AUTROL® America

SMART TRANSMITTERS

Quick Start Guide

APT 3000 Series

This manual covers mainly the functional needs for powering and configuring 3100 A/D/G/H & 3200 A/G series transmitters, including the 3100 MP & 3100 L/ 3200 L sealed assemblies.

For full instructions on installation, configuration and other features/option sets available with these transmitters please read the full product manuals available under the download tab of www.autroltransmitters.com.

Additional instructional videos outlining programming and configuration functionalities can also be found on www.autroltransmitters.com. First time users are encouraged to make use of these support resources made available at no cost online.

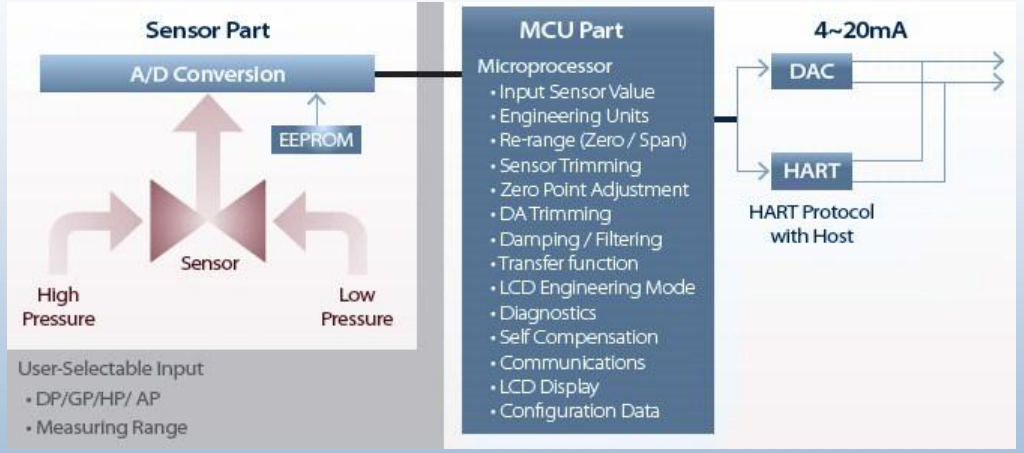
For additional technical support or advanced troubleshooting please contact your nearest Autrol office or call 1-847-779-5000.

Getting Started

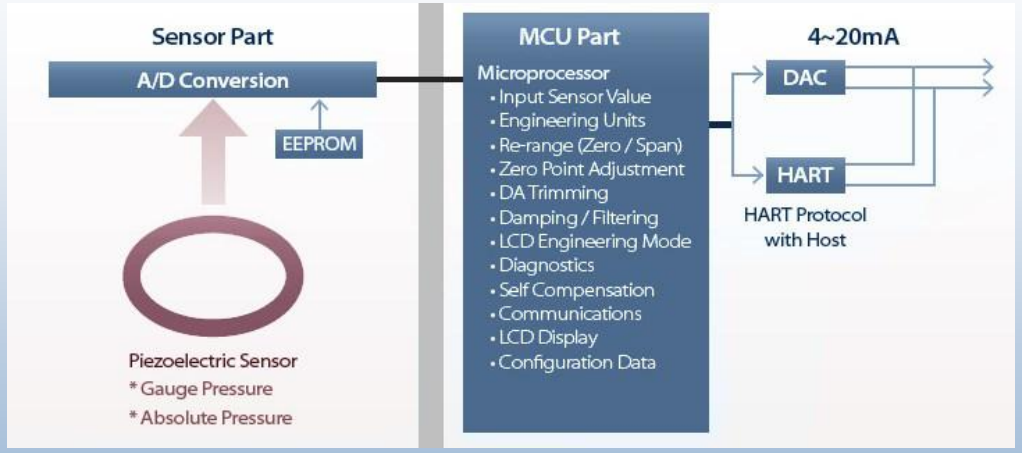
- Before installation check the model, specifications, and installation location for the transmitter. Install using proper engineering practice.
- Mount transmitter securely and stabilize any impulse piping.
- Follow the published pressure and temperature limits for ordered transmitter and options.
- For process temperatures ≥ 212°F, use of adequate impulse lines, capillaries (diaphragm seals), or cooling elements are recommended.
- Set Units, URL, and LRL (in menus 21, 22, and 23 respectively). See full menu tree at end of manual.
- After installation of a 3100 D/H/G or 3200 G always perform a Zero Trim (menu 11 - note this is not the same as Zeroing). Ensure applied process to transmitter is zero before attempting Zero Trim.
- Do not perform Zero Trim for 3100 A/ 3200 A (absolute) unless a true zero PV can be applied to these units. Instead a Zero Adjust (menu 12) is recommended.
- Zero Adjust is also recommended for 3100/ 3200 L (tank level application) to compensate for tank nozzle offsets.

