

# MAGNETIC CLAMP SYSTEM



Clamps mold with permanent magnets



(6600kN INJECTION MACHINE) MAGNET CLAMP SYSTEM



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# SR MAGNETIC CLAMP SYSTEM

## Clamps mold with permanent magnets

### Gentle to mold and peripheral equipments

Due to the whole mold face being used to clamp using magnetic force, deformation of mold is minimal and keeps the accuracy of products.

### Safety

Permanent magnets clamp (magnetize) mold, so the mold does not fall even in a power failure or a cable breakage. Sensors to catch mold separation and mold shifting. It sends an emergency signal to IMM to prevent accidents.

### Reduction of mold change time

Clamping (magnetizing) and unclamping (demagnetizing) takes only few seconds. This brings substantial reduction in mold change time.

### Unnecessary for mold size standardization

Mold size standardization is not necessary which is required for hydraulic or pneumatic clamping system. This makes full utilization of the platen.

### Advantages of introducing this system

### Labor saving

Manual tightening of bolts are eliminated in mold changing operation. Just one touch on the operation panel does the mold change. Also, this system provides stable clamping forces to clamp mold.

### Energy saving

Electric power is required only at clamping (magnetizing) and unclamping (demagnetizing) times, which saves energy and reduces running costs.

### Clean

It does not use hydraulic nor pneumatic, only uses electricity. Therefore this system is clean and it fits well even clean room environment.

### Long life

The permanent magnet which is used in this magnetic clamp system does not have secular change. There are no moving parts therefore it has a long life. Also because of that, daily maintenance is easy.

