NIR1030 SETUP MANUAL

TABLE OF CONTENTS

Content **Page**

The Netherlands
Pastoor Clercxstraat 26
5465 RH Veghel
Tel: +31 (0)413 376 599
Fax: +31 (0)413 379 310

USA
400 Pleasant Street
Watertown, MA 02472
Tel: +1 617 649 6322
Fax: +1 617 923 9911

office@exergenglobal.com
www.exergenglobal.com

GENERAL INFORMATION

For many OEM and general temperature control applications it is sometimes desirable to test sensors before being placed into service, or to conduct routine checking while they are in service. Accordingly, recommended procedures are presented to allow easy checking with commonly available equipment. However, prior to testing, it is important to understand what indications an actual IRt/c failure might cause.

Factory Calibration
The pre-calibrated IRt/c sensors (models without the “A” suffix that indicates user adjustability) are calibrated under conditions that optimize performance in actual use: target emissivity = 0.9 (a good general value for non-metals), and ambient temperature elevated to approximately 1/4 of the elevation of target temperature above room temperature (accurately simulates the effect of reflected energy). Since this type of test would require specialized devices, the procedures outlined have test standards that are slightly different, since they use blackbodies, or test surfaces/ambients whose properties vary to some extent.

What to Look For When Testing
Open Circuit: An open circuit (resistance > 15 KΩ) indicates a broken wire, and open circuit detection systems will perform normally to detect it.

No Response to Thermal Radiation: Sensor reads ambient temperature accurately, but does not respond when pointed at a hot target. This fault is similar to a short circuit with an ordinary thermocouple, in that the circuit is complete, but is measuring the ambient temperature at the short, and not at the measuring junction. For the IRt/c, this fault is the same as if the sensor were covered with foil, thus blinding it.

Sensor Reads Low: There are only two ways an IRt/c can shift after factory calibration: the lens becomes dirty; or the sensor loses its hermetically sealed Xenon gas.

CLEANING:

- **If the lens becomes dirty, the signal loss is directly proportional to the amount of dirt on the lens. Infrared energy is a form of light and therefore the situation is similar to ordinary window glass becoming dirty and blocking out sunshine. If considerably dirty before cleaning, the window will let more light through after cleaning, thus increasing the signal. If it was already clean, additional cleaning doesn’t let any more light through, and the signal remains the same.**

- If the durable IRt/c hermetic seal somehow fails, the Xenon gas will immediately escape. For even a small leak, the Xenon will escape quickly, within seconds. It is a “fail-safe” design. The Xenon gas will not leak gradually. If this occurs, the mV output sensitivity will immediately drop to approximately 50% or less of normal signal. For example, if a type K-180F/90C sensor looks at a high emissivity 212°F (100°C) surface and reads correctly on a thermocouple meter, or gives you 3.3 mV on a DVM, then the sensor is within specifications. If the signal is only approximately 1.7 mV, or reads in the neighborhood of 140°F (60°C) with a thermocouple meter (and the lens is clean), the fail-safe gas seal has been compromised.

GENERAL INFORMATION

- The fail-safe feature is quite important, since a breach of the sensor gas seal would permit contaminants to enter the sensitive detection system and cause unpredictable drift.

Conducting Pass/Fail Testing

For your convenience, 212°F (100°C) is recommended as a test target temperature, even though it might be outside the 2% linear range of the IRt/c being tested, since the strict repeatability of the IRt/c permits it to be tested at any temperature within its specified range. A digital volt meter (DVM) with at least 0.1 mV resolution is recommended instead of a thermocouple readout, since the DVM will be faster, and will not generate a leakage current that can cause readings to vary from sensor to sensor due to resistance variations. An electronic ice point reference is desirable, but not necessary for pass/fail testing.

Procedure

Make sure the sensor window is clean. If it is not, then clean with a mild solvent such as alcohol and wipe dry. Clip the DVM test leads to the IRt/c and point at the target, bringing the IRt/c as close as possible to be sure that the IRt/c sees only the target, taking care that the clip lead connections (the effective cold junctions) remain at room temperature. Immediately read the DVM for the correct reading. For details of test set-up for the boiling water, see *Tech Note No. 75*.

