

Stationary Equipment Emissions Analyzer (SEEA)



KEY FEATURES:

- Automatically Records O₂, CO, NO_x, & SO₂* Emission Levels
- Designed For Use With Stationary Combustion Systems
- Flexible Set-up and Output programming
- Designed For Unattended Operation
- Each SEEA will Monitor up to 4 Stacks

Product Description

The Stationary Equipment Emissions Analyzer (SEEA) is designed to monitor the exhaust gases of up to 4 stationary combustion systems, such as compressor & pump engines, generator sets, & industrial boilers.

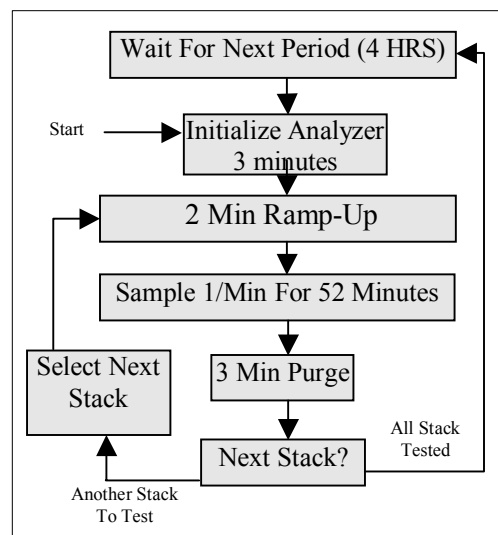
This system monitors and records the O₂, CO, NO_x and SO₂* (*optional) levels present in the exhaust at user defined frequencies. All data gathered are stored in a common spreadsheet format for later review & archiving, or transmitted real time via 4-20mA, RS232/RS485, or MODBUS.

The analyzer system is designed to operate unattended and requires minimal periodic maintenance and calibration. The frequency of calibration is determined by the operating conditions. The system consists of a wall mounted analyzer housing and communication control PC. Simple programming software is included with the system. The analyzer housing is intended to be mounted in a protected space in close proximity to the combustion systems being monitored. Sample lines are routed from the exhaust stack to sample connections located on the top of the analyzer housing. The SEEA system is powered by 120VAC 60Hz.



Automatic Testing Sequence

In the illustration to the right, the system samples the exhaust from the first stack 52 minutes per hour. At the start of the sample cycle, the SEEA initializes, selects the first stack, and begins drawing the exhaust gas into the analyzer. After a ramp up period of 2 minutes, data collection begins at a rate of one sample per minute for a period of 52 minutes. All emissions data is time stamped, with specific stack identification and location information stored for later review. The system then performs an automatic purge. If a 2nd, 3rd, or 4th stack is present, the next one is selected and the above procedure is repeated. After completion of all test cycles, the SEEA goes to stand-by mode, if designated, or repeats the test cycle on the first stack again. Specific measurement and cycle times are user programmable. Additionally, system inputs allow for “event driven” testing, where test cycles can be initiated by user defined equipment conditions.



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PRODUCT SPECIFICATIONS:

Analytical Measurement Specs.

MEASUREMENT	RANGE	ACCURACY**	RESOLUTION
Oxygen (O)	0-21% vol.	± 2% Reading	0.1%
Carbon Monoxide (C)	0-4,000 ppm	± 2% Reading	1 ppm
Carbon Monoxide (V)*	4000-40,000 ppm	± 2% Reading	5 ppm
Standard NOx Ranges			
Nitric Oxide (N)	0-4,000 ppm	± 2% Reading	1 ppm
Nitrogen Dioxide (X)	0-500 ppm	± 2% Reading	1 ppm
LOW NOx Ranges			
Nitric Oxide (.N)	0-300.0 ppm	± 2% Reading	0.1 ppm
Nitrogen Dioxide (.X)	0-50.0 ppm	± 2% Reading	0.1 ppm
Sulfur Dioxide (S)*	0-5000 ppm	± 2% Reading	1 ppm

*optional

CALCULATED PARAMETERS

Carbon Dioxide (CO ₂)	0-20%	± 3% Reading	0.1%
O ₂ Correction	0-20%		

**ACCURACY: When calibrated prior to use per ECOM America, Ltd. specifications. Frequency of calibration is determined by the operating permit.

