standard lengths in five (5) standard diameters to join materials with a combined thickness from approximately .075 to .360 inches. Other FAS-NER sizes or metals can be provided on request.

Select from the chart the FAS-NER size that will most closely approximate the total combined material thickness to be joined. The best joint strength will result from piercing the softest and/or the thinnest material first. AKH will confirm proper FAS-NER size and tooling upon request to complete samples of your materials or assembly using the AKH FAS-NER.

Steel FAS-NERS are formed from AISI/SAI #8620 or #1055/60 material. FAS-NERS, depending on material, are either thru-hardened or case hardened to a hardness requirement of 52-60 on the Rockwell "C" scale. FAS-NERS are then plated with a standard zinc chromate to a minimum thickness of .0003". Zinc dichromate as well as other platings are available upon request. Hydrogen embrittlement is controlled by specific baking techniques after plating. Painted FAS-NERS are available in epoxy coating to color match pre-coated metals.

Aluminum FAS-NERS are formed from either AISI/SAI #7178 or #7075 material and then hardened to a T-6 condition. FAS-NERS are then bright dipped after heat hardening or anodized, upon special request, for specific applications.

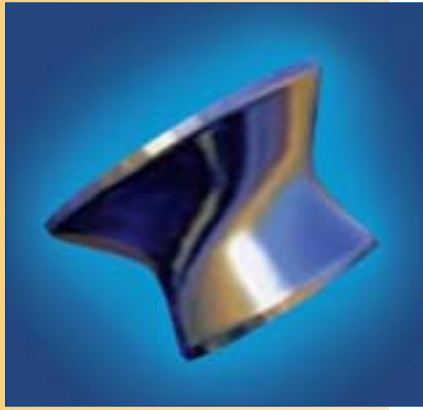
The quality of the manufacturing process for all FAS-NERS is carefully controlled at each phase to insure that specifications and tolerances are maintained. All FAS-NERS are sorted to height and diameter specifications prior to packaging through a carefully controlled process which also eliminated foreign matter accumulated during the heat treating and plating process. Lot certifications are available upon request.

AKH offers a complete line of press tools designed to automatically feed, insert and lock the AKH FAS-NER into your assembly. AKH offers portable, counter-balanced presses, and bench mounted or floor mounted presses in tonnage capacities from 5 to 30 tons. AKH can provide special design presses and tooling to meet specific needs.



Joining Expertise with Technology

NEW FROM AKH FAS-NER SYSTEMS



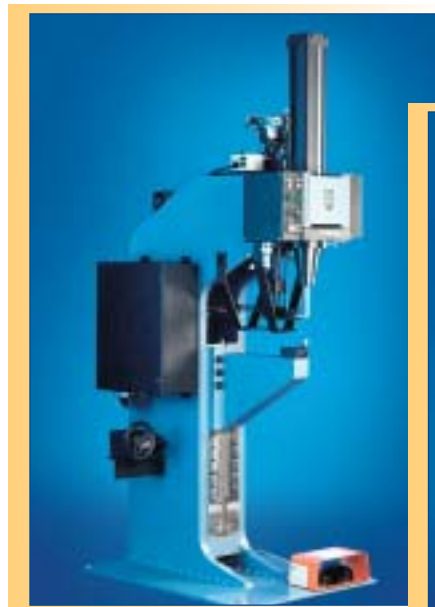
U.S. Patent No. 5,678,970

- Improved Strength
- Joins Dissimilar Metals
- Aesthetically Appealing
- Self-Piercing, One-Step Operation
- Available in Zinc Plate Steel and High Strength Aluminum
- Can Be Prepainted
- Environmentally Friendly
- Fast Cycle Times
- Consistent Joint
- Eliminates Destructive Testing

Introducing the Revolutionary **HEADED FAS-NER**™

The new **HEADED FAS-NER** from AKH holds its own against any other metal joining technique. The HEADED design eliminates coining marks and dramatically increases holding strength.

No more problems joining dissimilar metals. The new FAS-NER from AKH can hold it.



