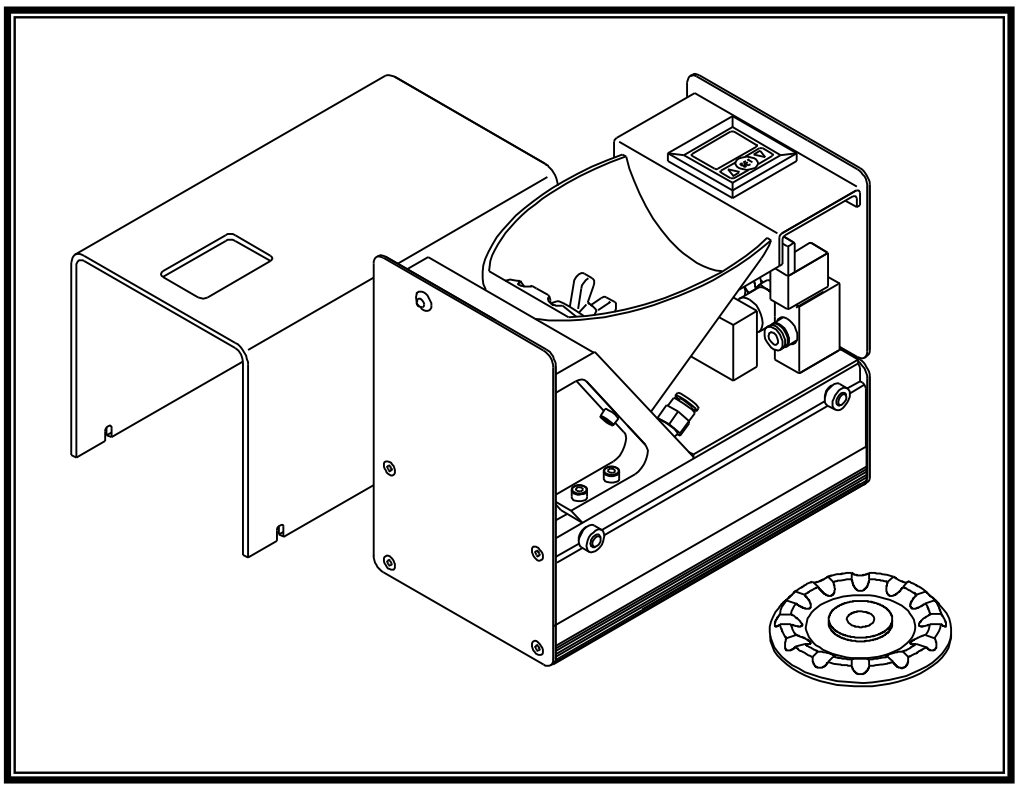
DISK TYPE FEEDER
DF200H
INSTRUCTION MANUAL



NITTO SEIKO CO., LTD.
Assembly Machine Division

【Notes】

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(2) By provision of operating manual recorded on CD-ROM, you shall be deemed to have agreed to the Terms and Conditions written in “readme.txt” on it.

(3) Contents of this manual are subject to update without notice according to specification change of the products.

(4) Unique nouns like the product name indicated in this brochure are registered or not registered trademark of each company.

INTRODUCTION

☆ **Thank you very much for your purchasing "DF200".**
In order to properly and correctly use DF200 for years to come, make sure to carefully read this Instruction Manual.

☆General Notices

- For the purpose of providing explanations in detail, covers and/or safety shields of the product are omitted, as the case may be, in the illustrations in this INSTRUCTION MANUAL. Such covers and/or safety shields are to be set in place prior to the practical operation. The practical operation shall be conducted complying with this INSTRUCTION MANUAL.
- Since the illustrations in INSTRUCTION MANUAL are general for explanation purpose, they may look different from the delivered product.
- INSTRUCTION MANUAL is subject to change without notice, due to the improvement of the product and/or INSTRUCTION MANUAL itself.
- Call your agent or the nearest sales office of ours to order a new INSTRUCTION MANUAL if the old one has been damaged or lost.
- We will not accept any responsibility if any modification of the product is made by the customer, the third party or anyone not officially authorized by us.

CONTENTS

[1] SAFETY INSTRUCTIONS

Installation, operation, maintenance, inspection, etc. of the product shall be performed correctly and carefully in conformity with the following instructions.
It is naturally impossible to describe all the details for safety. Note that judgments made by an operator from time to time in the practical operation are the essential factors for safety.

DANGER	It indicates that incorrect operation/handling may cause death or serious injury to the operator.
WARNING	It indicates that incorrect operation/handling may cause death or serious injury to the operator.
CAUTION	It indicates that incorrect operation/handling may cause injury to the operator and/or damage to the product or property or result in malfunction of the product.

Items classified under CAUTION may get further serious depending on the conditions or circumstances. Make sure to carefully read and follow the instructions below since they are very important in your practical operation.

SYMBOLS
(Symbols shown here are examples.)


The symbol indicating **you should be careful on**


The symbol indicating **you must not do it**.


The symbol indicating **you must do it**.

DANGER

WARNING

- **NEVER ACCESS OR TOUCH THE ROTATING PART DURING THE OPERATION**

  It is prohibited to access or touch the rotating part of the disk during the operation. Otherwise injury may be cause.

- **TURN OFF AND UNPLUG THE PRODUCT UPON NOTICE OF ABNORMALITY**

  Turn off the power and unplug the product immediately upon notice of abnormality, such as emission of smoke, an unusual smell or noise, etc. Using the product in such conditions may result in fires, electrical shock or accidents.
  Call your agent or the nearest sales office of ours for repair.

⚠ WARNING

- **NEVER USE ANY VOLTAGE OTHER THAN THE SPECIFIED VOLTAGE**

  The product shall not be used with any voltage other than the specified voltage.
  Otherwise fires, electrical shock or malfunction of the product may be caused.

- **DO NOT ACCESS OR TOUCH THE INNER PART OF THE CONTROLLER**

  It is strictly prohibited to access or touch the inner parts of the electrical controller box.
  Otherwise electrical shock or malfunction of the product may be caused.

- **DO NOT INSTALL THE PRODUCT IN THE PLACE EXPOSED TO DAMP, OILY SMOKE, DUST, ETC.**

  It is strictly prohibited to use the product in the place exposed to water, in the corrosive or inflammable atmosphere, or near the combustible material.
  Otherwise fires, electrical shock, or malfunction of the product may be caused.

- **DO NOT HURT OR DAMAGE THE POWER CABLE**

  It is not allowed to put heavy stuff on the power cable, pull it by force, bend it hardly, or such.
  Otherwise it may damage or hurt the power cable and result in fires, electrical shock, accidents, or malfunction of the product.

- **DO NOT DISASSEMBLE OR MODIFY THE PRODUCT**

  Otherwise fires, electrical shock, accidents, or malfunction of the product may be caused.

⚠ CAUTION

- **DO NOT OPERATE THE PRODUCT WITHOUT THE TOP COVER SET IN PLACE**

  Make sure to operate the product with the top cover set in place.
  Otherwise injury or malfunction of the product may be caused.

