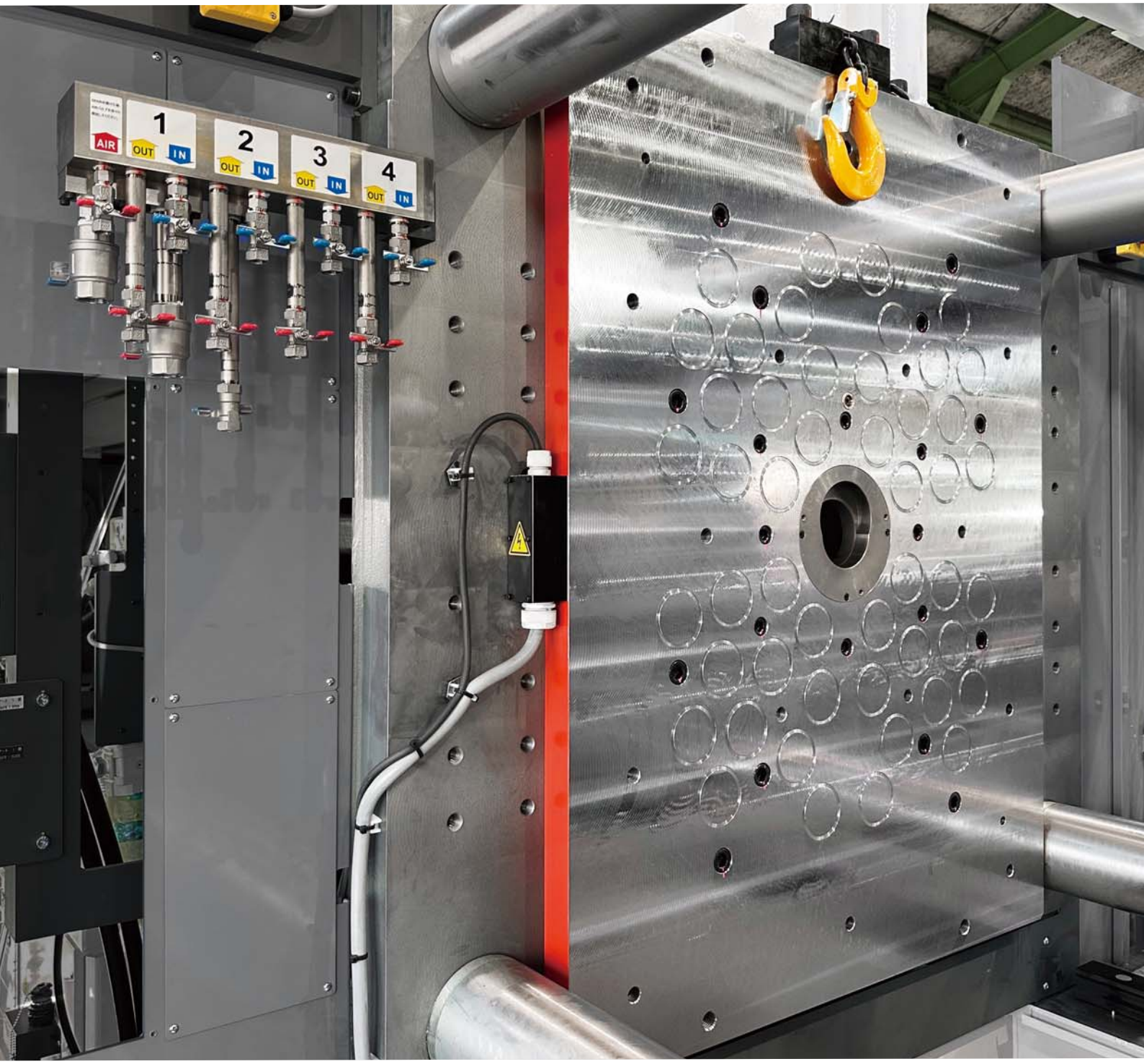
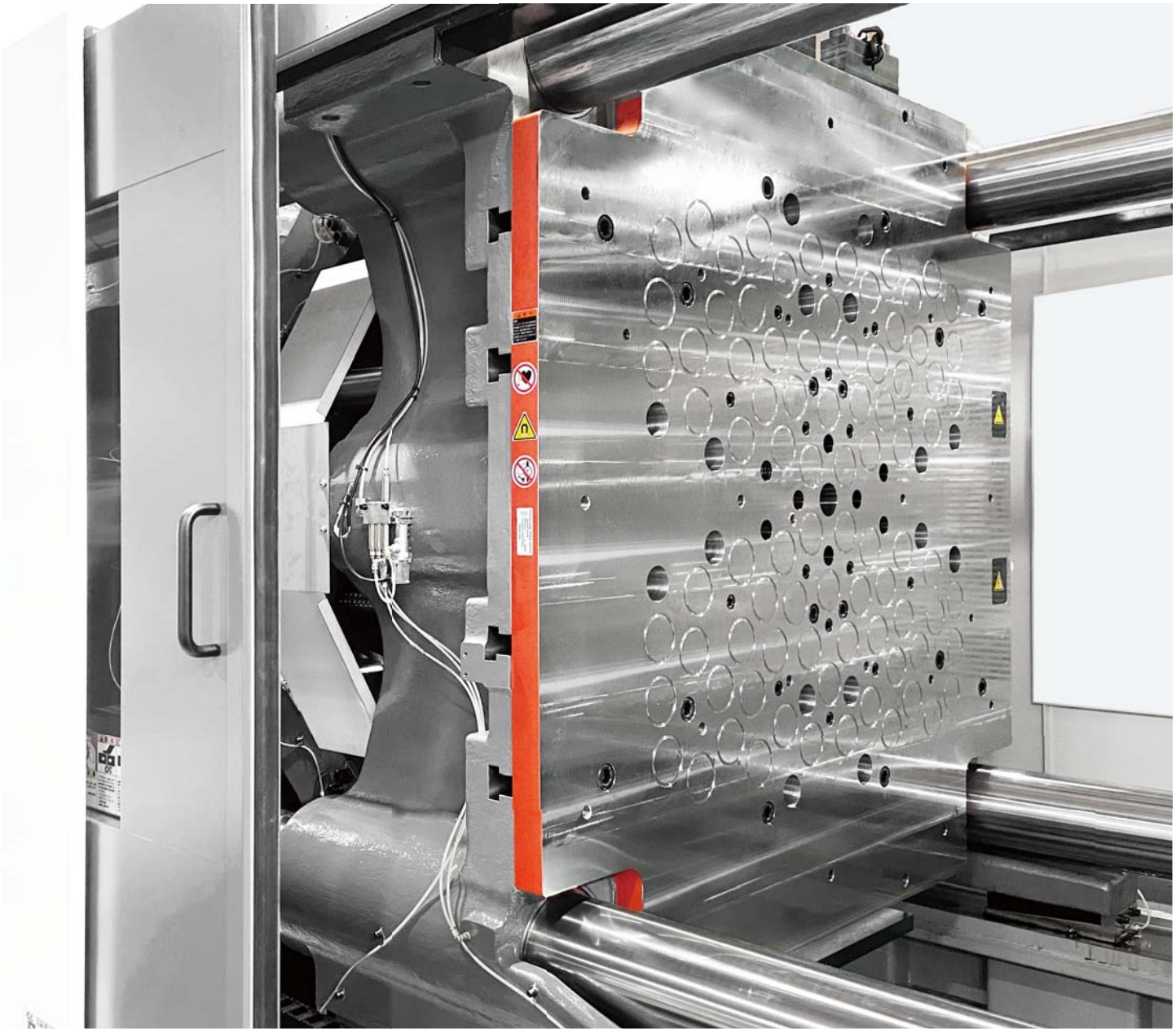
Pascal mag clamp

Reliability backed by a delivery record of 7000 units



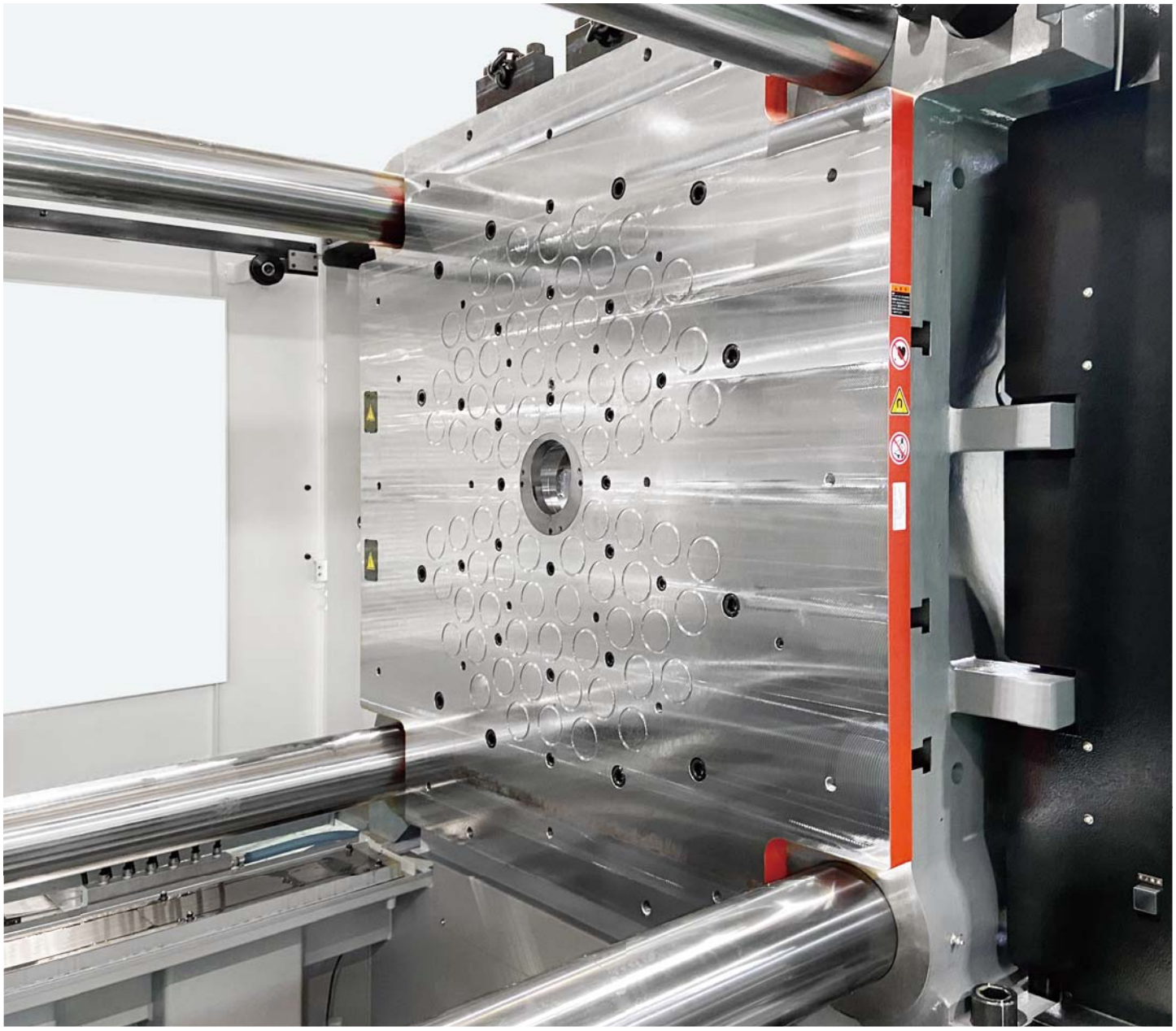
5,500kN Injection Molding Machine Circle Core magnetic clamp (Slim model) & Valve stand

Pascal

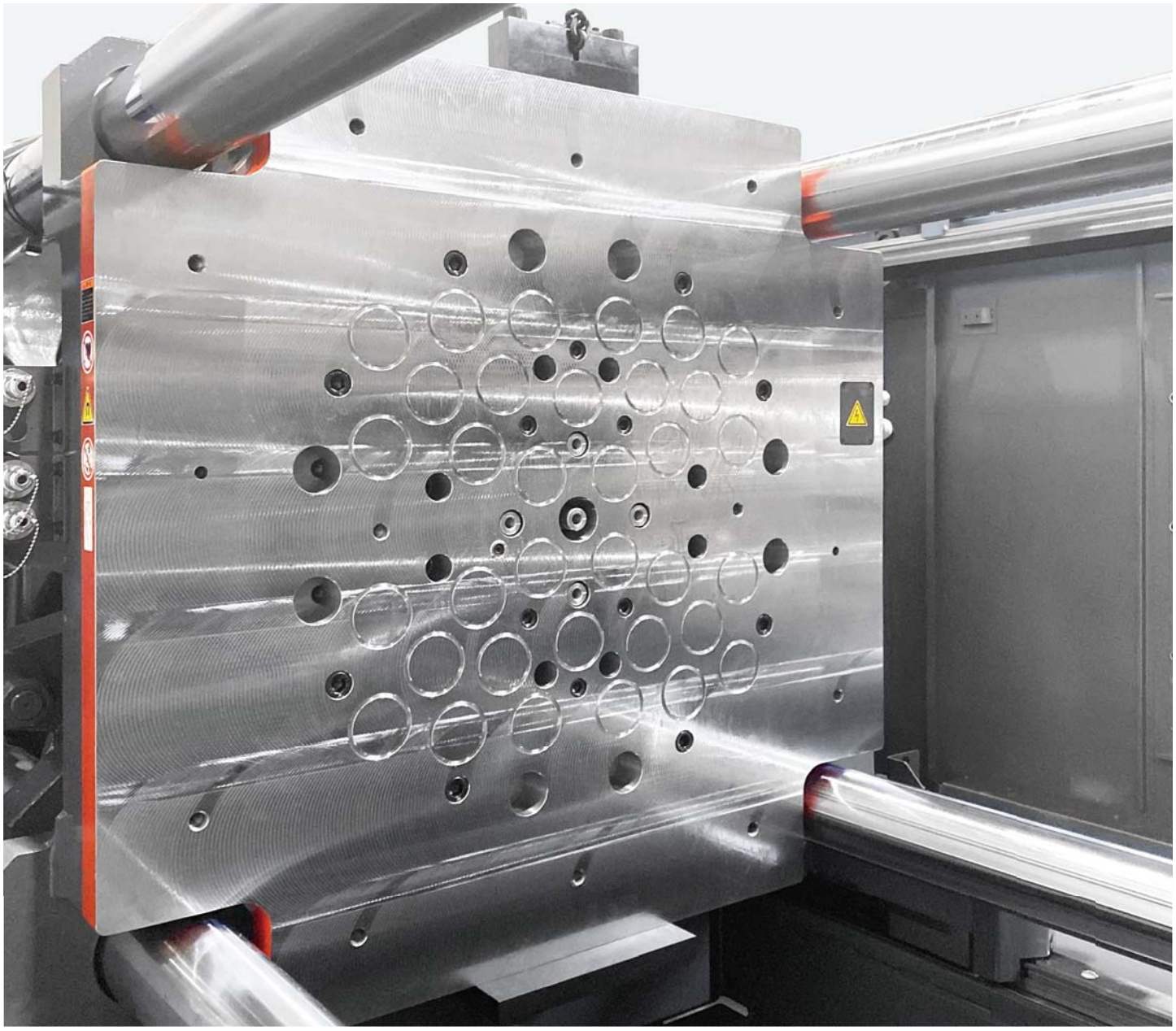


Clamping force 8,500 kN Injection Molding Machine

Automate mold clamping operations Mag clamp



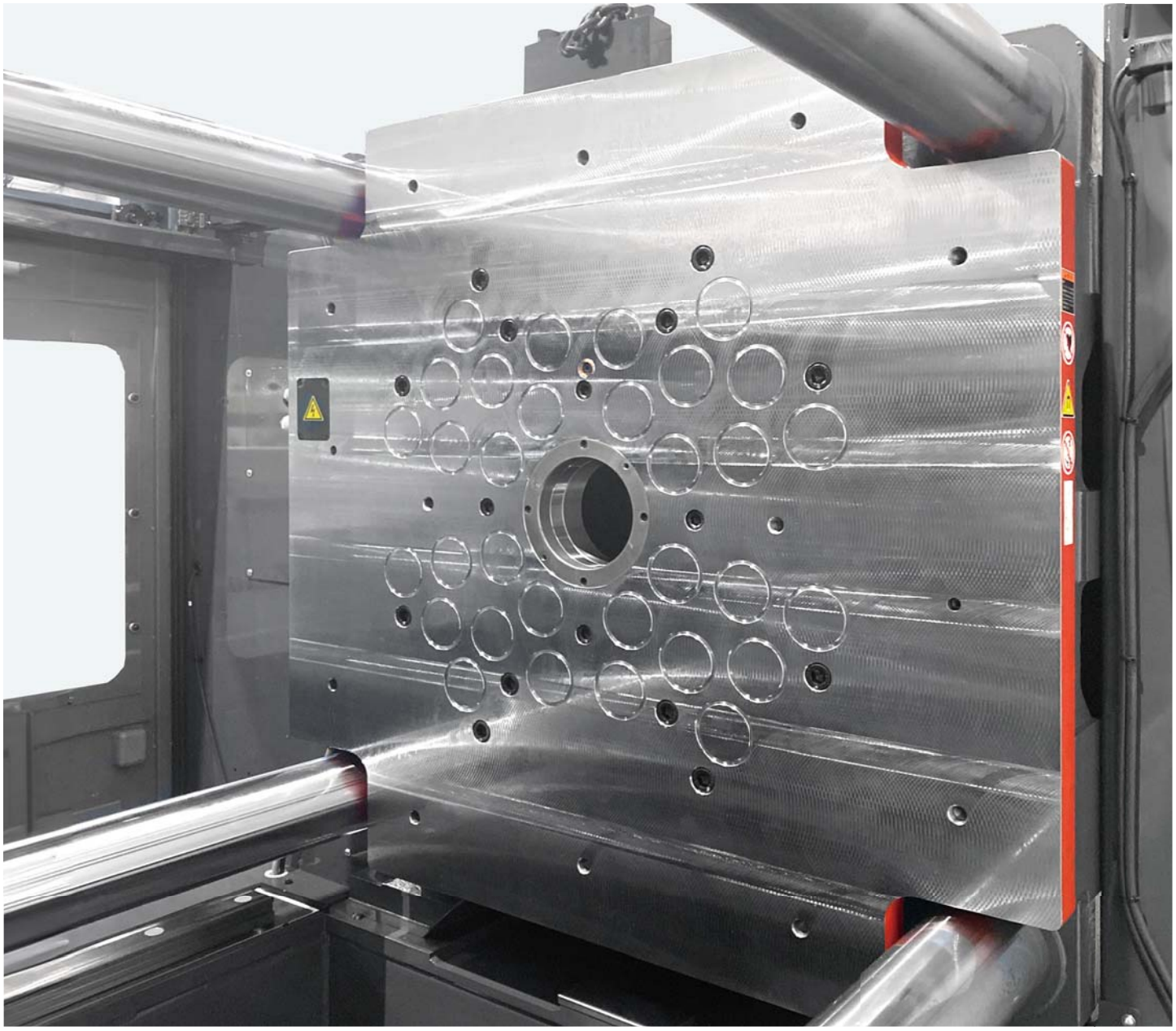
Movable side Number of Core 84 Max. clamping force 588 kN Fixed side Number of Core 76 Max. clamping force 532 kN



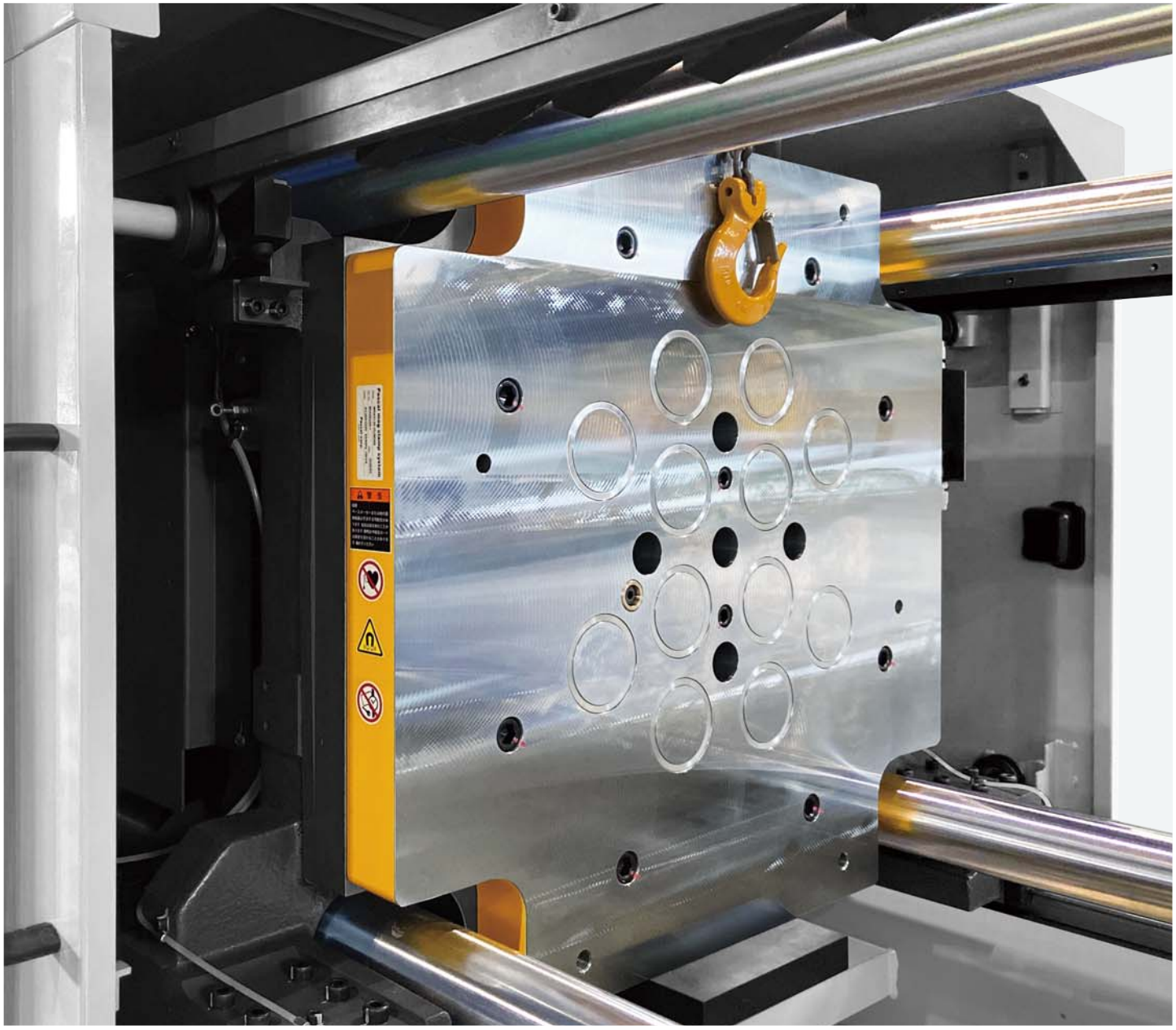
Clamping force 3,500 kN Injection Molding Machine

Mag clamp that consumes less energy

For a 3,500kN molding machine with a Mag Clamp, electricity costs 0.4 yen per mold change.
Electricity is only required when clamping or unclamping.



