Vacuum and charging unit

Medusa

Charge **Vacuum**

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) From 5 to 8 (PL4+)	From 1 to 4 From 5 to 8	From 1 to 8 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 • audible and light alarms • opening delivery valve for “anti-fire agent”		
Available Inputs to	• state (ON/OFF) of charger • state (Open/Closed) of working area door • state (Activated/Not activated) of fire alarm push button		
Available **Eolo** Rates	• 3100 m^3/hr /EOLO Jr • 3100 m^3/hr /EOLO • 4000 m^3/hr /EOLO L • 4500 m^3/hr /EOLO XL		
Control Unit	PL4/PL4+ /MS8/MS8+ 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 ~ 14 A controlling 4 ventilation units		
Dimensions (L x W x H)	800 x 600 x 250 mm		
Weight	~45 kg		

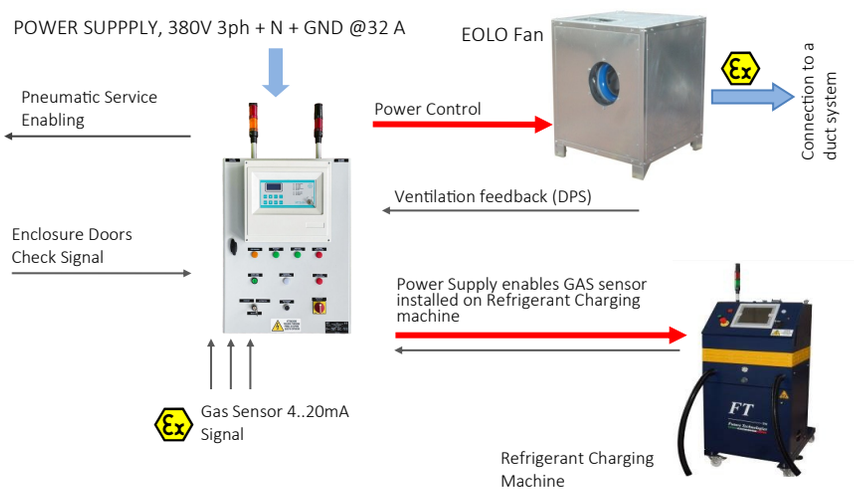
Optional features and devices
Calibration kit for HC sensors
IR environmental sensors
BOX_VALV_ETNA
BOX_VALV_SR
Additional light and Acoustic Alarm

