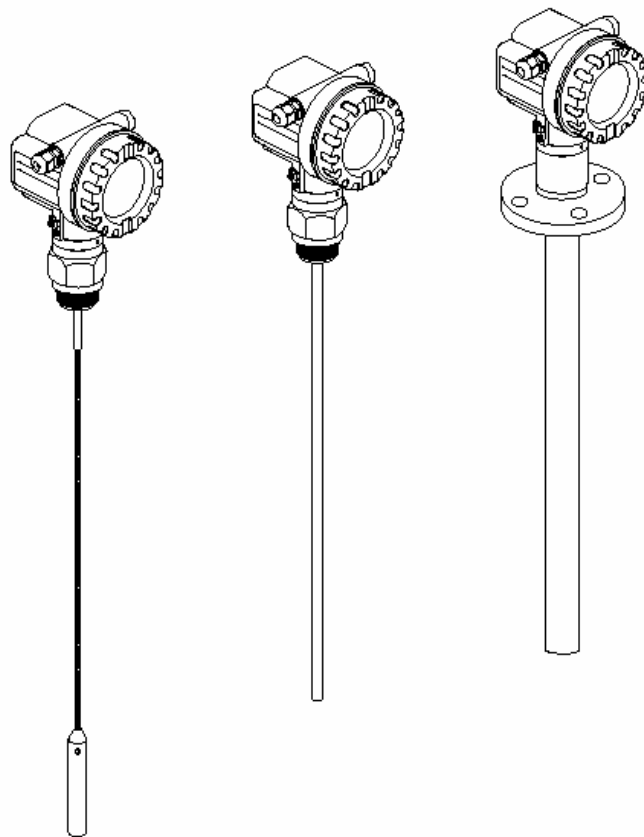


FMP40- LEVEL GUIDE

동작설명서

Operating Instructions



Endress + Hauser
The Power of Know How

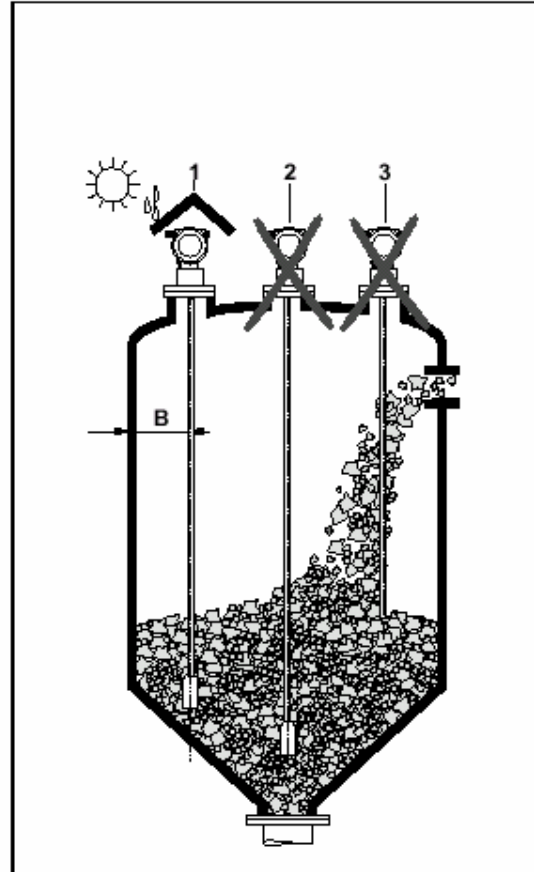


1. 설치위치

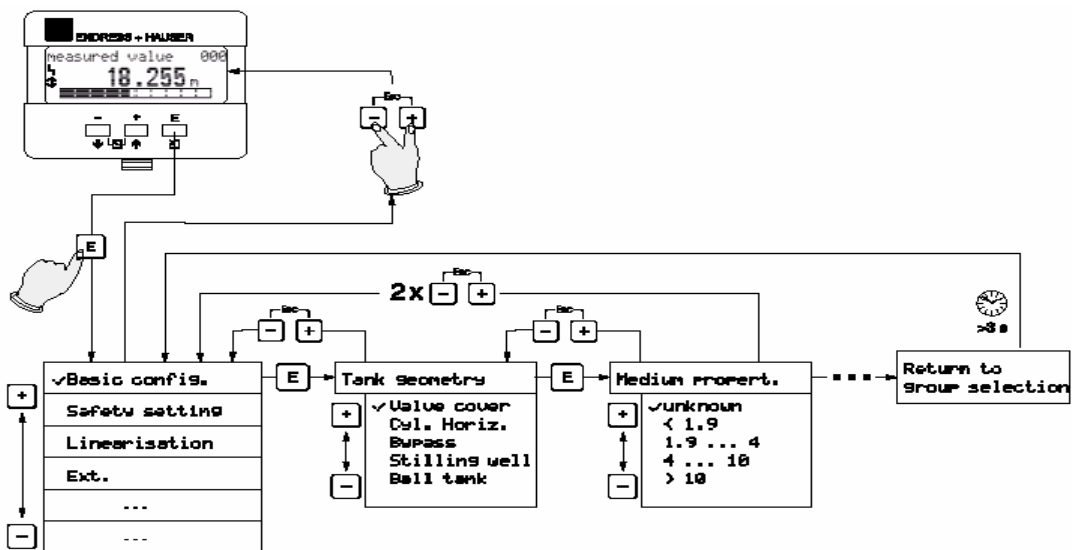
아래의 그림과 같이 측정물이 투입되는 위치를 피하여 반대쪽에 설치한다.

Mounting location

- As far away as possible from filling and emptying openings, in order to keep load and wear to a minimum.
- We recommend installing the probe in $\sim 1/6 \dots 1/4$ of the silo diameter..
- Concrete silos should be approx. 1 m, but min. 0.5 m from the wall.
- Metal and plastic silos can also be very close to the wall, as long as you are sure that the probe is not touching the wall. Not exactly central for metallic silos.