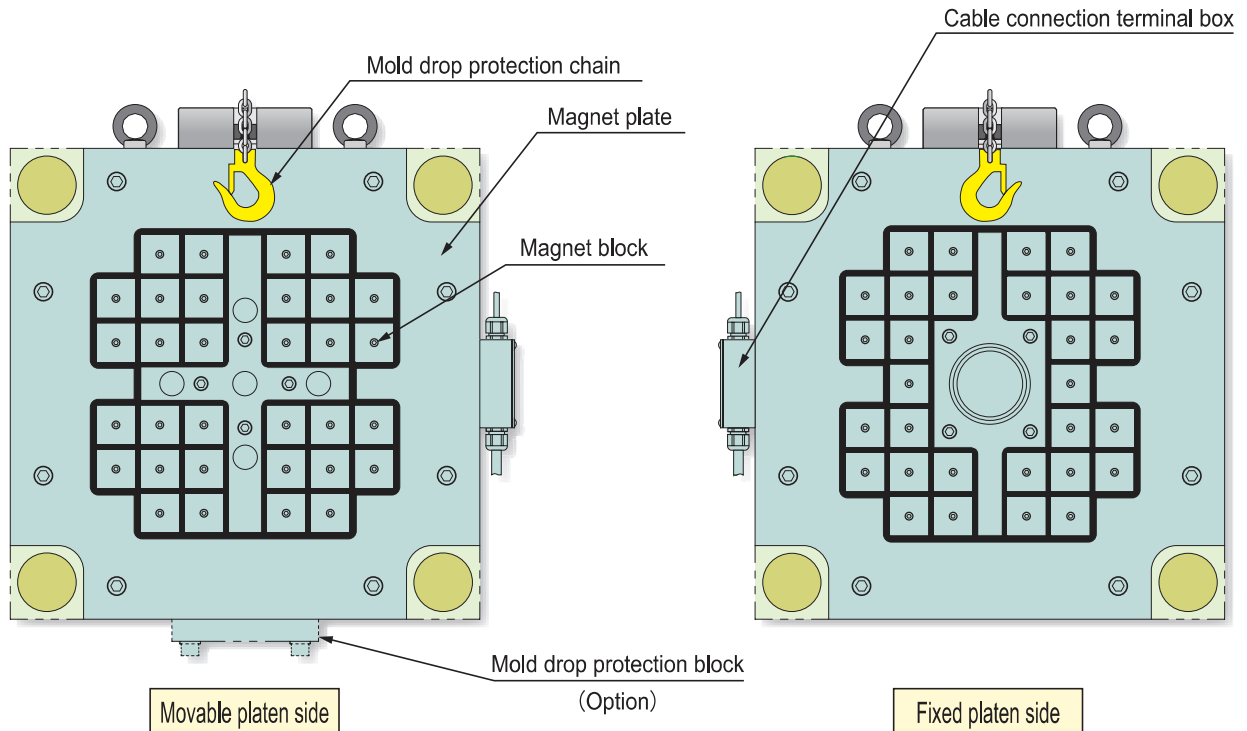
## Features

1. Superior safety measures
  - ... Mold slip detection sensor is standard. Also our original magnetic field detection sensor can detect abnormal mold contact into platen. (option)
2. Wide range of working temperature
  - ... Standard specification can go up to 120 °C degree.
3. Large clamping capacity
  - ... Each block has a large clamping capacity, even a small mold can be clamped properly.
4. Compact operation panel
  - ... Touch panel type makes the panel compact.
5. Hi reliability
  - ... Plates and control panels are made by our own brand. Customer's wide range of requirements can be complied immediately.

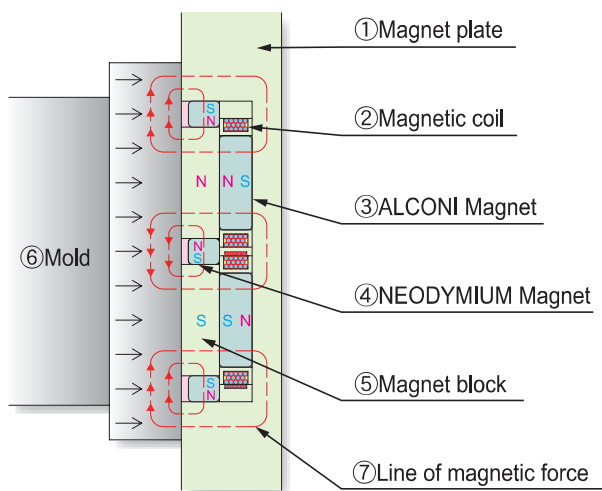
# What is a magnetic clamp system?

By sending electric currents into magnet coils, and reversing the magnetic pole of ALNICO magnets then clamping the mold by permanent magnets.

Sending electric currents are required only when clamping (magnetizing) ↔ unclamping (demagnetizing). Electricity is not needed to maintain mold to be held.

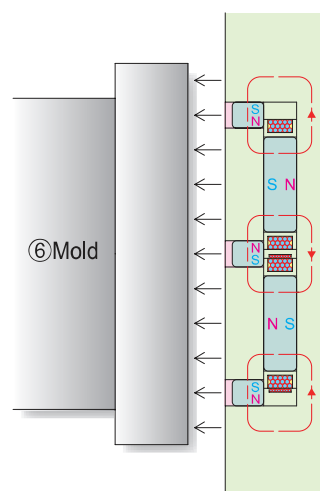


## Structure and Principle



### Clamp (Magnetize)

- Step 1** Send electric currents to magnetic coils② imbedded in magnet plate① for few seconds.
- Step 2** Magnetic pole of ALNICO magnet③ is reversed.
- Step 3** ALNICO magnet③ and NEODYMIUM magnet become like-pole.
- Step 4** Strong magnetic field line⑦ is established from magnet block⑤ through mold⑥ and mold is clamped (magnetized).



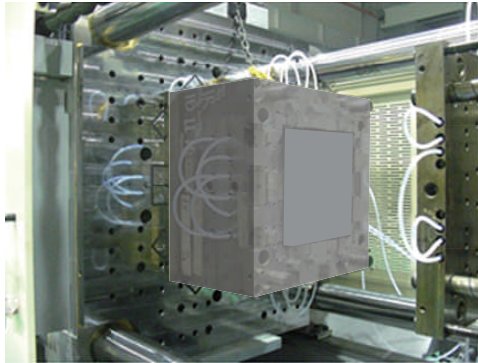
### Unclamp (Demagnetize)

- Step 1** Send electric currents to magnetic coils② imbedded in magnet plate① for few seconds.
- Step 2** Magnetic pole of ALNICO magnet③ is reversed.
- Step 3** ALNICO magnet③ and NEODYMIUM④ magnet become unlike-pole.
- Step 4** Magnetic field line⑦ of NEODYMIUM magnet④ is established only inside of magnet plate① and mold is unclamped (demagnetized).

