

TURBO BLOWER USER MANUAL

(RS – PROFACE)



NEUROS

This manual provides safe and reliable instructions for the installation, operation and maintenance of your Neuros turbo blower. Carefully read this manual before attempting to operate or perform any maintenance. If you are uncertain about any of the instructions or procedures provided in this manual, contact Neuros or distributor. We recommend you retain this manual, and all publications provided with your turbo blower, in a location which is accessible to all personnel who operate and service your turbo blower.

(REVISED IN OCT. 2017)

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Safety Instructions

Before stating operation or maintenance of this system, be sure to read through this section and understand the contents. Various dangerous utilities (electricity, pneumatic power, and etc.) are supplied to the system, so operate the system very carefully.

This section explains what should be understood on safety before starting operation or maintenance of this system. Noncompliance to these will bring you injury or fatal accident or may result in breakdown of the system, products (wafers) or facilities or may cause a disaster.

Warning of Danger

During operation or maintenance of the system, pay attention to the following three warning levels. Understand the contents and take proper actions.

Warning messages are shown in warning labels on the system and in Precautions for Safety in this manual.

DANGER



‘Danger’ messages forecast concrete dangers and indicate what will bring fatal accident or serious injury to the operator unless he strictly observes precautions or instructions to prevent such dangers. They also include what will leak harmful gas or cause fire unless handled correctly.

The contents are similar as warning messages but are generally more dangerous. The warning labels have been basically designed in red.

WARNING



‘Warning’ messages forecast concrete dangers and indicate what will bring fatal accident or serious injury to the operator unless he strictly observes precautions or instructions to prevent such dangers.

They also include what will leak harmful gas or cause fire unless handled correctly. The warning labels have been basically designed in orange.

CAUTION



‘Caution’ messages forecast concrete dangers and indicate what may bring light injury to the operator or what may damage the system, products (wafers) and facilities or lead them to trouble unless he strictly observes precautions or instructions to prevent such dangers.

The warning labels have been basically designed in yellow.

Pictographs to Warn Danger



Touching energized parts will burn finger, injure the operator or may kill him. Make it a rule to turn off the power before operation or maintenance of the system.



This symbol is attached to burn hazard part. Notice that service man's hands injure look down working of this unit during maintenance, setting or repair

Make it a rule not to operate or maintain the system when someone is working in the dangerous area



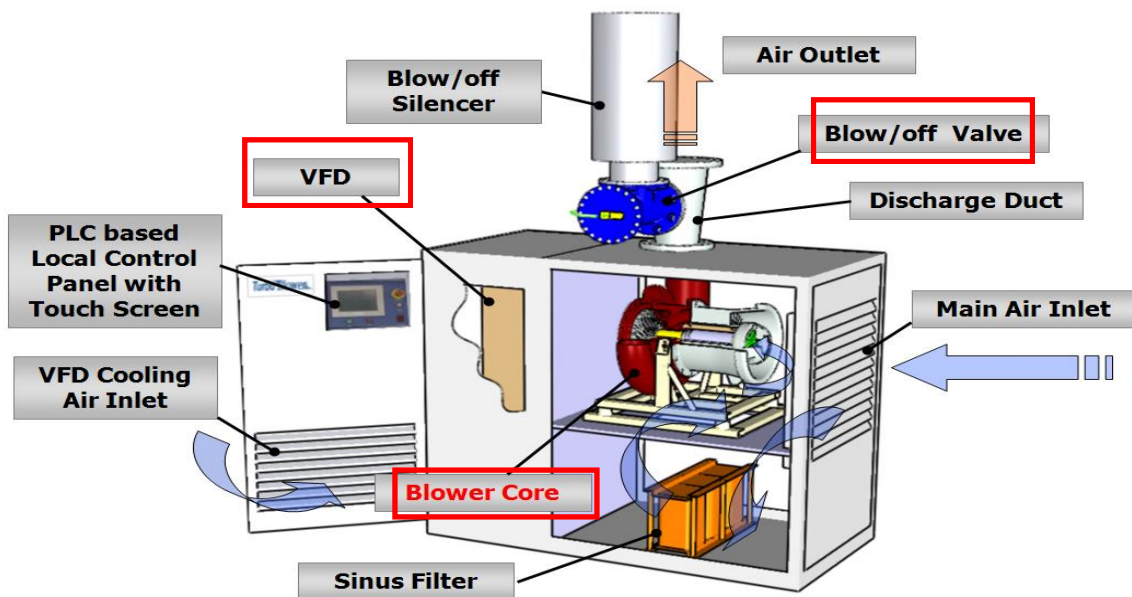
This symbol is attached to main hazard part. Notice that service man's hands injure look down working of this unit during maintenance, setting or repair

Make it a rule not to operate or maintain the system when someone is working in the dangerous area.

GENERAL INFORMATION

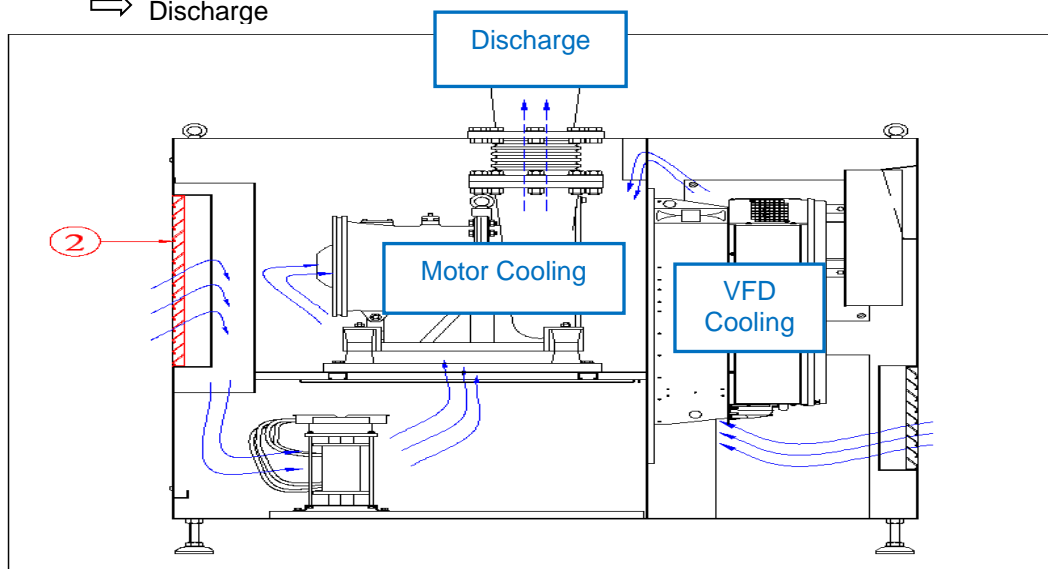
Introduction

Neuros turbo blower mainly consists of core, inverter and controller. And the blower core consists of highly efficient high-speed motor, impeller and air-foil bearings. A blow-off valve and silencer are installed before discharge pipe.



< Typical Configuration of Neuros Turbo Blower >

- Air Flow. Schematic (in case that cooling air is not emit to room)**
 - Atmospheric air \Rightarrow Dust Filtration \Rightarrow Motor&VFD cooling and air compression \Rightarrow Discharge



Neuros' blower has some special functions.

(1) Power Mode

As Neuros' blower shows same performance under the room temperature of 40°C(104°F), blower can exhaust electricity exceeding its rated power which is harmful for the life of its motor. When the power reaches its rated power, "Wc" mark appears in the controller and RPM does not be increased regardless of operator's command.

(2) Warning Message

Some of sensors such as motor temperature, bearing temperature, suction air temperature, discharge temperature, discharge pressure have limitation. When a sensor value exceeds its limitation, blower stops without any notice.

In order to inform operators of this situation, controller shows a warning message when the sensor value is 95% of its limitation. The operators can do something to solve trouble before blower stop.

(3) Surging Avoidance

When the RPM is low or discharge pressure is high, blower can suffer surging which discharge air flows backward. Surging is very harmful to air bearing which can make it failed.

If the blower runs near surge, warning message will appear in controller's view. If the blower approach surge line further more although this warning, the blower can open its blow-off valve to decrease discharge pressure or increase its rotation speed to increase its endurable discharge pressure limit. For this automatic operation by controller, the blower can run without stopping.

(4) Cancellation of Sensor Limit Stop

When a sensor value reaches its limitation, blower stops basically. As this fault stop is important to prevent blower failure, blower can be restarted after solving problems.

But, in case of some sensors (filter pressure drop, motor temperature, bearing temperature, vibration and so on) is out of order, the blower can run regardless of the faults by cancellation of sensor limit stop.

Control Modes

There are four control modes; Auto-Speed, Auto-Flow, Auto-Pressure and DO-Link mode.

Please note that the basic operation in controllers is similar though their configurations are different according to their version.

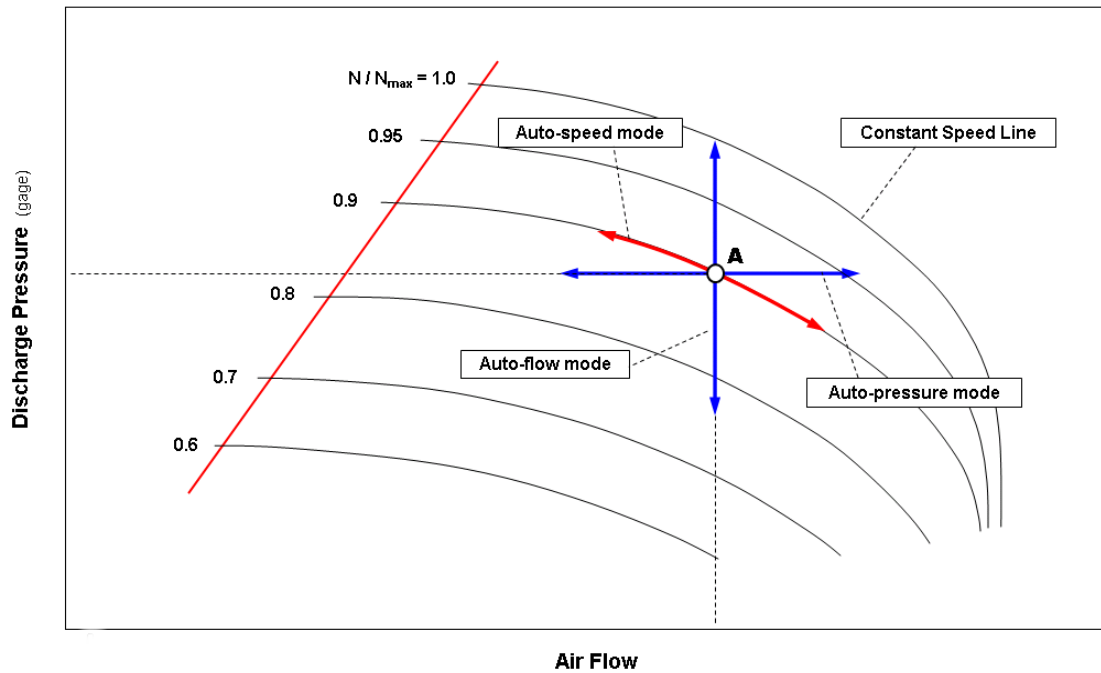
Auto-Speed Auto-Speed mode controls the blower speed, which is a calibrated speed based on the intake fluid temperature. Suppose that the blower is operating at point A in Auto-Speed mode. In this control mode, if the discharge pressure is changed then the operating point will move to another point along the constant speed line.
This is our standard control mode, and it can be changed during commissioning in site.
Master control panel is not needed in the auto-speed mode running of more than 2 blowers.

Auto-Flow Select this control mode when you need constant air flow, based on the calibrated air flow according to the intake fluid temperature. Suppose that the blower is operating at point A in Auto-Flow mode. In this control mode, if the discharge pressure is changed then the controller changes the motor speed so that the air flow be kept constant. The operating point will move to another point along the vertical line on the map.
This mode has a characteristic that operation point will go far away from surge line when discharge pressure increases because rotational speed will increase in order to increase flowrate. Therefore, this mode has a wider range for safe operation.
Master control panel is recommended in the auto-flow mode running of more than 2 blowers.

Auto-Pressure Select this control mode when you need constant discharge pressure. Suppose that the blower is operating at point A in Auto-Pressure mode. In this control mode, if the discharge pressure is changed then the controller changes the motor speed so that the discharge pressure kept constant. The operating point will move to another point along the horizontal line on the map.
When discharge pressure increases, flowrate will be decreased in order for reduction in pressure loss, by which blower go more near surge line. Therefore, this mode has a narrower range for safe operation.
Master control panel is recommended in the auto-pressure mode running of more than 2 blowers.

DO-Link DO-meter is a device that measures the amount of Dissolved Oxygen in the water. In this control mode, the controller changes the motor speed as the dissolved oxygen level is changed so that you may keep the dissolved oxygen level constant.