* FT software department develops customized software on request

Vacuum and charging unit

Medusa

Standard Functional Scheme for Medusa

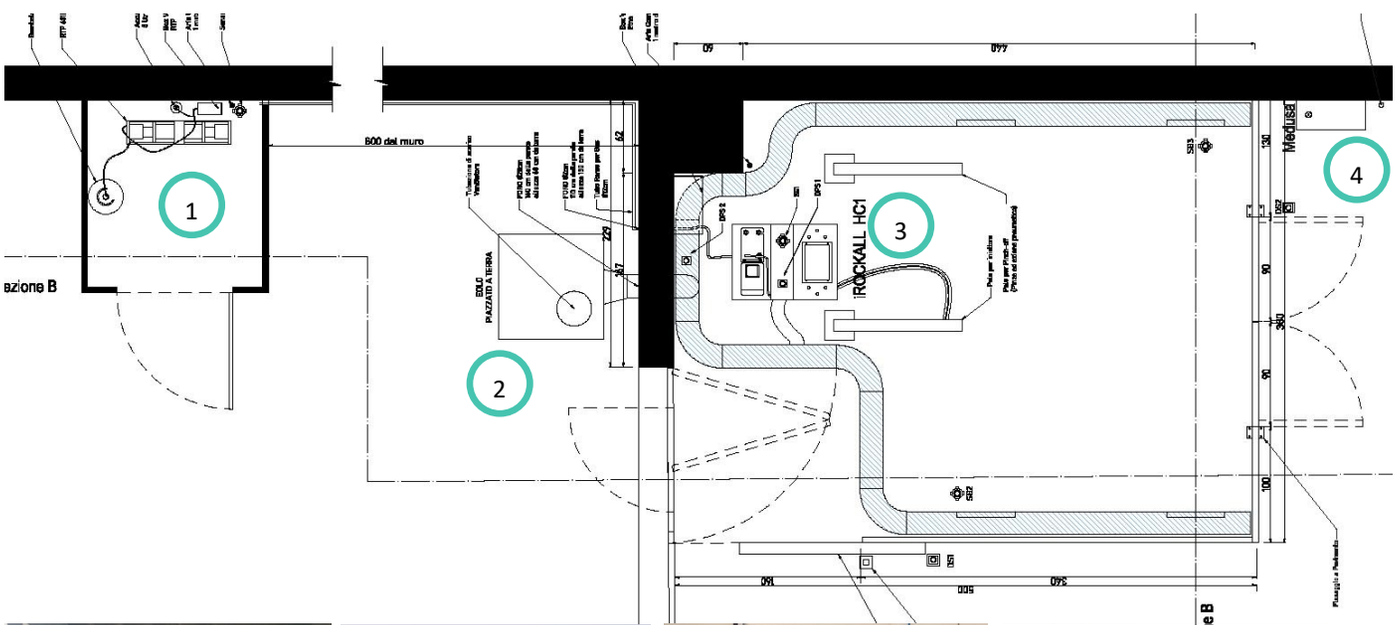


MEDUSA STANDARD FUNCTIONAL SCHEME

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



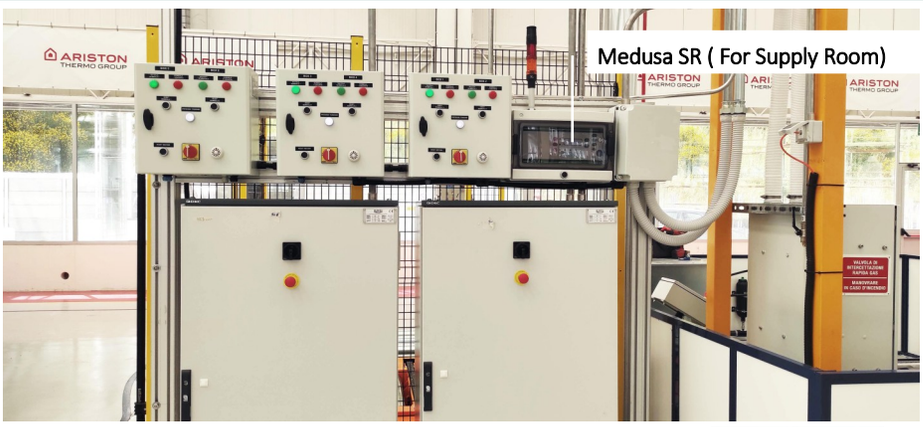
1. Supply Room
Refrigerant transfer pump (RTP)

