KEYENCE

96M11819

Digital Fiber Sensor

FS-N18N

Instruction Manual

Read this manual before using the product in order to achieve maximum performance.
Keep this manual in a safe place after reading it so that it can be used at any time.

■ Symbols

The following symbols alert you to important messages.
Be sure to read these messages carefully.

WARNING	**It indicates a hazardous situation which, if not avoided, could result in death or serious injury.**
Point	**It indicates additional information on proper operation.**
Tip	This provides useful tips for the feature being described.

See "FS-N10 Series User's Manual" for details on the features of the FS-N18N and detailed instructions for configuration.

Hints on Correct Use

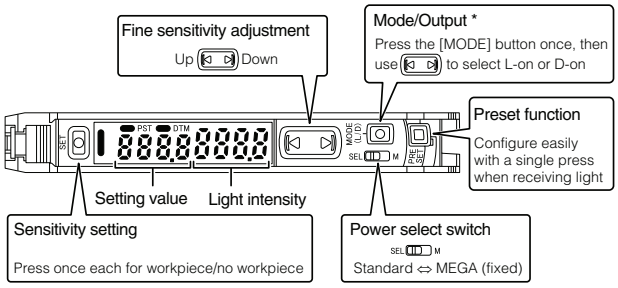
WARNING

- **This product is just intended to detect the object(s). Do not use this product for the purpose to protect a human body or a part of human body.**
- **This product is not intended for use as explosion-proof product. Do not use this product in a hazardous location and/or potentially explosive atmosphere.**
- **This product uses DC power. Do not apply AC power. The product may explode or burn if an AC voltage is applied.**

- Do not wire the amplifier line along with power lines or high-tension lines, as the sensor may malfunction or be damaged due to noise.
- When using a commercially available switching regulator, ground the frame ground terminal and ground terminal.
- Do not use the FS Series outdoors, or in a place where extraneous light can enter the light-receiving element directly.
- Due to individual dispersion characteristics and the difference in fiber unit models, the distance or displayed value at the time of maximum sensitivity adjustment may not be the same on all units.
- This product has not obtained UL or C-UL certification.

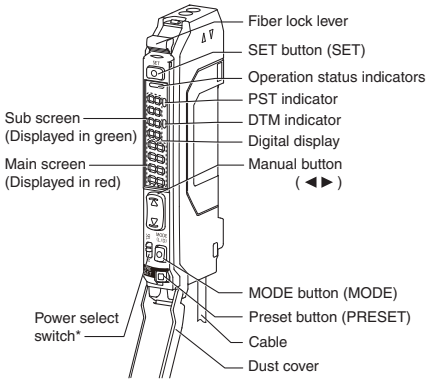
FS-N18N Quick Start

■ Quick Start



* Press and hold the [MODE] button to make advanced setting changes.

Names of Each Part of the Unit



* Setting to "M" locks the power mode to MEGA mode.

Mounting Unit

■ Mounting on a DIN Rail

1 **Align the claw at the bottom of the main body with the DIN rail, as shown in figure1. While pushing the main body in the direction of the arrow 1, push down in the direction of arrow 2.**

2 **To dismount the sensor, raise the main body in the direction of the arrow 3 while pushing the main body in the direction of arrow 1.**

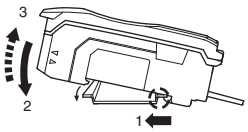


figure1

■ Installation on a Wall

1 **Attach the unit to the optional mounting bracket (OP-73880), and secure with two M3 screws as shown in figure2.**

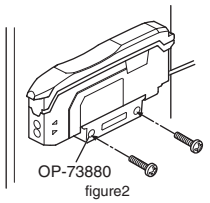


figure2

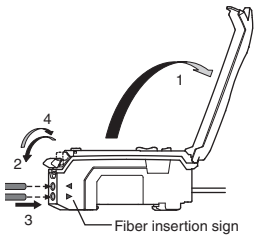
Connecting Fiber Unit

1 **Open the dust cover in the direction shown by arrow 1.**

2 **Move the fiber lock lever in the direction shown by arrow 2.**

3 **Insert a fiber unit into the amplifier as indicated by arrow 3 (approximately 14 mm).**