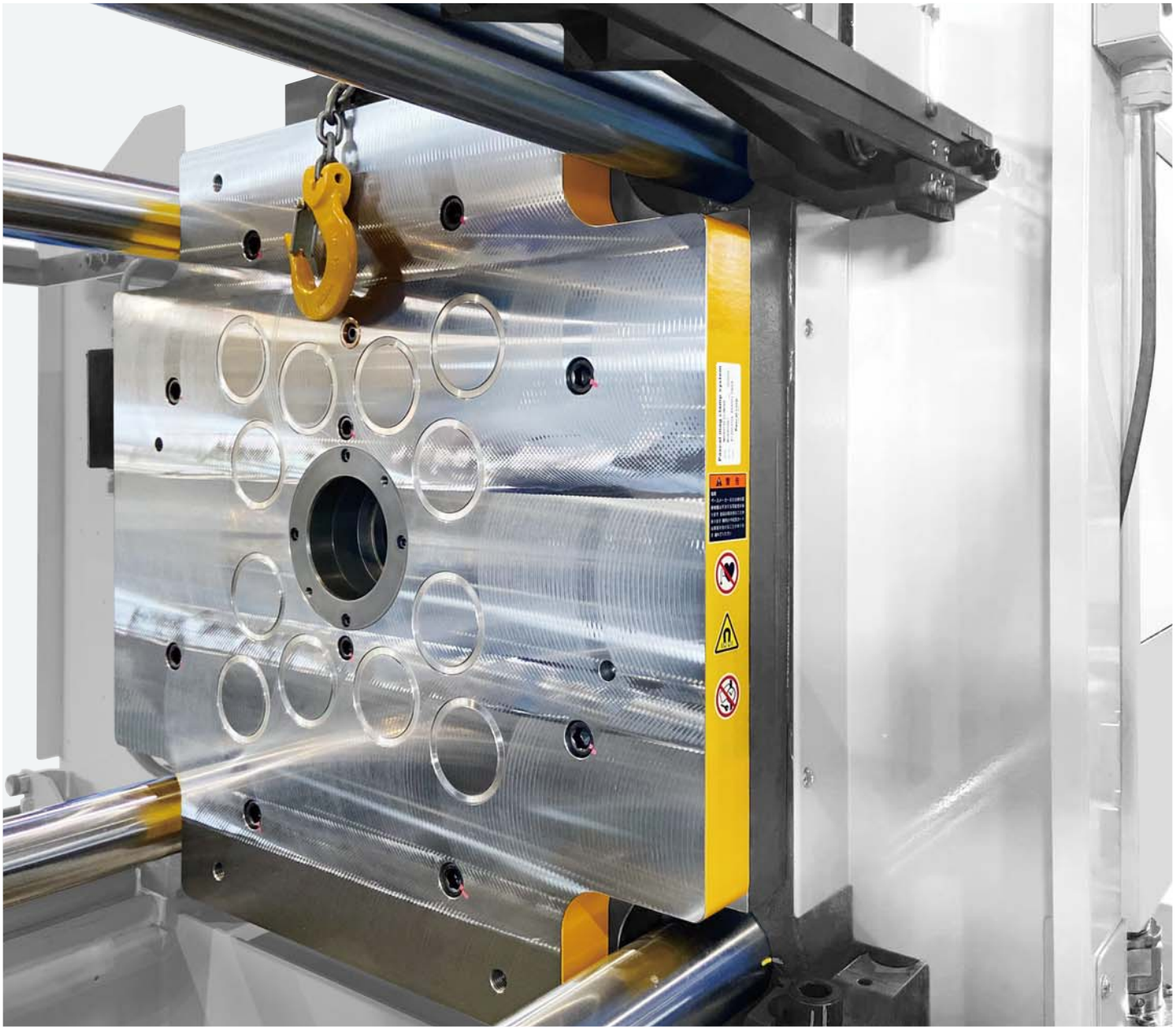
Movable side Number of Core 34 Max. clamping force 238 kN Fixed side Number of Core 32 Max. clamping force 224 kN



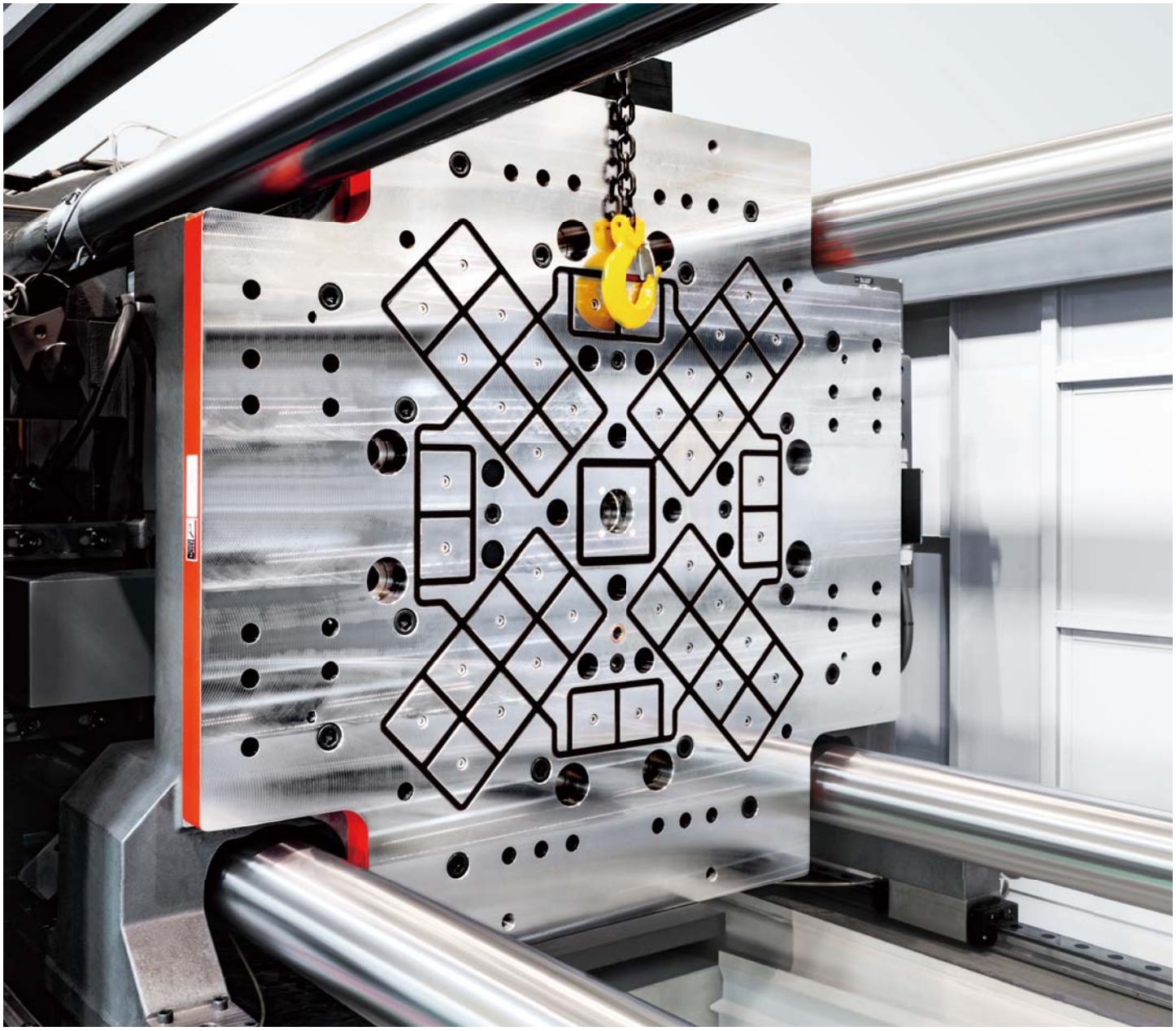
Clamping force 1,300 kN Injection Molding Machine

Super strong Neodium magnets securely clamp molds

The standard mold weight for a 3,500kN molding machine is 3 tons,
and the clamping force required for a Mag Clamp is 224kN (23 tons)

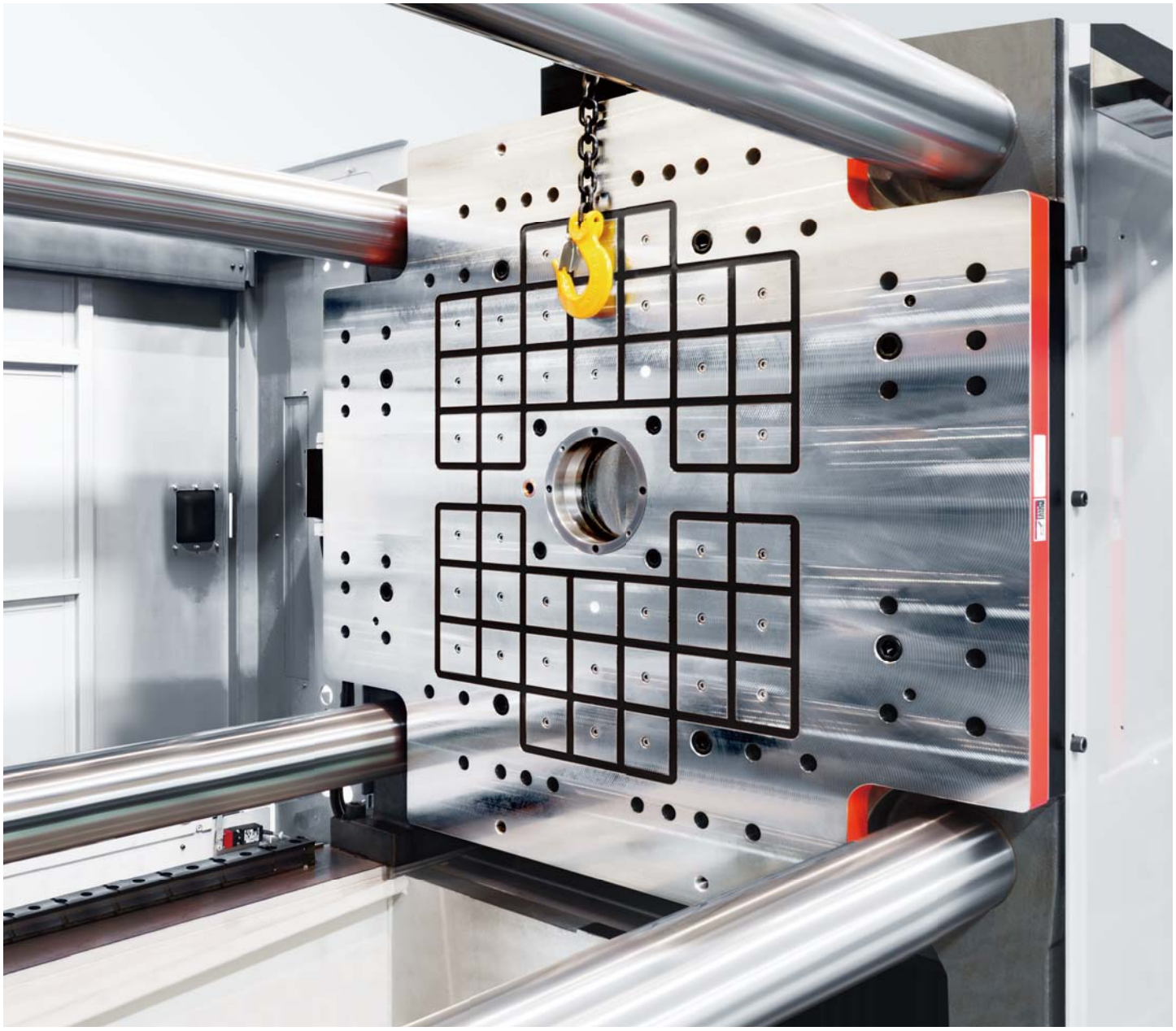


Movable side Number of Core 12 Max. clamping force 84 kN Fixed side Number of Core 12 Max. clamping force 84 kN

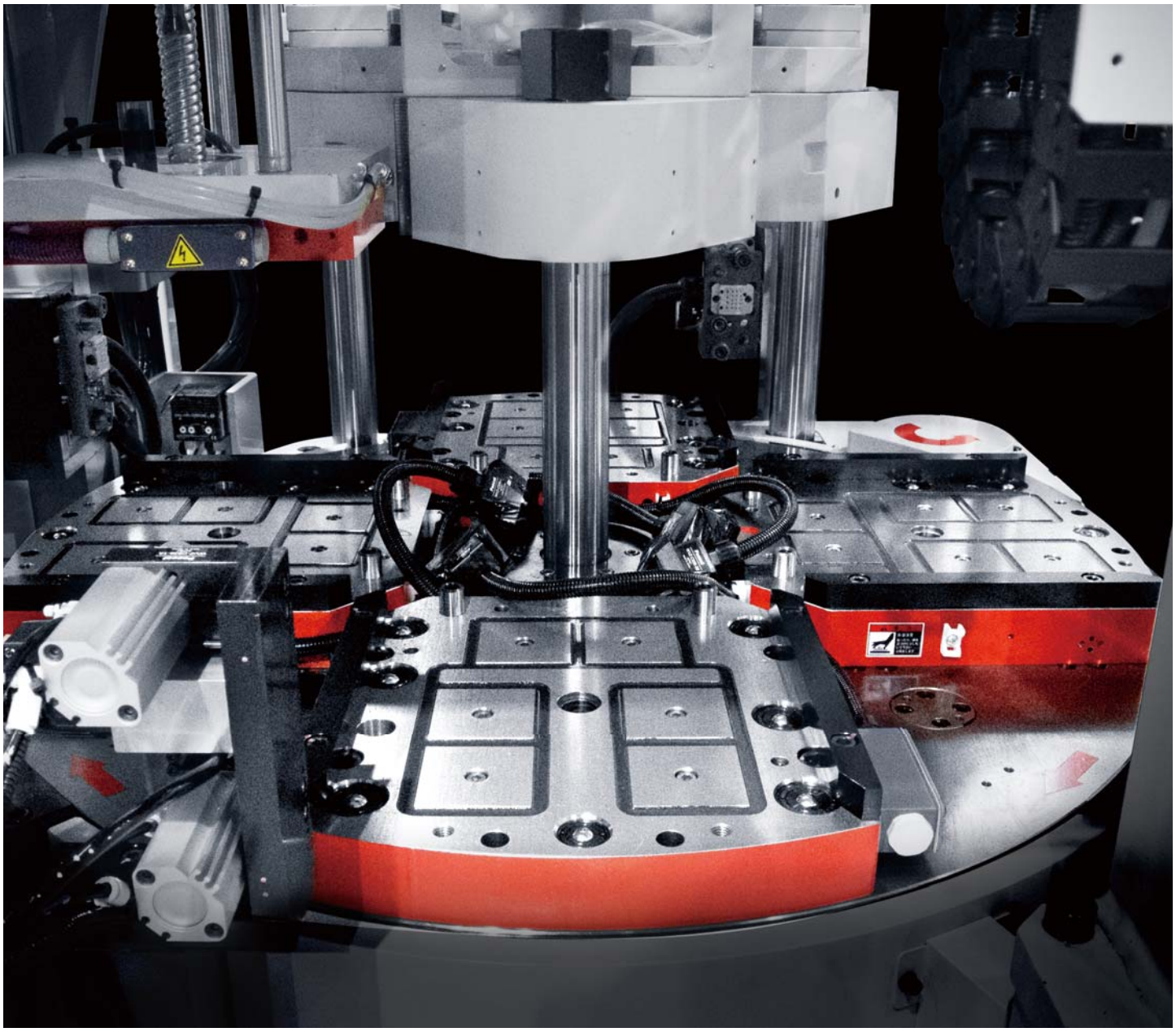


Clamping force 3,500 kN Injection Molding Machine

Automated clamping regardless of mold size



Movable side Number of Core 41 Max. clamping force 310 kN Fixed side Number of Core 40 Max. clamping force 314 kN



Vertical machine Clamping force 400 kN

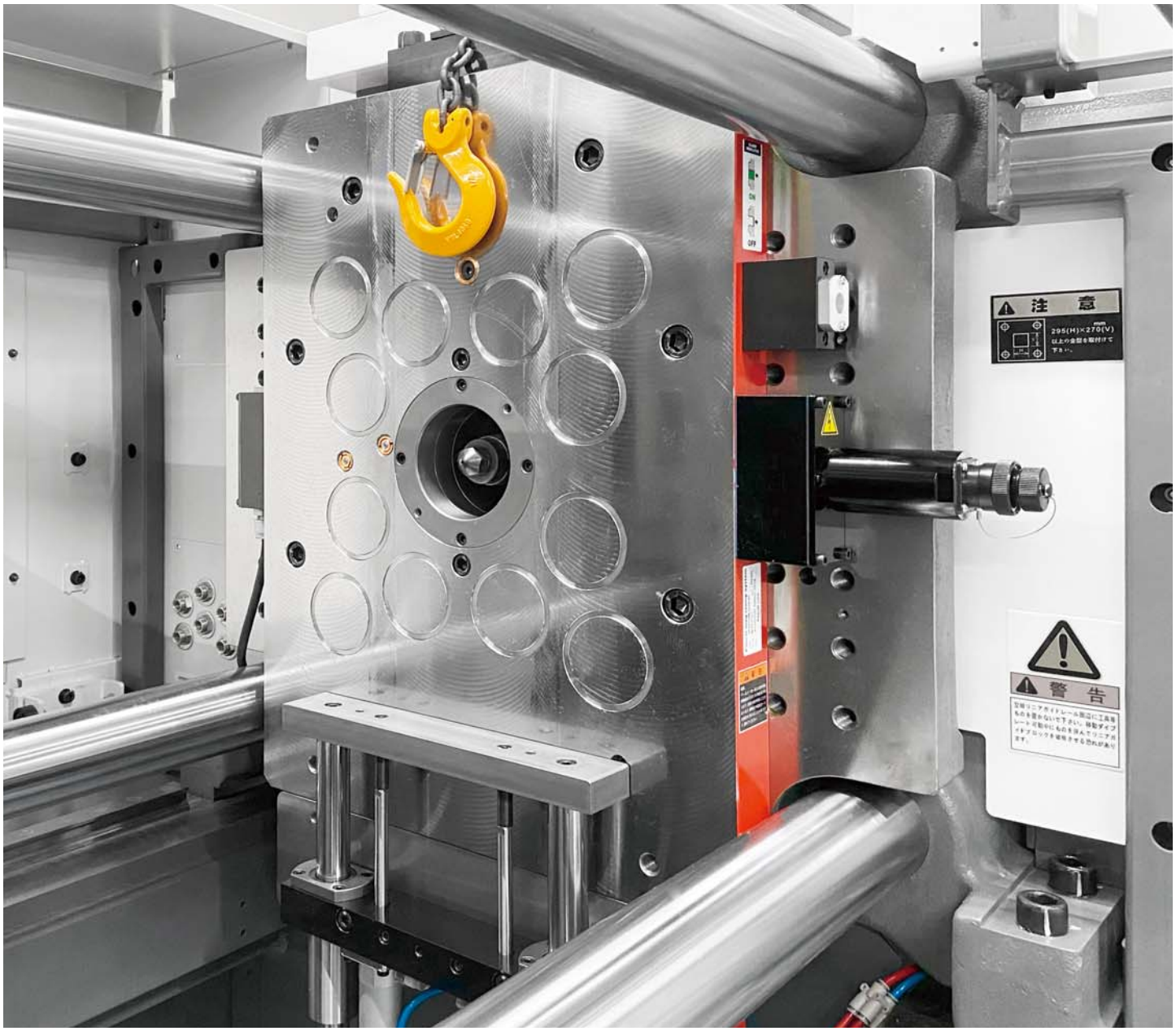
Instantly clamps molds

0.5 seconds to clamp for a 3,500kN molding machine,
3.2 seconds to clamp for a 13,000kN (per plate)

Multi-color machine Clamping force 6,000 kN

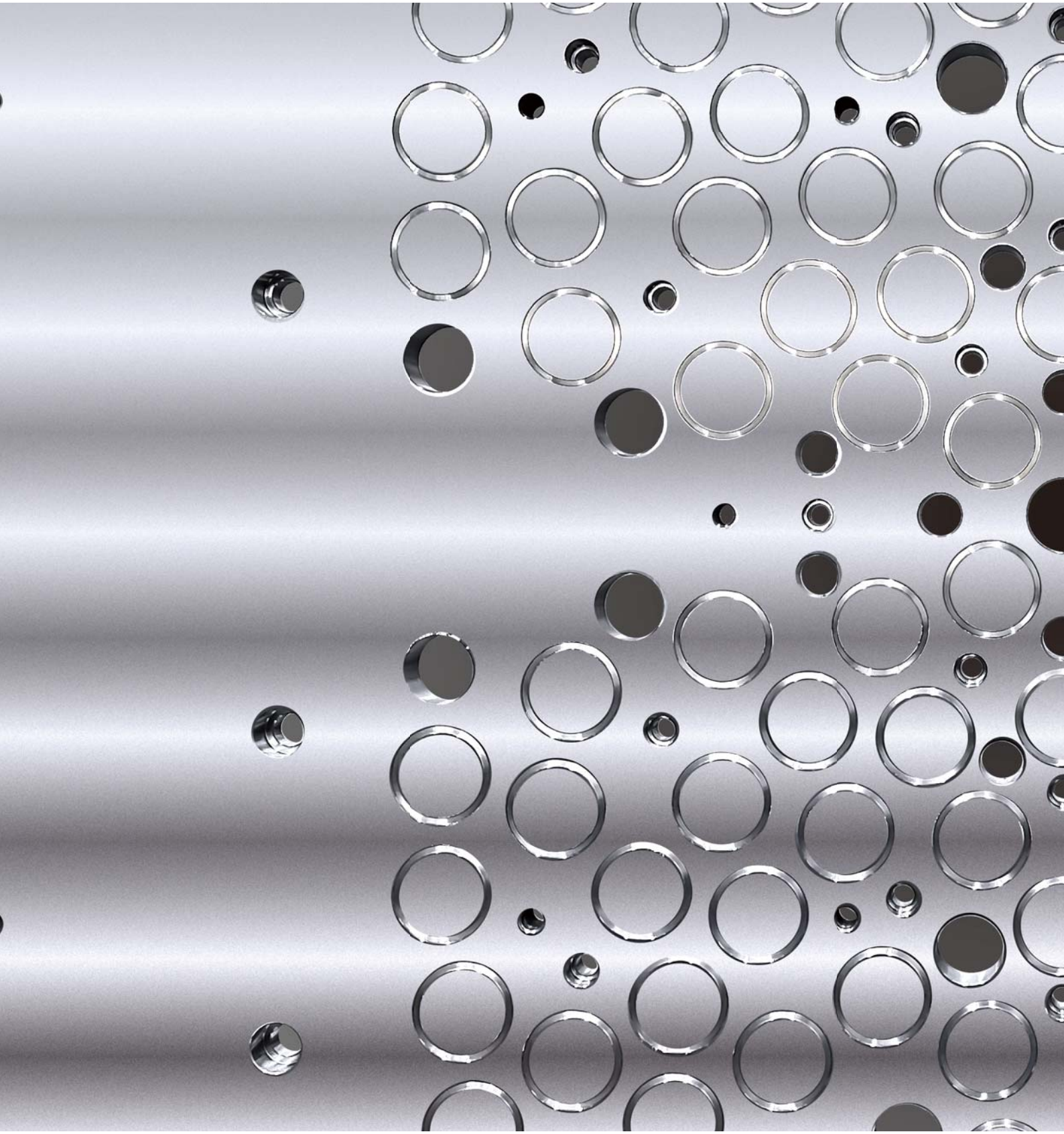
Clamping force 1,300 kN Injection Molding Machine

Multi-Mag Clamp, ideal clamping device for multiple molding machines at minimal cost.

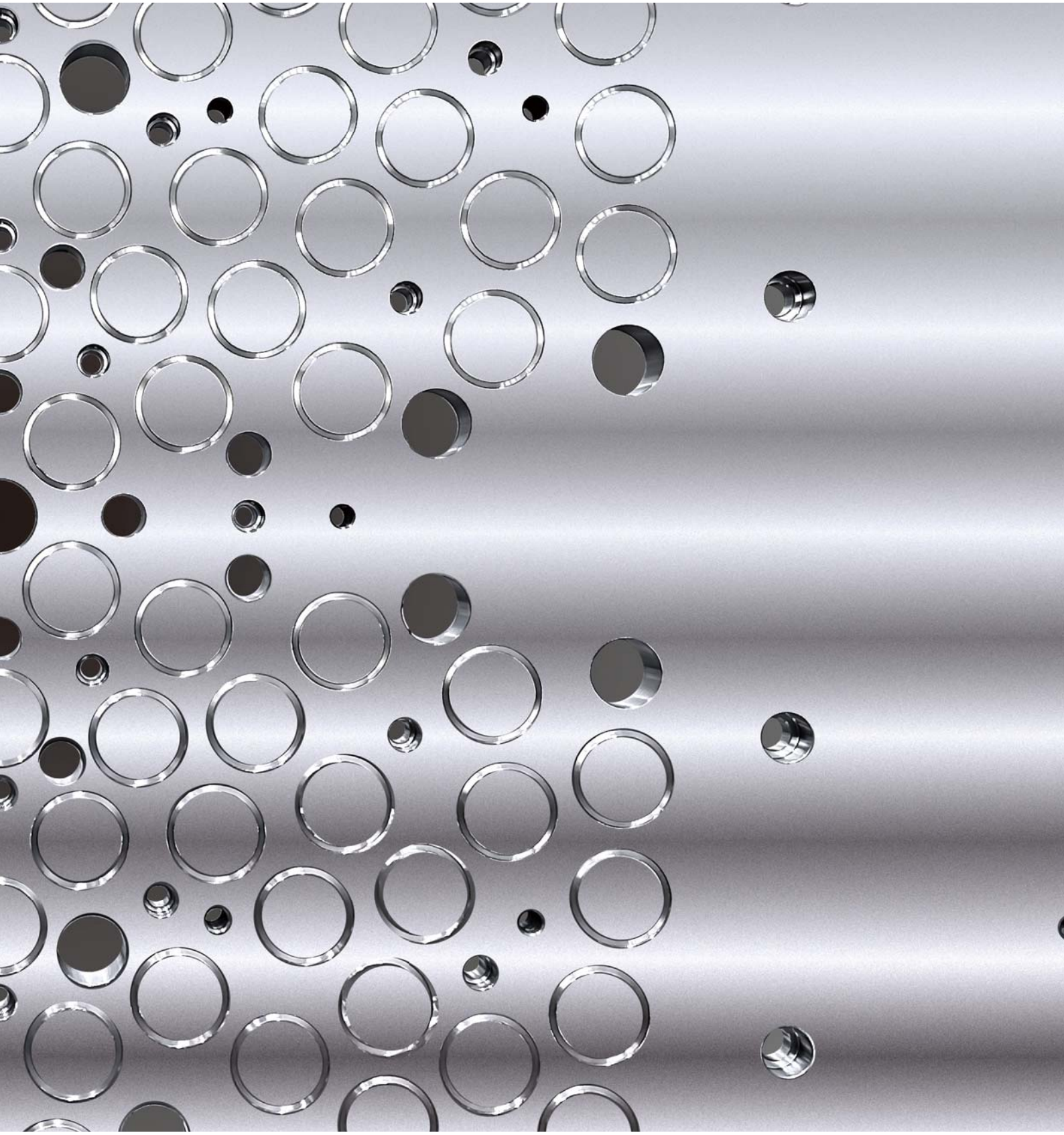


Movable side Number of Core 12 Max. clamping force 84 kN　Fixed side Number of Core 12 Max. clamping force 84 kN

Circle Core Mag clamp



Reliability backed by delivery record of 7000 units



Circle Core Mag clamp standard model

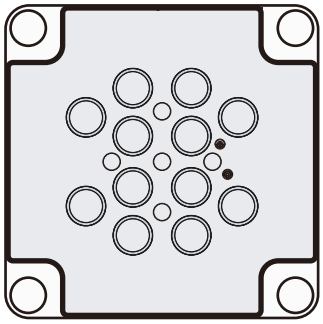
Temperature of mold plate 120℃

The Mag clamp is designed for reliabilty and economic efficiency. It is more ecomomical than the Square core mag clamp

Standard model Clamping force 500 - 30,000kN **Slim model** Clamping force 750 - 6,500kN

Moving platen

Standard model



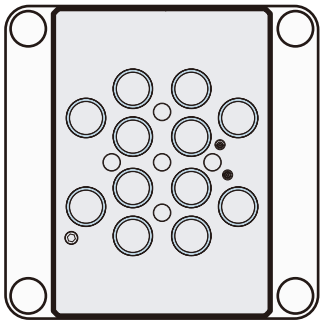
Fixed platen

See page → **30** for details

Moving platen

Slim model

This model is about 10% more economical than the standard type



Fixed platen

See page → **32** for details

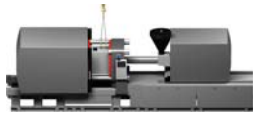
Circle Core multi mag clamp

Temperature of mold plate 120℃ Power Voltage 200/220v

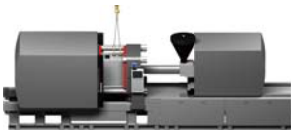
Economical model that allows one controller to operate multiple Mag Clamps

