Pixsys®
ELECTRONICS

DRR450

Controller

User manual

Summary

Introduction

Thanks for choosing a Pixsys controller.
The DRR450 series integrates in a single device the main elements of the control loop: reading of temperature sensor, control output by SSR module, reading and control of the current on the load by means of integrated current transformer. Serial communication RS485 and ModbusRTU protocol allow the connection to PC/HMI Panels for supervisory functions/remote control.
A second output is available for alarm or management of cooling systems for double PID action.

1 Safety guide lines

Read carefully the safety guidelines and programming instructions contained in this manual before using/ connecting the device.
Disconnect power supply before proceeding to hardware settings or electrical wirings.
Only qualified personnel should be allowed to use the device and/or service it and in accordance to technical data and environmental conditions listed in this manual.
Do not dispose electric tools together with household waste material. In observance European Directive 2002/96/EC on waste electrical and electronic equipment and its implementation in accordance with national law, electric tools that have reached the end of their life must be collected separately and returned to an environmentally compatible recycling facility.

2 Model identification

DRR450-12A-T	Power supply 24Vdc ±10% + 1 logic output 5Vdc/20ma + 1 logic output 24Vdc/50ma + RS485 +current transformer

3 Technical data

3.1 Main features

Operating temperature	0-45°C, humidity 35..95uR%
Sealing	IP20
Material	PA 6 UL94V0 self-exstinguishing
Weight	75 g

3.2 Hardware features

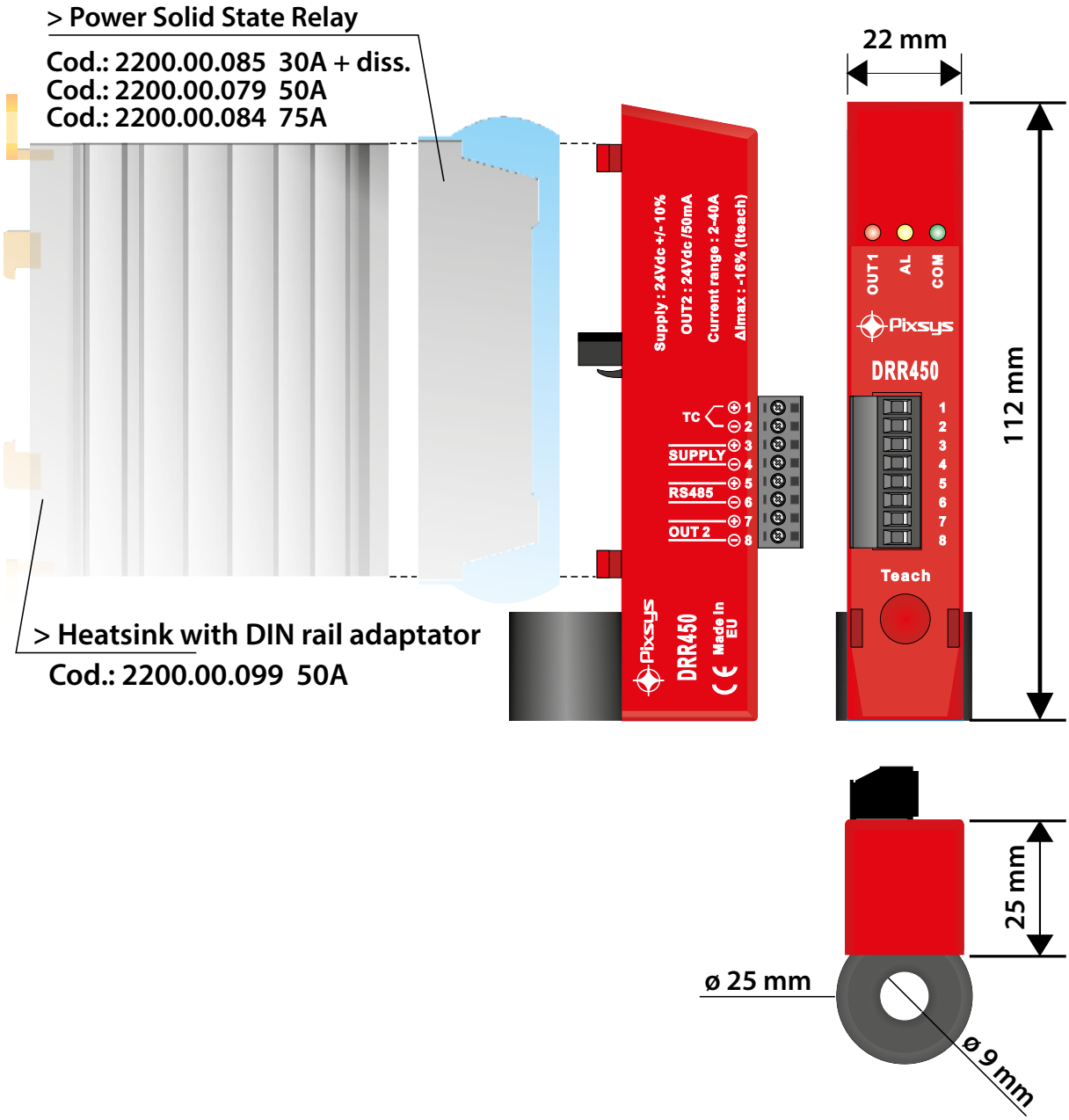
Analogue input	**AN1** Configurable via software **Input** Thermocouple type K, J, T, E. Automatic compensation of cold junction from 0°C to 50°C.	Tolerance (25°C) ±0.2 % Full scale ± 1 tenth of degree. Cold junction accuracy 0.1°C/°C
Command output	**1 logic output**. For connection to SSR Celduc SU/SUL series.	5 Vdc 20mA
Auxiliary output	1 logic output. Configurable as alarm or cooling control output in double loop mode.	24 Vdc 50mA

3.3 Software features

Regulation algorithms	ON-OFF with hysteresis. P, PI, PID, PD proportional time.
Proportional band	0..999°C or °F
Integral time	0,0..999,9 s (0 excludes integral function)

Derivative time	0,0..999,9 s (0 excludes derivative function)
Controller functions	Manual or automatic tuning, configurable alarm, Start/Stop.

