Regolatore-Programmatore Multi-ingresso, Multi-uscite, Multi-funzioni

Serie **QP**

Programmer Process Controller Multi-input, Multi-output Multi-functions

Series **QP**

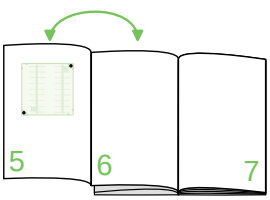
ISTRUZIONI PER L'USO
INSTRUCTION MANUAL
M.I.U. QP - 1/96.06
Cod. J30 - 304 - 1AQP-IE

ASCON spa

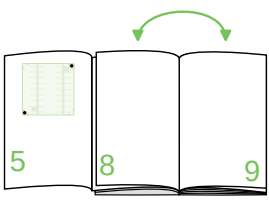
E

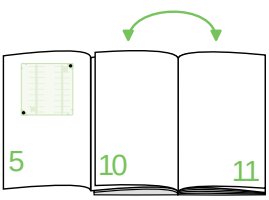
READING INSTRUCTION

To better read and understand this manual please note the following:

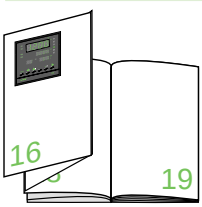


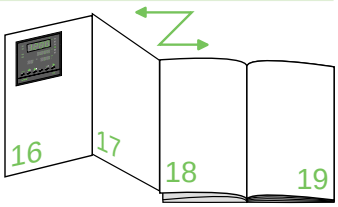
Electrical wiring



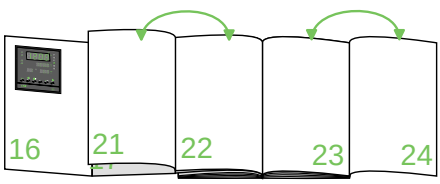


Configuration

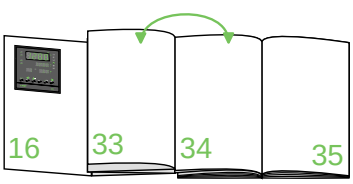




Parameterization



Programmable Set Point



Thank you for choosing an ASCON controller.

The QP series controllers can be used as programmer controllers. They are available with two main versions: the first with "Standard Set point" (Local/Rem/3 memorized S.p.), the second with "Programmable Set point" as an option (e.g. QP-3…1)
They are fitted with AUTO-TUNE, as auxiliary for sistem start-up, and serial communications for introduction into a distributed control network.
They are complete because all possible variables are always present.
Configuration of the instrument permits determination of the operating mode according to the required application.

1.1 Identification of model

Model code : QP

Model code: **QP**

Power supply

Serial communications RS485

Auxiliary analog output Y6

Programmable Set point

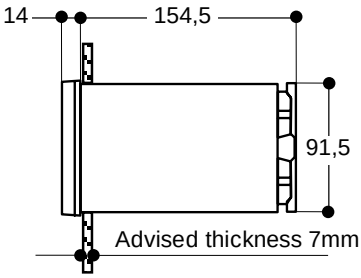
Power supply	
100…240V 50/60 Hz	3
16…28V 50/60 Hz and 20…30V dc	5

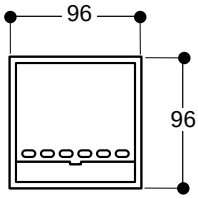
Serial communications (option)	
None	0
RS485 Modbus - Jbus	3

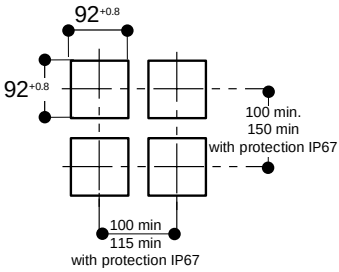
Y_6 auxiliary output (option)	
None	0
0/4…20mA, 0/1…5V, 0…10V	1

Programmable Set point (option)	
None	0
Provided (16 Prgm.s, 255 Segm.s)	1

2.1 Overall dimensions





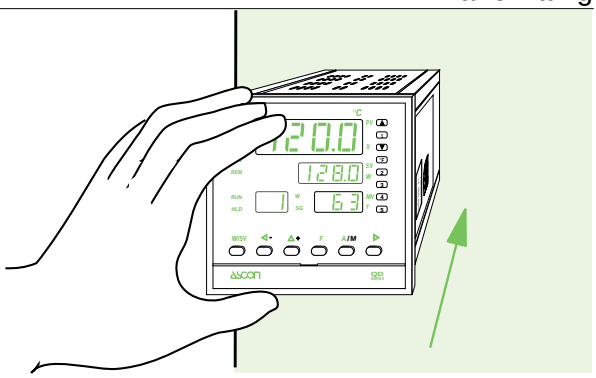


2.2 Panel installation

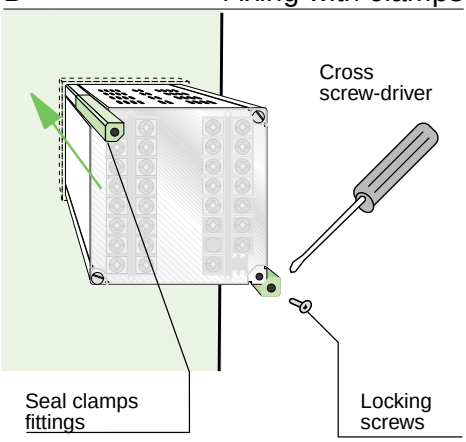
A • Panel fitting

Install away from:
- heat sources
- corrosive gases
- dusty environments

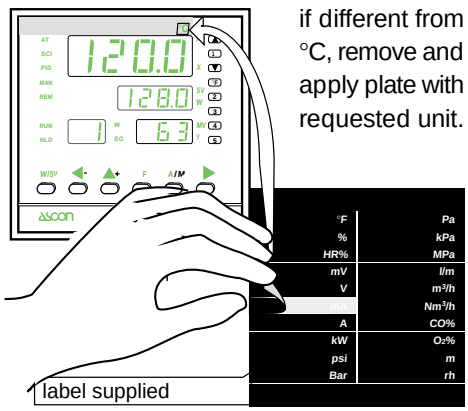
ENVIROMENT:
Temperature: 0…50 °C
Humidity : 30…85UR%



B • Fixing with clamps



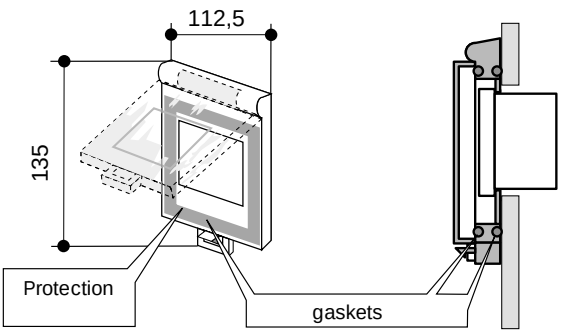
C • plate for engineering units



if different from °C, remove and apply plate with requested unit.

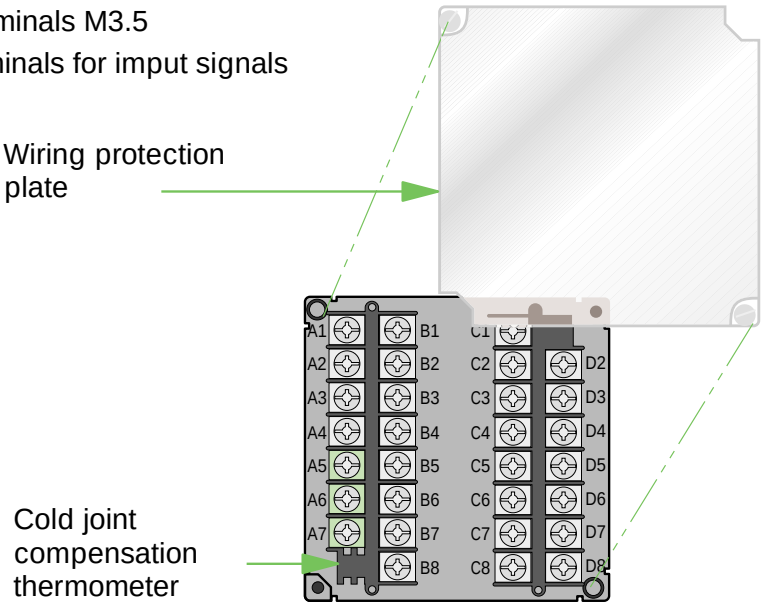
2.3 Front protection IP67

mod. F10-435-2A101



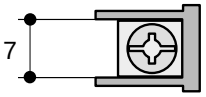
A • Terminal board

- 27 screw terminals M3.5
- 3 gilded terminals for imput signals



E

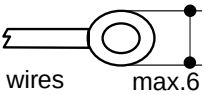
B • Effecting the connections



cable section
0,25÷2,5 mm^2
AWG 22÷14

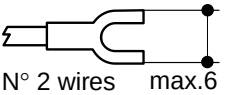
Preferential

with eyelet terminals



N° 2 wires max.6

with fork terminals



N° 2 wires max.6

3.1 Precautions and advised conductor course

Although this controller is designed to resist the heaviest disturbances present in industrial environments (as per CE mark), it is advised to keep to the following precautions:

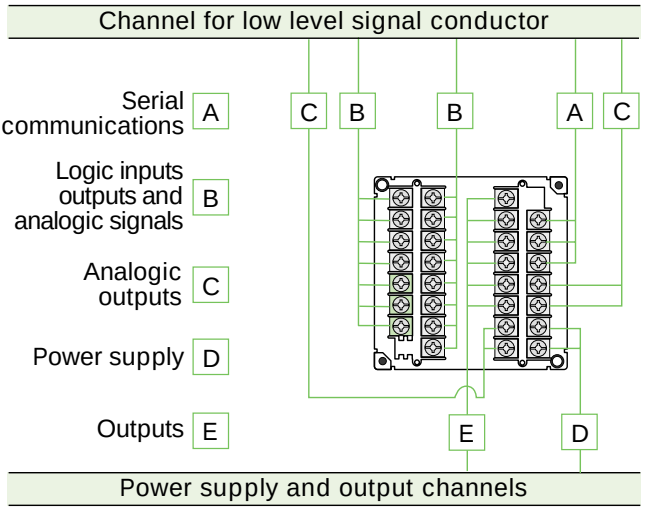
A. Precautions

Single out supply line from power line

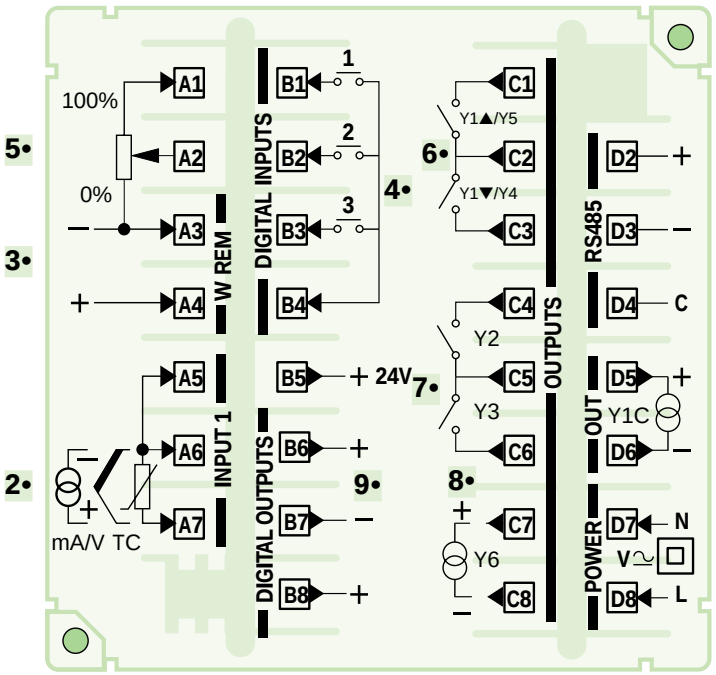
Keep away from teleruptors, electromagnetic contactors and powerful motors

Keep away from power groups, in particular if with phase control

B. Advised conductor course



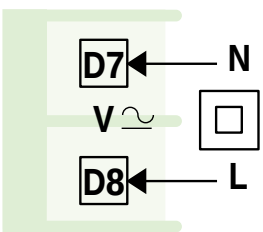
Wiring diagram



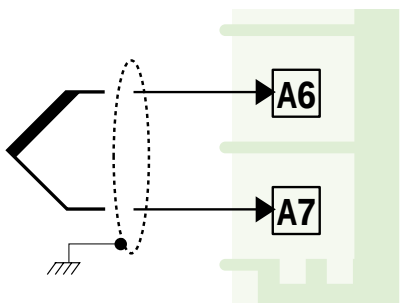
Relay outputs, combined to the terminals C1/C2 and C2/C3, can be configured as auxiliary output Y4 and Y5 (alarms) only if they are not used as main control output.

1• Single power supply

switching type with double isolation
Standard:
100…240Vac
-15 +10% (250 Vac max)
or:
24Vac - 24Vdc -15 +10%
Absorbed power 5 VA max



2• "X" measurement inputs

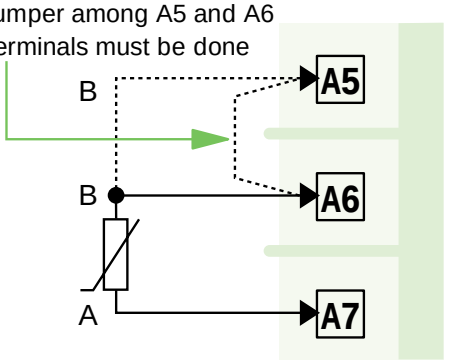


A • For Thermocouples
J-L-T-K-S-R-B-N-E-W

- Respect polarities
- For eventual extensions, use a compensated cable suitable for the type of used thermocouple
- The eventual screen is well earthed at only one end

2 • "X" measurement input (continued)

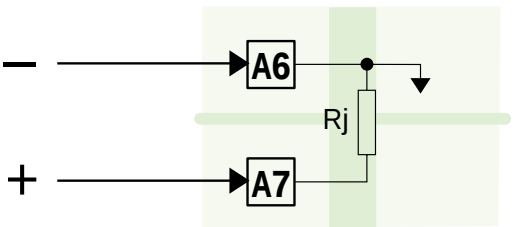
For 2 wires connection a jumper among A5 and A6 terminals must be done



B • For RTD Pt100

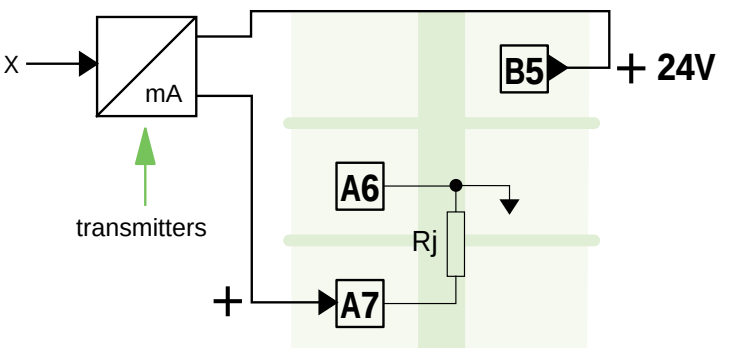
- For 3-wires connection, use cables of same section (min. 1mm^2) Line 20Ω max. for wire
- For 3-wires connection, use cables of adeguate section (min.1,5mm^2) Note: with a 15m probe-controller distance and a 1,5mm^2 section cable, the error is about 1°C.

