

## Pre-Operational System Calibration

When transmitter installation and electrical connections to a suitable receiver with indicating meter are complete, and power is turned "ON", the tank level indicating system must be calibrated. This consists of adjusting the TLI circuit for a full-scale meter reading, which is equivalent to full travel of the float on the transmitter. See receiver instructions for calibration procedure.

## Operation

Once the system has been calibrated and power is "ON", operation of the Gems 36000 Series transmitter is completely automatic.

## Maintenance

An occasional cleaning of transmitters, when excessive foreign material is present in the liquid, is done by moving floats up and down and wiping units clean during normal tank servicing. Zener Barriers should be checked periodically to make sure that Barrier units are clean and free from contaminating atmospheres and are in good physical and electrical condition.

## Trouble-Shooting

CAUTION: Be sure power is "OFF" when disconnecting or connecting any system wiring.

### Gems 36000 Series Transmitters

A system within a tank may include one or several transmitter units and will have a total resistance value between 1000 and 2500 ohms, as measured between the red wire (cable pin A) and the black wire (cable pin B). This resistance value is a constant and should not vary when unit floats are raised and lowered. If the system is malfunctioning or inoperative, disconnect receiver cable and make these three basic resistance tests on the transmitter:

1. Measure resistance from red to black wires. Refer to I.D. tag attached to transmitter for proper resistance values for that particular system (See Fig. 17). This resistance should not change when float(s) are moved up and down. If it does change, see "Corrective Action".
2. Measure resistance between black wire (cable pin B) and white wire (cable pin C). This resistance should be approximately 330 ohms  $\pm$  10% with all floats at bottom rest position and should increase gradually as float(s) are raised.

When float(s) are at top positions, this resistance should equal the total "red-to-black" resistance plus 330 ohms,  $\pm$  10%. If not, see "Corrective Action" below.

3. If "opens" are detected, check all cables and mating of all connectors. If open circuits are detected within transmitter unit(s), see "Corrective Action" below.

Reconnect receiver cable to transmitter after tests have been completed.

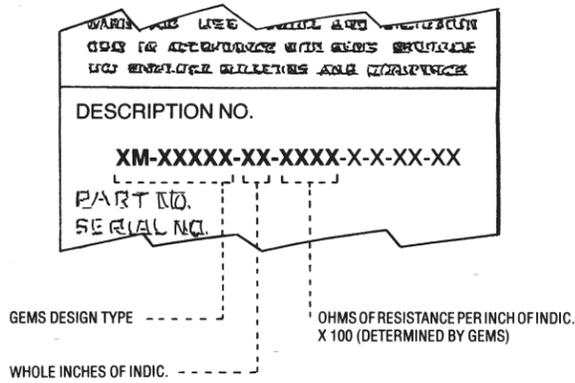


Fig 17

Explanation of Description Number Marked on I.D. Tag Attached to Transmitter Unit

### Corrective Action

Do not attempt to repair transmitters in the field. Remove and carefully package the transmitter unit and return it to Gems Sensors at the address shown below. Call 860-747-3000 for proper shipping instructions and return authorization number.

### Gems Zener Barrier SAFE-PAK

See "Field Testing of Barrier" in Zener Barrier Instruction Bulletin #56755 for trouble-shooting procedures. These procedures must be strictly followed in order to preserve the intrinsic safety of the system. Zener Barrier units are not repairable, and if found faulty as a result of these tests, they must be replaced.

### WARNING

The pressure limitations shown in the individual catalogs and drawings for the specified tank level indicator must not be exceeded. These pressures must take into consideration possible system surge pressures and their frequencies.

For hazardous area application, such as, but not limited to ignitable mixtures, combustible dust and flammables, the use of an approved intrinsically safe device is strongly recommended. Consult Factory.

\*\*\* Warning: To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing. The liquids used must be compatible with the materials of construction. Specifications of materials will be given on request. For specialized applications, consult factory.

The tank level indicator system has been designed to be shock and vibration-resistant. However, shock and vibration should be minimized. Consult Factory for assistance.

Excessive contaminants in the fluids may inhibit float operation. Consult factory for assistance.

The tank level indicators are custom-designed for particular applications. Any change in the application of the unit; the factory must be consulted.

Elastomer seals in the sensor and cable are subject to deterioration and aging and therefore need to be checked regularly. Their life expectancy varies with the application.

Troubleshooting and maintenance of the tank level indicator system must be in strict compliance with the procedure set forth in the trouble-shooting and maintenance section of the technical catalog and instruction bulletin.