- **DO NOT CHANGE THE WIRING WHILE THE PRODUCT IS TURNED ON OR PLUGGED.**

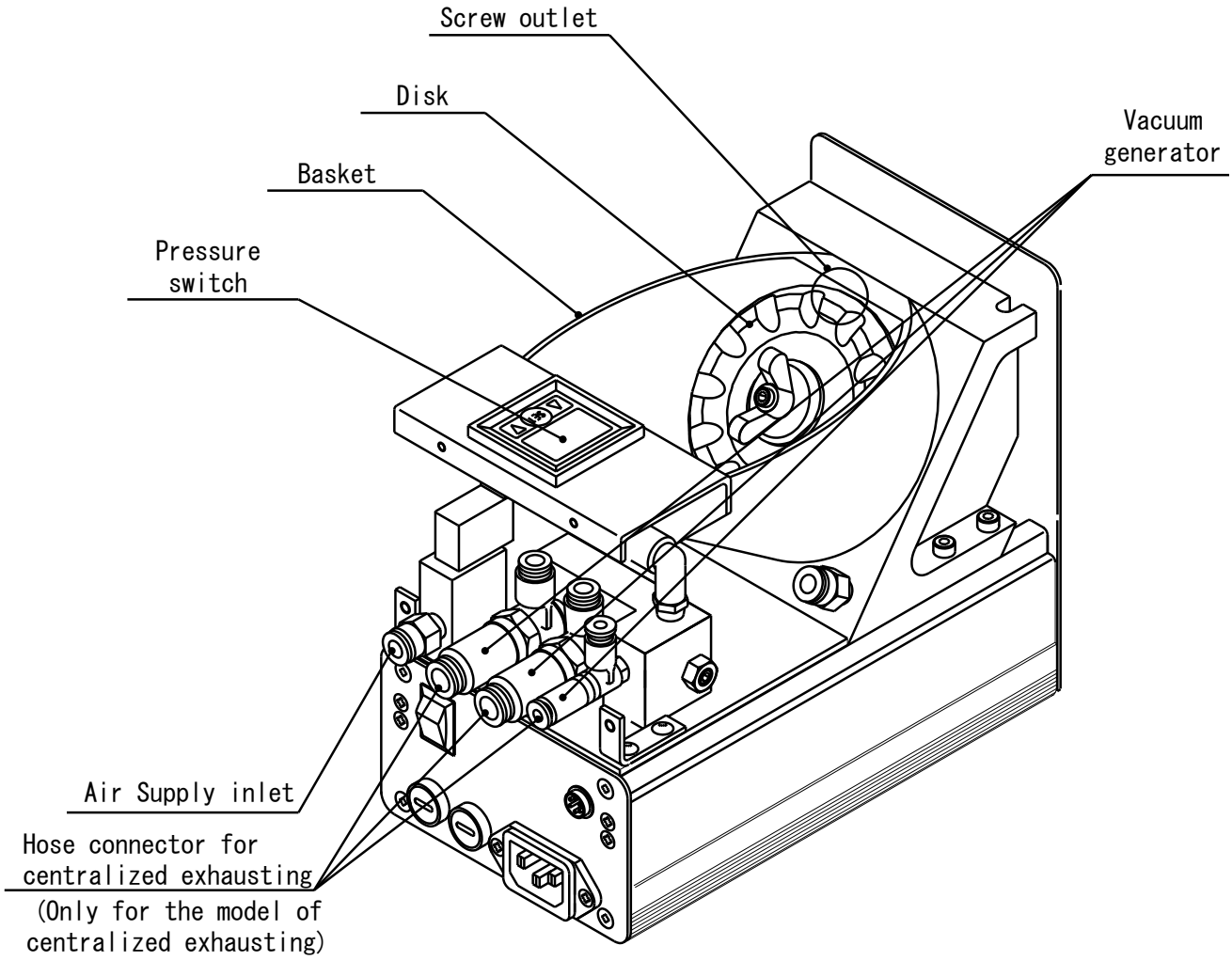
  Otherwise electrical shock or malfunction of the product may be caused.

- **FIX THE PRODUCT FIRMLY FOR USE**

  Make sure to firmly fix the product prior to use.
  Otherwise injury or malfunction of the product may be caused.

[2] STRUCTURE OF DISK-TYPE FEEDER

☆ **See the illustration below for the general structure.**
Several models of Disk-type Feeder are available. See the outline drawings on and after page 23 for detail.



[3] MODELS OF DISK-TYPE FEEDER

Disk-type Feeder is available in four models shown below.
Your Feeder belongs to one of the model categories.

A. Automatic model (Muffler-exhausting)	• Automatic Feeders are to be employed for distributing screws to the automatic main machine, with which the Feeder is connected.
B. Automatic model (Centralized exhausting)	
C. Hand-driver model (Muffler-exhausting)	• Hand-driver Feeders are to be used with the hand-type driver unit, with which the Feeder is connected.
D. Hand-driver model (Centralized exhausting)	

[4] INSTALLATION AND UTILITY CONNECTION

<1> Installation of Feeder

Disk-type Feeder shall be installed on the flat floor or base. Slant installation may cause a trouble in feeding screws.

<2> Utility Connection to Feeder

Follow the procedure stated below for connecting Disk-type Feeder with the automatic main machine or the hand-type driver unit.

① Air source connection
○ Use an air hose of outside diameter ϕ6 mm from the factory utility for the connection to the air supply inlet on the back of Feeder.

② Power source connection for Feeder
○ Connect the plug (3-pin) of the power cord to the power outlet of the specified voltage.

③ Connection of screw-feeding signal cord
○ Connect the cord for screw-feeding signal to the 4-pin metal connector on the back of Feeder. (For the automatic model only)

④ Air hose connection for centralized exhausting
○ Connect air hoses (two ϕ8 mm and one ϕ6 mm) for centralized exhausting to the three connectors on the back of Feeder. The length of ϕ8 mm hose shall be 1 m or less and the pressure of the hose-side shall be more or less atmospheric as negative. (For the centralized exhausting model only)

[5] PREPARATION FOR OPERATION

After the completion of the utility connection, the following arrangements shall be made prior to starting the operation.

① Adjust the air pressure. The in-house air supply line pressure shall be at least 0.4 Mpa (approx. 4 kg/cm^2).
② Remove the top cover.
③ Turn on the power switch on the back of Feeder.
④ Charge the designated screws into the basket.

• Make sure to observe the instructions below at charging screws.

Instructions	a) Characteristics (such as size) of the screws to be charged shall be in conformity with those designated in the order specification. Check them before charging. b) Do not charge used screws and/or magnetized screws. c) Charge screws only. Check nothing other than screws is mixed. d) Do not fill the basket with screws. At least 2/3 of the disk surface shall be visible anytime.

⑤ Wait for a while until Feeder has automatically completed the following procedures.
   a) The motor-driven disk of Feeder rotates. The underhead part of a screw is caught, by air vacuuming, into the screw-dressing hole on the disk.
   b) When the screw grasped in the hole on the rotating disk is delivered to the screw outlet, the pressure sensor detects the screw and stops the disk rotation.
⑥ Set the top cover back in the original position.

☆Feeder is now ready for the operation.

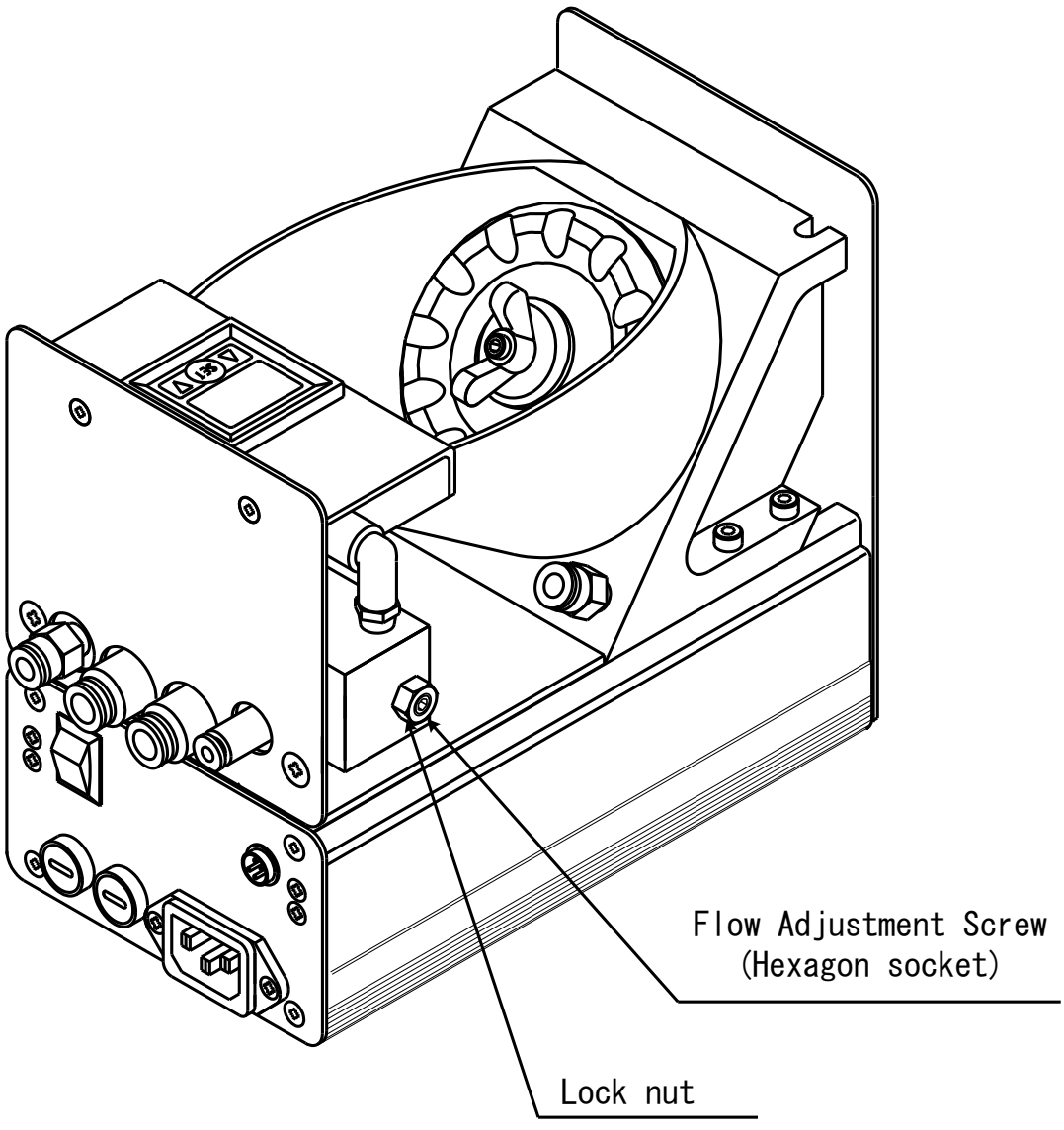
[6] SETTING AND ADJUSTMENT

☆ **Feeder is inspected and adjusted prior to shipment. The settings may be adjusted, if required, in the following ways.**

