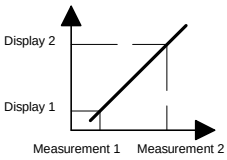
Sûreté des Procédés Industriels

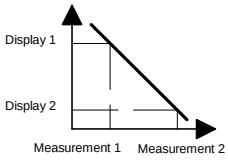
1. Operation

1.1. Display Range

By defining the display range the input signal may be scaled to obtain a readout in the units you want. To do this, you have to define 2 measurement/display points in order to set up a proportional relationship between the input signal's value and the display value.



Normal Scale

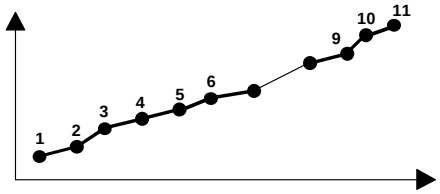


Inverse Scale

You should always select 2 measurement/display points at the signal's 2 evolving endpoints to obtain the best possible precision. You may enter the coordinates of these 2 endpoints either directly on the keyboard or via the "teach" mode option by mapping a value measured by the indicator to the displayed value.

Linearization by frames

If the input signal is not linear over the whole measurement range, it is possible, thanks to the linearization function, to define up to 11 frames or 12 measurement/display points.



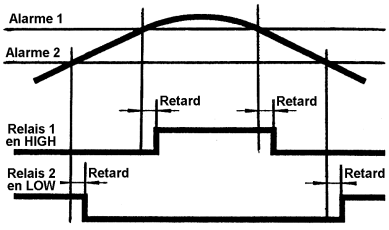
1.2. Alarm Outputs

The indicator has as an option 2 or 4 alarms with relay outputs or 4 alarms with PNP or NPN static outputs. Output activation is programmable in the HIGH level mode, that is, when the displayed value passes the threshold value in the increasing direction, or in the LOW level mode, that is, when the displayed value passes the threshold value in the decreasing direction.

The alarm operating mode is also programmable :

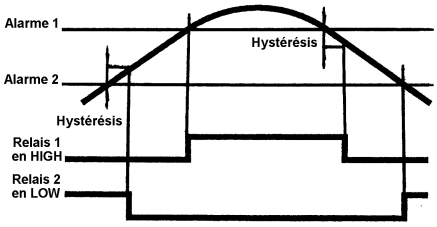
a) Action Delayed by Timeout

The timed-out delay acts on both sides of the alarm threshold value when the display value passes it in either the increasing or decreasing direction. This delay is programmable in seconds from 0 to 999.9.



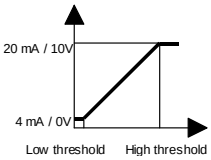
b) Asymmetrical Hysteresis

The output is immediately activated when the display value passes the alarm threshold value; on the other hand, the output is deactivated when it exceeds the hysteresis band programmed in display units from 0 to 9999.

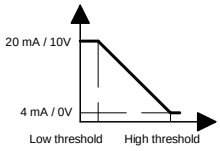


1.3. Analog Output 0-10V or 4-20mA

The indicator may be equipped as an option with an analog output which delivers a 4-20 mA or 0-10 V signal which is directly or indirectly proportional to the display's evolution.

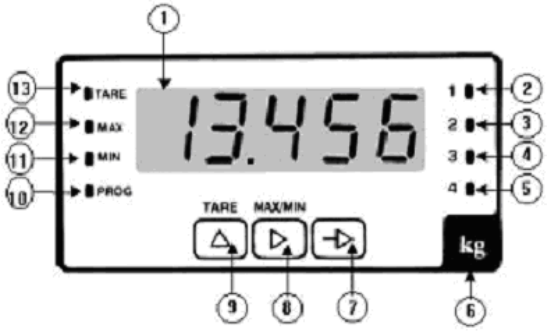


Normal Output



Inverse Output

2. Description of Keyboard and Display



N°	Designation	Function RUN	Function PROG
1	DISPLAY	Data display area	
2	LED 1	Alarm out 1 activation	Program. Alarm 1
3	LED 2	Alarm out 2 activation	Program. Alarm 2
4	LED 3	Alarm out 3 activation	Program. Alarm 3
5	LED 4	Alarm out 4 activation	Program. Alarm 4
6	LABEL	Stick the "units" label here	
7	KEY →	Enter in the PROG mode	Select the lines to be programmed
8	KEY ▷	Display the MIN and MAX values	Select the digit to be modified
9	KEY △	Record the displayed value as TARE	Increment the selected digit
10	LED PROG		Mode PROG activated
11	LED MIN	Value MIN displayed	
12	LED MAX	Value MAX displayed	
13	LED TARE	Value TARE displayed	

3. Consultation and Programming

CONSULTATION Mode

The indicator is in this mode at power-up. In this mode you may consult the recorded MIN and MAX values and the 4 alarm threshold values and initialize the TARE function.

