# Vacuum and charging unit

## *Medusa*

***Monitoring and Gas Extraction System***

**Medusa** is an environment monitoring system that allows to constantly keep safe the vacuum and charging machine within the working area, storage area and, if present, the refrigerant suction and transferring area.

**Medusa** can be configured according to the customer specific installation:

- Built in agreement to the European Machinery Directive, CE marked, CE Safety standards for potential dangerous areas
- Basic version suggested with three ambient sensors
- Microprocessor controller
- User interface with alarm lights
- Provided with integrated Acoustic Alarm
- Provided with UPS (Uninterruptible Power Supply) to constantly supply the sensors, related lights and sound alarms

Medusa supplies and controls the EOLO fan rate ventilation by means of a proper Power Electric cabinet. The Power rate can be configured according to the customer layout. Medusa standard version is provided with catalytic sensors that optionally include a sensitivity calibration device to check their performances according to the European Machine Directive.

### Components included in the Medusa System

- Main control box
- EOLO multi speed Atex fan
- Fire alarm box
- Gas alarm indicators column (up to three)
- Fan/door alarm indicators column (up to three)
- Spring + microswitch for charging room door
- Pneumatic valve, manual valve and safety valves group + 0,7 l accumulator
- Pneumatic valve, manual valve and safety valves group + refrigerant filter
- 30/40 bar safety valve

Medusa

Eolo fan

Gas Sensor IR/CAT

### Main using applications

Medusa signals operators and initiates additional ventilation when the concentration of Isobutane/Propane reaches 15% of the Lower Flammability. The system cuts the power supply to the vacuum and charging unit, putting it in a safe state, when the concentration exceeds 30% of the Lower Flammability. At the same time it activates the Alarm to signal the operators to leave the working area and activate all systems of the fire prevention.


| Medusa PL4 / PL4+, Technical Characteristics | | Medusa SR/SR+ Per Supply room | Medusa MS8/ MS8+ |
|---|---|---|---|
| Environment sensors | From 1 to 4 (PL4)<br>From 5 to 8 (PL4+) | From 1 to 4<br>From 5 to 8 | From 1 to 8<br>From 9 to 16 |
| Type of environment sensors | Catalytic / Infrared | | |
| Differential pressure switches | 1 or 2 | | |
| Available Outputs to | • cut the supply to the charger, to tank changer system, to the vacuum pump in the repair area, to the refrigerant delivery line from the transfer pump<br>• audible and light alarms<br>• opening delivery valve for "anti-fire agent" | | |
| Available Inputs to | • state (ON/OFF) of charger<br>• state (Open/Closed) of working area door<br>• state (Activated/Not activated) of fire alarm push button | | |
| Available **Eolo** Rates | • 3100 $m^3$/hr /EOLO Jr<br>• 3100 $m^3$/hr /EOLO<br>• 4000 $m^3$/hr /EOLO L<br>• 4500 $m^3$/hr /EOLO XL | | |
| Control Unit | PL4/PL4+ /MS8/MS8+<br>SR/SR+ Per Supply Room | | |
| Working temperature | 5 °C .. 45 °C | | |
| Power Supply | 400 V – 50 Hz – 3ph + N + GND | | |
| Rated electric current | ~ 7 A controlling 2 ventilation units<br>~ 14 A controlling 4 ventilation units | | |
| Dimensions (L x W x H) | 800 x 600 x 250 mm | | |
| Weight | ~45 kg | | |

| Optional features and devices |
|---|
| Calibration kit for HC sensors |
| IR environmental sensors |
| BOX_VALV_ETNA |
| BOX_VALV_SR |
| Additional light and Acoustic Alarm |

