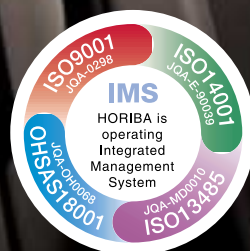


HORIBA

Explore the future

Motor Exhaust Gas Analyzer MEXA-7000 Series

Version 3



MEXA-7000 Version 3

HORIBA Automotive Test Systems **The future of engine and vehicle development**

From the very foundation of HORIBA, our ambition has been to create a global enterprise which incorporates ever-improving technology into our systems for exhaust gas emissions. In every application from automotive to non-road, engineers are continually challenged to develop cleaner, more fuel-efficient, advanced performance engine technology.

Since 1966 and the introduction of our first engine emissions analyzer, HORIBA has remained committed to continuous R&D integrating HORIBA's extensive knowledge and experience into all our equipment, so that our customers can develop and manufacture the low emissions technology necessary for tomorrow's future, today.



MEXA-7000 : The World Standard for Motor Exhaust Gas Analysis

The World's #1 Provider of Exhaust Emission Measurement Systems

The MEXA-7000 series, acclaimed by the automotive industry since its introduction in 1995, is now stepping into the future with the release of the MEXA-7000 version 3.

Benefiting from continuous development and improvement, the MEXA-7000 version 3 measures exhaust emissions from internal combustion engines running on a wide variety of fuels. It provides simultaneous measurements of CO, CO₂, NO/NO_x, THC, O₂, CH₄, NMHC, NO₂ and SO₂ over a wide, dynamic range of concentrations. It also supports the full range of sampling requirements for raw exhaust, dilute exhaust, EGR and tracer gas measurements. Optimum model configurations are available to suit all applications.

The new MEXA-7000 Version 3 is the culmination of HORIBA's advanced technology, maintaining it as the world's standard for emissions testing systems.



Condenser microphone type detector

This detector is used for the NDIR analyzer, measuring gases such as CO and CO₂. HORIBA develops and manufactures the detector "in house" as a core capability to ensure accurate measurement.

Using our unique technology to provide reliable and stable products

Producing highly reliable exhaust gas analyzers requires precise care in every single process from materials selection through assembly and quality inspection.

HORIBA optical systems are an important expertise; essential to the measurement and influential to the data quality. To ensure the basic quality of the apparatus, HORIBA produces its own optical materials using a unique crystal growth technology. Furthermore, the company carefully ages detectors to insure stability and accuracy over the long term. Following assembly, instruments go through a three-step adjustment process for the detector, analyzer, and system. This is just a part of the way HORIBA performs the best possible quality control; insuring reliable analysis and long-term stability.

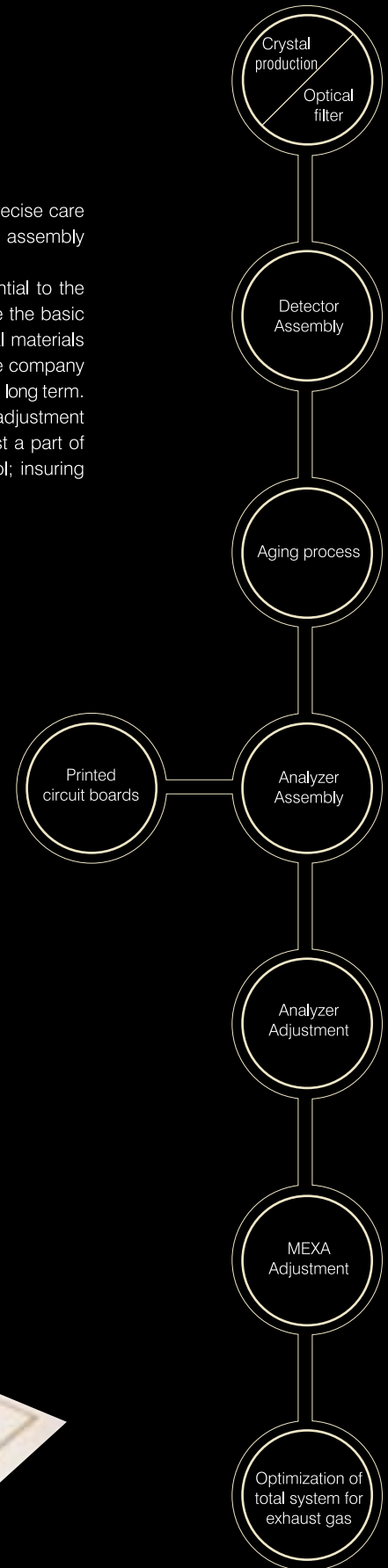
High Quality

The entire manufacturing process for each HORIBA instrument equates to more than one year of production time. In response to customer demand, HORIBA's production planning process reduces the linear time to three months.



Quality Assurance

MEXA-7000 is produced and inspected, based on a quality management system conforming to ISO 9001.

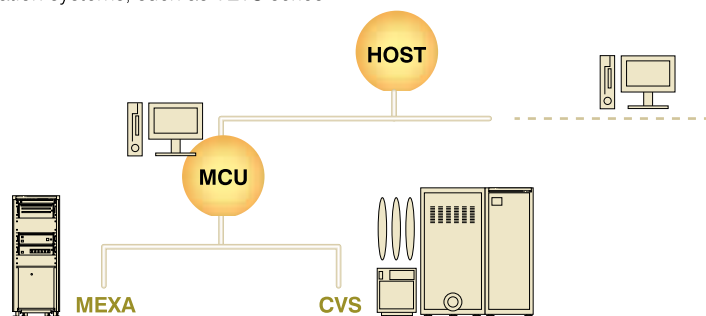


MCU

main control unit

Control of the system

The gas flow and concentration/system data of the MEXA-7000 series is controlled by special software installed in the Main Control Unit (MCU). The MCU of MEXA-7000 is also able to control other exhaust sampling systems, such as the CVS-7000 or DLS-7000, which are used in the laboratory at the same time. Host computer communication, providing full remote control and monitoring functions, is also available between the MEXA-7000 MCU and external laboratory automation systems, such as VETS series.

