TOHIN TURBO BLOWER

TX series

Environment Friendly & High Efficiency - The Best Blower in the World

TOHIN

明日の生活環境に貢献する信頼と技術

TOHIN TURBO BLOWER TX series

About Turbo Blower

This is a new generation blower that uses the jet turbine related technology used in aircraft, and is suitable for handling large volumes of air. Compared to conventional Roots blowers, it is energy saving and less maintenance, compact design, and low noise (no sound proof room required).

- The product consists of the core (motor), inverter, PLC (control panel), LED touch panel display. Simply, it is a cubicle product equipped with the core and a control panel.
- Impeller, directly connected to motor shaft, rotates at very high speed (about 10 times of Roots Blower) to generates a large volume of air.
- High speed rotation is possible without wearing due to use of air bearing.
- High performance inverter and PLC are equipped to control high speed motor rotation.
- With robust package with sound proof system, the operation noise level is kept very low.
- Air volume of blower can be controlled by a sensor which detects the amount of dissolved oxygen in the aeration tank.

FEATURES OF TOHIN TX TURBO BLOWER

TOHIN TURBO BLOWER TX series

TOHIN TURBO BLOWER is jointly developed by TOHIN INDUSTRY and Korean turbo blower manufacturer.

★FEATURES

1. ***Energy efficiency***
2. ***Easy maintenance***
3. ***Low noise, low vibration***
4. ***Main electrical parts are made in Japan and control system is designed by TOHIN***

TOHIN TURBO BLOWER TX series

1. *Energy efficiency*

a. No energy loss by direct connection of the impeller to the high-speed motor

b. Non contact air foil bearing uses the aerodynamic force making almost zero friction and outstanding energy efficiency possible.

c. Wide range of air volume is available by well controlled high efficiency motor and inverter.

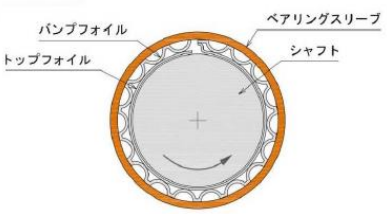
d. The unique cooling system and hollow shaft structure of the motor core allows achievement of great performances.

Energy saving operation can reduce operating cost and CO2 significantly.

A. Impeller

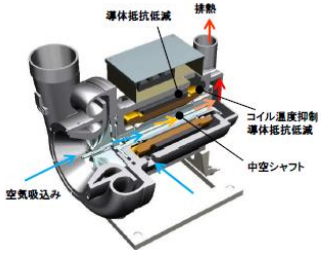
An impeller, was ideally designed based on fluid dynamics for high speed rotation to efficiently generate large amount of flow.

B. Air foil bearing



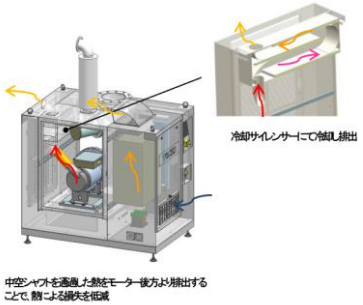
Air bearing utilize a thin film of pressurized air to provide a non-contact between surfaces. No wear, reduced noise & vibration. High rotating speed is need to create sufficient pressurized air to hold the shaft. No float when no air pressure.

C. Hollow rotor shaft



Hollow of the rotor shaft cools down internally, controls the temp. raise of motor coil &keeps a conductor resistance low resulted in high performance on induction motor. Exhale cooled air from motor end to outside keep from inner temp raise.

D. Special cooling system



Our unique cooling technology has reduced the temp. rise inside the blower box, thereby improving the motor efficiency and inverter performance and durability.

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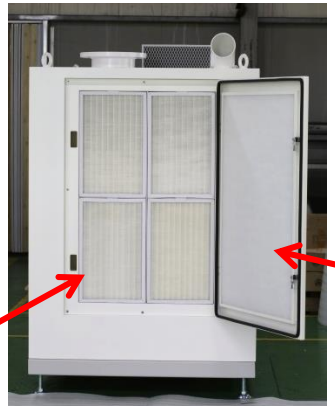
2. Easy maintenance

a. Air bearings do not use lubricant oil and grease, therefore greatly reducing the daily time and cost of maintenance.

b. Keeping the clean filter is the only maintenance required.

