APPENDICE D

Schede Tecniche degli Analizzatori Adottati nel Sistema di Monitoraggio Continuo delle Emissioni

Product Specifications

Model 42*i* $NO-NO_2-NO_X$ Analyzer

Chemiluminescent gas analyzer with enhanced communication capabilities for ambient air and source emissions monitoring

Key Features

- Ethernet connectivity for efficient remote access
- Enhanced user interface with one button programming and large display screen
- Flash memory for increased data storage and user downloadable software
- Enhanced electronics design optimizes product commonality
- Improved layout for easier accessibility to components

A change is in the air

The industry's new best-of-breed. Our customers told us exactly what they're looking for in a gas monitoring solution: reliability, simplicity, ease of use. The new *i*Series platform delivers on all counts - and then goes a step farther. The flagship product in Thermo's new *i*Series product line is the Model 42*i* $NO-NO_2-NO_X$ analyzer.

Using chemiluminescence technology, the Model 42*i* measures the amount of nitrogen oxides in the air from sub-ppb levels up to 100ppm.The Model 42*i* is a single Chamber, single photomultiplier tube design that cycles between the NO and NO_X modes.

The 42*i* has independent outputs for NO, NO_2, and Nox and each can be calibrated separately. Dual range and Auto range are standards features as well. If required, the instrument can be operated continuously in either the NO or NO_X modes allowing for response times of less than 5 seconds.

Temperature and pressure correction are standard features. User settable alarm levels for concentration and for a wide variety of internal diagnostics are available from an easy to follow menu structure.

This state-of-the-art gas analyzer offers features such as an ethernet port as well as flash memory for increased data storage.

Ethernet connectivity provides efficient remote access, allowing the user to down-load measurement information directly from the instrument without having to be on-site.

You can easily program soft-keys to allow you to jump directly to frequently accessed functions, menus or screens The larger interface screen can display up to five lines of measurement information.

Comprehensive Service Solutions

To maintain optimal product performance, you need immediate access to experts worldwide, as well as priority status when your air quality equipment needs repair or replacement. Thermo Electron offers comprehensive, flexible support solutions for all phases of the product lifecycle. Through predictable, fixed-cost pricing, Thermo services help protect the return on investment and total cost of ownership of your Thermo Electron air quality products.

Product Specifications

Preset Ranges	0-0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 50 and 100 ppm 0-0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 50, 100 and 150 mg/m^3
Custom Ranges	0-0.05 to 100 ppm 0-0.1 to 150 mg/m^3
Zero Noise	0.20 ppb RMS (60 second averaging time)
Lower Detectable Limit	0.40 ppb (60 second averaging time)
Zero Drift (24 hour)	< 0.40 ppb
Span Drift (24 hour)	+/-1% full scale
Response Time	40 seconds (10 second average time) 80 seconds (60 second average time) 300 seconds (300 second average time)
Precision	+/-0.4 ppb (500 ppb range)
Linearity	+/-1% full scale
Sample Flow Rate	0.6 liters/min.
Operating Temperature	15°C - 35°C
Power Requirements	100 vac, 115 vac, 220-240 vac +/-10% @ 300W
Size and Weight	16.75"(W) x 8.62"(H) x 23"(D), 55 lbs. (25 kg)
Outputs	Selectable Voltage, RS232/RS485, TCP/IP, 10 Status Relays, and Power Fail Indication (standard). 0-20 or 4-20 mA Isolated Current Outout (optional)
Inputs	16 Digital Inputs (standard), 8 0-10vdc Analog Inputs (optional)

Ordering Information

Model 42*i* NO-NO_2-NO_X Analyzer
Choose from the following configurations/options to customize your own Model 42*i*

Voltage options:
A = 120 Vac 50/60 Hz (standard)
B = 220 Vac 50/60 Hz
J = 100 Vac 50/60 Hz

Internal zero / span:
N = No zero / span assembly (standard)
Z = Internal zero span assembly
P = Internal permeation span source with zero/span assembly

