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User's Manual

FLOW INDICATOR TOTALISER

1008S-XP

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1. INTRODUCTION

Foreword

Thank you for purchasing **FLOW INDICATOR TOTALISER 1008S-XP**. This manual describes the basic functions and operation methods of 1008S-XP. Please read through this user's manual carefully before using the product.

Overview

This is a microcontroller based Indicator - Totaliser unit, with very high performance to price ratio. It is highly versatile, accurate and different from the conventional indicators.

The programming, calibration and operation of the instrument are by four simple keys and with two independent displays groups: one for flow rate and one for batch total.

Operation of the instrument is menu driven with user understandable prompts. For protecting programmed data password protection facility is provided. Integrated total, batch total and roll count are cleared by special password.

The product is made to accept current (4-20 mA, 0-20mA), Voltage (1-5Volt, 0-5 Volt) input, pulse input & Digital input. It is available as a single input version only. The instrument is providing with the five-point calibration. The unit can be calibrated in installed condition itself by front panel keys at predefined points.

The set Parameters and integrated total are stored in serial NVRAM. No battery back up is required.

Notice

The contents of this manual are subject to change without notice as a result of continuing improvements to the instrument's performance and functions.

Every effort has been made to ensure accuracy in the preparation of this manual. Should any errors or omissions come to your attention, however, please inform our Sales office or sales representative. Under no circumstances may the contents of this manual, in part or in whole, be transcribed or copied without our permission.

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Checking the Contents of the Package

Unpack the box and check the contents before using the product. If the product is different from that which you have ordered, if any parts or accessories are missing, or if the product appears to be damaged, contact your sales representative.

2. SAFETY AND WARNING PRECAUTIONS

2.1 Safety Precautions

- ⚠ Before installation or beginning of any troubleshooting procedures power to all equipment must be switched off and isolated. Units suspected of being faulty must be disconnected and removed first and brought to a properly equipped workshop for testing and repair. Component replacement and interval adjustments must be done by a Masibus authorized or trained person only.

2.2 Warning Precautions

- It is recommended that power of these units to be protected by fuses, circuit breakers or external over current rated at the minimum value possible.
- All wiring must confirm to appropriate standards of good practice and local codes and regulations. Wiring must be suitable for voltage, current, and temperature rating of the system.
- Unused control terminals should not be used as jumper points as they may be internally connected, causing damage to the unit.
- Verify the ratings of the output devices and the inputs are as specified.
- Provide Power from a single-phase instrument power supply. If there is a lot of noise in the power line, insert an insulating transformer into the primary side of the line and use a line filter on the secondary side. As counter measures against noise, do not place the primary and secondary power cables close to each other.

Note:

- **Information in this manual is subject to change without prior notice or permission due to continuous improvement.**

CAUTION:

High voltage transients may occur when switching inductive loads such as some contactors or solenoid valves. Through the internal contacts, these transients may introduce disturbances which could affect the performance of the instrument.
For this type of load it is highly recommended that a “snubber” is connected across the normally open contact of the relay switching though load. The snubber recommended consists of a series connected resistor/capacitor (typically **15nF/100 Ohms**). A snubber will also prolong the life of the relay contacts. A snubber should also be connected across the output of a trip output to prevent false triggering under line transient conditions.

3. SPECIFICATIONS

3.1 Measured input signal

NUMBER OF INPUTS	1(one) with Optional 2 & 3					
INPUT TYPE	DC Input		Current Input		*Pulse Input	Integrated/ Batch Total
	0-5 V	1-5 V	0-20 mA	4-20 mA		
MEASURING RANGE	0-30000 Range					0 - 99999999
ACCURACY	± 0.025% of full scale ± 1 Count					**0.45 %
BURN OUT DETECTION	Available for 1 to 5VDC, 4 to 20 mA, 0 to 10 KHz.					
INPUT RESISTANCE	• 250 Ohms Internal for current Input • 320K Ohms for Voltage Input					
ALLOWABE SIGNAL SOURCE RESISTANCE	DC input voltage: 1KΩ or less . Effect from allowable signal source Resistance: 0.031 % / 100Ω or less					
ALLOWABLE INPUT VOLTAGE	DC voltage: ±20V DC					
NOISE REJECTION RATIO	**Common Mode:** > 100db **Normal mode:** > 40db					
RESPONSE TIME	**Input to relay o/p:** < 1 second. **Input to Analog o/p:** < 1 second or less, 63 % (10 - 90%) (Time required for o/p to reach 63% of the maximum excursion when PV changes from 10% to 90%)					
RESOLUTION	16 bit					
POLARITY PROTECTION	Not provided					
MEMORY BACKUP	EEPROM					

Note:

- Input type is factory set.
- * Max. Pulse level<=24V , Min. pulse level > 1.0V
- ** ±(0.45% of Reading + 1 Digit)

3.2 Loop Power Supply Specification

LOOP POWER SUPPLY	24VDC ± 5% @ 50mA

3.3 Retransmission Output

NUMBER OF OUTPUT POINTS	1
OUTPUT SIGNAL	4 to 20 mA DC
ON LOAD RESISTANCE	500Ω or less
OUTPUT ACCURACY	± 0.25% of full scale +1 count
RESOLUTION	12 bits (5μA)

3.4 Contact Input (Digital input)

NUMBER OF INPUTS	4
USAGE	Input 1 : Stop Batch Input 2 : Integration total zero(Therefore Batch total and roll count will be zero) Input 3 : Start Batch Input 4 : Batch total zero

INPUT TYPE	Non- voltage contact input or transistor open collector input
INPUT CONTACT CAPACITY	12VDC,10mA or more (for non – voltage contact input)
ON/ OFF DETERMINATION	• **For non-voltage contact input** ON = contact resistance of 1KΩ or less, OFF = contact resistance of 20KΩ or more • **For transistor contact input** ON = 2V or less OFF = leak current of 100µA or less
MINIMUM RETENTION TIME FOR STATUS DETECTION	About 1 Second

3.5 Contact Output

USAGE	Flow alarm and batch
NUMBER OF RELAY CONTACT OUTPUTS	4 (2 Flow alarm relays, 2 Batch relays)
RELAY CONTACT RATING	250VAC/5Amps
RELAY CONTACT TERMINAL	3(Common, NO, NC)

3.6 Display Unit Specification

PROCESS VALUE DISPLAY	0.56” 5 digit 7- segment red display
INTEGRATED TOTAL DISPLAY	0.40” 8 digit 7- segment red display
PARAMETER DISPLAY	Same integrated total display
STATUS INDICATING LAMP	Red LED’s

3.7 Electrical Specification

POWER SUPPLY	90 to 255 VAC, 50Hz ; 24VDC**(optional)**
POWER CONSUMPTION	<10Va
WITHSTANDING VOLTAGE	• Between primary terminal and secodary terminal : 1500VAC(For 1 min) • Between primary terminal and ground terminal : 500VDC(for 1 min) • Between ground terminal and Secondary terminal : 500V AC (for 1 minute). • (**Primary terminal:** Power supply, relay output) (**Secondary terminal:** Analog input/output signal terminals, contact input terminal)

3.8 Isolation specification

ISOLATION RESISTANCE	Between power supply terminal and ground terminal: 500 VDC, 50MΩ
MEASURED INPUT TERMINAL	Isolated from other input/output terminals. Not isolated from 24Vdc supply (Transmitter power supply) and internal circuit.
24V DC SUPPLY FOR TRANSMITTER	Not isolated from the measured input terminal & internal circuit, isolated from other input/output terminals.
RETRANSMISSION OUTPUT TERMINAL	Isolated from other input/output terminals and internal circuit.
CONTACT INPUT TERMINAL	Isolated from other input/output terminals and internal circuit.
RELAY CONTACT O/P	Isolated from other input /output terminals and internal

TERMINAL (DIGITAL INPUT)	circuit.
RS-485 COMMUNICATION TERMINAL	Isolated from other input/output terminals and internal circuit.
POWER SUPPLY TERMINAL	Isolated from other input / output terminals and internal circuit.
GROUND TERMINAL	Isolated from other input/ output terminals and internal circuit.

3.9 Environmental Specification

OPERATING TEMPERATURE	0 to 55°C
STORAGE TEMPERATURE	0 to 70°C
HUMIDITY	30 to 90% RH (non-condensing)
WARM UP TIME	>10 Minute
EFFECT OF AMBIENT TEMPERATURE	For Voltage Input: ± 0.005% of FS/ °C or less For analog output: ± 0.010% of FS/ °C or less

3.10 Alarm Specification

ALARM TYPES	Flow high limit, Flow low limit
BATCHING ALARM	Pre warn and set point
SETTING RANGES FOR PROCESS VALUE ALARMS	**Flow (PV) Alarms:** Min = Zero of individual I/P type Max = Span of individual I/P type

3.11 Display Specification

PV DISPLAY	5 digit red 7 segment display for flow rate
INTEGRATED TOTAL	8 digit red 7 segment display for integrated total
PARAMETER DISPLAY	Same 8 digit red 7 segment display integrated total
STATUS DISPLAY	Red LEDs (for alarm & Batch)

