

# TDR 4100

## UNIVERSAL CONTROLLERS

### Temperature controllers and process regulators



#### KEYS

 <b>UP</b> - Scroll menu items - Increase values on the display - Programmable by parameter (see par. H31)	 <b>DOWN</b> - Scroll menu items - Decrease values - Programmable by parameter (see par. H32)	 <b>fnc</b> - Access QuickStart menu - ESC (exit) function	 <b>set</b> - Access Set Point editing - Access Programming Menu - Activate functions - Confirm commands	 <b>aux</b> - Programmable by parameter (see par.H34)
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#### DISPLAY & LED's

 <p><b>Process value (PV):</b> Used to display the process value, and the labels of parameters, alarms and functions.</p> <p><b>Set value (SV):</b> Used to display the set point, parameter value, function status, other states.</p>	<p><b>S.Str</b> <b>S.Str</b> ON: if the Soft Start function is active; OFF: otherwise.</p>	<p><b>aux</b> <b>aux</b> ON: when output active; OFF: otherwise.</p>
	<p><b>out1</b> <b>out1 - out2</b> ON: for output active; Flashing: for delay, protection or activation blocked OFF: otherwise;</p>	<p> <b>Allarme</b> ON: in case of alarm; Flashing: alarm silenced; OFF: otherwise.</p>
	<p><b>Tun.</b> <b>Tun</b> Not used</p>	<p> <b>°C/°F</b> Indicates if the temperature displayed is in °C or °F; OFF for other units of measure</p>

• UPPER DISPLAY **PV** FLASHING: DISPLAY **SV** value modifiable

#### SETTING THE SET POINT

The following describes the procedure for setting the 2 set point values in the instrument Set1 and Set2.



1) Press and release the 'set' key at the initial display.

2) The label SEt1 appears on the PV display, whereas the current Set Point value is shown on the SV display. Press the 'set' key again to display the Set Point 2 in the same way.

3) The 'UP' and 'DOWN' keys can be used to change the Set Point value shown on the SV display.

4) On pressing the 'set' or 'fnc' key, or when timeout has elapsed (15 sec), the new value appears and the initial display returns.

#### DIMENSIONS AND MECHANICAL ASSEMBLY

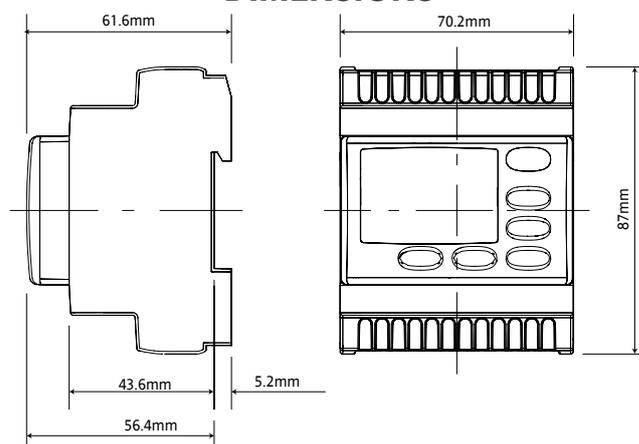
##### MECHANICAL INSTALLATION

The device is designed for wall or panel mounting on DIN rail. Make a 70x45 mm hole and insert the instrument, securing it with the special fixing hooks.

Do not install the instrument in damp and/or dirty places; in fact, it is suitable for use in places with ordinary or normal levels of pollution.

Keep the area around the instrument cooling slots adequately ventilated.

##### DIMENSIONS



# DESCRIPTION OF REGULATORS

## ON/OFF Regulator

The instrument has 2 ON/OFF regulators that can be configured by the user through parameter H01:

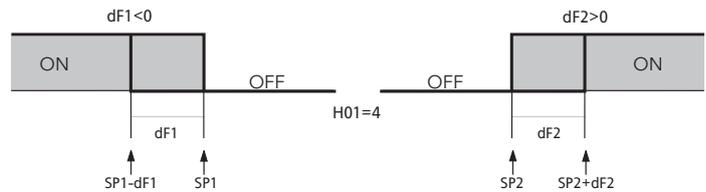
- H01=4, 5 threshold regulator
- H01=6 regulator with window

dF1<0	dF2>0	H01	Regulation type
hot	cold	4	independent setpoint
hot	cold	5 6	interdependent setpoint
-	-		Neutral Zone (or Window)

**NOTA: Examples with dF1<0 (hot) and dF2>0 (cold)**

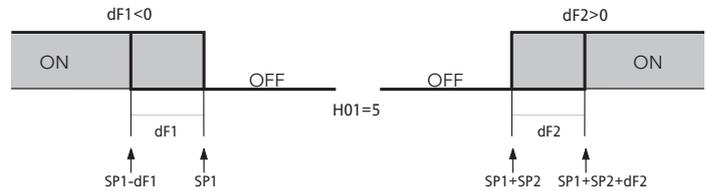
Associated parameters:

**SP1, SP2, dF1, dF2, db1, db2 and H01.**



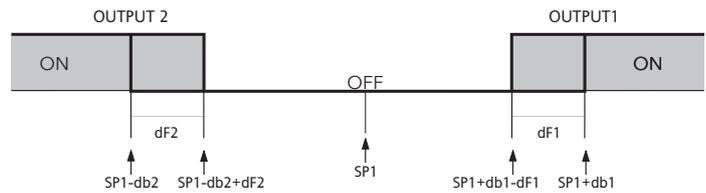
### 1 Independent ON-OFF regulation diagram.

