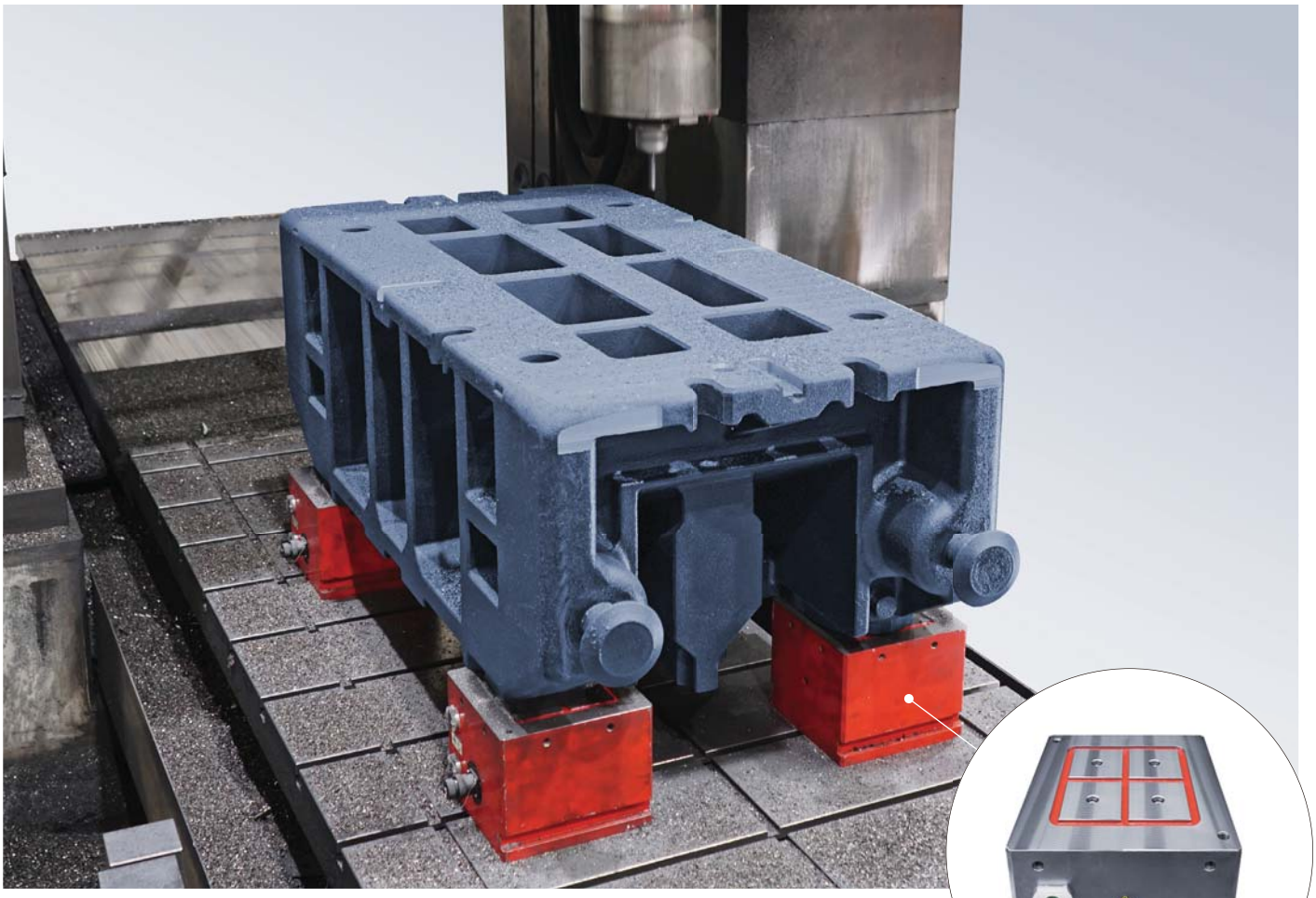
Pascal double mag clamp

model **MGW**

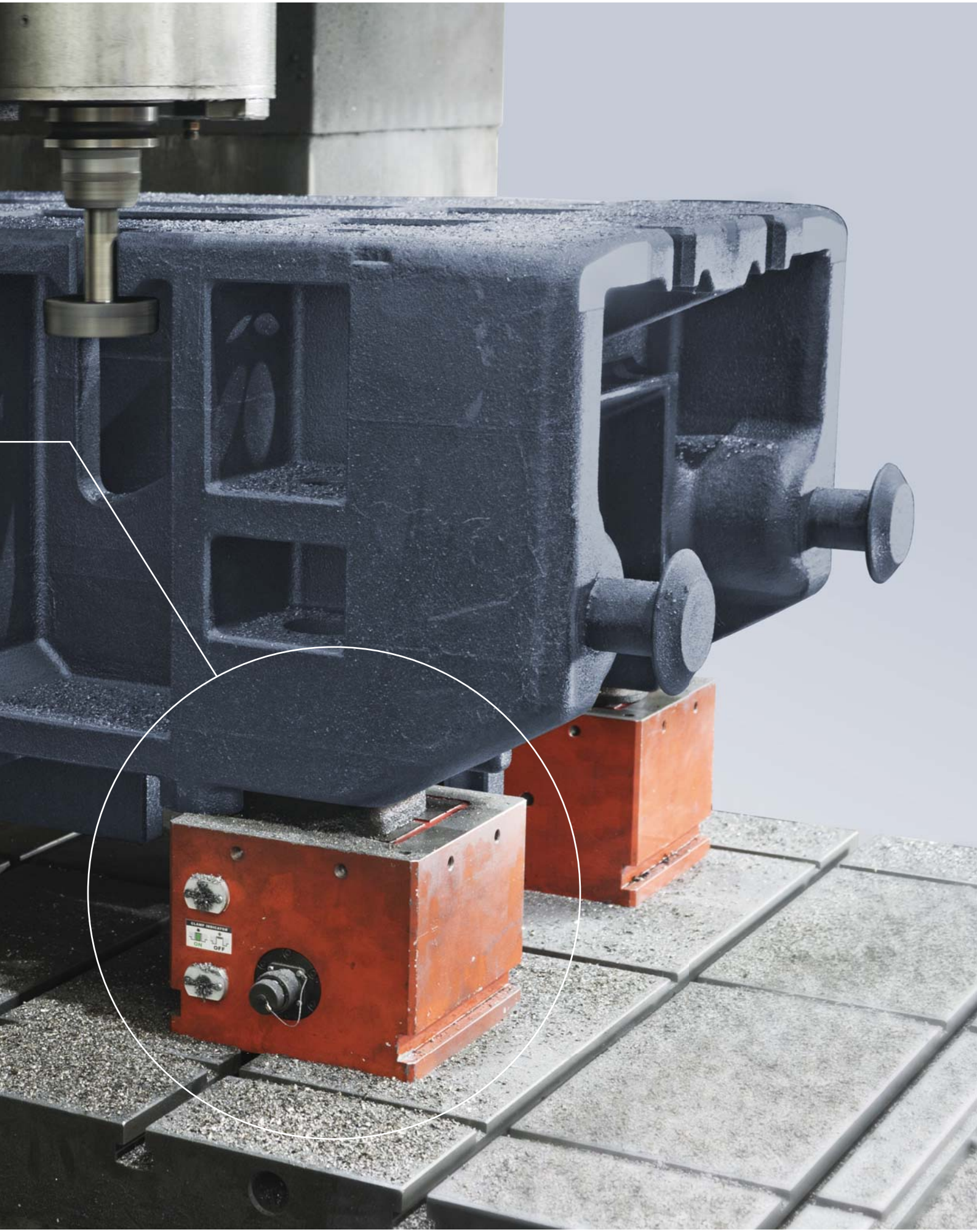


Double mag clamp
model **MGW4S**
Clamping force 29.4kN／piece

Pascal
www.pascaleng.co.jp

Double mag clamp model MGW

Double mag clamp 4 Cores double row × 4 pcs **Total clamping force on single side 117.6 kN**


ON
OFF

Optimum double magnet clamp for machining the side face of large-sized workpiece and drilling a through-hole

Double mag clamp is a work clamp system that clamps the magnetic body with strong permanent magnet (Neodymium magnet and alnico magnet).

