Pascal
molding machine system

Improving the set-up time for vertical IMM
Clamping

Clamp the workpiece
Clamp the mold
Clamp the tool

Changing

Change the workpiece
Change the mold
Change the tool

Control

Control them
The introduction of Mag clamp in the vertical IMM eliminates bolting job (temporary tightening, retightening) in the limited space of the machine and realizes shortening the set up time considerably.

Mold (big size)  Mold (small size)

Displacement detection core

Upper clamp plate

Magnet core

Plate mount screw

Displacement detection core

Measures against residual magnetic flux PAT.

750kN (75ton) Vertical IMM (fixed table) Mag clamp for upper mold

750kN (75ton) Vertical IMM (rotary) Mag clamp for lower mold

450kN (45ton) Vertical IMM (rotary) Mag clamp for lower mold

Mold (big size)  Mold (small size)

No need to unify the mold size
The introduction of **Mag clamp** in the vertical IMM eliminates bolting job (temporary tightening, retightening) in the limited space of the machine and realizes shortening the set up time considerably.
Mag clamp structure and function

- **Clamp (Magnetized)**
  - Neodymium magnet
  - Super strong permanent magnet
  - Alnico magnet
  - Polarity is inverted by electromagnetic coil
  - Electromagnetic coil
  - Inverts the polarity of alnico magnet
  - Magnet core
  - Powerfully adheres mold

- **Unclamp (Demagnetized)**
  - Electromagnetic coil is energized for 0.5 sec.
  - Polarity of alnico magnet is inverted.
  - Neodymium magnet and alnico magnet become homopolar.
  - Magnet core becomes a strong magnet to clamp the mold.

1. Electromagnetic coil is energized for 0.5 sec.
2. Polarity of alnico magnet is inverted.
3. Neodymium magnet and alnico magnet become homopolar.
4. Magnet core becomes a strong magnet to clamp the mold.

1. Electromagnetic coil is energized for 0.5 sec.
2. Polarity of alnico magnet is inverted.
3. Magnetic flux of neodymium magnet and alnico magnet is not emitted from the surface of the magnet core so that the mold can be unclamped.
Displacement detection system (standard)  **PAT.**

Displacement or lifting of the mold can be detected by the electromagnetic coils built into the magnet core near the center of the clamp plates. When the mold moves, these electromagnetic coils detect an induction current signal.

**Normal clamping status**

- Mold is in close contact with magnet core
- Electromagnetic coil
- Stable magnetic flux

**When the mold moves**

1. Displacement or lifting
2. Flux changes due to displacement or lifting
3. Induction current is generated.
Mag clamp for lower mold mold loading procedure

① Loading the master mold

②-1 Lower Mag clamp ON
②-2 Table rotates

③-1 Table stops rotating
③-2 Lower Mag clamp OFF
④-1 Mold clamped by platens with Mag clamp OFF
④-2 Upper Air clamp ON

⑤ Lower Mag clamp ON

⑥ Lower mold to be positioned by the procedure of ② to ⑤

- The system can be securely operated with safety interlock.
- The above procedure is explained at upper mold basis. Contact Pascal for lower mold basis procedure.
Air clamp, bolted type TLA

Clamp or unclamp the standardized mold by one-touch operation

Screw or Unscrew the mold in the limited space is not required.

It is the clamp with safety and high reliability, which does not lose holding force because of the strong spring and special wedge mechanism even at time of zero air pressure.
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At time of unclamping, the lever is retracted back in the body and it does not interfere in loading/unloading the mold.

Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>TLA010</th>
<th>TLA016</th>
<th>TLA025</th>
<th>TLA040</th>
<th>TLA063</th>
<th>TLA100</th>
<th>TLA160</th>
<th>TLA250</th>
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<tbody>
<tr>
<td>Holding force</td>
<td>At air pressure 0.49 MPa</td>
<td>kN</td>
<td>9.8</td>
<td>15.6</td>
<td>24.5</td>
<td>39.2</td>
<td>61.7</td>
<td>98</td>
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<tr>
<td></td>
<td>At air pressure 0.39 MPa</td>
<td>kN</td>
<td>9.8</td>
<td>15.6</td>
<td>24.5</td>
<td>39.2</td>
<td>61.7</td>
<td>98</td>
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<tr>
<td></td>
<td>At no air pressure (0MPa)</td>
<td>kN</td>
<td>3.92</td>
<td>6.17</td>
<td>9.8</td>
<td>15.6</td>
<td>24.5</td>
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<td>24.5</td>
<td>39.2</td>
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<tr>
<td>Residual clamping force</td>
<td>At no air pressure (0MPa)</td>
<td>kN</td>
<td>2.94</td>
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<td>2.2</td>
<td>2.2</td>
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<td>2.6</td>
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<td>1</td>
<td>1</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
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<tr>
<td>Safety stroke</td>
<td>mm</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td>1.4</td>
<td>1.4</td>
<td>1.6</td>
<td>1.8</td>
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<td>Cylinder capacity</td>
<td>Clamp</td>
<td>cm³</td>
<td>43</td>
<td>70</td>
<td>115</td>
<td>219</td>
<td>350</td>
<td>607</td>
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<td></td>
<td>Unclamp</td>
<td>cm³</td>
<td>39</td>
<td>63</td>
<td>104</td>
<td>197</td>
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<td>560</td>
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<td>Operating air pressure</td>
<td>MPa</td>
<td>0.39 ~ 0.49</td>
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<td>Proof pressure</td>
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<td>Operating temperature</td>
<td>°C</td>
<td>0 ~ 70</td>
<td>(5 ~ 120 by heat proof type)</td>
<td>0 ~ 70</td>
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<tr>
<td>Weight</td>
<td>kg</td>
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<td>3.2</td>
<td>4.2</td>
<td>7.8</td>
<td>13</td>
<td>25</td>
<td>43</td>
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Residual clamping force: the clamping force when air pressure drops to zero after clamp is clamped the mold at air pressure 0.49MPa.
Air clamp,
T-slot-less slidable type TLA-M

Slidable clamp for the IMM without T-slot.
Mold

The clamp lever is not retracted back in the body at time of unclamping.

Forward and backward of the clamp itself is manual.

No need to unify the mold size

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Forward and backward of the clamp itself is manual.

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<tr>
<td>Full stroke</td>
<td>mm</td>
<td>2.7</td>
<td>2.7</td>
<td>2.8</td>
<td>3.2</td>
<td>3.2</td>
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<td>mm</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1.2</td>
<td>1.2</td>
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<tr>
<td>Safety stroke</td>
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<td>2.0</td>
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<td>Standard sliding stroke</td>
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<td>35</td>
<td>40</td>
<td>50</td>
<td>60</td>
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<td>Cylinder capacity</td>
<td>Clamp cm³</td>
<td>27</td>
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<td>79</td>
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<td>234</td>
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<tr>
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<td>Unclamp cm³</td>
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<td>52</td>
<td>85</td>
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<td>Operating air pressure</td>
<td>MPa</td>
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<td>7.4</td>
<td>14.3</td>
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</tr>
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Residual clamping force: the clamping force when air pressure drops to zero after clamp is clamped the mold at air pressure 0.49MPa.
Mold positioning for insert / hoop molding

**Octagonal locate ring**

Mold positioning can easily be done by mating an octagonal locate block (mold side) to an octagonal locate ring (machine side) with visual observation sliding the mold on the machine table. (upper mold reference)

Conventional positioning using a stopper block is no longer needed even the positioning by a parallel pin can also be improved. Also unifying the mold size is not required.
Octagonal locate-ring
Restrained 8-faces can provide easy centering.

Octagonal locate-block
High rigidity can be obtained by receiving mold weight with multiple faces.

Mag clamp & Octagonal locate-ring & Rollers
(When the ring mounted in magnet plate)

Octagonal locate ring & Rollers
(When using an automatic clamp or a manual clamp)
C&C coupler  PAT.

It is the simple mechanism of coupler which maintains connection by the mold clamp.

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Hydraulic (Max. 1MPa)</th>
<th>Water</th>
<th>Air</th>
<th>Electric connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection port</td>
<td>1/4”</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Machine side
Coupler unit

Pilot air

Mold side
Coupler unit

Mold
Mold loading procedure

1. Lower coupler
   Disconnecting state

2. Lower coupler
   Connecting state

3. Table rotates

4. Upper coupler
   Disconnecting state

5. Upper coupler
   Connecting state

- Fluid Connection port 1/4”
- Electric connector
- Water
- Air
- Hydraulic (Max. 1 MPa)
- C&C coupler

Mold loading procedure:

1. Lower coupler
   Disconnecting state

2. Lower coupler
   Connecting state

3. Table rotates

4. Upper coupler
   Disconnecting state

5. Upper coupler
   Connecting state
Pre-roller PAT.

Pulling the mold out of the machine at the position where a forklift, overhead crane and mold change table can readily access to take the mold away.

Removable & fold type

Vertically fold type

model PRA

model PRF

model PRH

One-touch operation

Mounting block

Hook

One-touch operation

Screw-lock pin
Selection of Pre-roller each for allowable load (Mold weight)

In case the mold weight is 0.5 tonf, select PRA2-0630B or PRF2-0630B.