<1> Vacuum Flow Adjustment

☆ **The flow of vacuuming air for grasping screws in the screw-dressing hole is adjustable. It should be adjusted in case that the screws are abnormally delivered (such as upside down) to the screw outlet.**

Turning Direction of Flow Adjustment Screw	Vacuum Flow
Clockwise (tighten)	Decreased
Counter-clockwise (loosen)	Increased



<2> Pressure Switch Adjustment

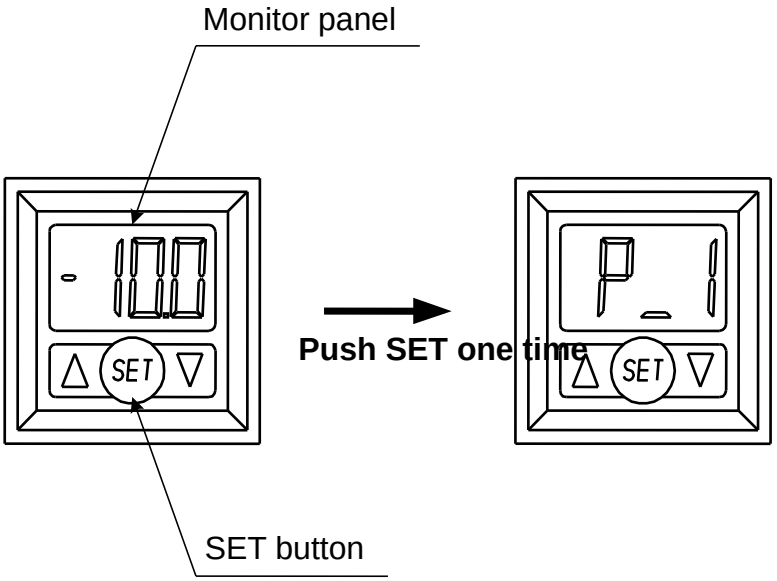
☆ The pressure sensor determines whether a screw is delivered to the screw out let by detecting the difference between the pressure with a screw and the pressure without a screw. Such setting of the sensor has been completed prior to the shipment. It should be adjusted in such cases that the disk rotation does not stop even though a screw is normally delivered to the screw outlet.

① Read the pressure value displayed on the pressure switch when the screw-dressing hole with a screw grasped passes the screw outlet and the value without a screw.

② Push [SET] button on the pressure switch one time to show [P_1] on the monitor panel. Calculate the mean value of the above two values. Then input it by using [△] and [▽] buttons located on either side of [SET] button.
(Example: The pressure value with a screw grasped in the screw-dressing hole is [-50], and the value without a screw is [-10]. The average value of these two values is [-30], which is the setting value to be input for [P_1].)

③ Push [SET] button one more time to display [P_2] and its setting value alternately. Verify that the setting value is [-99.0]. If not, correct it.

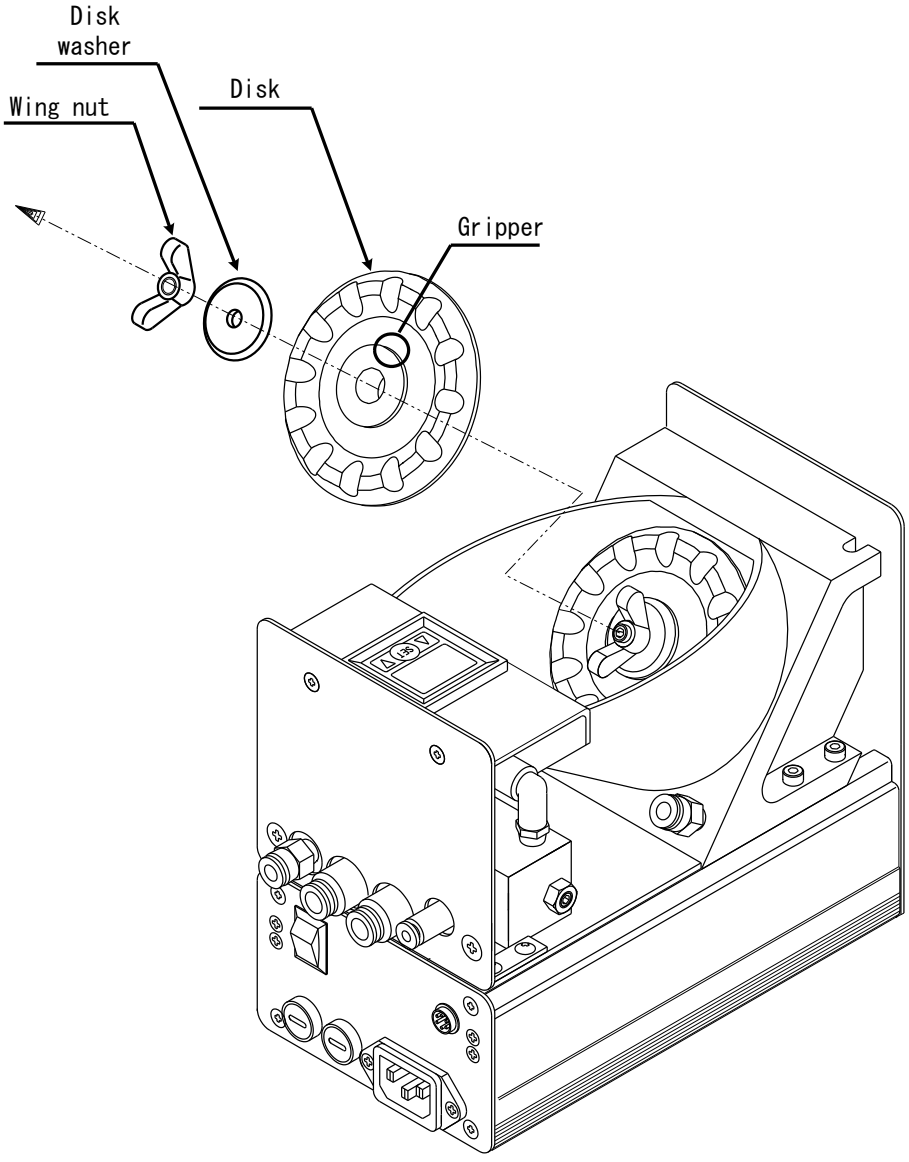
④ Then, the display changes to [P_3] →[P_4] →[C_5] in due order by every pushing [SET] button. After showing [C_5], push [SET] button just one more time to bring the display back to the beginning, for completing the adjustment.



<3> Changing Disk

☆ When you change the type (diameter) of the screws for feeding, the disk type shall correspondingly be changed according to the following procedure.

① Remove the butterfly nut on the upper surface of the disk.
② Remove the washer under the butterfly nut.
③ Remove the current disk by pinching its gripper with fingers.
④ Set the corresponding disk.
⑤ Reassemble the disk washer and butterfly nut.

