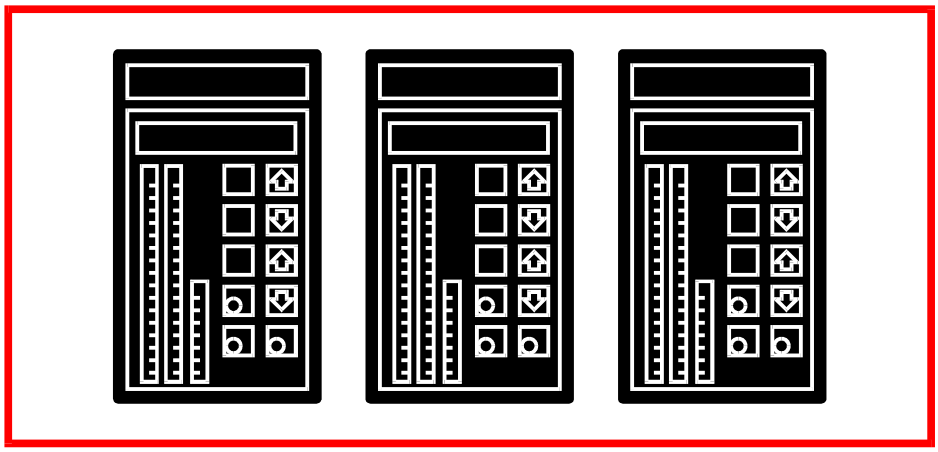
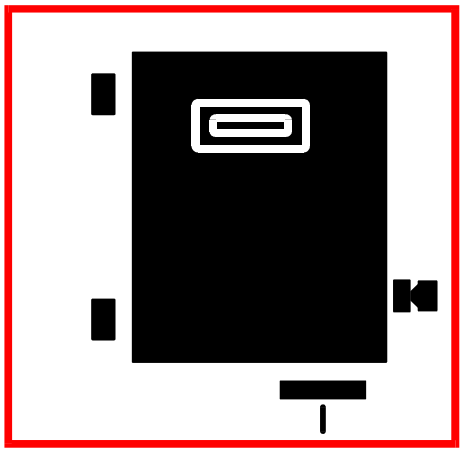
Bailey

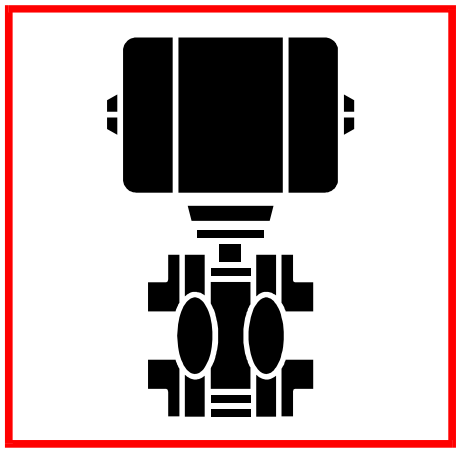
PRODUCT INSTRUCTION

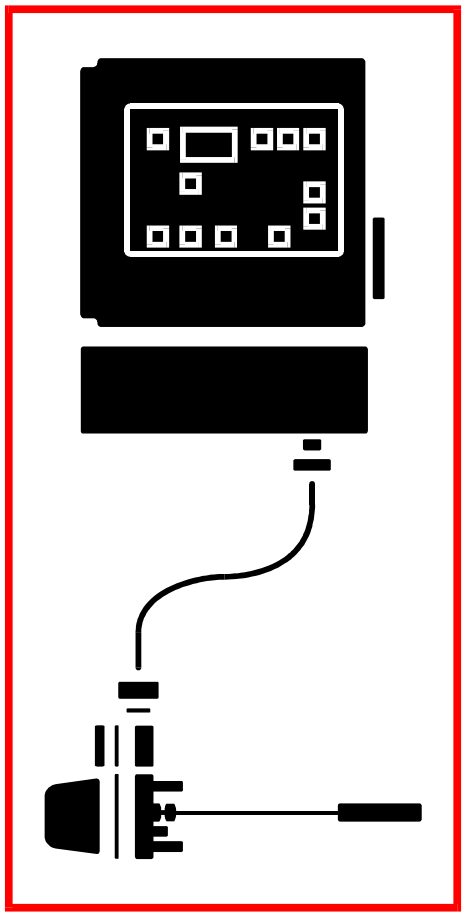
Type STT03E

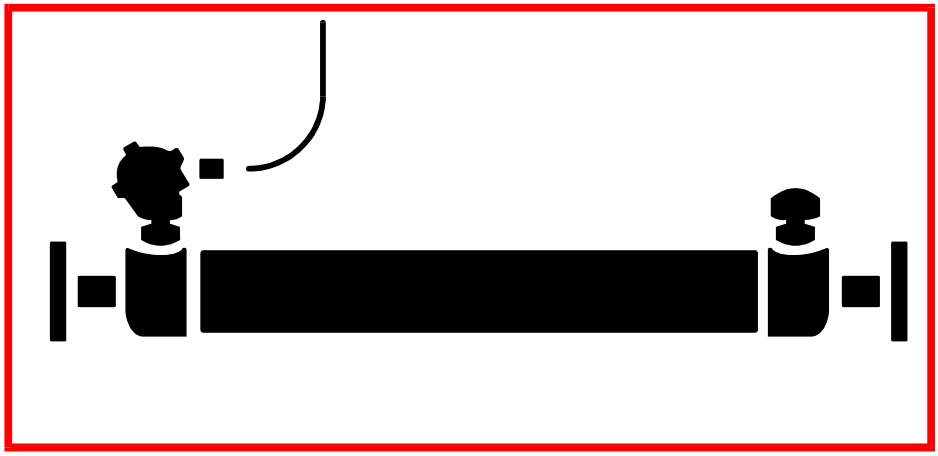
Smart Transmitter Terminal

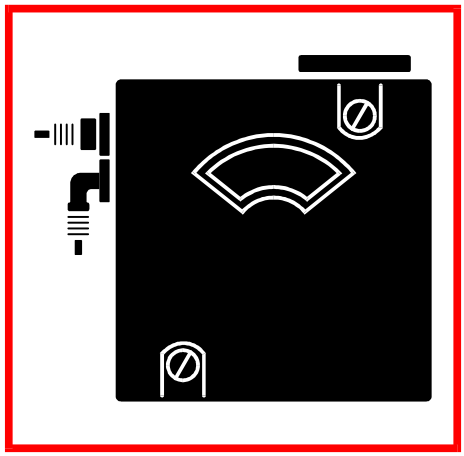












Elsag Bailey
Process Automation

Preface

The information in this instruction provides guidelines and procedures for installation, operation, and troubleshooting the Type STT03E Smart Transmitter Terminal. This instruction is a supplement to the device product instructions. The STT03E terminal interfaces to the following devices:

Type AVS Smart Positioner.
Type BCN Pressure Transmitter.
Type EQN Temperature Transmitter.
Type EQS Temperature Transmitter.
Type XM/SM/XE Magnetic Flowmeter.
Type PTS Pressure Transmitter.
TBN480 Conductivity Transmitter.
TBN580 Transmitter.
TBN581 (ORP/pION) Transmitter.

List of Effective Pages

Total number of pages in this instruction is 156, consisting of the following:

Page No.	Change Date
Preface	Original
List of Effective Pages	Original
iii through ix	Original
1-1 through 1-6	Original
2-1 through 2-2	Original
3-1 through 3-3	Original
4-1 through 4-20	Original
5-1 through 5-8	Original
6-1 through 6-2	Original
7-1 through 7-6	Original
8-1 through 8-1	Original
A-1 through A-10	Original
B-1 through B-10	Original
C-1 through C-8	Original
D-1 through D-8	Original
E-1 through E-8	Original
F-1 through F-9	Original
G-1 through G-12	Original
H-1 through H-12	Original
I-1 through I-10	Original
Worksheets (9)	Original
Index-1 through Index-3	Original

When an update is received, insert the latest changed pages and dispose of the superseded pages.

NOTE: On an update page, the changed text or table is indicated by a vertical bar in the outer margin of the page adjacent to the changed area. A changed figure is indicated by a vertical bar in the outer margin next to the figure caption. The date the update was prepared will appear beside the page number.

Table of Contents

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

List of Figures

List of Tables

Safety Summary

GENERAL WARNINGS	**Equipment Environment** All components, whether in transportation, operation or storage, must be in a noncorrosive environment. **Electrical Shock Hazard During Maintenance** Disconnect power or take precautions to insure that contact with energized parts is avoided when servicing.
SPECIFIC WARNINGS	Nonrechargeable batteries may explode or leak if recharged. This unit contains six rechargeable batteries. If battery replacement is required replace all batteries at same time and only with rechargeable type. To prevent ignition of a hazardous atmosphere, batteries must only be charged or changed in an area known to be nonhazardous. (p. 3-1, 7-4) System maintenance must be performed only by qualified personnel and only after securing equipment controlled by the circuit. Altering or removing components from an active circuit may upset the process being controlled. (p. 6-1) Explosionproof/dust-ignitionproof installations and intrinsically safe installations in Class II or Class III hazardous locations require that the assembly be kept tight while circuits are live unless the location is known to be nonhazardous at the time. (p. 6-1)
SPECIFIC CAUTIONS	Do not allow cleaning solution or any other liquid to enter the terminal case as it will damage internal components. (p. 6-1)

Sommaire de Sécurité

AVERTISSEMENTS D'ORDRE GÉNÉRAL	**Environnement de l'équipement** Ne pas soumettre les composants à une atmosphère corrosive lors du transport, de l'entreposage ou l'utilisation. **Possibilité de chocs électriques durant l'entretien** Débrancher l'alimentation ou prendre les précautions pour éviter tout contact avec des composants sous tension durant l'entretien.
AVERTISSEMENT D'ORDRE SPECIFIQUE	Les piles non-rechargable peuvent exploser ou couler si recharg'ees. Cet ensemble comprend six piles rechargables. Si le remplacement d'une pile est requis, Replacer toutes les piles en même temps en utilisant des piles de type rechargeable seulement. Afin d'èviter l'ignition d'une atmosphère que dans un endroit où le danger est manifestement inexistant. (p. 3-1, 7-5) L'entretien du système ne doit être effectuquèe par le personnel qualifiè et seulement une fois que l'èquipement contrôlè par le circuit est fixè en place. La modification ou le retrait des composants d'un circuit actif pourraient perturber le processus controlè. (p. 6-1) En ce qui concerne l'installation anti-explosion et anti-ignition provoquè par la poussière dans des endroits se Classe II ou Class III, il est indispensable que l'assemblage soit tenu ètanche pendant que les circuits sont èlectrises, a moins que cet endroit ne prsente aucun danger a ce moment-la. (p. 6-1)
ATTENTION D'ORDRE SPECIFIQUE	Ne pas laisser une solution nettoyante ou un quelconque liquide pènètrer le botier de raccordement, ceci pourrait endommager les composants internes. (p. 6-1)

SECTION 1 - INTRODUCTION

TYPE STT03E DESCRIPTION

The Type STT03E Smart Transmitter Terminal is a battery powered, portable communication device that is designed for use with the Bailey-Fischer & Porter line of smart electronic instrumentation. The basic terminal firmware supports all Type PTS Platinum Standard™ Transmitters and Type EQS Platinum Standard Temperature transmitters. The Type STT03E terminal interfaces the Type BCN, EQN, AVS, Mag Flow, and Series TBN transmitters using smart terminal cartridges (STC). Refer to Table 1-1 for Type STC cartridge nomenclature. Table 1-2 lists the functionality of the terminal with the Type STC cartridge combinations.

The STT03E terminal configures, calibrates, modifies, troubleshoots, and verifies the operation of Bailey-Fischer & Porter smart devices from various remote locations.

The STT03E terminal has 32 keys, including 12 numeric keys. Four of the keys are arrow keys. There are ten operation keys that provide menus and screens for various functions. In addition there are two function keys, one for future use and the other used to copy configurations to and from STC cartridges.

The STT03E terminal operates for approximately 24 continuous hours with a full charge on six AA NiCd rechargeable batteries. Each terminal includes a battery charger. The internal nonvolatile memory (NVRAM) maintains information for approximately ten years.

INSTRUCTION CONTENT

Description and Operation — Describes the STT03E terminal operating modes and communication method.

Installation — Presents information on making the STT03E terminal operational. Procedures detail unpacking, setup and battery charging.

Operating Procedures — Describes the numeric key pad and the function keys located on the STT03E terminal.

Troubleshooting — Provides a complete list of error messages that can display on the STT03E terminal. Each message has a probable cause, affected device, and corrective action.

™ Trademark of Elsag Bailey Process Automation.

Maintenance — Provides maintenance information as it pertains to the STT03E terminal.

Repair/Replacement and Upgrade Procedures — Provides handling and disassembly procedures for various terminal components and a list of recommended spare parts.

Support Services	Provides replacement and spare parts, training, and technical documentation information.
AVS Smart Positioner	Covers configuration and calibration procedures for the Type AVS Smart Positioner.
BCN Pressure Transmitter	Covers configuration and calibration procedures for the Type BCN Pressure Transmitter.
EQN Temperature Transmitter	Covers configuration and calibration procedures for the Type EQN Temperature Transmitter.
EQS Temperature Transmitter	Covers configuration and calibration procedures for the Type EQS Temperature Transmitter.
XM/SM/XE Magnetic Flowmeter	Covers configuration and calibration procedures for the XM/SM/XE Magnetic Flowmeter.
PTS Pressure Transmitter	Covers configuration and calibration procedures for the Type PTS Pressure, Temperature and Level Transmitters.
TBN480 Conductivity Transmitter	Covers configuration and calibration procedures for the Series TBN480 Conductivity Transmitter.
TBN580 Transmitter	Covers configuration and calibration procedures for the Series TBN580 pH Transmitter.
TBN581 (ORP/pION) Transmitter	Covers configuration and calibration procedures for the Series TBN581 (ORP/pION) Transmitter.

HOW TO USE THIS INSTRUCTION

Read this instruction completely through in sequence. It is important to become familiar with the entire contents of this instruction before installing and using the STT03E and the STC cartridges. Once complete:

1. Perform the steps in Section 3. Make sure all hardware is installed properly before connecting the STT03E.

2. Refer to Section 4 once installation is complete for information on the use of the STT03E.

3. Refer to the appropriate appendix when configuring and calibrating a field device.

4. Each device has a configuration worksheet located at the back of this instruction. Use the worksheets to keep a hard copy record of the device configuration.

NOMENCLATURE

The basic STT03E terminal firmware supports PTS and EQS transmitters. STC cartridges are available to support TBN, BCN, EQN, Mag Flow, and

AVS field devices. The STC cartridges plug into the bottom of the terminal. Table 1-1 lists the nomenclature for the cartridges. Use this table to order the desired cartridge. Table 1-2 summarizes the device support combinations of the STT03E terminal.

Table 1-1. Smart Terminal Cartridge Nomenclature

Position	1	2	3	4	5	6	
Type	**S**	**T**	**C**	**M**	**M**	**M**	**Smart Terminal Cartridges**
							Transmitter type
				1			TBN480/580/581, AVS
				2			AVS
				3			BCN, EQN
				4			XM/SM/XE Mag Flow
					A		**Cartridge firmware level**[1]
							Language
						E	English
						F	French
						S	Spanish

NOTE:
1. The original design will be designated by the letter *A* in the fifth nomenclature position, and will change to *B, C, D,* etc. as revisions are made.

Table 1-2. STT03E Support Combinations

STT03E	STT03E with STC1ME	STT03E with STC2ME	STT03E with STC3ME	STT03E with STC4ME
PTS EQS	PTS EQS AVS TBN480 TBN580 TBN581	PTS EQS AVS	PTS EQS BCN EQN	PTS EQS Magflow

REFERENCE DOCUMENTS

Table 1-3 lists the instructions related to the STT03E terminal.

Table 1-3. Reference Documents

Number	Document
I-E21-31	Smart Electronic Pressure Transmitter Type BCN1
I-E21-32	Smart Electronic Pressure Transmitter Type BCN2/3/4/5/6/8
I-E21-37	Smart Electronic Level Transmitter Type BCN7

Table 1-3. Reference Documents (continued)

Number	Document
I-E21-50-1	Platinum Standard Series Smart Pressure Transmitter Type PTSD
I-E21-50-2	Platinum Standard Series Smart Level Transmitter Type PTSDL
I-E21-51	Platinum Standard Series Smart Pressure Transmitter Type PTSP
I-E51-80-001	Platinum Standard Series Smart Temperature Transmitter Type EQS
I-E51-79	Smart Temperature Transmitter Type EQN
I-E67-38	Smart pH/ORP Specific Ion Transmitter Series TBN580/581
I E67-42	Smart Conductivity Transmitter Series TBN 480
I-E96-302	Field Bus Slave Module IMFBS01
I-P88-27	Smart Positioner Type AVS

GLOSSARY OF TERMS AND ABBREVIATIONS

Table 1-4 is a glossary of terms and abbreviations used in this instruction. It contains those terms and abbreviations that are unique to Bailey-Fischer & Porter or have a definition that is different from standard industry usage.

Table 1-4. Glossary of Terms and Abbreviations

Term	Definition
Smart transmitter	A field measuring device that utilizes digital communication to transmit information.
MFC	Multi-function controller module. A multiple-loop controller with data acquisition and information processing capabilities.
MFP	Multi-function processor module. A multiple-loop controller with data acquisition and information processing capabilities.

SPECIFICATIONS

Table 1-5 lists the performance specifications of the STT03E terminal. Table 1-6 lists performance specifications for the STC cartridge.

Table 1-5. STT03E Terminal Specifications

Property	Characteristic/ Value
Display format	
Type	LCD
Number of rows	4
Characters per row	16

Table 1-5. STT03E Terminal Specifications

Property	Characteristic/ Value
Configuration storage capacity	70 configurations
Keyboard type	Tactile feedback embossed membrane; 32 keys
Cable length	1.8 m (5 ft 10 in.)
Temperature limits Operating Storage	 0° to 50°C (32° to 122°F) -20° to 70°C (-4° to 158°F)
Humidity limits	95%, noncondensing
Batteries Type Continuous run time Charging time	 6 AA NiCd rechargeable 24 hours 48 hours
Weight	635 g (22.4 oz)
Dimensions (HxWxD)	197 x 110 x 51 mm (7.75 x 4.30 x 2.00 in)
Case material	Plastic, polycarbonate (Lexan 940® or equivalent)
Agency certifications[1]	Factory Mutual (FM) approval and Canadian Standards Association (CSA) certifications in the following categories: Nonincendive: Class I; Division 2; Groups A, B, C, D Intrinsically Safe: Class I; Division 1; Groups A, B, C, D

NOTE:
1. Hazardous location approvals for use in flammable atmospheres are for ambient conditions of -25° to 40°C (-13° to 104°F), 86 to 106 kPa (12.5 to 15.7 psi) with a maximum oxygen concentration of 21 percent.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

Table 1-6. STC Cartridge Specifications

Property	Characteristic/Value
Memory type	Nonvolatile random access memory (NVRAM). Retains data when power is removed.
Configuration storage capacity	85 configurations
Data retention	10 years average life
Temperature limits Operating Storage	 0° to 70°C (32° to 158°F) -40° to 85°C (-40° to 185°F)
Cartridge insertion	Keyed design to ensure correct insertion

® Registered trademark of General Electric Co., Noryl Products Dept.

Table 1-6. STC Cartridge Specifications (continued)

Property	Characteristic/Value
Weight	53 g (1.9 oz)

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

OPTIONS AND ACCESSORIES

Type STC Smart Terminal Cartridges are available to allow the STT03E terminal to interface to other devices. Order STC cartridges by nomenclature (Table 1-1). Refer to ***RECOMMENDED SPARE PARTS FOR TYPE STT03E TERMINAL*** in Section 7 for other available items related to the STT03E terminal.

SECTION 2 - DESCRIPTION AND OPERATION

INTRODUCTION

This section describes the operational modes of the Type STT03E Smart Transmitter Terminal and contains diagrams of the wiring connections between the field device and the terminal.

FUNCTIONAL OPERATION

The STT03E terminal operates with a field device by attaching clip leads from the terminal to the signal wires of the field device. Communication occurs over the signal wires and can support up to fifteen devices when interfacing the Bailey-Fischer & Porter digital field bus. The field device and terminal communicate by using frequency shift keying (FSK). FSK is a form of frequency modulation used for digital communication. The communication signal is a high frequency AC signal with a DC average of zero. Therefore, digital communication and process variable output can occur simultaneously.

PHYSICAL OPERATION

The STT03E terminal connects to the field device anywhere there is access to the signal leads of the transmitter for point-to-point. The STT03E terminal must be connected between the device and the 250 ohm resistance. The clip leads connect across the signal leads independent of signal direction or polarity. Refer to Figures 2-1 and 2-2.

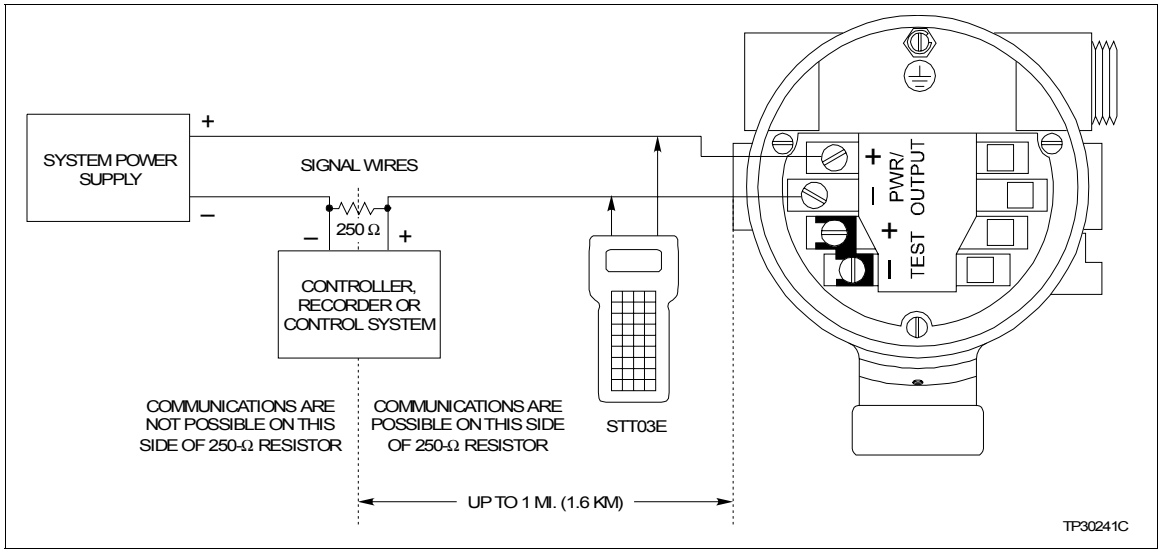


Figure 2-1. Analog Point-to-Point Wiring

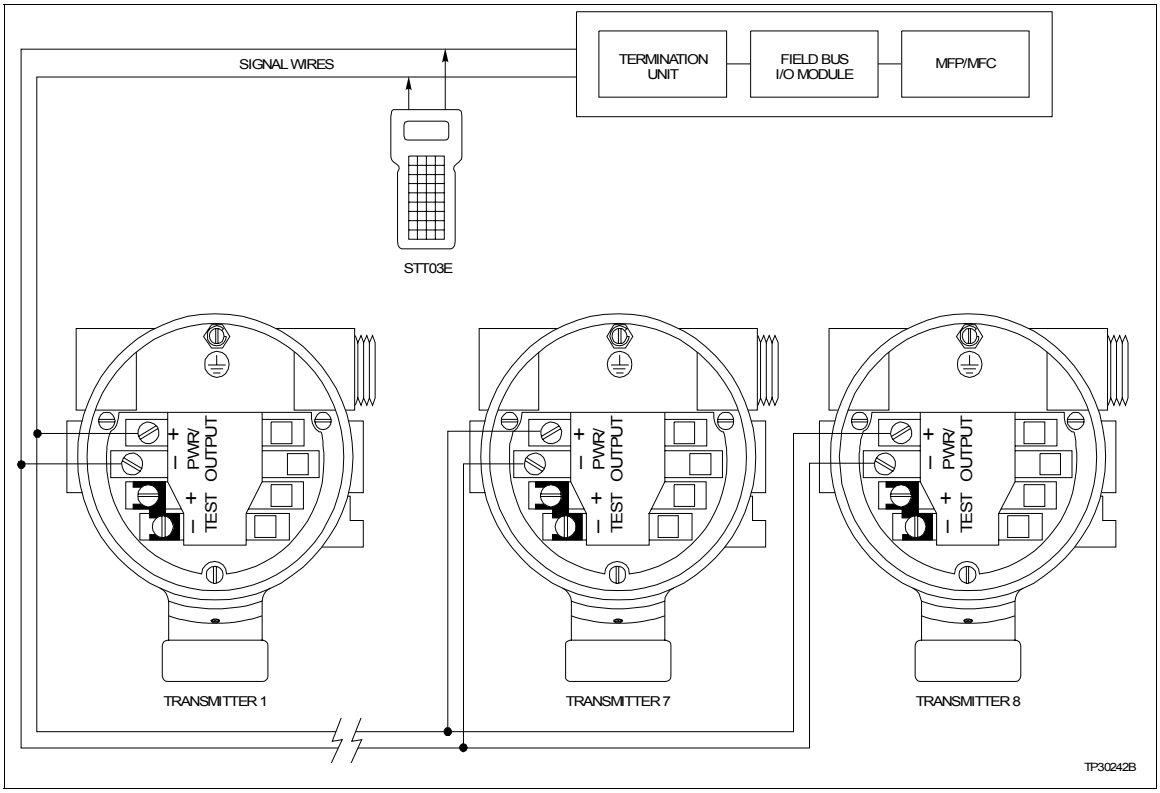


Figure 2-2. Digital Field Bus Wiring

SECTION 3 - INSTALLATION

INTRODUCTION

This section provides procedures that make the Type STT03E Smart Transmitter terminal operational.

UNPACKING AND INSPECTION

Before unpacking, carefully examine the exterior of the shipping container for evidence of in-transit damage. Inspect for punctures, tears or other damage that penetrates the outer container, and for evidence of water damage.

Examine the exterior of the STT03E terminal for cracks, scratches, or any physical defects that may be present.

> **NOTE:** Storage temperatures must not exceed the following limits: -20° to +70°C (-4° to +158°F).

If storing the terminal prior to operation, pack in the original container, if possible. Store in an area free of extremes in temperature and humidity.

SETUP AND PHYSICAL INSTALLATION

The only installation task is the connection of the provided clip leads. Otherwise, the STT03E terminal comes fully assembled and operational.

Charging STT03E Terminal

WARNING	**Nonrechargeable batteries may explode or leak if recharged. This unit contains six rechargeable batteries. If battery replacement is required, replace all batteries at same time and only with the rechargeable type. To prevent ignition of a hazardous atmosphere, batteries must only be charged or changed in an area known to be nonhazardous.**
AVERTISSEMENT	**Les piles non-rechargable peuvent exploser ou couler si recharg'ees. Cet ensemble comprend six piles rechargables. Si le remplacement d'une pile est requis, Replacer toutes les piles en même temps en utilisant des piles de type rechargeable seulement. Afin d'èviter l'ignition d'une atmosphère que dans un endroit où le danger est manifestement inexistant.**

Periodically the six AA batteries require charging. Use the battery charger, Bailey-Fischer & Porter part number 1948580□1.

With a full charge, the STT03E terminal can operate continuously for 24 hours without a recharge.

To charge the STT03E terminal:

1. Insert the male end of charger into the receptacle of terminal. The location of the receptacle is at the top of the terminal near the display screen.

2. Plug the charger into a 120 VAC, 50/60 hertz outlet.

3. Allow the terminal to charge at least one hour before operating. A full charge takes approximately 48 hours. The terminal can operate while recharging is in progress.

Smart Terminal Cartridge Installation

The basic firmware of the STT03E terminal interfaces two device types: PTS and EQS transmitters. STC cartridges are available that allow the STT03E terminal to address other devices (refer to ***NOMENCLATURE*** in Section 1). The cartridge slides into the bottom of the terminal and can store up to 85 configurations.

To install an STC cartridge:

1. Turn the STT03E terminal off.

2. Insert the cartridge (label facing out) into the receptacle at the bottom of the terminal (Fig. 3-1).

3. Make sure the cartridge is firmly seated in the terminal.

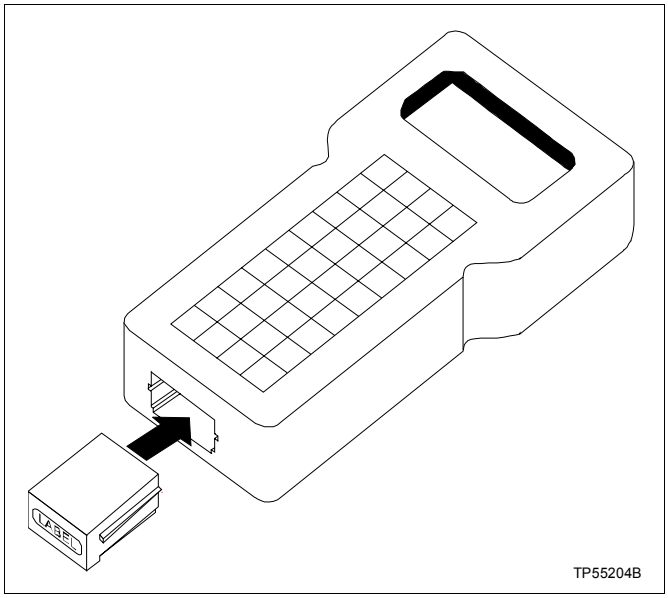


Figure 3-1. Cartridge Installation

4. Turn the STT03E terminal on. The device type selection in the configuration sequence will list the devices of the cartridge.

