

"FCX-AII-V5" serie transmitters

Type : FKC...5

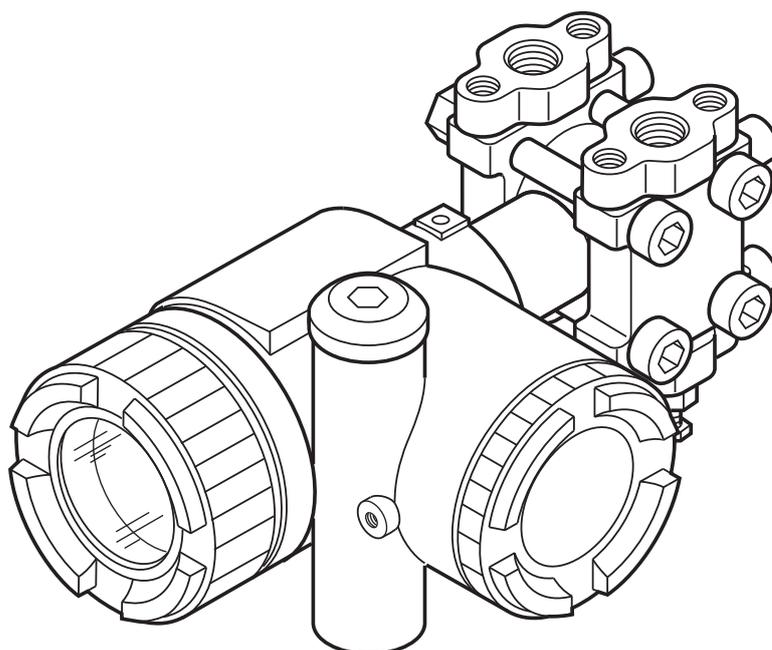
FKG...5, FKP...5

FKA...5, FKH...5

FKE...F

FKD, FKB, FKM...F

FKP, FKH...F







CAUTION :

Rotating the upper assembly part :

The upper assembly (housing and electronic unit) can be rotated by 90° left or right just by removing the 3 hexagonal screws.

If the assembly parts must be turned over than 90°, or if the position is already amended since the delivery by Fuji, it's necessary to remove the electronic unit from the housing and disconnect the flatcable from the electronic measuring cell before turn the housing.

If necessary, amend the flatcable's position connecting electronic unit and measuring cell, after fit the different parts.

Failure to observe this may lead to the deterioration of the flat cable, which is not covered by the manufacturer's warranty.

INTRODUCTION

First read this instruction manual carefully until an adequate understanding is required, and then proceed to installation, operation and maintenance of the FCX-AIIV5 series transmitter. The specifications of the transmitter will be changed without prior notice for further product improvement.

Modification of the transmitter without permission is strictly prohibited. Fuji will not bear any responsibility for a trouble caused by such a modification.

This instruction manual should be kept by a person who is actually using the transmitter.

After reading this manual, keep it at a place easier to access.

This manual should be delivered to the end user without fail.

For detail specifications and outline diagrams, refer to the specifications supplied separately.

Our pressure transmitters have been designed to meet international standards and directives. It is necessary to read carefully the manual before use these transmitters, to familiarize yourself with the installation, wiring processes, wiring and all operations and maintenance.

The technical information is detailed in each "Technical Specification" for each version of the transmitters.

Carefully read the instructions **ATEX "HD FCXAII 102"** for any use of sensors in dangerous areas.

The instrument nameplate as shown below is attached on the housing of this transmitter. Before use, make sure the contents of the nameplate agree exactly with your specifications.

FCX-AII Tag No. ①		FE	
Model .②_____		CE ⑫	
—③_____			
Range Limit —④_____			
Span Limit _____⑤_____			
<input type="checkbox"/> Power Supply —⑥_____			
Output .⑦_____			⑪ ○
M.W.P. ⑧_____ OAN _____			
Ser.No. —⑨_____ Mfd —⑩_____			
Fuji Electric France S.A.S. F-63039 Clermont-Ferrand 338B352			

- 1 Tag number
- 2 Model
- 3 Transmitter type (see corresponding "technical datasheet")
- 4 Range
- 5 Span limit
- 6 Power supply
- 7 Output
- 8 MWP
- 9 Serial number
- 10 Manufacturing date
- 11 Hazardous locations description
- 12 Marking 97/23/EC G1 or PED G1 (for equipments specified category III or IV)
G1 = for use with all kinds of fluid

EMC Directive (2004/108/EC)

All models of **FCX** series transmitters type **FCX-All** are in accordance with :

- the harmonized standards:
 - EN 61326-1 : 2006 (Electrical equipment for measurement, control and laboratory use - EMC requirements).
 - EN 61326-2-3 : 2006 (Part 2-3 : Particular requirements - Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning)

Emission limits : EN 61326-1 : 2006

Frequency range (MHz)	Limits	Basic standard
30 to 230	40 dB ($\mu\text{V/m}$) quasi peak, measured at 10m distance	EN 55011 / CISPR 11 Group 1 Class A
230 to 1000	47 dB ($\mu\text{V/m}$) quasi peak, measured at 10m distance	

Immunity requirements : EN 61326-1 : 2006 (Table 2)

Phenomenon	Test value	Basic standard	Performance criteria
Electrostatic discharge (EDS)	4 kV (Contact)	EN 61000-4-2	B
	8 kV (Air)	IEC 61000-4-2	
Electromagnetic field	10V/m (80 to 1000 MHz)	EN 61000-4-3	A
	3 V/m (1.4 to 2.0 GHz)	IEC 61000-4-3	
	1 V/m (2.0 to 2.7 GHz)		
Rated power frequency Magnetic field	30 A/m	EN 61000-4-8 IEC 61000-4-8	A
Burst	2 kV (5/50 NS, 5 kHz)	EN 61000-4-4 IEC 61000-4-4	B
Surge	1 kV Line to line 2 kV Line to line	EN 61000-4-5 IEC61000-4-5	B
Conducted RF	3 V (150 kHz to 80 MHz)	EN 61000-4-6 IEC61000-4-6	A

Performance criteria :

A : During testing, normal performance within the specification limits.

B : During testing, temporary degradation or loss of function or performance which is self-recovering.

CLASSIFICATION OF SAFETY INSTRUCTIONS

First of all, read carefully the “Safety instructions” for your own safety and for correct use of the transmitter.

- The risks related to a non-respect of the instructions are prioritized as follow :

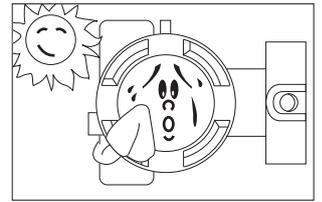
 DANGER	Risk of death or sever injury if the safety instructions are not followed.
 ATTENTION	In case of wrong handling probable injury or physical damage can happen.
 PRECAUTION	Important instructions to be respected.
 INDICATION	General observations concerning the product, product handling and correct use of the transmitter.

IMPORTANT RECOMMENDATIONS

Storage for a long period

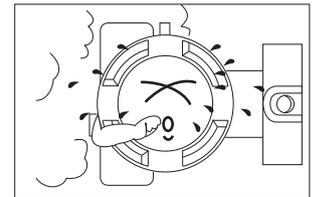
Store the transmitter in a dry room at normal temperature and humidity.

Keep protection caps in place at the conduit connection and process connection.



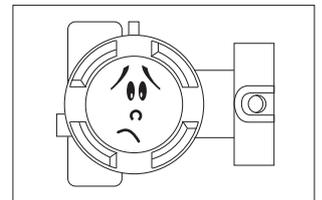
For installation, select an appropriate place

Site at location with minimal vibration, dust and corrosive gas



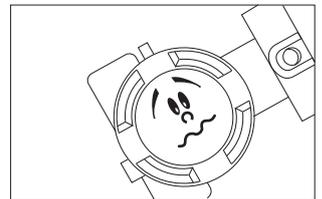
At a place allowing an adequate space for check-up

Site at location large enough to allow maintenance and checking.



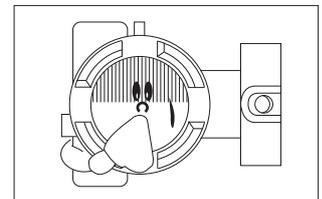
Mounting position

Mount to a pipe horizontally or vertically.



Attention to overload

Do not apply a pressure outside the specified range.



Others

Besides the above, be sure to observe the cautions given in this manual.

INTRODUCTION	4
CEM COMPATIBILITY	5
CLASSIFICATION OF SAFETY INSTRUCTIONS	6
IMPORTANT RECOMMENDATIONS	7
1. OUTLINE	
9	
2. OPERATING PARTS AND THEIR FUNCTIONS	10
3. START UP AND SHUTDOWN	13
3.1 Preparation for Start up	13
3.2 Operation	14
3.3 Shutdown	15
4. ADJUSTMENT	16
4.1 Adjustment procedure using the external adjusting screw	16
4.1-1 Zero adjustment by the screw	16
4.1-2 Span adjustment by the screw	17
4.2 Adjustment procedure by local configurator unit with LCD display	19
4.2-1 Menu list	20
4.2-2 Switching menus	21
4.2-3 Operating procedure.....	22
4.3 Adjustment with hand held communicator	47
4.3-1 Connection of HHC.....	47
4.3-2 Start up of the HHC	48
5. MAINTENANCE	68
5.1 The following verifications are suggested by the manufacturer	68
5.2 Troubleshooting	69
5.3 Replacement of defective parts	70
5.4 Adjustment after replacement of amplifier or measuring cell	77
6. INSTALLATION AND PIPING	78
6.1 Installation	79
6.2 Piping	83
6.2-1 Piping of differential pressure and flow transmitters.....	83
6.2-2 Piping of gauge and absolute pressure transmitters	87
6.2-3 Piping of direct mount : absolute and gauge pressure transmitters	89
6.2-4 Piping of level transmitter	91
6.2-5 Piping of remote seal(s) type transmitters	94
6.2-6 Piping of remote seal types absolute and gauge transmitters.....	97
7. WIRING	99
7.1 Wiring procedure	100
7.2 Power voltage and load resistance	102
7.3 Grounding	102
A1. BUILT-IN ARRESTOR	103
A2. CALIBRATION	105
A3. PARAMETER SETTING PRIOR TO DELIVERY	108
A4. HAZARDOUS LOCATION INSTALLATION INFORMATION	109
A5. HART® COMMUNICATION FUNCTION	111
A6. SPARE PARTS	115

The FCX-A2 V5 series transmitter accurately measures the differential pressure, level of liquid, gauge pressure or flow rate, and transmits a proportional current signal of 4 to 20mA DC. All the adjustment functions are incorporated in the transmission unit for making adjustments easily and exactly.

Transmitter settings (such as range and damping time constant, etc.) can be changed from an HHC (Hand Held Communicator).

The transmitter utilizes a unique micromachined capacitive silicon sensor with state-of-the-art microprocessor technology to provide exceptional performance and functionality.

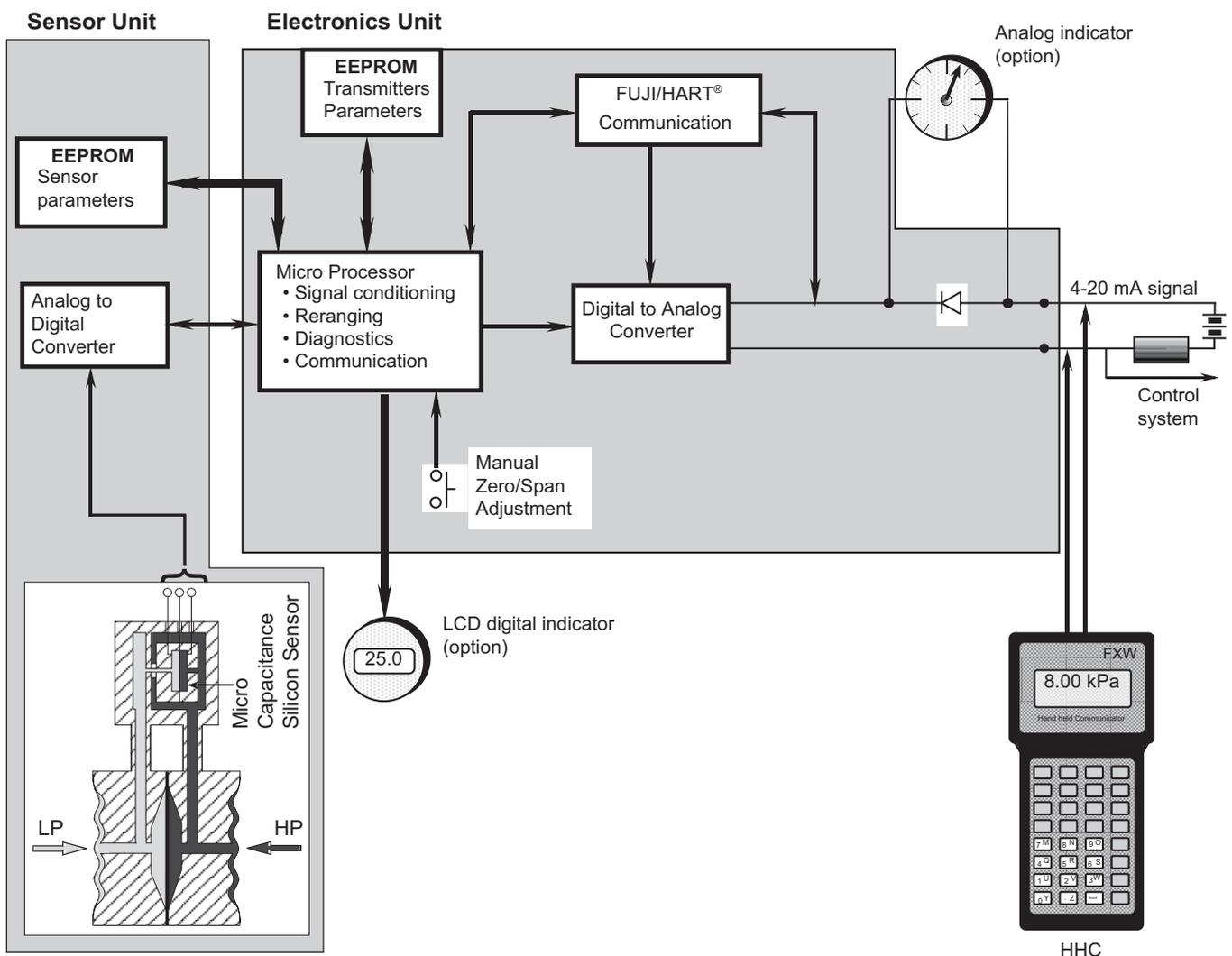
The transmitter is compact and light, provide high accuracy and reliability.

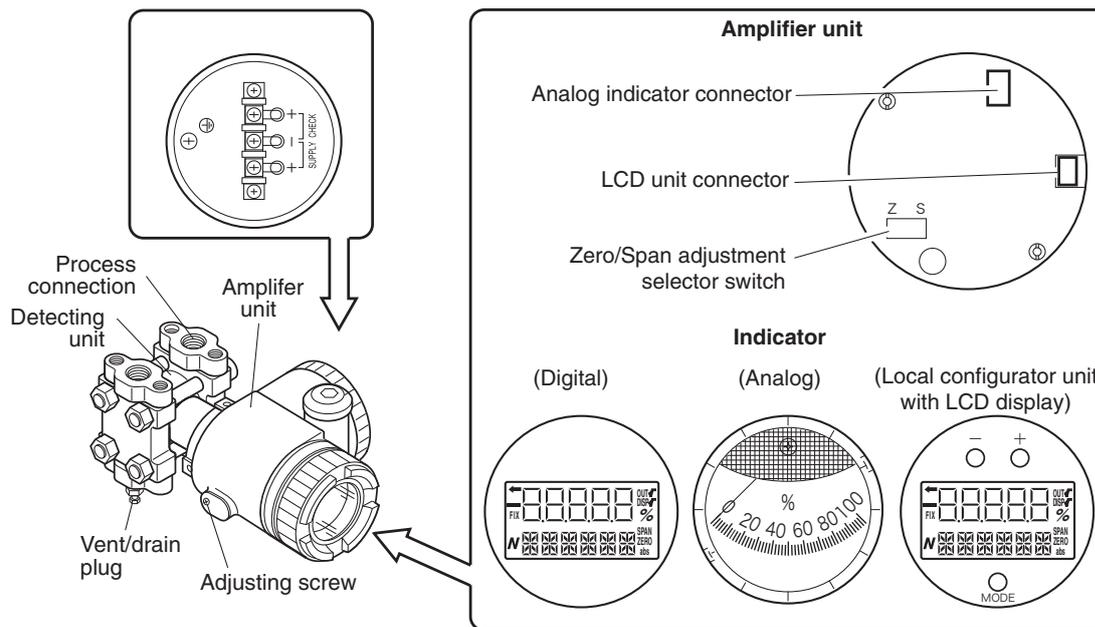
Local adjustment of zero and span are possible from outside screw on the electronic housing.

Measuring principle

The operating principle of the FCX-A2 V5 series transmitter is shown in the below block diagram. The input pressure is changed into an electrostatic capacitance in the detecting unit.

The change proportional to the pressure undergoes conditioning and amplification in the transmission unit, and is then output as a current of 4 to 20mA DC





Description of FCX-A2 V5 serie transmitters

Part name	Description
Detecting unit	Detects pressure, differential pressure or level of liquid.
Amplifier unit	Converts the detected signal into an output signal.
Vent/drain plug	Used for gas discharge or draining.
Process connection	Connects impulse pipes from the process.
Conduit connection	Connects the output cable.
Zero Adjusting screw	Used for adjustment.
Terminal unit	External terminal unit to connect an input-output line and ground wire

Amplifier Unit

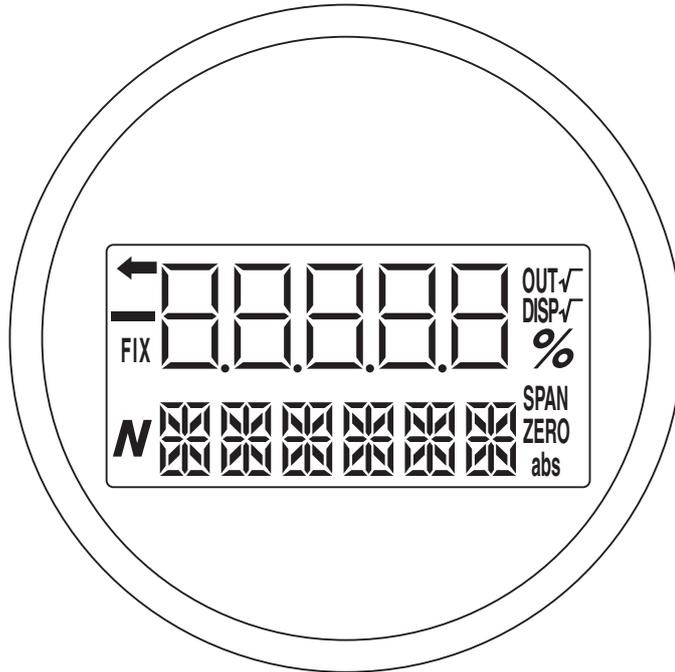
Part name	Description
Analog indicator connector	Used for connecting an analog indicator.
LCD unit connector	Used to connect the digital indicator or the local configurator unit with LCD display.
Indicator (option)	The analog or digital indicator, or the local configurator unit with LCD display can be mounted.
Zero/Span adjustment selector switch	Used to select the function (zero/span) to be adjusted by the external adjusting screw.

Terminals

Symbol	Description
	Connects the output cable.
	Used for checking the output or connecting an indicator.
	An external terminal used for grounding.



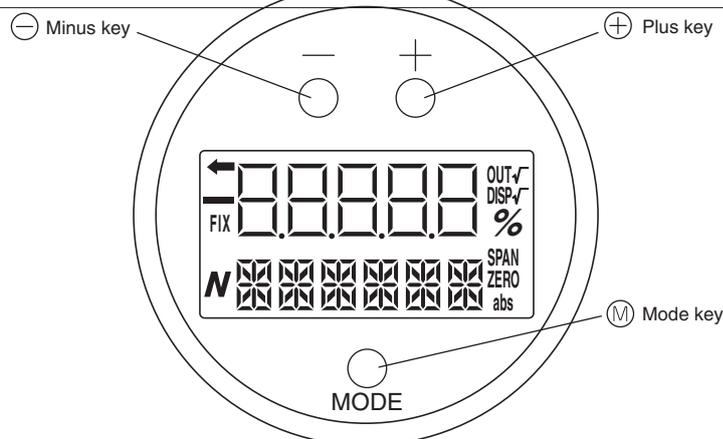
Mode indicating function of digital indicator



Mode indication

Mode	When indicated	When not indicated
%	% output	Actual scale
ZERO	Possible external zero adjustment	External zero adjustment not possible
SPAN	Possible external span adjustment	External span adjustment not possible.
DISP $\sqrt{\quad}$	Digital indicator $\sqrt{\quad}$ display	Digital indicator LIN display
OUT $\sqrt{\quad}$	$\sqrt{\quad}$ output	LIN output
FIX	Fixed current mode	Measurement mode
←	The transmitter is in operation (blinking).	The transmitter is not in operation.
abs	Absolute pressure	Gauge pressure
-	Output value < Zero	Output value ≥ Zero
N	(a part of unit indicator)	

Modes of the local configurator unit with LCD display and functions of the 3 push button key switches

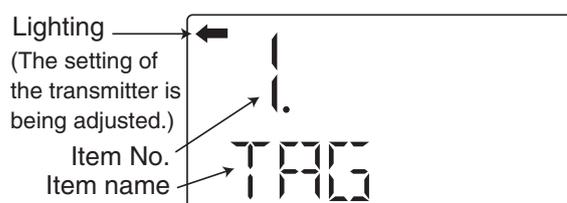


Normal mode (normal mode for indicating a measured value)



* For status indication in the normal mode, refer to the previous section "Mode indicating function of digital indicator."

Setting mode (functions of the 3 push button key switches)



Functions of the 3 push button key switches

Name	Main function
Ⓜ Mode key	Switches between the normal and setting modes.
⊖ Minus key	Changes an item No. or item name to the minus (decrease) direction.
⊕ Plus key	Changes an item No. or item name to the plus (increase) direction.

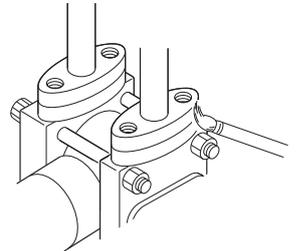
* Refer to Section "Adjustment procedure by the local configurator unit with LCD display" for details.

3.1 Installation :

After installation (refer to chapter 6.1) and before start up of the transmitter, be sure to perform the following checks and procedures.

Preparation :

- (1) Check for liquid or gas leakage of the process connection by applying soapy water or similare.
- (2) Check of the electrical connection according to the "Terminal block connection diagram" shown in 7.1.
- (3) Vent the process covers of the transmitter.



DANGER

Before starting up the transmitter in flameproof area, please read carefully the technical instruction note ATEX Ref.HDFCX-AII V5 002.

The compatibility of process with the transmitter, has to be checked and ensured by skilled people from customer side.



ATTENTION

When the plant requires chemical cleaning at the start up operation, be sure to close the isolating valves of the transmitter to avoid that cleaning liquid or particules are introduced to the transmitter wetted parts.

- (4) Perform zero point adjustment.

Zero point check

The zero point check or zero adjustment in flameproof area, is only possible by the outside screw on the electronics housing without opening the covers of this housing and in case of adjustment via HHC, the local wiring (connection) is not allowed.

Turn on the power to the transmitter.

Check the output signal of the transmitter by connecting a DC ammeter across CK+ and CK- of the terminal block.

After ten minutes or longer, adjust the transmitter output current at 4 mA (zero adjustment). (See below)

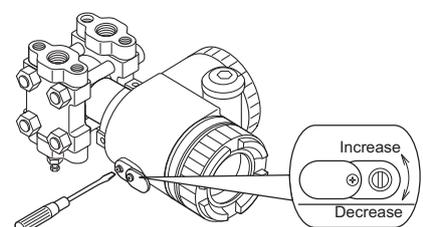
Zero adjustment:

Adjustment by zero adjustment screw

Zero adjustment is possible from outside screw on electronic housing.

Adjust zero point of the transmitter to 4 mA by turning the zero adjustment screw.

The higher you turn the screw, the quicker is the change of the zero.



- | | |
|------------------|--|
| Fine adjustment | : turning slowly
(approximately 5sec per turn) |
| Rough adjustment | : turning quickly
(approximately 1sec per turn) |

After all operations are finished, assemble and tight the covers of the electronics housing. (Tightening torque: 20 N.m).



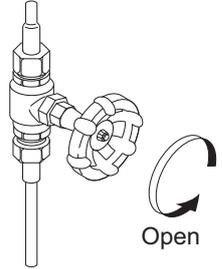
INDICATION

After adjustment of the transmitter, it should be kept energized for about 10 seconds to write the adjustment results into memory.

3.2 Operation

(1) Operation of gauge (FKG) and absolute (FKA) pressure transmitter :

Open the valve slowly to apply a pressure.
When a pressure is applied, the transmitter is set in the operating status.

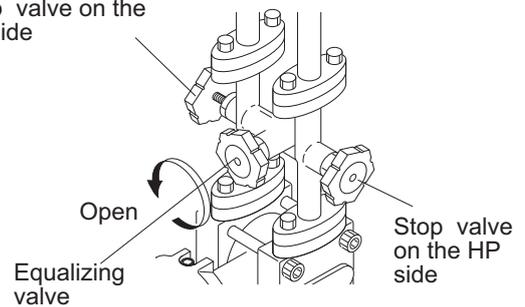


(2) Operation of differential pressure transmitter (FKC):

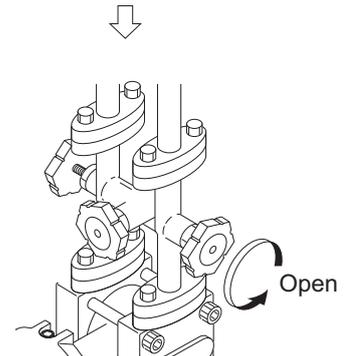
Set the operating status by manipulating the manifold valve.

