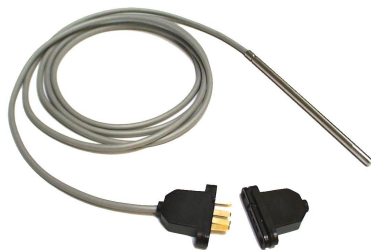
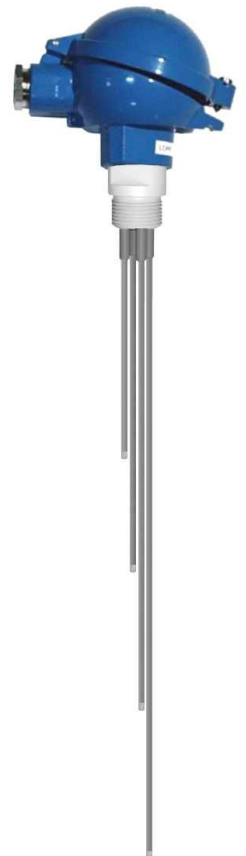
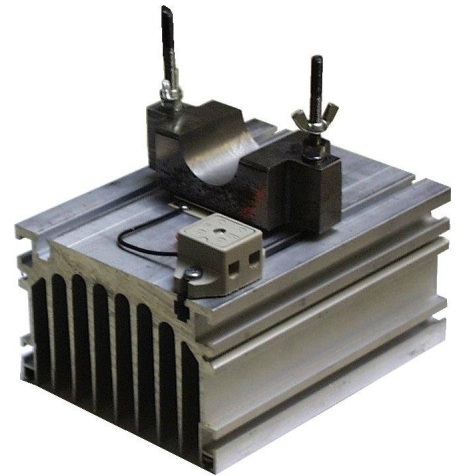
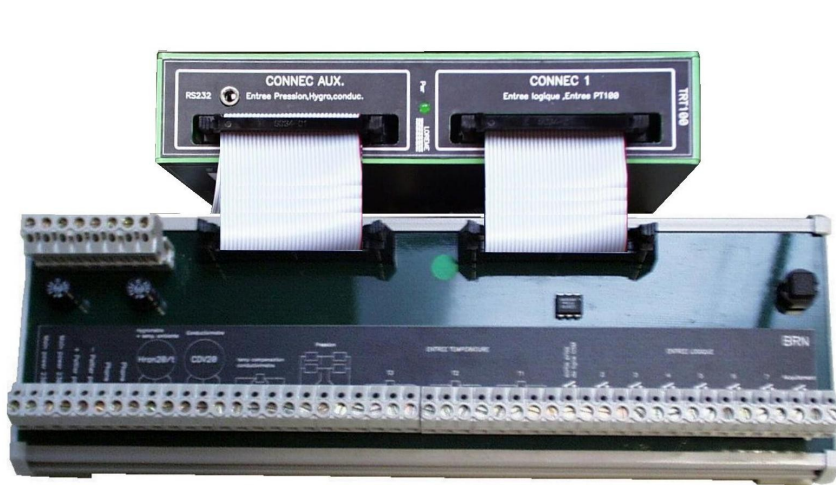


DISTRICT HEATING TELEMETRY



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System Introduction

1) Fonctionnalité:

1.1) Measure and diagnosis :

This system is an unattended device allowing monitoring and diagnosis of a condensate trap post, providing states by telephone line.

The system allow to detect and measure each parts of condensate trap post:

- .water presence,
- .condensate trap state,
- .vapor leakage presence,
- .water pollution,
- .network pressure,

From these detected and measured elements , the module performs various tasks:

- .post diagnosis,
- .alarm calculation,
- .events and measures recording.

1.2) Telemetry:

Its remote monitoring function allows :

- .alarms automatic call
- .inquiry of any parameters (detected, measured and recorded) by remote telephone link or local RS232 link

Telephone link is used to inform the central monitoring post of potential detected alarms states. But, it can also be used as a setting means and measurements display through a terminal.

2) System constitution :

The system of remote monitoring is consists of several elements:

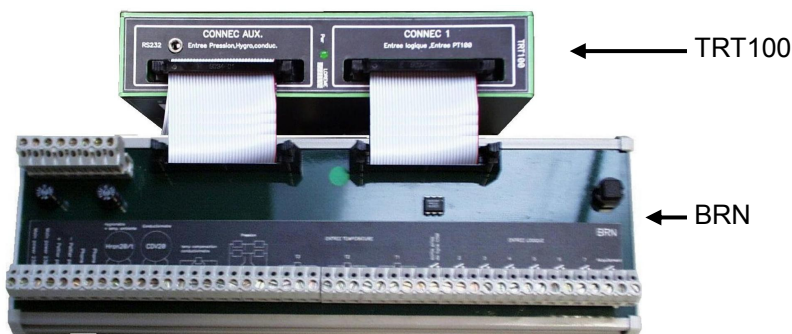
2.1) Transmitter and terminal block:

The **TRT100** transmitter tasks are process measurement / analysis and alarm transmission.

BRN is the terminal block linking power supply and all I/O to **TRT100**.

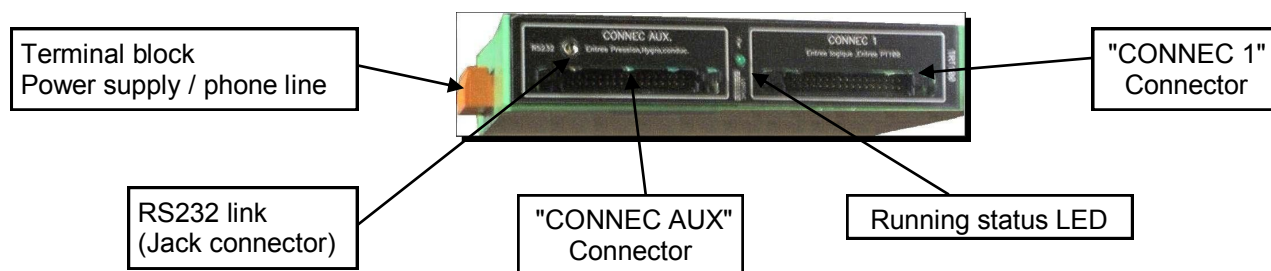
TRT100 and **BRN** are mounted in a box whose characteristic are :

Size L x W x D	300 x 300 x 200 mm
Material	epoxy coated steel
Protection index	IP65
Continuous temperature	80 °C
Peak temperature	120 °C
Locking	by key.



TRT100 has digital and analog I/O, which permit to acquire, measure and control all signals required for the post analysis. It is equipped of :

- a RS232 link (jack connector) : local configuration
- a running status LED Flashing : normal operation mode
- On : inhibition mode (alarm inhibition for maintenance)
- a "CONNECT 1" connector : standard I/O connection to BRN
- a "CONNECT AUX." connector : options connection to BRN
- a 8 points terminal block : connection of power supply and phone line to BRN.

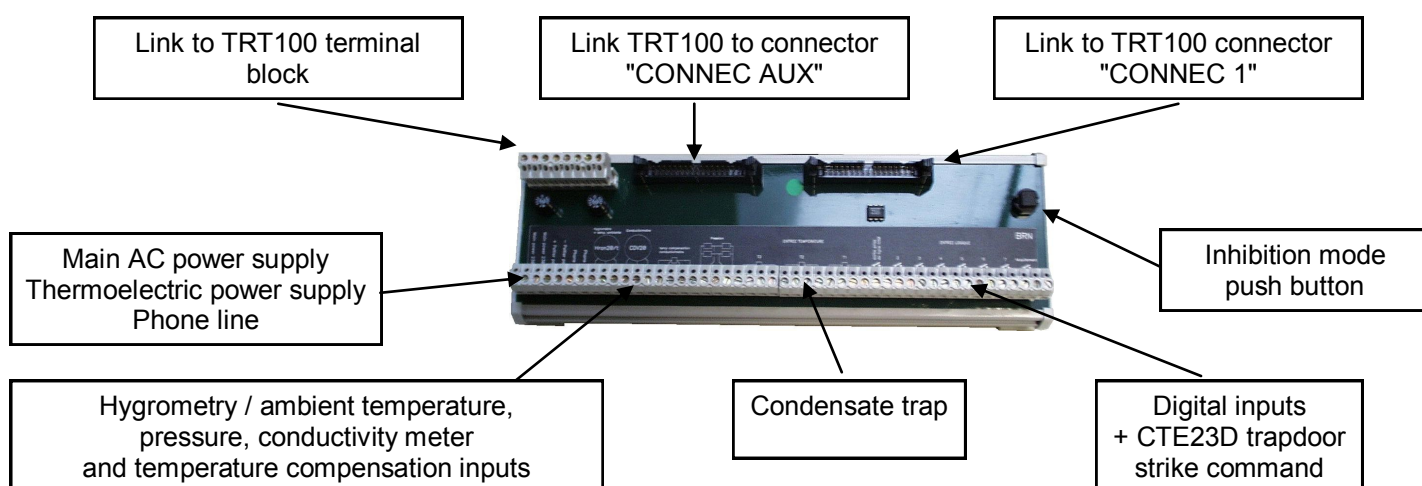


"BRN-CONNEC 1" link regroup all inputs of standard device kit :

- 1 inhibition mode digital input : for local push button on BRN
- 2 sump water-level digital inputs : top & bottom (SNL1000-2/DNR40 water-level sensor connection)
- 3 digital CTE23D trap interface inputs : watchdog/ready, water-level, traps synthesis (CTE23D option enabled) or reserved (CTE23D option disabled)
- 1 digital input : reserved
- 1 output : trapdoor strike command (CTE23D option enabled) or GSM control (CTE23D option disabled)
- 3 RTD inputs : condensate trap temperature (4 wires Pt100 RTD)

"BRN-CONNEC AUX" link regroup inputs of devices :

- 1 pressure input : for PR21 - strain gauge measure external module,
- 1 RH/T° input : for HRA20 - hygrometer and ambient temperature external module
- 1 conductivity meter input : for SCL20 - conductivity probe on CDV20 external module
- 1 RTD inputs : conductivity meter compensation temperature (4 wires Pt100 RTD)



The **BRN** also contain a temperature sensor allowing TRT100 to measure and record the box ambient temperature.

2.2) External modules, sensors:

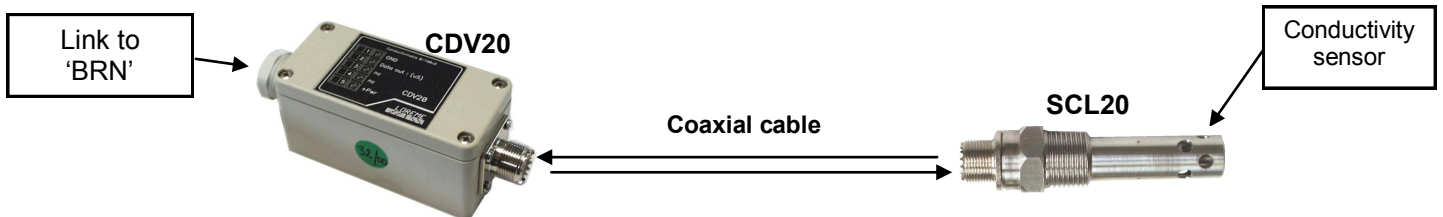
HRA20 (stand-alone HR / T° Sensor)

At each measure cycle, TRT100 wake up the module, read data and then put it back in standby. It has internal sensors allowing to directly measure hygrometry and ambient temperature.



CDV20 + SCL20 (stand-alone conductivity meter)

At each measure cycle, TRT100 wake up the module, read data and then put it back in standby. Conductivity measure is done by CDV20 using the probe SCL20 linked with a coaxial cable. This measure is temperature compensated by TRT100 with a 4 wires RTD Pt100 probe.



CTE23D (stand-alone trap interface)

Allow TRT100 to monitor the traps states and to command trapdoor strike.



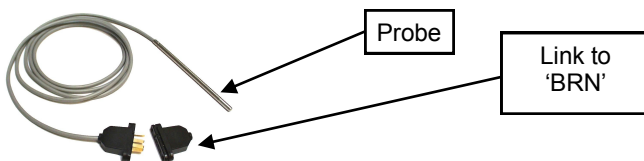
PR21 (pressure sensor)

High sensibility strain gauge pressure transducer directly used by TRT100 for pressure measurement.



Temperature probes

All the different temperature probes used, such as condensate trap's one or conductivity compensation are 4 wires RTD Pt100 probes equipped of specifics connector.

