



D3 line

User manual

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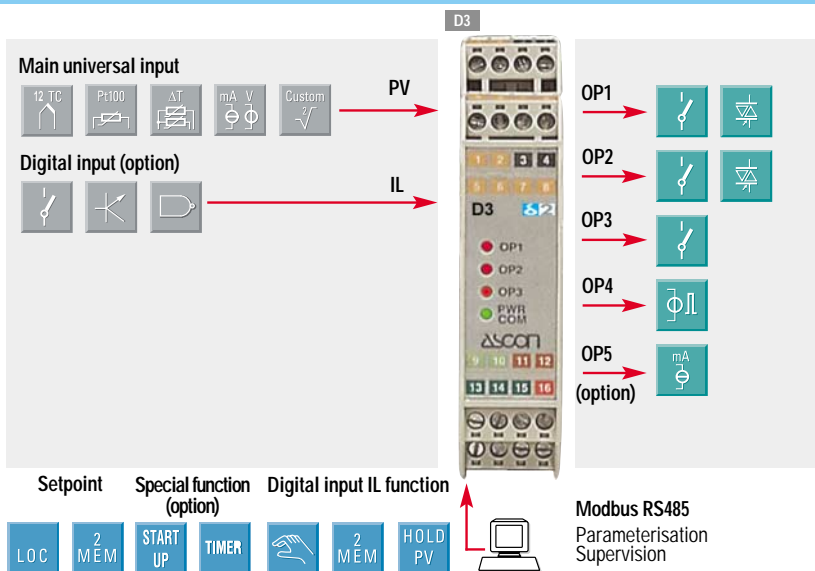
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D3 line

User Manual • 03/04 • Code: ISTR_U_D3_E_02_--



Resources



Operating mode

	Control	Alarms	Retransmission
1	Single action	OP1	OP2 OP3 OP5
2		OP4	OP1 OP2 OP3 OP5
3		OP5	OP1 OP2 OP3
4	Double action	OP1 OP2	OP3 OP5
5		OP1 OP4	OP2 OP3 OP5
6		OP4 OP2	OP1 OP3 OP5
7		OP1 OP5	OP2 OP3
8		OP5 OP2	OP1 OP3
9		OP5 OP4	OP1 OP2 OP3
10	Valve	OP1 OP2	OP3 OP5

Fuzzy tuning with automatic selection



Model code

Mod. **D 3** **5 B C 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 configuration of the instrument, that can be modified by specialized engineers only

Line **D 3**

Output OP1-OP2	B
Relay - Relay	1
SSR - SSR	5

Serial communications	C
CanBus	3
RS485 Modbus/Jbus SLAVE	5

Special function	E
Not fitted	0
Start-up + Timer	2

Options	D
None	0
Valve drive output	2
Analogue output	5
Valve drive output + Analogue output (retr.)	7

User manual	F
Italian/English (std)	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
TR Pt100 IEC751	-200...600 °C	-328...1112 °F
TC L Fe-Const DIN43710	0...600 °C	32...1112 °F
TC J Fe-Cu45% Ni IEC584	0...600 °C	32...1112 °F
TC T Cu-CuNi	-200...400 °C	-328...752 °F
TC K Cromel-Alumel IEC584	0...1200 °C	32...2192 °F
TC S Pt10%Rh-Pt IEC584	0...1600 °C	32...2912 °F
TC R Pt13%Rh-Pt IEC584	0...1600 °C	32...2912 °F
TC B Pt30%Rh Pt6%Rh IEC584	0...1800 °C	32...3272 °F
TC N Nicrosil-Nisil IEC584	0...1200 °C	32...2192 °F
TC E Ni10%Cr-CuNi IEC584	0...600 °C	32...1112 °F
TC Ni-NiMo18%	0...1100 °C	32...2012 °F
TC W3%Re-W25%Re	0...2000 °C	32...3632 °F
TC W5%Re-W26%Re	0...2000 °C	32...3632 °F
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
Analogue	Heat SSR Drive, Cool Relay	2
	Heat Relay, Cool Analogue	3
Valve drive	Heat Analogue, Cool Relay	4
	Heat SSR Drive, Cool Analogue	5
	Heat Analogue, Cool SSR Drive	6

Alarm 1 type and function	AL..	0	P	Q
Disabled or used by Timer (only for AL3)		1	2	3
Sensor break / LBA		0	0	0
Absolute	active high	1	1	1
	active low	2	2	2
Deviation	active high	3	3	3
	active low	4	4	4
Band	active out	5	5	5
	active in	6	6	6
		7	7	7

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

Standard parameters description

The parameters shown in the table are divided into groups which work in the same way. Below they will be described as they are listed in the table.