3.12 Communication

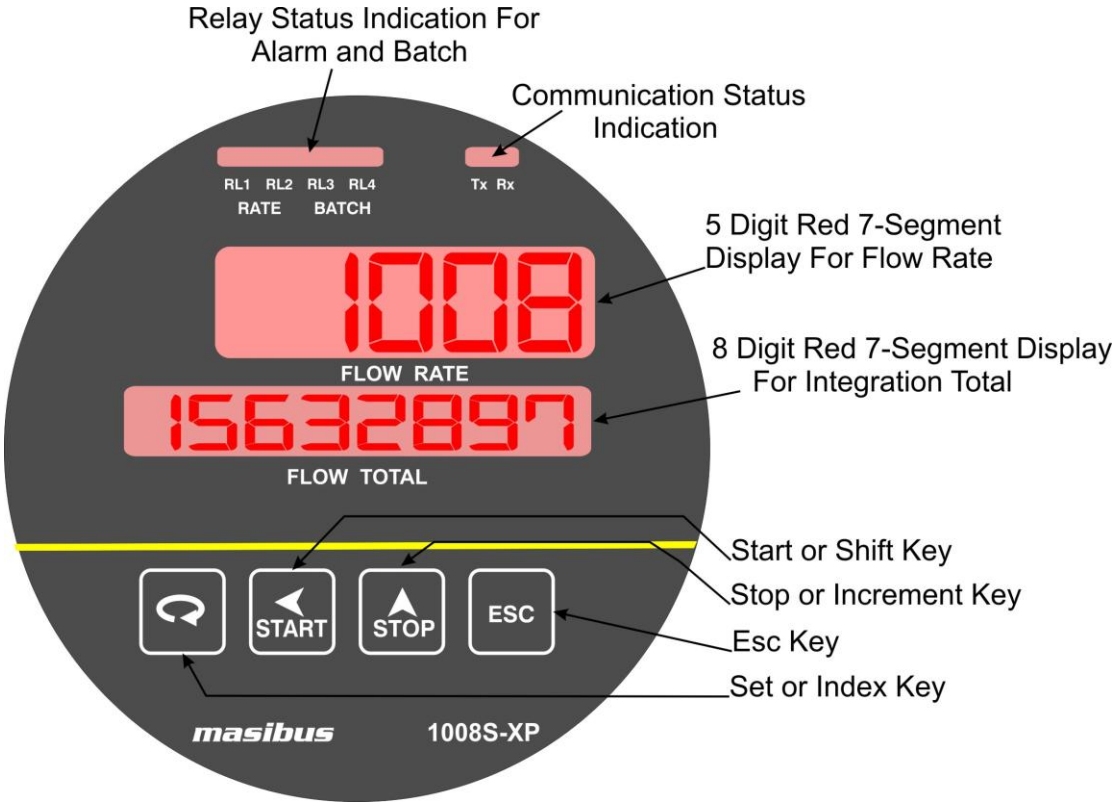
PROTOCOL	Modbus RTU serial
STANDARD	EIA RS-485
MAX. COMMUNICATION DISTANCE	1200 mtrs. (For 9600 bps RS 485)
COMMUNICATION METHOD	2 wire half duplex (RS 485)
DATA FRAME	N, 8, 1
COMMUNICATION RATE	9600, 19200 bps
MAX. CONNECTABLE CONTROLLERS/ INDICATOR	32
ADDRESS RANGE	1 to 99

3.13 Other Specification

SQUARE ROOT EXTRACTION	Applicable
DIGITAL FILTER	Applicable
TIME BASE UNIT	Second, minute, hour, day
CONVERSION FACTOR	0.00 to 99.99
FIVE POINT LINEARIZATION	Applicable
PULSE OUT PUT	Maximum pulse: 20 pulses/Sec. Excitation Voltage: <24Vdc with maximum 10 mAdc
LOW FLOW CUT OFF	Applicable

4. FRONT AND REAR PANEL DESCRIPTION

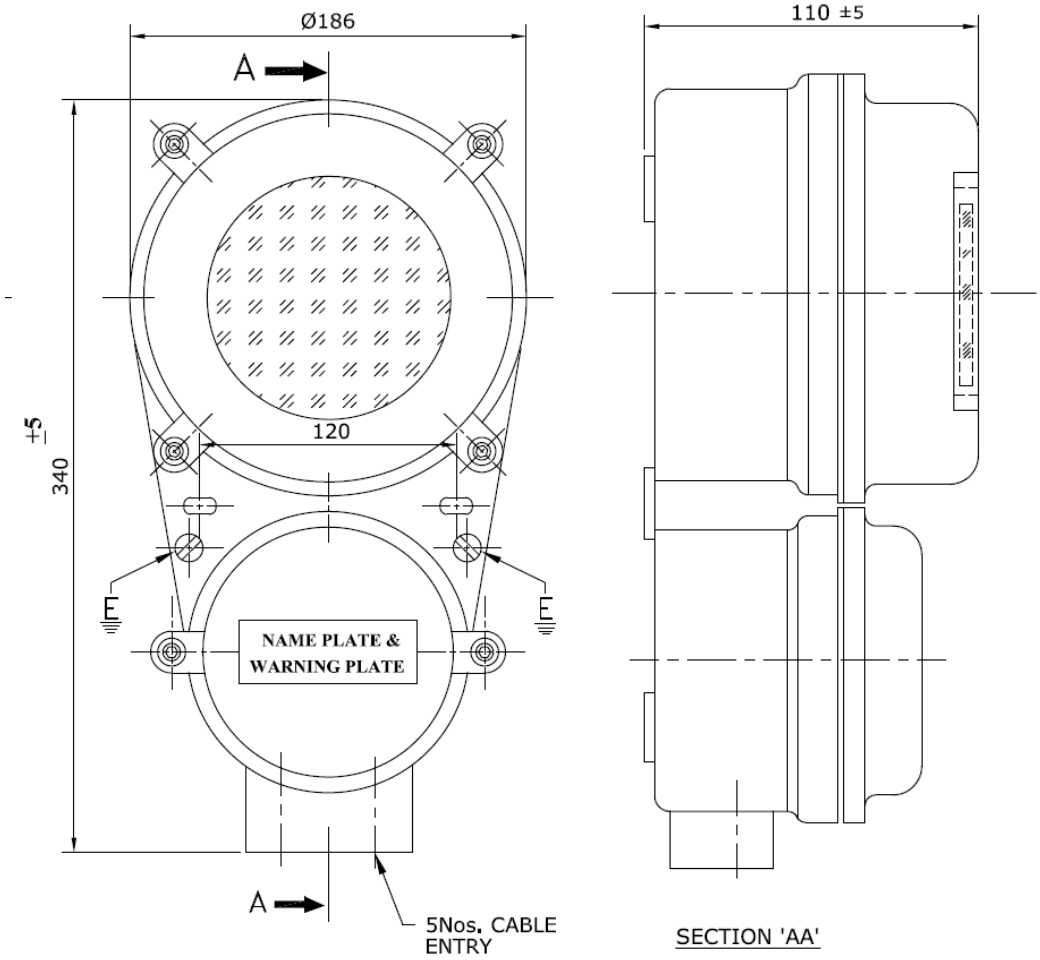
4.1 Front Panel Description



5. MECHANICAL GUIDELINES

5.1 Mounting Details

MOUNTING METHOD	Wall Mounting with the help of 4 NOS bolts of size M8
UNIT	mm
WEIGHT	Max. 6 Kg
TYPE OF PROTECTION	Ex-d AS PER IS:2148-07 (IS/IEC 60079-1 :2007)
IP PROTECTION	IP 65 AS PER IS / IEC 60529 - 2001
AREA CLASSIFICATION	GAS GROUPS IIA & IIB
MATERIAL	ALUMINIUM ALLOY LM-6
PAINT	ANTI CORRSIVE EPOXY LIGHT GREY SHADE -631 OF IS:5
HARDWARE	HIGH TENSIL ZINC PASSIVATED I STAINLESS STEEL (SS-304)
ENCLOSURE DIMENSION	186 mm (W) X 340 (±5)mm (H) X 110(±5)mm (D)
CABLE ENTRY SIZE / NO	M20 – 5 NOS
COMPONENTS	GLASS WINDOW DIA. 100 mm. 6mm THICKNESS – 1 No.