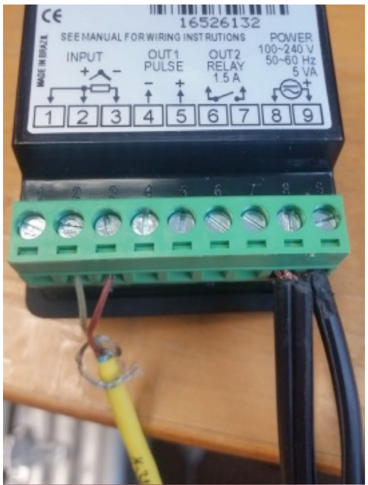
In-Service Inspection Methods

Measure the surface temperature of the target (with the target at normal operating temperature) with a Microscanner D-Series infrared thermometer. Make note of the temperature. Check the IRt/c display device and make sure the reading reproduces the original value that was obtained at installation calibration. If the IRt/c reading is incorrect, clean the lens with a cotton swab and alcohol (or similar cleaner) and recheck the display. If the reading is significantly lower, the fail-safe Xenon charge has esca ped, indicating that the sensor should be replaced.

Calibration Values

For specifications for the mV signals that should be obtained for the test conditions obtained above, for any given model IRt/c, please fill in the data below, and mail to Exergen: **info@exergenglobal.com**. The specifications will be return mailed to you.

NIR1030 SETUP INSTRUCTIONS



Step 1:

Wire the IRt/c in standard thermocouple fashion with the RED WIRE to (-) #3-INPUT and YELLOW WIRE to (+) #2-INPUT.

Step 2:

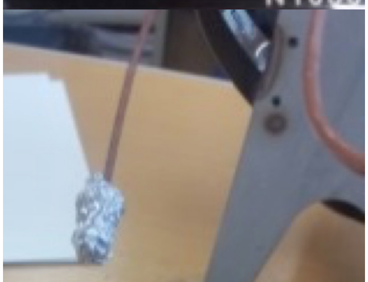
Power up as usual to 120VAC

Step 3:

Press and hold P until "tyPE" is displayed, press Up or Down arrow until correct sensor type is displayed

Step 4:

Wait a settling time of at least 15 minutes. This is the cold junction's settling time.



Step 5:

Blind IRt/c with aluminum foil

Step 6:

Wait 10 minutes, then record temperature displayed on controller

Step 7:

Measure ambient temperature surrounding IRt/c with reliable source (like DX501), and record

Step 8:

Subtract the measured ambient from the displayed temperature and that is your offset. For example if the ambient is 23C and displayed is 28C, the offset is -5C.

NIR1030 SETUP INSTRUCTIONS

Step 9:

Press **P** 3 times so that **OFFS** is displayed.

Step 10:

Press **UP** or **DOWN** arrow to get the required offset displayed (for example -5, if the offset is -5C).

Step 11:

Press **P** 7 times until the controller is back on displaying the ambient temperature and check to see if it matches with sensor blinded

Step 12:

Install IRt/c to measure high operating temperature in the process

Step 13:

Measure process temperature with reliable source (like DX501) and record.

Step 14:

Measure process temperature with Novus and IRt/c and record.

Step 15:

Press and hold **P** until **PASS** is displayed

Step 16:

Hit the **UP** arrow once so that “1” is displayed

Step 17:

Press **P** 7 times until **ECAL** is displayed

Step 18:

Press **UP** or **DOWN** arrow to program in GAIN adjustment for emissivity/reflectivity properties of the material measured. If the temperature measured in step 12 is higher the gain will be less than 1.00, if it is lower the gain will be greater than 1.00. You may have to go back and forth to check this a few times to get it right on.

Step 19:

Check process temperature with reliable source and Novus/IRt/c to see if they match. If not repeat step 17 until they do.

N1030 Controller

TEMPERATURE CONTROLLER – INSTRUCTIONS MANUAL – V1.0x A

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:	CAUTION OR DANGER:
Read the manual thoroughly before installing and operating the equipment.	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.

INSTALLATION / CONECTIONS

The controller must be fastened on a panel, following the sequence of steps described below:

- Prepare a panel cut-out of 46 x 46 mm;
- Remove the mounting clamps from the controller;
- Insert the controller into the panel cut-out;
- Slide the mounting clamp from the rear to a firm grip at the panel.

