

BAMOCOR 105 E

pH / Rh - METER



STARTING UP NOTICE

VERSION 4.xx

This document get 16 pages from 105/20 to 105/35

BAMO MESURES

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pH / Rh-METER
BAMOCOR 105 E / M

105 M1 01 A

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BAMOCOR 105 E / M

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1 - TECHNICAL SPECIFICATIONS

Main power supply	: 230 V \pm 10 % 50-60 Hz 10 VA single phase. Others on request
Enclosure box	: Dimensions : 72 x 144 x 185 : Weight : 1100 g : Protection : IP 40 / IP 65 for front face : Material : Noryl, front face polycarbonat : Connection: Pull off terminal screw
Wall mounting box	: Dimensions : 338 x 222 x 85 : Weight: 1900 g : Protection : IP 65 : Material : ABS, font face polycarbonat : Connection: Terminal screw, input by plastic cable gland.
Température	: Stock : -10 à 70 °C : Fonctionning : -5 à 50 °C
Measuring range :	pH : from 0 up to 14 pH temperature : from 0 up to 100 °C
Captors	pH : electrode supply 58 mV / pH Temperature Pt 100 at 0 °C, 3 wires
Accuracy	pH : \pm 0,03 pH Temperature : \pm 0,3 °C
Display	: Measure-Menu-Temperature
Displayer	: 16 alphanumeric characters - H = 9.22 mm - Back lighted
Programming	: Membrane switching push-button keyboard - Password protected
Probe connection	: Plug S7 connection
Temperature compensation	: Automatic with Pt 100 probe, range 0 to 100 °C, Manual 0 to 100 °C
Output relays	: Volt free change over contact rated at 500 VA / 250 V / 2 A
Alarm sets	: 2 independent alarm sets, adjustable hysteresis from 0 to 100%, adjustable timer 0 to 9999 s Selectable on measure or temperature
Régulation impulsionnelle	: Cycle time adjustable from 0 up to 9999 s, Proportionnal band high and low adjustable Adjustable dead zone.
P.I.D. regulation mode	: Adjustable gain from 0 up to 9,999 % Integral and Derive adjustable from 0 up to 9999 secondes
Alarm of defect	: For too long injection, adjustable timer 0 to 9 999 s.
Measure analogic output	: 0/4 - 20 mA (max. 600), galvanic isolated.
Temperature output or P.ID.	: 0/4 - 20 mA (max. 600) proportional from 0 to 100°C or P.I.D. regulation mode. Galvanic isolated.
Simulation	: By menu, action on output measure, sets, and temperature or P.I.D. regulation
OPTIONS	
Communication	: Connection J-BUS - Slave binary mode RS 485 2-wire output, 2400 to 9600 baud
Data logger	: Record of average measure in the meantime of the programming. (Example : meantime is 1mn = 6 month of Record) Maximum is 348 000 records. Auto-reset of memory after data recovery.