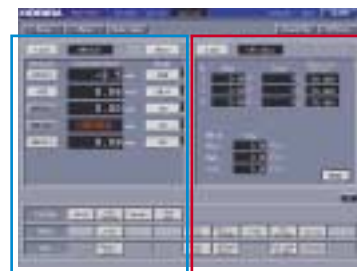


Basic screen

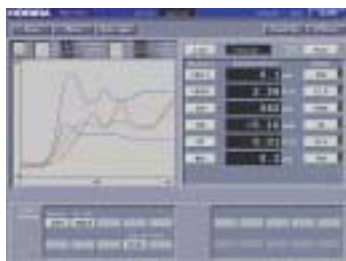
Normal operation (gas control functions or parameter set) of the MEXA-7000 can be conducted from the basic screen. Outputs from the analyzers can be displayed on the screen as numerical values or a trend-chart. The basic screen can also display system information (MEXA/ CVS-7000/DLS-7000) connected to the MCU.



MEXA-7000 basic screen



Combined MEXA-7000 and CVS
□ MEXA-7000 □ CVS



Trend chart



System configuration screens

Maintenance support

The MEXA-7000 has various test/check functions for system maintenance. Especially the MEXA-7000 ver.3 MCU can output an early warning about analyzer sensitivity shifts or the replacement / service of key components, which is beneficial for efficient operation of the system.

① Display the status of analyzer calibration coefficients visually on the "Cal. caution" status screen, as information to indicate sensitivity changes

② Display the caution message about replacement time of key components, according to the set values on the Maintenance pre-caution screen.



■ Maintenance is needed immediately
■ Maintenance is needed soon

▲ Cal caution status



▲ Maintenance caution

Main functions of the MCU

- Controls the MEXA-7000 system
- Controls and displays the data of CVS and DLT
- Outputs analyzers' concentration readings (real-time or averaged output)
- Chart display functions:
Real-time trend chart display,
Post trend chart display
- Displays calculations of A/F and EGR rates(option)
- Settings for system and analyzer parameters:
Full-scale display setting(when dynamic single range is applicable)
Calibration sequence times, ON/OFF timers, working time counters, etc.
- Analyzer checking function:
Checks items such as interference, leaks, hang-ups, calibration curves, NOx converter efficiency, etc.
- Displays all types of alarms
- Various interference compensation functions(option)



Compact Modular Configuration

The modular design of the MEXA-7000 Version 3 provides superb system flexibility. Each module is designed for a specific function and refined for optimum performance within a customizable system layout. Each module communicates via advanced "sockets" network technology.



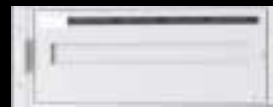
Main Control Unit (MCU)

The MCU controls and monitors all of the system modules and analyzers within the MEXA-7000 system. The MCU provides local manual control as well as remote controllability from a laboratory host computer. The MCU also integrates associated devices such as the CVS (for both heavy and light duty applications), DLT (dilution tunnel) and DLS (particulate samplers). The standard PC architecture allows complete flexibility in the operator control display with both CRT and LCD panels offered as standard.



Interface Controller (IFC)

The IFC is the communication module for the 7000 system and is fitted with every main system module such as OVN, CVS, DLS etc.



Analyzer Rack (ANR)

Each ANR can accommodate a maximum of 5 analyzer modules. Each analyzer module is equipped with a connection panel that permits easy fitting and removal.



Heated Analyzer Module

The main cabinet of the MEXA-7000 can be specified to have 19" rack mountable type heated analyzers for THC/CH₄ and NO/NO_x. This type of analyzer requires a heated sample handling module to supply the exhaust sample gas.



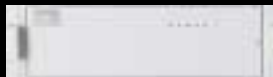
Power Supply Unit (PSU)

The PSU controls the power supply to the ANR rack and the system modules. Optional analog recorder signals can be output for the analyzers and other calculated parameters such as AFR and EGR ratios.



Solenoid Valve Selector (SVS)

The SVS supplies and controls the operation and calibration gases to the analyzer modules, incorporating humidifiers for interference checking. The SVS is also used for connection of the GDC modules for analyzer linearization and NOx Converter Efficiency checking.



Span Gas Selector (SGS)

The SGS supplies and controls the span gases for analyzer with multiple range specification.



Sample Handling System (SHS)

The SHS filters, conditions and pumps the exhaust gas sample from the engine to the analyzers. The SHS is located on a movable cart for ease of access and service.



OVN-720 Series

The OVN-720 modules provide an integrated solution for gas analysis under heated conditions (113 or 190 deg C, according to application). The OVN-720 combines the heated sample handling and analysis for THC/CH₄ and NO/NO_x close to the sample point for minimum component hang-up and loss.

New Feature

Conforms to latest emission regulations

The MEXA-7000 series is the most suitable system for certification testing according to the latest emission regulations, such as the latest HDD regulations defined by the US EPA. The MEXA 7000 series can optionally include a software package to meet the specific requirements of the 40 CFR Part 1065 *1

■ The software package for 40 CFR Part 1065

The 40 CFR part 1065 adopts new parameters and/or sequences for quality checking of measurement systems. This software package supports automatic sequences for these special requirements. The check sequence can be switched between CFR 1065 version and normal version in the software.