NOTES:

1. Do not attempt to edit an existing configuration that is supported by a STC cartridge without having the cartridge installed.

2. Do not plug in the cartridge with the power on as it may cause memory disruption.

SECTION 4 - OPERATING PROCEDURES

INTRODUCTION

This section covers the functions of the various keys on the Type STT03E Smart Transmitter Terminal. Step-by-step procedures illustrate each function.

This section covers:

- Key function table.
- Send configurations.[1]
- Get configurations.[1]
- View configurations.[1]
- Erase configurations.[1]
- Change working configurations.[1]
- Operational functions:

  SPECIAL FEATURE
  OUTPUT
  STATUS
  F1
  RERANGE

NOTE:
1. These functions apply to all transmitters. The procedures are not duplicated for each transmitter type. The PTS transmitter is used in the example procedures.

The creation and modification of configurations as well as callibration are specific for each field device and therefore are covered in the device specific appendices of this instruction.

The basic STT03E firmware supports PTS and EQS transmitters. Smart transmitter cartridges (STC) are available (refer to ***NOMENCLATURE*** in Section 1) that allow the terminal to interface other Bailey-Fischer & Porter devices. Configuration and calibration flowcharts provide an overview prior to the detailed procedures. Step-by-step configuration and calibration procedures for these devices are located in the appendices at the back of this instruction. Configuration worksheets provide a hard copy of the field device configuration, and are intended to help users take advantage of the features of Bailey-Fischer & Porter field devices. The worksheets are located in the back of the instruction.

NOTE: Be sure to make several copies of the blank worksheet to have on hand as needed.

HOW TO USE THE PROCEDURE TABLES

Procedures for each of the functions are presented in tables having three columns: Key, Display, and Comments. The procedure tables read from left to right. When the key shown is pressed, the screen shown directly to the right

in the display column appears on the terminal screen. The comment pertains to that screen. Use procedure tables to step through the functions.

OPERATOR/INTERFACE CONTROLS

Table 4-1 provides a description of functions for the various keys on the STT03E terminal. Functions of the terminal have been divided into the following three categories: configuration, calibration and operation (Table 4-2).

NOTE: **CONFIG**, **VIEW**, **SELECT DEVICE** and **F1** can function without a field device connected to the STT03E terminal. The other functions are locked out until a field device is connected to the terminal.

Table 4-1. STT03E Keypad Functions

Key	Function
ON	Powers the unit up and displays the STT03E software revision level.
OFF	Turns power off. Stored configurations remain in internal memory. The terminal will shut itself off after 15 minutes of idle operation.
↑ ↓ ← →	Scrolls through menus, selects functions, and selects ASCII characters for data input. Refer to Table 4-3 for the characters available on the STT03E.
0 9 . +/−	Inputs values into the terminal. Includes digits 0 through 9, a decimal point, and a sign key.
ENTER	Completes an input or a selection.
CONFIG	1. Inputs a new configuration into the STT03E internal memory. 2. Modifes an existing configuration. 3. Erases an existing configuration from the terminal memory.
GET CONFIG	Retrieves, views and optionally saves the configuration of the selected field device.
SEND CONFIG	Sends a user-selected configuration from the terminal memory to the selected field device.
CALI-BRATE	Steps through various calibration procedures (dependent on the selected field device).

Table 4-1. STT03E Keypad Functions (continued)

Key	Function
OUTPUT	Monitors primary input or output, secondary output or the ambient temperature of the selected field device.
STATUS	Displays field device status based on results of continuous self-diagnostics.
RE-RANGE	1. Changes engineering units. 2. Sets lower and upper range values of primary and secondary units of the field device. 3. Changes the output dampening.
SPECIAL FEATURE	1. Sets output to a fixed value. 2. Cancels a fixed output. 3. Sets up LCD - select display units to be displayed on the field device LCD. 4. Changes device configuration to the standard configuration (PTS only).
CLEAR	Escapes the current function and returns the display to the *READY* condition.
SELECT DEVICE	Selects and changes working configurations and field devices (if connected).
VIEW	Steps through the selections of the working configuration. Used to view a configuration and does not allow modifications to be made.
F1	Copies configurations from an STT03E terminal to an STC cartridge (and vise versa).
F2	For future use.

Table 4-2. STT03E Function Groupings

Function	Procedure
Calibration	D-to-A adjustment Bench calibration Rezero (BCN, PTS) Rerange
Configuration	New configuration Modify configuration Erase configuration[1] Get configuration[1] Send configuration[1] View configuration[1]

Table 4-2. STT03E Function Groupings

Function	Procedure
Operational[1]	Monitor field device output (%) Monitor field device input (engineering units) Monitor field device temperature Monitor secondary units output Fix field device output value Status check LCD set up Standard configuration Copying configurations to and from STC cartridges

NOTE:
1. These functions apply to all field devices covered in this section. The procedures for each transmitter type are covered in the appendices at the back of this instruction.

Table 4-3. STT03E Scroll Characters[1]

A	G	M	S	Y
B	H	N	T	Z
C	I	O	U	-
D	J	P	V	%
E	K	Q	W	/
F	L	R	X	#

NOTE:
1. Holding the up or down arrow key allows the user to quickly scroll through the available characters.

INITIAL START-UP

The sequence of screens described will appear when the STT03E terminal is powered up for the first time and is not connected to a field device, or when a configuration is created and stored in the terminal.

NOTE: The terminal (if not configuring or calibrating) will automatically shut itself off after approximately 15 minutes without operator interaction.

Key	Display	Comments
ON	BAILEY F&P STT03E REVISION E11	

Key	Display	Comments
ENTER	SCANNING FOR SMART TRANSMITTERS	STT03E terminal attempting to communicate with a field device. If the terminal is connected to a field device, the *READY* screen appears. If the terminal is not connected to a device, it searches for configurations that have been stored.
	NO SMART FIELD DEVICE RESPONDING	Appears if no field devices are connected. The STT03E terminal searches for configurations in its internal memory. If configurations are present, the STT03 CONFIG screen appears with ID tags.
	NO SMART FIELD DEVICE CONFIGURATIONS PRESENT	If initial start-up (just out of the box), no configurations will be found. In the case of PTS, a standard or special configuration will be found.
	CHOOSE A TAG READY	A configuration can be created. Refer to the appendices at the back of this instruction for configuration procedures for all Bailey-Fischer & Porter smart devices.

SEND CONFIGURATION

The send configuration function allows the user to select a configuration from the terminal memory and send it to a connected device.

NOTE: This procedure is identical for all device types. Use this procedure as a guide regardless of device type.

Key	Display	Comments
SEND CONFIG	STT03 CONFIG [ID TAG NAME]	If other configurations exist in the terminal, they will be displayed below the brackets. To select from the existing configurations, use the arrow keys to scroll through the list.
ENTER	SCANNING FOR SMART TRANSMITTERS	
ENTER	SEND CONFIG TO: [ID OF XMITTER]	If other field devices are present, they will be displayed below the brackets. Use the arrow keys to choose the field device.
	SENDING CONFIGURATION	

Key	Display	Comments
	CONFIG. ID TAG READY	Configuration was sent successfully.

GET CONFIGURATION

This function key allows the user to view and save the configuration of a connected field device. Get configuration requires that the STT03E terminal be connected to a device. It also allows the user to review the configuration of a device.

This procedure is similar for all device types. It is intended as a general guide for this function. Variances occur based on device type.

Key	Display	Comments
GET CONFIG	SELECTED CONFIGURATION [nnnnnnnnnnnnnn]	The name within the brackets is the working configuration.
ENTER	STORE THIS CONFIGURATION? NO → YES	The option to save the configuration in the STT03E terminal internal memory is presented. When the configuration is stored, exit the function by pressing **CLEAR**. **NOTE:** A maximum of 70 configurations can be stored in the STT03E terminal.
↓		
ENTER	CONFIG ID TAGNAME TYPE: PTS MODE: DIGITAL CHANNEL: 2	Displays the 14 character ID tag of the connected device. If *ANALOG* mode, the *CHANNEL* field is not shown. The *TYPE* field displays the device type.
ENTER	OUTPUT TYPE: LINEAR → SQUARE ROOT 3/2 FLOW MODE	Indicator points to the configured output type.
ENTER	OUTPUT ACTION: → NORMAL REVERSE	Configured output action is displayed.
ENTER	DAMPING (0 - 32 SEC) 6.00 SEC	Damping value is displayed to the nearest hundredth of a second.

Key	Display	Comments
ENTER	LOWER RANGE VAL. nn.nn UNITS UPPER RANGE VAL. nn.nn UNITS	Lower and upper range values are displayed.
ENTER	INITIALIZE MODE: → LOW HIGH	Indicator points to the configured initialization mode.
ENTER	FAIL MODE: → LOW HIGH LAST	Indicator points to the configured fail mode.
ENTER	SECONDARY L. R. nn.nn UNITS SECONDARY U. R. nn.nn UNITS	Secondary upper and lower range values are displayed to the nearest hundredth.
ENTER	LOWER TEMP ALARM -50.00℃ UPPER TEMP ALARM 120.00℃	Only applies if interfacing a Type PTS transmitter. The upper and lower range temperature alarm values are shown as configured.
ENTER	CONFIG. ID TAG READY	Configuration ID tag name just configured will be in the upper left corner if the configuration was saved. This becomes the working configuration.

VIEW CONFIGURATION

This function key allows the user to view the parameters of the working configuration. Modifications cannot be made to the configuration.

NOTE: This procedure is similar for all device types. This procedure is intended as a general guide for this function. Variances occur based on device type.

Key	Display	Comments
VIEW	CONFIG. ID TAG TYPE: PTS MODE: DIGITAL CHANNEL: 1	Displays the 14 character ID tag of the connected device. If using the *ANALOG* mode, the *CHANNEL* field will not display.
ENTER	OUTPUT TYPE: LINEAR → SQUARE ROOT 3/2 FLOW MODE	Indicator points to the configured output type.

Key	Display	Comments
ENTER	OUTPUT ACTION: → NORMAL REVERSE	Configured output action is displayed.
ENTER	DAMPING (0 - 32 SEC) 1.00 SEC	Damping value is displayed to the nearest hundredth of a second.
ENTER	LOWER RANGE VAL. 0.00 PSI UPPER RANGE VAL. 100.00 PSI	Lower and upper range values are displayed.
ENTER	INITIALIZE MODE: → LOW HIGH	Indicator points to the configured initialization mode.
ENTER	FAIL MODE: → LOW HIGH LAST	Indicator points to the configured fail mode.
ENTER	SECONDARY L. R. 0.00 UNITS SECONDARY U. R. 100.00 UNITS	Secondary lower and upper range values are displayed.
ENTER	LOWER TEMP ALARM -50.00℃ UPPER TEMP ALARM 120.00℃	Only applies if interfacing a Type PTS transmitter. The upper and lower range temperature alarm values are shown as configured.
ENTER	CONFIG. ID TAG READY	

ERASE CONFIGURATION

This procedure allows the user to erase a selected configuration from STT03E terminal memory.

NOTE: This procedure is identical for all device types.

Key	Display	Comments
CONFIG ↓ ↓ ENTER	CONFIGURATION NEW MODIFY → ERASE STT03 CONFIG. [CONFIG. ID TAG] CONFIG. ID TAG READY	Select *ERASE.* Scroll through the displayed ID tags using the arrow keys. When the desired choice is inside the brackets, press **ENTER**. **NOTE:** To return to the *READY* screen without erasing a configuration, press **CLEAR**. The selected configuration has been erased.

To completely erase the smart terminal internal memory of stored configurations, hold +/- and **ENTER** down, simultaneously, and turn the smart terminal ***ON***. The Bailey logo and STT03E software revision level will be displayed for a few seconds followed by the *READY* prompt. ***ALL CONFIGURATIONS STORED IN THE INTERNAL MEMORY HAVE BEEN ERASED.***

CHANGING WORKING CONFIGURATION

The working configuration is the configuration that the STT03E terminal is operating on. To change the working configuration, refer to the following procedure.

Key	Display	Comments
	CONFIG-1 READY	The current working configuration is *CONFIG-1,* as shown above *READY.*
SELECT DEVICE	SCANNING FOR SMART TRANSMITTER	If the STT03E terminal is not connected to a device, the *SELECT XMITTER* screen will not appear.

Key	Display	Comments
ENTER	SELECT XMITTER: [CONFIG-1] CONFIG-2	The terminal is communicating with a field device that is named CONFIG-1. Use the up and down arrow keys to select a transmitter. To access configurations that are stored in the STT03E terminal, press **CLEAR** .
CLEAR	STT03 CONFIG. [CONFIG-1] CONFIG-2	Use the arrow keys to choose the configuration. The STT03E terminal displays the names of the stored configurations. For this example select *CONFIG-2.* As many as 70 configurations can be stored in the STT03E terminal. Scroll through available configurations using the up and down arrow keys.
↓	STT03 CONFIG. [CONFIG-2]	Working configuration is now *CONFIG-2.*
ENTER	CONFIG-2 READY	

OPERATIONAL FUNCTIONS

The operational functions of the STT03E terminal apply to all transmitter types. The following functions are covered in this section:

- Special feature key functions.
- Output key functions.
- Status key functions.
- F1 key (copying configurations to and from STC cartridges).
- Rerange.

NOTE: A series of *n* s in the display portion of the function procedures indicate that an alphanumeric character can be displayed or entered in that position.

Special Feature Key

The special feature key has different functions for each transmitter. Reference the specific product instruction for special feature information. An example of the PTS transmitter is explained in this section.

SPECIAL FEATURE allows the user to perform the following functions:

- Fix output and cancel fix output.
- LCD setup.
- Standard configuration.

FIX OUTPUT/CANCEL FIX OUTPUT PROCEDURE

The fix output function allows the user to set the output to a percentage of output, where the output of the field device does not change until cancel fix output is performed. The following procedure steps through the fix and cancel fix output procedure.

Key	Display	Comments
SPECIAL FEATURE	→ FIX OUTPUT CANCEL FIX OUT. LCD SETUP STANDARD CONFG	Select *FIX OUTPUT.* If *CANCEL FIX OUTPUT* is selected, press **ENTER** and the *READY* screen appears.
ENTER	FIX OUTPUT TO: nnn.nn%	Use the number key pad to input the desired fix output value.

Key	Display	Comments
ENTER	CONFIG. ID TAG READY	The output remains at a fixed value until *CANCEL FIX OUT* is selected.

LCD SETUP PROCEDURE

This function allows the user to choose the variable to be displayed on the LCD of the field device. Display the output in secondary units, primary units, percentage of output, or if interfacing a PTS pressure transmitter, display the cell temperature.

Key	Display	Comments
SPECIAL FEATURE ↓ ↓	FIX OUTPUT CANCEL FIX OUT. → LCD SETUP STANDARD CONFG	Use the arrow keys to select *LCD SETUP.* **NOTE:** Menu selections will vary depending on device type.
ENTER	→ SECONDARY E. U. PRIMARY E. U. % OUTPUT CELL TEMP.	Specify the LCD display variable. **NOTE:** *CELL TEMP.* applies to PTS pressure transmitter only.
	CONFIG. ID TAG READY	**NOTE:** There may be more selections on the list than can be displayed. Use the up and down arrow keys to scroll through the list.

STANDARD CONFIGURATION

This function applies only to the PTS and EQS transmitters. It allows the user to change a transmitter configuration back to the original configuration installed in the factory.

Key	Display	Comments
SPECIAL FEATURE ↓ ↓ ↓	FIX OUTPUT CANCEL FIX OUT. LCD SETUP → STANDARD CONFG	Use the arrow keys to select *STANDARD CONFG.*
ENTER ↓	RESET TO STD. CONFIGURATION NO → YES	Select *YES.*
	OUTPUT WILL BE AFFECTED	
ENTER ↓	PROCEED? NO → YES	Select *YES.*
ENTER	RESET XMITTER: "[CONFIG ID TAG]" PRESS ENTER	Press **ENTER** to reset the transmitter name in brackets back to the standard configuration, or press **CLEAR** to abort the reset function.
ENTER	SENDING STANDARD CONFIG	
	CHOOSE A TAG READY	Use **SELECT DEVICE** to select a tag as the working configuration.

Output Key

OUTPUT has different functions for each transmitter. Refer to the specific product instruction for output key information. An example of the PTS transmitter is explained in this section.

OUTPUT allows the user to perform the following functions.

- Monitor field device output.
- Monitor field device input.
- Monitor secondary engineering units.
- Monitor temperature of cell.

MONITOR FIELD DEVICE OUTPUT PROCEDURE

This function allows the user to continuously monitor the output to the field device. The output is displayed in engineering units.

Key	Display	Comments
OUTPUT	→ MONITOR OUTPUT MONITOR INPUT SECONDARY UNITS TEMPERATURE	Select *MONITOR OUTPUT.*
ENTER	CONFIG. ID TAG PRIMARY OUTPUT: nnn.nn% GOOD STATUS	The output is displayed in percentage of the calibrated range. The display is updated every second. Press CLEAR to exit the monitor input function.
CLEAR	CONFIG. ID TAG READY	

MONITOR FIELD DEVICE INPUT PROCEDURE

This function allows the user to continuously monitor the input to the target device. The input is displayed in engineering units.

MONITOR SECONDARY UNITS OUTPUT PROCEDURE

With this function the user can display the output of the target device, in user defined units, specified in the configuration.

Key	Display	Comments
OUTPUT	MONITOR OUTPUT → MONITOR INPUT SECONDARY UNITS TEMPERATURE	Select *MONITOR INPUT* using the down arrow key.
↓		
ENTER	CONFIG. ID TAG PRIMARY INPUT: nnn.nn UNITS GOOD STATUS	The input is displayed in primary engineering units. The display is updated every second. To exit the monitor input function, press **CLEAR**.
CLEAR	CONFIG. ID TAG READY	

Key	Display	Comments
OUTPUT	MONITOR OUTPUT MONITOR INPUT → SECONDARY UNITS TEMPERATURE	Select *SECONDARY OUTPUT* using the down arrow key.
↓		
↓		
ENTER	CONFIG. ID TAG SECONDARY UNITS nnn.nn UNITS GOOD STATUS	
CLEAR	CONFIG. ID TAG READY	

TEMPERATURE FUNCTION PROCEDURE

Displays the temperature of the transducer or reference temperature in degrees Celsius.

Key	Display	Comments
OUTPUT ↓ ↓ ↓	MONITOR OUTPUT MONITOR INPUT SECONDARY UNITS → TEMPERATURE	Select *TEMPERATURE* using the down arrow key.
ENTER	CONFIG. ID TAG TEMPERATURE: nnn.nn℃ GOOD STATUS	The temperature of the transducer or reference temperature is displayed.
CLEAR	CONFIG. ID TAG READY	

Status Check Procedure

The following is a procedure for checking the status of the target device based on the results of the continual self diagnostics. The self tests include monitoring the transducer, transducer temperature, transmitter ambient temperature, input circuits, processor EEPROM, nonvolatile memory, and reference voltages.

> **NOTE:** When **STATUS** is pressed the problem holding the highest priority (based on a priority structure) is displayed. Any other problem that may exist cannot be viewed until the problem with the highest priority is corrected. If an error message displays, refer to Section 5 for troubleshooting information.

Key	Display	Comments
STATUS	FIELD DEVICE O.K.	Test results were successful, no problems to report. If instead, the field device has diagnosed a problem in any of the areas mentioned above, refer to Section 5 of this product instruction.

F1 Key (Copy Configurations to and from STC Cartridges)

The STT03E terminal allows the user to copy (a single or all) configurations to and from STC cartridges. Multiple configuration copies overwrite existing configurations on the terminal or cartridge, regardless of the amount of

memory space available. Perform single configuration copies by selecting from the available configurations.

This section covers the following functions:

- Copy configurations from the terminal to an STC cartridge.
- Copy configurations from an STC cartridge to the terminal.
- Erase a single configuration from an STC cartridge.

NOTE: To perform the copy and erase functions using F1, an STC cartridge must be installed into the STT03E terminal.

COPY STT03E CONFIGS TO STC CARTRIDGE

The following procedure explains how to copy configurations from the STT03E to the STC cartridge.

Key	Display	Comments
F1	COPY CONFIGS → TO CARTRIDGE FROM CARTRIDGE ERASE 1 CONFIG	Select *TO CARTRIDGE*.
ENTER	COPY CONFIGS COPY ONE → OVERWRITE ALL	Select *OVERWRITE ALL*. This selection will copy all the existing STT03E terminal configurations to the STC cartridge. **NOTE:** For a detailed screen flow of *COPY ONE* selection, refer to ***COPY STC CONFIGS TO STT03E TERMINAL***.
↓		
ENTER	ALL CONFIGS IN CARTRIDGE WILL BE ERASED	Regardless of the amount of free space of the cartridge, only the configurations from the terminal will exist on the cartridge after the overwrite.
ENTER	COPY TO CART ALL CONFIGS → O.K. CANCEL	Select *OK*. Be sure that there are no configurations that are needed on the cartridge.
ENTER	COPYING	
	CONFIG ID TAG READY	Configurations from the terminal now exist on the cartridge and the terminal.

COPY STC CONFIGS TO STT03E TERMINAL

The following procedure explains how to copy configurations from the STC cartridge to the STT03E terminal.

Key	Display	Comments
F1	COPY CONFIGS TO CARTRIDGE → FROM CARTRIDGE ERASE 1 CONFIG	Select *FROM CARTRIDGE*.
↓		
ENTER	COPY CONFIGS → COPY ONE OVERWRITE ALL	Select *COPY ONE*. The asterisk on the top line of the screen indicates copying from the cartridge to STT03E terminal. **NOTE:** For details on the screen flow of *OVERWRITE ALL* selection, refer to ***COPY STT03E CONFIGS TO STC CARTRIDGE***.
ENTER	STT03 CONFIG * [CONFIG-1] CONFIG-? CONFIG-75	Select a configuration using the up and down arrow keys. For this example ***CONFIG-1*** is the chosen configuration. The asterisk on the top line of the screen indicates copying from the cartridge to STT03E terminal.
ENTER	COPY FROM CART CONFIG-1 → O.K. CANCEL	To copy the chosen configuration to the STC cartridge, select OK.
ENTER	CONFIG "CONFIG-1 " COPIED TO HANDHELD RAM	
	CONFIG-1 READY	

ERASE CONFIGURATION FROM STC CARTRIDGE

The following procedure explains how to erase configurations from the STC cartridge.

Rerange Key

The following procedure allows the user to set the lower and upper range values and change the engineering units of the field device to suit a particular application. If the user is interfacing a PTS pressure or EQS temperature

Key	Display	Comments
F1 ↓ ↓	COPY CONFIGS TO CARTRIDGE FROM CARTRIDGE → ERASE 1 CONFIG	Select *ERASE 1 CONFIG.* This selection erases a chosen configuration from an STC cartridge.
ENTER	STT03 CONFIG * [CONFIG-1] CONFIG-? CONFIG-85	Select a configuration to erase from the cartridge using the arrow keys. **NOTE:** The asterisk indicates that the operation is performed on the cartridge.
ENTER	CONFIG ID TAG READY	The chosen configuration has been erased. **NOTE:** To erase a configuration from the STT03E terminal, refer to ***ERASE CONFIGURATION*.**

transmitter the upper and lower temperature alarm values can be changed. The ranges must be within those specified for the device.

NOTE: Field device output is based on the values entered in this procedure. The terminal will not reject invalid ranges; therefore, it is imperative that the range limits specified for the device are known. Refer to the applicable product instruction for specified range spans.

Key	Display	Comments
RE-RANGE	OUTPUT WILL BE AFFECTED	This operation will cause a change in output not corresponding to the input. Be sure the control loop is in manual.
↓	PROCEED? NO → YES	To select *NO* press **ENTER**. Display will return to the *READY* condition. Select *YES* using the down arrow key.
ENTER	LOWER RANGE VAL _ nn.nn iH20 UPPER RANGE VAL nn.nn iH20	Engineering units displayed will be those selected during configuration or calibration.
ENTER	SECONDARY L. R. _ nn.nn UNITS SECONDARY U. R. nn.nn UNITS	Input desired value using the numbered keypad. Press **ENTER**. Repeat for upper range value.

Key	Display	Comments
ENTER	DAMPING (0-32 SEC) nn.nn SEC	Input desired value using the numbered keypad. Press **ENTER**.
ENTER	LOWER TEMP ALARM -50.00℃ UPPER TEMP ALARM 120.00℃	The lower and upper temperature alarms apply only when reranging a PTS pressure transmitter. -50.00° and 120.00°C are the default values. Enter different values or accept the default values by pressing **ENTER**.
ENTER	SENDING RANGES	
	CONFIG. ID TAG READY	**RERANGE** will update the field device configuration, not the **STT03E** terminal internal configuration. To update the internal **STT03E** terminal configuration, perform **GET CONFIG** and save it in the **STT03E** terminal.

SECTION 5 - TROUBLESHOOTING

INTRODUCTION

This section contains all of the possible error messages that can display on the STT03E terminal. Table 5-1 lists the messages in alphabetical order. Table 5-1 has four columns:

- The ***Message*** column lists the errors (alphabetically) exactly as they appear on the terminal.
- The ***Affected Device*** column lists the device type the error can affect. Some probable cause and corrective action may vary depending on the affected device.
- The ***Probable Cause*** column provides a brief explanation of the cause of the error.
- The ***Corrective Action*** column lists corrective actions to take for each error.

ERROR MESSAGES

Table 5-1. STT03E Error Messages

Message	AffectedDevice	Probable Cause	Corrective Action
CALIBRATION REQUIRED	PTS	Cell has not been calibrated with present amplifier assembly.	Calibrate the field device. Refer to the calibration section of the appropriate PTS pressure transmitter instruction.
	EQS	Field device needs to be calibrated.	Calibrate the field device. Refer to the calibration section of the appropriate EQS temperature transmitter instruction.
CANNOT SAVE, CONFIGURATION TOO LARGE	STT03E	Transmitter type not supported by STT03E terminal revision level.	Consult Bailey-Fischer & Porter about obtaining latest STT03E terminal revision.
CELL CHARACTERIZATION BOARD EEPROM FAILURE	PTS	Damage to cell characterization board.	Turn the STT03E terminal off and then on. If error still exists, replace cell (refer to repair/replacement section of the appropriate product instruction for procedure).
CELL TEMPERATURE OVER USER ALARM	PTS EQS	Cell temperature over/under user alarm limit.	Correct temperature problem.
CELL TEMPERATURE UNDER USER ALARM			Change alarm value. Refer to configuration procedures for ***EQS TEMPERATURE TRANSMITTER*** in Appendix D or ***PTS PRESSURE TRANSMITTER*** in Appendix F.

Table 5-1. STT03E Error Messages (continued)

Message	AffectedDevice	Probable Cause	Corrective Action
CELL TEMPERATURE OVER LIMIT CELL TEMPERATURE UNDER LIMIT	PTS	Cell temperature input is over/under factory specified limits.	Remove the source of temperature extreme.
COMMAND ABORTED	STT03E	CLEAR pressed before function was completed.	Try function again.
CONFIG TAGNAME ALREADY EXISTS	All	Attempted to copy a configuration to a cartridge or field device where it already exists.	Erase old configuration before copying new one. Refer to ***ERASE CONFIGURATION FROM STC CARTRIDGE*** in Section 4.
DAMAGED CELL OR CHARACTERIZATION BOARD	PTS	Characterization board or cell is damaged.	Replace amplifier assembly. Refer to repair/replacement section of the appropriate product instruction. Replace cell/characterization board. Refer to repair/replacement section of the appropriate product instruction.
DEVIATION ALARM	AVS	Deviation has been greater than the alarm setting for two minutes.	Check valve. Check PID tuning.
DYNAMIC TEMPERATURE MEASUREMENT FAILURE	PTS	Dynamic temperature input exceeded limits set at factory. **NOTE:** The temperature of the high side of the cell with respect to the low side of a PTS.	Output may no longer be accurate. Remove source of temperature shift.
ELECTRONICS TEMPERATURE MEASUREMENT FAILURE	EQS PTS	Hardware failure of on-board temperature sensor.	Replace amplifier assembly. Refer to repair/replacement section of the appropriate product instruction.
ELECTRONIC TEMPERATURE OUT OF RANGE	PTS	Electronics temperature is outside the factory specified limit.	Remove the source of the temperature extreme.
ERROR! ATTEMPT TO CONFIGURE DUPLICATE ADDRESS	All	Attempt was made to assign an analog mode transmitter an address on FBS module.	Be sure transmitter is in the correct mode (analog or digital). Use VIEW to verify mode. Refer to ***VIEW CONFIGURATION*** in Section 4 for details.
		Attempt was made to assign a digital mode transmitter to an occupied FBS address.	Assign transmitter to an unoccupied address or channel number of FBS module.
FIELD DEVICE CAN'T EXECUTE COMMAND: COMMAND CONFLICT	BCN EQN TBN	Commands were sent by STT03E terminal in the wrong order. Verify IMFBS01 is off-line if STT03E terminal is in use.	Try command again.

