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Semi-automatic Gantry Welding Machine for wire shelf/wire mesh

Part A: Customized Design

Customized application: for the production of refrigerator wire shelf

According to the welding requirement & the dimension of all wire shelves, we designed machine DN-2×150KVA gantry semi-automatic welding machine with 8 welding heads,.

**The design is only for reference of any steel wire products including wire shelf, wire mesh, defence guard etc, exact machine design may be adjusted and differed by customer's different product size & shapes.*

Part B: Construction of the machine

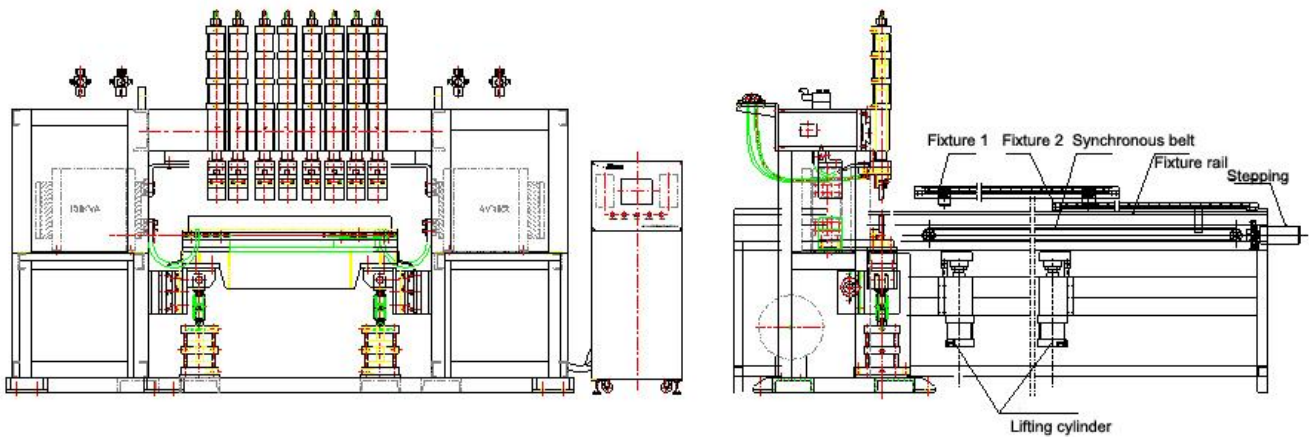
The diameter of the steel wire: $\phi 2.5-7\text{mm}$

