E

ASCON TECNOLOGIC

DIN-rail mounting temperature controller with current transformer input

82 SERIES

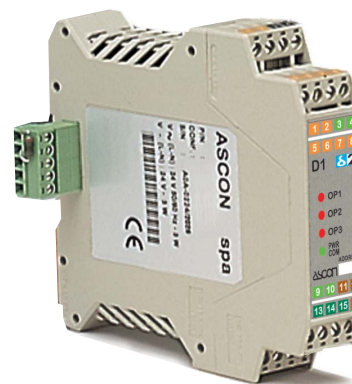## D1 line
User manual

D1 line

CE

C UL US LISTED

Table of contents
- Resources
- Model code
- Description and table of standard parameters
- Description and table of special function parameters
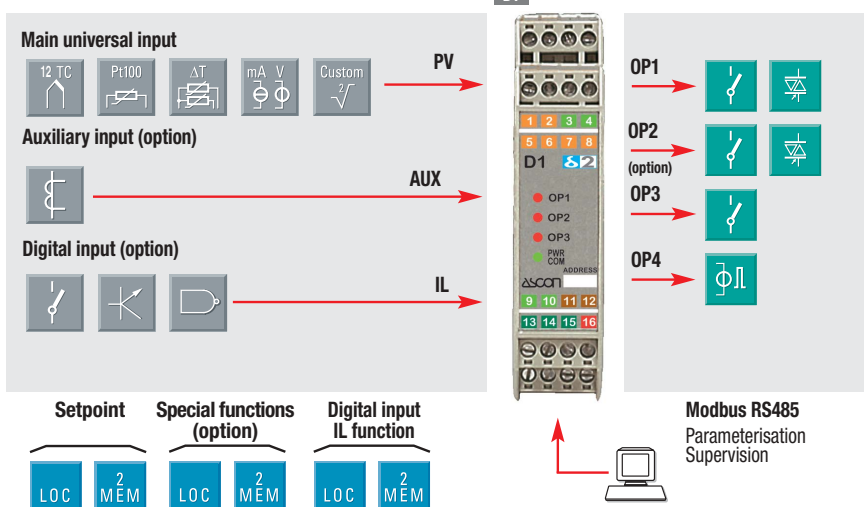- Technical specifications

---

Resources

D1

Main universal input

| 12 TC | Pt100 | ΔT | mA V | Custom |

→ PV

Auxiliary input (option)

→ AUX

Digital input (option)

→ IL

OP1 →
OP2 (option) →
OP3 →
OP4 →

Modbus RS485
Parameterisation
Supervision

Setpoint	Special functions (option)	Digital input IL function
LOC / 2 MEM	LOC / 2 MEM	LOC / 2 MEM

Operating mode

	Control 🕐			Alarms 🔔		
1	Single action	OP1			OP2	OP3
2		OP4	OP1		OP2	OP3
4	Double action (option)	OP1	OP2			OP3
5		OP1	OP4		OP2	OP3
6		OP4	OP2	OP1		OP3

Fuzzy tuning with automatic selection

One shot Auto tuning

One shot Natural frequency

Model code

	Model			Configuration	
Mod.	D 1	5 B 5 D - E F 0 0	/	I L M N - O P Q R	
	Line	Basic Accessories		1st part 2nd part	

The product code indicates the specific hardware coniguration of the instrument, that can be modified by specialized engineers only

Line	D 1

Output OP1-OP2	**B**
Relay - Not fitted	0
Relay - Relay	1
SSR - Not fitted	3
SSR - SSR	5

Options	**D**
None	0
Current transformer (CT)	3

Special functions	**E**
None	0
Start up + Timer	2

User manual	**F**
Italian/English (standard)	0
French/English	1
German/English	2
Spanish/English	3

Input type and range			**I**	**L**
TR Pt100 IEC751	-99.9…300.0 °C	-99.9…572.0 °F	0	0
TR Pt100 IEC751	-200…600 °C	-328…1112 °F	0	1
TC L Fe-Const DIN43710	0…600 °C	32…1112 °F	0	2
TCJ Fe-Cu45% Ni IEC584	0…600 °C	32…1112 °F	0	3
TC T Cu-CuNi	-200 …400 °C	-328…752 °F	0	4
TC K Chromel-Alumel IEC584	0…1200 °C	32…2192 °F	0	5
TC S Pt10%Rh-Pt IEC584	0…1600 °C	32…2912 °F	0	6
TC R Pt13%Rh-Pt IEC584	0…1600 °C	32…2912 °F	0	7
TC B Pt30%Rh Pt6%Rh IEC584	0…1800 °C	32…3272 °F	0	8
TC N Nichrosil-Nisil IEC584	0…1200 °C	32…2192 °F	0	9
TC E Ni10%Cr-CuNi IEC584	0…600 °C	32…1112 °F	1	0
TC NI-NiMo18%	0…1100 °C	32…2012 °F	1	1
TC W3%Re-W25%Re	0…2000 °C	32…3632 °F	1	2
TC W5%Re-W26%Re	0…2000 °C	32…3632 °F	1	3
Dc input 0…50mV	Engineering units		1	4
Dc input 10…50mV	Engineering units		1	5
Custom input range			1	6

