



### Features

- Universal Process Input (Thermocouples, RTD Pt100, DC Linear mA/mV/V)
- Self Tune PID (with Auto/Manual Bump-less Transfer), On-Off or Pulsed On-Off Control
- Universal Main Control Output (Output-1, Selectable as Relay / SSR Drive / mA or V), Fully Isolated from all other Circuits (Models neuro102V Plus & neuro102L Plus only)
- Ramp / Soak Setpoint Profile
- Remote & Auxiliary Setpoint Input
- PV/SP Retransmission Output
- Process Alarms & Serial Communication Port
- Various DIN Standard Sizes

### Notes

- Ramp/Soak Profile, Auxiliary Setpoint & Remote Setpoint are optional features and are mutually exclusive. That is, the controller can be shipped with only one of 3 options fitted. Default : Ramp/Soak Profile.
- The option Remote Setpoint is available in models neuro102V Plus & neuro102L Plus only
- If neuro 102 Plus is ordered with Auxiliary Setpoint option, then RS485 Serial Communication port will not be available.

### Specifications

Display	
Digital Readout	<p><b>For neuro 102 Plus &amp; neuro 102V Plus</b> Upper Readout : 4 digits, 0.39" Bright Red LED, 7 Segment Lower Readout : 4 digits, 0.32" Luminous Green LED, 7 Segment</p> <p><b>For neuro 102L Plus</b> Upper Readout : 4 digits, 0.52" Bright Red LED, 7 Segment Lower Readout : 4 digits, 0.52" Luminous Green LED, 7 Segment</p>
Status Indicators	5 Red LEDs (3mm Round)
Keys	
Type	4 Tactile Switches
Functions	PAGE, DOWN, UP, ENTER

<b>Sensor / Signal Input</b>	
Type (User Programmable) <b>(No Jumper settings)</b>	Thermocouple : J, K, T, R, S, B, N RTD : Pt100, 3 wire DC Linear : 0-20 mA, 4-20 mA, 0-80 mV, 0-1.25 V, 0-5 V, 0-10 V, 1-5 V
Corrections	<ul style="list-style-type: none"> <li>In-built Cold-Junction Compensation for Thermocouples</li> <li>In-built Lead Resistance Compensation for RTD (Upto 22 Ohms in each lead)</li> </ul>
Accuracy	For Thermocouples & RTD : $\pm 0.25\%$ of reading $\pm 1^\circ\text{C}$ For DC Linear Volts / Current : $\pm 0.25\%$ of reading $\pm 1$ LSD
Display Range	Refer Table 1 for Thermocouples & RTD Inputs Adjustable from -1999 to 9999 Counts for DC Linear mA/mV/V
Display Resolution (User Programmable)	Thermocouples : $1^\circ\text{C}$ Fixed RTD Pt100 : 0.1 / $1^\circ\text{C}$ DC Linear Volts / Current : 0.001 / 0.01 / 0.1 / 1 Counts
Zero Offset	User Adjustable over Full Range
ADC	16 Bit ( $\pm 32,768$ Counts), Sigma-Delta ( $\Sigma\Delta$ )
Sampling Time	200mS (5 Samples per Second)
Input Resistance	> 8 MOhm
Common Mode Rejection	> 100dB at 50/60 Hz
Signal Conditioning	R-C Analog Filter with Programmable Digital Low-Pass Filter
<b>Excitation Voltage</b>	
Rating	5VDC @ 15mA or 12VDC @ 30mA or 24VDC @ 50mA (24 VDC @ 50mA is available only in models Neuro102V Plus & Neuro102L Plus)
<b>Alarms</b>	
Numbers	2, Independent
Programmable Parameters	Mode : Process Low, Process High, Deviation, Window Logic : Normal, Reverse Hysteresis : 1 to 9999 Unit Counts Inhibit : No, Yes
Outputs (Optional)	Relay Change-over Contacts or SSR Drive (Jumper Selectable) Output-2 (OP-2) for Alarm-1, Output-3 (OP-3) for Alarm-2
<b>Retransmission</b>	
Parameter Type	Process Value (PV) or Setpoint (SP)
Parameter Value	User Settable through 'Range Low' & 'Range High' Parameters
Output Signal <b>(Optional on Output-3)</b>	DC Volts (0-5/10 V) or DC Current (0/4-20 mA)
<b>Control</b>	
Type	Self Tune PID, ON-OFF, Pulsed ON-OFF
Mode	Heat only, Cool only, Heat & Cool

