



*Changing the market  
from level to volume*



# Technical Data Sheet

APM's 3DLevelScanner™ incorporates advanced acoustic technology for accurately measuring bulk solids based on multiple point measurement and surface visualization of all kinds of silos and open bins.



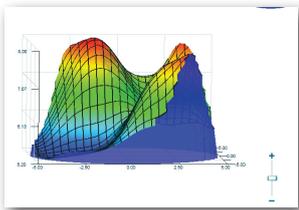
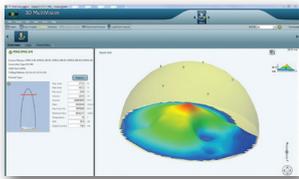
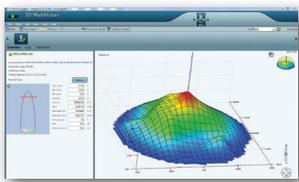
# Overview

## Theory Of Operation

The APM 3DLevelScanner is the only device presently available that delivers accurate measurement of bulk solids and powders - based on multiple point measurement and surface visualization regardless of the type of material or product characteristics, type and size of storage silo, bin or container, and harshness of the storage environment. The 3DLevelScanner employs an array of three antennas to transmit low frequency pulses and to receive echoes of the pulses from the contents of the vessel. Using three antennas the unit measures not only the time/distance of each echo but also its direction. The device's Digital Signal Processor samples and analyzes the received signals to provide very accurate measurements of the level and volume of the stored contents, and generates a 3D representation of actual allocation of product within the container for display on remote computer screens. It incorporates APM's unique dust-penetrating technology to achieve an unrivalled degree of process measurement and inventory control.

## 3D Mapping

This unique device measures practically any kind of material stored in a large variety of containers, including silos, large open bins, bulk solid storage rooms, stockpiles and warehouses. It maps build-up and other irregularities that randomly form over time, offering solutions for this and many other previously inaccessible challenging applications.



LCD Display

Easy navigation with 4-button operation

Same housing for all versions (IS and non-IS)

Cable entry M20X1.5 (1/2" NPT)



## Key Specifications

Preferred application:	Solids
Measuring range:	70 m (230 ft)
Process fitting:	Thread, Mounting Plate, Angel Adaptor
Process temperature, 2 models:	standard -40°... 85° C   high temp. -40°...180° C
Process pressure:	-0.02...3 bar (-0.29...43.5 Psi)
Communication:	4...20mA/RS485/Modbus
Emitting frequency:	2 KHz to 7 KHz

# Technical Data

<b>Materials</b>	
Housing	Painted aluminum die casting
Inspection window in housing	Polycarbonate
Antenna	Painted aluminum die casting / Teflon (PTFE)
<b>Weight</b>	
3DLevelScanner	5.6 Kg (12.35 lb)
<b>Output variable</b>	
Output signal	Active 4...20mA/RS485/Modbus
Resolution	10 $\mu$ A
Fault signal	Current output unchanged, 22 mA, >3.6 mA (adjustable)
Current limitation	22 mA
Maximal Load	400 Ohm
<b>Communication</b>	
Type	RS485/Modbus
<b>Ambient conditions</b>	
Ambient, storage and transport temperature	-40...85°C (-40...+185°F)
<b>Process conditions</b>	
Vessel pressure	0.02...3 bar (-0.29...43.5 PSI)
<b>Process temperature</b>	
Measured on the process fitting	-40...+180°C (-40...+350°F)
Vibration resistance	Mechanical vibrations with 2g and 5...200 Hz
<b>Electromechanical data</b>	
Cable entry/plug	1 x M20x1.5 (cable- $\varnothing$ 8...12mm), 1 x blind stopper M20x1.5 Or 2 x cable entry 1/2" NPT
<b>Display panel</b>	
LCD	4 lines x 20 characters
Adjustment elements	4 keys

# Technical Data

## Power supply – 4-wire instrument (Active) 4...20 mA

Supply voltage 18...32 VDC

Power consumption max 1.5 W @ 24VDC

## Electrical protective measures

Protection IP66, IP67 according to IEC 60529

## Approvals

ATEX ATEX II 1/2D, 2D, Ex ibD/iaD 20/21 T110°C

ATEX II 2G Ex ia/ib IIB T4

cFMus Intrinsically Safe CL I,II, DIV I, GP CDEFG

IECEX Ex ib [ia] IIB T4 Gb (-40 °C < Ta < +85 °C)

Ex ib [ia] IIIC T110°C Da/Db (-40 °C < Ta < +85 °C)

