



Smart Tank Data Transmitter 133-35

FEATURES

- ❑ Precise level and temperature transmission
- ❑ Automatic selection of temperature points / element for average temperature measurement
- ❑ Two-way, two-wire, digital transmission on RS 485 bus, allows looping of 16 transmitters, reduces cabling
- ❑ Level and temperature transmission on a common signal cable
- ❑ RS 232C output for Tank Side Indicator
- ❑ Flameproof housing and intrinsically safe terminals for temperature sensor
- ❑ Local (field) level, temperature and alarm status indication
- ❑ Microprocessor based, intelligent circuitry with self-diagnostics



INTRODUCTION

The Smart Tank Data Transmitter (STDT) is an intelligent, microprocessor based instrument and uses the most sophisticated digital technology presently available for accurate conversion and transmission of product level and temperature of large storage tanks.

STDT is designed to fit/retrofit on SBEM float and tape type Automatic Tank Level Gauge (ATLG) or any other make of gauge using a suitable adaptor.

Level data is taken from tank level gauge (float and tape type) and temperature data is taken from Spot / Averaging (Multi-point) temperature sensor.

Remote indication of the measured data is available using the SBEM Communication Interface Unit (CIU) with further interface with a standard PC-AT and/or a standard Dot Matrix Printer (with RS 232C serial port).

Transmission is on two wire RS 485 bus which allows looping of 16 transmitters on single cable. Signal from SBEM Servo Gauge can also be looped on the same RS 485 bus.

CONSTRUCTION

Housed in a flameproof and weatherproof cast Aluminium enclosure, it consists of an optical encoder and following circuits-

1. Power supply and RS 485 interface
2. CPU and tank side indicator interface
3. Temperature card (optional - required only for temperature measurement and transmission)
4. Built-in display card (optional - required only when level, temperature and alarm status is to be displayed at tank bottom (for side mounted gauge). A separate Tank side

Indicator is provided for top mounted gauge. These circuits are modular to ease installation, upgradation and maintenance.

Two terminal compartments are provided - one for connecting power and signal. The other compartment has intrinsically safe terminals for connecting temperature sensor.

OPERATION

Level data is picked up from the main shaft of float and tape type level gauge by the main shaft of STDT. This data is encoded in binary gray code by using an optical encoder.

Temperature data from temperature sensor - Spot / Averaging (Multi-point) is converted to binary form by A/D convertor. For Averaging temperature (Multi-point) sensor, all sensors immersed in the liquid are averaged. The selection is done using a solid state electronic multiplexer.

The microcontroller takes gray coded level data from encoder and binary temperature data, converts it to BCD and stores in memory. Alarm status is also generated and stored in memory. This data and alarm status is displayed on built-in display, converted to ASCII and transmitted on RS 485 bus to Communication Interface Unit on demand and on RS 232C bus to Tank Side Indicator.

SPECIFICATIONS

CIRCUITRY

Microprocessor based

CPU : Microcontroller 80C31, 8MHz
RAM : 2K

LEVEL MEASUREMENT AND TRANSMISSION

Range : 0-19999 mm
Accuracy : ± 1 mm *
Input : From sprocket shaft of SBEM or any other make of tank level gauge
Conversion : Through optical encoder

* This error is due to mechanical coupling between transmitter and level gauge. Transmission error is zero.

TEMPERATURE MEASUREMENT AND TRANSMISSION (OPTIONAL)

(using external temperature sensor)

Range : - 100.0 to + 100.0 °C
Accuracy : ± 0.2 °C
Resolution : ± 0.1 °C
Sensor type : Pt-100 Spot / Averaging (Multi-point).
Maximum 14 points Selection through solid state electronic multiplexer

DATA TRANSMISSION, DISPLAY AND DIAGNOSTICS

Transmission to -
Communication : 2 Way / 2 wire RS 485 ASCII coded
Interface Unit
Tank Side : Serial RS 232C
Indicator
Baud rate : 1200 (standard)
2400 (optional)
Data protection : Longitudinal and vertical parity check
Inbuilt display : 4 ½ digit, ½" high, 7 segment LCD
(optional) to display sequentially
- Level in mm
- Temperature in °C
- Alarm status and diagnostics
Diagnostics : In-built

POWER SUPPLY

110 VAC, $\pm 10\%$, 50 Hz, 1 ϕ , mains isolated, 4 VA

CABLING

From STDT in field to CIU in control room. Up to 16 transmitters can be looped on a same cable.