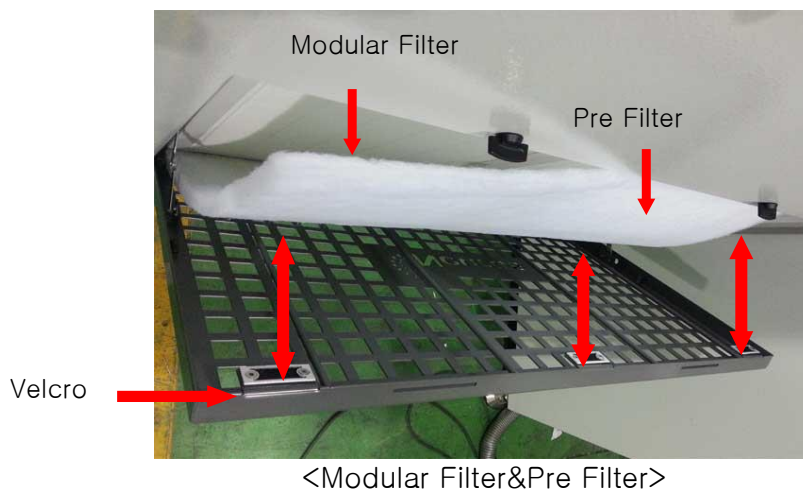
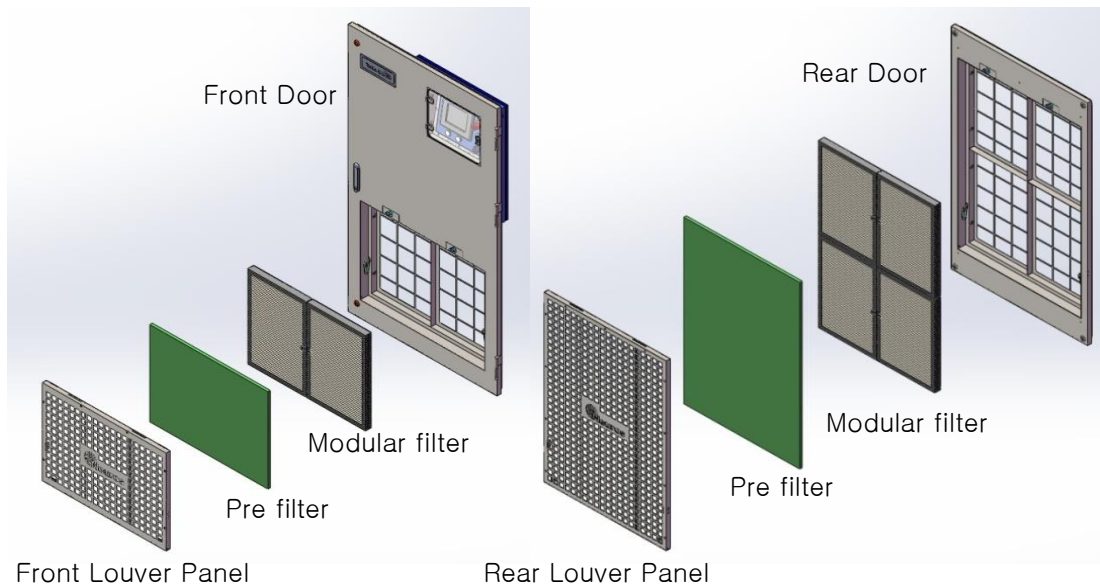
Master control panel is recommended in the DO-Link mode running of more than 2 blowers.



Filter

1) Composition

Neuros use modular filter. Its filtering effect much better than existing non-woven fabric filter.



2) Quantity


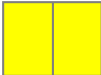

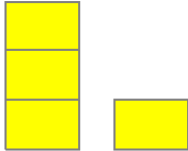
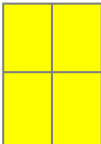
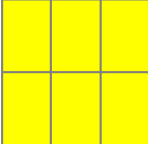
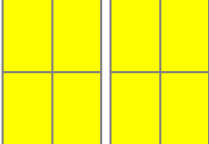
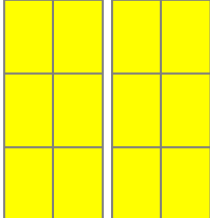
Modular filter & Pre filter quantity per blower model as below.

A. 500X400X35

	NX30	NX50~75	NX100	NX150
전면부	전장부 필터 별도 제작 (1ea) 	(1ea) 	(1ea) 	(1ea) 
후면부	(1ea) 	(2ea) 	(2ea) 	(2ea) 

- SIZE : 500 x 400 (ZX00000-ILF0003-200)
- NX30 전장필터 별도 제작 : 182 x 182 (ZX00000-ILF0004-200)

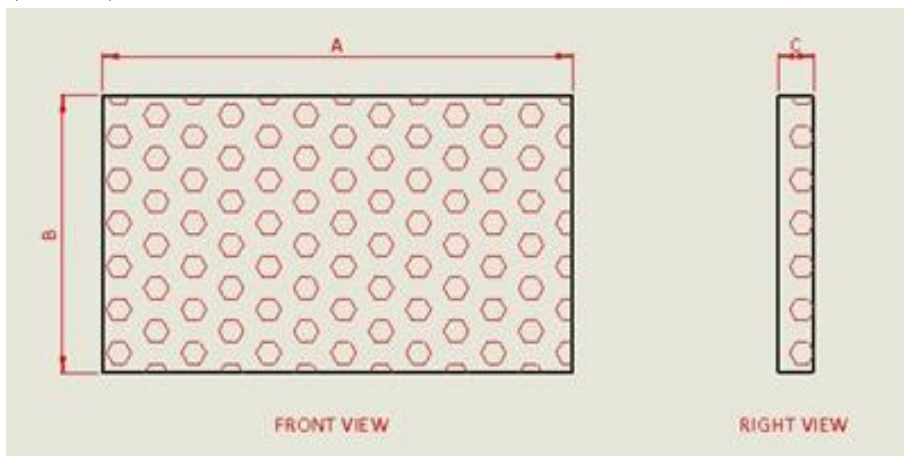
B. 500X350X35

	NX200	NX250~NX350	NX400	NX500~NX700
전면부	(2ea) 	(2ea) 	(3ea) 	(4ea) 
후면부	(4ea) 	(6ea) 	(8ea) 	(12ea) 

- SIZE : 500 x 350 (ZX00000-ILF0002-200)

C. Pre filter

➤ Pre Filter size



SYM	DWG NO.	A	B	C
①	Z00000-PRF9101-201	180	180	15
②	Z00000-PRF9102-201	500	410	
③	Z00000-PRF9103-201	546	400	
④	Z00000-PRF9104-201	500	810	
⑤	Z00000-PRF9105-201	806	563	
⑥	Z00000-PRF9106-201	705	510	
⑦	Z00000-PRF9107-201	1000	700	
⑧	Z00000-PRF9108-201	1006	746	
⑨	Z00000-PRF9109-201	1055	990	
⑩	Z00000-PRF9110-201	1100	1006	
⑪	Z00000-PRF9111-201	1045	490	
⑫	Z00000-PRF9112-201	490	360	
⑬	Z00000-PRF9113-201	1500	690	
⑭	Z00000-PRF9114-201	1509	746	

➤ Pre Filter size per blower model.

		FRONT	REAR LOUVER TYPE	REAR FLANGE TYPE
NX MODEL	NX30N	①	②	③
	NX50~NX150	②	④	⑤
	NX200	⑥	⑦	⑧
	NX300	⑥	⑨	⑩
	NX400	⑪	⑦ x2	⑧ x2
	NX600	⑪	⑬ x2	⑭ x2
		⑫		

OPERATION

Control Panel Configuration

Neuros turbo blower is controlled through many parameters. All these parameters have been set at the factory, and some of them are allowed to be changed by user. Some of the parameters have to be set depending on local conditions.

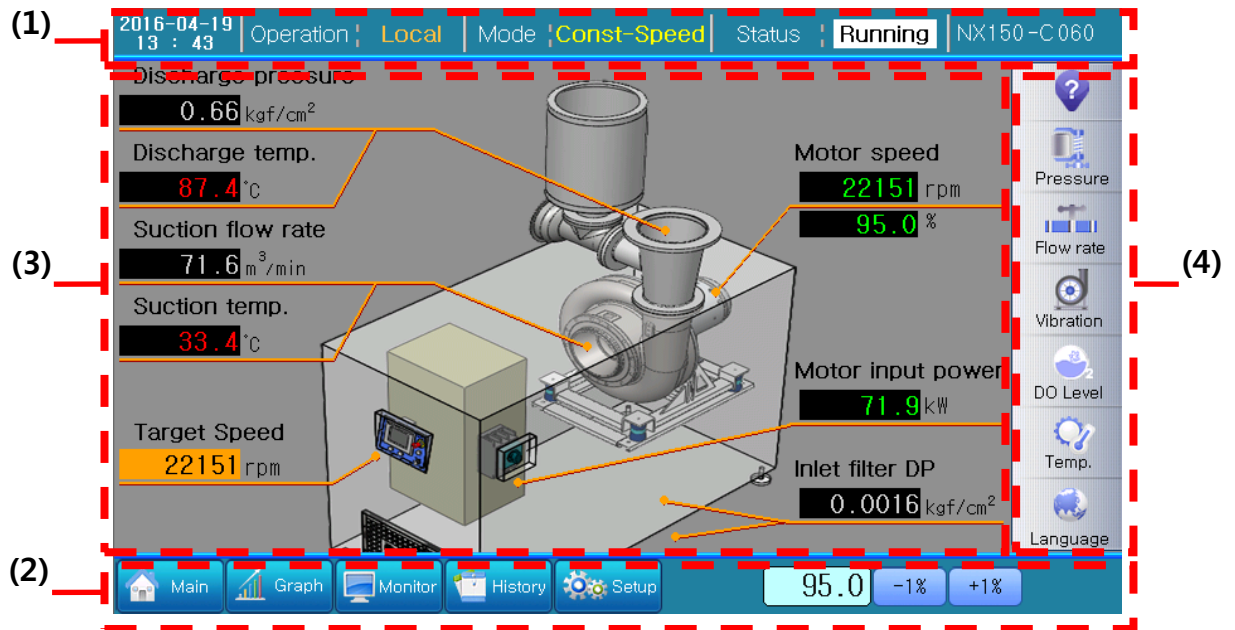
The signals to controller are the followings.

- Pressure sensor : 4-20mA current (Analog Card)
- RTD sensor : resistance (RTD card)
- Inverter (speed, power) : communication (RS485, MODBUS TCP/IP)

Please note that the basic operation in controllers is similar though their configurations are different according to their version.

⚠CAUTION Blower may be damaged if parameters are set incorrectly. Only trained and qualified personnel should change parameter settings.

1.1. Screen Configuration

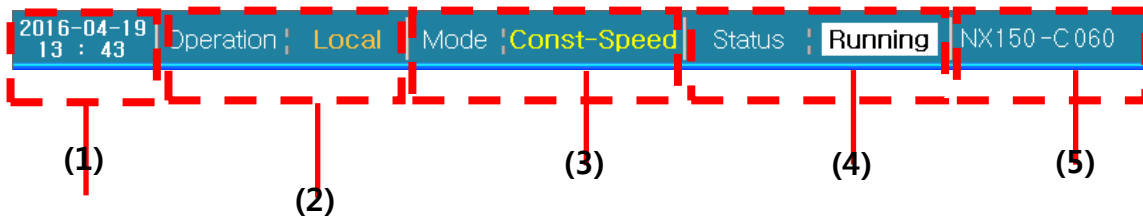


No.	Section	Description
(1)	Title	Provide information about current time, remote setup, control setup, status, model name
(2)	Go-to Buttons	Allow user to move to required screen
(3)	Description Screen	Provides button related information
(4)	Unit and Language Setup Button	Allows user to change Unit and Language for user convenience

2. Main












Following describes the Blower main screen and Title elements

2.1 Title



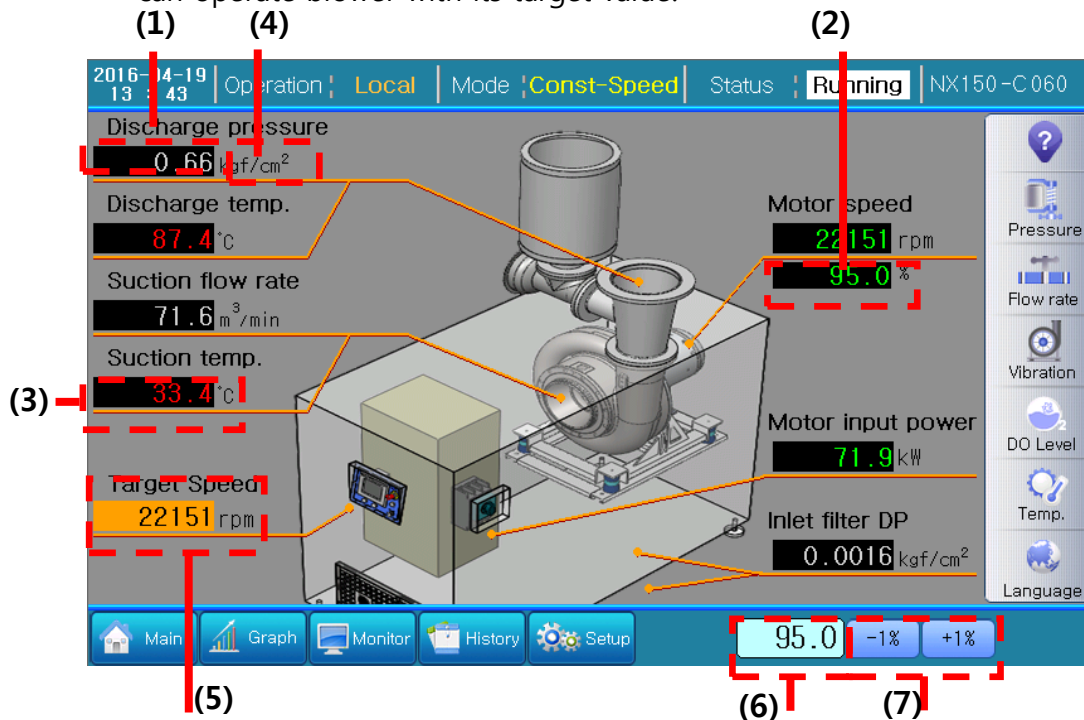
No.	Item	Description
(1)	Current Time	Display current time
(2)	Operation	Display Blower's control point. - Local : Local control for Blower - Com : Remote control for Blower through communication - D/I+A/I : Remote start via hardwiring + Target value via remote setup - D/I+T/P : Remote start via hardwiring + Target value via local setup
(3)	Mode	Display Blower's operation mode status (Constant Speed/ Flow/ Pressure, DO)
(4)	Current Status	Display Blower's current operation status - Check : Blower is in self checking - Ready : Blower is ready to operate - Start : Blower is in starting state prior to normal operation - Operation : Blower is in normal operation state - Stop : Blower is in stopping state - Fault : Fault occurred in Blower - Reset : Blower fault is reset
(5)	Model	Model name according to Blower's horse power and pressure

2.2. Go-to Button

No.	Button	Description
(1)	 Main	Go to Blower's Main screen
(2)	 Graph	Go to Graph screen to check Blower's operating point
(3)	 Monitor	Go to Monitor screen that monitors Blower's sensor value and values that are used for control
(4)	 History	Go to History screen to check Blower's fault or operation history up to now
(5)	 Setup	Go to Setup screen to enter to various setup items for Blower operation
(6)	 Operation Setup	Go to Operation Setup screen to set Blower's mode, model, operation, surge mode, time operation, and time setup
(7)	 Limit Setup	Go to Limit Setup screen to set limit value of Blower's each operating items
(8)	 Control Setup	Go to Control Setup screen for detail control parameters for Blower control
(9)	 Reset	Go to Reset screen to clear Blower Fault
(10)	 System Setup	Go to System Setup screen for Blower system operation
(11)	 Remote Setup	Go to Remote Setup screen to set remote support related items
(12)	 Back	Go to previous screen

2.3. Controller Main Screen

It is the blower's main screen which shows operating status and value. User can operate blower with its target value.