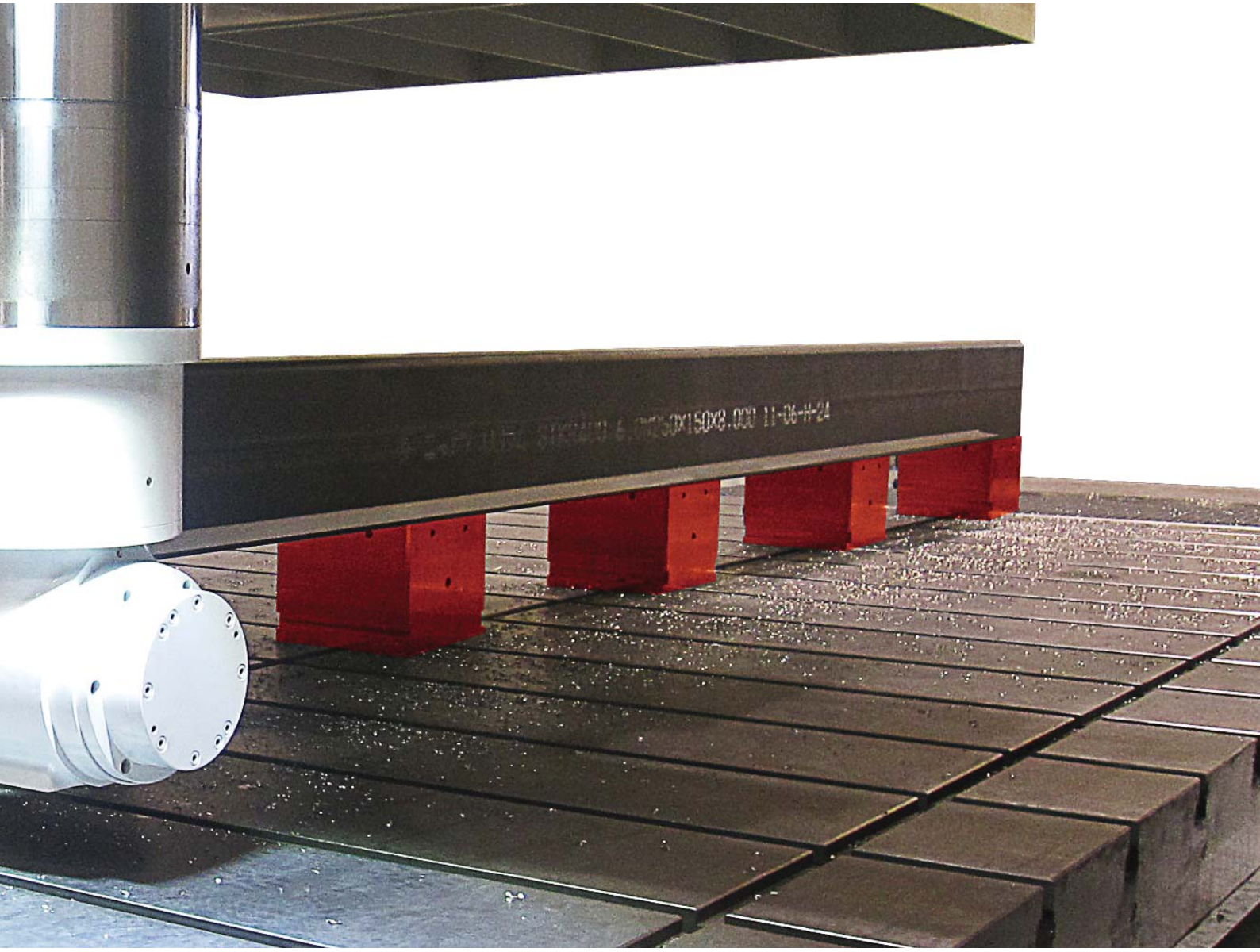
model
MGW4SK

Clamp plate

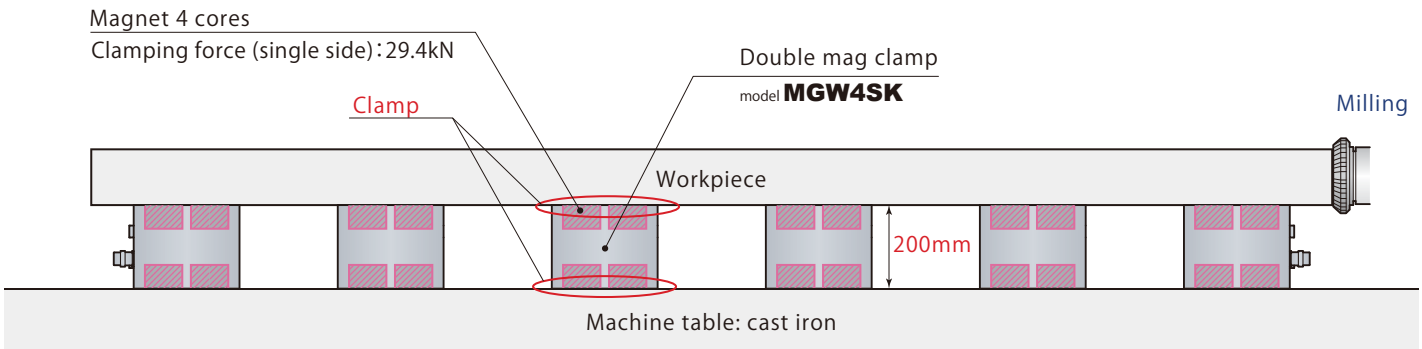
Magnet core
Clamping force (single side)：29.4kN

Indicator for clamp confirmation **PAT.**
Clamp and unclamp can be confirmed visually.

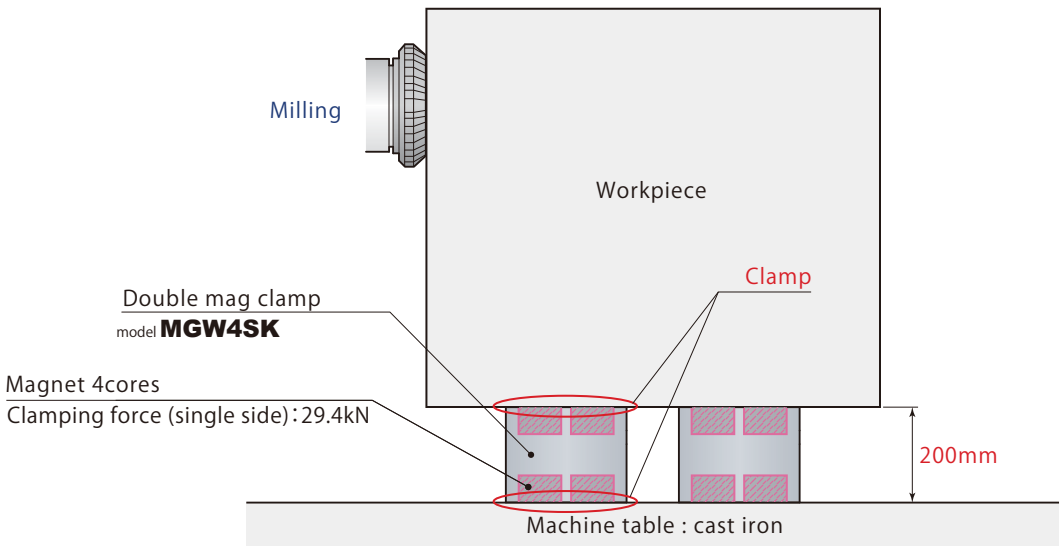
Power supply connector

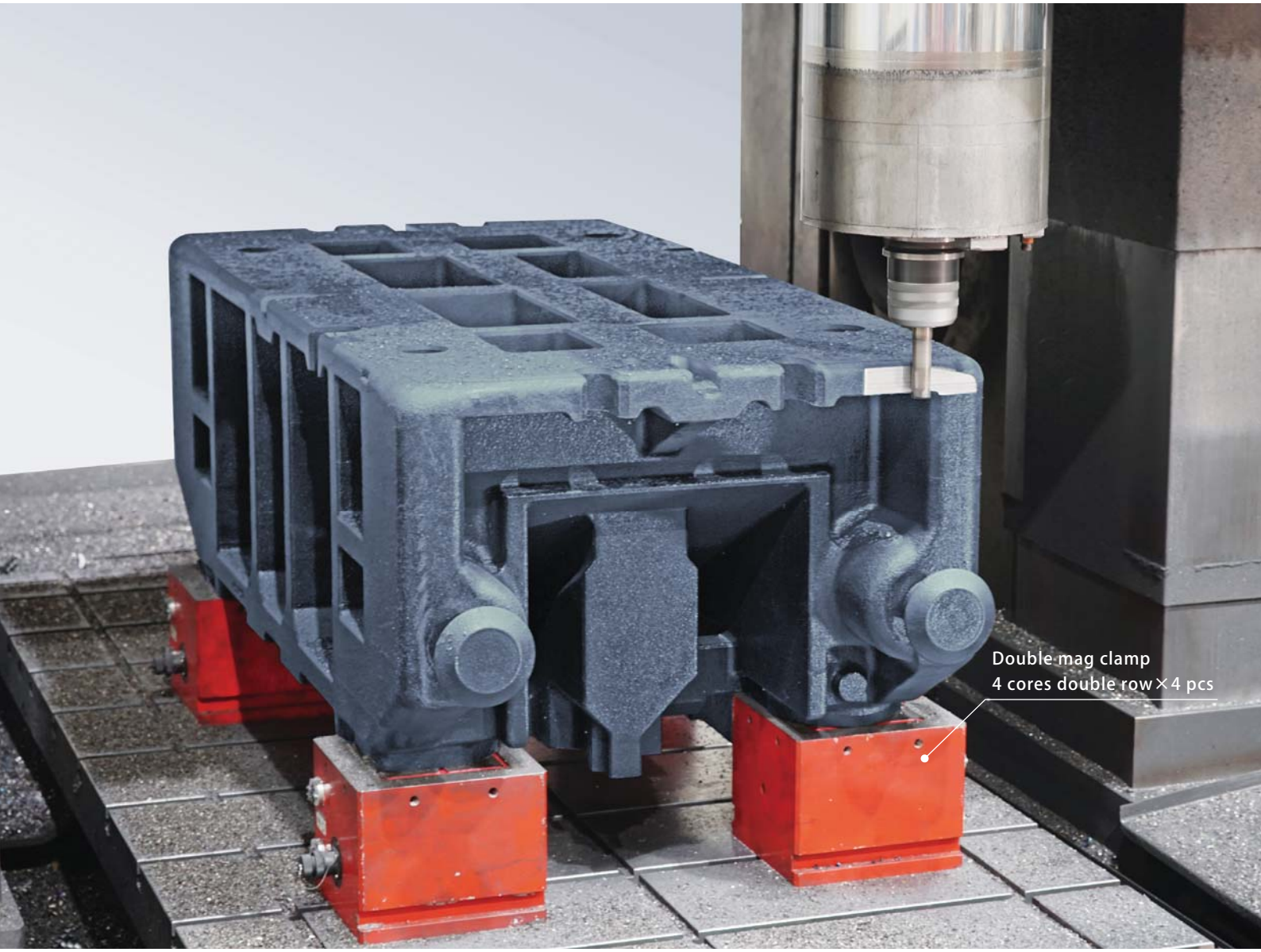


Double mag clamp 4 cores double row × 6 pcs　　Total clamping force on single side 176.4kN

