



IA SERIES

Centrifugal Turbo Blower User Manual

Preface

This manual provides information regarding the installation, operation, and maintenance of I.VA.CO. S.r.l. centrifugal turbo blowers. However, it does not provide detailed descriptions of all equipment components or countermeasures for unexpected accidents.

Please be sure to read these instructions before operating the equipment. Follow the instructions to avoid hazards in maintenance, repair, and operation. If there are any abnormal or suspicious operations, please contact headquarters.

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1. Introduction

1.1. General

I.VA.CO. S.r.l. guarantees that the delivered products are free from any defects and provides defect warranty for 12 months from the date of delivery from our company.

If a defect warranty period is separately specified in the contract, the contract content shall prevail.

1.2. Warranty

I.VA.CO. S.r.l. is responsible for repairing or replacing any defects that may occur during the warranty period. However, even during the warranty period, our company is not responsible for any product defects caused by the buyer's failure to operate, store, use, modify, or arbitrarily operate according to the applicable product manual.

1.3. Scope of Responsibility

I.VA.CO. S.r.l. is only responsible for defects arising from the product itself and is not responsible for indirect losses (secondary losses) arising from the product itself.

1.4. Scope of Application

This manual applies to commonly used air suspension centrifugal turbo blower models from I.VA.CO. S.r.l. .

Table 1-1 Common Specifications

Classification	Specification	Remarks
Type	Air Suspension Centrifugal Turbo Blower	
Motor	High-Speed Permanent Magnet Synchronous Motor	
Flow Control	Variable Frequency Regulation	
Power Supply	Three-Phase 380V~440V, 50/60Hz	
Vent Valve	Electromagnetic	
Motor Cooling	Air Cooling	
Vibration	≤1.5mm/s	
Noise (Sound Pressure Level)	80~110dB	
Temperature	-20°C~+40°C	
Humidity	0~95%RH	

The nameplate on the side of the product contains information such as model, serial number, and specifications.

1.5. Product Configuration

1.5.1. Main Unit

The air suspension centrifugal turbo blower does not require gear speed-increasing mechanisms or couplings, and is directly driven by a high-speed motor, with the motor using a frequency converter for speed control. The turbo blower impeller is directly combined with the motor main shaft and suspended on air bearings. Because there is no physical contact or lubrication oil system, the air suspension centrifugal

turbo blower has the characteristics of high efficiency, energy saving, low noise, reliable operation, and long-term maintenance-free operation.

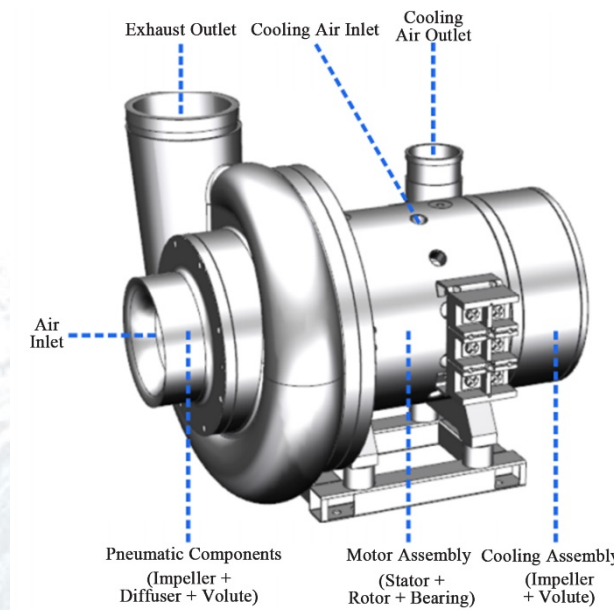


Figure 1-2 High-Speed Permanent Magnet Synchronous Motor

1.5.2. Frequency Converter

High-efficiency high-speed dedicated frequency converter with maximum operating frequency up to 1000Hz, advanced space vector pulse width modulation technology can fully realize the drive requirements of high-speed centrifugal turbo blowers;

Complete motor overload protection function;

High starting torque, high speed regulation accuracy, wide speed regulation range;

Leading high-speed permanent magnet open-loop control technology.

1.5.3. Intelligent Control System

Advanced control system with multiple operating modes available to meet various process requirements at customer sites;

Air suspension centrifugal turbo blower dedicated program that can accurately detect system temperature, pressure, flow rate and other signals, thereby ensuring safe, stable and reliable system operation;

The system supports intelligent cloud control, easily realizing intelligent control, remote control and other functions, making equipment operation and maintenance more convenient and efficient.

1.5.4. Sensor Detection Devices

- Pressure sensor for exhaust pressure detection
- Differential pressure sensor for flow rate detection
- Differential pressure sensor for filter pressure differential detection
- Temperature sensor for motor temperature detection
- Temperature sensor for exhaust temperature detection
- Temperature sensor for intake temperature detection

1.5.5. Enclosure

- Integrated welded frame
- Two-color spray coating with bright colors and strong adhesion
- Excellent sealing effect
- Excellent sound insulation and noise reduction effect

1.5.6. Precision Filtration System

- Filter pressure differential sensor can realize filter cotton replacement reminder function
- Filtration accuracy $5\mu\text{m}$, initial pressure differential $<200\text{Pa}$, can maintain efficient particle interception and low pressure loss, thereby keeping equipment continuously energy-saving
- Long service life, extending maintenance intervals

2. Safety

Please note the following general safety measures.

- ▶ Familiarize yourself with safety precautions before installation and operation.
- ▶ Ensure that no foreign objects enter the interior of the centrifugal turbo blower. When foreign objects enter the enclosure, they will be sucked in by the high-speed rotating impeller, causing serious damage to the main unit.

Special attention: During operation, it is not allowed to replace the intake filter.

- ▶ Operating pressure must not exceed the pressure value on the nameplate.
- ▶ It is not allowed to close the main valve during operation. Maintenance is not allowed during operation.
- ▶ Maintenance cannot be performed immediately after shutdown, as there may be small currents inside the frequency converter.
- ▶ All grounding connections should be made according to international electrical codes and should include three levels of dedicated grounding.
- ▶ This equipment cannot be used in explosive gas atmospheres.
- ▶ Sound may vary slightly depending on the model, but its sound may exceed 85 decibels. As a countermeasure, sound insulation devices can be installed, or appropriate earplugs can be used. Be careful not to be exposed to noise for long periods. May cause hearing damage.
- ▶ Do not modify any parts. Abnormal operation may cause serious injury or property damage. (If needed, please contact our technical personnel)
- ▶ No additional wiring or additional connections are allowed in the control panel. (If needed, please contact our technical personnel)

3. Storage

In many cases, equipment will be placed in warehouses until the final installation, when the product will be brought to the site. Therefore, a suitable storage method is required.

- Store in a place where moisture and dust will not enter the machine.
- Store in a place where temperature remains consistent. (If storage temperature changes, moisture will form inside the product, causing metal surface corrosion or electrical fault.)

