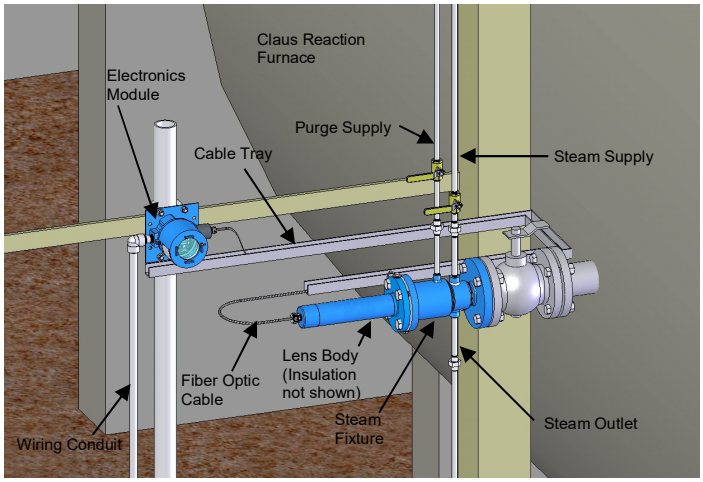
Model HIR
CLAUS THERMAL REACTOR INFRARED PYROMETER

- Measures refractory hot face temperature
- Operates accurately and reliably with up to 100% oxygen enrichment
- Stable electronics, no periodic factory re-calibration required; no "back-up unit" required
- Eliminates sulfur coating of lens window
- No build-up of sulfur in vessel nozzle
- No high flow nozzle purge or cooling required
- Insensitive to reaction gas infrared radiation, absorption or flame luminosity
- Dual wavelength sensing allows accurate temperature measurement even if the sight path is partially blocked by buildup or debris.(F range)
- Loop powered design
- Programmable alarm output



Accuracy: ±5ºC (9°F) or 0.5% of reading, whichever is higher.
Display: High Contrast LCD with backlight
Output Signal: 4-20 mADC, 2 wire loop, HART® Protocol

OPERATION AND TECHNOLOGY

The Model HIR "looks" into the Claus Thermal Reactor and senses the amount and spectrum of the infrared energy being emitted by the refractory hot face to accurately display the refractory hot face temperature. The infrared energy being sensed must pass through the reacting gases without being absorbed by them and the HIR "looks" through those same gases without seeing them or sensing their high temperatures. This is accomplished using narrow-bandpass optical filters and special sensors. The selected sensing spectrums avoid significant errors due to luminosity and absorption.

The Model HIR is nearly maintenance free. The lens, sighting window, and nozzle are kept at a high temperature to avoid sulfur buildup and the need to perform frequent periodic maintenance. This is accomplished by the steam jacketed lens assembly design that prevents sulfur from condensing onto the lens window or building up in the nozzle. In addition, the HIR utilizes stable electronics, which do not require frequent re-calibrations.

Because of the high temperatures at the lens window, the electronics are mounted away from the reactor and connected to the lens body by a 10ft (3m) armored fiber optic cable, eliminating the need to provide cooling. If it is impractical to mount the electronics within 10ft of the reactor mounting nozzle, the fiber optic adapter wires can be extended up to an additional 25ft (8m) using the "RS" option.

Two-Color Measurement
The HIR F range pyrometer measures the intensity of light at two different wavelengths to determine the temperature. This allows the measurement to be accurate even if there is a partial blockage of light due to buildup of material on the window or in the nozzle. In essence, the measurement is based on the color of the light, instead of the intensity of the light, as is usually done with a single wavelength measurement. In addition to the temperature, the amount of blockage can also be measured and used to generate an alarm signal. Note that at temperatures below 800 °C, there is not enough infrared light at both wavelengths to make a two color measurement. Therefore temperatures between 300 °C and 800 °C are only measured with a single wavelength. In that case, the amount of blockage cannot be determined.

SYSTEM USAGE

The Model HIR operates standalone or ideally in conjunction with either the Delta Controls Model HTP or HTX Claus Reactor thermocouple systems to achieve turnaround-to-turnaround reliability with minimum maintenance. This is particularly advantageous when supplemental oxygen is employed or even during upset conditions. The use of both technologies eliminates common cause errors and vastly improves overall system reliability.

