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URC

Universal Reactor Controller

At a Glance

Measure and Control: Process Temperature, Heater Temperature, Mixer Speed, and Process Pressure

**Autoclave
Engineers** 

Division of Snap-tite, Inc.



Principle of Operation

Autoclave Engineers URC (Universal Reactor Controller) provides the temperature, pressure and mixer speed control required for the majority of our stirred and non-stirred reactor systems. By completing the model number, the unit will provide the customer with a complete control solution for his system including the optional data acquisition/control package if required.

Features

- Temperature control provides closed loop, PID control for vessel heating systems
- Pressure indication with optional on/off valve or analog valve control for inlet and outlet
- Mixer speed control provides closed loop, PID control of impeller speed
- Over temperature control inhibits heater power when vessel external walls exceed preset limit

General Specifications

Specifications	URC
Electrical Power Requirements	100-120 VAC, 50/60 Hz or 200-240 VAC, 50/60 Hz
Dimensions	14.7" High x 5.8" Wide x 12.3" Deep (373 mm H x 148 mm W x 355 mm D)
35 Amp Remote	9.9" High x 11.9" Wide x 6.1" Deep (250 mm H x 300 mm W x 155 mm D)
Temperature Control Output	20 Amp, Solid State, 35 Amp Solid State or 4-20mA external signal
Cooling Output	2 Amp Relay
Temperature Sensor	Type K Thermocouple
Internal Motor Drive Type	Permanent Magnet

Option Module Specifications

Temperature Control

The Temperature Control provides closed loop, PID control for vessel heating systems. This module is matched with the appropriate output device to interface with electric furnaces as well as circulation systems. The controller instrument includes an adjustable set point ramping function as well as a high temperature alarm signal which is used by the system.

Temperature Sensor / Units

The standard temperature sensor: Type K Thermocouple. Fahrenheit or Centigrade Temperature units of display may also be selected.

Over-temperature Controller

The Over-Temperature Controller provides the ability to shutdown a vessel's electrical heater in the event a high temperature is sensed at the vessel skin. The Over-Temperature Controller includes a digital display of vessel skin temperature. The Over-Temperature Controller employs a non-latching alarm contact which will automatically reenergize the heater when the temperature falls below the alarm set point.

Speed Control and Indication

Designates how the agitator speed is controlled.

- **Closed Loop DC Motor Control** provides a PID controller to regulate the DC motor drive resulting in a more constant agitation speed despite changes in viscosity or load.
- **Closed Loop External Signal** provides a PID controller to regulate the AC or air motor drives located external to the URC. This results in a constant agitation speed despite changes in viscosity or load. The output signal to the external drive is 4-20mA.

Motor Size

This selection designates the motor size for appropriate tuning of the drive system.

Speed Indication Range

This selection designates the RPM range for the calibration of the tachometer instrument.

Pressure Indication and Control

This provides the monitoring and control of vessel pressure utilizing a 4-20mA signal generated by a pressure transducer. (Transducer not included in module)

- **Pressure Indication** provides a digital indicator which displays vessel pressure.
- **Indication & On/Off Control** This module includes digital indication of pressure as well as closed loop control using digital (On/Off) outputs. Outputs provided in this module: One output to drive pressure increase (for pumps, gas inlet) and one output to drive pressure decrease (for vent valves).
- **Indication & Analog Control** This module includes digital indication of pressure as well as closed loop control using analog (4-20mA) outputs. Two analog outputs are provided in this module: One output to drive pressure increase (for pumps, gas inlet) and one output to drive pressure decrease (for vent valves).

Pressure Indication Range / Units

These selections designate the range of the pressure transducer and units of measure for display.

Cables, Interconnect

Ten foot (3 meter) cables are provided for interconnect of the URC and the Vessel (Reactor).

Approval

Optionally provides specific modification for various agency approvals; UL, CUL, CE.

Ordering Guide

R _ _ _ _ _
A B C D E F G H J K L M N

Part Number Example: **R2111161310000** (See chart below)

Base Controller	
R	Universal Reactor Controller
A - Voltage	
1	120 Vac (50/60Hz)
2	240 Vac (50/60 Hz)
B - Temperature Control	
0	None
▶ 1	Internal 20 Amp
2	External Signal ¹
3	Internal 20 Amp w/Cooling ²
4	External Signal 1 w/Cooling
5	External 35 Amp
6	External 35 Amp w/Cooling
C - Temperature Sensor	
0	None
▶ 1	Type-K Thermocouple °C
2	Type-K Thermocouple °F
D - Overtemp Control Action	
0	None
▶ 1	Non-Latching
2	Latching
E - Speed Control	
0	None
▶ 1	Closed Loop DC Motor Control
2	Closed Loop External Signal ³
F - Motor Size	
0	None
1	1/25 Horsepower
2	1/10 Horsepower
3	1/8 Horsepower
4	1/4 Horsepower (90vdc)
5	1/3 Horsepower (90vdc)
6	1/2 Horsepower (90vdc)
7	1/4 Horsepower (180vdc)
8	1/2 Horsepower (180vdc)

▶ Standard Equipment

G - Pressure Control & Indication	
0	None
▶ 1	Indication Only
2	On/Off Inlet Control
3	On/Off Outlet Control (Vent)
4	On/Off Inlet & Outlet Control
5	On/Off Inlet Control & Analog Outlet
6	On/Off Outlet Control & Analog Inlet
7	Analog Inlet Control
8	Analog Outlet Control
H - Pressure Indication Range	
0	None
1	500 psi (24 bar)
2	1,000 psi (694 bar)
3	3,000 psi (207 bar)
4	5,000 psi (345 bar)
5	10,000 psi (689 bar)
6	Custom
J - Pressure Units	
0	None
1	psig
2	bar
K - Communication Options	
0	None
1	RS-232
L - Special Agency Approvals	
▶ 0	None
1	UL/CUL
2	CE
3	Canadian Standard (inspection required)
M - Special Configurations	
0	Conforms to Catalog Number
1	Customer Specified Requirements
2	IS Barrier Configuration (priced separately)
N - *Software (Requires "COMM" Option)	
0	None
1	URC - Companion

Notes:

1. An External Signal selection for Temperature Control routes an external signal to an External Power Module which is supplied separately. The External Power Module is capable of handling heater power in excess of the URC's Internal 15 Amp capability.
2. A Cooling selection for Temperature Control provides an external signal to a cooling solenoid valve which will circulate water through the vessel-cooling coil. The valve voltage will match that of the URC input of power.
3. An External Signal selection for Speed Control and Indication routes an external signal to an external motor speed controller which is supplied separately. The external motor speed controller is capable of handling larger DC & AC motors in excess of the URC's internal 1/2 Horsepower capability. The external signal can also be used to control an air regulator for an air motor.

! WARNING !

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND/OR PROPERTY DAMAGE.

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Bulletin IN-URC

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