Clamping force up to 4,000kN

Sharing the same controller



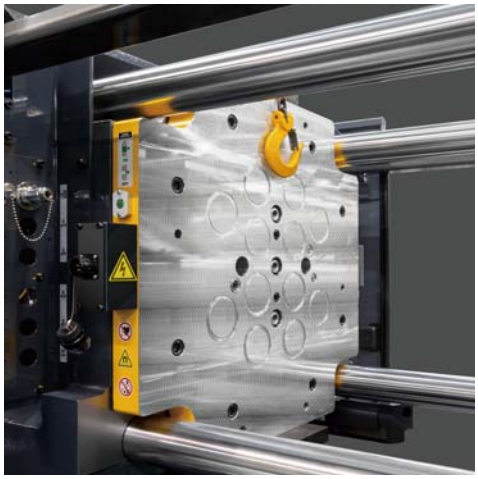
500kN IMM

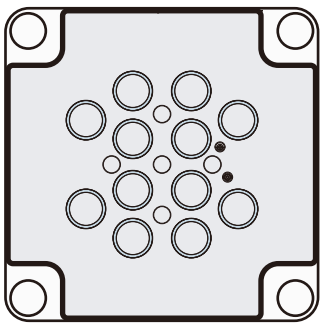


1,500kN IMM

3,500kN IMM

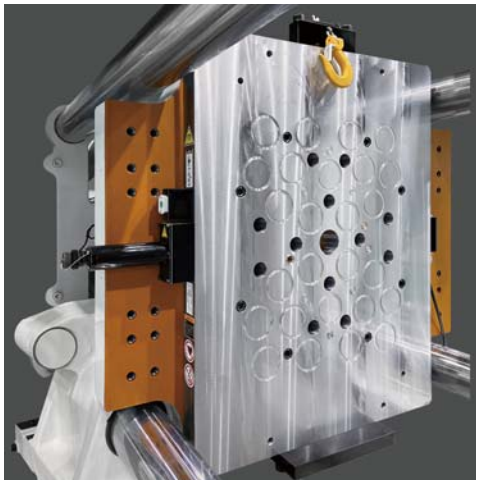
Standard model

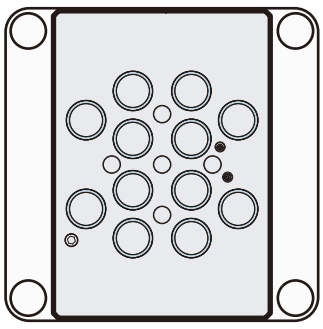




Slim model

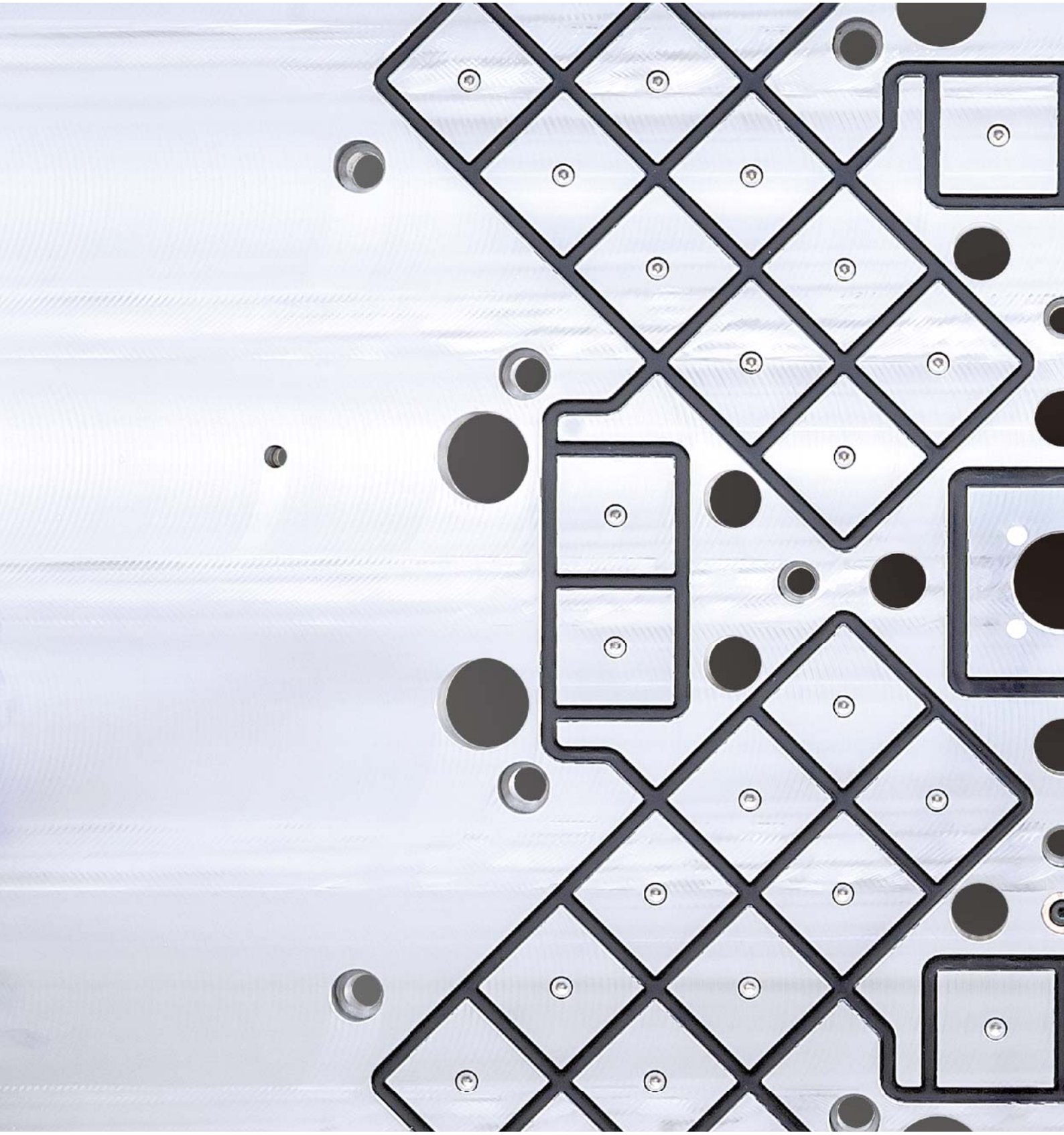
This model is about 10% more economical than the standard type



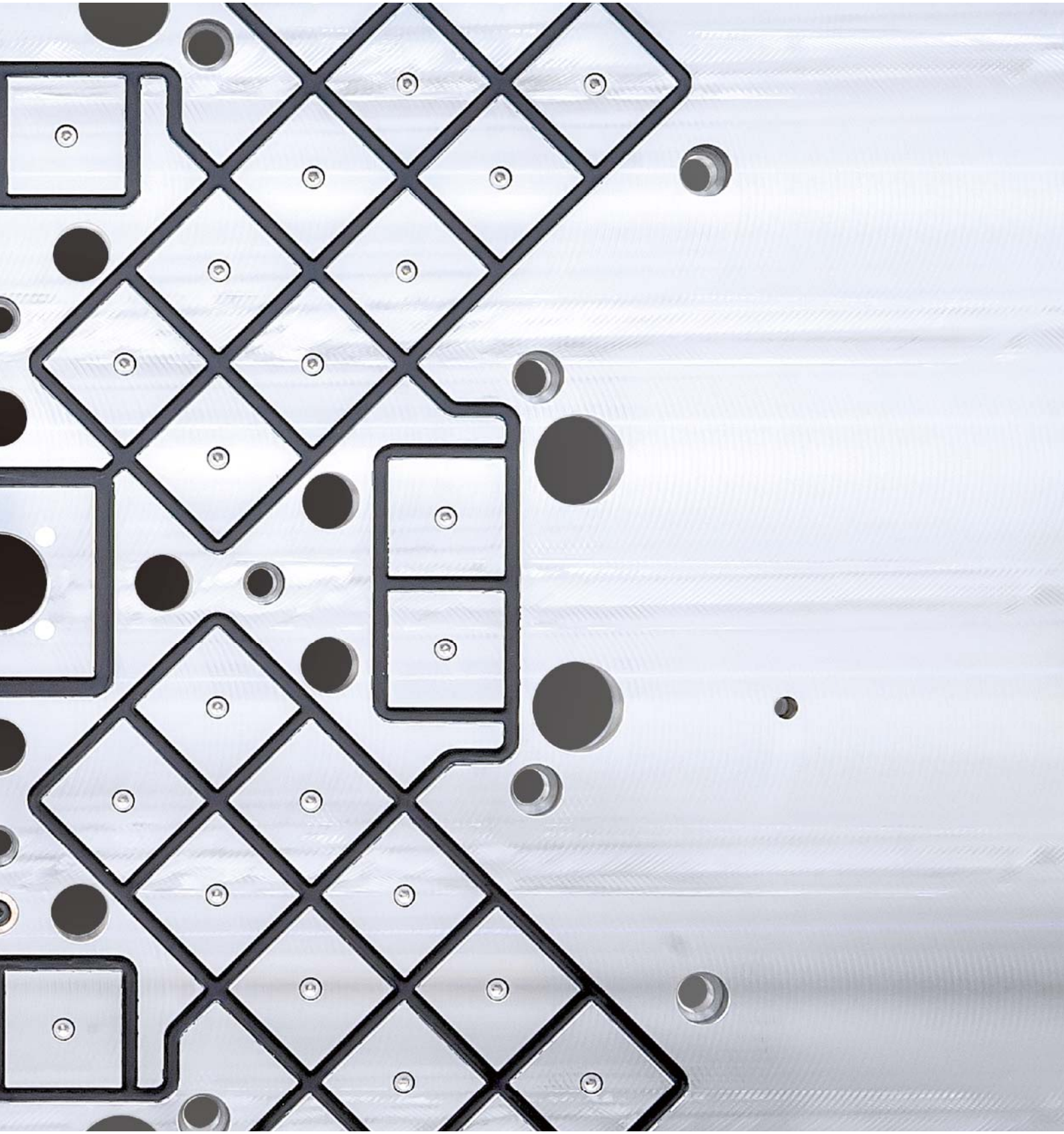


See page → **34** for details

Square Core Mag Clamp



Reliability backed by delivery record of 7000 units

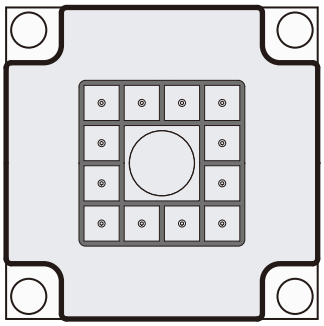


Square Core Mag Clamp Plate thickness 50mm Temperature of mold plate 80·150·180℃

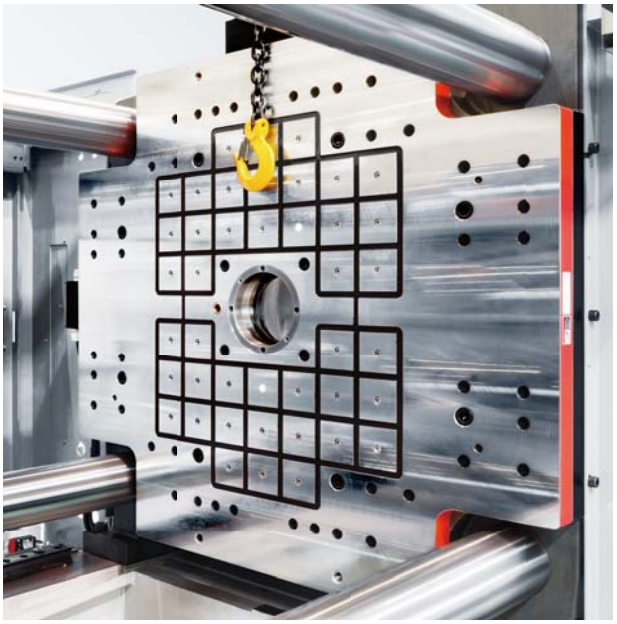
Select a Square Core Mag Clamp for applications with high temperatures above 120℃

Clamping force 500 - 30,000kN

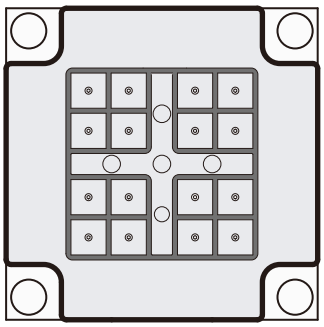
Fixed platen



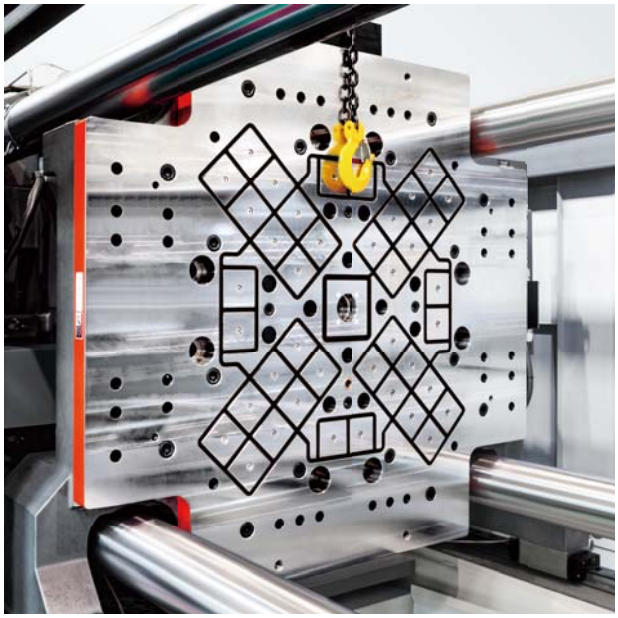
Fixed platen



Moving platen



Moving platen



See page → **44** for details

※52mm plate thickness for machines that are 4,500kN or larger.

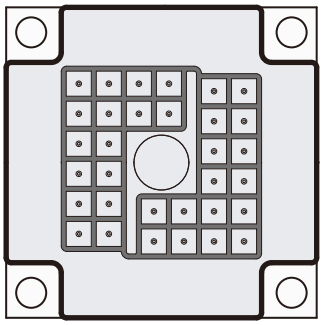
Square Core Mag Clamp Plate thickness 35mm

Temperature of mold plate 80·150·180℃

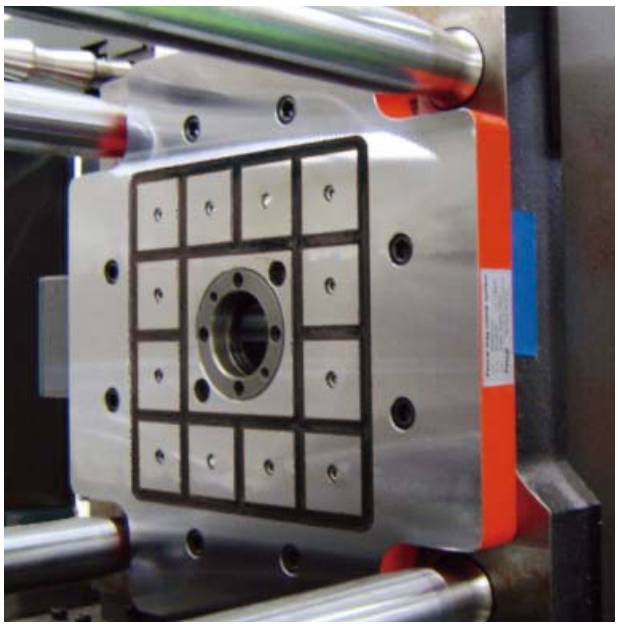
A 35mm thick plate is available for machines up to 1,500kN

Clamping force 200 - 1,500kN

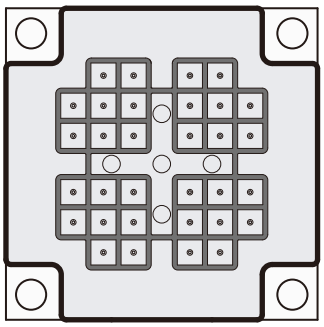
Fixed platen



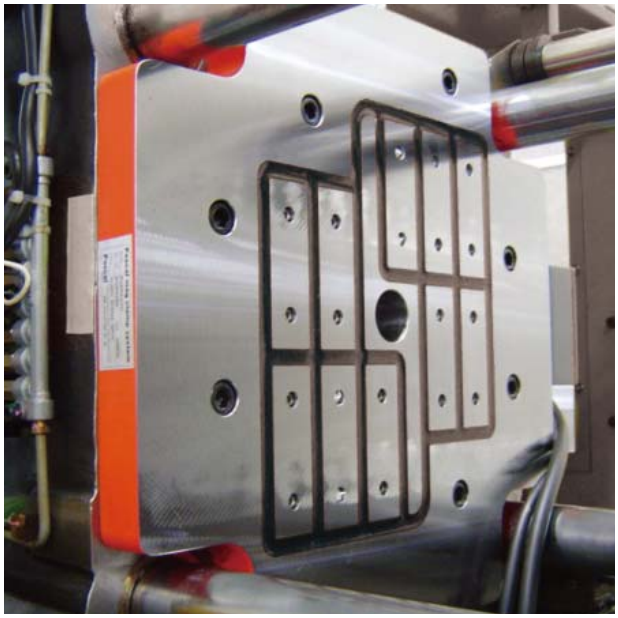
Fixed platen



Moving platen



Moving platen



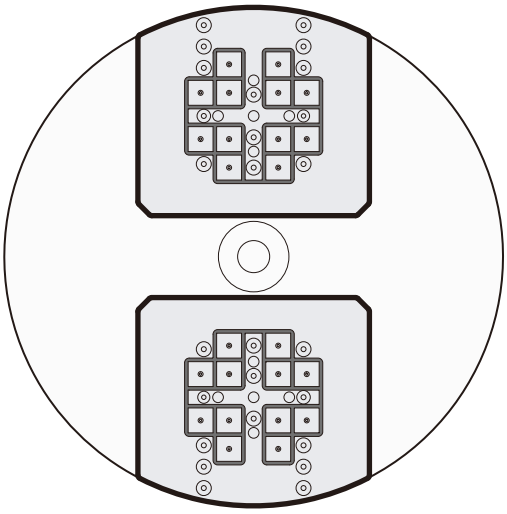
See page → **46** for details

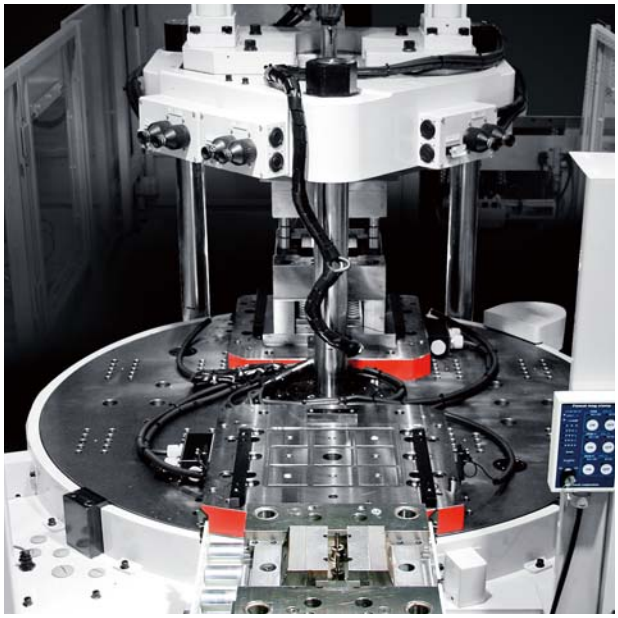
Square Core Mag Clamp for a Vertical IMM

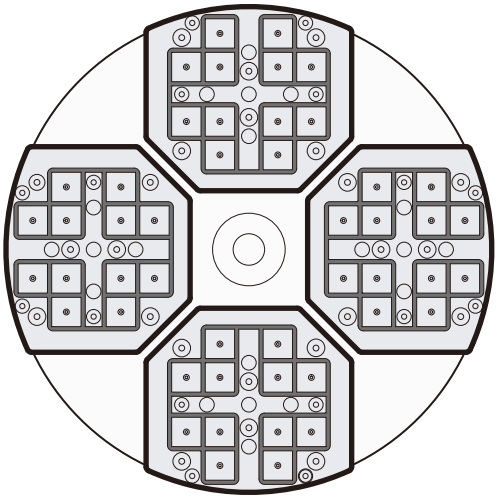
Temperature of mold plate 80·150·180℃

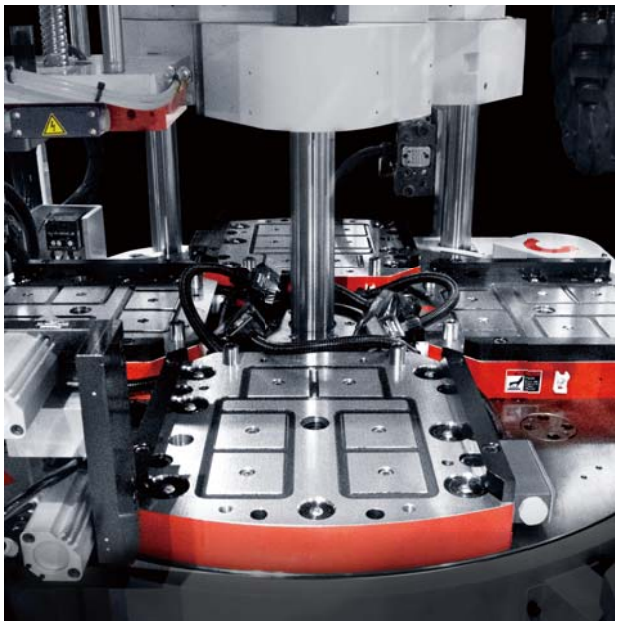
Square core models are suitable for vertical molding machines in view of Mag clamp functionality.

Plate thickness 50mm or 35mm (35mm is available for machines up to 1,500kN.)









See page → **48** for details

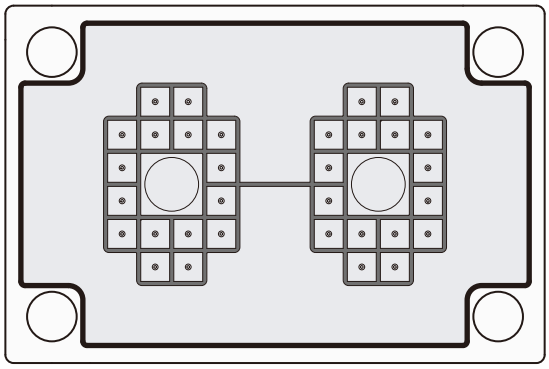
Square Core Mag Clamp for a Multi-Color IMM

Temperature of mold plate 80·150·180℃

Square core models are suitable for 2-color molding machines in view of Mag clamp functionality.

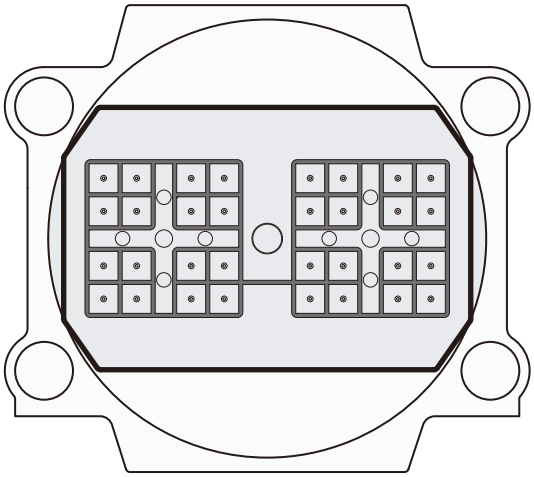
Plate thickness 50mm or 35mm 35mm is available for machines up to 1,500kN

Fixed platen

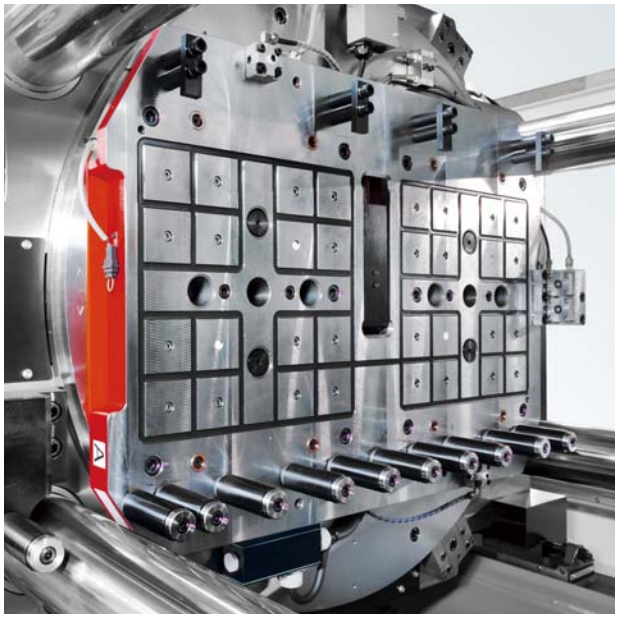


Fixed platen

Moving platen



Moving platen



See page → **50** for details

Automate mold clamping operations

Mounting and demounting molds with eight bolts using wrenches is hard work. Working underneath the molds is dangerous.

The Mag clamp can clamp and unclamp molds safely and easily, instantaneously reducing production times and heavy workloads, resulting in increased productivity and a more comfortable work environment.

Taking time to fasten/loosen the screw

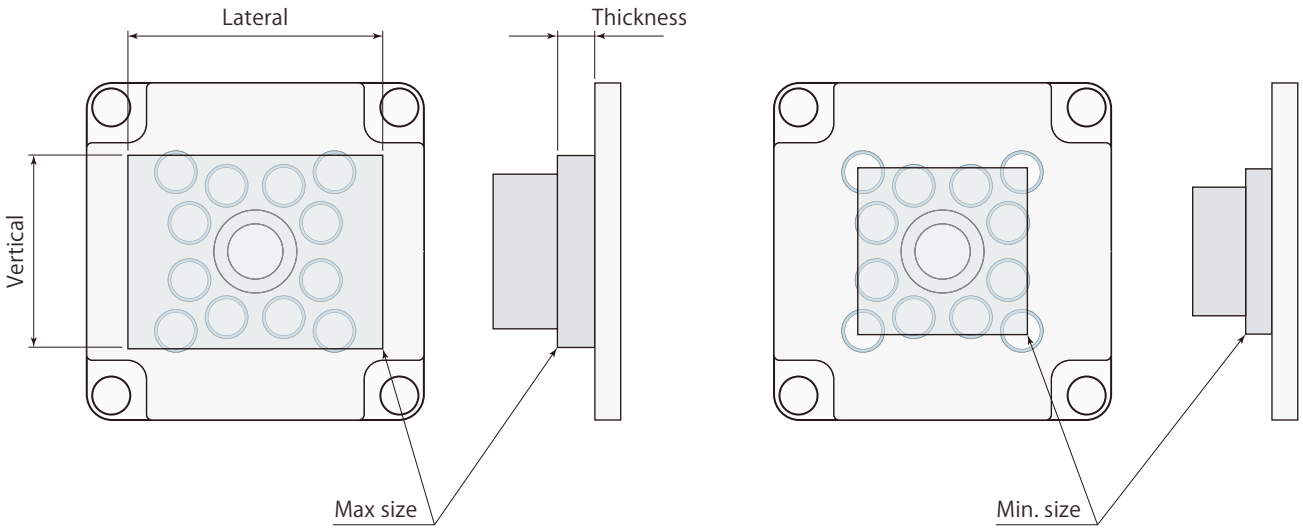
Difficult working posture

Mag clamp clamps and unclamps molds in 0.5 to 4.5 seconds.

