



OUM 223 Transmitter for Turbidity and Solids Content



SECHANG INSTRUMENTS

1

1.1



:

가 .



:

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가 .



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,

.

1.2

OUM 223

Version ,

SS(MLSS)

Transmitter .

**Drinking Water, Water Treatment, Cooling Water, Gas Scrubbers
Reverse Osmosis, Food Processing,**

Monitoring and safety devices

UV Resistance

가

,

가

,

Fault-Signaling

Contact

.

Fail-safety

OUM 223

CE

EN[Electromagnetic

Compatibility]

.

INPUT OUTPUT Galvanic Isolation.

Interference Suppression Filter.

Hardware and Software Design meeting EMC requirements.

OUM 223 Transmitter for Turbidity and Solids Content

1.3

OUM 223 turbidity / Trübung		CE
order code / Best.Nr. :	OUM 223-TU0110	
serial no. / Ser.-Nr. :	123456	Code: 1234
measuring range / Messbereich :	FNU, ppm, g/l, %	
temperature / Temperatur :	-5 ... 70 °C	
output 1 / Ausgang 1 :	0/4 ... 20 mA	
output 2 / Ausgang 2 :	0/4 ... 20 mA	
mains / Netz :	230 V AC	50/60 Hz 7,5 VA
prot. class / Schutzart :	IP 54 / IP 30	
ambient temp. / Umgebungstemperatur :	-10 ... 45 °C	

13.1085-1B

223-TYP.CDR

OUM 223	
Version	
TB	Solids content measurement with settings for concrete residual water
TU	Turbidity and solids content measurement
TS	Turbidity and solids content measurement with additional functions (Plus package)
Power supply	
0	230 V AC
1	115 V AC
5	100 V AC
8	24 V AC/DC
Measurement output	
0	Turbidity / SS
1	Turbidity / SS and temperature
Contacts	
05	No additional contacts
10	2 contacts (limits / PID / timer)
16	4 contacts (limits / PID / timer)
OUM223-	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
complete order code	

(transmitter) (Chapter 3.3),

(Chapter 4.2)

(Start-up) (Chapter 6)