- The length of the probe determines the measuring range. Order the length such that the end of the probe ends approx. 150 mm above the floor of the silo. Probe specific blocking distances have to be taken into account.
- It is better to order the probe too long than too short. If need be, it can be easily shortened.
- Temperature conditions must be met.
- It is recommended that a protective cover (1) is used, in order to protect the transmitter against direct sunlight or rain (see »Accessories« on page 63).

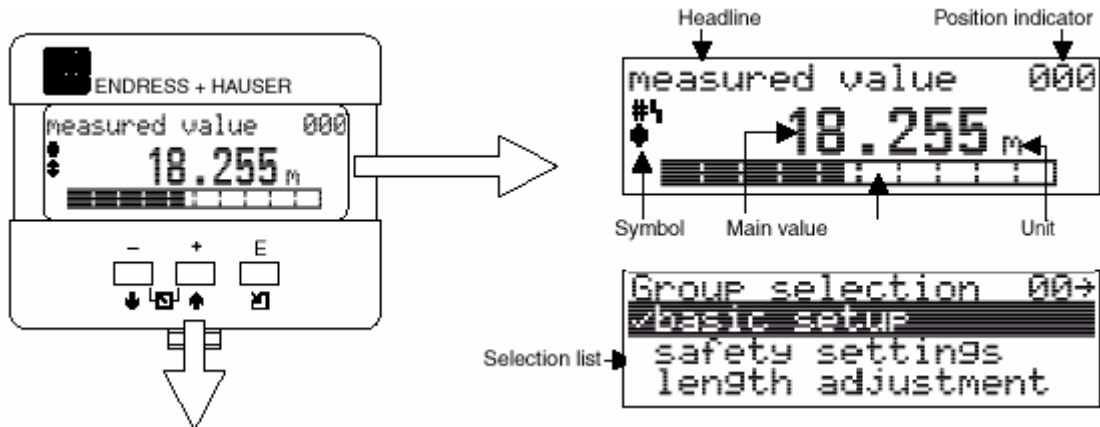


2. display 버튼의 동작방법 및 program 구성도.