Converter options:
M = Molybdenum (standard)
S = Stainless steel

Sample handling:
S = Standard plumbing (standard)
A = Ammonia scrubber

Ozone handling:
D = Drierite scrubber (standard)
P = Permeation dryer

Optional I/O:
A = None (standard)
C = I/O expansion board
(4-20mA outputs - 6 channels, 0-10v inputs - 8 channels)

Mounting Hardware:
A = Bench mounting (standard)
B = Ears & handles, EIA
C = Ears & handles, Retrofit

Your Order Code: 42*i* - __ __ __ __ __ __ __

Other options:
- Teflon particulate filter
- Ozone particulate filer
- Rack mounts
- Rear extender

ISO 9001

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Product Specifications

Model 48*i* CO Analyzer

Gas filter correlation gas analyzer with enhanced communication capabilities for ambient air and source emissions monitoring

Key Features

- Ethernet connectivity for efficient remote access
- Enhanced user interface with one button programming and large display screen
- Flash memory for increased data storage and user downloadable software
- Enhanced electronics design optimizes product commonality
- Improved layout for easier accessibility to components

A change is in the air

The industry's new best-of-breed. Our customers told us exactly what they're looking for in a gas monitoring solution: reliability, simplicity, ease of use. The new *i*Series platform delivers on all counts - and then goes a step farther.

A core product in Thermo's new *i*Series product line is the Model 48*i* CO analyzer.

Using gas filter correlation technology, the Model 48*i* measures the amount of carbon monoxide in the air. The Model 48*i* is based on the principle that carbon monoxide (CO) absorbs infrared radiation at a wavelength of 4.6 microns. Because infrared absorption is a nonlinear measurement technique, it is necessary for the instrument electronics to transform the basic analyzer signal into a linear output. The Model 48*i* uses an exact calibration curve to accurately linearize the instrument output over any range up to a concentration of 10,000ppm.

This state-of-the-art gas analyzer offers features such as an ethernet port as well as flash memory for increased data storage.

Ethernet connectivity provides efficient remote access, allowing the user to download measurement information directly from the instrument without having to be on-site.

You can easily program soft-keys to allow you to jump directly to frequently accessed functions, menus or screens The larger interface screen can display up to five lines of measurement information while primary screen remains visible.

Comprehensive Service Solutions

To maintain optimal product performance, you need immediate access to experts worldwide, as well as priority status when your air quality equipment needs repair or replacement. Thermo Electron offers comprehensive, flexible support solutions for all phases of the product lifecycle. Through predictable, fixed-cost pricing, Thermo services help protect the return on investment and total cost of ownership of your Thermo Electron air quality products.

Product Specifications

Preset Ranges	0-1, 2, 5, 10, 20, 50, 100, 200, 500, 1000, 2000, 5000 and 10000 ppm 0-1, 2, 5, 10, 20, 50, 100, 200, 500, 1000, 2000, 5000 and 10000 mg/m^3
Custom Ranges	0-1 to 10000 ppm 0-1 to 10000 mg/m^3
Zero Noise	0.02 ppm RMS (60 second averaging time)
Lower Detectable Limit	0.04 ppm
Zero Drift (24 hour)	< 0.1 ppm
Span Drift (24 hour)	+/-1% full scale
Response Time	60 seconds (30 second average time)
Precision	+/-0.1 ppm
Linearity	+/-1% full scale ≤ 1000 ppm +/-2.5% full scale > 1000 ppm
Sample Flow Rate	0.5-2 liters/min.
Operating Temperature	20^0C - 30^0C
Power Requirements	100 vac, 115 vac, 220-240 vac +/-10% @ 275W
Size and Weight	16.75"(W) x 8.62"(H) x 23"(D), 49 lbs. (22.2 kg)
Outputs	Selectable Voltage, RS232/RS485, TCP/IP, 10 Status Relays, and Power Fail Indication (standard). 0-20 or 4-20 mA Isolated Current Outout (optional)
Inputs	16 Digital Inputs (standard), 8 0-10vdc Analog Inputs (optional)

