Sinto products are designed with attention for safety and environmental quality concerns. Before using Sinto equipment, please read and understand the supplied Operation Manual and operate the equipment properly.
Sinto Technology Changes Green Sand Molding

Sinto developed SEIATSU Air-flow technology utilizing compressed air in 1979. This technology realized consistent production of highly dimensionally accurate castings with high quality. Sinto also developed Aeration Sand Filling technology by fluidizing sand using low-pressure air in castings. Sinto proposes the most suitable equipment to each customer among our various molding machines designed under unique technologies.

**Aeration Sand Filling technology**

- For Small and Medium Size Castings
  - **Features**
    - By uniform primary sand fill, mold strength over the whole mold becomes uniform, improving dimensional accuracy of small and medium size castings and increasing number of castings in a mold.
    - Huge energy saving is achieved by using low pressure air.

  
  
  **Principle of Aeration Sand Filling**
  - Green sand in the tank is fluidized by low pressure air and is introduced into flask.
  - Increased number of casting in a mold thanks to uniform mold strength across the mold contributes production volume increases.

**Air-flow technology**

- For Medium and Large Size Castings
  - **Features**
    - Improvement of mold strength of large molds with deep pockets.

  
  
  **Principle of Air-flow**
  - After sand is dropped into the flask by gravity, compressed air is introduced from the top of the mold through vent holes mounted on the pattern plate.

**Comparisons**

- **Aeration molding method (Pneumatic pre-set pad type, ACE series)**
  - **SEIATSU molding method (EFA series & ZFA series)**

- Increased number of casting in a mold thanks to uniform mold strength across the mold contributes production volume increases.
Line-up to answer the various needs of castings

<table>
<thead>
<tr>
<th>Molding Method</th>
<th>Aeration</th>
<th>SEIATSU</th>
<th>SEIATSU</th>
<th>SEIATSU</th>
<th>SEIATSU</th>
<th>SEIATSU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>ACE-3·4·5·6·7</td>
<td>EFA-S02D·3·4·5·6·7·8</td>
<td>ZFA-S02D·3·4·5·6</td>
<td>DAFM-S02D·3·4·5·6</td>
<td>HSP-1D·2D·3D·4D</td>
<td></td>
</tr>
<tr>
<td>Suitable Products</td>
<td>For small and medium size castings</td>
<td>For medium and large size castings</td>
<td>For medium and large size castings</td>
<td>For small lot production of various products</td>
<td>For small lot production of various products</td>
<td></td>
</tr>
<tr>
<td>Mold Size (mm)</td>
<td>Min. 700×650 - Max. 1,500×1,200</td>
<td>Min. 500×400 - Max. 3,000×2,000</td>
<td>Min. 500×400 - Max. 1,250×1,000</td>
<td>Min. 650×500 - Max. 2,500×2,000</td>
<td>Min. 650×500 - Max. 1,250×1,000</td>
<td></td>
</tr>
<tr>
<td>Mold System</td>
<td>Alternate molding</td>
<td>Alternate molding</td>
<td>Cope/drag simultaneous molding</td>
<td>Alternate molding</td>
<td>Alternate molding</td>
<td></td>
</tr>
<tr>
<td>Molding Rate</td>
<td>MAX 150 complete molds/hr. (Simultaneous molding by twin machine type MAX 240 complete molds/hr.)</td>
<td>MAX 140 complete molds/hr.</td>
<td>MAX 250 complete molds/hr.</td>
<td>MAX 80 complete molds/hr.</td>
<td>MAX 70 complete molds/hr.</td>
<td></td>
</tr>
<tr>
<td>Features</td>
<td>Simple &amp; energy saving. “Aeration sand filling” technology achieves uniform and highly strong mold.</td>
<td>Highly automated, high speed, highly flexible and accurate for complex geometries.</td>
<td>Highly automated, top speed, highly flexible and accurate for complex geometries.</td>
<td>Easy accessibility to pattern for manual work. Suitable for chiller, open top feeder setting or facing sand.</td>
<td>Easy accessibility to pattern for manual work. Suitable for chiller, open top feeder setting or facing sand.</td>
<td></td>
</tr>
</tbody>
</table>