FLP Enclosure Front View and Section view

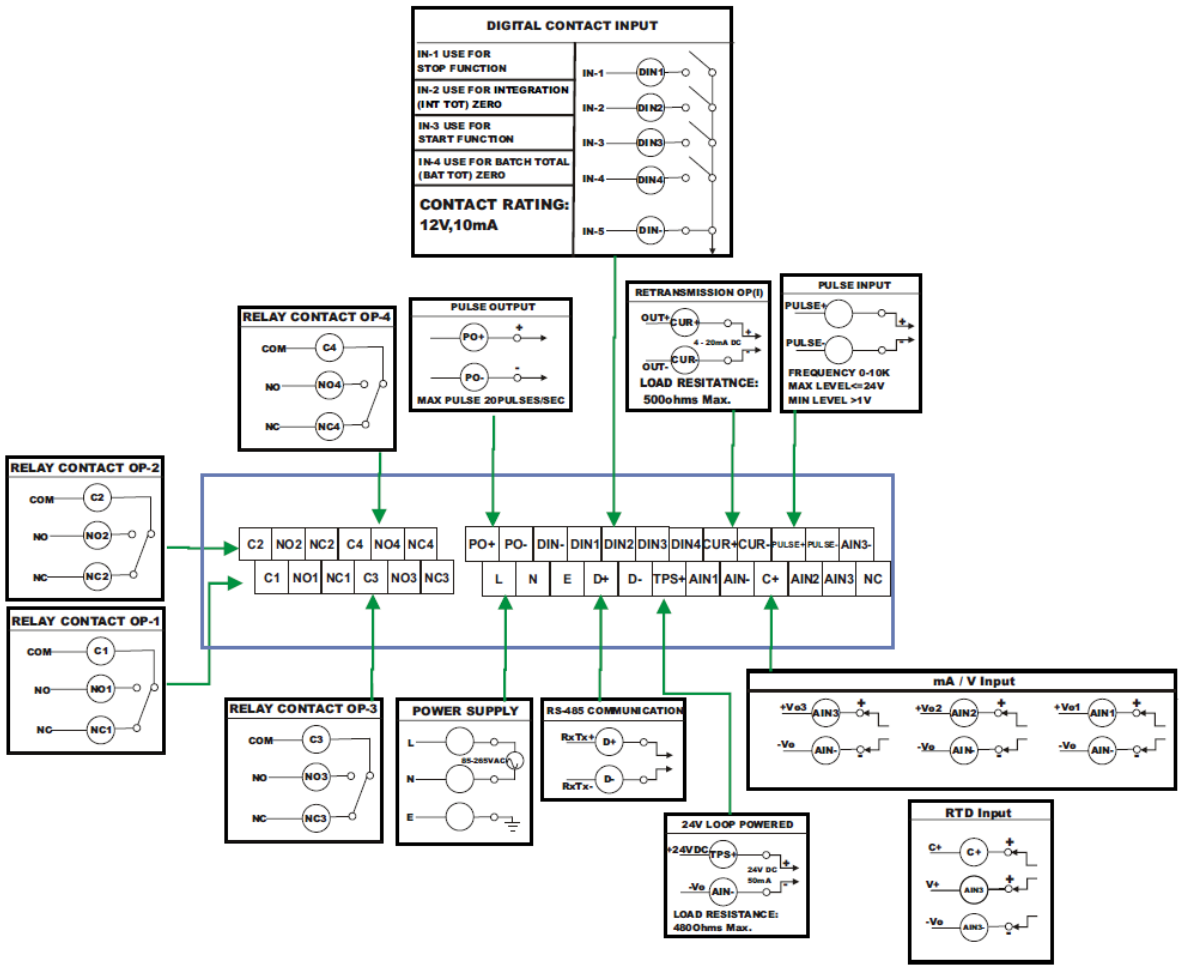
6. TERMINAL CONNECTION DETAILS

6.1 Terminal Connection Details of 1008S-XP Standard / Mass Flow

1	PHASE	MAINS 90-255 VAC	19	OUT+	CURRENT O/P: 4-20mA
2	NEUTRAL		20	OUT -	
3	EARTH		21	PULSE+	Pulse I/P (0-10 Khz)
4	RxTx+	RS-485 SERIAL	22	PULSE-	
5	RxTx -		B	RTD COMMON	
6	+24VDC (TPS)		23	COM 1	LOW ALARM RELAY
7	CH 1. I/P	ANALOG INPUT MA/Volts/ RTD	24	NO 1	
8	I/P -VE		25	NC 1	
9	RTD		26	COM 3	WP RELAY
10	CH 2. I/P		27	NO 3	
11	CH 3. I/P		28	NC 3	
A	NC		29	COM 2	HIGH ALARM RELAY
12	POUT +Ve	PULSE O/P	30	NO 2	
13	POUT -Ve		31	NC 2	
14	DIN -Ve	DIGITAL INPUT	32	COM 4	EP RELAY
15	DIN1 +Ve		33	NO 4	
16	DIN2 +Ve		34	NC 4	
17	DIN3 +Ve				
18	DIN4 +Ve				

7. WIRING DIAGRAM

7.1 Wiring Diagram of 1008S-XP Standard / Mass Flow



8. OPERATING DETAILS

The following paragraphs give detailed description of how to operate the unit.
Before using the instrument, make sure to study and understand this section.

8.1 Display Section:

The unit has two windows/groups of display:

- **Upper:**
  Five digits 7-segment, 0.56" Red LED display:
  It displays Flow rate/Process variable.
- **Lower:**
  Eight digits 7-segment 0.40" Red LED display:
  In normal mode of operation, Batch total/Integration Total is displayed. While in EDIT mode, parameters are displayed in this window.

8.2 Keyboard Section

Unit has 4 key membrane keypad organized as 4 x 1 matrix.
Following Table explain the Operation of the Keys used for configuration.

SET OR INDEX	1.It will allow user to enter in EDIT mode, when instrument is in RUN mode. 2. It will scroll menu and submenu when it is enabled 3. It will save edited data.
START OR SHIFT	1. It will enter into the submenu, when main menu is enabled and shows submenu's value. 2. It will select the digit to modify, when value is edited. 3. It will start batch, if pressed, when IT & BT are being displayed
STOP OR INCREMENT	1. It will increment value of digit selected or constant selected. 2. It will stop batch, if pressed, when BT/IT are being displayed. 3. For Pause batch press stop key for 1 second. 4. If we press stop key for 3 second then batch becomes zero.
ESCAPE	1.It will escape to previous status, with reference to its current status. Sequence of status: IT MENU SUB-MENU Parameter's Value Escape sequence When Esc key is pressed in Menu, the instrument will come in RUN Mode. If user wants to go in EDIT mode, he will have to enter the correct password again. 2. When Esc key is pressed in RUN Mode, it will directly enter in to the set point menu. This function is only applicable when type of instrument is totaliser.

8.3 Run Mode

Whenever mains is switched on to the unit,

- Engineering value proportional to the input signal will be displayed as Process variable. Decimal point is displayed at selected position.
- Last saved batch total/integration total will be displayed on the lower window.

8.3.1 Run Mode Parameters Details

No.	Name	Description	Max digits	Limits	
1	Batch Total	This parameter displays the Total flow since batch is started ('BT')	Max. 8	0 - 99999999	**For Standard Model**
2	Integrated Total	This parameter displays the Total flow since Last Reset. ('IT')	Max. 8	0 - 99999999	
3	Roll Count	This parameter displays the roll over count of the Integrated Total from '99999999' to '0' ('Rc')	Max. 4	0 - 9999	
4	P1*	Show first ch. flow	Max. 5	0 - 99999	***For Mass Flow Model**
5	P2*	Show second ch. flow	Max. 5	000.00-999.99	
6	P3*	Show third ch. flow	Max. 5	000.0-999.9	

- **Batch total:**
  This is an eight digit totalized value, displayed as Batch total. As per the selected time base, Zero and Full-scale settings, this total is updated continuously, proportional to input. When New Batch Starts or Integration total is reset this value also gets initialized to 0.

- **Integration total:**
  This is an eight digit totalized value, displayed as integrated total. As per the selected time base, Zero and Full-scale settings, this total is updated continuously, proportional to input.

- **Rollover Count (RC):**
  This is a two-digit value, displayed as the rollover that takes place when integrated total gets higher than higher limit. When the integrated total crosses high limit, this count is incremented by one.

  So the total integration will be equal to
  (Rollover Count) x (hi limit + 1) + Integrated Total (It)

  Integrated total, batch total and roll count are cleared by special password.
  On power fail detection, current value of Batch total, integrated total and rollover count are stored in NVRAM.

Mass Flow Parameter Description(Optional)

- **P1:** This is a 4-digit value of flow rate value. It is proportional to flow input. (1st channel)
- **P2:** This is a 4-digit value of Pressure. It is proportional to pressure input .(2nd channel)
- **P3:** This is a 4-digit value of Temperature. It is proportional to temperature input .(3rd channel)

Next section will describe the different Item of individual submenu.

➢ **Start & Stop function:(In Run Mode)**

☞ **START key**:

- ✓ If this key pressed batching relays (WP/EP) gets ON & BATCH TOTAL = 0.It means a new batch is started. If START key is pressed again and again, it will not start the batch until WP/EP relays gets OFF.
- ✓ Relays get OFF by two ways:

  1. STOP key
  2. BATCH TOTAL crosses the value of SETPOINT.

☞ **STOP key**:

- ✓ If user presses **STOP** key in running batch, batching relays (WP/EP) gets off. If again **STOP** key is pressed again and again only batching relays gets ON/OFF (only if BATCH TOTAL < (WP/EP) values. No new batch will be started by **STOP** key.
- ✓ When batch total value crosses the WP/EP value, relays gets OFF and batch is over.
- ✓ Again if START key is pressed then a new batch will start making BATCH TOTAL = 0. Batching relays gets ON.

8.4 Edit Mode

In this mode user can verify or modify, various parameters.
To enter the EDIT mode, correct password is to be entered.

- **Password Protection**
  When INDEX key is pressed, following prompt will be displayed at lower panel 7-segment display.

  “bAt tot” , then
  “Int tot” , then
  “roL Cnt “ , then
  “PASSUord” .
  User Can select the Parameter –any of the above prompt to display corresponding value by pressing INDEX key and then pressing “START KEY”(It is digit select key for editing the parameters),
  At the selection of password, value “0000” is displayed.

  Enter the correct password value with the help of START (digit select key) and STOP key (Incr key) and press INDEX KEY (INDEX key is used as ENTER key)

If correct password is entered & INDEX key is pressed, it will show the first mode PROG MOD. If wrong password is entered, then “0000” MSG will be displayed again at lower display window.

- **Parameter Description**

  There are total three Menu Items:

1.	Program Mode
2.	Configuration Mode
3.	Calibration Mode

  Three parameters are displayed after entering correct password.
  These parameters related with totaliser are mentioned in the following table.

8.4.1 Program mode

Programming menu provides facility to configure the relay for different function.

8.4.1.1 Program Mode parameters Details

No.	Name	Description	No of digit	Lo limit	Hi limit
1	High Alarm	Alarm conditions for flow rate.	5	0	30000
2	Low Alarm		5	0	30000
3	Pre warn Alarm	Batch control values.	6	0	999999
4	Set Point Alarm		6	0	999999
5	Lo Alarm Relay	Low alarm relay	-	Yes/No	
6	Hi Alarm Relay	High alarm Relay	-	Yes/No	
7	Pre-warn Relay	Pre-warn Relay	-	Yes/No	
8	Set Point Relay	Set Point Relay	-	Yes/No	
9	Filter number		2	1	25

- **Low alarm and high alarm:**
  Value of Low alarm should be lower than that of high alarm. If user tries to set value of Low alarm **greater** than high alarm Value, error message will be displayed. Similarly, if user set value of High alarm **lower** than low alarm Value, error message will be displayed. Alarms value cannot be set greater than Full-scale Value (FS).

- **Comparison with Zero and full-scale**:
  Low Alarm value should be greater then Zero value. If user tries to set value of Low alarm less than Zero Value, error message will be displayed.
  If (Low Alarm< Zero value), "error" message appears.

  High-Alarm value should be greater than Full-scale value. . If user tries to set value of High-alarm greater than Full-scale value, error message will be displayed.
  If (High Alarm > full-scale value), "error" message appears.

- **Set point and pre-warn:**
  Error message will be displayed if, set point value is lower than pre-warn and vice versa.

  When we press ESC key in RUN Mode we can directly enter in to Set point

  and pre-warn menu. This function is only applicable when type of instrument is totaliser.

- **Alarm ON-OFF :(submenu no 5 to 8):**
  Using these settings, user can set alarm/relay availability. If particular relay is set as 'yes', that particular alarm indication will be present over the display card and relay action will come into effect.

