

# TankRadar Pro for metallurgic high temperature applications

## BENEFITS

- High accuracy level measurement
- Highest reliability
- No moving parts, no recalibration and non-contact
- Suitable for high temperature iron and steel applications
- Ensures safety
- Specialized antennas with effective cooling and purging devices

## TankRadar Pro Steel & Hot

Rosemount TankRadar Pro Steel and Rosemount TankRadar Pro Hot are non-contacting radar level gauges suitable for the metallurgical industry and its harsh environment. Pro Steel and Pro Hot solve several level measuring problems and are a key to high quality production because of high performance, non-maintenance operation and total reliability. Pro Steel and Pro Hot are reliable due to the very high signal to noise ratio and the specialized antennas.

Emerson Process Management has over 25 years of experience of radar gauging in the steel and iron industry and the equipment has been continuously developed to suit the market.

## Pro Steel

Pro Steel has a specially designed high performance long range cone antenna and, a high efficient cooling and cleaning device with, a robust antenna connection. It is fully loaded with all of Pro's digital signal processing software modules. Pro Steel manages very long measuring ranges and very high temperatures. In blast furnace applications the gauge is suitable for both normal operation and when emptying the furnace. Pro Steel is resistant to "dirty" environment.

## Pro Hot

Pro Hot has a shorter cone antenna with air purging, and use a standard antenna connection. The gauge digital signal processing use FFT, and the software module Echofixer. Pro Hot is an excellent radar gauge for applications with shorter measuring range and lower temperature.

For more information about Pro Steel & Hot, see the specifications.



**TankRadar Pro Steel & Hot are non-contact radar level gauges suitable for high temperature with iron and steel applications.**

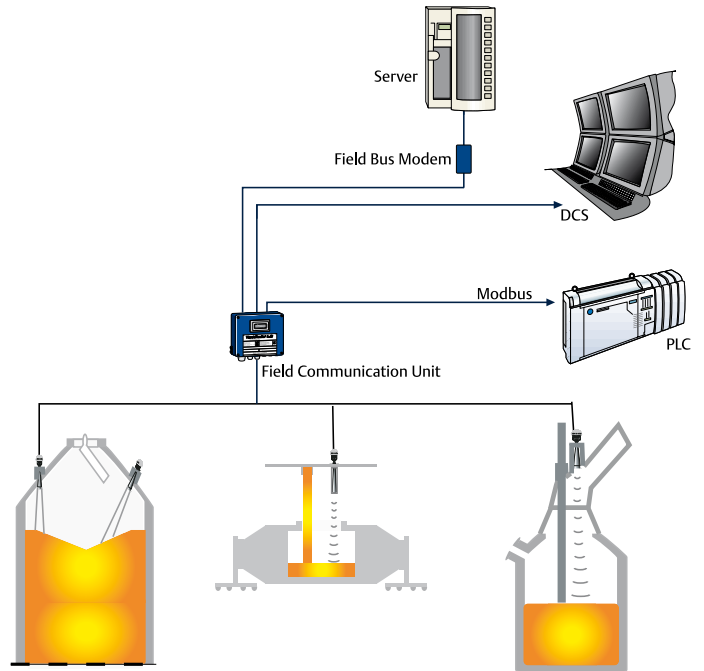


*From left to right: Rosemount TankRadar Pro Steel & Rosemount TankRadar Pro Hot.*

## System integration

TankRadar Pro can be equipped with a number of different output alternatives: analog 4-20mA HART, Foundation Fieldbus (FF), Profibus DP or Rosemount's Modbus based TRL/2 field bus. The analog outputs are either passive for connection to powered cables or active providing signal power for display units etc. Analog outputs can also be specified to be intrinsically safe.

When using the digital TRL/2 bus outputs, up to 8 gauges can be connected to each two-wire field bus, maintaining a high data updating speed. Each field bus is connected to a Field Communication Unit (FCU) that handles up to four field buses with data from maximum of 32 gauges. Several FCU's can be installed to handle large number of gauges. Data can be transmitted from the FCU using RS232/485 or TRL/2 bus to host computers (DCS, PC, PLC). Pro gauges with TRL/2 bus outputs can also be connected to the TankMaster operator software providing an OPC server that can be linked to the plant network.