Simply push the button

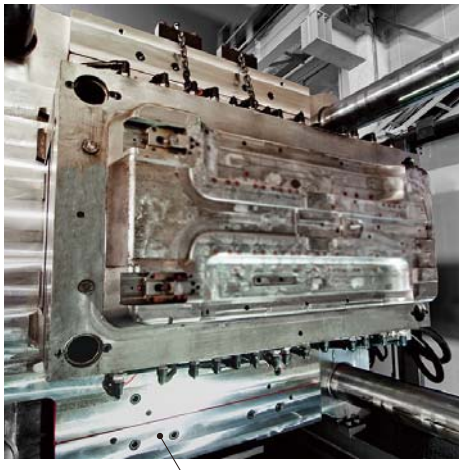
Automated clamping regardless of mold size

No standardizing the mold size and thickness of mold plate is necessary.



Use the machine platen area to the maxium

Extra space is not necessary to mount conventional clamps on the machine platen and molds can be designed without any dimensional constraints.



No interferences with the wire or hose

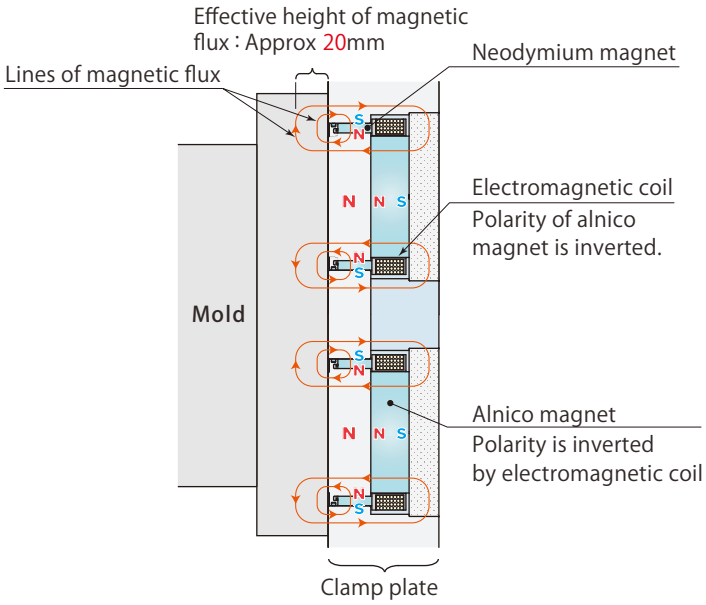
Extra space is required to mount manual or hydraulic clamps on the platen, and core cylinders, electrical connectors, couplers and hoses can create interferences.

Zero-energy clamping is accomplished with super-strong neodymium magnets.

No electric power is required when clamping the mold, and an air compressor and hydraulic pump motor are not necessary.

Structure

Clamp



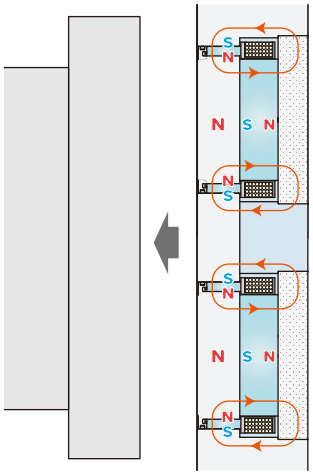
① Electromagnetic coil is energized for 0.5 sec.

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.

Unclamp



① Electromagnetic coil is energized for 0.5 sec.

② Polarity of alnico magnet is inverted.

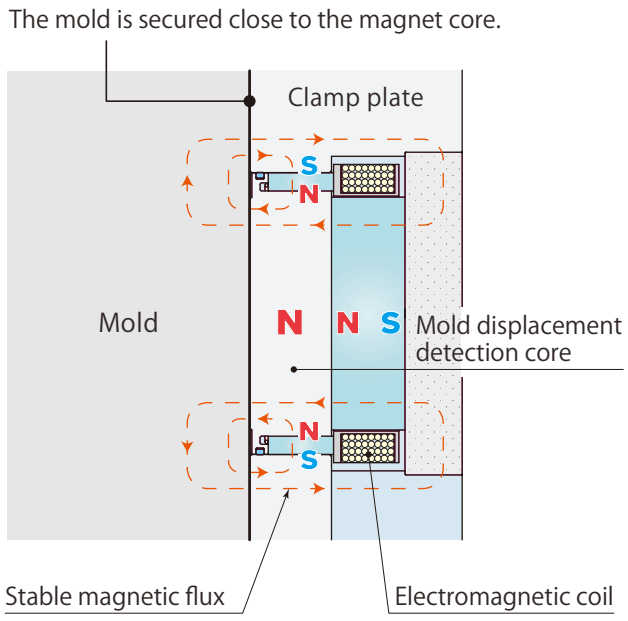
③ Magnetic flux of neodymium magnet and alnico magnet is not emitted from the surface of the magnet core so that the mold can be unclamped.

- Energization is only required when switching on and off. No energization is required during the clamped state. No electricity is consumed, thus no heat generation.
- The clamp plate has no moving parts, thus assuring high durability. The plate interior is maintenance-free.
- Clamping force is evenly applied on all faces of the magnet core. No gaps are created between the machine's platen surface and center part of the mold which helps improve molding accuracy.
- Once the mold is clamped, unclamping (demagnetization) will not occur even when if a power outage happens or if power cable breakage occurs.
- Magnetic force of permanent magnet will not decrease through aging. Clamping force is maintained for long-term use.
- The effective height of the magnetic flux is about 20 mm above clamp plate surface Magnetic field does not cause significant effect inside the mold.
- No magnetic field is generated from the sides of the clamp plate. So the injection nozzle and controller are not affected.

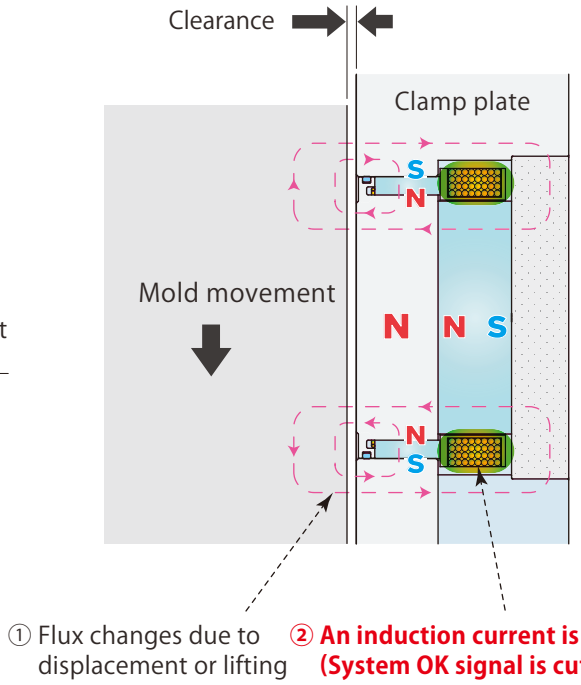
Mold displacement detection system Standard

When the mold is displaced or the mold floats above the clamp plate due to a rare mis-set ejector pin, mis-set nozzle touch, or guide pin getting stuck, the mold dislacement detection system detects the abnormality and stops the machine immediately. Displacement or lifting of the mold can be detected by the electromagnetic coils that are built in the magnet core located near the center of clamp plate. When the mold moves, these electromagnetic coils detect an induction current signal.

Normal clamping status



When the mold moves or lifts

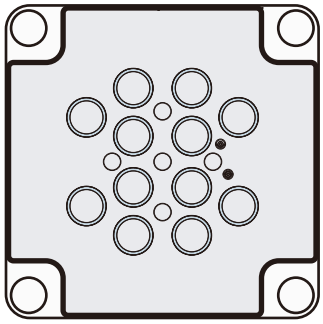


- It is not equipped on Multi Mag Clamps.
- Moving parts on the mold displacement detection core may cause false detection. Pascal suggests to change the parts to non magnetic materials. Ask Pascal for details.

Circle Core magnetic clamp

Moving platen

Standard model

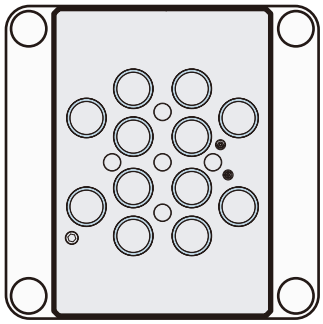


Fixed platen

Moving platen

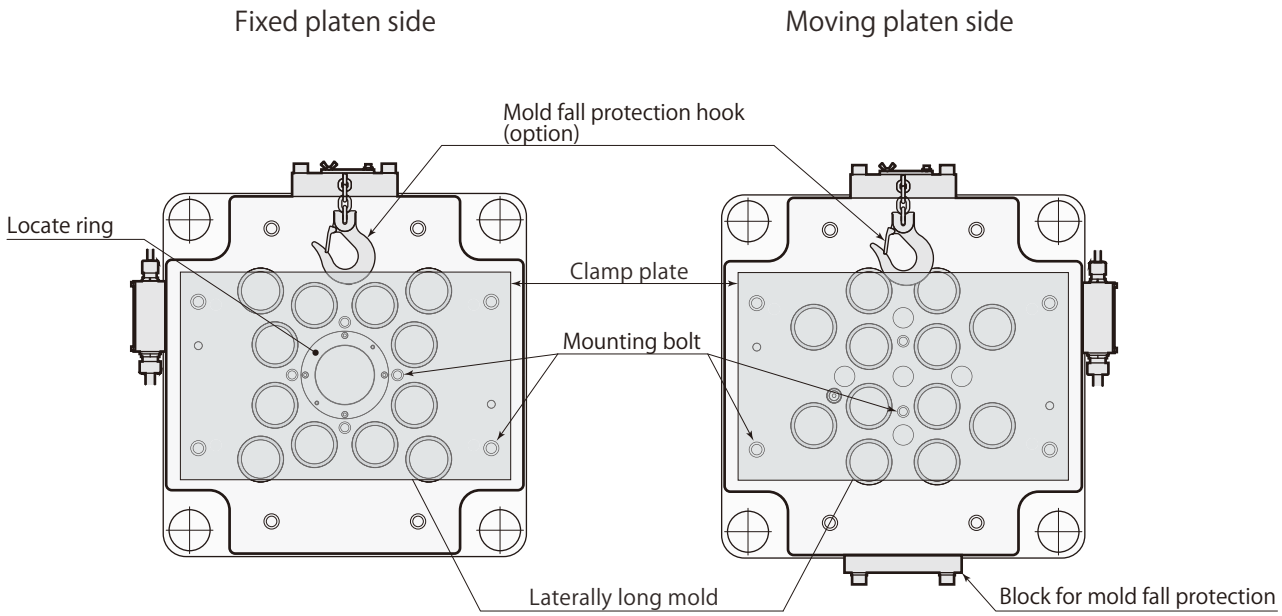
Slim model

The model about 10% more economical than the standard type



Fixed platen

Circle Core magnetic clamp Standard model Clamping force 500 - 30,000 kN



Specifications

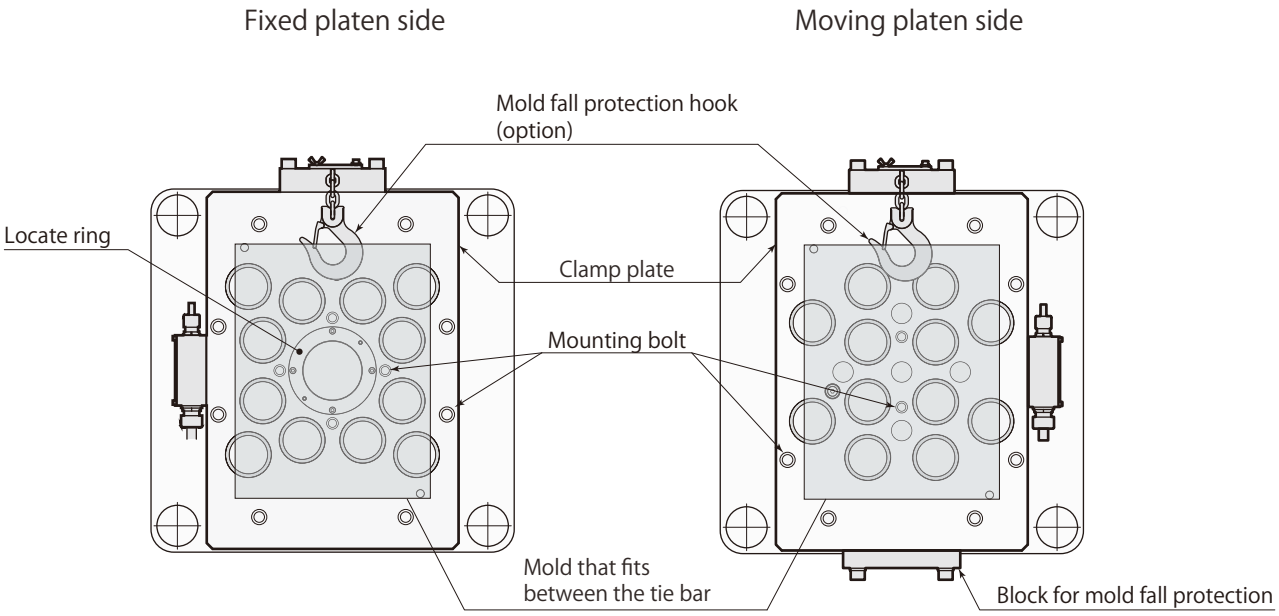
Model		MRA
Plate shape		Standard model
Clamping force	kN	7 per magnet core
Operating temperature	℃	0 ～ 120
Magnetic flux height	mm	20 (mold plate material SS400)
Plate thickness	mm	50
Power voltage		AC200 / 220 , 380 , 440 , 480V
Way of control		1BY1
Sensor		Mold displacement detection system (Fixed and moving platen)
Plate mounting method		Bolting with the standard and additional tap holes of machine platens

- Operating temperature indicates the temperature on the surface of the clamp plate
- Additional tap holes are necessary in the center of machine platen (Fixed and moving platen)
- Polishing surface speciication can be selected
- See page → **52 to 59** for details of options

Clamp plate						Mold fall protection hook(optional)			
Model	Clamping force of IMM kN	Weight kg		Voltage capacity kVA	Min. mold size mm	Model	Eye bolt on mold		Max. Allowable load per hook ton
		Fixed platen side	Moving platen side				Size	Qty	
MRA0050	500 ~ 600	82	88	10	300	MGR064	M12 ~ M24	2	0.40
MRA0080	750 ~ 850	111	117		300	MGR065			
MRA0100	1,000 ~ 1,200	131	136		305				
MRA0130	1,300 ~ 1,500	168	174		305				
MRA0180	1,600 ~ 1,900	214	217		425	MGR066			1.70
MRA0230	2,200 ~ 2,600	268	274	20	460				
MRA0280	2,800 ~ 3,000	326	332		485				
MRA0350	3,500 ~ 3,600	427	427		510	MGR082	M16 ~ M30		3.03
MRA0450	4,500	532	532	30	575	MGR102	M20 ~ M42		4.80
MRA0550	5,500	655	655		600				
MRA0650	6,500	747	734		660				
MRA0850	8,500	859	853		775			4	
MRA1050	10,000 ~ 10,500	1,161	1,154		830				
MRA1300	13,000	1,390	1,383		920				
MRA1600	14,000 ~ 16,000	1,390	1,383		1,160	MGR132	M24 ~ M48		8.04
MRA2000	18,000 ~ 20,000	2,017	1,980	40	1,185	MGR162	M36 ~ M64		12.06
MRA2500	22,000 ~ 25,000	2,518	2,486		1,315				
MRA3000	28,000 ~ 30,000	2,517	2,497		1,460				

- Reference value
- Capacity when 200/220VAC power voltage. Ask Pascal for 380, 440 and 480VAC.
- Reference value under normal production conditions, not guaranteed.
- The size of eye bolt on the mold is determined according to th e size of the hook. Make sure that the allowable load of the eye bolt is greater than the mold weight.
- The number of eye bolts on mold side indicates one per mold（movable side & fixed side）.

Circle Core magnetic clamp Slim model Clamping force 750 - 6,500 kN



Specifications

Model		MFA
Plate shape		Slim model
Clamping force	kN	7 per magnet core
Operating temperature	℃	0 ～ 120
Magnetic flux height	mm	20 (mold plate material SS400)
Plate thickness	mm	50
Power voltage		AC200 / 220 , 380 , 440 , 480V
Way of control		1BY1
Sensor		Mold displacement detection system (Fixed and moving platen)
Plate mounting method		Bolting with the standard and additional tap holes of machine platens

- Operating temperature indicates the temperature on the surface of the clamp plate
- Additional tap holes are necessary in the center of machine platen (Fixed and moving platen)
- Polishing surface speciication can be selected
- See page → **52 to 59** for details of options

Clamp plate						Mold fall protection hook(optional)			
Model	Clamping force of IMM kN	Weight kg		Voltage capacity kVA	Min. mold size mm	Model	Eye bolt on mold		Max. Allowable load per hook ton
		Fixed platen side	Moving platen side				Size	Qty	
MFA0080	750 ~ 850	87	93	10	300	MGR065	M12 ~ M24	2	0.40
MFA0100	1,000 ~ 1,200	109	115		305				
MFA0130	1,300 ~ 1,500	135	141		305				
MFA0180	1,600 ~ 1,900	172	175		425	MGR066			1.70
MFA0230	2,200 ~ 2,600	209	215	20	460				
MFA0280	2,800 ~ 3,000	256	261		485				
MFA0350	3,500 ~ 3,600	329	329		510	MGR082	M16 ~ M30		3.03
MFA0450	4,500	410	400	30	575	MGR102	M20 ~ M42		4.80
MFA0550	5,500	485	480		600				
MFA0650	6,500	629	627		660				

- Reference value
- Capacity when 200/220VAC power voltage. Ask Pascal for 380, 440 and 480VAC.
- Reference value under normal production conditions, not guaranteed.
- The size of the eye bolt on the mold is determined according to the size of the hook. Make sure that the allowable load of the eye bolt is greater than the mold weight.
- The number of eye bolts on mold side indicates one per mold（movable side & fixed side）.

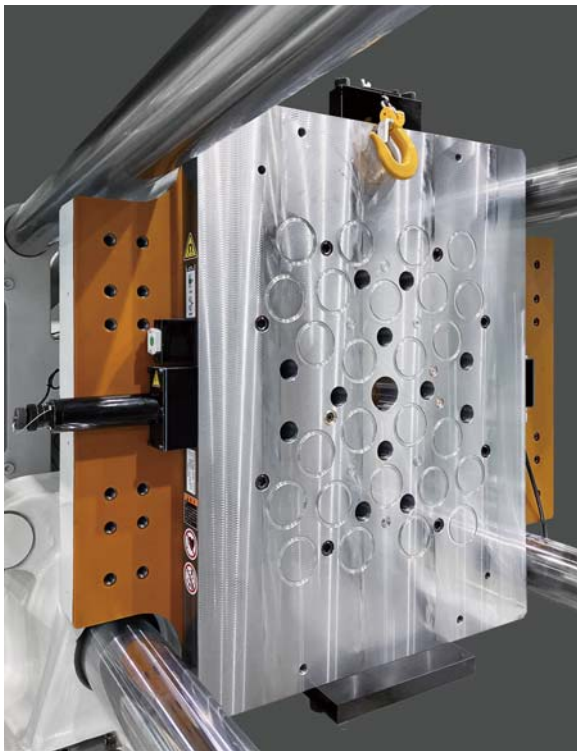
Moving platen side

Fixed platen side

Circle Core multi mag clamp PAT.

Mag clamp introduction cost are significantly reduced by sharing the same controller.

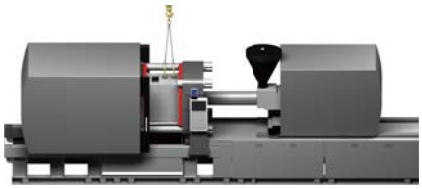
Clamping operation



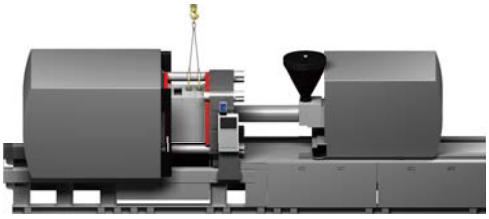
Multi controller

This is a cart-type operation panel that can be shared by multiple mag clamps.
Move it to the mag clamp and perform clamping/unclamping operations.

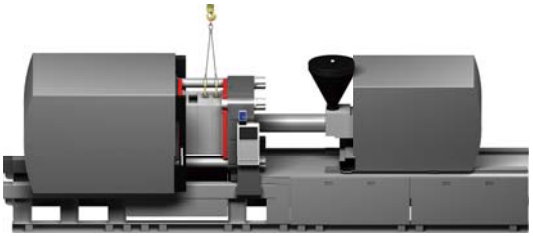
The multi-controller purchased as the first unit can be shared by multiple molding machines, enabling automation of clamping with only the cost of a mag clamp plate. The significant reduction in installation cost makes this device ideal for users who have a large number of molding machines with infrequent mold changes.



500kN Injection Molding Machine



1,500kN Injection Molding Machine



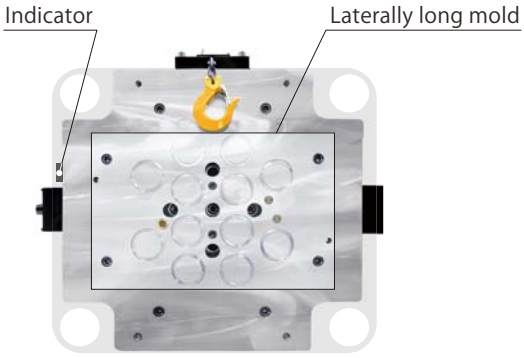
3,500kN Injection Molding Machine

Multi controller

Circle Core multi mag clamp Clamping force - 4,000 kN

Standard model Clamp plate

The standard type has the same shape as the conventional Mag clamp and is suitable for horizontal molds.

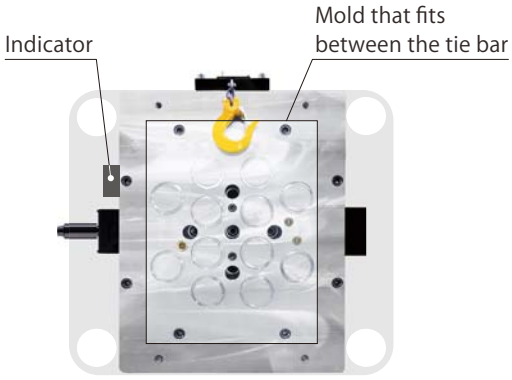


model **MRA_M**

Clamping force 500 - 4,000kN

Slim model Clamp plate

The slim type has a simplified plate shape for cost reduction, which is best suited for when the horizontal width of the mold fits inside the tie bar.



model **MFA_M**

Clamping force 750 - 4,000kN

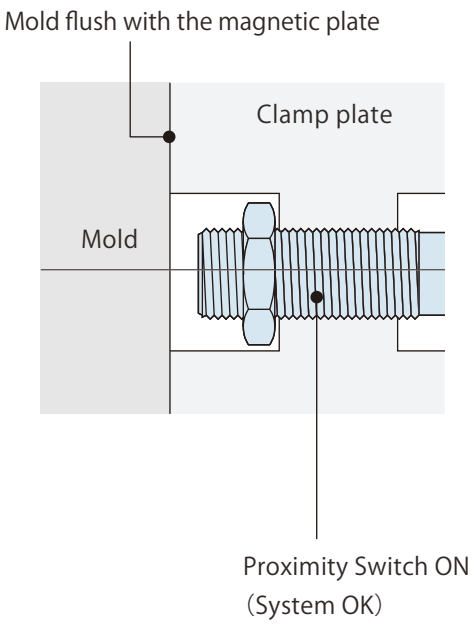
Model		M□A_M
Clamping force	kN	7 per magnet core
Operating temperature	℃	0 ～ 120
Magnetic flux height	mm	20 (mold plate material SS400)
Plate thickness	mm	50
Power voltage		AC200 / 220V
Way of control		Multi
Interlock		For Mold open/close feasible
Sensor		Proximity Switch (Fixed/Moving platen)
Clamp status		Indicator
Plate mounting method		Bolting with the standard and additional tap holes of machine platens

- Operating temperature indicates the temperature on the surface of the clamp plate
- Additional tap holes are necessary in the center of machine platen (Fixed and moving platen)
- Polishing surface specification can be selected
- See page → **52 to 59** for details of options

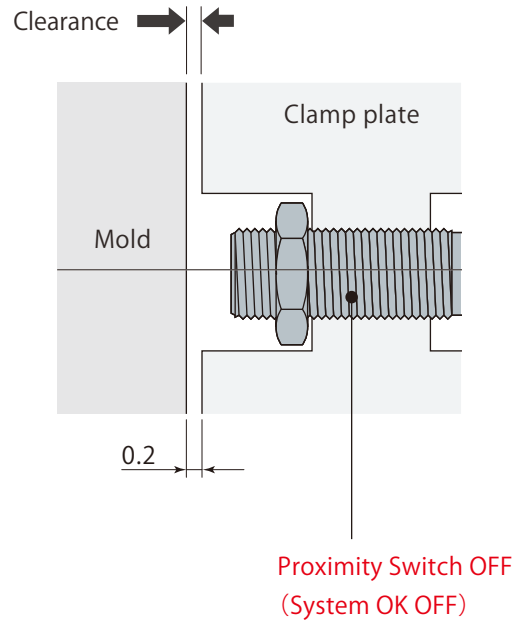
Gap detecting proximity switch (Standard)

When the mold is 0.2 mm or more away from the clamping plate (floating), the proximity switch turns off and the mold opening/closing operation of the molding machine is disabled. (This function differs from the conventional mold misalignment detection system. Please contact Pascal for details.)

