Technical Information
Ti 024G/03/ae

4110 HART® Level Encoder

Precision encoding instrument for transmission of level measurement from mechanical float gauges

Applications
The 4110 HART® Level Encoder (LE) connects directly to a mechanical float and tape tank gauge. Liquid Level data from the float gauge is encoded and transmitted to a HART® Host device. The unit is fully compatible with industry standard PLC's and RTU's utilised in tank farms, refineries and terminals and is designed to communicate with these devices over a low voltage, intrinsically safe, HART® communications bus.

Features & Benefits
- Universal connection - mounts to all standard float gauges
- Low maintenance - no gears, electrical brushes or alignment sensitive arrays - the precision disk assembly is the only moving part
- 2-wire intrinsically safe design
- Explosion proof NEMA Type 4 die cast enclosure with junction box
- Fully integrated terminal unit - allows complete configuration using a Handheld device

Online
www.systems.endress.com

Endress+Hauser
Systems & Gauging

Measuring System

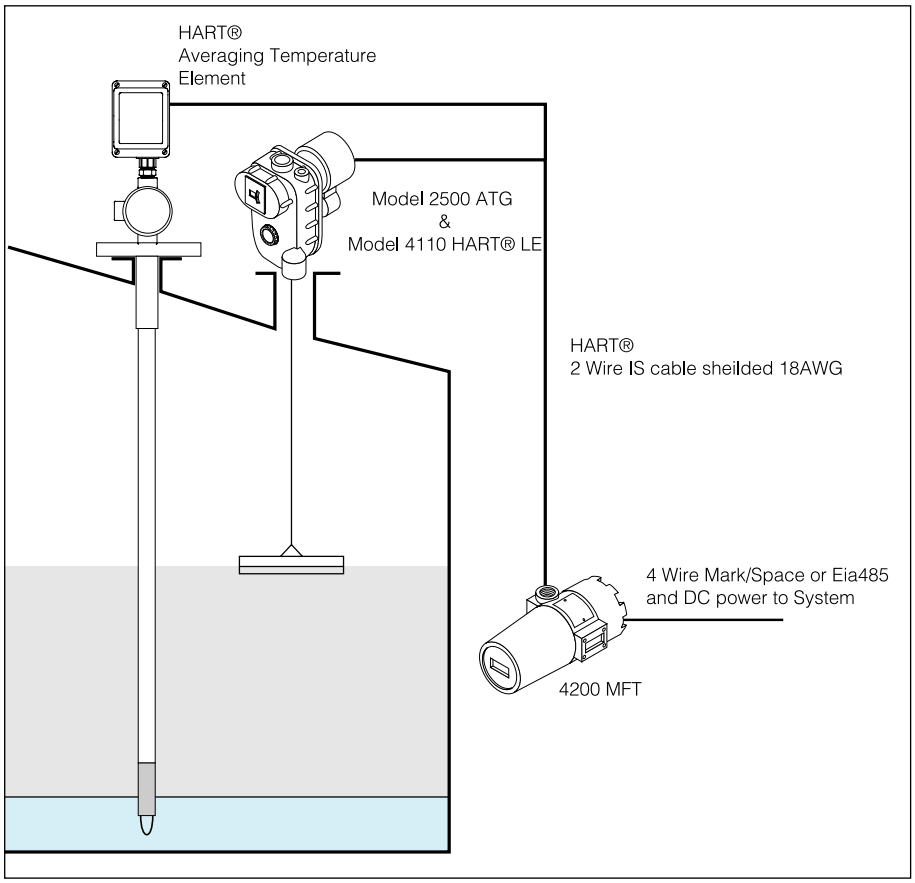
The 4110 HART® Level Encoder (LE), in conjunction with a HART® master, such as a 4200 MFT, provides a data acquisition and communications system for use in liquid level measurement applications. The 4110 HART® LE communicates the liquid level which is measured by a mechanical float and tape tank gauge, such as the 2500 ATG. Any tank calculations needed are performed by the HART® master.

The aluminium housing for the 4110 HART® LE is designed and approved to intrinsically safe and explosion proof requirements, it is also environmentally sealed to prevent exposure to internal components.

The unit has been tested by, and is compatible with products manufactured by Armcom Control Systems and Allen Bradley Co. This enables users in a wide range of industries, and in varying applications, to benefit from the features of HART® communications and third party products. Contact Endress+Hauser Systems & Gauging for further details of these interfaces.

Operation

The 4110 HART® LE uses an incremental counting technique for determining liquid level. After an initial level is determined as part of the calibration procedure, changes are determined through incremental increases or decreases detected by the 4110 HART® LE.