* FT software department develops customized software on request

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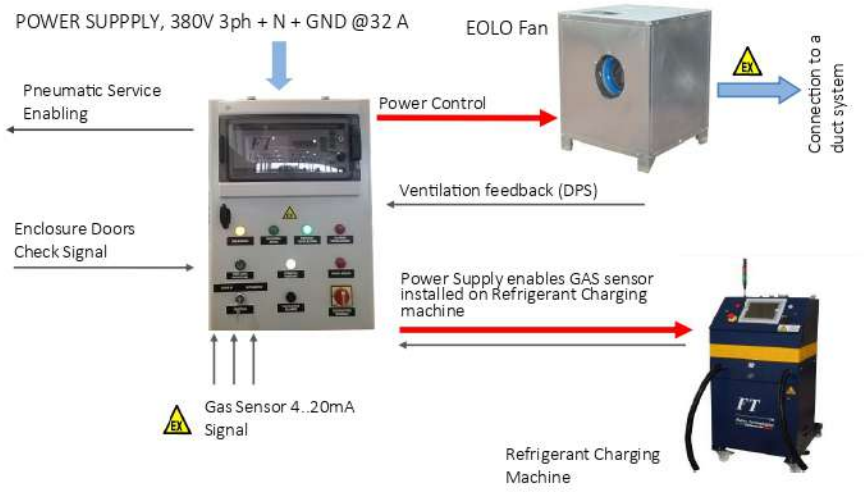
## *Medusa*

### *Standard Functional Scheme for Medusa*

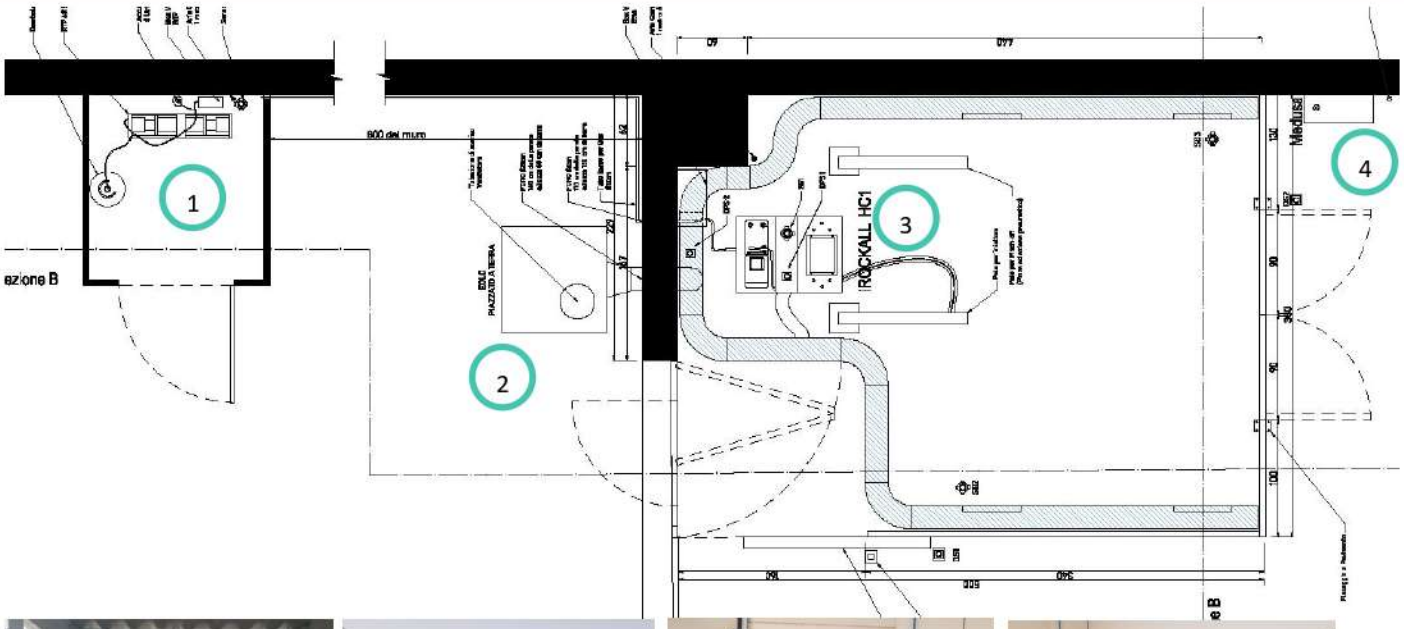



**MEDUSA STANDARD FUNCTIONAL SCHEME**

The following scheme represents a standard connection scheme for the Services controlled by the Monitoring System.