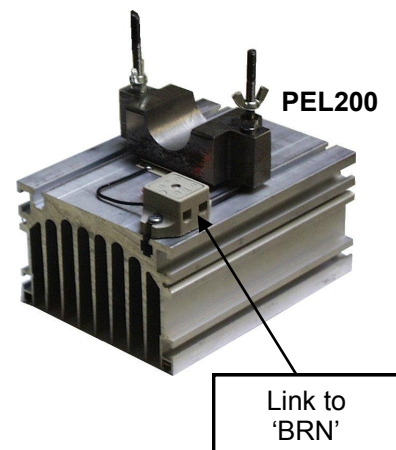


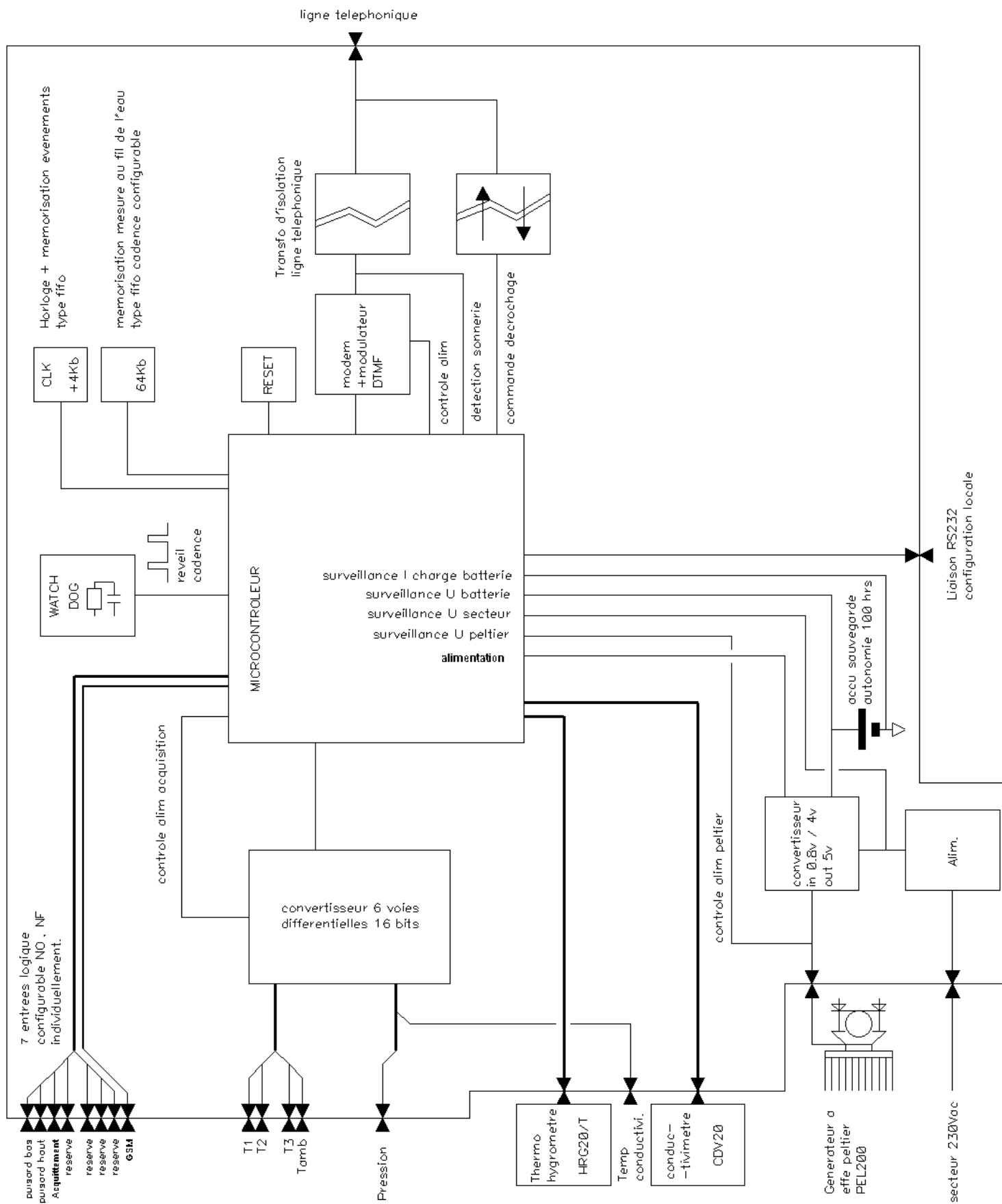
TRT100 has 3 power supply sources :

- External : - Main AC
- **PEL200** module (thermoelectric)
- Internal : - uninterruptible accumulator power supply
- (guarantee of normal system operation in case of power shut-down)

The system monitor and analysis permanently the state of its different power supply source by different ways :

- accumulator voltage measure / minimum threshold detection
- accumulator charge current measure / minimum threshold detection
- PEL20 module voltage measure
- main AC voltage presence detection
- automatic power supply detection and switching





System Behavior

1) Process

The real-time clock of device allow it to execute specific tasks at specific time.

For energy savings and better autonomy, the device is in standby mode for major part time.

All TRT100 functions are separated in two part, background and wake up functions.

They are executed according to internal clock and configuration.

The device wake up every second and performs all background functions. This event is signaled by TRT100 by a flash of the green led indicating the normal operation of device. After background functions execution, the transmitter checks if a complete wake-up period has expired and in which case, execute wake up functions. Else, it returns in standby mode until next measurement cycle.

2) Background functions - performed every second :

- inhibition mode input
- sump bottom input
- sump top input
- sump state
- reserved digital inputs
- power supplies measurements
- power supply state
- internal monitoring

3) Wake up functions - performed when wake up period is elapsed (can be set from 1 to 60 minutes)

- T1, T2, T3 condensate trap t° measurement
- condensate trap t° alarm
- condensate trap state
- transmitter temperature measurement
- transmitter temperature state
- hygrometry measure and ambient t° measurement
- hygrometry and ambient t° alarm
- leakage state
- pressure measurement
- pressure alarm, level 1 and 2
- pressure state
- conductivity measurement, compensation t°
- pollution alarm, level 1 and 2
- pollution state

4) Information reports

TRT100 analysis state of every logical functional inputs and systems. It check default presence or if status have changed and in which case, take necessary decisions according configuration :

- delay the detected phenomenon
- alarm state
- telephone call to control office
- measures, events recording (with date and time)

In addition, TRT100 launch a communication procedure with control office cyclically (configurable period), ensuring a perfect security system.

With configuration parameters, user define actions and procedures to be followed by TRT100 :

- digital inputs alarms
- measure inputs alarms
- internal settings alarms
- wake-up period, inhibition, cyclic call,
- telecommunication settings,
- operation options

Two different links can be used to communicate with the transmitter through a PC in terminal mode :

- RS232 serial link (local link)
- standard telephone line (remote link)

Identically on each links, user can set and view all parameters and data recorded.

1) Transmitter

To meet the critical needs of field of application, **TRT100** transmitter is made of different internal elements :

1.1) Power Supply

Transmitter is equipped with multiple power supply source.

Two of them are external : 230Vac grid supply & Thermoelectric Peltier module

One is internal : Storage cell

This last one is a rescue power supply allowing system to operate without external supply for a sufficiently long period.

This period depend of different parameters: - Cell load level - Transmitter wake up frequency
- Ambient temperature - Transmitter equipment (external modules)

The rescue period is 3 days warranty permitting a maintenance intervention in case of external power supply problems.

Power supply switching is automatically realized by a passive process increasing system security level.

Transmitter has several power supply identification methods.

Measured / controlled parameters are : - Grid supply presence - Peltier effect module voltage
- Cell voltage - cell load current (external power presence)

Transmitter can flag power supply switching and cell defaults (voltage and load current) in function of its configuration.

1.2) System core

System core is essentially constituted of a microcontroller managing all system monitoring functions.

It dispose of measure, control, recording and communication means to manage all tasks it has to handle.

Made with various security systems (watchdog; auto diagnostic; permanent regeneration of internal parameters; EEPROM recording; ambient temperature control; ...) it has a very high reliability level.

1.3) System clock

Clock block is made of two autonomous module permitting pacing and time/date stamp events and records.

These two modules, fully independent of each other, one passive and one active permit a high reliability level toward wake up phases and functions to execute.

1.4) Digital inputs

Transmitter has seven digital inputs whose acquisition is fully managed by the microcontroller.

Input n° :	Assignment :	Assignment with CTE23D option :
8	Acquittal, BRN push button	Acquittal, BRN push button
7	Sump level probe (low level)	Sump level probe (low level)
4	Sump level probe (high level)	Sump level probe (high level)
2	Reserved	Watchdog / ready
3	Reserved	Water level
5	Reserved	Traps synthesis
6	Reserved	Reserved

Polling of digital inputs is a priority function, realized on clocked wake up every seconds in normal operating mode (not communication or inhibition mode). This wake up is also materialized by a flash on green led.

When inhibition mode is required (BRN push button), green led behavior is reversed (always on / briefly off when polling).

Inhibition mode permit maintenance intervention without report of any error.

Device automatically turn back in normal mode after a settable delay or manually by pressing BRN push button.

1.5) Measure inputs

Transmitter has six measure inputs, whose acquisition circuit is driving by microcontroller.

Input n° :	Assignment :
T1	Condensate trap temperature
T2	Condensate trap temperature
T3	Condensate trap temperature
Pressure Input	Pressure of network
Conductivity temperature compensation	Temperature compensation for conductivity measure
... Internal (inside BRN) ...	Ambient temperature

Measure inputs acquisition is a secondary function, realized on clocked wake up every (settable from 1 to 60 mn).

1.6) External modules

Most measurements are realized directly by the transmitter. Only hygrometry, ambient temperature and conductivity or flow rate measurements are realized by autonomous and deported systems.

Modules realizing these measures :

- HRA20 : hygrometry and ambient temperature
- CDV20 : conductivity
- CCN20 : 4/20 mA current

Deported device acquisition is a secondary function, realized on clocked wake up every (settable from 1 to 60 mn).

Modules are connected with 3 wires:

- Pwr : power supply of module
- 0 V : ground of module
- Dout : communication line

These three modules operate on the same principle.

- * The transmitter supply the module
- * The module makes its measurement (After a stabilization time)
- * The module transmit digitally on its communication line
- * After reception and analysis of information, the transmitter shut down module power supply

1.7) Recording

Time stamped registered data are (Configurable cyclical period) :

- Events (up to 32)	- Relative humidity	- T1
- 7 measures	- Ambient Temperature	- T2
- Pressure	- Conductivity or debit	- T3

Presentation, exploitation and registering are detailed in chapters "events mode" and "real time recording display mode"

1.8) Remote link

Transmitter has a remote communication system based on standard phone line.

Each transmitter has a modem, a dialer and a ringing detection system.

Communication system is used for :

- Remote consulting and configuration through PC (terminal mode)
- To inform central monitoring post of condensate trap posts states.

In consulting mode, operator call the transmitter through PC in terminal mode and its modem.

This one detects the ringing, calibrate it, open the line and synchronize its modem on 1200 bauds V22.

Communication is established, transmitter send its measure page (see operating mode chapter).

The operator can then (see adequate chapters) :

- * consult measures
- * consult parameters
- * read and transfer registering memory
- * configure the transmitter

Communication can be stopped only by operator or, in problem contingency by communication with monitoring central post. In this case, the transmitter inform the operator, hang up the line and establish its communication.

Communication with central monitoring post is realized according to a procedure defined in specifications.

In this mode, transmitter behaves only in "caller" type system. Transmitter has 4 phone number (for 4 monitoring post)

So, calls are given with rotational method.

On communication failure with the first number (busy line, no answer...), transmitter uses the second number and so on.

Transmitter composes its phone number, detects line opening and wait for synchronization signal of monitoring post.

Now transmitter can emit its frame exclusively composed of DTMF codes (dual tone modulation frequency).

This frame allow to identify the transmitter caller and to mean call goal.

After frame complete transmission, transmitter waits for synchronization signal of monitoring post indicating good reception.

Transmitter can hang up and resumes normal operations.

1.9) Local link

Transmitter has RS232 local communication system link. Each transmitter has a terminal presence detection system.

Communication system is used for local consultation and configuration through PC in terminal mode.

RS232 link communication allow to perform the same functions that remote communication with a PC in terminal mode.

Communication can be stopped only by operator or, in problem contingency by communication with monitoring central post.

In this case, the transmitter inform the operator, hang up the line and establish its communication.

2) Terminal Block

Terminal block referenced **BRN**, is a report of connectors allowing to interconnect all differents transmitter TRT100 I/O.

Terminal block, fully passive, is equipped of unpluggable terminals clusterizing transmitter each functions (power supply, measure inputs, digital inputs, peripherals, phone line, acknowledgment control).



3) Thermoelectric generator

Peltier effect generator, **PEL200** referenced, is a power supply module allowing to transform thermal energy in electrical energy. With this module, it is possible to install transmitters in condensate trap posts without electrical power supply.

To ensure a good generator efficiency and thus a transmitter correct behavior, some rules must be observed :

- generator place of installation choice
- perfect fitting of flange and of pipe forms
- fixation clamping
- generator position, radiator orientation

Indeed, generator efficiency depend on two essential criterias :

- thermal exchange between generator and heating element
- temperature gradient between radiator and heating element

Spring loaded clamping system ensures an excellent thermal exchange between Peltier effect cell and radiator whatever installation and disturbance (vibration).

4) Hygrometer-thermometer

Hygrometer-thermometer, **HRA20** referenced, is an autonomous module allowing to detect leakage presence in condensate trap station. Information "leakage presence" is defined by the transmitter according to measurements made by this module. This measure is transmitted to transmitter via a digital link.

The **HRA20** module performs 2 measures types : ambient relative hygrometry and ambient temperature.

Hygrometry and temperature sensors are directly integrated into the electronic module **HRA20**.

Humidity measure element is a capacitance cell ensuring accuracy, linearity and response time.

HRA20 is a very low consumption module, it is directly power supply by transmitter.

5) Conductivity meter

Conductivity meter, **CDV20** referenced, is an autonomous module allowing to quantify the network pollution level. Information "pollution" is defined by the transmitter according to measurements made by this module.

CDV20 module measure, through its deported sensor **SCL20**, resistivity of a liquid and converts the analog resistive value to conductivity digital information.

This measure is transmitted to transmitter via a digital link.

CDV20 is a very low consumption module, it is directly power supply by transmitter.

6) Current transmitter

Current transmitter, **CCN20** referenced is an autonomous module allowing to convert information of a 4 / 20 mA current loop to debit. **CCN20** is connected in place of **CDV20** and uses thus resources associated with **CDV20** in **TRT100**.

The information of debit is thus display in the section 'CONDUCTIVITY'

7) Sensors

To realize all theses measures, transmitter has different deported sensors.

The sensors types are: temperature, pressure, conductivity

* **SP1000I Socapex** referenced sensor is used for temperature measurement on T1, T2, T3 points and measurement of conductivity meter compensation temperature (Directly connected to the transmitter terminal block).

