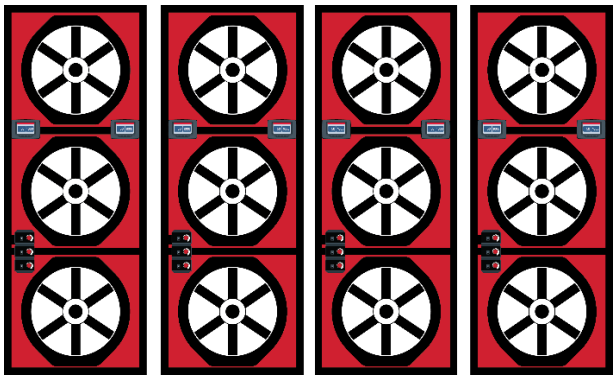
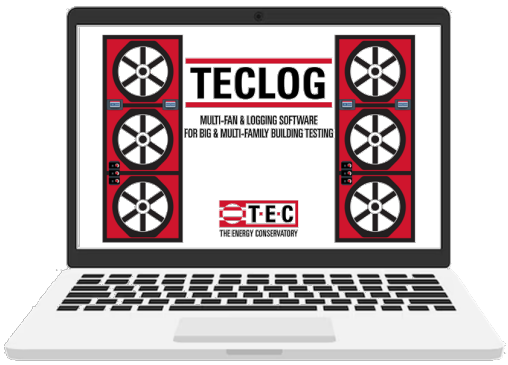
THE ENERGY CONSERVATORY

Whole Building Airtightness Testing Reference Material





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Setting up Fans, Tubing, Wiring and TECLOG

3 Fan System with 2 Gauges, Single Zone Building Testing from INSIDE

THE ENERGY CONSERVATORY

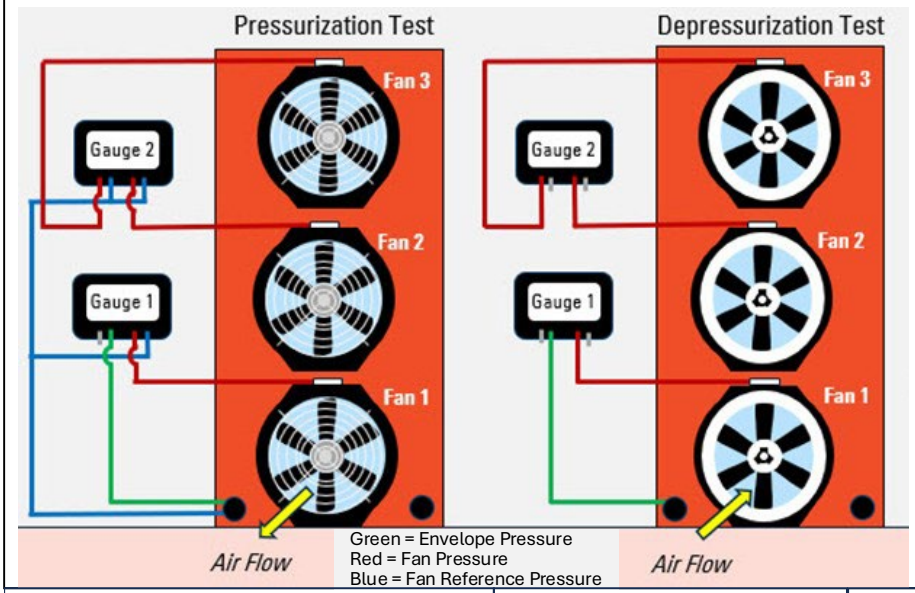
INSIDE SETUP

3 Fan/2 Gauge System, Single Zone Building

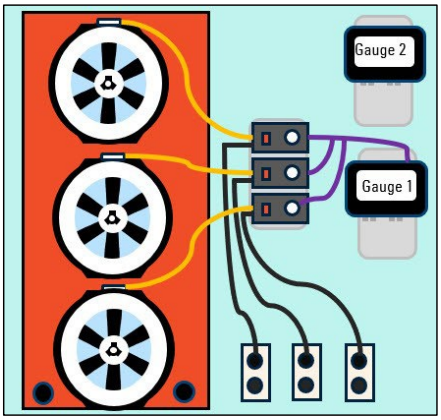
Equipment List

- Model 3 Fan – 3x
- DG1000 Gauge – 2x
- Gauge Mounting Board – 2x
- Speed Controller Mounting Board
- Commercial Frame
- 3-hole Panel
- 3-fan Control Cable

1. Install Fans & Setup Tubing Based on Gauge Location & Fan Direction

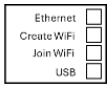


2. Power Fans & Setup Fan Control



- Each fan requires a separate 15A circuit.
- The 3-fan control cable allows one gauge to control all 3 fans. Fan speed control is independent of the tubing.

3. Setup Gauge Network



- Establish a network to connected gauges and computer w/TECLOG
- Connect via WiFi, USB, Ethernet, Ethernet Bridge Mode (WiFi & Ethernet).
- Use QR Code "DG-1000 Networking" for setup details on each networking option.

4. Configure TECLOG

- **See Back**

Related Resources

Multi Fan Testing	DG-1000 Networking	TEC Tech Support	TEC Store

3 Fan System with 2 Gauges, Single Zone Building

Testing from OUTSIDE

OUTSIDE SETUP

3 Fan/2 Gauge System, Single Zone Building

Equipment List

- Model 3 Fan – 3x
- DG1000 Gauge – 2x
- Gauge Mounting Board – 2x
- Speed Controller Mounting Board
- Commercial Frame
- 3-hole Panel
- 3-fan Control Cable

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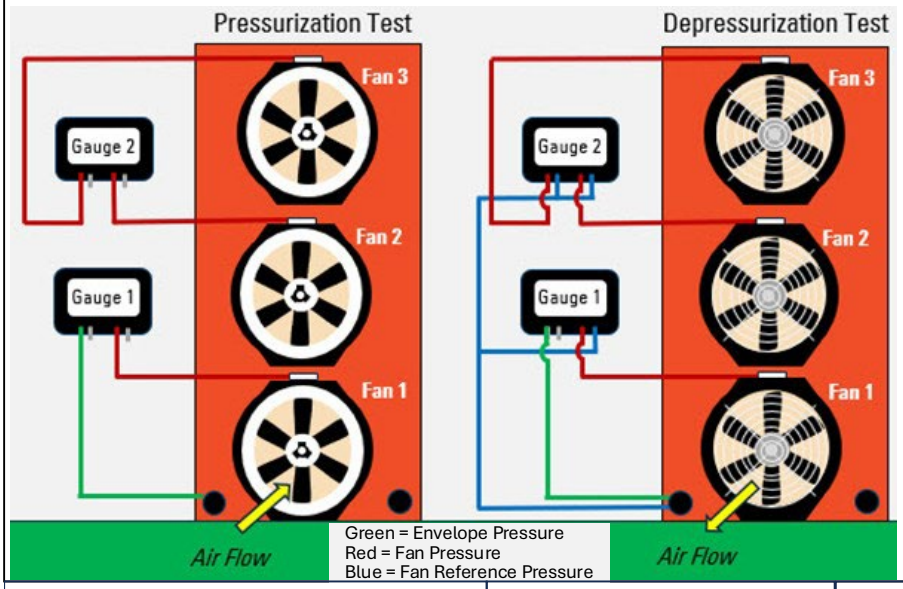
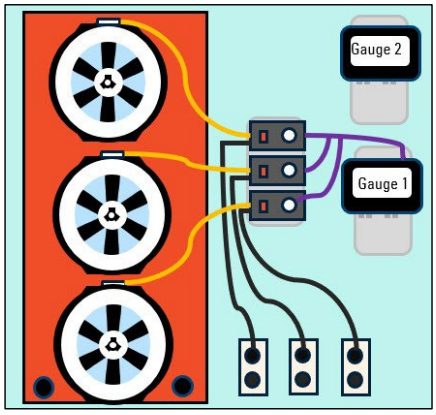


2. Power Fans & Setup Fan Control



- Each fan requires a separate 15A circuit.
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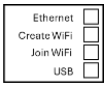


- Establish a network to connected gauges and computer w/TECLOG
- Connect via WiFi, USB, Ethernet, Ethernet Bridge Mode (WiFi & Ethernet).
- Use QR Code "DG-1000 Networking" for setup details on each networking option.