Front

Back



Main filter

Pre-filter

Side

Periodical inspection is required for the front filter and rear filter. Rear filter consists of two filters "main filter" and "pre-filter" Pre-filter is washable. The sensor to alarm clogged filter is equipped. Cleaning and replacement of filter is the key to the long and stable operation.

- *recommended filter change of "main filter" … every 6 month*
- *recommended filter change of "pre-filter"… every 3 month*

Consumable parts costs are mainly for filter replacement. We also recommend overhauling of the core and the inverter every 5 to 7 years for long time operation.

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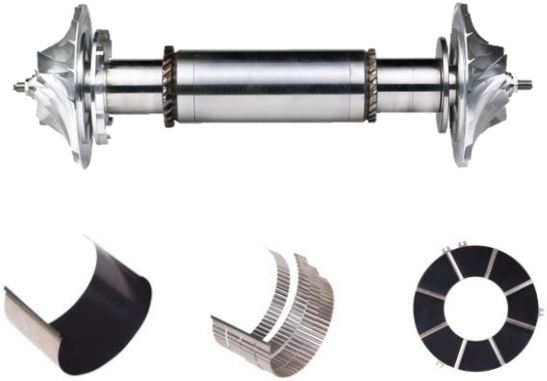
3. *Low noise, low vibration*

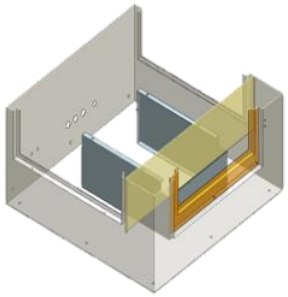
a. *The noise and vibration is significantly reduced.*

b. *Noise absorbing silencer is patented technology which reduces noise below 80 decibel during operation. You can talk near the blower with normal voice tone.*

a. Air foil bearing

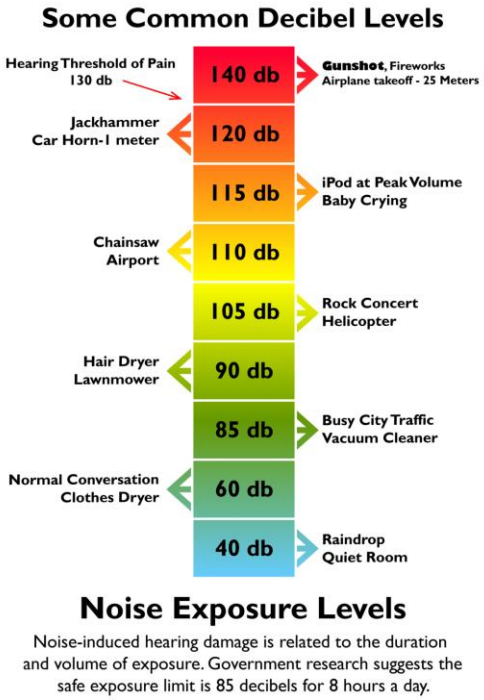


b. Patent technology
Noise absorbing sensor



More noise absorbing materials inside

Noise level chart



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Vibration is very low and a coin stay still