Control Parameters	<ul style="list-style-type: none"> <li>• ON-OFF : Hysteresis</li> <li>• Self Tune PID : Proportional Band, Integral Time, Derivative Time, Cycle Time, Relative Cool Gain, Power Low, Power High, Overshoot Inhibit</li> <li>• Pulsed ON-OFF : Hysteresis, Pulse Period, Pulse-ON Time</li> </ul>								
Manual Control	Bump-less Transfer between Auto PID and Manual Control through front panel Key								
<b>Setpoint Profile</b>									
Segments	16, Free Forming Ramp or Soak								
Hold Back Band	Common for entire Profile or Independent for each Segment								
Repeat Cycles	1 to 9999								
Power-fail Recovery	User Programmable for Resumption or Abortion of Profile								
<b>Remote Setpoint</b>									
Type (User Programmable) <b>(No Jumper settings)</b>	DC Linear : 0-20 mA, 4-20 mA, 0-5 V, 0-10 V								
Accuracy	± 0.25% of reading ± 1 LSD								
Setpoint Range	Adjustable from -1999 to 9999 Counts								
Display Resolution (User Programmable)	0.001 / 0.01 / 0.1 / 1 Counts								
ADC	16 Bit (±32,768 Counts), Sigma-Delta ( $\Sigma\Delta$ )								
Sampling Time	200mS (5 Samples per Second)								
Input Resistance	> 8 MOhm								
Common Mode Rejection	> 100dB at 50/60 Hz								
Signal Conditioning	R-C Analog Filter								
<b>Auxiliary Setpoint</b>									
No. of Auxiliary Setpoints	1								
Switching	Switching between Main & Auxiliary Setpoint through rear panel Digital Input								
<b>Digital Input</b>									
Type	Potential free Contact Closure								
Functions	<table border="1"> <thead> <tr> <th>Option</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>Ramp / Soak Profile</td> <td>Remote Start of Profile A trigger on digital input starts Profile, provided it is enabled</td> </tr> <tr> <td>Auxiliary Setpoint</td> <td>Switching between Main &amp; Auxiliary Contacts Closed: Auxiliary Setpoint is selected Contacts Open: Main Setpoint is selected</td> </tr> <tr> <td>Remote Setpoint</td> <td>Switching between Remote Setpoint &amp; Control Setpoint Contacts Closed: Control Setpoint is selected Contacts Open: Remote Setpoint is selected, provided it is enabled</td> </tr> </tbody> </table>	Option	Function	Ramp / Soak Profile	Remote Start of Profile A trigger on digital input starts Profile, provided it is enabled	Auxiliary Setpoint	Switching between Main & Auxiliary Contacts Closed: Auxiliary Setpoint is selected Contacts Open: Main Setpoint is selected	Remote Setpoint	Switching between Remote Setpoint & Control Setpoint Contacts Closed: Control Setpoint is selected Contacts Open: Remote Setpoint is selected, provided it is enabled
Option	Function								
Ramp / Soak Profile	Remote Start of Profile A trigger on digital input starts Profile, provided it is enabled								
Auxiliary Setpoint	Switching between Main & Auxiliary Contacts Closed: Auxiliary Setpoint is selected Contacts Open: Main Setpoint is selected								
Remote Setpoint	Switching between Remote Setpoint & Control Setpoint Contacts Closed: Control Setpoint is selected Contacts Open: Remote Setpoint is selected, provided it is enabled								

## Outputs

(Refer Table 2 : Output Option Selection & Function Assignments)

Relay	Contact Type : Potential-free Change-over Contacts Contact Rating : 5A Resistive @ 120/240 Vac Contact Life : > 5,00,000 Operations at Rated Voltage / Current
SSR Drive	12 VDC @ 40 mA
DC Linear	Voltage : 0-5V, 0-10V (into 5KOhm Minimum) Current : 0-20mA, 4-20mA (into 550 Ohm Maximum)

## Serial Communication

Port	RS485, 2-wire, Half Duplex, Start-Stop Synchronized
Protocol	Modbus RTU
Baud Rate	Settable : 4800, 9600, 19200, 38400, 57600
Parity	Settable : None, Even, Odd
Max. Units per Loop	31
Max. Distance	1200 Meters

## Power Supply

Type	Switch Mode (SMPS)
Line Voltage	Standard : 85~264 VAC, 50/60Hz
Consumption	5VA Max

