HA17051E

TYPE SSTB

SILENT BLOWER INSTRUCTION MANUAL

IE3 motor (compact low-pressure three-phase squirrel cage induction motor)

IPM motor (permanent magnet synchronous motor)

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IE3 motor (compact low-pressure three-phase squirrel cage induction motor)

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IPM motor (permanent magnet synchronous motor)

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Thank you very much for your purchase of SSTB type silent blower. This instruction manual is for your safety when using IE3 motor (small low-voltage three-phase cage induction motor) or IPM motor (permanent magnet synchronous motor) (hereinafter referred to as IE3 motor or IPM motor) And instructions for handling. In the text, the content that distinguishes IE3 motor and IPM motor is described in IE3 motor (left side) and IPM motor (right side) either separately or together. Please read this against the corresponding motor.

For IPM motor, read this blower instruction manual and the instruction manual for the dedicated inverter unit (Toshiba inverter) required when driving the motor, and use it properly.

Please read this manual for the perfect capability to be assured and also for its maintenance and inspection.

Please be sure to deliver this instruction manual not only to the contractor but also to the end user.

1. Inspection confirmation at the time of purchase (IE3 motor)

Please check with the nameplate of the blower and the specification table below to see if it is the product you ordered.

Especially depending on the area, there is a distinction of 50 · 60 Hz so please check. Also please check for damage etc. during transportation.

1. Inspection confirmation at the time of purchase (IPM motor)

Please check with the nameplate of the blower and the specification table below to see if it is the product you ordered.

For inverter drive there is no distinction of 50 · 60Hz depending on the region. Also please check for damage etc. during transportation.

2. Outline(IE3 motor, IPM motor)

This is a “low noise type blower” realized by improving the air pressure characteristics and suppressing noise of our long-reputed WTB Series.

Owing to the roll filter employed, the filter can be replaced easily with no need of cleaning the filter.

3. Precautions when using (IE3 motor)

- Because IE3 suppresses generation loss, rotation speed generally becomes faster than IE 1 (up to now motor). When IE1 (standard motor) is replaced with IE3 (high efficiency motor), the output of the motor increases as this rotational speed increases. Motor efficiency is high, but as the output increases, power consumption may increase.
- Also, since the (primary and secondary) resistors are lowered to reduce copper losses, the starting current is higher for IE1 (up to now motor), and it is necessary to change wiring breaker, electromagnetic switch, thermal relay, etc. It may become.

3. Precautions when using (IPM motor)

- IPM motors can not be operated by directly connecting a commercial power supply (50/60 Hz).Drive with the inverter for IPM motor operation. In particularly important equipment, it is recommended to prepare an inverter spare in case of failure.
- Since an IPM motor needs to be controlled based on the position of the rotor, it is not possible to operate multiple IPM motors with one inverter.
- If you combine an IPM motor with an inverter from different manufacturers, the inverter or motor may malfunction, or reverse operation depending on the machine may cause unexpected behavior.
- When the rotor of the IPM motor is mechanically rotated externally, the magnetic field of the permanent magnet generates an induced voltage between the motor terminals. Therefore, the inverter may be damaged depending on the risk of electric shock and the rotational speed at the time of power off.
- If the cable between the IPM motor and the inverter is long, it may not be able to operate normally due to the increase of inverter surge and the attenuation of sensor signal.
- The IPM motor has a permanent magnet inside, which requires careful handling. Please contact the manufacturer you purchased for maintenance.

4. Specification(IE3 motor, IPM motor)

* 1: The air volume, static air pressure, and noise value for an IPM motor are commercial power supplies (50 Hz / 60 Hz) input to the inverter.