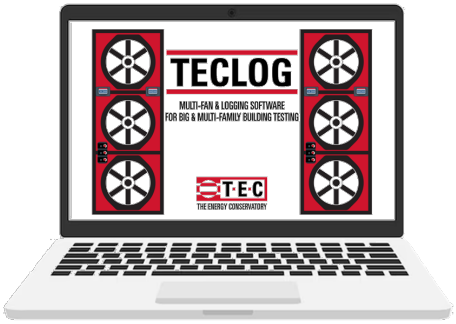
4. Configure TECLOG

- **See Back**

Related Resources

Multi Fan Testing | DG-1000 Networking | TEC Tech Support | TEC Store

TECLOG Overview



4. Configure Test in TECLOG

TECLOG Overview Video

1. Connect Gauges to TECLOG

1. Turn on DG-1000 gauges and in the Settings menu under Auto Off and Auto Sleep set them to Never.
2. Launch TECLOG 4 software.
3. In TECLOG 4 hit the Configuration drop down and select Settings and hit the Scan for Ports and Devices button.
4. The software will display all gauges connected to the network with the computer.

2. Set-up Gauge Device Labels, Link to Master

1. To setup each gauge start by selecting the check box on the left in the Device Settings window.
2. Then double click in the Serial # field and select a gauge this will automatically fill in the Device Type field.
3. Next fill in the Device Label field. (this label helps identify the gauge during the test).
4. Lastly, select the link check box if you want any fans connected to that gauge to be added to the Master Controller during the test (this allows multiple 3 fan systems to be operated as one).
5. Repeat steps 5-8 on a new line in the Device Settings window for each gauge.

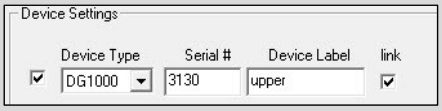
3. Assign each channel measurement

1. Identify what each channel of each gauge is measuring (envelope, fan pressure, etc.).
2. Click the View and Edit Channel Settings to open window where each gauge has a tab.
3. Based on the tubing setup from Step 1 of the guide fill in the Label and Channel Type fields.
   - Envelope Pressures: building pressure/s with ref to outside (DG-1000 CH A). Multiple channels averaged.
   - Model 3 Fan Flow: Uses fan pressure/ring to calculate flow. Channels are summed TECLOG for total flow.
   - Interior Pressure: Pressure between 2 areas inside building (to measure pressure uniformity during a test).
   - Pressure: Generic measurement of any pressure you want to record during a test.
4. Repeat steps 2 & 3 for all gauges.
5. Click Ok again to close the channel settings window.
6. Additional channel controls on Channel Settings window detailed in TECLOG 4 video, time stamp10:47.

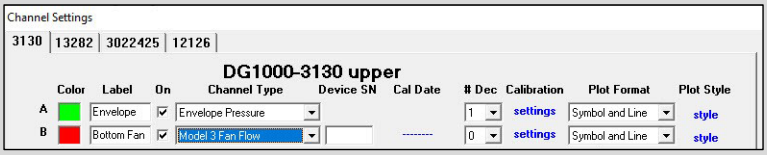
4. Select Test Standard

1. Select Test Standard from the Air Tightness Settings to follow aspects of the standard, includes report of results.
2. Hit Ok to close the Configuration Settings window