■ Quality check sequences which are added or modified

Performance check

Linearity check

Continuous analyzer system-response check

Continuous analyzer uniform-response check

Vacuum-side leak check

NDIR CO and CO₂ analyzer interference check

FIA CH₄ response check / O₂ interference check

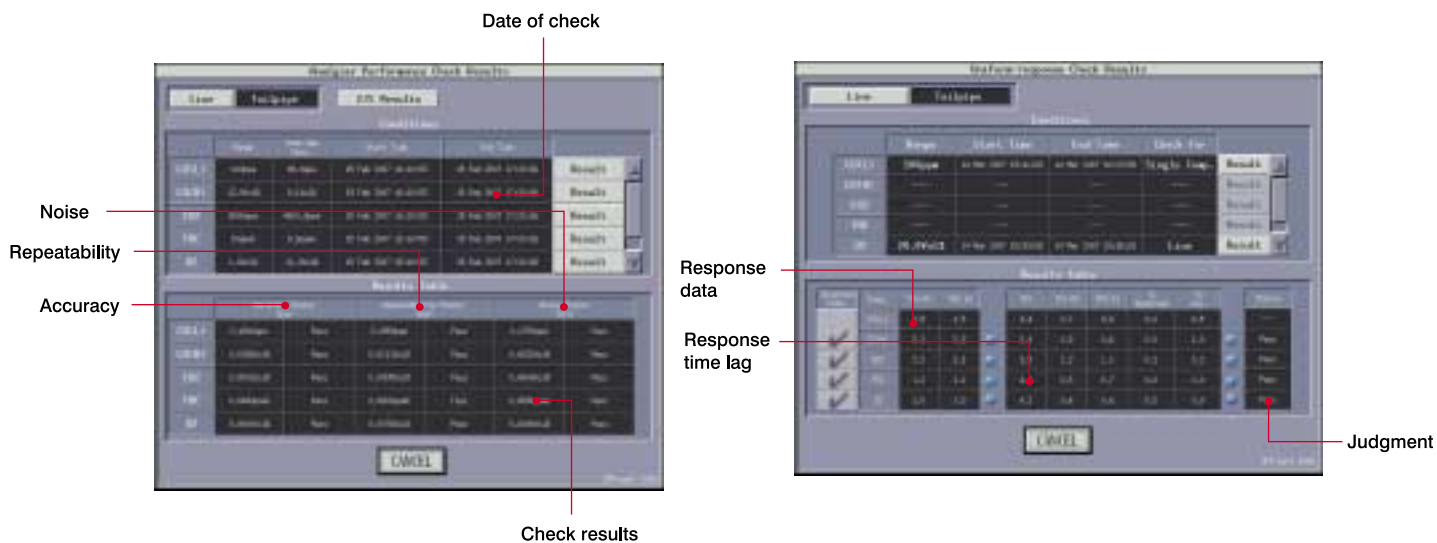
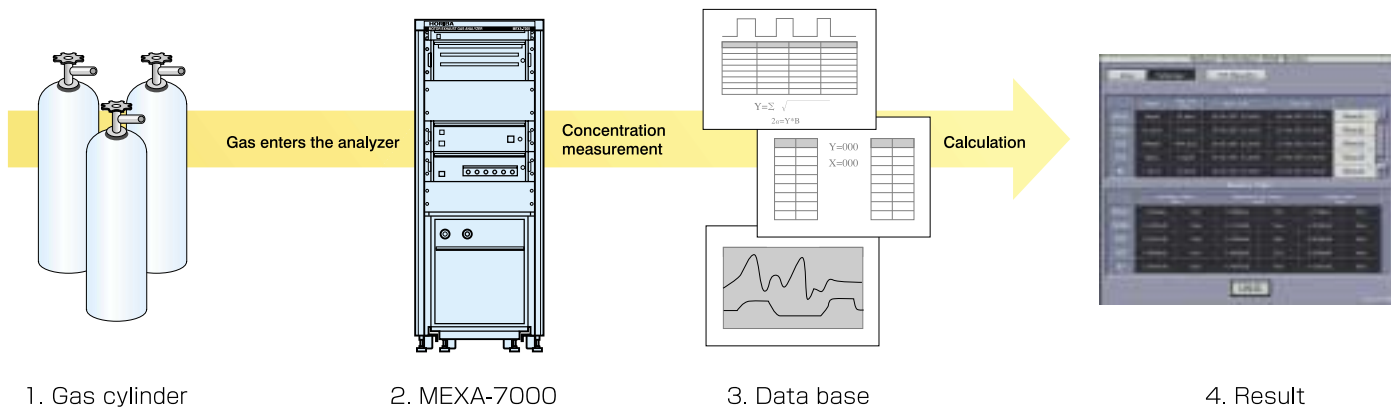
NMC penetration fraction check

HC hang-up check

CLA NO_x quench check (H₂O and CO₂)

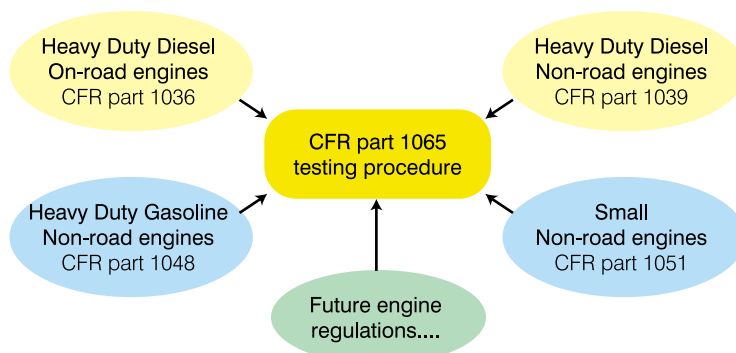
NO₂ to NO converter efficiency check

■ Performance check



*1 ■ 40 CFR part 1065

The US EPA has added a new section, Part 1065, to Title 40 of Code of Federal Regulations. This part defines the standard techniques, facilities and instrumentation which are commonly used to measure emissions from various sources such as non-road engines, HDD diesel engines etc. It is proposed that all requirements for the emission measurement technique are consolidated in the part 1065. Compared with the conventional regulations, Part 1065 adopts a lot of new concepts. For example, special sequences are defined to check analyzer performance, i.e. accuracy, repeatability and noise. Part 1065 also prescribes acquisition methods of the data used for correction in emission mass calculations.



MEXA-7000 Ver.3 Series

The MEXA-7000 Version3 series can be used to measure emissions from all types of engines including gasoline and diesel fueled vehicles. It supports simultaneous measurements of CO,CO₂, NO/NO_x, THC, O₂, and CH₄ over a wide range.

Providing a wide range of sampling applications for direct sampling, CVS sampling, EGR, tracer measurements and more.

