



# 无基准气密检漏仪 FL-610 系列

## ● 无需基准物

无需对基准物进行日常管理（如基准物的检查和储存），削减成本

## ● 精度更高，节拍更短

通过对比基准数据和检测数据，排除了形变、压缩热等干扰，最大限度的保证了精度和节拍。

## ● 配备USB接口

数据传输和软件升级更加容易。可以快捷的对检测数据进行存储和处理。

## ● 对应不同检测对象

可设置32种检测条件

## ● 大尺寸彩屏图形分析

实时显示检测、分析的过程，波形图和数据分析



## Master-Less Leak Tester

### ■ Master Management Not Needed

There is no need for master management (for maintenance and storage areas), which serves to reduce cost

### ■ High Accuracy and Short Measurement Time

Detection accuracy is enhanced by comparing master (reference) data structured with measured data, so that leaks can be detected in a short period of time

### ■ Equipped with USB Ports

Easy processing of I/O data, update software. Measurement results date can be save USB-memory and handling of the data.

### ■ A Variety of Parts Covered

32 different types of measurement conditions are configurable

### ■ Large-sized Graphic Color Display

Processes of on-going measurements, wave forms, and data analysis can be displayed on the screen.



### 串口通信输出 Serial connection output

- 可输出检测结果，压力值和设定值。可选择RS-232端口或者USB端口。  
Measurement results, pressure values, and settings values are output.  
A RS-232C connector or a USB function connector can be selected.

### 组号设定功能 Group Settings

- 可以根据被测物和检测环境的不同，设定0-31组（共32组）对应的测试参数  
Changes of works and conditions settings can be saved under different conditions which can be divided into groups 0 to 31 (32 different types).

### 输入/输出检测功能 I/O Check Function

- 检漏仪的输入和输出可以单独操作及显示。通过监测连接的外部设备的信号或者手动输出的信号，可以确定外部设备端口的工作状态。  
The input/output of the leak tester can be indicated or operated individually for confirmation. The interface with external devices can be confirmed by monitoring the signal of the external device connected or by manual output of the signal.

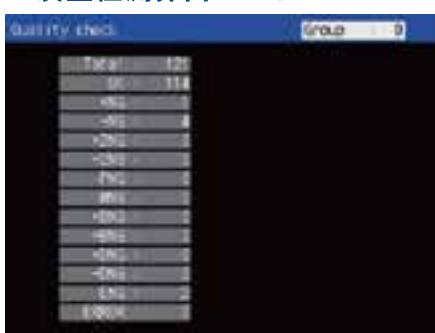
### 分析 Analysis

### 检漏仪的屏幕可以显示数据分析 Measurement results data can be analyzed on the tester's screen.

FL-610的内存可以临时储存并显示最多1000次检测数据。FL-610关闭的时候，所有数据清零。

As to data analysis function, the FL-610 can temporarily save the measurement results up to around 1000 times in its memory and indicate these results. Saved data in the memory is cleared when FL-610 is turned off.

#### ■ 质量检测界面 Quality check Screen



- 一组内的测试次数、合格品/不合格品的数量、检测结果明细可以一目了然的显示出来。由此可以判断不合格率。  
Breakdown information of the measurement results such as the number of measurement in the group, the number of acceptable and unacceptable parts is displayed. It can use judgment of a defective fraction.

### 自诊断功能

#### Self Check Function

- 在维护模式下，当阀体发生故障或者传感器信号断路时，机器会报警。传感器的敏感度下降也能被检测到。  
In the maintenance mode, this function gives a warning where an operational malfunction of the valves or a sensor disconnection is discovered. Sensor defects due to sensor deterioration can also be diagnosed.

