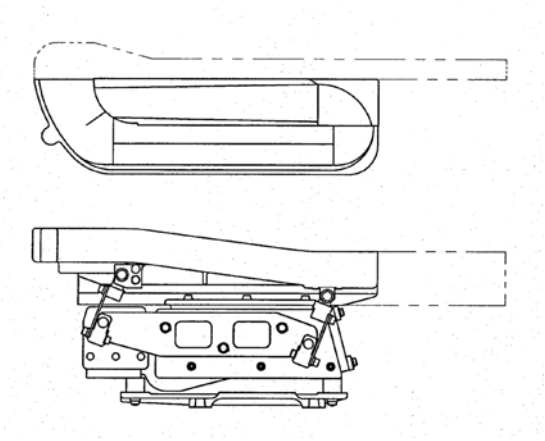
No. PMPH022E-c

NTN

INSTRUCTION MANUAL

Before use
Read this Instruction Manual thoroughly, and operate the machine correctly.



NTN Mono-Drive 2-Way Feeder

Type MD10･B(C)／MD20･B(C)
／MD30･B(C)

Introduction

Thank you for your purchase of the NTN mono-drive 2-way feeder.
For correct operation of the NTN mono-drive 2-way feeder, read this Instruction Manual carefully before use, and ensure execution of safe work through correct operation.
Be sure to deliver this Instruction Manual to the end user. The end user is further requested to store the Instruction Manual carefully in a ready-to-take out place to facilitate ready reference at any time after reading.

1. Before Use

- ☐ **When the machine is delivered, check for damage during transport and missing parts. If any trouble is found, inform the sales office nearby.**
- ☐ **When packaging of the machine and holding fixture for transport are attached to the body, be sure to remove them before use.**
- ☐ **Be sure to use NTN controller for this machine.**
  Otherwise, specified performance of the machine may not be obtained.

CONTENTS

Introduction ····· 1
1. Before Use ····· 1
2. Precaution for Safety ····· 2
3. Operating Principle ····· 4
4. Names of Main Component Parts ·· 4
5. Dimensional Drawing ····· 5
6. Transportation and Installation ···· 8
7. Wiring and Operating Methods ···· 9
8. Inspection and Adjustment ····· 10
9. Fitting Work of Attachment ····· 15
10. Troubleshooting ····· 16
11. Specifications ····· 17

2. Precaution for Safety

This machine is designed and manufactured for parts feeding equipment based on a concept of trouble-free operation and labor saving, while responsibility on user oneself is also important for safety. Read this manual carefully before starting use, and be sure to follow the description below on safety. Also be sure to follow the warning and caution label attached to the body.

WARNING	Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.
CAUTION	Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury or property damage only.

WARNING	
	The most dangerous position of the machine is electric equipment. Be sure to connect a grounding wire. Incompliance may result in electric shock.
	Do avoid use in the atmosphere of explosive gas or flammable gas, or in a wet place. Explosion or fire hazard may be caused.
CAUTION	
	Do not use the machine in a place exposed to splash of water, outdoors, or in a place of extremely low temperature or high temperature and high humidity. (See the next page for environmental condition in use.)
	• This machine is a heavy material. (See the specification in item 11 for the mass.) In transporting the machine, wear safety shoes, watch out for dropping, and take due care. • Fix the machine securely after installation.
	• Do not conduct the installation and assembly work with bare hands. • As for a chute equipped with array mechanism, pay attention to the sharp edge and do not touch with bare hand. Be sure to wear gloves.
	Do not use the machine on a base lacking in sufficient strength or in an unstable place. The specified performance of the machine may not be observed.
	Do not place the body in inclination. The specified performance of the machine may not be observed.
	Please do not scratch, pull or forcibly bend the wiring. Moreover, when a heavy thing is put on it, or it is pinched, the wiring will damage. It causes a fire or an electric shock.
	When welding the machine to a chute, be sure to connect the grounding clip of welder to the chute. If welding ground is insecure, the grounding wire connecting the body and the controller may be burnt, resulting in electric shock or leakage.

☐ For proper use

[1] NTN mono-drive 2-way feeder is a vibrating machine with a mechanism to align specified parts in a certain direction mounted on a chute to feed parts in bulk state to a specified position in alignment and regular series. Do not use the machine for other purposes such as equipment for material test and sieve.

[2] Use the NTN mono-drive 2-way feeder in conformance to instructions in this operation manual and packaged manual. See the specification in item 11 for technical specification.

[3] **This Instruction Manual is for the body with part number design change code B and C of NTN mono-drive 2-way feeder**, and is not applicable to the body without design change code and with design change code A of conventional machine.

[4] Be sure to use NTN controller for NTN mono-drive 2-way feeder. Also, use a controller and power supply compatible with this machine.

[5] Generated noise level depends on the specification of this machine, material of parts to be fed, etc. When noise level is above acceptable limit, take a noise insulation measure with noise insulation cover, etc.

(Note 1) Do not use the machine when it is not in complete condition (abnormal noise, abnormal vibration, chipped parts, etc).

(Note 2) When a chute is equipped with array mechanism for specified parts to be fed, only such specified parts can be fed.

(Note 3) Environmental condition in use

Ambient working temperature	0 to 40°C
Ambient working humidity	30 to 90% (Free from condensation)
Working altitude	Below 1,000 m
Storage temperature in transport	–10 to 50°C
Atmosphere of use place	Not exposed to water, chemical, etc. Free from combustible gas and corrosive gas. Use only indoors.

☐ What should be observed by users

[1] Follow the instructions in this operation manual and other manuals in any work such as operation, maintenance, and repair.

[2] Avoid such use that may deteriorate the safety of NTN mono-drive 2-way feeder. When any sign of change is found which may harm safety, inform NTN of details.

(Note) NTN mono-drive 2-way feeder must be installed, operated, maintained, and repaired by a special expert. Further, make sure that only authorized personnel are in charge of operation.

3. Operating Principle

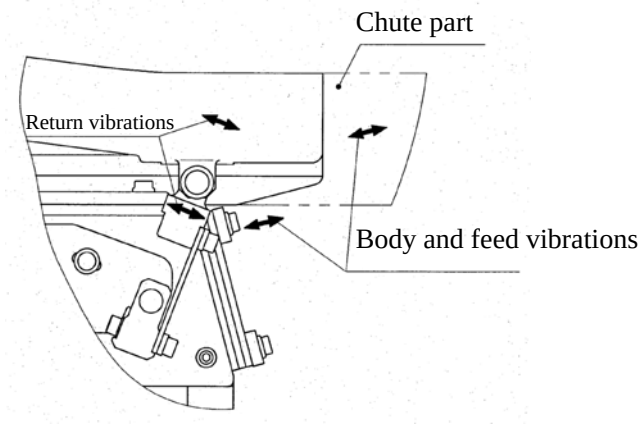
NTN mono-drive 2-way feeder is a return type alignment feeder enabled to store, align and feed parts by means of the alignment and feed side chute vibrated by the drive source of the feeder body and the return trough vibrating in the direction opposite.