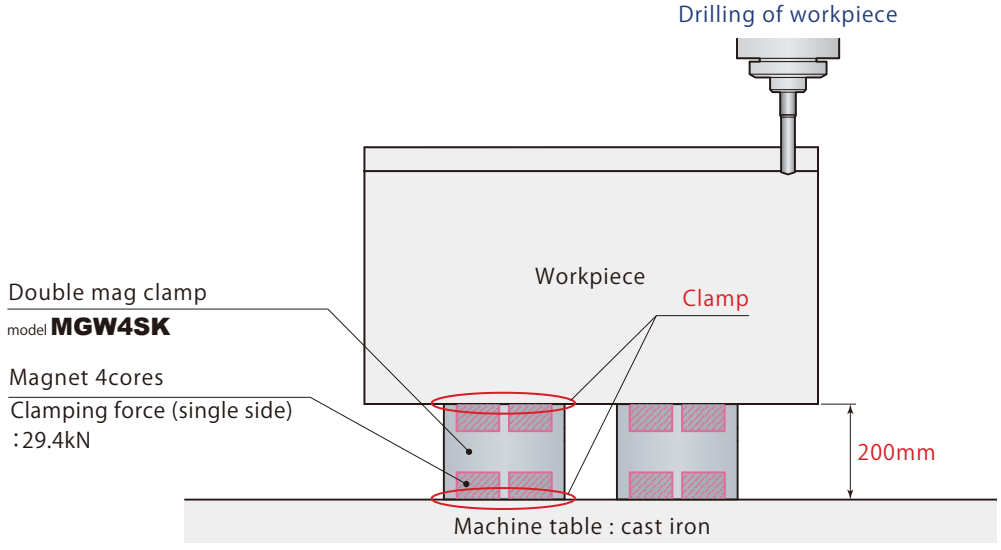


Double mag clamp 4 cores double row × 4 pcs **Total clamping force on single side 117.6kN**

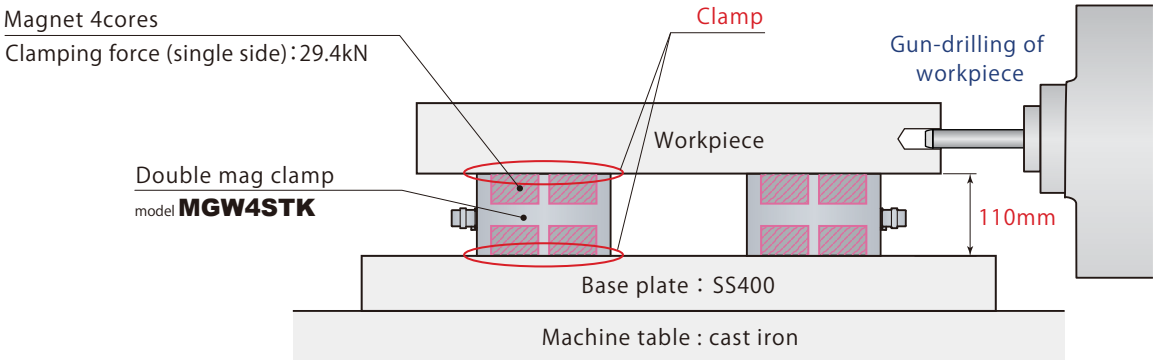




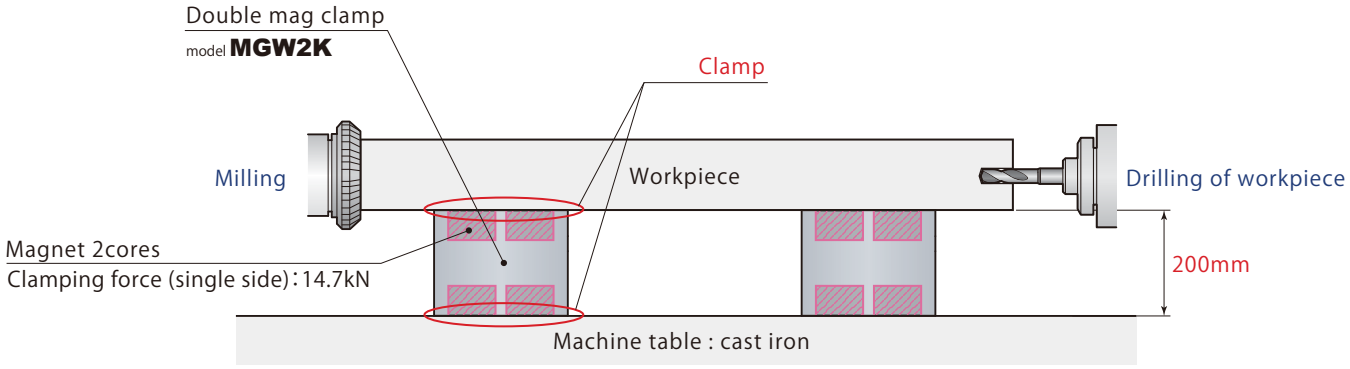
Double mag clamp 4 cores double row × 4 pcs Total clamping force on single side 117.6kN

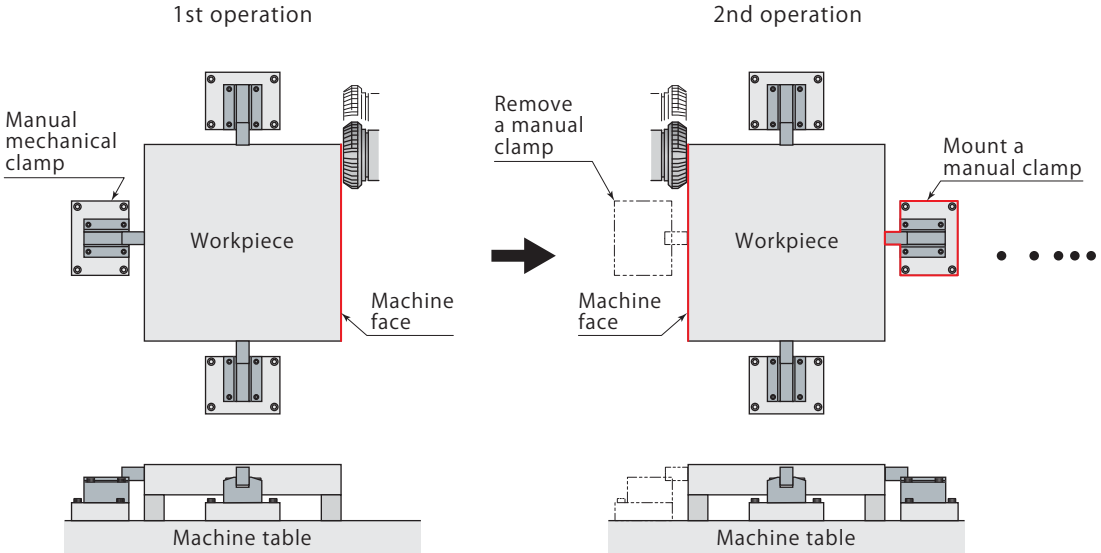


Double mag clamp 4 cores double row × 4 pcs **Total clamping force on single side 117.6kN**



Double mag clamp Double cores single row × 2 pcs Total clamping force on single side 29.4kN



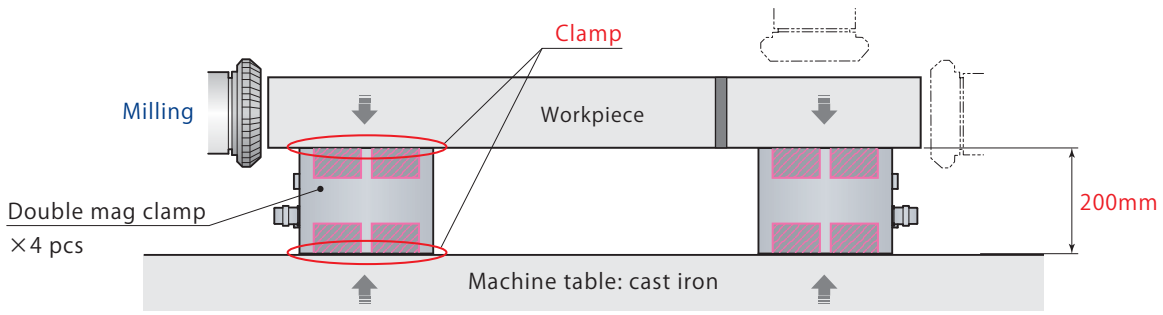


A manual clamp gets in the way of spindle access and it must be removed and re-mounted every time one face is machined.

Number of jig change per plate	4 times
Number of plate being completed per day	20

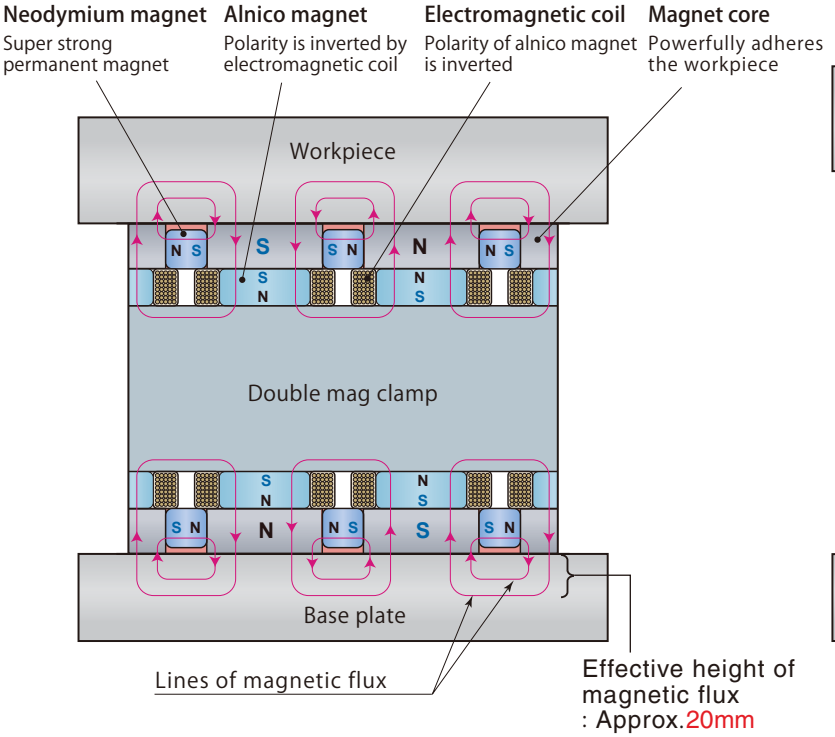
※ Prototype mag clamps are shown in the picture.
4 pcs of double-core mag clamps are under the workpiece. See the diagram shown below.

5-sided (4 sides + top face) machining is achieved only 1 time of clamping operation, no need to remove or remount the clamp.



