We Measure, We Control, We Record

N1200 Controller

UNIVERSAL CONTROLLER – SETTINGS EXAMPLES – V2.0x

SAFETY ALERTS

The symbols below are used on the equipment and throughout this document to draw the user's attention to important operational and safety information.

CAUTION: Read the manual thoroughly before installing and operating the equipment.	**CAUTION OR DANGER:** Electrical Shock Hazard

All safety related instructions that appear in the manual must be observed to ensure personal safety and to prevent damage to either the instrument or the system. If the instrument is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

HOW TO NAVIGATE IN THE CONTROLLER MENU

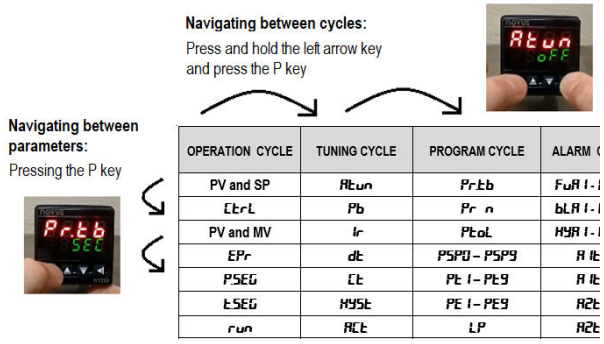

Figure 1 – Navigation mode

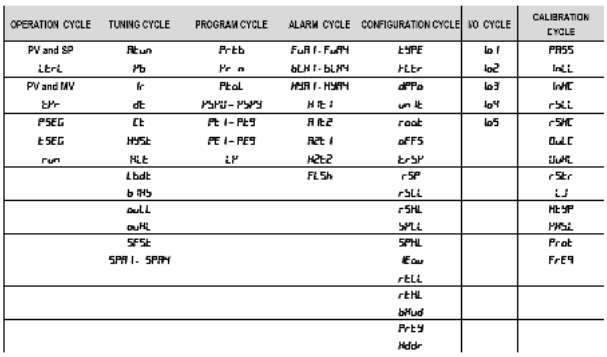

Figure 2 – Controller cycles

HOW TO TRIGGER A RELAY OUTPUT WITH ON/OFF CONTROL

GOAL

Use the I/O1 relay output with ON/OFF control to trigger a load. The load is a resistor that should heat up to the Setpoint of 100 °C (SP) with 5 °C hysteresis. The relay output will close at 100 °C and open at 95 °C (SP - hysteresis).

The sensor used to measure the temperature is a PT100 with a range of -200 to 850 °C (-328 to 1562 °F).

ELECTRICAL DIAGRAM

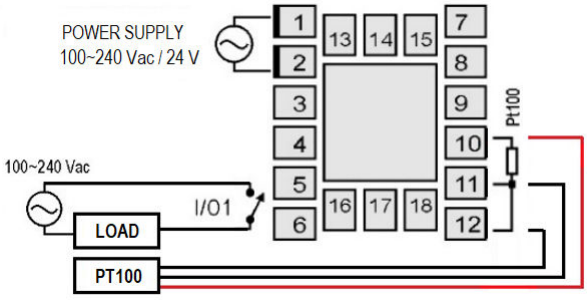

Figure 3 – Example 1

SETTINGS

OPERATION CYCLE

PARAMETER	VALUE
SP	100.0
CtrL	Auto
E Pr	0
run	YES

TUNING CYCLE

PARAMETER	VALUE
Atun	oFF
Pb	0.0
HYSt	5.0
Act	rE
Lbd.t	0
SP.A1	0.0
SP.A2	0.0
SP.A3	0.0
SP.A4	0.0

ALARM CYCLE

PARAMETER	VALUE
FuA1	oFF
FuA2	oFF
FuA3	oFF
FuA4	oFF

SCALE CYCLE

PARAMETER	VALUE
tYPE	Pt
FLtr	5
dPPo	0.0
un It	C
OFFS	0.0
E.rSP	no
SPLL	-200.0
SPHL	850.0
IEou	0.0

I/O CYCLE (INPUTS AND OUTPUTS)

PARAMETER	VALUE
io 1	CtrL
io 2	oFF
io 3	oFF
io 4	oFF
io 5	oFF

NOTES

- Parameters that were not mentioned during this example have no influence on this operation and can be set to zero or oFF whenever possible.
- It is recommended to use the original sensor cable length. Do not use a compensating cable, as this may influence the sensor resistance and result in an incorrect temperature measurement.
- It is recommended to use temperature transmitters to extend the distance between sensor and controller.
- It is recommended to avoid positioning the sensor cables and current signals near power cables or equipment that generates electromagnetic interference such as inverters or motors. This practice contributes to the correct measurement of the signals.

