English

Lifting Magnet

Owner's Manual

To Customer
- Operators are requested to read this manual.
- After reading, please keep this manual at hand for future use.

KITO

■Intended Use

This KRD series lifting magnet lifts steel products through the attracting force generated by its permanent magnet.

■Safety Precautions

Improper use of lifting magnet causes danger such as dropping of the load. Read this Owner's Manual carefully before operation and maintenance. Use the lifting magnet after understanding the product knowledge, safety information and precautions.
This Owner's Manual classifies the precautions into two categories of "DANGER" and "CAUTION".

⚠ DANGER Cases where it is considered that wrong handling may result in a dangerous situation that could lead to death or serious injury.

⚠ CAUTION Cases where it is considered wrong handling may result in a dangerous situation that could lead to moderate or minor injury, or property damage only.

In addition, even within the matters described in **⚠ CAUTION**, the possibility of serious consequences exists depending on the situation. Both these precautions describe important matters; be sure to heed them.

Pictorial Display Examples
Precautions and pictorial displays are described.
The ⃠ symbol indicates contents for prohibited behaviors.

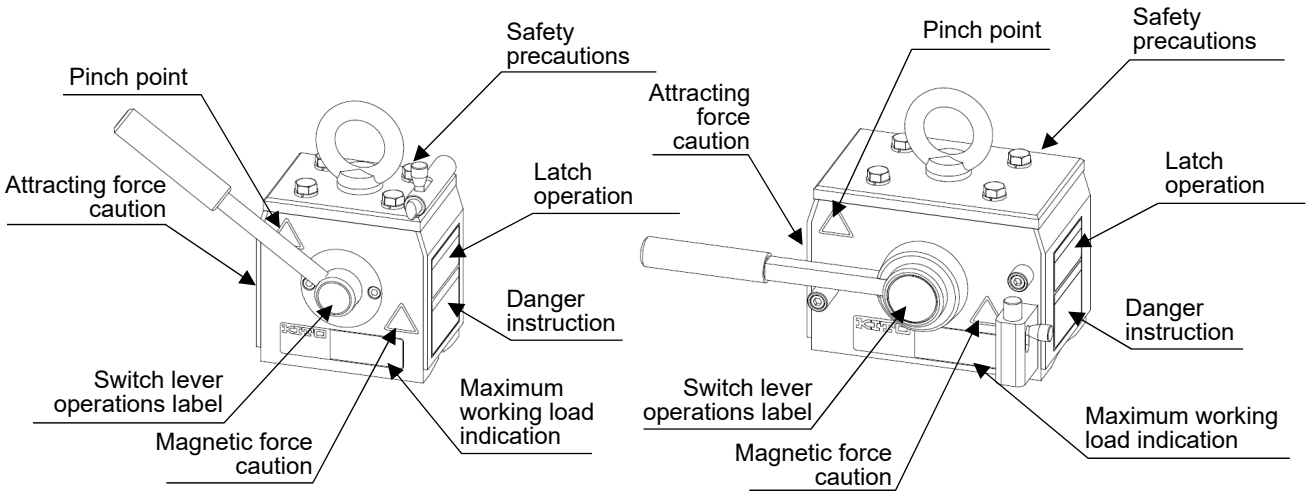
*** After reading, please keep this Owner's Manual at hand for future use by the user.**

■Disclaimer

- KITO shall not be liable for any damage incurred due to fire, natural disasters such as earthquake and lightning, actions of a third party, other accidents, intentional or accidental improper operation or misuse by customer, and operation under conditions exceeding the operating environmental conditions.
- KITO shall not be liable for any incidental damage incurred, due to the use or inability to use this product (loss of business profit, interruption of business, and damage to the lifted load).
- KITO shall not be liable for any damage incurred due to negligence concerning the instructions in this manual, or operation under a condition exceeding the range defined in the specifications.
- KITO shall not be liable for any damage arising from malfunction due to the combination of the chain hoist used with other equipment, unrelated to KITO.

■Indications on the Main Body of the Lifting Magnet

Nameplates with warning labels and notes for the main body of the lifting magnet are affixed at the positions shown on Figure 1. Please check them before using the lifting magnet. If by any chance the warning label or the nameplate is missing or illegible, stop the operation, procure new labels or nameplates from a KITO agency near you, and affix them at the positions shown in Figure 1 before resuming the operation.



KRD8, KRD16 KRD30, KRD50, KRD80, KRD100, KRD160

Figure 1 Indications on the main body

■General Matters on Handling

⚠ DANGER

- This lifting magnet is not to be operated by anyone who is not familiar with the contents of the Owner's Manual, warning labels or nameplates.
- Never try to lift a load that exceeds the maximum working load.
- Do not use the lifting magnet if its main body is damaged, if abnormal noises arise during switch lever operation, or if any abnormality is detected during the operation.
- Never use the lifting magent if any abnormality is found in the eyebolt or the top plate mounting bolt.
- Do not operate the switch lever by any means other than hand.
- Never disassemble or modify the product and its accessories.

■Laws and Standards

Carry out installation, inspections, operations, maintenance management in accordance with the laws and standards of the country and region where the product is used.
An application before installation or a test before beginning usage may be required. Furthermore, the tester may be required to have specific qualifications. Be sure to check the laws and standards of the corresponding country and region before using the product.

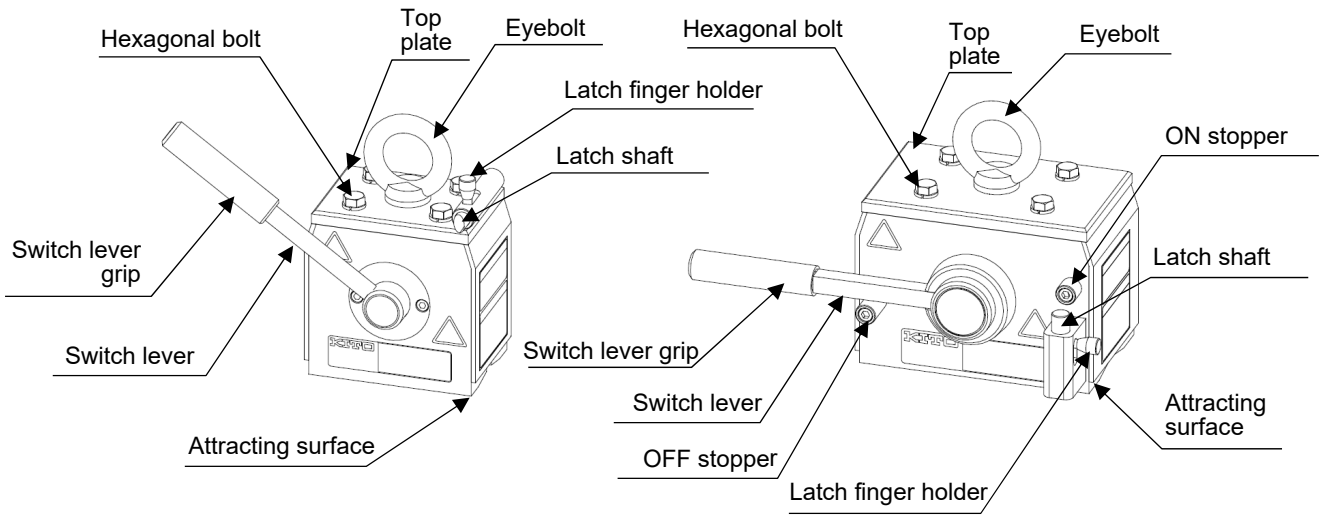
Note: The contents of the Owner's Manual are subject to change without prior notice.

– Table of Contents –

Intended Use ····· P1
Safety Precautions ····· P1
Disclaimer ····· P1
Indications on the Main Body of the Lifting Magnet ····· P1
General Matters on Handling ····· P2
Laws and Standards ····· P2
1. Names of Each Part ····· P3
2. Opening the Package ····· P4
3. Glossary ····· P4
4. Product Models and Specifications ····· P4
5. Operating Conditions ····· P6
6. Features ····· P6
7. Load Conditions and Attracting Force ····· P6
8. Selection of Suitable Model ····· P11
9. Precautions for Safety Operations ····· P13
10. How to Use ····· P14
11. Inspection and Maintenance ····· P16
12. Parts Replacement ····· P18
13. Disposal Method ····· P21
14. Quality Warranty ····· P22

1. Names of Each Part

Figure 1-1 shows the names of each part of the lifting magnet.



KRD8, KRD16 KRD30, KRD50, KRD80, KRD100, KRD160

Figure 1-1 Names of Each Part

2. Opening the Package

- Check for any discrepancies with your order specifications. Check for any abnormality in the appearance, contents and other items.
- The switch lever grip was removed at the time that the product was packed. Wipe off the oil from the screw part, then securely tighten the grip onto the switch lever. (Except for KRD8)
- Before using the lifting magnet, peel the oil paper off the attracting surface and wipe off the grease.
- Fill in the following fields by looking at the nameplate. Please also provide this information when repairing the product or arranging the service parts.

