NR2007

Compact-
Temperature controller
for 1 - 2 zones

Operations manual

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Dear customer,

thank you for having chosen a NOLDEN temperature controller. This high quality device has been produced in our ISO 9001-certified factory and was shipped to you after a thourough quality test.

Unpack Check the device for eventual shipping damage. Don't connect damaged equipment ! Claim the damage with your shipping agent.

Read Please read carefully this operating manual before bringing the device into service !

Connect Wiring the device should be done by your qualified electrician following the instructions given in this manual.

Warranty period is 2 years and includes all malfunctions clearly caused by material, production or design failures. Repair or replacement in this case are free of charge, you only pay the shipping cost to our factory. No further claims or requirements can be accepted, especially for consequential losses or damages.

Service We help you quickly and at resonable costs. Just send us the device with repair order and precise description of the malfunction.

Carefull packaging is essential for a safe shipment !

Small repairs up to 80,- EUR are done immediately without formal offer. In any other case, we contact you as soon as possible to determine the next steps.

To facilitate your orientation in this manual, you find the following symbols :

Safety advice

General information

Wiring- and installing advice

Table of content

Tabel of content (cont.)

1. Features

Microprocessor based compact temperature controller with the following features:

- Integrated power supply for 1 or 2 zones
- Usable for heating or cooling
- PID-caracteristic, 2-point-controller or manual constant powersetting
- Auto-adaptation to the caracteristic of every zone (autotuning) with 2 available PID-curves
- Available for thermocouples type J or K or Pt100– resistance sensor
- 2 programmable alarms per zone, wired to common alarm output
- Programmable softstart

2 Safety advice

1. Please read this advice carefully.

2. Keep this operations manual for use near the machine.

3. This is an electral device driven with high voltage, please respect the usual VDE- and safety regulations.
   Mains voltage and every voltage greater than 42 volts is dangerous !

4. Connect to a power source following the identification plate on the device.

5. Avoid contamination of the interior with debris, liquids or sprays.
   Risk of short-circuit, fire or electric shock !

6. **Before dismantling the controller insert from the frontpanel, remove the blocking screw (upper side of the carter, red point), switch mains power off and prevent unintentional restart.**

   Put blocking screw in place after having restored the insert!

   Non-compliance with this advice can cause contact to dangerous high voltage inside the device!

7. Don‘t place the device on hot machine surfaces or near radiation sources of hot parts.

8. Keep the power connection cable clear of hot parts or sharp edges.

9. Disconnect the power cable immediately, if
   - it was damaged,
   - liquid or parts penetrated the device,
   - the device was damaged by falling down or other mechanical impacts,
   - you have the suspicion of any malfunction.

10. The operator must be thoroughly instructed by a qualified person for the work to be carried out.

11. Intervention at the device must only be carried out by qualified staff members.

    For repair, the device should be send back to our factory. Attempted self-repair causes immediate termination of the warranty period !

    If spare parts are required, only parts recommended by the supplier must be used. The use of other parts may cause damage and/or hazard for operation personnel.

12. Please respect further recommandations and warnings described in this operations manual.

3. Specification

Mains voltage :
100...240V +/- 10%, 50/60Hz

Nominal rating / nominal current :
Controller 2.300W / 10A per zone
max. 16A with 2 zones

Fuses
Heaters : 10A FF, 6,3x32mm
Controller : 500mA MT, 5x20mm

Alarm output:
Relay max. 250V/5A, common output

Input :
- If ordered for thermocouple : Type J or K
- If ordered for resistive sensor : Pt100 2– or 3-wires

Accuracy:
0,5% FS

Power control
0...100% proportional, zero-voltage switching
Solid state relay rated up to 50A

Display :
7-segment LED-display 8mm green (actual value) and red (set-point), signal-LEDs red for output and alarm.

Soft-start
Softstart-time (min) and –powersetting (0…100%) programmable.

Heating- and TC-connection
6pol. + PE (1 zone) or 10-pol. +PE (2 zones) industrial heavy duty connector
16A/400V

Alarm connector :
7-pol. + PE for alarm output
Floating relay contacts, wired on 1 common output

Dimensions :
217 x 110 x 250mm (W x H x D)

Farbe:
Powder coating RAL 7035 (Bottom incl. front and back)
RAL 3000 (Upper casing)

Environmental conditions :
Degree of pollution (VG) 2 following EN610101
Ambient temperature 0 - 55°C
Humidity 10 - 80% (without condensation)

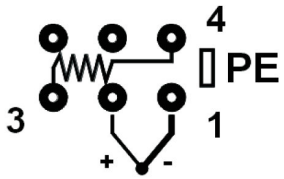
4 Installation and wiring :