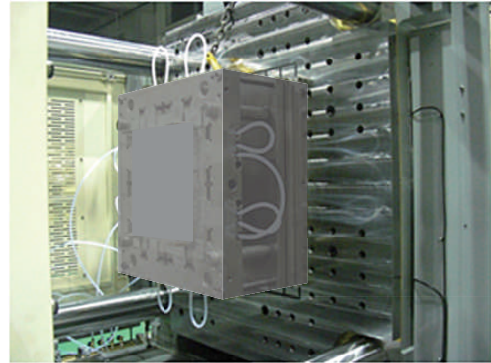
# Set-up images for Injection Molding Machine

No matter if it is an used machine or a new machine, it is easy to install.

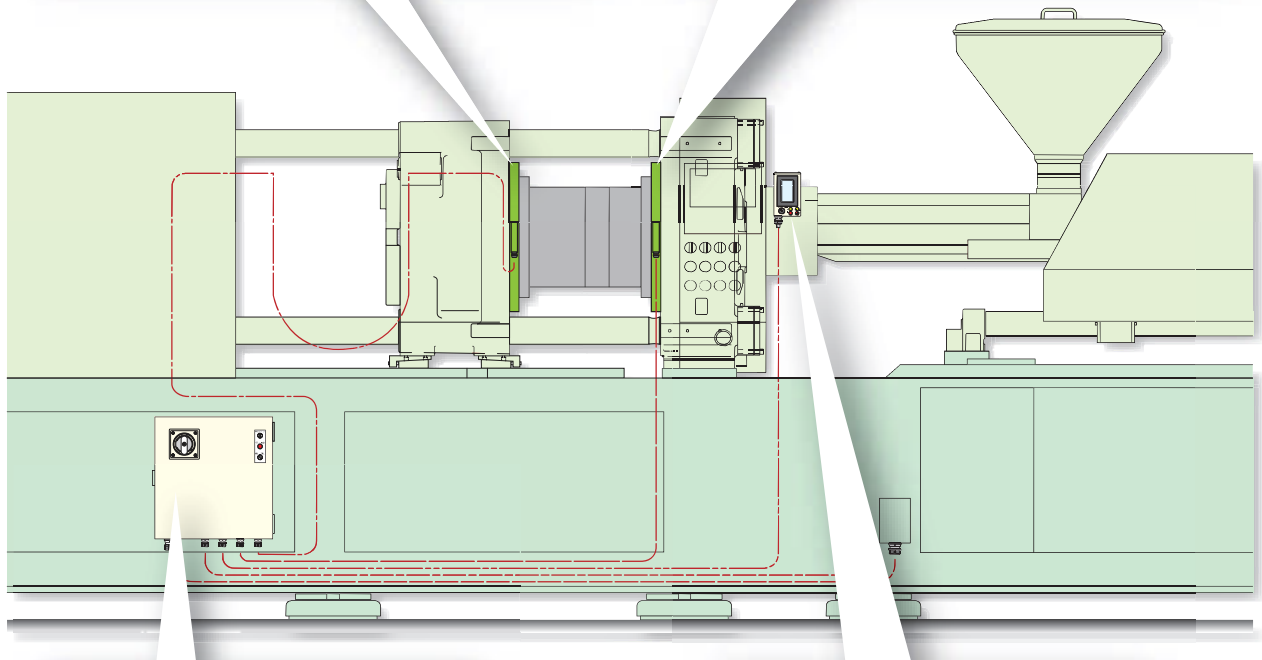
(Input/Output signals of interlock with Injection Molding Machine can be arranged. Even if they are special requirements on top of standard conditions.)



Movable platen side magnet clamp



Fixed platen side magnet clamp



Magnet clamp control panel



Magnet clamp operation panel

Note) Consult with IMM makers for necessary modifications on long nozzle and ejector pins when installing magnet clamps.



# Safety features such as mold drop protection

## ● During mold change operation

### ① Electric current sensor

Monitoring for electric currents during the reversing of magnetic poles. Observes normality of clamp (magnetize) and unclamp (demagnetize) operations.