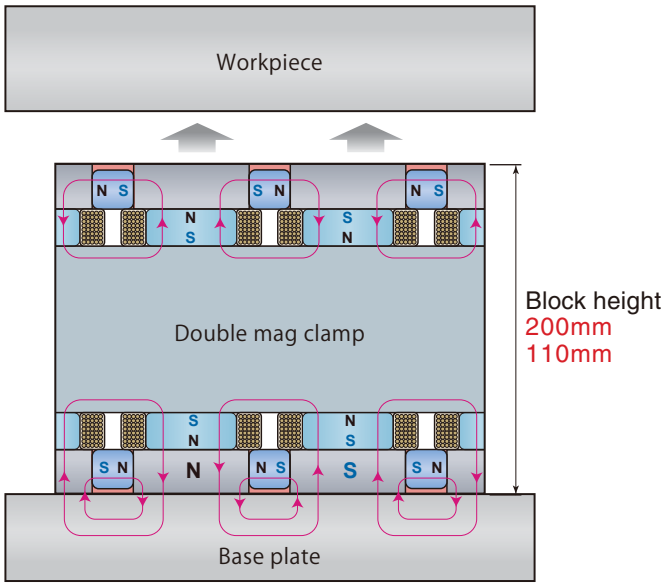
Number of jig change per plate	0 (1 setting and clamping operation)
Number of plate being completed per day	40

Clamp（Magnetized）



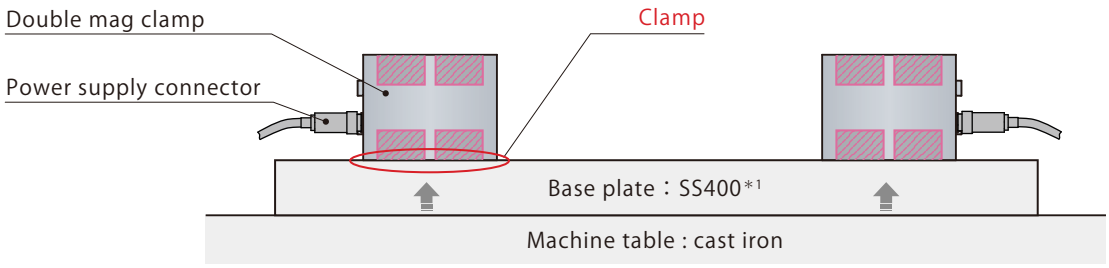
1. Electromagnetic coil is energized for 0.5 sec.
2. Polarity of alnico magnet is inverted.
3. Neodymium magnet and alnico magnet become homopolar.
4. Magnet core becomes strong magnet to adhere the workpiece.

Unclamp（Demagnetized）

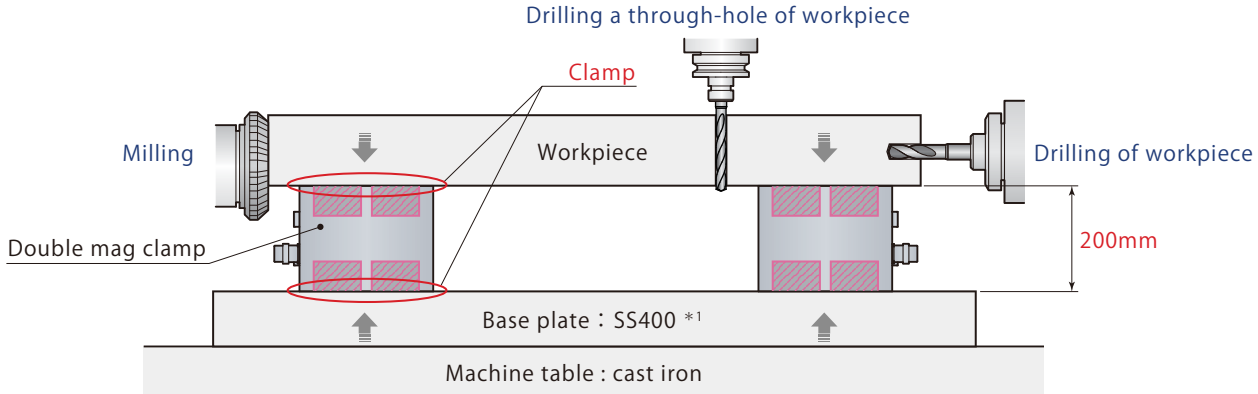


1. Electromagnetic coil is energized for 0.5 sec.
2. Polarity of alnico magnet is inverted.
3. Magnetic flux of neodymium magnet and alnico magnet is not emitted from the surface of the magnet core so that the workpiece can be unclamped.

Install the double mag clamp



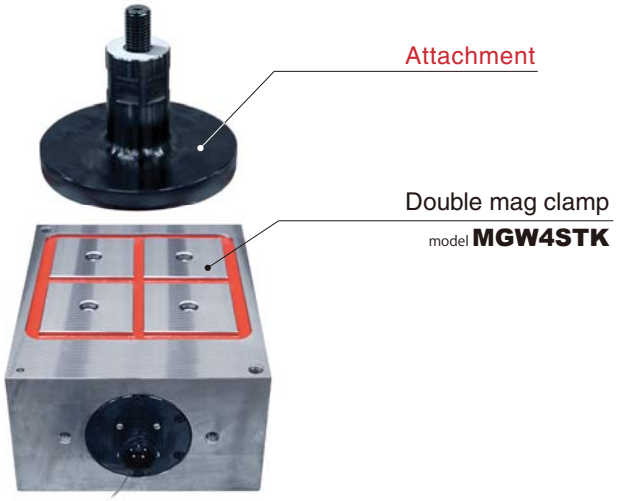
Install and machine the workpiece



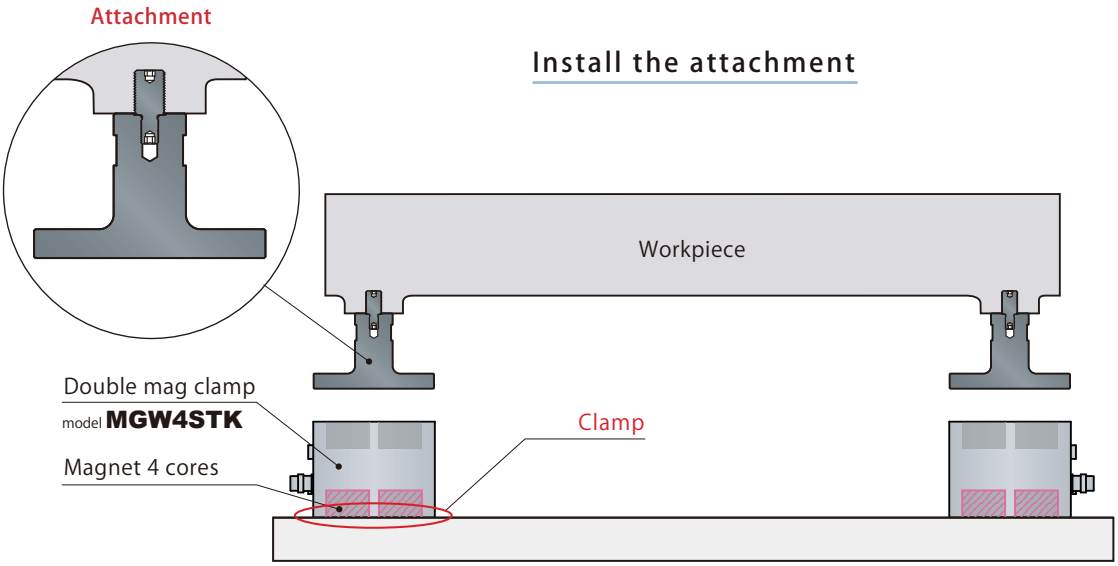
＊1：In case that the machine table is made of cast iron, the clamping force decreases approx.20% .

- Use of steel base plate is recommendable to prevent failure in clamping on the machine table side due to the horizontal load when machining the side face.
- The clamping force decreases depending on materials and surface roughness of work machine base in some cases. Refer to the **page→ 28.**

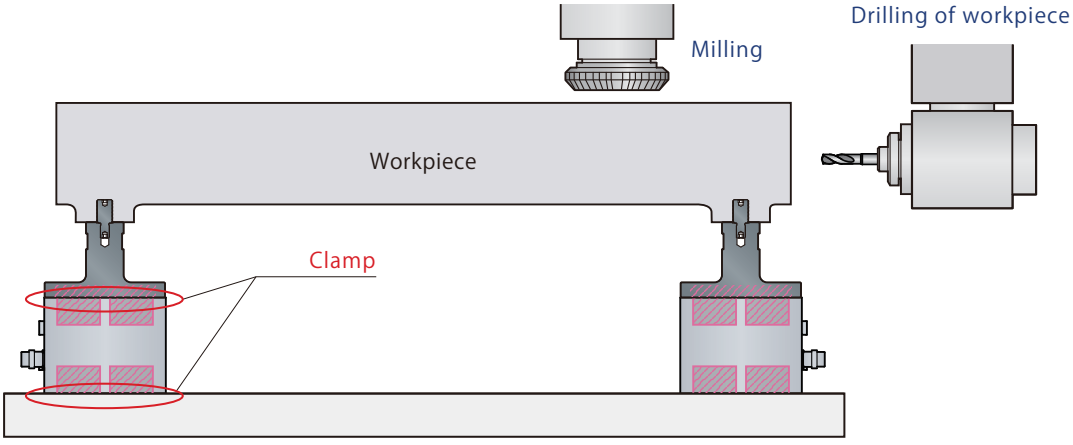
In case the contact surface of magnetic clamp is small for workpiece,
install the attachment to the workpiece and set it up on the double mag.



Install the attachment



Clamp and Machining



● Consult Pascal for the details.

Model designation

MGW [2] [T] [K]

1 Number of magnet core
- [2] : Double cores
- [4S] : 4cores double row
- [4] : 4cores single row

2 Block height
- [No code] : 200mm
- [T] : 110mm

3 Cable
- [K] : Disconnectable type
- [No code] : Pre-wired type

Example) **MGW2TK**
2cores, Block height 110mm, Cable disconnectable type

1 Number of magnet core

Model		MGW2□□	MGW4S□□	MGW4□□
Number of magnet core		Double cores	4 Cores double row	4 Cores single row
Clamping force (One face)	kN	14.7	29.4	29.4

[2] : Double cores

[4S] : 4 Cores double row

[4] : 4 Cores single row

The operation panel , control box and junction box are required additionally. Refer to the **pages →21 ～ 22** for the details.

Refer to the **pages →23 ～ 25** for the details of accessories.