C • Continuous mA, Volt



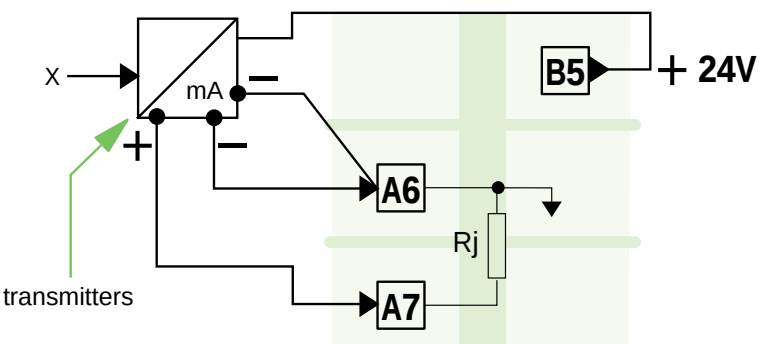
Internal Rj = 30Ω per mA
Internal Rj = 10MΩ per mV
Internal Rj = 10KΩ per Volt

C.1 • For 2 wires transmitter



auxiliary power supply
for transmitter
24 Vdc ±10%
30mA max

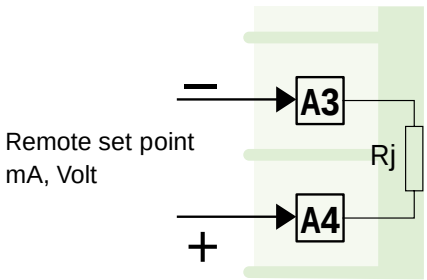
C.2• For 3 or 4 wires transmitter



auxiliary power supply
for transmitter
24 Vdc ±10%
30mA max

3• Auxiliary input

On Standard Set point version these terminals must be used as Remote Set point input.

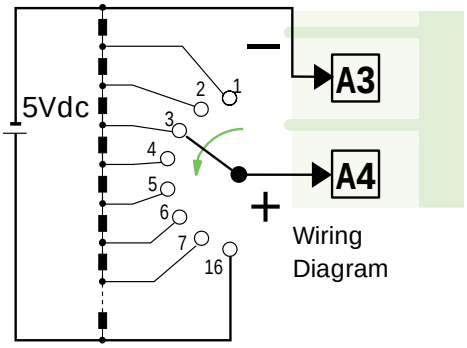


Current
0/4…20mA
Internal Rj = 30Ω

Voltage
1…5V, 0…5V, 0…10V
Internal Rj = 300 KΩ

NOT galvanically isolated

On Programmable Set point version these terminals must be used as Prgm selection input.



A stabilized external voltage sourse (max 5Vdc) allows to select one of the memorized Prgm.s.

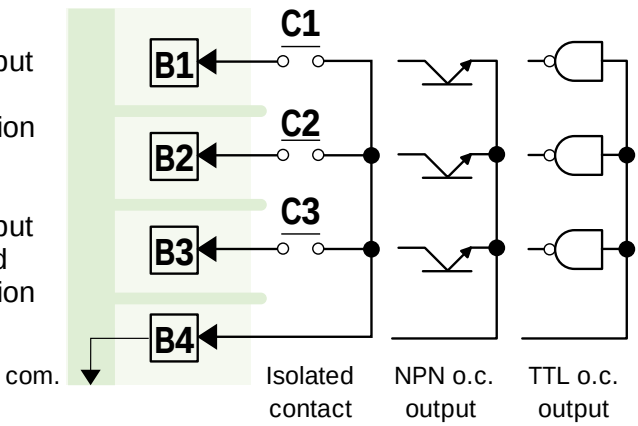
$$Vin = \frac{N° Prgm}{3.2}$$

Each Prgm has to be selected by a different voltage value as follows: (E.g. Prgm 8 = 2,5 Vdc).
With Vin = 0 the selection is inhibited.

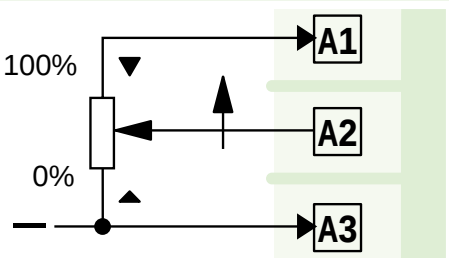
4 • Logic inputs

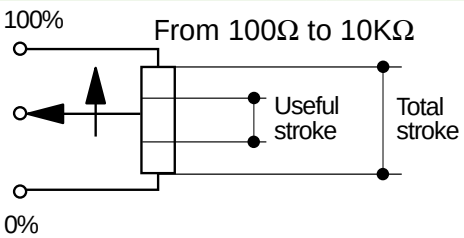
When the external logic input is ON (maintained closed contact), the relevant function is operating.

When the external logic input is OFF (maintained opened contact), the relevant function is not operating.
(see page 19)



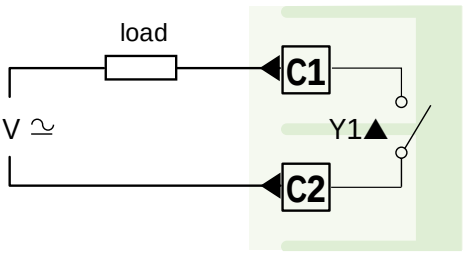
5 • Input feedback potentiometer (servomotors)





6.0• Relay single output

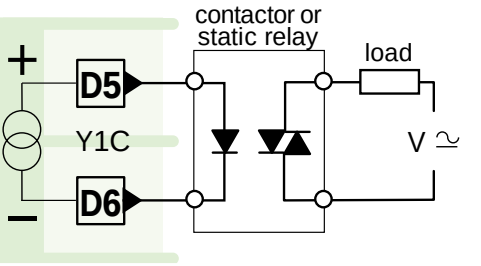
configuration N=



One N.O. contact

6.1• Logic single output

configuration N=

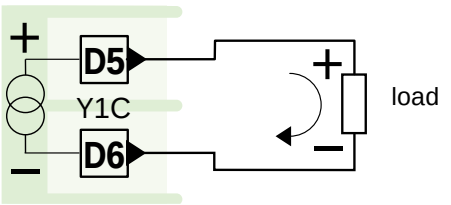


Output 0…22Vdc ±20% (20mA max.)
galvanically isolated

E

6.2• Continuous single output

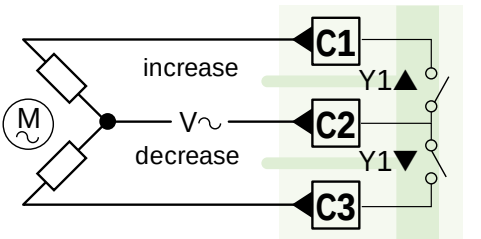
configuration N=



galvanically isolated
500Vac/1min
750Ω/15V max in current
500Ω/20mA max in voltage

6.3• Output for servomo-

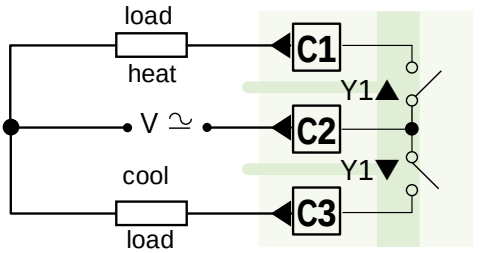
configuration N=



Three position with two interlocked contacts (increase, stop, decrease)

6.4• Relay / relay dual action output

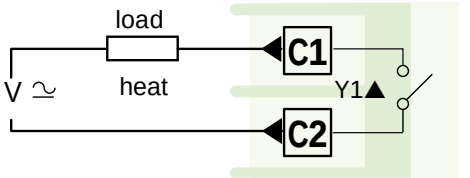
configuration N=

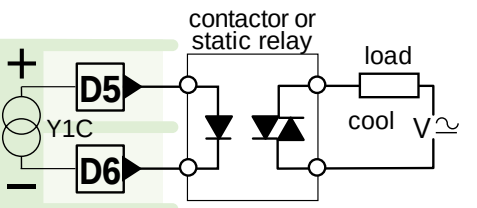


2 N.O. contacts

6.5• Relay / logic dual action output

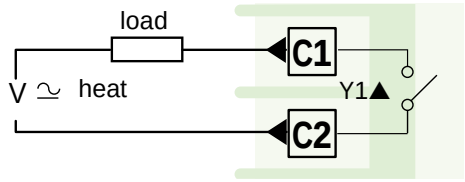
configuration N=





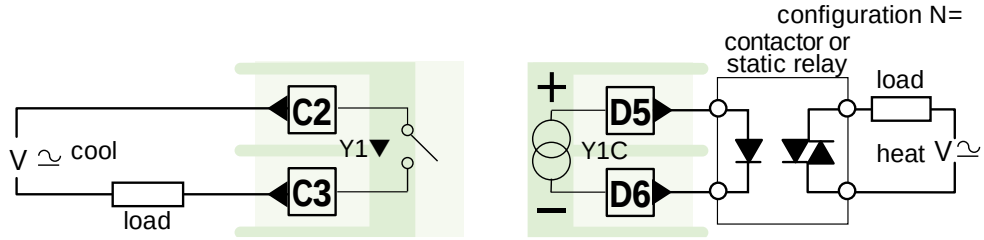
6.6• Relay / continuous dual action output

configuration N=



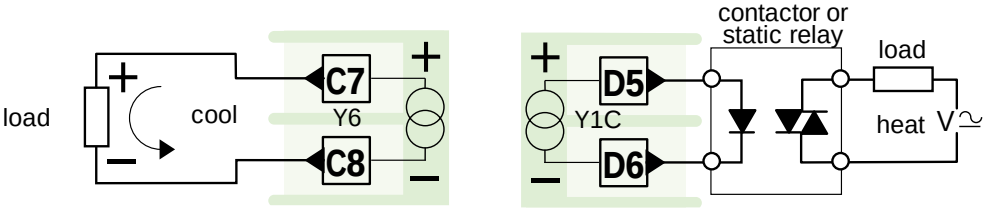
6.7• Logic / relay dual action output

configuration N=



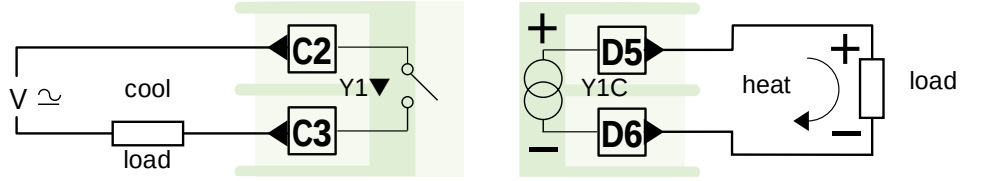
6.8• Logic / continuous dual action output

configuration N=



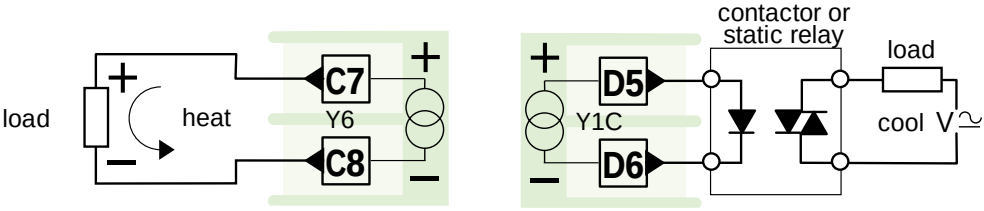
6.9• Continuous/ relay dual action output

configuration N=



6.10• Continuous / logic dual action output

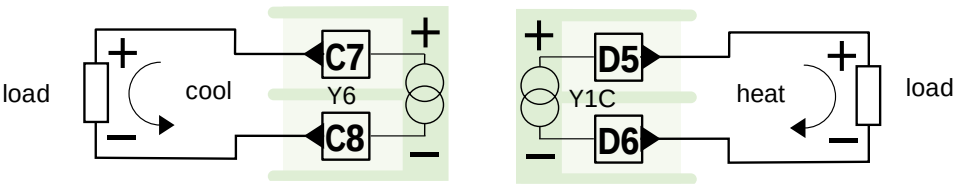
configuration N=



E

6.11• Continuous / continuous dual action output

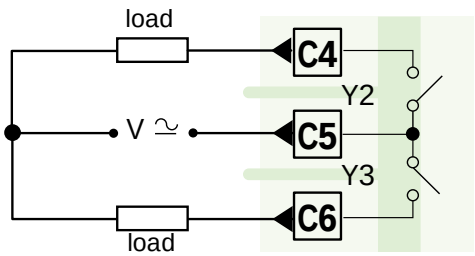
configuration N=



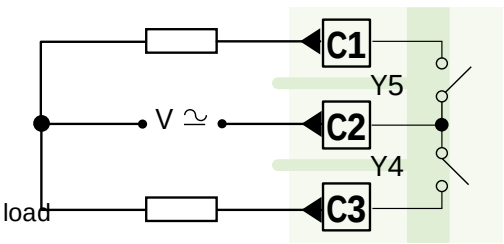
E

7• (6•) Auxiliary output Y2 - Y3 - Y4 -Y5

see page 19



2 N.O. relay outputs



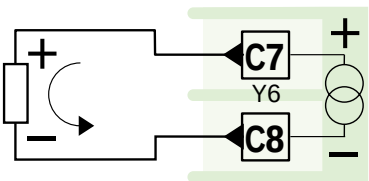
2 N.O. relay outputs

The 2 N.O. relay outputs can be used as Y4 and Y5 auxiliary outputs, only if they are not used before as main control relay output.