Step 2 Device Settings Window

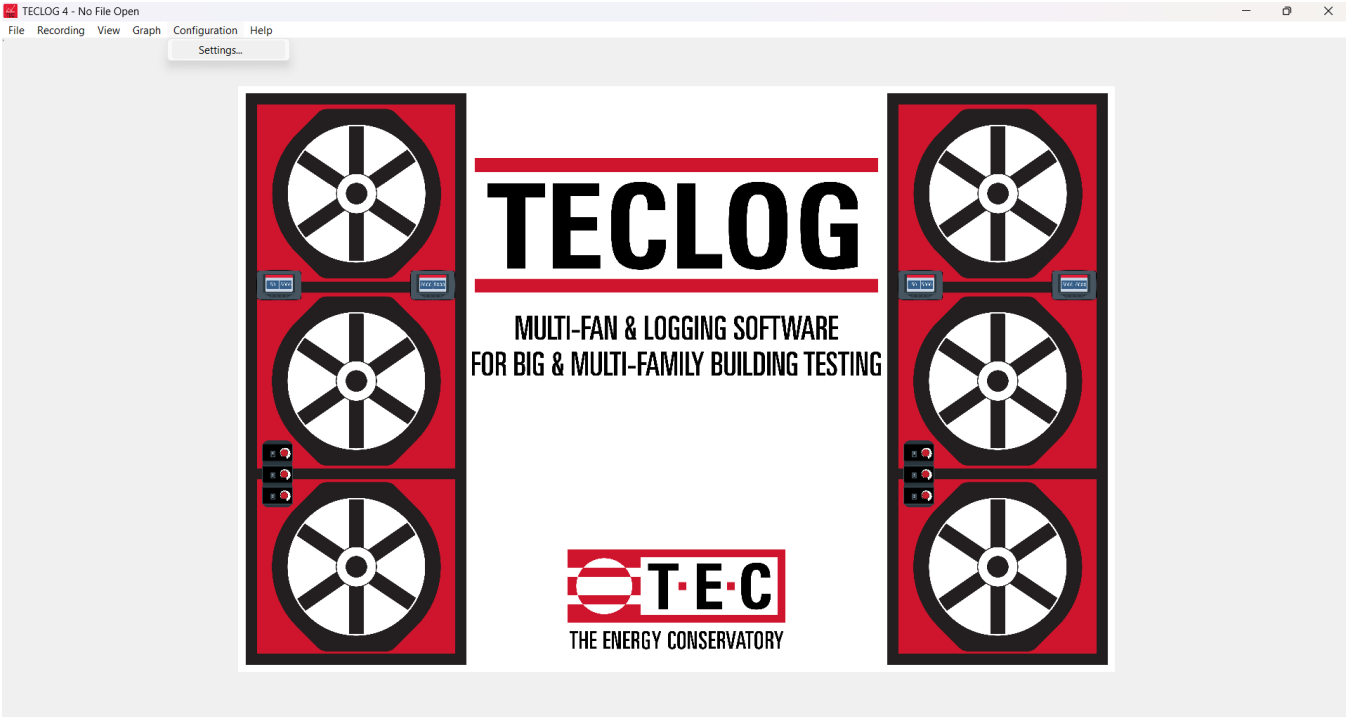


Step 3 Chanel Settings Window

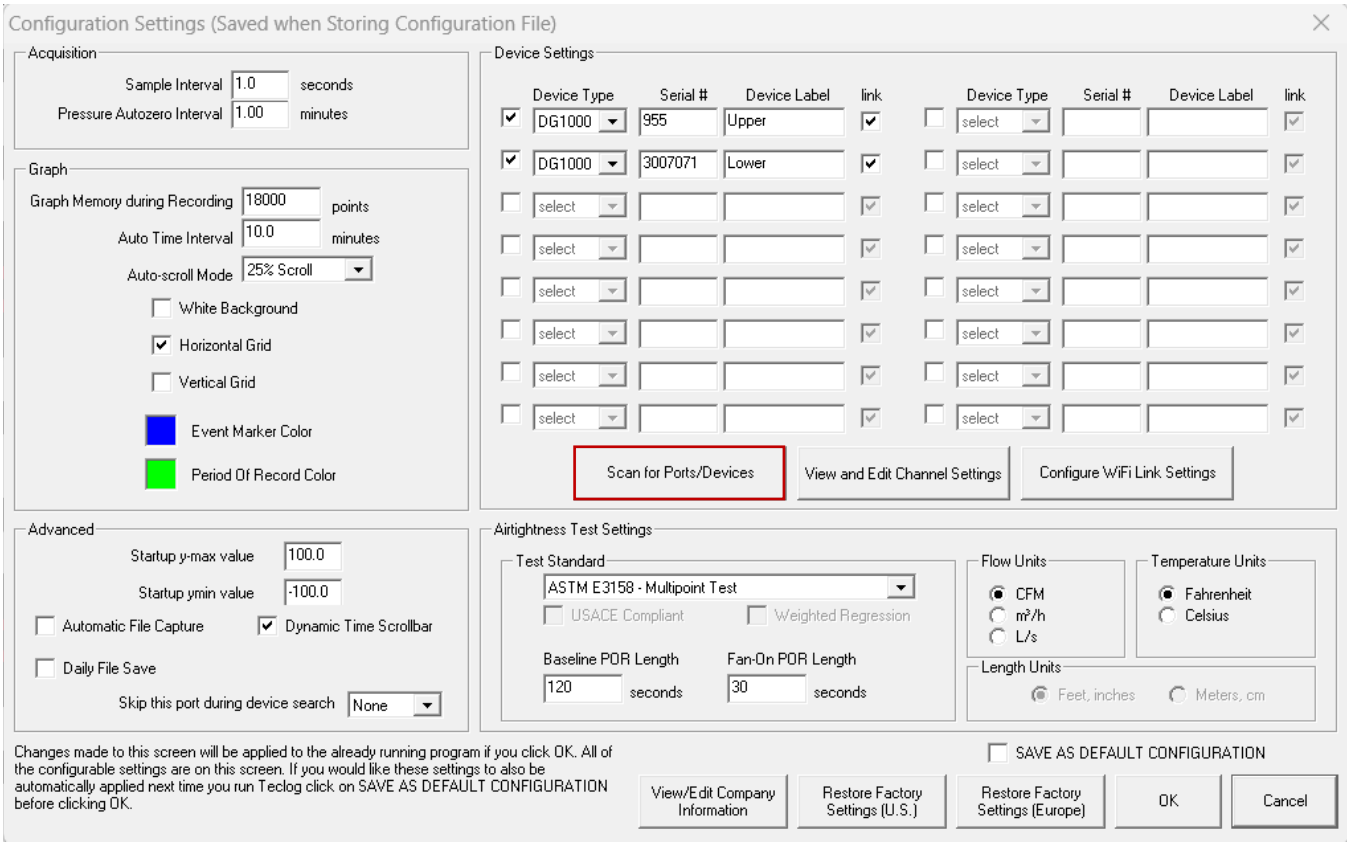


TECLOG 4 SCREEN REVIEW for Step 4: **CONFIGURATE TECLOG**

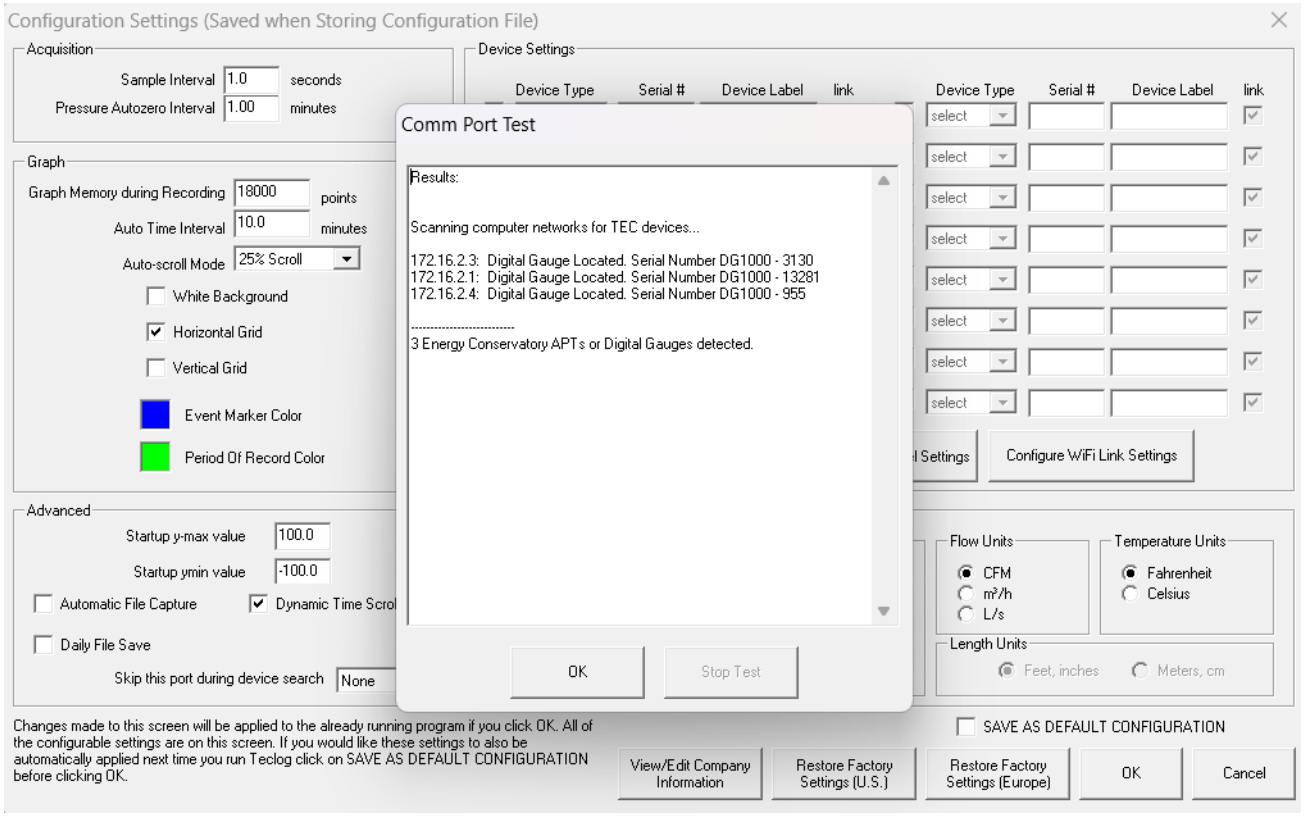
Step 1. From Home Screen, Select Configuration/Settings



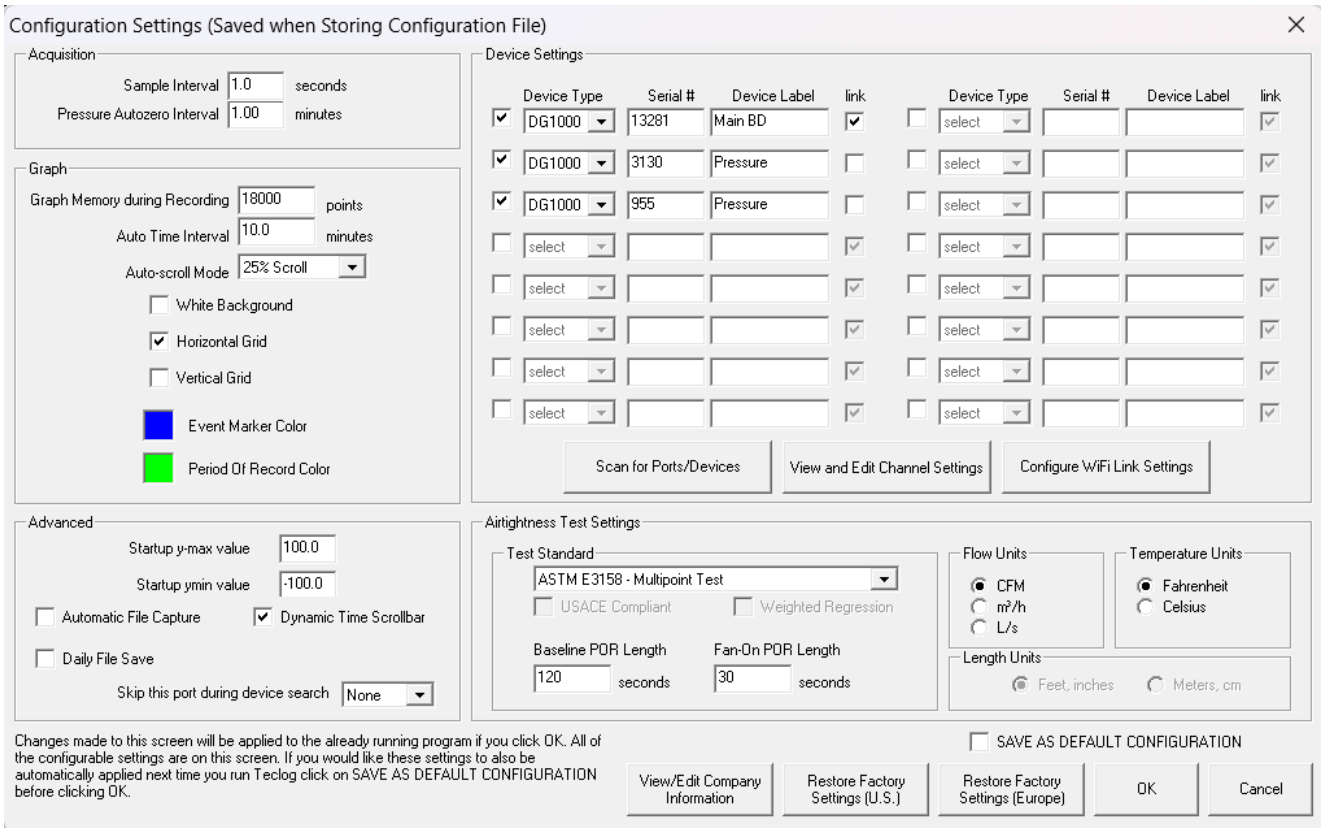
Step 2: In Configuration Settings, Hit "Scan for Ports/Devices"