2. Eolo (Fan Unit)
Multi Speed ATEX Fan

3. iRockall HC- uno

4. Medusa (monitoring and Gas Extraction System)

Sensors and Valves



IR Sensor

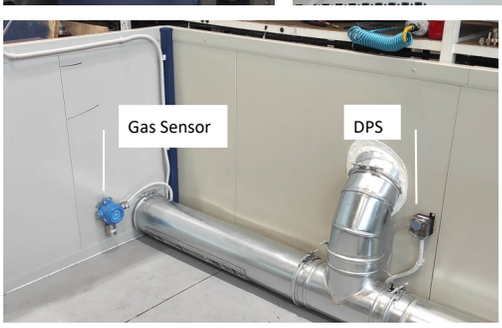
CAT Sensor

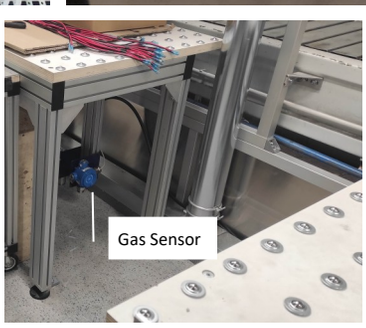
DPS

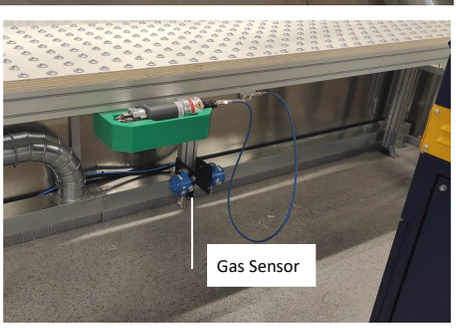
Door Sensor

BOX_VALV_SR

BOX_VALV_ETNA

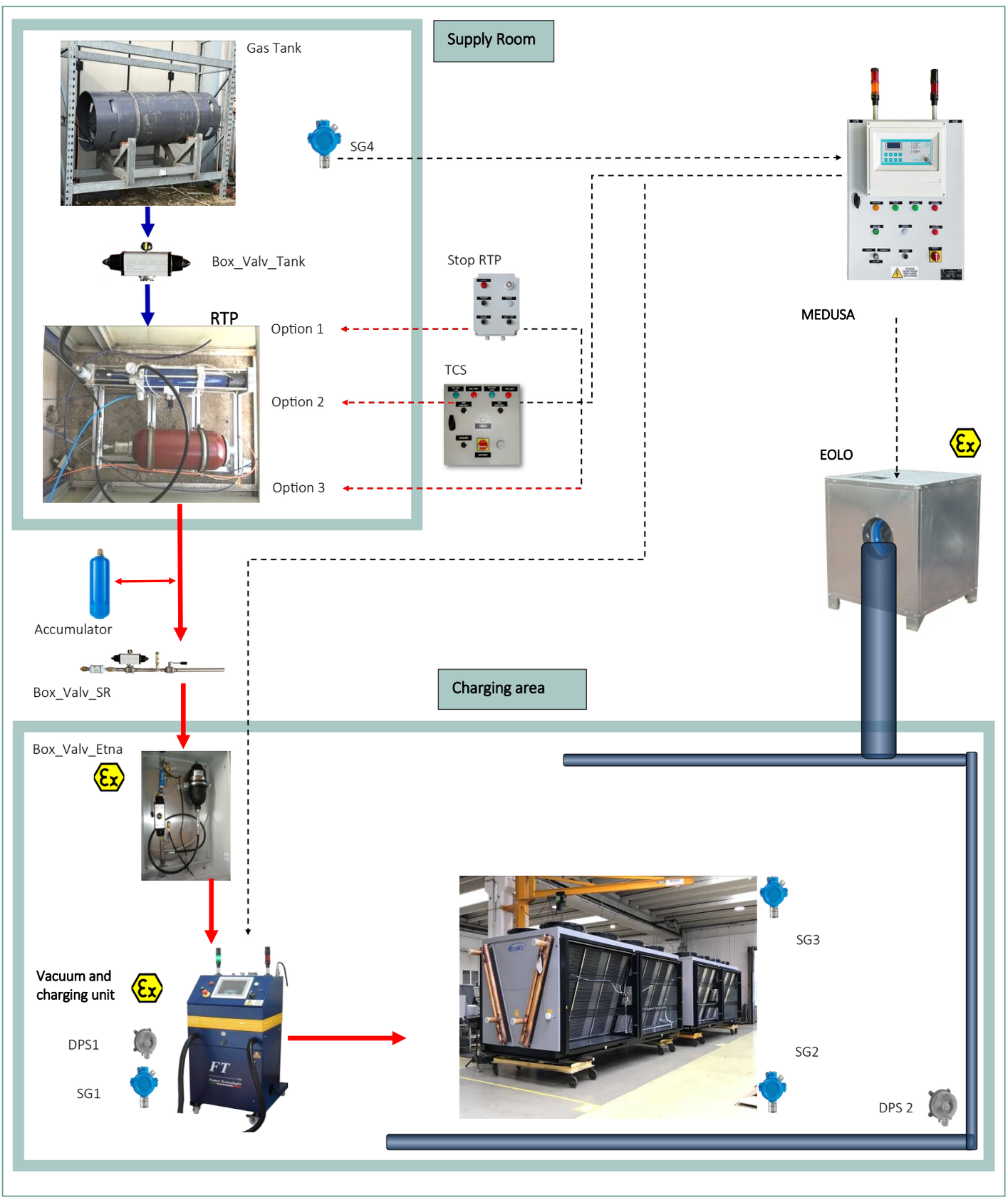


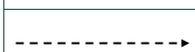




Vacuum and charging unit

Medusa
Monitoring and Gas Extraction System



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. 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 7000m^3/hr
 GAS Sensor	Electronic Infrared / catalytic	Gas sensor 4..20 mA. The gas sensors are generally positioned in the following locations: 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. 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