Model No.		SERIAL No.	
Purchase Date	(MM/DD/YYYY)	Sales Shop Name	

English

3. Glossary

- Attracting force ····· The effective working magnetic force for attracting the load
- Maximum lifting capacity ····· The attracting force obtained by the load and lifting conditions. (For the conditions, refer to page 6.)
- Maximum working load ····· The value obtained by dividing the maximum lifting capacity by 3 (safety coefficient)
- Attracting surface ····· The surface of the lifting magnet that holds the load
- Dynamic lifting off ····· The load held by the lifting magnet rises from the ground, due to hoisting by a crane or a similar machine.
- Magnetic force ····· The active magnetic strength

4. Product Models and Specifications

The lifting magnet series consists of the flat steel/round steel common use type.
Table 4-1 shows the specifications and dimensions. The outline drawings are provided in Figures 4-1, 4-2, and 4-3.
In addition, the dimension and the weight shown in Table 4-1 are rough values.

Table 4-1 Specifications and dimensions

Code	Maximum working load (kg)		Net weight (kg)	Dimension (mm)														
	Flat steel	Round steel		A1	A2	B1	B2	B3	B4	B5	B6	C1	C2	C3	D1	D2	D3	E
KRD8	80	60 (Φ120)	6	112	160	155	95	48.5	60	35	12.5	96.4	75.1	21.3	125	25	28	100
KRD16	160	120 (Φ160)	8	118	212	178	118	61	60	35	12.5	93.5	76.5	17	182	20	28	100
KRD30	300	220 (Φ200)	15	164	272	178	118	61	60	35	12.5	129	96.5	32.5	190	20	60	180
KRD50	500	360 (Φ200)	25	204	317	218	147	75	71	40	16	145.5	113	32.5	215	20	60	180
KRD80	800	600 (Φ300)	40	262	401	263	173	88	90	50	20	160	117	43	270	22	75	180
KRD100	1000	750 (Φ300)	54	283	441	307	197	101	110	60	25	170	127	43	300	22	75	180
KRD160	1600	1200 (Φ460)	101	364	600	379.5	248	125	131.5	70	31.5	200	145	55	418	28	94	180

- The applicable diameter for round steel loads is Φ80 to Φ300mm for KRD8 and KRD16, and Φ80 to Φ600mm for KRD30, KRD50, KRD80, KRD100, and KRD160.
- The maximum working loads shown in Table 4-1 are values for diameters enclosed with ( ) of round steel loads for the respective models.
- Maximum working load for round steel is determined by its diameter. For details, refer to Figures 7-6 and 7-7 on page 10, “Attracting force (%) according to the round steel diameter”.

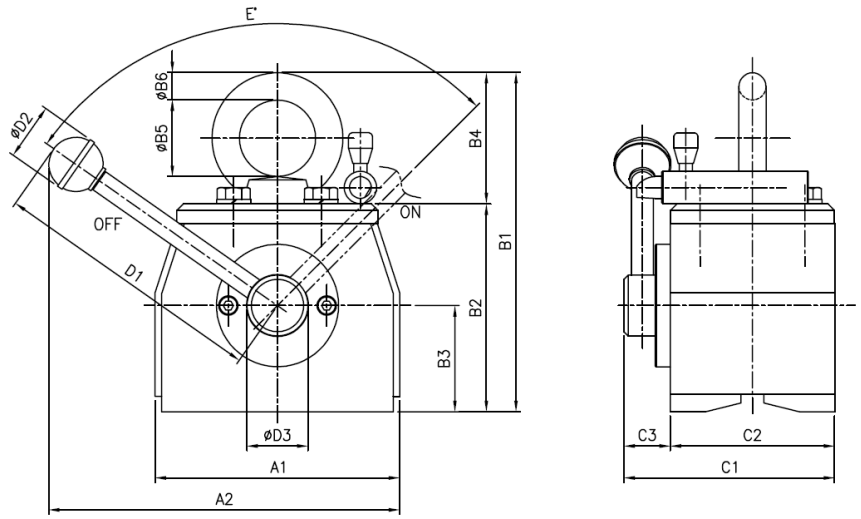


Figure 4-1 Outline drawing of KRD8

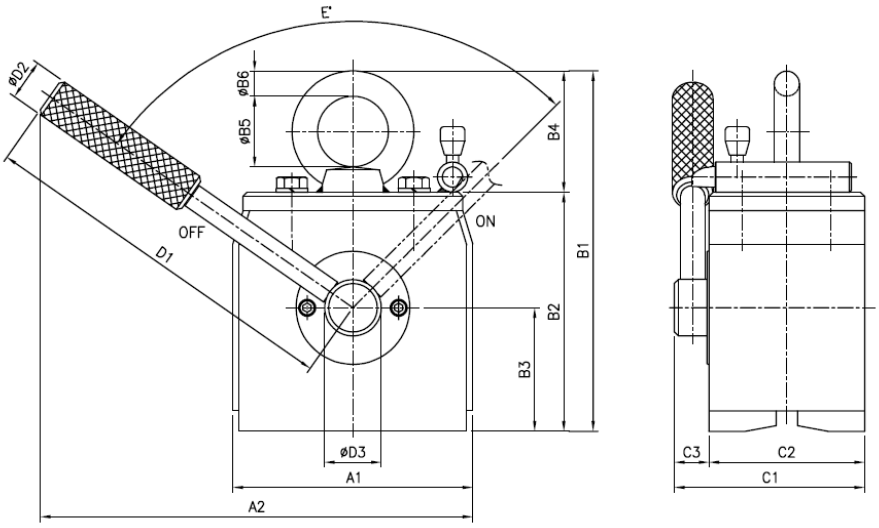


Figure 4-2 Outline drawing of KRD16

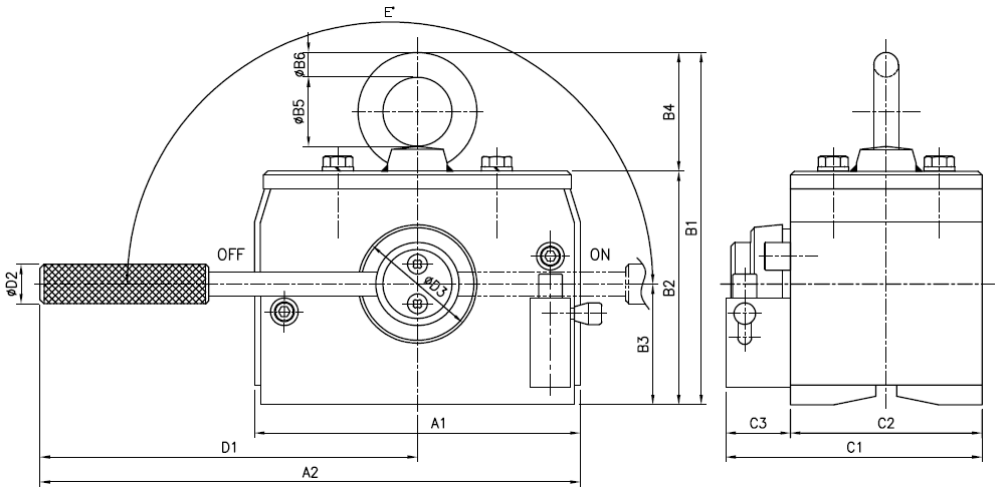


Figure 4-3 Outline drawing of KRD30, KRD50, KRD80, KRD100, KRD160

5. Operating Conditions

1. Operating temperature — Use the lifting magnet within the temperature range of –20°C to +50°C for both the load and the surrounding environment.

⚠ DANGER If the temperature of the load is 50°C or above, the attracting force of the lifting magnet decreases, resulting in dropping of the load. Therefore, absolutely avoid such high-temperature usage.

2. Humidity — 85%RH or lower; no new condensation.
3. Sealability — The lifting magnet is not of waterproof structure. Therefore it cannot be used outdoors, as water intrusion may occur.

⚠ CAUTION The lifting magnet is not of waterproof structure. Water intrusion may cause product failure, making it unavailable for use.

4. Liftable objects — Steel plates, shaped steel and round steel, and their processed goods

* Non-magnetic materials (metallic materials that are not held by magnets) such as aluminum, stainless steel, brass cannot be held.

6. Features

1. Can simply hold and release the load through switch lever operations.
2. The permanent magnet model avoids risks arising from electrical power failure.
3. The lifting magnet adopts a proprietary magnetic structure to enable reliable holding of the load.
4. Offers a rich product portfolio of 7 types; selection can be made according to the shape and weight of the liftable load.

7. Load Conditions and Attracting Force

Before using the lifting magnet, you need to fully understand terminology such as “Maximum lifting capacity”, “Maximum working load” and “Attracting force”.

1. Maximum lifting capacity
   The attracting force when both the load conditions and the lifting conditions are best met is called “maximum lifting capacity”.

   * The load conditions are as follows.