E

8• Retransmission output Y6 (option)

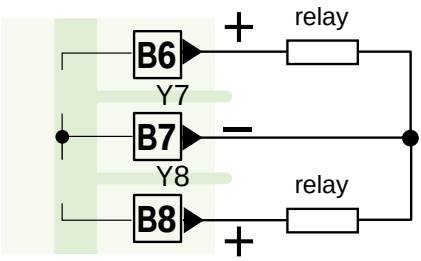
see page 19



galvanically isolated
500Vac/1min
750Ω /15V max in current
500Ω /20mA max in voltage

9• Y7 & Y8 Logic Outputs (for external relays)

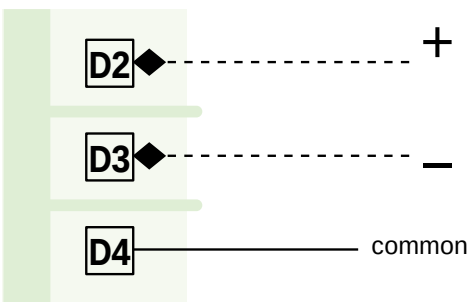
For "Programmable Set point" version only

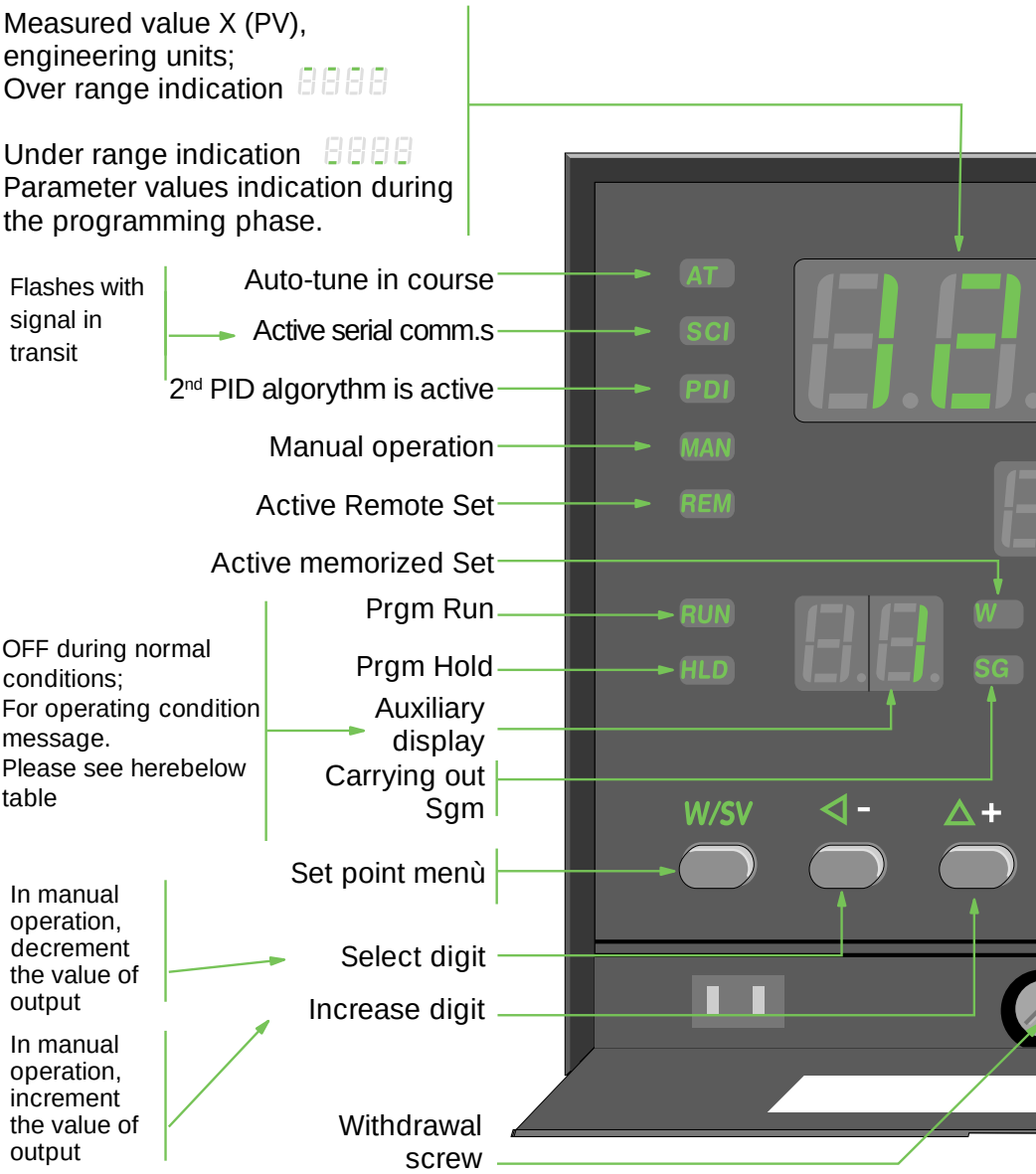


They can be freely configured to the programme.
The galvanically isolated
500 Vac/1min
30mA max, 28 Vdc (if Off)
1Vdc max at 30mA.

10• Serial communications (option)

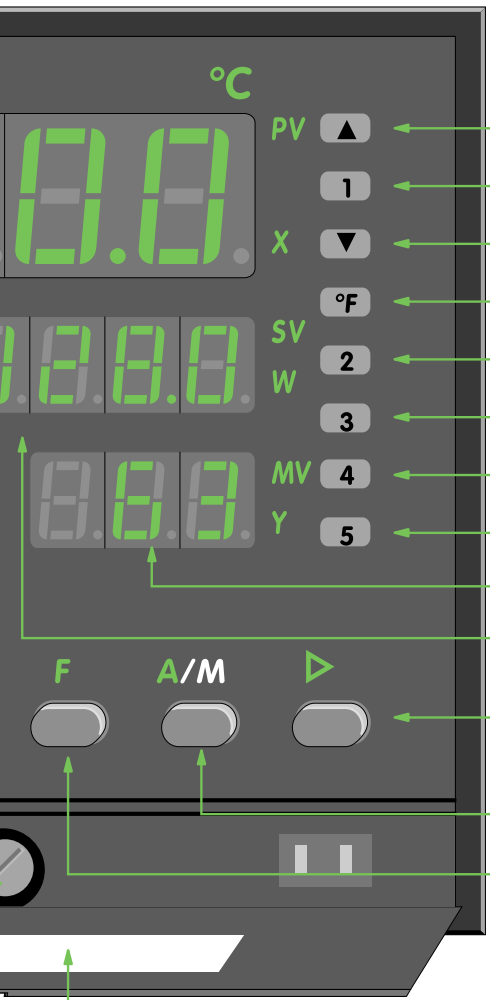
Consult direction for use "SERIAL COMMUNICATIONS SUPPLEMENT"





RUN HLD		W SG	Instrument operating condition	
	, ,	W	One of 3 memorized Set points	
		W	Computer set point is operating	
		—	One of three logic inputs is forcing Y1 equal to Remote Set Point	
		—	One of three logic inputs is forcing Y1 equal to Forcing output value	
		SG	Initial segment	Programmable Set point version
		SG	Final segment	
		SG	Segment n°…	
		SG	Reset mode	

Programme mode leds	
RUN	(Lighted) Programme carrying out
RUN	(blinking) Wait mode for "Out of Prgm Max Deviation" condition
HLD	Wait mode by keys, logic input or serial comm.s command. Wait mode when "Manual" operating condition is selected during a Programme carrying out.



Output Y1 ▲ ON

Output Y1 ON

Output Y1 ▼ ON

°F Selection

Output Y2 ON

Output Y3 ON

Output Y4 ON

Output Y5 ON

Output Y1/MV

Set point W/SV

Enter or Scroll values

Automatic/Manual

Function menù

Front cower with identification label

Increasing for servomotors or Y1 channel (heat)

De-activated with continuous or dual action discontinuous output

Decreasing for servomotors or Y1 channel (cool)

to 0…100% (to -100.100% for Y1 with dual output) or servomotor position

Local or Remote operating Set point; Parameter or activable command mnemonic codes during programming phase

When the mounting and wiring are completed, the instrument shall be configured and then, programmed. The controller is of the universal type, this means that all the functions are available on the instrument, configuration and programming allow to select and adjust the desired functions.

5.1• Configuration Access

Configuration is essential for the correct operation of the controller.
Proceed with care.

It is possible enter in configuration phase by two different ways.

E

5.1.2• Not configured instrument (1st configuration)

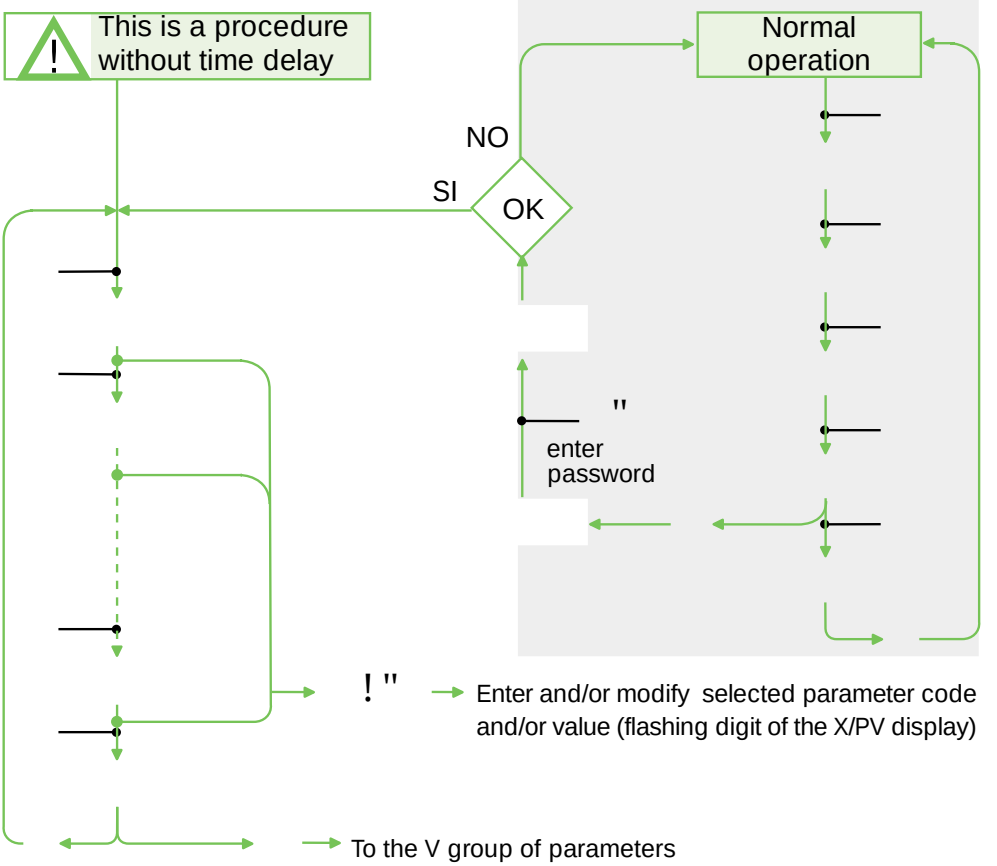
When powered, the instrument is in the stand-by mode, all the outputs are not operating.

The displays show permanently

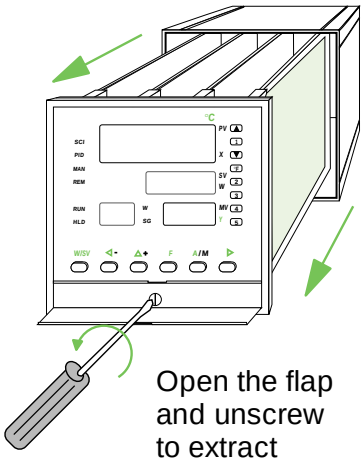
5.1.3• Configured instrument (configuration modify)

When powered, the instrument automatically checks if the configuration is correct. For 5 seconds all the outputs are not operating. After 5 seconds, and if the configuration is correct, the instrument automatically starts.

The instrument identification is displayed for 5 seconds

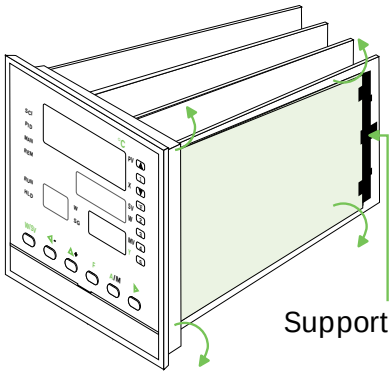


A • Instrument Withdrawal



Open the flap
and unscrew
to extract

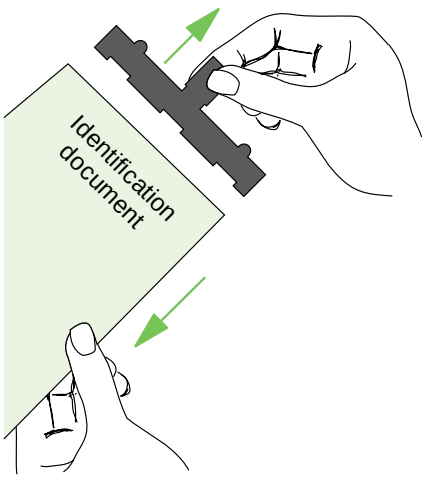
B • Unhook the paper support



Support

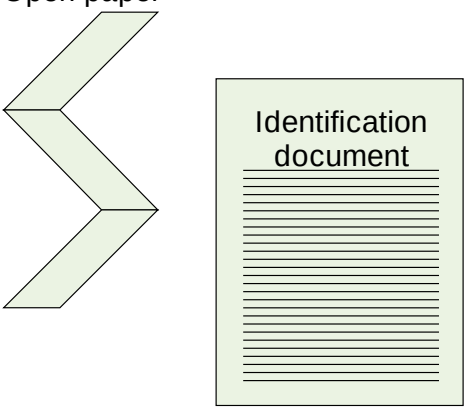
Left the support, unhook
and unthread the paper

C • Share paper



D • Write table

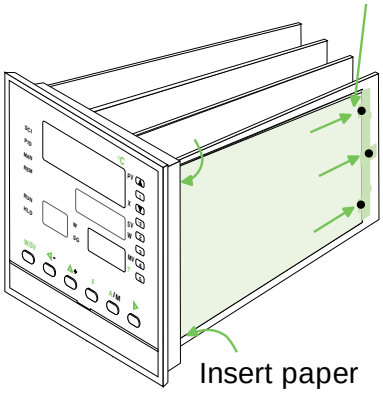
Open paper



Fold the paper and
connect to the support

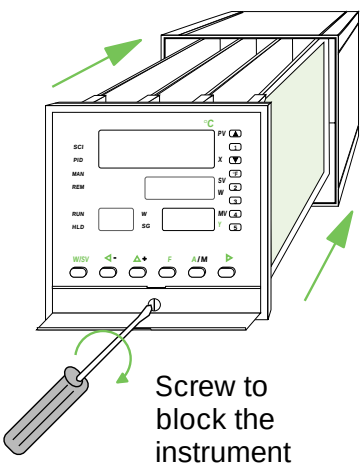
E • Insert paper

Graft
the support
in the 3 pivots

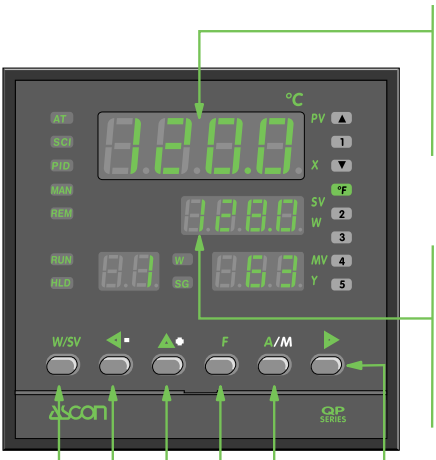


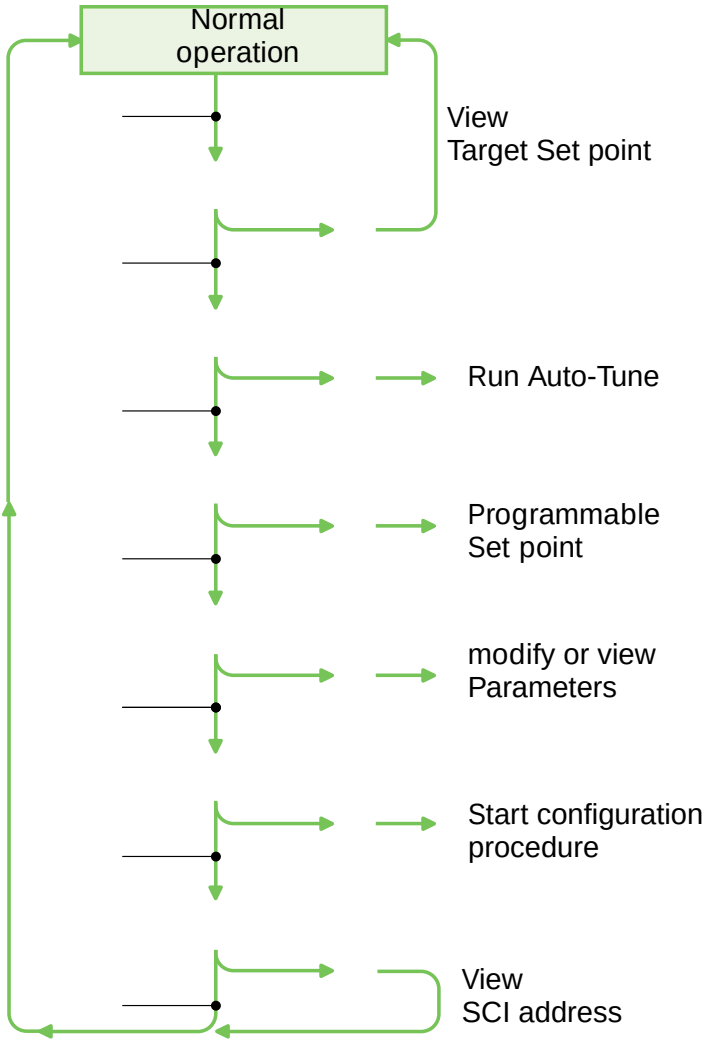
Insert paper

F • Instrument insert



Screw to
block the
instrument


Measure
during normal operation
Selected value/code
during programming phase
Set Point
during normal operation
Mnemonic code
during programming phase
Enter or scroll
values
Automatic/Manual
Access to function menù
Increasing digit
Select digit
Access to Set point menù


Normal
operation
View
Target Set point
Run Auto-Tune
Programmable
Set point
modify or view
Parameters
Start configuration
procedure
View
SCI address

5.2 Configuration phase

procedure without time delay

Before entering the configuration codes and parameter values given in the pages 18 and 19, it is suggested to carefully fill the given herebelow table with the selected codes/values.
All configuration codes/values affect the following ones, due to this, entering of the configuration codes/vaules must be done in accordance with the sequence given herebelow.

