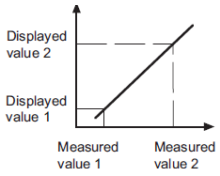
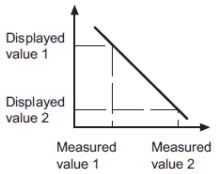
# 1. Operation

## 1.1. Display Range

Display scaling defines interaction of input signal and displayed value. Linear behavior requires defining two measured values - (inP) respectively displayed values (dSP). Both limits should be at the end of the display area to ensure maximum precision.




**Normal Scale**




**Inverse Scale**

There are two options to enter the value coordinates: Either by keypad (in SCAL mode) or using the teach-in feature (teach mode). Assigning the displayed values requires manual entry (with device still in teach mode).

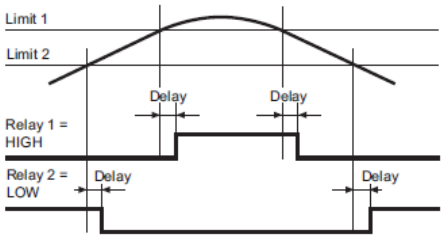
## 1.2. Alarm Output

The device provides 1 relay output. Output trigger either at ≥ displayed value or ≤ limit is defined by HIGH, LOW or HIGH-LOW configuration.

The output can be configured as time delay or hysteresis.

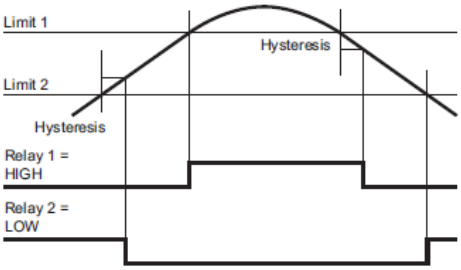
***a) Limit output as time delay***

Time delay parameterization is within the range from 0 to 99,9 s and will be effective both at limit output power on and off.



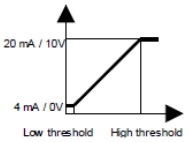

***b) Asymmetrical hysteresis***

Hysteresis is configured in display units from 0 to 9999 and only effective at limit output power off.

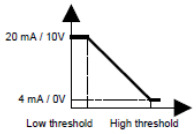



## 1.3. Analog Output 4-20mA

The device is equipped with an analogue output which delivers a 4-20 mA signal which is directly or indirectly proportional to the display's evolution.

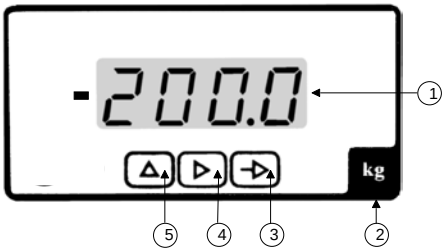



**Normal Output**




**Inverse Output**

# 2. Description of Keyboard and Display




| N° | Designation | Function RUN | Function PROG |
|---|---|---|---|
| 1 | DISPLAY | Data display area | |
| 2 | LABEL | Stick the "units" label here | |
| 3 | KEY ⊳ | Programming access | Selection of programming line |
| 4 | KEY ▷ | MIN/MAX display | Digit/function selection |
| 5 | KEY △ | | Incrementing the selected digit |

# 3. Operating and Programming

**OPERATING mode**
The indicator is in this mode at power-up. In this mode you may consult the recorded MIN and MAX values, the alarm threshold values or use the setpoint generator.

**KEY ▷ - MAX/MIN**
Whenever you press this key, the MAX, MIN and TARE successively appear, and then the current value of the measurement redisplays. You can reinitialize the displayed MAX or MIN value by pressing the key during 3 sec. The MAX and MIN values are saved in case power is cut off. The display of these values can be disable, see the chapter 5 - Programming Access Control.

**PROGRAMMING Mode**

Overall configuration of the process display is in programming mode providing 4 modules:

- **InP** Input configuration
- **dSP** Display configuration
- **SEtP** Limit output configuration
- **AnA** Analog output configuration

With the → key, you may access the programming mode, a configuration module, or scroll the various lines to be programmed.

With the ▷ key, you may select a configuration module to be programmed, an operating option, or a digit to be modified.

With the △ key, you may increment the selected digit.

***Procedure***

1° Press the → key ; the [-PRO-] message appears on the auxiliary display.

