PMx Sequential Samplers
Giano & Gemini

dado lab

PMx Sequential Samplers

Description

The PMx sequential samplers Mod. Giano and Gemini were designed and realized by Dado lab to be more practical, easier to transport and with user friendly interface compared to other available solutions.

The common heart to both models is the multi-purpose core unit (MPC) which manages the sequential sampling on a single or double channels.

The MPC particular concept allows both outdoor cabinet solution or the 19" rack installation in shelters or mobile labs.

Particular attention was paid to the systems engineering with the target to reduce the number of the parts, which increases the reliability and reduces the size and weight infact, Giano and Gemini weight only 35 kgs without considering the pump/s and support stand

The MPC and the outdoor cabinet are designed to have forced internal air recirculation which helps to keep the ventilation tube, filter under sampling and exposed samples at ambient temperature.

The optional air conditioning unit, required for applications where ambient temperature values can be particularly high, keeps the filters area temperature below 25°C in case of ambient temperature exceeds 25°C.

The air conditioning unit is placed below the cabinet and offer the advantage to give high cooling performances. Despite other solutions, the air conditioniong system doesn't require special protections or insulations for the filters tanks, which can still be easily accessed and changed on the field.

Characteristics

In the single channel version Giano, the sampling pump is placed directly inside the cabinet while in the twin channel version "Gemini", the two pumps are placed in a separate module located on the bottom of the stand.

The blank/exposed filters tank can load up to 21 filters to allow unattended operations up to three weeks.

The hardware platform of Giano and Gemini is based on the most recent industrial electronic standards which can grant high reliability and ruggedness.

The MPC features an advanced communication interface with different standards, from USB to Bluetooth.

Data communication is an aspect that Dado lab took in consideration, starting from USB key and arriving in the next future wireless data transfer to the new "smart cartridge" supports, which will supply the highest data traceability level actually available on the market, and remote communication through mobile network.

The built-in sensors measures also ambient temperature, pressure and rH.

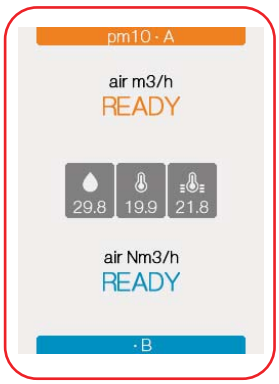
It's also available a weather station allowing to complete the data set also with wind speed and direction.

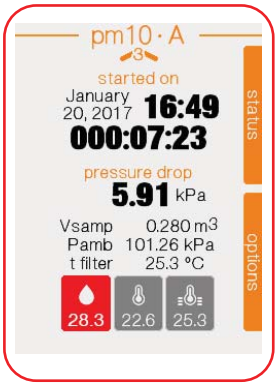
All those data will be logged by the MPC and transferred with a comprehensive report.

Display

Giano and Gemini are equipped with a high resolution color LCD display reporting the status, the ongoing operation and supplying the information “at the glance”, including weather sensors information.

Other data are still available in other screens and everything is, of course, logged.



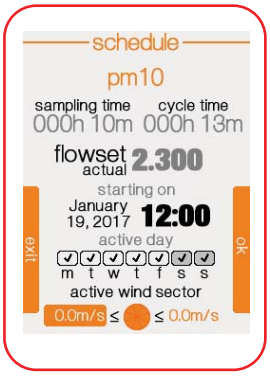


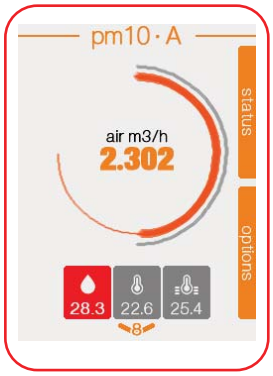
Program

Set up of the sampling schedule is much easier and faster thanks to the graphical interface and simplified software.

Just set the number of channels, for the Gemini version, the starting time, daily cycle and it’s done.

In case of power loss, data are safely secured and instrument will automatically resume on return of mains voltage





Pneumatic circuit

The sample is taken from the inlet to the filter through a straight, insulated aluminum tube designed to minimize any kinetic, thermal, chemical or electrostatic effect which may lead to any PM loss.

The sampling flowrate is digitally controlled through an orifice meter with an accuracy better than 1%. This solution has proven to be highly reliable and allow the use of any type of pump.

The pump is the last element of the system. Along with a rationalized pneumatic system, this solution greatly increases the tightness of the sampling line while system management, maintenance costs and power consumption are reduced.

The sampling pump is a 4,5 m^3/h and was chosen because of its characteristics :

- Performance: nominal flowrate up to 70 lt/min;
- Reliability: maintenance free for more than 12000 hours of operation;
- Ruggedness: the sampling pumps are treated with nitrocarburazing process which increase their resistance to oxydation and chemical aggression. Those pumps were tested on isokinetic sampling systems where proved to be highly reliable. operating under highly stressing conditions;
- Quietness: important aspect since those units can be in urban areas

Storage conditioning

After the sampling operation, exposed filters are stocked in a storage tank.

To fulfill the EN12341 request and avoid semi-volatile compounds loss, a high performances air conditioning system is available and automatically keeps the temperature of the storage tank below 23°C.

The air conditiong system is placed on the support stand, just below the instrument, and the cooling effect is enhanced by two fans pushing the air up in the filter storage area.

