Blower Door Testing

MODEL GTI 658

Operation Manual

01001
24.10

Before using GTI 658, kindly read and understand the warnings and precautions marked in this instruction manual.

To facilitate long-term use, please keep this instruction manual properly preserved.

Special Attention:

Contents of this manual and specifications of GTI 658 are subject to change without prior notice.

GTI reserves the right to change specifications and materials contained herein without notice. GTI does not assume responsibility for damages (including consequential damages) arising from trusting referenced materials, including but not limited to printing errors and other errors related to this publication.

[键入文字]

To ensure your benefits and enable you to receive timely and effective after-sales service, please diligently fill out the "Instrument Warranty Card," cut it along the dotted line, copy it, and send it to GTI by fax or mail according to our contact information. If you do not promptly send this warranty card to GTI, you will not be able to enjoy our normal warranty and technical support. Your cooperation is appreciated!

Please cut along this dotted line

Instrument Warranty Card

Date of Filling (Month Day Year):

Name	
Product Model	
Instrument Serial Number	(Please check on the control box)
Purchase Date	(Month Day Year)

User Organization			
Organization Address		Postal	
Contact Number		Fax	
Department of Use		Contact	
Contact Person's Email			
Instrument Usage (Please fill in the details)			
User Feedback			

User Notice:

1. Upon receiving the purchased instrument, please carefully fill out this warranty card and send it back to GTI via fax or mail after confirming and signing the form.

2. The warranty period for the purchased instrument is based on the "purchase date" filled out on this warranty card. (All instruments from GTI come with a one-year warranty, provided that the product manual has been carefully read and the instrument has been operated according to its instructions.)

3. To ensure your benefits and allow you to receive timely and effective after-sales service, please keep this instrument warranty card in a safe place.

GTI Precision Instrument (Shenyang) Co., Ltd.
Address: 56-39 Huanghebei Street, Hwanggu District, Shenyang, Liaoning Province (2212) Postal Code: 110034
Phone: +86-24-81231386 Fax: +86-24-81231386
Website: www.gti-instruments.com E-mail: sales@gti-test.com

Packing List

	Name	Quantity	Remarks
Standard Products	Fan Body	1 Set	
	Yellow Nozzle	1 Set	
	Red Nozzle	1 Set	
	Large Diameter Piston	8 Sets	
	Small Diameter Piston	1 Set	
	Nine-Sided Cover Plate	1 Set	
	Power Cord	1 piece	
	Fan Carrying Case	1 Set	
	Instrument Main Unit	1 unit	
	Main Unit Bracket	1 item	
	Communication Cable	1 Set	
	Main Unit Carrying Case	1 Set	
	Red Air Tube	2 meters	
	Blue Air Tube	2 meters	
	Alkaline Battery AA (Non-Air Transport Logistics)	4 pieces	
	Fan Seal Cover	1 Set	
	Inspection Report	1 copy	
	Building Air Tightness Test System MODEL GTI 658 Operation Manual	1 copy	
	Model GTI 116 Instruction Manual	1 copy	
Optional Items	Main Unit Adapter		
	Foot for Fan		
	RS485 Communication Cable		

Note: The frame and fabric cover components are packed separately.

[键入文字]

Precautions

GTI defines the types of warnings used in the instruction manual as follows.

[Identification Explanation]

Warning: Prevent Personal Injury

If the content of this warning is ignored, there may be a risk of personal injury.

Caution: Prevent Instrument Damage

If the content of this warning is ignored, the instrument may be damaged or its performance may degrade.

[Icon Description]

△ Symbol indicates caution (including danger). Specific caution content is depicted within the triangle frame.

⃠ Symbol indicates prohibition. Specific prohibited content is depicted within the circular frame.

● Symbol indicates mandatory action. Specific content is depicted near the diagram.

Warning	
Do Not Use in Flammable Gas Environments	○ Do not place the instrument in flammable gas. … Otherwise, it may lead to fire or even explosion.
Disassembly Prohibited	○ Do not disassemble or modify the instrument. ... Otherwise, it may lead to electric shock or fire.
Correct Use	○ Please use the instrument correctly according to the requirements of the instruction manual. ... Improper use may lead to sensor damage, electric shock, or fire.
Correct Use	○ If during use the instrument emits an unusual odor, sound, smoke, or if liquid flows into the instrument, please immediately cut off the power supply and contact the manufacturer. ... Otherwise, there may be a risk of electric shock, fire, and instrument damage.
Placement Prohibition	○ Do not expose the instrument to rain. … Otherwise, it may lead to fire or even explosion.

	Caution
	○ When not in use, please unplug the power cord. ... Otherwise, there may be a risk of damaging internal circuits, electric shock, or fire.
 **Placement Prohibition**	○ Do not place GTI 658 in high temperature, high humidity, dusty areas, or under direct sunlight. Do not expose GTI 658 to rain. ... Otherwise, it may cause damage to internal components or degrade instrument performance.
 **Correct Use**	○ Turn off and unplug GTI 658 when moving, not in use, or replacing the nozzle. ... Otherwise, it may cause injury to the operator.
 **Prohibition**	○ Do not drop or heavily press GTI 658. ... Otherwise, it may lead to instrument malfunction or damage.

Table of Contents

1 Product Introduction

GTI 658 Blower Door System is primarily used for air tightness testing of buildings and their internal indoor spaces. It adopts the fan pressure method (blower door method), creating a pressure difference between the interior and exterior of the building in a sealed state. By adjusting the fan speed, the indoor pressure reaches the ideal differential pressure (10-100 Pa). The volume flow of air delivered by the fan is measured, which is equal to the flow through the building's unsealed areas. It is used to assess the building's air tightness grade and locate leaks. This instrument complies with various current testing standards in the building industry in Europe, America, and China. Testing methods can be selected as needed, with simple operation and precise results. The entire system consists of three parts: the fan device, the instrument main unit, and the door frame and fabric cover assembly. The door frame uses a lightweight and sturdy alloy frame, the main unit is equipped with a high-resolution LCD color screen display, and a good human-machine interface for easy user operation. The system is lightweight, has a wide flow measurement range, is efficient and convenient, saves time and effort, and is easy to carry and transport.