When the configuration phase is started, the first configuration parameter is displayed. By pressing the key, all the configuration parameters are scrolled in accordance with the sequence given in the following table.

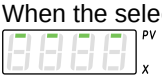
Parameter mnem. code (display W/SV)	parameter description	Entered Code and/or value (display X/PV)	Ref.
	Identification tag number		A
	Algorythm and control action		B
	"Standard" Set point type		C
	Programmable Set point		C1
	Input type and scale range		D
	°C, °F e K selection		E
	Temperature of external cool joint		F
	Decimal point for linear scales		G
	Scale beginning value for linear scales		H
	End scale value for linear scales		K
	(1 Input Logic function		I
	(2 Input Logic function		J
	(3 Input Logic function		L
	Remote Set point input range		M
	Y1 control output type		N
	Y1 output range		O
	Y2 alarm type		P
	Y3 alarm type		Q
	Y4 alarm type		R
	Y5 alarm type		S
	Y6 2nd analog output (retransmission) type		T
	Y6 output range		U
	End of configuration		

To the V group of parameters

The configuration codes/parameter values (shown with **grey background**), appear, or not , depending on the previously selected ones. (see notes page 18 & 19)

Attention: not coherent codes with the previously selected ones, if entered, are not accepted. Not admitted codes are also not accepted.

When the selected value is higher than the admitted value, the X/PV display shows:



When the selected value is lower than the admitted value, the X/PV display shows:

For an easy and quick subsequent identification/modification of the controller operating characteristics, it is suggested (as soon as the configuration is completed), to fill the “Identification document”, located inside the instrument, with the configuration codes/values. (see page 15)

Identification code A

Selectable range .. - - - -

Freely selectable tag number (in accordance to the customer service assignement).
When the configured controller is powered, the X/PV display shows the tag number for 5 seconds.

Algorythm and control action B

On - Off	Reverse	
	Direct	
P.I.D.	Reverse	
	Direct	
double P.I.D.	Reverse	)
	Direct	*

Press these keys to select digits, to modify values and enter parameter codes/values, codes and values are automatically accepted after 5 seconds.

Select digit | increasing digit

! *

Standard Set point type C

Only Local	
Local and 3 memorized	
Only Remote	
Local and Remote	
Local and Local + Remote	)

Not displayed if Progr. Set point version

!

Programmable Set point type C1

Time basis	Priority	
0Ð9999 sec.s	Slope	
	Duration	
0,0Ð999,9 min	Slope	
	Duration	
0Ð999,9 min	Slope	)
	Duration	*
0,0Ð999,9 hours	Slope	
	Duration	+
0Ð9999 hours	Slope	,
	Duration	-

Not displayed if Standard Set point version

#

Input type and scale range D

RTD **Pt100** Ω IEC 751	-200Ð600 °C	
	-328Ð1112 °F	
	73Ð873 K	
	-99.9Ð300.0 °C	
	-99.9Ð572.0 °F	
	173.3Ð573.2 K	
Thermocouple **J** FeCu45%Ni IEC584	0Ð600 °C	
	32Ð1112 °F	
	273Ð873K	
Thermocouple **L** FeConst. DIN 43710	0Ð600 °C	
	32Ð1112 °F	
	273Ð873 K	
Thermocouple **T** Cu CuNi IEC 584	-200Ð400 °C	
	-328Ð752 °F	)
	73Ð673 K	
Thermocouple **K** Cromel-Alumel IEC 584	0Ð1200 °C	
	32Ð2192 °F	*
	273Ð1473 K	
Thermocouple **S** Pt10%Rh-Pt IEC 584	0Ð1600 °C	
	32Ð2912 °F	
	273Ð1873 K	
Thermocouple **R** Pt13%Rh-Pt IEC 584	0Ð1600 °C	
	32Ð2912 °F	+
	273Ð1873 K	
Thermocouple **B** Pt30% Rh-Pt6%Rh IEC 584	400Ð1800 °C	
	752Ð3272 °F	,
	673Ð2073 K	
Thermocouple **N** Nicrosil-Nisil IEC 584	0Ð1200 °C	
	32Ð2192 °F	-
	273Ð1473 K	
Thermocouple **E** Ni-NiMo18% IEC 584	0Ð1100 °C	
	32Ð2012 °F	
	273Ð1373 K	
Thermocouple **W** W3%Re-W25%Re IEC 584	0Ð2000 °C	
	32Ð3632 °F	
	273Ð2273 K	
4Ð20 mA	Linear scales	
0Ð20 mA		
0Ð50 mV		)
0Ð200 mV		*
0Ð1 V		
1Ð5 V		+
0Ð5 V		,
0Ð10 V		-
4Ð20 mA	Linear scales with square root extraction √	
0Ð20 mA		
0Ð50 mV		
0Ð200 mV		
0Ð1 V		)
1Ð5 V		*
0Ð5 V		
0Ð10 V		+

! * $

°C, °F, K selection and cool joint compensation for X input E

Internal compensation	°C	
	°F	
	K	
External compensation	°C	
	°F	)
	K	*

External compensation does not appear with Pt100 Ω or linear inputs.
When the external cool joint compensation is configured, its value must be set by the parameter **%(Tab. F)**

!

Input decimal point for linear scales G

None	
1 decimal point	
2 decimal points	
3 decimal points	

This code does not appear when the D table ( ) is selected# between and .

Logic input notes

, ,),* !& - codes depend on the type of Set point previously entered. (**Tab. C**)

Index , and from to are displayed if Programmable Set point type has been chosen.

(’ (’ (’

Functions of the 3 logic inputs	I-J L
None	
Manual control (loop A)	
1st memorized Set point	
2nd memorized Set point	
3rd memorized Set point	)
Remote Set point	*
Local Set point	
Locked keyboard	+
2nd P.I.D. algorythm	,
Y1 Remote Set point input	-
Y1 Forcing value	
Programme Launch/Stop	
Programme Run/Hold	
Programme Launch-Run/Hold	)
Programme Stop	*
Programme Hold (Local S.p)	
Next segment	+
Back to the beginnining of sgm.	,

(see note on the left)

! ! !) ! *

Y2-Y3-Y4-Y5 Alarm type		P-Q R-S
Disabled		
X1 Input interruption (1)	N.A.(close)	
	N.C. (open)	
Independent loop A	Active high	
	Active low	)
Deviation loop A	Active high	*
	Active low	
Band loop A	Active outside	+
	Active inside	,
Output Y1 loop A	Active high	-
	Active low	
Out of Prgm. max. Dev. (2)	N.O.(close)	
	N.C. (open)	)
Configured to the Prgm. (2)		*

Y4 and/or Y5 outputs are not available if the control output has been already used as single or double relay for servomotor output. **Tab. N** Codes ,! ,), *, , +, -

(1) Only for thermoelements, 4 20mA and 1 5V

(2) Displayed if Programmable Set point version, only.

Is present only if Remote Set point has been selected **Tab. C** codes , ,).

Remote Set point scale range		M
Current	4 20 mA	
	0 20 mA	
Voltage	1 5 V	
	0 5 V	
	0 10 V	)

(see note on the left)

!

Control output type			N
	Y1(▲)	Y1(▼)	
Single	Relay		
	Logic		
	Continuous		
	Servomotors		
Double	Relay	Relay	)
	Relay	Logic	*
	Relay	Continuous	
	Logic	Relay	+
	Logic	Continuous	,
	Continuous	Relay	-
	Continuous	Logic	
	Continuous	Continuous	

Codes „ and , can be selected if the 2nd analog output option (Y6) is fitted. These codes depend on the **Tab. B** ( ).

If control action is (Tab. B)	Select (Tab. n)
On - Off	…
single P.I.D.	…
double P.I.D.	)…*

! OPTION

Y6 2nd analog output type		T
Disabled		
Retransmission	Measure X1	
	Set point W	
	Output Y1	
	Output Y1(channel ▼)	)
	Deviation 0 25%	*

This code is available only if the 2nd analog output has not been used as second control output (! **Tab. N** codes „ ,)

! %

External cool joint temperature		F
Admitted range	0 . 50°C	
	32 . 122°F	
	273 . 323 K	

Enter a value coherent with the admitted range. Higher and lower values will not be accepted.
This code is not available with internal Cold joint compensation

! #

Input beginning value for linear scales	H
- - - - - - - -	

& ’

Input full value for linear scales for	K
- - - … -100 on ! +100…- - - -	

minimum span 100 counts

Y1 output range		O
Current	4 20 mA	
	0 20 mA	
Voltage	1 5 V	
	0 5 V	
	0 10 V	)

The code is available only if the main output (Y1) is of the analog type (see **Tab. N** codes , , -,).

Y6 output range		U
Current	4 20 mA	
	0 20 mA	
Voltage	1 5 V	
	0 5 V	
	0 10 V	)

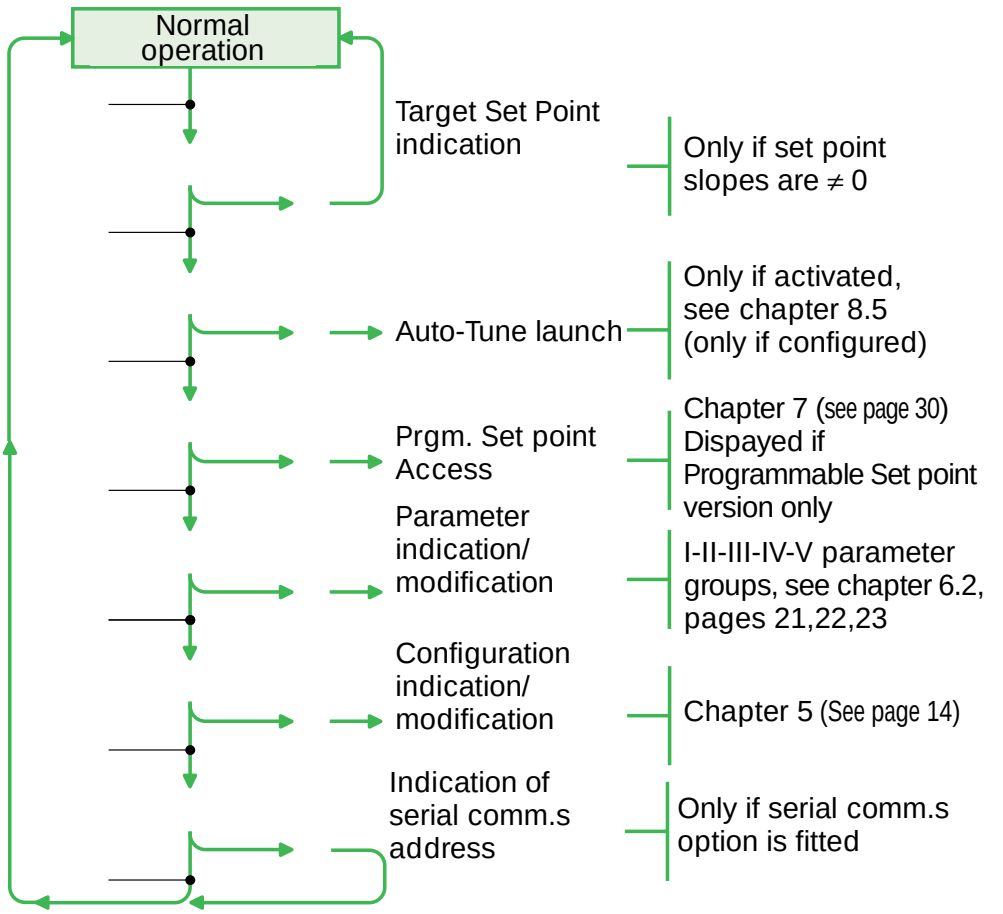
The code is not available if ! is disabled, **Tab. T** - Codes , , ,),* or if double output is selected and Y1 (channel ▼) is logic or continuous type.
Tab. N - Codes „ ,

When the configuration phase is completed the programming phase shall be started.

6.1• Main menù

The main menu allows controller configuration and parameterization, Auto tune launch (start), indication of target Set point and serial comm.s address.

Press key during normal operation, main menu functions are shown in the following sequence:



6.2• Parameters access

Starting from normal operation, press key repeatedly until the display W/SV shows . , press key to reach the first parameter of the first group .

Parameters are divided into 5 homogeneous groups.
Press key to reach the next parameter group.
The V group of parameters is protected by a Password, enter when display shows .

6.3 Parameterization

This procedure is time delayed. If no keys are pressed for about 30 seconds, the instrument returns to the normal operation.

1st GROUP

Parameter indication/modification

For a quick and easy use, parameters of 1st group are shown, herebelow, in accordance with the selected Set point type.