Normal status of clamp



When the mold detaches



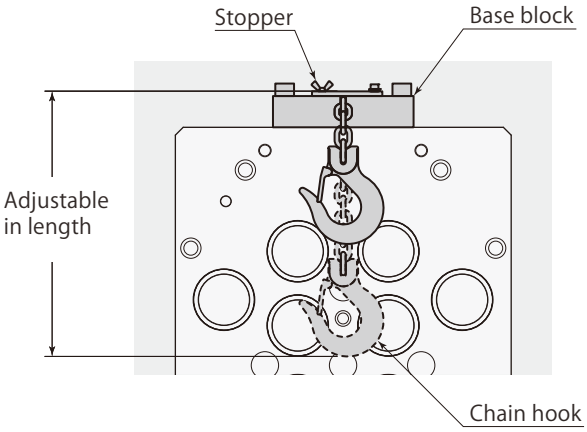
Circle Core multi mag clamp

Indicator (Standard) PAT.

Clamp status(ON or OFF) is indicated mechanically

Mold fall protection hook(option) model MGR

The protection hook with a easily adjustable chain (Optional)

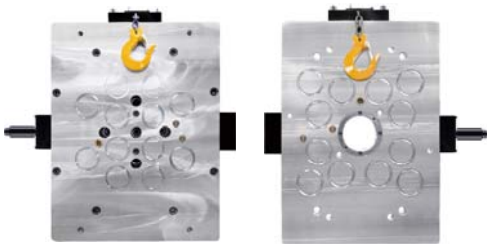


Stopper

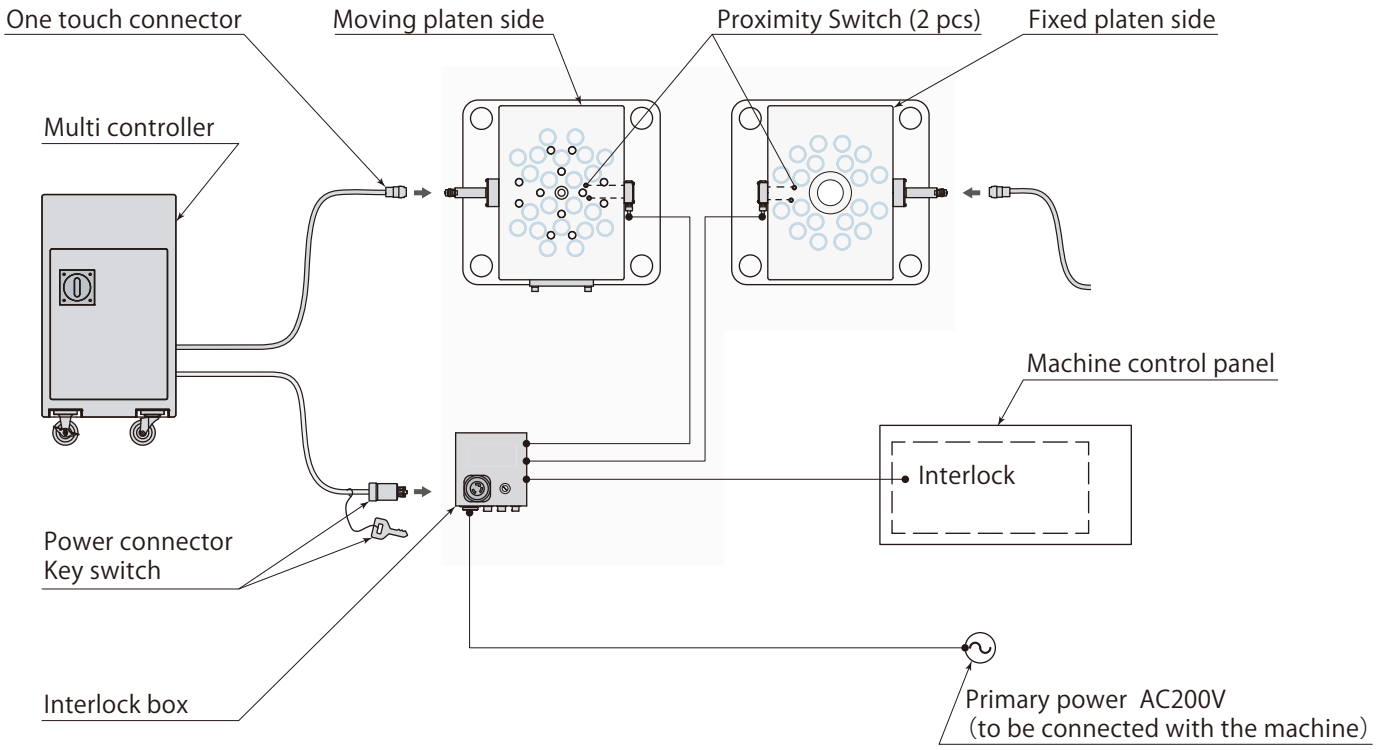
System configuration

Multi controller

Interlock box



Clamp plate for Fixed/Moving platen



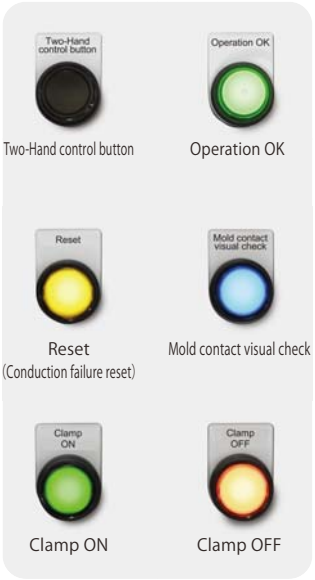
Connect the one-touch connector to the clamp plate and operate the fixed/movable plates individually. Before using the clamp, connect the power supply and switch the keyswitch to "setup".

Circle Core multi mag clamp

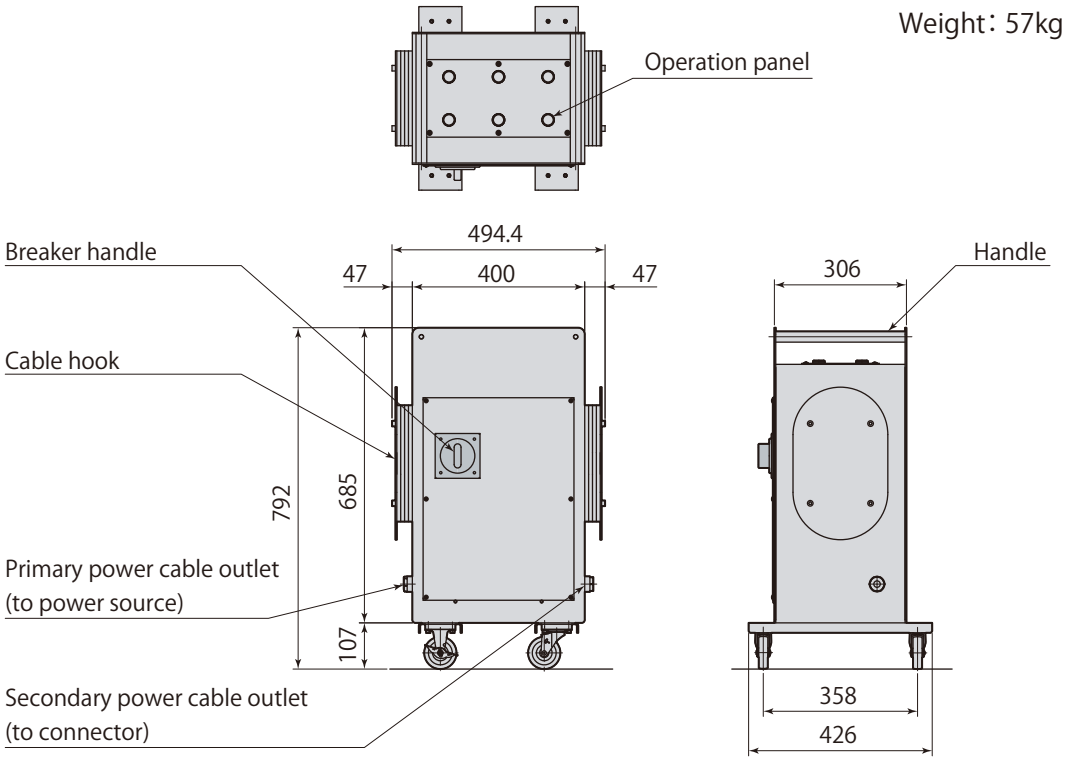
Multi controller

model ELR- A J 2 M C

- 200VAC only
- J : Japanese
  E : English



Weight: 57kg

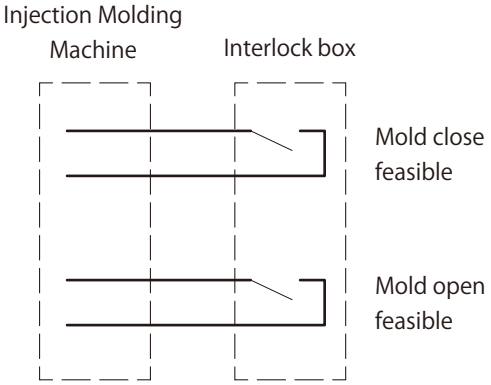


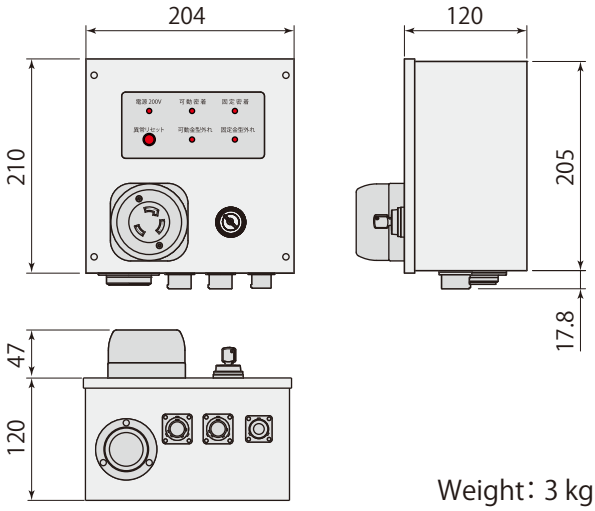
Interlock box

model ELR- A J 2 M L

- 200VAC only
- J : Japanese
  E : English

Before using the clamp, connect the power cable and switch the key switch to "setup". After use, return the key switch to "production" and remove the key before disconnecting the power cable. The signal between the devices shall be a zero potential contact.





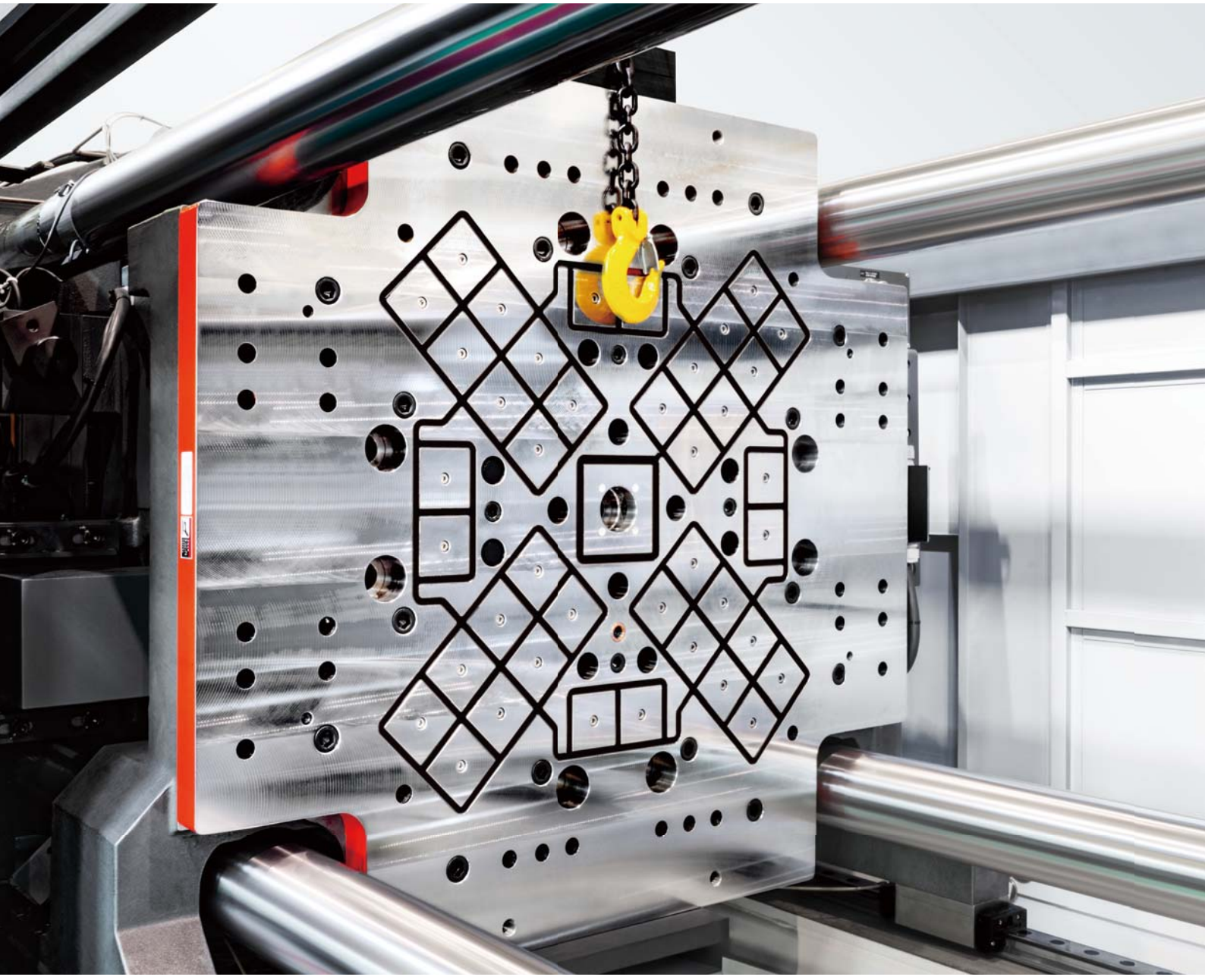
Weight: 3 kg

Interlock signals (From interlock box to the machine)

Name of signals	Description
Mold close feasible	Mold close operation is feasible at "ON" Mold close operation is disabled at "OFF" ※ The signal must always be monitored by the machine.
Mold open feasible	Mold open operation is feasible at "ON" Mold open operation is disabled at "OFF" ※ The signal must always be monitored by the machine.

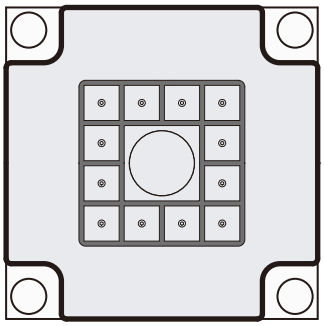
Square Core Mag Clamp Plate thickness 50mm Clamping force 500 - 30,000 kN

For applications with high temperatures above 120°C select a Square Core Mag Clamp.

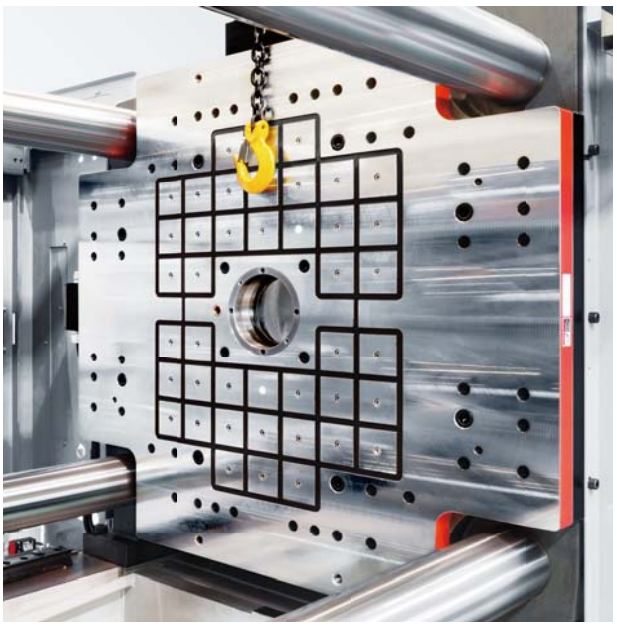


Square Core Mag Clamp Plate thickness 35mm Clamping force 200 - 1,500 kN

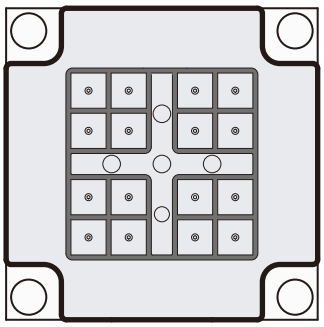
Moving platen



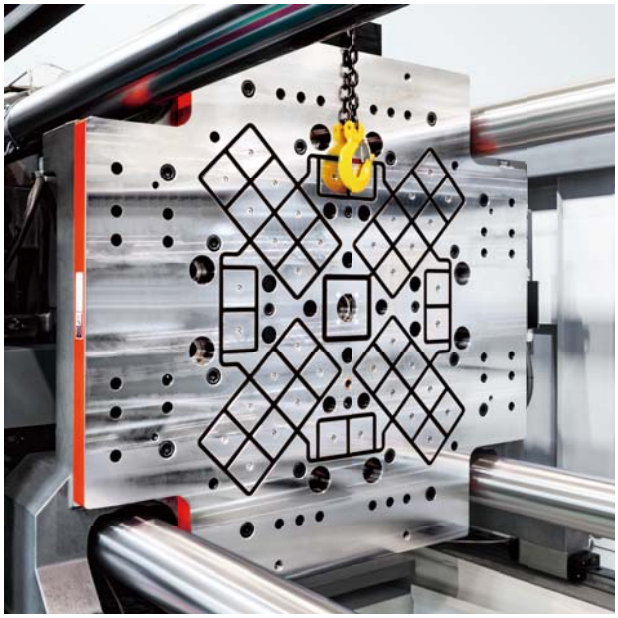
Moving platen



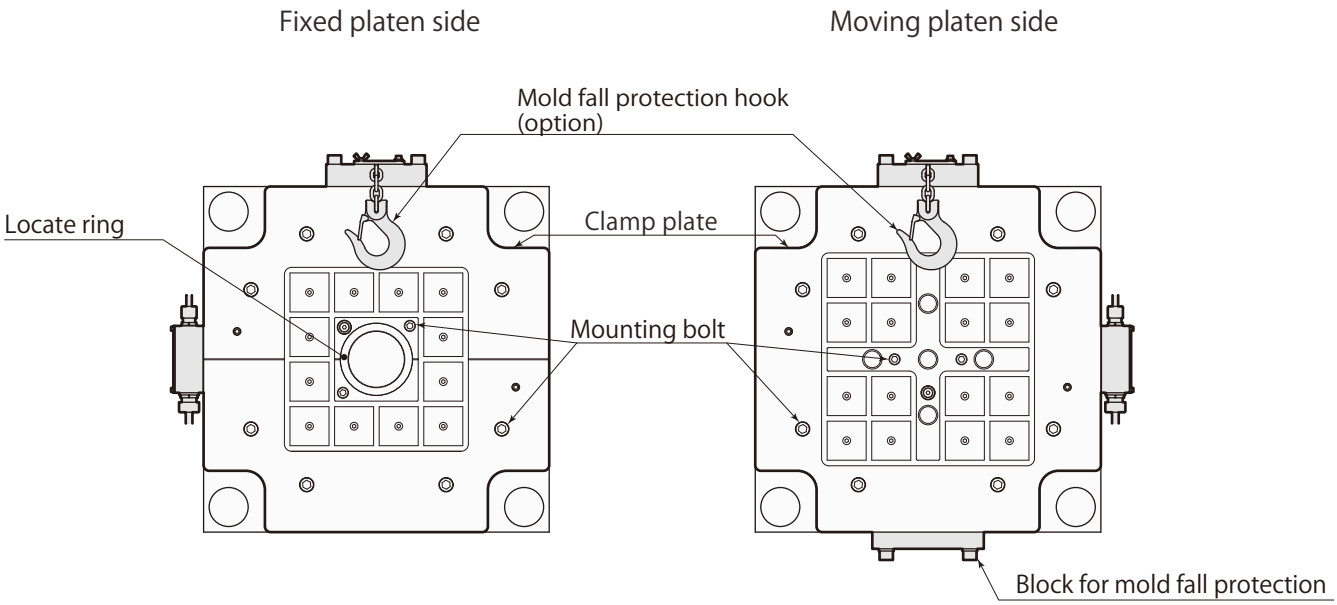
Fixed platen



Fixed platen



Square Core Mag Clamp Plate thickness 50mm Clamping force 500 - 30,000 kN



Specifications

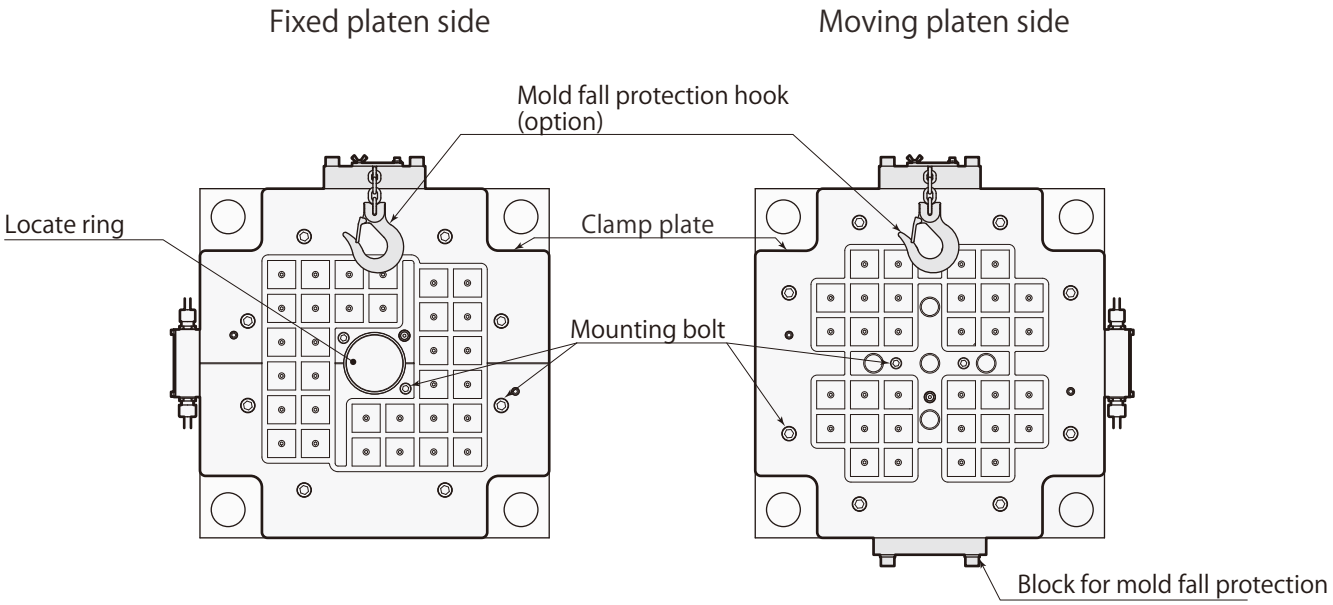
Model		MG□
Clamping force (per magnet core)	70×70mm	7.35kN
	75×75mm	7.84kN
	115×115mm	15.68kN
Operating temperature ℃		0 ～ 80 , 0 ～ 150 , 0 ～ 180
Magnetic flux height mm		20 (mold plate material SS400)
Power voltage		AC200 / 220 , 380 , 440 , 480V
Applicable machine		For general Injection Molding Machine
Sensor		Mold displacement detection system (Fixed and moving platen)
Plate mounting method		Bolting with the standard and additional tap holes of machine platens

- Operating temperature indicates the temperature on the surface of the clamp plate
- Additional tap holes are necessary in the center of the machine platen (Fixed and moving platen)
- Polishing surface and Nickel plating (Electroless) can be selected
- See page → 52 to 59 for details of options

Clamp plate							Mold fall protection hook(optional)			
Model	Clamping force of IMM kN	Plate thickness mm	Weight kg		Voltage capacity kVA	Min. mold size mm	Model	Eye bolt on mold		Max. Allowable load per hook ton
			Fixed platen side	Moving platen side				Size	Qty	
MGA0050	500 ~ 600	50	80	85	15	240	MGR064	M12 ~ M24	2	0.40
MGA0080	750 ~ 850		107	116		260	MGR065			
MGA0100	1,000 ~ 1,200		127	131	30	280				
MGA0130	1,300		163	169		280				
MGA0140	1,300		170	172		310				
MGA0150	1,400 ~ 1,600		171	177		310	MGR066			1.70
MGA0160	1,400 ~ 1,600		179	180		370				
MGA0180	1,700 ~ 1,800		185	188		330				
MGA0190	1,700 ~ 1,800		199	209		370				
MGA0230	2,200 ~ 2,300		260	260	40	400				
MGA0250	2,500 ~ 2,600		293	295		420				
MGA0280	2,800 ~ 3,000		315	320		440				
MGA0350	3,500 ~ 3,600		403	406		475	MGR082	M16 ~ M30		3.03
MGA0450	4,500	52	523	529		565	MGR102	M20 ~ M42	4	4.80
MGA0550	5,500		624	650		570				
MGA0650	6,500		786	787	45	635				
MGA0850	8,500		846	850		710				
MGA1050	10,000 ~ 10,500		1,201	1,205		790				
MGA1300	13,000		1,376	1,380		855				
MGA1600	14,000 ~ 16,000		1,428	1,434	80	970	MGR132	M24 ~ M48		8.04
MGA2000	18,000 ~ 20,000		2,017	1,980		1,000	MGR162	M36 ~ M64		12.06
MGA2500	22,000 ~ 25,000		2,162	2,218	100	1,065				
MGA3000	28,000 ~ 30,000		2,512	2,540		1,140				

- Reference value
- Capacity when 200/220VAC power voltage. Ask Pascal for 380, 440 and 480VAC.
- Reference value under normal production conditions, not guaranteed.
- The size of the eye bolt on the mold is determined according to the size of the hook. Make sure that the allowable load of the eye bolt is greater than the mold weight.
- The number of eye bolts on mold side indicates one per mold（movable side & fixed side）.