Functional Block/Sensor Part Diagram

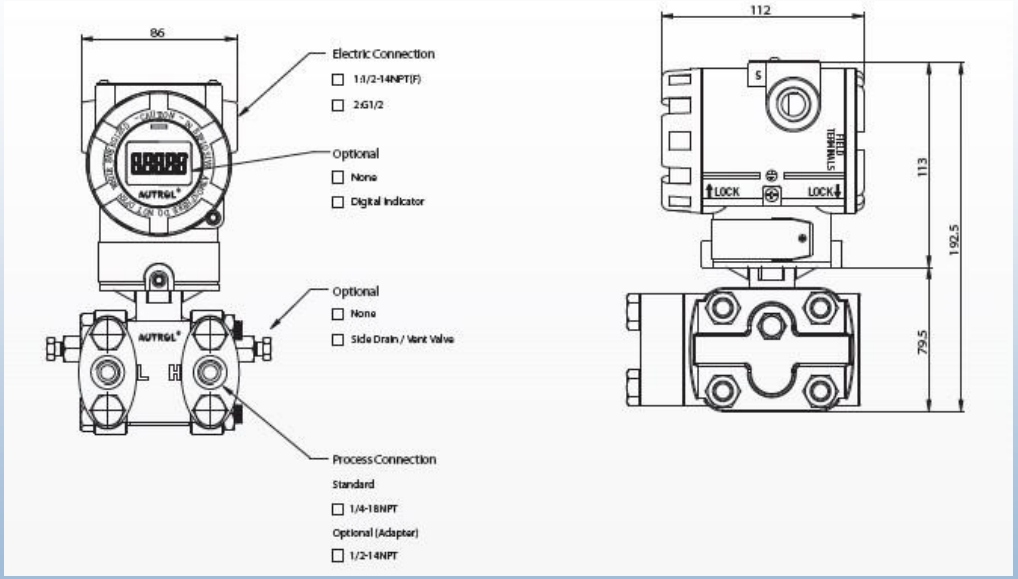
APT 3100



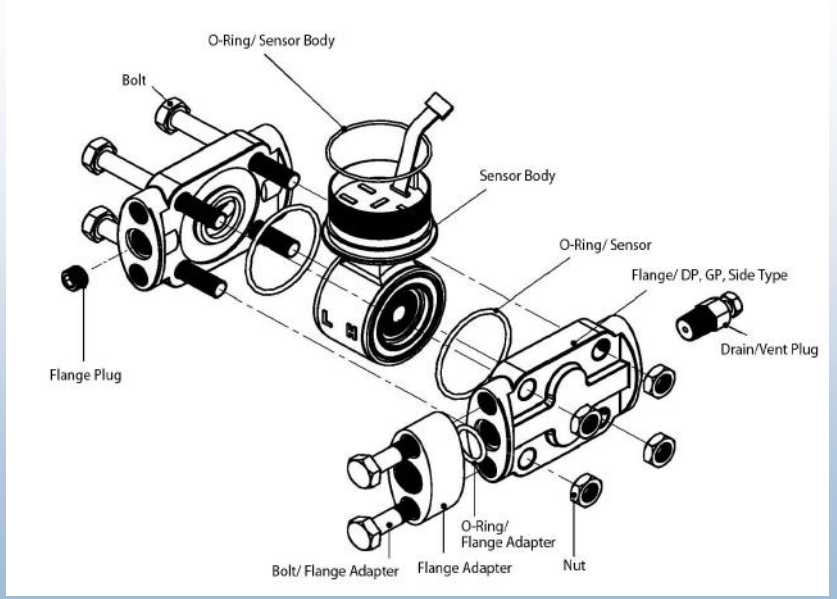
APT 3200



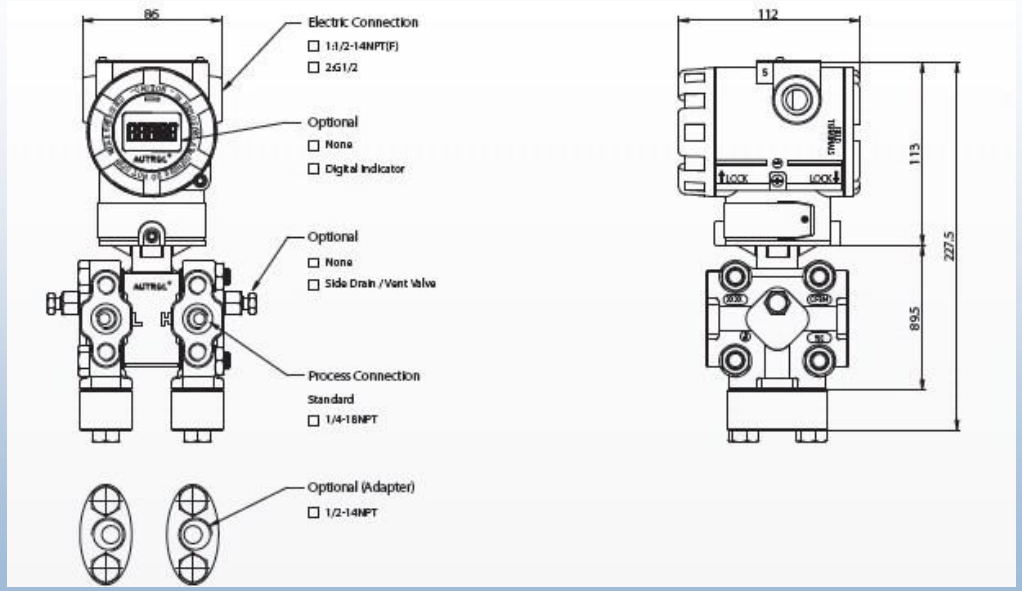
APT 3100 Dimensional Drawing



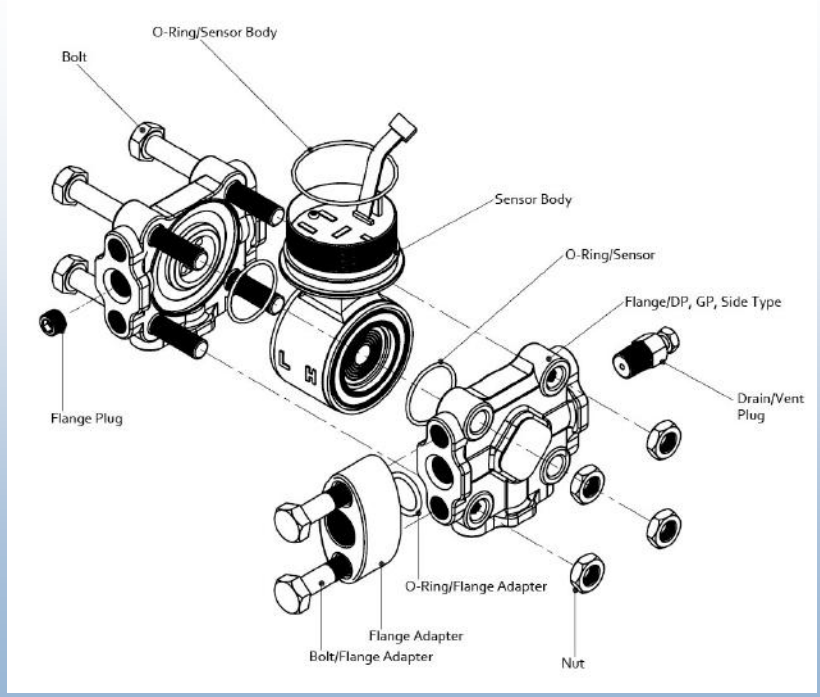
APT 3100 Exploded View



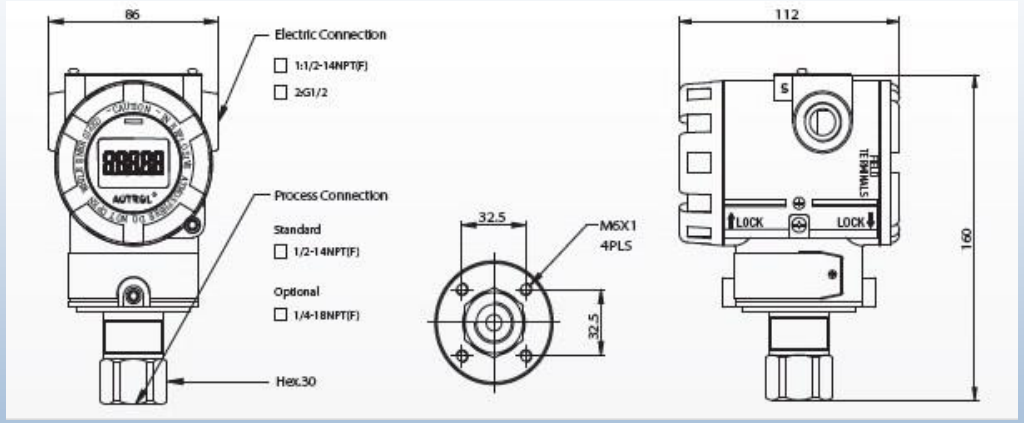
APT 3100 MP Dimensional Drawing



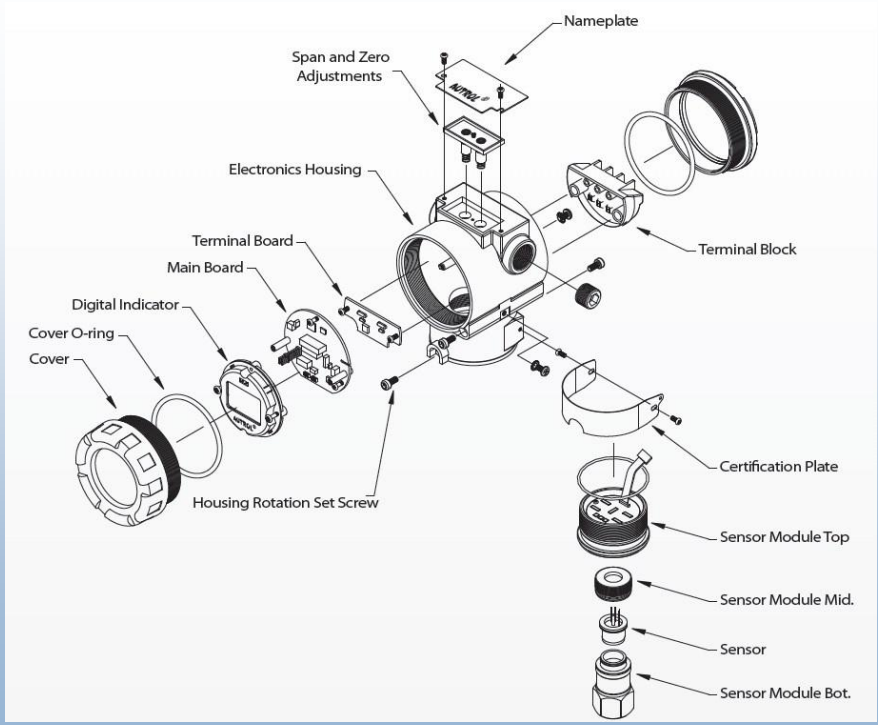
APT 3100 MP Exploded View



APT 3200 Dimensional Drawing



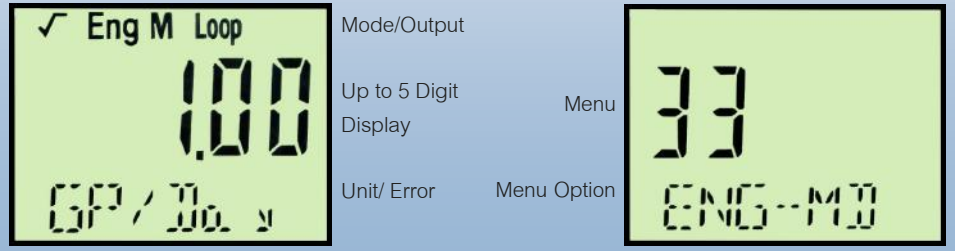
APT 3200 Exploded View



LCD Screen

The 5 digit LCD screen shows:

- Up to 5 digits of measured value
- Error code
- Units (Normal and Engineering)
- Menu and Menu Option
- Indication of being in Normal or Engineering mode
- Indication of output being Linear or Square Root
- Indication of performing a Loop Test
- Indication of being in Multi-Drop mode



LCD Screen Rotation

Unscrewing the two screws on either side of the LCD screen allows for the screen to be rotated 90° clock-wise or counterclockwise.

LCD Screen Display Error Codes

Message	Description	Remarks
ADJ-U	Set value outside of upper limits during Zero Adj function	Check Limits
ADJ-L	Set value outside of lower limits during Zero Adj function	Check Limits
ZERO	Initial message when activating Zero button	Apply Zero Input
SPAN	Initial message when activating Span button	Apply Span Input
BT-ERR	Button Input Sequence Error	Check Key Sequence
P-LOCK	Write Protect Lock On	Check Jumper
ZT-ERR	Setting Limit (10%) Error when performing Zero Trim	Redo Zero Trim
-TR-	Zero Trim done	Successful Trim
ZR-ERR	Set value outside of upper limits during Zero Trim	Check Limits
SP-ERR	Set value outside of upper limits during Span Trim	Check Limits
-ZR-	Zero button function done	Apply Zero PV
-SP-	Span button function done	Apply Span PV
-ZA-	Zero Adjustment done	Z-Adj Accepted
-DONE-	Setting Done using button	Changes Accepted
RNGOVR	Over Range	Check Limits
LCD_OV	Over Range for LCD display	Check Limits

