Pascal mold die change system
# Pascal mold change system

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mag clamp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydraulic clamp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air clamp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control unit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positioning device</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Die leveler</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Quick locating system</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Die setter</td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>Octagonal locate ring</td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>Mag clamp</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Operation panel &amp; Control box</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>DD mag clamp</td>
<td></td>
<td>64</td>
</tr>
<tr>
<td>Mag clamp for vertical IMM</td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>Mag clamp for two-color IMM</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>Mag clamp</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>Air clamp</td>
<td></td>
<td>22</td>
</tr>
<tr>
<td>Operation panel &amp; Control box</td>
<td></td>
<td>28</td>
</tr>
<tr>
<td>Operation panel &amp; Control box</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>Mag clamp</td>
<td></td>
<td>26</td>
</tr>
<tr>
<td>(For medium and large-sized IMM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>model HCM</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Pascal mold change system

Accessory
- Easy ejector rod .................................. page → 42
- Ball lock ejector rod .............................. page → 45

Auto coupler
- Auto coupler ...................................... page → 46

Multi coupler
- C&C coupler ...................................... page → 50
- Multi coupler ...................................... page → 52

Mold changer
............................................................ page → 56

Mold rotator
- Rolling type model SMR
- Flat type model SMF
- Die rotator with separation

Robot tool changer
............................................................ page → 66

N2 gas spring
............................................................ page → 67
Pascal mag clamp

Clamps the mold instantly with a super strong permanent magnet.

Pascal mag clamp is a mold clamp system for injection molding machines that clamps the mold with powerful magnetic force. The clamp plate is one set of two plates for movable platen and fixed platen sides.
Mold fall protection hook (length adjustable) model MGR

With a easily adjustable chain

Die stopper

It can positively prevent the die-fall accident due to the mold displacement or nozzle or ejector touch.
**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: Adheres the mold strongly

- **Unclamp (Demagnetized)**
  - Plate thickness: 35mm, 50mm, 52mm

1. Electromagnetic coil is energized for in 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.

**Displacement detection system (standard)**

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

**Normal clamping status**
- Mold is in close contact with magnet core
- Stable magnetic flux
- Displacement detection core
- Electromagnetic coil

**When the mold moves**
- 1. Displacement or lifting
- 2. Flux changes due to displacement or lifting
- 3. Induction current is generated.

Ex. Mold plate with openings or cutouts
Specifications

<table>
<thead>
<tr>
<th>Clamping force (per one magnet core)</th>
<th>Model</th>
<th>MG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thin-model 35mm</td>
<td>32×100mm</td>
<td>3.43kN</td>
</tr>
<tr>
<td></td>
<td>50×50mm</td>
<td>2.45kN</td>
</tr>
<tr>
<td></td>
<td>100×100mm</td>
<td>7.84kN</td>
</tr>
<tr>
<td>Standard 50,52mm</td>
<td>70×70mm</td>
<td>7.35kN</td>
</tr>
<tr>
<td></td>
<td>75×75mm</td>
<td>7.84kN</td>
</tr>
<tr>
<td></td>
<td>115×115mm</td>
<td>15.68kN</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>°C</td>
<td>0 ~ 80 (0 ~ 150 or 0 ~ 180 for heat proof type)</td>
</tr>
<tr>
<td>Magnetic flux height</td>
<td>mm</td>
<td>20 (mold plate material SS400)</td>
</tr>
<tr>
<td>Power voltage</td>
<td></td>
<td>AC200 / 220V±5% (50/60Hz)</td>
</tr>
<tr>
<td>Applicable machine</td>
<td></td>
<td>For general injection molding machine</td>
</tr>
<tr>
<td>Plate mounting method</td>
<td></td>
<td>by screws utilizing the tap holes on the machine platens</td>
</tr>
<tr>
<td>Displacement detection system (movable side &amp; fixed side)</td>
<td>Include</td>
<td></td>
</tr>
</tbody>
</table>

- Additional tap holes are required in the middle of machine platens.
- Operating temperature indicates the temperature on the surface of the clamp plate.

