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.
Pouring correctly at the optimal temperature is important in producing high quality castings. To achieve this while protecting workers’ safety, a system that operates efficiently with highly accurate automatic pouring is required.

With our wealth of accumulated knowledge and experience, Sinto proposes the suitable pouring system that fits the customer's production needs and provides environmentally-conscious, safe and reliable casting production.

**Highly accurate and safe pouring system: Econo-Pour**

**Point 1. Safely reproduce expert work**

Pouring necessarily involves the dangerous work of handling high-temperature molten metal as well as expertise in highly skilled techniques. Econo-Pour automates and simulates the exact work of expertised operator while safely reproducing consistent high quality pours.

**Point 2. Environmentally-conscious and energy saving pouring**

Reducing environmental burdens by saving power and using less scarce resources.

- Rapidly and accurately process constant amounts of molten metal. Minimizing the amount of metal by reducing spillage enables efficient production.
- In-stream inoculation system reduces required rare earth elements. Economic use of precious resources helps lower the costs of pouring.

**Point 3. Visualize production information with support for traceability**

Support for traceability of pouring information facilitates management of products and molten metal.

Linking pouring information with the molding line management system enables consolidated management of production information throughout the plant.
Econo-Pour Pouring Systems - Providing High Quality Casting Production

Our broad lineup responds to the needs of our customers

1. Create high quality castings
   - FVNX series
     - Highly accurate pouring by maintaining pouring based on teaching control technology.
     - Realizes stable production of high quality castings.

2. Add pouring machine to your foundry with no loss of cycle time
   - FVNX series
     - Synchronized pouring system moves according to the line movement.
     - Pouring can be done while molding line is being indexed. Cycle time will not be affected.

3. Automatic pouring for medium and large castings
   - P series
     - Supports ladles up to five tons. Achieves automatic pouring for medium and large molds.
     - Mobile and stationary ladle changer.
     - Realizes stable production of high quality castings.

Automatic Pouring Machine
FVNX series

Automatic Pouring Machine
P series

Molten Metal Transfer System

<table>
<thead>
<tr>
<th>Ladle capacity (kg)</th>
<th>Pouring time (sec/mold)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>750</td>
</tr>
<tr>
<td>1000</td>
<td>1500</td>
</tr>
<tr>
<td>2000</td>
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<td>4000</td>
<td>4500</td>
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<tr>
<td>5000</td>
<td>5000</td>
</tr>
</tbody>
</table>
**Automatic Pouring Machine FVNX series**

for small to medium size ladles

Highly accurate pouring contributes to stable production.

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### Specifications

<table>
<thead>
<tr>
<th></th>
<th>FVNX-E</th>
<th>FVNX-II</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ladle Capacity</strong></td>
<td>400-700 kg</td>
<td>700-1,000 kg</td>
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<tr>
<td><strong>Processable Molding Speed (MAX)</strong></td>
<td>25 sec/mold</td>
<td>30 sec/mold</td>
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</table>

### Dimensions (mm)

<table>
<thead>
<tr>
<th></th>
<th>FVNX-E</th>
<th>FVNX-II</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>3,200</td>
<td>3,500</td>
</tr>
<tr>
<td>B</td>
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<tr>
<td>C</td>
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<tr>
<td>D</td>
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<td>2,000</td>
</tr>
<tr>
<td>E</td>
<td>1,000</td>
<td></td>
</tr>
</tbody>
</table>

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### Features

- **Automated pouring work of skilled worker**
  Automated pouring work as same as skilled worker. Pouring machine repeats stable automatic craftsmanship of experts.

- **Maintaining high precision pouring**
  Constant shape of inner shape & nozzle of ladle are important factors to conduct accurate pouring. *Former for ladle inner shape forming* and *Wooden pattern for nozzle forming* to secure highly precise pouring over the long period are included in FVNX as a standard.

- **Equipment installation in a short period**
  Construction period for installation is short and immediate start-up of production line is available.

- **Saving rare earth elements**
  Since inoculation is conducted, saving rare earth elements is possible.

- **Cost reduction**
  High speed pouring reduces frequency of “Waiting for Pouring” and efficient production becomes possible based on the melting furnace operation. Less molten metal splash and defect pouring contribute to cost reduction.

### Control technology supporting the automatic pouring machine FVNX model

- **2-axis VN control**
  - Automated pouring work of skilled worker
  - 2-axis (nozzle tilting and body tilting) enable accurate nozzle top adjustment and high quality pouring.