HOW TO TRIGGER A PULSE OUTPUT WITH PID CONTROL

GOAL

Use pulse output I/O5 with PID control to trigger a load. The load is a resistor that must heat up to the Setpoint of 100 °C (SP). No hysteresis is set up for this type of control.

The output is connected to a Solid-State Relay, which closes contact to trigger the load.

The output will be automatically controlled by the PID control. Before this, the controller will need to perform process recognition through the Auto Tuning function, which will enable it to deliver satisfactory control according to the process.

The sensor used to measure the temperature is a J Thermocouple with a range of -110 to 950 °C (-166 to 1742 °F).

ELECTRICAL DIAGRAM

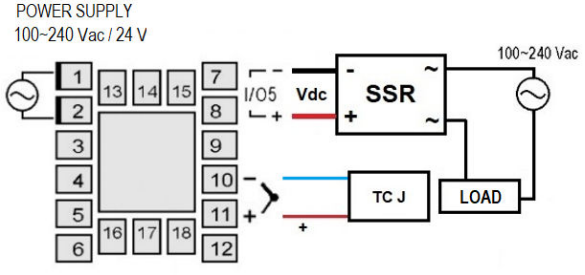

Figure 4 – Example 2

SETTINGS

OPERATION CYCLE

PARAMETER	VALUE
SP	100.0
CtrL	Auto
E Pr	0
run	YES

TUNING CYCLE

PARAMETER	VALUE
Atun	FuLL
Pb	0.1
Ir	0.01
dt	0.1
Ct	0.5
Act	rE
Lbd.t	0
b IAS	0.0
ouLL	0.0
ouHL	100.0
SFSt	0
SP.A1	0.0
SP.A2	0.0
SP.A3	0.0
SP.A4	0.0

ALARM CYCLE

PARAMETER	VALUE
FuA1	oFF
FuA2	oFF
FuA3	oFF
FuA4	oFF

SCALE CYCLE

PARAMETER	VALUE
tYPE	tc J
FLtr	5
dPPo	0.0
un It	C
OFFS	0.0
E.rSP	no
SPLL	-110.0
SPHL	950.0
IEou	0.0

I/O CYCLE (INPUTS AND OUTPUTS)

PARAMETER	VALUE
io 1	CtrL
io 2	oFF
io 3	oFF
io 4	oFF
io 5	oFF

NOTES

- Parameters that were not mentioned during this example have no influence on this operation and can be set to zero or oFF whenever possible.

- It is recommended to set all the equipment parameters and to set the run → YES only at the end. This will start the automatic control execution. This will start the Auto Tune execution to perform process recognition (the TUNE LED will light up in the display). Depending on the process, Auto Tuning may take minutes or hours.
- It is recommended to perform Auto Tune at the desired setpoint and not to change the value until the end of the tuning. When the Auto Tune process is finished, the TUNE LED will turn off, indicating that the controller is ready to deliver the best control at the output.
- The use of PID control linked to a relay output should only happen when the Ct value is greater than or equal to 10. Otherwise, the high frequency drive can damage the relay contact. For the pulse or current outputs, you can use the minimum value of Ct.
- The values suggested for Pb, Ir, dt are only initial values for performing the Auto Tuning process. After the Auto Tuning is finished, these parameters will be at their final values and should not be changed (They can be changed if you need to re-run the Auto Tuning).
- It is recommended to use the original sensor cable length. Do not use a compensating cable, as this may influence the sensor resistance and result in an incorrect temperature measurement.
- It is recommended to use temperature transmitters to extend the distance between sensor and controller.
- It is recommended to avoid positioning the sensor cables and current signals near power cables or equipment that generates electromagnetic interference such as inverters or motors. This practice contributes to the correct measurement of the signals.

HOW TO TRIGGER A CURRENT OUTPUT WITH PID CONTROL

GOAL

Use the current output I/O5 with PID control to trigger a load. The load is a valve with a 4-20 mA analog input, which is used to regulate the pressure to 5 Bar (Setpoint) in a line that circulates a certain liquid. No hysteresis is set up for this type of control.

The output will be controlled automatically by the PID control. Before this, the controller will need to perform process recognition through the Auto Tuning function, which will allow it to deliver a satisfactory control according to the process.

At its analog input, the controller reads a 4-20 mA signal from the pressure transmitter with a range of 0-10 Bar.