1.1 Product Features

Two pressurization modes: Blowing and Suction

Quick leak detection, @P function for fast and accurate air tightness data acquisition

Compliant with Standards: T/CECS 704-2020, ASTM E779-03, ATTMA, GB/T34010-2017/ISO 9972:2006, CGSB149.10-2019

Adjustable metal frame structure, compatible with various door sizes, easy to install, lightweight and durable

Multiple replaceable nozzles, large flow measurement range

3.2 " High-resolution LCD color screen, clear display, simple operation

Real-time display of leakage rate, test pressure, temperature, and atmospheric pressure

The main unit has two power supply options: adapter and battery, providing precise control of fan speed

Lightweight, more convenient for transportation and carrying

RS485 communication, Wi-Fi communication, equipped with dedicated software

1.2 Product Specifications

Fan Device

Item		Parameter
Flow Rate	Range	Natural State: 4,000 to 10,000 m^3/h
		Yellow Nozzle: 1,200 to 4,000 m^3/h
		Red Nozzle: 350 to 1,200 m^3/h
		8 Large Hole Nozzles: 160 to 350 m^3/h
		4 Large Hole Nozzles: 80 to 160 m^3/h
		2 Large Hole Nozzles: 40 to 80 m^3/h
		1 Large Hole Nozzles: 15 to 40 m^3/h
		1 Small Hole Nozzle: 6 to 15 m^3/h
	Accuracy	±3% of Reading ± 5 m^3/h (Flow Rate > 15 m^3/h)
	Resolution	0.1(6 ~ 1200) m^3/h
		1(1200 ~ 10000) m^3/h
Pressure	Range	0 ~ 100 Pa
	Accuracy	±0.5% of the reading ± 1Pa
	Resolution	0.1 Pa
Atmospheric Pressure	Range	70 ~ 130kPa
	Accuracy	±2% of the reading
	Resolution	0.1kPa
Temperature	Testing Range	0 ~ 60℃
	Accuracy	±0.5℃
	Resolution	0.1℃
Power Supply		AC220V,50Hz
Power		1000w
Weight		Approximately 19kgs (including all nozzles)
Dimensions (Length × Depth × Height)		586×300×680（mm）

Instrument Main Unit

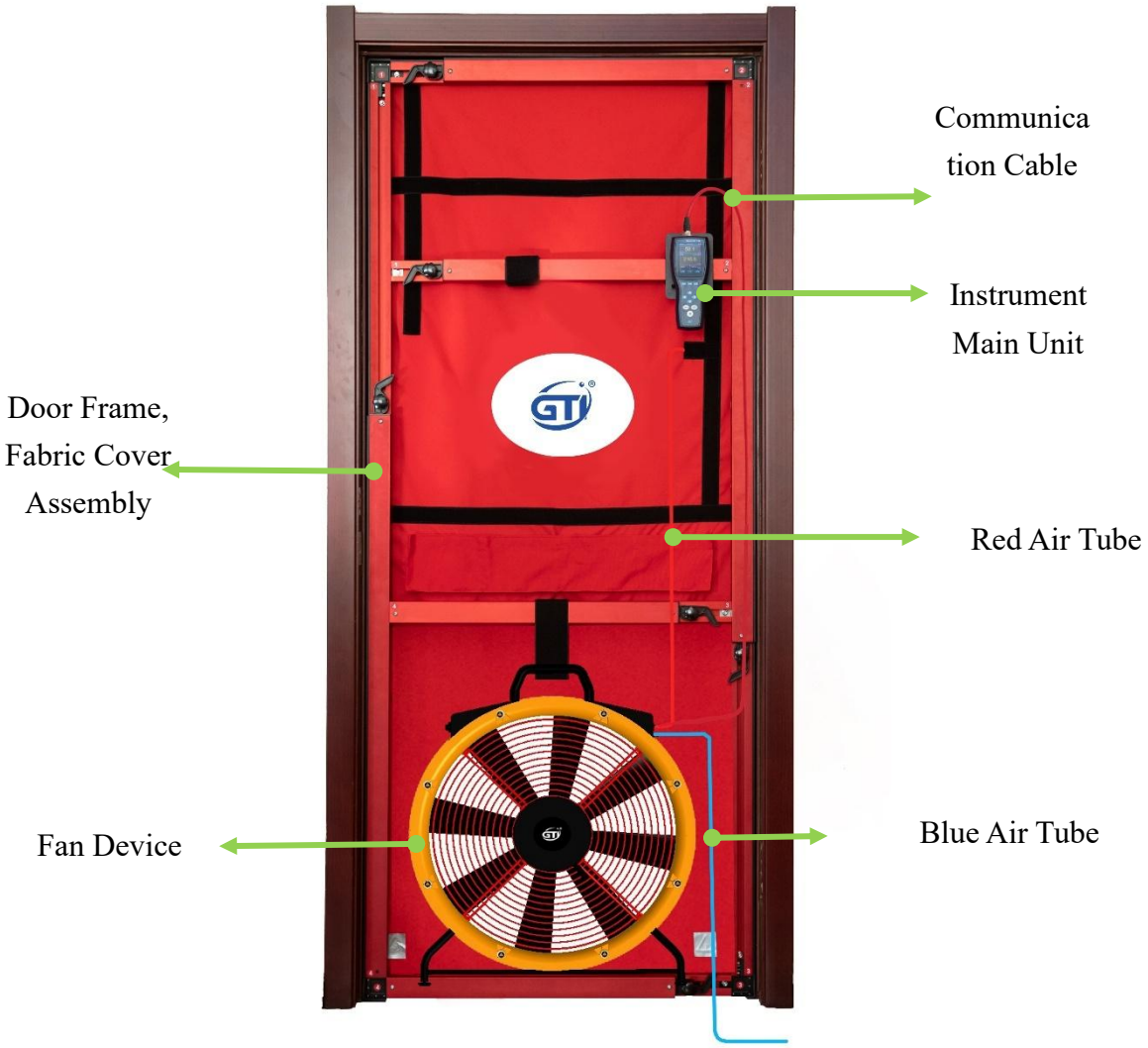
Item	Parameter
Display Screen	3.2 inch
Power Supply	4 AA batteries or DC5V adapter
Battery Life	Approximately 25 hours (default settings), about 8 hours with network activated
Communication Method	RS485, WI-FI
Operating Temperature	0 ~ 50℃
Storage Temperature	-20 ~ 50℃
Weight	Approximately 250g (excluding batteries)