MAX/MIN KEY

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 and holding the RESET key and then the MAX/MIN key. The MAX and MIN values are saved in case power is cut off.

TARE KEY

Pressing the TARE key at any moment allows you to reset to zero the display and store it as an offset of the input signal's value ; as soon as a "tare" (offset) has been made, the TARE LED is lit. You can reset to zero the TARE memory by pressing and holding the RESET key and then the TARE key. The TARE function may be inhibited by programming.

PROGRAMMATION Mode

The programming mode allows you to completely configure the indicator's operations. It is divided into 6 modules :

- Input configuration
- Display configuration
- Alarm outputs configuration
- Analog output configuration
- Serial link configuration
- Control inputs 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.

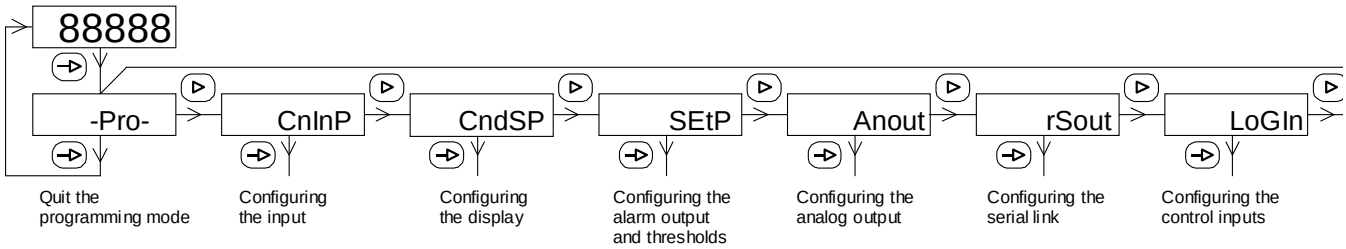
After programming a module, the indicator stores the modifications and displays the [StorE] message during the save operation.

4° Where applicable, program the other modules.

5° If necessary, lock the programming mode by using an access code. Refer to the chapter "Programming Access Control".

If programming is locked, you can always access the configuration modules to check the contents.

Block Diagram : Display of the Configuration Modules



The configuration modules for serial link, analog output and alarm outputs are only accessible if the indicator is equipped with the corresponding options.

1. Input Configuration

CnInP

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 Potentiometer
LoAd	Load-cell Signal
tEMP	Pt100 Sensor or Thermocouple Signal

1.1. Process Input

ProC

Process Signal	
10 U	Voltage Input ± 0-10 V or Potentiometer
20nA	Current Input ± 0-20 mA

1.2. Load-Cell Input

LoAd

Voltage Input Range	
15nU	± 15 mV
30nU	± 30 mV
150nU	± 150 mV

1.3. Temperature Input

tEMP

Signal Input

Pt100	Pt100 Sensor
-tC-	Thermocouple J, K, T

1.3.1 Pt100 Sensor Input

Pt100

Display Unit

-℃-	Degrees Centigrade
-℉-	Degrees Fahrenheit

Display Resolution

1°	Resolution in degrees
0.1°	Resolution in 1/10 of a degree

Display Offset

00.0	Value programmable from – 99 to + 99 display units

The display offset allows compensating for a difference, if any, between the real value and the measured value.

1.3.2 Thermocouple Input

tC

Thermocouple Type

-J-	Thermocouple J
-µ-	Thermocouple K
-t-	Thermocouple T

Display Unit

-℃-	Degrees Centigrade
-℉-	Degrees Fahrenheit

Display Resolution

0.1°	Resolution in degrees
1°	Resolution in 1/10 of a degree

Display Offset

00.0	Value programmable from – 99 to + 99 display units

The display offset allows compensating for a difference, if any, between the real value and the measured value.

2. Display Configuration

CndSP

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.

SCAL	Keyboard mode scale
tEACH	Learning mode scale
FILtP	Input and display filter
round	Display variation
brIGH	Display Luminosity
ModtA	TARE function

Remark :
For the signals Pt100 Sensor and Thermocouple, only the submodules « round » and « brIGH » are accessible.

