900 SERIES

MODELS 901/921/931 AES AND 901/921 AOS INTELLIGENT ACTUATORS

GENERAL DESCRIPTION

The Branson 900 Series AES and AOS Intelligent Actuators are compact, rigid 20 kHz units designed for use in manual, semi-automated, or fully automated systems. Used with a 900M/MA Series microprocessor-controlled ultrasonic power supply, converter, booster, and horn, they form the most advanced welding system available to the market.* The components enable versatile assembly system configuration: they may be mounted directly on a machine frame, with a support on a column and hub, or as a stand-alone system on a base with palm buttons. The actuator can operated as far as 25 cable feet (7.5 m) from the power supply.

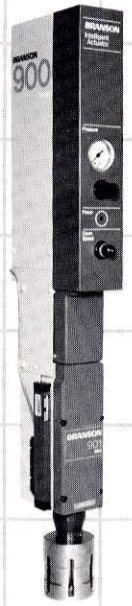
The AES actuators feature built-in pneumatic controls. In addition, the Intelligent actuator includes advanced features for precise wielding control and additional welding modes (e.g., three "distance" welding options, load cell for accurate ultrasonic triggering force).

AOS actuators are designed for systems use in which remote pneumatic control is desirable; remote solenoid valve and pneumatic controls are optional and available from Branson, but may also be supplied by the user. The removal of the pneumatic controls from the AOS actuator enables closer front-to-front positioning of multiple actuators.

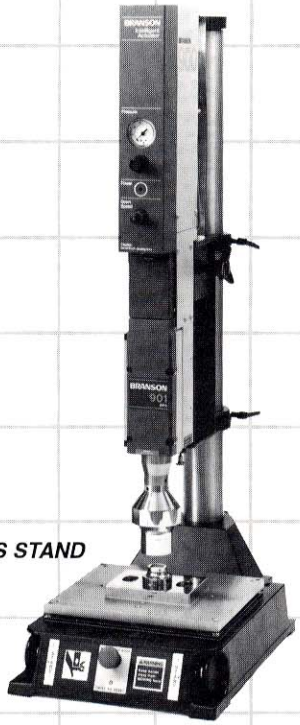
The 900 Series actuator design is based on a carriage and main support assembly with a precision slide system, and double-acting air cylinder to deliver the converter/booster/horn stack to the workpiece and provide force during the assembly operation.

The Models 901 AES and AOS actuators operate with 1000-watt 910M/MA power supplies. The 921 AES/AOS actuators, used with the 2000-watt M/MA power supplies, and the 931 AES, used with a 3000-watt 900MA power supply, have a larger cylinder (3 inches compared with 2-1/2 inches) to provide higher force if required by the application. (For complete information on power supply features, including microprocessor controls, communications interfacing, and multiple welding modes, refer to Data Sheets 900-1, 900M Series Power Supplies, and 900-13, 900MA Series Power Supplies.

**Models 901/921/931 AE/AO actuators with standard actuator features are described in Data Sheet 900-2.*



AES ACTUATOR



AES STAND

KEY FEATURES

- **A linear optical encoder** measures weld "distance" enabling welding (1) by specific part collapse (meltdown), (2) to a finished part height (absolute), or (3) until a ground detect device activates. The resolution on the encoder is 0.0001 inch.
- **Pressure transducer** accurately monitors air (pneumatic) pressure, allows accurate and repeatable setting of weld pressure, and enables a digital display of gauge pressure on the 900M/MA power supply.
- **A load cell (force transducer)** provides accurate Dynamic Trigger force with individually settable force window limits, return spring compensation (with the encoder), and enables the printout of a force graph for performance evaluation, monitoring, and recording. Load cell (force) (calibration is done via the 900M/MA power supply.
- **Dynamic Triggering** provides consistent weld quality by initiating (triggering) ultrasonic vibrations after a preset force, ranging from 10-400 lbs. (45-1780 N), is applied to the part.

BRANSON

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KEY FEATURES (CONTINUED)

- **Dynamic Follow-through**—As melting of the plastic occurs, dynamic follow-through ensures the smooth, efficient transmission of ultrasonic energy into the part by maintaining horn/part contact and force. /The range of dynamic follow-through is from 10 lbs to maximum clamp force (45 N to maximum clamp force).
- **Rugged construction and durability**—Rigidity and consistent, precise alignment of the horn and parts during welding is provided by linear ball bearing slides. The slide system incorporated linear motion guides with 4 sets of preloaded, permanently lubricated bearings. This design ensures long-term reliability, and allows smooth linear motion and well-balanced stiffness against loads applied from any direction.* Preload is built into the bearings and does not depend on actuator assembly.