8.4.2 Configuration mode

Configuration mode provides facility to configure type of mode, type of input, baud rate for communication, etc. Every parameter are explained in the next section.

8.4.2.1 Configuration Mode Parameters Of 1008S-XP Standard

Sr. No.	Name	Description	No Of Digit	Lo Limit	Hi Limit
1	Batch Mode	Type Of Mode, For Flow Control	-	Normal, Counter	
2	Input Type	Type Of Input	-	0-5V, 1-5V, 0-20mA, 4-20mA , Pulse	
3	Type Of Instrument	Type Of Instrument, Which You Want To Use.	-	Indicator/ Totaliser	
4	Square Root	Mode Of Linearization	-	Yes/No	
5	Digital Input	To Be Used To Reset Batch Total, Integration total & to start batch and to stop batch		Yes/No	
6	Digital Filter	If Yes Than In Programming Mode It Will Show Filter No.	-	Yes/No	
7	Time Base	For Calculation/Display Of Flow Rate	-	Sec, Min, Hour, Day	
8	ZR1	Zero Value	5	00000	30000
9	FS1	Full Scale Value	5	00000	30000
10	No Of Batches		2	00	99
11	Batch Count	Counter Will Count How Much Batches Has Been Taken	2	00	99
12	Relay Mode	Two Type Of Mode	-	Normal, Failsafe	
13	Cut Off		3	000	100
14	DP	Decimal Point	-	0,0.1,0.01,0.001	
15	SF1	Full Scale For Segment 1	5	00000	30000
16	FL1	% Age Of Full Scale (Segment 1)	-	10,20,30,40,50,60,70,80,90,100	
17	SF2	Full Scale For Segment 2	5	00000	30000
18	FL2	% Age Of Full Scale (Segment 2)	-	10,20,30,40,50,60,70,80,90,100	
19	SF3	Full Scale For Segment 3	5	00000	30000
20	FL3	% Age Of Full Scale (Segment 3)	-	10,20,30,40,50,60,70,80,90,100	
21	SF4	Full Scale For Segment 4	5	00000	30000
22	FL4	% Age Of Full Scale (Segment 4)	-	10,20,30,40,50,60,70,80,90,100	
23	SF5	Full Scale For Segment 5	5	00000	30000
24	FL5	% Age Of Full Scale (Segment 5)	-	10,20,30,40,50,60,70,80,90,100	
25	Baud Rate		-	9600,19200	
26	Serial No		2	01 TO 99	
27	Pout		4	0001 TO 9999	
28	Default Display		-	Batch Total/Integration Total (Bat Tot/Int Tot)	
29	Pass		4	0000-9999	
30	Conversion Factor		4	00.00-99.99	
31	K-FAC	K-FACTOR (**Optional**)	8	00000.00-99999.99	
32	Clear Total	To Clear Integration /Batch Total And Roll Count, write in password mode.	4	3210	
32	Rounding		2	1,2,5,10	
33	Over Range	If Yes then integration total will be	-	Yes/No	

		Running according to process value corresponding to 20ma and if No then integration total will stop after over limit is reached.		
34	Pulse time	For averaging of input pulse.	2	0 To 20
35	Frequency Selection	For Frequency Lower than 300Hz select frequency type low.	-	Low, High
36	Pulse width	To set width of input pulse in low frequency mode.	2	0 To 20

8.4.2.2 Configuration Mode Parameters Of 1008S-XP With Mass Flow

Sr. No.	Name	Description	No Of Digit	Lo Limit	Hi Limit
1	Batch Mode	Type Of Mode, For Flow Control	-	Normal, Counter	
2	Input Type	Type Of Input	-	0-5V, 1-5V, 0-20mA, 4-20mA , Pulse	
3	No of Channel	To convert 3 channel Mass flow unit to 1 channel unit.	-	1-CH , 3-CH	
4	Type Of Instrument	Type Of Instrument, Which You Want To Use.	-	Indicator/ Totaliser	
5	Square Root	Mode Of Linearization	-	Yes/No	
6	Digital Input	To Be Used To Reset Batch Total, Integration total & to start batch and to stop batch		Yes/No	
7	Digital Filter	If Yes Than In Programming Mode It Will Show Filter No.	-	Yes/No	
8	Time Base	For Calculation/Display Of Flow Rate	-	Sec, Min, Hour, Day	
9	Chnl1 ZR	Zero Value	5	00000	99999
10	Chnl1 FS	Full Scale Value	5	00000	99999
11	No Of Batches		2	00	99
12	Batch Count	Counter Will Count How Much Batches Has Been Taken	2	00	99
13	Relay Mode	Two Type Of Mode	-	Normal, Failsafe	
14	Cut Off		3	000	100
15	DP	Decimal Point	-	0,0.1,0.01,0.001	
16	SF1	Full Scale For Channel 1	5	00000	99999
17	SF2	Full Scale For Channel 2	5	000.00	999.99
18	CH3SEL	Rtd / 4 – 20 mA	-		
19	SF3	Full Scale For Channel 3	5	0000.0	9999.9
20	Pcns	Pressure constant	5	000.00	999.99
21	tcns	Temperature constant	5	00000	99999
22	F2E	Channel #2 Linearization mode	-	Sqrt / No sqrt	
23	ConE	Channel #3 Linearization mode	-	Sqrt / No sqrt	
24	Zp	Zero setting for Channel-2	5	000.00	999.99
25	Zt	Zero setting for Channel-3	5	0000.0	9999.9
26	F1E	Channel #1 Linearization mode	-	Sqrt / No sqrt	
27	Baud Rate		-	9600,19200	
28	Serial No		2	01 TO 99	
29	Pout		4	0001 TO 9999	
30	Default Display		-	Batch Total/Integration Total (Bat Tot/Int Tot)	
31	Pass		4	0000-9999	
32	Conversion Factor		4	00.00-99.99	

33	Clear Total	To Clear Integration /Batch Total And Roll Count, write in password mode.	4	3210
34	K-FAC	K-FACTOR (**Optional**)	8	00000.00-99999.99
35	Pulse time	For averaging of input pulse.	2	0 To 20
36	Frequency Selection	For Frequency Lower than 300Hz select frequency type low.	-	Low, High
37	Pulse width	To set width of input pulse in low frequency mode.	2	0 To 20

- **Batch Mode:**
  If '*Batch Mode'* (Batch nod) is selected to 'Counter', then two parameters "*Batch count*"(Bat cnt) and "*No of Batches"* (No_of_batch) will be displayed in Configuration mode.
  If 'Batch *Mode'* is selected to 'Normal', then two parameters will not be displayed.

- **Input Type:**
  Based on requirement, user can select input type. It will be either Voltage or Current or Pulse.

- **No. of Channel: (**Applicable for 1008S With Mass Flow**)**
  Based on requirement, user can select No. of channel (1 or 3).

- **Instrument Type:**
  If "*instrument type*" is set as indicator, then **Pre warn** and **Set point** parameter will not be displayed in Program mode.

- **Square root:**
  If user selects this mode as 'yes', flow rate will calculated using square root algorithm. Alternatively linear calculation will be done.

- **Digital Input:**
  If *Digital input* is selected as 'yes' than only digital inputs will work. Four digital inputs are there.

  DIN1+: Stop Function
  DIN2+: Integration (Int tot) Zero (since IT is initialize to 0, therefore batch total/roll count are also initialized to 0)
  DIN3+: Start Function
  DIN4+: Batch total (bat tot) Zero
  DIN-: GND (12V GND)
  When any of these inputs is connected to DIN-, it will perform its specific function.

- **Digital Filter:**
  If *Digital filter* is selected as 'yes' than in programming mode user can see '*filter* no' parameter. If selected 'no' then *'filter* no' will not be displayed.

- **Time base:** Time base is used for calculation & display of flow rate.

Time base Setting details

Select	Time base	Divisor
0	Second	1
1	Minute	60 (1 x 60)
2	Hour	3600(60 x 60)
3	Day	86400(24 x 60 x 60)

Value of Integrated total for time period of t (in seconds) will be

Integration total= (flow rate * time 't' in seconds)/divisor

- **Batch counter and no of batches:**
  These parameters will be displayed only if the 'Batch mode' is selected to counter type.
- **No of batches**: Set the parameter according to the requirement. It decides how much batches are to be taken

- **Batch counter:** It will be incremented by 1 whenever a new batch is started by START key in run mode. When batch counter value becomes equals to 'no of batches' value, then it will not *start* new batch.

  Note: To reset batch counter, Enter in batch count (bat cnt) parameter in configuration mode. Press "Start" key to see its value. Now if user presses "Stop" key Batch counter value will be cleared to 0.

- **Relay-mode:**
  In '*Relay-mode'* (relay nod), if set to '*normal* 'mode then alarm relays and LEDs will work according to alarm values.
  i.e. Relays on, LEDs on
  Relays off, LEDs off

  But if set to '*Failsafe'* Mode then alarm relays and LEDs will operate reversibly.
  i.e. Relays on, LEDs off
  Relays off, LEDs on

- **Cut off: (Low flow cut-off)**
  Cut off could be set to 0000 to 0100.
  Cut off will display the % value.

  Cutoff value = Cutoff parameter (in %)*Full scale value
  If full scale value is 10000 and cut off is 5%
  Then cut off value will be calculated as
  = (5/100)*10000 = 500.
  So, if the displayed flow rate (displayed at upper window) is less then 500, it will not be added in integration.

- **Decimal Point Selection:**
  Decimal point selection will be given from the configuration mode.

Select	Decimal position
0	No decimal
0.1	One decimal
0.01	Two decimals
0.001	Three decimals

- **Five point Linearization:**
  This instrument has feature of five-point linearization. User can define up-to five different segments of the full-scale input (in percentage) with Full-scale engineering value for each segment. We have to program the value of flow rate at different inputs.

  Here we are defining five scale factors for the current input 4 mA to 20mA. Let's have one example to understand this concept.

  For Example:
  ZR = 00000 and FS = 10000, Let us assume the Unit is current input mode.