4 Size, installation and wiring diagram



4.1 Electrical wirings

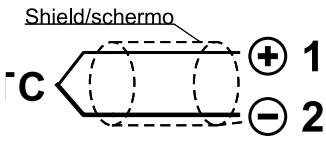
Although this controller has been designed to resist noises in industrial environment, please notice following safety guidelines:

- Separate control lines from the power wires
- Avoid the proximity of remote control switches, electro-magnetic meters, powerful engines.
- Avoid the proximity of power groups, especially those with phase control.

Power Supply

24Vdc ±10% – 1VA

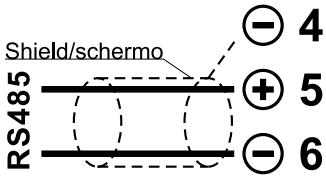
Analogue input AN1



For thermocouples K, J, T, E.

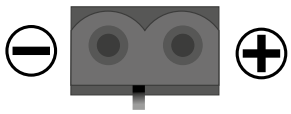
- Comply with polarity
- For possible extensions, use compensated cable and terminals suitable for the thermocouples used (compensated)
- When shielded cable is used, it should be grounded at one side only.

Serial input



Communication RS485 Modbus RTU/Slave

Logic output OUT1



- Logic output for the connection to SSR Celduc SU/SUL series.
- 5Vdc 20m

Logic output OUT2

- 24Vdc 50m

5 Leds and key function

5.1 Meaning of status lights (LED)

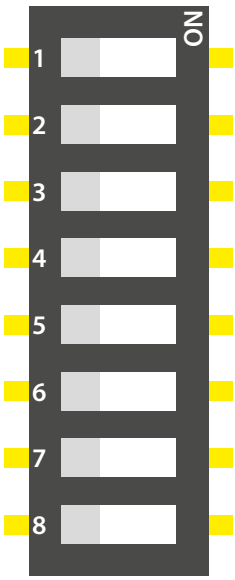
OUT 1	• Normally it indicates the status of output OUT1. • During a test (key pressure) it flashes with a 50ms frequency. • When the reading of the current ends, it flashes at 0.5s frequency if the operation has been done correctly; it flashes in alternation with the yellow led if the operation was not succesfull.
AL	• It indicates the status of output OUT2 if the parameter 18 AL. 1 is different from 0 and 10. • If the parameter 18 AL. 1 is disabled or selected as parallel of OUT1, it indicates the status of the Heater Break Alarm: a. ON fixed: SSR in short circuit. b. Flashing 50ms: open charge. c. Flashing 0.5s: partial lack of the charge.
COM	• It indicates that serial communication is active.

5.2 Key

Teach

- If pressed it enables the output OUT1: press for more than 3 seconds to manage the threshold current reading for the Heater Break Alarm control.
- If pressed during the modbus address assignment function, it stores the value assigned by the master (only if the dips are all in OFF).

5.3 Dip switch



- If contacts 1..7 are in OFF, the slave address for the modbus is selected on parameter 29 SLAd.
- If contact 8 is in ON, the parameters and the eeprom data are loaded with default values (DEFAULT setting)
- Determines the slave address for the Modbus in binary code (contact 8 excluded).
- Ex.: 0000001=1; 0000010=2; 0000011=3; 0000100=4; 0000101=5; 0000110=6; 0000111=7; 1111101=125; 1111110=126; 1111111=127.

6 Controller functions

6.1 Automatic tuning

Select 1 on parameter 5 (tunE word 2005).
Automatic tuning is always active and analyses constantly the difference setpoint-process. If this difference is greater than the value selected on parameter 7 MGtu. (Max Gap Tune), the DRR450 decides autonomously when to modify PID parameters.

6.2 Manual tuning

Select 2 on parameter 5 (tunE word 2005).
The manual procedure allows the user a greater flexibility on deciding when to update PID algorithm parameters.
This procedure is activated writing 1 on the word modbus 1004.
The reference threshold to calculate the new PID parameters is given by the result of the following operation:
Tune threshold = **Setpoint** (word 1001) – **Par. 6** S.d.tu. (word 2006)
Ex.: if setpoint is 100.0°C and Par.6 S.d.tu. is 20.0°C, the threshold to calculate PID parameters is (100.0–20.0) = 80.0°C.
N.B.: for greater accuracy in the calculation of PID parameters it is recommended to launch the manual tuning when the process is far from setpoint.

6.3 Synchronized tuning

Select 3 on parameter 5 (tunE word 2005).

This procedure has been conceived to calculate correct PID values on multi-zone systems, where each temperature is influenced by the adjacent zones. Writing on word 1004, the device works as follows:

Word 1004 value	Action
0	Tune off.
1	Command output OFF
2	Command output ON
3	Tune active
4	Tune completed: command output OFF

The operation of this Tuning mode is the following: the master switches-off or turns-on all zones (value 1 or 2 on word 1004) for a time long enough to create inertia on the system. At this

point the autotuning is launched (value 3 on word 1004). The controller calculates the new PID values. When the procedure ends, it switches-off the control output and sets the value 4 on word 1004. The master, which should always read the word 1004, checks the various zones and when all of them have reached the value 4 it will bring to 0 the value of word 1004.
The various devices will regulate the temperature basing on the new values.
N.B. The master must read the Word 1004 at least every 10 seconds or the controller will automatically exit the autotuning procedure.