Accessories

- Locate ring (fixed side only)
- Mold fall protection block (movable side only)
- Operation panel model ESMD
- Control box model EMGD
- Control cables
- Interlock

Option

- Non standard voltage arrangement (50/60Hz)  
  - AC380V ±5%
  - AC440V ±5%
  - AC480V ±5%

- High temperature  
  - 0 ~ 150°C
  - 0 ~ 180°C

- Rust proof, polish arrangement for clamp plate
- Mold fall protection hook model MGR (movable side & fixed side)
- Additional magnet core
- Special core layout
- Horizontal loading arrangement
- DD mag clamp
- Proximity sensor to detect the mold cohered
Vertical loading

- No need to unify the mold sizes. (Note that clamping force varies according to the size of mold plate.)
- No need to secure the space to mount the retrofitted clamps on the platens and the mold size will not be restricted by the clamp space.

Conventional

- Automatic clamp
- There are interferences

Mag clamp

- The flexibility of mold design has been improved
Even if the mold height is not unified, the horizontal loading is feasible by simply attaching the spacer or a riser.
Operation panel

Compact and user-friendly operation panel exclusively designed for magnetic clamp. It is mountable on IMM or wall of IMM utilizing the tap holes at the rear side. (M4 bolts x 4 accessories)

[ For vertical loading ]

model **ESMD-A**

[ For horizontal loading ]

model **ESMD-B**

<table>
<thead>
<tr>
<th>Model</th>
<th>ESMD-A</th>
<th>ESMD-B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loading direction</td>
<td>Vertical loading</td>
<td>Horizontal loading</td>
</tr>
<tr>
<td>Weight</td>
<td>kg 0.6</td>
<td>0.6</td>
</tr>
</tbody>
</table>

```
PSWFSUJDBMMPBEJOHʧ ʦ`PSIPSJ[POUBMMPBEJOHʧ .BHDMBNQ 1010
```
**Control box**

model **EMGD**

---

<table>
<thead>
<tr>
<th>Model</th>
<th>EMGD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>kg</td>
</tr>
</tbody>
</table>

---

**Interlock**

Safety interlocks listed below are built in the electric control circuit for mold change operation.

- When changing a mold, Mag clamp operation is feasible only when the following conditions are prepared.
  - Mag clamp: ① Mold change mode
  - IMM: ② Set-up (or manual) mode, ③ Nozzle retracted, ④ Ejector retracted, ⑤ Platen closed-end, ⑥ Safety door closed

Regarding the condition of IMM side such as ②, ③ and ⑤, it can be confirmed with LED lamp on operation panel.

- During molding production
  - If the mold is displaced or detached from the clamp plate, the molding machine is immediately stopped by the displacement detection function.
Mag clamp

DD mag clamp

**Smart sensor checks the mold**

The clamp with DD sensor which can numerically check the mold. It can detect the clamp force decrease caused by heat, mold base material and a clearance between the mold and magnet core.

As for DD mag clamp, the status indicator is added to the control box.

**Normal clamping status**

The sensor indicates AA which means the mold has adequate size, material and temperature are appropriate to clamp and there is no gap between the magnetic surface and mold.
Size detection
Detect **too small** mold

Gap detection
Clamp force decrease due to **the gap**

Clearance detection
Clamp force decrease due to a **clearance**

Minimum mold size required to clamp

Dents and Foreign material biting

Cutout (including screw hole)

The sensor output abnormal signal when clamp force decreases more than 20% due to gap or clearance.

Material detection
Clamp force decrease due to the material that are not easily magnetized.

Clamp force decreases due to the material that are not easily magnetized

High temperature detection
Clamp force decreases due to the mold heat-up

Mold becomes hot

Simply type of material or mold temperature does not make the clamping force decrease lower than 80% however the value goes down due to the force decrease.
Mag clamp for vertical IMM

Upper clamp plate
Magnet core
Plate mount screw
Displacement detection core

Mountable for upper die only

Mold (large size)
Mold (small size)

No need to unify the mold sizes
The introduction of Mag clamp in the vertical IMM eliminates bolting job (temporary tightening, retightening) in a limited space of the machine and realizes shortening the set up time considerably.
Mag clamp for two-color IMM

- Shortening the set up time to 45 min in 250 ton class
- Mold displacement Detectable

6,000kN (600ton) Two-color IMM  Vertical loading  Mag clamp
Hand tightening method

It takes a long time for an operator to screw or unscrew the bolts many times at a narrow space in a machine.

