



DESCRIPTION

The Expert nano model 200NANOMLK is an electronic regulator operating with microprocessor designed for applications of milk preservation / refrigeration; it controls temperature and stirrer. It is fitted with one analogue input for NTC or PTC temperature probe, two digital inputs, three relays for the control of the compressor, stirrer and alarm and buzzer. The regulator can also be configured for heat applications.

PRINCIPAL CHARACTERISTICS

- Can be configured for hot or cold applications.
- Can be configured to read NTC or PTC probes.
- Relay for controlling the compressor, stirrer and alarm.
- Ability to initiate cycles of temperature reduction, by key or digital input.
- Key or DI operated manual START/STOP stirrer.
- START/STOP Cyclic stirrer with time settings.
- Key operated ON/OFF.
- Display/adjustment of temperature with decimal point.
- Flat front surface for easy cleaning and keys of ample dimensions which can be customised with various colours (on request).
- 3-Digit LED display with sign, decimal point and system status icon.
- Internal buzzer for acoustic signals.
- PEGO programming philosophy guaranteeing immediate start-up.
- RS485 serial connection with Modbus-RTU or Telnet protocol.
- IP65 front protection. Two-fold fastening option: clips / screws.

NANOMLK01 SERIES MODELS

PEGO CODE	EXPERT NANO DESCRIPTION
200NANOMLK01	Power 230Vac, 3 relays (8A+8A+16A), digital input, cold/hot function, RS485, Buzzer, fixed clamps.

KEY FUNCTIONS

Key	FUNCTION
UP KEY	Increases values / Scrolls parameters in ascending order / Deactivates acoustic alarm if present / Acknowledges an alarm. If pressed for over 3 sec, activates stirrer (ON phase).
DOWN KEY	Decreases values / Scrolls parameters in descending order / If pressed for over 3 sec. activates/deactivates continuous cycles. With manual activation/deactivation a BIP is generated to confirm.
Stand by	STAND-BY KEY If pressed for over 1 sec. alternates the Stand-By with normal mode and vice versa. When mode is alternated a BIP is generated to confirm. In Stand-By mode the system stops and the display signals OFF and the temperature alternating.
Set	SET KEY Displays the set point. Allows the set point to be entered when pressed in combination with the DOWN or UP keys. Resets the acoustic alarm if present.

STATUS ICON

ICON	MEANING
	COLD FUNCTION ICON (icon activated with m01=0/2) Led OFF = Cold function OFF Led ON = Cold function ON Flashing Led = Cold function ON waiting for C1 delay
	HOT FUNCTION ICON (icon activated with m01=1/3) Led OFF = Hot function OFF Led ON = Hot function ON
	STIRRER ICON Led OFF = stirrer OFF Led ON = stirrer ON
	CONTINUOUS CYCLE ICON Led OFF = continuous cycle deactivate Led ON = continuous cycle
	ALARM ICON Led OFF = No alarm present Led ON = Indicates temperature alarm intervention with remedy (HACCP alarm). Flashing Led = Alarm present
	DOOR SWITCH Led OFF = Door switch not activated or not used Flashing Led = Door switch activated

COMBINED ACTIVATION OF KEYS AND THEIR FUNCTIONS

FUNCTION / KEY COMBINATION
SETTINGS PROGRAMMING / (Set + ^ o ^) Press the SET key to view the current SETPOINT value (temperature). Keeping the SET key down and pressing either the (^) or (v) key, the SETPOINT value can be changed. Release the SET key to return to view the room temperature; the changes made will be automatically saved.
LEVEL 1 PROGRAMMING / (^ + v) Press the UP and DOWN keys simultaneously for over 3 sec. to access the Level 1 programming menu. When the menu is accessed, a BIP is generated to confirm. The system leaves the menu after 30 seconds.
LEVEL 2 PROGRAMMING / (^ + v + Stand-by) Press the UP, DOWN and STAND-BY keys simultaneously for over 3 sec. to access the Level 2 programming menu. When the menu is accessed, a BIP is generated to confirm and the system is placed in Stand-By mode.
EXIT PROGRAMMING MENUS / (^ + v) Pressing the UP and DOWN buttons simultaneously in any programming menu for over 3 sec. causes the system to save the settings entered and leave that menu. A BIP is generated to confirm.

