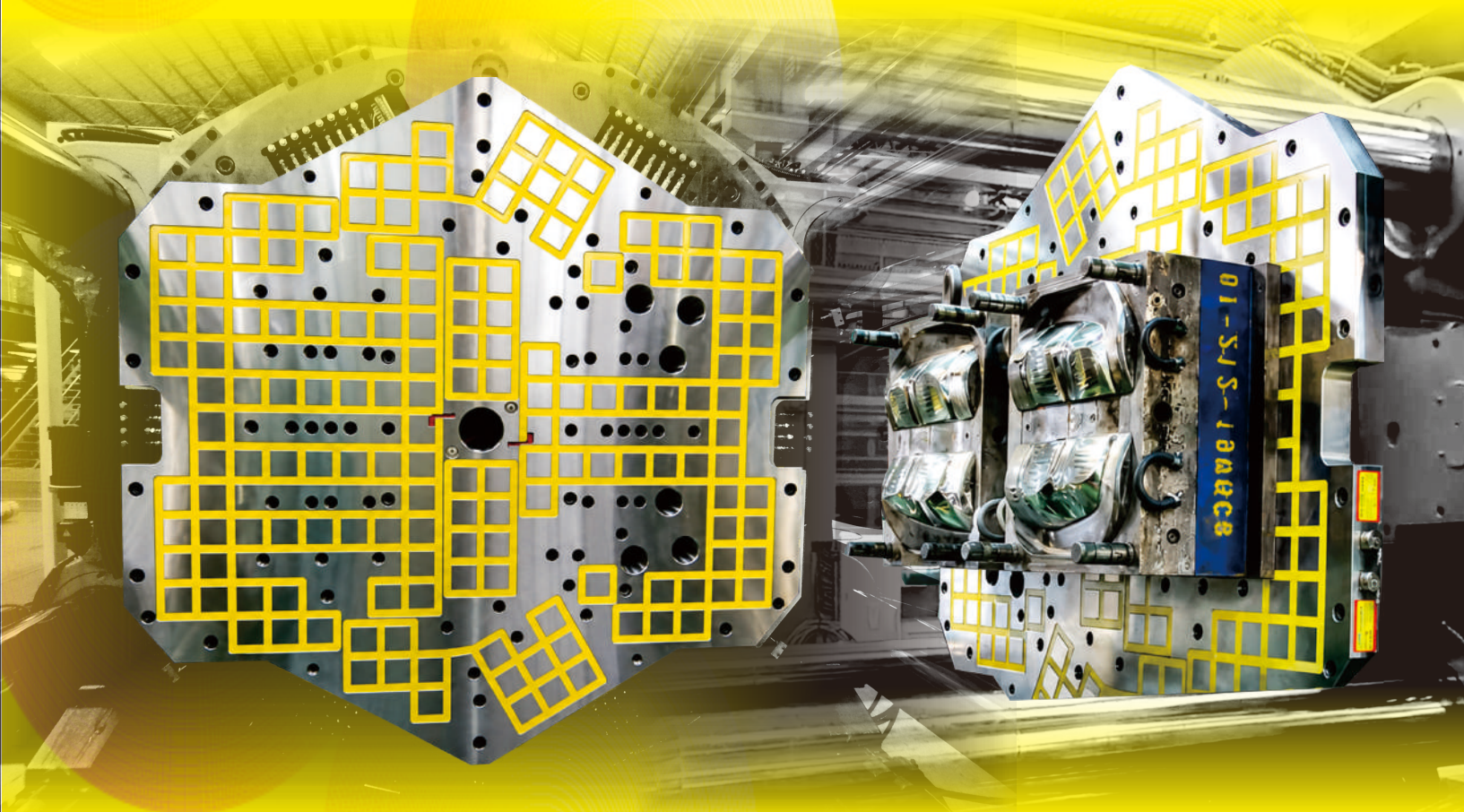


Quick Mold Change Systems for Plastic Injection Machine



Electro-Permanent Magnetic Chuck

Efficiency : Significantly reduce mold setting time up to 70%; shorten delivery time, increase efficiency and productivity.

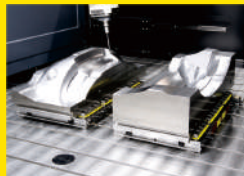
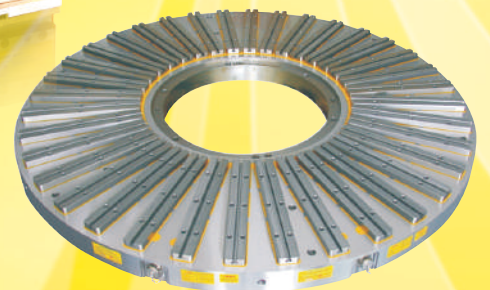
Convenience : Increase clamping area by 20%, perform clamping on all molds shapes, reduce burrs and the amount of mold maintenance.

Safety : Magnetic power offers 7 times safety factor, IC safety signal device, proximity sensor, max. temperature of 120°C.

Economy : Less than 1KW power consumption, oil-less working environment, applicable for high working specifications free of germs and dust.

EEPM-PIM Series

EARTH-CHAIN



EARTH-CHAIN ENTERPRISE CO., LTD.

 **Taiwan**
Corporation

Professional Manufacturer of Magnetic Tools

Earth-Chain Enterprise was established in 1988, specializing in manufacturing magnetic tools for industrial applications, which are marketed around the world under ECE brand. Owns various patented technologies and products under continuous developments for innovations and improvements as well as with over 40 patents. At present, the customized products have reached more than 50%, providing customers with the most complete product application technology.

Develop MagVise magnetic workholding system is suitable for CNC vertical and horizontal Machining Center, Double Column machining center, vertical and horizontal Lathe and Quick Mold change system for plastic injection machine to improve productive efficiency for customers.

In response to the needs of the CNC automation market, Earth-Chain develops the human-machine interface touch screen built-in intelligent IC signal feedback device, the programmable driven machine tool integrates the magnetic clamping system and links with the robot arm device to reduce the labor time and operation complexity required for future industrial applications.

Prospecting toward the future, Earth-Chain introduces Industry 4.0 to actively invest the market in the supply chain and continuously provide excellent products and services for industrial users, who will advance with us to promote businesses and social improvements for sustainable developments.

Advantages of Quick Mold Change Systems for Plastic Injection Machine

Advantage

1. Shorten mold change time significantly, increase machine production efficiency.
2. High quality machine, plant equipment meets customer request, increase order opportunity.
3. Production shift flexibility, quicker availability, win customers trust.
4. Comparison of EEPM-PIM system with other clamping systems:

Clamping System Items	Magnetic technology (EEPM-PIM Clamping)	Traditional Clamping (Mechanical systems)	Hydraulic Clamping (Hydraulic systems)
Clamping time	5 Min.	30 Min.	15 Min.
Consumable cost	X	X	Oil needs to be replaced per year
Clamping area	Increased 20%	Decreased	Decreased
Pattern thickness	Unlimited	Limited	Limited
Finished product yield	High	Low	Low
Price levels	Small machine: Medium Medium machine: High Large machine: Premium	Small/Medium/Large machine: Low	Small/Medium/Large machine: Medium

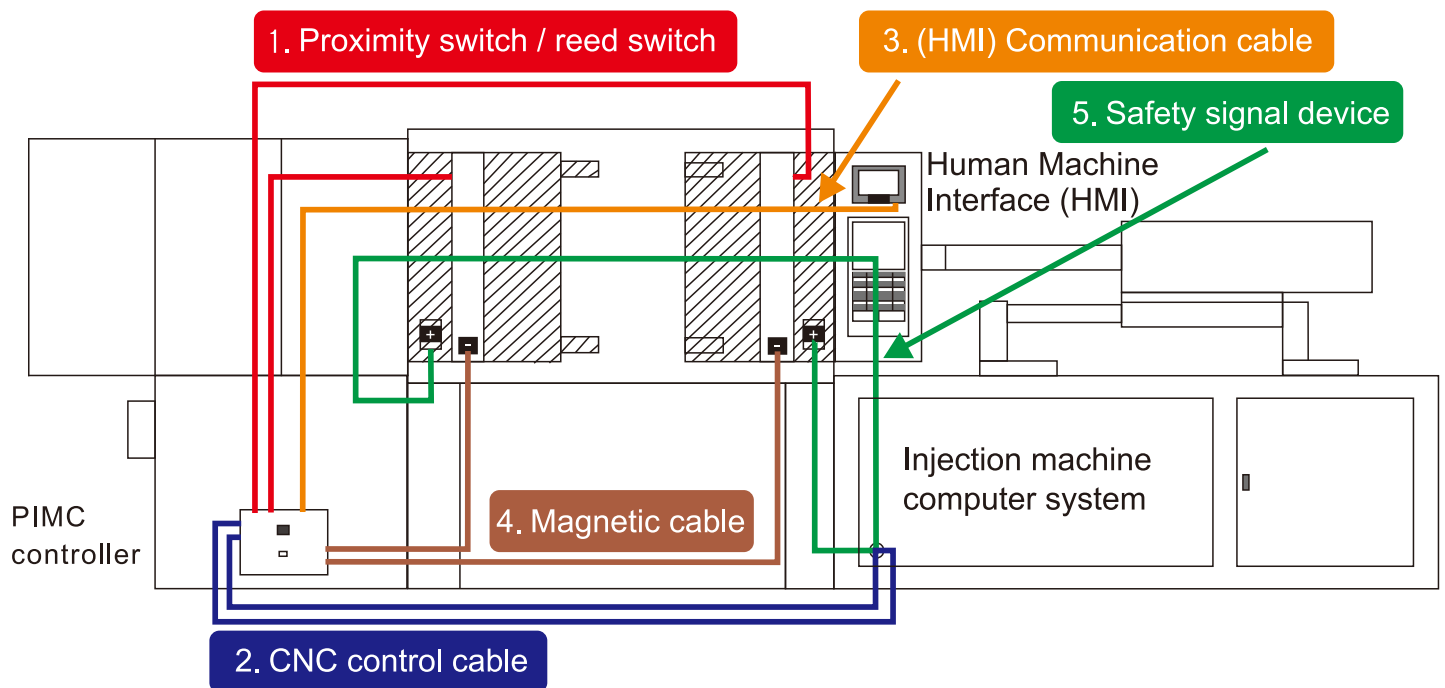
Benefits:

1. High quality product, reduce production burs, reduce material cost.
2. Reduce mold wear-out, extend mold duration.
3. Control products stock cost.
4. Save labor cost, saver mold change process.
5. No clamping plate interference, fully use machine injection stroke, increase machine shifts rotate.

Feature:

1. Safety
 - Electro-Permanent Magnetic design, no power supply to keep the magnetic chuck ON.
 - Safety in case of power failure. Magnetic power offers 7 times safety factor.
 - Rare-earth material bear up to max. 120°C.
2. Humanity
 - Proximity.
 - IC safety device.
3. Quickly
 - Significantly reduce mold setting time up to 70%.
 - shorten delivery time, increase efficiency and productivity.
4. Flexibility
 - Low cost and high quality.
 - Apply to any kinds of shapes mold.
5. Economic
 - Low labor cost.
 - Low mold repair cost.
 - Less than 1 KW power consuming.
 - Low maintenance cost.
6. Improved
 - Improve machine mold size capacity.
 - Improve machine shifts rotate.
 - Improve quick production demand.
 - Improve production quality
 - Improve strength and parallelism of machine movable/stationary plates and frame.

Quick Mold Change System of Injection Molding Machine Simulation Diagram

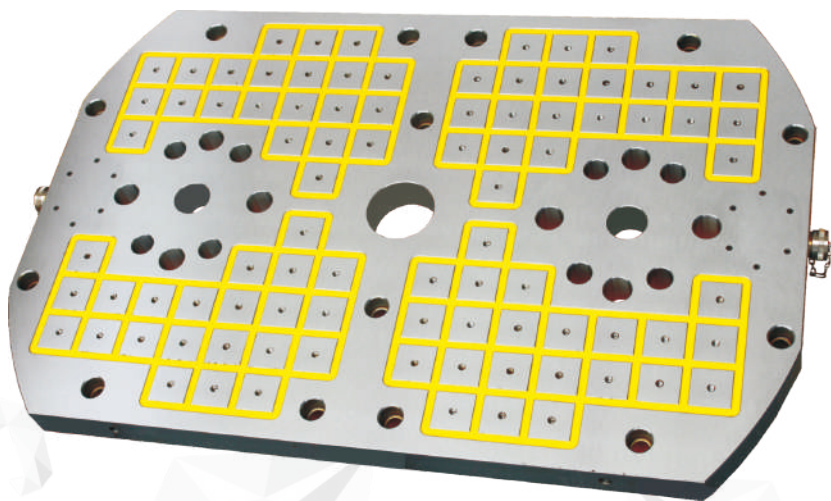


Function Description:

EEPM-PIM	Permanent magnet electronic control structure design, EEPM-PIM chucks are designed for different mold thickness.	See the detail on P3~P6
Human machine interface (HMI)	Display the abnormal status and instruction the troubleshooting. Should be entered the password when Magnetization/Demagnetization operation avoiding the danger caused by mistouch.	See the detail on P7~P8
Proximity Sensor	Proximity sensor : The proximity sensing distance is 1mm. When the chuck is magnetized and the mold is out of the EEPM-PIM chuck more than 1mm the injection machine will be shut down to avoid the false clamping prevent potential risk.	See the detail on P9
Safety signal activation device	Frame of double/triple-color injection machine will rotate during production process. EEPM-PIM system with safety device onto double/triple colors injection machine. After magnetization the magnetic cable need to take off from the EEPM-PIM Chuck and plug it into safety device then CNC injection machine could start to procedure process.	See the detail on P9
Features	1.Increasing 20% mold clamping area. It can be increased the mold ability by 20% compared with the traditional clamping. 2.The mold is clamped over the surface and not just on the perimeter, avoiding the [false clamping] occurrence, also ensuring that the mold is clamping completely when the mold opening, reducing the mold wear-out, extend mold duration and improves the yield of the finished products.	See the detail on P11~P12

Three magnetic pole specifications: EEPM-PIM、 EEPM-PIM-D、 EEPM-PIM-E

Custom-made



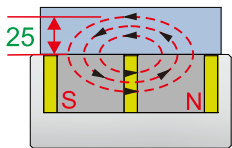
Features:

- 1. Electro-Permanent Magnetic system: 2~10 seconds control for power ON & OFF. No power supply required to keep the magnetic chuck on, Safety in case of power failure. Never get temperatures and deformation mold.
- 2. Magnetic force depends on the mold needs, with 3 sizes pole can choose.
- 3. Magnetic chuck is dual poles (N/S poles), no magnetize machine frame and equipment relative parts.
- 4. The clamping force is distributed consistently along the whole mold surface reduce product burs and increase mold duration.
- 5. Significantly reduce mold setting time up to 70%; shorten delivery time, increase efficiency and productivity.
- 6. Improve the strength and parallelism of machine movable/ stationary plate and machine frame.
- 7. Increase clamping area by 20%, perform clamping on all molds shapes, reduce burrs and the amount of mold maintenance.
- 8. Can be used with a working temperature up to 120℃, higher product safety.
- 9. No oil working environment, stable quality, applying for high working specification of germfree/dustfree.

Pole Specification (Height of magnetic field)

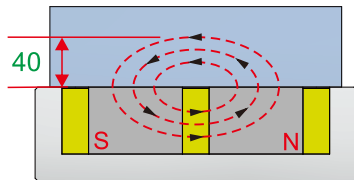
EEPM-PIM designed for different mold thickness. Specify the mold to be Large, Medium and Small sizes, make 3 poles size. Different pole sizes have different magnetic field height to ensure mold clamping safety.

For Small mold



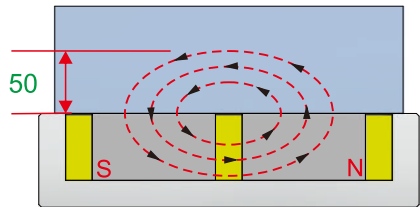
EEPM-PIMSeries

For Medium mold



EEPM-PIM-D Series

For Large mold

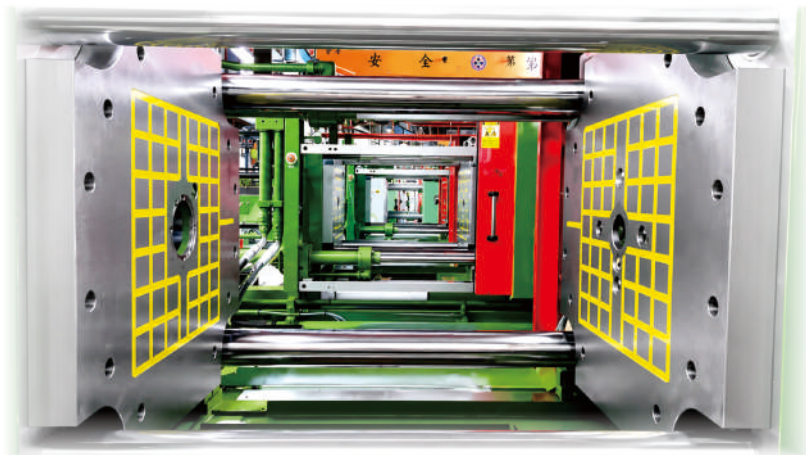


EEPM-PIM-E Series

Unit:mm

Model No.	Pole Size	Chuck height	Magnetic field height	Magnetic Force (kgf/ 4 poles)
EEPM-PIM Series	50x50	35~60	25	1250 ±5%
EEPM-PIM-D Series	70x70	70	40	2800 ±5%
EEPM-PIM-E Series	92x92	80	50	4800 ±5%