6.4 Automatic/manual regulation for % output control

This function allows to select automatic functioning or manual command of the output percentage. With parameter 28 (AU.MA. word 2028), you can select two methods.

1. The first selection (value 1 of word 2028) allows to modify, through the word 1005, the functioning mode: after writing 1 it is possible to change the output percentage on word 1011 (range 0-10000).
   To return to automatic mode, write 0 on word 1005.
2. The second selection (value 2 of word 2028) enables the same functioning, but with two important variants:

- If there is a temporary lack of voltage or after switch-off, the manual functioning will be maintained as well as the previously set output percentage value.
- If the sensor breaks during automatic functioning, the controller moves to manual mode while maintaining the output percentage command unchanged as generated by the P.I.D. immediately before breakage.

6.5 Loading default values

This procedure allows to restore default settings as pre-selected at the factory.
There are two reset modes:

- Close contact 8 of the dip switch and reopen it at restart.
- Write 9999 on word modbus 500.

After the restore, device restarts.

6.6 Heater Break Alarm on TA (Current Transformer)

This function allows to measure load current to manage an alarm during a malfunctioning with power in short circuit, always open or partial break of the charge.
The current transformer connected to terminals 15 and 16 must be 50mA (sampling time 80 ms).

- Select on par. 22 H.b.A.t. the Heater Break Alarm intervention threshold in Ampere. Otherwise it is possible to select this value in automatic mode pressing ● for more than 3 seconds.
- Select on par. 23 H.b.A.d. the delay time in seconds for the Heater Break Alarm intervention.
- It is possible to associate the alarm to the output OUT2, selecting 8 on par. 18 AL. 1.

The Solid State Relay malfunctions are reported as follows:

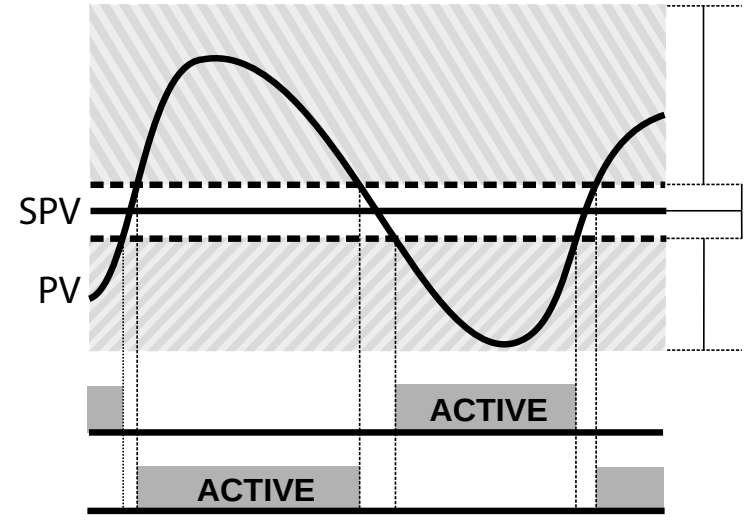
- SSR always closed: led **AL** ● ON.
- SSR always open: led **AL** ● flashing at 50ms frequency.
- Current load less than the value set on par. 23: led **AL** ● flashing at 0.5seconds frequency.

6.7 Dual Action Heating-Cooling

DRR450 is suitable also for systems requiring a combined heating-cooling action.

The command output has to be configured as PID for Heating (par. 11 P.b. greater than 0), while the alarm 1 has to be configured as Cooling (value 7 on word 18 AL. 1). The command output must be connected to the actuator responsible for heating, while the alarm will control cooling action.
Parameters to be configured for the heating PID are:
P.b. (word 11): Heating proportional band
t. i. (word 12): Integral time of heating and cooling
t.d. (word 13): Derivative time of heating and cooling
t.c. (word 14): Heating time cycle
Parameters to be configured for the cooling PID are:
AL. 1 (word 18)= (value 7) Alarm 1 selection (Cooling)
P.b.n. (word 25): Proportional band multiplier
ou.d.b. (word 26): Overlapping / Dead band
co.c.t. (word 27): Cooling time cycle

Par. P.b.n. (that ranges from 1.00 to 5.00) determines the proportional band of cooling action basing on the formula:
Proportional band for cooling action = P.b. * P.b.n.
This gives a proportional band for cooling which will be the same as heating band if P.b.n. = 1.00, or 5 times greater if P.b.n. = 5.00.
Integral and derivative time are the same for both actions.
The par. ou.d.b. determines the percentage overlapping between the two actions. For systems in which the heating output and cooling output must never be simultaneously active a dead band (ou.d.b. ≤ 0) must be configured, vice versa you can configure an overlapping (ou.d.b. > 0).
The following figure shows an example of dual action P.I.D. (heating-cooling) with t. i. = 0 and t.d. = 0.