* **SNL1000-2/DNR40** referenced level probe is used instead of float level switch.

* **PR21** referenced sensor is used to measure network pressure. (Directly connected to the transmitter terminal block).

* **SCL20** referenced sensor is used to measure network salinity. (Connected to conductivity meter **CDV20** whose converting electrical quantities to information of conductivity)

8) Trapdoor module

CTE23D is an autonomous system for automatic closing of sealing hatches ensuring protection against water coming in network works. It is interfaced with **TRT100** with 3 logic inputs and one output. The 3 inputs allows remote monitoring of module state and if necessary generate alarms. The output allows to control remote hatches closing.

(View on configuration channel to enable option)

RS232 Configuration

The whole of the configuration parameters can be visualized and modified with any system emulating a terminal and equipped with RS232 link. The dialog and configuration parts being resident in device memory, no software or specific interface is necessary for their configuration. Two systems of terminal emulation are presented, the PSION WorkAbout and the PC. Different procedures are enumerated below.

PC with WINDOWS:

Step for start up terminal program:

- 1 - Clic on **"START"** bouton.
- 2 - Tick off **"Programs \ Accessories \ Communication \ Hyper Terminal"**
- 3 - Clic on **"Hypertrm.exe"**

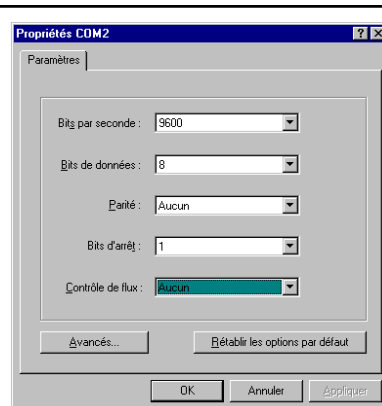
- 2 Enter a name for the new connection



- 3 Choose a communication port

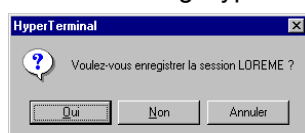


- 4 Choose:
 - 9600 bauds
 - 8 data bits
 - no parity
 - 1 stop bit
 - flow control:
XON/XOFF



- 5 PC is now in terminal mode, connect to device by plugging the RS232 link cable. Measure is now displayed and to access configuration, press **"C"** key .

- 6 When leaving HyperTerminal, the following window will appear.



By accepting the recording of the session, terminal mode will be able to be started again without using this procedure..



Thus, the short cut **LOREME.ht** will permit to communicate with all LOREME devices.

Note: to modify parameters of terminal mode whereas this one is already started, it is necessary, after having carried out the modifications, to close the terminal and to open it again so that the modifications are effective.

USB / RS232 adaptator:

More PC doesn't have RS232 connector. In this case a USB-DB9 adaptator link should be use



- 1 - Insert the CD provide with the adaptator in the reader,
- 2 - choose **"USB 1.1 to RS232 câble"**, click on **"Setup.exe"** to instal drivers,
- 2 - plug the adaptator in a USB,
- 3 - start **"Hypertrm.exe"**, follow the step above to configure it. (in the step 3, choose the new port com.)

Measures exploitation



To view transmitter measure or access to its configuration, two options are available to operator, in local mode by RS232 link or remotely through phone line. In both cases, it is through a PC in terminal mode that operator can interact with TRT100 transmitter. When communication is established, terminal detected on RS232 or on phone line, transmitter refresh its measures and transmits about every 5 seconds. Display is as follow :

REPERE 57777000	DATE 02/05/2000	SECTEUR NON	ACCU 8.7 V	
TEMP. 26 °C/31 °C	HEURE 13:53	PELTIER 1.2 V	CHARGE 2.6 mA	
ACQUITTEMENT 8	OUVERT	ACQUITTE →	NON	
PUISARD BAS 7	FERME AL	EAU →	TEMPS 16.5 h	
PUISARD HAUT 4	FERME AL		VITESSE 1.20 m3/h	
RESERVE 2	OUVERT AL			
RESERVE 3	OUVERT			
RESERVE 5	FERME AL			
RESERVE 6	OUVERT			
TEMPERATURE 1	159 °C			
TEMPERATURE 2	150 °C			
TEMPERATURE 3	140 °C	PURGE →	CORRECTE	
HYGROMETRIE	57 %			
T.AMBIANTE	18 °C	FUITE →	NON	
PRESSION	5.4 b	PRESSION →	CORRECTE	
CONDUCTIVITE	49 µS AL	POLLUTION →	OUI	
T.COMPENSATION	21 °C			
(M)esure	(E)venement	(F)il eau	(C)onfiguration	Version 0.7

or the next one if trap interface option is enable

REPERE 57777000	DATE 02/05/2000	SECTEUR NON	ACCU 8.7 V		
TEMP. 26 °C/31 °C	HEURE 13:53	PELTIER 1.2 V	CHARGE 2.6 mA		
ACQUITTEMENT 8	OUVERT	ACQUITTE →	NON		
PUISARD BAS 7	FERME AL	EAU →	TEMPS 16.5 h		
PUISARD HAUT 4	FERME AL		VITESSE 1.20 m3/h		
WATCHDOG/READY 2	OUVERT AL				
NIVEAU EAU 3	OUVERT				
SYNTHESE TRAPPE 5	FERME AL				
RESERVE 6	OUVERT				
TEMPERATURE 1	159 °C				
TEMPERATURE 2	150 °C				
TEMPERATURE 3	140 °C	PURGE →	CORRECTE		
HYGROMETRIE	57 %				
T.AMBIANTE	18 °C	FUITE →	NON		
PRESSION	5.4 b	PRESSION →	CORRECTE		
CONDUCTIVITE	49 µS AL	POLLUTION →	OUI		
T.COMPENSATION	21 °C				
(M)esure	(E)venement	(F)il eau	(G)aches	(C)onfiguration	Version 0.7

1)Header

This section, composed of eight informations, define transmitter operation state. Here is the composition:

- **TAG (REPARE)**, allow to identify and locate device
- **AMBIENT TEMPERATURE** and the **MAXIMUM TEMPERATURE**,
- **DATE** and **TIME (HEURE)**
- **POWER GRID (SECTEUR)** presence or not
- **PELTIER POWER SUPPLY** presence (characterized by its voltage)
- **ACCUMULATOR** state (characterized by its voltage level and its charge current)

2) Digital Inputs

7 digital inputs are defined as:

- 1 **acquittal** input

=> controlled by push-button

=> allow to inhibit alarms transmission to central monitoring post

- 2 inputs, **bottom** and **top sump**

=> allowing to detect arrival of water in works

=> When water level reached each sump, transmitter saves time of event

These recordings allow transmitter to define time gap

"bottom sump drowned - top sump drowned" and speed of water rising

- 1 or 4 inputs **reserved**

=> unaffected, freely usable by operator

- 3 inputs watchdog/ready

=> water level

=> synthesis traps

=> ensure interfacing with CTE23D

3) Condensate trap temperatures

Three temperature measurements are realized by the transmitter

They allows, through an algorithm to define condensate trap state :

- correct bleed,

- leakage

- insufficient bleed,

- do not bleed.

4) Hygrometer - Thermometer

Hygrometry and ambient temperature measures are realized by "HRA20" deported device.

Both measures returned by TRT100 allows to detect steam leak presence in works.

5) Pressure

Pressure measurement is realized by transmitter with "PR21" probe.

TRT100 measures network pressure and determines if this one is correct, in overpressure or underpressure.

6) Conductivity or discharge rate

Conductivity measurement is realized by "CDV20" deported device with "SCL20" probe.

This measure returned by TRT100 and counterbalanced in temperature, determines rate of water pollution.

Warning , if a CCN20 module is connected in place of CDV20, value displayed corresponds to signed debit in % of flowmeter scale. Values are displayed from 0 to 100 for a positive debit and from 101 to 201 for a negative debit. Do not consider unity 'us' in this case.

7) Background

This zone shows reachable modes from this page:

- **(M)esure** (Measure)

=> pressing "M" key =>

force measure refresh

- **(E)venement** (Event)

=> pressing "E" key =>

memory access events

- **(F)il eau** (On the fly)

=> pressing "F" key =>

access to stream line measures in memory

- **(G)ache** (Strike)

=> pressing "G" key =>

access to strikes activation command menu

- **(C)onfiguration** (Configuration)

=> pressing "C" key =>

access to configuration

- **Version X.Y,**

=> => =>

product version display

Configuration



1) Displaying

Pressing "C" key in "mesure" mode allows entry in "configuration" mode.

This mode allow you to view the essential of configuration, and by password entering, change all parameters. Saving of modified settings is performed during return to screen "mesure".

At delivery, transmitter has factory configuration.

A typical configuration is available by typing code "CPCU" on password box.

Display is as follow :

ALARME	TYPE	SEUIL	RETARD	ACTION	MODE	TELECOM
1 LOGIQUE 2	FERME		0 s	SANS		18 No 1 0143408552
2 LOGIQUE 3	FERME		0 s	SANS		19 No 2 0143408089
3 LOGIQUE 4	FERME		0 s	SANS		20 No 3 0143408552
4 LOGIQUE 5	FERME		0 s	SANS		21 No 4 0143408089
5 LOGIQUE 6	FERME		0 s	SANS		22 PREFIXE 0
6 LOGIQUE 7	FERME		0 s	SANS		HORLOGE
7 LOGIQUE 8	FERME		0 s	SANS		23 DATE 21/09/2000
8 TEMP T1-T2	HAUT	12 °C	0 s	SANS	FIXE	24 HEURE 16:23
9 TEMP T2	BAS	140 °C	0 s	SANS	FIXE	25 REVEIL 5 mn
10 TEMP T3	HAUT	160 °C	0 s	SANS	FIXE	26 APPEL CYCLIQUE 96 h
11 HYGROMETRIE	HAUT	80 %	0 s	SANS	FIXE	27 ACQUITTEMENT 60 mn
12 T.AMBIANTE	HAUT	60 °C	0 s	SANS	FIXE	AUXILIAIRE
13 FUITE	HAUT	30	0 s	SANS	FIXE	28 REPERE 57777000
14 PRESSION	HAUT	5.0 b	0 s	SANS	FIXE	29 PARAMETRES
15	BAS	0.5 b	0 s	SANS	FIXE	30 ALIMENTATION
16 CONDUCTIVITE	HAUT	20 µS	0 s	SANS	FIXE	31 DETECTION DEFAULT
17	HAUT	30 µS	0 s	SANS	FIXE	32 OPTION
						33 MOT DE PASSE

(M)esure (E)venement (F)il eau (A)ccès Configuration

This one is composed of different zones:

- ALARME : Alarms
- HORLOGE : Clock
- Menu
- TELECOM : Telecom
- AUXILIARE : Auxiliary

1.1) Alarms

* 7 logic alarms, with following parameters :

- type of detection
- action
- delay

* 10 measure alarms with following parameters

- direction detection,
- delay
- mode
- threshold
- action

1.2) Telecommunication

- 1st phone No.
- 2nd phone No.
- 3rd phone No.
- 4th No. phone call
- prefix

1.3) Clock

- date
- hours
- wake up period
- cyclic call period
- period acquittal

1.4) Auxiliaries

- device TAG (REPERE)
- parameters setting (PARAMETRES)
- power supply alarm menu
- default alarm menu (DETECTION DEFAULT)
- option
- password

1.5) Background

- (M)esure	(Measure)	=> pressing "M" key =>	back to measure page
- (E)venement	(Event)	=> pressing "E" key =>	memory access events
- (F)il eau	(On the fly)	=> pressing "F" key =>	access to stream line measures in memory
- (C)onfiguration	(Configuration)	=> pressing "C" key =>	access to configuration

2) Modification

Pressing "A" key provides access to configuration settings modification. To do this, a password is requested.

This one protects configuration of unauthorized transmitter modification.

Display is as follow :

```
MOT DE PASSE _
```

When password is entered correctly, operator can change all transmitter parameters.

There are 33 sections whose presentation of the different configuration menus and submenus is detailed below.

Each section is preceded by a number in order to select menu and change settings.

Simply enter selected section number, validate with "enter" and thus, reach sub-menu selection or modification.

Display is as follow :

```
POUR SORTIR --> 0   VOTRE CHOIX:
```

To validate configuration and return to measurement mode, simply type "0" and confirm with "enter" key.

2.1) Digital inputs

Configuration of the 7 logical alarms is identical.

To access configuration of one of them, enter the chosen alarm number and confirm with "enter" key.

Display is as follow :

```
ALARME LOGIQUE 4
```

```
1 TYPE           FERME
2 RETARD         0 s
3 ACTION         SANS
```

```
POUR SORTIR --> 0   VOTRE CHOIX:
```

2.1.1) Type

To access alarm type configuration, enter "1" and confirm with "enter" key.

Display is as follow :

```
TYPE
1 OUVERT
2 FERME
```

```
POUR SORTIR --> 0   VOTRE CHOIX:
```

Alarm can be detected on digital input opening or closing.

Select corresponding number to chosen type, "1" for an alarm on opening mode and "2" for an alarm on closure mode.

After validation by "enter", a similar screen as previous appears with realized modification.

2.1.2) Delay

To access delay configuration, enter "2" and confirm with "enter" key.

The visualization is as follows:

```
RETARD   0 s
```

Delay (in seconds), determinate time beyond which alarm changes status after event detection.

This time is configurable from 0 to 600 s. Delay is active at locking and unlocking of alarm.

To change delay, enter the value, and confirm by "enter" key

After validation by "enter", a similar screen as previous appears with realized modification.



2.1.3) Action

To access action configuration, enter "3" and confirm with "enter" key.

Display is as follows :

```
ACTION
1 SANS
2 APPEL
```

POUR SORTIR --> 0 VOTRE CHOIX:

When alarm lock or unlock, an action can be requested. Transmitter can decide to call central monitoring through telephone line to inform them of situation. Select the corresponding number to chosen action, "1" for none, "2" for call. After validation by "enter", a similar screen as previous appears with realized modification.