EEPM-PIM Series Pole Size : 50X50 mm



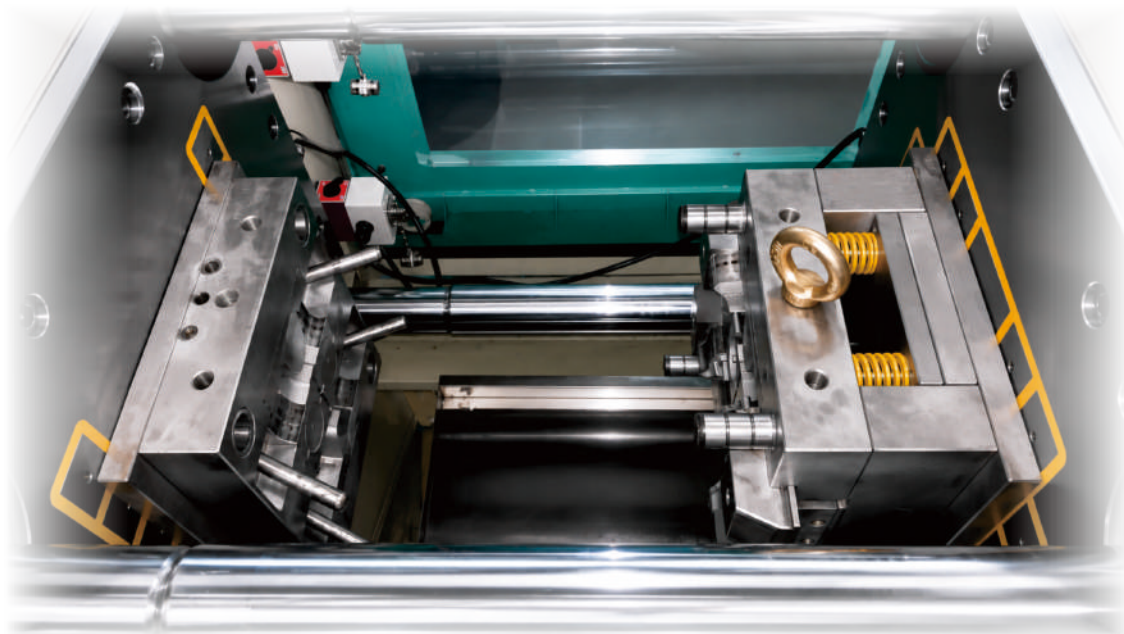
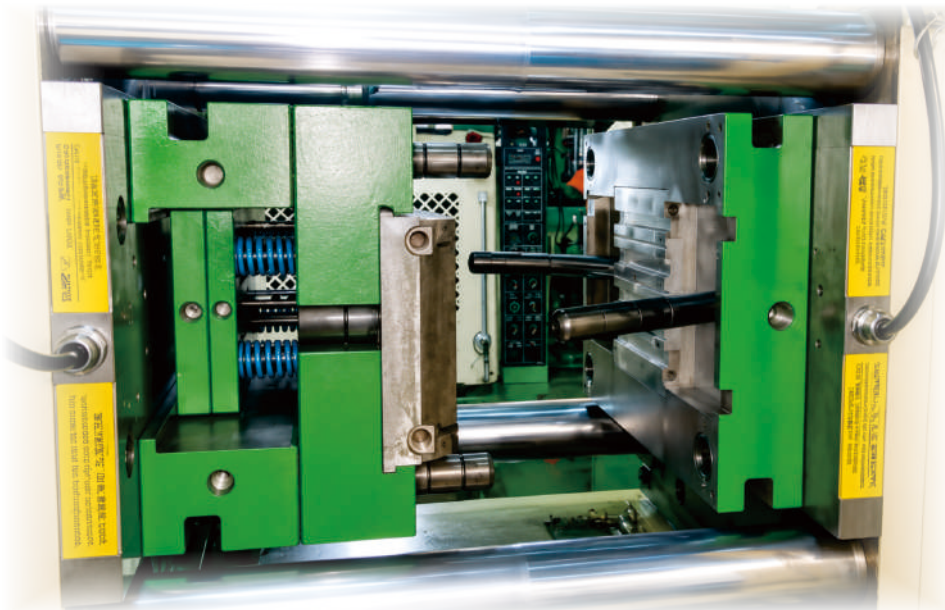
Pole Specification:

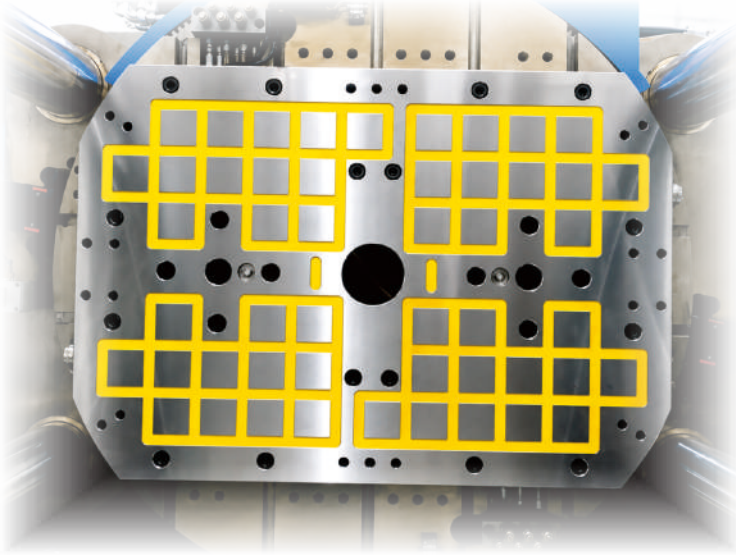
Pole Size : 50X50 mm

Magnetic field height : 25 mm

Magnetic Force : 1250 $\pm$ 5% Kgf/4 poles

Applicable mold weight : 100~800 Kg





Pole Specification:

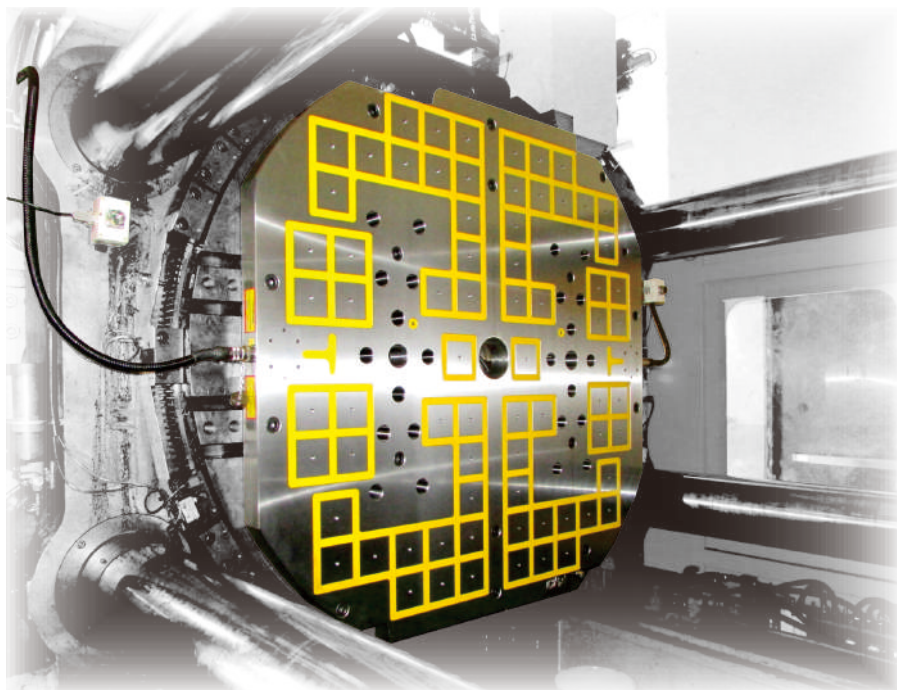
Pole Size: 70X70 mm

Magnetic field height : 40 mm

Magnetic Force: 2800 $\pm$ 5% Kgf/4 poles

Applicable mold weight : 800~1100 Kg





Pole Specification:

Pole Size:92X92 mm

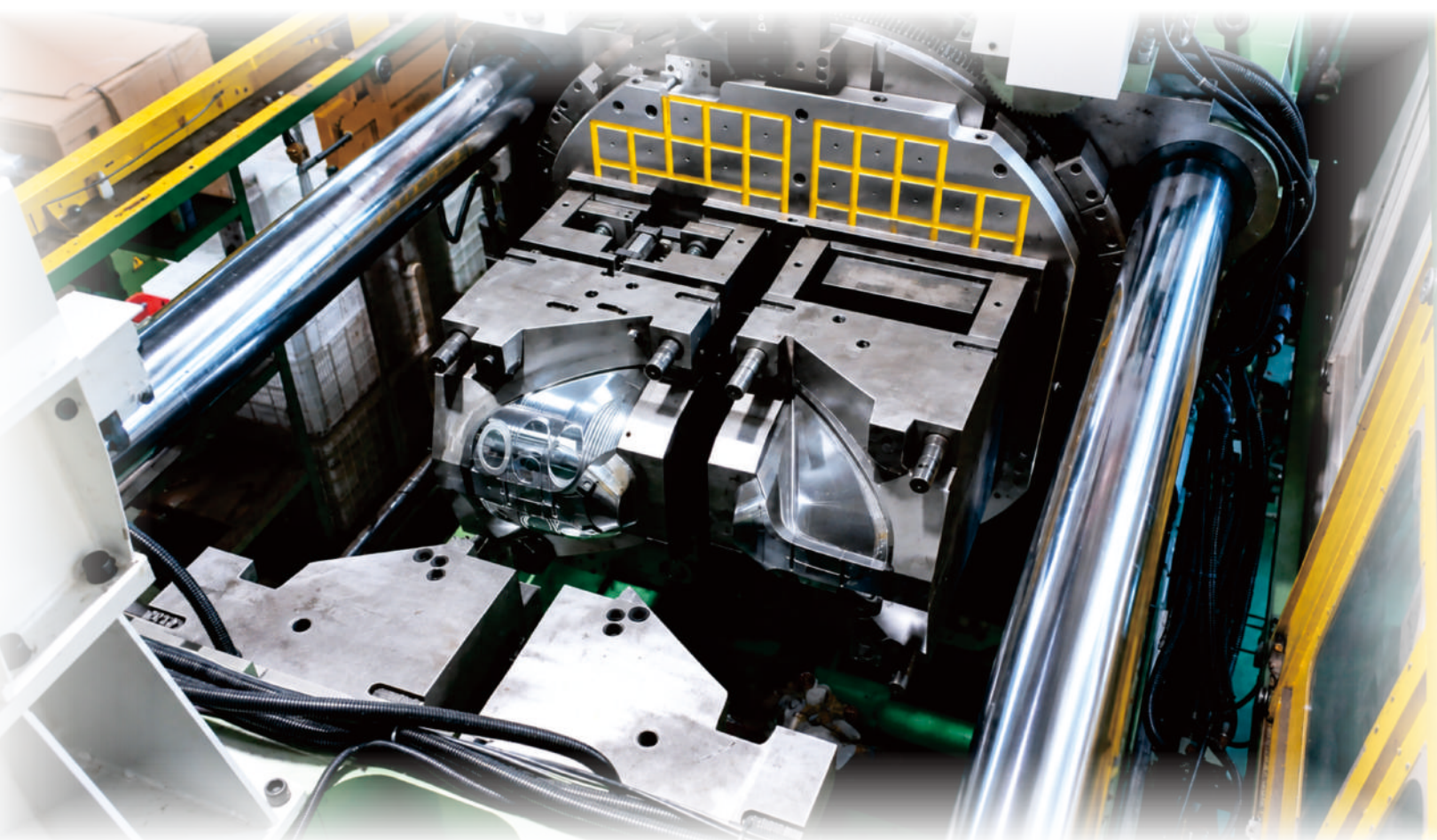
Magnetic field height :50 mm

Magnetic Force:

4800 $\pm$ 5% Kgf/4 poles

Applicable mold weight :

More than 1100kgs/Upward 1100kgs



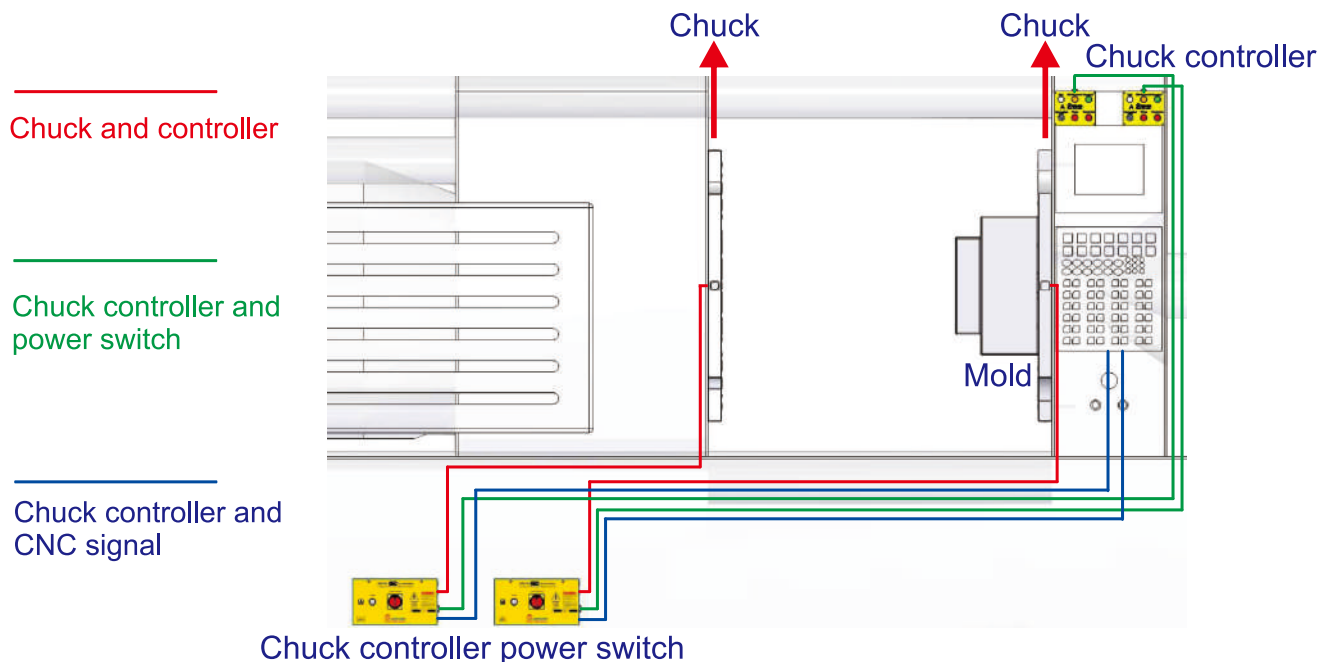


Features:

1. HMI touch screen can be set the language, brightness, buzzer switch and power management...etc.
2. Choose one control or two simultaneous operations depending on machining application.
3. Display the abnormal status and instruction the troubleshooting.
4. Need to enter the password when magnetize/demagnetize to prevent potential risk caused by mistouch.
5. Can be connected with CNC machine (computer control system), with fully automatic operation function.
6. Few seconds control for power ON & OFF. No electric power supply required to keep magnetic chuck ON. Never get high temperatures issue.

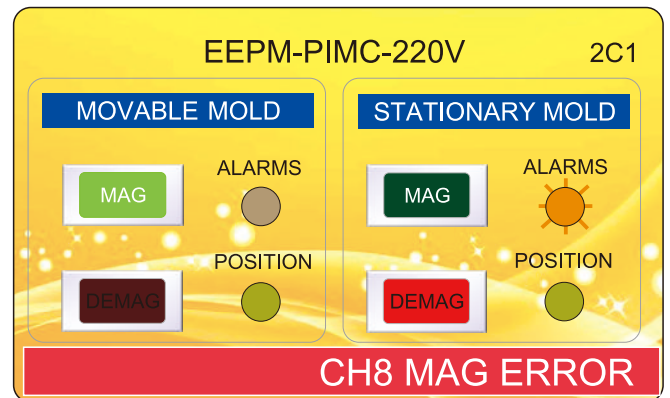
IC Controller (Safety device)

To ensure operator's safety, **EEPM-PIM** adds safety device to ensure all set-up process then injection machine starts to production process. Set-up process includes complete mold clamping, complete magnetization, plug chuck cable onto safety device ... etc.



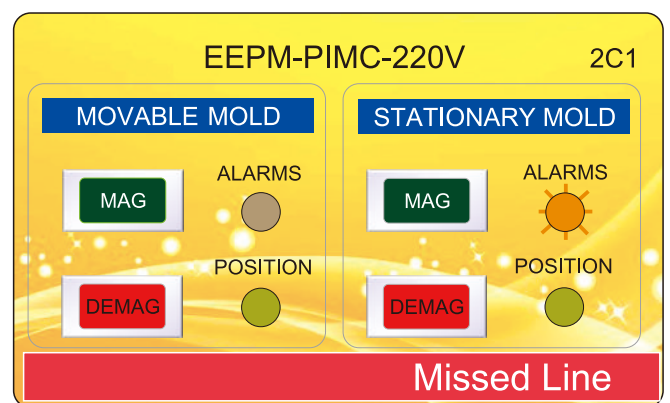
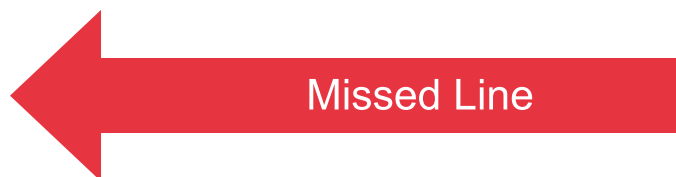
Error message: MAG. ERROR

When the internal damage of EEPM-PIM chuck or the coil is damaged, an error message will display.
(If the internal of EEPM-PIM chuck is damage, please contact your supplier for repair)



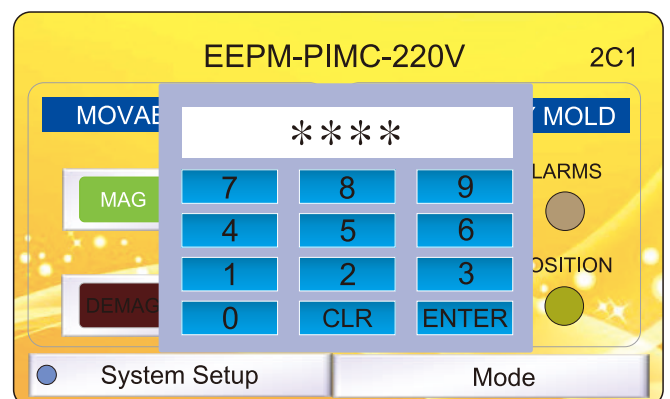
Error message: Missed Line

When the magnetic cable is not connected, power cable is broken or short-circuited, etc...
(Please check if the chuck cable is connected or if the cable is broken or shorted, please refer the connection diagram on P7)



Password (Can be modified to your own password)

1. Enter the password to perform the magnetization/demagnetization.
2. Enter the password for switchable Move/Stationary mode linkage or individual operation.



