

Head Press Sizing Machine for Main Muffler Assembly Line



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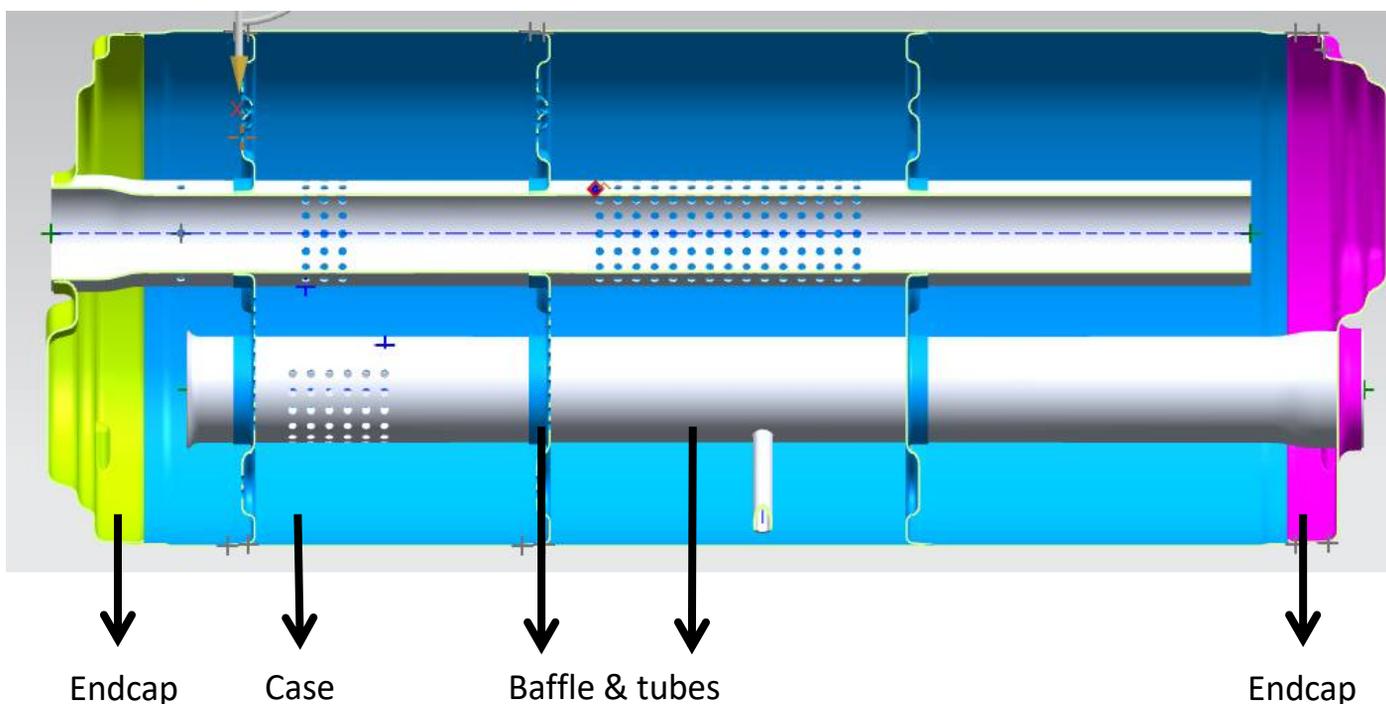
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Semi-Automated Main Muffler Assembly Line

As a leader in exhaust system manufacturing equipment, welding fixtures and tooling for the past 20 years, we supply several assembly lines for exhaust systems including main muffler assembly, resonator and baffle assembly, catalytic converter, and substrate assembly lines. This business case is focused on the main muffler assembly line for Toyota muffler models with shell size of 80-360 mm, and shell shape of any round, oval or polygon construction that fits the 1:1 to 6:1 major/minor axis ratio. The length of the muffler is anywhere from 180 mm to 1100 mm.

The image below shows the assembled muffler.