4 **Move the fiber lock lever in the direction shown by arrow 4 to secure the fiber.**

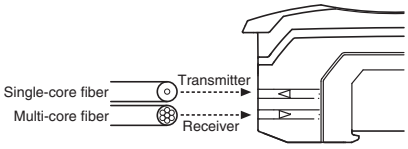


Point

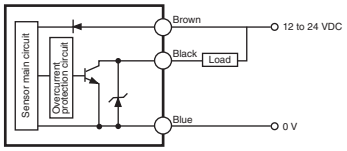
- **If a thin fiber unit is used, an adapter provided with the thin fiber unit will be required.**
  Unless the correct adapter is connected, the thin fiber unit will be loose and not detect targets correctly (the adapter is supplied with the fiber unit).

Cable outer dia	Adapter	Appearance
ø1.3	Adapter A (OP-26500)	
ø1.0	Adapter B (OP-26501)	

- **To connect the coaxial reflective type fiber unit to the amplifier, connect the single-core fiber to the transmitter side, and connect the multiple-core fiber to the receiver side.**



Connecting to External Devices

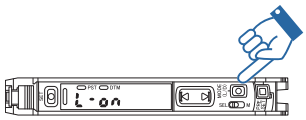


Output Switch

Either light-ON (L-on) mode or dark-ON (D-on) mode can be selected.

1 **While the current value is displayed, press the [MODE] button once.**

2 **Use ( ) to switch the output (L-on/ d-on), then press the [MODE] button again.**
The output change completes, and the display returns to the current value.



Sensitivity Adjustment Method

There are two kinds of sensitivity adjusting methods for FS-N18N: Preset and Tuning.

■ Preset

Simple operation allows sensitivity adjustment concurrently with correction of the received light intensity to " 1000" or "0".
This function helps preventive maintenance by eliminating dispersion of the received light intensity due to the contents of detection or individual workpieces.
However, this is not suitable for detection of transparent workpiece because there is a small difference in the received light intensity between presence and absence of a workpiece.

Point

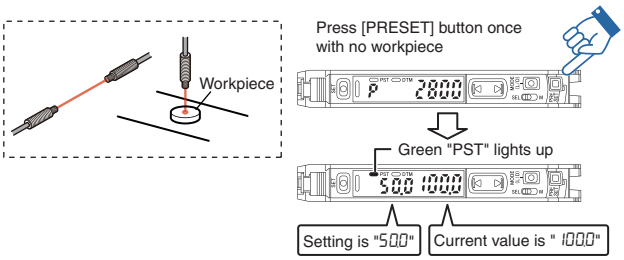
- **The various Preset functions listed below cannot be used when the Zero-Shift function is enabled. Disable the Zero-Shift function before executing the following functions.**
- **The Preset functions are not suited for transparent workpieces and other cases of detection with low light intensity differences.**

Tip

You can disable various Preset functions by pressing and holding the [PRESET] button.

● Preset Function

This function adjusts the current value to " 1000".
With light received, press the [PRESET] button. The current value is set to " 1000".



Pressing the [PRESET] button changes the setting and current value as shown below.

- **Presetting with preset disabled:**
  The setting is changed to "500". The setting can be changed via the normal calibration method.
- **Presetting with preset enabled:**
  Only the current value is changed to " 1000", and the setting is not changed.

Tip

Handy Uses for the Preset Function
This function is most useful when performing simple detection using a thrubeam model fiber unit (e.g. completely blocked detection, such as when all light axes of the fiber unit are interrupted by opaque workpieces).

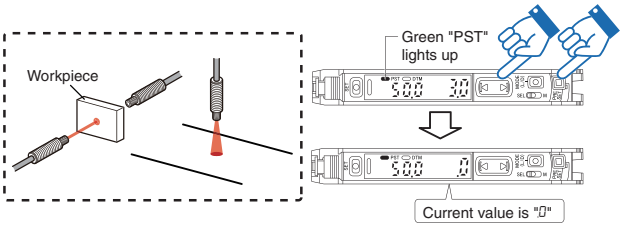
● Work-Preset Function

This function adjusts the current value to "0".
After executing the Preset function in a condition in which you would like " 1000" to be displayed, executing this function in a condition in which you would like "0" to be displayed, will adjust any two points to " 1000" and "0".