➤

4. Installation

4.1. Product Confirmation

Our centrifugal turbo blowers are shipped as a complete assembly, with the configuration table as follows:

Table 4-1 Checklist

Shipping	Contents	Missing*	Damaged**
Main Body	Main Unit (including: high-speed motor, impeller, volute, bearing)		
	Frequency Converter		
	Cabinet/Outlet Cone Pipe/Vent Silencer		
	Pressure Detection Module		
	Temperature Sensor		
	Controller		
	Touch Screen		
	Vent Valve		
	Main Power Circuit Breaker		
	Intake Filter		
	Solenoid Valve		
	Electrical Control Section (including: PLC, fuses, circuit breakers, filters, power switches, gateways, relays, transformers, etc.)		
Options	Wafer Check Valve		
	Wafer Butterfly Valve		
	Expansion Joint		
	H-Shaped Flange		
	Silencer		
	Reactor		

(*Check boxes with √)

When you receive the product, please ensure there is no damage caused by improper handling during transportation. If any product is found missing or damaged, please enter the detailed information of that product and get confirmation from the shipping party.

4.2. Installation Location Selection

4.2.1. Proper product placement can reduce installation and maintenance costs.

4.2.2. The centrifugal turbo blower must be installed in a bright, dust-free building. In areas with high dust levels, the intake filter may have a shortened service life, and high humidity may cause metal surface corrosion or electrical fault.

4.2.3. Choose a location away from pollution sources. Stay away from fire chimneys,

cooling towers, steam or high-temperature exhaust outlets to avoid the influence of heat sources, moisture or dust.

4.2.4. If installed in a poorly ventilated location and unavoidably installed in an enclosed room, appropriate ventilation should be provided to reduce the temperature of the turbo blower station room.

4.2.5. The area around the centrifugal turbo blower installation must have sufficient space for convenient maintenance and inspection, and maintain adequate spacing as shown in the table below.

Table 4-2 Required Installation Space

Model	Distance from Equipment	Distance from Wall	Installation Space Height
10HP	0.8m or more	0.8m or more	2.0 or more
15HP	0.8m or more	0.8m or more	2.0 or more
20HP	0.8m or more	0.8m or more	2.0 or more
30/50HP	1.0m or more	1.0m or more	3.0m or more
75/100/125HP	1.5m or more	1.0m or more	4.0m or more
150/200/250HP	2.0m or more	1.5m or more	4.0m or more

4.2.6. If the centrifugal turbo blower is installed at a high ground level or on the second floor, stairs or other structures should be installed to facilitate equipment inspection. If the ground is uneven, foundation work is required. The foundation work required for our products does not need to consider the dynamic load design required for reciprocating motion equipment, but should fully consider the static load of the product. In addition, vibrations generated by other machines need to be properly isolated and not transferred to our products. Level must be checked, and our equipment should be installed on a level surface, such as concrete pads or steel plates. If the equipment position may be changed by external vibrations, use anchor bolts to secure the equipment to the floor.

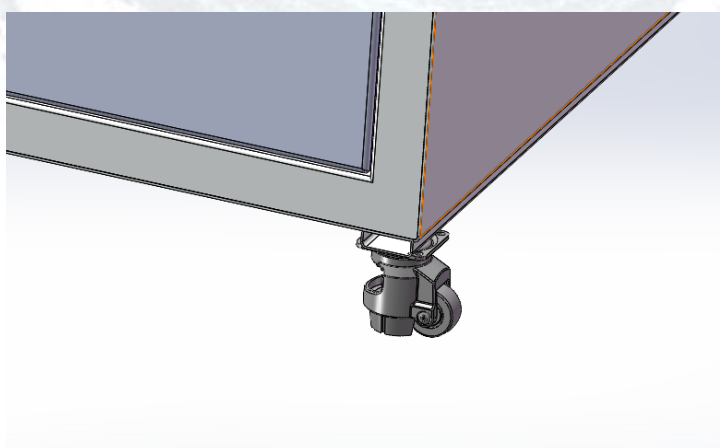


Figure 4-1 Foundation Work

4.3. Piping

4.3.1. The center of the centrifugal turbo blower outlet coincides with the center of the installed discharge pipeline. Before installing the centrifugal turbo blower, please check whether the actual height of the centrifugal turbo blower matches the drawing height.

4.3.2. After correctly positioning the centrifugal turbo blower at the installation

location, level it using the levelers at the bottom of the turbo blower.

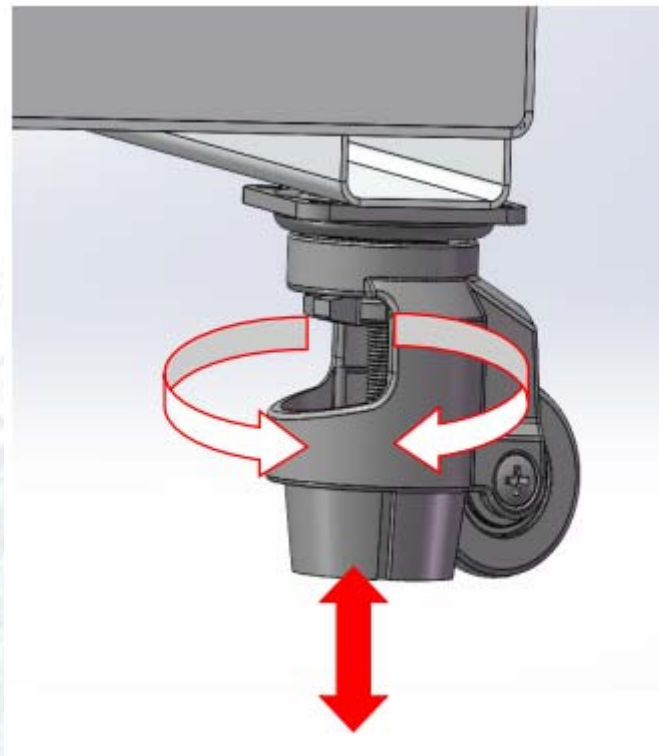


Figure 4-3 Leveling

4.3.3. Discharge Pipeline

4.3.3.1. Configuration of Centrifugal Turbo Blower Discharge Pipeline

- Expansion joint
- Check valve
- Discharge pipeline silencer

(Note) Connection sequence.

(Note) Be sure to check whether gaskets have been inserted at this time

4.3.3.2. Prevent pipeline loads from affecting equipment installation support, as shown in Figure 4-4

4.3.3.3. If possible, install the outlet silencer directly at the centrifugal turbo blower outlet (flexible connection).

4.3.3.4. After checking the internal condition and direction of the check valve, install it between the outlet silencer and the centrifugal turbo blower outlet.

