

New

Bulletin 1555 1/02

GSI - E/TGI

Enhanced Tank Gauge Interface

The E/TGI "Enhanced Tank Gauge Interface" is a multi-functional device that incorporates all of the features of the TGI (local display and protocol converter) and more.

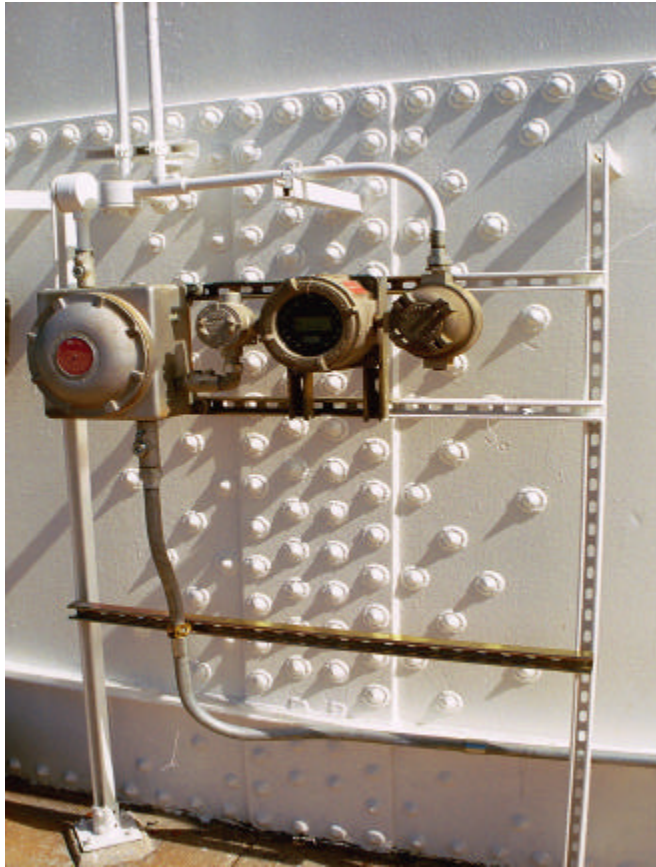
The E/TGI can be used for a variety of industrial process applications including; Local display, RTU, Protocol converter, Bus topology converter, Data concentrator, and Custom programmable applications.

With a powerful CPU and expandable memory, the E/TGI can be programmed for a specific custom application. The E/TGI can communicate with most tank gauging equipment on the market and Discrete, Analog, and Digital I/O. Personality modules provide the electrical standard and protocol for integration with most tank gauging manufacturers' equipment or host systems. Input / Output modules provide separate Discrete, Analog, and Digital variations.

The E/TGI is available with either a text or graphical display. Other features, such as Intrinsic Safety Barriers, Surge Protection, and Repeaters are supplied based upon the type of instruments used and the cabling topology.

The E / TGI comes in either a NEMA 7 Explosion Proof Enclosure for mounting at tank side (Class 1, Division 1, Group C & D areas) or a NEMA 4x Weather Proof Enclosure for mounting outside the tank dike (Safe area).

Gauging Systems Inc. has also added further communications capabilities to provide both electrical isolation of the tank farm and an increase in data throughput.



Gauging Systems Inc. (GSI™)

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E/TGI Features:

- A powerful 32 bit processor using the Linux Operating System (Embedded XP, Java 2).
- I/O Plug in modules, both Digital I/O and Analog I/O.
- Plug in personality modules, emulating electrical standards and protocols
- Character or graphical display.
- Single tank or multiple tank configurations

- **Host communication:**
 - RS 485 (IEEE Standard)
 - RS 232 (programming port or used with radio, cellular, or satellite communications)
 - **Ethernet; 10BASE-FL Fiber Link or 10BASE-T, Single or Redundant with multiple TCP/IP addresses**
 - **WEB Enabled device**
 - **Optional: Spread Spectrum Radio, Cellular, and Satellite communications**

- **Field communication:**
 - RS 485 (IEEE Standard)
 - Hard wired electrical connection (electrical standard & protocol) from personality module
 - **BlueTooth™** short distance radio used for the elimination of wire, thus, electrical isolation between the tank and field bus. BlueField™ Tank Farm Communications Topology (Patent Pending).

Gauge interfaces available with the E/TGI:

All of Gauging Systems Inc. tank gauge technology employs the IEEE RS 485 Electrical Standard and MODBUS RTU protocol . Note: Other gauge technologies have been integrated to the E/TGI through a 4-20 mA input on the optional I/O Board (Ultrasonic, Capacitance switches, etc.).

- MTG - Multi-function Tank Gauge
- GSI - Radar Tank Gauge
- CAP - Capacitance Accurate Probe
- GSI - 2000/MACB-485 Mechanical gauge transmitter
- GSI - 2002/APTB "All Purpose Transmitter Board" Mechanical gauge transmitter

Other manufacturers' gauge technology includes:

- SAAB - REX & TRL/2 Radar Tank Gauges with MODBUS RTU protocol
- Enraf - Bi-phase Mark or MODBUS RTU protocol
- MTS - Magnetostrictive Tank Gauge, DDA protocol or M-Series MODBUS RTU protocol
- L & J Tankway protocols
- Varec - 1500, 1600, 1700, 1800, 1900 electrical standards and gray code
- Sakura / Endress + Hauser - Various electrical standards and protocols

Other GSI technologies and manufacturers' equipment are currently under development. Please check with GSI for any additional equipment.