Table 5-1. STT03E Error Messages (continued)

Message	AffectedDevice	Probable Cause	Corrective Action
FIELD DEVICE CAN'T EXECUTE COMMAND: FBS ON-LINE	All	STT03E terminal cannot change any transmitter parameters while the field bus is active.	Transmitter must be brought off-line. This can be done from the MFC/MFP by tuning the function code. **NOTE:** To bring transmitter off-line, the retainer can be unplugged from the rack. Be aware that by doing this, communication is lost for all other transmitters on the bus. When the retainer is unplugged, there is a 2-minute time out period until the STT03E terminal will be allowed to change parameters. After the 2-minute period, the transmitter allows the STT03E terminal access.
FIELD DEVICE CAN'T EXECUTE COMMAND: HARDWARE PROBLEM	BCN EQN TBN	Detected error in hardware.	Press **STATUS** to determine error and use this table for appropriate corrective action. If status is not more explicit, check electronics assembly of field device.
	AVS	Unspecified hardware failure	Service unit.
FIELD DEVICE CAN'T EXECUTE COMMAND: INVALID COMMAND	All	Incorrect syntax.	Wrong device type selected in the configuration. Refer to the appropriate device configuration appendix for details about device type.
		Excessive line noise.	Check line noise. Use an oscilloscope to determine if line noise is excessive.
		STT03E terminal failure.	Verify STT03E terminal is operational. Verify by using another STT03E terminal that is known to be operational.
FIELD DEVICE CAN'T EXECUTE COMMAND: LOCKOUT ENGAGED	All	Unable to configure or calibrate. Hardware lock active.	Refer to the device product instruction for details about the configuration lockout jumper.
FIELD DEVICE CAN'T EXECUTE: DATA OUT OF RANGE	All	Transmitter sent data that is out of acceptable range.	Press **VIEW** to verify the parameters of the configuration and consult the appropriate device instruction for correct parameters.
FIELD DEVICE CONFIGURATION DOES NOT MATCH STT03'S	All	Configuration of the transmitter does not exactly match the corresponding configuration in the STT03E terminal.	Rerange was executed without updating the STT03E terminal configuration. Perform *GET CONFIG.* Refer to ***GET CONFIGURATION*** in Section 4. **NOTE:** The AVS will change the installed option flags if they are incorrect in the transmitted configuration. This error will appear if the configuration is not reloaded by the STT03.
FIELD DEVICE MAIN ELECTRONICS EEPROM FAILURE	BCN EQN TBN	Memory problem.	Reconfigure and recalibrate the transmitter. Refer to the appropriate configuration and calibration sections in this instruction for the transmitter type.
	EQS PTS	Memory problem.	Remove power from the field device and reapply. If problem persists replace the amplifier assembly. Refer to repair/replacement section of the field device product instruction.

Table 5-1. STT03E Error Messages (continued)

Message	AffectedDevice	Probable Cause	Corrective Action
FIELD DEVICE EPROM CHECKSUM ERROR	AVS BCN EQN TBN	Abnormal power up occurred.	Remove power from the field device and reapply.
		Program chip on microcomputer board is bad.	Replace microcomputer board. Refer to repair/replacement section of the appropriate product instruction for procedures.
		Configuration has been lost or corrupted.	Resend the configuration.
FIELD DEVICE INPUT OVER RANGE	AVS BCN EQN EQS	Input out of range.	Reduce process input, or configure proper limits. To verify proper limits use **GET CONFIG** to view the limits.
	PTS	Input greater than cell specification.	Reduce input pressure.
FIELD DEVICE INPUT UNDER RANGE	PTS	Input exceeds the cell specification.	Increase input pressure.
	AVS EQS	Input value too low.	Increase process input, or configure proper limits. To verify proper limits use **GET CONFIG** to view the limits.
FIELD DEVICE INTERNAL REFERENCE FAILURE	AVS BCN EQN EQS XM/SM/ XE	Reference problem on circuit board.	Check connections. Replace electronics assembly. Refer to repair/replacement section of the appropriate field device instruction.
	PTS	Reference problem on circuit board.	Replace amplifier assembly. If problem still exists, replace cell and characterization board. Refer to the repair/replacement section of the appropriate PTS instruction.
FIELD DEVICE MAIN INPUT FAILURE	BCN EQN TBN	Sensor failure.	Check input board connections. Refer to repair/replacement section of the appropriate product instruction.
		Input board failure.	Replace input board. Refer to repair/replacement section of the appropriate product instruction.
FIELD DEVICE MICROCOMPUTER HAS BAD EEPROM	BCN EQN TBN	Microcomputer cannot retain configuration and calibration data.	Replace the microcomputer board. Refer to repair/replacement section of the appropriate product instruction.

Table 5-1. STT03E Error Messages (continued)

Message	AffectedDevice	Probable Cause	Corrective Action
FIELD DEVICE NOT RESPONDING	All	STT03E terminal not connected properly.	Check STT03E terminal wiring connections. Refer to Figure 2-1 or 2-2 for correct wiring arrangements.
		Short in communication wire.	Perform a continuity check to determine if a short exists.
		Transmitter does not have a minimum amount of voltage across inputs.	Correct power problem. Refer to appropriate product instruction for minimum supply voltage requirements.
		Noise on field wiring.	Turn off STT03E terminal. ID tags appear on screen. Select the ID tag of the transmitter or, select the one appearing within brackets if unsure of ID tag. Press **ENTER**. Press **STATUS**. If message is still present, continue to the next corrective action.
		Transmitter or STT03E terminal is defective.	If available, verify that the STT03E terminal is functional by interfacing another transmitter. Replace the STT03E terminal if not functional.
			If STT03E terminal is functional, replace field device electronics assembly.
			PTS: Replace amplifier assembly, refer to repair/replacement section of the appropriate product instruction for replacement procedures.
FIELD DEVICE NOT SUPPORTED BY CARTRIDGE OR HANDHELD	All	Field device type not supported by the release of STT03E terminal and cartridge.	Check to see if correct cartridge is inserted into the STT03E terminal.
FIELD DEVICE OPEN SENSOR	EQS	Field device temperature transducer failure.	Replace the temperature transducer. (i.e thermocouple, RTD).
		Field device temperature transducer not connected.	Connect the proper transducer (i.e., thermocouple, RTD).
FIELD DEVICE OUTPUT IS FIXED OR IN ADJ. MODE	All	STT03E terminal turned off while the 4 to 20 mA output was being calibrated.	Power down the transmitter and power up the transmitter.
		Transmitter cannot execute command because of fix output.	Take transmitter out of fix output. Refer to ***FIX OUTPUT/CANCEL FIX OUTPUT PROCEDURE*** in Section 4.
FIELD DEVICE RAM FAILURE	All	Internal RAM failure.	Replace electronics. Refer to the repair/replacement section of the appropriate product instruction.

Table 5-1. STT03E Error Messages (continued)

Message	AffectedDevice	Probable Cause	Corrective Action
FIELD DEVICE TEMPERATURE ABOVE LIMIT ***- or -*** FIELD DEVICE TEMPERATURE BELOW LIMIT	BCN EQN EQS TBN XM/SM/ XE	Field device not calibrated properly, or transmitter is at a temperature above the performance specifications. Message will not affect operation but could mean temperature performance is out of range.	Recalibrate the field device. Refer to the appropriate calibration section for the device type. **NOTE:** Uncalibrated field devices may have this error until calibrated.
	PTS	Local heat or cold source exceeds electronics specifications.	Eliminate or reduce temperature extreme of the electronics.
FIELD DEVICE TEMPERATURE SENSOR FAILURE	BCN EQN	On-board temperature sensor failure.	Replace input board. Refer to repair/replacement section of the appropriate product instruction.
HIGH PROCESS ALARM	XM/SM/ XE	Process value over/under alarm limit.	Correct process problem.
LOW PROCESS ALARM			Change alarm value. Refer to ***CHANGING WORKING CONFIGURATION*** in Section 4.
INPUT APPLIED INCORRECTLY, CALIBRATION FAILURE	BCN EQN EQS PTS TBN	Input signal not at specified level.	Correct signal and recalibrate. Refer to the appropriate calibration section for details.
LOSS OF COIL EXCITATION	XM/SM/ XE	Coil excitation has stopped.	Check wiring of excitation signal and reference signal. If both are OK, call service.
MAIN POWER WAS LOST	XM/SM/ XE	Power was lost to device.	Check for loose wiring. Restore totalizers to known values if lost.
NO CARTRIDGE DETECTED	STT03E	Wrong cartridge type (i.e., CTT), or cartridge not seated properly.	Insert correct cartridge, or check for proper insertion.
NO SMART FIELD DEVICE CONFIGURATIONS PRESENT	STT03E	No configuration exists in the STT03E terminal memory.	Create configurations or copy configurations from STC to STT03E terminal. Refer to ***COPY STC CONFIGS TO STT03E TERMINAL*** in Section 4 .
NO SMART FIELD DEVICE RESPONDING	STT03E	STT03E terminal not connected to a device.	Check STT03E terminal lead connections. Verify proper field device wiring. Refer to the installation section of the appropriate product instruction.
EMPTY PIPE	XM/SM/ XE	The flowmeter is empty.	Allow process to fill flow tube.
OUTPUT PRESSURE ABOVE LIMIT	AVS	Pressure on output port 01 or 02 is too high.	Check air pressure supply.
POSITION TRANSMITTER	AVS	The position transmitter (transducer) has failed.	Replace transducer. Refer to the repair/replacement section of the Refer to the repair/replacement section of the appropriate AVS product instruction.

Table 5-1. STT03E Error Messages (continued)

Message	AffectedDevice	Probable Cause	Corrective Action
SOURCE PRESSURE BELOW LIMIT	AVS	Supply pressure is too low.	Check air pressure supply.
SPAN & ZERO KEY MISOPERATION	PTS	Misoperation of EZ CAL option.	Try again.
		Damaged EZ CAL option.	Replace EZ CAL option. Refer to the repair/replacement of the appropriate PTS product instruction.
		Damaged amplifier assemly.	Replace amplifier assembly. Refer to the repair/replacement section of the appropriate PTS product instruction.
SORRY, THAT ROUTINE NOT IMPLEMENTED IN ROM E11	All	Cartridge not compatible.	Purchase latest STT03E terminal firmware. Refer to ***RECOMMENDED SPARE PARTS FOR TYPE STT03E TERMINAL*** in Section 7.
STT03 INTERNAL NVRAM FAILURE	STT03E	STT03E terminal NVRAM is bad.	Replace NVRAM. Refer to ***RECOMMENDED SPARE PARTS FOR TYPE STT03E TERMINAL*** in Section 7 for NVRAM part number.
STT03 INTERNAL NVRAM FULL	STT03E	STT03E terminal memory is full.	Erase some configurations or copy some configurations to a STC cartridge. Refer to ***COPY STT03E CONFIGS TO STC CARTRIDGE*** in Section 4**.**
STT03 RECEIVE CHECKSUM ERROR	STT03E	Checksum from device was corrupted.	Try again or check data. If message persists, verify that electronic noise on line is within specifications using an oscilloscope.
STT03 RECEIVE FAILURE	STT03E	Reply from device was possibly corrupted.	Try again or check data. If message persists, verify that electronic noise on line is within specifications using an oscilloscope.
TAG ID LENGTH NOT SUPPORTED BY FIELD DEVICE	BCN EQN STT03E	Attempting to send a 13 or 14 character ID tag to a transmitter that can support just 12 characters.	Change the ID tag name to 12 or less characters.
TEMP ALARM	AVS	The electronics temperature has exceeded the product specification.	Remove the source of the temperature extreme.
TOTALIZER CHECKSUM ERROR	XM/SM/XE	Error in stored totalizer value.	Reset totalizer or preset totalizer to a known good value.
UNKNOWN ERROR	All	Transmitter reported an error that was not understood by STT03E terminal.	Contact Bailey-Fischer & Porter technical support.
VALUE ENTERED ABOVE LIMIT	STT03E	Value specified in the configuration is above the limit.	Refer to the appropriate product instruction for the value limits.
VALUE ENTERED BELOW LIMIT	STT03E	Value specified in the configuration is below the limit.	Refer to the appropriate product instruction for the value limits.

Table 5-1. STT03E Error Messages (continued)

Message	AffectedDevice	Probable Cause	Corrective Action
VALUES OUT OF ACCEPTABLE RANGE FOR FIELD DEVICE	All	Value specified in the configuration is below the limit.	Refer to the appropriate product instruction for the value limits.
			Check 4 to 20 mA input.
VALVE STUCK	AVS	Valve has not moved for over two minutes.	Check valve.
			Check 4 to 20 mA input.
OPTION NOT INSTALLED	XM/SM/XE	The current configuration is calling to use the empty pipe detector which requires an optional board.	Add empty pipe detector option, or turn empty pipe detection off in the configuration.

SECTION 6 - MAINTENANCE

INTRODUCTION

WARNING	**System maintenance must be performed only by qualified personnel and only after securing equipment controlled by the circuit. Altering or removing components from an active circuit may upset the process being controlled.**
AVERTISSEMENT	**L'entretien du système ne doit être effectuquèe par le personnel qualifiè et seulement une fois que l'èquipement contrôlè par le circuit est fixè en place. La modification ou le retrait des composants d'un circuit actif pourraient perturber le processus controlè.**
	En ce qui concerne l'installation anti-explosion et anti-ignition provoquè par la poussière dans des endroits se Classe II ou Class III, il est indispensable que l'assemblage soit tenu ètanche pendant que les circuits sont èlectrises, a moins que cet endroit ne prsente aucun danger a ce moment-la.

The Type STT03E terminal requires limited maintenance when operated under normal conditions. Periodically the batteries require charging. Refer to ***Charging STT03E Terminal*** in Section 3.

If the Type STT03E terminal is inoperative, or if operation is faulty, refer to the troubleshooting section of this manual.

CLEANING

CAUTION	**Do not allow cleaning solution or any other liquid to enter the terminal case as it will damage internal components.**
ATTENTION	**Ne pas laisser une solution nettoyante ou un quelconque liquide pènètrer le botier de raccordement, ceci pourrait endommager les composants internes.**

Before cleaning, turn the terminal off and disconnect it from the communication wires or loop. Make sure the battery charger is also disconnected. Wipe the unit down using a soft cloth dampened with a nonabrasive, mild detergent. Do so as often as the installation environment requires.

SECTION 7 - REPAIR/REPLACEMENT AND UPGRADE

INTRODUCTION

This section provides special handling procedures for MOS devices, and disassembly procedures for various components of the Type STT03E terminal. Also included, is a list of kits available for replaceable components.

SPECIAL HANDLING PROCEDURES FOR MOS DEVICES

Metal oxide semiconductor (MOS) devices are subject to damage by static electricity. Observe the following techniques while servicing and troubleshooting.

1. Most assemblies with MOS devices are shipped in a special antistatic bag. Keep the assembly in the bag as much as possible whenever the assembly is not in the system.

2. Remove assemblies containing MOS devices from their antistatic protective container only under the following conditions:

    a. When at a static-free work station or when the bag is grounded at the field site.

    b. After neutralizing the conductive area of the container.

    c. Only after firm contact with an antistatic mat and/or firmly gripped by a grounded individual.

3. Personnel handling assemblies with MOS devices should be neutralized to a static-free work station by a grounding wrist strap that is connected to the station or to a good ground point at the field site.

4. Do not allow clothing to make contact with MOS devices. Most clothing generates static electricity.

5. Avoid touching edge connectors and components.

6. Avoid partial connection of MOS devices. Damage can occur by floating leads, especially the power supply connector. If inserting an assembly into a live system, do so quickly. Do not cut leads or lift circuit paths when troubleshooting.

7. Be sure test equipment is grounded.

8. Avoid static charges during repair. Make sure circuit board is thoroughly clean around its leads but do not rub or clean with an insulating cloth.

NOTE: An antistatic kit (field service kit, Bailey-Fischer & Porter part number 1948385□1) is available for personnel working on devices containing MOS components. The kit contains a static-dissipative work surface (mat), a ground cord assembly, wrist bands and alligator clip.

DISASSEMBLY OF TYPE STT03E TERMINAL CASE

Complete the following procedure prior to performing the other procedures of this section.

1. Turn the power off by pressing **OFF** on the keypad.

2. Place the Type STT03E terminal on a table or smooth surface with the keypad facing down.

3. Remove the four screws from the lower case of the terminal.

4. Carefully lift the lower case off the PC board.

5. Grasp the PC board by the edges and turn it over so the components on the board are facing up (Fig. 7-1).

6. Carefully disconnect the keypad connector strip from the PC board. This will allow the PC board to lie flat next to the upper case assembly.

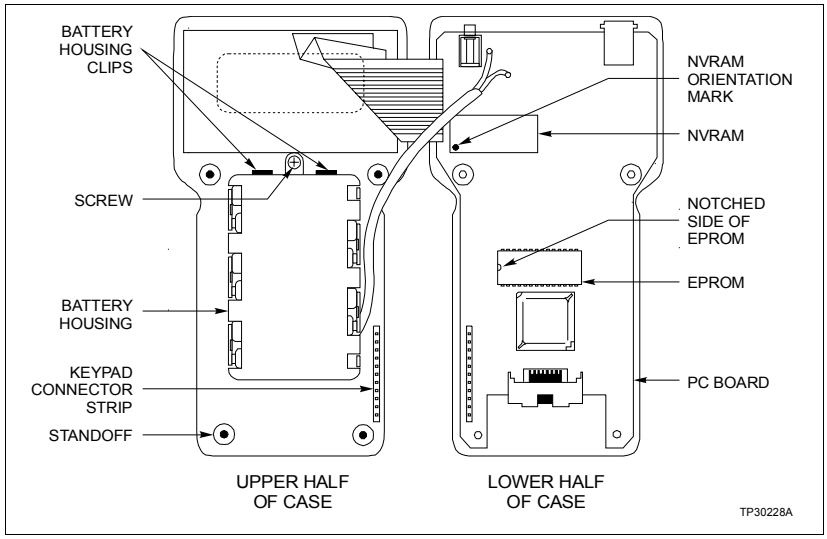


Figure 7-1. Internal Component Locations

REPLACING TYPE STT03E TERMINAL EPROM (FIRMWARE UPGRADE)

The EPROM chip stores the operating software (firmware) of the Type STT03E terminal (Fig. 7-1). When needed, software revisions are made to the firmware and can be obtained by customers (refer to ***RECOMMENDED***

SPARE PARTS FOR TYPE STT03E TERMINAL). To replace the EPROM chip:

1. Complete the ***DISASSEMBLY OF TYPE STT03E TERMINAL CASE*** section.

2. Using an integrated circuit (IC) removal tool, carefully remove the EPROM chip. Refer to Figure 7-1 for EPROM location.

3. Follow the precautions in ***SPECIAL HANDLING PROCEDURES FOR MOS DEVICES*** when handling the EPROM chip. Insert the new EPROM chip, kit number 258471□1 using the following procedure:

   a. Grasp the chip at the edges that have no connecting pins (right-side and notched-side, Fig. 7-1).

   b. Observe the position of the notched-side of the EPROM in Figure 7-1. Without fully inserting the connecting pins, set the EPROM in the connecting socket.

   c. Make sure the connecting pins of the chip are properly positioned in the socket.

   d. Place two fingers on the chip and evenly apply pressure. The chip should snap into place.

4. To complete this procedure, refer to ***REASSEMBLING THE TYPE STT03E TERMINAL CASE*** in this section.

REPLACING NVRAM

The NVRAM storage chip stores device configurations. To replace the NVRAM storage chip:

1. Complete the ***DISASSEMBLY OF TYPE STT03E TERMINAL CASE*** in this section.

2. Using an integrated circuit (IC) removal tool, carefully remove the NVRAM storage chip. Refer to Figure 7-1 for NVRAM storage chip location.

3. Follow the precautions in ***SPECIAL HANDLING PROCEDURES FOR MOS DEVICES*** when handling the storage chip. Insert the new storage chip, kit number 258474□1 using the following procedure:

   a. Grasp the NVRAM storage chip at the edges that have no connecting pins (right-side and left-side, Fig. 7-1).

   b. Observe the position of the storage chip in Figure 7-1. The print on the replacement storage chip should be legible for correct assembly. Without completely inserting the connecting pins, set the storage chip in the socket.

c. Make sure the connecting pins are properly positioned in the socket.

d. Place two fingers on the storage chip and evenly apply pressure. The NVRAM storage chip should snap into place.

4. To complete this procedure, refer to ***REASSEMBLING THE TYPE STT03E TERMINAL CASE*** in this section.

REPLACING RECHARGEABLE BATTERIES

If at some point the AA rechargeable NiCd batteries need replacing, purchase them anywhere batteries are sold.

Remove the battery housing using the following procedure (Fig. 7-1):

1. Complete the ***DISASSEMBLY OF TYPE STT03E TERMINAL CASE*** in this section.

2. Remove screw securing the battery housing (Fig. 7-1).

3. Place thumbs on the battery housing clips. Push the clips away from the battery housing. The battery housing releases and will rest on the clips.

4. Remove the battery housing, being careful not to twist or damage the wires. Place the housing so the batteries are accessible.

5. Remove the batteries from the housing.

WARNING	**Nonrechargeable batteries may explode or leak if recharged. This unit contains six rechargeable batteries. If battery replacement is required, replace all batteries at same time and only with the rechargeable type. To prevent ignition of a hazardous atmosphere, batteries must only be charged or changed in an area known to be nonhazardous.**
AVERTISSEMENT	**Les piles non-rechargable peuvent exploser ou couler si recharg'ees. Cet ensemble comprend six piles rechargables. Si le remplacement d'une pile est requis, Replacer toutes les piles en même temps en utilisant des piles de type rechargeable seulement. Afin d'èviter l'ignition d'une atmosphère que dans un endroit où le danger est manifestement inexistant.**

6. Insert the replacement, AA rechargeable batteries, according to the diagram shown on the battery housing.

7. Turn the battery housing over (batteries facing down), and insert housing as shown in Figure 7-1.

8. Replace the screw securing the battery housing.

9. To complete this procedure, refer to ***REASSEMBLING THE TYPE STT03E TERMINAL CASE*** in this section.

REASSEMBLING THE TYPE STT03E TERMINAL CASE

To reassemble the STT03E terminal:

1. Reconnect the keypad connector strip.

2. Turn the PC board over, setting and aligning the board with the stand-offs located on the upper case.

3. Place the lower case on the unit, carefully aligning the communication cord receptacle.

   NOTE: Be sure that wires do not protrude from case assembly.

4. Insert the rectangular mylar spring for the cartridge door into the tabs on the upper case and the door.

5. Press the cases together until they properly seat, while maintaining pressure on the cases.

6. Insert the four screws into the back of the lower case and tighten until heads are flush with case.

RECOMMENDED SPARE PARTS FOR TYPE STT03E TERMINAL

Table 7-1 lists the available spare parts for the Type STT03E terminal. Use the kit or part number to order components from your Bailey-Fischer & Porter sales representative.

Table 7-1. List of Spare Parts

Part Number	Description
NVRAM Part number 258474□1	NVRAM, internal configuration memory.
Communication cable Part number 1948517□3	STT03E communication cable.
EPROM Part number 258471□1	STT03 EPROM chip.
Antistatic Part number 1948580□1	Contains static-dissipative work susrface and ground cord assembly (wrist bands and alligator clips).
Recharger Part number 1948580□1	Battery charger Input: 110 VAC, 50/60 Hz. Output: 9 VDC, 100 mA.

NOTE:

1. For non-U.S. standard applications, use a charger that produces 9 VDC, 100 mA, similar to LCR Electronics Inc. part number AD0910B2-PN4 (220).

SECTION 8 - SUPPORT SERVICES

INTRODUCTION

Bailey-Fischer & Porter is ready to help in the use, application and repair of its products. Contact your nearest sales office to make requests for sales, applications, installation, repair, overhaul and maintenance contract services.

REPLACEMENT PARTS

When making repairs, order replacement parts from an authorized Bailey-Fischer & Porter sales representative. Provide the following information:

1. Part description, part number and quantity.

2. Nomenclature and serial numbers (if applicable).

3. Bailey-Fischer & Porter instruction manual number, page number and reference figure that identifies the part.

When ordering standard parts from Bailey-Fischer & Porter, use the part numbers and descriptions from the spare parts lists. Order parts without commercial descriptions from the nearest Bailey-Fischer & Porter sales office.

SPARE PARTS LISTS

For available spare parts, refer to ***RECOMMENDED SPARE PARTS FOR TYPE STT03E TERMINAL*** in Section 7.

TRAINING

Bailey-Fischer & Porter has a modern training facility available for training your personnel. On-site training is also available. Contact a Bailey-Fischer & Porter sales office for specific information and scheduling.

TECHNICAL DOCUMENTATION

Additional copies of this manual are available at the nearest Bailey-Fischer & Porter sales office for a reasonable charge.

APPENDIX A - AVS SMART POSITIONER

INTRODUCTION

This appendix covers the configuration and calibration functions of the AVS Smart Positioner.

AVS CONFIGURATION FUNCTIONS

Procedures explain the following functions:

- Create/modify configurations.
- Calibration.

The following functions apply to all devices and are similar or identical for all devices. The procedures are not duplicated for each device type, they are covered once for the PTS transmitter. Refer to Section 4, for the detailed description of these functions.

- Send configurations.
- Erase configurations.
- View configurations.
- Get configurations.
- Change working configurations.

For operation function procedures, (i.e., **STATUS**, **OUTPUT**, **SPECIAL FEATURE**, and **F1**) refer to ***OPERATIONAL FUNCTIONS*** in Section 4.

To change calibration or configuration parameters of a smart field device that is connected to an IMFBS01 module, the device must be taken off-line. This is done at the INFI 90® OPEN console.

Interfacing AVS positioner requires a Type STC1 Smart Terminal Cartridge. The cartridge inserts into the bottom of the STT03E terminal. For an installation procedure of the STC cartridge, refer to ***Smart Terminal Cartridge Installation*** in Section 3. To order cartridges, refer to ***NOMENCLATURE*** in Section 1.

Refer to Figure A-1 for an overview of the configuration function.

® Registered trademark of Elsag Bailey Process Automation.

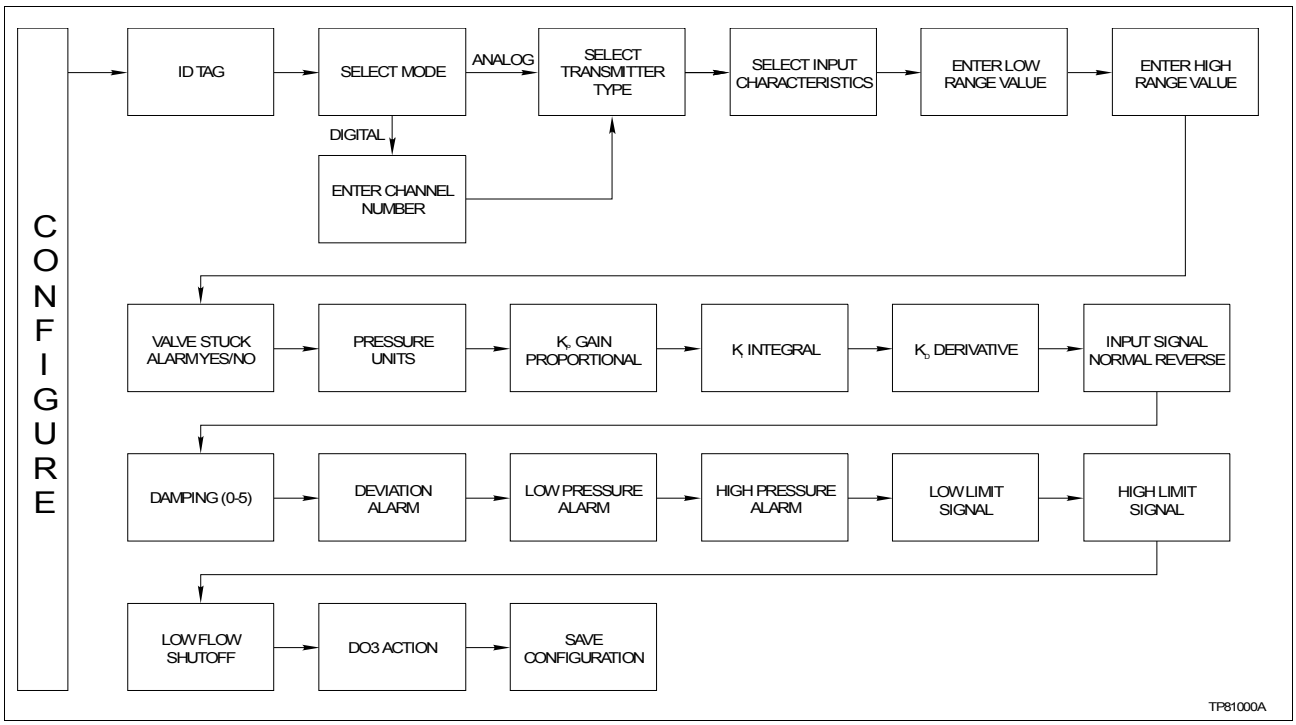


Figure A-1. Configuration Flowchart (AVS)

CREATE/MODIFY CONFIGURATION

The *NEW* function allows you to input and save a complete configuration. The *MODIFY* function allows you to change an existing configuration.