Transmitters and cables must not be field repaired. All other field repairs must be performed by qualified personnel only.

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# 36000 Series Tank Level Indicating Transmitters

## Instruction Bulletin No. 78805

### General Information

The Gems 36000 TLI Transmitter is a continuous liquid level detection unit mounted in the tank and cable-connected to a remotely located indicating meter. A float moves with liquid level to vary that portion of a voltage divider within the transmitter across which the remote meter is connected, to provide a continuous readout of liquid level.

### Mounting Methods

Transmitters are flange or thread-mounted through the tank top, or bracket-mounted completely within the tank; depending on unit design type and application. (See Fig. 2 thru Fig. 5.) Units are installed singly or cable-connected in multiples for deep or odd-shaped tanks...in which case, the multiple installation functions as a single, continuous transmitter. (See Fig. 1 for typical in-tank arrangements.)

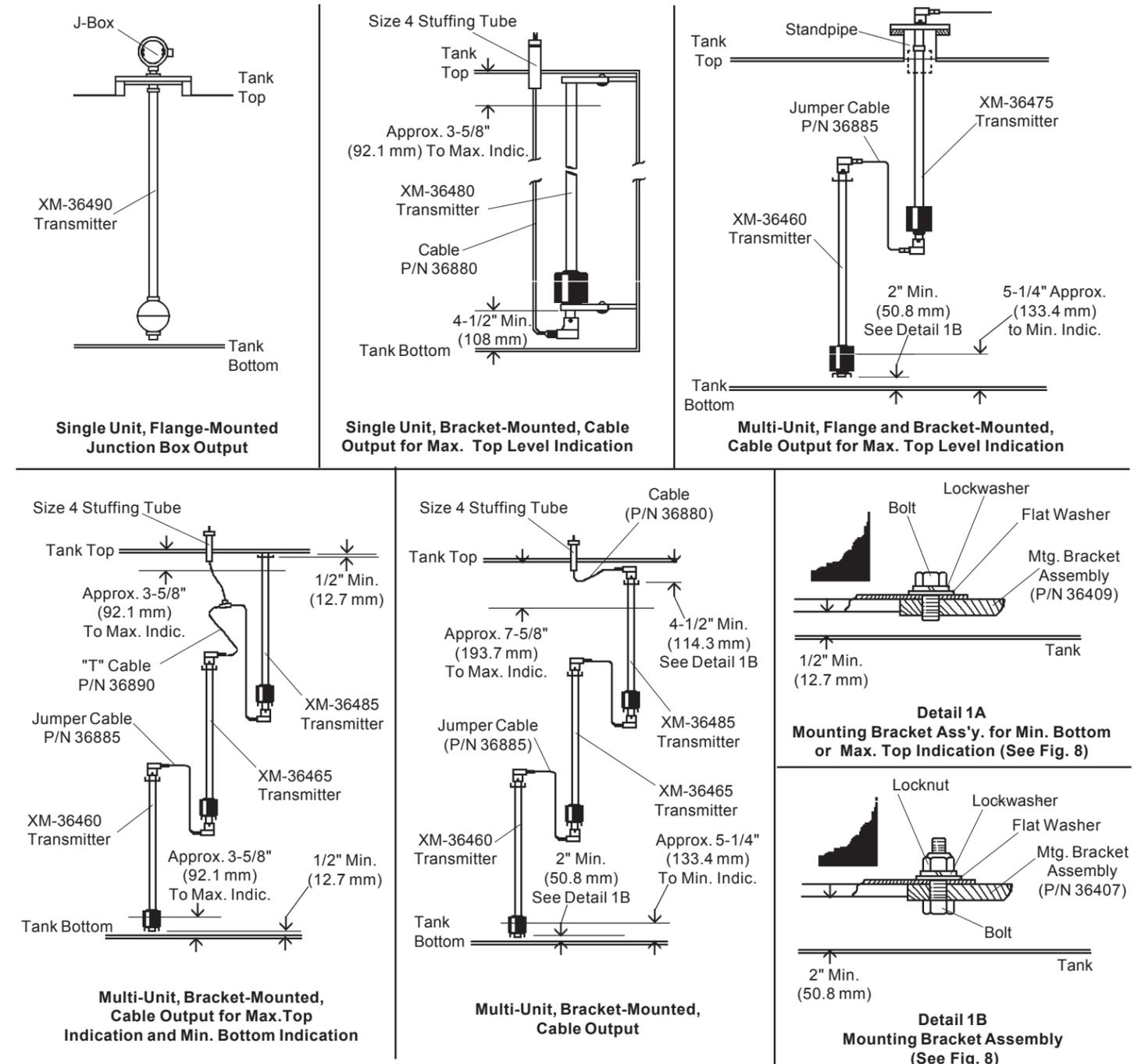


Fig. 1 Typical Installation Arrangements of Gems 36000 Series Transmitters in the Tank

## Installation

**Important:** Read the following instructions completely before installing, operating or maintaining Gems 36000 Series transmitters.