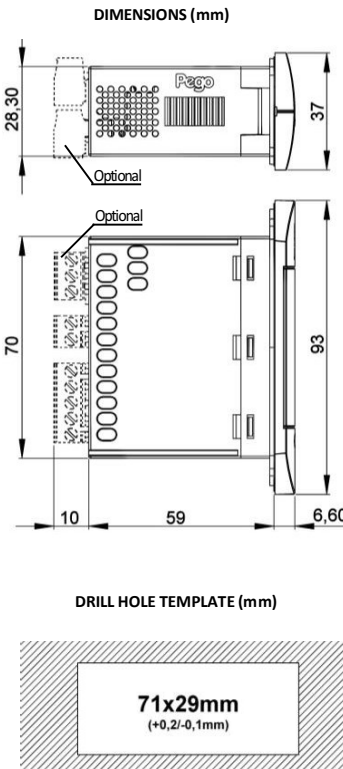
GENERAL INFORMATION

PEGO S.r.l. does not accept responsibility for any loss of data or information, costs of goods or substitute services, damages to objects, persons or animals, lost sales or profits, interruption of activities, any direct, indirect, accidental, property, insured, punitive, special or consequential damage caused in any way, be it contractual, extra-contractual or due to negligence or other responsibility resulting from the use of the product or its installation. The guarantee automatically becomes invalid in the case of poor functioning due to tampering, impact or inadequate installation. It is mandatory to observe all instructions in this manual and the operating conditions of the device. PEGO S.r.l. does not accept responsibility for any inaccuracies which may be present in this manual in the case that these are due to printing or transcription errors and reserves the right to make modifications to its products which it deems necessary or appropriate, without prejudicing the products essential characteristics.

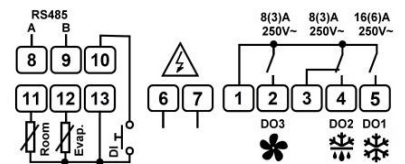
ELECTRICAL PRESCRIPTIONS

Avoid using multipolar cables with conductors connected to inductive and power loads and signal conductors such as probes and digital inputs. Avoid installing in the same channels power cables and signal cables (probes, digital inputs or RS485 connections). Reduce to a minimum the length of the connecting cables, avoiding that the cabling takes on a spiral form which may have inductive effects on the electronic system. All conductors used in the cabling must be appropriately sized in order to support the load which they must provide. If it is necessary to extend the probes, use conductors with appropriate cross-sections and not less than 1 mm². The extension or reduction of the probes may alter the calibration which was performed in the factory. Therefore, verify and calibrate by means of an external thermometer.

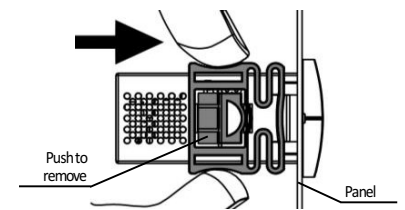
TECHNICAL DATA	
Power voltage	230 V~ +10/-15% 50/60Hz
Model 200NANOMLK01	230 V~ +10/-15% 50/60Hz
Absorbed power	3 VA Max
Environment conditions	
Operating temperature	-5T55°C - humidity < 90% Rel. Hum. Not condensing
Storage temperature	-20T 70°C - humidity < 90% Rel. Hum. Not condensing
Unsuitable operating environments	Environments with strong vibrations or impacts; aggressive, polluted or corrosive atmospheres, exposure to direct solar radiation, explosive atmospheres or flammable gas.
General characteristics	
Display	3-Digit with sign, decimal point and 9 LED status indicators
Resolution	0.1 °C
Probe precision (electronic)	± 0.5 °C
Reading range	-45T199 °C
Model 200NANOMLK01	Power clamps: fixed, screw for cables with c/section 0.2 to 2.5mm ² Signal clamps: fixed, screw for cables with c/section 0.2 to 1.5mm ²
Software class: A / Parameters saved on non-volatile memory (EEPROM)	
Input characteristics	
Analogue inputs	1 Inputs for NTC probes (10K Ω 1% at 25°C) or 1 Inputs for PTC probes (KTY83-121)
Digital inputs	2 Inputs (clean contact)
Output characteristics	
Compressor relay (DO1)	N.O. 16(6)A / 250V~
Heating elements relay (DO2)	N.O. 8(3)A N.C. 6(3)A / 250V~
Fan relay (DO3)	N.O. 8(3)A / 250V~
Buzzer	Present
Dimensional, insulation and mechanical characteristics	
Dimensions	93x37x65mm Depth 59mm (Depth 69mm with removable clamps)
Drill hole template	71x29mm (+0.2/-0.1mm)
Front protection rating	IP65 with front board installation
Installation	In front of board by means of rear fastening clips or two front screws
Casing	Plastic PC+ABS UL94 V-0 body, PC transparent front, Key panel PC or PC+ABS
Insulation type	Class II
Conformity with EEC low voltage directives, electromagnetic compatibility and EC mark	
Conforms to following EEC Directives : Directives 2014/30/EU, 2014/35/EU	
Conforms to following harmonised standards: EN60730-1:2011, EN60730-2:9:2010, EN61000-6-1:2007, EN61000-6-3:2007	



