



Thermal Dispersion Airflow Measurement

Advantage

SILVER Series

Startup Procedures

STA104-P Startup Checklist

TAG INFORMATION		
Location Name:	Model:	Type:
Reference Number:	Item:	Number of Probes:
Duct Size: x (in / mm)	Internal Insulation:	

Each item in the following tables should be satisfactorily completed before proceeding to the next step. Consult the installation instructions and troubleshooting guide to assist in resolving issues.

Prior To Powering Up The Equipment		
Step	Check	Result
1	Does the station location meet Ebtron's minimum placement guidelines?	Yes / No
2	Are the sensor probes mounted for equal area spacing as illustrated in the installation instructions?	Yes / No
3	Is air flowing through the sensor probes in the proper direction according to the airflow direction label?	Yes / No
4	Is the transmitter installed within the cable length of the sensor probes?	Yes / No
5	Is the transmitter installed so that it is not exposed to water or moisture?	Yes / No
6	Is the transmitter installed where the temperatures will be between -20° F and 120° F?	Yes / No
7	Is there a minimum of 7" of unobstructed space on the top of the transmitter so that the cover can be removed?	Yes / No
8	Has a "drip loop" in the sensor probe cable(s) been provided at the transmitter in the event of water runoff or condensation?	Yes / No
9	Are the 24 VAC power wires connected to positions L1 and L2 of the POWER terminal block?	Yes / No
10	If multiple transmitters are wired off of the same transformer, are they wired "in-phase"?	Yes / No
11	Are the cables from the sensor probes connected to the receptacles on the bottom of the transmitter?	Yes / No
12	Are the output signal switches OUT1 and OUT2 set to the desired output type (mA or VDC)?	Yes / No
13	Are the output signal wires to the host controls connected to positions 1 and COM for flow and 2 and COM for temperature on the OUTPUT terminal block?	Yes / No

Power Applied To The Equipment		
Step	Check	Result
1	Is the voltage between positions L1 and L2 on the POWER terminal block between 22.5 and 29 VAC?	Yes / No
2	Is the green LED labeled D3 flashing at 1 second intervals?	Yes / No
3	Put all of the FSR DIP switches on the ON position. Do the host controls receive a half scale output signal?	Yes / No
4	Put all of the FSR DIP switches on the OFF position. Do the host controls receive a zero output signal?	Yes / No
5	Set and record the FSR DIP switch positions for the desired flow and temperature output signal ranges.	1:(on/off) 2:(on/off) 3:(on/off) 4:(on/off)
6	Does the reading at the host controls track up and down with the varying airflow rates?	Yes / No

Field Adjustments		
Adjustment	Purpose	Usage
Gain	Adjusting the factory calibration.	The factory calibration should not require adjustment if the sensor probes are installed in accordance with published installation guidelines.

STA104-F Startup Checklist

TAG INFORMATION		
Location Name:	Model:	Type:
Reference Number:	Item:	Number of Probes:
Duct Size: x (in / mm)	Internal Insulation:	

Each item in the following tables should be satisfactorily completed before proceeding to the next step. Consult the installation instructions and troubleshooting guide to assist in resolving issues.

Prior To Powering Up The Equipment		
Step	Check	Result
1	Are the sensor probes installed in the same diameter of the throat of the fan upstream of the propeller without interfering with the fan operation?	Yes / No
2	Are the rod lengths set properly and evenly as per the installation instructions for the diameter that the sensor probes are installed in?	Yes / No
3	Is air flowing through the sensor probes in the proper direction according to the airflow direction label?	Yes / No
4	Do the protective shrouds of the fan inlet sensors face away from the center of the fan or the fan shaft?	Yes / No
5	Are the fan inlet sensor cables securely fastened as to not be drawn into the fan or cut by rough edges?	Yes / No
6	Is the transmitter installed within the cable length of the sensor probes?	Yes / No
7	Is the transmitter installed so that it is not exposed to water or moisture?	Yes / No
8	Is the transmitter installed where the temperatures will be between -20° F and 120° F?	Yes / No
9	Is there a minimum of 7" of unobstructed space on the top of the transmitter so that the cover can be removed?	Yes / No
10	Has a "drip loop" in the sensor probe cable(s) been provided at the transmitter in the event of water runoff or condensation?	Yes / No
11	Are the 24 VAC power wires connected to positions L1 and L2 of the POWER terminal block?	Yes / No
12	If multiple transmitters are wired off of the same transformer, are they wired "in-phase"?	Yes / No
13	Are the cables from the sensor probes connected to the receptacles on the bottom of the transmitter?	Yes / No
14	Are the output signal switches OUT1 and OUT2 set to the desired output type (mA or VDC)?	Yes / No
15	Are the output signal wires to the host controls connected to positions 1 and COM for flow and 2 and COM for temperature on the OUTPUT terminal block?	Yes / No