Configuration

IL Digital input function - Table 1

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

unit Engineering units - Table 2

Parameter descr.	Parameter descr.
°C (degree Centigrade)	A (Ampere)
°F (degree Fahrenheit)	
- (none)	psi
mV (millivolt)	Rh
V (Volt)	pH
mA (milliampere)	

Setpoint (SP)

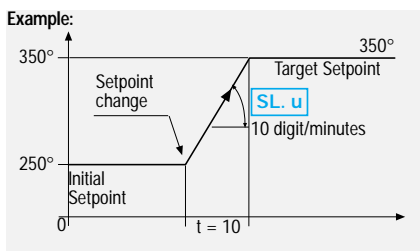
A1S.P AL1 - AL2 - AL3 threshold

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- Setpoint ramp down

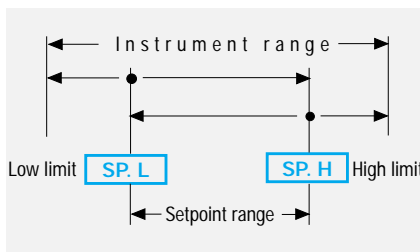
This parameter specifies the maximum rate of change of the SP in digit/min. The SP value is reached according to the configured rate of change. The new SP value is called "Target SP" (available via serial communications).



When the parameter is OFF, this function is disabled and the new Setpoint is reached immediately after being entered.

Setpoint low limit and Setpoint high limit

Low / high limit of the Setpoint value.



SP.1 1st stored SP - 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

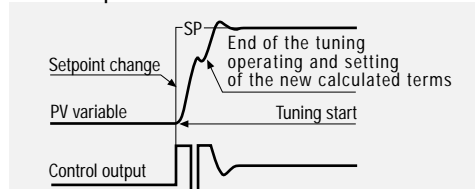
Configuration						
Mnemonic code	Parameter description	Range	Units	Factory setting	Notes	
IL	Digital input function IL	see table 1		not used		
Unit	Engineering unit	see table 2		none		
Sc.dd	N° of decimals	0...3		0	linear scale only	
Sc.Lo	Low range	-999...9999	engineer. units	Low range	minimum range 100 digit	
Sc.Hi	High range	-999...9999	engineer. units	High range		
Prot	Communications protocol	M.bus/Jbus		M.bus		
baud	Baud rate	1200,2400,4800,9600 baud		9600		
retr	Output range	0...20/4...20	mA	4-20	if output OP5 option is present	
rtH	Retransmitted signal	PV/SP		PV	unless used as a control analogue output	
Setpoint						
Mnemonic code	Parameter description	Range	Units	Factory setting	Notes	
A1S.P	AL1 alarm threshold	PV range	engineer. units	0	It is not enabled if the controller has been configured with alarm n° 2 not active or of sensor break type	
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	SP 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	%range	0.5		On - Off
tune	Tune run/stop	Start/stop				PID
P.b.	Proportional band	0.5...999.9	%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	% output	5.0	Without integral time	
d.err	Error dead band	OFF / 0.01...10.0	digit	inhibited		
t.c.	Cycle time	1...200	sec	20	Time proportional only	
OP. H	Control output high limit	10.0...100.0	% output	100.0		
S.Out	Output safety value	0.0...100.0	% output	0	-100.0...+100.0 Heat/Cool	
MV.tM	Motor travel time	15...600	sec	60		Valve drive
MV.hy	Minimum output step	0.1...5.0	% output	0.5		Heat Cool
dbnd	Dead band	-10.0...10.0	% output	0.5		
r.C.G.a	Cool relative gain	0.1...10.0		1		
hy. C	Cool output hysteresis	0.1...10.0	% range	0.5	On/Off only	
t.c. C	Cool cycle time	1...200	sec	20	Time proportional only	
OP. HC	Cool control output high limit	10.0...100.0	% ouput	100.0	PID 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	Latch and blocking alarm functions	none / Ltch / Bloc / LtBL		none		
t.Lba	LBA delay	OFF / 1...9999	sec	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	sec	1	Only if St.OP different than OFF	
t.Fil	Filter time costant	OFF / 1...30	sec	inhibited		
In.Sh	Input shift	OFF / -60...+60	digit	inhibited		
Addr	Communications address	1...247		247		
rt.lo	Retransmission low range	PV range	engineer. units	----	If OP5 output is present and not configured as control output	
rt.hi	Retransmission high range	PV range	engineer. units	----		