Molding process of each model

- **ACE**
  - Pneumatic pre-set pad type
  - Pre-set Pad System
  - Pre-set pads are positioned to make even compacting ratio.
  - Aeration Sand Filling

- **EFA**
  - Gravity Sand Drop
  - Air-flow
  - Multi-ram
  - Plain Squeeze

- **ZFA**
  - Gravity Sand Drop
  - Air-flow
  - Multi-ram
  - Leveling Squeeze

- **DAFM**
  - Air-flow
  - Multi-ram
  - Plain Squeeze

- **HSP**
  - Fine sand slinger
  - Air-flow
  - Multi-ram
  - Leveling Draw

Mold size variations

- **ZFA**
- **EFA**
- **ACE**
- **HSP**
- **DAFM**
ACE series

Simple & Energy Saving

Molding Rate: MAX 150 complete molds/hr.
Alternate molding
(Simultaneous molding by twin machine type
MAX 240 complete molds/hr.)

Features
- "Aeration sand filling" technology achieves uniform and highly strong mold.
- Draft angle is minimized.
- Spill sand is eliminated, cut-off sand is minimized.
- Achieves operator-friendly environment and energy reduction.
- Installation space is reduced by compact design.
- Molding condition can visually be monitored.
- Simple machine structure realizes easy maintenance.

"Aeration Sand Filling" Makes Mold Difference

Compared to gravity sand drop system, by aeration sand filling technology, sand is not only uniformly filled to the overall area of the pattern board, but also achieves good and stable filling density in the complex shape of pattern, thus realizes the state-of-art mold.

No spill sand, Minimized cut-off sand
Since sand is filled in the confined space by aeration sand filling, no spill sand is generated. Cut-off sand is minimized as well as required sand volume, by mold height feed back control.

Mold height feed back control

- Mold height target value
- Flask set target value
- Automatic sand volume adjustment
- Calculation of flask set position for next mold

Spill sand + Cut-off sand
= Sand in mold × 5%

Reduced installation space
Space-saving ACE is less restricted by installation space. Replacing existing molding machine is easier and minimizing pit size is also possible.

More dimensionally precise castings achieved by aeration technology

- Minimized draft angle
  Example: Mold of cylinder liners (Draft angle 0.5 degrees)

- Reduced wall thickness
  Example: Cylinder block

Excellent pattern draw by leveling frame
Highly accurate pattern draw is possible by lifting the mold with leveling frame at slow speed, sustaining the parallelism. Since molding and pattern draw are performed on the stationary table, draft angle can be minimized.

*To realize castings with high dimensional accuracy, overall study on improvement of core dimension, improvement of line equipment alignment, stable sand strength, improvement of gating system, etc, is indispensable.
**Options**

**Automatic pattern changer**

- Automatic pattern changer changing unit for reducing pattern changing time and labor costs.

**Wear-resistant nozzle**

- Aeration nozzle having high wear-resistance and long life.

**Pattern heater**

- Pattern is heated to prevent sand from sticking to the pattern to achieve smooth pattern draw.

**Cold climate specification**

- Hydraulic unit heater is available for shortening heating time of oil fluid.

**Hot climate specification**

- Control panel cooler is available to prevent overheating inside the control panel.

**Hydraulic pre-set pad**

- Additional pattern bolster

**Wear-resistant leveling seal for pattern bolster**

- Wear-resistant and long-life urethane leveling seal.

**Raised cope mold**

- Auxiliary sand mold for higher profile pattern is possible up to cope height +150mm.

**Clamp type pattern bolster**

- Easy mounting and dismantling of pattern by quick air coupling system, reducing pattern change time.

**Pattern heater**

- Pattern is heated to prevent sand from sticking to the pattern to achieve smooth pattern draw.