Frame and Fabric Cover Assembly

Item	Parameter
Width Range	Approximately 795 ~ 1,320 (mm)
Height Range	Approximately 1,380 ~ 2,460 (mm)
Door Frame Material	Lightweight Aluminum Alloy
Sealing Material	EPDM Rubber
Covering Material	Nylon Canvas
Weight	Approximately 5kgs

2 Configuration and Function Introduction

2.1 Overall Configuration



1. While in use, avoid impacts, heavy pressure, or intense vibrations to prevent damage to the internal precision electronic sensors of the product. If the casing experiences deformation, cracks, or damage, please promptly repair or replace it to avoid affecting the product's performance.
2. When storing or using the door frame assembly, avoid scratching or damaging the sealing gasket and fabric cover to ensure proper sealing.
3. Before starting the fan, ensure the fan is securely hung on the crossbeam of the door frame using Velcro.
4. Do not tightly knot or step on the red and blue tubes, as this may block the airflow and result in unstable and inaccurate measurements.

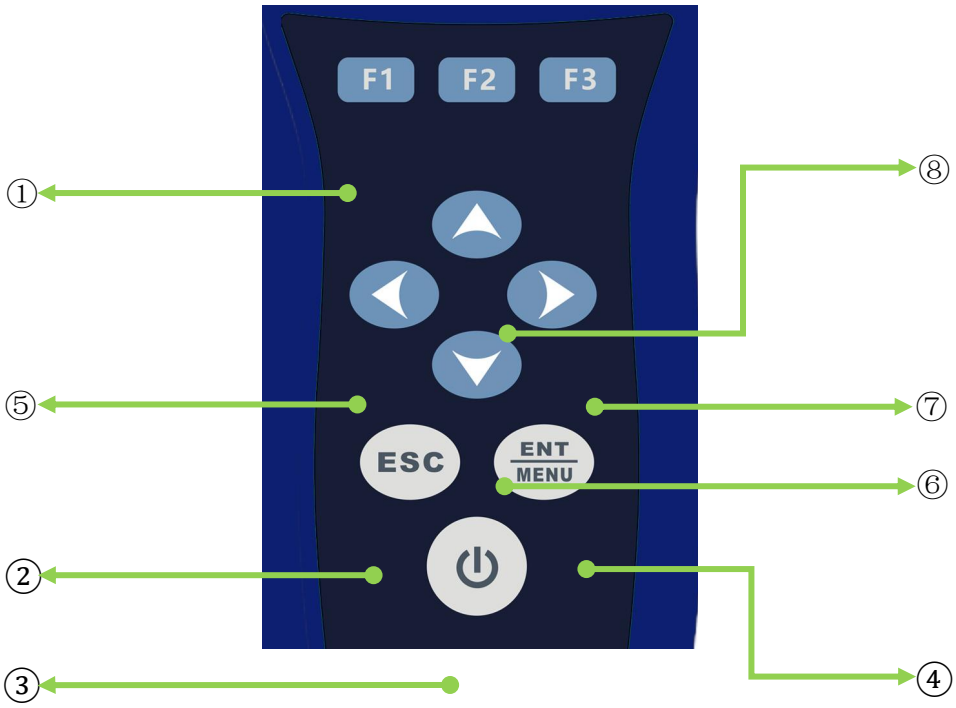
2.2 Instrument Main Unit

2.2.1 Main Unit Structure

Serial Number	Name
①	Communication Cable Interface
②	Display Screen
③	Button Area
④	Serial Communication Interface
⑤	Power Adapter Interface
⑥	Battery Cover

Please handle with care, avoid dropping, impact, liquid immersion, and acid-base corrosion.