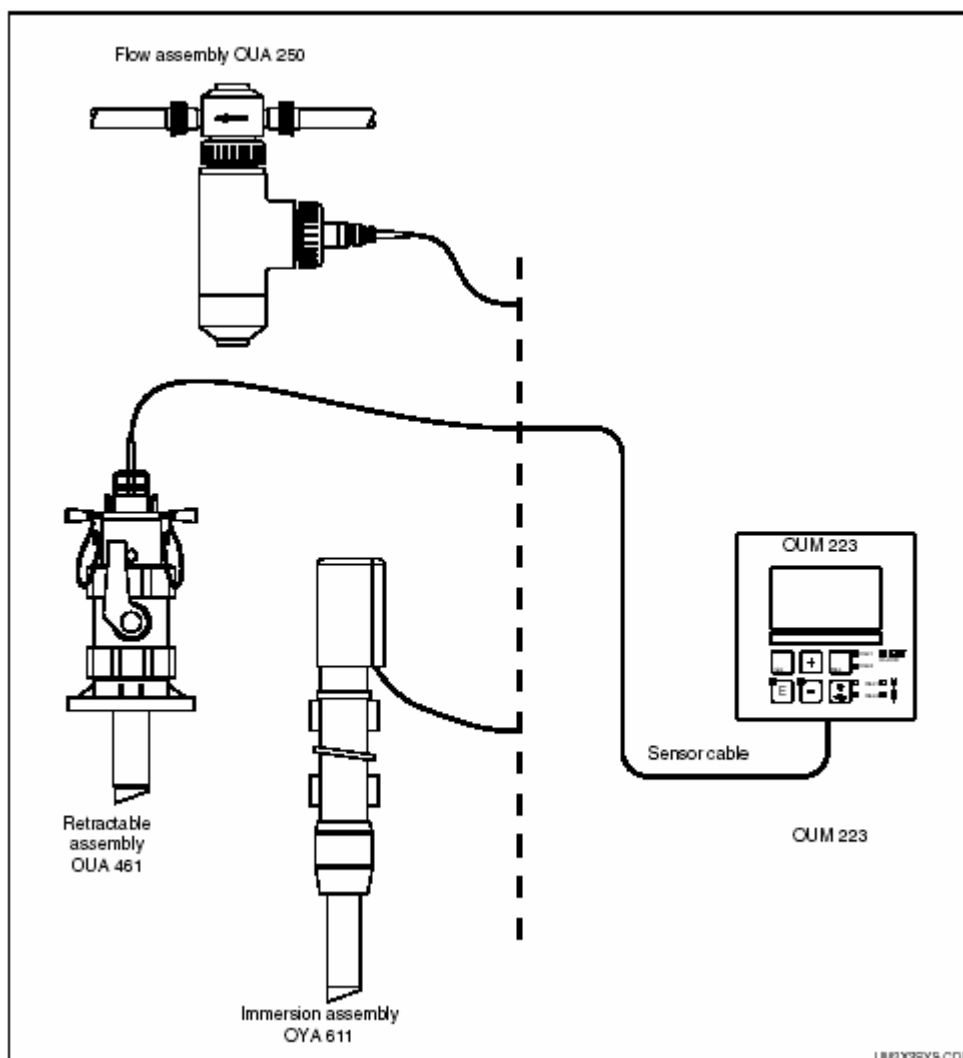
2.1

OUM223 Turbidity and Solids Content Transmitter

OUS 31 Turbidity Sensor

OUS 41 Solids Content Sensor

2.2



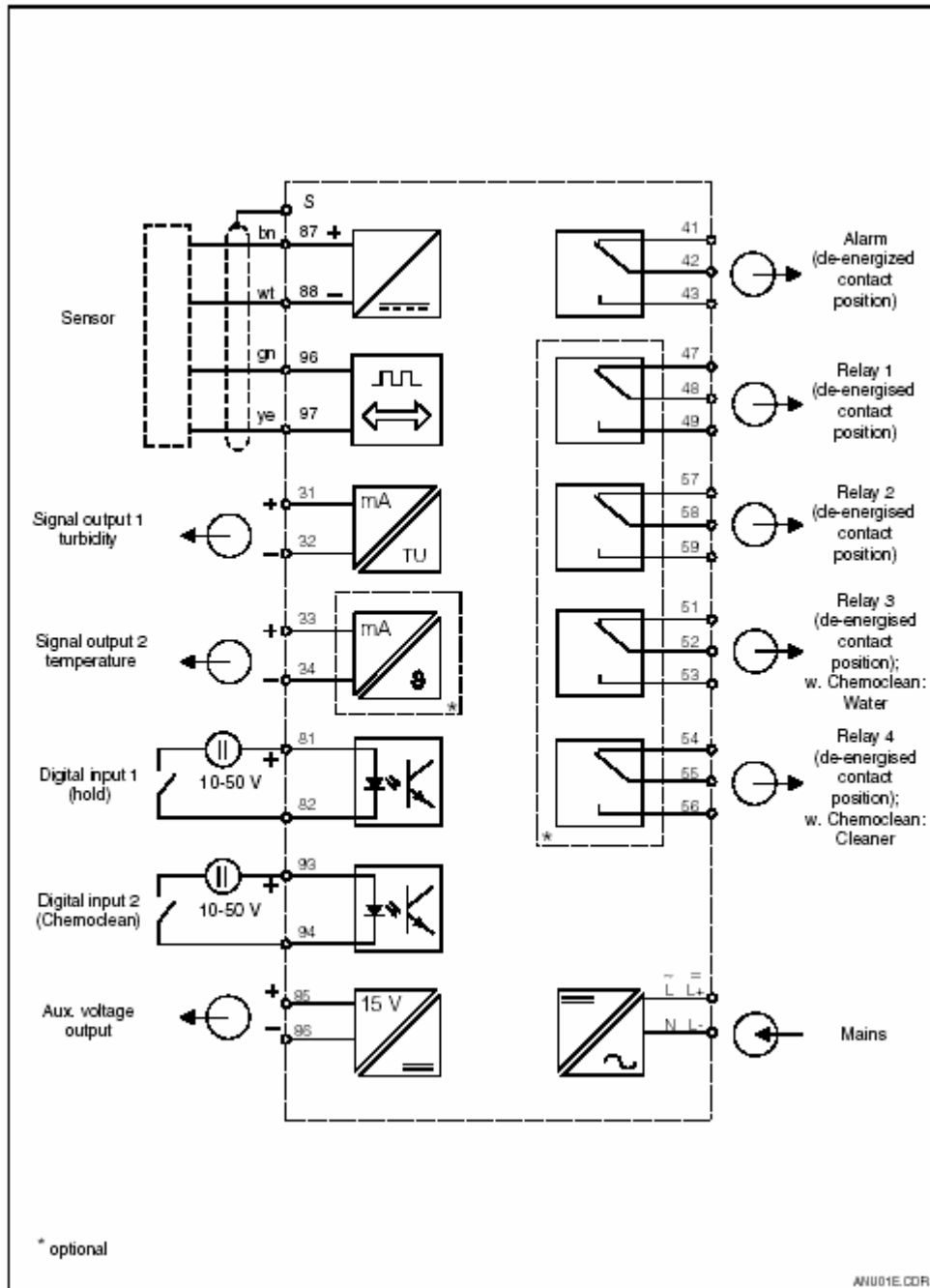
3

3.1

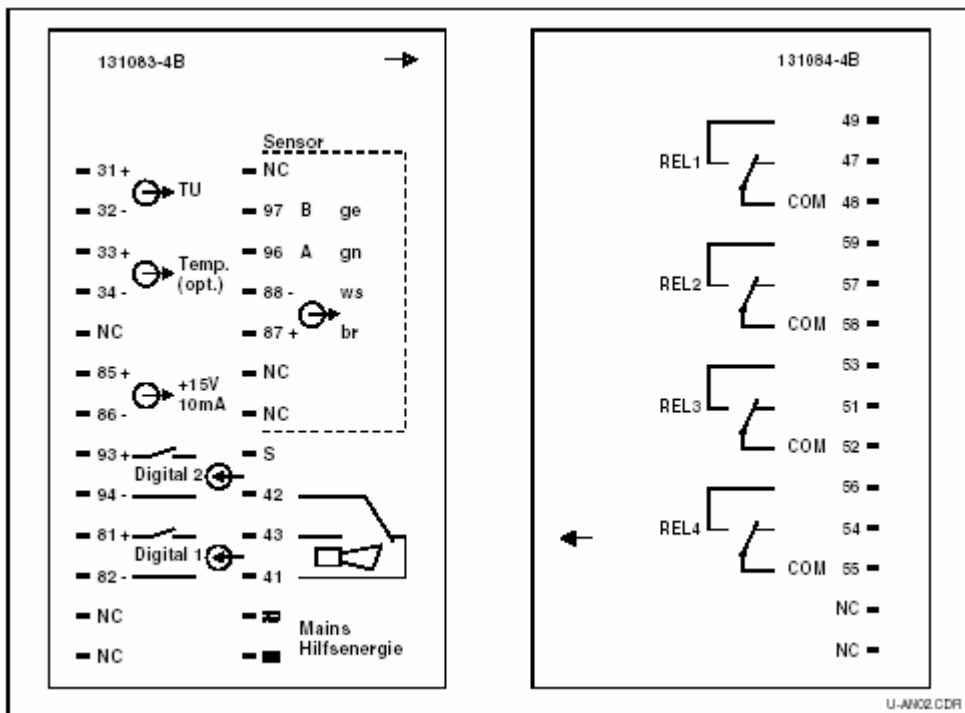
3.1.1

4.1

OUS 31/41

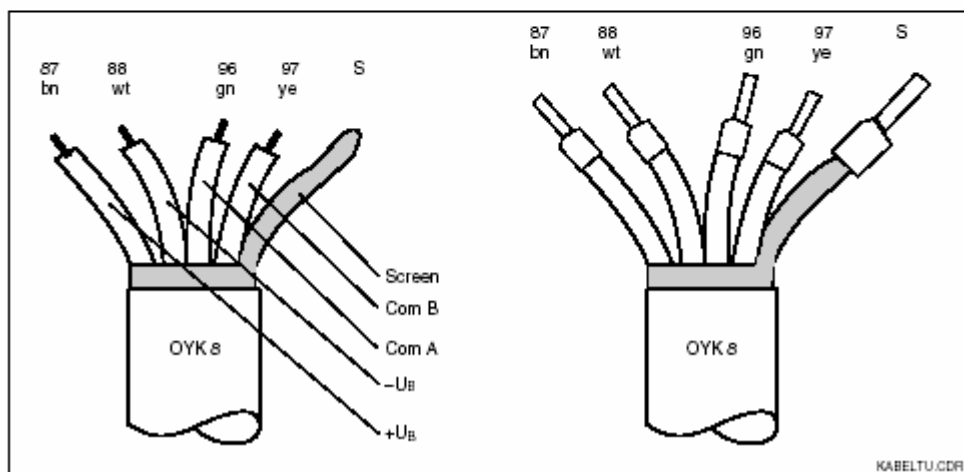


OUM 223 Transmitter for Turbidity and Solids Content



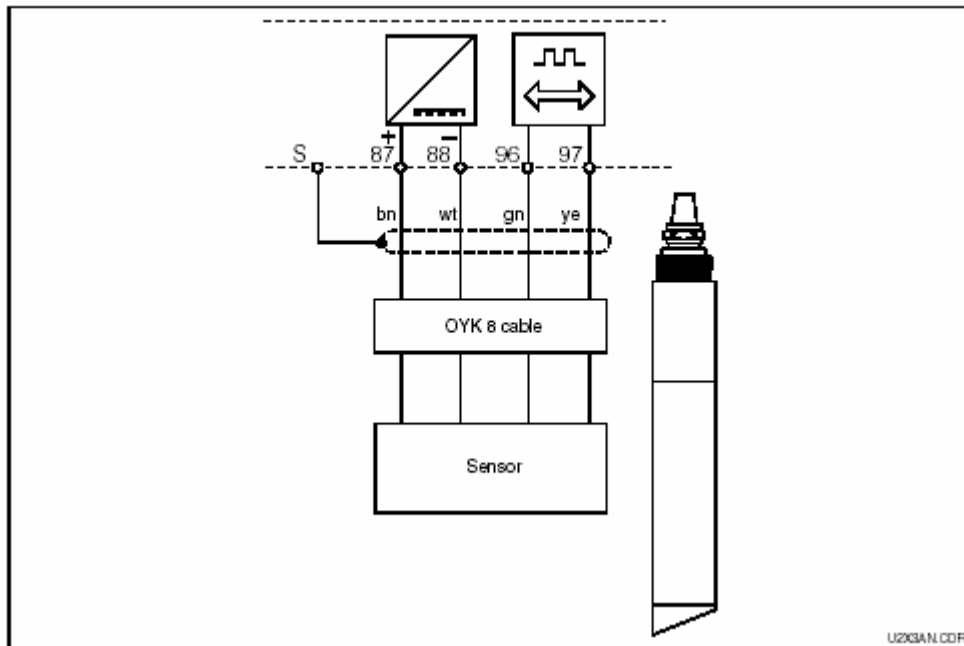
