



## MODEL 9100 HOT METAL DETECTOR



***“ALL-IN-ONE” Remote Design utilizing 400°C Optic Leads & Remote Lenses.***

- ***110 VAC or 24 VDC connection in one unit.***
- ***Interchangeable remote lenses: 1°, 2°, 4°, 7° F.O.V. spot & ½° x 25° F.O.V. precision slit rectangular.***
- ***High Temp lens ratings of 180°C, 400°C & 1000°C.***
- ***DIP switch selectable I.R. thresholds down to 270°C.***
- ***Output #1: Relay with 8A-250VAC SPNO contact.***
- ***Output #2: Dip switch selectable PNP & NPN***
- ***Adjustable response time from 2 to 200 msec.***
- ***Supplementary analog output to assist in alignment.***
- ***Remote Self-check facility.***
- ***Robust lens mounts available including air purged, air cooled or water cooled.***

### ***General Description***

The MD9100 is a remote “All-in-One” Hot Metal Detector that combines the features of various models into one unit. The MD9100 utilizes a modular electronic controller, flexible armored optic leads and interchangeable remote lenses. The MD9100 detector provides one electronic controller that can be standardized on throughout the mill. Now there is no need to stock a detector for each different trip level. Thus costly inventory of ordinary detectors can be replaced with the single MD9100.

A wide variety of remote lenses are available. Impervious to water or steam and built to withstand the harshest environments. Used in conjunction with flexible armored optic lead, these lenses provide a high level of optical accuracy by allowing the selection of the ideal lens arrangement for the installation. Robust lenses with temperature ratings of 180°C, 400°C and 1000°C can be mounted close to the hot product. Various robust lens mounts are available including air purged, air purged & air cooled, and air purged & water cooled.

All remote lenses incorporate filters to minimize sensitivity to extraneous light. For general tracking, spot lenses are commonly used. Where high accuracy is required or the product deviates about the center line (i.e. Rod Mill) a ½° x 25° precision slit rectangular lens should be utilized. This slit rectangular lens is also highly suited to Strip Mills. Also available is a high temperature Quartz Rod lens specifically for mounting in exceptionally high ambient adjacent to furnaces, hot slabs or billets. Withstands 1000°C radiant heat and provided in a robust lens shroud with protective nozzle and air purge facility.

To accommodate variation in product temperature and background radiation, six specific I.R. thresholds, from 300°C to 550°C, are selectable by an internal DIP switch in 50°C steps. Further adjustment to the trip level down to 270°C and up to 750°C can be accomplished via a threshold sensitivity adjuster.

The MD9100 can be operate from either 110VAC-50/60 Hz or 24VDC power input. Standard output includes a relay with a 8A/250VAC SPNO volt free contact plus an additional switch selectable PNP & NPN transistor output. A supplementary 0-6VDC, non-linear, analog output that allows the user to align the detector to a low energy target (i.e. a flashlight) that would normally be insufficient to switch the detector. Also a remote self check feature that is remotely initiated. When activated the detector will switch and its performance checked.

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## General Information

### Remote Electronic Controller

**Housing:** Aluminum AL6, Oven baked black paint

**Housing Rating:** IEC IP66, DIN, 89011

**Weight w/o Cable:** 1.7 Kg

**Connector:** IP65 Plug/Socket

**Cable Length:** 1.5 M

### Remote Lenses:

**Precision Rectangular Slit:** FOV:  $\frac{1}{2}^\circ \times 5^\circ$ ,  $\frac{1}{2}^\circ \times 15^\circ$  &  $\frac{1}{2}^\circ \times 25^\circ$ ; rated 160°C.

**Stainless Rectangular Slit:** FOV:  $2^\circ \times 25^\circ$ ; rated 180°C or 400°C.

**Stainless Tubular Spot:** FOV:  $1^\circ$ ,  $2^\circ$ ,  $4^\circ$  or  $7^\circ$ ; rated 180°C or 400°C.

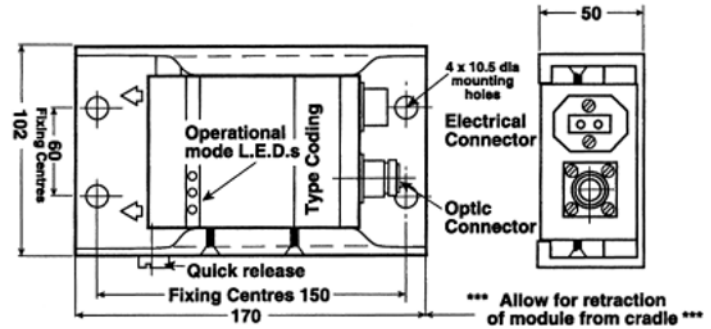
**High Temperature Quartz Rod:** FOV:  $1^\circ$ ; rated 1000°C.

### Optic Cables:

Armored Stainless Sheath available in lengths from 2 meters to 15 meters in 1 meter lengths; rated 400°C.

## Dimensions

### Model 9100 Remote Electronic Controller



For dimensional information & specifications on remote lenses, lens mounts and optic cables please see Bulletin MD9000-003

## General Specifications

Sensing Element	Germanium Diode	Supply Voltage	110 VAC $\pm$ 15% 50/60 Hz and 24 VDC $\pm$ 15%
Power Indication:	Red LED	Power Consumption	5 VA
Function Indication	Green LED	Operating Temperature	-20°C to +60°C
Remote Self-Check	Single wire to 24 DVC internal line		
I.R. Threshold settings	Selector switch selectable in 50°C steps between 300°C to 550°C	Output (#1)	Relay Output (N/O) 250 VAC, 8A 20 mSec response time
Min/Max I.R. Threshold settings	Down to 270°C and up to 750°C using internal sensitivity adjustment	Output (#2)	Switch selectable NPN & PNP Outputs, N.O., 500 mA, 45 V, 2A peak
Response Time:	2 msec. min to 200 msec max., dip switch selectable.	IR Analog Output	0 - 6 VDC, non-linear, for aiding in alignment

### Smallest Detectable Product when utilizing a $\frac{1}{2}^\circ \times 25^\circ$ Lens

The table below identifies the minimum % of vertical field of view required with hot steel at stated temperature for it to be repetitively detected.

Indicative Preset Thresholds		
Steel Temp.	Nominal 350°C Preset Trip	Nominal 450°C Preset Trip
400°C	10%	Not Detectable
450°C	5%	100%
500°C	1%	60%
500°C	1/2%	20%
800°C	Less than 1/2%	Less than 5%

### Terminal Connections

Pin No.	Wire Color	Function
1	Pink	Self-check to 24 VDC Supply
2	Red	+ 24VDC Supply
3	Black	110VAC Supply (L1)
4	White	110VAC Neutral (L2)
5	Violet	PNP/NPN Selectable Output
6	Blue	0VDC (For 24VDC Supply)
7	Green	Ground
8	Brown	N.O. Relay Output
9	Orange	N.O. Relay Output
10	Light Blue	Set IR Trip Point
11	Yellow	+ IR Analog Output
12	Grey	- IR Analog Output

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We reserve the right to alter specifications without prior notice. Specifications without tolerances are typical values.

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