Make sure the equalizing valve is open

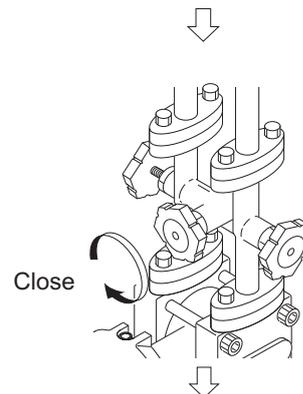
Stop valve on the LP side



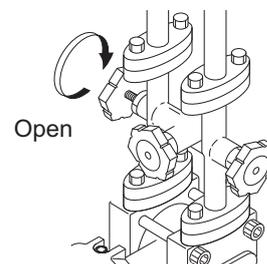
Open the stop valve on the HP side slowly.



Close the equalizing valve.



Finally, open the stop valve on the LP side slowly



Check of operating status

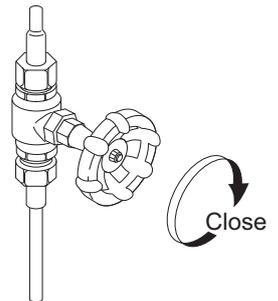
Use a field indicator, receiving instrument or HHC to check the operating status.

3.3 Shutdown

Follow the procedures

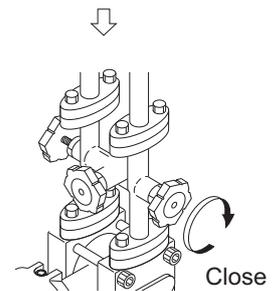
(1) Absolute and gauge pressure transmitters (FKG/FKP or FKA/FKH) :

Close the valve slowly to stop applying a pressure.
The transmitter is set in the measurement stop status.

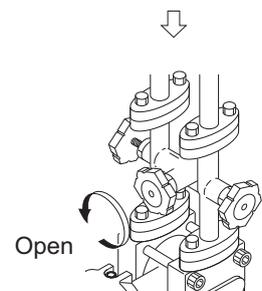


(2) Flow and differential pressure transmitter (FKC) :

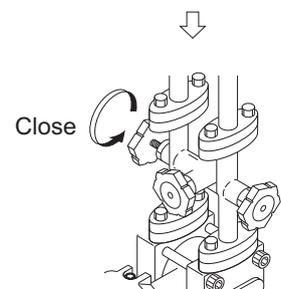
Close the stop valve on the high pressure side (HP side) slowly.



Open the equalizing valve..



Close the stop valve on the low pressure side slowly



PRECAUTION

Before a long shutdown, discharge the process fluid and drain completely from the transmitter. This is to protect the transmitter from freezing, corrosion, etc...

For changing the measuring range, carry out zero adjustment first, and span adjustment next. (If zero adjustment is performed after span adjustment, the 100% point may not be adjusted correctly.)

Accordingly, the zero point (LRV) or span (URV-LRV) of the measuring range is changed. To confirm the changed values, display the measuring range (LRV, URV) by the HHC or the LCD unit with three push buttons after this operation



In the case of a flameproof transmitter, do not open the cover from amplifier case to make following adjustments with active DC power supply.

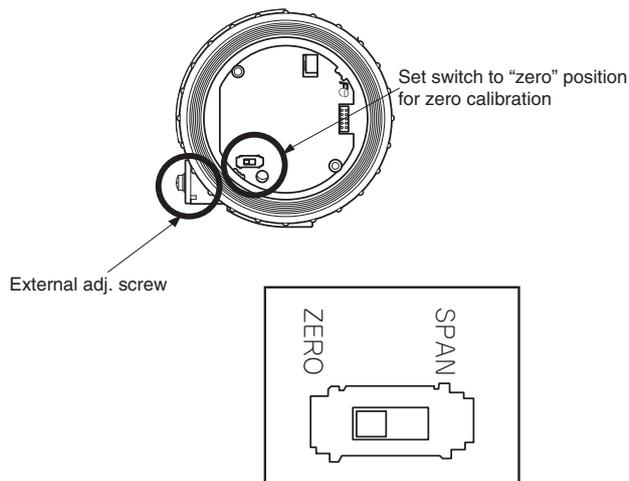
4.1 Adjustment procedure using the external adjusting screw

4.1-1 Zero adjustment by the screw

Zero point of the transmitter is adjustable by the outside screw with the mode setting switch in the housing set at zero position.

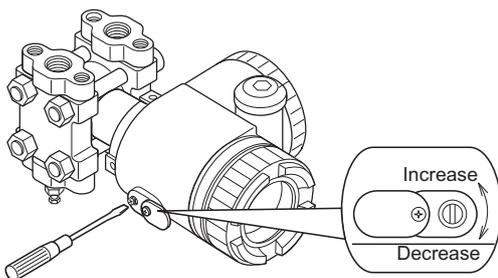
The figure shown below is an example of "Mode setting switch" is attached.

(1) Set the mode setting switch to zero position.



(2) Apply standard input pressure corresponding to new Lower Range Value

(3) Adjust output to 4mA by turning the outside screw



Fine adjustment : turning slowly
(approximately 5sec per turn)
Rough adjustment : turning quickly
(approximately 1sec per turn)

For zero suppression or elevation, apply the specified input pressure in advance and adjust the output to 4mA using the outside screw.

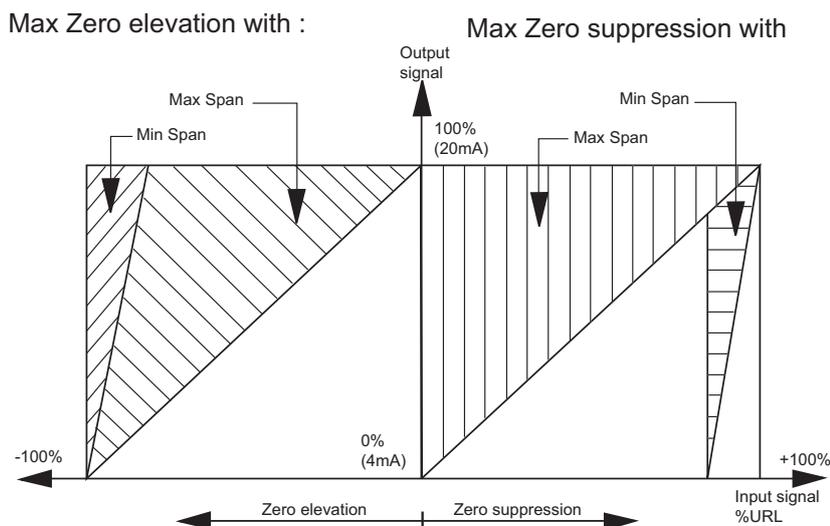
Note :

- 1) If the transmitter is locked, it can't be adjusted by the external adjustment screw.
- 2) When a digital indicator is attached to the transmitter, make sure that the LCD lamp "ZERO" is ON.

! INDICATION

After adjustment, the transmitter should be kept energized at about 10 seconds to write the adjustment results into memory. When a digital indicator is attached to the transmitter, it's necessary to remove this indicator and to replace it in the same place by the zero/span adjustment electronic circuit.

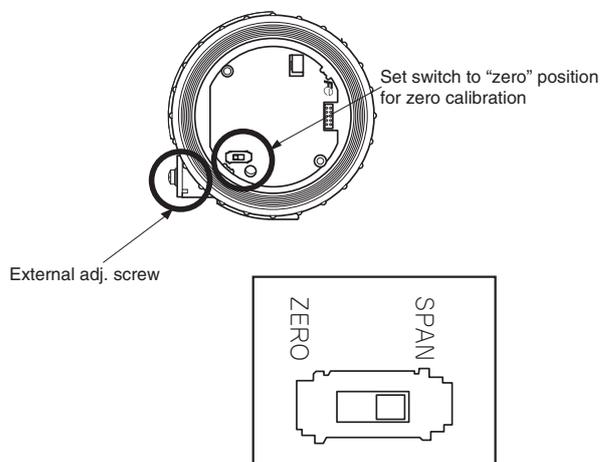
For zero suppression or elevation ranges, apply the specified LRV pressure in advance and adjust the output signal to 4.00mA using the external adj. screw.



4.1-2 Span adjustment by the screw

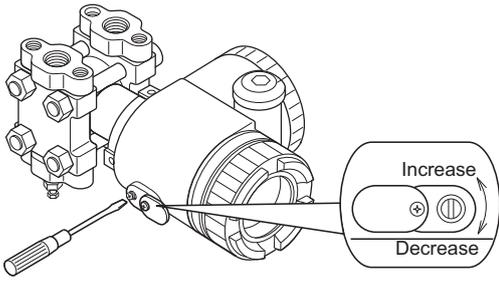
The measuring range for each transmitter is determined according to its type. Span is changed by the outside screw with the mode setting switch in the housing set at span position. The figure shown below is an example of "Mode setting switch" is attached.

(1) Set the mode setting switch to span position.



(2) Apply standard input pressure corresponding to new Lower Range Value

(3) Adjust output to 20mA by turning the outside screw



Fine adjustment : turning slowly
(approximately 5sec per turn)
Rough adjustment : turning quickly
(approximately 1sec per turn)

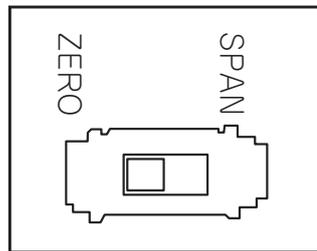
Note :

- 1) After adjustment the span, reset the mode setting switch to Zero position

Note :

- 1) If the transmitter is locked, it can't be adjusted by the external adjustment screw.
- 2) When a digital indicator is attached to the transmitter, make sure that the LCD lamp "ZERO" is ON.

(4) Then return to applying input pressure of zero again and make sure output is 4 mA.



! INDICATION

After adjustment, the transmitter should be kept energized at about 10 seconds to write the adjustment results into memory.
When a digital indicator is attached to the transmitter, it's necessary to remove this indicator and to replace it in the same place by the zero/span adjustment electronic circuit.



4.2 Adjustment procedure by local configurator unit with LCD display

You can use various functions of the FCX-All V5 serie transmitters with 3 push button key switches by installing the local configurator unit with LCD display in the transmitter.

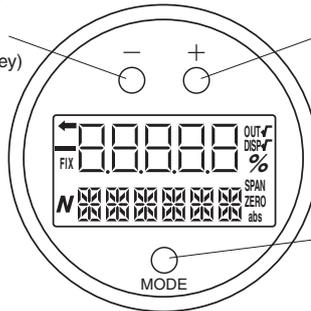
Cautions for opération



To change the set value, check that the control loop of the host system (such as an instrumentation system) can be performed manually.

Key switch name

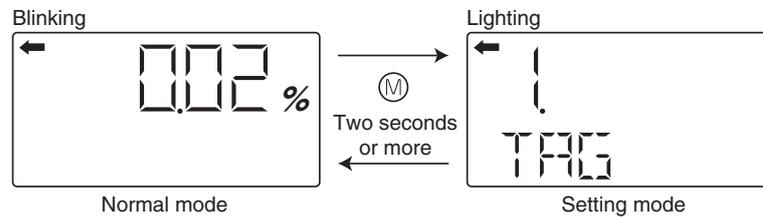
⊖ key
(minus key)



⊕ key
(plus key)

Ⓜ key
(mode key)

Mode switching



- To switch the normal mode to the setting mode:
Press the Ⓜ key for two seconds or more.
- To switch the setting mode to the normal mode:
Press the Ⓜ key for two seconds or more on the item name selection screen.
If no operation is performed for three minutes in the setting mode, the mode is automatically switched back to the normal mode.

Cautions for setting

- Setting error
If a setting error occurs, an error display shown on the lower right appears in the display. Press the Ⓜ key to return to the item name selection screen in the setting mode.
- Adjusting screw
You cannot use the adjusting screw in the setting mode.
- HHC transmission
After switching to the setting mode, you can input commands during the item name selection screen.
After switching to the setting mode, you cannot input commands after selecting items.



4.2.1 Menu list

The following are the menu items. Adjust each setting as required.

Item (large classification)	Item name	Description	Page	
1	TAG No.	1. TAG	Display and setting of TAG No. (*1)	22
2	Model code	2. TYPE	Display and setting of type (*1)	23
3	Serial No.	3-1. SERIAL N	Display of serial No.	24
		3-2. VER	Display of transmitter software version	24
4	Engineering unit	4. UNIT	Display and change of engineering unit (*1)	25
5	Range limit	5. URL	Display of maximum measuring range	25
6	Measuring range	6-1. LRV	Change of LRV (lower range value of measuring range = 0% point) (*1)	26
		6-2. URV	Change of URV (upper range value of measuring range = 100% point) (*1)	27
7	Damping	7. DAMP	Change of damping time constant (*1)	28
8	Output mode	8-1. OUT Md	Change of output mode (*3) (*1)	29
		8-2. CUT Pt	Setting of low flow rate cut point (*3) (*1)	29
		8-3. CUT Md	Setting of low flow rate cut mode (*3) (*1)	30
9	Direction and value of burnout	9-1. BURNOT	Change of burnout direction (*1)	31
		9-2. OVER	Change of output value when burnout direction = OVERSCALE (*4) (*1)	31
		9-3. UNDER	Change of output value when burnout direction = UNDERSCALE (*5) (*1)	33
A	Zero/span calibration	A-1. ZERO	Zero calibration (*6) (*2)	33
		A-2. SPAN	Span calibration (*6) (*2)	34
B	Output circuit calibration	b-1. 4mAAdj	4 mA calibration (*8) (*2)	35
		b-2. 20mAAdj	20 mA calibration (*8) (*2)	35
		b-3. FIXcur	Constant current output (*8)	35
D	Self-diagnosis	d-1. AMPTMP	Display of internal temperature of transmitter	36
		d-2. ALMCHK	Display of self diagnosis.	36
F	Locking of adjustment functions	F. LOCK	Locking and unlocking of the adjusting screw and the adjustment function in the setting mode (*1)	37
G	LCD display range setting	G-1. LDV	LDV (Lower Display Value) setting (*1)	38
		G-2. UDV	UDV (Upper Display Value) setting (*1)	39
		G-3. DP	DP (number of digit after Decimal Point) setting (*1)	39
		G-4. LcdUnit	LcdUnit (LCD Unit Code) setting (*1)	40
		G-5. LcdOpt	LcdOpt (LCD Option) setting (*1)	40
I	Input-output range adjustment	I-1. LRVAdj	Zero adjustment by range (LRV) change (*6) (*2)	41
		I-2. URVAdj	Span adjustment by range (URV) change (*6) (*2)	42
J	Value and specification of saturation current	J-1. SAT LO	Change of saturation current value (lower limit) (*7) (*1)	43
		J-2. SAT HI	Change of saturation current value (upper limit) (*7) (*1)	43
		J-3. SPEC	Selection (Nomal specification/expanded specification) of specifications of burnout & saturation current (*1)	44
K	Protective function of set value	K. GUARD	Setting and cancellation of set value protection (write protect) (*9)	45
L	History information	L-1. HisZERO	Display of zero calibration data for users	46
		L-2. HisSPAN	Display of span calibration data for users	46
		L-3. HisCLEAR	Clearing of zero/span calibration data (*1)	46
		L-4. HisAMP	Display of min/max of amplifier temperature history information	46
		L-5. HisCELL	Display of min/max of cell temperature history information	46

*1: If the write protect is selected at "K. GUARD," the display for selecting whether the setting will be performed does not appear, but "GUARD" appears. You cannot change the value in this condition.

*2: If the adjustment function is locked at "F.Lock" or the write protect is selected at "K. GUARD," the item names is not displayed.

*3: Only differential pressure transmitters have this function. Other transmitters do not display the item name.

*4: This item is valid only if when the burnout direction = "OVERSCALE." If not, the item name is not displayed.

*5: This item is valid only if when the burnout direction = "UNDERSCALE." If not, the item name is not displayed.

*6: This item is valid only if polygonal line correction is invalid. If the polygonal line correction is valid or the equipment is defective, the item name is not displayed.

*7: You cannot change the value if the nomal specification is selected at "J-3: SPEC."

*8: In the multidrop mode, this item is invalid and the item name is not displayed.

*9: If the write protect function (with a password) is selected by the HHC, the item name is not displayed.

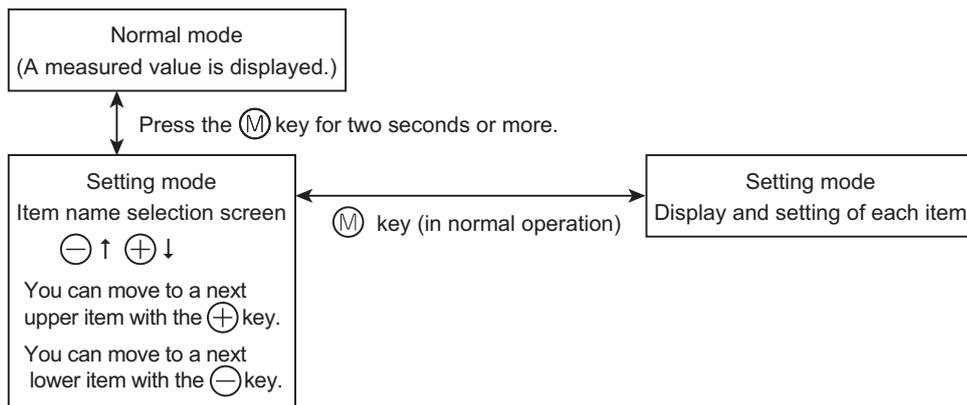
4.2.2 Switching menus

Setting mode (item name selection screen □ display and setting of each item)

Press the M key for a few seconds to switch the normal mode to the setting mode (item name selection screen).

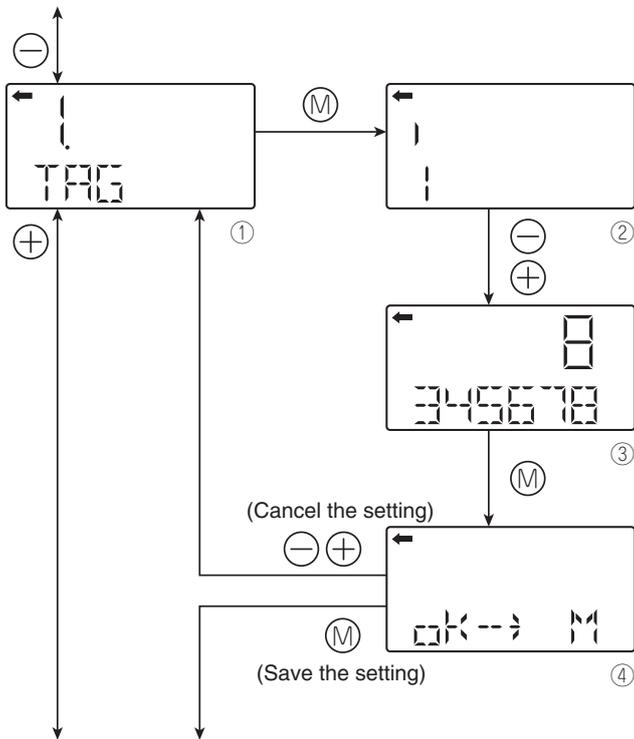
Press the M key for a few seconds to switch the setting mode (item name selection screen) to the normal mode.

After selecting an item with the \ominus/\oplus keys, press the M key (in normal operation) to move to each item.



1. TAG	↑ ↓	→ 1. Display and setting of TAG No.
2. TYPE	↑ ↓	→ 2. Display and setting of type
3-1. SERIAL N	↑ ↓	→ 3-1. Display of serial No.
3-2. VER	↑ ↓	→ 3-2. Display of transmitter software version
4. UNIT	↑ ↓	→ 4. Display and change of engineering unit
5. URL	↑ ↓	→ 5. Display of maximum measuring range
6-1. LRV	↑ ↓	→ 6-1. Change of LRV (lower range value of measuring range = 0% point)
6-2. URV	↑ ↓	→ 6-2. Change of URV (upper range value of measuring range = 100% point)
7. DAMP	↑ ↓	→ 7. Change of damping time constant
8-1. OUT Md	↑ ↓	→ 8-1. Change of output mode
8-2. CUT Pt	↑ ↓	→ 8-2. Setting of low flow rate cut point
8-3. CUT Md	↑ ↓	→ 8-3. Setting of low flow rate cut mode
9-1. BURNOT	↑ ↓	→ 9-1. Change of burnout direction
9-2. OVER	↑ ↓	→ 9-2. Chang of output value when burnout direction = OVERSCALE
9-3. UNDER	↑ ↓	→ 9-3. Chang of output value when burnout direction = UNDERSCALE
A-1. ZERO	↑ ↓	→ A-1. Zero calibration
A-2. SPAN	↑ ↓	→ A-2. Span calibration
B-1. 4mAAdj	↑ ↓	→ B-1. 4 mA calibration
B-2. 20mAAdj	↑ ↓	→ B-2. 20 mA calibration
B-3. FIXcur	↑ ↓	→ B-3. Constant current output
D-1. AMPTMP	↑ ↓	→ D-1. Display of internal temperature of transmitter
D-2. ALMCHK	↑ ↓	→ D-2. Display of self-diagnosis.
F. LOCK	↑ ↓	→ F. Locking and unlocking of the adjusting screw and the adjustment function in the setting mode
G-1. LDV	↑ ↓	→ G-1. LDV (Lower Display Value) setting
G-2. UDV	↑ ↓	→ G-2. UDV (Upper Display Value) setting
G-3. dP	↑ ↓	→ G-3. DP (Digit Number Under Decimal Point) setting
G-4. LcdUnit	↑ ↓	→ G-4. LcdUnit (LCD Unit Code) setting
G-5. LcdOpt	↑ ↓	→ G-5. LcdOpt (LCD Option) setting
I-1. LRVAdj	↑ ↓	→ I-1. Zero adjustment by range (LRV) change
I-2. URVAdj	↑ ↓	→ I-2. Span adjustment by range (URV) change
J-1. SAT LO	↑ ↓	→ J-1. Change of saturation current value (lower limit)
J-2. SAT HI	↑ ↓	→ J-2. Change of saturation current value (upper limit)
J-3. SPEC	↑ ↓	→ J-3. Selection (nomal specification/expanded specification) of specifications of burnout & saturation current
K. GUARD	↑ ↓	→ K. Setting and cancellation of set value protection (write protect)
L-1. HisZERO	↑ ↓	→ L-1. Display of zero calibration data for users
L-2. HisSPAN	↑ ↓	→ L-2. Display of span calibration data for users
L-3. HisCLEAR	↑ ↓	→ L-3. Clearing of zero/span calibration data
L-4. HisAMP	↑ ↓	→ L-4. Display of min/max of amplifier temperature history information
L-5. HisCELL	↑ ↓	→ L-5. Display of min/max of cell temperature history information

4.2.3 Operating procedure



TAG N°

To set the TAG No. of each field device, use the procedures shown in the following diagram. TAG NO. can be inputted up to 26 character of alphanumeric codes.

- Press the **M** key on the screen ① to display the TAG No. setting (②).

- Input alphanumeric characters as required with the **-** and **+** keys on the screen ②.

Functions of the keys:

- key: To input characters at the cursor position

(0 to 9, space, A to Z, -)

- +** key: To move the cursor position to the next

(1 \rightarrow 2 \rightarrow 3 ... \rightarrow 26 \rightarrow 1)

Note)

Characters other than numerical characters, capital letters of the alphabet, space, and “-” are displayed as “*.”

Initial six characters are displayed. (The cursor position is displayed by a vertical bar.)

To display the seventh and following characters, scroll the characters to the left. (The cursor position (far right) is displayed as a number.)

The cursor position is 1 in the example ②. (Number 1 is input as the first character.)

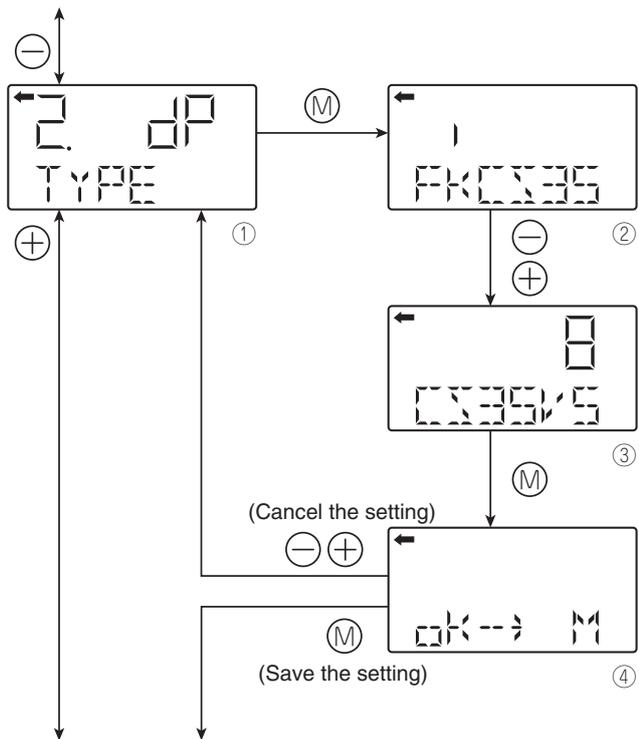
The cursor position is 8 in the example ③. (Number 8 is input as the eighth character.)

If HART is selected, the initial eight characters are treated as TAG information.

- Select whether the TAG No. setting is saved on the screen ④.

Press the **M** key to save the TAG No. setting.

Press the **-** or **+** key to cancel the setting.



Model code (TYPE)

Model code of field device is displayed and changed (example of differential pressure transmitter).

- Press the **M** key on the screen ① to display the model code setting screen (②).
- Input alphanumeric characters as required with the **-** and **+** keys on the screen ②.

Functions of the keys:

- key: To input characters at the cursor position.
(0 to 9, space, A to Z, -)
- +** key: To move the cursor position to the next.
(1 \rightarrow 2 \rightarrow 3 ... \rightarrow 16 \rightarrow 1)

Note)

Characters other than numerical characters, capital letters of the alphabet, space, and “-” are displayed as “*.”

Initial six characters are displayed. (The cursor position is displayed by a vertical bar.)

To display the seventh and following characters, scroll the characters to the left. (The cursor position (far right) is displayed as a number.)

