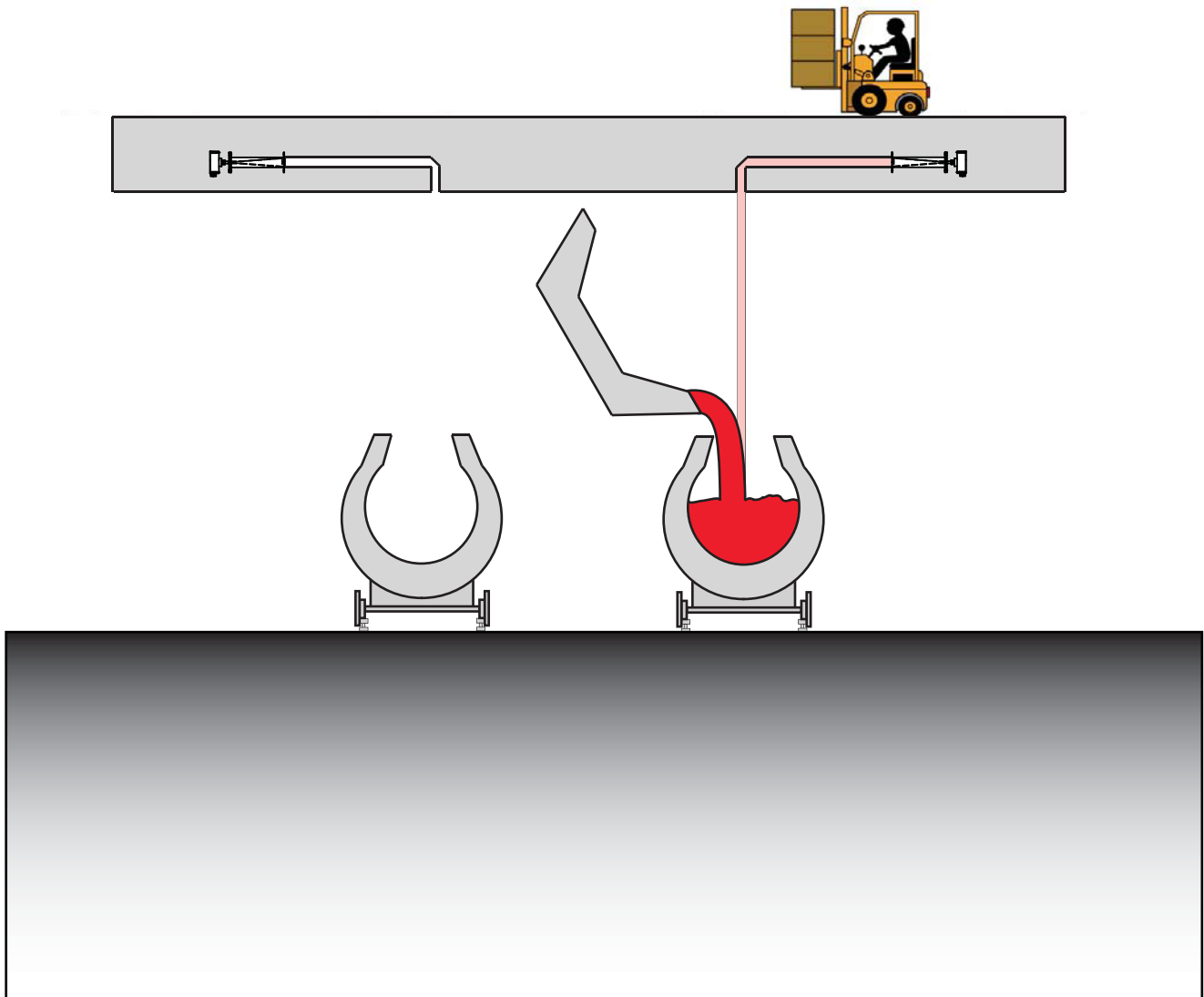


**Milliwave Range Finder**

**MWS-79RF**

**MILLI-RANGER**

**The new compact 79GHz  
Milli-Ranger!!**

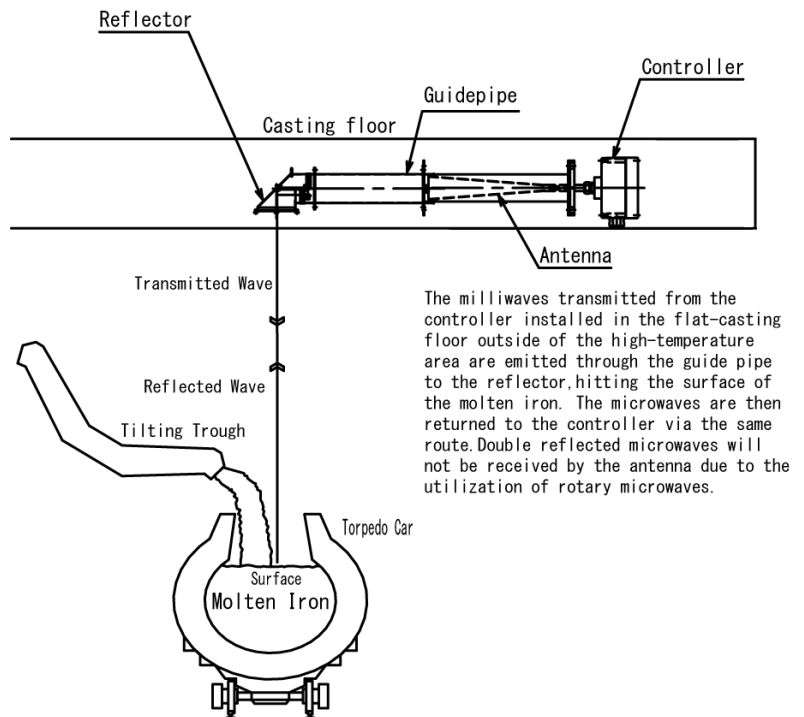


**HiTech Technologies, Inc.**

# Milliwave Range Finder

**Unaffected by high temperature, high pressure, flames, steam, dust or vapor!!**

The type No. MWS-79RF Milli-Ranger is a milliwave range finder which uses the FM-CW system. Through use of guidepipes and reflectors, the controller can be installed away from the high temperature area. The reflector can be installed in the high temperature area and the controller in the normal temperature area, enabling measurement under high temperature even without cooling systems.



## ■ Features

### 1. Flat Casting Floor

- The flat casting floor allows heavy machinery to keep moving freely without obstruction

### 2. Unaffected by adverse conditions

- Microwaves are unaffected by heat, flames, and air particles.
- The reflector and guide pipes can be used in very high temperature areas, while the antenna can be used in temperatures up to 150°C. The controller should be installed in normal temperature areas

### 3. High accuracy and reliability

- The 79GHz model uses a smaller antenna, creating a sharper beam angle. This makes the Milli-Ranger ideal for installations where space is limited.
- Previously difficult measurements with large rest angles are now possible with milliwaves, therefore the Milli-Ranger is suitable for measuring sloped surfaces of anything from powder to lumps of material.
- Accuracy  $\pm 10\text{mm}$
- False measurements caused by double-reflected waves are eliminated through the use of rotary microwaves.
- The accuracy of the measured range is not affected by fluctuating temperatures, nor does it deteriorate over extended periods.
- The software utilizes filters which eliminate spurious signals.

### 4. The operational state is shown on your personal computer

- It displays a FFT spectrum, the received signal and various preset values.
- The received signal, FFT spectrum and the measurement trend are continually displayed. This displayed data can be recorded and reviewed in real or accelerated time.
- Use of the recording and reviewing capabilities allows the system parameters to be optimized offline.
- The controller outputs the internal temperature and any abnormal conditions (i.e. a lowering of received signal power, rising temperature in the controller and communication failures), which can be shown on the display (optional).