<table>
<thead>
<tr>
<th>Allowable load * (Mold weight)</th>
<th>PRA2</th>
<th>PRA3</th>
<th>PRA5</th>
<th>PRF2</th>
<th>PRF3</th>
<th>PRF5</th>
<th>PRH3</th>
<th>PRH5</th>
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</thead>
<tbody>
<tr>
<td>5 tonf (50kN)</td>
<td></td>
<td></td>
<td>400</td>
<td></td>
<td></td>
<td>400</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 tonf (40kN)</td>
<td></td>
<td>450</td>
<td></td>
<td></td>
<td></td>
<td>450</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.2 tonf (32kN)</td>
<td></td>
<td>355</td>
<td>560</td>
<td></td>
<td>355</td>
<td>560</td>
<td></td>
<td>355</td>
</tr>
<tr>
<td>2.6 tonf (26kN)</td>
<td></td>
<td>400</td>
<td>710</td>
<td></td>
<td>400</td>
<td>710</td>
<td></td>
<td>400</td>
</tr>
<tr>
<td>2 tonf (20kN)</td>
<td></td>
<td>450</td>
<td>850</td>
<td></td>
<td>450</td>
<td>850</td>
<td></td>
<td>450</td>
</tr>
<tr>
<td>1.6 tonf (16kN)</td>
<td>250</td>
<td>630</td>
<td>1000</td>
<td>250</td>
<td>630</td>
<td>1000</td>
<td>630</td>
<td>1000</td>
</tr>
<tr>
<td>1.2 tonf (12kN)</td>
<td></td>
<td></td>
<td></td>
<td>710</td>
<td></td>
<td></td>
<td>710</td>
<td></td>
</tr>
<tr>
<td>1 tonf (10kN)</td>
<td>355</td>
<td>850</td>
<td></td>
<td>355</td>
<td>850</td>
<td></td>
<td>850</td>
<td></td>
</tr>
<tr>
<td>0.8 tonf (8kN)</td>
<td>450</td>
<td>950</td>
<td></td>
<td>450</td>
<td>950</td>
<td></td>
<td>950</td>
<td></td>
</tr>
<tr>
<td>0.6 tonf (6kN)</td>
<td>500</td>
<td>1000</td>
<td></td>
<td>500</td>
<td>1000</td>
<td></td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>0.5 tonf (5kN)</td>
<td>630</td>
<td></td>
<td></td>
<td>630</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

*M The allowable load of above table is for 2 pre-rollers.

Mold travel

Mold travel = Length from mounting surface of block to the stopper.
Select the Pre-roller where mold dimensions are within mold travel.

Allowable load

Static load measured at the position of 1/4 of the mold travel.
Select Pre-roller where allowable load (kN) multiplied by the quantity is greater than the mold weight.

SI conversion: Mold weight (kN) = Mold weight (kgf) × 9.8 ÷ 1000
Mold die changer

Proposing time reduction for overall mold change operation including transportation.

Manual, Non track, Table elevation type
Proposing time reduction for overall mold change operation including transportation.

1,500 kN IMM  Mold 800kg × 2 molds × 2
Mold changer: Manual, Non track

1,000 kN IMM  Mold 600kg × 2 molds  Mold changer: Manual, Non track

Manual, Rail type
Mold rotator

It can flip the heavy materials such as mold, coil and castings part quickly and securely.

Model SMF

Maximum mold weight 1, 3, 5, 10, 15, 20, 30 (ton)

Model SMR

Maximum mold weight 1, 3, 5, 10, 15, 20, 30, 50 (ton)

SMF can be embedded and flattened as shown in the photo. The table is rigid enough to be passed by a forklift or a truck.
Robot tool changer

Applicable payload

5  10  20  40  60  100  150  200 kg

In the welding line

For sheetmetal stamping
DOMESTIC LOCATIONS

JAPAN

Head office / R & D center
- Itami, Hyogo

Sales office
- Osaka, Hyogo
- Kumagaya, Saitama
- Atsugi, Kanagawa
- Nagoya, Aichi
- Yamagata
- Hiroshima

Plant
- Oita
- Yamagata

Head office (Itami, Hyogo)

Oita plant

Yamagata plant
Pascal products are supporting

For die and mold
Press machine: Body, Roof, Door etc...
Molding machine: Bumper, Instrument panel etc...

For sheetmetal stamping
Traveling clamp
Stamping die clamp

For plastic molding
Mag clamp
Mold die clamping system
Auto coupler
N2 gas springs
automotive production lines in the world.
Pascal

CERTIFICATE OF APPROVAL ISO9001

Specifications are subject to change without prior notice.