Semi-Automated Main Muffler Assembly Line

Our client suggested the following assembly process for the main mufflers, which can be either done simultaneously or in sequence depending on the layout and the number of operators assigned for the entire assembly line:

1. Shell forming and welding
2. Flanging
3. Piercing and extruding
4. Baffle stuffing and spot welding
5. Plate welding
6. Stuffing of baffle and pipe sub-assembly
7. Spot welding
8. Head-press and sizing
9. Inlet pipe ridge-locking
10. Spinning

We recommended the following machines for the main muffler assembly:

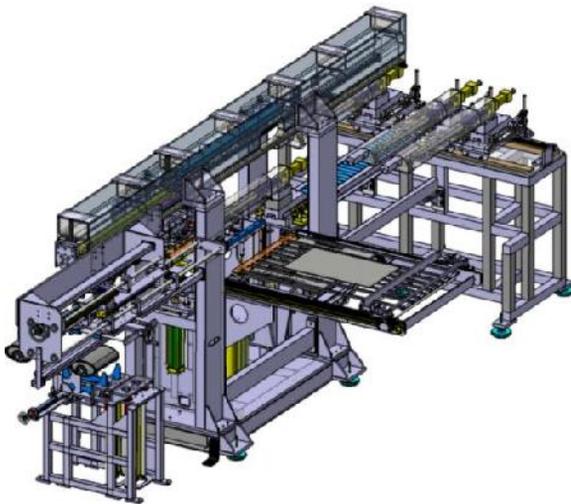
1. Double flange machine for shell forming and welding
2. Flange-up machine for flanging
3. Piercing and burring machines for piercing and extruding pipes
4. Baffle inserting machine and spot welder
5. Reinforcing welding machine for plate welding
6. Baffle stuffing machine and pipe sub-assembly
7. Spot welding machine
8. Muffler head pressing and sizing machine for muffler heads and sub-assembled tubes
9. Inlet ridge-locking machine before welding of the heads and sub-assembled tubes
10. Double seaming machine

Muffler Shell Forming & Welding

Double Flanging Machine

Muffler shell blanks are fed into the machine with a dual loader where one side places shells while the other side is loading shells. The muffler shell blank is wrapped around a shaped mandrel with rubber roller arms. The machine produces an empty shell from 80 mm to 360 mm in any round, oval or polygonal shape that fits the 1:1 to 6:1 major/minor axis ratio.

The loader automatically runs one sheet through the machine and checks that the right blank has been loaded in the right orientation by using weight and direction sensors.

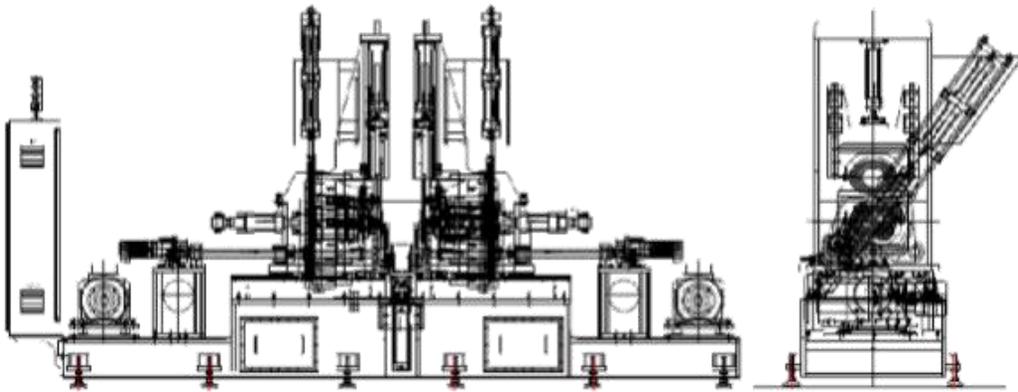


No.	Machine Features
1	Movement control of the die carriage is servo driven
2	Sheet stopper installed for automatic adjustment of loading speed
3	Quick change-over mandrel clamps (Q.D.C type applied)
4	Customer specified welding method applied

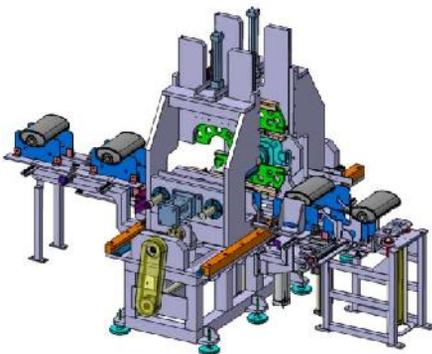
Flanging

Flange-Up Machine

Muffler shells are manually fed into the machine, which holds the part in place while rotating rollers come in from the top and bottom to create a 90-degree flange on the ends of the shell. It flanges an empty shell. We offer 2 types of flange machines: radial-servo and ram-hydraulic.