Power Applied To The Equipment		
Step	Check	Result
1	Is the voltage between positions L1 and L2 on the POWER terminal block between 22.5 and 29 VAC?	Yes / No
2	Is the green LED labeled D3 flashing at 1 second intervals?	Yes / No
3	Put all of the FSR DIP switches on the ON position. Do the host controls receive a half scale output signal?	Yes / No
4	Put all of the FSR DIP switches on the OFF position. Do the host controls receive a zero output signal?	Yes / No
5	Set and record the FSR DIP switch positions for the desired flow and temperature output signal ranges.	1:(on/off) 2:(on/off) 3:(on/off) 4:(on/off)
6	Does the reading at the host controls track up and down with the varying airflow rates?	Yes / No

STA104-F Startup Checklist

Field Adjustments		
Adjustment	Purpose	Usage
Gain	Adjusting the factory calibration.	Installed accuracy is primarily a function of the inlet area calculation and presence of disturbances near the fan inlet (i.e. belt guards, pulleys, bearings, etc.). An installed accuracy of $\pm(2\%$ to $3\%)$ of reading can be obtained with field adjustment when the recommended setup procedures are followed (see: Adjusting Factory Calibration Service Supplements for more information).

STN104-P Startup Checklist

TAG INFORMATION		
Location Name:	Model:	Type:
Reference Number:	Item:	Number of Probes:
Duct Size: x (in / mm)	Internal Insulation:	

Each item in the following tables should be satisfactorily completed before proceeding to the next step. Consult the installation instructions and troubleshooting guide to assist in resolving issues.

Prior To Powering Up The Equipment		
Step	Check	Result
1	Does the station location meet Ebtron's minimum placement guidelines?	Yes / No
2	Are the sensor probes mounted for equal area spacing as illustrated in the installation instructions?	Yes / No
3	Is air flowing through the sensor probes in the proper direction according to the airflow direction label?	Yes / No
4	Is the transmitter installed within the cable length of the sensor probes?	Yes / No
5	Is the transmitter installed so that it is not exposed to water or moisture?	Yes / No
6	Is the transmitter installed where the temperatures will be between -20° F and 120° F?	Yes / No
7	Is there a minimum of 7" of unobstructed space on the top of the transmitter so that the cover can be removed?	Yes / No
8	Has a "drip loop" in the sensor probe cable(s) been provided at the transmitter in the event of water runoff or condensation?	Yes / No
9	Are the 24 VAC power wires connected to positions L1 and L2 of the POWER terminal block?	Yes / No
10	If multiple transmitters are wired off of the same transformer, are they wired "in-phase"?	Yes / No
11	Are the cables from the sensor probes connected to the receptacles on the bottom of the transmitter?	Yes / No
12	Are the PROTOCOL DIP switches in the proper position for the desired network protocol (see the transmitter installation and configuration guide for settings)?	Yes / No
13	Are the ADDRESS DIP switches set to the desired unique address between 1 and 255 (see the transmitter installation and configuration guide for settings)?	Yes / No
14	Are the TERMINATION DIP switches set to the proper termination type (see the transmitter installation and configuration guide for settings)?	Yes / No
15	Are the signal wires connected to the proper positions of the OUTPUT terminal block (position 1 for A, 2 for B and COM for common)?	Yes / No