SSTB-S Standard type

Type	Air quantity (m^3/min) *1		Static pressure (kPa) *1		Motor power (kW)	Rated current (A)			Connection	Revolution per minute (min^{-1})			A Sound level (dB) *1		Weight (kg)	
	50Hz	60Hz	50Hz	60Hz		IE3 50Hz	IE3 60Hz	IPM 180Hz 200V/400V		IE3 50Hz	IE3 60Hz	IPM	50Hz	60Hz	IE3	IPM
3S	5	4	6.0	6.5	1.5	6.2	6.2	6.40/3.20	80A	2890	3460	3600	62	63	225	219
4S	9	9	6.0	6.0	2.2	9.2	9.0	9.00/4.50	100A	2875	3445		65	66	246	235
5S	17	16	6.5	6.5	3.7	14.4	14.2	15.2/7.60	125A	2910	3490		67	68	319	306
6S	25	26	6.5	6.5	5.5	21.4	21.0	23.0/11.5	150A	2920	3500		69	71	348	317
8S	35	34	7.0	7.0	7.5	29.8	28.6	31.0/15.5	200A	2920	3505		71	73	448	416
10S	54	55	6.0	6.0	11.0	44.0	43.0	45.0/22.5	250A	2940	3520		73	74	548	506
12S	70	70	6.5	6.5	15.0	58.8	56.8	60.0/30.0	300A	2940	3525		75	76	608	561
12SH	75	80	7.0	7.0	18.5	72.4	71.0	74.0/37.0	300A	2940	3525		78	79	649	592

SSTB-H High pressure type

Type	Air quantity (m^3/min)		Static pressure (kPa) *1		Motor power (kW)	Rated current (A) *1			Connection	Revolution per minute (min^{-1})			A Sound level (dB) *1		Weight (kg)	
	50Hz	60Hz	50Hz	60Hz		IE3 50Hz/200V	IE3 60Hz/200V	IPM 180Hz 200V/400V		IE3 50Hz	IE3 60Hz	IPM	50Hz	60Hz	IE3	IPM
3H	5	4	7.5	8.5	2.2	9.2	9.0	9.00/4.50	80A	2875	3445	3600	65	66	246	235
4H	10	9	7.5	9.5	3.7	14.4	14.2	15.2/7.60	100A	2910	3490		67	69	259	246
5H	17	17	8.5	9.5	5.5	21.4	21.0	23.0/11.5	125A	2920	3500		70	72	348	317
6H	24	25	8.5	9.5	7.5	29.8	28.6	31.0/15.5	150A	2920	3505		73	74	358	326
8H	36	36	8.5	9.5	11.0	44.0	43.0	45.0/22.5	200A	2940	3520		74	75	518	476
10H	50	50	8.5	9.5	15.0	58.8	56.8	60.0/30.0	250A	2940	3525		75	76	568	521
12H	70	70	8.0	9.5	18.5	72.4	71.0	74.0/37.0	300A	2940	3525		77	78	639	582

5. Safety precautions(IE3 motor, IPM motor)

Be sure to thoroughly read this instruction manual and other attached documents before installation work, test operation adjustment, maintenance and inspection, familiarize all about equipment knowledge, safety information, and precautions before using. In this instruction manual, the rank of safety precautions is classified as "danger", "warning", "caution".

Meaning of indication

Indication	表示の意味
 DANGER	Indicates contents that could result in death or serious injury if you handle it with the contents of this indication ignored.
 WARNING	Indicates contents that could result in serious injury if you handle it with the contents of this indication ignored.
 CAUTION	Indicates the possibility of being subject to moderate injury or minor injury, and handling that ignores the contents of this indication, and it is supposed to cause physical damage.

Meaning of drawing

Drawing mark	Meaning of drawing
 INSTRUCTION	This is to tell that there is indication to instruct compulsorily your action. Contents of the instruction must be described definitely nearly.
 PROHIBITION	This is to tell the prohibited action. Specifically prohibited action are described.
 CAUTION	This is to tell that three is a thing to be at attended. The specifically attended thing is described nearly.