Control mode

tune Automatic tune

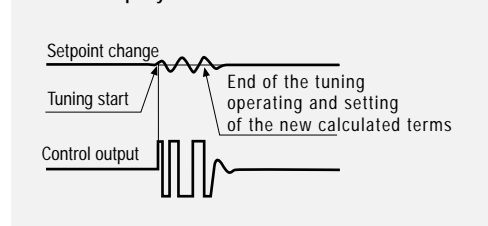
The Fuzzy-Tuning determines automatically the best PID term with respect to the process behaviour. The controller provides 2 types of "one shot" tuning algorithm, that are selected automatically according to the process conditions when the operation is started

A - STEP response



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.

B - 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.

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

Control mode - follows

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 PID algorithm. Setting 1, the overshoot control is disabled.

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

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

t.c.C

cool output

OP.H Control output high limit

It specifies the maximum value the control output can be set.

OP.HC

cool output

Separate parameters for both heat and cool outputs limitation are available.

S.Out Output safety value

Output Value in case of input anomaly.

MV.tM Travel time

It provides the time required to the valve to go from the 0% position to 100%

MV.hy Minimum step

It specifies the minimum allowed time of activation of the output to a valve that produces a sensible effect. It is related to the deadband of the valve

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

ln.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 from 1 to 247 and must be unique for each controller on the communications bus to the supervisor.

OP5 Retransmission output (if option installed)

When OP5 output is present and not configured as control output, it retransmits linearised PV or SP.

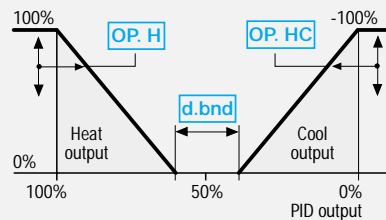
With **rt.Lo** greater than **rt.Hi** it is possible to obtain a reverse scale.

Heat/Cool control

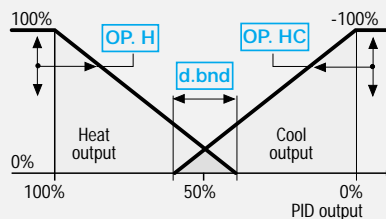
By a sole PID control algorithm, the controller handles two different outputs, one of these performs the Heat action, the other one the Cool action. **It is possible to overlap the outputs.**

A - Heat/Cool actions separated

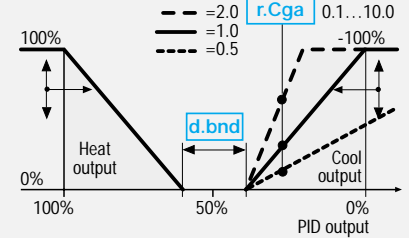
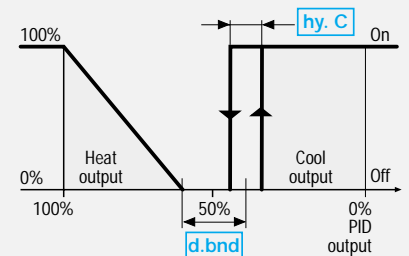
d.bnd positive 0...10.0%

**B - Heat/Cool actions overlapped**

d.bnd negative -10.0...0.0%

**C - Cool action adjusting**

Example with different relative cool gains

**D - On-Off Cool action**

Alarm occurrences of OP1 - OP2 - OP3 outputs, respectively linked to AL1 - AL2 - AL3