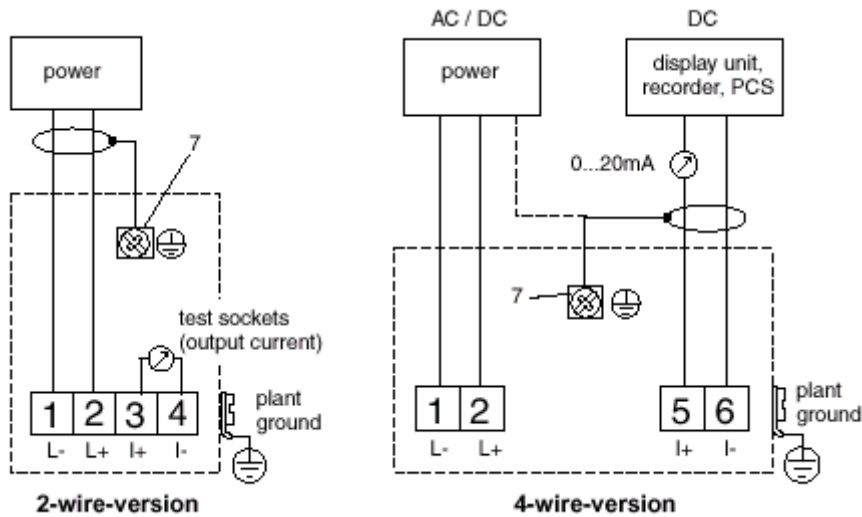


위의 그림과 같이 -, +, E 세가지의 버튼으로 구성되어 있다.

아래의 그림은 display에 관한 symbol에 관하여 설명하고 있다.

