NJK Signal Processing Unit

Internal Terminal Connections for Power and Signal
Internal RJ-45 Connection for Sensor
Water Tight NEMA IP-65 Housing
On Board Sensor Fuse and Switch
Water Tight Sensor Cable Access
High Visibility Display

Keypad Programmable:
Sensor Area, Output Filter Processing
Signal Update Processing, Output Signal Offset
Flow Correction Factor, Multiple Output Ranges
Minimum Flow, Multiple Sensor Inputs
Grouping for Multiple Sensor Inputs
Simultaneous Display of four Sensors or Groups

NJK-02 Installation Guidelines.

The **Electrical or Mechanical Installer must record the placement and Serial Number of each Flow Sensing Module** installed in a Multiple Sensor application. This will need to be passed along to the Control System Start up Technician.

Each NJK Precision Sensor sold will require an Installation Checklist and Controls Checklist startup form to initiate the NJK product warranty. A separate Installation Startup Sheet will be required for each installed sensor. A single Controls Startup Sheet will be required per HVAC system. The responsibility of completion of each startup checklist will fall upon the contractor that receives the NJK Precision sensor order for the job.

Install the NJK Sensor Flow Frame in a placement that will assure that the air flow measured through the NJK Sensor Flow Frame is a true representation of the desired air flow.

- Place all NJK Sensor Flow Frames ahead of damper banks. This will keep the sensor out of mixing chambers and will eliminate poor sensor readings due to damper restrictions and possible return air entrainment.

- Do Not install the NJK Sensor Flow Frame in an outside air louver section where the NJK Sensor is hanging freely in the OA chamber as this can allow air to swirl on the outlet side of the sensor and may cause a false reading through the NJK Sensor Flow Frame.

- Do Not install NJK Sensor Flow Frame on the face of a Coil or Filter Bank as the coil or filters will become loaded with dirt and debris and will cause a false reading through the NJK Sensor Flow Frame.

- Do Not install NJK Sensor Modules external to the Flow Frame on the bottom of the Flow Frame as this can allow water to build up inside of the Sensor Module and effect sensor accuracy. This is most often an issue with outside air applications.

NJK-02 Product Specifications

Measurement:	
Working range	50-3000 ft/min
Sensor accuracy (CFM)	+/- 0.5% of reading
Sensor repeatability	+/- 0.5% of reading
Installed accuracy	+/- 2% of reading
Response time	0.5 seconds
Output	1 - 10 VDC
Output reading	Cubic Feet per Minute
Humidity range	0-95% Relative Humidity

General:	
Power supply	24VAC /24VDC
Current consumption	AC 75mA
Electrical connections	Screw terminal
S.P.U. Casing Protection class	Polycarbonate NEMA 4X (IP-65) UL-94 HB
Working temperature (probe)	-25F – 230F
Working temperature (elect.)	-13F – 160F
Temperature Probe	-25F – 230F

NJK-02 Sensor Power Requirements

The NJK Signal Processing Unit (S.P.U.) will receive 24 VAC power from the electrician. NJK Flow Measuring Module will be powered from the NJK Signal Processing Unit . All cable connections will be via an RJ-45 plug-in.

The NJK Flow Measuring Module will contain the sensing probe and signal transmitter. This will come with a factory cable that will be 25 feet in length. Custom cables can be purchased at 50', 75', and 100'.

On multiple NJK Flow Measuring Module inputs, an NJK Multi Sensor Hub will be delivered as required to eliminate the need to run more than one sensor cable to the NJK Signal Processing Unit

NJK Precision Product Warranty:

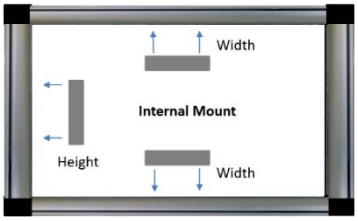
The NJK-02 Air flow sensor "Flow Frame", Flow Measuring Module, Multi Sensor Hub, and Signal Processing Unit all come with a 3 year factory warranty. The serial number is matched to the job to which the sensor was delivered.