Control mode		**M**
ON-OFF reverse action		0
ON-OFF direct action		1
P.I.D. single reverse action		2
P.I.D. single direct action		3
P.I.D. double action	Linear cool output	4
	ON-OFF cool output	5
	Water cool output	6
	Oil cool output	7

Output configuration		**N**
Single action	Double action	
Relay	Heat Relay, Cool Relay	0
SSR drive	Heat Relay, Cool SSR Drive	1
	Heat SSR Drive, Cool Relay	2

Alarm type and function		**O**	**P**	**Q**
AL1, AL2 and AL3	AL..	1	2	3
Disabled or used by Timer (AL3 only)		0	0	0
Sensor break/LBA		1	1	1
Absolute	active high	2	2	2
	attivo basso	3	3	3
Deviation	active high	4	4	4
	attivo basso	5	5	5
Banda	active out	6	6	6
	active in	7	7	7
Heater Break from CT	active during ON output state	8	8	8
	active during OFF output state	9	9	9

Setpoint type	**R**
Local only	0
Local and 2 tracking stored Setpoint	1
Local and 2Stand-by stored Setpoint	2

Standard parameters description

Configuration parameters, shown in the parameters table, have been divided into groups with homogeneous functionalities. The parameters described hereafter are in the same order as they are listed in the parameters table.

Configuration

IL — **Digital input function**

Table 1

Not used
PV measure hold
Auto/Man
1st stored Setpoint
2st stored Setpoint
Run Timer

unit — **Engineering units**

Table 2

C (degree Centigrade)	A (Ampere)
°F (degree Fahrenheit)	bar
- None	psi
mV (millivolt)	Rh
V (Volt)	pH
mA (milliampere)	

Setpoint (SP)

A1S.P — **AL1 threshold**
A2S.P — **AL2 threshold**
A3S.P — **AL3 threshold**

Alarm occurrences of OP1,OP2 and OP3 outputs, respectively linked to AL1, AL2 and AL3.
The range of the alarm threshold correspond to the whole span and it is not limited by the SP Setpoint span.

SL. u — **Setpoint ramp up**
SL. d — **Setpoint ramp down**

This parameter specifies the maximum rate of change of the SP in digit/min. The SP value is reached according to the configured rate of change. The new SP value is called "Target SP" (available via serial communications).
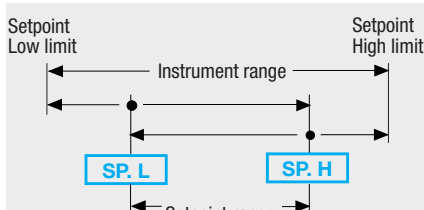
Example:
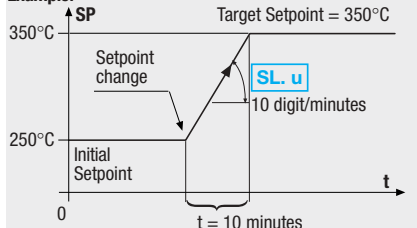
When the parameter is **OFF**, this function is disabled and the new Setpoint is reached immediately after being entered.

SL. u — **Setpoint low limit**
SL. d — **Sepoint high limit**

Low / high limit of the Setpoint value.

SP. 1 — **1st stored SP**
SP. 2 — **2nd stored SP**

Values of the two Setpoints, that are activated by mean of digital input or communications parameters. If configured with "**Tracking**", the previous Local Setpoint value will be lost, when the stored Setpoint is selected.
If configured with "**Stand-by**" the Local Setpoint value will not be lost, when the Stand-by Setpoint is selected. It will operate again when back to Local.

Table of standard parameters

Configuration

Mnemonic code	Parameter description	Range	Units	Factory setting	Notes
IL	Digital input function IL	see table 1		**not used**	
PStr	Instrument position	**Alone/left side/central/right side**		**Alone**	
Unit	Engineering unit	see table 2		**none**	
Sc.dd	No. of decimals	0...3		**0**	Linear scales only
SC.Lo	Low range	-999...9999	engineer. units	**Low range**	Minimum range 100 digit
Sc.Hi	High range	-999...9999	engineer. units	**High range**	
Prot	Communications protocol	Modbus/Jbus		**Modbus**	
baud	Baud rate	1200, 2400, 4800, 9600 baud		**9600**	
O.c.rb	Enhanced Overshoot management	0.2...5.0		**0.5**	P.I.D. only

Setpoint

Mnemonic code	Parameter description	Range	Units	Factory setting	Notes
A1S.P	AL1 alarm threshold	PV range	engineer. units	**0**	not enabled if the controller has been configured with alarm not active or with sensor break alarm
A2S.P	AL2 alarm threshold	PV range	engineer. units	**0**	
A3S.P	AL3 alarm threshold	PV range	engineer. units	**0**	
SL. u	Setpoint ramp up	OFF/0.1...999.9	digit/min	**inhibited**	With OFF the new Setpoint is reached immediately after being entered.
SL. d	Setpoint ramp down	OFF/0.1...999.9	digit/min	**inhibited**	
SP. L	Setpoint low range	low range...SP. H	engineer. units	**low range**	
SP. H	Setpoint high range	S.P L...high range	engineer. units	**high range**	
SP. 1	1st stored Setpoint	PV range	engineer. units	**----**	
SP. 2	2nd stored Setpoint	PV range	engineer. units	**----**	
SP	Setpoint	PV range	engineer. units	**----**	