Material	: IS262 (Indian Standard)
Sheet thickness	: 50mm
Surface finishing	: 6.3 / 3.2
Surface processing	: None
Gap	: No gap should exist between the attracting surface of the lifting magnet and the steel sheet.
Load surface state	: Dry

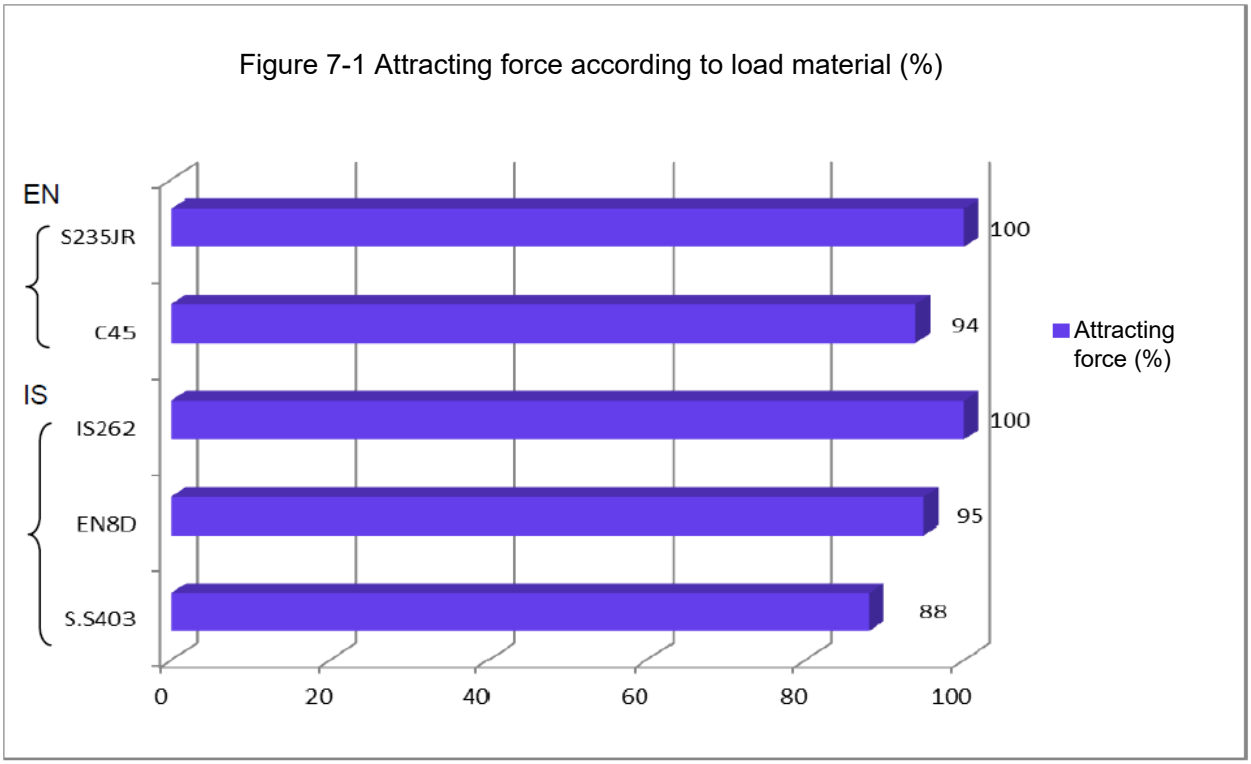
2. Maximum working load
   The value obtained by dividing the maximum lifting capacity by 3 (safety coefficient)

3. Load conditions and attracting force
   - The attracting force varies significantly depending on load conditions such as shape, material, thickness, lifting surface roughness, presence/absence of coating and plating, gap between the lifting surface and the lifting magnet attracting surface, size and surface state.
     Refer to the following items A to H.
   - Some residual magnetism may remain temporarily in the held load even after it is released, making it difficult to detach the lightweight load.

A. Load material composition and attracting force

- The attracting force depends on the material composition of the load.
- Stainless steel materials (JIS SUS304 equivalent) are not held.
- Figure 7-1 shows attracting force according to load material. (Reference: IS material)

Figure 7-1 Attracting force according to load material (%)



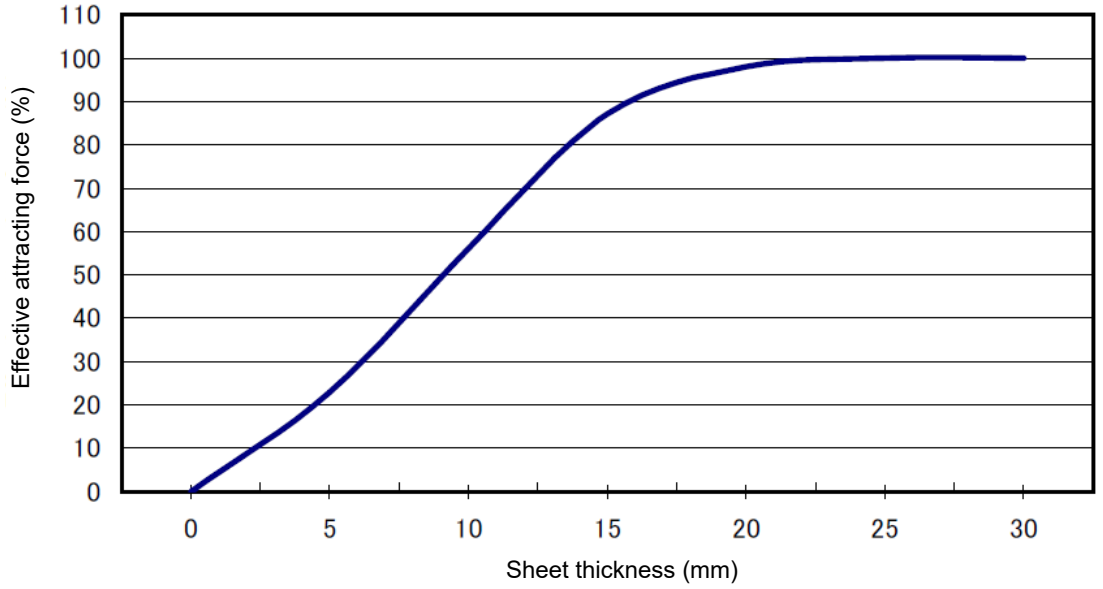
⚠ CAUTION

- The lifting magnet cannot lift the stainless (JIS SUS304 equivalent) load.
- Heat-treated materials tend to retain residual magnetism and sometimes make it difficult to release (OFF) the load.

B. Thickness and attracting force

- If the load thicknessis less than 25mm, there is a big drop in attracting force, which prevents generation of adequate attracting force.
- Figure 7-2 shows attracting force according to sheet thickness.

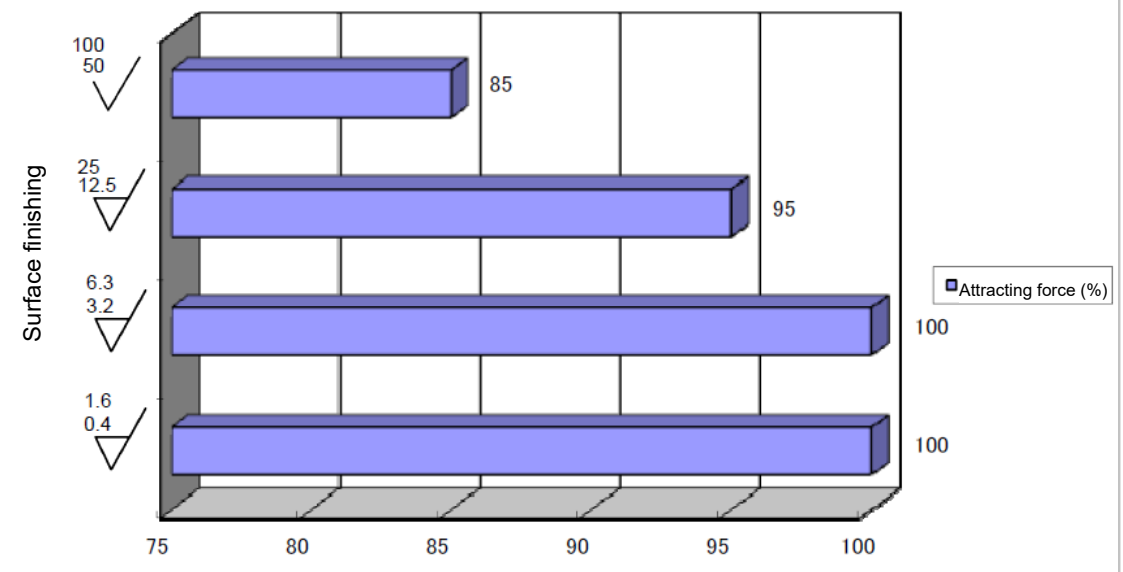
Figure 7-2 Attracting force according to sheet thickness (%)



C. Surface finishing and attracting force

- The attracting force depends on the surface finishing of the load.
- Figure 7-3 shows attracting force according to surface finishing.

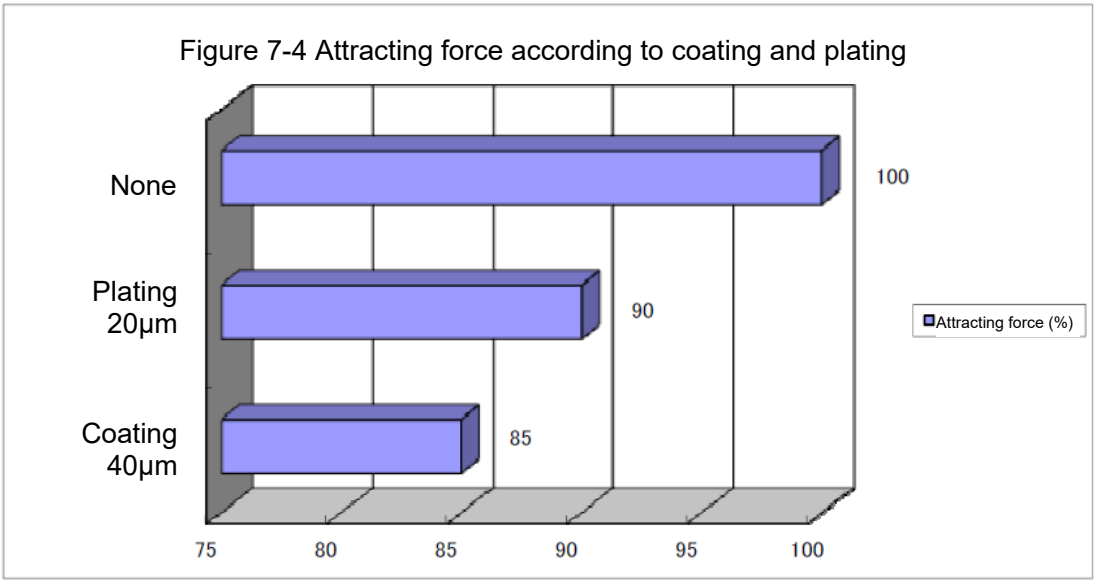
Figure 7-3 Attracting force according to surface finishing (%)



D. Anti-rust treatment and attracting force

- The attracting force depends on the coating and the plating processing of the lifting surface of the load.
- Figure 7-4 shows attracting force according to coating and plating.

