



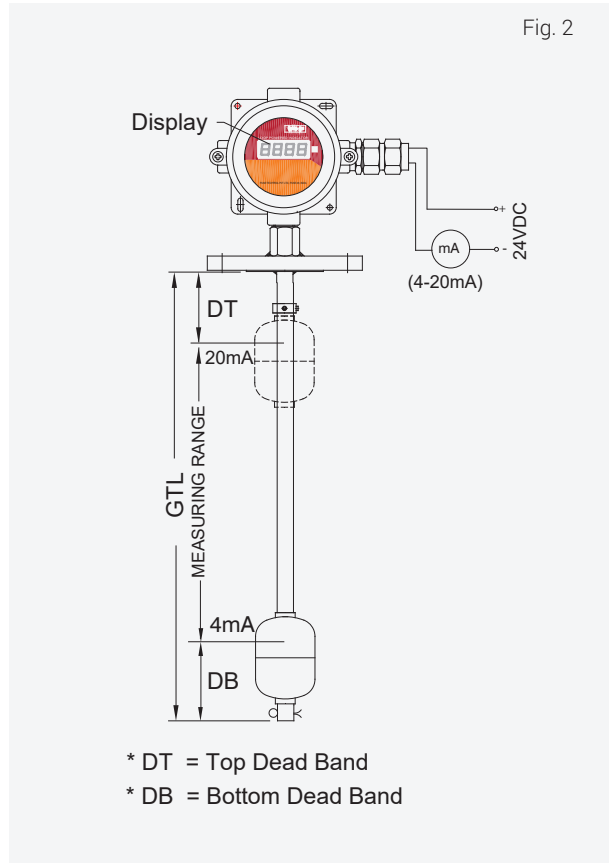
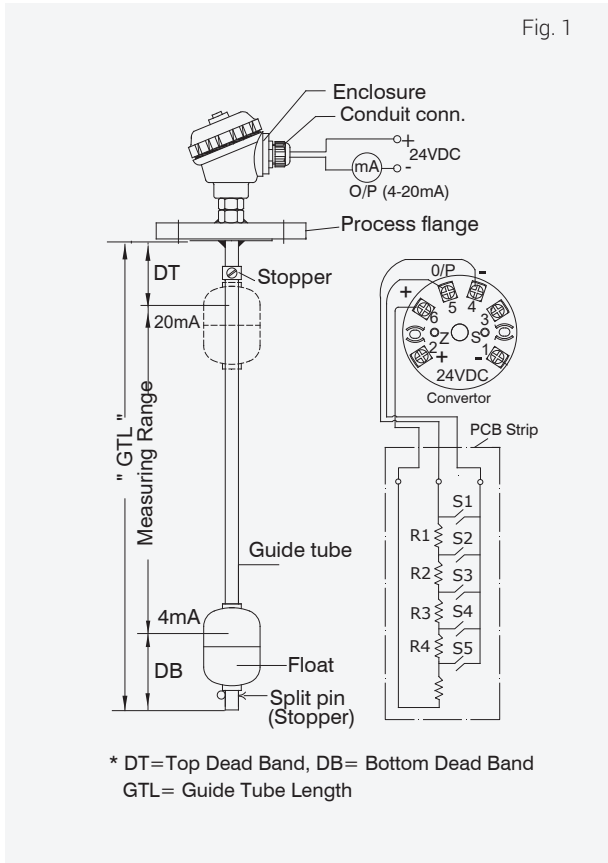
Float Guided Transmitter
- FGT

INSTRUCTION AND MAINTENANCE MANUAL

Every Techtrol product should be installed properly, maintained regularly and used within its specified limits to ensure accurate & troublefree performance with extended working life.

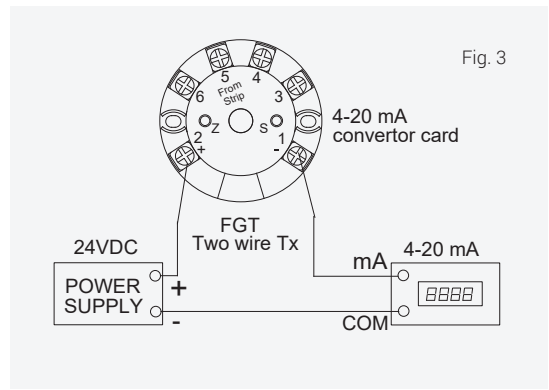
'FGT' is used for continuous level indication. It is available in two configurations.