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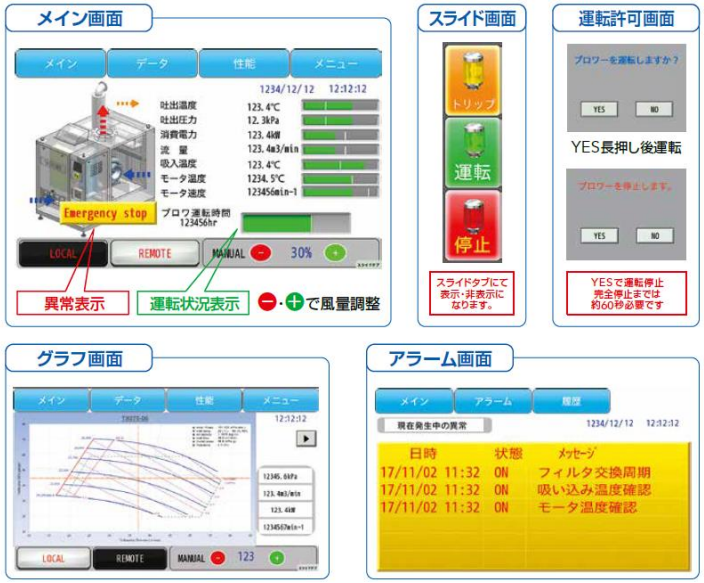
4. *Main electrical parts are made in Japan and the control system is designed by TOHIN*
   a. *PLC, touch panel are made by KEYENCE Corporation, inverter by YASUKAWA ELECTRIC Corporation and more electrical parts are made in Japan They are highly reliable, quick delivery of repair parts.*
   b. *PLC by KEYENCE enables precise control. TOHIN custom designs the control program to meet customers requirements. Touch panel with high resolution & good controllability makes it easy to check the operation status, various setting and change in settings.*
   c. *Inverter is made by Yasukawa Electric Corp and high efficiency control is possible.*

LCD Touch Panel



PLC by KEYENCE

Inverter by YASUKAWA

Using a high resolution panel LCD, operation status is easily analyzed. Operation status can be monitored by logging system and error records are saved on SD card. Air volume can be adjusted easily +/- switch and operation on/off are by two step method to avoid operation error.
Equipped with universal functions, multi-language (JPN, ENG,KOR,CHN,VNM) are standardized.

Control Modes

There are 4 types of settings.

1. Motor rotation speed control mode

Control the speed. Touch "-" or "+" of the touch panel to change the speed. Watch the meter and adjust the speed. By pressing "+" switch, air volume and pressure increase as the speed increases.

2. Air volume control mode

Air volume is maintained regardless of passive pressure. This mode can be used when the water depth fluctuates drastically but a certain amount of airflow is required.
Volume of air cannot be controlled by "-" or "+" of touch panel.

3. Pressure control mode

Maintain the pressure as programmed. It is used when constant pressure is required for some application, such as damper and air knife.

4. DO (Dissolved Oxygen) control Mode

Used to adjust the air volume by the signal from an external DO meter (4-20mA).

★ *TOHIN can customize the program by request.*

ADVANTAGE OF TOHIN TX BLOWER

TOHIN TURBO BLOWER TX series

★***COST PERFORMANCE***

Permanent Magnetic Motor (PMM) is very expensive. TOHIN is successful to reduce the cost by equipping TX with Induction Motor (IM).

★*Equipped with Induction Motor.*

TOHIN can repair and maintenance IM at site.

★***ELECTRIC PARTS ARE MADE IN JAPAN***

TOHIN uses KEYENCE PLC and touch panel and YASUKAWA ELECTRIC inverter while the most of other turbo blower manufacturers use PLC and inverter not from Japan, but from somewhere else.

★***TOHIN ORIGINAL PROGRAM FOR CONTROL SYSTEM***

TOHIN makes the original control program for TX blower. The backup software can be stored in SD card inserted into PLC to help restart the blower without PC when PLC software is damaged.

★***COOPERATION WITH TUROB BLOWER MANUFACTURER IN KOREA***

TOHIN has formed the alliance with Korean turbo blower manufacturer, "ACE Turbo". Our engineers are trained at the factory for repair and maintenance.

