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## VULCATHERM® WITH WATER OR GLYCOL WATER, EQUIPPED WITH A SGC (CENTRALISED MANAGEMENT SYSTEM)



Water cooling, types 10801, 10802, 10805  
 Without cooling system, type 10811, 10812, 10815  
 Cooling by refrigerating unit, types 10821, 10822, 10825  
 Cooling by air cooler, types 10831, 10832, 10833

Atmospheric circuit for 90°C, types 10801, 10811, 10821, 10831  
 With pressurization by network for 140° C, types 10802, 10812, 10822, 10832  
 With pressurization by network for 110°C, types 10805, 10815, 10825, 10835  
 With pressurization by network for 160°C maximum, types 10806, 10816,  
 10826, 10836



**READ THIS MANUAL CAREFULLY AND COMPLETELY  
 BEFORE INSTALLING THE UNIT. THIS MANUAL IS AN INTEGRAL  
 PART OF THE PRODUCT AND ACCOMPANIES IT  
 UNTIL ITS DISASSEMBLY.**

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## SUMMARY

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**1 WARNING**

- Use the rating plate to check that the reference number for the commercial specification of the equipment actually corresponds to the present manual. Check also that the device frequency and the nominal voltage is the same as your electrical communication.
- Make you sure that you got the SGC manual instruction “UT30789”.
- If existing, please read in priority the annex dedicated to your Vulcatherm.
- If your Vulcatherm® is class 2, please read the DESP user manual “UT\_DESP\_CATII”.

**2 CHARACTERISTICS, DIMENSIONS AND HANDLING**

**2.1 Characteristics**

Thermal Fluid:

- Water for the models whose minimal temperature is not lower than +10°C
- Mix of water and NEUTRAGEL NEO for the machines whose minimal temperature is not lower than -20°C. NEUTRAGEL NEO is an Antifreeze containing mono ethylene glycol and anti-oxidant. Independently of the Antifreeze properties indicated below, the anti-corrosive effect of NEUTRAGEL NEO is obtained only for concentrations higher or equal to 33%. Here are the minimal contents according to the minimal temperatures of regulation:
  - +9°C : 5%
  - +5°C : 15%
  - 0°C : 25%
  - -10°C : 40%
  - -20°C : 50%
- Special heat transfer with aqueous base for the machines whose minimal temperature can go down to -30°C

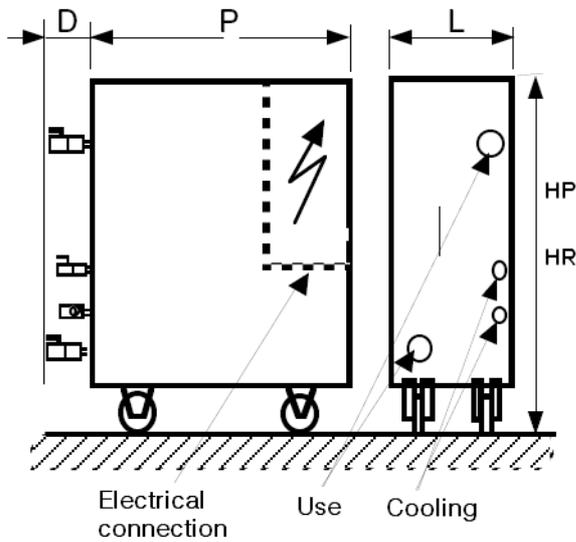


**IMPORTANT:**

Never mix Antifreeze of different colors. NEUTRAGEL NEO is red. Other products can be used, subject to checking their Antifreeze properties at minimal temperatures of evaporation (say 12°C under the temperature of regulation). But never mix different products.

Temperature of use	:Maximum range 90°C or 110°C or 140°C or 160°C, see rating plate.
Supply voltage	:230 to 500 VAC tri + T – 50/60 Hz, see rating plate
Heating power capacity	:Standard 4 to 150 kW -5 +10%
Cooling power capacity	:Depends on the setpoint temperature and the temperature of the cooling water or air inlet
Temperature Regulator	:SGCEco, SGC.v2, SGC.v3 and SGC.v3Twin
Temperature Sensor	:Internal on the fluid flow, or external (option)
Pumps	:See hydraulic nomenclature
Noise level	:Lower than 75 dB (A)
Vibrations level	:Frequency of weighted quadratic average acceleration lower than 2.5 m/s <sup>2</sup>

2.2 Dimensions



HP is the height with base and HR is the height with caster

The table opposite presents the various standard formats.

Notes:

- (1) See hydraulic nomenclature.
- (2) Approximate values; dependent on options.
- (3) From the R2 size, the length D of the inlets and outlets of CR versions is to be added to L, and not to P (inlets and outlets are laterals).
- (4) Format 34 will be available only in 2012. In the meantime, format 5 is used.
- (5) Format 34AR will be available only in 2012. In the meantime, format R0CR is used.
- (6) The formats whose reference ends by G (sheath) are envisaged to evacuate the cooling air by blowing in a sheath.

Type <sup>(1)</sup> Format	OBSTRUCTION in mm					Mass <sup>(2)</sup> (kg)
	HR	HP	L	P	D <sup>(2)(3)</sup>	
1	570	530	300	500	150	40
2	670	630	320	550	180	50
3B <sup>(4)</sup>	780	730	400	830	200	90
3BAR <sup>(5)</sup>	980	930	400	830	200	110
5	1170	1080	500	900	280	240
5 B	1370	1280	600	1000	280	280
6	1570	1480	600	1280	300	325
6B			800		300	
6BL			800		300	
R0					180	
R0CR					180	
R0CRG <sup>(6)</sup>					180	TBD
R1					180	
R1CR					180	
R1CRG <sup>(6)</sup>					180	
R2AR	ND	2200	1000	760	300	TBD
R2CR	ND	2200	1000	1560	300	
R2CRG <sup>(6)</sup>	ND	2125	1000	2060	300	
R4AR	ND	2200	1000	1520	300	TBD
R4CR	ND	220	1000	2320	300	
R4CRG	ND	2125	1000	3000	300	1300
R6AR	ND	2200	1000	2280	300	TBD
R6CR	ND	2200	1000	3080	300	TBD
R8AR	ND	2200	1000	3040	300	TBD
R8CR	ND	2200	1000	3840	300	TBD

ND: option not available

TBD: to be determined

2.3 Handling

Vulcatherm<sup>®</sup> is easy to handle by forklift truck, or by slinging when it has lifting rings.

### 3 PRINCIPLE OF OPERATION

The various principles of operation will be described along two lines:

- The type and the operation of the system of pressurization (which determines the maximum temperature likely to be reached)
- The type and the operation of the system of cooling (which determines the minimum temperature likely to be reached)

#### 3.1 System of pressurization

There are 4 types of system of pressurization:

Vulcatherms<sup>®</sup> type 108x1 (10801, 10811, 10821, 10831) run on with the atmospheric pressure only (without system of pressurization). These machines cannot exceed 90°C.

Vulcatherms<sup>®</sup> type 108x2 (10802, 10812, 10822, 10832), which has a system of pressurization by the water's network supply and a surge tank. These machines can reach 140°C.

Vulcatherms<sup>®</sup> type 108x5 (10805, 10815, 10825, 10835), which has a system of pressurization by the water's network supply and a surge tank. These machines can reach 110°C.

Vulcatherms<sup>®</sup> type 108x2 type (10806, 10816, 10826, 10836), which has a system of pressurization and expansion with electric control. According to the versions, these machines can reach 110, 140 or 160°C.

##### 3.1.1 Atmospheric Vulcatherm<sup>®</sup> 108x1 (10801, 10811, 10821, 10831)

Atmospheric Vulcatherms<sup>®</sup> are the simplest models. They are autonomous (they do not require a network of fluid under pressure). They can thus run with water or glycol water.

This type of Vulcatherm<sup>®</sup> is limited to 90°C. As the use of glycol water is possible, this type of Vulcatherm<sup>®</sup> can work at temperatures lower than +10°C (up to -30°C, according to the models).

The system of filling, degasification and expansion of these machines comprises:

- An atmospheric tank allowing the fluid supply and the expansion.
- A degassing bottle, generally integrated in the heater boiler. This bottle is placed just at the pump suction, where the pressure is lowest in the circuit. It is generally built in order to reduce the dimensionless speed of the heat transfer fluid (Reynolds Re number), so as to facilitate the separation of the liquid and the gases. It constitutes also a reserve of liquid at the pump suction.
- Two flexible pipes connecting the degassing bottle and the tank. The bottom pipe allows the filling, the top pipe allows degasification. The length and the position of these two pipes are carefully determined in order to, facilitate degasification and to limit the warming of the tank by thermo-syphon. The length and the position of these pipes should not be modified.

### 3.1.2 Vulcatherms<sup>®</sup> pressurized by the network for 140°C 108x2 (10802, 10812, 10822, 10832)

Vulcatherms<sup>®</sup> pressurized by network for 140°C, are not autonomous; in fact they require a network of fluid under pressure (3 bars minimum). They cannot thus operate in glycol water (except if a network of glycol water under pressure is available).

This type of Vulcatherm<sup>®</sup> can reach 140°C. As the use of glycol water is generally not possible, this type of Vulcatherm<sup>®</sup> cannot work at temperatures lower than +10°C.

The system of filling, degasification and expansion of these machines comprises:

- A pressure reducer feeding the heat transfer circuit and limiting the initial pressure.
- A degassing bottle, generally integrated in the heater boiler. This bottle is placed just at the pump suction, where the pressure is lowest in the circuit. It is generally built in order to reduce the dimensionless speed of the heat transfer fluid (Reynolds Re number), so as to facilitate the separation of the liquid and the gases. It constitutes also a reserve of liquid at the pump suction.
- A surge tank, which supports the expansion related to the dilation of heat transfer fluid. This tank always has a limited capacity, which never should be exceeded.
- A safety valve placed between the degassing bottle and the pump. This valve guarantees the respect of the maximum pressure tolerated in the pump suction, in the event of capacity overshooting of the surge tank above.

### 3.1.3 Vulcatherms<sup>®</sup> pressurized by the network for 110°C: 108x5 (10805, 10815, 10825, 10835)

Vulcatherms<sup>®</sup> pressurized by network for 110°C, are the most economic models. They are not autonomous; in fact they require a network of fluid under pressure. They cannot thus operate in glycol water (except if a network of glycol water under pressure is available).

This type of Vulcatherm<sup>®</sup> is generally limited to 110°C maximum. As the use of glycol water is generally not possible, this type of Vulcatherm<sup>®</sup> cannot work at temperatures lower than +10°C.

The system of filling, degasification and expansion of these machines comprises:

- A pressure reducer feeding the heat transfer circuit and limiting the initial pressure.
- A degassing bottle, generally integrated in the heater boiler. This bottle is placed just at the pump suction, where the pressure is lowest in the circuit. It is generally built in order to reduce the dimensionless speed of the heat transfer fluid (Reynolds Re number), so as to facilitate the separation of the liquid and the gases. It constitutes also a reserve of liquid at the pump suction.
- A surge tank, which supports the expansion related to the dilation of heat transfer fluid. This tank always has a limited capacity, which should never be exceeded.
- A safety valve placed between the degassing bottle and the pump. This valve guarantees the respect of the maximum pressure tolerated in the pump suction, in the event of capacity overshooting of the surge tank above.

