QMCS
QUICK MOLD CHANGE SYSTEMS

New "Lightning Controller" with greatly reduced energy consumption by 50%

Magnetic Clamping Systems PAT.

Reduce Mold Change Time
Increase Mold Change Safety Model MAK/MAG



KOSMEK
Harmony in Innovation

MIMS Goal:
Zero Accidental Falls

Safety is Everything

Mold Clamping Force/ Temperature Monitor

The monitor displays the clamping force with a digital display. It is able to measure magnetic plate surface temperature and calculate the change of clamping force caused by temperature changes.



Case Study Video

Case study of mold change with 1300ton machine using Kosmek Magnetic Clamp available on our wesite.



https://www.kosmek.co.jp/php_file/video_products.php?id=085&lang=2



Individual Sensors in Every Core

All magnetic cores are equipped with MIMS sensor that measures clamping force. It is able to measure actual clamping force even if a mold has through holes.
In the case the mold moves from the magnetic plate during production, the MIMS sensor detects the magnetic flux error caused by the mold movement and securely outputs an error detection signal.

Mold Contact/ Separation Detection

In case a mold is separated, two proximity switches will immediately output an emergency stop signal.
It is able to detect whether a mold is securely locked at the time of installation.
※ For smaller plates, there may be one proximity switch.

Multi Information Monitoring System

MIMS

(In case of Detection System G□/K□/M□)

&

Double Monitoring System

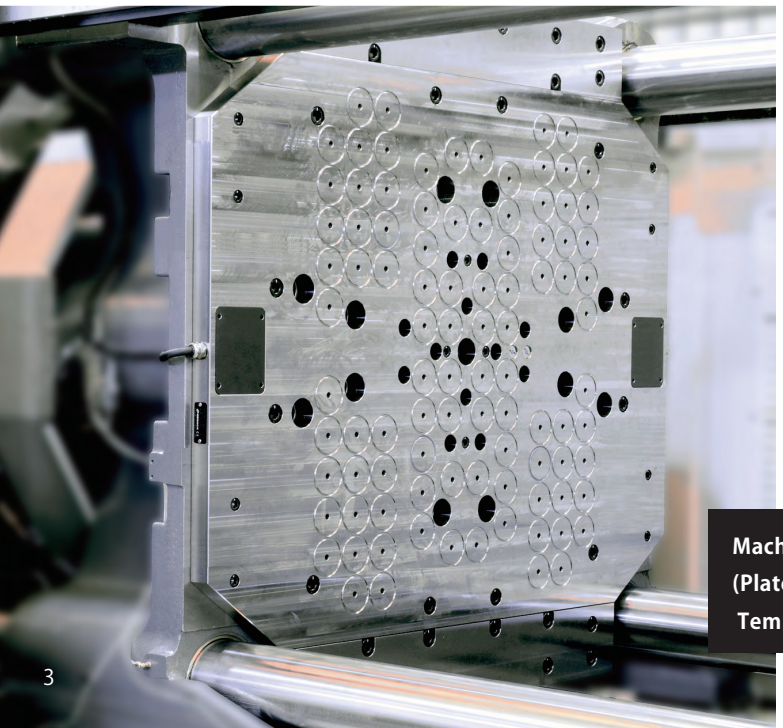
(In case of Detection System G1/G2/K1/K2/M1/M2)

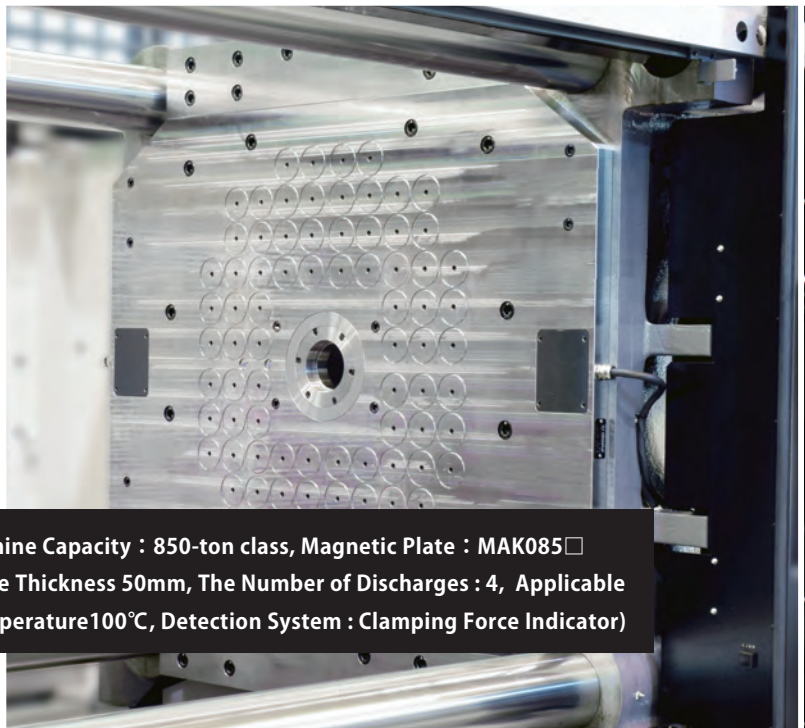
Case Studies

Magnetic Clamp Series

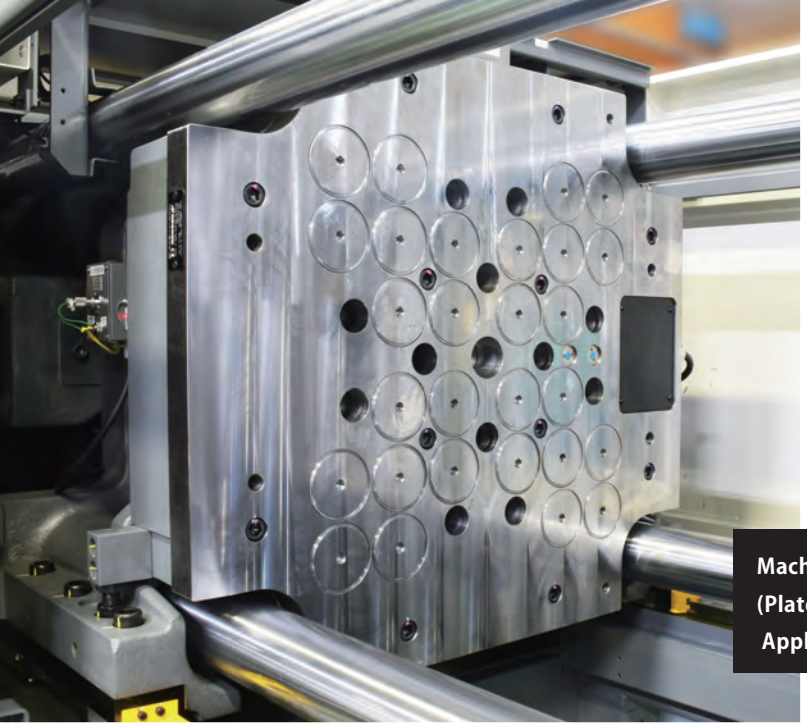
Magnetic Plate

Can be Installed on Various Molding Machines from 50 ton to 3000 ton



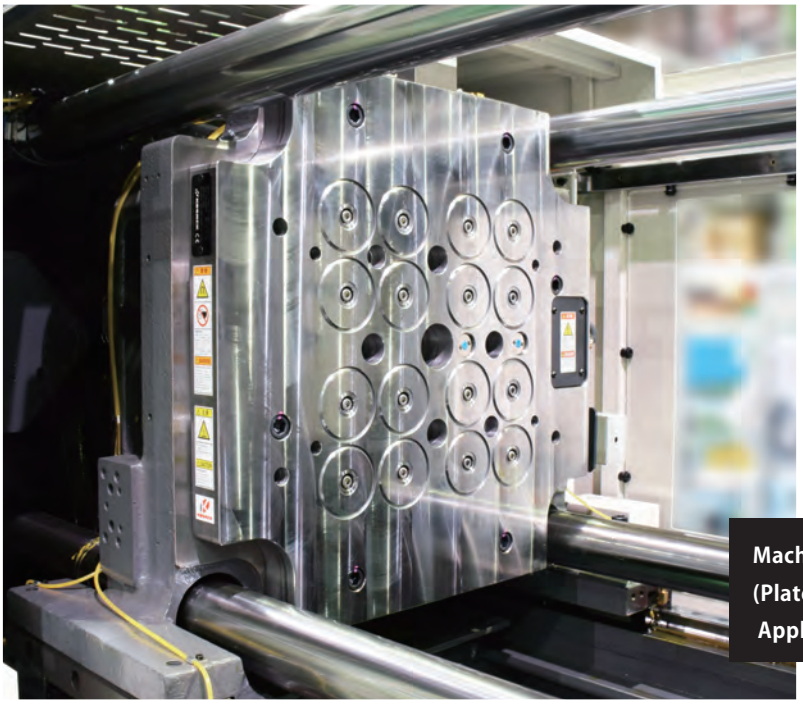


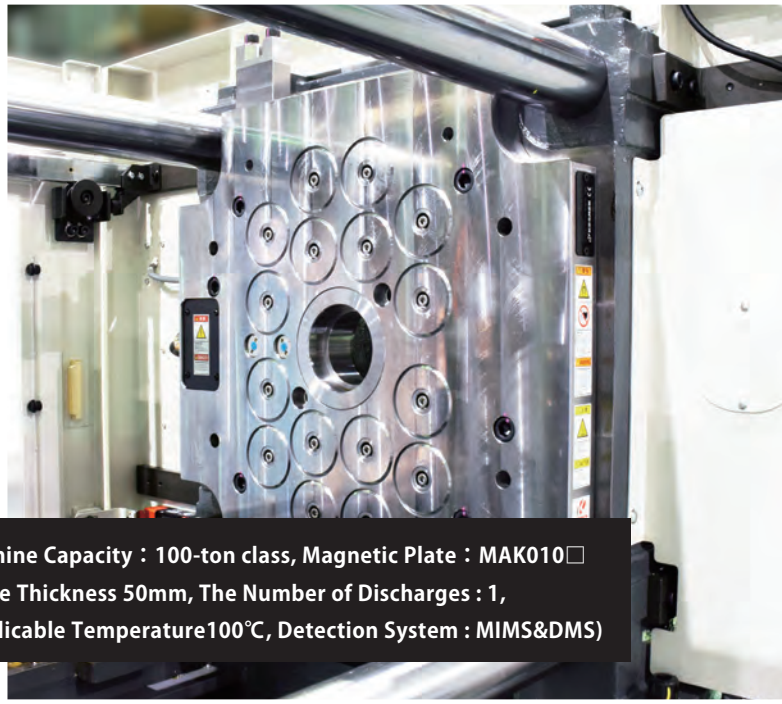
Machine Capacity：850-ton class, Magnetic Plate：MAK085□
(Plate Thickness 50mm, The Number of Discharges : 4, Applicable Temperature100℃, Detection System : Clamping Force Indicator)



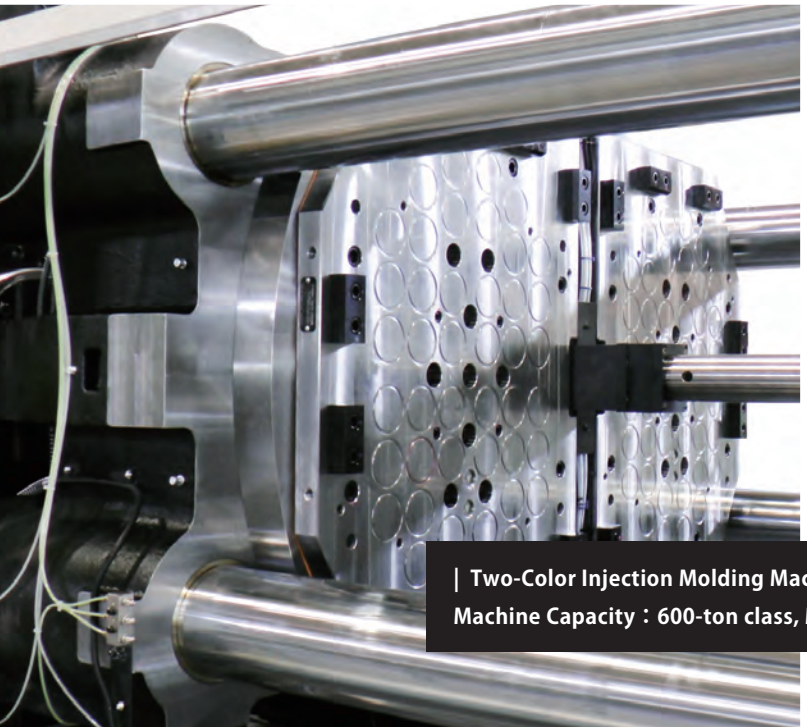


Machine Capacity：180-ton class, Magnetic Plate：MAK018□
(Plate Thickness 50mm, The Number of Discharges : 1,
Applicable Temperature120℃, Detection System : MIMS&DMS)



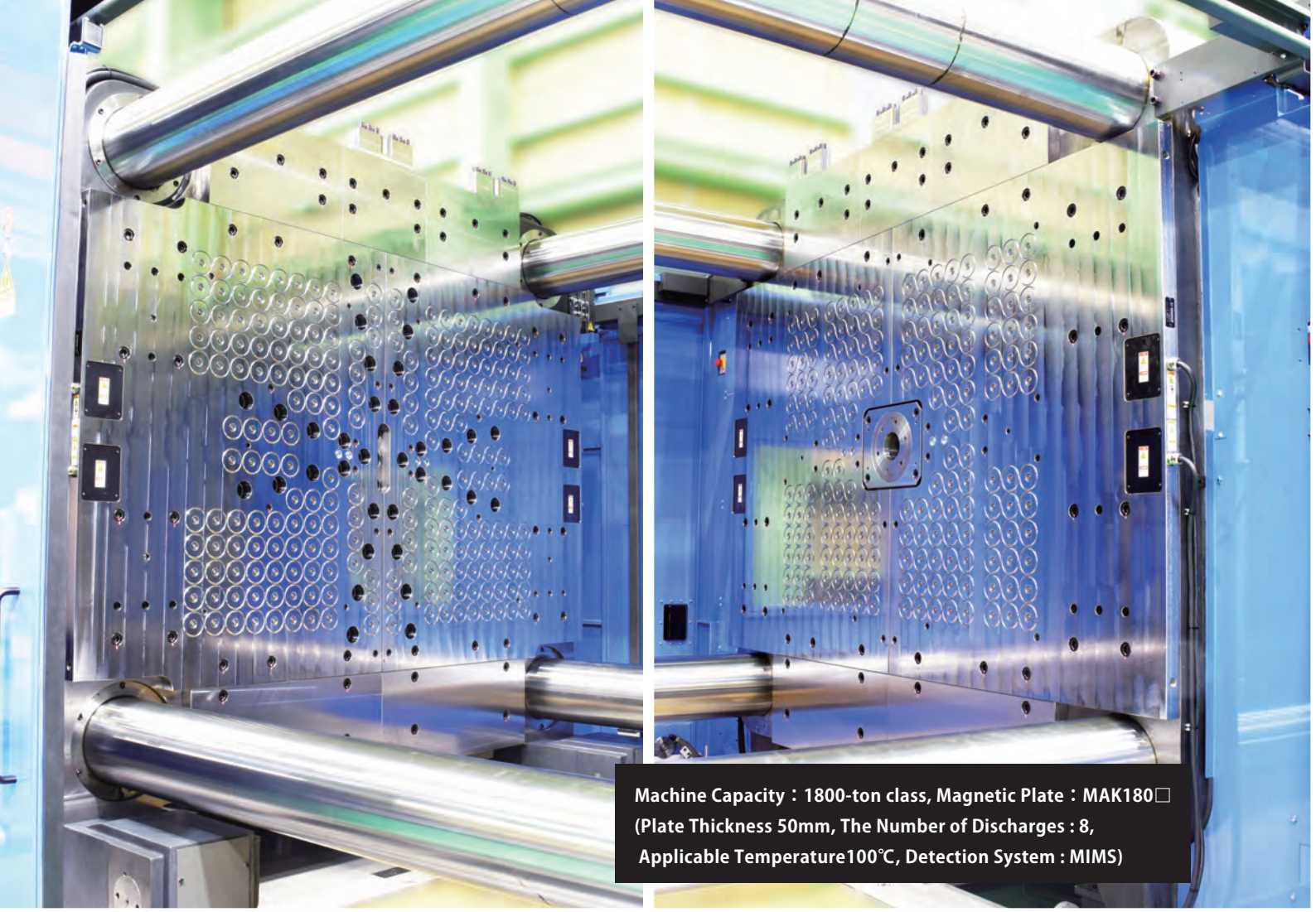


Machine Capacity：100-ton class, Magnetic Plate：MAK010□
(Plate Thickness 50mm, The Number of Discharges : 1,
Applicable Temperature100℃, Detection System : MIMS&DMS)

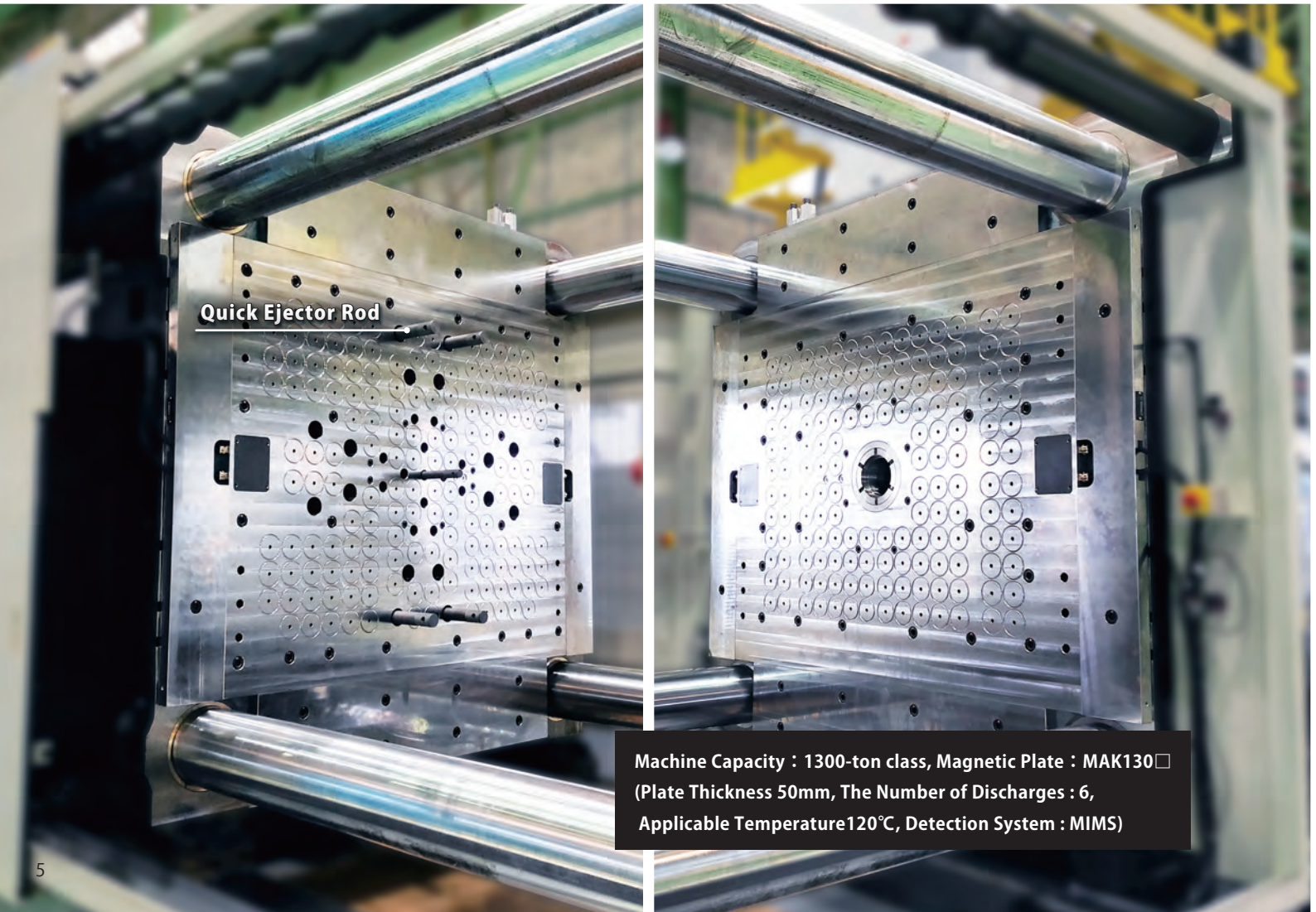




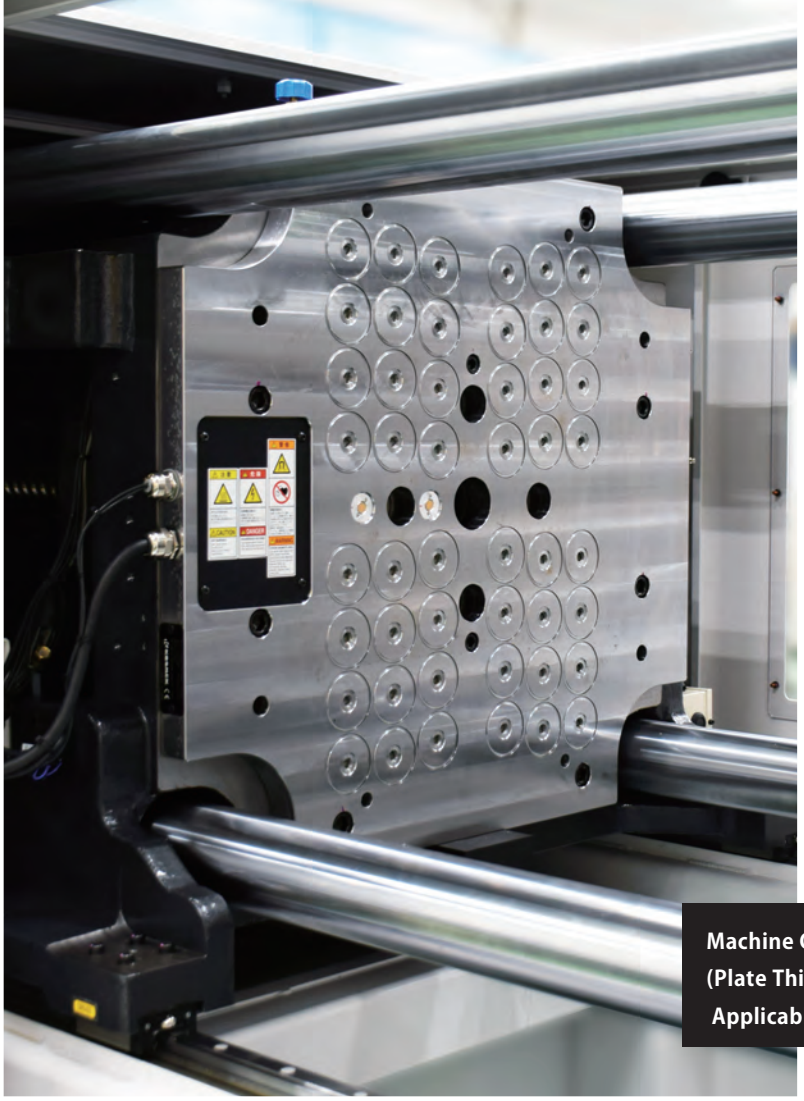
| Two-Color Injection Molding Machine Example |
Machine Capacity：600-ton class, Magnetic Plate：for Two-Color Injection Molding Machine