ELECTRICAL CONNECTIONS

Fig. 01 below shows the electrical terminals of the controller:

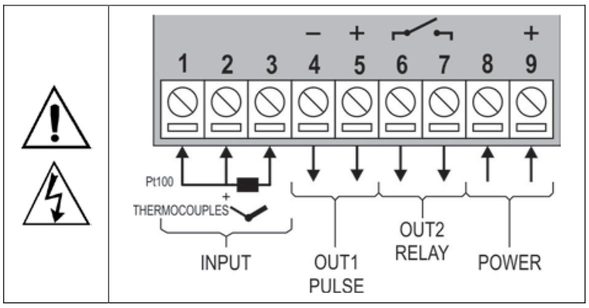


Fig. 01 - Connections of the back panel

RECOMMENDATIONS FOR THE INSTALLATION

- All electrical connections are made to the screw terminals at the rear of the controller.
- To minimize the pick-up of electrical noise, the low voltage DC connections and the sensor input wiring should be routed away from high-current power conductors. If this is impractical, use shielded cables. In general, keep cable lengths to a minimum.
- All electronic instruments must be powered by a clean mains supply, proper for instrumentation.
- It is strongly recommended to apply RC'S FILTERS (noise suppressor) to contactor coils, solenoids, etc. In any application it is essential to consider what can happen when any part of the system fails. The controller features by themselves can not assure total protection.

FEATURES

INPUT TYPE SELECTION

Table 01 shows the sensor types accepted and their respective codes and ranges. Access the parameter **tYPE** in the INPUT level to select the appropriate sensor.

TYPE	CODE	RANGE OF MEASUREMENT
Termopar **J**	tc J	Range: -110 to 950 °C (-166 to 1742 °F)
Termopar **K**	tc K	Range: -150 to 1370 °C (-238 to 2498 °F)
Termopar **T**	tc t	Range: -160 to 400 °C (-256 to 752 °F)
Pt100	Pt	Range: -200 to 850 °C (-328 to 1562 °F)

Table 01 – Input types

The input type should be the first parameter to be configured on the controller. Any modifications on the input type will automatically change other related parameters. The user must verify the configuration every time that an input type modification occurs.

OUTPUTS

The controller has two outputs. The user can configure these outputs to operate as **Control Output (CtrL)** or **Alarm Output (AL)**.

OUT1 - Output Voltage pulse, 5 Vdc / 25 mA

OUT2 - Output Relay SPST-NO

CONTROL OUTPUT (CtrL)

The control strategy can be **ON/OFF** (when **Pb** = **0.0**) or **PID**. The PID parameters can be automatically determined enabling the auto-tuning function (**Atun**).

ALARM OUTPUT (AL)

The controller contains 2 alarms that can be directed (assigned) to any output channel. The alarm functions are described in **Table 02**.

oFF	Output is not used as alarm.	
Lo	Alarm of Absolute Minimum Value. Triggers when the value of measured PV is **below** the value defined for alarm *Setpoint (SPAL).*	PV SPAL
HI	Alarm of Absolute Maximum Value. Triggers when the value of measured PV is **above** the value defined for alarm *Setpoint*.	PV SPAL
dIF	Alarm of Differential. In this function the parameters, SPAL represent the deviation of PV in relation to the SP of CONTROL. PV SP – SPAL SP SP + SPAL Positive SPAL	PV SP + SPAL SP SP – SPAL Negative SPAL

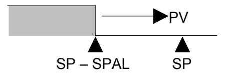
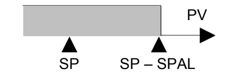
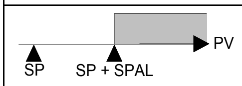
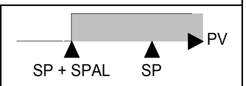
d IFL	Alarm of Minimum Differential Value. It triggers when the value of PV is **below** the defined point by SP-SPAL.	
		
	Positive SPAL	Negative SPAL
d IFH	Alarm of Maximum Differential. Triggers when the value of PV is **above** the defined point by SP+SPAL.	
		
	Positive SPAL	Negative SPAL
IErr	Alarms of the Sensor Break (Sensor *Break Alarm*). It is activated when the Input presents problems such as interrupted sensor, bad connection, etc.	