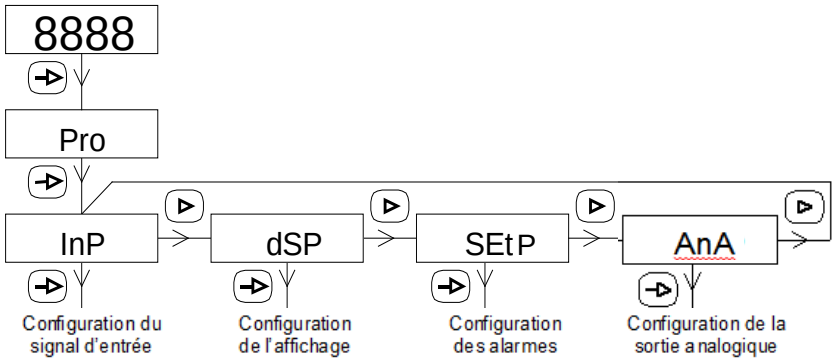
2° Use the ▷ key to select the module to be programmed ; the various modules are identified by a name.

3° Use the → key to validate the selected module and the →, ▷ and △ keys to program the various lines.

After programming a module, the indicator stores the modifications and displays the [StorE] message during the save operation.

4° When applicable, program the other modules.

## Block Diagram of the Configuration Modules




## 1. Input Configuration

InP

This module's first phase allows you to select by using the ▷ key one of the various configuration submodules. It is identified by a name.

| | |
|---|---|
| ProC | Process Signal or voltage 200 VDC |
| tEMP | Pt100 Sensor or Thermocouple Signal |

### 1.1. Process Input

ProC

**Process Signal**

| | |
|---|---|
| - U - | Voltage Input |
| - A - | Current Input ± 0-20 mA **(*)** |

**(*)** No additional programming is required for current input

---

**Voltage Input Range**

| | |
|---|---|
| 10 U | Process 0 - 10 V |
| 200 U | Voltage 0 - 200 VDC |

### 1.2. Temperature Input

tEMP

**Signal Input**

| | |
|---|---|
| tC | Thermocouple |
| Pt | Pt100 **(*)** |

**(*)** No additional programming is required for Pt100 Input, we pass directly to the programming of the display unit..

---

**Thermocouple Type**

| | |
|---|---|
| - 1 - | Thermocouple J |
| - 2 - | Thermocouple K |
| - 3 - | Thermocouple T |
| - 4 - | Thermocouple N |

---

**Temperature unit and resolution**

| | |
|---|---|
| 1°C | Degree Celsius |
| 0.1°C | 1/10 degree Celsius |
| 1°F | Degree Fahrenheit |
| 0.1°F | 1/10 degree Fahrenheit |

---

**Display Offset**

| | |
|---|---|
| 00.0 | Value programmable from – 9,9 to + 99 display units, depending on resolution. |

The offset allows compensation of a specified discrepancy between actual value and the measured value.

## 2. Display Configuration

dSP

This module's first phase allows you to select by using the ▷ key one of the various configuration submodules. It is identified by a name.

Le nombre et le type d'option de configuration de l'affichage accessible est fonction du signal d'entrée sélectionné à l'étape précédente.

The number and type of configurable display options is depending on the input signal selected in the previous step.

**Process Input**

| | |
|---|---|
| SCAL | Keypad mode |
| tEAC | Teach mode |
| FiLt | Display stabilization filter |

---

**Temperature Input**

| | |
|---|---|
| FiLt | Display stabilization filter |

## 2.1. Keypad scaling mode

SCAL

| | |
|---|---|
| InP 1 | **Value of 1st measurement point** |
| 0000 | Value programmable from –9999 to 9999 |

---

| | |
|---|---|
| dSP 1 | **Value of 1st display point** |
| 0000 | Value displayed for the input signal value defined in the previous phase, programmable from –9999 to 9999 |

---

| | |
|---|---|
| | **Decimal point of DSP1** |
| 000.0 | Position of the decimal point for the DSP1 value defined in the previous phase |

---

| | |
|---|---|
| InP 2 | **Value of 2nd measurement point** |
| 0000 | Value programmable from –9999 to 9999 |

---

| | |
|---|---|
| dSP 2 | **Value of 2nd display point** |
| 0000 | Value displayed for the input signal value defined in the previous phase, programmable from –9999 to 9999 ; the position of the decimal point is fixed by the decimal point of the 1st display value |

