WATLOW®

SERIES CLS200

Compact Loop System, Providing Powerful Control in a 1/8 DIN Package

Watlow's SERIES CLS200 is a powerful line of controllers, combining performance and flexibility with compact design. The 4, 8 and 16 loop versions provide complete controller solutions for a broad range of applications. Support for multiple types of sensor inputs is available, including thermocouples, RTDs, linear voltage, current and frequency. Each controller can operate as a stand-alone system, and includes built-in serial communications for computer interface and data acquisition. Optional programmable ramp and soak features allow complex batch processing and sequencing. An enhanced feature option offers cascade control, ratio control, differential control, process variable retransmit and remote analog set point.

The SERIES CLS200 controllers are UL® and C-UL® listed and meet the requirements of the European Community EMC Directive and carry the CE mark.

Features and Benefits

PID control of up to 16 heat and cool loops
- Minimizes panel space per loop
- Reduces installation time
- Increases reliability: fewer parts means fewer failures

Auto-tune
- Requires less time tuning
- Achieves excellent control with less expertise

Menu-guided operation with full text display
- Allows quick setup of the controller
- Simplifies operation

Eight jobs stored and recalled
- Changes quickly from one process to another

Multiple and mixed inputs
- Accepts combinations of thermocouples, RTDs, linear dc voltage and linear dc current sensors
- Reduces learning curve and inventory

Sensor failure detection
- Reduces time troubleshooting reversed, shorted and open sensors

High/low process and deviation alarms for each input
- Integrates as needed to integrate with PLC and other control elements

34 digital outputs
- Provides flexible configuration
- Allows use of outputs as needed for control and alarms

EIA/TIA-232 and 485 communications
- Connects to software for easy configuration and operation
- Allows integration with controllers and software

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DAC and SDAC Modules

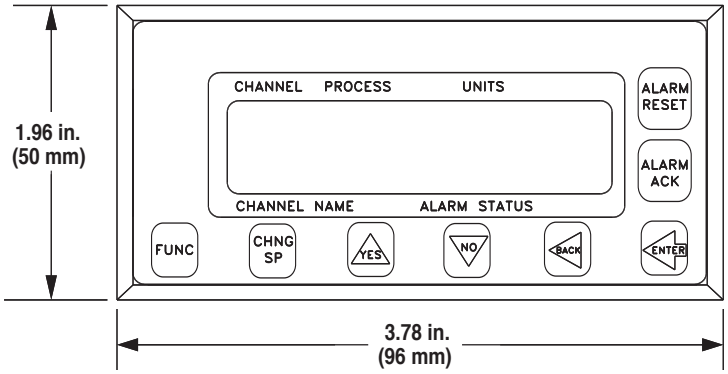
The optional DAC and SDAC modules are available for Watlow SERIES CLS200 controllers.

DAC

The DAC (digital to analog converter) converts one or two of the controller's distributed zero crossing (DZC) output signals to analog signals. Each output is field configurable for 4-20mVDC, 0-5VDC or 0-10VDC.

SDAC

The SDAC (serial digital to analog converter) converts one controller output to a precise analog voltage or current signal. The unit is typically used for process variable retransmit, open-loop control, motor or belt speed control, or phase-angle fired SCR power controllers. The SDAC bears the CE mark and is UL® and C-UL® listed.

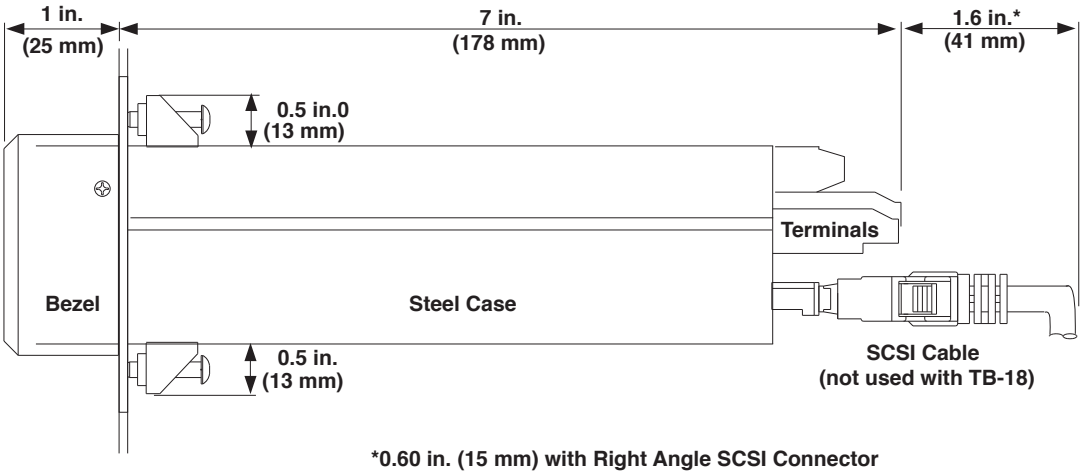


Firmware Options

Choose firmware with the features needed for the application:

- Standard—includes closed-loop PID control, auto-tune, alarms, job memory and failed sensor detection.
- Ramp and soak—includes the standard firmware features with the addition of ramp and soak and process variable retransmit. Each channel can be configured for standard PID control or ramp and soak operation. Unused control outputs on any channel can be configured for retransmition.
- Enhanced features— includes the standard firmware features with the addition of process variable retransmit, remote analog set point, cascade control, ratio control and differential control algorithms. Each channel can be configured for standard PID controller or one of the other control algorithms. Each channel of cascade control or remote analog set point requires two controller channels. Unused control outputs on any channel can be configured for retransmit.

Because the SERIES CLS200 has no onboard analog outputs, applications that use process variable retransmit typically require one SDAC module per retransmitted signal.



*0.60 in. (15 mm) with Right Angle SCSI Connector

CLS200 Specifications

Operator Interface
- 32-character vacuum fluorescent display
- 8-key keypad to access guided menus and prompts, enter passkey sequence, set values, switch between single channel and multiple channel displays
- Controller configuration can be loaded through the standard serial port

Analog Inputs
- CLS204 4 differential
- CLS208 8 differential
- CLS216 16 single-ended

Noise Rejection
- 120dB at 60Hz

Temperature Coefficient
- 40ppm/°C

Sensors/Inputs
- Thermocouples: user-selectable type, direct connection, linearization, reference junction compensation, reversed and shorted thermocouple detection and upscale break protection with output averaging
- RTD: (CLS204 and CLS208 only) 2- or 3-wire, platinum, 100Ω @ 0°C, DIN 0.003850Ω/Ω/°C curve, user-selectable range. Two user-selectable ranges offer different resolutions. Requires scaling resistors. See special/linear inputs in ordering information.
- Linear: current and voltage signals from linear transmitters
- Pulse input

Input Range and Accuracy

Sensor	Range (°C)	Range (°F)	Accuracy
Type B	66 to 1760°C	150 to 3200°F	±4.0°C
Type E	-200 to 787°C	-328 to 1448°F	±1.0°C
Type J	-212 to 760°C	-350 to 1400°F	±1.2°C
Type K	-268 to 1371°C	-450 to 2500°F	±1.3°C
Type R	-18 to 1766°C	0 to 3210°F	±2.8°C
Type S	-18 to 1760°C	0 to 3200°F	±2.8°C
Type T	-268 to 399°C	-450 to 750°F	±1.6°C

RTDs available on CLS204 and CLS208 only.

Sensor	Range (°C)	Range (°F)	Accuracy
RTD1	-100 to 275˚C	-148 to 527˚F	±1.1˚C
RTD2	-120 to 840˚C	-184 to 1544˚F	±1.6˚C

Note: Accuracy @ 25˚C ambient. Valid for 10 to 100 percent of span except Type B, which is specified for 800˚F to 3200˚F. RTD.

Linear Voltage and Current Inputs
Requires scaling resistors. See special inputs in ordering information.

0-20mAVDC/4-20mAVDC
0-5VDC
0-10VDC

Other ranges available. Consult factory.

Pulse Input
- One TTL-level square wave input up to 2kHz

Input Sampling Rate at 60Hz
Each channel has the following scans per second:
- CLS204: 6 samples per second (update time: 0.167 sec.)
- CLS208: 3 samples per second, (update time: 0.333 sec.)
- CLS216: 1.5 samples per second, (update time: 0.667 sec.)

