

» SR - 800N

EXTENDED AREA BLACKBODY CONTROLMASTER

CI Systems' advanced architecture ControlMaster SR-800N sets a new standard for accuracy and uniformity in blackbody technology.

Temperature measurement and calibration are both performed in the radiation head itself and then transferred digitally to the ControlMaster controller. The result is accurate, stable, reliable and NIST-traceable.

Temperature is controlled by easily-removable sensors which the user can replace in just minutes. Our factory-supplied replacement sensors provide an efficient means for recalibrating the system, providing an additional 12 months of service. Alternatively, customers may recalibrate the blackbody with our optional CK-800R calibration kit.



Figure 1: SR800N units

» FEATURES

- ▶ Standard emitter sizes ranging from 2" to 40". Other sizes are available upon request
- ▶ Superior accuracy
- ▶ High-uniformity emitting surface
- ▶ Millidegree-Kelvin resolution
- ▶ Wide range of radiation temperatures
- ▶ Able to operate at a wide range of ambient temperatures
- ▶ Configurable stability window
- ▶ Interchangeability between head and controller
- ▶ Low acoustic noise
- ▶ Nitrogen inlet for inert atmosphere on all LT models
- ▶ Dual head (optional)

Calibration features:

- ▶ Quick periodic calibration by replacing the removable sensor
- ▶ NIST-traceable calibration
- ▶ Calibration available upon request
- ▶ Dedicated remote control software included

Controller features:

- ▶ Large color LCD display with touch screen user interface (see figure below)
- ▶ Ability to control up to four motorized devices
- ▶ Certified to MIL-T-28800D, CE, and FCC
- ▶ Compact, portable ControlMaster controller
- ▶ 19" rack-mount kit included
- ▶ Ethernet and RS-232 communication ports (optional GPIB)

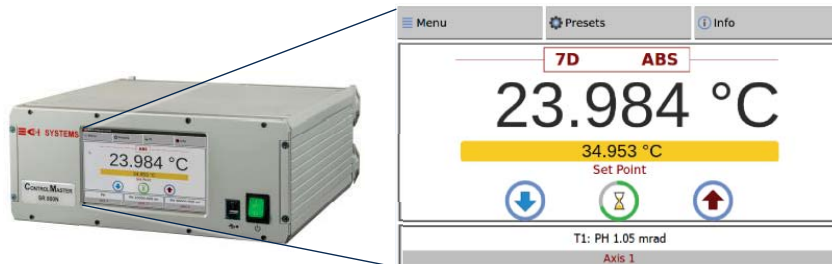


Figure 2: Intuitive touch screens for controlling the system

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» SPECIFICATIONS

Model: SR-800N-	2A 2D	4A 4D	7A 7D	8A 8D	10A 10D	12A 12D	14A 14D	16A 16D	20A 20D	40A 40D
Emitter size	2" dia.	4"x4"	7"x7"	8"x8"	10"x10"	12"x12"	14"x14"	16"x16"	20"x20"	40"x40"
Absolute Temp. range, °C	0 to 125		0 to 100		10 to 80			15 to 80		
Differential Temp. range, °C	-25 to 100		-25 to 75		-15 to 55			-10 to 55		
Uniformity, °C ¹	±0.005	±0.010				±0.015			±0.030	
Set point resolution, °C	0.001									
Absolute Temp. Accuracy, °C ²	0.015 @ T < 0 , 0.007 @ 0 < T < 50 , 0.015 @ T > 50									
Differential Temp. Accuracy, °C ²	0.008 @ ΔT ≤ 25 , 0.015 @ ΔT > 25									
Stability, °C	±0.003 @ ΔT ≤ 10 , ±0.008 @ ΔT > 10									
Emissivity	0.98 ± 0.02									
Settling time (at 0.01°C) , Sec.	15									
Power consumption, W	100	200	600	1000	1000	1200	1800	1800	3000	7000
Blackbody Head Size, HxWxD, cm	Ø6.5x10	20x16x16	27x23x23	35x31x16	35x31x16	40x36x16	59x46x17	59x46x17	71x62x20	128x76x160
Blackbody Head Weight, kg	1	5	11	16	16	21	50	50	86	450
Controller Size, HxWxD, cm	35x31x14 (3U)						45x60x18 (4U)			
Controller Weight, kg	10						15	15	20	60
Operating voltage	95 to 240 VAC. 50/60 Hz									
Operating Temp. Head, °C	-20 to +70									
Operating Temp., Controller, °C	0 to 50									
Storage Temp., °C	-20 to +70									

