4000 Advanced Technology Transmitter

Transmits level measurement and temperature data from the tank side to inventory management systems

FM APPROVED

FuelsManager® Compatibility

Benefits

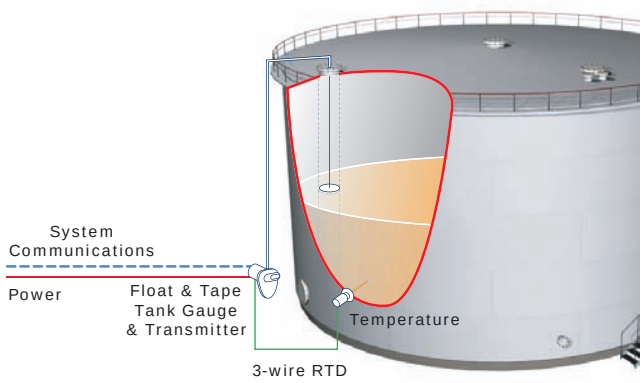
- Transmits level and temperature information
- Mounts to all standard mechanically operated, float and tape tank gauges
- Designed for mechanical simplicity – only one moving part
- Integrates a spot temperature device into your tank gauging system
- Never requires mechanical calibration
- Communicates over most common field buses
- Extensive lightning and transient protection
- Built-in damping scheme to stabilize the level and temperature in turbulent tanks
- FM & CSA approved for use in hazardous areas

Application

The 4000 Advanced Technology Transmitter (ATT) series of tank gauge transmitters connects to mechanical float and tape operated instruments to provide level measurement data to host computer systems.

The 4000 ATT is explosion proof and can integrate a temperature sensor at the tank side, making it particularly suited for use in bulk storage applications found in the oil and gas industries.

These simple and reliable products, have been the market leaders in float and tape tank gauge integration for over 50 years.



Function and System Design

The 4000 Advanced Technology Transmitter (ATT) connects to the following manufacturers mechanical float and tape operated instruments.

- Varec
- Shand & Jurs
- Gauging Systems, Inc.
- Whessoe

The changes in level measured by the float gauge are coupled to an optical encoder in the transmitter. Data encoded by the transmitter is then output, via industry standard communications, to the control room. The 4000 ATT implements a damping scheme to stabilize the level and temperature in turbulent tanks. The amount of damping is specified during configuration.

The 4000 ATT offers temperature measurement integration that can be used for inventory control applications. A 3-wire, platinum or copper RTD sensor can be connected to terminals in the integral junction box.

Field Communications

For integration with your tank inventory system, the following digital protocols are available:

- Mark Space (Matrix 1600/1700)
- Whessoe Bus
- TIWAY
- GPE
- GSI MODBUS

ATTI Bus

The ATTI Communication Port is a HART device compatible port. However, it does not power HART devices and is not designed to be intrinsically safe. It is used by the 1200 Handheld Interface for configuration of 4000 ATT and companion devices.