  Rigidity is further enhanced by the provision of three mounting points on the back surface of the actuator. Additionally, the optional actuator support for column mounting is designed to solidly support the assembly.

  For applications requiring high precision and more repeatable and consistent welding, a 4" column is optional to reduce system deflection. (This column requires a different hub and actuator support.) In addition, 20 kHz solid-mount boosters are available to provide further reduced deflection and precise alignment.
- **Ease of setup**—The converter/booster/horn stack installs easily and may be removed from the front of the carriage assembly without repositioning the actuator. The stack may be rotated a full 360° in the carriage for horn alignment with the workpiece.
- **Versatility**—The compact size of the Model 901/921/931 AES Actuators - only 4.6" (117 mm) in width and 35" (890 mm) high - allows close side-by-side stacking of multiple actuators and facilitates the incorporation of the unit in automated and semi-automated production systems. A 4" stroke is standard. The AOS Actuators are only 31.75" (807 mm) in height; the elimination of the pressure and downspeed controls from the actuator decreased the distance from the centerline of the horn to the front surface of the actuator to only 2.3" (59 mm), enabling closer front-to-front mounting of multiple actuators.
- **Converter cooling**—Cooling air is directed into the carriage to the top of the converter during each operation cycle.
- **Built-in adjustable 24 tpi locking mechanical stop** with an adjustment knob—When properly set, the stop prevents the horn from touching the fixture or nest when no workpiece is in place. It is internal to the carriage with only the adjustment knob exposed, allowing 360° horn rotation without interference for alignment.
- **Carriage home switch** causes the power supply to produce a "ready" signal when the carriage has fully retracted. The ready signal can be used a s a safety interlock switch on automated systems to prevent the movement of material handling equipment (indexing) when the horn has not retracted. An optical switch provides reliable, wear-free operation.
- **Power supply/converter compatibility** -- The 901 AES/AOS actuators are used with Branson power supply Models 910M/MA (1000 watts) and the 902J converter. The 921 AES/AOS actuators are operated with the Model 920M/MA, 2000-watt power supplies and the 922JA converter. The 931 AES is used with the Model 930MA 3000-watt power supply and the 502 converter (only). [The 901 AES.AOS can be used with the 920M/MA power supplies and the 922JA converter. The 921 AES/AOS actuators may be used with the 902J converter and correct power supply to obtain higher clamp force; however, care must be taken to ensure that the proper power supply/converter match-up is made.]
- **AES Actuator Controls**
  - *Flush-mounted 2" diameter calibratable pressure gauge* provides excellent visibility for ease of setup; graduation is in both USCS (English) and metric (SI) units.
  - *Precision regulator* provides accuracy, control, and repeatability, with settings in 1 psi increments shown on the power supply VF display. Included is a locking feature—pull to set, push to lock—that enables consistency of operation once the unit is set up.
  - *Calibrated flow control valve* for downspeed gives accuracy, consistency, and repeatability machine to machine. A locking mechanism is built in.
  - *Electronic pretriggering* is provided by the 900M/MA power supply; there is no mechanical switch to wear, adjust, or fail.
- **Stand with Ergo base** (option) - The base includes ergonomically-placed, light-force start switches and mounting holes to enable bolting of the base to the work table for increased stability.

*For applications involving severe side loading, check with Branson before operation.

WARRANTY

The Branson Series 900 Series Intelligent Actuators carry a three-year warranty on materials or workmanship. *Note:* This warranty applies to actuators purchased and operated in the United States. For warranty information on units purchased and/or operated outside the U.S. contact your local representative.

ELECTRICAL SPECIFICATIONS

Power requirements:

Line voltage:	117V AC, 50/60 Hz (200-245V AC, 50/60 Hz, selectable outside of N. America)
Line current drawn:	200 mA max.
Fuse:	1/4 Amp

MECHANICAL SPECIFICATIONS

Pneumatic requirement: Clean (5 micron, filtered), dry, non-lubricated air at 100 psi (690 kPa)

Maximum clamp force on part:

Model 901: 440 lbs. at 100 psig (1.96 kN at 690 kPa) (2-1/2" cylinder)

Models 921/931: 630 lbs. at 100 psig (2.8 kN at 690 kPa) (3" cylinder)

Dynamic Triggering range: 10 to 400 lbs. (45 - 1780 N) max.

Dynamic Follow-through range: 10 lbs. to max. clamp force (45 N to max. clamp force) max.

Stroke length: 4" (102 mm)

Throat: 3.75" (95.25 mm) mounting surface to centerline of horn.

Weight:

901 AES/AOS: 38 lbs. (17.2 kg)

921 AES/AOS, 931 AES: 39.7 lbs. (18 kg)

Note: All specifications subject to change without notice.