Ordering Information

Model 48*i* CO Analyzer

Choose from the following configurations/options to customize your own Model 48*i*

Voltage options:
A = 120 Vac 50/60 Hz
B = 220 Vac 50/60 Hz
J = 100 Vac 50/60 Hz

Internal zero /span:
N = No zero / span valve
A = No zero / span valve w/zero air scrubber
Z = Internal zero / span valves
C = Internal zero / span valves w/zero air scrubber

Filter Wheel Purge:
S = Standard plumbing (standard)
P = Filter wheel purge set-up

Optional I/O:
A = No optional I/O (standard)
C = 0-20, 4-20mA current output - 6 channels, 0-10v analog input - 8 channels

Mounting hardware:
A = Bench mounting (standard)
B = Ears & handles, EIA
C = Ears & handles, retrofit

Your Order Code: 48*i* - __ __ __ __ __

Other options:
- Teflon particulate filter
- Rack mounts
- Rear extender

ISO 9001

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The 1440D provides a rack or panel mounted measurement of one or two of the following gases: oxygen, carbon dioxide, carbon monoxide and methane.

- Excellent stability and performance
- Low maintenance - no chemical cells to replace or renew
- Variants suitable for flammable/toxic sample gases
- Rack mounting or bench-top configuration.
- Concentration and low flow alarms.

Specification

Gas Measured:	Oxygen	Methane	Carbon Dioxide	Carbon Monoxide
PERFORMANCE				
Technology:	Paramagnetic transducer	Infrared transducer	Infrared transducer	Infrared transducer
Range:	0 - 5, 10, 20, 25, 50, 100%[1]	0 - 5, 25, 50, 100%	0 - 0.25, 0.5, 1.0, 2.5, 5, 10, 25, 50, 100%	0 - 1, 2.5, 10, 25, 50%
Accuracy: (Intrinsic Error)	±0.1% O_2	±1% of full scale	±1% of full scale	±1% of full scale
Linearity:	±0.1% O_2	±1% of full scale	±1% of full scale	±1% of full scale
Repeatability:	±0.1% O_2	±1% of full scale	±1% of full scale	±1% of full scale
Response time (T_{90})	<10 seconds	<10 seconds	<10 seconds	<10 seconds
Zero Drift:	<±0.002% O_2/hour	2% of full scale/week	2% of full scale/week	2% of full scale/week
Span Drift:	<±0.002% O_2/hour	1% of reading/day	1% of reading/day	1% of reading/day
SIGNAL OUTPUTS				
Display:	3½ Digit LED			
Display Resolution:	0.1%			
Analogue Output:	One isolated 4-20mA output (maximum load impedance 600 ohms) and one non-isolated 0-1V output (typical output impedance 470 ohms) per transducer with full zero and span adjustment. The user may assign a second range to each output (Methane/Carbon Dioxide/Carbon Monoxide only, 80% of full scale).			
Alarms:	Two changeover relay contacts rated 1A/110VAC or 1A/28VDC non-inductive per measurement			
PHYSICAL				
Dimensions (W x D x H):	Single unit: 236 x 380 x 178mm (9 x 15 x 7"),		Double unit: 483 x 380 x 178mm (19 x 15 x 7")	
Weight:	Single unit: 5.5kg (12lb) typical,		Double unit: 12kg (26lb) typical	
Case Rating:	IP20 (IEC 529)			

[1] Two ranges are user selectable from those shown

Servomex

Power Supply

88 to 264VAC, 47 to 63Hz (45VA maximum)

Ambient Conditions

Temperature:
- Storage:
  - -20 to +70°C (-4 to +158°F)
- Operating:
  - 0 to 45°C (32 to 113°F)*

Relative Humidity:
- 0 to 90% non-condensing

Pressure:
- Oxygen measurement:
  - 80 to 110 kPaa (0.8 to 1.1bara)
- Carbon Dioxide/Carbon Monoxide/Methane:
  - 90 to 110 kPaa (0.9 to 1.1 bara)