Message	Description	Remarks
SCD--ER	Sensor Code Error	Check Senor
F-RST	Flash Setting Data Reset	Reboot
F-LOCK	While Flash Setting Data Reset, Protect Locked	Write Protection On
F-FAIL	Flash Setting Data Reset Failure	Initialize Failed
-FR-	Flash Reset Done	Initialize Completed
A-RST	Analog EEPROM Initializing Start	Initialize Initiated
A-STOR	Analog EEPROM Whole Write	Write Initiated
A-FAIL	Analog EEPROM Whole Write Failure	Write Fail
-AC-	Analog EEPROM Whole Write Done	Write Completed
S-FL	Sensor Failure	Check Sensor Input
S-OP	Sensor PV exceeds MWP	Check Limits
AEP-RF	Check Sum Error in EEPROM during Read Sequence	Reboot
AEP-WF	Check Sum Error in EEPROM during Write Sequence	Reboot
TS-FL	Temperature Sensor Failure	Replace
EOSC	Sensor Element Defective	Replace
FAVE	Flash Access Violation	Reboot

Fail-Mode

AUTROL® Smart Pressure Transmitters automatically perform real time self-diagnostic routines and display any error codes on the local LCD (M1 option if ordered) that can be used for troubleshooting. In addition to this, the self-diagnostic routines are also designed to drive transmitter current output outside of the normal saturation values in case a fault mode is detected. The transmitter will drive its current 4-20mA output low (down) or high (up) based on the position of the failure mode alarm jumper (or DIP switch) configured in line with NAMUR requirements.

Level	4-20mA Saturation	4-20mA Alarm
Low/Down	3.9 mA	≤ 3.75 mA
High/Up	20.8 mA	≥ 21.75 mA

Selected Fail Mode	Jumper status on LCD and DIP Switch (2) on CPU Module		DIP Switch (2) setting on CPU Module
	CPU Module	LCD Module	CPU Module
Fail Down	Down	D	Down
Fail Up	Down	U	Up
	Up	U or D	

Fail Mode Selection Jumper Switch on LCD Module

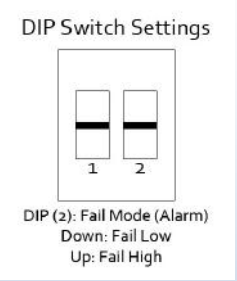
U O O O D

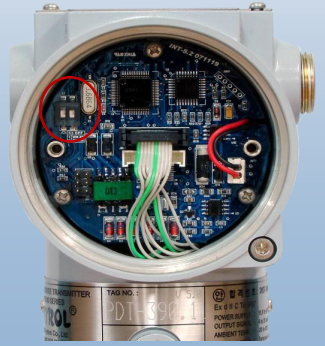
Fail Mode Up (place jumper to left)

U O O O D

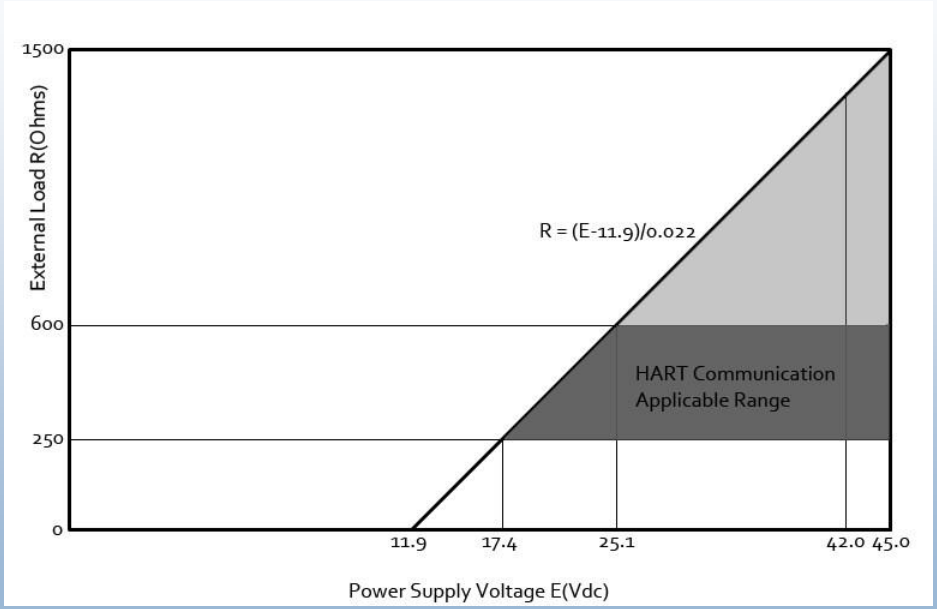
Fail Mode Down (place jumper to right)

*For Blind units using DIP switch on MCU board .





Power Supply Load Limitations



11.9-45 Volts DC is recommended for powering the transmitter. The external power supply ripple noise should not be higher than 2%. When calculating loop resistance please include resistance of all devices added in the loop. For intrinsic safety applications when using an Intrinsic Safety Barrier, please also include the resistance of the barrier into the max loop resistance calculations.

Max. Loop Resistance [Ω] = (E-11.9) [Vdc] / 0.022 [mA]

Note for Standard 4-20mA output units, operating at 11.9V is possible only with Zero load connected to transmitter analog output. HART is not supported at this low of supply voltage input.

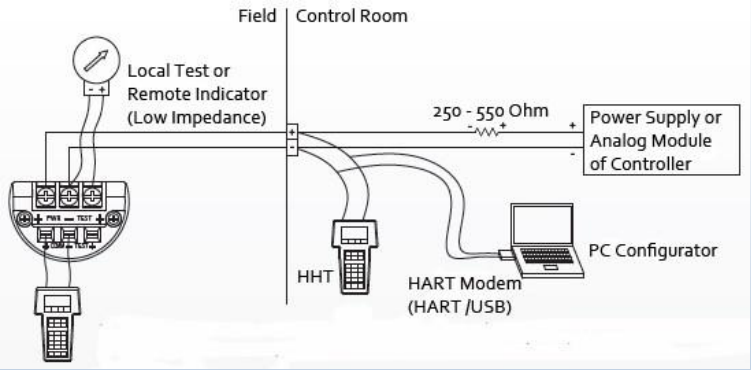
17.5V is recommended as minimum drop across the transmitter for both HART and 250 Ohm loop resistance (loads).

24V +/- 30% is the typically recommended operating range for standard 4-20mA(HART) transmitters.