Special measuring cables required for connection of turbidity sensors		
Sensor type	Cable	Extension
Turbidity sensor OUS 31 / OUS 41	Non-detachable cable on sensor	VBM box + OYK 8
Maximum cable length		
OUS 31 / OUS 41	max. 200 m using OYK 8	

Structure and termination of measuring cables



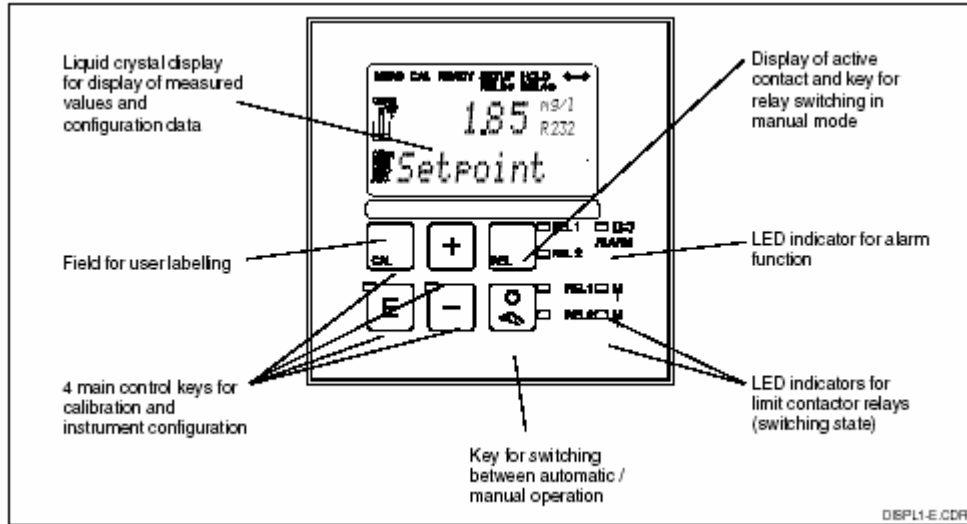
OUM 223 Transmitter for Turbidity and Solids Content