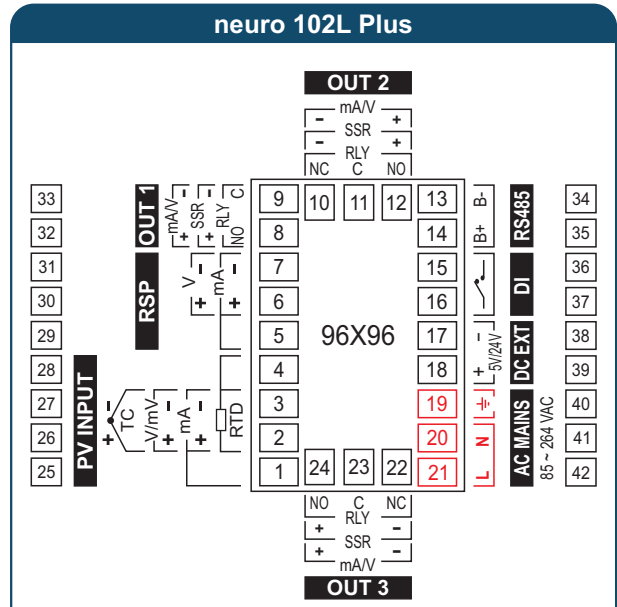
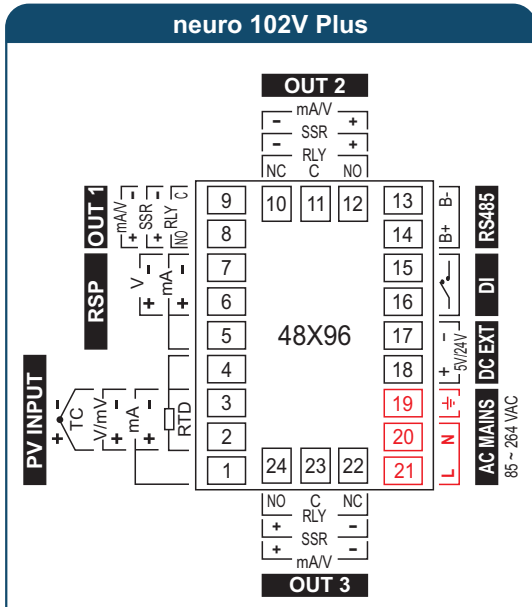
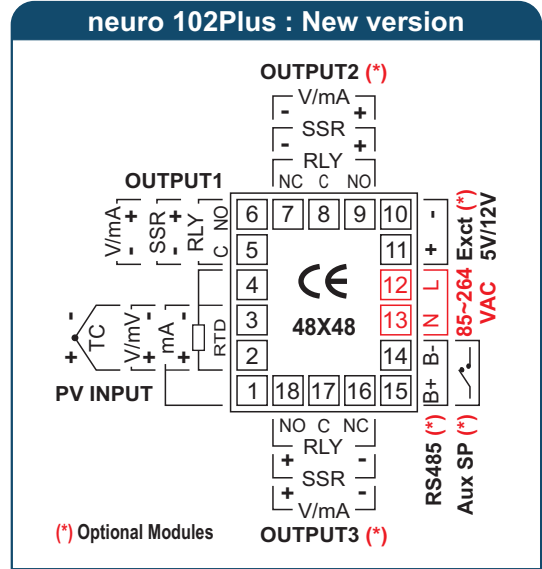
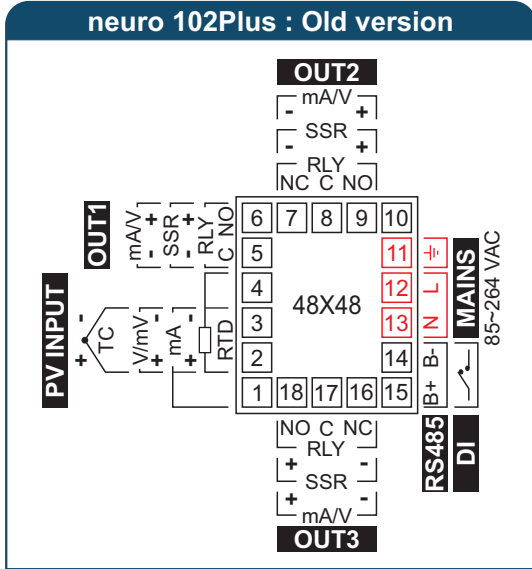
## Physical

Mounting	Plug-in with Panel Mounting Clamps
Dimensions / Panel Cutout	neuro102 Plus : 48 (H) X 48 (W) X 110 (D), mm / 45 (H) X 45 (W), mm neuro102V Plus : 96 (H) X 48 (W) X 100 (D), mm / 92 (H) X 45 (W), mm neuro102L Plus : 96 (H) X 96 (W) X 100 (D), mm / 92 (H) X 92 (W), mm
Terminals	Screw Type
Weight	225 gm, Appx.

## Environmental

Operating Ambient	0~55°C & 5~90%RH Non-condensing
Storage Temperature	-10 to +70 °C
EMC Standards	EN50081-2 & EN 50082-2 Generic Stds for Industrial Environment
Safety Standards	Meets EN61010, Installation Category II
Atmospheres	Not Suitable for use in Corrosive or Explosive Atmospheres. The Panel in which the Instrument is Mounted must be free of Electrically Conductive Pollution.