INMETRO Ex ib [ia] IIB T4 Gb (- 40 °C < Ta < + 85 °C) Ex ib [ia]

IIIC T110 °C Da/Db (- 40 °C < Ta < + 85 °C)

EAC I Ex ib [ia] IIB T4 Gb X

Ex ib [ia] IIIC T1 110°C Da/DbX

NEPSI II 2G Ex ia/ib IIB T4

PESO (India) Ex ib [ia] IIB t4 Gb

FCC 47 CFR part 15:2007, subpart B, class A

KTL (Korea) Ex ib [ia] IIB T4 Gb, Ex ib [ia] IIIC T1100C Da/Db

## CE

EMC

Emission EN 61326:1997 (class B)

Susceptibility IEC / EN 61326:1997 + A1:1998 + A2:2001 + A3:2003

NSR (73/23/EWG) EN 61010-1:2001

## FCC

Conformity Part 15 of the FCC regulations

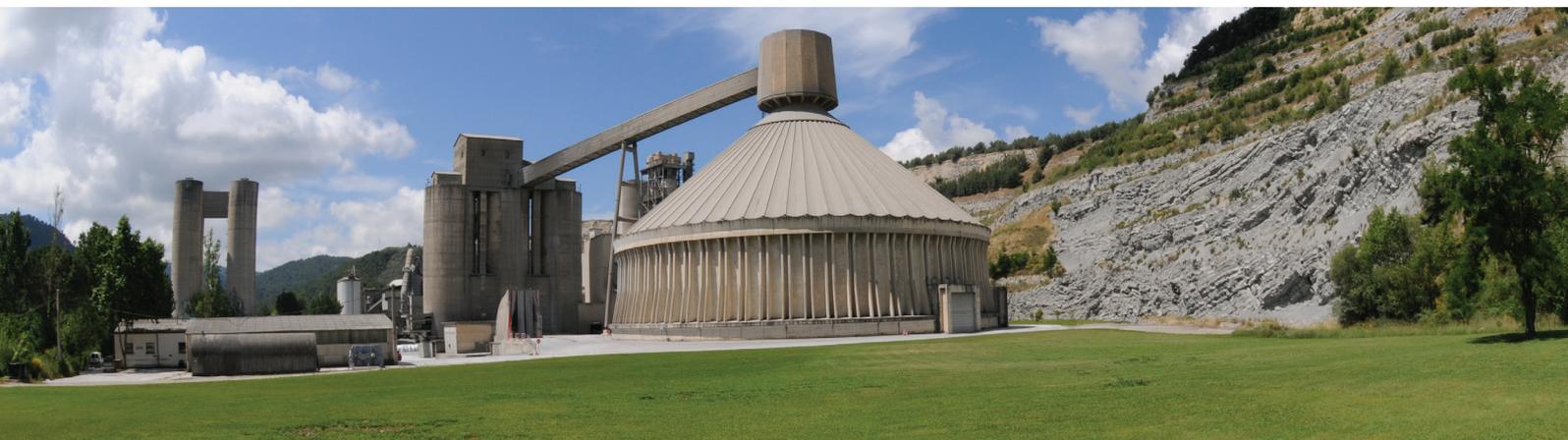
FCC 47 CFR part 15:2007, subpart B, class A

## Measurement characteristics

Frequency 2 KHz to 10 KHz

Beam angle 30 - 70 degrees

Volume Accuracy Maximal potential volumetric error out of total vessel capacity <3%



## Electrical Connection

### General Requirements

In hazardous areas you should take note of the appropriate regulations, conformity and type of approval certificates of the sensors and power supply units.

When multiple scanners and/or 3DLinkPro are connected with the same power supply, the total power consumption should be taken into account.

### 4...20 mA 4-wire

Power supply and signal current are carried on two separate connection cables. The output signal is active, hence the PLC must be configured passive.