Control mode

Mnemonic code	Parameter description	Range	Units	Factory setting	Notes	Algorithm type
hy	Control output hysteresis	0.1...10.00	% PV range	**0.5**		**ON - OFF**
tune	Tune run/stop	**Start/stop**				
P.b.	Proportional band	0.5...999.9	% PV range	**5.0**		
t.i.	Integral time	OFF/0.1...100.0	min	**5.0**		
t.d.	Derivative time	OFF/0.01...10.00	min	**1.00**		
O.C.	Overshoot control	0.01...1.00		**1.00**	Setting 1 is disabled	
M.res	Manual reset	0.0...100.0	% ouput	**50.0**	Without integral time	**P.I.D.**
d.err	Error dead band	OFF/0.01...10.0	digit	**inhibited**		
t.c.	Cycle time	1...200	s	**20**	Time proportional only	
OP. H	Control output high limit	10.0...100.0	% ouput	**100.0**		
S.Out	Control output safety value	0.0...100.0	% ouput	**0**	-100.0...+100.0 Heat/Cool	
dbnd	Dead band	-10.0...10.0	% ouput	**0.5**		
r.C.G.a	Cool relative gain	0.1...10.0		**1**		**Heat/ Cool**
hy. C	Cool output hysteresis	0.1...10.0	% PV range	**0.5**	ON/OFF only	
t.c. C	Cool cycle time	1...200	s	**20**	Time proportional only	
OP. HC	Cool control output high limit	10.0...100.0	% ouput	**100.0**	P.I.D. only	
A.Man	Auto/man selection	Auto/Man		**Auto**		

Alarm and Auxiliary

| Mnemonic code	Parameter description	Range	Units	Factory setting	Notes
A1hy	AL1 hysteresis	0.1...10.0	% range	**0.5**	The same parameters are available for AL2 and AL3 alarms
A1LB	Alarm Latching and Blocking	**none/Ltch/Bloc/LtbL**		**none**	
t.Lba	LBA delay	OFF / 1...9999	s	**inhibited**	OFF = sensor break
St.OP	Soft-start output value	OFF/0.1...100.0	% ouput	**0.5**	t.mod = OFF only
St.tn	Soft-start activation time	1...9999	s	**1**	ONly if sT.OP different than OFF
t.Fil	Filter time costant	OFF/1...30	s	**inhibited**	
in.Sh	Input shift	OFF/-60...+60	digit	**inhibited**	
Addr	Communications address	1...247		**247**	
Ht.F.S.	CT primary high range	OFF/1...200	A	**100**	

Control mode

tune — **Automatic tune**

The Fuzzy Tuning determines automatically the best method to use to calculate the P.I.D. term, according the process conditions.

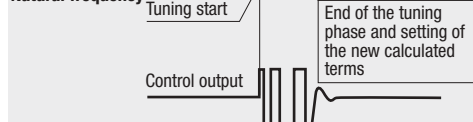**Method 1:**
STEP respose
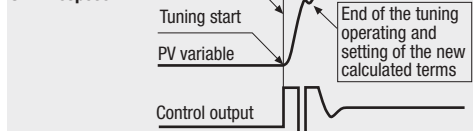
This type is selected when, at the start of the autotune operation, the PV is far from the Setpoint of more than 5% of the span.
This method has the big advantage of fast calculation, with a reasonable accuracy in the term calculation.

Method 2:
Natural frequency

This type is selected when the PV is close to the SP Setpoint.
This method has the advantage of a better accuracy in the term calculation with a reasonable speed calculation.

p.B. — **Proportional band**

This parameter specifies the proportional band coefficient that multiplies the error (SP - PV)

t.i. — **Integral time**

It's the integral time value, that specifies the time required by the integral term to generate an output equivalent to the proportional term. When OFF the integral term is not included in the control algorithm.

t.d. — **Derivative time**

It is the time required by the proportional term P to repeat the output provided by the derivative term D. When OFF the derivative term is not included in the control algorithm.

O.C. — **Overshoot control**

This parameter specifies the span of action of the overshoot control. Setting lower values (1.00 —> 0.01) the overshoot generated by a Setpoint change is reduced. The overshoot control doesn't affect the effectiveness of the P.I.D. algorithm. Setting 1, the overshoot control is disabled.

OC.rb — **Enhanced overshoot management**

Configuration parameter. Defines a zone across the Setpoint where the P.I.D. algorithm is not affected by overshoot control.
Setting range 0.2... 5.0.
Default value 0.5.
If OC.rb < 1 the non influenced zone is inside the proportional band, if OC.rb > 1 the non influenced zone is outside the proportional band
Reducing the OC.rb value causes higher overshooting effect and longer times in reaching the Setpoint.