### 3.1.4 Vulcatherms<sup>®</sup> with electric pressurization 108x6 (10806, 10816, 10826, 10836)

The electric pressurization has the following advantages:

- Precise control of the pressurization (at 0.5 or 1 bar approximately).
- Great capacity of expansion (it is even infinite in the case of pressurization controlled by solenoid valve).
- Possibility of pressurization up to 6 bars, thus 160°C.
- Possibility of temporarily cancelling the pressurization (the maximum temperature is thus limited to 90°C).
- No need for network of fluid under pressure (pressurization by pump). Vulcatherm<sup>®</sup> pressurized by pump can thus run with water or glycol water.

This type of Vulcatherm<sup>®</sup> can reach 110, 140 or 160°C according to the models. As the use of glycol water is possible, this type of Vulcatherm<sup>®</sup> can work at temperatures lower than +10°C (up to -30°C, according to the models).

There are two types of electric pressurization:

- Pressurization by pump
- Pressurization by network controlled by solenoid valve

The two systems share the following common elements:

- A degassing bottle, generally integrated in the heater boiler. This bottle is placed just at the pump suction, where the pressure is lowest in the circuit. It is generally built in order to reduce the dimensionless speed of the heat transfer fluid (Reynolds Re number), so as to facilitate the separation of the liquid and the gases. It constitutes also a reserve of liquid at the pump suction.
- A pressure transducer of CPA suction placed between the degassing bottle and the pump. This transducer enables controlling the pressure in the pump suction. It also provides the safety of minimal pressure in the inlet.
- A safety valve placed in the immediate vicinity of the CPA pressure transducer. This valve guarantees the respect of the maximum pressure tolerated in the pump suction, in the event of failure of the electric system of pressurization.
- An air detection device (height sensor with electrode), placed in the upper part of the degassing bottle. It informs the SGC of a possible need for degasification.
- Debballasting solenoid valve, placed just at the top of the air detection device. This high temperature, with direct piloting, solenoid valve allows:
  - Either evacuating the air trapped in the circuit (degasification function)
  - Or evacuating a beginning of overpressure caused by the dilation of the heat transfer fluid (unballasting function)
- A small shock absorber tank. This tank, too small to ensure only the expansion, absorbs brutal variations related to the operation of the on/off organs (solenoid valve and pump).

In the case of pressurization by pump, the system also comprises an atmospheric tank (used to feed the circuit and to allow the expansion) and a pump of PP pressurization. The pump is used to fill and pressurize the circuit. The unballasting solenoid valve evacuates the heat transfer fluid and the air in the atmospheric tank.

In the case of pressurization by network and solenoid valve, the system also comprises a filter 100 µm placed on the water inlet under pressure and a solenoid valve of filling. This solenoid valve, with direct piloting, allows the filling and the pressurization of the circuit. In this case the “pressurization” function is priority over the “cooling” function. That is if the opening of the solenoid valve of filling is required, that blocks the opening of the solenoid valve of cooling, in order to be certain to have sufficient pressure on the network to pressurize the heat transfer circuit. The unballasting solenoid valve evacuates the heat transfer fluid and the air in the return of the cooling circuit.

### 3.2 Cooling system

There are 4 types of cooling systems:

- Vulcatherm<sup>®</sup> of the 1080y type, which is cooled by water. It is the simplest cooling system, most economic and most compact.
- Vulcatherm<sup>®</sup> of the 1081y type, do not have any cooling system. One can compare their operation to that of a boiler.
- Vulcatherm<sup>®</sup> of the 1082y type, which are cooled by refrigerating unit (condensation with air or water). This model makes it possible to cool the coolant at a temperature lower than that of the heat transfer fluid (water or ambient air).
- Vulcatherm<sup>®</sup> of the 1083y type, which is cooled by air cooler, i.e. cools by the ambient air. They thus do not require cooling water. They are available in "compact" or "split" model. In this last case, the air cooler unit is separated from the thermo regulator itself, so as, for example, to be placed outside. The air cooled model delivers its maximum power of cooling if the heat transfer fluid is warmer than the ambient air of at least 65°C and if the ambient air is not warmer than 35°C. Its power of cooling becomes nil when the temperature of the heat transfer fluid is higher than that of the ambient air only from 5 to 10°C.

#### 3.2.1 Vulcatherm<sup>®</sup> cooled by water, 1080y (10801, 10802, 10805, 10806)

It is the simplest cooling system, most economic and most compact. This system is usable only if one has a cooling water circuit. The cooling system is limited to:

- A heat exchanger with soldered plates. The primary circuit of this exchanger is traversed permanently by the heat transfer fluid (it is placed between the discharge of the principal pump and the entry of the electric heater). The secondary circuit is traversed by cooling water.
- A cooling solenoid valve, checking the cooling water flow in the secondary circuit of the exchanger above.
- A strainer placed on the cooling water inflow.
- An anti-return valve placed on the cooling water return.

Cooling power is checked by controlling during the cooling solenoid valve wave.

A circuit of by-pass is often used to adapt the hydraulic characteristic of the exchanger to the circuit of the Vulcatherm<sup>®</sup>.

In the typical case of Vulcatherm<sup>®</sup> 10802 160°C, the system is supplemented by a 3 channel proportional valve dosing the flow of the heat transfer fluid in the primary circuit of the heat exchanger.

#### 3.2.2 Vulcatherm<sup>®</sup> without cooling system, 1081y (10811, 10812, 10815, 10816)

These Vulcatherm<sup>®</sup> does not have coolant circuit. They are comparable to boilers. Their minimal temperatures of operation go from about ten degrees Celsius to above the room temperature to approximately 100°C, according to the power of the pump and of endothermic capacity of the receiver. They are thus really usable only for heat clearly above the room temperature.

To control a neutral or slightly endothermic load at a temperature slightly higher than the room temperature, prefer a model cooled by water 1080y above or 1083y if no network of cooling is available.

### 3.2.3 Vulcatherm<sup>®</sup> cooled by refrigerating unit, 1082y (10821, 10822, 10825, 10826)

For the type 1082y (Vulcatherm<sup>®</sup> hot/cooled), the exchanger, allowing the cooling of the heat transfer fluid, is an evaporator placed at the discharge of the principal pump, right before the entry of the electric heater. This evaporator is associated:

- On the one hand, with the usual components of a refrigerating system (compressor, condenser, pressure reducer...).
- On the other hand, with special components, allowing the refrigerating unit to work at temperatures of evaporator which can reach 140°C.

The control of the cooling power is done by modulating the opening of the principal electronic pressure reducer.

Condensation can be with water or with air according to the models. Condensation by water requires a cooling water circuit. Condensation by air requires that the machine is placed in a place or the renewal of air is sufficient to evacuate the heat released (cooling of the receiver plus electricity consumption of the refrigerating machine compressor).

### 3.2.4 Vulcatherm<sup>®</sup> cooled by air cooler, 1083y (10831, 10832, 10835, 10836 T< 110°C)

This paragraph concerns vulcatherm types 10831, 10832, 10835 and 10836 with a maximum operating temperature not exceeding 110 ° C

For the types 1083y (Vulcatherm<sup>®</sup> air cooled), the exchanger, allowing the cooling of the heat transfer fluid, is a liquid/air battery.

The power of cooling is checked by the proportional valve.

A ventilator provides the air flow necessary to the cooling of the battery. A temperature sensor makes it possible to limit the temperature of the blowback to 60°C on an average.

Lastly, this type of Vulcatherm<sup>®</sup> is available in compact version and split version. In this last case, the air cooler unit is separated from the thermo regulator itself, so as, for example, to be placed outside.

### 3.2.5 Vulcatherm<sup>®</sup> cooled by air cooler 10836 T=160°C

This paragraph Concerns the type 10836 Vulcatherm with a maximum operating temperature up to 160 ° C.

The battery exchange air / water That can not Withstand conduire temperature 125 ° C, a fluid superposition system is used Alongside conventional pressurization system (see Section 3.1.4).

The system included :

- One additional auxiliary pump called Expired pump .
- A Pressurized tank
- In a 3 -way valve.

The auxiliary pump is used to circulate in the secondary circuitry Continuously qui est Composed of a battery exchange air / water and a Pressurized tank . The 3 -way valve has role in sending more or less fluid of the secondary system in the main Circuit to Reduce the temperature of the main circuit.

Note: For the vulcatherm with power between 14kW and 40 kW, the pressurizing pump and the auxiliary pump is confused . A 3-way valve installed specially allows to define the role of the pump ( either pressurization or secondary circuit)

## 3.3 HYDRAULIC PRINCIPLE SCHEMA AND NOMENCLATURE

See pages in appendix.

## 4 ELECTRIC PRINCIPLE SCHEMA AND NOMENCLATURE

See pages in appendix.

## 5 HYDRAULIC AND ELECTRIC CONNECTIONS

Check on the rating plate that the reference of the apparatus corresponds to that of this note and that the nominal voltage, frequency and total power are in conformity with your network.

### 5.1 Hydraulic Connection

- Check the closing of the drain valves (dismounted operating levers) or the drain plugs located in general on the low points of the circuits (see hydraulic diagram) as well as the closing of possible manual drainer.
  - Connect the apparatus hydraulically to the receiver by 2 pipes supporting, continuously, the maximum temperature related to the rating plate under a pressure of:
    - 10 bars for the types 108x1, 108x5 and 108x6 not exceeding 110°C
    - 12 bars for the types 108x2 types and 108x6 functioning at 140°C
    - 16 bars for the 108x6 types functioning at 160°C
- The presence of a strainer on the return is generally strongly advised. Its presence is obligatory in the event of the first starting on a manifestly much polluted receiver.
- For the models with water cooling (1080y & 1082y with water-cooled condenser), connect the apparatus to the coolant circuit by 2 pipes provided with connections adapted to the apparatus (difference in mini pressure between 2 pipes and minimum cooling water flow according to regulation of the hydraulic diagram). Check the presence of a strainer on the cool water inlet. The internal diameter of the inlet and outlets of connection should not be lower than that of the Vulcatherm<sup>®</sup>. Lastly, for the 108x2 types and the 108x6 types which can reach 140 or 160°C, the return pipes must permanently support water at 95°C, and occasionally, vapour at the saturating vapour temperature corresponding to the back-pressure of the return circuit.

When several Vulcatherms<sup>®</sup> are connected in parallel on the same coolant circuit, the piping must be balanced to avoid the preferential passages, which could generate instabilities of regulation. It is thus advised to oversize the diameter of pipes of evacuation and to install a water hammer arrester surge tank on the inlet manifold.

- In the case of a 1083y "Split" (that is to say with separate air cooling unit) connect the air cooling unit to the Vulcatherm<sup>®</sup>. This connection must be able to withstand the same pressure and temperature as connections in the receiver. It is not necessary to insulate it, however, its temperature often exceeding 60°C, it is essential to protect it in order to avoid the risks of burn. If the distance between Vulcatherm<sup>®</sup> and the air cooling unit do not exceed 10m, use a pipe of the same diameter as the inlet and outlets of Vulcatherm<sup>®</sup>. If the distance between Vulcatherm<sup>®</sup> and the air cooling unit lie between 10 and 25m, use a larger pipe of one size. If the distance exceeds 25m, use a larger pipe of 2 sizes.
- Check the full opening of all the valves placed in the auxiliary circuit (in general 3: one at the auxiliary pump suction, one at the pump discharge, one after the filter).

If the receiver comprises low points located below Vulcatherm<sup>®</sup>, a tap should be installed there to ensure the future complete draining of the circuit.