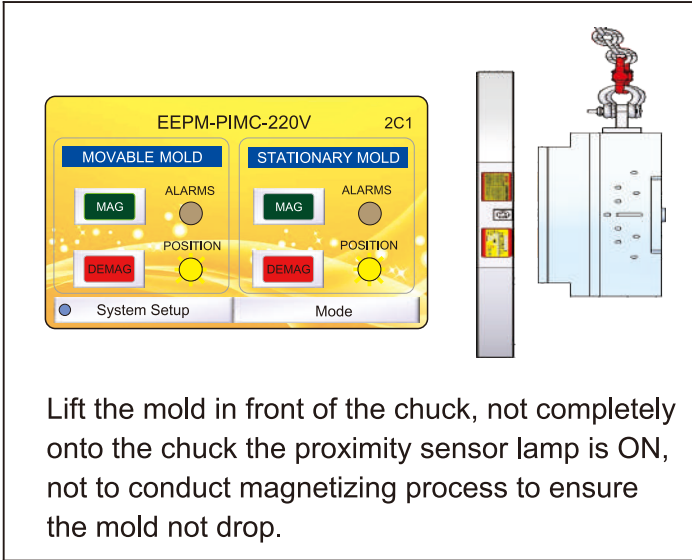
Signal Line :

1. It can be operated at the injection machine interface for magnetization, demagnetization and identification. (Requires the built-in system of the injection machine manufacturer)
2. The proximity signal will send the message to controller.

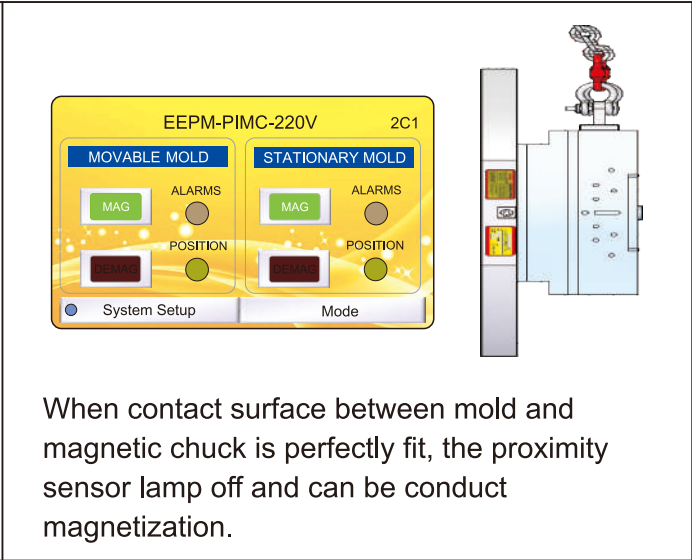
Proximity Sensor Device (Mold clamping detective system)

EEPM-PIM control system built-in IC security detection devices to ensure 100% magnetization when light ON. Install Proximity sensor by detecting lamp shows up the clamping status of the mold, to warn the operator if the mold is completely attached, to avoid holding false happens.

When proximity sensor lamp ON,
unable magnetizing process.

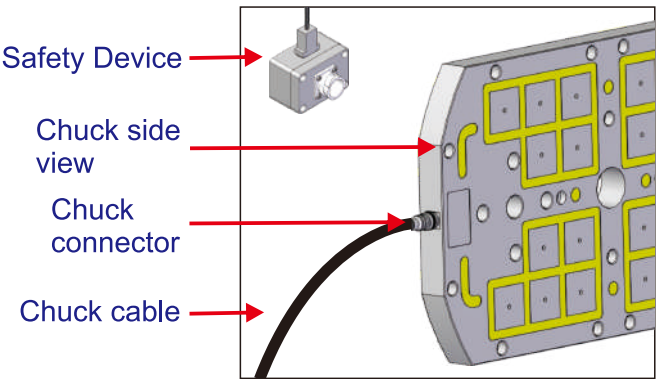


When proximity sensor lamp OFF,
conduct magnetizing process.

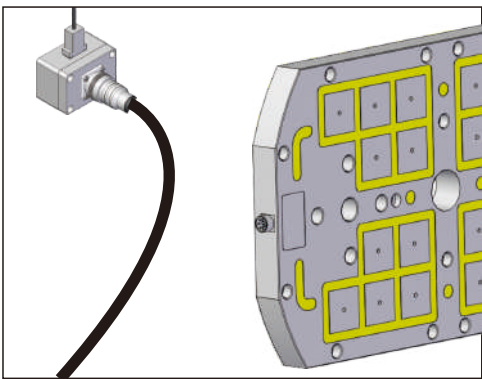


Safety device (for double color or triple color machine)

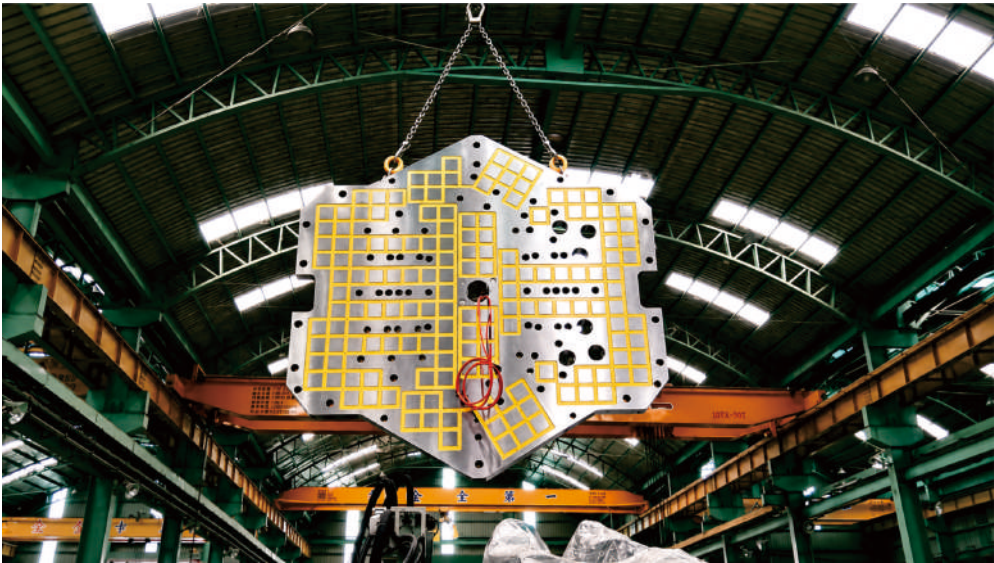
Frame of double/triple colors injection machine will rotate during production process. EEPM-PIM system adding a safety device onto double/triple colors injection machine. After magnetization the magnetic cable need to take of from the chuck and plug it into safety device then CNC injection machine could start to procedure process.



When the chuck cable is connected to chuck doing magnetizing/de-magnetizing, CNC injection machine is out of action.



After magnetizing/de-magnetizing process, plug the chuck cable into safety device, then CNC injection machine could start to procedure process.