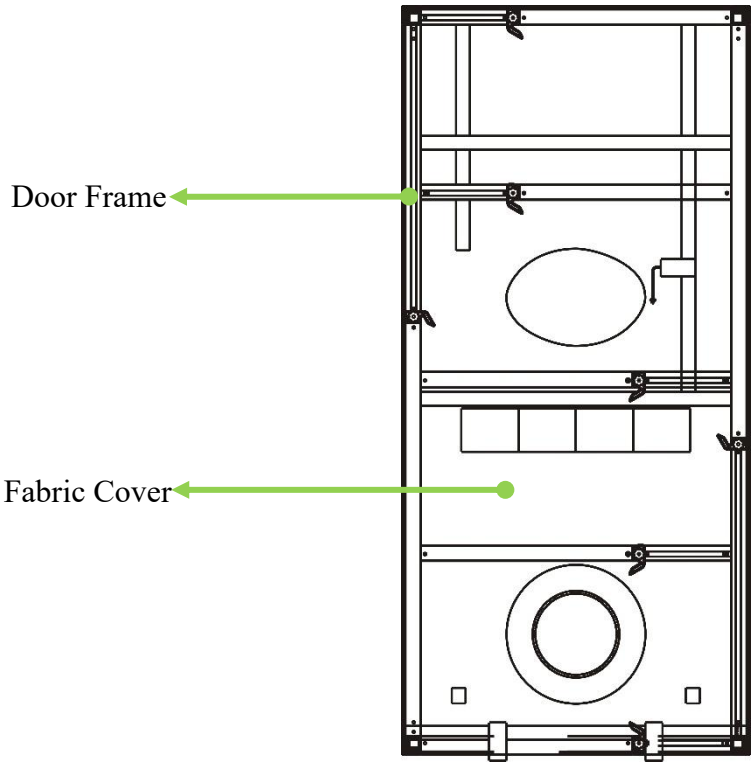
2.2.2 Button Functions



Serial Number	Name	Function	
		Test Interface	Menu Interface
①	F1、F2、F3	Execute the corresponding software functions from the above interface	
②	ESC Button	Undo/Exit	
③	Power Button	Long press to power on/off	
④	Function Buttons	Enter the Menu	Set, Save
⑤	Move Line Left Button	Modify Parameter Size	Switch Menu Pages, Modify Parameter Size
⑥	Move Line Down Button		
⑦	Shift Right Button		
⑧	Shift Up Button		

Detailed operation instructions for the main unit can be found in the Model GTI 116 Model User Manual.

2.3 Door Frame and Fabric Cover Assembly



For detailed installation and operation methods of the door frame and fabric cover assembly, please refer to the *User Manual for Model GTI 650C Model Door Frame and Fabric Cover*.

Ensure that the sealing strip and fabric cover are not damaged to maintain sealing effectiveness.

2.4 Fan Assembly

2.4.1 Fan Assembly Structure

①

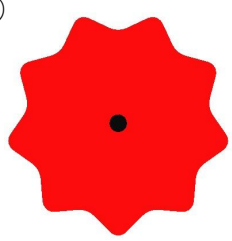
②

③

④

⑤

⑥

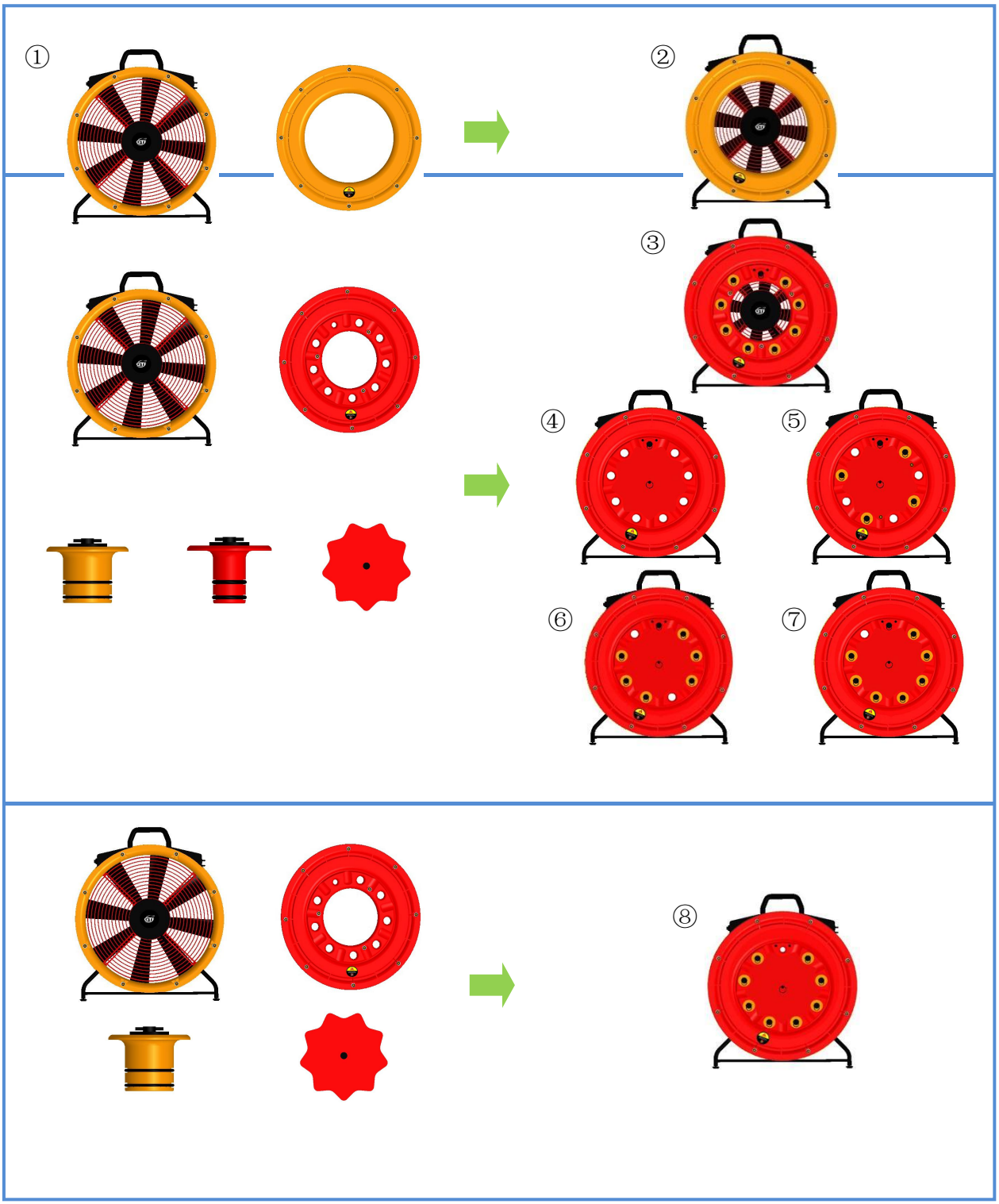


Serial Number	Name	Serial Number	Name
①	Fan	④	Large Diameter Piston
②	Yellow Nozzle	⑤	Small Diameter Piston
③	Red Nozzle	⑥	Nine-Sided Cover Plate

1. Nozzles and the casing are made of plastic. Handle with care during use to avoid damage.
2. Keep the air circulation holes at the center of each nozzle clean. Dust off before and after use, ensuring no foreign objects are on the surface to prevent affecting the measurement results.