### 5. Convenient built-in functions

- A reference point and the required range are easily preset.
- Compatible for use with a personal computer.
- Wide range of power supply 90~240V, 50/60Hz.
- Communicates with a Personal Computer by RS-232C.
- 4-20mA, analogue output.
- RS-422 digital output terminals (distance, receiving power level, temperature and alarm).

### 6. Lightweight and compact

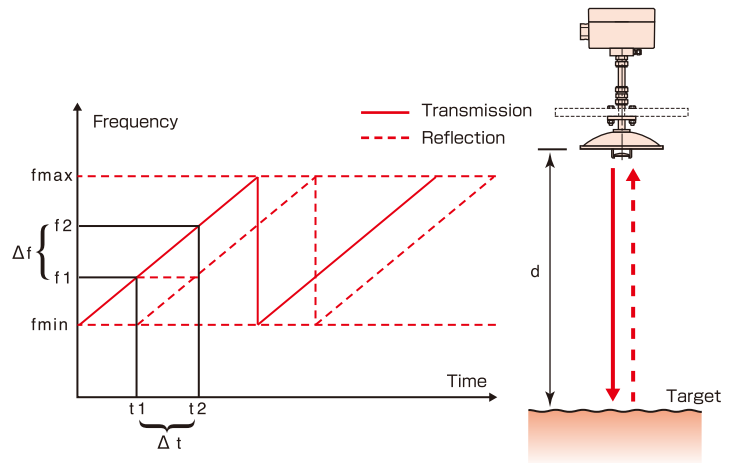
- Can be carried by hand, lightest and smallest antenna yet.
- Small, easy installation, guidepipe size of 80A

### 7. High Versatility

- Both hardware and software can be modified to suit your requirements.

## PRINCIPLE

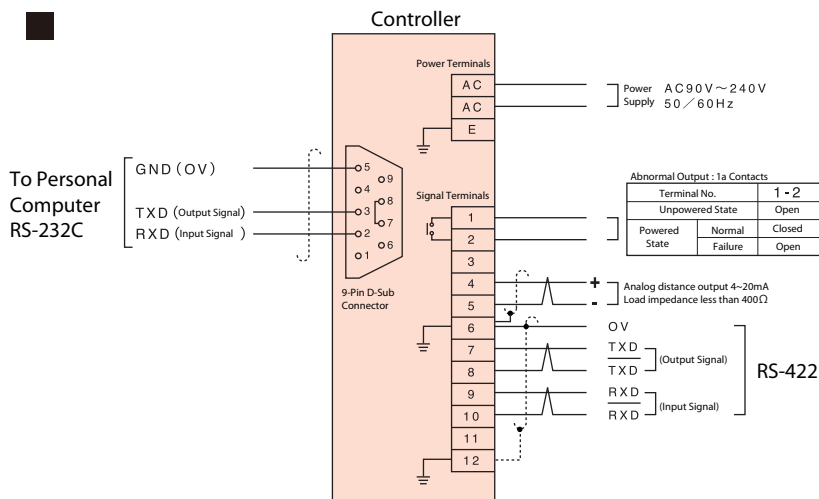
The Milli-Ranger transmits a milliwave signal towards the target with a frequency that increases linearly with time. The milliwave signal transmitted at time,  $t_1$ , with frequency,  $f_1$ , is reflected by the target and received by antenna at time,  $t_2$ . The total time to travel to and from the target is  $\Delta t$ . The transmitted frequency increases to  $f_2$  at time,  $t_2$ . The difference in frequency,  $\Delta f$ , between the transmitted and reflected waves is proportional to the distance,  $d$ , to be measured. The Milli-Ranger mixes the transmitted and reflected signals together to extract the difference in frequency. This signal is analyzed by an FFT (Fast Fourier Transform) analyzer to output a distance signal. This is called the FM-CW method and is suitable for improving the accuracy of distance measurements.