(1) Vibrations of feeder body

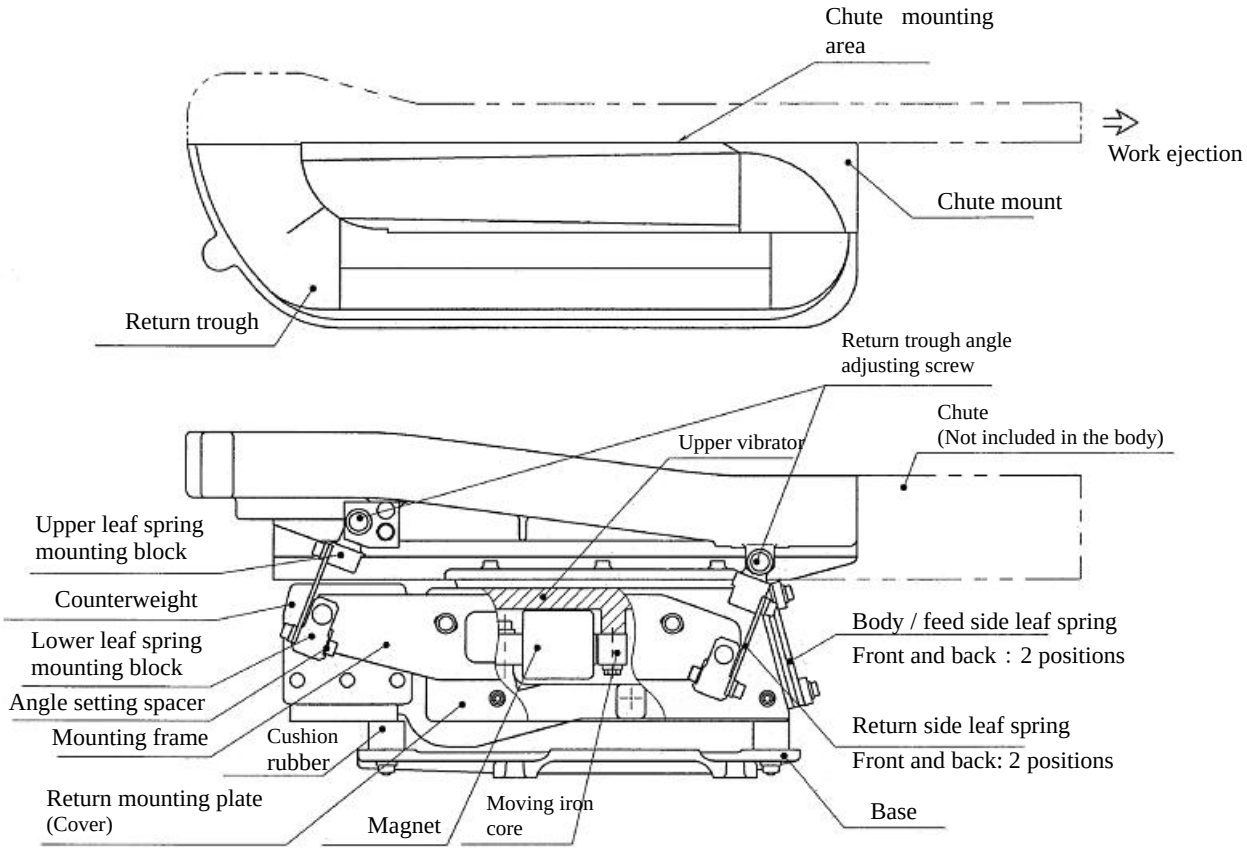
The alignment and feed side chute installed on the upper vibrator is connected to the lower vibrator by the leaf spring provided at a certain angle and they are vibrated with a magnet, so that works on the chute are thrown upward aslant, resulting in little-by-little advancement of the works. As for vibration, large vibration can be produced with small vibrating force by means of setting the strength of body leaf spring properly corresponding to the installed chute mass and resonating by setting the absorption frequency of magnet.

(2) Vibrations of return trough

Leaf spring unit for return is installed on the lower vibrator of the feeder body (1) above mentioned, works can be advanced little by little to the opposite direction by using vibration of the feeder body and transmitting vibration of the different direction from that of aligning and feeding side.



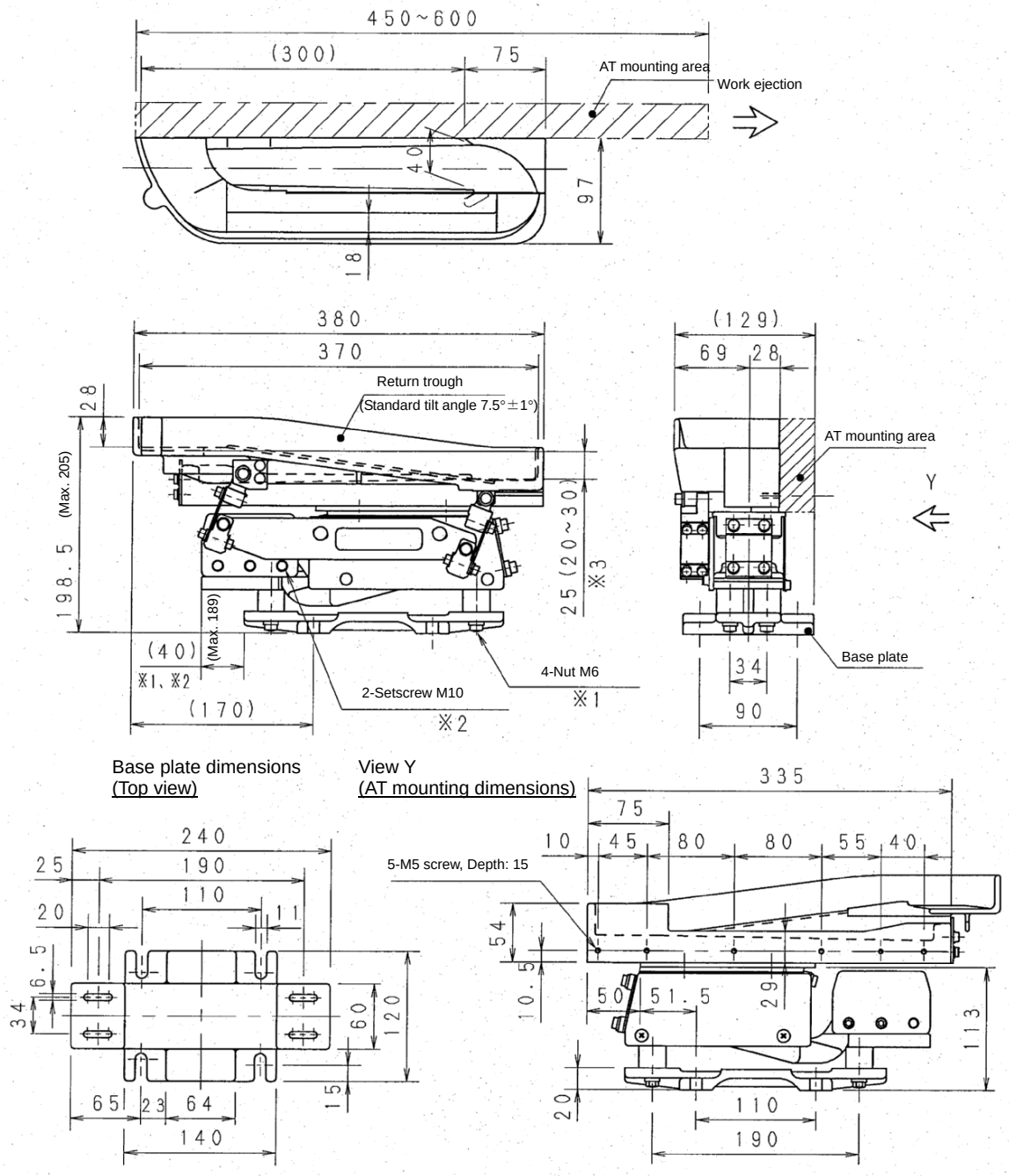
4. Names of Main Component Parts



For detailed dimensions of the linear feeder body, refer to the linear feeder specifications and dimensions described in XI/J and subsequent paragraphs in the Parts Feeder General Catalog: CAT. No. 7018.