For 12V and lower please refer to our 3100/3200 LV (low voltage, 1-5V output units)

Connection Diagram

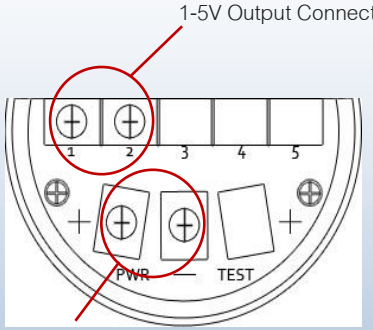
of Signal, Power and HTT for Standard Model Transmitters



1. HHT (HART Communicator) or PC Configurator may be connected at any terminal point in the signal loop
2. HART Communication requires a loop resistance between 250 and 550 Ohm at 24 Vdc
3. Power Supply
   - Voltage Range: 12 to 45 Vdc
   - Voltage Rating: 24 Vdc ± 30%

Connection Diagram

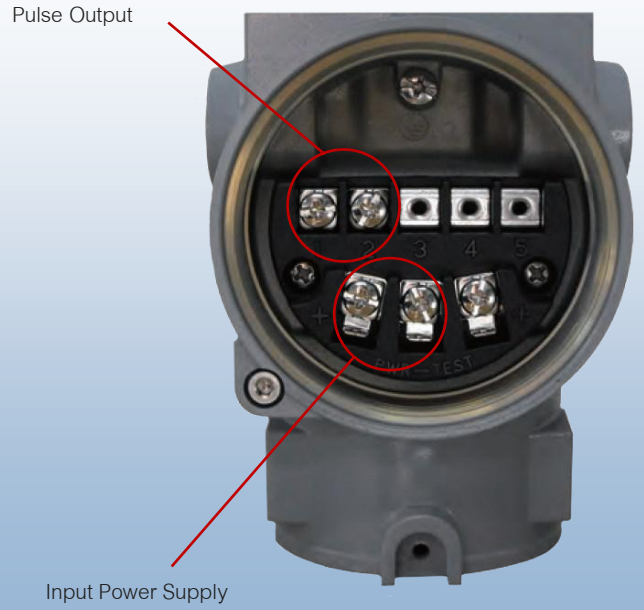
For Low Voltage Transmitters



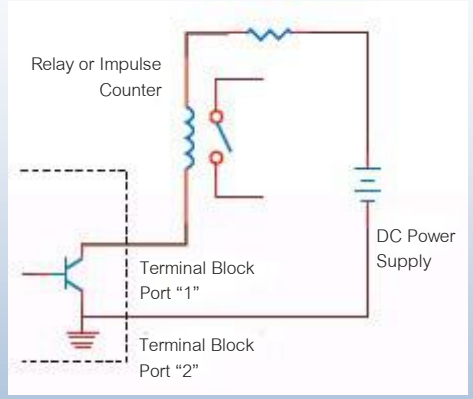
Minimum operating input of 9V (with no loading), recommended 12V (48V maximum).

Connection Diagram

For 3100F (Pulse Out/ Flow Transmitters)



Pulse Output Hook Up



Pulse Specification

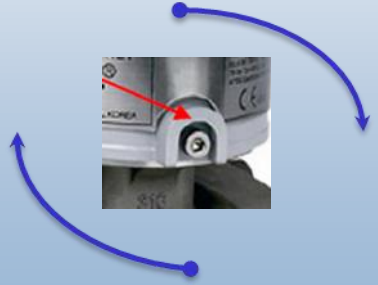
- Scaled Pulse: A single pulse is output for a specified flow amount
  - Pulse Width: 10ms, 50ms, 100ms selectable
  - Duty Cycle: 49 Pulse/Second maximum
  - Output Type: Open Collector, 30V, 500mA maximum

Minimum operating 17.5V (with no loading), Recommended 24V minimum for pulse and 4-20mA 2-wire loops.

Housing Rotation

Unscrewing the housing rotation screws in the front and back of the transmitter allow the housing to be rotated 90° counterclockwise.

360° rotation possible, however please take care that the sensor cable (inside neck) is not pinched or damaged during re-orientation.

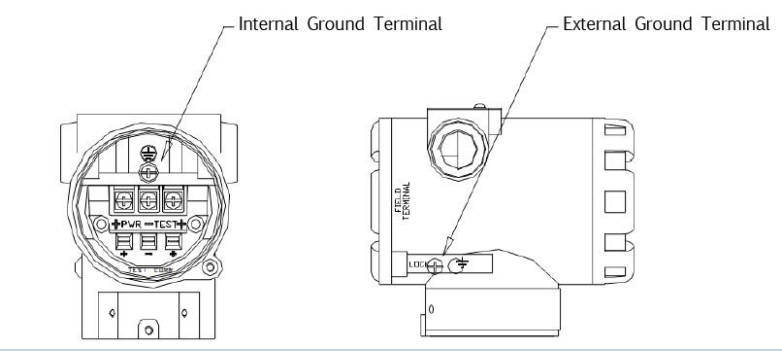


Lock Front/Rear Covers

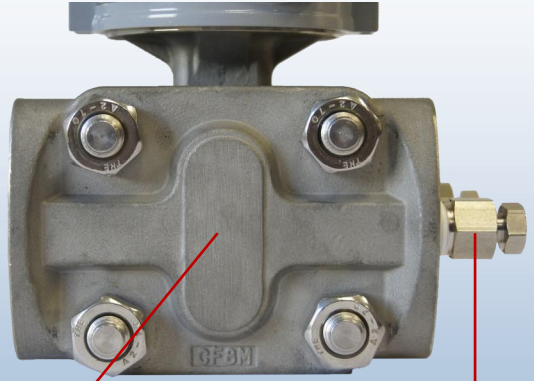
Allen Screw provided on each side of Front and Rear Cover allows for locking the covers for tamper proofing.

Grounding

Please provide for proper grounding (earth ground) at designated points (external or internal).