Insertion Press Models



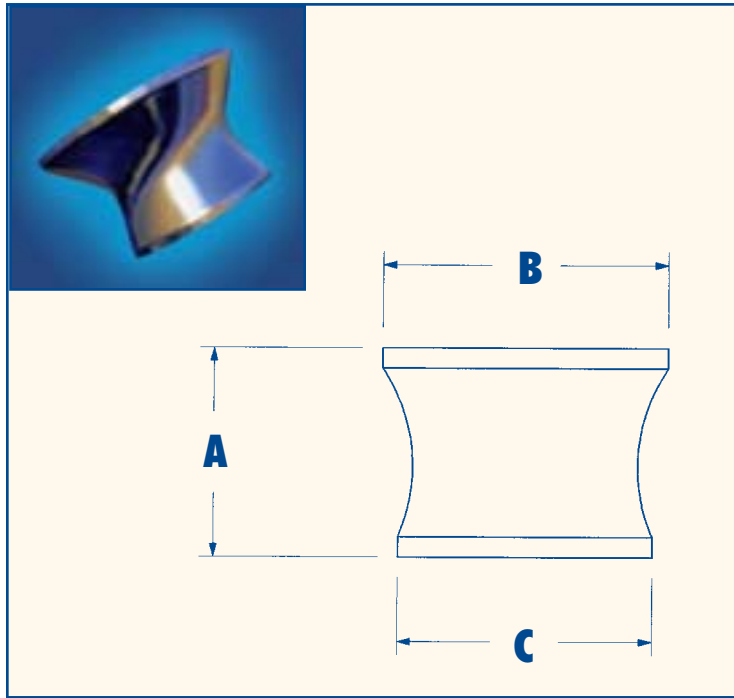
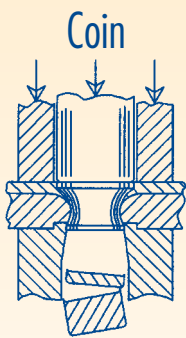
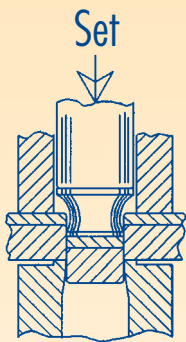
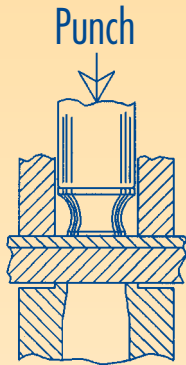
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Joining Expertise with Technology

NEW FROM AKH FAS-NER SYSTEMS

Three Operations In One Simple Step:



| FAS-NER Size | A | B | C |
|--------------|-----------------|----------------|----------------|
| 3 | 0.099" / 2.5 mm | 0.210 / 5.3 mm | 0.187 / 4.7 mm |
| 4 | 0.111" / 2.8 mm | | |
| 5 | 0.125" / 3.2 mm | | |
| 6 | 0.138" / 3.5 mm | | |
| 7 | 0.155" / 3.9 mm | 0.280 / 7.1 mm | 0.250 / 6.3 mm |
| 8 | 0.165" / 4.2 mm | | |
| 9 | 0.180" / 4.6 mm | | |
| 10 | 0.195" / 4.9 mm | | |
| 11 | 0.210" / 5.3 mm | | |

Other sizes available, please consult our factory.



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INSERTION PRESSES • SELF PIERCING-FLUSH AKH FAS-NERS™

HYDRAULIC PRESS SERIES



The Hydraulic Series Insertion Press adds flexibility, efficiency, quality and consistency to your metal fabricating requirements.