5. Dimensional Drawing

K-MD10$^{R}_{L}$B$^{1}_{2}$（With base plate）、K-MD10$^{R}_{L}$C$^{1}_{2}$（Without base plate）

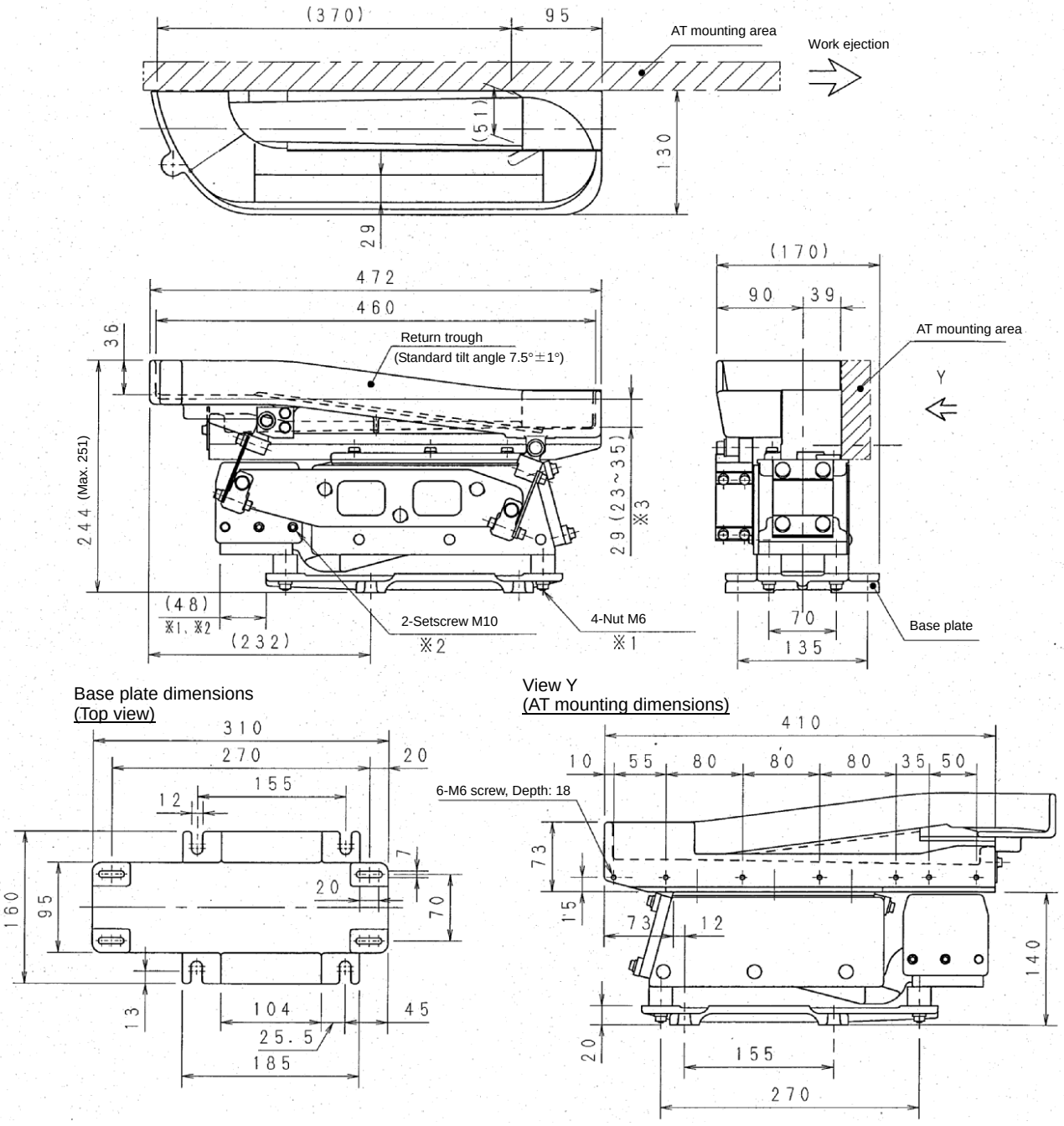


*1: When four M6 nuts are loosened, the base plate position can be changed up to 10 mm each in the forward and backward directions.
*2: When two M10 setscrews are loosened, the counterweight can be moved forward up to 15 mm from the position shown in the ejection direction and up to 35 mm backward.
*3: Height dimension is that of return trough of standard tilt angle 7.5^{0}. Dimension in parenthesis is alterable minimum/maximum dimension in the tilt angle adjustment range.

(Note 1) As for a type without base plate refer to the base plate dimension drawing in installation.

(Note 2) When manufacturing a chute, observe the acceptable dimension in the drawing and the mass described in item 11 Specification. Make a chute as light as possible to the extent in which its rigidity is not weakened.

K-MD20 $^{R}_{L}$ B$_{2}^{1}$（With base plate）、K-MD20 $^{R}_{L}$ C$_{2}^{1}$（Without base plate）