* See notes on next page

» EXAMPLES FOR STANDARD MODELS



Figure 3: Blackbody head
SR-800N-20A



Figure 4: Blackbody head and refrigerator
SR-800N-12A-LT

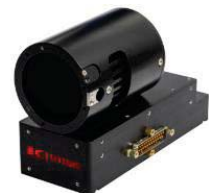


Figure 5: Blackbody head
SR-800N-2A

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» OPTIONS

	Option:	Model: SR-800N-	2A 2D	4A 4D	7A 7D	8A 8D	10A 10D	12A 12D	14A 14D	16A 16D	20A 20D
Room Temp. Environment	ET	Absolute temp. range, °C	0 to 175			0 to 125			10 to 125		
		Differential temp. range, °C	-25 to 150			-25 to 100			-15 to 100		
	LT ³	Absolute temp. range, °C	---	-40 to 150			---				
		Differential temp. range, °C	---	-65 to 125			---				
	WTR	Absolute temp. range, °C	-40 to 150	-20 to 150	-15 to 150	---	---				
Differential temp. range, °C		-65 to 125	-45 to 125	-40 to 125	---	---					
HE		0.99 ± 0.01						---			
Dual Head	Absolute temp. range, °C	0 to 125			---			---			
	Differential temp. range, °C	-25 to 100			---			---			
Chamber Environment	CH-STD	Chamber temperature, °C	-30 to 70								
		Absolute temp. range, °C	-40 to 80								
		Differential temp. range, °C	-10 to 40								
	CH-ET	Chamber temperature, °C	-40 to 80			-40 to 80			-40 to 80		
		Absolute temp. range, °C	-40 to 150			-40 to 150			-40 to 150		
		Differential temp. range, °C	-20 to 125			-20 to 100			-15 to 100		
	CH-LT ³	Chamber temperature, °C	---	-40 to 80			---				
		Absolute temp. range, °C	---	-40 to 150			---				
		Differential temp. range, °C	---	-65 to 125			---				
	CH-WTR	Chamber temperature, °C	-40 to 80	---							
Absolute temp. range, °C		-40 to 150	---								
Differential temp. range, °C		-65 to 125	---								
	Differential accuracy ² , °C	0.020 @ (-20 < T ambient < 80) , 0.040 @ (T ambient < -20)									
	Stability, °C	0.005 @ (ΔT < 10) , 0.010 @ (ΔT > 10)									

Notes:

- 1) Uniformity values are for a ±1°C step from ambient temp @ 80% of the central area. For other temperatures multiply by ΔT
- 2) Accuracy is referenced to a NIST-calibrated CI Systems master sensor
- 3) Includes refrigerator (power consumption depends on model)

General notes related to all models:

- All values are valid at an ambient temperature of 22°C, and in a non-condensing environment
- Typical yearly drift: 0.02°C
- Total system uncertainty: 0.02°C @ ΔT < ±25°C and 0.03°C @ ΔT > ±25°C
- Differential temperature range is limited to absolute temperature range, and absolute temperature range is limited to differential temperature range
- All mechanical sizes are approximates. Please contact us for ICD drawing with the accurate sizes. General tolerances for all mechanical sizes and weight: ±10%
- For mechanical characteristics of optional models please contact CI
- Specifications are subject to change without notice
- For special applications: see examples on page no. 4

» ORDERING INFORMATION

Model: SR-800N - -

Emitter size Option

A (Absolute) or **D** (Differential)

Examples:

SR-800N-4D
SR-800N-2D-CH-ET
SR-800N-8A-WTR

» ABBREVIATIONS

A	Absolute Blackbody model
D	Differential Blackbody model
Temp.	Temperature
ET	Extended Temperature Range
WTR	Wide Temperature Range
LT	Low Temperature
HE	High Emissivity
CH	Chamber Environment
STD	Standard Temperature Range
H	Height size
W	Width size
D	Depth size

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» DUAL-HEAD BLACKBODY SYSTEM (OPTIONAL MODEL)

Blackbody system with dual extended area emitters. One controller is able to accurately control two separate BB heads with two different temperature differentials.

The controller display shows both controlled temperatures on the same screen (see figure 1).

(*) Currently available for emitter sizes: 2", 4" and 7"

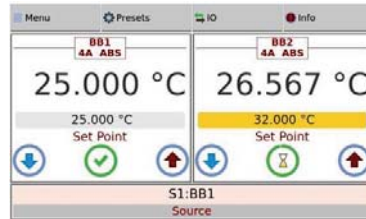


Figure 6: Dual-Head Blackbody Controller Display



Figure 7: Dual-Head Blackbody System

» EXAMPLE OF SPECIAL APPLICATION: WEATHERPROOF BLACKBODY SYSTEM

A weatherproof (IP44) absolute temperature blackbody head can operate when water is splashing against the enclosure (except for the emitter surface). For use at ambient temperatures of 0°C to 25°C.

Absolute temperature range from T(ambient) to T(ambient)+75°C.

Operates with the standard SR-800N controller and a 24V power supply (the controller is not weatherproof).

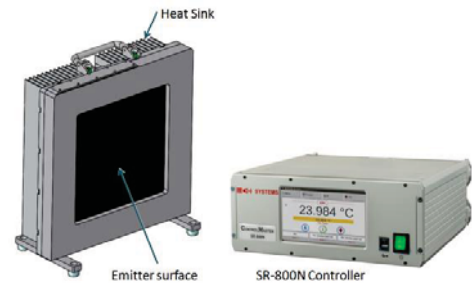


Figure 8: Weatherproof Blackbody System

» EXAMPLE OF SPECIAL APPLICATION: NUC TOWER SYSTEM

The CI Systems NUC (Non-Uniformity Correction) Tower is recommended for testing multiple cameras or detectors for fast NUC tables, including ambient temperature reference.

The system shown on the right delivers a fast NUC process at three different temperatures.

It is used for enhancing the throughput of mass production cameras and detectors inside or outside an environmental chamber.

T1	T2	T(ambient)
5.00	60.00	25.15
5.00	60.00	25.82
5.00	60.00	24.98
5.00	60.00	24.86
5.00	60.00	24.61

Figure 9: Main screen

The system consists of ten high emissivity and uniformity blackbodies and five high emissivity and uniformity surfaces at ambient temperature.

The high-accuracy controllers ensure that all surfaces are within an accuracy greater than 0.015°C.

The blackbody controllers are mounted in a standard rack mount and communicate with one central PC.



Figure 10: "NUC Tower" System with 15 controlled temperature blackbodies

Distribution in the UK & Ireland



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