- Fast Cycle Times
- Bench Mount or Counter Balance
- Low Maintenance
- Quiet Operation
- Vibratory Bowl or Turret Feed
- Easily Integrated into Automated Systems
- Monitored Feed Systems
- Consistent Joint by Regulated Coining Pressure
- Tight Tolerances on Tooling
- Variable Volume Piston Pump

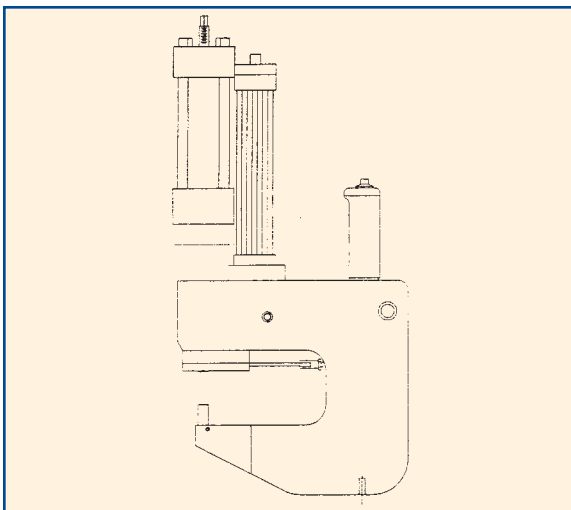
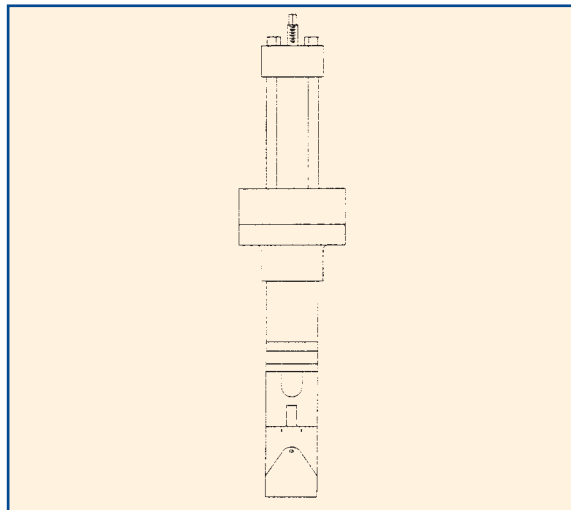


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INSERTION PRESSES • SELF PIERCING-FLUSH AKH FAS-NERS™



U.S. Patent No. 4,130,922. Other patents pending.

In addition to the Hydraulic Press Series, AKH offers the AO Series, a floor mounted, air over oil press in three models ranging in tonnage capacity from 8 to 30 tons, providing maximum work area to accommodate a wide range of part sizes.

| MODEL |
|------------------------------------|
| Combined Material Thickness |
| FAS-NER Sizes |
| Minimum Flange |
| Throat Depth |
| Throat Open Height |
| Die Heights |
| Lower Jaw Thickness |
| Cycles Per Minute |
| Air Pressure |
| Feed System |
| Operation |
| Electrical |
| Estimated Weight |
| Dimensions (Inches) |
| • A (Height) |
| • B (Depth) |
| • C (Width) |

FEATURES AND BENEFITS

The AKH Hydraulic Press Series is available in three models. The presses are fully automatic and based on the model are capable of installing the full range of 21 different AKH FAS-NER sizes. Tooling changeover can be accomplished quickly and easily as is the characteristic of all AKH Presses. The many different ways in which these presses can be used provide a solution for nearly every assembly requirement.

The AKH Hydraulic Presses are powered by a hydraulic power pack designed for heavy duty operating capabilities. The pump, with a capacity of 3000 p.s.i., operates with a large capacity oil reservoir. The pump is capable of providing for the high-speed operation of the Presses utilizing hydraulic cylinders.

All AKH Hydraulic Presses are equipped with an electronic PLC based controller providing self-diagnostic system checks while it automatically shuts down when a problem is diagnosed. This user friendly system provides the operator with a signal to indicate the source of the problem to be corrected before restart.

Each AKH Press can utilize either a turret-fed or vibratory bowl feed system. When an application requires a portable insertion press, the turret-fed, air-operated system facilitates AKH FAS-NER installation from any position. Stationary operated presses have the option of using the vibratory bowl feed which provides a controlled, continuous flow of AKH FAS-NERS.