2.1. Keyboard Display Range

SCAL

InP 1	**Value of 1st measurement point**
00000	Value programmable from –19999 to 99999

---

dSP 1	**Value of 1st display point**
00000	Value displayed for the input signal's value defined in the previous phase, programmable from –19999 to19999

Decimal point of DSP1

0000.0	Position of the decimal point for the DSP1 value defined in the previous phase

---

InP 2	**Value of 2nd measurement point**
00000	Valeur programmable de –19999 to 99999

---

dSP 2	**Value of 2nd display point**
00000	Value displayed for the input signal's value defined in the previous phase, programmable from –19999 to19999 ; the position of the decimal point is fixed by the decimal point of the 1st display point's value

Multiple linearization

If the input signal is not linear over the whole measurement range, it is possible, thanks to the linearization function, to define up to 10 frames or 11 measurement/display points.

To access the programming of the other measurement/display points, press the ⟶▷ key for 3sec after programming the display of the 2nd point in the previous stage. The new values of the measurement/display points are identified by the message [Inp-xx] and [dSP-xx], where xx is the point number (from 03 to 11).

InP xx	**Value measurement point xx**
00000	Value programmable from –19999 to 99999

---

dSP xx	**Value display point xx**
00000	Value displayed for the input signal's value defined in the previous phase, programmable from –19999 to19999

To interrupt the programming of measurement/display points and record the values which have already been entered, press the ⟶▷ key for 3sec after programming the display of point xx in the previous stage.

NOTE :
The values to be programmed for each measurement/display point must all be in either increasing or decreasing order.

2.2. Learning Display Range

-tEACH

tCH 1	**V Value of 1st measurement point**
00000	Value of the applied input signal is used

---

dSP 1	**Value of 1st display point**
00000	Value displayed for the input signal's value defined in the previous phase, programmable from –19999 to19999

Decimal point of DSP1

0000.0	Position of the decimal point for the DSP1 value defined in the previous phase

---

tCH 2	**Value of 2nd measurement point**
00000	Value of the applied input signal is used

---

dSP 2	**Value of 2nd display point**
00000	Value displayed for the input signal's value defined in the previous phase, programmable from –19999 to19999 ; the position of the decimal point is fixed by the decimal point of the 1st display point's value

Multiple linearization

If the input signal is not linear over the whole measurement range, it is possible, thanks to the linearization function, to define up to 10 frames or 11 measurement/display points. See the programming mode describes in chapter 2.1

2.3. Stabilization Filter

FILtP

Filter Value

0	Value programmable from 0 to 9 by the ▷ key

The stabilization filter allows damping the input signal in case of sudden process variations. Increasing the filter's value is translated by a longer display response time to an abrupt process variation.

2.4. Display Variation

round

Display Evolution

01	Variation in 1 unit increments
05	Variation in 5 unit increments
10	Variation in 10 unit increments

2.5. Display Luminosity

brIGH

Luminosity

-Hi-	High Luminosity
-Lo-	Low Luminosity

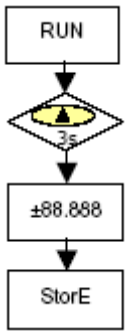
2.6. Tare function

ModtA

Tare function

tArE1	In this mode, the instrument, by pressing on the Δ key, stores the current displayed as TARE. By pressing this key during 3s., the instrument will set the tare value to zero.
tArE2	The TARE value to subtract to the displayed value is introduced manually with the keyboard **(*)**.
tArE3	The TARE value is introduced manually by programming the value with the keyboard **(*)**.

Example : Programmed value = 100



Mode Tare2

Display value = 1000 before programming.
Display value = 1000 -100 = 900 after value programming.

Mode Tare3

Display value = 1000 before programming.
Display value = 100 after value programming.

3. Alarm 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.

SEt1	Alarm Setpoint n°1
SEt2	Alarm Setpoint n°2
SEt3	Alarm Setpoint n°3
SEt4	Alarm Setpoint n°4

Remark :

If the indicator is equipped with the 2 relay outputs option, you may set parameters only in the submodules n°1 a nd n°2.