Power Applied To The Equipment		
Step	Check	Result
1	Is the voltage between positions L1 and L2 on the POWER terminal block between 22.5 and 29 VAC?	Yes / No
2	Is the green LED labeled D1 flashing at 1 second intervals?	Yes / No
3	Is the Status point returning an "OK" value (Does not apply to BACnet MS/TP)?	Yes / No
4	Does the reading at the host controls track up and down with the varying airflow rates?	Yes / No

Field Adjustments
None

STN104-F Startup Checklist

TAG INFORMATION		
Location Name:	Model:	Type:
Reference Number:	Item:	Number of Probes:
Duct Size: x (in / mm)	Internal Insulation:	

Each item in the following tables should be satisfactorily completed before proceeding to the next step. Consult the installation instructions and troubleshooting guide to assist in resolving issues.


Prior To Powering Up The Equipment		
Step	Check	Result
1	Are the sensor probes installed in the same diameter of the throat of the fan upstream of the propeller without interfering with the fan operation?	Yes / No
2	Are the rod lengths set properly and evenly as per the installation instructions for the diameter that the sensor probes are installed in?	Yes / No
3	Is air flowing through the sensor probes in the proper direction according to the airflow direction label?	Yes / No
4	Do the protective shrouds of the fan inlet sensors face away from the center of the fan or the fan shaft?	Yes / No
5	Are the fan inlet sensor cables securely fastened as to not be drawn into the fan or cut by rough edges?	Yes / No
6	Is the transmitter installed within the cable length of the sensor probes?	Yes / No
7	Is the transmitter installed so that it is not exposed to water or moisture?	Yes / No
8	Is the transmitter installed where the temperatures will be between -20 ° F and 120 ° F?	Yes / No
9	Is there a minimum of 7" of unobstructed space on the top of the transmitter so that the cover can be removed?	Yes / No
10	Has a "drip loop" in the sensor probe cable(s) been provided at the transmitter in the event of water runoff or condensation?	Yes / No
11	Are the 24 VAC power wires connected to positions L1 and L2 of the POWER terminal block?	Yes / No
12	If multiple transmitters are wired off of the same transformer, are they wired "in-phase"?	Yes / No
13	Are the cables from the sensor probes connected to the receptacles on the bottom of the transmitter?	Yes / No
14	Are the PROTOCOL DIP switches in the proper position for the desired network protocol (see the transmitter installation and configuration guide for settings)?	Yes / No
15	Are the ADDRESS DIP switches set to the desired unique address between 1 and 255 (see the transmitter installation and configuration guide for settings)?	Yes / No
16	Are the TERMINATION DIP switches set to the proper termination type (see the transmitter installation and configuration guide for settings)?	Yes / No
17	Are the signal wires connected to the proper positions of the OUTPUT terminal block (position 1 for A, 2 for B and COM for common)?	Yes / No

Power Applied To The Equipment		
Step	Check	Result
1	Is the voltage between positions L1 and L2 on the POWER terminal block between 22.5 and 29 VAC?	Yes / No
2	Is the green LED labeled D1 flashing at 1 second intervals?	Yes / No
3	Is the Status point returning an "OK" value (Does not apply to BACnet MS/TP)?	Yes / No
4	Does the reading at the host controls track up and down with the varying airflow rates?	Yes / No

Field Adjustments
None

Adjusting Factory Calibration

The factory calibration should not require adjustment if the sensor probes are installed in accordance with published installation guidelines on STx104-P systems. However, some installations may not meet placement guidelines or commissioning requirements may dictate field adjustment. Field adjustment may improve the performance of the systems. Only OUTPUT1, airflow rate, can be adjusted. Make sure that the reference device and technique used to determine the airflow rate in the field is suitable for such measurement. Select a location that is acceptable for the device being used as the reference recognizing that this may not be the location where the EBTRON airflow station is installed. Field measurement accuracy will not be better than +/- (5% to 10%) of reading and can often exceed 10%. Do not adjust the output of the STx104 if the difference between the transmitter and the field measurement are less than 10%. The STx104 transmitter can be adjusted for output 1 signal "gain". To adjust the output signal "gain", the STx104 transmitter must be powered up with all of the FSR DIP switches in the ON position. When GAIN potentiometer is disabled, adjusting the output signal GAIN potentiometer will not affect the output of the transmitter.