The Product does not include the Ventilation ducts, while all the following options are intended as accessories supplied and installed by FT:

1. Power Control of the Extractor
2. Power control of the Refrigerant Charging machine
3. Pneumatic enabling control of remote service
4. Electric ON/OFF switches for correct system working




1. Supply Room
Refrigerant transfer pump (RTP)

2. Eolo (Fan Unit)
Multi Speed ATEX Fan

3. iRockall HC- uno

4. Medusa (monitoring and Gas Extraction System)

EX



## Sensors and Valves



IR Sensor



CAT Sensor

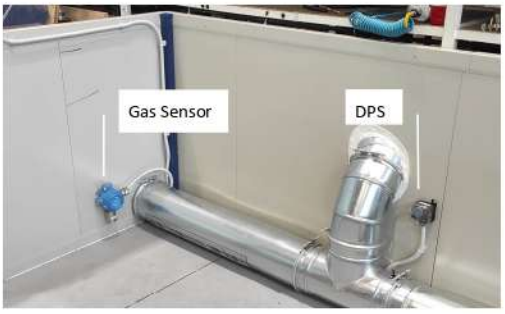
DPS

Door Sensor

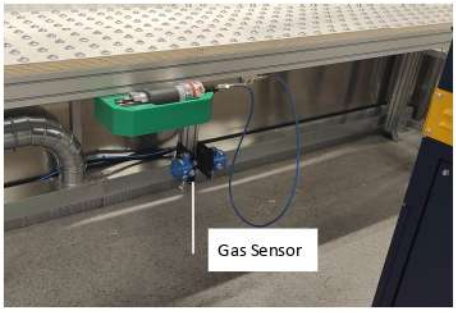
BOX_VALV_SR

BOX_VALV_ETNA







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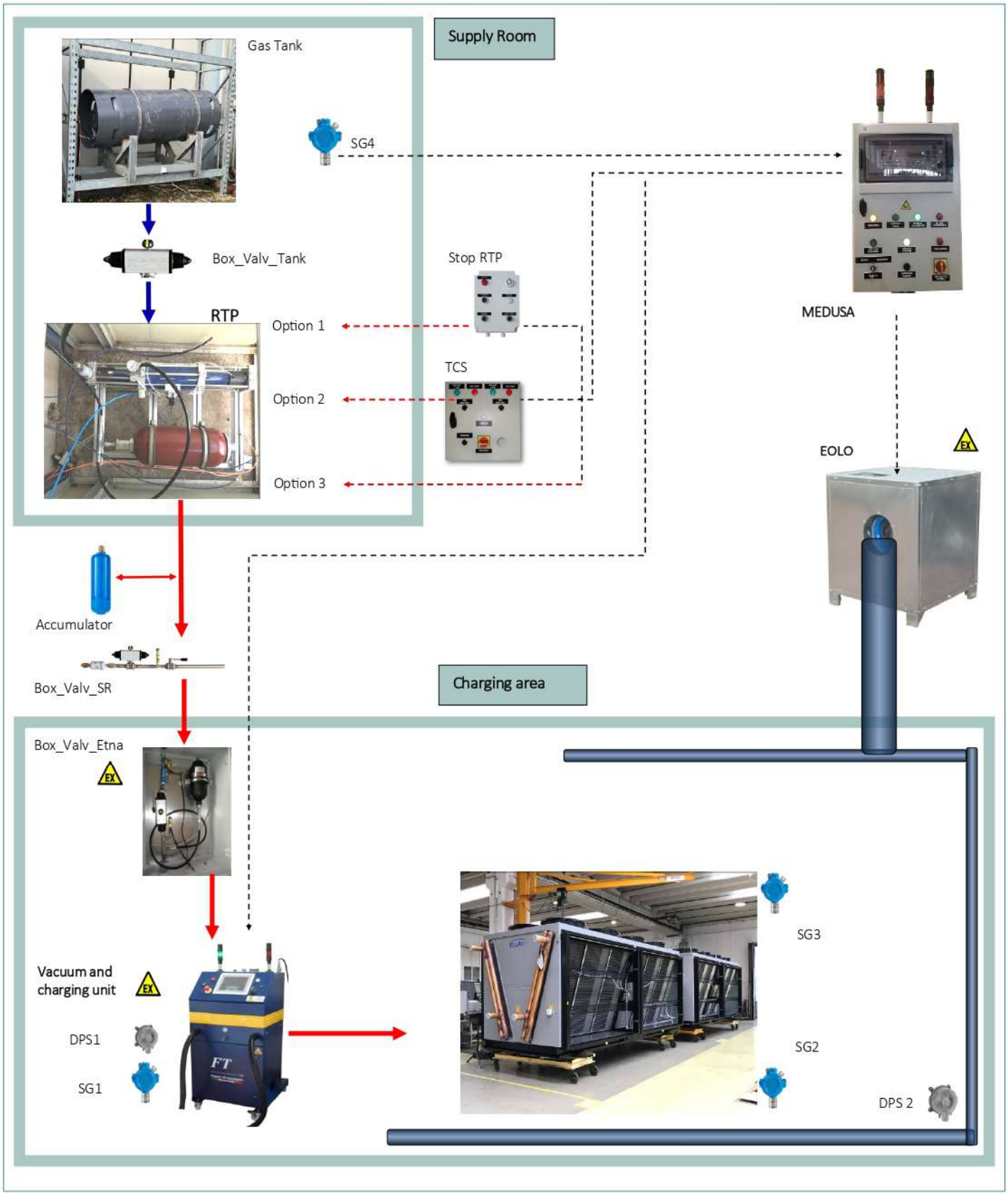