4.3.3.5. Install the butterfly valve at the tail of the discharge silencer.

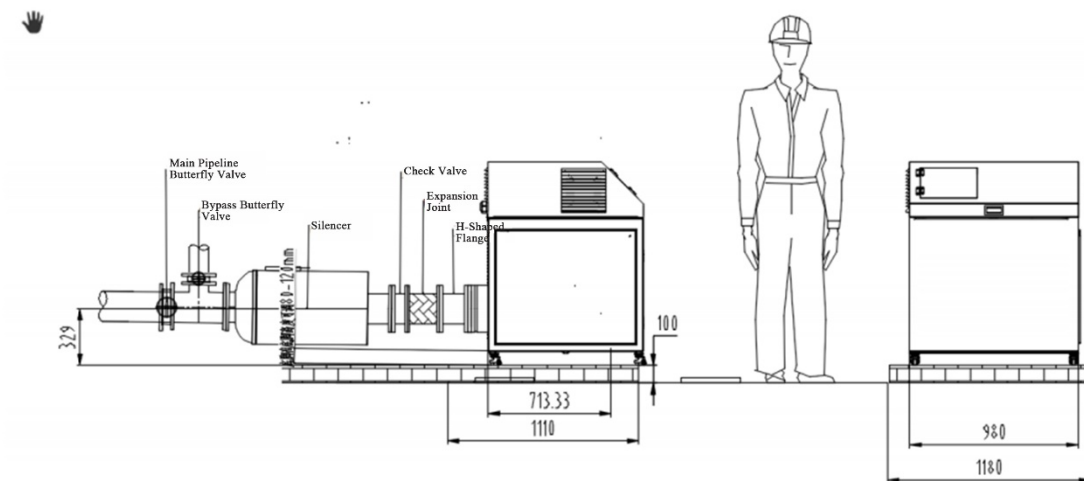


Figure 4-4. Discharge Line Connection

4.3.4. Suction Pipeline

4.3.4.1. Check whether the Intake Filter is Connected to the Product.



Figure 4-5 Intake Filter

4.3.4.2. If the intake uses external pipeline and filter structure, it must be ensured that: 95% of foreign substances with diameter greater than $5\mu\text{m}$ can be filtered. Suction differential pressure does not exceed 1kPa.

In particular, the structure of these components should be convenient for disassembly to facilitate regular inspection and cleaning in the future. In addition, install a drain valve at the lowest part of the suction pipeline, as condensation may occur due to humidity.

4.4. Main Power Supply and Grounding

4.4.1. Recommended main power circuit breaker and cable wire diameter parameter table:

Table 4-3 Power and Grounding Cable Specifications

Model	Circuit Breaker	Wire	
		R(L1)、S(L2)、T(L3) mm ²	Ground Wire mm ²
10HP	20A	≥4	2.5
15HP	32A	≥6	4
20HP	40A	≥6	4
30HP	60A	≥10	6
50HP	100A	≥25	16
75HP	150A	≥50	25
100HP	200A	≥50	25
125HP	250A	≥70	35
150HP	300A	≥95	50
200HP	400A	≥120	70
250HP	500A	≥185	95
300HP	600A	≥185*2	120

Cable products that comply with GB/T19666 and JB/T8734.2 requirements should be used.

4.4.2. The color of the ground wire should be two-color and must not be used for purposes other than grounding.

4.4.3. Check Insulation Resistance

If placed in a humid place during transportation or storage, insulation resistance must be measured before energizing. The insulation resistance between phase and ground must be greater than 10MΩ.

4.5. Control Line Connection

For remote operation, the control lines shown in the figure below can be used

Table 4-6 Control Line Terminal Connections

S/N	Signal Terminal	Description
1	24+	24V Power Supply
	24-	
2	FAULT1	Fault Output
	FAULT2	
3	RUN1	External Start Signal
	RUN2	
4	COM	Remote Control Signal
	X2	
5	24+	Remote Start, Start/Stop Terminal
	REM-	
6	R485+	External Remote Communication (IoT)
	R485-	

4.6.

Before initial operation, the following items must be checked:

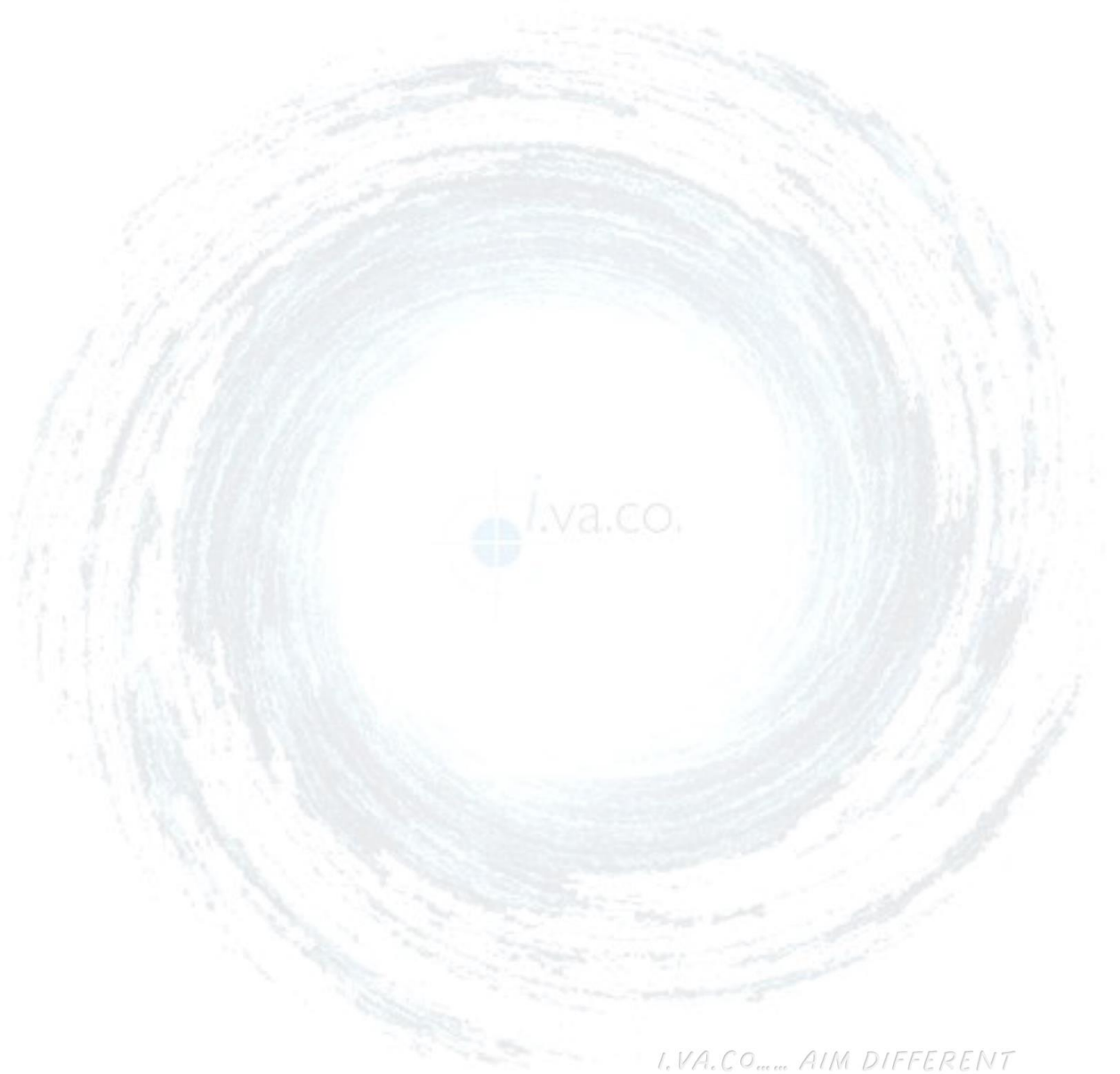


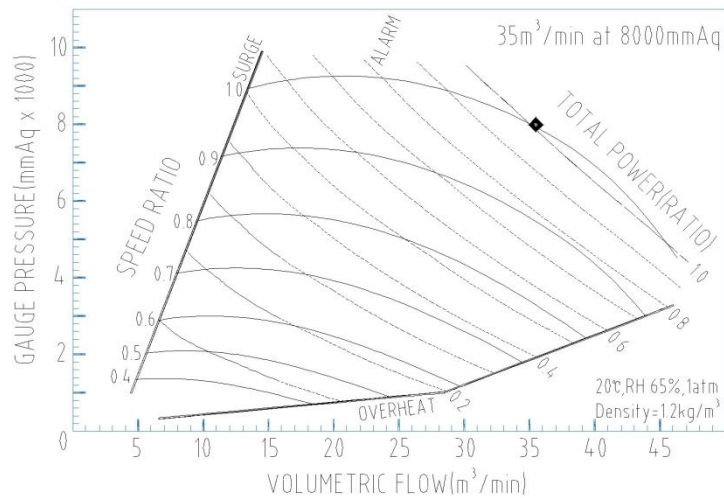
Table 4-4 Pre-Initial Operation Checklist

Classification	Item	Details	Check
Check Piping	Discharge Pipeline Condition	Is the discharge pipeline size appropriate?	Y□/N□
		Check for foreign objects/obstacles	Y□/N□
	Suction Pipeline Condition	How is the bolt tightening and gasket insertion condition?	Y□/N□
		Is the suction pipeline size appropriate?	Y□/N□
Check Installation	Anti-Vibration	(When external vibration is large) Are anti-vibration springs installed?	Y□/N□
	Foundation Level	Is the level appropriate?	Y□/N□
	Spacing	Is there appropriate space required for maintenance and inspection?	Y□/N□
	Outlet Component Sequence	Flexible Joint->Check Valve->Silencer->Shut-off Valve	Y□/N□
Power Supply and Controller	Check Main Power Supply	Is the voltage between each line in accordance with specifications?	Y□/N□
	Circuit Breaker Capacity	Is the circuit breaker capacity sufficient?	Y□/N□
	Power Connection Status	Check final tightening	Y□/N□
	External Control Line Connection	Is each terminal connected correctly?	Y□/N□
	Power Lines	Are power/ground lines adequate?	Y□/N□
	Ground Wire	Is the ground wire properly connected?	Y□/N□
	Communication Line Usage	Are UTP cables and terminal connections correct?	Y□/N□
Check Power On	Touch LCD Display	Are control parameters saved as described in the report?	Y□/N□
		Does the touch screen display normally?	Y□/N□
		Are exhaust pressure and filter pressure differential parameters normal?	Y□/N□
		Are temperature parameters normal?	Y□/N□
		Are speed parameters normal?	Y□/N□
		Are power parameters normal?	Y□/N□
	Vibration/Noise	Are vibration and noise normal during operation?	Y□/N□

5. Operation

There are three types of operation: local field operation with touch screen, remote connection operation, and MCP operation (LAN). Each operation style operates under the same control.

Figure 5-1 Performance Chart (Flow vs. Pressure Curve)



During normal operation, the centrifugal turbo blower load is within the working area of Figure 5-1.

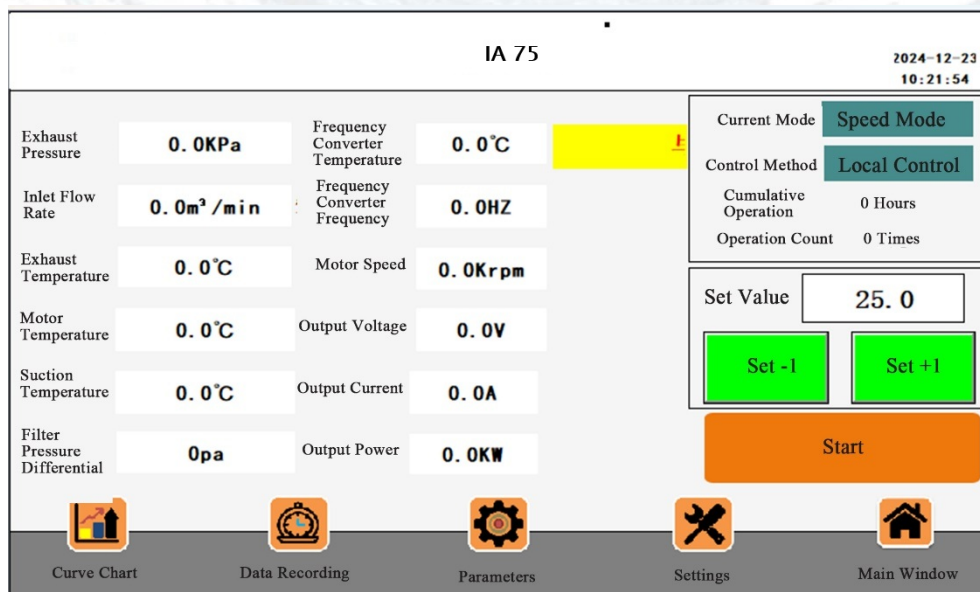
5.1. Local Operation

5.1.1. Touch Screen Display Configuration

- It consists of seven screens
- For each screen description, please refer to 5.1.1.1 to 5.1.1.7.