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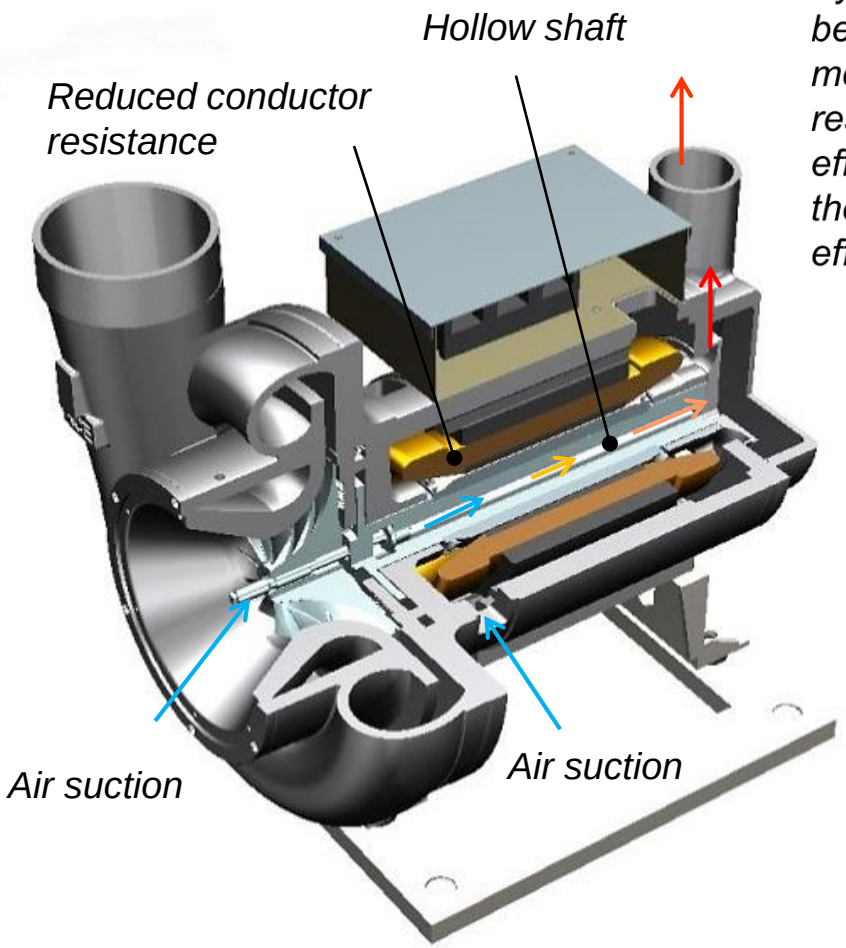
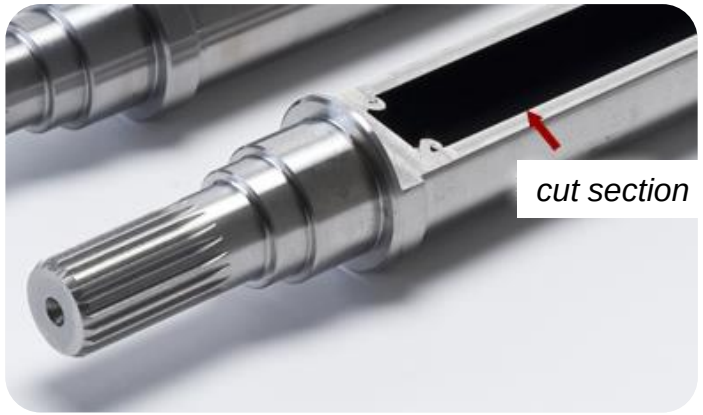
Cooling system



Originally developed "CORE COOLING SYSTEM"

By making the rotor shaft hollow, cooling from the inside has been made possible. By cooling externally and internally, the motor coil temperature is controlled keeping the conductor resistance low, thus CRIM (induction motor) operates highly efficient. And cooling air discharged from the motor end to the outside prevents from temperature rise increasing overall efficiency. Energy saving has been achieved.

Hollow shaft



Advantage of TOHIN

★*TOHIN uses CRIM (Copper Rotor Induction Motor) while other companies uses PMSM (Permanent Magnet Synchronous Motor)*

* *Limited models*

Efficiency comparison

PMSM	*approx. 95%*
CRIM	*approx. 93 – 94 %*

PMSM

Highly efficient motor with zero secondary copper losses. Advantage of being smaller than induction motor. However, the disassembly requires the high voltage application within the demagnetization facility, therefore it is basically impossible to disassemble and repair at the site.