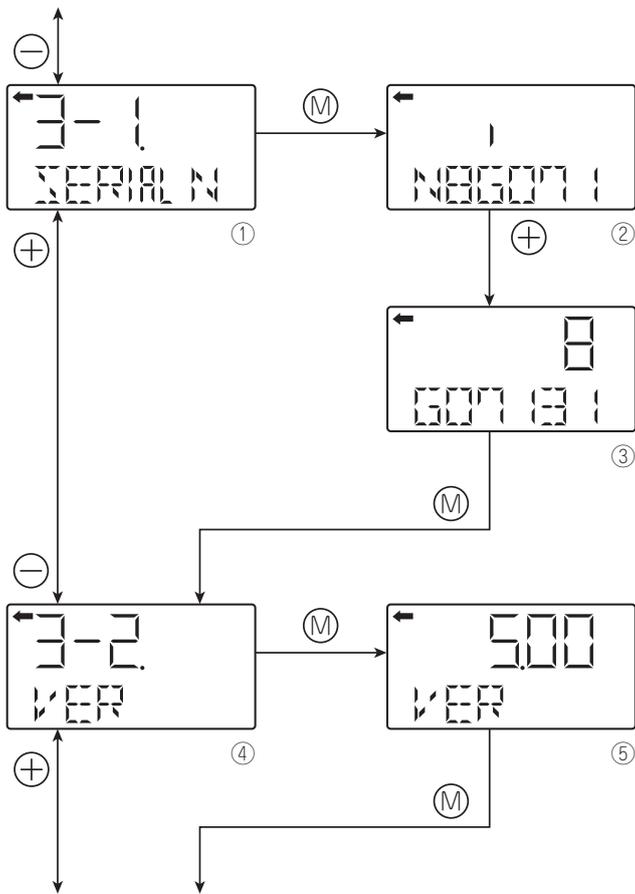
The cursor position is 2 in the example ②. (“K” is input as the second character.)

The cursor position is 8 in the example ③. (“5” is input as the eighth character.)

- Select whether the type setting is saved on the screen ④.
Press the **M** key to save the type setting.
Press the **-** or **+** key to cancel the setting.

*Description of the displays on the first line on the item name selection screen (①)

- $\square\square\square\square$: Differential pressure transmitter
- $\square\square\square$: Pressure (gauge pressure) transmitter
- $\square\square\square$: Absolute pressure transmitter



Serial N°

SERIAL N°(8 letters) and transmitters software version are displayed.

Display of SERIAL No.

- Press the (M) key on the screen ① to display the SERIAL N° (②)

Note)

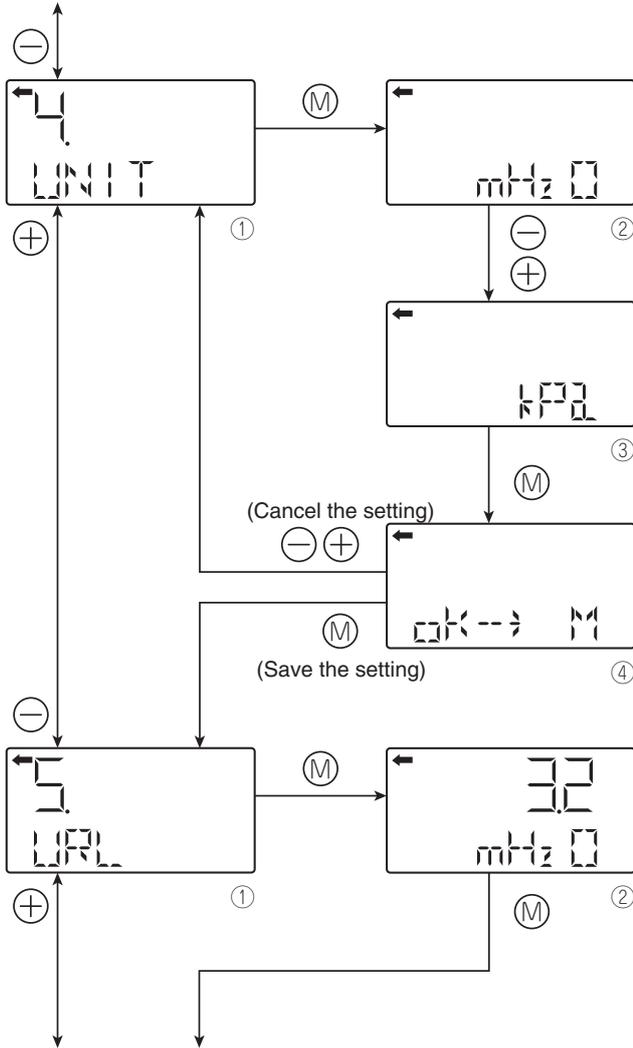
Characters other than numerical characters, capital letters of the alphabet, space, and “-” are displayed as “*.”

Initial six characters are displayed. (The cursor position is displayed by a vertical bar.)

To display the seventh and following characters, scroll the characters to the left by pressing ⊕ key. (The cursor position (far right) is displayed as a number.)

Display of transmitter software version

- To display the software version (⑤), press the (M) key on the screen ④.



Engineering unit

- To display the screen for changing the engineering unit (②), press the **M** key on the screen ①.
- Select an engineering unit with the **+** and **-** keys on the screen ②.

! INDICATION

The engineering unit is set according to the range as ordered, but the display resolution lowers depending on the unit being set.

Available unit for FCX-AII V5

(The units with * cannot be used because they are not legal units in Japan.)

- mmH₂O *
- cmH₂O *
- mH₂O *
- g/cm² *
- kg/cm² *
- Pa
- hPa
- kPa
- MPa
- mbar
- bar
- psi *
- inH₂O *
- ftH₂O *
- mmAq *
- cmAq *
- mAq *
- mmWC *
- cmWC *
- mWC *
- mmHg *
- cmHg *
- mHg *
- inHg *
- < Torr > *
- < atm > *

Note: The mark < > is settable for absolute pressure transmitter only.

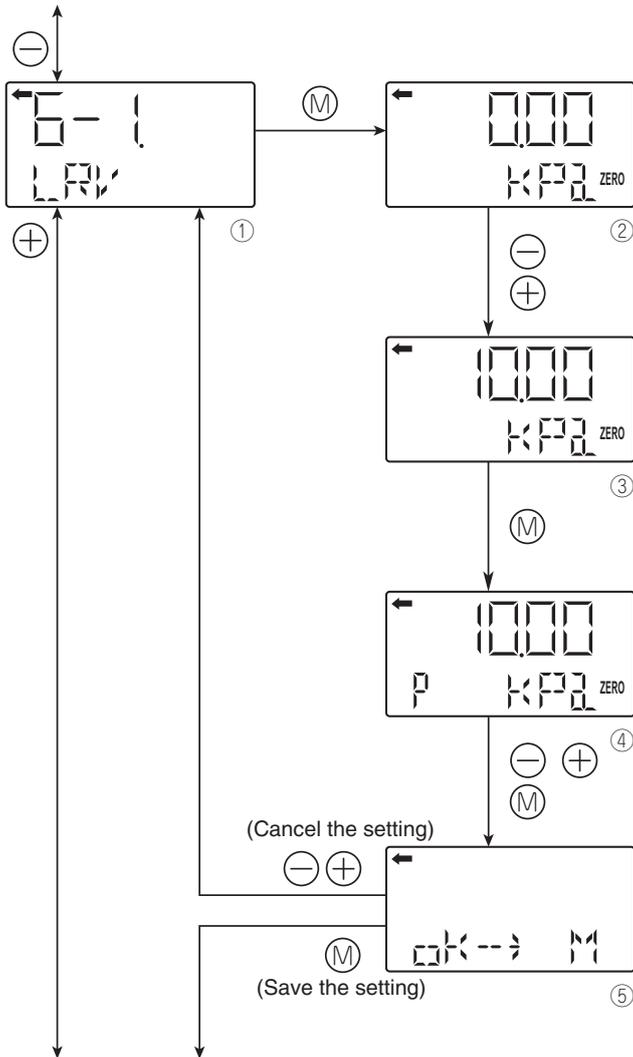
Range limit

Indicates the maximum measuring range of this transmitter.

- To display the range limit value (②), press the **M** key on the screen ①.

Note)

If “UUUUU” is displayed as a URL value, the unit is not supported.

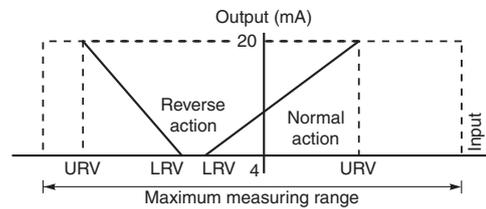


Measuring range (LRV, URV)

LRV: Lower range value (0% point)

URV: Upper range value (100% point)

Selectable setting range



Note) If the set value of the LRV is outside the range, an error also occurs in the URV setting, and vice versa.

The maximum setting range is ± 99999 .

The URV may exceed the upper limit depending on the change of the UNIT. If that happens, change the URV first.

Change of LRV (lower limit of the measuring range = 0% point)

- Press the M key on the screen ① to display the screen for setting the zero point range (②).
- Input the numerical values with the \ominus and \oplus keys on the screen ②.

Functions of the keys:

\ominus key: To decrease the value.

\oplus key: To increase the value.

Range: $-99999 \leq \text{LRV} \leq 99999$

Note) If "UUUUU" is displayed as a LRV value, the unit is not supported.

- To set the decimal point position, press the M key on the screen ③. "P" is displayed at the left of the unit name (④) and you can set the decimal point position with the \ominus and \oplus keys.

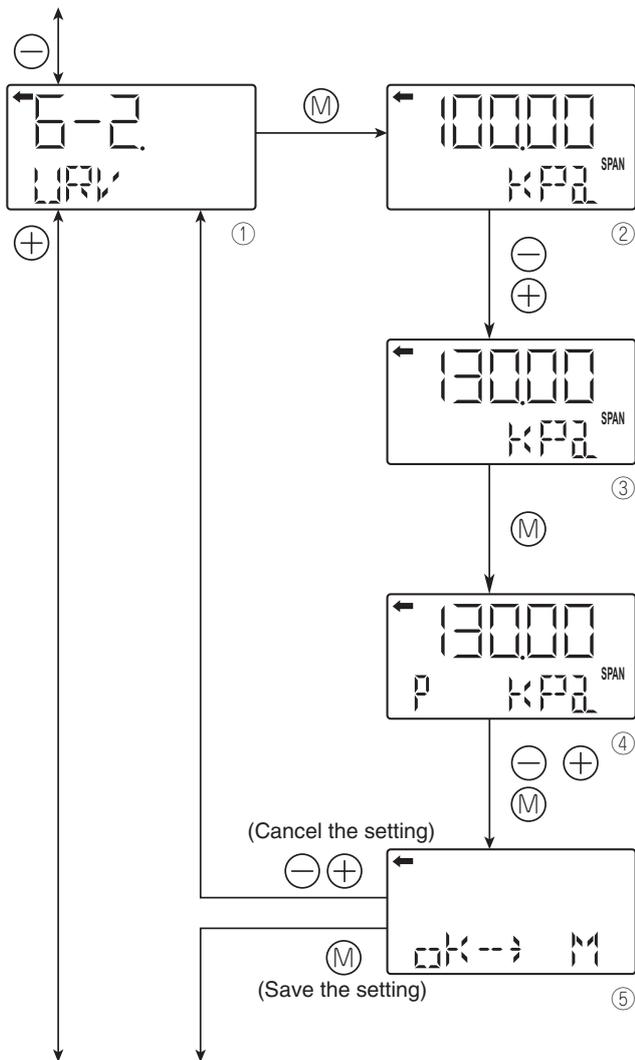
\ominus key: To move the decimal point position to left

\oplus key: To move the decimal point position to right

- Select whether the LRV setting is saved on the screen ⑤.

Press the M key to save the zero point range setting.

Press the \ominus or \oplus key to cancel the setting.



Change of URV (upper limit of the measuring range = 100% point)

- Press the M key on the screen ① to display the screen for setting the 100% point (②).
- Input the numerical values with the \ominus and \oplus keys on the screen ②.

Functions of the keys:

\ominus key: To decrease the value.

\oplus key: To increase the value.

Range: $-99999 \leq \text{URV} \leq 99999$

Note)

If "UUUUU" is displayed as a URV value, the unit is not supported.

- To set the decimal point position, press the M key on the screen ③. "P" is displayed at the left of the unit name (④) and you can set the decimal point position with the \ominus and \oplus keys.

\ominus key: To move the decimal point position to left

\oplus key: To move the decimal point position to right

- Select whether the URV setting is saved on the screen ⑤.

Press the M key to save the 100% point setting.

Press the \ominus or \oplus key to cancel the setting.

Damping

In the case where the process input fluctuation is large, the vibration of the installation site is large, and minute differential pressure is measured, if the output fluctuation is large, set appropriate damping time constant to suppress the output fluctuation.

Change of damping time constant

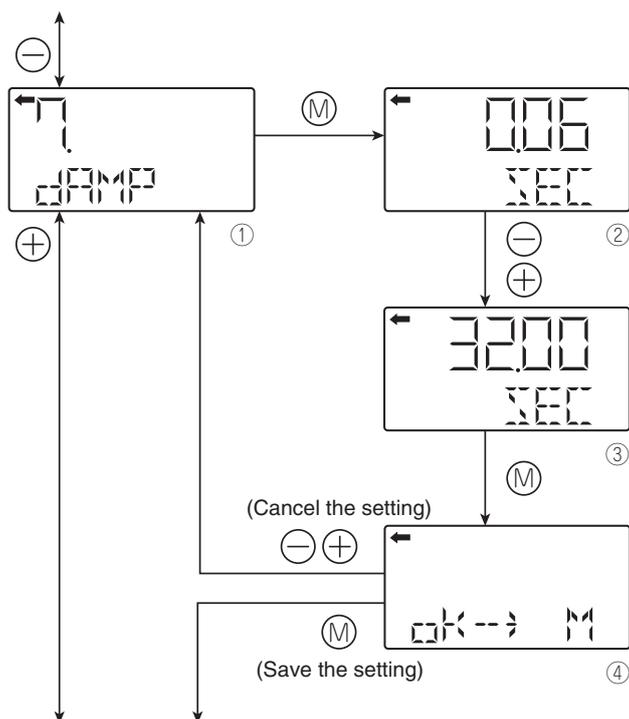
- Press the M key on the screen ① to display the screen for changing the damping time constant (②).
- Input the damping time constant with the \ominus and \oplus keys on the screen ②. Press the \ominus key to decrease the value and press the \oplus key to increase the value.

Settable range: 0.06 to 32.0 sec

- Select whether the damping time constant setting is saved on the screen ④.

Press the M key to save the damping time constant setting.

Press the \ominus or \oplus key to cancel the setting



About the output fluctuation of the transmitter caused by vibration and damping

1) Magnitude of output fluctuation (oscillation) caused by vibration

If the transmitter is mounted to a place subject to severe vibration, output fluctuation (oscillation) may increase. Since the transmitter uses oil as internal pressure transmitting medium, if acceleration is caused by vibration, internal pressure is generated in accordance with the acceleration value, thus resulting in the output fluctuation. The magnitude of output oscillation may become the value shown below at the maximum.

Oscillation frequency: 10 to 150 Hz

Within $\pm 0.25\%$ of URL/(9.8m/s²)

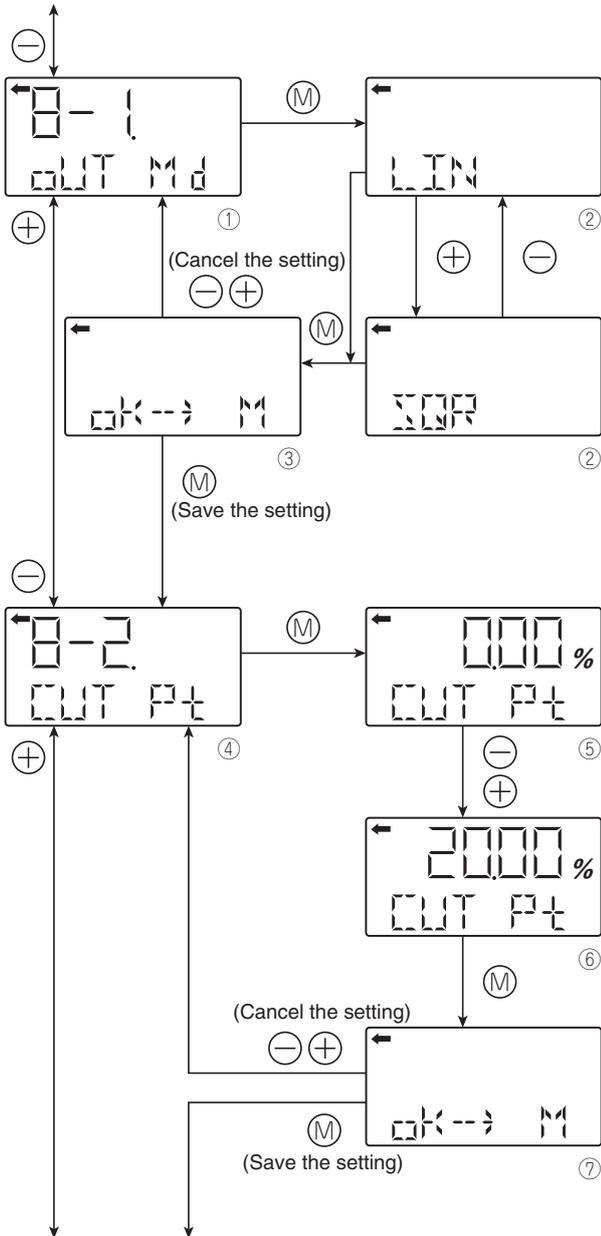
2) Damping

The output fluctuation (oscillation) of the transmitter in an environment subject to vibration can be damped by setting appropriate damping time constant using the HHC. The following table shows the effect of damping on the vibration of 10Hz where the output fluctuation becomes the maximum.

Guideline of the effect of damping on the output fluctuation (oscillation)

Damping set value [sec]	Damping of output oscillation	Remarks
1.2	1/3 or lower	
4.8	1/5 or lower	
19.2	1/10 or lower	

Note) In the oscillation range from 10 to 150Hz, the output fluctuation (oscillation) becomes the maximum at 10Hz, that is, the lowest frequency.



Output mode

The output mode is used to select the proportional mode (proportional to input differential pressure) or square root extraction mode (proportional to flow rate) for the output signal (4 to 20 mA) of the differential pressure transmitter.

In the square root extraction mode, you can set the cut point of low cut and the modes below the cut point.

Change of output mode

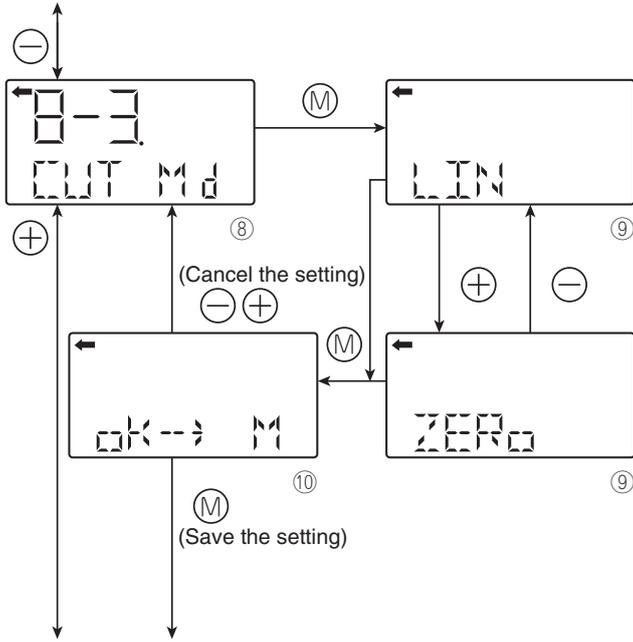
- Press the **M** key on the screen ① to display the screen for changing output mode (②).
- You can select the proportional or square root extraction mode on the screen ②.
Select LIN (proportional mode) or SQR (square root extraction mode) with the **-** or **+** key and press the **M** key.
- Select whether the output mode setting is saved on the screen ③.
Press the **M** key to save the output mode setting.
Press the **-** or **+** key to cancel the setting.

Low cut point setting

If you select the square root mode, set the low cut point.

Cut point is adjustable within the range of 0.00 to 20.00%. Note that if the cut point is set to a small value around 0%, even a minute differential pressure change causes a sudden output fluctuation. The cut point is used for stabilizing output near 0% when the square root extraction mode is selected for output signal.

- Press the **M** key on the screen ④ to display the screen for setting the low cut point (⑤).
- You can set and change the low cut point by inputting the numerical values with the **-** and **+** keys on the screen ⑤.
Settable range: 0.00 to 20.0%
- Select whether the cut point setting is saved on the screen ⑦.
Press the **M** key to save the cut point setting.
Press the **-** or **+** key to cancel the setting.



Low cut mode setting

There are two modes; in one mode, proportional output is selected for output below a cut point (Fig. A) and in the other mode, output is forcibly reduced to 0% for output below a cut point (Fig. B).

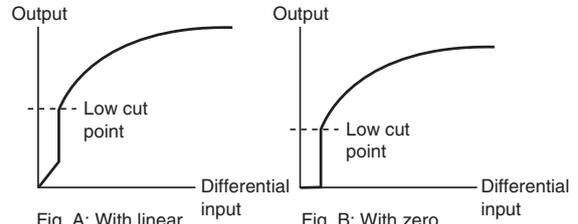
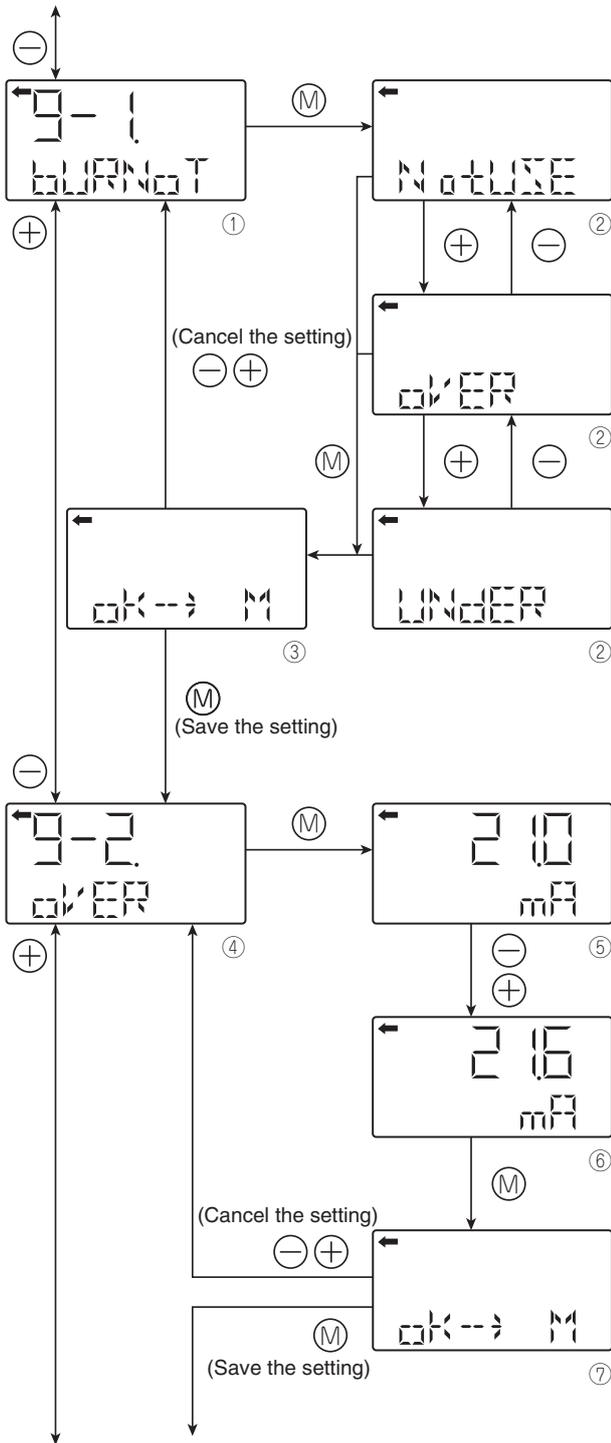


Fig. A: With linear output selected in low cut mode

Fig. B: With zero output selected in low cut mode

- Press the **M** key on the screen ⑧ to display the screen for changing the outputs below the cut point (⑨).
- Select LIN (linear) or ZERO on the screen ⑨ with the **+** or **-** key and press the **M** key.
- Select whether the low cut point setting is saved on the screen ⑩.
Press the **M** key to save the low cut point setting.
Press the **+** or **-** key to cancel the setting.



See the next page for the procedure when UNdER is selected.

Burnout direction

Used for selecting output at occurrence of a fault in the detecting unit.

Change of burnout direction

NotUse → Output hold
 OVER → OVERSCALE
 UNDER → UNDERSCALE

- Press the **M** key on the screen ① to display the screen for changing the burnout direction (②).
- Select NotUse, OVER or UNDER on the screen (2) with the **⊖** or **⊕** key and press the **M** key.
- Select whether the burnout direction setting is saved on the screen ③.
 Press the **M** key to save the burnout direction setting.
 Press the **⊖** or **⊕** key to cancel the setting.

Change of burnout current when OVER (OVERSCALE) is selected for the burnout direction

This display appears if you select “OVER” for the burnout direction.

- Press the **M** key on the screen ④ to display the screen for changing the burnout current for OVERSCALE (⑤).
- You can change the burnout current with the **⊖** and **⊕** keys on the screen ⑤.

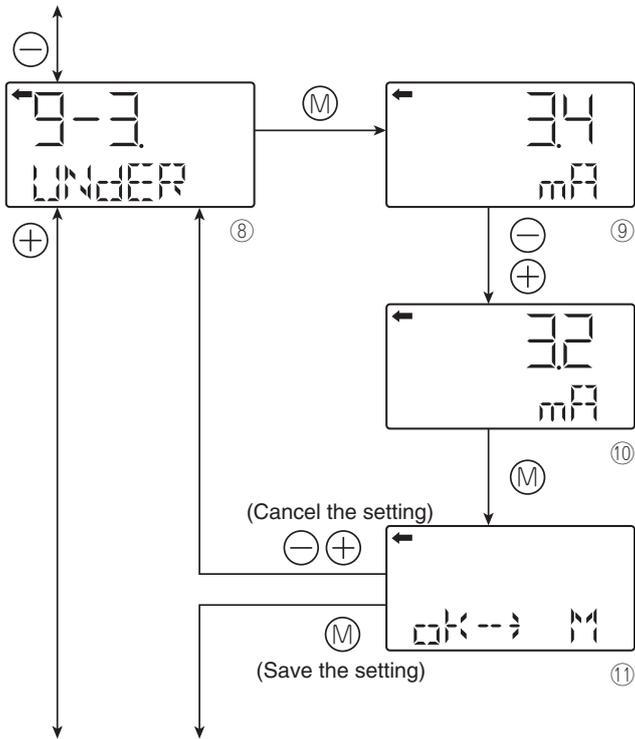
Settable range:

Saturation current value (upper limit) ≤ Burnout (OVER) ≤ 21.6 mA

Note)

You can change the saturation current value (upper limit) setting at “J: Value and specification of saturation current.”