2.2) Measure inputs

Configuration of the 10 measures alarms is identical.

To access configuration of one of them, enter the number of selected alarm, then confirm with "enter" key.

Display is as follows :

```
ALARME TEMP T2
```

```
1 SENS      BAS
2 SEUIL     140 °C
3 HYSTERESIS 10 °C
4 RETARD    0 s
5 ACTION    SANS
6 MODE      FIXE
```

POUR SORTIR --> 0 VOTRE CHOIX:

2.2.1) Direction

To access alarm direction configuration, enter "1" and confirm with "enter" key.

Display is as follows :

```
SENS
1 BAS
2 HAUT
```

POUR SORTIR --> 0 VOTRE CHOIX:

The alarm can be detected on high or low threshold.

Select corresponding number to chosen direction, "1" for low threshold alarm and "2" for high threshold alarm.

After validation by "enter", a similar screen as previous appears with realized modification.

2.2.2) Threshold

To access threshold configuration, enter "2" and confirm with "enter" key.

Display is as follows :

```
SEUIL      140 °C
```

Threshold, given in the same unit as measure, determinate the value at which measure switch in alarm.

To change threshold, enter its value, and confirm by "enter", a similar screen as previous appears with realized modification.

2.2.3) Hysteresis

To access hysteresis configuration, enter "3" and confirm with "enter" key.

Display is as follows :

```
HYSTERESIS 10 °C
```

Hysteresis, associated with threshold, and given in the same unit as measure, determinate value at which measurement alarm goes off.

To change hysteresis, enter its value, and confirm by "enter", a similar screen as previous appears with realized modification.

2.2.4) **Delay**

To access delay configuration, enter "4" and confirm with "enter" key.

Display is as follow :

```
RETARD    0 s
```

Delay, given in seconds, determines time beyond which alarm changes status after event detection.

This time is configurable from 0 to 600 s. Delay is active at locking and unlocking of alarm.

To change delay, enter a value, and confirm by "enter", a similar screen as previous appears with realized modification.

2.2.5) **Action**

To access action configuration, enter "5" and confirm with "enter" key.

Display is as follow :

```
ACTION
1 SANS
2 APPEL
```

```
POUR SORTIR --> 0   VOTRE CHOIX:
```

When alarm lock or unlock, an action can be requested. Transmitter can decide to call central monitoring through telephone line to inform them of situation. Select the corresponding number to chosen action, "1" for none, "2" for call.

After validation by "enter", a similar screen as previous appears with realized modification.

2.2.6) **Mode**

To access mode configuration, enter "6" and confirm with "enter" key.

Display is as follow :

```
MODE
1 FIXE
2 ADAPT
```

```
POUR SORTIR --> 0   VOTRE CHOIX:
```

This characteristic is not available yet, alarm operating mode remains fixed, alarm behaves in standard way.

2.3) **Telecommunication**

Configuration of the 5 parameters of this section is identical.

To access configuration of one of them, enter the number and confirm with "enter" key.

Display (for example) is as follow :

```
N° 1      01 43 40 85 52
```

To change parameter, enter a value, and confirm by "enter", a similar screen as previous appears with realized modification. Each phone number can be up to 16 digits. Prefix, consist on 1 or 2 digits. It allows to exit of a telephone network governed by an internal central.

2.4) **Clock**

Configuration of the 5 parameters of this section is identical.

Settings available in this category are date, time, wakes up period, cyclical call period and acquittal time.

To access configuration of one of them, enter the number and confirm with "enter" key.

Display (for example) is as follow :

```
REVEIL    15 mn
```

To change parameter, enter its value, and confirm by "enter", a similar screen as previous appears with realized modification. Period of alarm can be set from 1 to 60 minutes, cyclic call from 1 to 150 hours and acquittal from 1 to 720 minutes.

2.5) **Auxiliary**

This part is composed of 6 sections. To access configuration of one of them, enter the number and confirm with "enter" key.



2.5.1) Tag

To access TAG configuration, enter "28" and confirm with "enter" key.
Display is as follow :

```
REPERE 57777000
```

The TAG is composed of 8 digits. It is use to identify and locate the transmitter.
To change TAG, enter its value, and confirm by "enter",
a similar screen as previous appears with realized modification.

2.5.2) Settings

To access settings configuration, enter "29" and confirm with "enter" key.
Three parameters are settable by operator.
Display page is as follow :

```
PARAMETRES
```

```
1 PUISARD      1.00 m3
2 PRESSION    4.35 mV/b
3 CONDUCTIVITE 2.0 %/°C
```

```
POUR SORTIR --> 0   VOTRE CHOIX:
```

The first parameter, given in m3, defines volume of sump, the second, given in mV/bar, defines sensitivity of pressure sensor and the third, given in %/°C, defines compensation temperature rate of conductivity.
We can access the various settings, sump, pressure and conductivity, respectively, by typing "1", "2" or "3".
After validation by "enter", a similar screen as previous appears with realized modification.

2.5.3) Power Supply

To access settings for detection of power supply configuration, enter "30" and confirm with "enter" key.
Display page is as follow :

```
ALARME ALIMENTATION
```

```
1 RETARD  0 s
2 ACTION  SANS
```

```
POUR SORTIR --> 0   VOTRE CHOIX:
```

2.5.3.1) Delay

To access delay configuration, enter "1" and confirm with "enter" key.
Display is as follow :

```
RETARD  0 s
```

Delay, given in seconds, determinate time beyond which change of power supply is taken into account.
This time is configurable from 0 to 600 s.
To change delay, enter its value, confirmed by "enter", a similar screen as previous appears with realized modification.

2.5.3.2) Action

To access action configuration, enter "2" and confirm with "enter" key.
Display (for example) is as follow :

```
ACTION
1 SANS
2 APPEL
```

```
POUR SORTIR --> 0   VOTRE CHOIX:
```

When transmitter detects power supply change, an action can be required. Transmitter can decide to call central monitoring through telephone line to inform them of situation. Select the corresponding number to chosen action, "1" for none, "2" for call. After validation by "enter", a similar screen as previous appears with realized modification.

2.5.4) Default

To access settings for defaults detection configuration, enter "31" and confirm with "enter" key.

Display page is as follow :

ALARME DETECTION DEFAUT

1 RETARD 0 s
2 ACTION SANS

POUR SORTIR --> 0 VOTRE CHOIX:

2.5.4.1) Delay

To access delay configuration, enter "1" and confirm with "enter" key.

Display is as follow:

RETARD 0 s

Delay, given in seconds, determines time beyond which defect is taken into account.

This time is configurable from 0 to 600 s. Delay is active on default appearance and disappearance. To change delay, enter its value. After validation by "enter", a similar screen as previous appears with realized modification.

2.5.4.2) Action

To access action configuration, enter "2" and confirm with "enter" key.

Display is as follows:

ACTION
1 SANS
2 APPEL

POUR SORTIR --> 0 VOTRE CHOIX:

When transmitter detects a default, an action can be requested. Transmitter can decide to call central monitoring through telephone line to inform them of situation. Select the corresponding number to chosen action, "1" for none, "2" for call. After validation by "enter", a similar screen as previous appears with realized modification.

2.5.5) Options

To access option configuration, enter "32" and confirm with "enter" key.

Four options are available and configurable by operator.

Display page is as follows:

OPTIONS

1 HYGROMETRIE OUI
2 PRESSION OUI
3 CONDUCTIVITE OUI
4 INTERFACE TRAPPES NON

POUR SORTIR --> 0 VOTRE CHOIX:

We can access the various options, hygrometry, pressure, conductivity and traps interface, by entering respectively "1", "2", "3" or "4". Configuration page of the four options is identical.

Display, for example, is as follows:

HYGROMETRIE

1 OUI
2 NON

POUR SORTIR --> 0 VOTRE CHOIX:

To activate the option, enter "1", to disable it, enter "2". "HYGROMETRIE" option validates hygrometer-thermometer "HRA20" module presence. "PRESSION" option validates pressure measure. "CONDUCTIVITE" option validates "CDV20" conductivity module or "CCN20" current converter presence, "INTERFACE TRAPPE" option validates "CTE23D" module presence. After validation by "enter", a similar screen as previous appears with realized modification.

2.5.6) Password

To access password configuration, enter "33" and confirm with "enter" key.
Display is as follows:



MOT DE PASSE 1234

Password is composed of 4 digits. It is used to block access to transmitter configuration . To change the password, enter the code. After validation by "enter", a similar screen as previous appears with realized modification.

Default password is "1234".

FRAME RECEIVED ON PC

The frame sent to central monitoring post contains three information groups :

- TAG - Digital inputs - Measures, controls,

1) Tag

TAG is composed of eight characters representing the device. This information allows to identify the sending device.

Example : 57777123

2) Digital inputs

Status of the eight logic inputs has the number of input position its status is in alarm. Otherwise the input state is 0.

entrées	en alarme	hors alarme		
Puisard haut	4	0	=>	high sump
Puisard bas	7	0	=>	low sump
Acquittement	8	0	=>	acquittal
Reserve 2, Watchdog/ready	2	0	=>	reserved / watchdog
Reserve 3, Niveau eau	3	0	=>	reserved / water level
Reserve 5, Synthese trappes	5	0	=>	reserved / traps synthesis
Reserve 6	6	0	=>	reserved

3) Measures, controls

Status of the eight information corresponds to measures and various control parameters. Each information can have several status according to its allocation. Here is the information sent by the transmitter for different status of the controls and measurements realized.

1 Purgeur	0 Correcte	=>	1 Bleeder	0 Correct
	1 Insuffisante	=>		1 Insufficient
	2 Fuite	=>		2 Leakage
	3 Ne purge pas	=>		3 Do not bleed
2 Fuite	0 Etat normal	=>	2 Leakage	0 Normal status
	1 Alarme T° ambiante	=>		1 Ambient T° alarm
	2 Alarme hygrométrie	=>		2 Hygrometry alarm
	3 Alarme T° ambiante + hygrométrie	=>		3 Ambient T° + hygrometry alarm
	4 Détection de fuite	=>		4 Leak detection
3 Pression	0 Etat normal	=>	3 Pressure	0 Normal status
	1 Alarme 1	=>		1 Alarm 1
	2 Alarme 2	=>		2 Alarm 2
	3 Alarme 1+2	=>		3 Alarm 1+2
4 Pollution	0 Etat normal	=>	4 Pollution	0 Normal status
	1 Alarme 1	=>		1 Alarm 1
	2 Alarme 2	=>		2 Alarm 2
	3 Alarme 1+2	=>		3 Alarm 1+2
5 Alimentation	0 Secteur	=>	5 Power Supply	0 Power grid
	1 Cellule Peltier	=>		1 Peltier cell
	2 Accumulateur	=>		2 Accumulator
6 Défaut	0 Etat normal	=>	6 Default	0 Normal status
	1 Capteur (un ou plusieurs)	=>		1 Sensor (one or more)
	2 Tension batterie	=>		2 Battery voltage
	3 Courant de charge batterie	=>		3 Battery charging current
	4 Système (Mémoire, acquisition,...)	=>		4 System (Memory, acquisition,...)
7 Cyclique	0 Appel normal d'alarme	=>	7 Cyclical	0 Alarm normal call
	1 Appel cyclique	=>		1 Cyclical call
8 Acquittement	0 Mode normal	=>	8 Acquittal	0 Normal mode
	1 Mode acquittement	=>		1 Acquittal mode

EVENTS MODE

Pressing "E" key in "operating measure" or "configuration" mode allows to enter in "event" mode. TRT100, after sending all registered events, gives access to a menu allowing to realize the 3 following operations :

- **(T)ransfert** (Transfer) transmission (again) of events memory
- **(E)ffacement** (Erase) deleting all registered events
- **(F)in** (End) return to "operating measure" mode.