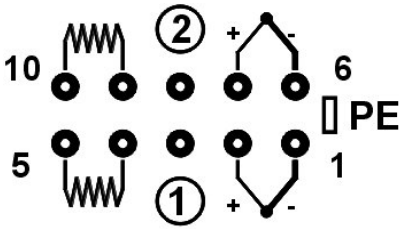
4.1 Installation :
The installation site must provide easy access for the operator without hazard. Sufficient mechanical stability must be guaranteed, also secure the device from slipping on the installation surface.
Protect from heat, radiation and allow free air circulation. Protect power cable from heat and mechanical stress. Do not place the device on hot surfaces.

4.2 Connection of the power supply :
This device must only be operated at the voltage indicated on the name plate. Please check for a sufficient fuse protection of the power outlet foreseen for the device.
Protective earth conductor must be provided !

4.3 Connection of heater and thermocouples :
Please compare the connecting diagram on the temperature controller (backside, near the outlet) with the diagram of the mould. Inappropriate connection can destroy controller, heater and TC !
Available mould connecting cables contain heater– and FeCu-Ni compensation wires for TC. Never use compensation wires to connect a heater.

Heater– and TC-wiring





for 1 zone (NR2007.1)
following NR-Norm NR6

for 2 zones (NR2007.2)
following NR-Norm NR10

Other pin assignment schemes on request
(see Annex page 29 of this operations manual)

5.4 Alarm output

For every zone, two alarm functions can be programmed individually. These alarms operate 2 common floating contacts as cumulative exits for both zones together, they are wired on a 7-pin connector on the back side.

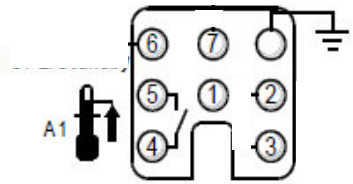


Fig. : Front side NR 2007.2

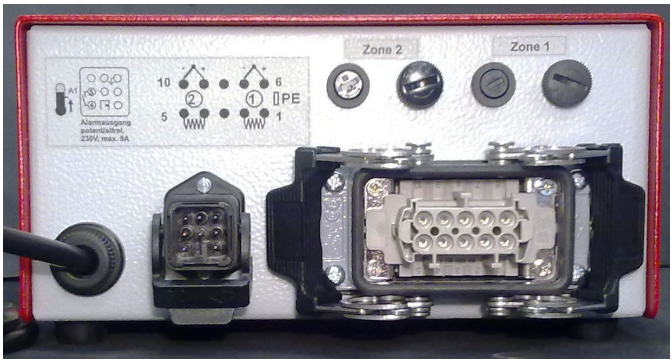


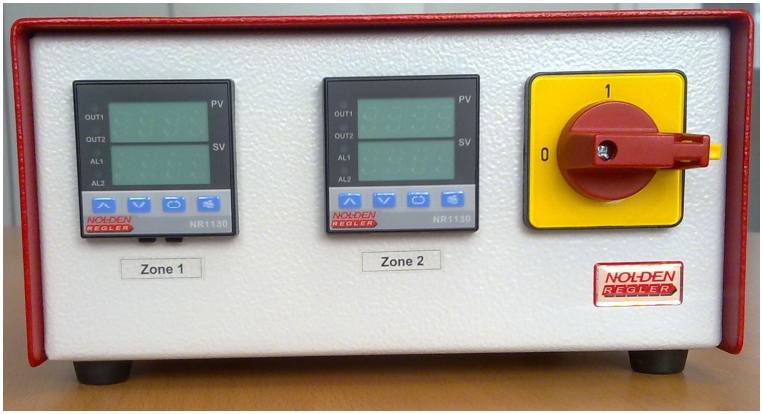
Fig. : Back side NR 2007.2

5. Operation

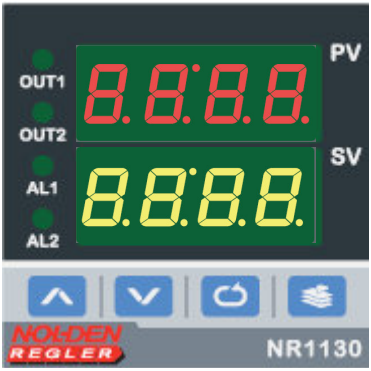
5.1 Main switch

Before wiring the device, make sure that the main switch is in position OFF „0“. Herewith, all poles are disconnected from the mains voltage. The main switch can be locked following EN81-80. Before working on the device itself or on a tool connected to it, the switch must be locked to prevent the device against unintentional restart.
This can be done by retracting the power cable and securing it against re-connecting or by locking the main switch with a personal lock.