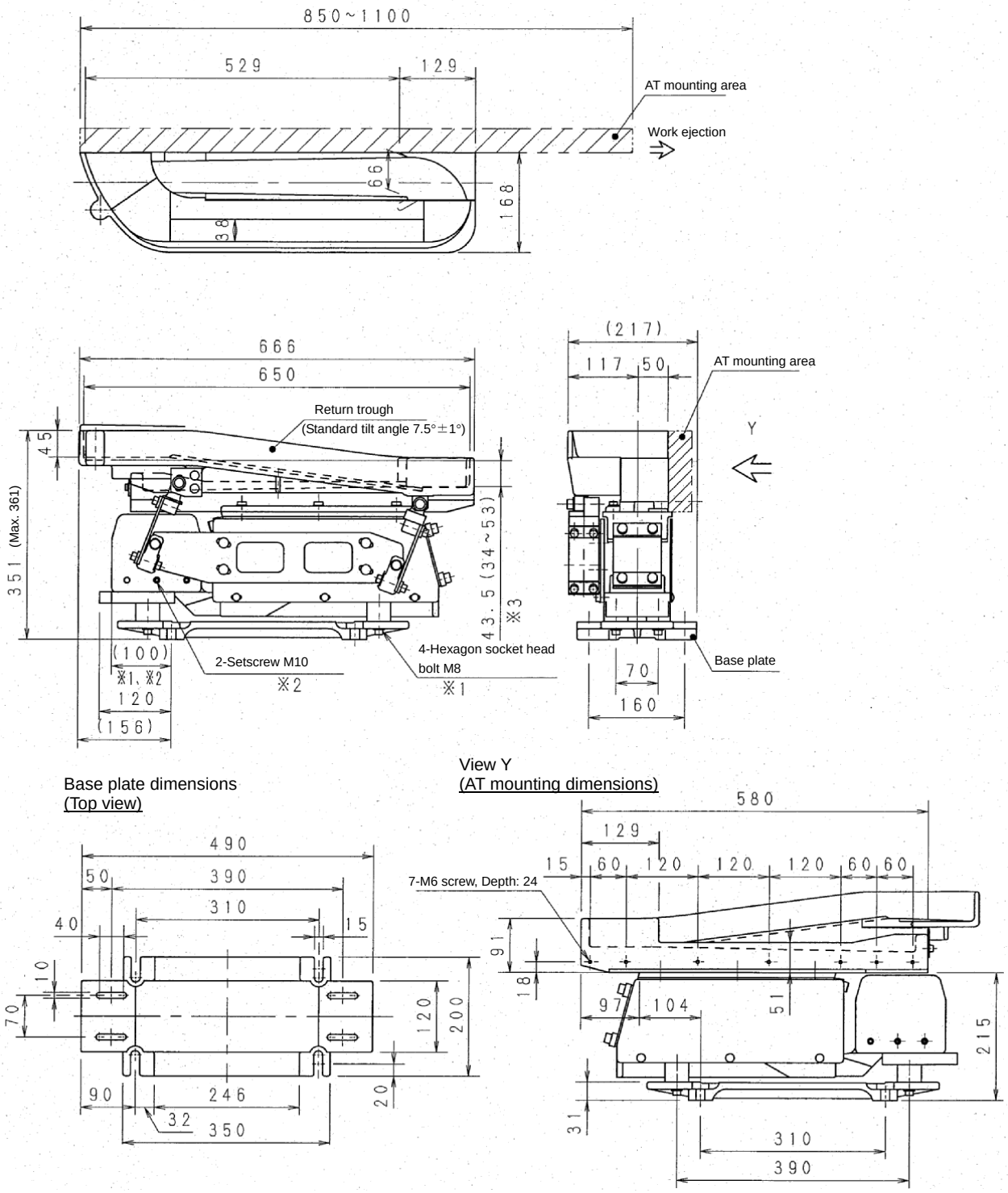


*1: When four M6 nuts are loosened, the base plate position can be changed up to 10 mm each in the forward and backward directions.

*2: When two M10 setscrews are loosened, the counterweight can be moved forward up to 10 mm from the position shown in the ejection direction and up to 35 mm backward.

*3: Height dimension is that of return trough of standard tilt angle 7.5^{0}. Dimension in parenthesis is alterable minimum/maximum dimension in the tilt angle adjustment range.

K-MD30 $^{R}_{L}$ B4（With base plate）、K-MD30 $^{R}_{L}$ C4（Without base plate）



*1: When four M6 nuts are loosened, the base plate position can be changed up to 10 mm each in the forward and backward directions.

*2: When two M10 setscrews are loosened, the counterweight can be moved forward up to 10 mm from the position shown in the ejection direction and up to 65 mm backward.

*3: Height dimension is that of return trough of standard tilt angle 7.5^{0}. Dimension in parenthesis is alterable minimum/maximum dimension in the tilt angle adjustment range.

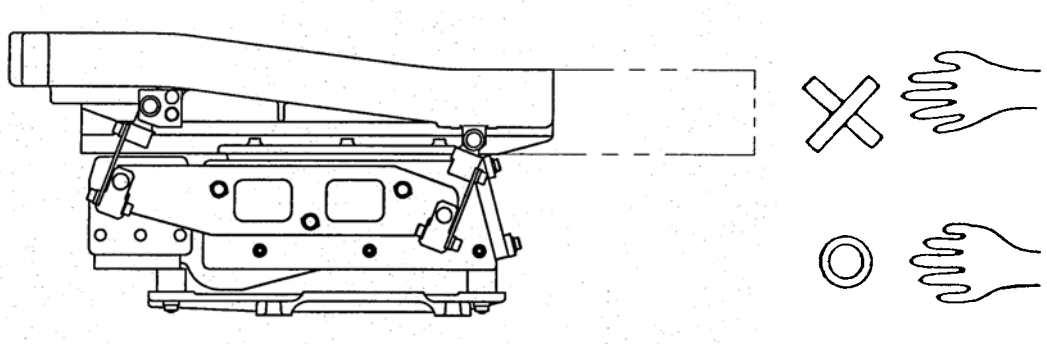
6. Transportation and Installation

⚠ CAUTION

The body is a heavy material. Transport the body carefully with care not to cause drop.

(1) Transportation

Be sure to transport the body while holding the base or the mount. If the chute or the return trough is held for transportation, the chute may be deformed or the trough position may deviate.



☐ Note in transporting

This machine is a heavy material. Watch out for dropping in transporting and be cautious enough. Especially, MD20 and MD30 must not be carried by single person. They must be carried carefully by more than one personnel or by use of lifting apparatus or hoisting attachment with sufficient lifting capacity.

* Refer to item 11 Specification for the mass of the body (adding the mass of chute if attached).

(2) Installation

Fix the base firmly with the fixing bolts (fix cushion rubber screw part for the type without base) on the place (such as a bench) with sufficient strength. Little vibration will be felt when the base is touched in operation, if the machine is installed properly.

☐ Caution for installation

[1] Be sure to wear safety gloves to prevent the sharp edges of the chute and others from touching bare hand.

[2] Do not operate the machine on a base with insufficient strength or in an unstable place.

[3] Do not allow the vibrating part of the machine (except the base) to be in contact with some other things in fixing.

[4] When the machine is inclined in installation, specified capability cannot be obtained. Be sure to level the machine.

[5] When perform welding work or grinding work nearby the feeder body, protect the feeder body all over with a protective cover. Incompliance may deteriorate the performance because iron powder etc. jumps into the machine.

[6] The structure is designed so that clearance is provided between chute mount and return trough. When such as oil and dust drops through the clearance, provide oil drain / dust exhaust (oil pan) system additionally for use.