Mold changing time : 60min (250 ton class)

- Easy to drop tools.
- Limited power exertion.
- No visual
- Need to move to operation / non-operation side to install / remove bolts.
- Install bolts many times.

Mag clamp

Clamp instantly by magnetic force with no work in the machine.

Mold changing time : 15min (250 ton class)

- Simply use the operation panel to clamp and unclamp the mold.
- With no work in the machine.
- Mold changing is done in only 15 minutes.

The moving picture of mold change operation for two-color IMM with mag clamp is being uploaded in Pascal web site.
Hydraulic clamp

4,500kN (450ton) IMM Vertical loading  Hydraulic clamp, slidable type TYA
16,000kN (1,600ton) IMM Vertical loading  Hydraulic clamp, automatic slidable type TYC-Z

3,500kN (350ton) IMM Vertical loading  Hydraulic clamp, T-slot-less slidable type TYA-M
**Hydraulic clamp**

**Slidable & Die leveler**

- **Guide block**
  - **Clamp TYA**
- **T-slot**
- **Die leveler**

---

**Automatic slidable & Die leveler**

- **Guide block**
- **T-slot**
- **Air cylinder**
- **Die leveler**

---

**Slidable type line-up**

T-slotted manual slide type of clamp

- **TYA** Standard type
- **TYB** Long stroke type
  - The max. 5mm (in case of using a lever spacer, max. 15mm) of dimensional variation can be absorbed.
- **TYJ** Long stroke type
  - The max. 10mm lever stroke can accommodate dimensional variation of clamping height.

---

**Automatic slidable type**

Automatic slidable clamp with air cylinder. It enables to shorten the mold change time.

- **TYC-Z** Slide direction: Horizontal
- **TYC-R** Slide direction: Vertical

---

**Pin** The spacer is pulled up at unclamping.

**Lever spacer** PAT.P.

**Pin engagement groove**

**Magnet** Install the spacer tightly on the clamp body.

---

**Warning:** There is a risk of mismounting the wrong size of mold in case of choosing long stroke type of clamp.
Clamp, T-slot- less slidable type & Die leveler

Guide block

Side block

Clamp TYA-M

Die leveler

T-slot-less slidable /automatic slidable type

Manual slide type of clamp with a sideblock (T-slotted block). It enables the clamp to slide it manually even if machine platens do not have T-slots.

Bolted type clamp & Positioning block

Guide block

Clamp TME

Positioning block

Bolted type

Bolted type of clamp.

TME

For small and medium-sized IMM

TKB

For medium and large-sized IMM

model TYA-M

model TME

model TKB
Air clamp

2,200kN (220ton) IMM Vertical loading  Air clamp, slidable type TLC
1,100kN (110ton) IMM Vertical loading  Air clamp, automatic slidable type TLC-Z

400kN (40ton) Vertical IMM  Air clamp, T-slot-less slidable type TLA-M
Slidable type
T-slotted manual slide type of clamp

model TLC

Automatic slidable type
Automatic slidable clamp with air cylinder. It enables to shorten the mold change time.

model TLC-Z
Slide direction: Horizontal

model TLC-R
Slide direction: Vertical
**T-slot-less slidable clamp & Die leveler**

Manual slide type of clamp with a sideblock (T-slotted block). It enables the clamp to slide it manually even if machine platens do not have T-slots.

**Bolted type clamp & Positioning block**

Bolted type of clamp.

---

**T-slot-less slidable / automatic slidable type**

**Bolted type**

**model TLA-M**

**model TLA**
Pascal hydraulic control unit

Control unit HCM

Returning oil to the tank at air bleeding
Adopting transparent pipe to return the oil from air bleeding valve to the tank, air bleeding can be done without draining the oil.