 If performing a closed loop test and using another location as the reference, be aware that this method will not account for leakage in the system between the two points of measurement.

Procedure for 1 Point Field Adjustment

Select an airflow rate that represents a valid operating condition for the system. Set fan speed, dampers, and VAV boxes to a fixed speed or position when measurements are taken. Complete the following worksheet to determine the gain setting to be set on the transmitter.

1. Confirm that the GAIN potentiometer is disabled by putting all of the FSR DIP switches in the off position and cycling power to the transmitter. Return the DIP switches to their previous position once the LED begins to flash. This is the factory default setting and disables the offset and gain potentiometers.
2. _____ Record the free area of the duct / inlet where the sensor probes are installed.
3. _____ Record the airflow full scale reading set by the FSR DIP switches for the station.
4. _____ Multiply line 2 by line 3. This is the full scale CFM (span) of the station.
5. _____ Record the transmitter output by taking a meter and measuring between positions 1 and COM on the OUTPUT terminal block. Time averaging the data will improve field recalibration.
6. _____ If the output signal is 4-20 mA, subtract 4 mA from line 5.
7. _____ If the output signal is 4-20 mA, divide line 4 by 16 and multiply by line 6. If the output is 0-10 VDC, divide line 4 by 10 and multiply by line 5. This is the CFM reading from the flow station.
8. _____ Record the free area of the duct / inlet where the reference measurement is taken.
9. _____ Record the reference airflow reading and convert to CFM if not already in CFM (Reference CFM = Reference FPM x Reference Free Area).
10. _____ Calculate the gain factor by dividing line 9 by line 7.
11. _____ Calculate the adjusted output signal for the flow station. If the output signal is 4-20 mA, multiply line 10 by line 6 then add 4 mA. If the output signal is 0-10 VDC, multiply line 10 by line 5.
12. Enable the GAIN potentiometer by setting all of the FSR DIP switches to the ON position and cycle power to the transmitter.
13. When the LED begins, return the FSR DIP switches to their previous position.
14. Place a meter on the flow output (between positions 1 and COM on the output terminal block) and turn the GAIN potentiometer until the meter reads the value calculated in line 11 (turning the potentiometer clockwise will increase the value and counterclockwise will decrease the value).

STA102-T Startup Checklist

TAG INFORMATION		
Location Name:	Model:	Type:
Reference Number:	Item:	Number of Probes:
Duct Size: x (in / mm)	Internal Insulation:	

Each item in the following tables should be satisfactorily completed before proceeding to the next step. Consult the installation instructions and troubleshooting guide to assist in resolving issues.


Prior To Powering Up The Equipment		
Step	Check	Result
1	Does the station location meet Ebtron's minimum placement guidelines?	Yes / No
2	Is the sensor probe mounted for equal area spacing as illustrated in the installation instructions?	Yes / No
3	Is air flowing through the sensor probe in the proper direction according to the airflow direction label?	Yes / No
4	Is the transmitter installed within the cable length of the sensor probe?	Yes / No
5	Is the transmitter installed so that it is not exposed to water or moisture?	Yes / No
6	Is the transmitter installed where the temperatures will be between -20° F and 120° F?	Yes / No
7	Is there a minimum of 7" of unobstructed space on the top of the transmitter so that the cover can be removed?	Yes / No
8	Has a "drip loop" in the sensor probe cable been provided at the transmitter in the event of water runoff or condensation?	Yes / No
9	Are the 24 VAC power wires connected to positions L1 and L2 of the POWER terminal block?	Yes / No
10	If multiple transmitters are wired off of the same transformer, are they wired "in-phase"?	Yes / No
11	Is the cable from the sensor probe connected to the receptacle on the bottom of the transmitter?	Yes / No
12	Is the output signal switch set to the desired output type (mA or VDC)?	Yes / No
13	Are the output signal wires to the host controls connected to positions (+) and (-) for flow on the output terminal block?	Yes / No