- Select whether the burnout current setting is saved on the screen ⑦.
 Press the **M** key to save the burnout current setting for OVERSCALE.
 Press the **⊖** or **⊕** key to cancel the setting.



Change of burnout current when UNDERSCALE is selected for the burnout direction

This display appears if you select “UNDER” for the burnout direction.

- Press the **M** key on the screen ⑧ to display the screen for changing the burnout current for UNDERSCALE (⑨).
- You can change the burnout current with the **-** and **+** keys on the screen ⑨.

Settable range:

$$3.2 \text{ mA} \leq \text{Burnout (UNDER)} \leq \text{Saturation current value (lower limit)}$$

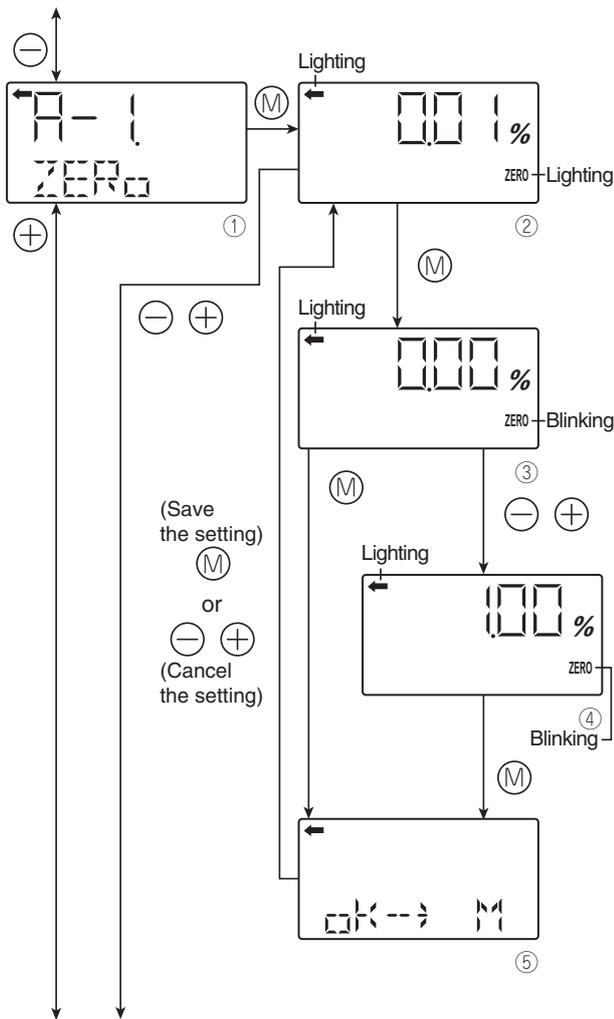
- Select whether the burnout current setting is saved on the screen ⑪.

Press the **M** key to save the burnout current setting for UNDERSCALE.

Press the **-** or **+** key to cancel the setting.

Note)

You can change the saturation current value (lower and upper limits) setting in “J. Value and specification of saturation current.”



Zero/span calibration

Zero and span are adjustable by applying an reference pressure.

! INDICATION

1. After performing a zero calibration, perform a span calibration.
2. If you input the value that exceeds the adjustable range, the setting will not be changed even after the setting is saved.

Adjustable range

Zero calibration: within ±40% of the max span

Span calibration: within ±20% of the set span

Zero calibration

- Press the (M) key on the screen ① to select the zero calibration mode. The measured value and unit on the screen ② are the same as those in the normal mode and “←” and “ZERO” light up.
- Apply the actual input pressure on the screen ②. After checking the measured value, press the (M) key.
- “ZERO” blinks on the screen ③. Press the (M) key on the screen ③ to perform a zero calibration at the input pressure at the time. To perform a zero calibration at a point other than 0%, input an appropriate set value (%) (④) with the (-) and (+) keys, and press the (M) key.

Settable range:

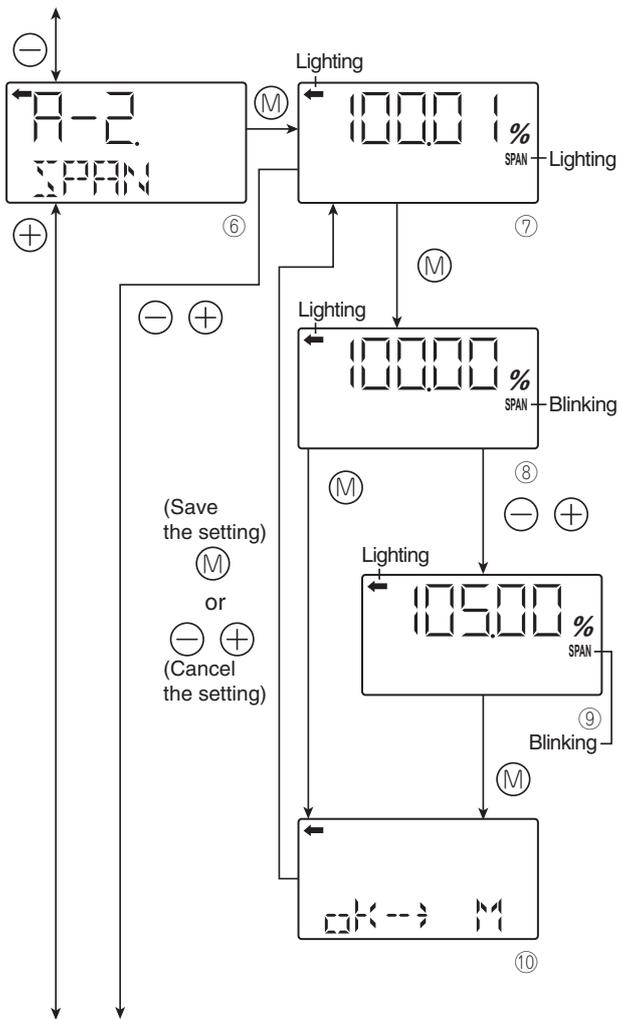
$$-1.000\%CS \leq PL \leq 100.000\%CS$$

$$PL = \frac{\text{Lower limit of adjustment point} \times 100}{\text{Setting range}}$$

Setting range

- * CS is an abbreviation of Calibrated Span, which means an actual measurement range.

- Select whether the zero calibration value setting is saved on the screen ⑤. Press the (M) key to save the zero calibration value setting and return to the screen ②. Press the (-) or (+) key to cancel the setting and return to the screen ②.
- Check that the zero calibration was performed as intended. Press the (M) key to perform a zero calibration again. Press the (-) or (+) key to move to the next screen for item name selection.



Span calibration

- Press the (M) key on the screen ⑥ to select the span calibration mode.

The measured value and unit on the screen (⑦) are the same as those in the normal mode and “←” and “SPAN” light up.

- Apply the actual input pressure on the screen ⑦. After checking the measured value, press the (M) key.
- “SPAN” blinks on the screen ⑧. Press the (M) key on the screen ⑧ to perform a span calibration at the input pressure at the time. To perform a span calibration at a point other than 100%, input an appropriate set value (%) (⑨) with the (-) and (+) keys, and press the (M) key.

Settable range:

0.000%CS ≤ PH ≤ Saturation current (upper limit) set value (%CS)

$$PL = \frac{\text{Upper limit of adjustment point} \times 100}{\text{Setting range}}$$

Setting range

- Select whether the span calibration value setting is saved on the screen ⑩.

Press the (M) key to save the span calibration value setting and return to the screen ⑦.

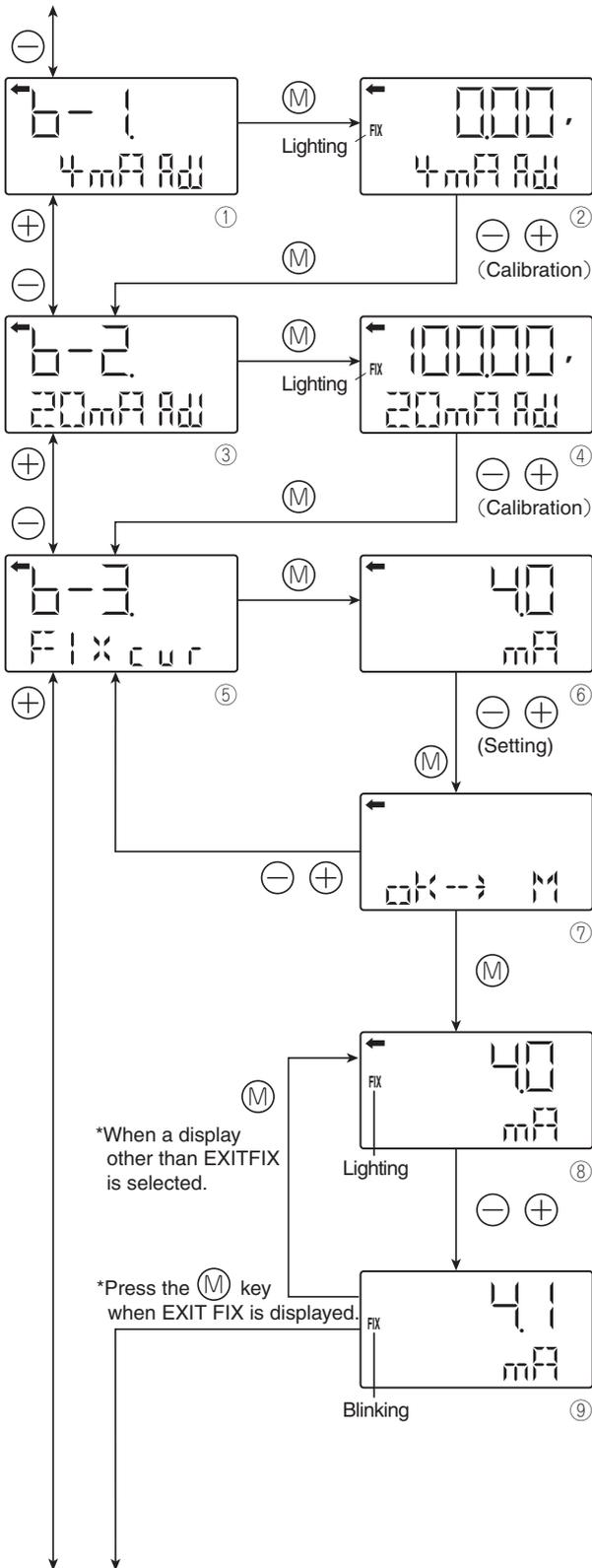
Press the (-) or (+) key to cancel the setting and return to the screen ⑦.

- Check that the span calibration was performed as intended.

Press the (M) key to perform a span calibration again.

Press the (-) or (+) key to move to the next screen for item name selection.

* CS is an abbreviation of Calibrated Span, which means an actual measurement range.



Calibration of output circuit (D/A)

The output circuit (D/A) should be calibrated by the following procedure when necessary.

Make calibration wiring transmitter according to “Calibration” in Appendix A2, and calibrate the output circuit using the following procedure.

4 mA adjustment

- Press the **M** key on the screen ① to display the screen for calibrating the constant current mode 4 mA ②.
- Perform a calibration for 4 mA on the screen ② with the **⊖** and **⊕** keys.
- After the calibration, press the **M** key to move to the screen for calibration of 20 mA.

20 mA adjustment

- Press the **M** key on the screen ③ to display the screen for calibrating the constant current mode 20 mA ④.
- Perform a calibration of 20 mA on the screen ④ with the **⊖** and **⊕** keys.
- After the calibration, press the **M** key to move to the constant current output screen.

Constant current output

- Press the **M** key on the screen ⑤ to display the screen for performing a constant current output ⑥.
- Input a current to be output on the screen ⑥ with the **⊖** and **⊕** keys.

Output value range

3.2 mA ↔ 21.6 mA ↔ EXITFIX (cancellation) ↔ 3.2 mA

- Press the **M** key on the screen ⑦ to output the input current value and the screen ⑧ appears. Press the **⊖** or **⊕** key to cancel the input and return to the screen ⑤.
- Press the **⊖** or **⊕** key on the screen ⑧. FIX blinks and you can reset the constant current output value ⑨. Input a set value with the **⊖** and **⊕** keys, press the **M** key to return to the screen ⑧, and output the reset current.
- Select EXITFIX on the screen ⑨ and press the **M** key to terminate the constant current output and move to the item name selection screen.

Note)

If nothing is input for three minutes in the status of the constant current output, the screen returns to the normal mode with the constant current output kept. You can confirm it by the lighted FIX. Select the setting mode again. Select “FIX cur” on the display ⑨ in the items of “6-3. FIX cur” and press the **M** key to terminate the constant current output.

Self-diagnosis

Self-diagnosis display shows the internal temperature of the transmitter and the failure description.

Internal temperature of the transmitter

- Press the M key on the screen ① to display the screen of internal temperature of the transmitter (②). When a temperature alarm is issued, “TEMP” is changed to “ALM.”

(This corresponds to “AMP TMP” of “Error display of self-diagnosis” in the following table.)

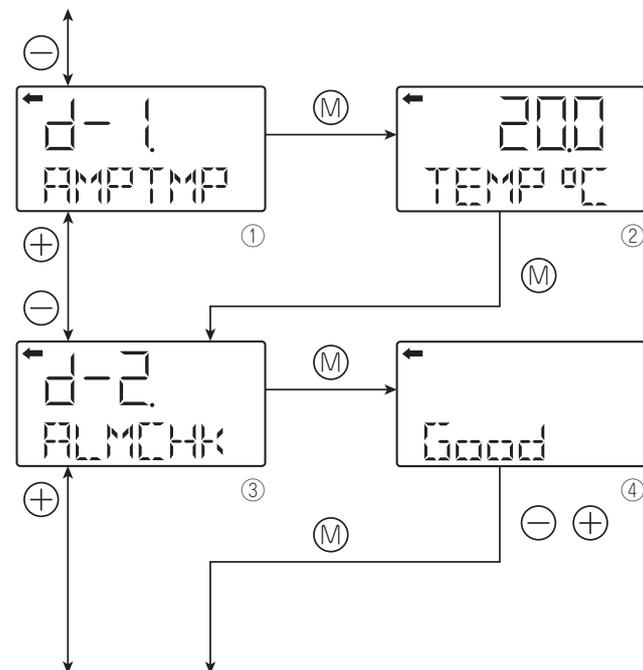
If the temperature cannot be measured due to defective internal data, “IMPOSS” is displayed.

(This corresponds to any of “RAM ER”, “PAR ER” or “AMP EP” of “Error display of self-diagnosis” in the following table.)

Display of self-diagnosis results

- Press the M key on the screen ③ to show the self-diagnosis results (④). Press the \ominus and \oplus keys to display errors sequentially.

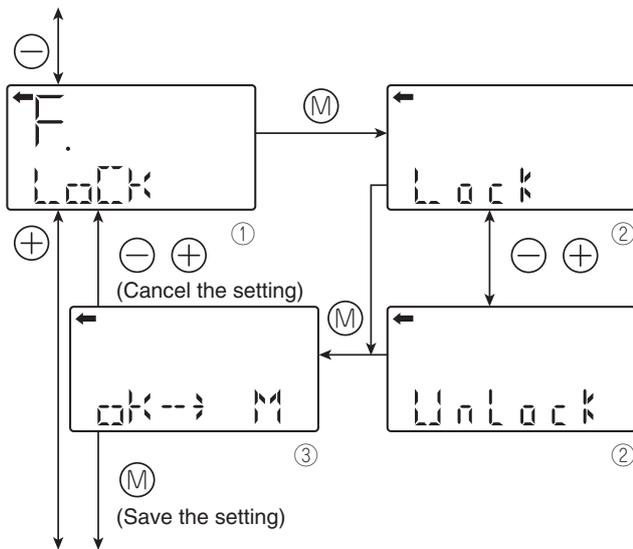
See the following table “Contents of message” for the errors of the transmitter.



[Contents of message]

As a result of self-diagnosis, the message below is appeared on the LCD display, when there are trouble in the transmitter. For each error, its cause and remedy are suggested.

Error display of self-diagnosis	Display in normal mode	Cause	Remedy
C1 ERR ~ C9 ERR	FL-1	Error of detecting unit	Check the wiring between the detecting unit and transmitter. If the error is not recovered, replace the detecting unit.
RAM ER	FL-1	Calculation parameter (RAM) error	Replacement of amplifier
PAR ER		Error of magnitude relation of temperature data	
AMP EP	FL-2	EEPROM error on amplifier side	Replacement of amplifier
CEL EP	FL-3	EEPROM error on cell side	Replacement of detecting unit
AMP TMP	T. ALm	Amplifier temperature error	Transmitter temperature is normalized.
CEL TMP	T. ALm	Cell temperature error	
	OVER	Input pressure: J-2, saturation current (Hi) or higher	Correction of input pressure
	UNDER	Input pressure: J-1, saturation current (Lo) or lower	Correction of input pressure



Lock of adjustment functions

You can lock/unlock the adjustment function of the local configurator unit as follows.

When the adjustment functions are locked, the external adjusting screw is also locked.

- Press the **M** key on the screen ① to display the lock selection screen of adjusting functions (②).
- Select the locking/unlocking of the adjustment functions on the screen ② with the **⊖** and **⊕** keys. Select the locking to lock the adjustment functions of the local configurator unit with LCD display. Select the UnLock to cancel the lock of the adjustment functions of the local configurator unit with LCD display.
- Select whether the locking/unlocking of the adjustment functions are saved on the screen ③. After selecting the locking/unlocking, press the **M** key to save the setting. Press the **⊖** or **⊕** key to cancel the setting and return to the screen ①.

List of adjustment functions locked/unlocked

A. Zero/span calibration	A-1. ZERO
	A-2. SPAN
B Output circuit calibration	b-1. 4mA Adj
	b-2. 20mA Adj
I. Input/Output range adjustment	I-1. LRV Adj
	I-2. URV Adj

Setting of LCD display range

You can set the indicated value corresponding to 0% (4 mA) and 100% (20 mA) for the actual scale display of the LCD unit.

LDV (Setting of the indicated value of 0% (4 mA))

- Press the M key on the screen ① to display the screen for setting the indicated value corresponding to 0% (②).

- Input the indicated value corresponding to 0% of the actual scale on the screen ② with the \ominus and \oplus keys.

Functions of the keys:

\ominus key: To decrease the value

\oplus key: To increase the value

- To set the decimal point position, press the M key on the screen ②. "P" is displayed at the right of the unit name (③) and you can set the decimal point position with the \ominus and \oplus keys.

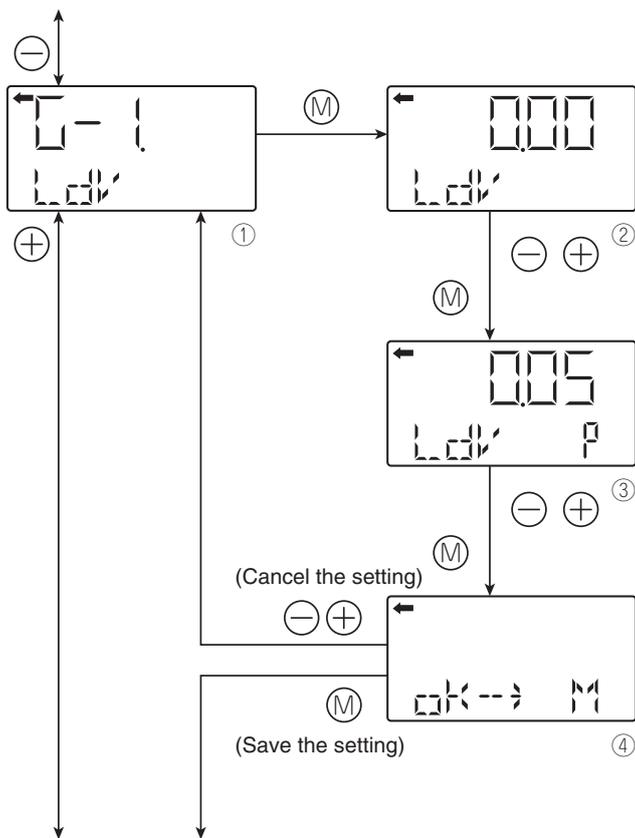
\ominus key: To move the decimal point position to left

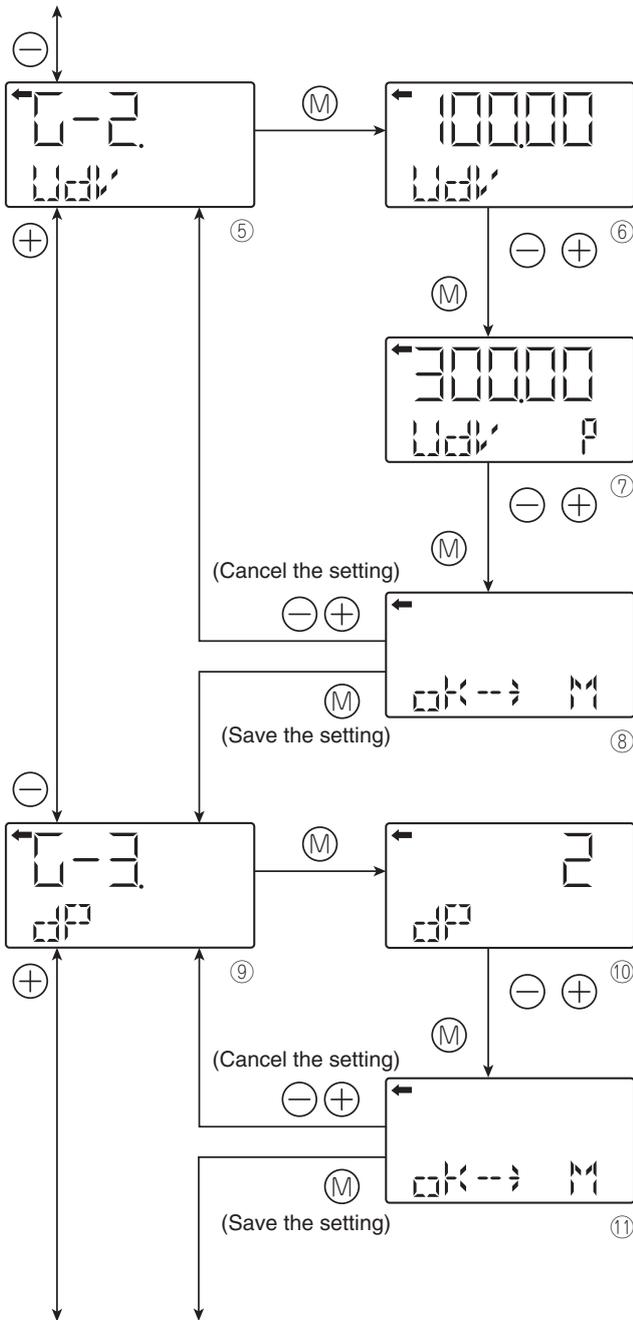
\oplus key: To move the decimal point position to right

- Select whether the indicated value setting of 0% is saved on the screen ④.

Press the M key to save the indicated value setting.

Press the \ominus or \oplus key to cancel the setting.





- UDV (Setting of the indicated value of 100% (20 mA))
- Press the M key on the screen ⑤ to display the screen for setting the indicated value corresponding to 100% (⑥).
 - Input the indicated value corresponding to 100% of the actual scale on the screen ⑥ with the \ominus and \oplus keys.
 - Functions of the keys:
 - \ominus key: To decrease the value
 - \oplus key: To increase the value
 - To set the decimal point position, press the M key on the screen ⑥. "P" is displayed at the right of the unit name (⑦) and you can set the decimal point position with the \ominus and \oplus keys.
 - \ominus key: To move the decimal point position to left
 - \oplus key: To move the decimal point position to right
 - Select whether the indicated value setting of 100% is saved on the screen ⑧.
 - Press the M key to save the indicated value setting.
 - Press the \ominus or \oplus key to cancel the setting.

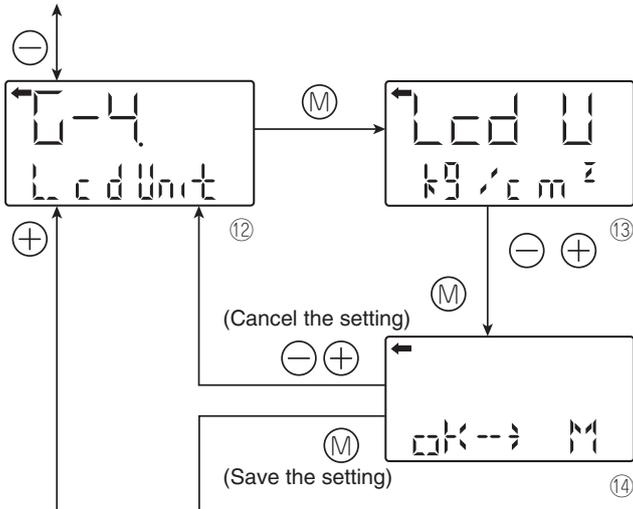
DP setting (number of digits after Decimal Point)
Set the number of digits after decimal point for the LCD indicated value.

- Press the M key on the screen ⑨ to display the screen for setting the DP (⑩).
- Input the DP on the screen (10) with the \ominus and \oplus keys.

Setting range:
 $0 \leq \text{DP} \leq 4$

	Display range
DP=0	-99999 ~ 99999
DP=1	-9999.9 ~ 9999.9
DP=2	-999.99 ~ 999.99
DP=3	-99.999 ~ 99.999
DP=4	-9.9999 ~ 9.9999

- Select whether the DP setting is saved on the screen ⑪.
 - Press the M key to save the DP setting.
 - Press the \ominus or \oplus key to cancel the setting.



LCD Unit (Setting of the actual scale unit)

- Press the **M** key on the screen ⑫ to display the screen for setting the unit (⑬).
- Input the unit on the screen ⑬ with the **-** and **+** keys.
- Select whether the unit setting is saved on the screen ⑭.
- Press the **M** key to save the unit setting.
- Press the **-** or **+** key to cancel the setting.