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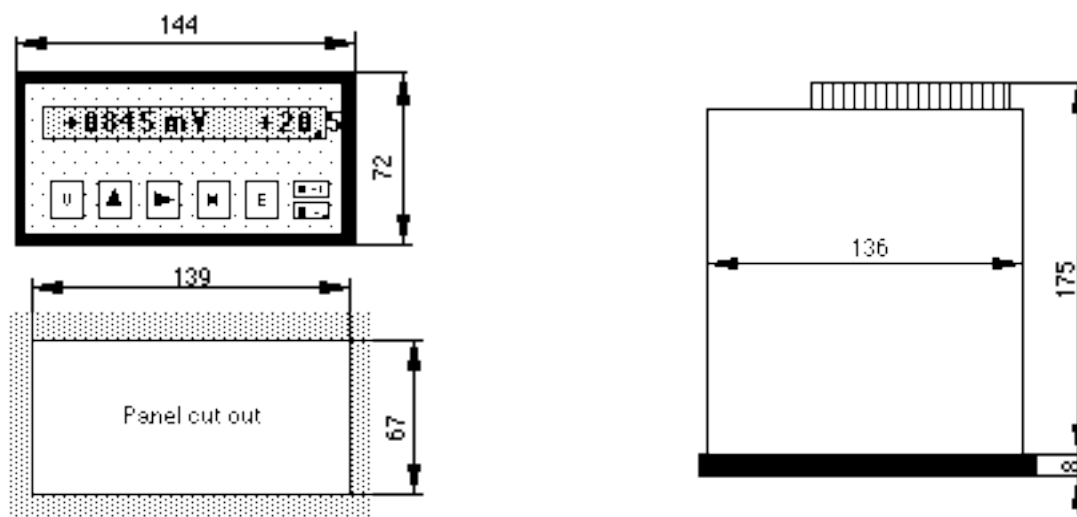
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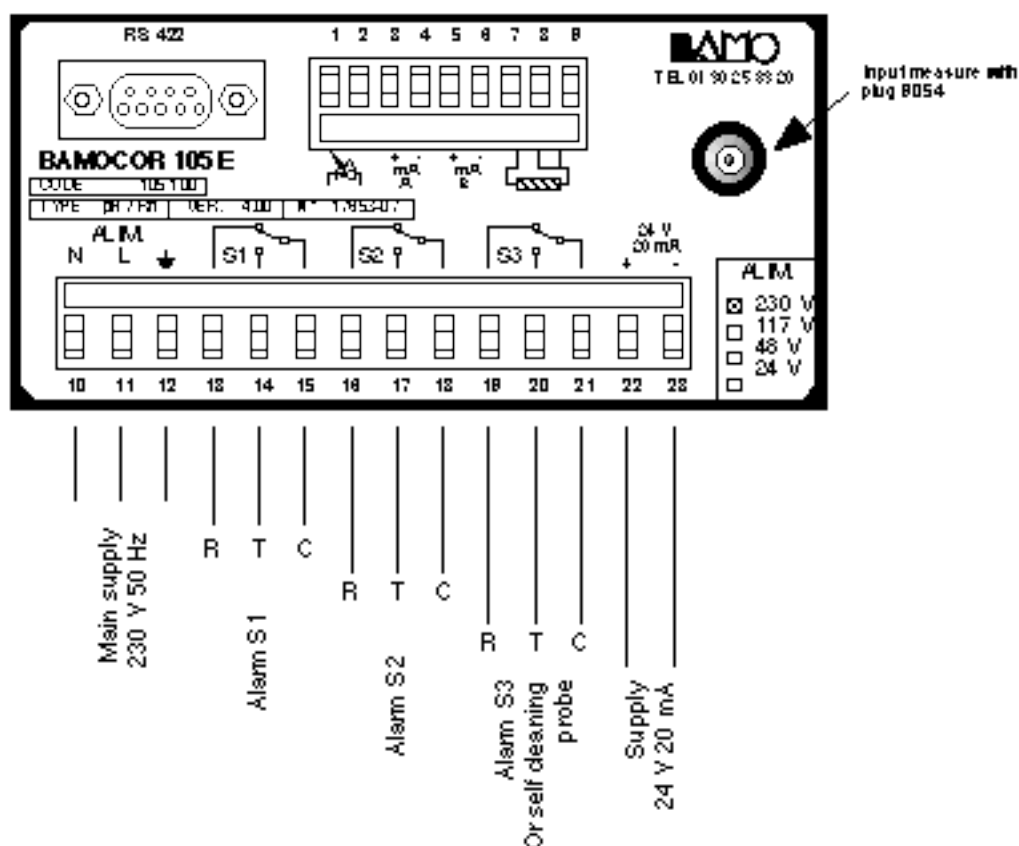
2 - DIMENSIONS

ENCLOSURE BOX



3 - WIRING CONNECTIONS

ENCLOSURE BOX



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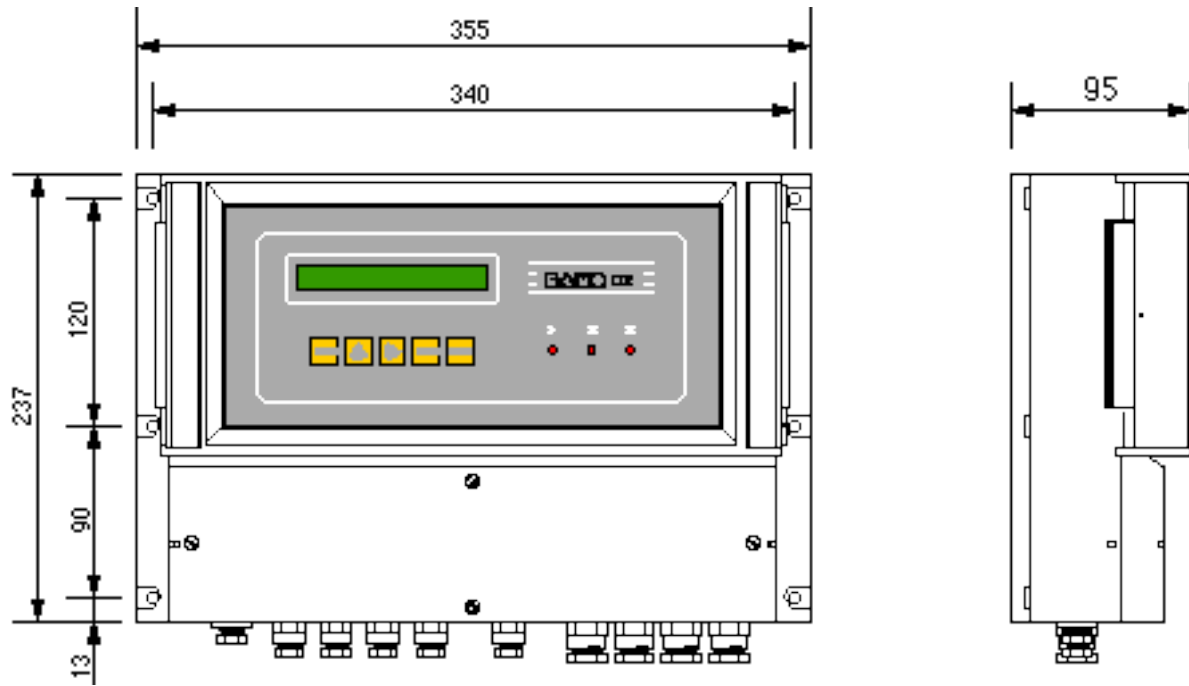
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WALL MOUNTING