The two outputs regulate as though they were completely independent



### 2 Dependent ON-OFF regulation diagram.

Set Point 2 SP2 regulates according to SP1



### 3 ON-OFF regulation diagram with Neutral Zone (or window).

NOTE: If dF1 and dF2 are both=0, the outputs are de-energised when SP1 is reached

## HEATING WINDOWS Regulator

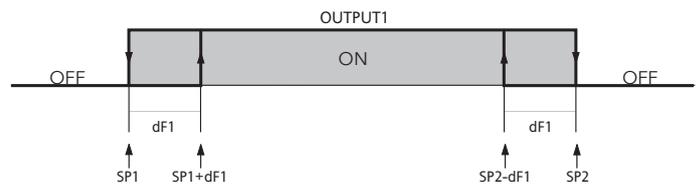
### Heating Window Regulator diagram.

If dF1 = 0, the regulator will operate with a differential at 0,1°C.

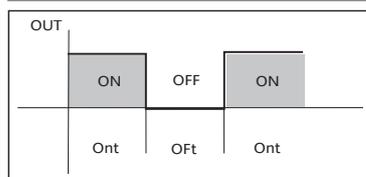
If SP2 < (SP1+2\*dF1), the regulator, instead of using the Setpoint value SP2, will use the value (SP1+2\*dF1).

The regulator is not active under these circumstances:

- during the start-up
- H10 timing or safety timing in progress
- probe error
- Stand-by



## DUTY CYCLE Regulator



A probe error status causes the following actions:

- code E1 is displayed
- the regulator is activated as indicated by parameters On1/On2 and OF1/OF2 if programmed for Duty Cycle.

Associated parameters: **On1, On2, OF1 and OF2**

Ont	OF1	Regulator output
0	0	OFF
0	>0	OFF
>0	0	ON
>0	>0	Duty Cycle

## AUXILIARY Regulator

The auxiliary regulator can be activated by Digital Input if configured as auxiliary (parameter H11=4) or by key (parameter H31 or H32=4): in this case, the regulator control must be provided for as Aux by means of parameters H21(22)=4.

This function allows the relay to be activated if de-energised, or vice versa. The relay status is stored, to maintain correct operation in case of a power failure, unless setting parameter H11 = 4 (aux); in this case, the relay reflects the status of the digital input. With parameter H13 it is also possible to establish the priorities/polarities for activation by key and Digital Input.

**NOTE: The significance of the Digital Input (D.I.) must remain the same: e.g. when activating the relay by D.I. and switching off with a key, if the D.I. is subsequently deactivated the relay status will not be changed as it has been de-energised by a key.**

## SOFT START regulator

**Note: The SOFT START function can be selected by key, D.I. or by a function.**

The Soft Start regulator enables setting temperature gradient with which a given set point is reached in a predefined time. In fact, with this function a gradual increase of the regulation Set Point is obtained automatically, from value Ta (ambient temperature at activation) to the value actually set on the display; this allows the initial temperature rise to be slowed down and thus reduce the risk of "overshooting".

## CYCLIC Regulator

**Note: The PERIODICAL CYCLE function can be selected by key or Digital input**

This function can be associated with both the outputs on relay (by setting parameters H21, H22 to 2), and enables the implementation of a "Duty Cycle" regulation with the intervals set by parameters Con and CoF.

## QUICK START MENU

access the QuickStart menu containing several special functions, useful for setting and managing the instrument: the Functions Folder and Alarms Folder (if at least one alarm is present).



The following is a description of the menu structure and the functions of the individual folders:

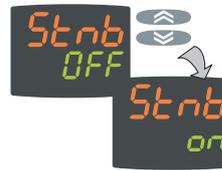
### Functions Folder

Function	Function label	Default status	D.I. (H11)	Key (H31...H34)	Active function signalling
Soft Start	SStr	ON	1	1	LED S.Str ON
Stand-by	Stnb	OFF	5	5	/

Press the 'set' key at the label FnC to access the functions.



The label and the current status of the function will be displayed. To scroll the available functions, use the 'set' key.



To change the status of a function, use the UP and DOWN keys.

## PROGRAMMING MENU

The programming menu contains all the parameters necessary for setting instrument operation and is divided into two visibility levels: user level and installer level:



- After pressing the 'set' key from the main display for 3 seconds the user can access the Parameter Programming menu; the label USER corresponding to the user level of the menu is shown.