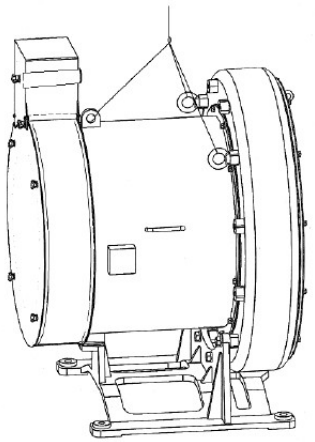
5. Safety precautions(IE3 motor, IPM motor)

DANGER	
 PROHIBITION	**Do not drive beyond the capability of the equipment** This machine is designed so that the current value does not exceed the rated current value during operation at the rated flow rate. If the discharge flow rate exceeds the rated flow rate due to, for example, no resistance at the outlet or downstream from the outlet, the overcurrent could cause failure or seizure of the motor. Be sure to use the burner in a manner that the rated current value and rated flow rate are not exceeded.
 ELECTRIC SHOCK	**Electric shock attention** When you remove the cover of a terminal box, please be sure to carry out after shutting off a former power supply.
 PROHIBITION	**Do not disassemble** Because you might be hurt with a turning impeller please never remove Looking cover while driving.
 COMPULSON	Please fix a blower with an anchor bolt on the stable foundation.
 COMPULSON	To fix the piping from the blower be sure to provide independent supports.
 PROHIBITION	Do not use the attached gasket for sealing this blower. Put the replaced old gaskets pouch and throw away them according to the waste disposal regulation or 「the waste cleaning regulation」. Never burn up them.

7. Transportation method (IE3 motor, IPM motor)

As for lifting, please use the eyebolt (3 places)which is assembled to the main body as shownon the right.

Never use the handle of the silent cover.



8. Installation (IE3 motor, IPM motor)

- Secure a space at least 1m around the blower in consideration of disassembly cleaning and repair.
- Please avoid the place described below.
  - ·Places sucking the corrosive gases.
  - ·Place with much dust.
  - ·Place that gets wet with rainwater.
  - ·Place where the circumference will be 40 ℃ or more.
- Fix to the stable foundation firmly with an anchor bolt.
  When you install on a steel-materials structure unavoidably, please use the rubber mount of an option.
- In order to prevent offset load, please install so that a blower axis becomes horizontal.

9. Piping(IE3 motor, IPM motor)

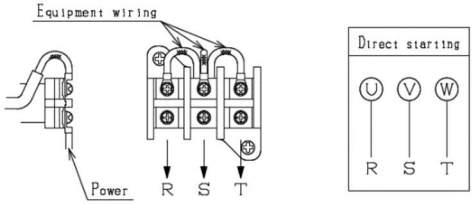
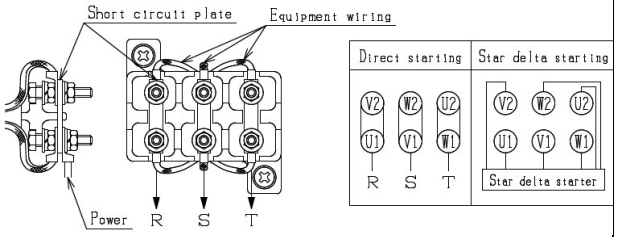
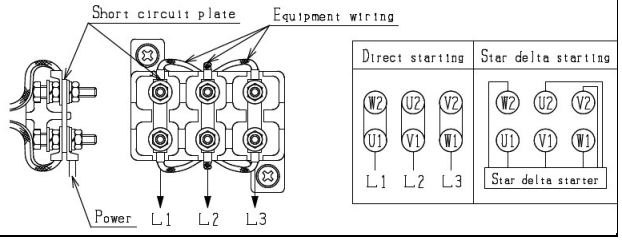
- For the piping, be sure to provide independent supports for fixing, and use the accompanying rubber joints to protect the blower from the direct impact of load and vibration from the piping.
- Piping size should be the same diameter as the blower, or larger size.
- A straight part of a blower exit pipe more than three times longer than pipe diameter is required.

10. Wiring connection of the Motor(IE3 motor)

Please check the specification of a motor with the name plate stuck on the external terminal box.

