



TECHNICAL DATA SHEET



*Changing the market
from level to volume*

APM's 3DLevelScanner™
incorporates advanced
technology for accurately
measuring bulk solids and
powder stored in silos and
open bins of all types.



OVERVIEW

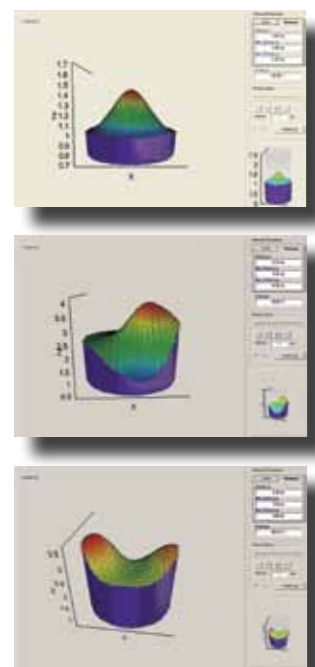
Theory of operation

The APM 3DLevelScanner II is the only device presently available that delivers accurate measurement of bulk solids and powders - 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 II employs an array of three antennas to transmit low frequency pulses and to receive echoes of the pulses from the contents of the silo, bin or other container. 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.

3-D 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 loads and other irregularities that randomly form over time, offering solutions for this and many other previously inaccessible challenging applications.
- 3D representation of the stored contents for display on a remote computer screen.



Key Specifications

Preferred application:	Solids
Measuring range:	70 m
Process fitting:	Thread, Flange, Mounting Strap
Process temperatures:	-40...+85°C (-40...+185°F)
Process pressure:	-0.2...1 bar (-2.9...14.5 Psi)
Signal output:	4-wire 4...20mA/HART/RS485/Modbus
Emitting frequency:	3 kHz to 10 kHz

TECHNICAL DATA

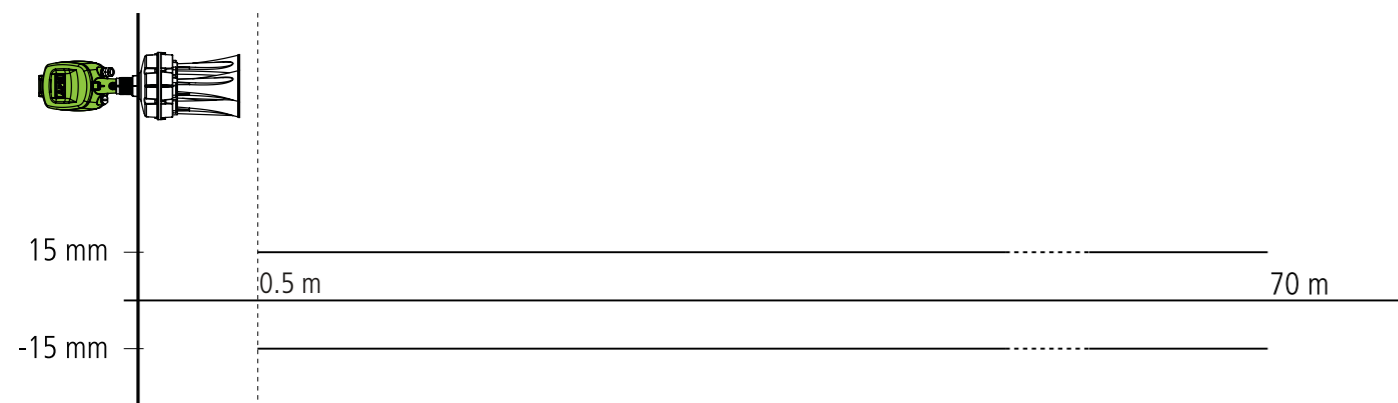
Materials, non-wetted parts	
Housing	Painted aluminum die casting
Inspection window in housing	Polycarbonate
Antenna	Painted aluminum die casting
Flange	Steel
Weight	
5.6 kg	Thread version
Output variable	
Output signal	4 ...20mA/HART/RS485/Modbus
Resolution	10 µA
Fault signal	Current output unchanged, 22 mA, >3.6 mA (adjustable)
Current limitation	22 mA
Load	
4-wire sensor	Max. 500 Ohm
Ambient conditions	
Ambient, storage and transport temperature	-40...85°C (-40...+185°F)
Relative humidity	20...85%
Altitude	5,000 m (16,400 ft)
Process conditions	
Vessel pressure	-0.2...1 bar (-2.9...14.5 Psi or -20...100 kPa)
Process temperature	
Measured on the process fitting	-40...+85°C (-40...+185°F)
Vibration resistance	Mechanical vibrations with 2g and 5...200 Hz
Electromechanical data	
Cable entry/plug	1 x cable entry M20x1.5 (cable-Ø 8...12mm)
	1 x blind stopper M20x1.5
	Or
	2 x cable entry ½ NPT
Display panel	
LCD	4 lines x 20 characters
Adjustment elements	4 keys
Protection	IP67