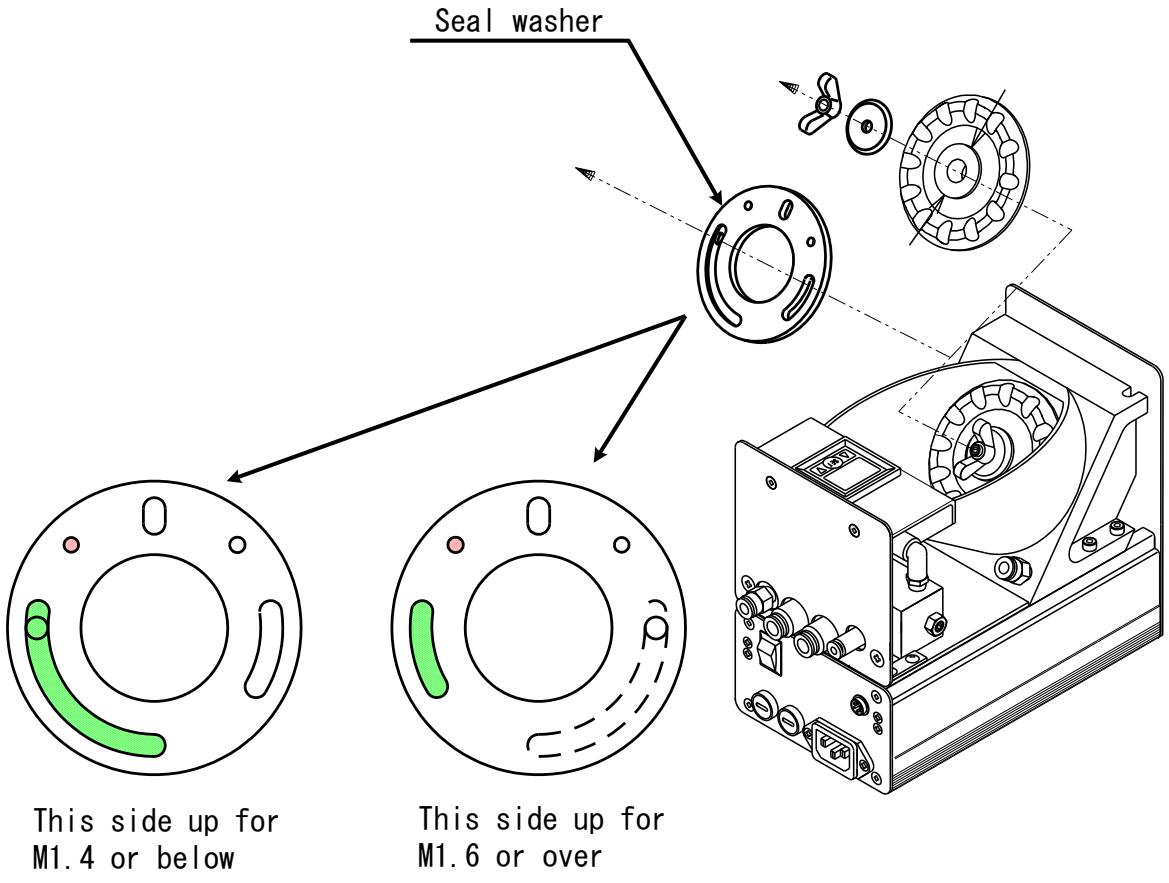


<4> Changing Seal Washer

☆ The seal washer shall be set turned over to shift the vacuuming area depending on the type (diameter) of screws so that the screws are fed efficiently. Follow the instructions below to set the seal washer right side up correspondingly, if necessary, when changing the type of screws for feeding.

① Remove the top cover.
② Remove the disk complying with the procedure stated in <3>.
③ Take out the seal washer under the disk.
④ See the illustration below to determine which is the corresponding side. Then, set the seal washer accordingly.
⑤ Reassemble the disk washer and butterfly nut. Make the test operation and confirm screws are fed normally without any problem.

NOTE:
The corresponding side of the seal washer is subject to change depending on the shape of screws.



[7] MAINTENANCE

☆ **Make sure to disconnect Feeder from the power and air sources prior to the maintenance work.**

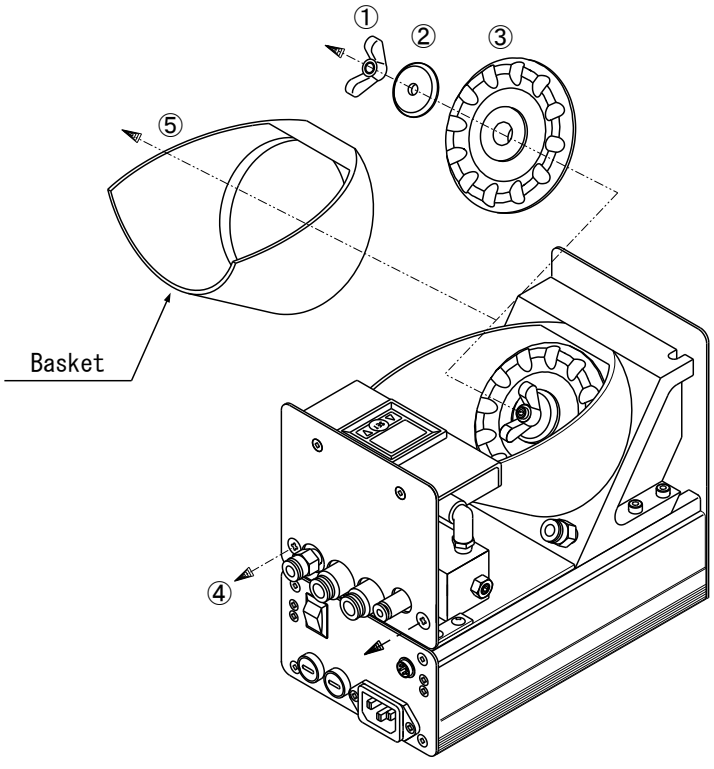
<1> Cleaning

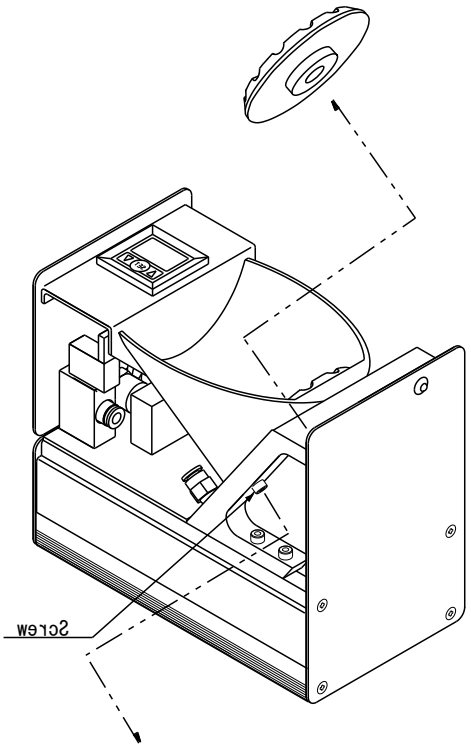
- Machine Model: ····· All models
- Frequency: ····· From time to time
- Part to be cleaned: ····· Selectively on the basket and the disk.
  (They have to be removed from Feeder for cleaning.)
- Cleaning work: ····· Wipe off the dust, oil, grease, etc. with waste cloth.

<2> Disassembling Basket

☆ **Follow the instructions below to disassemble the basket.**

① Remove the Wing nut on the upper surface of the disk.
② Remove the washer under the Wing nut.
③ Remove the disk by pinching its gripper with fingers.
④ Loosen the screws on the either side of the basket.
⑤ Remove the basket by pushing it out of Feeder.





<3> Cleaning Filter

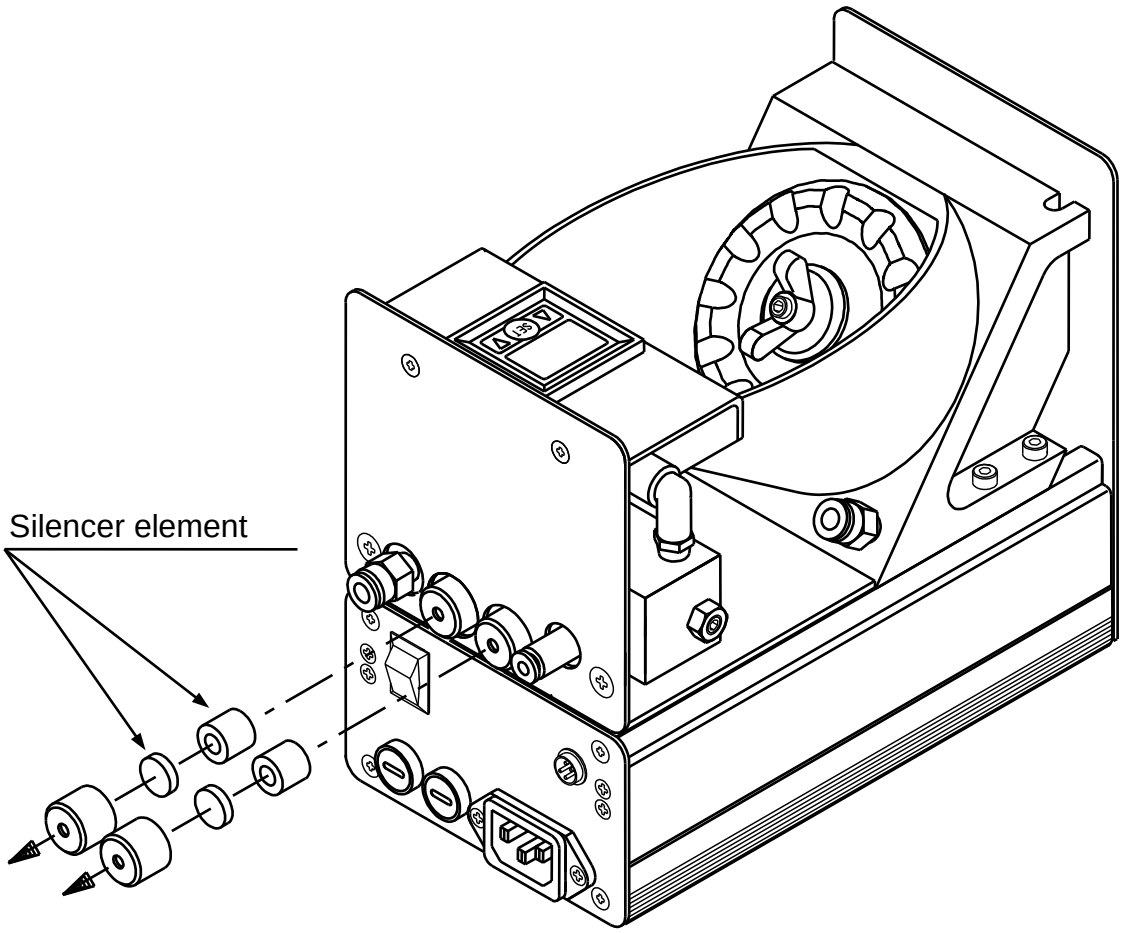
☆ When the vacuum generator is equipped with the exhausting muffler, the filter of the muffler shall be periodically cleaned according to the following procedure.