Power (110 VAC) : 2 core, 1.5 mm² Copper
Signal (RS 485) : 2 core (1 twisted pair)
1 mm² Copper
R_{max} \leq 200 Ω
C_{max} \leq 1 μ F
Distance : Up to 1200 Mtrs.
(More distance possible with Line Drivers)
From STDT to TSI : 3 core, 1.5 mm² Copper
(50 Mtrs. maximum)
From temperature Sensor to STDT : (n+2) core, 1.5 mm² Copper,
n = no. of points in the temperature sensor

TERMINAL COMPARTMENTS

Two compartments
Terminals can accommodate 2.5 mm² cables
Compartment 1 : 2 cable entries for power and signal
Compartment 2 : 2 cable entries for intrinsically safe terminals for temperature sensor

SAFETY

Transmitter enclosure : Flameproof to IS 2148-1981
Gr. IIA and IIB. Weatherproof to IP 65 as per IS 2147-1962
Terminals for temperature sensor : Intrinsically safe to IS 5780-1980, Ex ia IIA and IIB T6

PROTECTION

Opto isolators provide galvanic isolation between transmitter circuit and communication bus. Metal Oxide Varistors provide protection against surges due to supply voltage and lightning

ENVIRONMENT

Ambient operating temperature : 0 to + 60 °C
Relative humidity : 95% maximum, non-condensing

MATERIALS OF CONSTRUCTION

Transmitter housing : Cast Aluminium LM6

MOUNTING

On SBEM tank level gauge (ATLG) or any other make gauge with suitable adaptor

ACCESSORIES - optional

JUNCTION BOXES (POWER & SIGNAL)

Flameproof and weatherproof cast Aluminium junction boxes are supplied with mounting hardware.

These are mounted at tank side on mounting frame & have 4 / 8 cable entries & 15 terminals suitable for 2.5 mm² cables. These enable looping & termination of power and signal cables in the field.

POWER ON/OFF SWITCH

Flameproof and weatherproof cast Aluminium box with ON/OFF switch enables switching on/off power to a particular field transmitter in the loop for loop checking / maintenance.

MOUNTING FRAME

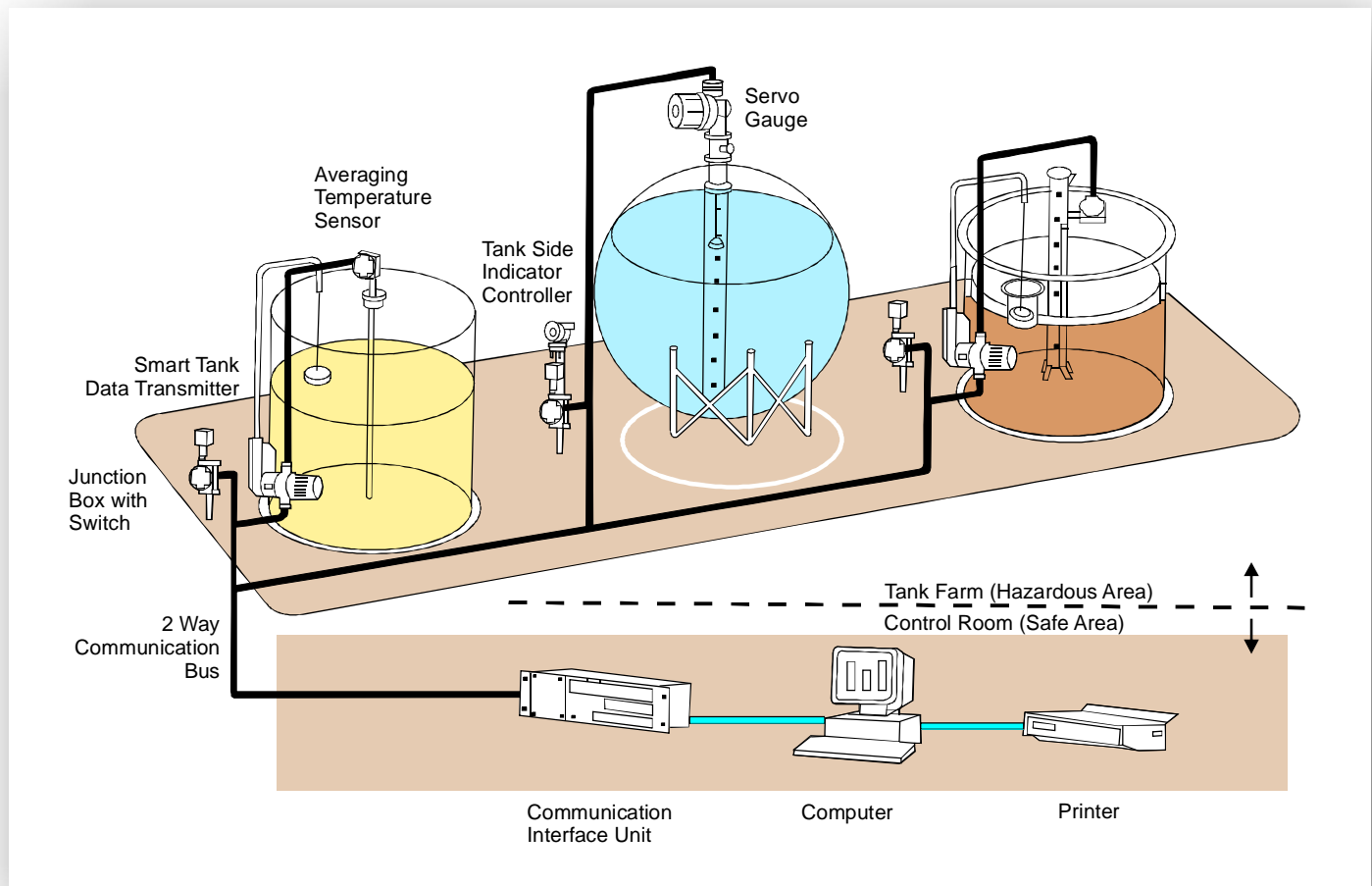
Rugged frame made of MS angles, with holdfast for grouting at tank side. Suitable for mounting junction boxes (power & signal), Power ON/OFF Switch and/or Tank Side Indicator. The frame also has cable guide pipes.