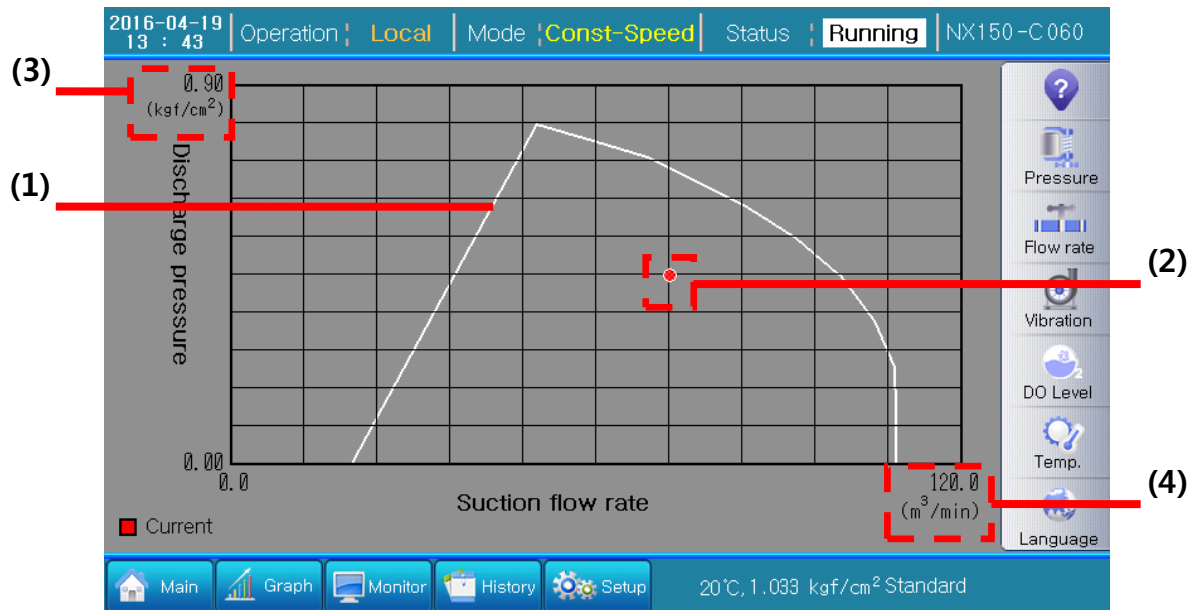


No	Item	Description
(1)	Name of each value	Name of each Blower items - Motor Speed : Blower's current operating RPM - Discharge Pressure : Discharge air pressure - Suction Flow Rate : Bearing air suction flow rate - Motor Input Power : Motor input power value - Suction Temperature : Suction air temperature - Discharge Temperature : Discharge air temperature - Inlet Filter DP : Pressure difference between inside and outside to check filter status
(2)	RPM	Blower's current operating RPM(%) value
(3)	Value	Current value of each item
(4)	Unit	Unit of each item
(5)	Target Value	Display the target value of applied mode (Constant speed/ flow/ pressure, DO)
(6)	Target Percent	User enters the target(%) of applied mode If not setup to 'Local' or 'DI+TP', It does not work
(7)	Target Adjust Button	Adjust +1% or -1% of target

3. Operating Point

3.1. Blower Operating Point

It is able to check performance curve using discharge pressure (vertical axis) and suction flow (horizontal axis), and can check blower's current operating point based on the curve.

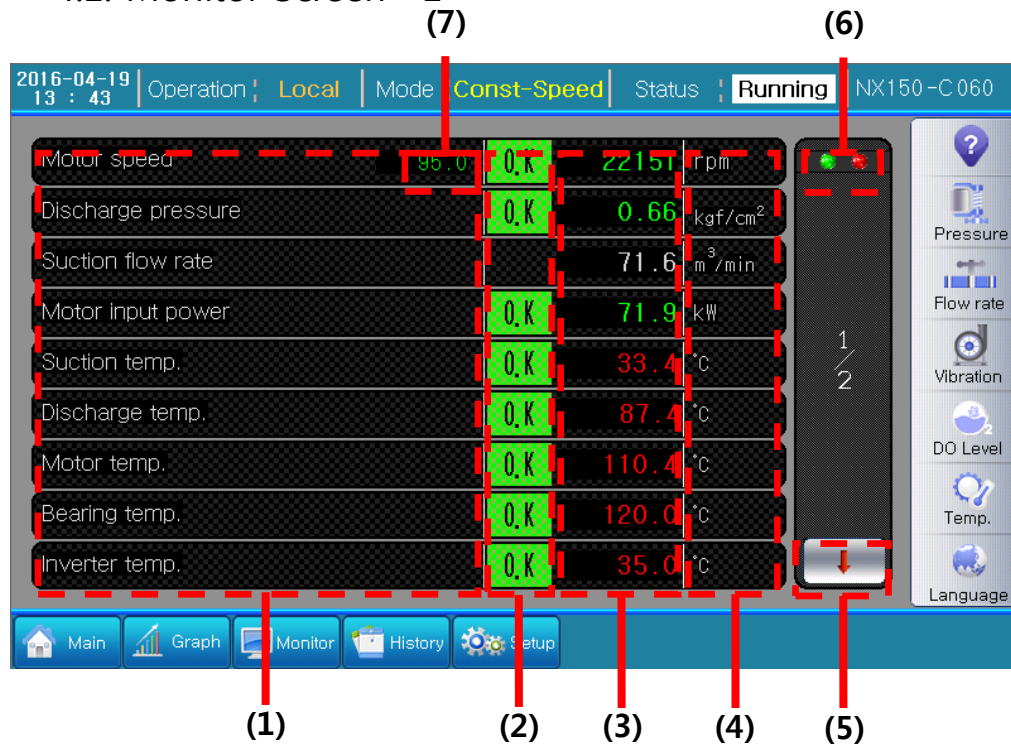


No	Item	Description
(1)	Operating Region	Blower's operating region curve
(2)	Operating Point	Check Blower's operating point
(3)	Max. Discharge Pressure	Blower's max. discharge pressure
(4)	Max. Suction Rate	Blower's max. suction rate

4. Monitor Screen

You can see the Blower's all sensor and calculation values..

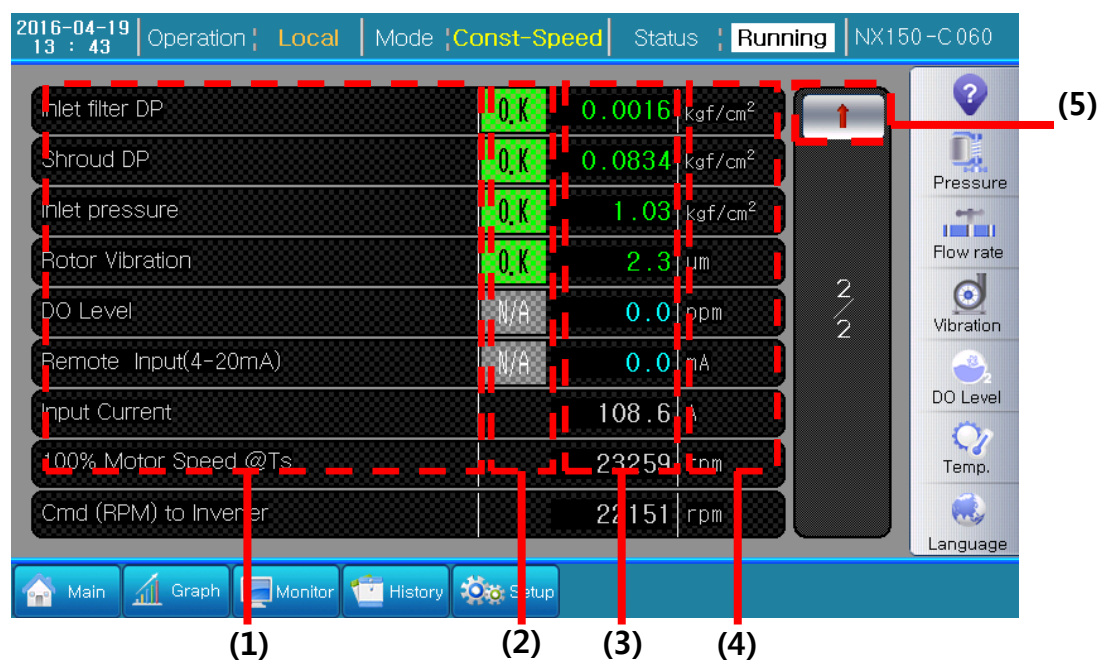
4.1. Monitor Screen #1



No	Item	Description
(1)	Name	Name of Blower's each item - Motor Speed : Motor current speed - Discharge Pressure : Current discharging air pressure - Suction Flow Rate : Current Air Suction Flow Rate - Motor Input Power : Input power to inverter - Suction Temperature : Current Air Suction Temperature - Discharge Temperature : Current Discharging Air Temperature - Motor Temperature : Current Motor Temperature - Bearing Temperature : Current Bearing Temperature - Inverter Temperature : Current inverter temperature
(2)	Status	Indicate the status of each sensor and item. - OK : Normal state - ER : Abnormal state - N/A : Sensor not used (Sensor Limit Stop)

(3)	Value	Each item's current value
(4)	Unit	Unit of each item
(5)	Switch Monitor Screen	Button to go to Second Monitor Screen
(6)	USB Lamp	<p>USB recognition lamp. It flashes when USB is inserted, and data is being logged.</p> <ul style="list-style-type: none"> - Green lamp : USB memory is recognized - Red lamp : activating Data logging
(7)	Motor Speed Percent	Display the % value of current motor speed.

4.2. Monitor Screen #2

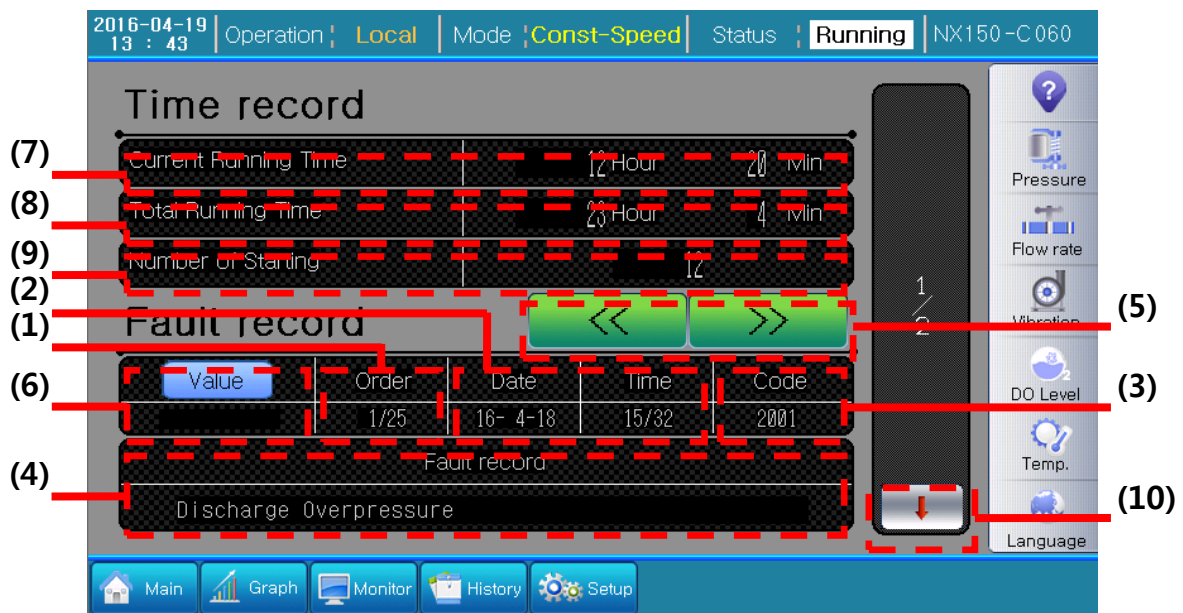


5. History Screen

You can check up to 25 fault history from this screen.