1 Block-type Valve unit
Independent circuit valves have been configured as a block valve, improving maintainability.

Digital pressure switch
User-friendly display with 7 segments. It can also show abnormal pressure sign and allows hydraulic control unit to be compact.

A rigid bracket for the regulator to withstand the machine vibration

Equipped with filter regulator as standard

Adoption of steel tank which is strong against impact and heat
New control unit HCM with excellent maintenance

Air-driven hydraulic control unit integrating electric control (solenoid operated), Pascal pump and Pascal non-leak valve in a panel which is applicable to a medium and large-sized IMM.
Operation panel

User friendly control panels with compact body and high visible indication. It is mountable on IMM or wall of IMM utilizing the tap holes at the rear side. (M4 bolts x 4 accessories)

[ For vertical loading ]

model **ESTE-A**

[ For horizontal loading ]

model **ESTE-B**

<table>
<thead>
<tr>
<th>Model</th>
<th>ESTE-A</th>
<th>ESTE-B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loading direction</td>
<td>Vertical loading</td>
<td>Horizontal loading</td>
</tr>
<tr>
<td>Weight</td>
<td>kg 0.6</td>
<td>0.6</td>
</tr>
</tbody>
</table>

![Diagram of operation panels]
**Control box**

model **ECTE**

<table>
<thead>
<tr>
<th>Model</th>
<th>ECTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>kg</td>
</tr>
</tbody>
</table>

**Interlock**

The following interlock is incorporated into the electric control circuit for hydraulic and air clamp, so the mold changing operation can be performed safely.

The operation of hydraulic and air clamp is feasible when all of conditions ①～⑥ shown below have become complete at time of mold changing.

Hydraulic/Air clamp : ①Mold change mode
IMM : ②Set-up (or manual) mode, ③Nozzle retracted, ④Ejector retracted, ⑤Platen closed-end, ⑥Safety door closed

Regarding the condition ②, ③ and ⑤, these can be confirmed with LED lamp on operation panel.
Operation panel ELC-B/Smart clamp

An economical control system that can operate the clamp with limited function (built in simplified safety interlocks)

It is applicable to the customers who

- want to increase the number of clamp system but to reduce the initial cost.
- want to automate only the clamping and unclamping the mold.

Conventional way of operation and control

Operation panel ELC-B

- (to be installed in the machine control panel)

<table>
<thead>
<tr>
<th>Operation panel</th>
<th>Control box</th>
</tr>
</thead>
<tbody>
<tr>
<td>model ESTE-A</td>
<td>model ECTE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hydraulic clamp</th>
<th>Air clamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYA</td>
<td>TLC</td>
</tr>
<tr>
<td>TYC-Z/R</td>
<td>TLC-Z/R</td>
</tr>
<tr>
<td>TYA-M</td>
<td>TLA-M</td>
</tr>
<tr>
<td>TYA-M</td>
<td>TLA</td>
</tr>
<tr>
<td>TME</td>
<td>TLA</td>
</tr>
<tr>
<td>TKB</td>
<td>TLA</td>
</tr>
</tbody>
</table>

- Not applicable to automatic slidable clamp.
For small, medium and large-sized IMM
Die leveler
Locate ring & Die leveler

helps automatic leveling of the mold after centering with a locate ring

<table>
<thead>
<tr>
<th>Model</th>
<th>MDH04</th>
<th>MDH08</th>
<th>MDH12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mold  weight kg</td>
<td>400</td>
<td>800</td>
<td>1200</td>
</tr>
</tbody>
</table>

3,500kN (350ton) IMM Vertical loading  Die leveler & Locate ring & Mag clamp
Down (Retracted)

- Mold
  - Sketch for just an example
- Locate ring
- Mag clamp
- Pusher
- Guide
- Air cylinder
- Die leveler MDH04,08,12

Up (Mold is leveled)

- Mold
- Mag clamp
- Pusher
- Locate ring
- Die leveler MDH04,08,12
- Guide
- Air cylinder

Mold weight Max. 1.2 ton

2,800kN (280ton) Two-color IMM Application example

When installing the mold
Quick locating system

A new proposal to enable the mold setting to be easy.
Slide block (vertical guide) and die setter (leveling guide) allow the mold centering quick and simple.
Mold setting procedure

Mold loading in

Push the mold against the slide block.

