

Automatic Isokinetic Sampler **ST5 Evo**





## Automatic Isokinetic Sampler **ST5 Evo**



The ST5 Evo is evolved version of the ST5 isokinetic sampler, developed to be even more efficient, easy to use, practical, cost/time-saving. The perfect companion for stack testers.

The instrument is composed by two units, the Control Unit and the Pump Unit. The Evo version is designed to allow the user to take up on the sampling point only the light Control Unit (6 kgs) while the heavy Sampling Unit can be left down on the ground.

All the electronic boards and measuring sensors are placed inside a robust steel box, making it a practical device to be taken on the stack and reducing the risk of damages

Differently from other manufacturer's solutions, the Pump Unit includes only the pump. The reason of this choice is to save costs of long, expensive connection cables. To connect the CU to the PU, only a suction tube and a power cable are needed.

The expensive umbilical cable, taking all the signals and temperature control from the probe to the CU can be now very short because the connection with the SU can be done with inexpensive tubes and power cable.

Moreover, in case of pump failure, the CU can work with a spare Dado PU unit or with any pump capable to supply the needed flowrate, allowing to complete the job without the need to send the instrument to maintenance.



This solution allow to save money and time thanks to faster startup, stack libraries, possibility to sample unattended for longer periods (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 Evo has a built-in water sensor that "feels" the presence of liquids passing through the inlet, in this case, it goes automatically in stand-by preventing any internal damage.

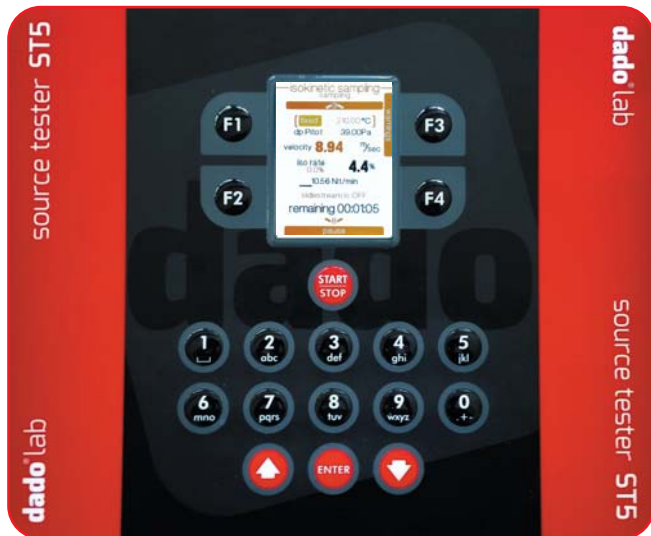
Precise isokinetic condition measure thanks to mass flow meter real time flowrate measure, which allows the faster correction resulting in a flow velocity entering the nozzle asymptotic to the stack gas velocity.

The ST5 integrates four pressure sensors to measure differential pressure, in stack an the mass flow, static and barometric pressure, to determine, with high accuracy, velocities, densities and stack conditions.

Having dp, barometric and static pressure measured, along with temperatures, allow to certify even the velocity determination.

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 Evo 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 Evo Pump Unit is available with a 4,5m<sup>3</sup>/h, standard or corrosion proof version, or with a 8,5 m<sup>3</sup>/h pump.

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

With the ST5 Evo, additional thermocouples input, thermoregulators for heated devices, water presence sensor, water collection tank and carrying case are not an option, they are included in the price.

## Main Characteristics



Split automatic isokinetic sampler for the pollutants evaluation in stack emission.

Since the pump is separated, no cooling fan is needed on the control unit, reduce dramatically the dust entering the unit and thus the required cleaning and related problems.



Only the light Control Unit (8 kgs) has to be taken on the sampling point, the heavier Pump Unit can be left on the ground, reducing risks for technicians and making their life easier.



Velocity and flowrate determination in ducts in accordance with UNI EN16911-1 method, including swirl angle evaluation and WAF correction.



Fast Isokinetic condition through mass flow sensor. 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.



Built-in water presence sensor and collection tank to grant maximum protection against liquids, responsible for the most common maintenance operation and lost working days.



Easy to transport on the stack sampling point and fast to setup and operation thanks to stacks and Pitot libraries.