> **NOTE:** For illustrative purposes these procedures have been combined. Any deviation between them will be noted in the ***Comments*** column.

A configuration can be created off-line, without a connected field device. A number of configurations can be created and stored in the terminal and sent to a field device at a later time with **SEND CONFIG**.

A series of *n* s may appear in the ***Display*** column of this instruction where alphanumeric characters can be displayed or entered. The STT03E terminal is assumed to be in the *READY* state when beginning the following procedures.

Key	Display	Comments
CONFIG	CONFIGURATION → NEW MODIFY ERASE	Select *NEW* to create a configuration. To modify an existing configuration, select *MODIFY*. The screen sequence is the same, however, the *MODIFY* screens will appear with the values and cursor positions as originally configured.

Key	Display	Comments
ENTER	STT03 CONFIG [nnnnnnnnnnnnnn]	Enter a name for the configuration (also known as ID tag) using up to 14 ASCII characters. To select a character, scroll through the list (refer to Table 4-3) using the up and down arrow keys. Use the right arrow key to move to the next character. To change a character, use the left arrow key to backspace.
ENTER	SELECT MODE: ANALOG → DIGITAL	Select *DIGITAL*. Use the up and down arrow keys to select mode. **NOTE:** The *DIGITAL* selection should only be made when using an IMFBS01 field bus I/O module. Select *ANALOG f*or all other cases.
↓		
ENTER	ENTER CHANNEL #: nn	This screen only appears in the *DIGITAL* mode. It is used to assign an address to the AVS positioner for use with the field bus. The address range is 1 through 15.
ENTER	TRANSMITTER TYPE PTS EQS → AVS	Choose *AVS.*
↓		
↓		
ENTER	INPUT CHAR → LINEAR SQUARE ROOT SQUARE	Move the indicator to the choice with the up and down arrow keys. Refer to the appropriate product instruction for input characterization types. For this example *LINEAR* is the input characterization type. **NOTE:** The STT03E terminal is capable of displaying 3 input characterization types on the screen. Use the up and down arrow keys to view the additional input characterization types.
ENTER	LO RANGE VAL nn.nn HI RANGE VAL nn.nn	Input lower range value using the number keys, then press **ENTER**. Input the upper range value.

Key	Display	Comments
ENTER	VALVE STUCK AL NO → YES	Set this to *YES* to be alerted if the actuator has not moved for over two minutes with a change in the input signal. **NOTE:** Review product instruction for details.
↓		
ENTER	PRESSURE UNIT psi → bars	Select pressure units.
↓		
ENTER	Kp: Prop. Gain nn.nn	Proportional tuning constant. Use numbers between 1 and 0 for small drives and numbers greater than 1 for large drives. **NOTE:** Review product instruction for details.
ENTER	Ki: Integral nn.nn	Integral tuning constant. This number will usually range from 1 to 40. **NOTE:** Review product instruction for details.
ENTER	Kd: Derivative nn.nn	Derivative tuning constant. This number will usually range between 2 and 70. **NOTE:** Review product instruction for details.
ENTER	INPUT SIGNAL: → NORMAL ACT REVERSE ACT	Move the indicator to proper selection. Refer to the AVS Smart Positioner instruction for an explanation of terms.
ENTER	DAMPING: (0 - 5 sec) n secs	The input can be damped with a value of 1 to 5 seconds. A value of 0 will disable this parameter.
ENTER	DEVIATION ALARM n.n%	Set the deviation alarm in % of deviation from the set point.

Key	Display	Comments
ENTER	LO PRESS ALARM nn.nn UNITS	Sets the low pressure alarm for the supply pressure.
ENTER	HI PRESS ALARM nn.nn UNITS	Sets the high pressure alarm for the pressure at port 1 or port 2.
ENTER	LO LIMIT SIGNAL nnn%	Sets the percent of span that the digital output will be activated.
ENTER	HI LIMIT SIGNAL nnn%	Sets the percent of span that the digital output will be activated.
ENTER	LO FLOW SHUTOFF n%	Sets the minimum input value (in % of span) that the control element will go to 0%.
ENTER	DO3 ACTION → LO PRESS DEVIATION ALARM VALVE STUCK AL	Select a DO3 action with the arrow keys. Reference AVS instruction for details. **NOTE:** Scroll with the up and down arrow keys to view other selections.
ENTER ↓	STORE THIS CONFIGURATION? NO → YES	Make selection using arrow keys.
ENTER	CONFIG. ID TAG READY	Configuration ID tag name just configured will be in the upper left corner if the configuration is saved. It becomes the working configuration.

CALIBRATION

This section details the calibration functions of the STT03E terminal while interfacing an AVS positioner. There are four types of calibration functions:

- Output D-to-A calibration.
- Input D-to-A calibration.
- Manual position calibration.
- Automatic position calibration.

When calibrating, an AVS must be connected to the STT03E terminal. When using an IMFBS01 module (field bus), up to fifteen transmitters can be connected to the bus. Select the field device by using **SELECT DEVICE**.

> **NOTE:** To change calibration or configuration parameters of a field device that is connected to an IMFBS01 module, the field device must be taken off-line. This is done at the INFI 90 OPEN console.

After selecting a field device the *READY* screen appears. All calibration functions can be performed on the selected device. Refer to Figure A-2 for an overview of the calibration functions.

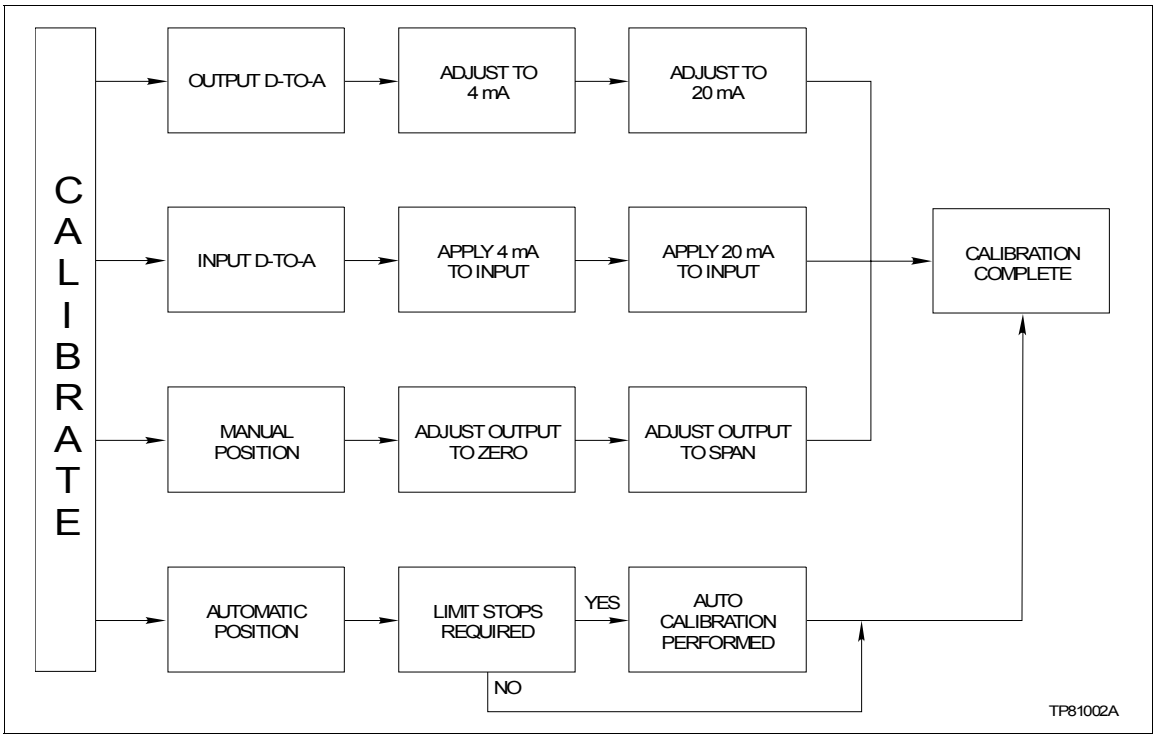


Figure A-2. Calibration Flowchart (AVS)

Output D-to-A Calibration

The *D-TO-A ADJUST* selection is only present when you are in the *ANALOG* communication mode, specified in the configuration procedure. This selection allows you to adjust the four to 20 milliampere output of the field device.

NOTE: Analog board must be installed for this function.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	
↓	PROCEED? NO → YES	
ENTER	→ OUTPUT D/A CAL INPUT A/D CAL MAN POS CAL AUTO POS CAL	Select the desired calibration.
ENTER	ADJUST TO 4mA THEN HIT ENTER	Use the up and down arrow keys to adjust the 4 mA signal. **NOTE:** When increasing or decreasing the mA signal, the increments of change increase with successive depressions until the maximum level of change is reached. By changing direction you will return to the smallest increment of change. This adjustment technique speeds up the adjustment process without affecting fine adjustment.
ENTER	ADJUST TO 20 mA THEN HIT ENTER	Use the up and down arrow keys to adjust the 20 mA signal. **NOTE:** Refer to AVS instruction for details on the calibrations.
ENTER	CONFIG. ID TAG READY	

Input A-to-D Calibration

This procedure applies to AVS Positioner configured for either *ANALOG* or *DIGITAL*. Any differences between the two are noted in the ***Comments*** column.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	
↓	PROCEED? NO → YES	
ENTER	OUTPUT D/A CAL → INPUT A/D CAL MAN POS CAL AUTO POS CAL	Select the desired calibration.
↓		
ENTER	APPLY 4 mA TO INPUT THEN HIT ENTER	Make the proper adjustments and press **ENTER**. **NOTE:** Refer to AVS instruction for details on the calibrations.
ENTER	APPLY 20 mA TO INPUT THEN HIT ENTER	Make the proper adjustments and press **ENTER**. **NOTE:** Refer to AVS instruction for details on the calibrations.
ENTER	CONFIG. ID TAG READY	

Manual Position Calibration

This procedure applies to AVS Positioner configured for either *ANALOG* or *DIGITAL*. Any differences between the two are noted in the ***Comments*** column.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	
↓	PROCEED? NO → YES	
ENTER	OUTPUT D/A CAL INPUT A/D CAL → MAN POS CAL AUTO POS CAL	Select the desired calibration.
↓		
↓		
ENTER	ADJUST OUTPUT TO ZERO THEN HIT ENTER	Make the proper adjustments and press **ENTER**. **NOTE:** Refer to AVS instruction for details on the calibrations.
ENTER	ADJUST OUTPUT TO SPAN THEN HIT ENTER	Make the proper adjustments and press **ENTER**. **NOTE:** Refer to AVS instruction for details on the calibrations.
ENTER	CONFIG. ID TAG READY	

Automatic Position Calibration

This procedure applies to AVS Positioner configured for either *ANALOG* or *DIGITAL*. Any differences between the two are noted in the ***Comments*** column.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	
↓	PROCEED? NO → YES	
ENTER	OUTPUT D/A CAL INPUT A/D CAL MAN POS CAL → AUTO POS CAL	Select the desired calibration.
↓		
↓		
↓		
↓		
ENTER	LIMIT STOPS REQUIRED	Limit stops are required for the *AUTO POS CAL* selection. **NOTE:** Refer to AVS instruction for details on the calibrations.
↓	PROCEED? NO → YES	
ENTER	AUTO CAL STARTED	The AVS is being automatically calibrated.
	AUTO CAL COMPLETE	The AVS is calibrated.

APPENDIX B - BCN PRESSURE TRANSMITTER

INTRODUCTION

This appendix covers the configuration and calibration functions of the Type BCN Pressure Transmitter.

BCN CONFIGURATION FUNCTIONS

Procedures explain the following functions:

- Create/modify configurations.
- Calibration.

The following functions apply to all devices and are similar or identical for all devices. The procedures are not duplicated for each device type, they are covered once for the PTS transmitter. Refer to Section 4, for the detailed description of these functions.

- Send configurations.
- Erase configurations.
- View configurations.
- Get configurations.
- Change working configurations.

For operation function procedures, (i.e., **STATUS**, **OUTPUT**, **SPECIAL FEATURE** and **F1**) refer to ***OPERATIONAL FUNCTIONS*** in Section 4.

To change calibration or configuration parameters of a smart field device that is connected to an IMFBS01 module, the device must be taken off-line. This is done at the INFI 90 OPEN console.

Interfacing BCN transmitter requires a Type STC3 Smart Terminal Cartridge. The cartridge inserts into the bottom of the STT03E terminal. For an installation procedure of the STC cartridge, refer to ***Smart Terminal Cartridge Installation*** in Section 3. To order cartridges, refer to ***NOMENCLATURE*** in Section 1.

Refer to Figure B-1 for an overview of the configuration function.

CREATE/MODIFY CONFIGURATION

The *NEW* function allows you to input and save a complete configuration. The *MODIFY* function allows you to change an existing configuration.

> **NOTE:** For illustrative purposes these procedures have been combined. Any deviation between them will be noted in the ***Comments*** column.

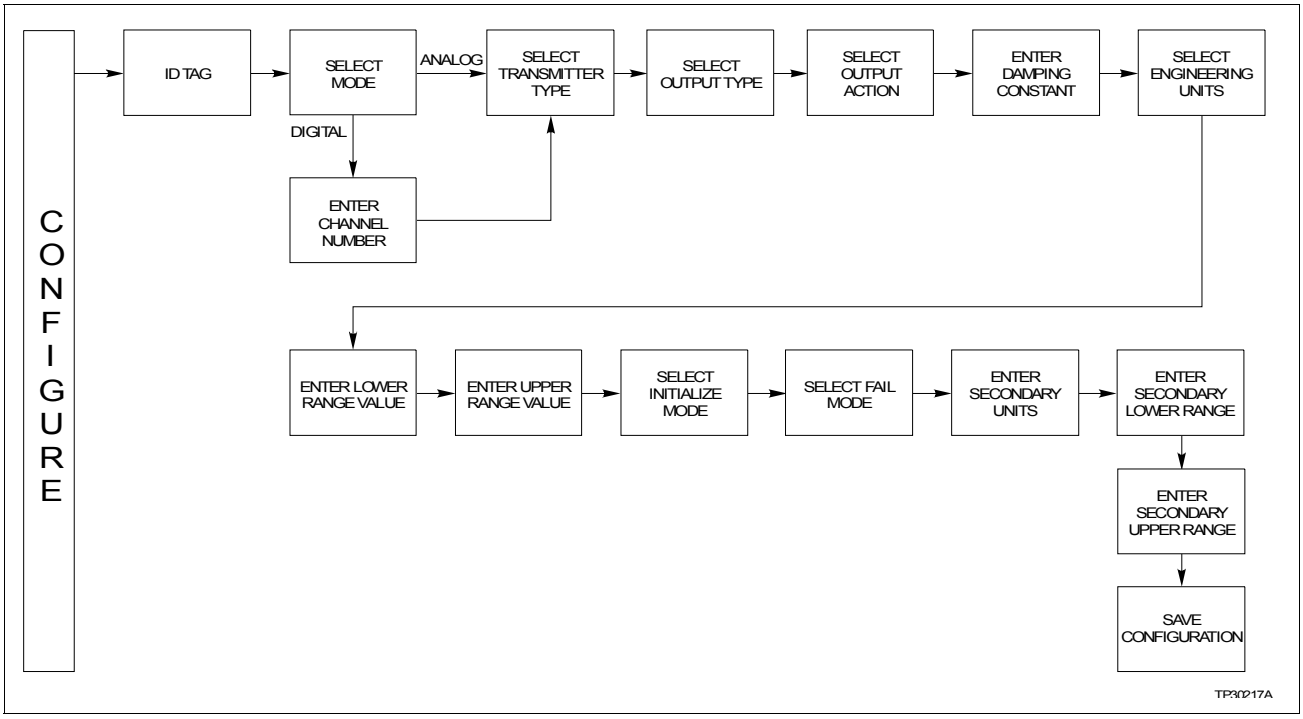


Figure B-1. Configuration Flowchart (BCN)

A configuration can be created off-line, without a connected field device. A number of configurations can be created and stored in the terminal, and sent to a field device at a later time with **SEND CONFIG**.

A series of *n* s may appear in the ***Display*** column of this instruction where numeric characters can be displayed or entered. The STT03E terminal is assumed to be in the *READY* state when beginning the following procedures.

Key	Display	Comments
CONFIG	CONFIGURATION → NEW MODIFY ERASE	Select *NEW* to create a new configuration. To modify an existing configuration, select *MODIFY.* The screen sequence is the same, however, the *MODIFY* screens will appear with the values and cursor positions as originally configured.
ENTER	STT03 CONFIG [nnnnnnnnnnnnn]	Enter a name for the configuration (also known as ID tag) using up to 12 ASCII characters. To select a character, scroll through the list (refer to Table 4-3) using the up and down arrow keys. Use the right arrow key to move to the next digit. To change a character, use the left arrow key to backspace.
ENTER	SELECT MODE: ANALOG → DIGITAL	Select *DIGITAL* (device in this mode defaults to below 4 mA, independent of input). Use the up and down arrow keys to select mode. **NOTE:** The *DIGITAL* selection should only be made when using an IMFBS01 field bus I/O module. Select *ANALOG f*or all other cases.
↓		

Key	Display	Comments
ENTER	ENTER CHANNEL #: nn	If *ANALOG* is selected, *ENTER CHANNEL #* screen will not appear. The next screen will be *TRANSMITTER TYPE*. This screen is used to assign an address to the transmitter for use with the field bus. The address range is 1 through 15.
ENTER	TRANSMITTER TYPE → BCN EQN	Choose *BCN*.
ENTER	OUTPUT TYPE → LINEAR SQUARE ROOT 3/2 FLOW MODE	Move the indicator to the choice with the up and down arrow keys. Refer to the ***Smart Pressure Transmitter Type BCN*** instruction for output types.
↓	OUTPUT TYPE 3/2 FLOW MODE 5/2 FLOW MODE → FUNC GEN	For this example *FUNC GEN* is the output type. **NOTE:** The STT03E terminal is capable of displaying 3 output types on the screen. Use the up and down arrow keys to view the additional output types.
↓		
↓		
↓		
↓		
ENTER	POINT 1 INP (%) nn.nn POINT 1 OUT (%) nn.nn	Five input and output points need to be specified as a percentage of input. The first and last points on the curve are assumed to be 0.00% and 100.00%. Use the number keys to enter a value. Press **ENTER**. Continue until all 5 pairs of points have been entered.
	POINT 5 INP (%) nn.nn POINT 5 OUT (%) nn.nn	
ENTER	OUTPUT ACTION: → NORMAL REVERSE	Move the indicator to your selection. Refer to the ***Smart Pressure Transmitter Type BCN*** instruction for an explanation of terms.

Key	Display	Comments
ENTER	DAMPING: (0 - 32 SEC) _nn.nn SEC	Enter a value between 0 and 32 seconds.
ENTER	ENGINEERING UNIT →iH20 mmHG cmH20 PSI MPA KPA BARS mBARS $Kgcm^2$	Select an engineering unit.
ENTER	LOWER RANGE VAL. nn.nn UNITS UPPER RANGE VAL. nn.nn UNITS	Input lower range value using the number keys, then press **ENTER**. Input the upper range value. The *UNITS* displayed will be those designated in the previous screen.
ENTER	INITIALIZE MODE: → LOW HIGH	Refer to the ***Smart Pressure Transmitter Type BCN*** instruction for mode description.
ENTER	FAIL MODE: → LOW HIGH LAST	Make a selection using the arrow keys.
ENTER	ENTER SECONDARY UNITS _nnnnnn	This is a 6 character alphanumeric designation to represent values in user familiar units. Use the up and down arrow keys to scroll through the alphanumeric list. Use the left and right arrow keys to move through the character places.
ENTER	SECONDARY L. R. nn.nn UNITS SECONDARY U. R. nn.nn UNITS	Specify values using the number keys. The *UNITS* displayed will be those designated in the previous screen. After entering value press **ENTER**.
ENTER	STORE THIS CONFIGURATION? NO → YES	Make a selection using the arrow keys.
↓		
ENTER	CONFIG. ID TAG READY	The Configuration ID tag name just configured will be in the upper left corner if the configuration is saved. It becomes the working configuration.

CALIBRATION

This section details the calibration functions of the STT03E terminal while interfacing a BCN transmitter. There are three types of calibration functions:

- Bench calibration.
- Rezero.
- D-to-A adjust.

When calibrating, a field device must be connected to the STT03E terminal. When using an IMFBS01 module (field bus), up to fifteen transmitters can be connected to the bus. Select the field device by using **SELECT DEVICE**.

> **NOTE:** To change calibration or configuration parameters of a field device that is connected to an IMFBS01 module, the transmitter must be taken off-line. This is done at the INFI 90 OPEN console.

After selecting a field device the *READY* screen appears. All calibration functions can be performed on the selected device. Refer to Figure B-2 for an overview of the calibration functions.

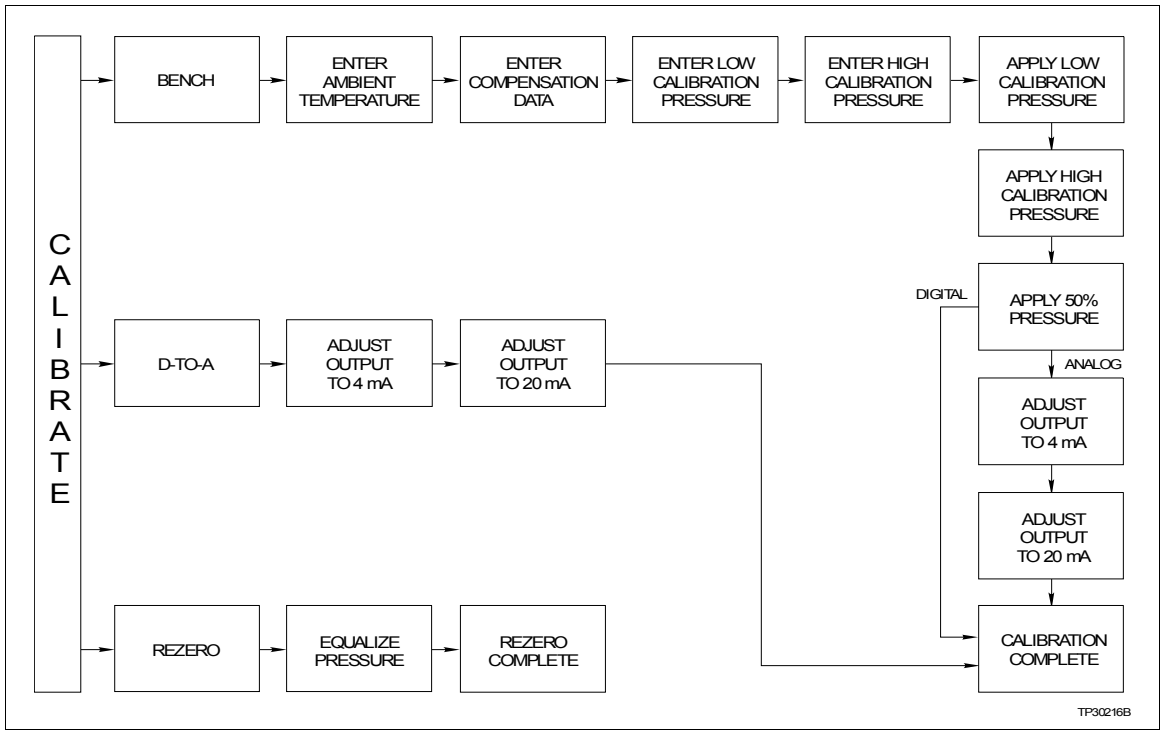


Figure B-2. Calibration Flowchart (BCN)

Bench Calibration

This procedure applies to BCN transmitters configured for either *ANALOG* or *DIGITAL*. Any difference between the two are noted in the ***Comments*** column.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	
↓	PROCEED? NO → YES	
ENTER	CALIBRATION D-TO-A ADJUST → BENCH CALIB. REZERO	Select *BENCH CALIB*. If configured digitally, the *D-TO-A ADJUST* selection will not appear.
↓		
ENTER	ENTER XMITTER AMBIENT TEMP. nn,nn C	Enter the field device ambient temperature in degrees Celsius using the number keypad. The surrounding room temperature can be used for this temperature value.
ENTER	ENTER COMP DATA NO → YES	The compensation data is based on characteristics of the individual transducers for temperature correction. Refer to the ***Smart Pressure Transmitter Type BCN*** instruction.
↓		
ENTER	ZERO SHIFT A. 000000000 B. 000000000 C. 000000000 D. 000000000 E. 000000000	There are 5 sets of data, A through E. Press **ENTER** to advance to the next set of data. This data should match the tag located in the electronics side of the transmitter. **NOTE:** After a value for C is entered D and E are displayed and after E is entered a checksum value is requested.
ENTER	SPAN SHIFT A. 000000000 B. 000000000 C. 000000000 D. 000000000 E. 000000000	There are also 5 sets of data, A through E, for span shift. Press **ENTER** to advance to the next set of data. **NOTE:** After a value for C is entered D and E are displayed and after E is entered a checksum value is requested.

Key	Display	Comments
ENTER	LOW CALIB PRES nn.nn UNITS HIGH CALIB PRES nn.nn UNITS	Enter the low calibration pressure using the number keypad. Press **ENTER**. Then enter the high calibration pressure.
ENTER	APPLY PRESSURE THEN HIT ENTER nn.nn UNITS	Apply the low range value to the input of transmitter as specified earlier.
ENTER	APPLY PRESSURE THEN HIT ENTER nn.nn UNITS	Apply the high range value to the input of transmitter as specified earlier.
ENTER	APPLY PRESSURE THEN HIT ENTER nn.nn UNITS	Apply the middle range value. This value is calculated by STT03E terminal using low and high values.
ENTER	ADJUST TO 4 mA THEN HIT ENTER	If configured digitally this adjust selection does not appear. Adjust transmitter output using up and down arrow keys. **NOTE:** When increasing or decreasing the mA signal, the increments of change increase with successive depressions until the maximum level of change is reached. By changing direction the smallest increment of change returns. This technique speeds up the process without affecting fine adjustment.
ENTER	ADJUST TO 20 mA THEN HIT ENTER	Adjust the transmitter output using up and down arrow keys.
ENTER	CONFIG. ID TAG READY	Bench calibration is complete.

Rezero

The rezero procedure allows you to zero the transmitter without going through the complete bench calibration procedure.

D-to-A Adjust

The *D-TO-A ADJUST* selection is only present when you are in the *ANALOG* communication mode, specified in the configuration procedure. This

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	
↓	PROCEED? NO → YES	
ENTER	CALIBRATION: D-TO-A ADJUST BENCH CALIB. → REZERO	Select *REZERO*. If digitally configured, the *D-TO-A ADJUST* selection will not appear.
↓		
↓		
ENTER	APPLY PRESSURE THEN HIT ENTER nn.nn	Apply zero value to the transmitter.
ENTER	CONFIG. ID TAG READY	Rezero is complete.

selection allows you to adjust the four to 20 milliamp output of the field device.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	
↓	PROCEED? NO → YES	

Key	Display	Comments
ENTER	CALIBRATION → D-TO-A ADJUST BENCH CALIB. REZERO	
ENTER	ADJUST TO 4 mA THEN HIT ENTER	Use the arrow keys to adjust the 4 mA signal. **NOTE:** When increasing or decreasing the mA signal, the increments of change increase with successive depressions until the maximum level of change is reached. By changing direction you will return to the smallest increment of change. This adjustment technique speeds up the adjustment process without affecting fine adjustment.
ENTER	ADJUST TO 20 mA THEN HIT ENTER	Use the up and down arrow keys to adjust the 20 mA signal.
ENTER	CONFIG. ID TAG READY	

APPENDIX C - EQN TEMPERATURE TRANSMITTER

INTRODUCTION

This appendix covers the configuration and calibration functions of the EQN Smart Temperature Transmitter.

EQN CONFIGURATION

Procedures explain the following functions:

- Create a configuration.
- Calibration.

The following functions apply to all devices and are similar or identical for all devices. The procedures are not duplicated for each device type, they are covered once using the PTS transmitter. Refer to Section 4, for the detailed description of these functions.

- Send configurations.
- Erase configurations.
- View configurations.
- Get configurations.
- Change working configurations.

For operation function procedures, (i.e., **STATUS**, **OUTPUT**, **SPECIAL FEATURE**, and **F1**) refer to ***OPERATIONAL FUNCTIONS*** in Section 4.

To change calibration or configuration parameters of a smart field device that is connected to an IMFBS01 module, the device must be taken off-line. This is done at the INFI 90 OPEN console.