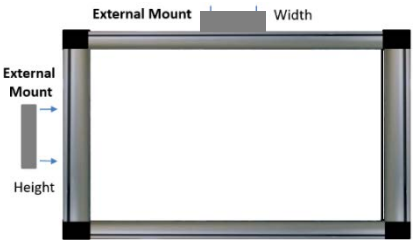
NJK Precision Accessories:

Signal Processing Unit (IP – Rated), Multi Sensor Hub, Multi Sensor Hub (Water Tight Conn.), Sensor Cable Lengths (50', 75', and 100'), Cut and Slide End Plates, replacement Flow Sensing Module Gaskets.

Flow Measuring Module Placement.

NJK Flow Measuring Modules are available mounted **inside** (**Internal)** of the NJK Sensor Flow Frame or **outside (External)** to the NJK Sensor Flow Frame. These can also be mounted on the Height side of the Sensor Flow Frame or on the Width side of the Sensor Flow Frame.

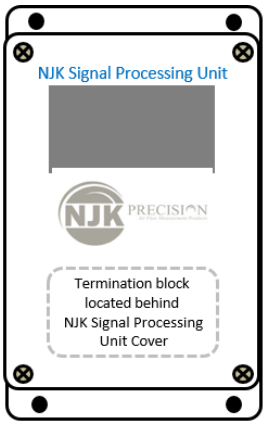




Flow modules mounted inside of the flow frame and interior to ductwork will require a minimum 18" x 18" access door to allow for servicing. Door location must be selected so that maintenance staff can readily remove and replace the NJK Flow Measuring Module for routine cleaning or repair.

Proper installation practices must be followed to assure that the air flow measured through the NJK Sensor Flow Frame is a true representation of the desired air flow and is not being effected by other air sources such as return air flows or by system dynamics that adversely effect the air flow through the NJK Sensor. (refer to NJK-02 Installation Guide)

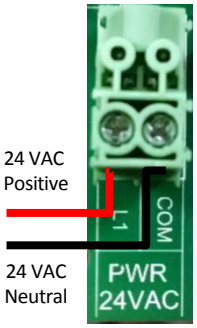
NJK-02 – Wiring and Electrical



All sensing connections to the NJK Flow Measuring Module and the Signal Processing Unit will be an RJ-45 plug-in.

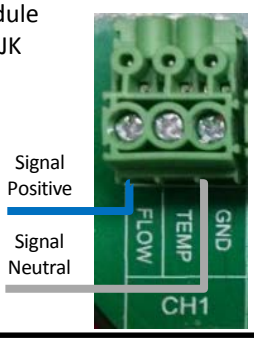
The RJ-45 connection to the Signal Processing Unit will be internal to the casing and accessible through EMT knock-outs. (Liquid Tight cable fittings are available).

Building Automation wiring and 24 VAC power wiring will be done via termination blocks in the NJK Signal Processing Unit only. The NJK Signal Processing Unit will receive 24 VAC power from the control electrician.



The NJK Flow Measuring Module will be powered from the NJK Signal Processing Unit.

An NJK Signal Processing Unit delivered with a single Flow Measuring Module will output only to Channel 1

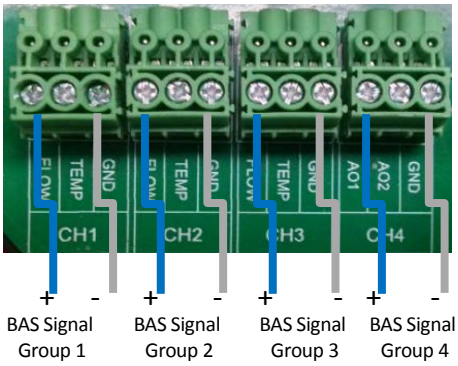


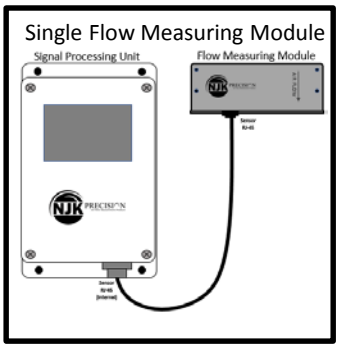
All sensing connections to the Multi Sensor Hub will be an RJ-45 plug-in.

