

Automatic Isokinetic Sampler **ST5**





# Automatic Isokinetic Sampler ST5

## Description

The ST5 is the next generation isokinetic sampler, developed to be efficient, rugged, accurate and user friendly. The perfect companion for stack testers.

The ST5 includes all the measuring sensors inside its robust structure making it a single practical device to be taken on the stack and reducing the need of maintenance.

### Precise isokinetic condition

The sampling flowrate is directly controlled with a mass flow meter which allows the fastest correction and have the flow velocity entering the nozzle asymptotic to the stack gas velocity.

Despite the apparent higher costs when compared to a manual solution, the automatic isokinetic sampler allow to save money and time thanks faster startup, stack libraries, possibility to sample for longer periods unattended (e.g. for pcdd/pcdf or heavy metals).

All those characteristics reduce the risk of compromising the operation or losing data.

Superior protection against liquids, the ST5 has built-in sensor that "feels" the presence of liquids passing through the inlet, in this case, the ST5 goes automatically in stand-by preventing any internal damage.

Higher quality of the data due to automated parameters control which also grants high accuracy and compliance to the most diffused standard, especially when sampling micropollutants in low concentrations.

Bigger LCD color display with cycling screens reporting each the essential data to keep the sampling operation under control.

The ST5 can work with all Pitot tubes and thermocouples, it's possible to enter the information related to Pitot tubes in the internal library.

Powerful pumps, the ST5 is available with a 4.5m<sup>3</sup>/h or with a 8.5 m<sup>3</sup>/h pump.

All those features make the ST5 the best tool for stack sampling, allowing at the same time a high degree of traceability to make your life easier with quality procedures.

## Main Characteristics

- Automatic isokinetic sampler for the pollutants evaluation in stack emission
- Velocity and flowrate determination in ducts in accordance with UNI EN16911-1 method and EN15259
- Meets and exceeds the requirements defined in the sampling methods such as UNI EN 13284, EN1948-1, EN 14385, EN 13211 and US EPA M2, M5, M17
- Grants high standards of accuracy and traceability of measurements and calibrations.
- Easy to use and possibility of integration with PC, smartphones and tablet
- Download of the sampling, calibration and traceability data to all operative systems and computers.
- The ST5 Evo is equipped with a standard USB2.0 port and wireless connectivity for the Dadolab Companion App.



## Technical Characteristics

### General

Flowrate operative range	5 ÷ 60 l/min
Sampled gas conditions	Dehydrated, max temperature 45°C
Gas inlet	with protection filter for particulate and liquids
Connections	with quick connectors
Operation conditions	-20 ÷ 45°C 95% RH
Stock conditions	-10 ÷ 50°C 95% RH
Display	3.5" Graphic LCD (QVGA)
Data Port	USB 2.0, Bluetooth
Internal Memory	16GB
Power supply	230 Vac ±10% 50/60Hz
Materials	Steel/Aluminum combined structure
Keyboard	Polycarbonate, tactile effect keys
Dimensions (WxDxH)	370 x 250 x 500 mm
Weight	16 kg (4.5 m <sup>3</sup> /h pump)

### Characteristics and accuracy of the measures

#### Sampled Volume

Gas Meter Class	Dry Gas Meter, class G4, certified 2004/22/CE, in compliance to EN 1359
Flowrate range	0.4 m <sup>3</sup> /h ÷ 6.0 m <sup>3</sup> /h
Accuracy	2%
Encoder resolution	0.001 liters

#### Sampling flowrate

Device	Flowmeter in compliance with UNI EN ISO 5167-2
Range	5 ÷ 60 l/min
Resolution	0.01 l/min
Accuracy	± 1%

#### Differential Pressure (pitot)

Range	-100 ÷ 1000 Pa (-10÷100 mmH <sub>2</sub> O)
Hysteresis and Linearity	0.25 % F.S
Accuracy	Better than 1% (± 2Pa)
Resolution	0.05 Pa (0.005 mmH <sub>2</sub> O)
Burst Pressure	max. 3000 Pa (300 mmH <sub>2</sub> O)