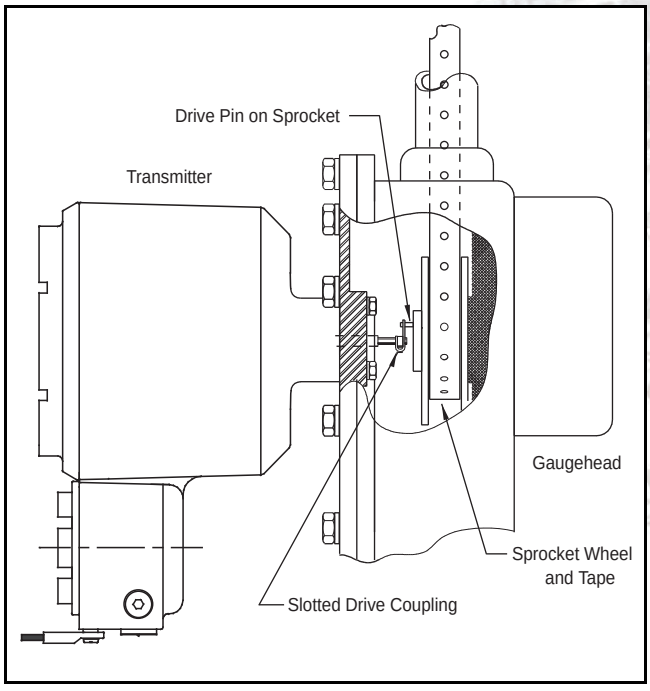
Installation Guidelines

The following information should be used as a guide only; please refer to the operation and maintenance manual for complete installation instructions. You are able to leave the tank in-service and the mechanical float gauge in place while you install and configure the 4000 ATT.

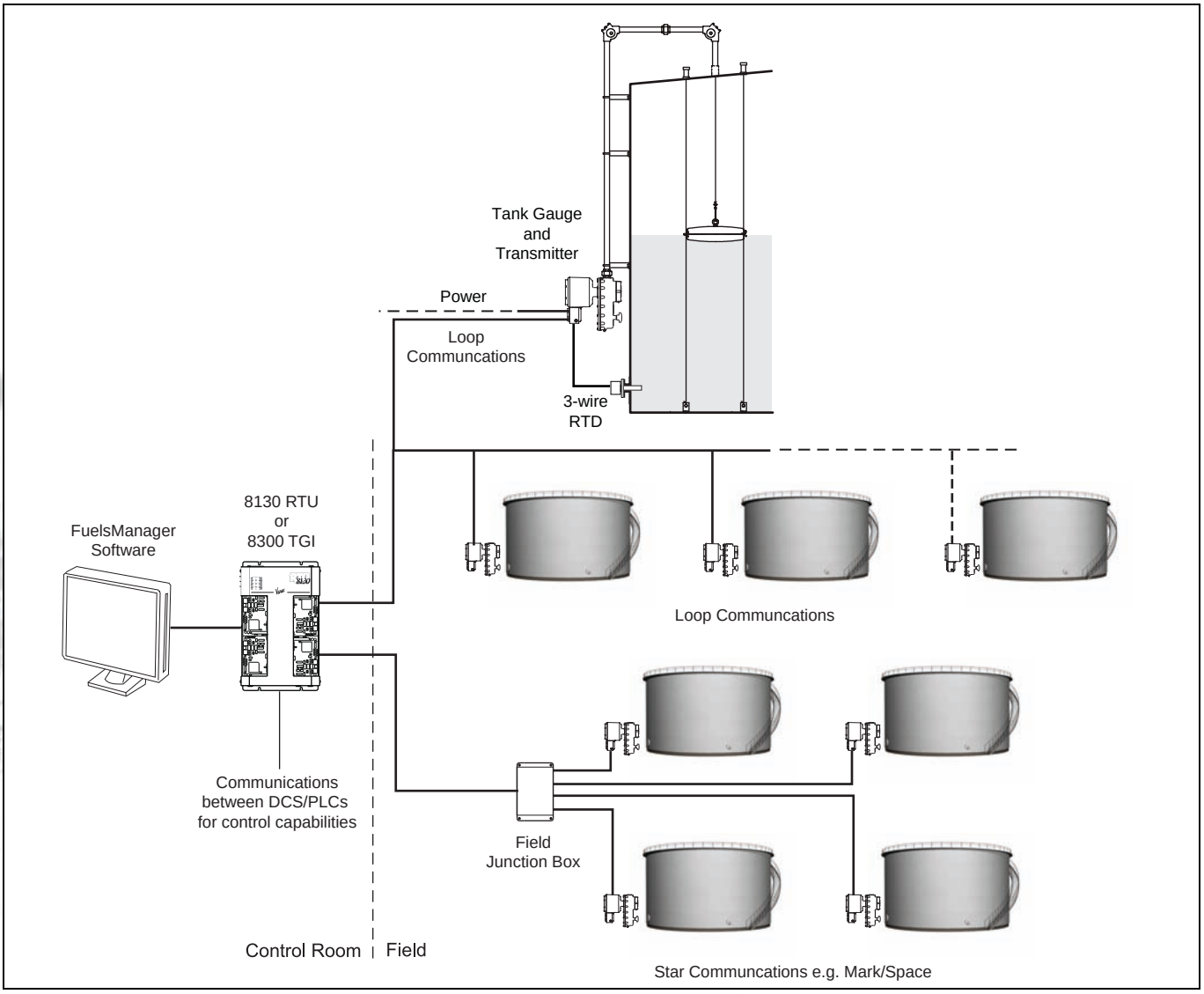
Before the 4000 ATT is connected to a mechanical float gauge at the tank side, check the following:

1. The mechanical float gauge is operating correctly.
2. There is sufficient space around the mechanical gauge to install the transmitter and accessories (such as conduit and cabling).
3. You have the correct transmitter/mechanical gauge adaptor if required.
4. You have the correct field connections at the gauge-head ready to connect to the 4000 ATT (i.e. power, communications and temperature sensor wiring).

To mount the transmitter onto the gauge, the back cover of the mechanical float gauge must first be removed. Mount the 4000 ATT in place of the access cap, making certain that the "TOP" of the 4000 ATT housing lines up with the top of the back cover. Make certain that the slot in the 4000 ATT drive coupling engages with the pin on the tape sheave of the mechanical float gauge.



4000 ATT Connected to a 2500 Automatic Tank Gauge (ATG)



Example System Diagram

Input and Output

Wiring and Configuration

Wiring to the 4000 ATT consists of connecting power, host communication, RTD input and an optional ground connection. The procedure used to wire the 4000 ATT to the host computer depends on the type of host interface option ordered with the 4000 ATT.

Input Power

The 4000 ATT operates on a 24-48 volts DC power source.

Note! Mark/Space Communications requires 48 Vdc and TIWAY communications requires 65 Vac.

Note! When connecting power to the 4000 ATT, make certain that the power is OFF.

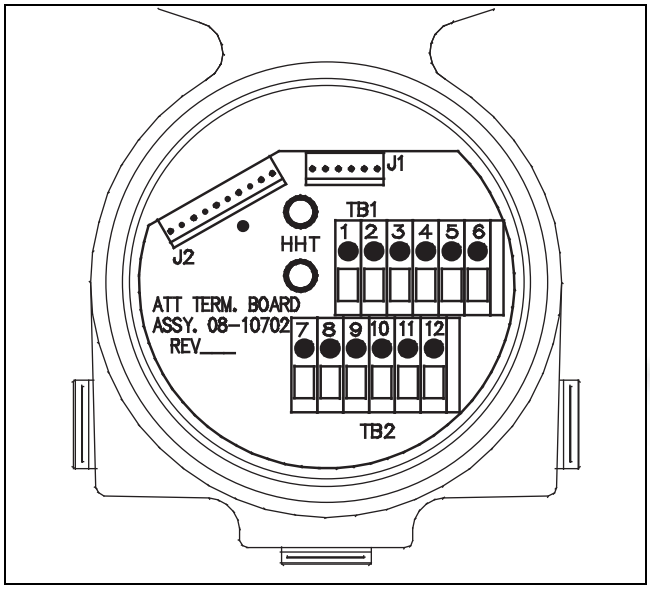
Temperature RTD Input

The 4000 ATT measures temperature directly using a high accuracy 16-bit analog to digital converter. Temperature inputs can be 3-wire copper, platinum RTD, or manual input.

Battery Back-up

The encoder's back-up battery provides continuous operation during power outages. The battery is non-rechargeable with a continuous operating lifetime of 10 days or more and a shelf life of ten years. To preserve the battery life, automatic battery shut down occurs after 24 hours of continuous power outage. The encoder monitors the voltage of the back-up battery and provides a battery low warning to the host in the

event the battery needs replacement or has shut down due to an extended power outage.