No.	Machine Features
1	Servo controlled 2 shift unit
2	Horizontal oscillator type flanging machine
3	Flanging unit is controlled by servo motor for position correction and adjustment
4	Automatic lubricator spray installed



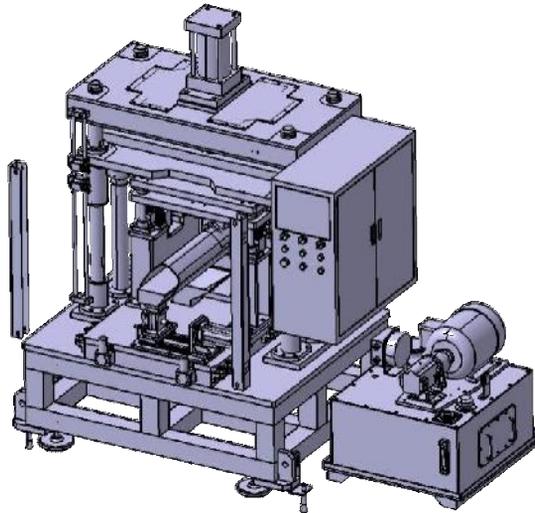
No.	Machine Features
1	Hydraulic unit powered ram type
2	Horizontal oscillator type flanging machine
3	Flanging unit is controlled by a geared motor for position correction and adjustment
4	Automatic lubricator spray installed

Piercing and Pressing

Piercing and Burring Machine

Empty mufflers are manually fed into the 50-ton extruding press machine, which holds the part in place while one set of piercing and extruding tools performs all the jobs simultaneously, including deburring the hole in the side of the shell.

Machine capabilities consist of extruding, piercing and deburring of an empty shell from 80 to 360 mm in any round, oval or polygon shape that fits the 1:1 to 6:1 major/minor axis ratio.