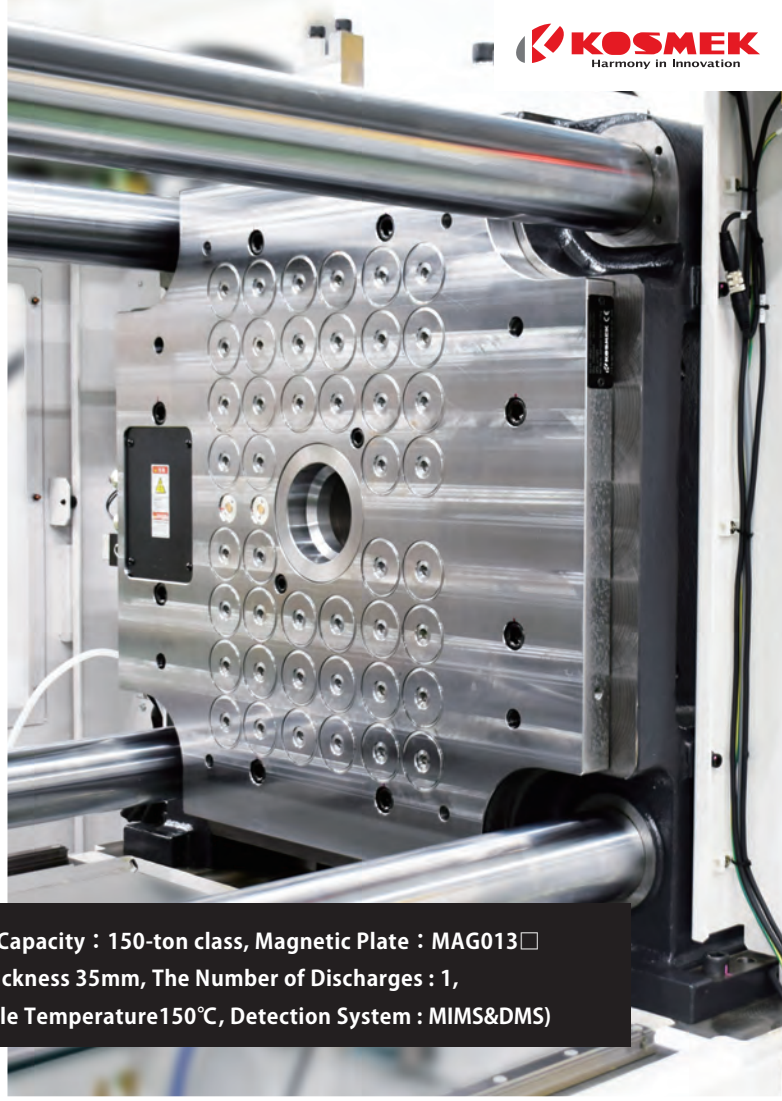


Machine Capacity：1800-ton class, Magnetic Plate：MAK180□
(Plate Thickness 50mm, The Number of Discharges : 8,
Applicable Temperature100℃, Detection System : MIMS)

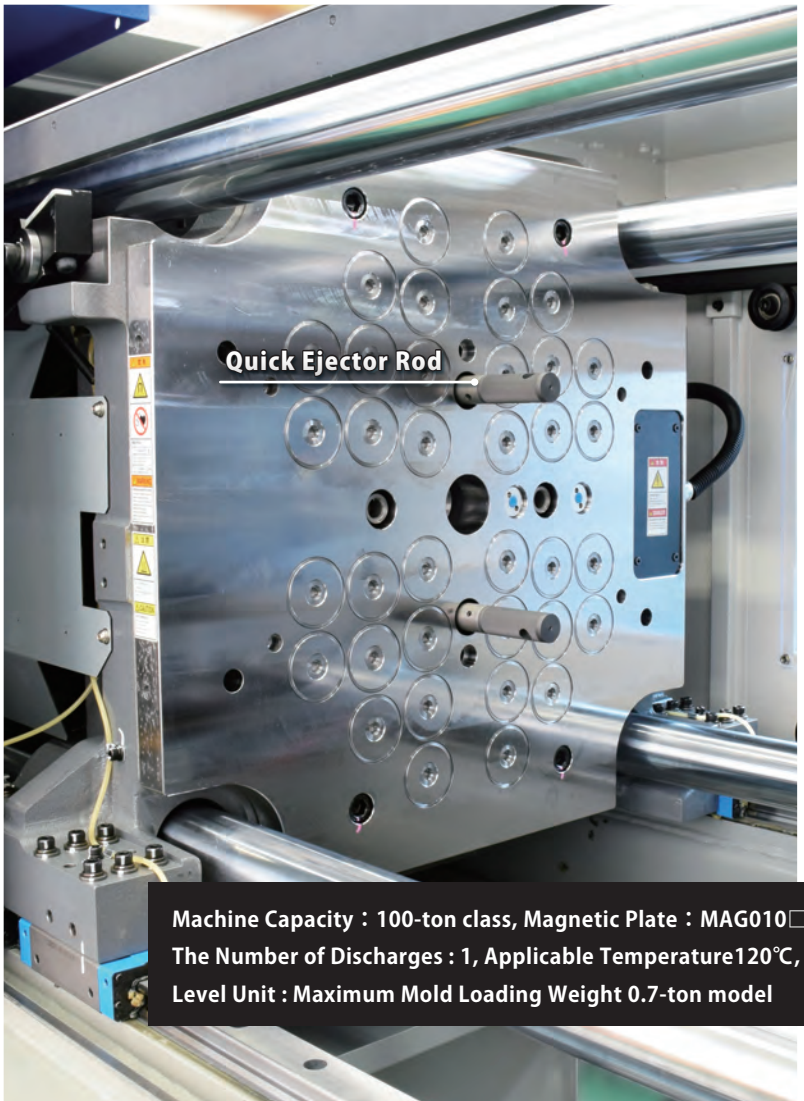


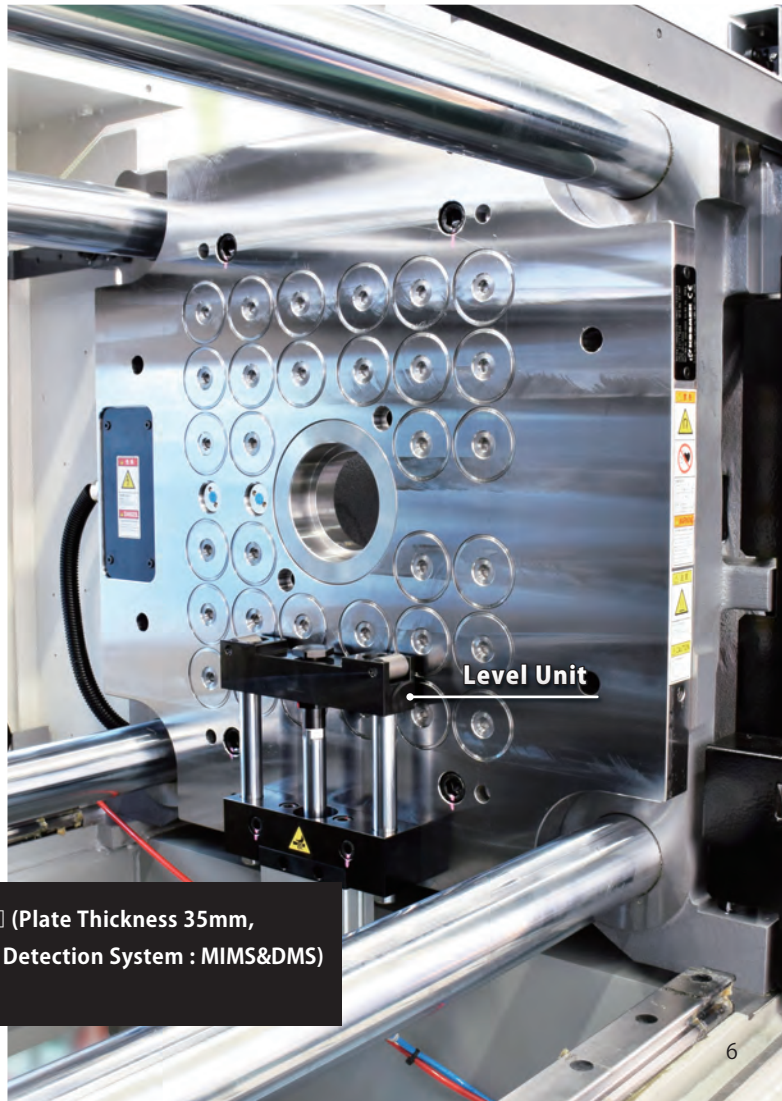
Machine Capacity：1300-ton class, Magnetic Plate：MAK130□
(Plate Thickness 50mm, The Number of Discharges : 6,
Applicable Temperature120℃, Detection System : MIMS)





Machine Capacity：150-ton class, Magnetic Plate：MAG013□
(Plate Thickness 35mm, The Number of Discharges : 1,
Applicable Temperature150℃, Detection System : MIMS&DMS)





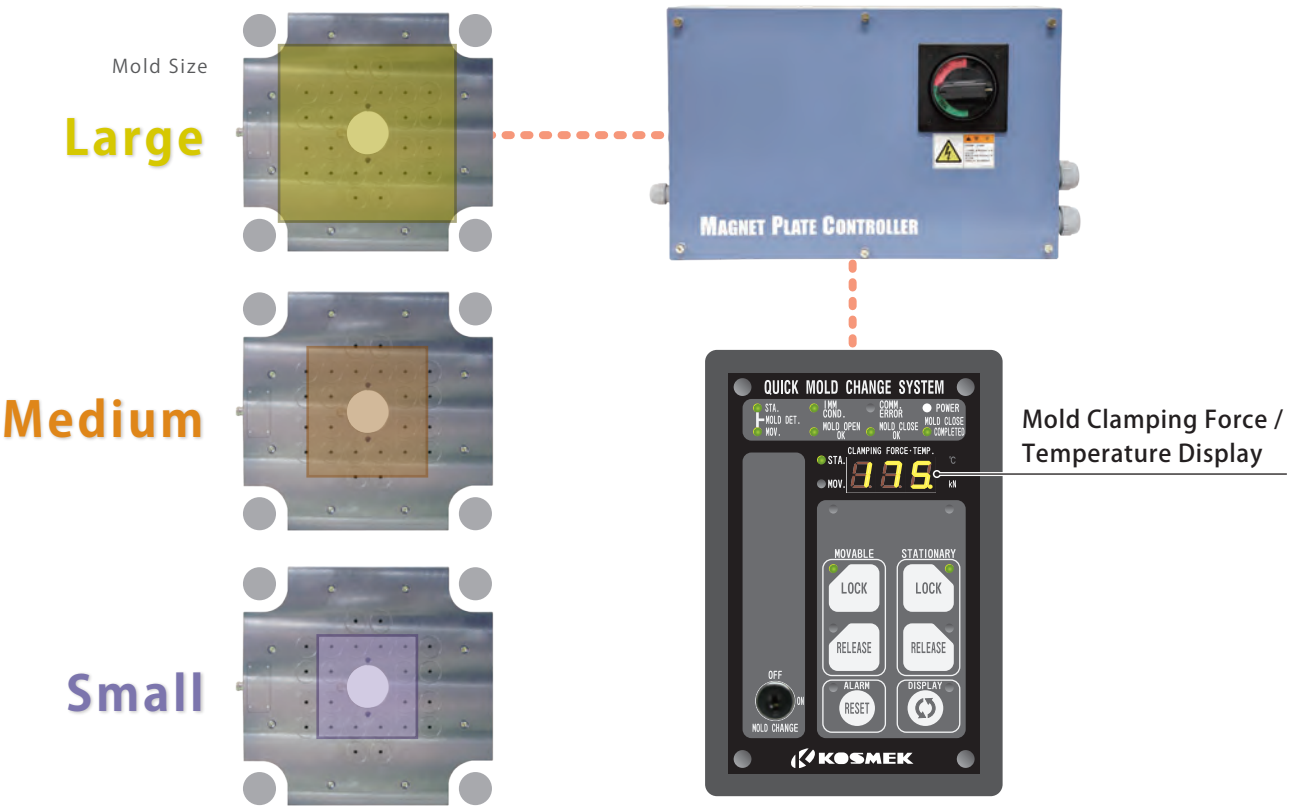
Machine Capacity：100-ton class, Magnetic Plate：MAG010□ (Plate Thickness 35mm,
The Number of Discharges : 1, Applicable Temperature120℃, Detection System : MIMS&DMS)
Level Unit : Maximum Mold Loading Weight 0.7-ton model

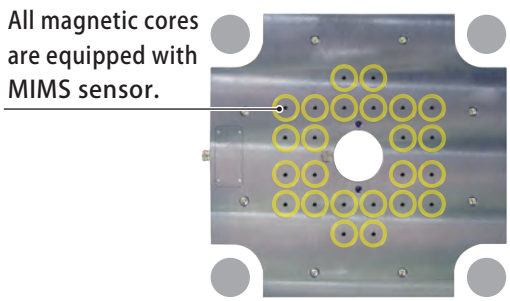
MIMS

Multi Information Monitoring System

Invisible Magnetic Forces Visually Digitized

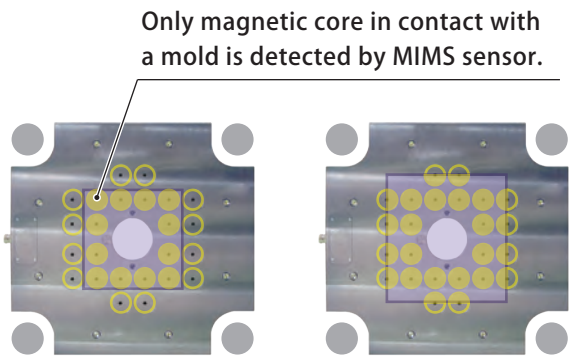
Measuring clamping force of the area that a mold contacts
the magnetic plate enables accurate display of clamping force.





Every magnetic core has a MIMS sensor to confirm overall clamping force.

Since every magnetic core has a MIMS sensor, the magnetic clamp is able to confirm actual clamping force of molds in various sizes.

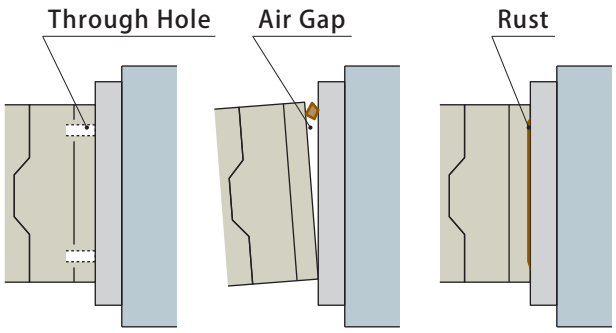


Accurate Reading Regardless of Mold Size

It measures clamping force of the area that the magnetic core and mold are in contact with.

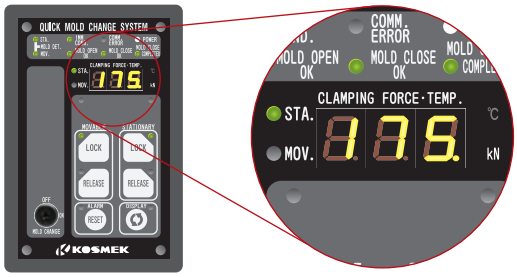
No Need to Input Information

Actual measuring of the mold contact area means there is no need to input information such as mold size, etc beforehand.



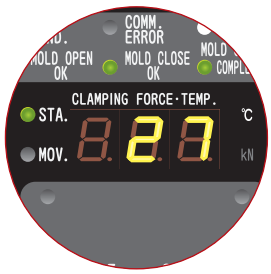
Accurate Measuring Regardless of Mold Condition

Able to confirm accurate clamping force, even there are air gaps or through holes for mounting bolt, because it does not measure the area that the mold is not in contact with the plate. It also measures the change in clamping force caused by rust or material of mold mounting plate.



Accurate Display with Digital Number

Clamping Force Indicator displays clamping force digitally.



Magnetic Plate Temperature Check

Built-in temperature sensors allow for monitoring mold temperatures. It calculates by the change in clamping forces.

MIMS for More Safe Operation

New More Safety!

Clamping Force Normality Self-Diagnosis

model MU□-G

Before Is it difficult to confirm MIMS?

KOSMEK's exclusive MIMS is a highly secure system.

Able to measure an actual mold clamping force. ➡ The calculated value of the clamping force and the previous records can be compared to determine the consistency.



Clamping force displayed on the control panel.



Problems

- Since the displayed clamping force alone cannot be used to determine normality, it is necessary to determine the threshold value for each mold in advance.
- Pass/fail must be determined by an operator.
- Rules can be made, but operators are likely to forget them.

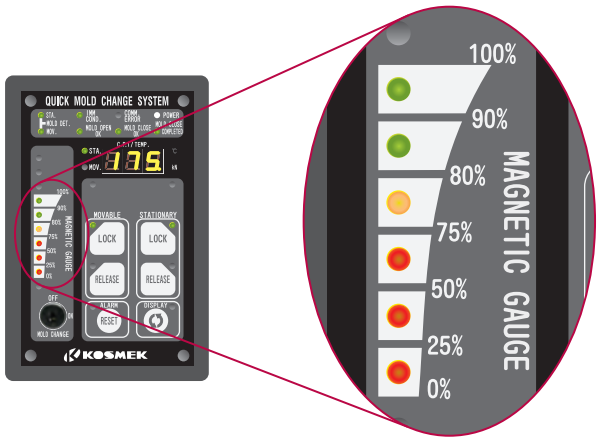
After With Magnetic Flux Density Measurement

Normality of clamping force can be determined via magnetic flux density.

Displayed Clamping Force	Magnetic Flux Density	Evaluation
175kN	100%	Normal
130kN	75%	Abnormal

Error signal triggered if 75% or less

➡ Interlock Activated



Magnetic Flux Density displayed as a percentage!



Introduction Video
https://www.kosmek.co.jp/php_file/video_products.php?id=213&lang=2

Improvements

- There is no need to set thresholds for each mold.
- The system judges pass or fail.
- Operator error or forgetfulness during inspection will be eliminated.

New More Safety! PAT.P.

Clamping Force Verification

model MU□-K

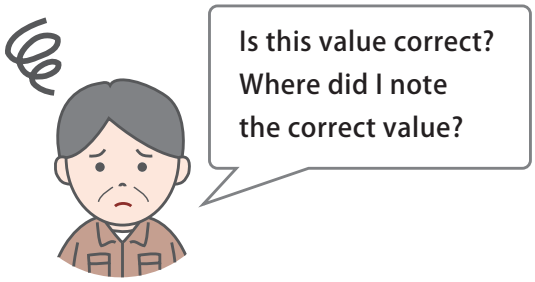
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Clamping force displayed on the control panel.



Problems

- Since the displayed clamping force alone cannot be used to determine normality, a separate record of the threshold value is required.
- Pass/fail must be determined by an operator.
- Rules can be made, but operators are likely to forget them.

After With Clamping Force Verification

Clamping force registered in advance to determine its normality.



Preparation in Advance

Measure the clamping force with a mold, and register it on the Mold ID.
(Up to 99 Mold IDs can be registered.)

Verification Sequence

Recall and set the Mold ID prior to mold installation.

↓

Mold Installation

↓

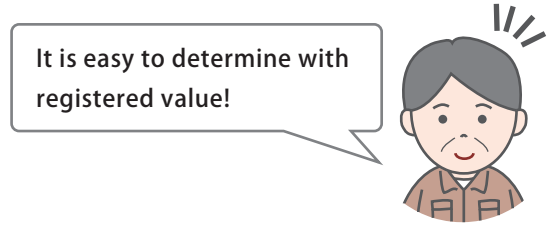
An error signal is activated when the clamping force deviates ±10% from the registered value.

↓

Interlock Activated

Ex. When the registered value of mold C01 is 175kN.

Registered Value	Actual Clamping Force	Evaluation
175kN	175kN	Normal
	145kN	Abnormal

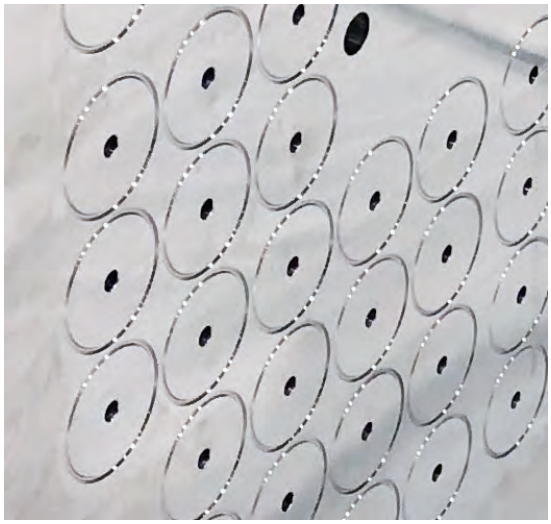


Improvements

- Able to register threshold values in the system
- The system judges the pass-fail criteria based on the recalled threshold values

Introduction Video
https://www.kosmek.co.jp/php_file/video_products.php?id=212&lang=2

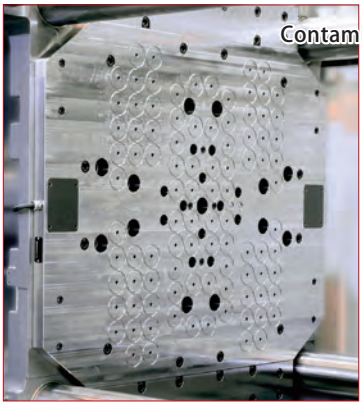
High Durability with Metal Surface

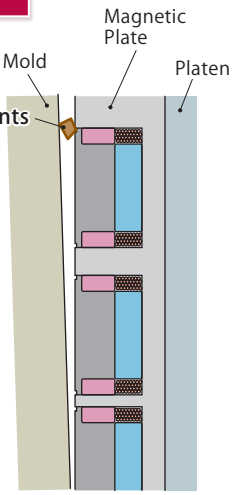


The metal surface of Magnetic Plate enables high durability.