4000 ATT terminal enclosure

Note! An external grounding lug is provided on the 4000 ATT. A connection from the ground lug to earth ground must be made before any other wiring connections are made.

Terminal Block One TB1		
1	L+	= ATTI expansion Bus + power
2	HPORT	= ATTI bus HART Signal
3	L-	= ATTI expansion Bus - power
4	C	= RTD C lead
5	B	= RTD B lead
6	A	= RTD A lead

Terminal Block Two TB2		
7	--	= Reserved
8	--	= Reserved
9	B -	= ATT - power
10	B +	= ATT + power
11	M	= Mark or EIA485 -
12	S	= Space or EIA485 +

Configuration

Each 4000 ATT installed must be configured for the specific tank, attached sensors and host interface. All configuration operations are performed using either the Model 1200 Handheld Terminal (HHT) or a download from host computer software, such as FuelsManager. However, certain parameters, such as communication address and speed, must be configured via the 1200 HHT.

Configuration Parameters

A full list of configuration parameters and instructions can be found in the 4000 ATT operation manual.

Quick Configuration

The Quick Setup option allows the 4000 ATT to be configured quickly with default values. It is not likely that this configuration will match your installation exactly. However, after the Quick Setup option is selected, you are able to go into the configuration and modify any parameter. Complete Quick Setup default values are provided in the Installation, Operations and Maintenance Manual.

Using the 1200 Handheld Terminal

The 1200 HHT may be attached to the specific terminals located in the 4000 ATT junction box. It is also able to configure companion devices connected to the 4000 ATT, 4040 ATTI Bus Display Unit (BDU) and the 4050 ATTI Bus Digital I/O Unit (BID). For more information on the 1200 HHT, please see the accessories section.

Note! The Model 1200 HHT on the 4000 ATT is not Intrinsically Safe. Care must be taken to only use in a non-hazardous environment.

Accessories

Spare Parts and Maintenance Kits

The 4000 ATT is designed and manufactured to provide accurate and reliable operation without an intensive maintenance schedule.

Varec can provide spare parts, maintenance kits, preventive maintenance advice, training and warranties. Please consult your Installation, Operations and Maintenance Manual or a Varec representative for more details.

1200 Handheld Terminal

The 1200 Handheld Terminal (HHT) is a device used to support configuration of all Varec equipment with HART® and ATTI bus, such as:

- 4000 Advanced Technology Transmitter (ATT)
- 4040 ATTI Bus Display Unit (BDU)
- 4050 ATTI Bus Digital Input/Output Unit (BIU).
- 4110 HART® Level Encoder (HLE)
- 4120 Multi-Element Temperature Transmitter (METT)
- 4200 Multi-Function Transmitter (MFT)

The 1200 Handheld Terminal (HHT) can be connected at any point in the field communications loop using an interface cable with two “banana” plugs. The unit is light, easy to grip in one hand and provides a large supertwist graphics LCD display. All alpha keys are accessed through a single shift key. High speed communications ensure fast response and virtually eliminate “com error” messages.

The 1200 HHT is FM approved for use in intrinsically safe areas.

Ordering the 1200 HHT

When ordering, please use the product designation “N1200”. The 1200 HHT weighs 2lbs (0.9kg) and comes complete with a carrying case, strap, interface cable and three “AA” batteries.

Transmitter Adapters Kits

The following kits include the necessary parts, including an adaptor bracket to allow the 4000 ATT to mount to other manufacturers’ tank gauges.

Part #	Description
13-05956-102	Adapter kit for mounting to L&J 92514, 92020 and 92030 gauges
13-05956-202	Adapter kit for mounting to L&J 92006 and Whessoe Varec 2006, 2026 and 2036 gauges

ATTI Bus Display Unit

The 4040 ATTI Bus Display Unit (BDU) is a four line LCD display unit. It operates connected to and is powered from the ATTI bus. The unit is mounted in a round explosion proof junction box (CSA or FM Approved) with a window. Two 3/4-inch conduit entries are available.