### CAL检测功能

#### CAL Open Test Function

- 如果在前面板上的CALPORT打开的状态下，进行一般检测，可以用来检测设定的容积和测试节拍是否合适。

检测进行时，将定流量发生器（型号FFM-100）连接到被测物上，此时被测物被看做带着漏孔。操作员可以根据检测结果判断被测物的容积和测试节拍是否匹配。

Usual measurements are done under conditions where the CAL PORT on the front panel is released. This function can be utilized for confirming work volume configured and verifying proper tact time.

Where measurements take place connecting an acceptable work to the flow master (Type: FFM-100), measurements are done as if the acceptable work was a work with leak. The user can know whether the work volume and tact time is proper from the leak rate measured.

### 容积测定功能

#### Volume Measurement Function

- 将手动校正器或者定流量发生器（型号FFM-100），或者配备有精密型针阀的流量计连接在CALPORT口上，可以产生一个人为泄漏。根据产生的泄漏率，可以计算出被测物的容积。

Connecting the manual calibrator or flow master (type: FFM-100), and the flow meter with a precision needle valve to the CALPORT can generate an artificial leak. This serves to obtain the volume of the work connected from the leak rate of the artificial leak generated.

### USB接口

#### USB Connectors

- USB接口及其应用让数据的传输和软件的升级更加简单。各项设置也可以容易的被更改。

Adoption of USB hosts and USB functions makes it easier to input/output data and update software. Settings can also be re-configured easily.

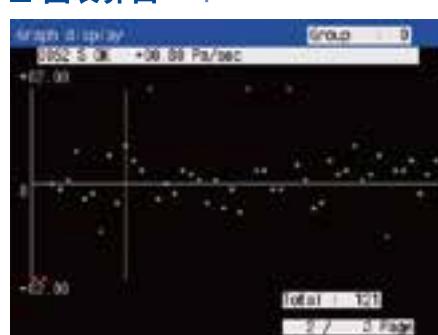
### 大容积被测物的检测

#### Measurement of Large Capacity Works

- 2-8L的大容积被测物可以选用旁路充气设备（CBU-600型），如需测量更大容量的被测物，请咨询联系我公司。

Works from 2L to 8L can be measured by selecting the option for the pressurization bypass unit (CBU-600). Works with even a greater capacity. Please feel free to consult us about this option.

#### ■ 图表界面 Graph Scree



- 检测结果会以图表的形式显示。每个光标点处（图中黄线）的详细数据也会被显示。能够进行工程能力的评价。

Measured data is graphically displayed. The detailed data at each point of the cursor (the yellow line in the figure) is also displayed. The process performance is appreciable from the graph.

## 数据

Data

### 根据特定环境可以选择不同的数据输出方式

Data output methods can be selected according to particular circumstances.

#### USB 内存 USB memory



- 内存: 2GB
- 数据: 100万次读写
- 2-GB Memory
- Data : One million times

USB内存让数据易于转移，不同检漏仪的设定参数可以很容易的被复制和输入。检漏仪的参数可以很方便的重置，尤其是当有多台检漏仪，或者更换检漏仪，或者新增被测物时。

使用USB内存也使得软件升级变得更加简单。即使检漏仪不和电脑相连，数据也可以长期保存。当操作环境变化，或者发生故障寻找原因时，可以进行数据管理分析。

USB memory makes data portable, so that the settings values of separate testers can be copied and entered. Settings of testers can be easily configured, especially where there are multiple testers, where the testers are changed, or where a new work is measured. Software update can also be easily performed by using USB memory. Data can be stored for a longer time without connecting the tester to a computer. Data can be managed for data analysis which is performed when operation conditions are confirmed or causes are investigated where malfunctions occur.

#### USB功能端口 USB function connector

数据可以输入电脑进行管理分析。电脑安装专用驱程以后，可以输出和RS-232接口相对应的通信数据。

Data is managed or analyzed by outputting data to a computer. The installation of a specific driver on the computer allows the same data which is output from a RS-232C connector to be output to serial communication.

#### RS-232端口 RS-232C connector

通过电脑和串口的连接，进行串口通讯。通讯模式可以有多种选择。

This connector conducts serial communication in order to output data by means of a connection with a computer or sequencer. Output data can be selected from several different kinds of output modes depending on the data to be output.