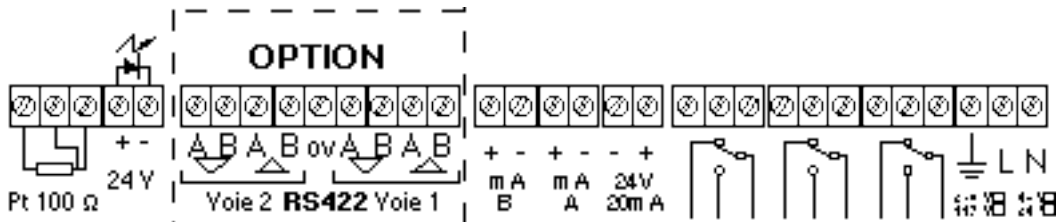


WALL MOUNTING

Take off the cable gland to introduce the plug 9054.



Terminal for plug 9054



Temperature probe

Stand by the PID regulation

Analogic output for temperature or P.I.D.

Analogic output for the measure

Loop power 24 V 20 mA

Alarm S1

Alarm S2

Alarm S3 or cleaning probe

Main supply

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4 - FRONT FACE

PUSH-BUTTON AND LEDS

16 alphanumeric characters
H = 9.22 mm - Back lighted

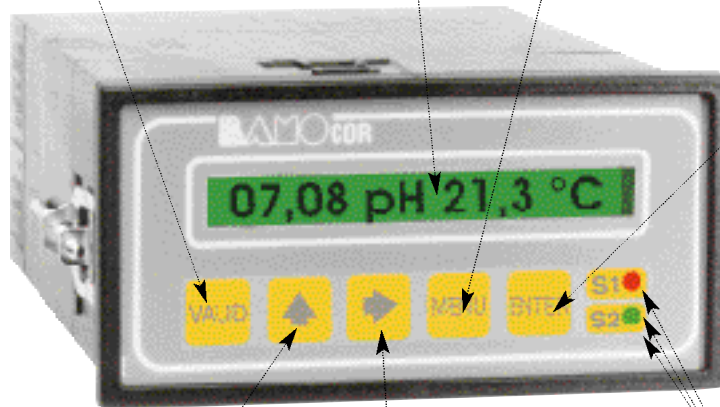
Key **VALID** write parameters on the EPROM when the displayer ask you :

VALIDATION ?

Take care, when you press this push-button, all the parameters are memorised. So if you are not sure of our manipulation do not press.

Key **MENU** change the part of programmation
At the last one, come back on the first.

Key **ENTER** change the step of one menu.
At the last step, come back to the first



Press \uparrow to change parameters of data capture :
- Numéric input :
 increase the flashing digit (loop 0 after 9).
- Reverse the choose Yes / No, Up/ Down,
 0-20 mA / 4 - 20 mA etc.

Leds **S1**, **S2** or **S3** display the output state of the relay. (Red : relay ON. No lighth : relay OFF, if flashing : temporisation).

Press \Rightarrow to flashing the next display to change the value.

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5 - MODE CONSULTATION / MODIFICATION

First, if you read this text it is because you can not read french. If it's true, it's the same for this BAMOCOR. So, start to read the explanation about enter into modification mode (§ 6.1.2) and go to the last step for change the language programmation. This BAMOCOR can speah French, English and Italian for the moment.

There is two mode to read the programmation :

- Consultation mode, all parameters can be read but can not be changed
- Modification mode, the user can adjust the most operationnal parameter (alarm, regulation, temperature ...), this mode is protected by a password come from the 4th last number of the serial number
(Ex : 12345-67. the password will be 4567)

6. LISTING of MENU

6.1 Consultation mode

6.1.1 Display / forcing measures

Display of measure and temperature in °C

07,01 pH +21,6°C

Press "ENTER"

IF the PID regulation is on

Display the output value in %

PID out. 12,25 %

if mode " MODIFICATION ", it is possible to forcing the PID regulation

* press " ENTER " : display

FORCED MEASURE

* press " ENTER " : display

07,01 pH +21,6°C

Change the measure value with \uparrow and \Rightarrow on the flashing display.

This modification is immediatly understand by the electronic and all other parameter.

(alarm, regulations, output mA...).

* press " ENTER " : display

FORCED PID out.

* press " ENTER " : display

08,63 pH 12,25 %

Change the measure value with \uparrow and \Rightarrow on the flashing display.

This modification is immediatly understand by the electronic and all other parameter.

(alarm, regulations, output mA...).

It is possible to forcing the PID regulation 4-20 mA output

if the PID regulation is ON and on MANUAL mode (See § 6.1.7)

* come back on the right measure by pressing " ENTER "

6.1.2 About BAMOCOR : soft version and serial number

* press " ENTER " : display = VERSION : 4.00

* press " ENTER " : display = SERIAL N° :

* press " ENTER " : display = 12345-67

Nota : the 4th last numbers are the password to come in the modification mode. (See §5).