### ② Magnetic field detection sensor (Option)

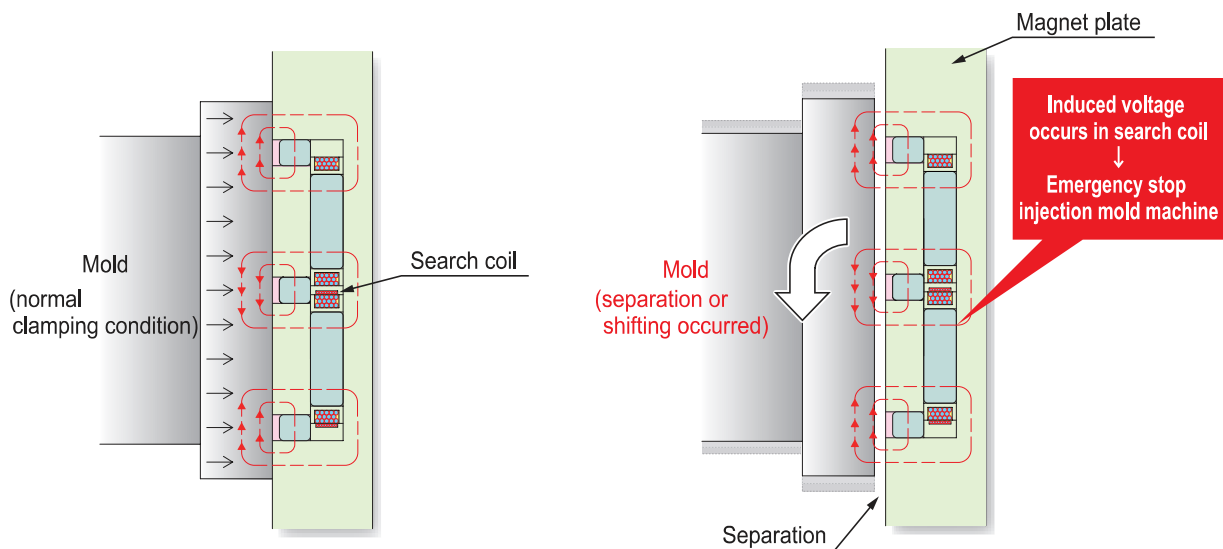
Senses the occurred magnetic force during clamp (magnetize) time and confirms if specified magnetic force is produced.

When mold is not in absolute contact with the clamp plate, the specified magnetic force is not registered and this sensor detects abnormality.

## ● During molding operation

### ③ Mold shift detection sensor PAT.P

Search coil around magnetic coil monitors mold separation and mold shifting, during molding operations. If mold separation or mold shifting occurs, emergency stop signal stops the machine through provided interlock.



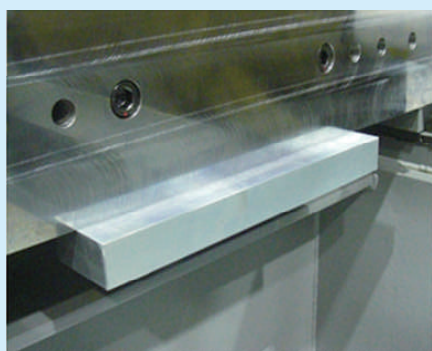
### Mold drop protection chain (standard equipment) PAT.P

Mold drop protection hooks for both moving platen and fixed platen are standard equipments to improve safety.

Chain length can be adjusted easily.

Adjust chain length so it will not be loose when mold is set.

We can accommodate nonstandard application for chain and hook based on the mold design.



### Mold drop protection block (Option)

If mold drops, this block absorbs the shock to the Injection Molding Machine.

We can accommodate special shapes and blocks with shock absorbing Urethane too.