The AKH FAS-NER SYSTEM will join two or more parts in one quick press stroke. The AKH FAS-NER is a self-piercing, headless fastener that mounts flush with material being joined. The AKH FAS-NER SYSTEM will automatically feed, punch, insert and lock the AKH FAS-NER into steel and/or aluminum. The combined material thickness of your parts can range from .075 to .360 inches. AKH FAS-NERS have standard zinc chromate plating. Optional platings, paints and anodizations on aluminum are also available.

SPECIFICATIONS

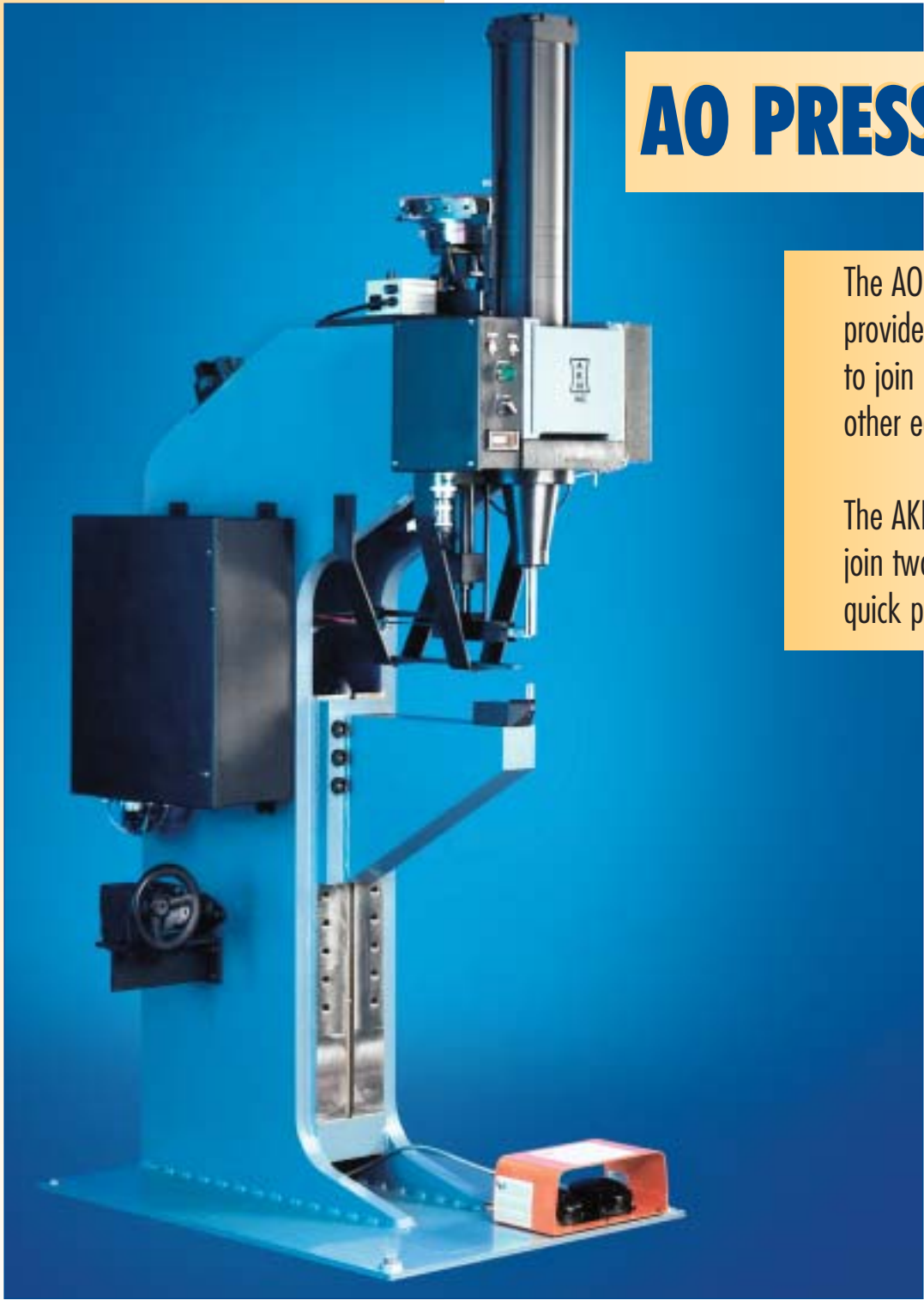
| | HP 853 | HP 854 | HP 930 |
|-----------------------------|---|----------|-----------|
| Combined Material Thickness | .075-.155 | 165-.210 | .075-.360 |
| FAS-NER Sizes | 1-7 | 8-11 | 1-21 |
| Minimum Flange | .375 | .500 | .375-1.00 |
| Throat Depth | 6.00 | 6.00 | 6.00 |
| Throat Open Height | 2.00 | 2.75 | 3.00 |
| Die Heights | .25-1.50 | .25-2.25 | .25-2.25 |
| Lower Jaw Thickness | 2.375 | 3.50 | 5.00 |
| Cycles Per Minute | 50 cpm | 40 cpm | 20 cpm |
| Air Pressure | 40-60 psi | | |
| Feed System | Turret Feed or Vibratory Bowl Feed Hand or Foot Actuated | | |
| Operation | Automatic or Jog Control | | |
| Electrical | Variable Pressure Regulated Cycle | | |
| Estimated Weight | 115 V single phase, 230 V 3 phase, 60 Hz AC Standard - 460 V optional | | |
| Dimensions (Inches) | 56 lbs. | 120 lbs. | |
| • A (Height) | 23.25 | 24.25 | |
| • B (Depth) | 11.50 | 15.00 | |
| • C (Width) | 2.50 | 3.50 | |



