

Flexible, Customizable Controller Platform for Foodservice Equipment

Watlow's new SERIES N7 temperature controller provides ample flexibility for use in a broad range of foodservice equipment. This platform controller features up to four zones of control, a powerful processor with additional memory, expanded communication options and a modular architecture that provides OEMs with design alternatives to meet their unique specifications.

The SERIES N7 offers flexibility in user-interface customization. With custom firmware and overlays including up to 32 LEDs and 32 buttons, menu operation can be designed to suit any application. An eight-character alphanumeric display combined with a large, bright numeric display communicates status and options clearly to users. An optional second display module allows one controller to replace multiple controllers.

This controller offers a scalable, flexible mixture of inputs and outputs. The base model is equipped with two sensor inputs and six switched DC outputs, used to operate external switching devices such as solid state relays for heaters. Additional switched DC outputs and process outputs are available for up to ten total outputs. The optional high voltage module replaces switched DC outputs with solid state relays (SSRs) or electromechanical relays that can be used to switch devices such as rotisserie motors, heaters or solenoid valves.

The flexible SERIES N7 is ideal for foodservice applications such as fryers, griddles, heated cabinets and a multitude of ovens. The SERIES N7 platform controller offers OEMs the ability to deliver a truly differentiated product at a significantly lower development cost than a traditional custom controller. It also features expanded communication options such as NAFEM (North American Association of Food Equipment Manufacturers) DP (Data Protocol) Ethernet connectivity allowing users to meet growing industry needs for documentation. The controller is UL® and C-UL® recognized, carries the CE mark for emissions and immunity, the NSF option and the CSA standard C22.2-24.

UL® and C-UL® are registered trademark of Underwriter's Laboratories, Inc.



Features and Benefits

Designed for Foodservice Equipment

- Optional motor controller/driver supports automated equipment such as clam shell grills
- Optional second display module provides additional indicator for integrated equipment such as dual vat fryers
- WATCURVE temperature compensation adjusts recipe time when temperature varies from set point
- Ethernet communications module option enables NAFEM data protocol
- Provides support for multiple timers
- Update program and menus via communications
- Seamless overlay for easy and safe clean up
- Mechanically fits within 2.75 x 7.75 inches (69.85 x 196.85 mm) footprint
- Ambient temperature rating of 80°C (176°F) allows controller to withstand hot environments
- On-board, variable, audible alarm alerts operator of control conditions

Customizability

- Custom sized and shaped overlays fit the equipment and support brand uniqueness
- Up to 32 membrane switches and 32 LEDs in custom layout optimize ease-of-use
- Custom firmware allows multiple applications in one controller
- Dual displays support ease-of-use and offer flexibility in interface design
- Vertical and horizontal orientations offer mounting options
- Auto-tuning simplifies tuning of PID parameters



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ISO 9001



Features and Benefits (con't)

Modular Design

- Up to four sensor inputs can be customized to include thermocouples, RTDs or process inputs
- Up to ten outputs with options including switched DC, SSRs, electromechanical relays and current and voltage process outputs
- Up to eight event inputs allow for door switch and other automation and interlocks

NAFEM Data Protocol Option

- HACCP compliance: Records times and temperatures
- Food quality: Monitor cook and hold times and temperatures
- Reduces unscheduled downtime: Warns managers of impending failures
- Improves inventory control: Tracks consumption
- Upgrades menus
- Determines warranty status

Applications

- Rethermalizers
- Refrigerators and Freezers
- Fryers
- Griddles
- Ovens
- Proofers
- Cook and hold equipment
- Combination equipment

Specifications

Control Capabilities

- Up to four zones of PID or on-off control
- Time over temperature
- Microprocessor-based, programmable, control outputs
- Flash download
- One step auto-tuning
- WATCURVE temperature compensation
- Displayed in °C, °F or process variable units
- Battery/real time clock option: 6 year lithium battery, provides power upon backup power failure, operation resumption after power recovery, ability to display time of day
- Program retention upon power failure via non-volatile memory
- One non-isolated, passive serial communications channel
- One non-isolated, master serial communications channel
- Optional Ethernet communications module
- Optional high voltage output module has six high-voltage outputs including two standard SSR outputs. The remaining four outputs can be SSRs or electromechanical.