ELECTRICAL DIAGRAM

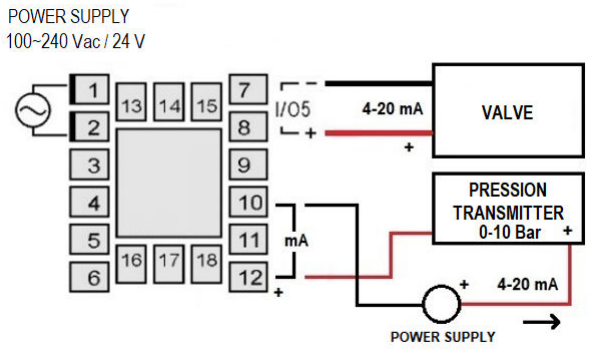

Figure 5 – Example 3

SETTINGS

OPERATION CYCLE

PARAMETER	VALUE
SP	5.0
CtrL	Auto
E Pr	0
run	YES

TUNING CYCLE

PARAMETER	VALUE
AtUn	FuLL
Pb	0.1
Ir	0.01
dt	0.1
Ct	0.5
Act	rE
Lbd.t	0
b IAS	0.0
ouLL	0.0
ouHL	100.0
SFSt	0
SP.A1	0.0
SP.A2	0.0
SP.A3	0.0
SP.A4	0.0

ALARM CYCLE

PARAMETER	VALUE
FuA1	oFF
FuA2	oFF
FuA3	oFF
FuA4	oFF

SCALE CYCLE

PARAMETER	VALUE
tYPE	L4.20
FLtr	5
dPPo	0.0
root	no
OFFS	0.0
E.rSP	no
SPLL	0.0
SPHL	10.0
IEou	0.0

I/O CYCLE (INPUTS AND OUTPUTS)

PARAMETER	VALUE
io 1	oFF
io 2	oFF
io 3	oFF
io 4	oFF
io 5	C.4.20

NOTES

- Parameters that were not mentioned during this example have no influence on this operation and can be set to zero or oFF whenever possible.
- It is recommended to set all the equipment parameters and to set the run → YES only at the end. This will start the automatic control execution. This will start the Auto Tune execution to perform process recognition (the TUNE LED will light up in the display). Depending on the process, Auto Tuning may take minutes or hours.

- It is recommended to perform Auto Tune at the desired setpoint and not to change the value until the end of the tuning. When the Auto Tune process is finished, the TUNE LED will turn off, indicating that the controller is ready to deliver the best control at the output.
- The use of PID control linked to a relay output should only happen when the CT value is greater than or equal to 10. Otherwise, the high frequency drive can damage the relay contact. For the pulse or current outputs, you can use the minimum value of CT.
- In this application, controller 2 does not know which range it will read. Therefore, TYPE, SPLL, SPHL are the main parameters to properly configure the reading.
- By using a properly gauged cable and a shielded and grounded twisted pair, the 4-20 mA current signal can reach up to 1 km. This is to avoid generating impedance and a voltage drop that could interfere with the signal. This practice ensures immunity in noisy environments and increases the system robustness.
- It is recommended to avoid positioning the sensor cables and current signals near power cables or equipment that generates electromagnetic interference such as inverters or motors. This practice contributes to the correct measurement of the signals.

HOW TO TRIGGER A RELAY OUTPUT VIA ALARM

GOAL

Use the I/O1 relay output as an alarm to trigger a load. The load is a fan that must cool to the setpoint of 20 °C (SP) with 3 °C hysteresis.

The relay output will open at 20 °C and close at 23 °C (SP + hysteresis).

The sensor used to measure the temperature is a K Thermocouple with a range of -150 to 1370 °C (-238 to 2498 °F), connected to a temperature transmitter with a 0-10 Vdc output.

The controller will read the signal from the temperature transmitter at analog input.

ELECTRICAL DIAGRAM

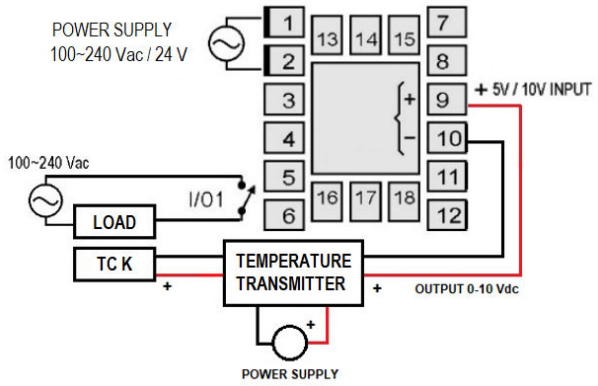

Figure 6 – Example 4

SETTINGS

OPERATION CYCLE

PARAMETER	VALUE
SP	0 (Not used)
CtrL	Auto
E Pr	0
run	YES

TUNING CYCLE

PARAMETER	VALUE
Atun	oFF
Pb	0.0
HYSt	0
Lbd.t	0
SP.A1	20 (Setpoint)
SP.A2	0
SP.A3	0
SP.A4	0