**ATTENTION: The networks of cold water supply must be free from particles higher than 100 µm.**

Hydraulic connections of use external to this apparatus are carried at the maximum temperature indicated on the rating plate. Prevent the risks of burn of the staff by a suitable protection during the installation (heat insulator, protective grill, hooding).

## 5.2 Electric Connection



### **DANGER**

- Connect the electric cable on the terminals R, S, T or on the master switch. This connection must be made according to the code of practice and in accordance with the regulations in force, especially for the section of the cable to be used. The feeder should be able to support, in permanent mode, the maximum current appearing on the electric diagram and the rating plate. It will be suitably protected upstream, with distributed ground.



### **IMPORTANT**

- If necessary, connect the connecting cables de between Vulcatherm<sup>®</sup> and automatism of operation or off-set control: See electric diagram.
- In the case of a 1083y "Split" (that is to say with separate air cooling unit of the Vulcatherm<sup>®</sup>) connect the air cooling unit to the Vulcatherm<sup>®</sup>. Two cases are possible:
  - If the air cooling unit has its own switch/disconnecting switch, connect the unit to the network (mono or three-phase voltage according to the cases, see the rating plate of the air cooler), then connect the connection RS485 between Vulcatherm<sup>®</sup> and its unit (1 sheathed pair).
  - If the air cooling unit does not have its own switch/disconnecting switch, connect the subsystems individually: Ventilator/s, valve of by-pass, thermocouple probe of air temperature. See the electric diagram for the details of connection.
- After having checked the presence of an adequate voltage on the supply connector block, close the door of the electric box.

## 6 PILOTING OF THE SGC.V2

**⚠ Caution:** These instruction sheets explain how works Vulcatherm® equipped with a Centralised Management System SGC.v2. However, THE SGC.v2 has close to a SGCEco operation, a SGC.v3 or SGC.v3Twin. For more details, please refer to the manual of SGC "UT30789" instruction.

This chapter presents the mains screens of SGCs, which are the start-up page and the elementary control, and fluid superposition screens. For the others screens this manual crossrefers to the instructions manual."UT30789".

Moreover, in a continuous improvement approach, Vulcanic frequently updates the SGCs' software. If you observe a difference between the software available in this manual and the screens of your SGC, consult the instructions manual."UT30789".

### 6.1 General presentation

#### 6.1.1 The interface of the machine



The interface consists of:

- An ON/OFF button : Thermal regulator On/Off.
- A Horn Reset/Off button : To turn off the horn and reset the defaults.
- Buttons  ... : Principal buttons of navigation.
- An alphanumeric keyboard.

Four direction keys.

- The Up / Down arrow  / : Increases / Reduces the set point.
- The Left / Right arrow  / : Goes to the preceding / next page.

An ESC button : Allows cancelling the current action.

A Confirm button : For recording each modification.

6.1.2 Powering

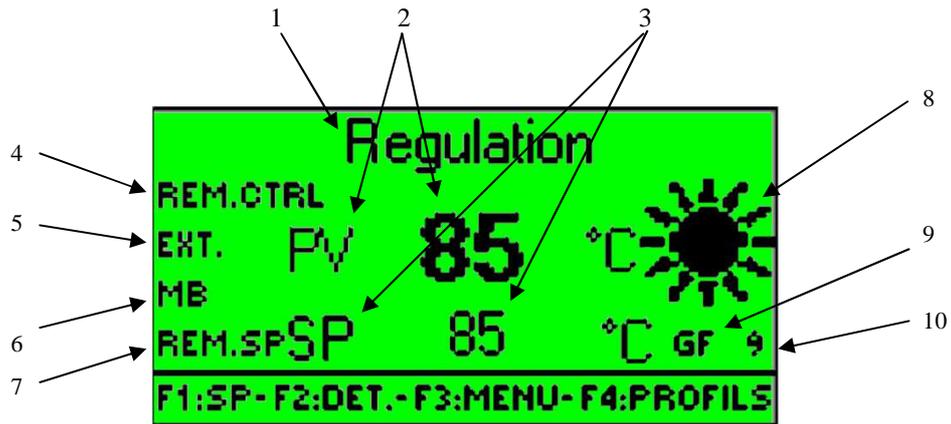
The first page appearing after the energising of the machine displays the program version number.



6.1.3 Home

The homepage screen presents a summary of the main information. It also allows the input of the setpoint.

In the event of a fault being detected, SGCv2 returns automatically to this page.



Zone of information and entry of set point:

- 1 - Machine status indicator, in the above example "Regulation" (see note of SGC.v2 for the list of possible messages).
- 2 - PV (Process Value): indicates the current measurement in °C.
- 3 - SP (Set Point): indicates the current set point. Adjustable Digital value.
- 4 - Indicator of remote or programmed functioning:
  - a. Indicator unlit: local operation only.
  - b. REM.CTRL (Remote Control): indicates that the thermal regulator is under remote control.
  - c. PROG (Programmer): indicates that the thermal regulator is operating programmed clock alone.
  - d. PRG/MAN: indicates that the thermal regulator accepts manual and programmed clock off and on orders.
- 5 - Regulation mode indicator:
  - a. Indicator unlit: regulation on internal probe.
  - b. EXT: indicates that external probe regulation is active.
  - c. CASC.: indicates that cascade regulation is active.

## 6 - Digital links (fieldbus):

- a. Indicator unlit: no bus or digital link active.
- b. DP: indicates that the Profibus DP link is active.
- c. MB: indicates that the Modbus (RTU or IP) link is active.
- d. 2.0A: indicates that the CanBus 2.0A link is active.
- e. 2.0B: indicates that the CanBus 2.0B link is active.
- f. V485: indicates that the proprietary Vulcanic link (ASCII frame on RS485) is active.
- g. ENG: indicates that the ENGEL proprietary link (ASCII frame on current loop) is active.

## 7 - Set point origin indicator:

- a. Indicator unlit: local set point modifiable in the keyboard.
- b. REM.SP (Remote Set Point): indicates that the remote set point is active. In this case, the set point cannot be entered on the keyboard.
- c. PROFILE: the profiles generator (as option) is in service (the set point cannot be entered on the keyboard).
- d. HOLD: the profiles generator is held (the set point cannot be entered on the keyboard).
- e. DISEN.: the profiles generator is disengaged (the set point can be entered on the keyboard).
- f. HL/DIS: the profiles generator is held and disengaged (the set point can be entered on the keyboard).

## 8 - Heating/cooling/limitation indicator:



Heating



Cooling

Limitation of  
power of heating

The limitation indication appears in the following cases:

- a. The surface temperature of the heating element has reached maximum.
- b. The flow rate is momentarily too low.
- c. The temperature of the heat transfer fluid has reached a maximum.
- d. The maximum delta T is reached (only if the management of the deltas T is active).

## 9 - Indicator of operation of the cooling system:

- a. Indicator unlit: no particular indication. If a chilling unit is installed it is off.
- b. GF: the chilling unit is operating.

10 – Segment number: If the “Profile Generator” option is taken, indicates the number of the current segment.

6.1.4 Browsing keys

Key **F1** : is used for modifying the current set point using the digital keypad and for validating any modifications (it is inactive if the remote set point is active).

Key **F2** : is used for changing over to the details screen.

Key **F3** : is used for changing over to the screen Methods of operation and menus.

Key **F4** : the key F4 is be used in the following cases:

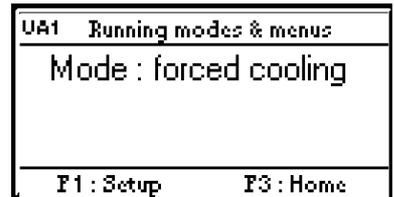
- If the "Profile Generator" option is available, the **F4** key allows changeover to the Profile Generator management screen.
- If the "Profile Generator" option is not available, the **F4** key can be set up to select the measurement probe (internal or external probe). Setting up uses the External Measurement R4 (see chapter 5.4.8).

6.2 **Running mode and access to menus**

This user menu subsection includes two screens.

6.2.1 UA1 Running modes & menus

To open the running modes action page, press the **F3** key from the homepage.



The running modes are:

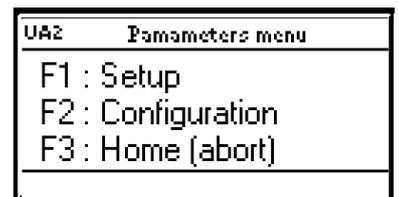
- Regulation: The pump (or pumps) is operating and Vulcatherm® regulates them to the set point temperature.
- Pump alone: The pump (or pumps) is or are operating alone without heating or cooling, for instance, to start a process or to check the flow rate and pressure.
- Forced cold: Maximum cooling power is applied.
- Degassing: (only for models 108x6). The circuit evacuates any air that could remain in the circuit and applies maximum cooling.
- Filling: (only for models 108x6). The pressurization pump operates alone and fills the heating fluid circuit.

The browsing keys are:

- Key **F1** : is used for switching over to the menu selection screen (see [chapter 5.2.2](#)).
- Key **F2** : is used for switching over to the profile generator menu (as option).
- Key **F3** : used for return to the homepage.

6.2.2 UA2 Change of menu

**F3** This menu is accessed from the home page by pressing on the **F1** key Running modes & menus then on the adjustment **F3** key (see above).



This page provides access to the three available menu levels:

- [F1]: Setup: accessible to qualified personnel only.
- [F2]: Configuration menu: Accessible to qualified personnel only (Caution: access by password).
- [F3]: Home (abort): Return to current menu (user menu).

6.3 Other setup screens

6.3.1 U1 Next programmed starting or stopping time

This page appears only if the option “programmable clock is active”. See the corresponding chapter in the “UT30789” manual.

6.3.2 U2 Details Vulcatherm®

In the upper right hand zone, there are heater limitation reason indicators. These reasons can denote:

- ST (Surface Temperature): the surface temperature of the heating element has reached maximum.
- OT (Outlet Temperature): the temperature of the heat transfer fluid has reached a maximum.
- DT (DeltaT): the maximum delta T is reached (only if the management of the deltas T is active).
- FR (Flow Rate): the flow rate is momentarily too low.

U2 Vulcatherm Détails		STOTDTFR
Pressure :	-99.9 bars	
Flow rate :	99.9 m <sup>3</sup> /h	
Power inst./aver.:	-999 % / -999 %	
T Inlet/Outlet :	-999 °C / -999 °C	
F1:Next. F2:Prev. F3:Home		

In the central zone, the display is:

- Pressure: Outlet pressure in bar.
- Flow: Outlet flow rate in m<sup>3</sup>/h.
- Instantaneous/average power: Instant and average power (in %). The average power is calculated for 2 sliding minutes. The power (instant and average) is positive when Vulcatherm® is heating and negative when Vulcatherm® has cooled.
- Element/Outlet T°: Indicates the heating element and Vulcatherm® starting temperatures. The indicated heating element temperature is the average temperature of the heating element thermocouples in the heater. This indication is only available on thermal regulators with instrumented heating elements. The starting temperature is the outlet temperature of the heat transfer fluid (in °C). If Vulcatherm® is regulating on an internal probe, this value equals PV (process value).

6.3.3 U3. Regulating operation

Used to view the operation of the regulator:

- SP inst. (Set Point): The instant set point in °C, which can be different from the set point posted in the Homepage, which indicates only the final set point.
- PV (Process Value): Temperature in °C, measured on the internal or external probe, depending on the selection.
- Power: Power delivered by the thermo regulator in % of the nominal power. It is negative if the regulator is cooling.
- GRFC instant (instant Hot Cold Relative Gain): A way of adapting the cold outlet gain with respect to the heat outlet gain (and therefore modifying the respective value of the cold proportional band with respect to the heat proportional band). It is all the more small as cooling is important. This value depends on the GRFC at 65°C (entered in the page C5 Cooling law) and on the instant variation in temperature between principal circuit and auxiliary circuit.
- Actions of PID: Displays Proportional, Integral and Derived actions. The sum of the three actions is 10 times the applied power in %.