Table 02 – Alarm functions

INITIAL BLOCKING OF ALARM

The **initial blocking** option inhibits the alarm from being recognized if an alarm condition is present when the controller is first energized (or after a transition from run YES → NO). The alarm will be enabled only after the occurrence of a non alarm condition followed by a new occurrence for the alarm.

The initial blocking is useful, for instance, when one of the alarms is configured as a minimum value alarm, causing the activation of the alarm soon upon the process start-up, an occurrence that may be undesirable.

The initial blocking is disabled for the sensor break alarm function IErr.

OFFSET

Allows fine adjustments to the PV reading for compensation of sensor error.

OPERATION

The controller's front panel, with its parts, can be seen in the **Fig. 02**:

Fig. 02 - Identification of the parts referring to the front panel

Display of PV / Programming (top display, red color): Displays the current value of PV (*Process Variable*). When in configuration mode, it shows the parameters names.

Display of SP / Parameters (bottom display, green color)**:** Displays the value of SP (*Setpoint*). When in configuration mode, it shows the parameters values.

TUNE Indicator: Stays ON while the controller is in tuning process.

OUT Indicator: For relay or pulse control output; it reflects the actual state of the output.

A1 and A2 Indicators: signalize the occurrence of alarm situation.

P Key: used to walk through the menu parameters.

▲ **Increment key** and ▼ **- Decrement key**: allow altering the values of the parameters.

◀ **Back key**: used to retrocede parameters.

OPERATION

When the controller is powered up, it displays its firmware version for 3 seconds, after which the controller starts normal operation. The value of PV and SP is then displayed and the outputs are enabled.

In order for the controller to operate properly in a process, its parameters need to be configured first, such that it can perform accordingly to the system requirements. The user must be aware of the importance of each parameter and for each one determine a valid condition.

The parameters are grouped in levels according to their functionality and operation easiness. The 3 levels of parameters are

1 – Tuning / 2 – Input / 3 – Calibration

The "**P**" key is used for accessing the parameters within a level.

Keeping the "**P**" key pressed, at every 2 seconds the controller jumps to the next level of parameters, showing the first parameter of each level:

PV >> **Atun** >> **tYPE** >> **PASS** >> **PV** ...

To enter a particular level, simply release the "**P"** key when the first parameter in that level is displayed. To walk through the parameters in a level, press the "**P"** key with short strokes. To go back to the previous parameter in a level, press ◀:

Each parameter is displayed with its prompt in the upper display and value/condition in the lower display. Depending on the level of parameter protection adopted, the parameter **PASS** precedes the first parameter in the level where the protection becomes active. See section **Configuration Protection**.

DESCRIPTION OF THE PARAMETERS

OPERATION LEVEL

PV + SP	PV Indication screen. On the higher display (red) the value of the measured variable (PV) temperature is shown. On the lower display (green), the control setpoint (SP) is shown.

TUNING LEVEL

Atun	**AUTO-TUNE**: enables the auto-tuning function for the PID parameters (**Pb**, **Ir**, **dt**). Defines the control strategy to be taken: **oFF** - Turned off. (no PID tuning) **FASt** - Automatic tuning. **FULL** - More accurate automatic tuning.
Pb	Proportional Band - Value of the term **P** of the control mode PID, in percentage of the maximum span of the input type. Adjust of between 0 and 500.0 %. **When set to zero (0), control action is ON/OFF.**
Ir	Integral Rate - Value of the term **I** of the PID algorithm, in repetitions per minute (Reset). Adjustable between 0 and 99.00. Displayed only if proportional band ≠ 0.
dt	Derivative Time - Value of the term **D** of the control mode PID, in seconds. Adjustable between 0 and 300.0 seconds. Displayed only if proportional band ≠ 0.
Ct	**Level time**: Pulse Width Modulation (PWM) period in seconds. Adjustable between 0.5 and 100.0 seconds. Displayed only if proportional band ≠ 0.
HYSt	**Control hysteresis**: Is the hysteresis for ON/OFF control (set in temperature units). This parameter is only used when the controller is in ON/OFF mode (**Pb=0**).

ACt	Action Control: **rE** Control with **Reverse Action**. Appropriate for **heating**. Turns control output on when PV is below SP. **dIr** Control with **Direct Action**. Appropriate for **cooling**. Turns control output on when PV is above SP.
Out1 **Out2**	Assign functions to the Output channels OUT1, OUT2 **oFF** - Not used. **CtrL** - Control output. **AL** - Alarm output.