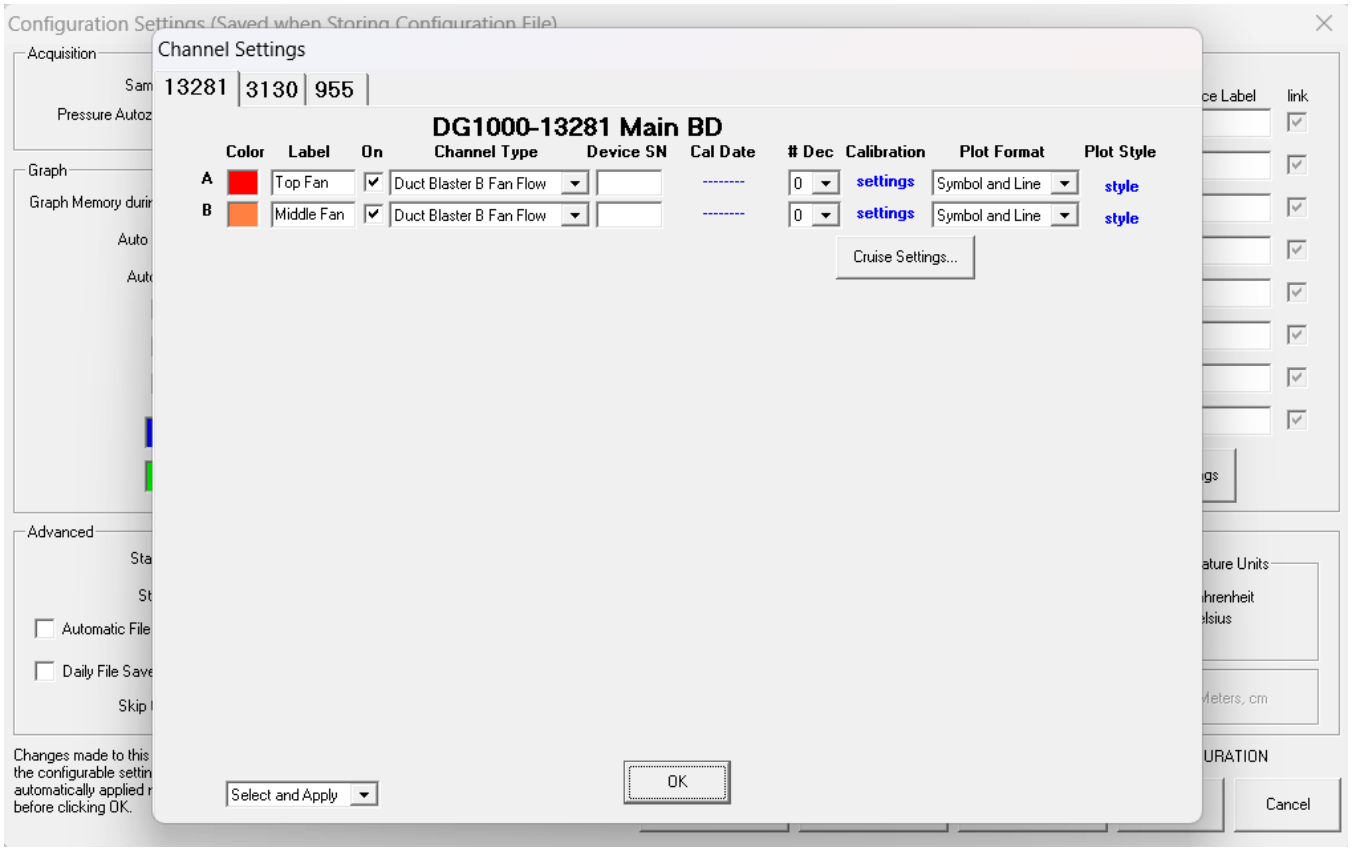
Step 2: Scan for Ports/Devices



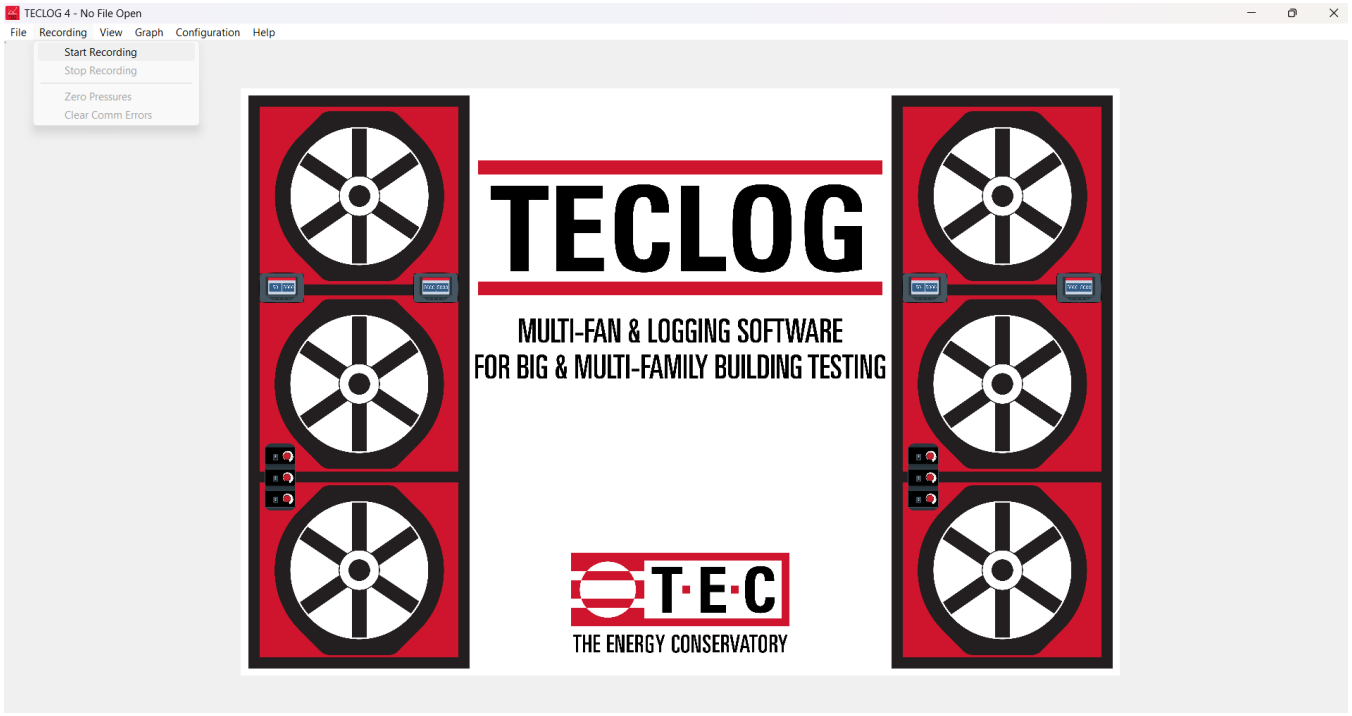
Step 3: Complete Device Type, Serial #, Device Label, Link