* reduces in benchtop case to 0 to 40°C (32 to 104°F)

Warm up time:
- Typically 1 hour

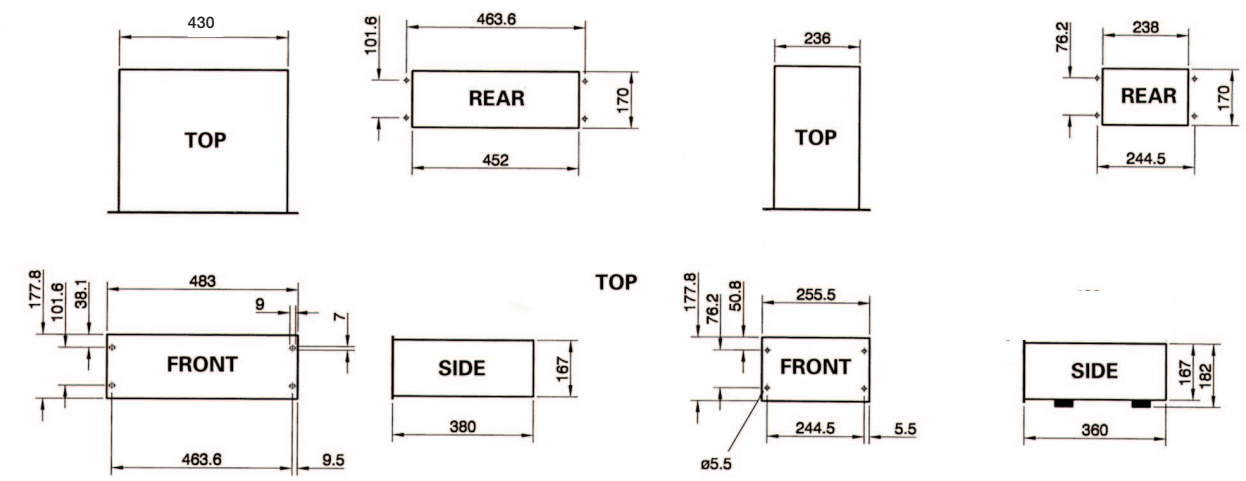
Sample Wetted Materials

Item	Materials
FTX analyser oxygen transducer	Stainless steel, Viton, borosolicate glass, platinum and nickel
FTX analyser methane/ carbon monoxide/ carbon dioxide transducer	Stainless steel, Viton, sapphire, epoxy resin
Additonal materials with STD analyser	Bonded glass fibre, nylon, neoprene, gold on silver, brass, monel, acetyle, polypropylene
Additonal materials with Back Pressure Regulator	Copper, PVC, PVDF, beryllium copper

Sample Gas Conditions

	Standard Analyser (STD)	Standard Analyser with back pressure regulator	Flammable/Toxic sample Analyser (FTX)
Inlet/Outlet Connections	6.4mm (1/4") OD tube DO NOT RESTRICT ANALYSER VENT		3.2mm (1/8") OD tube DO NOT RESTRICT ANALYSER VENT
Inlet Pressure	1 to 10 psig 7 to 70 kPag	17 to 20 psia 120 to 140 kPaa	Typically 0.3kpag (30 mmWG) at 200ml/min
Vent Pressure	11.6 to 15.9 psia 80 to 110 kPaa		13.0 to 15.9 psia 90 to 110 kPaa
Flow Rate	1 to 6 l/min	1 to 2 l/min	User limited to 250ml/min MAXIMUM
Dew Point	At least 5°C below ambient temperature		At least 5°C below ambient temperature
Temperature	Nominally at ambient temperature		Nominally at ambient temperature
Particulates	<3µm. an internal replaceable, 0.3µm filter is fitted as standard		An external filter of 6µm must be provided by the user
Condition	Clean, non flammable, non toxic*, non corrosive, oil free, dry (see dew point above)		Clean, non-corrosive, oil free, dry (see dew point above), toxic and flammable, but not oxygen enriched samples. The auto-ignition temperature of each flammable gas in the sample must be greater than 200°C.