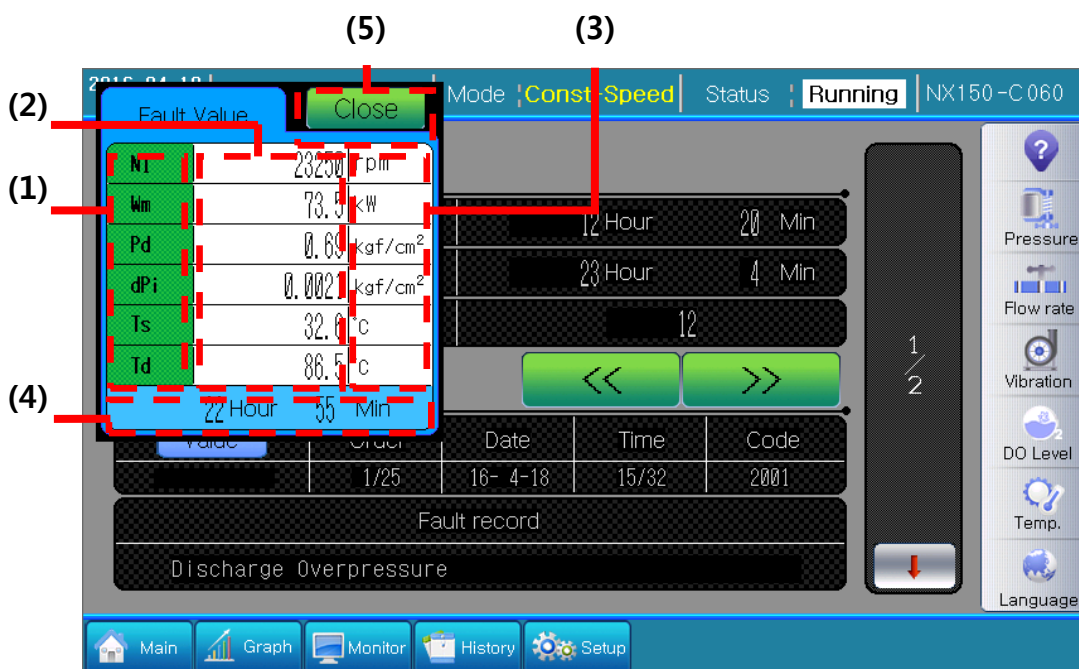
You can check up to 100 Blower operation history from this screen.

5.1. History Screen #1



No	Item	Description
(1)	Order	Indicate the sequence of Fault History, and has up to 50 sequence
(2)	Date/Time	Display the occurred date & time of each Fault History
(3)	Code	Display the code of each Fault history according to its cause
(4)	Fault record	Display the message for each corresponding Fault Code
(5)	Order Button	Change the sequence of Fault History by +1 or -1
(6)	Value	Display the history value of important items when Fault occurred You can check the details of data when press the button.
(7)	Current Running Time	Display the running time from start to stop of Blower
(8)	Total Running Time	Display the total running time from initial Blower start up to now
(9)	Number of Starting	Display the Number of starting time
(10)	History2 Switch Button	Button to go to History 2 screen

5.2. History Screen #2



No	Item	Description
(1)	Item	Item name that is recorded when Fault occurred
(2)	Value	Item value that is recorded when Fault occurred
(3)	Unit	Unit of each item
(4)	Running Time	Blower running time until Fault occurred
(5)	Close	Button to close popup window

5.2. History Screen #3



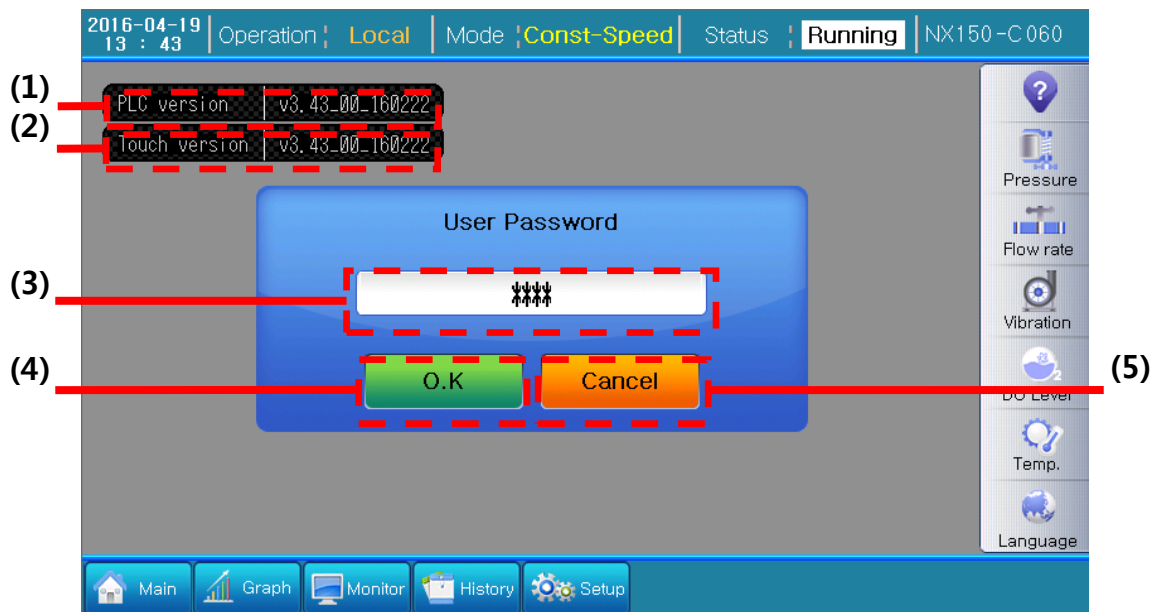
No	Item	Description
(1)	Operation Record	Display the Date/Time/Status/Fault code in accordance with the Blower's state
(2)	Page Number	Display the Current Page number
(3)	Order Button	Page move Button
(4)	History1 Switch Button	Button to go to previous History screen

6. Setup Screen

Screen to enter various parameter values required to operate Blower.

6.1. Setup Entry Screen

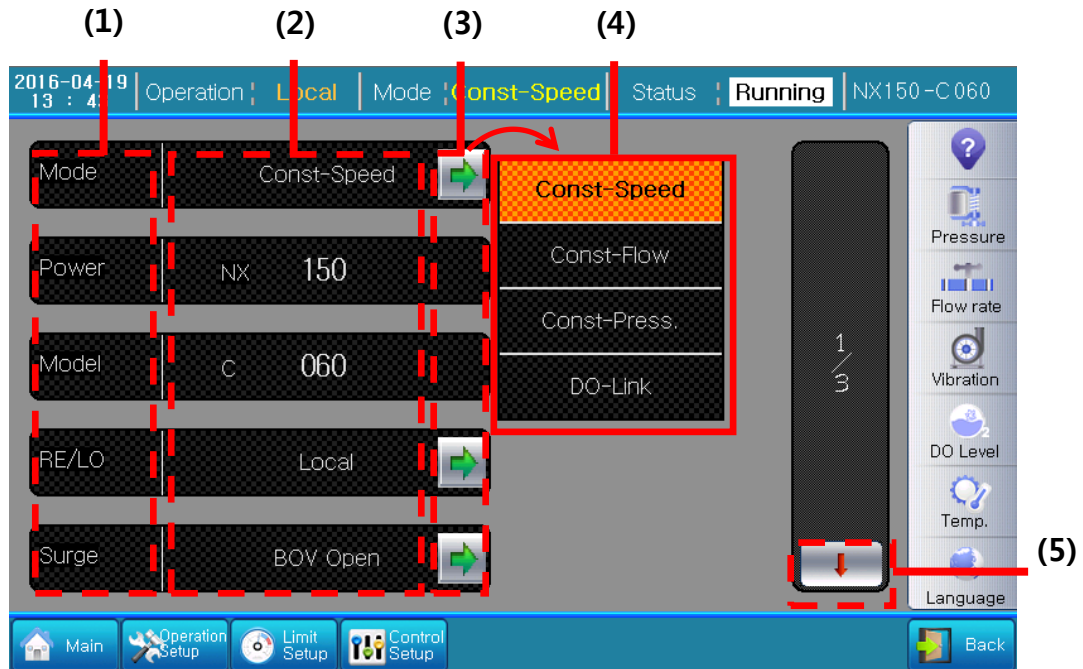
In order to move to the setting screen, it is a screen to enter the user's password.



No	Item	Description
(1)	PLC Version	Indicate program version of PLC under operation
(2)	Touch Version	Indicate program version of Touch Panel under operation
(3)	Pass code	Enter password to enter into Setup screen The password can be set to four digits.
(4)	Confirm Button	Confirm button after entering password
(5)	Cancel Button	Cancel button to enter into Setup screen

6.2. Operation Setup

You can change the basic operation setup item from this Operation Setup screen.

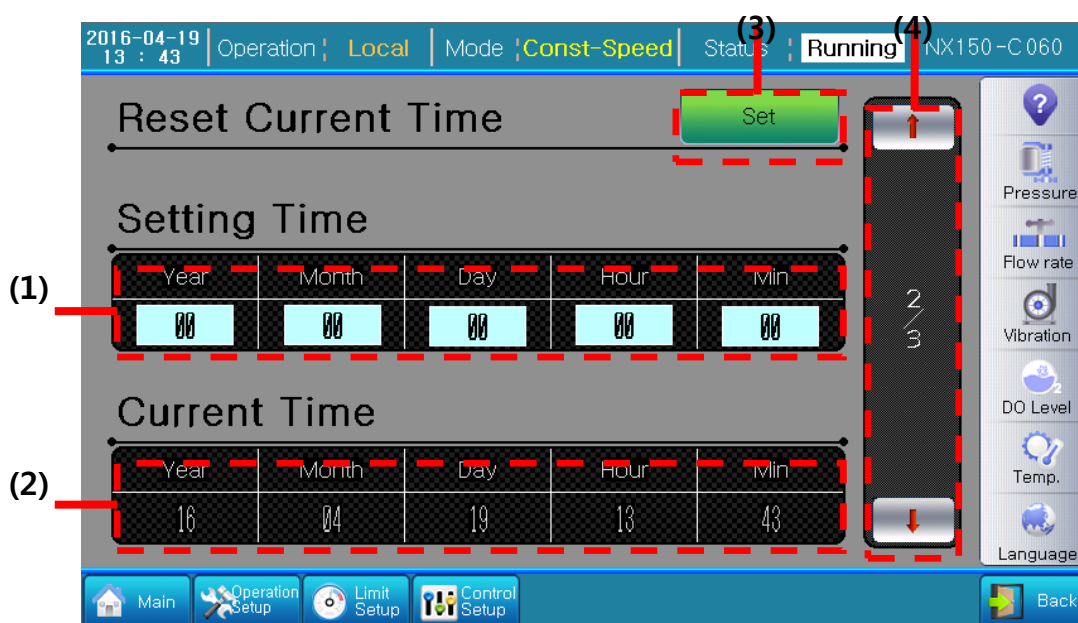


No	Item	Description
(1)	Operation Setup Item	<p>These are Blower's basic operation items, and cannot set during its operation.</p> <ul style="list-style-type: none"> - Mode: This sets the reference of Blower operation control (Constant Speed/Volume/Pressure Control, DO Link) - Power: It sets Blower's horse power. - Model: It sets Blower's rated discharge pressure. - Operation Position: It sets the control location <ul style="list-style-type: none"> Site → Operate at Blower's location Com. → Remote operation of the Blower DI+AI → Digital Remote (Start/Stop), Analog remote (Control Target value) DI+TP → Digital Remote (Start/Stop), Site Screen (set Target value) - Surge Setup: Set protection logic for Blower damage by Surge <ul style="list-style-type: none"> None → Ignore Surge occurrence condition Stop → Generate and stop Blower Fault when satisfying surge Condition Boundary → It automatically increases specific speed to avoid surge when it reaches to surge generating condition (This function is not available for DO linked control) BOV Open → When it approaches to surge generating condition, it opens blow-off valve(BOV) to avoid surge. Then speed is

		increased 0.5% above existing target value and maintains it. (When set as N1_Min_OPCT > 0, it maintains minimum speed to protect surge with % value at N1_Min_OPCT before surge is generated)
(2)	Check Setup Change	Able to check the mode that user has changed.
(3)	Setup Change Button	Button to change each setup
(4)	Operation Setup Screen Change Button	Button to go to next screen to setup operation

6.3. Time Reset

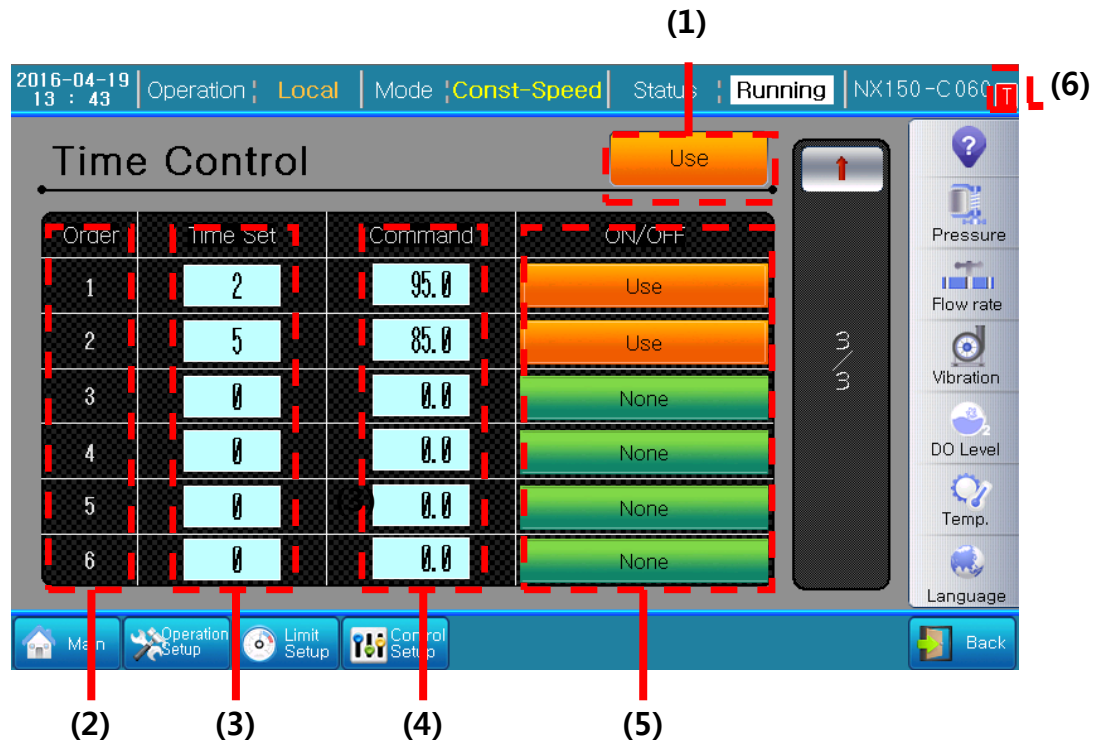
This screen sets Blower's operation time..