### User level access (User):

- At the label USER, press and release the 'set' key to access the folders containing the user level parameters



### Installer level access (InSt):

- Press the "UP" and "DOWN" keys at the label UsEr to display the label InSt which indicates the point of access to folders containing the installer level parameters. At InSt, press and release the 'set' key

### Modifying parameter values (on both levels):



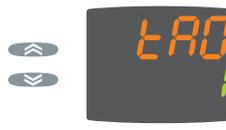
- Press the UP and DOWN keys to scroll all the user level folders and, at the required folder, press the 'set' key to access the parameters contained in it (e.g. ALAr folder).



- After pressing the 'set' key at ALAr, the first parameter of the folder will be displayed as follows:

- PV display: parameter label (PAO)
- SV display: current parameter value(0)

Press the 'set' key to scroll all the parameters in the folder.



- Use the 'UP' and 'DOWN' keys to change the value of the parameter displayed. When the parameter has been set to the required value, press 'fnc', or allow the 15 second timeout to elapse, to store the new set value.



- Then press and release the 'fnc' key to return to the previous display levels.

**At every level of all of the menus, press the "fnc" key, or allow the 15 second timeout to elapse, to return to the previous display level; the last value shown on the display will then be stored.**

## PASSWORD

Access to each parameter management level can be limited by means of password. The two different passwords can be activated by setting parameters PA1 and PA2 present in the folders 'diSP' (PA1 at USER level and PA2 at InSt level). The password is enabled if the value of parameter PA1/PA2 is different from 0.



- If the password PA1 is active (different from 0) the user will be requested to enter it. Select the correct value using the UP and DOWN keys and press the 'set' key to confirm.

If the password entered is incorrect, the device displays label 'PAS1' again and the operation must be repeated. The password PAS2, for InSt level works in the same way as password **PAS1**.



- To access the "Programming" menu, press the "set" key for more than 5 secs. If provided for, the access PASSWORD will be requested; press 'set' again.

## COPY CARD

The Copy Card is an accessory which, connected to the TTL serial port, enables quick programming of instrument parameters (upload and download a parameter map to one or more instruments of the same type). Uploading (label UL), downloading (label dL) and Copy Card formatting (label Fr) are done as follows:

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  - The controls necessary for use of the Copy Card are inside the 'FPr' folder, contained in the USER level of the programming menu.
  - Press 'set' to access the functions.
- 

  - Scroll with the 'UP' and 'DOWN' keys to display the required function.
  - Press the 'set' key and the selected function (upload, download or formatting) will be performed.
- 


  - If the operation is successful, the display will show y, otherwise n will appear.

**Download from reset:** Connect the Copy Card when the instrument is off. The programming parameters are downloaded when the instrument is switched on; at the end of the lamp test, the following will be displayed for about 5 seconds:

- the label **dLY** in case of successful operation
- the label **dLn** in case of failed operation

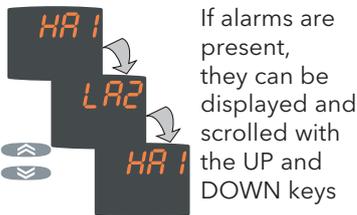


**NOTES:**

- After downloading from reset the instrument works with the settings of the new map just downloaded.
- see **FPr** folder in 'Parameters' on page 4-5
- connect the Copy Card with the wording "MEMORY MODULE" facing upwards

## ALARMS FOLDER (appears only if at least one alarm is present)

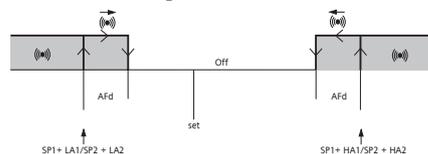
Press the 'set' key at the label ALAR to access the alarms folder. This folder stores all the alarms managed by the instrument. If no alarms are present, the folder does not appear inside the menu.



LABEL	ALARM	CAUSE	EFFECTS	RESOLUTION
<b>E1</b>	Probe 1 faulty (Regulation)	<ul style="list-style-type: none"> <li>• read values outside operating range</li> <li>• probe faulty / shorted / open</li> </ul>	<ul style="list-style-type: none"> <li>• Display label E1</li> <li>• Alarm LED Fixed</li> <li>• Min/max alarm regulator disabled</li> </ul>	<ul style="list-style-type: none"> <li>• check probe wiring</li> <li>• replace probe</li> </ul>
<b>HA1 HA2</b>	HIGH temperature alarm on probe 1 or 2	<ul style="list-style-type: none"> <li>• value read by probe <math>Pb_x \geq HA1/2</math> after time equal to "tAO". (see "MAX/MIN ALARMS")</li> </ul>	<ul style="list-style-type: none"> <li>• Recording of label <b>AH1/AH2</b> in folder ALAR</li> <li>• No effect on regulation</li> </ul>	<ul style="list-style-type: none"> <li>• Wait until the temperature value read by probe 1 returns below <b>HA1/2-AFd</b></li> </ul>
<b>LA1 LA2</b>	LOW temperature alarm on probe 1 or 2	<ul style="list-style-type: none"> <li>• value read by probe <math>Pb_x \leq LA1/2</math> after time equal to "tAO". (see "MAX/MIN ALARMS")</li> </ul>	<ul style="list-style-type: none"> <li>• Recording of label <b>LA1/LA2</b> in folder ALAR</li> <li>• No effect on regulation</li> </ul>	<ul style="list-style-type: none"> <li>• Wait until the temperature value read by probe 1 returns above <b>LA1/2-AFd</b></li> </ul>
<b>EA</b>	External alarm	<ul style="list-style-type: none"> <li>• activation of digital input with delay of H14 minutes (H11 = 9 or 10)</li> </ul>	<ul style="list-style-type: none"> <li>• Recording of label <b>EAL</b> in folder ALAR</li> <li>• Alarm LED fixed</li> <li>• Regulators off if H11=10</li> </ul>	<ul style="list-style-type: none"> <li>• Stop alarm manually by pressing a key</li> <li>• If H11=10, the regulators are reactivated only after the digital input is disabled</li> </ul>