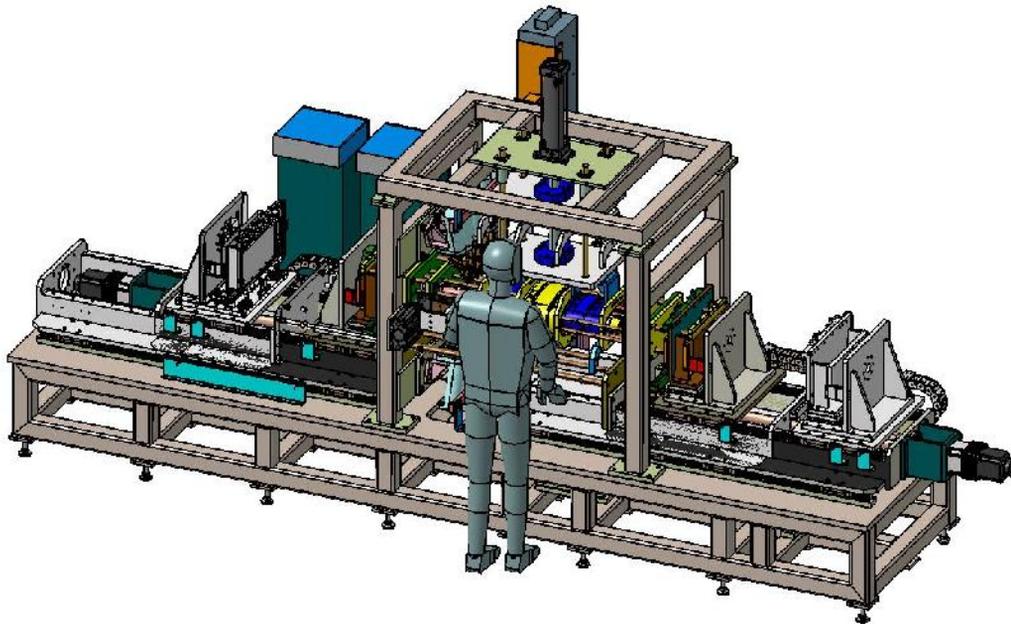


No.	Machine Features
1	Vertical hydraulic Press
2	Simultaneous movement of piercing and extruding process
3	1 set of piercing and extruding tooling installed
4	Easy-to-maintain design

Baffle Stuffing & Spot Welding

Baffle Inserting Machine and Spot Welder

Empty muffler shells are fed into the machine, which holds the part in place while the machine presses the baffle partition into place and spot welds it six times on the top and six times on the bottom. Then the stuffed shell passes out the backside of the machine. The machine comes with an automatic lubrication system.

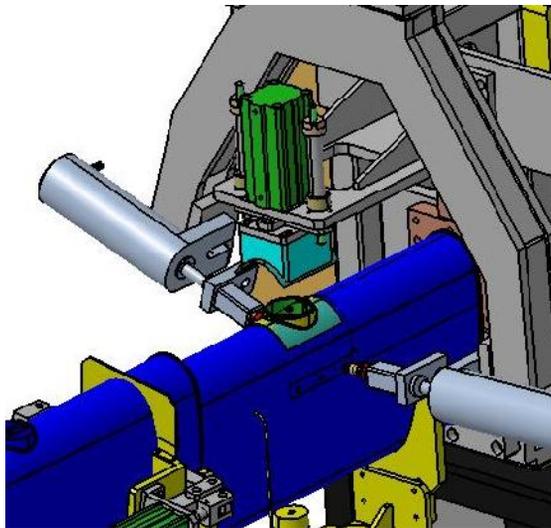


No.	Machine Features
1	Horizontal type baffle stuffing machine
2	Stuffing jigs are controlled by servo motor
3	WTC spot welding System
4	3 types of tooling: 1 spot welding gun, 1 baffle separator stuffer, and 1 shell support

Plate Welding

Reinforcement Plate Spot Welding Machine

Muffler shells are manually fed into the machine, which holds the part in place while inserting a support plate and spot welding the plate four times for reinforcement. This machine inserts and spot-welds the support plate on an empty shell from 80 to 360 mm in any round, oval or polygon shape that fits the 1:1 to 6:1 major/minor axis ratio. Then the muffler shell is manually pulled out of the machine. The machine comes with an automatic lubrication system.

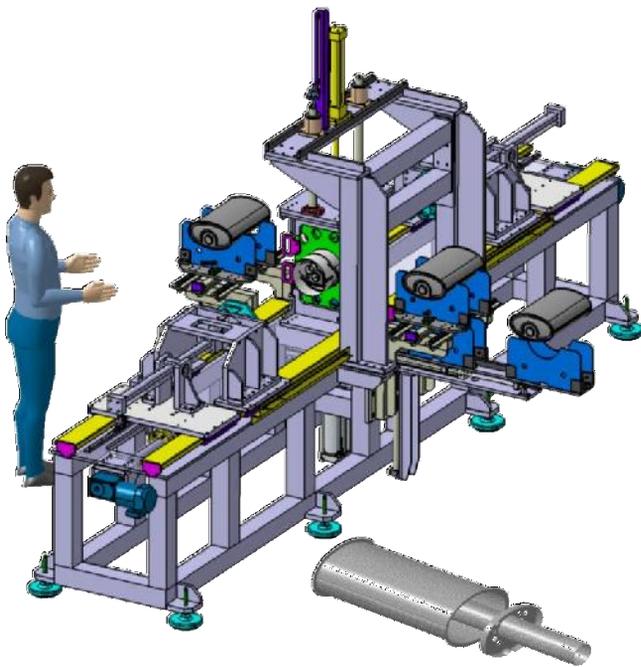


No.	Machine Features
1	LM-guided spot welding gun applied (Pitch 35mm 8 Point on both sides)
2	Versatile welding gun positioner depending on the product shape and size

Baffle Stuffing and Pipe Sub-Assembly

Baffle Stuffing Machine and Pipe Sub-Assembly

Muffler shells are manually fed into the machine, which holds the part in place while pressing the partition into place. The stuffed shell is removed by an automatic transfer system. This stuffing machine is controlled by servo for its clamp movement for high precision.