The plate surface is constructed with metal only.
The metal surface prevents outside interference and does not deteriorate over time as epoxy resin does.

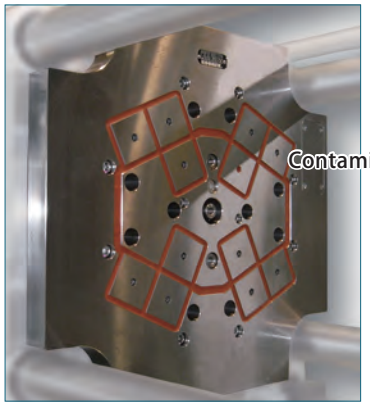
Latest Model Metal Surface

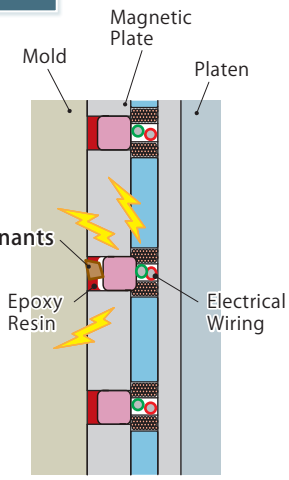




The plate surface is constructed with metal only, preventing contaminants from outside. This enables high rigidity, and Metal Surface does not deteriorate over time as epoxy resin does.

Previous Model Epoxy Resin Surface



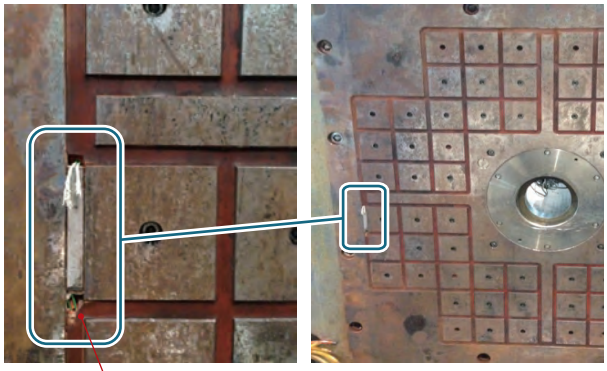


Previous model has magnets embedded from mold mounting surface and epoxy resin molding its perimeter. This causes contaminants to get stuck in epoxy resin and damages internal electrical wiring.

Trouble Case of Epoxy Resin Model

Epoxy Resin Deteriorates

Resin is peeled off by deterioration, causing snapping and short circuit of the electrical wiring.



Exposed electrical wiring inside the epoxy resin.

Waterproof Equal to IPX5

Prevent Infiltration of Contaminants and Fluid

Magnetic Clamp Waterproof Testing

Waterproof Rating equal to IPX5
Conditions
Water Flow Rate：
12.5L/min with a 6.3mm-diameter nozzle
Water Spraying Distance：2.5 ~ 3m
Testing Time：3 min at the minimum



The actucal testing video is available on our website.

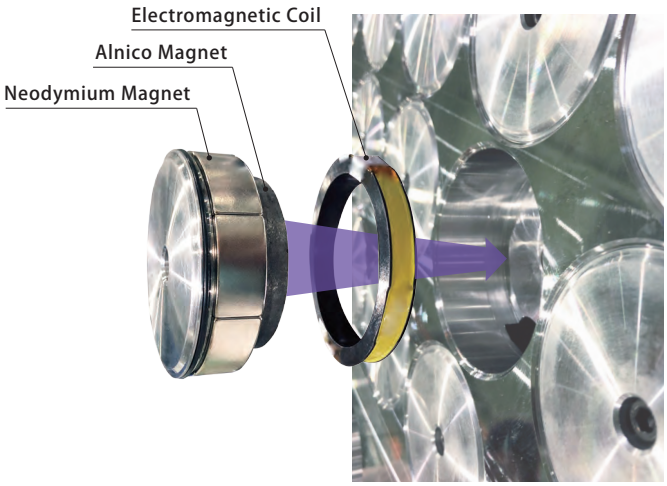


http://www.kosmek.co.jp/php_file/video_products.php?id=084&lang=2

Improved Maintainability

Each magnetic core is replaceable in case of a trouble.

※ Required to remove a magnetic plate from an I.M.M.



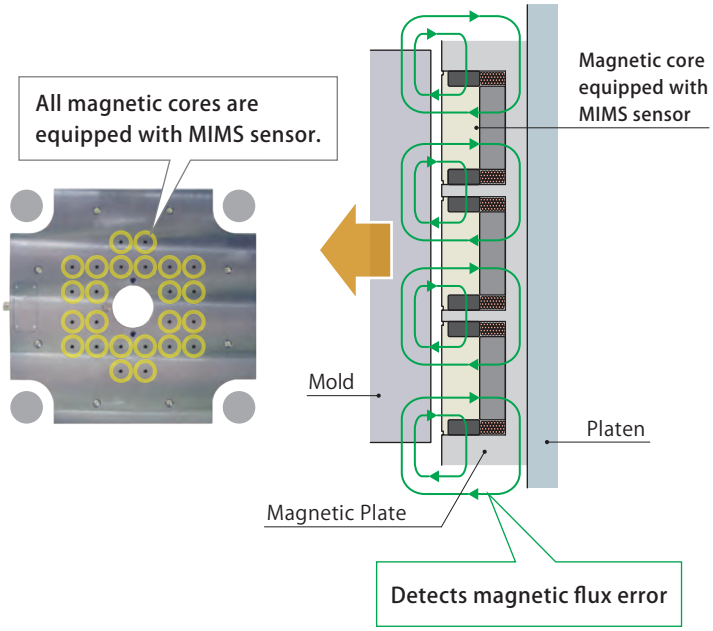
New

PAT.P.

Double Monitoring System

The highest level of safety in the industry

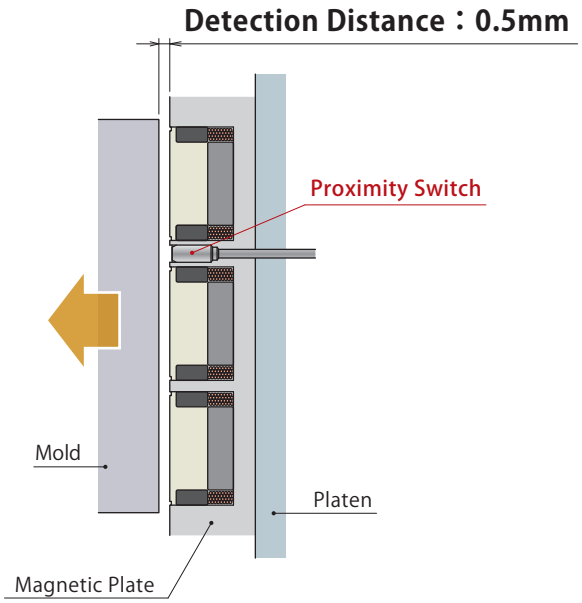
(In case of Detection System **G1/G2/K1/K2/M1/M2 :** Double Monitoring System)



① Magnetic Flux Error Detection with MIMS sensor

With our magnetic core sensors, the slightest error will not be overlooked.

In case the mold moves from the magnetic plate during production, the MIMS sensor embedded in all magnetic cores detects the magnetic flux error caused by the mold movement and it securely outputs an error detection signal.



② Mold Separation Detection with Proximity Switch

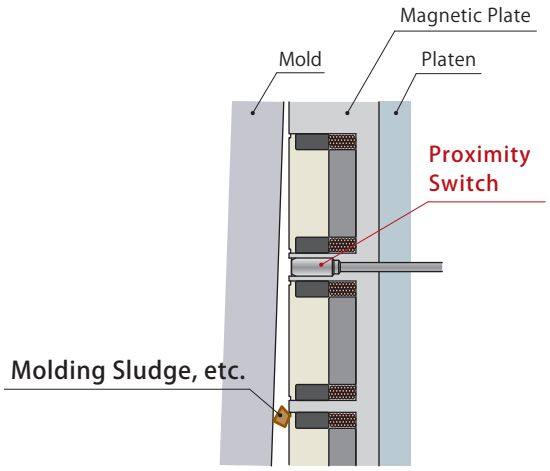
Real-time monitoring of mold contact with proximity switch

It securely outputs an error detection signal when a mold is separated 0.5mm from the magnetic plate.

This proximity switch system has the highest level of safety measures with EN standard.

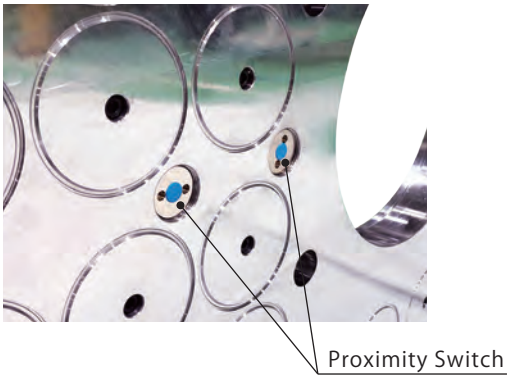
Mold Contact Check with Proximity Switch

(In case of Detection System F/G0/G1/K0/K1/M0/M1 : Mold Contact Check)



Checking distance with proximity switch, able to detect errors securely when a mold is not in close contact.

A gap between a mold and a magnetic clamp leads to decrease in clamping force. When the magnetic plate and the mold are not in contact, mold change cannot be completed. Mold contact check with proximity switch prevents the risk of production with gaps and insufficient clamping force.



Secure Detection using Two Proximity Switches※1

There are two proximity switches per plate, even when a mold through hole for mounting bolt and a proximity switch are overlapped. It detects a mold when either of them is in contact with the mold.

※ For smaller plates, there may be one proximity switch.

Available Options		MIMS Sensor		Proximity Switch	
		Magnetic Flux Error Detection	Mold Clamping Force Display	Mold Separation Detection	Mold Contact Check
Detection System	F	-	-	○	○
	G0/K0/M0	-	○	○	○
	G1/K1/M1	○	○	○	○
	G2/K2/M2	○	○	△※2	-

Double Monitoring System

G1/K1/M1 Detection Features

Double Monitoring System and mold contact check with proximity switch provides the highest level of safety in the industry.

G2/K2/M2 Detection Features

No restriction on the mold contact surface area because of the mold contact check system. The proximity switch is not included in the clamped state. In addition, safety is ensured by the Double Monitoring System.

※2. Mold separation detection by the proximity switch of detection system **G2/K2/M2** is activated only when there is no gap at the time of locking and the proximity switch reacts.

PAT.

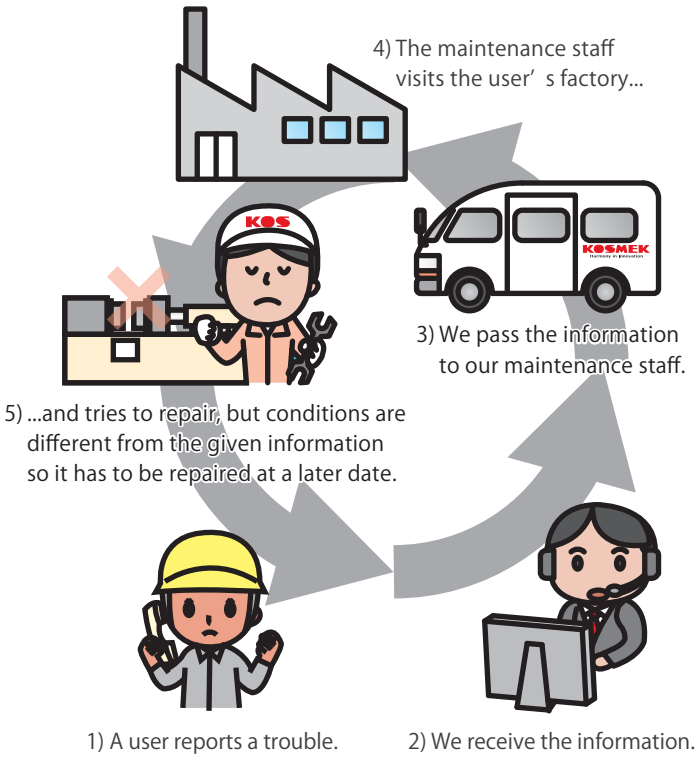
Remote Monitoring System

Remote Diagnosis of Clamping System Condition

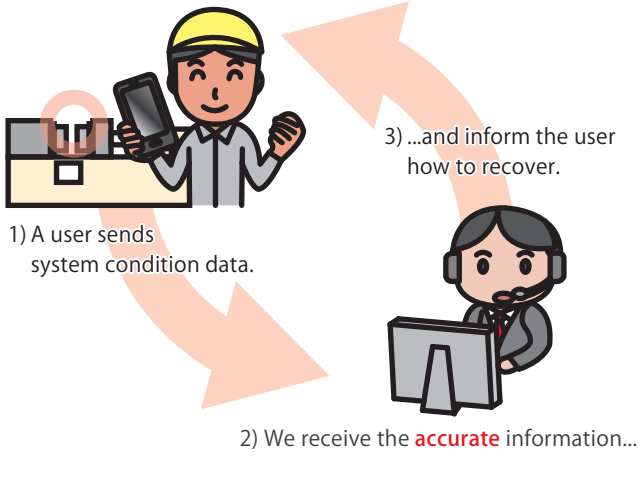
(In case of Option W：Remote Monitoring System)

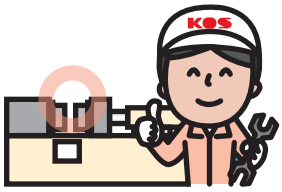
Easy Setup, provides machine condition and user information wirelessly.
Accurate data transmission enables quick machine recovery.

Before Introducing Remote Monitoring System



After Introducing Remote Monitoring System



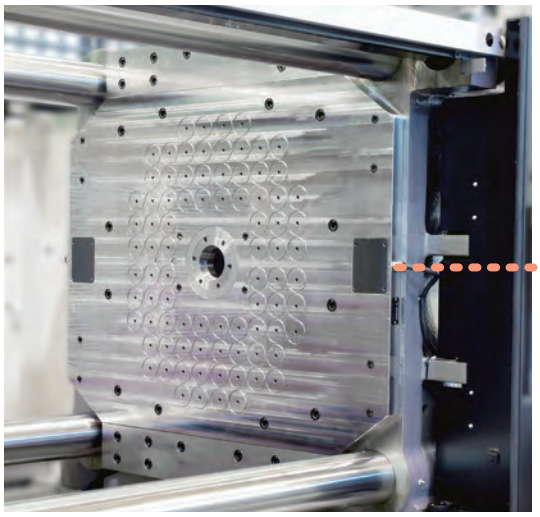


Even if it is difficult to be repaired by a user, we are able to solve problems in early stages as we have accurate trouble information.

Quick recovery from a system error improves service accuracy.

An error status during mold clamping can be sent to a smart phone or tablet and the data will be sent to Kosmek via a user's communication network. This allows prompt and accurate condition information.

Magnetic Plate



Operation Panel



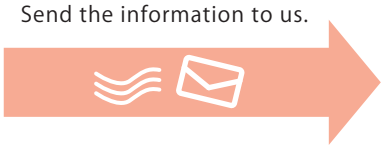
Control Unit



User's PC ※



Send the information to us.





Magnetic clamping system information can be sent to PC.

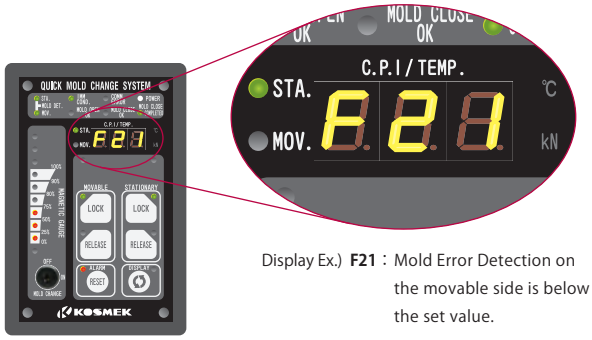
Immediately respond after we check.

※ Smartphones, tablets, etc. can also be used.
Contact us for further information.

System Condition at a Glance

Multifunctional Operation Panel



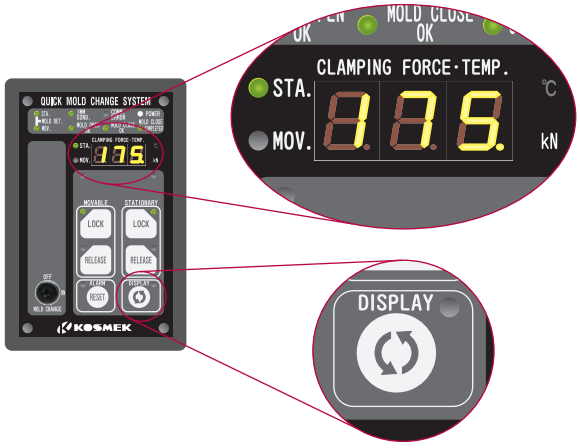


Display Ex.) **F21** : Mold Error Detection on the movable side is below the set value.

CPI Clamping Process Indicator

Clarify Error Conditions

C.P.I. function shows detailed error conditions, simplifying recovery operations. Now able to check the C.P.I. on the operation panel.

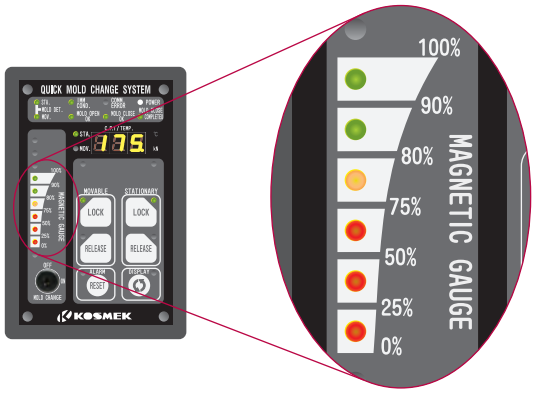


MIMS Multi Information Monitoring System

Mold Clamping Force • Temperature Display

Able to check the actual clamping force and temperature of a magnetic plate with the operation panel.
Push the DISPLAY button to switch the display of mold clamping force and temperature.

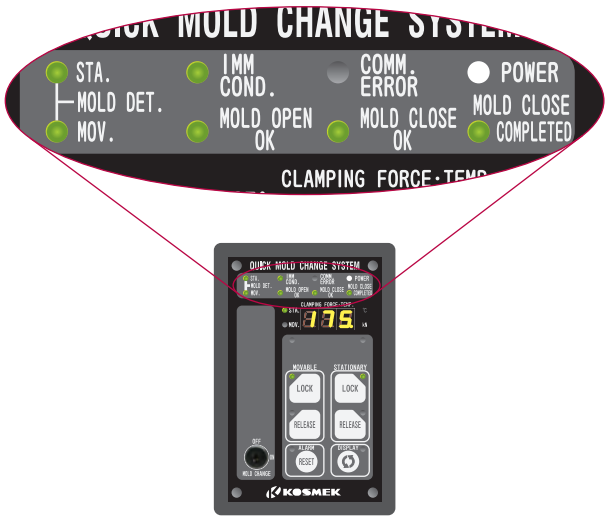
※ In case of Model MUA-M□ / MUV-M□ / MUW-M□



Mold Clamping Force Indicator

Magnetic flux detection coil makes measurement of magnetic flux density, and checks magnetizing condition of magnetic cores.
Indicator is displayed with six levels, and alarms when clamping force falls below 75%.

※ In case of Model MUA-F / MUV-F / MUW-F.



Displays Conditions of Mold and IMM

The operation panel indicators will confirm a mold and if mold opening and mold closing are operating properly.

Interlock

Operation Panel communicates with the IMM to prevent operational errors before they happen. The risk of mold dropping due to operational error is excluded.

Superior Performance

Simple operation leads to improved performance.

Superior Protection

Control Unit



Superior Protection

The control unit has an IP (Ingress Protection) rating of IP5X, a level that protects against the entry of dust particles, ensuring proper functionality.

Compliance Friendly

Complied with the standards of each country of operation.

Magnet Burn-Out Protection

If magnets are activated or deactivated more than six times within a one minute period, the operational function shuts down to avoid system burn-out.

※ Functionality returns after a certain time.

Installation Position Flexibility

A molding machine can be located lower since the overall height of the unit has been lowered.

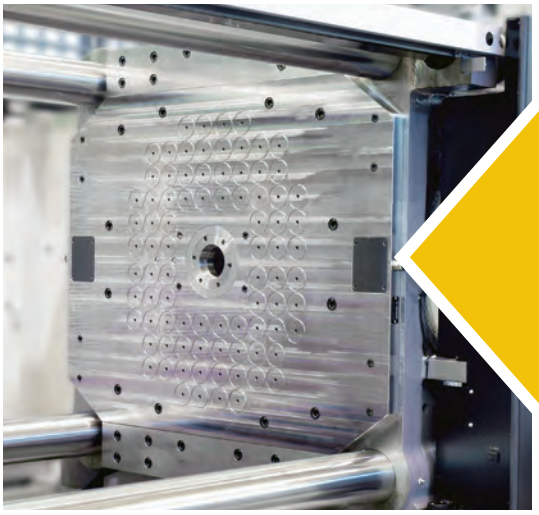
New

PAT.P.

" Lightning Controller"

with greatly reduced energy consumption by 50%

Improved control unit cuts power consumption by 50%.



Magnetic Plate



Control Unit

KOSMEK Exclusive "Lightning Controller"(PAT.P.) reduces mold clamping time by half !