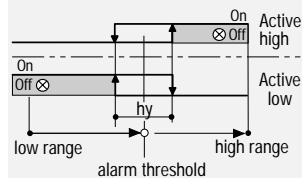
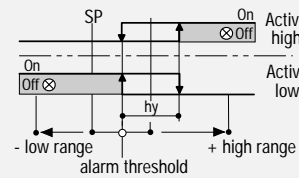
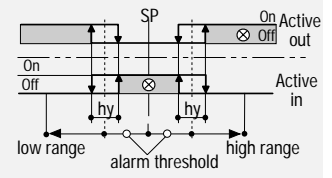
The relay/SSR output OP1, OP2 and OP3, can be used as alarm outputs only if they are not used as control outputs.

For each alarm is possible to configure:

- A - The type and the operating 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 blocking

A3L.b

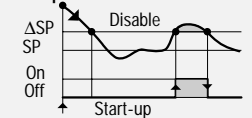
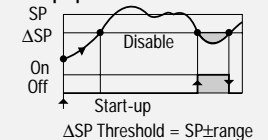
For each alarm it is possible to select the following functions:

- None
- latching
- blocking
- both latching and blocking

Alarm acknowledge function

The alarm, once occurred, is maintained until 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.

Start-up disabling**Ramp down****Ramp up****D - "Loop Break Alarm" LBA or sensor break****LBA delay**

Setting "none" the alarm works as Sensor break with immediate action.

t.Lba

Setting a value between 1 and 9999 sec the alarm works as LBA+Sensor break with delay.

When the cause of the alarm disappears, the alarm status stops.

Soft-start control output function

St.OP

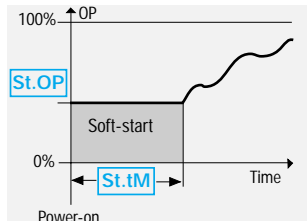
Soft-Start value

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

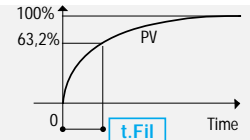
St.TM

Soft-Start activation time

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



Input digital filter



Time constant, in sec, of the RC input filter applied to the PV input. When this parameter is set to "inhibited" the filter is bypassed.

Special parameters description

In order to have the above functions the product code digit **E** must be 2

For example: mod. D3 3100-2000

To improve the instrument performances and to reduce the wiring and installation costs, two special functions are available:

- Start-up
- Timer

⚠ This functions is disable with Heat/Cool control.

Selecting Timer or Start-up, the Soft-start function is disabled, therefore the parameters

St.TM **St.OP** will not be enabled.

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

Timer/Start-Up operating mode

t.Mod This parameter defines (see table 3):

- When the count starts.
- The state of the control output at the end of the count

- To select the Start-up function select 1

- To select the Timer function select the value from 2 to 6 and use alarm AL3 (output OP3) configured with configuration code **Q** = 0.

Example: conf. **I L M N - O P 0 R**

Table 3

Timer/Start-up counting mode	Output to 0
Disabled	0
Start-up function	1
Counting start time	End mode
When inside the band	Control mode
	Output to 0
When launched	Control mode
	Output to 0
When launched Control disabled	Output to 0
When launched stand-by Setpoint	Output to 0

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

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

Timer setting

time Timer (1...9999 sec/min.)

S.P.SB **Stand-by Setpoint**

(only for **t.Mod** = 7)(SP L...SP H)

Table 4

Time units	Starting mode	OP3 status [1]	Value
Seconds	Manual by serial communications	Off	0
	Automatic at the power on [2]	On	1
	Automatic at the power on [2]	Off	2
	Automatic at the power on [2]	On	3
Minutes	Manual by serial communications	Off	4
	Automatic at the power on [2]	On	5
	Automatic at the power on [2]	Off	6
	Automatic at the power on [2]	On	7

[1] If used by Timer

[2] Using this selection, manual starting mode is possible too

Table of special function parameters - (if option installed)

Timer and Start-Up					
Mnemonic code	Parameter description	Range	Unit	Factory setting	Notes
t.Mod	Timer/Start-up operation mode	see table 3		0	
t.Act	Timer action	see table 4		0	tMode ≠ to 1
time	Timer setting	1...9999	sec/min	0.5	
S.P.Sb	Stand-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	Start-Up Setpoint	SP L...SP H		0	
OP.HS	Control output high limit	5.0...100.0	output %	100.0	