The standard motor is 3 ratings of 200V-50 Hz, 200V/220V-60 Hz of single voltage.

As a special motor, there is also different voltage, such as 380V, 400V, and 440V.

	Lead wire Number of terminals	Motor power kW	Lead wire connection method
Applicable standard JIS JEC	3	1.0 ∫ 3.7	
	6	5.5 ∫ 18.5	
Applicable standard	6	5.5 ∫ 18.5	

10. Wiring connection of the Motor (IPM motor)

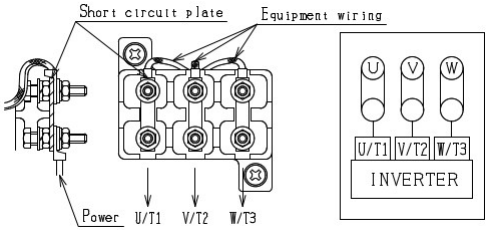
Please check the specification of a motor with the name plate stuck on the external terminal box.

The standard motor is 2 ratings of 200V-180 Hz, 400V-180 Hz of single voltage.

Connect the commercial power supply to the terminal block of the inverter.

Inverter is three-phase 200-240V-50 / 60Hz

It is two models of three-phase 380-500V-50 / 60Hz.

Lead wire Number of terminals	Motor power (kW)	Lead wire connection method
3	1.5 ～ 18.5	

※Please connect so that there is no short circuit between wires.

※Ground the earth terminal securely.

※Please do not remove the short circuit board.

※Please connect so that there is no short circuit between wires.

※Ground the earth terminal securely.

※When connecting to the star delta starter please remove the short circuit plate.

(Star delta starting is possible for models with 5.5 kW or more)

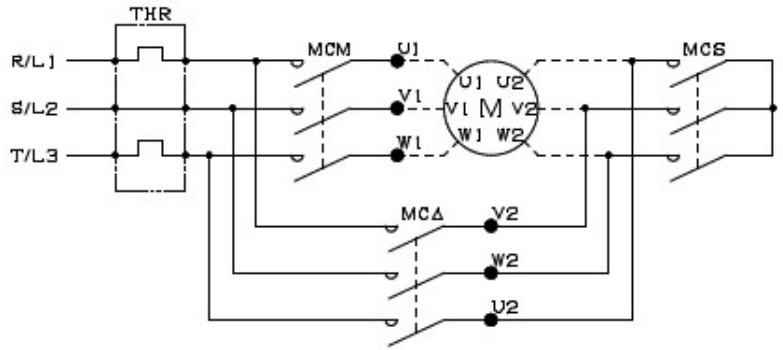
11. Star delta starting(IE3 motor)

1). Notes on star delta start

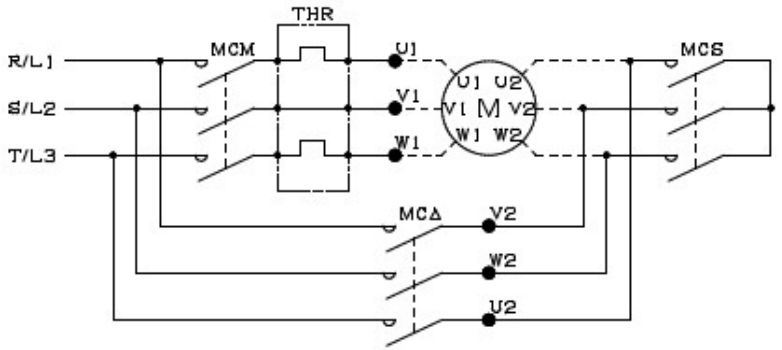
There are three electromagnetic contactor type and two magnetic contactor type in the star delta starting method. 2 Electromagnetic contactor type circuit is simple and economical, but since voltage is constantly applied to the windings of the motor even when the motor is stopped, safety during maintenance and inspection, dust and humidity are high Because it is necessary to pay attention to insulation degradation between the windings of each motor phase winding and winding to ground at the place, 3 electromagnetic contact type is recommended.