① Turn the filter cover counter-clockwise to remove it.

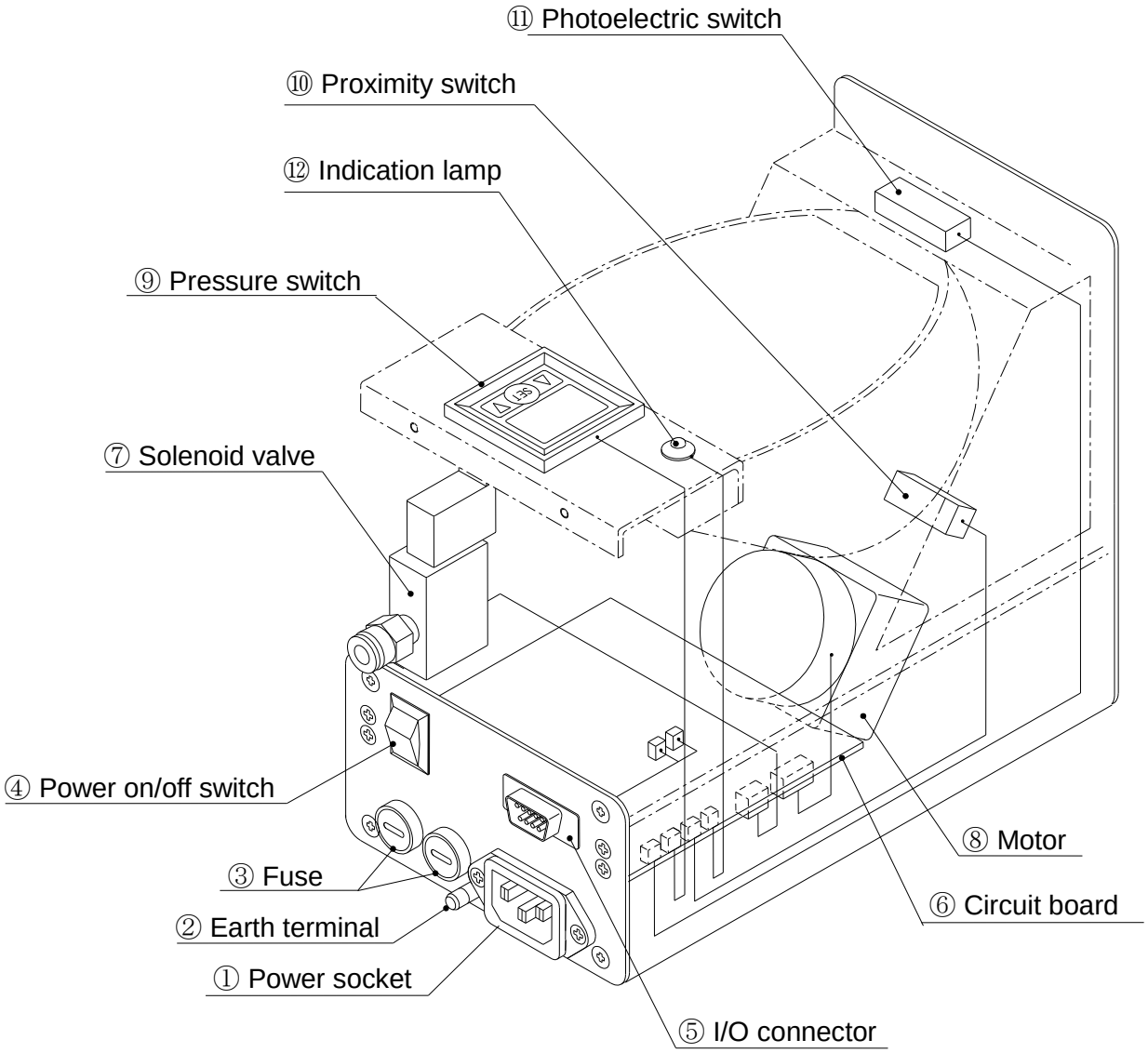
② Take out and clean the silencer elements (2 pieces). After cleaning, put them back in place and set the filter cover.

* If the elements have been too dirty, replace them with new ones according to the following information. (The illustration below shows DF200H model.)

Manufacturer	Set of Element	Model of Vacuum Generator
PISCO	SEE0802 (one position)	VHH05-4M5
	SE01 (two positions)	VHL10-601



[8] CONTROL SYSTEM CONFIGURATION (The illustration below shows DF200H model.)



① Power socket

Use the provided power cord equipped with earthing pole to connect with the power outlet of the specified voltage.

② Earth terminal

If the power outlet is not available to receive the earthing pin of the provided power cord, make sure to ground the pin in some way.

③ Fuse

The fuse used on each pole is ϕ5 mm x 20 mm in size and 1 A in rating.
Never use a fuse of which rating is more than 1A. Otherwise the product may be damaged by a burnout.

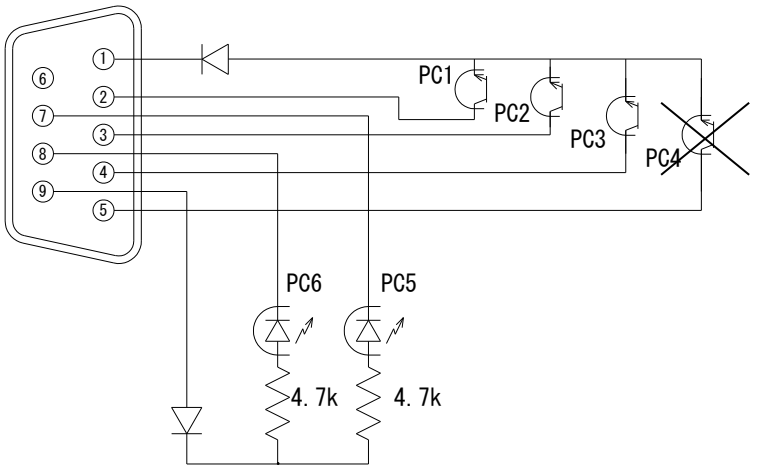
④ Power on/off switch

Upon turning on the switch, the switch itself gets lighted and the rotation of the disk starts. Keep the switch off whenever Feeder is not in use. Otherwise the disk may keep rotating depending on the conditions.

⑤ I/O connector (DSUB 9-pin Male)

User shall prepare the female plug.

Connection



① Output COM OV
② Output: Screw feedable
③ Output: Add screw
④ Output: Abnormal
⑦ Input: Feed complete
⑧ Input: Disk rotatable
⑨ Input: +24 V

○Photo Coupler

Output Signal: Open collector output, Max. 30 VDC, 30 mA

Input Signal: 24 VDC, approx. 5 mA

(1) Screw-feedable output

The output is transmitted when the disk stops at the given segment upon detecting a feedable screw at the screw outlet.

Feeding can be reset and the disk restarts rotations after receiving either Feed-complete input form the feed-detecting PHS or such an input from the outside.

(2) Add-screw output (Optional)

The output is transmitted upon detecting that the amount of remaining screws in the basket is less than the given amount. It is a level-detecting system. User shall prepare the after-output-sequence for alarm, timer, etc.

(3) Abnormal output

The sensor working in conjunction with a timer circuit transmits the output and stops the disk-rotating motor upon detecting abnormal action of the disk rotation. It can be reset by turning off the power switch.

(4) Feed-complete input

This input is used for restarting the disk rotation by an external signal, which shall be either a pals of over 0.1 second or a continuous signal, when OFF→ON signals from the feed-detecting PHS are not used for that purpose.

(5) Disk-rotatable input

The feed-detecting PHS is used for interlocking the disk rotation. If the PHS is not included (JP-A side), an external signal as input may be used for the same purpose.

⑥ Circuit board

The applicable voltage is 100/200 VAC and the applicable range is from 85 through 250 VAC. Employing logic IC, the control works on hardware. The voltage required for the control including sensors is 12 VDC.

Note: There are 3 types of Circuit board since 3 different types of condenser are used corresponding to different types of motor.

⑦ Solenoid valve

The solenoid valve is employed to control the vacuuming for dressing screws at the disk and for the screw-detecting pressure switch. 12 VDC, 1 W (or less).

⑧ Motor

This is a geared motor for driving the disk.

The segment-detecting sensor detects the abnormal disk rotation caused by overloading or such and stops the motor. Turn off the power switch to reset this status of abnormal stop. (It is determined to be abnormal if the disk stops rotating and no output signal of Screw Feedable is received.)

Note: Four different types of motor are available corresponding with the variation of power source.

⑨ Pressure switch

The pressure switch determines whether a screw is present or not at the screw outlet.

If the pressure switch outputs the signal of Screw Feedable in the OFF→ON timing of the segment-detecting proximity switch ⑩, the disk stops at the given segment. If not, the disk rotates again.

Note: See [6]-<2> for adjustment of the pressure switch.