	Conduction time for mold clamping ※1
Current Method	1.0 sec.
Improved Method	0.5 sec.

Reduces 50% of magnetizing time

※1. Per 1 Discharge.

MAK0550	Power consumption per magnetization ※2
Current Method	12.6 VAh
Improved Method	6.3 VAh

Reduces 50% of power consumption

※2. As an example, it shows the power consumption during the magnetization per hour when setting up MAK0550 magnetic plates on both movable platen and stationary platen once per hour.
(Magnetic plate for movable platen and stationary platen：2 Discharges each)

New



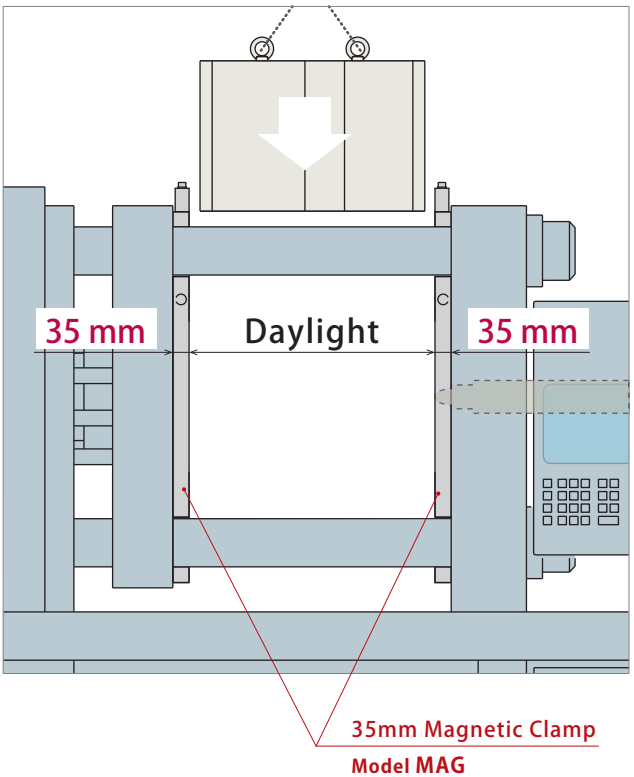
The World's Thinnest Magnetic Clamp

For customers who have given up on using magnetic clamps due to daylight problems.

35mm Magnetic Clamp

35mm Plate ensures Maximum Daylight !

The new Magnetic Clamp developed by Kosmek is one of the thinnest in the world, with a plate thickness of 35 mm, allowing for maximum daylight. It can be used in cases where magnetic clamps were unsuitable in the past due to insufficient daylight.



Minimize Extension of Daylight and Nozzle !

Even when extending daylight, injection nozzles, or ejector rods, the extension can be minimized, which is advantageous in terms of the cost for extension. Also, the effect of temperature changes in the material caused by the nozzle extension is reduced.

Advantages

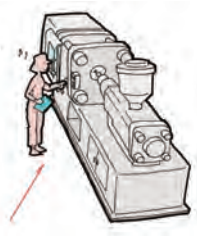
Much Shorter Mold Change Time



Manual Tightening

Confusion due to searching, loosening, tightening and so on makes the work unstable, jeopardizes safety and decreases productivity.

① With a manual clamping system, workers must loosen and tighten bolts one by one. However, with an automatic clamping system, a single operator can release the clamps holding the mold on both sides at once, reducing changing time.
② Reduction of mold changing time results in less time the crane spends waiting to put the mold in place, an important factor at plants where multiple molding machines are in operation.
③ When there is an urgent need to make repairs to the mold or the machine, the automatic clamping system can allow the mold to be removed faster, resulting in less down time.
④ Reduction of mold changing time leads to an overall improvement in productivity.



Magnetic Clamping System

Stable work anyone can do improves the work environment. A better morale increases productivity !

Simplified Mold Loading and Unloading

It is very easy to clamp and unclamp a mold. You just need to press the LOCK or RELEASE buttons. The magnetic clamp series drastically simplifies mold loading/unloading operations.
The mold is clamped just by pressing the LOCK button.
No need to move to the non-operation side or use a wrench or other tools. Hard work such as tightening bolts is also reduced.

Manual Tightening

- Lower Mold in with Crane
- Align with the Locator Ring
- Adjust Position and Close the Mold
- Tighten the Operation Side
  - 4 Bolts
  - Open the Safety Door ↓ Attach the Bolts/Fittings ↓ Tighten the Bolts ↓ Close the Safety Door
- Go to the Non-Operation Side
- Tighten the Non-Operation Side
  - 4 Bolts
  - Open the Safety Door ↓ Attach the Bolts/Fittings ↓ Tighten the Bolts ↓ Close the Safety Door
- Move to the Operation Side
- Mold Setting Completed

Magnetic Clamping System

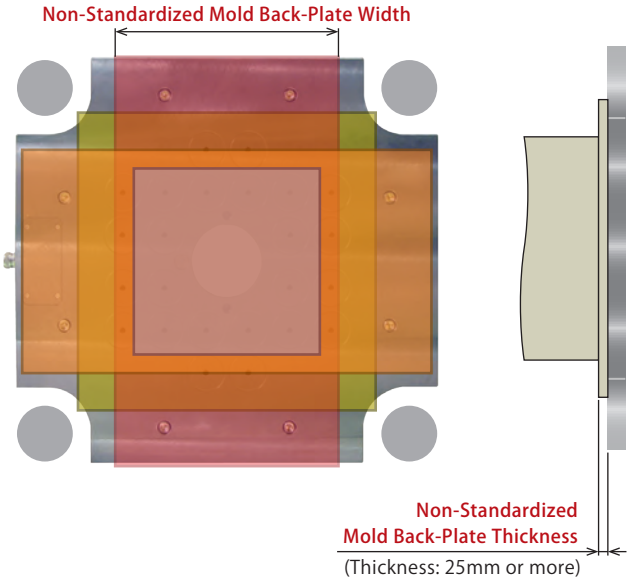
- Lower Mold in with Crane
- Align with the Locator Ring
- Adjust Position and Close the Mold
- Turn on the Lock Switch for the Fixed Side
- Turn on the Lock Switch for the Movable Side
- Installation of Safety Chain
- Mold Setting Completed

The effect on working time and work load is a **big** improvement.

High Quality

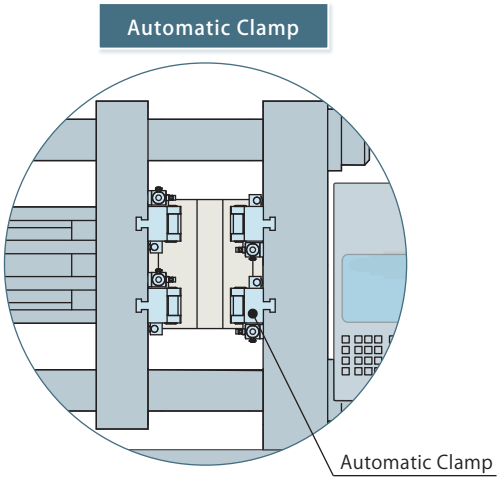
Uniform clamping force to the mold mounting surface causes no distortion of the mold.
This feature also leads to higher product quality and longer mold life.
(To prevent clamp distortion, it is required to machine additional bolt holes near the center of a machine platen.)

No Need to Standardize Width and Thickness of Mold Back-Plate

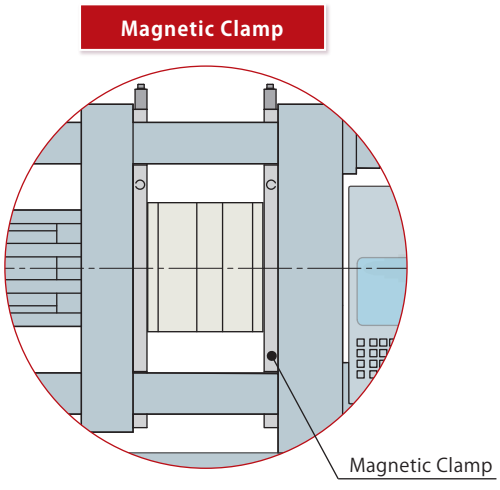


Mold standardization held back plans for converting to auto-clamping…
Magnetic Clamp is available for various mold sizes.

No Interference on the Mold Mounting Surface



Automatic clamps interfere with the mold, so that piping installation are limited.
Magnetic Clamp, has no obstacles, allows for flexible layout for piping, reducing time for mold designing.



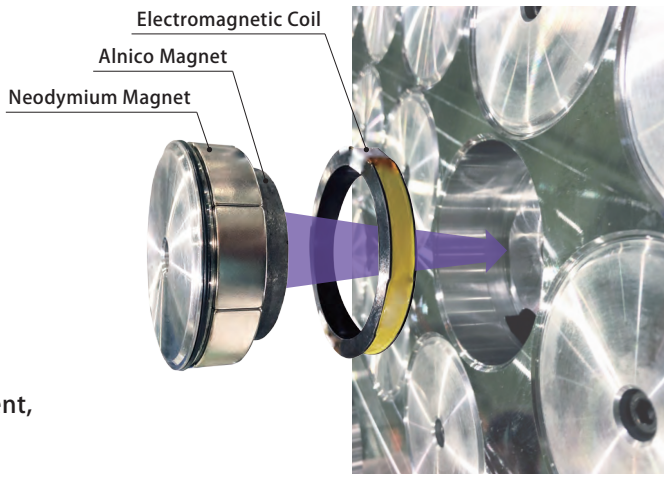
Energy Saving

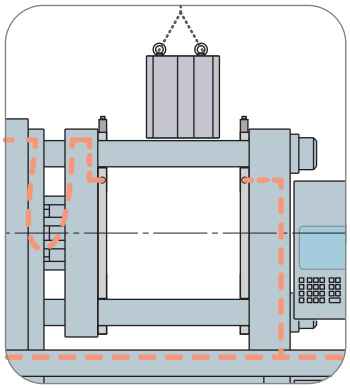
Power (Electric power) is used for just a few seconds during magnetizing and demagnetizing operations. No moving components are used.
This feature especially reduces the possibility of wear of the internal components, eliminating maintenance inside the magnetic plate.

Action Description

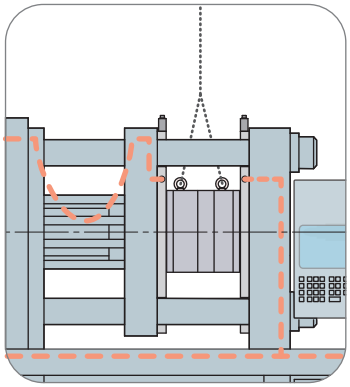
Stable Clamping Force with a Bi-directional Magnetic Circuit

Permanent magnets are used for Magnetic Clamp.
By reversing the polarity of magnet with electric current, clamping force is generated to lock a mold.

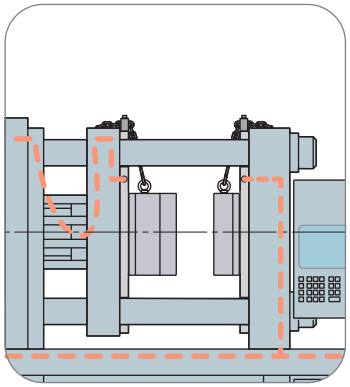




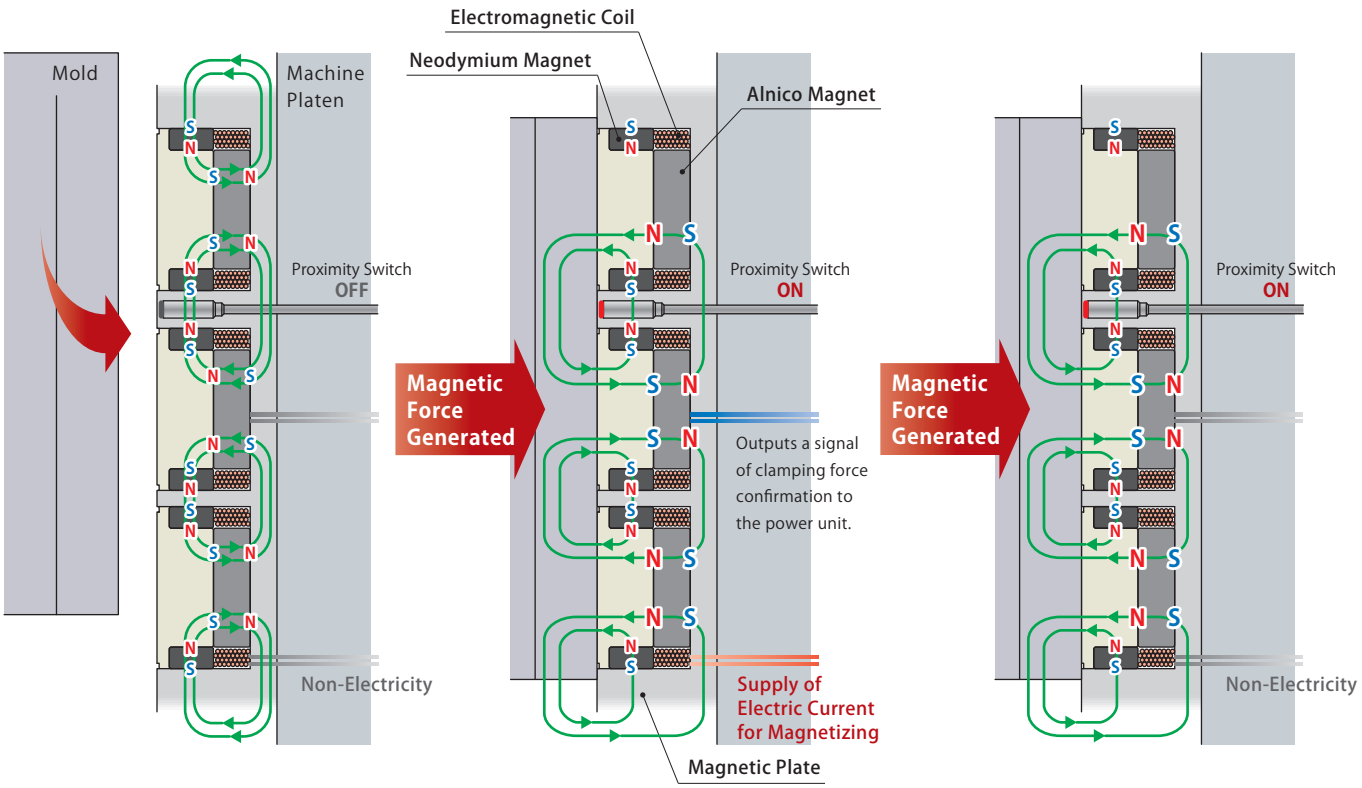
De-Magnetized



During Magnetization



Magnetized



Mold Loading/Unloading
(Initial De-Magnetizing)

The magnetic force is balanced within the plate and is non-existent on the surface.

Mold Closing
(Start Magnetization)

The polarity of the alnico magnet wrapped around the coil is reversed when the electric current is supplied, shifting the magnetic flux. This operation generates magnetic force on the surface of the magnetic plate.
The magnetic force becomes permanent.

Molding Enabled
(Magnetized State)

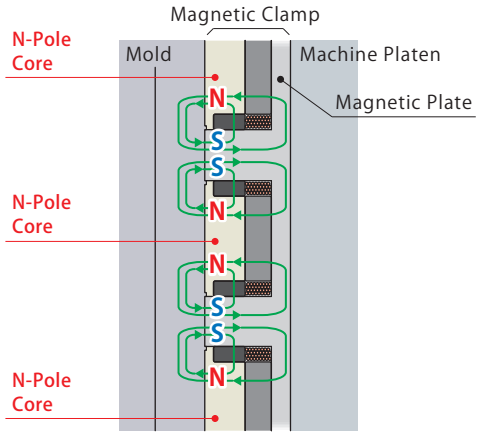
The magnetic flux will be permanently maintained unless an electric current is supplied. During production, power is supplied only to the proximity switch, so there is almost no energy consumption.

Magnetic Clamp in general has

Mono-Directional or Bi-Directional Magnetic Circuit

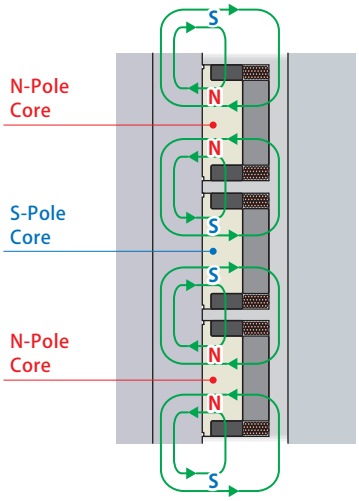
Mono-Directional Magnetic Circuit

Magnetic circuit is generated on each pole.
All magnetic cores are composed of N pole and the magnetic plate is magnetized to S pole.



Bi-Directional Magnetic Circuit (Kosmek Magnetic Clamp)

Magnetic circuit is generated between adjacent poles.
Composed of N-pole and S-pole magnetic cores.



Clamping Force Comparison

Mono-Directional Magnetic Circuit

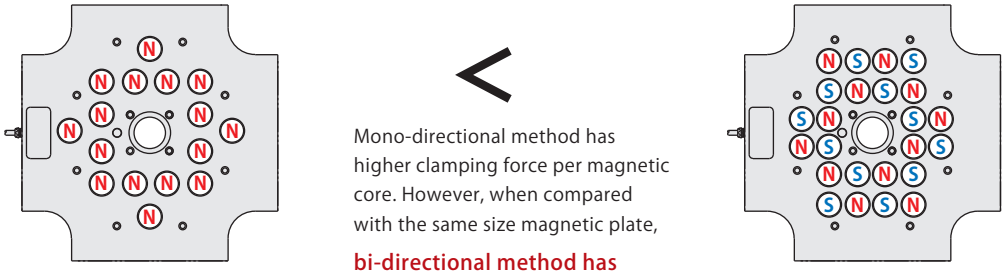
Clamping Force **Low**

Needs space between magnetic cores, which reduces core quantity and leads to low clamping force.

Bi-Directional Magnetic Circuit (Kosmek Magnetic Clamp)

Clamping Force **High**

Magnetic cores can be placed close to each other, increasing core quantity, resulting in high clamping force.



Mono-directional method has higher clamping force per magnetic core. However, when compared with the same size magnetic plate, **bi-directional method has higher clamping force.**

Influence of Air Gap

Mono-Directional Magnetic Circuit

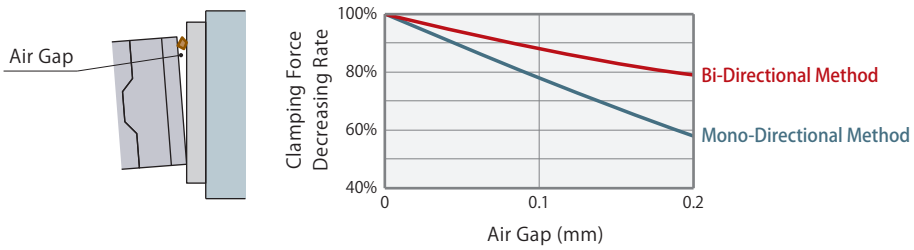
Air Gap Resistance **Low**

Magnetic circuit is generated by single pole, so the force to emit magnetic flux is small and resistance to air gap is low.

Bi-Directional Magnetic Circuit (Kosmek Magnetic Clamp)

Air Gap Resistance **High**

Magnetix flux pulled by different polarities, the force to emit magnetic flux is large and resistance to air gap is high.



Clamping force of mono-directional method is decreased by 150% compared to bi-directional method.
※ Reference value measured by Kosmek.

Kosmek magnetic clamp is designed with **superior bi-directional magnetic circuit method.**

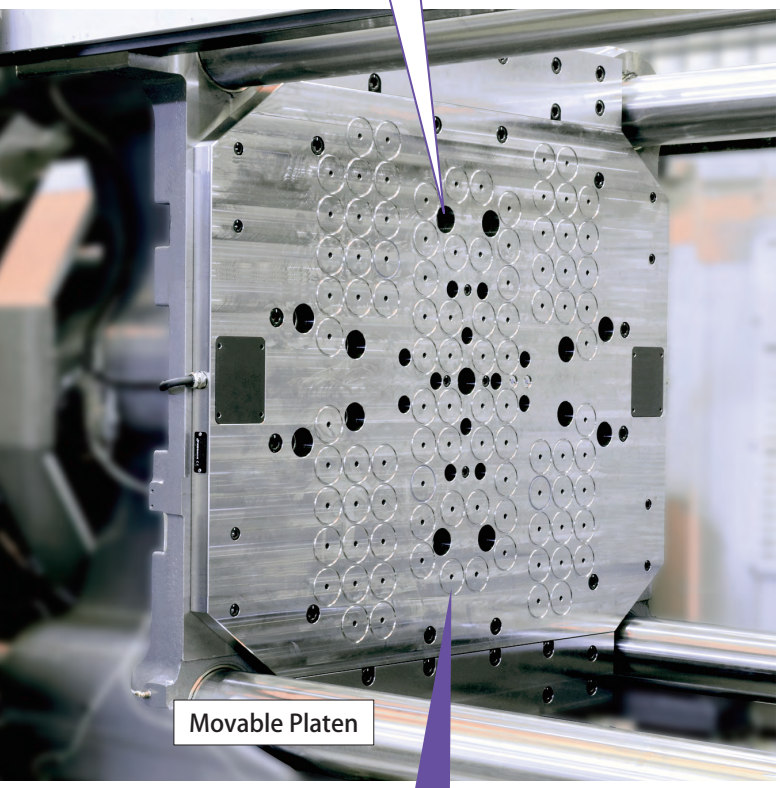
Basic Structure of Magnetic Plate

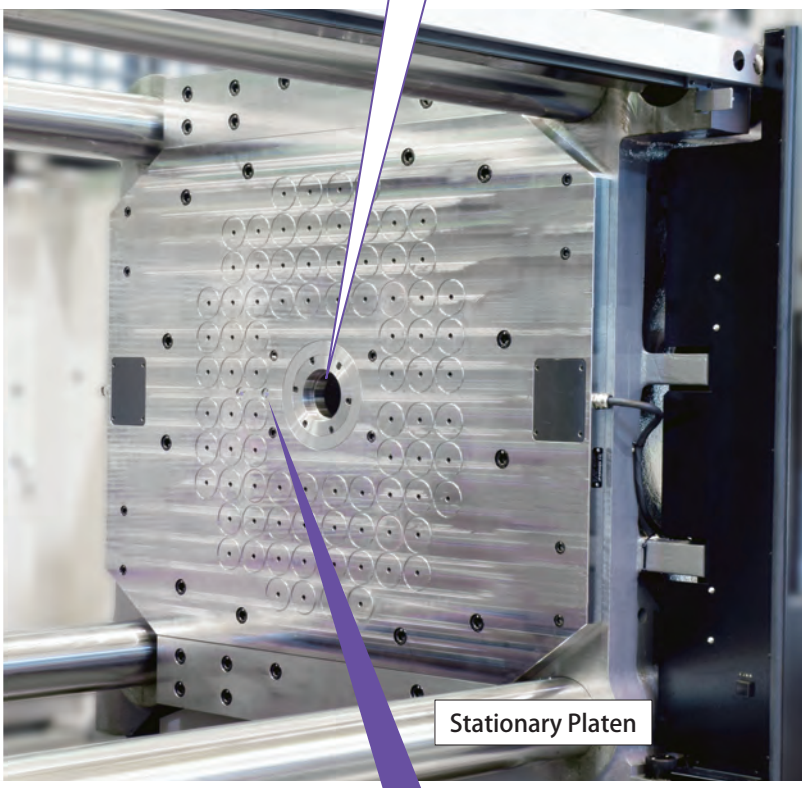
Ejector Rod Holes

The plate is made to meet the specifications of the movable platen of the machine.