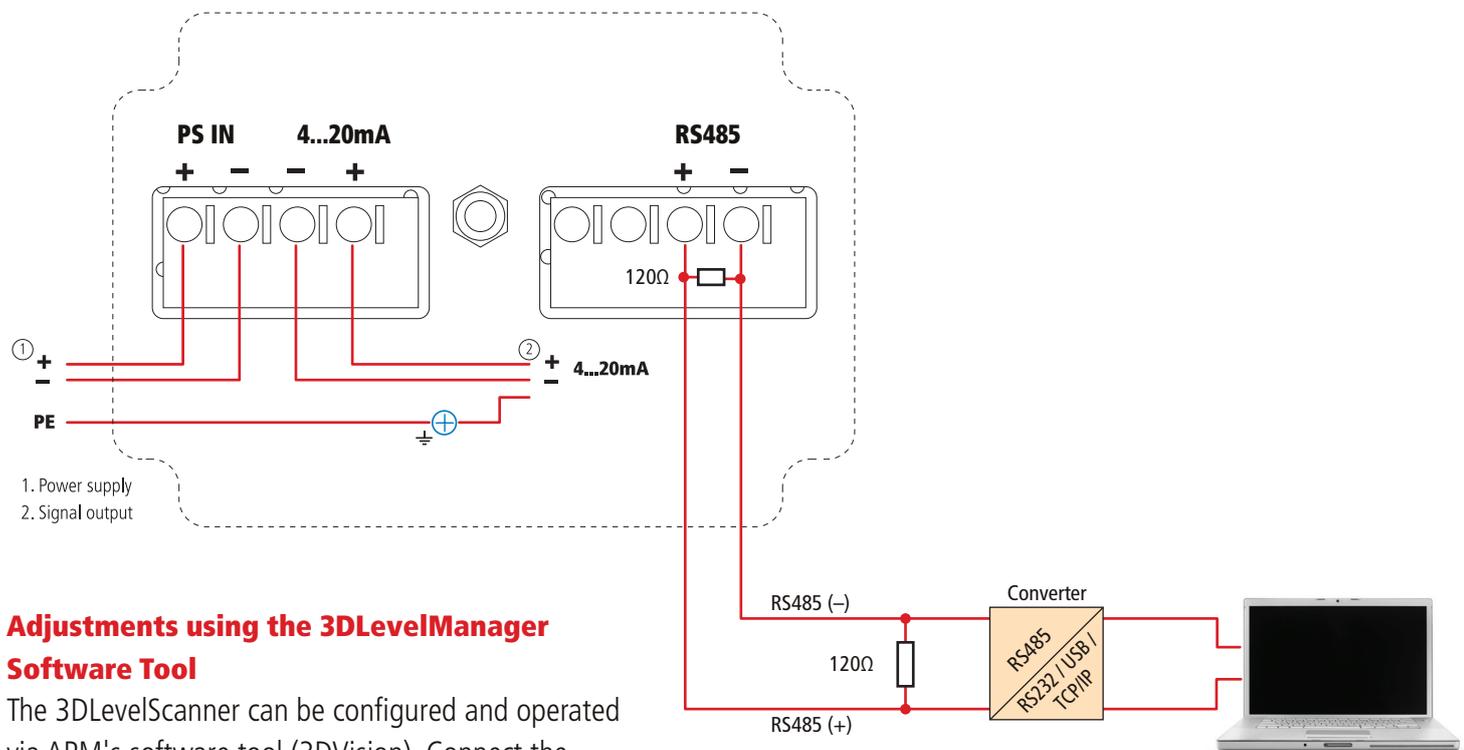
### Connection Cable

RS485 cables should be shielded, twisted pair with 120 Ohm impedance, terminated by 120 Ohm resistors on both ends.

Avoid star topology wiring when connecting multiple scanners with on RS485 bus.

An outer cable diameter of 8 ...12 mm ensures the seal effect of the cable entry. If electromagnetic interference is expected, we recommend the use of screened cable for the signal lines.

### Wiring Plans



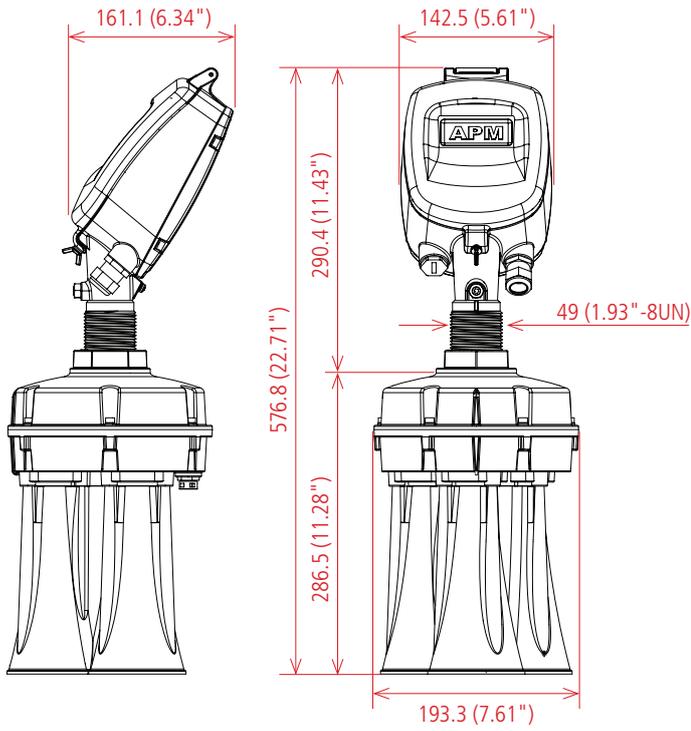
### Adjustments using the 3DLevelManager Software Tool