⑩ Proximity switch for segment-detecting

One rotation of the output shaft of the geared motor corresponds to one action segment. The phase setting within one action segment is; start rotation at 120° angle; stop and lock at 260° angle. The rotation stops at the OFF→ON timing of the proximity switch. The position at the OFF→ON timing of the proximity switch is the center of stop-and-lock position.

⑪ Photoelectric switch

This switch detects the completion of feeding screws and interlocks the disk rotation.

Normal ON/Disk rotatable → Insert 1 bit for feeding screw out/OFF → Rise Feed-complete bit/ON → Disk rotation

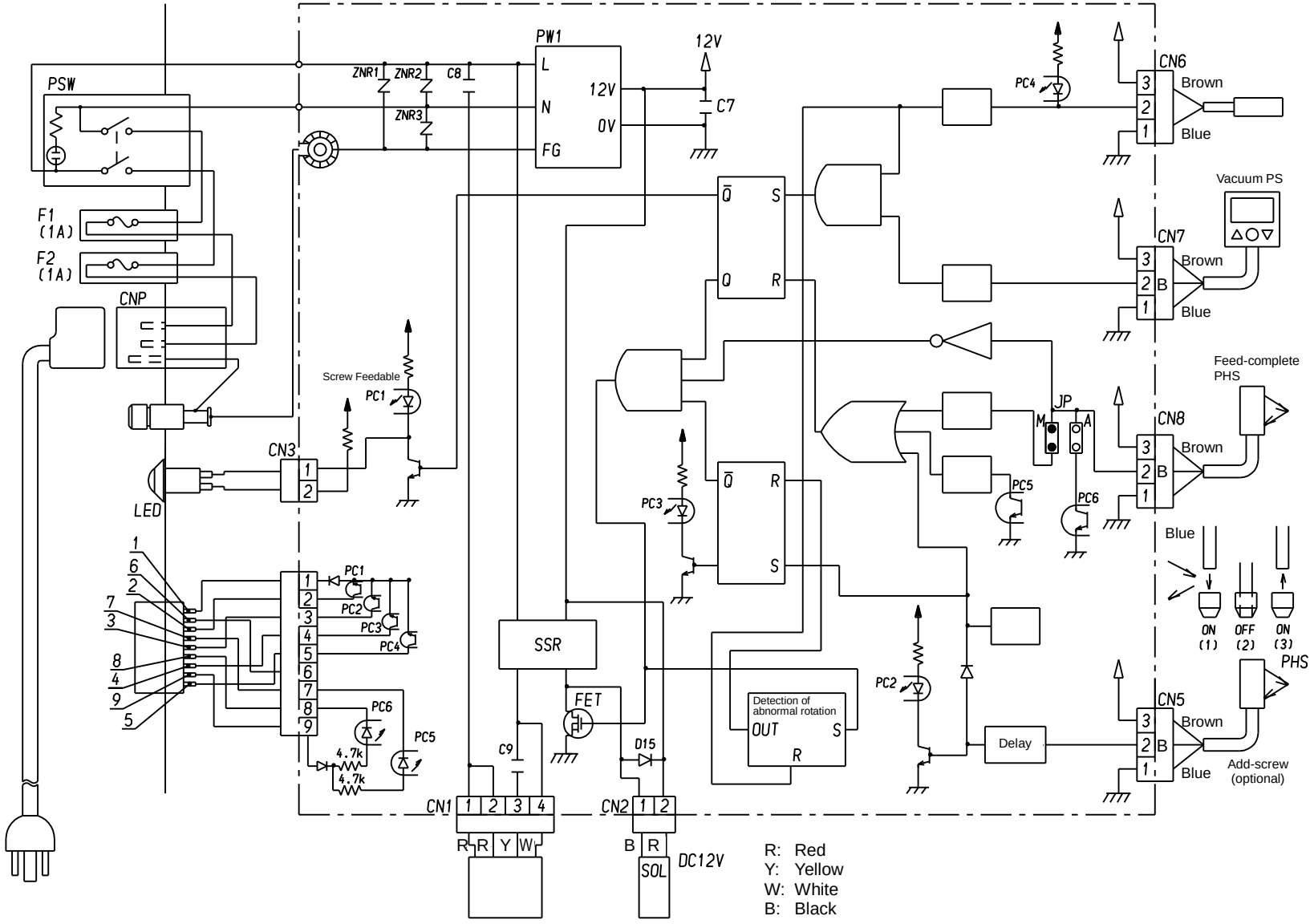
⑫ Display of screw-feedable

It is displayed upon the screw-feedable output signal.

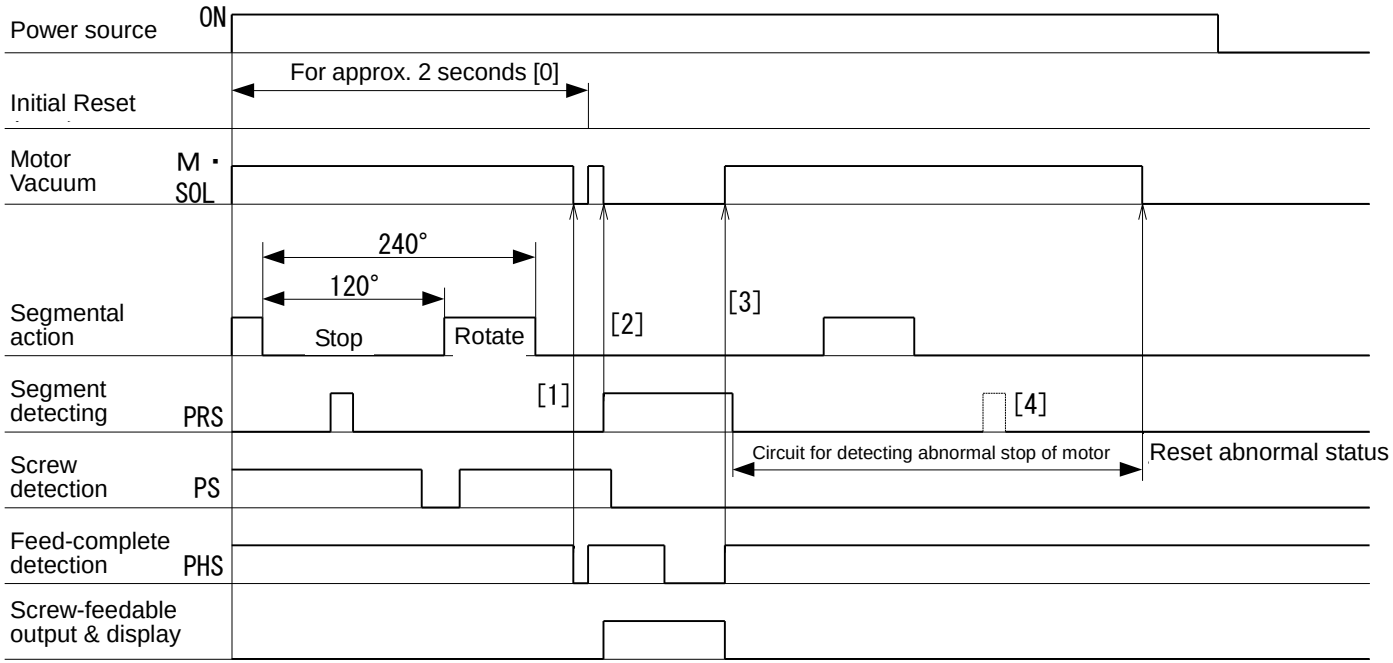
⑬ Add-screw output (Optional)

The output is transmitted upon detecting that the amount of remaining screws in the basket is insufficient. User shall prepare the sequence for alarm, timer, etc.

[9] ELECTRICAL WIRING DIAGRAM



[10] TIME CHART



* 1 and 0 are respectively assigned to “active status” and “inactive status” of Detecting Sensor, Motor and SOL.

[0] Initial Reset…… Whatever the conditions are, the disk independently rotates for approx. 2 seconds right after turning on the power.
[1] Interlock …… The Feed-complete detecting sensor is also the condition, anytime, for interlocking the disk rotation.
[2] Completion of segmentation …… When the segment-detecting sensor changes form OFF to ON, the disk stops if a screw is present.
(Screw-feedable signal is output and displayed.)
[3] Restarting rotation…… The rotation is restarted by either the status change (OFF→ON) of the Feed-complete detecting sensor or the external input of rotation command.
(Condition [1] is required even in case of the external input.)
[4] Detecting motor abnormality…… If there is no input from the segment-detecting sensor within the give time during the motor rotation, it is determined to be abnormal and the motor is stopped. (Turn off the power for reset.)