SPECIFICATIONS

Power: 24 VDC loop
Steam: 50-100 # supply required
Lens Sweep: Approx. 25 LPM (N_2 required)
See: www.claustemp.com/products/model-hfi/
Fiber Optic Interconnecting Cable:
PTFE jacketed over SS armor;
3m (10') length standard. (See "RS" option)
Electronics Enclosure:
Cast aluminum with stainless steel mounting hardware
Conduit Connection: 1 x ¾" NPT
Process Connection: Carbon Steel Steam Jacketed Body 2" or 3"ANSI flange standard; other types & sizes available
Materials:
Steam Fixture & Lens Flange: Carbon Steel
Mounting Hardware: Stainless Steel
Lens Assembly: Stainless Steel
Lens Cable: High Temp Armored Fiber Optic, PTFE Jacketed
Ingress Protection: IP65; Encl 4x
Ambient Temperature Limits:

Fiber Optics & Lens:	-30°C to 200°C (-20°F to 400°F)
Fiber Optic Adapter:	-20°C to 85°C (-4°F to 185°F)
Electronics:	-20°C to 70°C (-4°F to 158°F)

Product Certifications: Class I, Div 1, Groups B, C and D;
Class II, Div 1, Groups E, F and G;
Class III, Div1
Class I, Zone 1, Ex d IIB+H2
Class I, Zone 1, AEx d IIB+H2
II 2 G Ex db IIB+H2 T6 Gb
SIRA 17ATEX1232X
IECEx SIR 17.0057X

Range: "F" Dual Wavelength 700ºC - 1700ºC (1472ºF - 3092ºF)
Single Wavelength down to 300°C (572 °F)

HART REGISTERED

Delta Controls CORPORATION

Model HIR Infrared Pyrometer
Model Number System

	BASIC TYPE		EXTN TYPE		RANGE		HOUSING RATING		CABLE LENGTH		MOUNTING NOZZLE		OPTIONS
MODEL EXAMPLE	HIR	-	A	-	F	-	7B	-	10'	-	2"/150RS	-	AA