7. Wiring and Operating Methods

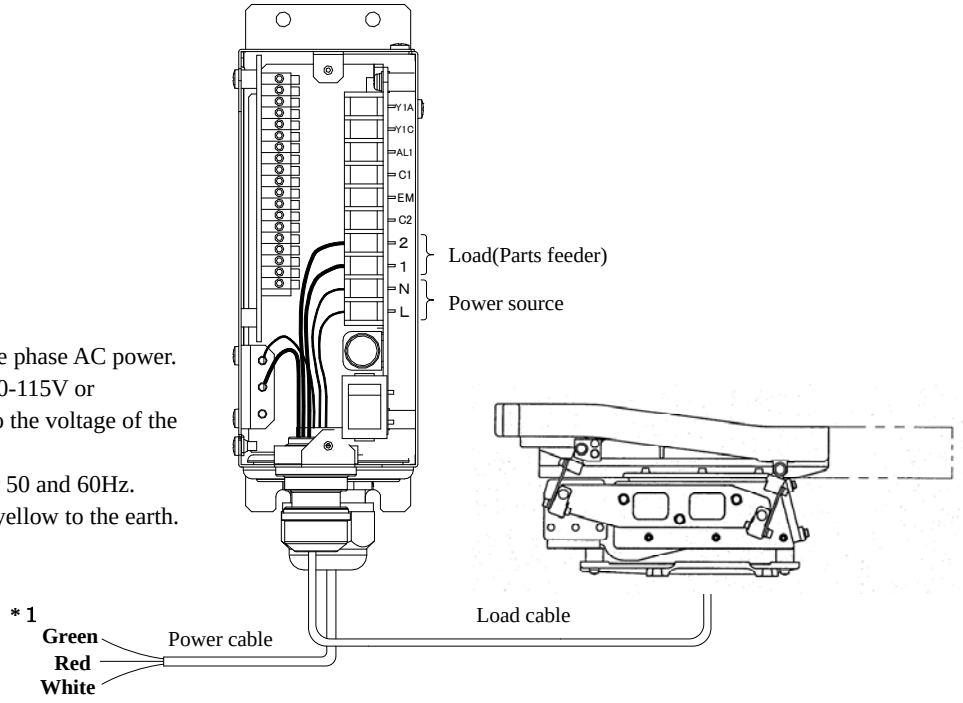
⚠ WARNING

Ensure that the supply voltage is as shown on the machine nameplate (seal bearing the type, power supply and manufacturer's serial No.) of the vibrator body. Be sure to connect the grounding wire of the power source.

⚠ CAUTION

When setting F-V curve and other data for a controller of variable frequency controllers, make settings conform to the specification and power conditions of the body. Wrong setting may result in accidents such as burning of the magnet. For setting for controllers, refer to the Controller Operation Manual.

Controller (K-ECF25 as example)



・It is connected to the single phase AC power. Please connect it to AC100-115V or AC200-230V according to the voltage of the main vibration body.
・ The frequency is both for 50 and 60Hz.
・ Connect green or green/ yellow to the earth.

***1 Power cable to the single-phase AC power source (feeder body specified voltage). In the case of three-phase power source, use two phases out of three. Do not use the remaining one phase.**

(1) Remove transportation fixtures (Red tag) fixing the feeder body and the chute as well as transportation members, if attached.
(2) Connect power supply. (See the operation manual of the controller for connection in detail.)
(3) Turn the speed adjusting knob of the controller counterclockwise to set the graduation at "0". (Make sure that the feeder body is free and in no contact with something around.)
(4) Turn on the power switch of the controller. (Confirm lighting of LED on the operation panel.)
(5) Turn the speed adjusting knob of the controller slowly clockwise to set the graduation at a workpiece speed that matches with supply capacity. Operate this machine under the maximum acceptable amplitude of leaf spring in the item 8 in order to prevent breakage of leaf spring.

(Note 1) When the machine is incorporated to some apparatus, do not open or close the primary side of the controller but use external control input terminal in turning on and off.

(Note 2) Power connecting work must be performed by personnel in charge of electric engineering. When modifying or changing connection, see the operation manual of controller.

(Note 3) When a chute that matches with the shape of specified parts is installed, and indication mark is found around the controller speed adjusting knob, set the adjusting knob at corresponding position in use.

(Note 4) When you extend the load wire of the machine, use a wire of size above 2.5 mm^2 below 10 m. Also conduct the protective continuity test and make sure that the wire is grounded appropriately.

(Note 5) See the operation manual of controller in use.

8. Inspection and Adjustment

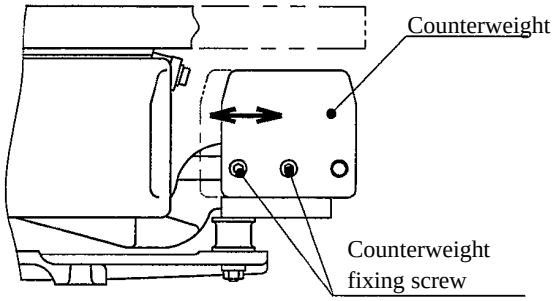
(1) Adjustment of counterweight

⚠ CAUTION

If the counterweight should move beyond the specified movable range, the setscrew may loosen, resulting in dislocation of the counterweight from the mounting area, followed by falling.

If irregular parts transportation speeds should occur between the front and rear areas on the feed and alignment side chute, move the counterweight in the forward or backward direction to adjust the speeds.

(Note) Tighten the counterweight fixing screw securely. Also make sure that the fixing position of the counterweight is within the moving range shown in item 5 (Dimension of *2).



(2) Inspection and adjustment of leaf spring of the body

[1] Acceptable maximum amplitude of leaf spring

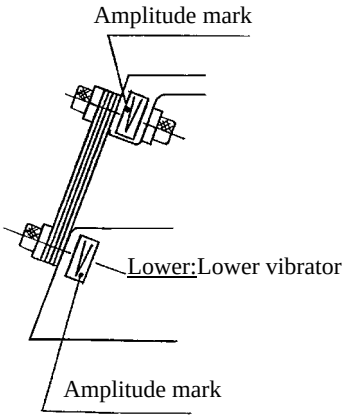
Operate the machine with the amplitude below that shown in the following table in order to prevent breakage of leaf spring.

If the machine is used with greater amplitude, the leaf spring may be broken earlier. For measuring amplitude, stick the attached amplitude mark as a figure shown below and totalize readings of upper and lower amplitude marks of leaf springs of body/feed side and return side without fail.

Model/ Size	Leaf spring part	Leaf spring product number	Amplitude mm (Upper + Lower)
MD10	Body / feeder side	K-PLS4-40 × 6	0.7
	Return side	K-PLS4-41×7	0.8
MD20	Body / feeder side	K-PLS4-70 × 12	1.4
	Return side	K-PLS4-62×12	1.3
MD30	Body / feeder side	K-PLS4-86 × 15	1.8
	Return side	K-PLS4-100×20	2.0

(Note) When NTN specifies a recommended speed, set the speed adjusting knob of controller at a corresponding recommended graduation.

Upper：Upper vibrator and Return trough



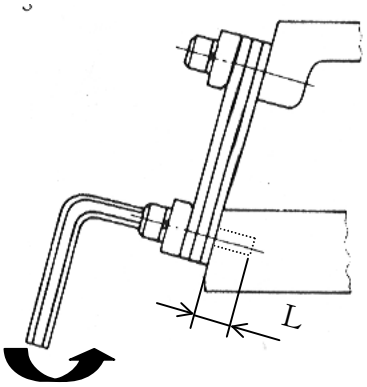
[2] Caution in attaching and detaching leaf spring

When attaching and detaching the leaf spring, be sure to complete one unit before moving to the next unit. Do not loosen all the units at the same time.

a) Set the fitting depth of bolts (dimension L includes the depth on upper vibrator side) 1.5 times of the screw diameter, and change the bolt length when the leaf spring increases or decreases.