## MAX/MIN Temperature ALARMS

### Temperature value in relation to setpoint (Att=1)

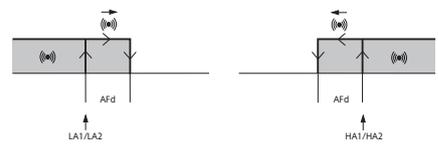


- Minimum temperature alarm**
- Maximum temperature alarm**
- Resumption from min. temperature alarm**
- Resumption from max. temperature alarm**

- Temp.  $\leq$  **Set + LAL \***
- Temp.  $\geq$  **Set + HAL \*\***
- Temp.  $\geq$  **Set + LAL + AFd** or  $\geq$  **Set - |LAL| + AFd** (LAL < 0\*)
- Temp.  $\leq$  **Set + HAL - AFd** (HAL > 0\*\*)

\* if LAL is negative, Set + LAL < Set  
 \*\* if HAL is negative, Set + HAL < Set

### Temperature as Absolute value (Att=0)



- Temp.  $\leq$  **LAL** (LAL with sign)
- Temp.  $\geq$  **HAL** (HAL with sign)
- Temp.  $\geq$  **LAL + AFd**
- Temp.  $\leq$  **HAL - AFd**

Associated parameters: **Att, AFd, HA1/2, LA1/2, PAO, SAO, tAO e AOP.**

## PARAMETER Table

PAR.	LIV.*	Description of Parameter (divided by folder and Level)	Range	M.U.	Values DR4120	Values DR4120S
SEt1		Temperature regulation SEt Point 1.	LS1 ... HS1	°C/°F	0	0
SEt2		Temperature regulation SEt Point 2.	LS2 ... HS2	°C/°F	0	0
<b>1&amp;2 REGULATOR 1 (folder "rE1")</b>						
OS1	2	Offset Set Point 1. Temperature value to be added algebraically to the set point if reduced set enabled (Economy function). It cannot be 0.	-30.0 ... 30.0	°C/°F	0	0
db1	1&2	Response band above SEt Point 1.	0.0 ... 30.0	°C/°F	1	1
dF1	1&2	Relay 1 intervention differential. The load stops when the Set Point "SP1" is reached (indicated by regulation probe 1) and restarts at a temperature value equal to Set Point "SP1" plus the differential value.	-30.0 ... 30.0	°C/°F	-1	-1
HS1	1&2	Maximum value that can be assigned to SEt Point "SP1"	LS1 ... HdL	°C/°F	800	800
LS1	1&2	Minimum value that can be assigned to SEt Point "SP1"	LdL ... HS1	°C/°F	-200	-200
HA1	1&2	Maximum alarm OUT 1 (See 'MAX/MIN Temperature Alarms' diagram)	LA1 ... 2910	°C/°F	2910	2910
LA1	1&2	Minimum alarm OUT 1 (See 'MAX/MIN Temperature Alarms' diagram)	-328 ... HA1	°C/°F	-328	-328
dn1	2	Start delay. The indicated time must elapse between the request for regulator relay activation and activation.	0 ... 255	secs	0	0
do1	2	Delay time after deactivation. The indicated time must elapse between regulator 1 relay deactivation and the next activation.	0 ... 255	min	0	0
di1	2	Delay time between activations. The indicated time must elapse between two consecutive activations of regulator 1.	0 ... 255	min	0	0
dE1	2	Deactivation delay. The indicated time must elapse between the request for regulator 1 relay deactivation and deactivation. <b>NOTE: For parameters dn1, do1, di1, dE1 the value 0 = not active</b>	0 ... 255	secs	0	0
On1	2	Regulator on time for faulty probe. If <b>On1</b> = "1" and <b>OF1</b> = "0", the regulator remains on; if <b>On1</b> = "1" and <b>OF1</b> > "0", it operates in duty cycle mode. (See Duty Cycle diagram)	0 ... 255	min	0	0
OF1	2	Regulator off time for faulty probe. If <b>OF1</b> = "1" and <b>On1</b> = "0", the regulator remains off; if <b>OF1</b> = "1" and <b>On1</b> > "0", it operates in duty cycle mode. (See Duty Cycle diagram)	0 ... 255	min	1	1
<b>1&amp;2 REGULATOR 2 (folder "rE2")</b>						
OS2	2	Offset Set Point 2. Temperature value to be added algebraically to the set point if reduced set enabled (Economy function). It cannot be 0.	-30.0 ... 30.0	°C/°F	0	0
db2	1&2	Response band above SEt Point 2.	0.0 ... 30.0	°C/°F	1	1