* For flammable or toxic samples use the 1440FTX



A) Double unit case

B) Single unit case

Dimensions do not include Back Pressure Regulator, if fitted.

EC Directive Compliance

The 1440 complies with the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC (as amended by Directive 92/31/EEC), both as amended by Directive 93/68/EEC.

It conforms to the following harmonised European standards for product safety and electromagnetic compatibility:

EN 50081-1: Generic emission standard

EN 50082-1: Generic immunity standard

EN 61010-1: Safety requirements for electrical equipment for measurement, control and laboratory use.

This product is rated for Installation Category II in accordance with IEC 664.

This product is rated for Pollution Degree 2 in accordance with IEC 664.

Performance Specification Continued

Gas Measured	Oxygen	Methane	Carbon Dioxide	Carbon Monoxide
Output fluctuation (peak to peak noise):	±0.02%O_2	0.5% of selected range	0.5% of selected range	0.5% of selected range
Ambient temperature coefficient:	<±0.05% O_2/10°C zero <±0.3% reading/10°C span	1% of full scale per 10°C change	1% of full scale per 10°C change	1% of full scale per 10°C change
Ambient pressure coeffcient:	Directly proportional	>0.15% of reading per mbar within specified range	>0.15% of reading per mbar within specified range	>0.15% of reading per mbar within specified range
(with back pressure regulation, only available for STD analyser):	(0.025% reading per mbar)	(0.025% reading per mbar)	(0.025% reading per mbar)	(0.025% reading per mbar)
Sample flow effect:	0.1% of O_2 for 50 to 200ml/min	3% of full scale for 50 to 200ml/min	3% of full scale for 50 to 200ml/min	3% of full scale 50 to 200ml/min

The performance specification has been written, and verified, in accordance with the international standard IEC 1207-1: 1994 "Expression of performance of gas analysers"

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Visit www.servomex.com for technical data sheets, application and technology information for all Servomex analysers.

Servomex has a policy of constant product improvement and therefore reserves the right to change specifications without notice.

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TDS1440D Rev. 2 04/05 E

ECO PHYSICS **CLD 822 M h**

Application examples

- Burners and Boilers
- Manufacturers of gas turbines
- Certification and calibration authorities
- DeNOx plants
- Refining of fuels and lubricants
- Tobacco industry
- Research and development

The solution for simultaneously measured NO and NO_x has got a name: CLD 822 M h. The heated inlet copes with hot and humid gas samples – no gas cooler required!

A fascinating technology.

The analyzer is not only a state-of-the-art product in terms of precision and reliability. Its technological base also sets the trend for others. The integrated hot tubing (h) allows the direct measurement of hot and moist gases. An external preconditioning of the sample gas is not required. Naturally occurring pressure variations in the sample flow are balanced out by means of an electronic and mechanical bypass system (r).

Many options can be integrated without any problem to satisfy the need for non-standardized applications. The advantage of compact design: the CLD 822 M h includes everything inside the case – even the vacuum pump and the ozone scrubber.

The CLD 822 M h with slides is perfectly prepared for rack mounting.

Two instead of one.

The CLD 822 M h nitrogen oxide analyzer is optimized for its use in systems which require reliable NO_2 measurements or the control of two sample gases in parallel.

The outstanding feature is the concept of two parallel reaction chambers. They guarantee simultaneous measurement of NO and NO_x in order to generate the precise value of NO_2.

The analyzer is capable of coping with two separate measurement tasks. This may include the task of comparing the values at the inlet and the outlet of a process or the direct comparison of two independent samples. The analyzer simply requires a dual inlet feature option (d) and one additional converter.

User friendliness is a top priority.

The analyzer can be operated by means of the integrated keypad or remotely from a personal computer. The clear layout of the menu structure guides the user and enables him to take advantage of all analyzer functions with simple commands. Integrating the analyzer in larger systems is possible by including runners in the standard chassis design.