1. FGT (fig 1) provides variable o/p viz . 4-20 mA, 4-20mA with HART, 1 - 5 VDC or RS485. There outputs can be wired to any remote display unit viz. TLPI, TLIC or TUIC to indicate level and control or PLC/DCS.
2. FGT with integral display (fig 2) provides 4-20mA output and in addition, indicates liquid level in mm or % or mtrs on display



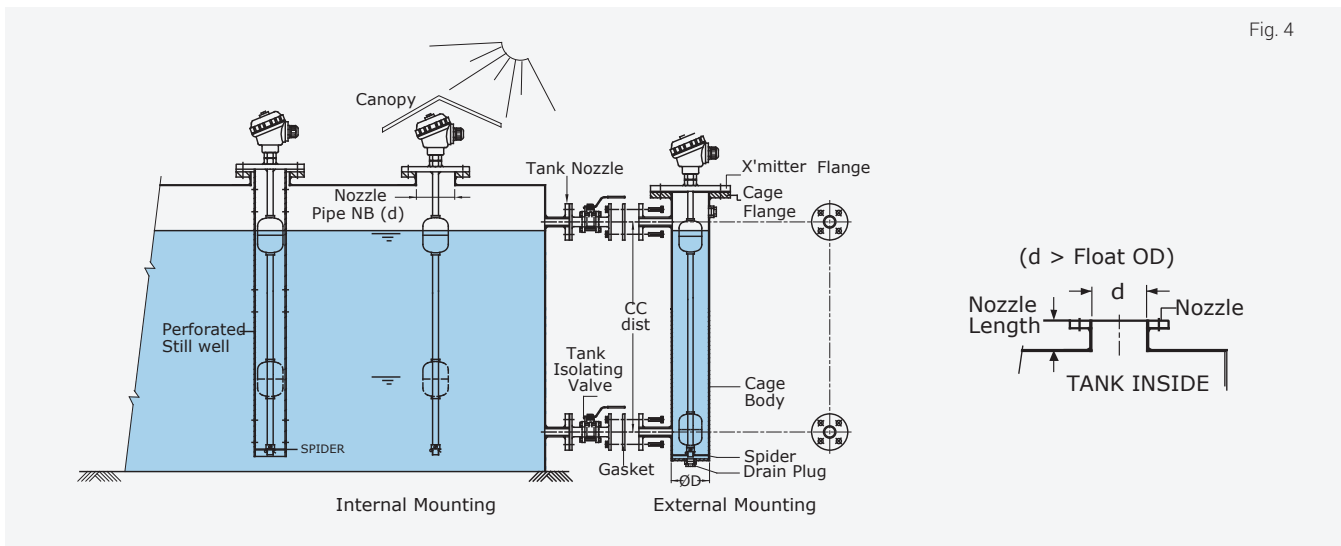
1. PRE-INSTALLATION CHECK

- Ensure supplied goods are in accordance to required specification.
- Ensure FGT is not physically damaged & stoppers have not loosened in transit.
- FGT is **pre calibrated** by setting trim pot on convertor and should be installed **without disturbing** it.
- Follow the steps below to check with 4 to 20 mA output.
 - ⌚ Connect -ve of 24VDC supply -ve (1) terminal of x'mitter. Connect +ve of 24VDC to +ve terminal (2) of x'mitter through a multimeter in current mode such that it is in series, as shown in fig 3
 - ⌚ Move the float manually over the guide tube gradually from bottom to top end and observe change in current readings in an ascending order.
 - ⌚ The multimeter will indicate 4mA, when float is in bottom position and 20mA in top position.



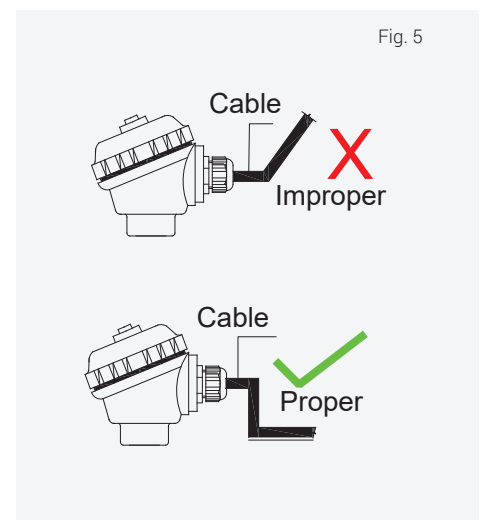
2. INSTALLATION

- FGT is top mounted transmitter. It can be installed internally or externally through external chamber.
- Select suitable location for transmitter on tank where vibrations are minimum. Perforated still well is recommended for tanks with excessive turbulence.
- Ensure process connection of transmitter should match with counter connection provided on tank.
- Ensure ID (d) of nozzle is greater than float OD to enable insertion of transmitter through the nozzle. In case $d < \text{float OD}$, remove the float and re- insert on guide tube from below after installing transmitter without float.
- In case of external mounting, provide separate isolation valve on the tank for safety and removal of level transmitter for repairs and maintenance.
- Ensure that there is no leakage at process connection by providing gasket / tape for flanged / threaded connections respectively.
- In case of outdoor location, electronics should be protected from severe weather conditions by using canopy.