"Standard" Set point

1st memorized Set point (2)

2nd memorized Set point (2)

3rd memorized Set point (2)

Slope up during transition Set point (3) 0.0…10.0% of span

Slope down during transition Set point (3) 0.0…10.0% of span

Y2 Set point (4)

Y2 hysteresis (5) 0.01…10.00% of span

Y3 Set point (4)

Y3 hysteresis (5) 0.01…10.00% of span

Y4 Set point (4)

Y4 hysteresis (5) 0.01…10.00% of span

Y5 Set point (4)

Y5 hysteresis (5) 0.01…10.00% of span

"Programmmable" Set point

Local Set point

Slope up during transition Set point (3) 0.0…10.0% of span

Slope down during transition Set point (3) 0.0…10.0% of span

Y2 Set point (4)

Y2 hysteresis (5) 0.01…10.00% of span

Y3 Set point (4)

Y3 hysteresis (5) 0.01…10.00% of span

Y4 Set point (4)

Y4 hysteresis (5) 0.01…10.00% of span

Y5 Set point (4)

Y5 hysteresis (5) 0.01…10.00% of span

2nd GROUP

For a quick and easy use, parameters of the 2nd group are shown, herebelow, in accordance with the selected

Single and double P.I.D. algorythm and Control action (B table ((#)

Proportional band
0.5...999.9%span

Integral time (reset)
(0.0 = Off)
0.0...100.0 min.

Derivative time (rate)
(0.00 = Off)
0.00...10.00 min.

Balance output shift
(only when is Off)
0...100% for single action or
-100...100% for double action

Fuzzy intensity
(0.0 = Off)
0.0…90.0%

Y1 cycle time
(only for relay or logic output)
1…200 seconds

Y1▼ cycle time (6)
(only for relay or logic output)
1…200 seconds

Dead band (6)
0.0…5.0% of output

Cool relative gain (6)
0.1…3.0

On-Off algorythm and control action (B table ( )

Hysteresis (On- Off)
0.10...10.00%span

P.I.D. algorythm and Control action with only servomotors output (B table (and N table)

Proportional band
0.5...999.9% span

Integral time
(0.0 = Off)
0.0...100.0 min.

Derivative time
(0.00 = Off)
0.00...10.00 min.

Fuzzy intensity
(0.0 = Off)
0.0...90.0%

Stroke time Value
15…600 seconds

Dead zone Output
0.1…10.0% output

Valve position calibration

Valve is driven fully closed

Wait stopping of valve press A/M key to enter valve closed value (0)

Valve is driven fully opened

Wait stopping of valve press A/M key to enter valve opened value (100)

3rd GROUP

Proportional band (7)
0.5...999.9%span

Integral time (reset) (7)
(0.0 = Off)
0.0...100.0 min.

Derivative time (rate) (7)
(0.00 = Off)
0.00...10.00 min.

Balance output shift (7)
(only when is Off)
0...100% for single action or
-100...100% for double action

Cool relative gain (6)
0.1…3.0

4th GROUP

Fuzzy scale amplitude (7)
0.5…999.9% span

Derivative Fuzzy (7)
0.10…99.99% span/min

Sampling time
0…30 seconds
(0 = 0.5sec.s)

Time constant of the
input filter (0 = Off)
0…30 seconds

Max speed for increasing
Y1 value (8)
(0 = Off) 0…20 %/sec.s

Max speed for decreasing
Y1 value (8)
(0 = Off) 0…20 %/sec.s

E

Notes

1 Local Set point is available only with Programmable Set point version.
Wide range settable but within the Set point limits entered under the V parameter group.

2 The 3 memorized Set points are displayed only if the ◊Set point type◊ code is selected as ◊local and 3 memorized (**Table C** , see page 16). The memorized Set points are adjustable over the full scale range but within the Set point limits entered under the V parameters group.

3 If set to 0.0, the slope is excluded. The Set point change is of the step type.
The maximum set value is 10% of span expressed in digits/min. Example:

Range:	-200É600 °C
Span:	800°C
Maximum set value:	80.0 digit/min
Corresponding to:	80.0°C/min

Only for "Programmable Set point version" slopes can be expressed in the following modes: 0,1 digits/sec, 0,1 digits/min or 0,1 digits/hour. It depends on the selected value during the configuration phase (**Table C1** page 18).

4 This parameter is not displayed if the ◊alarm type◊ code is selected as ◊Disabled◊ or ◊Input interruption", if grater the Prgm. max deviation or linked to the Prgm. (**Tables P-Q-R-S** , , , , , # ,see page 19)
The set range of Y2 and Y3 Set point, changes in accordance with the configuration of the ◊alarm type◊ as follows:

¥ Independent: over the full scale range
¥ Deviation: -300É+300
¥ Band: 0É300

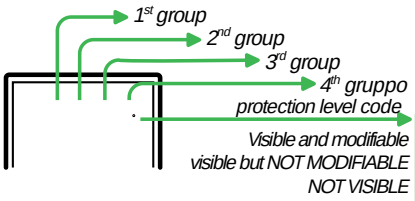
5 This parameter is not displayed if the ◊alarm type◊ code is selected as ◊Disabled◊ or ◊Input interruption◊ if grater the Prgm. max deviation or linked to the Prgm.(**Tables P-Q-R-S** , , , see page 19)

6 Only for double action output.

7 Not displayed if the "Algorythm and control action" is "On-Off" or if one of the 3 logic inputs is configured as "2nd PID algorythm" (**Table P-Q-R** code ,)

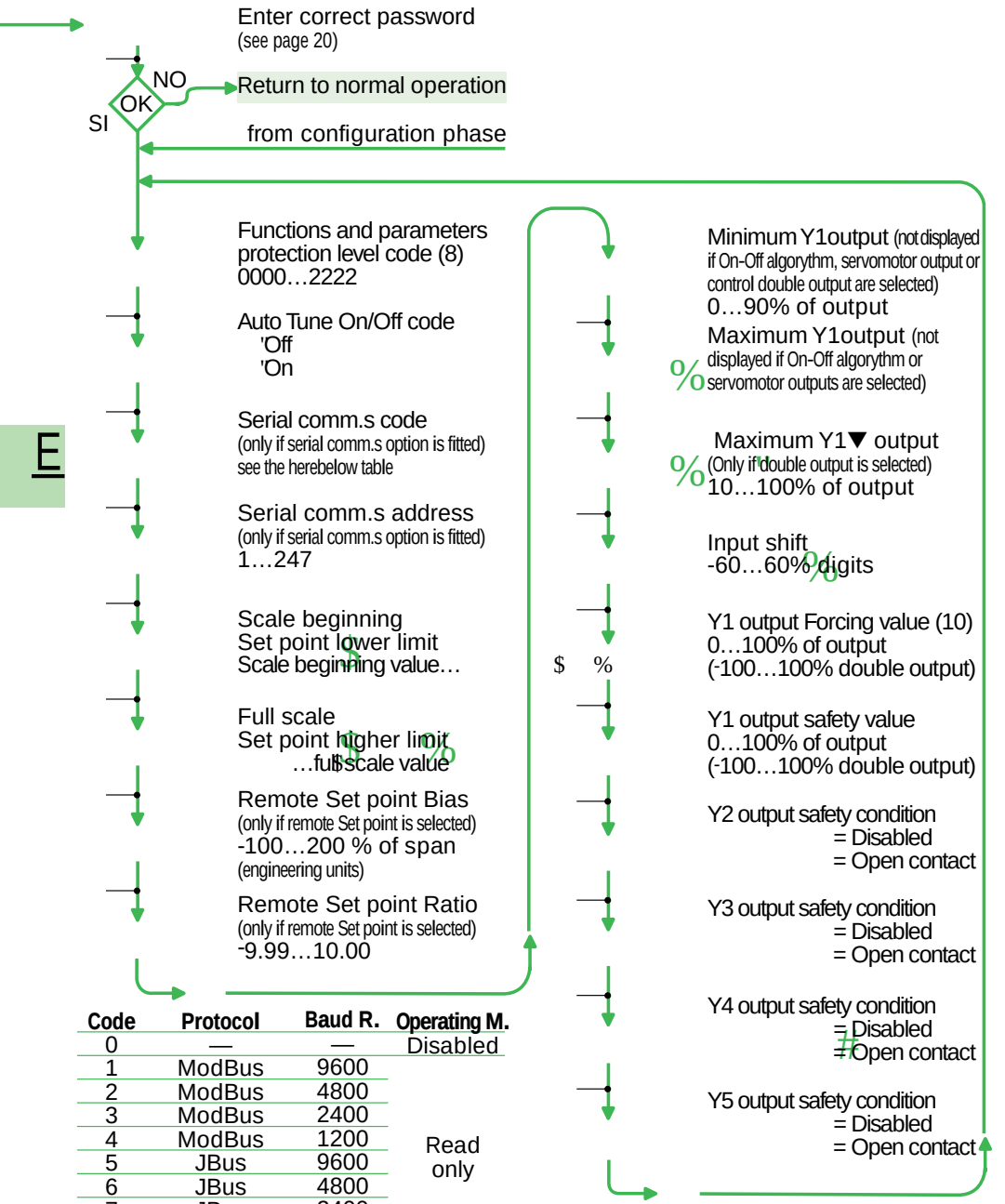
8 Not displayed if the "Algorythm and control action" is "On-Off" or if the "Control Action" is selected for servomotors.

9 Functions and parameters protection level code.



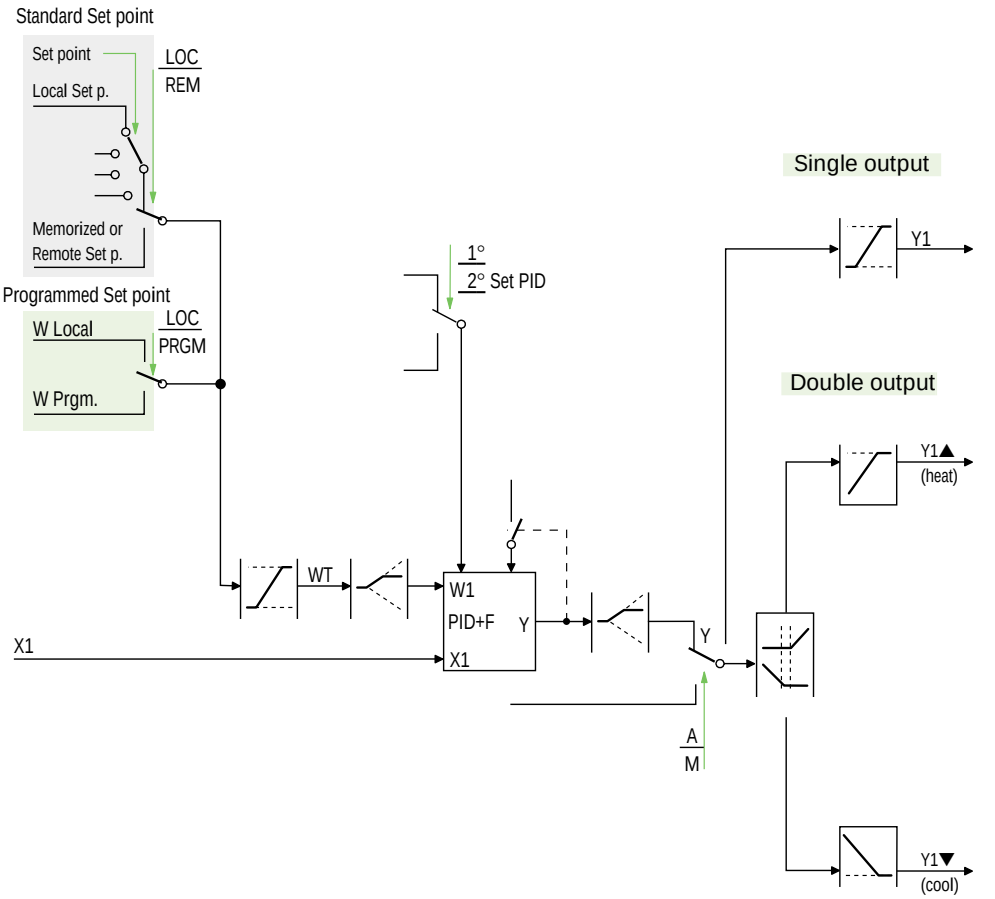
10 Parameter is present if Y1 is not configured as servomotor output or one of the 3 logic inputs is configured as "Y1 forcing value" (**Table I-J-L** code)

5th GROUP



Code	Protocol	Baud R.	Operating M.
0	—	—	Disabled
1	ModBus	9600	Read only
2	ModBus	4800	
3	ModBus	2400	
4	ModBus	1200	
5	JBus	9600	
6	JBus	4800	
7	JBus	2400	
8	JBus	1200	
9	ModBus	9600	Read and write
10	ModBus	4800	
11	ModBus	2400	
12	ModBus	1200	
13	JBus	9600	
14	JBus	4800	
15	JBus	2400	
16	JBus	1200	
17	ModBus	9600	Supervision system or local mode
18	ModBus	4800	
19	ModBus	2400	
20	ModBus	1200	
21	JBus	9600	
22	JBus	4800	
23	JBus	2400	
24	JBus	1200	

6.4•Block diagram for 1 Std. Loop with single and/or double output



When the QP controller is configured with a double action (e.g. Heat/Cool) two different outputs are used from the same PID algorythm. In addition some specific parameters are available to help the PID algorythm: parameter which defines the ratio between Heating Proportional band and Cooling Proportional band. parameter instead set the dead zone transition among the two Heating & Cooling actions. Besides the Maximum Y1 output value can be modified by and for the different outputs.

6.5• Parameters description

To semplify the use of parameters, they are grouped in homogeneous groups with the similar functions

1st GROUP

1st memorized Set point

2nd memorized Set point

3rd memorized Set point

These pre-fixed Set point values can be recalled by logic inputs, keyboard or serial comm.s. The selected Set point number appears on the auxiliary display

Set point Slope up

Set point Slope down

Set point speed change (digits/min) (digits/sec.s, digits min, digits/hours for Prgm Set point)

Y2 Alarm Set point

Y3 Alarm Set point

Y4 Alarm Set point

Y5 Alarm Set point

Set point of Y2,Y3,Y4,Y5 outputs. The alarms type depend on the relative configuration code.

Y2 hysteresis

Y3 hysteresis

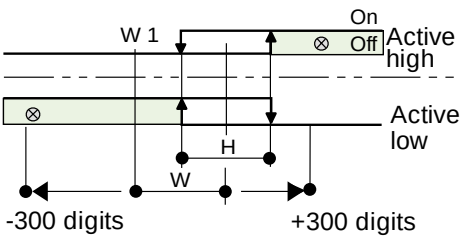
Y4 hysteresis

Y5 hysteresis

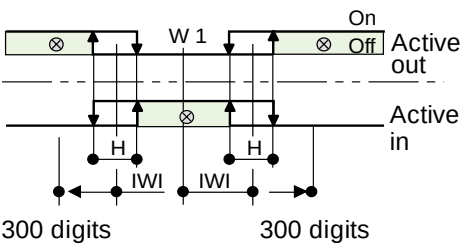
Hysteresis of Y2,Y3,Y4,Y5 outputs (% of span)

Alarm types

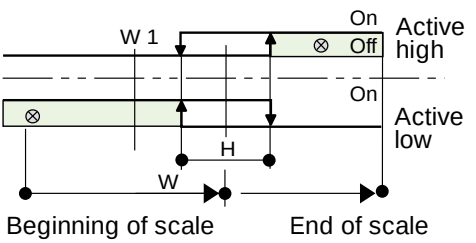
Deviation



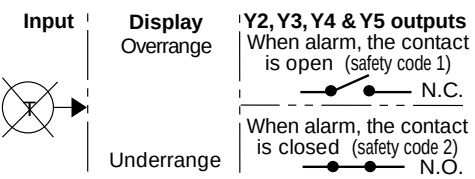
Band



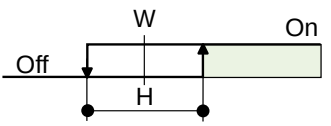
Independent



Input interruption



Hysteresis



2nd GROUP

Proportional band

The proportional action modifies the Y1 control output value respect the deviation (W - X) in a proportional way.