**Automatic molding line for ACE series**

- Suitable molding line for medium volume production

- **High speed line with 2 ACE units for further high volume production**

**Hydraulic pre-set pad type**

- ACE-5 · 6 · 7

Squeeze: Multi-ram & Leveling squeeze

Pre-set pads can be used as segment foots for multi-ram.

**Model No.**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE-3</td>
<td>1,450</td>
<td>1,800</td>
<td>1,600</td>
<td>3,700</td>
</tr>
<tr>
<td>ACE-4</td>
<td>1,600</td>
<td>2,000</td>
<td>1,850</td>
<td>4,550</td>
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<tr>
<td>ACE-5</td>
<td>1,900</td>
<td>2,300</td>
<td>2,100</td>
<td>5,000</td>
</tr>
<tr>
<td>ACE-6</td>
<td>2,100</td>
<td>3,000</td>
<td>2,600</td>
<td>5,700</td>
</tr>
<tr>
<td>ACE-7</td>
<td>2,800</td>
<td>3,700</td>
<td>2,900</td>
<td>7,000</td>
</tr>
</tbody>
</table>

**Options**

- Automatic pattern changer
- Wear-resistant nozzle
- Pattern heater
- Cold climate specification
- Hot climate specification
- Hydraulic pre-set pad
- Additional pattern bolster

**Automatic molding line for ACE series**

- **Standard molding line for ACE**

- **High speed molding line with twin type ACE**
### EFA series & ZFA series

#### EFA-SD/S series

- **Features**
  - Fully automatic molding machine with pattern turnable/shuttle for the production of cope and drag molds, equipped with multi-ram press as standard equipment
  - Sand fill by batch hoppers
  - Molding flask handling by means of hydraulic cylinder on roller conveyors
  - Excellent pattern draw by leveling frame (Leveling squeeze and draw type)

#### ZFA-SD/S series

- **Features**
  - Fully automatic twin-type molding machine for simultaneous production of one cope and one drag mold, with pattern roller conveyor and pattern shuttle truck, equipped with flat squeeze plates, elastic squeeze plates or multi-ram presses
  - Sand fill by batch hoppers
  - Molding flask handling by means of hydraulic cylinder on roller conveyors
  - Excellent pattern draw by leveling frame (Leveling squeeze and draw type)

### Specifications

#### EFA-SD series

<table>
<thead>
<tr>
<th>Model No.</th>
<th>EFA-SD2</th>
<th>EFA-SD3</th>
<th>EFA-SD4</th>
<th>EFA-SD5</th>
<th>EFA-SD6</th>
<th>EFA-SD7</th>
<th>EFA-SD8</th>
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</thead>
<tbody>
<tr>
<td>Width x Length (mm)</td>
<td>500×400</td>
<td>650×500</td>
<td>800×650</td>
<td>1,000×800</td>
<td>1,250×1,000</td>
<td>1,600×1,250</td>
<td>2,000×1,600</td>
</tr>
<tr>
<td>Molding System</td>
<td>Air-flow + Squeeze</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Molding Rate (Max. complete molds/hr.)</td>
<td>140</td>
<td>140</td>
<td>120</td>
<td>120</td>
<td>100</td>
<td>80</td>
<td>70</td>
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</table>

#### EFA-S series

<table>
<thead>
<tr>
<th>Model No.</th>
<th>EFA-S5</th>
<th>EFA-S6</th>
<th>EFA-S7</th>
<th>EFA-S8</th>
<th>EFA-S9</th>
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</thead>
<tbody>
<tr>
<td>Width x Length (mm)</td>
<td>3,000×2,000</td>
<td>2,000×1,600</td>
<td>1,600×1,250</td>
<td>1,250×1,000</td>
<td>1,000×800</td>
</tr>
<tr>
<td>Molding System</td>
<td>Air-flow + Squeeze</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Molding Rate (Max. complete molds/hr.)</td>
<td>60</td>
<td>50</td>
<td>40</td>
<td>30</td>
<td>20</td>
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</tbody>
</table>