2). Current detection method of thermal relay

As shown in the figure below, the thermal relay at the star delta start has the line current detection method and the phase current detection method, and the selection of the heater rating is different. In the line current detection method, the heater rating is selected based on the motor full load current. On the other hand, in the phase current detection method, the heater rating is selected based on the current of 1 / √3 of the full load current of the motor. In this method, the frame size of the thermal relay can be made smaller than that of the line current detection method, but since the wiring size of the motor circuit does not change in any detection method, in the case of the phase current detection method, Since it is necessary to consider whether wire connection is possible or not, the line current detection method is recommended.



Line current detection method



Phase current detection method

12. Starting current and starting time(IE3 motor)

SSTB-S Standard type

Type	Motor power (kW)	Starting current (A)				Start time (s)			
		Direct		Star delta		Direct		Star delta	
		50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
3S	1.5	44.8	42.2	-	-	13.57	12.86	-	-
4S	2.2	63.7	61.4	-	-	10.03	9.69	-	-
5S	3.7	101.5	101.1	-	-	8.84	7.80	-	-
6S	5.5	153.2	145.9	76.3	63.2	6.21	5.51	24.4	23.9
8S	7.5	217.0	199.7	108.0	86.4	3.97	3.87	14.9	15.5
10S	11.0	304.1	295.8	151.4	128.0	4.00	3.98	16.3	17.8
12S	15.0	407.8	390.6	203.0	169.1	3.60	3.80	14.1	16.0
12SH	18.5	505.4	492.5	251.6	213.2	3.31	3.34	12.5	13.5

SSTB-H High pressure type

Type	Motor power (kW)	Starting current (A)				Start time (s)			
		Direct		Star delta		Direct		Star delta	
		50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
3H	2.2	61.8	57.9	-	-	13.78	13.68	-	-
4H	3.7	84.1	97.1	-	-	9.26	12.33	-	-
5H	5.5	139.1	140.1	69.3	60.6	7.62	5.11	30.0	22.1
6H	7.5	188.0	194.0	93.6	84.0	5.26	3.35	19.7	13.4
8H	11.0	303.5	290.8	151.1	125.9	5.91	5.39	24.1	24.1
10H	15.0	423.6	387.7	210.9	167.8	4.55	3.80	17.7	16.0
12H	18.5	510.4	481.9	254.1	208.6	3.47	3.60	13.1	14.6

13. About electromagnetic contactor, switch, thermal relay(IE3 motor)

※Compared with conventional motors, the IE3 motor increases the starting current by 15 to 30%.The startup time also tends to become longer.

1). Main circuit voltage 200 to 220 V direct startup (by Fuji Electric)

※ Please use late type thermal relay for thermal relay.

※ When the thermal relay trips, increase the set value of the thermal relay to 5% We recommend you to.

Type	Motor power (kW)	Electromagnetic switch type	Thermal type	Settling range (A)
3S	1.5	SW-0/2L Main circuit AC□V 1.5kW Coil AC□V 1a(1b)	TR-0NL	5～8(5)
3H 4S	2.2	SW-0/2L Main circuit AC□V 2.2kW Coil AC□V 1a(1b)	TR-0NL	7～11(7)
4H 5S	3.7	SW-4-1/2L Main circuit AC□V 3.7kW Coil AC□V 1a(1b)	TR-5-1NL	12～18(12)
5H 6S	5.5	SW-N1/2L Main circuit AC□V 5.5kW Coil AC□V 2a2b	TR-N2L	18～26(18)
6H 8S	7.5	SW-N2/2L Main circuit AC□V 7.5kW Coil AC□V 2a2b	TR-N2L	24～36(24)
8H 10S	11.0	SW-N2S/2L Main circuit AC□V 11kW Coil AC□V 2a2b	TR-N3L	34～50(34)
10H 12S	15.0	SW-N3/2L Main circuit AC□V 15kW Coil AC□V 2a2b	TR-N3L	45～65(45)
12SH 12H	18.5	SW-N4/2L Main circuit AC□V 18.5kW Coil AC□V 2a2b	TR-N5L	53～80(53)

2). Main circuit voltage 200 to 220 V Star delta starting (by Fuji Electric)

For the selection in the table below, the thermal relay uses line current detection and the star electromagnetic switch is selected by the star short circuit method.