6.1.3 - Choose consultation / modification, input password

Come in MODIFICATION mode

Press MENU, display

CONSULTATION

Press \uparrow , display :

MODIFICATION

Press ENTER , display :

CODE ? 0000

Input the password (see § 5) with keys \uparrow and \Rightarrow

Press ENTER

If wrong password, display:

ERROR

during 3 second

If it is the right password, display :

TIME : 30 mn !

The CONSULTATION mode come back automatiquely after

30 minutes (Come back MEASURES menu).

Press MENU to choose the data to change.

Password : to know the password see § 5.

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6.1.4 - ADJUST THE SET 1

To adjust the set 1

Press **ENTER** : display

Choose with \uparrow

Press **ENTER** : display

MEASURE = fontionning with the measure

TEMP. = Fontionning with the temperature

Choose with \uparrow

Press **ENTER** : display

HIGH = relay ON if the measure is upper the set

LOW = relay is ON if the measure is lower the set

Choose with \uparrow

Press **ENTER** : display

Value of the set S1 is ON

Choose with \uparrow and \Rightarrow

Press **ENTER** : display

Value of the set S1 is OFF

Choose with \uparrow and \Rightarrow

Press **ENTER** : display

With or without delay S1 for ON

Choose with \uparrow

Press **ENTER** : display

Time of the delay S1

Choose with \uparrow and \Rightarrow

Press **ENTER** : display

With or without delay S1 for OFF

Choose with \uparrow

Press **ENTER** : display

Time of the delay S1

Choose with \uparrow and \Rightarrow

Press **ENTER**, display :

Press **VALID** to save all data.

ALARM 1 ON (OFF)

ALARM 1 MEASURE (TEMP.)

ALARM 1 LOW (HIGH)

ON 12,00 pH

OFF 12,50 pH

DELAY UP ON (OFF)

TIME 0010 Sec

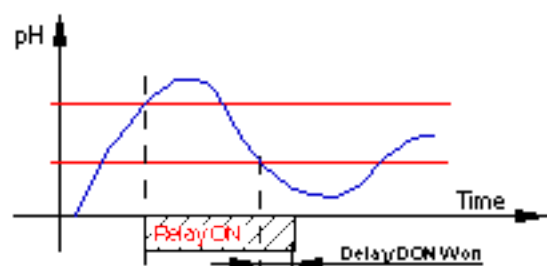
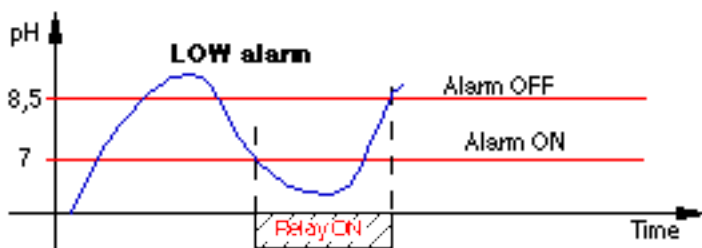
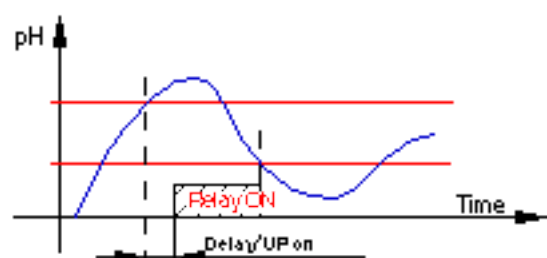
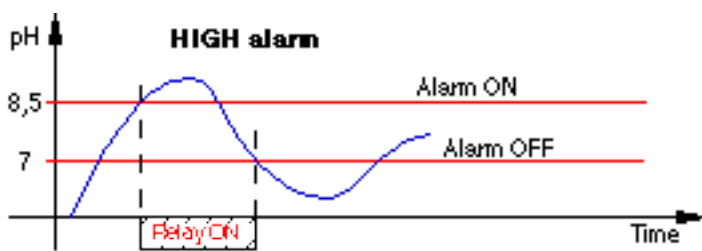
DELAY DOWN ON (OFF)

TIME 0060 Sec

SAVING ?

6.1.6 - ADJUST THE SET 2

same as before for set 1 (§ 6.1.4)



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6.1.6 - RELAY REGULATION

This mode is for a proportionnal regulation.

Press "ENTER"

If display is :

Goto **ADJUST ALARM 1** and **ADJUST ALARM 2** to turn OFF **ALARM 1 OFF / ALARM 2 OFF** (See § 6.1.4 and 6.1.5)

ON / OFF MODE

or

If display is :

BAMOCOR is on PID regulation mode.

Goto **REGUL. PID** and turn it OFF

REGULATION OFF (See § 6.1.7)

PID MODE

Now your are ready,

Press **ENTER**, display :

With \uparrow , turn it ON..

REGULATION OFF (ON)

You turn it ON, Press **ENTER**, display :

With \uparrow and \Rightarrow , Choose your set point.

SET VAL 08,50 pH

Press **ENTER**, display :

With \uparrow and \Rightarrow , Choose the cycle time.

This cycle time is directly fonction of the process.