Heat/Cool control

OC.rb (continue)

Increasing the OC.rb value increases the zone, near the Setpoint, in which the P.I.D. functions with its natural dinamic mode, this reduces the time in reaching the Setpoint.

Setting procedure for OC and OC.rb parameters

1. Set O.C. = 1 and OC.rb = 0.5 and observe the process behaviour.
2. If overshoot or undershoot is not acceptable, set O.C. = 0.5.
3. If overshoot or undershoot is still not acceptable, reduce the O.C. value.
4. If there is no overshoot o undershoot, record the time required by the PV to reach the Setpoint.
5. If the time required by the process variable to reach the Setpoint value is too long, gradually increase the value of "OC.rb" (suggested steps = 0.5).
6. If an acceptable time to reach the Setpoint cannot be obtained with "OC.rb" values up to 2, increase the O.C. value and repeat the procedure re-starting from item 3.

M.res   Manual reset

This specifies the control output value when PV = SP, in a PD only algorithm (lack of the integral term).

d.err   Error Dead Band

Inside this band for (PV - SP), the control output does not change to protect the actuator (output Stand-by)

t.c.   Control output cycle time
t.c. C   Cool output cycle time

It's the cycle time of the time proportioning control output. The P.I.D. control output is provided by the pulse width modulation of the waveform.

OP. H   Control output high limit
OP.HC   Cool output high limit

It specifies the maximum value the control output can be set. Separate parameters for both heat and cool outputs limitation are available.

S.Out   Output safety value

Output Value in case of input anomaly.

d.bnd   Dead band

It is the zone where it is possible to separate or overlap the heat and cool actions.

r.Cga   Relative cool gain

It permits to adjust the proportional cool action.

Auxiliary parameters

In.Sh   Input shift

This value is added to the measured PV input value. Its effect is to shift the whole PV scale of up to ±60 digits.

Addr   Controller address

The address range is 1... 247 and must be unique for each controller on the communications bus to the supervisor.
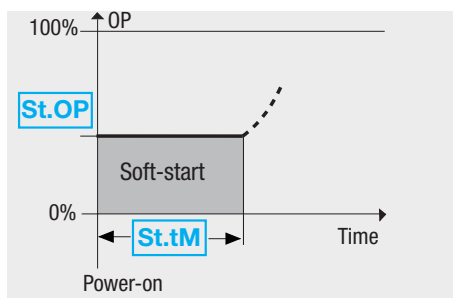
Soft-start control output function

St.OP   Soft-Start value

Value of the control output during the Soft-start activation time.

St.TM   Soft-Start activation time

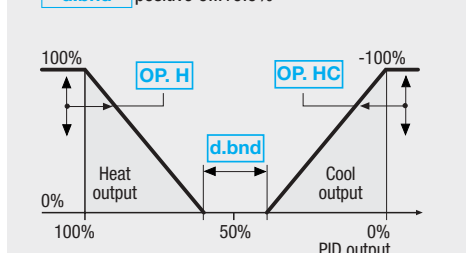Time duration (starting from the power on) of the Soft-start function.

By a sole P.I.D. control algorithm, the controller handles two different outputs, one of these performs the Heat action, the other one the Cool action. **It is possible to overlap the outputs.**
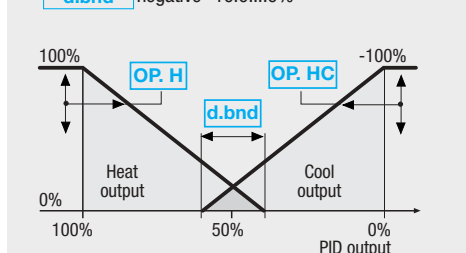
A - Heat/Cool actions separated
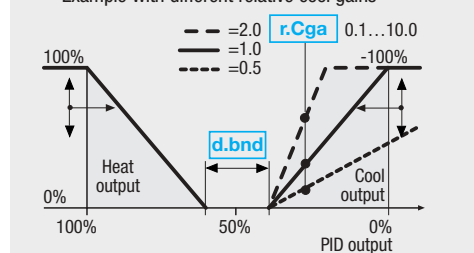
d.bnd   positive 0...10.0%

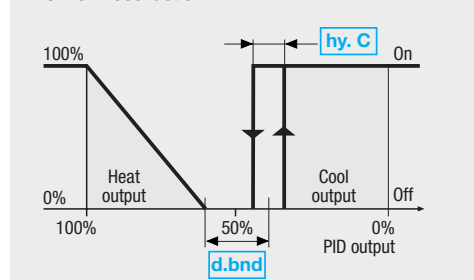**B - Heat/Cool actions overlapped**

d.bnd   negative -10.0....0%

C - Cool action adjusting

Example with different relative cool gains

r.Cga 0.1...10.0

D - ON-OFF Cool action

Alarm occurances of OP1 - OP2 - OP3 outputs, respectively linked to AL1 - AL2 - AL3
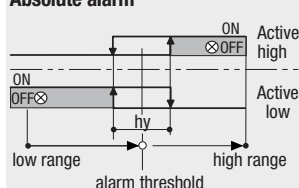
The relay/SSR output OP1, OP2 and OP3, can be used as alarm outputs only if they are not used as control outputs.
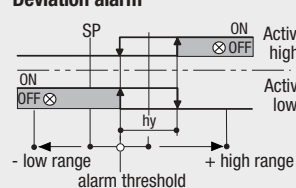
For each alarm is possible to configure:

A - The type and the operationg condition of the alarm
B - The functionality of the alarm acknowledgement
C - The blocking function on start-up
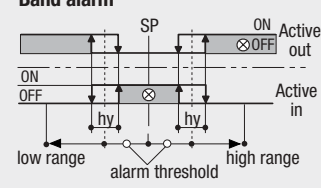D - Loop break or sensor break

A - Alarm type and function

Absolute alarm

Deviation alarm

Band alarm

B/C - Latching and blocking enable

A1L.b   AL1, AL2, AL3
A2L.b   latching and
A3L.b   blocking

For each alarm it is possible to select the following functions:
- none
- latching
- blocking
- both latching and blocking

Alarm acknowledge function

The alarm, once occurred, is maintained until to the time of acknowledgement.
The acknowledge operation is performed by serial communications.
After this operation, the alarm leaves the alarm state only when the alarm condition is no longer present.

D - "Loop Break Alarm" LBA or sensor break

t.Lba   LBA delay

Setting "none": the alarm works as Sensor break with immediate action.
Setting a value between 1 and 9999 s: the alarm intervention is delayed; if the alarm is caused by a sensor break, the intervention is immediate.
When the cause of the alarm disappears, the alarm status stops.

Start-up disabling

Ramp down

Ramp up

ΔSP Threshold = SP±range
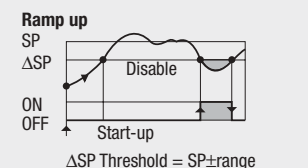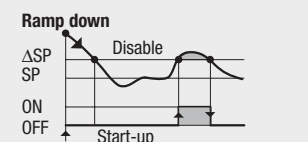
Input digital filter
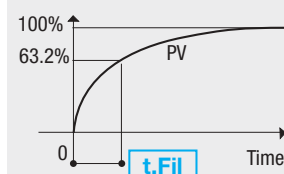
Time constant, in s, of the RC input filter applied to the PV input.
When this parameter is set to "inhibited" the filter is bypassed.

Special parameters description

- **Start-up**
- **Timer**

In order to have the above functions the product code digit $\boxed{E}$ **must be** $\boxed{2}$

For example: mod. D1 3100-2000

⚠️ **These functions are not available when the instrumen is configured for Heat/Cool control.**

1 To select these two functions to use set the parameter as in table 3:

$\boxed{\text{t.Mod}}$ **Timer/Start-Up operating mode**

This parameter defines (see table 3):
- When the count starts.
- The state of the control output at the end of the count

2 **To select the Start-up function** select the code $\boxed{1}$

3 **To select the Timer function** select the value between **2...6** and use alarm AL3 (output OP3) configured with configuration code $\boxed{Q} = 0$.

Example: conf. $\boxed{I}$ $\boxed{L}$ $\boxed{M}$ $\boxed{N}$ - $\boxed{O}$ $\boxed{P}$ $\boxed{0}$ $\boxed{R}$

Table 3

Timer/Start-up counting mode		Value
Disabled		0
Start-up function		1
Conting start time	End mode	
When inside the band	Control mode	2
	Output to 0	3
When launched	Control mode	4
	Output to 0	5
When launched with start-up and control	Control mode	6
When launched with stand-by Setpoint	Control mode	7

4 If Timer function is selected it will show the parameter above:

$\boxed{\text{t.Act}}$ **Timer action**

By this parameter can be defined:(see table 4)
- the time units
- the starting mode
- the OP3 status when the timer is running.
When the timer is not running, the OP3 takes the opposite status

$\boxed{\text{time}}$ **Timer setting**

Timer (1…9999 s/min.)

$\boxed{\text{S.P.SB}}$ **Stand-by Setpoint**

(only for $\boxed{\text{t.Mod}}$ = 7)(SP L…SP H)

Table 4

Time units	Strating mode	AL3 status [1]	Value
Seconds	Manual through serial communications	OFF	0
		ON	1
	Automatic at power ON [2]	OFF	2
		ON	3
Minutes	Manual through serial communications	OFF	4
		ON	5
	Automatic at power ON [2]	OFF	6
		ON	7

[1] If used by Timer

[2] Using this selection, manual starting mode is possible too (through the serial communications port)

Table of special function parameters - (if option installed)

Timer and Start-Up

Mnemonic code	Parameter description	Range	Units	Factory setting	Notes
t.Mod	Timer/Start-up operation mode	see table 3		0	
t.Act	Timer action	see table 4		0	Only for t.Mod ≠ to OFF and 1 ≠ to
time	Timer setting	1…9999	s/min	0.5	
S.P.Sb	Standy-By Setpoint	SP L…SP H		0	For t.Mod = 7
t.h.SU	Start-Up hold time	0…500	min	1	
S.P.SU	Setpoint di Start-Up	SP L…SP H		0	
OP.HS	Control output high limit during the Start-Up phase	5.0…100.0	% output	100.0	

