

# IR-R NRLM Type Black Body Furnaces

For High Temperature  
Model IR-R27

For Medium Temperature  
Model IR-R26

For Low Temperature  
Model IR-R24



The NRLM type black body furnaces have been developed as large opening black body furnaces for calibration as a result of the joint research with the National Research Laboratory of Metrology, Japan (NRLM), based on the latest radiation thermometer traceability systems. The reference black body furnaces are prepared for high temperature range (800...1450°C) and medium temperature range (200...1050°C), while the standard black body furnace is prepared for low temperature range (50...450°C).

The black body furnace for high temperature is used for comparison calibration by using a fixed-point calibrated 0.90µm optical fiber monochromatic radiation thermometer as the standard thermometer.

The black body furnace for medium temperature range is used for comparison calibration by utilizing a fixed-point calibrated 0.90µm silicon monochromatic radiation thermometer as the standard thermometer, and the black body furnace for

low temperature is used for calibration by utilizing a built-in platinum resistance thermometer as the standard thermometer.

The cavity is profiled as a double cone having a high mirror surface reflection effect, and a high calibration accuracy has been realized with a large opening by uniquely designing the furnace body structure and heaters.

Also, these black body furnaces have been designed to be compact and lightweight with low power consumption by taking their operation ease and economy into due consideration.

## ■ FEATURES

- High Cavity Emissivity with a Large Opening

The opening diameters are 30 mm for high temperature, 50mm for medium temperature, and 60mm for low temperature. The cavity emissivity is evaluated as 0.99, 0.997, 0.993, so that the scales can be calibrated easily with high accuracy.

- Excellent Furnace Temperature Stability

The black body furnace for high temperature is stabilized within  $\pm 0.5K$ , the black body furnace for medium temperature is stabilized within  $\pm 0.25K$ , and the black body furnace for low temperature is stabilized within  $\pm 0.15K$  respectively, in about 20 minutes after arrival at each preset temperature.

- Compact, Lightweight, and Easy-to-operate

These black body furnaces are compact and lightweight to 1/10 as compared with those of conventional CHINO's products, and they can easily be mounted and operated.

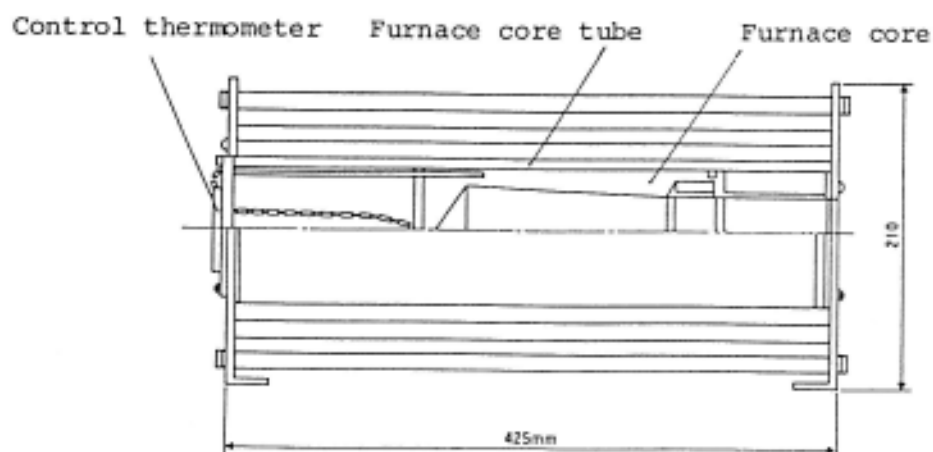
- Low Power Consumption and Economical

The black body furnaces for low and medium temperature can be operated with a 100V AC commercial power source, while the black body furnace for high temperature is operated with 200V AC. The maximum power consumption is 1200VA (for medium temperature) and 500VA (for low temperature) which are 1/10 as compared with those of conventional CHINO's products. Also, the maximum power consumption is 2500VA (for high temperature).

## ■ CONSTRUCTION

The furnace core is made of a metal having excellent thermal conduction, and a double conic cavity is formed inside. The heaters are embedded along the outer circumference to enhance the thermal efficiency, and arranged to improve the temperature distribution in the cavity.

The furnace temperature is controlled by the pulse type PID system using SSR, and the furnace body and the control system are encased into the same case.



## ■ SPECIFICATIONS

### ● Black Body Furnace for Low Temperature Range

Model IR-R24

WORKING TEMPERATURE RANGE	: 50 ~ 450°C
MAXIMUM WORKING TEMPERATURE	: 500°C
MAXIMUM HEATING TIME	: About 2.0 hours
CAVITY PROFILE	: Double cone type
VERTICAL ANGLE ON THE BOTTOM FACE OF CAVITY	: 120°
OPENING DIAMETER OF CAVITY	: 60mm
OPENING RATIO ( $\lambda/d$ )	: 5
CAVITY MATERIAL	: Internal wall is treated with Cu
CAVITY EMISSIVITY	: 0.993
TEMPERATURE STABILITY	: $\pm 0.15K/30min$
HEATER MATERIAL	: Kantal Al
CONTROL THERMOMETER	: Pt resistance thermometer
TEMPERATURE CONTROL SYSTEM	: Pulse type PID system
POWER CONTROL DEVICE	: SSR
POWER SUPPLY	: 100V AC 1 $\phi$
MAXIMUM POWER CONSUMPTION	: About 500VA
GROSS WEIGHT	: About 30kg