T. CYCLE 0010 Sec

Press **ENTER**, display :

With \uparrow and \Rightarrow , Choose the value for the high proportionnal bande

HIGH PB 05,00 pH

Press **ENTER**, display :

With \uparrow and \Rightarrow , Choose the value for the low proportionnal bande.

LOW PB 05,00 pH

Press **ENTER**, display :

With \uparrow and \Rightarrow , Choose the value for the high Dead Zone

HIGH DZ 00,50 pH

Press **ENTER**, display :

With \uparrow and \Rightarrow , Choose the value for the low Dead Zone

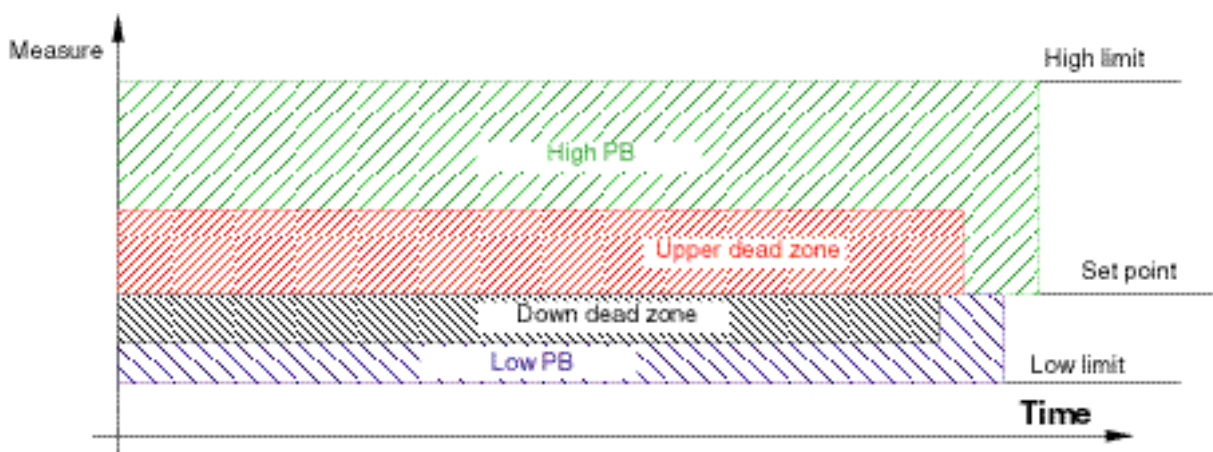
ZM Bsse 00,10 pH

Press **ENTER**, display :

Press **VALID** for saving datas.

SAVING ?

Important note. The output relay S1 is for the low PB and the relay S2 is for the high BP.

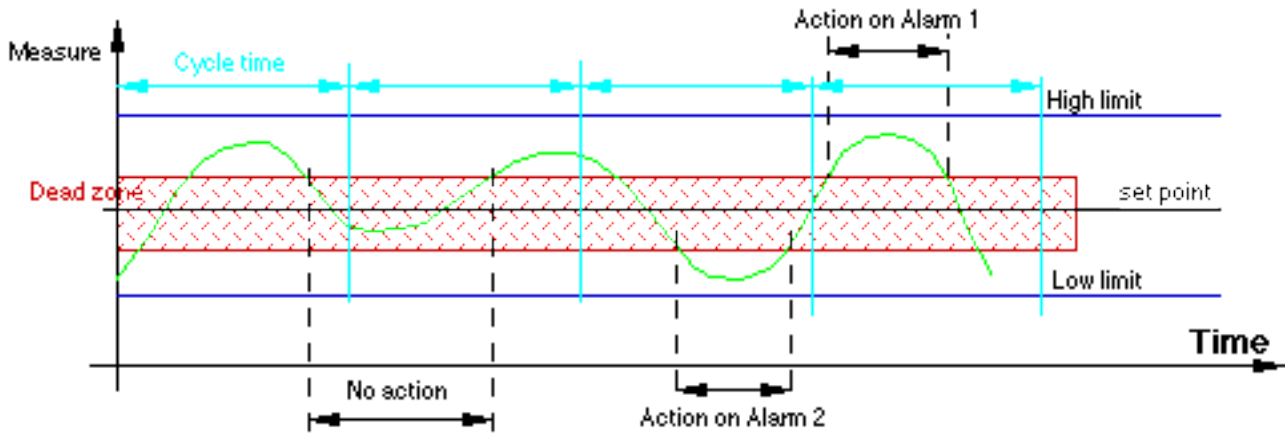


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Exemple :

For following data :

- Set point : pH 7
- Hiht DZ : 0,3 pH from 7 to 7,3 pH
- Low DZ : 0,7 pH from 7 to 6,3 pH
- High PB : 3 pH (so pH10 for high limit)
- Low PB : 1 pH (so pH 6 for low limit)

- Upper the high limit, so between ph 10 and 14, the pump is all time ON.
- Inside the ZM, so between 6,7 and 7,7 pH, the pump is OFF
- If the measure is upper than the DZ but lower than the limit, the pump will function proportionnaly from the step between the measure and the set point.

