T-LGA4810WMS Series Laser Spectrometer

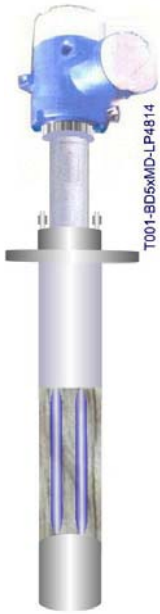
Process Gas Analyzer

Ref: T_LGA4810_DS_E
Revision:2004-09-1
Date: 2005-10-23

- Rugged industrial design, real time measurement
- Continuously monitoring technology.
- Continuously in situ monitoring
- High selectivity from spectroscope interference from other gases
- High sensitivity and accuracy
- Adjustable measuring range
- Selectable output signals, .No cross interference from other gases
- Easy installation
- Built-in calibration routines
- No gas sampling
- Dust on optical windows has less influence
- TAR type supports 1 to 3 gases analysis.
- Series structure suit to varies device and arts
- Enhancement modules support the system from single beam photometer to spectroscopy analyzer. for higher chemical selection or multi-gases analysis

Measuring Principle

The LGA4814-Monitor is based on double beam double wave measuring principle photometer.
One single default gas absorption line with no interference reference wave is chosen in the near infrared spectral range. A single mode diode laser operating around room temperature scans this single absorption line. A detector detects the light and the absorption caused only by the gas molecules. Once the absorption by default gas molecules is detected, the gas concentration is calculated. No compensation for other gases present is done. Automatic corrections for temperature and pressure variations are included(need extra Pressure sensor, or order separately).



Applications

- Process control and Emission control in flue
- Combustion and Emission control for incinerators
- Industry chemical process
- Research and Process optimization

Limitations:

- Only applicable for clean gases, with suspended particles less than 10mg/M3;
- Or could be purged with air or other gases available.

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Maintenance and Calibration

The rugged industrial design and the air purging make the LaserGas Monitors easy to maintain. There are no moving parts in the instrument and no consumables are needed during operation of the instrument. All critical parameters are monitored continuously and warning messages are given if maintenance is required beyond the recommended maintenance intervals. Calibration may be performed against certified calibration gas in the integrated internal cell, or on a separate calibration cell using certified calibration gas purged through the cell or contained in a sealed glass cell.
The routine maintenance interval is three months.

Installation and Operation

The LGA4814 Monitor is easy to install and operate.
The transducer T model is one unit integrity; inserting the sensor part into gas container or pipe where suitable, and fixing the instrument with attached flange.
The AR model consists of 3 basic units: Transmitter unit, receiver unit and electronics unit.
The transmitter and receiver units are mounted directly to the process device by DN50/F125 flanges.
There are no moving parts in the instrument, thus preventative maintenance is limited to visual inspection and cleaning of optical windows.
Purging prevents dust from collecting on the optical windows. Experience shows that a three months preventative maintenance interval is sufficient for most applications.

Calibration

The calibration procedure is easy. The monitor may be calibrated using the integrated flow through cell, or alternatively mounted to a separate calibration tube.

Specifications

Optical path length (OPL): Max. 6 meter
Bandwidth: 10nm;
Start up time: <3 mins
Response time: Less than 2 seconds
Averaging time: Rolling average from 2 seconds to 24 hours (exp. decay)
Detection limit: Refer to Table 1.
Min. measuring range: Refer to Table 1.
Max range: Refer to Table 1.
Instrument span drift: < 4% of measuring range between maintenance intervals
Instrument zero drift: Negligible (<2% of measuring range between maintenance intervals)
Maintenance interval: Recommended every 3 months (no consumables needed)
Calibration: In situ with flow through cell, or in separate calibration tube

Input/ Output Signals

Analogue output: 0/4 - 20 mA current loop, 500 & max.
Digital output: RS 232 or RS485 by protocol of Modbus or STIMcom
Relay output: High gas relay (normally closed-circuit relays)
Warning relay (normally closed-circuit relays)
Fault relay (normally closed-circuit relays)
Analogue input: Optional 0/4 - 20 mA