System Diagram

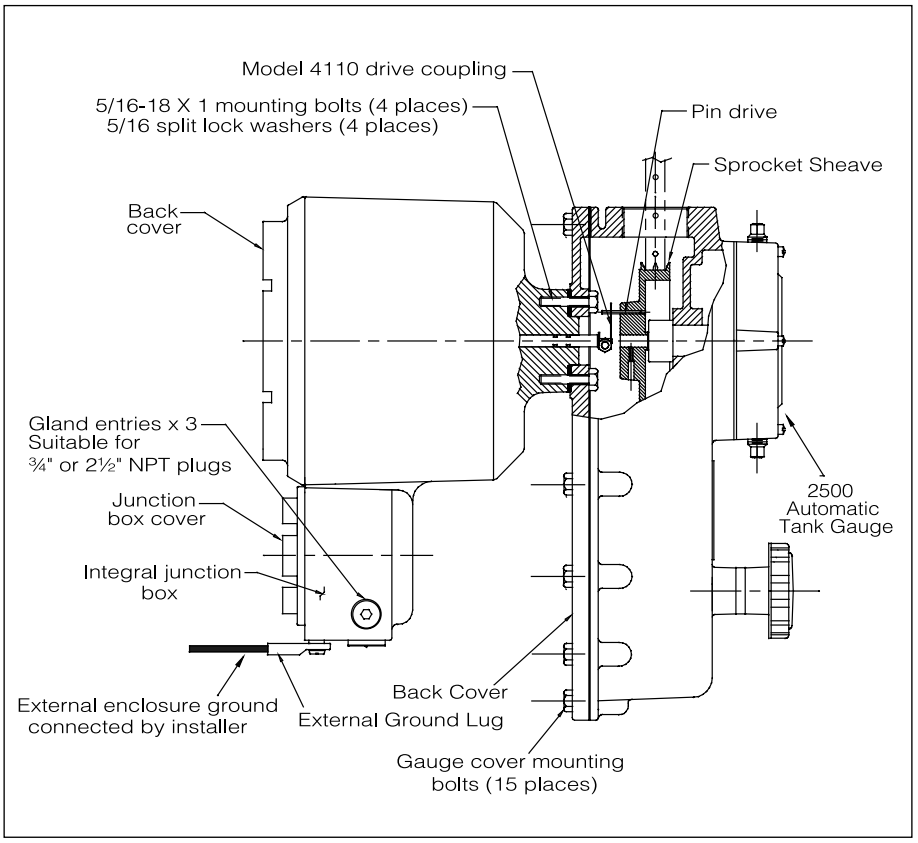
Installation

The 4110 HART® LE can be connected to most mechanical float and tape gauges on the market today. The unit is bolted to the mechanical gauge using a flange adapter, please contact Endress+Hauser to confirm the availablity of specific adapters for your requirements.

Basic Installation Procedure

- Remove the back cover from the level gauge
- Mount the 4110 LE to the back of the level gauge making sure the orientation of the LE and gauge are the same
- Make sure the mechanical gauge and 4110 HART® LE drive couplings engage
- No reverse gearing or special encoders are required since all configuration is software based
- Proceed with field wiring

The Model 4110 may also mount to a high pressure tank gauge such as the Endress+Hauser model 2520, through the use of a Oil Tight Adapter.



4110 HART® LE shown connected to a 2500 ATG

Configuration

Communications
The HART® Host collects measurement information by polling the 4110 HART® LE over a two wire intrinsically safe HART® bus and then transmits this information to a host computer, Modbus™ master or intermediary device. Power to the 4110 HART® LE is provided by the HART® Host device and a battery backup is integrated into the device to provide continuous tracking of level measurement through power outages.

HART Bus Connection
The HART® Bus connection to the 4110 HART® LE is accomplished in the following manner:

- Run the two HART® bus wires into the 4110 HART® LE terminals through the conduit entry (NPT plugs)
- Connect the minus (-) to terminal one (1)
- Connect the plus (+) to terminal two (2)
- For intrinsically safe (I.S.) installations connect the chassis ground of the 4110 HART® LE to the ground terminal of the HART® master device

Configuration
The 4110 HART® LE can be configured by the HART® Master such as the 4200 MFT or Endress+Hauser handheld devices via the HART® bus terminal connections. The 4110 cover may be removed without powering the encoder down when properly installed in an I.S circuit. For complete instructions please refer to the specific manuals for the instrumentation used within your tank gauging system.