[11] TROUBLESHOOTING

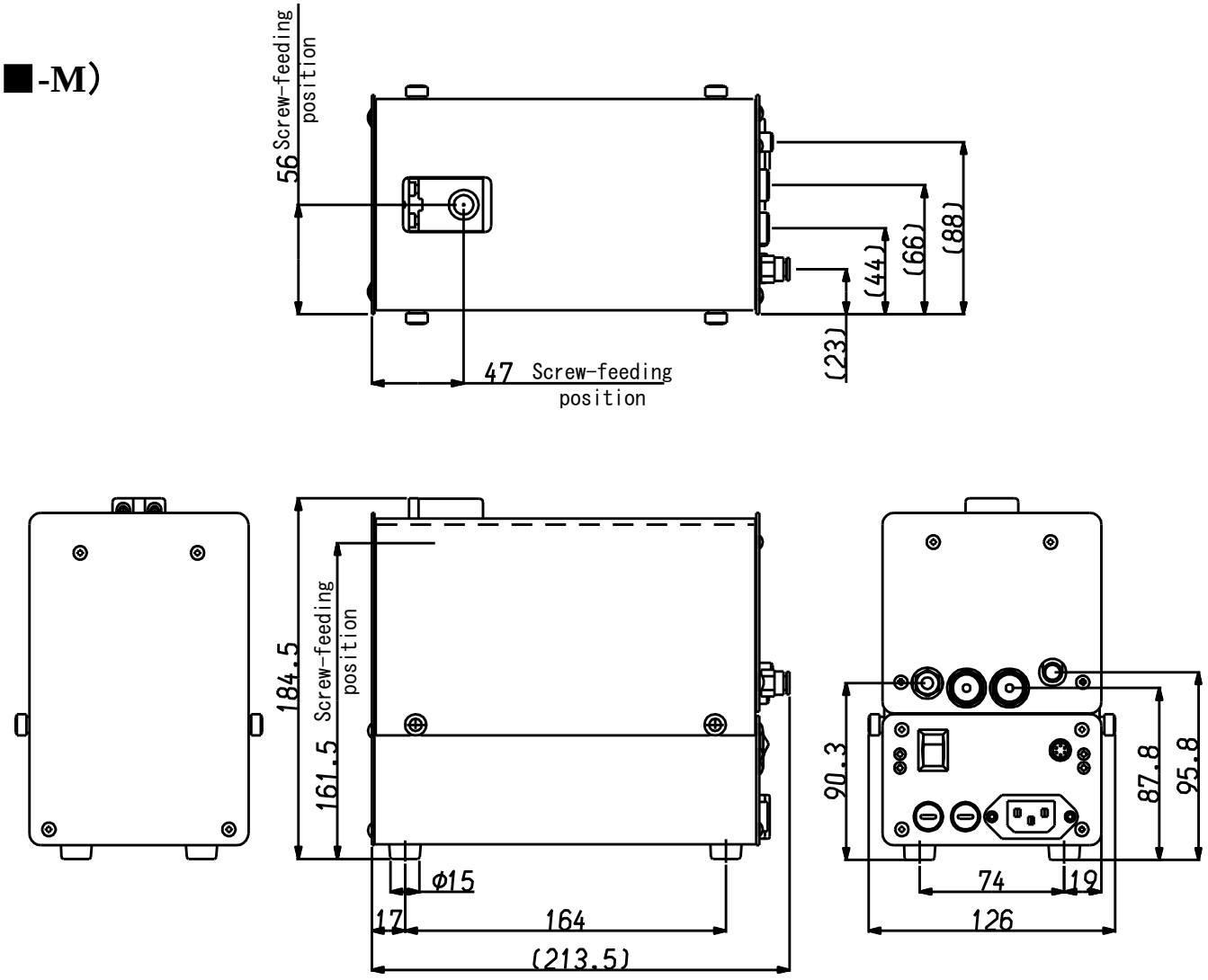
NOTICE	① See the following table for troubleshooting if the product is not operating correctly. ② It is strictly required to follow the instructions and procedure stated in [1] SAFETY INSTRUCTIONS for your safety whenever inspection and/or repair is conducted. ③ Call your agent, distributor or us anytime for any further question.

Trouble	Check Point			Cause	Remedy
No screw is fed.	**Screws are in the basket.**	Disk is not rotating.	Motor is working.	Setscrew for gear on motor shaft or output shaft came loose.	Check and ensure the setscrew for gear tightened.
				Damage of gear on motor shaft or output shaft	Call your agent, distributor or us.
			Motor is not working.	Breakdown /failure of motor	Call your agent, distributor or us.
				Bad connection to power source	Check and ensure the connecting condition of cable, cord, connector, etc.
				Breakdown /failure of electric circuit	Call your agent, distributor or us.
		Disk is rotating.	Screw is not delivered to Screw Outlet. Solenoid valve is working.	Flow adjustment screw is tightened too much.	Loosen and adjust flow adjustment screw properly.
				Air hose is bent.	Replace air hose.
				Bad connection of air hose	Check and ensure the connecting condition of air hose.
			Screw is not delivered to Screw Outlet. Solenoid valve is not working.	Breakdown /failure of solenoid valve	Call your agent, distributor or us.
				Breakdown /failure of electric circuit	Call your agent, distributor or us.
			Screw is delivered to Screw Outlet.	Breakdown /failure of pressure switch	Call your agent, distributor or us.
				Wrong setting of pressure switch	Correct setting properly.
	No screw is in the basket.				Charge screws in the basket.

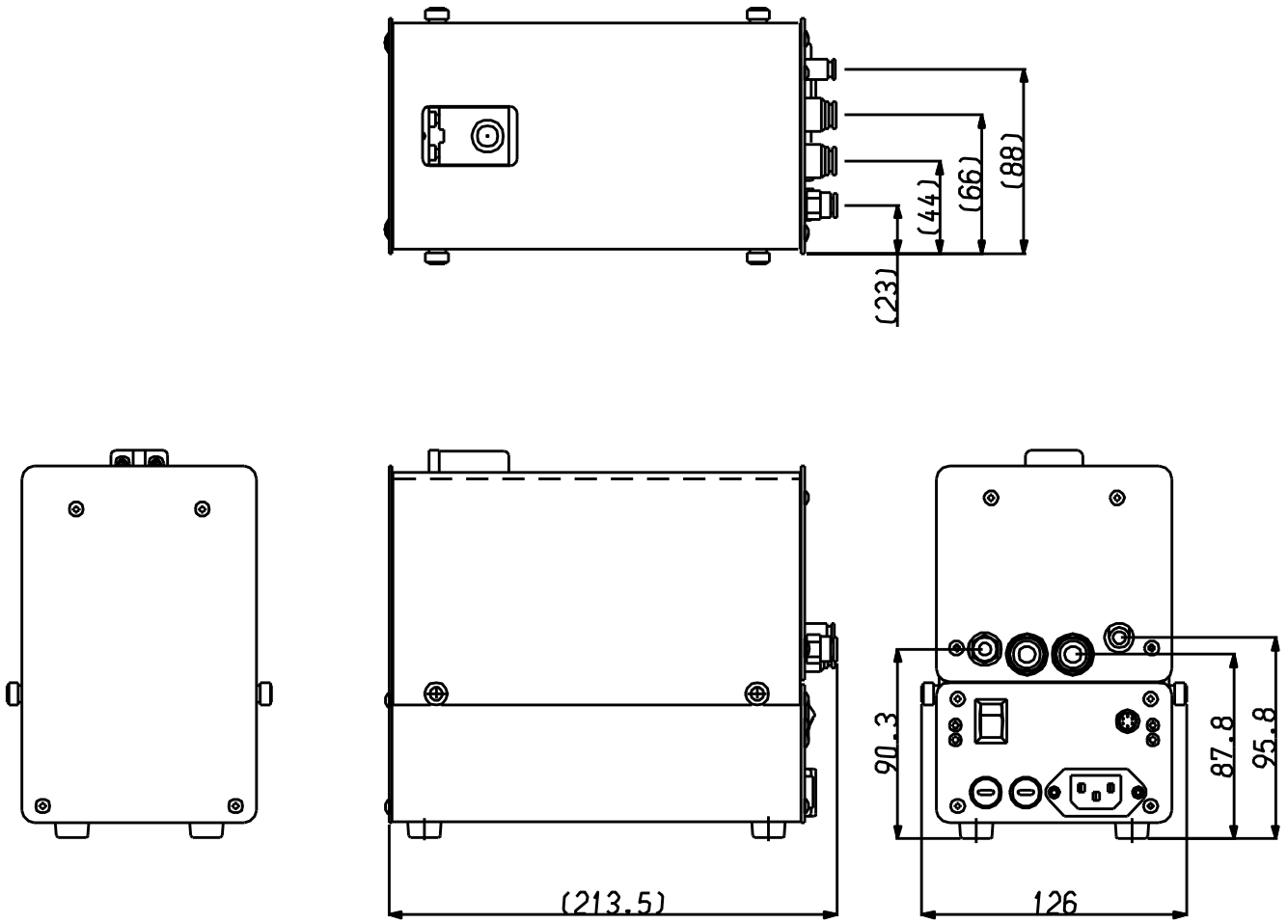
Trouble	Cause	Check point	Remedy
Inefficient feeding of screw	Silencer element of vacuum generator is dirty. (For muffler exhausting only)	Element of vacuum generator	Clean or replace element.
	Flow adjustment screw is tightened too much.	Flow adjustment screw	Adjust flow adjustment screw properly.
	Air hose is bent.	Air piping	Replace air hose.
	Volume of screw remained in basket is too much, or not sufficient.	Volume of screw in basket.	Take out or add screws to meet specified volume.
	Air supply pressure is less than required value (0.5 MPa).	Air supply pressure	Control air supply pressure to meet required value.
Disk does not restart rotation after screw is fed.	Breakdown or failure of photoelectric sensor at screw outlet. (For hand-driver model only)	Photoelectric sensor	Call your agent, distributor or us.
	Connector for external input signal is disconnected.	Connector for external input signal	Check and ensure the connection of cable, cord, etc.
No power supply	Power connector is disconnected.	Power connector	Check and ensure the connection of cable, cord, etc.
	Burn-out fuse	Fuse (two positions)	Replace fuse.
	Breakdown or failure of electric circuit	-	Call your agent, distributor or us.