#### Abs. Pressure (static/barometric)

Range	10 ÷ 105 kPa (1050 mBar)
Hysteresis and Linearity	0.25 % F.S
Resolution	0.01 kPa (0.1 mBar)
Accuracy	Better than 1% (± 0.25 kPa)

#### Thermocouples input (std programmed curve type "K" as per ITS 1990)

Range	-20 ÷ 1200 °C
Resolution	0.01 °C
Accuracy	1% (± 0.4 °C)

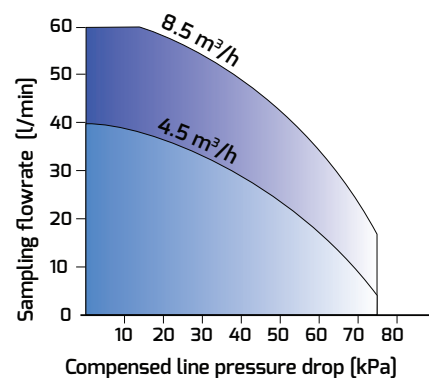
#### DGM Temperature (Pt100 sensor)

Range	-20 ÷ 100 °C
Resolution	0.01 °C
Accuracy	1% (± 0.2 °C)

Dimensions (mm)



Pumps operative range



## Integrated Functions

- **Operative Modes**
  - Duct velocity
  - Constant flow operation
  - Isokinetic sampling
  - PMx sampling
- **Utilities**
  - Sampling nozzle determination
  - Automatic leak test
  - Density calculation
  - "Point" or "Continuous" mode
  - Sampling line auto-purge
  - V'a and Ta constant
- **Libraries management**
  - Sampling reports
  - Measures log
  - Alarms log
  - Frequently visited stacks
  - Pitot terminals
  - Stack thermocouples
- **Calibration Manager**
  - Temperature measurement
  - Dry gas meter check
- **Alarms Management**
  - Thermocouples
  - Pump
  - Presence of liquid
  - Dry Gas Meter
  - Mass Flowmeter
  - Isokinetic Deviation
  - Pressure Sensors
- **Automatic restart after**
  - Power failure
  - Duct velocity alarm
  - Isokinetic deviation alarm
- **Automatic creation of the sampling reports**
  - Full measure report
  - Weighted average of the duct parameters
  - Evaluation of the sampling compliance criteria in accordance with ISO 10780 and EN13284

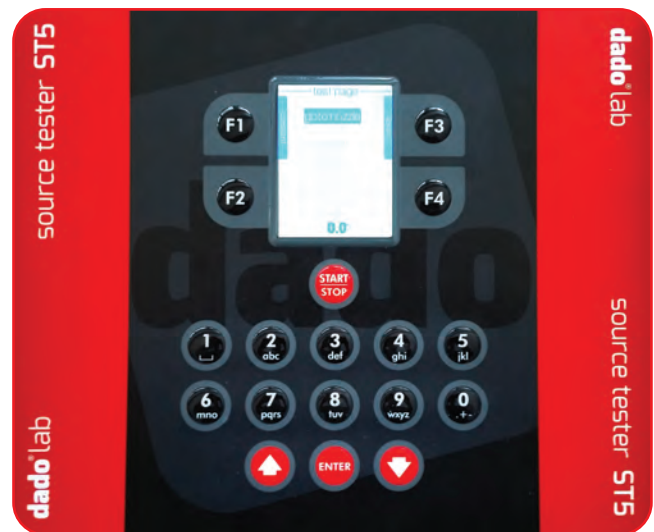


## Calibration, Accuracy and Traceability

The ST5 is supplied by DadoLab with traceable calibration report made with internal Accredia certificated references and including data related to nominal and actual values, deviation errors of all instrument sensors.

For all measured parameter is possible to enter multi-point correction curves freely programmable by the user through DadoLab's utility.

The ST5 features a user friendly interface, setup and operation is fast and easy, without the need of complicated procedures.



## Rugged design and attention to details

Ergonomy was also considered during development. ST5 is protected by rubber profiles with rounded angles. Display and keyboard are protected by transparent shell.

Thermocouples connectors are made with different colors to easy the connection. Protection filter is located behind a transparent, easy to remove cover.