Communications

Field communications

The E/TGI has two (2) serial ports and are referred to as COM1 and COM2. COM 2 is a hardware selectable RS 232 / RS 485 port. It is connected to the field (tank gauge or BlueBoard™) and operates as a polling master for ASCII or MODBUS protocols over IEEE RS 485. The E-TGI can utilize a failure management system to incorporate Com1, that in case of a communication problem with the field the second Com port would start polling the field devices and flag the error code that service was needed on the system. This mode is optional and only available if the Host communication is on a network.

In the case of dedicated electrical standards and protocols, field communications from the E/TGI is through "Personality Modules". The personality modules emulate the electrical standard and protocol of the end device and convert the data to a format recognizable by the E/TGI. Power supply modules are required with most personality modules (other than 24 Vdc) when powering transmitters from the E/TGI.

Host / LAN communications

COM 1 is normally used for Host communications. It is a hardware selectable RS 232 / RS 485 port. Communications to the Host can be directly over the RS 485 bus or with optional communications devices, connecting via RS 232. These devices include: Phone Modem, Spread Spectrum Radio, Cellular RTU, Satellite Modem, etc. NOTE: The E/TGI can also be configured as a WEB enabled device for host communications.

Optional single or redundant, 10BASE-T or 10BASE-FL "Fiber Link" Ethernet connections are available for Host communications. When using a LAN connection, the E/TGI uses MODBUS encapsulated TCP/IP protocol as standard. The use of LAN for Host communication can also free up COM 1 for other uses.

Error Codes / Diagnostics

Error codes received from a tank gauge are placed in the appropriate Status Register within the MODBUS Register map. If the tank gauge does not respond to a poll, the E-TGI will put an Error Code of 00 01 in the Product Level Status register the BS & W Level Status Register and the Temperature Status Register. Any other errors will be stored in these status registers. This error code register is part of the packet of data sent to host.

Local Display

The local display is a four (4) row by twenty (20) character liquid crystal display (LCD). For tank gauging applications, information can be selected for display based upon what data is available from the gauge. In addition, the selection of one or multiple tanks data to be displayed. Data between tanks can scroll or be switch selectable.

Depending on the type of device, the level can be displayed in Feet, Inches and 16ths of inches, Feet and 100ths of feet, Inches and Fractions of inches (10ths, 100ths or 1000ths), or in Metric units. When being used as an RTU, various engineering units can be displayed.

GSI - E/TGI “Enhanced Tank Gauge Interface”

Ordering Information

Model Number: GSI - E/TGI – A – B – C – D – E – F – G – H - I

A = Input Devices, Electrical Standard & Protocol

GSI MTG (RS485 or BlueBoard™, Modbus RTU), I.S. required	=	MTG
GSI RTG Radar Tank Gauge (RS485 or BlueBoard™, Modbus RTU)	=	RTG
GSI CAP (RS485 or BlueBoard™, Modbus RTU), I.S. required	=	CAP
GSI APTB Transmitter (RS485, 10BASE-FL, BlueBoard™)	=	APT
MTS Magnetostrictive Probes, I.S. required	=	DDA
MTS M-Series Magnetostrictive Gauge	=	MMR
Enraf Servo or Radar Gauges, Bi-phase Mark, Local power required	=	BPM
Enraf Servo or Radar Gauges, MODBUS, Local power required	=	EMR
L & J Engineering, Tankway, Surge required	=	TWY
SAAB Radar, Frequency Shift Key, Local power required	=	FSK
SAAB Radar, MODBUS, Local power required	=	SMR
Endress + Hauser / SAAB	=	EHS

B = Power Distribution

0	=	Field Devices Powered Locally
1	=	Field Devices and E/TGI Powered by Bus
2	=	Field Devices Powered by E/TGI
3	=	Field Devices Powered by E/TGI Solar Option

C = Power (power source available to the E/TGI, example = 110Vac)

D = Output from E/TGI

A	=	RS 485, Modbus RTU Protocol (Configurable Register Map)
B	=	RS 485, ASCII Protocol (See GSI for standard & custom protocols)
C	=	RS 485/RS 232 to Radio (Spread Spectrum)
D	=	RS 485/RS 232 to Satellite (Low earth orbiting)
F	=	RS 485/RS 232 to Cellular (Modem)
G	=	RS 485/RS 232 to Phone (Modem)
H	=	10BASE-T Ethernet, Modbus encapsulated TCP/IP
I	=	10BASE-FL “Fiber Link” Ethernet Output, Modbus encapsulated TCP/IP

E = Surge Protection and/or I.S. Barriers

4	=	Surge Protection
5	=	IS Barriers
6	=	Surge Protection (Output), IS Barriers (Input)

F = Enclosure (with UL Approvals, CENELEC and PTB pending)

J	=	NEMA 7, Explosion Proof (Class 1, Division 1, Groups C & D)
K	=	NEMA 4x, Water Proof and Rain Tight

G = Display

8	=	LCD, 4 lines x 20 Characters
9	=	VGA LCD Display

I = Options

L	=	I/O Configuration
M	=	I/O Configuration
N	=	Heater & Drain (Consult GSI on options)
O	=	ON / OFF Switch, Explosion Proof
P	=	BlueBoard™ (Piconet Master)
Q	=	WEB enabled device software
R	=	Custom Software

If you have any questions, please contact Gauging Systems Inc. at (281) 980-3999.