Integral Time

This is the necessary time of the Integral action to give the same power which has already given by the proportional action

Derivative time

This is the necessary time of proportional action to reach the same level of P. + D. actions

Balance output shift

If is Off, the Balance Output Shift corresponds to the Y1 value on steady conditions (W = X)

Fuzzy intensity

It allows to change the strenght of Fuzzy algorythm respect the PID algorythm during the control mode

Y1 cycle time

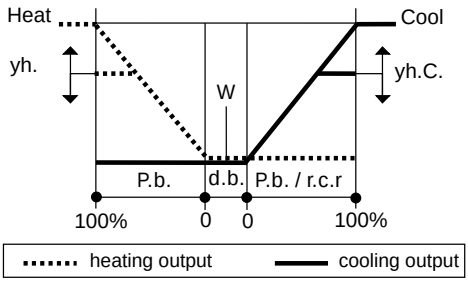
Y1▼ cycle time

This is the basic time used by the control algorythm to change the On % value respect the Off % value of Y1 output during the control mode.

Dead band

Dead Band between heating/cooling control outputs.

Heating / cooling algorythm



Cool Relative Gain

This value is the ratio between the cooling/heating proportional band

Valve stroke time

Necessary time to go from 0 to 100% of servomotor stroke.

Output dead zone

Output sensitivety or output dead zone

Valve position calibration

It allows to enter into the calibration procedure of the potentiometer position.

Y1 hysteresis

Hysteresis of Y1 output (% of span).

E

3rd GROUP

2nd Proportional band

The proportional action modifies the Y1 control output value resoect the deviation W-X in a proportional way.

2nd Integral time

This is the necessary tyme of the integral action to give the same power wich has already given by the proportional action

2nd Derivative time

This is the necessary time of proportional action to reach the same level of P. + D. actions

2nd Balance output shift

If is Off, the Balance Output Shift corresponds to the Y1 value on steady conditions (W = X) (When the correct PD algorythm is entered and the process has been stabilized, on off-set conditions, enter the Y1 value shown on the W/SV display).

2nd Cool Relative Gain

This value is the ratio between the cooling/heating proportional band

4th GROUP

Fuzzy scale amplitude

$

It means the % of span where the Fuzzy logic operates.

Fuzzy derivative

#

This parameter inform the Fuzzy algorythm about the maximum process speed. (% of span)

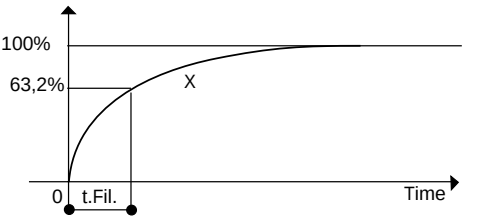
Sampling time

It refers to the sampling time of the controller. (sec.s)

X1 input Time constant

Time Constant of the input RC filter applied on the process variable (X) input (sec.s).

Filter effects



Max speed for increasing of Y1 value

Max speed for decreasing of Y1 value

It limits the increasing speed of Y1 output (output% / min. see note 3 page 23)

5th GROUP

Functions and Parameters protection level code (See page 23)

Auto-Tune On/Off code

0 = Off
1 = On
If the code “0” is entered, the function does not appear in the main menu.

Serial comm.s code
(see table on V° group)

Serial comm.s address

The address can be selected between 1 and 247.

Scale beginning Set point lower limit

It limits the selection of the minimum Set point value.

Full scale Set point higher limit

It limits the selection of the maximum Set point value.

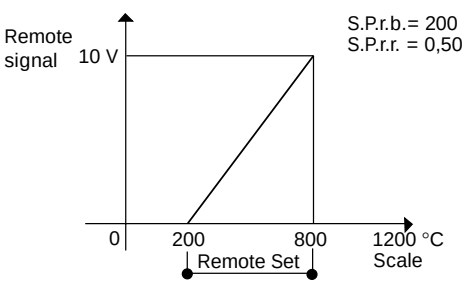
Remote Set point Bias

Starting point of analog remote Set point (eng. units).Selectable up to -100…+200% of range scale.

Remote Set point Ratio

It defines the remote Set point span (eng. units).

Example



Remote Set point span = span x S.P.r.r.

Minimum Y1 output

Minimum Y1 output value during control mode. This limit also operates in manual mode.

Maximum Y1 output

Maximum Y1 output value during control mode. This limit also operates in manual mode.

Maximum Y1▼ output

Maximum “cool” Y1 output value during the heating / cooling control mode. This limit also operates in manual mode.

X1 Input shift

This function allows to shift the scale range within ±60 digits.

Y1 Output forcing value

Controller forces Y1 output to the selected value when the corresponding Logic input is active

Y1 output safety value

Controller forces the Y1 to the selected value in the under/overrange conditions

Y2 output safety condition
Y3 output safety condition
Y4 output safety condition
Y5 output safety condition

Controller forces the Y2 , Y3 ,Y4 and Y5 alarms to the selected conditions in the under/overrange conditions
(see table page 19)

E

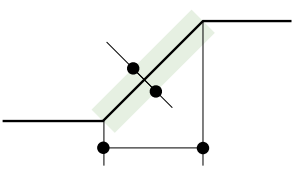
7.1• Introduction

The programmable Set point version of QP series (e.g. QP..1) has been developed to build, memorize recall and carry out programmes. By the above it is possible to link a Set point change and time together.

7.2• Main technical characteristics

- 16 programmes (max)
- Continuous or 1...9999 cycles (programme times)
- Seconds, minutes or hour time basis
- Duration or slope priority (in case of anomalies)
- Run, stop, hold, reset functions, etc. . These command are available by keyboard, logic input or serial comm.s.
- Up to 6 configurable time programmed logic outputs
- Auxiliary input for Programmes remote selection by the memorized ones (see page 7).

7.3• Programme structure



The programme is composed by a set of connected segments. On each segment the configuration of the following parameters is possible:

- Target Set point ( )
- Duration ( )
- Maximum deviation ( )

} Necessary data

- State of the 6 logic outputs
- Selection of the two available PID algorythm

- Programme composition
  1 Initial segment called
  1 Final segment called
  1...99 standard segments

7.3.1• Initial segment

By this segment the process reaches the expected starting condition of the real programme.

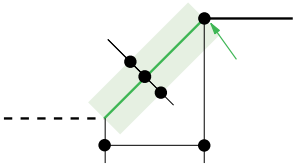
7.3.2• Final segment

By this segment, the process variable can be positioned at a fixed value and state, after the programme end.

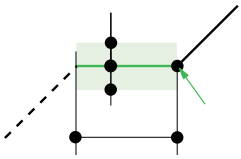
7.3.3• Standard segments

By these ones it is possible to set the real programme.
Three different types of segment can be set:

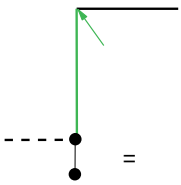
Ramp



Steady



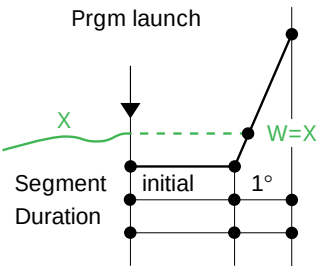
Step



= Dwell Set point
= Duration
= Maximum deviation
= Previous segment
= Carrying out segment
= Next segment

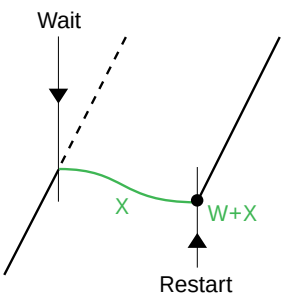
E

7.4• Working conditions



7.4.1• Programme launch with X (Pv) different from the Set point (Segment ( )

The initial segment duration ( ) is = or too short.
The real programme starts with the 1st segment with W (Sv)= X (Pv) to carry on the Process variable to the fixed Set point ( ).
The configured priority influences the controller behaviour.

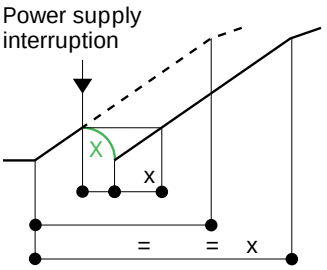


7.4.2. Programme restarts after a wait condition (from Manual mode or Local Set point mode

After the stop the programme restarts with
W (Sv)= X (Pv)
The configured priority influences the controller behaviour.

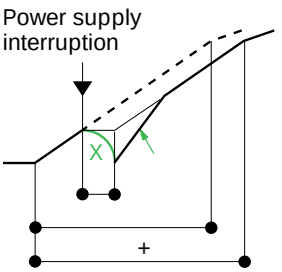
7.4.3 Programme restarts after a power supply interruption

The configured priority influences the controller behaviour.
It can be applied during a ramp segment only.



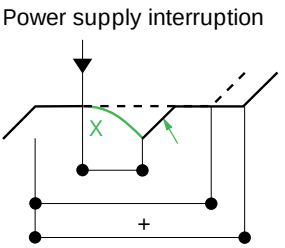
A• Slope priority

- The ramp slope remains constant.
- At the end of the power supply interruption, the process variable reaches the programmed Set point value with the same previous ramp slope. The “slope” parameters do not influence the controller behaviour.
- The carrying out duration becomes
  + + x



B• Duration priority

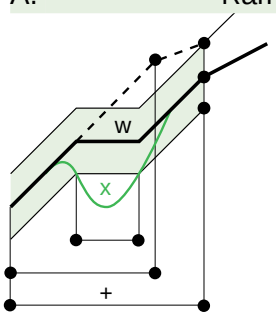
- The segment duration remains constant.
- At the end of the power supply interruption the process variable reaches the programmed Set point value with the previously entered “slope” parameter (up & down). If set correctly, it is possible to make up for the whole delay.
- If not, the carrying out segment duration becomes +



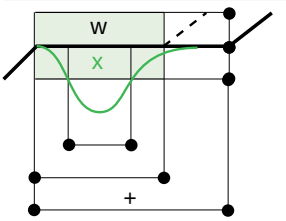
C• Steady segment

- If the power supply interruption happens during a steady segment, the controller behaviour is equal for both priorities.
- At the end of the power supply interruption the process variable reaches the programmed Set point value with the previously entered “slope” parameter (if different from 0).
- The carrying out segment duration is +

A. Ramp



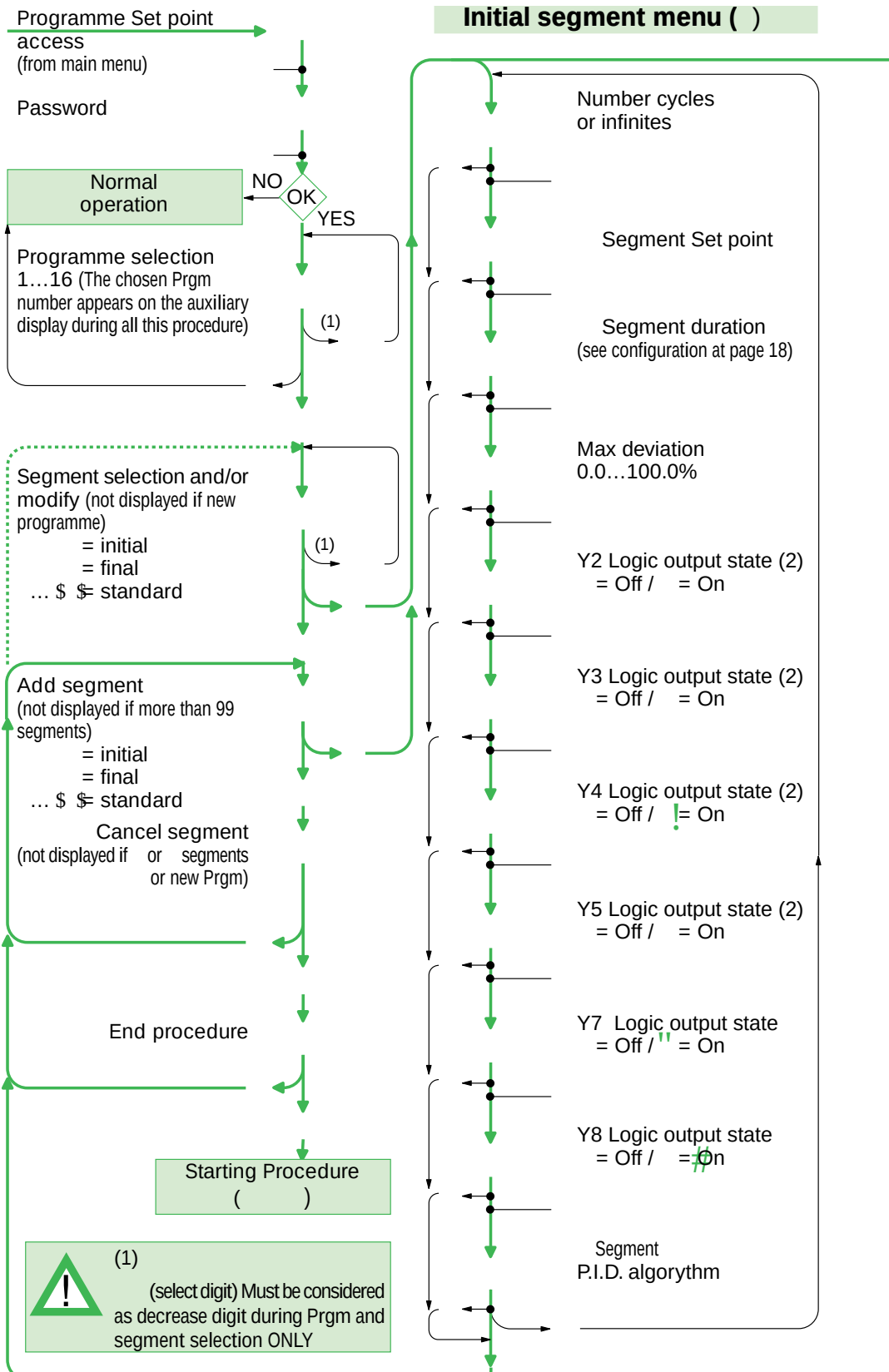
B. Steady



7.4.4• Out of Maximum deviation ( )

When process variable is greater than the entered “Maximum deviation” ( ), the time counting of carrying out segment goes to a stand-by condition, up to the process variable come back into the “Maximum deviation". The carrying out segment duration is +

7.5• Programme loading and/or modifying



For all segments:	next segment
	select parameter

Final segment menu

Segment Set point

Y2 Logic output state (2)
= Off / = On

Y3 Logic output state (2)
= Off / = On

Y4 Logic output state (2)
= Off / = On

Y5 Logic output state (2)
= Off / = On

Y7 Logic output state
= Off / = On

Y8 Logic output state
= Off / = On

Segment
P.I.D. algorythm

(2) Displayed if previously configured to the programme
(**Table P, Q, R, S,** cod. , ,!)