真空和冷媒充注装置

Medusa

充注 真空

Medusa是一种环境监控系统，可以持续保持工作区域、存储区域以及制冷剂吸入和传输区域内的真空和充注机的安全。

Medusa可根据客户具体装置进行配置：

- 构造符合欧洲机械指令、CE标志、针对潜在危险区域的CE安全标准
- 建议使用三个环境传感器的基本版本
- 微处理器控制器
- 带报警灯的用户界面
- 配备集成声音警报
- 配备UPS（不间断电源），从而为传感器、相关灯光和声音警报持续供电

Medusa通过适当的电力电气柜提供并控制EOLO风扇速率通风。供应速率可以根据客户布局进行配置。Medusa标准版本配有催化传感器，传感器可选配灵敏度校准装置，以根据欧洲机器指令检查其性能。

Medusa系统中包含的组件

- 主控箱
- EOLO多速Atex风扇
- 火灾报警盒
- 气体报警指示灯柱（最多三个）
- 风扇/门报警指示灯柱（最多三个）
- 充注室门弹簧+微动开关
- 气动阀、手动阀和安全阀组 + 0.7 L蓄能器
- 气动阀、手动阀和安全阀组 + 制冷剂过滤器
- 30/40 bar安全阀

Medusa

Eolo风扇

气体传感器IR/CAT

主要使用应用

当异丁烷/丙烷浓度达到较低可燃性的15%时，Medusa会向操作员发出信号并启动附加通风。如果浓度超过低可燃性的30%，系统将气短真空和冷媒充注装置的电源，将其置于安全状态。同时它启动警报，通知操作人员离开工作区域并启动所有防火系统。

Medusa PL4 / PL4+, 技术特性		Medusa SR/SR+ 用于供应室	Medusa MS8/ MS8+
环境传感器	从1到4 (PL4) 从5到8 (PL4+)	从1到4 从5到8	从1到8 从9到16
环境传感器类型	催化/红外线		
压差开关	1或2		
可用输出,用于	• 切断从传输泵到充注器、储罐更换系统、维修区域的真空泵。制冷剂输送管线的供应声音和灯光警报打开“防火剂”输送阀		
可用输入之	• 充注器状态（开/关） 工作区门状态（打开/关闭）火灾报警按钮的状态（激活/未激活）		
可用Eolo速率	• 3100 m^3/h /EOLO Jr3100 m^3/h /EOLO4000 m^3/h /EOLO L4500 m^3/h /EOLO XL		
控制装置	PL4/PL4+ /MS8/MS8+ 用于供应室的SR/SR+		
工作温度	5 ℃..45 ℃		
电源	400 V - 50 Hz - 3ph + N + GND		
额定电流	~ 7 A 控制2个通风装置~ 14 A 控制4个通风装置		
尺寸（长x宽x高）	800 x 600 x 250 mm		
重量	~45 kg		

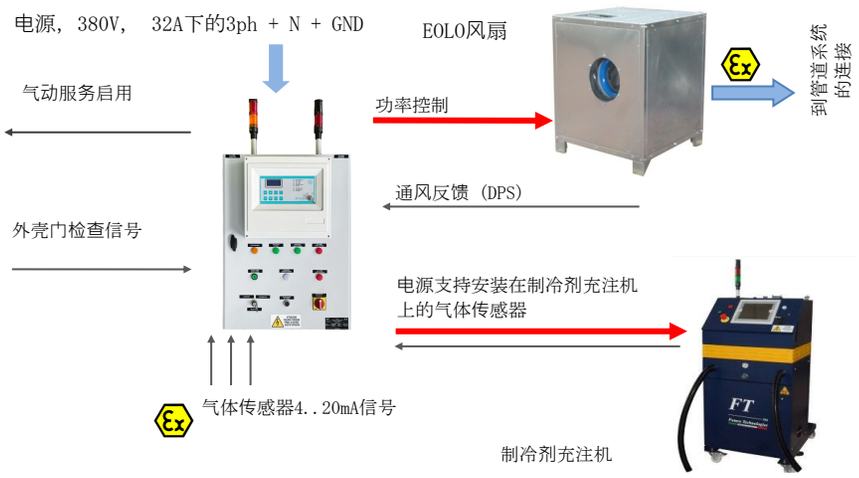
可选功能和设备
HC传感器校准套件
红外环境传感器
BOX_VALV_ETNA
BOX_VALV_SR
附加的灯光和声音报警