- **Five Point Linearization**

No.	Flow rate	Value	Parameter	Display Value	Input Current mA
1	FL1	10%	SF1	2000	5.6
2	FL2	50%	SF2	4000	12.0
3	FL3	60%	SF3	4500	13.6
4	FL4	80%	SF4	7500	16.8
5	FL5	100%	SF5	10000	20

In above example
Flow rate on Display varies between:
- 0 – 2000 for input of 0 % – 10%
- 2000 – 4000 for input of 10% – 50%
- 4000 – 4500 for input of 50 % – 60%
- 4500 – 7500for input of 60 % – 80%
- 7500– 10000 for input of 80 % – 100%

If user wants a flow to be linear throughout the span than configure this parameter as:
SF1 = FS1, FL1 = 100 %.

User is not required to initialize SF2, SF3, SF4, SF5, FL2, FL3, FL4 and FL5.

- **Pout Selection:**
Pout value decides the pulse Output.
There will be a pulse at pulse output pins (PIN NO.9, PIN NO 10), whenever a integrated total value is greater than by POUT by previous IT value [where last pulse is registered], it will be added to the integration total value.
i.e.
Current IT value ≥ (Pout + previous IT value).

Example:
1. If Flow rate = 1000, Pout = 1000, Time base = second,
Every second, 1000 is added in integration total. Since pout is 1000, 1 times of pout value is added to integration-total every sec. Therefore we will have 1 pulse/sec.

2. Flow rate = 1000, Pout = 100,

Time base = second,
Every second, 1000 is added in integration total. Since pout is 100, 10 times of pout value is added to integration-total every sec. Therefore we will have 10pulses/sec. It could not be observed on CRO. For this use a pulse counters for testing.
3. Flow rate = 600, Pout = 10,

Time base = min,
Every second, 10(600/60) is added in integration total. Since pout is 10, 1 times of pout value is added to integration-total every sec. Therefore we will have 1pulse/sec or 60 pulses/min.

4. Flow rate = 600, Pout = 100,
Time base = min,
Every second, 10(600/60) is added in integration total. Since pout is 100, 1/10 times of pout value is added to integration-
Total every sec. Therefore we will have 1 pulse/10 sec or 6 pulses/min.

- **Default Display:** This parameter will select the parameter to be displayed in run mode.

If Int tot / Bat tot is selected then in run mode 'Integration total '/ 'Batch total 'will be displayed on lower panel accordingly.

If "*instrument type*" parameter is set as indicator, then this parameter will not be displayed in Configuration mode and Integration total will be displayed in run mode.

- **Password:** A 'PASS' parameter is added in configuration mode.
  But it will always show '0000'.User has to remember the password .If user needs to change password, then go in 'pass' parameter, enter the required password and press Enter key.
  For eg: If user enters '1234' in '***pass'*** parameter, then, to enter in EDIT mode, a password '1234'is to be entered.

- **Conversion Factor (Conv-F):**
  It is a constant, which simply divides process value by the factor set. Usually, it is set as 1.00

  For example, if process value is 100 liters/minute & conversion factor is 1 then it will simply integrate process value as it is.
  If we change conversion factor = 2, then it will divide process value by that factor i.e. 100/2 = 50 & it integrates that value (in both integral and batch total) but on the display it shows original process value.

- **K Factor (K-FA): (OPTIONAL)**
  Formula for K-FACTOR:
  FLOW: - [(Pulse count per second *Time base)/ (K-FACT)]
  Where, Time Base value =

Select	Time base	Divisor
0	Second	1
1	Minute	60 (1 x 60)
2	Hour	3600(60 x 60)
3	Day	86400(24 x 60 x 60)

  For example: - if we want to set FLOW value equals to 250.00 and remaining parameter at: -

  - For Flow per minute:

    Time base = 2 = 60
    Pulse count = 10000
    Then FLOW = [(10000 * 60)/2400]
    FLOW = 250 per minute.

  - For Flow per Hour:
    Time base = 3 = 3600
    Pulse count = 10000
    Then FLOW = [(10000 * 3600)/144000]
    FLOW = 250 per Hour.

Note: - K-factor works linearly at 60/minute.
For Retransmission Output, "F.S" parameter is provided.

- **Clear total**:
  Parameter to reset IT, BT, and RC.
  If user enters the correct password, IT, BT and Roll over count gets cleared (initialized to Zero). And 'cleared' message is displayed on the lower window of display. By pressing ESC key, menu goes back to the clear total. If wrong password is entered, 'cleared' message will not appear.

- **Rounding**:
  This parameter will round the figure of flow rate. It will increase/decrease the flow rate in multiple of rounding value. E.g. if rounding = 5 selected then flow rate will increase/decrease by 5, 10, 15….

- **Over Range**:
  If this parameter is yes then integration total will be adding according to process value corresponding to 20ma and if this parameter is no then integration total will stop adding after over limit is reached.

- **Pulse Time**:
  This parameter is used for averaging of input pulse in low frequency mode (Frequency < 300 Hz).

- **Frequency Selection**:
  For frequency below 300Hz select frequency type low.

- **Pulse Width**:
  This parameter is used for set the input pulse width in low frequency mode (Frequency < 300 Hz).

8.4.3 Calibration mode

8.4.3.1 Calibration Mode Parameters Details This menu allows user to perform calibration of analog input & output.

No	Setting	Description	No of digit	Lo limit	Hi limit
1	Cal Zero	Zero Cal. Count	4		
2	Cal Span	Span Cal. Count	5		
3	Out Zero	Zero Cal. Count for Output	4	0000	4095
4	Out Span	Span Cal Count for Output	5	0000	4095
5	Default Out	If user selects ‘yes’, then Out zero = 800 and Out span (4000) is selected.	Yes/No		

- **INDICATION:**
  For conversion in engineering value, the input is scaled between Zero and Full scale set values as per following formula (for linear mode):
  For any type of input:

  $$\text{Indication (Engineering Value)} = \frac{X}{(CALS-CALZ)} + \text{Zero}$$

  X = (Input signal - CALZ) * (Full scale - Zero)
  CALZ = Value of input applied during zero calibration
  CALS = Value of input applied during Span calibration

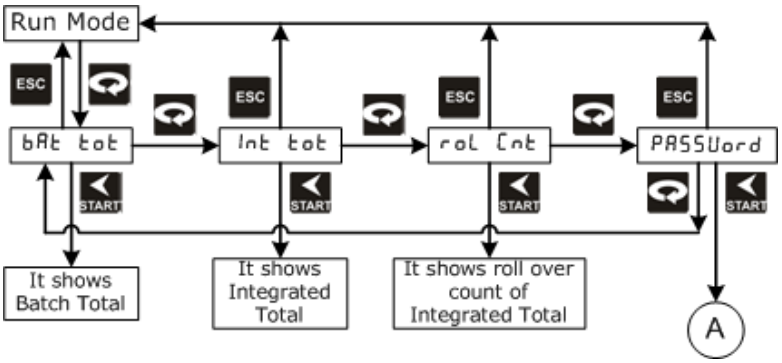
  If input signal is outside the set Zero and Full-scale limit, all the four digits of the Process variable starts flashing. Only when input signal comes back into the allowed range, display becomes steady.

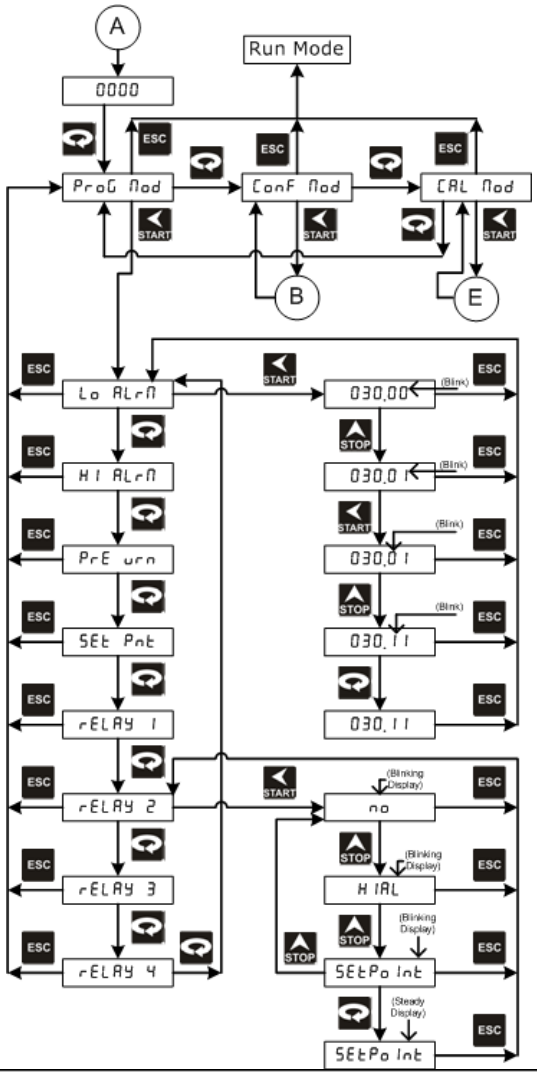
NOTE:
1). When no input is connected to the unit, it will display “open” message in pulse mode, current mode and voltage mode. (Pulse input 0 to 10KHz, 4-20mA, 1-5V)
2). When input is out of the range the display will blink.