INPUT LEVEL

tYPE	Input Type: Selects the input signal type to be connected to the process variable input. Refer to **Table 01** for the available options.
dPPo	Selects the decimal point position to be viewed in both PV and SP.
unit	Selects display indication for degrees Celsius or Fahrenheit: **C** - Indication in Celsius. **F** - Indication in Fahrenheit.
OFFS	Sensor Offset: Offset value to be added to the PV reading to compensate sensor error. Default value: zero.
SPLL **SPHL**	SP Low/High Limit. Defines SP upper and lower limits. It defines the maximum and minimum PV indication range. This parameter does not limit the Alarm SP configuration.
FuAL	Functions of Alarms. Defines the functions for the alarms among the options of the **Table 02**.
SPAL	Alarm SP: Value that defines the point of activation of the alarm outputs. For the alarms programmed with the functions of the type **Differential**, these parameters represent the deviations. For the **IErr** alarm function, this parameter has no meaning.
bLAL	Blocking Alarm. This function blocks the alarms. **YES** - enables initial blocking **no** - inhibits initial blocking
HYAL	Histeresis of Alarm. Defines the difference between the value of PV at which the alarm is triggered and the value at which it is turned off.

CALIBRATION LEVEL

All types of input are calibrated in the factory. In case a recalibration is required; it shall be carried out by a specialized professional. In case this level is accidentally accessed, do not perform alteration in its parameters.

PASS	Password. This parameter is presented before the protected levels. See item Protection of Configuration.
CAL	Calibration. Enables the possibility for calibration of the indicator. When the calibration is not enabled, the related parameters are hidden.
InLC	Input Low Calibration. Enter the value corresponding to the low scale signal applied to the analog input.
InHC	Input High Calibration. Enter the value corresponding to the full scale signal applied to the analog input.
rStr	Restore. Restores the factory calibration for all inputs and outputs, disregarding modifications carried out by the user.
PAS.C	Password Change. Allows defining a new access password, always different from zero.
Prot	Protection. Sets up the Level of Protection. See **Table 04**.

CONFIGURATION PROTECTION

The controller provides means for protecting the parameters configurations, not allowing modifications to the parameters values, avoiding tampering or improper manipulation. The parameter **Protection** (**Prot**), in the Calibration level, determines the protection strategy, limiting the access to particular levels, as shown by the **Table 04**.

PROTECTION LEVEL	PROTECTION LEVELS
1	Only the Calibration level is protected.
2	Calibration and Input levels.
3	Calibration, Input and Tuning levels.
4	All levels are protected, including SP.

Table 04 – Levels of Protection for the Configuration

ACESS PASSWORD

The protected levels, when accessed, request the user to provide the **Access Password** for granting permission to change the configuration of the parameters on these levels.

The prompt **PASS** precedes the parameters on the protected levels. If no password is entered, the parameters of the protected levels can only be visualized.

The Access Password is defined by the user in the parameter *Password Change* (**PAS.C**), present in the Calibration Level. **The factory default for the password code is 1111.**

PROTECTION ACCESS PASSWORD

The protection system built into the controller blocks for 10 minutes the access to protected parameters after 5 consecutive frustrated attempts of guessing the correct password.

MASTER PASSWORD

The Master Password is intended for allowing the user to define a new password in the event of it being forgotten. The Master Password doesn't grant access to all parameters, only to the *Password Change* parameter (**PASC**). After defining the new password, the protected parameters may be accessed (and modified) using this new password.

The master password is made up by the last three digits of the serial number of the controller **added** to the number 9000. As an example, for the equipment with serial number 07154321, the master password is 9 3 2 1.

Controller serial number is displayed by pressing ◀ for 3 seconds.

DETERMINATION OF PID PARAMETERS

During the process of determining automatically the PID parameters, the system is controlled in **ON/OFF** in the programmed Setpoint. The auto-tuning process may take several minutes to be completed, depending on the system. The steps for executing the PID auto-tuning are:

- Select the process Setpoint.
- Enable auto-tuning at the parameter "**Atun**", selecting **FASt** or **FULL**.