3. TERMINATION & WIRING

- While wiring, power supply should be strictly off.
- Ensure the distance between transmitter and controller should not exceed 3000 mtrs. ('Max load' = 600 Ohm)
- Wires/cables from enclosures are routed down to avoid seepage of water inside the enclosure. Fig 5
- Follow the diagrams showing 'Termination & Wiring' of FGT with other instruments.
- In case of FGT with RS485 output, refer protocol document for DIP switch setting.
- FGT with intrinsic safety is supplied with zener barrier. Refer for wiring while ensuring that zener barrier is installed in safe area.



FGT with 4-20mA O/P

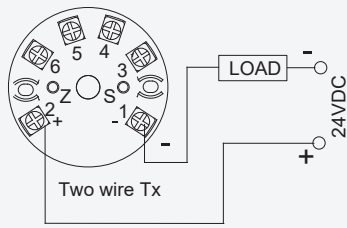


Fig. 6

FGT with 1-5 VDC O/P

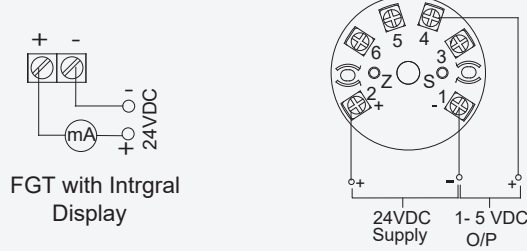


Fig. 7

FGT with RS485 O/P

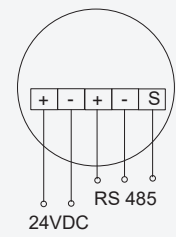


Fig. 8

FGT with LP- Cator

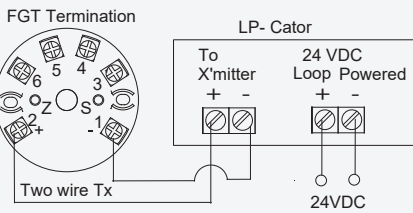


Fig.9

FGT with TUIC/TLIC

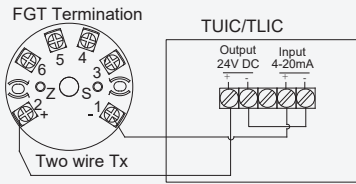


Fig. 10

FGT Intrinsically Safe

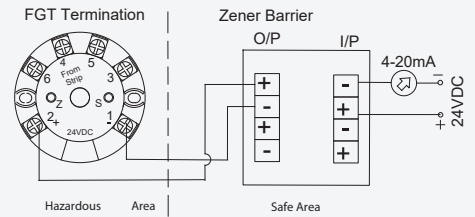


Fig. 11

4. PRECAUTIONS

- Guide tube should not be subjected to mechanical shock as the reed switch assembly inside is glass encapsulated.
- Ensure transmitter is duly earthed.
- Level transmitter should not be used in liquids containing iron particles/ burrs
- Ensure that the liquid does not have excessive contaminants which may inhibit float operation.
- Do not disturb trim pots on convertor card, as they are set for calibrated range & will result in faulty readings.
- In **hazardous** locations, open enclosure only after disconnecting transmitter from supply to prevent explosion
- Ensure IP 66 weather proofness by closing enclosure with its gasket and, cable should be full tight in cable gland ensuring no gap.
- Wiring should run away from high voltage cables, contactor and drive controls.
- Ensure that operating temperature and pressure does not exceed the specified limit.
- Before turning on power supply, ensure all wiring is correct.

5. PERIODIC MAINTENANCE




- During maintenance switch **off** the supply. Ensure that all terminal screws are properly tightened and not loose.
- Wipe the float /guide tube to remove sediment particles.Visually examine float for any puncture and bent in guide tube.
- After maintenance, ensure IP66 weather proofness by closing enclosure cover with its gasket and, cable should be full tight in cable gland ensuring no gap.
- In **hazardous locations** do not open the enclosure cover before disconnecting switch from supply and carry out maintenance then after to prevent ignition / explosion.