### ● Common Specifications

#### CALIBRATION TEMPERATURE SETTING

: Local/remote (0 ~ 1V)

SETTING MODE SPECIFICATION : Contact signal (A contact  $\rightarrow$   
remote)

#### CALIBRATION TEMPERATURE TRANSMISSION

: 0 ~ 10mV DC, full scale

CABINET SURFACE TEMPERATURE : Lower than 45° by air cooling

SAFETY MEASURES : Earth linkage  
With breaker

EXTERNAL DIMENSIONS : 280W x 420H x 550D (mm)

## ■ SPECIFICATIONS

- Black Body Furnace for Medium Temperature Range  
Model IR-R26

WORKING TEMPERATURE RANGE	:	200 ~ 1050°C
MAXIMUM WORKING TEMPERATURE	:	1100°C
MAXIMUM HEATING TIME	:	About 4 hours
CAVITY PROFILE	:	Double cone type
VERTICAL ANGLE ON THE BOTTOM FACE OF CAVITY	:	120°
OPENING DIAMETER OF CAVITY	:	50mm
OPENING RATIO (l/d)	:	6
CAVITY MATERIAL	:	SUS310S
CAVITY EMISSIVITY	:	0.997
TEMPERATURE STABILITY	:	±0.25K/30min
HEATER MATERIAL	:	Kantal A1
CONTROL THERMOMETER	:	R thermometer
TEMPERATURE CONTROL SYSTEM	:	Pulse type PID system
POWER CONTROL DEVICE	:	SSR
POWER SUPPLY	:	100V AC 1φ
MAXIMUM POWER CONSUMPTION	:	About 1200VA
GROSS WEIGHT	:	About 32kg

- Common Specifications

CALIBRATION TEMPERATURE SETTING	:	Local/remote (0 ~ 1V)
SETTING MODE SPECIFICATION	:	Contact signal (A contact + remote)
CALIBRATION TEMPERATURE TRANSMISSION	:	0 ~ 10mV DC, full scale
CABINET SURFACE TEMPERATURE	:	Lower than 45° by air cooling
SAFETY MEASURES	:	Earth linkage With breaker
EXTERNAL DIMENSIONS	:	280W x 420H x 550D (mm)

## ■ SPECIFICATIONS

- Black Body Furnace for High Temperature Range  
Model IR-R27

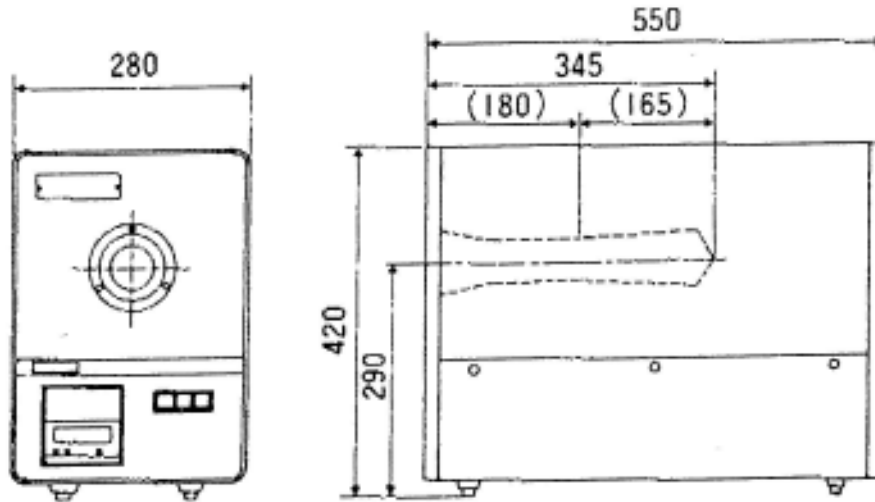
WORKING TEMPERATURE RANGE	:	800 ~ 1450°C
MAXIMUM WORKING TEMPERATURE	:	1500°C
MAXIMUM HEATING TIME	:	About 1.5 hours
CAVITY PROFILE	:	Cylindrical cone type
VERTICAL ANGLE ON THE BOTTOM FACE OF CAVITY	:	120°
OPENING DIAMETER OF CAVITY	:	30mm
CAVITY MATERIAL	:	Silicon carbide
CAVITY EMISSIVITY	:	0.99
TEMPERATURE STABILITY	:	±0.5K/30min
HEATER MATERIAL	:	Silicon carbide
CONTROL THERMOMETER	:	0.90µm Si monochromatic radiation thermometer
TEMPERATURE CONTROL SYSTEM	:	Pulse type PID system
POWER CONTROL DEVICE	:	SSR
POWER SUPPLY	:	200V AC 1ø
MAXIMUM POWER CONSUMPTION	:	About 2500VA
GROSS WEIGHT	:	About 35kg

- Common Specifications

CALIBRATION TEMPERATURE SETTING	:	Local/remote (0 ~ 1V)
SETTING MODE SPECIFICATION	:	Contact signal (A contact + remote)
CALIBRATION TEMPERATURE TRANSMISSION	:	0 ~ 10mV DC, full scale
CABINET SURFACE TEMPERATURE	:	Lower than 45°C by air cooling
SAFETY MEASURES	:	Earth linkage, with breaker
EXTERNAL DIMENSIONS	:	280W x 420H x 550D (mm)

■ EXTERNAL DIMENSIONS

● IR-R24, R26



● IR-R27