Standard

MEXA-7100/7200/7400/7500 Series

○Sample line

Direct, Dilution(Bag), Dilution(continuous) EGR, Tracer

○Feature

- Wide range of sampling conditions for versatile applications
- Supports a wide range of sampling conditions for Direct sampling, CVS sampling (Bag sampling and continuous sampling).
- Combination of two line sampling and EGR are available.

Type		MEXA-7100/7200/7400/7500 Series	MEXA-7200SLE	MEXA-7100FX
Ranges	CO	0-50ppm ~ 0-20vol%	0-10ppm ~ 0-200ppm	0-100ppm ~ 0-12vol%
	CO ₂	0-0.5vol% ~ 0-20vol%	0-0.5vol% ~ 0-20vol%	0-0.5vol% ~ 0-20vol%
	NO _x	0-10ppm ~ 0-10000ppm	0-1ppm ~ 0-200ppm	0-10ppm ~ 0-10000ppm
	THC	0-10ppmC ~ 0-50000ppmC	0-1ppmC ~ 0-200ppmC	0-10ppmC ~ 0-50000ppmC
	O ₂	0-1vol% ~ 0-25vol%	--	0-5vol% ~ 0-25vol%
Response time *	CO	1.5s ~ 3.0s	4.0s	1.1s
	CO ₂	1.5s	1.5s ~ 2.0s	1.1s
	NO _x	3.0s	3.0s	1.0s
	THC	1.5s	4.0s	0.7s
	O ₂	1.5s ~ 2.0s	1.5s ~ 2.0s	1.0s

*90% response of exhaust gas line

SULEV Measurement

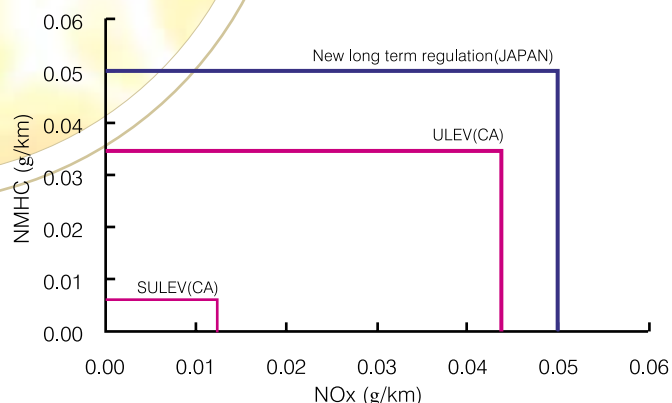
MEXA-7200SLE

○Sample line

Dilution(Bag)

○Feature

- Equipped with special SULEV-compatible sampling systems.
- Toward hydrocarbon-free sampling system
- SULEV emissions measurement, combining constant volume sampler(CVS-7000SLE), Dilution Air Refinement system(DAR) as well as Bag Mini Diluter system(BMD-1000).



Emission Regulation for Gasoline Engine Vehicle

MEXA-7000 Ver.3

High Speed Response

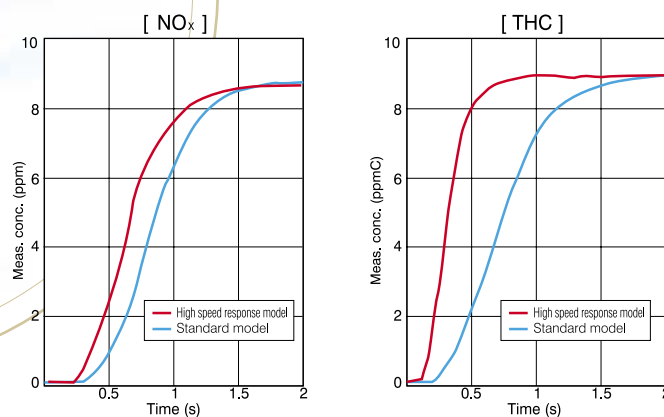
MEXA-7100FX

○Sample line

Direct

○Feature

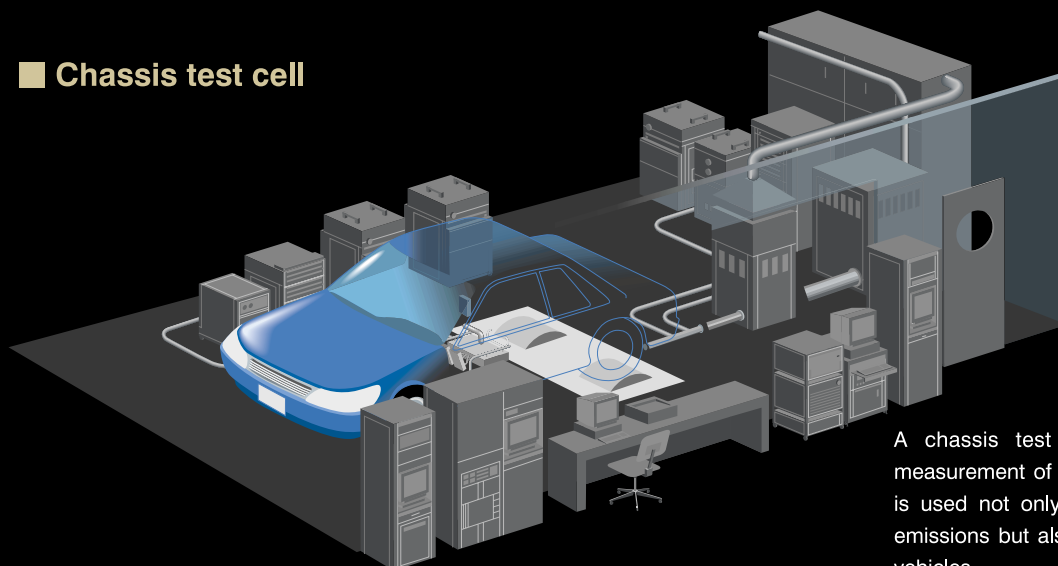
- High speed response times of 0.9 seconds or less (T_{10-90})*
 - Fast response system for direct modal mass measurement.
 - High accuracy direct measurement, combining ultrasonic exhaust flow meter
- *calibration line