Interfacing the EQN transmitter requires a Type STC3 Smart Terminal Cartridge. The cartridge inserts into the bottom of the STT03E terminal. For an installation procedure of the STC cartridge, refer to ***Smart Terminal Cartridge Installation*** in Section 3. To order cartridges, refer to ***NOMENCLATURE*** in Section 1.

Refer to Figure C-1 for an overview of the configuration function.

CREATE/MODIFY CONFIGURATION

The *NEW* function allows you to input and save a complete configuration. The *MODIFY* function allows you to change an existing configuration.

> **NOTE:** For illustrative purposes, these procedures have been combined. Any deviation between them will be noted in the ***Comments*** column.

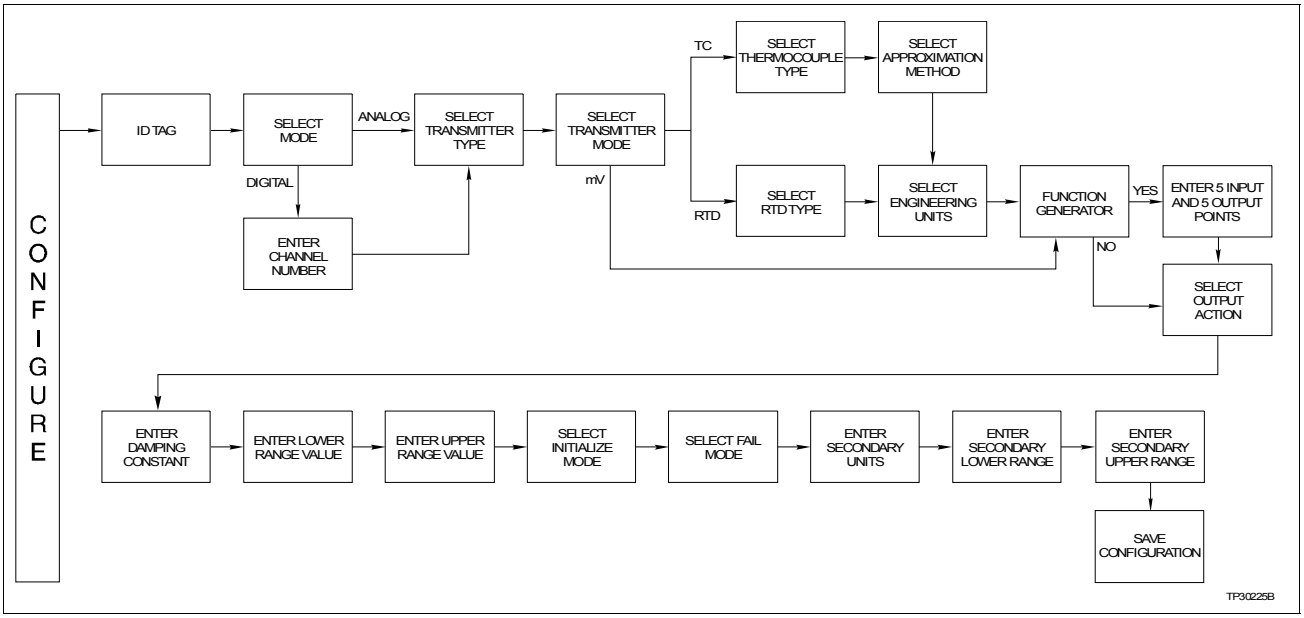


Figure C-1. Configuration Flowchart (EQN)

A configuration can be created off-line, without a connected field device. A number of configurations can be created and stored in the terminal and sent to a field device at a later time with **SEND CONFIG**.

A series of *n* s may appear in the Display column of this instruction where alphanumeric characters can be displayed or entered. The STT03E terminal is assumed to be in the READY state when beginning the following procedures.

Key	Display	Comments
CONFIG	CONFIGURATION → NEW MODIFY ERASE	Select *NEW.* To create a new configuration. To modify an existing configuration, select *MODIFY.* The screen sequence is the same, however, the *MODIFY* screens will appear with the values and cursor positions as originally configured.
ENTER	STT03 CONFIG [nnnnnnnnnnnn]	A 12-character ID tag name is entered within the brackets. Use the arrow keys to select characters. Use the right arrow to advance to the next character. When finished entering a name press **ENTER**.
ENTER	SELECT MODE: → ANALOG DIGITAL	For this example select *ANALOG.*

Key	Display	Comments
ENTER	TRANSMITTER TYPE BCN → EQN	Use the arrow keys to select *EQN*.
↓		
ENTER	TRANSMITTER MODE → THERMOCOUPLE RTD MILLIVOLT	For this example select *THERMOCOUPLE.*
ENTER	THERMOCOUPLE → N B E J K R S T C	Select *N* type.
ENTER	APPROX. METHOD: → LINEAR NON-LINEAR	Select *LINEAR*.
ENTER	TEMP UNITS → °C °F °K	Choose the desired temperature unit.
ENTER	OUTPUT FUNC GEN. → NO YES	If *YES* is selected, 5 input and output points must be specified between 0 and 100%.
ENTER	OUTPUT ACTION: → NORMAL REVERSE	Refer to the ***Smart Electronic Temperature Transmitter Type EQN*** instruction for description.
ENTER	DAMPING: (0-32 SEC) _nn.nn SECS	Enter a value between 0 and 32. Refer to the ***Smart Electronic Temperature Transmitter Type EQN*** instruction for description.
ENTER	LOWER RANGE VAL. nn.nn UNITS UPPER RANGE VAL. nn.nn UNITS	Enter the lower range temperature value and press **ENTER**. Input the upper range value.

Key	Display	Comments
ENTER	INITIALIZE MODE: → LOW HIGH	Refer to the ***Smart Electronic Temperature Transmitter Type EQN*** instruction for description.
ENTER	FAIL MODE: → LOW HIGH LAST	Refer to the ***Smart Electronic Temperature Transmitter Type EQN*** instruction for description.
ENTER	ENTER SECONDARY UNITS _nnnnnn	Enter up to 6 characters. Use familiar units to describe the output.
ENTER	SECONDARY L.R. _nn.nn UNITS SECONDARY U.R. nn.nn UNITS	Input the lower range value and press **ENTER**. Input the upper range value.
ENTER	STORE THIS CONFIGURATION NO → YES	
↓		
ENTER	CONFIG. ID TAG READY	The Configuration ID tag name just configured will be in the upper left corner if the configuration is saved. It becomes the working configuration.

CALIBRATION

This section details the calibration functions of the STT03E terminal while interfacing an EQN temperature transmitter. There are two types of calibration functions:

- Bench calibration.
- D-to-A adjust.

When calibrating, a device must be connected to the STT03E transmitter. When using an IMFBS01 module (field bus), up to fifteen transmitters can be connected to the bus. Select the transmitter by using **SELECT DEVICE**.

> **NOTE:** To change calibration or configuration parameters of a smart transmitter that is connected to an IMFBS01 module, the transmitter must be taken off-line. This is done at the INFI 90 OPEN console.

After selecting a device the *READY* screen appears. All calibration functions can be performed on the selected device. Refer to Figure C-2 for an overview of the calibration functions.

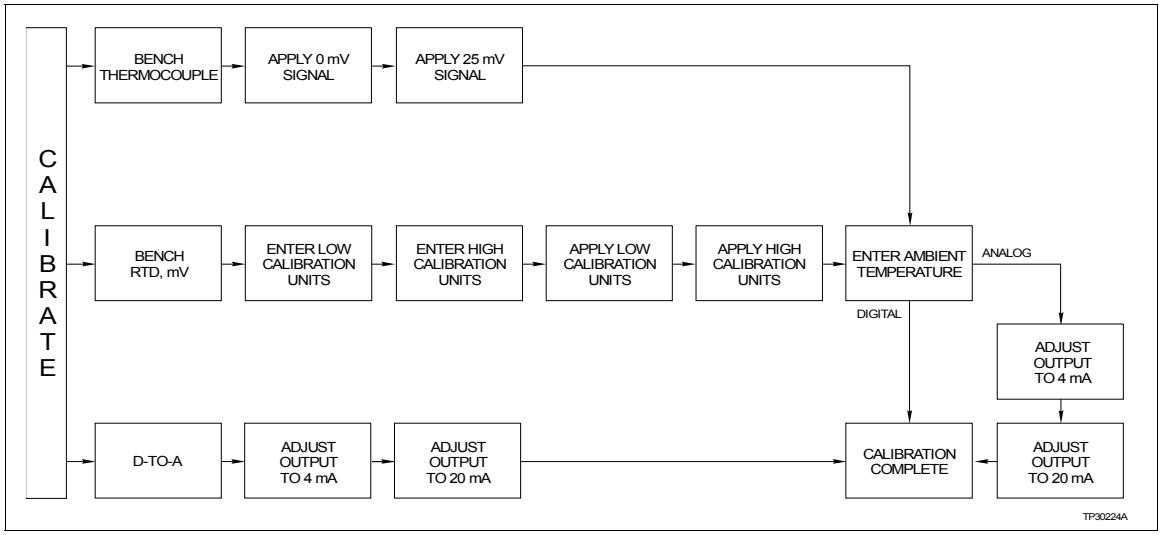


Figure C-2. Calibration Flowchart (EQN)

Bench Calibration

This procedure applies to EQN Transmitters configured for either *ANALOG* or *DIGITAL*. Any difference between the two are noted in the ***Comments*** column.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	
↓	PROCEED? NO → YES	Select *YES*.

Key	Display	Comments
ENTER	CALIBRATION D-TO-A ADJUST → BENCH CALIB.	Select *BENCH CALIB.*
↓		
ENTER	APPLY 0 mV SIGNAL THEN HIT ENTER	Apply 0 mV to the transmitter.
ENTER	APPLY 25 mV SIGNAL THEN HIT ENTER	Apply 25 mV to the transmitter.
ENTER	ENTER XMITTER AMBIENT TEMP. nn.nn C	Enter the field device ambient temperature in degrees Celsius using the number keypad. The surrounding room temperature can be used for this temperature value.
ENTER	ADJUST TO 4 mA THEN HIT ENTER	Adjust the transmitter output using the up and down arrow keys.
ENTER	ADJUST TO 20 mA THEN HIT ENTER	Adjust the transmitter output using the up and down arrow keys.
ENTER	CONFIG. ID TAG READY	Bench calibration is complete.

D-to-A Adjust

The *D-TO-A ADJUST* selection is only present when you are in the *ANALOG* communication mode, specified in the configuration procedure. This selection allows you to adjust the four to twenty milliamp output of the field device.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED!	
↓	PROCEED? NO → YES	
ENTER	CALIBRATION → D-TO-A ADJUST BENCH CALIB.	
ENTER	ADJUST TO 4 mA THEN HIT ENTER	Use the arrow keys to adjust the 4 mA signal. **NOTE:** When increasing or decreasing the mA signal, the increments of change increase with successive depressions until the maximum level of change is reached. By changing direction you will return to the smallest increment of change. This adjustment technique speeds up the adjustment process without affecting fine adjustment.
ENTER	ADJUST TO 20 mA THEN HIT ENTER	Use the arrow keys to adjust the 20 mA signal.
ENTER	CONFIG. ID TAG READY	

APPENDIX D - EQS TEMPERATURE TRANSMITTER

INTRODUCTION

This appendix covers the configuration and calibration functions of the EQS Smart Temperature Transmitter.

EQS CONFIGURATION

Procedures explain the following functions:

- Create a configuration.
- Calibration.

The following functions apply to all devices and are similar or identical for all devices. The procedures are not duplicated for each device type, they are covered once using the PTS transmitter. Refer to Section 4, for the detailed description of these functions.

- Send configurations.
- Erase configurations.
- View configurations.
- Get configurations.
- Change working configurations.

For operation function procedures, (i.e., **STATUS**, **OUTPUT**, **SPECIAL FEATURE**, and **F1**) refer to ***OPERATIONAL FUNCTIONS*** in Section 4.

To change calibration or configuration parameters of a smart field device that is connected to an IMFBS01 module, the device must be taken off-line. This is done at the INFI 90 OPEN console.

Refer to Figure D-1 for an overview of the configuration function.

CREATE/MODIFY CONFIGURATION

The *NEW* function allows you to input and save a complete configuration. The *MODIFY* function allows you to change an existing configuration.

> **NOTE:** For illustrative purposes these procedures have been combined. Any deviation between them will be noted in the ***Comments*** column.

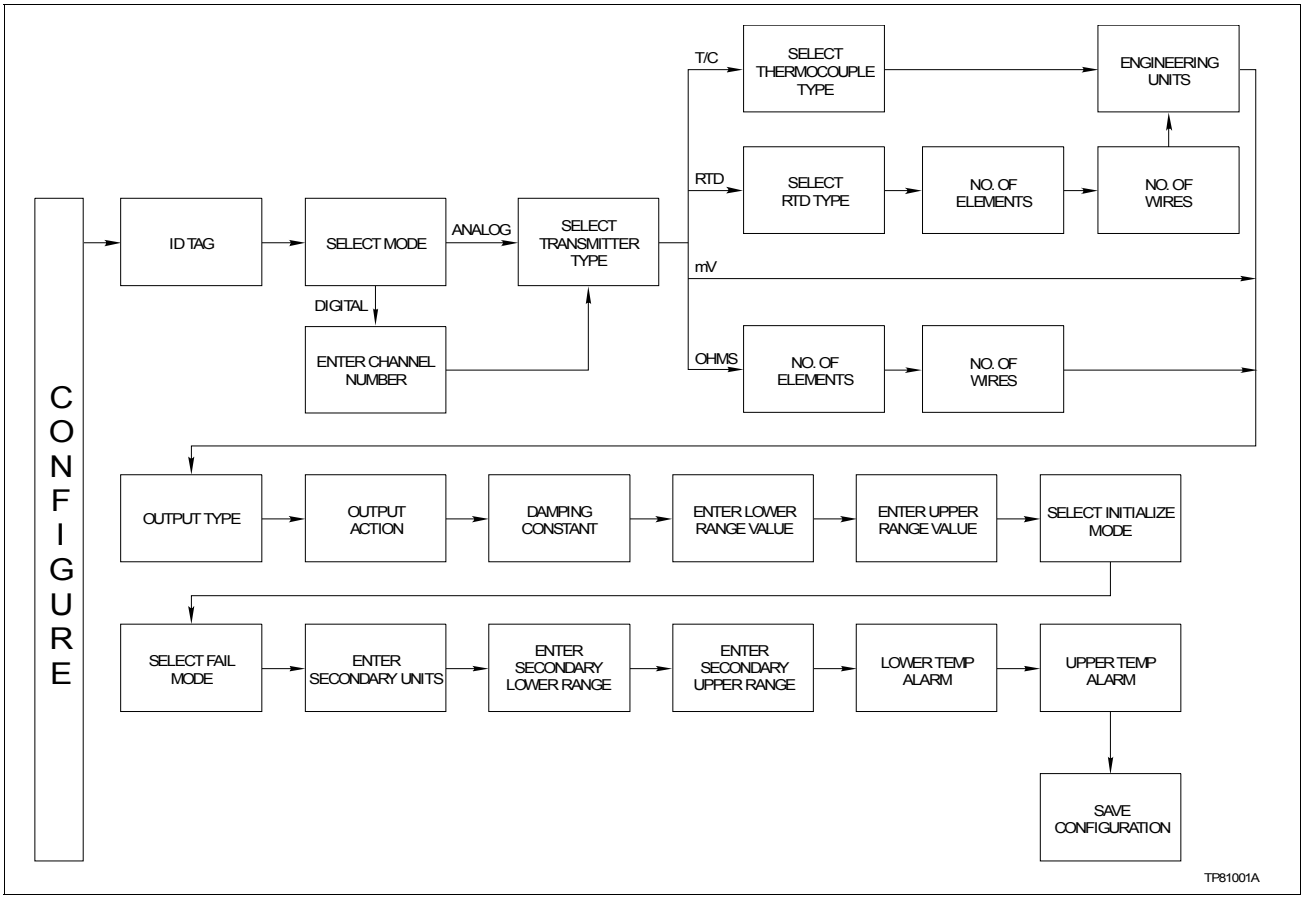


Figure D-1. Configuration Flowchart (EQS)

A configuration can be created off-line, without a connected field device. A number of configurations can be created and stored in the terminal and sent to a field device at a later time with **SEND CONFIG**.

A series of *n*s may appear in the ***Display*** column of this instruction where alphanumeric characters can be displayed or entered. The STT03E terminal is assumed to be in the *READY* state when beginning the following procedures**.**

Key	Display	Comments
CONFIG	CONFIGURATION → NEW MODIFY ERASE	Select *NEW* to create a new configuration. To modify an existing configuration, select *MODIFY.* The screen sequence is the same, however, the *MODIFY* screens will appear with the values and cursor positions as originally configured.
ENTER	STT03 CONFIG [nnnnnnnnnnnnn]	A 14-character ID tag name is entered within the brackets. Use the arrow keys to select characters. Use the right arrow to advance to the next character. When finished entering a name press **ENTER**.

Key	Display	Comments
ENTER	SELECT MODE: → ANALOG DIGITAL	For this example select *ANALOG*.
ENTER	TRANSMITTER TYPE PTS → EQS	Use the arrow keys to select *EQS*.
↓		
ENTER	SENSOR TYPE: → T/C RTD mV OHMS	For this example select *T/C*.
ENTER	THERMOCOUPLE → N B E J K R S T C	Select *N* type.
ENTER	ENGINEERING UNIT → °C °F °K	Choose the desired temperature unit.
ENTER	OUTPUT TYPE: → LINEAR FUNC GENERATOR	If *FUNC GENERATOR* is selected, 5 input and output points must be specified between 0 and 100%.
ENTER	OUTPUT ACTION: → NORMAL REVERSE	Refer to the ***Platinum Standard Series Smart Temperature Transmitter Type EQS*** instruction for description.
ENTER	DAMPING: (0-32 SEC) nn.nn SECS	Enter a value between 0 and 32. Refer to the ***Platinum Standard Series Smart Temperature Transmitter Type EQS*** instruction for description.
ENTER	LOWER RANGE VAL nn.nn °C UPPER RANGE VAL nn.nn °C	Enter the lower range temperature value and press **ENTER**. Input the upper range value.

Key	Display	Comments
ENTER	INITIALIZE MODE: → LOW HIGH	Refer to the ***Platinum Standard Series Smart Temperature Transmitter Type EQS*** instruction for description.
ENTER	FAIL MODE: → LOW HIGH LAST	Refer to the ***Platinum Standard Series Smart Temperature Transmitter Type EQS*** instruction for description.
ENTER	ENTER SECONDARY UNITS nnnnnn	Enter up to 6 characters. Use familiar units to describe the output.
ENTER	SECONDARY L.R. _nn.nn UNITS SECONDARY U.R. nn.nn UNITS	Input the lower range value and press **ENTER**. Input the upper range value.
ENTER	LOWER TEMP ALARM _nn.nn UNITS UPPER TEMP ALARM. nn.nn UNITS	Input the lower temperature alarm value and press **ENTER**. Input the upper temperature alarm value and press **ENTER**.
ENTER ↓	STORE THIS CONFIGURATION NO → YES	
ENTER	CONFIG. ID TAG READY	Configuration ID tag name just configured will be in the upper left corner if the configuration is saved. It becomes the working configuration.

CALIBRATION

This section details the calibration functions of the STT03E terminal while interfacing an EQS temperature transmitter. There are two types of calibration functions:

- Bench calibration.
- D-to-A adjust.

When calibrating, a device must be connected to the terminal. When using an IMFBS01 module (field bus), up to 15 devices can be connected to the bus. Select the transmitter by using **SELECT DEVICE**.

> **NOTE:** To change calibration or configuration parameters of a field device that is connected to an IMFBS01 module, the device must be taken off-line. This is done at the INFI 90 OPEN console.

After selecting a device the *READY* screen appears. All calibration functions can be performed on the selected device. Refer to Figure D-2 for an overview of the calibration functions.

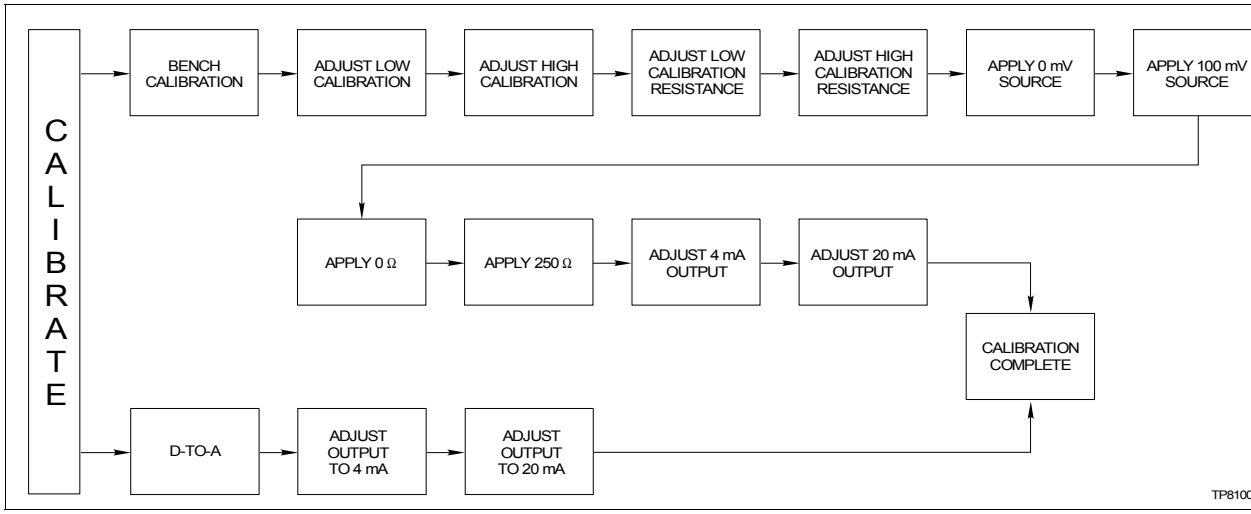


Figure D-2. Calibration Flowchart (EQS)

Bench Calibration

This procedure applies to EQS Transmitters configured for either *ANALOG* or *DIGITAL*. Any difference between the two are noted in the ***Comments*** column.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED!	
↓	PROCEED? NO → YES	Select *YES*.
ENTER	CALIBRATION D-TO-A ADJUST → BENCH CALIB.	Select *BENCH CALIB* with the down arrow key.
↓		
ENTER	LOW CALIB n.nnn mV HIGH CALIB n.nnn mV	Enter the low and high calibration voltages.
ENTER	LOW CALIB RES n.nn Ω HIGH CALIB RES nnn.nn Ω	Enter the low and high calibration resistances.
ENTER	APPLY 0.00 mV AT 3(+), 4(-) THEN HIT ENTER	Apply 0.00 mV to the transmitter. **NOTE:** Refer to the EQS instruction for detailed wiring diagrams of this procedure.
ENTER	APPLY 100.00 mV AT 3(+), 4(-) THEN HIT ENTER	Apply 100 mV to the transmitter. **NOTE:** Refer to the EQS instruction for detailed wiring diagrams of this procedure.
ENTER	APPLY 0 .00 Ω SHORT 1-2, 2-3, 3-4 THEN HIT ENTER	Apply 0 Ω to the transmitter. **NOTE:** Refer to the EQS instruction for detailed wiring diagrams of this procedure.
ENTER	APPLY 250 Ω SHORT 1-2, 3-4 Ω AT 2-3 THEN HIT ENTER	Apply 250 Ω to the transmitter. **NOTE:** Refer to the EQS instruction for detailed wiring diagrams of this procedure.

Key	Display	Comments
ENTER	ADJUST TO 4 mA THEN HIT ENTER	Use the arrow keys to adjust the 4 mA signal. **NOTE:** When increasing or decreasing the mA signal, the increments of change increase with successive depressions until the maximum level of change is reached. By changing direction you will return to the smallest increment of change. This adjustment technique speeds up the adjustment process without affecting fine adjustment.
ENTER	ADJUST TO 20 mA THEN HIT ENTER	Use the arrow keys to adjust the 20 mA signal.
ENTER	CONFIG. ID TAG READY	

D-to-A Adjust

The *D-TO-A ADJUST* selection is only present when you are in the *ANALOG* communication mode, specified in the configuration procedure. This selection allows you to adjust the four to 20 milliampere output of the field device.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED!	
↓	PROCEED? NO → YES	
ENTER	CALIBRATION → D-TO-A ADJUST BENCH CALIB.	
ENTER	ADJUST TO 4 mA THEN HIT ENTER	Use the arrow keys to adjust the 4 mA signal. **NOTE:** When increasing or decreasing the mA signal, the increments of change increase with successive depressions until the maximum level of change is reached. By changing direction you will return to the smallest increment of change. This adjustment technique speeds up the adjustment process without affecting fine adjustment.

Key	Display	Comments
ENTER	ADJUST TO 20 mA THEN HIT ENTER	Use the arrow keys to adjust the 20 mA signal.
ENTER	CONFIG. ID TAG READY	

APPENDIX E - XM/SM/XE MAGNETIC FLOWMETER

INTRODUCTION

This appendix covers the configuration and calibration functions of the XM/SM/XE Magnetic Flowmeter (Mag Flow).

XM/SM/XE MAGFLOW CONFIGURATION FUNCTIONS

Procedures explain the following functions:

- Create/modify configurations.
- Calibration.

The following functions apply to all devices and are similar or identical for all devices. The procedures are not duplicated for each device type, they are covered once for the PTS transmitter. Refer to Section 4, for the detailed description of these functions.

- Send configurations.
- Erase configurations.
- View configurations.
- Get configurations.
- Change working configurations.

For operation function procedures, (i.e., **STATUS**, **OUTPUT**, **SPECIAL FEATURE** and **F1**) refer to ***OPERATIONAL FUNCTIONS*** in Section 4.

To change calibration or configuration parameters of a smart field device that is connected to an IMFBS01 module, the device must be taken off-line. This is done at the INFI 90 OPEN console.

Interfacing the XM/SM/XE Mag Flow Meter requires a Type STC4 Smart Terminal Cartridge. The cartridge inserts into the bottom of the STT03E terminal. For an installation procedure of the STC cartridge, refer to ***Smart Terminal Cartridge Installation*** in Section 3. To order cartridges, refer to ***NOMENCLATURE*** in Section 1.

Refer to Figure E-1 for an overview of the configuration function.

CREATE/MODIFY CONFIGURATION

The *NEW* function allows you to input and save a complete configuration. The *MODIFY* function allows you to change an existing configuration.

> **NOTE:** For illustrative purposes these procedures have been combined. Any deviation between them will be noted in the ***Comments*** column.

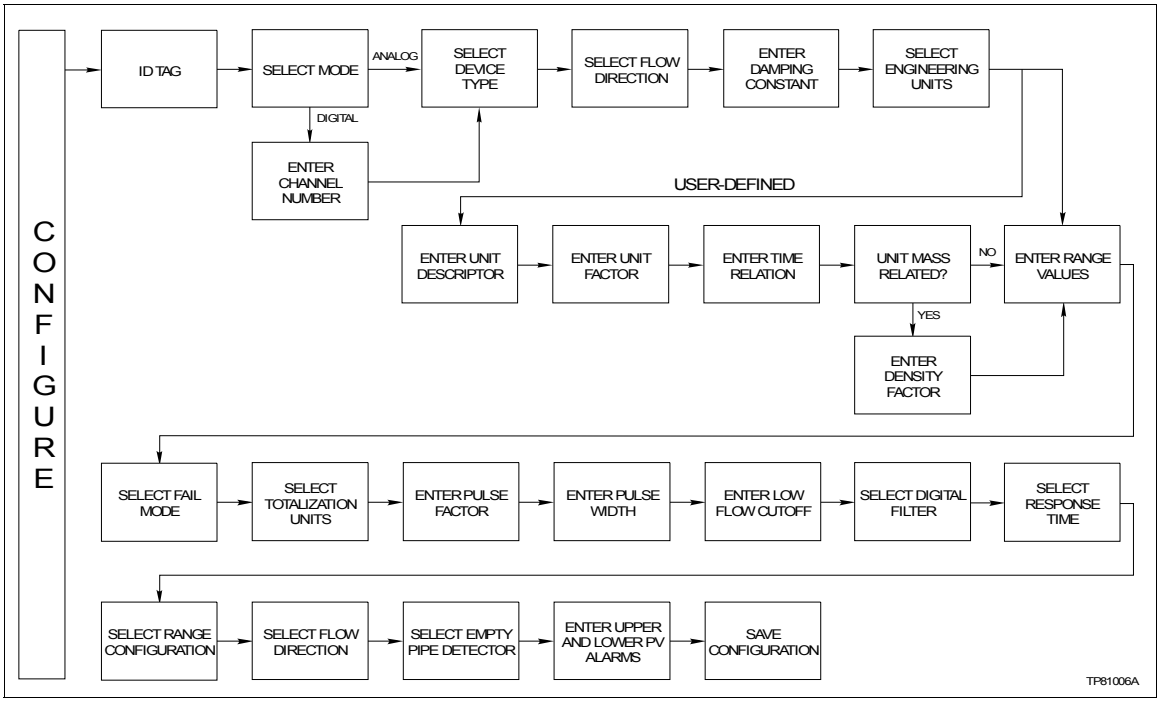


Figure E-1. Configuration Flowchart (XM/SM/XE Mag Flow)

A configuration can be created off-line, without a connected field device. A number of configurations can be created and stored in the terminal, and sent to a field device at a later time with **SEND CONFIG**.