Square Core Mag Clamp Plate thickness 35mm Clamping force 200 - 1,500 kN



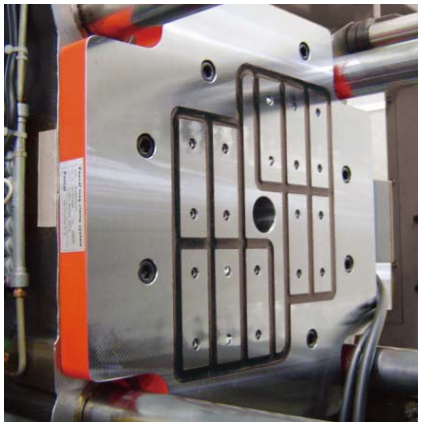
Specifications

Model		MG□
Clamping force (per magnet core)	70×70mm	3.43kN
	75×75mm	2.45kN
	115×115mm	7.84kN
Operating temperature ℃		0 ～ 80 , 0 ～ 150 , 0 ～ 180
Magnetic flux height mm		20 (mold plate material SS400)
Power voltage		AC200 / 220 , 380 , 440 , 480V
Applicable machine		For general Injection Molding Machine
Sensor		Mold displacement detection system (Fixed and moving platen)
Plate mounting method		Bolting with the standard and additional tap holes of machine platens

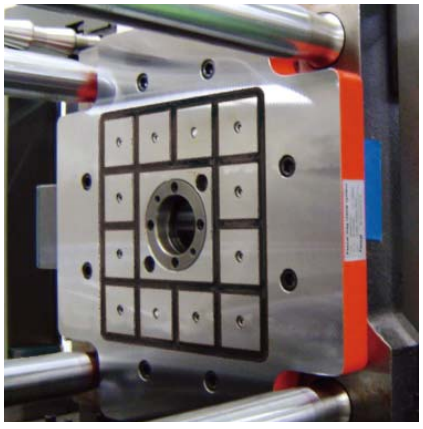
- Operating temperature indicates the temperature on the surface of the clamp plate
- Additional tap holes are necessary in the center of the machine platen (Fixed and moving platen)
- Polishing surface and Nickel plating (Electroless) can be selected
- See page → 52 to 59 for details of options

Clamp plate							Mold fall protection hook(optional)			
Model	Clamping force of IMM kN	Plate thickness mm	Weight kg		Voltage capacity kVA	Min. mold size mm	Model	Eye bolt on mold		Max. Allowable load per hook ton
			Fixed platen side	Moving platen side				Size	Qty	
MGA0020S	200	35	34	32	15	130	MGR064	M12 ～ M24	2	0.40
MGA0030S	300 ～ 350		46	48		200				
MGA0050S	400 ～ 550		55	60	30	215				
MGA0055S	400 ～ 550		55	60		225				
MGA0060S	600		58	63		240				
MGA0080S	750 ～ 800		73	79	40	290	MGR065			
MGA0100S	1,000 ～ 1,100		87	91		300				
MGA0130S	1,200 ～ 1,300		111	116		330				
MGA0150S	1,400 ～ 1,500		120	123		370	MGR066			1.70

- Reference value
- Capacity when 200/220VAC power voltage. Ask Pascal for 380, 440 and 480VAC.
- Reference value under normal production conditions, not guaranteed.
- The size of eye bolt on the mold is determined according to the size of the hook. Make sure that the allowable load of the eye bolt is greater than the mold weight.
- The number of eye bolts on mold side indicates one per mold（movable side & fixed side）.



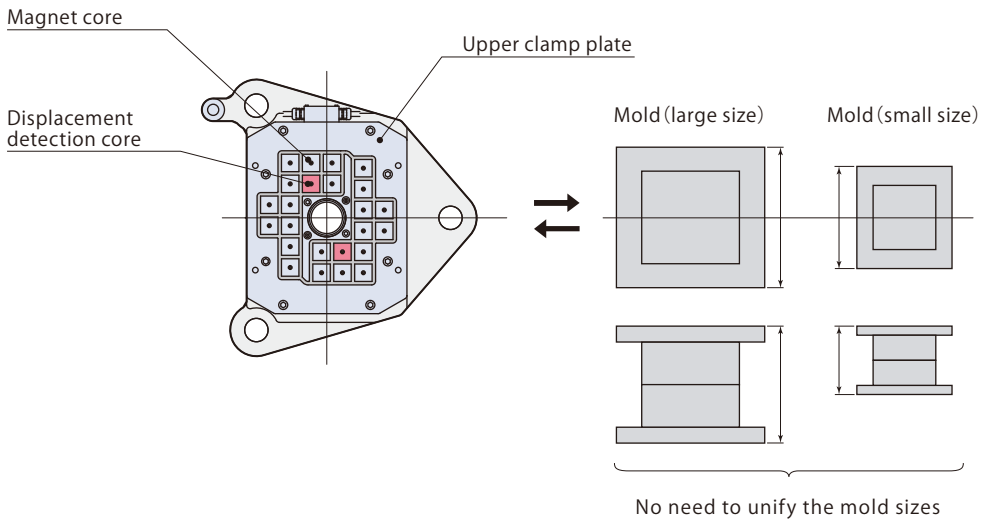
Moving platen side

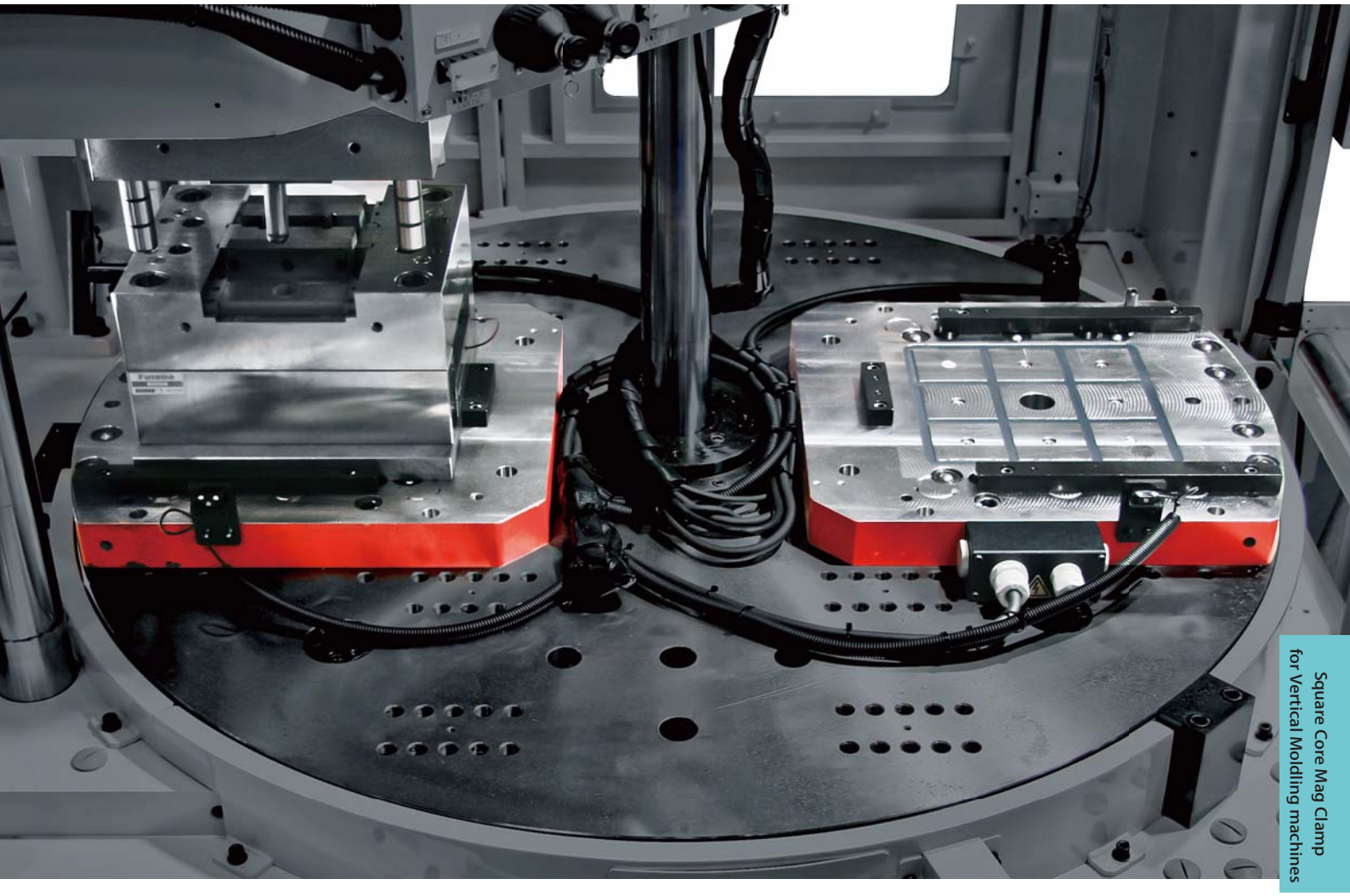


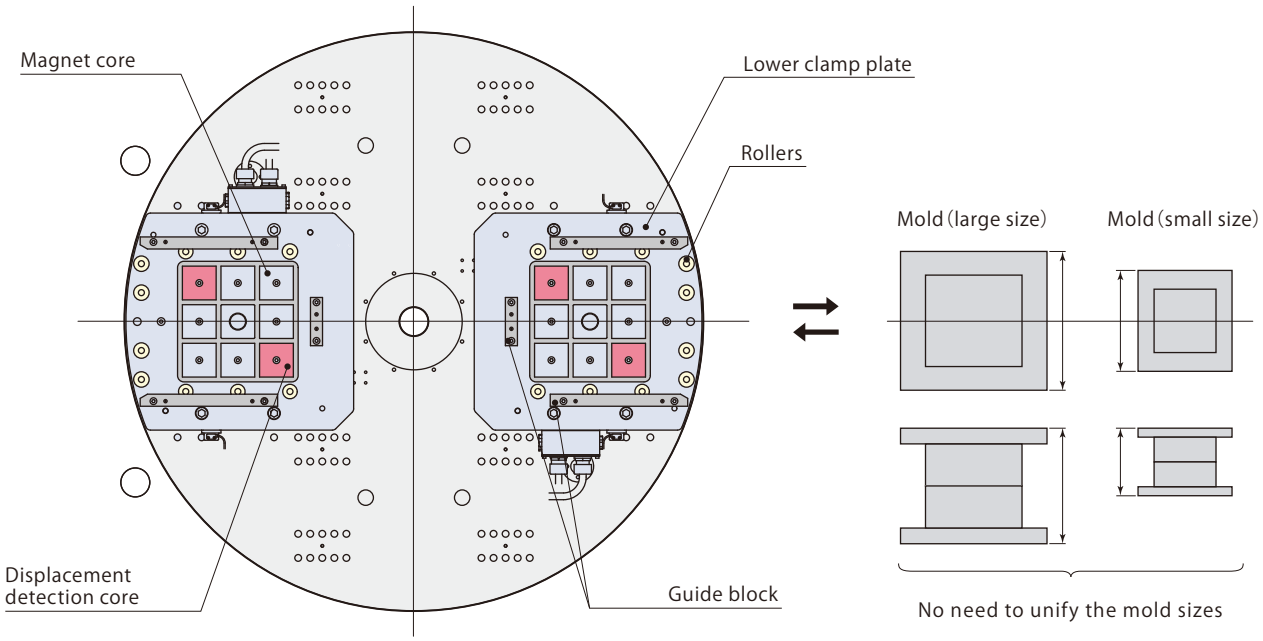
Fixed platen side

Square Core Mag Clamp the model for Vertical Molding machine

Mag clamps for vertical IMMs eliminate bolting jobs (temporary tightening, retightening) in the limited space of the machine and shortens set up time considerably.

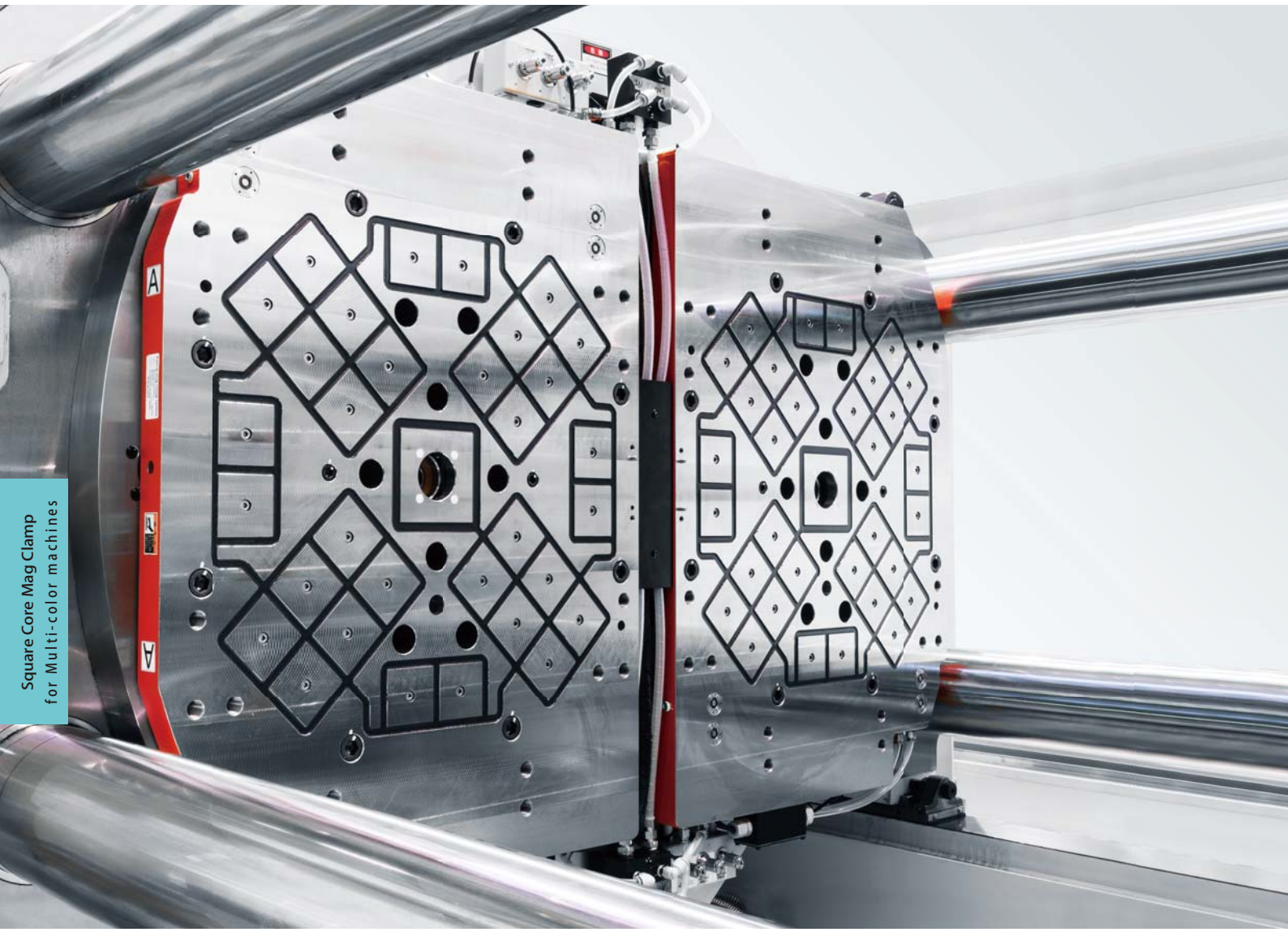





Magnet core
Lower clamp plate
Rollers
Displacement
detection core
Guide block
Mold (large size)
Mold (small size)
No need to unify the mold sizes

Square Core Mag Clamp the model for Multi-color machine

Mold change with no work in the machine



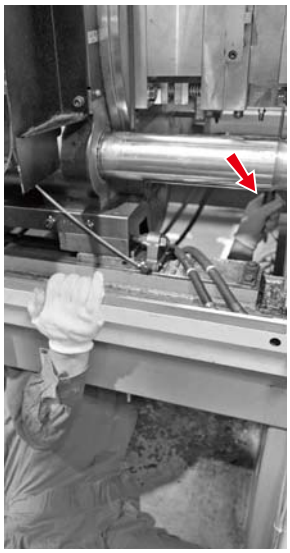
6,000kN（600ton） Two-color IMM vertical loading Mag clamp

Fixing by bolts

It takes a long time for operators to install / remove bolts many times in the narrow space of the machine.

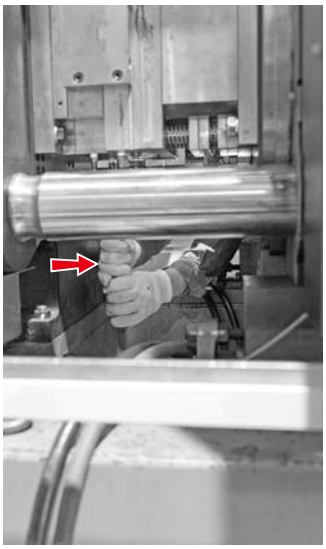
Mold changing time：60min (250 ton class)

Easy to drop tools.

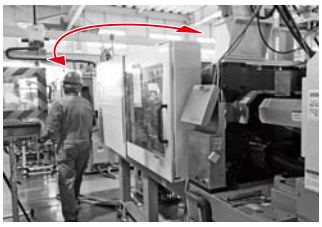


Limited power exertion.

No visual



Need to move to operation / non-operation side to install / remove bolts.



Install bolts many times.

Mag clamp

Clamps instantly with magnetic force and does not require work in the machine.

Mold changing time：15min (250 ton class)

- Simply use the operation panel to clamp and unclamp the mold.

- No work in the machine requlred.

- Mold change complete in just **15 minutes**.

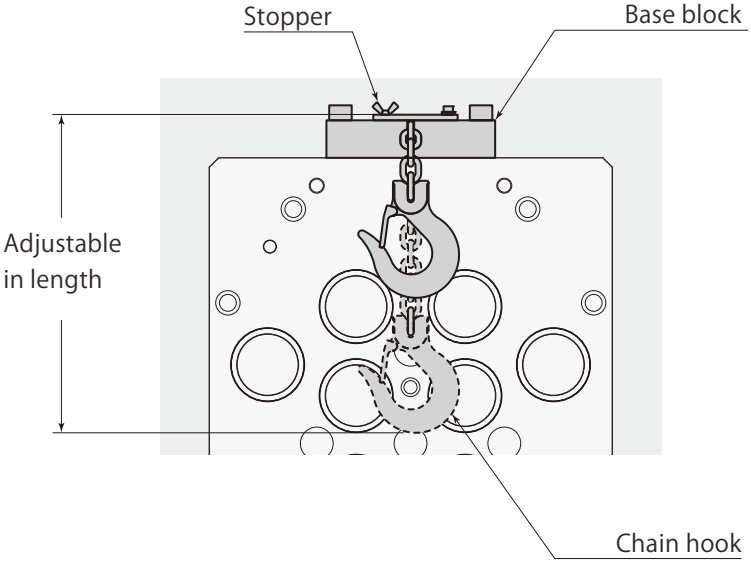
A video of the mold change operation for a two-color IMM with a mag clamp is available on the Pascal web site.

Mold fall protection hook (length adjustable) model MGR

Optional

Additional safety measure for mold fall prevention

Mold fall protection hook with an easily adjustable chain



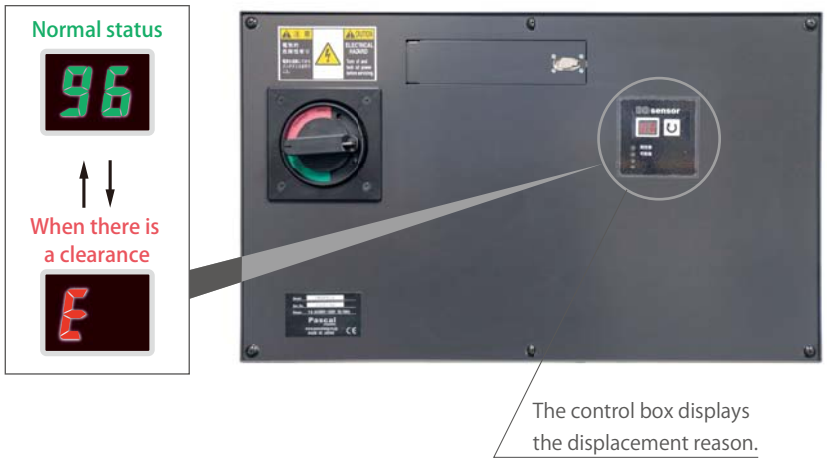
Stopper

DD sensor

This magnetic clamp features a built-in DD sensor that checks the mold condition numerically. It can detect drops in clamping force due to a gaps or clearance between the mold and the plate that are caused by mold material that is difficult for the magnetic force to pass through.

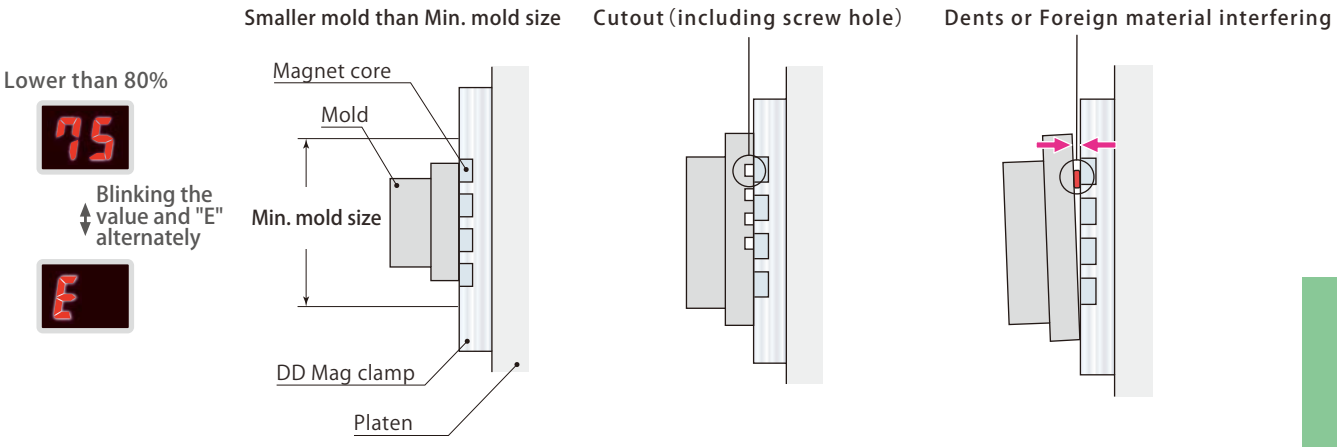
Normal status

This display indicates  when the mold size is proper for the system. It also ensures that there are no clearances and that the mold material and temperature are adequate.

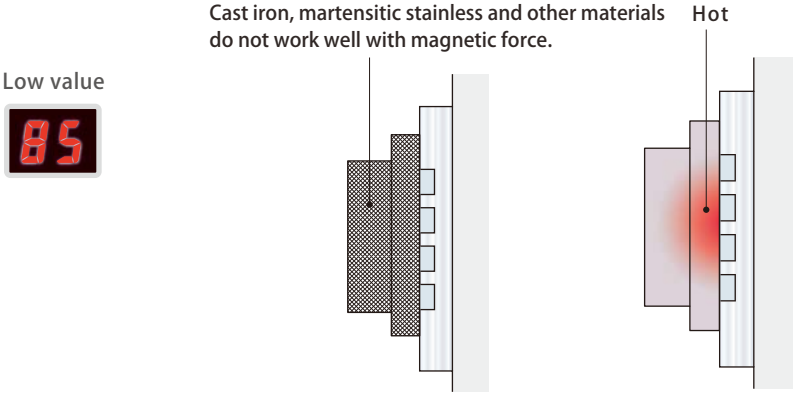


Abnormal signal output (Indicated on the display)

An abnormal signal is detected when the clamping force drops to less than 80% due to a clearance.



The display indicates a lower value than usual if the clamp force decreases due to the mold material or temperature.

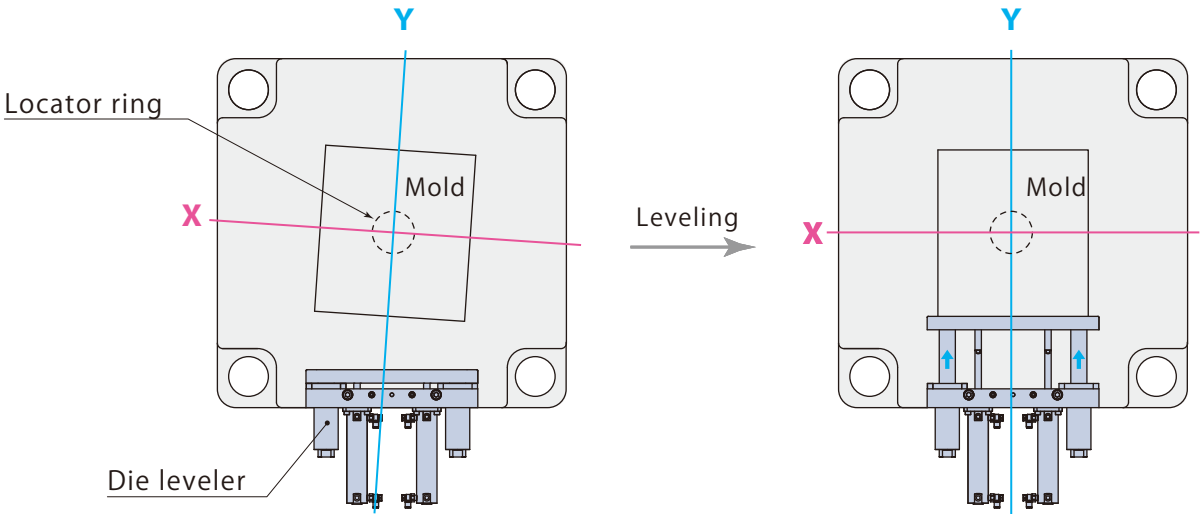


Die leveler

Optional

Mold centering with a locate ring and leveling with the Die Leveler can be automated, which can reduce mold setup time.

The locate ring centers the mold and the Die Leveler pushes the mold to level it.