No	Item	Description
(1)	Setup Time	User enters time here to change
(2)	Current Time	Blower's current time
(3)	Time Change Button	Apply Blower's changed time
(4)	Change Operation Setup Screen	Button to go to next operation setup screen

6.4. Time Operation

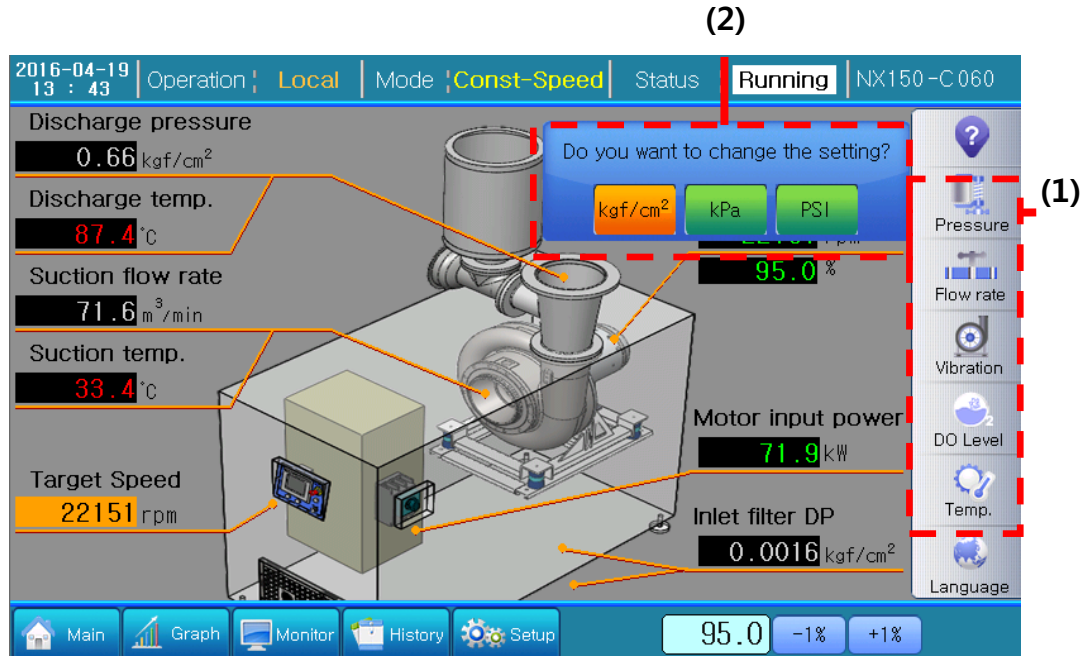
Screen to control Blower start/stop operation repeatedly by time



No	Item	Description
(1)	Time Operation Button	Button to select Blower's Time Operation
(2)	Order	Operation sequence. Blower is start or stop from the time that has been set in order until the next order time
(3)	Time Set	Column to enter hour for Blower's on/off operation Unit of time, enter the 0 to 24 hours at the input of the per 24 hours.
(4)	Command	Column to enter target value for operation at specified time
(5)	ON/OFF	Column to select on/off operation at specified time
(6)	Go to Button	Button to go to next operation setup screen
(7)	Time Operation Indicator	Status of time operation application

6.5. Unit Setup

User can change the unit to try to set the value to be displayed.



No	Item	Description
(1)	Unit Change Window Activate Button	it is able to change unit by pressing 'unit conversion button' at right side at any screen. (Pressure, Flow, Vibration, D.O,level, Temperature)
(2)	Unit select	Unit selection window

6.6. Language Setup

User can set language as appropriate



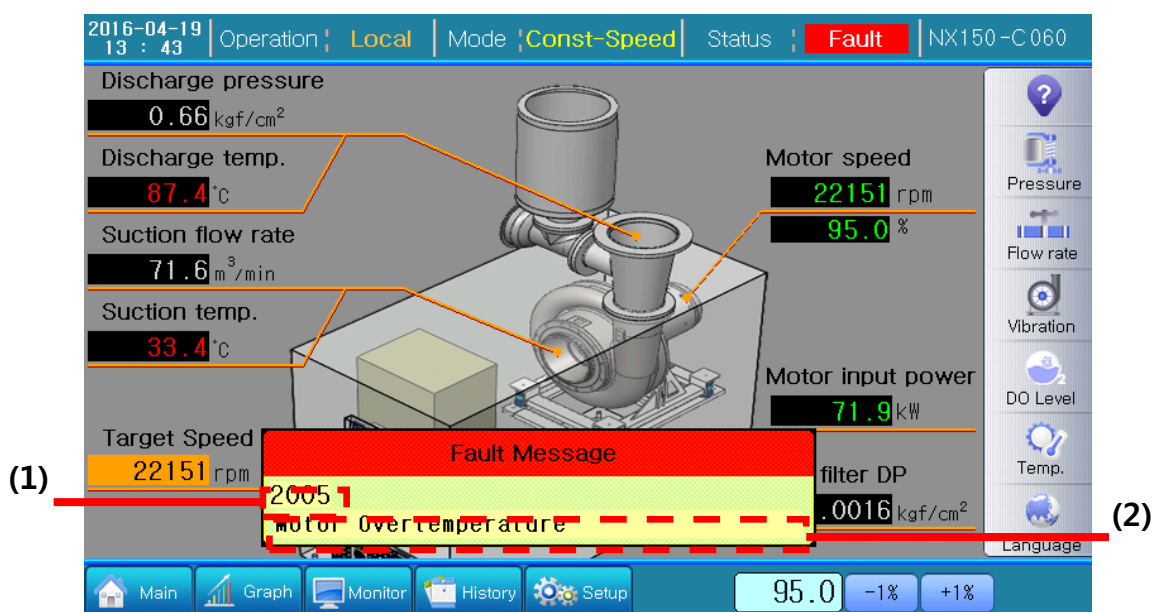
No	Item	Description
(1)	Device setup screen change button	Button to go to other device setup screen
(2)	Language	Apply when selecting required language button Supported language is Korean, Chinese, Japanese, English, Turkish, Russian

7. Error & Error Reset

It shows how to set error occurrence state and reset it.

7.1. Error Screen

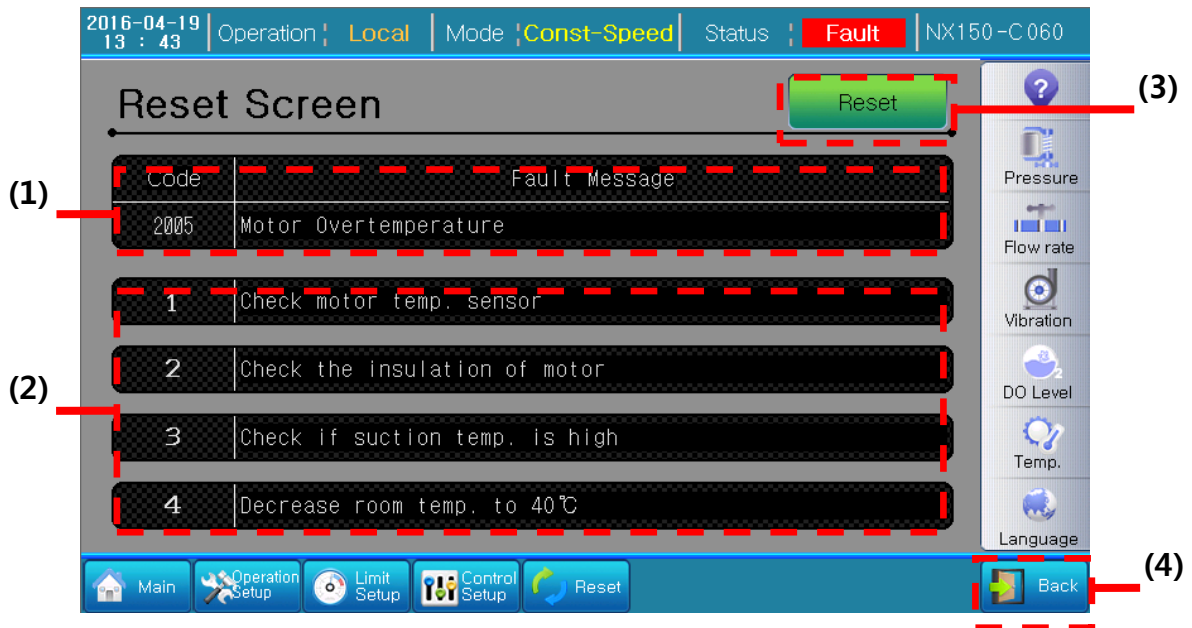
Following error screen appears from main screen when error occurs



No	Item	Description
(1)	Code	Indicate generated error code
(2)	Message	Show information corresponding to the occurred error code.

7.2. Error Reset Screen

Move to Error Reset screen by pressing ("Setup Screen" ► "Error Reset").



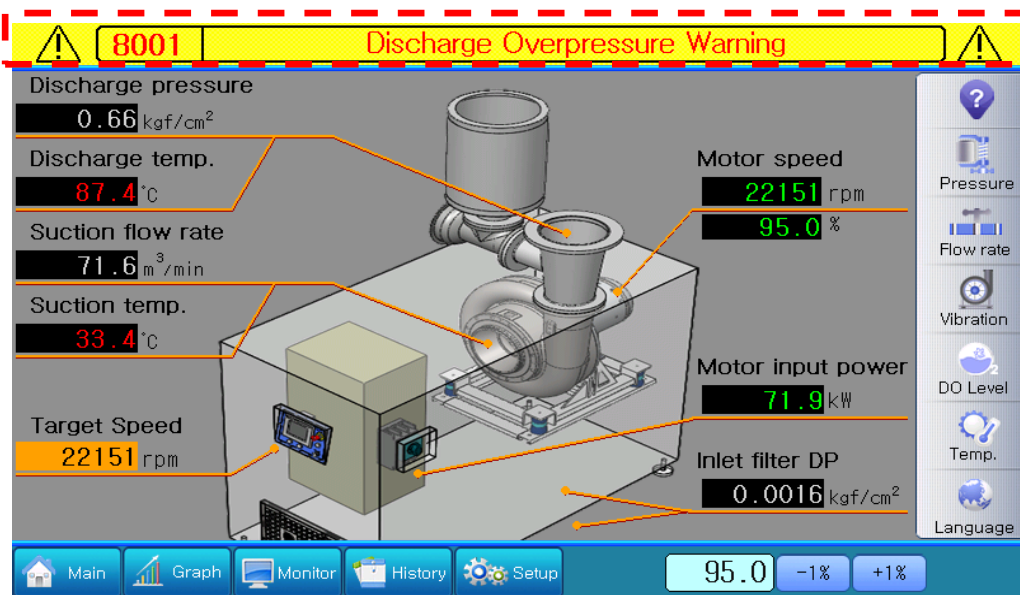
No	Item	Description
(1)	Error	Indicate generated error code and its message.
(2)	Check Item	Show help item for generated error
(3)	Reset	Button to reset error
(4)	Back	Button to return to main screen

8. Operation Alarm

It pops up alarm window to inform user for the problem symptom during Blower operation.

8.1. Alarm Window

This window automatically disappears when alarm condition is cleared. If alarm message keeps appearing, then user shall check operation condition and related area.