U3 Vulcatherm Regulator				WDWU
SP instant.	PV	Power		
-999.9 °C	-999.9 °C	-999 %		
GRFC Inst.	Action P	Action I	Action D	
99.99	-99999	-99999	-99999	
F1:Next. F2:Prev. F3:Home				

6.3.4 U5 T° and power for each element

This screen only appears if the individualised control of the heating elements is in service. This individualized control is generally used for Vulcatherm® having a power of heating higher than 100 kW.

U5 T° and power for each element							
N°	TTC	T°S	%	N°	TTC	T°S	%
1:	99	99	99	4:	99	99	99
2:	99	99	99	5:	99	99	99
3:	99	99	99	6:	99	99	99
F1:Next. F2:Prev. F3:Home							

In the central zone, for each heater, one finds:

- **N°**: Number of heating element, numbered from (1 to 6).
- **T° TC**: Temperature of heating element thermocouples.
- **T° S**: Heating element surface temperature.
- **%**: Power percentage. The value -1 indicates that the component concerned is in power limiting mode.

6.3.5 U5A Status of the electric pressuriser

This screen only appears if Vulcatherm® has an electric pressurisation system. Thus, in the case of Vulcatherm® types 10806, 10816, 10826 and 10836. In the central zone, it displays:

U5A	Pressurizer
Normal pressure	
Suction pressure	: -9.9 bars
F1:Next. F2:Prev. F3:Home	

- Pressuriser status. This status can be:
  - **Inactive (wait)**: the pressuriser is waiting for the Vulcatherm® to start.
  - **Pressurisation normal**: pressurisation is set up normally.
  - **Pressurisation in progress**: pressurisation is in progress. The pump (or filling solenoid valve) is operating.
  - **Filling in progress**: the pump (or the filling solenoid valve) and the degassing solenoid valve are simultaneously under operation in order to fill the circuit by evacuating the air.
  - **Degassing**: the pressuriser evacuates the trapped air in the circuit.
  - **Relief**: the pressuriser releases fluid to reduce the pressure.
  - **Emergency depressurisation**: the pressuriser is switched off, with relief valve open, following an emergency stop.
  - **Depressurised**: the pressuriser is off and opens the circuit to the atmosphere (by keeping the relief valve open). Vulcatherm® operates in atmospheric mode (as model 10801). In this mode, the temperature at the beginning of Vulcatherm® is always limited to 90°C.
- **Suction pressure**: current pump suction pressure.

6.3.6 State of the digital link

If applicable, see the corresponding chapters in the “UT30789” manual.

6.3.7 U7A Description of the page "Positioner of proportional valve"

This page appears only if the coolant circuit uses a proportional valve. This valve exists only on the air cooled models 1083y (10831, 10832, 10835, and 10836). Or on the 10806 which can reach 160°C.

U7A Proportionnal valve					
VALVESP			POSITION		
BASE	OFFSET	CORR.	RAW	CORR.	
999.9%	999.9%	999.9%	999.9%	999.9%	
Offset	D.B.	In. - Limiter	Out		
999.9%	999.9%	999.9%	999.9%	999.9%	
F1:Next. F2:Prev. F3:Home					

From top to bottom and left to right, the display is:

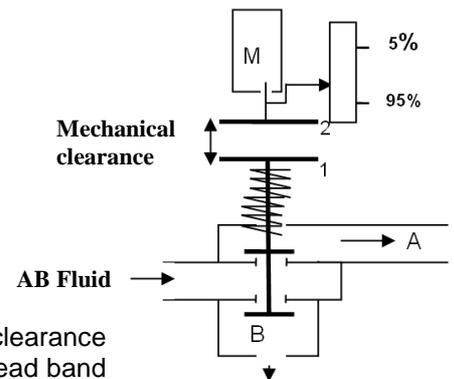
- **VALVE SP:** Because of the difference between the electric setpoint and the mechanical setpoint and also the possible presence of a mechanical clearance, corrections have to be made to the requested position (setpoint) for the proportional valve.

**BASE:** position of valve requested by regulator.

**OFFSET:** basic setpoint corrected for mechanical clearance of valve.

**CORR.:** above setpoint offset to allow for position of mechanical travel ends.

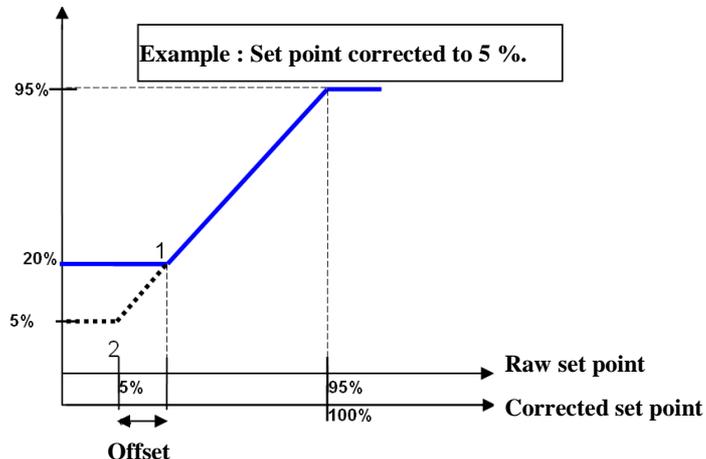
- **VALVE POSITION:** current valve position.
- **Offset:** compensation for mechanical clearance as set out in the configurations menu in the table "CF proportional valve positioner".
- **B.M.:** Positioner dead band.
- **Limits:**
  - **Inl.:** extreme position reached on inlet,
  - **Outl.:** extreme position reached on outlet.
- **Position :**
  - **RAW :** Raw valve position
  - **CORR :** Valve position with correction



By construction, some valves have a mechanical clearance between valve pusher 1 and motor pusher 2, creating a dead band in which the valve no longer moves although the motor is running. This clearance generates non-linearity, which could be detrimental to correct operation of the Vulcatherm®. It has to be corrected. The principle of correction explained below in the case of a distribution valve used to control cooling.

In the figure opposite, when motor pusher 2 is not in contact with valve pusher 1, the spring released and the valve comes to the high position. All the fluid from AB runs through circuit A (no cooling).

After compensation for the clearance when pusher 2 presses against pusher 1, the spring is compressed, the valve drops to the low position and liberates into circuit B an amount of fluid proportional to the descent of the valve.



6.3.8 U7B Description of the page “Direct air cooling”

This page appears only on the air cooled models (i.e. cooled directly by the ambient air, without refrigerating unit) of types 1083y (10831, 10832, 10835, 10836).

In the central zone, one finds:

U7B	Direct air cooling
	Attente / Stand-by
T <sup>air/estim. amb.</sup> :	-999 °C / -99 °C
PrValve Curr./Max	999.9 %/999 %
Fan CV	999 %
F1:Next. F2:Prev. F3:Home	

- The indicator of the air cooling system status. The possible values are:
  - **Stand-by:** The system is awaiting a request for cooling.
  - **Taking of room temperature:** A request for cooling has just arrived. The system updates the measurement of room temperature before beginning cooling.
  - **Cooling:** Cooling is going on.
  - **End of cooling:** The request for cooling has just ended. The system evacuates the hot air and updates the measurement of room temperature.
- **T<sup>air/amb.estimated</sup>:**
  - Temperature of air in the ventilator inlet.
  - Room temperature estimated (taken during phases of taking of room temperature and end of cooling, at least every 2 hours. This value is used to calculate the Grfc.
- **Pos.PVCurr./Max.:**
  - Current VP position: Current electric position of the proportional valve of cooling.
  - Maximum possible opening of the VP: Maximum possible mechanical opening of the proportional valve guaranteeing a temperature of air acceptable to the suction of the ventilator.
- **CV ventilator:** Parameter of command of the ventilator.

6.3.9 U8A Description of the page “Refrigerating param.”

This screen appears only in the case of Vulcatherms® type 1082y (10821, 10822.10825, equipped with a refrigerating unit).

In the top left zone, one finds the indicators of operation of the refrigerating components:

- **A:** is displayed when the compressor N° 1 functions
- **B:** is displayed when the compressor N° 2 functions
- **C:** is displayed when the compressor N° 3 functions
- **D:** is displayed when the compressor N° 4 functions
- Indicator of operation of the ventilators:
  - **VLS** (Ventilator low speed): the ventilator/s functions in low speed.
  - **VMS** (Ventilator medium speed): the ventilator/s functions in medium speed.
  - **VHS** (Ventilator high speed): the ventilator/s functions in high speed.
  - **V10 to V100:** ventilator/s at variable speed. % speed from 10% to 100%.
- **R:** is displayed when the electronic pressure reducer functions at reduced power.

U&A Chiller parameters	
HP	-99.9 bar/ -99.9 °C
BP	-99.9 bar/ -99.9 °C
OD/TA/SC	99 % / -99 °C/ -99.9 °C
T Evap/Power	-999 °C/ 99.9 kW
F1:Next. F2:Prev. F3:Home	

In the central zone, the display is:

- **HIGH PRESSURE:** Pressure of the refrigerant to the discharge of the compressor. It is expressed in bar as well as in saturated vapour temperature.
- **LOW PRESSURE:** Pressure of the refrigerant to the suction of the compressor. It is expressed in bar as well as in saturated vapour temperature.
- **OD/TA/SC:** Opening of the principal pressure reducer/temperature at the inlet/overheating:
  - Opening of the pressure reducer: expressed as a percentage.
  - Temperature in the suction: temperature measured by the probe placed at the suction of the compressor. It is used to control the solenoid valve of injection of liquid. It is also used to calculate the overheating of gases sucked in.
  - Overheating: it is the difference between the temperature in the suction and the saturated vapour temperature in the suction. In order to make sure that the compressor does not suck in liquid, this parameter must remain positive.
- **ODIL/TE/PU.:** Opening of the pressure reducer of injection of liquid, temperature of outlet of the evaporator/Power.
  - Opening (in %) of the pressure reducer of injection of liquid (used to cool gases sucked in by the compressor).
  - Temperature of outlet of the evaporator: temperature of the heat transfer fluid in outlet of the evaporator. This value is used to release anti-ice safety.
  - Power: conventional power of the compressor following the Asercom standard.
- **COND. WATER FLOW:** (Displays only in case of condenser with cooling by water) cooling water flow of the condenser.

6.3.10 Profile generator

If applicable, see the corresponding chapters in the “UT30789” manual.

6.4 SETUP

The setup allows the basic adjustments of the thermal regulator. The pages of this menu are described in the following paragraphs. It is available in several languages.

6.4.1 R0 Languages and hourly meter

From top to bottom it displays

- The language selector. Used for choosing the display of operator and adjustment menus from among:
  - French (by default).
  - English.
  - German (Deutsch).
  - Espagnol (Español).
  - Portuguese (Português).
- Hourly meter: Indicates the number of running hours of the main pump.

R0	Language & time counter
Select a language :	
English	
Validate maintenance:F4 for 10 sec.	
Time counter	999999 H
F1:Next. F2:Prev. F3:Home	

If maintenance validation is necessary the indication "Maintenance validation: F4 for 10s" appears. To validate the maintenance, hold the  key down for 10 seconds.