ORDERING INFORMATION *

Note: Items marked with "◆CE" indicate models that are usable in Europe and comply with CE regulations.

ACTUATORS—(Require booster and converter; AOS models also require pneumatic control package.)

	Branson EDP No.
Model 901 AES Actuator (◆CE)	101-134-060
Model 921 AES Actuator (◆CE)	101-134-059
Model 931 AES Actuator (◆CE)	101-134-097
Model 901 AOS Actuator (◆CE)	101-134-064
Model 921 AOS Actuator (◆CE)	101-134-063

STANDS—Include actuator, fixed actuator support, 4' (4.0" O.D.) column, Ergo base, converter, and standard aluminum booster.

Model 901 AES Stand (for use with Models 910M/MA power supplies (◆CE)	101-134-062
Model 921 AES Stand (for use with Models 920M/MA power supplies (◆CE)	101-134-061
Model 931 AES Stand (for use with Models 930M/MA power supplies (◆CE)	101-134-113

LOW DEFLECTION STANDS (option)—4" heavy wall column with base or hub. Contact Branson, Danbury to order.

ASSEMBLY SYSTEMS—Assembly systems include the 900M/MA power supply with maintained closure MBOS; stand including AES actuator with actuator support, column, base or hub, converter, and booster; J931 RF, J921 control cables (8'), J951 data link cable (8'). Do not include ECI-1. Contact Branson, Danbury to order.

* All sales shall be subject to the Supplier's terms and conditions of sale as described in Branson's quotations and sales contracts.

	Branson EDP No.
ACTUATOR SUPPORTS	
For 4" O.D.; 4', 6' length columns	101-246-882

HUB - Used in automation with column in place of base assembly.

For 4" O.D. columns	101-063-583

BASE ASSEMBLY—Ergo base used in manual installations. Includes start cable, start palm buttons, and emergency stop switch.

Inch model (3/8-16) for 4" O.D. column	100-246-883
Metric model (M10 x 1.5) for 4" O.D. column	100-246-884
Leveling fixture (option)	
Inch model (for use with inch model Ergo base **only**)	101-063-358
Metric model (for use with metric model Ergo base **only**)	101-063-444

COLUMNS

4" O.D., 4' (1/2" wall)	100-028-011
4" O.D., 6' (1/2" wall)	100-028-012
4" O.D., 4' (1/4" wall) (standard)	100-028-017

BOOSTERS

Boosters are available in the standard O-ring mount configuration or with solid mount for increased rigidity.

	Branson EDP No. Horn End Drill and Tap	
	1/2-20	3/8-24**
Aluminum, 1:0.6(Purple)(◆CE)	101-149-055	101-149-090
Aluminum, 1:1 (Green) (◆CE)	101-149-051	101-149-093
Aluminum, 1:1.5 (Gold) (◆CE)	101-149-052	101-149-092
Aluminum, 1:2 (Silver) (◆CE)	101-149-053	101-149-094
Titanium, 1:0.6 (Purple (◆CE)	101-149-060	—
Titanium, 1:1 (Green) (◆CE)	101-149-056	—
Titanium, 1:1.5 (Gold) (◆CE)	101-149-057	—
Titanium, 1:2 (Silver) (◆CE)	101-149-058	—
Titanium, 1:2.5 (Black) (◆CE)	101-149-059	101-149-091

Solid Mount Boosters (1/2-20 input; 1/2-20 output)

Titanium, 1:0.6 (Purple) (◆CE)	101-149-095
Titanium, 1:1 (Green) (◆CE)	101-149-096
Titanium, 1:1.5 (Gold) (◆CE)	101-149-097
Titanium, 1:2 (Silver) (◆CE)	101-149-098
Titanium, 1:2.5 (Black) (◆CE)	101-149-099

****IMPORTANT:** For *light duty use* with **905M and 910M/MA power supplies only.** With 920M/MA and 930M/MA power supplies, use 1/2-20 threaded boosters, **only.**

CONVERTERS

	Branson EDP No.
Model 902J (acorn contact): for use with Model 910M/MA power supply and 901 AES/AOS actuator (◆CE)	101-135-047
Model 922JA (acorn contact): for use with Model 920M/MA power supply and 921 AES/AOS actuator (◆CE)	101-135-049
Model 502 (acorn contact): for use with Model 930MA power supply and 931 AES actuator (◆CE)	101-135-032

ACTUATOR CABLES

Control, J921 (◆CE)	8'	101-240-019
	15'	101-240-014
	25'	101-240-009
RF, J931	8'	101-240-017
	15'	101-240-012
	25'	101-240-007

