FMCW 76(94)/10/X Millimeter Wave Distance Sensor (option X: 100 - 600mm Cassegrain antenna) is 10mW high-accuracy non-contact level measurement of large volumes of bulk materials in hoppers and silos at minerals and chemical industries. The examples of use are hard-rock mines, cement hoppers, and other bunkers with adverse environmental conditions such as dust, corrosive gas, fog, high level noise. The Distance Sensor can also be used for liquid level measurement at huge industrial tanks where there is a fuzzy edge of liquid because of foam or vapor. The example of that application is volume measurement in tanks at large breweries.

Features

- Narrow beam for 76 GHz or 94 GHz spectrum
- Operation into dusty and smog
- Distance operation up 500m
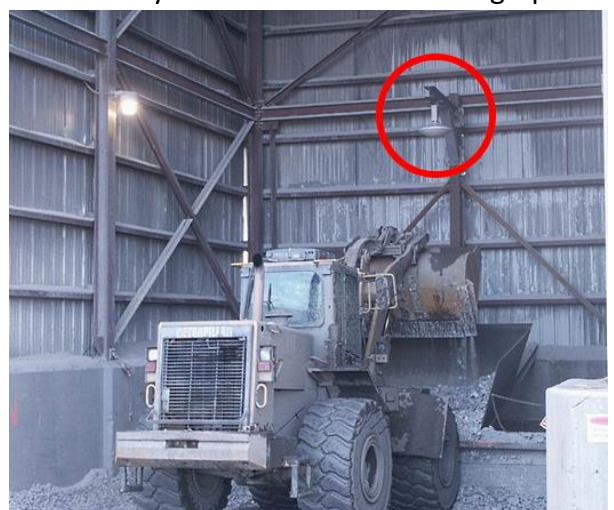- High resolution

Applications
- Mines and bunkers
- Cement and other dusty manufactories
- Ground control in airports and other facilities
- Avoid collision systems

The Distance Sensor is based on millimeter wave FMCW (frequency-modulated continuous wave) radar principles. It is free from laser, acoustic, and microwave radar shortcomings. It is characterized by a narrow beam that's good for enclosed areas like ore passes, because of 76 (94) GHz FMCW radar operational frequency that is equivalent to 3mm wave length, the sensor provides an excellent penetration of dust and water vapor. The Distance Sensor works well even with a dust sticking on antenna. With a narrow beam, the Distance Sensor can build a precise surface profile at a hopper (mechanical scanning required). The operation range of Distance Sensor is 500m, that allowing using it at deep mines, where typical passes are up to 300m but rarely even longer.

To facilitate installation, mounting and alignment at field condition, the sensor is built as two modules; a front end and a separate signal processor connected by a shielded cable. A local graphics display and keypad are incorporated into the control unit. The front end and antenna are housed in robust metal case. The signal processor and power supplies are built into a commercially available housing with signal access via cable glands.

To use Distance Sensor within complete data acquisition system on an enterprise, the sensor has RS-485 interface using MODBUS protocol RJ-45 socket made in dust and moisture-proof embodiment. The radar transmitter at the Distance Sensor complies with international safety regulations.