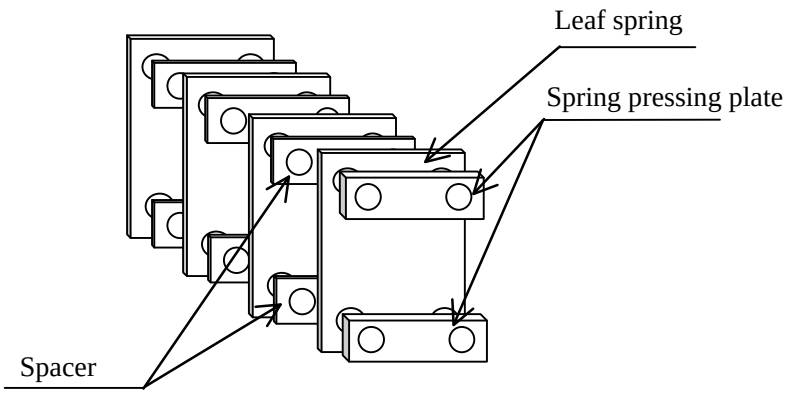
* Tighten the bolt securely, using the table below for guide of tightening torque.

Model/ Size	Used bolt	Tightening torque
MD10 MD20	Hexagon socket head bolt M6 (Strength classification 10.9 or above)	Approx 14.7 N·m (150 kg f·cm)
MD30	Hexagon socket head bolt M10 (Strength classification 10.9 or above)	Approx 68.6 N·m (700 kg f·cm)



b) Apply grease or rust preventive oil between leaf springs (between leaf spring and spacer) in assembling.

MD10 MD20 MD30



(Note) Do not sandwich dust, chip, etc. between the leaf springs.

[3] Retightening

Check the leaf spring tap bolt and retighten it after actual operating time of about 40 hours.

(When the tightening is normal, there is hardly the additional tightening allowance. But, consider this requirement as retightening of comfortable fitting of the leaf spring.)

[4] Correction of fatigue

When the machine is operated with the speed adjusting volume set to the MAX. position at all times, add 1 or 2 pieces of leaf springs to a leaf spring unit in either one place.

(When the machine is operated 40 - 100 hours, the spring constant of leaf spring itself is deteriorated by repeated stress by vibration, which slightly reduces the amplitude, although the leaf spring mounting bolt is jointed normally.)

[5] Replacement of leaf spring

100% replacement of leaf springs is recommended with the guideline of 1-year operation on the basis of 8 hours a day.

If amplitude cannot be recovered after correction of set in fatigue described in [4] above, we recommend that you replace all leaf springs, considering that the end of the life of the leaf spring has been reached.

(Note) When a leaf spring is needed newly, purchase one referring to the leaf spring product number in item 11 "Specifications".

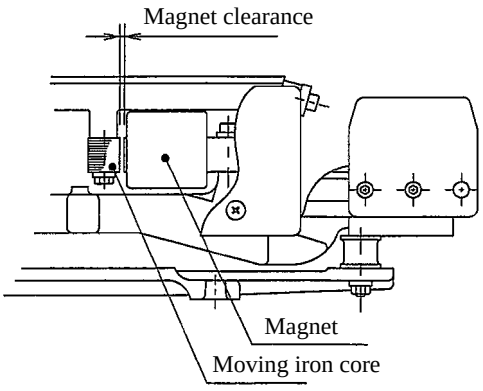
(3) Check and adjustment of magnet clearance

Clearance between the magnet and moving iron core is set to those described in the table below in shipment of the machine from NTN. It is recommended to make it as small as possible to the extent where they are not in contact in the maximum amplitude, therefore check it from time to time and maintain an appropriate value.

<Adjusting procedure>

[1] Remove the cover. (Allowed only on single side)
[2] Loosen the moving iron core tightening bolt.
[3] Insert a clearance gauge of the specified dimensions for each body (shown in the follwing table) into the magnet clearance, push the moving iron core toward the magnet side, and temporarily tighten the moving iron core locking bolt.
[4] Tighten the moving iron core locking bolt. At that time, take care so that the moving iron core position set in the Step [3] may not deviate.
[5] Pull out the clearance gauge. Check the parallelism to and clearance in the magnet.
[6] Fit the cover.

Model/Drive system	Magnet clearance (mm)	
	In shipment	Maximum
MD10 (Full wave)	1.0	
MD20 (Full wave)	1.0	
MD30 (Half wave)	2.0	



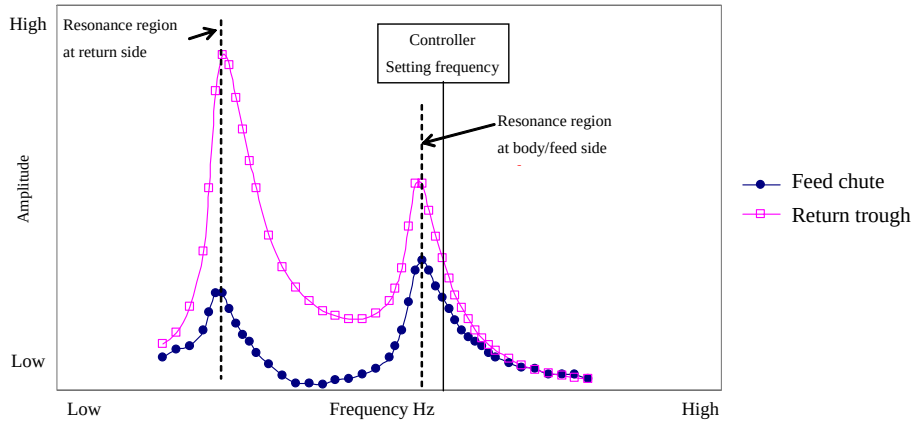
⚠ CAUTION

When the magnet clearance is set more than 20% exceeding the maximum value above in use, the magnet may be burnt. Check the magnet clearance from time to time and maintain an appropriate value.

(4) Adjustment of vibration feeder frequency（Product for construction makers）

The controller applicable to NTN mono-drive 2-way feeder is a variable frequency controller. Adjustment of number of leaf springs at the body / feed side is unnecessary for power supply frequency change in the area used. But adjustment of number of leaf springs as the body / feed side according to installed chute mass and transportation condition is required. Make adjustment referring to the following.

Vibration characteristic graph



［1］ This machine is equipped with vibration characteristic shown in above graph and has two resonance regions at the body / feed side and return side. When operating, conform the setting frequency of controller to the resonance region at the body / feed side (higher side). Stable vibration is obtainable when setting frequency is set a little higher (1~3Hz) than resonance point and speed adjustment knob of controller is set to proper position.