# Specifications

## Clamping capacity

Injection molding machine clamping capacity (kN) Note①	Clamping plate thickness (mm)	Clamping capacity (kN) Note ②	
		Movable platen side	Fixed platen side
300 ~ 350	35	28	28
400		42	35
500 ~ 550		42	42
600		56	42
750 ~ 850		70	63
1000 ~ 1100		98	84
1300 ~ 1400		112	105
1500 ~ 1600		126	112
1800		140	140
2200 ~ 2300		50	210
2500 ~ 2600	240		240
2800 ~ 3000	240		240
3500 ~ 3600	300		300
4500 ~ 4600	390		390
5500 ~ 5600	52	450	450
6500 ~ 6800		540	540

Note① 8500 (kN) ~ 30000 (kN) can be adapted.

Note② This shows the maximum clamping forces when mold mounting plate is attached to all magnetic block.

## Magnet specifications

Clamping capacity per single magnetic block	□50block: 3.5 kN (for plate thickness 35mm) □70block: 7.5 kN (for plate thickness 50/52mm)
Operating temperature range	0 ~ 120 °C (at clamping plate surface)
Height of magnetic flux	Approximately 20mm (from clamping plate surface)
Power supply voltage	AC200 ~ 220 V +/- 5% (50/60 Hz)
Time required for clamping	0.5 ~ 2.0 seconds (depend on the type)
Safety devices	①Mold drop protection chain and hook    ②Mold shift detecting sensor ③Electric currency sensor    ④Magnetic field detection sensor
Special adaptation	①Other voltage adaptation: AC380 ~ 480V
	②Operating temperature range: 0 ~ 180 °C
	③Rust prevention specification
	④Special magnet block layout, additional block
	⑤Mold change from side
	⑥For IMM clamping force 8500 ~ 30000 kN

## Product type designation

M C M [ ① ] - [ ② ] - [ ③ ] - [ ④ ] - [ ⑤ ] - [ ⑥ ]	
①IMM clamping force (kN) x 0.1	0030 ~ 0680
②Magnet clamp plate thickness (mm)	35 / 50 / 52
③Primary power supply voltage	empty (200~220) / 380 / 440 / 480 / others
④Operating temperature range (c)	empty (0 ~ 120) / H: (0~180)
⑤Options	Manufacturer specifies (plate rust prevention, mold drop protection block, magnetic field detection sensor...etc)
⑥Design code	A: standard / special code: decided at design stage

# Operation panel and Control panel

## Operation panel designation

DM 6 6 S - [ ① ] - [ ② ] - [ ③ ]	
① Touch panel program number	001 ~
② Mounting bracket direction	W: left or right direction / H: top or bottom direction
③ Design code	A: standard / special number: assigned at design stage

The compact size operation panel utilizes a touch panel which is excellent in visibility and operability.

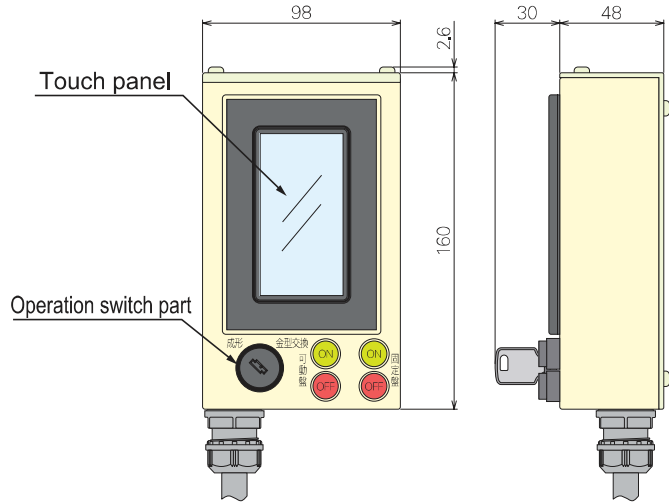
- ① Operation ready indication
- ② Mold change condition indication
- ③ Abnormal/Malfunction indication

Under abnormal conditions, touch panel send a flashing red light and a warning sound which notifies abnormality.

Mold change switch is a key switch which prevents operation error.

And operation switches are simple, illuminated, and are the push button type.

When clamp or unclamp operation is completed the button illuminates, it is excellent for visibility.



Mounting bracket is provided either for left/right mount or for top/bottom mount.