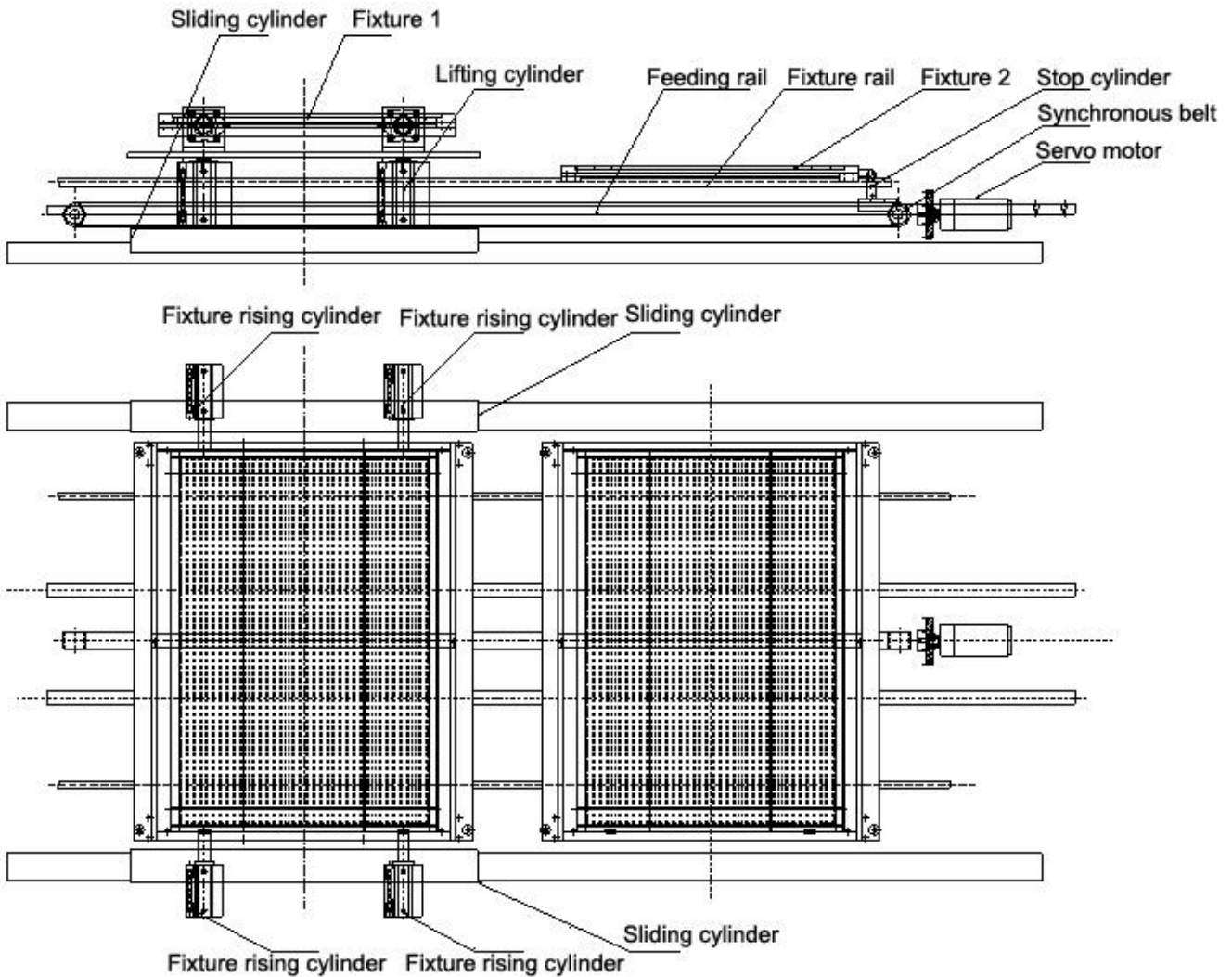
Dimension of the grid: the available width is 914mm (the joint of two grids maximum width)

Dimension of the grid: the available length is 720mm (the maximum length of a grid)

PART C:

The general design sketch of machine structure:





Part D: Machine general description:

The multiple spots welding machine is consisted of two mechanical parts: the working part and the controlling part.

1. The machine is designed with gantry frame, there are two AC resistance welding transformers (150KVA) installed inside left & right cabinet, both transformers work 4 times simultaneously, every transformer discharges and welds 1~4 welding spots, so finish the welding of one row steel wire.
2. Machine's welding part adopts pneumatic system, eight welding cylinders are installed on top of the machine, and each cylinder provides welding pressure needed for 1~4 welding spots. There are two support cylinders below the machine, they work together when welding.
3. In the front of machine working table, there is sliding device (like trolley) to put steel wire shelf on its fixture; there is location mould on trolley.
4. All performance of the machine is controlled by the PLC (Programmable Logic Controller), there are two resistance welding controllers equipped to control pressurization, welding, maintenance, pause time & welding current.
5. During the welding process, workers need to put the shelf frame on its fixture, place steel wires & pick finished shelf from fixture by hand; All other steps including delivering, stepping, welding, lifting, resetting act automatically.
7. Capacity is 2x150KVA, the voltage is 380V±10%, 50/60Hz, the pressure of the compressed air is more

than 0.6Mpa, the pressure of the cooling water is more than 0.2Mpa.

Part E: Design advantage:

Controlled by the PLC, the welding performance is normative; it can weld multiple wire shelf products in big Lot.

The machine adopts module of one-time pressing & electric discharging welding, it can reduce the deformation of wire shelf.

It is suitable to any dimension shelf within the sizes, only needs to change the fixture.