6.4.2 R1 Temperature regulation / Power proportioning

From top to bottom it displays

- Selection of mode:
  - Temperature regulation: normal regulation operation.
  - Power proportioning: a way of establishing a constant heating or cooling power factor. Essentially, this mode is intended for regulation testing and development. Without surveillance, the outlet temperature of the Vulcatherm® can reach the temperature limits (maximum temperature is the sum of the power is positive, otherwise minimum temperature).
- T° of cold water: the cold water temperature is a digital value on which the cooling power calculation is based.

R1	Modes & Cooling source
Temperature control	
Autotune : F4 for 5 seconds	
Cooling water T°	-99 °C
F1:Next. F2:Prev. F3:Home	

If the conditions for starting a soft adjustment cycle are fulfilled, the indication "For self-adjustment: F4 for 5s" appears.

To start the soft adjustment cycle, hold the  key down for 5 seconds.

6.4.3 R2 Adjustments of the Vulcatherm® regulator

In the central zone, one finds:

- **Prop. Band:** Proportional band. Adjustable Digital value between 0.1°C and 99.9°C.
- **Integral:** Digital value adjustable between 1 and 9999 seconds. The integral time cannot drop below 4 times the rate time (see below). In some cases, decrementation of the integral time can result in automatically decrementing the rate time.
- **Rate:** Digital value adjustable between 0 and 999 seconds, with a maximum at quarter the integral time (see above). The display of "0" stands for "rate time zero = no rate correction". In some cases, decrementation of the integral time can result in automatically decrementing the rate time.
- **Dead Band:** digital value adjustable between 0 and 30% of the proportional band.

F2 Vulcatherm regulator setup	
Proport. band	99.9 °C
Reset	9999 sec.
Rate	999 sec.
Dead band	99.9 % de BP
F1:Next. F2:Prev. F3:Home	

6.4.4 R2A. Process regulator

See the corresponding chapter in the "UT30789" manual.

6.4.5 R2B. Ramps

See the corresponding chapter in the "UT30789" manual.

6.4.6 R2C. Delta T

See the corresponding chapter in the "UT30789" manual.

6.4.7 R3 Remote set point

In the central zone, one finds:

- The selector of set point source allowing choosing between:
  - **Local Set Point only:** The set point can only be input on the home page.
  - **Remote Set Point only:** The set point used comes from the external signal (digital or analog). It can only be modified on the home page.
  - **Remote set point on input I14:** An external on/off signal allows switching between the 2 previous modes.
  - **Remote set point commanded by BUS:** A BIT coming from the digital link allows switching to remote set point mode. This option is functional only if a digital link of modBUS type or profiBUS is used.
  - **Remote set point on remote command:** Vulcatherm® switches over automatically to remote set point mode as soon as remote piloting is active.

R3	Remote SP
Remote Set Point only	
2 / 10 V	4 / 20 mA
RSP SCALE LOW/HIGH (°C): -999/-999	
Remote setpoint (RSP) -999 °C	
F1:Next. F2:Prev. F3:Home	

The choice of remote set point reveals:

- The selector of analogical input scale allows choosing between:
  - **2/10V 4/20mA:** Choose this mode if your signal has an offset origin of 20%. It is particularly the case of the analogical current loops 4/20 mA.
  - **0/10V 0/20mA remote only:** Choose this mode if your signal does not have an offset origin. It is particularly the case of the analog signals 0/10 volts.
- **SCAL.SETP.LOW/HIGH (°C):** Low and high set point scale. For the low limit, adjustable digital value between 100°C and top of scale of remote set point. If this parameter is lower than the bottom of scale of local set point, the SGC will be limited to this value (bottom of scale of local set point). For the high limit, adjustable digital value between the bottom of scale of remote set point and 600°C. If this parameter is higher than the top of scale of local set point, the SGC will be limited to this value (top of scale of local set point).
- **Remote set point Instant:** Instant value of the remote set point depending on the above scales.

6.4.8 R4 External measurement

In the central zone, from top to bottom and from left to right, one finds:

- Choice of external measurement
  - No external probe: the external probe is not used and regulation is on the internal probe of the Vulcatherm®.
  - External measurement activated.
  - External measurement active on condition.
  - Cascade regulation activated (option, see description of the cascade regulation in the note of SGC).
  - Cascade regulation on inlet I16/32. Same remark as above.
- Choice of measurement source:
  - Analogue measurement: external analogue measurement,
  - T° extern. by bus: external measurement by digital link (option).
- Choice of measurement selection:
  - Select by contact: selection by an electric contact,
  - Selection by F4: Selection by the  key on the homepage (only if the profile generator option is unavailable),
  - Selection by bus: selection by digital link.
- Lower external meas. scale: digital value adjustable between -100°C and top of the analogue measurement scale. If this parameter is lower than the bottom of the local setpoint scale, S.G.C. will be unable to use measurements located beneath the bottom of the local setpoint scale.
- Lower external meas. scale: digital value adjustable between the bottom of the analogue measurement scale and 600°C. If this parameter is higher than the local setpoint scale top, SGC will be unable to use measurements located above the top of the local setpoint scale.

R4	External probe
	No external probe
	External Analog mesure
	Lower ext.measurement scale: -999 °C
	Higher external meas. scale: -999 °C
	F1:Next. F2:Prev. F3:Home

6.4.9 Temperature alarm

See the corresponding chapter in the “UT30789” manual.

6.4.10 R8 Setpoint scale

Define the range for setpoint SP (local or distant):

- SP bottom stop: Adjustable digital Value between the bottom of scale of setpoint and the SP top stop.
- SP top stop: Adjustable digital value between the SP bottom stop and the top of scale of setpoint.

R8	SP range
Top inferior SP	-99 °C
Top superior SP	-999 °C
	F1:Next. F2:Prev. F3:Home

6.4.11 R9 – Power & cyclical reports

In the central zone, one finds:

- Maximum Power:** It may be that the effectiveness of the heating is overabundant. The heating power can be controlled by displaying a maximum power percentage of less than 100% (E.g.: a 20 kW Vulcatherm® only dissipates 12 kW when its MAX POWER parameter is set to 60%).
- Hot cycle time:** Digital value which must be set on 1 second maximum. In the case of Vulcatherm® having an individual heating check for each heater, this parameter is inoperative and the cycle time is 1.11 second.
- Cold cycle time:** digital value adjustable between 10 and 120 seconds. Normally set to 30 seconds. This parameter is, of course, inoperative in the case of Vulcatherm® cooled by air (1082y with condensation with air and 1083y). It can also be sometimes inoperative in the case of 1082y with condensation with water (according to the type of valve of control of the cooling water flow).

R9 Power and PWM period	
Power limit	999 %
Hot cycle time :	999 sec.
Cold cycle time	999 sec.
External control average :	99 sec.
F1:Next. F2:Prev. F3:Home	

6.4.12 R10 – Fluid temperature limits

Fluid low temp limit: digital value adjustable between the bottom of the set point scale and 90°C, exclusively when the measurement sensor is external. Limits the minimum outlet temperature independently of any other condition.

Fluid high temp limit: digital value adjustable between 0°C and the top of the set point scale, exclusively when the measurement sensor is external. Limits the maximum outlet temperature independently of any other condition.

If the 2 values overlap, the lower limit is aligned on the top limit.

R10 Fluid temperatures limits	
Fluid low temp. limit :	-99 °C
Fluid High temp limit :	-999 °C
F1:Next. F2:Prev. F3:Home	

6.4.13 R11 – Digital connection

See the corresponding chapter in the “UT30789” manual.

6.5 CONFIGURATION menu

The screen pages shown in this chapter are reserved exclusively for users having all the skills needed for setting up a thermal regulator. The input of an incorrect parameter can cause extensive damage to property and people.



**CAUTION : This menu is exclusively bilingual in French and English.**

Access requires a password, using the following procedure:

- Go to the homepage (see [chapter 5.1.3](#)),
- Press the **F3** key to switch to the running mode and menu screen,
- Press the **F1** key to open the menu selection screen,
- Press on the **F2** “Menu configuration” key (see [chapter 5.2.2](#)),
- Input the password to log on to the configuration menu. If you don't have it, please contact the Vulcanic's after-sales service.

6.5.1 C1 Safety Thresholds

In the central zone, one finds:

- **Mini static pressure:** minimal Static Pressure of heat transfer fluid, measured on CPP.
- **Minimum flow:** flow rate beneath which the “no flow rate” error message appears.
- **Fault / No fault when power resume:** activate or deactivate the “Power return” message on energising.
- **T° maxim. of surface:** maximum authorised surface temperature of the heating elements.

C1	Security thresholds
Minimal static presur.	-99.9 bars
Minimum flow rate	99.9 m <sup>3</sup> /h
No fault when power resume	
Maximal surface T°	999 °C
F1:Next. F2:Prev. F3:Home	

6.5.2 C1A. Flow output parameters

In the central zone, one finds:

- **ISO Viscosity:** used for adjusting the kinematic viscosity of the fluid. This parameter is used by the flow rate estimation algorithm.
- **Coeff. Flow/Pressure:** Used for calibrating the flow display in m<sup>3</sup>/h.

C1A	Flow rate calculation
ISO viscosity @ 40°C	999.9 cSt
Flow/pressure ratio	999.99
Estimated flow rate : 99.9 m <sup>3</sup> /h	
F1:Next. F2:Prev. F3:Home	

6.5.3 C2 Safety measures

Used to deactivate most of the safety measures (By defaults, the safety measures are active).



**ATTENTION: INHIBITING THE SAFETY DEVICES CAN CAUSE MAJOR DAMAGE TO PROPERTY AND PERSONNEL.**

C2	Safety management
2	Rotortflow inhibé
Rotortflow inhibited	
Att :Risque de dommage important!	
Warning : Risk of heavy damages!	
F1:Next. F2:Prev. F3:Home	

6.5.4 C4 Miscellaneous information

This screen shows only in read mode, various information items useful for checking the running of the thermal regulator.

C4	Various informations	-999°C
Rotoflow/CT: 99.9 m3/h/ 9999 m3		
CPP/CPV pr.: -99.99 b/ -99.99 b		
CPA or CPPA pressure: -99.99 b		
Delta P/Var. -99.99 b/ 999999		
F1:Next. F2:Prev. F3:Home		

In the right top zone one finds the temperature of the heat sink. This value is valid only if an electronic power board having a control of heating by thyristor is used.

In the central zone, from top to bottom and from left to right, one finds:

- **Rotoflow:** Cooling water flow measured by the Rotoflow flowmeter.
- **CPV pressure:** Used for the calculation of the flow and the display of the effective pressure present on the starting pipe of use.
- **CPP Pressure:** Used for the calculation of the flow.
- **CPA Pressure:** Used to control the suction pressure.
- **Delta P:** Indicates the clear pressure difference (corrected by the offset of measurement) between CPV and its sensor of reference (CPP, CPA or atmosphere) according to the model of Vulcatherm®. This value is valid only if the principal pump functions (if not the displayed value is the last delta P before the stopping of the pump).
- **Var.:** Variance. Indicates the variance (square of the standard deviation) of the signal Delta P above. The unit is the kPa<sup>2</sup>.