Agency Approvals

- UL®60730, C-UL®
- CE mark: EU LV Directive 72/23/EEC, EU EMC Directive 89/336/EEC (Emissions, Immunity)
- NSF option
- NAFEM Data Protocol communications
- CSA standard E60730-209

Operator Interface

- Membrane overlay with embedded LEDs and switches
- Up to 32 embedded LEDs
- Up to 32 embedded switches
- Contamination and water resistant
- Overlay can be supplied by Watlow or customer
- One or two display modules
- Display module includes: Four-character 14.22 mm (0.56 in.) high, seven-segment LED display and eight-character 5.08 mm (0.2 in.) dot matrix display
- Displays times, temperatures, user prompts and diagnostic codes
- User-selectable time and temperature display formats. Time formats include HH:MM, MM:SS, MMM:SS
- Temperature display in Centigrade and/or Fahrenheit
- Menu driven operation and manual modes available
- Real time clock option displays time of day

Accuracy

- Calibration accuracy and sensor conformity: $\pm 1^\circ\text{F}$ for Type J thermocouple and RTD
- Accuracy span: Normally 540°C (1000°F) minimum span

Configured Sensor Inputs

- Update rate: 5Hz

Thermocouple

- Requires ungrounded thermocouples
- Accuracy: $\pm 1.1^\circ\text{C}$ (2°F), drift: $\pm 0.10^\circ\text{C}/^\circ\text{C}$ ($\pm 0.10^\circ\text{F}/^\circ\text{F}$)
- Type J range: -46°C to 316°C (-50°F to 600°F)
- Type K range: -46°C to 316°C (-50°F to 600°F)
- Other types available

RTD

- 2- or 3-wire platinum, DIN curve (0.00385 curve)
- Accuracy: $\pm 1.1^\circ\text{C}$ (2°F), drift: $\pm 0.10^\circ\text{C}/^\circ\text{C}$ ($\pm 0.10^\circ\text{F}/^\circ\text{F}$)
- Range: -46°C to 316°C (-50°F to 600°F)

Voltage Inputs

- Input impedance: 60Ω
- Input range: 0 to 12V
- Accuracy: $\pm 25\text{mV}$, drift: $\pm 5\text{mV}/^\circ\text{F}$

Current Inputs

- Input impedance: 100Ω
- Input range: 0 to 22mA
- Accuracy: $\pm 40\mu\text{A}$, drift: $\pm 5\mu\text{A}/^\circ\text{F}$

DC Event Inputs

- Input high: 3 to 30V or $>10\Omega$
- Input low: -0.5 to 0.5V or $<250\Omega$

Switched DC Outputs

- 5V at 30mA maximum

Voltage Outputs

- Range: 0 to 12V at 50mA maximum
- Minimum load impedance: 500Ω
- Accuracy: $\pm 100\text{mV}$, drift: $\pm 2.1\text{mV}/^\circ\text{F}$

Current Outputs

- Range: 0 to 22mA at 20V maximum
- Maximum load impedance: 1000Ω
- Accuracy: $\pm 100\text{mA}$, drift: $\pm 4.3\text{mA}/^\circ\text{F}$

Relay Outputs

- Contact type: normally open
- Maximum operating current: 8 Amps
- Maximum operating voltage: 250V~(ac)
- 120/240V~(ac)
- 250VA pilot duty

SSR Outputs

- Contact type: normally open
- Maximum operating current: 0.4 Amps
- Maximum operating voltage: 250V~(ac)
- 120/240V~(ac)
- 0.4A pilot duty

Power/Line Voltage

- 24V~(ac) power input, 50/60Hz
- Class 2 power source required
- 15VA maximum

Audible Alarm

- Internal audible alarm, 85dB @ 10cm @ 2000Hz
- Frequencies supported: 250, 500, 1000, 2000, 4000Hz

