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WELDING EQUIPMENT FOR METALLURGICAL INDUSTRY

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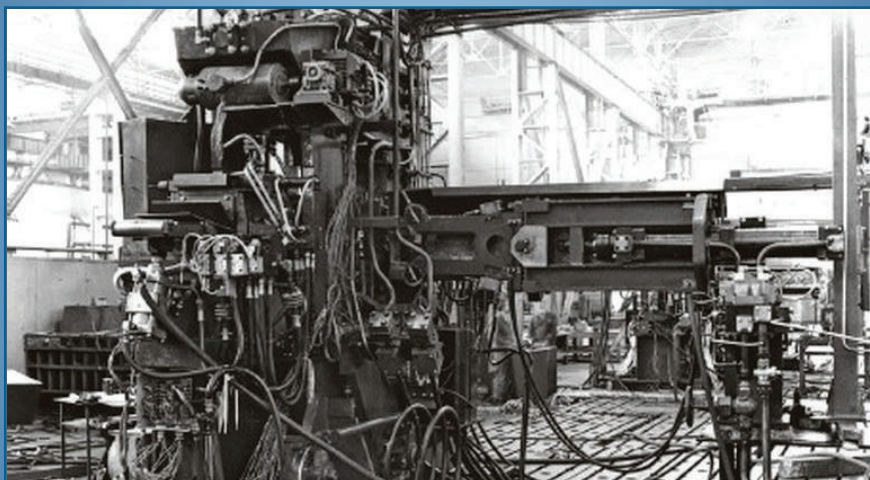


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Welding equipment for metallurgical industry

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FBW machine of strips with width up to 300 mm MCO-12.07

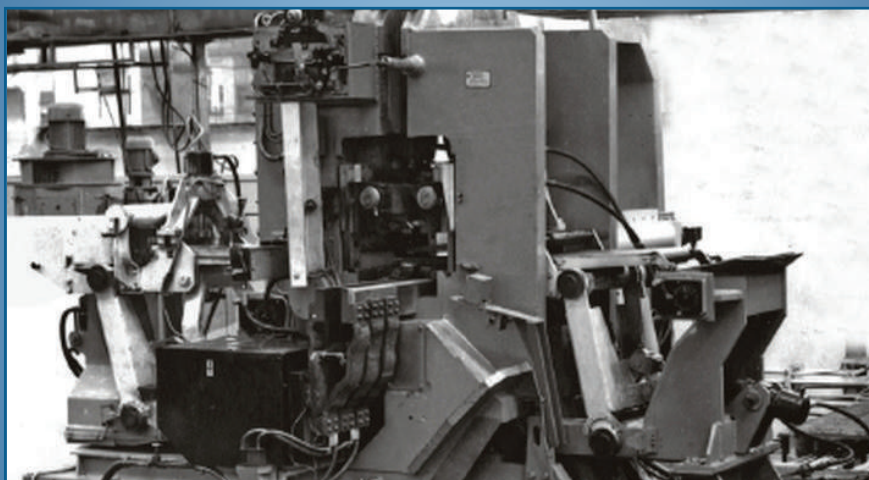


Machine MCO-12.07 is designed for FBW by continuous flashing of steel strips with width from 50 mm up to 300 mm and thickness from 1 mm up to 6 mm from low carbon

and low-alloyed steels. It is used as a part of metallurgical aggregates of continuous treatment of steel strips.

| TECHNICAL DATA | | |
|---|-------------------------------------|-----------|
| CHARACTERISTIC | | VALUE |
| Rated supply main voltage of 3-phase AC, V | | 380 |
| Supply main frequency, Hz | | 50 |
| Welding transformers power at duty circle=50%, kVA | | 95 × 2 |
| Adjustment stages number | | 8 |
| Rated continuous secondary current, kA, not less | | 4,5 × 2 |
| Rated upsetting force, kgf | | 12 000 |
| Rated gripping force, kgf | | 30 000 |
| Max. section of welded strips, mm ² | | 1 800 |
| Flashing speed adjustment limits, mm/s | | 0,2 - 10 |
| Upsetting speed (controlled), mm/s, max. | | 100 |
| Max. performance in line of production, welds/h | | 30 |
| Duration of welding cycle of strips 4 x 300, s | | 48,5 |
| Air consumption, m ³ /h, not more | | 90 |
| Operating pressure, supplied by workshop air line, kPa (kgf/cm ²) | | 450 (4,5) |
| Dimensions, mm (length x width x height) | length along the line of production | 4 320 |
| | total length | 7 800 |
| | width | 7 100 |
| | height above the floor | 3 165 |
| Mass, kg | | 24 000 |