3.1. Alarm Setpoint n°1

SEt 1

Using the Alarm Setpoint

-on-	Alarm activated
-oFF-	Alarm deactivated ; in this case the following phases are not accessible

---

Alarm Value

00000	Programmable from –19999 to 19999

Assigning the Alarm Setpoint

nEt	Test the measurement + TARE
GroS	Test the measurement without TARE

Activating the Alarm Setpoint

-HI-	Activate the out at the HIGH level
-Lo-	Activate the out at the LOW level

Operating Mode

-dLY-	Action delayed by timeout
-HYS-	Hysteresis

Configuration Value

00000	Programming the delay (dLY) from 0 to 99 sec or hysteresis (HYS) in display units

---

Display Colour when activating the Alarm

no CH	The display colour is not changed
ALArM	The display colour is red
ALArM	The display colour is green
ALArM	The display colour is orange

3.2. Alarm Setpoint n°2, 3 and 4

The programming is the same as for Alarm Setpoint n°1 .

4. Analog Output Configuration

Anout

Output Evolution Range

outHI	**High Scale**
00000	The full output scale will be attained at this value defined between -19999 and 19999

---

outLo	**Low Scale**
00000	The output will start to evolve from this value defined between -19999 and 19999

5. Serial Interface Configuration

rSout

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.

bAud	Transmission rate
trAnS	Protocol Selection
dLY	Response Time **(*)**

(*) These configuration submodules do not appear with the RS232 serial link option.

5.1. Transmission Rate

bAud

Transmission Rate

1200	1200 bauds
2400	2400 bauds
4800	4800 bauds
9600	9600 bauds
19200	19200 bauds

Adr	**Indicator Address**
01	Value between 01 and 99

5.2. Communication Protocol

trAnS

Communication Protocol

Prt 1	ASCII
Prt 2	ISO 1745
Prt 3	MODBUS (RTU)

5.3. Serial Interface Response Time

dLY

Response Send Time

1	Delay of 30 ms
2	Delay of 60 ms
3	Delay of 100 ms

6. Control Input Configuration

LoGIn

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.

InP-1	Control Input Connector pin 2
InP-2	Control Input Connector pin 3
InP-3	Control Input Connector pin 4

6.1. Control Input Connector pin 2

InP-1

Function Number

1	Value between 00 and 15

6.2. Control Input Connector pin 3

InP-2

Function Number

2	Value between 00 and 15

6.3. Control Input Connector pin 4

InP-3

Function Number

6 Value between 00 and 15

LIST OF AVAILABLE FUNCTIONS

N°	Description	(*)
00	Input deactivated	-
01	TARE **(**)**	F
02	Reset TARE **(**)**	F
03	Display the MAX value	N
04	Display the MIN value	N
05	Reset the MAX or MIN value	F
06	HOLD the display	N
07	Print the measure without TARE	F
08	Print the measure + TARE	F
09	Print the TARE	F
10	Send the last 4 digits on the Serial Interface, every second on level input N	F/N
11	Change the Display Luminosity	N
12	Display the Alarm Setpoint	N
13	Dummy Setpoints if the Alarms are nonexistent	N
14	Print the MAX value	F
15	Print the MIN value	F

(*) Function activated on Level - N or on Edge – F
(**) Only in mode Tare1 and Tare3

After selecting a Print function, the indicator displays the option “Time and Date Printout”.

tIME **Time and Date Printout**
oFF Printing deactivated
on Printing activated

When a print order is given on one of the control inputs, the indicator may or may not add to the frame sent the "Time and Date Printout" command **<ESC>H**. This command should only be added if the printer could process it.

4. Programming the Alarm Setpoints

This programming is independent of the programming of the configuration modules ; you may carry it out at any moment.

Procedure

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

2° Press the Δ key to access the modification of the first Setpoint.

Alarm n°1 ☞ LED 1 lit

00000 Value of Setpoint n°1, modified with ▷ and Δ keys.

3° Press the → key to access the modification of the second alarm Setpoint.

Alarm n°2 ☞ LED 2 lit

00000 Value of Setpoint n°2, modified with ▷ and Δ keys.

4° Press the → key to access the modification of the third Setpoint.

Alarm n°3 ☞ LED 3 lit

000000 Value of Setpoint n°3, modified with ▷ and Δ keys.

5° Press the → key to access the modification of the fourth alarm Setpoint.