- *Four freely selectable measurement ranges [with option (d) two per channel]*
- *Choice between several types and numbers of converters from 0 to 2 according to the application*
- *Error message coded and in full text*
- *Rapid system integration*
- *Virtually maintenance-free even in continuous operation.*

CLD 822 M h

Specifications

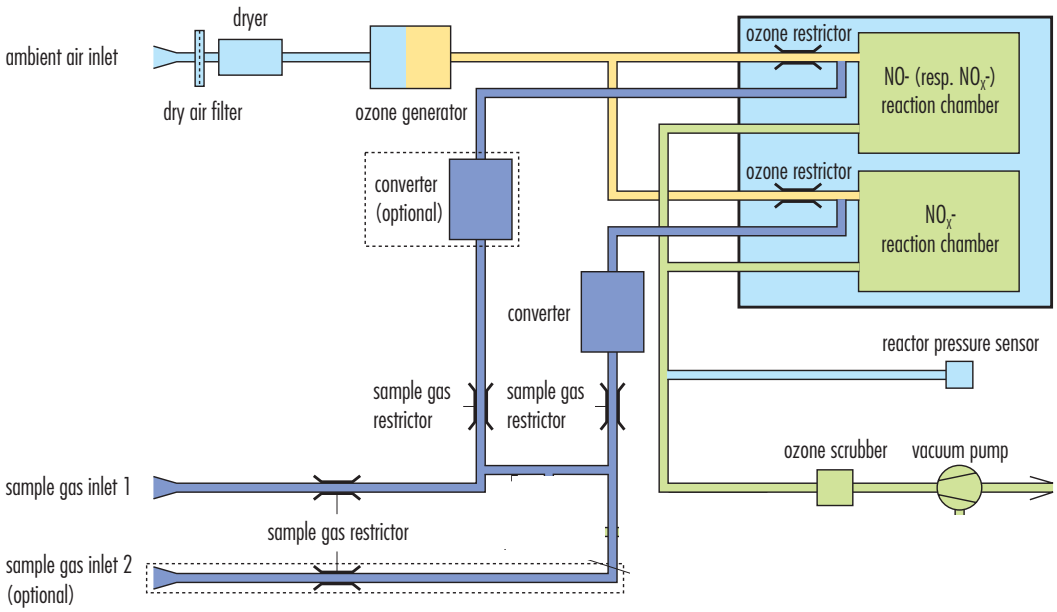
Measuring ranges	four freely selectable ranges from 5–5000 ppm, with option d two per channel
Min. detectable concentration	0.25 ppm*
Noise at zero point (1 σ)	0.125 ppm*
Lagtime	<1 sec
Rise time (0–90%)	<1 sec
Temperature range	5–40 °C
Humidity tolerance	5–95% rel. h (non-condensing, ambient air and sample gas)
Quenching (with gas cooler)	for H_2O: <1.5% of meas. value for CO_2: <0.3%/vol.-% CO_2
Sample flow rate	0.1 l/min
Input pressure	externally stabilized within ±3 mbar
Dry air use for O_3 generator	internally generated (no external supply gas required)
Power required	400 VA (incl. membrane pump and ozone scrubber)
Supply voltage	100-230 V/50–60 Hz
Interface	RS 232 (standard)
Analog output	4–20 mA into 500 Ω max.; 0–1 V; 0–10 V
Dimensions	height: 133 mm (5¼ ") width: 450 mm (19 ") with moulding: 495 mm depth: 545 mm
Weight	26 kg
Delivery includes	CLD 822 S h analyzer, power cable, analog signal cable, manual

Standard	CLD 822 M h	metal converter, hot tubing
Options	S	steel converter
	d	dual sample gas inlet
	MM d	dual channel NO_x/NO_x

** depending on filter setting*

ECO PHYSICS reserves the right to change these specifications without notice.

Flow diagram



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