Y-axis is fixed.

Slide the platen back to make a clearance

Place the mold on the die setter

X-axis is fixed

Slide the platen forward to get the locate ring in the hole

Mold setting is over
Die setter

New proposal in place of conventional locate ring

Introducing a Die setter, the horizontal and vertical positioning can be determined surely and easily by placing a mold on a Die setter and it can reduce mold set-up time and improve the productivity.

<table>
<thead>
<tr>
<th>Model</th>
<th>MDL01</th>
<th>MDL03</th>
<th>MDL04</th>
<th>MDL06</th>
<th>MDL10</th>
<th>MDL15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mold</td>
<td>weight kg</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>3000</td>
<td>4000</td>
<td>6000</td>
<td>10000</td>
<td>15000</td>
<td></td>
</tr>
</tbody>
</table>
1,800kN (180ton) IMM Vertical loading  Die setter & Hydraulic clamp, slidable type TYA040

3,500kN (350ton) IMM Horizontal loading  Die setting roller & Mag clamp
Die setter

**Leveling block**

Positioning by putting leveling block between a die set block and die set base.
Die setting with locate ring

Mold center ($X, Y$) is not stable.

Hard to fit the ring into the nozzle hole
It is not easy to check from back side of the platen if the ring fits in the hole by slinging the mold by overhead crane, in addition, there is risk of damage of surface of platen or mold itself.

Die setting with die setter

Mold centering ($X, Y$) is quickly secured.

By placing a mold on a die setter, mold is easily positioned.
Octagonal locate ring

Mold positioning for insert / hoop molding

For improvement of mold set-up time.
The use of octagonal locate ring (octagonal taper cone) provides easy positioning, eliminating need for retraining of robot.

Mold side

Fixed platen side

Octagonal locate block
(Locate ring cylindrical)

Octagonal locate ring
(Base)
High rigidity can be obtained by receiving mold weight on multiple faces.

Taper allows easy mold setting.

Restrained 8-faces can provide easy centering.

Octagonal locate ring
MCL 70S
MCL 100S
MCL 120S

Octagonal locate block
MCL 70P
MCL 100P
MCL 120P

1,800kN (180ton) IMM Vertical loading
Octagonal locate ring & Mag clamp

500kN (50ton) Vertical IMM
Octagonal locate ring (positioning for upper mold) & Rollers
Pascal Easy ejector rod makes an ejector rod changing dramatically easier

It is a newly designed ejector rod with strong magnets on the joint surface of the fixed/removable rods, which plugs in/out by one-touch operation.

30,000 pieces have been sold

5,500kN (550ton) IMM
Changing ejector rod
3min13sec to 30sec
1,000kN IMM
1min08sec to 6sec

5,500kN IMM
5min30sec to 20sec
Easy ejector rod

Super strong permanent magnet
Neodymium magnet

Fixed rod
Removable rod

Conventional ejector rod

Movable platen

Easy ejector rod

Movable platen

Separated into fixed and removable rod

* Select a ball ejector rod for large sized IMM with the ejector stroke more than 300mm.
Ball lock ejector rod

The ejector rod can be installed and removed by one-touch operation with the ball lock structure.
Auto coupler

Automatic connection and disconnection of plural piping and tube

Auto coupling system with large number of delivery records in the plastic molding, press working and die casting machine line.
Module | Coupler, Electric connector, Lock guide, Mold detection proximity switch(Special)
--- | ---
Fluid | Hydraulic, Water, Air
Connection port | 3/8", 1/2", 3/4", 1", 1 1/4", 1 1/2", 2"
4,500kN (450ton) IMM Horizontal loading  Mag clamp & Auto coupler
4,500kN (450ton) IMM Horizontal loading  Auto coupler & Mag clamp