5.1.1.1. Touch Screen Main Screen

- Check real-time operation and status
- Able to set operation values



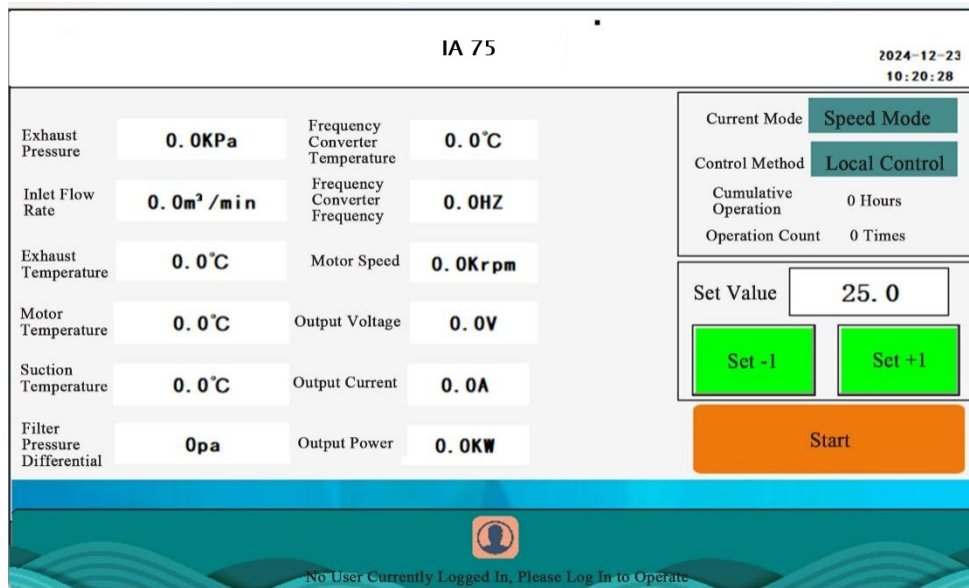


Figure 5-2 Main Screen

Display contents are shown in Table 5-1.

Table 5-1 Main Screen Content

S/N	Description
1	Login Interface (Enter login password to access parameter interface)
2	Machine Operation Status Monitoring
3	Machine Model/Machine Operation Mode
4	Machine Operation Time
5	Set Value Input

5.1.1.2. Touch Screen Settings

5.1.1.2.1. Control Mode Settings

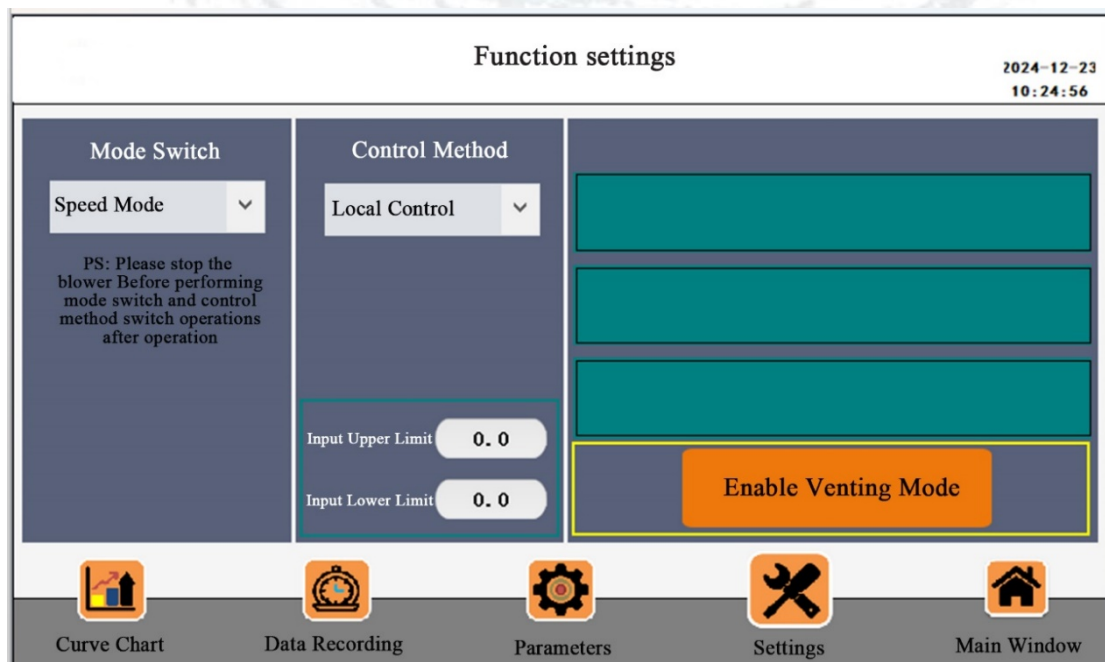


Figure 5-2 Screen Settings

Touch screen settings display is shown in Table 5-2.

Table 5-2 Screen Settings Content

- Set MIN/MAX values

Mode	Min. Value	Max.
Speed (Krpm)	20	Rated Speed (Nameplate Speed)
Power (%)	50	100
Current (%)	50	100
Flow Rate (m ³ /min*10)	50	Rated Flow Rate (Nameplate Flow Rate)
Pressure (kPa*10)	10	Rated Pressure (Nameplate Pressure)

Enter appropriate settings according to the operating area.

5.1.1.2.2. Set Value Description

Set value is local, indicating touch screen setting.

Set value is remote, indicating change of set value through analog input.

Set value is network cable, indicating change of set value through external Ethernet.

5.1.1.3. Data Monitoring

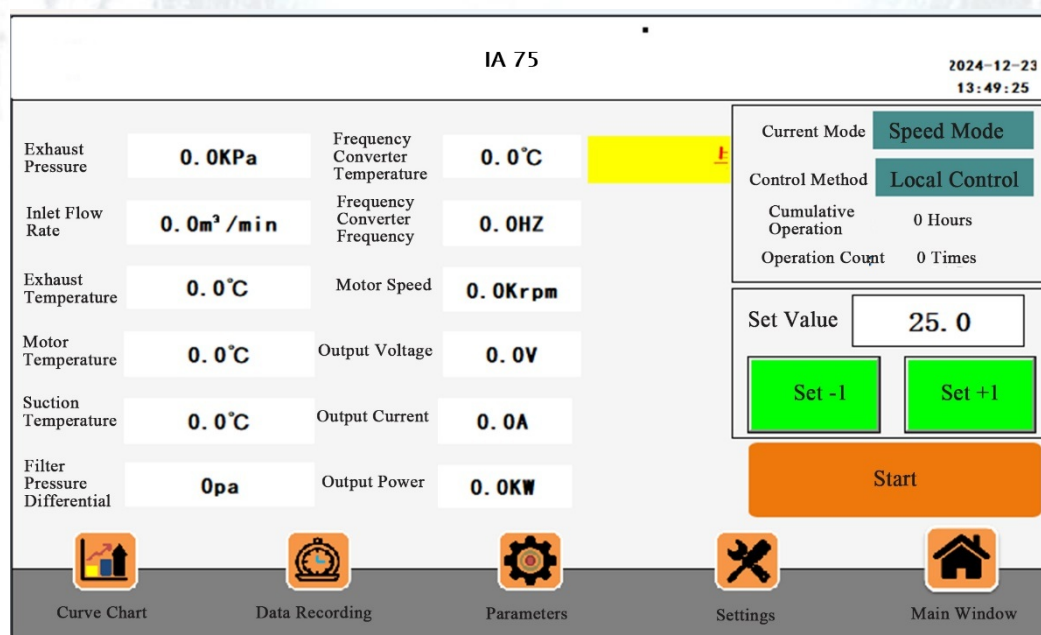


Figure 5-3 Data Monitoring Screen

Network Communication Protocol Address

Modbus TCP/IP RTU Memory Mapping					
Communication Memory Mapping					
Modbus Data Read					
Ethernet Mode (Communication)					
BLOWER-->CCR	ADD	RANGE	UNIT	DATA TYPE	REMARK
0: Start	40031			DECIMAL	W
				DECIMAL	
1: Stop				DECIMAL	