Start-Up function

Setting **t.Mod** to 1

Three parameters are associated to the Start-up function:

t.h.SU **Start-Up hold time**

S.P.SU **Start-Up Setpoint**

OP.HS **Control output high limit**

The Start-up function includes three phases:

1^a "Limy" - The control output is limited to the **OP.HS**

2^a "Hold" - The process variable is maintained to the Start-up Setpoint for the time fixed by the parameter **t.h.SU**

3rd "Off" - When the **t.h.SU** time is elapsed the process variable is maintained to the working Setpoint.

There are two possibilities:

A - Start-Up Setpoint **SP.SU**

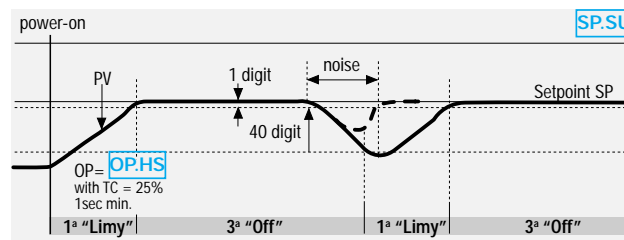
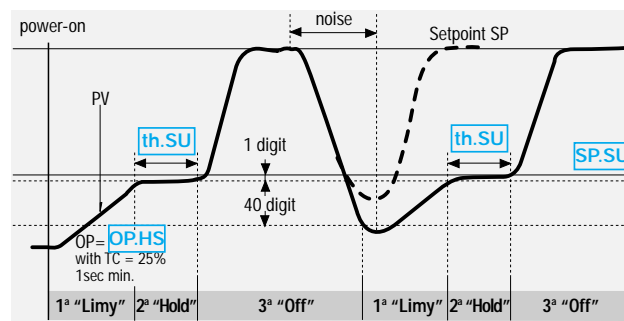
lower than the local Setpoint

The "Hold" phase starts when the process variable PV achieves the **SP.SU** (with a tolerance of 1 digit).

B - Start-Up Setpoint **SP.SU** ≥ greater or equal to the local Setpoint

When the process variable PV achieves the local Setpoint (with a tolerance of 1 digit), the Start-up function passes directly to the "Off" phase.

If, at the controller power-on, the process variable PV is greater than the lowest between the **SP.SU** and the working Setpoint, the next phase ("Hold" or "Off") will be executed instead of the "Limy" phase.



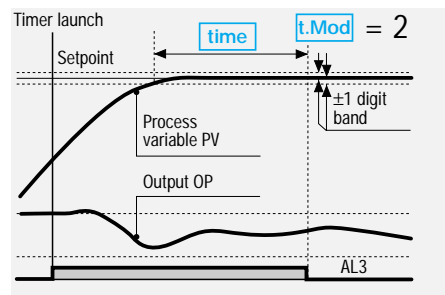
Whether the process variable, for any reason (e.g. load change), decreases at a value lower than (**OP.HS** - 40 digits), the Start-up function starts again from the "Limy" phase.

When the Start-up is in Hold phase, if the local Setpoint becomes lower than the Start-up Setpoint or if the operating mode changes to manual, the Start-up function passes to the "Off" phase.

Timer counting modes

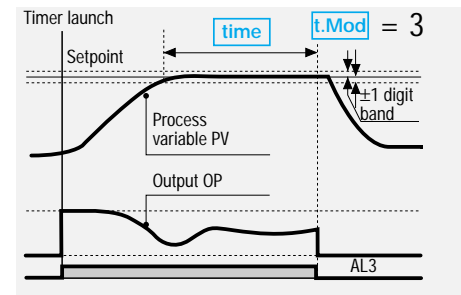
A - Counting start time inside the band, end in control mode.

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]



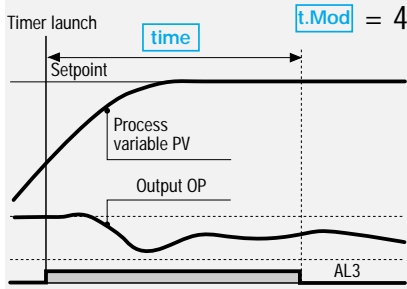
[1] When the Timer is not running the control output is forced to zero, also before the Timer launch.