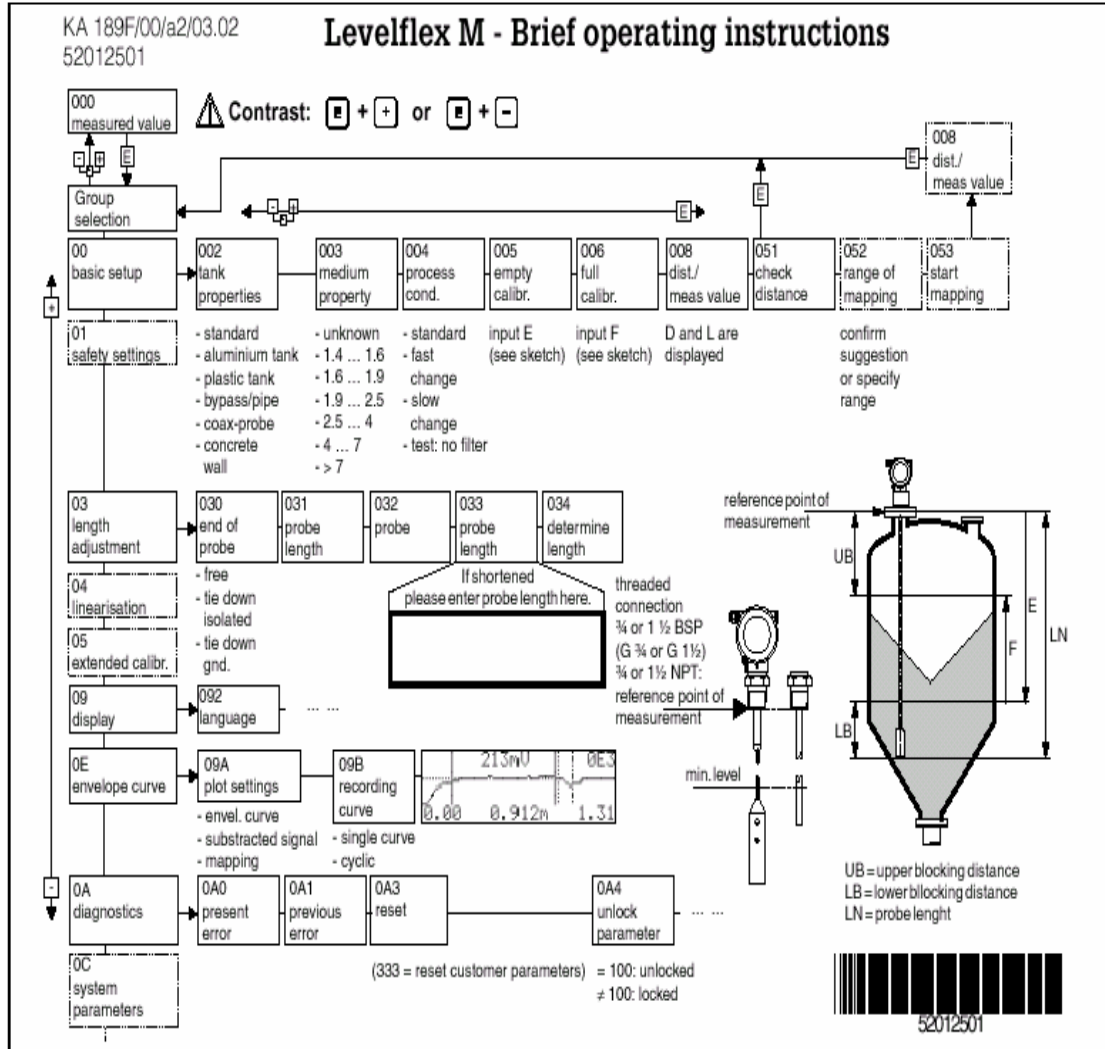


3. connection 구성도.(2-wire , 4-wire version)