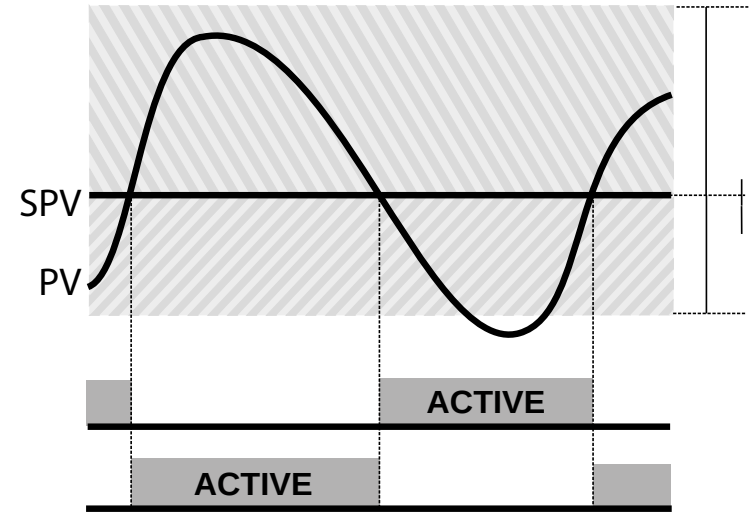
P.b x P.b.M = **COOL**

ou.d.b. < **0**

P.b (**HEAT**)

COMMAND OUTPUT (**HEAT**)

ALARM OUTPUT (**COOL**)



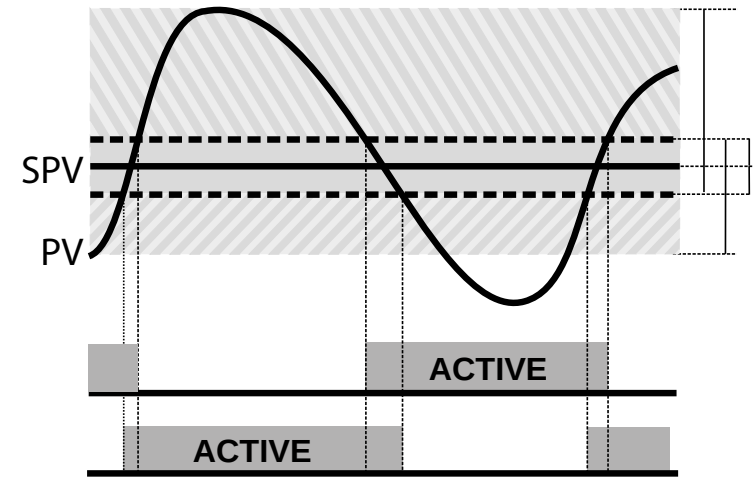
P.b x P.b.M = **COOL**

ou.d.b. = **0**

P.b (**HEAT**)

COMMAND OUTPUT (**HEAT**)

ALARM OUTPUT (**COOL**)



P.b x P.b.M = **COOL**

ou.d.b. > **0**

P.b (**HEAT**)

COMMAND OUTPUT (**HEAT**)

ALARM OUTPUT (**COOL**)

The parameter co.c.t. has the same meaning as the heating time cycle t.c.
Par. 24 co.c.t. (Cooling Fluid – word 2024) pre-selects the proportional band multiplier P.b.M. and the cooling PID cycle time co.c.t. basing on the type of cooling fluid:

coo.F.	Cooling fluid type	P.b.M.	co.c.t.
Air	Air	1.00	10
oil	Oil	1.25	4
H2o	Water	2.50	2

Once selected the parameter coo.F., parameters P.b.M., ou.d.b and co.c.t. can however be modified.

6.8 Softstart function

DRR450 integrates the Softstart function: on parameter 34 (softstart threshold) it is possible to select the threshold under which the softstart is activated at starting. Parameter 35 selects the output percentage (0 to 100) that the controller will keep until the process exceeds threshold selected on parameter 34 or until the time selected in minutes on parameter 36 will expire.

7 Serial communication

DRR450-12A-T is equipped with RS485 and can receive/broadcast data via serial communication using MODBUS RTU protocol.
The device can only be configured as a Slave.
This function enables the control of multiple controllers connected to a supervisory system/SCADA.
If contacts of dip-switch are all open each controller responds to a Master query only if the query contains the same address as parameter 29 SL.A.d.

The addresses permitted range from 1 to 254 and there must not be controllers with the same address on the same line.
Address 255 can be used by the Master to communicate with all the connected equipment (broadcast mode), while with 0 all the devices receive the command, but no response is expected.
DRR450 can introduce a delay (in milliseconds) of the response to the master request. This delay must be set on parameter 32 SE.dE.
Each parameter modification is saved by the controller in the EEPROM memory (100000 writing cycles), while the setpoints are saved with a delay of 10 seconds after the last modification.
NB: Changes made to words that are different from those reported in the following table can lead to malfunction.

Modbus RTU protocol features

Baud-rate	Selectable on par. 30 bd.rt.	
	Value 0: 1200bit/s	Value 5: 28800bit/s
	Value 1: 2400bit/s	Value 6: 38400bit/s
	Value 2: 4800bit/s	Value 7: 57600bit/s
	Value 3: 9600bit/s	Value 8: 115200bit/s
	Value 4: 19200bit/s	
Format	Selectable on par. 31 S.P.P.	
	Value 0: 8N1	Value 3: 8N2
	Value 1: 8E1	Value 4: 8E2
	Value 2: 8O1	Value 5: 8O2
Supported functions	WORD READING (max 20 word) (0x03, 0x04)	
	SINGLE WORD WRITING (0x06)	
	MULTIPLE WORDS WRITING (max 20 word) (0x10)	

RO = Read Only R/W = Read/Write WO = Write Only

Modbus address	Description	Read Write	Reset value
0	Type of device	RO	EEPROM
1	Software version	RO	EEPROM
5	Slave address	R/W	EEPROM
50	Automatic addressing	WO	-
51	System code comparison	WO	-
500	Loading default values (write 9999)	RW	0
1000	Process (tenth of degree)	RO	?
1001	Command setpoint (tenth of degree)	R/W	EEPROM
1002	Alarm 1 setpoint (tenth of degree)	R/W	EEPROM
1003	Start/Stop 0=controller in STOP 1=controller in START	R/W	0
1004	With automatic tuning (word 2005 = 1): 0=autotuning function OFF 1=autotuning function ON	RO	0
	With manual tuning (word 2005 = 2): 0=autotuning function OFF 1=autotuning funciton ON	R/W	0
	With synchronized tuning (word 2005=3): 0=autotuning function OFF 1=command out. OFF (forces the cooling) 2=command out. ON (forces the heating) 3=autotuning ON 4=autotuning completed	R/W	0
1005	Automatic/manual selection 0=automatic ; 1=manual	R/W	0
1006	Output status (0=off, 1=on) Bit 0 = **OUT1** Bit 1 = **OUT2**	RO	0
1007	Led status (0=off, 1=on) Bit0 = Red led Bit1 = Yellow led Bit2 = Green led	RO	0