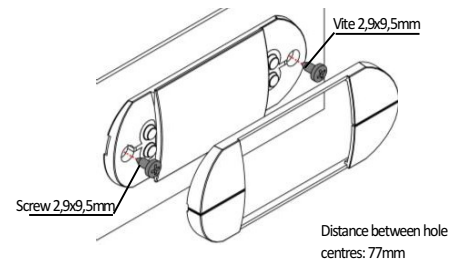
ELECTRICAL CONNECTIONS:



FASTENING TO PANEL BY MEANS OF TWO BACK CLIPS:



FASTENING TO PANEL BY MEANS OF TWO FRONT SCREW:



ENGLISH

LIST OF FIRST LEVEL VARIABLES (User level)

Var	MEANING	DEF.
r0	Temperature differential in relation to principal SET-POINT < Range: 0.2 ÷ 10.0°C > Expressed in absolute values and defines hysteresis (positive if mO1=0/2 or negative if mO1=1/3) of temperature in relation to SET POINT.	2
A1	Minimum temperature alarm < Range: -45 ÷ (A2-1)°C > Absolute temperature referred to by the ambient probe below which, following the ALD delay, the LOW temperature alarm is triggered, activating the buzzer (if present) and showing the letters EL alternating with the temperature on the display, as well as the flashing alarm icon.	-45
A2	Maximum temperature alarm < Range: (A1+1) ÷ 99°C > Absolute temperature referred to by the ambient probe above which, following the ALD delay, the HIGH temperature alarm is triggered, activating the buzzer (if present) and showing the letters EH alternating with the temperature on the display, as well as the flashing alarm icon. When the alarm is reset the alarm icon remains on without flashing to indicate that the event occurred, until the UP key is pressed.	99

LIST OF SECOND LEVEL VARIABLES (Installer level)

Var	MEANING	DEF.
ton	Stirrer activation period (compressor off) < Range: 0 ÷ 999 sec >	600
toF	Period between two activations of the agitator < Range: 0 ÷ 999 min >	10
tcc	Continuous cycle duration < Range: 0 ÷ 999 min > (tcc=0 disabled)	0
cAd	Inhibit time temperature alarms after continuous cycle < Range: 0 ÷ 999 min >	0
C1	Minimum time between each turning off and on of the compressor < Range: 0 ÷ 15 min >	0
CE1	Duration of compressor ON time in the case of faulty ambient probe (emergency mode). < Range: 0 ÷ 240 min / 0=Disabled > If CE1=0 the emergency mode in the presence of error EO remains disabled, the compressor remains off.	0
CE2	Duration of compressor OFF time in the case of faulty ambient probe (emergency mode). < Range: 5 ÷ 240 >	5
mO1	Thermostat functioning mode < Range: 0 ÷ 3 > 0 = Cold function (NTC probe) 1 = Hot function (NTC probe) 2 = Cold function (PTC probe) 3 = Hot function (PTC probe)	0
mO2	Stirrer functioning mode < Range: 0 ÷ 2 > 0 = Compressor dependent 1 = Compr. independent (first cycle stirrer ON) 2 = Compr. independent (first cycle stirrer OFF)	0
in1	Digital Input DI and activation mode setting < Range: -6 ÷ 6 > 6= Stop defrosting remotely (DI=1) (reads leading edge of impulse) 5= Start defrosting remotely (DI=1) (reads leading edge of impulse) 4= Stand-by remotely (DI=1) (In order to indicate Stand-By mode, the display shows IN4 alternating with the current view) 3= Man-in-room alarm (DI=1) 2= Door switch (DI=1) 1= Compressor protection (DI=1) 0= Disabled -1= Compressor protection (DI=0) -2= Door switch (DI=0) -3= Man-in-room alarm (DI=0) -4= Stand-by remotely (DI=0) (IN4 alternating with the current view is displayed to indicate stand-by mode) -5= Start defrosting remotely (DI=0) (reads leading edge of impulse) -6= Stop defrosting remotely (DI=0) (reads leading edge of impulse)	1
in2	Digital input DI2 and activation mode setting < Range: -9 ÷ 9 > Like In1	
LSE	Minimum value attributable to set point < Range: -45 ÷ (HSE-1) °C >	-45
HSE	Maximum value attributable to set point < Range: +99 ÷ (LSE+1) °C >	45
bEE	Buzzer enable 0 = disabled 1 = enabled	1
CAL	Ambient probe value correction < Range: -10 ÷ 10 °C >	0.0
Ald	Delay time for signalling and display of minimum and maximum temperature alarm < Range: 0 ÷ 240 >	120
iAd	Delay time for signalling opened door alarm < Range: -1 ÷ 240 min > -1 = alarm disabled	0