## 2.2. Teach scaling mode

tEAC

| | |
|---|---|
| InP 1 | **Value of 1st measurement point** |
| 0000 | Value of the applied input signal is used |

---

| | |
|---|---|
| dSP 1 | **Value of 1st measurement point** |
| 0000 | Value displayed for the input signal value defined in the previous phase, programmable from –9999 to 9999 |

---

| | |
|---|---|
| | **Decimal point of DSP1** |
| 000.0 | Position of the decimal point for the DSP1 value defined in the previous phase |

---

| | |
|---|---|
| InP 2 | **Value of 2nd measurement point** |
| 0000 | Value of the applied input signal is used |

---

| | |
|---|---|
| dSP 2 | **Value of 2nd display point** |
| 0000 | Value displayed for the input signal value defined in the previous phase, programmable from –9999 to 9999 ; the position of the decimal point is fixed by the decimal point of the 1st display value |

## 2.3. Stabilization Filter

FiLt

| | |
|---|---|
| | **Filter Value** |
| 0 | Value programmable from 0 to 9 by the ▷ key |

The stabilization filter will balance fluctuations caused by instable input signals. The higher the filter parameter, the more delay in the display's reaction time. 0 means filter not enable.

## 3. Limit output configuration

SEtP

This module's first phase allows you to select by using the ▷ key one of the various configuration submodules. It is identified by a name.

When the PA406 is used as setpoint generator, the "in-out-diF" selection appears, otherwise you go directly to the selection of the "Hi-Lo-HiLo" operating mode.

---

Select with the key ▷ the operating mode of the limit value, associated with the setpoint generator, which is compared to the

| | |
|---|---|
| In | Value of input signal |
| out | Value of output signal |
| dIF | Absolute value of the difference value input signal - value output signal |

---

Select with the key ▷ the operating mode of the limit value.

| | |
|---|---|
| Hi | Mode High |
| Lo | Mode Low |
| HiLo | Mode High and Low |

## 3.1. Limit in mode Hi

| | |
|---|---|
| | **Limit value** |
| 0000 | Value programmable from –9999 to 9999 |

The relay output is activated for display value ≥ limit value and the display flashes.

---

| | |
|---|---|
| | **Relay output in resting state** |
| no | Normally open |
| nc | Normally closed |

---

| | |
|---|---|
| | **Operating mode** |
| dLY | Time delay |
| HYS | Hysteresis |

---

| | |
|---|---|
| | **Time delay or hysteresis** |
| 0000 | Configuration of time delay (dLY) from 0 to 99,9 s or hysteresis (HYS) from 0 to 9999 displayed units. |

## 3.2. Limit in mode Lo

| | |
|---|---|
| | **Limit value** |
| 0000 | Value programmable from –9999 to 9999 |

The relay output is activated for display value ≤ limit value and the display flashes.

---

| | |
|---|---|
| | **Relay output in resting state** |
| no | Normally open |
| nc | Normally closed |

---

**Operating mode**

| | |
|---|---|
| dLY | Time delay |
| HYS | Hysteresis |

---

**Time delay or hysteresis**

| | |
|---|---|
| 0000 | Configuration of time delay (dLY) from 0 to 99,9 s or hysteresis (HYS) from 0 to 9999 displayed units. |

### 3.3. Limit in mode HiLo

**Limit value SPHi**

| | |
|---|---|
| 0000 | Value programmable from –9999 to 9999 |

---

**Limit value SPLo**

| | |
|---|---|
| 0000 | Value programmable from –9999 to 9999 |

The relay output is activated for display value ≤ limit value SPLo and ≥ limit value SPHi, and the display flashes.

The value SPLo must be < the value SPHi ; otherwise the message Err is displayed when programming the limits.