### Warning

Product must be installed, used and maintained in strict accordance with Gems technical catalog and instruction bulletins. Failure to observe this warning could result in serious injuries or damages.

### Caution

During installation, handle transmitters with care to avoid damaging floats and electrical connectors.

### Installing Flange-Mounted Units

Provide standpipe with suitable flange in top of tank as in Fig. 2. Insert transmitter in tank through standpipe and bolt transmitter flange to standpipe flange.

### Installing Thread-Mounted Design Type Unit in Tank

Provide boss with 1-7/8" - 12UN-2A thread in tank top as in Fig. 3. Mark location of float stop at bottom of transmitter stem, loosen set screws and remove stop. Mark top of float and carefully slide float off of stem.

Be sure O-ring is in place on mounting thread and insert transmitter through boss into tank. Engage mounting thread in boss and tighten securely. Reassemble float (same end up) and float stop in original position on unit from inside of tank. Tighten stop set screws securely.

### Installing Bracket-Mounted Units

See Fig. 1 for typical in-tank arrangements of transmitters. Determine and mark transmitter location(s) on tank wall or other suitable surface. Provide proper overlaps and distances apart for multi-unit transmitters as in Fig. 6. (For 3-unit transmitters: If vertical overlaps at top and bottom of intermediate unit are not exactly 7", adjust position for equal overlaps.) Install unit(s) as nearly vertically as possible, using either the "Welding Fixture" or "Direct" method. Install multi-unit transmitters in this order: (1) top unit, (2) intermediate unit, (3) bottom unit.

**Note:** Transmitters may be mounted by means of mounting brackets (furnished with units) to flat surfaces, or by means of ladder brackets or sounding tube brackets (available separately). See Figs 4 and 5.

### Welding Fixture Method

1. Select proper Gems welding fixture for top transmitter unit (see Fig. 7 and chart below). Remove locking pin, adjust fixture to indication distance\* of transmitter unit as marked on inner tube of fixture and re-insert pin. Attach mounting brackets (furnished with unit) to welding fixture brackets as in Fig. 1, Details 1A or 1B and Figs. 8 or 9.

Fixture P/N	Transmitter Indicating Distance
36452	18" to 36"
36453	37" to 75"
36454	76" to 150"

\* Transmitter indication distance is included in the description (designation) number marked on the I.D. tag attached to the transmitter unit. See Fig. 17 for explanation of description number.

- Place fixture in pre-marked position for top transmitter, with brackets on mounting surface (Fig. 10). Weld mounting brackets in place on surface.
- Detach welding fixture from welded mounting brackets.
- Repeat Steps 1, 2, and 3 for intermediate transmitter unit.
- Repeat Steps 1, 2, and 3 for bottom transmitter. (See Fig. 11.)
- Assemble units to welded mounting brackets as in Figs. 8 or 9. (See Fig. 12.)

### Direct Method

- Attach mounting brackets to top transmitter brackets as in Fig. 8 or 9.
- Wrap floats in protective covering. Place and hold top transmitter unit in predetermined position in tank with mounting brackets on welding surface (Fig. 13). Tack-weld both mounting brackets in place.
- Detach transmitter from mounting brackets, weld mounting brackets securely in place, and reattach transmitter.
- Repeat Steps 1, 2, and 3 for intermediate unit.
- Repeat Steps 1, 2, and 3 for bottom unit.

## Electrical Connection

### Transmitters with J-Box Outputs

Bring 3-wire cable from receiver into J-Box atop transmitter and connect as in Fig. 14. 1/2" NPT entrance in J-Box accepts 1/2" conduit or flexible cable connector.

### Transmitters with Cable Outputs

See Fig. 1 for Gems cable assembly types and interconnection configurations for various transmitter arrangements. Gems cable assemblies connect to all cable output transmitters in the same manner.