CRIM

Our TX turbo motor compensates for the 1% efficiency loss with features of the unique cooling mechanism. Overall efficiency is the same as that of PMSM. Induction motor could be repaired at the site.

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Substituting roots blower (positive displacement lobe pump)

Examples of cost reduction:
running cost down by turbo blower

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CUT RUNNING COST

Roots Blower

Typical Roots blower
150A x5pc (14.6㎥/min・18.5kw at 40.0kPa)

Roots blower of other company 150A x 5pc	
Annual electricity cost	Approx. USD 110,000
Overhaul and consumable goods/year	Approx. USD 7,300
Total	Approx. USD 117,300

USD27,200/year COST DOWN

Turbo Blower

★*Roots blowers for back up*

Turbo blower
TX050-06-200×2 sets (36.5㎥/min at 40.0kPa)

Turbo blower TX050-06-200×2 sets	
Annual electricity cost	Approx. USD 85,600
Overhaul and consumable goods/year	Approx. USD 4,500
Total	Approx. USD 90,100

Initial capital investment costs can be recovered in 3 to 5 years by less running costs.

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★*Case study: food company*

Replacing 2 roots blower to 1 turbo blower reduced electricity cost about USD 18,000 per year!!

Roots blower 30Kw 150A x 2 pc (20.6 ㎥／min)	
Annual electricity cost	Approx. USD 81,500

Approx. USD 18,600/year cost down

Turbo blower TX-75-08 x 1pc (41.6㎥／min)	
Annual electricity cost	Approx. USD 62,900

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SALES RESULTS

R FOOD COMPANY	FOOD FACTORY	TX30-06	2	200V	WATER TREATMENT AERATION	OCTOBER 2017
MILK COMPANY	FOOD FACTORY	TX100-08	1	200V	WATER TREATMENT AERATION	JUNE, 2018
MILK COMPANY	FOOD FACTORY	TX75-07	2	200V	WATER TREATMENT AERATION	OCTOBER 2018
M COMPANY	FOOD FACTORY	TX75-08	1	200V	WATER TREATMENT AERATION	OCTOBER 2018
N COMPANY	FOOD FACTORY	TX75-06	1	200V	WATER TREATMENT AERATION	NOVEMBER 2018
Y COMPANY	FOOD FACTORY	TX75-08	1	200V	WATER TREATMENT AERATION	NOVEMBER 2018
M COMPANY	FOOD FACTORY	TX30-06	2	200V	WATER TREATMENT AERATION	OCTOBER 2018
F CHEMICALS	CHEMICAL FACTORY	TX100-08	1	400V	WATER TREATMENT AERATION	MARCH 2019
Y COMPANY	FOOD FACTORY	TX75-06	3	200V	WATER TREATMENT AERATION	JUNE 2019
S COMPANY	FOOD FACTORY	TX100-06	1	400V	WATER TREATMENT AERATION	SEPTEMBER 2019
H COMPANY	FOOD FACTORY	TX150-06	1	400V	WATER TREATMENT AERATION	SEPTEMBER 2019

TOHIN supplies 4 sets of big turbo blower TX-600 for public wastewater treatment plant in Ho Chi Minh city, Vietnam in 2020.