FBW machine of strips with width up to 500 mm KCO-32.01

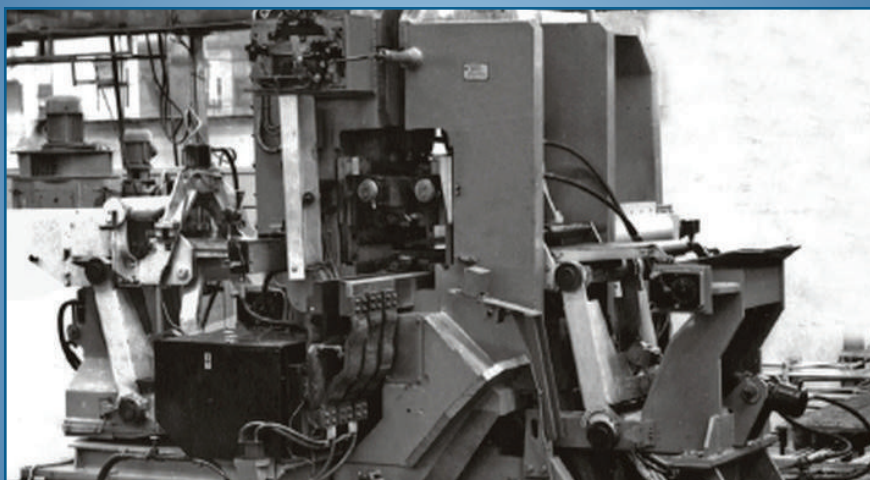


Machine KCO-32.01 is designed for FBW by continuous flashing of steel strips with width from 50 mm up to 500 mm and thickness from 1 mm up to 6 mm from low carbon

and low-alloyed steels. It is used as a part of metallurgical aggregates for continuous treatment of steel strips.

| TECHNICAL DATA | |
|--|-----------------------|
| CHARACTERISTIC | VALUE |
| Rated supply main voltage of 3-phase AC, V | 380 |
| Supply main frequency, Hz | 50 |
| Rated continuous secondary current, kA | 21,5 |
| Welding transformer power at duty cycle=20%, kVA | 480 |
| Duration of welding cycle at not combined operations without heat treatment for strips with thickness from 1 up to 6 mm, s | 50 - 62 |
| Duration of welding cycle at combined operations without heat treatment for strips with thickness from 1 up to 6 mm, s | 40 - 50 |
| Adjustment stages number | 16 |
| Rated upsetting force, kgf | 32 000 |
| Dimensions (without separate hydraulic and electric equipment), mm (length x width x height) | 4 685 × 4 796 × 2 460 |
| Mass, kg | 33 000 |