Transmission example :

Date	Time	Identification
22/09/2000	08:41	CONNEXION TERMINAL RS232
22/09/2000	08:42	CONFIGURATION
22/09/2000	08:43	DECONNEXION TERMINAL RS232
22/09/2000	08:50	PRESSION 2 ALARME ON
22/09/2000	09:55	HYGROMETRIE ALARME ON
22/09/2000	10:41	CONDUCTIVITE ALARME ON
22/09/2000	10:43	PRESSION 2 ALARME OFF
22/09/2000	11:15	APPEL PCS CYCLIQUE
22/09/2000	11:54	HYGROMETRIE ALARME OFF

(T)ransfert (E)ffacement (F)in

Visualized events are three types :

- **Digital inputs**, concerning logic inputs alarm locking or unlocking
- **Measure inputs**, concerning measure inputs alarm locking or unlocking
- **Diverse**, concerning transmitter and operator actions

Memorized events list is detailed below:

1) Digital inputs

- ACQUITTEMENT ALARME ON ou ALARME OFF.
=> **ACQUITTAL ALARM ON or ALARM OFF.**
- PUISARD BAS ALARME ON ou ALARME OFF.
=> **LOW SUMP ALARM ON or ALARM OFF.**
- PUISARD HAUT ALARME ON ou ALARME OFF.
=> **HIGH SUMP ALARM ON or ALARM OFF.**
- RESERVE 2 ou WATCDOG/READY ALARME ON ou ALARME OFF.
=> **RESERVED 2 or WATCDOG/READY ALARM ON or ALARM OFF.**
- RESERVE 3 ou NIVEAU EAU ALARME ON ou ALARME OFF.
=> **RESERVED 3 or WATER LEVEL ALARM ON or ALARM OFF.**
- RESERVE 5 ou SYNTHESE TRAPPES ALARME ON ou ALARME OFF.
=> **RESERVED 5 or TRAPS SYNTHESIS ALARM ON or ALARM OFF.**
- RESERVE 6 ALARME ON ou ALARME OFF.
=> **RESERVED 6 ALARM ON or ALARM OFF.**

2) Measure inputs

- TEMPERATURE PURGEUR T1-T2 ALARME ON ou ALARME OFF.
=> **CONDENSATE TRAP TEMPERATURE T1-T2 ALARM ON or ALARM OFF.**
- TEMPERATURE PURGEUR T2 ALARME ON ou ALARME OFF.
=> **CONDENSATE TRAP TEMPERATURE T2 ALARM ON or ALARM OFF.**
- TEMPERATURE PURGEUR T3 ALARME ON ou ALARME OFF.
=> **CONDENSATE TRAP TEMPERATURE T3 ALARM ON or ALARM OFF.**
- HYGROMETRIE ALARME ON ou ALARME OFF.
=> **HYGROMETRY ALARM ON or ALARM OFF.**
- TEMPERATURE AMBIANTE ALARME ON ou ALARME OFF.
=> **AMBIENT TEMPERATURE ALARM ON or ALARM OFF.**
- FUIITE ALARME ON ou ALARME OFF.
=> **LEAKAGE ALARM ON or ALARM OFF.**
- PRESSION 1 ALARME ON ou ALARME OFF.
=> **PRESSURE 1 ALARM ON or ALARM OFF.**
- PRESSION 2 ALARME ON ou ALARME OFF.
=> **PRESSURE 2 ALARM ON or ALARM OFF.**
- CONDUCTIVITE 1 ALARME ON ou ALARME OFF.
=> **CONDUCTIVITY 1 ALARM ON or ALARM OFF.**
- CONDUCTIVITE 2 ALARME ON ou ALARME OFF.
=> **CONDUCTIVITY 2 ALARM ON or ALARM OFF.**
- TEMPERATURE MAXI ALARME ON ou ALARME OFF.
=> **MAXIMUM TEMPERATURE ALARM ON or ALARM OFF.**

- DEFAULT CAPTEUR ALARME ON ou ALARME OFF.
=> **SENSOR DEFAULT ALARM ON or ALARM OFF.**
- DEFAULT TENSION BATTERIE ALARME ON ou ALARME OFF.
=> **VOLTAGE DEFAULT BATTERY ALARM ON or ALARM OFF.**
- DEFAULT COURANT DE CHARGE ALARME ON ou ALARME OFF.
=> **CHARGING CURRENT DEFAULT ALARM ON or ALARM OFF.**
- DEFAULT SYSTEME ALARME ON ou ALARME OFF.
=> **SYSTEM DEFAULT ALARM ON or ALARM OFF.**

3) Others

- ALIMENTATION SECTEUR.
=> **GRID SUPPLY.**
- ALIMENTATION PELTIER.
=> **PELTIER POWER SUPPLY.**
- ALIMENTATION BATTERIE.
=> **BATTERY POWER SUPPLY.**
- CONNEXION TERMINAL RS232.
=> **RS232 TERMINAL CONNECTION.**
- DECONNEXION TERMINAL RS232.
=> **RS232 TERMINAL DISCONNECTION.**
- CONNEXION TERMINAL MODEM.
=> **MODEM TERMINAL CONNECTION.**
- DECONNEXION TERMINAL MODEM.
=> **MODEM TERMINAL DISCONNECTION.**
- APPEL PCS SUR ALARME.
=> **CALL PCS ON ALARM.**
- APPEL PCS CYCLIQUE.
=> **CALL PCS CYCLICAL.**
- CONFIGURATION.
=> **CONFIGURATION.**

Recording capacity is 127 time-stamped events. System memory is FIFO type.

REAL TIME RECCORDING DISPLAY MODE

Pressing "F" key in "operating measure" or "configuration" mode allows to enter in "stream line" mode.

TRT100, after sending all registered measures, gives access to a menu allowing to realize the 3 following operation:

- **(T)ransfert** (Transfer) transmission (again) of events memory
- **(E)ffacement** (Erase) deleting all registered events
- **(F)in** (End) return to "operating measure" mode.

Transmission example :

T1	T2	T3	Hr	Tamb	P	Cd
159	151	140	57	19	5.4	48
159	151	140	57	19	5.4	48
159	151	140	57	19	5.4	48
159	151	140	57	19	5.4	48
159	151	140	57	19	5.4	48
159	151	140	57	19	5.4	48
159	151	140	57	19	5.4	47
T1	T2	T3	Hr	Tamb	P	Cd
DATE	02/05/2000					
HEURE	15:11					
PERIODE	5 mn					
(T)ransfert (E)ffacement (F)in						

On transfer, **TRT100** send all recorded measures, date, time and reg. period. Registration period correspond to transmitter wake-up period. When it wakes up, transmitter carries out its measure campaign and register 7 following information:

- T1:** Condensate trap temperature 1 **Hr:** Hygrometry
- T2:** Condensate trap temperature 2 **Tamb:** Ambient temperature
- T3:** Condensate trap temperature 3 **P:** Pressure
- Cd:** Conductivity or flow

Recording capacity is 1022 measures groups, either a record period from 17 hours to 42 days with a frequency programmed from 1 to 60 min. Transmission of measures carried out in ASCII characters.

By text capture in terminal mode, all measures can be recovered and treated by all office software such as spreadsheet or text processor.

TRT100 MEASURE TRANSMITTER

- **8 measure inputs, 8 digital inputs/outputs**
- **Monitoring and internal diagnosis**
- **Events memory, on the fly**
- **Telephone link and RS232**
- **Grid supply or peltier cell**
- **Uninterruptible power supply on accumulator**
- **Low overall dimension**



TRT100 transmitter is an autonomous device allowing monitoring and diagnosis of condensate trap post, providing through telephone line, works status.

FUNCTIONALITY:

Logic Inputs/Outputs:

- 2 sump monitoring inputs
- 1 acquittal input controled by push button
- 4 reserved inputs
- 1 GSM power supply control output

- Possibility of alarm on each input with configuration of type, opening or closing, delay and action, phone call or not.
- Calculation of complementary information (sump input)
- time stamped memorization of status changing

Measures inputs:

- 3 condensate trap temperature measures
- 1 transmitter temperature measure
- 1 hygrometry measure and 1 ambient temperature measure on deported module
- 1 conductivity measure on deported module and 1 compensation temperature measurement
- 1 pressure measure

- Possibility of alarm on each measure with configuration of direction, high or low, threshold and hysteresis, delay and action, phone call or not
- Definition of complementary status (compensate trap, pollution, leak, pressure).
- Memorization on the fly.

Internal monitoring:

- transmitter temperature measuring
- power supply type detection
- Peltier cell voltage measure
- voltage and charging current of accumulator measure
- Default detection (sensors, power supply, system...).

POWER SUPPLY:

- Dual power supply source, automatic commutation, power grid or Peltier cell
- Uninterruptible power supply with accumulator
- Low consumption.

DIALOG - CONFIGURATION:

Device can interact remotely through phone line or in local mode through RS232 link with any system emulating terminal with 24 rows and 80 columns.

Example: PC + HyperTerminal windows or PSION série 5. (RS232 cable provided for free on request)

Through terminal, operator may:

- Visualize measurements
- Configure TRT100,
- Consult events
- Fetch memorized measures

SECURITY:

TRT100 responds to problems encountered in Industry:

- galvanic insulation : power supply / inputs-outputs / phone line
- configuration saving, (warranty > 10 years)
- events and measures saved on the fly. (warranty > 10 years)
- noise immunity
- watchdog controled program behavior
- regeneration of internal parameters on each measures
- algorithm for permanent check of measures validity
- ambient temperature variation stability

LOGIC INPUTS / OUTPUTS

Designation	Type	Measure, calculation
Acquittal (8)	BP	acquittal duration
Low sump (7)	input	Date / hour, time and speed of flood
High sump (4)	input	
Reserved (2)	input	
Reserved (3)	input	
Reserved (5)	input	
Reserved (6)	input	
GSM (1)	output	GSM power supply command

MEASURE INPUTS

Description	Range	Accuracy
condensate trap n°1 T°	0 to 200 °C	1 °C
condensate trap n°2 T°	0 to 200 °C	1 °C
condensate trap n°3 T°	0 to 200 °C	1 °C
Hygrometry	0 to 100 %	1 %
Ambient T°	0 to 100 °C	1 °C
Conductivity	0 to 100 uS	1 uS
Compensation T°	0 to 200 °C	1 °C
Pressure	0 to 10 bar	0,1 bar

INTERNAL MONITORING

Description	Measure/detection
Power grid presence	Absence / Presence
Peltier voltage	0.8 to 4 V
Battery voltage	0 to 8 V
Battery current	0 to 10 mA
Ambient T°	0 to 100 °C

Elecromagnetic compatibility

Generic standards: **NFEN50081-2 / NFEN50082-2**

EN55011	meet	groupe 1 / classe A
EN61000-4-2	no influence	B
EN61000-4-4	< +/- 3 %	B
ENV50140	< +/- 3 %	A
ENV50141	< +/- 1 %	A
ENV50204	no influence	A



POWER SUPPLY

	Power grid	Peltier	Battery
U mini	200 V	0,8 V	6,6 V
U maxi	250 V	4 V	8,8 V

Consumption	70 mW	standby mode
(integrated battery)	150 mW	measure mode
	170 mW	communication mode

COMMUNICATION

By phone	Notice	V22, 1200 bauds
	Number	4 x 16 digits
	Prefix	2 digits
RS232		9600 bauds
		1 stop bit, 8 data bits, no parity, no flow control

MEMORISATION

On the fly:	Clock	1 to 60 mn
	Capacity	1022 x 7 mesures
	Period	17 hours to 42 days
Events:	Clock	on events
	Capacity	127 events
Divers:	Transmitter T°	maximum T°

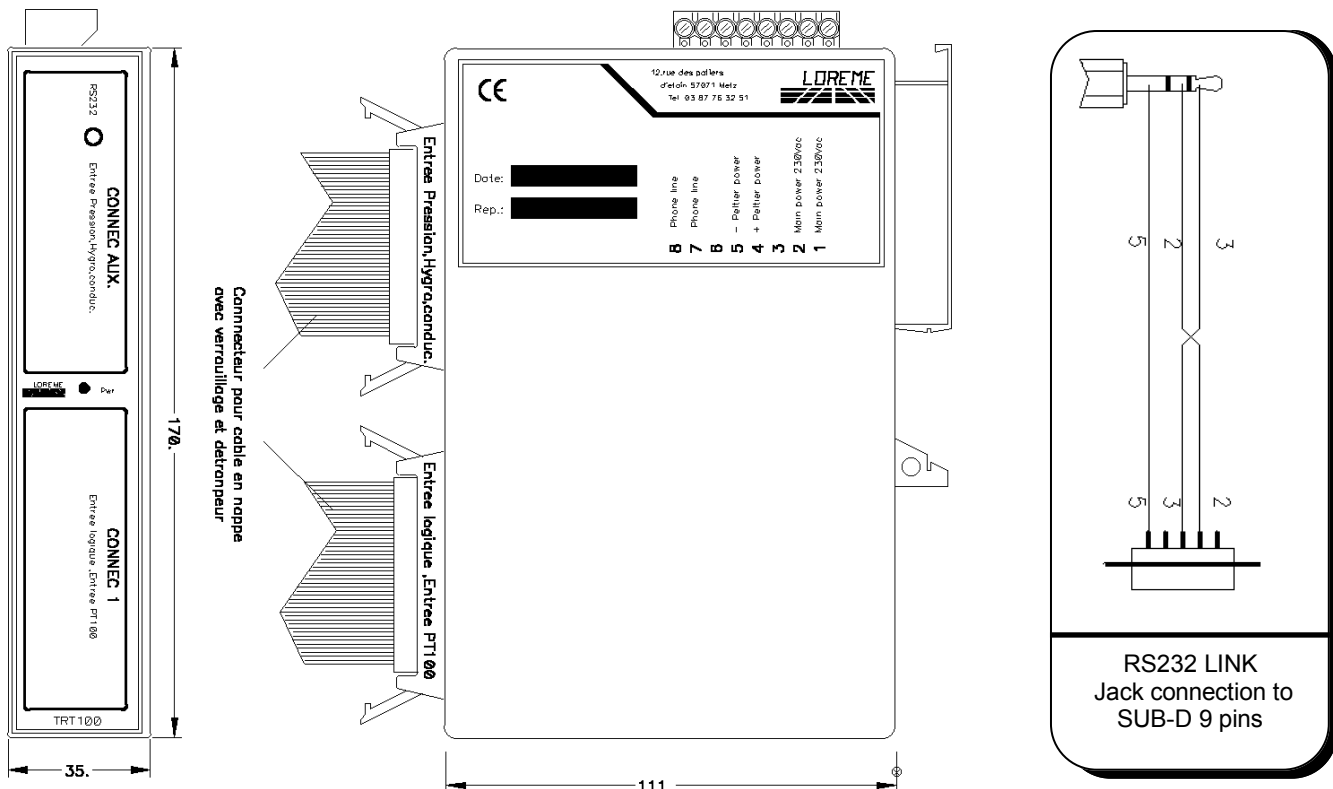
CLOCK

Wake-up cycle	1 to 60 mn
Cyclical call	1 to 150 h
Acquittal	1 to 720 mn

ENVIRONMENT

Temperature	
Operating	-10 to +70 °C
Storage	-20 to +85 °C
Influence	0.005 % / °C (% full scale)
Hygrometry	85 % (no condensed)
Weight	~ 370 g
Protection	IP20
Dielectric strength	1500 Veff / alim 230 V 2500 Veff / telephone line

WIRING AND OUTLINE DIMENSIONS:



THERMOMETER - HYGROMETER HRA20

- 2 measures in 1 module
- Integrated sensors
- Low consumption
- Low overall dimension
- IP65

