

UNIVERSAL OPACITY MONITOR



RELIABLE, CONTINUOUS INDICATION OF
CONFINED PARTICULATES SUCH AS DUST OR SMOKE

STANDARD FEATURES

- Easy to align and install
- Modbus communications
- 4-20 mA dc output signal
- Adjustable alarm trip point time delay
- Per cent opacity calibration
- NYC DEP approved

APPLICATION

The Series A-08740-A0 Opacity Monitor includes an electronics unit with two breeching components, a light source and a receiver. On the front of the electronics, the standard vacuum fluorescent display shows all operation and alarm messages. For models equipped with auxiliary functions (described below), additional necessary messages are also displayed. Buttons marked Enter, Inc, Dec, and Reset, located below the front display, provide interaction with the electronics. On standard models, three LED indicators for Clear, Smoke, and Alarm conditions are located below the buttons. For units equipped with auxiliary functions (described below), an additional LED indicator is included.

The wide-beam light source and narrow-view receiver are easy to install in the stack because they do not require precise alignment. The opacity monitor is easy to calibrate and requires no routine maintenance other than occasional cleaning of the sight glass.



Stack units, left to right:
P/N 31180 Light Source
P/N 31181 Receiver

OPERATION

The light source directs a beam through the measured particulate, and the light sensor receives the beam, detects changes in opacity, and sends a proportional signal to the electronics unit. The electronics produces a digital readout of percent opacity and a 4-20 mA dc output signal suitable for recording, display, or indication. SPDT contacts are provided for remote alarm or control functions. A contact closure is provided for a remote alarm available separately, Cleveland Controls Model L- 05500-00.

The operator can select manual or automatic alarm reset. Modbus communications for interface with a SCADA system or other controls is standard. A standard serial printer port is provided. The electronics unit is available in open-mount, surface-mount, and flush-mount formats. It can be installed in any dry, convenient area within 250 feet of the light source and receiver units.

AUXILIARY FUNCTIONS

The **Burner Cutoff** auxiliary function is a delayed de-energization timer that shuts the burner down if an alarm condition (opacity exceeding 20%) persists for 120 seconds. The timer can be manually reset only after reduction of opacity: it cannot be reset when opacity is above 20%. (This feature meets the requirements of the **NYC** air pollution control code for alarm and burner control functions).

For units equipped with the burner cutoff module, the vacuum fluorescent display shows Clear, Smoke, Alarm, and Burner Off messages in addition to the standard messages. An additional red LED indicator for "Burner Off" is included, and an audible alarm with adjustable trip point and delay is mounted adjacent to the display.

The **Overfire Air Timer** auxiliary function is a delayed de-energization timer that provides relay contacts for the

control of smoke-reduction air in coal-fired installations. Whenever opacity exceeds the alarm trip point, the relay is energized. It remains energized as long as the alarm condition persists. After the alarm condition is corrected, the relay remains energized for an adjustable period up to five minutes.

For units equipped with the overfire air timer module, the vacuum fluorescent display shows Clear, Smoke, Alarm, and Overfire Air messages in addition to the standard messages. An additional red LED indicator for "Overfire Air" is included,

P/N 31726 Purge Air Blower Kit for positive pressure flue gas systems. Sight glass lenses at the ends of the traverse pipe can become cloudy due to water from the flue gas condensing on the lenses when the flue gas pressure exceeds ambient air pressure, resulting in false opacity alarms. The lenses can be purged with instrument air (not plant air) if sufficient volume is available, but usually it is not. The Purge Air Blower Kit provides a single blower, wired to run whenever the burner is running, that prevents condensation on the lenses using ambient air at low pressure (not compressed). It can be connected to fittings near the lenses. It operates with 120/230 V ac. The complete kit includes the blower with air inlet filter, four fittings, and two 6-ft lengths of 1-inch liquid-tight flexible conduit for tubing connections to the traverse pipe near the light source and receiver lens. Order separately.



SPECIFICATIONS

Power requirements: 120 V ac $\pm$ 10%, 50/60 Hz.

Ambient temperature ranges:

32–130 °F (0–54 °C) for electronics unit
32–160 °F (0–70 °C) for light source and receiver modules)

Fuse: One, @ 1 Amp.

Measurement range: 0 to 100% opacity

Retransmit output range:

4–20 mA dc, 750 Ω maximum load. Directly proportional to measurement range, where 4 mA = 0% and 20 mA = 100%. Output is grounded (not isolated).

Resolution:

Digital meter reads 0–100% opacity with 1% resolution.

Response time:

1 second for 90% of actual change in opacity.

Accuracy:

$\pm$ 5% opacity under all specified operating conditions.

Light source to receiver distance:

minimum 4 ft. (1.20 m), to maximum 15 ft. (4.57 m).

Light source lamp life: 1 year minimum.

Spectral response of photocell: 350–1100 nM.

Cable length: 250 ft. (76 m) maximum.

Indicators:

Green: "Clear" LED.

Yellow: "Smoke" LED and flashing display.

Red: "Alarm" LED and flashing display.

Red: "Burner Off" LED and flashing display (on NYC Burner Cutoff Timer models only).

Red: "Overfire Air" LED and flashing display (on Overfire Air Timer models only).

Alarm timer: adjustable 0–300 second delay.

Alarm trip point: adjustable 0–99% opacity.

Alarm reset: automatic; field-convertible to manual.

Alarm contacts: isolated SPDT, 10 Amp., 120 V ac resistive, fail safe.

Purge delay timer:
adjustable 1–600 second delay

NYC Burner Cutoff (optional):
fixed 20% trip point and fixed 2-minute (120-second) delay.

NYC Burner Cutoff contacts:
isolated SPDT, 10 Amp, 120 V ac resistive, fail safe.

Overfire air timer (optional):
maintains contact closure after smoke abatement for a period adjustable from 1–300 seconds.

Overfire air contacts: isolated SPDT, 10 Amp., 120 V ac resistive, fail safe.

Housing for enclosed models: NEMA 1.

Relative Humidity: 0–90%, non-condensing.

Modbus Communication: RTU. 9600 or 19200 Baud rate. N/8/1 (no parity, 8 data bits, 1 stop bit).

Printer port:

RS232 serial port, DB9-M connector, 9600 baud, N81 (no parity, 8 data bits, 1 stop bit). Output adjustable, generated every 0–60 minutes, where 0 = disabled.

Output format: 5 sequence #, blank space, 3 digit opacity, "%" symbol, carriage return, line feed.

Example: 01234 011% c/r l/f

Shipping Weight:

Varies with options; these are typical:
Electronics units in enclosures: 7.5–8.5 lbs.
Open-mounted electronics units: 6.5–8.0 lbs.
Light source and receiver, combined, 9 lbs.

Approvals: NYC DEP. UL & CUL pending.

SPECIFICATIONS ARE SUBJECT TO CHANGE.



HOW TO ORDER

The basic catalog number is shown below. Replace suffixes A and B with selections from the table.

A-08740-A0 -A-B

Universal Opacity Monitor

A: Auxiliary Application Functions0. None.

1. **Burner Cutoff Timer** with audible alarm on front of electronics and "Burner Off" LED. NYC DEP approved.

2. **Overfire Air Timer** with "Overfire Air" LED (for stoker applications).

B: Housing

0. Open-mounted (for OEM applications).

1. Surface-mount, NEMA 1 (for wall-mounting).

2. Semi-flush mount, NEMA 1 (for panel-mounting).

All standard models include light source and receiver units.

Model A-08740-A0 Universal Opacity Monitor replaces all obsolete A-08710 through A-08730 models.