FBW machine of strips ends KCO-32.01M



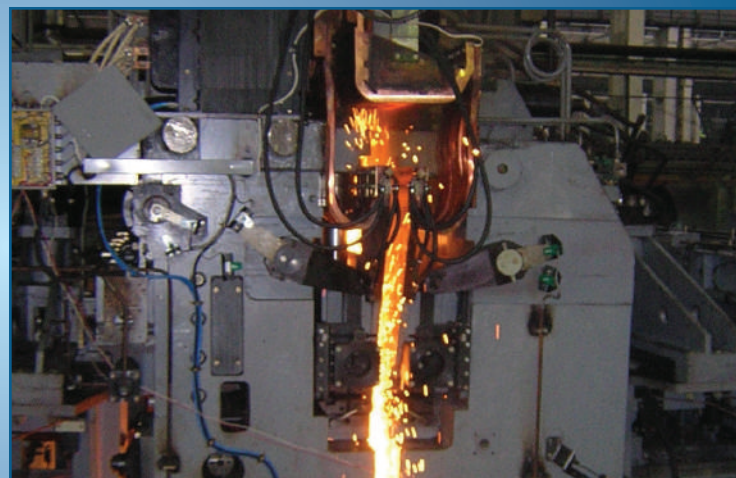
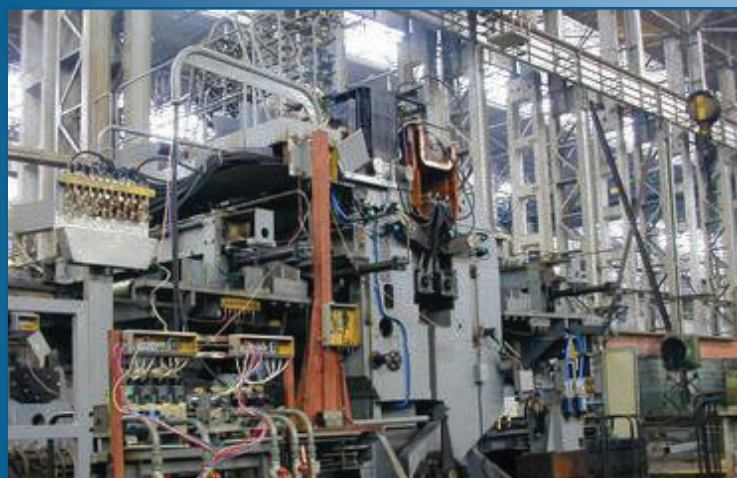
Machine KCO-32.01M is installed in the head part of tube mill and designed for FBW of strips ends ensuring continuous technological process pipes welding.

The machine provides semi automatic installation of strips ends in welding position with simultaneous assembly

of their longitudinal axes. It provides FBW by continuous flashing of these ends and brushing of welded seams, as well as automatic choice of basic technological parameters of welding during part type changing.

| TECHNICAL DATA | | |
|--|--------------------|-------------|
| CHARACTERISTIC | | VALUE |
| Rated supply main voltage of 3-phase AC, V | | 380 |
| Supply main frequency, Hz | | 50 |
| Secondary current adjustment limits, V | | 4,75 - 14,6 |
| Number of secondary voltage adjustment stages | | 16 |
| Rated duration of duty circle, % | | 20 |
| Upsetting force, kgf, max. | | 32 000 |
| Upsetting speed, mm/s, not less | | 150 |
| Flashing speed, mm/s | min., not more | 0,2 |
| | max., not less | 12,0 |
| Force, kgf, max. | clampings | 80 000 |
| | shears | 40 200 |
| | weld flash remover | 24 500 |
| Distance between electrodes, measured between low jaws, mm | min. | 0 |
| | max. | 45 |
| Operating pressure of oil, kgf/cm ² | low | 55 |
| | high | 220 |
| Rated pressure of air, kgf/cm ² | | 5,0 |

FBW machine of wide strips MCO-100.05, MCO-100.06, MCO-100.08, MCO-100.09, MCO-100.11



Using continuous processes in metallurgical aggregates in cold rolling workshops allows increasing performance of these aggregates and quality of production. Continuous process is provided by installation of welding machines for strips ends at the head part of aggregates. Width of welded strips from 700 mm up to 2 350 mm, thickness of welded strips from 1,2 mm up to 8,0 mm, max. strips section

12 000 - 14 000 mm², max. carbon content of steel 0,4 - 0,6 %.

The machine provides high quality of welding, which ensures passing of welding seams without breaks at all technological operations, compliance of welding duration to machine working tempo, as well as provides high service reliability.

| TECHNICAL DATA | | | | | | |
|---|--|----------------|------------------|----------------|----------------|----------------|
| CHARACTERISTIC | | MCO-100.05 | MCO-100.06 | MCO-100.08 | MCO-100.09 | MCO-100.11 |
| Strip width, mm | | 700 - 1 550 | 1 100 - 2 350 | 900 - 1 850 | 700 - 1 550 | 700 - 1 850 |
| Strip thickness, mm | | 1,2 - 8,0 | 2,0 - 6,0 | 1,2 - 6,5 | 1,2 - 8,0 | 2,0 - 6,0 |
| Max. strip section, mm ² | | 12 400 | 14 100 | 12 025 | 12 400 | 12 000 |
| Max. carbon content of steel, % | | 0,6 | 0,4 | 0,6 | 0,6 | 0,6 |
| Operation time, s | strip standing | 23 | 23 | 23 | 23 | 23 |
| | strip welding | 6 - 25 | 6 - 22 | 6 - 22 | 6 - 25 | 6 - 25 |
| | weld flash removing by built-in trimmer | 23 - 18 | 25 - 20 | 23 - 18 | 23 - 18 | 23 - 18 |
| | weld flash removing by plough trimmer | 8 | 8 | 8 | 8 | 8 |
| Time for electrodes changing, h | | 1 | 1 | 1 | 1 | 1 |
| Time for cutters changing, min | | 3 | 3 | 3 | 3 | 3 |
| Length of basic machine, mm | | 8 660 | 8 660 | 8 660 | 8 690 | 8 690 |
| Length of machine with additional equipment installation, mm | | 12 645 | 12 645 | 12 645 | 11 220 | 9 680 |
| Machine mass, t | | 150 | 175 | 164 | 146 | 156 |
| Mass of complete set of additional equipment, t | | 35 | 45 | 43 | 55 | 65 |