The option **FASt** performs the tuning in the minimum possible time, while the option **FULL** gives priority to accuracy over the speed.

The sign TUNE remains lit during the whole tuning phase. The user must wait for the tuning to be completed before using the controller.

During auto tuning period the controller will impose oscillations to the process. PV will oscillate around the programmed set point and controller output will switch on and off many times.

If the tuning does not result in a satisfactory control, refer to **Table 05** for guidelines on how to correct the behavior of the process.

PARAMETER	VERIFIED PROBLEM	SOLUTION
Band Proportional	Slow answer	Decrease
	Great oscillation	Increase
Rate Integration	Slow answer	Increase
	Great oscillation	Decrease
Derivative Time	Slow answer or instability	Decrease
	Great oscillation	Increase

Table 05 - Guidance for manual adjustment of the PID parameters

For further details on PID tuning, visit our web site: www.novusautomation.com.

MAINTENANCE

PROBLEMS WITH THE CONTROLLER

Connection errors and inadequate programming are the most common errors found during the controller operation. A final revision may avoid loss of time and damages.

The controller displays some messages to help the user identify problems.

MESSAGE	DESCRIPTION OF THE PROBLEM
----	Open input. No sensor or signal.
Err1 Err6	Connection and/or configuration problems. Check the wiring and the configuration.

Other error messages may indicate hardware problems requiring maintenance service.

PROCESS VARIABLE INPUT CALIBRATION

All inputs are factory calibrated and recalibration should only be done by qualified personnel. If you are not familiar with these procedures do not attempt to calibrate this instrument.

a) Set the type parameter according to the input tYPE.

b) Configure the lower and upper limits of indication for the maximum span of the selected input type.

c) Access the calibration level.

d) Enter the password.

e) Enable the calibration setting YES in the parameter CALib.

f) With the aid of an electrical signals simulator, apply a signal level close the lower limit of the measuring range of the input, on the corresponding terminals.

g) Access the parameter " InLc". With the keys ▲ and ▼ adjust the display reading such as to match the applied signal. Then press the P key.

h) Inject a signal that corresponds to a value a little lower than the upper limit of indication.

i) Access the parameter " InHC". With the keys "▲" and "▼", adjust the display reading such as to match the applied signal. Then press the key "P" until return to the Display PV screen.

j) Validate the calibration performed.

Note: When checking the controller calibration with a Pt100 simulator, pay attention to the simulator minimum excitation current requirement, which may not be compatible with the 0.170 mA excitation current provided by the controller.

IDENTIFICATION

N1030-PR	Version with power supply 100~240 Vac 48~240 Vdc
N1030-PR-24V	Version with power supply 12~24 Vdc / 24 Vac

SPECIFICATIONS

DIMENSIONS:..........48 x 48 x 35 mm

Approximate Weight: ....60 g

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

..........48 to 240 Vdc (±10 %)

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

Maximum consumption: .... 5 VA

ENVIRONMENTAL CONDITIONS:

Operation Temperature: .... 0 to 50 °C

Relative Humidity:.......... 80 % @ 30 °C

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

...... Internal use; Category of installation II, Degree of pollution 2; altitude < 2000 meters

INPUT...... Thermocouples **J**; **K**; **T** and **Pt100** (according of **Table 01**)

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

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

Rate of input reading: ....up 5 per second

Precision: Thermocouples **J**, **K**, **T**: 0.25 % of the *span* ±1 °C (*)

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

Input Impedance:..........Pt100 and thermocouples: > 10 MΩ

Measurement of Pt100: .... 3-wire type, (α=0.00385)

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

(*) The use of thermocouples requires a minimum time interval of 15 minutes for stabilization.