Operating Conditions

Ambient temperature: -20C to +55C
Maximum Pressure: 1Mpa or 10 bars abs for general model. High pressure system under requirement;
Maximum SampleTemperature: T type: <200°C; AR type <500°C
Protection classification: Transmitter and Receiver units: IP65, optionally Ex-p adapted
Electronics unit: IP55, optionally IP65
Mains voltage: 24V DC
Power consumption: Less than 50 Watts (not include consumption of valve and air resource device)

Mounting

Standard mounting: DN50/PN10, F150
Alignment tolerances: Flanges parallel within 1° with <1m light path(AR Model only).
Purging of air: Dry and oil-free pressured air or gas, or by fan. The pressure of purging air must be 0.1 kgf/cm2 higher than that of samples in pipe.
Cooling air: adjust the flow to assure the temperature inside sensor is lower than 70 °C, this temperature could be read by instruments. In the case of high temperature application, cooling air must be guaranteed to supply continuously, once stop longer than seconds might damage the sensor. It was

recommended to select AR model for high temperature application if possible.
Air connect:: ϕ2- 6 pipe with M10 screw.

Dimension and Weight

TR: Dia.150x (1000/possible sensor length+500/Electronics); 15Kg
Insertion Deepth: <1300cm(varying from range)
Diameter of insertion part: ϕ50mm
T/TR: ∅165x600-1500mm; 15kg
TAR:
  Transmitter unit: Dia: 165x350 mm, 8 kg
  Receiver unit: Dia.165x350 mm] 8 kg
Electronics unit: Dia. 120 x 400 mm, 5 kg

Ordering Code:

TR/TAR-LGA4814-[Product ID]-[gas]-R(range)-T[sample temperature]-P[sample pressure]-M[c-s-w]-S[serial port]P[communication portocol]-A[analog output standard]

Coding information:

Product ID: Refer to Table 1.

Connect code：0= none；1=threat；2=clamp; 3=Flange；

Code Format of Contact Materials: xyz

c@ structure materials;
w@ optical window;
s@ seal ring

Wet material code：01=PVC；02=Nylon; 04=PTFE；05=Acrylonitrile butadiene rubber; 06=Fluorinated rubber; 10=Iron；11=AM alloy；12=SS316；13= Hastelloy – C; 30=Optical glass; 31:Quartz

BigDipper Technochem Institute
Call: (86) 10-8264.0226; 6257.3897; 8911.1814； Fax: 86-10-6252.3517;8264.0221;
P.o.Box 603 BDTI Beijing, China 100080
Email: sales@bigdipper-technochem.com web: http://www.fullsense.com
Address: Building #1, NanSanJie, ZhongGuanCun, Haidian district
Beijing, China 100080