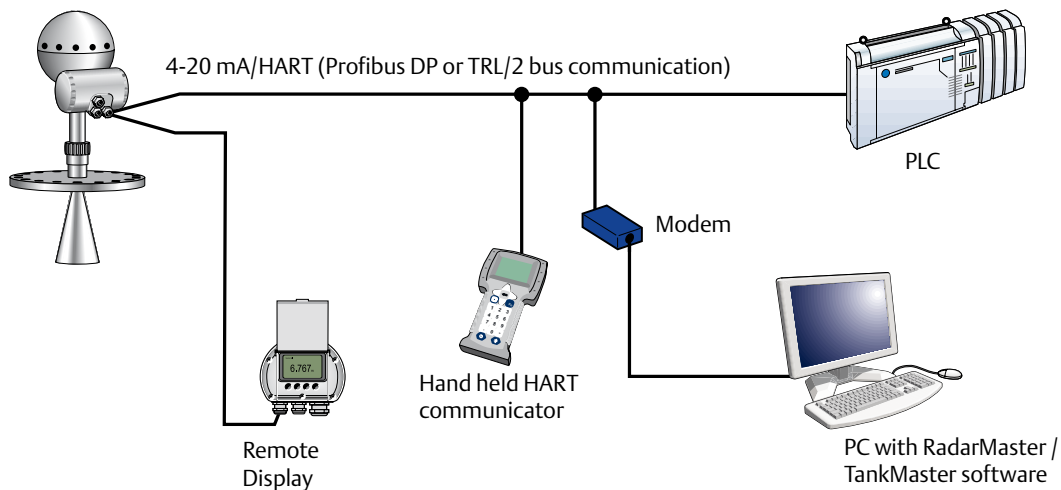


*Typical application*

Data can be displayed on the optional 2210 Display Unit, which is mounted on the gauge or separately. Via the separately mounted display, up to six temperature sensors can be connected.

Configuration can be done with a HART communicator, 2210 Display Unit or a PC using the Windows based RadarMaster software package. RadarMaster includes advanced graphics software tools, including FFT disturbance echo tracking.

TankRadar Pro can also be connected to the FF bus among any other type of instrument. Up to 16 Pro gauges can be connected to each FF segment. Pro can be configured from any FF host system.



Specifications - Rosemount TankRadar Pro Steel & Hot		
<b>General</b>		
Operating principle	10 GHz FMCW Radar	
Microwave output power	Max 1.0 mW	
Internal calibration	Integrated digital reference for automatic compensation of radar sweep	
Temperature measurement	Optional	
<b>Display/Configuration</b>		
Display	Factory mounted gauge or mounted separately up to 100 m distance	
Configuration	RadarMaster, powerful Windows based configuration software or local display	
HART Device	Rosemount hand-held communicator RS375 Rosemount Asset Management Solutions™ AMS Software	
FOUNDATION Fieldbus	DeltaV	
<b>Electric</b>		
Power supply	Ultra wide 24-240 V DC or AC 0-60 Hz	
Power consumption	Maximum 10 W, nominal 5 W	
Outputs	<b>Primary output (for level, volume etc.)</b> Alt. 1: Rosemount TRL/2 Bus (FSK with Modbus protocol) Alt. 2: HART + 4-20 mA current loop (IS option) Alt. 3: Profibus DP Alt. 4: FOUNDATION Fieldbus (IS option) <b>Secondary output (Optional for volume, signal quality, temperature etc)</b> Analog 4-20 mA current loop, active or passive Optional: IS version	
Analog output characteristics	Type: Analog 4-20 mA current loop, active (with) or passive (without loop supply)	
<b>Measuring performance</b>		
Instrument accuracy	+5 mm (+- 0.2") with FFAST; +- 10 mm (+-0.4") with FFT	
Resolution	1 mm (0.04")	
Repeatability	+- 1 mm (+-0.04")	
Update time	100 mS	
Ex approval transmitter head	ATEX: EEx II (2) (1) 1/2 GD T85 °C EEx de [ib] [ia] IIC T6 (-40 °C to +70 °C)  CSA: Ex de [ia/ib] IIC T6 GOST: EEx de ib IIC T4	FM: Explosion proof Class I, Div 1 & 2, Groups A, B, C, D Dust ignition proof Class II/III, Div 1, Groups E, F, G
<b>Antennas</b>	<b>Pro Hot</b>	<b>Pro Steel</b>
Antennas	8" and 10" cone, length 0.37 resp 0.48 m (1.21 resp. 1.57 ft)	12" cone, length 1.5 m (4.9 ft)
<b>Measuring range</b>		
Blast furnace, converter, torpedo car	10-20 m (33-66 ft)	30 m (98 ft)
Other, depending on application	Up to 50 m (164 ft)	Up to 60 m (197 ft)
<b>Temperature at antenna</b>	-40 to 400°C (-40 to 752°F)	Up to 1000°C (1832°F) (depending on option)
<b>Antenna material exposed to vessel</b>	Stainless steel 316L Sealing: Quartz	Alt. 1: Stainless steel 316L, max 400 °C Alt. 2: Inconell, 800 °C Alt. 3: Titanium gr. 2
<b>Cooling and Cleaning</b>	Device for purging, N <sub>2</sub> or air integrated with flange and antenna	High efficient purging device N <sub>2</sub> or air
<b>Protective Housing</b>	Optional protection housing for transmitter head recommended	
<b>Flange</b>	Optional ANSI and DIN standard	Customer supply
<b>Transmitter head</b>	<b>Pro Hot</b>	<b>Pro Steel</b>
<b>Wave guide connection</b>	Standard	Special design, robust and high resistant to dirt
<b>Signal processing</b>	Digital signal processing with FFT, and optional Echofixer	Digital signal processing with FFT, Echofixer, FFAST and MET