Plug transmitter connector into receptacle in cable adapter (Fig. 15). Make sure O-ring is in place in cable adapter and then apply O-ring lubricant. Press adapter over transmitter connector and end of transmitter stem until it completely covers black line unit on stem.

Bring penetration cable from in-tank-mounted transmitter out of tank through size 4 stuffing tube and into remote J-Box. Connect to receiver cable as in Fig. 16.

### For Intrinsically Safe Transmitter Operation in Hazardous Areas . . . All Units

Install Gems Zener Barrier SAFE-PAK, P/N 54805, one for each tank transmitter, in a non-hazardous area and connect between transmitter and receiver as described in Instruction Bulletin #56755. Zener Barrier may be installed singly or grouped on a common, earth-grounded mounting plate in a common enclosure as described in the bulletin.

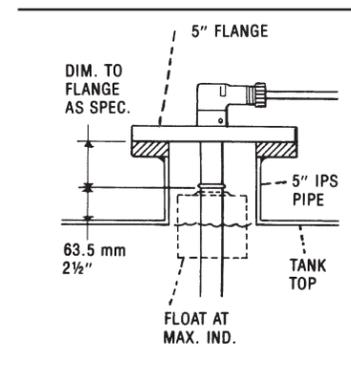


Fig. 2  
Flange-Mounting  
in Standpipe

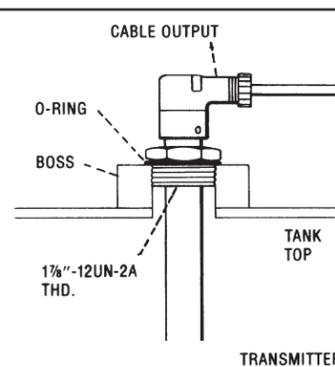


Fig. 3  
Thread-Mounting  
in Boss

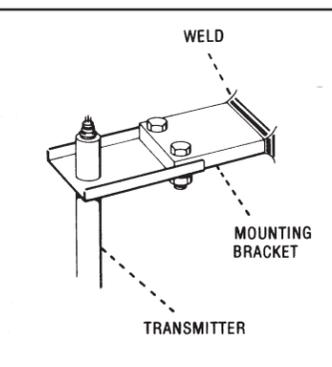


Fig. 4  
Bracket-Mounting  
on Flat Surface

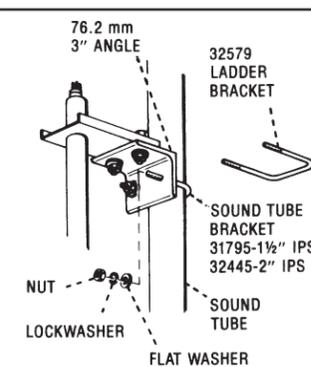


Fig. 5  