Seam welding machine by direct current MШB-48.01, MШB-48.02, MШB-48.03

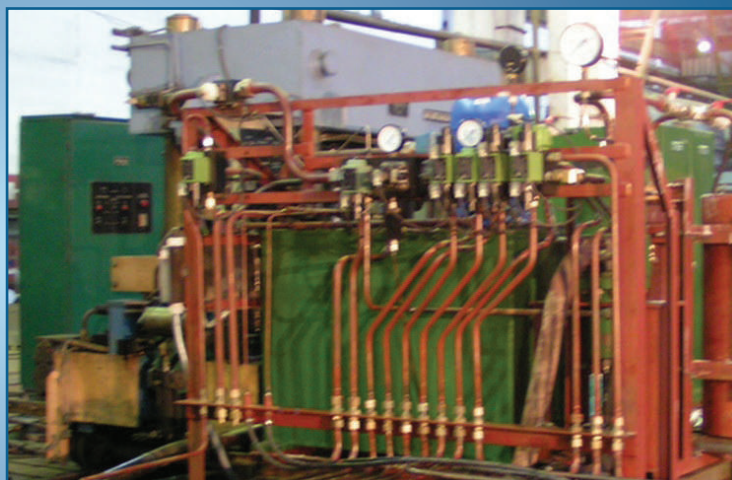


Machine is designed for resistance seam welding by direct current with crushing strip edges made from low carbon and low alloyed steels with carbon content up to 0,35% and electric (dynamo) steels with silicon content up

to 1,8%, as well as steels with coating (MШB-48.02.1) as a part of metallurgical aggregates. It is acceptable to weld transition seams of strips which differ in thickness two times.

| TECHNICAL DATA | | | |
|--|---|---------------------------|-------------|
| CHARACTERISTIC | MШB-48.01 | MШB-48.02, MШB-48.02.1 | MШB-48.03 |
| Rated supply main voltage of 3-phase AC, V | 380 | 380 | 380 |
| Supply main frequency, Hz | 50 | 50 | 50 |
| Max. power, kW | 280 | 280 | 280 |
| Max. secondary current, kA | 48 | 48 | 48 |
| Rated continuous secondary current, kA | 14 | 14 | 14 |
| Secondary voltage of welded transformer, V | 2,12 - 4,24 | 2,16 - 4,33 | 2,12 - 4,24 |
| Width of welded strip, mm | 1 000 - 1 850 | 700 - 1 550 | 650 - 1 500 |
| Thickness of welded strip, mm | 0,4 - 2,0 | 0,4 - 2,0 | 0,5 - 1,5 |
| Cutting speed, m/min | 18 | 18 | 18 |
| Welding speed, m/min | 6 - 12 | 6 - 12 | 6 - 12 |
| Welding cycle, s | 39 | 39 | 34 |
| Clamp drive | rack and pinion from direct current motor | | |
| Lubrication | central lubrication system | | |
| Shears type | circle | | |
| Auxiliary drives power, kW | 20 | 20 | 20 |
| Gripping force of rods, daN (kgf) | 600 - 1 800 | 600 - 1 800 | 600 - 1 800 |
| Clamping force of seam, daN (kgf) | 12 000 | 12 000 | 12 000 |

FBW machine MCO-100.01 (K-607)



Machine MCO-100.01 (K-607) is designed for FBW of both straight and ring items with diameter from 500 mm up to 2 000 mm from aluminum, magnesium and titanium alloys, heat resistant and stainless steels of section up to 4 000 mm². It is possible to weld cathode steel rods (blooms)

with length up to 2 000 mm and section up to 26 450 mm² (115 × 230 mm) from steel Cr I with box of aluminum strips of section 10 500 mm² (70 × 150 mm) from aluminum of grade A7M. The machine provides welding of items from low carbon steels of section up to 15 000 mm².