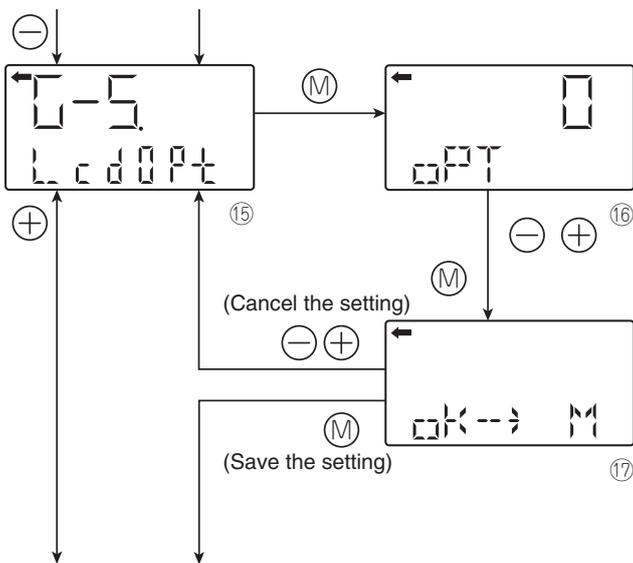
Available unit for FCX-All

(The units with * cannot be used because they are not legal units in Japan.)

(a)	(b)	(c)
%(LIN)	mm	%(SQR)
NONE(LIN)	cm	NONE(SQR)
MPa	m	Nm ³ /s
kPa	in *	Nm ³ /min
hPa	ft *	Nm ³ /h
Pa		Nm ³ /d
bar		m ³ /s
mbar		m ³ /min
kg/cm ² *		m ³ /h
g/cm ² *		m ³ /d
mmH ₂ O *		NI/s
cmH ₂ O *		NI/min
mH ₂ O *		NI/h
inH ₂ O *		NI/d
ftH ₂ O *		l/s
mmAq *		l/min
cmAq *		l/h
mAq *		l/d
mmWC *	gal/s *	
cmWC *	gal/min *	
mWC *	gal/h *	
mmHg *	gal/d *	
cmHg *	ft ³ /s *	
mHg *	ft ³ /min *	
inHg *	ft ³ /h *	
PSI *	ft ³ /d *	
<atm> *	bbl/s *	
<Torr> *	bbl/min *	
	bbl/h *	
	bbl/d *	
	kg/s	
	kg/min	
	kg/h	
	kg/d	
	t/s	
	t/min	
	t/h	
	t/d	

The units in parentheses < > are displayed only when the absolute pressure transmitter is used.

The flow units in the column (c) can be set only for the group of differential pressure transmitters.



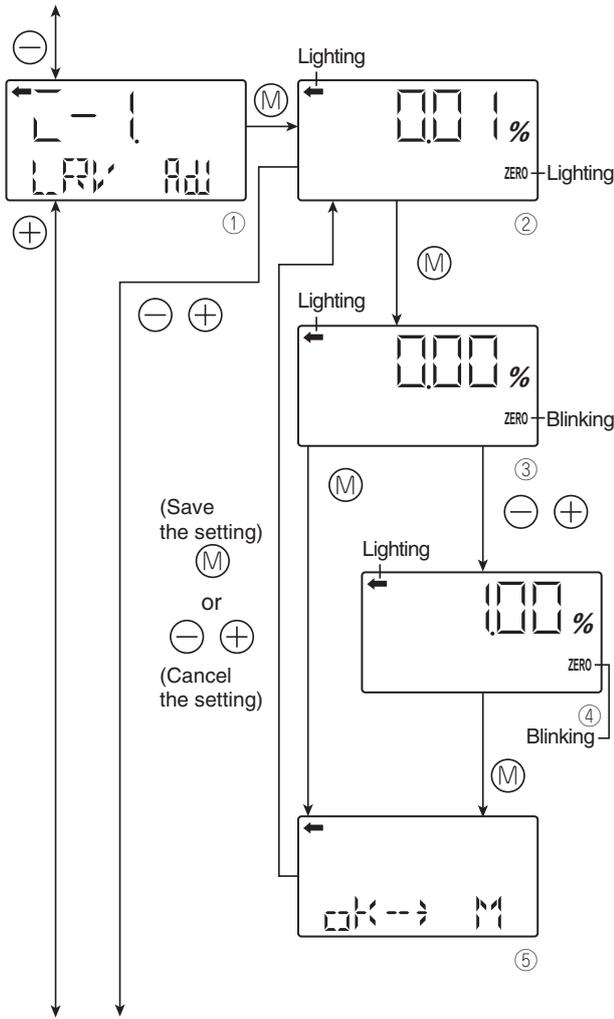
LCD Option

- Press the **M** key on the screen ⑮ to display the screen for setting the LCD option (⑯).
 - Input the option No. on the screen ⑯ to set the LCD option with the **-** and **+** keys.
- Setting range:

$$0 \leq \text{LCD Option} \leq 3$$

LCD Option	Function
0	Normal display (Display set at G1 to G4)
1	Alternate display (Display set at G1 to G4 and % display [in increments of 1%])
2	Alternate display (Display set at G1 to G4 and % display [in increments of 0.1%])
3	Alternate display (Display set at G1 to G4 and % display [in increments of 0.01%])

- Select whether the option setting is saved on the screen ⑰.
- Press the **M** key to save the option setting.
- Press the **-** or **+** key to cancel the setting.



Input-output range adjustment (Rerange: adjustment by LRV/URV change)

(application to level measurement) at change of level (LRV/URV)

The input-output range adjustment enables you to change the measurement range by readjusting the lower limit of the measurement (LRV) or the upper limit of the measurement (URV) in the level measurement of the tank.

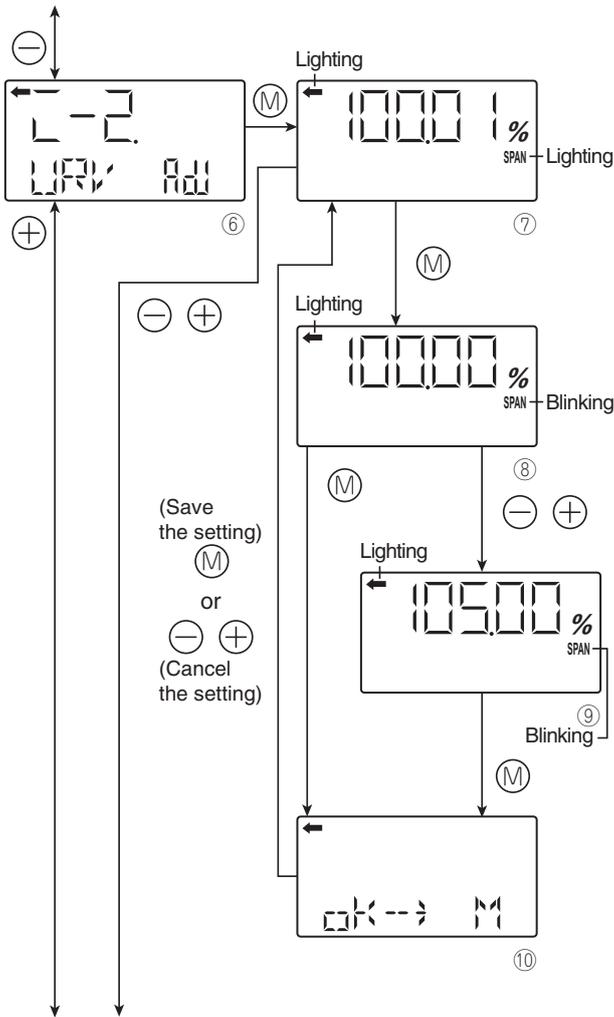
Zero adjustment by changing the range (LRV) (LRV adjustment)

- Press the (M) key on the screen ① to select the LRV adjustment mode. The measured value and unit on the screen ② are the same as those in the normal mode and “←” and “ZERO” light up.
- Apply the actual input pressure on the screen ②. After checking the measured value, press the (M) key.
- “ZERO” blinks on the screen ③. Press the (M) key on the screen ③ to perform a zero adjustment at the input pressure at the time. To perform a zero adjustment at a LRV point other than 0%, input an appropriate set value (%) (④) with the ⊖ and ⊕ keys. Press the (M) key to set the new measurement range appropriate for the input pressure.

Settable range:
 $-1.00\% \leq \text{LRV (Note 1)} \leq 100.00\%$

Note 1:
 Output adjustment value (%) corresponding to the input pressure for the LRV adjustment

- Select whether the LRV adjustment value setting is saved on the screen ⑤. Press the (M) key to save the LRV adjustment value setting and return to the screen ②. Press the ⊖ or ⊕ key to cancel the setting and return to the screen ②.
- Check that the zero adjustment (LRV) was performed as intended on the screen ②. Press the (M) key to perform a zero adjustment again. Press the ⊖ or ⊕ key to move to the next screen for item name selection.



Span adjustment by changing the range (URV) (URV adjustment)

- Press the (M) key on the screen (6) to select the URV adjustment mode.

The measured value and unit on the screen (7) are the same as those in the normal mode and “←” and “ZERO” light up.

- Apply the actual input pressure on the screen (7). After checking the measured value, press the (M) key.

- “SPAN” blinks on the screen (8). Press the (M) key on the screen (8) to perform a span (100% point) adjustment at the input pressure at the time. To perform a span adjustment at a URV point other than 100%, input an appropriate set value (%) (9) with the (-) and (+) keys. Press the (M) key to set the new measurement range appropriate for the input pressure.

Settable range:

$0.00\% \leq \text{URV (Note 2)} \leq \text{Saturation current value (upper limit)}$

Note 2:

Output adjustment value (%) corresponding to the input pressure for the URV adjustment

- Select whether the URV adjustment value setting is saved on the screen (10).

Press the (M) key to save the URV adjustment value setting and return to the screen (7).

Press the (-) or (+) key to cancel the setting and return to the screen (7).

- Check that the span adjustment (URV) was performed as intended on the screen (7).

Press the (M) key to perform a span adjustment again.

- Press the (-) or (+) key to move to the next screen for item name selection.

PRECAUTION

If the input-output is adjusted, the measurement range is changed as shown in the following page.

LRV adjustment

- The measurement range (LRV and URV) are changed. The span is not changed.

URV adjustment

- Only the URV (span) of the measurement range is changed. The zero point (LRV) is not changed.

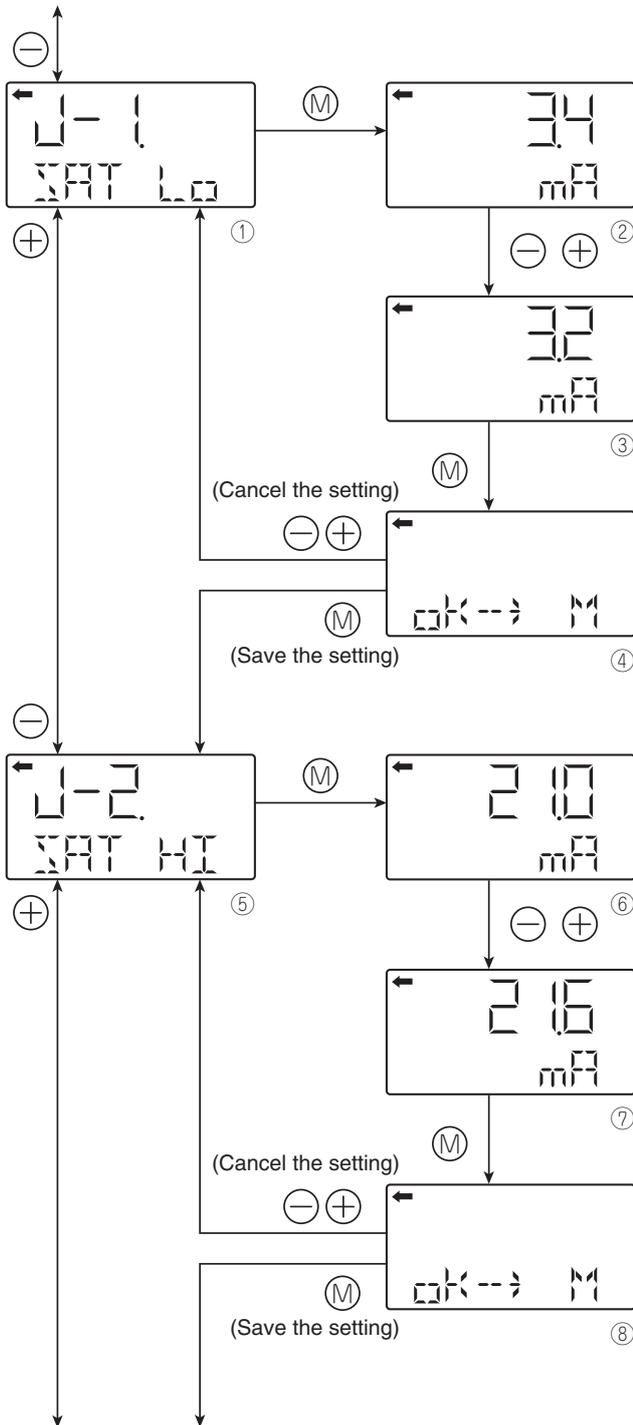
The following are the setting conditions for the adjustment point:

$-1.00\% \leq \text{LRV (Note 1)} \leq 100.00\%$

$0.00\% \leq \text{URV (Note 2)} \leq \text{Saturation current value (upper limit)}$

Note 1: Output adjustment value (%) corresponding to the input pressure for the LRV adjustment

Note 2: Output adjustment value (%) corresponding to the input pressure for the URV adjustment



Value and specification of saturation current

*: You cannot change the saturation current setting if “NoRMAL (normal specification)” is selected at “J-3.” To change the saturation current setting, select “EXP (expanded specification)” at “J-3” as shown in the following page.

Change of the saturation current value (lower limit) (available only when the expanded specification is selected)

- Press the M key on the screen ① to display the screen for setting the lower limit of the saturation current (②).

- Input the lower limit on the screen ② with the \ominus and \oplus keys.

Setting range:

$3.2 \text{ mA} \leq \text{Burnout current (UNDER)} \leq \text{Saturation current (lower limit)} \leq 4.0 \text{ mA}$

- Select whether the lower limit setting of the saturation current is saved on the screen ④.

Press the M key to save the lower limit setting.

Press the \ominus or \oplus key to cancel the setting.

Change of the saturation current value (upper limit) (available only when the expanded specification is selected)

- Press the M key on the screen ⑤ to display the screen for setting the upper limit of the saturation current (⑥).

- Input the upper limit on the screen ⑥ with the \ominus and \oplus keys.

Setting range:

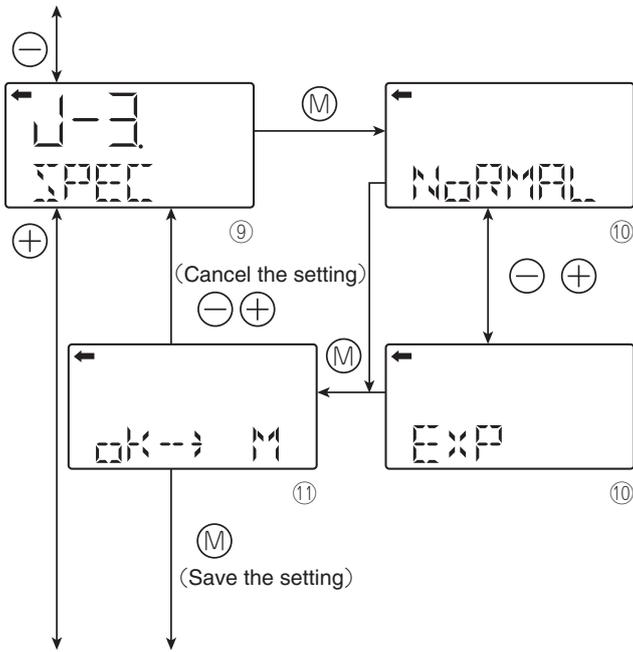
$20.0 \text{ mA} \leq \text{Saturation current (upper limit)} \leq \text{Burnout current (OVER)} \leq 21.6 \text{ mA}$

- Select whether the upper limit setting of the saturation current is saved on the screen ⑧.

Press the M key to save the upper limit setting.

Press the \ominus or \oplus key to cancel the setting.

* You can change the burnout current setting at “9: Direction and value of burnout.”



Selection of the burnout & saturation current value specification (normal specification/expanded specification)

- Press the **M** key on the screen ⑨ to display the screen for selecting the burnout & saturation current value specification (⑩).
- Select “NoRMAL (normal specification)” or “EXP (expanded specification)” on the screen ⑩ with the **-** and **+** keys.

Select “NoRMAL” for the normal setting.

Select “EXP” for the expanded setting.

* To change the saturation current value (upper limit, lower limit), select the expanded specification.

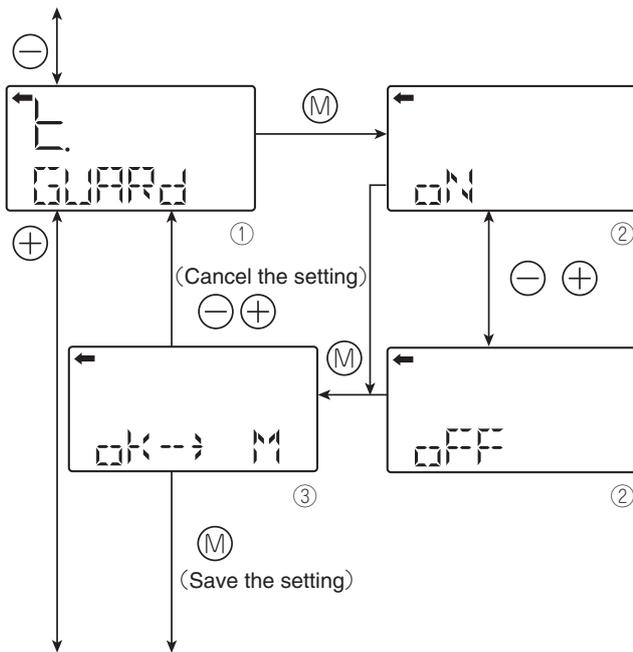
	Normal specification	Expanded specification
Saturation current value (lower limit)	3.8 mA (fixed)	3.2 mA to 4.0 mA Settable in increments of 0.1 mA
Saturation current value (upper limit)	20.8 mA (fixed)	20.0 mA to 21.6 mA Settable in increments of 0.1 mA

The table below lists the output current value for burnout (OVER, UNDER).

	Normal specification	Expanded specification
Burnout (UNDER)	3.2 to 3.8 mA	3.2 mA to saturation current value (lower limit)
Burnout (OVER)	20.8 to 21.6 mA	Saturation current value (upper limit) to 21.6 mA

The values in the table above can be set in increments of 0.1 mA.

- Select whether the NoRMAL/EXP setting is saved on the screen ⑪.
Press the **M** key to save the NoRMAL/EXP setting.
Press the **-** or **+** key to cancel the setting and return to the screen ⑨.

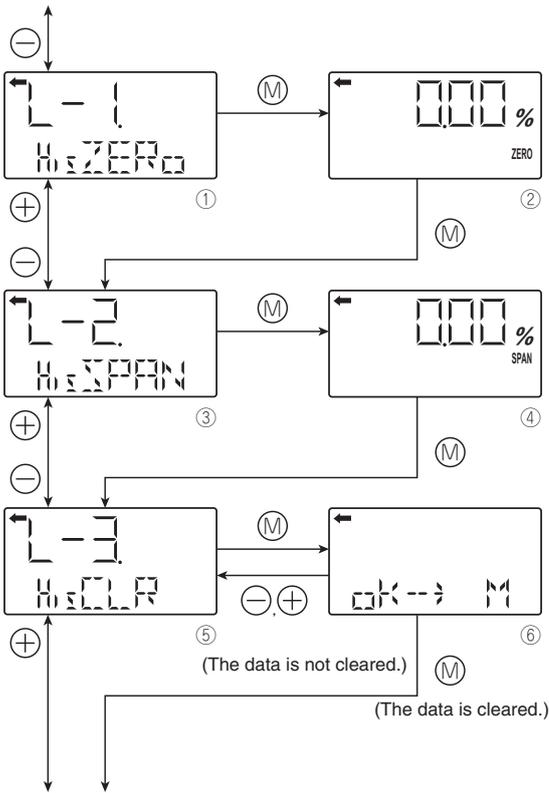


Protective function of set value (Write protect)

- Press the M key on the screen ① to display the screen for setting/canceling write protect (②).
- Select oN (setting)/oFF (canceling) on the screen ② with the \ominus and \oplus keys.
To enable write protect, select "ON."
To disable write protect, select "OFF."
- Select whether the selection of oN (setting)/oFF (canceling) is saved on the screen ③.
After selecting oN/oFF, press the M key to save the setting.
Press the \ominus or \oplus key to cancel the setting and return to the screen ①.

Note:

- If you enable write protect and set a password by the HHC, you cannot cancel the setting with the 3 push buttons and the item name of "K. GUARD" does not appear.
- If you enable write protect by setting the protective function of set value (GUARD) with the 3 push buttons, you can cancel the setting by the HHC.



History information

Display of zero calibration data for users

- The zero calibration value at the time is displayed.
- Press the (M) key on the screen ① to display the zero calibration value (②).
- Press the (M) key on the screen ② to move to “Display of span calibration data for users.”

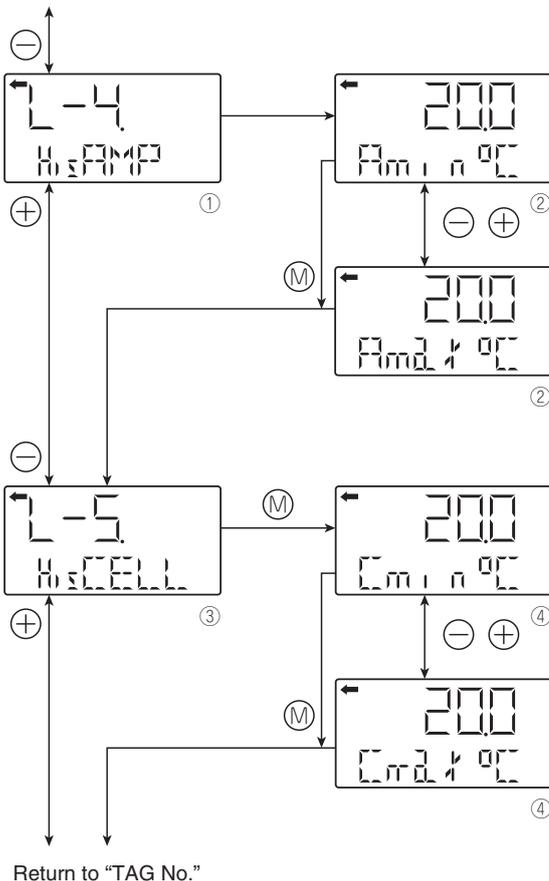
Display of span calibration data for users

- The span calibration value at the time is displayed.
- Press the (M) key on the screen ③ to display the span calibration value (④).
- Press the (M) key on the screen ④ to move to “Clearing of zero/span calibration data.”

Clearing of zero/span calibration data

- The zero/span calibration value at the time is cleared.
- Press the (M) key on the screen ⑤ to display the screen for confirming the zero/span calibration value (⑥).
- Press the (M) key on the screen ⑥ to clear the zero/span calibration data. Press the (-) or (+) key to return to the screen ⑤ without clearing the data.

PRECAUTION Note that if you clear the zero/span calibration data, the adjusted zero/span calibration value is deleted and reset to the factory default.



Display of min/max of amplifier temperature history information

- The min/max values of the amplifier temperature history are displayed.
- Press the (M) key on the screen ① to display the min/max values of amplifier temperature (②).
- Select and display the min/max values on the display ② with the (-) and (+) keys. Select “Amin” to display the min value of the amplifier temperature history. Select “Amax” to display the max value of the amplifier temperature history.
- Press the (M) key on the screen ② to move to “Display of min/max of cell temperature history information.”

Display of min/max of cell temperature history information

- The min/max values of the cell temperature history are displayed.
- Press the (M) key on the screen ③ to display the min/max values (④).
- Select and display the min/max values on the display ④ with the (-) and (+) keys. Select “Cmin” to display the min value of the cell temperature history. Select “Cmax” to display the max value of the cell temperature history.
- Press the (M) key on the screen ④ to return to “TAG No.”

To operate the FCX-A2 V5 serie transmitters, the FXW (HHC) is used for each adjustment.

4.3 Adjustment with Hand Held Commnicator (HHC)

! DANGER In the case of a flameproof transmitter, never connect the HHC to the terminal block of the transmitter in hazardous area installations.

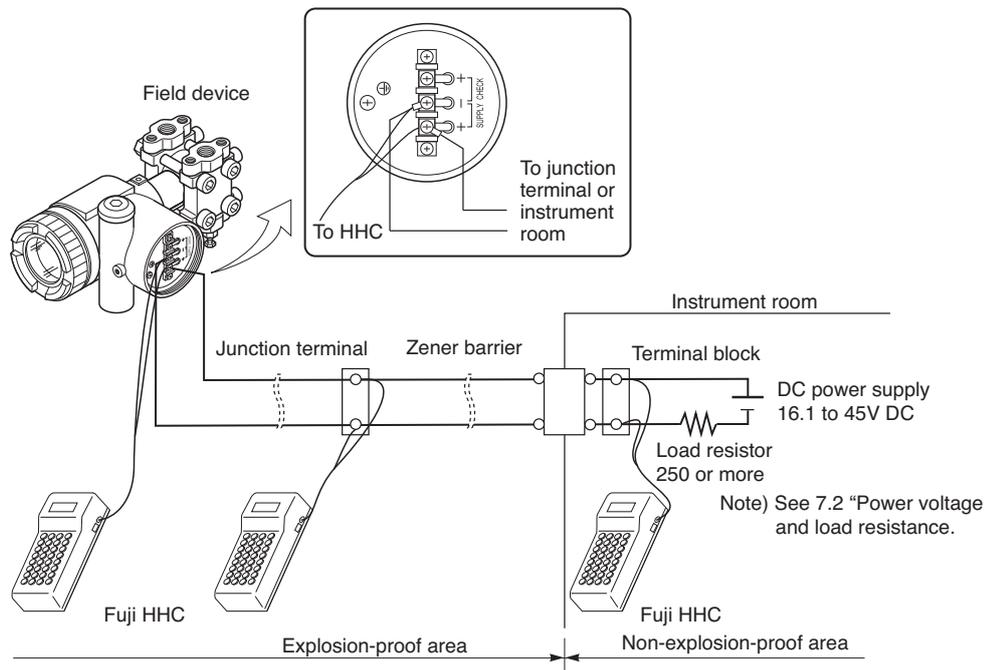
The span adjustment of the transmitter can be done by using the HHC without applying a reference pressure. Here after you will find the wiring of the HHC to modify the transmitter parameters. For the use and the start up of the HHC, please refer to the instructions of FXW (HHC).