Alarm n°4 ☞ LED 4 lit

000000 Value of Setpoint n°4, modified with ▷ and Δ keys.

6° Press the → key to validate the programmed Setpoints 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 configuratio n module for programming access control. The factory access code is "**0000**". Use the ▷ and Δ 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
CHAnG Access code
CoLor Display Colour

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

SEt1 Alarm Output Configuration n°1
SEt2 Alarm Output Configuration n°2
SEt3 Alarm Output Configuration n°3
SEt4 Alarm Output Configuration n° 4
InPut Input Configuration
dISP SCAL, FILtP, round Configuration
Anout Analog Output Configuration
rSout Serial Interface Configuration
LoGIn Control Input Configuration

tArE	Tare key Configuration
SPUAL	Alarm Setpoints Programming

CHAnG

- - - - **Access Code**

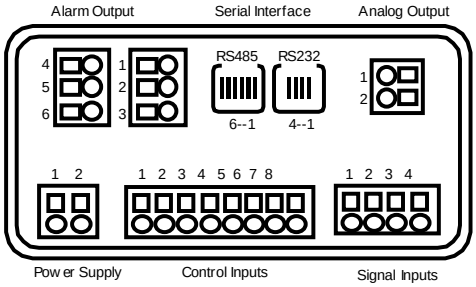
If you modified the access code, the indicator stores this code and quits the programming mode.

CoLor

Display Colour

run	Run mode
Pro	Programming mode

6. Connection



- **Power Supply**

Version	VAC	VDC
Terminal 1 :	phase	-
Terminal 2 :	neutral	+

- **Signal Inputs**

⇒ ***PROCESS Input***

Terminal 1 :	Excitation -
Terminal 2 :	Excitation +24V
Terminal 3 :	Excitation +5V or +10V
Terminal 4 :	NC
Terminal 5 :	I IN +
Terminal 6 :	V IN +
Terminal 7 :	NC
Terminal 8 :	IN -

⇒ ***LOAD-CELL Input***

Terminal 1 :	Excitation -
Terminal 2 :	NC
Terminal 3 :	Excitation +5V or +10V
Terminal 4 :	NC
Terminal 5 :	NC
Terminal 6 :	NC
Terminal 7 :	mV +
Terminal 8 :	mV -

⇒ ***Pt 100 Input***

Terminal 1 :	NC
Terminal 2 :	NC
Terminal 3 :	NC
Terminal 4 :	Pt100
Terminal 5 :	NC
Terminal 6 :	NC
Terminal 7 :	Pt100
Terminal 8 :	Pt100 Common

⇒ ***THERMOCOUPLE Input***

Terminal 1 :	NC
Terminal 2 :	NC
Terminal 3 :	NC
Terminal 4 :	NC
Terminal 5 :	NC
Terminal 6 :	NC
Terminal 7 :	Thermo +
Terminal 8 :	Thermo -

⇒ ***POTENTIOMETER Input***

Terminal 1 :	Excitation -
Terminal 2 :	NC
Terminal 3 :	Potentiometer HI
Terminal 4 :	NC
Terminal 5 :	NC
Terminal 6 :	Potentiometer middle
Terminal 7 :	NC
Terminal 8 :	Potentiometer LO

- **Analog Output**

Terminal 1 :	- 4-20 mA / 0-10 V
Terminal 2 :	+ 4-20 mA / 0 V

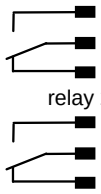
- **Serial Interface**

Interface	RS 232	RS 485
Terminal 1 :	NC	---
Terminal 2 :	TxD	NC
Terminal 3 :	RxD	TR B
Terminal 4 :	GND	TR A
Terminal 5 :		GND
Terminal 6 :		---

- **Alarm Outputs**

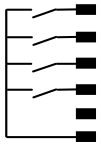
⇒ ***2-Relay Option***

Terminal 1 :	contact NO	relay 1
Terminal 2 :	common	
Terminal 3 :	Contact NF	
Terminal 4 :	Contact NO	relay 2
Terminal 5 :	common	
Terminal 6 :	Contact NF	



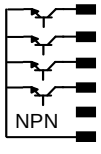
⇒ ***4-Relay Option***

Terminal 1 :	contact C1
Terminal 2 :	contact C2
Terminal 3 :	contact C3
Terminal 4 :	contact C4
Terminal 5 :	NC
Terminal 6 :	common



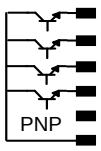
⇒ ***4-NPN Static Option***

Terminal 1 :	opto C1
Terminal 2 :	opto C2
Terminal 3 :	opto C3
Terminal 4 :	opto C4
Terminal 5 :	NC
Terminal 6 :	Common



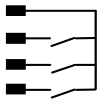
⇒ ***4-PNP Static Option***

Terminal 1 :	opto C1
Terminal 2 :	opto C2
Terminal 3 :	opto C3
Terminal 4 :	opto C4
Terminal 5 :	NC
Terminal 6 :	common