Joining Expertise with Technology

INSERTION PRESSES • SELF PIERCING-FLUSH AKH FAS-NERS™

AO PRESS SERIES



The AO Series Insertion Press provides maximum flexibility to join metals difficult with other equipment.

The AKH FAS-NER system will join two or more parts in one quick press stroke.

- Fast Cycle Time - 2 or 3 Seconds
- Maximum Strength to Minimize Deflection
- Adapts to Many Die and Tooling Variations
- One Complete Easy Joining Operation
- Fastens Wide Range of Part Configurations
- Vibratory Bowl Feed System
- Electronic Control System
- Includes Safety Device

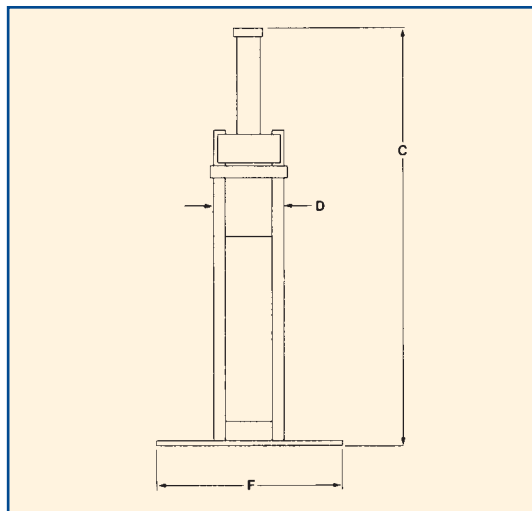
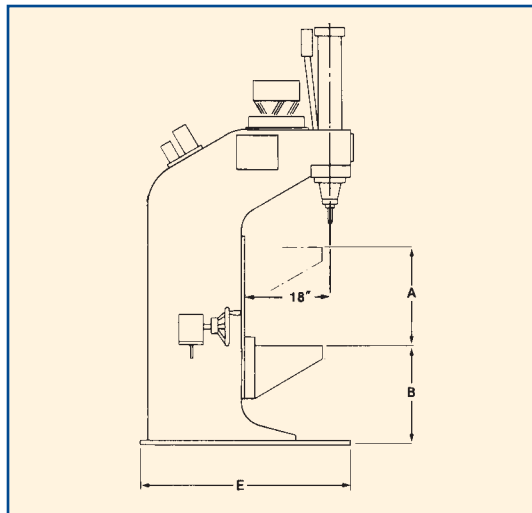


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INSERTION PRESSES • SELF PIERCING-FLUSH AKH FAS-NERS™



U.S. Patent No. 4,130,922. Other patents pending.