The 3DLevelScanner can be configured and operated via APM's software tool (3DVision). Connect the 3DLevelScanner according to the above diagram.

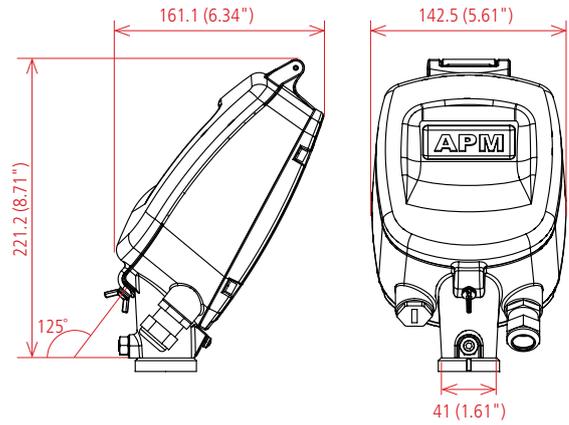
The drawing is not for IS applications

# Dimensions

## 3DLevelScanner with horn antenna in threaded version

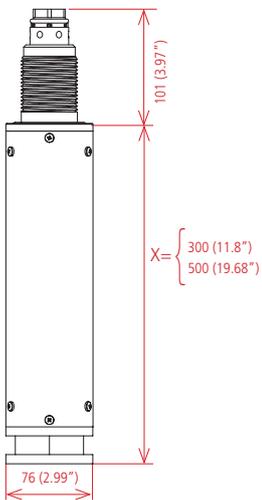


## 3DLevelScanner Housing

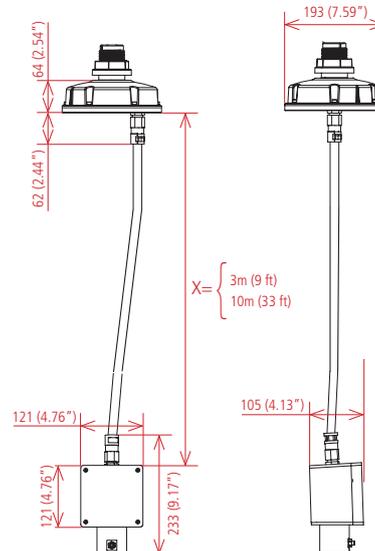


# Accessories

## Neck Extension

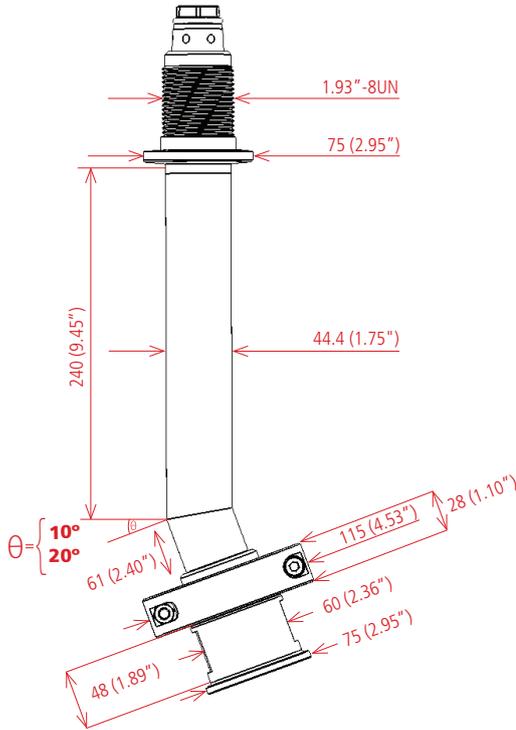


## Head Body Separation Kit

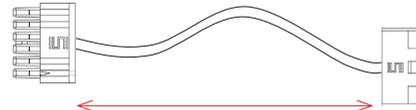


Dimensions in mm (inch)