Ad	Network address for connection to TeleNET or Modbus supervision system < Range: 0 ÷ 31 (SEr=0) 1 ÷ 247 (SEr=1) >	0
SEr	RS-485 communication protocol < Range: 0 ÷ 1 > 0= TeleNET protocol 1= Modbus-RTU protocol	0
Bdr	Modbus baudrate 0 = 300 baud 3 = 2400 baud 6 = 14400 baud 1 = 600 baud 4 = 4800 baud 7 = 19200 baud 2 = 1200 baud 5 = 9600 baud 8 = 38400 baud	5
Prt	Configuration of the Modbus parity check 0 = none 1 = even 2 = odd	0
P1	Password: protection type (active when PA is different from 0) < Range: 0 ÷ 3 > 0= Displays only the set point and allows alarm stop 1= Displays the set point, allows alarm stop, + defrost + light 2= Blocks access to levels 1 and 2 during programming (all other functions permitted) 3= Blocks access to level 2 during programming (all other functions permitted)	0
PA	Password (see P1 for protection type) < Range: 0 ÷ 999 / 0=Disabled >	0
rel	Release software	reading only

THERMOSTAT FUNCTION MODES (mO1)

The variable Mod allows the selection of function mode of the thermostat, in particular:

COLD MODE (Mod=0 NTC or Mod=2 PTC)

The DO1 output is activated when the temperature measured by the ambient probe reaches or exceeds the SET POINT+r0 value and remains active until the temperature drops below the SET POINT. In this mode, the DO1 output is linked to the cold function icon.

HOT MODE (Mod=1 NTC or Mod=3 PTC)

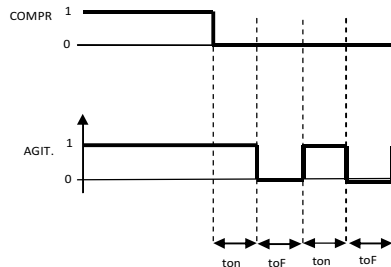
The DO1 output is activated when the temperature measured by the ambient probe reaches or exceeds the SET POINT-r0 value and remains active until the temperature increases and exceeds the SET POINT. In this mode, the DO1 output is linked to the hot function icon.

STIRRER FUNCTION MODES (mO2)

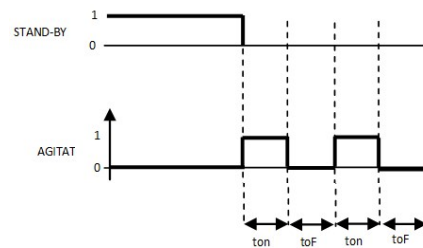
Stirrer has three operating modes:

- Compressor dependent (mO2=0)

The stirrer stays on when the compressor is active. When the compressor stops the stirrer remains active for a period equal to the parameter "ton"; then the stirrer alternates periods of stop and periods of operation according to the parameters "toF" and "ton". At first start the stirrer is ON ("ton" time).
Compressor off:
If ton=0 the stirrer is always off.
If toF=0 the stirrer remains on for the time "ton" after the compressor has stopped. Subsequent cycles of switching on and off are not performed.