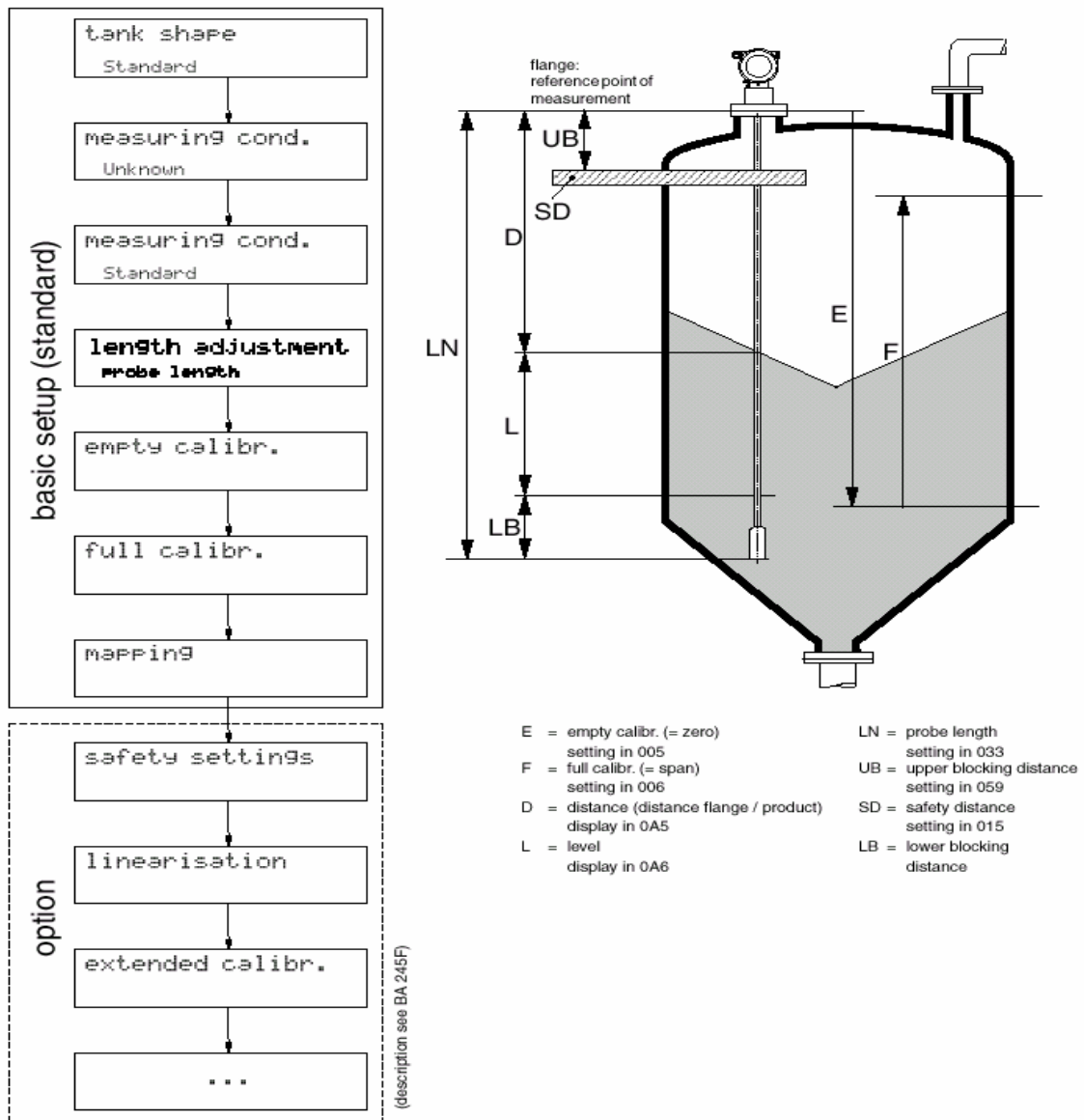


4. program 전체 구성도.

아래의 그림은 전체적인 program 구성도를 나타내고 있다.



5. basic calibration 방법

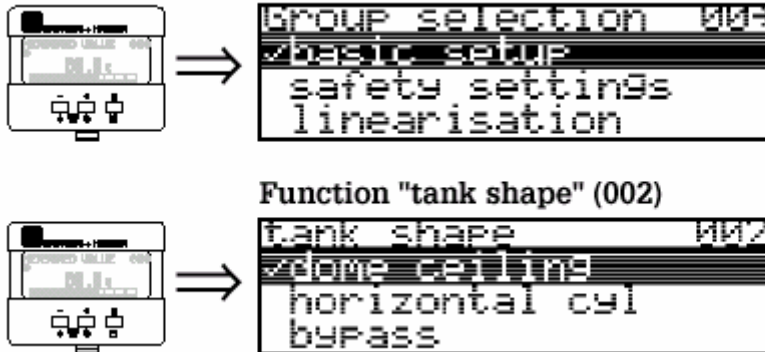


basic setup 방에서 위와 같은 순서에 의거하여 setting 하면 된다.

- 1> tank의 형태, 모양에 관하여 입력한다.
- 2> 측정물의 유전율을 입력한다. 유전율을 모를 경우, unknow으로 입력한다.
- 3> tank안의 측정물의 변화에 관하여 입력한다. 통상적으로 standard를 입력한다.
- 4> tank 바닥부터 센서의 flange까지의 거리를 입력한다.
- 5> 불감대를 뺀 실질적인 4-20mA 값을 입력한다.

6. 자세한 setting 방법.(basic setup)

1> basic setup / tank shape: tank 형태를 입력한다.

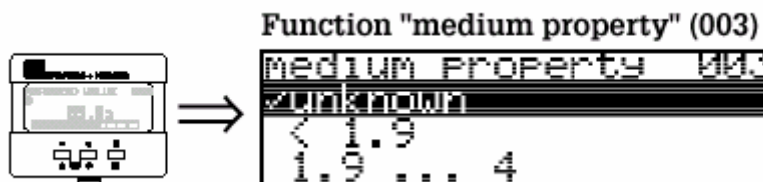


아래의 내용은 tank 형태에 관하여 나타내고 있다.

Selection:

- **standard**
- aluminium tank
- plastic tank
- bypass / pipe
- coax probe
- concrete wall

2> basic setup / medium property 형태를 입력한다.

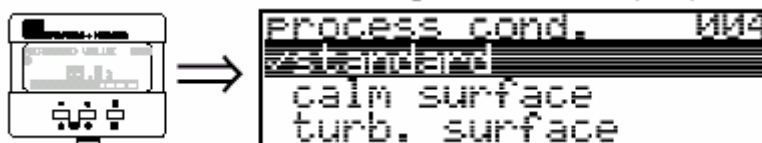


Selection:

- **unknown**
- 1.4 ... 1.6
- 1.6 ... 1.9
- 1.9 ... 2.5
- 2.5 ... 4.0
- 4.0 ... 7.0
- > 7.0

3> basic setup / process cond. 형태를 입력한다.