[12] DRAWING FOR EXTERNAL DIMENSIONS

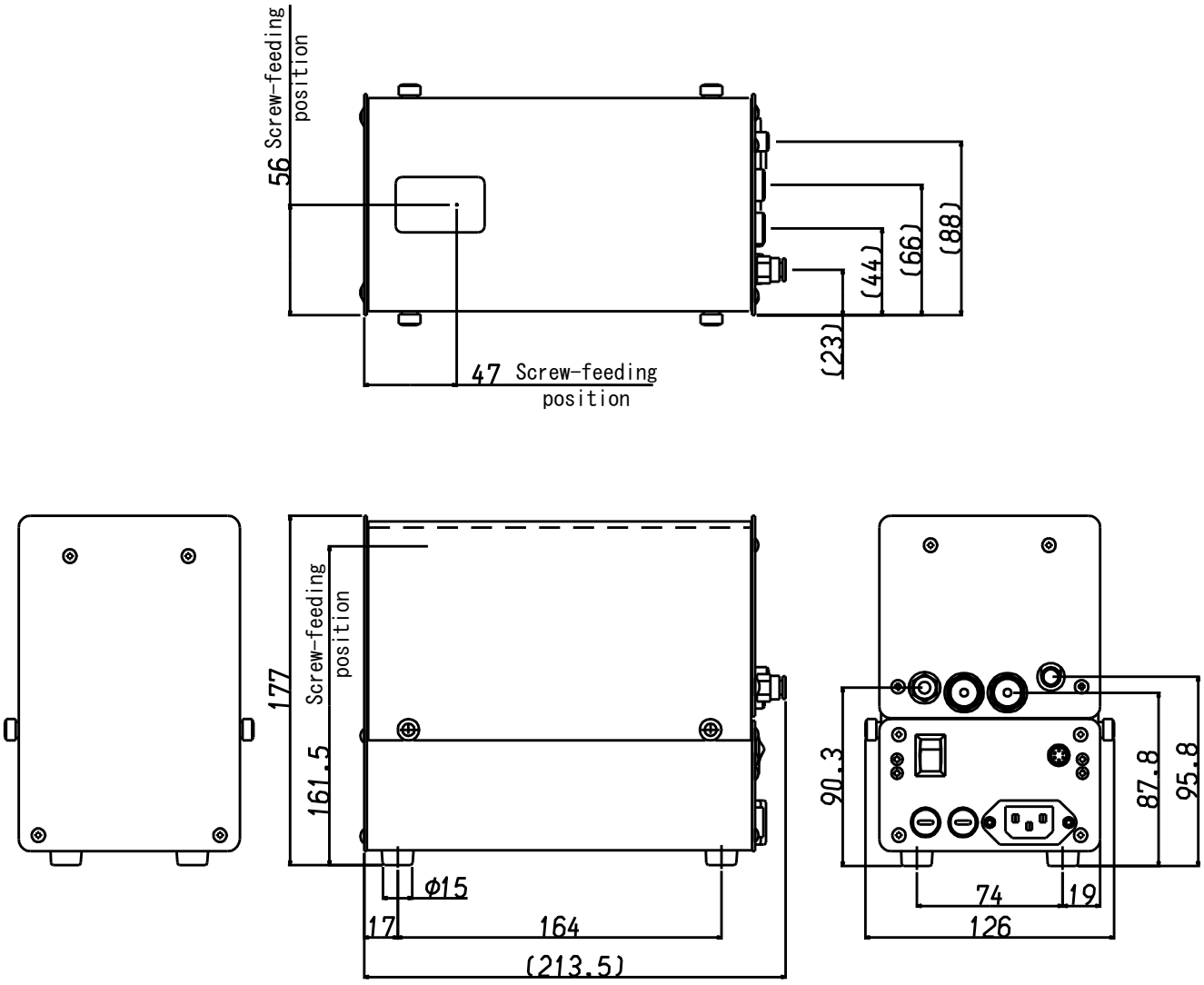
(1) (DF200H-■■-M)



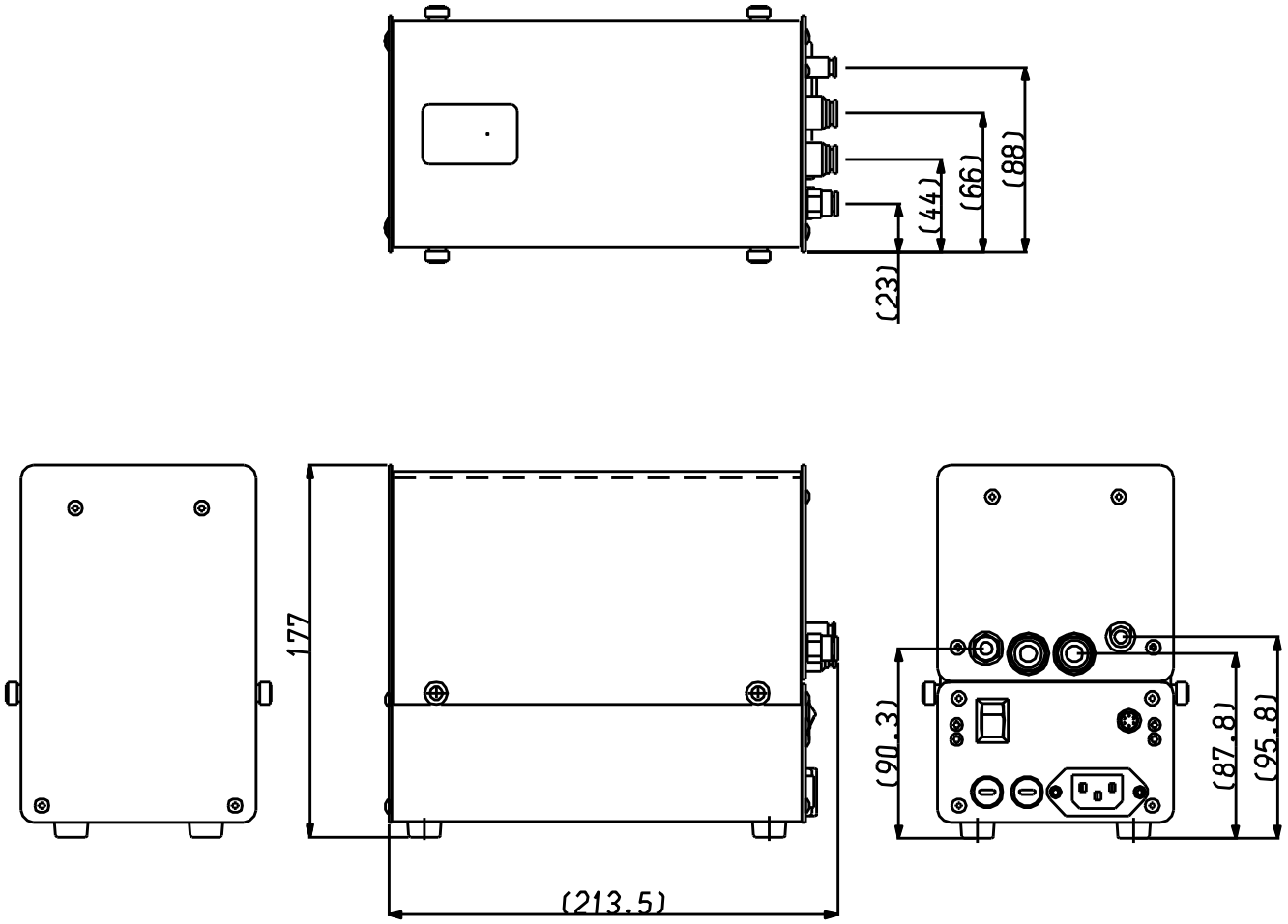
(2)（DF200H-■■-MC）



(3)（DF200H-■■-A）


56 Screw-feeding position
(88)
(66)
(44)
(23)
47 Screw-feeding position
177
Screw-feeding position
161.5
φ15
17
164
(213.5)
90.3
87.8
95.8
74
19
126

(4)（DF200H-■■-AC）



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Instruction Manual (Ver. 1.0)
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NITTO SEIKO CO., LTD.
Assembly Machine Division