Environment

- Operating Temperature: 0°C to 80°C (32°F to 176°F)
- Operating Humidity: 0 to 90 percent relative humidity, non-condensing
- Storage Temperature: -40°C to 80°C (-40°F to 176°F)

Dimensions

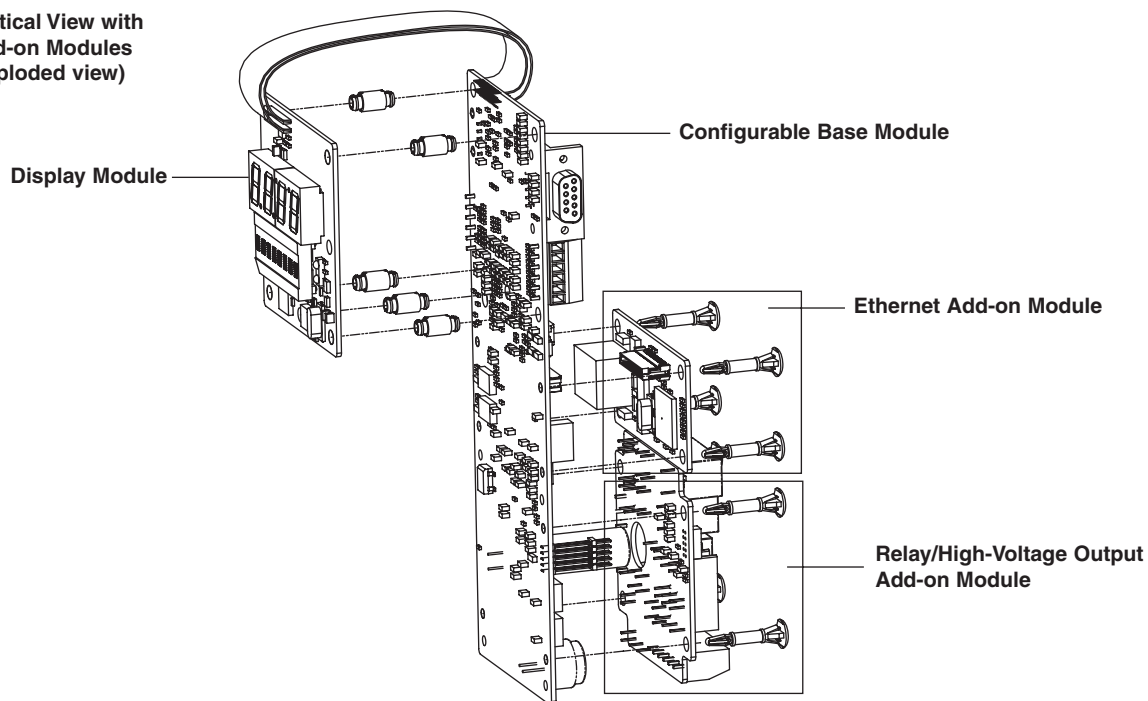
- Vertical – 196.85 mm x 76.2 mm x 50.8 mm (7.75 in. x 3 in. x 2 in.)
- Horizontal – 76.2 mm x 196.85 mm x 50.8 mm (3 in. x 7.75 in. x 2 in.)