## Control panel designation

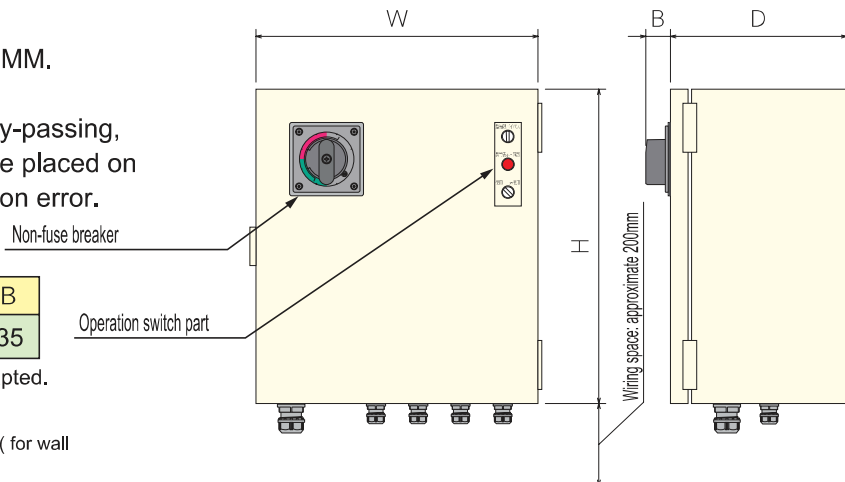
DM 6 6 C - [ ① ] - [ ② ] [ ③ ] - [ ④ ] - [ ⑤ ]	
① Primary power supply voltage (V)	empty: 200~220 / 380 / 440 / 480 / others
② Movable platen side control element number	1 / 2 / 3 / 4
③ Fixed platen side control element number	1 / 2 / 3 / 4
④ Control panel program number	001~
⑤ Design code	A: standard / special number: assigned at design stage

Control panel also made compact. Considered for easy installation to IMM.

Switches for Mold clamping limits by-passing, magnet clamp in use / not in use are placed on the front face for preventing operation error.

Injection molding machine clamping force Note ③	W	H	D	B
300~ 6800 (kN)	400	430	250	35

Note ③ 8500 (kN) ~ 30000 (kN) can be adapted.

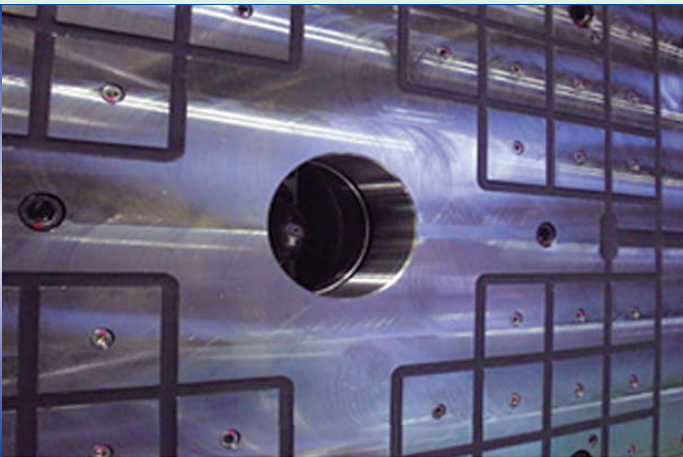


Mounting brackets are available in various design ( for wall mounting, floor mounting and etc.), Upon request, we select the most suitable one.

## Specifications for interlock to the Injection Molding Machine.

We adapt not only standard specifications but special specifications.

Injection molding machine ↓ Magnet clamp control panel	① Mold change (setup) mode	mode signal at mold change from IMM
	② Nozzle retraction	signal at retract end of nozzle or injection unit.
	③ Ejector retraction	signal at retraction end of ejector
Magnet clamp control panel ↓ Injection molding machine	④ Clamping (pressure rising)	signal when mold is completely clamped.
	⑤ Safety door closed	signal when both side doors are closed.
	① During mold change	signal when mold change is in operation.
	② Clamping (close) is able	signal when clamping (close) is possible.
	③ Unclamping is able	signal when unclamping is possible.
	④ System failure (emergency stop)	signal when magnet clamp is malfunctioning.



## MAGNETIC CLAMP SYSTEM

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※Because of improvement of product quality, the dimensions in the specification are subject to change without notice.