2.4.2 Test Combination and Applicable Airflow

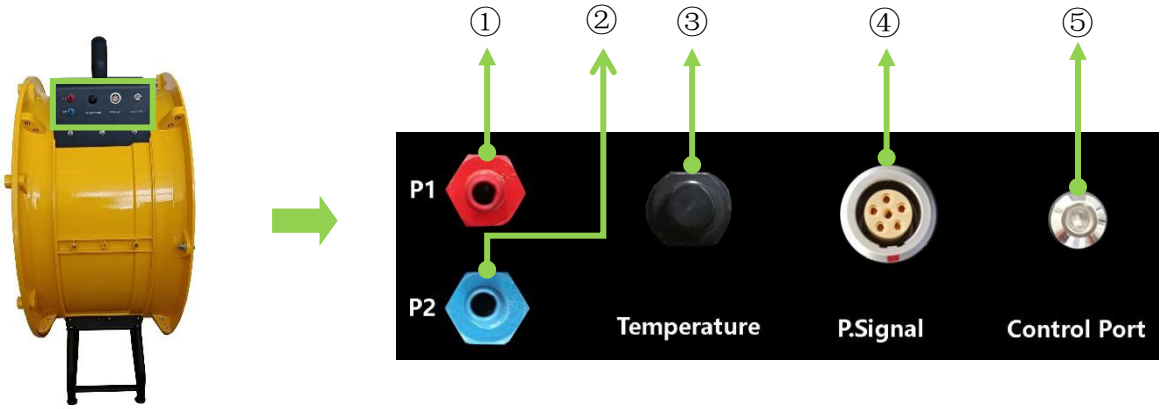
Choose the appropriate nozzle according to usage requirements. Align the magnetic suction area of the nozzle with the fan's outer circumference magnetically. Gently rotate to ensure all magnets are aligned, then lightly press on the eight magnets to ensure a secure attachment between the nozzle and the fan. Ensure that the contact surface of the nozzle and fan is closely fitted to avoid nozzle detachment or air leakage, which could affect the test results.

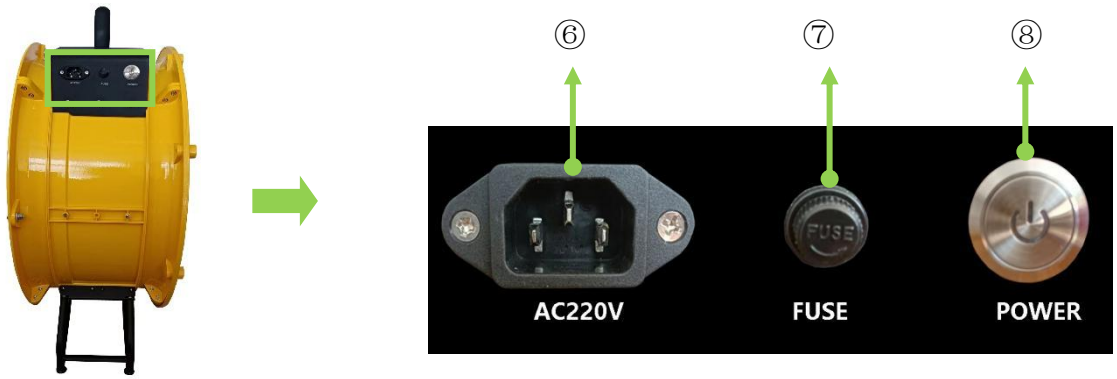


1. During testing, the yellow and red nozzles with magnetic fasteners must each attach separately to the fan.
2. The yellow and red nozzles can be nested together for attachment during transport or storage to save space.
3. After attaching each nozzle to the fan, lightly press on the eight magnetic fasteners to ensure the contact surface between the nozzle and fan is fitted properly, to avoid affecting the test results.

Serial Number	Fan Nozzle Status	Naming	Applicable Airflow at 50Pa	Remarks
①		Natural State	4000 ~ 10000 m^3/h	
②		Yellow Nozzle	1200 ~ 4000 m^3/h	
③		Red Nozzle	350 ~ 1200 m^3/h	All Circular Distributed Holes Sealed with Large and Small Plungers
④		8 Large Aperture Nozzles	160 ~ 350 m^3/h	Small Aperture Sealed with a Small Diameter Plunger
⑤		4 Large Aperture Nozzles	80 ~ 160 m^3/h	Sealed with 1 Small Diameter Plunger + 4 Large Diameter Plungers
⑥		2 Large Aperture Nozzles	40 ~ 80 m^3/h	Sealed with 1 Small Diameter Plunger + +6 Large Diameter Plungers
⑦		1 Large Aperture Nozzles	15 ~ 40 m^3/h	Sealed with 1 Small Diameter Plunger + +7 Large Diameter Plungers
⑧		1 Small Aperture Nozzle	6 ~ 15 m^3/h	Sealed with 8 Large Diameter Plungers

