

CLD 790 SR – based 4 Channel Measurement System

A star in the high spheres



Fast, highly sensitive four channel Measurement System, designed on two 2-channel chemiluminescence-based NO and O₃ analyzer for all applications involving the measurement of extremely low concentrations. Optimised for airborne and ground use, typically in stratospheric research programs:

- extremely compact, light, very low power consumption, very high sensitivity and fast response time;
- simultaneous measurement of ozone and nitric oxides;
- specially designed to analyze simultaneously ozone and the most important nitrogen compounds nitric oxide (NO), nitrogen dioxide (NO₂) and NO_x (sum of all oxidized nitrogen and nitrogen oxides containing compounds);





ECO PHYSICS CLD 790 SR - 2

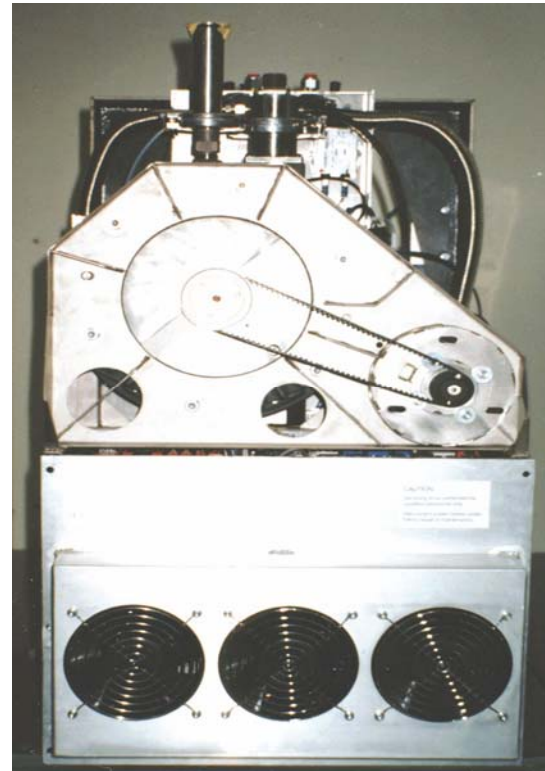
Performance:

Principle:	4 completely independent channels (two per analyser 790 SR-2), with pre-chambers, for NO, NO ₂ , NO _y and O ₃ measurement by the chemiluminescence method		
Sensitivity:	15 cps/ppt		
Electr. Zero Signal:	< 1000 cps		
Noise at Zero:	< 5 ppt in 1 sec		
Detection Limit:	3σ	< 20 ppt / sec	
	1σ	< 2 ppt / 10 sec	
Integration Interval:	freely selectable in 0.1 sec. steps.		
Signal Filter:	Dynamic, shortest time constant = 0.1 sec. Sliding average, Arithmetic average. Frequency of zero-point determination freely selectable.		
Channel Synchronisation:	Yes, selectable		
T90 Time:	< 1 sec, dependent on inlet pressure		
Zero Point Drift:	< 1% / day		
Calibration:	Zero point, Span (standard NO), λ-determination (reaction ratio Pre-chamber/Main-chamber). Calibration data filter is independent of measurement data filter. Measurement channels can be calibrated together with the same gas or individually with different cal. gases.		
Linearity:	< 1%		
Interferences:	negligible (can be measured and corrected by pre-chamber principle).		

Peripheral Components:

PLC 762 SR photolysis high efficiency converter

Measurement principle:	Conversion of NO ₂ into NO by ultraviolet photolysis method		
Sample Flow:	1.5 l/min	Cell Volume:	1500 sccm
Light source:	200 Watt Metal Halide Lamp.	Operating pressure:	80 to 200 mbar
Conversion efficiency:	70 % at 170 mbar for 7ppb NO ₂	Residence time:	6 sec at 100 mbar
Cell temperature:	≤ 10 °C when ambient temperature ≤ 25 °C		



CLD 790 SR - 2: A Frame from another Space. Inside.

Operating and physical characteristics:

Measuring Range:	0 to 50 ppb		
Sample Flow:	≈ 1.7 l/min per channel		
O ₂ flow:	≈ 0.3 l/min per channel		
Dry air flow:	≈ 100 ml/min		
Reaction chamber pressure:	< 10 mbar		
Gas inlet:	thermostatised		
Reaction chamber:	thermostatised		
Sample inlet:	pressure regulated		
Operating range:			
Pressure altitude:	1000 to 80 mbar		
Ambient (cabin) pressure:	750 to 1200 mbar		
Ambient Temperature:	5 to 35 °C at 5 to 95%RH		
Power consumption:	< 800 Watt, incl. pump		
Operating Power:	28 VDC +/- 1VDC		
Housing dimensions:	Width x Height x Depth: 440 x 735 x 470 mm		
Total weight (incl. pump):	80 kg		
Construction materials:	Tubular steel frame, Aluminium, Composite panels.		



