



TELEDYNE MONITOR LABS
Everywhere you look™

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ML® 675 Continuous Emission Monitoring System

THEORY OF OPERATION

The ML®675 or 675® Open Architecture (OA) is a pre-engineered Continuous Emissions Monitoring System (CEMS) designed for use in EPA 40 CFR Part 60 and Part 75 compliance applications and for process control. This dilution based system can be configured to accurately measure SO₂, NO_x, CO, CO₂, and /or O₂ on a wet basis.

Both configurations of the ML®675 CEMS consist of a heated probe, heated sample umbilical, single bay cabinet, analyzers, control equipment, and a dilution air cleanup package. The Open Architecture version has the dilution air cleanup package mounted on a wall instead of the cabinet.

Using dilution extractive principles, pressurized dilution-air is used as the motive force to provide suction that mixes a small amount of stack gas into the same dilution air stream. This creates a diluted sample which returns under positive pressure to the analyzers for analysis. A precision mass flow meter is used to determine an accurate, real time dilution ratio. Since no moisture is actually removed from the original sample, measurements are made on a wet basis.

A programmable logic controller (PLC) performs all automatic sequencing of the sample cycle, daily calibration cycle, and backpurge cycle. During calibration mode, zero and span gases are injected into the probe head to comply with EPA calibration requirements. Backpurge air is delivered to the probe on a periodic basis to clean the heated probe filter, providing months of continued operation without maintenance.

In addition, the PLC has the ability to log fuel flows and provide the required analog outputs in units of diluent corrected ppm concentrations (ppmc), Lbs/MBTU, and Lbs/Hr. Standard relay outputs that signal system status and fault information are also generated from the PLC. A RegPerfect® Data Acquisition System (DAS) may be attached to the PLC via Ethernet to provide long term data collection, compliance report generation, remote control and diagnostic information.

The ML®675 is a self-contained system requiring single point attachment for power, instrument air, and calibration gases. All utility distributions are routed through the ML®675 internally. No duplication of utilities is required on the stack.

ML® 675 FEATURES

- EPA certifiable for all 40 CFR 60 and 40 CFR 75 applications.
- Well suited to generate reliable and accurate process control information. Typical applications include gas turbines, industrial sources, and power boilers.
- State of the art TML T-Series® analyzers are utilized for pollutant monitoring. This allows a single source for system as well as analyzer support.
- Automatic, local and remote initiation of any system sequence is available. This includes the ability to zero and span a single analyzer both through the entire sampling train or directly at the analyzer to diagnose sampling system anomalies.
- Minimal maintenance is required. Weekly manual calibrations, quarterly probe checks, and quarterly filter changes are typically all the system requires to achieve uptime of 95% or greater, and
- Self-diagnosing alarm package. The ML®675 will alarm the user for sample train heater failures, dilution air delivery problems, probe and analyzer faults. This system is smart enough to protect itself during a fatal fault condition ensuring no moisture can contaminate any analyzer.



MADE IN THE U.S.A.

SPECIFICATIONS

PROBE:

Standard 316L Stainless Steel or Hastelloy probe straw
 EPA approved lengths
 2 micron ceramic filter
 Heated head maintained above 350°F (176.7 °C)
 Components housed in a NEMA 4X enclosure

DILUTION SAMPLE LINE:

3/8" Teflon or 316 Stainless Steel sample tube
 Tubes for calibration and backpurge standard
 Frost free protection when required
 Fire retardant jacket

Air Cleanup Package:

Provides dilution air at -100°F dew point
 Free of CO₂, NO_x and SO₂
 Optional CO scrubber
 Supports up to two dilution systems with additional hardware
 Low instrument air alarm
 Ballast tank provided for mixing and pressure stabilization
 Precision mass flow meter for real time dilution ratio

CABINET VERSION:

Dual bay, 19" Rack Mount, NEMA 12 with fan ventilation
 Other NEMA ratings are available.
 Dimensions 80"H x 50"W x 40"D, Approx. 400lbs
 Front door with window, rear door, removable side panels
 Lifting lugs and/or castors can be provided

OPEN ARCHITECTURE VERSION:

Open rack with optional desk.
 Dimensions 80"H x 63"W x 30"D (w/out Desk 23" W), Approx. 300 lbs.
 Dilution Air Cleanup Package 60"H x 21"W x 13"D
 Approx. 60 lbs.

SYSTEM CONTROLLER:

GE or Allen Bradley PLC, C3io provides data buffering, digital inputs, digital outputs, analog inputs, analog outputs, and Ethernet communications. Optional HMI provided for manual system control.

GAS ANALYZERS:

Model Number T300, U, M, H for CO
 Model Number T200, M, H for NO_x
 Model Number T100, H for SO₂
 Model Number T360, M for CO₂
 An optional Zirconia Oxide sensor can be added to the probe

RANGES:

CO 0-100 to 0-10000ppm
 NO_x 0-50 to 0-5000ppm
 SO₂ 0-50 to 0-5000ppm
 O₂ 0-25%
 CO₂ 0-20%

RELATIVE ACCURACY:

± 20% of Reference Methods for 40 CFR 60
 ± 7.5% (better than ± 10.0%) of Reference Methods for 40 CFR 75

RESPONSE TIME:

Less than 90 seconds to 95% full scale from system inlet

CALIBRATION DRIFT:

Zero and Span
 ± 0.5% absolute for O₂/CO₂%
 ± 2.5% of full scale for NO_x, and SO₂ ppm
 ± 5.0% of full scale for CO ppm

REPEATABILITY: ± 1% of full scale

PROCESS: 80-1800°F, up to 35% moisture

AMBIENT: 65-80°F, 35% RH, no direct sunlight

SYSTEM UTILITIES: 40°F dew point instrument air, 80 psig minimum, 2 SCFM
 Per probe, 240Vac, single phase, 60 hertz, 50 amp power

VALUE ADDED OPTIONS:

- Regulatory Consultation
- LightHawk® 560 Opacity Monitor integration
- LaserHawk® 360 Particulate Monitor integration
- Ultraflow 150 Ultrasonic Stack Flow integration
- Automatic Linearity's
- RegPerfect® Data Acquisition System
- Training
- Installation supervision
- Startup
- EPA certification
- Maintenance Contracts

ML®675 Piping and Instrumentation Diagram