Locating Ring

The locating ring is custom made and replaceable (Standard model). Adapter Replaceable option is also available for using several locating rings with different diameters.
(In case of Option **A** : Adapter Replaceable)





Magnetic Cores

Enables powerful and stable clamping force generated by the best combination of Alnico and Neodymium magnets in a bi-directional magnetic circuit.

Individual MIMS Sensors in Every Core

All magnetic cores are equipped with MIMS sensor that measures magnetic force. It is able to measure actual magnetic force even if the mold has through holes.
(In case of Detection System **M**□: MIMS)

Proximity Switch

Enables to check mold contact during mold installation.
(In case of Detection System **F/M0/M1 :** Mold Contact Detection)
※ For smaller plates, there may be one proximity switch.

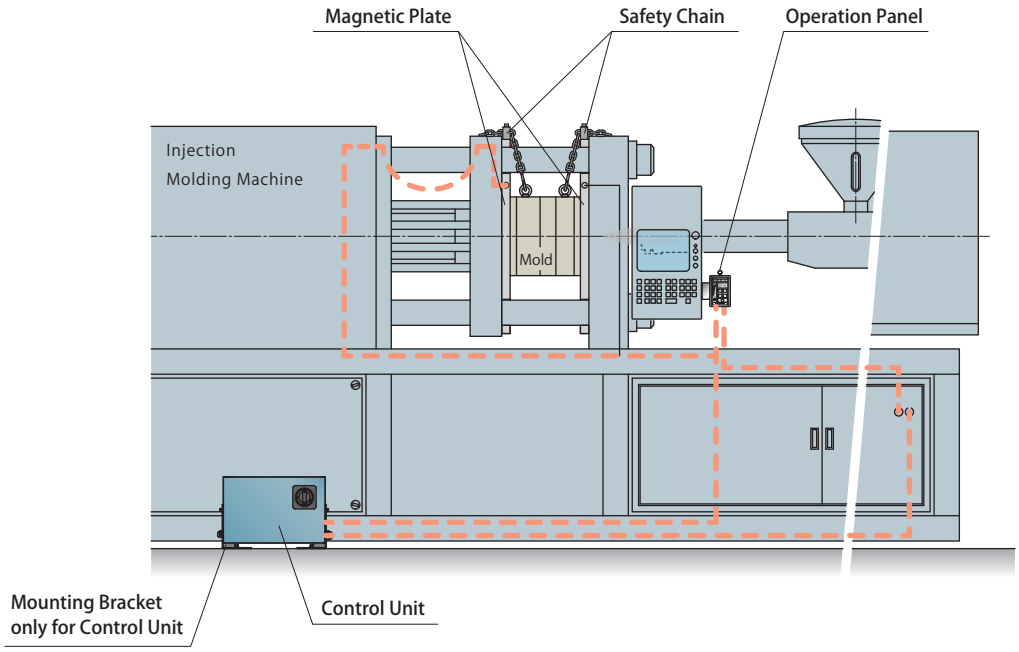


Double Monitoring System

Double monitoring system detects magnetic flux errors with MIMS. Sensors are embedded in all magnetic cores and mold separation is detected by proximity switches. Once separation is detected, immediate output of emergency stop signal. Double Monitoring System achieves the highest level of safety in the industry.
(In case of Detection System **M1/M2 :** Double Monitoring System)

External dimensions differ depending on the number and the arrangement of magnetic cores.
We will prepare an outline drawing based on a machine capacity. Please contact us for further information.

Installation Image



Magnetic Clamping System Selection List

● Standard Magnetic Plate：Model MAK (Plate Thickness 50 mm)

Machine Capacity (kN)	Standard Magnetic Plate ▶P.27			Control Unit/ Operation Panel Model No. ▶P.29	Mounting Bracket for Control Unit Model No. ▶P.41	Safety Chain Model No. ▶P.45
	Model No.	Clamping Force (kN)				
		MOV. Side	STA. Side			
～ 500	**MAK0050**	50	50	MUA1712 MUV1712 MUW1712	MEF0011/0020 /0030/0040 /0060/0070	MES□□□1
～ 800	**MAK0080**	75	62			
～ 1100	**MAK0100**	100	100			
～ 1500	**MAK0130**	150	125			
～ 1800	**MAK0180**	175	175			
～ 2500	**MAK0220**	225	200			
～ 3150	**MAK0280**	275	250	MUA17□2 MUV17□2 MUW17□2		
～ 3850	**MAK0350**	326	300			
～ 5000	**MAK0450**	401	401			
～ 5600	**MAK0550**	451	426			
～ 6800	**MAK0650**	551	476			
～ 8600	**MAK0850**	652	601			
～ 11000	**MAK1000**	827	752			
～ 13000	**MAK1300**	978	953			

● 35mm Magnetic Plate：Model MAG (Plate Thickness 35 mm)

Machine Capacity (kN)	35mm Magnetic Plate ▶P.27			Control Unit/ Operation Panel Model No. ▶P.29	Mounting Bracket for Control Unit Model No. ▶P.41	Safety Chain Model No. ▶P.45
	Model No.	Clamping Force (kN)				
		MOV. Side	STA. Side			
～ 500	**MAG0050**	54	43	MUA1512 MUV1512 MUW1512	MEF0011/0020 /0030/0040 /0060/0070	MES□□□1
～ 800	**MAG0080**	76	65			
～ 1100	**MAG0100**	97	86			
～ 1500	**MAG0130**	130	119			
～ 1800	**MAG0180**	151	151			

Notes : 1. The above shows standard system references. It varies depending on machine capacity, platen size and others. Please contact us when deciding specifications.
2. The model number of safety chain should be specified according to the mold weight, dimensions and others.
3. It is also available for higher machine capacity than shown above. Please contact us for further information.

Model No. Indication : Magnetic Plate

MAK 035 0 - H M N 2 - C AP - S□□□□□

1 2 3 4 5 6 7 8 9 10

1 Magnetic Plate Model

MAK : Standard Model Plate Thickness 50 mm **MAG** : Thin Model Plate Thickness 35 mm

2 Machine Capacity Code

※ Please refer to the specifications.

3 Design No.

0 : Revision Number

4 Injection Molding Machine Type

H : Horizontal
W : Two-Color Rotary
V : Vertical Single Acting
R : Vertical Rotary

5 Detection System

• **Without MIMS (Multi Information Monitoring System)**

F : Mold Clamping Force Indicator (Stationary Side Magnetic Plate Temperature Display)

• **With MIMS (Multi Information Monitoring System)**

G : Mold Clamping Force and Magnetic Plate Temperature Display, Clamping Force Normality Self-Diagnosis (Only for 1 **MAK**)
M : Mold Clamping Force and Magnetic Plate Temperature Display ※1

※1. If Detection System 1 of Control Unit/Operation Panel is **K**, 5 Detection System of Magnetic Plate becomes **M**.

6 Operating Temperature

N : Standard 0 ~ 100 ℃ **Z** : High Temperature 0 ~ 120℃ **H** : High Temperature 0 ~ 150 ℃

7 The Number of Discharges

1 : 1 Discharge **4** : 4 Discharges **8** : 8 Discharges **G** : 16 Discharges
2 : 2 Discharges **6** : 6 Discharges **C** : 12 Discharges

※ 7 The Number of Discharges varies depending on 2 Machine Capacity Code.

8 Cable Wiring Specification

Blank : Standard Interface
C : Multi-Conductor Cable with Connectors
(Only available in case of 1 **MAK** and 7 **1** or **2** discharge(s))



9 Option

Blank : None
A : Adapter Replaceable
D : Keyhole-shaped Locating Ring
E : Groove for Mold Removal (for Emergency Power Outages) (Only for 1 **MAK**)
F : Flanged Proximity Switch (Only available in case of 1 **MAK** and 6 **N** or **Z**)
P : Pin Specification
T□ : With Heat Insulating Plate
(Please indicate the thickness of heat insulating plate in 1mm increments in □.)

10 SER. No.

※ It is the serial number of the product specification. We will create a number.

Specifications

Model No.		MAK	MAG
Clamping Force (per Magnetic Core)	kN	6.27	2.70
Magnetic Core Diameter	mm	ϕ70	ϕ50
Magnetic Plate Thickness	mm	50	35
Operating Temp. (Mold Contact Surface)	℃	6 **N**：Standard 0 ~ 100 **Z**：High Temp. 0 ~ 120 **H**：High Temp. 0 ~ 150	
Magnetic Flux Height (Penetration Depth to Mold Side)	mm	20	
Mold Contact Detection Distance	mm	within 0.3 ※2	
Mold Separation Detection Distance	mm	0.5 or more ※2	
Operating Voltage ※3	(AC) V	Single Phase AC 200 ~ 230 (50 / 60Hz)	
Conduction Time ※4	sec.	Activation：0.5 Deactivation：0.5 (per Discharge)	

Notes : ※2. Changes in these figures may be necessary according to actual mold specifications and other conditions.
※3. Please inform us of the operating voltage in advance. Since the internal structure of a magnetic plate varies with operating voltage, no changes are allowed after launching the manufacture of the plate.
※4. The time of magnetic pole inversion. The full operating time differs depending on the number of magnetic cores and the conduction method to the plate.

Specifications：2 Machine Capacity Code 7 The Number of Discharges

● Standard Magnetic Plate：Model MAK (Plate Thickness 50 mm)

Machine Capacity (kN)	Magnetic Plate Model No.	Clamping Force (kN)		No. of Discharges	Weight (kg)	
		MOV. Side	STA. Side		MOV. Side	STA. Side
～ 500	**MAK0050**	50	50	1	90	90
～ 800	**MAK0080**	75	62	1	100	100
～ 1100	**MAK0100**	100	100	1	130	130
～ 1500	**MAK0130**	150	125	1	180	180
～ 1800	**MAK0180**	175	175	1	230	230
～ 2500	**MAK0220**	225	200	1	280	280
～ 3150	**MAK0280**	275	250	2	350	350
～ 3850	**MAK0350**	326	300	2	400	400
～ 5000	**MAK0450**	401	401	2	450	450
～ 5600	**MAK0550**	451	426	2	600	600
～ 6800	**MAK0650**	551	476	4	800	800
～ 8600	**MAK0850**	652	601	4	900	900
～ 11000	**MAK1000**	827	752	4	1000	1000
～ 13000	**MAK1300**	978	953	6	1300	1300

● 35mm Magnetic Plate：Model MAG (Plate Thickness 35 mm)

Machine Capacity (kN)	Magnetic Plate Model No.	Clamping Force (kN)		No. of Discharges	Weight (kg)	
		MOV. Side	STA. Side		MOV. Side	STA. Side
～ 500	**MAG0050**	54	43	1	60	60
～ 800	**MAG0080**	76	65	1	80	80
～ 1100	**MAG0100**	97	86	1	90	90
～ 1500	**MAG0130**	130	119	1	115	115
～ 1800	**MAG0180**	151	151	1	140	140

Notes : 1. Please contact us for power consumption (that is required when switching activation and deactivation). There is almost no power consumption by the magnetic clamp during normal injection molding operation.
2. It is also available for higher machine capacity than shown above. Please contact us for further information.

Model No. Indication：Control Unit/Operation Panel

MUA	37	4	2	-	V	-	M	1	N	-		-	AW
1	2	3	4		5		6	7	8		9		10

CE

1 Control Unit Model

MUA : Standard (for Horizontal Single-Acting Molding Machine)
MUV : For Vertical Molding Machine
MUW : For Two-Material Injection Molding Machine

2 Category No.

- Magnetic Core Diameter：ϕ70 mm
  (When selecting Magnetic Plate：**MAK**)

37 : Multi-Conductor Cable with Connectors
(In case of 3 1, 2 or 4 discharge(s).)

17 : Standard Interface
(In case of 3 more than 6 discharges.)

- Magnetic Core Diameter：ϕ50 mm
  (When selecting Magnetic Plate：**MAG**)

35 : Multi-Conductor Cable with Connectors

3 The Number of Discharges

1 : 1 Discharge
2 : 2 Discharges
4 : 4 Discharges
6 : 6 Discharges
8 : 8 Discharges
C : 12 Discharges
G : 16 Discharges

4 Design No.

2 : Revision Number

5 Injection Molding Machine type and Mold Loading/Unloading Direction

1 **MUA**：Standard
V : Horizontal Machine・Vertical Mold Loading
H : Horizontal Machine・Horizontal Mold Loading

1 **MUV**：For Vertical Molding Machine
A : Vertical Machine・Upper Mold Only
B : Vertical Machine・Upper and Lower Mold
R□ : Vertical Rotary Machine (Lower Side)・Upper Mold ×1 Lower Mold ×2
Lower side Rotary Table Stop Position
R1：1 position / **R2**：2 positions / **R3**：3 positions / **R4**：4 positions

1 **MUW**：For Two-Material Injection Molding Machine
U : 1-Plate Loading ··· Control Channel STA. 1 / MOV. 1
S : 2-Mold Simultaneous Loading ··· Control Channel STA. 2 / MOV. 2
D : 2-Mold Sequential Loading ··· Control Channel STA. 2 / MOV. 2

6 Detection System 1

• **Without MIMS (Multi Information Monitoring System)**

F : Mold Clamping Force Indicator (Stationary Side Magnetic Plate Temperature Display)

• **With MIMS (Multi Information Monitoring System)**

G : Mold Clamping Force and Magnetic Plate Temperature Display, Clamping Force Normality Self-Diagnosis (Only for Magnetic Plate: **MAK**)

K : Mold Clamping Force and Magnetic Plate Temperature Display, Clamping Force Verification

M : Mold Clamping Force and Magnetic Plate Temperature Display

7 Detection System 2

Blank : Mold Separation Detection with Proximity Switch (With Mold Contact Check) — 6 Detection System 1 : **F** Only

0 : Mold Separation Detection with Proximity Switch (With Mold Contact Check)

1 : Double Monitoring System ※1 (With Mold Contact Check) — 6 Detection System 1 : **G, K, M** Only

2 : Double Monitoring System ※1 ※2 (Without Mold Contact Check)

※1. Double Monitoring System combines magnetic flux error detection with MIMS sensor and mold separation detection with proximity switch.
※2. Mold separation detection with proximity switch of detection system **M2** is activated only when there is no gap at the time of locking and the proximity switch reacts.

8 Operating Temperature

N : Standard 0 ~ 100 ℃ **Z** : High Temperature 0 ~ 120 ℃ **H** : High Temperature 0 ~ 150 ℃

9 Indication Language ※3

Blank : Japanese (Control Unit: written in English, Operation Panel: written in Japanese)

E : English (UK) (Control Unit & Operation Panel: written in English, Temperature: ℃ [Celsius])

N : English (US) (Control Unit & Operation Panel: written in English, Temperature: ℉ [Fahrenheit])

C : Chinese (Control Unit: written in English, Operation Panel: written in Chinese)

※3. Please contact us for other indication languages.

10 Option

Blank : None (Standard)

A : Correspondence to UL

W : Remote Monitoring System ※4

700 : Correspondence to EUROMAP 70.0 ※4

701 : Correspondence to EUROMAP 70.1 ※4

※4. Please contact us for further information.

Specifications

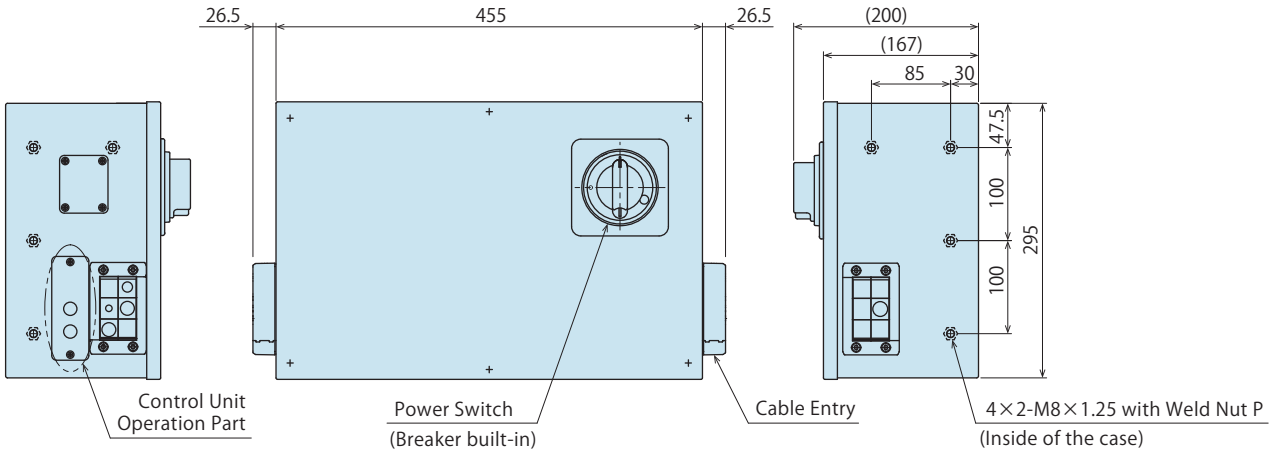
Model No.		**MUA / MUV / MUW**
Operating Temperature		0 ~ 55℃ (Based on JIS-C0025)
Operating Voltage		Single Phase AC200 ~ 230 V (50 / 60Hz)
Withstand Voltage		AC1000V (10mA/1 min.)
Resistant	Vibration	1G/10 ~ 150Hz (Based on IEC60068/JIS-C0040)
Environment	Protection Level	IP5X (Based on IEC60529 : 2001)
Paint Color		Mansel 5PB4/4 (Japan Paint Color 75-40H)

Note : 1. For any specifications other than those described in "Model No. Indication" and "Specifications", please contact us. "-Z□□□□□" will be added to the end of model number as a sign of a custom-made model.

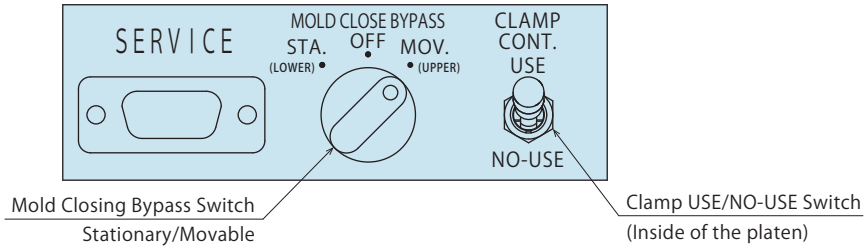
External Dimensions : Control Unit

MUA3712 / MUV3712 / MUW3712
MUA3512 / MUV3512 / MUW3512
MUA3722 / MUV3722 / MUW3722

※ The drawing shows MUA/MUV/MUW for 1 discharge and 2 discharges (Multi-Conductor Cable with Connectors).

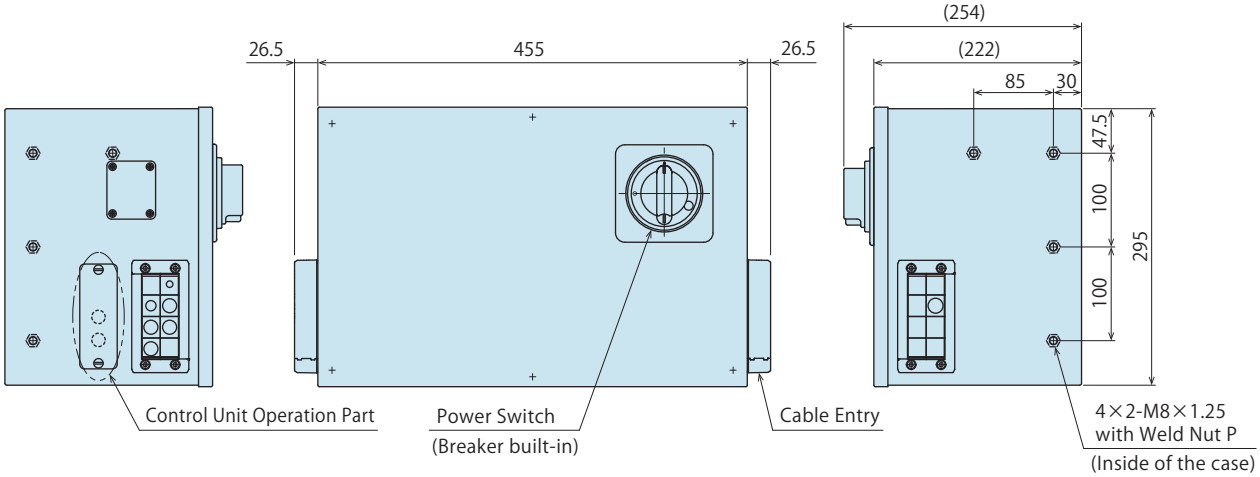


Detail : Control Unit Operation Part

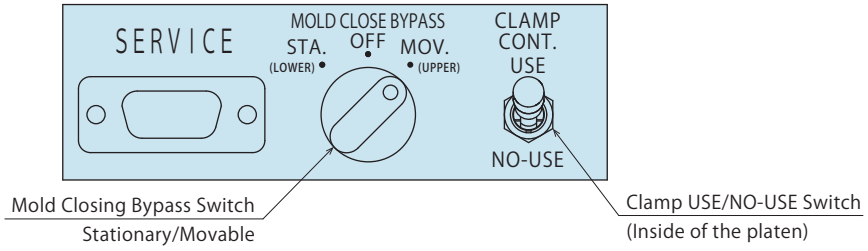


MUA3742 / MUV3742 / MUW3742

※ The drawing shows MUA/MUV/MUW for 4 discharges (Multi-Conductor Cable with Connectors).