Suction Temperature	40005		$\times 0.1^{\circ}\text{C}$	DECIMAL	R
Outlet Temperature	40003		$\times 0.1^{\circ}\text{C}$	DECIMAL	R
Motor Temperature	40004		$\times 0.1^{\circ}\text{C}$	DECIMAL	R
Flow Rate	40018		$\times 0.1\text{m}^3/\text{min}$	DECIMAL	R
Output Power	40006		$\times 0.1\text{KW}$	DECIMAL	R
Filter Pressure Differential	40019		$\times 1\text{Pa}$	DECIMAL	R
Outlet Pressure	40017		$\times 0.1\text{Kpa}$	DECIMAL	R
Status: 1 Ready; 2 Operating; 3 Fault	40016			DECIMAL	R
Output Voltage	40022		$\times 1\text{V}$	DECIMAL	R
Motor Speed	40021		$\times 0.1\text{Krpm}$	DECIMAL	R
Motor Current	40023		$\times 0.1\text{A}$	DECIMAL	R
Operation Count	40081		*1 Time	DECIMAL	R
Operation Time	40082		*1h	DECIMAL	R
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Local Mode					
BLOWER-->CCR	ADD	RANGE	UNIT	DATA TYPE	REMARK
Fault Code	40015	1: Suction Temperature High Warning 2: Motor Temperature High Warning 3: Filter Pressure Differential Warning 4: Outlet Pressure High Warning 5: Speed High Warning 6: Current High Warning 7: Surge Warning 8: Low Pressure Warning 9: Butterfly Valve 1 Fault Alarm 10: Butterfly Valve 2 Fault Alarm 11: Butterfly Valve 3 Fault Alarm			101: Suction Temperature High Alarm 102: Motor Temperature High Alarm 103: Filter Pressure Differential High Alarm 104: Outlet Pressure High Alarm 105: Speed High Alarm 106: Current High Alarm 107: Surge Alarm 108: Low Pressure Alarm 109: Start Failure 110: Butterfly Valve Fault Shutdown 201: Emergency Stop Button Pressed 202: Frequency Converter Fault Alarm 203: Frequency Converter Communication Failure Alarm

485 Communication Settings		
PARAMETER	DEFAULT SETTING	REMARK
Baud Rate	19200	
Parity	NONE	
Stop Bits	1	
Data Bits	8	
Slave Address	Default Setting 1 (Number according to equipment quantity 1; 2; 3, etc.)	

5.1.1.4. Control Parameter Settings Screen (Page 1, Page 2, Page 3, Page 4)

Parameter Settings 2024-12-23 13:46:43

Alarm Settings

Suction Temperature Warning Value: 0.0℃

Suction Temperature Alarm Value: 0.0℃

Motor Temperature Warning Value: 0.0℃

Motor Temperature Alarm Value: 0.0℃

Filter Pressure Differential Warning Value: 0.0Pa

Filter Pressure Differential Alarm Value: 0.0Pa

Outlet Pressure Warning Value: 0.0KPa

Outlet Pressure Alarm Value: 0.0KPa

Speed Warning Value: 0.0Krpm

Speed Alarm Value: 0.0Krpm

Current Warning Value: 0.0A

Current Alarm Value: 0.0A

Speed Adjustment

ID Pressure Increase Limit: 0

ID Pressure Decrease Limit: 0

Vent Valve No-Load Min. Speed: 0

Shutdown Frequency Deceleration Rate: 0

Page 1 Page 2 Page 3 Page 4 Initialize Parameters

Curve Chart Data Recording Parameters Settings Main Window

2024-12-23 13:47:09

Surge Settings

Min. Surge Outflow: 0

Max. Surge Outflow: 0

Min. Surge Abscissa: 0

Max. Surge Abscissa: 0

Surge Alarm Warning Differential: 0

Vent Valve Alarm Differential: 0

Low Pressure Settings

Min. Pressure Outflow: 0

Max. Pressure Outflow: 0

Min. Pressure Abscissa: 0

Max. Pressure Abscissa: 0

Thrust Alarm Warning Differential: 0

Hard-Wired Mode Settings

Outlet Pressure Output Upper Limit: 0

Flow Rate Output Upper Limit: 0.0

Power Output Upper Limit: 0.0

Speed Output Upper Limit: 0.0

Fourth Channel Analog Upper Limit: 0.0

Page 1 Page 2 Page 3 Page 4

Curve Chart Data Recording Parameters Settings Main Window

Parameter Settings 2024-12-23 13:47:37

Other Settings 1

Opening Cross-Section Diameter: 0.000

Altitude: 0M

Ballfloat Valve Timeout: 0S

Vent Valve Closing Time: 0S

Shutdown Time: 0S

Disable Surge Alarm: 0

Other Settings 2

Frequency Converter Power Upset Limit: 0KV

Min. Frequency Converter Control: 0A

Min. Frequency Converter Frequency: 0HZ

Max. Frequency Converter Frequency: 0HZ

Power Value Correction: 0.000Pa

Flow Rate Correction Factor: 0.000

Other Settings 3

Pressure Differential Offset: 0

Opening Pressure Offset: 0

485 Slave Address: 1

485 Baud Rate: 9600

Motor Temperature Correction Coefficient: 0.000

Page 1 Page 2 Page 3 Page 4

Curve Chart Data Recording Parameters Settings Main Window

Parameter Settings 2024-12-23 13:47:55

PLC Address Settings

IP Address: 0 0 0 0

Subnet Mask: 0 0 0 0

Gateway: 0 0 0 0

Read PLC IP

Modify PLC IP

Remote Port Start/Stop

Enable 502 Interface

Enable 503 Interface

Enable 504 Interface

Touch Screen Address Settings

Local IP: 192 168 2 2

Remote IP: 192 168 2 1


Modify Communication IP

Page 1 Page 2 Page 3 Page 4

Curve Chart Data Recording Parameters Settings Main Window

Figure 5-4 CP Value Settings Screen

- The values in the control parameter screen are the main parameter setting values for centrifugal turbo blower operation.
- Entering the control parameter settings screen requires password input.