Connections to the Multi Sensor Hub will be internal to the casing which will be delivered with capped ½" EMT knock-outs.

The connections in the Multi Sensor Hub are non-specific and each can be used for any of the sensor inputs.

An NJK Signal Processing Unit delivered for multiple Flow Measuring Modules will be capable of outputs to any of four Channels



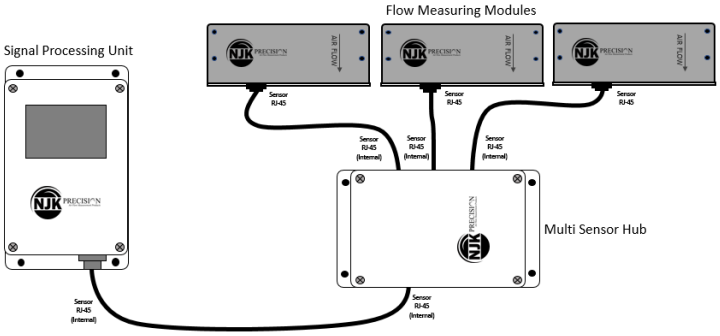


For single NJK Flow Measuring Module applications, the NJK Signal Processing Unit will receive a direct RJ-45 connection from the NJK Flow Measuring Module.

The NJK Sensor Cabling Ends are a standard RJ-45 configuration (as Below). If Field Manufactured cables are chosen to be used place each end as shown below.
(NJK Precision will not be responsible for Field Cabling)

For multiple NJK Flow Measuring Module applications, the NJK Signal Processing Unit can accept signals from multiple Flow Measuring Modules. This is done by connecting all NJK Flow Measuring Modules to one NJK Multi Sensor Hub enabling all sensors to connect to the Signal Processing Unit via one RJ-45 cable..

All NJK Flow Measuring Modules will be delivered with an address to be used when adding to the Signal Processing Unit and the BAS System. **On multiple Flow Measuring Module applications this address must be recorded as to air handling system and sensor location and will be used when programming the sensor at the NJK Signal Processing Unit** .

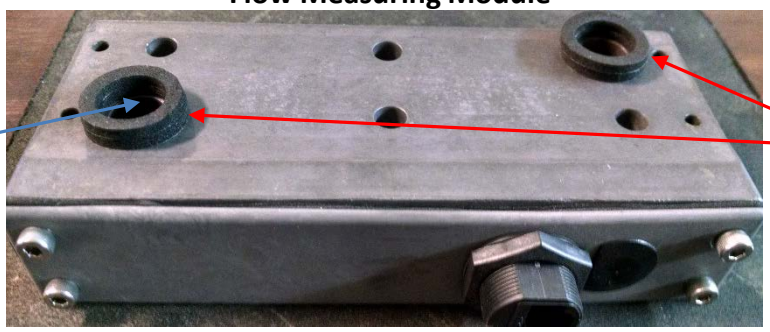


NJK-02 Product Maintenance:

The NJK-02 Air Flow Sensor Flow Frame and Flow Measuring Module will need to be kept clear of debris that can inhibit the operation of the air flow sensor. In an unfiltered outdoor air application the Sensor Flow Frame will need to be free of leaves and or airborne items that can plug the sensor frame. Cottonwood and other such particulates will have very little effect on the operation of the flow frame.

The NJK Flow Measuring Module can be cleaned by removing the four mounting screws that attach the module to the Sensor Flow Frame and flushing the sampling port with either a small amount of air or electrical contact cleaner. Air pressures in excess of 110 psig may damage the Sensing Probe. It is recommended that the rubber sealing gaskets be replaced whenever the Flow Sensing Module is removed / replaced. Recommended cleaning interval is two years for a standard application.