A series of *n*s may appear in the ***Display*** column of this instruction where numeric characters can be displayed or entered. The STT03E terminal is assumed to be in the *READY* state when beginning the following procedures.

Key	Display	Comments
CONFIG	CONFIGURATION → NEW MODIFY ERASE	Select *NEW* to create a new configuration. To modify an existing configuration, select *MODIFY.* The screen sequence is the same, however, the *MODIFY* screens will appear with the values and cursor positions as originally configured.
ENTER	STT03 CONFIG [nnnnnnnnnnnnn]	Enter a name for the configuration (also known as ID tag) using up to 14 ASCII characters. To select a character, scroll through the list (refer to Table 4-3) using the up and down arrow keys. Use the right arrow key to move to the next digit. To change a character, use the left arrow key to backspace.
ENTER	SELECT MODE: → ANALOG DIGITAL	Select *DIGITAL* (device in this mode defaults to below 4 mA, independent of input). Use the up and down arrow keys to select mode. **NOTE:** The *DIGITAL* selection should only be made when using an IMFBS01 field bus I/O module. Select *ANALOG* for all other cases.

Key	Display	Comments
ENTER	TRANSMITTER TYPE PTS → XM/SM/XE	Choose *XM/SM/XE*.
↓		Move the indicator to your selection.
ENTER	FLOW DIRECTION: → FORWARD REVERSED	Refer to the Magnetic Flowmeter XM/SM/XE instruction for an explanation of terms.
ENTER	DAMPING: (0 - 32 SEC) _nn.nn SEC	Enter a value between 0 and 32 seconds.
ENTER	SELECT PV EU → I/s l/m User Defined	Select required engineering units. **NOTE:** If not using *User Defined* engineering units skip the next five screens to *RANGE VALUES*.
ENTER	EU DESCRIPTOR: nnnn	Enter the description of the user defined engineering units.
ENTER	EU FACTOR: nnn.nn EU/l	Enter a range and a scale factor for the user defined engineering unit.
ENTER	TIME RELATION → PER SEC PER MIN PER HOUR	Select a time relation for the user defined engineering unit.
ENTER	EU MASS RELATED? → NO YES	If the engineering unit is not mass related, skip the next screen.
ENTER	DENSITY FACTOR: (0.1 - 5 g/cm^3 nnn.nn	Enter the density factor for the user defined engineering unit.

Key	Display	Comments
ENTER	RANGE VAL 1:. nnn.nn UNITS RANGE VAL 2: nnn.nn UNITS	Input range value 1 using the number keys, then press **ENTER**. Input range value 2. The *UNITS* displayed will be those designated in the previous screens.
ENTER	FAIL MODE: → LOW HIGH	Make a selection using the arrow keys.
ENTER	SELECT TOT. EU: → l m3 User Defined	Select the engineering units for the totalizer.
ENTER	PULSE FACTOR: (0.001 - 1000/EU) nnn.nn	Enter the proper pulse factor for the totalization process.
ENTER	PULSE WIDTH: (0.64 - 2000 ms) nnn.nn	Enter a value between 0.032 and 2000 ms. For driving an electromechanical counter, the pulse width should be about 50 ms. For high speed electronic devices a pulse width of 0.05 ms. is common.
ENTER	LOW FLOW CUTOFF: (0 - 10%) nn.nn%	Enter a value between 0 and 10% of full scale. This parameter causes the input to drop to a zero state when the flow drops below the set value.
ENTER	DIGITAL FILTER: → OFF ON	Make a selection using the arrow keys.
ENTER	RESPONSE TIME: → NORMAL FAST	Make a selection using the arrow keys.
ENTER	RANGE CONFIG: → 2-FWD 1-FWD, 1REV	Make a selection using the arrow keys.
ENTER	FLOW DIRECTION: → FWD AND REV FWD ONLY	Make a selection using the arrow keys.

Key	Display	Comments
ENTER	EMPTY PIPE DET.: → OFF ON	Make a selection using the arrow keys.
ENTER	UPPER PV ALARM nnn.nn UNITS LOWER PV ALARM nnn.nn UNITS	Specify values using the number keys. The *UNITS* displayed will be those designated in a previous screen. After entering a value press **ENTER**.
ENTER	STORE THIS CONFIGURATION? NO → YES	Make a selection using the arrow keys.
↓		
ENTER	CONFIG. ID TAG READY	The Configuration ID tag name just configured will be in the upper left corner if the configuration is saved. It becomes the working configuration.

CALIBRATION

This section details the calibration functions of the STT03E terminal while interfacing an XM/SM/XE Mag Flow Meter. There are two types of calibration functions:

- Empty pipe detector.
- D-to-A adjust.

When calibrating, a field device must be connected to the STT03E terminal. Up to fifteen transmitters can be connected to the IMFBS01 module (field bus) bus. Select the field device by using **SELECT DEVICE**.

> **NOTE:** To change calibration or configuration parameters of a field device that is connected to an IMFBS01 module, the transmitter must be taken off-line. This is done at the INFI 90 OPEN console.

After selecting a field device the *READY* screen appears. All calibration functions can be performed on the selected device. Refer to Figure E-2 for an overview of the calibration functions.

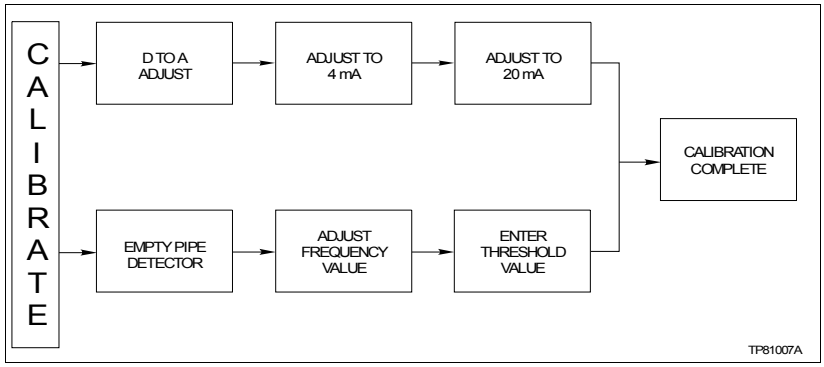


Figure E-2. Calibration Flowchart (XM/SM/XE Mag Flow)

Empty Pipe Detector

This procedure applies to XM/SM/XE Mag Flow meters configured for either *ANALOG* or *DIGITAL*. Any difference between the two are noted in the ***Comments*** column.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	
↓	PROCEED? NO → YES	
ENTER	CALIBRATION D-TO-A ADJUST → EMPTY PIPE DET	Select *EMPTY PIPE DET.* If configured digitally, the *D-TO-A ADJUST* selection will not appear.
↓		
ENTER	FREQUENCY nnn.nn	Use the arrow keys to adjust the frequency as described in the Mag-Flow product instruction. The frequency value will be updated between key presses, during which, a wait screen will appear.
ENTER	THRESHOLD: nnn.nn Hz	Enter the threshold of the empty pipe detector with the number keys.

Key	Display	Comments
ENTER	CONFIG. ID TAG READY	Empty pipe detector calibration is complete.

D-to-A Adjust

The *D-TO-A ADJUST* selection is only present when you are in the *ANALOG* communication mode, specified in the configuration procedure. This selection allows you to adjust the four to 20 milliampere output of the field device.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED!	
↓	PROCEED? NO → YES	
ENTER	CALIBRATION → D-TO-A ADJUST EMPTY PIPE DET	Select *D-TO-A ADJUST.*
ENTER	ADJUST TO 4 mA THEN HIT ENTER	Use the arrow keys to adjust the 4 mA signal. **NOTE:** When increasing or decreasing the mA signal, the increments of change increase with successive depressions until the maximum level of change is reached. By changing direction you will return to the smallest increment of change. This adjustment technique speeds up the adjustment process without affecting fine adjustment.
ENTER	ADJUST TO 20 mA THEN HIT ENTER	Use the arrow keys to adjust the 20 mA signal.
ENTER	CONFIG. ID TAG READY	

APPENDIX F - PTS PRESSURE TRANSMITTER

INTRODUCTION

This appendix covers the configuration and calibration functions of the PTS pressure, differential pressure and level transmitters.

> **NOTE:** The examples use the pressure transmitter, although the same procedure is used for all three PTS transmitters.

PTS CONFIGURATION FUNCTION PROCEDURES

Procedures explain the following functions.

- Create a configuration.
- Calibration.

The following functions apply to all devices and are similar or identical for all devices. The procedures are not duplicated for each device type, they are covered once for the PTS transmitter. Refer to Section 4, for the detailed description of these functions.

- Send configurations.
- Erase configurations.
- View configurations.
- Get configurations.
- Change working configurations.

For operation function procedures, (i.e., STATUS, OUTPUT, SPECIAL FEATURE, and F1) refer to ***OPERATIONAL FUNCTIONS*** in Section 4.

To change calibration or configuration parameters of a smart field device that is connected to an IMFBS01 module, the device must be taken off-line. This is done at the INFI 90 OPEN console.

Refer to Figure F-1 for an overview of the configuration function.

CREATE/MODIFY CONFIGURATION

The *NEW* function allows you to input and save a complete configuration. The *MODIFY* function allows you to change an existing configuration.

> **NOTE:** For illustrative purposes these procedures have been combined. Any deviation between them will be noted in the ***Comments*** column.

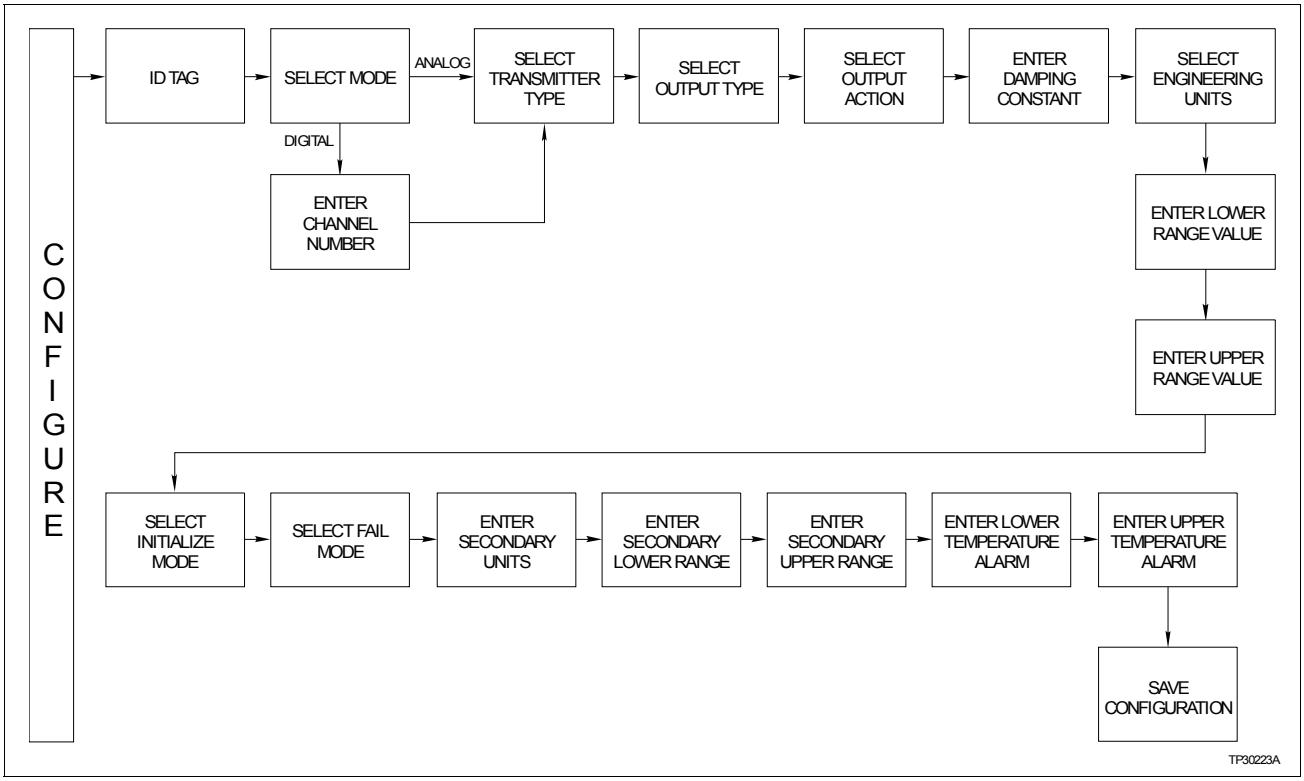


Figure F-1. Configuration Flowchart (PTS)

A configuration can be created off-line, without a connected field device. A number of configurations can be created and stored in the terminal and sent to a field device at a later time with **SEND CONFIG**.

A series of *n* s may appear in the ***Display*** column of this instruction where alphanumeric characters can be displayed or entered. The STT03E terminal is assumed to be in the *READY* state when beginning the following procedures.

Key	Display	Comments
CONFIG	CONFIGURATION → NEW MODIFY ERASE	Select *NEW* to create a configuration. To modify an existing configuration, select *MODIFY*. The screen sequence is the same, however, the *MODIFY* screens will appear with the values and arrow positions as they were originally configured.
ENTER	STT03 CONFIG [nnnnnnnnnnnnn]	Enter a name for the configuration (also known as ID tag) using up to 14 ASCII characters. To select a character, scroll through the list (refer to Table 4-3) using the up and down arrow keys. Use the right arrow key to move to the next digit. To change a character, use the left arrow key to backspace.
ENTER	SELECT MODE: → ANALOG DIGITAL	Select *ANALOG*. **NOTE:** *The DIGITAL* selection should only be made when using an IMFBS01 field bus I/O module. A *CHANNEL #* prompt appears when *DIGITAL* is selected.

Key	Display	Comments
ENTER	TRANSMITTER TYPE → PTS EQS	Select *PTS*.
ENTER	OUTPUT TYPE 3/2 FLOW MODE 5/2 FLOW MODE → FUNC GENERATOR	In this example *FUNC GENERATOR* is chosen as an output. Five input and output points need to be specified as a percentage of input. The first and last points on the curve are fixed at 0.00% and 100.00%. The 5 points are to be between these values. **NOTE:** Other output type selections not shown here include *LINEAR*, *SQUARE ROOT*, *VOL./ SPHERE* and *VOL./CYLINDER*.
↓		
↓		
↓		
↓		
ENTER	POINT 1 INP (%) nn.nn POINT 1 OUT (%) nn.nn	Use the number keys to enter a value between 0.00 and 100.00 for the INP(%).
ENTER	POINT 5 INP (%) nnn.nn POINT 5 OUT (%) nnn.nn	Press **ENTER**. Use the number keys to enter a value between 0.00 and 100.00 for the *OUT(%)* value. Press **ENTER**. Continue until all 5 pairs of points have been entered.
ENTER	OUTPUT ACTION: → NORMAL REVERSE	Move the indicator to your selection. Refer to the ***Platinum Standard Series Smart Pressure Transmitter Type PTS*** instruction for an explanation of terms.
ENTER	DAMPING: (0 - 32 SEC) _ nn.nn SEC	Enter a value between 0 and 32 seconds.
ENTER	ENGINEERING UNIT →iH20 mmHG cmH20 PSI MPA KPA BARS mBARS $Kgcm^2$	Select an engineering unit best suited for the application.

Key	Display	Comments
ENTER	LOWER RANGE VAL. nn.nn UNITS UPPER RANGE VAL. nn.nn UNITS	Input lower range value using the arrow keys, then press **ENTER**. Input the upper range value.
ENTER	INITIALIZE MODE: → LOW HIGH	Refer to the ***Platinum Standard Series Smart Pressure Transmitter Type PTS*** instruction for mode description.
ENTER	FAIL MODE: → LOW HIGH LAST	Make a selection using the arrow keys.
ENTER	ENTER SECONDARY UNITS _nnnnnn	This is a 6-character alphanumeric designation to represent values in user familiar units. Use the up and down arrow keys to scroll through the alphanumeric list. Use the left and right arrow keys to move through the character places.
ENTER	SECONDARY L. R. nn.nn UNITS SECONDARY U. R. nn.nn UNITS	Specify values using the number keypad. The *UNITS* displayed will be those designated in the previous screen. After entering value press **ENTER**.
ENTER	LOWER TEMP ALARM -50.00°C UPPER TEMP ALARM 120.00°C	Lower and upper temperature alarms are user configurable alarms. The temperature is based on the cell. The default alarms setting are shown here. The defaults are also the lower and upper limits of the alarm.
ENTER	STORE THIS CONFIGURATION? NO → YES	Make a selection using the arrow keys.
↓		
ENTER	CONFIG. ID TAG READY	Configuration ID tag name just configured will be in the upper left corner if the configuration was saved. It becomes the working configuration.

CALIBRATION

This section details the calibration functions of the STT03E terminal while interfacing a PTS pressure transmitter. There are three types of calibration functions:

- Bench calibration.
- Rezero.
- D-to-A adjust.

When calibrating, a device must be connected to the STT03E transmitter. When using an IMFBS01 module (field bus), up to fifteen transmitters can be connected to the bus. Select the transmitter by using **SELECT DEVICE**.

> **NOTE:** To change calibration or configuration parameters of a smart transmitter that is connected to an IMFBS01 module, the transmitter must be taken off-line. This is done at the INFI 90 OPEN console.

After selecting a device the *READY* screen appears. All calibration functions can be performed on the selected device. Refer to Figure F-2 for an overview of the calibration functions.

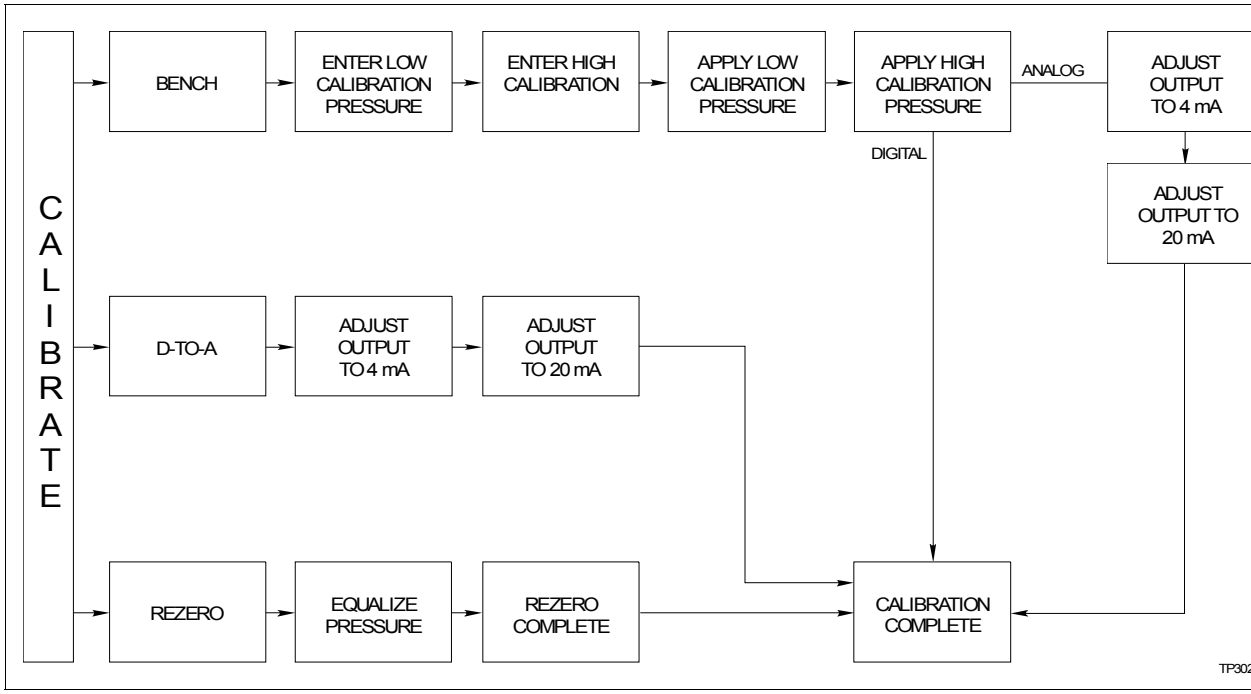


Figure F-2. Calibration Flowchart (PTS)

Bench Calibration

This procedure applies to PTS pressure transmitters configured for either *ANALOG* or *DIGITAL*. Any difference between the two are noted in the ***Comments*** column.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED!	
↓	PROCEED? NO → YES	
ENTER	CALIBRATION D-TO-A ADJUST → BENCH CALIB. REZERO	Select *BENCH CALIB*. If configured digitally, the *D-TO-A ADJUST* selection would not appear.
↓		
ENTER	LOW CALIB PRES nn.nn units HIGH CALIB PRES nn.nn units	Enter the low calibration pressure value and press **ENTER**. Enter the high calibration pressure value.
ENTER	APPLY PRESSURE OF nn.nn UNITS THEN HIT ENTER	Apply the low calibration pressure to the input of transmitter as specified earlier.
ENTER	APPLY PRESSURE OF nn.nn UNITS THEN HIT ENTER	Apply the high calibration pressure to the input of transmitter as specified earlier.
ENTER	ADJUST TO 4 mA THEN HIT ENTER	Adjust transmitter output using the up and down arrow keys. If configured digitally this adjust display does not appear. **NOTE:** When increasing or decreasing the mA signal, the increments of change increase with successive depressions until the maximum level of change is reached. By changing direction the smallest increment of change returns. This technique speeds up the adjustment process without affecting fine adjustment.

Key	Display	Comments
ENTER	ADJUST TO 20 mA THEN HIT ENTER	Adjust the transmitter output using the up and down arrow keys.
ENTER	CONFIG. ID TAG READY	Bench calibration is complete.

Rezero

The rezero procedure allows you to zero the transmitter without going through the complete bench calibration procedure.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	
↓	PROCEED? NO → YES	
ENTER	CALIBRATION: D-TO-A ADJUST BENCH CALIB. → REZERO	Select *REZERO*. If digitally configured, the *D-TO-A ADJUST* selection will not appear.
↓		
↓		
ENTER	APPLY PRESSURE OF nn.nn UNITS THEN HIT ENTER	Apply zero value to the transmitter.
ENTER	CONFIG. ID TAG READY	Rezero is complete.

D-to-A Adjust

The *D-TO-A ADJUST* selection is only present when you are in the *ANALOG* communication mode, specified in the configuration procedure. This selection allows you to adjust the four to 20 milliampere output of the field device.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	
↓	PROCEED? NO → YES	
ENTER	CALIBRATION → D-TO-A ADJUST BENCH CALIB. REZERO	
ENTER	ADJUST TO 4 mA THEN HIT ENTER	Use the arrow keys to adjust the 4 mA signal. **NOTE:** When increasing or decreasing the mA signal, the increments of change increase with successive depressions until the maximum level of change is reached. By changing direction you will return to the smallest increment of change. This adjustment technique speeds up the adjustment process without affecting fine adjustment.
ENTER	ADJUST TO 20 mA THEN HIT ENTER	Use the arrow keys to adjust the 20 mA signal.
ENTER	CONFIG. ID TAG READY	

APPENDIX G - TBN480 CONDUCTIVITY TRANSMITTER

INTRODUCTION

This appendix covers the configuration and calibration functions of the TBN480 Conductivity Transmitter.

TBN480 CONFIGURATION

Procedures explain the following functions:

- Create a configuration.
- Calibration.

The following functions apply to all devices and are similar or identical for all devices. The procedures are not duplicated for each device type, they are covered once for the PTS transmitter. Refer to Section 4, for the detailed description of these functions.

- Send configurations.
- Erase configurations.
- View configurations.
- Get configurations.
- Change working configurations.

For operation function procedures, (i.e., **STATUS**, **OUTPUT**, **SPECIAL FEATURE**, and **F1**) refer to ***OPERATIONAL FUNCTIONS*** in Section 4.

To change calibration or configuration parameters of a smart field device that is connected to an IMFBS01 module, the device must be taken off-line. This is done at the INFI 90 OPEN console.

Interfacing TBN480 transmitter requires a Type STC1 Smart Terminal Cartridge. The cartridge inserts into the bottom of the STT03E terminal. For an installation procedure of the STC cartridge, refer to ***Smart Terminal Cartridge Installation*** in Section 3. To order cartridges, refer to ***NOMENCLATURE*** in Section 11.

Refer to Figure G-1 for an overview of the configuration function.

CREATE/MODIFY CONFIGURATION

The *NEW* function allows you to input and save a complete configuration. The *MODIFY* function allows you to change an existing configuration.

> **NOTE:** For illustrative purposes these procedures have been combined. Any deviation between them will be noted in the ***Comments*** column.

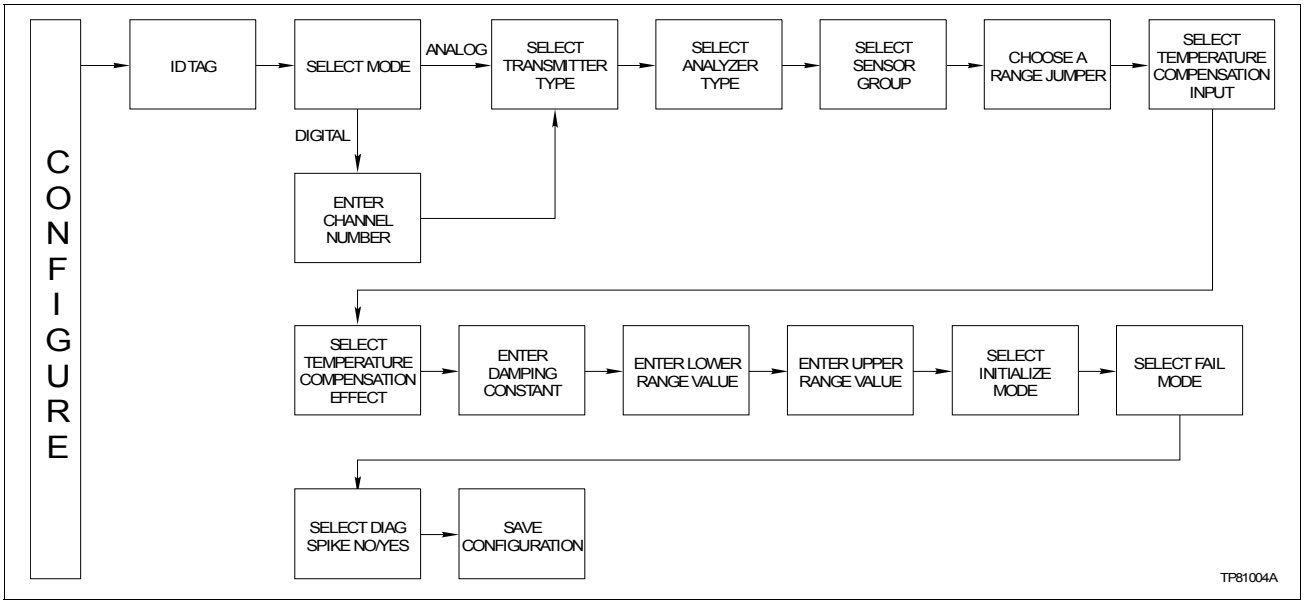


Figure G-1. Configuration Flowchart (TBN480)

A configuration can be created off-line, without a connected field device. A number of configurations can be created and stored in the terminal and sent to a field device at a later time with **SEND CONFIG**.

A series of *n* s may appear in the ***Display*** column of this instruction where alphanumeric characters can be displayed or entered. The STT03E terminal is assumed to be in the *READY* state when beginning the following procedures**.**

Key	Display	Comments
CONFIG	CONFIGURATION → NEW MODIFY ERASE	Select *NEW.* To create a new configuration. To modify an existing configuration, select *MODIFY.* The screen sequence is the same, however, the *MODIFY* screens will appear with the values and cursor positions as originally configured.
ENTER	STT03 CONFIG [nnnnnnnnnnnnn]	A 14 character ID tag name is entered within the brackets. Use the arrow keys to select characters. Use the right arrow key to advance to the next character. When finished entering a name, press **ENTER**.
ENTER	SELECT MODE: → ANALOG DIGITAL	For this example select *ANALOG.*
ENTER	TRANSMITTER TYPE → cond TBN pH TBN ORP/pION	Select *cond TBN.*

Key	Display	Comments
ENTER	ANALYZER TYPE → GENERAL PURE H2O COND CONCENTRATION	Select analyzer type.
ENTER	SENSOR GROUP → A B C	Refer to ***Smart Conductivity Transmitter Series TBN480*** instruction for description.
ENTER	RANGE JUMPER HIGH MEDIUM → LOW	Refer to ***Smart Conductivity Transmitter Series TBN480*** instruction for description.
↓		
↓		
ENTER	ANALYZER RANGE 0-9990 µS/cm 0–999 µS/cm	Displays analyzer ranges.
ENTER	TEMP COMP INPUT → MANUAL 3.0KΩ BALCO	Select proper temperature compensation input. Refer to ***Smart Conductivity Transmitter Series TBN480*** instruction for description.
↓		
ENTER	TEMP COMP TYPE → STANDARD 0-15% NaOH 0-20% NaCl	Select a temperature compensation effect. Use the down arrow key to view more selections. Refer to ***Smart Conductivity Transmitter Series TBN480*** instruction for description.
ENTER	DAMPING: (0-32 SEC) _nn.nn	Enter a value between 0 and 32. Refer to the ***Smart Conductivity Transmitter Series TBN480*** instruction for description.
ENTER	LOWER RANGE VAL. nnn.nn µS/cm UPPER RANGE VAL. nnn.nn µS/cm	Enter the lower range temperature value and press **ENTER**. Input the upper range value. Low and high default values are dependent on the sensor group and range jumper setting. Refer to the ***Smart Conductivity Transmitter Series TBN480*** instruction for description.