Note		Any arbitrary settings without manufacturer consent may cause serious equipment problems. Please change after obtaining consent from the person in charge.
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5.1.1.5. Touch Screen Data Recording Screen

5.1.1.5.1. Data Log Screen Configuration and Description

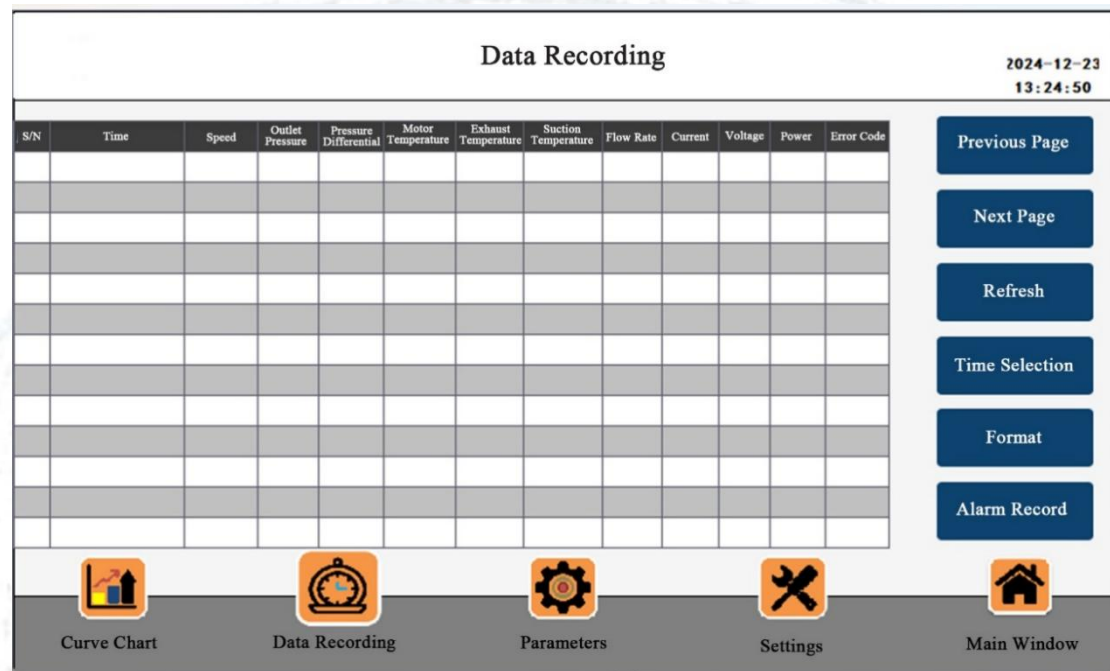


Figure 5-3 Data Log Screen

- The data log screen records and stores key data to prevent faults or warnings.
- Contents are shown in Table 5-3.
- If a fault occurs, related data is saved in the historical alarm page.

Table 5-3 Contents of Event Data Saved on Screen

S/N	Description	S/N	Description
DATA	Saved Data	P	Power
TIME	Time of Saved Data	OP	Exhaust Pressure
Hz	Operating Frequency	RPM	Speed
T1	Suction Temperature	FLOW	Flow Rate
T2	Exhaust Temperature	DP	Filter Pressure Differential
TM	Motor Temperature	FAIL	Error

5.2 Remote Operation

Remote operation can use contactless switch signal control for starting and analog signal for setting.

Figure 5-4 Remote Terminal Layout

S/N	Signal Terminal	Description
-----	-----------------	-------------

1	24+	24V Power Supply
	24-	
2	FAULT1	Fault Output
	FAULT2	
3	RUN1	External Start Signal
	RUN2	
4	COM	Remote Control Signal
	F.D-LA-	
5	24+	Remote Start, Start/Stop Terminal
	REM-	
6	R485+	External Remote Communication
	R485-	

6. Maintenance/Repair

6.1. General Precautions

6.1.1. Never disassemble the product arbitrarily. (Problems caused by arbitrary operation will require payment of repair fees regardless of warranty period length).

6.1.2. If the product shuts down abnormally, do not operate arbitrarily. Check the error code and contact our technical personnel.

6.2. Periodic Inspection Items

6.2.1. Daily Inspection Items

Inspection Item	Description	Remarks
Touch LCD Display	Power, speed, exhaust pressure, flow rate, suction and exhaust temperature	Keep records
Filter Pressure Differential	If pressure differential is too large, replace filter	Replace filter every three months
Vibration	Check vibration by hand feeling Check vibration transmitted through piping	When problems occur, inquire about after-sales service
Air Leakage	Check for air leaks in compressed air flow. Check for air leaks in flange connections and piping	
Noise	Abnormal sound appears	When problems occur, inquire about after-sales service
Odor	Burning smell around the machine	When problems occur, inquire about after-sales service
Power Lines	Power cable overheating. Load imbalance between three-phase cables (R-S-T)	When problems occur, inquire about after-sales service

6.2.2. Monthly Inspection Items

Inspection Item	Description	Remarks
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Filter	If pressure differential is too large, replace filter	Replace filter every three months
Compare Operating Data	Compare pressure, flow rate, temperature, power with normal operating condition data	When problems occur, inquire about after-sales service

6.2.3. Annual Inspection Items

Inspection Item	Description	Remarks
Check Frequency Converter	External inspection and assembly condition	Contact technical service center
Check Motor	Rotor inspection, terminal inspection, insulation resistance measurement.	Contact technical service center
Check Controller	Sensor calibration Safety shutdown circuit inspection	Contact technical service center
Check Power Supply	Check safety circuit breaker and measure power supply	Contact technical service center

6.2.4. Filter Change

Part	Inspection Cycle	Inspection and Repair Items	Change Cycle (Repair/Recommendation)
Pre-filter	Once a week	Degree of contamination	When contamination is severe. Replacement cycle is weekly or monthly
Filter	Once a month	Degree of contamination	When contamination is severe. Replacement cycle is 3 or 6 months

6.3. Parts Inspection and Replacement Cycle

The inspection and replacement cycle of parts may vary depending on the environment around the equipment installation. When operating equipment in areas with severe surrounding contamination, inspection cycles and replacement cycles must be observed.

6.3.1. Motor

S/N	Part	Inspection and Repair Items	Major Overhaul Restart Cycle	Remarks
1	Motor Major Overhaul	Insulation resistance inspection	Once a year	Starting from two years later
		Stator Winding	Once every 3~5 years	Decided after insulation resistance inspection
		Clean Impeller and Volute	Once every 3~5 years	
		Thrust Bearing Inspection	Once every 3~5 years	Decided after disassembly inspection
		Radial Bearing Inspection	Once every 3~5 years	Decided after disassembly inspection
◆ Generally, motor major overhaul is recommended every 3 to 5 years				

(depending on the environment of the installation site).

6.3.2. Frequency Converter

The frequency converter consists of semiconductor devices, passive electronic devices, and moving devices, all of which have service lives. Even under normal working environments, if the service life is exceeded, some devices may experience characteristic changes or failure. To prevent this phenomenon from causing faults, daily inspections, regular inspections, device replacements and other preventive inspection maintenance must be performed. It is recommended to perform inspections every 3-4 months after machine installation.