OUTPUTS: OUT1: ....Voltage pulse, 5 Vdc / 25 mA

OUT2: ....Relay SPST; 1,5 A / 240 Vac / 30 Vdc

FRONT PANEL:.......... IP65, Polycarbonate (PC) UL94 V-2

ENCLOSURE:.......... IP30, ABS+PC UL94 V-0

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

EMISSION:.......... CISPR11/EN55011

IMMUNITY:..........EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8 and EN61000-4-11

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

SPECIFIC CONNECTIONS FOR TYPE FORK TERMINALS;

PROGRAMABLE LEVEL OF PWM: from 0.5 up 100 seconds;

STARTS UP OPERATION: after 3 seconds connected to the power

CERTIFICATION: CE

WARRANTY

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

D501

Product Overview

The D501 Features

- Handheld Precision IR Thermometer
- High Accuracy
- High Speed
- NIST Traceable
- Interchangeability ± 1%
- Resolution 0,1°C (0.2°F)
- Repeatability 0,1°C (0.2°F)

Technical Data

Temperature Range	-45 to 287°C (-50 to 550°F)
Field of View	1:1 (approx. 53°)
Operating Temperature	0 to 50°C (32 to 122°F)
Minimum Spot Size	6 mm (.25")
Spectral Response	2 to 20µm
Emissivity Error	± 1% maximum of difference between target temperature and instrument temperature when touching, for emissivity of 0,8 to 1,0
Linearity Error	± 1% (of reading)
Accuracy	± (0,6 + 0,02 (reading less ambient)) in °C ± (1 + 0,02 (reading less ambient)) in °F

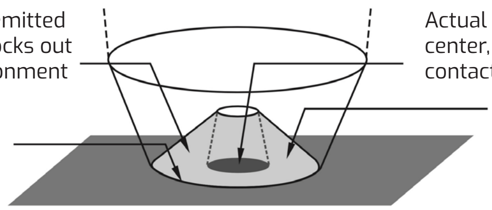
Emissivity Adjustment	Automatic Emissivity Compensation System
Dimensions	Main Case: 8.5 x 12.5 x 2 cm (3 3/8" x 5" x 3/4")
Weight	0,23 kg (8 oz.)
Repeatability	± 0,02% of absolute temperature
Resolution	0,1°C (0.1°F)
Calibration Requirement	None
Response Time	60 msec
°F/°C Conversion	Yes
Power	9V Alkaline Battery
Length of Nose Piece	44,45 mm (1.75")

Automatic Emissivity Compensation System

The D-Series is an entirely different type of instrument than conventional temperature measuring devices. Designed especially for the highest possible accuracy, it is the only infrared instrument, that can be certified with NIST-traceable accuracy on real surfaces of unknown emissivity, while remaining completely free of the contact errors and heat sinking errors of contact devices.

Recessed cone traps all emitted surface radiation, and blocks out any radiation from environment

Only a thin lip of material actually contacts the target, thus minimizing heat transfer



Actual measurement area is in the center, well away from the area contacted by the edge of the cone

Reflective cone automatically corrects for emissivity variations by creating an actual blackbody at the precise location of measurement

Figure 1. Unique Automatic Emissivity Compensation System (AECS) produces accurate temperatures everywhere the infrared probe is placed by creating its own blackbody

The sensing area of the D Scanner is equipped with a reflective surface to correct emissivity variations

Pastoor Clercxstraat 26
5465 RH Veghel
The Netherlands

+31 (0)413 376 599
www.cleverir.com
info@cleverir.com

EXERGEN IRT/C AND TEMPERATURE CONTROLLER NIR1030

Product Overview

N1030 is a temperature controller that features a high performance PID algorithm in a compact housing, with only 35 mm depth. Its compact construction and the convenient detachable connector provides an easy set up on short profile panels, optimizing the space and reducing costs. It has two outputs always available which can be configured both as a control or an alarm output.

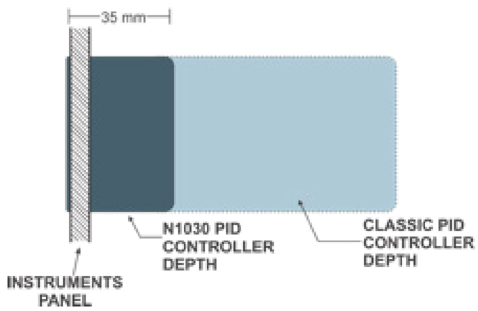
Features

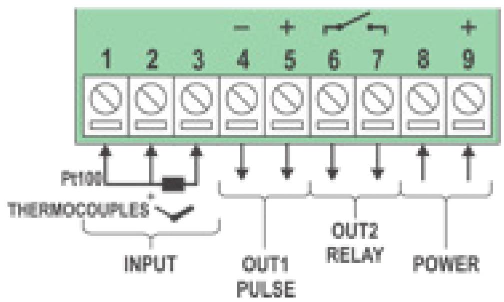
Single Loop PID and ON/OFF controller
PID auto tuning
Two independent outputs available
1.5 A relay output
Pulse output
Six alarm functions: LO, HI, differential, differential LO, differential HI, sensor break
Initial blocking alarm function
Adjustable alarm hysteresis
Temperature unit °C or °F
Decimal place indication