Key	Display	Comments
ENTER	INITIALIZE MODE: LOW → HIGH	On power up, a two second initialization period occurs during which the transmitter output becomes either 100% (high) or 0% (low).
ENTER	FAIL MODE: LOW → HIGH LAST	During continual diagnostics, if the micro computer detects a fatal problem the transmitter output will go to 0% (low), 100% (high), or the last value before the error.
ENTER	DIAG SPIKE OUTPUT → NO YES	In analog mode, a pulse can be sent on the 4 to 20 mA output to indicate a detected sensor fault. This pulse can be adjusted from 0 to 100% of the loop current (0 to 16 mA).
ENTER ↓	STORE THIS CONFIGURATION NO → YES	Select *YES* to store the configuration.
ENTER	CONFIG. ID TAG READY	Configuration ID tag name just configured will be in the upper left corner if the configuration is saved. It becomes the working configuration. **NOTE:** Connect the terminal to a device and send the configuration (using **SEND CONFIG**) to a device before calibrating.

CALIBRATION

This section details the calibration functions of the STT03E terminal while interfacing a TBN480 conductivity transmitter. There are three types of calibration functions:

- Process calibration.
- Edit calibration.
- Reset calibration.

When calibrating, a device must be connected to the STT03E transmitter. When using an IMFBS01 module (field bus), up to fifteen transmitters can be connected to the bus. Select the transmitter by using **SELECT DEVICE**.

> **NOTE:** To change calibration or configuration parameters of a smart transmitter that is connected to an IMFBS01 module, the transmitter must be taken off-line. This is done at the INFI 90 OPEN console.

After selecting a device, the *READY* screen appears. All calibration functions can be performed on the selected device. Refer to Figure G-1 for an overview of the calibration functions

Process Calibration

This procedure applies to TBN480 Transmitters configured for either *ANALOG* or *DIGITAL*. Any differences between the two are noted in the ***Comments*** column.

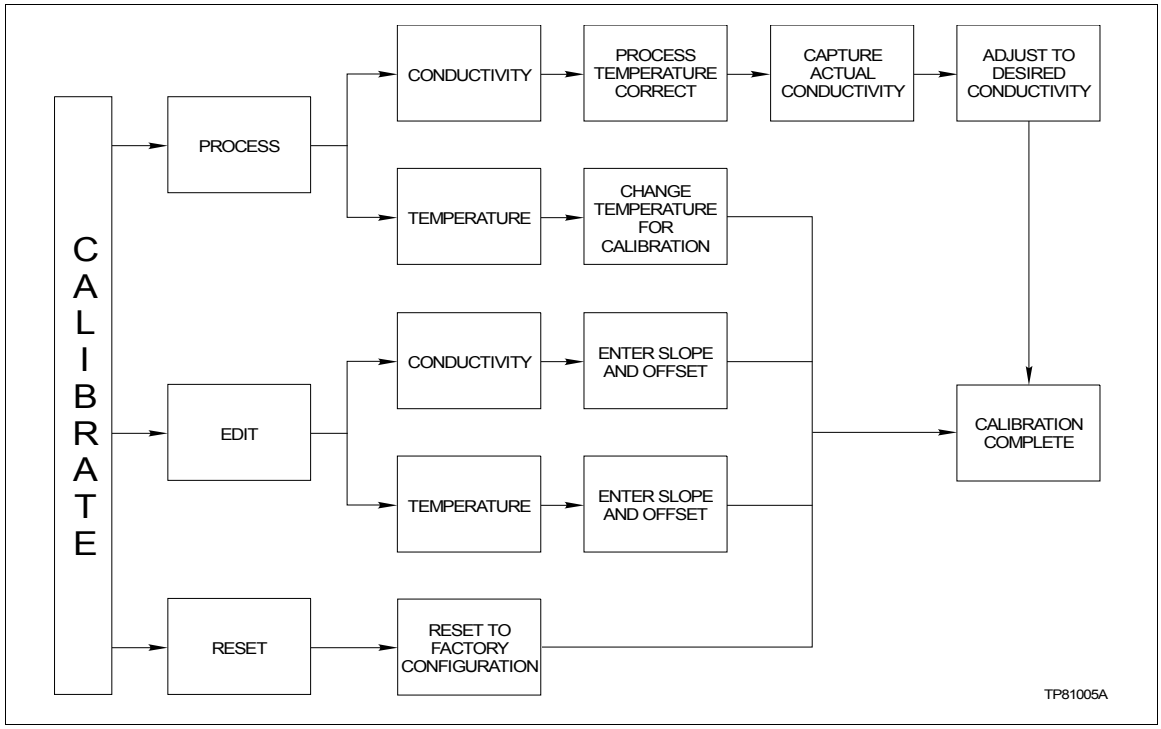


Figure G-2. Calibration Flowchart (TBN480)

CALIBRATE PROCESS CONDUCTIVITY

The following procedure steps through the calibration of the process conductivity.

CALIBRATE PROCESS TEMPERATURE

This section steps through calibrating the process temperature.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	
↓	PROCEED? NO → YES	Select *YES*.
ENTER	CALIBRATION → PROCESS CAL EDIT CAL RESET CAL	Select *PROCESS CAL*.
ENTER	PROCESS CAL → CONDUCTIVITY TEMPERATURE	Select *CONDUCTIVITY.*
ENTER	PROCESS TEMP nn.nn CAL TEMP 1st IF INCORRECT	If the temperature value is not correct, go back and calibrate the process temperature before proceeding. Refer to ***Process Calibration*** in this section.
ENTER	PROCESS CAL nn.nn mS/cm PRESS ENTER TO CONTINUE	This displays the actual live reading. When the reading is stable press **ENTER**. The value displayed is captured for the next process calibration screen.
ENTER	PROCESS CAL ENTER DESIRED CONDUCTIVITY nn.nn mS/cm	Use the numeric keys to correct the captured value to the desired value.
ENTER	WORKING	
	CALIBRATION COMPLETE	
ENTER	CONFIG ID TAG READY	Calibration complete.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	
↓	PROCEED? NO → YES	Select *YES*.
ENTER	CALIBRATION → PROCESS CAL EDIT CAL RESET CAL	Select *PROCESS CAL*.
ENTER	PROCESS CAL CONDUCTIVITY → TEMPERATURE	Select *TEMPERATURE*.
↓		
ENTER	CHANGE TEMP FOR CAL-IBRATION nn.nn °C	Use the numeric keys to enter the process temperature.
ENTER	WORKING	
	CALIBRATION COMPLETE	
ENTER	CONFIG ID TAG READY	Calibration complete.

Editing the Calibration Constants

These functions are for recording or modifying slope or offset calibration constants.

EDIT CONDUCTIVITY

This procedure steps through the modification of the conductivity.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	
↓	PROCEED? NO → YES	Select *YES*.
ENTER	CALIBRATION PROCESS CAL → EDIT CAL RESET CAL	Select *EDIT CAL*.
↓		
ENTER	EDIT CAL DATA → CONDUCTIVITY TEMPERATURE	Select *CONDUCTIVITY*.
ENTER	CONDUCTIVITY PROCESS CAL SLP: n.nnnn OFF: n.nnnn	To view values press **ENTER** twice. To change the slope enter the correct number and press **ENTER**. To change the offset, enter the correct number and press **ENTER**.
ENTER	WORKING	
	CALIBRATION COMPLETE	

Key	Display	Comments
ENTER	CONFIG ID TAG READY	Calibration complete.

EDIT TEMPERATURE

This procedure steps through the modification of the temperature.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	
↓	PROCEED? NO → YES	Select *YES*.
ENTER	CALIBRATION PROCESS CAL → EDIT CAL RESET CAL	Select *EDIT CAL*.
↓		
ENTER	EDIT CAL DATA CONDUCTIVITY → TEMPERATURE	Select *TEMPERATURE*.
↓		
ENTER	TEMPERATURE PROCESS CAL SLP:n.nnnn OFF:n.nnnn	To view values, press **ENTER** twice. To change the slope, enter the correct number and press **ENTER**. To change the offset, enter the correct number and press **ENTER**.

Key	Display	Comments
ENTER	WORKING	
	CALIBRATION COMPLETE	
ENTER	CONFIG ID TAG READY	Calibration complete.

Reset to Factory Configuration

This function resets all of the device parameters to the factory settings. Refer to the product instruction for information on the factory settings.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	
↓	PROCEED? NO → YES	Select *YES*.
ENTER	CALIBRATION PROCESS CAL EDIT CAL → RESET CAL	Select *RESET CAL*.
↓		
↓		

Key	Display	Comments
ENTER	WORKING	
	CALIBRATION COMPLETE	
	CONFIG ID TAG READY	Calibration complete.

APPENDIX H - TBN580 TRANSMITTER

INTRODUCTION

This appendix covers the configuration and calibration functions of the TBN580 pH Transmitter.

TBN580 CONFIGURATION

Procedures explain the following functions:

- Create a configuration.
- Calibration.

The following functions apply to all devices and are similar or identical for all devices. The procedures are not duplicated for each device type, they are covered once for the PTS transmitter. Refer to Section 4, for the detailed description of these functions.

- Send configurations.
- Erase configurations.
- View configurations.
- Get configurations.
- Change working configurations.

For operation function procedures, (i.e., **STATUS**, **OUTPUT**, **SPECIAL FEATURE**, and **F1**) refer to ***OPERATIONAL FUNCTIONS*** in Section 4.

To change calibration or configuration parameters of a smart field device that is connected to an IMFBS01 module, the device must be taken off-line. This is done at the INFI 90 OPEN console.

Interfacing a TBN580 transmitter requires a Type STC1 Smart Terminal Cartridge. The cartridge inserts into the bottom of the STT03E terminal. For an installation procedure of the STC cartridge, refer to ***Smart Terminal Cartridge Installation*** in Section 3. To order cartridges, refer to ***NOMENCLATURE*** in Section 1.

Refer to Figure H-1 for an overview of the configuration function of the TBN580 pH transmitter.

CREATE/MODIFY CONFIGURATION

When configuring, the *NEW* function allows you to input and save a complete configuration. The *MODIFY* function allows you to change an existing configuration.

> **NOTE:** For illustrative purposes these procedures have been combined. Any deviation between them will be noted in the ***Comments*** column.

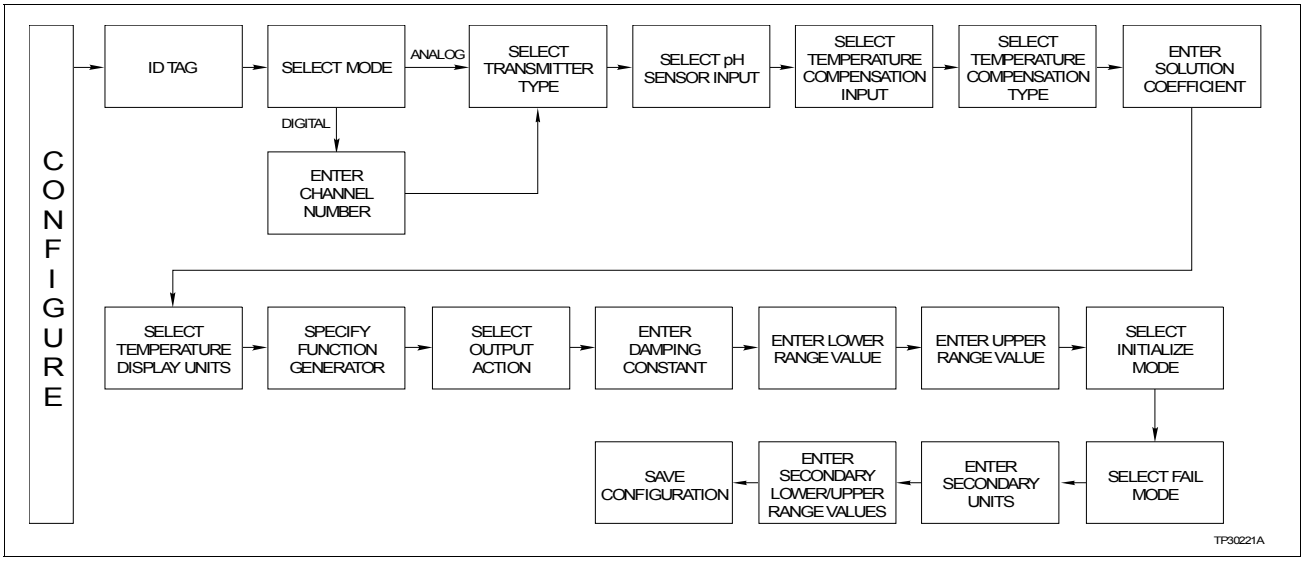


Figure H-1. Configuration Flowchart (TBN580)

A configuration can be created off-line, without a connected field device. A number of configurations can be created and stored in the terminal and sent to a field device at a later time with **SEND CONFIG**.

A series of *n*s may appear in the ***Display*** column of this instruction where alphanumeric characters can be displayed or entered. The STT03E terminal is assumed to be in the *READY* state when beginning the following procedures.

Key	Display	Comments
CONFIG	CONFIGURATION → NEW MODIFY ERASE	To create a new configuration, select *NEW*. To modify an existing configuration, select *MODIFY*. The screen sequence is the same, however, the *MODIFY* screens will appear with the values and cursor positions as originally configured.
ENTER	SELECT ID TAG →[nnnnnnnnnnnnnn]	A 14-character ID tag name is entered within the brackets. To select characters, use the up and down arrow keys. To advance to the next character, use the right arrow key. After entering a name, press **ENTER**.
ENTER	SELECT MODE: → ANALOG DIGITAL	For this example select *ANALOG*.

Key	Display	Comments
ENTER	TRANSMITTER TYPE cond TBN → pH TBN ORP/pION	Select *pH TBN*.
↓		
ENTER	pH SENSOR INPUT → STANDARD ANTIMONY	For this example, select *STANDARD* . *STANDARD*: thermo-isopotential 7.0 pH; slope 59.15 mV at 25°C. *ANTIMONY*: isopotential 1.5 pH; slope 51 mV at 25°C. **NOTE:** If after selecting *ANTIMONY,* the STT03E terminal branches to a *TEMPERATURE DISPLAY UNITS* selection screen, choose the desired temperature unit.
ENTER	TEMP COMP INPUT → 3.01 K BALCO NONE	Select *3.01 BALCO.* When *NONE* is selected, the STT03E terminal branches to a *TEMPERATURE DISPLAY UNITS* selection screen. Choose the desired temperature unit.
ENTER	TEMP COMP TYPE MANUAL AUTO NERNSTIAN → AUTO SOLUTION AUTO PURE H2O	For this example select *AUTO SOLUTION.* **NOTE:** Other temperature compensation selections branch to a *TEMPERATURE DISPLAY UNITS* selection screen.
↓		
↓		
ENTER	ENTER SOLUTION CO-EFFICIENT ±n.nnn pH per 10°C (from 25°C)	This screen is unique to the *AUTO SOLUTION* selection of the *TEMP COMP TYPE*. Other selections go to the temperature display units.
ENTER	TEMPERATURE DISPLAY UNITS → °C °F	
ENTER	OUTPUT FUNC GEN → NO YES	If *YES* is selected, enter 5 input and output points. Values must be between 0 and 100%.

Key	Display	Comments
ENTER	OUTPUT ACTION: → NORMAL REVERSE	Refer to the ***Smart Specific Ion Transmitter Series TBN580*** instruction for description.
ENTER	DAMPING: (0-32 SEC) _nn.nn	Enter a value between 0 and 32. Refer to the ***Smart Specific Ion Transmitter Series TBN580*** instruction for description.
ENTER	LOWER RANGE VAL. _nn.nn pH UPPER RANGE VAL. nn.nn pH	Enter the lower range value and press **ENTER**. Input the upper range value.
ENTER	INITIALIZE MODE: → LOW HIGH	Refer to the ***Smart Specific Ion Transmitter Series TBN580*** instruction for description.
ENTER	FAIL MODE: → LOW HIGH LAST	During continual diagnostics, if the micro computer detects a fatal problem the transmitter output will go to 0% (low), 100% (high), or the last value before the error.
ENTER	ENTER SECONDARY UNITS _nnnnnn	Enter up to 6 characters. Use familiar units to describe the output.
ENTER	SECONDARY L.R. _nn.nn UNITS SECONDARY U.R. nn.nn UNITS	Input the lower range value and press **ENTER**. Input the upper range value.
ENTER	STORE THIS CONFIGURATION NO → YES	To store the configuration, select *YES*.
↓		
ENTER	CONFIG. ID TAG READY	The Configuration ID tag name just configured, will be in the upper left corner if the configuration is saved. It becomes the working configuration. **NOTE:** Connect the terminal to a device and send the configuration (using **SEND CONFIG**) to the device before calibrating.

CALIBRATION

This section details the calibration functions of the STT03E terminal while interfacing a TBN transmitter. There are three types of calibration functions:

- Process calibration.
- Bench calibration (pH and temperature).
- D-to-A adjust.

When calibrating, a device must be connected to the STT03E smart terminal. When using an IMFBS01 module (field bus), up to fifteen transmitters can be connected to the bus. Select the transmitter by using **SELECT DEVICE**.

> **NOTE:** To change calibration or configuration parameters of a transmitter that is connected to an IMFBS01 module, the transmitter must be taken off-line. This is done at the INFI 90 OPEN console.

After selecting a device, the *READY* screen appears. All calibration functions can be performed on the selected device. Refer to Figure H-2 for an overview of the calibration functions.

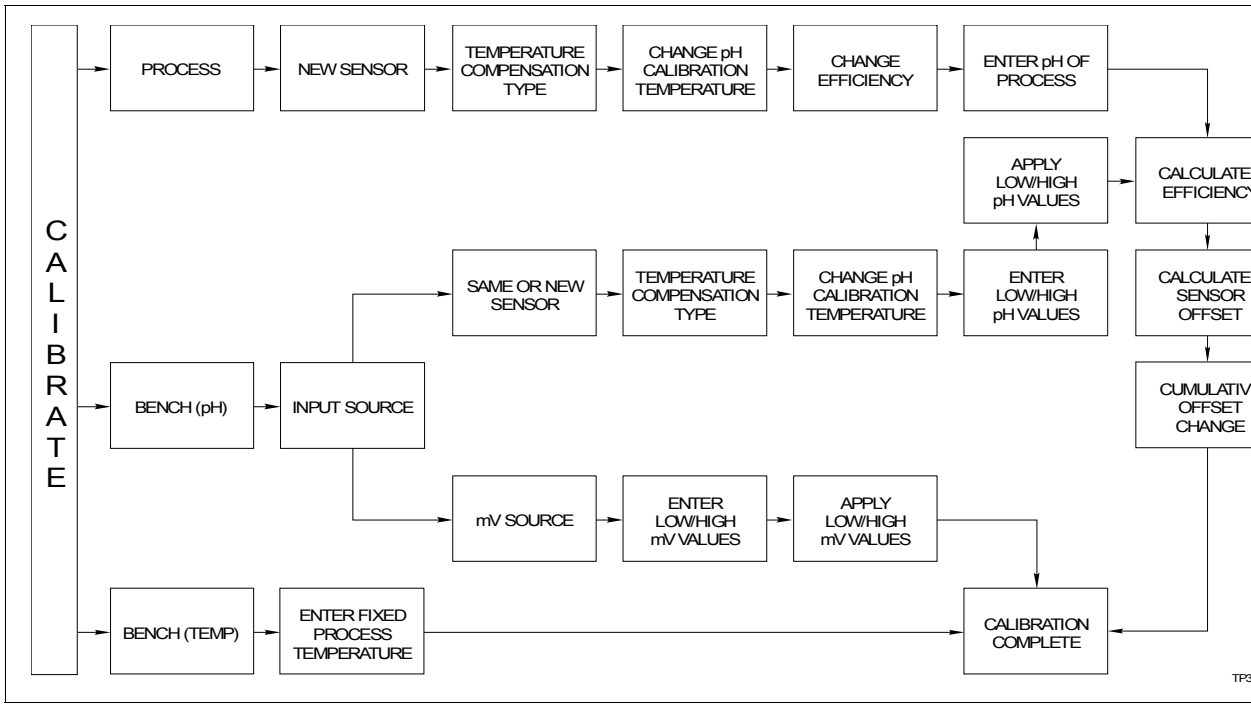


Figure H-2. Calibration Flowchart (TBN580)

Process Calibration

This procedure applies to TBN transmitters configured for either *ANALOG* or *DIGITAL*. Any difference between the two are noted in the ***Comments*** column.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	
↓	PROCEED? NO → YES	Select *YES*.
ENTER	CALIBRATION → PROCESS CAL BENCH CAL pH BENCH CAL TEMP D-TO-A ADJUST	Select *PROCESS CAL*. If configured digitally, the *D-TO-A ADJUST* selection would not appear.
ENTER	INSTALLING A NEW SENSOR? → NO YES	If *YES*, a new sensor offset will be calculated and the cumulative offset change will be reset to 0.00 mV.
ENTER	TEMP COMP TYPE IN USE: HIT ENTER	Displayed will be the *TEMP COMP TYPE* selected in configuration.
ENTER	ENTER FIXED PROCESS TEMP nnn.n°UNITS	If *TEMP COMP TYPE* is *MANUAL* or *NONE* (as selected in configuration), this screen will appear, otherwise, the next screen, *CHANGE TEMP OF PROCESS?* will appear. Default is 25°C.
ENTER	CHANGE TEMP OF PROCESS? nnn°UNITS	The value displayed is the temperature of the process (interior of sensor). **NOTE:** If the new temperature value is entered, this change will affect the calibration of temperature.
ENTER	CHANGE EFFICIENCY? nn.nn% HIT ENTER	Value from last calibration. If *NEW SENSOR*, efficiency will be 98%. This value can be changed if desired. A change in efficiency will affect the calibration span.

Key	Display	Comments
ENTER	CURRENT READING nn.nn pH ENTER DESIRED nn.nn pH	
ENTER	CALCULATED EFFICIENCY nnn.nn% HIT ENTER	
ENTER	CALCULATED SENSOR OFFSET nnn.nn pH HIT ENTER	This value is recalculated during each calibration.
ENTER	CUMULATIVE OFFSET CHANGE n.nn pH HIT ENTER	This value shows the offset change over time for a particular sensor. Value resets to 0.00 pH if installing a new sensor.
ENTER	CONFIG. ID TAG READY	Calibration complete.

Bench Calibration pH

The following procedure steps through the bench calibration of the pH level.

Key	Display	Comments
CALI- BRATE	OUTPUT WILL BE AFFECTED	
↓	PROCEED? NO → YES	

Key	Display	Comments
ENTER	CALIBRATION PROCESS CAL → BENCH CAL pH BENCH CAL TEMP	Select *BENCH CAL pH*.
↓		
ENTER	INPUT SOURCE: SAME SENSOR NEW SENSOR → mV SOURCE	Select *mV SOURCE*. When selecting *SAME SENSOR* or *NEW SENSOR*, the smart terminal branched to *TEMP COMP TYPE IN USE*.
↓		
↓		
ENTER	ENTER LO mV CAL nn.nn mV ENTER HI mV CAL nn.nn mV	The following mV screens apply only when *mV SOURCE* is selected under *INPUT SOURCE*. **NOTE:** Positive mV corresponds to low pH values and negative mV corresponds to high pH values. Default values are ±414 mV.
ENTER	APPLY nn.nn mV nn.nn HIT ENTER WHEN STABLE	Positive mV cal value specified on the prior screen will be displayed. Apply low mV value. When applied, the value shown on the smart terminal (from the input source) will not match the specified value. Hit **ENTER** when the applied value stabilizes.
ENTER	APPLY nn.nn mV nn.nn HIT ENTER WHEN STABLE	Negative mV cal value specified on the prior screen will be displayed. Apply high mV value. When applied, the value shown on the smart terminal (from the input source) will not match the specified value. Hit **ENTER** when the applied value stabilizes. When mV operation is complete hit **ENTER**, the *READY* screen will follow.
ENTER	CHANGE pH CAL TEMPERATURE? nnn°UNITS	The value displayed is the temperature of the process (interior of sensor). Default is 25°C. **NOTE:** If a new temperature value is entered, it is used only for pH calibration. This change does not affect the calibration on the temperature sensor.
ENTER	ENTER LO pH CAL nn.nn pH ENTER HI pH CAL nn.nn pH	Default values 4.01 and 7.00 pH. Enter low pH value and press **ENTER**. Enter the high pH value. If *mV SOURCE*, default is 0.00 and 14.00 pH at 25°C.

Key	Display	Comments
ENTER	APPLY nn.nn pH nn.nn pH HIT ENTER WHEN STABLE	Displays low pH calibration value, and the uncalibrated pH value as determined from the input source.
ENTER	APPLY nn.nn pH nn.nn pH HIT ENTER WHEN STABLE	Displays high pH calibration value, and the uncalibrated pH value as determined from the input source.
ENTER	CALCULATED EFFICIENCY nnn.n % HIT ENTER	Value from the last calibration. If *NEW SENSOR* efficiency will be 98%.
ENTER	CALCULATED SENSOR OFFSET nnn pH HIT ENTER	This value is recalculated during each calibration.
ENTER	CUMULATIVE OFFSET CHANGE nnn pH HIT ENTER	This value shows the offset change over time for a particular sensor. Value resets to 0.00 pH if installing a new sensor.
ENTER	CONFIG ID TAG READY	

Bench Calibration Temperature

The following procedure steps through the bench calibration of the temperature.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	
↓	PROCEED? NO → YES	

Key	Display	Comments
ENTER ↓ ↓	CALIBRATION PROCESS CAL BENCH CAL pH → BENCH CAL TEMP	Select *BENCH CAL TEMP.*
ENTER	ENTER FIXED PROCESS TEMP nnn.n° UNITS	If in *TEMP COMP TYPE*, *MANUAL* or *NONE* is selected during configuration, this screen will not appear, otherwise the next screen, *CHANGE TEMP OF PROCESS?* appears. Default is 25°C.
ENTER	CHANGE TEMP OF PROCESS? nnn.n° UNITS	The value displayed is the temperature of the process (interior of sensor). **NOTE:** If a new temperature value is entered, this change will affect the calibration of temperature.
ENTER	CONFIG. ID TAG READY	Calibration complete.

D-to-A Adjust

The *D-TO-A ADJUST* selection is only present when you are in the *ANALOG* communication mode, specified in the configuration procedure. This selection allows you to adjust the four to 20 milliamphere output of the field device.

Key	Display	Comments
CALIBRATE ↓	OUTPUT WILL BE AFFECTED PROCEED? NO → YES	

Key	Display	Comments
ENTER ↓ ↓ ↓	CALIBRATION PROCESS CAL BENCH CAL pH BENCH CAL TEMP → D-TO-A ADJUST	
ENTER	ADJUST TO 4 mA THEN HIT ENTER	Use the arrow keys to adjust the 4 mA signal. **NOTE:** When increasing or decreasing the mA signal, the increments of change increase with successive depressions until the maximum level of change is reached. By changing direction you will return to the smallest increment of change. This adjustment technique speeds up the adjustment process without affecting fine adjustment.
ENTER	ADJUST TO 20 mA THEN HIT ENTER	Use the arrow keys to adjust the 20 mA signal.
ENTER	CONFIG. ID TAG READY	

APPENDIX I - TBN581 (ORP/pION) TRANSMITTER

INTRODUCTION

This appendix covers the configuration and calibration functions of the TBN581 (ORP/pION) Transmitter.

TBN581 (ORP/pION) CONFIGURATION

Procedures explain the following functions:

- Create a configuration.
- Calibration.

The following functions apply to all devices and are similar or identical for all devices. The procedures are not duplicated for each device type, they are covered once using the PTS transmitter. Refer to Section 4, for the detailed description of these functions.

- Send configurations.
- Erase configurations.
- View configurations.
- Get configurations.
- Change working configurations.

For operation function procedures, (i.e., **STATUS**, **OUTPUT**, **SPECIAL FEATURE**, and **F1**) refer to ***OPERATIONAL FUNCTIONS*** in Section 4.

To change calibration or configuration parameters of a smart field device that is connected to an IMFBS01 module, the device must be taken off-line. This is done at the INFI 90 OPEN console.

Interfacing TBN581 transmitter requires a Type STC1 Smart Terminal Cartridge. The cartridge inserts into the bottom of the STT03E terminal. For an installation procedure of the STC cartridge, refer to ***Smart Terminal Cartridge Installation*** in Section 3. To order cartridges, refer to ***NOMENCLATURE*** in Section 1**.**

Refer to Figure I-1. for an overview of the configuration function.

