

Features

- 2 Rows of 4 Digits, Bright 7 Segment LED Display
- Universal Inputs (Thermocouples, RTD Pt100, DC mA/mV/V)
- 24VDC @ 30mA Excitation Voltage (5 VDC on Request)
- Built-in LRC for RTD & CJC for Thermocouple Inputs
- Programmable Range / Resolution for DC mA/mV/V Inputs
- Programmable Input Signal Conditioning (Digital Filter & Zero Offset)
- Uni-Directional / Bi-Directional Control
- Self Tune PID (with Auto/Manual Bumpless Transfer), On-Off, and Pulsed On-Off Control
- Universal Main Control Output (Relay / SSR / mA or V)
- Built-in 16 Segment Ramp / Soak Profile or Auxiliary Setpoint Input
- Optional Alarms & PV/SP Retransmission Outputs
- RS485 MODBUS RTU Serial Communication Port
- Universal Supply Voltage : 85~264 VAC, 50/60 Hz
- Dimensions (mm) : 96(H) X 48(W) X 100(D)
- Flame-proof Enclosure (Gas Group IIA & IIB) Available

Specifications

Operator Interface	
Display	Upper Readout : 4 digits, 0.39" Bright Red LED, 7 Segment Lower Readout : 4 digits, 0.32" Luminous Green LED, 7 Segment
Status Indicators	5 Red LEDs (3mm Round)
Keys	4 Tactile Switches PAGE, DOWN, UP, ENTER

Sensor / Signal Input	
Type (User Programmable) (No Jumper settings)	Thermocouple : J, K, T, R, S, B, N RTD : Pt100, 3 wire DC mA : 0-20 mA, 4-20 mA, DC mV : 0-80 mV, DC Volts : 0-1.25 V, 0-5 V, 0-10 V, 1-5 V
Corrections	- Built-in Cold-Junction Compensation for Thermocouples - Built-in Lead Resistance Compensation for RTD (Upto 22 Ohms in each lead)
Accuracy	For Thermocouples & RTD : $\pm 0.25\%$ of reading $\pm 1^{\circ}\text{C}$ For DC Linear Volts / Current : $\pm 0.25\%$ of reading ± 1 LSD
Display Range	Refer Table 1 for Thermocouples & RTD Inputs Adjustable from -1999 to 9999 Counts for DC mA/mV/V Inputs
Display Resolution (User Programmable)	Thermocouples : 1°C Fixed RTD Pt100 : 0.1 / 1°C DC mA/mV/V : 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
Excitation Voltage	
Rating	Standard : 24VDC @ 30mA Optional : 5VDC @ 15mA
Alarms	
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
Retransmission	
Parameter Type	Process Value (PV) or Setpoint (SP)
Parameter Value	User Settable through 'Range Low' & 'Range High' Parameters
Output Signal (Optional on Output-3)	DC Volts (0-5/10 V) or DC Current (0/4-20 mA)
Control	
Type	Self Tune PID, ON-OFF, Pulsed ON-OFF
Mode	Heat only, Cool only, Heat & Cool

Control Parameters	• ON-OFF : Hysteresis • Self Tune PID : Proportional Band, Integral Time, Derivative Time, Cycle Time, Relative Cool Gain, Power Low, Power High, Overshoot Inhibit • Pulsed ON-OFF : Hysteresis, Pulse Period, Pulse-ON Time									
Manual Control	Bump-less Transfer between Auto PID and Manual Control through front panel Key									
Setpoint Profile										
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									
Remote Setpoint										
Type (User Programmable) (No Jumper settings)	DC mA : 0-20 mA, 4-20 mA DC Volts : 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 (ΣΔ)									
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									
Auxiliary Setpoint										
No. of Auxiliary Setpoints	1									
Switching	Switching between Main & Auxiliary Setpoint through rear panel Digital Input									
Digital Input										
Type	Potential free Contact Closure									
Functions	<table><tr><th>Option</th><th>Function</th></tr><tr><td>Ramp / Soak Profile</td><td>Remote Start of Profile A trigger on digital input starts Profile, if enabled.</td></tr><tr><td>Auxiliary Setpoint</td><td>Switching between Main & 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 & Control Setpoint Contacts Closed: Control Setpoint is selected Contacts Open: Remote Setpoint is selected, provided it is enabled</td></tr></table>		Option	Function	Ramp / Soak Profile	Remote Start of Profile A trigger on digital input starts Profile, if 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, if 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 mA/V	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

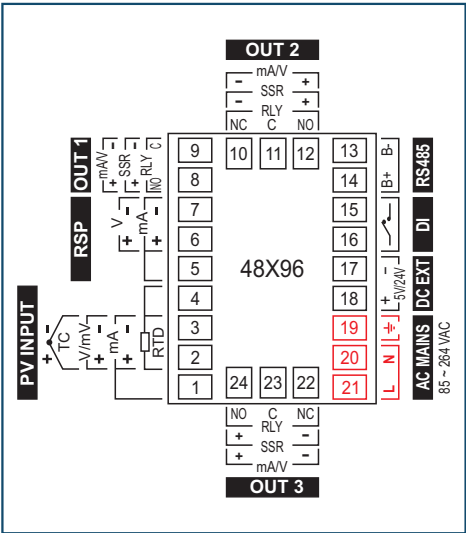
Physical

Mounting	Plug-in with Panel Mounting Clamps
Dimensions	Overall : 96 (H) X 48 (W) X 100 (D), mm Cutout : 92 (H) X 45 (W), mm
Terminals	Screw Type
Weight	400 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)
Output 1	Universal, User Selectable through Jumper Settings Relay : 5A / 230 VAC, 5A / 30 VDC, Resistive Load DC Pulses : 12 VDC @ 40 mA (for SSR) DC mA/V : 0/4 - 20 mA into 550Ω Max., Standard 0 - 5/10 VDC into 5KΩ Min., Optional (Isolated from Power, Inputs & Outputs)	✓ Main Control Output
Output 2 (Non-Isolated) (Optional, For Alarm or Bi-Directional Control)	User Selectable through Jumper Settings Relay : 5A / 230 VAC, 5A / 30 VDC, Resistive Load DC Pulses : 12 VDC @ 40 mA (for SSR) Or DC mA/V : 0/4 - 20 mA into 550Ω Max., Standard 0 - 5/10 VDC into 5KΩ Min., Optional (Non - Isolated)	✓ Cool Control Output ✓ Alarm-1 Output ✓ End of Profile Output
Output 3 (Non-Isolated) (Optional, For Alarm or Retransmission)	User Selectable through Jumper Settings Relay : 5A / 230 VAC, 5A / 30 VDC, Resistive Load DC Pulses : 12 VDC @ 40 mA (for SSR) Or DC mA/V : 0/4 - 20 mA into 550Ω Max., Standard 0 - 5/10 VDC into 5KΩ Min., Optional (Non - Isolated)	✓ Alarm-2 Output ✓ End of Profile Output ✓ Retransmission Output

Ordering Code

Model		Input		Output 1		Output 2		Output 3	
NV	96(H) X 48(W) Front	TC	Thermocouple	CX	Refer Note-1	0	None	0	None
		PT	RTD Pt100	VX	Refer Note-2	1	Relay*	1	Relay*
		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	2	5 VDC	P	Ramp/Soak Profile
						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 **NV-TC-4C-1-4-0-1-0-A**

Model 96(H) X 48(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 24 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 .