Table 1 Specifications for TAR-LGA4814WMS Single Gas Transducer

Gas	Low Detect Limit /1M	Min/Typical range	Pressure	Temperature	Cross Interference Information	Application
O2	100ppm	0-30/100%V	10atm	400℃	O3(0.1), O2(0.005),	Flue gas;
HCL	**0.1ppm**	**0-100ppm,**	**10atm**	**400℃**	**NO**	
HF	**2ppm**	**0-1000 ppm**	**10atm**	**400℃**	**SO2F2(?),HF(1.5), H2CO, O3(0.1), HOBr(0.25),**	
HF	**0.03ppm**	**0-5/100 ppm**	**10atm**	**400℃**	**SO2F2(?),HF(1.5), H2CO, O3(0.1), HOBr(0.25),**	
HF	**0.03ppm**	**0-5/100 ppm**	**10atm**	**400℃**	**SO2F2(?),HF(1.5), H2CO, O3(0.1), HOBr(0.25),**	
NH3	**0.3ppm**	**0-300ppm**	**10atm**	**400℃**	**CO2 <3%**	
NH3	**0.1ppm**	**0-100ppm**	**10atm**	**400℃**	**CO2 <3%**	
NH3	**0.48ppm**	**0-1000ppm**	**10atm**	**400℃**		
NH3	**0.5ppm**	**0-1000ppm**	**10atm**	**400℃**		
NH3	**0.5ppm**	**0-1000ppm**	**10atm**	**400℃**	CHC12F, HCN	
CO	**20ppm**	**0-20%**	**10atm**	**400℃**	**H2S;**	
CO	40ppm	0-8000 ppm	10atm	400℃	O3(.15),NO(),	
CO2	**3ppm**	**0-3000ppm,%V**	**10atm**	**400℃**	**HBr, H2S,CH3SCH3,NH3, HCHO,**	
CO2	**30ppm**	**0-30%V**	**10atm**	**400℃**	**H2S(), CO(),**	
CO2	**30ppm**	**0-30%V**	**10atm**	**400℃**	**H2S(), CO(),**	
CO2	10ppm	0-1000ppm,	10atm	400℃	HI,C4H2,SO2F2(), O3(.15), H2O(0.1), 3(0.1), HOBr(0.25),	
H2S	**3ppm**	**0-1000 ppm,0-30%V**	**10atm**	**400℃**		
H2S	**3ppm**	**0-1000 ppm,0-30%V**	**10atm**	**400℃**		
H2S	3ppm	0-1000 ppm,0-30%V	10atm	400℃		
H2S	**5ppm**	**0-1000 ppm,0-30%V**	**10atm**	**400℃**		
H2S	0.1ppm	0-100 ppm,0-30%V	10atm	400℃	water(.1);	
CH4	**0.1ppm**	**0-600ppm/0-100%V**	**10atm**	**400℃**	**CO2(), C2H6()**	
CH4	0.1ppm	0-100 ppm/0-100%V	10atm	400℃	N2O(-)	
CH3OH	0.01ppm	0.1-100ppm/0-10%V	10atm	400℃	CH3OH(12),water(13), CH3SH(.2),	

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	CH3SH	0.01ppm	0.1-100ppm/0-10%V	10atm	400℃	C2H6,CH3OH,CH4	
	COS	**0.5ppm**	**0-1000ppm/0-10%V**	**10atm**	**400℃**		
	COS	**3ppm**	**0-1000ppm/0-10%V**	**10atm**	**400℃**		
	COS	**10ppm**	**0-1000ppm/0-10%V**	**10atm**	**400℃**		
	COS	**10ppm**	**0-1000ppm/0-10%V**	**10atm**	**400℃**		
	CS2	**0.9ppm**	**0-1000ppm/0-10%V**	**10atm**	**400℃**		
	CH3SH	**0.9ppm**	**0-1000ppm/0-10%V**	**10atm**	**400℃**	**C2H6,CH3OH,CH4**	
	CH3SCH3	**2ppm**	**1-1000ppm/0-10%V**	**10atm**	**400℃**	**C2H6,CH3OH,CH4**	
	CH3SH	**0.9ppm**	**0-1000ppm/0-10%V**	**10atm**	**400℃**	**C2H6,CH3OH,CH4**	
	CH3SSCH3		**0.1-100ppm/0-10%V**	**10atm**	**400℃**	**C2H6,CH3OH,CH4**	
	SO2	**10ppm**	**0-1000ppm**	**10atm**	**400℃**		
	SO2	**10ppm**	**0-1000ppm**	**10atm**	**400℃**		
	NO	**10ppm**	**0-1000ppm,**	**10atm**	**400℃**		
	NO	**5ppm**	**0-1000ppm**	**10atm**	**400℃**		
	N2O	**2.2ppm**	**0-1000ppm,**	**10atm**	**400℃**	**CH4,NH3**	
	N2O	**10ppm**	**0-1000ppm,**	**10atm**	**400℃**		
	N2O	**10ppm**	**0-1000ppm,**	**10atm**	**400℃**	**water**	
	NO2	**2.6ppm**	**0-260ppm,**	**10atm**	**400℃**		
	NO2	**30ppb**	**0-3ppm,**	**10atm**	**400℃**	**NH3(-);**	**Flue gas;**
	H2O	**0.03ppm**	**0-10ppm,0-100%V**	**10atm**	**400℃**	**water(.6), O3(.1),CH4,**	
	H2O	**0.1ppm**	**0-10ppm**	**10atm**	**400℃**	HBr	
	H2O	**0.08ppm**	**0-10ppm**	**10atm**	**400℃**	**H2S-,NO-**	
	HNO3	**0.06ppm**	**0-60 ppm**	**10atm**	**400℃**		
	HNO3	**1.2ppm**	**0-1200 ppm**	**10atm**	**400℃**		