(3) Each parameter mnemonic code has an identification number (two digits) corresponding the selected segment

(4) During a new segment addition, the controller displays the equal parameter values to the previous segment

Standard segment menu (... $)

(4) (3) Segment Set point

(4) (3) Segment duration
(see configuration at page 18)

(4) (3) Max deviation
0.0...100.0%

(4) (3) Y2 Logic output state (2)
= Off / = On

(4) (3) Y3 Logic output state (2)
= Off / = On

(4) (3) Y4 Logic output state (2)
= Off / = On

(4) (3) Y5 Logic output state (2)
= Off / = On

(4) (3) Y7 Logic output state
= Off / = On

(4) (3) Y8 Logic output state
= Off / = On #

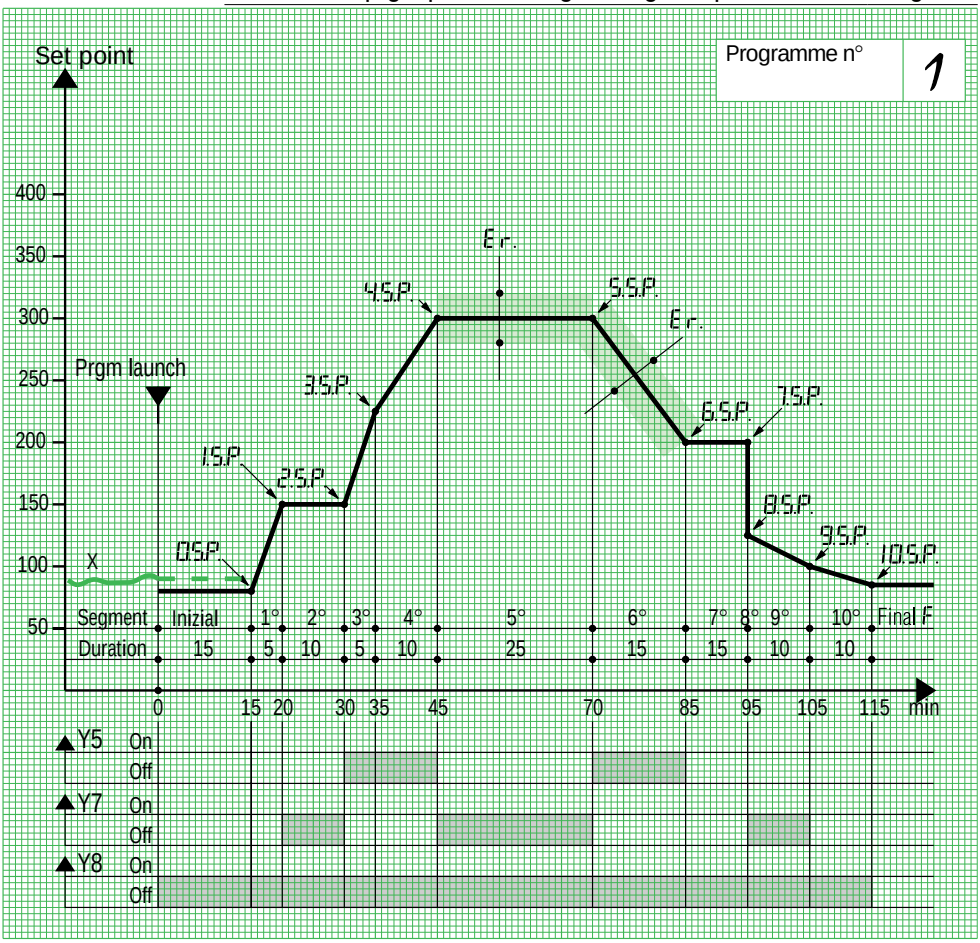
(4) (3) Segment
P.I.D. algorythm

7.6• PRGM Programming Guide

A¥ Enter the following data, previously selected during Configuration phase

	Segment duration	0 9999 sec ☐	0 999,9 min ☐	0 9999 min ☑	0...999,9 hours ☐	0...9999 hours ☐
	Logic Output	Y2 State ☑	Y3 State ☐	Y4 State ☐	Y5 State ☐	Y7 Programma ☑
		Y2 Max dev. ☐	Y3 Max dev. ☑	Y4 Max dev. ☑	Y5 Max dev. ☐	
		Y2 Programme ☐	Y3 Programme ☐	Y4 Programme ☐	Y5 Programme ☑	Y8 Programme ☑

B¥ Draw the prgm profile, linking the Logic output state to each segment

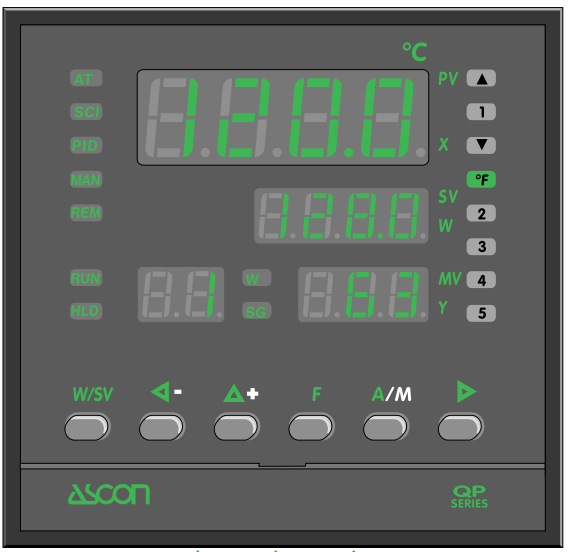


C¥ Complete the herebelow table with the requested Prgm data

Description	N° of cycles	Set point	Duration	Max dev.	Output Y2	Output Y3	Output Y4	Output Y5	Output Y7	Output Y8	PID algor.
range.	0...9999			0,0...100,0%	0 = Off / 1 = On						1 o 2
Cod./n° seg.	PrG9	SP.	du.	Er.	Y2	Y3	Y4	Y5	Y7	Y8	PA
Initial		0 80	0 15	0 100.0	0 0	0 0	0 0	0 0	0 0	0 1	0 1
Final		F 85			F 0	F 0	F 0	F 0	F 0	F 1	F 1
1°		1 150	1 5	1 100.0	1 0	1 0	1 0	1 0	1 0	1 1	1 1
2°		2 150	2 10	2 100.0	2 0	2 0	2 0	2 0	2 0	2 1	2 1
3°		3 225	3 5	3 100.0	3 0	3 0	3 0	3 0	3 0	3 1	3 1
4°		4 300	4 10	4 100.0	4 0	4 0	4 0	4 0	4 0	4 1	4 2
5°		5 300	5 25	5 3,0	5 0	5 1	5 0	5 0	5 1	5 1	5 2
6°		6 200	6 15	6 3,0	6 0	6 0	6 1	6 1	6 0	6 1	6 2
7°		7 200	7 10	7 100.0	7 0	7 0	7 0	7 0	7 0	7 1	7 1
8°		8 125	8 0	8 100.0	8 0	8 0	8 0	8 0	8 0	8 1	8 1
9°		9 100	9 10	9 100.0	9 0	9 0	9 0	9 0	9 0	9 1	9 1
10°		10 85	10 10	10 100.0	10 0	10 0	10 0	10 0	10 0	10 1	10 1

7.7• Command selection and operating phases

The Command selection can be done by 3 different ways:



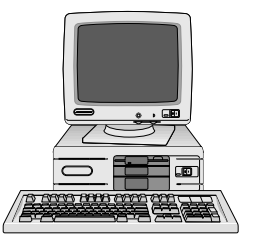
RS485 Mod Bus/Jbus

Keyboard

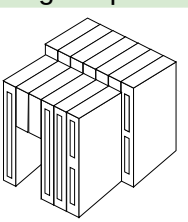
& Set point menu
Command selection

Enter value
Enter the selected value

By Serial comm.s



Logic inputs

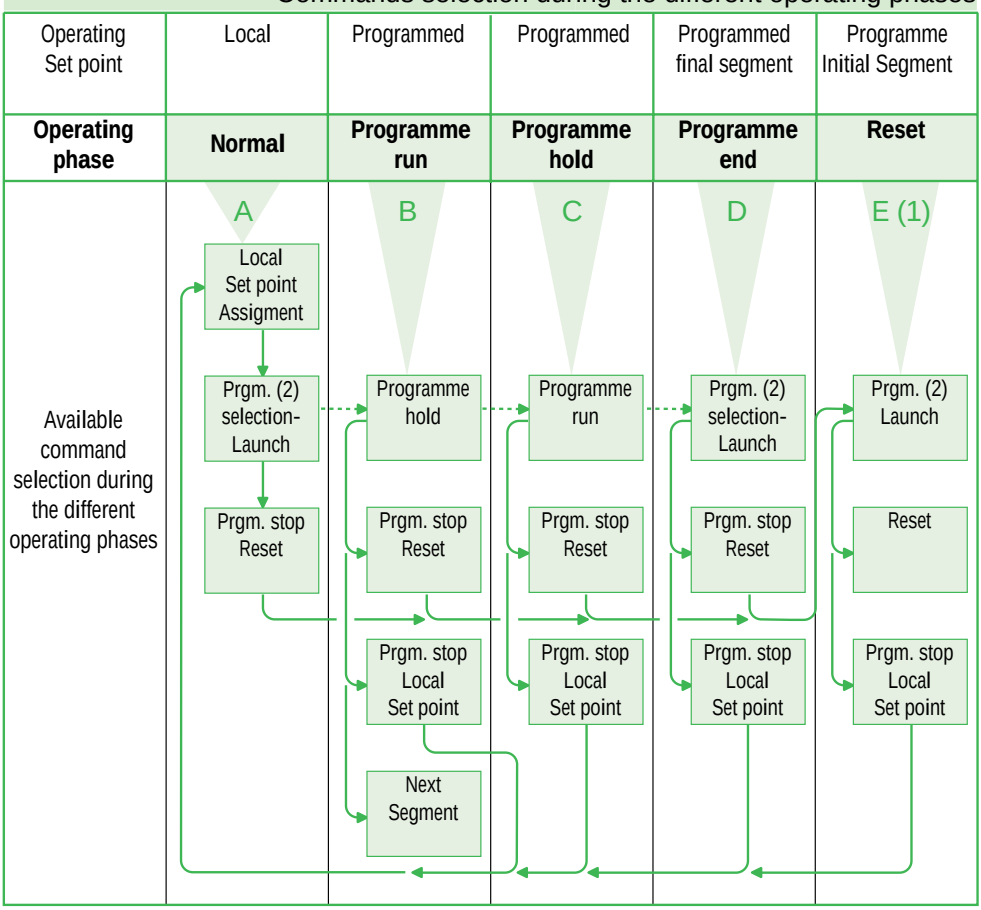


see page 36

The command selection depends on the operating phases.
The 5 available phases are the following:

A Local Set point mode
B Programme run mode
C Programme hold mode
D Programme end (final segment) mode
E Reset mode

Commands selection during the different operating phases



To better understand the meaning of the above flow chart, the operating phases have been shown in a sequence way. For modifying procedure and command activation please see the herewith enclosed. Operating Instructions sheet (Chapter 8.3 Set point Menu for Programmable Set point version).

Notes
1) After the programme stop; the controller goes to a specific mode: Reset condition, ready to start with the segment of the programme.

2) During the above phases the programme can be selected if it has not already done by the auxiliary input (see page 7).

7.8• Logic inputs IL1, IL2, IL3

Each logic input can be freely configured to perform one of the available functions during the proper configuration phase. An external logic signal shall be of the maintained type. The following type of logic inputs can be accepted to do this: isolated contact, NPN o.c. or TTL o.c. outputs. The function is operating when the logic input is “ON”, while the logic input is “OFF” when the function must be inhibited.
“ON” logic inputs have the priority with respect to the keyboard and Serial comm.s controls.

Function		Code	Logic input state Off	On	Notes
None					
Manual control			AUTO	MAN	
Locked keyboard		"	UNLOCK	LOCK	Logic and Serial comm.s controls can be used during lock condition 2nd PID algorythm
Y1 forcing value			Std mode	Active	
Standard Set point version	1st memorized Set point.		Local Set point	Active	If more than one logic input are simultaneously ON, the last request will be operating
	2nd memorized Set point.		Local Set point	Active	
	3rd memorized Set point	!	Local Set point	Active	
	Remote Set point		Local Set point	Active	
	2nd PID algorythm	#	1st PID set	Active	
	Y1=Remote Set point input	$	Std mode	Active	
Local Set point (1)		,	Remote Set point	Active	Standard Set point version
			Prgm Set point		Programmable Set point version (when local mode, it stop the programme carrying out)
Programmable Set point version	Programme launch/stop		STOP	LAUNCH	If ON condition is maintained the prgm runs to the end. If during the programme the condition changes (OFF) the controller switches on Prgm stop - Reset condition
	Programme run/hold		HOLD	RUN	If ON condition is maintained the prgm runs to the end. If during the programme the condition changes (OFF) the controller switches on Prgm. - Hold condition
	Programme launch + run / hold	!	HOLD	LAUNCH RUN	OFF condition holds the programme With ON the programme runs when: - Local mode - Final segment of another Prgm -after Hold condition (OFF)
	Programme Reset			RESET	When ON during the programme carrying out, the controller switches on Prgm stop - Reset condition
	Hold (to Local Set point)	'	RUN	HOLD	When ON during the programme carrying out, the controller switches on Hold condition. With OFF the Prgm runs again.
	Next segment	"		OK	When ON , the programme goes to the beginning of th next segment
	Reset		#	OK	The ON condition resets the segment time, during the steady segment type only. It causes a new start of the same segment from the beginning

1) When the controller works on Local mode , the logic inputs (associated to the programme) are inhibited.

8 OPERATING INSTRUCTION

see enclose leaflet

9 TECHNICAL DATA

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Features at env. 25°C	Description			
Total configurability	From the keyboard or serial line, with a guided menu, you can choose, in sequence: type of control, operational mode, inputs, outputs, Set points and insert all control parameters.			
Operational mode	1 Loop with single/double output			
Control mode	Algorythm	On-Off, P.I.D., PID + FUZZY and PID " with "three point stepping" output		
	Proportional Band (P)	0.5É999.9%	Escludable	
	Integral time (I)	0.0É100.0 min		
	Derivative time (D)	0.00É10.00 min		
	FUZZY intensity	0.0É90.0%		
	Balance output shift	0É100%	For P. and P.D. algorythm	
	Cycle time	1É200 sec.	For discontinuous output	
	Hysteresis	0.01É10.00%	For On-Off algorythm	
	Dead zone	0.0É5.0%	For PID algorythm to double action (heat-cool)	
	Cool Relative gain	0.1É3.0		
	Valve stroke time	15É600 sec	For servomotors output	
	Output dead zone	0.1É10.0%		
	Potentiometer	100ΩÉ10K Ω		
Input measure X1 (see page 18)	Common characteristics	A/D converter with 50.000 points Sampling time: 0.5 to 30.0 sec. configurable Input shift: -60É+ 60 digits Input filter: 0É30 sec.s (excludable)		
	Accuracy	0.2% ± 1 digit (T/C, RTD) 0.1% ± 1 digit (mA e V)	Between 100É240V ac, error is irrelevant	
	Thermoresistance	Pt100Ω a 0 °C (IEC 751) With °C/°F/°K selection	2 or 3 wires connections	Line: 20Ω max (3 wires) Thermal drift: 0.1°C/10°C env. T. <0.5°C/10Ω line R.
	Thermocouple	L,J,T,K,R,S,B,N,E,W (IEC 548) With °C/°F/°K selection	Internal or external cold joint compensation in °C/°F/K	Line: 150Ω max Thermal drift: <2µV/°C.env. T. <5µV/10Ω line R.