Response Speed Comparison



■ Chassis test cell

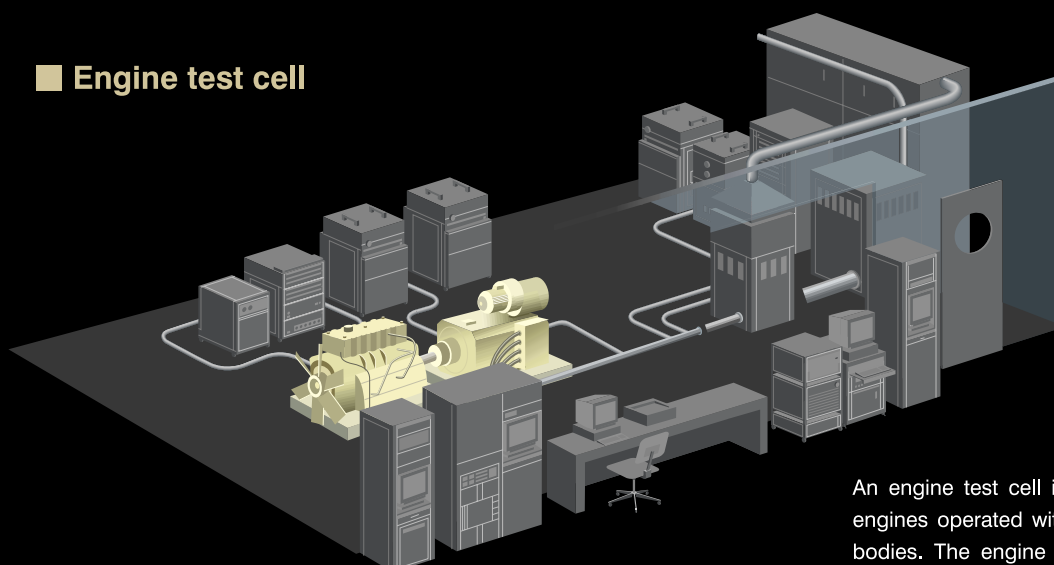


A chassis test cell is a special facility for measurement of actual vehicles. This type of cell is used not only for the certification of exhaust emissions but also for durability test of light-duty vehicles.

Highly accurate and reliable emissions measurement systems, trusted by engineers all over the world

HORIBA's mainstay emission measurement systems command an 80% share of the global market. They are used worldwide in the automotive industry for R&D and quality control, and have been adopted as standard equipment by many of the world's exhaust gas certification organizations.

■ Engine test cell

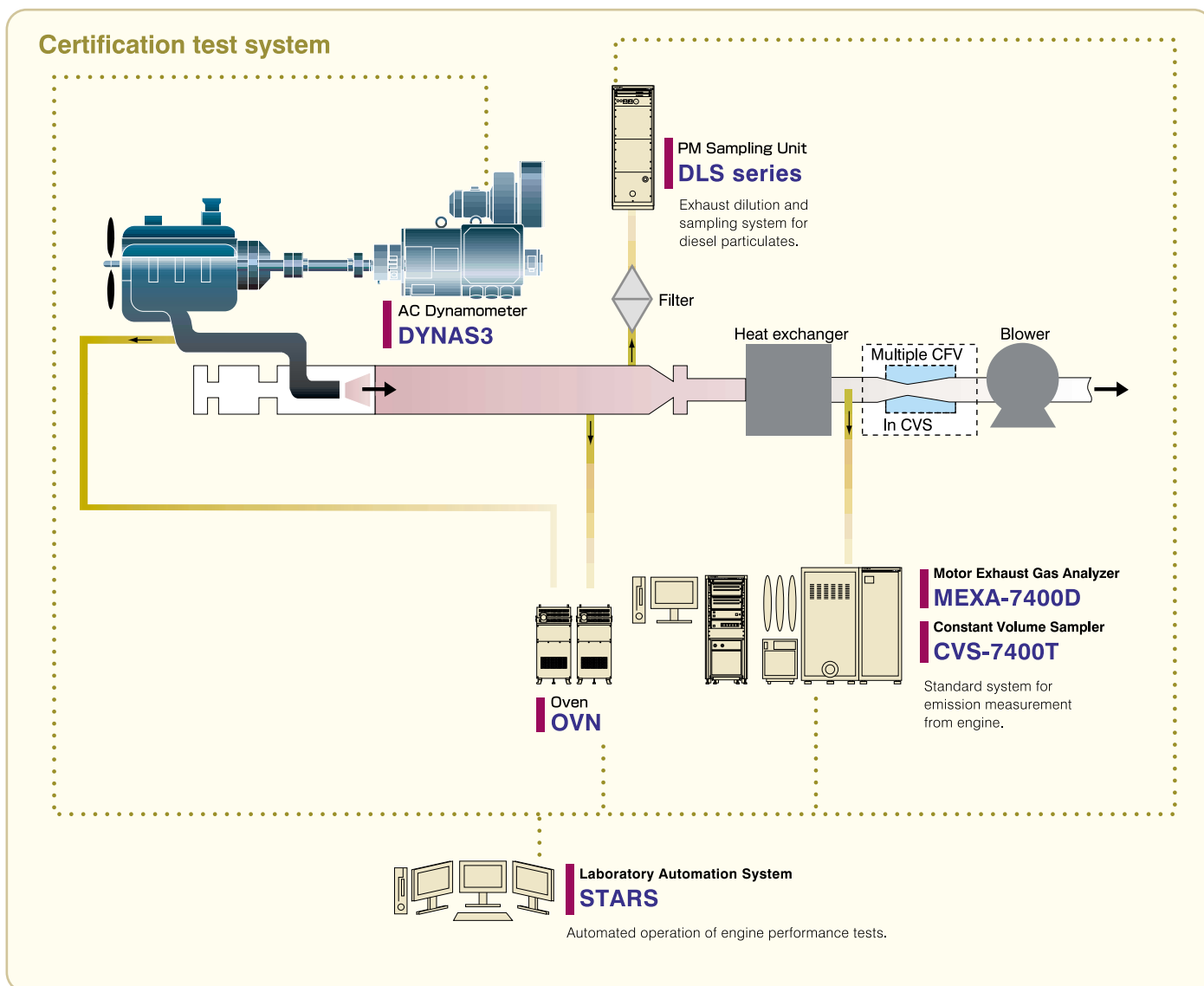


An engine test cell is essential for evaluation of engines operated without drivetrains and vehicle bodies. The engine test cell is used for a wide range of purposes, such as certification testing of heavy-duty engines, general engine performance test, ECU optimization and evaluation of exhaust gas after-treatment devices.