※ Please use late type thermal relay for thermal relay.

※ When the thermal relay trips, increase the set value of the thermal relay to 5% We recommend you to.

Type	Motor power (kW)	Electromagnetic switch type	Thermal type	Settling range (A)
5H 6S	5.5	MCM:SC-4-0 Coil AC□V 1a MC△:SC-4-0 Coil AC□V 1b MCS:SC-5-1 Coil AC□V 1a1b	TR-N2LH	18～26(18)
6H 8S	7.5	MCM:SC-4-1 Coil AC□V 1a MC△:SC-4-1 Coil AC□V 1b MCS:SC-N1 Coil AC□V 2a2b	TR-N2LH	24～36(24)
8H 10S	11.0	MCM:SC-N2 Coil AC□V 2a2b MC△:SC-N2 Coil AC□V 2a2b MCS:SC-N1 Coil AC□V 2a2b	TR-N2LH	34～50(34)
10H 12S	15.0	MCM:SC-N2 Coil AC□V 2a2b MC△:SC-N2 Coil AC□V 2A2b MCS:SC-N2 Coil AC□V 2a2b	TR-N3LH	45～65(45)
12SH 12H	18.5	MCM:SC-N2S Coil AC□V 2a2b MC△:SC-N2S Coil AC□V 2a2b MCS:SC-N2 Coil AC□V 2a2b	TR-N3LH	53～80(53)

MCM：Electromagnetic contactor for power

MC△：Electromagnetic contactor for delta

MCS：Electromagnetic contactor for star (star short circuit)

14. Before getting into operation(IE3 motor)

＜Check of direction of rotation＞

1）Rotate the impeller slowly by turning ON/OFF the started switch instantaneously.

2）Looking through the rotation instruction cover, check whether the rotation confirmation mark (yellow) on the spindle shows the same direction as the direction of the arrow. If not, turn OFF the main power immediately, and correct the connection.

＜Starting operation＞

1）Turn on the start switch of a blower.

2）When the blower becomes steady, increase the load to the maximum level, and check whether the current value of the motor is not above the rated value. (Never run the motor under overloaded condition.)

3）If the operating air quantity is reduced excessively, a surging phenomenon (pressure fluctuation like waving) may occur. If such phenomenon occurs, it is advisable to provide a vent valve on the delivery side.

15. Maintenance inspection(IE3 motor)

Please inspection and maintenance in the following way.

1）Even if there is not abnormality, please do the inspection in the main body of impeller and blower once a year.

2）Occasionally check the tightening of the bolts of each part.

3）Always pay attention to the abnormal sound, vibration, overheat of the blower body and any other abnormality.

4）Please rolling up the dirty roll filter and clean it.

16. Roll filter(IE3 motor, IPM motor)

Please check the filter periodically, and before it starts decreased pressure by the clog of dust etc., Rolling up a roll filter.

The roll filter is supposed to be replaced by rolling up once every week or so, but this replacement frequency may be adjusted according to the usage and the environment.

One roll filter lasts for about one year.

●Rolling up the roll filter

1）Loosen the wing nut B.

2）Release the latch to open the presser foot.

3）Rolling up one circumferential amount of the filter.

4）Put the presser foot back to the former state with the latch.

5）Cut off the soiled portion of the filter.

6）Tighten the wing nut B.