Start-Up functions

Setting $\boxed{\text{t.Mod}}$ to **1**

Three parameters are associated to the Start-up function:

$\boxed{\text{t.h.S.U}}$ **Start-Up hold time**
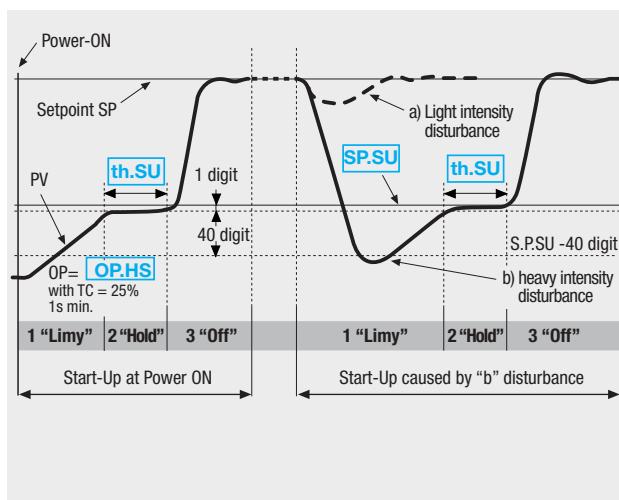
$\boxed{\text{S.P.S.U}}$ **Start-Up Setpoint**

$\boxed{\text{OP.HS}}$ **Control output high limit**

The Start-up function includes three phases:

1ª "Limy" - The control output is limited to the $\boxed{\text{OP.HS}}$

2ª "Hold" - The process variable is maintained to the Start-up Setpoint $\boxed{\text{S.P.SU}}$ for the time fixed by the parameter $\boxed{\text{t.h.S.U}}$

3rd "OFF" - When the $\boxed{\text{t.h.S.U}}$ time is elapsed the process variable is maintained to the working Setpoint.

Notes:

1 - The "**Hold**" phase starts when the process variable PV achieves the $\boxed{\text{SP.SU}}$ (with a tolerance of 1 digit).

2 - Whether the process variable, for any reason (e.g. load change), decreases at a value lower than ($\boxed{\text{OP.HS}}$ - 40 digits), the Start-up function starts again from the "**Limy**" phase.

3 - **When the Start-up is in Hold phase, if the local Setpoint becomes lower than the Start-up Setpoint** $\boxed{\text{SP.SU}}$ **or if the operating mode changes to manual, the Start-up function passes to the "OFF" phase.**


Timer counting modes

A - Counting start time inside the band, end in control mode

The time counting starts only when the error is inside a ±1 digit band. The control action is not affected by the Timer function.
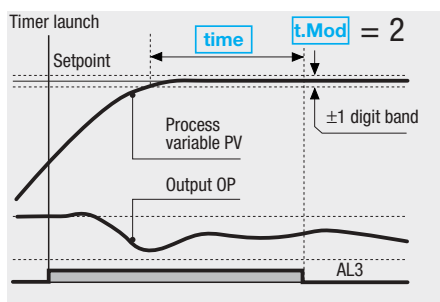
B - Counting start time inside the band, end with control output forced to zero

The time counting starts only when the error is inside a ±1 digit band. At the end, the control output is forced to zero [1].
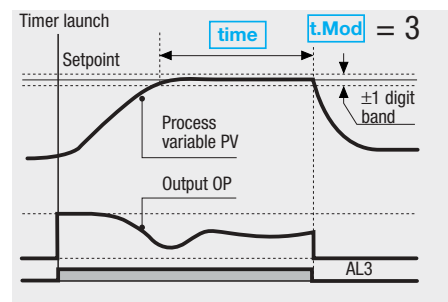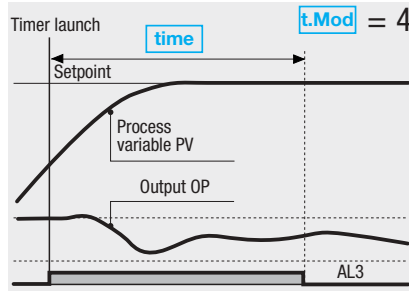

[1] When the Timer is not running the OP control output is forced to zero, also before the Timer launch.

## Special function parameters description

Timer function mode

C - Counting start time = timer launch time, end in control mode.

The time counting starts when the timer is launched. The control action is not affected by the Timer function.

**D - Counting start time = timer launch time, end with control output forced to zero.**

The time counting starts when the timer is launched. At the end, the control output is forced to zero. [1]
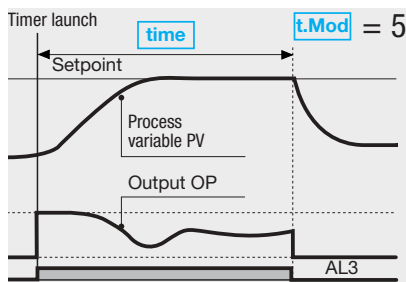
[1] When the Timer is not running the control output is forced to zero, also before the Timer launch.

E - No control action during the counting time.