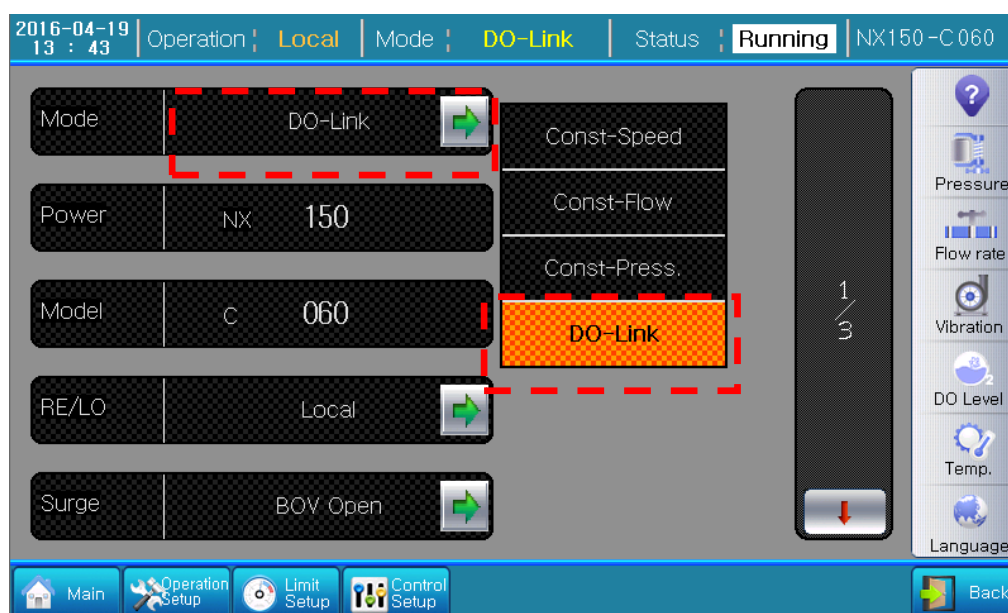
No	Item	Alarm Condition	Unit
(1)	Filter pressure difference (dPi) alarm	When error value is above 95% of reference value	kPa
(2)	Vibration (Xm) alarm	When error value is above 95% of reference value	μm
(3)	Discharge pressure (Pd) alarm	When error value is above 97% of reference value	kgf/cm^2
(4)	Suction temperature (Ts) alarm	When error value is above 95% of reference value	$^{\circ}\text{C}$
(5)	Discharge temperature (Td) alarm	When error value is above 95% of reference value	$^{\circ}\text{C}$
(6)	Motor temperature (Tm) alarm	When error value is above 95% of reference value	$^{\circ}\text{C}$
(7)	Bearing temperature (Tb) alarm	When error value is above 95% of reference value	$^{\circ}\text{C}$
(8)	Motor input power (Wm) alarm	When error value is above 95% of reference value	kW
(9)	Inverter temperature (Tv) alarm	When error value is above the reference value minus 5°C	$^{\circ}\text{C}$

9. DO Link Control

It describes additional explanation regarding DO Link Control and its related setup.

9.1. DO Link Mode Selection

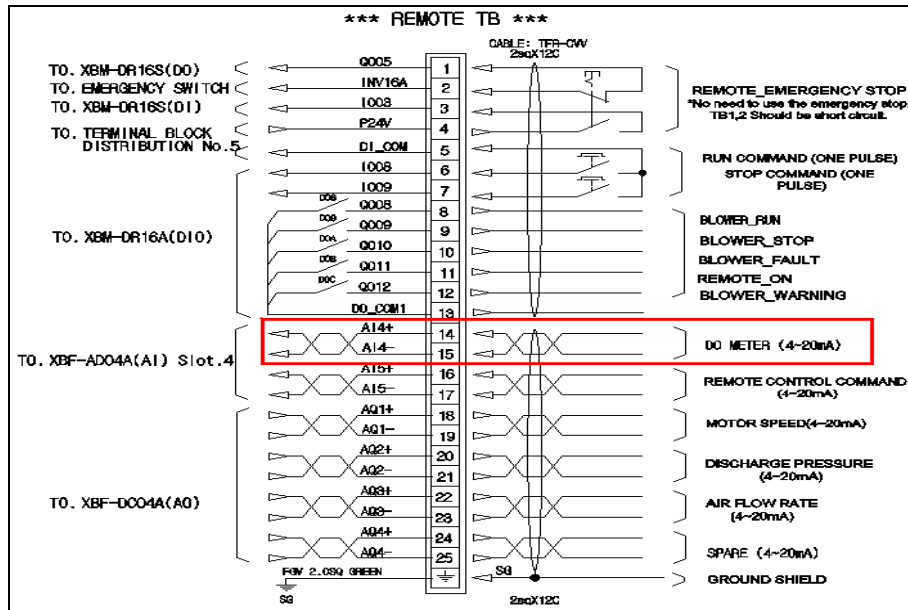
Set Operation mode as DO Link.



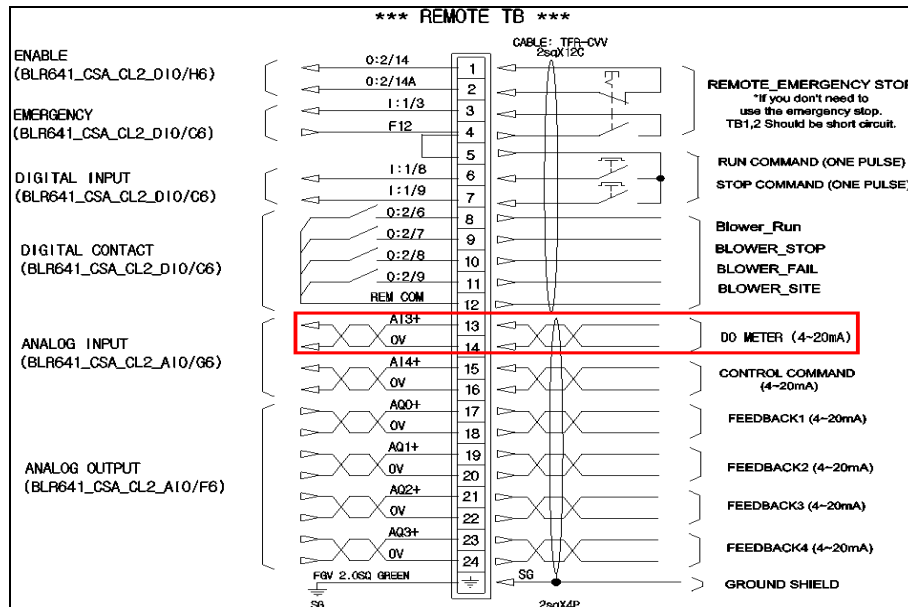
9.2. DO Link Measurement Signal Wiring DO

Connect linked device or sensor to No. 14, 15 of Blower's remote terminal block to receive dissolved oxygen value as 4~20mA analog signal.

(LS)

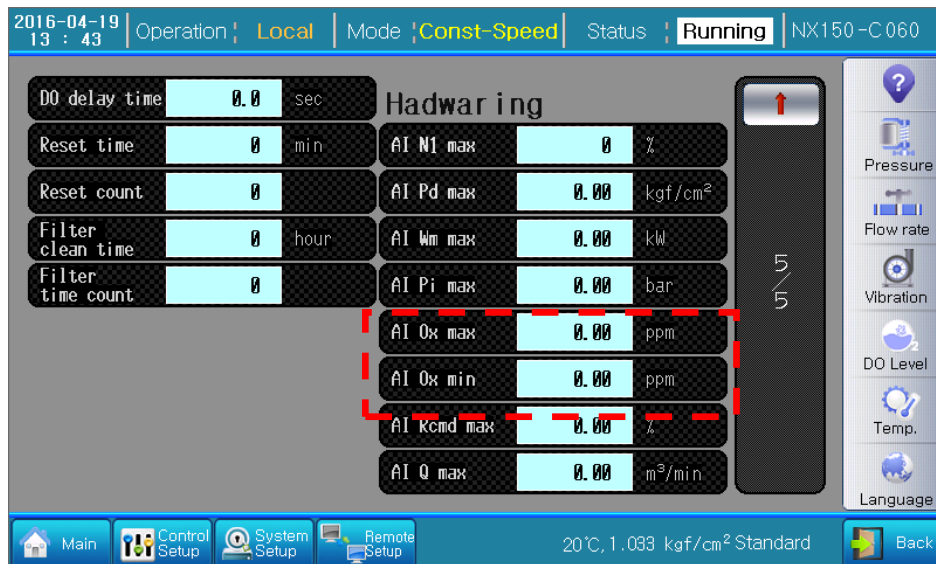


(AB, Siemens)



9.3. DO Sensor's Measurement Range

Scale maximum and minimum value of 4~20mA input signal. Enter max. & min. value of DO measurement at Control Setup screen. It is set as 0~10ppm, in general.

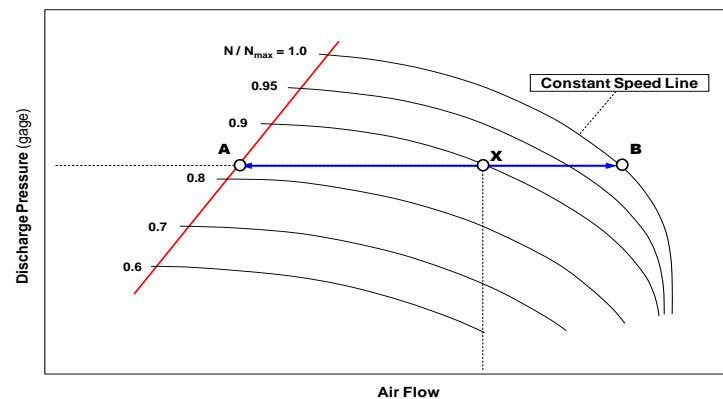


9.4. DO Link Target Value & Control Operation

This section describes the setting of the control system in relation to the DO Link

9.4.1. DO Link Operation Graph

Blower's speed is operated between A↔B airflow range as follow according to site discharge pressure to adjust to DO target value according to Step Logic.



- A (Min. Airflow Point): Minimum performance speed point by Control Setup parameter, but it becomes surge protection speed point at surge limit mode.
- B (Max. Airflow Point): 100% performance speed, or upper limit speed according to maximum power when power limit is set.
- It becomes DO Link control when start operation is completed after Blower startup. Blower becomes temporary stop mode when DO value is retained for longer than a Certain period of time with higher than upper limit value, and Blower restarts when DO value becomes lower than lower limit value.

9.4.2. DO Link Control Related Parameters

Do Link related control parameters are in "Control Setup Screen", and it is controlled by these parameters

Parameter	Description	Unit
T Sample	Time interval to compare current and target value for each mode when operation mode is constant volume/ pressure, DO mode.	sec
KDO	\pm Target DO error range setup value in DO Link mode	ppm
KRO	Speed change per interval to move to target DO in DO Link mode	rpm
DO limit	DO upper limit value in DO Link mode	ppm
DO delay time	Blower operation temporary stop delay time after reaching DO upper limit in DO Link mode	sec

Operation Procedure

1. Controller Booting

- (1) When main circuit breaker on enclosure is turned on, power will be supplied to blower.
- (2) When 'POWER' button is pushed, controller will boot up and check blower system. If no problem, main view will be shown and blower will be in ready status.

(Status: 'Ready')



2. Check before Start

- (1) Check the open/close status of valves on the piping
- (2) Check the method of operation.

It is displayed at the center of the top portion such as "OPERATION: Local". When the blower is in remote mode, you cannot operate the blower by 'Run' and 'Stop' button on the local controller.

If you want to make the blower running with control panel of blower, select the control mode as local.

- (3) Select control mode as you want. Default mode is Auto Speed mode

3. Start

- (1) Move to the Monitor view then check the sensor figures. It is possible to check some sensor's values in the Main view.

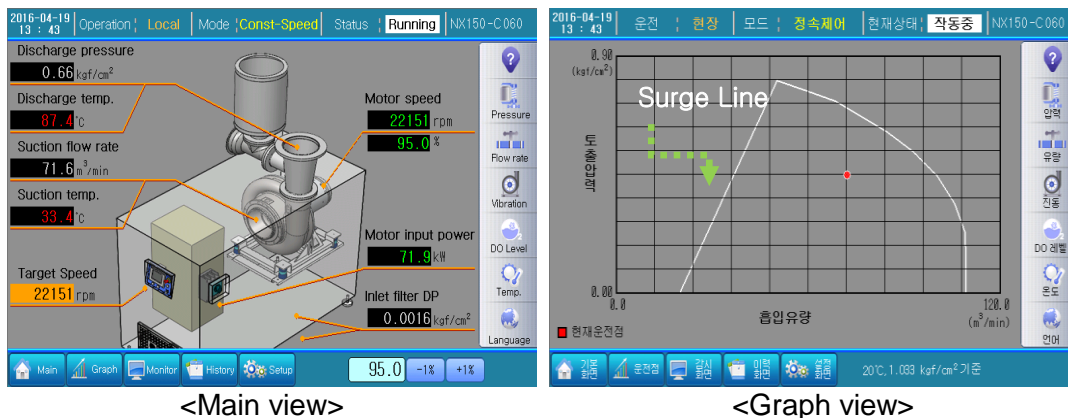


- (2) Set up the target by the Command located in Main view above. Push the “RUN” button, check the sensor values during starting. (**Status: ‘Starting’**)
- (3) When BOV is closed, “RUN” button is turned on and starting procedure is finished. (**Status: ‘Running’**).
- (4) After 30 seconds for stability, blower will go to target.

4. Change of target

Target can be changed by input it or using -1% , $+1\%$ button in main view. The running point of blower can be seen in graph view.

As high discharge pressure and low rotational speed make blower stopped in order to prevent damage by surging, it is recommended that blower runs far away surge line.