* FT软件部门根据要求开发定制软件

真空和冷媒充注装置

Medusa

Medusa的标准功能方案

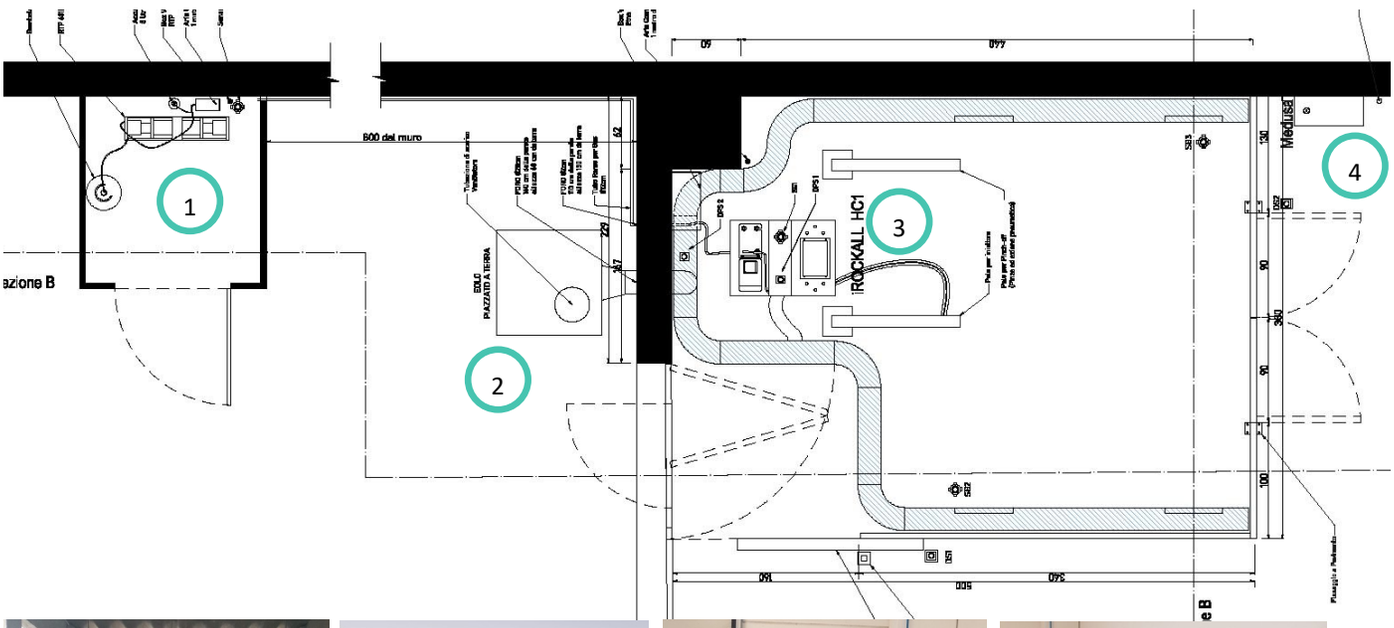


MEDUSA标准功能方案

以下方案代表了监控系统控制的服务的标准连接方案。

该产品不包括通风管道，而以下所有选项均作为FT提供和安装的附件：

1. 抽出机的功率控制
2. 制冷剂充注机的功率控制
3. 远程服务的气动使能控制
4. 用于正确系统工作的电动开关



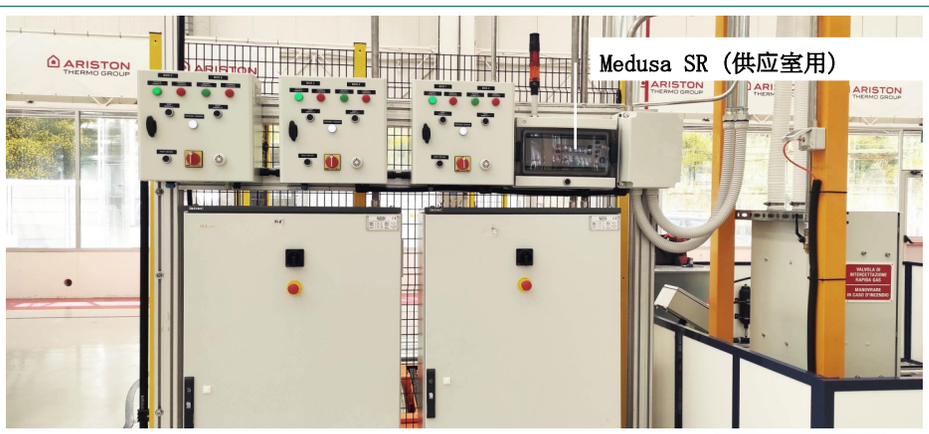
1. 供应室
制冷剂输送泵（RTP）

2. Eolo（风扇装置）
- 多速Atex风扇

3. iRockall HC- uno

4. Medusa（监测和气体抽取系统）

传感器和阀



红外传感

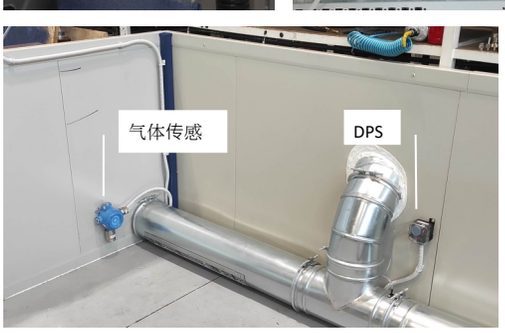
CAT传感器

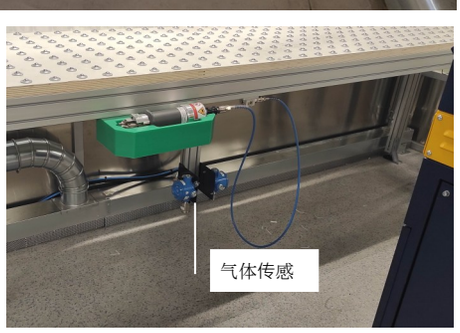
DPS

门传感器

BOX_VALV_SR

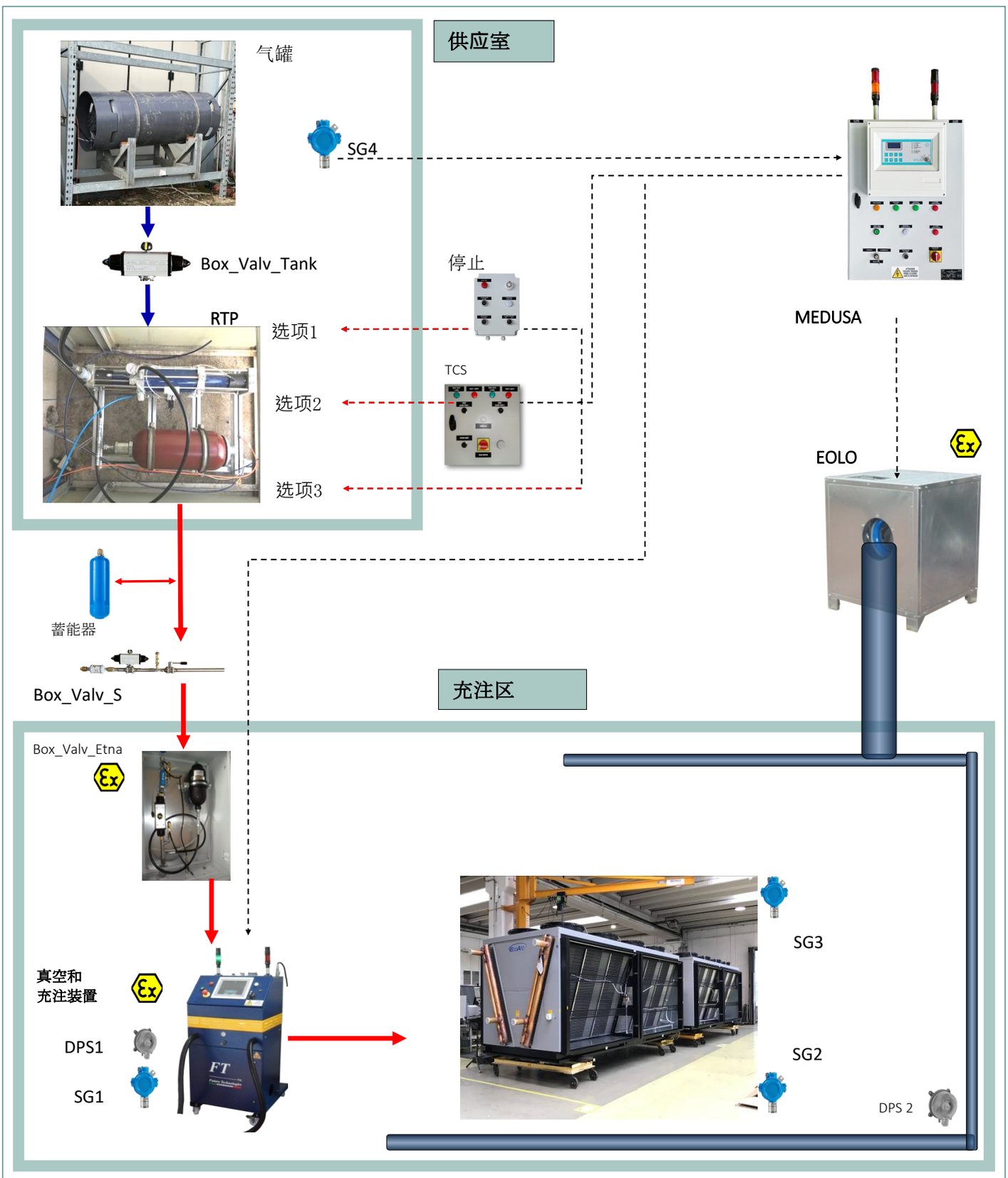