Tank 내부의 측정물의 환경적인 변화를 입력한다. 통상적으로 standard를 입력한다.

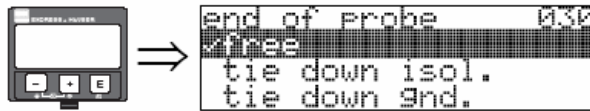


Selection:

- **standard**
- calm surface
- turb. surface
- agitator
- fast change
- test:no filter

4> length adjustment (probe length)

Free을 선택한다



Use this function to select the polarity of the probe end signal. If the probe end is uncovered or in an insulated attachment, there is a negative probe end signal. The signal from the probe end is positive if the attachment is grounded.

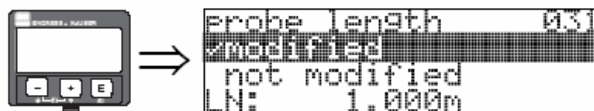
Selection:

- free
- tie down isol.
- tie down gnd.

4-1> probe length

만약 probe 을 절단하지 않았으며, not modified을 선택한다.

이 값은 기본으로 setting 되어있다.



Use this function to select whether the probe length was changed after factory calibration. Only then is it necessary to enter or correct the probe length.

Selection:

- not modified
- modified

4-2> probe

Probe 끝 추를 tank 와 연결하지 않았을 경우, free 을 선택한다.
이 값은 기본적으로 setting 되어있는 값이다.

Function "probe" (032)



Use this function to select whether the probe is at the time of the commissioning uncovered or covered.
If the probe is uncovered, the Levelflex can determine the probe length automatically "determine length" (034) function. If the probe is covered, a correct entry is required in the "probe length" (033) function.

Selection:

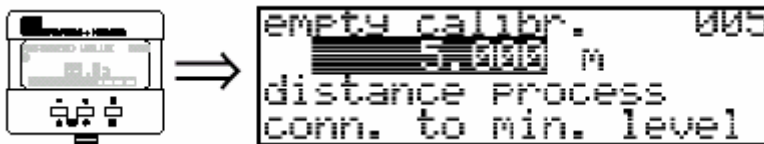
- free
- covered

4-3> 기타 시운전시 위에 명기되지 않은 setting 값이 나올 경우,

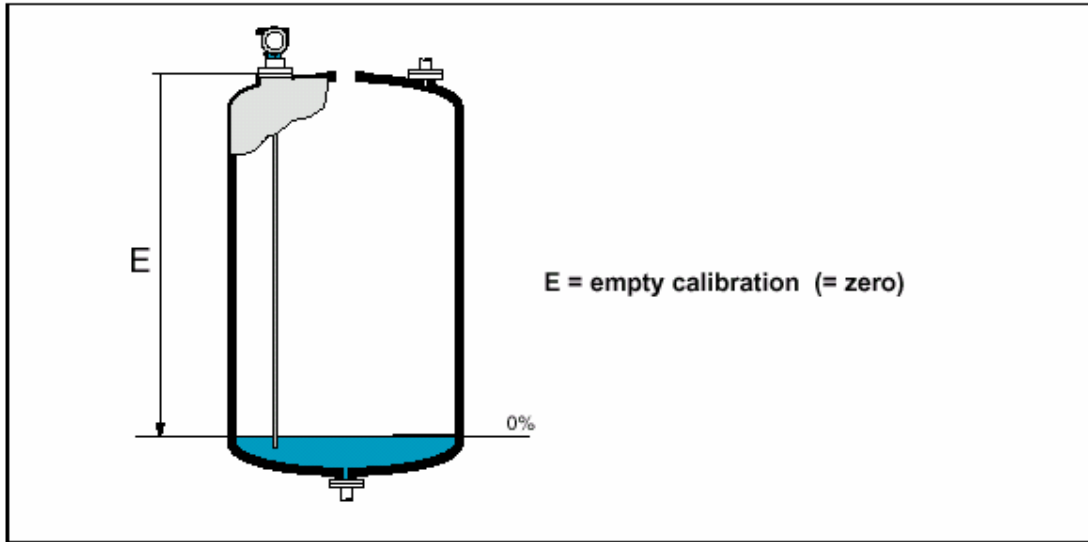


E 버튼을 이용하여 계속 진행하면 된다.