Power Applied To The Equipment		
Step	Check	Result
1	Is the voltage between positions L1 and L2 on the POWER terminal block between 22.5 and 29 VAC?	Yes / No
2	Is the green LED labeled D2 flashing at 1 second intervals?	Yes / No
3	Put all of the FSR DIP switches on the ON position. Do the host controls receive a half scale output signal?	Yes / No
4	Put all of the FSR DIP switches on the OFF position. Do the host controls receive a zero output signal?	Yes / No
5	Set and record the FSR DIP switch positions for the desired flow and temperature output signal ranges.	1:(on/off) 2:(on/off) 3:(on/off) 4:(on/off)
6	Does the reading at the host controls track up and down with the varying airflow rates?	Yes / No

Field Adjustments		
Adjustment	Purpose	Usage
Gain	Adjusting the factory calibration.	The factory calibration should not require adjustment if the sensor probes are installed in accordance with published installation guidelines.

Adjusting Factory Calibration

The factory calibration should not require adjustment if the sensor probes are installed in accordance with published installation guidelines on STx102-T systems. However, some installations may not meet placement guidelines or commissioning requirements may dictate field adjustment. Field adjustment may improve the performance of the systems. Make sure that the reference device and technique used to determine the airflow rate in the field is suitable for such measurement. Select a location that is acceptable for the device being used as the reference recognizing that this may not be the location where the EBTRON airflow station is installed. Field measurement accuracy will not be better than +/- (5% to 10%) of reading and can often exceed 10%. Do not adjust the output of the STx102 if the difference between the transmitter and the field measurement are less than 10%. The STx102 transmitter can be adjusted for output signal "gain". To adjust the output signal "gain", the STx102 transmitter must be powered up with all of the FSR DIP switches in the ON position. When GAIN potentiometer is disabled, adjusting the output signal GAIN potentiometer will not affect the output of the transmitter.

 If performing a closed loop test and using another location as the reference, be aware that this method will not account for leakage in the system between the two points of measurement.

Procedure for 1 Point Field Adjustment

Select an airflow rate that represents a valid operating condition for the system. Set fan speed, dampers, and VAV boxes to a fixed speed or position when measurements are taken. Complete the following worksheet to determine the gain setting to be set on the transmitter.

1. Confirm that the GAIN potentiometer is disabled by putting all of the FSR DIP switches in the off position and cycling power to the transmitter. Return the DIP switches to their previous position once the LED begins to flash. This is the factory default setting and disables the offset and gain potentiometers.
2. _____ Record the free area of the duct / inlet where the sensor probes are installed.
3. _____ Record the airflow full scale reading set by the FSR DIP switches for the station.
4. _____ Multiply line 2 by line 3. This is the full scale CFM (span) of the station.
5. _____ Record the transmitter output by taking a meter and measuring between positions (+) and (-) on the output terminal block. Time averaging the data will improve field recalibration.
6. _____ If the output signal is 4-20 mA, subtract 4 mA from line 5.
7. _____ If the output signal is 4-20 mA, divide line 4 by 16 and multiply by line 6. If the output is 0-10 VDC, divide line 4 by 10 and multiply by line 5. This is the CFM reading from the flow station.
8. _____ Record the free area of the duct / inlet where the reference measurement is taken.
9. _____ Record the reference airflow reading and convert to CFM if not already in CFM (Reference CFM = Reference FPM x Reference Free Area).
10. _____ Calculate the gain factor by dividing line 9 by line 7.
11. _____ Calculate the adjusted output signal for the flow station. If the output signal is 4-20 mA, multiply line 10 by line 6 then add 4 mA. If the output signal is 0-10 VDC, multiply line 10 by line 5.
12. Enable the GAIN potentiometer by setting all of the FSR DIP switches to the ON position and cycle power to the transmitter.
13. When the LED begins, return the FSR DIP switches to their previous position.
14. Place a meter between positions (+) and (-) on the output terminal block and turn the GAIN potentiometer until the meter reads the value calculated in line 11 (turning the potentiometer clockwise will increase the value and counterclockwise will decrease the value).