Applications in emission test cells

Emission measurement is essential for development and certification of both engines and vehicles.

The HORIBA MEXA-7000 series supports a variety of needs for such measurements, providing an accurate and reliable analyzing system for the varied components. Furthermore, the MEXA-7000 series can be integrated into the total test systems which HORIBA supplies, combined with other measurement devices such as Constant Volume Sampler (CVS series), chassis/engine dynamometers (ECDM, DYNAS3) and data processing system (VETS, STARS). When used with other specialized analyzer systems for unregulated components or particulates, the MEXA-7000 series supports a wide range of advanced applications.



● Engine emission measurement system

Exhaust gas emission measurement is essential for the development of clean engines. Particulate Matter (PM) measurement is also required due to its possible impact on the environment and human health.

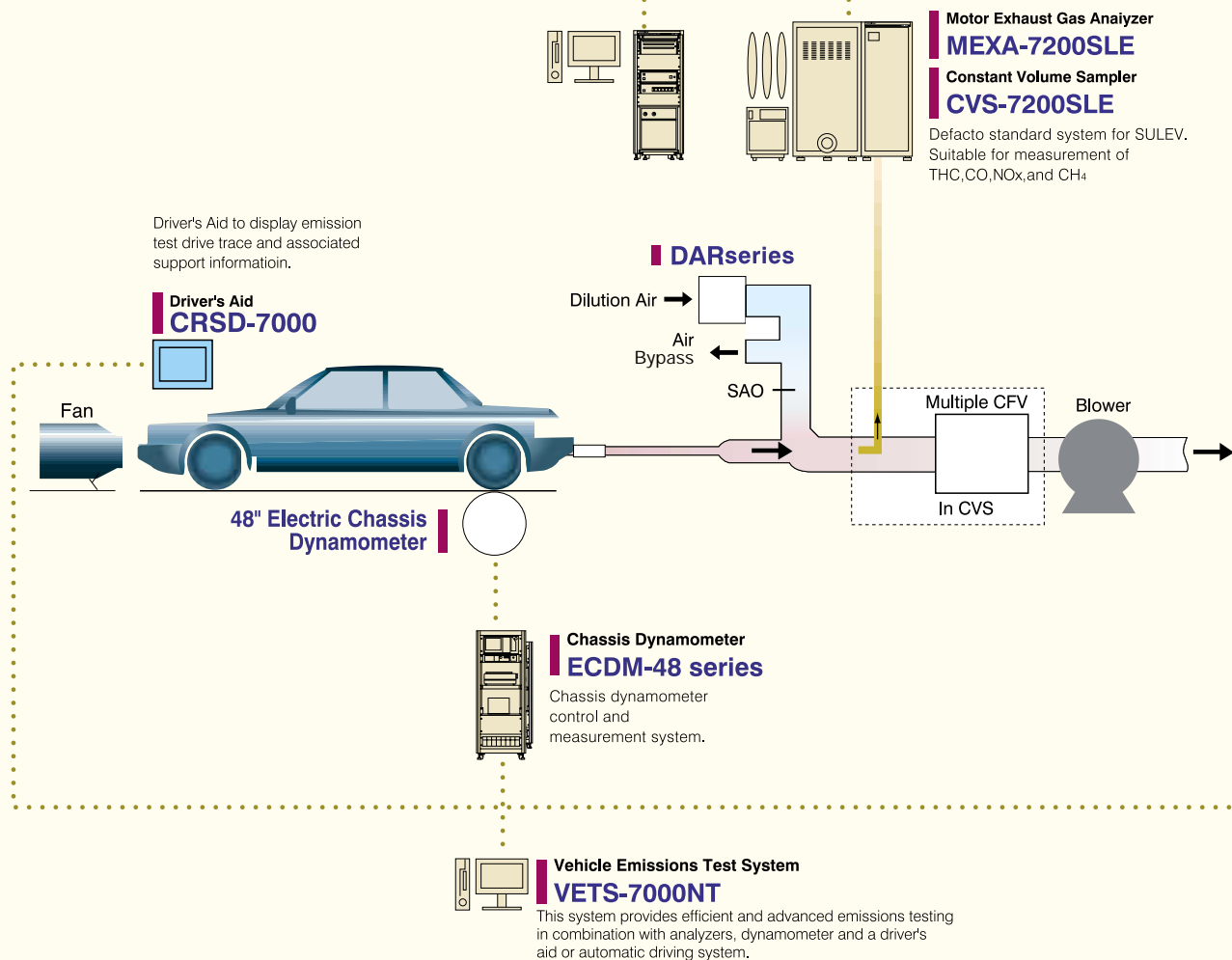
- Compact test facility using partial-flow tunnel system
MEXA-7100D/7500D + MDLT-1300T
- Analysis of oil consumption rate by S-trace method
MEXA-1170SX
- Real-time analysis of PM mass concentration, or number counting of solid particles
MEXA-1230PM, MEXA-1000SPCS

● Catalyst evaluation test system

The performance of vehicle catalyst, traps etc. is of very high interest because engine after-treatment is one of the key technologies for emission reduction. Measurement of emissions from upstream and downstream of such catalysts provides vital information for vehicle development.

- Direct 2-line analyzer to measure pre- and post-catalyst gas simultaneously
MEXA-7500D
- Simultaneous measurement of multi-components including unregulated components
MEXA-6000FT

CVS-bag measurement of SULEV emission



● SULEV emission measurement system

This system is optimized for accurate measurement of the very low emission levels generated from vehicles equipped with the highly advanced controls and after-treatment technologies required to meet the Super Ultra Low Emission Vehicle category.