After having finished the wiring completely, switch the device on with main switch in position ON „1“.



5.2 Display and keys



PV : Normal operation ACTUAL temperature

SV : Normal operation SETPOINT temperature

Both available 4-digits or 3-digits with one digit after the decimal point (see page 26)

OUT1 : LED Heat– or Cooling output 1 active

AL1 : LED Alarm 1 active

Failure : Thermocouple break

UP-key : Sets the chosen parameter to a higher value

DOWN-key : Sets the chosen parameter to a lower value

Press „DOWN“-key for ~ 2 sec. = Heating ON / OFF

Press „UP“ and „DOWN“-key simultaneously ~2 sec.= Start or Stop autotuning

Press „UP“-key for ~ 2 sec. = manual mode ON / OFF

ENTER-Key : Choose the parameters to be set or modified

The associated digit of the 7-segment-display flashes and can be set with the „UP“ - or „DOWN“ keys as needed. Pressing the „ENTER“-key once more confirms the entered value and goes to next digit.

No entry after 15 sec. = back to normal operation

No confirmation after 15 sec. = automatical confirmation of the entry

LEVEL-Key : Choice of menu level
PLE1 up to
PLE4

No entry after 15 sec. = back to normal operation

If menu level is already chosen, press „LEVEL“-key once = back to top of list

If menu level is chosen, press „LEVEL“-key 2 sec. = back to normal operation

5.3 Altering setpoint temperature

Altering the setpoint temperature can be made during normal operation without having to choose a menu level .

- Press „ENTER“-key, until the desired digit in the SV-display flashes

- Alter the value with the „UP“ and „DOWN“ keys as needed

- Confirm with the „ENTER“-key an go to the next digit

- To finish, press „ENTER“-key once (or no entry after 15 sec. = back to normal operation)

5.4 Menu level 1 = Operational level

Choice of menu level with the „LEVEL“- key
-> Display „*PLE I* “

Choice of parameter with the „UP“- and „DOWN“-keys

Display output power setting 0….100%
(outPut Percentage 1)

(Value can only be altered, if the controller is set to manual mode, see 5.6)

Alarm 1 signal contact
(ALarm low value)

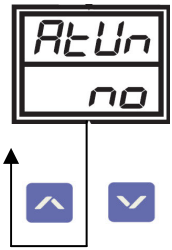
Low temperature 0….99°C
Depending on alarm configuration PLE3

Altering the value as described in 5.3

Alarm 1 signal contact
(ALarm high value)

Over temperature 0….99°C
Depending on alarm configuration PLE3

Altering the value as described in 5.3



Autotuning :

YES	Start Autotuning
no	No / Stop Autotuning

Back to top of menu / 1st parameter

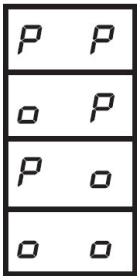
5.5 Menu level 2 = Program level

Choice of menu level with the „LEVEL“- key
-> Display „*PLE 2* “

Choice of parameter with the „UP“- and „DOWN“-keys

Setting type of control (Control) for **Output 1** and 2 (option)

o = on/off (2-pt.-controller) P= PID-mode



Outp.1	Outp. 2 (Opt.)
PID	PID
on/off	PID
PID	on/off
on/off	on/off

Setting type of control adaptation mode (Control Mode) for output 1

SELF = Selftuning

At = Autotuning

Selftuning : Slow, no overshooting, less precise
Autotuning : Quick, limited overshooting accepted, more precise

Setting heating / cooling (type Heat Cool) for **output 1** and 2 (option)

Outp.1	Outp. 2 (Opt.)
Heating	Cooling
Cooling	Heating

Setting cycle time output 1 (Cycle time 1)
0 … 60 sec.

Setting proportional band output 1 (Prop.-band 1 or Autotuning P.-band 1)

Depending on type of control adapt. mode (s.o.) for selftuning 0 … 100 °C

Setting integral time output 1
(int.-time 1 or Autotuning i.-time 1)

Depending on type of control adapt. mode (s.o.)
0 … 250 / 0.1 sec.

Pb 1 ⇨ A Pb 1
it 1 ⇨ A it 1
dt 1 ⇨ A dt 1

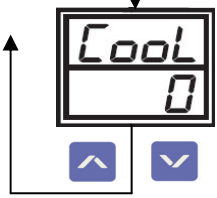
Setting differential time output 1
(diff.-time 1 or Autotuning d.-time 1)

Depending on type of control adapt. mode (s.o.)
0 … 250 / 0.1 sec.