#### ZFA-S series

<table>
<thead>
<tr>
<th>Model No.</th>
<th>ZFA-S2</th>
<th>ZFA-S3</th>
<th>ZFA-S4</th>
<th>ZFA-S5</th>
<th>ZFA-S6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width x Length (mm)</td>
<td>500×400</td>
<td>650×500</td>
<td>800×650</td>
<td>1,000×800</td>
<td>1,250×1,000</td>
</tr>
<tr>
<td>Molding System</td>
<td>Air-flow + Squeeze</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Molding Rate (Max. complete molds/hr.)</td>
<td>250</td>
<td>250</td>
<td>200</td>
<td>180</td>
<td>160</td>
</tr>
</tbody>
</table>

#### ZFA-SD series

<table>
<thead>
<tr>
<th>Model No.</th>
<th>ZFA-SD2</th>
<th>ZFA-SD3</th>
<th>ZFA-SD4</th>
<th>ZFA-SD5</th>
<th>ZFA-SD6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width x Length (mm)</td>
<td>500×400</td>
<td>650×500</td>
<td>800×650</td>
<td>1,000×800</td>
<td>1,250×1,000</td>
</tr>
<tr>
<td>Molding System</td>
<td>Air-flow + Squeeze</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Molding Rate (Max. complete molds/hr.)</td>
<td>250</td>
<td>250</td>
<td>200</td>
<td>180</td>
<td>160</td>
</tr>
</tbody>
</table>

### Options

- **Fine sand slinger (For large molds)**
  - Produces a uniform layer of fine sand over the entire mold surface.
- **Automatic pattern changer**
  - Changes patterns quickly and efficiently, reducing downtime.
- **Pattern heater / Pattern temperature controller**
  - Keeps the pattern at the optimal temperature, ensuring consistent casting quality.

#### Advantage of Air-flow Technology

- Uniformly high mold strength
  - Produced molds are uniformly hard resulting in the production of dimensionally accurate castings. The molds produced by air-flow process are considerably harder than those produced by jolt squeezing.
- Example: Cylinder block (150kg)
- Example: Oil cooler (28kg)
### DAFM-SD/S series

**Features**
- 2-station molding machine with pattern turnable/shuttle for alternate production of cope and drag molds, equipped with multi-ram press
- Suitable for chiller, open top feeder setting or facing sand
- Sand fill by hopper, discharge belt or batch hopper in front of the machine with possibility of manual intervention
- Excellent pattern draw by leveling frame (Leveling squeeze and draw type)

**Molding Rate**: MAX 80 complete molds/hr.

- 2-Station, Alternate molding

### DAFM-S series

**Features**
- 2-station molding machine with pattern turnable/shuttle for alternate production of cope and drag molds, equipped with multi-ram press
- Suitable for chiller, open top feeder setting or facing sand
- Sand fill by hopper, discharge belt or batch hopper in front of the machine with possibility of manual intervention
- Excellent pattern draw by leveling frame (Leveling squeeze and draw type)

**Molding Rate**: MAX 70 complete molds/hr.

- 2-Station, Alternate molding

### Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>DAFM-SD3</th>
<th>DAFM-SD4</th>
<th>DAFM-SD5</th>
<th>DAFM-SD6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width x Length (mm)</td>
<td>850x950</td>
<td>850x950</td>
<td>1,050x800</td>
<td>1,050x800</td>
</tr>
<tr>
<td>Height (mm)</td>
<td>150-400</td>
<td>150-400</td>
<td>150-400</td>
<td>200-400</td>
</tr>
</tbody>
</table>

### Options
- **Fine sand slinger (For large molds)**: This equipment disintegrates sand lumps in mixed sand and projects fine sand to the pattern for better coating surface and edge along with better sand fill.
- **Automatic pattern changer**: Automatic pattern bolt drop changing unit for reducing pattern changing time and labor costs.
- **Flex**: (Available for DAFM-SD/S): By using sponge rubber for squeeze plate, uniform mold strength can be obtained for patterns having large height differences.
- **Multi-ram press (Standard for DAFM-SD/S)**

