TEMPERATURE FORCING SYSTEM

# DRAGON

Froilabo

# PRECISE AND VERSATILE
# DRAGON

Our temperature forcing system offers precise and accurate thermal testing, with a temperature range from -70°C to +250°C. With an adjustable air flow and fast ramping, the Dragon is the perfect solution for rapid heating and cooling of samples.

This versatile product is perfect for a wide range of applications, including heating electronic components, sensors aircraft engineering, and any other industry which requires testing of resistance, reliability, and performance.

100 years of experience in temperature control products

Achieve the highest performance whilst adhering to the European norm in force: EN60068-3-11

| 7 s | -70°C | <+/- 0.5°C | 24 |
|---|---|---|---|
| from -55 °C to +125 °C | Coldest Temperature | Thermal stability | h/7d |

# **THE DRAGON** FOR A WIDE VARIETY OF APPLICATIONS

Our temperature forcing system offers precise and accurate thermal testing and is the perfect solution for reliable thermal analysis in your laboratory.


## Who is the Dragon suitable for?

The Dragon is designed for a wide range of applications which includes:

- Heating and cooling electronic components
- Heating printed circuit boards
- Performing climatic simulations
- Electronic characterization
- Temperature cycling and targeted freezing applications

The Dragon is currently used in industries such as:

- Aerospace and defence
- Photo-electronics material suppliers
- Semiconductor device testing
- Chips and PCB makers

# **EQUIPMENT** FEATURES

## Easy plug and play technology
Contains a guide handle and wheels for easy maneuvering into your desired location to perform testing.

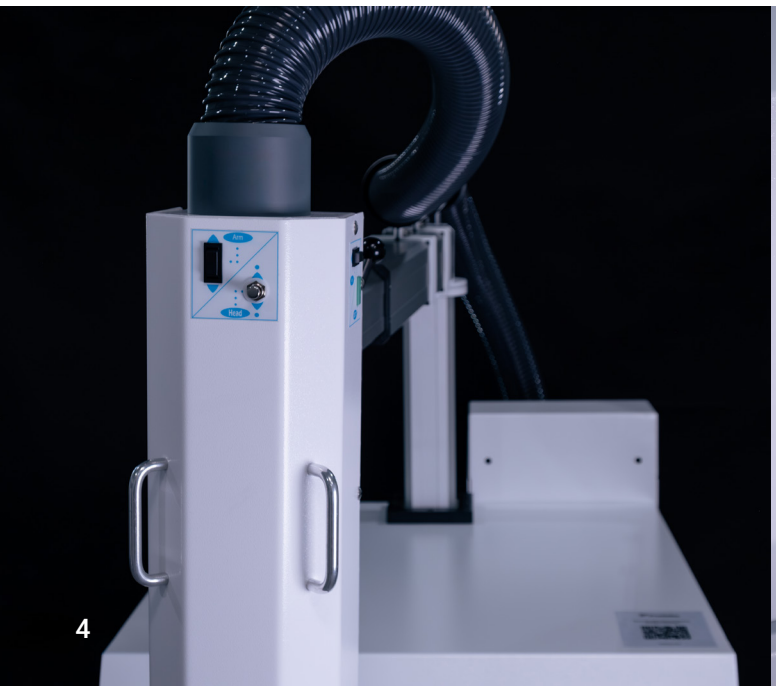
## Excellent temperature stability
Ensure precision at every step of your testing, with a temperature range of -70oC to +250°C.

## Rapid temperature changes
Go from -55°C to +125°C in a matter of seconds, with high precision and accuracy at all temperatures .

## Adjustable air flow
Adaptable to your needs, with an adjustable air flow between 2.2 l/sec and 8.4 l/sec.

## Digital connections
Connect your computer to your dragon for simple method creation and run monitoring.

## Compliance at every step
Achieve the highest performance whilst adhering to the European norm in force: EN60068-3-11.



# USER FRIENDLY OPERATION

## Additional Features

Our Dragon is compliant with European low voltage and CE standards, and is equipped with the various features for increased user safety and ease of use.