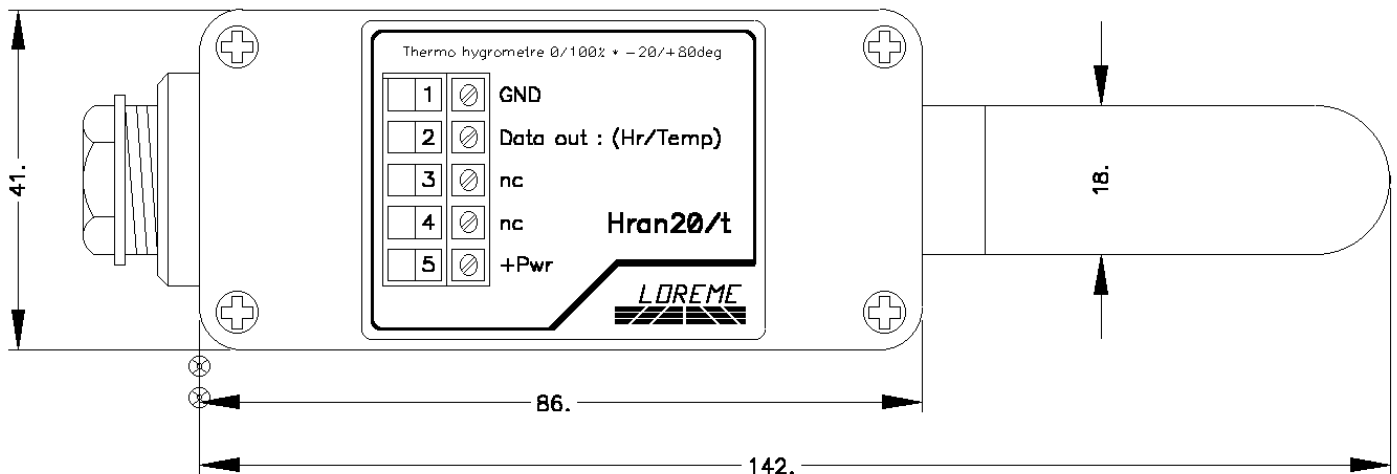


HRA20 is an autonomous hygrometer and temperature sensor. Wired to TRT100 , it transmit its measures through a digital line.

TECHNICAL SPECIFICATIONS:

INPUT			ENVIRONMENT	
Temperature	Range	Accuracy	Temperature	
	0 to 100 °C	+/- 0,5 °C	Operating	-10 to +70 °C
Hygrometry	0 to 100 %	+/- 2 %	Storage	-20 to +85 °C
			Influence	0.005 % / °C (% full scale)
			Hygrometry	100 % (no condensed)
			Weight	~ 85 g
			Protection	IP65
POWER SUPPLY				
Minimum voltage	3.5 V			
Maximum voltage	6 V			
Electromagnetic compatibility				
Generic standards: NFEN50081-2 / NFEN50082-2				
EN55011	meet	groupe 1 / classe A		
EN61000-4-2	no influence	B		
EN61000-4-4	< +/- 3 %	B		
ENV50140	< +/- 3 %	A		
ENV50141	< +/- 1 %	A		
ENV50204	no influence	A		

WIRING AND OUTLINE DIMENSIONS:



CONDUCTIVITY METER - CDV20
SALINITY SENSOR - SCL20



• **CDV20:** *Digital output conductivity meter*
Low consumption
IP65

• **SCL20:** *Salinity sensor*
Robust, reliable
Fully made of 316L Ss.
PTFE insulated

CDV20



SCL20



CDV20 conductivity meter equipped with SCL20 probe are an autonomous unit allowing to measure resistivity of a liquid and therefore its conductivity. Connected to TRT100 transmitter, CDV20 transmits its measurements via a digital line. All these can be supplemented with a temperature sensor used in for temperature compensation.

TECHNICAL SPECIFICATIONS:

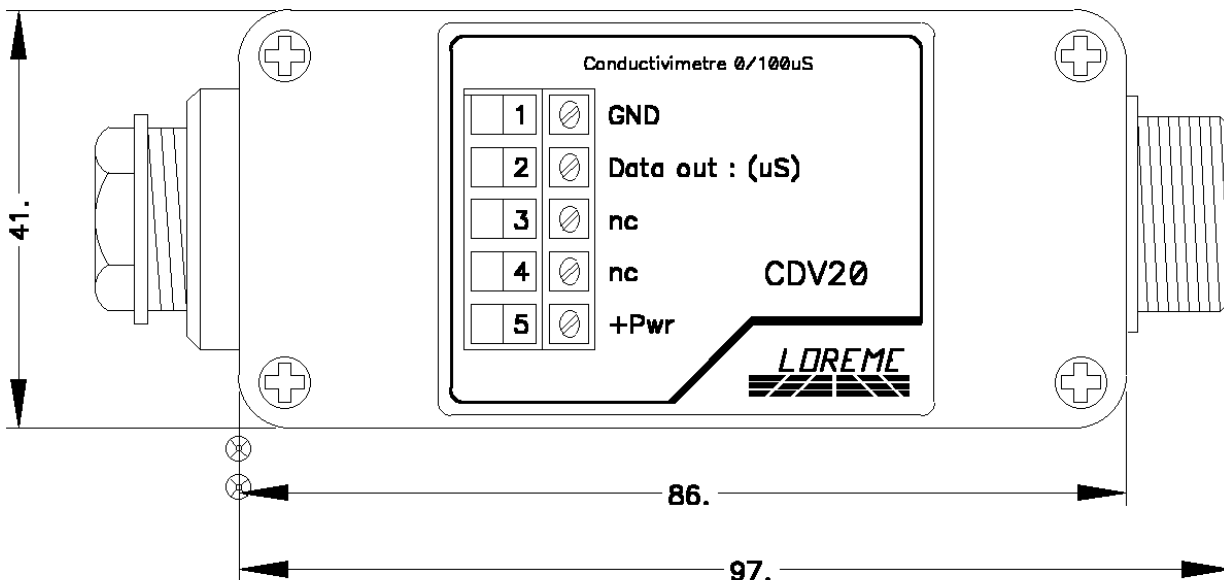
SCL20	
K coefficient	0.1
Pressure	10 bar
Maximum temperature	100 °C
Matter	316 L stainless steel
Insulation	PTFE
Connection	1/2"
Connector	PL259

Electromagnetic compatibility		
Generic standards: NFEN50081-2 / NFEN50082-2		
EN55011	meet	groupe 1 / classe A
EN61000-4-2	no influence	B
EN61000-4-4	< +/- 3 %	B
ENV50140	< +/- 3 %	A
ENV50141	< +/- 1 %	A
ENV50204	no influence	A



CDV20		
INPUT		
Conductivity	Range 0 to 100 µS	Accuracy +/- 1 µS
POWER SUPPLY		
Minimum voltage	3.5 V	
Maximum voltage	6 V	
ENVIRONMENT		
Temperature		
Operating		-10 to +70 °C
Storage		-20 to +85 °C
Influence		0.005 % / °C (% full scale)
Hygrometry		85 % (no condensed)
Weight		~ 85 g
Protection		IP65

WIRING AND OUTLINE DIMENSIONS:



CONVERTISSEUR DE COURANT CCN20

CCN20: Digital output 4...20mA Transmitter

Low consumption

IP65



CCN20

CCN20 transmitter, is used to measure flowmeter 4-20 mA output current. It has digital output to flag flow direction. Wired to TRT100 in place of CDV20, CCN20 transmit its measure by a digital line.

TECHNICAL SPECIFICATIONS:

INPUT			
current range	4 à 20 mA	accuracy	+/- 0,16 mA
impedance			150 Ohms
measure polarity	digital input		
POWER SUPPLY			
minimum voltage	3.5V		
Maximum voltage	6 V		
ENVIRONNEMENT			
Temperature operating	-10 à +70 °C		
storage	-20 à +85 °C		
influence	0.005 % / °C (% full scale)		
Hygrometry	85 % (no condensated)		
Weight	~ 85 g		
Protection	IP65		

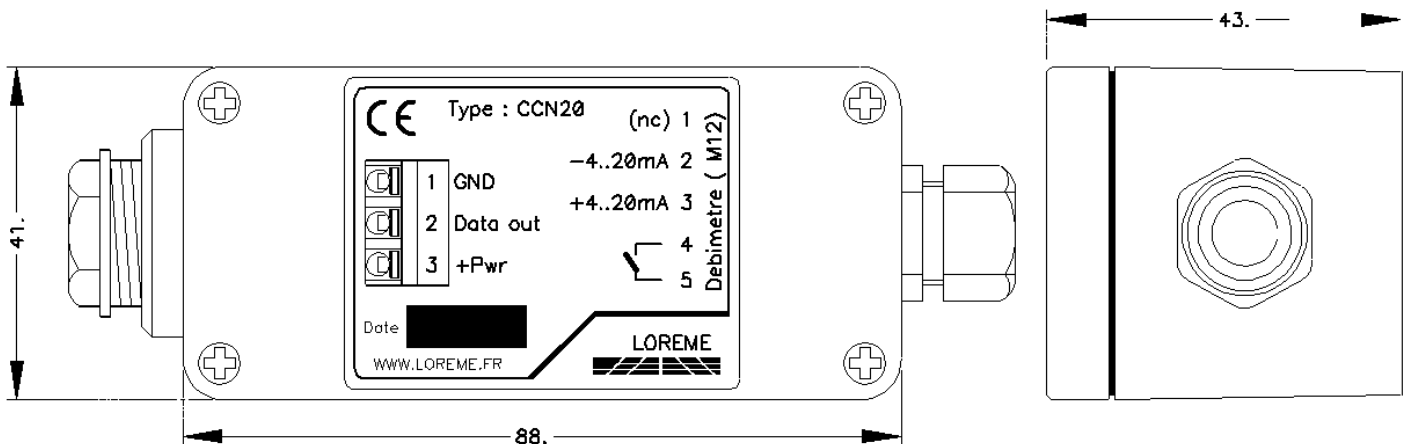
Electromagnetic compatibility

Generic standards: **NFEN50081-2 / NFEN50082-2**

EN55011	meet	groupe 1 / classe A
EN61000-4-2	no influence	B
EN61000-4-4	< +/- 3 %	B
ENV50140	< +/- 3 %	A
ENV50141	< +/- 1 %	A
ENV50204	no influence	A



WIRING AND OUTLINE DIMENSIONS:



Terminal n° 3, 2: + / - 4/20 mA input

Terminal n° 4, 5: digital input, measure polarity
open = mesure « + », closed = mesure « - »

PR21
PRESSURE SENSOR



- **Passive pressure sensor**
- **High sensitivity**
- **Low consumption**



PR21 is a high sensitivity passive strain gauge type pressure sensor for very low power consumption applications. Connected to TRT100, it delivers an electric information depending on pressure at which cell is subject.

TECHNICAL SPECIFICATIONS:

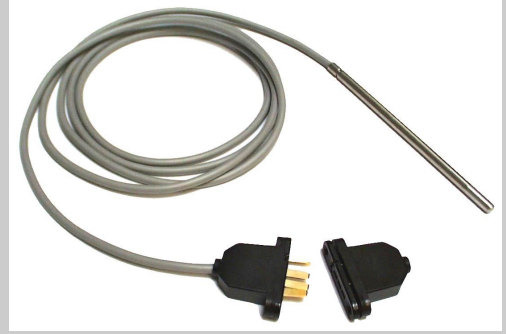
MEASURE	ENVIRONMENT
Sensitivity 1,45 mV / Bar / V power supply TRT100 configuration : 4,35 mV / Bar	Temperature Operating -25 to +90 °C Storage -25 to +105 °C
Impedance, output: 4.5kohm Nominal pressure 0 - 10 bars Maximum overpressure 20 bars Hysteresis: 0.5% Linearity: ±0.5% Connection 4 wires (strain gauge mounting) Wiring 1/4" BSP	Influence on offset 0.02 % / °C (% full scale) Influence on sensibility 0.02 % / °C (% full scale) Total error / T° ± 1 %
Electromagnetic compatibility	Long-term stability < 0,1 % (% full scale) Hygrometry 85 % (no condensed) Insulation resistance > 100 MΩ to 50 V Protection IP65 Weight ~ 60 g Wiring high temperature cable
Generic standards: NFEN50081-2 / NFEN50082-2	

WIRING AND OUTLINE DIMENSIONS:

Signal type	Color of wires on termination
- power supply	White
+ output	Red
+ power supply	Black
- output	Blue

SP1000I SOCAPEX TEMPERATURE SENSOR

- **4 wires Pt100 RTD temperature probe**
- **Wiring by SOCAPEX connector**

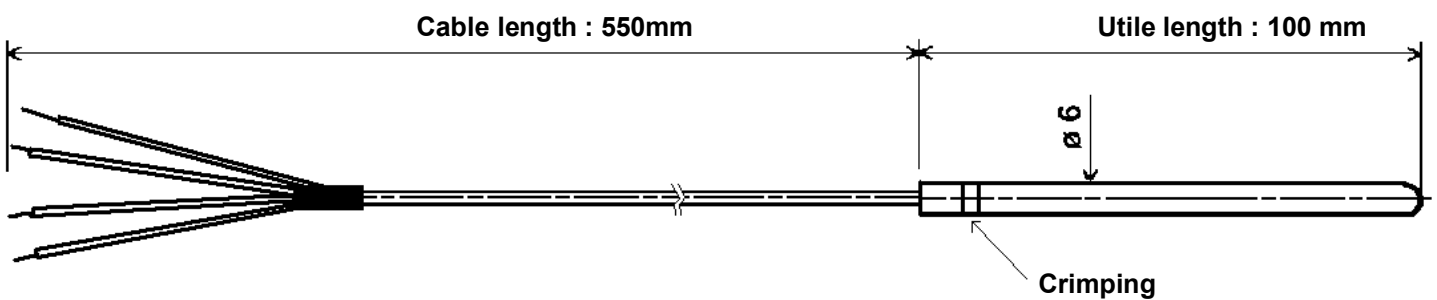


The SP1000I SOCAPEX is a temperature probe 4 wires Pt100 RTD connected to TRT100 transmitter. This one delivers an electric information depending on temperature at which is subject measuring element.