6.3.2.1. Frequency Converter Fault Diagnosis

Table 6-1 Frequency Converter Fault Diagnosis

Condition		Inspection Item	Countermeasure
Motor Does Not Rotate	No frequency converter output generated	Is the frequency converter input power normal?	Measure frequency converter input voltage.
		Are the frequency converter operating mode and set values set correctly?	Check parameter set values.
		Is the frequency converter operating signal input?	Check whether the operating signal input on the frequency converter is correct.
		Are there any warnings or errors?	Reset and restart.
	Frequency converter output generated	Is the motor connection correct?	Connect frequency converter output and motor input.
		Is the motor fixed or is the load too large?	Reduce motor load.
		If the motor has a circuit breaker, check whether the circuit breaker operates correctly.	Circuit breaker is closed and motor is started.
		Check whether the motor is defective.	Connect frequency converter output and motor input.
		Is the frequency converter output current equal to or greater than the set current limit value?	Check parameter settings, increase acceleration time slightly.
	Motor Rotation Direction is Reverse	Are the frequency converter output phases (U, V, W) correct?	Change the positions of U phase and V phase terminals.
Is the rotation direction operation signal connected correctly?		Change signal positions.	
Motor Speed Does Not	Is the load too heavy?	Release or reduce motor	

Increase		load, increase acceleration time.
Motor Deceleration is Not Smooth	Is resistance connected in the frequency converter?	Connect resistance.
	Is deceleration not smooth after resistance is connected?	Increase deceleration time.
Motor Current is Too Large	Is the load too heavy?	Release or reduce motor load.
	Is the input voltage too low?	Check frequency converter input power supply.
	Has the main unit failed?	Check main unit.

6.3.2.2. Frequency Converter Inspection

Daily inspection: To avoid frequency converter damage and shortened service life, please confirm the following items daily.

Table 6-2 Daily Frequency Converter Inspection

Inspection Item	Inspection Content	Countermeasure
Power Supply	Check whether the supply voltage meets requirements and whether there is phase loss in power supply.	Solve it according to nameplate requirements.
Surrounding Environment	Does the installation environment meet requirements.	Confirm source and solve properly.
Cooling System	Whether the frequency converter and motor have abnormal heating and discoloration, cooling fan working condition.	Confirm whether overloaded, tighten screws, whether frequency converter heat sink is dirty, confirm whether fan is blocked.
Motor	Whether the motor has abnormal vibration and abnormal sound.	Tighten mechanical and electrical connections, and lubricate mechanical parts.
Load Condition	Whether the frequency converter output current is higher than the rated value of the motor or frequency converter and has continued for a certain time.	Confirm whether overload has occurred, confirm whether frequency converter selection is correct.

Regular inspection: Generally, regular inspections should be performed every 3 to 4 months, but in actual situations, please determine the actual inspection cycle based on the usage and working environment of each machine.

Table 6-3 Regular Frequency Converter Inspection

Inspection Item	Inspection Content	Countermeasure
Overall	Insulation resistance inspection; Environmental	Tighten and replace defective parts; Clean and

	inspection.	improve operating environment.
Electrical Connection	<ul style="list-style-type: none"> • Whether wires and connections have discoloration, whether insulation layer has damage, cracks, discoloration and aging traces; • Whether connection terminals are worn, damaged, loose; • Grounding inspection. 	<ul style="list-style-type: none"> • Replace damaged wires; • Tighten loose terminals and replace damaged terminals; • Measure grounding resistance and tighten corresponding grounding terminals.
Mechanical Connection	Whether there is abnormal vibration and sound, whether fixation is loose.	Tighten, lubricate, replace defective parts.
Semiconductor Devices	<ul style="list-style-type: none"> • Whether contaminated with garbage and dust; • Whether appearance has obvious changes. 	<ul style="list-style-type: none"> • Clean operating environment; • Replace damaged parts.
Electrolytic Capacitor	Whether there is leakage, discoloration, cracking, whether safety valve is exposed, expansion, rupture or leakage.	Replace damaged parts.
Printed Circuit Board	Whether there is odor, discoloration, severe rust, whether connectors are correct and reliable.	<ul style="list-style-type: none"> • Tighten connections; • Clean printed circuit board; • Replace damaged printed circuit board;
Cooling System	<ul style="list-style-type: none"> • Whether cooling fan has damage and blocking phenomena; • Whether heat sink is contaminated with garbage and dust, whether dirty; • Whether air inlet and exhaust outlet are blocked or contaminated with foreign objects. 	<ul style="list-style-type: none"> • Clean operating environment; • Replace damaged parts.
Keyboard	Whether keyboard has damage and display defects.	Replace damaged parts.

6.3.3. Controller

6.3.3.1. PLC Controller

S/N	Part	Inspection Cycle	Inspection and Repair Items	Replacement Cycle (Repair/Recommendation)
1	Temperature Sensor	Once a year	Measurement and calibration	When fault occurs/ten years
2	Pressure Sensor	Once a year	Measurement and calibration	When fault occurs/ten years
3	Communication Card	Once a year	Operation inspection	When fault occurs/ten years
4	Touch LCD Display	Once a year	Operation inspection	When fault occurs/ten years

6.3.4. Fault Codes

Table 6-4 Error Codes

Fault Code	Fault Content	Inspection Content
1	High Suction Temperature (Warning)	Check air inlet, confirm temperature sensor, ambient temperature, etc.
2	High Motor Temperature (Warning)	Check whether motor operation is normal
3	High Filter Pressure Differential (Warning)	Check pressure sensor, filter cotton, etc.
4	High Outlet Pressure (Warning)	Check outlet valve, pressure sensor, etc.
5	High Motor Speed (Warning)	Check touch screen speed setting, whether frequency converter operation is normal
6	High Current (Warning)	Confirm whether motor is operating normally
7	Surge (Warning)	Check whether vent valve opening and closing is normal and its time setting, etc.
8	Low Pressure (Warning)	Confirm whether speed and flow rate are normal
101	High Suction Temperature (Shutdown)	Check air inlet, confirm temperature sensor, ambient temperature, etc.
102	High Motor Temperature (Shutdown)	Check whether motor operation is normal
103	High Filter Pressure Differential (Shutdown)	Check pressure sensor, filter cotton, etc.
404	High Outlet Pressure (Shutdown)	Check outlet valve, pressure sensor, etc.
105	High Motor Speed (Shutdown)	Check touch screen speed setting, whether frequency converter operation is normal
106	High Current (Shutdown)	Confirm whether motor is operating normally
107	Surge (Shutdown)	Check whether vent valve opening and closing is normal and its time setting, etc.
108	Low Pressure (Shutdown)	Confirm whether speed and flow rate are normal

109	Start Failure	Confirm whether frequency converter starts and operates normally
201	Emergency Stop	Check emergency stop button
202	Frequency Converter Fault	Check current frequency converter status
203	Frequency Converter Communication Failure	Check touch screen, frequency converter, PLC communication

7. Contact Information

I.VA.CO. SRL

Italian Vacuum Compressors

Via delle Brigole, 33

23877, Paderno D'Adda, -LC-

Italy T. +39.039.9281084

www.ivaco.it



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