Configurable setpoints limits
Password protection configuration
Factory configuration parameters recovery
Dual red and green four-digit display
Front panel material PC UL94 V-2
Enclosure material: PC UL94 V-2
Front panel protecion: IP65
Operating environment: 0 to 50 ºC, 20 to 80 % RH
Dimensions: 48 x 48 x 35 mm
Power supply: 100 to 240 Vac/dc
Detachable terminal block

Sensor model	Operating range	First linearized value	Last linearized value
IRt/c**-K-80F/27C	0° to 50°C	0	50
IRt/c**-K-180F/90C	60° to 105°C	60	105
IRt/c**-K-280F/140C	115° to 165°C	115	165
IRt/c**-K-340F/170C	140° to 190°C	140	190
IRt/c**-K-440F/220C	160° to 260°C	160	260

** applying for all sensor models (e.g. 01., 1x, 3x, SV, 3SV etc.)





Pastoor Clercxstraat 26
5465 RH Veghel
The Netherlands

+31 (0)413 376 599
www.cleverir.com
info@cleverir.com

EXERGEN MICRO IRT/C AND TEMPERATURE CONTROLLER NMICROIR1030

Product Overview

N1030 is a temperature controller that features a high performance PID algorithm in a compact housing, with only 35 mm depth. Its compact construction and the convenient detachable connector provides an easy set up on short profile panels, optimizing the space and reducing costs. It has two outputs always available which can be configured both as a control or an alarm output.

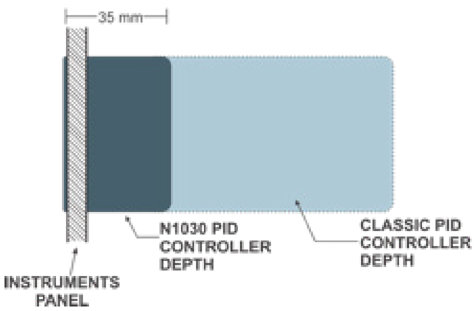
Features

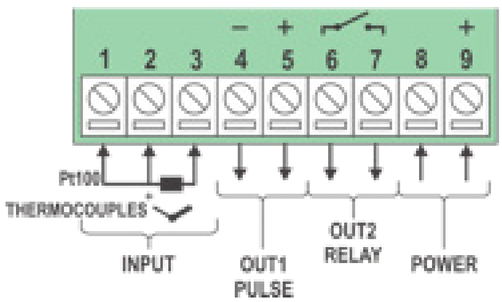
Single Loop PID and ON/OFF controller
PID auto tuning
Two independent outputs available
1.5 A relay output
Pulse output
Six alarm functions: LO, HI, differential, differential LO, differential HI, sensor break
Initial blocking alarm function
Adjustable alarm hysteresis
Temperature unit °C or °F
Decimal place indication

Configurable setpoints limits
Password protection configuration
Factory configuration parameters recovery
Dual red and green four-digit display
Front panel material PC UL94 V-2
Enclosure material: PC UL94 V-2
Front panel protecion: IP65
Operating environment: 0 to 50 ºC, 20 to 80 % RH
Dimensions: 48 x 48 x 35 mm
Power supply: 100 to 240 Vac/dc
Detachable terminal block

Sensor model	Operating range	First linearized value	Last linearized value
micro IRt/c**-K-80F/27C	0° to 50°C	0	50
micro IRt/c**-K-180F/90C	77° to 104°C	77	104
micro IRt/c**-K-280F/140C	132° to 154°C	132	154
micro IRt/c**-K-340F/170C	166° to 188°C	166	188
micro IRt/c**-K-440F/220C	213° to 241°C	213	241

** applying for all sensor models (e.g. 4, SV, 4SV)





Pastoor Clercxstraat 26
5465 RH Veghel
The Netherlands

+31 (0)413 376 599
www.cleverir.com
info@cleverir.com