Point

The Work-Preset function can be used while the Preset function is in use (when Preset is enabled).

Pressing the [PRESET] button and the ( ) button at the same time will set the current value at that time to "0". Values that have been set to " 1000" with the Preset function cannot be changed.



Tip

When using this function with reflective models, " 1000" will be displayed when there is a workpiece, and "0" will be displayed when there is no workpiece, making it easy to know when the workpiece is present or absent. Additionally, even when with a reflective model, the background has higher light intensity than the workpiece, if you set a condition with low light intensity to " 1000" using the Preset function and then using the Work-Preset function, register a condition with high light intensity as "0", the background will display as "0" and when the workpiece is present, it will be displayed as " 1000".

● At times like this

- **Mobile object moves fast**
  → Full automatic preset

See “FS-N10 Series User’s Manual” for details.

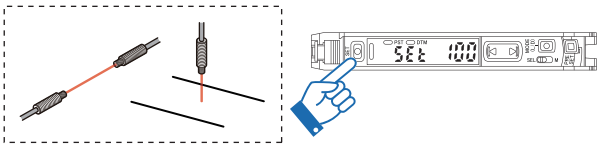
■ Calibration

Sensitivity can be adjusted by a simple operation. This function does not correct the received light intensity.
This function is applied for using the received light intensity without correction or for high-precision detection.
Calibration is also available in a preset state.

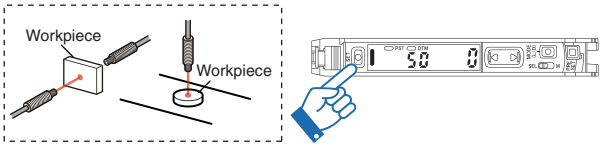
● Two-point Calibration

Two-point calibration is the basic method of calibration.
Press the [SET] button once without the workpiece, and then press it once again with the workpiece.

1 **Press the [SET] button with no workpiece.**
[SET] will be displayed on the sub-menu (green display).



2 **Press the [SET] button with workpiece.**
The values will be set and the submenu (green display) will flash. The values will be set to the mid-point between the light intensity when there is no workpiece, and the light intensity when there is a workpiece.



If "----" flashes for two seconds on the main screen, the light intensity is too small between conditions when the workpiece is absent and when it is present. These values will be set, but there is the possibility that detection may become unstable.

● At times like this

- **Mobile body moves fast**
  → Full automatic calibration
- **Using the unit in the environment that tends to get dirty easily.**
  → Maximum sensitivity calibration
- **Using the unit for positioning**
  → Positioning calibration
- **Using the unit for high-precision detection**
  → Percentage calibration

See “FS-N10 Series User’s Manual” for details.

Convenient Functions

■ Adjusting the current intensity value when it is too large (when saturated).

● Use the Saturation Recovery Function

Press the [SET] button while pressing the [MODE] button.
After adjusting the light transmission level and light intensity sensitivity, the current values will be adjusted to within the ranges listed in the table that follows.

Power mode	Light intensity setting range
HSP*, FINE, TURBO	2047 ±350
SUPER	4095 ±500
ULTRA, MEGA	5000 ±600

* HIGH SPEED

● Disable Saturation Recovery

When the saturation recovery function is enabled, press the [SET] button while pressing the [MODE] button to cancel it.

Tip

Handy Uses for the Saturation Recovery Function
This function is useful when the intensity value is saturated after installation. This function corrects the saturation via a simple operation, by automatically calibrating the light transmission level and light intensity gain.

■ Maximizing the power

● MEGA Mode Lock

The sensor amplifier can be locked in MEGA mode, such that it always operates in MEGA mode regardless of the power mode selected in the basic setup.

Slide the power select switch to the "M" side.

Sliding the power select switch SEL M back to the "SEL" side restores the power mode that was set before sliding the power select switch to MEGA mode.

■ Disabling key operations

● Activating key lock

Press and hold the [MODE] button and (or) simultaneously for 3 seconds or more.
The screen displays "Loc", disabling key operation and displaying the current received light intensity.

● Deactivating key lock

Press and hold the [MODE] button and (or) simultaneously for 3 seconds or more.
The screen displays "unL", enabling key operation.