#### 打印输出 Printout

当检测结果需要打印出来，作为产品的附件资料时，可以将一台使用RS-232端口的打印机（型号BL-80RSII）连接到检漏仪（详见选型表中“可选设备”）。

When the measurement results need to be printed out and attached to a product, connect the tester to a printer using the RS-232C connector (type: BL-80RSII) (See the section "Additional Equipment" for details).

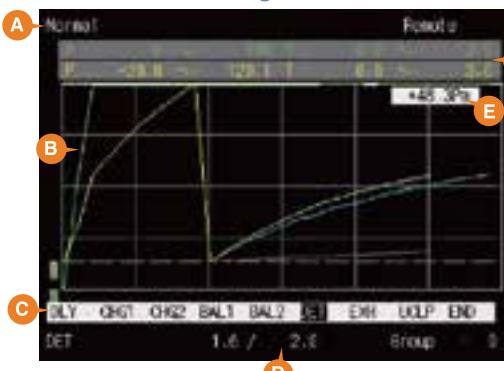
## 显示

Displays

### 福田检漏仪以多种形式显示多种数据

FUKUDA's leak tester Displays a variety of data in various forms.

#### ■ 检测中界面 During Measurement Screen



※ 根据上边的波形图可以确定检测环境和检测参数，发生故障时可以追踪原因。

From wave data, measurement conditions are confirmed, settings values at start-up are verified, and causes can be traced where trouble occurs.

A : 检测类型: 基准检测/普通检测

B : 检测曲线

绿色: 测试压 黄色: 差压值 蓝色: 基准值

紫色: 基准数据修正后的差压值

C : 检测环节与当前环节

D : 环节已用时间/环节设定时间

E : 当前差压值

F : 图表显示的范围设定

Mastering / Normal

A : Measurement type: Mastering/ Normal

B : Measured data graph

Green: Gauge pressure Yellow: Differential pressure sensor value

Blue: Master data Purple: Differential pressure value corrected by master data

C : Processes and the current process

D : Process elapsed time/ Process set time

E : Current sensor value

F : Scale settings for graphic display

#### ■ 检测结果界面 Measurement Results Screen



A : 检测结果判定

B : 检测结果数值

C : 检漏仪的操作状态 (保持模式)

D : 检测时被测物的内部压力

E : 判断产品是否合格的设定值

A : Determination result of the measurement

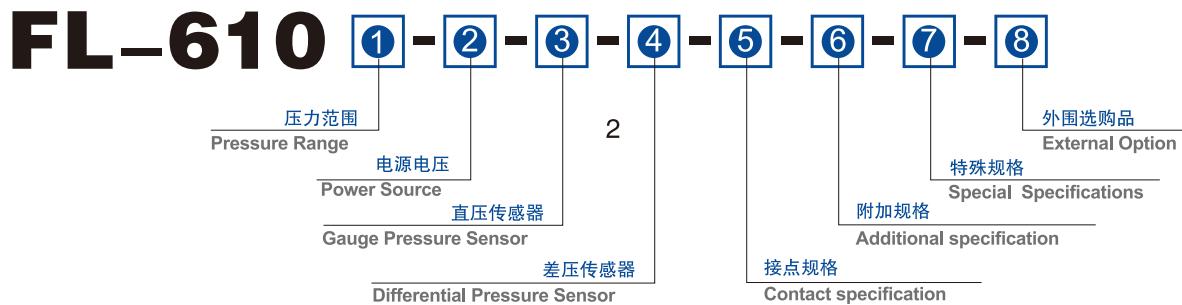
B : Numerical value of the measurement result

C : Operational status of the leak tester (Hold mode)