Specifications

Distance Sensor Performance

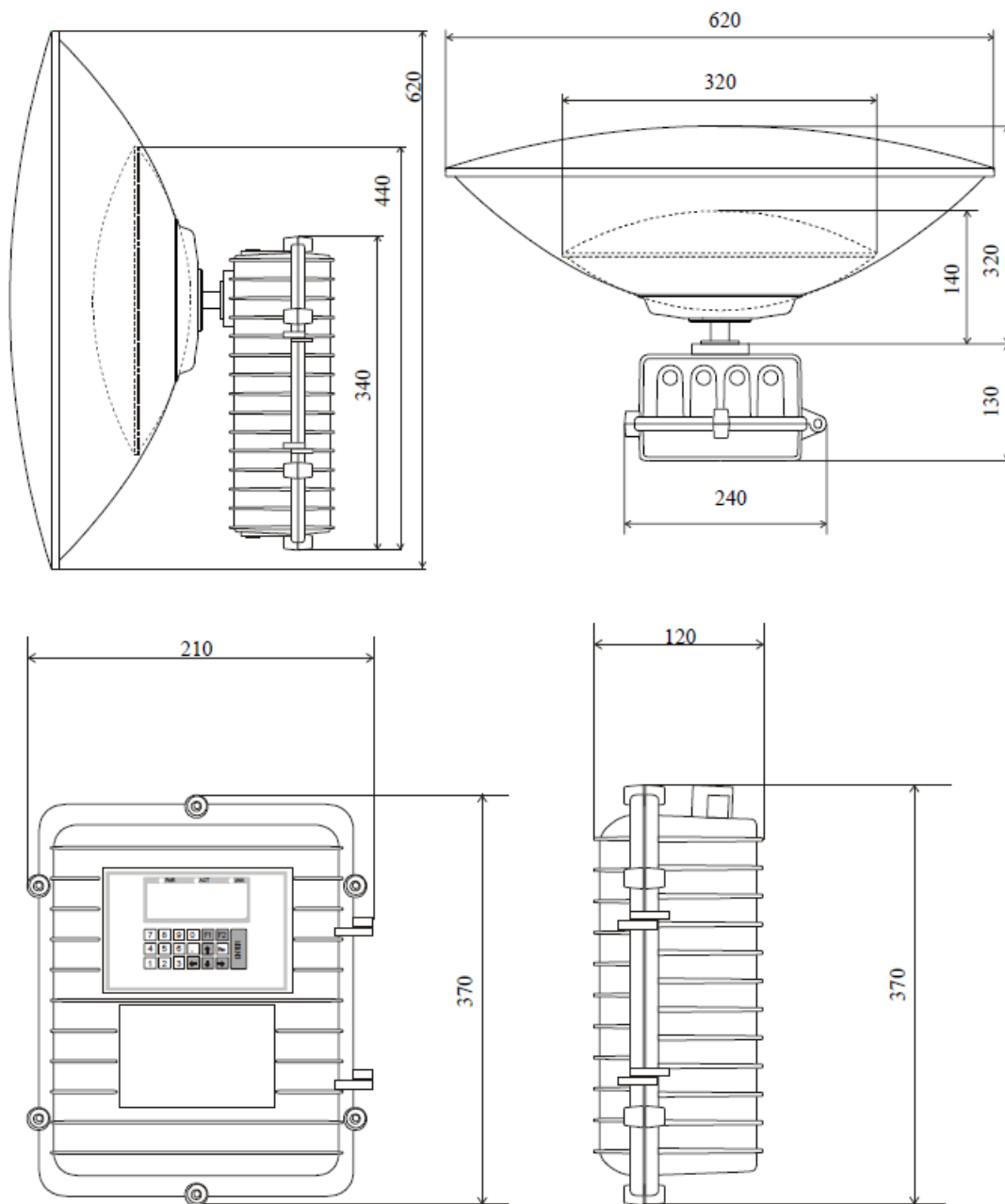|	
Distance Sensor resolution	0.005 m
Range of heights of Sensor position above the surface of material	0.6 to 500 m
Main reflector diameter size	300 and 600 mm
Distance Sensor radar transmitter emission power	10 mW
Distance Sensor radar operating frequency	76 GHz or 94 GHz
Power supply voltage	+18 - +36 DCV opt.110/220V AC
Distance Sensor radar power consumption	20W
Operation mode	CW

Distance Sensor Head Specification

Sweep Range, MHz	505.472 962686326
Sweep time, ms	12.285
Interface protocol	IP 192.168.1.1
Sampling rate	4096 points per 12.285 ms
Data range	14 bits
Power supply voltage	External Power supply
Enclosure	IP65
Communication connector	RJ-45
Ambient temperature	-30 to +50°C
Atmospheric pressure	84.0-106.7 kPa (630-800 Torr)
Relative humidity at 35°C and lower, no more than	95%
Vibration amplitude at 5Hz to 25Hz band, no more than	0.1mm

Controller NZ6100 Specifications

Display	20 digits, 4.75 mm height 4 lines Liquid Crystal Display
Indicators	Power LED
Control Unit Power Supply	85-265 VAC, 47-63Hz, 15W optionally +18 - +36 DCV
Membrane Keypad	27 keys including 8/18 function keys
Communications:	RS-485 or TBD
Communication protocols	MODBUS RTU

Distance Sensor Drawing

How to order

Specify Model Number **FMCW-76/10/xxx** or **FMCW-94/10/xxx** where:
XXX – antenna size mm (available 100-600 mm, see Cassegrain antenna ECA-W-10-xxx)

Example
FMCW-76/10/300, Industrial Distance sensor with the following specification: operation frequency 76.0 GHz, output power 10 mW, antenna 300 mm.

Contact ELVA-1:   www.elva-1.com   sales@elva-1.com