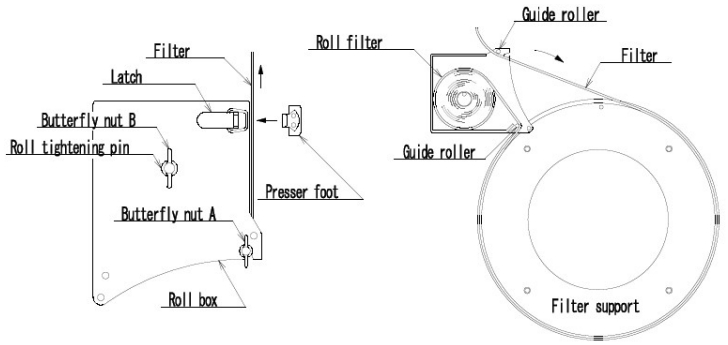
●A filter kind and pressure loss

There are 3 filter types as listed below Please use properly according to usage environment.

As of shipping from our facilities, the filter of medium roughness (RF-M) type has been provided.

※Pressure loss (Maximum) is a value at the time of the maximum air quantity in each model. When ordering, make an entry in the □□ spaces as follows.

＜Detailed view of roll filter ＞



●Exchange of a roll filter

1）Loosen the wing nut A and open the roll box.

2）Remove the wing nut B and pull out the roll receiving pin.

3）Insert a new roll filter and insert the roll receiving pin.

4）Tighten with the wing nut B and fix.

5）Pass the tip of the filter through the inside of the guide roller as shown in the figure.

6）Return the roll box to its original position.

7）Tighten the wing nut A and fix the roll b

Type	Model	Sieve opening（mm）	Pressure loss (Maximum)※
Coarse mesh	RF-□□-L	2.5	Less than 0.06kPa
Medium mesh	RF-□□-M	1.3	Less than 0.10kPa
Fine mesh	RF-□□-S	0.6	Less than 0.20kPa

ＳＳＴＢ－３，４　→3 4

ＳＳＴＢ－５，６　→5 6

ＳＳＴＢ－８，１０　→8 1

ＳＳＴＢ－１２　→1 2 0

17. Disassembly method(IE3 motor, IPM motor)

<Blower body inside side>

1) Pass a wire or the like through the eye bolts② attached to the cover⑫, hoist the blower body①, and fix the blower body① in the hoisted position
2) Remove the bolts from the cover⑫, and separate the cover⑫ from the blower body①.
3) Release the fixing teeth of the bearing washer⑩, and remove the bearing washer⑩ together with the bearing nut⑪ and the collar⑨.
4) Remove the impeller⑧, and remove the key⑦.
5) Remove the positioning collar⑥.

<Silent cover side>

1) Remove the Wing nut㉑ and pull out a Filter support⑱than a Rod bolt⑯.
2) Disconnect the wiring and remove the Terminal boxA.
3) Remove the BushingC and Lock nutD from the ConnectorE, push the Plica tubeF to the inside of the cover.
4) Remove the bolt from the cover support㉕ and silent cover⑮, and separate the silent cover⑮ from the blower body① by using the cover knob.
   Now, the disassembly of the inside of the main body and silent cover unit is completed.

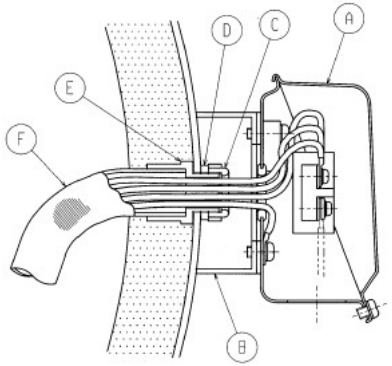
   In the case of assembling, please go in the inverse order mentioned above.

18. Precautions in assembling(IE3 motor, IPM motor)

1) Never scratch or bruise the shafts and meshing parts.
2) Apply high quality machine oil to the shaft, etc., after cleaning.
3) Tighten the bearing nuts firmly and fix them bending the pawls of the bearing washers.
4) Upon completion of assembly turn the blower shaft by a hand to confirm that it moves as smoothly as before disassembly.