Flow Measuring Module



The NJK Flow Measuring Module must be mounted squarely on the Flow Frame to ensure optimal sampling port gasket sealing and proper sampling of the total air flow through the ductwork and into the Flow Measuring Module. Tighten all 4 screws equally to maintain an even contact between the Flow Measuring Module and the Flow Frame. Hand tighten the screws only.

NJK-02 Sensor Processing Unit Programming:

Sensor Display Parameters

Display Area: The area of the ductwork where the Sensor Flow Frame is mounted, not the area of the Sensor Flow Frame. (Sensor Flow Frame is manufactured at a minimum to be ½ inch less in size than the interior of the ductwork.

Flow Range: Input point is to be defined as a 1 *to* 10 VDC only and will directly reflect minimum and maximum airflow in Cubic Feet per Minute (CFM). Input point must be scaled as labeled on the NJK Air Flow Station label with 1 VDC representing the low flow (in Cubic Feet per Minute) and with 10 VDC representing the high flow (in Cubic Feet per Minute). This will be adjustable between 750, 1500, or 3000.

Output Gain: The flow multiplication factor as determined by the Test and Balance contractor to allow for proper air flow readings based on system dynamics and ductwork anomalies.

Output Offset: The lower starting point of the signal scale. This can be a positive number or a negative number and should be verified and entered as found by the Test and Balance contractors readings. This will come defaulted as a setting of zero.

Filter: The flow signal sensing rate from the actual measured signal as delivered to both the displayed value and the value sent to the building automation system (digital signal processing). This takes into account signal sensing output and timing. Available settings are None, 1, 2, 3, 4 , and 5.

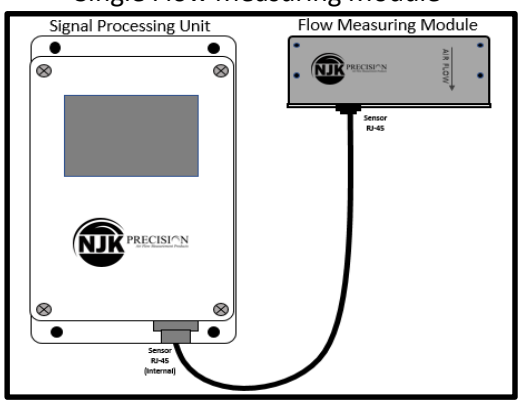
Update Rate: The rate of time in which the air flow is updated at the Signal Processing Unit for both the displayed value and the value sent to the building automation system. Update Rate can be 0, 15, 30, 60, 90, or 120 seconds.

Minimum Flow: The minimum flow (in Feet per Minute) at which the NJK Air Flow Measuring Station will begin to read air flow. This is used in situations where ambient air flows may be present when air handler is not running.

Single Flow Measuring Modules:

(If using Multiple Flow Measuring Modules with a single Signal Processing Unit go to Page #5)

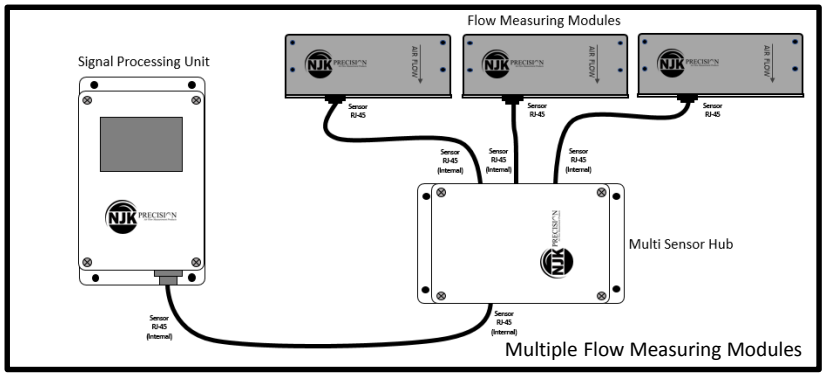
Single Flow Measuring Module



Flow Sensing Module will be located and reading automatically once plugged into powered Signal Processing Unit-Single (SPU-S).