Technical Data

Manufacturer	Endress+Hauser Systems & Gauging, Atlanta, USA
Instrument designation	4110 HART® LE
Function	HART® Level Encoder for mechanical tank gauges

General Information

Power Input	18 V_{dc} nominal 12.5 V_{dc} minimum 30 V_{dc} maximum
Power supply	HART® Master
Power consumption	8 mA nominal @ 18 Vdc (0.13 W)
Encoder type	Optical incremental
Sensor arrays	Two (2) fixed position, infra red
Battery operation	10 x 24 hours - maximum
Battery shelf life	Ten (10) years
Communications	Hart 5.0 digital compliant

Certification & Approvals

FM	Explosion Proof Class I, Div. 1, Groups C & D I.S for Class I, Div 1, Group A through G
CSA	Class 1, Groups C & D, Class II, Groups E, F & G, Class III,
CENELEC	EEx ib IIB T4, EEx d IIB T5

Environmental

Operating temperature	-40 to 185 °F (-40 to 85 °C)
Surge protection	Meets or exceeds ANSI/IEEE 62.41

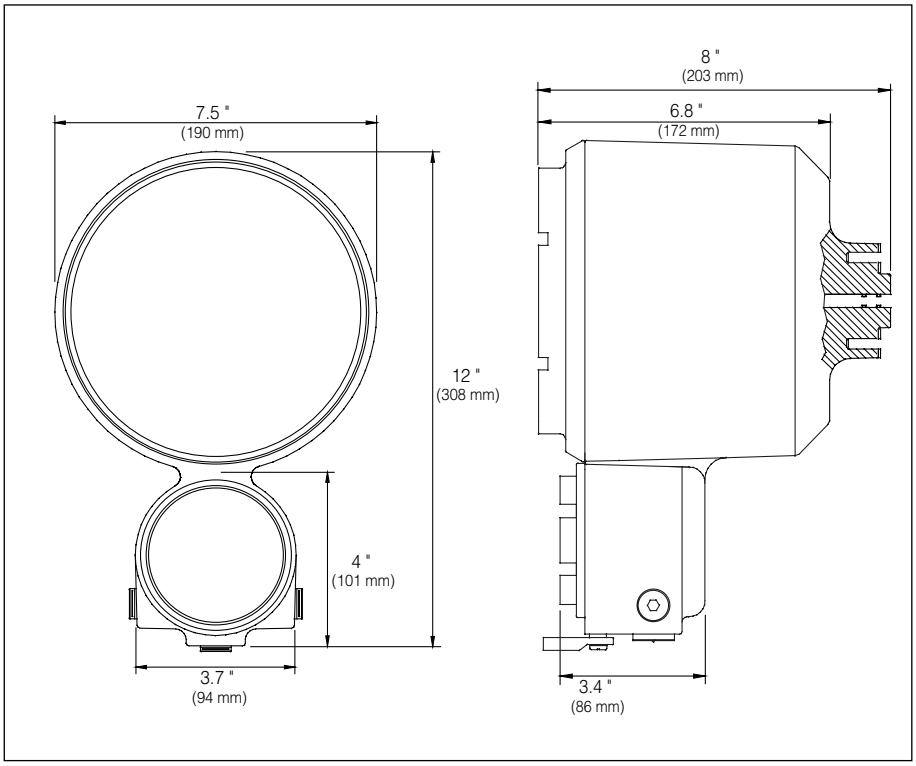
Performance Specifications

Encoder range	0 to 39 m (0 to 128 ft)
Encoder accuracy	1 mm (0.04")
Communications range	Maximum 333 m (1000 ft) to 4200 MFT
Encoder resolution	1 mm (0.04")
Rotational speed	1000 RPM @ 100% accuracy without losing synchronization with the level gauge

Physical Specifications

Gland entries	3 x ¾" or 3 x 2½" NPT (both sized plugs are provided)
Shipping weight	7.25 kg (16 lb)
Dimensions	190 mm diameter x 308 mm height x 203 mm depth (7.5" diameter x 12" height x 8.0" depth)
O-Rings seals	Dual O-rings on Encoder Shaft (Buna-N) Electronics & Integral Junction Box covers (Buna-N)
Enclosure	NEMA Type 4 Polyester coated die-cast aluminium - grade 360

Construction



4110 HART® LE
Dimensions

The Model 4110 HART® LE is designed to meet requirements for intrinsically safe operation as defined by Factory Mutual in the United States, Canadian Standards Association in Canada and CENELEC within the European community.

Product Structure

4110 Hart® Level Encoder

Approvals

CE CENELEC EEx ib IIB T4, CENELEC EEx d IIB T5

FM FM C1.I Div.1 Gr. C,D

N4110		product designation

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