dF2	1&2	Relay 2 intervention differential. The load stops when the Set Point "SP2" is reached (indicated by regulation probe 2) and restarts at a temperature value equal to Set Point "SP2" plus the differential value.	-30.0 ... 30.0	°C/°F	-1	-1
HS2	1&2	Maximum value that can be assigned to SEt Point "SP2"	LS1 ... HdL	°C/°F	800	800
LS2	1&2	Minimum value that can be assigned to SEt Point "SP2"	LdL ... HS1	°C/°F	-200	-200
HA2	1&2	Maximum alarm OUT 2 (See 'MAX/MIN Temperature Alarms' diagram)	LA1 ... 2910	°C/°F	2910	2910
LA2	1&2	Minimum alarm OUT 2 (See 'MAX/MIN Temperature Alarms' diagram)	-328 ... HA1	°C/°F	-328	-328
dn2	2	Start delay. The indicated time must elapse between the request for regulator relay activation and activation.	0 ... 255	secs	0	0
do2	2	Delay time after deactivation. The indicated time must elapse between regulator 2 relay deactivation and the next activation.	0 ... 255	min	0	0
di2	2	Delay time between activations. The indicated time must elapse between two consecutive activations of regulator 2.	0 ... 255	min	0	0
dE2	2	Deactivation delay. The indicated time must elapse between the request for regulator 1 relay deactivation and deactivation. <b>NOTE: For parameters dn2, do2, di2, dE2 the value 0 = not active</b>	0 ... 255	secs	0	0
On2	2	Regulator on time for faulty probe. If <b>On2</b> = "1" and <b>OF2</b> = "0", the regulator remains on; if <b>On2</b> = "1" and <b>OF2</b> > "0", it operates in duty cycle mode. (See Duty Cycle diagram)	0 ... 255	min	0	0
OF2	2	Regulator off time for faulty probe. If <b>OF2</b> = "1" and <b>On2</b> = "0", the regulator remains off; if <b>OF2</b> = "1" and <b>On2</b> > "0", it operates in duty cycle mode. (See Duty Cycle diagram)	0 ... 255	min	1	1
<b>1&amp;2 ANALOGUE OUTPUT (folder "AnOu")</b>						
AOL	1&2	Analogue output mode: 020 = 0...20mA; 420 = 4...20mA; 001 = 0...1V; 005 = 0...5V; 010 = 0...10V;	020/420/ 001/005/010	num	420	420
AOF	1&2	Analogue output mode: <b>dis</b> = output disabled; <b>ro</b> = read out, output proportional to probe reading, in the range set by parameters LAO and HAO <b>Er</b> = error, output proportional to error between set point 1 and the value read by the probe, within the error values specified by parameters LAO and HAO <b>cPH</b> = do not use <b>cPc</b> = do not use	dis/ro/Er/ cPH/cPc	num	ro	ro
AOS	1&2	Analogue output mode with faulty probe: <b>Aon</b> =analogue output ON; <b>Aof</b> =analogue output OFF;	Aon/Aof	flag	Aof	Aof
LAO	1&2	Analogue output lower limit	LdL ... HdL	°C/°F	0	0
HAO	1&2	Analogue output upper limit	LdL ... HdL	°C/°F	100	100
<b>2 SOFT START REGULATOR (folder "SFt")</b>						
dSi	2	dynamic Step increment (Step Value). Value (in degrees) of each subsequent increment (dynamic) of adjustment point. (0 = SOFT START function disabled).	0 ... 25	num	0	0
Std	2	duration of Soft Start regulator step (unit of measure defined by Unt)	0 ... 255	min	0	0
Unt	2	Unit of measure (hours, minutes, seconds)	0/1/2	num	1	1
SEn	2	Function sensitivity Outputs enabled. Establishes on which outputs the function must be enabled: <b>0</b> = disabled; <b>1</b> = enabled <b>OUT1</b> ; <b>2</b> = enabled <b>OUT2</b> ; <b>3</b> = Enabled <b>OUT 1 &amp; 2</b> ;	0/1/2/3	num	1	1
Sdi	2	Function reactivation threshold. Establishes the threshold beyond which the SOFT START function is to be automatically reactivated	0.0 ... 30.0	°C/°F	0	0
<b>2 CYCLIC REGULATOR (folder "SFt")</b>						
Con	2	ON time for cyclic regulator output	0 ... 255	min	0	0
CoF	2	Off time for cyclic regulator output	0 ... 255	min	0	0