ALARM CYCLE

PARAMETER	VALUE
FuA1	H I (Cooling)
FuA2	oFF
FuA3	oFF
FuA4	oFF
bLA1	no
bLA2	no
bLA3	no
bLA4	no
HYA1	3 (Hysteresis)
HYA2	0
HYA3	0
HYA4	0
A1t1	0
A2t1	0
A3t1	0
A4t1	0
A1t2	0
A2t2	0
A3t2	0
A4t2	0
FLSh	----

SCALE CYCLE

PARAMETER	VALUE
tYPE	LO. 10
FLtr	5
dPPo	0
root	no
OFFS	0
E.rSP	no
SPLL	-150
SPHL	1370
IEou	0.0

I/O CYCLE (INPUTS AND OUTPUTS)

PARAMETER	VALUE
io 1	A1
io 2	oFF
io 3	oFF
io 4	oFF
io 5	oFF

NOTES

- Parameters that were not mentioned during this example have no influence on this operation and can be set to zero or oFF whenever possible.
- It is recommended to set all the equipment parameters and to set the run → YES only at the end. This will start the automatic control execution.

- In this application, controller does not know which range it will read. Therefore, tYPE, SPLL, SPHL are the main parameters to properly configure the reading.
- It is recommended to use the 0-10 Vdc voltage signal with short cable distances. When using exceptionally long cables (maximum 10 meters), it becomes very susceptible to interference or noise. This practice ensures immunity in noisy environments and increases the robustness of the system.
- It is recommended to avoid positioning the sensor cables and current signals near power cables or equipment that generates electromagnetic interference such as inverters or motors. This practice contributes to the correct measurement of the signals.

PV RETRANSMISSION

GOAL

Use the current output I/O5 to retransmit the process variable (PV), that is, to retransmit the reading signal from the sensor connected to the analog input of controller 1 so that controller 2 can indicate it as its PV.

The current output will be 4-20 mA.

The sensor used in the first controller to measure the temperature is a PT100 with a range of -200 to 850 °C.

ELECTRICAL DIAGRAM

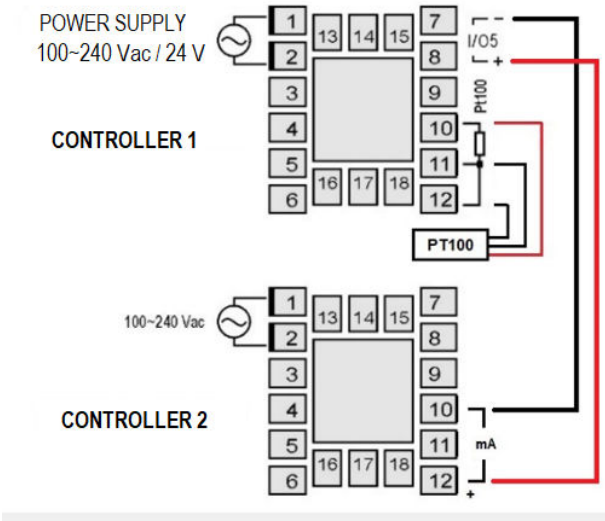

Figure 7 – Example 5

CONTROLLER 1 SETTINGS

OPERATION CYCLE

PARAMETER	VALUE
SP	0.0 (Not used)
CtrL	Auto
E Pr	0
run	YES

TUNING CYCLE

PARAMETER	VALUE
Atun	oFF
Pb	0.0
HYSt	0.0
Act	rE
Lbd.t	0
SP.A1	0.0
SP.A2	0.0
SP.A3	0.0
SP.A4	0.0

ALARM CYCLE

PARAMETER	VALUE
FuA1	oFF
FuA2	oFF
FuA3	oFF
FuA4	oFF

SCALE CYCLE

PARAMETER	VALUE
tYPE	Pt
FLtr	5
dPPo	0.0
un It	C
OFFS	0.0
E.rSP	no
SPLL	-200.0
SPHL	850.0
rtLL	-200.0
rtHL	850.0
IEou	0.0