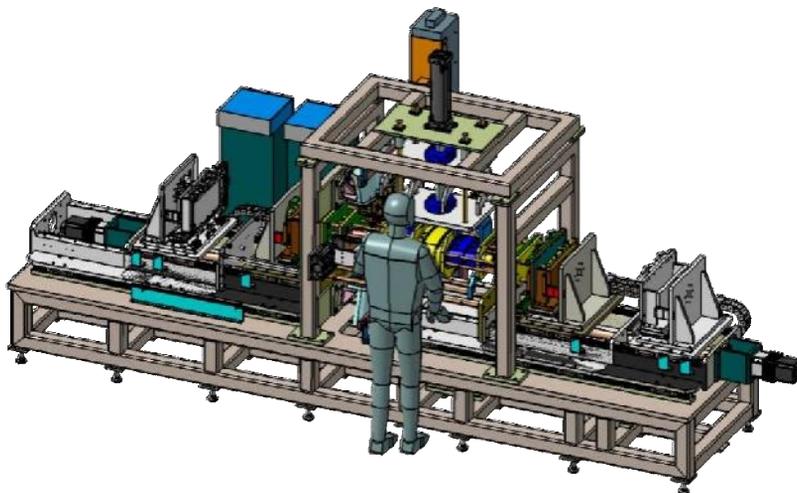
No.	Machine Features
1	Servo-controlled clamping of the shell and inserting of the baffle
2	Horizontal type servo-controlled stuffer
3	One or both direction stuffing can be selected
4	Automatic transferring of the stuffed shell to the spot welder

Spot Welding Machine for Muffler Shells and Partitions

Spot Welding Machine

Muffler shells are fed into the machine by a transfer system. The machine holds the part in place and spot welds each partition six times on the top and six times on the bottom with a WTC welder. Then the spot-welded shells are passed out the backside of the machine. The machine comes with an automatic lubrication system.

Machine capabilities include spot welding the two outer partitions six times on the bottom and six times on the top on an empty shell from 80 to 360 mm in any round, oval or polygon shape that fits the 1:1 to 6:1 major/minor axis ratio.



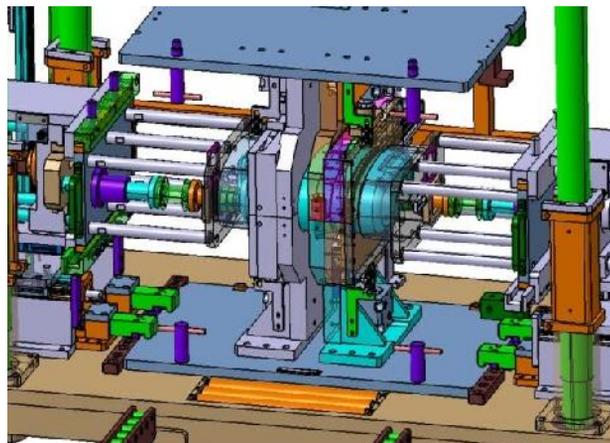
No.	Machine Features
1	Horizontal type spot welding machine
2	WTC spot welding system
3	Tooling: one set of spot welding gun unit, shell support tool and spare tooling

Head Press Sizing Machine for Main Muffler Assembly

Baffle Inserting, Fitting and End-Forming Machine

Muffler shells are manually fed into the machine. One tooling set holds the part in place while another tooling set presses the heads into the shell and then sizes the ends of the pipe up. The shell with heads on are passed out the backside of the machine. The machine comes with an automatic lubrication system.

Machine capabilities include pressing the heads onto the assembly at a cross section from 80 to 360 mm in any round, oval or polygon shape that fits the 1:1 to 6:1 major/minor axis ratio.