Vent/Drain Plugs

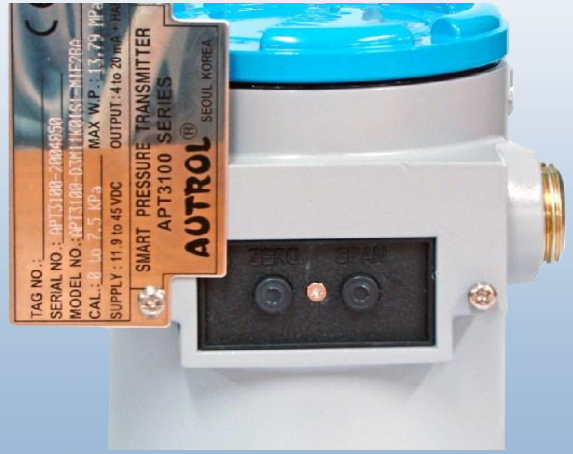


Optional with F1 or F2 Code

Standard with Bleed

Fully Functioning Push Buttons

To access the magnetic push buttons loosen one of the screws holding down the nameplate on the top of the transmitter. Turn the nameplate out of the way; underneath are two push buttons labeled Zero and Span. These magnetic push buttons are fully functioning (see menu tree in following pages).



Re-Ranging and Applying External PV

- Press Zero (5 sec)
  - When display shows “–ZR–” release the button
  - Apply PV corresponding to desired LRV (4mA) setting
  - Press Zero again. Display will show –Z or –ZE if error occurs.
- To adjust SPAN press SPAN button (5 sec)
  - When display shows “–SP–” release the button
  - Apply PV corresponding to desired URV (20mA) setting

*IMPORTANT

It is highly recommended to use a PV source that is at least +/- 0.005% accurate to avoid adding negative bias to factory calibration. If accurate PV source is not available please use push button menu 2.2 & 2.3 to re-range accurately without need of applying an external PV source.

Local Push Button Menu (Ver7.x and Higher)

Menu Functions of the push buttons are controlled by the firmware version of the transmitter.

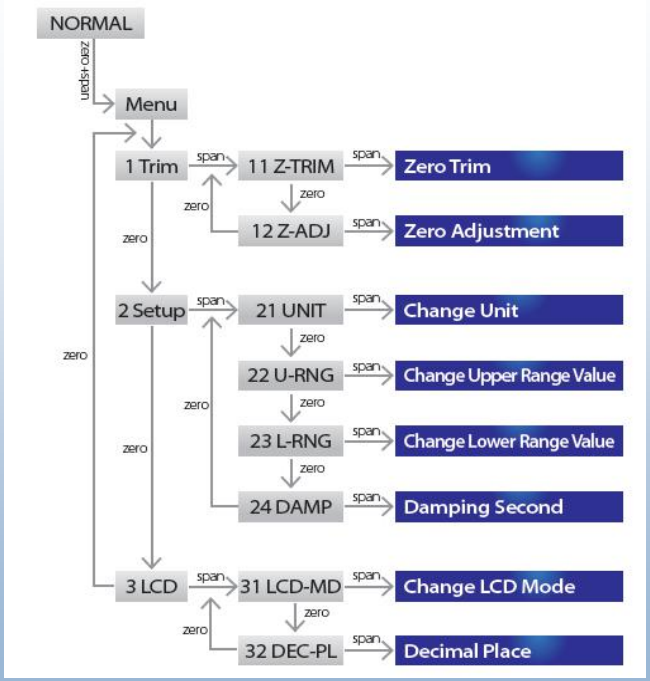
Please check the specific firmware version listed on the neck tag of the transmitter (under LCD screen), as this may limit the available features.

As new features are continuously added please check with the most current manual online for any specific updates on new firmware's and functionality included.

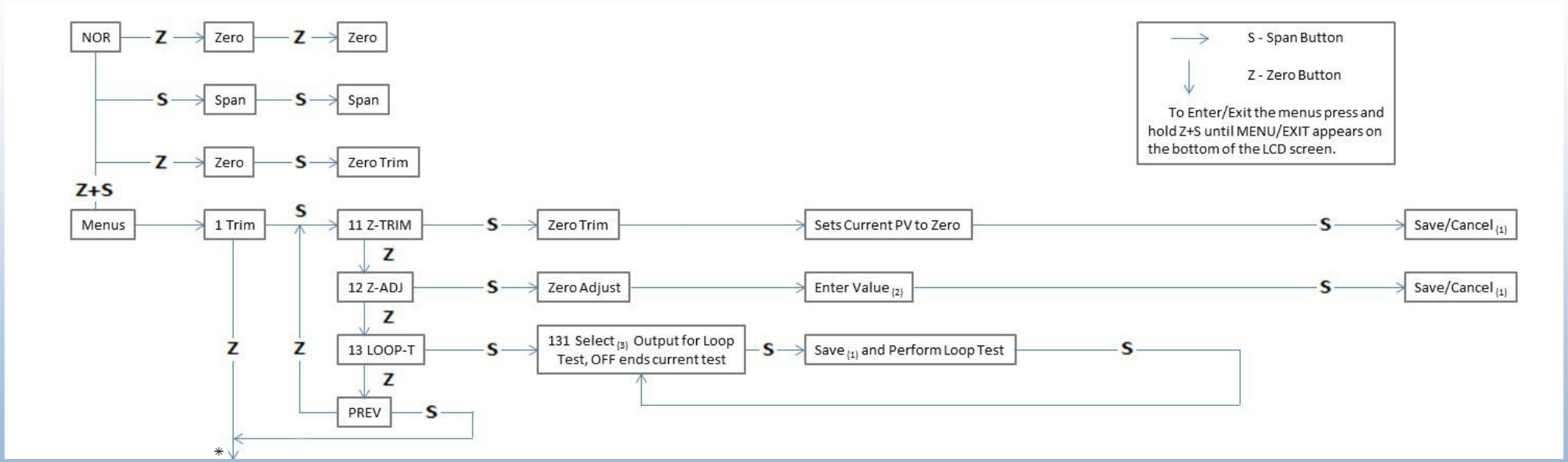
All available menus are divided into 4 primary sections

- 1(TRIM) - for trims, loop test etc.
- 2(SETUP) - for user configuration (units, range settings, output, damping etc.)
- 3(LCD) - for display resolution, multi-parameter display, engineering mode
- 4(Device) - for reset, password lock, Hart Device ID, etc.