2.4.3 Button Functions





Serial Number	Name	Function	Remarks
①	P1 Interface	Side of Fabric Cover without Frame	Attach Red Air Tube
②	P1 Interface	Side of Fabric Cover with Frame	Attach Blue Air Tube
③	Temperature Probe	Measures Temperature in Real-Time	Do Not Cover during Use
④	Communication Connector Socket	Connect Communication Cable	Communicating with the Instrument Main Unit
⑤	Indicator Light	Indicating the Fan Status	
⑥	Power Outlet	Connecting the Power Cord	
⑦	Fuse	Overload Protection	
⑧	Power Switch	Starting and Stopping the Fan	

3. Preparations Before Use

1. Ensure the environment is sealed before testing. Close all doors, windows, exhaust vents, and ventilation openings connected to the test space to avoid affecting the accuracy of the measurement results.
2. When the fan is running, it generates strong airflow that may fill the test space with debris such as wood shavings, fibers, and paint dust. Clean the airflow path, and operators should wear protective face masks.
3. Secure or remove any suspended or loose items in the test space, as they may be affected by the airflow, causing damage or posing a safety hazard.
4. The fan exchanges a large volume of air during operation. Prevent pollutants, such as carbon monoxide or embers with open flames, from entering the intake, as these impurities may quickly fill the test space and create safety risks.

5. Close off devices like water heaters and gas stoves, and turn off all

3.1 Test Space Preparation

a. Identify the test space, complete the preparation tasks in the table below, and carefully read the safety warnings.

	Serial Number	Work	Remarks
Test Space and External Environment	(1)	Select an appropriately sized door for the test space, ensuring the doorframe is flat and without noticeable slant.	
	(2)	Seal all openings connected to the outside, except for the test door.	
	(3)	If there is a basement, open the basement door.	
	(4)	Seal all windows and ventilation openings in the test space.	⚠
	(5)	Seal all pipes, range hoods, and air conditioning vents in the test space.	
Inside the Test Space	(6)	Clear any paper, carpet, or debris from the airflow path.	⚠
	(7)	Open all interior doors within the test space.	
	(8)	Remove or secure any hanging items such as light fixtures, smoke detectors, and ceiling fans.	⚠
	(9)	Turn off gas pathways, inspect the combustion sources, and ensure they are sealed with no open flames.	⚠
	(10)	Safeguard any valuable items present in the test room.	
Outside the test space	(11)	Ensure that there are no contaminating gases, dust, or liquids outside the test door.	⚠
	(12)	Remove any obstructions in front of the fan and nozzle.	
	(13)	The operator should stand to the side of the fan and not obstruct airflow.	⚠
	(14)	Secure the test door.	

3.2 Assembly of the Frame and Fabric Cover

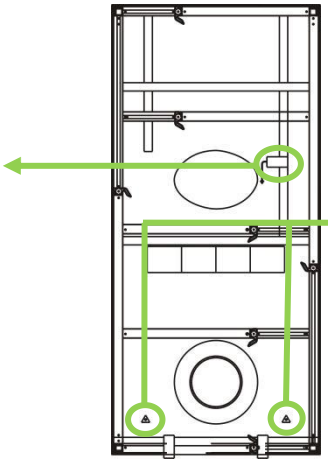
Please read the User Manual for Model GTI 650C Model Door Frame and Fabric Cover to complete the assembly of the frame and fabric cover.

3.3 Assembly of the Frame, Fabric Cover, and Motor

3.3.1 Connection of the Red Air Tube on the Fabric Cover

The red air tube should be connected to the side of the fabric cover without a frame. There are two methods on the fabric cover as shown below. You can choose either method to connect the air tube while sealing the unused air holes. After the door frame is securely installed, proceed with the installation of the fan and the main unit.

Red Air Tube Connection Method One



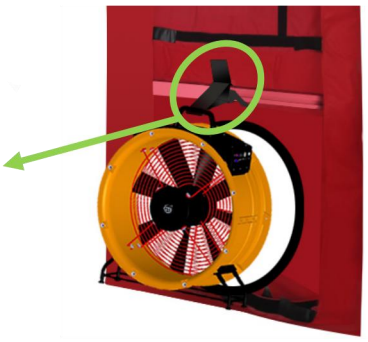
Red Air Tube Connection Method Two

If not using this insertion point for the red air tube, please ensure sealing.

3.3.2 Installing the Fan

Adjust the fan strap on the middle lower beam to the appropriate position, and follow the steps in the diagram below to install the fan.