D : Internal pressure of the work during measurement

E : Set value for determining acceptable or unacceptable works

## ■ 型号 Model



### ① 压力范围 Pressure Range

型号 Mode	使用范围 Applied Pressure Range	设定范围 Setting Pressure Range	显示范围 Indicated Pressure Range
VB	-90.0 ~ -5.0 kPa	-90.0 ~ 0.0 kPa	-99.9 ~ 0.0 kPa
LC	5.0 ~ 20.0 kPa	0.0 ~ 20.0 kPa	0.0 ~ 50.0 kPa
LJ	5.0 ~ 50.0 kPa	0.0 ~ 50.0 kPa	0.0 ~ 52.0 kPa
LD	10.0 ~ 99.9 kPa	00.0 ~ 99.9 kPa	00.0 ~ 99.9 kPa
LE	10 ~ 100 kPa	0 ~ 100 kPa	0 ~ 125 kPa
LF	30 ~ 300 kPa	0 ~ 300 kPa	0 ~ 300 kPa
MC	100 ~ 700 kPa	0 ~ 700 kPa	0 ~ 999 kPa
HC	300 ~ 990 kPa	0 ~ 999 kPa	0 ~ 999 kPa

② 电源电压 Power Source	型号 Mode	电源电压 Power Source	备注 Note
	AA	AC 100~240V	
③ 直压传感器 Gauge Pressure Sensor	型号 Mode	精度 Accuracy	
	01	± 2% F.S.	
	02	± 3% F.S.	适用于VB, LC, LD, MC
④ 差压传感器 Differential Pressure Sensor	型号 Mode	规格 Specifications	
	02	2 kPa	
	03	10 kPa	适用于LF, MC, HC
⑤ 接点规格 Contact specification	02	NPN 输出 NPN output	
⑥ 附加规格 Additional specification	03	PNP 输出 PNP output	
⑦ 特殊规格 *1 Special Specifications	NN	无 Without	
⑦ 特殊规格 *1 Special Specifications	NN	无 Without	

\*1) 如需详细规格, 请联系福田公司

Please contact FUKUDA about the detailed specifications.