Technical Characteristics :

General

Operation conditions:	-20 ÷ 45°C
Stock conditions:	-10 ÷ 50°C 95% UR
Max numbers of blank/exposed filters:	21
Display:	3.5" Graphic LCD (QVGA)
Data Port:	USB 2.0
Internal Memory:	16GB
Power supply:	230 Vac ±10% 50/60Hz
Materials:	Steel/Aluminum combined structure
Keyboard:	Polycarbonate, tactile effect keys

Weight:

19" Rack Version Single Channel :	14 Kgs	19" Rack Twin Channel:	19 Kgs
Outdoor Version (without head) Giano:	35 Kgs	Support stand:	5 Kgs
Outdoor Version (without head) Gemini:	34 Kgs	Support stand (with two pumps):	25 Kg

Power consumptions (230Vac 50Hz) :

Giano (w/ Glass fibers filter)	0,65 A	about 0.150 kW
Gemini (Both channels with GF filters)	1.30 A	about 0.300 kW

Measuring sensors characteristics measures

Sampling flowrate

Measuring Device:	mass flow orifice meter
Range:	10 ÷ 60 l/min
Resolution:	0.01 l/min
Accuracy:	± 1%

Amb. Pressure/Pressure Drop

Range:	10 ÷ 105 kPa (1050 mBar)
Hysteresis and Linearity:	0,25 % F.S
Resolution:	0.01 kPa (0,1 mmH20)
Accuracy:	Better than 1% (± 2Pa)

Temperatures

Ambient:	PT100
Range:	-20 + 100°C
Resolution:	0,01°C
Uncertainty:	≤ 1 K

Filter Sampling/Storage :	TC Type J
Range:	-20 + 100°C
Resolution:	0,01°C
Uncertainty:	≤ 3 K

Weather sensors Characteristics

RH % Humidity

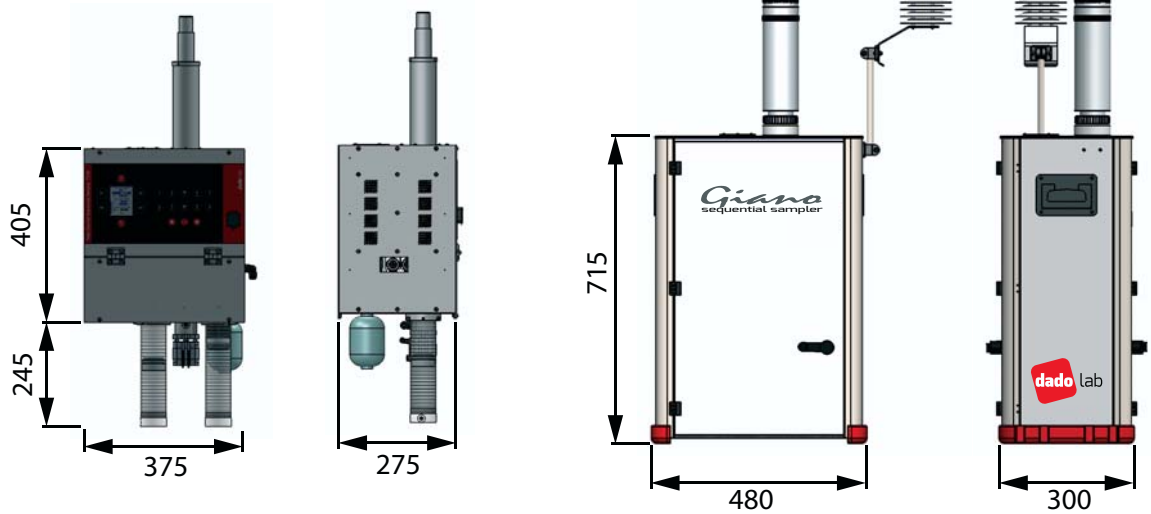
Range:	0 ÷ 100 %
Resolution:	1%
Accuracy:	± 5 % (range 0% to 60% RH)

Wind Speed

Range:	0,5 ÷ 80 m/s
Resolution:	0,1 m/s
Accuracy:	± 1 m/s

Wind Direction

Resolution:	8 sectors on compass rose
Accuracy:	± 4°



Models, accessories and spare parts

102 101 1001	**Giano PMx Sequential Sampler (Outdoor version)**
102 101 1002	**Gemini PMx Sequential Sampler (Outdoor version)**
102 101 1011	**Giano PMx Sequential Sampler (19" Rack version)**
102 101 1012	**Gemini PMx Sequential Sampler (19" Rack version)**

Standard supply:
- Test and Calibration report
- USB key
- Power cable
- User Manual

102 101 2001 **EN-LVS PMx Sampling Head**

EN-LVS reference sampling head including both PM10 and PM2.5 accelerating nozzles. Works at 2.3 m3/h

102 101 2050 **Box of 21 Smart Cartridges - White**

102 101 2051 **Box of 21 Smart Cartridges - Black**

POM cartridges for Ø 47mm filter membranes.

102 101 2080 **Giano support stand**

Realized in light aluminum, this stand is designed to support the single channel sequential sampler and the optional air conditioning system.

102 101 2070 **Air conditioning system**

Giano and Gemini are developed to ensure the best cooling effect using the natural air ventilation. However, for high ambient temperature conditions, a true air conditioning system is available to avoid loss of volatile and semi-volatile compounds from stored samples, in accordance to EN1231 method.

102 101 2100 **Interface for velocity/speed sensor**

Giano and Gemini can be equipped with a weather

102 101 2101 **Wind Speed/Direction Sensor**

Giano and Gemini can be equipped with a weather station to measure wind speed and direction.