Internal Measurement Resolution
- 0.006 percent, greater than 14 bits

Calibration
- Automatic zero and full scale

Digital Inputs
- TTL-level used for selecting recipes or jobs, or R/S triggers
- 8 inputs and 1 pulse input with 50-pin terminal board option
- 2 inputs and pulse input or 3 inputs with 18-pin terminal block option

Digital Outputs
- 34 digital outputs are available with 50-pin terminal board option
- 10 control outputs with 18-pin terminal block option
- 1 or 2 control outputs are user assigned for each loop
- Each control output can be configured for on-off time proportioning, or distributed zero crossing
- Outputs sink up to 60mA each at 5VDC
- 350mA at 5VDC available from on-board supply

Alarm Outputs
- Independent process and deviation alarms for each channel
- Alarms can operate any output not used for control
- User-programmable deadband, delay and startup suppression
- Global alarm output activates when any alarm occurs
- Watchdog output indicates controller is functioning correctly

Serial Interface
- EIA/TIA-232 or EIA/TIA-485

Baud Rate
- 2400, 9600 or 19200, user-selectable

Communications Protocols
- Form of ANSI X3.28-1976, (D1, F1) compatible with Allen-Bradley PLC/2
- Modbus® RTU

Line Voltage/Power
- 15 to 24VDC ± 3VDC @ 1A (maximum), 300mA (no load)

Agency Approvals
- UL®, C-UL® listed: UL® 61010-1 safety requirements for measurement, control and laboratory equipment
- CE Mark: See Declaration of Conformity for details

Ordering Information

Part Number

On-off controller, rotary set point adjustment, 4 character, 7 segment display

①	②③ Number of Channels	④ Controller Type	⑤ Terminal Board	⑥ Power Supply	⑦ SCSI Cables	⑧ Serial Comm. Cables	⑨ Serial Comm. Jumper Settings
2							

②③	Number of Channels
04 =	4 channel
08 =	8 channel
16 =	16 channel

④	Controller Type
1 =	Standard EPROM
3 =	Ramp and Soak
4 =	Enhanced features
C =	Custom firmware

⑤	Terminal Board
0 =	SCSI connector only, user supplies cable and terminal board
1 =	18-pin terminal block (CLS204 and CLS208 only)
2 =	50-pin terminal block (includes 3 foot SCSI cable)

⑥	Power Supply
0 =	No power supply
3 =	120/240VAC, 50/60Hz power supply adapter (15VDC @ 1.2A) CE, UL® Class 2 approved

⑦	SCSI Cables
0 =	3 foot SCSI cable with terminal board option 2 (no cable with options 0 or 1)
2 =	3 foot right angle SCSI cable

⑧	Serial Communication Cables
0 =	No serial communication cable
1 =	10 foot serial communication cable (DB-9 female/bare wire)

⑨	Serial Communication Jumper Settings
0 =	EIA/TIA-232
1 =	EIA/TIA-485
2 =	EIA/TIA-485 terminated

⑩	Special Inputs and Other Custom Options
(Standard unit supports thermocouples and -10 to 60mV linear inputs. For other sensors, order special inputs. See below for ordering instructions. For CLS216 specify two digits, for CLS204 and CLS208 specify one digit. 0 or 00 = Thermocouples and -10 to 60mV inputs only N or NN = Number of current, voltage or RTD inputs (N is number) XX = Factory assigned custom code (XX is two alphabetic characters)	

Ordering Information

Special Input Type

①②③④⑤	⑥⑦ Special Input Type	⑧ Start Channel	⑨ End Channel
CLSSI			

⑥⑦	Special Input Type
Not required for thermocouple sensor inputs.	
20 =	RTD 1: 0.1°, -148 to 527°F (-100 to 275°C) (Not available on CLS216)
21 =	RTD 2: 1°, -184 to 1544°F (-120 to 840°C) (Not available on CLS216)
44 =	0-20mA dc/4-20ma dc
55 =	0-5VDC
56 =	0-10VDC

⑧	Start Channel
XX =	Channel Number XX

⑨	End Channel
XX =	Channel Number XX

Availability: Up to four weeks, depending on complexity and order release quantity. Contact factory for details.

Ordering Information

DAC/SDAC

①②③	④ Special Input Type	⑤ Start Channel
DAC		

④	DAC/SDAC Type
1 =	DAC with 2 each 0 to 5VDC outputs
2 =	DAC with 2 each 0 to 10VDC outputs
3 =	DAC with 2 each 4 to 20ma dc outputs
4 =	Serial digital to analog converter (SDAC)

⑤	Power Supply
A =	None
H =	120/240VAC, 50/60Hz power supply adapter, (15VDC @ 1.2A) powers up to 12 dual DAC modules
L =	120/240VAC, 50/60HZ power supply adapter (5VDC @ 3A) powers up to 10 SDAC modules

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

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France	+33 1 41 32 79 70	**Japan**	+81 3 3518 6630	**Spain**	+34 91 675 1292
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