PAR.	LIV.*	Description of Parameter (divided by folder and Level)	Range	M.U.	Values DR4120	Values DR4120S																																				
<b>1&amp;2 ALARMs (folder "ALAR")</b>																																										
Att	2	Alarm type. Parameter "HA1/2" and "LA1/2" modes, as absolute temperature values or differential with respect to the Set Point. ( <b>Abs</b> = absolute value; <b>reL</b> = relative value).	Abs/reL	flag	Abs	Abs																																				
AFd	2	Alarm Fan differential. Alarm activation differential. It works with parameters "HA1/2" and "LA1/2". (See 'MAX/MIN Temperature Alarms' diagram)	1 ... 50	°C/°F	2	2																																				
PAO (!)	1&2	Power-on Alarm Override. Alarm exclusion time (expressed in hours) after the instrument is switched on or following a power failure.	0 ... 10	hours	0	0																																				
SAO	1&2	Set Point Alarm Override. Alarm exclusion time until the Set Point is reached. If "SAO" = 0 is disabled. If "SAO" > 0, an alarm will be generated if the Set Point is not reached after the time (in hours) set by this parameter.	0 ... 24	hours	0	0																																				
tAO	1&2	Temperature Alarm Override. Temperature alarm signal delay time.	0 ... 255	min	0	0																																				
AOP	2	Alarm output polarity: <b>nc</b> = normally closed; <b>no</b> = normally open.	nC/nO	flag	nC	nC																																				
<b>1&amp;2 COMMUNICATION (folder "Add")</b>																																										
dEA	1&2	index of the device inside the family (valid values from 0 to 14)	0 ... 14	num	-	1																																				
FAA	1&2	device family (valid values from 0 to 14). The pair of values FAA and dEA are the network address of the device and are given in the format "FF.DD" (where FF=FAA and DD=dEA).	0 ... 14	num	-	0																																				
PtY	1&2	Modbus parity bit: n = none; E=Even; o=odd;	n/E/o	num	-	E																																				
StP	1&2	Modbus stop bit: 1b=1 bit; 2b=2 bit;	1b/2b	num	-	1b																																				
<b>1 DISPLAY (folder "diSP")</b>																																										
LOC	1	LOCK. Keyboard lock and Set Point modification. It is still possible to access parameter programming and modify the parameters, including the status of this parameter to enable keyboard unlocking. ( <b>y</b> = Keyboard LOCKED; <b>n</b> = Keyboard FREE).	n/y	flag	n	n																																				
PA1	1	Password 1. When enabled ( <b>PA1 ≠ 0</b> ), it represents the access key for level 1 (USER) parameters.	0 ... 999	num	0	0																																				
PA2***	2	Password 2. When enabled ( <b>PA2 ≠ 0</b> ), it represents the access key for level 2 (INSTALLER) parameters.	0 ... 999	num	0	0																																				
ndt	1	number display type. Display with or without the decimal point ( <b>y</b> = with decimal point; <b>n</b> = without decimal point).	n/y	flag	y	y																																				
CA1	1	CALibration 1. Probe 1 calibration. Positive or negative temperature value added to that read by probe 1, before being displayed and used for regulation, according to the setting of parameter "CAi".	-30 ... 30	°C/°F	0	0																																				
CAi	1	Calibration operation: <b>0</b> = sum with only temperature displayed; <b>1</b> = sum with only the temperature used by the regulators and not for the display, which remains unchanged; <b>2</b> = sum with temp. displayed, which is also used by the regulators;	0/1/2	num	2	2																																				
LdL	2	Low display Level. Minimum value that can be displayed by the instrument.	-328 ... HdL	°C/°F	-328	-328																																				
HdL	2	High display Level. Maximum value that can be displayed by the instrument.	LdL ... 2910	°C/°F	2910	2910																																				
dro	2	Selection of °C or °F for displaying the temperature read by the probe. 0 = °C, 1 = °F. <b>NB: Switching between °C and °F or vice versa DOES NOT modify the set point, differential, etc. (e.g. set point=10°C becomes 10°F)</b>	0/1	flag	0	0																																				
<b>1 CONFIGURATION (folder "CnF")</b>																																										
H01	2	Configuration of regulators.	0 ... 12	num	4	4																																				
		<table border="1"> <thead> <tr> <th>H01</th> <th>Description</th> <th>OUT 1</th> <th>OUT 2</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>free</td> <td>H21</td> <td>H22</td> </tr> <tr> <td>1</td> <td>ON/OFF</td> <td>H/C</td> <td>H22</td> </tr> <tr> <td>2 e 3</td> <td>not used</td> <td>-</td> <td>-</td> </tr> <tr> <td>4</td> <td>2 independent ON/OFF</td> <td>H/C</td> <td>H/C</td> </tr> <tr> <td>5</td> <td>2 dependent ON/OFF</td> <td>H/C</td> <td>H/C</td> </tr> <tr> <td>6</td> <td>neutral zone</td> <td>H/C</td> <td>H/C</td> </tr> <tr> <td>7 ... 11</td> <td>non usati</td> <td>-</td> <td>-</td> </tr> <tr> <td>12</td> <td>Heating window</td> <td>H/C</td> <td>H22</td> </tr> </tbody> </table>					H01	Description	OUT 1	OUT 2	0	free	H21	H22	1	ON/OFF	H/C	H22	2 e 3	not used	-	-	4	2 independent ON/OFF	H/C	H/C	5	2 dependent ON/OFF	H/C	H/C	6	neutral zone	H/C	H/C	7 ... 11	non usati	-	-	12	Heating window	H/C	H22
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7 ... 11	non usati	-	-																																							
12	Heating window	H/C	H22																																							
H02	2	Key activation time, when configured with a second function. Press the ESC, UP and DOWN keys (if configured for a second function) for time "H02" to activate the function. <b>NOTE:</b> The AUX function has a fixed activation time of 0.5 second.	0 ... 15	secs	5	5																																				
H06	2	Key or aux/light digital input active with the instrument OFF: <b>n</b> = not active; <b>y</b> = active;	n/y	flag	y	y																																				
H08	2	Standby mode <b>0</b> = only the display switches off; <b>1</b> = display on and regulators locked; <b>2</b> = display off and regulators locked	0/1/2	num	2	2																																				
H10	1	Delay for output activation after Power On; minimum delay time for connection of loads in the event of restart after a power failure.	0 ... 255	num	0	0																																				
H11	2	Digital Input Configuration. <b>0</b> = Disabled; <b>1</b> = SOFT START; <b>2</b> = Offset set point; <b>3</b> = Cyclic operation regulated; <b>4</b> = AUX; <b>5</b> = STANDBY; <b>6, 7 and 8</b> = Not used; <b>9</b> = External alarm; <b>10</b> = Regulator lock external alarm	0 ... 10	num	0	0																																				
H13	2	Digital input polarity and priority. <b>no</b> = normally open (open); <b>nc</b> = normally closed (close); <b>noP</b> = normally open with polarity; <b>ncP</b> = normally closed with polarity.	no/nc/noP/ncP	flag	no	no																																				
H14	2	Digital input activation delay	0 ... 255	min	0	0																																				
H21	2	Configurability of digital output 1 (* See table, parameter H01): 0=disabled; 1=alarm; 2=cyclic; 3=aux/light; 4=Standby;	0 ... 4	num	0	0																																				
H22	2	Configurability of digital output 2 (if present): Same as H21 (* See table, parameter H01).	0 ... 4	num	0	0																																				
H25	2	Buzzer enabling (only if buzzer present): <b>n</b> =not enabled; <b>y</b> =enabled;	0 ... 4	num	0	0																																				
H31 (!)	2	UP key configuration. <b>0</b> = disabled; <b>1</b> = SOFT START; <b>2</b> = Offset set point; <b>3</b> = Cyclic operation regulator; <b>4</b> = AUX; <b>5</b> = STANDBY; <b>6, 7 and 8</b> = Not used	0 ... 8	num	0	0																																				
H32 (!)	2	DOWN key configuration. Same as "H31".	0 ... 8	num	0	0																																				
H34 (!)	2	AUX key configuration. Same as "H31".	0 ... 8	num	0	0																																				
PAS2**	1	Accessing level 2 (INSTALLER) parameters. See Password and Programming Menu sections.																																								