6.5.5 C5 Cooling law

In the central zone, one finds:

- The display (without possibility of modification) of the cooling law:
  - **Linear:** This law is generally used only for model 10806 which can reach 160°C (and thus equipped with a proportional valve).
  - **Quadratic:** This law is generally used for Vulcatherm® cooled by water: types 10801, 10802, 10805 and 10806 (except 10806 160°C).
  - **Refrigerating Unit:** Case of types 10821, 10822, 10825 and 10826.
  - **Air cooled:** Case of types 10821, 10822, 10825 and 10831.
- **GRFC @ 65°C:** Adjustable digital value between 0.05 and 20.0. It is the relationship between the heating and cooling powers, under a difference in temperatures between cold source and hot source of 65°C. The hot source is the principal heat transfer fluid circuit, the cold source is the cooling water or the ambient air in the case of Vulcatherm® cooled by refrigerating unit (types 10821, 10822, 10825 and 10826), this parameter is not displayed because it is calculated by SGC according to the parameters of the refrigerating unit.

C5	Cooling law
Linéaire / Linear	
GRFC@65°C: 99.99	
F1:Next. F2:Prev. F3:Home	

6.5.6 C5A Level detector

See the corresponding chapter in the “UT30789” manual.

6.5.7 C7-Positioners proportional valve

This C7 page relates to the positioner used for the proportional valve of proportioning of cooling power. This valve exists only on the air cooled models 1083y (10831, 10832, 10835, and 10836). Or on the 10806 which can reach 160°C.

C7 Proportionnal valve positioning	
JCI	
Src.=ouv./Out=open &lim pot. AN1	
Dead band	999.9 %
Gap Time/Travel:	99.9 s / 999.9 %
F1:Next. F2:Prev. F3:Home	

From top to bottom and left to right, the display is:

- Types of Valve:
  - **No Prop Valve**: no proportional valve. General case, other machines than those mentioned above.
  - **Regular valve**: regular coupling proportional valve (clearance-free).
  - **Samson K valve**: K type clearance Samson valve.
  - **JCI**: JCI (Johnson control) valve with clearance in the potentiometer of recopy.
- Action direction:
  - **Out=Open**: The motor output corresponds to increased cooling.
  - **Out=Close**: The motor output corresponds to decreased cooling.
- Position copy potentiometer polarisation. This supply can be:
  - **Pot.exter.supply**: Use of an external supply
  - **Pot. supply AN1**: Use of the No. 1 analog output (this outlet is then no longer available).
- **Dead Band**: Range in which motor no longer seeks to correct the error (1 to 3% depending on motor): if the valve is too small, the motor never stops, reducing the life duration; too high a value can interfere with regulation.
- **Offset**: Mechanical clearance compensation. (in % of the total electric stroke). Appears only if valve K is selected.
- **Clearance duration/course**: Appears only if valve JCI is selected. Mechanical clearance compensation of the copy potentiometer. The two parameters are:
  - Duration: Time (in seconds) necessary to compensate the entire clearance of the potentiometer.
  - Course: Mechanical clearance of the potentiometer expressed as % of the electric course.

**CAUTION:**

***THE CHOICE OF LAW IS FACTORY-ADJUSTED. IT MUST NOT BE CHANGED. CHOOSING ANOTHER LAW CAN CAUSE MAJOR DAMAGE TO PROPERTY AND PERSONNEL.***

6.5.8 C8 Refr. unit 1: Fluid & safety devices

This page displays only in the case of models 10821, 10822, 10825 and 10836 (with refrigerating unit).

In the central zone, from top to bottom and from left to right, one finds:

C8	Chiller.1 : Fluid & safeties
danfoss MTZ 160-4 50HZ R404a	
Déten. électronique/Electronic valve	
Anti-ice/Tmax.Suction °C: -99 /99	
HP maximum :	99.9 bars
F1:Next. F2:Prev. F3:Home	

- The type of compressor being used and the associated refrigerating fluid. In the example here, it is a Danfoss compressor of the MTZ160-4 type designed to run at 50Hz with refrigerating fluid R404a (display only).
- Choice of relief type (display only). The possibilities are:
  - **Th.expan.valve**: Mechanical relief (thermostatic).
  - **Electronic valve**: Electronic relief valve controlled by stepper motor.
  - **Electric valve**: Electric relief valve (relief solenoid valve supporting a 6 second wave train and having a calibrated orifice).
- **Anti-icing threshold**: Temperature threshold belief which the machine stops to avoid the heating fluid freezing in the evaporate.
- **Max temperature in the suction**: If this threshold is exceeded too long, the SGC goes in error mode "Overheat compressor suction". In the event of thermostatic relief, it is also the threshold of the limiting device of suction temperature. When the temperature of gases sucked in by the compressor exceeds this threshold, SGC immediately orders the opening of the solenoid valve of injection of liquid in order to again reduce this temperature to an acceptable value by the compressor.
- **HP maximum**: Maximum high pressure threshold above which the machine stops to avoid deterioration caused by over pressure.

6.5.9 C9 Other refrigerating parameters

This page displays only in the case of models 10821, 10822, 10825 and 10826 (with refrigerating unit).

In the central zone, from top to bottom and from left to right, one finds:

C9	Others chiller parameters
POWER PUMP/HEATER:	99.9 / 999.9
INERT. TEMPERATURE :	99 °C
COMPR.2 P. START/STOP	999 % / 999 %
COMPR.3 P. START/STOP	999 % / 999 %
COMPR.4 P. START/STOP	999 % / 999 %
F1:Next. F2:Prev. F3:Home	

- **POWER PUMP/HEATING (kW)**: Rated output of the engine of the principal pump and heater. These parameters are used by the regulator of the Vulcatherm® in order to determine the cold/hot relative gain.
- **INERTING TEMPERATURE**: Temperature at which is maintained the expansion tank, in order to avoid the condensation of water droplets in it.
- **COMPR2 POW. START/STOP**: Vulcatherm® having at least 2 compressors. Percentage of power of cooling at which compressor 2 is started and stopped.
- **COMPR3 POW. START/STOP**: Vulcatherm® having at least 3 compressors. Percentage of power of cooling at which compressor 3 is started and stopped.
- **COMPR4 POW. START/STOP**: Vulcatherm® having 4 compressors. Percentage of power of cooling at which compressor 4 is started and stopped.

6.5.10 C9A Electronic relief

This page displays only in the case of models 10821, 10822, 10825 and 10826 (with refrigerating unit).

In the central zone, from top to bottom and from left to right, one finds:

C9A	Electronic expansion		
	S.HEAT	MOP	LIQ.INJ
SP	99.9°C	99.9B	99°C
PB	99.9°C	99.9B	999.9°C
RESET	999 SEC	999 SEC	999 SEC
RATE	999 SEC	999 SEC	999 SEC
F1:Next. F2:Prev. F3:Home			

- **OVERHEATING:** overheated zone (Regulates super-heating at the evaporator outlet):
  - SETPOINT: superheating regulator set point
  - BP: superheating regulator proportional band
  - INT.: superheating regulator integrating constant
  - DER.: superheating regulator drift constant
- **MOP** (regulates maximum pressure on compressor suction side):
  - SETPOINT: MOP regulator set point
  - BP: MOP regulator proportional band
  - INT.: MOP regulator integrating constant
  - DER.: MOP regulator drift constant
- **INJ.LIQ:** liquid injections are in (regulating the compressor minimum suction temperature):
  - SETPOINT: injection regulator set point
  - BP: injection regulator proportional band
  - INT.: injection regulator integrating constant
  - DER.: injection regulator drift constant

On certain Vulcatherm® the parameters of overheating and MOP are regulated directly on the pilot of the electronic pressure reducer. In this case, these parameters are not visible here.

6.5.11 C10 Control of the condensation. (HP – high pressure)

This page displays in the cases of models 10821, 10822, 10825 and 10826 (with refrigerating unit) as well as models 10831, 10832, 10835 and 10836 (air cooled).

This control is by cooling the compressor to a greater or lesser extent. In this chapter one speaks only about control of a ventilator (atmospheric condenser), but it can also be control of a valve (water-cooled condenser).

C10	Condenser control
	4-2VENT.-3VITES./2FANS-3SPEEDS
	HIGH SPEED THRESHOLD (BAR): 99.9
	MIDDLE SPEED THR. (BAR): 99.9
	LOW SPEED THRESHOLD (BAR): 99.9
	STOP THRESHOLD (BAR) : 99.9
	F1:Next. F2:Prev. F3:Home

From top to bottom it displays

- Choice of condensation control type. This can be:
  - **None:** The condenser pressure is not controlled by SGC. This is the choice generally made if Vulcatherm® has a water condenser associated with a pressure valve.
  - **On-Off:** control is simply by starting or stopping the fan.
  - **Star – Triangle:** the three-phase ventilator has 2 speeds.
  - **2FANS-3SPEEDS:** special combination of 2 three-phase fans offering 3 different speeds.
  - **By regulator:** the fan operates at a variable speed.

The lower part of the page depends on the type of control.

In case of on/off control, one finds:

- **STARTING THRESHOLD or HIGH SPEED THRESHOLD:** Threshold of pressure beyond which the fan starts or passes into high speed
- **MEDIUM SPEED THRESHOLD:** Threshold of pressure beyond which the fan goes into medium speed (system with 3 speeds only)
- **LOW SPEED THRESHOLD:** Threshold of pressure beyond which the fan starts in low speed (system with 2 or speeds)
- **STOP THRESHOLD:** Threshold of pressure below which the fan stops.

In case of control by regulator, one finds:

- **SETPOINT:** Set point (in bar) of the pressure regulator.
- **PROPORTION. BAND:** Proportional band (in bars) of the pressure regulator.
- **INTEGRAL:** Integral (in minute) of the pressure regulator.
- **RATE:** Rate (in seconds) of the pressure regulator.

6.5.12 C11 State of the external bus

See the corresponding chapter in the “UT30789” manual.

6.5.13 C12 & C13: Digital link

See the corresponding chapters in the “UT30789” manual.

#### 6.5.14 C13A - Input D configuration

This screen is available on all models (SGCEco, SGC.v2, SGC.v3 and SGC.v3Twin) fitted with a 30789.30 interface terminal module.

It defines the function of the input configurable (InD). The choices depend on the type of remote control selected. For input InD the possible choices are:

##### 6.5.14.1 **Cases other than the external control**

If the "external control" option (see SGC instructions manual "UT30789") has not been selected, the choices are:

- Pump only
- Forced cooling
- Select internal/external probe
- Remote set point
- Delta T
- Ranges

##### 6.5.14.2 **Cases "External control"**

If the "external control" option (see SGC instructions manual "UT30789") has been chosen, the choices become:

- Select internal/external probe.
- Reset (reset on the rising edge).
- Reset & External validation control. The reset is active on rising edge, external control is active on the level.
- Validate external control.

In the first two cases, is permanently Vulcatherm® "external control" mode. An informational message is displayed.

6.5.15 C14 Pressurizer

This screen indicates the electric type of pressurizer used. Except for the 108x6 type, the selection must be "None".