*The range data is with 1 m optical path cell, unless other where specified with OL.

TAR-LGA4814WMS-2s -Gases Analyzer(only available with TAR Type)

Model	Product No.	Gas	Min range	Temperature	Applications
TAR-2s	13333+ 14815	HCl HF	0-160ppm 0-300ppm	200℃	
TAR-2s	26130+	SO2 HF	0-2400ppm 0-300ppm	200℃	

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	14815				
TAR-2s	26130+ 13333	SO2 HCl	0-2400ppm 0-160ppm	200℃	
TAR-2s	26130+ 12500	SO2 NO	0-2400ppm 0-2000ppm	200℃	
TAR-2s	26130+ 12500	SO2 NO2	0-2400ppm 0-2000ppm	200℃	Flue gas;
TAR-2s	22222+ **12500**	**NO2** **NO**	**0-2000ppm** **0-2000ppm**	**200℃**	Flue gas;
TAR-2s	**12376+** **12500**	**CO** **NO**	**0-15%** **0-2000ppm**	**200℃**	Flue gas;
TAR-2s	**12376+** **12048**	**CO** **CO2**	**0-15%** **0-20%**	**200℃**	Flue gas;
TAR-2s	12987+ 10309	O2 CH4	0-25% 0-2000ppm/3%	200℃	
TAR-2s	12048+ 10309	CO2 CH4	0-20% 0-2000ppm/3%	200℃	
TAR-2s	12048+ 12987	CO2 O2	0-20% 0-25%	200℃	

TAR-LGA4814WMS-3s-Gases Analyzer(only available with TAR Type)

Model	Product No.	Gas	Min range	Temperature	Applications
TAR-3s	13333+ 14815+ 14705	HCl HF HCN	0-160ppm 0-300ppm 0-200ppm	200℃	Flue gas
TAR-3s	26130+ 22222+ 12500	SO2 NO2 NO	0-2400ppm 0-2000ppm 0-2000ppm	200℃	Flue gas
TAR-3s	12048+ 12436+ 10309	CO2 CO CH4	0-20% 0-15% 0-2000ppm/3%	200℃	Flue gas
TAR-3s	12048+ 12987+ 10309	CO2 O2 CH4	0-20% 0-25% 0-2000ppm/3%	200℃	Flue gas

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TAR-3s	22222**+** **12500+** 12376	**NO2** **NO** **CO**	**0-2000ppm** **0-2000ppm** **0-10%**	**200℃**

Available Structure Types for Application

Type	Installation	Fixing Fitter	Application	
T	Insertion	DN50PN40 flange.	Flue, tank; Normal<60℃,if >70℃ Air purge needed.	
TR	Across	DN50PN40 flange.	Stove, oven, or reactor, <200℃	Possible for 2 gases
TAR	Across	DN50PN40 flange	Stove, oven, or reactor , <400℃; Wide space gas detect;	Possible for 2 or 3 gases;
TARS	in-situ	DN50 flange	Workshop, depot, Wide space toxic or hazardous gas detect; Max transmission distance:< 30m;	Open path; Possible for 2 or 3 gases;

*the type have to be adjusted because of technical design for light path, or economic consideration.
*Must be cooled with air, while the temperature of samples beyond 70℃.but suitable extended pipe(air cooling actually) with glass window could help usage below 120 ℃ without cooling.