8.5 Parameter Flow

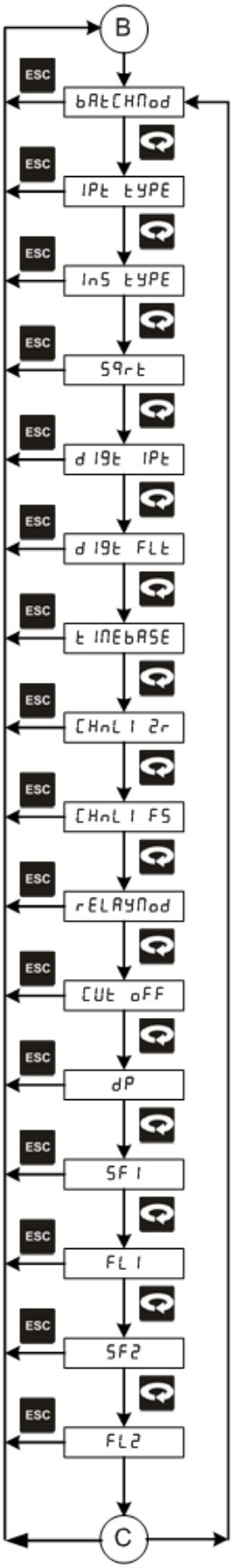
8.5.1 Parameter Flow Of 1008S-XP Standard

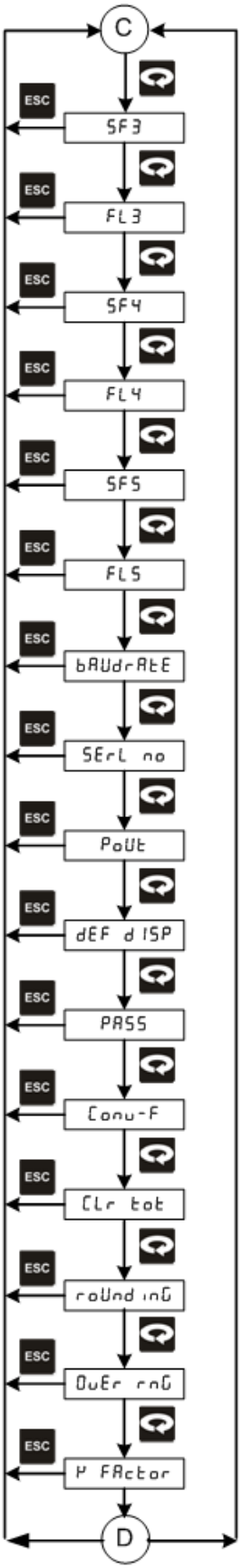
How to operate menu is shown below in the form of flow diagram

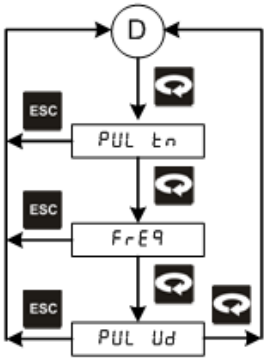


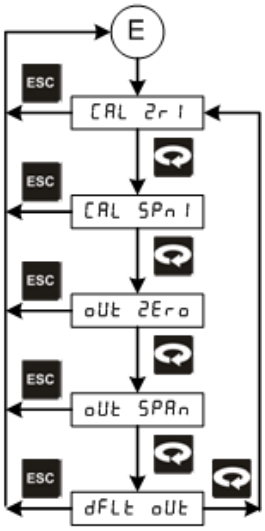


Note : 1) For all settings which have text as setting parameter, kindly refer rELAY 2 setting
2) For all settings which have number as setting parameter, kindly refer Lo ALrn setting


B
ESC
bAtCHMod
IPt tYPE
InS tYPE
SQrt
d 19t IPt
d 19t FLt
t IMEbASE
CHnL 1 2r
CHnL 1 FS
rELAYMod
CUt oFF
dP
SF 1
FL 1
SF2
FL2
C

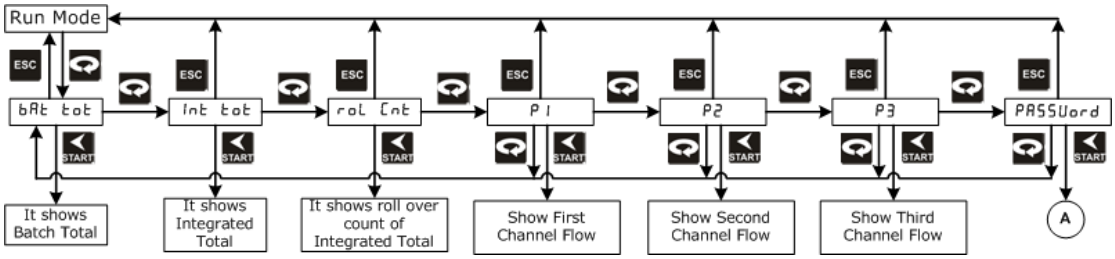

C
ESC
SF3
FL3
SF4
FL4
SFS
FLS
bAUdrAtE
SErL no
PoUt
dEF dISP
PASS
Conu-F
CLr tot
roUnd inG
OuEr rnG
F FActor
D

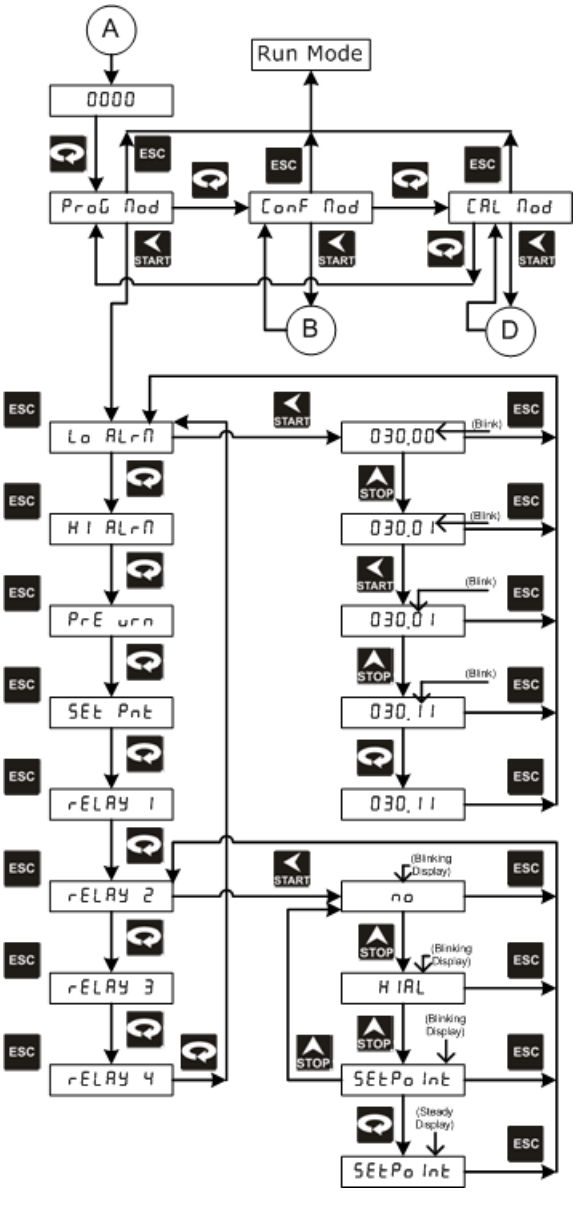

D
ESC
PUL tn
FrE9
PUL Ud


E
ESC
CAL 2r 1
CAL SPn 1
oUt 2Ero
oUt SPAn
dFLt oUt

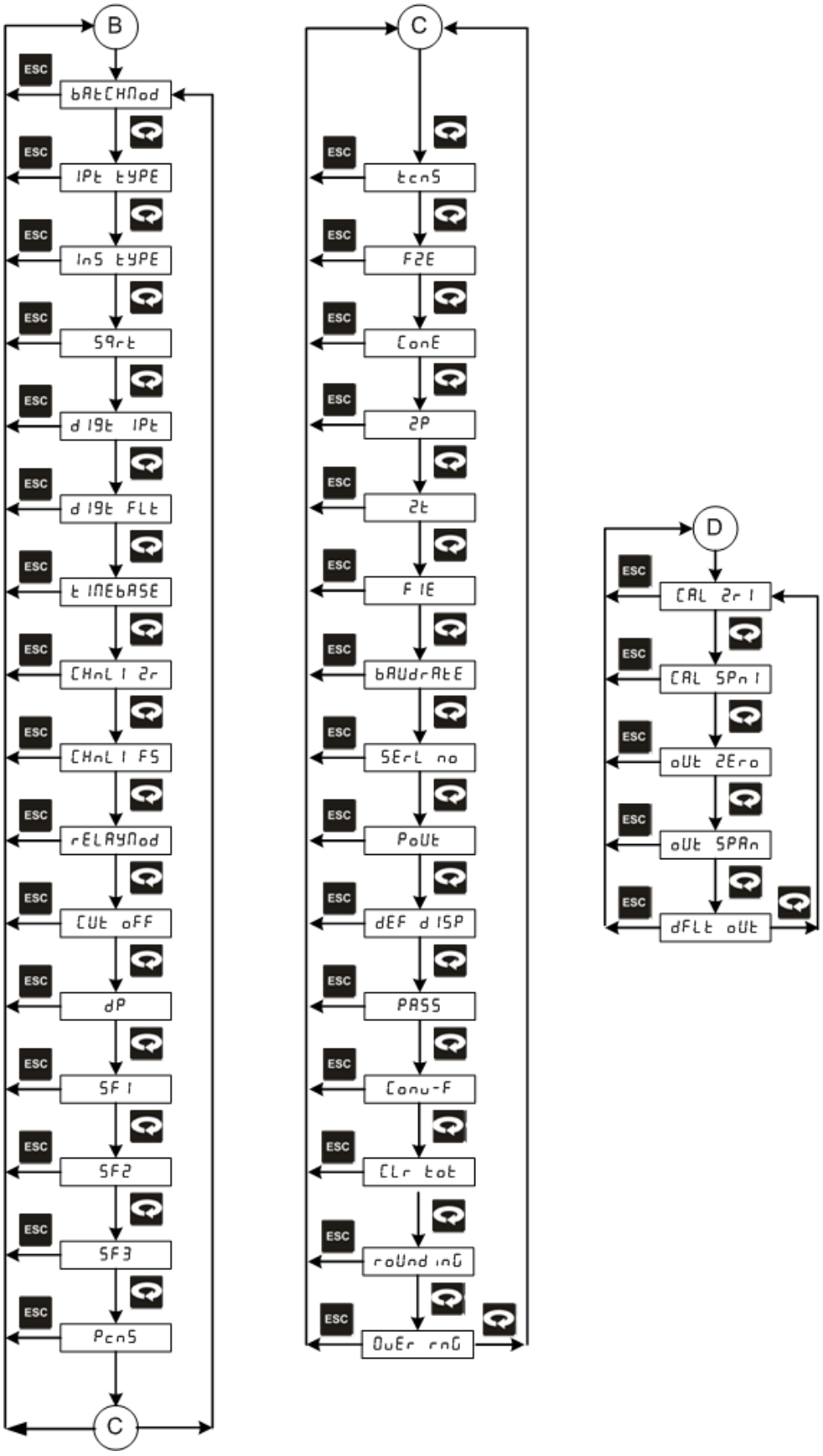
8.5.2 Parameter Flow Of 1008S-XP With Mass Flow