! INDICATION After adjustment of the transmitter, it should be kept energized for about 10 seconds to write the adjustment results into memory.

4.3.1 Connection of HHC

The HHC can be connected in any point of the loop.
To communicate with the HHC, a load resistor of 250Ω mini is required.

Refer the following diagram connection of the HHC (hand Held Communicator).



Remarks :

- * The HHC must be on "OFF" position during the connection.
It can't be connected to the junction terminal "CHECK + and -" of the transmitter.
- * The HHC has no polarity. (You can connect either the red or black electrical wire to the terminals + or - of the transmitter or on the wires of the loop).

! DANGER In the case of a flameproof transmitter, the HHC can only be connected via the junction box located outside the hazardous area.

4.3.2 Start up of the HHC

- Put on/off switch of the HHC on "ON" position.
Put on the enclosed "key" in the corresponding location of the HHC. Without the key and with the key in vertical position, you can just read the transmitter parameters.
To write new parameters in the transmitter, the key needs to be in horizontal position. Otherwise, you will have an inscription on the HHC screen "**INHIBIT KEY OK ?**" to let you know that the key needs to be turned to enable the programming of new parameters in the transmitter.
NOTA : "**INHIBIT KEY**" means that the key permits or inhibits (prohibited) writing parameters in the transmitter
- The transmitter version and the revision of the HHC software are indicated on the screen during the start up.
After around 4 seconds the inscription "**PUSH MENU KEY**" appears (please push menu key) HHC with the optional printer will have the inscription "**PAPER FEED**". Please push on <INC> key. By pushing on <INC> key the paper feed is activated.
"**PUSH MENU KEY**" will be indicated on the screen by if you push on the clear <CL> key.
On the screen appears the inscription "**RECEIVING START**". The HHC reads out the data from the transmitter, and switches automatically in the first programming menu : TAG menu.
In case of a connection problem, "**NO CONNECTION**" will appear on the screen. The "**PUSH MENU KEY**" appears again if you push the clear <CL> key.
The reasons of a communication problem can be :
 - The 4-20 mA output is not powered.
 - The 4-20 mA is disconnected.
 - The connection between the amplifier unit and the measuring cell is wrong.
 - The loop resistance value doesn't correspond to the required one depending on the power supply.
 - The HHC is not connected to the correct terminals

Configuration menus of HHC

The configuration is based on different menus. The identification of the following program steps are indicated on the bottom line of the screen inside following signs (<_____>).
The configuration menus are selectable by pushing on the **INC** (increase: configuration N+1), or the **DEC** (decrease: configuration N-1), keys. The most important menus can be selected with a specific, corresponding key.
The <**CHNG**> (CHANGE, modification) key inside each menu gives the possibility to make modifications or to program new parameters in the transmitter with the alphanumeric keys.
To program letters, you first need to push the <**ALHA**> key, each time before programming the letter. To add a space between characters, you have to push the keys <**ALHA**>, and < >. To delete characters, please use the clear key <**CL**>.
When the modification is programmed, you have to push the enter key <**ENT**> to send the new information to the transmitter. For safety reasons, you need to confirm the modification a second time by replying on the question "**CHNG OK ?**". You confirm by typing a second time on the enter <**ENT**> to confirm.
At this moment the new programmed information are written in the transmitter memory, "**WRITE**" indication will appear on the screen of the HHC

The following shows the flow of 21 key operations (n°1 to L), explained for FXW version 7.0 (FXW□□□□1-A4).

FXW prior to Version 7.0 are not available of operation of FCX-A2 V5 serie transmitters. In this case, the user is requested to contact our office for ROM version up.

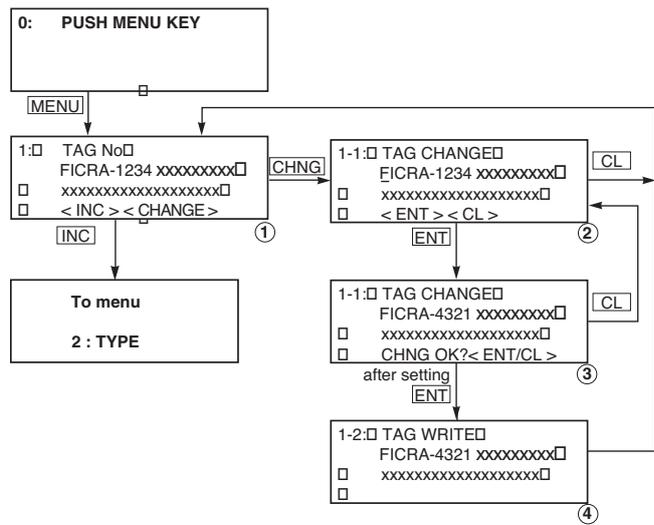
Classification		Display symbol	Key symbol	Referential page
1	TAG No.	INC 1: TAG No.	MENU	50
2	Type	INC 2: TYPE	MENU ⇨ INC	50
3	Display of serial No.	INC 3: SERIAL No.	MENU ⇨ INC ⇨ INC	51
4	Industrial value unit	INC 4: UNIT	UNIT	51
5	Range limit	INC 5: RANGE LIMIT	UNIT ⇨ INC	52
6	Range change (LRV,URV)	INC 6: RANGE	RANG	52
7	Damping adjustment	INC 7: DAMPING	DAMP	53
8	Output mode and value	INC 8: OUTPUT MODE	LIN / ?	54
9	Burnout direction	INC 9: BURNOUT	LIN / ? ⇨ INC	55
A	Calibration of the zero/span	INC A: CALIBRATE	CALB	56
B	Calibration of output circuit	INC B: OUTPUT ADJ	OUT	57
C	Indication of measured data	INC C: DATA	DATA	58
D	Self-diagnosis	INC D: SELF CHECK	DATA ⇨ INC	58
E	Printer function	INC E: PRINT	DATA ⇨ INC ⇨ INC	59
F	Lock of adjustment functions	INC F: XMTR EXT. SW	DATA ⇨ INC ⇨ INC ⇨ INC	59
G	Indication of digital indicator	INC G: XMTR DISPLAY	DATA ⇨ INC ⇨ INC ⇨ INC ⇨ INC	60
H	Programmable linearization function	INC H: LINEARIZE	DATA ⇨ INC ⇨ INC ⇨ INC ⇨ INC ⇨ INC	62
I	Rerange (Set LRV/URV calibration)	INC I: RERANGE	DATA ⇨ INC ⇨ INC ⇨ INC ⇨ INC ⇨ INC ⇨ INC	64
J	Saturation current value and specification setting	INC J: SATURATE CUR	DATA ⇨ INC ⇨ INC ⇨ INC ⇨ INC ⇨ INC ⇨ INC ⇨ INC	65
K	Write protect	INC K: WRITE PROTCT	DATA ⇨ INC ⇨ INC ⇨ INC ⇨ INC ⇨ INC ⇨ INC ⇨ INC ⇨ INC	66
L	History information	INC L: HISTORY	DATA ⇨ INC ⇨ INC ⇨ INC ⇨ INC ⇨ INC ⇨ INC ⇨ INC ⇨ INC ⇨ INC	67

Tag N°

To set the TAG N° of each field device, use the procedures shown in the following diagram.

TAG N° can be inputted up to 26 characters of alphanumeric codes.

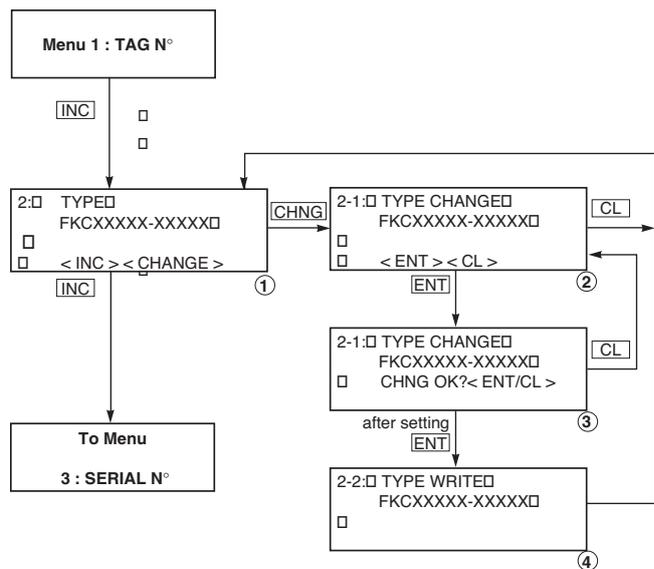
- After PUSH MENU KEY is displayed, press the <MENU> key to display TAG N°.
- To make changes press the <CHNG> key and the cursor will be displayed under display ①.
- Set the alphanumeric keys as necessary under display ② .
To set the alphabet, press the <CHNG ALHA> key first.
Using <◀> <▶> keys, cursor position can be moved.
- At the completion of setting, press the <ENT> key and a prompt is displayed check entry under display ③ .
- If the entry is correct, press the <ENT> key to input it to the field device under display ③ and ④ and the initial image ① is displayed.
- To display TYPE display, press the <INC> key under display ①



Type

Type of field device is displayed and changed (ex. of differential pressure transmitter).

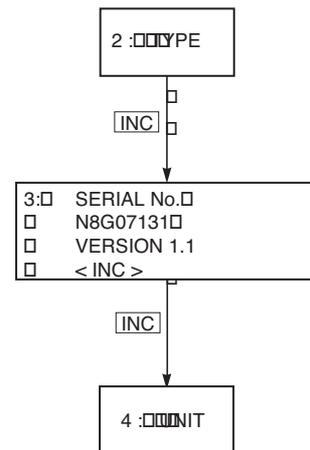
- After TAG N° is displayed, press the <INC> key to display TYPE image.
- To make changes press the <CHNG> key under display ① and the cursor will be displayed under display ② .
- Set the alphanumeric keys as necessary under display ② . To set the alphabet, press the <CHNG ALHA> key first.
Using <◀> <▶> keys, cursor position can be moved.
- At the completion of setting, press the <ENT> key and a prompt is displayed check entry under display ② .
- If the entry is correct, press the <ENT> key to input it to the field device under display ③ and ④ and the initial image ① is displayed.
- To display SERIAL N°, press the <INC> key under display ①.



Serial N°

SERIAL N° and transmitters software version are displayed.

- After setting TYPE, press the <INC> key to display SERIAL N° and software version of transmitter.
- By pressing the <INC> key, UNIT setting image is displayed.



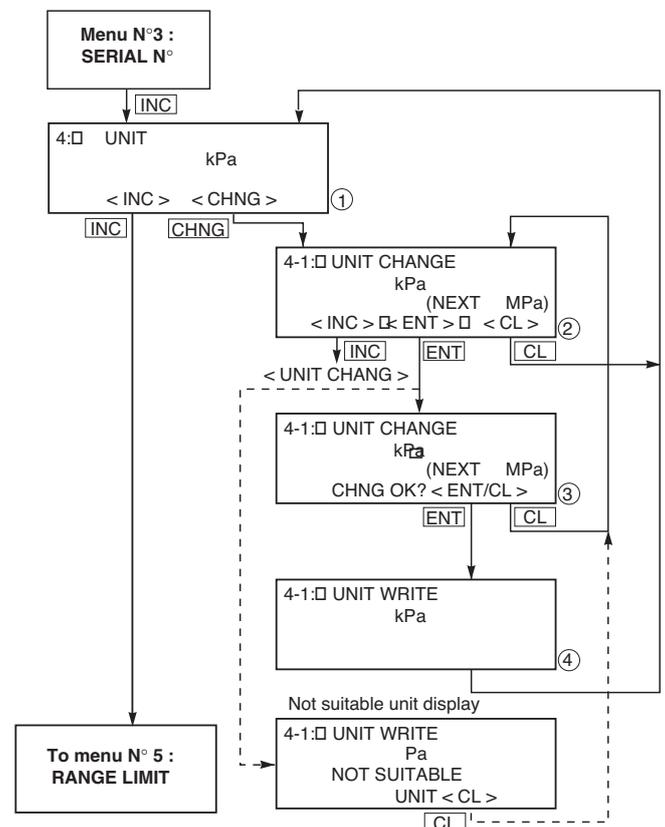
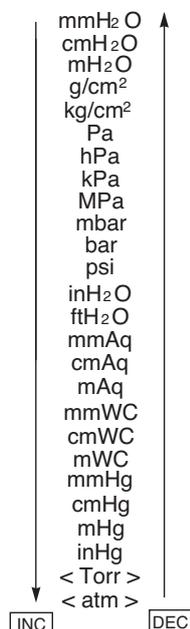
Industrial value Unit

26 industrial units can be used by the operator (see below).

Note:

The mark < > is settable for absolute pressure transmitter only.

- When pressing <CHNG> under display ①, the display for changing the unit of industrial value ② appears.
- The desired unit of industrial value is selectable by using <INC> or <DEC> under display ②.
- Display ③ is provided for confirming your change.
- Display ④ is for registering the unit of industrial value.



Range Limit

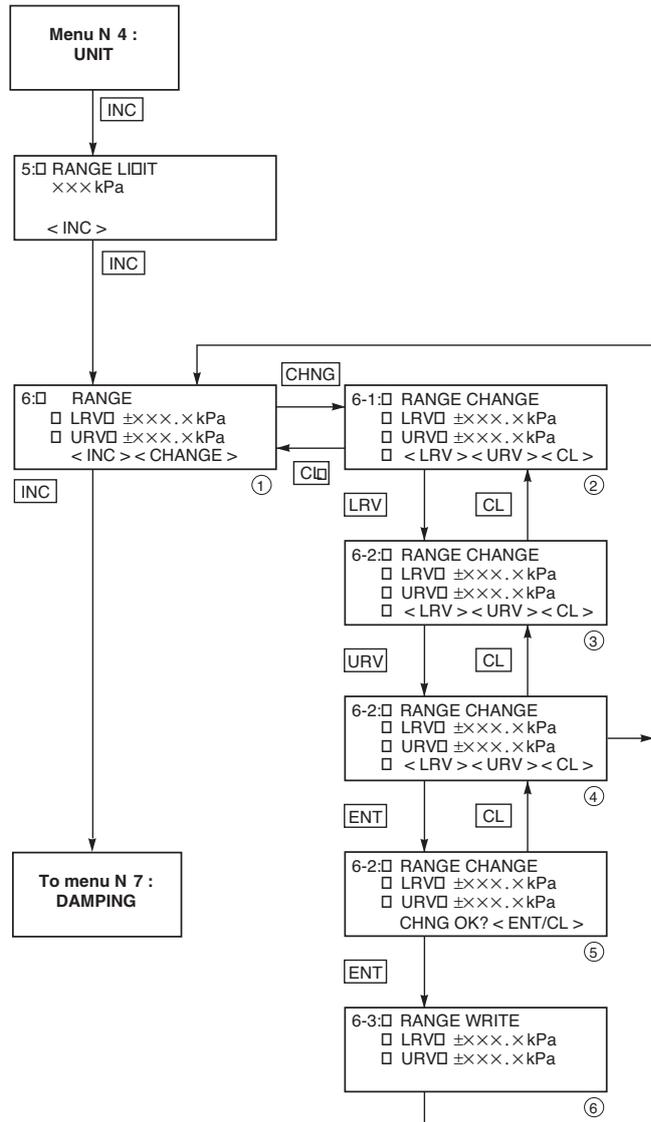
Indicates the maximum measuring range of this transmitter.

Range change (LRV, URV)

LRV: Lower range value (0% point)

URV: Upper range value (100% point)

- When pressing <CHNG> under display ①, display changes to the LRV and URV selection screen. Press <LRV> for presenting the display for setting the zero point range (display ③), or <URV> for presenting the display for setting the span range (display ④).
- Under displays ③ and ④, input zero point and span values. *Press <ENT> after setting LRV and URV.
- When pressing <+/-> under display ③, ④, negative value is available.

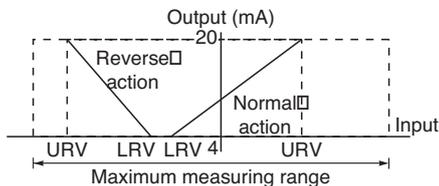


Allow to read or modify the points 0% and 10 %.

0% = 4 mA = LRV

100% = 20 mA = URV

Selectable setting range



In case of the actual scale specification with a digital indicator provided, if the range is changed, indicator display does not match. So, setting is required again in response to the display in the digital indicator (G: XMTR DISPLAY). In case of the actual scale specification with an analog indicator provided, if the range is changed, indicator display does not match. So, replacement of the analog indicator is required.

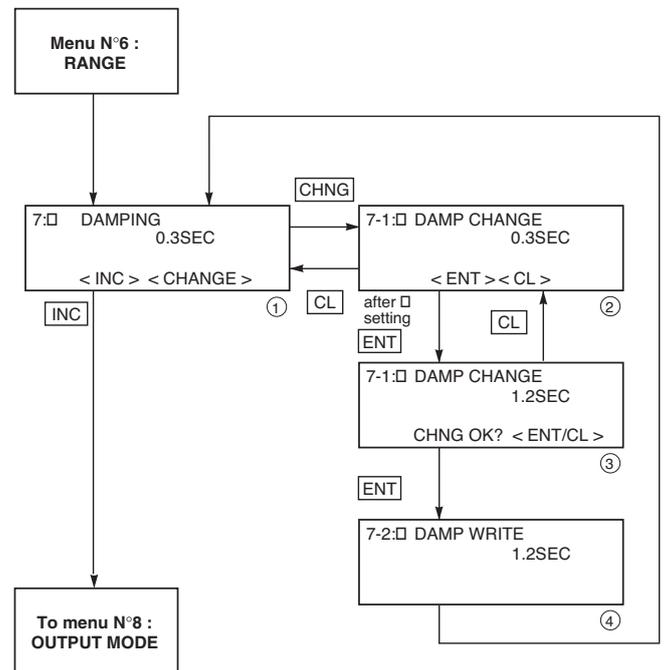
Damping Adjustment

The configuration menu 7 “DAMPING” allows adjusting the damping of the output signal according to the application conditions. It is important to make the difference between the damping, the time constant and the response time.

The damping corresponds to an average value on the output signal for a pressure input who changes very quickly programmable over a certain period of time called damping value in sec.

The time constant τ is a fixed value related to the measuring upper range limit of a transmitter

The response time corresponds to the time that the output signal takes to reach around 62.3% when a pressure is applied corresponding 0 to 100% of span. The response time takes in account the time constant and the dead time of the transmitter.



Output Mode

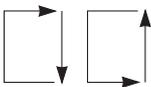
The output mode is used to select the proportional mode (proportional to input differential pressure) or square root extraction mode (proportional to flow rate) for output signal (4 to 20mA).

In case of square root extraction mode, the cut point and the mode below the cut point can be set.

Under display ②, press <INC> or <DEC> for selection of the square root extraction mode or proportional mode.

Change of output mode

<INC> <DEC>



a: OUT=LIN

b: OUT=SQR

Since display ⑦ is presented when the square root extraction mode is selected, the low flow cut point should be set.

Cut point is adjustable within the range of 0.00 to 20.00%. The cut point is used for stabilizing output near 0% when the square root extraction mode is selected for output signal.

There are two modes; in one mode, proportional output is selected for output below a cut point (Fig. A) and in the other mode, out put is forcibly reduced to 0% for output below a cut point (Fig. B).

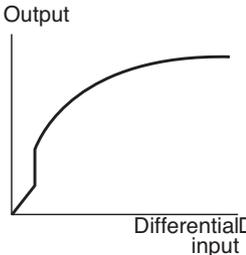


Fig. A: With linear output selected in low cut mode

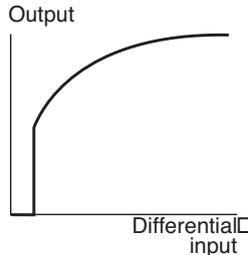
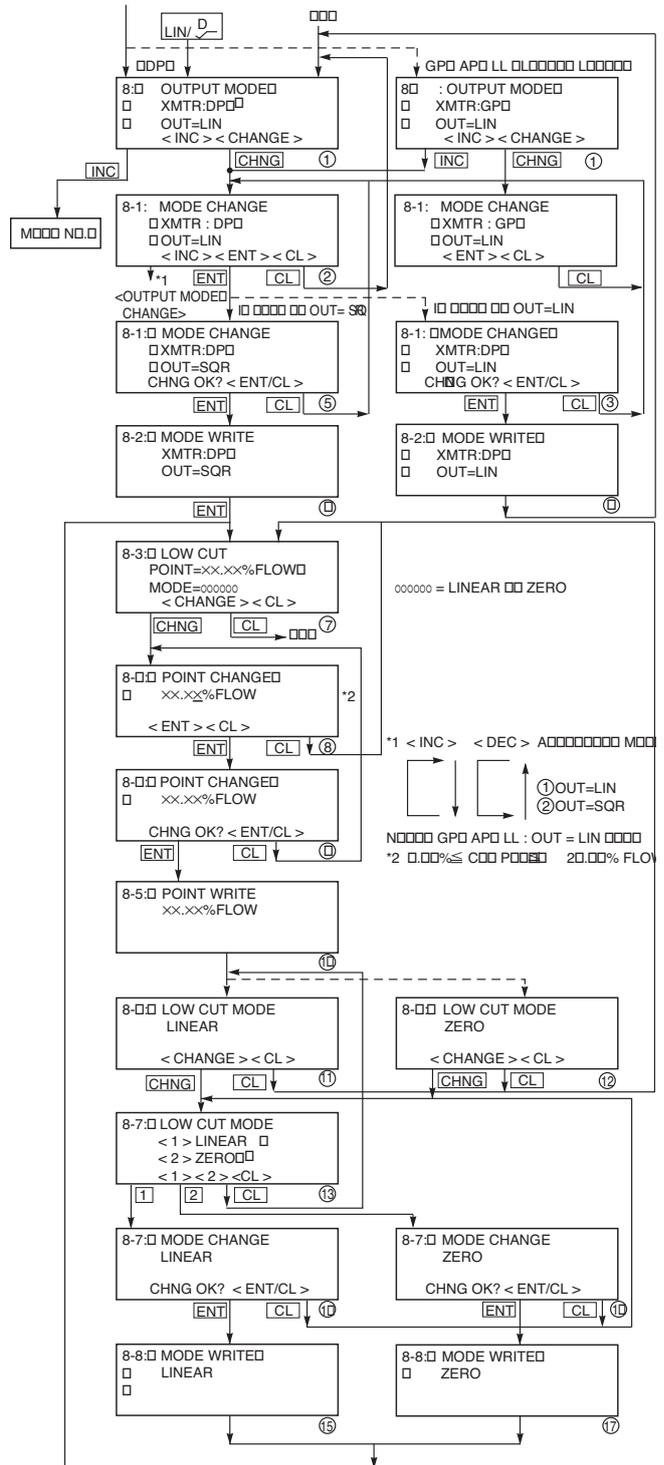


Fig. B: With zero output selected in low cut mode

Under display ⑬, linear or zero output is selectable for output below the cut point.



Burnout direction

Used for selecting output at occurrence of a fault in the detecting unit. Burnout direction is selectable under display ②

- For selection of NOT USED, press <1>.
- For selection of OVER SCALE, press <2>.
- For selection of UNDER SCALE, press <3>.

The meaning of each condition above is as follows.

- NOT USED → Not used (Output hold)
Saturation current = 3.8, 20.8mA

Note)

Output value just before the occurrence of trouble is given in the output hold mode.

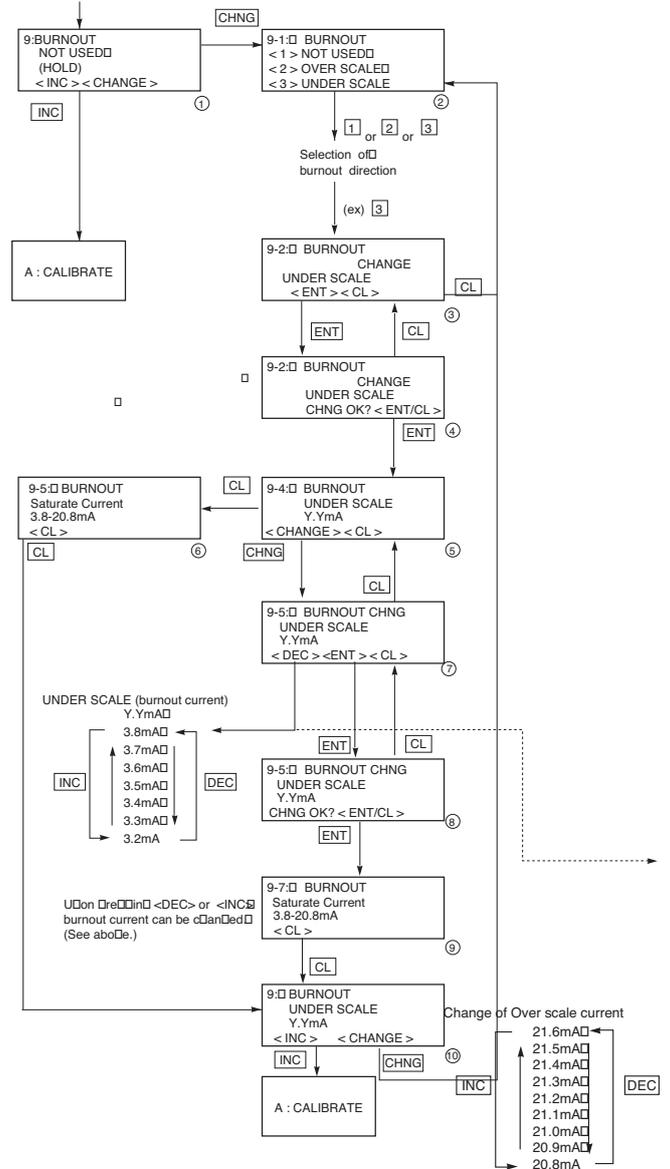
- OVER SCALE → Over scale (Output 20.8 to 21.6mA)
Saturation current = 3.8, 20.8mA
- UNDER SCALE → Under scale (Output 3.2 to 3.8 mA)
Saturation current = 3.8, 20.8mA

Burnout Current of FCX-All series transmitter

Over scale burnout current = 20.8 to 21.6mA

Under scale burnout current=3.2 to 3.8mA

Saturation current = 3.8, 20.8mA



Calibration of the zero and span

Configuration menu A “CALIBRATE” gives the possibility to calibrate zero and span of the transmitter LRV and URV).