Equipment Options

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Option

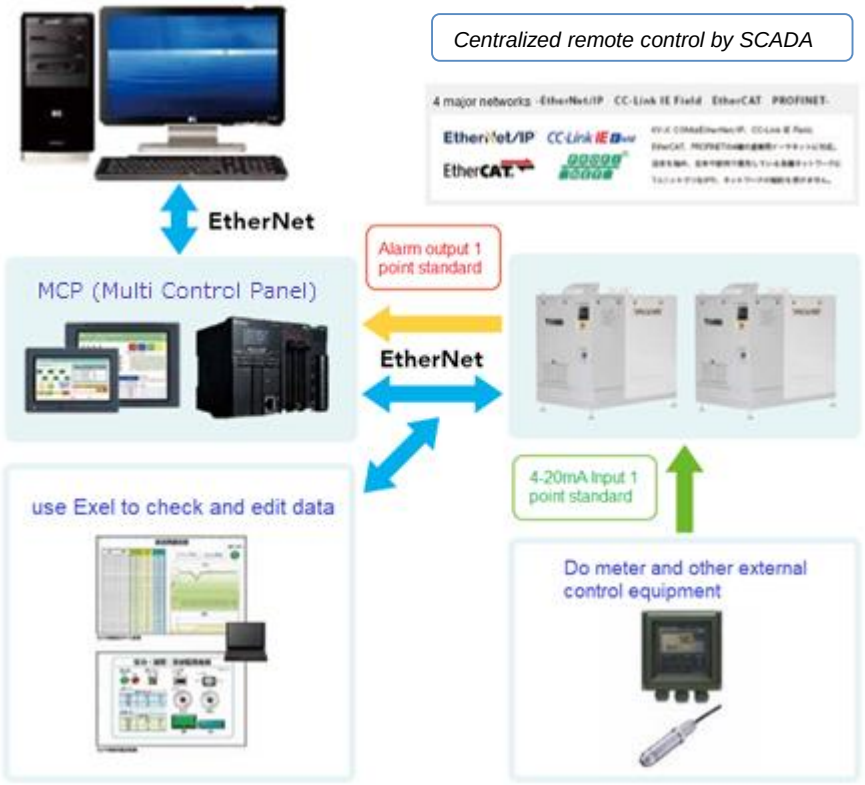
- *Suitable optional equipment according to the installation site*
- *Outdoor, Separate control unit are also available by option.*

e.g.) Rear discharge type

Highly extensible option systems

- Ethernet is available as standard equipment for easy connection to PC (*when use CP KP COM+)
- Optional KV COM+ can easily create meters and graphs in Excel and edit data.
- Optional MCP (Master Control Panel) can provide more high operability and extensible control system.
- Compatible with 4 major networks, it can easily communicate with a higher system like SCADA, and external control equipment (Do meter, air flow meter, etc.)
- Customization is available along with your requirements.