Power is protected by interchangeable fuse, replaceable easily without opening the instrument.

Every detail of the ST5 is designed to make it the best work companion for stack testers.

## ADS-1 Automatic Derived Sampler

EN methods for micropollutants sampling such as heavy metals, mercury or acids offer the possibility to realize the isokinetic sampling line with the "side sampling" solution, where a second gas stream is extracted using a constant flow pump and pollutants are captured in a dedicated impingers train.

Actually, the side sampling flowrate, which must be kept at a fixed ratio with the isokinetic flow, is set manually.

Dado lab realized the first world fully automated sampler for the side sampling applications.

The ADS-1 totally automates the side sampling operation and works in combination with the ST5 sampler.

Once the derived flowrate is set on the ADS-1, all the process is then controlled by the ST5 sampler, which measures the isokinetic condition and set consequently the flowrate on the ADS-1 in order to keep the ratio between the two flows constant.

Thanks to its advanced pneumatic line, the working flowrate on the ADS can be set even with the derived line closed. This greatly reduces the risks of losing the adsorbing solutions because of the unbalanced pressures between the lines. To increase protection from liquids, the ADS-1 is equipped with a protection filter and tank which will water presence.

101 101 1200 Automatic Derived Sampler mod. ADS-1



Flowrate	0.250 ÷ 5.000 NL/min
Regulator	electronic by OM
Sample cond.	dehyd, max temp. 45°C
Protection	filter particulate & liquids
Connections	quick connectors
Operation cond.	-20 ÷ 45°C 95% RH
Stock cond.	-10 ÷ 50°C 95% RH
Power supply	230 Vac ± 10% 50/60Hz
Materials	Steel/Aluminum
Pump	Single head diaphragm
Dimensions (WxDxH)	330 x 310 x 360 mm
Weight	9 kg

## Dadolab Companion App

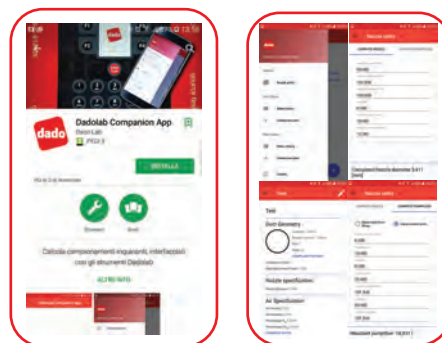
The Dadolab Companion App was developed to help technicians with the isokinetic sampling setup and calculations.

The app can calculate the best nozzle for the stack conditions or calculate the resulting pump flowrate but allows also to create libraries for stacks and Pitot tubes which can be recalled when needed.

The Dadolab Companion App can also connect to the ST5 and ST5 Evo and mirror the display, download data, upload configurations.

More and more features will come in the next future.

101 107 2001 Smartphone Android for ST5 & ST2



QR Code to download the app  
or search **Dadolab** on google play

## Models, accessories and spare parts



- 101 101 1001    **ST5 V4.5 standard supply**
- 4.5 m<sup>3</sup>/h corrosion proof pump
  - heated units control
  - liquids protection of the inlet
  - inputs for 5 thermocouples
  - test and calibration report
  - USB flash disk
  - transport case
  - power cable
  - user manuals



- 101 101 1002    **ST5 V8.5 standard supply**
- same as V4.5 except for
- 8.5 m<sup>3</sup>/h corrosion proof pump

- 101 101 2001    **Zero dp sensor**
- Integrated module for the Pitot tube auto-zero without probe disconnecting



- 101 101 2100    **Connection cable, 5 meters**
- suction tube complete with quick connectors
  - 3 thermocouples
  - heated units cables
  - pitot pneumatic signals

- 101 101 2110    **Connection cable, 10 meters**

- 101 101 2120    **Connection cable 15 meters**

- 101 101 2130    **Connection cable 20 meters**

- 101 101 2140    **Connection cable 25 meters**

other lengths available on request



- 101 101 3010    **Sampled gas protection filters**
- set of 10 pieces

- 101 101 4002    **Silica Gel/Charcoal Trap**
- 100cc

- 101 101 4003    **Silica Gel/Charcoal Trap**
- 1 liter