---

**Relay output in resting state**

| | |
|---|---|
| no | Normally open |
| nc | Normally closed |

---

**Operating mode**

| | |
|---|---|
| dLY | Time delay |
| HYS | Hysteresis |

---

**Time delay or hysteresis**

| | |
|---|---|
| 0000 | Configuration of time delay (dLY) from 0 to 99,9 s or hysteresis (HYS) from 0 to 9999 displayed units. |

## 4. Analog Output 4-20 mA Configuration

Anout



### Output Evolution Range

| | |
|---|---|
| outH | **High Scale** |
| 00000 | The full output scale will be attained at this value defined between -9999 and 9999 |

---

| | |
|---|---|
| outL | **Low Scale** |
| 00000 | The output will start to evolve from this value defined between -9999 and 9999 |

---

| | |
|---|---|
| SEtG | **Setpoint generator 4-20 mA** |
| no | Generator disable |
| diMM | Generator controlled by the key ▷ et Δ **(*)** |
| ProG | Generator controlled by entering a value **(*)** |

**(*)** See chapter 5, 4-20 mA setpoint generator

## 5. Setpoint generator 4-20 mA

To generate, on the analog output, a setpoint 4-20mA controlled directly with the Up / Down keys or by a keyboard input. In this mode, the Process and Temperature inputs are not necessarily used.

### 5.1 Mode diMM

| | |
|---|---|
| SEtG | |
| diMM | Generator controlled by the key ▷ and Δ |

The key ▷ decreases the value of the analog output, the key Δ **i**ncreases the value of the analog output.

---

| | |
|---|---|
| dFLt | **Default value when the generator is activated** |
| LASt | Last value entered by the keys ▷ and Δ **(*)** |
| SEt | SEt value preprogrammed |
| 0000 | Value programmable from -9999 to 9999 and necessarily between the high and low limits defined for the evolution of the analog output |

**(*)** Last value not modified for at least 1 min.

### 5.2 Mode ProG

| | |
|---|---|
| SEtG | |
| ProG | Generator controlled by entering a value |

---

| | |
|---|---|
| dFLt | Last value entered by the keys ▷ and Δ **(*)** |
| LASt | SEt value preprogrammed |
| SEt | Value programmable from -9999 to 9999 and necessarily between the high and low limits defined for the evolution of the analog output |
| 0000 | Last value entered by the keys ▷ and Δ **(*)** |

**(*)** Last value not modified for at least 1 min.

---

***Procedure for entering the value in OPERATING mode:***

1° Press the key →▷, the message [Pro] appears.

2° Press the key ▷ to access at the modification

| | |
|---|---|
| 0000 | Value programmable from -9999 to 9999 and necessarily between the high and low limits defined for the evolution of the analog output |

3° Press the key →▷ to valid the value ant return to the operating mode.

---

***Keypad lock in setpoint generator mode***

It is possible to lock / unlock the keypad to avoid any change of the setpoint.

To do this, press the key →▷, the message [CodE] is displayed, then press the key ▷ for 5 sec to access the Loc / uLoc menu.

## 4. Limit programming

Limit programming does not relate to module configuration and can be performed at all times.

***Procedure***

1° Press the →▷ key ; the [PRO] message displays.

2° Press the Δ key to access the modification of the limit.

| | |
|---|---|
| | **Limit value Hi or Lo or SPHi** |
| 0000 | Value programmable from –9999 to 9999 |

3° Press the → key to access the modification of the third limit when mode HiLo is used.

| | |
|---|---|
| | **Limit value SPLo** |
| 0000 | Value programmable from –9999 to 9999. |

4° Press the → key to validate the programmed limits and quit the programming mode.

## 5. Programming Access Control

To prevent any unintentional modification of the indicator's programming, you may protect this programming :

- **Either Totally**.
  Once programming is locked, you can always access the various configuration modules to check the contents. In this case, the [DAtA] message will display instead of the [PRO] message if you enter the programming mode.
- **Or Partially**, by selecting the configuration modules to be locked. Once programming is locked, you can always access the various configuration modules to check the contents**.**

***Procedure***

1° Press and hold the → key for 3 sec ; the [CodE] message displays.

2° Enter the access code protecting the configuration module for programming access control. The factory access code is "**0000**". Use the ▷ and △ keys to enter the value.