- Bag Mini-Diluter as an alternative sampling method
MEXA-7200SLE + BMD-1000 + EXFM-1000
- Automatic Driving System with excellent repeatability
ADS-7000
- Evaluation of EGR for NOx emission reduction
MEXA-7500EGR

- Sulfur compounds analyzer to research sulfur poisoning of catalyst
MEXA-1170SX
- Ammonia analyzer for performance evaluation of SCR
MEXA-1170NX

- Evaluation of PM reduction by DPF
MEXA-1230PM, MEXA-1000SPCS
- Catalyst evaluation with the generator of simulated exhaust gas
SIGU series

NDIR:Non Dispersive Infrared Detector
FID:Flame Ionization Detector
HFID:Heated Flame Ionization Detector
GC-FID:Gas Chromatograph-Flame Ionization Detector
NMC-FID:Non Methane Cutter-Flame Ionization Detector
CLD:Chemiluminescence Detector
CLD[Wet/Dry]:Chemiluminescence Detector
[Wet/Dry switchable]
HCLD:Heated Chemiluminescence Detector
PMD:Paramagnetic Detector

Standard Analyzers

Compound	Model	Type	Method	Ranges*
CO	AIA-721	ANR	NDIR	50-5000ppm
	AIA-722	ANR	NDIR	0.5-12vol%
	AIA-723	ANR	NDIR	3-20vol%
CO ₂	AIA-722	ANR	NDIR	0.5-20vol%
	AIA-723	ANR	NDIR	3-20vol%
CO/CO ₂	AIA-722	ANR	CO: NDIR CO ₂ : NDIR	CO:0.5-12vol% CO ₂ :0.5-20vol%
THC	FIA-720	ANR	FID	10-20000ppmC
	FIA-725A	OVN	HFID	10-50000ppmC
	FIA-726/D	19 inch	HFID	10-50000ppmC
O ₂	MPA-720	ANR	PMD	1-25vol%
THC/O ₂	FMA-720	ANR	THC: FID O ₂ : PMD	THC:10-20000ppmC O ₂ :1-25vol%
CH ₄	GFA-720	ANR	GC-FID	5-2500ppm
	FIA-721HA	OVN	NMC-FID	10-5000ppm 50-25000ppm
THC/CH ₄	FIA-726N	19 inch	THC: HFID CH ₄ : NMC-FID	THC:10-50000ppmC CH ₄ :10-5000ppm THC:10-50000ppmC CH ₄ :50-25000ppm
NO _x	CLA-720A	ANR	CLD	10-10000ppm
	CLA-750A	ANR	CLD	10-10000ppm
	CLA-720MA	OVN	HCLD	10-10000ppm
	CLA-755A	OVN	HCLD	10-10000ppm
	CLA-725M	OVN	CLD[Wet/Dry]	10-10000ppm
	CLA-756	19 inch	HCLD	10-10000ppm
	CLA-755M	OVN	HCLD	2-2,000ppm
NO/NO _x	CLA-757	19 inch	NO: HCLD NO _x : HCLD	NO:10-10000ppm NO _x :10-10000ppm
HC	AIA-721	ANR	NDIR	100-5000ppm
N ₂ O	AIA-721	ANR	NDIR	100-5000ppm
SO ₂	AIA-721	ANR	NDIR	100-5000ppm

SLE Analyzers

CO	AIA-721SLE	ANR	NDIR	10-200ppm
CO ₂	AIA-722	ANR	NDIR	0.5-20vol%
THC	FIA-726SLE	19 inch	FID	1-200ppmC
CH ₄	GFA-720SLE	ANR	GC-FID	1-200ppm
NO _x	CLA-750SLE	ANR	CLD	1-200ppm

FX Analyzers

CO-L	AIA-721F	ANR	NDIR	100-5000ppm
CO-H/CO ₂	AIA-722	ANR	NDIR	0.5-12vol%
				0.5-20vol%
THC	FIA-726F	19 inch	Hot-FID	10-50000ppmC
O ₂	MPA-720F	ANR	MPD	5-25vol%
NO _x	CLA-756F	19 inch	CLD	10-10000ppm

*Other ranges on request

Comprehensive Options

- EGR/Tracer Line Option for SHS
- Booster Pump Unit (BSPU)
- Heated Multi Line Selector (HMLS)
- Heated Pre-Filter Unit (HF-10)
- Gas Divider/Converter Checker (GDC-703)
- Span Gas Selector (SGS)
- Leak Checker, Hang up Checker
- Temperature Control Unit (TCU)
- Various Interference Check and Compensation Units
- Remote Controller
- Host Communication (LAN,GPIB,RS-232C)

System Integration

- Support for integration with additional analyzers, such as MEXA-1170 Series (Including SO_x, NH₃)