TECHNICAL DATA

Power supply – 4-wire instrument (Active) 4...20 mA / HART	
Supply voltage	20 ...32 VDC
Power consumption	max 4 VA; max 3 W
Electrical protective measures	
Protection	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
FM	FM Intrinsically Safe CL I,II, DIV I, GP CDEFG
CSA	cCSAus Intrinsic Safety (pending)
IECEX	IEC EEx ia IIC T6 (pending)
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	to part 15 of the FCC regulations FCC 47 CFR part 15:2007, subpart B, class A
Measurement characteristics	
Frequency	3 - 10 kHz
Beam angle	30 - 70 degrees

Accuracy



ELECTRICAL CONNECTION

General Requirements

The power supply range can differ depending on the instrument version. See the Technical Data section for full details.

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

Power Supply

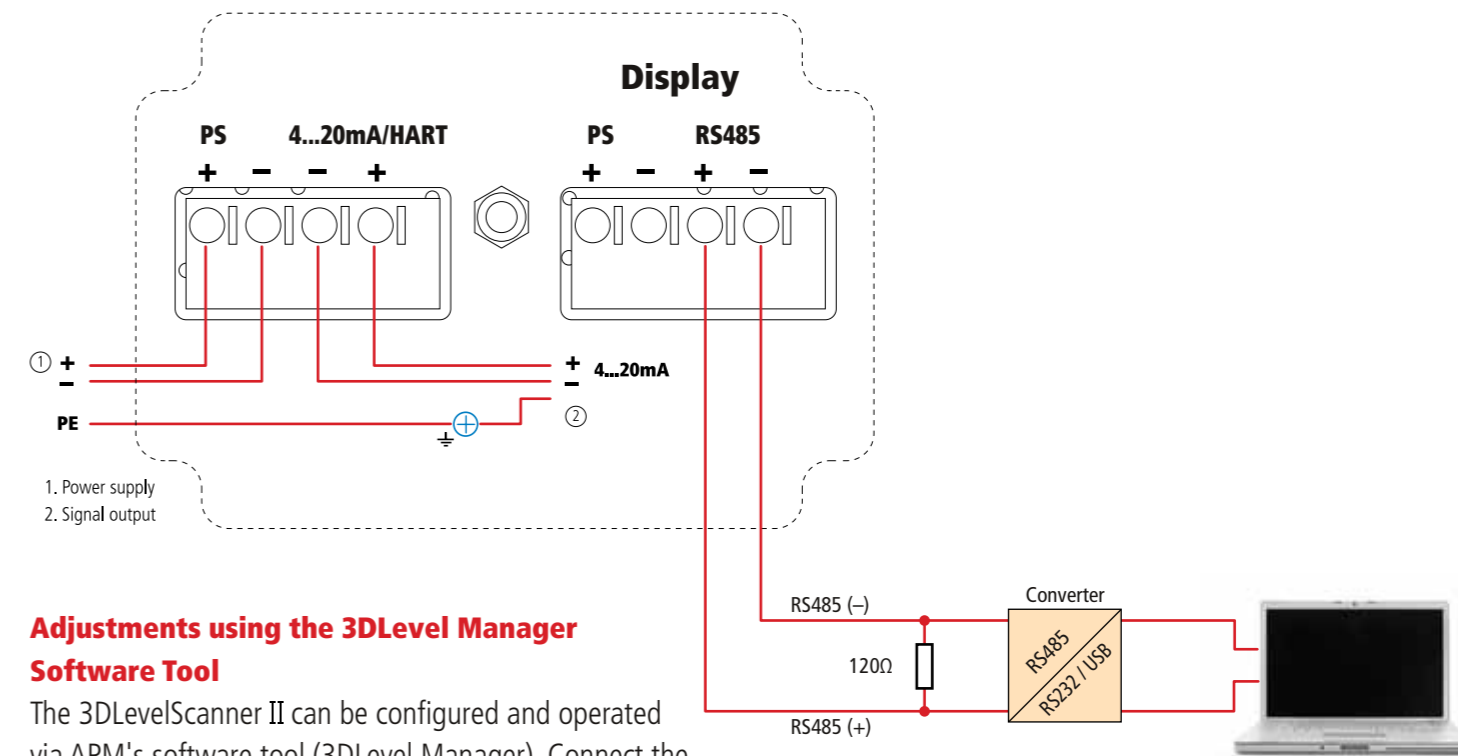
4 ...20 mA/HART 4-wire

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

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

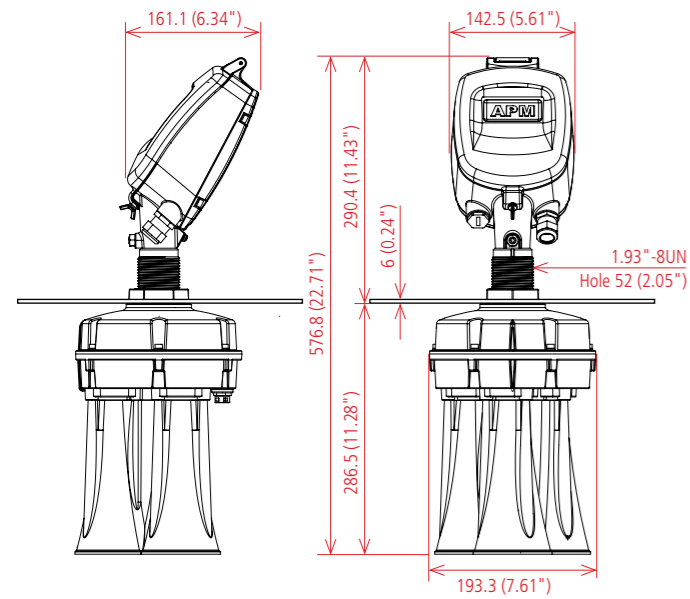


Adjustments using the 3DLevel Manager Software Tool

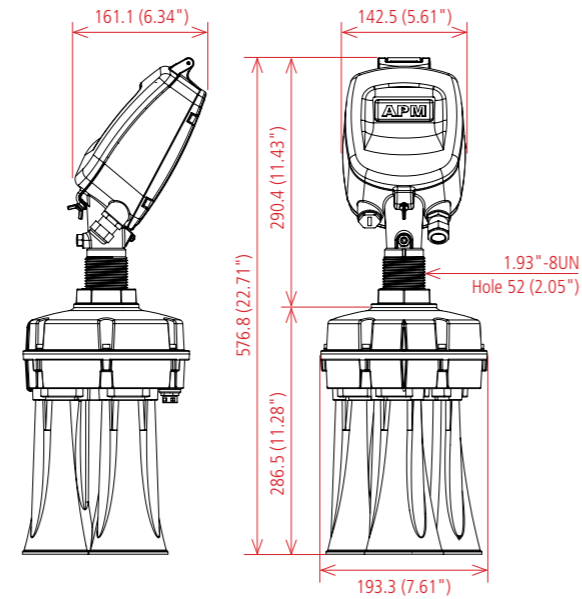
The 3DLevelScanner II can be configured and operated via APM's software tool (3DLevel Manager). Connect the 3DLevelScanner II according to the above diagram.

DIMENSIONS

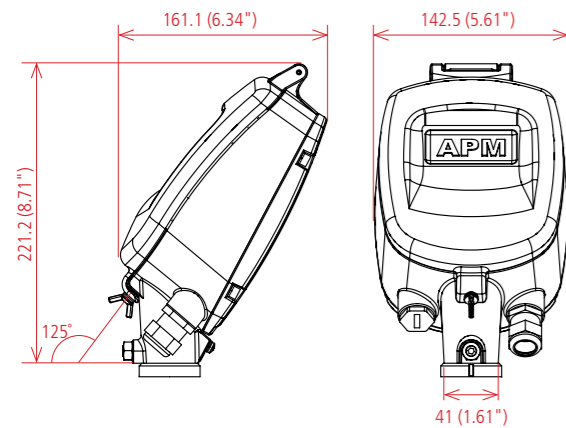
3DLevelScanner II with horn antenna in flange version



3DLevelScanner II with horn antenna in threaded version



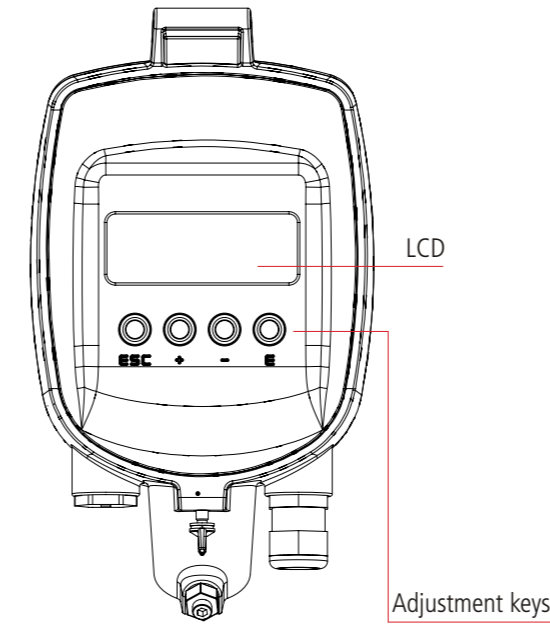
3DLevelScanner II Housing



Dimensions in mm (inch)