2 Block height

MGW 2 T K

1 Number of magnet core

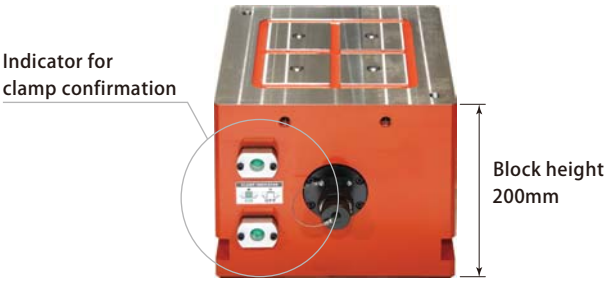
2 Block height
No code : 200mm
T : 110mm

3 Cable

Block height 200mm

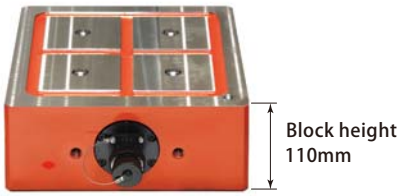
MGW□□

(No code)

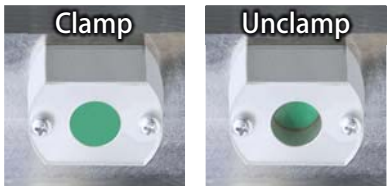


Block height 110mm

MGW□T□



Indicator for clamp confirmation
PAT.



Clamp and unclamp can be confirmed visually.

The model for MGW□T□ has no indicator.

3 Cable

MGW 2 T K

1 Number of magnet core

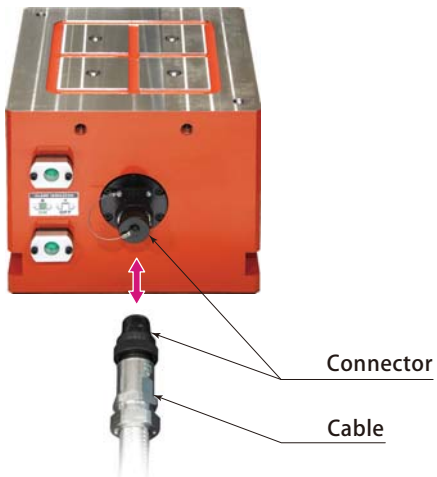
2 Block height

3 Cable
K : Disconnectable type
No code : Pre-wired type

Disconnectable type

MGW□□K

The cable can be installed only when clamp and unclamp operation is performed and during machining the cable can be disconnected.

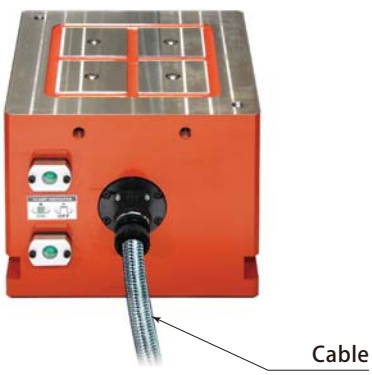


Pre-wired type

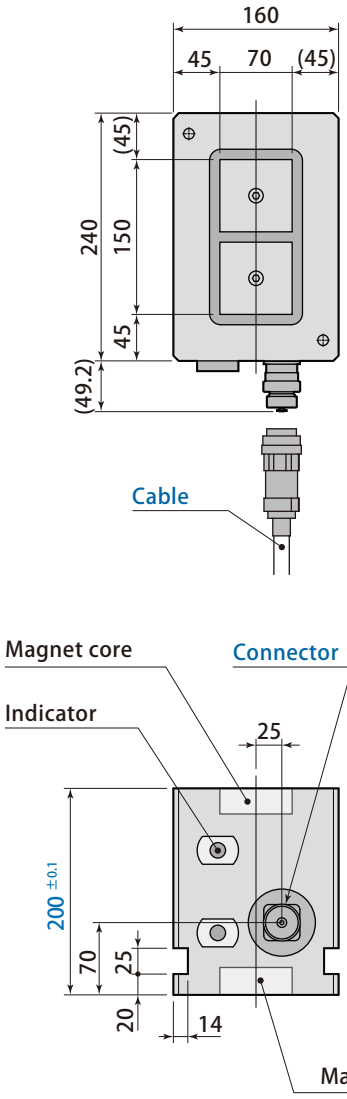
MGW□□

(No code)

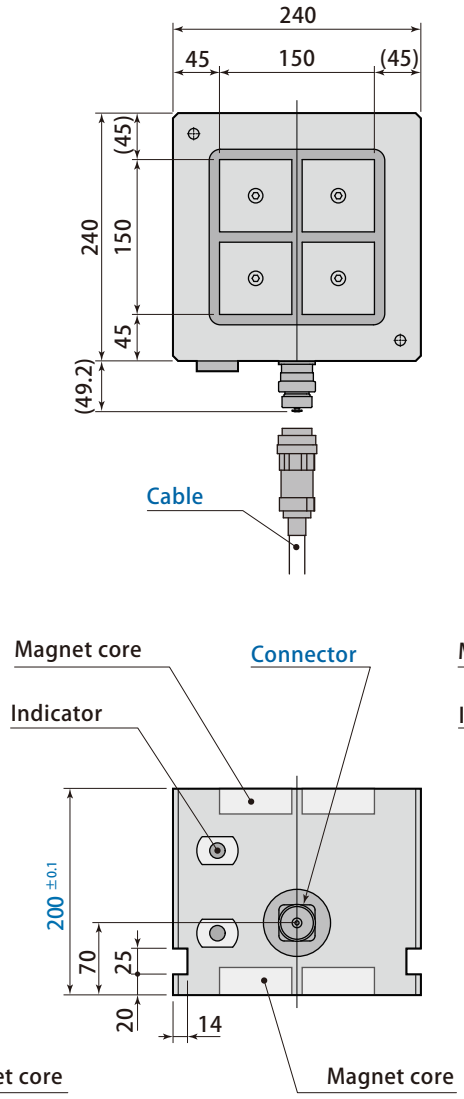
Cable can not be disconnected.



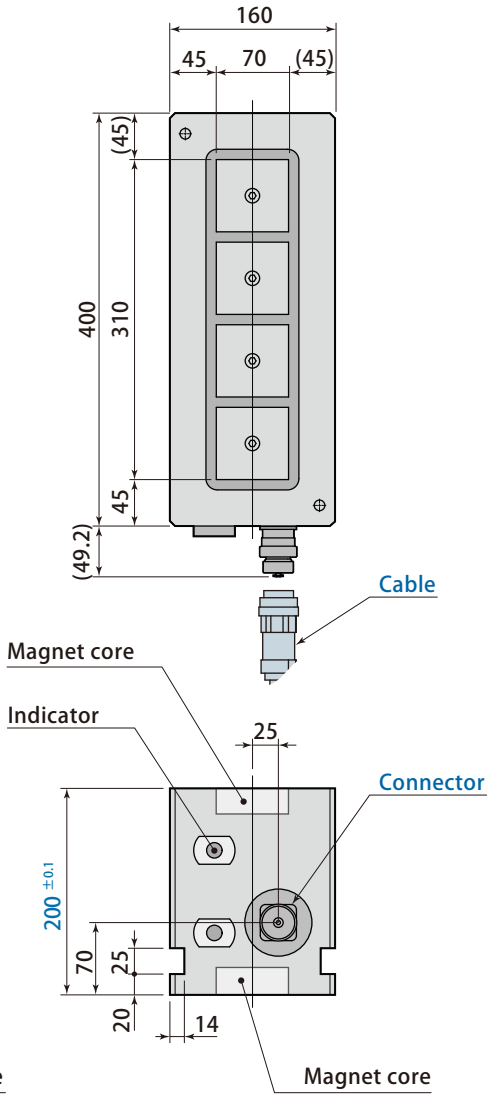
MGW2K
2 cores



MGW4SK
4 cores double row



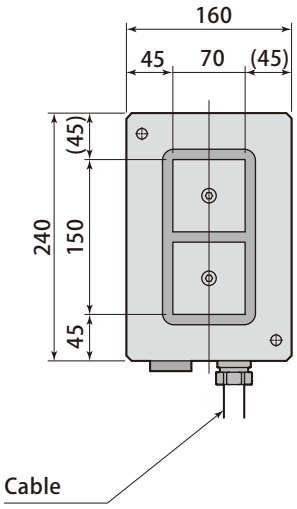
MGW4K
4 cores single row



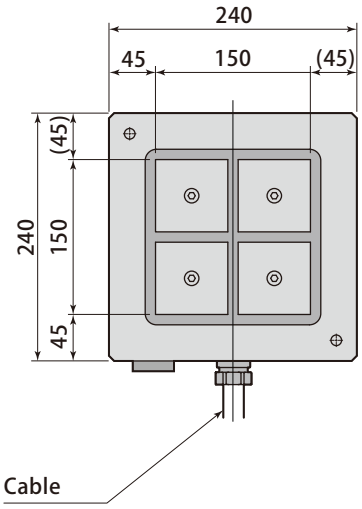
Type		2cores type	4cores double row type	4cores single row type
Mag clamp model		MGW2K	MGW4SK	MGW4K
Number of magnet core		2	4	4
Max. Clamping force (One face)	kN	14.7	29.4	29.4
Weight	kg	59	83	94
Operating temperature	℃	0 ～ 80		
Clamping force per one magnet core	kN	7.35		
Self cut length (One face)	mm	3		
Height of magnetic flux	mm	20（Workpiece material SS400）		
Power source voltage	V	AC200 / 220V ±5%（50/60Hz）		
Power source capacity	kVA	10	20	20
Breaker capacity	A	40	50	50

- The operating temperature is temperature of clamp plate surface.
- In case of using multiple double mag clamps, both sides of surface can be cut off at your side to align the height.