Figure 7-4 Attracting force according to coating and plating



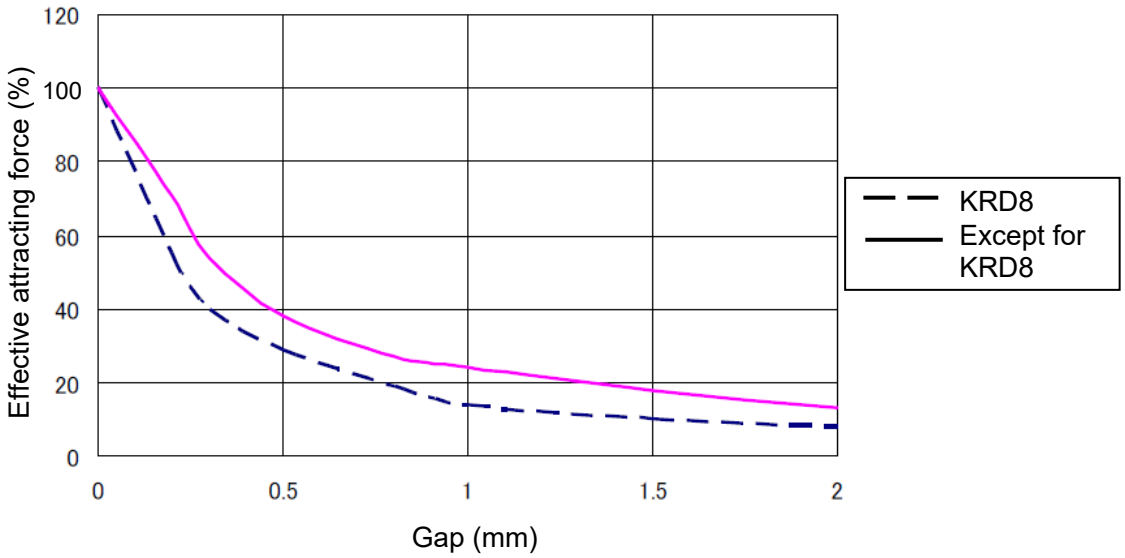
⚠ CAUTION

- The attracting force of the lifting magnet decreases in the presence of coating and plating. Pay adequate attention to this point when holding a coated or plated surface.

E. Gap and attracting force

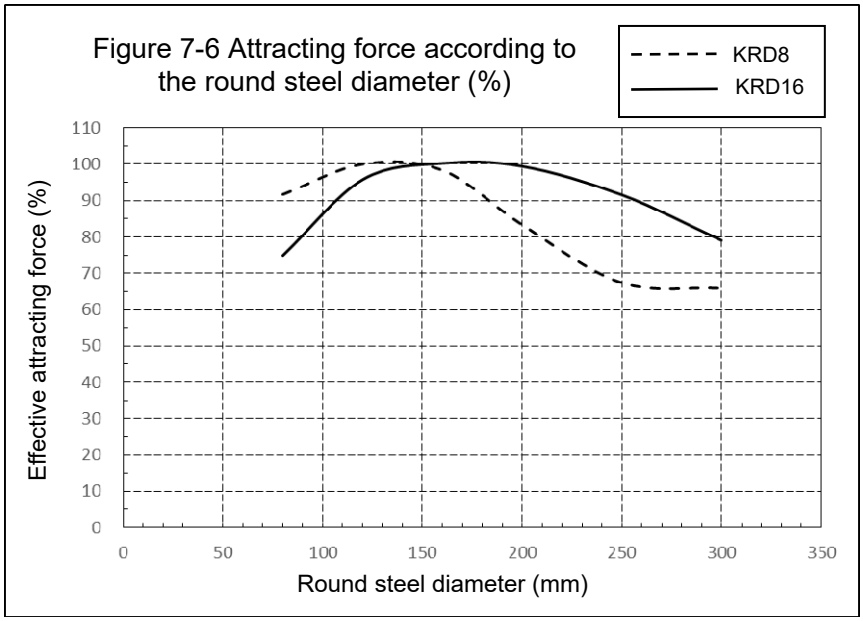
- The attracting force decreases significantly in the presence of a gap between the lifting surface of the load and the attracting surface of the lifting magnet.
- Figure 7-5 shows a reduction of the actual attracting force according to the size of the gap between the flat steel lifting surface and the lifting magnet attracting surface.
- During actual operations, ensure that no gap exists between the lifting surface of the load and the attracting surface of the lifting magnet.

Figure 7-5 Attracting force according to the gap (%)



F. Round steel attracting force

- When lifting round steel, the applicable diameter of round steel is Φ80 to Φ300mm for KRD8 and KRD16, and Φ80 to Φ600mm for other models.
- The lifting capacity of round steel varies according to its diameter. It reaches 100% at Φ120 to 160mm for KRD8, Φ160 to Φ200mm for KRD16, Φ200mm for KRD30 and KRD50, Φ300mm for KRD80 and KRD100, Φ460mm for KRD160. Figure 7-6, Figure 7-7, and Table 7-1 show attracting force according to diameter.
- When lifting round steel, take care regarding its length and weight.



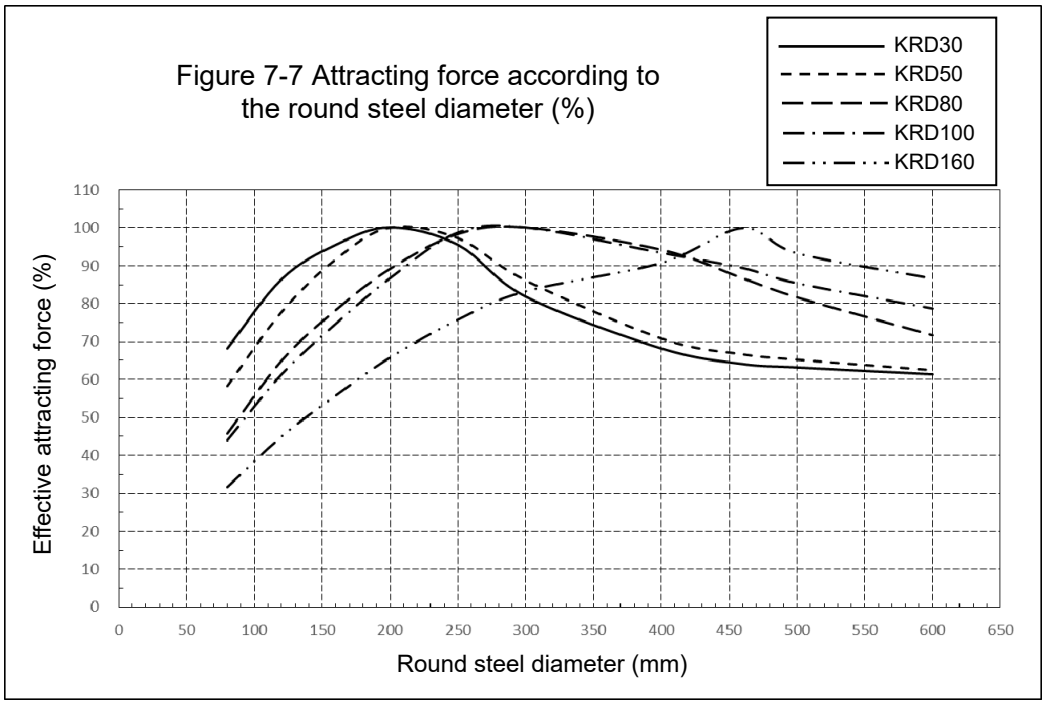


Table 7-1 Maximum working load according to the round steel diameter (kg)

Code	Φ80 mm	Φ120 mm	Φ160 mm	Φ200 mm	Φ250 mm	Φ300 mm	Φ400 mm	Φ460 mm	Φ500 mm	Φ600 mm
KRD8	55	60	60	50	40	40	—	—	—	—
KRD16	90	115	120	120	110	95	—	—	—	—
KRD30	150	190	210	220	210	180	150	140	140	135
KDR50	210	280	330	360	350	310	255	240	235	225
KRD80	275	390	470	535	590	600	565	520	490	430
KRD100	330	460	560	650	740	750	700	670	640	590
KRD160	380	540	670	790	910	1000	1090	1200	1120	1040

- Table 7-1 shows the values according to the representative diameters of each model.

