Machine for downward vertical continuos casting of bronze bars and tubes

Machine for downward vertical casting of bronze bars and tubes is consisted of 7 basic subassemblies as follows:

1. Platform
2. Stand
3. Cooling unit
4. Clamping and driving unit – withdrawal unit
5. Flying circular saw
6. Induction furnace
7. Crystalizer
8. Control system

Machine could be delivered in 3 basic option:
- left option
- right option
- front option
according to position of withdrawal unit and position of saw (see following pages).
Overall dimensions of machine could be seen on following pages.

Platform with stand

Platform with stand carry on other subassemblies.
Design of stand and platform based on welded profile provide sufficient carrying capacity.

Cooling unit

Colling unit with circulated cooling water insure that temperature of casted profile decrease to normal level.

Withdrawal unit

Withdrawal unit, which is consisted of AC servomotor (4.4 KW) and servogearhead controled via PLC, provide precise and repeatable withdrawal of profiles.
Clamping assembly within withdrawal unit, based on pneumatic cylinders and precise guideways, insure sufficent clamping force, while additional mechanical safety subassembly maintain permanent clamping force, even in the case when the pressure air is not available.

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Flying circular saw

Flying circular saw cut off profile on specified length.
Cut of length is determine by operator via HMI touch display.
All linear movements of circular saw are performed via pneumatic cylinders and precise guideways.
Circular saw is driven by AC motor 1.5 KW on high speed rate.

Induction furnace

The frequency inverter is based on the latest power IGBT transistor technology. Inverter panel is water-cooled type.
Programmable logic controller (PLC) perform the control of all furnace. All important messages, PLC writes to the text display and operator interface, on the front panel. Text display and operator panel also allows adjustment of designed program variables.

Type	IP-80
Mains power supp	100 kVA
Mains power supp	3 ph 400V, 50/60Hz,
Rated frequency	2000 Hz
Crucible capacity	300 kgCu
Melting temperature max	1200° C
Power control	Continuous: 10% - 100%
Cooling water	demineralised
Max. conductivity	100 µS/cm
Flow	Min. 2 m^3/h at 3bar
Water Temperature - input	Max. 32° C

Crystalizer

Machine also include 13 types of crystalizer, which cover casting of profile within range of output diameter from 13 to 71 mm.
Crystalizer has been cooled via circulated water.
Crystalizer consist of:
- body, made of stainless steel
- core, made of forged cooper
- graphite mould

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Control system

-Input power 8kW
-Input voltage 380V, 50 Hz
-Full load current 32A
-Control voltage 230V 50Hz, 24 VDC
-Climate conditions: Ambient
-Degree of protection IP54
-Regulation: IEC

Control system equipment is placed on several locations:

1. <u>Electric box,</u>
   -dimension 800x2000x500 mm + base 800x100x500
   -degree of protection IP54
   -main control equipment is installed
   -OMRON TFT colour touch panel dimension 10" as user interface is mounted on the electric box door

2. <u>Electric box for regeneration resistors,</u>
   -dimension 500x500x210 mm
   -degree of protection IP54

3. <u>Electric box for distanced touch panel,</u>
   -dimension 310x210x116 mm
   -degree of protection IP54
   -OMRON TFT colour touch panel dimension 5" as user interface is mounted

4. <u>Junction box for connecting valves and sensors</u>
   -dimension 200x160x90 mm
   -degree of protection IP54

5. <u>Box with emergency stop push button</u>
   -dimension 65x75x70 mm
   -degree of protection IP54

   Main parts of control system are:

   -servo motor-drive, OMRON-YASKAWA series Sigma II, 4.4kW on pulling cylinders
   -PLC OMRON series CJ1 for controlling and monitoring whole system
   - HMI devices, OMRON TFT colour touch panel 12" and 5" series NS, as user interface