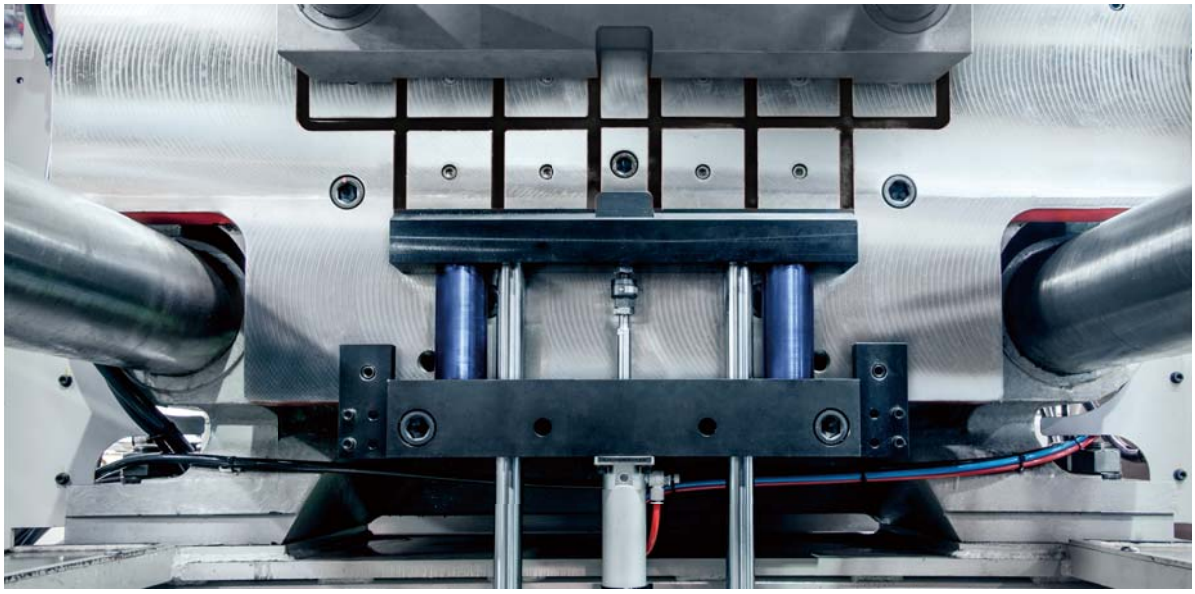


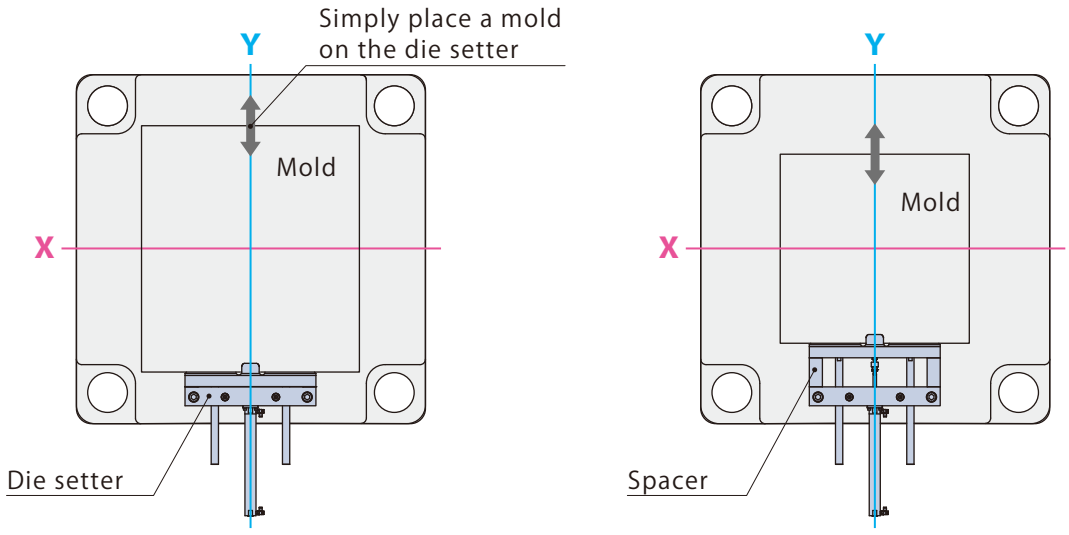
● Refer to the Die Leveler catalog for details

Die setter

Mold change without locate rings

Simply place a mold on the Die Setter, and it horizontally and vertically positions the mold, improving setup.





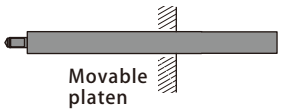
● Refer to the Die Setter catalog for details

Easy Ejector Rod PAT.

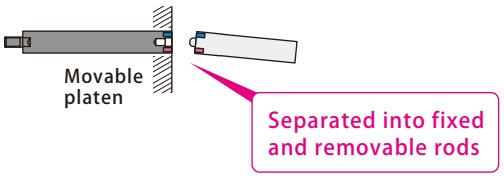
The Pascal Easy ejector rod makes ejector rod changes dramatically easier.

The ejector rod is equipped with a magnet at the joint between a fixed rod and a detachable rod, allowing the detachable rod to be attached and detached with a single touch.

Conventional ejector rod

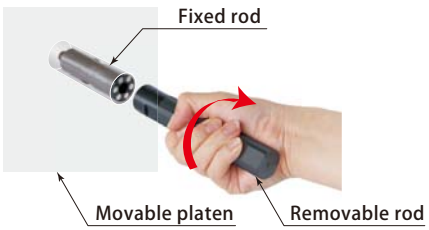


Easy ejector rod



Quick installation

Quick de-installation
(Separated into fixed and removable rod)



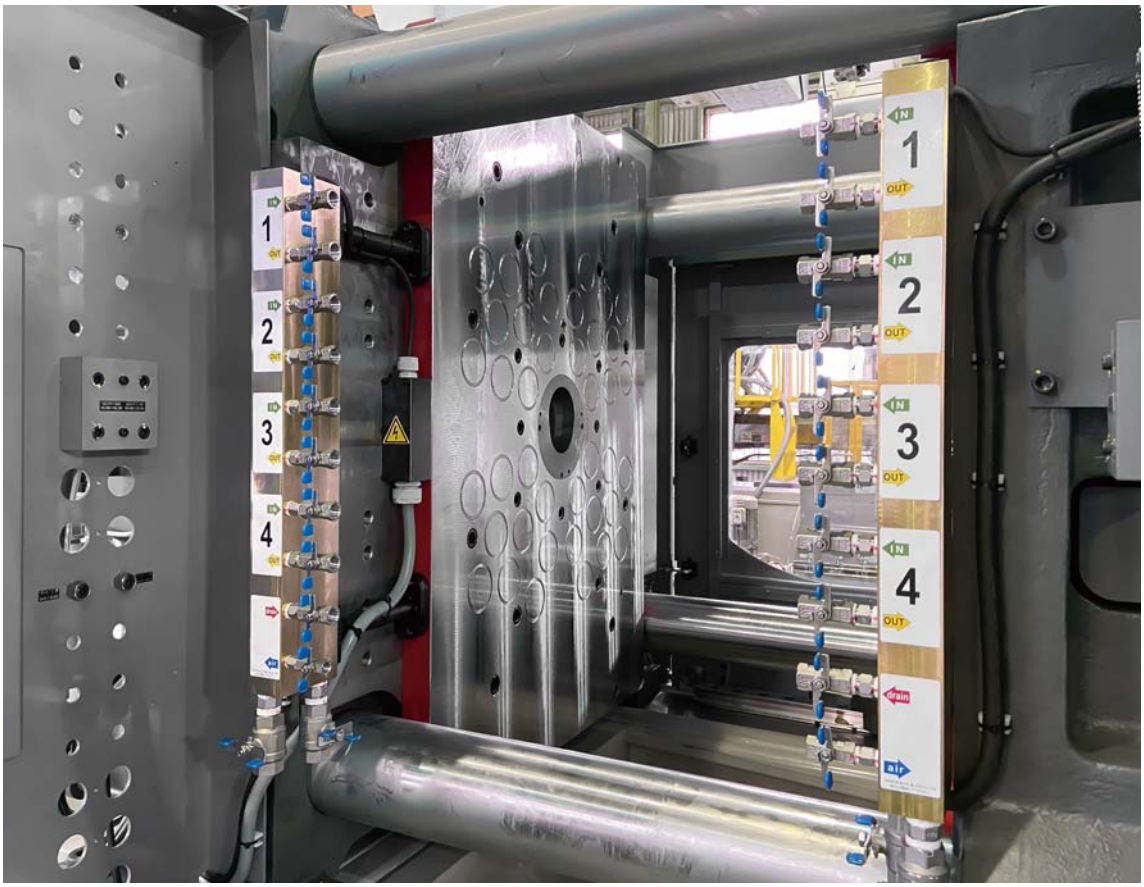
- Only 300g & 1/10-lightweight !!
  ＊350ton-class
- No tools required
- Avoid dangerous work
- Simply detach removable rods

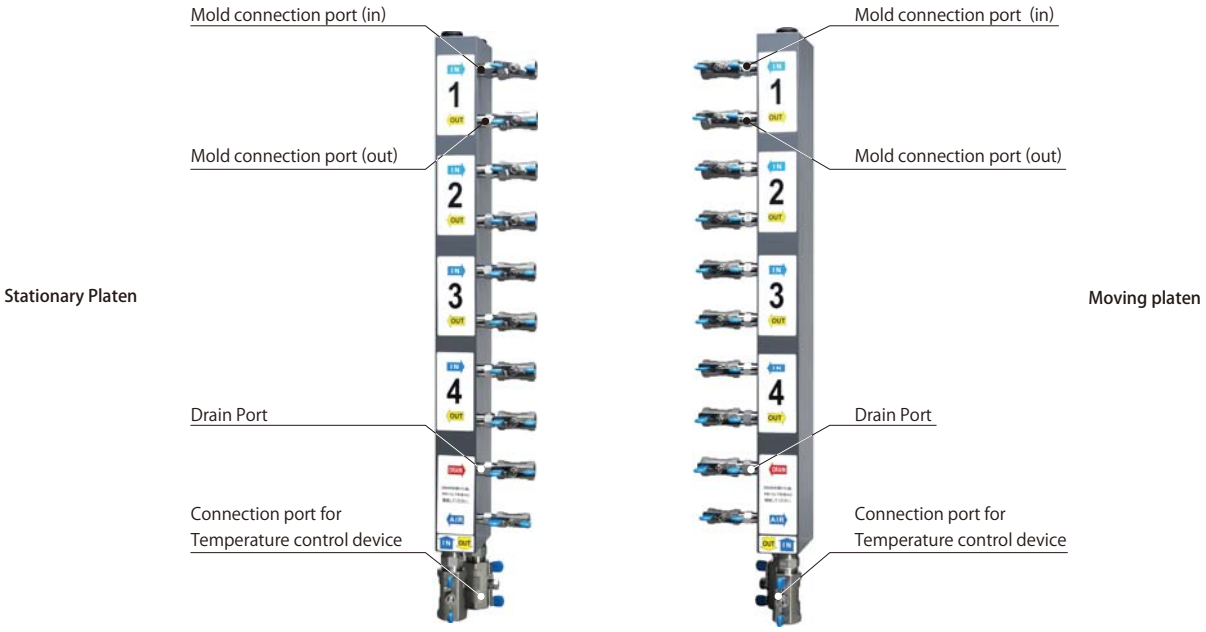
● Refer to the Easy Ejector Rod catalog for details

Optional

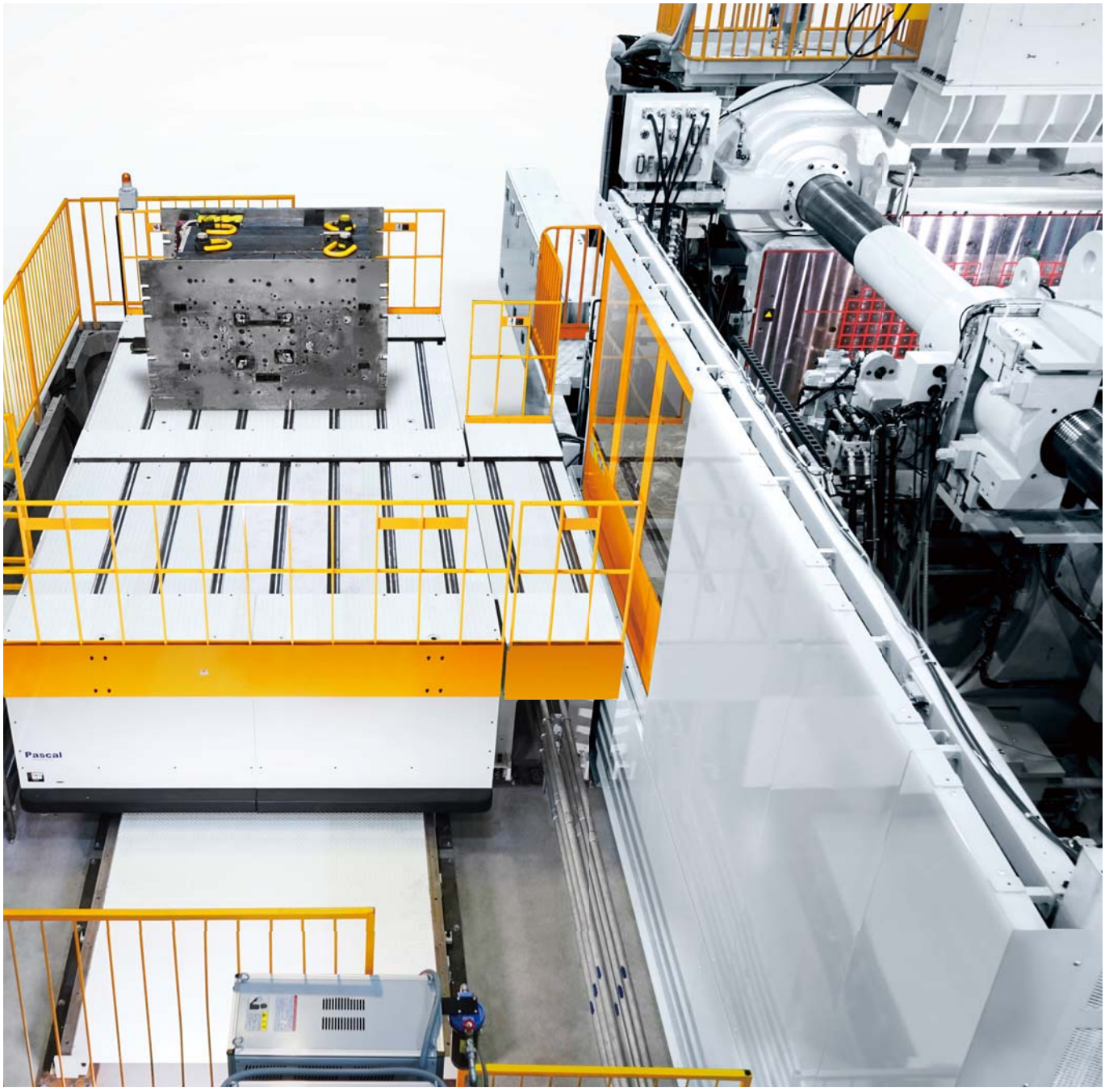
Valve stand

It prevents the miscoupling of temperature control piping for quick die change. Hoses are not scattered around the plant floor and machine area, keeping them tidy for easy maintenance.





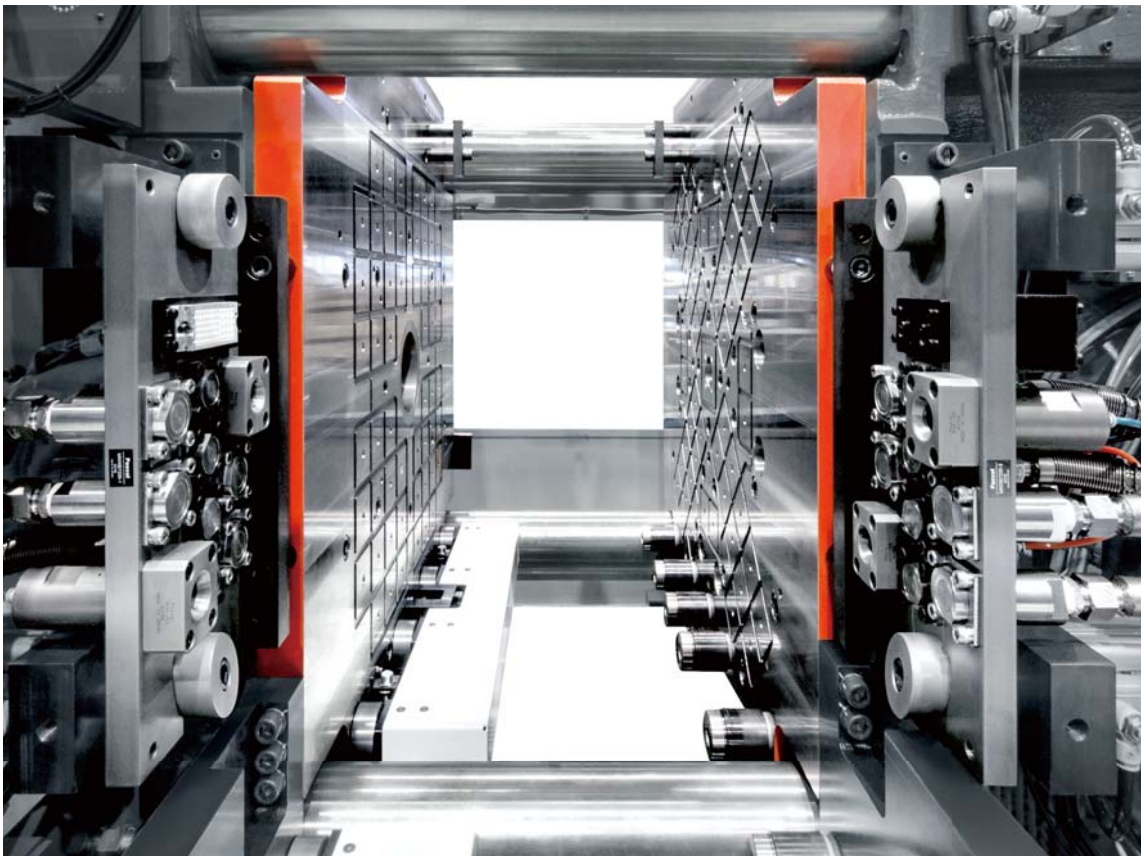
● Refer to the Valve Stand catalog for details

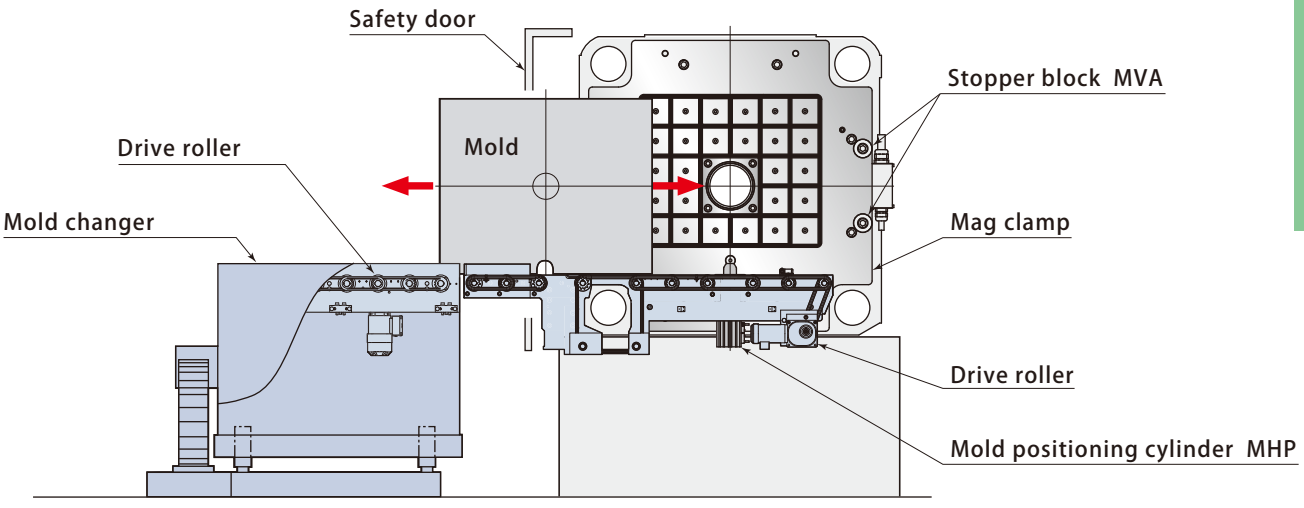


Mag Clamp & Die Changer for 30000kN Injection Molding Machine, Mold weight 30 tons, Max.3581kN clamp force (Fixed and moving platen total)

Automatic Mold Change with Die Changers

Crane-less die change operations can be achieved by introducing a die changer.



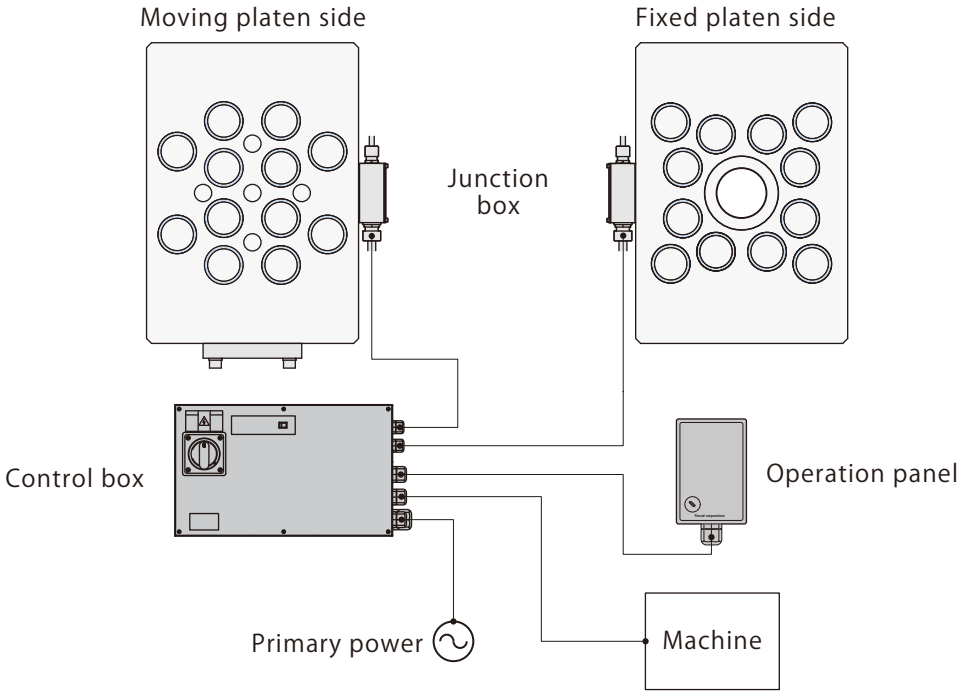


● Refer to the Die Changer catalog for details

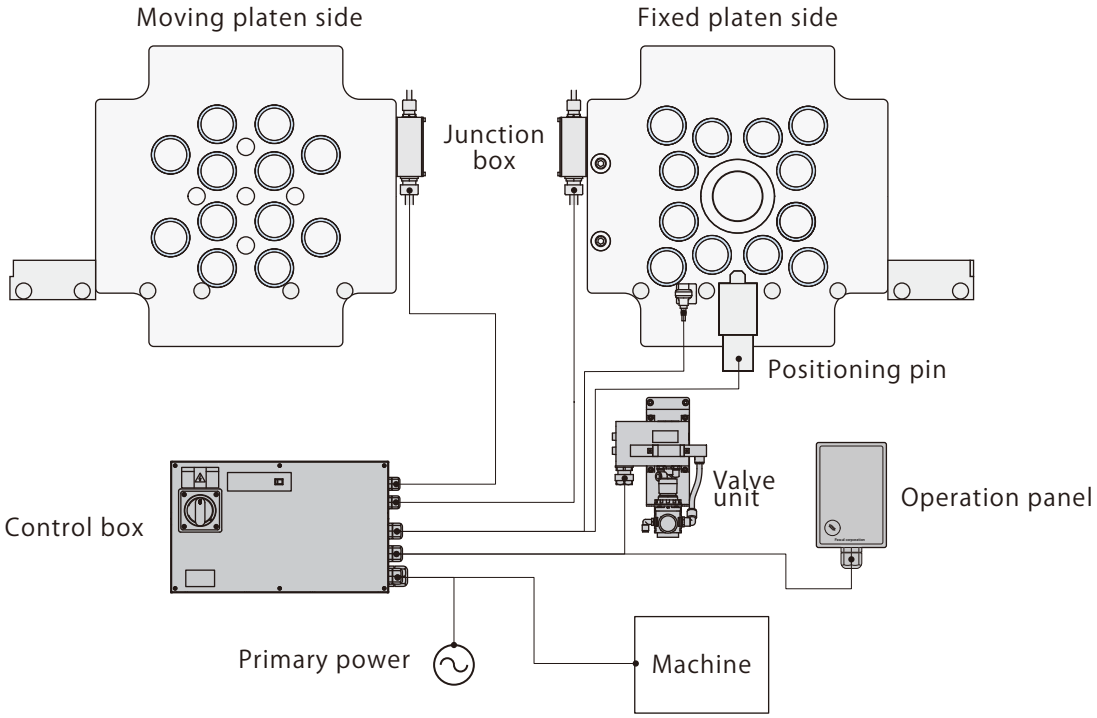
Optional

The system configuration is the same for Circle Core Mag Clamps and Square Core Mag Clamps.

Mold change by overhead cranes



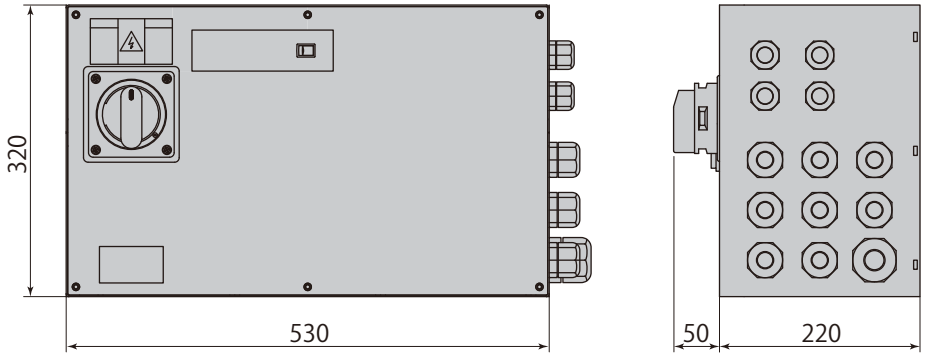
Mold Change with Die Changers



Control box

model EMG R

R : Circle Core
S : Square Core

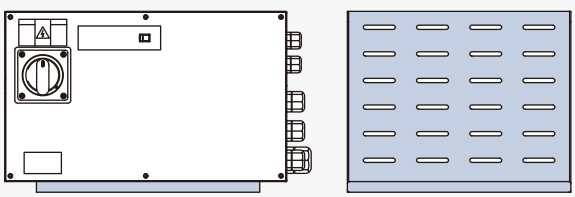


Weight: 25 ~ 80 kg

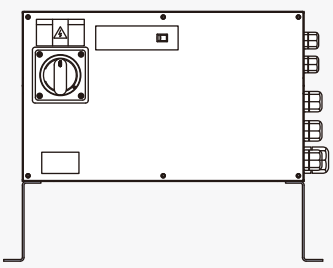
The diagram above denotes the dimensions of EMGD-A2J2.