In the central zone, from top to bottom, the display is:

C14	Pressurizer
PRESSU.PAR RESEAU (MAINT. SIAU)	
PRESS. BY INLET (HOLD IF EMERGEN.)	
MINIMUM PRESSURE :	99.9 barr
MAXIMAL PRESSURE :	99.9 barr
DEGAS./PRESSU. THRESH.	999 °C
F1 : Next. F2 : Prev. F3 : Home	

- Selection of pressuriser function:
  - **None**
  - **ELECTRIC DEGAZ & EXPANSION:** Degasser only. The function manages only the degassing valve.
  - **PRESSU.BY PUMP (HOLD. IF EM)/PRESS. BY PUMP (HOLD IF EMERGEN.):** pressurisation **with holding if AU**. In an emergency stop, pressurizing is held. Pressurization by auxiliary pump. This is the general case of Vulcatherm® of the 108x6 type
  - **PRESSU.BY PUMP (CUT IF EM)/PRESS. BY PUMP (DOWN IF EMERGE.):** pressurization not maintained if Emergency. In an emergency stop, pressurizing is cancelled. Pressurization by auxiliary pump. This option can also be used for a 108x6 type.
  - **PRESSU. BY INLET (HOLD IF EM)/PRESS. BY INLET (HOLD IF EMERGE.):** Pressurisation by EV on cooling water network with hold if emergency. In an emergency stop, pressurizing is held. Do not use.
  - **PRESSU. BY INLET (DOWN IF EM)/PRESS. BY INLET (DOWN IF EMERGE.):** Pressurisation by EV on cooling water network with hold if emergency. In an emergency stop, pressurizing is cancelled. Do not use.
  - **FILL. & DEGAS ONLY (NO PRESSURE):** Fill and degas only. The pressurizer ensures only the filling and the degassing of the circuit. No pressure is applied.
  - **FILLING BY DIREC. COOL.10804/5 ONLY:** The pressurizer ensures only the filling by FORCED OPENING OF THE PROPORTIONAL VALVE of cooling. This option is reserved for Vulcatherm® of the type 10804 or 10805 with cooling by direct cold ordered by proportional valve. Do not use.
- **MINIMUM PRESSURE:** The minimum pressure beneath which the pressurisation pump starts.
- **MAXIMUM PRESSURE:** The maximum pressure above which the load shedding solenoid valve opens.
- **DEGASSING/PRESSU. THRESHOLD:** Temperature threshold at which the pressurisation strategy changes. Beneath this threshold: priority to degassing (the presence of air forces the opening of the degassing solenoid valve), above the threshold: priority to pressurisation (the presence of air forces the pump to start).

## 7 PROCEDURE OF THE FIRST COMMISSIONING

This procedure depends on the hydraulic circuit type. The paragraphs below describe these procedures for the types:

- Atmospheric vulcatherm® 10801, 10811, 10821, 10831
- 10802, 10812, 10822, 10832, 10805, 10815, 10825 and 10835 (Vulcatherm® with pressurization by network)
- 10806, 10816, 10826 and 10836 (Vulcatherm® with electric pressurization)

### 7.1 Precautions and warnings concerning all the models



**ATTENTION IMPORTANT: THE PUMPS SHOULD NEVER TURN DRY.**



#### **IMPORTANT NOTES**

- The receiver must to be perfectly watertight (in particular if its high point is located above the Vulcatherm®), in order to avoid the overflow of the tank after stopping of the pump (by phenomenon of the communicating vases).
- The receivers traversed at low speed by the thermal fluid (tanks, double envelope...) must be equipped with a degasser in their high point. This degasser can only be of the “automatic” type if Vulcatherm® is installed above the receiver. In the absence of degassing the air pockets, compressed by the pressure of the pump, would discharge the thermal fluid towards the tank after stopping of the pump.
- The degassers are generally not essential to the high points of the receivers traversed at high speed by the heat transfer fluid (coils, exchangers, channels inside tools...).
- They are essential on the other hand on pipes between the receiver and Vulcatherm®. If those are of big length and have a high point.



**NEVER SEAL THE OPENING TOO FULL.**

Vulcatherm® with tank only (model 108x1 and 108x6)

## 7.2 Commissioning of types 10801, 10811, 10821 and 10831 (Vulcatherm® atmospheric)

These Vulcatherms® are always equipped with a tank.

- Connect if necessary the probe of measurement of the process (option). It is then necessary to set the limiting device to the maximum temperature of the fluid at the desired value (See Setup, R10, Fluid temperature limits).
- After having checked that the stoppers or drain valves are well closed, manually fill the tank with thermal fluid up to its maximum level (overflow opening).
- Certain pumps for high temperature have one or several degassing screws on the top part, which it is then necessary to open (pump with the stop) until the total evacuation of the air.
- Make sure of the opening of the isolating valves of the heat transfer fluid on the circuit of use (option). The possible feed valve will be voluntarily throttled at the starting (1 turn of opening only on the globe valves) to facilitate degassing by reducing the speed of circulation.
- Open the isolating valves of the cooling water circuit (only for the models cooled by water).
- Check the opening of the automatic drainer (if present on the machine).
- Energize Vulcatherm®. The program version number appears on S.G.C. display board. After a few seconds, the homepage appears.
- If an error message appears, press the  button. If the message does not disappear, or if other error messages appear, consult the corresponding chapter of the note of SGC.
- On the air intake of the engine, observe the arrow indicating its correct direction of rotation. Failing this, dismount a side panel allowing viewing the arrow appearing on the pump or its coupling.
- Go to "PUMP ONLY" mode. Then return to the homepage.
- By successive pressures on the  button, make starts/stop of short duration, check the direction of rotation of the pump. If necessary, invert the order of 2 phases on the power supply of the pump.
- Once the correct direction of rotation is checked, let the machine function in "Pump only" mode. Maintain the high level in the tank by successive supplements of thermal fluid up to the overflow opening, in order to avoid the release of the contact of bottom level and the appearance of a defect.
- If the system has one or more manual drainers, check if there remains air in the circuit.
- Open wide the possible valve located on the start of the circuit of use.
- Supervise the pressure on the start of the circuit of use: it must always be lower than the maximum total manometric height of the pump. This maximum pressure is read when the feed valve is completely turned off.



### **ATTENTION IMPORTANT: THE FEED VALVE MUST NOT BE CLOSED FOR MORE THAN 10 SECONDS.**

- Carry out a test of cooling operation in "Forced cold" mode, see chapter 5.2.1 (or by regulating the set point to the minimal value). The power used then passes to -100%, which indicates that the power of cooling is maximal. If Vulcatherm® is equipped with a refrigerating unit (type 1082y), it will start after 30 seconds approximately. If Vulcatherm® is cooled by air (1082y with condensation with air or type 1083y), the fan(s) will start.
- When the minimal temperature is reached, stop Vulcatherm® and adjust the bottom level of the tank (at the height of the fitting valve). This operation is essential to avoid an overflow of the tank at high temperature.
- Return to "regulation" mode, see chapter 5.2.1 (or restore the preceding set point).
- Vulcatherm® is from now on ready to control in heating and cooling.
- If the pump generates an abnormal noise while heating or if the pressure and the flow are not stable, continue the operation of degassing.

### 7.3 Commissioning of types, 10812, 10822, 10832, 10805, 10815, 10825 and 10835 (Vulcatherm® pressurized by network)

These Vulcatherms® must always be connected to a water supply network under pressure. They never have a tank

- Connect if necessary the probe of measurement of the process (option). It is then necessary to set the limiting device to the maximum temperature of the fluid at the desired value (See Setup, R10, Fluid temperature limits).
- Make sure of the opening of the isolating valves of the coolant on the circuit of use (option). The possible feed valve will be voluntarily throttled at the starting (1 turn of opening only on the globe valves) to facilitate degassing by reducing the speed of circulation.
- Open the isolating valves of the cooling water circuit AND/OR the separate filling valve.
- Check the opening of the automatic drainer (if present on the machine).
- Energize Vulcatherm®. The program version number appears on S.G.C. display board. After a few seconds, the homepage appears.
- If an error message appears, press the  button. If the message does not disappear, or if other error messages appear, consult the corresponding chapter of the note of SGC.
- On the air intake of the engine, observe the arrow indicating its correct direction of rotation. Failing this, dismount a side panel allowing to view the arrow appearing on the pump or its coupling.
- Go to "PUMP ONLY" mode. Then, return to the homepage.
- By successive pressures on the , make starts/stop of short duration, check the direction of rotation of the pump. If necessary, invert the order of 2 phases on the power supply of the pump.
- Once the correct direction of rotation is checked, let the machine function in "Pump only" mode. Maintain the high level in the tank by successive supplements of thermal fluid up to the overflow opening, in order to avoid the release of the contact of bottom level and the appearance of a defect.
- If the system has one or more manual drainers, check if there remains air in the circuit.
- Open wide the possible valve located on the start of the circuit of use.
- Supervise the pressure on the start of the circuit of use: it must always be lower than the maximum total manometric height of the pump. This maximum pressure is read when the feed valve is completely turned off.



#### **ATTENTION IMPORTANT: THE FEED VALVE MUST NOT BE CLOSED FOR MORE THAN 10 SECONDS.**

- Carry out a test of cooling operation in "Forced cold" mode, see chapter 5.2.1 (or by regulating the set point to the minimal value), the power used then passes to -100%, which indicates that the power of cooling is maximum. If Vulcatherm® is equipped with a refrigerating unit (type 1082y), it will start after 30 seconds approximately. If Vulcatherm® is cooled by air (1082y with condensation with air or type 1083y), the fan/s will start.
- Return to "regulation" mode, see chapter 5.2.1 (or restore the preceding set point).
- Vulcatherm® is from now on ready to control in heating and cooling.
- If the pump generates an abnormal noise while heating or if the pressure and the flow are not stable, continue the operation of degassing.

#### 7.4 Commissioning of types 10806, 10816, 10826 and 10836 (Vulcatherm<sup>®</sup> with pressurization and electric expansion)

These Vulcatherms<sup>®</sup> are always equipped with a tank. They can have a fluid supply to fill the tank automatically.

Procedure to be followed:

- Connect if necessary the probe of measurement of the process (option). It is then necessary to set the limiting device to the maximum temperature of the fluid at the desired value (See Setup, R10, Fluid temperature limits).
- Check the full opening of all the valves placed in the pressurisation circuit (in general 2: one in the suction of the pump of pressurization and, one in the discharge of the pump).
- After having checked that the stoppers or drain valves are well closed, manually fill the tank with thermal fluid up to its maximum level (overflow opening).
- Certain pumps for high temperature have one or several degassing screws on the top part, which it is then necessary to open (pump with the stop) until the total evacuation of the air.
- Make sure of the opening of the isolating valves of the coolant on the circuit of use (option). The possible feed valve will be voluntarily throttled at the starting (1 turn of opening only on the globe valves) to facilitate degassing by reducing the speed of circulation.
- If applicable (type 10802 and 10822 with condensation with water), to open the isolating valves of the cooling water circuit.
- Energize Vulcatherm<sup>®</sup>. The program version number appears on S.G.C. display board. After a few seconds, the homepage appears.
- If the message "Inversion order of phases:" appears, the order of the phases must be reversed ON THE ELECTRIC INCOMING CABLE of Vulcatherm<sup>®</sup> (on the master isolator). Or upstream of it. If, after inversion, this message still appears, check if a phase is not missing.



**ATTENTION IMPORTANT: Always reverse the order of the phases on the electric incoming cable of Vulcatherm<sup>®</sup>. Any inversion in the electrical cabinet itself would lead to an unforeseeable operation.**

- If other error messages appear, consult the corresponding chapter of the note of SGC.
- When the homepage displays "Vulcatherm<sup>®</sup> ready", Press the  button. The automatic sequence of filling and degassing starts. During this phase, maintain the high level in the tank by successive supplements of thermal fluid up to the overflow opening, in order to avoid the release of the contact of bottom level and the appearance of a defect (except model with automatic filling of the tank).
- At the end of the automatic sequence of filling degassing (display of the message "Regulation"), open wide the possible valve located on the start of the circuit of use.
- Supervise the pressure on the start of the circuit of use: it must always be lower than the maximum total manometric height of the pump. This maximum pressure is read when the feed valve is completely turned off.