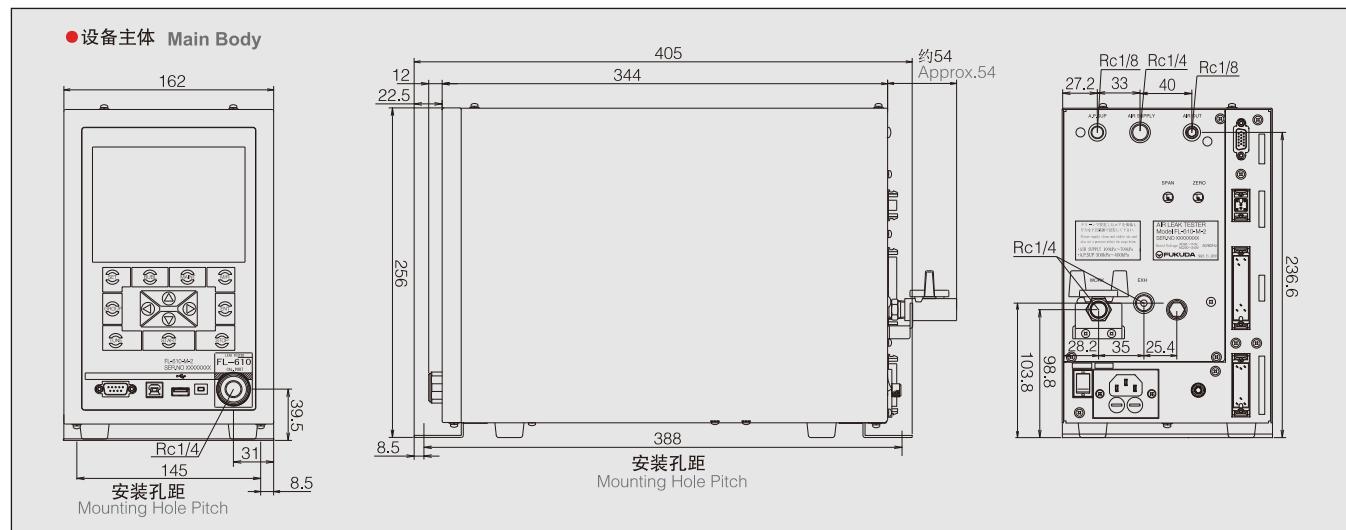
### ⑧ 外围选购品

型号	产品名称	规 格		
		电源线	压力	范围
D14-0901-01		日本用3m 125V-7A 三级插头 带转换插头		
D14-0901-02		国外用2m 250V-10A 不带插头		
型号	产品名称	规 格	压力	范围
No		—		
FRZ-0051-0		正压 标准	R5	5.0 ~ 10.0 kPa
		P-200-2	1.0 ~ 10.0 kPa	LC LJ
FRZ-0052-0		正压 精密	P-200-3	10.0 ~ 50.0 kPa
		P-200-4	10.0 ~ 80.0 kPa	
FRZ-0053-0		正压 标准		0.02 ~ 0.2 MPa
FRZ-0054-0	过滤器/减压阀	正压 精密		0.005 ~ 0.2 MPa
FRZ-0055-0		正压 精密+高精密过滤器		0.005 ~ 0.2 MPa
FRZ-0056-0		正压 标准		0.05 ~ 0.85 MPa
FRZ-0057-0		正压 精密		0.01 ~ 0.8 MPa
FRZ-0058-0		正压 精密+高精密过滤器		0.01 ~ 0.8 MPa
FRZ-0059-0		正压 标准		0.1 ~ 1.6 MPa
FRZ-0061-0		负压 精密		-100.0 ~ -1.3 kPa
FRZ-0062-0		负压 精密	P-200-8	-80.0 ~ -10.0 kPa

### ⑧ External Option

Model	Product Name	Specification		
		Power Cord		
D14-0901-01		For use within Japan 3m 125V-7A 3-pronged plug, conversion adapter included		
D14-0901-02		For use outside of Japan 2m 250V-10A, plug not included		
Model	Product Name	Specification	Pressure	Range
No		—		
FRZ-0051-0		Positive Pressure Standard Spec	R5	5.0 ~ 10.0 kPa
		P-200-2	1.0 ~ 10.0 kPa	LC LJ
FRZ-0052-0		Positive Pressure Precision Spec	P-200-3	10.0 ~ 50.0 kPa
		P-200-4	10.0 ~ 80.0 kPa	
FRZ-0053-0		Positive Pressure Standard Spec		0.02 ~ 0.2 MPa
FRZ-0054-0	Filter/Regulator Unit	Positive Pressure Precision Spec		0.005 ~ 0.2 MPa
FRZ-0055-0		Positive Pressure Standard Spec and High Performance Spec		0.05 ~ 0.85 MPa
FRZ-0056-0		Positive Pressure Standard Spec		0.01 ~ 0.8 MPa
FRZ-0057-0		Positive Pressure Precision Spec		0.01 ~ 0.8 MPa
FRZ-0058-0		Positive Pressure Precision Spec and High Performance Spec		0.01 ~ 0.8 MPa
FRZ-0059-0		Positive Pressure Standard Spec		0.1 ~ 1.6 MPa
FRZ-0061-0		Negative Pressure Precision Spec		-100.0 ~ -1.3 kPa
FRZ-0062-0		Negative Pressure Precision Spec	P-200-8	-80.0 ~ -10.0 kPa