Special function parameters description

Timer function mode

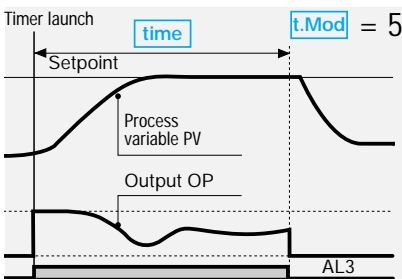
C - Counting start time = timer launch time, end in control mode.

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.

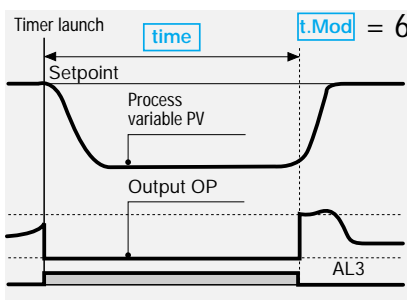
The time counting starts when the timer is launched. At the end, the control output is forced to zero. [1]



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

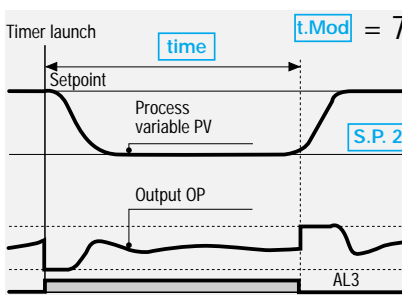
E - No control action during the counting time.

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 T. envir. temp)		Description	
Total configurability	By means of the configuration tools is possible to choose:	<ul style="list-style-type: none"> - the type of input - the type of control input - the type of output 	
		<ul style="list-style-type: none"> - 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 sec; Sampling time: 0.5 sec; Input bias: - 60...+ 60 digit; input filter: 1...30 sec. OFF = 0	
	Accuracy	0,25% ± 1 digit (per termoelementi) 0,1% ± 1 digit (per mA e mV)	Between 100...240V~ the error is minimal
	Resistance thermometer (for ΔT: R1+R2 must be < 320 Ω)	Pt100Ω a 0°C (IEC 751) °C/°F selectable	2 or 3 wires connection Burnout (with any combination) Max. wire Res: 20Ω max (3 wires) Sensitivity: 0.35°C/10° E. T. <0.35°C / 10Ω Wire Res.
	Thermocouple	LJ,T,K,S, R, B, N, E, W3, W5 (IEC 584) Rj > 10MΩ °C/°F selectable	Internal cold junction compensation con NTC Error 1°C/20°C ±0.5°C Burnout Line: 150Ω max Input drift: <2μV/°C Env. Temp <5μV / 10Ω Wire Res.
	DC input (current)	4...20mA, 0-20mA with external shunt 2.5Ω Rj > 10MΩ	Burnout. Engineering units Conf. decimal point position Init. Scale -999...9999 Full Scale -999...9999 (min. range of 100 digits)
Digital input	DC input (voltage)	10...50mV, 0-50mV Rj > 10MΩ	Input drift: <0.1% / 20°C Env. Temp. <5μV / 10Ω Wire Res.
	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	PID with overshoot control or On-off - PID with valve drive algorithm, for controlling motorised positioners	
	Proportional band (P)	0.5...999.9%	Single action PID algorithm
	Integral time (I)	0.1...100.0 min	
	Derivative time (D)	0.01...10.00 min	
	Error dead band	0.1...10.0 digit	
	Overshoot control	0.01...1.0	
	Manual reset	0.0...100.0%	On-Off algorithm
	Cycle time (Time proportional only)	1...200 sec	
	Control output high limit	10.0...100%	
	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%	Double action PID algorithm (Heat / Cool) with overlap
	Dead band	-10.0...10.0%	
	Relative cool gain	0.1...10.0	
	Cycle time (Time proportional only)	1...200 sec	
	Control output high limit	10.0...100.0%	
Control mode	Cool output hysteresis	0.1...10.0%	Valve drive PID algorithm without feedback potentiometer
	Motor travel time	15...600 sec	
	Motor minimum step	da 0.1...5.0%	

Digital input commands

Function		Performed operation		Notes
		Off	On	
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	Local	2nd SP	The impulsive closure, selects the stored value. Setpoint modification is allowed.
Timer		—	Timer start	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.