Menu Tree for Version 6.x and Lower



Fully Functioning Push Buttons



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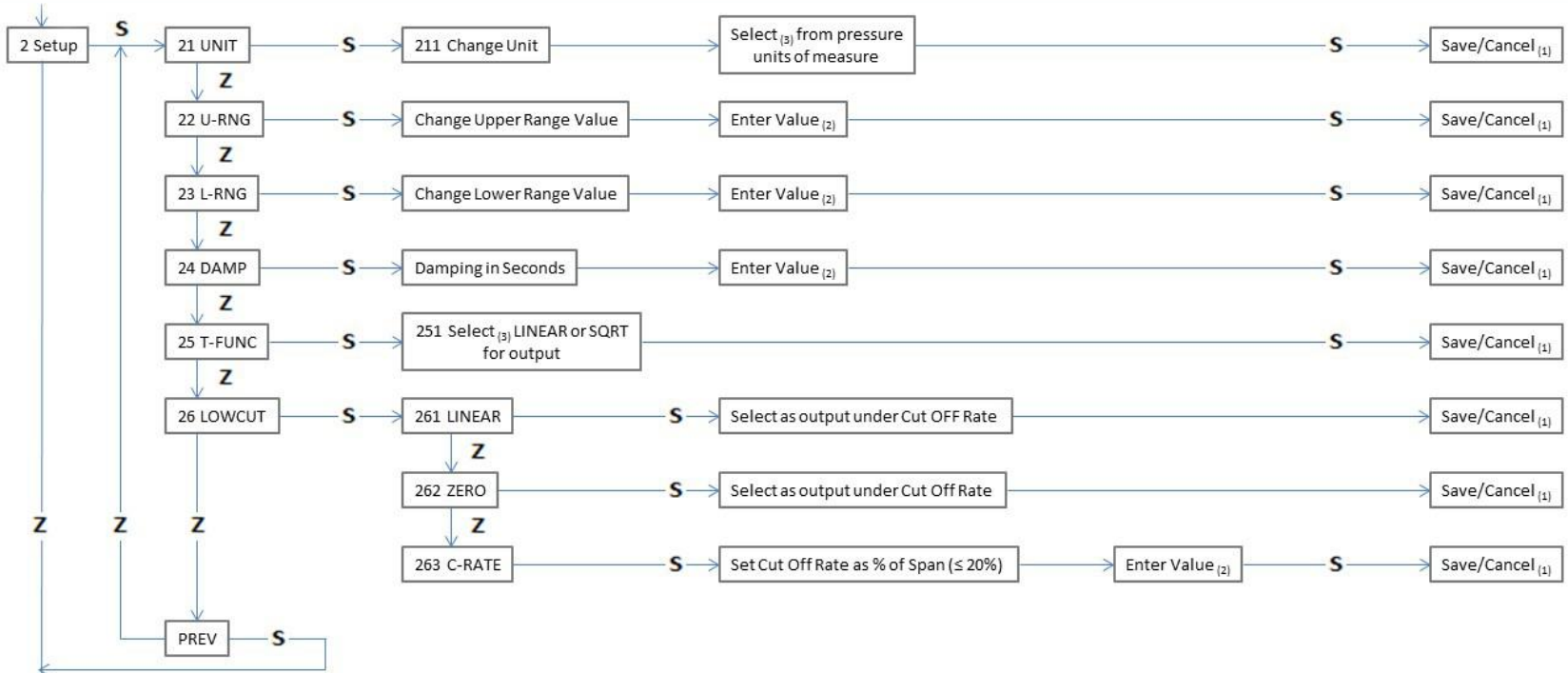

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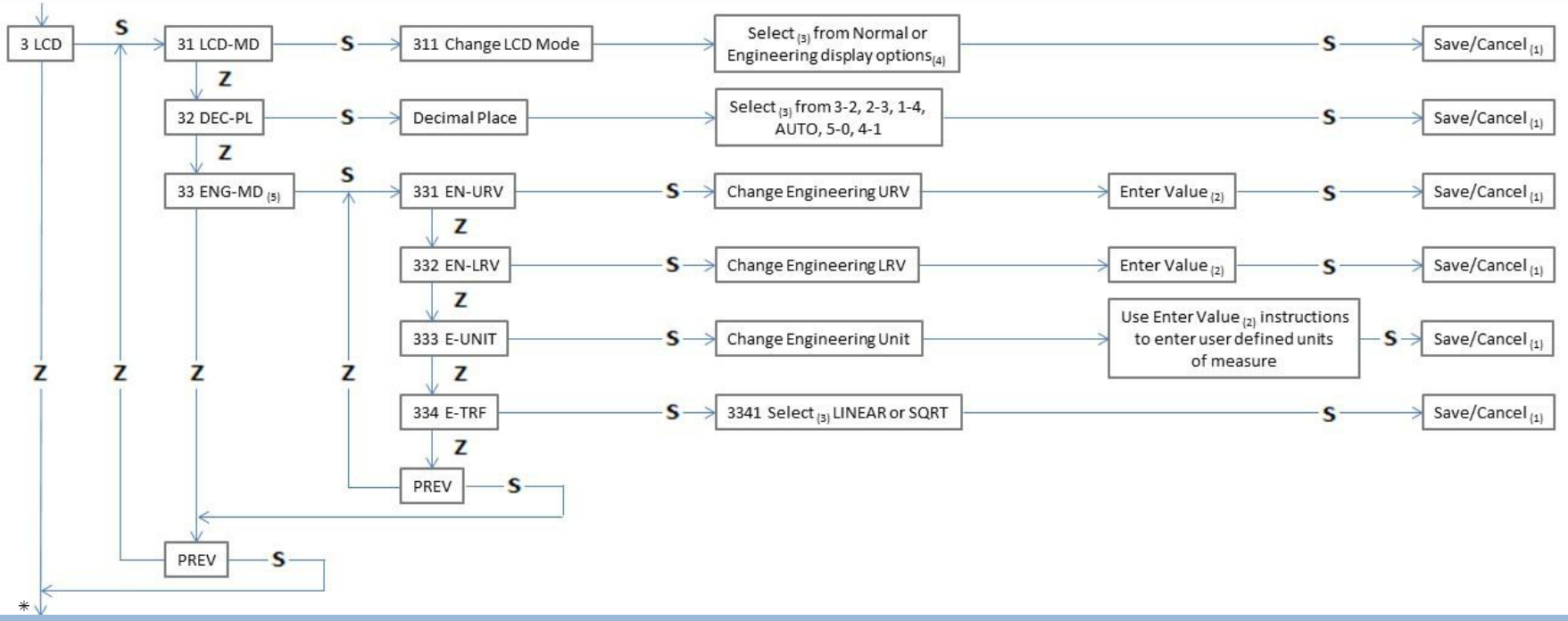