［2］ This machine is equipped with frequency by which stable transportation is possible. Adjust number of leaf springs for the body / feed side according to installed chute mass.

a. Installed chute mass (Target)

Installed chute mass	Number of body leaf springs		Operational driving frequency
	MD10、MD30	MD20	
Heavy	Front & back: 5 each (Total 10)	Front & back: 7 each (Total 14)	MD10、MD20…85～110Hz MD30…60～66Hz
Light	Front & back: 3 each (Total 6)	Front & back: 5 each (Total 10)	

(Note) Adjustment of number of springs for return trough side is unnecessary.

b. Transportation condition of return trough

Installed chute mass	Number of body leaf springs	Remarks
When transportation is slow	Reduce number	When works at feed side snake their ways or dance widely, reduction of number is too much.
When transportation is too fast	Increase number	

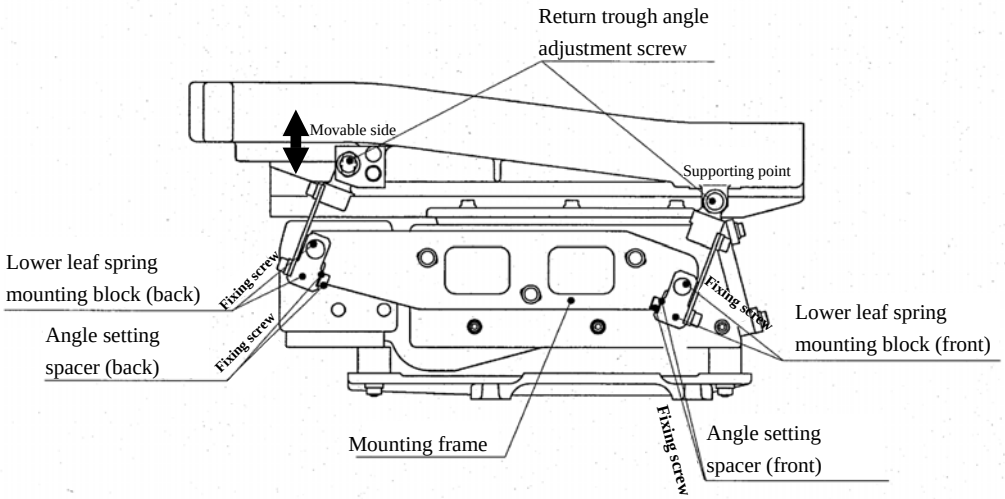
(Note) Range for increase and reduction of number of body leaf springs is about 1 to 4.

[3] When amount of amplitude changes during operation and it is not possible to adjust with the speed control knob of controller, adjust the frequency referring to above [1], [2] and Instruction Manual for the controller.

(5) Angle adjustment of return trough

Tilt angle of return trough is adjustable within the range of ±1° with reference to 7.5°.

For angle adjustment, loosen front and back return trough adjustment screws at supporting point side and movable side, and change within slide range of elongate hole at movable side. Then adjust the trough position so that works flow smoothly, and fix firmly.



(6)Adjustment of leaf spring mounting angle for return trough

For leaf spring of return trough, the angle is adjustable in three kinds (17°, 21°[Initial value], 25°) corresponding to climbing condition of transportation parts. When adjustment is required, follow to the following procedure.

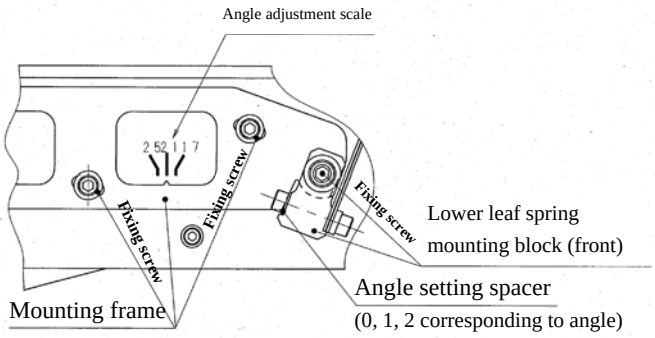
① Loosen return trough angle adjustment screws of supporting point side and movable side (don't dismount).

② Loosen fixing screws of lower leaf spring mounting block at front and back.

③ Loosen fixing screws of mounting frame (MD10: 2 locations, MD20: 3 locations, MD30: 5 locations).

④ Loosen fixing screw of angle setting spacer and dismount the spacer.

⑤ Slide angle adjustment scale of mounting frame to conform to value of mounting angle and tighten fixing screws of mounting frame to fix.



⑥ Mount number of angle setting spacers of lower leaf spring mounting blocks at front and back in the following table corresponding to mounting angle.

Angle / Lower leaf spring mounting block	17°	21°	25°
Font side (Return upper stream side)	Spacer：2 pieces	Spacer：1 piece	Spacer：Nil
Back side (Return downstream side)	Spacer：Nil	Spacer：1 piece	Spacer：2 pieces

⑦Touch lower leaf spring mounting blocks of front and back to the end face (circular arc face and wall surface of angle setting spacer side) of mounting frame and tighten fixing screws to fix.

⑧Adjust angle and position of return trough and fix with return trough angle adjustment screws of front and back.

（Note）Leaf spring for return is easy to bend, therefore tighten up not to be bent.

(7) Inspection and adjustment of leaf springs for return trough

[1] The return trough leaf springs are shipped from NTN after assembly in appropriate number of pieces. Adjustment of number of the leaf springs required for the feeder body leaf springs is not required as a rule.

[2] Relating to change of leaf springs, 100% change of leaf springs is recommended on the yardstick of 1-year operation on the basis of 8-hour operation a day, same as operation of the feeder body. Where new leaf springs are required, purchase them while referring to the leaf part No. described in the "Leaf spring Part No." column in item 11 "Specifications".

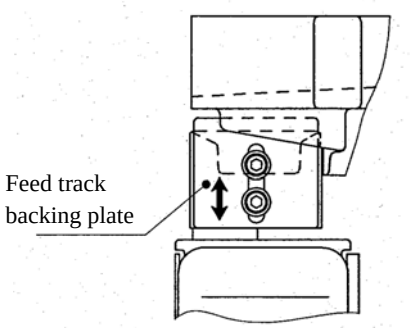
(8) Coating

Return trough transporting works and coated surface of the chute mount will get dirty due to works transported and transportation ability of works may be reduced. Check the coated surface from time to time, and clean the coated surface with water or neutral detergent, if it is found foul.

9. Fitting Work of Attachment

(1) The tilt angle of the return trough inclined surface can be adjusted by turning the angle adjusting screw shown in item 4 "Names of Main Component Parts". Adjust the angle to the climbing ability of works to be fed.

Moreover, adjust the height of backing plate of feed track (right figure) so that works do not outflow from behind of the chute mount due to the mounting.

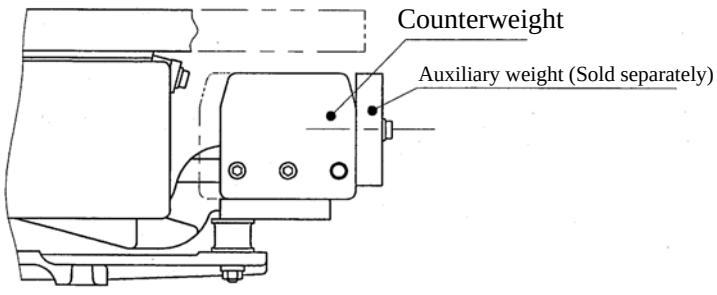


(2) When climbing performance of trough is not ensured depending on works transported even if the body was adjusted, bond commercially available belt material on the feed track surface.

<Belt: example>

No.	Denomination	Top surface
1	Transportation belt (MITSUBOSHI) NEOFLEXSTART NS82UN2/2G	Coarse mesh
2	Transportation belt (NITTA) GU-12A	Pear-skin finish (Green)

(3) When irregular speeds occur on the feed side chute depending on works transported and chute configuration, adjust the movement of the counterweight referring to Adjustment of counterweight of (1) of clause 8. Moreover, when the counterweight mass is insufficient after adjustment, mount an auxiliary weight (Sold separately).