The pump is now easy to replace in case of failure, even on the field, a spare unit or another compatible pump can be used to restore, in no time, the operativity.

The advanced software allows the Evo to continue the operations even in case of DGM malfunctioning. A warning will notify the user about the problem and give the option to continue the operation using the mass flow only. In the report a red note will appear warning the user about the calculated volume.

The umbilical cable can now be very short. The connection cable between Control and Sampling Unit is composed by a simple and cheap pneumatic and power cable.

Those features, along with many other solutions, allow to save money and reduce the downtime of the instrument.



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 Bluetooth for future connections to PCs, tablets or smartphones.

Future firmware updates can be quickly applied through the USB port.

## Calibration, Accuracy and Traceability

The ST5 Evo is supplied by DadoLab with traceable calibration report made with internal Accredia certified 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 Evo features a user friendly interface. Setup and operation are fast and easy, without the need of complicated procedures.

## Rugged design and attention to details

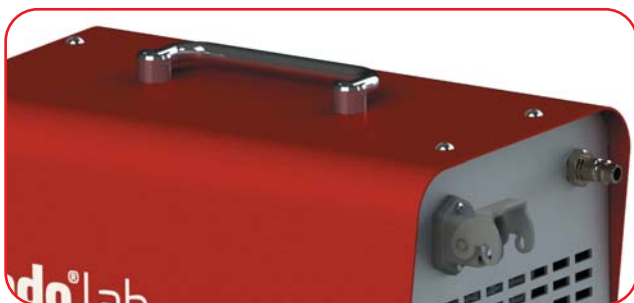
Ergonomy was also considered during development. ST5 Evo is protected by rubber profiles with rounded angles. Display and keyboard are protected by transparent and shocks resistant polycarbonate cover.

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 Evo is designed to make it the best work companion for stack testers.



## Integrated Functions :

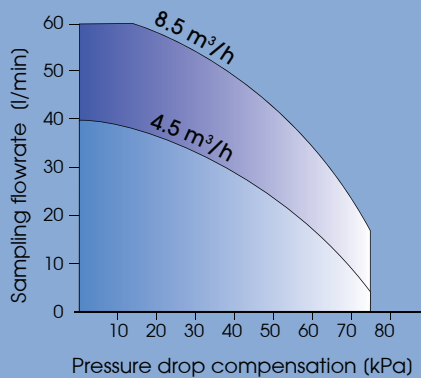
- **Operative Modes:**
  - Duct velocity
  - Constant flow operation
  - Isokinetic sampling
  - PMx sampling
- **Utilities :**
  - Sampling nozzle determination
  - Automatic leak test
  - Density calculations
  - V'a and Ta constant
- **Libraries management :**
  - Sampling reports
  - Measures log
  - Alarms log
  - Frequently visited stacks
  - Pitot terminals
  - Stack thermocouples
- **Calibration Manager**
  - Temperature measurement
  - Dry gas meter check
  - Mass Flow 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

## Technical Characteristics :

### ST5 Evo :

Flowrate operative range:	5 - 60 l/min
Sampled gas conditions:	Dehydrated, max temperature 45°C
Gas inlet:	with protection filter for particulate and liquids with quick connectors
Connection:	with quick connectors
Operation conditions:	-20 ÷ 40°C 95% UR
Stock conditions:	-10 ÷ 50°C 95% UR
Display:	3.5" Graphic LCD (QVGA)
Data Port:	USB 2.0
Internal Memory:	16GB
Power supply:	220 Vac ±10% 50/60Hz
Materials:	Steel/Aluminum combined structure
Keyboard:	Polycarbonate, tactile effect keys
Dimensions:	CU : 390 x 264 x 386 mm (W x D x H) PU : 330 x 217 x 180 mm
Weight:	Control Unit : 6 kgs Pump Unit [4,5 m <sup>3</sup> /h] : 10 kgs

Pumps operative range



### 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% (± 0.2%)
Encoder resolution:	0.02 liters

#### Sampling flowrate

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

#### Differential Pressure

dP Pitot :	-100 ÷ 2600 Pa (-10÷260 mmH <sub>2</sub> O)
Hysteresis and Linearity:	0.25 % F.S
Accuracy:	Better than 1% (± 2Pa)
Resolution:	0.10 Pa (0.01 mmH <sub>2</sub> O)
Differential Pressure:	max. 10 000 Pa (1000 mmH <sub>2</sub> O)