Physical Specs

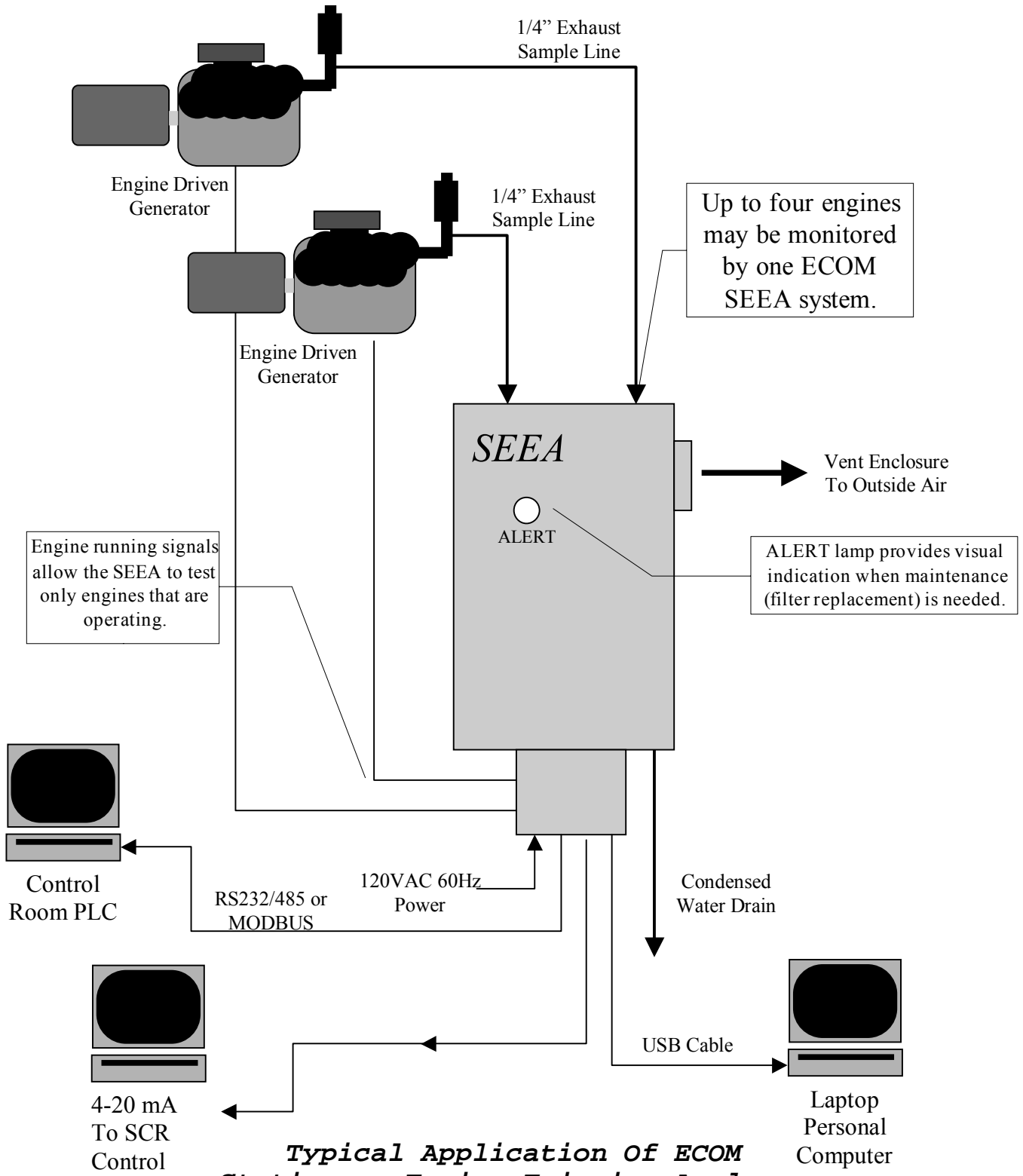
Enclosure Type:	Wall Mount NEMA 12
Enclosure Size:	20" x 20" x 10"
Weight:	100lbs
Environmental:	65°F - 95°F, 20% - 90% Non-Condensing
Sample Inlet(s):	One 1/4" tubing connection for each sample inlet. Maximum of 4 per unit. Flow Rate of sample = 2.5 liters per minute.
Condensate Drain:	One 1/4" tubing connection located at the bottom of the enclosure
Enclosure Vent:	Enclosure gas discharge (3" PVC Pipe Fitting) to be routed to outside air
Power:	120VAC 60Hz, 200W max. Analyzer contains 12V sealed lead-acid battery.
Communications:	USB (local) up to 15 feet. Output Options: 4-20mA outputs, RS232/RS485, or MODBUS.
Electrical Conn.:	A dedicated junction box with conduit knockouts and customer connection terminal strip is provided at the bottom of the analyzer enclosure.

