



TX1 WEIGHT TRANSMITTER OPERATIONAL MANUAL

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PRECAUTIONS

- Don't let unauthorized people interfere with the instrument.
- Check the supply voltage, the load cell and especially the ground connections before energizing TX 1.
- Don't energize TX 1 before making the load cell connection.
- Don't connect / disconnect the cables and/or connectors while TX 1 is energized.
- Do not open the enclosure while TX 1 is connected to the power supply.

WARNING !

The Error LED can be active before calibration. Do not care the error status before performing the calibration of your weighing system.

1. Features

The amplifier type TX 1 is an accurate and economic load cell transmitter, easy to integrate into process control systems. By its "digital heart" – modern microcontroller technology – type TX 1 allows a comfortable calibration and set up with a combination of LED's and push buttons. Option equipped TX 1 can be programmed and calibrated via PC software xFace.

The analogue signal output is programmable to 0 - 10 V or 4 - 20 mA. An opto-isolated interface option offers 2 setpoints, 1 error output, 1 input for zeroing by external command and one RS232C serial data output for setup & calibration.

TX 1 has important advantages listed below:

- It is a rail mounted device which can be easily installed in control panels. Its physical dimensions allow reasonable space advantage in the panel.
- Very easy and user friendly digital adjustment and programming via keys located on the front panel.
- In case of Error, user is warned by Error LED on front panel and optional Error output signal is activated. Analogue output goes out of the operating range.
- Via optional zeroing input, TX 1 can be zeroed by PLC or any other external device.
- eCal calibration and setup without weights via optional serial port and PC software.

1.1. Technical Specification

NPUT & A/D CONVERTER						
Linearity	% 0.01 or better					
Analogue input range	0 mV to 20 mV					
Min. input range	< 1 mV					
A/D Converter	24 bit Delta-Sigma ratiometric with integral analog and digital filters					
Resolution	Min. 0.50 μV/count					
Internal resolution	Min. 8 000 000 counts					
Conversion rate	Up to 100 measurements per second at TX 1					
	Up to 400 measurements per second at TX 1W					
SCALE CALIBRATION	& ANALOGUE OUTPUT					
Calibration	Performed with keys. There is no any switch or resistor for adjustment in					
	the instrument					
Digital Filter	2 step adjustable digital adaptive filter at TX 1					
	9 step adjustable digital adaptive filter at TX 1W					
Weighing Functions	Zeroing via opto-isolated digital input (only TX 1W)					
D/A Converter	16 bit					
Analogue output	Current output 4-20 mA or voltage output 0-10 V					
Set point	2 programmable free setpoints (only TX 1W)					
input / output	2 opto-isolated outputs for setpoints and 1 opto-isolated input for zeroing (only TX 1W)					
LOAD CELLS						
Excitation	5 V DC					
Number of Load Cells	Up to 4 units of 350 Ω or 12 units of 1100 Ω (min. 85 Ω)					
Connection	4 or 6 wire technique. Cable length 274 m/mm ² for 6 wire connection					
SETUP & COMMUNICA	ATION					
Front panel	Membrane keypad including 2x LED and 3x programming keys					
eCal	Calibration without weights by PC software (only TX 1W)					
POWER						
Power supply	230 V AC, 50 Hz , 6 VA or 24 VDC 0.2 A					
ENVIRONMENT AND ENCLOSURE						
Operation Temperature	Between -10 °C and +40 °C at 85% RH max, non-condensing					
Enclosure	Enclosure Polyamide, for DIN-rail mount, IP20					

2. Installation and Commissioning

PRECAUTION: Please read this manual carefully before energizing the indicator and perform the commissioning operation according the procedure given here. Use trained personnel for cleaning, commissioning, checking and service of the indicator. The interference of untrained personnel may cause some unwanted damages or injures.

2.1. Mechanical Installation

First of all please determine the place where your instrument can operate safely. The place where you will use/install your instrument should be clean, not getting direct sunlight if possible, with a temperature between -10°C and +40°C, 85% maximum relative humidity non-condensing.

The cables should be installed safely to avoid mechanical damages.

The housing dimensions are given in Section 5. To avoid electrical noise protect your transmitter which has very low input signal level, from the equipment that produces electrical noise.

Place your transmitter in a separate metal panel from the frequency converters and motor contactors, or at least place it in another partition of the panel. Do not combine signal cables and power cables in cable trays. And check that the cables are wired properly in order to prevent mechanical damage.

2.2. Electrical Connections

The pin layout of TX 1 is shown below. Electrical connections should be done carefully. TX 1 requires a power supply of 230 VAC, 50 Hz and 6 VA (Figure 1) or 24 VDC 0.2 A (Figure 2) to operate.

