

# Emerson Solutions to Petroleum Refinery Flare Regulations – 40 CFR Part 63

By January 30, 2019, 40 CFR Part 63 requires Petroleum Refinery owners or operators of flares used as control devices for emissions point to meet the requirements of §63.670, regardless of the construction date of the flare. The regulation is part of the 1990 Clean Air Act that regulated emission standards for hazardous air pollutants (HAP) and is in addition to 40 CFR 60 Subpart Ja requirements. Emerson Rosemount has developed two standard solutions that are compliant with 40 CFR Part 63 using its Rosemount 1500XA gas chromatograph..

40 CFR Part 63 regulations require determining the concentration of individual components in the flare vent gas within 15 minutes or direct monitoring of the net heating value of the flare vent gas at standard conditions. Emerson Rosemount's 1500XA gas chromatograph offers the greatest flexibility in measuring, calculating, and recording the individual component concentrations present in the flare vent gas. Emerson is offering two standard 8-minute solutions using the Rosemount 1500XA with multiple thermal conductivity detectors (TCDs) to meet the requirements of 40 CFR Part 63 Subpart CC (Refinery MACT 1) and 40 CFR Part 63, Subpart UUU (Refinery MACT 2). Solution 1 looks at hydrocarbons, H<sub>2</sub>S, H<sub>2</sub>, CO and CO<sub>2</sub>. Solution 2 is identical to Solution 1 with the addition of Benzene detection. Custom solutions that measure, calculate and record operators' specific flare compositions are available.

## 40 CFR Part 63 Gas Chromatograph Requirements

40 CFR Part 63 requires gas chromatograph use to measure Net Heating Value meet Performance Specification 9 of 40 CFR Part 60 Appendix B accuracy requirements, perform single mid-level daily calibration check, and quarterly multi-point calibration. The Rosemount 1500XA accuracy rate is well within the specified relative error rate of less than 10%. Daily calibration checks can be run automatically through Emerson's exclusive MON2020 software



## Features

- No shelter required – significant overall total costs savings
- 100% chamber tested – guarantees the GC will work reliably and repeatedly over full temperature range of -18 °C to 55 °C (0 °F to 130 °F)
- Fully compatible with modern Ethernet networks and DCS communication
- Use of thermal conductivity detectors (TCD) with sensitivity down to very low parts-per-million levels – allows for simple, easy-to-maintain detectors rather than more complicated flame ionization detectors (FID) or flame photometric detectors (FPD)
- 2 clock allow 2 streams to run simultaneously

## Solution 1 - Hydrocarbons, H<sub>2</sub>S, H<sub>2</sub>, CO and CO<sub>2</sub> Detection

The Rosemount 1500XA measuring, calculating, and recording the individual component concentrations present in the flare vent gas in 8 minutes using three TCDs.

Stream components	Units	Measured range	
		Min.	Max.
Hydrogen Sulfide (H <sub>2</sub> S)	ppm	3	300 PPM
Nitrogen/Oxygen	Mole%	0	1
Carbon Monoxide	Mole%	0	1
Hydrogen	Mole%	0	40
Methane	Mole%	0	60
Ethane	Mole%	0	20
Ethylene	Mole%	0	20
Propane	Mole%	0	10
Propylene	Mole%	0	10
Isobutane	Mole%	0	10
n-Butane	Mole%	0	10
C4 Olefins	Mole%	0	10
Isopentane	Mole%	} C5+ = 0 - 10	
n-Pentane	Mole%		
CO <sub>2</sub>	Mole%	0	1
BTU / LB		0	500
Water	Mole%		

## Solution 2 - Hydrocarbons, H<sub>2</sub>S, H<sub>2</sub>, CO, CO<sub>2</sub> and Benzene Detection

The Rosemount 1500XA measuring, calculating, and recording the individual component concentrations present in the flare vent gas in 8 minutes using four TCDs.

Stream components	Units	Measured range	
		Min.	Max.
Hydrogen Sulfide (H <sub>2</sub> S)	ppm	3	300 PPM
Nitrogen/Oxygen	Mole%	0	1
Carbon Monoxide	Mole%	0	1
Hydrogen	Mole%	0	40
Methane	Mole%	0	60
Ethane	Mole%	0	20
Ethylene	Mole%	0	20
Propane	Mole%	0	10
Propylene	Mole%	0	10
Isobutane	Mole%	0	10
n-Butane	Mole%	0	10
C4 Olefins	Mole%	0	10
Isopentane	Mole%	} C5+ = 0 - 10	
n-Pentane	Mole%		
CO <sub>2</sub>	Mole%	0	1
Benzene	Mole %	0	5
BTU / LB		0	500
Water	Mole%		

## Construction

**Environment:** -18° to 55 °C (0° to 130 °F) for TCD/FID

**Dimensions (without sample system):**

198 cm H x 61 cm W x 61 cm D (70" H x 24" W x 24" D)

**Mounting:** Wall-mount (standard); free-standing (optional)

**Approximate Weight (without sample system):**

Approximately 68 kg. (150 lbs.)