## ■ 外形尺寸(单位: mm) External Dimensions (Unit: mm)



## ■ 规格 Specifications

测定方式	被测物、固定基准物差压比较方式(无基准物)	Testing Method	Work/ Fixed Master Comparison (Master-Less) Differential Pressure Method Air Leak Tester
容积测定	使用定流量发生器或手动校正器进行容积测定和校准	Volume Testing	By employing a flow master, Volume testing and calibration can be done according to actual leak standards.
差压传感器	VRZ-5500 ± 2 kPa 精度 ± 0.5%F.S. ± 10 kPa 精度 ± 0.5%F.S.	Differential Pressure Sensor	VRZ-5500 ± 2 kPa Accuracy ± 0.5%F.S. ± 10 kPa Accuracy ± 0.5%F.S.
直压传感器	VB型 -101kPa ※ LC型 50kPa ※ LJ型 50kPa LD型 100kPa ※ LE型 100kPa LF型 300kPa MC型 1MPa ※ HC型 1MPa	Gauge Pressure Sensor	VB Range -101 kPa ※ LC Range 50 kPa ※ LJ Range 50 kPa LD Range 100 kPa ※ LE Range 100 kPa LF Range 300 kPa MC Range 1 MPa ※ HC Range 1 MPa
被测物侧容积	约6.2ml	Work Side Volume	Approx. 6.2 mL
基准容器容积	约32ml	Master Tank Volume	Approx. 32 mL
测定精度	50mL标准被测物1ml/min的测试条件下, 测定误差在±5%以内	Testing Sensitivity	Standard work of 50mL Used for Leak Experimen ±5% 1mL/min
推荐前导压	驱动压300 ~ 400kPa	Recommended Pilot Pressure	Driving pressure 300 ~ 400 kPa
显示	5.7英寸LCD显示 (320×R.G.B.) X240 dot TFT色彩	Display	5.7 Inch、LCD(320×R.G.B)×240 dot、Color TFT
组号设定	0~31 (共32组)	Group Setting	0~31 group (32 Total)
测试压力自动控制	自动压力控制器 (APU-70, APU-90, APU-120, APU-130) ※	Test pressure Automatic Control	Corresponds to Pneumatic Regulators (APU-70, APU-90, APU-120, APU-130) ※
显示单位	检测结果单位: Pa, kPa, Pa/s, kPa/s, Pa/min, kPa/min, mL/s, mL/min, Pam <sup>3</sup> /s, Pa/DET, kPa/DET  测试压单位: kPa, MPa, kgf/cm <sup>2</sup> , psi, mbar, bar, mmHg, cmHg, inHg	Display Unit	Testing Unit: Pa, kPa, Pa/s, kPa/s, Pa/min, kPa/min, mL/s, mL/min, Pam <sup>3</sup> /s, Pa/DET, kPa/DET  Test Pressure Unit: kPa, MPa, kgf/cm <sup>2</sup> , psi, mbar, bar, mmHg, cmHg, inHg
外部输入/输出	REMOTE 50P (外部控制信号) APU SIGNAL 8P (APU控制信号) EXT VALVE SIGNAL 34P (外部选购阀信号) RS-232 D-SUB 9P (数据输出信号) ANALOG IN 15P (外部模拟信号) USB接口 A型接口 USB接口 B型接口	External Input/Output	REMOTE 50P (External Connection Signal) APU SIGNAL 8P (APU Connection Signal) EXT VALVE SIGNAL 34P (Externally Mounted Option Signal) RS-232 D-SUB 9P (Data Output Signal) ANALOG IN 15P (External Analog Signal) USB Host A connector USB Function B connector
温度/湿度范围	0~40°C 45~85%RH (无结露)	Operation Temperature/Humidity Range	0~40°C 45~85%RH (With no Precipitation)
电源	约AC100~240V	Power Source	Approx. AC100~240V
耗电量	约100VA	Applied Current	Approx. 100 VA
重量	约12kg	Weight	Approx. 12 kg
语言	日语/英语	Language	Japanese/ English

※APU可选 (请参考FL-600系列“可选设备”选项)

※ APU is an option. (Please refer to the FL-600 series Additional Equipments.)

主要产品 ● 气密检漏仪 ● 数字压力表 ● 流量计 ● 自动压力、流量控制器 ● 密封性能检测专用设备



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