CLD 790 SR - 2: A Golden Standard. Reaction chambers.

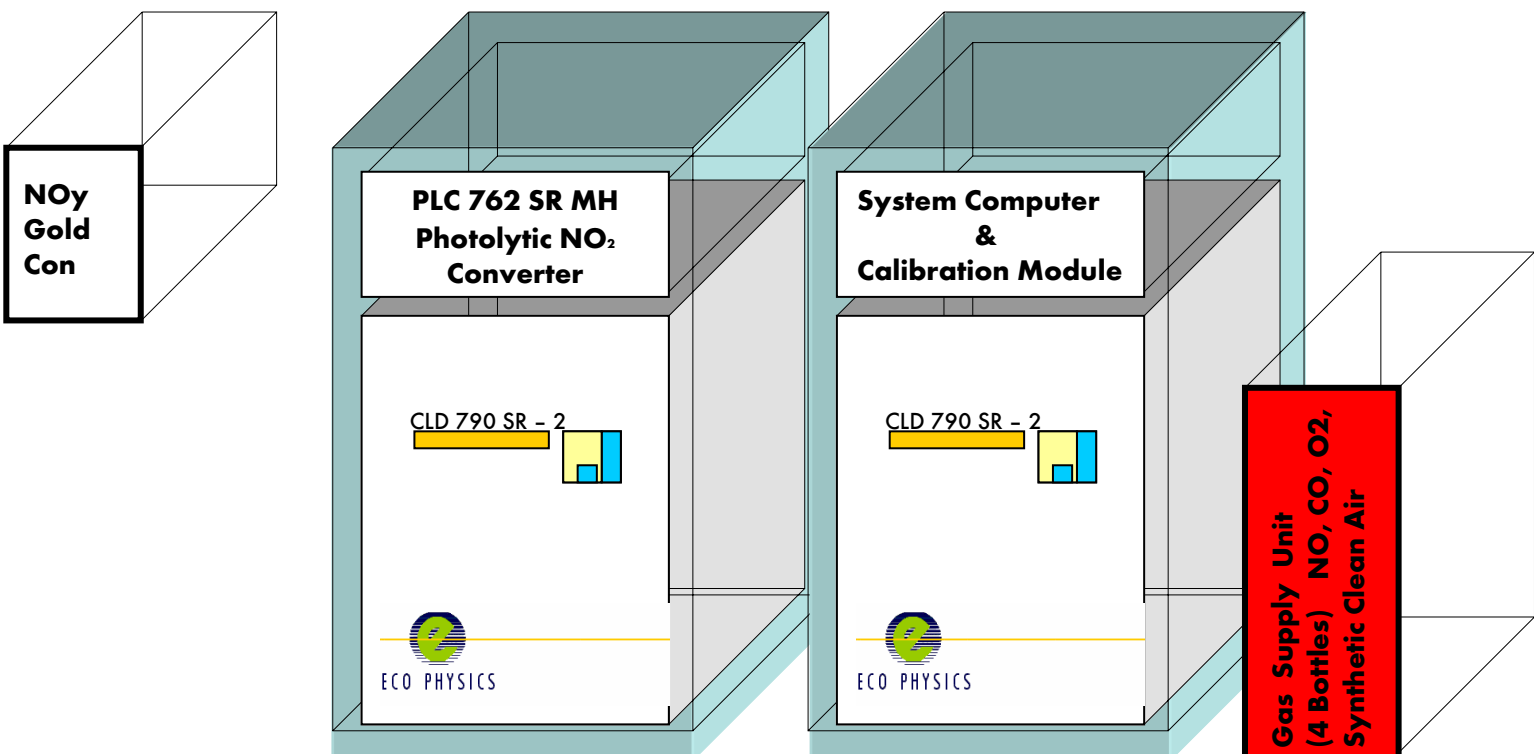


ECO PHYSICS

Onboardsystem

CRANOX and NOXAR are worldwide known synonyms for complete systems to measure automatically all scientifically relevant nitrogen oxides and ozone. ECO PHYSICS has had the knowledge and the experience to manufacture the most ambitious systems for more than a decade. Our analyzers and systems are installed on high mountains and successfully used in aircraft measurement research programs such as NOXAR, POLINAT, MOZAIC.

There is almost no nitrogen oxide detection problem to which our engineers can't find a solution fulfilling all the needs of a scientist or researcher in the field of atmospheric chemistry.



NOXAR: Nitrogen Oxides measurement system for Atmospheric Research

System controlling and operating computer and software: The software controls all the functions of the CLD 790 SR and peripheral components. It acquires, stores and displays the measurement data and many important operating parameters such as system temperatures, sample gas flows, sample pressure, reaction pressure. The onboard calibration is complete and totally software controlled.

The calibration module consists of Massflowcontrollers allowing the onboard automatic calibration of all measurement channels of the CLD by the use of bottled calibration gases.