CREATE/MODIFY CONFIGURATION

The *NEW* function allows you to input and save a complete configuration. The *MODIFY* function allows you to change an existing configuration.

> **NOTE:** For illustrative purposes these procedures have been combined. Any deviation between them will be noted in the ***Comments*** column.

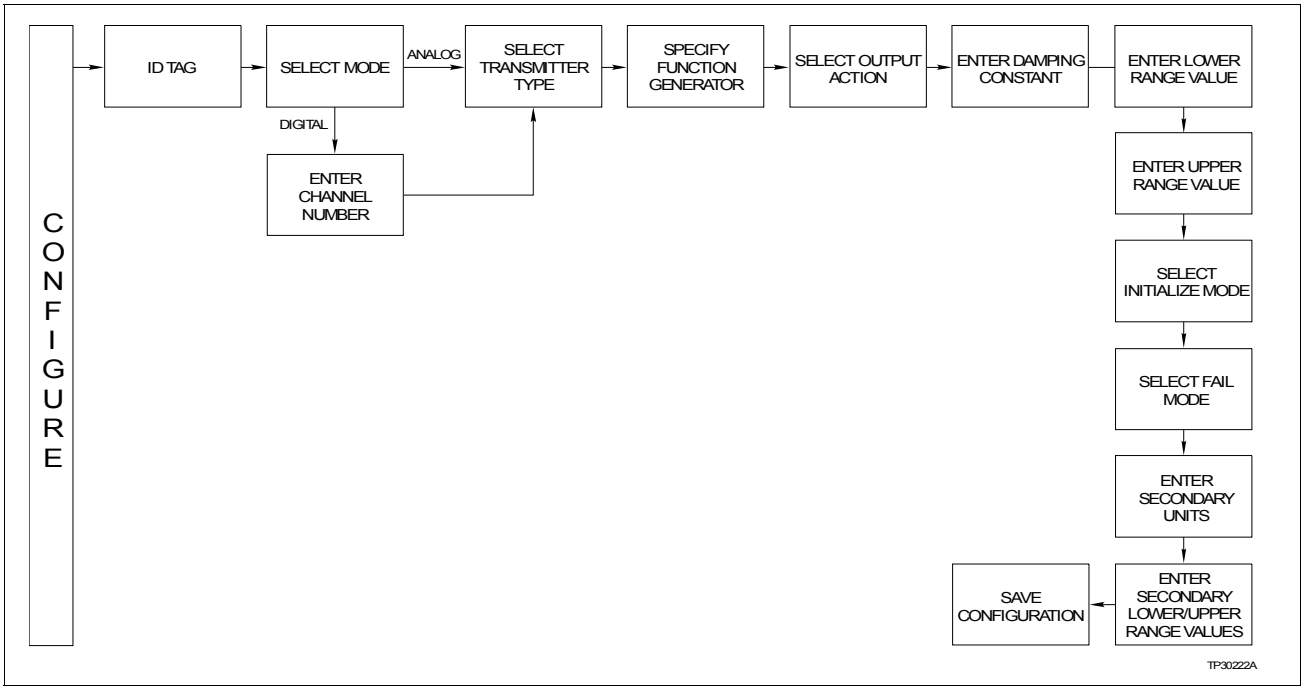


Figure I-1. Configuration Flowchart (TBN581)

A configuration can be created off-line, without a connected field device. A number of configurations can be created and stored in the terminal and sent to a field device at a later time with **SEND CONFIG**.

A series of *n*s may appear in the ***Display*** column of this instruction where alphanumeric characters can be displayed or entered. The STT03E terminal is assumed to be in the *READY* state when beginning the following procedures**.**

Key	Display	Comments
CONFIG	CONFIGURATION → NEW MODIFY ERASE	To create a new configuration, select *NEW.* To modify an existing configuration, select *MODIFY.* The screen sequence is the same, however, the *MODIFY* screens appear with the values and cursor positions as originally configured.
ENTER	STT03 CONFIG [nnnnnnnnnnnnn]	A 14-character ID tag name is entered within the brackets. Use the arrow keys to select characters. Use the right arrow key to advance to the next character. When finished entering a name press **ENTER**.
ENTER	SELECT MODE: → ANALOG DIGITAL	For this example select *ANALOG.*

Key	Display	Comments
ENTER	TRANSMITTER TYPE cond TBN pH TBN → ORP/pION	Select *ORP/pION*.
↓		
↓		
ENTER	OUTPUT FUNC GEN → NO YES	If *YES* is selected enter 5 input and output points. Values must be between 0 and 100%.
ENTER	OUTPUT ACTION: → NORMAL REVERSE	Refer to ***Smart (ORP/pION) Transmitter Series TBN581*** instruction for description.
ENTER	DAMPING: (0-32 SEC) _nn.nn	Enter a value between 0 and 32. Refer to the ***Smart (ORP/pION) Transmitter Series TBN581*** instruction for description.
ENTER	LOWER RANGE VAL nnn.nn mV UPPER RANGE VAL nnn.nn mV	Enter the lower range temperature value and press **ENTER**. Input the upper range value. Low default value: -1000 mV. High default value: +1000 mV.
ENTER	INITIALIZE MODE: → LOW HIGH	Refer to the ***Smart (ORP/pION) Transmitter Series TBN581*** instruction for description.
ENTER	FAIL MODE: → LOW HIGH LAST	Refer to the ***Smart (ORP/pION) Transmitter Series TBN581*** instruction for description.
ENTER	ENTER SECONDARY UNITS _nnnnnn	Enter up to 6 characters. Use familiar units to describe the output.
ENTER	SECONDARY L.R. _nn.nn UNITS SECONDARY U.R. nn.nn UNITS	Input the lower range value and press **ENTER**. Input the upper range value.

Key	Display	Comments
ENTER	STORE THIS CONFIGURATION NO → YES	Select *YES* to store the configuration.
↓		
ENTER	CONFIG. ID TAG READY	The Configuration ID tag name just configured will be in the upper left corner if the configuration is saved. It becomes the working configuration. **NOTE:** Connect the terminal to a device and send the configuration (using **SEND CONFIG**) to a device before calibrating.

CALIBRATION

This section details the calibration functions of the STT03E terminal while interfacing a TBN581 ORP/pION transmitter. There are four types of calibration functions:

- Process calibration.
- Bench calibration (ORP/pION).
- Bench calibration (mV).
- D-to-A adjust.

When calibrating, a device must be connected to the STT03E transmitter. When using an IMFBS01 module (field bus), up to fifteen transmitters can be connected to the bus. Select the transmitter by using **SELECT DEVICE**.

> **NOTE:** To change calibration or configuration parameters of a smart transmitter that is connected to an IMFBS01 module, the transmitter must be taken off-line. This is done at the INFI 90 OPEN console.

After selecting a device, the *READY* screen appears. All calibration functions can be performed on the selected device. Refer to Figure I-2 for an overview of the calibration functions.

Process Calibration

This procedure applies to TBN581 Transmitters configured for either *ANALOG* or *DIGITAL*. Any difference between the two are noted in the ***Comments*** column.

Bench Calibration (ORP/pION)

This procedure applies to TBN581 Transmitters configured for either *ANALOG* or *DIGITAL*. Any difference between the two are noted in the ***Comments*** column.

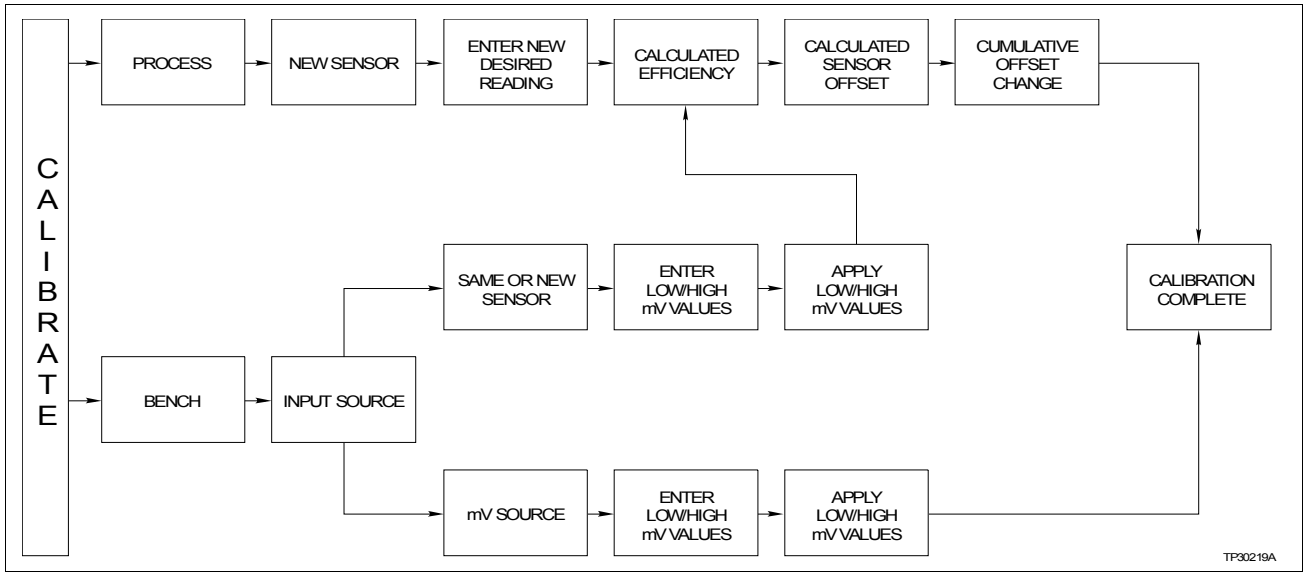


Figure I-2. Calibration Flowchart (TBN581)

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	Select *YES*.
↓	PROCEED? NO → YES	
ENTER	CALIBRATION → PROCESS CAL BENCH CAL D-TO-A ADJUST	Select *PROCESS CAL*. If configured digitally, the *D-TO-A ADJUST* selection would not appear.
ENTER	INSTALLING A NEW SENSOR? → NO YES	If *YES*, a new sensor offset will be calculated and the *CUMULATIVE OFFSET CHANGE* will be reset to 0.00 mV.
ENTER	CHANGE EFFICIENCY? nn.nn% HIT ENTER	Value from last calibration. If *NEW SENSOR*, efficiency will be 98%. This value can be changed if desired. A change in efficiency will affect calibration span.
ENTER	CURRENT READING nn.nn mV ENTER DESIRED nn.nn mV	

Key	Display	Comments
ENTER	CALCULATED SENSOR OFFSET nnn.nn pH HIT ENTER	This value is recalculated during each calibration.
ENTER	CUMULATIVE OFFSET CHANGE n.nn pH HIT ENTER	This value shows the offset change over time for a particular sensor. Value resets to 0.00 pH if installing a new sensor.
ENTER	CONFIG ID READY	Calibration complete.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	
↓	PROCEED? NO → YES	
ENTER	CALIBRATION PROCESS CAL → BENCH CAL D-TO-A ADJUST	Select *BENCH CAL.*
↓		
ENTER	INPUT SOURCE: → SAME SENSOR NEW SENSOR mV SOURCE	*SAME SENSOR:CALCULATED SENSOR OFFSET*, *CALCULATED EFFICIENCY*, and *CUMULATIVE OFFSET CHANGE* are recalculated. *NEW SENSOR: CALCULATED SENSOR OFFSET, CALCULATED EFFICIENCY* are calculated and *CUMULATIVE OFFSET CHANGE* is set to 0.00 mV. **NOTE:** *mV SOURCE* selection is covered in ***Bench Calibration (mV)*.**
ENTER	ENTER LO mV CAL nn.nn mV ENTER HI mV CAL nn.nn mV	Low default value: -1000 mV. High default value: +1000 mV. Enter low mV value and press **ENTER**. Enter high mV value.

Key	Display	Comments
ENTER	APPLY nn.nn mV nn.nn HIT ENTER WHEN STABLE	Displays low mV calibration value, and the uncalibrated mV values determined from the input source.
ENTER	APPLY nn.nn mV nn.nn HIT ENTER WHEN STABLE	Displays high mV calibration value, and the uncalibrated mV values determined from the input source.
ENTER	CALCULATED EFFICIENCY nnn.n % HIT ENTER	Value from last calibration. If new sensor, efficiency will be 98%.
ENTER	CALCULATED SENSOR OFFSET nnn pH HIT ENTER	This value is recalculated during each calibration.
ENTER	CUMULATIVE OFFSET CHANGE nnn pH HIT ENTER	This value shows the offset change over time for a particular sensor. Value resets to 0.00 mV if installing a new sensor.
ENTER	CONFIG ID TAG READY	Calibration complete.

Bench Calibration (mV)

This procedure applies to TBN581 Transmitters configured for either *ANALOG* or *DIGITAL*. Any difference between the two are noted in the ***Comments*** column.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	
↓	PROCEED? NO → YES	

Key	Display	Comments
ENTER	CALIBRATION PROCESS CAL → BENCH CAL D-TO-A ADJUST	Select *BENCH CAL.*
↓		
ENTER	INPUT SOURCE: SAME SENSOR NEW SENSOR → mV SOURCE	Select *mV SOURCE*.
ENTER	ENTER LO mV CAL nn.nn mV ENTER HI mV CAL nn.nn mV	Low default value: -1000 mV. High default value: +1000 mV. Enter low mV value and press **ENTER**. Enter high mV value.
ENTER	APPLY nn.nn mV nn.nn mV HIT ENTER WHEN STABLE	Displays low mV calibration value, and the uncali- brated mV values determined from the input source.
ENTER	APPLY nn.nn mV nn.nn mV HIT ENTER WHEN STABLE	Displays high mV calibration value, and the uncali- brated mV values determined from the input source.
ENTER	CONFIG ID TAG READY	Calibration complete.

D-to-A Adjust

The *D-TO-A ADJUST* selection is only present when you are in the *ANALOG* communication mode, specified in the configuration procedure. This selection allows you to adjust the four to 20 milliamphere output of the field device.

Key	Display	Comments
CALI-BRATE	OUTPUT WILL BE AFFECTED	

Key	Display	Comments
↓	PROCEED? NO → YES	
ENTER	CALIBRATION → D-TO-A ADJUST BENCH CALIB.	
ENTER	ADJUST TO 4 mA THEN HIT ENTER	Use the arrow keys to adjust the 4 mA signal. **NOTE:** When increasing or decreasing the mA signal, the increments of change increase with successive depressions until the maximum level of change is reached. By changing direction you will return to the smallest increment of change. This adjustment technique speeds up the adjustment process without affecting fine adjustment.
ENTER	ADJUST TO 20 mA THEN HIT ENTER	Use the arrow keys to adjust the 20 mA signal.
ENTER	CONFIG. ID TAG READY	

Type AVS Smart Positioner Configuration

IDTAG (≤14 digits, alphanumeric)

MODE ☐ Analog ☐ Digital ___ Channel Number

INPUT CHARACTERISTICS ☐ Linear ☐ Square root ☐ Square ☐ Equal % ☐ Function Generator ☐ Quick Act

FUNCTION GENERATOR

Input		Output	
_____ %	Point 0	_____ %	Point 0
_____ %	Point 1	_____ %	Point 1
_____ %	Point 2	_____ %	Point 2
_____ %	Point 3	_____ %	Point 3
_____ %	Point 4	_____ %	Point 4
_____ %	Point 5	_____ %	Point 5
_____ %	Point 6	_____ %	Point 6
_____ %	Point 7	_____ %	Point 7
_____ %	Point 8	_____ %	Point 8
_____ %	Point 9	_____ %	Point 9
_____ %	Point 10	_____ %	Point 10

LOW RANGE VALUE _____ Specified LRV _____ LRV

HIGH RANGE VALUE _____ Specified HRV _____ HRV

VALVE STUCK ALARM ☐ Yes ☐ No

PRESSURE UNITS ☐ psi ☐ bars

PID PARAMETERS _____ Kp _____ Ki _____ Kd

INPUT SIGNAL ☐ Normal act ☐ Reverse act

DAMPING _____ sec (0.00[1] to 5.00 sec)

ALARMS
_____ Deviation alarm
_____ Low pressure alarm
_____ High pressure alarm

LIMIT SIGNALS _____ Low _____ High

LOW FLOW SHUT OFF _____ %

DO3 ACTION ☐ Lo pressure ☐ Deviation alarm ☐ Valve stuck alarm ☐ Status

NOTE:
1. Default parameters.

Type BCN Smart Electronic Pressure Transmitter Configuration

IDTAG (≤14 digits, alphanumeric)

MODE ☐ Analog ☐ Digital ___ Channel Number

OUTPUT TYPE
☐ Linear[1] ☐ Square root ☐ 3/2 Flow Mode
☐ 5/2 Flow Mode ☐ Vol./Sphere ☐ Vol./Cylinder
☐ Function Generator

FUNCTION GENERATOR

Input	_____ %	Point 0
	_____ %	Point 1
	_____ %	Point 2
	_____ %	Point 3
	_____ %	Point 4
	_____ %	Point 5
Output	_____ %	Point 0
	_____ %	Point 1
	_____ %	Point 2
	_____ %	Point 3
	_____ %	Point 4
	_____ %	Point 5

OUTPUT ACTION ☐ Normal[1] ☐ Reverse

DAMPING _____ sec (0.00[1] to 32.00 sec)

ENGINEERING UNITS
☐ iH_2O[1] ☐ mmHG ☐ cmH_2O
☐ psi ☐ MPA ☐ KPA
☐ BARS ☐ mBARS ☐ $kgcm^2$

LOW RANGE VALUE _____ Specified LRV

UPPER RANGE VALUE _____ Specified URV

INITIALIZE MODE[2] ☐ Low ☐ High

FAIL MODE[2] ☐ Low ☐ High ☐ Last

SECONDARY UNITS
_____ Secondary LRV
_____ Secondary URV

NOTES:
1. Default parameters.
2. Select to maintain safe operation during start-up and diagnostically detected failures of the transmitter.

Type EQN Smart Electronic Temperature Transmitter Configuration

IDTAG (≤14 digits, alphanumeric)

MODE	☐ Analog	☐ Digital	___ Channel Number
TRANSMITTER MODE	☐ Thermocouple	☐ RTD	☐ Millivolt
THERMOCOUPLE	☐ N ☐ B ☐ E ☐ J ☐ K ☐ R ☐ S ☐ T ☐ C		
RTD	☐ 100 ohms (pt 385)	☐ 100 ohms (pt 392)	☐ OHMS MODE
RTD TYPE	☐ 2 wire	☐ 3 wire	☐ Dual
APROXIMATION	☐ Linear	☐ Nonlinear	(Thermocouple only)

OUTPUT TYPE

Function generator	☐ Yes	☐ No
Input	_____ %	Point 1
	_____ %	Point 2
	_____ %	Point 3
	_____ %	Point 4
	_____ %	Point 5
Output	_____ %	Point 1
	_____ %	Point 2
	_____ %	Point 3
	_____ %	Point 4
	_____ %	Point 5

OUTPUT ACTION	☐ Normal[1]	☐ Reverse	
DAMPING	_____ sec	(0.00[1] to 32.00 sec)	
ENGINEERING UNITS[2]	☐ Celsius	☐ Fahrenheit	☐ Kelvin
LOW RANGE VALUE	_____ Specified LRV	_____ LRV	
UPPER RANGE VALUE	_____ Specified URV	_____ URV	
INITIALIZE MODE[3]	☐ Low	☐ High	
FAIL MODE[3]	☐ Low	☐ High	☐ Last

NOTES:
1. Default parameters.
2. Not applicable in millivolt mode.
3. Select to maintain safe operation during start-up and diagnostically detected failures of the transmitter.

Type EQS Platinum Standard Series Smart Temperature Transmitter

IDTAG (≤14 digits, alphanumeric)

MODE ☐ Analog ☐ Digital ___ Channel Number

TRANSMITTER MODE ☐ Thermocouple ☐ RTD ☐ Millivolt ☐ Ohms

THERMOCOUPLE ☐ N ☐ B ☐ E ☐ J ☐ K ☐ R ☐ S ☐ T ☐ C

RTD TYPE ☐ 100 ohms (pt 385) ☐ 100 ohms (pt 392) ☐ OHMS MODE

OF ELEMENTS ☐ Single ☐ Dual
☐ 2 wire
☐ 3 wire
☐ 4 wire

ENGINEERING UNITS ☐ Celsius ☐ Fahrenheit ☐ Kelvin

OUTPUT TYPE
Function generator ☐ Yes ☐ No

Input	_____ %	Point 1
	_____ %	Point 2
	_____ %	Point 3
	_____ %	Point 4
	_____ %	Point 5
Output	_____ %	Point 1
	_____ %	Point 2
	_____ %	Point 3
	_____ %	Point 4
	_____ %	Point 5

OUTPUT ACTION ☐ Normal ☐ Reverse

DAMPING _____ sec (0.00 to 32.00 sec)

LOW RANGE VALUE _____ Specified LRV _____ LRV

UPPER RANGE VALUE _____ Specified URV _____ URV

INITIALIZE MODE[2] ☐ Low ☐ High

FAIL MODE[2] ☐ Low ☐ High ☐ Last

SECONDARY UNITS _____ Secondary LRV _____ Secondary URV

TEMPERATURE ALARM _____ Lower Temp. _____ Upper Temp.

NOTES:
1. Default Parameters.
2. Select to maintain safe operation during start-up and diagnostically detected failures of the transmitter.

XM/SM/XE Magnetic Flowmeter Configuration

IDTAG (≤14 digits, alphanumeric)			
MODE	☐ Analog	☐ Digital	___ Channel Number
FLOW DIRECTION	☐ Normal	☐ Reverse	
DAMPING	_____ sec	(0.00[1] to 32.00 sec)	
SELECT PV EU	☐ 1/s	☐ 1/m	☐ User Defined
EU DESCRIPTOR	_____		
EU FACTOR	_____		
TIME RELATION	☐ Per sec	☐ Per min	☐ Per hour
DENSITY FACTOR	_____		
RANGE VALUE 1	_____ Units		
RANGE VALUE 2	_____ Units		
FAIL MODE[2]	☐ Low	☐ High	
SELECT TOTALIZER EU.	☐ 1	☐ m3	☐ User Defined
PULSE FACTOR	_____		
PULSE WIDTH	_____		
LOW FLOW CUTOFF	_____%		
DIGITAL FILTER	☐ ON	☐ OFF	
RESPONSE TIME	☐ Normal	☐ Fast	
RANGE CONFIGURATION	☐ 2-FWD	☐ 1-FWD, 1-REV	
FLOW DIRECTION	☐ FWD and REV	☐ FWD only	
UPPER PV ALARM	_____ Units		
LOWER PV ALARM	_____ Units		

NOTES:
1. Default parameters.
2. Select to maintain safe operation during start-up and diagnostically detected failures of the transmitter.

Type PTS Smart Electronic Pressure Transmitter Configuration

IDTAG (≤14 digits, alphanumeric

MODE ☐ Analog ☐ Digital ___ Channel Number

OUTPUT TYPE
☐ Linear[1] ☐ Square root ☐ 3/2 Flow Mode
☐ 5/2 Flow Mode ☐ Vol/Sphere ☐ Vol/Cylinder
☐ Function Generator

FUNCTION GENERATOR

Input	_____ %	Point 0
	_____ %	Point 1
	_____ %	Point 2
	_____ %	Point 3
	_____ %	Point 4
	_____ %	Point 5
Output	_____ %	Point 0
	_____ %	Point 1
	_____ %	Point 2
	_____ %	Point 3
	_____ %	Point 4
	_____ %	Point 5

OUTPUT ACTION ☐ Normal[1] ☐ Reverse

DAMPING _____ sec (0.00[1] to 32.00 sec)

ENGINEERING UNITS
☐ iH_2O[1] ☐ mmHG ☐ cmH_2O
☐ psi ☐ MPA ☐ KPA
☐ BARS ☐ mBARS ☐ $kgcm^2$

LOW RANGE VALUE _____ Specified LRV

UPPER RANGE VALUE _____ Specified URV

INITIALIZE MODE[2] ☐ Low ☐ High

FAIL MODE[2] ☐ Low ☐ High ☐ Last

SECONDARY UNITS
_____ Secondary LRV
_____ Secondary URV

TEMPERATURE ALARM
_____ Lower Temperature Alarm
_____ Upper Temperature Alarm

NOTES:
1. Default parameters.
2. Select to maintain safe operation during start-up and diagnostically detected failures of the transmitter.

Type TBN480 Smart Conductivity Transmitter Configuration

IDTAG (≤14 digits, alphanumeric)

MODE	☐ Analog	☐ Digital	___ Channel Number
ANALYZER TYPE	☐ General	☐ Pure H_2O Cond.	☐ Concentration
SENSOR GROUP	☐ A	☐ B	☐ C
RANGE JUMPER	☐ High	☐ Medium	☐ Low
ANALYZER RANGE	☐ 0-99.9 µS/cm	☐ 0–9.99 µS/cm	
TEMPERATURE COMP.	☐ Input	☐ Manual	☐ 3.01K Balco
TEMP. COMP TYPE	☐ STANDARD	☐ 0-15% NaOH	☐ 0-20% NaOH
DAMPING	_____ sec	(0.00[1] to 32.00 sec)	
LOW RANGE VALUE	_____ Specified LRV	_____ LRV	
UPPER RANGE VALUE	_____ Specified URV	_____ URV	
INITIALIZE MODE[2]	☐ Low	☐ High	
FAIL MODE[2]	☐ Low	☐ High	☐ Last
DIAG. SPIKE OUTPUT	☐ NO	☐ YES	

NOTES:
1. Default parameters.
2. Select to maintain safe operation during start-up and diagnostically detected failures of the transmitter.

Type TBN580 Smart pH Transmitter Configuration

IDTAG (≤14 digits, alphanumeric)

MODE	☐ Analog	☐ Digital	___ Channel Number
pH SENSOR INPUT	☐ Standard	☐ Antimony	
TEMP. COMP. INPUT	☐ 3.01K Balco	☐ None	
TEMP. COMP. TYPE	☐ Manual ☐ Auto Solution	☐ Auto Nernstian ☐ Auto Pure H_2O	
SOLUTION COEFFICENT	_____		
TEMPERATURE DISPLAY	☐ C °	☐ F °	

OUTPUT TYPE

Function generator	☐ Yes	☐ No
Input	_____ %	Point 1
	_____ %	Point 2
	_____ %	Point 3
	_____ %	Point 4
	_____ %	Point 5
Output	_____ %	Point 1
	_____ %	Point 2
	_____ %	Point 3
	_____ %	Point 4
	_____ %	Point 5

OUTPUT ACTION	☐ Normal[1]	☐ Reverse	
DAMPING	_____ sec	(0.00[1] to 32.00 sec)	
LOW RANGE VALUE	_____ Specified LRV	_____ LRV	
UPPER RANGE VALUE	_____ Specified URV	_____ URV	
INITIALIZE MODE[2]	☐ Low	☐ High	
FAIL MODE[2]	☐ Low	☐ High	☐ Last
SECONDARY UNITS	_____ Secondary LRV _____ Secondary URV		

NOTES:
1. Default parameters.
2. Select to maintain safe operation during start-up and diagnostically detected failures of the transmitter.

Type TBN581 Smart ORP/pION Transmitter Configuration

IDTAG (≤14 digits, alphanumeric)

MODE	☐ Analog	☐ Digital	___ Channel Number

OUTPUT TYPE

Function generator	☐ Yes	☐ No
Input	_____ %	Point 1
	_____ %	Point 2
	_____ %	Point 3
	_____ %	Point 4
	_____ %	Point 5
Output	_____ %	Point 1
	_____ %	Point 2
	_____ %	Point 3
	_____ %	Point 4
	_____ %	Point 5

OUTPUT ACTION	☐ Normal[1]	☐ Reverse	
DAMPING	_____ sec	(0.00[1] to 32.00 sec)	
LOW RANGE VALUE	_____ Specified LRV	_____ LRV	
UPPER RANGE VALUE	_____ Specified URV	_____ URV	
INITIALIZE MODE[2]	☐ Low	☐ High	
FAIL MODE[2]	☐ Low	☐ High	☐ Last
SECONDARY UNITS	_____ Secondary LRV _____ Secondary URV		

NOTES:
1. Default parameters.
2. Select to maintain safe operation during start-up and diagnostically detected failures of the transmitter.

Index

Index (continued)

Visit Elsag Bailey on the World Wide Web at http://www.ebpa.com/bfp

Our worldwide staff of professionals is ready to meet *your* needs for process automation.
For the location nearest you, please contact the appropriate regional office.

Americas
125 East County Line Road
Warminster, PA USA
18974
Telephone 1-215-674-

Asia/Pacific
539 Yishun Industrial Park A
Singapore 768740
Telephone 65-756-7655
Telefax 65-753-6549

Germany
Borsigstrasse 2
63755 Alzenau
Germany
Telephone 49-6023-943-0
Telefax 49-6023-943-

Europe, Africa, Middle East
Via Puccini 2
16154 Genoa, Italy
Telephone 39-10-6584-943
Telefax 39-10-6584-941

Form WBPEEUI110501A0 Litho in U.S.A. 596

Elsag Bailey
Process Automation