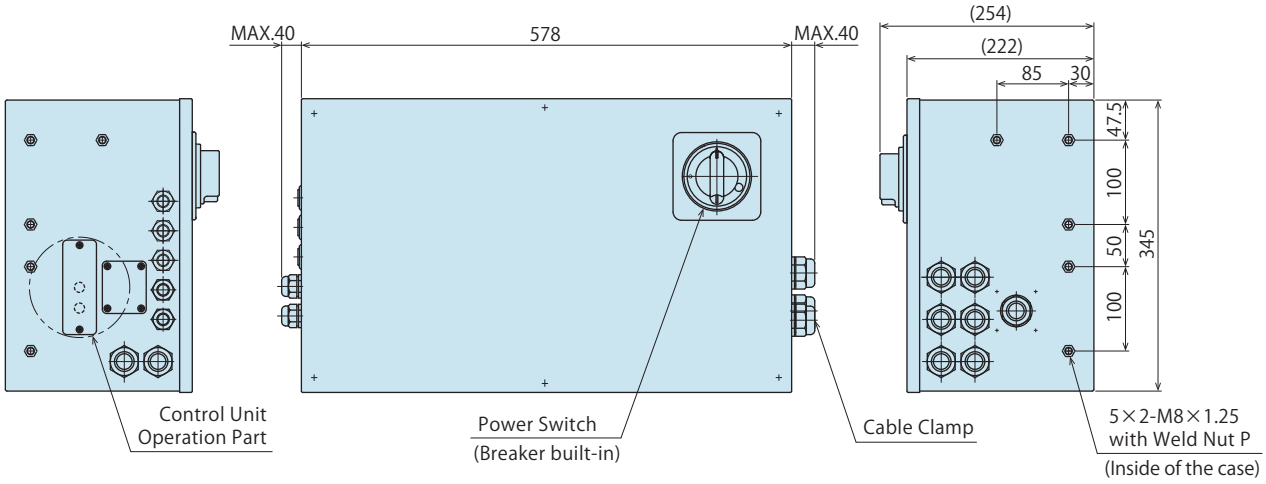


Detail : Control Unit Operation Part

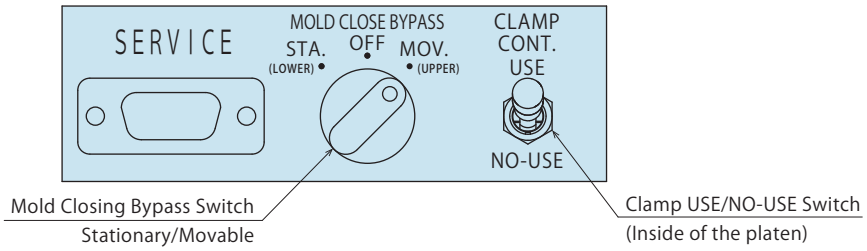


MUA1762 / MUV1762 / MUW1762

※ The drawing shows MUA/MUV/MUW for 6 discharges (Standard Interface).

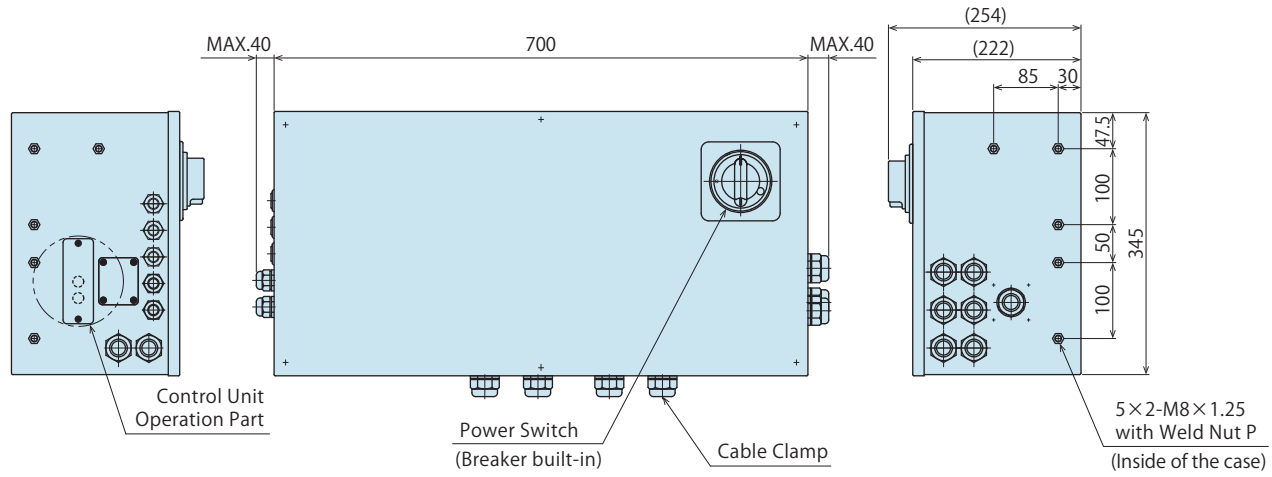


Detail : Control Unit Operation Part

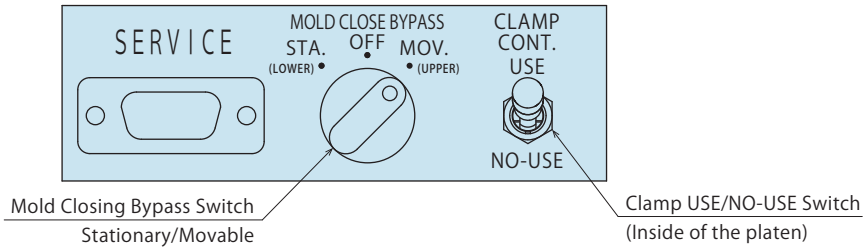


MUA1782 / MUV1782 / MUW1782

※ The drawing shows MUA/MUV/MUW for 8 discharges (Standard Interface).

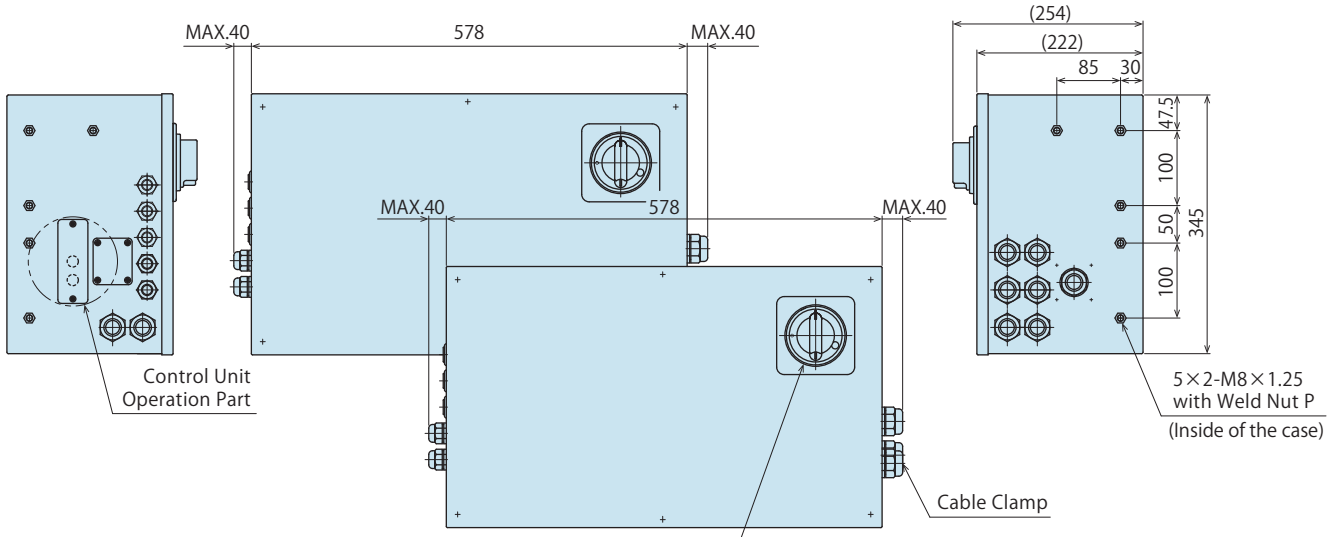


Detail : Control Unit Operation Part

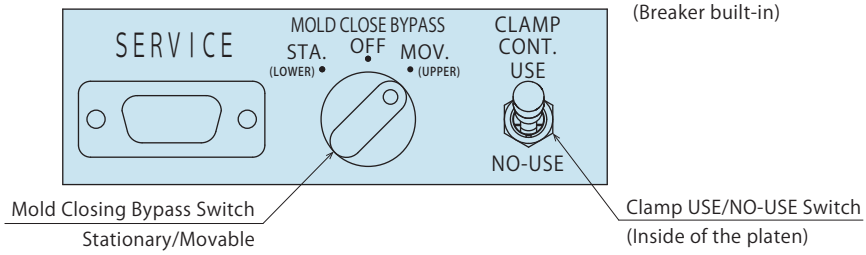


MUA17C2 / MUV17C2 / MUW17C2

※ The drawing shows MUA/MUV/MUW for 12 discharges (Standard Interface).
Composed of 2 sets of MUA/MUV/MUW for 6 discharges.

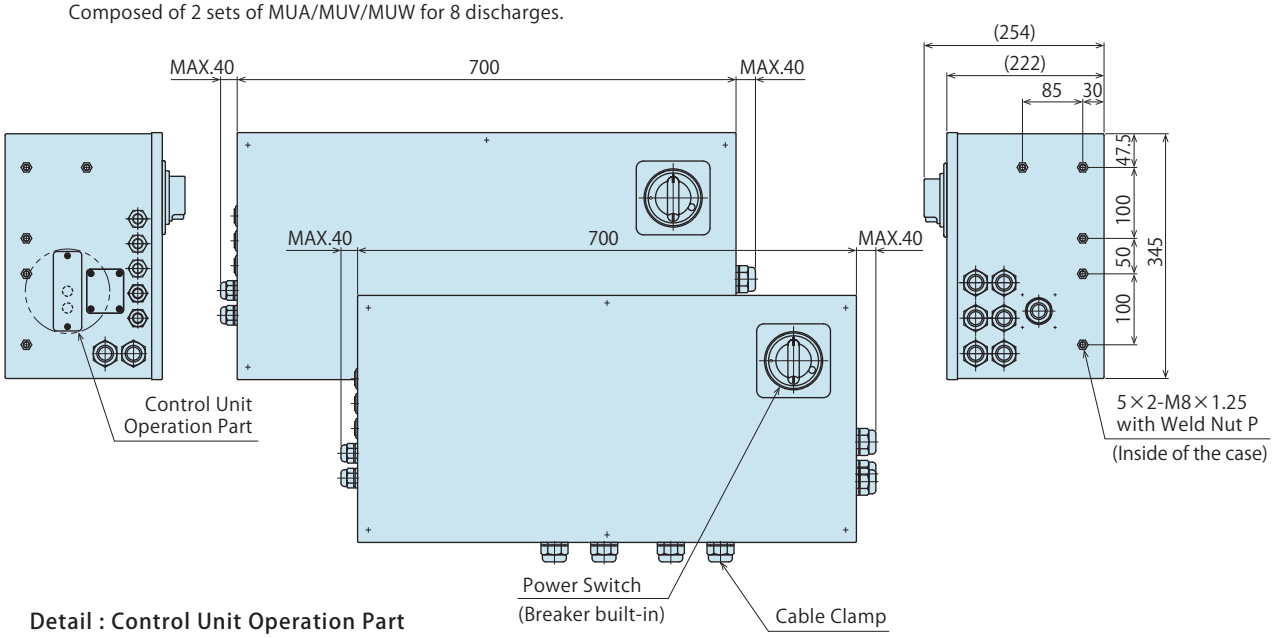


Detail : Control Unit Operation Part

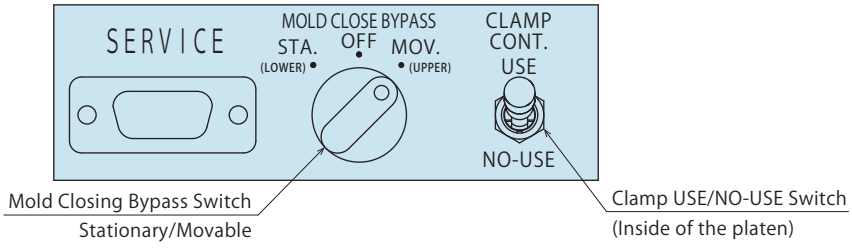


MUA17G2 / MUV17G2 / MUW17G2

※ The drawing shows MUA/MUV/MUW for 16 discharges (Standard Interface).
Composed of 2 sets of MUA/MUV/MUW for 8 discharges.



Detail : Control Unit Operation Part

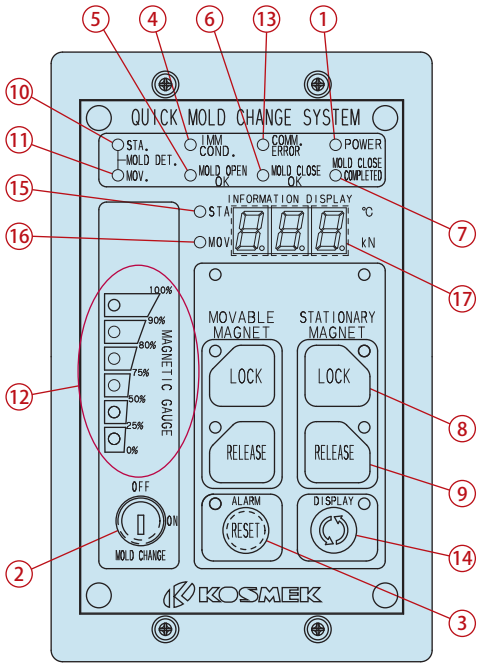


Note :

1. Refer to P.41 ~ P.44 for mounting bracket.

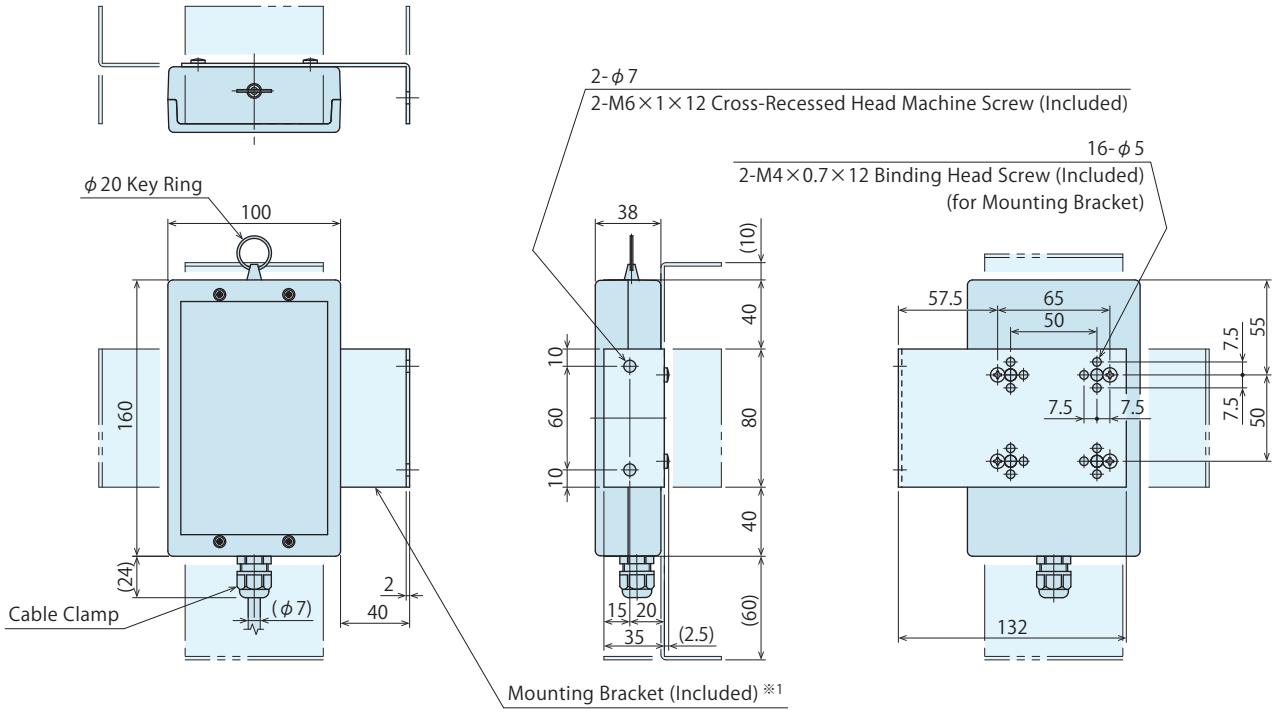
Operation Panel：MUA□□□2

Detail: Operation Panel



No.	Display / Lamp		Description
①	[POWER]	Display Lamp	Turns on when the power is ON.
②	[MOLD CHANGE]	Key Switch	Turn this switch ON when changing molds.
③	[CLAMP ERROR]	Display Lamp	Buzzer is activated and the lamp flashes when an error is detected.
	[RESET]	Button	Error Reset Button
④	[IMM COND.]	Display Lamp	Turns on when the conditions necessary to make a mold change have been met.
⑤	[MOLD OPEN OK]	Display Lamp	Turns on when it is possible to open the mold.
⑥	[MOLD CLOSE OK]	Display Lamp	Turns on when it is possible to close the mold.
⑦	[MOLD CLOSE COMPLETED]	Display Lamp	Turns on when the machine has closed the mold.
⑧	[LOCK]	Switch	The switch to lock (magnetize) the magnetic clamp.
		Display Lamp	Turns on when the magnetic clamp is locked (magnetized). Flashes when it is locked (magnetized) by special operation.
⑨	[RELEASE]	Switch	The switch to release (demagnetize) the magnetic clamp.
		Display Lamp	Turns on when the magnetic clamp is released (demagnetized).
⑩	[STA. MOLD DET.]	Display Lamp	Turns on when a mold is in contact with the magnetic plate on the stationary side. Flashes when separation detection is activated during molding operation.
⑪	[MOV. MOLD DET.]	Display Lamp	Turns on when a mold is in contact with the magnetic plate on the movable side. Flashes when separation detection is activated during molding operation.
⑫	Mold Clamping Force Indicator	Detection System : **F, G**	Indicates a magnetizing status of magnetic cores in six levels. An alarm is activated when a clamping force is less than 75%.
		Detection System : **K, M**	No indicator.
⑬	COMM. ERROR		Turns on when there is a communication error, or the machine is in protect mode.
⑭	[SWITCH DISPLAY]	Switch	Switches the display.
⑮	[STATIONARY]	Display Lamp	Turns on when displaying the stationary side data. (Except error code)
⑯	[MOVABLE]	Display Lamp	Turns on when displaying the movable side data. (Except error code)
⑰	Status Display	Detection System : **F**	CPI：System Condition and Error Code Display Stationary Platen Side Magnetic Plate Temperature Display
		Detection System : **G, K, M**	CPI：System Condition and Error Code Display MIMS：Mold Clamping Force Display (Displays the error code when the overall clamping force is less than 25%.) Magnetic Plate Temperature Display

External Dimensions



Notes :

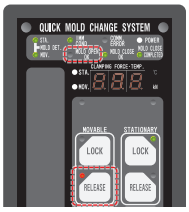
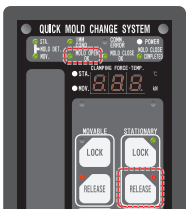
1. This operation panel shows in case of MUA, Option：None.
   Please contact us for Option：EUROMAP 70.0/70.1 and the operation panel for MUV and MUW.

※1. The bracket can be mounted on any of top, bottom, left and right.

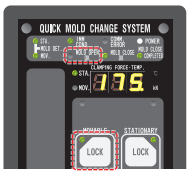
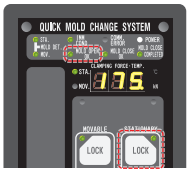
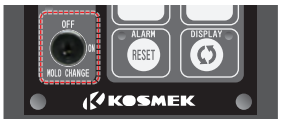
Operating Procedure

※ It shows the operating procedure of MUA, Option：None.
Please contact us for Option：EUROMAP 70.0/70.1.
Please contact us for MUV or MUW.

Unloading a Mold

Procedure	IMM / Magnetic Plate	Operation Panel
1	Suspend the mold by crane. → Close the safety door.	
2	Prepare for mold change mode. → Move the nozzle / ejector back.	 The [IMM COND.] lamp turns on.
3		 Turn the [MOLD CHANGE] switch ON.
4	Close the mold.	 The [MOLD CLOSE COMPLETED] lamp turns ON.
5		Press the movable side [RELEASE] button. Note : ・The stationary side and movable side cannot be operated simultaneously. Make sure to operate them sequentially. Push each button for more than 1 second to avoid misoperation.
6	Movable side mold release complete	 The [MOLD OPEN OK] lamp turns OFF. Movable [RELEASE] lamp turns ON.
7		Press the stationary side [RELEASE] button. Note : ・The stationary side and movable side cannot be operated simultaneously. Make sure to operate them sequentially. Push each button for more than 1 second to avoid misoperation.
8	Stationary side mold release complete	 The [MOLD OPEN OK] lamp turns ON. Stationary [RELEASE] lamp turns ON.
9	Open the platens → Open the safety door → Unload the mold	

Loading a Mold

Procedure	IMM / Magnetic Plate	Operation Panel
1	Set the mold. → Close the safety door.	
2	Close the mold.	 Movable / Stationary [MOLD DETECT] lamp turns ON. The [MOLD CLOSE COMPLETED] lamp turns ON.
3		Press the movable side [LOCK] button. Note : ・The stationary side and movable side cannot be operated simultaneously. Make sure to operate them sequentially. Push each button for more than 1 second to avoid misoperation.
4	Movable side lock complete.	 The [MOLD OPEN OK] lamp turns OFF. Movable [LOCK] lamp turns ON.
4 (Error)	When clamping force of the movable side is insufficient: This results from mold-related errors. For such errors, please refer to the Instruction Manual or contact us. ※The function of Detection System：**F**	※ Insufficient Clamping Force (below 75%)  Error Code on the display. Please refer to the Error Code List. [CLAMP ERROR] lamp starts flashing.
5		Press the stationary side [LOCK] button. Note : ・The stationary side and movable side cannot be operated simultaneously. Make sure to operate them sequentially. Push each button for more than 1 second to avoid misoperation.
6	Stationary side lock complete.	 The [MOLD OPEN OK] lamp turns ON. Stationary [LOCK] lamp turns ON.
7		 Turn the [MOLD CHANGE] switch OFF.