- **Control Inputs**

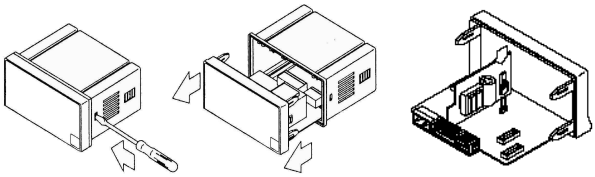
Terminal 1 : Common
Terminal 2 : TARE
Terminal 3 : RESET TARE
Terminal 4 : HOLD



The functions that are associated with the control inputs are programmable. The factory configuration is given above. The use of the electrical inputs RESET, TARE and MAX/MIN is identical to the use of the keys on the keyboard. These inputs are optocoupled and the active logic level is 0.

Sensor Excitation 10 V

You can modify the 10 V excitation voltage to 5 V by setting a jumper inside the indicator.

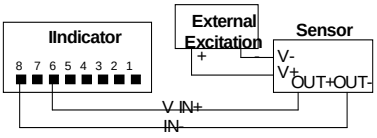


Jumper OFF = Excitation 10 V
Jumper ON = Excitation 5 V

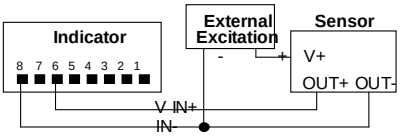
Connecting Examples

⇒ ***PROCESS Input in Voltage***

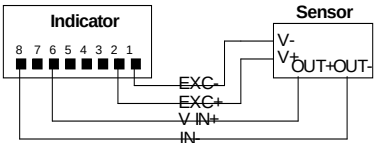
4-Wire Sensor and External Excitation



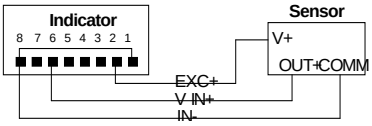
3-Wire Sensor and External Excitation



4-Wire Sensor

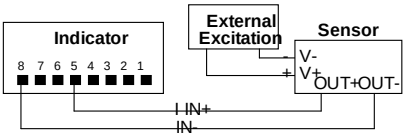


3-Wire Sensor

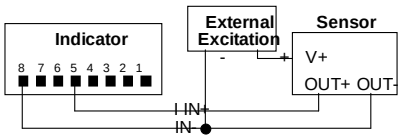


⇒ ***PROCESS Input in Current***

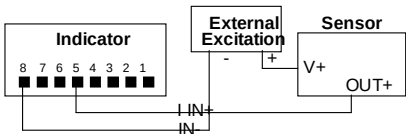
4-Wire Sensor and External Excitation



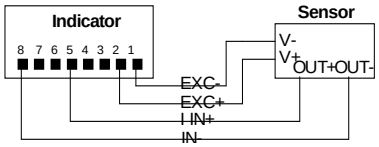
3-Wire Sensor and External Excitation



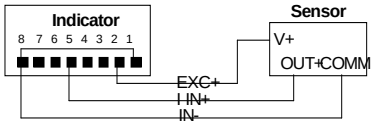
2-Wire Sensor and External Excitation



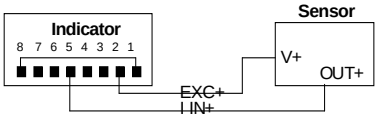
4-Wire Sensor



3-Wire Sensor

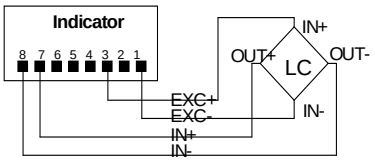


2-Wire 4-20mA Sensor



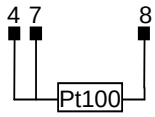
Remark : in this example, the indicator delivers the supply for the buckle of current.

⇒ ***LOAD-CELL Input***

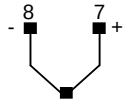


You can connect up to 4 load-cells in parallel without an external power supply. The sensor excitation voltage delivered by the indicator must be 5 V or 10 V / max. current 60mA.

⇒ ***PT100 Input***

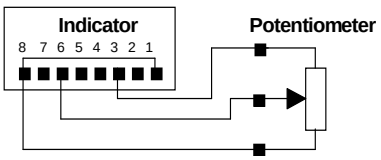


⇒ ***THERMOCOUPLE Input***



Thermocouple

⇒ ***POTENTIOMETER Input***



The sensor excitation voltage delivered by the indicator must be 10 V.