

TECHNICAL DATA

A) ECM B 8 / 12 BATTERY TYPE HIGH PRESSURE CASTING MACHINE WASH BASINS



| TECHNICAL DATA | |
|----------------------------|-----------------|
| ALUMINIUM PLATE DIMENSIONS | 1000 X 1.850 mm |
| MOULD HEIGHT DIMENSIONS | 450 – 600 mm |
| MOULD INCLINATION ANGLE | 10° |
| MAX CASTING PRESSURE | 15 BAR |
| MAX MOULD CLAMPING FORCE | 2250 KN |
| COMPRESSED AIR | AT 16 BAR |

1. Structure

The machine is a steel construction. The body of the machine is designed to allow 12 moulds to be installed vertically and have a capability of vertical demoulding or 8 moulds to be installed for horizontal demoulding. The pressing is achieved by a hydraulic cylinder and associated driven unit.

The moulds are closed automatically. In order to seal the moulds and prevent slip leakage, a pre-closing force is applied. This force can be adjusted from the operator panel. The machine has a circulating 2" dia. slip line. This line circulates before slip filling so each time the moulds are filled with fresh slip.

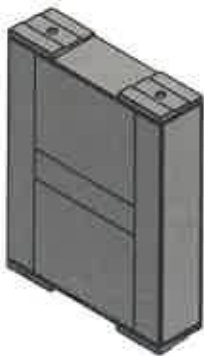
Air, water and slip inlet/outlets to the mould are provided using control valves. These valves are controlled automatically by PLC. The heated slip from the slip heating tank is discharged to the circulation line by means of a diaphragm pump. Filling the mould is made in this way.

After filling, the slip pressure increases with pressurized air. There is slip pressure tank for this and the tank level is controlled during the mould filling operation. After filling, pressurized air is applied into this tank, the Slip pressure increases to 13 bar dependent on the slip and model conditions. There should be 16 bar pressurized air available in the plant. If this cannot be provided, a booster can be used.

There is a 70-liter empty pressure tank in the system. Slip pressure fluctuations which occur during the slip feeding pumps direction change, is minimized with this tank. Therefore, the shock force on both the moulds and the machine construction are reduced to a minimum.

1.1 Fixed Frame - Qty: 1

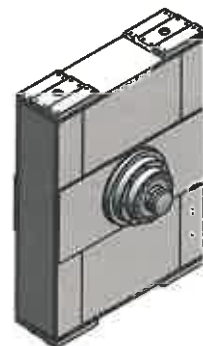
This is one of the two groups that connect the top beam and arm group.



1.2 Fixed Frame with cylinder - Qty: 1

This is the other group that connects the top beam and arm group. This frame is on the hydraulic cylinder which provides the pressing.

This frame is fixed on the up and lower beams.

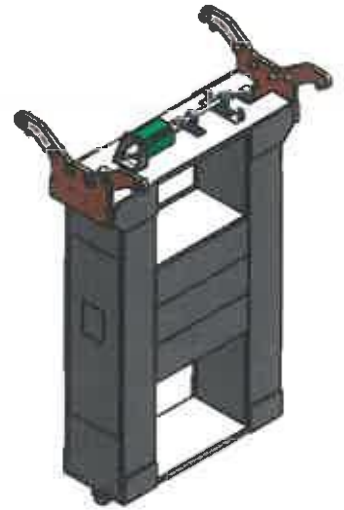


1.3 Movable frame - Qty: 1

It is used for closing the moulds. All the moulds and movable frame move together during closing and set to closing position. Arm group and movable frame's forward and backward movement provide by the motor.

There are locking pins, which are moved by pneumatic cylinders, on the lower and top corners of movable frame. Once the movable frame reaches the appropriate locking position, these locking pins goes to their housing and fix the movable frame.

After this stage, hydraulic cylinder pushes the molds towards the frame and molds are closed.



1.4 Lower Beam-Qty: 2

The machine is positioned on these two lower beams. There are fixed frames at each end. There are a number of holes where the movable frame can be locked.



1.5 Upper Beam-Qty: 2

The Upper beam is above the fixed frame at each end. The main purpose of this upper beam is to carry the mould carriage and movable frame.

There are hardened steel rails on the upper beam for moving the mould carriage and the movable frame. The racks that provide the mould carriages and movable frame movement, is installed on the upper beam.



1.6 Head plate -Qty: 2

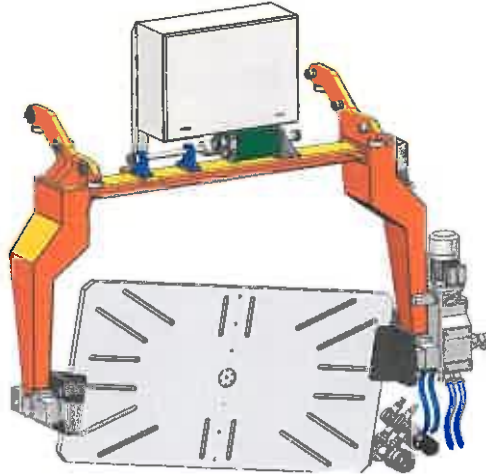
There are two units of head plates installed on the empty surface of the mould connection plate. These are the plates that provide force distribution during pressing and fixing.

1.7 Mould carriage -Qty: 1

This is a construction that carries the mould fixing plates and hangs on to the upper beam by means of bearings. There is a movement motor, process valves and control buttons.

1.8 Mould fixing plate -Qty: 1

It is an aluminum plate that the mould is installed on. It is embedded on to the mould carriage group at a 10 degree angle. It gives the flexibility to install different sizes of mould with its channel.



2. Hydraulic cylinder -Qty: 1

The hydraulic cylinder is used to close and press the moulds. It is designed to work with 350 bar.

3. Hydraulic unit -Qty: 1

This unit provides the power for the cylinder on the machine. It pressurizes the oil that hydraulic cylinder needs. The electrical motor of this hydraulic unit is driven by inverter. Therefore, the hydraulic unit only works when it is needed. This provide energy saving.

4. Main Slip Circuit -Qty: 1

This is a line which supplies slip to the moulds and consists of hose, pipe, connection equipment and valves.

5. Electrical control board -Qty: 1

This is a panel that holds the control equipment for the machines general operation.

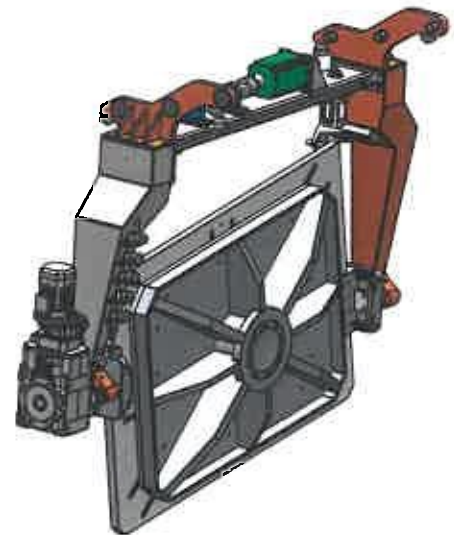
- PLC system is Siemens S7-300 which is the most popular PLC series of Siemens.
- Communication protocol is Profinet that is supported by the lots of brand in the world. Profinet is very stable communication method and very fast. (100 megabits per second)
- Industrial wireless access point (master) and its clients(slaves) of brand is Phoenix Contact. So that, it gives advantages such as less cable use, easy maintenance and easy troubleshooting.
- Drives are Siemens. Also the these drives communicate with PLC via Profinet and Quality of Siemens drives are proven in the world.

- Industrial PC is manufactured by ESA that is Italian company only produce HMI systems with CE, UL, MARINE certificate.
- The valves on the arms are controlled by FESTO CPX profinet valve island. FESTO is a well-known pneumatic brand on the world-wide.
- The encoders and sensors of the machine are KUEBLER, which are especially experts on the encoders and optic sensor.
- Every electrical cabinet has a ventilator system and temperature control device as a standard.
- Screen designs are user friendly.
- Every equipment in control panel is suitable to CE.
- Every automation system has some safety equipments which has a CE certificate like emergency stop relay, light barrier, safety locks etc.
- Software is produced by Unimak's know-how and experience that is achieved for many years.



6. Mould Carriage- Qty: 8

This is a construction that carries the mould fixing plates and hangs on to the upper beam by means of bearings. There is a movement motor, process valves and control buttons.



7. Automatic – motorized mould opening system

This system consist of following items.

7.1 Arm group -Qty: 8

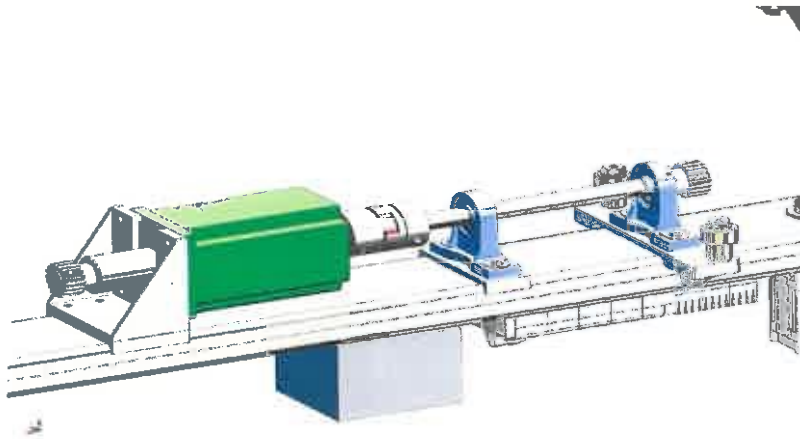
Arm group which carries the aluminum plate, is composed of combining of 7 parts. All these parts are made of painted steel and bolted. Arm groups ship disassembled and form up by means of these bolts.

The embedding parts that aluminum plates install on the arm group have an adjusting mechanism as to enable mould gravity center. While the mould is rotating, bringing the gravity center to the rotating axis is simplified by making these adjustments.

7.2 Movement motor -Qty: 8

Movement motor enables arm group's back and forth movement. Rock and pinion mechanism is used for this mechanism. There are 2 unit rock and pinion mechanism for each beam and assembled on to the beam.

Instead of gear box, torque motor has been used. Torque motor is electrical motor, which doesn't have cogwheel, oil etc... This provides long life, sensitive control and easy maintenance for the user.



7.3 Control board for automatic opening system -Qty:8

There are pneumatic valves on the arm group, which operates the process valves and there are also I/Os. There is a control unit that all these equipments are together. Ethernet communication is possible by means of this unit. It provides less wiring and fast communication.

7.4 Automatic mould turning system – Qty: 8 (for horizontal demoulding)

Moulds are installed on the mould fixing plate. This aluminum plate is embedded to the arm group from each head. The table can rotate 360 degree due to this embedding. This table can rotate in -90,0,+90 degrees as in process. 0 degree is the position that table is vertical and casting realized.

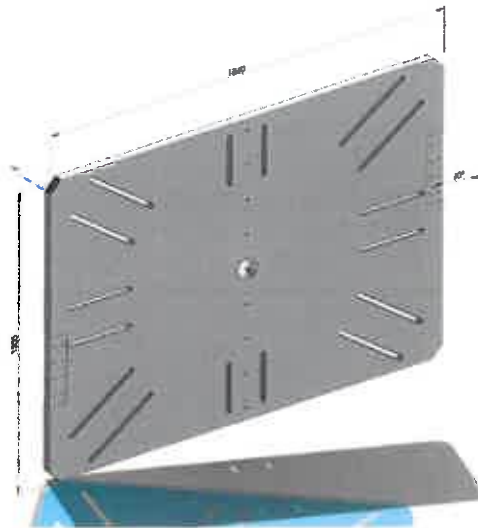
+ & - 90°degrees are the demoulding positions. These positions can be chosen from PLC. This choice is defined according to product position. Embedded table is rotated with the help of a gearbox. Table horizontal and vertical position is precisely adjusted by switches.

7.5 Control system of horizontal demoulding

Rotation and rotation speed is precisely adjusted by a gearbox inverter. This operation is controlled by a PLC. The communication between the PLC, driver and motors are provided by an Ethernet protocol.

8. Mould Fixing Plate - Qty: 8

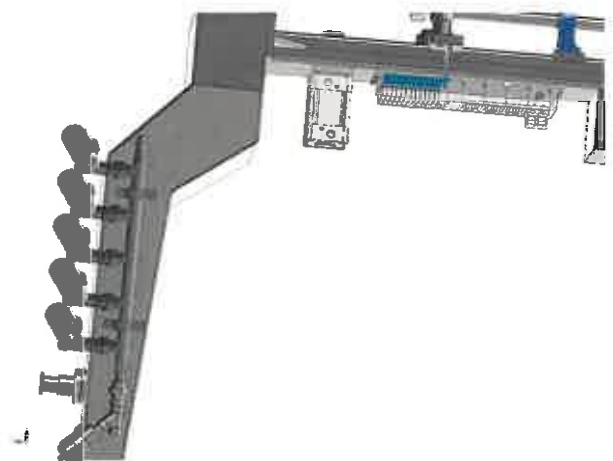
In this system, the front and back surface of the mould fixing plate is used to install mould's male and female parts. It is made of high strength alloyed aluminum. There are slots to install mould parts. When the moulds install to this plate, these slots and special connection equipments are used. This aluminum plate is embedded onto machine at a 10 degree angle. This is a fixed angle that can be changed. There are holes with 100 mm dia and 10 mm depth hole on the center and each side of the plate. A pin is installed on this hole. There are also same holes in the middle of the moulds. This system enables that moulds being in the center of the plate.



9. VALVE GROUP FOR CONNECTING ONE MOULD -Qty: 8

This is the group that consists of slip, air, water and vacuum valves.

The valves that are used piston type. These valves bodies are chosen from stainless steel material. These valves are connected on to the stainless steel pipe. To easy change of these valves, the valve body is connected to the main pipe via quick fixing parts. This valve group is assembled vertically, next to arm of mould carriage. The valves are on this group are worked by air actuated and these valves are controlled by Festo valve island.



10. SAFETY DEVICE WITH FIXED BARRIERS - Qty: 1

These are fixed barriers on the back and sides of the machine and light curtain sensor in the front of the machine so that access to the machine is prevented during operation.

11. AUTOMATIC DEMOULDING SYSTEM- QTY: 4

System has a automatic demoulding car.

Demoulding car which is carrying the setter over, it comes below the product and automatically goes up to the level which is settled before. Then the vacuum which is holding the product will shut down and the air pressure will applied to separate the product from mould and put it over the Demoulding car.

All mechanic movements of the machine is driven by a PLC controlled hydraulic system.

There are proportional valves in this hydraulic system in order to minimize the possible impacts and vibrations.

Also, all mechanic movements are controlled by sensors located in different positions. The steps will follow each other by the signal which goes to PLC through sensors. There won't be any action for the next step, before the finishing signal of previous step.

Demoulding car backward and forward movements is provided by a gearbox. All the vertical movement is realized by an scissor type hydraulic lift. The height that lift will go up is measured with the laser meter.

There is a roller conveyor on the hydraulic lift. This roller conveyor enables to send the setters to conveyor deposit bench.



12. SLIP HEATING 2 m³ TANK & FEEDING PUMP -Qty :1

This tank is where the casting slip is heated. Tank is made of stainless steel. It is a cylindrical tank and bottom of tank has a conic shape. The conical bottom is for easy cleaning purpose and prevents any fallen foreign object in the tank to go to the moulds.

The slip is easily drained by the cleaning valve in the center of tank.

The tank is composed of 3 sections. In the first section slip is stored, in the second section, the hot water is circulated and in the third section, insulation is made.

The slip that is in the inner part of the tank is heated by hot water, which is circulated around the inner section of the tank.

The target temperature is maintained by using a heat sensor. The slip is mixed constantly by a mixing unit which driven by a gearbox, this prevents the slip settling out in the tank. The water used to flush and clean the moulds.

Stainless steel tank body

Electric stirrer

Level probe

Automatic feeding valve

Manual discharge valve

Electrical control board

Pneumatic temperature regulation system

Technical data

| | |
|----------------------------|----------|
| Inside diameter | 1650 mm |
| Tank height | 1250 mm |
| Useful capacity | 2000 L |
| Total height with stirrer | 2780 mm |
| Max. pressure of hot water | 0,35 bar |
| Slip temperature | 45 °C |
| Min temperature slip inlet | 20 °C |
| Speed of stirrer | 14 rpm |
| Motor power of stirrer | 1,1 kW |