All Electric Servo Drive Vertical Type Injection Molding Machine
High Quality Compact Design.

JSW has produced a super-advanced all-electric vertical type injection molding machine - it is faster, more precise, and more compact. The JT-AD series machines have been evolving to mach the needs of today and beyond: They display high productivity on in-line assembly. Using the advanced technologies that have been fostered for many years and are unique to JSW, we have achieved high-precision injection molding.
Low-Profile and Compact Design

This compact machine is easy to operate and suitable for in-line configuration.

Space saving

The machine width and installation space have been greatly reduced, to make possible inclusion of the machine on the assembly line. JT40RAD has reduced machine width by 150 mm and installation space by 18%, when compared with conventional models. (comparison between our JT-ELIII & AD Series machines)

Larger molds

Although the machine width is more compact, the outer diameter of the table is the same as that of conventional models: Optimizing the nozzle position makes it possible to mount larger molds, and the machine can also handle larger, more complex dies, such as sliding cores. (comparison between our JT-ELIII & AD Series machines)

Compact table

The mold securing height has been reduced to allow the assembly line to be lowered, making it easier for the operator. With a JT40RAD-55V, the table height is 894 mm (35.2 inch), 146 mm (5.75 inch) lower than on conventional machines; the machine height of 2850 mm (112.2 inch) is the most compact in the industry (including mounting pads). (comparison between our JT-ELIII & AD Series machines)

Mold accessible in three directions

A three-piece safety door is used: The door open/close area is smaller. This improves operability and ease of machine installation. A mold can be accessed from three directions - both sides of the machine and the operation side - and an open space is left on the opposite side from operation, so that a runner can be easily removed.
High-speed mold open/close and fast table rotation, improve productivity.

Faster cycles for mold open/close and rotary table rotation have been achieved.

Fast, smooth mold open/close operation is ensured

A clamping mechanism exclusively for vertical machine with high-capacitance servo motor shortens the mold open/close dry cycle by 21% (JT40RAD).

This redesign results in high-speed, smooth mold open/close operation and facilitates high-cycle molding.

High-performance servo motor & timing belt

Silent, high-speed table rotation - the best in the industry - has been achieved by using a high-performance servo motor and timing belt. A mechanical stopper is provided at the rotation stop end to improve the stop accuracy during repetitive operation. This enables stable molding without any displacement of the inserted product. (The table rotates 180 deg. for reciprocated turning.)

Injection compression makes a wide variety of molding possible.

The injection compression molding function, unique to JSW, is equipped as standard: The injection compression controls the position of mold with accuracy more than 10 times that of direct-pressure molding machines, making possible a wide variety of molding (PAT. 1744469).

A mode

A1-A6, A7 (option)

B mode

S1/S3

Initial clamping

Injection

Mold opened by injection pressure

Compressed in 6 steps

Steps before touching

Injection

Compressed in 6 steps

Setting for injection compression conditions

A7 mode: Platen sensor position feedback (optional)

Crosshead Ball screw

Upper movable platen

Servo motor

Control command

SYSCOM3000T (servo amp)
62 micro second high-speed servo control circuit, the fastest in the industry, improves the product quality.

The marvelous 62 micro second high-speed servo control circuit results in both high precision and stable quality.

Use of 62 micro second high-speed servo control circuit in the “JT-AD Series” reduces scanning time to 1/16th of conventional controls. It promotes product quality through a reduction in performance variation, such as holding transfer pressures.

A vertically arranged large 15 inch TFT color LCD screen. The controller rotates to provide the operator with a clear view of molding parameters.

A large 15 inch LCD color monitor Remarkably improved operability and visibility

Molding machines: JT40REL II (conventional machine) vs JT40RAD-5SV
Molded product: Electronic parts
Resin: PA 6

The resolution of injection pressure detector has been greatly improved.

The resolution of the load cell amplifier for the injection pressure has been intensified five times for more accurate injection, holding and back pressure control which helps insure stabilized precision molding.

SYSCOM3000T screens
A controller consists of the condition setting screen, mode keys screen and operation switches.

1. Cycle monitor screen
2. Convenient monitoring screens
3. Condition setting screens

Variation in the holding transfer pressure
(comparison between our JT-EL III & AD Series machines)

Variation in cushion pressure
(comparison between our JT-EL III & AD Series machines)

Variation in product weight
(comparison between our JT-EL III & AD Series machines)
A wide range of injection units with versatile control modes promotes the product quality.

The low inertial injection (HR) specifications ("optional") and high-speed, high response injection (HS) specifications ("optional") have been added on the module system that is highly accepted in the industry. The module system enables selection of opportune injection unit and covers diversified products including micro and thin-walled molding.