6. TROUBLESHOOTING

SL	Faults	Probable Causes	Solution
1	No variation in output or no output.	<ul style="list-style-type: none"> Loose terminal wiring Incorrect wiring Incorrect supply voltage. Loose connection from PCB strip to X'mitter card. Damage in PCB strip. Float punctured or not suitable for liquid Sp.Gr. X'mitter card faulty 	<ul style="list-style-type: none"> Tighten loose screws. Refer 'Termination & Wiring' diagram & ensure correct polarity Check and ensure correct supply (24VDC, $\pm 10\%$) Tighten loose connections. Consult factory Replace float with correct sp.gr or consult factory (op.pr should be within specs.) Consult factory
2	Float does not rise or fall with liquid level	<ul style="list-style-type: none"> Sediment/ particles settled on guide tube or float. Float not suitable for liquid Sp.gr. Float punctured. (Check Op.pr.) Float stuck in still well 	<ul style="list-style-type: none"> Wipe off deposition on float / guide tube and clean periodically. Replace float / consult factory with revised sp.gr for correct float. Replace float. Ensure op.pr is within specified limits/ Consult factory Use spider to bring guide tube in plumb
3	Fluctuation in current o/p	<ul style="list-style-type: none"> Turbulence in liquid 	<ul style="list-style-type: none"> Use still well or external cage
4	Improper output	<ul style="list-style-type: none"> Incorrect supply voltage Fault in reed switch serie X'mitter Convertor card faulty X'mitter Convertor card faulty due to ingress of water in enclosure Incorrect programming in case of Integral FGT 	<ul style="list-style-type: none"> Check & ensure supply voltage is rated. (16 to 30 VDC) Consult factory (Handle FGT carefully) Consult factory. Remove water and change the card. Close enclosure properly with gasket In addition, prevent ingress of water by using canopy. Re-program with correct values.
5	Communication failure in RS485	<ul style="list-style-type: none"> Incorrect or loose wiring Incorrect DIP s/w setting 	<ul style="list-style-type: none"> Tighten loose connections. Ensure correct polarity. Refer Protocol Doc. for DIP s/w setting.