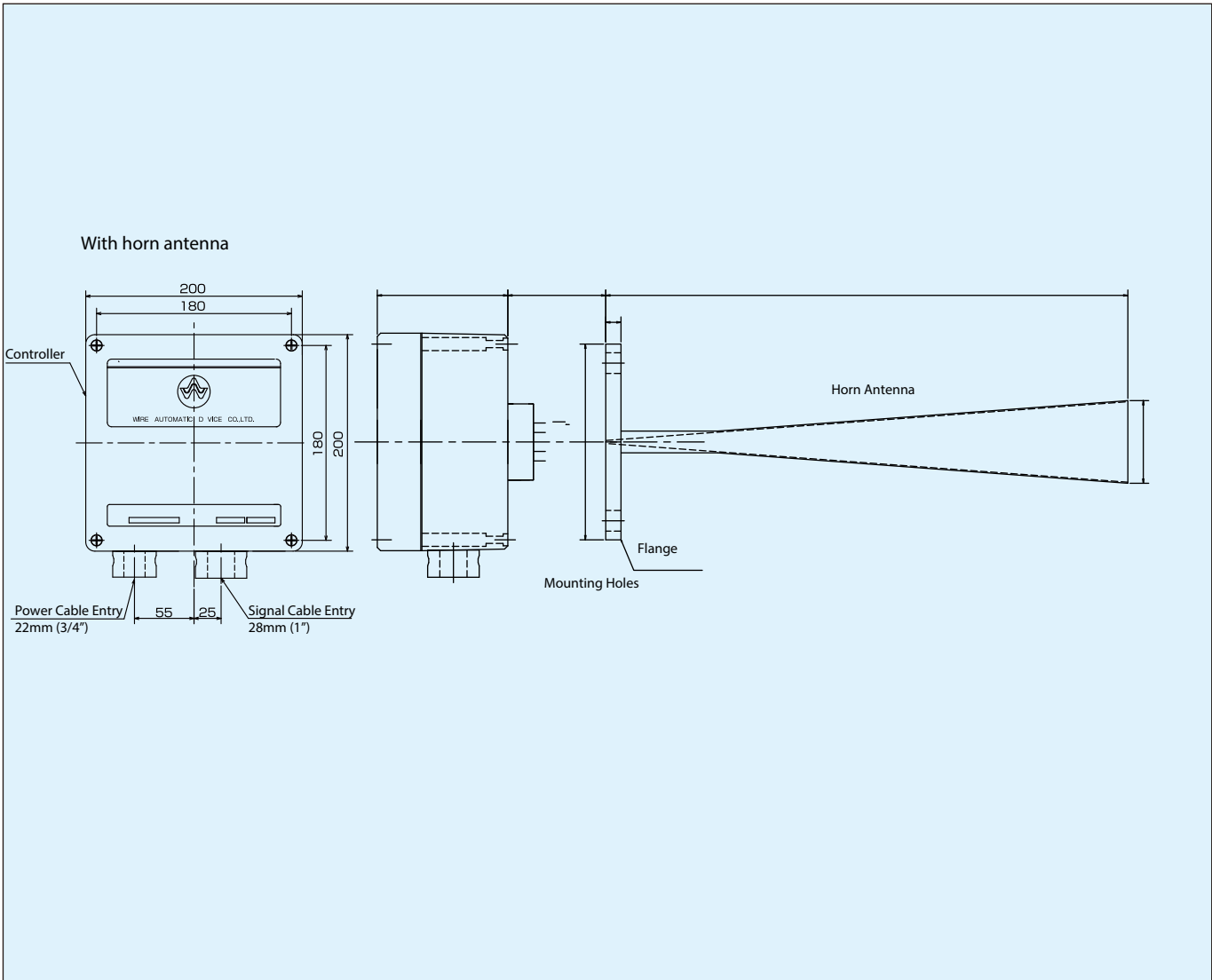
## SPECIFICATIONS

Type	Controller MWS-79RF
Power Supply	AC90~240V, 50/60Hz
Power Consumption	Approx. 15W
Milliwave Frequency	Approx. 79GHz
Modulation and Frequency Analysis	FM-CW modulation FFT analysis
Range	Maximum 50m (depending on target)
Accuracy	$\pm 0.1\%$ F.S. or $\pm 10\text{mm}$ (whichever value is larger) when target is a steel plate.
PC Interface	RS-232C or RS-422
Analog Distance Output	Range ..... 4mA~20mA Accuracy ..... $\pm 0.5\%$ Max. Load Resistance ..... 400 $\Omega$
Abnormal Outputs	Major failure and minor failure, both 1a relay contacts (relays are excited under normal conditions) DC30V 2A or AC250V 0.5A
Start-up Time	Minimum 5 seconds (may increase depending on parameter settings)

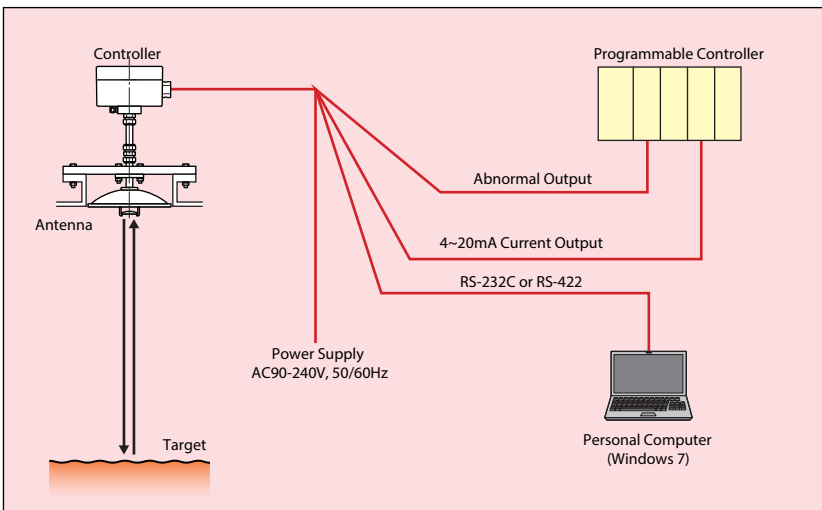