**ATTENTION IMPORTANT: THE FEED VALVE MUST NOT BE CLOSED FOR MORE THAN 10 SECONDS.**

- Carry out a test of cooling operation in "Forced cold" mode, see chapter 5.2.1 (or by regulating the set point to the minimal value), the power used then passes to -100%, which indicates that the power of cooling is maximum. If Vulcatherm<sup>®</sup> is equipped with a refrigerating unit (type 1082y), it will start after 30 seconds approximately. If Vulcatherm<sup>®</sup> is cooled by air (1082y with condensation with air or type 1083y), the fan/s will start.
- When the minimal temperature is reached, stop Vulcatherm<sup>®</sup> and adjust the bottom level of the tank (at the height of the fitting valve). This operation is essential to avoid an overflow of the tank at high temperature.
- Return to "regulation" mode, see chapter 5.2.1 (or restore the preceding set point).
  - Vulcatherm<sup>®</sup> is from now on ready to control in heating and cooling.
  - If the pump generates an abnormal noise while heating or if the pressure and the flow are not stable, continue the operation of degassing.

## 8 PROCEDURE OF STARTING IN REGULAR SERVICE

- Check that the intake and feed valves of the heat transfer fluid and cooling water are well open.
- A voluntary throttling of the isolation valve on the start of use can accelerate the procedure of degassing if the introductions of air have been too significant, on the condition however of not going down below the threshold of minimum flow triggering a defect.

The flow and the pressure are checked in the page of the Machine details (page U2 USER Menu, directly accessible by the button [F2] from the homepage).



### **IMPORTANT NOTE**

If Vulcatherm<sup>®</sup> is controlled by a digital link (except for ENGEL connection), this connection takes precedence over the automatic sequence of filling degassing, and this sequence is thus no longer executed. In this case, it is imperative that the system controlling Vulcatherm<sup>®</sup> provokes this sequence (by controlling Vulcatherm<sup>®</sup> (1 minute in filling then 1 minute in forced cold) at least once per day (or on each starting, if Vulcatherm<sup>®</sup> functions in continuous service). This sequence should not be started if Vulcatherm<sup>®</sup> is already at a temperature higher than 60°C during the start-up.

## 9 REMOTE CONTROL

See the corresponding chapter in the “UT30789” manual.

## 10 DRAINING

It is always possible to drain a part of the heat transfer fluid circuit, in order to limit the losses of fluid during the disassembling of pipes of connection.

Stop the apparatus, after having checked that heat transfer fluid is at a temperature lower than 50°C. In the contrary case, using forced cooling beforehand or lowers the regulation set point.

Turn off the cooling water intake taps.

Carefully open the valve or the drain plug of the degassing bottle, after having if required connected to it a discharge pipe to the valve of the retention tank.



### **REMINDE: NEVER RUN THE PUMP DRY.**

Models with water cooling (10803 and 10823 with water-cooled condenser): Do not store the apparatus where there is a risk of freezing without having drained the coolant circuit completely beforehand.

## 11 PARAMETERS OF ADJUSTMENT

- SGC parameter setting : See the SGC manual instruction « UT30789 ».
- Parameter setting of the electronic expansion valve control (If applicable) : See the CVEND parameter manual.
- Parameter setting of the overload pum protection : Use the pump(s) rating plate.
- Setting the output safety temperature thermostat (THx) : 10°C above the maximal température indicated on the rating plate.
- Setting the tank thermostat (THR) : If exist, setting the tank thermostat at 130°C.



### Caution

If your Vulcatherm is submitted to the DESP's class II, it will be equipped with one or several adjustables pressur switch. In this case, please read the DESP manual N°UT DESP CATII.

## 12 ECONOMIC CONTROL, OPTIMIZATION OF THE PARAMETERS OF REGULATION

See the corresponding chapter in the "UT30789" manual.

## 13 **MESSAGES OF STATUS AND ASSISTANCE TO THE DIAGNOSIS OF BREAKDOWNS OR ANOMALIES**

This chapter lists some messages likely to be displayed on the machine status indicator. You can find all the messages in the "UT30789".

### 13.1 Status messages

- Initialisation: The machine is in the process of initialization.
- Vulcatherm<sup>®</sup> ready: The thermal regulator is ready to operate.
- Pump alone: The machine will run in the "Pump alone" mode.
- Regulation: (See User Menu).
- Power proportioning: The machine runs in "Power proportioning" mode (see User Menu)
- Forced cold: The machine seeks to cool.

### 13.2 Helps with the diagnosis of breakdowns or anomalies

- Lack of flow: The flow rate of the thermal fluid is below the minimum contractual value. Check the opening of the isolating valves, the cleanliness of the filters, or the receiver load loss. Degas the installation if necessary.
- Init. impos.: Too much noise on Delta P: the pressure sensor signal is unstable and it is impossible to calibrate this sensor. The problem can come from the sensor itself, from its electrical connection or from the acquisition card of the SGC.
- DeltaP >> during initialisation: The pressure deviation is too great compared to the threshold value during initialisation.
- CPP signal outside limit: Concerns the pump pressure probe. Break in one of the 2 power supply wires or measurement signal out of tolerance.
- CPP signal outside limit: Concerns an output pressure probe. Break in one of the 2 power supply wires or measurement signal out of tolerance.
- Outlet pressure too high: The outlet pressure of the Vulcatherm<sup>®</sup> has exceeded the authorised maximum.
- Too low pressure: The pump pressure has reached the authorised minimum.
- Main pump defect: Primary pump thermal relay cut out.
- Thermostat release: Overheating of the heater or the tank in superposition of fluid.
- Emergency stop: Emergency stop button hit:
- Internal T° probe fault: Break in one of the 3 wires or abrupt short circuit in the internal probe.
- External T° probe fault: Same as the internal temperature probe, see above.
- Fluid bottom level: The tank level is very low. Check there is no leak and adding fluid.
- TCK limitat. fault. Element T°: Break in one of the 2 wires of a thermocouple inserted in the thimble of the heater.
- Return of voltage: If the "Voltage return fault" option is activated, this message will be displayed after machine energises.

### 13.3 Informational Messages

These messages scroll in alternation with status or anomaly messages.

- Band alarm: Temperature deviation between measurement and set point exceeded.
- High alarm: Maximum authorised temperature exceeded.
- Low alarm: Minimum authorised temperature exceeded.
- Safety devices inhibited: Indicates that the safety devices are inactive.



**ATTENTION: INHIBITING THE SAFETY DEVICES CAN CAUSE MAJOR DAMAGE TO PROPERTY AND PERSONNEL.** (See CONFIGURATION Menu)

- Maintenance necessary: the machine requires some planned maintenance.
- URGENT: Replace the battery: the battery needs replacing. Not replacing the battery will involve the loss of the parameter setting of Vulcatherm®.

## 14 **PROCEDURE OF REPLACEMENT OF THE BACKUP BATTERY**

See the corresponding chapter in the "UT30789" manual.

## 15 BREAKDOWN

Trouble shooting and repair action must be carried out by a trained and competent professional using this user manual and the hydraulic and electrical files. Generally, operating anomalies are displayed in plain language on the homepage. However, if it is impossible to quickly solve a malfunction problem, contact the After Sales Service at VULCANIC or its local dealer.



**ATTENTION:** *The pressure sensors CPP, CPV and CPA (CPA on 108x6 only) are important measuring equipment, which ensures the monitoring of the hydraulic parameters of Vulcatherm®. Take Care not to seal them, shock them or force them mechanically during the operations of assembly or disassembly.*

Their output voltage is calibrated in factory, with the values of 4 mA for -1 bar and 20 mA for 15 bars.

### 15.1 Preventive Maintenance

After 10 hours of running, then after 200 hours, 1000 hours, and every 2000 hours, proceed with the following operations:

- Check the cleanliness of the strainer on the cool water inlet. Caution: the non-observance of this instruction can result in a blocking in open position of the cooling solenoid valve. On the industrial water supply networks, it is essential to install a filter 100µm upstream, because those present significant risks of pollution.
- Check the status of clogging of the filter on the heat transfer fluid circuit.
- Check the operation of the level sensor (on expansion tank), model 108x1 and 108x6.
- Check the cleanliness of the grids of ventilation, the interior of the electric boxes and hydraulic chambers.
- Check the tightening of all electric connections and the status of the contacts of relay.
- Supervise the satisfactory performance of the regulation.
- Supervise the status of the joints and the heat insulator, so as to take care to prevent the risks of burn of the staff. Test the operation of the alarm of very low flow rate by closing the output isolating valves. If alarm does not start at the end of 50 seconds, proceed with the adjustment of the maximum TMH (Total Manometric Height).
- Test the operation of the other safety measures and their value of adjustment.

After 6000 operating hours:

- Entirely drain the installation in order to regenerate the quality of heat transfer fluid.
- Measure the change of the contractual values: flow, pressures, intensities, reaction time, and variation in temperature.

### 15.2 Recommended list of spare parts

See electric and hydraulic nomenclatures. Matter subject of another supply agreement. The majority of the standardized components is available on stock at VULCANIC or its supplier.

#### 15.2.1 Batch of first urgency

Cooling solenoid valve, mechanical seal of pump, thermocouple and probe of regulation or limitation, thermostat of safety, analogical pressure sensor, pressure controller, sieve for filters, fuses and bulbs.

#### 15.2.2 Batch of second urgency

Heaters, exchanger of cooling, unit of power.

#### 15.2.3 Batch of third urgency

Principal and auxiliary motor-driven pumps, radiator, SGC.

## 16 PARAMETER SETTING

- SGC parameter setting : See the SGC manual instruction « UT30789 ».
- Parameter setting of the electronic expansion valve control (If applicable) : See the CVEND parameter manual.
- Parameter setting of the overload pump protection : Use the pump(s) rating plate.
- Setting the output safety temperature thermostat (THx) : 10°C above the maximal temperature indicated on the rating plate.
- Setting the tank thermostat : If exist, setting the tank thermostat at 130°C.



### Caution

**If your Vulcatherm is submitted to the DESP's class II, it will be equipped with one or several adjustable pressure switch. In this case, please read the DESP manual N°UT DESP CATL.**

## 17 WARRANTY

Its duration is 12 months as from the commissioning, and at the latest 18 months after provision. The terms and conditions of the guarantee are compliant with the VULCANIC's general sale's conditions or with any most favourable clauses indicated in the contract. In particular, the manufacturer will not guarantee the process performance to which Vulcatherm<sup>®</sup> is connected when it has not been commissioned for a design service.

Vulcatherm<sup>®</sup> guarantees NO-DEGRADATION of the thermal fluid by cracking or oxidization under the operating conditions defined by the initial contract governing the adjustments of the safety devices and limiters.

The repair of defective parts or any construction defects will take place in the manufacturer's factory.

**Attachments:** - Electrical and hydraulic diagrams and bills of materials.

Other technical documents are sometimes supplied with Vulcatherm<sup>®</sup>:

Manual for the main components (motor pump system, power unit, temperature regulator...), commercial specification, factory exit inspection sheet...

These additional documents do not form part of the present contractual operating manual. They are reserved to specialised technicians acting by delegation and under the control of VULCANIC. They are thus worded in the French and English languages, in accordance with harmonised European Directive 89/392 of 14 June 1989 with its latest modifications.