TANK SIDE INDICATOR (TSI)



An accessory provided with STDT for remote indication of level, temperature, alarm status & diagnostics data. This is required when the float & tape type level gauge with STDT are mounted on top of the tank. The TSI provides indication of tank parameters at grid level. The 4 1/2" digit, 1/2" high, 7 segment LCD display unit is provided in the flameproof & weatherproof cast Aluminium enclosure, with accessories suitable for pipe mounting.

TYPICAL TANK INVENTORY MANAGEMENT SYSTEM



ORDERING INFORMATION

MODEL
133-35

SMART TANK DATA TRANSMITTER

CODE INBUILT DISPLAY

0 Without display
1 With built-in display

CODE TEMPERATURE MEASUREMENT AND SENSOR TYPE

0 No temperature sensor
1 Pt-100 single point
2 Averaging (Multi-point)

CODE CABLE ENTRIES

1 1/2" NPT (F)
2 3/4" UNF (F)

133-35

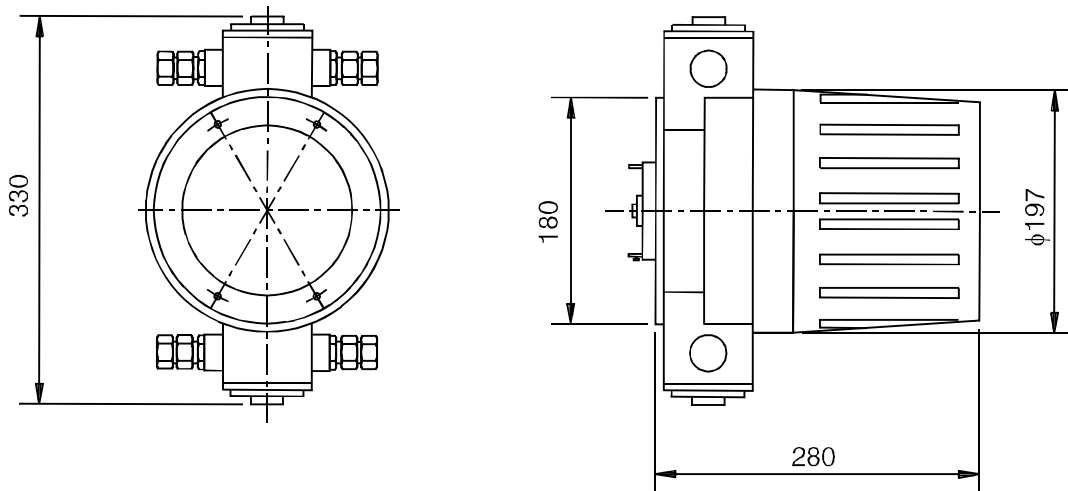
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2

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TYPICAL MODEL NO.

MECHANICAL DIMENSIONS



***Continuous development may necessitate changes without notice.

LF - 133 - 0806 R05 7/11

LF -SmartTnkDataTrnsmtr- 133



SBEM Pvt. Ltd.

H.O. : 39, Electronic Co-Operative Estate, Pune - 411 009 (India)
Tel. : 91-20-24220505, 24223375 Fax : 91-20-24215670
Email : sales@sbem.co.in, ho@sbem.co.in
Web : www.sbem-india.com



Works : Bibwewadi Industrial Estate, 691/A/2, Pune-Satara Road, Pune - 411 037 (India)

Office : Mumbai
Tel. : 91-22-27823601 / 03
Fax : 91-22-27823603
Email : sbemho@bom4.vsnl.net.in

Chennai
Tel. : 91-44-24911235
Fax : 91-44-24416947
Email : chennai@sbem.co.in

New Delhi
Tel. : 91-11-26560647, 26969679
Fax : 91-11-26969679
Email : newdelhi@sbem.co.in

Pune
Tel. : 91-20-41030100
Fax : 91-20-24215670
Email : pune@sbem.co.in

• Our Product Range •

Level Switches: Float, Displacer, Capacitance, Conductivity, Vibration, Rotary Paddle
Level Transmitters: Pulse Radar, Guided Wave Radar, Ultrasonic, Capacitance, Hydrostatic
Tank Gauging: Servo, Float & Tape, Magnetostrictive, Float & Board
Flow Meters: Electromagnetic, Ultrasonic