### Module system

<table>
<thead>
<tr>
<th>Single acting type</th>
<th>M40</th>
<th>M70</th>
<th>M100</th>
<th>Clamping module</th>
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<tbody>
<tr>
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</tbody>
</table>

*Note: High-speed, high-response injection (HS) specification applies to the injection unit marked O.

### JSW’s unique injection control

#### IWCS (Injection Weight and Cushion Stability) control

This control keeps the pressure of the molten resin in the screw head section at a set value to re-stabilize the measured density each shot after plasticizing. This is the unique control technology of JSW that exerts great effect to minimize cushion and product weight variation.

#### Effect of reduced cushion variation

<table>
<thead>
<tr>
<th>PBT</th>
<th>PA6</th>
<th>High-flow PP</th>
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</thead>
<tbody>
<tr>
<td>0.20</td>
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<td>0.14</td>
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<td>0.16</td>
<td>0.14</td>
<td>0.12</td>
</tr>
</tbody>
</table>

#### Electric-driven soft-pack servo control

This JSW unique control technology suppresses peak pressure immediately before switching the holding pressure in the injection process, keeping the machine pack at optimum pressure. It results in over-pack prevention in thin-wall molding. (PAT. # 1755568)

#### Effects of soft-pack servo

- Molding distortion reduced
- Burrs cleared
- Dispersion in weight of molded products reduced
- Clamping force reduced (low-pressure molding)
- Mold-friendly

#### APC (Advanced Pressure Control)

This JSW unique control technology suppresses overshoots or undershoots of resin pressure during the filling/holding pressure process, a dramatic upgrade of the tracking and responsibility for setting pressure. (PAT. # 3168289)

### Advanced Pressure Control

#### Pressure feedback

- Optimum pressure control predicting resin filling condition.
- Screw
- Injection force sensor
- Drive train
- Servo motor
- Servo controller

#### Pressure setting value

- Speed
- Estimator
- Controller

#### Hold pressure force characteristics

- Setting: 50, 30, 10 MPa
- Actual value

### Predicted control of metering

To ensure smooth stops with optimum screw rotation and back pressure load at the screw rotation completion position, estimate control is located in the front of the screw rotation completion position. The screw rotation number can be reduced to the optimum without any loss in time, and back pressure can be decreased.

### Before-holding pressure deceleration control

This control uses the estimate control to reduce the speed to the optimum holding pressure speed, from its position before the holding pressure transfer position: This decreases the inertia that is peculiar to electric injection molding machines and improves stability in holding pressure transfer pressure, which is essential for precision molding.
This efficient energy saving performance greatly reduces power consumption.

- Power consumption is 1/3 to 1/4 that of a hydraulic machine.
- Cooling water amount is less than 1/5 that of a hydraulic machine.

**Promotion of maintainability.**

- **Automatic lubricating device**
  This automatically lubricates the injection and clamping devices to prevent any problem due to inadequate lubrication.

- **Polycarbonate safety door**
  A large polycarbonate (steel is also available) safety door that allows operator to clearly view the inside of platen is used. The status of both mold and molded product is easily visible, to facilitate maintenance.

- **Highly endurable ball screw**
  Using a ball screw that maintains high accuracy improves endurance.

- **Air pressure inspection window**
  The window allows operator to easily check the supply status of factory air that is necessary for the safety device of the machine.

**NET100 system and LINK10 system**

This system performs both quality control and production control of injection molding machines: When the system is connected to the factory LAN, it will be possible to communicate data with the injection molding machines connected to network. Depending on the number of machines connectable to network, the NET100 system can control up to 100 machines, and the LINK10 system can control up to 10 machines. *Optional

**Remote management system**

Connecting the NET100 system or LINK10 system to the Internet will allow operator to monitor the molding status, display the controller screens and change settings from anywhere in the world: This will greatly increase the efficiency of molding work.  * Optional

**Power Consumption Comparison Graph** (Comparison using our products)

- **Power Consumption**
  - Table turn
  - Mold closing
  - Injection molding pressure
  - Cooling
  - Mold open
  - Table turn
  - Ejector

- **Electric series JT40RAD**
  - Power consumption
  - Cycle: 30.0 s
  - Weight: 12.4 kg
  - Material: ABS
  - Standard: 5/8

- **Hydraulic series**
  - Power consumption
  - Cycle: 30.0 s
  - Weight: 12.4 kg
  - Material: ABS
  - Standard: 5/8

*Note: Power consumption by cylinder heater is not included.*

Power consumption is reduced by 1/3 to 1/4, when compared with hydraulic machines.

**Molding Factory**

- In-factory Ethernet LAN
- Host PC
- Injection molding machine #1
- Injection molding machine #2
- Injection molding machine #100

**Mobile phone of administrator**

- Collects data on operating status and measurement value of each molding machine.
- Sends alarm occurrence by email.
- Checks the operating status of molding machines on remote PC in office, etc.

* When host computer is equipped with mail function.
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