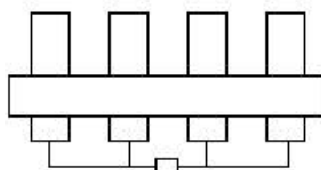
TECHNICAL SPECIFICATIONS:

MEASURE		ENVIRONMENT	
Maximum temperature	280 °C	Hygrometry	85 % (non condensed)
Measure element		Insulation resistance	> 50 MΩ to 500 V
Probe	RTD Pt100 4 wires B class	Protection	IP65
Utile length	100 mm	Weight	~ 60 g
Diameter	6 mm		
Pipe	316 L Stainless steel		
Cable			
Length	550 mm		
Cable insulation	PFA braid PFA		
Wiring	4 poles socapex connector		

WIRING AND OUTLINE DIMENSIONS:



CONNECTOR



PT100

Level resistive probe
Type : SNL1000-2/DNR40
2 levels probe with incorporated threshold detector

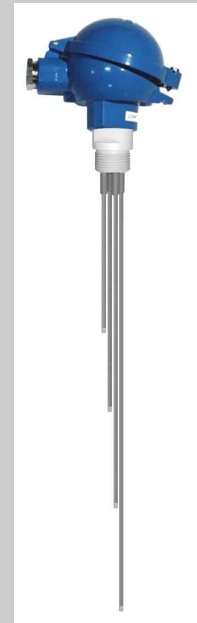


• **multilevel Probe for conductive liquids.**

- SNL1000 2/DNR40 for direct connection on TRT100.*
- 2 levels (adjustable electrode length).*
- Maximum pressure 10 bars.*
- Maximum temperature 150°C.*
- IP 66, câble output or connection head*
- sheathed electrodes with 316L stainless steel electrodes*

• **Application**

- level control or regulation*
- For tank, canal ...*



Resistive level probe, based on electrical resistance variation caused by fluid presence between 2 electrodes. This resistance is transformed into a digital signal through DNR40 detector.

Description :

The probe operates according to principle of conductivity between a common electrode and one or more switching level electrodes.
 Presence of liquid is detected by resistance variation at electrode contact.
 Each probe is composed of 3 parts :
 - measure electrodes 316L Ss. teflon coated
 (Std length: 1000mm / Max length: 6000mm => can be cut to desired height)
 - mounting 3/4" connection which also act as insulator between electrodes themselves and tank (Teflon)
 - Connection head, IP66, epoxy coated with output on M20 cable gland.

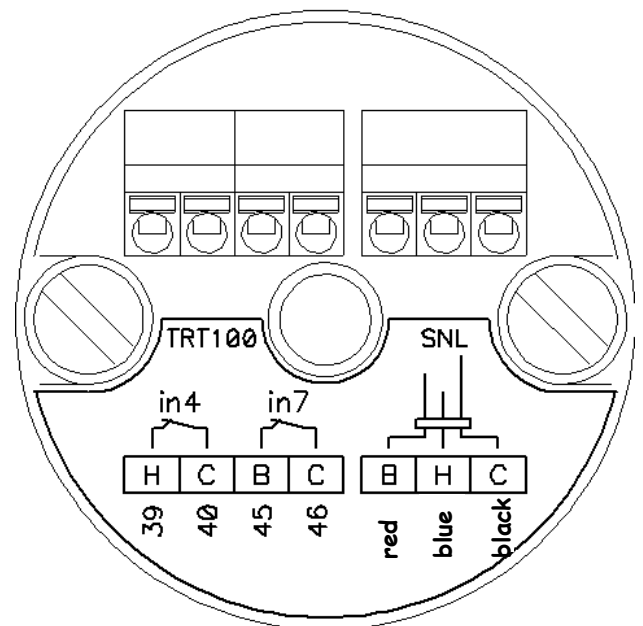
TRT100				SNL		
in4 : 39	in4 : 40	in7 : 45	in7 : 46	down (red)	up (blue)	com (black)

Technical characteristic

SNL type probes...
 Maximum temperature of electrode : 180 °C, head: 100 °C
 Maximum pressure: 6 bar to 20°C (1 bar to 100 °C)
 Process connection : 3/4 " (bracket in option)
 Environment : For any conductor liquids
 Material : electrode support: Teflon
 electrodes : 316L stainless steel
 Electrical Connection: 30 meters max

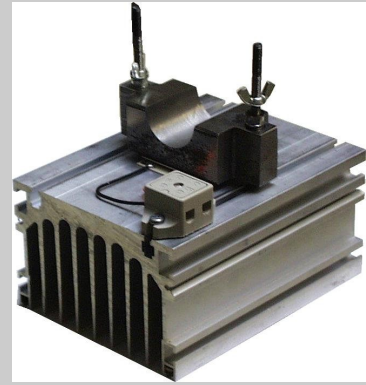
Maintenance

For a correct probe operation, you have to check occasionally electrodes status (no deposits)
 The probe itself require very little maintenance, but when mounting, it is necessary to verify perfect clamping of cable gland and head to avoid any humidity penetration
 In case of malfunction, check electrical continuity between electrodes extremities and terminal block.



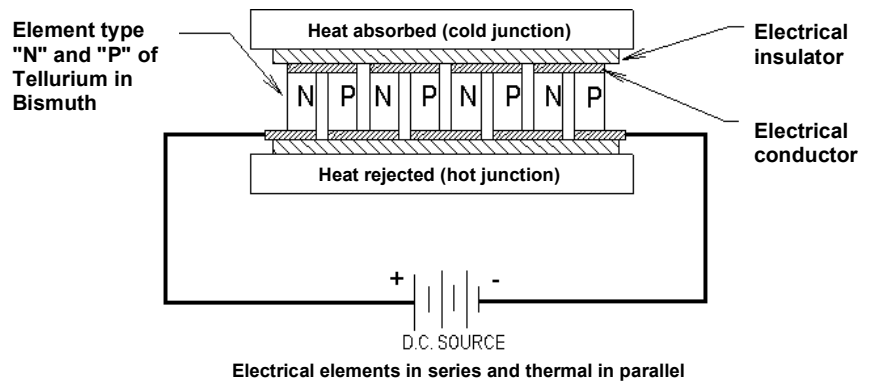
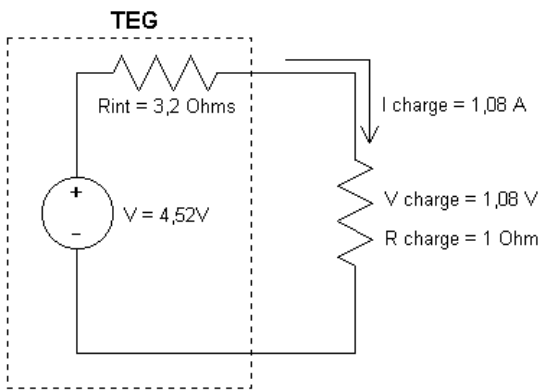
PEL200 PELTIER EFFECT GENERATOR

- **Autonomous Peltier effect power supply**
- **High performance**
- **Fast mounting**
- **Reduced outline dimension**

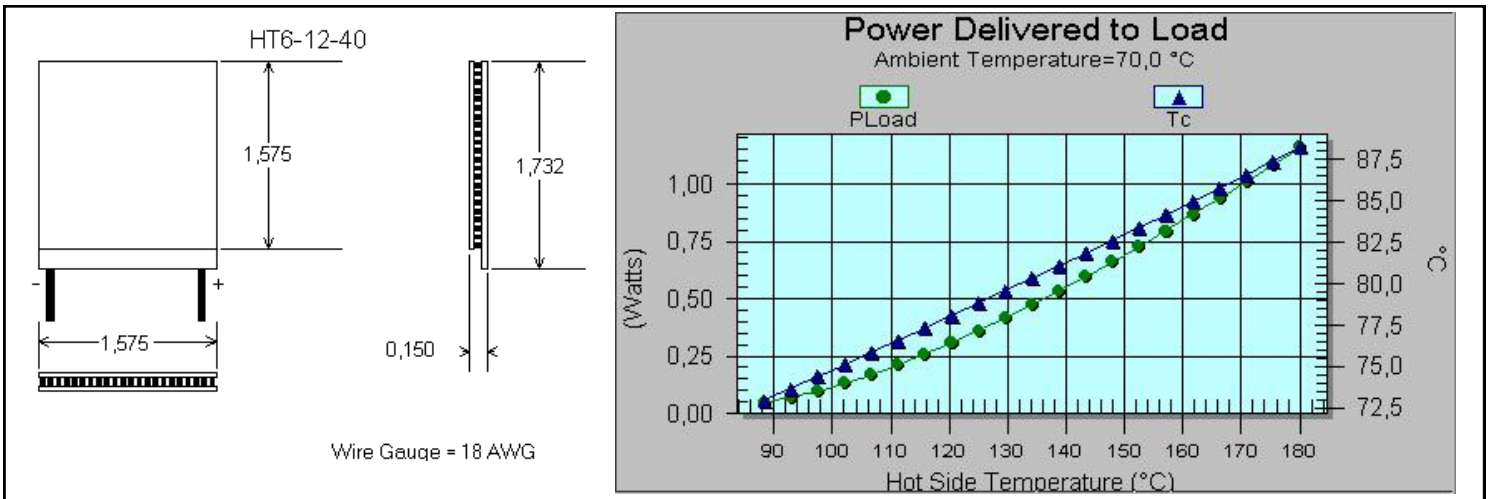


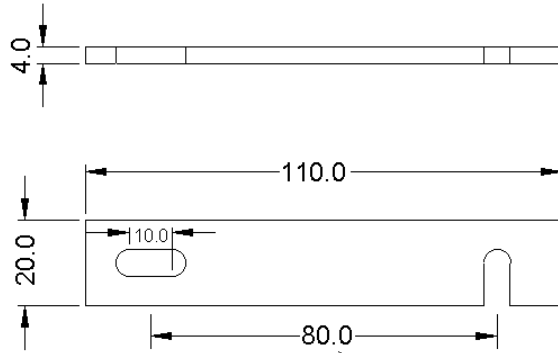
PEL200 is a Peltier effect generator transforming thermal energy into electrical energy allowing to power equipment in areas lacked of electricity.

EXAMPLE USE ON 1OHM LOAD:



TECHNICAL SPECIFICATIONS:





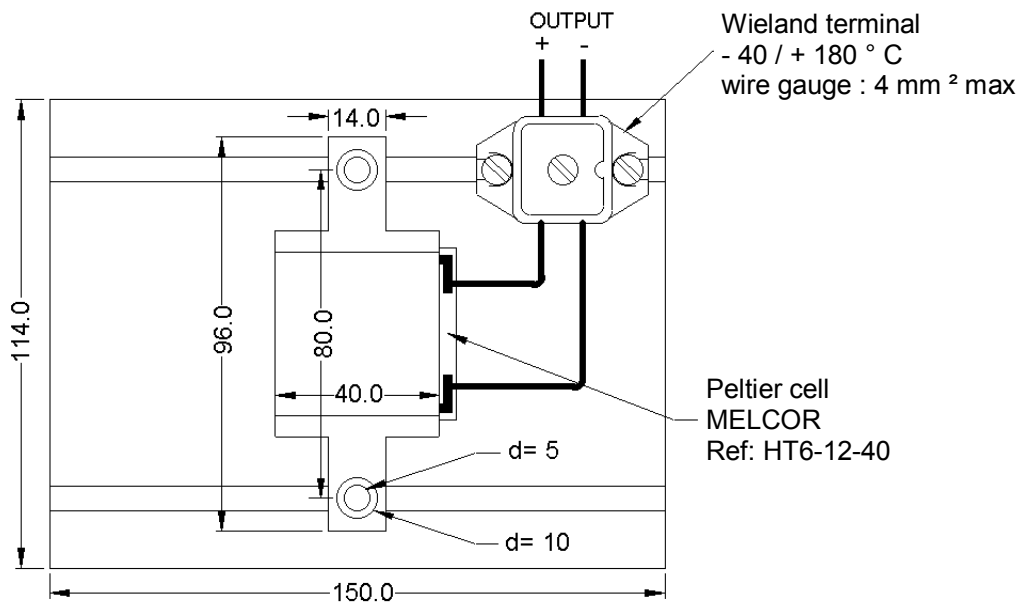
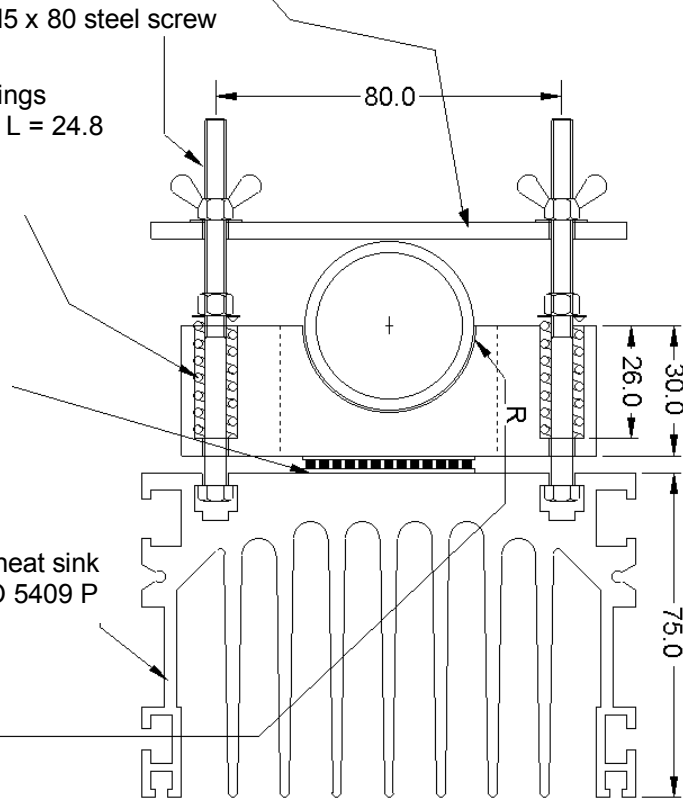
M5 x 80 steel screw