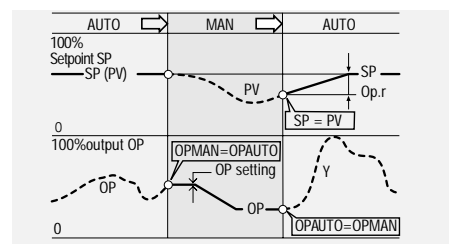
Technical specifications

Features (at 25°C T. envir. temp)	Description				
OP1-OP2 outputs	SPST Relay N.O., 2A/250V~ for resistive load SSR, 1A/250V~ 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/150V~ for resistive load				
OP4 output	Logic not isolated: 0/5V-, ±10% 30 mA max				
OP5 output (opt.)	Control or PV/SP retr.; Galvanic isolation: 500 V~/1 min; Res. 12bit (0.025%); Accuracy 0.1%; 4/20 mA 750 Ω 15 V max				
AL1 - AL2 - AL3 Alarms	Hysteresys 0.1...10.0%				
	Action	Active high	Action type	Deviation threshold ± range	
		Active low		Band threshold 0...range	
		Special functions	Absolute threshold whole range		
			Sensor break, Heater break and Loop break detection		
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 sec/min Stand-by Setpoint: $5LH \leq 5P \leq 5LH$			
	Start-up	Start-up Setpoint: $5LH \leq 5P \leq 5LH$ 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/sec, 3 wires				
Auxiliary Supply	+24V- ± 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 and alerts on display			
	Control output	Safety value: -100%...100%			
	Parameters	Parameter and configuration data are stored in a non volatile memory for an unlimited time			
	Outputs lock				
General characteristics	Power supply (PTC protected)	24V- (-15% +25%) 50/60Hz e 24V-(dc voltage) (-15% +25%)		Power consumption 3W max	
	Safety	EN61010-1 (IEC1010-1). installation class 2 (2500V), pollution class 2, instrument class II			
	Electromagnetic compatibility	Compliance to the CE standards			
	Protection	Terminal strip IP20			
	Dimensions	Pitch: 22.5 mm - depth: 114.5 mm - with: 53			

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.

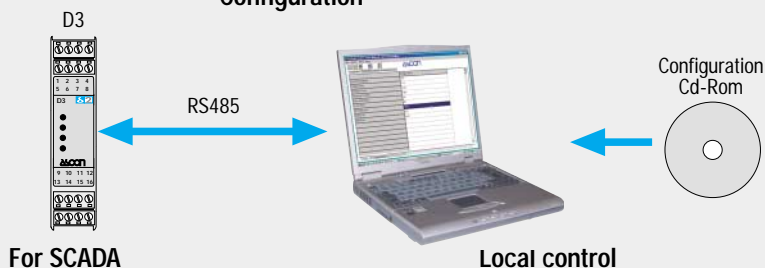
Output lock

The outputs are switched to the OFF via serial communications.

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

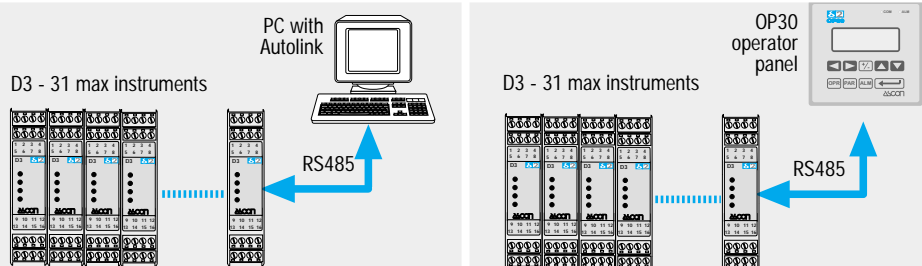
Serial communications connection example

Configuration



For SCADA

Local control



Warranty

We warrant that the products will be free from defects in material and workmanship for 3 years from the date of delivery.

The warranty above shall not apply for any failure caused by the use of the product not in line with the instructions reported on this manual.