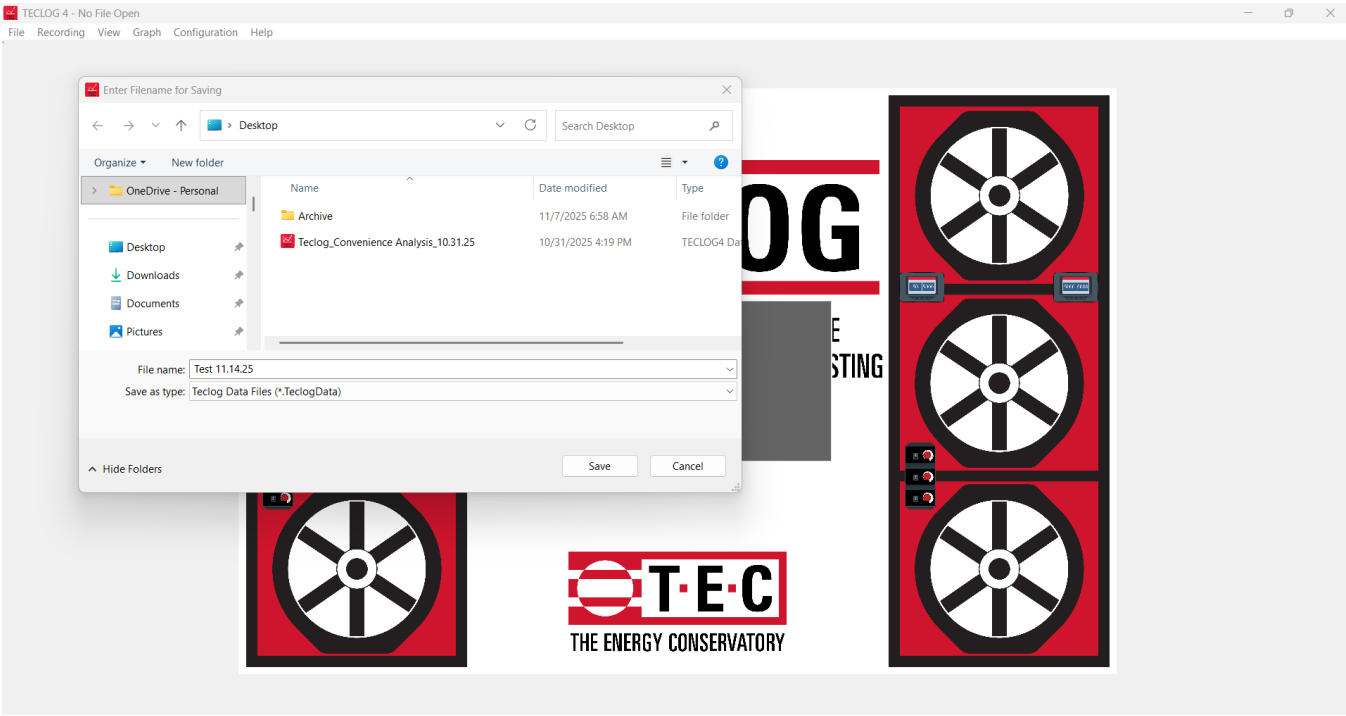
Step 4: View & Edit Channel Settings



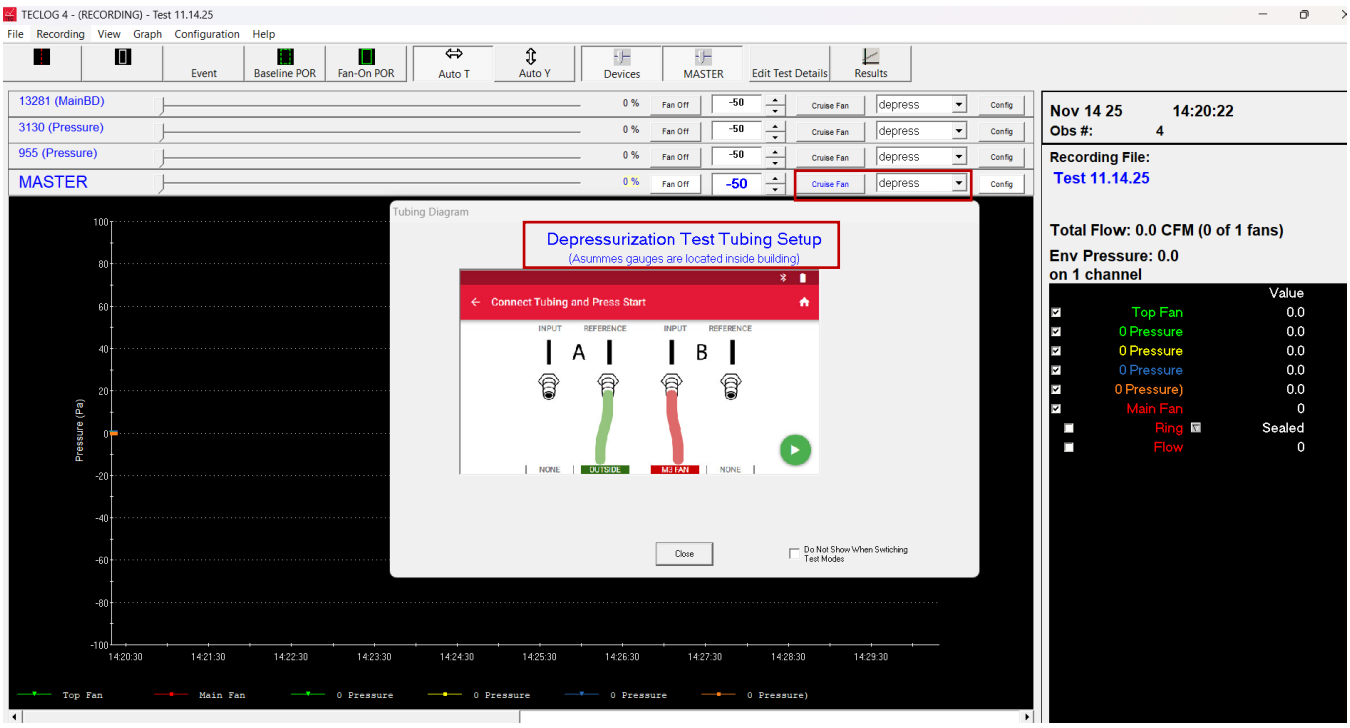
Step 5: Start Recording



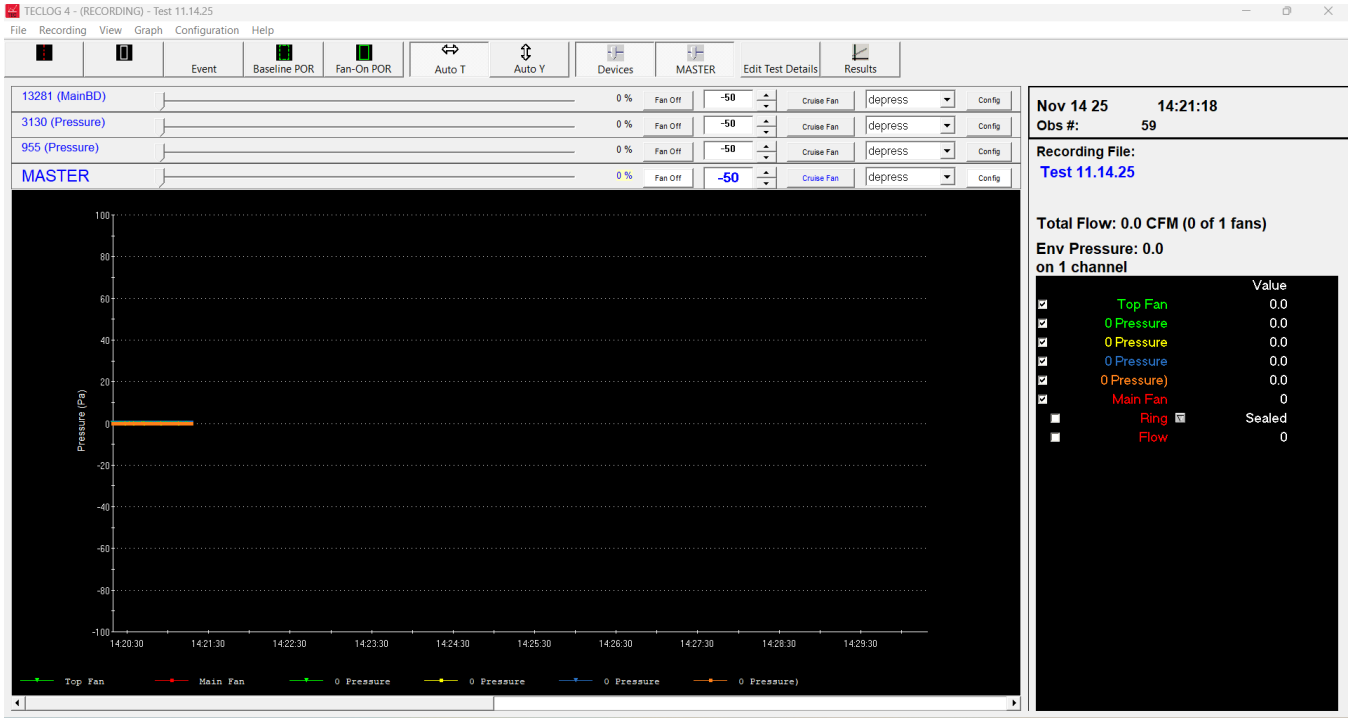
Step 5: Start Recording, Name File



Step 6: Confirm Tubing Set-up on Fans per Guide



Step 7: Begin Test

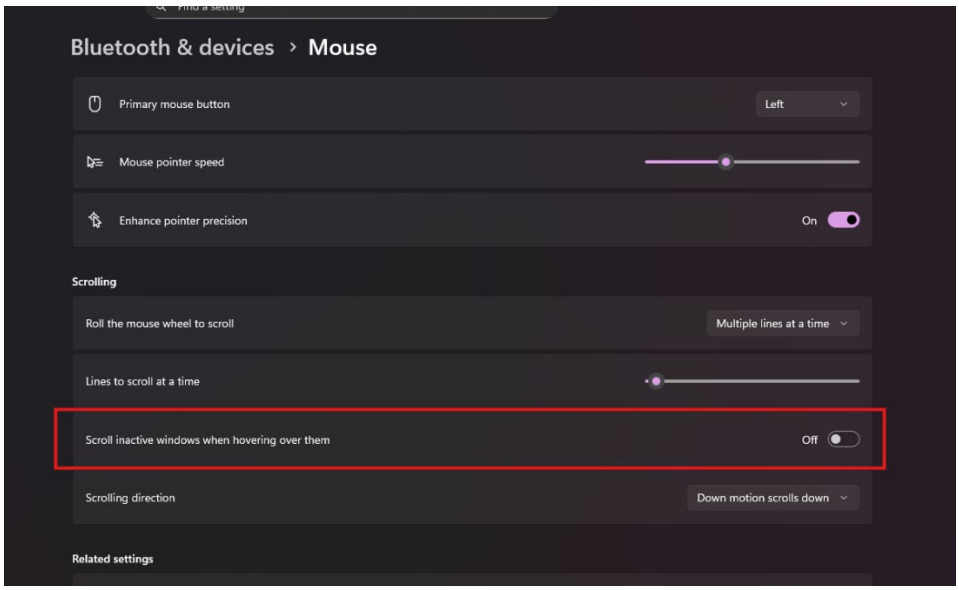


TECLOG Hot Keys

- B: Create a baseline POR with the default POR length starting at the current point
- F: Create a fan-on POR with the default POR length starting at the current point
- M: add event marker
- S: Toggle scan rate indicator
- Z: autozero all devices
- ← / → :
- If time measurement line tool active, move marker left or right
- If region select tool active, move region
    - + CTRL: move left index
    - + ALT: move right index
- ESC: Shut off all fans (if recording data)
- CTRL + C: copy chart to clipboard
- F1: Show help
- Press and Hold Left Mouse Button: drag graph

To enable zoom with mouse wheel:

Turn off “Scroll inactive windows when hovering over them” in Mouse scrolling settings (Windows 10/11)



DG-1000 QUICK GUIDE:

Computer Networking Examples

DG-1000 Pressure and Flow Gauge Networking Examples

TEC Example 1

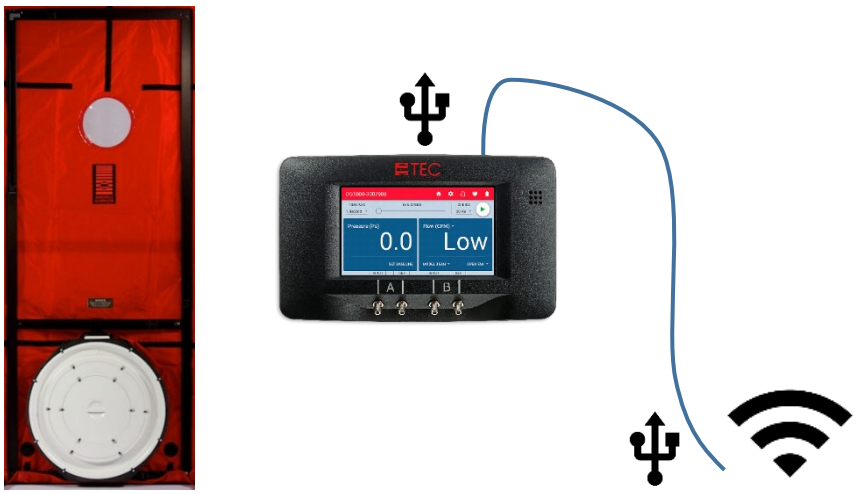