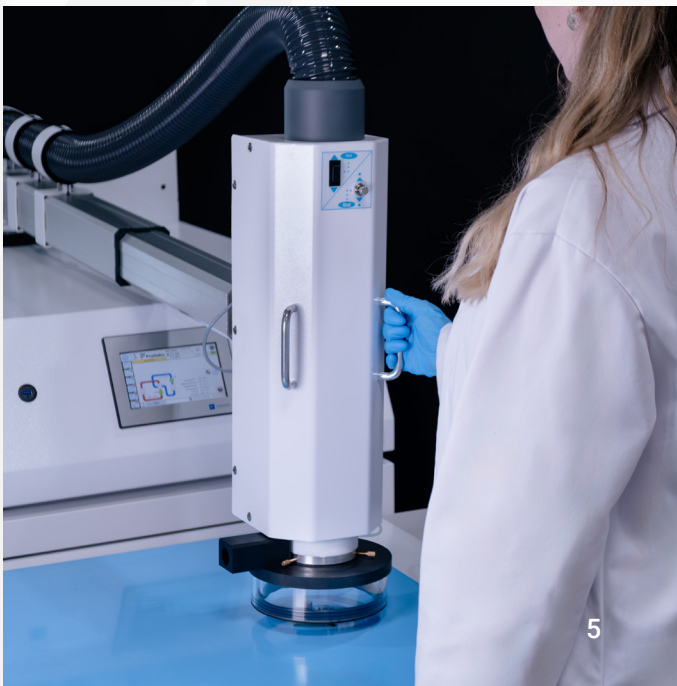
- Password protected touch screen to ensure only authorized personal can operate the dragon.
- Various alarms which include over-temperature, high temperature, no air supply, CP1 and CP2 overpressure, DUT and AIR failure, air pressure monitoring and communication failure.
- Contains minimum and maximum temperature thresholds to ensure the dragon operates within its parameters.
- Displays a real-time diagnostic menu, for quick and efficient resolution of any issues that arises.
- Ensures user safety by blowing dry air onto the test area at the end of test, to ensure that the operator can safely access their testing materials.


# CUSTOMIZATION

## Designed to fit your needs

The Dragon can be customized on request with the following and other specifications.

- Borosilicate Bell - to enable the user to see the test in progress and to resist temperature change.
- GPIB - to enable integration with other devices.
- Footswitch (IEEE) - to increase adaptability.
- ESD Kit - to avoid electric discharge.
- Nozzle - to adapt to the test sample.
- Different thermocouples - for DUT or air.
- Bespoke box designs - for special applications.



# Technical Specifications

## **DRAGON** TEMPERATURE FORCING SYSTEM

| | |
|---|---|
| **REFERENCE** | |
| Function | Rapid, precise and reproducible heating & cooling of samples |
| Version | 3.1 |
| Temperature Range | From -70 °C to +250 °C (with arm length = 1m) |
| Application | Heating electronic components and circuit boards, performing climatic simulations, electronic characterization, temperature cycling, targeted freezing, aerospace and defense. |
| **GENERAL SPECIFICATIONS** | |
| Frame dimensions (H x W x D) | 1040 x 900 x 700 mm (without electrical arm) |
| Construction | Electrogalvanized steel with epoxy paint |
| Net weight | 250 kg |
| Standard Equipment | 4 swivel casters with lock 2 easy moving handle<br>Glass Thermo Cup (T-Cup) & nozzle n°7 Foam mat<br>Type K thermocouple |
| Climate class (temperature) | From +18 °C to +30 °C |
| Relative humidity | < 70% |
| Indoor / Outdoor use | Indoor use only |
| Environment | Not designed for use in an explosive atmosphere (ATEX) |
| Noise level | < 63 dB |
| Warranty | 2 years by FROILABO (during and after warranty period) |
| **ELECTRICAL ARM AND HEAD** | |
| Positioning | 2 electric cylinders for vertical and horizontal positioning of the head |
| Arm length (deployed / folded) | 900 mm / 1400 mm (from pivot to nozzle) |
| Working height | From 675 mm to 1270 mm |
| Arm rotation | 270° |
| Head cylinder | Pneumatic for component change (fast up/down) |
| Head rotation | 180° |
| T-Cup dimensions | Internal diameter : 144 mm / available height : 50 mm |
| **REFRIGERATION AND THERMAL PRODUCTION** | |
| Refrigeration system | 2 cascade-mounted compressors with intermediate plate heat exchanger |
| Type of regulator | Capillary tube |
| Refrigerant charge | 1st stage: ISCEON89 / 2nd stage: R508B |
| Thermal production | Electrical heating resistance |
| **PERFORMANCES (AMBIENT TEMPERATURE +22°C)** | |
| Temperature range | From -70 °C to +250 °C, display and setting (on air) at +/- 0.1 °C |
| Air flow | From 2.2 L/s to 8.4 L/s |
| Controlled ramp | From 0.1°C to 16°C/s |
| Transition time without control | From -55 °C to +125 °C /s : 7 seconds / from +125 °C to -55 °C/s : 14 seconds |
| Head stability (AIR regulation) | +/- 0.5 °C |