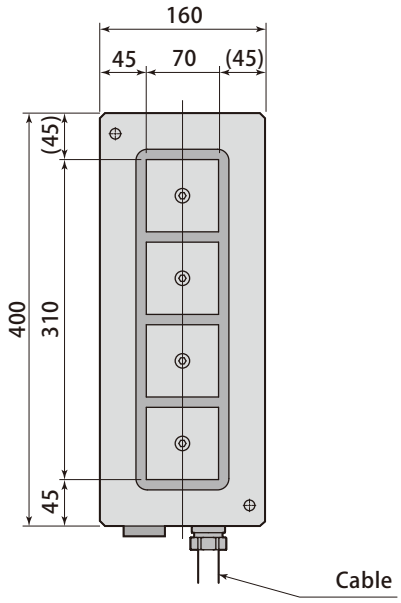
MGW2
2 cores

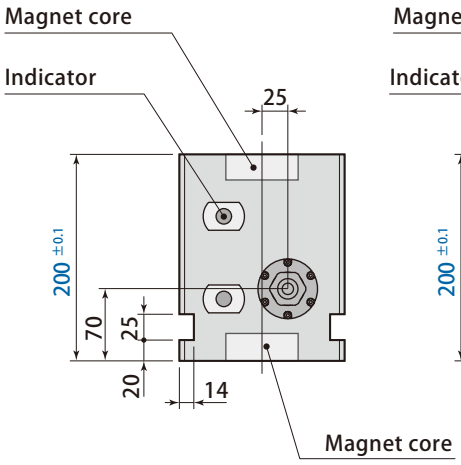


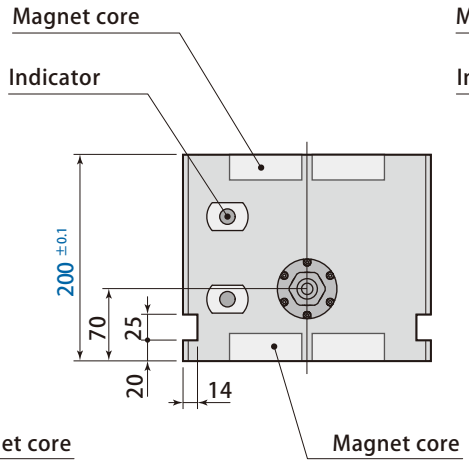
MGW4S
4 cores double row

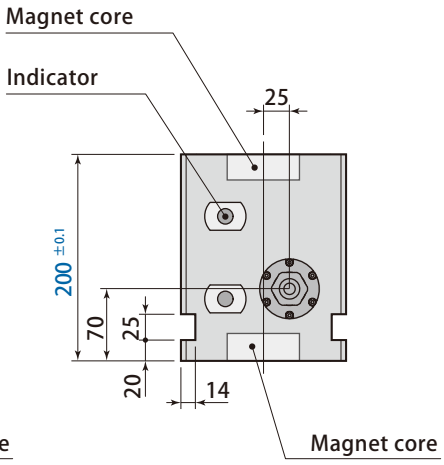


MGW4
4 cores single row





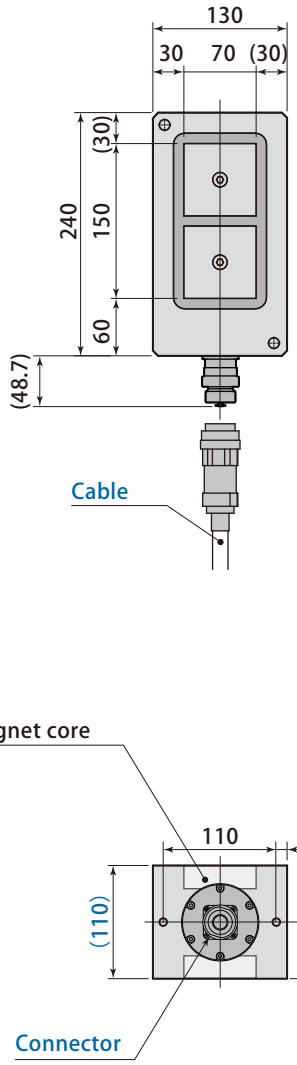




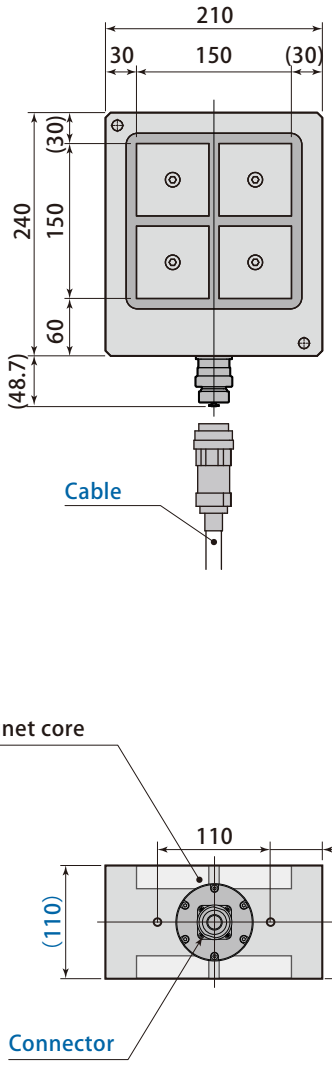
Type		2cores type	4cores double row type	4cores single row type
Mag clamp model		MGW2	MGW4S	MGW4
Number of magnet core		2	4	4
Max. Clamping force (One face)	kN	14.7	29.4	29.4
Weight	kg	59	83	94
Operating temperature	℃	0 ～ 80		
Clamping force per one magnet core	kN	7.35		
Self cut length (One face)	mm	3		
Height of magnetic flux	mm	20（Workpiece material SS400）		
Power source voltage	V	AC200 / 220V ±5%（50/60Hz）		
Power source capacity	kVA	10	20	20
Breaker capacity	A	40	50	50

- The operating temperature is temperature of clamp plate surface.
- In case of using multiple double mag clamps, both sides of surface can be cut off at your side to align the height.

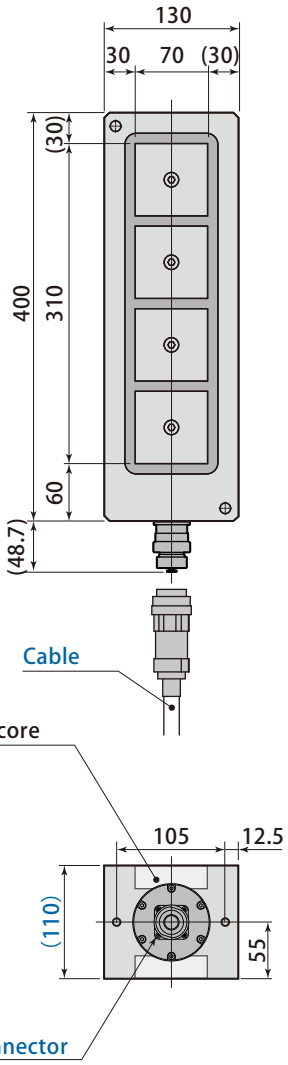
MGW2TK
2 cores



MGW4STK
4 cores double row



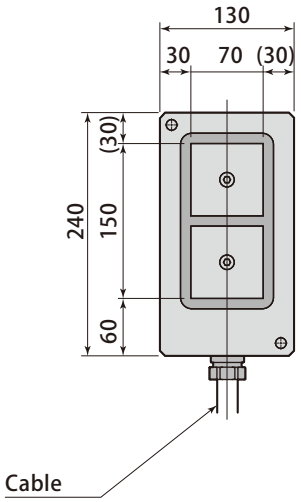
MGW4TK
4 cores single row



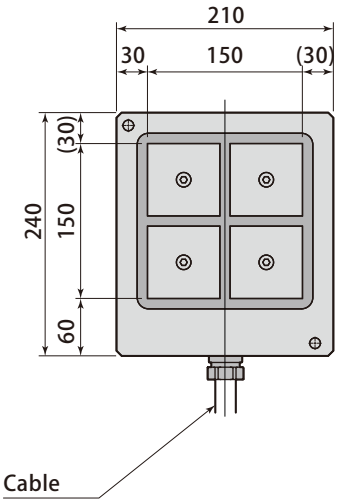
Type		2cores type	4cores double row type	4cores single row type
Mag clamp model		MGW2TK	MGW4STK	MGW4TK
Number of magnet core		2	4	4
Max. Clamping force (One face)	kN	14.7	29.4	29.4
Weight	kg	24	44	45
Operating temperature	℃	0 ～ 80		
Clamping force per one magnet core	kN	7.35		
Self cut length (One face)	mm	3		
Height of magnetic flux	mm	20（Workpiece material SS400）		
Power source voltage	V	AC200 / 220V ±5%（50/60Hz）		
Power source capacity	kVA	10	10	10
Breaker capacity	A	40	40	40

- The operating temperature is temperature of clamp plate surface.
- In case of using multiple double mag clamps, both sides of surface can be cut off at your side to align the height.

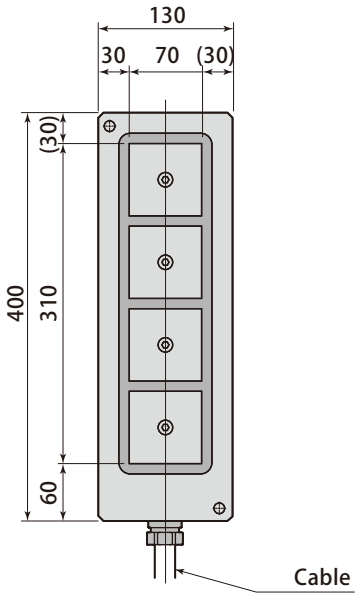
MGW2T
2 cores

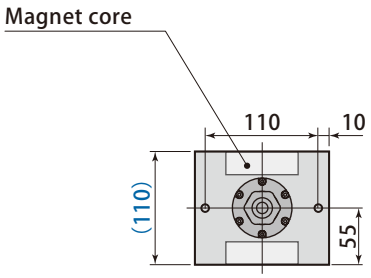


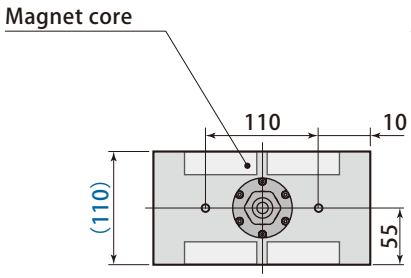
MGW4ST
4 cores double row

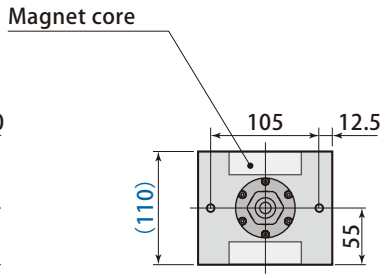


MGW4T
4 cores single row









Type		2cores type	4cores double row type	4cores single row type
Mag clamp model		MGW2T	MGW4ST	MGW4T
Number of magnet core		2	4	4
Max. Clamping force (One face)	kN	14.7	29.4	29.4
Weight	kg	24	44	45
Operating temperature	℃	0 ～ 80		
Clamping force per one magnet core	kN	7.35		
Self cut length (One face)	mm	3		
Height of magnetic flux	mm	20（Workpiece material SS400）		
Power source voltage	V	AC200 / 220V ±5%（50/60Hz）		
Power source capacity	kVA	10	10	10
Breaker capacity	A	40	40	40

- The operating temperature is temperature of clamp plate surface.
- In case of using multiple double mag clamps, both sides of surface can be cut off at your side to align the height.