I/O CYCLE (INPUTS AND OUTPUTS)

PARAMETER	VALUE
io 1	oFF
io 2	oFF
io 3	oFF
io 4	oFF
io 5	P.4.20

CONTROLLER 2 SETTINGS

OPERATION CYCLE

PARAMETER	VALUE
SP	0.0 (Not used)
CtrL	Auto
E Pr	0
run	YES

SCALE CYCLE

PARAMETER	VALUE
tYPE	L4.20
FLtr	5
dPPo	0.0
root	no
OFFS	0.0
E.rSP	no
SPLL	-200.0
SPHL	850.0
IEou	0.0

NOTES

- Parameters that were not mentioned during this example have no influence on this operation and can be set to zero or oFF whenever possible.

- It is recommended to use the original sensor cable length. Do not use a compensating cable, as this may influence the sensor resistance and result in an incorrect temperature measurement.
- It is recommended to use temperature transmitters to extend the distance between sensor and controller.
- It is recommended to avoid positioning the sensor cables and current signals near power cables or equipment that generates electromagnetic interference such as inverters or motors. This practice contributes to the correct measurement of the signals.
- In this application, controller 2 does not know which range it will read. Therefore, tYPE, SPLL, SPHL are the main parameters to properly configure the reading.
- By using a properly gauged cable and a shielded and grounded twisted pair, the 4-20 mA current signal can reach up to 1 km. This is to avoid generating impedance and a voltage drop that could interfere with the signal. This practice ensures immunity in noisy environments and increases the system robustness.

REMOTE SETPOINT

GOAL

Remotely change the Setpoint that controls the load in a heating process: Change between the controller main display Setpoint, which will be at 50 °C, and the remote Setpoint, which will be at 100°C. This way, by configuring I/O5 as a digital input connected to a Dry Contact button, the operator can change the Setpoint without being in front of the controller.

When the button contact is open, the Setpoint selected is the one on the main screen. When it is closed, it is the remote Setpoint.

You can select the type of remote Setpoint signal in parameter rSP, and the Setpoint range in parameters rSLL and rSHL.

The sensor used to measure the temperature is a T Thermocouple with a range of -160 to 400 °C (-256 to 752 °F).

ELECTRICAL DIAGRAM

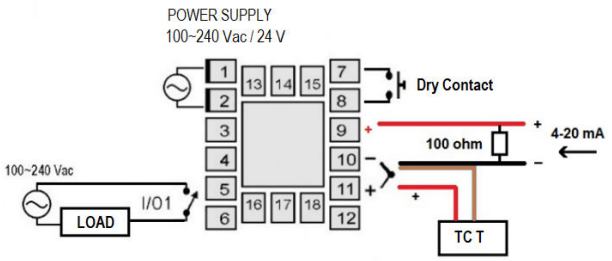

Figure 8 – Example 6

SETTINGS

OPERATION CYCLE

PARAMETER	VALUE
SP	50.0
CtrL	Auto
E Pr	0
run	YES

TUNING CYCLE

PARAMETER	VALUE
Atun	oFF
Pb	0.0
HYSt	2.0
Act	rE
Lbd.t	0
SP.A1	0.0
SP.A2	0.0
SP.A3	0.0
SP.A4	0.0

ALARM CYCLE

PARAMETER	VALUE
FuA1	oFF
FuA2	oFF
FuA3	oFF
FuA4	oFF

SCALE CYCLE

PARAMETER	VALUE
tYPE	tc t
FLtr	5
dPPo	0.0
un It	C
OFFS	0.0
E.rSP	YES
rSP	4-20
rSLL	100.0
rSHL	116.0
SPLL	-160.0
SPHL	400.0
IEou	0.0

I/O CYCLE (INPUTS AND OUTPUTS)