G. Surface condition

⚠ DANGER

- Any oil adhering to the lifting surface of the load or to the attracting surface of the lifting magnet may cause sideslip of the load. Also, adhesion of waste materials or other objects may cause a gap and significantly reduce the attracting force. Always ensure that the lifting surface of the load and the attracting surface of the lifting magnet are clean.

H. Lifting direction

⚠ DANGER

- When using the lifting magnet, be sure to hold the load horizontally at its center of gravity and lift it vertically.
- Lifting at a position shifted from the center of gravity, or lifting diagonally, causes the load to move significantly during the movement of dynamic lifting off. Also, the load is prone to detach from the lifting magnet.

8. Selection of Suitable Model

The suitable model is selected by calculating the corresponding load weight by multiplying the weight of the load to be lifted by the load condition coefficient and the operating condition coefficient, and then select a lifting magnet model which has the maximum working load required for safely lifting the load.

8-1 Selection steps

(1) Calculating the corresponding load weight

Corresponding load weight = Load weight x Each type of load condition coefficient (Table 8-1) x Operating condition coefficient (Table 8-2)

- Load condition coefficients: Coefficients relating to each condition, consisting of 1. Material, 2. Thickness (flat steel), 3. Surface finishing, 4. Anti-rust treatment (coating and plating), 5. Round steel diameter, 6. Gap
  * When the attracting force is 80%, the coefficient is 1/0.8 =1.25.
- Operating condition coefficients: Coefficients relating to the load shake and vibration conditions

(2) Selecting a suitable model

Selected model's maximum working load > Corresponding load weight

(3) Each type of load condition coefficient

Table 8-1 Coefficients based on load conditions (Theoretical value)

Load conditions		Load status					
1. Material	EN	S235JR		C45		–	
	IS	IS262		EN8D		S.S403	
Coefficient		1		1.06		1.15	
2. Thickness (mm)		25	22	18	16	14	12
Coefficient		1	1.02	1.05	1.12	1.18	1.40
3. Surface finishing		1.6 0.4	6.3 3.2	25 12.5	100 50		
Coefficient		1	1	1.05	1.18		
4. Anti-rust treatment		None		Plating 20μm		Coating 40μm	
Coefficient		1		1.11		1.18	
5. Round steel diameter		The attracting force is found from the graphs in Figures 7-6 and 7-7, "Attracting force according to the round steel diameter".					
Coefficient		1 / Attracting force					

⚠ CAUTION

- These values are theoretical only, and do not guarantee absolute safety.

(4) Operating condition coefficients

Table 8-2 Coefficients based on operating conditions

Operational situation	Load shake coefficient
Operations where the attracting force applies at the center of gravity, without load shake or vibrations	1.1
Operations where the attracting force applies at the center of gravity, with load shake or vibrations	1.25

- These values are coefficients for a rough guide for general transport operations. Therefore, select a higher coefficient according to your actual operational situation.
- Do not use the lifting magnet when the attracting force is applied away from the center of gravity, or when a gap arises between the attracting surface and the lifting surface due to steel sheet deflection, or when excessive shake or impact is expected.
- A lifting method that generates large load deflection may create gap between the attracting surface and the lifting surface and result in dropping of the load.

(5) Model's maximum working load

Table 8-3 Maximum working load

Code	Maximum working load (kg)	
	Round steel	Flat steel
KRD8	80	60
KRD16	160	120
KRD30	300	220
KRD50	500	360
KRD80	800	600
KRD100	1000	750
KRD160	1600	1200

8-2 Selection example

(1) Flat steel

- Lifting weight……100kg
- Determine the load condition coefficients and the operating condition coefficients.

Load conditions	1. Material	2. Thickness (mm)	3. Surface finishing	4. Anti-rust treatment	6. Gap
	EN8D	25	25 / 12.5	Coating 40μm	None
Coefficient	1.05	1	1.05	1.18	–

Operational conditions	Load shake coefficient
Operation without vibrations	1.1

- Calculating the corresponding load weight
  100 (kg) x 1.05 x 1 x 1.05 x 1.18 x 1.1 = 143kg
- Selection of suitable model
  Select a model that has a maximum working load (Table 8-3) which is greater than the value of the corresponding load weight (143kg).

  KRD16 Maximum working load 160 (kg) > Corresponding load weight 143 (kg)

(2) Round steel

Provisionally select a model that has a working load which easily exceeds the weight of the load to be lifted, find the coefficients of the attracting force according to the diameter of the round steel (using Figures 7-6 and 7-7), and then calculate the corresponding load weight in the same way as for flat steel.
Confirm that the calculated value is within the model's maximum working load for round steel (using Table 8-3).
If the value exceeds the maximum working load, review the provisional selection again.

⚠ CAUTION

- For the lifting magnet, select a model of the maximum working load which exceeds the corresponding load weight.

English

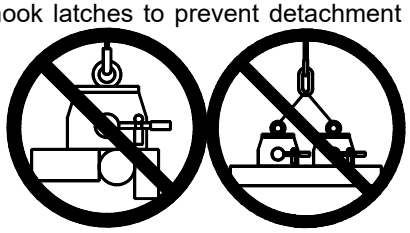
9. Precautions for Safety Operations

Before using the lifting magnet, read and understand adequately the following precautions, and comply with them.

●Before opeartion

⚠ CAUTION

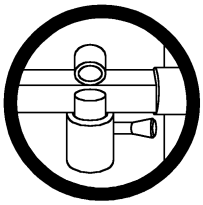
- The load weight must be strictly kept within the maximum working load, referencing the load conditions and the operating conditions.
- The size of the load shall not exceed the limits described in the Owner's Manual. The attracting force decreases for steel sheets thinner than 25mm.
- Watches, cards, mobile phones, etc. may be adversely affected due to strong magnets. In addition, tools must not be brought close to the product.
- When handling medical equipment like pacemakers, be sure to consult related experts.
- Be sure to wear protective goggles, work gloves, safety boots, and helmets.
- Ensure that the temperature of the load and the surrounding is below 50°C.
- Be sure to warn people near the load not to remain closer than a distance of 1.5 times the lifting height of the load.
- Be sure to warn people near the load prior to lifting and transporting.
- Equip the hooks of the cranes or other equipment with hook latches to prevent detachment from the eyebolt of the lifting magnet.
- Do not detach warning labels, nameplates, or other indications.
- Do not lift multiple loads in an overlapping manner, such as by double lifting. Do not lift multiple steel pipes or round steel.
- Do not use multiple lifting magnets at the same time.



●During opeartion

⚠ CAUTION

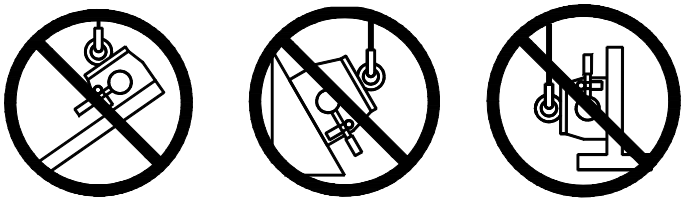
- The switch lever must only be switched on above loads which are made of iron and steel. It is forbidden to switch the lever on above non-magnetic materials.
- Ensure that no chips, dust, paper or other foreign objects are present on the attracting surface of the lifting magnet or the lifting surface of the load.
- When removing foreign objects from the gap between the lifting magnet and the load, never insert your fingers or hand into the gap.
- When the force required to operate the switch lever is large, confirm the load conditions (closeness of contact, non-magnetic, etc.).
- Due to the danger of getting your fingers trapped between the switch lever and the main body, never put your hand into the lever's range of motion.
- When the switch lever has been rotated to the ON side, be sure to perform latch lock.
- Handle the switch lever with due care to avoid breaking it; do not hit and kick the lever.

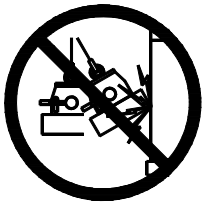


●Lifting the load

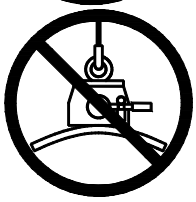
⚠ CAUTION

- Maintain the lowest practicable height for the lifting magnet in lifting and transporting the load.
- Do not put your hand or foot under the load being lifted. Do not enter or cross the space under the load being lifted.
- Do not move the load close to or over people.
- Do not use the lifting magnet at the edge of the load. Attracting force shall be applied at the center of gravity
- Do not use the lifting magnet with its attracting surface oriented vertically or tilted away from the horizontal.
- Ensure that the load does not collide with surrounding objects during transport. Also, be careful of the shock incurred when a load contacts the stopper at a crane traveling end.
- Do not subject the lifting magnet body or the switch lever to impact such as by allowing them to come into contact with surrounding objects.





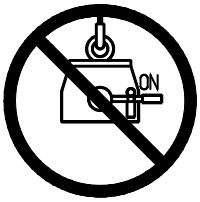
- A lifting method that allows large deflection in the steel sheet may create a gap between the the attracting surface of the lifting magnet and the lifting surface of the load, and thereby decrease the attracting force, generate tilt and shake, and result in dropping of the load.
- Do not leave the lifting magnet with a load held when not in use.



●Miscellaneous

⚠ CAUTION

- Be sure to leave the switch lever of the lifting magnet in the OFF position unless a load is being lifted.
- Do not use the lifting magnet to lift or support people.
- Never disassemble the lifting magnet.