The key operations can be locked with PIN number.
See “FS-N10 Series User’s Manual” for details.

■ Set Current Value to "0"

● The Zero Shift Function

See “FS-N10 Series User’s Manual”.

Initializing the Settings

■ Initialization Method

1 **Press and hold the [SET] and [PRESET] buttons simultaneously for three seconds.**

2 **Use the ◁▷ to select "rSt", then press the [MODE] button.**

3 **Use the ◁▷ to select " in it", then press the [MODE] button.**
After initialization is complete, the display returns to the current value.

● Initial Settings

Setting	Initial Value
Power mode	FINE
Detection mode	Std (Normal)
Setting value	50
Output switch	L-on

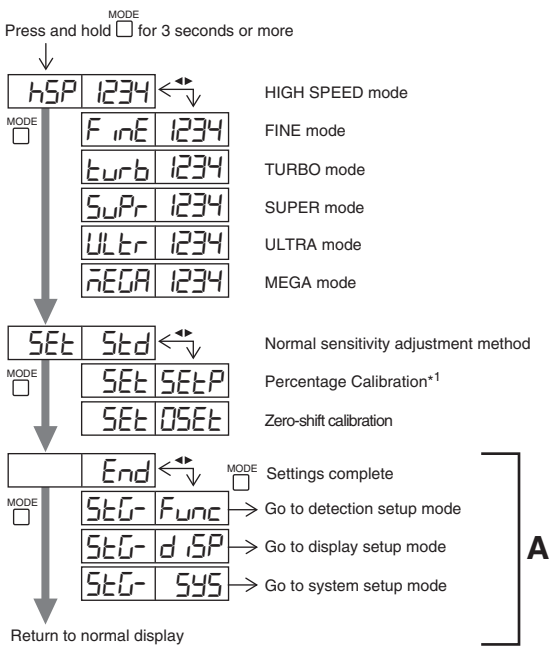
Error Displays and Corrective Actions

Error display	Cause	Solution
ErC	Overcurrent in the control output.	Check the load and return the current within the rated value.
ErE	Failed to write/load the internal data.	Perform initialization (p. 3).
Loc	The keylock function is ON.	For disabling (setting) method, see p. 2.

Consult your nearest KEYENCE office regarding error displays other than the ones listed above.

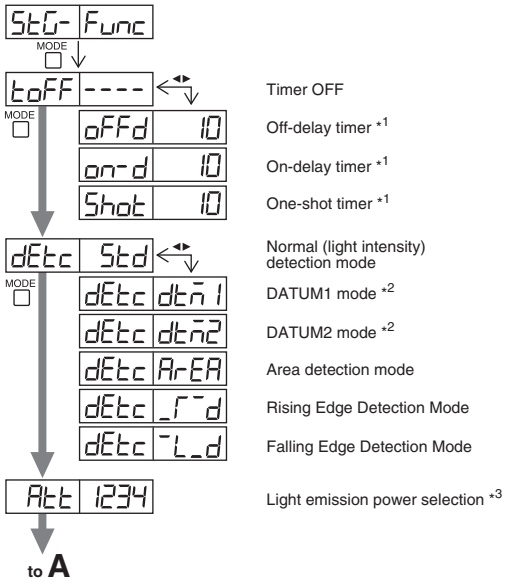
Function Configuration

■ Basic Setting



*1 You can press the MODE button to set between the range of -99P to 99P.

■ Detection Settings

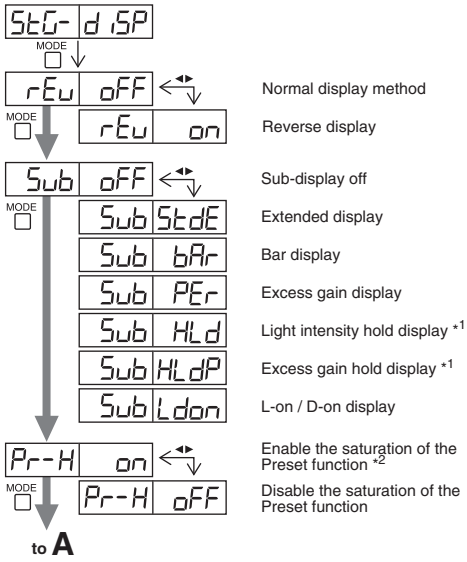


*1 Press the MODE button to set between the range of 1 and 9999 (ms).