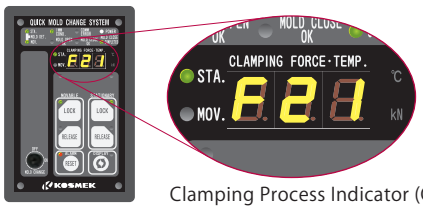
Notes :

1. For your safety, make sure to check surrounding condition before starting operation.
2. In case of using a crane for mold loading/unloading, make sure that a mold is securely suspended.
3. Make sure that molds meet the specifications of clamps and machines.
4. DO NOT modify or remodel clamps, control panels, other devices, interlock wiring, etc.
5. Even when using them continuously, make sure to check operations and interlocks of each device regularly.
6. If you find anything abnormal, stop operating and contact us immediately.

Detail : Clamping Process Indicator (CPI)

Error Code List

Category	Display			Description (STA) = Stationary side, (MOV) = Movable side	Causes・Measures
Load	U	1,3	1-8	(STA) Current value during operation is above the upper limit.	Turn the power on again. There can be insulation reduction, deterioration, or short circuit of coils in the plate and an error between the control panel and plate wiring. Also, there might be power voltage fluctuation. Check the power voltage.
		2,4	1-8	(MOV) Current value during operation is above the upper limit.	
	L	1,3	1-8	(STA) Current value during operation is below the lower limit.	
		2,4	1-8	(MOV) Current value during operation is below the lower limit.	
		E	1	Leak current of drive circuit in the control panel.	
Mold	F	01-16		(STA) Mold error detection value is below the set value.	Release the mold on the side the error is occurring. Check if there is a gap or rust on the mold back side near the error detected part.
		21-36		(MOV) Mold error detection value is below the set value.	
Temp.	t	1	1-5	(STA) Temperature is above the upper limit of plate temperature.	Plate temperature is too high. Cool down the plate temperature.
			6-9,0	(MOV) Temperature is above the upper limit of plate temperature.	
		2	1-5	(STA) Temperature sensor error.	Make sure there is no abnormality in wiring of the temperature sensor.
			6-9,0	(MOV) Temperature sensor error.	
Sensor	E	4	1	(STA) Proximity detection is OFF.	Release the mold on the error side, and recover the seating. Make sure there is no gap or rust on the mold back side near the proximity detection.
			2	(MOV) Proximity detection is OFF.	
			3	(STA) Proximity detection turns OFF and then ON again.	Mold separation detection is activated. Make sure it is within the specification range, and there is no abnormality in wiring.
			4	(MOV) Proximity detection turns OFF and then ON again.	
			5	Both the locating pin insert limit and removal limit are ON.	Make sure the locating pin part has nothing detected by mistake, and there is no abnormality in wiring.
			6	(STA) Mold separation detected.	Release the mold on the error side and recover. Make sure there is no gap or rust on the mold back plate. Make sure it is within the specification range, and no abnormality in wiring.
			7	(MOV) Mold separation detected.	
Clamping Force	E	5	1	(STA) Clamping force is lower than the minimal required value.	Make sure clamping force is more than the prescribed value (25% of plate clamping capacity), and there is no abnormality in clamping force detection coil or wiring.
			2	(MOV) Clamping force is lower than the minimal required value.	
			5	(STA) Clamping force is out of the evaluation range.	Release and recover the mold on the relevant side. Make sure there is no difference between the registration number and the loaded mold. Check the magnetic plate and mold contact area for rust or other contaminants that may cause clamping force to be reduced. Make sure there is no abnormality in wiring.
			6	(MOV) Clamping force is out of the evaluation range.	
Molding	E	6	1	IMM COND OK + MOLD CHANGE OFF + RELEASE COND OK	It is in the released state during "Mold Change OFF". Conduct locking operation to recover.
Clamp Control	E	8	1	(STA) Connection between the control panel and plate is cut off.	Make sure there is no abnormality in connection between the control panel and plate.
			2	(MOV) Connection between the control panel and plate is cut off.	
			3	Clamp Control Panel switch is at NO-USE.	Switch it to "USE".
			4	Exceeding a specified number of clamping operations within a prescribed time.	Auto reset after 180 sec. Plate coils receive a large load, so the number of operation cycles within a prescribed time is limited.
			5	Connection in the control panel is cut off.	Make sure there is no abnormality in base plate connecting part in the control panel. Turn the power on again. Control base plate may be damaged if the power will not recover.
			6	Memory in the control panel is broken.	
			7	(STA) Operation uncompleted since power is turned OFF during operation (locking/releasing).	Release after turning the power on.
			8	(MOV) Operation uncompleted since power is turned OFF during operation (locking/releasing).	Release after turning the power on.
Output	E	9	1	(STA) Electric current when locking is above the prescribed value.	Turn the power on again. There can be insulation reduction, deterioration, or short circuit of coils in the plate and an error between the control panel and plate wiring. Also, there might be power voltage fluctuation. Check the power voltage.
			2	(MOV) Electric current when locking is above the prescribed value.	
			3	(STA) Electric current when releasing is above the prescribed value.	
			4	(MOV) Electric current when releasing is above the prescribed value.	



Clamping Process Indicator (CPI) Display

Interlock (Interface)

The interlock functions between devices listed below are incorporated in the magnetic clamping system control circuit, ensuring safe mold changing.

※The interlock functions may not be operational depending on the machine conditions.

IMM ⇒ Magnetic Clamping Systems

Signal Name	Description
Mold Change Mode	A signal that indicates the molding machine is in low-speed mold change mode. The platens move slowly.
Mold Closed (Mold Touch)	A signal that ensures the mold is completely closed. Prohibits release (demagnetizing) operation when mold is open to prevent it from falling out.
Nozzle Back	A signal that ensures the nozzle / injection unit is fully back to prevent damage to the nozzle / injection unit when changing molds.
Door Close	A signal that shows the safety door is closed. Prevents operators from entering dangerous areas during mold loading and unloading.
Ejectors Back (Option)	A signal that ensures the ejector plate is in the back position to prevent damage to the ejector rods during mold removal.

Magnetic Clamping Systems ⇒ IMM

Signal Name	Description
Mold Open OK	A signal that indicates the clamping system is ready for mold opening.
Mold Close OK	A signal that indicates the clamping system is ready for mold closing.
Mold Change “ON”	A signal that indicates the clamp system is in “Mold Change Mode” .
Clamp Error ※1	When an error in the clamp circuit occurs, this signal is sent to make an emergency stop of the machine.

Note :

※1. For clamping errors, please refer to the Instruction Manual or contact us.

Model No. Indication : Mounting Bracket (for Control Unit only)

MEF 001 1
1 2

1 Mounting Method

001 : Floor Mounted 1
002 : Wall / Machine Frame Mounted 1
003 : Wall / Machine Frame Mounted 2
004 : Hanging
006 : Floor Mounted 2
007 : Wall / Machine Frame Mounted 3

※ Please contact us for unlisted mounting methods.

2 Design No. (Revision Number)

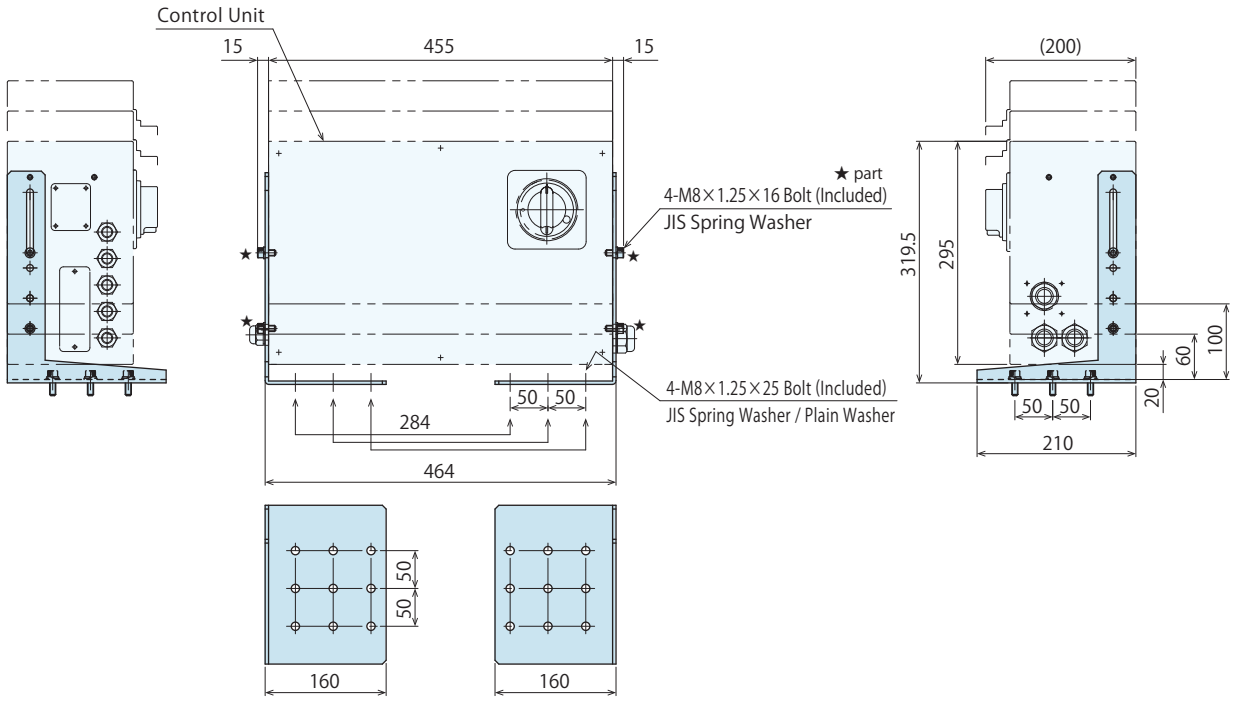
0 : In case of 1 **002/003/004/006/007**
1 : In case of 1 **001**



External Dimensions

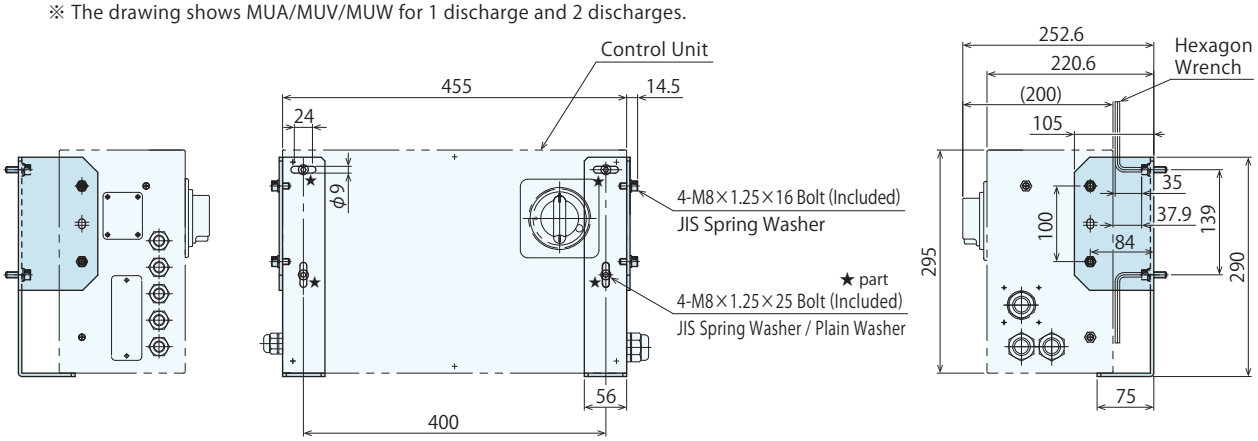
MEF0011 : Floor Mounted 1

※ The drawing shows MUA/MUV/MUW for 1 discharge and 2 discharges.



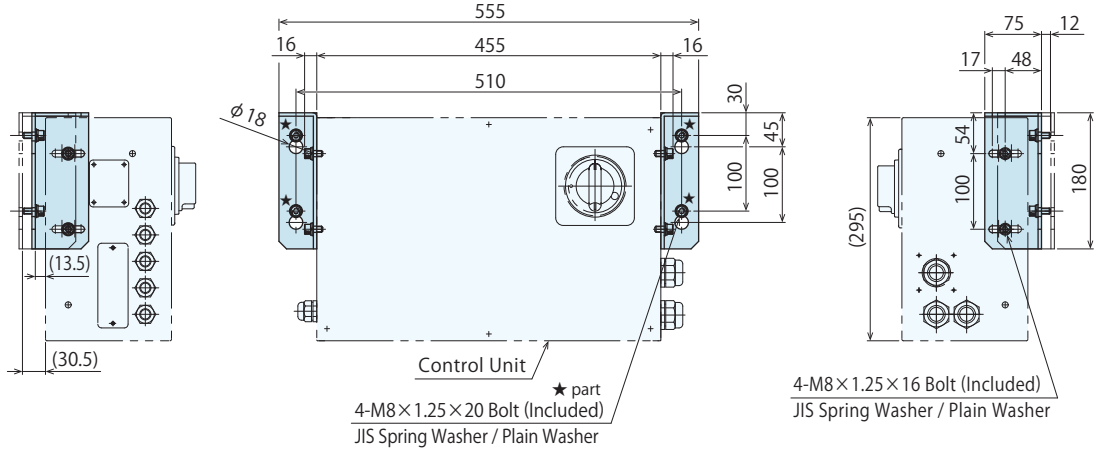
MEF0020 : Wall/Machine Frame Mounted 1

※ The drawing shows MUA/MUV/MUW for 1 discharge and 2 discharges.



MEF0030 : Wall/Machine Frame Mounted 2

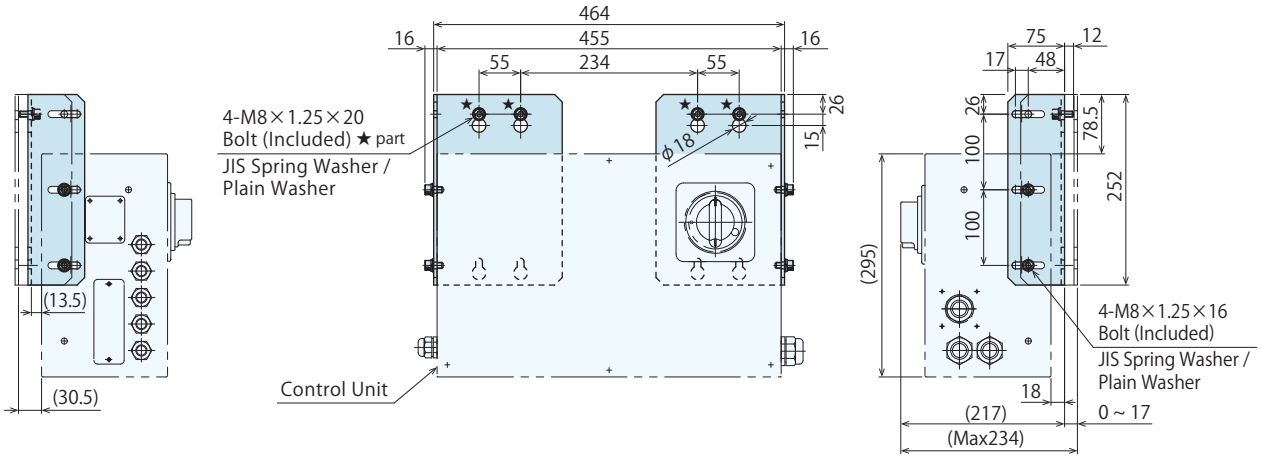
※ The drawing shows MUA/MUV/MUW for 1 discharge and 2 discharges.



External Dimensions

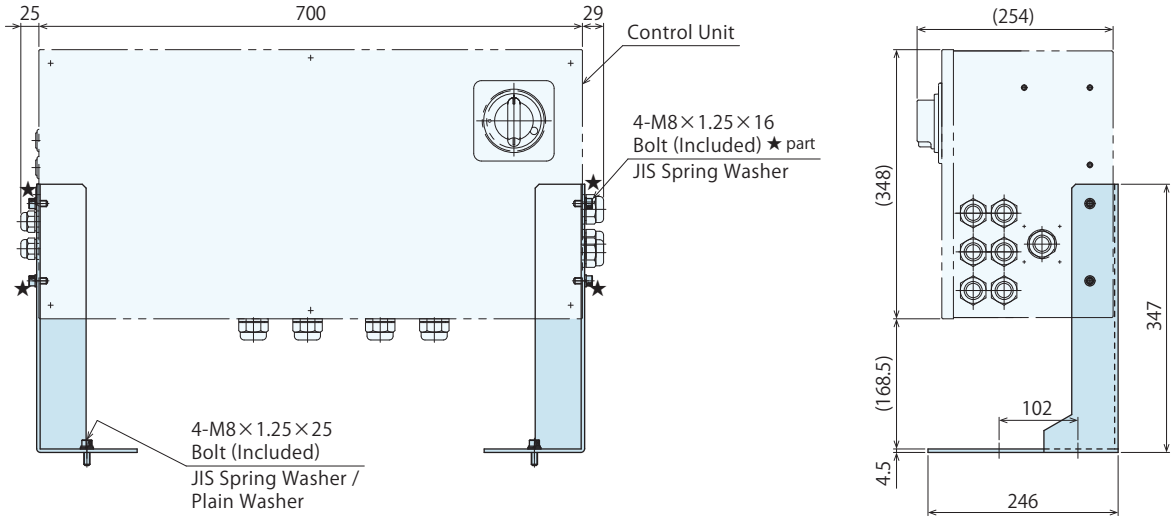
MEF0040：Hanging

※ The drawing shows MUA/MUV/MUW for 1 discharge and 2 discharges.



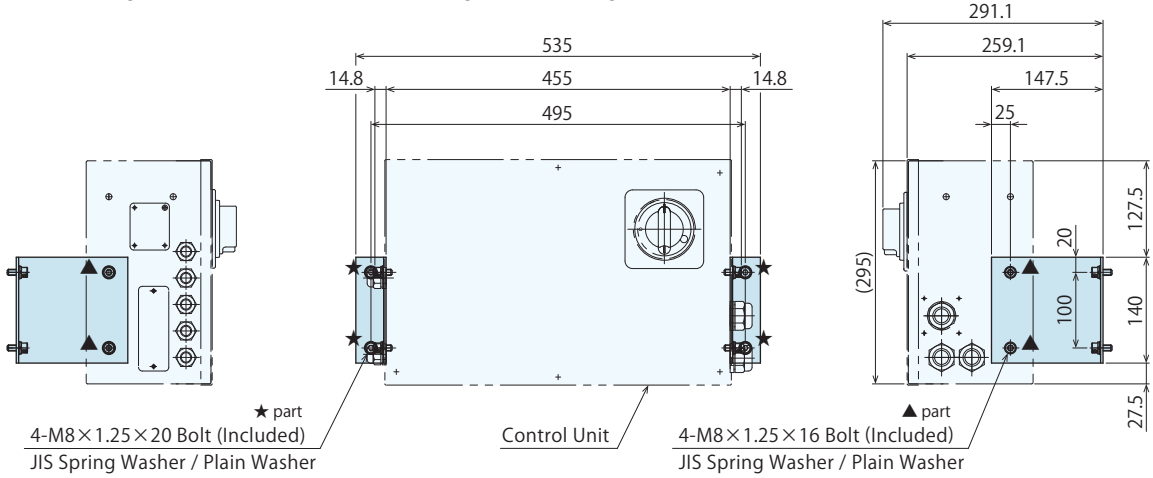
MEF0060：Floor Mounted 2

※ The drawing shows MUA/MUV/MUW for 8 discharges.



MEF0070：Wall/Machine Frame Mounted 3

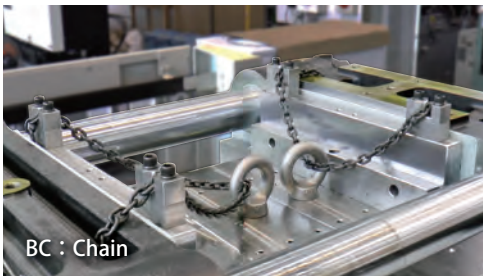
※ The drawing shows MUA/MUV/MUW for 1 discharge and 2 discharges.



Model No. Indication : Safety Chain

MES 100 1 - BC - 05 - 00

1 2 3 4 5

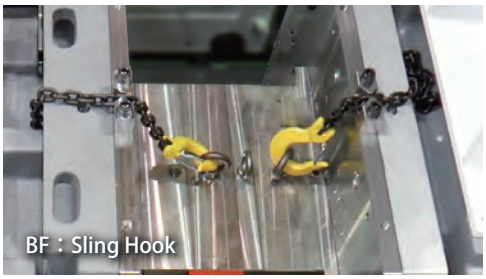


1 Chain Diameter

※ Please refer to the specifications and external dimensions.

2 Design No.

1 : Revision Number



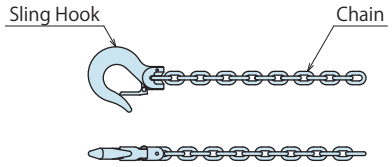
3 Mounting Method

BC : Chain (Number of Blocks Installed : 2)
BF : Sling Hook (Number of Blocks Installed : 1)
※ The number of blocks installed represents quantity required for one set of Safety Chain.

BC : Chain



BF : Sling Hook



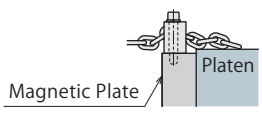
4 Chain Length

08 : 800mm
15 : 1500mm
※ The above shows examples for representing chain length.
Chain can be set to any length in 100 mm increments.
Chain length may not be precise depending on the number of chains used.
Enough chain length should be allowed to facilitate mounting.