Consumables:

Water Trap / Particulate Filters, NOx / SO2 Filter Media, Calibration Gas

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Stationary Equipment Emissions Analyzer (SEEA example set-up)



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Installation

Installation Planning

Refer to the installation drawing on the following page for detailed dimensions and component locations.

When planning the installation of the SEEA, the designer should keep in mind that the instrument must be located in a climate controlled environment. A location should be found on a wall inside a climate controlled building that is free of vibration and physically as close to the engine(s) as possible (less than 100' from the engine). The wall chosen must be capable of supporting the 100 lb weight of the instrument. The location chosen must allow sufficient space to mount the SEEA housing such that the sample inlet connections are oriented up and the electrical junction box is oriented down. The SEEA housing must be located in such a way as to allow for the flat or continuously sloped run of the sample line tubing from the engine exhaust sample connection to the inlet connection on the top of the SEEA housing. Provision must be made during installation planning for the enclosure vent to be routed to an outside location through sealed 3" PVC pipe or other suitable duct.

The SEEA instrument has an electrical junction box located at the bottom of the housing specially for the connection of all electrical conduits related to this device. The designer should only plan to connect electrical conduits to this junction box since there are no customer connections inside the main enclosure of the SEEA and since punching, drilling or cutting any holes in the SEEA's main enclosure voids any and all product warranties.

Installation Requirements

1. The SEEA housing must be installed indoors in a climate controlled environment in which the temperature is maintained between 65 °F and 95 °F and the relative humidity is between 20% and 90%, non-condensing.
2. The SEEA housing must be permanently installed on a wall in a vertical position.
3. The SEEA housing must be installed in a location that is free from vibration.
4. The engine exhaust sample lines must be 1/4" or larger and must be routed such that the sample line route is flat or slopes continuously from the exhaust sample connection to the inlet connection on the SEEA housing. There must be no "dips" or "humps" in the run that can lead to trapping of condensed water in the sample line. The maximum length total length for a sample line is 100'.
5. The SEEA housing vent must be routed to a outside location with 3" sealed PVC pipe or other suitable ducting. The end of this vent line must be directed downward to avoid catching rainwater and must be covered with a wire mesh screen to block the entrance of insects and animals.
6. The Condensate Drain connection located on the bottom of the SEEA housing must be routed to a collection container to capture the water condensed from the sampled exhaust gas.
7. All electrical conduit connections must be made only in the junction box located at the bottom of the SEEA housing using the knockout positions already provided. There are no customer connections for the SEEA inside the main enclosure and no holes may be made in the main enclosure for any purpose.
8. The 120VAC power terminals are sized to accept 12 Ga copper wire. The remaining electrical connections are sized to accept copper wire between 30 Ga and 16 Ga.