Mounting bracket

Wall mount type



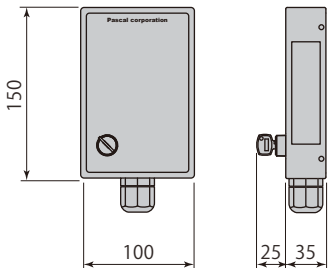
Self-standing type



Mold change by overhead cranes　System configuration

Operation panel

model **ESMS-AE**



Weight：0.6 kg

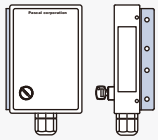
It can be mounted to the machine or the wall with the tap holes on the back.

①	LED lit	IMM at manual or mold-set mode
②	LED lit	IMM injection nozzle retracts
③	LED lit	IMM clamps the mold by platens
④	LED lit	IMM mold open disabled
⑤	LED lit	IMM mold close disabled
⑥	LED lit	When mold displacement detection errors occur, the SCR unit is out of order.
	LED blinking	If a cable is cut off, clamp ON/OFF conduction error happens (Current value decrease)
	LED blinking	Clamp abnormal for DD sensor (Magnetic flux decrease)
⑦	LED lit	Communication error between operation panel and control box
⑧	LED lit	Mold change operation possible
	LED lit off	Mold change operation disabled (due to lack of interlocking signals)
⑨	Molding	Mold change operation done
	Change	During mold change operation
⑩ ⑪	LED lit	Clamp ON/OFF operation possible
	LED blinking	Operation suspended
	LED blinking	Clamp abnormal for DD sensor (Magnetic flux decrease)

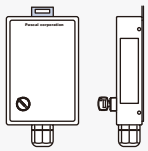
⑫	LED lit	Mold moves on the clamp plate
⑬	LED blinking	Requires clamp operation again
⑭ ⑮	Clamp ON push botton	
	LED lit	Clamp ON complete
	LED blinking	Clamp magnetizing
⑯ ⑰	Clamp OFF push button	
	LED lit	Clamp OFF complete
	LED blinking	Clamp magnetizing

Mounting bracket

L type



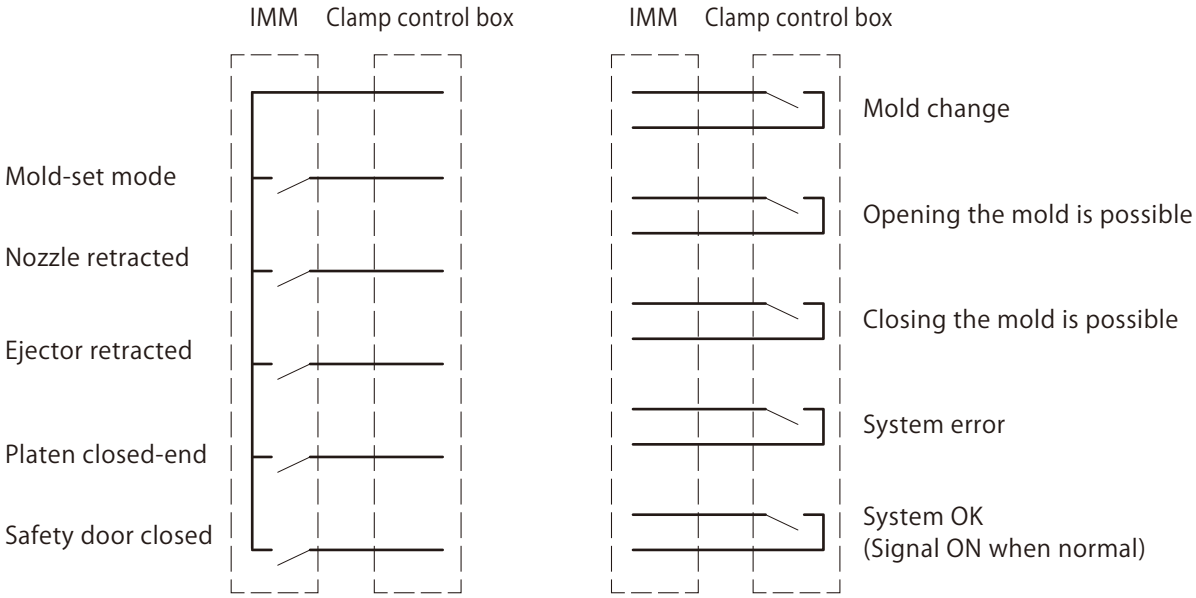
Wall mount type



System configuration

Interface

The interlock signals shall be transmitted by the way of zero potential contacts.



Injection Molding Machine → Clamp control box

Name of signals	Description
Mold-set mode	ON when machine operation mode at mold set
Nozzle retracted ∗1	ON when injection nozzle is retracted
Ejector retracted ∗1	ON when ejector is retracted
Mold clamped by platens	ON when mold is clamped by the machine platens in mold set mode, OFF when mold opens.
Safety door closed ∗1	ON when the machine safety door closed

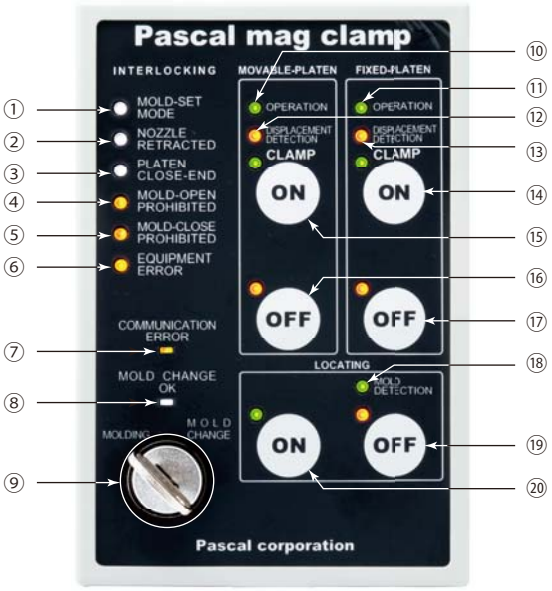
∗1 The signal can be omitted by changing the setting in the control box.

Clamp control box → Injection Molding Machine

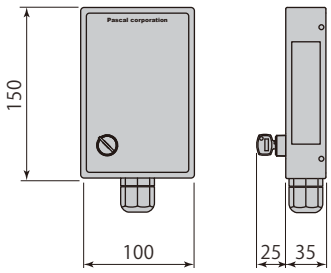
Name of signals	Description
Mold change	Mold changing (Operation panel selected mold change)
Mold close possible	A condition for IMM mold close
Mold open possible	A condition for IMM mold open
System error	This signal indicates abnormal clamping at the IMM
System OK (Signal ON when normal)	IMM stops immediately when clamp is abnormal (E-stop)

Mold Change with Die Changers　System configuration

Operation panel



model **ESMS-BE**



Weight：0.6 kg

It can be mounted to the machine or the wall with the tap holes on the back.

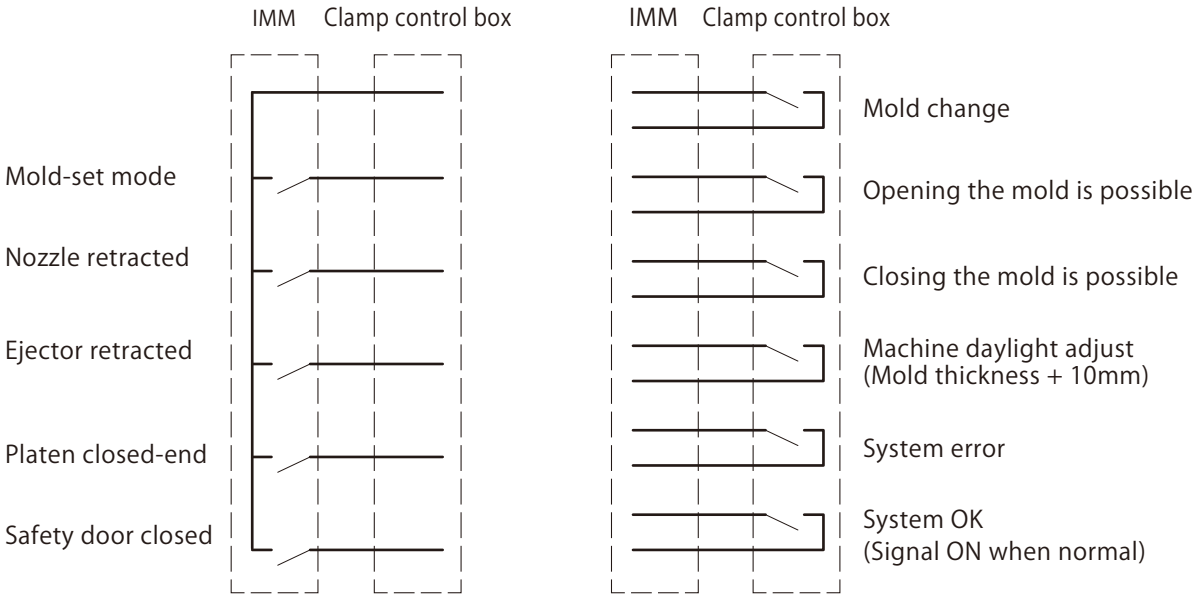
①	LED lit	IMM at manual or mold-set mode
②	LED lit	IMM injection nozzle retracts
③	LED lit	IMM clamps the mold by platens
④	LED lit	IMM mold open disabled
⑤	LED lit	IMM mold close disabled
⑥	LED lit	When mold displacement detection error occurs, SCR unit is out of order.
	LED blinking	If a cable is cut off, clamp ON/OFF conduction error occurs (Current value decrease)
	LED blinking	Clamp abnormal for DD sensor (Magnetic flux decrease)
⑦	LED lit	Communication error between operation panel and control box
⑧	LED lit	Mold change operation possible
	LED lit off	Mold change operation disabled (due to lack of interlocking signals)
⑨	Molding	Mold change operation complete
	Change	During mold change operation
⑩ ⑪	LED lit	Clamp ON/OFF operation possible
	LED blinking	Operation suspended
	LED blinking	Clamp abnormal for DD sensor (Magnetic flux decrease)

⑫	LED lit	Mold moves on the clamp plate
⑬	LED blinking	Requires clamp operation again
⑭ ⑮	Clamp ON push botton	
	LED lit	Clamp ON complete
	LED blinking	Clamp magnetizing
⑯ ⑰	Clamp ON push botton	
	LED lit	Clamp OFF complete
	LED blinking	Clamp magnetizing
⑱	LED lit	Mold in the machine
	LED lit off	Mold not in the machine
⑲	Mold positioning ON push button	
	LED lit	Mold positioning pin dowelled
	LED blinking	Mold positioning pin dowelling
⑳	Mold positioning OFF push button	
	LED lit	Mold positioning pin released
	LED blinking	Mold positioning pin releasing

See page →62 for bracket details

Interface

The interlock signals shall be transmitted by the way of zero potential contacts.



Injection Molding Machine → Clamp control box

Name of signals	Description
Mold-set mode	ON when machine operation mode at mold set
Nozzle retracted ∗1	ON when injection nozzle is retracted
Ejector retracted ∗1	ON when ejector is retracted
Mold clamped by platens	ON when mold is clamped by the machine platens at mold set mode, OFF when mold opens.
Safety door closed ∗1	ON when the machine safety door closed

∗1 The signal can be omitted by changing the setting in the control box.

Clamp control box → Injection Molding Machine

Name of signals	Description
Mold change	Mold changing (Operation panel selected mold change)
Mold close possible	A condition for IMM mold close
Mold open possible	A condition for IMM mold open
Machine daylight adjust (Mold thickness + 10mm)	The signal controls machine mold open operation (Mold thickness + 10mm)
System error	This signal indicates abnormal clamping at the IMM
System OK (Signal ON when normal)	IMM stops immediately when clamp is abnormal (E-stop)

Caution in use

⚠ Warning

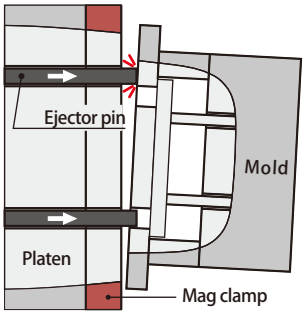
Keep away from the magnetic plate when it is magnetized.

- The Mag clamp generates powerful magnetic force. People with cardiac pacemakers are strictly prohibited from approaching the Mag Clamp. The projected height of magnetic flux above the clamp plate on the mold side is just around 20 mm. To avoid damage, do not to bring mobile phones, magnetic cards, compact discs, or any items that are susceptible to magnetism close to the clamp plate.
- Do not bring any magnetic substances such as ferrous metal close to the adhering surface when the Mag clamp is at clamping (Magnetized). Magnetic substances may be attracted to the clamp surface due to the magnetic force, resulting in injury to fingers or hands.

Check point before molding operation

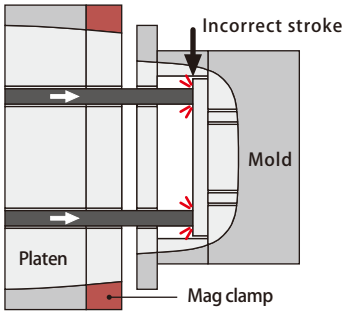
- Ejector setting errors can be critical as they can cause the mold to fall. A caution plate is provided for machine operators so that they can check the mounted position of the ejector pin, stroke, and displacement of the pin hole.

① Incorrect pin position



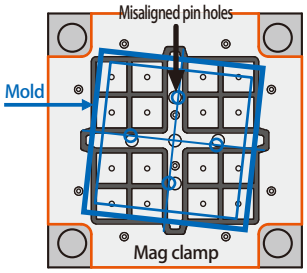
Check if the pin position is correct

② Incorrect stroke



Check if the pin stroke is correctly set

③ Misaligned pin holes



Check if the mold tilts

Recommended set values	Thrust force: Less than the clamping force on moving platen	Speed: 50mm/sec. or slower

Caution in use

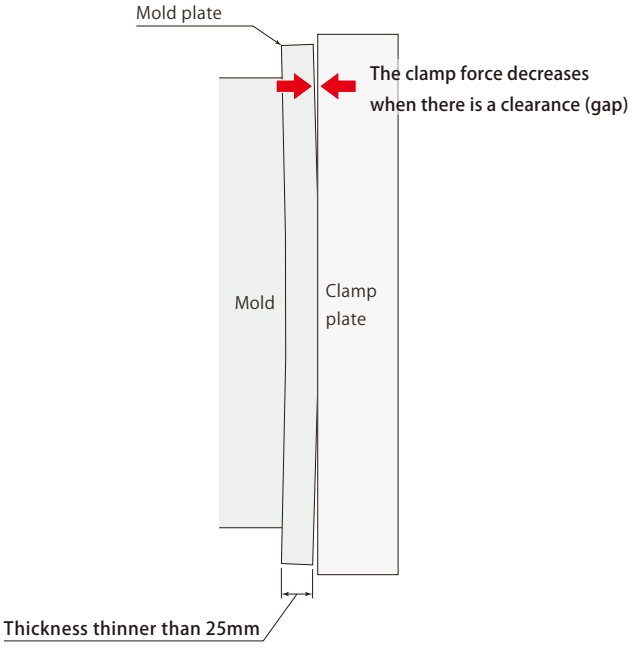
The surface of the mold plate and magnetic plate must always be clean. Wipe off when it is dirty and perform daily visual checks.

- Water, oil, etc. adhering to the surface will not directly cause a decrease in clamping force, but it does make it easier for dust and foreign substances to adhere to the surface. If there are any dents on the surface, remove the convexity (bulge) using an oil stone or similar tool. Foreign substances and dents can cause the damage to the magnet plate.

Surface, Mangetic plate　　Surface, Mold plate

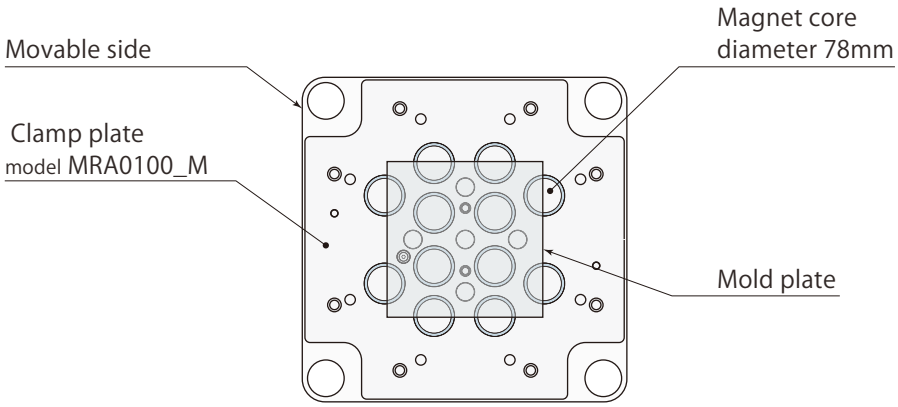
Be careful of mold plate deformation and thickness.

- Do not use a mold with a plate that is deformed or warped. Clamp force can decrease due to the gap between the mold plate and clamp plate.
- Use a mold plate with a thickness of 25 mm or more. The height of the magnetic force lines protruding toward the mold mounting plate is approximately 20 mm. If the mold plate is thinner than 25 mm, there is a risk of clamp force decreasing as well as sensor malfunction. If there is no restriction on mold thickness, a mounting plate thickness of 40 mm or more is recommended.
- In the rare case of a 3-plate mold, Pascal recommends increasing the mold plate thickness because magnetic force may affect the operation of the stripper plate.



Calculation of rated clamping force

- The clamping force of the Mag clamp (the adhering force of magnetic clamp) varies according to the area size (number of magnet cores) where the mold plate and clamp plate are in contact. When loading a small mold of which mold plate does not contact all the magnet cores, the rated clamping force is determined by the calculation formula shown below. Refer to the following calculation example.



Example : Clamp plate model MGA0100 (movable side)

1. Magnet cores that the mold plate contacts with its entire area = 4 pcs
2. Magnet cores that the mold plate contacts with 1/2 of its area = 8 pcs
3. Total magnet cores that the mold plate contacts

   = 4 pcs + 8 pcs × 1/2 = 8 pcs
4. Clamping force per magnet core = 7.0 kN/pcs
5. Rated clamping force = 7.0 kN/pcs × 8 pcs = 56 kN

- If there is a hole or notch at the bottom of mold plate, deduct the respective area from the total contact area (number of magnet cores)
- The actual clamping force may be less than the rated force according to the conditions of mold plate. (Regarding to the decline of clamping force)

Decline of clamping force

- According to the mold plate conditions for the mold, the actual clamping force may become less than the rating. Before using a mag clamp, be certain to calculate and acknowledge the decline of clamping force referring to the tables and charts below. And be sure to use in the strict condition that the actual clamping force is greater than the mold opening force of the injection molding machine.

(Actual clamping force) = (Rated clamping force - Reduced force) ≧ (Mold opening force of the injection molding machine)

If the actual clamping force is not sufficient, replace the mold plate with a larger one to increase the contact area on the clamp plate.

- Clamping force decreases according to the material of the mold plate. Also the mold plate that is made of S45C-H, SUJ and FCD600 material tends to be difficult to detach when demagnetized. This is due to the residual magnetic flux in the mold. A small clearance between the magnetic plate and mold plate will make it easiler to detach it.

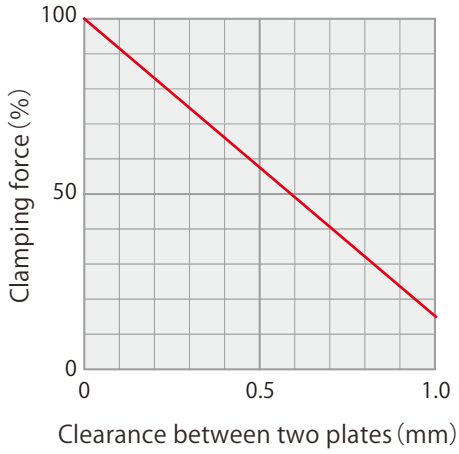
Clamping force	100% (Rated value)	95%	85%	80%	70%
Material	SS400 S55C S45C-H	S45C	SK3 SUJ	SUS430 FC250 FCD600	SKH51 SKD11

- The clamping force declines according to the grade of surface roughness in contact with the mold plate and clamp plate.

Clamping force	100% (Rated value)	approx.100%	approx.90%
Surface roughness (Max. height and surface roughness Rz)	Rz 1.6 ～ 3.8	Rz 7.5 ～ 15.5	Rz 85 ～ 150

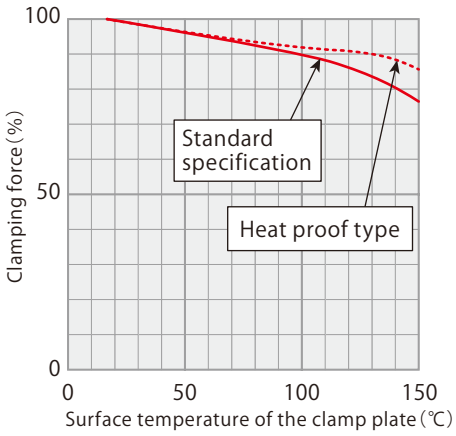
- A dent or deformation on the mold plate can create a gap between the mold and the clamp plate, which will decrease the clamping capacity significantly.

■ Clearance between two plates



- If the temperature of the mold plate becomes too hot, clamping force will significantly decrease. Clamp the mold when its mold plate temperature is below the operating temperature.

■ Temperature of the mold plate



Temperature transmitted to the mold plate

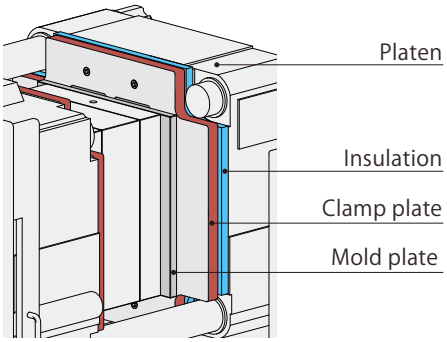
Caution in use

When using a heat insulating plate

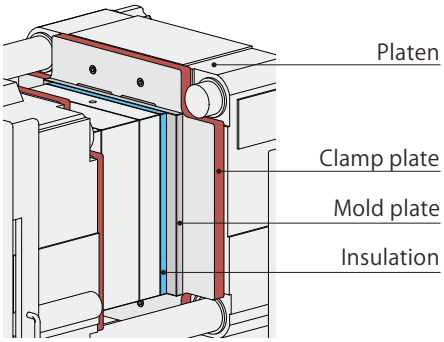
● Be careful of the position of the plate. The mag clamp cannot be operated depending on the position.

System operable

Between the platen and clamp plate

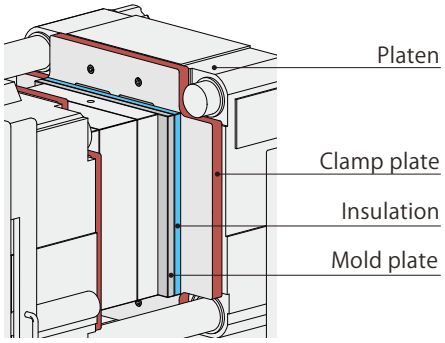


Between the mold and mold plate



System not operable

Between the mold plate and clamp plate



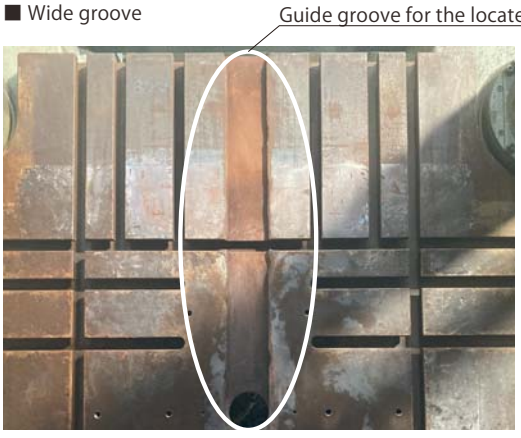
About existing machine platens

● Make sure the surface of the platens will not interfere with the Mag clamp when installing it on an existing machine.

■ Dents or scratches

● If wide grooves, dents or scratches are found on the platens, the Mag clamp may become deformed and malfunction.

■ Wide groove



GLOBAL NETWORK

● Plant ● Subsidiary ● Sales office ● Liaison office ● Agency

● Chicago (U.S.A.)
Subsidiary

64 West Seegers Road Arlington Heights, IL 60005, U.S.A.
TEL. +1-847-427-1234 FAX. +1-847-427-1222

● Stuttgart (Germany)
Subsidiary

Humboldtstr. 30/32, D-70771 Leinfelden-Echterdingen, Germany
TEL. +49-711-782-850-0 FAX. +49-711-782-850-29

● Dalian (China)
Plant / Subsidiary

1F No.100-1, Second Street, DD Port, Dalian Economic and Technological Development Zone, Dalian, Liaoning 116600, P.R.China
TEL. +86-411-8732-2988 FAX. +86-411-8732-7299

● Shanghai (China)
Subsidiary

1F, No.3 Office Building, Lane 1199, Jidi Road, Minhang Area, Shanghai 201107, P.R.China
TEL. +86-21-5263-4122 FAX. +86-21-6296-2882

● Changwon (Korea)
Subsidiary

1029, 37, Sangnam-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do 642968, Korea
TEL. +82-55-274-0971 FAX. +82-55-274-0972

● Bangkok (Thailand)
Liaison office

No.1 MD Tower 15Fl. Unit F, Soi Bangna-Trad 25, Bangna-Trad Rd. Kwang Bangnanua, Khet Bangna, Bangkok 10260, Thailand
TEL. +66-2173-5855 FAX. +66-2173-5857

DOMESTIC LOCATIONS

Head office / R & D center ・・・ ★Itami, Hyogo

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

Plant ・・・・・・・・・・・・・・・・・・・・
- ◎ Oita
- ◎ Yamagata

CERTIFICATE OF APPROVAL ISO9001

QMC-17E-8
2025. 03

Pascal