How to operate menu is shown below in the form of flow diagram





Note : 1) For all settings which have text as setting parameter, kindly refer rELAY 2 setting
2) For all settings which have number as setting parameter, kindly refer Lo ALrn setting


B
ESC
bAtCHNod
IPt tYPE
InS tYPE
SArt
d 19t IPt
d 19t FLt
t INEbASE
CHnL 1 2r
CHnL 1 FS
rELAYNod
CUt oFF
dP
SF 1
SF2
SF3
PcnS
C
C
tcnS
F2E
ConE
2P
2t
F IE
bAUdrAtE
SErL no
PoUt
dEF d ISP
PASS
Conu-F
Clr tot
rouNd inG
OuEr rnG
D
CAL 2r 1
CAL SPn 1
oUt 2Ero
oUt SPAn
dFLt oUt

9. CALIBRATION PROCEDURE

9.1 Input Calibration

As explained earlier, One can do calibration thro' the keyboard itself, Zero and Full-scale values are stored in NVRAM.

1. Switch on the instrument and allow 15 minutes of warm up time before starting calibration.
2. Take a standard source. Set it's output at desired Zero value. Apply output of the source to the input terminals of connector pin according to input select.
3. In calibration mode, Press shift /start key to calibrate zero. This will show prompt - "CAL Zr1". To enter in "CAL Zr1" mode press shift /start key
4. Lower window displays a count. This is raw count proportional to analog input. Wait till counts are stable, save this count by pressing 'Index' key twice.
5. Press ESC key to come out from "CAL Zr1".
6. Now apply input equal to Full scale/Span (CALS):
7. Set output of the source at desired full-scale value. Apply output of the source to the input terminals
8. Press index key to go to calibration span. This will show prompt -"CAL SPn1". To enter in "CAL SPn1" mode press shift /start key.
9. Lower window displays raw counts count proportional to analog input.
10. Allow the reading to settle and Press 'Index' Key twice to save the count.
11. This reading will be stored as Span Now the instrument is calibrated.
12. Press ESC key to come out from "CAL SPn1".

9.2 Output Calibration

For output calibration, measuring instrument should be at least 3 times accurate.

9.2.1 Out zero and Out span

These two parameter are used for the calibration of re-transmission output. Users have to change the value of out zero and out span for the zero setting (for 4mA) and span setting (20 mA) respectively for re-transmission output.

1. In calibration mode, go to out zero calibration mode by pressing index key. This will show "oUT ZEro" prompt. To enter in "oUT ZEro" mode press shift /start key
2. Lower window displays a count. Using shift /start or inc/stop key to set reading (zero output) of connected ampere meter at output, exactly at 4.000mA and press index key to store the calibration value.
3. Press ESC key to come out from "oUT Zero".
4. Press index key to go to out span calibration. This will show prompt- "oUT SPAn". To enter in "oUT SPAn" mode press shift /start key
5. Lower window displays a count. Using shift /start or inc/stop key to set reading (span output) of connected ampere meter at output, exactly at 20.000mA and press index key to store the calibration value.
6. Press ESC key to come out from "oUT SPan".
   This reading will be stored. Now the instrument is calibrated.

If user enters values greater than 4095 "error" message will appear.
It user enters **out zero value > out span** value then also "error" message will appear.

Accuracy of retransmission O/p - 0.25% of Full span.

10. COMMUNICATION GUIDELINES

10.1 Introduction

The unit can be connected in RS-485 communication data link either in multi drop or repeat mode. Each unit must have unique Serial Number. Entire range of addresses (1 to 247) may be used. Before starting any communication, choose a baud rate compatible to the host computer. The serial protocol used is MODBUS RTU.

10.2 Function Code for Modbus

CODE	NAME	Function
01	Read coil status	Use to read Relay and Digital output status
03	Read Holding registers	Use to read PV, Control, RSP output etc
05	Write input registers	Use to write digital parameter value.
06	Preset Single register	Use to write programmable register

The error checking field contains a 16-bit value implemented as two eight-bit bytes. The error check value is the result of a Cyclical Redundancy Check (CRC) calculation performed on the message contents.

Note:

- **For Analog Read**:
  FLx (FL1, FL2, FL3, FL4, and FL5) consists of 9 selectable values from 10 to 100.
  For 10 it will read…. 0
  For 20 it will read…. 1
  If FL1 =100, Hex address 0x0024 will show 9.

- **For Digital Read/Write**: Cmd Action = 1;
  Reg. Address = 0x0001 to 0x0004.
  1. Relays will read 0- OFF (relay) 1 – ON
  2. For start /stop function
     Cmd Action = 5
     Reg Address = 0x0005
     For Start – write 1
     For Stop – write 0

10.3 Modbus RTU protocol addresses for RS 485 Communication

10.3.1 Addresses Of 1008S-XP Standard

Sr. No.	Reg. No.	Parameter Name	Length in bytes (Words)	Read/Write
1	40001	High alarm	2(1)	R/W
2	40002	Low alarm	2(1)	R/W
3	40003	Set point	2(1)	R/W
4	40004	Setpoint+2	2(1)	R/W
5	40005	Pre-warn	2(1)	R/W
6	40006	Prewarn+2	2(1)	R/W
7	40007	Conv-Factor	2(1)	R/W (00.00-99.99)
8	40008	Filter no	2(1)	R/W (1 to 25)
9	40009	Batch mode	2(1)	R/W (0 for Normal, 1 for Counter)

10	40010	Type of input	2(1)	R/W (0 for 0-5V, 1 for 1-5V, 2 for 0-20mA, 3 for 4-20mA, 4 for pulse)
11	40011	Type of Inst	2(1)	R/W (0 for indicator, 1 for Totaliser)
12	40012	Sqrt mode	2(1)	R/W (0 for Yes, 1 for No)
13	40013	Digital input	2(1)	R/W (0 for Yes, 1 for No)
14	40014	Digital filter	2(1)	R/W (0 for Yes, 1 for No)
15	40015	Time base	2(1)	R/W (0 for SECOND, 1 for MINUTE, 2 for HOUR, 3 for DAY)
16	40016	ZR	2(1)	R/W
17	40017	FS	2(1)	R/W
18	40018	No of batches	2(1)	R/W
19	40019	Batch counter	2(1)	Read only
20	40020	Relay mode	2(1)	R/W (0 for normal, 1 for failsafe)
21	40021	Cut-off	2(1)	R/W (000.0 to 100.0)
22	40022	Dp	2(1)	R/W (0 for 0, 1 for 0.1, 2 for 0.01, 3 for 0.001)
23	40023	SF1	2(1)	R/W (0-20000)
24	40024	FL1	2(1)	R/W (0-9)*
25	40025	SF2	2(1)	R/W (0-20000)
26	40026	FL2	2(1)	R/W (0-9)*
27	40027	SF3	2(1)	R/W (0-20000)
28	40028	FL3	2(1)	R/W (0-9)*
29	40029	SF4	2(1)	R/W (0-20000)
30	40030	FL4	2(1)	R/W (0-9)*
31	40031	SF5	2(1)	R/W (0-20000)
32	40032	FL5	2(1)	R (9)
33	40033	Baud rate	2(1)	R/W (0 for 9600, 1 for 19200)
34	40034	Serial no	2(1)	R/W (01 - 99)
35	40035	Pout	2(1)	R/W (0000-9999)
36	40036	Default display	2(1)	R/W (0 for batch total, 1 for integration total)
37	40037	Out zero	2(1)	R/W (0000-4095)
38	40038	Out span	2(1)	R/W (0000-4095)
39	40039	Default out	2(1)	R/W (0 for yes, 1 for no)
40	40040	Int total	2(1)	Read only
41	40041	Int total+2	2(1)	Read only
42	40042	Batch total	2(1)	Read only
43	40043	Batch total+2	2(1)	Read only
44	40044	Roll count	2(1)	Read only
45	40045	Flow rate	2(1)	Read only
46	40046	Rounding	2(1)	R/W
47	40047	Over Range	2(1)	R/W(0 for Yes, 1 for No)
48	40048	K-factor	2(1)	R/W
49	40049	K-factor + 2	2(1)	R/W
50	40050	Pulse Time	2(1)	R/W (00-20)
51	40051	Frequency Selection	2(1)	R/W (0 for Low Freq.(< 300Hz), 1 for High Freq.)