Sensor Capability Enhancement Unit

Items	Model	Introduction	
CWP Modulator	RAM	To expand the dynamic detect range	Select
WMS Modulator	HC0.01	To optimize the wave length of emission for best selection to objective and avoiding coexisted gas interferences	Select
FMS Modulator	TDLAS 400	Spectrum modulator, it scans 100nm wide around the original beam, with resolution of 0.01 to 0.1 nm. usually. To measure multiple gases with one instrument.	Select
Pressure Sensor	PS10	0-1.0 MPa pressure sensor; For pressured inline test, pressure sensor must be installed to compensate and correction the standard concentration;	Select

*The price is listed in this table if only for each channel.

Instrumental Accessories

Items	Introduction	$RMB

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Remote Controller	pBD4	Remote display and setup.	8900
Remote Digitalizer	XM3.5	Remote display.	1200
Power regulator	DC12	Power adapter from local stanard 110/200 AC to 12 DC.	300
Extended Wiring and piping		Attached to sample gun	20/m

Calibration Accessories

		Introduction	
Standard gas	0	4L bottle, 9.5MPa	
Cal tool kit	1	regulator	
Cal tool kit	1	Switch	
Cal tool kit	1	connector	

* This part of fee should be added to special system for application in area of NEC CLASS I Group E/F/G; NEMA 2; IEC IP10 down.

Process Maintenance Accessories

Items		Quat.	Introduction
Mentanance Control Box		1	Cleaning and calibration control. Include valves
Air Compressor		1	

Environment Adaptation

Items		Quat.	Introduction
Temperature controller	Heater1	1	To control temperature inside of transmitter to be used from –10 to –40 °C
Environ Protector Box		1	For outdoor installation

Sampling Adaptation

Items	Quat.	Introduction
By flow suit	1	

Other Accessories

		Quat.	Introduction	
pAirWin V1.0			PC window 2000 application, STIM data acquisition	
pAirWin Pro V1.0			PC window 2000 application	
RS485 Kit			Append RS485 port, and Connector to RS232 port of PC	

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?			User defined, need consultation	
Window Glass	∅56	2 pc	For air cooling pipe.	

Instrument Guaranteed: 1 years.

Ordering Attentions:

1) This instrument is guaranteed to use in special gas analysis in the defined mixture, based on information from user.
2) Application system in unsafe area, must order special Anti-explosive Extension
3) Non-standard system would be charged extra design fee of 30% of total budget based on the price list of this file. 3 suits up would be free of this special charge.
4) The measurement range of Multi-beam system would be limited because of compatible optical path length.

Technological Configuration of System for Application

- If there is not interfering gases existed, basic 2 beam system is good enough.
- If the interference gases coexisted, and the concentration is beyond 1/100 of the main gas to be tested, you need select WF Modulator to increase the chemical selection ability of the system;
- If you are interested to gauge more than one gas that listed in as being interferences, you can enhance the system to spectroscopy analyzer by TDLs modulator. More than expected gases might be analyzed with this technology.

Type Selection for Application

- If the temperature of sample is below 70 ℃, you can choose TR type; but for low detect limit that need optical length > 2m, you might need to select TAR type;
- TAR type is special convenient for high temperature application, with proper length of pipe with glass window(aimed to air cooling) , u can extend the test temperature to 1600 ℃ up;

Consideration for Engineers

For online continuously analyzing, clearing of the system and correction or calibration are all necessary to analysis system.