10. How to Use

(1) Before using the lifting magnet, observe closely its overall condition and check for any abnormality in appearance.
If the switch lever grip is loose, tighten it firmly.
Check eyebolts and top plate bolts, and also the latching function.
If any abnormality is observed, the lifting magnet should not be used.

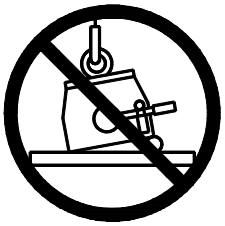
⚠ CAUTION

- If any abnormality is found with eyebolts or the top plate, stop using the lifting magnet.

(2) Clean the attracting surface of the lifting magnet and the lifitng surface of the load.

⚠ DANGER

- If any foreign object is present between the attracting surface of the lifting magnet and the load, the attracting force will decrease, resulting in dropping of the load.
- If oil is attached to the attracting surface of the lifting magnet or the lifitng surface of the load, it will cause the load to slip, resulting in dropping of the load.



(3) Confirm that the switch lever of the lifting magnet is in the OFF position.
If the lifting magnet approaches the load in the ON state, the load may be held suddenly; this can result in injury due to a body part being caught or damage to the lifting magnet due to impact from the load.

(4) Place the lifting magnet quietly at the horizontal center of gravity of the load. If the lifting surface of the load is smaller than the attracting surface of the lifting magnet, place the load at the center of the attracting surface of the lifting magnet and hold the load while keeping them evenly contacted.
Also, use the groove of the attracting surface of the lifting magnet to orient the round steel in the longitudinal direction (direction parallel with the switch lever).

⚠ DANGER

- If the load is deviated to one side of the lifting magnet, excessive force gets applied to the lifting magnet, resulting in dropping of the load.

⚠ CAUTION

- If the lifting magnet is placed on the load surface carelessly, harmful scratches may be generated on the attracting surface of the lifting magnet or the load surface.
- Using the lifting magnet at a position deviated from the center of gravity of the load will generate excessive force at the lifting magnet and may result in dropping of the load.

(5) Switch lever ON

(5)-1 Refer to Figure 10-1 for KRD8 and KRD16.
Rotate the switch lever to the ON side. The switch lever hits the latch. Further rotation of the switch lever pushes the latch out of its path; the latch backs to its original position after the switch lever passes through it, and the switch lever gets locked in this position.

(5)-2 Refer to Figure 10-2 for KRD30, KRD50 , KRD80, KRD100, and KRD160.
Rotate the switch lever till it hits the latch, while pulling the switch lever toward you.
Press down the latch, and put the switch lever under the ON stopper.
The latch backs upward and locks the switch lever in place.

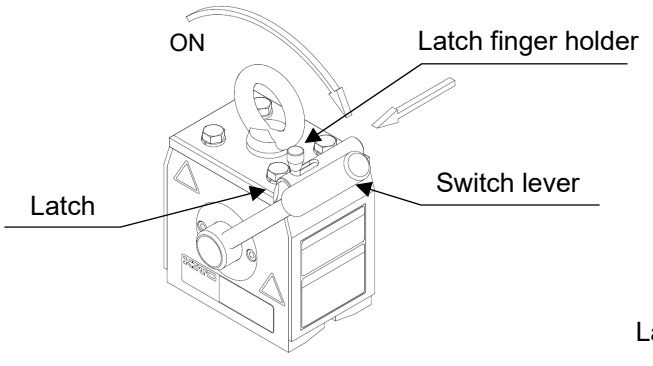


Figure 10-1 KRD8, KRD16

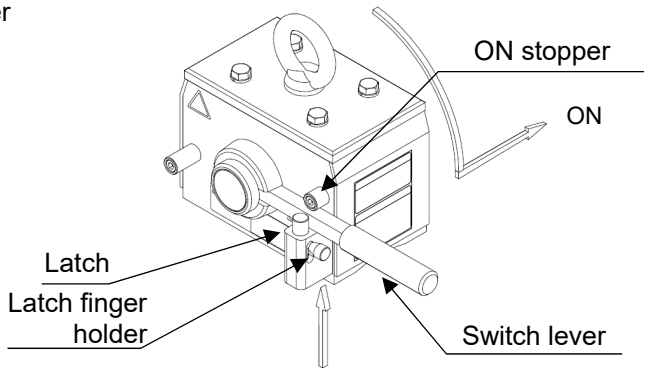


Figure 10-2 KRD30, KRD50, KRD80, KRD100, KRD160

⚠ DANGER

- The lifting magnet cannot attain adequate attracting force if the switch lever is not rotated to a position where latch locking is possible. Never attempt to use the lifting magnet while the switch lever is at an in-between position.

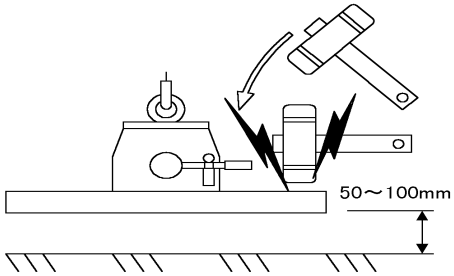
⚠ CAUTION

- If any abnormal noises are heard, or if the operation “feels” bad while you are operating the switch lever, stop using the lifting magnet and check the holding status with the load and the attracting surface of the lifting magnet.
- If the load is thin, the switch lever feels heavy and the operation becomes difficult.
- Switch lever operation with unstable foothold may result in injury.
- Operate the switch lever only by hand. Operation other than by hand may cause trouble.

⚠ DANGER

- While a load is being held, if the switch lever has not been locked with the latch, the switch lever will move for reasons such as impact during transport, resulting in dropping of the load.

(6) Confirmation at dynamic lifting off
After confirming holding, lift the load above the ground by 50 to 100mm as a preliminary check.
Knock the end of the lifting load to exert impact, and confirm that the load is being held reliably.



⚠ DANGER

- When an impact is applied to confirm holding, the load may drop down. Therefore, do not put your hands or feet under the load or ride on the load.

⚠ CAUTION

- During dynamic lifting off, take care not to get your hand trapped in touch eyebolts of the lifting magnet, crane hooks or other parts.
- The repulsive force of the magnet may cause the switch lever to return rapidly. Therefore, do not detach the load while the switch lever is in the ON state, and do not turn on the switch lever while no load is present.

(7) Always raise the load slowly, and perform transportation at the lowest practicable height above the ground.

⚠ DANGER

- Do not put any part of your body, hand and foot under the load. The load may drop and cause serious injury.
- Do not transport the load with any person riding on it. The load may drop and cause serious injury.
- Rapid lifting of the load, or collision during the transport, may result in dropping of the load.

(8) Lower the load to the ground only after confirming safety of the surrounding area.
(9) Confirm complete grounding before releasing the latch lock. Grip the switch lever and conduct the following operation.
- KRD8, KRD16: Put a finger into the latch finger holder and press the latch toward the main body side (Figure 10-3).
- KRD30, KRD50, KRD80, KRD100, KRD160: Put a finger into the latch finger holder and press down the latch, and pull the switch lever toward you at the same time. (Figure 10-4).

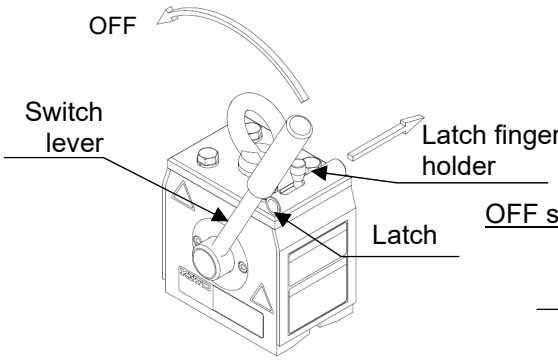


Figure 10-3 KRD8, KRD16

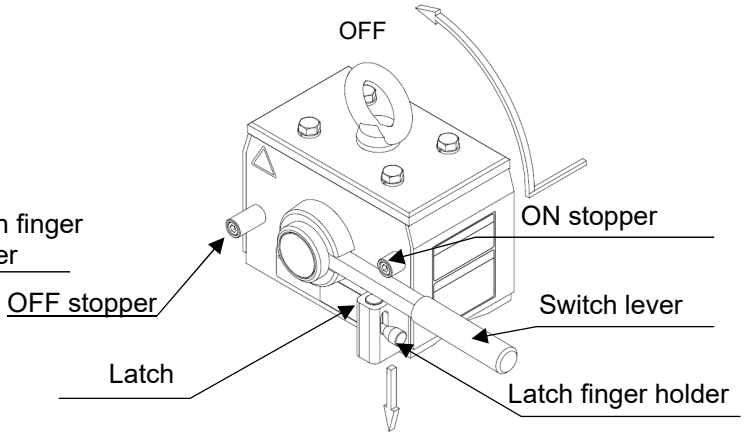


Figure 10-4 KRD30, KRD50, KRD80, KRD100, KRD160

⚠ DANGER	- Latch operations with unstable foothold may result in injury.

(10) Return the switch lever to the OFF side.
- KRD8, KRD16: Return the switch lever till it stops moving.
- KRD30, KRD50, KRD80, KRD100, KRD160: Return the switch lever till it hits the OFF stopper.

⚠ DANGER	- If the switch lever is not completely returned to the OFF side, the attracting force will not become zero. Therefore, when the lifting magnet is raised off the load in this condition, the non-zero magnetic force may partially raise and drop down the load unpredictably.