*2 Press the MODE button to set the retouch sensitivity to a range of between LEv1 and LEv3 and set the warning output level to a range of between 0P and 100P.

*3 Can be set between the range of 1 and 100.

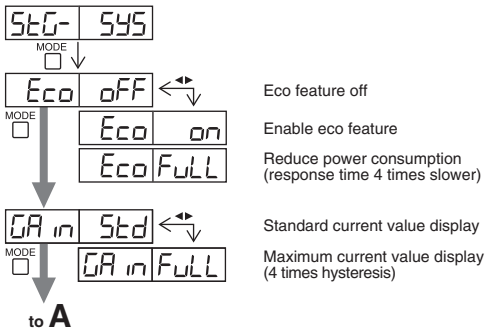
■ Display Settings



*1 Press the MODE button to toggle between Std/P-P_/b-b_/P_b-/P-b_

*2 Press the MODE button to set between the range of 100P and 200P.

■ System Settings



* There's no Custom Save function in the FS-N18N.

Using a Fiber Cutter and Cautions for Use

■ Using a Fiber Cutter

1 **Insert the fiber into the cutter hole.**

2 **Bring down the blade in a single, swift motion to cut the fiber.**
Always insert fiber from **the side with writing**.

■ Cautions for Using a Fiber Cutter

- The fiber cutter comes with the fiber unit.

Failure to follow the cautions below could reduce the detection range.

- When cutting a fiber unit to be attached to the FS-N18N, be sure to use a gray fiber cutter (OP-87098).
- Stopping the blade midway could cause a bad cut plane, reducing the detection range.
- Do not use the same hole twice.

Specifications

Type		Standard 1 output
Input/Output configuration		Cable
Main unit/expansion unit		Main unit (expansion not possible)
Model		FS-N18N
Number of Input/output	Control output	1 output
	Monitor output (1 to 5 V)	–
	External input	–
Light source LED		Red 4-element LED (wavelength 630 nm)
Response time		50 µs (HIGH SPEED)/250 µs (FINE)/500 µs (TURBO) /1 ms (SUPER)/4 ms (ULTRA)/16 ms (MEGA)
Output toggle		Light-ON/dark-ON toggle
Timer function		Timer OFF, OFF delay, ON delay, One-shot
Output specifications		NPN open collector 24 V or less, Allowable current 100 mA or less, Residual voltage 1 V or less
Expansion Units		Not connected
Protection circuit		Protection against reverse power connection, output overcurrent, and output surge
Number of interference prevention units		0 units (Interference prevention functions not supported)
Rating	Power voltage	12 to 24 V DC ±10% ripple (P-P) 10% or less
	Power consumption	Normal: 630 mW or less (26 mA max. at 24 V, 34 mA max. at 12 V)*1 Eco on (All) mode: 560 mW or less (23 mA max. at 24 V, 28 mA max. at 12 V)*1 Eco Full mode: 380 mW or less (15 mA max. at 24 V, 19 mA max. at 12 V)
Environmental resistance	Operating ambient luminance	Incandescent lamp: 20,000 lx or less, Sunlight: 30,000 lx or less
	Operating ambient temperature	-20 to +55 °C (no freezing)*2
	Operating ambient humidity	35 to 85% RH (no condensation)
	Vibration resistance	10 to 55 Hz Compound amplitude 1.5 mm, 2 hours for each of X,Y,Z axis
	Shock resistance	500 m/s^2 3 times for each of X,Y,Z axis
Case material		Both main unit and expansion unit housing material: Polycarbonate
Case dimensions		H 30.3 mm x W 9.8 mm x L 71.8 mm
Weight		Approx 75 g

*1 Increases 100 mW (4.0 mA) for High Speed mode

*2 1 or 2 more units closely attached: -20 to +55°C,
3 to 10 more units closely attached: -20 to +50°C,
11 to 16 more units closely attached: -20 to +45°C.
All temperature regulations are for when the unit is mounted on a DIN rail and installed on metal sheeting.

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