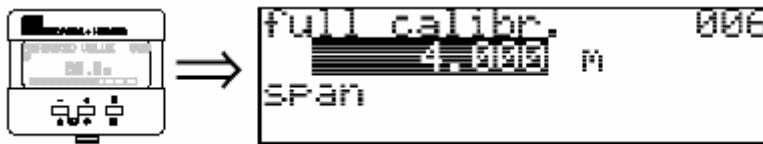
5> basic setup / empty calibration 를 입력한다



아래의 그림과 같이 tank 바닥부터 센서의 flange까지의 거리를 입력한다.

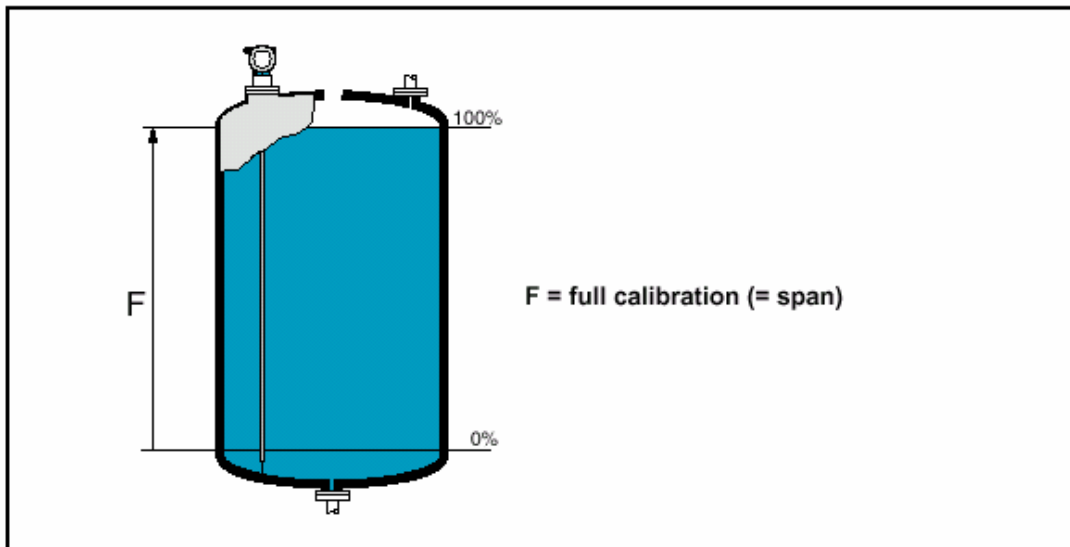


6> basic setup / full calibration 를 입력한다



아래의 그림과 같이 실질적인 4-20mA에 해당하는 값을 입력한다.

이유는 tank내의 측정물이 넘치는 것을 막기 위함이다. 이 값은 4>항목의 empty 값보다 작아야 한다.



위와 같이 setting을 하면 기본적인 calibration을 마치게 된다.

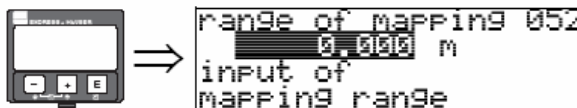
위와 같이 시운전을 마친 후 만약 tank가 비었을 경우, 지시값이 “0” 에 가깝게 지시하지 않을 경우, 아래의 program을 이용하여 외부 산란요인을 제거하여야 한다. (zero 점과 같은 의미 . - E+H 용어... mapping)

7> extended calibration (05)에 들어간다

“E” 버튼을 이용하여 아래그림의 방으로 이동한다.

이동 후, tank 높이의 약 80 % 에 해당하는 거리를 입력한다.