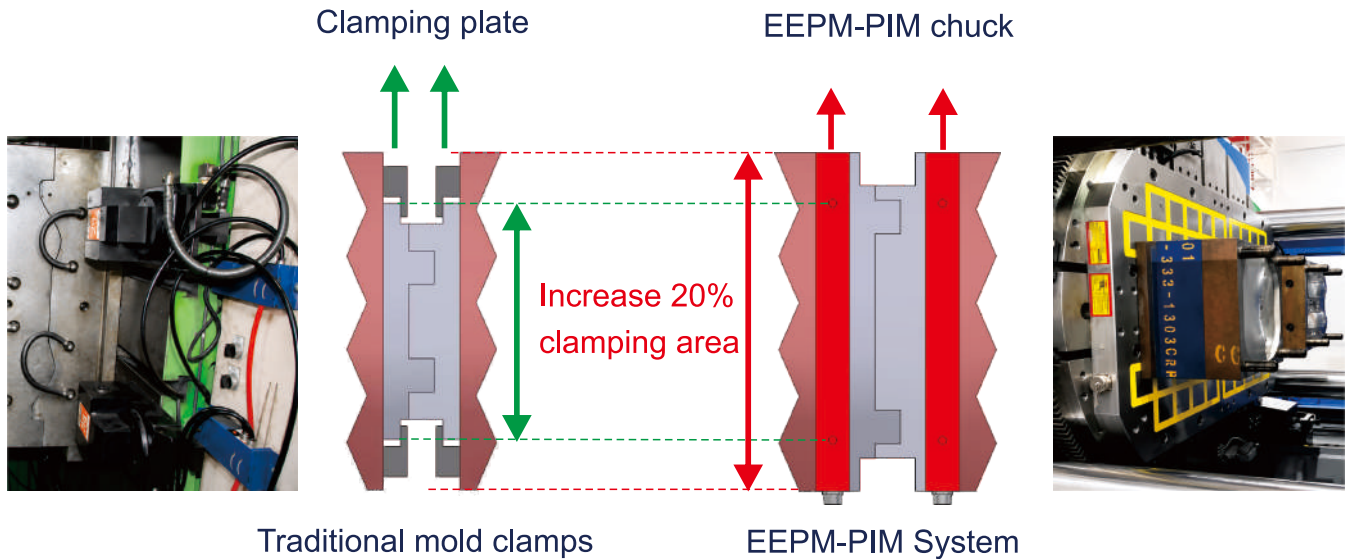


Automatic connection system

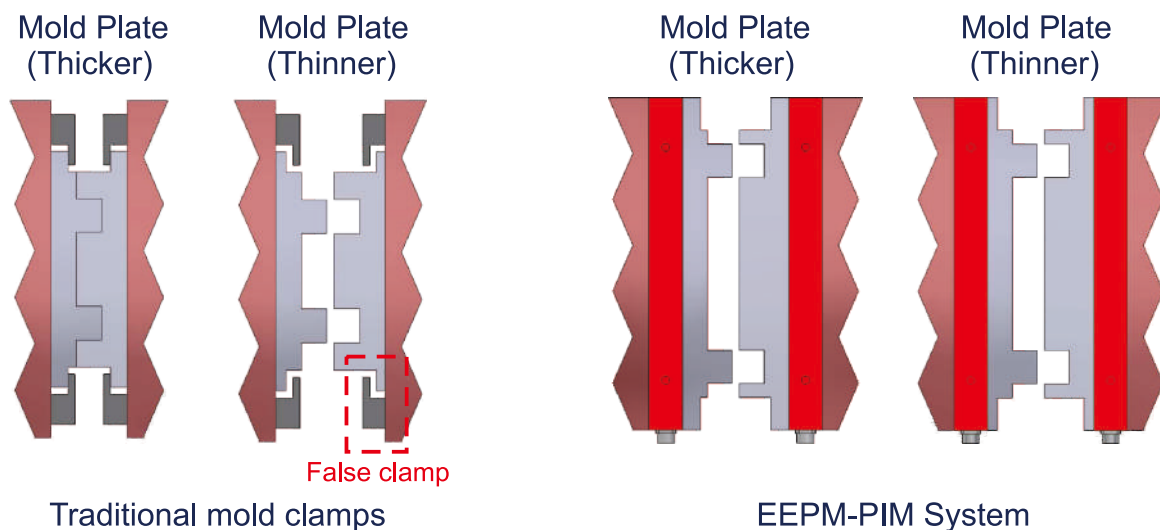
Competitive advantage

Total Flexibility/Full Application

Molds of any shape and size are easily clamped without any modification of the mold base plates.



EEPM-PIM uses full surface touch system, mold is completely touched to chuck surface to ensure operation safety.

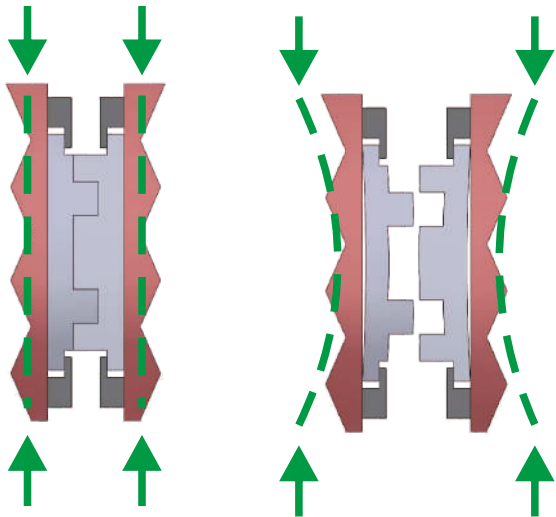


Competitive advantage

No deformation

EEPM-PIM System magnetically clamped does not receive any stress or deformation as its holding strength is equally distributed across the contact area. Reduce mold worn-out, product no burs increase product yield rate.

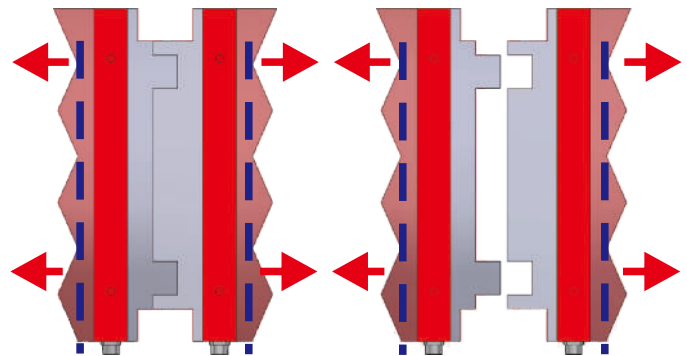
Traditional Mold Clamps



Single clamping points,
Stressed not consistently

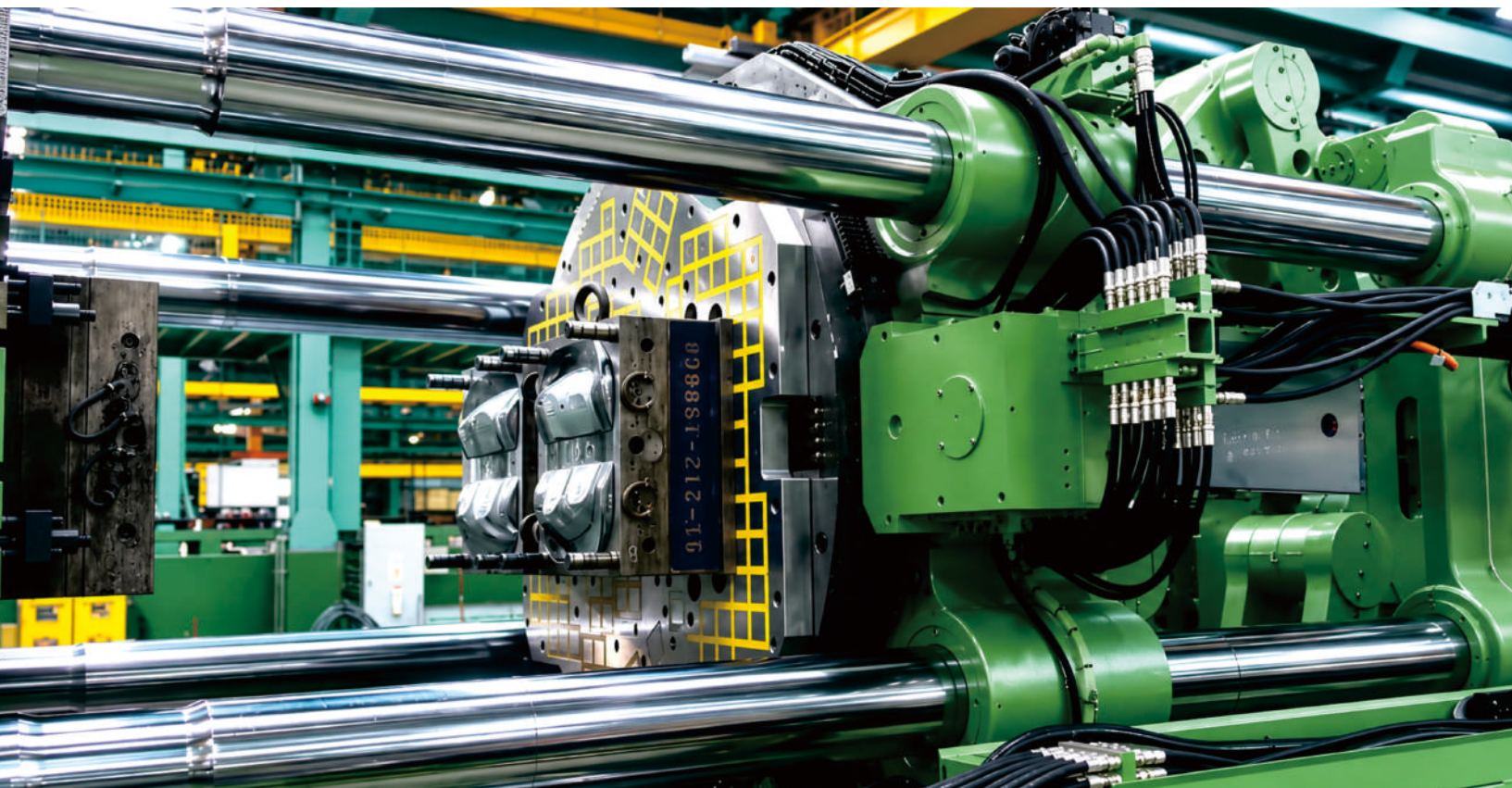
Deformation

EEPM-PIM Clamping



Clamping force is
distributed consistently.