Motor Hanging Strap

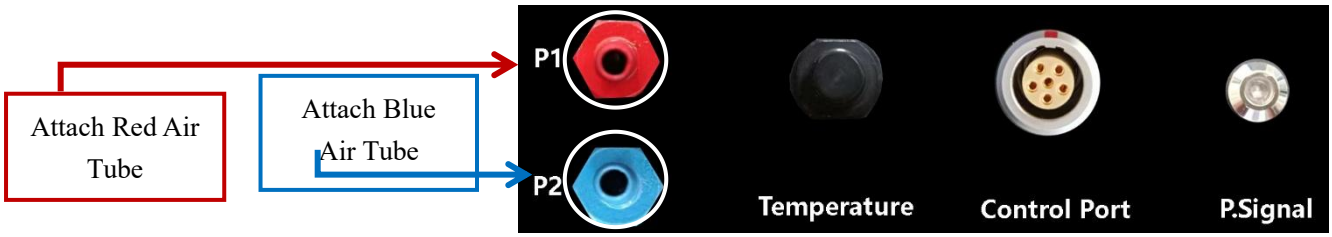


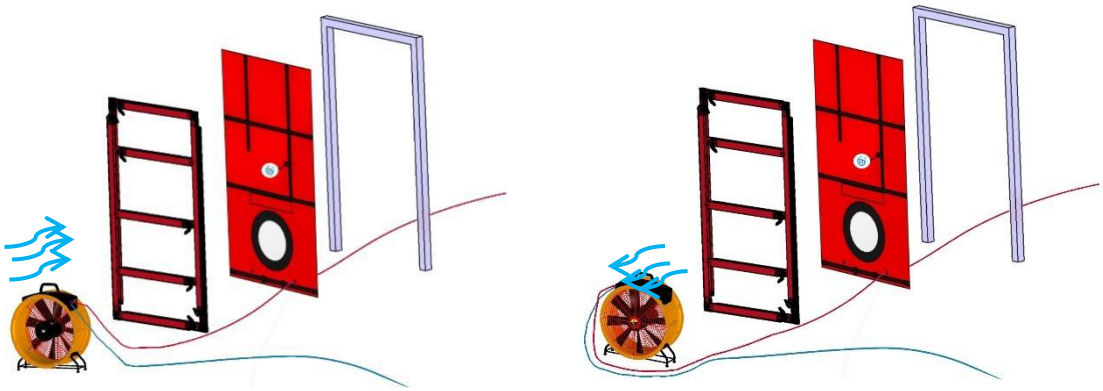
Adjust the installation direction of the fan according to the wind direction measurement needs. As shown above, support the bottom of the fan, thread the hanging strap through the handle, fit the fan's circular flange into the elastic opening of the fabric cover, adjust the position, wrap, and fasten the hanging strap securely. Ensure that the circular flange fits closely with the elastic cord of the

fabric cover.

3.3.3 Connection of Red and Blue Air Tubes on the Fan

After installing the fan, connect the red and blue air tubes: connect the red tube to the red connector, and connect the blue tube to the blue connector.





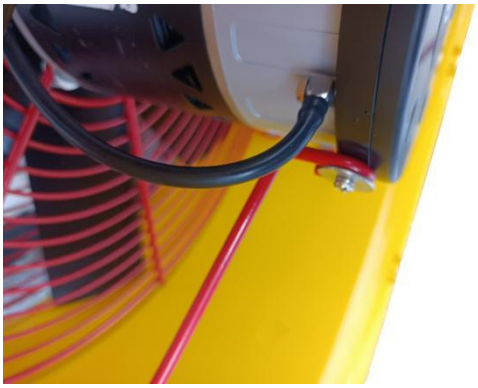
As shown in the image above, when adjusting the wind direction for different measurement needs, only the direction of the fan needs to be changed; do not change the position of the air tubes.

1. The blue and red air tubes measure pressure in the spaces on either side of the fabric cover—the red tube connects to the space on the side without a frame, and the blue tube connects to the space on the side with a frame.
2. During fan testing, do not nest or stack nozzles. Choose the nozzle according to the measurement flow range.
3. Regardless of which side of the doorway frame in which the fan is installed, the connection method for the red and blue air tubes on the fabric cover and fan remains unchanged.

3.3.4 Connection of Black Air Tube on the Fan

The black air tube is inside the fan assembly. Using different nozzles, the black air tube will have two connection states.

In the three test states of ① natural state, ② yellow nozzle, and ③ red nozzle, connect the black air tube to the connector on the black cylindrical body as shown in Figure A. In the five test states of ④ 8 large hole nozzles, ⑤ 4 large hole nozzles, ⑥ 2 large hole nozzles, ⑦ 1 large hole nozzle, and ⑧ 1 small hole nozzle, connect the black air tube to the connector on the back of the red nozzle as shown in Figure B.



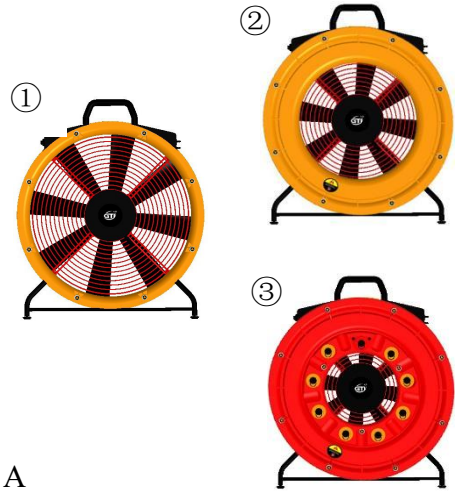
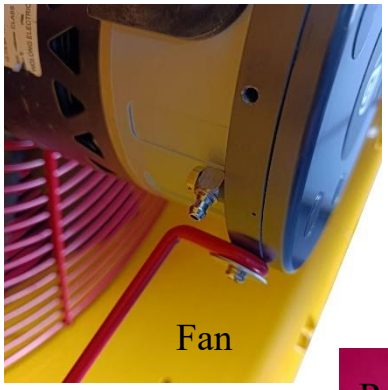


Figure A



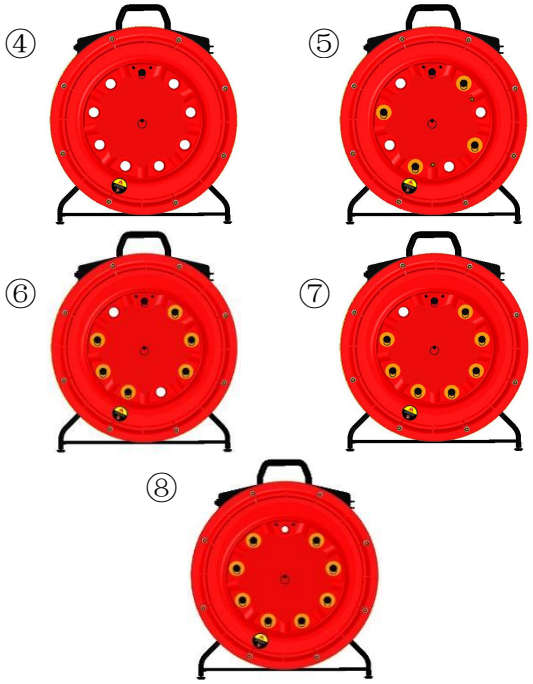


Figure B

3.4 Communication between GTI 658 and Fan

The communication cable can only be plugged or unplugged when both the GTI 658 and the fan are powered off to avoid poor communication or damage to the instrument.