TECHNICAL DATA

| CHARACTERISTIC | | VALUE |
|--|-------------------------|-----------------------|
| Rated supply main voltage of 3-phase AC, V | | 380 |
| Supply main frequency, Hz | | 50 |
| Power at duty cycle=50%, kVA | | 412 |
| Max. secondary current, kA | | 140 |
| Max. power at short circuit, kVA | | 2 250 |
| Rated upsetting force, daN (kgf) | | 100 000 |
| Rated gripping force, daN (kgf) | | 200 000 |
| Upsetting speed, mm/s, not less | | 250 |
| Max. width of welded items, mm | | 320 |
| Max. welding performance, welds/h | | 12 |
| Distance between current-conducting jaws, mm | min. | 15 |
| | max. | 90 |
| Dimensions, mm (length x width x height) | welding machine | 3 360 × 2 450 × 3 382 |
| | hydraulic drive station | 2 300 × 1 650 × 1 930 |
| | control cabinet | 810 × 830 × 2 080 |
| | power box | 1 010 × 1 010 × 2 080 |
| | control panel | 550 × 550 × 1 100 |
| Mass, kg | welding machine | 17 000 |
| | hydraulic drive station | 2 050 |
| | control cabinet | 458 |
| | power box | 800 |
| | control panel | 35 |

FBW machine for hot blooms MCO-90



Machine MCO-90 is designed for FBW by pulsating flashing of steel blooms with section up to 170 x 170 mm, with length up to 12 m, of different chemical content and heated up to 1 100 °C – 1 200 °C. The machine is installed before the first rolling stand and ensures continuous rolling process by welding of periodically supplied blooms.

The machine consists of welding unit installed on moving platform, cabinet with electric equipment, hydraulic station

and hydraulic unit, weld flash trimmer, roller transfer stations, measuring and pressure rollers.

The machine construction allows providing all processes of gripping, alignment, welding and weld flash trimming in the course of its movement along the guides with welded blooms. After joint completing the machine returns to the starting point, grips the next bloom and repeats the whole cycle.

| TECHNICAL DATA | | |
|--|---|-----------------------|
| CHARACTERISTIC | | VALUE |
| Rated supply main voltage of 3-phase AC, V | | 380 |
| Supply main frequency, Hz | | 50 |
| Power of 2 welding transformers at duty cycle=50%, at nominal stage, kVA | | 1 100 |
| Max. secondary current, kA, not less | | 150 |
| Rated continuous secondary current, kA, not less | | 48 |
| Secondary voltage of idle according to control stages, V | 1 stage (transformation coefficient=33) | 11,5 |
| | 2 stage (transformation coefficient=30) | 12,7 |
| | 3 stage (transformation coefficient=26) | 14,6 |
| | 4 stage (transformation coefficient=23) | 16,5 |
| Rated upsetting force, daN (kgf) | | 90 000 |
| Rated gripping force, daN (kgf) | | 120 000 |
| Movable frame stroke, mm, not less | | 50 |
| Clampings stroke, mm, not less | | 150 |
| Max. upsetting speed, mm/s, not less | | 30 |
| Adjustment range of welding speed, mm/s | | 1 - 5 |
| Max. cross section area of welded articles from low carbon and constructional steel, mm ² | | 28 900 |
| Time of blooms 150 × 150 mm welding, s, not less | | 30 |
| Total time of parts joint with max. section including weld flash trimming, s, not more | | 50 |
| Cooling water consumption at pressure 0,25 MPa (2,35 kgf/cm ²), l/min, not more | | 200 |
| Dimensions, mm (length x width x height) | welding unit | 2 071 x 2 760 x 2 760 |
| | pump station | 1 800 x 1 825 x 2 100 |
| | control cabinet | 800 x 600 x 1 800 |
| | power supply cabinet | 800 x 800 x 1 800 |
| | contact cabinet | 800 x 600 x 1 800 |
| | control cabinet of pump station | 800 x 600 x 1 800 |
| Mass, kg | | 19 000 |



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