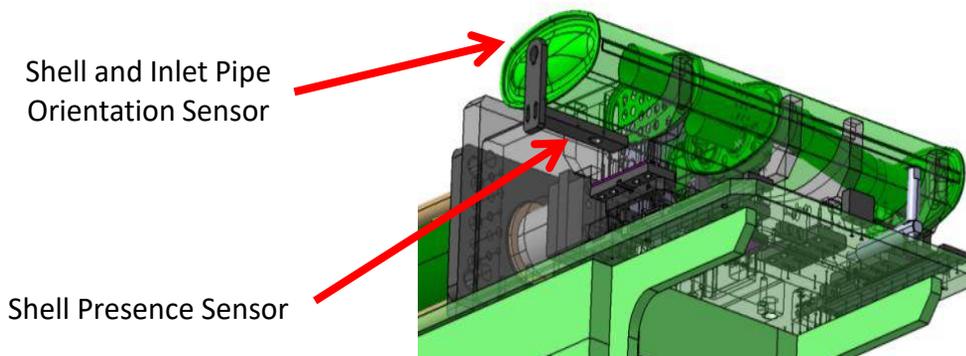
No.	Machine Features
1	Horizontal type pressing machine
2	Clamping technology for fitting the head on both sizes of the shell
3	Pressing and fitting is controlled by servo motor
4	High precision clamping tools are applied for pressing and resizing

Inlet Pipe Ridge Locking

Inlet Pipe Ridge Locking Machine with Fool-Proof System

Muffler shells are manually fed into the machine. A set of tooling holds the part in place while the machine ridge-locks the inlet pipe into place. The Ridge Locking Machine creates ridges to combine muffler baffles and tubes into one structure, prior to welding. This process improves the straightness between the baffles, reducing the muffler defects significantly when the muffler has two or more layers of baffles inside.

This machine is equipped with a sensor to detect the presence of the part and an orientation indicator for the shell and inlet pipe as a fool-proof system.



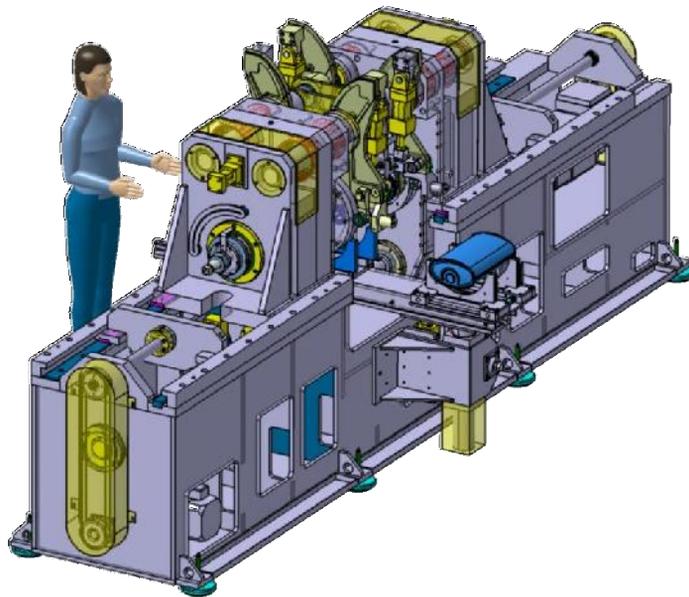
No.	Machine Features
1	Horizontal & Hydraulic Type
2	Manual LM Guide operation
3	Quick tool change model
4	Shell & inlet pipe orientation detection

Spinning Machine

Double Seaming Machine

Muffler shells are manually fed into the machine. A set of tooling holds the part in place while mandrel sets roll over the heads and create a seal. Our patented mandrel technology is applied to this double seaming or spinning machine.

Machine capabilities include spinning a muffler with a cross section from 80 to 360 mm in any round, oval or polygon shape that fits the 1:1 to 6:1 major/minor axis ratio.



No.	Machine Features
1	Motors are controlled by servo
2	Top and bottom spinning cam tooling applied
3	Quick tool change model with maximum 10 minutes for changing tooling



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