

Automatic Welding Machines T10/T20

for welding of non-ferrous metal profiles



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Application

Sinking profiles from non-ferrous metal such as aluminum, copper, brass

The welding machines are intended for welding profiles square, rectangle, triangle and ring in a resistance press procedure.

The welding machines are designed for an output of approx. 160 pieces/h.

Design

Main body is assembled of pressed aluminum profiles; it holds a pre-mounted welding station, tube grip unit and tube transfer module on two steel supports. The space between external body edging and steel supports is covered by aluminum protection plates.

The two welding transformers and air pressure transformer DPA 100-10 are installed under the welding unit. The working area (covered by a protective shield) houses two consoles on which the terminal-block box and all air-operated control units are mounted. The shield-free main body extension houses profile drive unit and profile fitting. The Control cabinet for the welding equipment is attached on the right-hand side of the main body. Protection equipment is comprised of framework casing made of pressed aluminum profiles and acrylic glass as well as two doors with lockable emergency switches

Welding System

Welding station is attached on machine body. the end cap is fed to clamping tong through an open welding station by means of a bowl feeder, and the separated and clamped by air operated cylinders.

The Welding station is shut and interlocked by pneumatic power while both parts of welding chamber being sealed with tightening stuff.

The profile will be fed to, and positioned in, the welding station by profile drive device, then in clamping tong by compressed air cylinder clamped.

After this operation has finished, the welding chamber is cleared and filled in with helium. Further welding operation is being performed while end cap is loaded into profile by feed unit at predefined path. Once welding process has completed, the profile will be removed.

The welding chamber will be opened and a new production process can start.

Handling of Profiles

This operation comprises of the following :

- profile feed device
- profile positioning device
- profile clamping device
- Loading module

Profile feeding module

Profile feeding device is located at the edge of main body extension. It is comprises of lower sled and upper sled. A double-roll feed device is placed on the lower sled. It is formed of two profiled feed rolls which are operated through tooth-belt disc and tooth-belt by worm-gearing motor. Motor revolutions are adjusted by frequency transformer.

On the upper support two pinch rolls are placed which have to produce required counter-pressure. Pressure force is controlled by a pressure - adjusting valve.

Two light beams produce stop limit during the tube feeding operation to position profile in corresponding working range.

Profile positioning module

Profile positioning device is a double-support unit operated by pneumatic power that moves the profile to the end cap at a distance of about 10 – 40 mm. It will then be clamped by grip device of the upper support and pressed to end cap by direct-acting valve with pre-set force.

The profile will then be moved back by both upper and lower sled traveling 0 – 2 mm path, previously set at stop screw.

Profile clamping module

Two cylinders, activated by pneumatic power, move two pairs of jaws together to clamp the profile.

Loading module

The loading module is used for transferring the end cap to the welding chamber. It is a vibrating-pivoting-type assembly with feeding bowl mounted on stand. End caps are ejected, position-aligned from feeding bowl and transferred in "hanging state" on linear guide.

From linear guide, end caps fall into storing hose, which is equipped with module touch control, and reach separator. Only one end cap is ejected from separator to reach pivoting unit. They are turned 90° here and picked by grip device.

Two linear units transfer end cap to clamping tongs of welding station.

Compressed air unit

Control valves of compressed air unit are mounted on two arms which are placed in the welding machine's protected area. Pressure monitor of maintenance unit has to observe the smallest acceptable operational pressure. If operational pressure drops below 4,5 bar it will switch welding machine off.

Gas supply unit

Model T 10 option (automatic equipment)

Welding chamber is filled with inert gas prior to and during welding process. Gas is leared from the gas cylinder which has a pressure reducer. Required gas flow is set on throttle valve. Gas flow can be controlled by flow counter and shown on the display. A draw-off hose can be installed in workshop to withdraw effluent gas from welding chamber.

Model T 20 option (automatic equipment)

The welding chamber is cleared prior to the welding process (max. 500 Pa), it will the be filled with helium at pre-set pressure (max. 25 bar). Gas pressure is maintained until welding process has finished. Inert gas purity can be continuously controlled while welding is in progress.

Welding station

The welding station includes a high-frequency inverter and welding equipment as well as two transformers connected one after the other. The inverter and control unit are installed in joint housing which is built in the open main body extension. Both transformers are placed under the welding equipment in main body.

Electrical equipment and control unit

Electrical equipment of automatic welding machine is installed in separate control cabinet and operation terminal. Main body of equipment is programmable control SIMATIC IPC 677E (Panel PC), 19" Multi Touch with SPS-System (S71500 OPC UA) made by Siemens It is allocated in control panel. The PC controls the technical processes.

Supervision and control are provided by position sensors and measured value estimate. Welding occurs with high-frequency inverter while ProfiNET carries control functions and estimates measured values.

To assure quality, the following parameters are observed and recorded:

- profile clamping force
- welding pressure
- forward move
- embedding path
- welding voltage
- welding power
- vacuum pressure
- inert gas pressure
- water and oxygen percentage in inert gas

Technical and technological data:

Workpieces: welded parts of	
profile width / height	8 – 12 mm
profile length	up to 4000 mm

Equipment:

- Space requirement for operation and maintenance	6,5 m x 2,8 m x 2,4 m
- Main dimensions	4100 mm x 1350 mm x 2050 mm
- Gas vacuum unit	1350 mm x 500 mm x 875 mm
- control cabinet (1 pc)	800 mm x 500 mm x 1600 mm
- total weight	approx. 2000 kg
- welding machine, complete	approx. 1800 kg
- control cabinet	approx. 100 kg
- supply connections	inert gas, max. pressure 200 bar
- connection :	Innox tube 10x1
- compressed air (4,5 bar) max 10 bar	60 Nm ³ /h
- quality according to PNEUROP 6611/1984	acid content quality class 3 Water content quality class 4 Oil content quality class 5
- noise	< 75 dB (A)
- elektric equipment:	
- mains supply by	Main switch (330/4)
- control system	SIMATIC IPC 677E
- protection class	I
- control cabinet	IP 42
- terminal boxes	IP 42
- other system parts	IP 20
- protective measure	Zeroing
- welding capacity	max. 160 profiles/h
- ambient conditions:	
- ambient temperature	20° C+20K –10K
- humidity	F nach DIN 40040 (20%-80%)
- room air	Room air free of aggressive media and Unusual dust exposure
- manpower requirement	1 plant operator with multi-machine operation (with automatic in-/out-feed of profiles)

Subject to changes in the sense of technical progress.