Technical details are subject to change without prior notice. For more technical details, see the Pro Technical Description.

## Application examples

### Blast furnaces - Stockline detectors

The use of non-contact and maintenance free level measuring equipment in the blast furnace is essential to ensure the correct level for loading material at all times.

The furnaces can be equipped with either one or several transmitters. Pro Steel and Pro Hot are suitable for both "BellTop" and "Roating Chute" blast furnaces and is not affected by the chute.

### Torpedo cars - Automation of filling

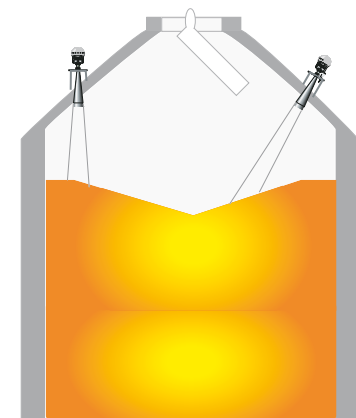
The installation of Pro Steel and Pro Hot for the measurement of the iron level in torpedo cars during filling, optimizes the use of the torpedo car fleet. It reduces the number overfilled or underfilled transports to a minimum. If the level values are sent for example to a DCS system the filling of the cars can be controlled and optimized. The data can also be displayed on an optional 2210 Display unit mounted on the gauge or separately.

### BOF or LD converters - Improved lance positioning

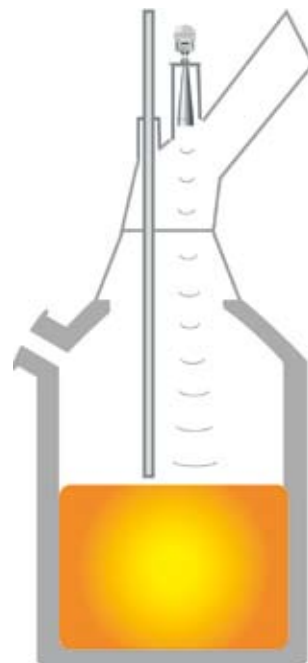
Pro Steel installed for bath level measuring in a Basic Oxygen Furnace or LD converter results in improved process control. The exact level is determined by sending the microwaves down to the surface, where they are reflected back to the transmitter. The transmitter can be mounted as fixed or mechanically movable to a measuring position. It takes less than 10 seconds to set an accurate reading even if mounted movable. Data about level position ensures optimal positioning of the oxygen lance, and gives more information about estimated blowing time. High temperatures, smoke and dust do not affect the function.

### References

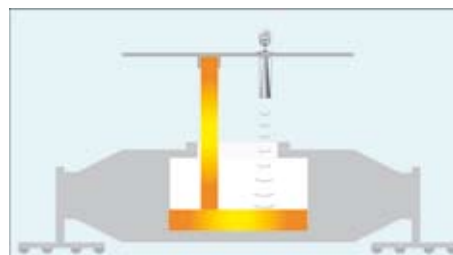
SIDERAR - Argentina, ONE STEEL - Australia, BLUE SCOPE STEEL - Australia, VOEST ALPINE - Austria, ACOMINAS - Brazil, COCKERILL-SAMBRE - Belgium, MAANSHAN STEEL - China, ARCELOR - France, EKO STAHL - Germany, TATA STEEL - India, JINDAL - India, ILVA - Italy, POSCO - Korea, ISCOR - South Africa, SSAB - Sweden, CORUS - UK, US STEEL - USA, WHEELING PITTSBURGH - USA etc.



Blast furnace



Pro Steel installed in a LD converter



Torpedo



Inside a torpedo

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