The ranging of the transmitter needs to be done in the “RANGE” menu 6. Please use menu A “CALIBRATE” only when the LRV and URV are fixed in the “RANGE” menu. It is absolutely necessary to apply an accurate reference pressure corresponding to the zero or LRV point as well as the span or URV point when making a calibration.

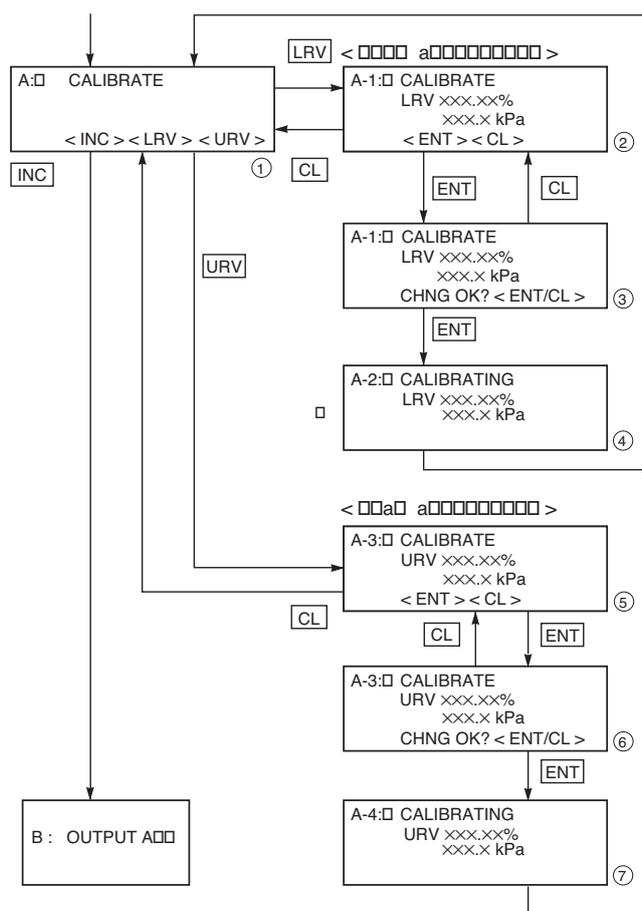
Adjustment of the Low Range Value (LRV) : In the CALIBRATE menu you push key LRV to adjust the zero point corresponding to analog output 4 mA.

Reference pressure is applied on the transmitter, and you enter the corresponding value through the key pad on HHC.

Please confirm the value by applying in key “ENTER”.

Adjustment of the Low Range value (URV): In the CALIBRATE menu you push key URV to adjust the span point corresponding to the analog output 20 mA. Reference pressure is applied on the transmitter corresponding to the span, and you enter the corresponding value through the key pad on HHC.

Please confirm the value by applying in key “ENTER”.



PRECAUTION

- The calibration (LRV & URV) require a pressure generator with an better accuracy than the transmitter. If the customer do not have this kind of pressure generator, he should not use this menu but only the “RANGE” menu to make a ranging of the transmitter without applying a reference pressure. The “RANGE” menu will always keep the factory calibration done with very accurate pressure equipment.
- The menu “CALIBRATE” has always to be used when the transmitter has been previously adjusted in “RANGE” menu.
- On transmitters with local indicator option : the modification of the Zero/ Span in “RANGE” and “CALIBRATE” menu will not modify automatically the configuration of the LCD indicator. A new adjustment of the LCD indicator for the zero and span indication has to be performed. Indicator with 0 to 100% indication don’t need to be changed.

Calibration of output circuit D/A

The output circuit (D/A) should be calibrated by the following procedure when necessary.

Make calibration wiring transmitter according to "Calibration" in appendix A2, and calibrate the output circuit with the HHC using the following procedure.

When the <LRV> key is pressed at the display of ①, the display ② for 4mA current output and its calibration will appear on the screen. When the <URV> key is pressed, the display ⑦ for 20mA current output and its calibration will appear on the screen.

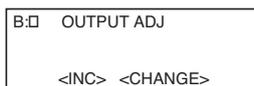
Under display ①, input a desired value within a range of 3.8 to 20.8mA and then press <ENT> two times.

At this input value, a regulated current output is available.

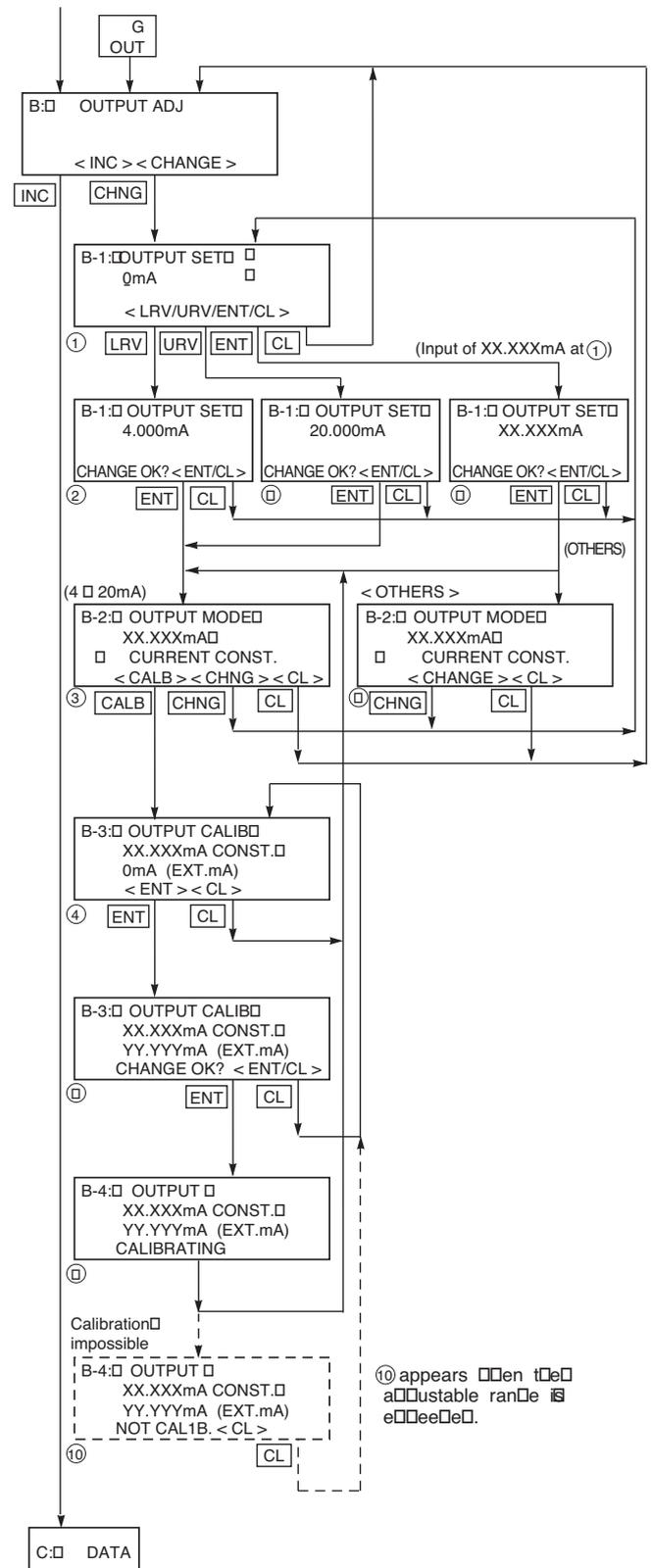
Under display ④, input digital values measured by digital voltmeter.

Under display ④, the output circuit is calibrated when pressing <ENT>.

After setting and calibrating the constant current output, be sure to reset the HHC display to the initial display.



In this way, the transmitter output is reset to the measurement output. It should be noted that if HHC is removed from the transmitter loop or the HHC power is turned OFF when the constant current output has been set, the transmitter output is retained at the constant current output.



⑩ appears on the screen when the output is unstable or the output is not calibrated.

Indication of measured data

The measured value can be indicated.
For more information about operating procedure, refer to the instruction manual of HHC.

Self-diagnosis

Use for displaying the measured temperature in the transmitter and the alarm information.
When pressing <1> on display ②, the temperature in the amplifier (AMP TEMP) is displayed. When pressing <2>, result of self-diagnosis about transmitter (ALM CHECK) is displayed.

Result of diagnosis

When the temperature in the amplifier is normal:

```
D-2: SELF CHECK
    TEMP= xxx.x°C
    <CL>
```

When temperature alarm is detected:

```
D-2: SELF CHECK
    TEMP= xxx.x°C
    TEMP. ALARM
    <CL>
```

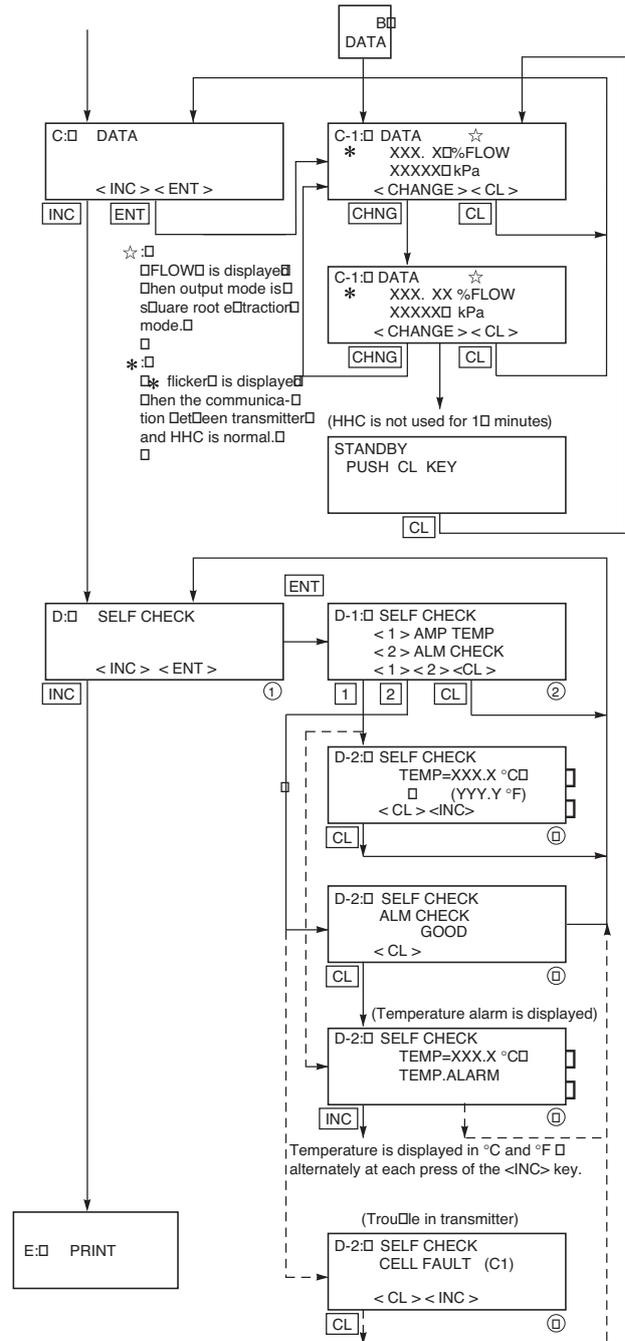
When no error has occurred:

```
D-2: SELF CHECK
    ALM CHECK
    GOOD
    <CL>
```

When an error has occurred:

```
D-2: SELF CHECK
    CELL FAULT (C1)
    <CL> <INC>
```

For contents of error, refer to "Contents of message" on the next page.



[Contents of message]

As a result of self-diagnosis, the message below is appeared on the LCD display of HHC, when there are trouble in the transmitter. For each error, its cause and remedy are suggested.

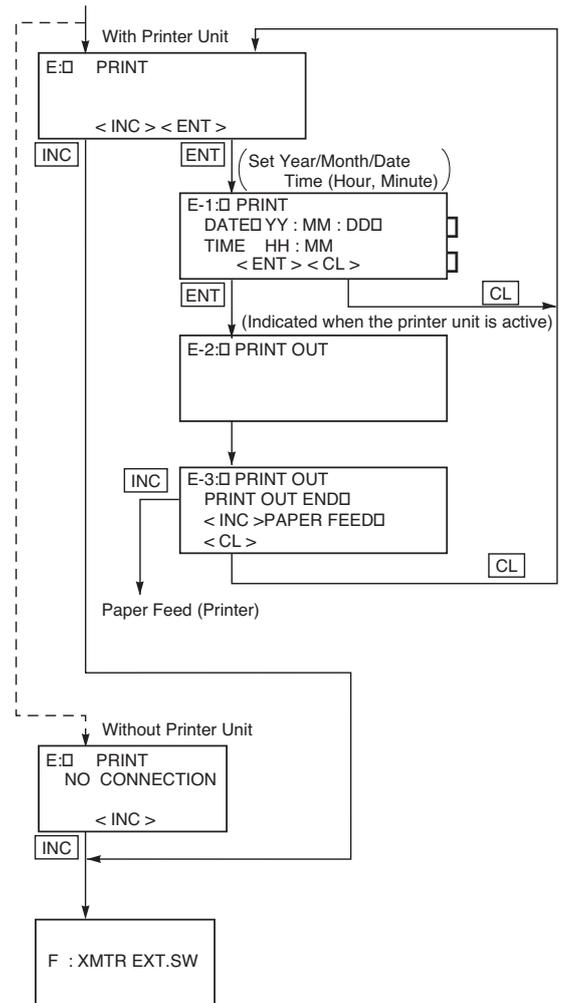
Message	Indication on digital indicator	Cause	Remedy
CELL FAULT (C1) {	FL-1	Error of detecting unit	Replacement of detecting unit
CELL FAULT (C9) ^(*)			
EEPROM (AMP) FLT	FL-2	EEPROM error on amplifier side	Replacement of amplifier
EEPROM (CELL) FLT	FL-3	EEPROM error on cell side	Replacement of detecting unit
TEMP. ALARM	^(*) T.ALAM	Transmitter temperature is not within the allowable range (-45 to 90°C).	Transmitter temperature is normalized.
XMTR FAULT	FL-1	Amplifier error	Replacement of amplifier
	^(*) OVER	Input pressure is 105% or higher of setting range.	Properly controlled.
	^(*) Under	Input pressure is -1.25% or lower of setting range.	Properly controlled.

(*) CELL FAULT (C5) to (C9) are appeared in case of "9" in 6th digit code of FK.C.

(*) Real indication

Printer function

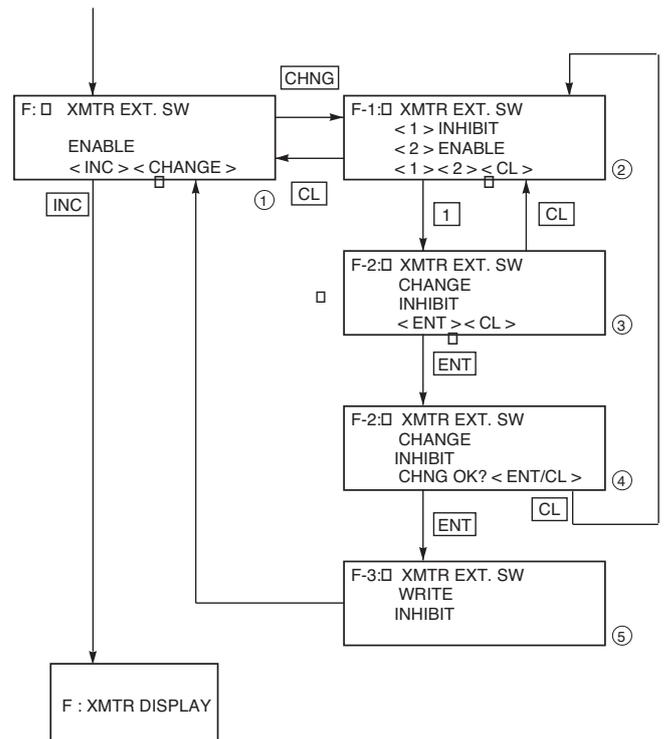
Usable only when a printer is connected.
Refer to the instruction manual of HHC.



Lock of adjustment function

The zero adjustment function can be locked by the transmitter adjust screw.

When pressing <1> (INHIBIT) under display ②, the external switch lock function is activated, and it is released when pressing <2> (ENABLE).



Indication of digital indicator

For digital indicator, either % display or actual-scale display is selectable. In display on the actual scale, display values corresponding to 0% (4mA) and 100% (20mA) are settable.

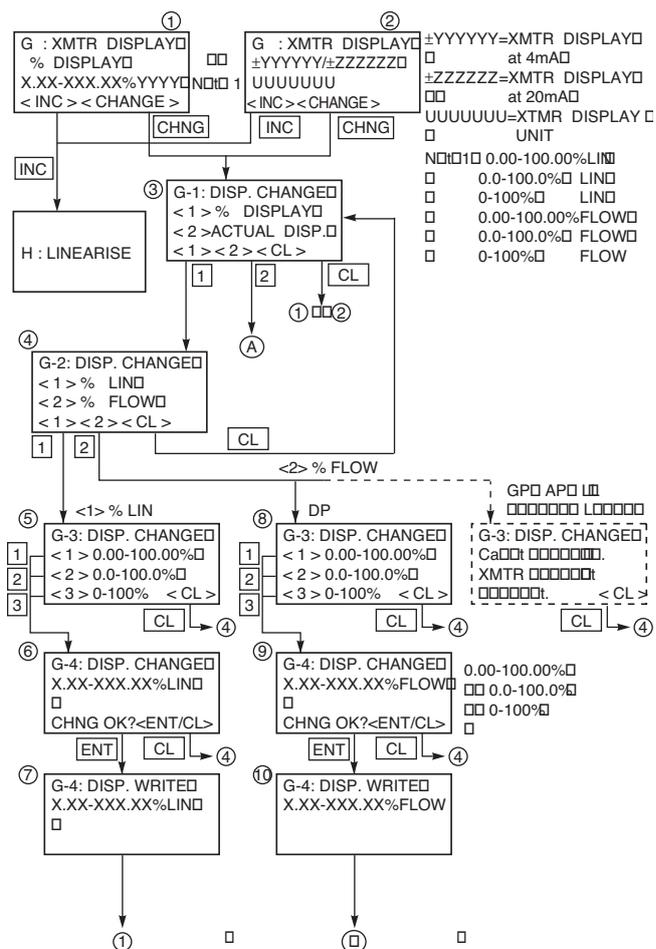
In setting % display, proportional mode and square root extraction mode is selectable as shown in ④.

<1> % LIN is displayed in % in the proportional mode

<2> % FLOW is set by % in the square root extraction mode (proportional to flow)

In case of pressure transmitter, absolute pressure transmitter and level transmitter,

<2> % FLOW cannot be set in ④.



Programmable linearization function

User can set output compensation against the input using 14 compensation points, $(X_1, Y_1), (X_2, Y_2) \dots (X_{14}, Y_{14})$. Each compensation value between (X_n, Y_n) and (X_{n+1}, Y_{n+1}) is connected by first order approximate formula.

This linearization function is useful to compensate the tank figure in level measurement application and the flow rate of steam or gas in flow measurement application.

Functions for LINEARIZE are available for FXW Version 6.0 and upward.

By pressing INC at display of ②, the display is shifted to the setting of LINEARIZE POINT ③. Press CHNG at display of ③ and input POINT XX to be compensated. Then press ENT and the display will be shifted to ⑤.

Press INC at display of ⑤ and the display will be shifted to y for selection of <1> Lin. point: LP and <2> Comp. value : CV.

Select <1> Lin. point : LP at display of 6 and input XXX.XX% to each point (LP1-LP□).

At the completion of input to all the compensated points, press ENT twice and the write of LP will be finished.

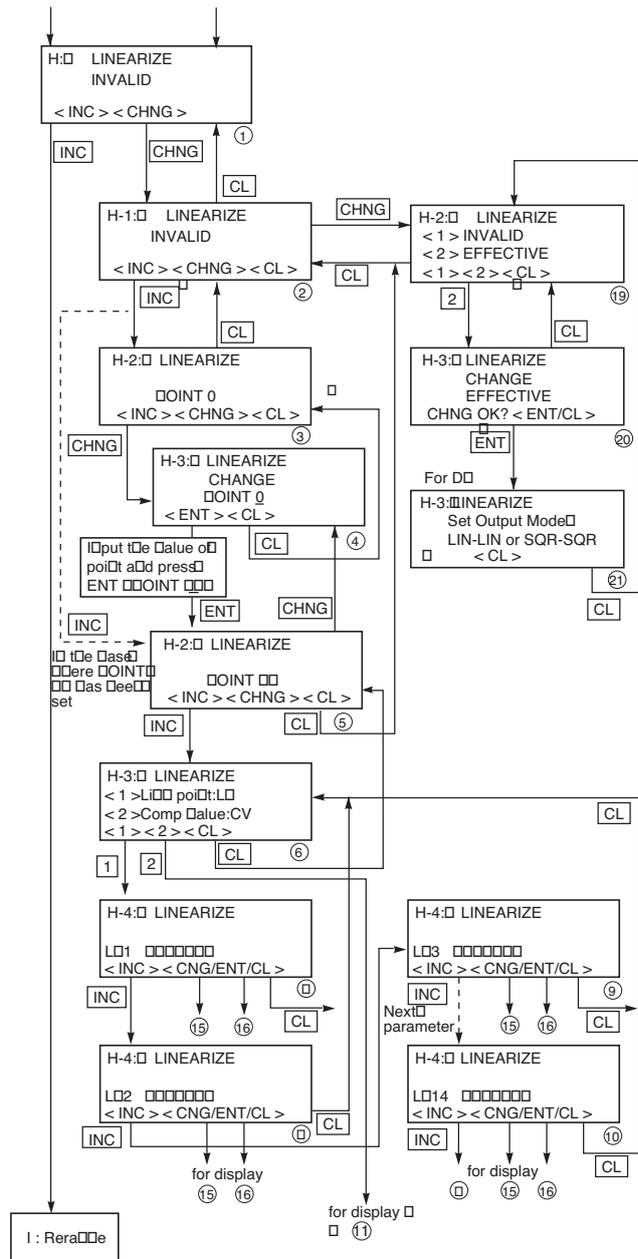
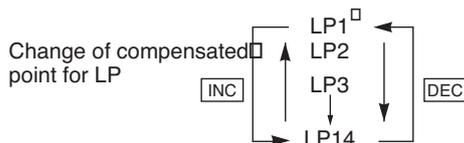
At this time, the display is shifted to ⑥.

Select <2> Comp. point : CV at display of ⑥ and input XXX.XX% to each point (CV1-CV □) in the same way as noted in <1> LP.

At the completion of input to all the compensated points, press ENT twice and the write of CV will be finished.

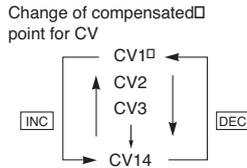
At the completion of write of compensated program for LP/CV, press CL twice at the display of ⑥ for shifting to ②.

Then, press CHNG for selection of <1> INVALID and <2> EFFECTIVE of ⑱. At display of ⑱, press <2> and the display will be changed to EFFECTIVE.



Note) In the key stroke for Linearization, please set each parameter in the below sequence.

1. Set the number of compensation points in the range of 2 to 14.
2. Set each linearization option point (LP*) correctly, and write them.
3. Set each compensation value (CV*) correctly, and write them.
4. Set linearization option into EFFECTIVE and write.



When INC is pressed at display of ③, the following is displayed,

H-2: LINEARIZE
POINT 0
SETTING ERR <CL>

or

When ENT is pressed at display of ④, the following is displayed,

H-3: LINEARIZE
POINT 15
POINT SET
SETTING ERR <CL>

POINT=2 ≤ (number of correction) ≤ 14
setting err=00 or 01 or ≥15

When ENT is pressed at display of ⑮, the following is displayed,

H-5: LINEARIZE
CHANGE
LPM 150.01%
SETTING ERR <CL>

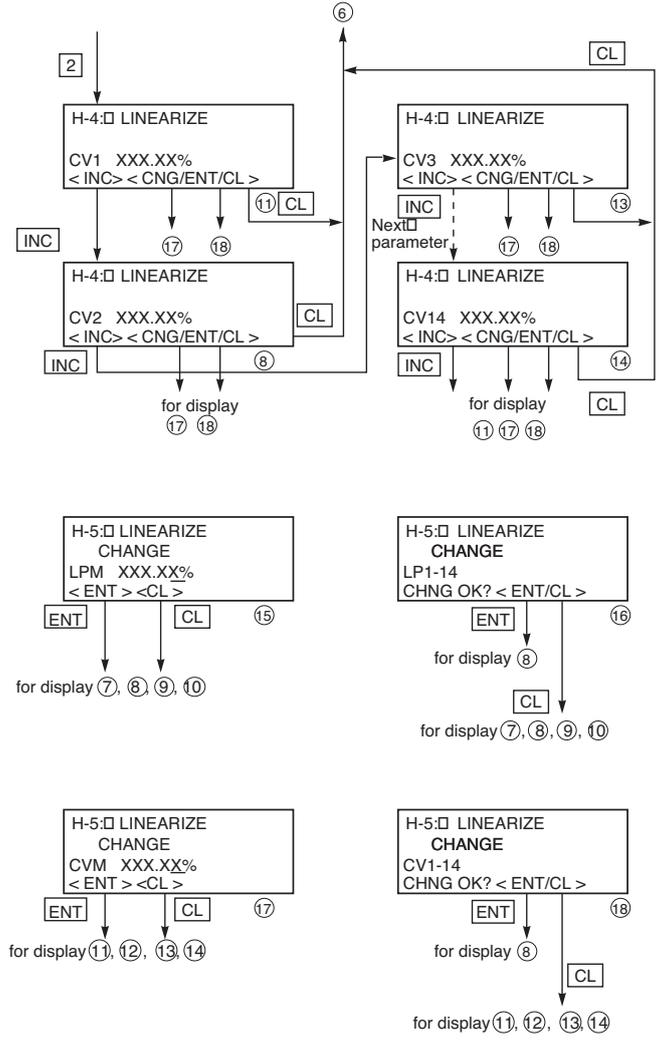
Requirement of setting
-1.25% ≤ LP1 < LP2... < LP14 ≤ +110%

When ENT is pressed at display of 17, the following is displayed,

H-5: LINEARIZE
CHANGE
CVM 100.01%
SETTING ERR <CL>

Requirement of setting
-100% ≤ CV1 < CV2... < CV14 ≤ +100%

Before performing the LINEARIZE setting, set either of the following equations in the OUTPUT mode (Menu No.8) and XMTR DISPLAY (Menu No. G):
 OUT = LIN SMTR DISP = LIN or
 OUT =SQR XMTR DISP = FLOW (Note 1)
 Note 1)
 XMTR DISP = FLOW means the settings of % FLOW in % display or of FLOW units in actual scale display.