PAR.	LIV.*	Description of Parameter (divided by folder and Level)	Range	M.U.	Values DR4120	Values DR4120S
<b>1 COPY CARD (folder "FPr")</b>						
UL	1	UpLoad. Transfer of programming parameters from Instrument to Copy Card	/	/	/	/
dL	1	downLoad. Transfer of programming parameters from Copy Card to Instrument	/	/	/	/
Fr	1	Format. Cancellation of all data entered in the Copy Card. <b>ATTENTION:</b> If "Fr" parameter (Copy Card formatting) is used, the data entered in it will be permanently lost. This operation cannot be cancelled. The controller must be switched off and then on again after the operation with the Copy Card.	/	/	/	/

**NOTES:** \* The LEVEL column indicates the visibility level of parameters accessible by means of password (see relevant section)  
 \*\* PAS2 is visible (if requested or if specified) at Level1 in the "CnF" folder and can be set (or modified) at Level2 in the "diS" (parameter "PA2") folder.

**ATTENTION (!):** If one or more parameters marked with (!) are modified, to ensure correct operation the controller **MUST** be switched off and then switched on again after the modification.

**NOTE:** Make sure to switch the instrument off and on again each time the parameter configuration is changed, in order to prevent malfunctioning in the configuration and/or timing in progress.

## TECHNICAL DATA (EN 60730-2-9)

Use:	operation (not safety) device for incorporation
Mounting:	on DIN rail (Omega 3) or panel mounting with 70x45 drilling template.
Type of action:	1.B
Pollution class:	2
Material class:	IIIa
Overvoltage category:	II
Rated impulse voltage:	2500V
Temperature:	Use: -5.0 ... +55.0°C - Storage: -20.0 ... +85.0°C
Power supply:	Switching 100-240Va (+10% / -10%) 50/60 Hz
Consumption:	4W max
Digital outputs (relay):	refer to the label on the device
Fire resistance category:	D
Software class:	A

**NOTE: Check the power supply specified on the instrument label; contact our Sales Office for power and relay ratings.**