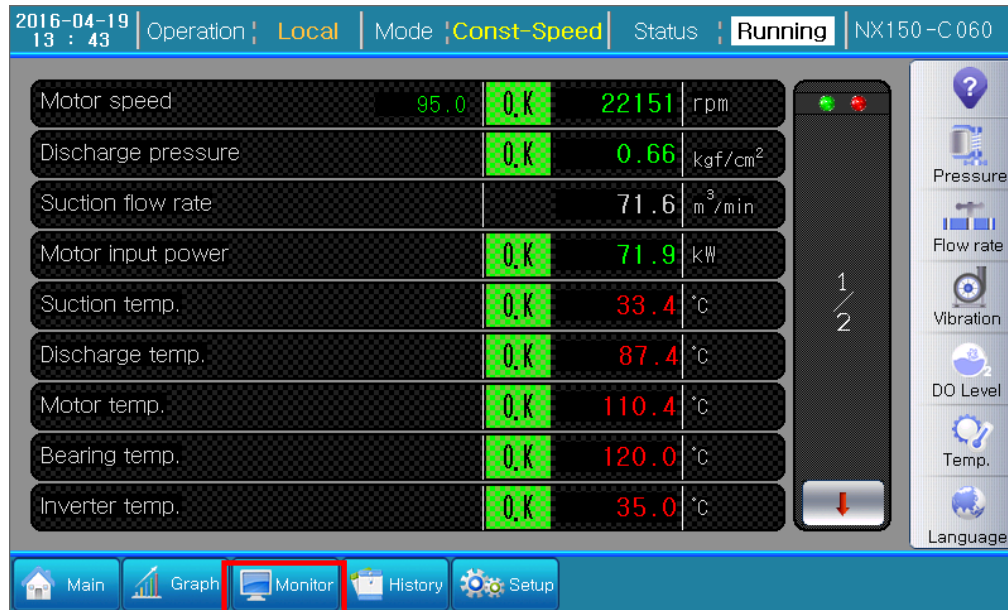
<Main view>

<Graph view>

5. Checking running data

Move to the Monitor view and check the sensor figures. It is possible to check some sensors' values in the Main view.

Because the temperature of blower room higher than 40°C makes blower performance lowered and blower life decreased, it is necessary to find the reason and solve it.



< Monitoring Screen >

6. Normal Stop and Emergency Stop



[STOP] button should be pushed in order for normal stop. Then, [STOP] button is turned on and BOV is open. (**Status: 'Stopping'**) blower is stopped after a while and [STOP] button is turned off.

In order for complete stop of rotor and restart of blower, 30 seconds is needed. The time remained is shown in the box of "STATUS".

The yellow emergency stop button can be used for in case of emergency such as fire and electric short. Emergency stop can make the blower immediately stopped, but it is not recommended because surge can be made during emergency stop. Before resetting the blower, emergency button should be released by turning it clockwise.

In the blower models using water pump, the pump will run for 30 minutes after stop.

In the blower models installed ventilation fan, the fan will also run for 30 minutes after stop. But, the ventilation fan in NX30 will be stopped immediately when stop button is pushed.

7. Checking Fault

When controller becomes aware of abnormal status in blower, it can make blower stopped with showing fault messages. After checking "Trouble Shooting" and "Inspection Manual for Fault Stop", contact to NEUROS with fault data.

Fault may also occur in case of power suspension.

TROUBLE SHOOTING

Trouble Shooting According to Fault Code

Fault code and message will be displayed on the touch screen when faults occur in the Neuros Turbo Blower. It is essential to let us know the error code for solving the troubles.

Please put in the following table for the troubleshooting when contacting us due to fault occurrence.

(1) Situation before and after fault

- When fault occurred, during running or starting ?
- How was restart after reset ?

(consumed time to fault after start and blower situation during start)

- remarks about the site (power cut, change of pipe lines or modification of process)

(2) Customer's information such as company, name of operator and his telephone no.

(3) Running data when fault

	Date	Time	Code	Message	N1 (rpm)	Wm (kW)	Pd (kgf/cm ²)	dPi (kPa)	Ts (°C)	Td (°C)
1										
.										
.										
10										



In case of power suspension, blower controller is better to reboot because it may suffer a electric shock. Especially, in remote control, it is necessary to check blower when faults occur.

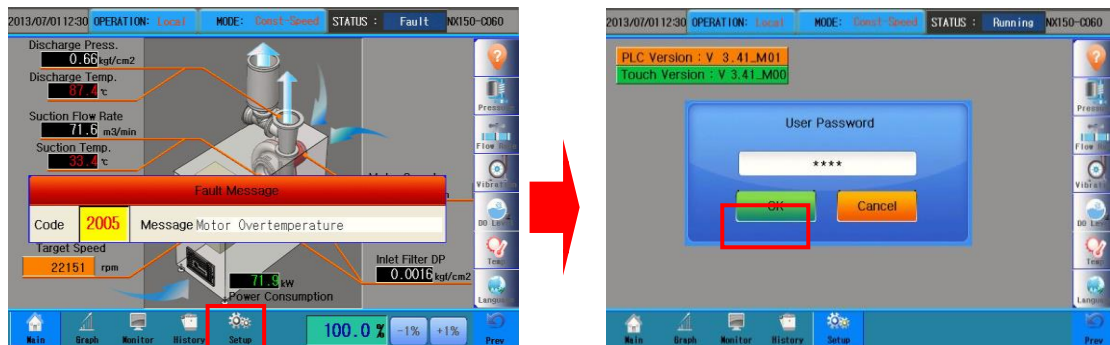
The faults and actions for Neuros blower are described in the following tables..

Restart Procedure

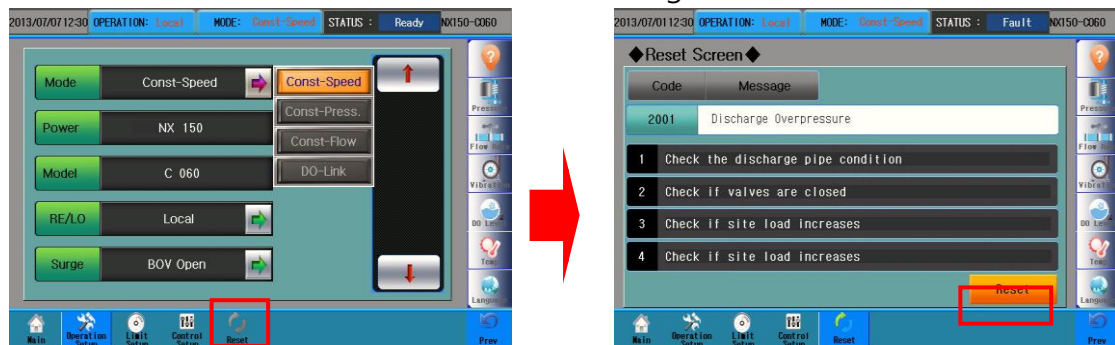
1. Restart Procedure

If you need to restart the Turbo Blower, please clear the fault code and message by the following reset process after solving troubles.

1. Press "Setup" button on the right side of the touch screen.
2. Press "OK" on the password screen. (Do not input user password)



3. Press "Reset" button on the right side or the operation screen. Then you can see the Reset screen and can see the fault code and message.
4. Press "Reset" button on the touch screen. Then "Stop" and "Reset" ramps will be turn off and the fault code and message will be clear.



5. Press "RUN" button on the control panel to restart the blower.

Restart of blower without solving the source of troubles makes blower worse. Please discuss it with Neuros when fault occurs.

MAINTENANCE

Maintenance Schedule

Interval	Item	Check Point	Action	Remarks
Day	Environment	Check Circumstance around Blowers (Room temperature, Condition of the blower in&out side etc.)	Cleaning	Atmosphere temp Limit : 40°C
	Operation Status	Check Operating Data (Filter Press, Discharge Press, Temp etc.)	Log Sheet Record	Refer to User Manual
		Check Warning Message	Refer to User Manual	
		Cooling Water Level over than 70%	Cooling Water Replenish	
		Check Water Pump Press Gauge (1~2kgf/cm ²)	Check Water Pump	
		Check Cooling Water Leakage	Check Leakage parts.	
		Check BOV tube	If needed, Replace	
Week	Filters	Check the filter Condition	Filter Cleaning or Replace	
Month	Operation Status	Check inside of the blower (Dust and Foreign substance)	Cleaning	
		Leakage of the check valve	Repair or Replace	
		Check Flange or Bolt connection	Tighten bolts or Replace gasket	
		Check sound absorbing of the blower inside.	Replace	
Quarter Year	Water Cooling System	Radiator Pin	Cleaning	Refer to User Manual
		Leakage	Check Leakage parts.	
		Water pump	Repair or Replace	
		Water hoses	Check Leakage parts.	
Year	Electric Device	Check sensors and switch	If needed, Repair or Replace	Refer to User Manual
		Check tightening connections		
		VFD visual inspection		

		Check PLC and HMI Status		
		Check VFD cooling fan		

2years	VFD	Check DC Link voltage	Check value	
	BOV	Check BOV and Sol-valve operation Status	If needed, Repair or Replace	
		Check Diaphragm in bov		
		Check Piston and Disk Seal		
	Cooling Water	Change cooling water (include anti freezing)		Only use same type anti freezing
5years	Core Overhaul	Core dismantle/inspection/cleaning (include Rotor balancing etc.)		Refer to Overhaul Program
	VFD Overhaul	VFD Overhaul (Replace overhaul kit parts.)		

In case that blower is out of order because of the following situations, the trouble is responsible to customer and is solved at customer's own expenses regardless of within warranty period.

- not using air filter approved by Neuros
- improper air filter maintenance
- insufficient in enclosure cleaning
- unsuitable maintenance to cooling water in case of water-cooled models
- Subject to misuse, neglect, accident, abuse
- Improperly repaired or used unallowable parts without the manufacturer's prior, written authorization
- altered or modified in any way
- provided unstable power from the installation site
- used in violation of instructions for customer's use
- the other mistakes done by customer

※ As it is not good for blowers to be left without running for a long time, it is recommended to run blowers once a month.

Cleaning and Replacement of Air Filter

1. Filter Cleaning

- (1) Use the Lever, Open the Filter case. Take the Pre Filter and Modular filter out.



- (2) In case of modular filter can be out as use below part.

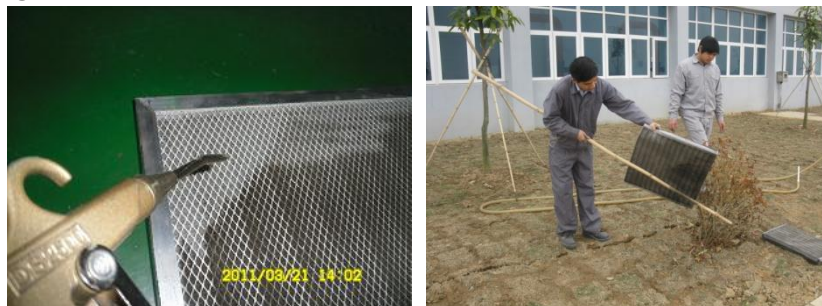


- (3) In case of flanged inlet type, open a filter cover in the side of flanged inlet and drag out air filter

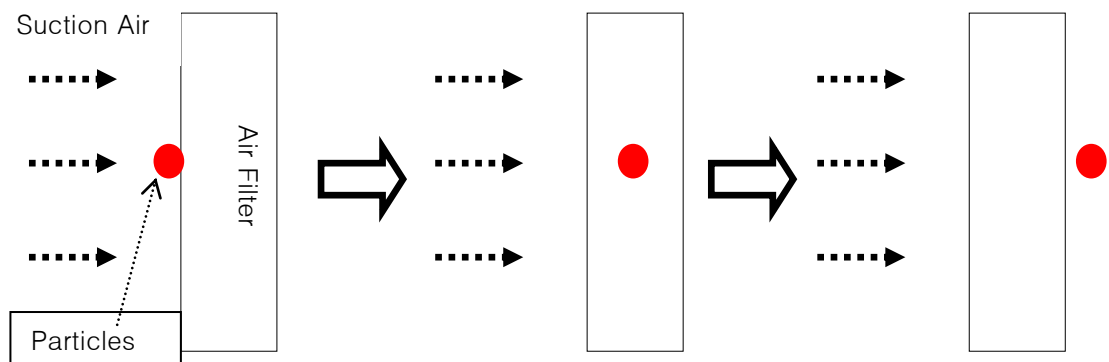


(4) Basically, the particles on air filter can be removed with compressed air. It is important to clean the air filter enough to remove most of particles. Hitting the air filter with a stick is effective to get rid of particles even in air filter.

(5) Air filter cleaning should be done **at least 1 time per month**. In dirty sites, the cleaning interval is needed to be shortened.



(6) Basically, air filter cannot block particles perfectly. Moreover, particles will pass through air filter and go into enclosure as time goes on. Therefore, periodical maintenance of air filter and cleaning of enclosure is very important.



- (7) For the convenience of maintenance, a pop-up message will appear on controller screen every given period of running. After cleaning or replacement of air filter, push "OK" button on the pop-up message.

2. Filter Replacement

- (1) When air filter is used for a long time or cleaned many times, its capability of filtering will be dropped. After **at most 4 times** of filter cleaning, air filter should be replaced with new one



< Examples of Bad Filter Maintenance >

- (2) Pre Filter can be reuse 2 or 3 times after cleaning. Modular filter can't cleaning just can replace. Modular filter last up to 6 months. According to condition around blower, have to change replace or cleaning period.
- (3) Insufficient filter maintenance makes the troubles of blower increased and the life of blower decreased.
- (4) Especially, filter cleaning by water is not good to filtering, it is not allowed.
- (5) And, it is also important to keep clean around blower.