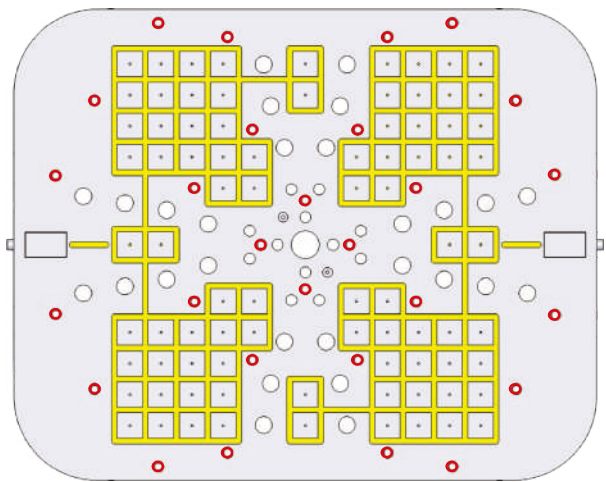
No deformation



Magnetic Chuck screws fixing holes

Design **EEPM-PIM** to integrate central locating ring, extension ejector, poles into consideration, deploy chuck fixing holes on chuck surface averagely, and ensure magnetic chuck 100% touch to the machine frame.

Magnetic Chuck
screw holes



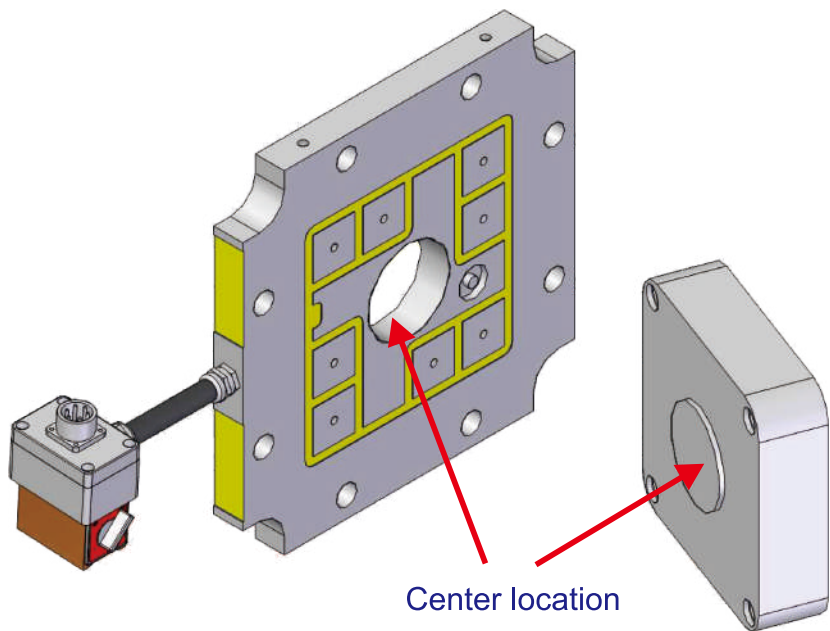
Screw torque specification

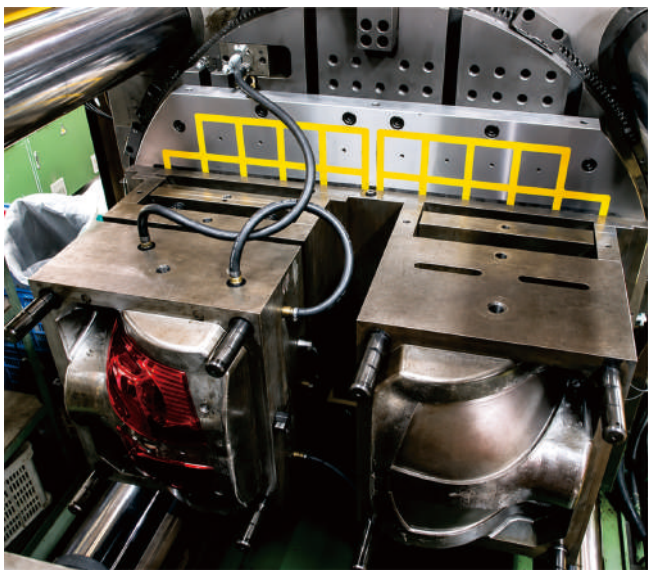
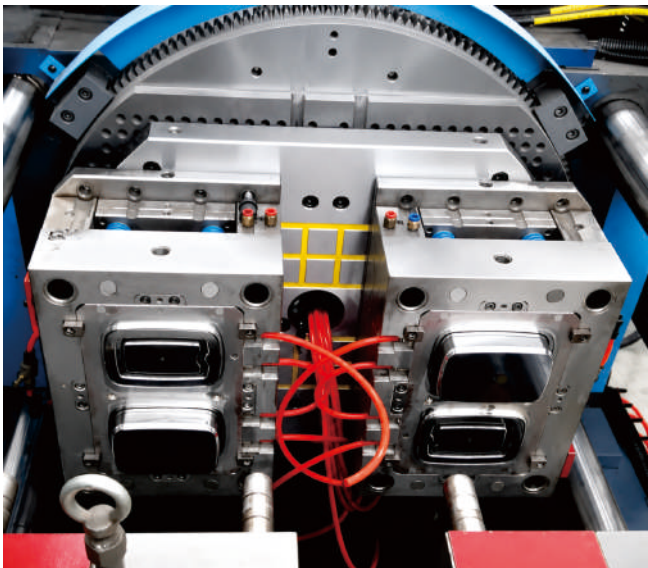
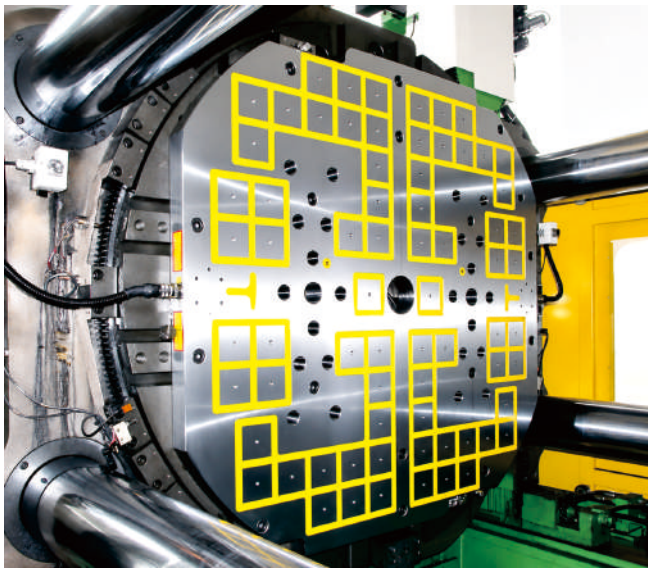
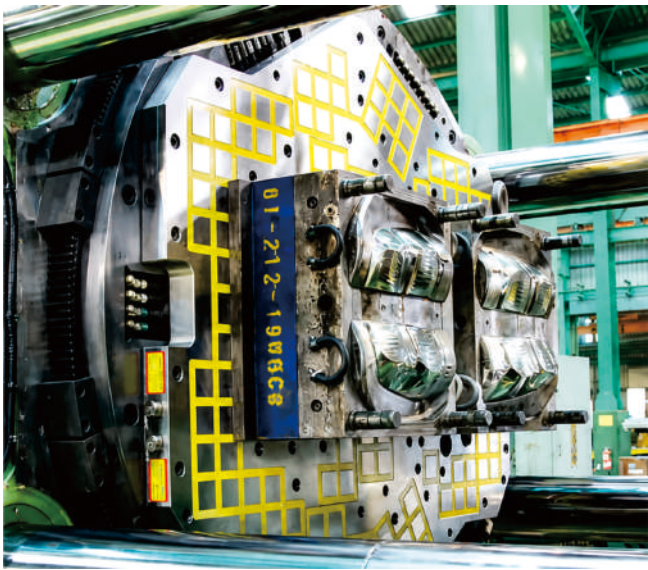
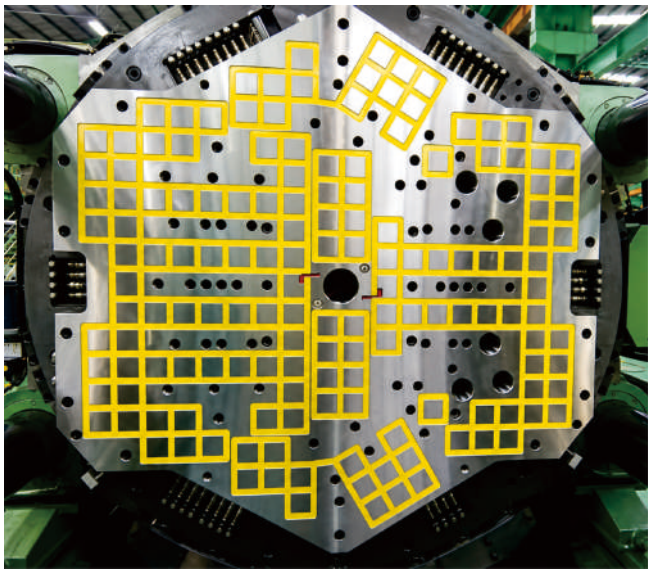
Unit \ Metric	M8	M10	M12	M16	M20	M24	M30	M36
N.m	40	70	90	170	360	670	1350	2000
lbf.ft	30	52	66	125	265	495	995	1475