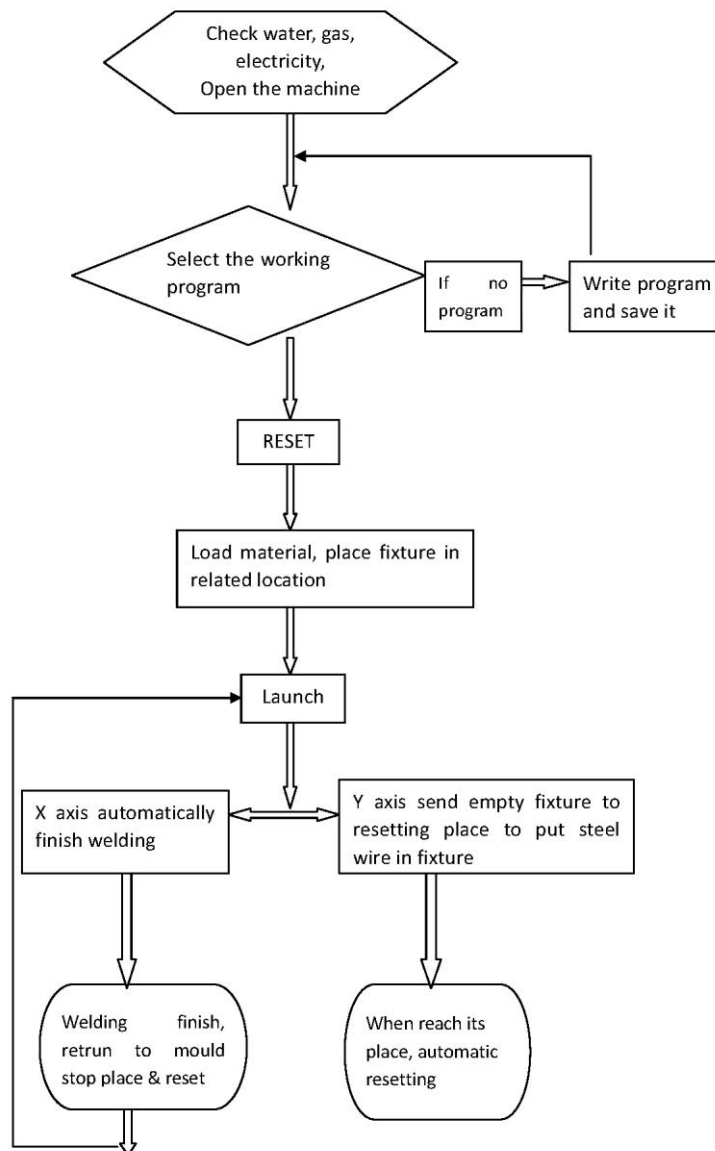
The electricity of each cylinder is independent and can be controlled freely in certain range; it is convenient and easy to operate.

Every time 2 welding cylinders work, each cylinder welds 2 spots simultaneously, time saving and efficiency increasing.

The welding speed: 2~3 seconds/row

The machine is controlled by the microcomputer; it can store multiple welding parameters for different products.

Part F: The welding process



Part G: The main parts:

| Part Name | Brand | Origin |
|-------------------------------------|--------------|----------------|
| Cylinder, Filter voltage regulator | / | Made in Taiwan |
| Electromagnetic valve | NORGREN | Made in U.K |
| Silicon steel sheet | KAWASAKI | Made in Japan |
| Main controlling board | / | Made in China |
| Servo motor | DELTA | Made in Taiwan |
| Sliding rack | / | Made in Taiwan |
| Programmable logic controller (PLC) | MITSUBISHI | Made in Japan |
| Thyristor | TECHSUM | Made in Taiwan |
| Electrode | Alloy-copper | Made in China |

Part H: Main technical specifications:

The input voltage: $380 \pm 10\%$ 50/60Hz

The rated power: $2 \times 150\text{KVA}$

The secondary voltage: 11V

The max welding current: 28.7KA

The loading duration factor: 50%

Insulation resistance of the input current to the machine body: $\geq 2.5\text{M}\Omega$

The working environment: temperature $\leq 40^\circ\text{C}$, relative humidity $\leq 90\%$

The pressure of the air supply: $\geq 0.5\text{Mpa}$

The working pressure: adjustable from 100 to 4.2KN

The cooling way of the electrode: the cycled water-cooling

The production efficiency: 4~6 shelves/minute

Part I: Delivery time

By 60 working days.

Part J: Acutal welding machine produced for customer:

