JT-ELIII SERIES

Vertical Type Electric Servo Drive Injection Molding Machine
Harmonizing Ecology and Technology JSW Builds The Most Advanced Vertical Type Electric Servo Drive Injection Molding Machine

Friendly to Earth Environment is now needed. Here’s the response by JSW. All the technologies cultured and build-up for many years by JSW are concentrated on the vertical type electric Servo Motor driven injection molding machine. In addition a shorter molding cycle time and improved precision molding have performed. Also by taking advantages of the space saving design, adaptability to automatic system and characteristics of vertical clamp machine, this is equipped with the unique JSW electric servo-driven system exclusive for molding operation and new high performance APC pressure control system. A bell crank toggle mechanism is applied for compact design to feature a fast, low costing and stable molding operation.
Block Systems

Our JT-EL series has various modules ready for use. The size, shape, production quantity and mode of a molding part will select the most opportune specification and viable performance of an injection machine currently available, resulting in a precise, steady and enhanced molding production.

Screw and Cylinder with Ultimate Precision Design and High Rigidity Are Standard Specifications

N-ALOY®

S50 Screw

JSW’s own high-hardness alloy. Having an outstanding high wear resistance, a single flight S50 screw is a new development realizing a fast cycle molding.

HT Screw Head

This HT screw head is useful for stabilizing parts weight. As compared with the conventional screw heads, the clearance between the cylinder and check ring is decreased to the minimum, so that the back flowing resin is decreased to the minimum.

Tip Nozzle

In contrast to the conventional open nozzle structure, this new type consists of a tip nozzle and an adaptor. The advantages are: an easy replacement of the tip nozzle and an enlargement of molding conditions.
Safety, Easy Operation with Energy Conservation and Space Saving

**Rotary Table**
The table turning mechanism driven by the electric servo motor needs no positioning pin for the table. Shortening of the revolving time, noiseless rotation, stable stopping point and stopping accuracy have been improved. (180 deg. turning reciprocated)

The rotary type has a photoelectric safety device equipped as a standard specification on both sides of operator’s position for safety improvement.

**Mold Access in Three Directions**
A three-piece safety door is designed. By shortening each door, opening and closing are getting easy, operation has been improved and the machine installation is more easy. A mold can be accessed in three directions, from either of the machine sides or front, therefore connection to auxiliary equipment is more flexible.

**Reply the Ecological Requirements**
Not only the running cost, but also the primary equipment cost in plant for power and water can be reduced.

<table>
<thead>
<tr>
<th>Flow rate of cooling water</th>
<th>Electric series JT40REL III</th>
<th>Hydraulic series</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 m³/h</td>
<td>0.3</td>
<td>1.0</td>
</tr>
</tbody>
</table>

In the hydraulic machines, the cooling water is mostly consumed by the oil cooler, but in electric machines, there is no oil cooler, so water consumption is greatly saved.

<table>
<thead>
<tr>
<th>Time(s)</th>
<th>Table turn</th>
<th>Mold close</th>
<th>Injection-Holding pressure</th>
<th>Cooling</th>
<th>Mold open</th>
<th>Table turn</th>
<th>Ejector</th>
</tr>
</thead>
</table>

Comparison of Power Consumption

Table turn: 0.58 kWh
Injection-Holding pressure: 2.16 kWh
Cooling: 0.58 kWh
Mold open: 2.16 kWh
Mold close: 0.58 kWh
Screw rotation: 2.16 kWh

Power consumption is reduced by one third to one quarter, compared to hydraulic powered machines.

<table>
<thead>
<tr>
<th>Electric series JT40REL III</th>
<th>Hydraulic series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumption kWh</td>
<td>0.58</td>
</tr>
<tr>
<td></td>
<td>2.16</td>
</tr>
</tbody>
</table>

(Note: Cylinder heater energy is not included.)
Our Unique Control System Pursuits Ultimate Stable Molding

Soft-Pack Servo Unit for Setting Injection Pressures

The optimum pressure molding (soft-pack servo) known for its performance in the hydraulic operated machines has been adopted for this electrically driven machine. Eliminating the peak pressure immediately before switching to the holding pressure is effective for reducing flash and warp problems.

Holding Pressure Characteristics

The surge pressure is cut to stabilize pressure fluctuations.

Holding pressure stage | Filling stage

Switch to holding pressure | Profile of injection filling pressures

Original Servo-Amplifier Developed by JSW

A result of JSW’s Research & Development designed to be operated under severe conditions, the servo driving system is built exclusively for molding machines. A 32 bit RISC chip delivers high speed processing, with a high degree of accuracy.

APC (High performance injection force feedback control) Delivers High Precision Control

The injection force sensor combined with JSW’s high performance feedback control has realized a truly reliable pressure follow-up and shockless pressure control.

Theory of Control

Smooth Operation and High Cycle Molding

Shorter Cycle Time

A high response function and speed provided by simple designed drive unit, increases a shorter operation time of mold open / close and table turning. (Intra-company comparison)

Comparison of Mold Open/close Time

Comparison of Table Turning Time

Automatic Central Lubrication

Automatic central lubrication of all moving parts, clamp, injection carriage and ball screws is standard spec. Any grease malfunctions cause an audible alarm.

Compound Actions

Reliable compound movements by the single driving inherent to the electric servo driven machine further reduce the cycle time and expand the adaptability range of the gate cutting function and others.

Automatic grease supplying unit
Reliable Controller of Easy Handling and High Function

**SYSCOM2000T** (Standard specification)
A clear and friendly to operator screen has been realized by adoption a large TFT color LC display screen (10.4 inches). Also interactive operation enables easy setting of the conditions, just by touching the setting place.

**High-touch Keyboard**
Friendly to operator and easy-to-handle design with the mode selection keys arranged on the machine illustrated on the display screen. Easy setting to totally eliminate erroneous handling. (The internal memory has a storing capacity of the molding conditions of 40 molds and a data card has the same for 40 molds.)

**Built-in Controller**
The display section (large LC display screen) and operational keyboard are housed in the operator’s control panel at stationary platen. This eliminates wasteful space around the machine. The operator is able to command all machine operation while standing by the panel.

**Printer Output**
With a printer connection, it is possible to keep records of molding conditions, measured data of various sorts and injection profiles.

**Molding Condition Change** (Rotary type specification)
Two lower dies, delicately differs from each other in terms of their molding requirements. To conform, the requirements for either die (INJECTION, HOLDING PRESSURE, SCREW ROTATION) are made settable, independently.
## Standard Equipment

<table>
<thead>
<tr>
<th>Standard Equipment</th>
<th>Unit Item</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Injection and Plasticizing</strong></td>
<td></td>
</tr>
<tr>
<td>Open nozzle (tip type)</td>
<td></td>
</tr>
<tr>
<td>Wear and corrosion-resistant cylinder Note 1</td>
<td></td>
</tr>
<tr>
<td>Wear and corrosion-resistant screw Note 1</td>
<td></td>
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<tr>
<td>HT screw head</td>
<td></td>
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<tr>
<td>Screw cylinder exchanger</td>
<td></td>
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<tr>
<td>Cold start-up prevention</td>
<td></td>
</tr>
<tr>
<td>Mold-pause changeover function</td>
<td></td>
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<tr>
<td>Automatic purging circuit</td>
<td></td>
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<tr>
<td>Nozzle touch force remote setting</td>
<td></td>
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<tr>
<td>Nozzle back timing select</td>
<td></td>
</tr>
<tr>
<td>Injection/rotation program control</td>
<td></td>
</tr>
<tr>
<td>Inj.speed/press.Holding press.: 1~6 steps(adjust.)</td>
<td></td>
</tr>
<tr>
<td>Screw speed/back press.: 1~6 steps(adjust.)</td>
<td></td>
</tr>
<tr>
<td>Transfer to holding pressure by sensing injection speed (IVS)</td>
<td></td>
</tr>
<tr>
<td>Cylinder temp.remote setting</td>
<td></td>
</tr>
<tr>
<td>Cylinder temp. control (SSR)</td>
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<tr>
<td>Soft-pack servo control</td>
<td></td>
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<tr>
<td>Self-lubricating toggle bushings</td>
<td></td>
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<tr>
<td>Automatic greasing</td>
<td></td>
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<tr>
<td>Mold open/close and ejector program control</td>
<td></td>
</tr>
<tr>
<td>Mold open/close: 1<del>4 steps(fixed) ejector: 1</del>3 steps(adjust.)</td>
<td></td>
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<tr>
<td>Automatic mold clamping force setting</td>
<td></td>
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<tr>
<td>Automatic mold height adjuster</td>
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<tr>
<td>Remote setting mold height</td>
<td></td>
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<tr>
<td>Mold protection device</td>
<td></td>
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<tr>
<td>Safety devices (electrical, and mechanical) Note 2</td>
<td></td>
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<tr>
<td>Photocell type safety device(for rotary type only)</td>
<td></td>
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<tr>
<td>Remote setting of table rotation speed</td>
<td></td>
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</tbody>
</table>

### Controller
- SYSCOM controller display (touch panel TFT color LCD)
- Japanese/English switching function Note 3
- Interlock display function
- Injection 2 molding conditions change (or rotary type only)
- Memory of Molding conditions
  (internal memory 40 molds)
- Data card (40 molds/card)
- Printer output terminal Note 4
- Self-diagnostic function
- Overall set screen
- Compound actions
- Cylinder temp. monitoring function
- Heater circuit alarm
- Injection pressure monitor function(IPM)
- Injection wave form monitor
- Injection wave form memory
- Statistical graph function
- Measured value display
- Grease alarm
- Production monitor function Note 5
- Operating time display function
- Action monitor function
- Molding condition upper/lower limit monitor Note 6
- Maintenance service Note 7
- History of alarm
- History of set value
- Servo control fault alarm
- Abnormal alarm buzzer
- Mold cooling water closed circuit
- Auxiliary parts (maintenance tools, ejector rod)

### Monitor

### Optional Equipment

<table>
<thead>
<tr>
<th>Optional Equipment</th>
<th>Unit Item</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Injection</strong></td>
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<tr>
<td>B size screw cylinder</td>
<td></td>
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<tr>
<td>High accurate nozzle temperature control (2 zone control)</td>
<td></td>
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<tr>
<td>SVO long nozzle</td>
<td></td>
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<tr>
<td>High-melter M II screw Note 8</td>
<td></td>
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<tr>
<td>LCP resin exclusive screw Note 9</td>
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<tr>
<td>Cylinder heat insulation cover</td>
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<tr>
<td>Shut-off nozzle (pneumatic type)</td>
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<tr>
<td>Hopper</td>
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<tr>
<td>Friction ring ceramic</td>
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<tr>
<td>Cylinder module system</td>
<td></td>
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<tr>
<td>Resin dwell fault alarm</td>
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<tr>
<td>Toggle injection compression function Note 10</td>
<td></td>
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<tr>
<td>Daylight extension</td>
<td></td>
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<tr>
<td>Mold platen heat insulating plate</td>
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<tr>
<td>Air jet</td>
<td></td>
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<tr>
<td>Pneumatic core puller circuit</td>
<td></td>
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<tr>
<td>Unscrewing motor control circuit</td>
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<tr>
<td>Die clapper</td>
<td></td>
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</tbody>
</table>

### Mold Clamping
- Ejector for upper mold (hydraulic type)
- Ejector 3 points ejection (rotary type only)
- Ejector stroke extent (rotary type only)
- Mold heater circuit
- Mold temp. control piping for high temp. (rotary type only)
- Quick mold change device
- Mold positioning device
- Mold temperature display
- Language switching function Note 11
- Calendar timer
- Warning light

### Controller
- Communication function with host computer (Link10)
- Printer (with printer cable)
- Printer cable (IBM compatible type)
- Data card (40 molds/card)
- Robot interface
- Spare plug receptacle

### Other
- Flow indicator for cooling water
- Cooling water cut-off alarm
- Vibration proof rubbers

### Notes:
1. Either of the A or K size are standard specification. (B size will be optional.)
2. The operating section of the rotary type shall be a photoelectric type.
3. Japanese/English switching function is standard equipment.
4. The printer unit and cable are optional.
5. The production volume and advanced notice of production complete can be set and expected finish time is displayed.
6. Monitoring functions of the following particulars are equipped as standard.
   - Cycle time
   - Injection time
   - Rotation time
   - Mold opening/closing time
   - Cushion
   - Injection start point
   - Changeover position to holding pressure
   - Changeover pressure to holding
   - Injection pressure
   - Screw back pressure
7. Maintenance service time and areas are displayed.
8. Adaptable for screw diameter over 35mm.
9. Adaptable for screw diameter smaller than 28mm.
10. A and B mode are available for injection compression operaion, compression can be adjusted in 1-6 steps.
11. One more language can be added, in addition to Japanese and English.