Cycle time = 10 s
Measure = 8,5

$$\text{Pump ON} = \frac{\text{Cycle time} \times (\text{Measure} - \text{Set point})}{\text{Proportionnal Bande}}$$

Caution: The minimum time for an action is 1 seconde

If the measure is M = 7,8 we can calculate :

$$\frac{10 \times (7,8-7)}{3} = 2,66 = 3 \text{ sec}$$

6.1.7 - REGULATION PID

This regulation mode is for PID action with analogic output in mA (0/20 or 4/20 mA).

Press **“ENTER”**

If display is :

PROPORTION. MODE

**BAMOCOR is on RELAY regulation mode.
Goto RELAY REGULATION and turn it OFF
REGULATION OFF (See § 6.1.6)**

Otherwise, display :

REGULATION OFF (ON)

With \uparrow , turn it ON.

ON mode,

Press **ENTER**, display :

REGUL. MANU (AUTO)

With \uparrow , make your choice.

Nota : if MANU is selected, the output can be forced by the operator (see § 6.1.1)

IF régulation PID is with AUTO mode :

Press **ENTER**, display :

SET VAL 08,50 pH

With \uparrow and \Rightarrow , change the value for set point.

Press **ENTER**, display :

GAIN 4,800

With \uparrow and \Rightarrow , change the gain

(see § 6.1.7.1 the description to choose datas for a good PID regulation).

Press **ENTER**, display :

Ti : 0150 Sec

With \uparrow and \Rightarrow , change the integral value.

Press **ENTER**, display :

Td : 0012 Sec

With \uparrow and \Rightarrow , change the derived time value.

Press **ENTER**, display :

ACID INJECTION
(BASE INJECTION)

With \uparrow , Choose the PID action

depend of the correcter liquide choosed.

Press **ENTER**, display :

OUTPUT 4/20 mA (0/20 mA)

With \uparrow , Choose the output signal. Depend of the actuator.

Press **ENTER**, display :

SAVING ?

Press **VALID** for saving data.

Nota : If this regulation mode is turned OFF, the analogic output is assigned to the temperature measure output (see § 6.1.9).

To stand by the PID regulation, input 24 V= 20 mA on terminal 4 (+) and 5 (-).

6.1.7.1 - METHODE TO ADJUST THE PID PARAMETERS

In order to fixed the starting value for PID regulation, we recommend to used the Ziegler - Nichols open loops methode. Proceed as following :

* Put a reccorder on the analogic measure output or write the reading measure value and draw the measure curve fonction of the time.

* Turned on the PID regulation with MANU mode (§ 6.1.7).

* Keep the measure stable near the set point with forced mode. (see § 6.1.1)

* Apply an echelon Cde of 10 % on the analogic output.

Exemple : If the value is 30,00 % , apply 40,00 %

* Note on the evolution curve the time T0 corresponding to this echelon.

* Found on the curve times t and T as :

t = delay of reponse

T = Time regarding % of variation m from the measure to the commande Cde, (m = Cde).

This value can be found on the slope.

* Change the PID data as following caculation:

Regulation	Gain	Ti(s)	Td(s)
PID	$1,2 \times T/t$	$2 \times t$	$0,5 \times t$
PI	$0,9 \times T/t$	$3,3 \times t$	0
P	T/t	9999	0

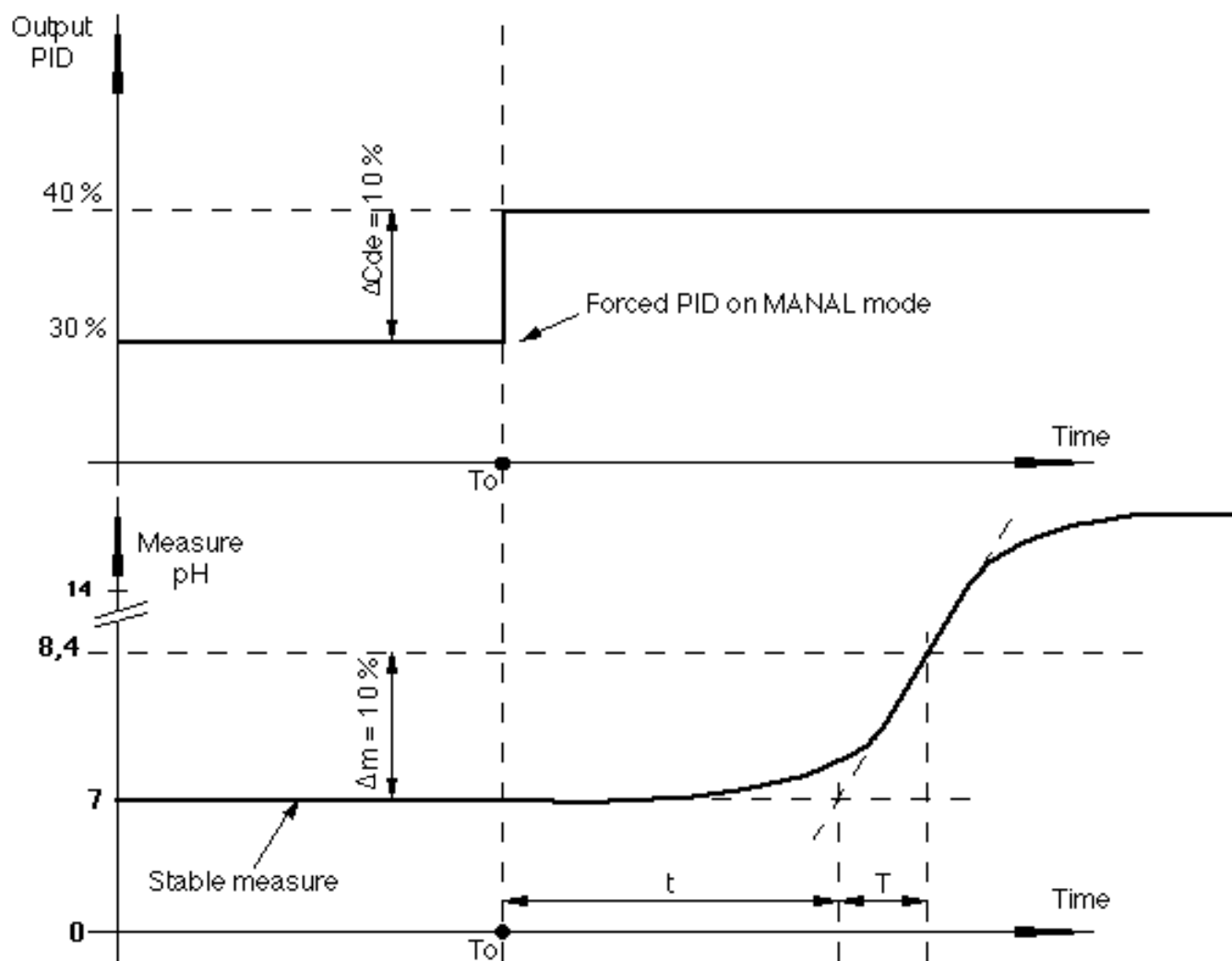
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6.1.8 - OUTPUT mA pH