Modbus address	Description	Read Write	Reset value
1008	Alarm status (0=absent, 1=present) Bit0 = Alarm 1	RO	0
1009	Error flags Bit0 = Cold junction error Bit1 = Process error (sensor) Bit2 = Error in eeprom writing Bit3 = Error in eeprom reading Bit4 = Error missing calibration Bit5 = Generic error Bit6 = Hardware error Bit7 = Error H.B.A. (SSR in short circuit) Bit8 = Error H.B.A. (SSR/open charge) Bit9 = Error H.B.A. (partial break of the charge)	RO	0
1010	Cold junction temperature (degree with tenth)	RO	?
1011	Hot output percentage (0-10000)	R/W	0
1012	Cold output percentage (0-10000)	R/W	0
1013	Current TA (ampere with tenth)	RO	?
1014	Current TA ON (ampere with tenth)	RO	?
1015	Current TA OFF (ampere with tenth)	RO	?
1016	Key status	RO	0
1017	Dip value	RO	0
2001	Parameter 1	R/W	EEPROM
2002	Parameter 2	R/W	EEPROM
2044	Parameter 44	R/W	EEPROM
4001	Parameter 1*	R/W	EEPROM
4002	Parameter 2	R/W	EEPROM
4044	Parameter 44	R/W	EEPROM

* Par. modified using serial addresses from 4001 to 4044 are saved in eeprom only after 10 seconds from the last parameter writing.

8 Table of configuration parameters

1 SEn.1 Sensor 1

Analogue input configuration/sensor selection (AI1)

Word modbus 2001

0 Tc-K 0..1000°C
1 Tc-J 0..740°C >**Default**
2 Tc-T 0..400°C
3 Tc-E 0..540°C

2 o.cA.1 Offset Calibration AI1

Value added/subtracted to visualized process value (normally used to correct ambient temperature value)

Word modbus 2002

-999..+999 tenths of degree. >**Default**: 0.
Es. 10 = 1.0°C/°F

3 G.cA.1 Gain Calibration AI1

% value multiplied with displayed number to calibrate process value.

Word modbus 2003

-999%..+999 % in tenths. >**Default**: 0.
Es.10=1.0%

4 c. HY. Command Hysteresis

Hysteresis in ON/OFF or dead band in P.I.D.

Word modbus 2004

-999..+999 tenths of degree. >**Default**: 0.
Es. 10 = 1.0°C/°F

5 tunE Tune

Autotuning type selection.

Word modbus 2005

0	Disabled. > **Default**.
1	Automatic. Calculation of P.I.D. parameters at starting and at command setpoint modification.
2	Manuale. Lanciato dai word modbus 1004.
3	Synchronized

6 S.d.tu. Setpoint Deviation Tune

Selects deviation from command setpoint as threshold used by manual tuning to calculate P.I.D. parameters.

Word modbus 2006

0..5000 tenths of degree.> **Default**: 200.
Es. 200 = 20.0°C/°F

7 M.G.tu. Max Gap Tune

Selects the max. process-setpoint gap over that the automatic tuning recalculates P.I.D. parameters.

Word modbus 2007

1..500 tenths of degree.> **Default**: 10.
Es. 10 = 1.0°C/°F

8 Mn.P.b. Minimum Proportional Band

Selects the min. proportional band value selectable by the automatic tuning.

Word modbus 2008

0..1000 tenths of degree.> **Default**: 50.
Es. 50 = 5.0°C/°F

9 MA.P.b. Maximum Proportional Band

Selects the max. proportional band value selectable by the automatic tuning.

Word modbus 2009

0..3000 tenths of degree.> **Default**: 500.
Es. 500 = 50.0°C/°F

10 Mn.i.t. Minimum Integral Time

Selects the min. integral time value selectable by the automatic tuning.

Word modbus 2010

0..9999 seconds.> **Default**: 100.
Es. 100 = 10.0 seconds

11 P.b. Proportional Band

Process inertia in units (Ex: if temperature in °C)

Word modbus 2011

0..3000 tenths of second. > **Default** 0.
0 = ON/OFF if also t.i. is equal to 0.
Es. 100 = 10.0°C/°F

12 t.i. Integral Time

Process inertia in seconds

Word modbus 2012

0..9999 tenths of second. > **Default**: 0.
0 = Integral action disabled. Es. 400 = 40.0 seconds

13 t.d. Derivative Time

Normally ¼ of integral time

Word modbus 2013

0..9999 tenths of second. > **Default**: 0.
0 = Derivative action disabled.
Es. 100 = 10.0 seconds

14 t.c. Cycle Time

Cycle time (for P.I.D. on SSR 1”).

Word modbus 2014

1..3000 tenths of second > **Default**: 10.

Es. 10 = 1.0 seconds

15 LLo.P. Lower Limit Output Percentage

Selects min. value for command output percentage.

Word modbus 2015

0..100% > **Default**: 0%.

16 uLo.P. Upper Limit Output Percentage

Selects max. value for command output percentage.

Word modbus 2016

0..100% > **Default**: 100%.