ACTUATOR CABLES, continued

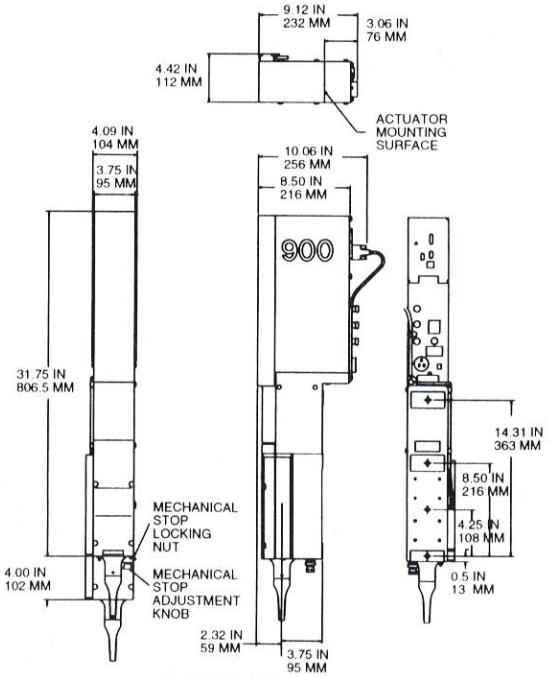
		Branson EDP No.
RF, J931C (◆CE) (option)	8'	101-240-176
	15'	101-240-177
	25'	101-240-178
Data link, J951C (◆CE)	8'	101-240-018
	15'	101-240-013
	25'	101-240-008

OPTIONS

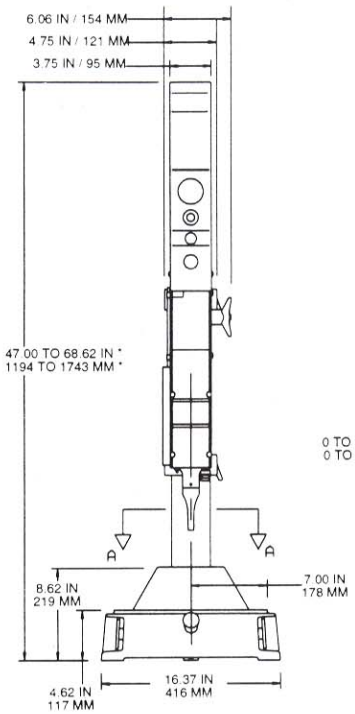
Pneumatic control package for AOS actuator (optional) (includes gauge, regulator and solenoid valve, upspeed and downspeed control) *(Product Liability Agreement required).*

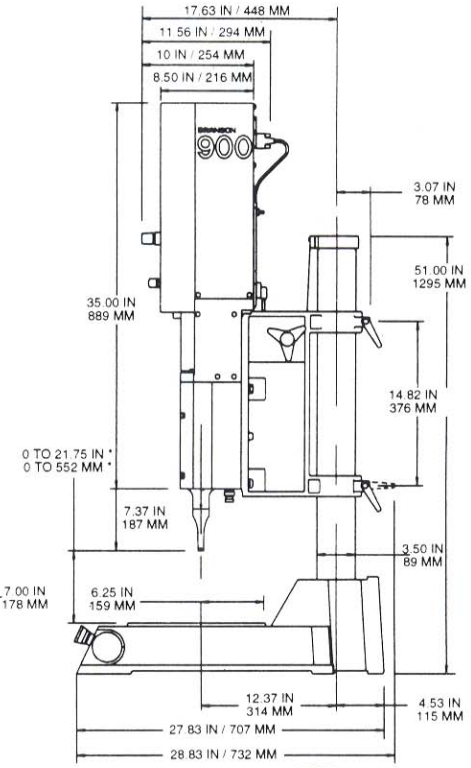
101-063-257

Note: For complete power supply ordering information, refer to Data Sheets 900-1, 900-13, and 900-22.



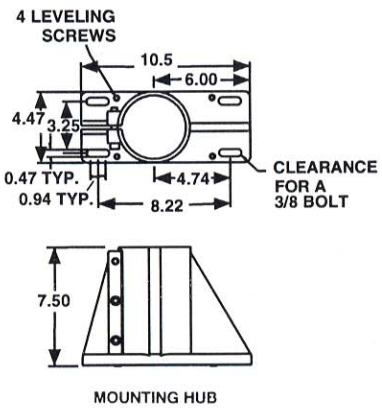
901/921 AOS ACTUATOR



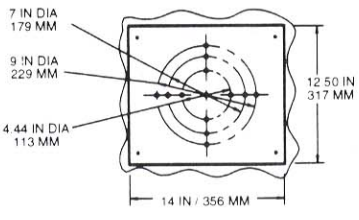


901/921/931 AES ACTUATOR (SHOWN ON STAND)

* Dimensions reflect a green booster and a 1/2 wavelength horn.



MOUNTING HUB



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