Spring D = 1.6 mm thread
 D ext = 9.6 mm / 12.5 windings
 Free L = 45 mm / Minimum L = 24.8
 Flexibility: 10.4 N / mm
 Load for minimum L: 212N

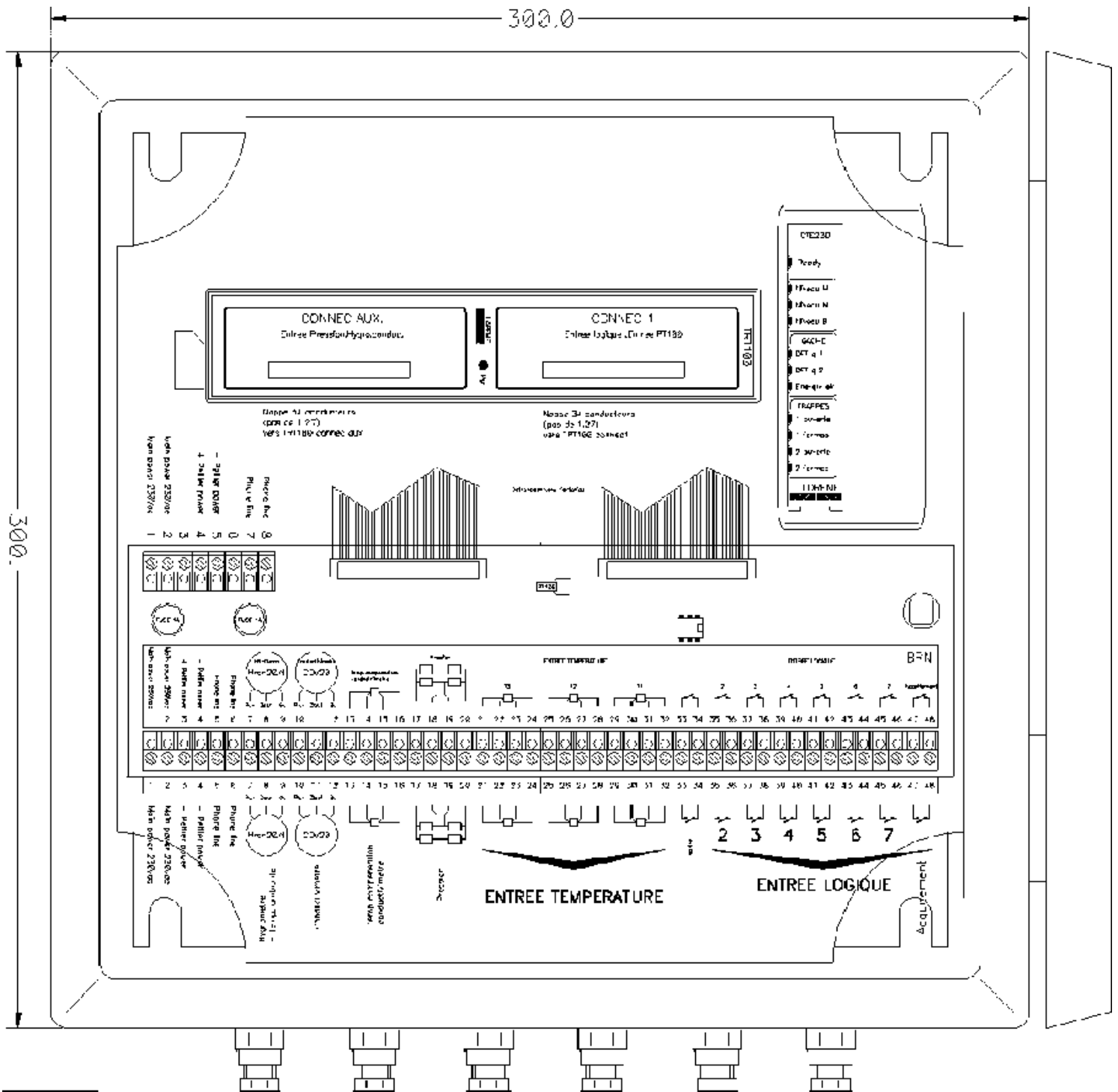
Thermal interface sheet
 or graphite
 Ref: GRF-159-174
 (on both sides)

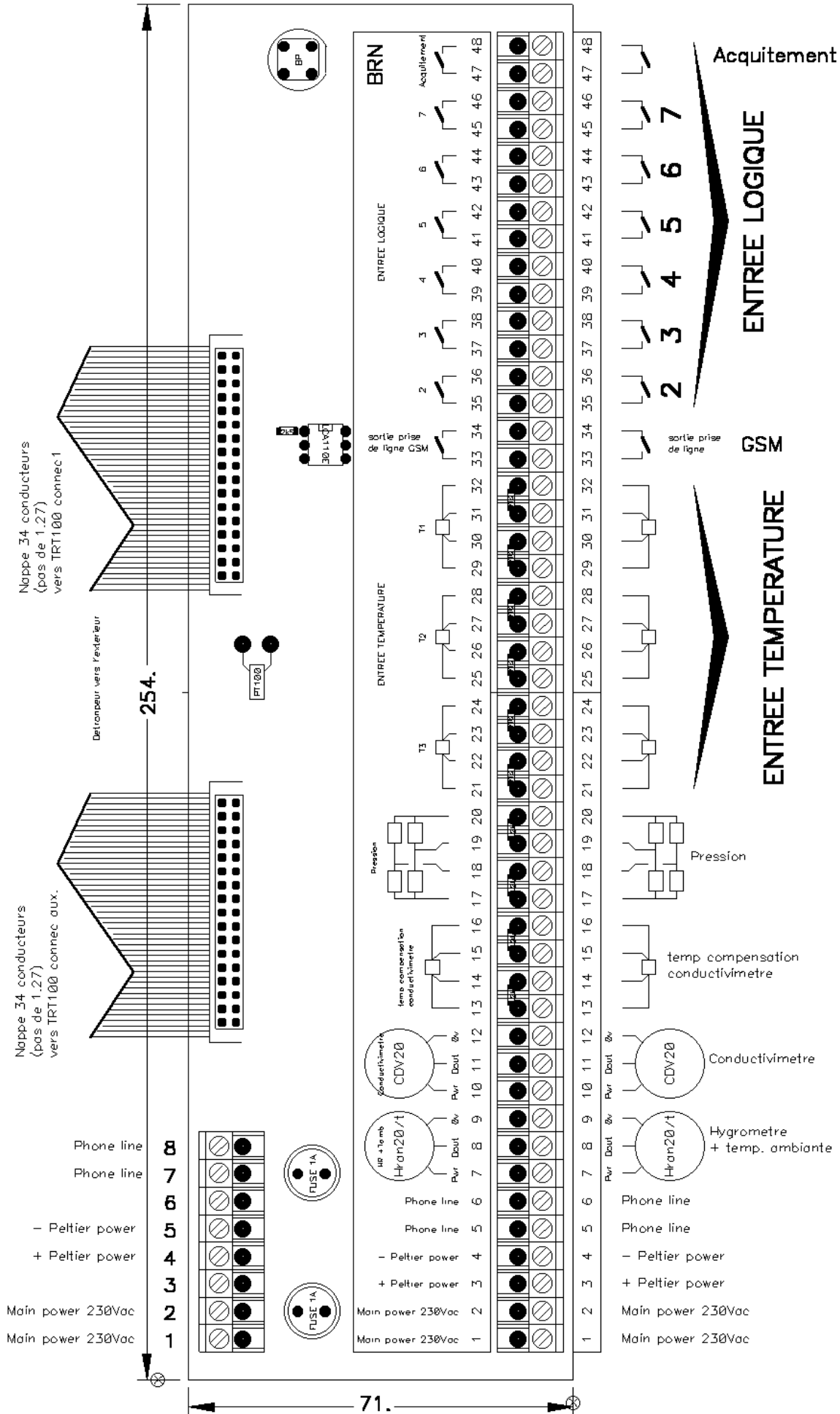
SEEM heat sink
 Ref: CO 5409 P

DN	R
20	13.5
25	17
32	21.5
40	24.5



BOX IMPLEMENTATION





EMC CONSIDERATION

1) Introduction:

In order to satisfy its policy as regards EMC, based on the Community directive 89/336/CE, the LOREME company takes into account the standards relative to this directive from the very start of the conception of each product.

As the devices are devised to work in industrial environments, the various tests are carried out in the sight of the EN 50081-2 and EN 50082-2 standards, in order to make out a statement of conformity.

As the devices lie in certain typical configurations during the tests, it is not possible to secure the outcomes in any possible configuration. To ensure the best functioning of each device, it would be judicious to comply with several recommendations of use.

2) Recommendations of use:

2.1) General remarks:

- Comply with the recommendations of assembly indicated in the technical sheet (direction of assembly, spacing between the devices, ...).
- Comply with the recommendations of use indicated in the technical sheet (temperature range, protection index).
- Avoid dust and excessive humidity, corrosive gas, considerable sources of heat.
- Avoid disturbed environments and disruptive phenomena or elements.
- If possible, group together the instrumentation devices in a zone separated from the power and relay circuits.
- Avoid the direct proximity with considerable power distance switches, contactors, relays, thyristor power groups, ...
- Do not get closer within fifty centimetres of a device with a transmitter (walkie-talkie) of a power of 5 W, because the latter can create a field with an intensity higher than 10 V/M for a distance fewer than 50 cm.

2.2) Power supply:

- Comply with the features indicated in the technical sheet (power supply voltage, frequency, allowance of the values, stability, variations ...).
- It is better that the power supply should come from a system with section switches equipped with fuses for the instrumentation element and that the power supply line be the most direct possible from the section switch.
- Avoid using this power supply for the control of relays, of contactors, of electrogates, ...
- If the switching of thyristor statical groups, of engines, of speed variator, ... causes strong interferences on the power supply circuit, it would be necessary to put an insulation transformer especially intended for instrumentation linking the screen to earth.
- It is also important that the installation should have a good earth system and it is better that the voltage in relation to the neutral should not exceed 1V, and the resistance be inferior to 6 ohms.
- If the installation is near high frequency generators or installations of arc welding, it is better to put suitable section filters.

2.3) Inputs / Outputs:

- In harsh conditions, it is advisable to use sheathed and twisted cables whose ground braid will be linked to the earth at a single point.
- It is advisable to separate the input / output lines from the power supply lines in order to avoid the coupling phenomena.
- It is also advisable to limit the lengths of data cables as much as possible.

Maintenance advices



Here is a list of advices of periodical maintenance for correct operation of remote monitoring systems.

- 1) Box**
To ensure its function of box (tightness), it is necessary to control its general status :
- fixing, - door gasket - lock handle - cable gland Periodicity: 2 years
- 2) TRT100 transmitter**
To ensure all functions of transmitter and no degradation of system, it is necessary to control its general status:
- aspect of box - indicator visualisation - fixing Periodicity: 4 years
- connections CONNEC1, CONNEC AUX, power supply + P&T Periodicity: 4 years
- Some elements of transmitter should be checked and replaced at plant:
- accumulator - electrolytic capacitors Periodicity: 5 years
- memory recording measurements and events Periodicity: 10 years
- Eventually, check metrological data from transmitter:
- logic inputs status - condensate trap temperatures - hygrometry and t° (HRA20) Periodicity: 1 year
- pressure - conductivity meter (CDV20) or flow (CCN20) Periodicity: 1 year
- 3) BRN terminal and connector**
To ensure continuity of information from outside to transmitter, check general status of terminal:
- ribbon cable wiring - unpluggable connection Periodicity: 4 years
- inputs, outputs and power supply clamping quality Periodicity: 4 years
- 3) PEL200 Peltier effect generator**
To ensure its function and its performance, control general status of generator:
- cleaning of radiator - clamping on pipe verification - connection control Periodicity: 2 years
- 4) HRA20 Thermometer - Hygrometer**
To ensure its function, control its general status:
- box - cable gland - fastening Periodicity: 1 year
- Rigorously inspect filter :
- visual control, cleaning - return in plant, repair or replacement if cloged up Periodicity: 1 year
- 5) CDV20 Conductivity meter**
To ensure its function, control its general status:
- box - cable gland - fastening Periodicity: 2 years
- Eventually, realize a comparative measure, probe disconnected:
- place a 10KOhms resistor on its input
- execute a measure procedure on transmitter
- conductivity measurement must indicate 10 µS Periodicity: 2 yeras.
- 6) SCL20 salinity sensor**
Ssensor disassembly is imperative to realize a perfect control of its measure elements:
- visual control of electrodes status, cleaning, Periodicity: according
- return in plant, repair or replacement if soiling contamination level
- Possibly, realize a measure on free air:
- ohmic measure between its electrodes, - impedance > 10 Mohms
- 7) CCN20 current converter**
To ensure its function, contrôle its general status:
- box - cable gland - fastening Periodicity: 2 years
- 8) PR21 pressure sensor**
To ensure its function, control its general state:
- tightness - fastening Periodicity: 2 years.
- 9) SP1000I socapex temperature sensor**
No maintenance is necessary.