Model designation

Set model for control panel and operation panel

EMG-W K

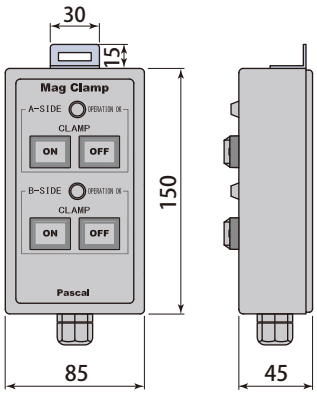
1 Cable

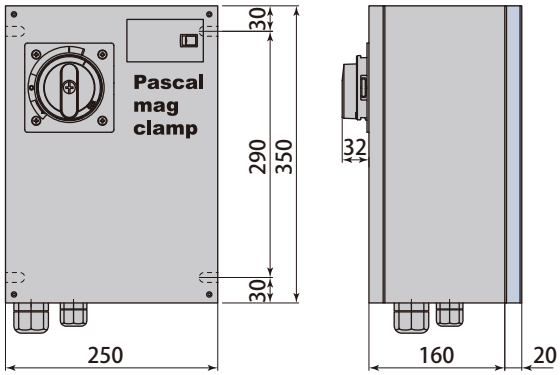
K : Disconnectable type

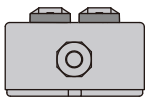
No code : Pre-wired type

Operation panel

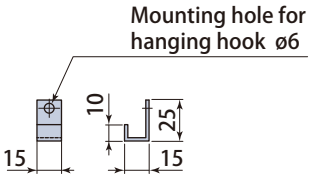
Control box

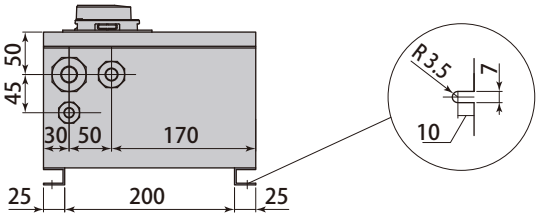






Hanging hook





Model		EMG-W□
Weight	kg	Operation panel 0.3 ／ Control box 10

● Refer to the **pages →23 ～ 25** for the details of accessories.

Operation panel and Control box are sold separately. Purchase one set of operation panel and control box per 1 system.

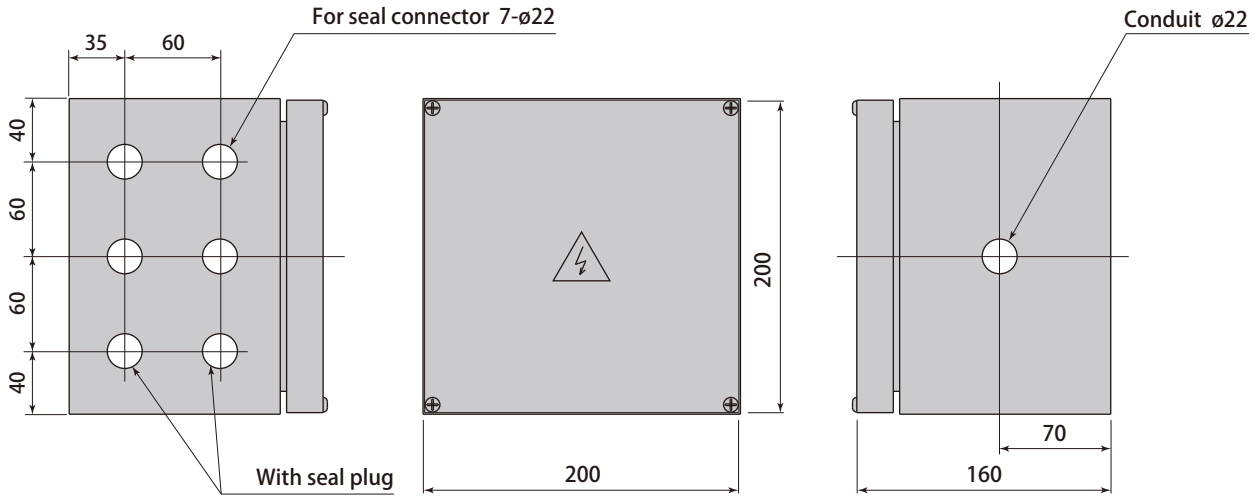
Model designation

ECL-WK 2

1 Number of cable

- 2 : 2 cables
- 3 : 3 cables
- 4 : 4 cables
- 5 : 5 cables
- 6 : 6 cables

Model	ECL-WK
Weight kg	4



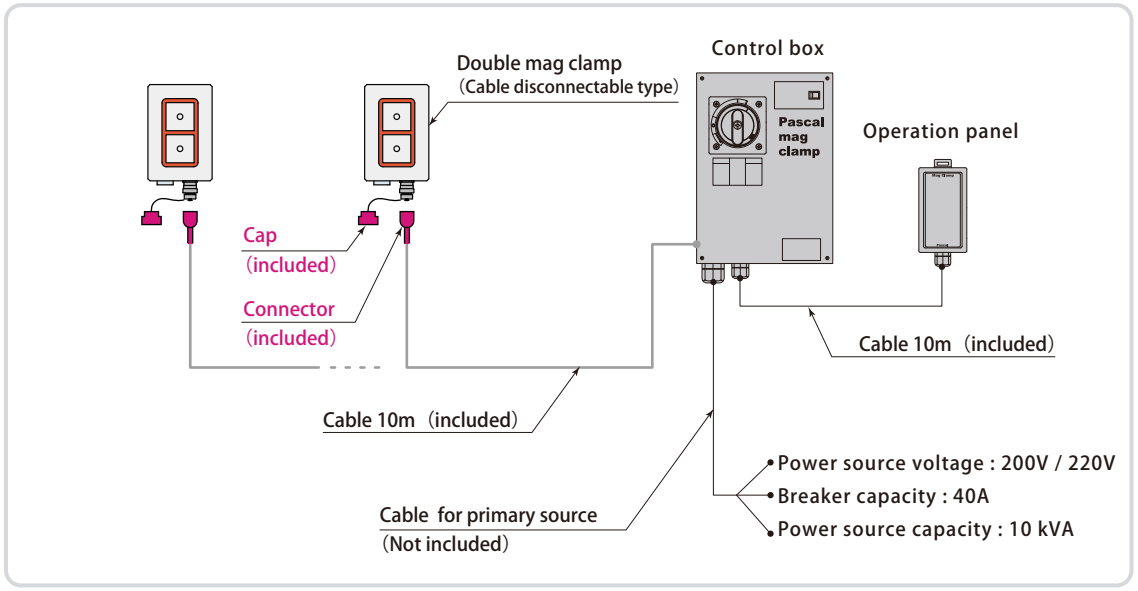
1 Number of cable

Model	ECL-WK2	ECL-WK3	ECL-WK4	ECL-WK5	ECL-WK6
Number of cable	2	3	4	5	6

● Refer to the **pages →23 ～ 25** for the details of accessories.

Junction box is sold separately, the price differs according to the number of cable.
Consult Pascal for the details.

In case of making energization one by one



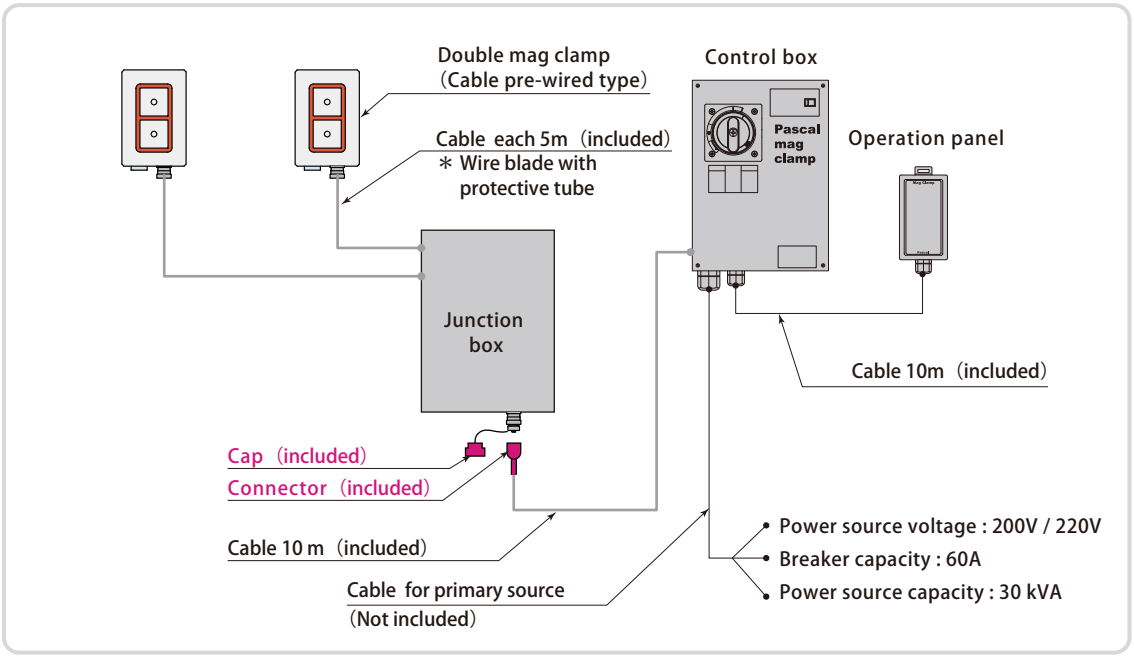
● After clamping has been completed, remove the connector with cable and cover with the cap.