(11) Raise the lifting magnet slowly and confirm complete release of the load. Place the lifting magnet at a safe location for standby when it has completed its operations.

⚠ CAUTION	- Never place the lifting magnet at locations where a person bumps into the product and has a possibility of stumbling or falling over.

11. Inspection and Maintenance

11-1 Inspection items

(1) Daily inspection
- Before using the lifting magnet, perform an overall inspection for any abnormality, and clean the attracting surface using a waste cloth or similar item.
- After each use of the lifting magnet, check its attracting surface for any abnormality, and clean the attracting surface using a waste cloth or similar item.

(2) Periodic inspection
- Perform monthly and annual inspections in compliance with the inspection standard in Table 11-1.
- If any abnormality is found, such as looseness, cracks, deformation or defects, immediately get it corrected appropriately.
- If parts replacement is required, perform operations with reference to the next section, “12. Parts replacement”.

(3) Storage
- Find a location where no scratches will be generated on the attracting surface of the lifting magnet during storage, lay down a clean paper or vinyl sheet free from foreign objects such as chips or dust at this location, and then place the lifting magnet on it.

⚠ DANGER
- Place the lifting magnet in a stable place where it will not slip, tilt, or drop.
- Store the lifting magnet in an environment that will not degrade its performance or impact its safety.
- If the lifting magnet is not to be used for a long time, apply anti-rust oil on the attracting surface, and then cover it with a cloth or vinyl sheet.

Table 11-1 Inspection reference table

Never use a lifting magnet that had been judged “Abnormal” according to the inspection results.
Parts that can be replaced by the customer are described in the next section,
“12. Parts Replacement”.

Item	Check method	Criteria
[Monthly Inspection]		
1. Visual Inspection (1) Every part of the main body	- Visual inspection -	- There shall be no scratches, cracks, burrs, rust, or deformation that could adversely affect the operation.
(2) Nameplates and labels 1) Maximum working load 2) Danger instruction 3) Latch operation 4) Switch lever Operation label 5) Safety Precautions 6) Attracting force caution 7) Pinch point 8) Magnetic force caution	-Visual Inspection-	- The appropriate nameplates and labels shall be present at the specified positions. - No nameplate or label shall have peeled off. - The contents of the nameplates and labels shall be legible.
(3) Attracting surface	-Visual Inspection- - Measurement -	- No waste or similar substances shall be adhered. Clean to remove any contamination detected. - No protrusions shall exist. Remove any protrusions by means such as filing. - The flatness of the attracting surface shall be below 0.2mm.
2. Status confirmation 1) Switch lever 2) Switch cover 3) Latch 4) Eyebolt 5) Hexagon bolt	- Operation - - Touch operation - - Operation - - Measurement - - Touch operation -	- With the lifting magnet placed on a sheet of thickness 25mm or more, - ON/OFF operations shall be smooth. - The switch lever grip shall not be loose. - No rattling shall be detected when it is moved back and forth or up and down. - Switch lock release operation shall take place smoothly. - Latch shaft shall return to the lock position by spring force. - The amount of wear on the eyebolt must not exceed 10% of the diameter. - No looseness shall exist. If looseness is detected, perform tightening.
[Annual Inspection] Add the following items to monthly inspection.		
1. Attracting force confirmation	- Measurement -	- Place the stainless material (JIS SUS304 equivalent) or brass nonmagnetic material plate on the test piece (IS262 Indian Standard) selected for attracting force confirmation, place the lifting magnet on it, and turn ON the switch lever to enable holding. - Test piece and nonmagnetic material plate sizes for attracting force confirmaiton are in compliance with Table 11-2.
2. Residual attracting force	- Measurement -	- Place the lifting magnet on the test piece selected for residual attracting force confirmation, then turn ON the switch lever and turn it OFF again. Now, if the lifting magnet is raised, the test piece for residual attracting force confirmation shall not be held together with it. - Test piece for residual attracting force confirmation IS262 Indian Standard, surface roughness $\overset{100}{\underset{50}{\checkmark}}$, t 6 x 600 x 250

Table 11-2 Test piece and nonmagnetic material plate dimensions for attracting force confirmation

Code	Test piece dimension (mm)	Nonmagnetic material plate dimension (mm)
KRD8	t 25 x 300 x 400	t 0.3 x 300 x 400
KRD16	t 35 x 450 x 450	t 0.5 x 450 x 450
KRD30	t 35 x 600 x 600	t 1 x 600 x 600
KRD50	t 35 x 600 x 600	t 2 x 600 x 600
KRD80	t 35 x 600 x 600	t 3.8 x 600 x 600(Note)
KRD100	t 35 x 600 x 600	t 4.8 x 600 x 600(Note)
KRD160	t 35 x 600 x 600	t 6 x 600 x 600

Note) Regarding nonmagnetic material plates having non-commercial plate thicknesses (3.8 or 4.8), create the stipulated plate thickness by combining the plate with a different plate thickness, and then confirm the attracting force.
Example)
Plate thickness 3.8mm →
Plate thickness 3mm + Plate thickness 0.8mm

12. Parts Replacement

⚠ CAUTION - Never perform disassembly/reassembly except for the purpose of parts replacement.

12-1 Replacement parts

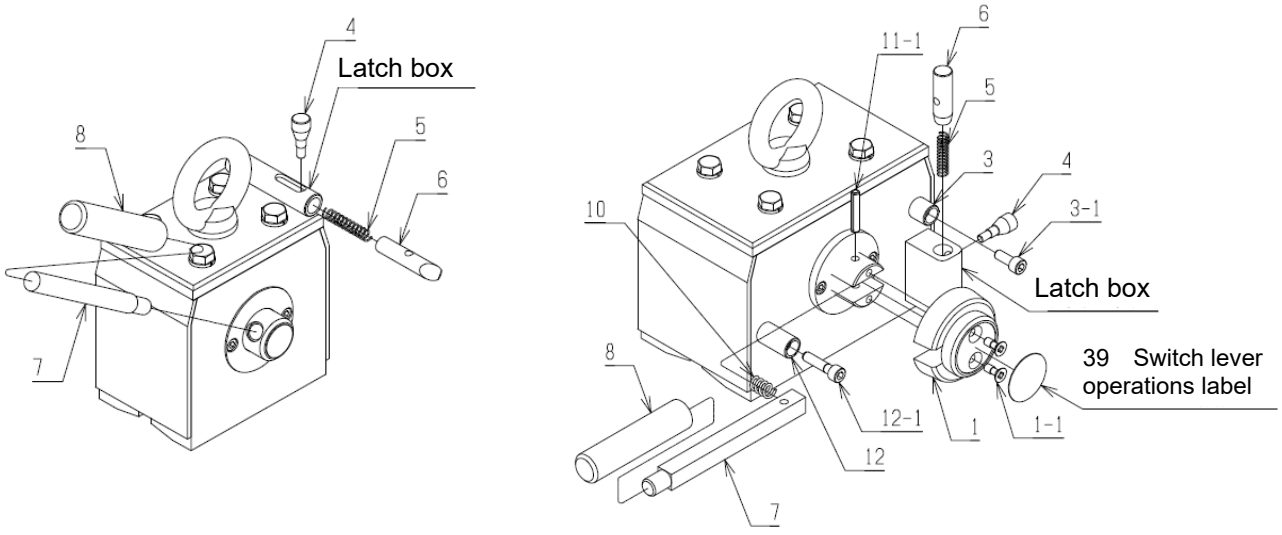
- The parts that can be replaced by the customer are as follows.
- For replacement of the switch cover or the switch lever, a new “Switch Lever Operations” label (refer to page 3) will be required. (KRD30 to KRD160)

Table 12-1 List of replacement parts (KRD8, KRD16)

No.	Part name	No.	Part name
4	Latch finger holder	7	Switch lever
5	Latch spring	8	Switch lever grip
6	Latch shaft		

Table 12-2 List of replacement parts (KRD30, KRD50, KRD80, KRD100, KRD160)

No.	Part name	No.	Part name
1	Switch cover	7	Switch lever
1-1	Switch cover mounting screw	8	Switch lever grip
3	ON stopper	10	Switch lever spring
3-1	Socket bolt	11-1	Shaft pin
4	Latch finger holder	12	OFF stopper
5	Latch spring	12-1	Socket bolt
6	Latch shaft	39	Switch lever operations label



KRD8, KRD16 KRD30, KRD50, KRD80, KRD100, KRD160

Figure 12-1 Replacement parts

12-2 Disassembly/reassembly tools

- Prior to replacement operations, prepare the tools shown in Table 12-3.

Table 12-3 Tools to be prepared

No.	Tool name	Purpose	Application		
			KRD8 KRD16	KRD30 KRD50	KRD80 KRD100 KRD160
1	Phillips screwdriver for M5 and M6	For mounting/detaching switch cover mounting screw	–	○	○
2	Allen wrench for M6	For fixing stopper For mounting/detaching socket bolt	–	○	–
3	Allen wrench for M8	For fixing stopper For mounting/detaching socket bolt	–	–	○
4	Pliers	For mounting/detaching shaft pin	–	○	○
5	Hammer	For mounting/detaching shaft pin	–	○	○
6	Round steel bar Φ4.5 x length approx. 50mm	For detaching shaft pin	–	○	○
7	Square steel bar ☐10 x 10 x length approx. 200mm Or round steel bar Φ10 x length approx. 200mm	For aligning with the shaft pin hole	–	○	○
8	Screw-locking adhesive Loctite 242 or equivalent	For locking screws and bolts	○	○	○
9	General-purpose grease	For lubricating latch spring and latch shaft	○	○	○

12-3 Parts replacement

- Perform parts replacement operations with reference to Figure 12-1.
- Be sure to perform inspection and operation check after parts replacement.
- Apply the screw-locking adhesive to the screws, socket bolts and screw parts.