When ENT is pressed at display of 0, the following is displayed,

H-3: LINEARIZE
Set LINEARIZE
Point, LP and CV
correctly. <CL>

Requirement of setting

1. LP ≤ LP2 ≤ LP3...LP8 ≤ LP9...LP13 ≤ LP14 (In the case that LP1-LP14=All Zero, it is inhibited to be set enable)
- 2.If CVa≠CVb, then it must be LPa < LPb (Note1)
- 3.If LPa =LPb, then it must be CVa=CVb (Note1)
Note1)
a, b show next numeral such as
a=1 b=2 or a=2 b=3 ora=13 b=14.
or the following is displayed.

H-3: LINEARIZE
Set OUTPUT MODE
LIN-LIN or
SQR-SQR <CL>

Rerange (Set LRV/URV calibration)

Application to level measurement at change of level (LRV/URV)

Functions of RERANGE can be made with FXW Version 6.0 or upward.

When the lower range value (LRV) and upper range value (URV) need to be adjusted again during measurement of tank level, the measurement levels can be changed at the same time by setting the LRV or URV to be adjusted from FXW.

Apply an input pressure required for rerange of LRV at display of ③ and press ENT twice.

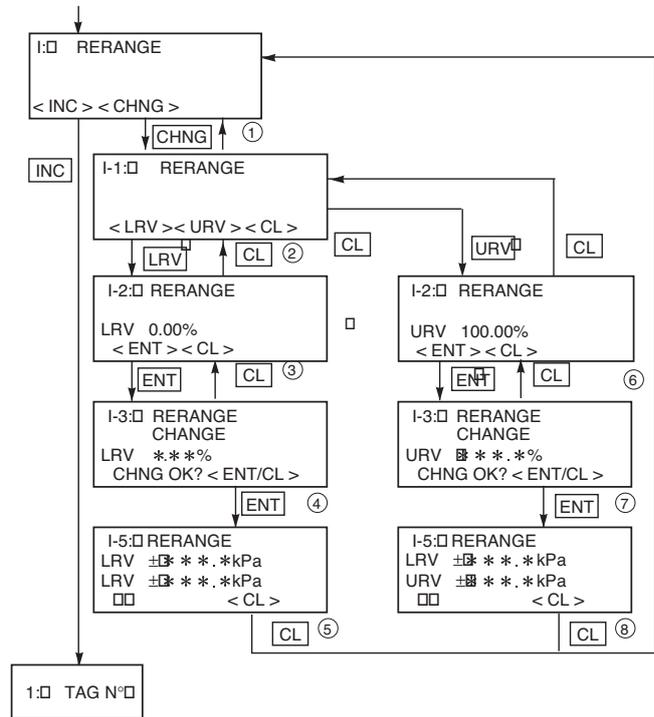
In this way, the rerange of LRV is completed, then the new measurement range LRV and URV, which conforms to the actual input pressure, is displayed.

When rerange is made at a point other than 0%, input the set value (PV%) of that point at display of ③, and press ENT at display of ④ while applying a corresponding pressure. In this way, the measurement range can be changed to the input corresponding to that pressure.

Apply an input pressure required for rerange of URV at display of ⑥ and press ENT twice. The rerange of URV is completed, then the new measurement range LRV and URV corresponding to the actual input pressure is displayed. When rerange is made at a point other than 100%, input the set value (PV%) of that point at display of ⑥ and press ENT at display of ⑦ while applying a corresponding pressure. In this way, the measurement range can be changed to the input corresponding to that pressure.

Note)

The unit of LRV/URV at ⑤ and ⑧ are displayed in the unit selected by Menu N° 4:UNIT.



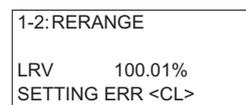
Adjustment point setting condition

-1.00% ≤ LRV 100.00%

0.00% ≤ URV 110.00%

In the case that point is out of setting limit.

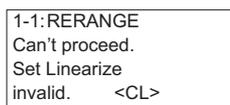
(Ex)



In case of the actual scale specification with a digital indicator provided, if the range is changed, indicator display might not match. So, setting is required again in response to the display in the digital indicator (G:XMTR DISPLAY).

In case of the actual scale specification with an analog indicator provided, if the range is changed, the scale for indicator might not ensure exact reading.

When CHNG is pressed at display of q, the following is displayed.



This means that RERANGE can't be made because MENU N° H:LINEARIZE is set in EFFECTIVE.

In this case, press the CL key and set in INVALID on the panel of N° H: LINEARIZE.

Saturation current value and specification

Saturation current value (Lower limit value=SAT LO, Upper limit value=SATO HI) and specification (NORMAL= Existing specification, EXP. = Extended specification) are settable.

When the setting of specification (SPEC) is for existing specification, saturation current is not be settable.

When change the setting of saturation current, EXP. should be set for the SPEC setting.

- Change of saturation current value (Lower limit) (Changeable only for the extended specification) Settable setting range by <INC> or <DEC> key on the display ③ is as follows.

$3.2\text{mA} \leq \text{Burnout current (UNDER SCALE)} \leq \text{Saturation current (Lower limit value)} \leq 4.0\text{mA}$

- Change of saturation current value (Upper limit value)

Make a setting as same as the setting of the lower limit value by input ② from Menu.

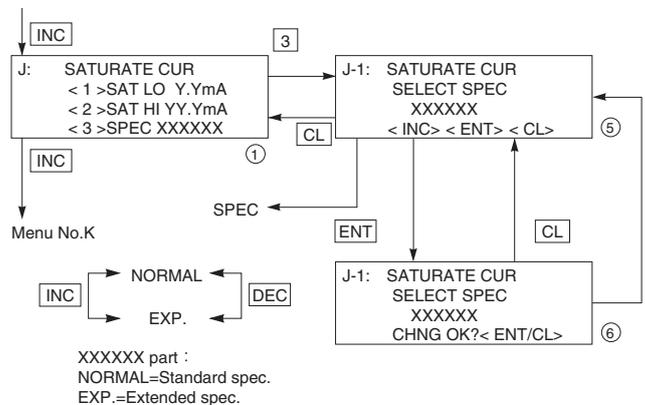
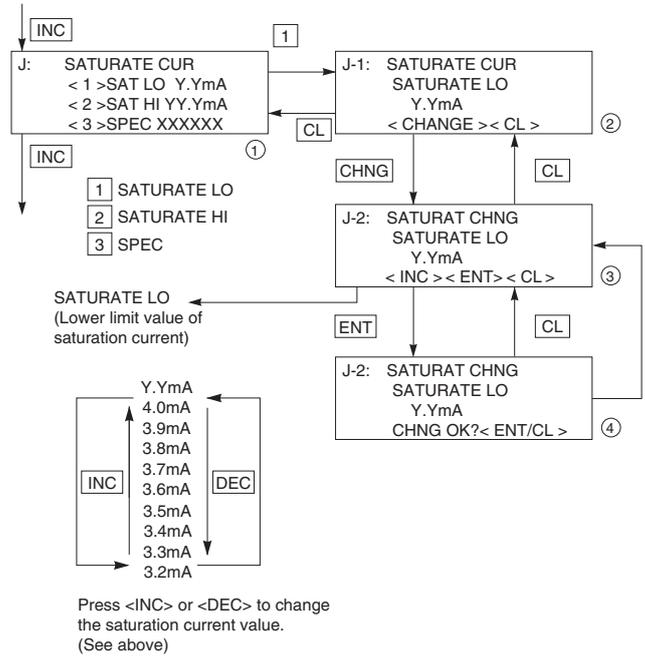
Selectable setting range by <INC> or <DEC> key is as follows.

$20.0\text{mA} \leq \text{Saturation current (Upper limit value)} \leq \text{Burnout current (OVER SCALE)} 21.6\text{mA}$

- * Burnout current is settable according to "9. Burnout direction and value".
- Change of the specification

Existing specification or enhanced specification is selectable.

Refer to "J-3" in "J. Saturation current value and specification" of a local configurator unit with LCD display for details.



History information

Display of ZERO/SPAN adjustment data for users

It is displayed by selecting <1> on the display 1 .

ZERO means ZERO adjustment value.

SPAN means SPAN adjustment value.

Clear of ZERO/SPAN adjustment data for users

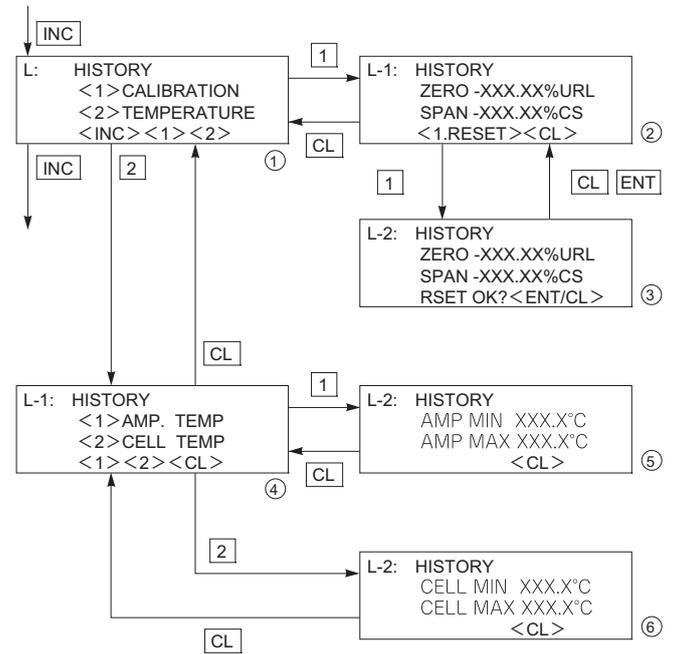
It is cleared by selecting <1> on the display 2 .

Display of history information of AMP temperature (MIN/MAX)

Displaying the min/max value of history information of AMP temperature.

Display of history information of CELL temperature (MIN/MAX)

Displaying the min/max value of history information of CELL temperature (display 6).



No maintenance of transmitter is necessary.

According to the application conditions and the measured process, a periodic check of the output signal of the transmitter has to be done by skilled people (suggested period 36 months).

5.1 The following verifications are suggested by the manufacturer :

- Leak check of the tightness of the transmitter and the process connections as often as required.
- Check and if possible clean all wetted transmitter parts (see parts list) to make guarantee the chemical resistance of the wetted parts. In the case of corrosion, find out the reasons of the corrosion and replace and adapt the concerned parts or replace the complete transmitter with an adapted one. Please follow the replacement procedure of the measuring cell described later.
- Visual inspection of the non wetted parts of the transmitter.
Protect or replace the transmitter if necessary.

5.2 Troubleshooting

If troubleshooting, check the fault by using the Hand Held Communicator (HHC) with function "SELF CHECK" - Refer the chapter " Operation" in this manual.

The transmitter is supplied with the burnout adjusted : "fixed" output signal in case of failure.

If an abnormality occurred in the process or transmitter, action should be taken with references to the table below:

Symptom	Cause	Remedy
Output current overshoots scale (The value is more than the upper limit of the saturation current.).	(1) The manifold valve does not open/ close normally. (2) Pressure leak is occurring. (3) Process piping is improper. (4) Process pipe is clogged. (5) Power supply voltage and/or load resistance is improper. (6) Voltage between the external connection terminals of amplifier unit is wrong. (7) Zero and span or fixed output current(4, 20mA) are not adjusted. (8) Amplifier unit is faulty.	→ Repair the valve so that it opens/closes normally. → Repair a leak. → Make correct piping. → Eliminate the cause of clogging. → Make arrangement to obtain proper values. For power supply voltage and load resistance, refer to chapter 7.2. (For intrinsically safe installations, the power supply voltage should be 16.1 to 26V DC.) → Check for faulty cable, insulation, etc. and repair as needed. For power supply voltage and load resistance, refer to chapter 7.2. (For intrinsically safe installations, the power supply voltage should be 16.1 to 26V DC.) → Readjust according to chapter 4. → Replace the amplifier unit according to chapter 5.3.
No output current (The value is less than the lower limit of the saturation current.).	(1) Same as (1) to (4) above (2) Power supply polarity is wrong. (3) Power supply voltage and/or load resistance is improper. (4) Voltage between the external connection terminals is wrong. (5) Zero and span or fixed output current(4, 20mA) are not adjusted. (6) Amplifier unit is faulty.	→ Correct wiring according to chapter 7.1. → Make arrangement to obtain proper values. (For power supply voltage and load resistance, refer to chapter 7.2.) (For intrinsically safe installations, the power supply voltage should be 16.1 to 26V DC.) → Check for faulty cable, insulation, etc. and repair as needed. (For power supply voltage and load resistance, refer to chapter 7.2.) (For intrinsically safe installations, the power supply voltage should be 16.1 to 26V DC.) → Readjust according to chapter 4. → Replace the amplifier unit according to chapter 5.3.
Output current error.	(1) Process piping is improper. (2) Gas or solution is mixed in. (3) Liquid density changes. (4) Ambient temperature changes widely. (5) Zero, span or fixed output current (4, 20mA) has deviated. (6) Amplifier unit is faulty.	→ Correct the piping. → Vent or drain the transmitter. → Perform density compensation. → Minimize the temperature change. → Readjust according to chapter 4. → Replace the amplifier unit according to chapter 5.3.
When the indicator is abnormal.	(1) An error display is appeared.	→ P28 capital to "contents of message"

If remedy is impossible, contact Fuji Electric's service department.

1. HART[®] communication function

1.1 HART[®] communication

The FCX-All V5 smart type transmitters are used for communication with Fuji HHC (Handheld Communicator) or HART^{® 1)} master device such as HART[®] communicator. For details, refer to the instruction manual for HART[®] master device.

Note1) HART[®] (Highway Addressable Remote Transducer) is a trademark of Rosemount Inc.

1.2 HART[®] Universal Handheld communicator

The HART[®] universal handheld communicator (hereinafter referred to as HART[®]) is a communicator capable of using for communication with various type of HART[®] field devices. A user in possession of HART[®] master device is ready for communication with the FCX-All V5 transmitters. For details, refer to the instruction manual for HART[®] communicator.

1.3 DD (Device Description)

Device Description (DD) is a program to pick up features of a field device having HART[®] communication functions. By saving DD in the memory of HART[®] communicator, the functions of each field device can be used for communication.

Even when FCX-All series / FCX-All V5 series DD is not saved in the memory of HART[®] communicator, it can be used in Generic mode ²⁾.

For details, refer to the instruction manual for HART[®] communicator.

Note2)

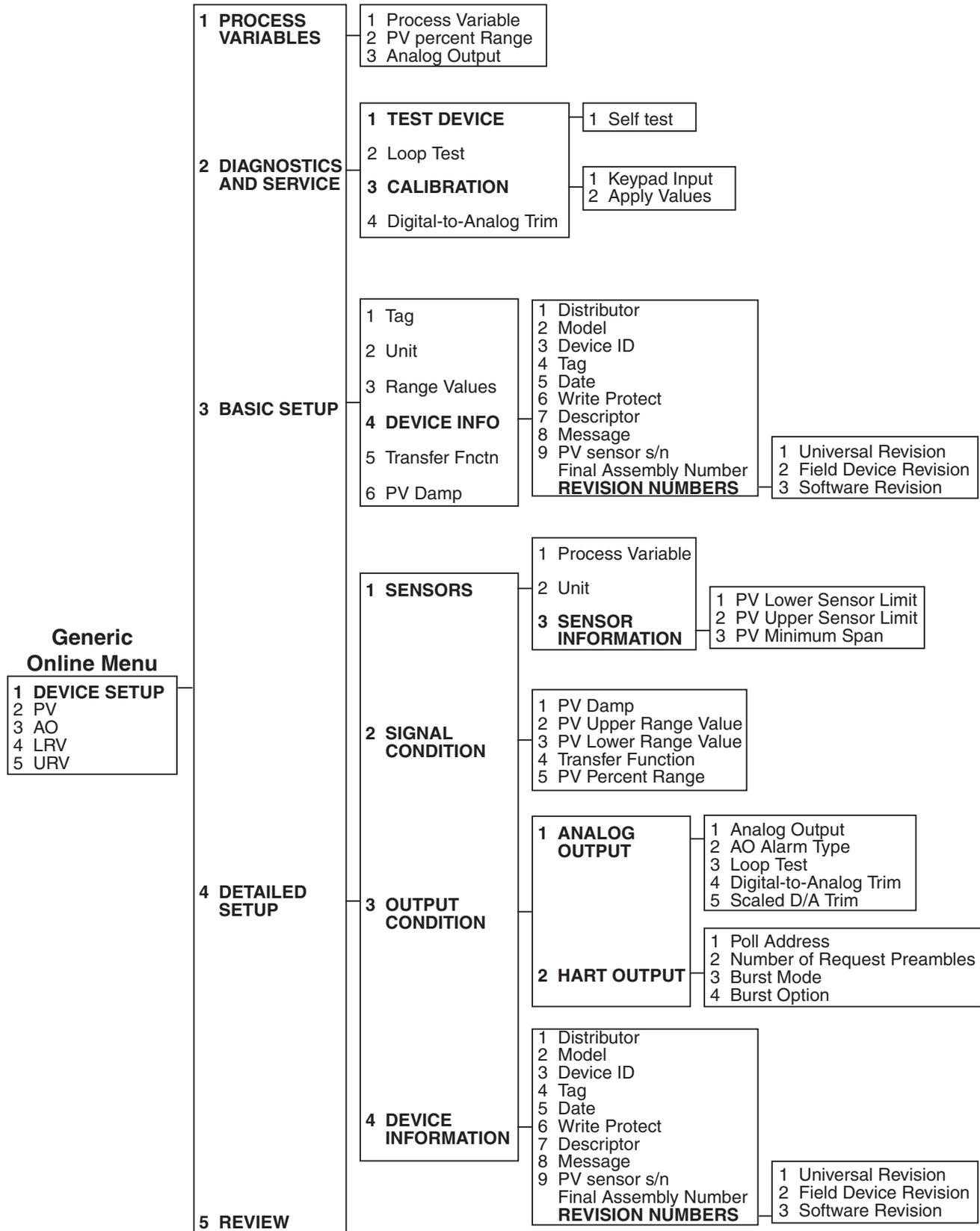
The Generic mode is used to start communication when a field device DD is not installed in HART[®] communicator. In this mode, functions which can be used are limited to general-use functions.

3. Function and operation (example)

3.1 HART® Communicator Menu Tree

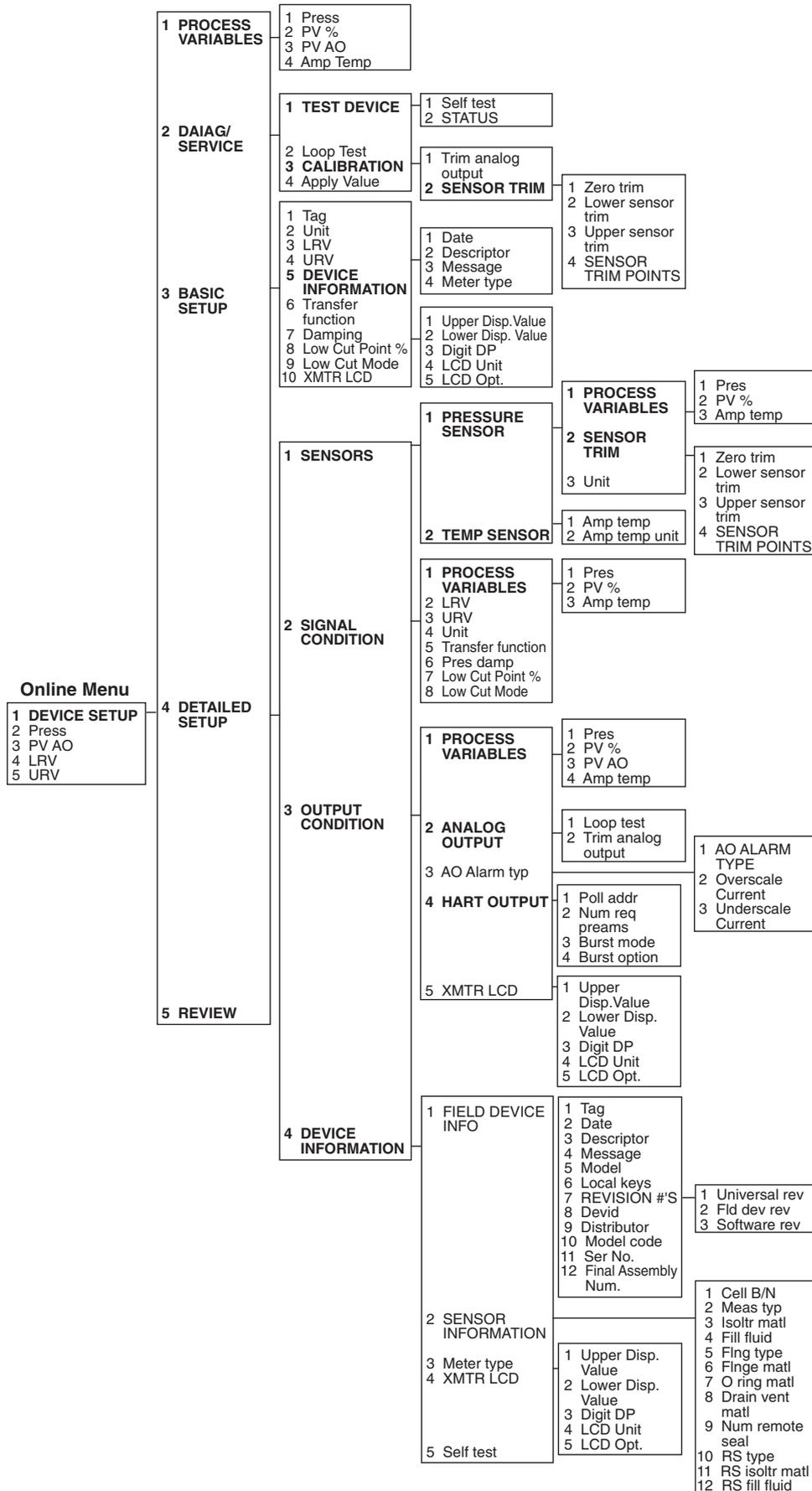
3.1.1 Menu Tree 1 - Generic -

Example on HC-375 Handheld communicator



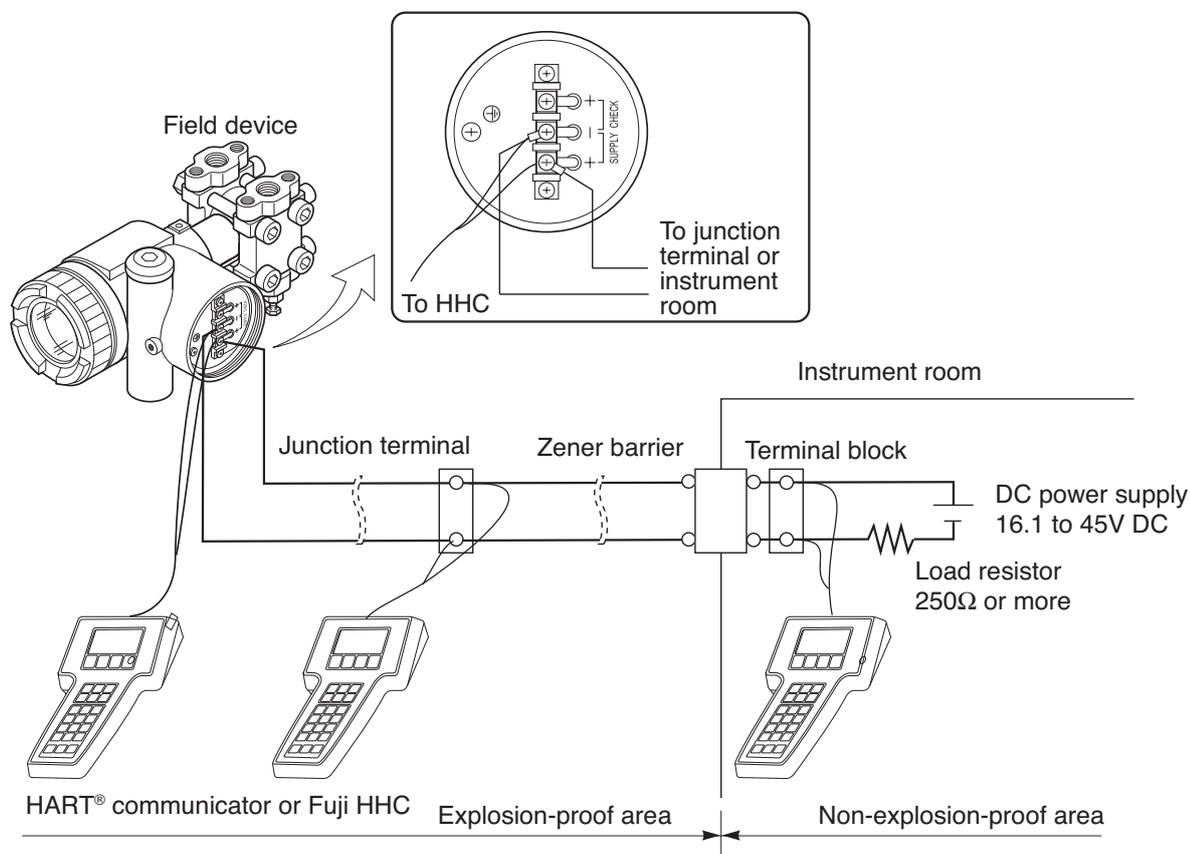
3.1.2 Menu Tree 2 - Use of DD for FCX-All series transmitters -

Example on Rosemount HC-275 Handheld communicator



2. Connection

Connection of HC-375 hand held communicator (example)



PRECAUTION

Fuji HHC and HART® communicator can not be used at the same time. Be sure to connect individually.

When using Fuji HHC and HART® communicator alternately, turn OFF the power for communicator after changing from one to another, then restart the communication. At this time, old data may be left in the communicator.

DANGER

When using flame-proof transmitter, do not connect HHC to the transmitter terminal and junction terminal in an explosion-proof area.

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