Connection examples



4

4.1



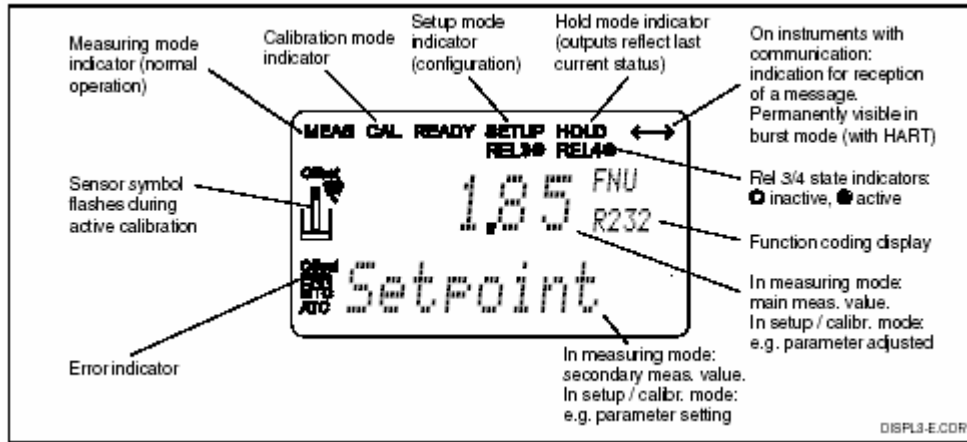
5.1: Operating elements of OUM 223

4.2







4.2.1

	현재 구동 모드 표시: 자동 (green LED) or 수동 (yellow LED)
	수동 모드에서 릴레이(Relay) 작동 표시 (red LED)
REL.1 REL.2	릴레이 1과 2의 구동상태 표시 green LED: Relay inactive red LED: Relay active
ALARM	경보 표시: 시스템 오류, 온도 센서 오류 등 (7.4장[Fault Diagnosis Chart] 참조)










4.2.2



4.3

	<p>CAL key</p> <p>(22 가).</p> <p>CAL 가</p> <p>Ⓜ : C</p>
	<p>ENTER key</p> <p>(Confirm)</p> <p>(CAL)</p> <p>가</p>
 	<p>PLUS key & MINUS key</p> <p>(5.2)</p> <p>(PLUS key, 5.7)</p> <p>(MINUS key, 5.7)</p>
	<p>REL key</p> <p>“ ” “ ”</p>
	<p>AUTO key</p> <p>&</p>

4.4 /

	(Auto)
	(Manual)
	1. AUTO
 	2. 22
	3. or REL 가
 	4. PLUS ON, MINUS OFF ON, OFF 가 가 Special case: three-point step controller 3 NO PLUS NO MINUS 4 NC 2 가 ON ON , 2 OFF (ENTER)
	5. 가 AUTO 가



1) OFF , ON

2)

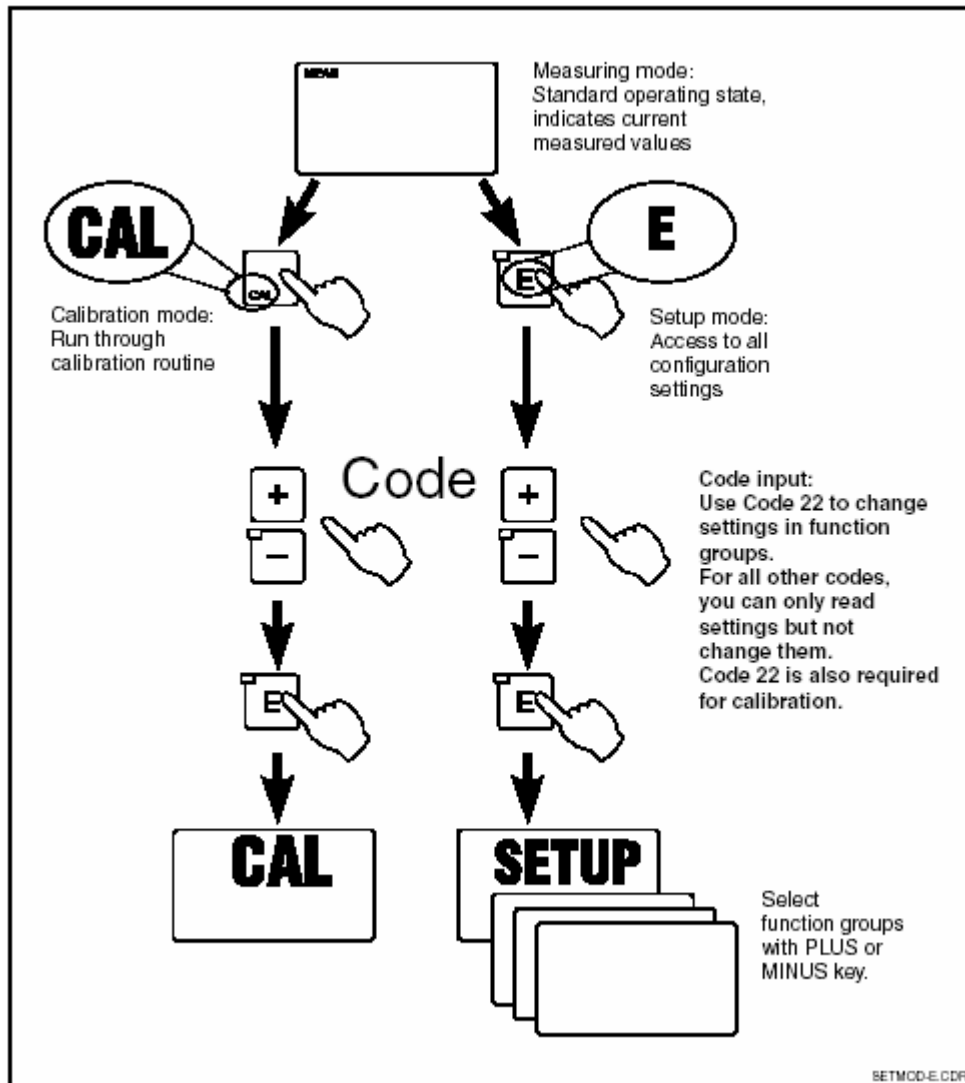
3) Hardware

4)