#### Abs. Pressure

Static and barometric]:	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)

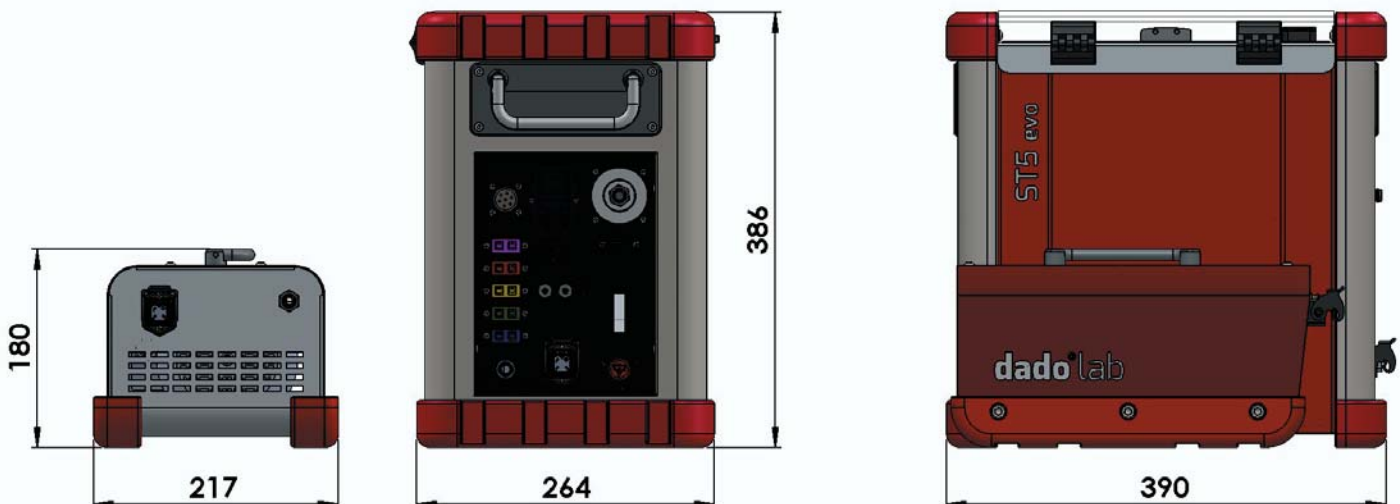
#### Thermocouples input

[std programmed curve type "K" as per ITS 1990]	
Range:	0 ÷ 1200 °C
Resolution:	0.01 °C
Accuracy:	1% (± 0.4 °C)

#### DGM Temperature

[Pt100 Ohm sensor]	
Range:	-20 ÷ 100 °C
Resolution:	0.01 °C
Accuracy:	1% (± 0.2)

ST5 Evo Dimensions



## Models, accessories and spare parts



101 101 1100 **ST5 Evo Control Unit** standard supply:

- Heated units control
- Liquids Protection of the inlet
- Inputs for 5 thermocouples
- Test and Calibration report
- USB key
- Power cable
- User Manual
- Transport Case

101 101 2001 **Zero dp Sensor**

Integrated module for the Pitot tube auto-zero without disconnecting it.



101 101 1101 **Pump Unit V4.5** w/ 4.5 m<sup>3</sup>/h pump

101 101 1102 **Pump Unit V8.5** w/ 8.5 m<sup>3</sup>/h pump

101 101 1103 **Pump Unit V4.5** w/ 4.5 m<sup>3</sup>/h corrosion proof pump

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 4100 **CU-PU Connection cable, 5 meters**

- Suction tube complete with quick connectors
- Power Cable

101 101 4110 **CU-PU Connection cable, 10 meters**

101 101 4120 **CU-PU Connection cable, 15 meters**

101 101 2130 **CU-PU Connection cable, 20 meters**

101 101 2140 **CU-PU Connection cable, 25 meters**

Other lengths available on request.



101 101 3010 **Sampled gas protection filters**

Set of 10 pieces.