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Remote Control Connections

The SEEA may be equipped with four (4) 4-20mA process signal transmitters to transmit individual gas concentrations. Each 4-20mA output may be individually configured to transmit the measured concentration of any of the gases monitored by the SEEA using a personal computer connected to the instrument's USB port. The 4-20mA process signal transmitters are loop powered and capable of controlling a process loop with up to 750 OHMs total resistance, assuming a 24VDC loop supply. The SEEA provides a 24VDC loop supply to power loops not driven by the receiver.

SEEA units equipped with 4-20mA outputs also include a SPDT contact output for each sample inlet to indicate when the corresponding inlet is being sampled. These status contact outputs are rated for 1A at 24VDC.

All SEEA units include an ALERT SPDT relay output that provides a simple OK/PROBLEM status indication for a remotely located monitor. This relay is energized when the SEEA is operating normally and de-energized when any manner of error or malfunction occurs.

All SEEA units also include an ENABLE contact input for each sample inlet. The ENABLE input allows the operator to only enable sampling on inlets whose associated equipment is in operation. An ENABLE input is activated by closing a contact between the desired channels +ENABLE CONTACT INPUT and ENABLE CONTACT INPUT RETURN terminals. Each ENABLE input is internally wetted from the 24VDC LOOP SUPPLY through a 2400 OHM resistor and each ENABLE CONTACT INPUT RETURN signal is internally connected to the 24VDC LOOP SUPPLY RETURN signal.

The electrical connections in the SEEA Junction Box are as follows:

- | | |
|---|---|
| 1) 120VAC 60Hz HOT | 22) CHANNEL 3 -mA OUT |
| 2) 120VAC 60Hz NEUTRAL | 23) CHANNEL 3 +ENABLE CONTACT INPUT |
| 3) 120VAC 60Hz GROUND | 24) CHANNEL 3 ENABLE CONTACT INPUT RETURN |
| 4) ALERT RELAY NO | 25) CHANNEL 3 ACTIVE RELAY NO |
| 5) ALERT RELAY COMMON | 26) CHANNEL 3 ACTIVE RELAY COMMON |
| 6) ALERT RELAY NC | 27) CHANNEL 3 ACTIVE RELAY NC |
| 7) CHANNEL 1 +mA OUT | 28) CHANNEL 4 +mA OUT |
| 8) CHANNEL 1 -mA OUT | 29) CHANNEL 4 -mA OUT |
| 9) CHANNEL 1 +ENABLE CONTACT INPUT | 30) CHANNEL 4 +ENABLE CONTACT INPUT |
| 10) CHANNEL 1 ENABLE CONTACT INPUT RETURN | 31) CHANNEL 4 ENABLE CONTACT INPUT RETURN |
| 11) CHANNEL 1 ACTIVE RELAY NO | 32) CHANNEL 4 ACTIVE RELAY NO |
| 12) CHANNEL 1 ACTIVE RELAY COMMON | 33) CHANNEL 4 ACTIVE RELAY COMMON |
| 13) CHANNEL 1 ACTIVE RELAY NC | 34) CHANNEL 4 ACTIVE RELAY NC |
| 14) CHANNEL 2 +mA OUT | 35) +24VDC LOOP SUPPLY |
| 15) CHANNEL 2 -mA OUT | 36) +24VDC LOOP SUPPLY |
| 16) CHANNEL 2 +ENABLE CONTACT INPUT | 37) +24VDC LOOP SUPPLY |
| 17) CHANNEL 2 ENABLE CONTACT INPUT RETURN | 38) +24VDC LOOP SUPPLY |
| 18) CHANNEL 2 ACTIVE RELAY NO | 39) 24VDC LOOP SUPPLY RETURN |
| 19) CHANNEL 2 ACTIVE RELAY COMMON | 40) 24VDC LOOP SUPPLY RETURN |
| 20) CHANNEL 2 ACTIVE RELAY NC | 41) 24VDC LOOP SUPPLY RETURN |
| 21) CHANNEL 3 +mA OUT | 42) 24VDC LOOP SUPPLY RETURN |

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