The time counting starts when the timer is launched and the control output is forced to zero. At the end, the control action starts.
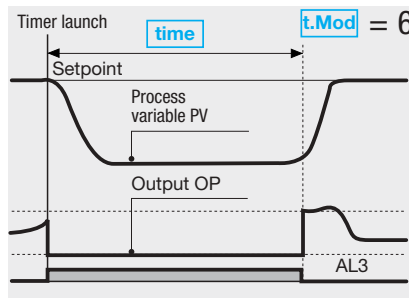
F - Control action with stand-by Setpoint during the counting time

The time counting starts when the timer is launched and the control action use the Stand-by Setpoint. At the end, the control action use the working Setpoint.
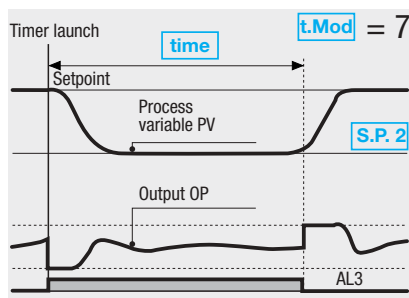
Technical specifications

Features (at 25°C env. temp.)		Description	
Total configurability		By means of the confiurgation tools is possible to choose: - the type of input - the type of control input - the type of output	- the type and functionality of the alarms - the type of Setpoint - control parameter values
PV Input	Common characteristics	A/D converter with resolution of 50,000 points; update measurement time: 0.2 s; sampling time: 0.5 s; input bias: - 60…+ 60 digit; input filter: 1…30 s. OFF = 0	
	Accuracy	0.25% ±1 digit (for T/C and Pt100) 0.1% ±1 digit (for mA and mV)	Between 100…240Vac the error is minimal
	Resistance thermometer (for ∆T: R1+R2 must be <320Ω)	Pt100Ω à 0°C (IEC 751) °C/°F selectable	2 or 3 wires connection Burnout (with any combination)	Max. wire Res: 20Ω max.: (3 wires) Input drift: 0.35°C/10°C Env. temp. <0.35°C/10Ω Wire Resistance
	Thermocouple	L, J, T, K, S, R, B, N, E, W3, W5 (IEC 584) °C/°F selectable	Compensation interne soudure froide Erreur 1°C/20°C ±0.5° Rupture capteur	Line: 150Ω max. Input drift: <2µV/1°C Env. temp. <5µV/10Ω Wire Resistance
	DC input current	0…20mA, 4…20mA with external shunt 2.5Ω Rj >10MΩ	Burnout. Engineering units Decimal point position selectable by the user Init. Scale -999…9999 Full Scale -999…9999 (min. range of 100 digits)	Input drift: <0.1%/20°C Env. Temp. <5µV/10Ω Wire Resistance
	DC input voltage	10…50mV, 0…50mV Rj >10MΩ		
Auxiliary input	CT current transformer	50 or 100mA input hardware selection	Current visualization via serial comm.s 10…200 A With 1A resolution And heather break alarm	
Digital input		The closure of the external contact produces any of the following actions: Auto/Man mode change, Stored Setpoints activation, measure hold. Timer activation (if options installed)	
Mode of operation		1 single or double action P.I.D. loop or ON/OFF with 1, 2 or 3 alarms	

Control mode	Algorithm	P.I.D. with overshoot control or ON-OFF P.I.D. with valve drive algorithm, for controlling motorised positioners		
	Proportional band (P)	0.5…999.9%		Simple action P.I.D. algorithm
	Integral time (I)	0.1…100.0 min	OFF = 0	
	Derivative time (D)	0.01…10.00 min		
	Error dead band	0.1…10.0 digit		
	Overshoot control	0.01…1.00		
	Manual reset	0.0…100.0%		
	Cycle time (time proportional only)	1…200 s		
	Control output high limit	10.0…100.0%		
	Soft start output value	0.1…100.0%	OFF = 0	
	Output safety value	0.0…100.0% (-100.0…100.0% for Heat/Cool)		
	Control output hysteresis	0.1…10.0%		ON-OFF algorithm
	Dead band	-10.0…10.0%		Double action P.I.D. algorithm (Heat/Cool) with overlap
	Relative cool gain	0.1…10.0		
	Cycle time (time proportional only)	1…200 s		
	Cool output high limit	10.0…100.0%		
	Cool output hysteresis	0.1…10.0%		

Digital input commands

Function associated to the IL logical input		Performed operation		Notes
		Open	**Closed**	
None		—	—	Not used
PV measure hold		Normal operation	PV is hold	The value of PV is "frozen" at the time the digital input goes to the close state
Set manual mode		Automatic	Manual	
Standard Setpoint	1st stored Setpoint	Local	1st SP	The permanent closure **forces** the chosen stored value. Setpoint modification is not possible.
	2nd stored Setpoint	Locale	2nd SP	The impulsive closure, **selects** the stored value. Setpoint modification is allowed.
Timer		—	Timer start (RUN)	The impulsive closure is enough to start the Timer

A function is assigned, through the configuration procedure to digital input.
The configured function is activated when the digital input (free voltage contact or open collector output) is in the ON state (closed). It is deactivated by setting the input to the OFF state (open).
The activation of the function through the digital input has the highest priority than through the keypad or through the serial communications.