Configuration is performed with the 1200 HHT. The handheld interface can be connected to any point on the ATTI bus to communicate with the Model 4040. The user may select any of the following parameters for display on each of the three lines:

- Level (default)
- Temperature (RTD)
- Status (default)
- Digital I/O

ATTI Bus Digital I/O Unit

The 4050 ATTI Bus Digital I/O Unit (BIU). It includes four digital contact closure outputs and four digital inputs. It operates connected to and is powered from the ATTI bus. The unit is mounted in a round explosion proof junction box (CSA or FM Approved). Three 3/4-inch conduit entries are available.

Technical Specifications

The following specifications apply to the model 4000 ATT over the normal (ambient) operating temperature range.

General

Manufacturer	Varec, Inc.
Designation	4000 Advanced Technolgy Transmitter
Function	Precision incremental optical encoder instrument designed to provide accurate level and temperature information from the tank side to the control room

System Design

Encoder	Incremental, infrared optical reflective
Encoder sensors	Optical infrared
Gearing system	Stainless steel, direct drive

Functional

Available ranges	0 -138 ft (0 - 42 m)
Gauging range	0 - 60 ft (18 m)

Physical

Net weight	13 lbs (5.9 kg)
Shipping weight	16 lbs (7.25 kg)
Enclosure	Explosion proof die-cast epoxy coated aluminum Rated IP65 (NEMA 4)
Conduit entries	Integrated junction box provides 3 x 1/2" NPT
O-Rings seals	Dual o-rings on encoder shaft (Buna-N) Electronics & integral junction box covers (Buna-N)

Power

Power requirements	18 - 65 Vdc 3 mA typical at 48 Vdc 150 mW, nominal Note: Mark/Space communications requires 48 Vdc Note: TIWAY communications requires 65 Vac
Battery shelf life	Ten (10) years
Battery operation	240 hours (automatic shut-off after 24 hours)

Field Communications

Mark/Space

No. of units	50+ (Depending on specifications; consult a Varec Engineer)
Mode	Low speed or high speed Mark/Space
Cable	Four (4) wire, twisted pairs

GPE

No. of units	16
Baud rate	2400 or 4800
Cable	Four (4) wire

Whessoe Bus

No. of units	15 instruments per loop (connected to RTU)
Baud rate	1,200 / 2,400 bits/s
Cable	Four (4) wire, twisted pairs

Environmental

Operating temperature	-40 °F and +185 °F (-40 °C and +85 °C)
Operating humidity	0 to 95% relative humidity non-condensing
Transient lightning protection	ANSII/IEEE C62.41
EMI	SAMA 33.1C
Vibration shock	SAMA PMC 31.1