5) E102가

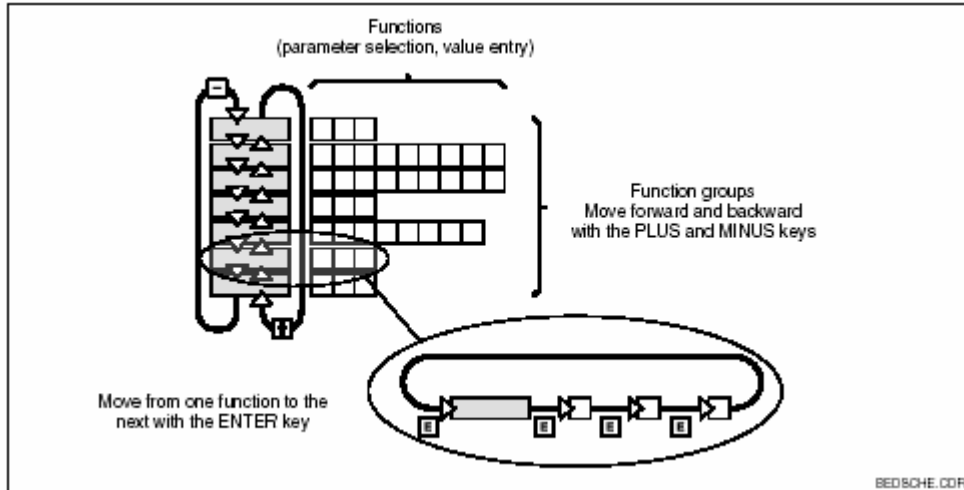
4.5

4.5.1



4.5.2

PLUS MINUS
 ENTER
 가 PLUS MINUS
 ENTER (Confirm)
 MINUS PLUS
 가
 :
 가 ENTER



4.5.3 (Hold) : (Freezes)

, 가

(Normal)

During each hold the I component of the controller is set to zero.

Error Delay가 0

. (4.1: digital input 1).

(Manual hold (Field S3))

4.6

가
 .(5.3)
 (ENTER/CAL)
 Code 22 : CAL
 Code 22 : ENTER , 가
 가 ,
 4.3

4.7

()
 _____ (FTU, NTU, PPM)
 _____ ()
 PLUS

1. ()
- 2.
3. (%) (0 100% ≙ 4 20mA) ()
4. (mA) ()
5. (FNU/NTU)

MINUS

1. 10 가
2. ,



F(5.5.1)

4.8

5.9

5 (configuration)

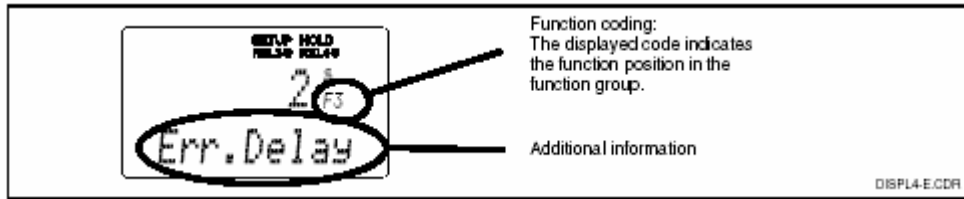
가
 가 ,

가 .)

* SETUP 1 (A)	5.2.1
* SETUP 2 (B)	5.2.2
* CURRENT INPUT (Z)	6.3
* CURRENT OUTPUT (O)	5.3
* ALARM (F)	5.5.1
* CHECK (P)	5.5.2
* RELAY (R)	5.5
* CONCENTRATION (K)	5.6
* SERVICE 1 (S)	5.7
* SERVICE 2 (E)	5.8
* INTERFACE (I)	5.9

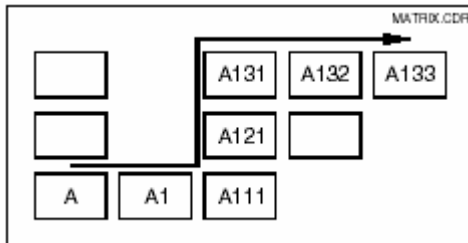
Offset mode

* CALIBRATION (C)	5.10
* OFFSET (V)	5.11
* SLOPE (N)	



[5.1: (Setup Mode)]

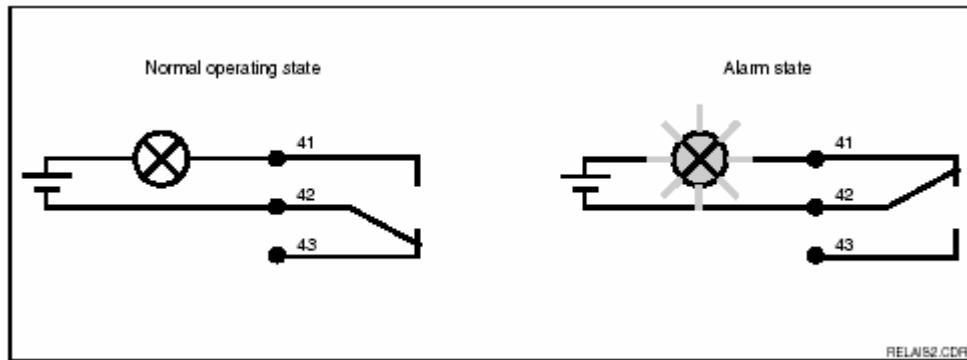
5.2 “ ” “ ”



ON

OUM 223 Transmitter for Turbidity and Solids Content

Type of measurement	turbidity in FNU, temperature* in °C or °F
Temperature offset / turbidity offset	0 °C 0 FNU
Limit 1	9999 FNU
Contact function of limit contactor 1	MAX contact without delay
Limit 2	9999 FNU
Contact function of limit contactor 2	MAX contact without delay
Current outputs 1 and 2*	4 ... 20 mA
Current output 1: meas. value for 4 mA signal current	0 FNU
Current output 1: meas. value for 20 mA signal current	9999 FNU
Current output 2: temperature value for 4 mA signal current*	-5.0 °C
Current output 2: temperature value for 20 mA signal current*	70.0 °C
Measured value damping	10
Calibration data set	no. 3
Wipe control	off



5.3

Normal State		Alarm State	
가	(alarm LED green)	(alarm LED red)	(alarm LED off)
=>	ON	=>	OFF
=>	42&43	=>	41&42

5.1

ON ,

SERVICE (S)

S 1: ,

SETUP 1 (A)

. 6.2.1 .