Antenna	Horn Antenna Type ..... H-80A-79-2 Size ..... 80A Beam Angle ..... Approx. $\pm 2^\circ$ (Angle in half of receiving power value)
Ambient Temperature	Controller ..... $-10^\circ\text{C} \sim +50^\circ\text{C}$ Antenna ..... $-40^\circ\text{C} \sim +200^\circ\text{C}$ (when purged)
Noise Tolerance	Square wave noise from noise simulator (Rising 1 nanosecond Width: 1 microsecond) $\pm 2\text{KV}$ (Normal and common mode)
Vibration Resistance	10-55Hz, 0.75mm single amplitude in X, Y and Z directions, for two hours each
Construction	Controller: Aluminum Diecast Antenna : SUS316
Color	Munsell 5Y7/1 Light Gray
Weight	TBD



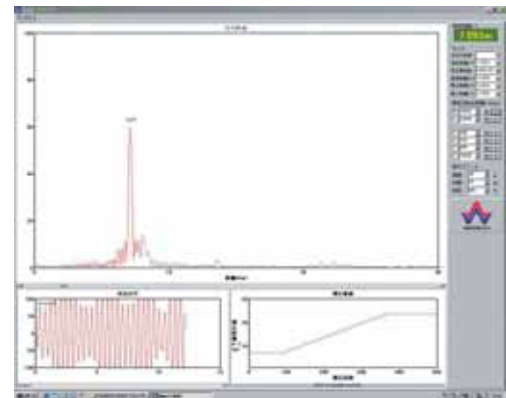
## DIMENSIONS



## SYSTEM EXAMPLE



## COMPUTER DISPLAY



Specifications subject to change without notice.

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