Ladder or Sounding  
Tube Mounting

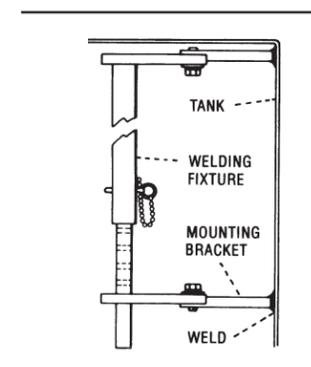


Fig. 10  
Welding Fixture  
Positioned In Tank

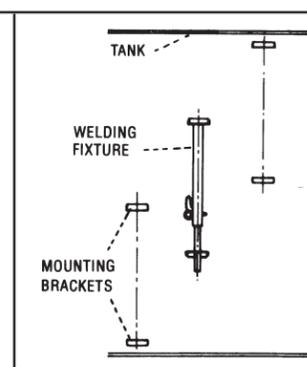


Fig. 11  
Locating Brackets  
With Welding Fixture

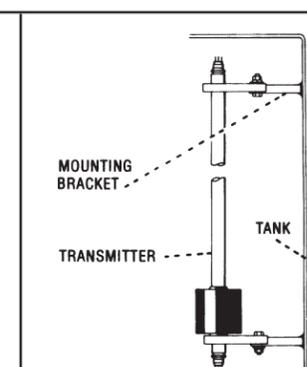


Fig. 12  
Unit Assembled on  
Mounting Brackets

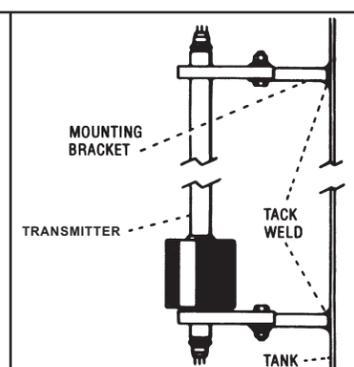


Fig. 13  
Unit with Brackets  
Positioned for Tack-Welding

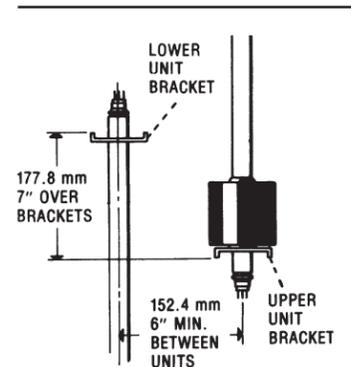


Fig. 6  
Multi-Unit Overlap and  
Spacing Apart

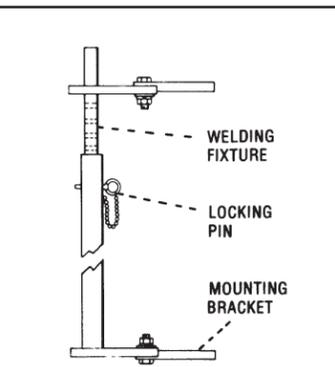


Fig. 7  
Welding Fixture with  
Brackets Attached

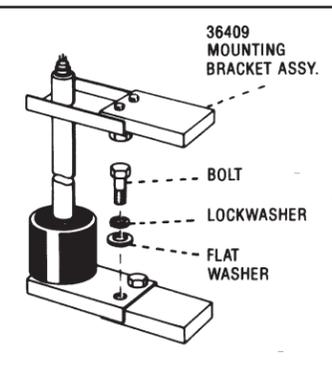


Fig. 8  
Assembling P/N 36409  
Mtg. Bracket on Unit.  
See Detail 1A, Fig. 1

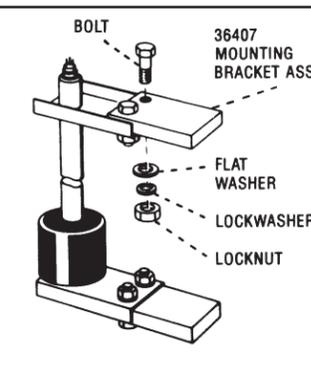


Fig. 9  
Assembling P/N 36407  
Mtg. Bracket on Unit.  
See Detail 1B, Fig. 1

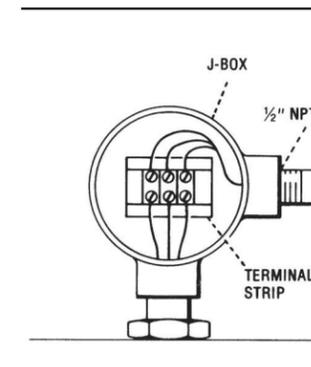


Fig. 14  
Electrical Connections  
in Unit Junction Box

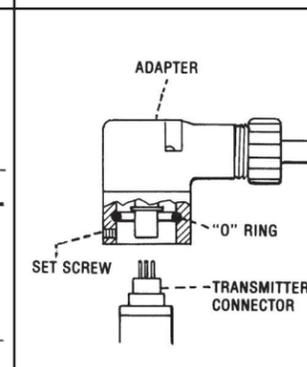


Fig. 15  
Cable Assembly  
Connection to Transmitter

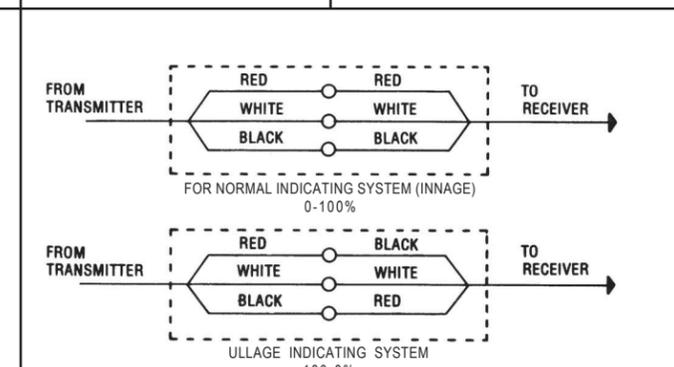


Fig. 16  
Connection of Transmitter Cable  
to Receiver Cable in Junction Box