17 dEGr Degree

Selects degree type.

Word modbus 2017

0	Centigrades. > **Default**.
1	Fahrenheit.

18 AL. 1 Alarm 1 selection.

The alarm intervention is related to AL1.

Word modbus 2018

0	Disabled. > **Default**.
1	Absolute alarm, referring to process
2	Band alarm
3	Upper deviation alarm
4	Lower deviation alarm
5	Absolute alarm, referring to command setpoint
6	Status alarm (active in Run / Start)
7	Cooling output

8 Heater Break Alarm
9 Loop Break Alarm
10 Parallel of OUT1

19 A.1.S.o. Alarm 1 State Output

Alarm 1 output contact and type of action

Word modbus 2019

0 Normally open, active from start. >**Default**.
1 Normally closed, active from start
2 Normally open, active from alarm reaching[1]
3 Normally closed, active from alarm reaching[1]

20 A.1.HY. Alarm 1 Hysteresis

Word modbus 2020

-999..+999 tenths of degree. >**Default**: 0.
Es. 10 = 1.0°C/°F

21 A.1.S.E. Alarm 1 State Error

Contact status for alarm 1 output in case of error

Word modbus 2021

0 Open contact. > **Default**.
1 Closed contact.

22 H.b.A.t. Heater Break Alarm Threshold

Heater Break Alarm activation threshold

Word modbus 2022

0..550 tenths of ampere. > **Default**: 0.
0 = alarm disabled
Es. 200 = 20.0 ampere

[1] *At starting, the output is inhibited if the device is in alarm condition. It is activated at each alarm start.*

23 H.b.A.d. Heater Break Alarm Delay

Heater Break Alarm activation delay

Word modbus 2023

0..3600 seconds. >**Default**: 60.

24 coo.F. Cooling Fluid

Type of refrigerant fluid for heating / cooling P.I.D.

Word modbus 2024

0	Air. > **Default**.
1	Oil
2	Water

25 P.b.M. Proportional Band Multiplier

Word modbus 2025

100..500 hundreths. >**Default**: 100.

Es. 100 = 1.00

26 ou.d.b. Overlap/Dead Band

Dead band combination for heating / cooling P.I.D.

Word modbus 2026

-20.0..50.0 % in tenths. >**Default**: 0.

Negative: dead band.

Positive: overlapping.

Es. 100 = 10.0%

27 co.c.t. Cooling Cycle Time

Cycle time for cooling output.

Word modbus 2027

1..300 seconds. >Default: 10.

28 Au.MA. Aumatic / Manual

Anables the automatic/manual selection.

Word modbus 2028

0	Disabled. > **Default**.
1	Enabled.
2	Enabled Stored.

29 SL.Ad. Slave Address

Selects slave address for serial communication.

Word modbus 2029

1..254. >**Default**: 240.

30 bd.rt. Baud Rate

Selects baud rate for serial communication.

Word modbus 2030

0	1200 bit/s
1	2400 bit/s
2	4800 bit/s
3	9600 bit/s
4	19200 bit/s. > **Default**.
5	28800 bit/s
6	38400 bit/s
7	57600 bit/s
8	115200 bit/s

31 S.P.P. Serial Port Parameters

Selects the type of format for the serial.

Word modbus 2031

0	8 bit, no parity, 1 stop bit >**Default**: 0.
1	8 bit, even parity, 1 stop bit
2	8 bit, odd parity, 1 stop bit
3	8 bit, no parity, 2 stop bit
4	8 bit, even parity, 2 stop bit
5	8 bit, odd parity, 2 stop bit

32 SE.dE. Serial Delay

Selects the serial delay.

Word modbus 2032

0..100 milliseconds. >**Default**: 10.

33 oFFL. Off-line

Selects the off-line time. If no communication is available within the selected time, the controller will switch-off the command output.

Word modbus 2033

0..600 tenths of second. >**Default**: 0.
0 = Offline disabled
Es. 100 = 10.0 seconds

34 SoFt. Softstart threshold

Selects the threshold under which the device will activate Softstart function at starting.

Word modbus 2034

-600..10000 tenths of degree. >**Default**: -60.0.
Es. 1000 = 100.0 degrees

35 S.PErc. Softstart percentage

Value of the output percentage during Softstart.

Word modbus 2035

0..100%. >**Default**: 80%.

36 S.tiME Softstart time

Max. softstart duration: if the process doesn't reach the threshold entered on parameter 34 within the selected time, the controller will start to regulate on setpoint value.

Word modbus 2036

1..1440 minutes >**Default**: 15.

37 inIt.S. Initial state

Selects controller status at starting.

Word modbus 2037

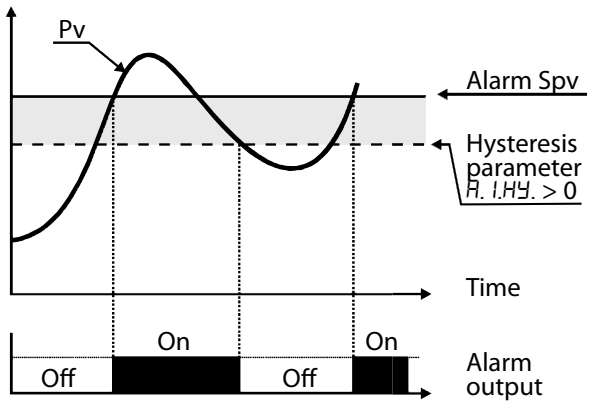
0 Controller in START. >Default.