## FURTHER INFORMATION

### Input Characteristics

Display range:	PT100: -200.0°C ... +800°C (on display with 3 and a half digits + sign)
Accuracy:	0.5% end of scale +1 digit (over entire scale) - 0.2% end of scale +1 digit (between -150 ... 300°C).
Resolution:	0.1°C (0.2°F)
Analogue inputs:	1 PT100 input
Digital inputs:	1 voltage-free digital input

### Output Characteristics

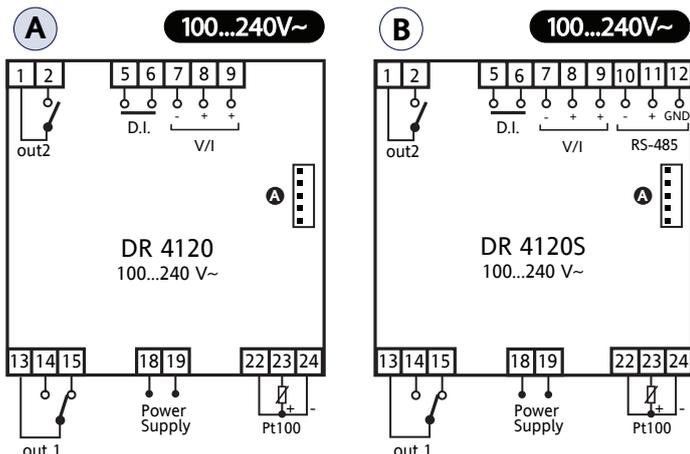
Digital outputs:	2 relay outputs: - (OUT 1) 1 SPDT 16A max 250 Va - (OUT 2) 1 SPST 8(3)A max 250 Va
Analogue outputs*	V/I output: 0-1 V, 0-5 V, 0-10 V, 0-20 mA and 4-20 mA
Buzzer output	only on models providing for it ( <b>OPTIONAL</b> )

### Mechanical Characteristics

Enclosure:	Plastic casing 4 DIN modules
Dimensions:	front panel 70x85 mm, depth 61 mm
Terminals:	screw-on for cables with section 2.5mm <sup>2</sup>
Connectors:	TTL for connection to Copy Card <b>+ RS-485 Serial for connection to Modbus systems (only in models providing for it)</b>
Humidity:	Use / Storage 10...90% RH (non-condensing)

**NOTE: The technical specifications given in this document regarding measurement (range, accuracy, resolution, etc.) refer to the instrument and not to any accessories provided, such as the probes. This means, for example, that the error introduced by the probe must be added to the error of the instrument.**

## WIRING DIAGRAMS



TERMINALS		
1 - 2	N.O. relay out2 par. H22	10-11-12 RS485 serial port
13 - 14	N.O. relay out1 par. H21	18 - 19 Power supply
13 - 15	N.C. relay out1 par. H21	22-23-24 PT100 probe input
5 - 6	Digital input - D.I.	A TTL input for Copy
7 - 8 - 9	Analogue output V-I	Card and Televis system

\* maximum loads controllable from the analogue output:

output type	controllable load
0-1 V	20mA with minimum load resistance 50 Ohm
0-5 V	20mA with minimum load resistance 250 Ohm
0-10 V	20mA with minimum load resistance 500 Ohm
0-20 mA	350 Ohm
4-20 mA	350 Ohm

## ELECTRICAL CONNECTIONS

**Attention! Make sure the machine is switched off before working on the electrical connections.**

The instrument is equipped with screw terminal blocks for connecting electrical cables of max. section 2.5 mm<sup>2</sup> (one wire per terminal for power connections): for the terminal ratings, see the label on the instrument. The relay outputs are voltage free. Do not exceed the maximum permissible current; in case of higher loads, use a contactor of adequate capacity. Make sure the power supply voltage complies with that required by the instrument. The length of the analogue input and output wiring can affect the behaviour of the instrument from an electromagnetic compatibility standpoint, therefore take special care with the wiring; it is advisable to carry out wirings of length not exceeding 3 metres. The probe cables, power supply cables and the TTL serial cable should be kept separate from the power cables.

## LIABILITY AND RESIDUAL RISKS

The manufacturer declines any liability for damage due to:

- installation/uses different from those foreseen and, in particular, not complying with the safety regulations and/or instructions given in this document;
- use on panels that do not ensure adequate protection against electric shock, water or dust when assembled;
- use on panels allowing access to dangerous parts without having to use tools;
- tampering with and/or modification of the product;
- installation/use on panels not complying with the current standards and regulations.

## CONDITIONS OF USE

### PERMITTED USE

For safety reasons, the instrument must be installed and used according to the instructions supplied and, in particular, parts under dangerous voltages must not be accessible in normal conditions. The device must be adequately protected from water and dust with regard to the application, and must only be accessible using tools (except for the front panel).

The device is suitable for use in household refrigeration appliances and/or similar equipment and has been tested for safety aspects in accordance with the harmonised European reference standards.

### PROHIBITED USE

Any use other than that expressly permitted is prohibited.

The relay contacts provided are of a functional type and subject to failure: any protection devices required by product standards, or suggested by common sense for obvious safety requirements, must be installed externally to the instrument.