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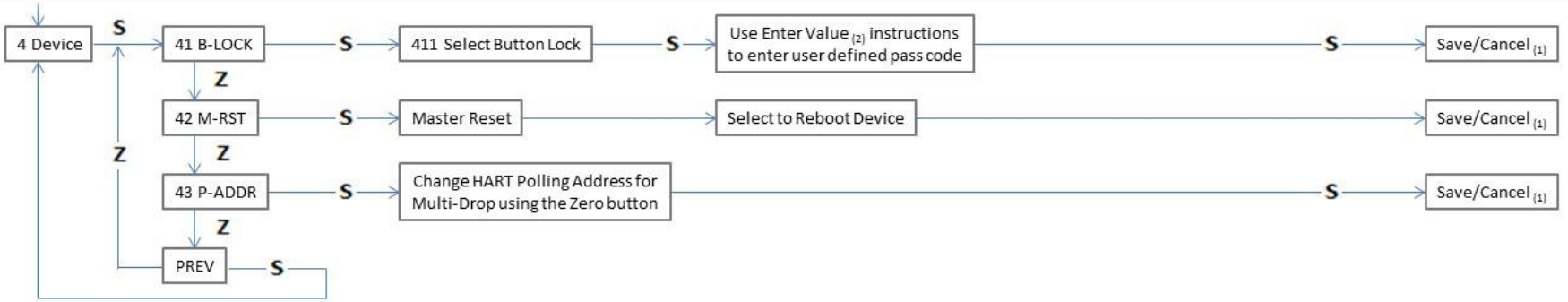


1. Save/Cancel

After making a change or selection, a flashing SAVE will appear that requires a response. The Zero button will toggle between the SAVE/CANCEL options and the Span button will select and execute the flashing action. Both cancel ling and saving return the user to the previous menu.

2. Enter Value

- The first selected digit will be flashing
- Zero button increases the value
- Span button decreases the value
- Press both buttons to save a value and move onto the next digit
- After the last digit has been entered press both buttons to save the entire value

3. Select

Use the Zero button to scroll though options when making selections.

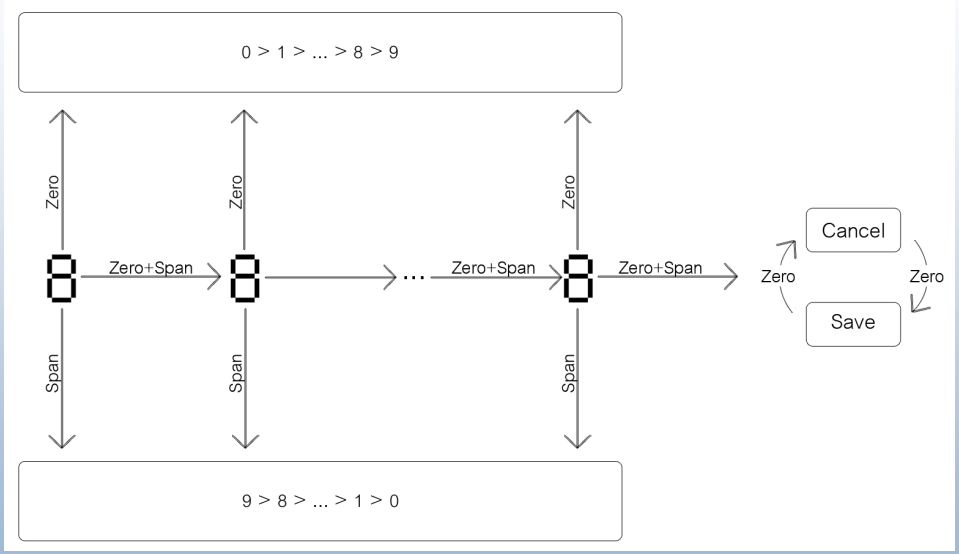
4. Display Options

- NOR_PV
- NOR_%
- NOR_mA
- ENG_RO
- ENG_PV
- NOR_RO

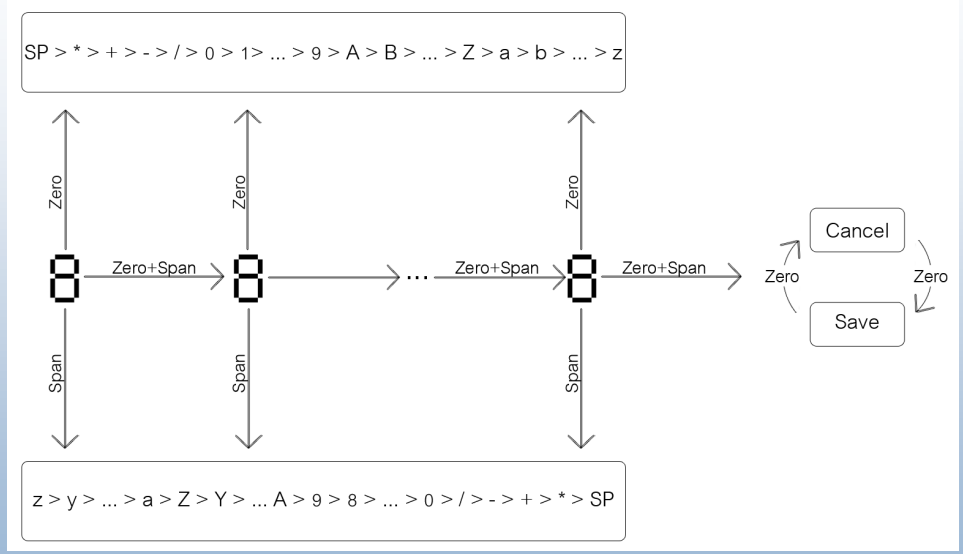
5. Once Engineering parameters have been set, engineering mode must be enabled in menu 311 for the LCD screen to show these parameters for local indication.

Sub Menus

Numeric Entry Sub Menu



Alpha - Numeric Entry Sub Menu



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