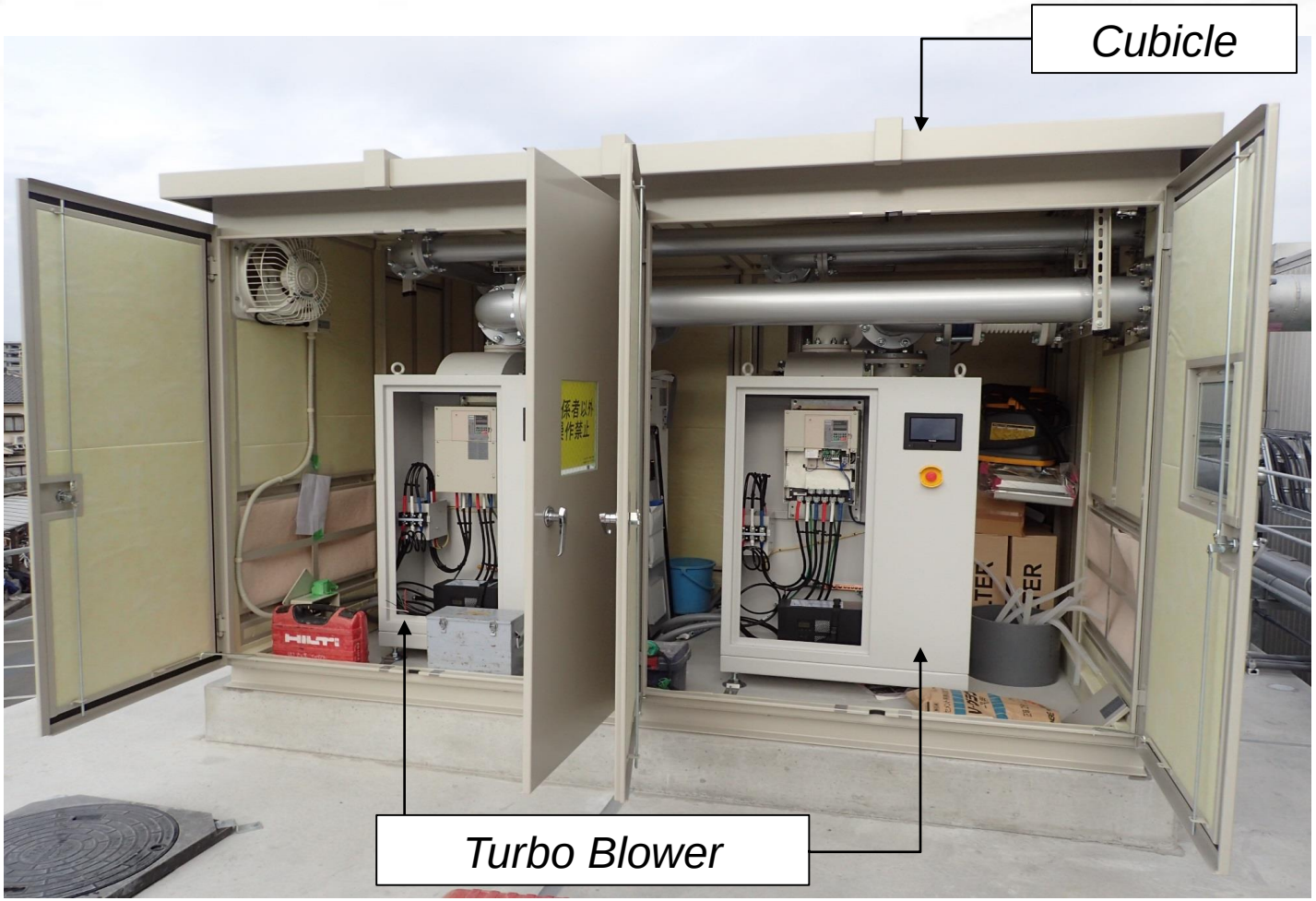
Examples of Configuration of multiple units control



Installation ambient conditions

- Indoor installation is standard.
- For outdoor installation, we can provide a cubicle as an option. See next page.
- PLC, touch panel and inverter are sensitive electric devices, therefore, controlling ambient temperature is necessary.
- Air bearing works at very high speed rotation. Please avoid dust and corrosion environment.
- Under the dusty condition, frequent cleaning and changing filters may prevent from malfunction.
- Height and level can be adjusted by leveling foot. (*Please contact us for special installation environment such as high temperature, high humidity and/or outdoors.)

Outdoor installation in a cubicle



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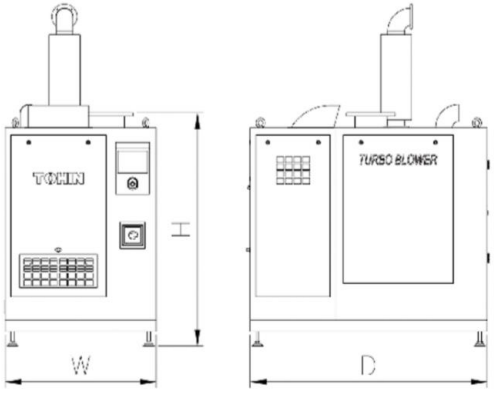
*Flow rate (㎥/min ±5%) 20℃ 101.3kPs 65%RH