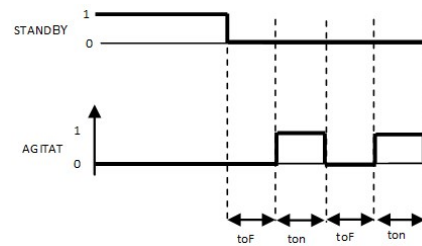


- Compressor independent, first cycle stirrer ON (mO2=1)
Stirrer alternates periods of stop of duration "toF" and periods of operation of duration "ton", regardless of the hot / cold call of the thermostat. At first start the stirrer is ON ("ton" time).
If ton=0 the stirrer is always on.
If ton=0 and toF has any value other than 0 the stirrer is always off.



- Compressor independent, first cycle stirrer OFF (mO2=2)
Stirrer alternates periods of stop of duration "toF" and periods of operation of duration "ton", regardless of the hot / cold call of the thermostat. At first start the stirrer is OFF ("toF" time).
If ton=0 the stirrer is always off.

If toF=0 and ton has any value other than 0 the stirrer is always on.



CONTINUOUS CYCLE

Continuous cycle function allows to maintain cold (or hot, depending on mO1) output active for "tcc" time regardless of the cold/hot calling of the thermostat. This function is useful if it is necessary to rapidly increase/reduce goods temperature. The stirrer functioning depends anyway on "mO2" parameter. Alarm temperature are disabled during continuous cycle and for "Adc" minutes from continuous cycle end. Continuous cycle

is signalled by icon, and it's disabled if "tcc" is zero. You can activate/deactivate continuous cycle by button (long press of button) or by digital input.

STIRRER'S MANUAL ACTIVATION

It is possible to manually activate the stirrer by pressing button more than 3 sec; by this way the ON phase of the stirrer is activated.

PASSWORD FUNCTION

The password function is activated by entering a value other than 0 for the PA parameter. See parameter P1 for various protection levels. The protection is activated automatically if the keyboard remains inactive for about 30 seconds. The figure 000 appears on the display. Use the up/down keys to change the number and the SET key to confirm. The password entry template 000 disappears if the keyboard is not activated within 30 seconds. If you forget the password, use the universal number 100.

EMERGENCY MODE IN THE CASE OF ERROR EO

This safety mode guarantees the functioning of the compressor even in the case of a faulty ambient probe (error EO). If probe errors EO and CE1 are different to 0, the compressor functions in operation pause mode, with compressor ON for the time CE1 and OFF for the time CE2. If CE1=0 the emergency mode in the presence of error EO remains disabled. Eliminate as soon as possible the cause of error EO and reactivate the control's normal function for a correct temperature adjustment.

RS-485 CONNECTION

Connection to a RS485 network must be chain type, avoiding star connections and observing A and B polarity. It is advisable to use BELDEN 8762 cables. The configuration of the device in the TeleNET program is performed by entering the module name such as "TWMIT device" and assigning to it the same network address entered in the variable Ad. For a Modbus-RTU network connection and for details on the protocols of these devices, refer to the manual "MODBUS-RTU_NANO_MLK" which can be downloaded from our internet site at www.pegos.it.

DIAGNOSTICS

In the case of faults, the "Expert nano" control unit informs the operator by means of alarm codes shown on the display and an acoustic signal emitted by the buzzer (if present). The acoustic alarm can be stopped by pressing the UP key (the error code remains) and can be reactivated by pressing the SET key. In the event of an alarm, one of the following messages is displayed:

ALARM CODE TABLE

Var	MEANING
EO	Functional fault of ambient probe.
E2	EEPROM memory error. All outputs are deactivated except for alarm outputs if present.
Ec	Compressor protection alarm (e.g. thermal protection or max. pressure switch). Compressor output is disabled.
EA	Stirrer protection (from digital input). Stirrer output is disabled.
EOF	General alarm (from digital input). All outputs are deactivated except for alarm output.
EL	Minimum temperature alarm. The letters EL flash alternating with the temperature (see parameter A1).
EH	Maximum temperature alarm. The letters EH flash alternating with the temperature (see parameter A2).
Ed	Door open alarm. Outputs state depends on In1/In2 parameters



This document was created with Win2PDF available at <http://www.win2pdf.com>.
The unregistered version of Win2PDF is for evaluation or non-commercial use only.
This page will not be added after purchasing Win2PDF.