Single Fan System (1 DG-1000 Gauge to Computer via Wi-Fi wireless communication)

Wireless Connections

- 1 DG-1000 gauge with the network configuration set to **Create Network**.
- The laptop computer is joined to the wireless network being broadcast by the DG-1000 gauge.

TEC Example 2

Single Fan System (1 DG-1000 Gauge to computer via wired USB communication)



Wired Connections

- 1 DG-1000 with the network configuration set to **USB**.
- The laptop computer is connected to the DG-1000 gauge using a micro USB/standard USB cable.
- You will need to download and install the appropriate USB driver to your laptop computer in order to use the **USB** networking option. Drivers are installed on the laptop using the Windows Update service.

TEC Example 3

Single 3 Fan System (2 DG-1000 Gauges – wireless communication)

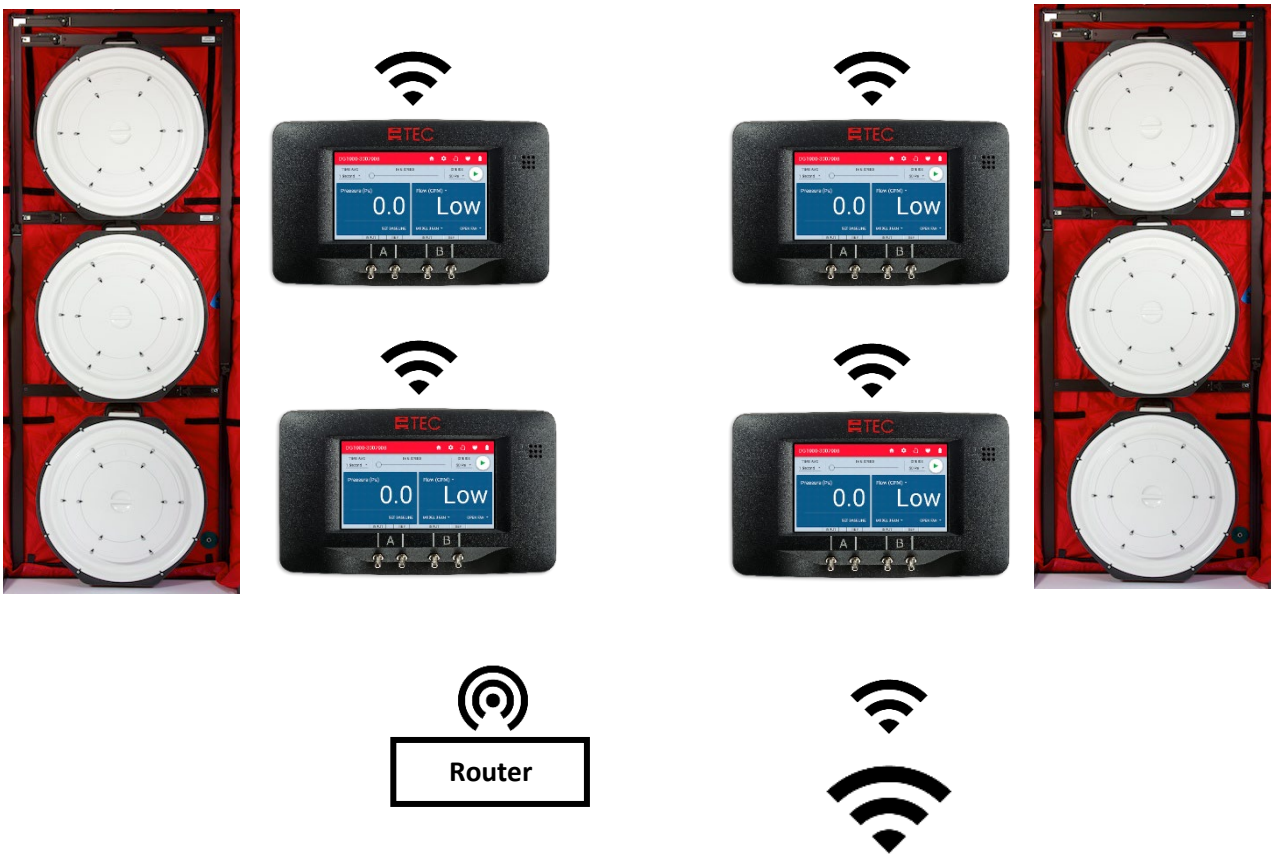
Wireless Connections

- 1 DG-1000 gauge in the 3 Fan System with the network configuration set to **Create Networ**k
- 1 DG-1000 gauge in the 3 Fan System with the network configuration set to **Join Network**
- Both the laptop computer and the DG-1000 gauge set to **Join Network** are joined to the wireless network being broadcast by the DG-1000 gauge set to **Create Network**.