## Angle Adaptor

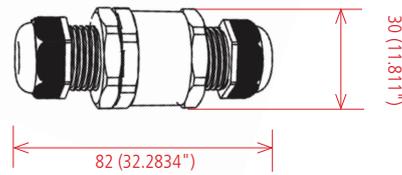


## Cable Extension (for T0 only)

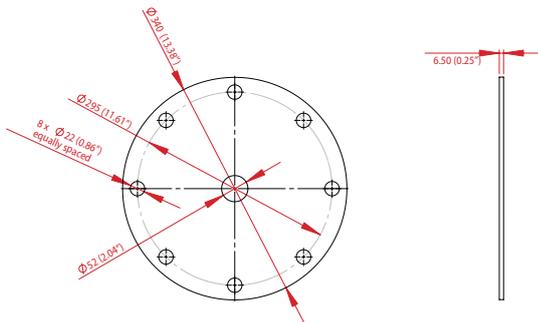


- X=
- 300 (11.8")
  - 500 (19.68")
  - 600 (23.62")
  - 1m (3.3 ft)
  - 2m (6.6 ft)
  - 3m (9.84ft)
  - 3.5m (11.48ft)
  - 5m (16.4ft)

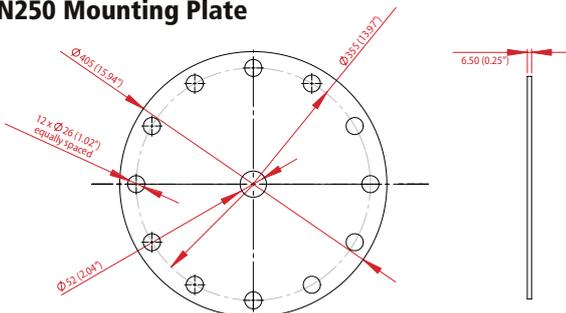
## Cable Extension Conector



## DN200 Mounting Plate



## DN250 Mounting Plate



\* DN100 and DN200 are also available

Dimensions in mm (inch)

## Type

- S-** For solid applications
- M-** For solid applications with mapping capabilities
- MV-** For solid applications with mapping capabilities and visualization graphics tool
- MVL-** MV for multiple scanner connection

## Approvals

**XX** – Without

<b>DX</b>	ATEX	II 1/2D, 2D, Ex ibD/iaD 20/21 T110°C
	ATEX	II 2G Ex ia/ib IIB T4
	FM / cFMus	Intrinsically Safe CL I,II, DIV I, GP CDEFG
	NEPSI	II 2G Ex ia/ib IIB T4
	NEPSI	II 1/2D Ex ibD/iaD 20/21 T110°C
	IECEX	Ex ib [ia] IIB T4 Gb (-40 °C < Ta < +85 °C)
	IECEX	Ex ib [ia] IIIC T110°C Da/Db (-40 °C < Ta < +85 °C)
	INMETRO	Ex ib [ia] IIB T4 Gb (- 40 °C < Ta < + 85 °C) Ex ib [ia]
	IIIC	T110 °C Da/Db (- 40 °C < Ta < + 85 °C)
	EAC	I Ex ib [ia] IIB T4 Gb X
		Ex ib [ia] IIIC T1 110°C Da/DbX
	KTL (Korea)	Ex ib [ia] IIB T4 Gb, Ex ib [ia] IIIC T1100C Da/Db

## Material / Finish

- B** – With horn antenna @195mm/ALU
- C** – With horn antenna @195mm/ALU Teflon Coated

## Process connection

**GD** – Thread 1.93" - 8 UN

## Electronics

**V** – 4 ...20mA – 4-wire/RS485/Modbus

## Cable entry

**M** – M20x1.5 / 1/2" NPT

## Temperature

- T0** – Standard Version Suitable For 85°C (185°F)
- T3** – Suitable For 180°C (356°F)
- T3C** – Suitable For 180°C (356°F)  
Including Extended Cable L=30Cm (11.8")
- T3D** – Suitable For 180°C (356°F)  
Including Extended Cable L=50Cm (19.7")
- T3E** – Suitable For 180°C (356°F)  
Including Extended Cable L=1m (3' 3")
- T3F** – Suitable For 180°C (356°F)  
Including Extended Cable L=1.5m (4' 11")
- T3G** – Suitable For 180°C (356°F)  
Including Extended Cable L=2m (6' 7")
- T3I** – Suitable For 180°C (356°F)  
Including Extended Cable L=5m (16' 5")
- T3x10** – Suitable For 180°C (356°F)  
Including Extended Cable L=10m (32' 10")

3DLevelScanner

Represented by



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