The meanings of the pins are:



Pin Name	Definition				
LOAD CELL CONNECTION					
- Ex	- Excitation				
- Se	- Sense				
+ Se	+ Sense				
+ Ex	+ Excitation				
- Si	- Signal				
+ Si	+ Signal				
<i></i>	Shield				
DIGITAL I/O	(only TX 1W)				
Err	Error output				
+ Vc	Common +24V DC for digital outputs				
O1	Digital output no. 1				
O2	Digital output no. 2				
NC	Not Connected				
Com	Zeroing input (0 V)				
Z	Zeroing input (+24 V)				
TX	TXD (RS232C)				
RX	RXD(RS232C)				
G	Ground (RS232C)				
ANALOGUE	OUTPUT				
	4 - 20mA output				
G	GND				
V	0 - 10V output				
POWER SU	PPLY				
Ν	Neutral				
L	230 V Phase				
NC	Not Connected				

Figure 1. TX 1 230 VAC front view and pin layout

	Pin Name	Definition		
	LOAD CELL CONNECTION			
-Ex -Se +Se +Ex Err +Vc O2 O1	- Ex	- Excitation		
	- Se	- Sense		
	+ Se	+ Sense		
Si Si Jrr Jrr NC Com NC Z	+ Ex	+ Excitation		
	- Si	- Signal		
	+ Si	+ Signal		
BAYKON	<i>H</i>	Shield		
	DIGITAL I/O	(only TX 1W)		
	Err	Error output		
ZERO * 0	+ Vc	Common +24V DC for digital outputs		
GAIN * *	01	Digital output no. 1		
	O2	Digital output no. 2		
	NC	Not Connected		
(F)) ((▲)) ((▼))	Com	Zeroing input (0 V)		
	Z	Zeroing input (+24 V)		
TX 1 WEIGHING TRANSMITTER	TX	TXD(RS232C)		
	RX	RXD (RS232C)		
	G	Ground (RS232C)		
	ANALOGUE	OUTPUT		
I G V 卅	Ι	4 - 20mA output		
	G	GND		
	V	0 - 10V output		
0V 24V NC ,卅 TX RX G 卅	POWER SU	PPLY		
	0V	0 V		
	24V	24 VDC		
	NC	Not Connected		

Figure 2. TX 1 24 VDC front view and pin layout

Do not forget to connect the shield of the load cell cable and the analogue output cable to TX 1 at the correct ground terminals.

The quality of the grounding of your system provides the accuracy of your weighing system beside its safety. If the condition of the power line in the plant is bad, prepare a special power line and grounding.

If you have to service the instrument, turn off the power and wait at least for 30 seconds before interfering.

Perform the other connections to TX 1 as described below.

2.3. Load Cell Connection

The load cell wiring should be made carefully before energizing to avoid damages to the instrument and the load cells. The input resistance of the load cells that you want to connect should be more than 85 Ω . The sense pins of the instrument must absolutely be connected. In 4-wire installations the sense and the excitation pins with the same polarity should be short circuited at the connector side.

Pinout Name	6 Wire Load Cell Connection	4 Wire Load Cell Connection		
+Ex	+ Excitation	+ Excitation		
+Se	+ Sense	+ Excitation		
-Se	- Sense	- Excitation		
-Ex	- Excitation	- Excitation		
+Si	+ Signal	+ Signal		
-Si	- Signal	- Signal		
<i></i>	Shield	Shield		

2.4. Analogue Output Connection

There are 2 analogue outputs on TX 1; one is for 0 - 10 volt and the other for 4 - 20 mA. But only one of them can be used at the same time and has to be selected in the setup mode.

The wiring of the analogue output should be done according to the pin configuration given in the table below.

Pin Name	Definition		
V	0 - 10 V Output		
Ι	4 - 20mA Output		
G	GND		
<i></i>	Shield		

2.5. Input and Outputs (only TX 1W)

TX 1W has one zeroing input, one error output and two setpoint outputs. If an input signal is supplied to the zeroing input, the analogue output signal of TX 1W will be set to "0 kg". The setpoints will be active when the weight value is higher than the entered setpoint value.

If any failure occurs within TX 1W, an error output will be passive and the LED on the front panel will be lightened.

If you want to use these I/O's, prepare the circuits as shown below.



Figure 3. Digital I / O connection diagram and error output description

2.6. Serial port RS232C (only TX 1W)

Serial port can be used for eCal electronic calibration, adjusting filter value, entering setpoint values and following status etc.