Function "range of mapping" (052)

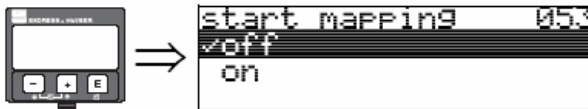


This function displays the suggested range of mapping. The reference point is always the reference point of the measurement (see Page 52 ff.). This value can be edited by the operator. For manual mapping, the default value is 0,3 m.

위 setting 이 끝나면 아래의 방으로 “E” 버튼과 함께 이동할 수 있다.

“On” 을 실행하면, mapping 이 저장된다.

Function "start mapping" (053)



This function is used to start the interference echo mapping up to the distance given in "range of mapping" (052).

Selection:

- off: no mapping is carried out
- on: mapping is started

static mapping 부분을 최소화 해주어야 하므로 0.5m 정도로 mapping distance를 지정하여 준다.

상기 작업이 완료되면, main 화면으로 빠져나와 지시값을 확인한다.

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7. trouble shooting.

문제가 발생할 시 아래의 error message에 의거하여 display 진단에 error message를 확인할 수 있다.

Code	Description	Possible cause	Remedy
A102	checksum error general reset & new calibr.required	device has been powered off before data could be stored; emc problem; E ² PROM defect	reset; avoid emc problem; if alarm prevails after reset, exchange electronics
W103	initialising - please wait	E ² PROM storage not yet finished	wait some seconds; if warning prevails, exchange electronics
A106	downloading please wait	processing data download	wait until warning disappears
A110	checksum error general reset & new calibr.required	device has been powered off before data could be stored; emc problem; E ² PROM defect	reset; avoid emc problem; if alarm prevails after reset, exchange electronics
A111	electronics defect	RAM defective	reset; if alarm prevails after reset, exchange electronics
A113	electronics defect	ROM defective	reset; if alarm prevails after reset, exchange electronics
A114	electronics defect	E2PROM defective	reset; if alarm prevails after reset, exchange electronics
A115	electronics defect	general hardware problem	reset; if alarm prevails after reset, exchange electronics
A116	download error repeat download	checksum of stored data not correct	restart download of data
A121	electronics defect	no factory calibration existant; E ² PROM defective	contact service
W153	initialising - please wait	initialisation of electronics	wait some seconds; if warning prevails, power off device and power on again
A160	checksum error general reset & new calibr.required	device has been powered off before data could be stored; emc problem; E ² PROM defect	reset; avoid emc problem; if alarm prevails after reset, exchange electronics
A164	electronics defect	hardware problem	reset; if alarm prevails after reset, exchange electronics
A171	electronics defect	hardware problem	reset; if alarm prevails after reset, exchange electronics
A221	Probe pulse deviation from average values	HF module or cable between HF module and electronics defective	Check contacts on HF module If fault cannot be eliminated: Replace HF module

Code	Description	Possible cause	Remedy
A241	Broken probe	Broken probe or value for probe length is too short	Check the probe length in 033, Check the probe itself, if the probe is broken, change the probe, or change to a non contact system
A251	Feedthrough	Lost contact in the process feedthrough	Replace process feedthrough
A261	HF cable defective	HF cable defective or HF connector removed	Check HF connector, replace cable if defective
A275	Offset too high	Temperature at the electronics too high or HF module defective	Check temperature, replace HF module if defective
W511	no factory calibration ch1	factory calibration has been deleted	record new factory calibration
A512	recording of mapping please wait	mapping active	wait some seconds until alarm disappears
W601	linearisation ch1 curve not monotone	linearization not monotonously increasing	correct linearisation table
W611	less than 2 linearisation points for channel 1	number of entered linearization points < 2	correct linearisation table
W621	simulation ch. 1 on	simulation mode is active	switch off simulation mode
E641	no usable echo channel 1 check calibr.	echo lost due to application conditions of built up on antenna	check installation; clean antenna (cf. Operating Instructions)
E651	level in safety distance - risk of overspill	level in safety distance	alarm will disappear as soon as level leaves safety distance;
A671	linearisation ch1 not complete, not usable	linearisation table is in edit mode	activate linearisation table
W681	current ch1 out of range	current out of range (3,8 mA ... 21,5 mA)	check calibration and linearisation