1 Controller in STOP.

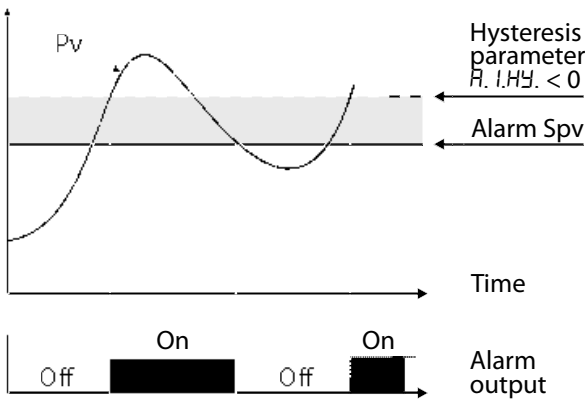
2 Backs the controller to the Start/Stop status existing before the switching-off.

9 Alarm intervention modes

Absolute alarm or Threshold alarm (word 2018 = 1)

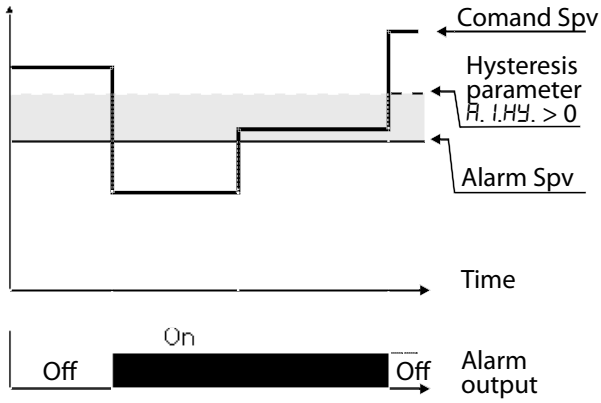


Hysteresis value greater than "0" (Par. 20 A. 1.HY > 0).



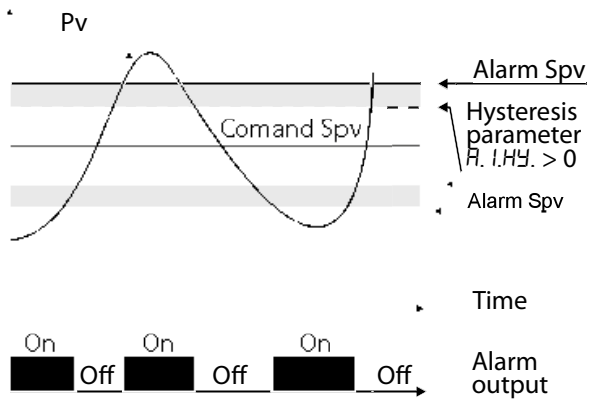
Hysteresis value less than "0" (Par. 20 A. 1.HY < 0).

Absolute alarm or Threshold alarm referring to command setpoint (word 2018 = 5)

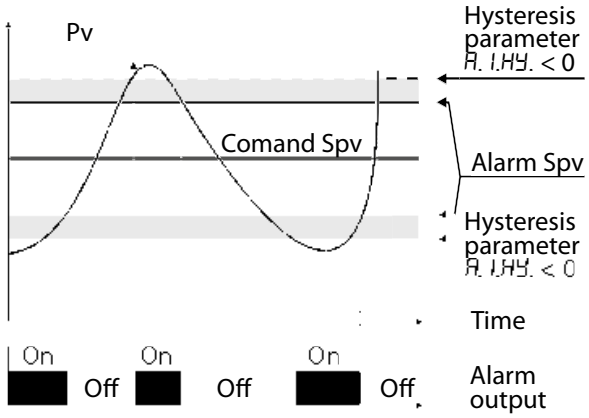


Absolute alarm referred to the command setpoint. Hysteresis value greater than "0" (Par. 20 A.1.HY > 0).
The command setpoint can be modified using the serial port RS485 commands (word 1001).

Band alarm (word 2018 = 2)

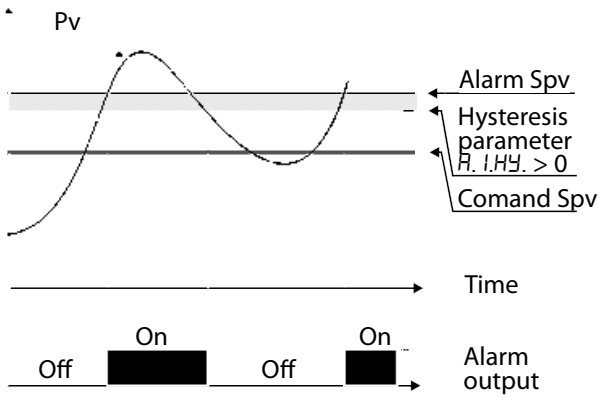


Hysteresis value greater than "0" (Par. 20 A.1.HY > 0).



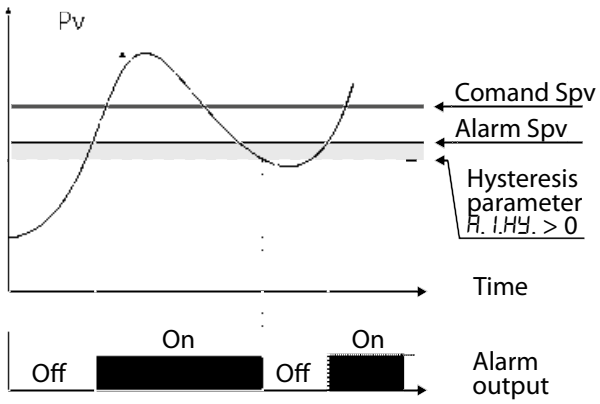
Hysteresis value less than "0" (Par. 20 A.1.HY < 0).

Upper deviation alarm (word 2018 = 3)



Value of alarm setpoint greater than "0" and hysteresis value greater than "0" (Par. 20 A.1.HY > 0).