OPERATION

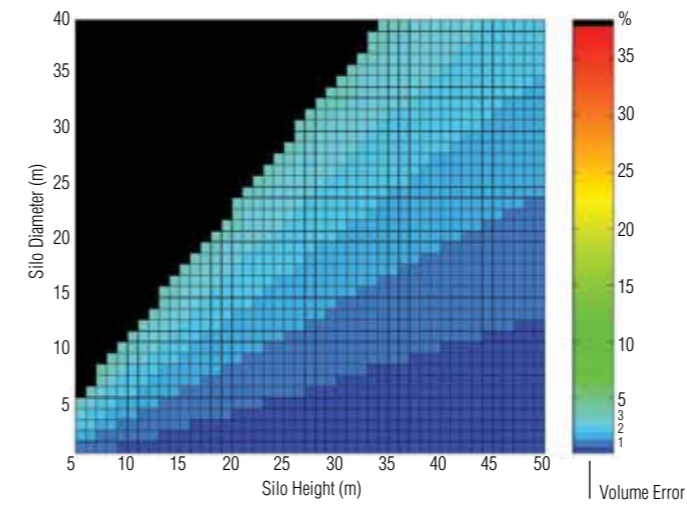
Adjustments Using the LCD Panel



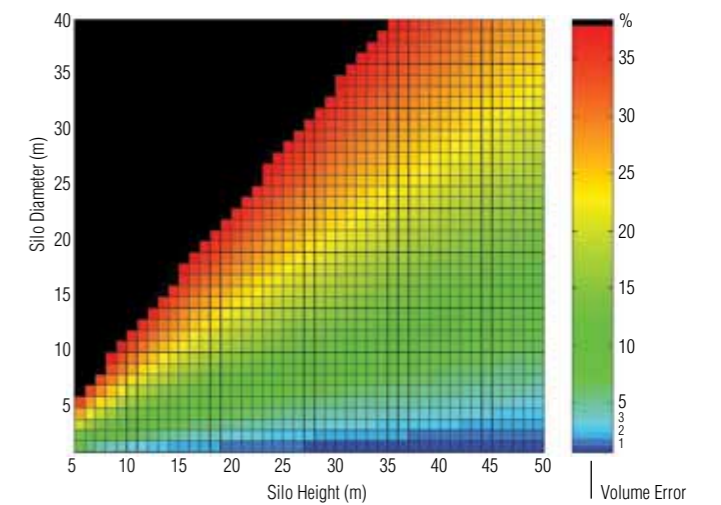
ESC	Navigate to the left within a function group; press ESC for 3 sec to go back to the basic screen
+	Navigate upwards in the selection list; edit numeric value within a function
-	Navigate downwards in the selection list; shifts to the right within a function
E	Navigate to the right within a function group; confirmation
+ and E	Increase contrast settings of the LCD
- and E	Decrease contrast settings of the LCD
+ and - and E	Hardware lock/unlock After a hardware lock, operation of the instrument via display or remote communication is not possible. The hardware can only be unlocked via the display, and an unlock parameter must be entered to do so. The display continues – uninterrupted. When all three buttons are pressed the display writes: "Hardware locked". When all three buttons are pressed again the display asks for "unlock parameter".

Volume Accuracy

Volume Accuracy - 3DLevelScanner II M/MV



Volume Accuracy of a single point device



3DLevelScanner II

Type

S For solid applications

M For solid applications with mapping capabilities

MV For solid applications with mapping capabilities and visualization graphics tool

Approvals

XX Without

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

GX ATEX II 2G Ex ia/ib IIB T4

FX FM Intrinsically Safe CL I,II, DIV I, GP CDEFG

Version / Material

B With horn antenna @195mm/ALU

Process connection

GD Thread 1.93" - 8 UN

FE Flange DN200

FG Flange DN250

AD Flange 6" 150lb RF, ANSI B16.5 / 316L

AE Flange 8" 150lb RF, ANSI B16.5 / 316L

AF Flange 10" 150lb RF, ANSI B16.5 / 316L

Electronics

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

Cable entry / Plug connection

M M20x1.5 / without

N 1/2 NPT / without

Neck Extension

A Without

B 200 mm

C 300 mm

D 400 mm

3DLevelScanner

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