As shown below, one end of the communication cable connects to the fan communication cable socket, and the other end connects to the GTI 658 communicatio

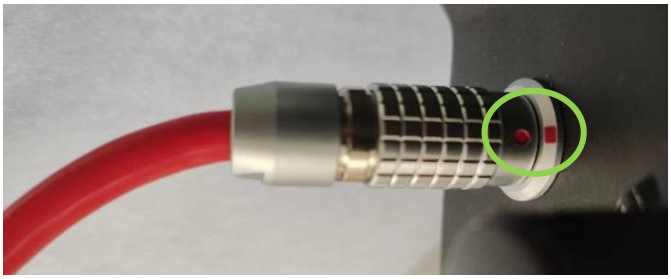
Communication cable connected to the fan as shown in the diagram

Communication Cable

Communication cable connected to the GTI 658 as shown in the diagram

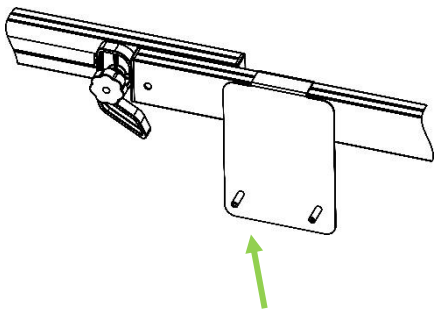
a. Connection of Communication Cable

The communication cable connectors at both ends are identical. One end connects to the GTI 658, and the other end connects to the fan. When connecting, ensure that the red dot on the connector aligns with the red dot on the socket.

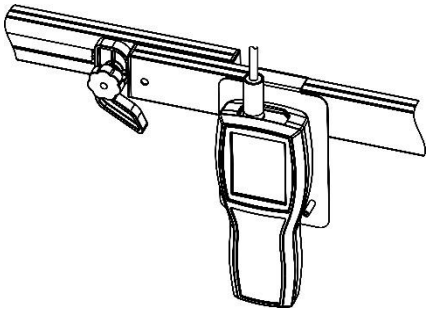


When connecting the communication connector to the GTI 658, ensure the red dots on the connector and socket are aligned.

b. GTI 658 Hanging



Main Unit Hanging Board



Place the main unit on the hanging board and use the Velcro on the fabric cover to secure the communication cable.

c. Press the power button to start the fan.

4. Begin Use

For GTI 116 operation, please refer to the Model GTI 116 User Manual.

5. Common Malfunctions and Troubleshooting Methods

Serial Number		Fault Phenomenon	Cause	Resolution
Fan Device	1	The fan cannot start	Poor contact with power cord	Re-plug the power cord
			Incorrect GTI 658 settings	Read the User Manual for Model GTI 116
	2	Abnormal noise from fan blades	Fan blades are aging	Please contact the manufacturer
Instrument Main Unit	3	No response when powering on	Incorrect adapter specifications	Use the adapter specified by the manufacturer
			Battery not installed or installed in wrong direction	Reinstall AA batteries according to markings inside the battery
			Low battery	Replace with 4 AA batteries
	4	The test interface displays ----	Probe not connected	Power off, connect the probe
			Probe or GTI 658 malfunction	Power off and restart; if the problem persists, contact the
Frame and Fabric Cover Assembly	5	Frame Unable to Assemble	Incorrect frame connection sequence	Read the User Manual for Model GTI 650C Model Door Frame
			The upper and lower beam corner limit blocks are not	Gently sway the frame left and right during alignment
			Limit block did not rebound after alignment	Sway left and right, re-align, if it still does not rebound, contact the
	6	Cam assembly cannot lock	The star-shaped knob is not tightened	Re-secure the locking components, and assist in fixing
			The handle is not rotated properly or is misaligned	Read the User Manual for Model GTI 650C Model Door Frame
			The cam locking component is aged	Ensure the star bolt is tightened and the handle angle is correct; please contact the manufacturer

6 Warranty and Service

Under the premise that users have carefully read the GTI 658 user manual and operate it normally according to its instructions, any quality issues with GTI 658 are covered under warranty for one year from the date of purchase.

When a malfunction occurs, users should refer to "5 Malfunctions and Troubleshooting" to check and resolve the issue themselves first. If the fault cannot be resolved, please contact GTI.

Repairs during the warranty period: any faults due to manufacturing reasons by GTI will be repaired free of charge.

Repairs outside the warranty period: After the warranty period, if users need to maintain the function and accuracy of GTI 658, GTI will provide paid services according to user requests.

Regarding the retention period for repair parts: After production stops, repair parts will be retained for a minimum of 5 years. This retention period refers to the period during which repairs can be made. For details, please contact GTI.

When service is needed, please provide the following information:

* Product Name ----------
* Product Model ----------
* Product Serial Number ----------
* Malfunction Description Be as detailed as possible
* Purchase Year Month Date

GTI Precision Instrument (Shenyang) Co., Ltd.

GTI PRECISION INSTRUMENT (SHENYANG) CO., LTD.
Address: No. 56-39, Huanghe North Street, Huanggu District, Shenyang, Liaoning Province (2212)
ZIP Code: 110004 Fax:+86 024-81231386Phone: +86 024-81231386
Website: https://www.gti-instruments.com/
E-mail: sales @gti-test.com

Watch Video