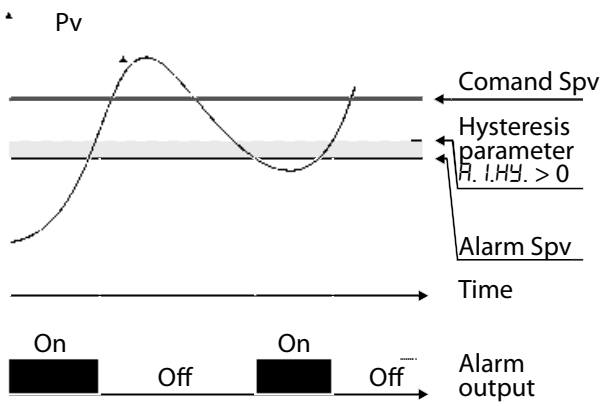
N.B.: with hysteresis less than "0" (A.1.HY < 0) dotted line moves over the alarm setpoint.



Value of alarm setpoint less than "0" and hysteresis value greater than "0" (Par. 20 A.1.HY > 0).

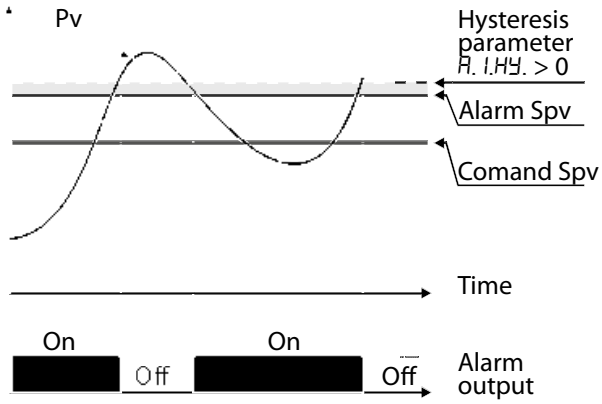
N.B.: with hysteresis less than "0" (A.1.HY < 0) dotted line moves over the alarm setpoint.

Lower deviation alarm (word 2018 = 4)



Value of alarm setpoint greater than "0" and hysteresis value greater than "0" (Par. 20 A.1.HY > 0).

N.B.: with hysteresis less than "0" (A.1.HY < 0) dotted line moves under the alarm setpoint.



Value of alarm setpoint less than “0” and hysteresis value greater than “0” (Par. 20 A.1.HY > 0).

N.B.: with hysteresis less than “0” (A.1.HY < 0) dotted line moves under the alarm setpoint.

10 Table of Anomaly Signals

If installation malfunctions, the controller switches off the regulation output and reports the anomaly noticed on word 1009 (error flags).

For example, the controller will report a defective thermocouple by flashing alternately red/yellow LED and setting to 1 the bit 0 of the word 1009.

For other signals see table below:

	Cause	What to do
BIT2	Error in EEPROM cell programming.	Call assistance
BIT0	Cold junction sensor failure or room temperature outside of allowed limits.	Call assistance
BIT3	Incorrect configuration data. Possible loss of instrument calibration.	Verify that configuration parameters are correct.
BIT1	Broken thermocouple or temperature outside of limits.	Verify the connection with the sensors and their integrity.
BIT4	Missing calibration.	Call assistance

11 Summary of configuration parameters

Date: Model DRR450:

Installer: System:

Notes:

N.	Par.	Word	Description
1	SEn. 1	2001	Analogue input AI1 configuration
2	o.cA. 1	2002	Offset calibration AI1
3	G.cA. 1	2003	Gain calibration AI1
4	c. HY.	2004	Hysteresis/dead band for command set
5	tunE	2005	Autotuning selection
6	S.d.tu.	2006	Setpoint Deviation Tune
7	M.G.tu.	2007	Max Gap Tune
8	Mn.P.b.	2008	Min. Proportional Band
9	MA.P.b.	2009	Max.Proportional Band
10	Mn.i.t.	2010	Min. Integral Time
11	P.b.	2011	Proportional band
12	t.i.	2012	Integral time
13	t.d.	2013	Derivative time
14	t.c.	2014	Cycle time
15	L.L.o.P.	2015	Lower limt output percentage
16	u.L.o.P.	2016	Upper limt output percentage
17	dEGr.	2017	Degrees type
18	AL. 1	2018	Alarm 1 selection
19	A.1.S.o.	2019	Alarm 1 output contact

N.	Par.	Word	Description
20	A.1HY.	2020	Alarm 1 hysteresis
21	A.1.S.E.	2021	Alarm 1 contact state in case of error
22	H.b.A.t.	2022	Heater Break Alarm threshold
23	H.b.A.d.	2023	Heater Break Alarm delay
24	coo.F.	2024	Cooling fluid type
25	P.b.M.	2025	Proportional band multiplier
26	ou.d.b.	2026	Overlapping/Dead band
27	co.c.t.	2027	Cycle time for cooling output
28	Au.MA.	2028	Automatic/manual selection
29	SL.Ad.	2029	Slave address
30	bd.rt.	2030	Baud Rate
31	S.P.P.	2031	Serial parameters
32	SE.dE.	2032	Serial delay
33	oFF.L.	2033	Off-line time
34	SoFt.	2034	Softstart threshold
35	S.PErc.	2035	Softstart percentage
36	S.t.ME	2036	Softstart time
37	in.t.S.	2037	Initial state

Notes / Updates

Read carefully the safety guidelines and programming instructions contained in this manual before using/connecting the device.

Prima di utilizzare il dispositivo leggere con attenzione le informazioni di sicurezza e settaggio contenute in questo manuale.

RoHS Compliant

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