- Note: If using DG-1000 firmware version 1.8.0 (137) or later, no password entry is required to connect DG-1000's to networks created by another DG-1000.

TEC Example 4

Multiple 3 Fan System (4 DG-1000 Gauges – wireless communication)

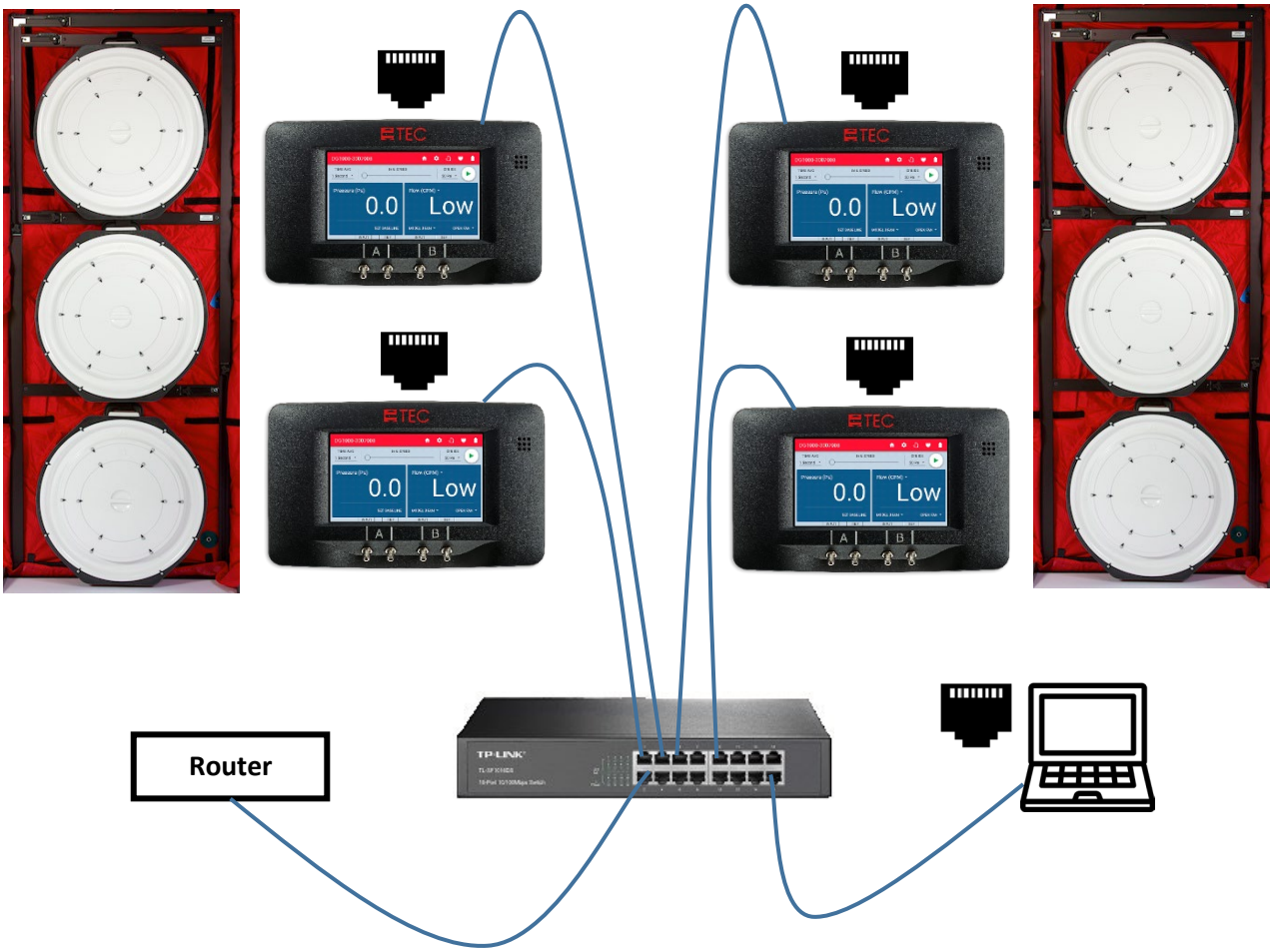


Wireless Connections

- All 4 DG-1000 gauges with the network configuration set to **Join Network**
- The 4 gauges are joined to the wireless network being broadcast by the router.
- The laptop computer is also joined to the wireless network being broadcast by the router.
- This setup can be expanded for additional Blower Door systems and DG-1000 gauges.

TEC Example 5

Multiple 3 Fan System (4 DG-1000 Gauges – wired Ethernet communication)

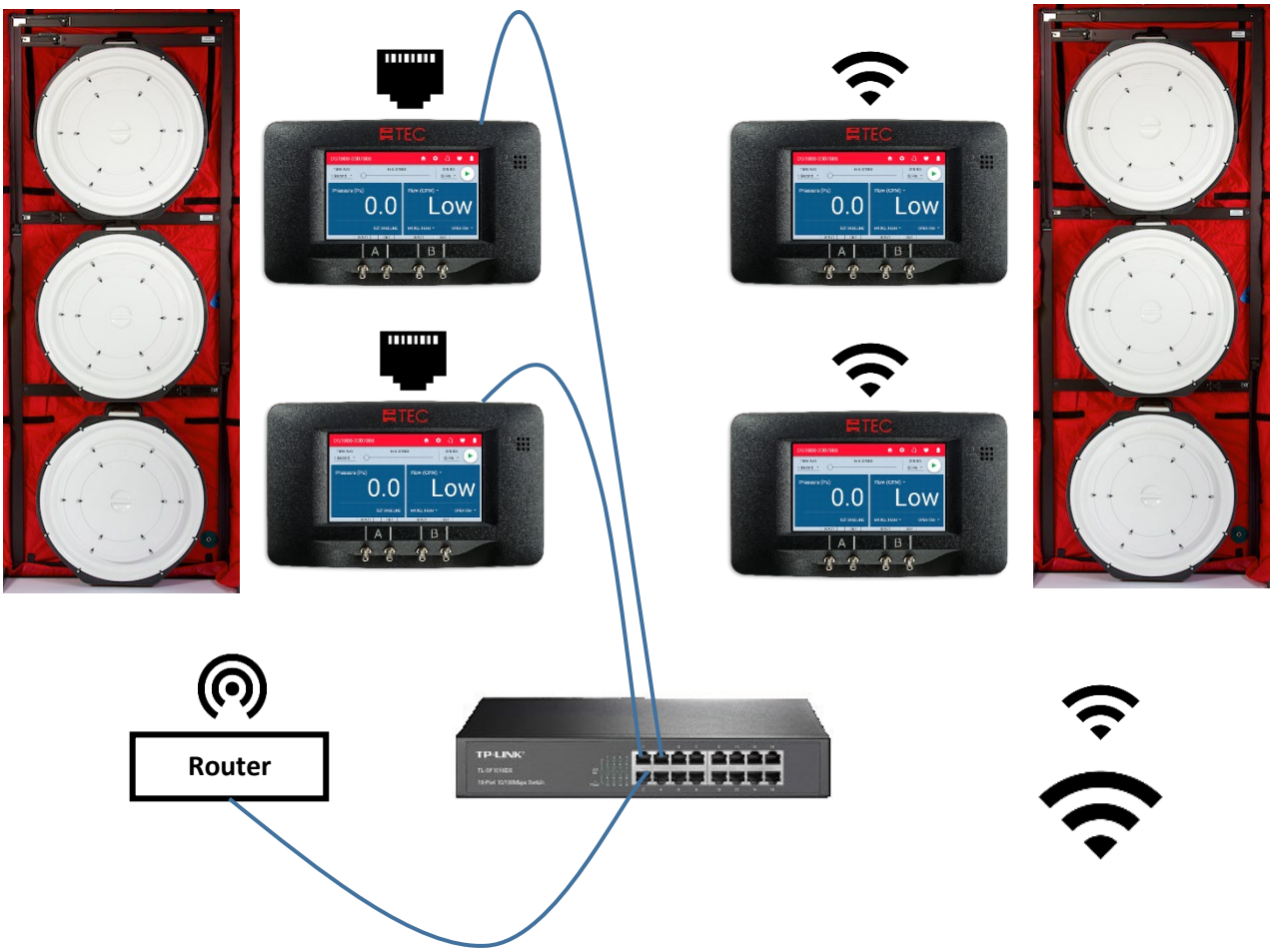


Wired Connections

- All 4 DG-1000 gauges with the network configuration set to **Ethernet**.
- The 4 gauges are connected to an Ethernet switch.
- A router and laptop computer are also connected to the Ethernet switch. The router is connected using a LAN port on the router.
- Using the **Etherne**t networking option on the DG-1000 requires that a single device in the network is running DHCP server (this is the reason we have a router connected to the network).
- This setup can be expanded for additional Blower Door systems and DG-1000 gauges.