PROGRAMMING - FGT with INTEGRAL DISPLAY

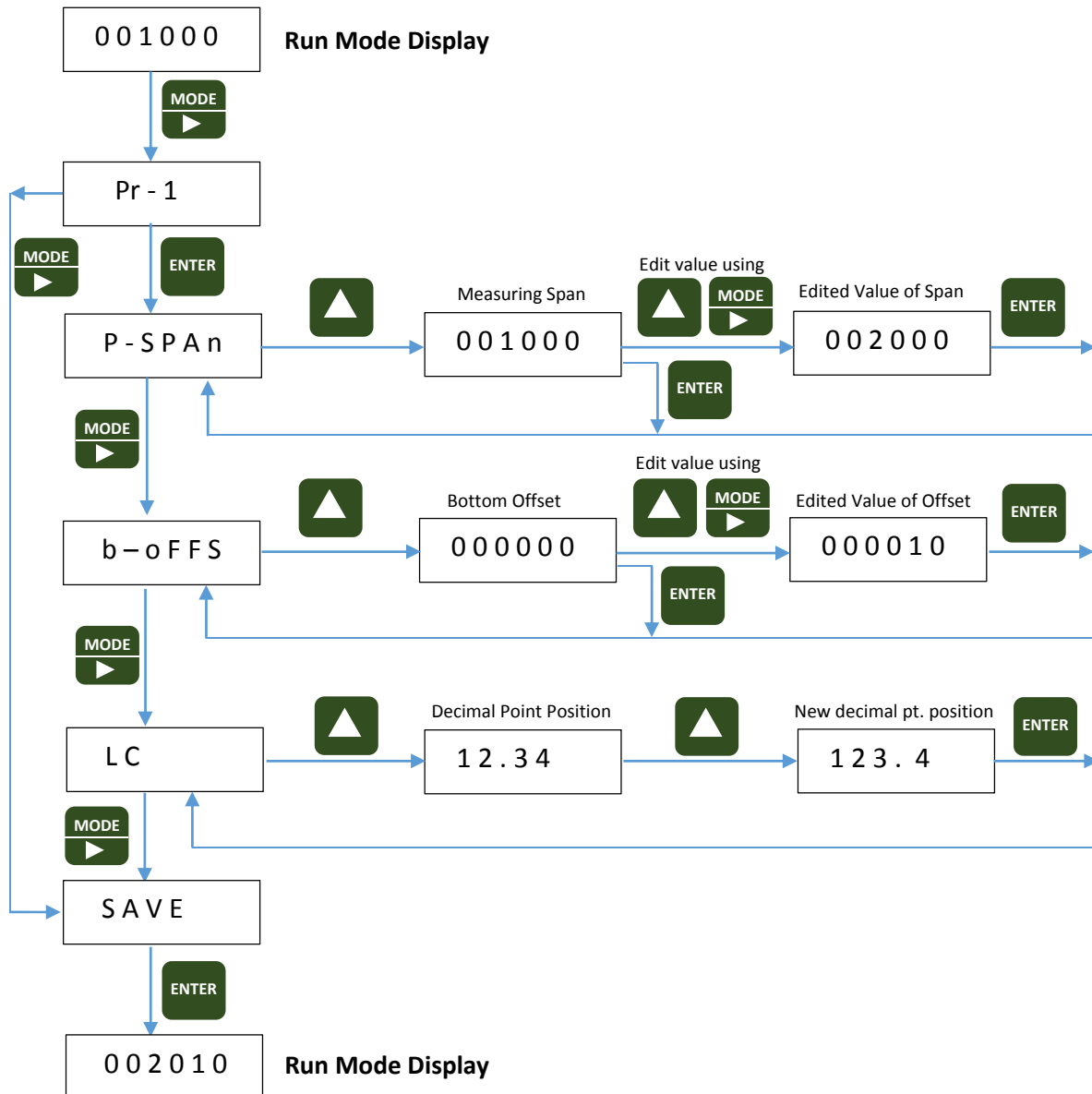
Key Functions

-  **MODE/DEC Key** - To enter in the program menu to configure data or decrement digit value when in sub menu. Also to enter in next menu
-  **UP/ SHIFT Key** - To enter in submenu to increment the digit value. Also to shift decimal point.
-  **ENT Key** - To enter or save parameter

Run Mode – Data viewed on display is operating value

Programming Mode – Operator should use keypad in conjunction with display to set parameter

Programming Flow Chart



PROTOCOL DOCUMENT

Float Guided Transmitter 'FGT with RS-485'

1. INTRODUCTION

The communication between Host & FGT with RS-485 is done on a standard RS-485 as a physical layer. The data link layer is Modbus – RTU and the function code implemented is – **Function Code 03: Read Input Register**.

2. QUERY AND RESPONSE FORMAT

Query Byte No.	Query	Response Byte No.	Response
1	Slave Address (AA)	1	Slave Address (AA)
2	Function Code (03)	2	Function Code (03)
3	HO Start Address (00)	3	Byte Count (02)
4	LO Start Address (00)	4	HO First Register Data (DD)
5	HO No. of Registers (00)	5	LO First Register Data (EE)
6	LO No. of Registers (01)	6	HO CRC-16 (FF)
7	HO CRC-16 (BB)	7	LO CRC-16 (GG)
8	LO CRC - 16 (CC)		

REMARKS :

- 'AA' is single byte slave address, which is variable from 1 to 7 depending upon DIP switch position as given below.
- 'BBCC' are two byte CRC on Query side. It is variable upon Query bytes 1 to 6.
- 'DDEE' are two byte sensor data on response side which is variable from 0 to 4095 proportionally to the float position of FGT.
- 'FFGG' are two byte CRC on Response side, it is variable depending upon Response bytes 1 to 5.

3. DIP SWITCH SETTING

DIP Switch Number	Function
1	Baud rate Selection
2	
3	
4	Slave Selection
5	
6	
7	NA
8	

A) Baud rate

DIP Switch Number	Baud Rate
1	9600
2	19200
3	38400

B) Slave Address

DIP Switch No. Configuration 4,5,6	Slave Address (In Decimal Number)
0, 0, 1	1
0, 1, 0	2
0, 1, 1	3
1, 0, 0	4
1, 0, 1	5
1, 1, 0	6
1, 1, 1	7

1= ON, 0= OFF

NOTE :

- Total 7 nos. combinations of slave address are possible.
- DIP1 switch should be ON for enabling 120 ohm termination resistor in daisy chain of RS-485
- To change the slave ID or Baud rate –
 - ⌚ First turn OFF the unit and then push the appropriate DIP switches to ON state.
 - ⌚ Now turn ON the unit and new setting will be implemented.

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