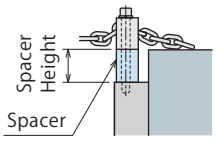
5 Spacer Height

00 : No Spacer
05 : 50mm
10 : 100mm
※ Spacer height is adjustable in 50mm increments up to 100mm at maximum. Contact us for spacer height over 100mm. Spacer is used in case the surface of magnetic plate is lower (smaller) than the platen surface. Contact us for details of shapes.

00 : No Spacer



□□ : With Spacer



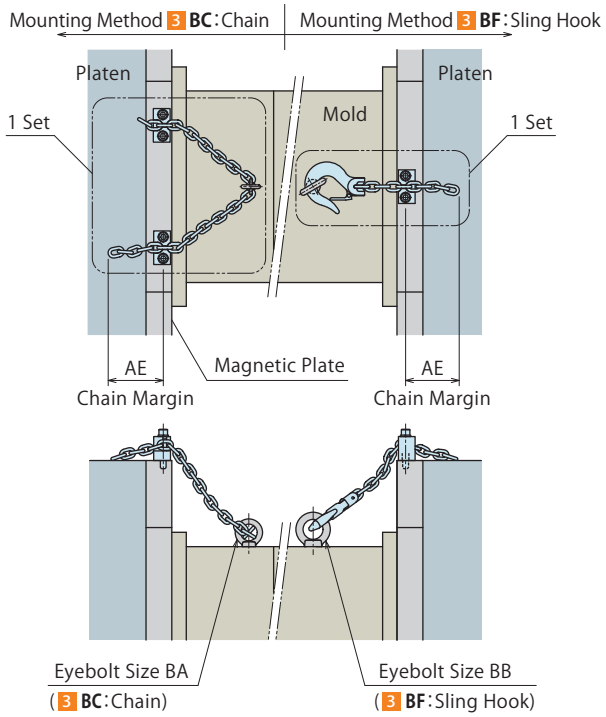
Specifications

Model No.		MES0501	MES0601	MES0801	MES1001	MES1301	MES1601	MES2001
Applicable Magnetic Plate Model		MAK/MAG	MAK/MAG	MAK	MAK	MAK	MAK	MAK
Chain Operating Load (Static Load) per Chain	ton	0.50	1.10	2.00	3.20	5.20	8.00	12.50
Weight of Chain	kg/m	0.55	0.83	1.30	2.11	3.27	5.34	8.37
Weight of Sling Hook ※1	kg	0.2	0.5	0.9	1.7	3.4	6.9	11.5

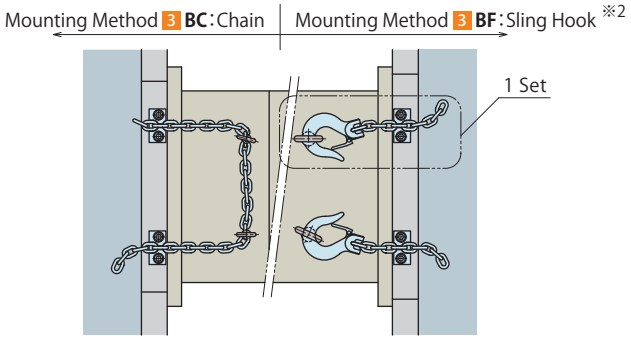
Notes : ※1. It shows the weight of the sling hook part of 3 **BF** : Sling Hook mounting method.
1. Select a safety chain based on the weight of mold on the movable side platen or stationary platen side, whichever is heavier.

Mounting Examples

In case of one eyebolt on one side of a mold



In case of two eyebolts on one side of a mold



Notes :

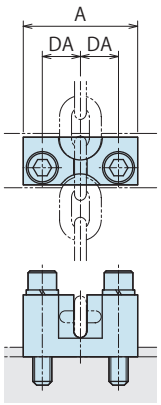
※2. When using 3 **BF** : Sling Hook with two eyebolts on one side, two sets of safety chain are required.

1. The drawings describe different mounting methods on the movable and stationary platen sides in order to show examples for mounting methods. No need to install the system using different mounting methods as shown in these drawings.
2. For block mounting positions on the stationary mold platen side, consideration should be given to an extractor.

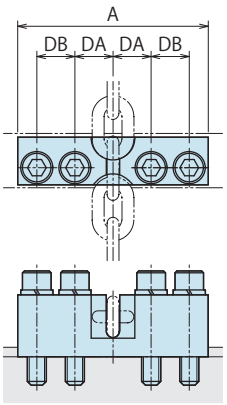
External Dimensions

※ The drawing below shows in case of 5 Spacer Height : **00** (No Spacer).

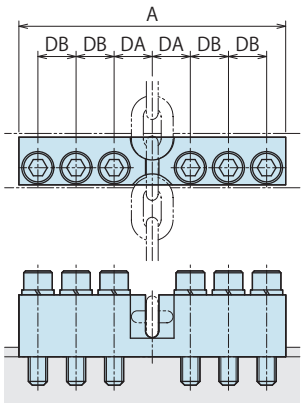
MES0501 / MES0601 / MES0801 MES1001 / MES1301



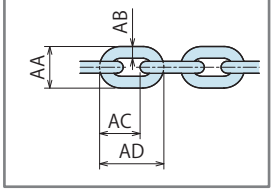
MES1601

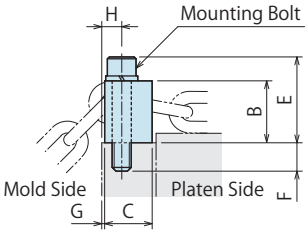


MES2001



Chain Dimensions





(mm)

Model No.		MES0501	MES0601	MES0801	MES1001	MES1301	MES1601	MES2001
Applicable Magnetic Plate Model		MAK/MAG	MAK/MAG	MAK	MAK	MAK	MAK	MAK
Block Dimensions	A	70	75	110	120	125	220	290
	B	30	32	45	65	65	100	100
	C	30	32	45	45	45	45	45
	DA	20	22.5	37.5	42.5	42.5	50	45
	DB	–	–	–	–	–	40	40
	E	45	47	65	85	90.1	125.1	125.1
	F	17	15	21	21	29.9	24.9	24.9
	G	1	1	0	0	0	0	0
	H	16	17	18	18	18	18	18
	Mounting Bolt※3	2-M12×1.75×50	2-M12×1.75×50	2-M16×2×70	2-M16×2×90	2-M20×2.5×100	4-M20×2.5×130	6-M20×2.5×130
Chain Dimensions	AA	17	21	28	35	43.5	59.2	74
	AB	5.35	6	8	10	13	16	20
	AC	15	17.6	24	30	39	48	60
	AD	25	30	40	50	65	80	100
Chain Margin	AE	200 or more	200 or more	200 or more	200 or more	200 or more	200 or more	300 or more
Eyebolt Size for Mold Side※4	Min.BA	M8×1.25	M10×1.5	M12×1.75	M20×2.5	M24×3	M30×3.5	M42×4.5
	Min.BB	M10×1.5	M16×2	M20×2.5	M24×3	M30×3.5	M36×4	M48×5
	Max.BB	M24×3	M33×3.5	M33×3.5	M45×4.5	M52×5	M64×6	M80×6

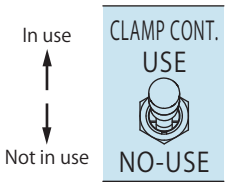
Notes : ※3. For spacer options, mounting bolts are provided in consideration of the spacer height.
※4. The eyebolt size indicates the effective range of chain or hook dimensions, not compatibility in terms of strength.

Cautions

Notes for Design

1) Check Specifications
- Please use each product according to the specifications.
- Magnetic Plate Operating Temperature (Mold Contact Surface) :
  Standard **N** : 0 ~ 100℃,
  High Temperature **Z** : 0 ~ 120℃, **H** : 0 ~ 150℃.
  Do not use the product when a contact surface temperature of a mold back-plate and a magnetic plate is above the upper limit.

2) When Not Using Clamps
When not using clamping systems, switch the CLAMP CONT. switch to <NO-USE> equipped inside the body. IMM interlock will be released. Switching to <USE> will activate interlock. Regardless of the clamp conditions at maintenance, switch to <NO-USE> before operating a molding machine.



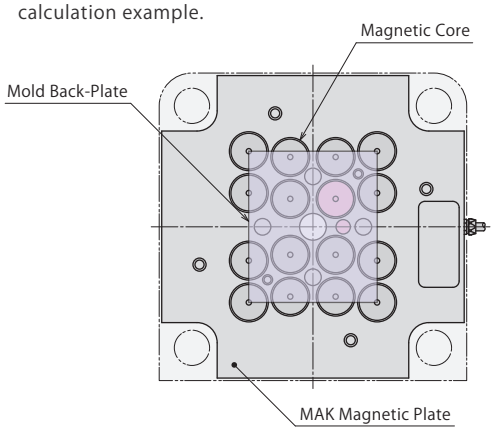
In order to avoid misoperation, this switch cannot be switched unless the nob is pulled up.

3) Output state relationship at power OFF and clamp in use/ not in use.
Regardless of the switch position, clamp normal output is OFF when the power is OFF as shown in the following.

Clamp Switch	Control Unit	Mold Open OK Output	Mold Close OK Output	Clamp Normal Output
USE	Power ON	Control	Control	Control
	Power Loss	OFF	OFF	OFF
	Power OFF	OFF	OFF	
NO-USE	Power ON	ON	ON	ON
	Power Loss	ON (Standard Spec.)		OFF
	Power OFF			

4) Clamping Force (Magnetic Force)
Thickness of a mold back-plate should be 20mm or more. Distance of the magnetic flux line protrudes is approximately 20mm, so if a mold back-plate is thinner than 20mm, clamping force might be decreased. Rust, liquid or oil adhered on a mold back-plate will cause a decrease in clamping force. Those will not directly decrease clamping force, but cause dust and contaminants stick to the surface leading to make a gap between a magnetic plate and a mold back-plate.

5) Rated Clamping Force Calculation Method
- Clamping force of the magnetic clamp (Clamping Capacity) is based on the contact area (number of magnet cores) between the mold back-plate and the magnetic plate.
  If a mold back-plate does not contact all of the magnetic cores, calculate the rated clamping force ※1 referring to the following calculation example.



Calculation Example
In case of MAK magnetic plate shown above.
Magnetic Core ϕ70mm / 16 cores
Total Clamping Force 100.32kN
(6.27kN per Core)

① Count the number of magnetic cores contacting the entire surface of the mold back-plate.
- Contact Entirely × 4 cores
- Approx. 50% Contact × 8 cores
- Approx. 25% Contact × 4 cores

② Total number of magnetic cores contacting the mold back-plate.
Total Number ＝ 4 pcs ＋ 8 pcs×0.5＋4 pcs×0.25＝9 cores

③ Multiply the clamping force of each magnetic core (6.27kN / core) by the total number of cores.
Rated Clamping Force ※1＝6.27kN / core × 9 cores＝56.43kN

※1. The above calculation is for when a mold is clamped in ideal conditions. We recommend reducing the theoretical calculated value by 20% and adjusting a mold opening force of a machine before use.

1. If there are holes or notches on a rear surface of a mold back-plate, subtract the area from the contact area (number of magnetic cores) with the mold back-plate.
2. Actual clamping force may be reduced due to the conditions of a mold back-plate.

6) Factors regarding Clamping Force Reduction

● Influence of the Material of Mold Back-Plate

Actual clamping force may decrease below the rated clamping force due to the material of the mold back-plate.

Material	Clamping Force
SS400	100 % (Standard)
S55C / S45C	90 ～ 100%
SCM440 / SNCM240	78 ～ 93%
SUJ2 / SUS405	75 ～ 90%
FC250	54 ～ 64%

In case material of a mold back-plate is S55C/S45C/SUJ or others, it may be difficult to release the mold when the clamp is turned OFF due to residual magnetism. Clamping force decreases with an increasing gap between a mold back-plate and a magnetic plate.

● Influence of Roughness of Mold Back-Plate

Roughness of a mold back-plate may decrease a clamping force. Make sure to check the roughness of a mold back-plate.

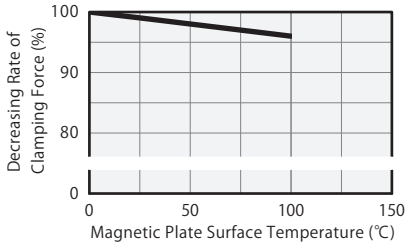
Roughness	Clamping Force
▽▽▽ (Rz1.6 ～ 3.8)	100%
▽▽ (Rz7.5 ～ 15.5)	about 100%
▽ (Rz85 ～ 150)	about 90%

● Influence of Temperature

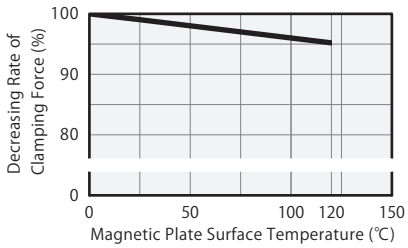
Clamping force decreases according to mold temperature. In case surface temperature of a magnetic plate exceeds the withstanding temperature, cool it down to room temperature. After that, release the magnetic clamp, and lock it again.

※ Make sure to suspend a mold with a crane before demagnetization.

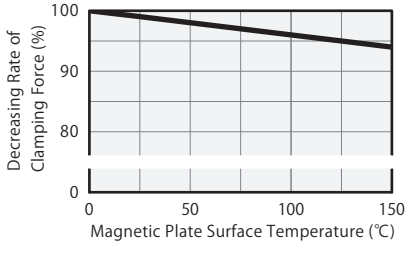
Operating Temperature **N**：Standard 0 ~ 100℃



Operating Temperature **Z**：High Temperature 0 ~ 120℃



Operating Temperature **H**：High Temperature 0 ~ 150℃



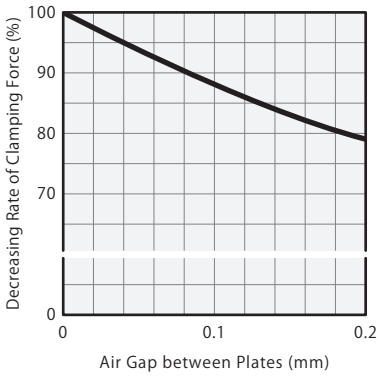
● Influence of Air Gap between Magnetic Plate and Mold Back-Plate

Do not use a mold with a warped or deformed mold back-plate. Make sure to magnetize after ensuring there is no air gap between a magnetic plate and a mold back-plate.

An air gap between a magnetic plate and a mold back-plate caused by contaminants or a warped or deformed mold back-plate will decrease a clamping force as shown below.

※ When there is no flection on a mold back-plate at locking.

※ Roughness of a magnetic contact surface should be ▽▽ (Rz15.5) or better.



7) Confirmation Items in regards to Molding Machine

① Errors of ejector force setting will cause an accidental mold drop.

● When an ejector force (ejection force and speed) exceeds a clamping force, a mold will be pushed off and dropped by ejector pins.

Setting Target：
Ejection Force ・・・ Less than 1/3 of clamping force of movable platen side
Speed ・・・ Less than 50mm/sec

● Make sure to check the proper length of ejector pin and hole alignment.

● Suspend a mold with a crane when removing and inserting ejector pins.

② Mold will drop when a mold opening force exceeds a clamping force.

● Ensure that a mold opening force does not exceed a clamping force. It is recommended to prepare measures to prevent a mold fall in the event of an abnormal mold opening force and other accidents.

③ Using an overweight mold exceeding a clamping force will cause a mold fall.

④ Clamping force should be twice the nozzle touch force.

8) For details of other cautions, confirmation and adjusting method, please read through the instruction manual and attention labels to ensure safe operation.

Cautions

Installation Notes

1) Do not touch the button or key switches with wet hands. This may result in electrocution.

2) As the magnetic plate generates a strong magnetic field, ensure that people with heart pacemakers do not approach this device. If the pacemaker malfunctions due to the effect of the magnetic field, this may be dangerous for the body.

3) Do not approach the contact surface with magnetic items, i.e. iron, while the equipment is locked. As the strength of the magnet is extremely strong, magnetic objects will attach to the clamp surface. Injuries may result from fingers or hands getting caught between objects and the plate.

4) When the mold is open, do not place any body parts, i.e. hands and feet, etc., in the machine.

5) As the magnetic field lines rise above the front surface (mold side) of the magnetic plate by about 20mm, do not approach the magnetic plate with items easily affected by magnetic fields, i.e. cell phones, magnetic cards, compact disks and others, to avoid malfunction or damage of the items.

6) Even when the clamp is turned OFF (demagnetized), caution is required as a small residual amount of magnetism is still generated.

7) Do not use a mold with a warped or deformed mold back-plate. Clamping force decreases with a gap between a magnetic plate and a mold back-plate.

8) Ensure that contact surface of a magnetic plate and a mold back-plate is always clean. Although water and oil on the contact surface do not directly cause clamping force to decrease, dust and contaminants adhered to these liquids may cause a gap between a magnetic plate and a mold back-plate.

9) Clamping force changes according to the contact area between a mold back-plate and a magnetic plate. In addition, clamping force may decrease according to conditions of a mold back-plate. Make sure to perform initial testing for each mold and confirm the conditions are appropriate.

10) When using ejector pins, make sure to check the proper pin length and hole alignment. A mold may be pushed off and dropped by the ejector pin.

11) Temperature of contact surface of a mold back-plate and a magnetic plate should be within **N**：0 ~ 100 ℃ for standard model, **Z**：0 ~ 120 ℃, or **H**：0 ~ 150 ℃ for high temperature options.

12) Always visually confirm safe mold handling when using the push button or key switches of the operation panel to avoid operating errors.

13) When disconnecting power to the molding machine, also disconnect power to this product.

14) This product does not operate properly with an unstable power supply. Errors may occur when the power supply is momentarily interrupted or during lightning strikes. Do not operate the product when abnormal power fluctuations are anticipated, i.e. lightning strikes.

15) Remove the key switch of the operation panel and store in a safe location except when switching molds.

16) Do not operate the product when the voltage exceeds the range of the primary power source. (±10%)

17) Ensure that the operation panel and control unit remains free from water or oil. In case water or oil is spilled onto this equipment, stop all operations.

18) Precautions for Use of Mold Safety Chain

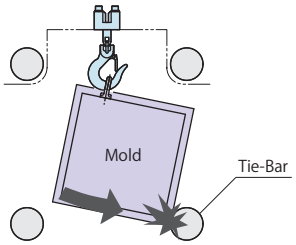
① The chain operating load represents static load. Do not reuse the chain if any impact load is applied to it.

② Use the chain with minimum chain slack. This can minimize chain shift length even in the worst case.

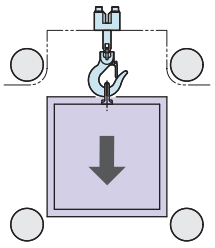
③ For eyebolt used on the mold side, take into account the mounting position.

Take into account a balance in the horizontal direction.

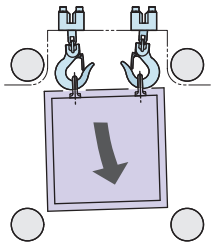
✕ Eyebolt mounted NOT in the center of gravity: Large mold sway.



○ Eyebolt mounted in the center of gravity: Minimal mold sway.

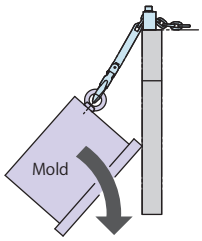


○ Two eyebolts mounted: Minimal mold sway.

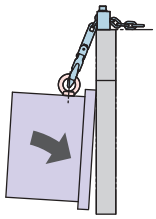


Take into account a balance in the front-back direction.

✕ Eyebolt mounted too far from the mold mounting surface.



○ Eyebolt mounted close to the mold mounting surface.



Maintenance and Inspection

1) Disconnect the power to the molding machine and the magnetic clamp before starting maintenance.

2) Do not operate the product with wet hands.

3) As the magnetic plate generates a strong magnetic field, ensure that people with heart pacemakers or other devices do not approach this device.

4) Do not approach the contact surface with magnetic items, i.e. iron while the product is locked. As the strength of the magnet is extremely strong, magnetic objects will attach to the clamping surface. Injuries may result from fingers or hands getting caught between objects and the plate.

5) This product should only be operated by personnel authorized by the Safety Management Manager.

6) Ensure that a third party does not mistakenly operate the product during maintenance and inspection.

7) Always visually confirm safe mold handling when using the push button or key switches of the operation panel to avoid operating errors.

8) Always display appropriate signs or placards during maintenance and inspection of the product.

9) Confirm the following points before turning the power ON after conducting maintenance and inspection.
① All tools and jigs used for maintenance and inspection have been removed.
② Removed covers and cables have been returned to their original locations.

10) Ensure that the operation panel and control unit remains free from water or oil. In the event that water or oil is spilled onto the machinery, stop all operations.

11) As the magnetic field lines extend from the front surface (mold side) of magnetic plate by about 20mm, do not approach the magnetic plate with items easily affected by magnetic fields such as cell phones, magnetic cards, compact disks and others to avoid malfunction or damage to the items.

12) The control unit and the magnetic plate have high voltage terminals. They are extremely dangerous. Do not touch the terminals unless performing authorized maintenance. Touching these terminals may lead to accidental death by electrocution.

13) If the product is taken apart or modified, the warranty will be voided even within the warranty period.

Warranty

1) Warranty Period
- The product warranty period is 18 months from shipment from our factory or 12 months from initial use, whichever is earlier.

2) Warranty Scope
- If the product is damaged or malfunctions during the warranty period due to faulty design, materials or workmanship, we will replace or repair the defective part at our expense.
  Defects or failures caused by the following are not covered.

① If the stipulated maintenance and inspection are not carried out.

② If the product is used while it is not suitable for use based on the operator's judgment, resulting in defect.

③ If it is used or handled in inappropriate way by the operator. (Including damage caused by the misconduct of the third party.)

④ If the defect is caused by reasons other than our responsibility.

⑤ If repair or modifications are carried out by anyone other than Kosmek, or without our approval and confirmation, it will void warranty.

⑥ Other caused by natural disasters or calamities not attributable to our company.

⑦ Parts or replacement expenses due to parts consumption and deterioration.
(Such as rubber, plastic, seal material and some electric components.)

Damages excluding from direct result of a product defect shall be excluded from the warranty.

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- For Further Information on Unlisted Specifications and Sizes, Please call us.
- Specifications in this Leaflet are Subject to Change without Notice.

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