**Area Safety Certification Options:**

Class 1 Div. 2, Groups B, C, D with Z-Purge

**Instrument Air:** 4 SCFM at 70 psig of oil-free instrument air for purge and oven heat

## Performance Capabilities

**Oven:** Air bath oven, maximum 150 °C (300 °F)

**Valves:** six-port and ten-port XA diaphragm chromatograph valves

**Carrier Gas:** Argon, Helium, 90–120 psig

**Sample Input Pressure Range (recommended):** 15–20 psig

**Carrier Gas Input Pressure Range (recommended):** 90–100 psig

**Columns:** micro-packed

**Detector:** Thermal conductivity detector (TCD)

## Electronics

**Power:** 115 VAC ±15 %, 220 VAC ±15 %, 50/60 HZ 400 watts running, 1100 watts start-up

## Standard Communications

**Analog Inputs:** Two standard inputs filtered with transient

**Analog Outputs:** Six isolated outputs, 4–20 mA

**Serial Communication Ports:** Three termination blocks, configurable as RS-232, RS-422 or RS-485 and one D-sub (9-pin) port for PC connection

**Digital Inputs:** Five inputs, user assignable, optically isolated, rated to 30 VDC @ 0.5 A

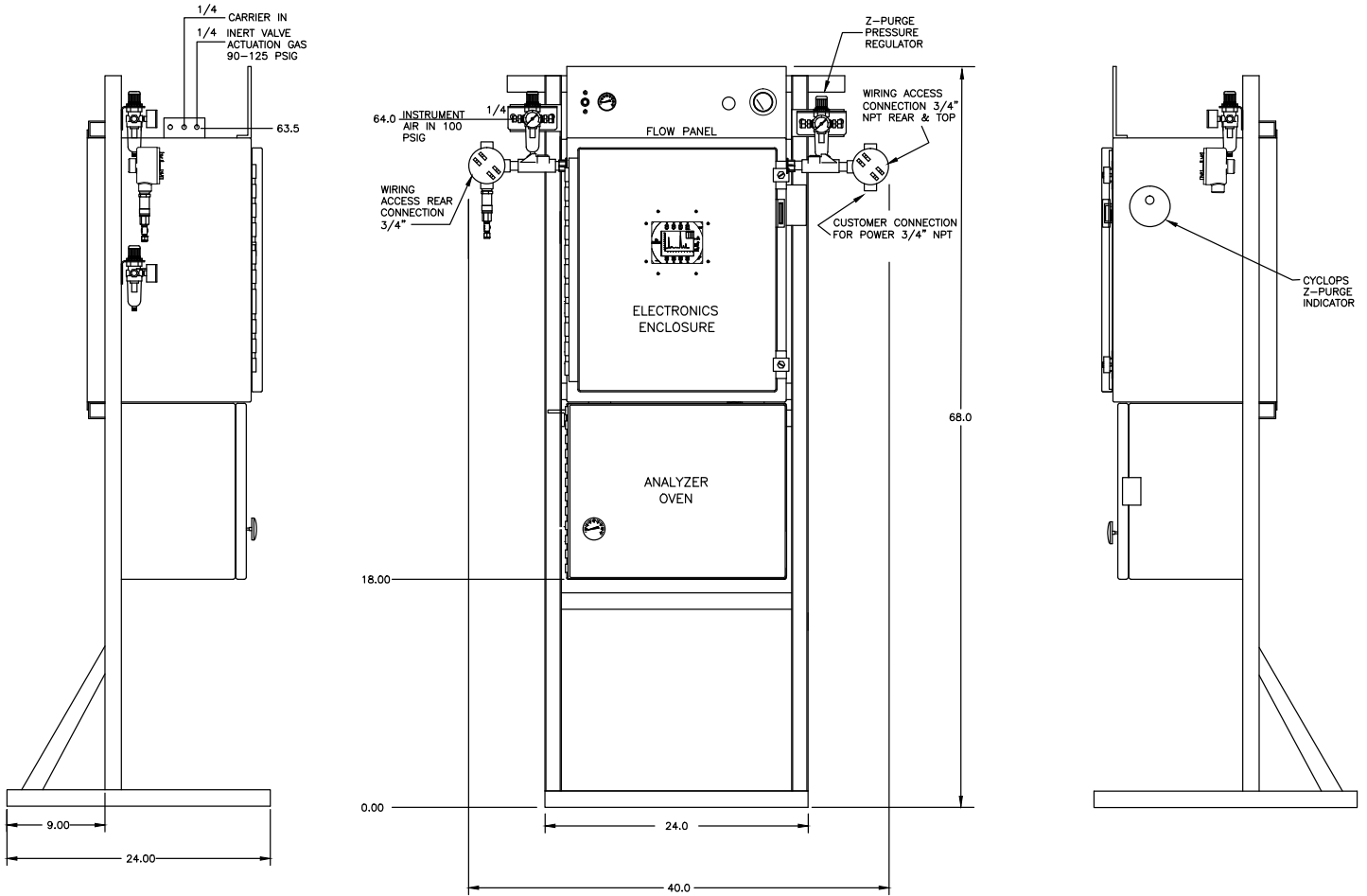
**Digital Outputs:** Five user-assignable outputs, Form C and electro-mechanically isolated, 24V DC

**Ethernet:** Two available connections – one RJ-45 port and one four-wire termination – with 10/100 Mbps






## Optional Communications

Four expansion slots available for additional communications. Each slot has the capacity to add one of the following:

- Four analog inputs (isolated) card
- Four analog outputs (isolated) card
- Eight digital inputs (isolated) card
- Five digital outputs (isolated) card
- One RS-232, RS-422, or RS-485 serial connection card (max of two cards)



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