SETUP 2 (A)

. 6.1 .






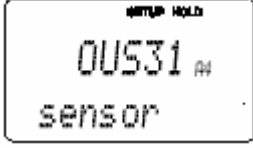
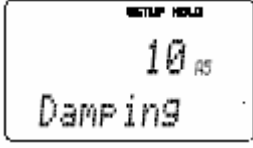
5.2 (System configuration)

SETUP 1 & SETUP 2


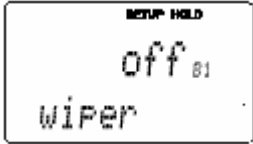
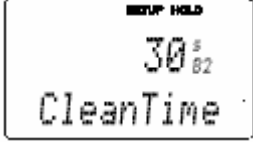
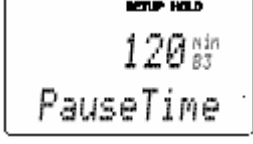
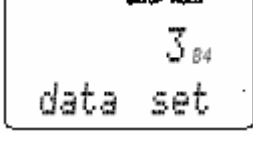
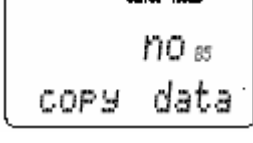
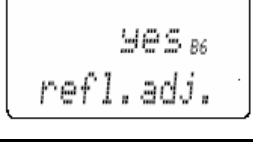
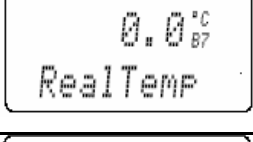
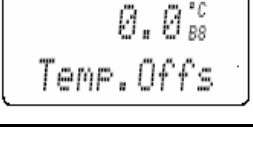
가

가 , 가

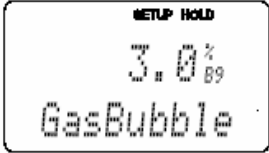
5.2.1 Setup 1

	Field	()		Remarks
A	SETUP 1			SETUP 1
A 1		NTU FNU ppm mg/l g/l % spec.		
A 2		Kg/l % t/m3 none		A1 Spec. 가
A 3		XX.XX X.XXX XXX.X XXXX		A1 Spec. 가
A 4		OUS 31 OUS 41		가
A 5		10 1.....60		

5.2.2 Setup 2

	Field	()		Remarks
B	SETUP 2			2
B1	Wiper	Off on auto		auto Wiper Chemoclean B2 B3
B2	Wiper	30s 3...999s		
B3	Wiper	120min 1...7200min		
B4	DATA	3 1...3		3 가 Data 1
B5	DATA	no 1->2 1->3 2->3 3->2		1 () 1
B6	Reflection adaptation	yes no		CUS31/ 41 : Assembly NTU, FTU, PPM, mg/l 가
B7		-5.0...100.0		
B8		-5.0...5.0		

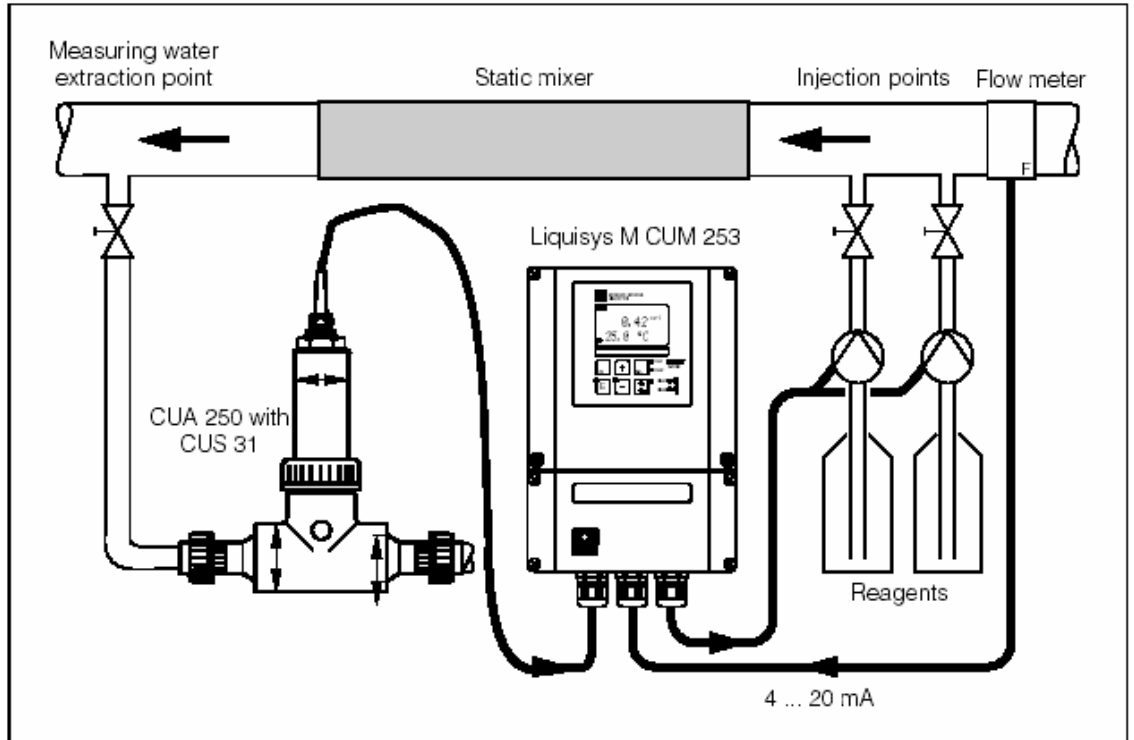
OUM 223 Transmitter for Turbidity and Solids Content

B9		3.0% 0.1...100%		. 0.1%= 100%=
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5.3.2 Feed-forward control to PID controller

가

. (6.7).