35,000kN (3,500ton) IMM Horizontal loading  Auto coupler & Air clamp
C&C coupler

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

<table>
<thead>
<tr>
<th>Module</th>
<th>Coupler, Electric connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Hydraulic, Water, Air</td>
</tr>
<tr>
<td>Pressure</td>
<td>Max. 1MPa</td>
</tr>
<tr>
<td>Connection port</td>
<td>1/4&quot;</td>
</tr>
</tbody>
</table>
Vertical loading

Release

Coupling

Air clamp

Centering block

Mold side C&C coupler unit

Mold stopper

No driven cylinder and compact size

Machine side C&C coupler unit

Horizontal loading

Release

Coupling

Air clamp

Mold side C&C coupler unit

No driven cylinder and compact size

Machine side C&C coupler unit

Positioning cylinder
Multiple couplers are connectable easily and securely by pushing the gripper slightly. It prevents misplace of couplers and can shorten the coupling time.
**Locking operation**

Insert the couplers (Female) along the guide

- Mold side (Plug) coupler
- Lock guide
- Machine side (Socket) coupler

Incorrect connecting prevention hole

Incorrect connecting prevention pin

Push the gripper slightly and the locking has been completed.

- Indicator
- Gripper

**Release operation**

Hold the gripper and pull the lock ring slightly and the couplers disconnect.

- Mold side (Plug) coupler
- Machine side (Socket) coupler
- Coupling
- Release

Incorrect connecting prevention hole

Incorrect connecting prevention pin

Gripper

Lock ring

The locking completion can be recognized at a glance with this indicator.

- Pull slightly
- Lock ring
Check valve model

A manual coupler which check valve is operable by a pilot pressure.

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Hydraulic, Water, Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure</td>
<td>Max. 0.8MPa</td>
</tr>
<tr>
<td>Connection port</td>
<td>Rc1/4</td>
</tr>
<tr>
<td>Number of port</td>
<td>4, 6, 8</td>
</tr>
</tbody>
</table>
**Open (Check valve-less) model**

An open type of coupler has no check valve, and the pressure loss is small. Malfunction caused by foreign substances besing caught into the coupler does not occur.

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Hydraulic, Water, Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure</td>
<td>Max. 0.8MPa</td>
</tr>
<tr>
<td>Connection port</td>
<td>Rc1/4  Rc3/8</td>
</tr>
<tr>
<td>Number of port</td>
<td>6, 8, 12</td>
</tr>
</tbody>
</table>

![Double row type](image1)

![Single row type](image2)

Mold side (plug) coupler | Machine (socket) side | Mold (plug) side | Machine (socket) side

Gripper

<table>
<thead>
<tr>
<th>Lock guide pin</th>
<th>Open type coupler (plug side)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorrect connecting prevention pin</td>
<td>Open type coupler (socket side)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lock guide socket</th>
<th>Incorrect connecting prevention hole</th>
</tr>
</thead>
</table>

Mold side

6,000kN(600ton) IMM
Mold changer

It is an automatic mold changer which can shorten the mold changing time considerably, comparing with the conventional forklift or overhead crane.
Layout example

**Manual loading**

**Non track**

1. Pusher 1 pitch traveling with roller table, 2molds

2. Drive rollers 1 pitch traveling (with standby position), 2molds

**Manual loading**

**Rail type**

1. Pusher Short distance traveling, 2molds

2. Drive rollers Fixed roller table, 1mold, Pushing in/out style

**Drive rollers**

1. 1 pitch traveling, 2molds Pushing in/out style

2. Long distance traveling, 2molds, Face to face layout
Manual loading, Non track, Non elevated table type  model QMF

<table>
<thead>
<tr>
<th>Model</th>
<th>QMF1</th>
<th>QMF2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamping force of IMM</td>
<td>400 ～ 1000 kN (40 ～ 100 tonf)</td>
<td>400 ～ 600 kN (40 ～ 60 tonf)</td>
</tr>
<tr>
<td>Max. mold weight</td>
<td>600 kg</td>
<td>300 kg</td>
</tr>
<tr>
<td>Number of load</td>
<td>1 mold</td>
<td>2 molds</td>
</tr>
</tbody>
</table>