Performance

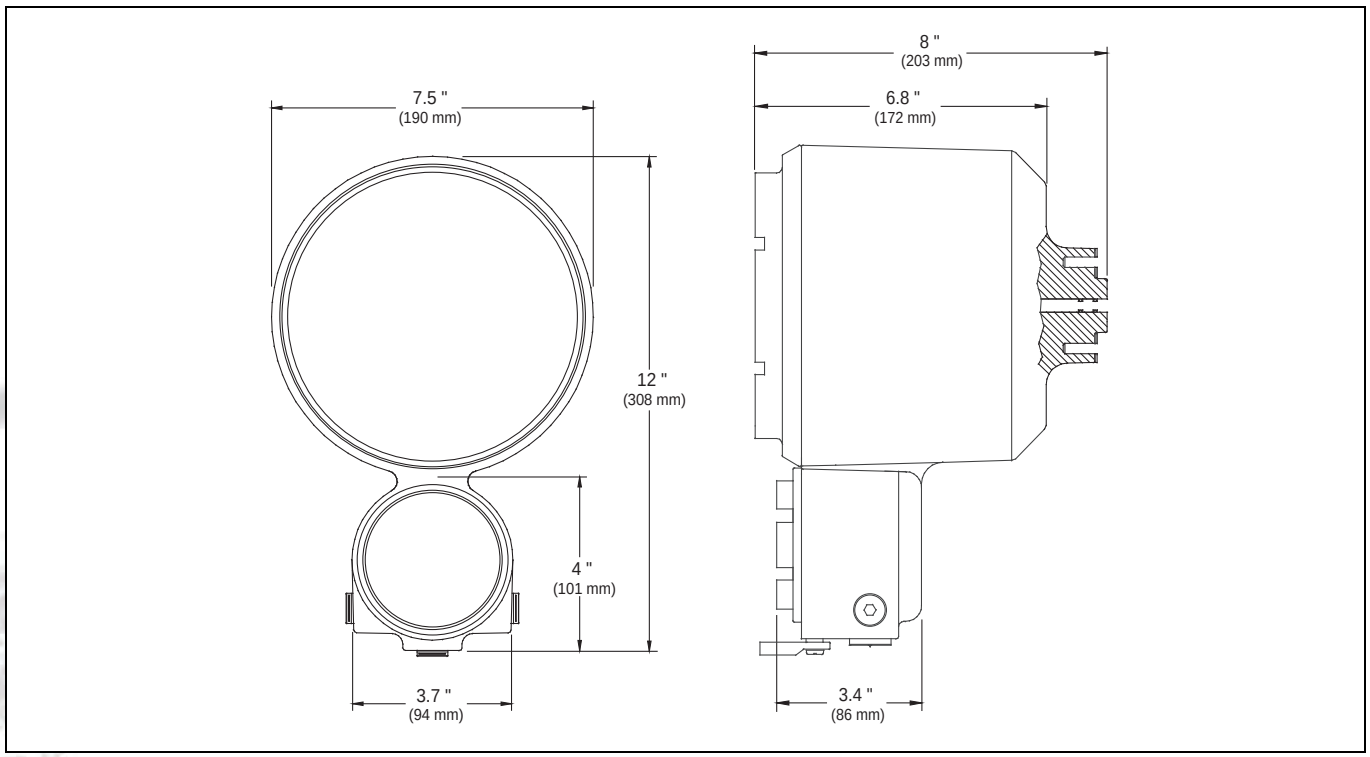
Accuracy	0.04" in (1.0 mm)
Encoder resolution	0.04" (1.0 mm)
Rotational speed	1000 RPM Maximum @ 100% accuracy - without losing synchronization with the gauge.

Certifications & Approvals

Factory Mutual (FM)
Class I, Division 1, Groups C & D; Class II, Groups E,F & G ; Class II Hazardous Location
(ETL 557067)

ETL and ETLc Certified for use in hazardous areas
Class I, Div 1, Groups C&D.
Class II, Div I. Class III, CAN/CSA 22.2
No. 30-M1986, and FM 3600, 3615

Product Dimensions



Order Codes

4000 Advanced Technology Transmitter

10	**Communications**			
	GE	GPE Loop Communication		
	MX	Mark Space Matrix (1600/1700)		
	TI	TIWAY Communication		
	WB	Whessoe Bus Current Loop (1315)		
	GM	GSI Type MODBUS		
20		**Approvals**		
		CS	CSA	
		FM	FM	
30			**Mounting**	
			0	Mounting 2500 ATG Series
			1	L&J (Shand & Jurs) 92513, 92514, 92020, 92030
			2	Whessoe 2006, 2026, 2036 and L&J (Shand & Jurs) 92006
			3	Adapter for Sakura LT-101
N4000 –				Complete product designation

www.varec.com

Corporate Headquarters
5834 Peachtree Corners East
Norcross, GA 30092
Tel: +1 (770) 447-9202
Toll Free: +1 (866) 698-2732
Fax: +1 (770) 662-8939

Your Official Representative

If no offical representative is listed here, please visit www.varec.com to find your local representative.