Name of product	Model	Quantity
Double mag clamp Double cores	MGW2K	2 pcs
Operation panel , Control box	EMG-WK	1 set

System components

Mag clamp MGW2K	Standard accessories：Connector cap
Operation panel (Sold separately) Control box (Sold separately) (Set model EMG-WK)	Standard accessories： Cable between operation paneland control box(10m) , Cable between control box and double mag clamp(10m)
Cable for primary source	Not included (To be prepared by the customer)

In case of making energization to multiple mag clamps at the same time (The cable of mag clamp can not be disconnected)



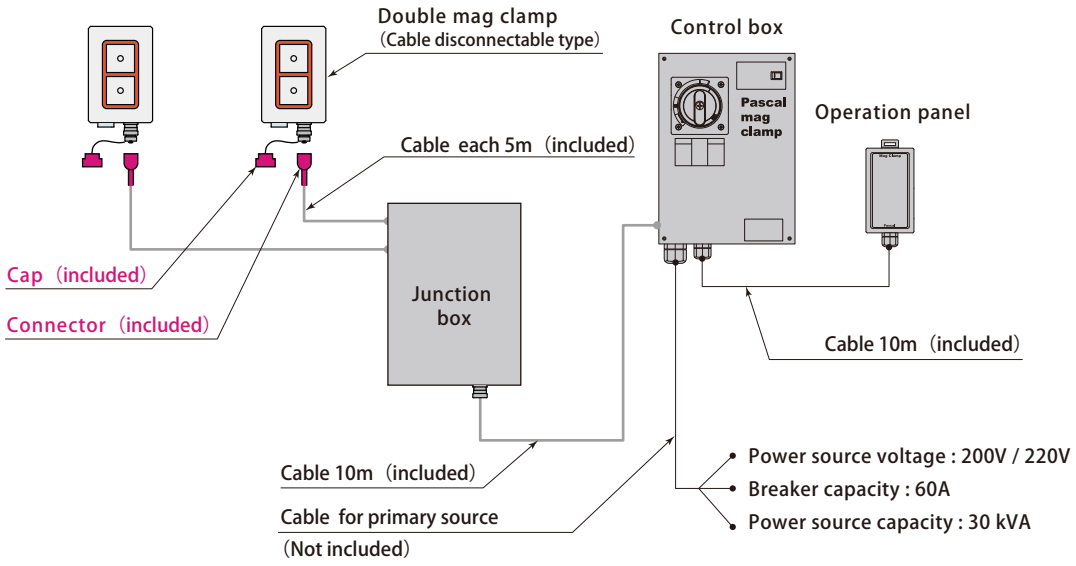
- Max. 6pcs of mag clamp can be available for one junction box.
- After clamping has been completed, remove the connector with cable and cover with the cap.

Name of product	Model	Quantity
Double mag clamp Double cores	MGW2	2 pcs
Operation panel , Control box	EMG-WK	1 set
Junction box	ECL-WK2	1 pcs

System components

Mag clamp MGW2	Standard accessories：Connector cap
Operation panel (Sold separately) Control box (Sold separately)	Standard accessories： Cable between operation panel and control box(10m), Cable between control box and junction box(10m)
Junction box ECL-WK2 (Sold separately)	Standard accessories： Cable between double mag clamp and junction box(each5m), Connector cap
Cable for primary source	Not included (To be prepared by the customer)

In case of making energization to multiple mag clamps at the same time (After clamp operation is completed, disconnect the cable)



- Max. 6pcs of mag clamp can be available for one junction box.
- After clamping has been completed, remove the connector with cable and cover with the cap.

Name of product	Model	Quantity
Double mag clamp Double cores	MGW2K	2 pcs
Operation panel , Control box	EMG-W	1 set
Junction box	ECL-WK2	1 pcs

System components

Mag clamp MGK2K	Standard accessories：Connector cap
Operation panel (Sold separately) Control box (Sold separately) (Set model EMG-W)	Standard accessories： Cable between operation panel and control box(10m), Cable between control box and junction box(10m)
Junction box ECL-WK2 (Sold separately)	Standard accessories： Cable between double mag clamp and junction box(each5m), Connector cap
Cable for primary source	Not included (To be prepared by the customer)

- Do not use a workpiece with the plate that is deformed or warped. Clamp force decreases due to the gap between the workpiece and clamp plate.

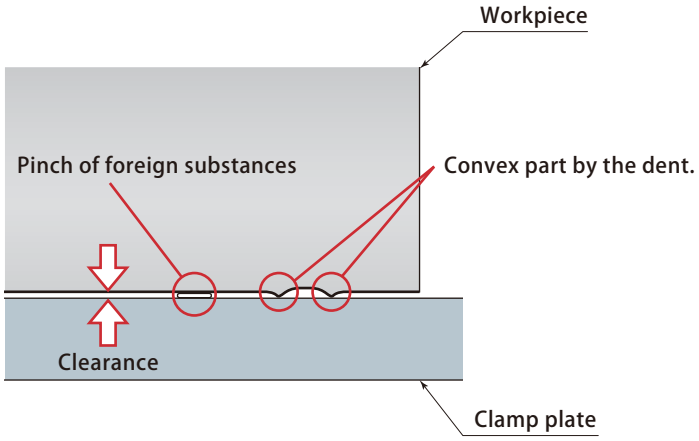
- Be sure to use mag clamp by keeping the contact surfaces of workpiece and clamp plate always clean.

- In case that there are some dents in the contact surfaces of workpiece and clamp plate, remove the convex part using the oilstone.

Check the below to improve the safety

- Mag clamp generates a powerful magnetism. The person who is wearing a cardiac pacemaker is strictly prohibited to approach. Projecting height of magnetic flux above the clamp plate towards forward (to workpiece side) is just around 20 mm. However, be sure not to bring mobile phone, magnetic card or compact disc, etc. that are susceptible to magnetism close to the clamp plate to avoid a damage.

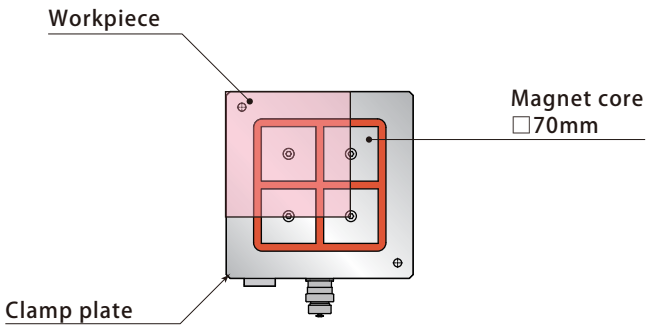
- Do not bring any magnetic substance such as ferrous metal close to the adherence surface when mag clamp is at clamping (magnetized). Due to the power of magnet, it may be adhered to the clamp surface to cause injury to a finger or hand.



- Be sure to use a workpiece of which thickness is 25 mm or more. Although the projecting height of magnetic flux is around 20 mm, workpiece which is thinner than 25 mm may cause decrease of clamping force.

Calculation of rated clamping force

The clamping force of Mag clamp（the adhering force of magnetic clamp） varies according to the area size （number of magnet core） where the workpiece and clamp plate contact. When loading a small workpiece which does not contact all the magnet cores, you are requested to work out the rated clamping force by referring to below example.



Example：Clamp plate　model MGW4SK

1. Magnet cores that the workpiece contacts with its area= 1pc
2. Magnet cores that the workpiece contacts with 1/2 of its area= 2pcs
3. Magnet cores that the workpiece contacts with 1/4 of its area= 1pcs
4. Total magnet cores that the workpiece contacts

   ＝ 1pc+2pcs×1/2+1pc×1/4=2.25pcs

5. Clamping force per magnet core ＝ 7.35 kN/pcs
6. Rated clamping force ＝ 7.35 kN/pcs × 2.25 pcs ＝ 16.5 kN

- If there is a hole or notch at the bottom of workpiece, reduce the respective area from the total contact area （number of magnet core）.
- The actual clamping force is subject to decline lower than the rated force according to the conditions of workpiece. Refer to the **page →28**"Regarding to the decrease of clamping force".

Regarding the decrease of clamping force

Depending on the conditions of workpiece, the actual force may become lower than the rating. Before using mag clamp, be certain to calculate and acknowledge the decrease of clamping force according to the below tables and charts.

(Actual clamping force) = (Rated clamping force - decrease of clamping force)

Material of workpiece

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

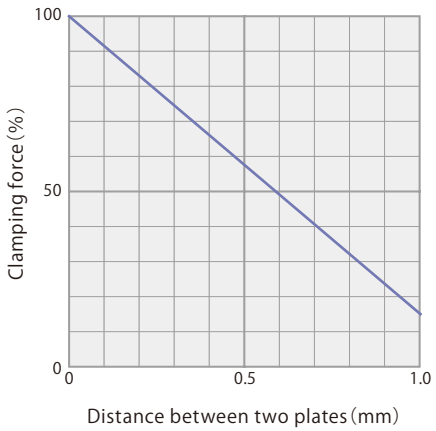
The clamping force decreases according to the materials of workpiece. S45C-H, SUJ, and FCD600 tends to be hard to come off at unclamping because the residual magnetic flux on the workpiece affects this however it should be improved once the clearance is created between the workpiece and clamp plate.

Surface roughness of workpiece

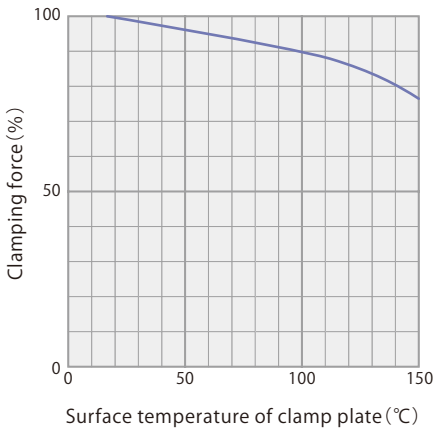
Surface roughness (Max. height and surface roughnessRz)	Clamping force
Rz1.6～3.8	100% (Rating)
Rz7.5～15.5	Approx.100%
Rz85～150	Approx.90%

The clamping force decreases according to the grade of surface roughness in contact with the workpiece and clamp plate.

Distance between two plates (mm)



Temperature of mold plate



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