Go to Page #6

NJK-02 Sensor Processing Unit Programming:



Flow Measuring Module Limitations

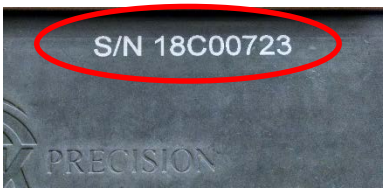
Each Multi Sensor Hub can accept up to 3 Flow Measuring Modules per Channel and 8 Flow Measuring Modules total. For cabling limitations please refer to the Cabling section on Page #8.

Locate Sensor Identification numbers

Refer to Sensor Serial Number from Install Electrician or Mechanical Sensor Installer.

Use above Sensor Serial Number when adding Sensors to Display. Sensor UUID Number is the Serial Number first two digits followed by the last four digits (Example: **S/N** 18C00723 is **UUID Number** 180723).

(To locate Sensors by UUID Number refer to Troubleshooting Section of Installation and Operations Manual – Page 8).



Sensor Serial Number is located on top of Flow Measuring Module.

Set Sensor Group Functionality

Press Down Button until Desired Sensor is highlighted., Press Select Button to view Sensor Group Settings.

Press down button to highlight **Group Settings,** Press Select.

Press down button to highlight **Sensors,** Press Select button to select between Sum or Average.

Press Right button to highlight **Home**.

Press Select button to return to main screen.

Name Sensor Group **(Limit – 3 Sensors per Group)**

Press Down Button until Desired Sensor Group is highlighted.

Press Select Button to view Sensor Group Settings.

Highlight **Group Settings**, press Select button.

Select **Group Name** from None, Supply Air 1-4, Return Air 1-4, Outside Air 1-4, Exhaust Air 1-4 by pressing up / down arrows.

Press Right button to select Save or Left button to cancel.

Press Select button again to save to desired Group.

Setup Sensors

Press right button to select Menu.

Press down button until **Sensors** is highlighted.

Press select button to add a Sensor.

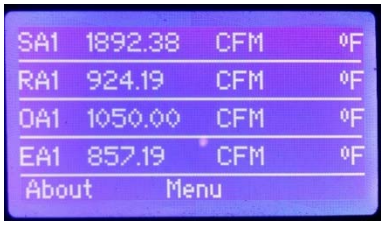
Add Sensor I.D. (from Sensor Module). Press right button until **Save** is highlighted.

Press select button. Press select button again to save to Group 1 (or desired group).

Press right button until **Home** is highlighted, press Select.

ALL SENSORS IN GROUP -1 WILL OUTPUT TO CH-1
ALL SENSORS IN GROUP -2 WILL OUTPUT TO CH-2
ALL SENSORS IN GROUP -3 WILL OUTPUT TO CH-3
ALL SENSORS IN GROUP -4 WILL OUTPUT TO CH-4

DISPLAY FOR GROUP -1
DISPLAY FOR GROUP -2
DISPLAY FOR GROUP -3
DISPLAY FOR GROUP -4



NJK-02 Sensor Processing Unit Programming:

"To access each of the Settings below, follow these two steps first"

Press up/down buttons to select sensor group to be edited, press select button
Press up/down buttons to select sensor to be edited, press select button

Setting the Display Area

1. Press up/down buttons until **Display Area** is shown
2. Press Select button then press Up button. (Curser will Blink under number)
3. Set Display Area to the NJK Sensor Area (Sq Ft) by adjusting settings using up and down buttons. Use left and right buttons to move curser. Use reset button to clear entry.
4. Press Right button until **Save** is highlighted
5. Press Select button to return to Settings menu

Setting the Output Flow Range (Building Automation High Scale):

1. Press up/down buttons until **Flow Range** is shown, press Select button
2. Press up button to highlight ranges, Press Select button
3. Set Output Scaling to desired Scale (750, 1500, or 3000 (FPM)) by adjusting settings using up and down buttons. Press Right button to highlight **Save**
4. Press Select button to return to Settings menu.