● In case of KRD8 and KRD16

(1) Switch lever

1) Detaching
   - Set the switch lever to OFF.
   - Loosen the mounting screw for the switch lever joint shaft, and remove the switch lever.
2) Mounting
   - Tighten the switch lever to the tap hole of the shaft.
3) Inspection
   - The switch lever shall be smoothly operable.

(2) Latch

1) Disassembly
   - Set the switch lever to OFF.
   - Loosen the latch finger holder and detach it from the latch shaft.
   - Remove the latch shaft and the latch spring.
2) Reassembly
   - Apply general-purpose grease to the latch spring and latch shaft.

   <Operational considerations>

   ◆ General-purpose grease shall not enter the tap hole of the latch shaft.
   - Insert the latch spring, and then the latch shaft, into the hole on the top surface of the latch box.
   - Align the tap hole of the latch shaft with the long hole on the latch box.
   - Tighten the latch finger holder to the tap hole of the latch shaft.
3) Inspection
   - The latch shaft shall move smoothly.
   - The latch shaft shall return naturally by the latch spring force.
   - When the switch lever is ON on a steel sheet of thickness 25mm or more, the locking operation by the latch shall be smooth.

- In case of KRD30, KRD50, KRD80, KRD100, and KRD160

(1) Switch cover
  1) Detaching
    - Set the switch lever to OFF.
    - Peel off the “Switch Lever Operations” label.
    - Loosen the switch cover mounting screw and detach the switch cover.
  2) Mounting
    - Align the hole of the switch cover with the tap hole of the shaft end, and fix with switch cover mounting screw.
    - Affix a new “Switch Lever Operations” label.

(2) Switch lever
  1) Detaching
    - Set the switch lever to OFF.
    - Peel off the “Switch Lever Operations” label.
    - Loosen the switch cover mounting screw and detach the switch cover.
    - Use a round steel bar of Φ4.5 x length approx. 50mm to remove the shaft pin and detach the switch lever.

    <Operational Considerations>
    ◆ In this situation, the switch lever spring may fly out; take care not to lose it.
  2) Mounting
    - Assemble the switch lever spring into the spot facing of the hole opening side of the switch lever.
    - With the switch lever spring on the shaft side, assemble the switch lever into the concave groove of the shaft end.
    - Align the hole of the switch lever with the hole of the shaft end, and insert the shaft pin (be sure to use a new pin).

    <Operational Considerations>
    ◆ For hole alignment, hitch the square □10 x 10 x length approx. 200mm or round Φ10 x length approx. 200mm steel bar on the latch shaft, perform the alignment while pressing the switch lever, and then insert the shaft pin as shown in Figure 12-2.
    ◆ In such a case, pay attention to the fly-out of the switch lever spring.
    - Mount the switch cover. (Refer to (1) Switch cover, 2) Mounting.)

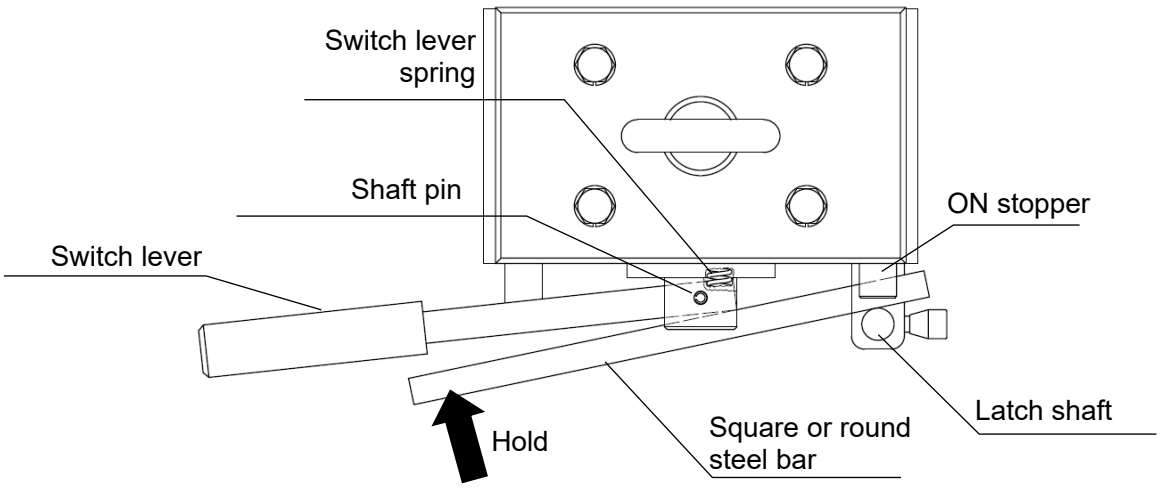


Figure 12-2 Striking the shaft pin

3) Inspection
- When the switch lever is moved back and forth at its OFF position, it shall return to the main body side by the switch lever spring force.
- When the lifting magnet is placed on a steel sheet of thickness 25mm or more, the switch lever shall be smoothly operable.
- When the lifting magnet is placed on a steel sheet of thickness 25mm or more and the switch lever is rotated to the ON position, the locking operation by latch shaft shall be smooth.

(3) Latch
1) Disassembly
- Set the switch lever to OFF.
- Loosen the latch finger holder and detach it from the latch shaft.
- Remove the latch shaft and the latch spring by pulling upward.

2) Reassembly
- Apply general-purpose grease to the latch spring and latch shaft.

<Operational considerations>
◆ General-purpose grease shall not enter the tap hole of the latch shaft.
- Insert the latch spring, and then the latch shaft, into the hole on the top surface of the latch box.
- Align the tap hole of the latch shaft with the long hole on the latch box side surface.
- Tighten the latch finger holder to the tap hole of the latch shaft.

3) Inspection
- The latch shaft shall move smoothly.
- The latch shaft shall return naturally by the latch spring force.
- When the switch lever is ON on a steel sheet of thickness 25mm or more, the locking operation by the latch shall be smooth.

(4) ON stopper
1) Detaching
- Set the switch lever to OFF.
- Loosen the socket bolt for fixing the ON stopper and detach it.

2) Mounting
- Set the switch lever to OFF.
- Pass the socket bolt for fixing the ON stopper through the ON stopper, and tighten it into the main body tap hole.

(5) OFF stopper
1) Detaching
- Set the switch lever to OFF.
- Loosen the socket bolt for fixing the OFF stopper and detach it.

2) Mounting
- Set the switch lever to OFF.
- Pass the socket bolt for fixing the OFF stopper through the OFF stopper, and tighten it into the main body tap hole.

12. Disposal Method

When disposing of the lifting magnet at the end of its useful life, disassemble it so that it cannot be reused, in order to prevent any accidents.
Perform the disassembly through the following steps:

1. Set the switch lever to OFF.
2. Detach the switch cover and the switch lever so that the lifting magnet cannot be operated. (For the steps, refer to the previous section 12-3.)
3. Contact professional disposal companies to handle the lifting magnet main body and the disassembled parts.

⚠ DANGER

- Pay adequate attention during the disassembly process to avoid injury. In particular, never attempt to detach the magnet embedded inside the lifting magnet main body. The magnetic force of the magnet is very strong and may cause unexpected and serious injury or other damage.

13. Quality Warranty

Thank you for purchasing KITO's product.
The product is assured of its quality according to the following regulations.

1. Scope of Warranty
   Should there be any trouble, damage, etc. due to design, manufacture and material defects despite the use of the product according to the instructions in the Owner's Manual and on the warning labels during a warranty period, the product will be repaired free from charge.

2. Warranty Period
   The warranty period shall be one year from the delivery date of the product.

3. Cases Not Covered by Warranty
   In the following cases, the product is not covered by the warranty even during the warranty period and may be charged for repair.
   (1) When the product is used in an environment beyond the product specifications.
   (When it is exposed to an external factor such as soot and smoke, chemicals and salt damage or in a special environment)
   (2) When the product is not given maintenance and inspection specified in the Owner's Manual, etc. and maintenance after use.
   (3) Troubles attributable to improper maintenance/servicing or mishandling.
   (4) When the product or its accessory is remodeled.
   (5) When an original component part is not used.
   (6) When the product is used contrary to the instructions in the Owner's Manual.
   (7) Damage attributable to natural disasters such as an earthquake, typhoon and flood, accidents and fires.
   (8) Operational failures attributable to normal wear and tear or aging.

The warranty does not cover secondary damage such as suspended production due to the trouble of the product. When such a situation is predicted, prepare an alternative machine, etc.

4. Request for Repair
   When you want to have the product repaired, check its serial number and contact our dealer with the Owner's Manual at hand.

5. Application of Warranty
   The Warranty is effective only in the region/country where the product was purchased.

"The product is intended for use in the region or country where it was purchased. It is not usable elsewhere because its specifications and Owner's Manual do not comply with the standards, etc. of other region or country."

KITO

Global Website: kito.com