TEC Example 6

Multiple 3 Fan System (4 DG-1000 Gauges – combination of wireless and wired communication)



Wired Connections

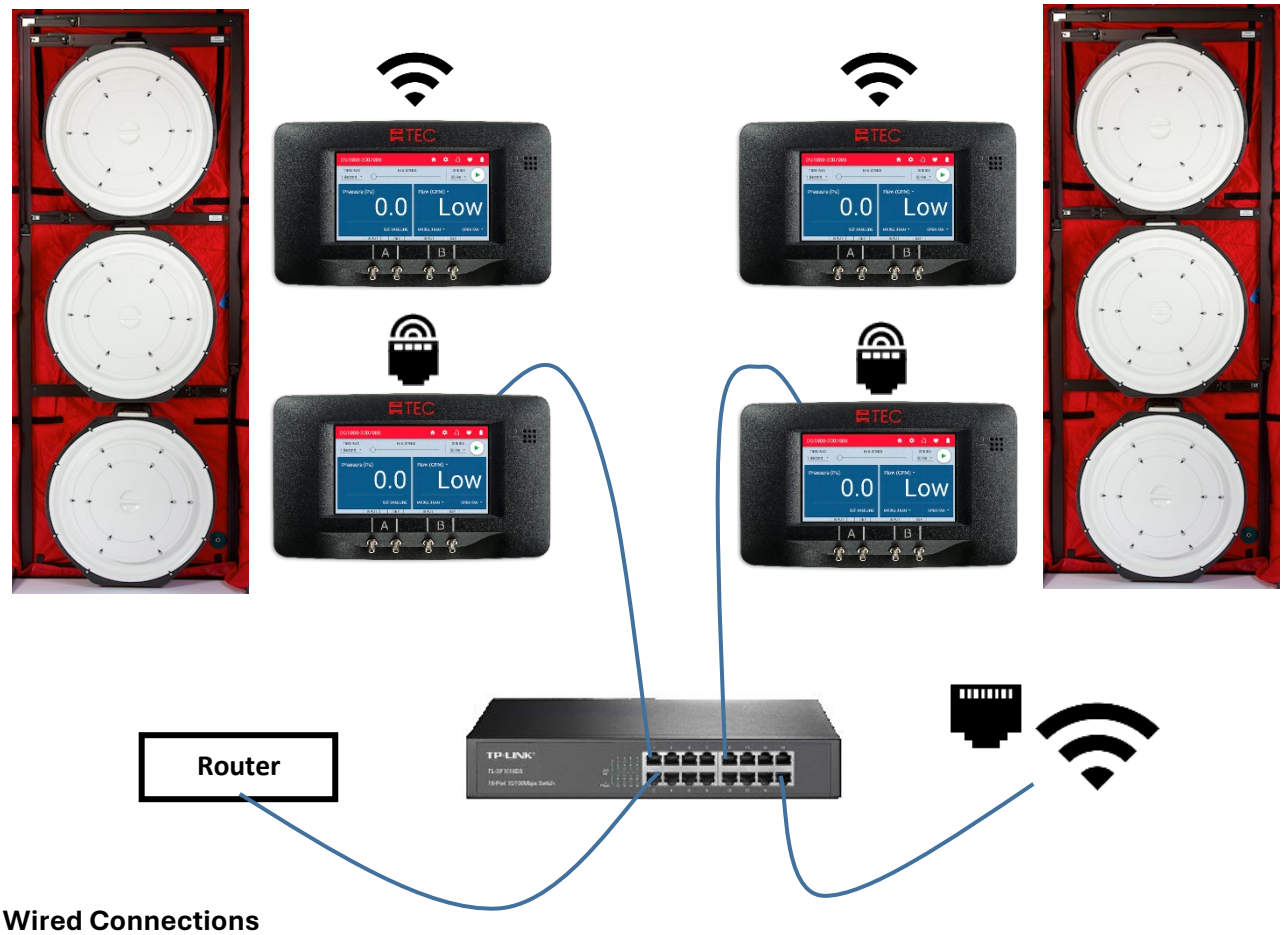
- Both DG-1000 gauges in one 3 Fan System with the network configuration set to **Ethernet** .
- Both gauges are connected to an Ethernet switch.
- A router is also connected to the Ethernet switch. The router is connected using a LAN port on the router.
- Using the **Ethernet** networking option on the DG-1000 requires that a single device in the network is running DHCP server (this is the reason we have a router connected to the network).

Wireless Connections

- Both DG-1000 gauges in one 3 Fan System with the network configuration set to **Join Network**
- Both gauges are joined to the wireless network being broadcast by the router.
- The laptop computer is also joined to the wireless network being broadcast by the router.
- This setup can be expanded for additional Blower Door systems and DG-1000 gauges.

TEC Example 7

Multiple 3 Fan System (4 DG-1000 Gauges – Ethernet Bridge communication)



Wired Connections

- 1 DG-1000 gauge in each 3 Fan System with the network configuration set to **Create Network** (*with the* Ethernet Bridge *configuration enable*d) .
- Both gauges are connected to an Ethernet switch.
- A router and laptop computer are also connected to the Ethernet switch. The router is connected using a LAN port on the router.
- Using the Ethernet Bridge configuration option on the DG-1000 requires that a single device in the network is running DHCP server (this is the reason we have a router connected to the network).

Wireless Connections

- 1 DG-1000 gauge in each 3 Fan System with the network configuration set to **Join Network** .
- Each gauge is joined to the wireless network being broadcast by the 2nd DG-1000 gauge in the 3 Fan System that is set to **Create Networ**k (*with* Ethernet Bridge *configuration enabled*).
- This setup can be expanded for additional Blower Door systems and DG-1000 gauges.

Planning, Preparing and Performing Tests

Pre-Test Planning Tests

1. Ensure you have gauges, switches, router and ethernet cables in good condition
    a. Gauges & Fans
        i. Usually, calibration is required to comply with standards / contract
        ii. https://www.energyconservatory.com/calibration-repair/
    b. Switches
        i. DG-1000's after S/N 9541 generally good compatibility with any switch
        ii. For early versions of DG-1000, best luck with the NETGEAR switch

    c. A router is needed in each set-up to assign the IP addresses
    d. Ethernet Cables
        i. Generally, CAT6 is recommended to avoid any issues in the field
        ii. Check cables for continuity prior to test

Checking Ethernet Cables

Connect to both ends of cable RJ45.
GREEN = GOOD

Connect to both ends of cable RJ45.
RED OPEN = BAD

Building Prep per ASTM 3158

Category	Envelope (Closed Up)	Operational (In Use)
Natural Ventilation openings	Sealed	Closed and latched
Active or passive smoke control systems	Sealed	As found
Waste or linen handling systems & equipment	Sealed at rooftop chute vent openings	• Rooftop vent = open • Chute intake doors = closed • Chute intake & discharge room doors = closed & latched • Fire dampers = as fnd
Interior doors, hatches, and operable windows inside the test envelope that are normally closed	Open	Closed and latched
Other interior doors	Open	Open
Mechanical ventilation or AC openings	Sealed; equipment with dampers are to have dampers closed and opening sealed	Sealed
Intermittently used mechanical ventilation or AC openings	Sealed	Sealed
Clothes dryer/vent	Sealed	As found; seal vent if dryer is not installed
Windows, doors and roof hatches	Closed & latched	Closed and latched
Solid fuel appliance (ie fireplace)	Dampers closed; chimney sealed	Dampers closed
Openings not intended for ventilation	Sealed; floor drains and plumbing traps filled	Floor drains and plumbing traps filled