The pin configuration of this port can be seen in Figure 1 and 2.

2.7. Commissioning

After making the connections of TX 1 as described above, energize TX 1 carefully. Then set the instrument to the desired output mode and perform the setup and calibration operations as described in Section 4.

Check the performance of your system with different test weights.

After you have assured the accuracy of the system you can use it.

3. Operation

There are 2 LEDs and 3 keys on the front panel of TX 1. The keys are being used for setup and adjustments and the LEDs have different meanings in operation and setup mode. The usage of the keys is described in Section 4.

During power on period both LEDs are lightened 3 seconds. In operation mode the green RUN LED is ON and the red ERROR LED is OFF. The status of the LEDs in the operation mode is given in the table below.



See Section 7 in case of the red LED turns on.

	0 – 10 V output	4 – 20 mA output		
Green RUN LED	Flashes (on for 4 seconds)	On		
Red ERROR LED	Off	Off		

The analogue output signal also gives information about the status of the system and the weighing process:

Condition	0 – 10 V output	4-20 mA output	Error (option)
Operation	Х	Х	High
Programming	Х	Х	Low
The weight is more than the range (Over)	13 V	24 mA	Low
The weight is under than the zero range (Under)	-1.4 V	0 mA	Low
System Error	13 V	24 mA	Low
ADC is out of operating range	-1.4 V	0 mA	Low

4. Programming via Keys

After making the connections of TX 1 as described before, energize the transmitter.

During power on period green and red LEDs are lightened for 3 second. After turning off both LEDs for a short period, one of them will be lightened. If you did not follow these LED signalization sequence, power off the instrument, check the power and load cell cables and power on it again.

In this step the lightened LED informs you also for the analogue output mode of the instrument. If LED is continuously lightened, it means the analogue output mode is 4-20 mA; if it flashes, it means analogue output mode is 0 - 10 V. If your usage is different than the programmed mode, you have to select your analogue output mode first as described in Section 4.1.

After this, set up and calibrate the instrument as described in Section 4.2.

Finally check the performance of your system with different test weights. After being sure of the accuracy of the system you can use it.

4.1. Changing the Analogue Output Mode

The selected analogue output mode (voltage or current) is indicated by the lightened LED. If LED is continuously lightened, it means the analogue output mode is 4 - 20 mA; if it flashes, it means analogue output mode is 0 - 10 V. If your usage is different than the programmed mode, you have to change your analogue output mode first as described below.

For changing the analogue output mode press (F) and (A) keys simultaneously. You can follow the selected mode by lightened LED.

If you have changed the analogue output mode, you have to recalibrate the transmitter – regardless if it has already been calibrated for the other output mode.

4.2. Setup and Calibration

Warning: The analogue output mode shall be selected as 0 - 10 V or 4 - 20 mA before programming and calibration. Do not forget program and calibrate the instrument after changing analogue output mode.

In this Section you'll find the required information for the setup and the calibration of TX 1. The symbols at the right bottom of the keys show the function of the keys in setup mode. The meanings of the keys in the setup mode are given in the table below.

F			
• Enter / exit the setup mode	 Increase the value 	Decrease the value	
Go to next step	Setup Setpoint no. 1	Setup Setpoint no. 2	
Save	 Filter type "High" 	 Filter type "Low" 	

4.2.1. Fast Calibration

The Transmitter has fast calibration feature to earn time to the service technician. If only the calibration adjustment is needed, follow the below steps for fast calibration.

Press () and () keys simultaneously to enter the "Fast Calibration" menu. The transmitter indicates the fast calibration mode by flashing the two LEDs on the front panel the same time as continuously.

STEPS	LED'S POSITION GREEN RED	DESCRIPTION
ZERO ADJUST	i¥ ¥ Flash Flash	Unload the scale:
v ↓ SPAN ADJUST	★ ★ Flash Flash	Load your maximum capacity on the scale :
	✤ ★ Flash Flash	F : Return to the operation mode.

4.2.2. Entering Setup & Calibration

Press \bigcirc and \bigcirc keys simultaneously to enter the "Setup and Calibration" menu. The transmitter indicates the started setup mode by flashing the two LEDs on the front panel three times sequentially. Then Green LED flashes.