Programming the measure analogic output.

Press **ENTER** : display
value for 20,00 mA output

HIGHER 14,00 pH

With \uparrow and \Rightarrow , change the value

Press **ENTER** : display
value for the beginning of the output 0,00 mA or 4,00 mA

LOWER 00,00 pH

With \uparrow and \Rightarrow , change the value

Press **ENTER** : display
Choose the output signal 0,00 mA or 4,00 mA

OUTPUT 4/20 mA (0/20 mA)

With \uparrow , change the value

Press **ENTER**, display :

VALIDATION ?

Press **VALID** to save the change.

6.1.9 - Output mA temperature

If PID REGULATION is turned ON, this step can not be displayed.

Press **ENTER** : display
value for 20,00 mA output

HIGHER +160,0°C

With \uparrow and \Rightarrow , change the value

Press **ENTER** : display
value for the beginning of the output 0,00 mA or 4,00 mA

LOWER +000,0°C

With \uparrow and \Rightarrow , change the value

Press **ENTER** : display
choix du type de sortie de 0,00 mA ou 4,00 mA

OUTPUT 4/20 mA (0/20 mA)

With \uparrow , change the value

Press **ENTER**, display :

SAVING ?

Press **VALID** to save the change.

For stand by the PID regulation, input 24 V= 20 mA on terminal 4(+) and 5(-)

6.1.10 - Temperature, choose automatic / manual

Parameter of the temperature compensation

Press **ENTER** : display

MEASURE : MANUAL (AUTO)

MEASURE AUTO : The measure is done by the temperature
probe Pt 100 like compensator 9090.

With \uparrow , change the value

MESURE MANU : The temperature value is manually input on the next step.

Press **ENTER** : display

FLUID T. +020,0°C

This can appear only if you select MANUAL

Enter manually the temperature value

With \uparrow and \Rightarrow , change the value

Press **ENTER**, display :

SAVING ?

Press **VALID** to save the change.

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6.1.11 - FORCED RELAY, S1 and S2

This fonction can help you to controle the good fonctionning of your wiring connection of S1 and S2 and so on.

Press **ENTER**, display :

ALARM 1 OFF

Press **↑** , display :

ALARM 1 ON

S1 turn ON and led is red

same for ALARM 2

6.1.12 - Adjust alarm. (relay S3)

This fonction is a security of too long injection on alarm S1 and S2. If there is no more acide on you tank the pH will not be corrected and the alarm will be turn in fonction.

Can be adjusted only with RELAY REGULATION.

If cleaning probe is turned ON, display :

CLEANING ON

Goto the CLEANING PROBE step an turned it OFF (see §6.1.13)

Press **ENTER**, display :

WITHOUT ALARM (WITH)

With **↑** , to choose WITH:

Press **ENTER**, display :

TIME S1 0005 Sec

With **↑** and **⇒** , choose the time of maximum fonction for S1

Press **ENTER**, display :

TIME S2 0005 Sec

With **↑** and **⇒** , choose the time of maximum fonction for S2

Press **ENTER**, display :

SAVING ?

Press **VALID** to save the changing data

6.1.13 - Cleaning probe (relais S3)

In order to not perturbed the process, during this cleaning the measuring outputs are fixed. This fixing is avable for the cleaning time more one lite time delay. This delay is to give time for the cleaning liquide to disperse itself before restart the regulation.