PARAMETER	VALUE
io 1	CtrL
io 2	oFF
io 3	oFF
io 4	oFF
io 5	rSP

NOTES

- Parameters that were not mentioned during this example have no influence on this operation and can be set to zero or oFF whenever possible.
- The controller will perform a heating process, searching the main screen Setpoint of 50 °C with 2 °C hysteresis. When the Dry Contact button closes, the heating Setpoint changes to 100 °C.
- The current signal should be connected to remote Setpoint input terminals 9 and 10 (respecting polarity). A 100 ohms resistor must be connected in parallel to these terminals.
- In this example, the remote setpoint signal has been set to 4-20 mA, i.e., rSP → 4-20. There is a range of 16 units between 4 and 20 mA. The limits were set as rSLL → 100 (4 mA), rSHL → 116 (20 mA). To force the selection of 100 °C as the remote setpoint, a constant 4 mA signal will be sent to the remote setpoint input.
- The Setpoint can be changed remotely and according to the current value received at the remote Setpoint analog input. It can vary between the limits configured in rSLL and rSHL.
- It is recommended to use the original sensor cable length. Do not use a compensating cable, as this may influence the sensor resistance and result in an incorrect temperature measurement.
- It is recommended to use temperature transmitters to extend the distance between sensor and controller.
- It is recommended to avoid positioning the sensor cables and current signals near power cables or equipment that generates electromagnetic interference such as inverters or motors. This practice contributes to the correct measurement of the signals.

- By using a properly gauged cable and a shielded and grounded twisted pair, the 4-20 mA current signal can reach up to 1 km. This is to avoid generating impedance and a voltage drop that could interfere with the signal. This practice ensures immunity in noisy environments and increases the system robustness.

MODBUS-RTU COMMUNICATION

GOAL

Read the respective process variable (PV) and Setpoint (SP) registers via Modbus-RTU communication (The controller is a slave on the network).

On the **NOVUS** website (www.novusautomation.com), you can check the controller register table. This allows you to identify the PV and SP register number and the other registers of this controller.

The sensor used to measure the temperature is a PT100 with a range of -200 to 850 °C (-328 to 1562 °F).

ELECTRICAL DIAGRAM

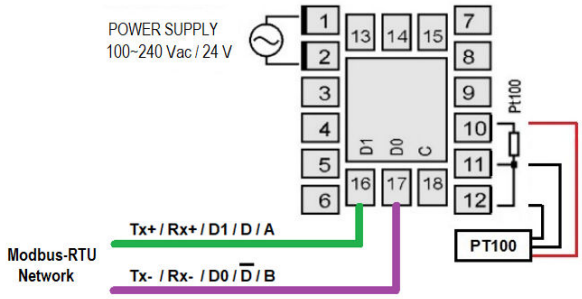

Figure 9 – Example 7

SETTINGS

SCALE CYCLE

PARAMETER	VALUE
tYPE	Pt
FLtr	5
dPPo	0.0
un It	C
OFFS	0.0
E.rSP	no
SPLL	-200.0
SPHL	850.0
IEou	0.0
bAud	19.2
PrtY	nonE
Addr	1

SP AND PV REGISTERS

Address	Parameter	Register Description
0000	Active SP	Read: Active control SP (main SP, from ramp and soak or from remote SP). Write: to main SP. Range: from **SPLL** to **SPHL**.
0001	PV	Read: Process Variable. Write: Not allowed. Range: Minimum value is the one configured in **SPLL** and the maximum value is the one configured in **SPHL**. Decimal point position depends on **dPPo** value. In case of temperature reading, the value read is always multiplied by 10, independently of **dPPo** value.

As described in the controller manual, the PV register is 1. The SP register is 0 (zero).

A Modbus-RTU master connected on this same network and with the same communication parameters can read these variables for monitoring.

PV does not allow writing. SP allows writing. If the master is a supervisory or a PLC that has a write command, it can read PV and SP and change SP remotely.

NOTES

- Parameters that were not mentioned during this example have no influence on this operation and can be set to zero or **oFF** whenever possible.
- The communication main parameters: **bAud**, **PrtY**, **Addr**.
- The controller must be configured with the same Baud Rate (**bAud**) and Parity (**PrtY**) as the network it will be inserted into and must have a separate address (**Addr**) from all slaves already on the network.
- The controller recognizes and communicates in networks with Stop Bit 1 or Stop Bit 2. Thus, the Stop Bit setting is not available.
- The master has no address in a Modbus-RTU network, only the slaves. In this example, the controller address on the network is **Addr** → **1**.
- It is recommended to use the original sensor cable length. Do not use a compensating cable, as this may influence the sensor resistance and result in an incorrect temperature measurement.
- It is recommended to use temperature transmitters to extend the distance between sensor and controller.
- It is recommended to avoid positioning the sensor cables and current signals near power cables or equipment that generates electromagnetic interference such as inverters or motors. This practice contributes to the correct measurement of the signals.

HOW TO TRIGGER THE RELAY OUTPUT USING RAMPS AND SOAKS

GOAL

Use the I/O1 relay output with ON/OFF control to trigger a load. The load is a heating element that must heat and cook a ceramic process, as shown in the following graphic.

The Setpoint and the cooking timer will obey what has been set in the Program Cycle of the controller. The program that will be executed must be selected in parameter **E Pr**.