FEATURES AND BENEFITS

The AO Press Series is available in three models operating with tonnage capabilities of 8, 15 and 30 tons. The presses are fully automatic and capable of installing the full range of 21 different AKH FAS-NER sizes.

All three floor mounted models are designed with maximum strength in its frame to minimize deflections. All models have an 18 inch throat depth to accommodate the most demanding jobs and have an adjustable lower tool arm which allows for movement in 2 inch increments to a maximum of 18 inches. Tooling dies of many configurations can easily be mounted on the lower tool arm to meet the size requirement of your part.

The power cylinder used on the AO Series Press is an air over oil cylinder which results in the unit having high speed coupled with high force. This unit is designed to meet your production assembly requirements.

All press models utilize a vibratory bowl feed system to provide a controlled, continuous flow of AKH FAS-NERS through the System. The AO Series Press is easily operated, and simple to service and maintain.

The AKH FAS-NER SYSTEM will join two or more parts in one quick press stroke. The AKH FAS-NER is a self-piercing, headless fastener that mounts flush with material being joined. The AKH FAS-NER SYSTEM will automatically feed, punch, insert and lock the AKH FAS-NER into steel and-or aluminum. The combined material thickness of your parts can range from .075 to .360 inches. AKH FAS-NERS are available in hardened steel and hard tempered aluminum. Steel AKH FAS-NERS have standard zinc chromate plating. Optional platings, paints and anodizations on aluminum are also available.

SPECIFICATIONS

Standard AO Presses are delivered set-up with tooling for a specified FAS-NER size. All AO Presses are designed to insert FAS-NERS in all five diameters and all twenty-one lengths, dependent on the shear strength and thickness of the material used. Changeover feed kits are available for all diameters on all three press models. Consult your AKH representative for information.

In addition to the AO Press Series, AKH offers a complete line of hydraulic presses for stationary or counter balanced applications. The three models in the Hydraulic Series operate from 5 to 30 tons, depending on FAS-NER size.

MODEL

- Tonnage
- Combined Material Thickness (Inches)
- Required Flange Width
- FAS-NER Sizes
- Throat Depth
- Stroke
- Vibratory Bowl Dimension
- Controls
- Operation
- Air Pressure
- Cycle Rate
- Electrical Requirements
- Estimated Weight
- Dimensions (Inches)

- A (Tool arm adjustment)
- B (Minimum arm height)
- C (Height)
- D (Width)
- E (Base depth)
- F (Base width)

| | AO-818 | A0-1518 | AO-3018 |
|--------------------------------------|---------------------------------|-----------|------------|
| Tonnage | 8 Tons | 15 Tons | 30 Tons |
| Combined Material Thickness (Inches) | .075-.155 | .075-.210 | .075-.360 |
| Required Flange Width | .375 | .375-.500 | .375-1.000 |
| FAS-NER Sizes | 1-7 | 1-11 | 1-21 |
| Throat Depth | 18.00 | 18.00 | 18.00 |
| Stroke | 3.90 | 3.90 | 3.90 |
| Vibratory Bowl Dimension | 8.00 | 8.00 | 10.00 |
| Controls | Electronic PLC Based Controller | | |
| Operation | Foot Actuated | | |
| Air Pressure | 80 to 145 psi | | |
| Cycle Rate | 2-3 seconds | | |
| Electrical Requirements | 115V 60Hz AC 5 Amps | | |
| Estimated Weight | 1800 lbs. | 3200 lbs. | 3500 lbs. |
| Dimensions (Inches) | | | |
| • A (Tool arm adjustment) | 18.00 | 16.00 | 16.00 |
| • B (Minimum arm height) | 19.00 | 14.00 | 14.00 |
| • C (Height) | 81.00 | 86.70 | 90.00 |
| • D (Width) | 9.50 | 14.00 | 14.00 |
| • E (Base depth) | 38.00 | 38.00 | 38.00 |
| • F (Base width) | 28.00 | 28.00 | 28.00 |