If ADJUST ALARM is turned ON :

ALARM MODE

Goto the ADJUST ALARM and turned it OFF (see §6.1.12)

Press **ENTER**, display :

CLEANING NO (YES)

With **↑** , change to YES:

Press **ENTER**, display :

PERIOD 1800 Sec

With **↑** and **⇒** , choose the periode of the cleaning.

Press **ENTER**, display :

TIME 0010 Sec

With **↑** and **⇒** , chosse how long time the cleaning is.

Press **ENTER**, display :

DELAY 0015 Sec

With **↑** and **⇒** , Choose the delay time to restart the regulation mode.

Press **ENTER**, display :

SAVING ?

Press **VALID** to accept data.

6.1.14 - CLOCK (logger option)

If this step displaying, you have the logger option so :

Press **ENTER**,display the current date

26/01/1998

Press **ENTER**, display the current time

15:36:22

Press **ENTER**, display

ADJUSTING NO (YES)

If the datas are not good and if you want to change then

select yes with **↑**

Will appear, years, month, date, hours and minutes.

Press **ENTER**, display :

SAVING ?

Press **VALID** to accept the new date.

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6.1.15 - RECORD PERIOD. (logger option)

This is to configure the period of saving data into the EEPROM. If you select 2 mn for example, the BAMOCOR will record every 2 mn the average of the measure during the paste 2 mn.

Press **ENTER**, display
Press **ENTER**, display
With \uparrow and \Rightarrow change the period.
Press **ENTER**, display
Press **VALID** pour mémoriser la période choisie.

BETWEEN 1 AND 60 mn
PERIOD : 0001 mn

SAVING ?

6.1.16 - Serial communication

J-BUS calibration.
Press **ENTER**, display
This can not be change. It is the size of one word

DATA : 8 bits

Press **ENTER**, adisplay
Transmission speed
With \uparrow change the value.

SPEED 2400 Bds (4800, 9600)

Press **ENTER**, display
With \uparrow change the value.

PARITY EVEN (ODD, NO)

Press **ENTER**, display
With \uparrow change the value.

STOP Nb.1 (1,5, 2)

Press **ENTER** : display
Station number from 1 up to 247
With \uparrow and \Rightarrow , change the value.

STATION 0123

Press **ENTER**, display
Press **VALID** to save all J-BUS datas

SAVING ?

6.1.17 - Language: Choose from French / English / Italien

Choose the language for the different menu

Press **ENTER** : display

ENGLISH (ITALIAN, FRENCH)

Choose your language with \uparrow .

Press **ENTER**, display :

SAVING ?

Press **VALID** to confirm your choice

6.1.18 - pH / RH CHOICE

This is to choose the kind of measure BAMOCOR done. pH or ORP

Press **ENTER** : display

pH - METER (RH - METER)

With \uparrow change the function .

Press **ENTER**, display :

SAVING ?

Press **VALID** to accept data

BAMO MESURES

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pH / Rh-METER
BAMOCOR 105 E / M

21/07/99

105 M1 01 A

MES

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6.2 - MODIFICATION MODE ONLY

6.2.1 - Adjust electrode.

This step is located between TEMPERATURE and FORCED RELAY and only appear if you are in MODIFICATION mode. You can not see it with CONSULTATION mode

First, change the TEMPERATURE mode to MANUAL at 20 °C.

This function is to calibrate the measuring electrode.

In order to not perturbed the process, during the calibration the measuring outputs are fixed. This fixing is available for the calibration time more one lite time delay. This delay is to give time for the operator to replace the probe on his right place before restart the regulation.

Press **ENTER**, display

Input the electrode on the standard solution pH 7,00 (Réf 9011. Green color).

Do not forget to take off the small transparent cap on the electrode, you can throw it away, his fonction stop here..

STANDARD 7,00 pH

Press **ENTER**, display

Keep the electrode during 5 mn to be sure that the measure is stable.

The more the ASYMetrie is small, the more the electrode is good.

ASYM. +0,05 pH

Press **ENTER**,display

If the measure of asymetrie is too high

- Take care of the solution pH 7,00

- Take care the wiring connection

- Change the electrode.

ERROR

If the measure is correct display

Clean the electrode with water, TAKE CARE, **never** dry it with a rag. pH 4,00 (Réf 9012. Red) or pH 9 (Réf 9013. Blue).

Change the display value for the right solution value with \uparrow and \Rightarrow (For a good calibration, the standard solution have to be choosed in fonction of the process. If it is acid, choose pH 4 and if it is basic choose pH 9.).

STAND. x,xxx pH

Press **ENTER**, display the slope of the electrode

Press **ENTER**, display

If the gain is too low.(<70%)

- Take care of the solution is the good one..

- Change the electorde

SLOPE xxx,x %

ERROR

If the gain is normal (Between 110 and 70%)

- input the delay value. You have to keep the time necessary to the operator to make the calibration and replace all the systeme in place.

DELAY 0300 Sec

Press **ENTER**, display :

Press **VALID** to save the new calibration.

SAVING ?

Put back the temperature measure a the same than before.

6.2.2 - J-BUS table

This table is give only if necessary.

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