- **Teaching system**
  - Repeating stable pouring work
  Only initial setting of pouring speed by tilt is done by the worker. Once the pouring program is the most optimum, teaching program is registered. The registered program repeated to the same pattern. Non-teaching programming is also available by simple setting of pouring parameter.

- **Anti-sloshing control**
  - High speed pouring work becomes possible
  During automatic pouring or molten metal transportation, the molten metal surface forms waves in the ladle, becoming difficult to increase speed of transportation and pouring as well as pouring accuracy. The anti-sloshing control is designed to prevent these waves on molten metal surface.

- **Synchronized pouring system**
  - Pouring is also possible while line is indexing
  Pouring machine is synchronized with molding line movement. Wait time while indexing of molding line becomes unnecessary.

- **Weighting system**
  - High precision pouring weight is possible
  Changes of molten metal weight is measured by the load cells and then used to stop pouring based on a pre-pattern preset pouring weight. Improved measuring accuracy is achieved through statistical processing of load cell measurements.

### Option

- **In-stream inoculation device**
  Inoculation is done simultaneously with pouring. Amount of inoculants is adjusted in proportion relatively to the amount of pouring metal.

- **Remote operation unit**
  Remote control and adjustment of pouring machine are possible.

- **Metal stream temperature measurement unit**
  Non-contact temperature sensor monitors temperature drop and ensures detailed quality control.
Automatic Pouring Machine P series

Fully automated pouring for ladle capacity up to five tons.

Features

Pouring condition monitoring system for high quality casting
The pouring stream of molten metal is monitored by means cameras, and a programmable control system regulating the pouring speed to match the in-flow capacity of the sand molds thereby ensuring more precise production of cast iron parts of every type and design.

Suitable systems for each customer
Standard stationary type and optional mobile type ladle changeovers are available and can be expanded with additional functions as required. These have proven their value when used at molding plants of various designs.

Precise pouring to achieve high quality castings
In all models pouring ladles with a segment construction are used, i.e. the flow rate is proportional to the angle of tilt of the ladle – a prerequisite for precise and loss-free casting.

Specifications

<table>
<thead>
<tr>
<th>P10-S/W</th>
<th>P20-S/W</th>
<th>P30-S/W</th>
<th>P50-S</th>
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</thead>
<tbody>
<tr>
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<td>2,600</td>
</tr>
<tr>
<td>B</td>
<td>5,700</td>
<td>6,200</td>
<td>6,500</td>
</tr>
<tr>
<td>C</td>
<td>4,600</td>
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Molten Metal Transfer System

Transfers molten metal safely from melting furnace to pouring area.

**Features**

- **Automation of hazardous ladle operation**
  System automation dispenses workers from direct ladle operation and provides safer operation.

- **Safe transfer work**
  Ladle transfer without crane and forklift prevents metal spillage and reduces workers' risks.

- **High productivity**
  Accurate and high-speed transfer achieves efficient operation.

- **Saving energy**
  Reducing frequency of emptying ladle prevents molten metal from temperature drop and saves electric power consumption.

Our transferring system enables accurate pouring and safe operation.

- **Molten metal receiving carriage**
  This receives molten metal from furnace and transfers it to the molten metal transfer carriage. Then, the empty ladle is exchanged with the full ladle.

- **Molten metal transfer carriage**
  This receives molten metal from furnace and transfers it to the pouring unit. There, the empty ladle is exchanged with the full ladle.

- **Alloy and inoculant charger**
  This calculates amount of alloys and inoculants from molten metal materials and amount, then feeds the alloys into empty ladles.

Accurate inoculant feeding by electromagnetic feeder and load cell.

Molten metal supplying device
Molten metal supplying method is an important point in whole transfer system. We propose optimum system from two alternate systems. The best automation is proposed to make the most of their own know-hows.

**Ladle change method**
Molten metal is transferred by exchanging ladles between transfer carrier and pouring machine. This method prevents temperature drop of molten metal and is good for reduction of casting defects.

**Empty replacement method**
Molten metal is transferred from the transfer carriage into the pouring ladle. This method assures alloy reaction and enables accurate molten metal composition control.

Production information management system
Supporting melting plan

- **Production information management**
  - Instruction for Melting
  - Melting device
  - Melting weight
  - Melting weight

- **Mold information management**
  - Melting weight
  - Melting weight
  - Melting weight

- **Pouring line**
  - Pouring data
  - Pouring Instruction for each mold

Data collection
Traceability achievement