The sensor used to measure the temperature is a T Thermocouple with a range of -160 to 400 °C (-256 to 752 °F).

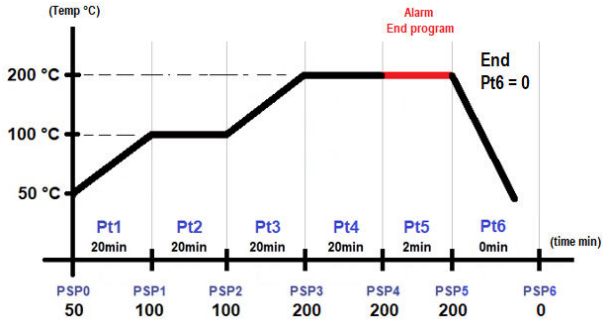

Figure 10 – Temperature range

ELECTRICAL DIAGRAM

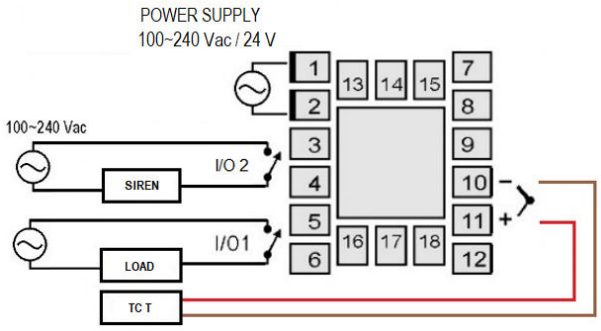

Figure 11 – Example 9

The Ramps and Soaks program starts by selecting **RUN → YES**. The start Setpoint **PSP0** is set slightly above the initial ambient temperature. This Setpoint has no time bound and serves to guarantee an initial condition above the ambient temperature.

If the PV is above **PSP0** in a heating process (or below in a cooling process), the program does not start.

When it reaches **PSP0**, it starts counting the **Pt 1** time to reach **PSP 1** (Ramp). When it repeats the same value from **PSP 1** to **PSP2**, it indicates that it should maintain the value for the **Pt2** time (Soak).

In the next step it goes up to **PSP3** for the **Pt3** time (Ramp), keeps the value at **PSP4** for the **Pt4** time (Soak) and then finishes the program.

To signal the end of the program, it is possible to create another segment with brief time, repeating the value from **PSP4** to **PSP5**. This allows you to trigger an alarm.

The alarm will be triggered by the **Pt5** time. The program ends when it finds the next time parameter equal to zero (**Pt6** = **0**).

When the program ends, the controller will automatically change the parameter **RUN → No**.

SETTINGS

OPERATION CYCLE

PARAMETER	VALUE
SP	0 (Not used)
CtrL	Auto
E Pr	1
run	YES

TUNING CYCLE

PARAMETER	VALUE
AtUn	oFF
Pb	0.0
HYSt	1
Act	rE
Lbd.t	0

CICLO DE PROGRAMAS

PARAMETER	VALUE
Pr.tb	Min
Pr n	1
PtoL	1
PSP0	50
Pt 1	20
PE 1	- - - -
PSP 1	100
Pt2	20
PE2	- - - -
PSP2	100
Pt3	20
PE3	- - - -
PSP3	200
Pt4	20
PE4	- - - -
PSP4	200
Pt5	1
PE5	- - - 1 (Uses alarm 1)
PSP5	200
Pt6	0
PE6	- - - - (Leave the next ones like this)
PSP6	0 (Leave the next ones at zero)
...	
LP	0

ALARM CYCLE

PARAMETER	VALUE
FuA1	rS
FuA2	oFF
FuA3	oFF
FuA4	oFF
bLA1	no

SCALE CYCLE

PARAMETER	VALUE
tYPE	tc t
FLtr	5
dPPo	0.0
un It	C
OFFS	0.0
E.rSP	no
SPLL	-160.0
SPHL	400.0
IEou	0.0

I/O CYCLE (INPUTS AND OUTPUTS)

PARAMETER	VALUE
io 1	CtrL
io 2	A1
io 3	oFF
io 4	oFF
io 5	oFF

NOTES

- When **PtoL** is other than zero, temperature is the priority during program execution. When it is equal to zero, the priority is the time.
- Parameters that were not mentioned during this example have no influence on this operation and can be set to zero or **oFF** whenever possible.
- To trigger an alarm during the Ramps and Soaks program, the alarm function must be configured as **FuA1 → rS** and the

respective segment PES → - - - 1 with the alarm that will be triggered. Finally, this alarm must be assigned to an output 2 → A1.