| Description | Typology | Function |
|---|---|---|
| Gas Tank | Hydraulic | The specifications are made in accordance with the design requirements. For charging of large chillers the capacity reaches 800 kg. In cases of outdoor installation, subject to low winter temperatures, FT recommends the use of thermal covers in order to facilitate the suction of the refrigerant. |
| BOX_VALV_SR | Hydraulic + Pneumatic | Box Valve Supply Room: Pneumatically operated valve, controlled by the monitoring system for the hydraulic connection between the gas tank and the refrigerant vacuum line.<br>A manual valve is included |
| BOX_VALV_TANK | Pneumatic | Controls the flow rate of the refrigerant to the RTP |
| BOX_VALV_ETNA | Hydraulic + Pneumatic | Pneumatic valve for the hydraulic connection between the refrigerant arrival line (usually in the charging area) and the vacuum and charge unit. Pneumatic valve is controlled by the Medusa environmental monitoring system. The valve box is connected directly to the cabinet of vacuum and charge unit through a sheathed FR5 3/8" tube. This tube ensures that the air in the valve box is draw in through the vacuum and charging unit cabinet which is connected to the air ducts. |
| RTP | Hydraulic + Pneumatic | Pneumatically operated Refrigerant Transfer Pump: The suction is automatically activated until the in-line pressure balance is reached. The activation is caused by the compressed air regulated by the Medusa environmental monitoring system. |
| Accumulator | Hydraulic | Hydro-pneumatic Accumulator: An accumulation/damping system for the pressure peaks of the refrigerant is used to level out the pressure and the flow rate inside the vacuum and charging unit. The connector includes a safety valve in the case of failure, where the accumulator is no anymore able to level up the pressure. |
| MEDUSA | Electronic Power | Ambiental monitoring system and ventilation control system |
| EOLO | Aeraulic | Forced extraction system is connected to the ventilation circuit and can be customized according to the client's request. It is available with different flow rates based on the processed air, from 3000 to 7000$m^3$/hr |
|  GAS Sensor | Electronic Infrared / catalytic | Gas sensor 4..20 mA. The gas sensors are generally positioned in the following locations:<br>Supply Room / Charging area / Potentially critical points along the ventilation circuit / Inside the cabinet of the vacuum and charge unit / Any possible gas accumulation points in the case of leakage. The signal is sent to the Medusa environmental monitoring system. |
| Vacuum and charging unit | Digital Pneumatic Hydraulic | Station to perform the vacuum and charging of the refrigerant |
|  | Aeraulic | Ventilation ducts that can be built according to the client's layout |
|  DPS | Pneumatic Electric ON/OFF | Differential Pressure Switch: DPS will be used to detect the air depression inside the ventilation ducts and the cabin of the vacuum and charge unit.<br>The signal is sent to the Medusa environmental monitoring system. |
|  | Hydraulic | Refrigerant line, Tank pressure |
|  | Hydraulic | Refrigerant line, charging pressure $P = P_{TV} + P_{\text{compressed air RTP}} * 4{,}27$ |
|  | Pneumatic | Pneumatic control signal according to the operating states of Medusa |
|  | Electric | Electric control signal according to the operating states of Medusa |
| Stop RTP | Pneumatic Electric | Automatic RTP Stopping System |
| TCS | Pneumatic Electric | Automatic Tank Charging System |