Pb 1 ⇨ A Pb 1
it 1 ⇨ A it 1
dt 1 ⇨ A dt 1

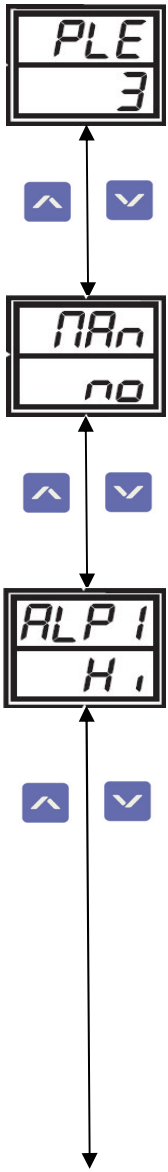
Setting setpoint lower limit
(Low Limit)
in °C / F

Setting setpoint upper limit
(High Limit)
in °C / F



Setting cycling delay time
cooling in °C / F

5.6 Menu level 3 = Program level



Choice of menu level with the „LEVEL“- key
-> Display „*PLE 3* “

Choice of parameter with the „UP“- and „DOWN“-keys

Setting manual output mode (MAnual)

no : off (=automatical control mode)
yes: on (=manual control mode)

Setting Alarm 1
(ALarm Program 1)

No alarm

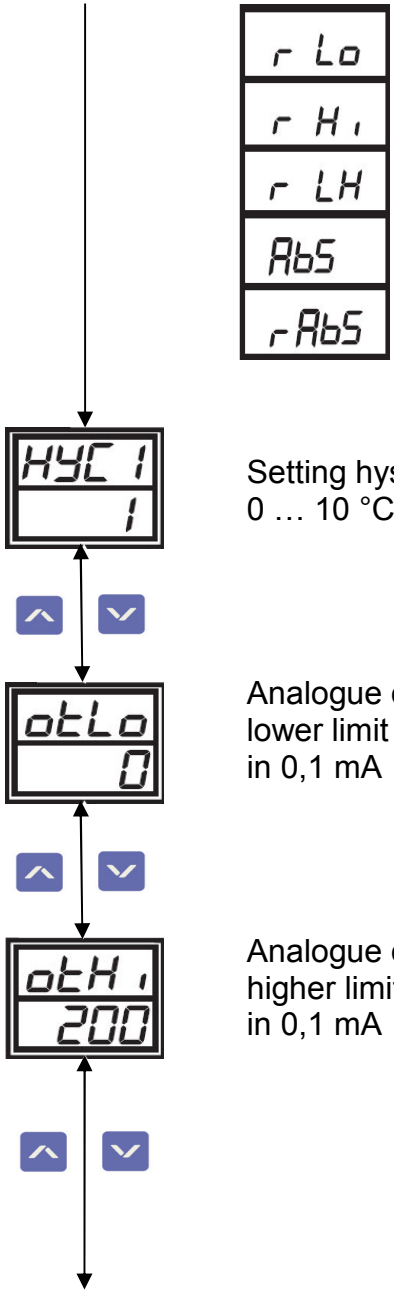
Lower limit contact

Higher limit contact

Lower + higher lim.-cont.

Standby lower lim.-cont.

Standby Lower + higher limit contact



Inverted limit contact

Inverted higher contact

Inverted lower+higher lim.-cont.

Absolute value

Inverted absolute value

Setting hysteresis alarm 1
0 … 10 °C / F

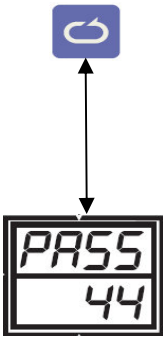
Analogue output (Option)
lower limit
in 0,1 mA

Analogue output (Option)
higher limit
in 0,1 mA

Intentionally left blank, please see reverse!

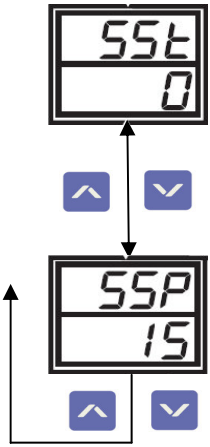
Ad 5.7 , Menu level 4 = Configuration level

5 sec



To Reset the operation locking mode, press „ENTER“-key for 5 sec., herewith, all menu levels will be unlocked (PASS 0044).