BASIC TYPE		
M/N	DESCRIPTION	
HIR-A	INFRARED TEMPERATURE TRANSMITTER	

HOUSING RATING		
M/N	DESCRIPTION	
7B	FLAMEPROOF Ex db 2B+Hc T6 Gb	

MOUNTING NOZZLE		
M/N	FLANGE DESCRIPTION	
2"/150RS	2" 150# R.F. ANSI	
3"/150RS	3" 150# R.F. ANSI	
ZZ	AS REQUIRED	

RANGE		
M/N	DESCRIPTION	
C*	800 ° C TO 1700 ° C	
D*	300 ° C TO 1700 ° C	
F	300 ° C TO 1700 ° C	

*not recommended for new installations

CABLE LENGTH		
M/N	DESCRIPTION	
10'	10 FT FIBER OPTIC CABLE	

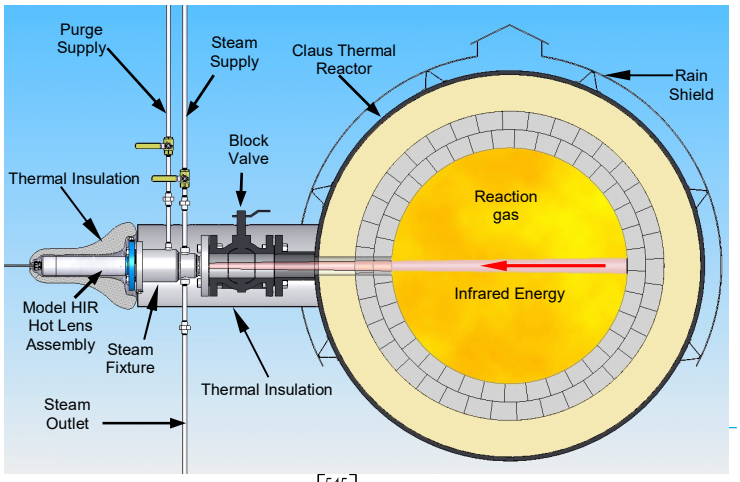
OPTIONS		
M/N	DESCRIPTION	
AA	NONE	
RS	REMOTE SENSOR	
ZZ	SPECIAL	

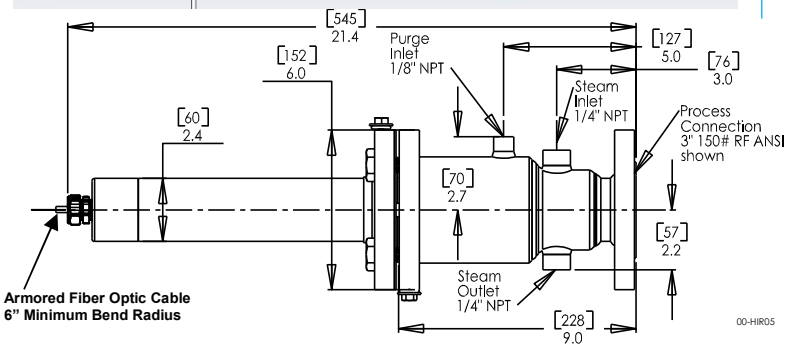
SPARE PARTS

Item	P/N	Description	
1	25-198SM	Lens Body	
2*	25-212Z1	Window w/ O-Rings	
3*	39-418YB	2" 150# Gasket	
4	25-199Z0	Steam Body 2" 150#	
	25-199Z1	Steam Body 3" 150#	
	25-199Z2	Steam Body 2" 300#	
	25-199Z3	Steam Body 3" 300#	
5*	25-385Z1	Fiber Optic Cable	
6	00-HS7B5	Housing w/ Cover	
7*	05-264Z2	Electronics Module	
8	11-357Z1	O-ring -239 Aflas	
9*	25-384Z2	Fiber Optic Adapter, Sensor	
10	11-833TT	Pipe Stand Mounting Plate	
11*	25-414Z3	Complete Optical Train "F" (Items 5,7,9 above) Factory Calibrated	

* Recommended Spares

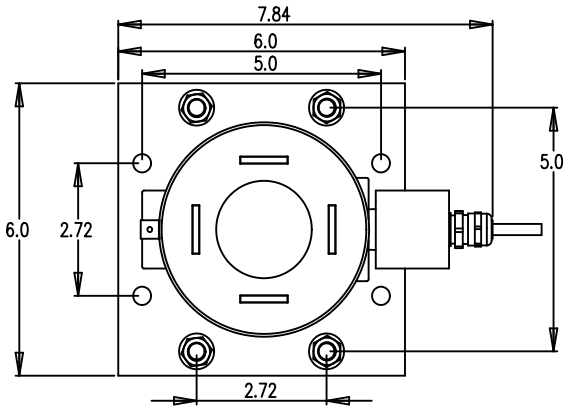
REACTOR MONITORING SYSTEM SCHEMATIC



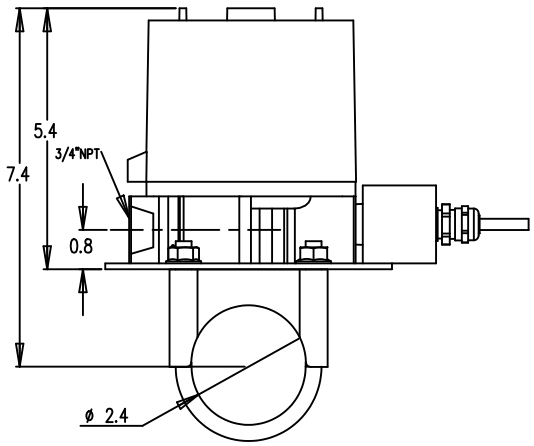


Hot Lens Assembly / Steam Fixture / Process Connection Orientation

DIMENSIONS



Electronics Unit



Pipe Stand Mounting Configuration

Delta Controls CORPORATION

Shreveport, LA 71107 - USA
Ph: +1(318) 424-8471
Fax: +1(318) 425-2421
E-mail: sales@deltacnt.com
Web: www.claustemp.com