10. Troubleshooting

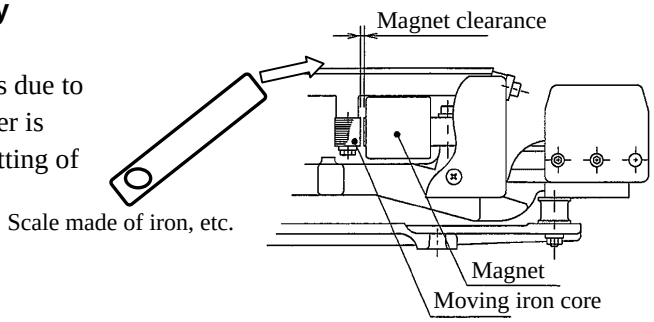
If any trouble should be found, check the following points:

(1) No vibration at all

In this case, distinguish the trouble between mechanical system and electric system as shown below for checking. Insert an iron piece to the magnet clearance as shown below with power switch turned on.

[1] When the piece is sucked in strongly (including small vibration)

Electric system is normal. Accordingly, it is due to either that setting frequency of the controller is not appropriate or that problems such as setting of number of body leaf springs exist.



[2] When the piece is not sucked in at all

Trouble of electric system including controller and magnet. However, for the controller with sensor, remove works since such a condition that the detection head is detecting works is considered. Moreover, when the sensor is detecting error, recheck such as optical axis setting and proximity distance.

Further, check the following points for electric system for safety:

a) Power supply is connected properly. (See the item 7 "Wiring and Operating Methods".)
b) Fuse of controller is not melted, and overcurrent protection function is not active.
c) External control input terminal of controller is connected correctly as well as correct setting. (For details, refer to the Controller Operation Manual.)
d) Magnet coil is not broken.

(2) Vibration is found, although amplitude is insufficient.

[1] Imperfect power source (such as 100 V connection in spite of 200 V specification.)
[2] Leaf spring mounting bolt is not loosened.
[3] Tightening bolt of chute etc. is not loosened.
[4] Magnet clearance is not too large.
[5] Omission of removal of fixtures used for transportation
[6] Too heavy chute mass
[7] Improper number of leaf springs to the mass of the chute
[8] Foreign matter is not pinched in space between the chutes

(3) Amplitude is decreasing during use.

[1] Leaf spring is not fatigued.
[2] Leaf spring mounting bolt is not loosened.
[3] Leaf spring is not damaged, and rust is not found.
[4] Foreign substance is not pinched in the magnet clearance.
[5] Chute tightening bolt is not loosened.

(4) Unusual metallic noise

[1] Magnet clearance is not so small as to allow contact in vibration.
[2] Inclusion of foreign matter in space between chutes
[3] Excessive amplitude
[4] Omission of removal of fixtures used for transportation
[5] Deformed cover interfering with vibrator

When you inform NTN of trouble condition with unknown cause, let them know the detail as far as possible with reference to the above so that they can take a measure as soon as possible.

11. Specifications

K- MD 10 R B 1

- **Voltage･drive system (1: 100V Full wave, 2: 200 V Full wave, 4: 200 V Half wave)**
- **Design change code (B: with base, C: without base)**
- **Feed direction (R: CW, L: CCW)**
- **Body size**
- **Body type**

Product No.	**Spec. with base**	K-MD10$^{R}_{L}$B1	K-MD10$^{R}_{L}$B2	K-MD20$^{R}_{L}$B1	K-MD20$^{R}_{L}$B2	K-MD30$^{R}_{L}$B4
	Spec. without base	K-MD10$^{R}_{L}$C1	K-MD10$^{R}_{L}$C2	K-MD20$^{R}_{L}$C1	K-MD20$^{R}_{L}$C2	K-MD30$^{R}_{L}$C4
Body specifications (Part No.)		K-S10B(C)1	K-S10B(C)2	K-S20B(C)1	K-S20B(C)2	K-S30B(C)4
Power voltage (V)		100	200	100	200	200
Current consumption (A)		0.4	0.2	1.0	0.5	0.9
Power consumption (VA)		40		100		180
Operating frequency (yardstick)		90–106 Hz		85–103 Hz		60–66 Hz
Body spring angle (θ°)		12°		15°		
Return trough (coating)		Aluminum casting, 2-row feed course (urethane, green)				
Return trough tilt angle (Variable range)		Standard 7.5° (6.5–8.5°)				
Installed chute length (mm)		450–600		550–800		850–1100
Installed chute mass (kg) *1		2		5		15
Work accommodation L (Max. value in manual run)		0.15 (0.3)		0.3 (0.7)		0.6 (1.6)
Magnet product number (quantity)		K-PMG-111-1 (1 piece)	K-PMG-121-1 (1 piece)	K-PMG-211-1 (1 piece)	K-PMG-221-1 (1 piece)	K-PMG-321 (1 piece)
Cable thickness x length (from the center)		1.0 mm^2 × 1.1 m				
Leaf spring **product number**	**Body**	K-PLS4-40 × 6		K-PLS4-70 × 12		K-PLS4-86 × 15
	Return	K-PLS4-41 × 7		K-PLS4-62 × 12		K-PLS4-100 × 20
setting number	**Body**	5 sheets × 2 positions = 10 sheets		7 sheets × 2 positions = 14 sheets		5 sheets × 2 positions = 10 sheets
	Return	2 sheets × 2 positions = 4 sheets				
dimension (mm) width ×Length (hole pitch) ×plate thickness	**Body**	42 × 54 (40) × 0.6		50 × 88 (70) × 1.2		80 × 106 (86) × 1.5
	Return	25 × 52 (41) × 0.7		38 × 74 (62) × 1.2		50 × 120 (100) × 2
Strength classification of leaf spring fixing bolt		12.9				
Leaf spring tightening torque (Screw size)	**Body**	14.7 N･m [150 kgf･cm] (M6)		14.7 N･m [150 kgf･cm] (M6)		68.6 N･m [700 kgf･cm] (M10)
	Return	8.8 N･m [90 kgf･cm] (M5)		14.7 N･m [150 kgf･cm] (M6)		34.3 N･m [350 kgf･cm] (M8)

***1 The installed chute mass value is a mass of an additionally installable chute.**

Product No.	Spec. with base	K-MD10$^{R}_{L}$B1	K-MD10$^{R}_{L}$B2	K-MD20$^{R}_{L}$B1	K-MD20$^{R}_{L}$B2	K-MD30$^{R}_{L}$B4
	Spec. without base	K-MD10$^{R}_{L}$C1	K-MD10$^{R}_{L}$C2	K-MD20$^{R}_{L}$C1	K-MD20$^{R}_{L}$C2	K-MD30$^{R}_{L}$C4
Appearance paint color		Black / silver (Coating: Green)				
Mass (kg)	with base	10.5		19		54
	without base	9		15.5		46
Tooling drop mm [Return feed track upper stream edge – Feed side bottom face] At time of 7.5° standard assembly		26		32		46
Applicable controller		K-ECF25 (Frequency variable)				

- The content of this instruction manual is subject to change without prior notice due to functional improvements.

Published: July 1, 2013

NTN Technical Service Corporation

1578 Higashi-Kaizuka, Iwata, Shizuoka 438-8510, Japan
PHONE: 81-538-37-8104, FAX: 81-538-37-8128