MODEL	pressure	flow rate	voltage	cooling		core	weight	discharge diameter	dimension (mm)		
	kPa	㎥/min	V	Air	Water		kg	A	W	D	H
TX010-06	60	6.9	200	O		Single	110	80	600	630	970
TX020-06	60	13.7	200	O		Single	353	150	800	1,120	1,300
TX030-06	60	20.6	200	O		Single	534	150	920	1,350	1,500
TX050-06	60	33.3	200	O		Single	731	200	1,020	1,600	1,575
TX050-08	80	26.5	200	O		Single					
TX075-06	60	48	200	O		Single	735	200	1,020	1,600	1,575
TX075-07	70	40	200	O		Single					
TX075-08	80	37	200	O		Single					
TX100-06	60	69	200	O		Single	1,193	250	1,300	1,950	1,900
TX100-07	70	57	200	O		Single					
TX100-08	80	53	200	O		Single					

MODEL	pressure	flow rate	voltage	cooling		core	weight	discharge diameter	dimension (mm)		
	kPa	㎥/min	V	Air	Water		kg	A	W	D	H
TX010-06	60	6.9	400	O		Single	119	80	600	800	740
TX020-06	60	13.7	400	O		Single	323	150	800	1,120	1,300
TX030-06	60	20.6	400	O		Single	340				
TX050-06	60	33.3	400	O		Single	538	200	920	1,350	1,500
TX050-07	70	28.4	400	O		Single					
TX050-08	80	26.5	400	O		Single					
TX050-09	90	23.0	400	O		Single					
TX050-10	100	21.6	400	O		Single					
TX075-06	60	48	400	O		Single	542	200	920	1,350	1,500
TX075-07	70	40	400	O		Single					
TX075-08	80	37	400	O		Single					
TX075-09	90	32	400	O		Single					
TX075-10	100	30	400	O		Single					
TX100-06	60	69	400	O		Single	742	250	1,020	1,600	1,575
TX100-07	70	57	400	O		Single					
TX100-08	80	53	400	O		Single					
TX100-09	90	47	400	O		Single					
TX100-10	100	44	400	O		Single					
TX150-06	60	100	400	O		Single	762	250	1,020	1,600	1,575
TX150-07	70	84	400	O		Single					
TX150-08	80	79	400	O		Single					
TX150-09	90	69	400	O		Single					
TX150-10	100	65	400	O		Single					
TX200-06	60	130	400	O	O	Single	1,252	350	1,300	1,950	1,900
TX200-07	60	109	400	O	O	Single					
TX200-08	60	101	400	O	O	Single					
TX200-09	60	88	400	O	O	Single					
TX200-10	60	83	400	O	O	Single					

MODEL	pressure	flow rate	voltage	cooling		core	weight	dischare diameter	dimension (mm)		
	kPa	㎥/min	V	Air	Water		kg	A	W	D	H
TX300-06	60	194	400	O	O	Single	1,347	350	1,300	1,950	1,900
TX300-07	70	164	400	O	O	Single					
TX300-08	80	153	400	O	O	Single					
TX300-09	90	133	400	O	O	Single					
TX300-10	100	126	400	O	O	Single					
TX400-06	60	257	400	O	O	Double	2,300	500	1,800	3,500	2,180
TX400-07	70	219	400	O	O	Double					
TX400-08	80	201	400	O	O	Double					
TX400-09	90	177	400	O	O	Double					
TX400-10	100	167	400	O	O	Double					
TX500-06	60	339	400	O	O	Double	2,530	500	1,800	3,500	2,180
TX500-07	70	282	400	O	O	Double					
TX500-08	80	263	400	O	O	Double					
TX500-09	90	234	400	O	O	Double					
TX500-10	100	222	400	O	O	Double					
TX600-06	60	388	400	O	O	Double	2,530	500	1,800	3,500	2,180
TX600-07	70	324	400	O	O	Double					
TX600-08	80	302	400	O	O	Double					
TX600-09	90	266	400	O	O	Double					
TX600-10	100	251	400	O	O	Double					



- *Dimension H shows the height of discharge outlet.*
- *Please contact us for more details.*
- *Contents are subject to change without notice.*

The following power supply is available.

Voltage in the table	50Hz	60Hz
200	200V	200V
	N/A	220V
400	380V	N/A
	400V	400V
	N/A	440V

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