- To set up a new program, simply change the parameter number Pr n → 2. After that, select the program number under E Pr 2.
- It is recommended to use the original sensor cable length. Do not use a compensating cable, as this may influence the sensor resistance and result in an incorrect temperature measurement.
- It is recommended to use temperature transmitters to extend the distance between sensor and controller.
- It is recommended to avoid positioning the sensor cables and current signals near power cables or equipment that generates electromagnetic interference such as inverters or motors. This practice contributes to the correct measurement of the signals.

SPECIFICATIONS

DIMENSIONS.....48 x 48 x 110 mm (1/16 DIN)

Panel Cutout: .....45.5 x 45.5 mm (+0.5 -0.0 mm)

Approximate Weight: ..... 150 g

POWER SUPPLY.....100 to 240 Vac/dc (±10 %), 50 / 60 Hz

Optionally 24V: .....12 to 24 Vdc / 24 Vac (-10 % / +20 %)

Maximum consumption:..... 9 VA

ENVIRONMENTAL CONDITIONS:

Operation Temperature: ..... 5 to 50 °C

Relative Humidity: .....80 % max. @ 30 ºC

For temperatures above 30 °C, reduce 3 % for each °C

Internal Use; Category of installation II, Degree of pollution 2; altitude < 2000 m

INPUT.....T/C, Pt100, voltage and current (according to **Table 1**)

Internal Resolution: .....32767 levels (15 bits)

Display Resolution: ..... 12000 levels (from - 1999 up to 9999)

Rate of input reading: .....up to 55 per second

Accuracy: .Thermocouples **J**, **K**, **T**, **E**: 0.25 % of the span ±1 ºC

.....Thermocouples **N**, **R**, **S**, **B**: 0.25 % of the span ±3 ºC

.....Pt100: 0.2 % of the span

.....4-20 mA, 0-50 mV, 0-5 Vdc, 0-10 Vdc: 0.2 % of the span

Input Impedance: 0-50 mV, Pt100 and Thermocouples: >10 MΩ

..... 0-5 V: >1 MΩ

..... 4-20 mA: 15 Ω (+2 Vdc @ 20 mA)

Pt100 Measurement: ..... Three wire type, (α=0.00385)

with compensation for cable length, excitation current of 0.170 mA.

All input and output types are factory calibrated. Thermocouples according to standard NBR 12771 / 99, RTD's NBR 13773 / 97.

ANALOGICAL OUTPUT (I/O5): .....0-20 mA or 4-20 mA, 550Ω max.

31000 levels, insulated, for control or retransmission of PV and SP

CONTROL OUTPUT:

2 Relays SPST-NO (I/O1 and I/O2): 1.5 A / 240 Vac, typical use

..... 1 Relay SPDT (I/O3): 3 A / 250 Vac, typical use

.....Voltage pulse for SSR (I/O5): 10 V max. / 20 mA

.....Voltage pulse for SSR (I/O3 and I/O4): 5 V max. / 20 mA

ELECTROMAGNETIC COMPATIBILITY:..... EN 61326-1:1997 and EN 61326-1 / A1:1998

SAFETY: ..... EN61010-1:1993 and EN61010-1 / A2:1995

USB INTERFACE 2.0, CDC CLASS (VIRTUAL COMMUNICATIONS PORT), MODBUS-RTU PROTOCOL.

SPECIFIC CONNECTIONS FOR 6.3 MM PIN TERMINALS.

FRONT PANEL: .....IP65, polycarbonate - UL94 V-2

HOUSING: ..... IP20, ABS+PC UL94 V-0

START-UP OPERATION: After 3 seconds connected to the power supply.

CERTIFICATIONS: .....CE, UKCA, UL (FILE: 300526)

IDENTIFICATION

N1200 -	3R -	485 -	24V
A	B	C	D

A: Controller Model:
N1200

B: Optional I/O:

Blank (basic version, without **I/O3** nor **I/O4**)

3R (SPDT Relay in **I/O3**)

DIO (Digital I/O in **I/O3** and **I/O4**)

HBD (Burnt-Out Resistance detection)

C: Digital Communication:

Blank (basic version, without serial communication)

485 (RS485, Modbus protocol)

D: Power Supply:

Blank (basic version, 100 to 240 Vac/dc input)

24V (12 to 24 Vdc / 24 Vac input voltage)

WARRANTY

Warranty conditions are available on our website www.novusautomation.com/warranty.