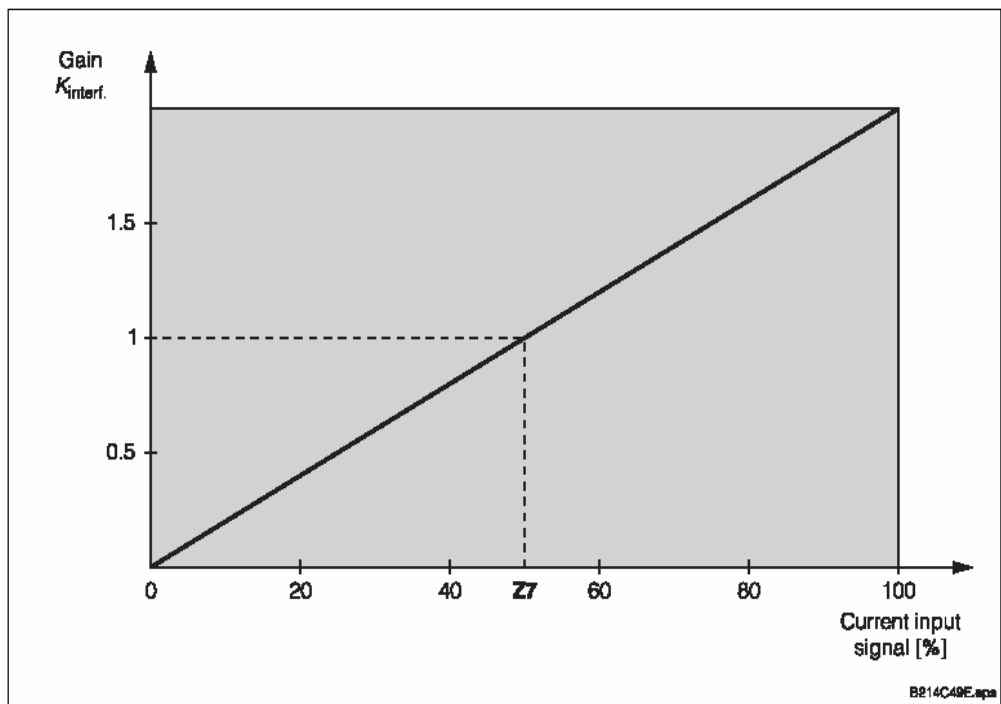
5.7 Feed-forward

Feed-forward

5.8

:

OUM 223 Transmitter for Turbidity and Solids Content



[5.8 Multiplying feed-forward control]

5.4

CURRENT OUTPUT

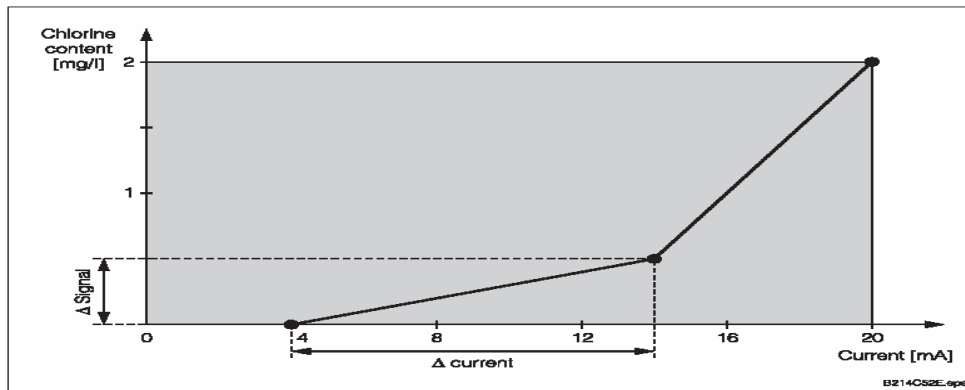
linear (O3(1))

ES and EP

(O3(3))

(O3(2))

Simulation



[5.9 Current Output Characteristic]

mA

0.005 FNU/ NTU/ ppm/ mg/l/ %

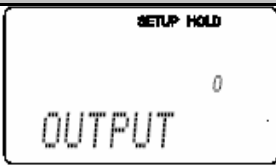
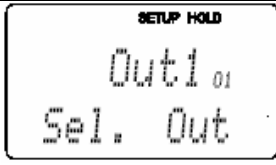
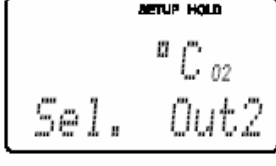
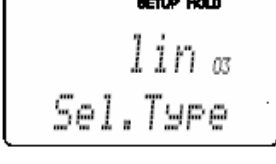
0.05 g/l

Temperature : 0.25

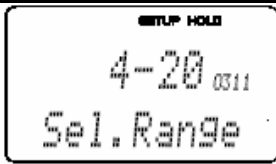
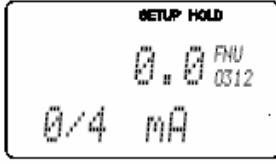
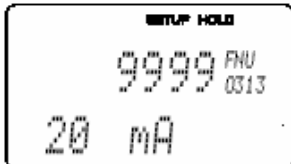
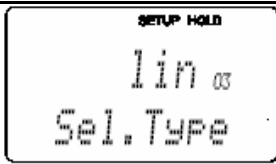
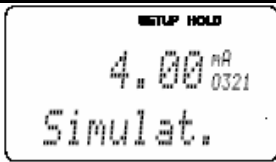
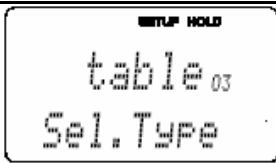
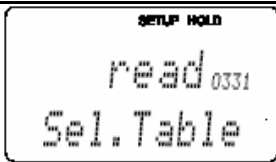
가