MEXA-7000 Series Version 3 Models

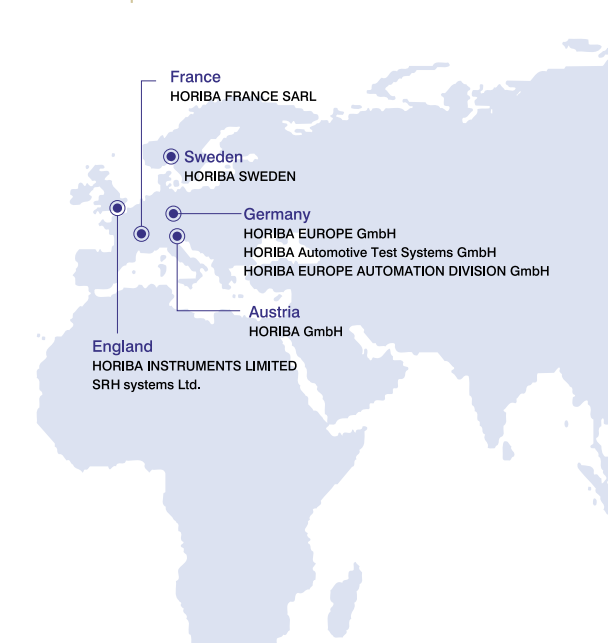
Model	Exhaust				Sampling line			
MEXA-7100	Gasoline				Direct			
MEXA-7100H	Gasoline	Alternative	CNG		Direct			
MEXA-7100D	Gasoline	Alternative	CNG	Diesel	Direct			
MEXA-7100EGR	Gasoline				Direct	EGR		
MEXA-7100HEGR	Gasoline	Alternative	CNG		Direct	EGR		
MEXA-7100DEGR	Gasoline	Alternative	CNG	Diesel	Direct	EGR		
MEXA-7200	Gasoline				Dilute	Bag		
MEXA-7200H	Gasoline	Alternative	CNG		Dilute	Bag		
MEXA-7200D	Gasoline	Alternative	CNG	Diesel	Dilute	Bag		
MEXA-7200TR	Gasoline				Dilute	Bag	Tracer	
MEXA-7200HTR	Gasoline	Alternative	CNG		Dilute	Bag	Tracer	
MEXA-7200DTR	Gasoline	Alternative	CNG	Diesel	Dilute	Bag	Tracer	
MEXA-7400	Gasoline				Direct	Dilute	Bag	
MEXA-7400H	Gasoline	Alternative	CNG		Direct	Dilute	Bag	
MEXA-7400D	Gasoline	Alternative	CNG	Diesel	Direct	Dilute	Bag	
MEXA-7400EGR	Gasoline				Direct	Dilute	Bag	EGR
MEXA-7400HEGR	Gasoline	Alternative	CNG		Direct	Dilute	Bag	EGR
MEXA-7400DEGR	Gasoline	Alternative	CNG	Diesel	Direct	Dilute	Bag	EGR
MEXA-7400TR	Gasoline				Direct	Dilute	Bag	Tracer
MEXA-7400HTR	Gasoline	Alternative	CNG		Direct	Dilute	Bag	Tracer
MEXA-7400DTR	Gasoline	Alternative	CNG	Diesel	Direct	Dilute	Bag	Tracer
MEXA-7500	Gasoline				Direct(1st)	Direct(2st)		
MEXA-7500H	Gasoline	Alternative	CNG		Direct(1st)	Direct(2st)		
MEXA-7500D	Gasoline	Alternative	CNG	Diesel	Direct(1st)	Direct(2st)		
MEXA-7500EGR	Gasoline				Direct(1st)	Direct(2st)	EGR	
MEXA-7500HEGR	Gasoline	Alternative	CNG		Direct(1st)	Direct(2st)	EGR	
MEXA-7500DEGR	Gasoline	Alternative	CNG	Diesel	Direct(1st)	Direct(2st)	EGR	
MEXA-7200LE(1line)	Gasoline	Alternative	CNG		Bag(LE)			
MEXA-7200LE(2line)	Gasoline	Alternative	CNG		Bag(LE)	Dilute	Bag	
MEXA-7200SLE	Gasoline	Alternative	CNG		Bag(LE)			
MEXA-7100FX	Gasoline	Alternative		Diesel	Direct			

MEXA-7000 Series Version 3 System Specifications

Model	MEXA-7000 Version3[Standard]	MEXA-7200SLE	MEXA-7100FX
System configuration	Built up with common basic modules and optional units		
MCU [PC&display]	Mounted in main cabinet or separately installed on a table		
Host communication	LAN GPIB or RS232c		
Sample handling	One or two sample lines with EGR or tracer option	One line dedicated for low concentration gases sampled in bags	Direct:One line
Sample flow rate	9 L /min to 12 L /min[system dependent]		15 L /min
Sample inlet pressure	0 kPa to 30 kPa		
Ambient temperature	5 deg.C to 40 deg.C	20 deg.C to 30 deg.C	5 deg.C to 40 deg.C
Ambient humidity	Under 80% as relative humidity		
External dimension	570[W]×850[D]×1190/1500/1562/1785/1970[H] mm[others on request]		
Mass	Approx. 300kg[configuration dependent]		
Power supply	100/115/200/220/230/240 V AC, 50/60 Hz, single phase[others on request]		
Power capacity	1.5 kVA to 9.0 kVA[configuration dependent]	2.5kVA to 3.5kVA[configuration dependent]	Max:3.8 kVA[configuration dependent]

Global Network

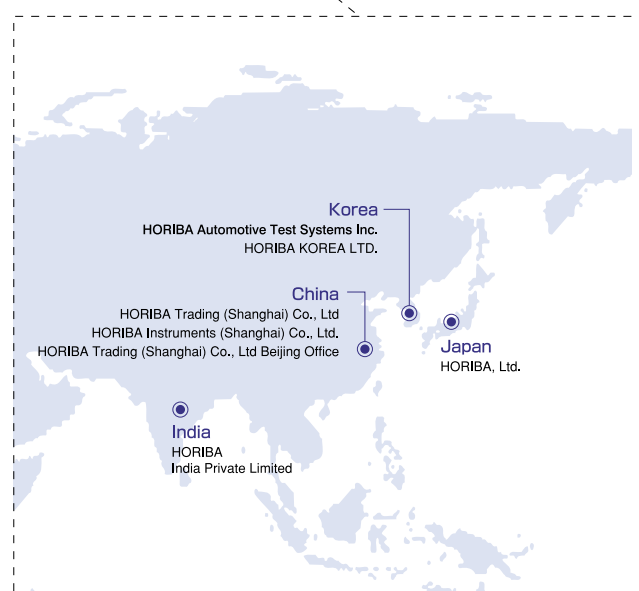
Europe



America



Asia



Where you are, We are

World-Wide Sales & Service Network

HORIBA representatives are always ready to provide assistance with specifications and applications. They are also available to assist in laboratory operation by providing technical information, additional training courses, servicing and maintenance support. Contractual preventative maintenance programs are available upon request. Contact your nearest HORIBA office or authorized representative for details.

As a dedicated manufacturer of advanced analyzer technology, HORIBA will continue creating technical innovations, doing its very best to contribute to progress, in the field of emissions testing by providing analytical excellence.



Please read the operation manual before using this product to assure safe and proper handling of the product.

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