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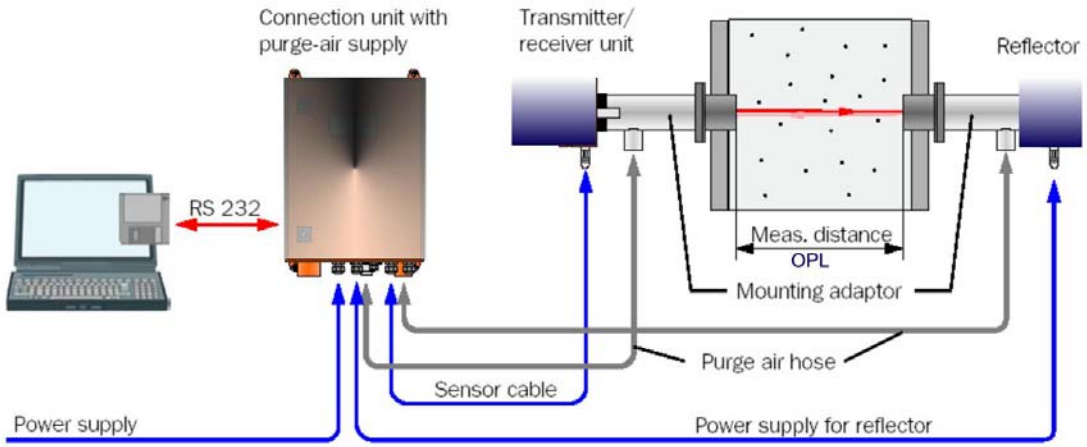
Installation Information

TAR Type Application

T-GA4810 Gas Analyzer Across Reflector System Installation



TR Type Application

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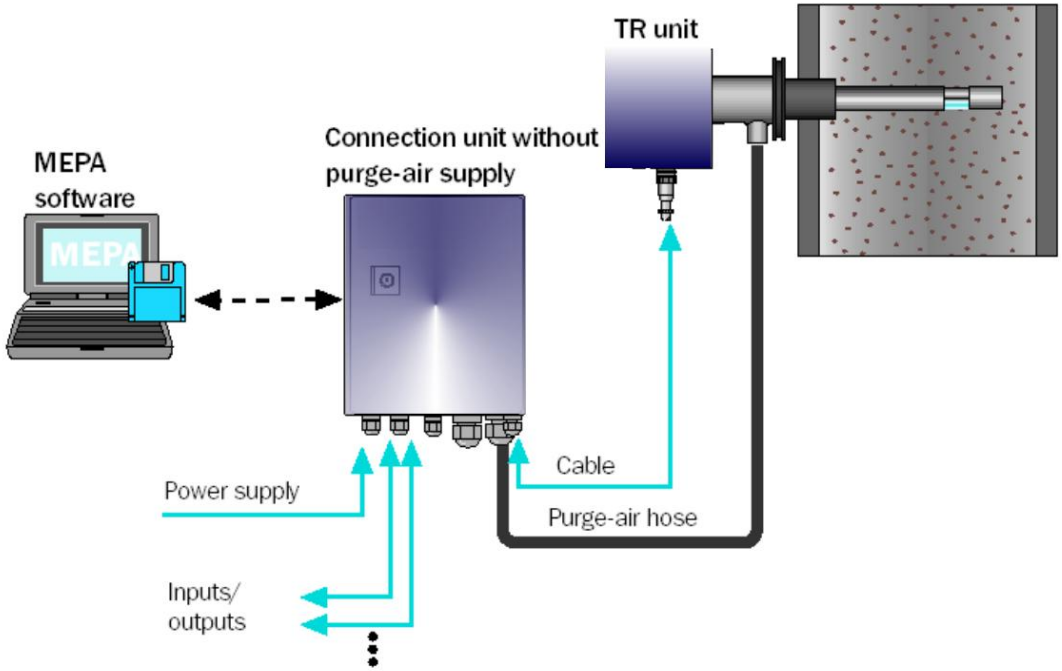
T_GA4810 Gas Analyzer Insertion Installation



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