Features at env. 25°C	Description				
Input measure X1 (see page 18)	Continuous current	4Ė 20mA,0-20mA Ri=30Ω	Engineering units, floating point, with or without sq.rt. extraction L.R. -999Ė 9999 H.R. -999Ė 9999 (min 100 digits)	Input drift: <0.1%/20°C env. T.	
	Continuous voltage	0-20mV, 0-50mV Ri=10 MΩ			
		0-1/1-5/0-5/0-10V Ri=10kΩ			
Auxiliary inputs	3 of logic type	Permanent closure of external associated command allow:	Auto/Man switching, local/Remote Set point selection, recall of 3 stored Set points, keyboard lock. 2nd PID algorythm, (only for Std. Set point version) Y1 = Remote Set point Y1 = forcing value Run, hold, reset, etc. of the programme (only for Prgm Set point version (QPĖ 1)		
Main outputY1	Single or double, with direct or reverse action				
	Lower limit	0Ė 90%(channel ▲)			
	Upper limit	100Ė 10% (channel ▲) -100Ė -10% (channel ▼)			
	Safety value	0Ė 100%,-100Ė 100% (for double output)			
	Forcing value	0Ė 100%,-100Ė 100% (for double output) from Logic input			
	Discontinuous	Double action relay, 2 contats N.O., 5A/250Vac, 2x10 5 transitions			
		Logic	0-22Vdc, 20mA max for solid state relay	Galvanically isolated: 500 Vac/1min s.c. protection	
	Continuous	Current	0-20mA, 4-20mA 750Ω/15Vdc max	Galvanically isolated: 500 Vac/1min s.c. protection Resol.: 12 bit (0.025%) Accuracy: 0.1%	
		Voltage	1-5V,0,5V,0-10V 500Ω/20mA max		
	"Three Points Stepping"		Double action relay 2 Contats NO, 5A/250Vac, 2 x 10 5 transitions		
Y2-Y3-Y4-Y5 auxiliary outputs	Relay with contact NO, 5A/250Vac, 2x10 5 transitions - Hysteresis 0,01Ė 10,00%				
	Action mode	Active high	Active type	Deviation Set point	± 300 digits
				Band Set point	0Ė 300 digits
		Active low		Independent Set point	from Beginning to Full sc.
				Set point to Y1	0Ė 100%
		Special functions	Input interruption (only for thermoelements, 4Ė 20mA, 1Ė 5V		
			Maximum deviation (only for Prgm Set point version)	Time programmed & associated to the programme	
	Safety state		enabled or not enabled with NO or NC contact		
Y6 auxiliary analogic output (option)	Galvanically isolated: 500Vac/1 min Protected by s.c. 12 bit (0.025%) Tollerance: 0.1%	In current: 0-20mA, 4-20mA 750Ω/15V max	Measure X retransmission		
			Set point W retransmission		
		In voltage: 1-5V, 0-5V, 0-10V 500Ω/20mA max	Y1 output (channel ▲) retransmission		
			Y1 output (channel ▼) retransmission		
			Error retransmission 0Ė 25% of range		
2 logic outputs (Y7-Y8)	Open collector, 500 Vac isolation Vac max/1 min. 30 mA max, 28 Vdc (OFF status) Voltage drop: 1 Vdc max - 30 mA		Only for Prgm Set point version (time programmed & associated to the programme)		
Set point	Up or down ramp can be set in digits/min. between 0.0Ė 10.0% of the range Limits: lower to upper can be set separately within the range		Local only	Standard Set point	
			Local and 3 memorized		
			Remote only		
			Local and Remote		
			Local+(Local and Remote)		
			Programmable		

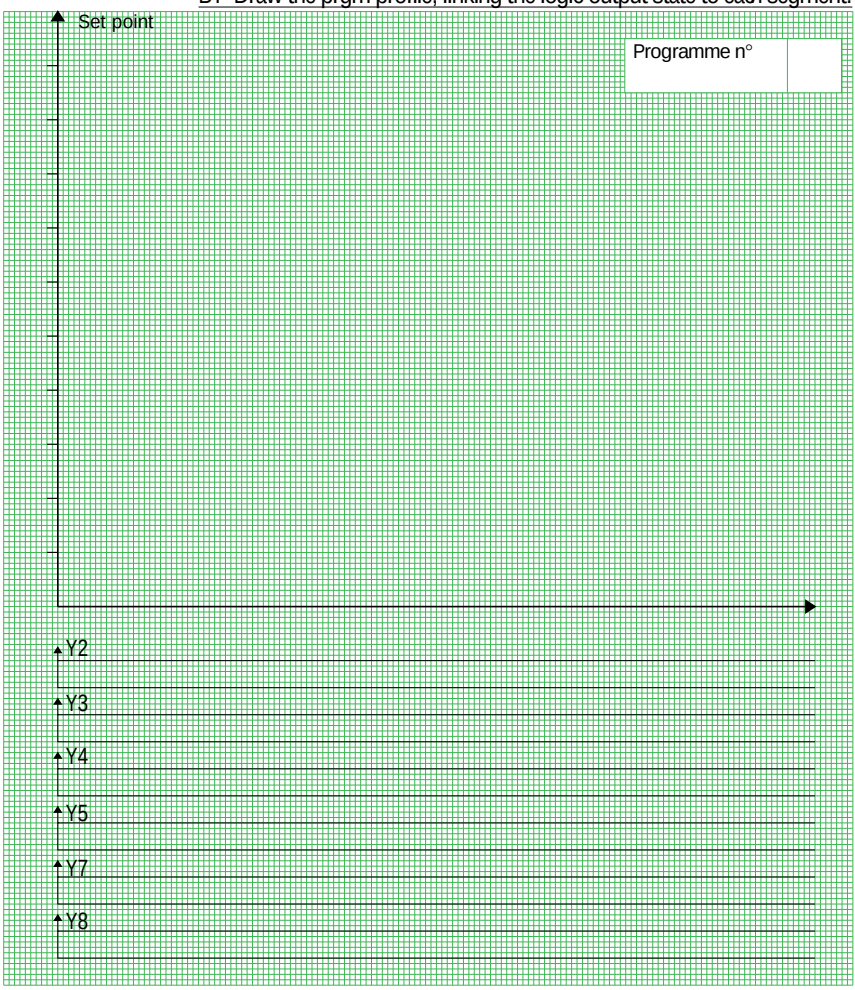
Features at env. 25°C	Description		
Remote Set point (Not available with programmed Set point option)	Non isolated Accuracy 0.1%	Current: 0-20mA, 4-20mA Ri = 30Ω	Bias in engineering units (-100% + 200%) (compatible with display)
		Voltage: 1-5V, 0-5V, 0-10V Ri = 300 kΩ	Ratio from -9.99É + 10.00
			Sum Local Set point + Remote Set point
Programmed Set point (Option)	16 programms max, 99 segments/program max, 255 segments total. From 1 to 9999 repetitions / program or infinite. Time base configurable in seconds, minutes, hours. Priority of duration or slope (in case of anomalies). Up to 6 logic outputs and ' logic inputs, programmable and related to the program. Selection between the 2 available sets of PID parameters for each segment. Auxiliary voltage input for selecting the program remotely. Run, hold, reset, etc., excludable from the keyboard, logic inputs and via serial port.		
Auto-tune	With "Natural Frequency", method, Tuning can occur at a Set point change or during process steady conditions, with launch enabling index.		
Auto-Man station	Incorporated, with Bumpless action Auto-Man transfer via keyboard, logic input and serial communications		
Serial Comm.s (option)	RS 485, Modbus, Jbus protocol, 1200,2400,4800,9600 bit/sec., 2 wires (read only or read write or supervision system local mode)		
Auxiliary power supply	24 Vdc ± 10%, 50 mA max Up to 2 external transmitters (2, 3 o 4 wires connection)		
Operational security	Main input	Out of range or hardware failure (short or open circuit) is monitored and the outputs are forced to security values	
	Control output	Settable security value: 0É 100%, -100É +100% (for double action)	
	Auxiliary outputs	Security status can be configured: excluded, N.O. or N.C.	
	Parameters	All parameters values are saved for unlimited time in non volatile memory. Subdivided into 5 homogeneous groups, configurable as: visible and modifiable, visible or not modifiable, invisible.	
General features	Access keys	"Password" for accessing the V° group of parameters, to programming parameters for the Set point and for the configuration..	
	Power supply	100É 240V, 50/60 Hz, -15É +10% (250 Vac max) or 16É 28V, 50/60 Hz e 20É 30Vdc Absorbed power 5VA max	
	Electric safety	EN61010, installation category II° (2500V), pollution level 2	
	Electromagnetic compatibility	According to norms required for CE brand for systems and industrial apparatus	
	Environmental	KWF according to DIN 40040, working ambient temperature 0É 50°C	
	Protection according to DIN40050	P 20 (terminal block), P 30(case), IP54 (front panel) or IP67 with kit F10-435-2A101, material guard UL 94 V11	
	Dimensions: 96 x 96 DIN, depth: 154.5 mm, weight: 0.8 kg appr.		

7.6• PRGM Programming Guide

A¥ Enter the following data, previously selected during Configuration phase

	Segment duration	0÷9999 sec.s ☐	0÷999,9 min. ☐	0÷9999 min ☐	0...999,9 hours ☐	0...9999 hours ☐
	Logic Output	Y2 State ☐ Y2 Max der. ☐ Y2 Programme ☐	Y3 State ☐ Y3 Max der. ☐ Y3 Programme ☐	Y4 State ☐ Y4 Max der. ☐ Y4 Programme ☐	Y5 State ☐ Y5 Max der. ☐ Y5 Programme ☐	Y7 Programme ☐ Y8 Programme ☐

B¥ Draw the prgm profile, linking the logic output state to each segment.



C¥ Complete the herebelow table with the requested Prgm data

Description	N° of cycles	Set point	Duration	Max der.	Output Y2	Output Y3	Output Y4	OutputY5	OutputY7	Output Y8	PID algor.
range	0...9999			0,0...100,0%	0 = Off / 1 = On						1 o 2
Cod./n° seg.											
Initial											
Final											
1°											
2°											
3°											
4°											
5°											
6°											
7°											
8°											
9°											
10°											
11°											
12°											
13°											
14°											
15°											
16°											
17°											
18°											
19°											
20°											

GUARANTEE

The equipment is guaranteed free from manufacturing defects for 1 year after installation, for a maximum of 18 month after delivery.
Faults caused by use other than that described in the operating instructions are excluded from the guarantee.

CE conformity

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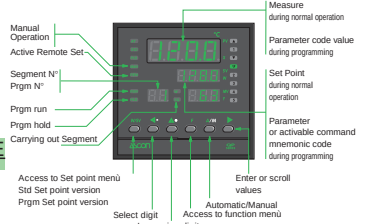
We declare that this instrument is in conformity with the following Standards for Industrial enviroment:

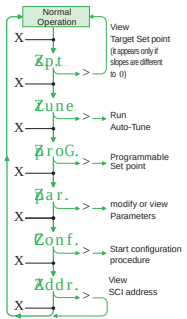
EN 50081-2	Electromagnetic compatibility Generic emission standard
EN 50082-2	Electromagnetic compatibility Generic immunity standard
EN 61010	General safety requirements for electrical equipments

E

Keys and displays functions



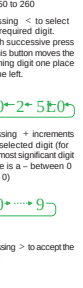
8.0• Function menùi



8.1• Modification of a numeric field

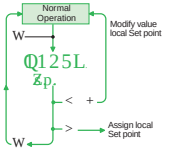
It is possible to modify any numeric field by changing each digit in turn.

Example: to change 250 to 260

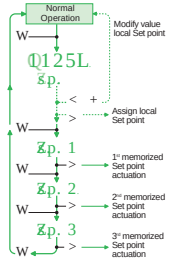


8.2• Standard Set point Menu

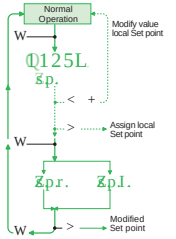
8.2.1• Local only



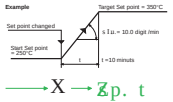
8.2.2• Locale+ 3 memorized Set

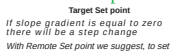


8.2.3• Local + Remoto



Note:
After the Set point has been modified the new target Set point will be reached after a period of time, depending upon the values entered in the `SLu` *(Slope up) and* `SLd` *(Slope down) gradient parameters.*



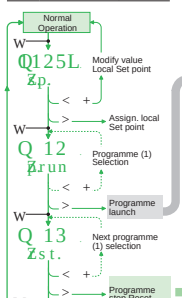


If slope gradient is equal to zero there will be a step change

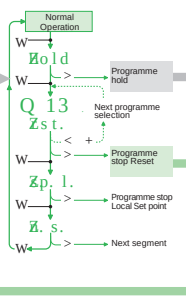
With Remote Set point we suggest, to set `SLu` *and/or* `SLd` *to 0 (zero)*
The new Set point value which must be reached, it is called ***"target Set point "****.*
It appears under `SPcode` *during the main men scrolling.*

8.3• Programmable Set point menu, (for each operating phase)

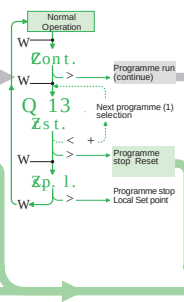
8.3.A• Local Set point mode



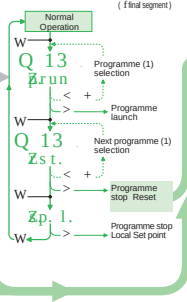
8.3.B• Programme carrying out



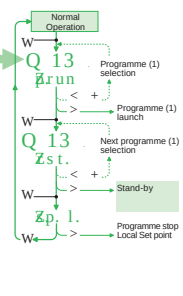
8.3.C• Programme Hold



8.3.D• Programme end (final segment)



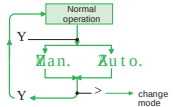
8.3.E• Reset

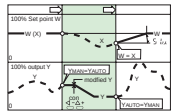


To end each phase without actions. Press W until the routine goes out or wait 30 sec.s without pressing any key.

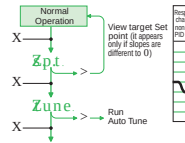
Note:
(1) Not available selection if already selected by external logic command (see page 7).
The controller display the external prgm number which is visible but not modifiable

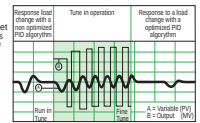
8.4• Auto Man





8.5• Auto Tune





8.6• Page scrolling

8.6.1•Auxiliary display Possible combination during the different operation phases

Local Set point by P.C. (normally off)	Programme Stand-by when out of max dev. fix loght when into max dev.	Programme end final segment
Programme carrying out (segment n°25)	Programme Stand-by from keyboard, logic inputs, serial comm.s or if manual mode. (segment n° 28)	Programme Reset

8.6.2• Pages

During the programme carrying out, it is possible to select different "pages". They display the control variables, programme and segment data, in a cycling way. This selection can be done pressing time to time the > key.
This selection is inhibited when out of Normal operation.