Power requirement:

CLD 790 SR - 2 NO, NO	800 Watt	28 VDC
CLD 790 SR - 2 NO, NO or O3	800 Watt	28 VDC
PLC 762 SR MH	400 Watt	28 VDC
NOy Converter	400 Watt	28 VDC
Ozone analyzer for calibration	200 Watt	28 VDC
Computer and Calibration module	600 Watt	28 VDC
Boxes (Frames)		

Physical dimensions:

Width x Depth x Height,	Weight
440 x 520 x 670 cm,	75 kg
440 x 520 x 670 cm,	75 kg
483 x 530 x 266,	25 kg
220 x 530 x 266,	25 kg
500 x 700 x 1000	25 kg

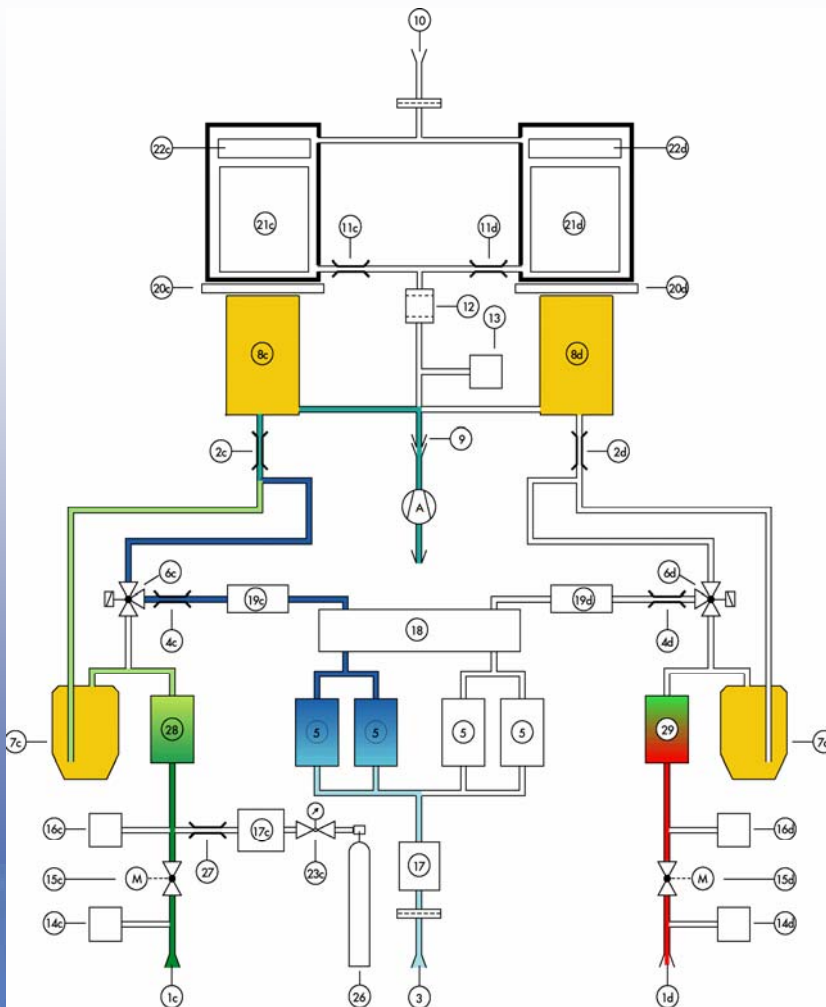
System, as shown above,
excl. Gas Bottles

3000 Watt 28 VDC

2 Boxes plus NOy Conv. 250 kg



ECO PHYSICS CLD 790 SR - 4



- A Vacuum pump
- 1 Sample inlet
- 2 Sample flow restrictor
- 3 O₂ inlet with filter
- 4 Ozone flow restrictor
- 5 Ozone generators
- 6 Solenoid valve Fore/Main-chamber
- 7 Fore-chamber
- 8 Main-chamber
- 9 Vacuum port
- 10 Dry air inlet with filter
- 11 PMT flushing outlet with flow restrictor
- 12 Filter with drying agent
- 13 Pressure sensor „Reactor“
- 14 Pressure sensor „Inlet“
- 15 Pressure regulator, motor
- 16 Pressure sensor „Back“
- 17 Pressure regulator, electric
- 18 Damper
- 19 Pre-volume
- 20 Red filter
- 21 Photomultiplier (PMT)
- 22 Highvoltage / preamplifier module
- 23 Two-stage pressure reducer
- 24 NO cylinder
- 25 NO flow restrictor
- 26 CO cylinder
- 27 CO flow restrictor
- 28 NO, gold converter
- 29 NO₂ photolysis converter

Gas Flow Diagram of
Channel c (NO_x) and Channel d (NO_x)

Note: simplified schematic, not complete,