52	40052	Pulse Width	2(1)	R/W (00-50)
53	40053	Setpoint Type	2(1)	R/W 0 - Absolute, 1 - Deviation
54	1	Low alarm Relay Status	1	R, digital
55	2	High alarm Relay Status	1	R, digital
56	3	Set point Relay Status	1	R, digital
57	4	Pre warm Point Relay Status	1	R, digital
58	5	Start/Pause batch		W(0 for Pause, 1 for Start)
59	6	To Clear Batch Total	1	W, digital(1 for Clear)
60	7	To Clear Integration Total and Batch Total	1	W, digital(1 for Clear)

* **For FL1 to FL4**:

To write these parameters:
0 for 10, 5 for 60,
1 for 20, 6 for 70,
2 for 30, 7 for 80,
3 for 40, 8 for 90,
4 for 50, 9 for 100

10.3.2 Addresses Of 1008S-XP With Mass Flow

Sr. No.	Reg. No.	Parameter Name	Length in bytes (Words)	Read/Write
1	40001	High alarm	2(1)	R/W
2	40002	High alarm + 2	2(1)	R/W
3	40003	Low alarm	2(1)	R/W
4	40004	Low alarm + 2	2(1)	R/W
5	40005	Set point	2(1)	R/W
6	40006	Setpoint+2	2(1)	R/W
7	40007	Pre-warn	2(1)	R/W
8	40008	Prewarn+2	2(1)	R/W
9	40009	Conv-Factor	2(1)	R/W (00.00-99.99)
10	40010	Filter no	2(1)	R/W (1 to 25)
11	40011	Batch mode	2(1)	R/W (0 for Normal, 1 for Counter)
12	40012	Type of input	2(1)	R/W (0 for 0-5V, 1 for 1-5V, 2 for 0-20mA, 3 for 4-20mA, 4 for pulse)
13	40013	Type of Inst	2(1)	R/W (0 for indicator, 1 for Totaliser)
14	40014	Sqrt mode	2(1)	R/W (0 for Yes, 1 for No)
15	40015	Digital input	2(1)	R/W (0 for Yes, 1 for No)
16	40016	Digital filter	2(1)	R/W (0 for Yes, 1 for No)
17	40017	Time base	2(1)	R/W (0 for SECOND, 1 for MINUTE, 2 for HOUR, 3 for DAY)

18	40018	ZR	2(1)	R/W
19	40019	ZR + 2	2(1)	R/W
20	40020	FS	2(1)	R/W
21	40021	FS + 2	2(1)	R/W
22	40022	No of batches	2(1)	R/W
23	40023	Batch counter	2(1)	Read only
24	40024	Relay mode	2(1)	R/W (0 for normal, 1 for failsafe)
25	40025	Cut-off	2(1)	R/W (000.0 to 100.0)
26	40026	Dp	2(1)	R/W (0 for 0, 1 for 0.1, 2 for 0.01, 3 for 0.001)
27	40027	SF1	2(1)	R/W
28	40028	SF1 + 2	2(1)	R/W
29	40029	SF2	2(1)	R/W
30	40030	SF2 + 2	2(1)	R/W
31	40031	SF3	2(1)	R/W
32	40032	SF3 + 2	2(1)	R/W
33	40033	PCNS	2(1)	R/W
34	40034	PCNS + 2	2(1)	R/W
35	40035	TCSN	2(1)	R/W
36	40036	TCSN + 2	2(1)	R/W
37	40037	F2E	2(1)	R/W (0-sq,1-nosq)
38	40038	CONE	2(1)	R/W (0-sq,1-nosq)
39	40039	NOT USE	-	-
40	40040	ZT	2(1)	R/W (0-9999)
41	40041	F1E	2(1)	R/W (0-sq,1-nosq)
42	40042	Baud rate	2(1)	R/W (0 for 9600, 1 for 19200)
43	40043	Serial no	2(1)	R/W (01 - 99)
44	40044	Pout	2(1)	R/W (0000-9999)
45	40045	Default display	2(1)	R/W (0 for batch total, 1 for integration total)
46	40046	Out zero	2(1)	R/W (0000-4095)
47	40047	Out span	2(1)	R/W (0000-4095)
48	40048	Default out	2(1)	R/W (0 for yes, 1 for no)
49	40049	Int total	2(1)	Read only
50	40050	Int total+2	2(1)	Read only
51	40051	Batch total	2(1)	Read only
52	40052	Batch total+2	2(1)	Read only
53	40053	Roll count	2(1)	Read only
54	40054	Mass Flow	2(1)	Read only
55	40055	Mass Flow+2	2(1)	Read only
56	40056	NOT USE	2(1)	Read only
57	40057	NOT USE	2(1)	Read only
58	40058	NOT USE	2(1)	Read only
59	40059	Flow Rate dp	2(1)	Read only
60	40060	K-factor	2(1)	R/W
61	40061	K-factor +2	2(1)	R/W
62	40062	Pulse Time	2(1)	R/W (00-20)

63	40063	Frequency Selection	2(1)	R/W (0 for Low Freq.(< 300Hz), 1 for High Freq.)
64	40064	Pulse Width	2(1)	R/W (00-50)
65	40065	No Of Channel	2(1)	3- CH / 1- CH
66	40066	CH 3 SEL	2(1)	Rtd / 4 – 20 mA
67	40067	ZP +	2(1)	R/W (0-999999)
68	40068	ZP + 2	2(1)	R/W (0-999999)
69	40069	P1	2(1)	Read only
70	40070	P1 + 2	2(1)	Read only
71	40071	P2	2(1)	Read only
72	40072	P2 + 2	2(1)	Read only
73	40073	P3	2(1)	Read only
74	40074	P3 + 2	2(1)	Read only
75	1	Low alarm Relay Status	1	R, digital (1 for ON, 0 for OFF)
76	2	High alarm Relay Status	1	R, digital (1 for ON, 0 for OFF)
77	3	Pre warm Point Relay Status	1	R, digital (1 for ON, 0 for OFF)
78	4	Set point Relay Status	1	R, digital (1 for ON, 0 for OFF)
79	5	Start/Pause batch		W(0 for Pause, 1 for Start)
80	6	To Clear Batch Total	1	W, digital(1 for Clear)
81	7	To Clear Integration Total and Batch Total	1	W, digital(1 for Clear)

11. MISCELLANEOUS

RETRAMISSION OUTPUT TABLE FOR OPEN /OVER /UNDER CONDITION:

- **For 4-20mA:-**

INPUT FEED (mA)	DISPLAY		RX O/P (mA)	
	LINEAR	SQUARE ROOT	LINEAR	SQUARE ROOT
I/P <1.60	OPEN	OPEN	4.00	4.00
1.60<I/P<3.20	UNDER	UNDER	4.00	4.00
3.20<I/P<4.00	Flow Rate	Flow Rate	4.00	4.00
20.00>I/P>20.80	Flow Rate	Flow Rate	20.00	20.00
20.80>I/P>22.40	OVER	OVER	20.00	20.00
22.40>I/P	OPEN	OPEN	20.00	20.00

NOTE:- For OPEN Sensor Condition Pre-warn and batch total (Set Point) Relays are in OFF State.

- **For 0-20mA:-**

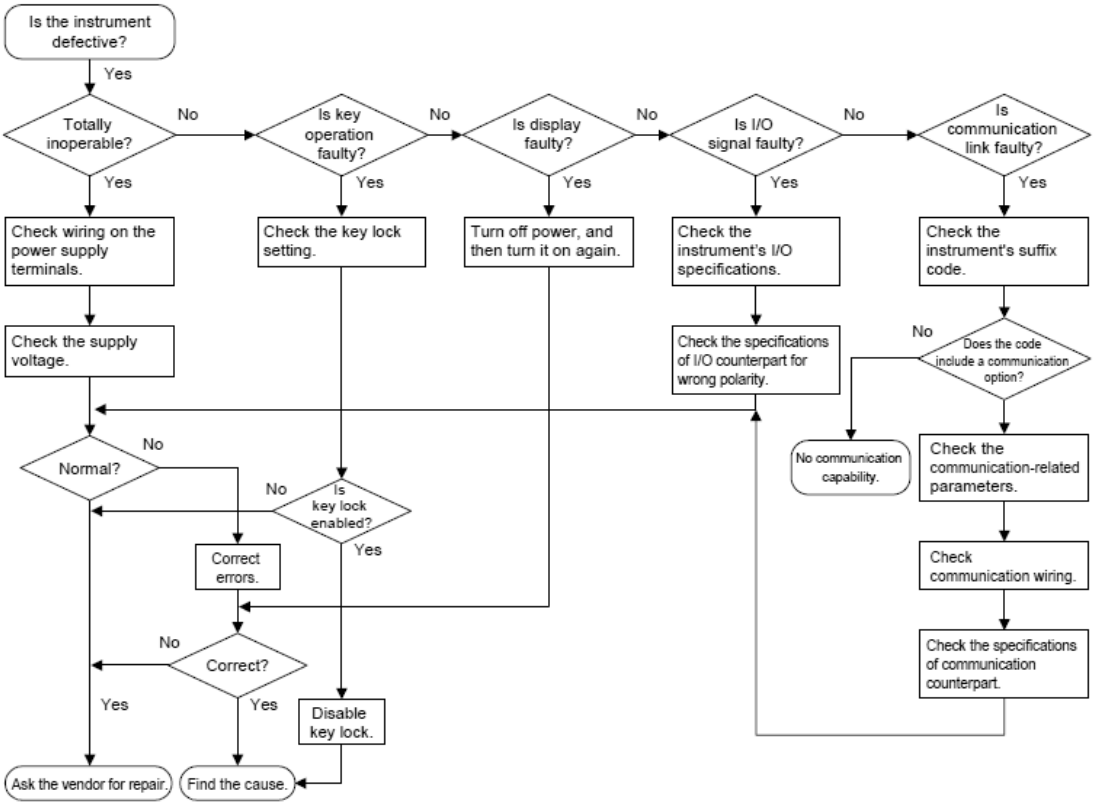
INPUT FEED (mA)	DISPLAY		RX O/P (mA)	
	LINEAR	SQUARE ROOT	LINEAR	SQUARE ROOT
0.00<I/P	ZERO	ZERO	0.00	0.00
20.00>I/P>20.80	Flow Rate	Flow Rate	20.00	20.00
20.80>I/P>22.40	OVER	OVER	20.00	20.00
22.40>I/P	OPEN	OPEN	20.00	20.00

NOTE:- For OPEN Sensor Condition Pre-warn and batch total (Set Point) Relays are not affected because during open sensor flow rate will be zero.

12. TROUBLESHOOTING

If the operating display does not appear after turning on the controller's power, follow the measures in the procedure below.

If a problem appears complicated, contact our sales representative.



SOME IMPOTANT NOTS :

1- If batch complete press stop key 3 second so total velue is reset
2- If set 4-20mA to pulse - pulse i/p work after power on-off (ch-1)
3- If set 4-20mA to RTD and vice versa - i/p work after power on-off (ch-3)
4- if no. of ch. 1 is selected and then selection changed to 3. for RTD input PV shows fixed value 20.0 Need to change Zt. Zero setting for Channel-3 to 0 then only rtd input works.