# Technical Specifications

## **DRAGON** TEMPERATURE FORCING SYSTEM (continued)

### CONTROL AND PROGRAMMING

| | |
|---|---|
| Controller | Temperature regulator |
| Interface | 7" tactile display (800 x 480) - curve tracking - Languages : French / English |
| Mode | Hot mode (heating resistance only) / Hot & Cold mode |
| Data | Data recording on USB key (.csv) Alarms historical |
| Regulation | Air or component |
| Operating Mode | Manual : 3 sets of 4 parameters (T °C, q air, ramp, level time)<br>Automatic : 20 programs of 32 steps with settings of : T °C, q air, ramp, level time<br>Loopback : 0 to 999 cycles<br>Automatic programs for tests in appliances with international standards<br>(Program 10: JESD22-A104 – Temperature Cycle / Program 11: MIL-STD-202 Method 107 – Thermal Shock). |
| Thermal Protection | The head temperature is protected by an independent probe against temperatures above 260 °C |
| Remote connection | VNC connection via ethernet connection for run status monitoring and method creation. |

### ELECTRICAL DATA AND CONNECTIONS

| | |
|---|---|
| Compressed air source | Flow : 12 l/s<br>Supply pressure : from 6 to 10 bars<br>Air temperature : from +15 °C to +25 °C |
| Types of power supply | 230 V +/-10%, 50 Hz, circuit breaker 32 A circuit breaker D curve (motor support) with differential 30 mA |
| Electrical protection | Protection of power elements by fuse |

### OPTIONS AND CONFORMITIES

| | |
|---|---|
| Options | Commands for the machine via RS232 or GPIB communication<br>Board IEEE / 488.1 / GPIB<br>Anti-static equipment (head, nozzle and mat)<br>Specific nozzles and boxes on request<br>Support service for adjusting the regulation parameters on request |
| Supplied with | Quality control sheet 2 technical notices:<br>• Implementation, installation, commissioning, use, preventive maintenance and communication<br>• Refrigeration and electrical diagrams |
| Certification / Conformity | Comply with the standard NF EN61010-1 Meets CE requirements<br>2014/35/UE – Low pressure directive 2014/30/UE – EMC directive, class A device<br>2014/68/UE – Under pressure device |

### SHIPMENT

| | |
|---|---|
| Shipment size (H x W x D) | 1750 x 1400 x 900 mm |
| Shipment weight | 370 kg |
| Type of package | Delivered in a wooden case |

### SYSTEM PROTECTION

The Dragon cooling unit is protected by two pressure sensors which will be activated when the pressure is too high, or the condenser is obstructed with dust particles. To avoid heater (or the DUT) burn-out the system permanently controls the air inlet pressure, and the integrity of the air thermocouple. If the Dragon reaches its limit, the system will stop automatically, and an error message will be shown on the screen. For safety, when the head is raised, the airflow is automatically reduced and the temperature set point is lowered to 20˚C until the head is returned to the testing position. To safeguard the environment, the Dragon uses non-flammable gases and without CFC or HCFC.

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## TECHCOMP GROUP

In addition to Froilabo, Techcomp Europe comprises of the following companies:

Dynamica · Edinburgh Sensors · Edinburgh Instruments · Isotopx · Precisa · Scion Instruments


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