4.2.3. Setup & Calibration

The status of the LEDs on the front panel indicates the setup step as seen below. You can go to the next step by pressing the \bigcirc key. Calibrate the scale and adjust other parameters as indicated below:

STEPS	LED's POSITION GREEN RED	DESCRIPTION
ZERO ADJUST -	¥ ● Flash Off	 Unload the scale. Adjust the output value to 0 V or 4 mA by using keys described below : Pressing this key will decrease the output value. Pressing this key continuously will decrease output faster. While pressing this key continuously, pressing key will decrease the output value very high rate. Pressing this key will increase the output value. Pressing this key continuously will increase output faster. While pressing this key continuously will increase output faster. While pressing this key continuously will increase output faster. While pressing this key continuously will increase output faster. While pressing this key continuously will increase output faster. While pressing this key continuously, pressing key will increase the output value very high rate.
SPAN ADJUST	★ ★ Flash Flash	 Load your scale. The load value must be between 10% to 100% of your maximum. Adjust the output value to the required value for your load by using keys described below: Pressing this key will decrease the output value. Pressing this key continuously will decrease output faster. While pressing this key continuously, pressing key will decrease the output value very high rate. Pressing this key will increase the output value. Pressing this key continuously will increase output faster. While pressing this key continuously will increase output faster. While pressing this key continuously will increase output faster. While pressing this key continuously will increase output faster. While pressing this key continuously, pressing key will increase the output value very high rate.
SETPOINT ENTRY	● 🔆 Off Flash	Put the weight equal to SP1 or SP2 on load receptor
FILTER SELECT	O O On C ★ On Flash	 High filtering (Low frequency cut off / slower performance) (Default) Pres () Pres () key to adjust the filter low filtering Low filtering (High frequency cut off / faster performance) Press () key to make the filter high filtering Note: If it does not create you weighing problem, prefer high filtering for increasing the stability of the weighing system.

4.2.4. Exit from Setup & Calibration

To exit from setup and calibration mode, press the \bigcirc key to save the changes and go to the next step. Press the \bigcirc and the \bigcirc keys simultaneously to exit from the setup mode and return to the operation mode.

5. Programming by PC Software

TX 1W has RS232C serial interface, you can perform eCal electronic calibration, adjust filter, download setpoint values and follow status by using **xFace** software installed on a PC.

You can make eCal easily by entering total load cell capacity in kg, load cell output in mV/V, scale capacity in kg and estimated preload values to the eCal window and clicking "write eCal values to the transmitter" button easily.

The minimum PC requirements are:

- Windows 2000, Windows XP or Windows Vista operating system
- Serial port
- Serial cable for RS232C signals between TX 1W and PC

For installing the xFace follow the steps described in the Readme.txt file in the eCal set up directory.

The main menu of this software is as seen below;

File T	n <mark>ce v2.01</mark> pols Data He	əlp							
D New	💋 🔓 Open Sav	ve Sz	ave as	Connection	¢ w	ka ite all	Read All	Se Disconnect	Connect
	eCal	Plea	Ca se choo	alibration ose analogu	ie out	put mod	Setup e before calil	Station	atus
	Analogue Output Mode • 0-10V C 4-20mA								
	Total Load	l Cell C	apacity	/	: 150	00	kg	Warnii	ng!
	Avarage Load Cell Output : 2.0000 mV/V eCal shall be performed after analogue output mode is selected.						ll be after output lected.		
	Estimated	Dead L	oad		: 123	1	kg		
		f	Read e rom Tr	Cal Data ansmitter		Write Ti	eCal Data to ransmitter		

After performing eCal as described in the software, check the performance of your system. After being sure of the accuracy of the system you can use it. You can find required information for using the eCal-Transmitter software in its help file.

6. Housing Dimensions



7. Trouble Shooting

The type TX 1 amplifier has been designed as a very reliable and virtually error free instrument. However if an error occurs, do not attempt to repair the equipment before you understand what caused the error. Note the status of the front panel LEDs, and try to find the problem with the help of the table given below. Don't let unauthorized people interfere with the instrument.

In case of an error the ERR LED indicates the analogue output mode too in case of error like RUN LED.

If the output mode is set to 4 -20 mA, the ERR LED lights continuously in case of an error. If the analogue output mode is set to 0 - 10 V, the ERROR LED flashes.

FRONT PANEL LEDS		ERROR	DEFINITION
Run (Green LED)	Error (Red LED)	(Optional)	
On	Off	1	- Operation in 4 – 20 mA output mode.
Flash	Off	1	- Operation in 0 – 10 V output mode.
Off	Off	0	No powerBoard failure
Off	On	0	Output mode is 4 – 20 mA and - Input signal is out of range - Calibration needed. - Check output circuit and cabling. - Board failure
Off	Flash	0	Output mode is 0 – 10 V and - Input signal is out of range - Calibration needed. - Check output circuit and cabling. - Board failure

The analogue output also give additional information about the weighing system as described in Section 3.

Notes :

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