BOX_VALV_ETNA





真空和冷媒充注装置

Medusa
监测和气体抽取系统



说明	类型	功能
气罐	液压	规格按照设计要求制定。大型冷水机的充注容量可达800 kg。如果室外安装，由于冬季气温较低，FT建议使用隔热罩，以利于制冷剂的吸入。
BOX_VALV_SR	液压+气动	箱阀供应室：气动阀门，由储气罐和制冷剂真空管路之间的液压连接监控系统控制。包括一个手动阀
BOX_VALV_TANK	气动	控制流向RTP的制冷剂流量
BOX_VALV_ETNA	液压+气动	用于制冷剂到达管线（通常在充注区域）与真空和冷媒充注装置之间的液压连接的气动阀。气动阀由Medusa环境监测系统控制。阀箱通过带护套的FR5 3/8”管直接连接到真空和冷媒充注装置柜。该管确保阀箱中的空气通过连接到空气管道的真空和冷媒充注装置柜吸入。
RTP	液压+气动	气动制冷剂输送泵：抽吸会自动启动，直到达到线上压力平衡。激活是由Medusa环境监测系统调节的压缩空气引起的。
蓄能器	液压	液压气动蓄能器：用于制冷剂压力峰值的累积/阻尼系统用于平衡真空和充注单元内的压力和流量。连接器包括一个安全阀，一旦有故障，蓄能器不再能够平衡压力，则安全阀可起到保护作用。
MEDUSA	电子电源	环境监测系统和通风控制系统
EOLO	气动	强制抽风系统与通风回路连接，可根据客户要求定制。根据处理空气的不同，可提供从3000至7000m^3/h的不同流量
□气体传感器	电子红外线/催化	4..20 mA气体传感器。气体传感器一般安装在以下位置：供应室 / 充注区域 / 通风回路上的潜在关键点 / 真空和冷媒充注装置内 / 泄漏时的气体聚集点。信号发送至Medusa环境监测系统。
真空和冷媒充注装置	数字气动液压	执行抽真空和充注制冷剂的站
	气动	可根据客户的布局建造通风管道
□DPS	气动电动开/关	压差开关：DPS将用于检测通风管道以及真空和冷媒充注装置舱内的气压。信号发送至Medusa环境监测系统。
	液压	制冷剂管路、罐压力
	液压	制冷剂管路，充注压力$P = P_{TV} + P_{压缩空气RTP} * 4,27$
	气动	根据Medusa的运行状态提供气动控制信号
	电动	根据Medusa的运行状态提供电动控制信号
停止RTP	气动电动	自动RTP停止系统
TCS	气动电动	自动储罐充注系统