Setting the Signal Output Offset:

1. Press up/down buttons until **Offset** is shown, press Select button
2. Press up button to highlight settings, Press Select button
3. Set Offset to determined amount by adjusting settings using up and down buttons. Use left and right buttons to move curser, press Right button to highlight **Save**
4. Press Select button to return to Settings menu.

Setting the Signal Output Gain (Correction Factor):

1. Press up/down buttons until **Output Gain** is shown, press Select button
2. Press up button to highlight settings, Press Select button
3. Set Gain to desired Correction Factor (a percentage of 1.0,) by adjusting settings using up and down buttons. Use left and right buttons to move curser. Press Right button to highlight **Save**
4. Press Select button to return to Settings menu.

Setting the Signal Output Filter:

1. Press up/down buttons until **Filter** is shown, press Select button
2. Press up button to highlight settings, Press Select button
3. Set Filtering adjustment as desired (None, 1, 2, 3, 4 or 5 (Lowest to Highest), Press Right button to highlight **Save**
4. Press Select button to return to Settings menu.

Setting the Signal Update Rate:

1. Press up/down buttons until **Update Rate** is shown, press Select button
2. Press up button to highlight settings, Press Select button
3. Set desired Update Rate (0, 15, 30, 60, 90, or 120 (Seconds)), Press Right button to highlight **Save**
4. Press Select button to return to Settings menu

Setting the Minimum Flow:

1. Press up/down buttons until **Minimum Flow** is shown, press Select button
2. Press up button to highlight settings, Press Select button
3. Set Minimum Flow to Sensor minimum flow in Feet Per Minute by adjusting settings using up and down buttons. Use left and right buttons to move curser, press Right button to highlight **Save.** (Factory set to 35 FPM)
4. Press Select button to return to Settings menu

- Press Select button to return to display reading or press up/down buttons to continue w/settings

NJK-02 Troubleshooting:

Locate Sensor Identification numbers

To located connected Flow Sensing Module UUID address through the Signal Processing Unit each connected Flow Sensing Module must be plugged into Multi Sensor Hub individually. The Signal Processing Unit will only recognize one non-addressed Flow Sensing Module at a time while in the **Get Sensor UUID** mode.

Get Sensor UUID:

Press right button to select menu.

Press Select Button to enter **Display Settings** screen.

Press up / down buttons to highlight **Sensors**, press Select.

Press up / down buttons to highlight **Get Sensor UUID**, press Select.

Press up / down buttons to highlight **Get UUID**, press Select twice.

Connected sensor will display reading: Sensor Found: (Sensor I D Number).

Use above Sensor I D Number when adding Sensing Modules to Display.

Press Right button until **Home** is highlighted, press Select.

Repeat above steps for each Sensing Module connected to Signal Processing Unit and Multi Sensor Hub.

NJK Cabling:

An NJK Signal Processing Unit should never use more than one NJK Multi Sensor Hub per Signal Processing Unit.

The Multi Sensor Hub can accept up to 3 Flow Measuring Modules (FMMs) per Channel and 8 FMMs total.

Sensor Module signal certainty is dependent upon cable lengths, all connections, and sensor system communication traffic (sensor wiring configuration and sensor programming parameter settings).

Single cable lengths of up to 300 feet can be utilized on a single Flow Measuring Module and Signal Processing Unit-S.

Cumulative cable lengths of 300 feet can be safely used when wiring the NJK Signal Processing Unit-M and Multi Hub Unit.

NJK Signal Processing Unit flow signal to Building Automation System cable length will be the responsibility of the BAS Control Contractor.