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### HSP-D/HSP series

**Features**
- 2-station molding machine with pattern turnable for alternative production of cope and drag molds, equipped with flat squeeze plate
- Suitable for chiller, open top feeder setting or facing sand
- Sand fill by hopper, discharge belt or batch hopper
- Molding flask handling by means of hydraulic cylinder or electric motors on roller conveyors
- Turnkey machine with integrated hydraulic system and electronic control

**Molding Rate**: MAX 70 complete molds/hr.

- 2-Station, Alternate molding

### HSP-D series

**Features**
- 2-station molding machine with pattern turntable for alternative production of cope and drag molds, equipped with flat squeeze plate
- Suitable for chiller, open top feeder setting or facing sand
- Sand fill by hopper, discharge belt or batch hopper
- Molding flask handling by means of hydraulic cylinder or electric motors on roller conveyors
- Turnkey machine with integrated hydraulic system and electronic control

**Molding Rate**: MAX 80 complete molds/hr.

- 2-Station, Alternate molding

### Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>HSP-1D</th>
<th>HSP-2D</th>
<th>HSP-3D</th>
<th>HSP-4D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width x Length (mm)</td>
<td>650x950</td>
<td>850x950</td>
<td>1,050x950</td>
<td>1,050x1,000</td>
</tr>
<tr>
<td>Height (mm)</td>
<td>150-300</td>
<td>150-300</td>
<td>150-400</td>
<td>150-400</td>
</tr>
</tbody>
</table>

### Options
- **Pattern heater / Pattern temperature controller**: Pattern is heated to prevent sand from sticking to the pattern to achieve smooth pattern draw. Temperature of pattern heater is automatically controlled.

---

### HSP series

**Features**
- 2-station molding machine with pattern turntable for alternative production of cope and drag molds, equipped with flat squeeze plate
- Suitable for chiller, open top feeder setting or facing sand
- Sand fill by hopper, discharge belt or batch hopper
- Molding flask handling by means of hydraulic cylinder or electric motors on roller conveyors
- Turnkey machine with integrated hydraulic system and electronic control

**Molding Rate**: MAX 70 complete molds/hr.

- 2-Station, Alternate molding

### Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>HSP-1</th>
<th>HSP-2</th>
<th>HSP-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width x Length (mm)</td>
<td>650x950</td>
<td>850x950</td>
<td>1,050x950</td>
</tr>
<tr>
<td>Height (mm)</td>
<td>150-300</td>
<td>150-300</td>
<td>150-400</td>
</tr>
</tbody>
</table>

### Options
- **Pattern heater / Pattern temperature controller**: Pattern is heated to prevent sand from sticking to the pattern to achieve smooth pattern draw. Temperature of pattern heater is automatically controlled.
Sinto supports customer's sustained production by attentive services.

For continuous production of high quality castings at lowest cost, and for sustaining customer's production operations...

Remote Support
Quick Recovery Assistance at Time of Machine Problem
This program includes support from engineers with experienced knowledge of equipment for temporary action and recovery in case of emergent machine troubles during production.

Maintenance and Monitoring Support
To Keep Equipment at Best Condition
This is a support program to keep operation of equipment at its best condition. There are several functions and services available, such as diagnosis by "mechanical doctors", operation data analysis, and parts replacement timing announcement.

Quick Parts Supply
Avoid Downtime of Manufacturing
Critical parts and consumables, any defect of which immediately leads to a line stop or failure, shall be kept as spares in stock at the customer and also shall be kept at an overseas site close to the customer to permit immediate delivery.

World-wide support from support centers in Japan and Germany, along with Sinto Group Companies

Support Center (Germany)
Support Center (Japan)

This service may not be available depending on your internet access environment. In such case, availability of this service shall be reviewed respectively.

Customer
Support Center

A program which advises more effective operation and proposes improvement is available, by collecting operation information automatically and by analyzing such data.

Consumable parts replacement information

Daily inspection support with hand-held terminals
Equipment diagnosis by "mechanical doctors"