Unit \ UNC	3/8"	5/8"	3/4"	1"	1" 4/4
N.m	35	190	310	760	1600
lbf.ft	26	140	230	560	1180

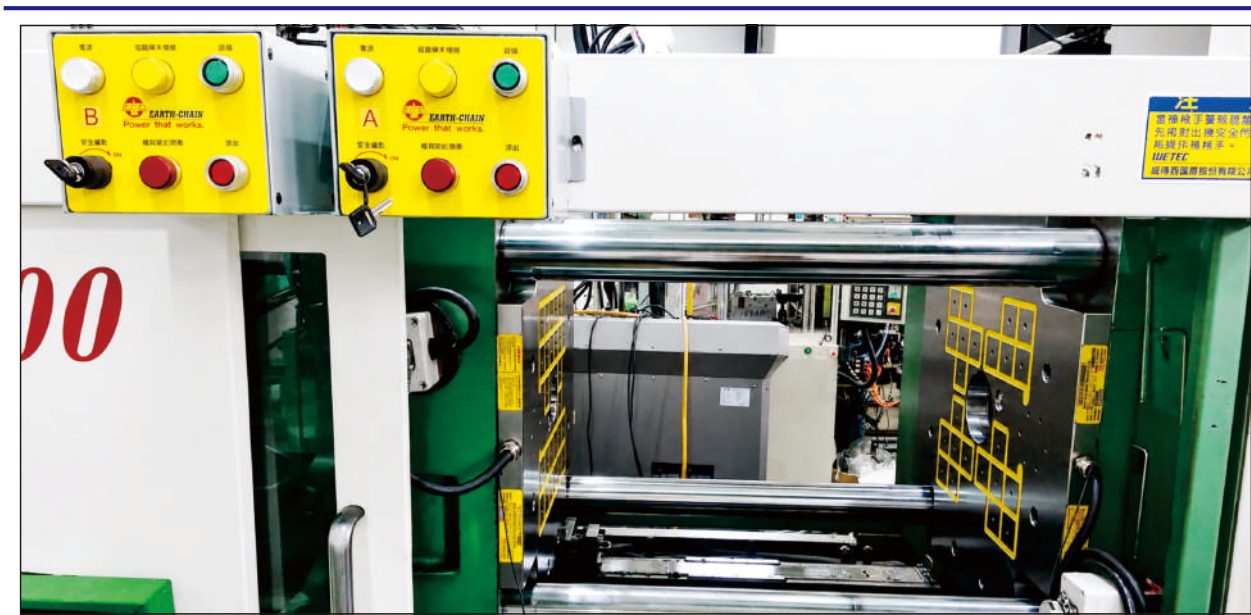
Center locating ring

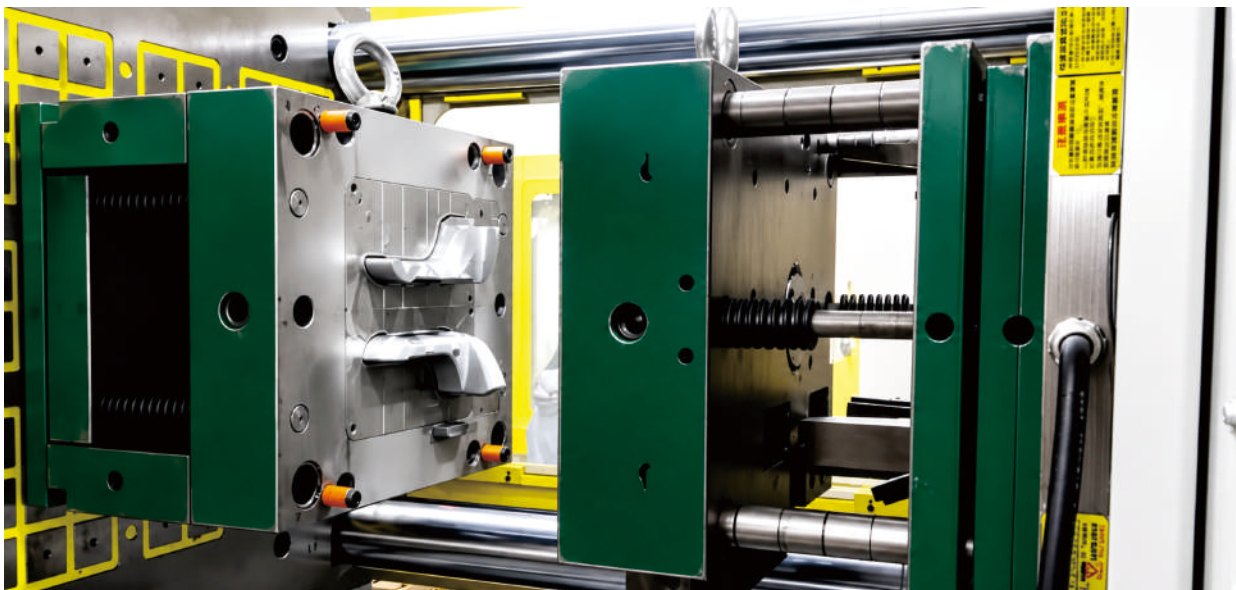
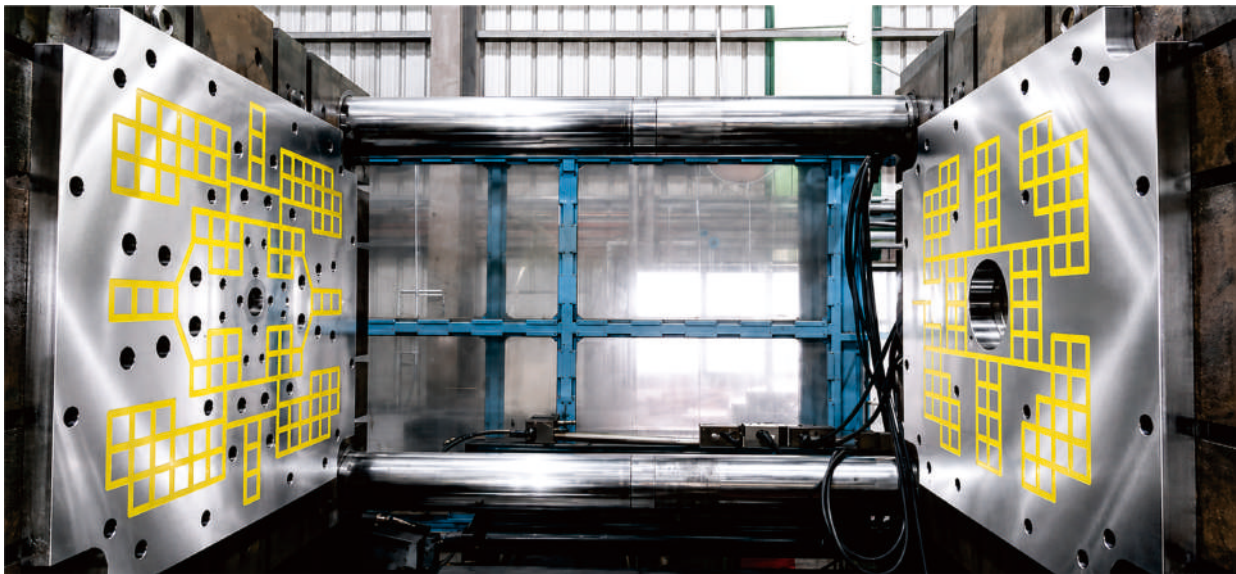
For a quick and precise mold set up. **EEPM-PIM** system can be saved 70% mold setting time. **EEPM-PIM** is modifiable according to mold center retainer size.





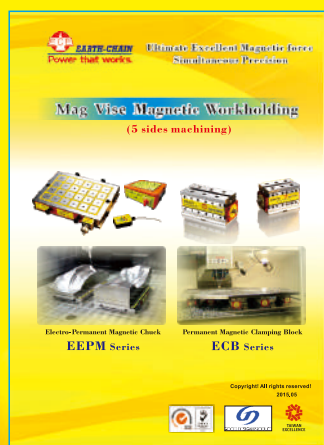
Working Example







OUR OTHER PRODUCTS SYSTEM



www.earth-chain.com

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