Manual loading, Non track, Table elevation type  model QMA

<table>
<thead>
<tr>
<th>Model</th>
<th>QMA1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamping force of IMM</td>
<td>400 ～ 1000 kN (40 ～ 100 tonf)</td>
</tr>
<tr>
<td>Max. mold weight</td>
<td>300 kg</td>
</tr>
<tr>
<td>Number of load</td>
<td>1 mold</td>
</tr>
</tbody>
</table>
Battery-powered, Non track, Table elevation type  

**Model QMB**

<table>
<thead>
<tr>
<th>Model</th>
<th>QMB1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamping force of IMM</td>
<td>400 ~ 4500 kN (40 ~ 450 tonf)</td>
</tr>
<tr>
<td>Max. mold weight</td>
<td>kg 800 1500 2500</td>
</tr>
<tr>
<td>Number of load</td>
<td>1 mold</td>
</tr>
</tbody>
</table>

Manual loading, Rail type  

**Model QME**

<table>
<thead>
<tr>
<th>Model</th>
<th>QME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamping force of IMM</td>
<td>500 kN (50 tonf) 800 kN (80 tonf) 1000 kN (100 tonf) 1300 kN (130 tonf) 1500 kN (150 tonf) 2000 kN (200 tonf) 2500 kN (250 tonf)</td>
</tr>
<tr>
<td>Max. mold weight</td>
<td>kg 300 400 400 600 800 1000 2000</td>
</tr>
<tr>
<td>Number of load</td>
<td>2 molds</td>
</tr>
</tbody>
</table>
2,500kN (250ton) Two-color IMM  Horizontal loading  Mold changer: Powered, Drive rollers type

500kN (50ton) IMM  Horizontal loading  Mold changer: Manual loading, Non track, Table elevation type
2,500kN (250ton) Two-color IMM  Horizontal loading  Mold changer: Manual loading, Rail type

4,500kN (450ton) IMM  Horizontal loading  Mold changer: Powered, Drive rollers type
Roller gear driven type model SMR

Model SMR rotates the table with high rigidity roller gear and large sized sprocket, which enables excellent in durability and safety by introducing roller gear driven type (PAT.).

<table>
<thead>
<tr>
<th>Max. rotation weight (ton)</th>
<th>1, 3, 5, 10, 15, 20, 30, 50</th>
</tr>
</thead>
</table>

High rigidity roller gear

Large sized sprocket

Electric motor
Mold rotator

Flat type model SMF

Model SMF is embeddable in the floor.
The table is flattened also rigid enough to be passed over by a forklift or a truck.

<table>
<thead>
<tr>
<th>Max. rotation weight (ton)</th>
<th>Roller gear driven (electric motor) type</th>
<th>Hydraulic cylinder driven type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1, 3, 5</td>
<td>10, 15, 20, 30</td>
</tr>
</tbody>
</table>
Die rotator with separation

Mold maintenance work can be performed outside the machine without lowering machine operation rate.

Die weight 8 ton (4 ton per each side)
Mold separator with magnetic platen

Die weight 15 ton (7.5 ton per each side)
Robot tool changer

Payload: 5 10 20 40 60 100 150 200 kg

For plastic molding machine

For the welding line
N\textsubscript{2} gas spring

Excellent durability

For quick cam or ejector plate return.
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 sheetmetal stamping
- Traveling clamp
- Stamping die clamp

For plastic molding
- Mag clamp
- Mold die clamping system
- Auto coupler
- N2 gas springs

For die and mold
- Press machine: Body, Roof, Door etc...
- Molding machine: Bumper, Instrument panel etc...
automotive production lines in the world.

Engine

Transmission

Axle

For die cast machine
Die-clamping system
C-plate mag clamp

For metal cutting machine line
Work clamp
Pallet clamp
Index table
N2 gas balancer
Pascal

CERTIFICATE OF APPROVAL ISO9001