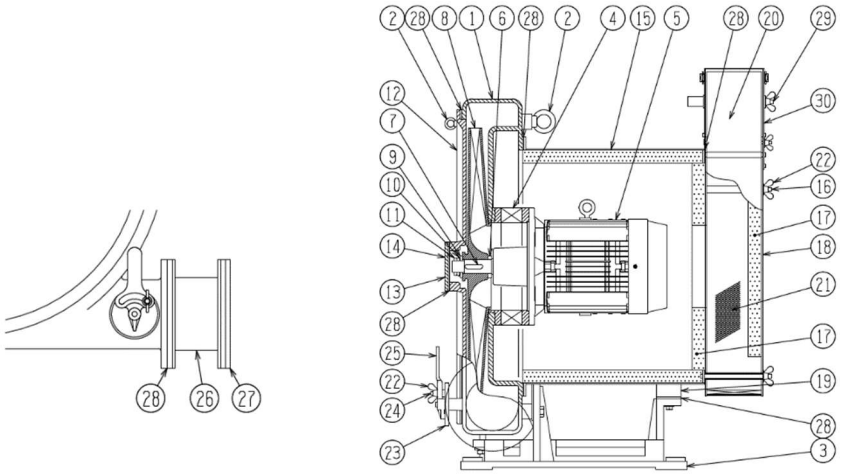
19. Structure drawing(IE3 motor, IPM motor)

<Terminal box>



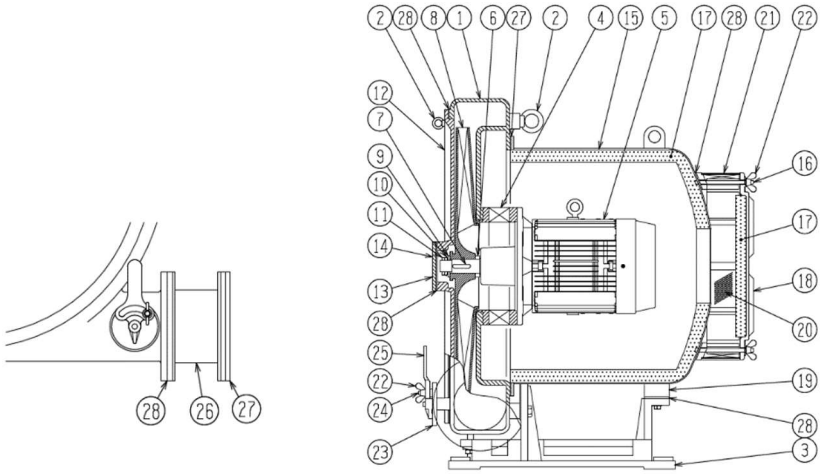
A	Terminal box
B	Box support
C	Bushing
D	Lock nut
E	Connector
F	Plica tube

<Roll filter type>



1	Blower body	16	Rod bolt
2	Eye bolt	17	Silent pad
3	Base	18	Filter support
4	Motor support	19	Cover support
5	Motor	20	Roll filter
6	Positioning collar	21	Punching metal
7	Key	22	Wing Nut
8	Impeller	23	Gauge plate
9	Collar	24	Butterfly spindle
10	Bearing washer	25	Butterfly handle
11	Bearing nut	26	Rubber joint
12	Cover	27	Mate flange
13	Rotation instruction cover	28	Packing
14	Rotation instruction label	29	Roll receive pin
15	Silent cover	30	Roll box

<Wire mesh type>



1	Blower body	15	Silent cover
2	Eye bolt	16	Rod bolt
3	Base	17	Silent pad
4	Motor support	18	Filter support
5	Motor	19	Cover support
6	Positioning collar	20	Filter
7	Key	21	Filter presser
8	Impeller	22	Wing Nut
9	Collar	23	Gauge plate
10	Bearing washer	24	Butterfly spindle
11	Bearing nut	25	Butterfly handle
12	Cover	26	Rubber joint
13	Rotation instruction cover	27	Mate flange
14	Rotation instruction label	28	Packing

Specifications are subject to change without notice for improvement. 2019.7