If you prefer, please remove this page from the operations manual and keep it out of reach for a given group of users)



Setting Softstart-duration
(SoftStart time)
0 … 60 min

Setting Softstart-Output powersetting
(SoftStart Percentage)
0 … 100%

5.7 Menu level 4 = Configuration level

Choice of menu level with the „LEVEL“- key
-> Display „*PLE 4* “

Choice of parameter with the „UP“- and „DOWN“-keys

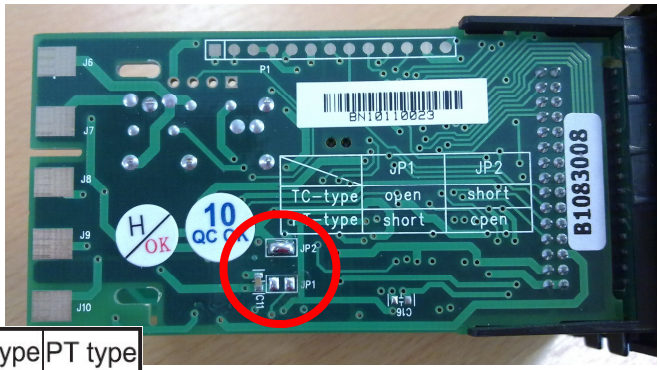
Setting operation locking mode
0000 … 0044
Last digit : Menu levels readable up to PLE ...
2nd last digit : Menu levels free to edit up to PLE ...

Setting type of thermocouple
(see next page)

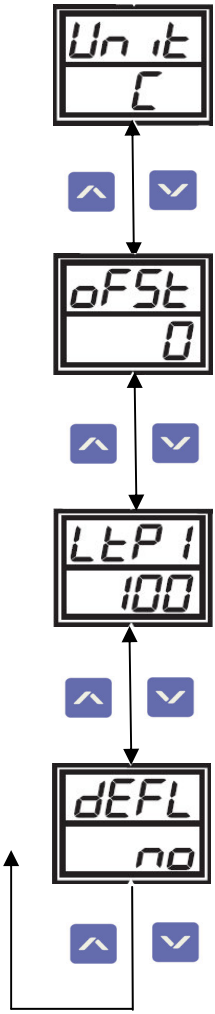
J0 TYPE	Thermocouple Type J w/o position after dec.pt. Range 0 … 900°C / 32 … 1200 °F
J1 TYPE	TC (J) with 1 position after decimal point Range 0 … 900,0°C / 32,0 … 999,9 °F
K0 TYPE	TC Type K w/o position after decimal point Range 0 … 1200°C / 32 … 1500 °F
K1 TYPE	TC (K) with 1 position after decimal point Range 0 … 999,9 °C / 32,0 … 999,9 °F
PT0 TYPE	Resistance sensor Pt100 w/o pos. after dec.pt. Range 200 … 500 °C / 328 … 900 °F
PT1 TYPE	Resistance sensor Pt100 w.1 pos. after dec.pt. Range 199,9 … 500,0 °C / 199,9 … 900 °F

Attention :

TC and Pt100 type version differ in the position of a soldered bridge on the main board of the controller, this position is defined by the factory at delivery. If this setting must be changed, the position of the soldered bridge must be modified too.



	TC type	PT type
JP1	Open	Short
JP2	Short	Open



Setting unit of temperature
°C or °F

Thermocouple input offset
-99 … +99 °C / °F

Output 1 powersetting limitation
(Limit Percentage 1)
0 … 100%

Reset to factory default settings
(dEFauLt)

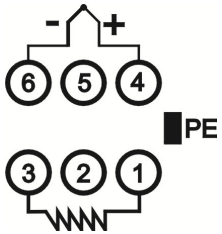
no : no reset
yes : reset

6. Appendix :

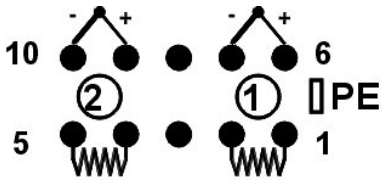
Custom specific pin assignment

(actual version is marked with a cross)

SN 10-06
(1 zone)



SN10-10
(2 zones)



DECLARATION OF CONFORMITY

This declaration is valid for the following products :

Model designation : **Compact temperature controller**
Type : **NR2007.1 and NR2007.2**

Hereby is confirmed, that these products meet in their design and accomplishment as marketed by the manufacturer and if properly used the following EU-directives :

EU-Low voltage directive	2004/108/EG
EU-Directive for electro-magnetic compatibility	2006/95/EG
Applicable harmonized norms :	EN 60204 Part 1 EN 61000-6-1 EN 61000-6-3

This declaration is binding for the manufacturer

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D-53347 Alfter · Germany

Alfter, 01.06.2011 **Hans Werner Müller, General manager**