# Back Panel Terminations



## Tables

### Table 1 : Temperature Ranges for Thermocouples & RTD

Input Type	Range (Min. to Max.)
Type J Thermocouple (Fe-K)	0 to +960°C / +32 to +1760°F
Type K Thermocouple (Cr-Al)	-200 to +1376°C / -328 to +2508°F
Type T Thermocouple (Cu-Con)	-200 to +387°C / -328 to +728°F
Type R Thermocouple (Pt/Pt-Rh13%)	0 to +1771°C / +32 to +3219°F
Type S Thermocouple (Pt/Pt-Rh10%)	0 to +1768°C / +32 to +3214°F
Type B Thermocouple	0 to +1826°C / +32 to +3218°F
Type N Thermocouple	0 to +1314°C / +32 to +2397°F
3-wire, RTD Pt100	-199 to +600°C / -328 to +1112°F

### Table 2 : Output Option Selection & Function Assignments

	Available Options (Specify while Ordering)	Function Assignments (User Programmable)
<b>Output 1</b>	Universal, User Selectable through Jumper Settings <b>Relay</b> : 5A / 230 VAC, 5A / 30 VDC, Resistive Load <b>DC Pulses</b> : 12 VDC @ 40 mA (for SSR) <b>DC Linear</b> : 0/4 - 20 mA into 550Ω Max., Standard 0 - 5/10 VDC into 5KΩ Min., Optional  <b>*(Isolated from Power, Inputs &amp; Outputs)</b>	✓ Main Control Output
<b>Output 2 (Non-Isolated)</b> (Optional, For Alarm or Bi-Directional Control)	User Selectable through Jumper Settings <b>Relay</b> : 5A / 230 VAC, 5A / 30 VDC, Resistive Load <b>DC Pulses</b> : 12 VDC @ 40 mA (for SSR) <b>Or</b> <b>DC Linear</b> : 0/4 - 20 mA into 550Ω Max., Standard 0 - 5/10 VDC into 5KΩ Min., Optional  <b>(Non - Isolated)</b>	✓ Cool Control Output ✓ Alarm-1 Output ✓ End of Profile Output
<b>Output 3 (Non-Isolated)</b> (Optional, For Alarm or Retransmission)	User Selectable through Jumper Settings <b>Relay</b> : 5A / 230 VAC, 5A / 30 VDC, Resistive Load <b>DC Pulses</b> : 12 VDC @ 40 mA (for SSR) <b>Or</b> <b>DC Linear</b> : 0/4 - 20 mA into 550Ω Max., Standard 0 - 5/10 VDC into 5KΩ Min., Optional  <b>(Non - Isolated)</b>	✓ Alarm-2 Output ✓ End of Profile Output ✓ Retransmission Output

\* Output 1 Isolation is available in models neuro102V Plus & neuro102L Plus only

## Ordering Code

Model		Input		Output 1		Output 2		Output 3	
NS	48(H) X 48(W) Front	TC	Thermocouple	CX	Refer Note-1	0	None	0	None
NV	96(H) X 48(W) Front	PT	RTD Pt100	VX	Refer Note-2	1	Relay*	1	Relay*
NL	96(H) X 96(W) Front	LV	Linear Voltage	2C	SSR	2	SSR*	2	SSR*
		LC	Linear Current	2V	SSR	3	0-5/10 V	3	0-5/10 V
				3V	0-5/10 V	4	0/4-20 mA	4	0/4-20 mA
				4C	0/4-20 mA				

Power Supply		Serial Port		Excitation Voltage		Options	
0	85~264 VAC	0	None	0	24 VDC**	N	None
		1	RS485	1	12 VDC	P	Ramp/Soak Profile
				2	5 VDC	A	Auxiliary SP
						R	Remote SP***

### Note 1

The character **C** specifies output option as “Relay, SSR & 0/4-20 mA”. The character **X** can be specified as 1, 2 or 4 for the factory jumper setting to Relay, SSR or 0/4-20 mA, respectively.

### Note 2

The character **V** specifies output option as “Relay, SSR & 0-5/10 V”. The character **X** can be specified as 1, 2 or 3 for the factory jumper setting to Relay, SSR or 0-5/10 V, respectively.

### Example Code **NL-TC-4C-1-4-0-1-0-A**

Model 96(H) X 96(W) Front, Thermocouple Input, Output-1 0/4-20 mA, Output-2 Relay, Output-3 0/4-20 mA (Retransmission), 85~264 VAC Supply, Serial port Rs485, Excitation Voltage 12 VDC, Auxiliary Setpoint

- \* Relay and SSR selection is jumper settable by user. The ordering code only implies the factory settings at the time of dispatch if Relay/SSR output option is ordered .
- \*\* Available in models neuro102V Plus & neuro102L Plus only
- \*\*\* Available in models neuro102V Plus & neuro102L Plus only