Technical specifications

Features (at 25°C Env. Temp.)		Description			
OP1-OP2 outputs		SPST Relay N.O., 2A/250Vac for resistive load (4A at 120 Vac) SSR, 1A/250Vac for resistive load **Too meet the double isolation requirements OP1 and OP2 must have the same load voltage**			
OP3 output		SPST Relay N.O. 2A/150Vac for resistive load			
OP4 output		Logic not isolated: 0/5Vdc, ±10% 30 mA max.			
AL1 - AL2 - AL3 Alarms	Hysteresis	0.1...10.0%			
	Action	Active high	Action type	Deviation threshold:	± range
		Active low		Band threshold:	0…range
				Absolute threshold:	whole range
		Special functions	Sensor break, Heater break and Loop break detection		
			Acknowledge (latching), activation inhibit (blocking)		
			Connected to Timer or program (if options installed)		
Setpoint	Local		Up and down ramps 0.1…999.9 digit/min. (OFF=0)		
	Local plus 2 stored with tracking or Stand-by		Low limit: from low range to high limit High limit: from low limit to high range		
Special functions (option)	Timer	Automatic start at the power on, Digital inputs or serial			
		Comm.s Setting time:	1…9999 s/min		
		Stand-by Setpoint:	$SLL0 <= SP >= SLH1$		
	Start-up	Start-up Setpoint:	$SLL0 <= SP >= SLH1$		
		Hold time:	0...500 min		
		Control output high limit:	5.0...100.0%		
Fuzzy-Tuning one shot	The controller selects automatically the best method according to the process conditions		One shot Auto tuning One shot Natural frequency		
Auto/Man station	Standard with bumpless function, digital input or serial communications				
Serial comm.s	RS485 isolated, Modbus/Jbus protocol, 1200, 2400, 4800, 9600 bit/s, 3 wires				
Auxiliary Supply	+24Vdc ±20% 30mA max. - for external transmitter supply				
Operational Safety	Measure input	Detection of out of range short circuit or sensor break with automatic activation of the safety strategies			
	Control output	Safety value: -100…100%			
	Parameters output lock	Parameter and configuration data are stored in a non volatile memory for an unlimited time			
General characteristics	power supply (PTC protected)	24Vac (-25...+12%) 50/60Hz and 24Vdc (-15...+25%)		Power consumption 3W max.	
	Safety	EN61010-1 (IEC1010-1) installation class 2 (2.5kV), pollution class 2, **instrument class II**			
	Electromagnetic compatibility	Compliance to the CE standards			
	UL and cUL approval	File 176452			
	Protection	Terminal strip IP20			
	Dimensions	Pitch: 22.5 mm - depth: 114.5 mm - width: 53			
	Weight	159 g approx.			

Serial communications connection example

Configuration

D1

RS485

Configuration Cd-Rom

For SCADA

PC with Autolink

D1 - 31 max. instruments

RS485

Local control

OP35 operator panel

D1 - 31 max. instruments

RS485

## Current trasformer input (optional)

With CT option, it is possible to set an alarm threshold. The setting can be done by means the 8 or 9 configuration index of the codes O, P or Q (see page 1). It is possible to set one of the alarms (see page 1) to have an alarm when, during the ON time of the time proportional output, the load current is less then the specified threshold (index 8), or during the OFF time there is a value > 3% of full scale load current. The alarm condition must be longer than 120 ms to set the alarm. By the parameter

Ht.F.S. **CT primary high range**

the load current display can be adapted to the transformer characteristics. (OFF means disabled)

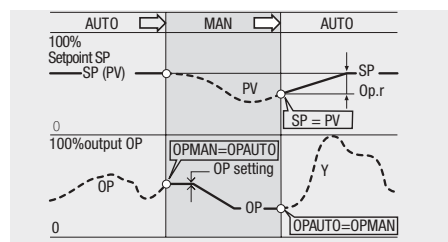During the OFF time the parameter **t.Cur** latches the last on time current value.

Example: CT input on OP1, alarm on AL2 during on time (configuration digit **P** = 8 , see page 21)
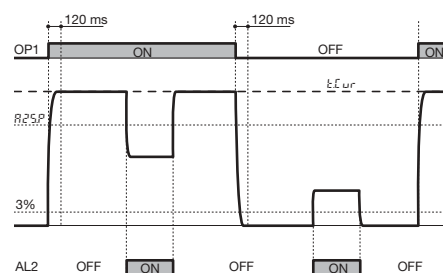
Commands

Auto/Manual

The bumpless action is present switching between AUTO, MAN and vice versa with the parameter **A.Man** .

⚠ **In case of power failure, the AUTO/MAN status and the output value remain stored in the controller memory**

Timer starting

Depending on the Timer action **t.Act** selection, there can be two different starting ways:
- Automatic at the power on
- Manual by digital inputs or serial communications.

The Timer function can be started or stopped any time.

Output lock

The outputs are switched to the OFF via serial communications.

⚠ **The outputs lock/unlock is maintained in case of power failure.**

Warranty