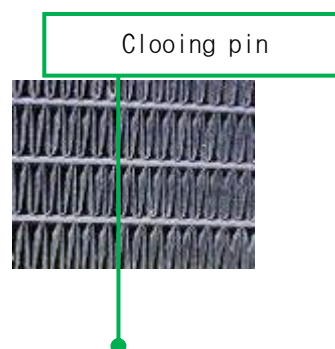
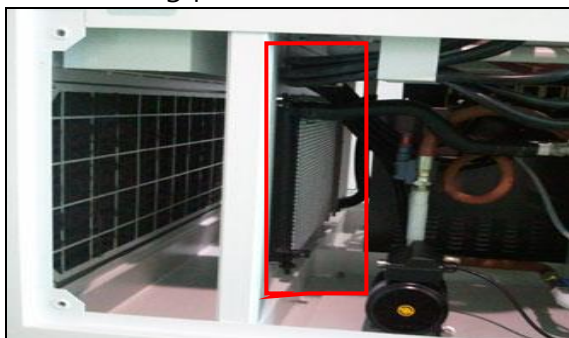
Maintenance of Radiator (in case of water-cooled models)

1. Radiator Cleaning

- (1) Blower radiator use suction air for cooling of heated water. If many foreign substances accumulate on the radiator surface (cooling pin), the thermal conductivity will be dropped. Because of this case, please note that if the filter management is insufficient, there will be a lot of dust accumulating on the cooling pins, which may reduce cooling efficiency.
- (2) It is recommended that the radiator cleaning cycle be carried out on a quarterly basis. If there is a lot of scattering dust on the site, please shorten the cleaning cycle. Especially in summer, when the air temperature rises, the coolant temperature rises as the blower room temperature rises. It is recommended to clean the radiator if the blower temperature exceeds 30°C

2. Cleaning method of Radiator

- (1) To clean the radiator, please open the blower enclosure and spray the compressed air to remove dust accumulated in the radiator and enclosure. At this time, it is important to thoroughly clean the dust and dirt between the cooling pins until dust is removed.



3. Replacement period of Radiator

- (1) The antifreeze in the cooling water may deteriorate if it is used for a long time and then, it may indicate the air flow path clogging of the radiator. If the air flow path is clogged, the cooling efficiency of the radiator is lowered, Please be sure to replace it every two years because the pressure of the water-cooling line may increase and leakage may be occurred.

Maintenance of coolant (in case of water-cooled models)

Water-cooled blower is to cool motor stator and inverter using water and applied to high power models. Cooling water is sent to the water jacket of inverter and motor stator by a water pump, radiates the absorbed heat from them to ambient at a radiator, and return to water tank.

As the cooling system is a circulating type, water supply line from outside is not needed. As the main reason of overheating is the lack of cooling water, the level of water in the tank should be checked periodically. The water level can be checked easily by the level gauge on the side of enclosure.

Cooling water is a solution of water mixed with antifreeze which prevents ice and rust formation in cooling system.

In case of lack of water by evaporation, fill up water tank with clean water.

In case of lack of water by leakage, fill up water tank with clean water mixed with antifreeze as water without antifreeze make its concentration weak.

It is recommended that old antifreeze is replaced with new one every two years because antifreeze loses its characteristics after **2 years**.

1. Antifreeze

Our standard antifreeze is EG(Ethylene Glycol), and PG(Propylene Glycol) can be used. But, mixture of EG and PG can make deposit, and block the cooling passage.

Therefore, EG is recommended. If PG is used, change antifreeze after cooling water mixed EG should be removed from blower.

The standard ratio of antifreeze in coolant is 30% which prevents the coolant from freezing until -15°C. If the temperature of blower room is below -15°C, discussion with Neuros is needed.

Antifreeze Proportion	Mixing Ratio (Antifreeze : Water)	Freezing Temperature
50%	1:1	-37°C
40%	2:3	-24°C
33%	1:2	-18°C

Table. Antifreeze Mixing Ratio as Freezing Temperature

2. Coolant Check

The coolant level can be checked easily by the level gauge on the side of enclosure. If the level is under middles of the gauge, it is needed to check blower.

In case of low level without leakage, fill up the tank with clean water because water evaporates. In case of leakage, fill up the tank with clean water mixed with antifreeze after finding the source of leakage and fixing it.

The shape and location of level gauge can be different from the pictures. And coolant tank can be located outdoors in some special blowers.

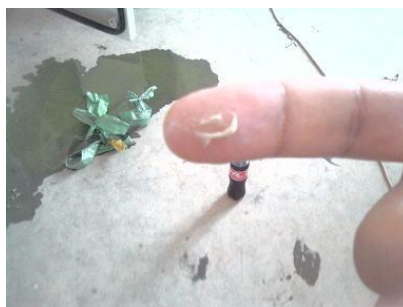


In order to open the cap of tank, turn it counterclockwise.



3. Coolant Replacement

As old antifreeze shows degeneration, it is recommended to replace it with new one every 2 years.

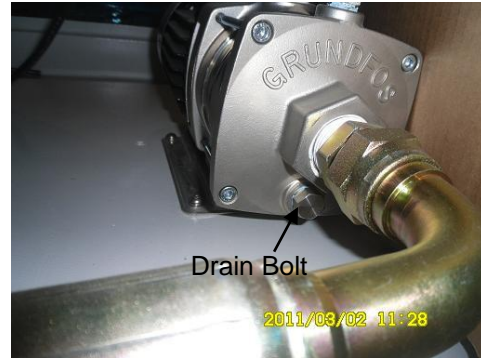


< Deposit in old antifreeze >

In order to change coolant, it is needed to extract old one from cooling lines. Old coolant can flow out by opening drains in pump and tank. It is possible through the cover of tank.



<Drain valve under tank>

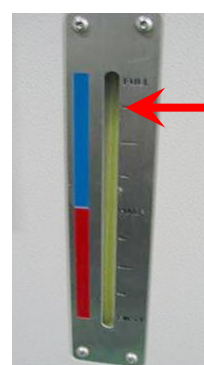


<Drain in pump>



<Cover of tank>

After remove the old coolant, mixture of clean water and new antifreeze is poured on the tank.



Up To Here!!

- Self Diagnosis

Code	Error Message	Contents	Check & Action
1001	Pd Signal Failure (Discharge Pressure)	Trouble in Discharge Pressure Sensor or Cable	1. Check or replace discharge pressure (Pd) sensor and cable. 2. Check or replace PLC.
1002	Ps Signal Failure (Filter Drop Pressure)	Trouble in Filter Pressure Drop Sensor or Cable	1. Check filter pressure drop (dPi) sensor and cable. 2. Check or replace PLC.
1003	We Signal Failure (Motor Power)	Error in Communication with Inverter	1. Check or replace inverter and PLC. 2. Check or replace communication cable between inverter and PLC.
1004	Nm Signal Failure (Motor Speed)	Error in Communication with Inverter	1. Check or replace inverter and PLC. 2. Check or replace communication cable between inverter and PLC.
1005	Tm Signal Failure (Motor Temp)	Trouble in Motor Temperature Sensor or Cable	1. Check or replace motor temperature (Tm) sensor and cable. 2. Check or replace PLC.
1006	Tb Signal Failure (Bearing Temp)	Trouble in Bearing Temperature Sensor or Cable	1. Check or replace bearing temperature (Tb) sensor and cable. 2. Replace the bearing temperature sensor.
1007	Ti Signal Failure (Suction(Inlet) Temp)	Trouble in Suction Air Temperature Sensor or Cable	1. Check the suction temperature (Ts) sensor, cable and connector 2. Check or replace PLC.
1008	Td Signal Failure (Discharge Temp)	Trouble in Discharge Air Temperature Sensor or Cable	1. Check the discharge temperature (Td) sensor, cable and connector 2. Check or replace PLC.
1009	Vibration Signal Failure	Trouble in Vibration Sensor or Cable	1. Check the vibration sensor and signal transducer. 2. Check or replace PLC.
1010	LCD Initialization Fail	Error in Communication with Controller Touch Panel	1. Check or replace the touch panel.
1011	Inverter Comm. Check	Error in Communication with Inverter	1. Check power line to inverter. 2. Check or replace inverter keypad and PLC.
1012	Inverter Power Unit Not Ready	Error in Inverter Power Unit	1. Check the message in inverter keypad screen. 2. If the message is "noP" or "LS", reset controller. 3. Check or replace the inverter.

- Excess of limitation (1/2)

Code	Error Message	Contents	Check & Action
2001	Discharge Overpressure	Excess of Discharge Air Pressure	<ol style="list-style-type: none"> 1. Check the discharge pressure. 2. Check if valves in discharge pipes are closed. 3. Check if load in aeration site increases.
2002	Filter Overpressure	Excess of Filter Pressure Drop	<ol style="list-style-type: none"> 1. Check if suction opening is blocked by obstacles. 2. Check if air filters are blocked by thick dust 3. Check if radiator is blocked by dust in water-cooled models. 4. Check the filter pressure drop sensor and tube.
2003	Motor Overload	Excess of Motor Power	<ol style="list-style-type: none"> 1. Compare actual power with the value displayed in controller 2. Check the rotor by rotating it by hand.
2004	Motor Over speed	Excess of Motor Speed	<ol style="list-style-type: none"> 1. Check suction air and room air temperatures. 2. If room temperature is higher than 40℃, reduce it.
2005	Motor Over temperature	Excess of Motor Temperature	<ol style="list-style-type: none"> 1. Check or replace motor temperature sensor and cable. 2. Check motor insulation. 3. Check suction air and room air temperatures. 4. If room air temperature is higher than 40℃, reduce it 5. In case of water-cooled models, check water level.
2006	Bearing Over temperature	Excess of Bearing Temperature	<ol style="list-style-type: none"> 1. Check the rotor by rotating it by hand. 2. Check or replace bearing temperature sensor and cable.
2007	Suction Over temperature	Excess of Suction Air Temperature	<ol style="list-style-type: none"> 1. Check if suction temperature is high. 2. Check if discharge air leaks. 3. Decrease room air temperature until 40℃ (104 °F). 4. Check or replace suction temperature sensor and cable.

- Excess of limitation (2/2)

Code	Error Message	Contents	Check & Action
2008	Discharge Over temperature	Excess of Discharge Temperature	<ol style="list-style-type: none"> 1. Check if suction temperature is high. 2. Decrease room temperature until 40 °C (104 °F). 3. Check or replace discharge air temperature sensor and cable.
2009	Abnormal Vibration	Excess of Rotor Vibration	<ol style="list-style-type: none"> 1. Check the value of vibration. 2. Check or replace vibration sensor and cable.
2010	Compressor Surge	Compressor Surge	<ol style="list-style-type: none"> 1. Check the discharge pressure. 2. Check if valves in pipes are closed. 3. Check if load in aeration site increases. 4. Restart blower with higher rpm in case of low RPM.
2012	Discharge Under pressure	Deficiency of Discharge Pressure	<ol style="list-style-type: none"> 1. Compare discharge pressure with minimum setting (Pd_min). 2. Check if valve opening in discharge pipes is larger than before. 3. Check if load in aeration site decreases.

- Inverter fault

Code	Error Message	Contents	Check & Action
3001	Inverter Overvoltage	DC-Link voltage is high	1. Check the message (E.OP) in inverter keypad. 2. Check if input voltage is too high.
3002	Inverter Undervoltage	DC-Link voltage is low	1. Check the message (E.UP) in inverter keypad. 2. Check if supplied voltage is too low or unstable. 3. Check voltage loss to inverter. 4. Replace the inverter.
3004	Inverter Overcurrent	Running over 150% of rated current for short time	1. Check the message (E.OC) in inverter keypad. 2. Check the rotor by rotating it by hand 3. Check the insulation of motor. 4. Check terminal block on motor. 5. Change the inverter parameter.
3008	Inverter Overheat Power Module	Overtemperature in Power Module	1. Check the message (E.OH) in inverter keypad. 2. Check the inverter room temperature. 3. Check if discharge air leaks. 4. Check the level of water tank in water-cooled model. 5. Check ventilation fan in some models. 6. Change inverter temperature sensor.
3012	Inverter Power Unit Error	General Power Circuit Fault	1. Check the message (E.PU) in inverter keypad.
3016	Inverter Overload	Running over 125% of rated current for some time	1. Check the message (E.OL) in inverter keypad. 2. Check motor insulation and bearing.
3058	Inverter Overspeed	Real speed is bigger than the maximum output speed	1. Check the message (E.OS) in inverter keypad.
3080	Inverter Hardware Current Limit Over	Output Current Reaches the Hardware Current Limit	1. Check the message (HCL) in inverter keypad.

- Running Fault

Code	Error Message	Contents	Check & Action
4001	Start Failure	Starting Failure	<ol style="list-style-type: none"> 1. Check rotation speed when fault. 2. Check the message (E.OC) in inverter keypad. 3. Check the rotor by rotating it by hand. 4. Check the insulation of motor.
4002	Starting Overtime	Long Starting Time	<ol style="list-style-type: none"> 1. Check rotation speed when fault. 2. Check if blow-off valve is closed during starting. 3. Check "STime_Max" of control parameter.
4003	Motor Underspeed	Deficiency of RPM	<ol style="list-style-type: none"> 1. Check site status such as power suspension. 2. It can occur during stopping due to other faults.
4004	Minimum Discharge Press. Error	Low Discharge Pressure During Starting	<ol style="list-style-type: none"> 1. Check the discharge pressure and if valves in pipes are opened inordinately. 2. Check if load in aeration site decreases. 3. It can occur during stopping due to other faults. 4. Check "Pd_min" of control parameter.