Communications

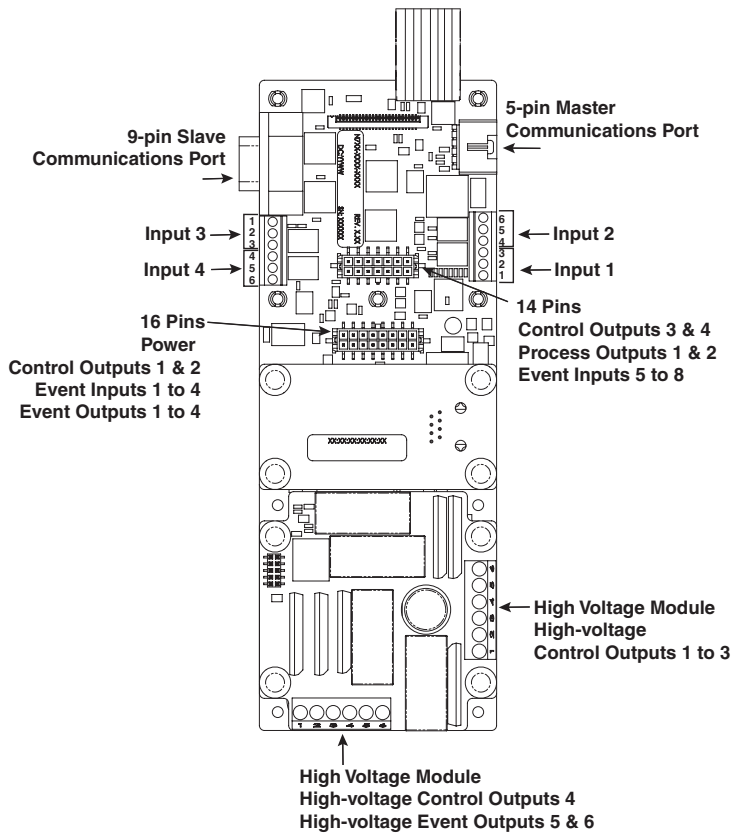
- 10 baseT Ethernet
- EIA-232 and EIA-485 for flash download, PC communications, Modbus™ communications
- Expansion bus for devices such as motor speed controller, encoder, multiple or custom displays and other custom remote I/O

Platform Components

Vertical View with Add-on Modules (exploded view)



Input and Output Connections



Additional Options

- Motor controller and driver module for conveyors, clamshells grills, etc.
- Second display module

Notes:

- To use inputs 3 or 4 as thermocouple, input 1 must also be thermocouple. Requires at least one ungrounded thermocouple.
- There is no option for suppression on any of the high voltage outputs.

Your Authorized Watlow Distributor is:

Ordering Information

SERIES N7

Up to four channels of microprocessor-based time and temperature control: 24V~(ac) power input

Abbreviation for customer name

Input 1 and Input 2

- 1 = Dual thermocouple
- 2 = Input 1 thermocouple / input 2 process input
- 3 = Input 1 thermocouple / input 2 RTD
- 4 = Dual process inputs
- 5 = Input 1 RTD / input 2 process input
- 6 = Dual RTD inputs

Input 3 and Input 4

- 0 = None
- 1 = Input 3 and 4 thermocouples
- 2 = Input 3 process / input 4 thermocouple input
- 3 = Input 3 RTD / input 4 thermocouple
- 4 = Input 3 process input / input 4 process input
- 5 = Input 3 RTD / input 4 process input
- 6 = Input 3 RTD / input 4 RTD

Process Outputs, Event Inputs and Control Outputs

- 0 = No events or process outputs
- 1 = 4 event inputs (rated @ 0 to 30V or contact closure) and 2 control outputs (rated for 5V @ 30mA)
- 2 = Current output 1 (0 to 20mA) with 4 event inputs and 2 control outputs
- 3 = Current outputs 1 and 2 (both are rated 0 to 20mA) with 4 event inputs and 2 control outputs
- 4 = Current output 1 and dc output 2 (rated 0 to 10V) with 4 event inputs and 2 control outputs
- 5 = DC output (rated 0 to 10V) with 4 event inputs and 2 control outputs
- 6 = DC outputs 1 and 2 with 4 event inputs and 2 control outputs
- 7 = DC output 1 and current output 2 with 4 event inputs and 2 control outputs

Add on Ethernet Module

- 0 = None
- 1 = Ethernet module board

Add on High Voltage Module

- 0 = None
- 1 = 2 SSRs (rated at 0.4A, normally open)
- 2 = 2 SSRs and 4 mechanical relays (rated at 8A, normally open)
- 3 = 6 SSRs
- 4 = 4 SSRs and 2 mechanical relays

Display Options (Horizontal or Vertical)

- 1 = Vertical
- 2 = Horizontal left
- 3 = Horizontal right

Custom Software and Options Designator

XX= Made to order control, code number assigned by factory

To be automatically connected to the nearest North American Technical and Sales Office call:

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