3° The next step allows you to select, by using the ▷ key, one of the access control submodules. It is identified by a name.

| | |
|---|---|
| LiSt | List of modifiable modules and submodules |
| CHAn | Access code |
| VEr | Displaying the software version number |

LISt →

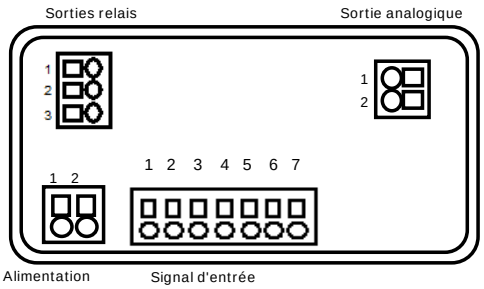
| | |
|---|---|
| totLC | **Locking programming** |
| 0 | Partially : the submodules can be can be configured independently |
| 1 | Totally : the indicator memorizes the option and leaves the programming mode |

| | |
|---|---|
| SEt | Limit output configuration |
| AnA | Analog output configuration |
| InP | Input configuration |
| dSP | Display configuration |
| MAH | Disabling MIN / MAX values on display |

CHAnG →

| | |
|---|---|
| 0000 | **Access Code**<br>If you modified the access code, the indicator stores this code and quits the programming mode. |

## 6. Connection




- **Supply voltage**

| Version | VAC | VDC |
|---|---|---|
| Connection 1 : | phase | - |
| Connection 2 : | neutral | + |

- **Input signal**

⇒ ***PROCESS***

| | |
|---|---|
| Connection 1 : | IN - / Sensor supply- |
| Connection 2 : | NC |
| Connection 3 : | NC |
| Connection 4 : | NC |
| Connection 5 : | 20mA IN+ |
| Connection 6 : | Sensor supply+24V |
| Connection 7 : | 10V / 200V IN+ |

⇒ ***Pt 100***

| | |
|---|---|
| Connection 1 : | Pt100 Common |
| Connection 2 : | Pt100 |
| Connection 3 : | NC |
| Connection 4 : | Pt100 |
| Connection 5 : | NC |
| Connection 6 : | NC |
| Connection 7 : | NC |

⇒ ***THERMOCOUPLE***

| | |
|---|---|
| Connection 1 : | Thermo - |
| Connection 2 : | Thermo + |
| Connection 3 : | NC |
| Connection 4 : | NC |
| Connection 5 : | NC |
| Connection 6 : | NC |
| Connection 7 : | NC |

- **Relay output**

| | |
|---|---|
| Connection 1 : | Normally NO |
| Connection 2 : | Changeover contact |
| Connection 3 : | Normally NC |

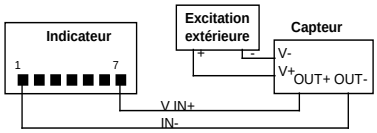
- **Analog output**

| | |
|---|---|
| Connection 1 : | - 4-20 mA |
| Connection 2 : | + 4-20 mA |

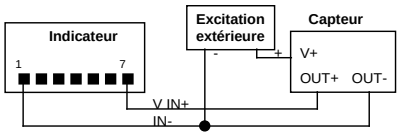
## *Wiring examples*

⇒ ***Input process voltage***

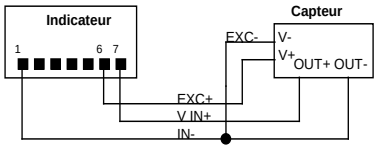
*4-wire sensor, external supply*




*3-wire sensor, external supply*

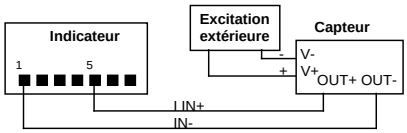



*4-wire sensor*

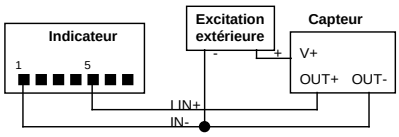



⇒ ***Input process voltage***

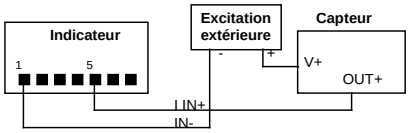
*4-wire sensor, external supply*



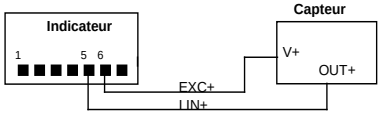

*3-wire sensor, external supply*




*2-wire 4-20 mA sensor, external supply*

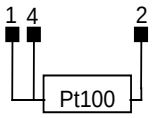



*2-wire 4-20 mA sensor*

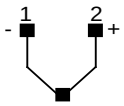



**Remark** : In the example below, sensor supply is by device current loop.

⇒ ***Input Pt100***




⇒ ***Input THERMOCOUPLE***




Thermocouple