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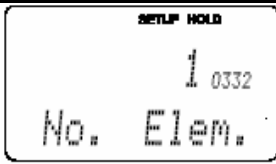
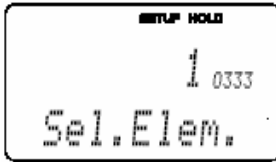
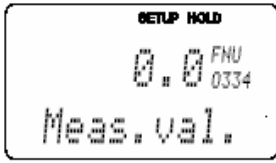
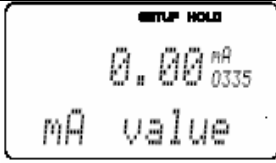
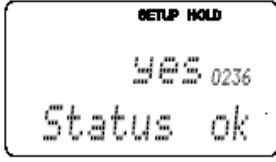
Value pair	Current output 1			Current output 2		
	Tu / °C []	Current [mA]	Distance per mA	Tu / °C []	Current [mA]	Distance per mA
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

	Field	()	Field	Remarks
O	CURRENT OUTPUT			Current output
O1		Out 1 Out 2		2(Out2): 가
O2	2	mg/l Contr		R237 Curr 가 O2 Contr
O3(1)	Enter linear characteristic	Lin=linear		

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	O311		4~20mA 0~20mA		
	O312	0/4mA	0.0 NTU 0.0 FNU 0.0 ppm 0.0 mg/l 0.0 g/l 0.0 kg/l 0.0 t/m3 0.0% 0.0		0/4mA 20mA Field O313
	O313	20mA	10.00 NTU 10.00 FNU 10.00 ppm 10.00 mg/l 300.0 g/l/ 3.00 g/l. 99.99 kg/l 99.99 t/m3 10.0% 100.0		20mA
	O3(2)	Simulate current output	Sim=simulation		Simulation O3(1) O3(3) 7f
	O321	simulation	Current value 0.00 ~ 22.00mA		
	O3(3)	Enter current output table	Tab=table		
	O331		read edit		

OUM 223 Transmitter for Turbidity and Solids Content

	O332	Enter number of table value pairs	1 1 ~ 10		X, Y ()
	O333	Select table value pair	1 1 ~ number of table value pairs assign		The functional chain O333 ~ O335 is automatically passed as often as set in O332. "assign" is displayed as the last step. After confirmation, the display jumps to O336.
	O334	x	0.0 NTU 0.0 FNU 0.0 ppm 0.0 mg/l 0.0 g/l 0.0 kg/l 0.0 t/m3 0.0% 0.0		x value =
	O335	y	4.00mA 0.00 ~ 20.00mA		O334
	O336	?	yes no		Back to O3. No 가

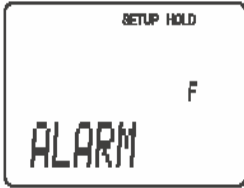

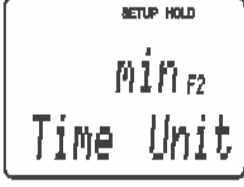


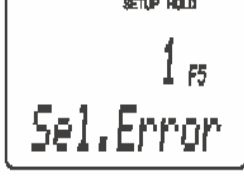
5.5

가

Error /

(F8)

5.5.1

	Field	()		Remarks
F	Function Group ALARM			
F1		Stead=steady contact Fleet=fleeting contact		
F2		min s		
F3		0 min (s) 0 ~ 2000 min (s)		F2
F4		22 mA 2.4 mA		F5 off 가 Switch ! "0 ~ 20mA" O311 "2.4mA" 가.
F5		1 1 ~ 255		7

OUM 223 Transmitter for Turbidity and Solids Content

F6		Yes no		"no" (e.g. error delay). F5
F7		no yes		, F4 F5
F8		no yes		7
F9	가	Next=next error <----R		Next F5

5.5.2 Check

Plus Packet

	Field	()		Remarks
P	CHECK			&
P1	Threshold	Off Low High Lo+ Hi = Low + High High! LoHi!		xxxxx = without controller switch-off, xxxx! = with controller switch-off.
P2		0 min (s) 0 ~ 2000 min (s)		F2

OUM 223 Transmitter for Turbidity and Solids Content

P3	threshold	0.000 NTU 0 ... 9999NTU!	0.000 NTU P3 LowAlarm	
P4	threshold	9999NTU 0...9999 NTU	9999 NTU P4 HighAlarm	
P5		Off AC CC AC CC AC! CC! ACCC!	Off P5/1 P115 ProcMonit	AC= CC= xxxxx = without controller switch-off, xxxx! = with controller switch-off.
P6	(for lower limit violation)	60 min 0 ~ 2000 min	60 min P116 Tmax Low	P5 CC AC CC
P7	(for upper limit violation)	120 min 0 ~ 2000 min	120 min P117 Tmax High	P5 CC AC CC
P8	Enter limit	0.000 NTU 0 ... 9999 NTU	0.000 NTU P8 Setpoint	

6

/ 가

- *Limit contactor for measured turbidity value: R2 (1)
- *Limit contactor for temperature : R2 (2)
- *P(ID) controller : R2 (3)
- *Timer for Cleaning function : R2 (4)
- *ChemoClean function : R2 (5)

6.1.1 Limit contactor for turbidity value and temperature

6.10

(Max Function),

Switch-on Point(t_1) , t_2 (Close)

Pickup delay (t_2-t_1) Alarm Threshold(t_3)

, Error Delay(t_4-t_3)

OUM 223 Transmitter for Turbidity and Solids Content

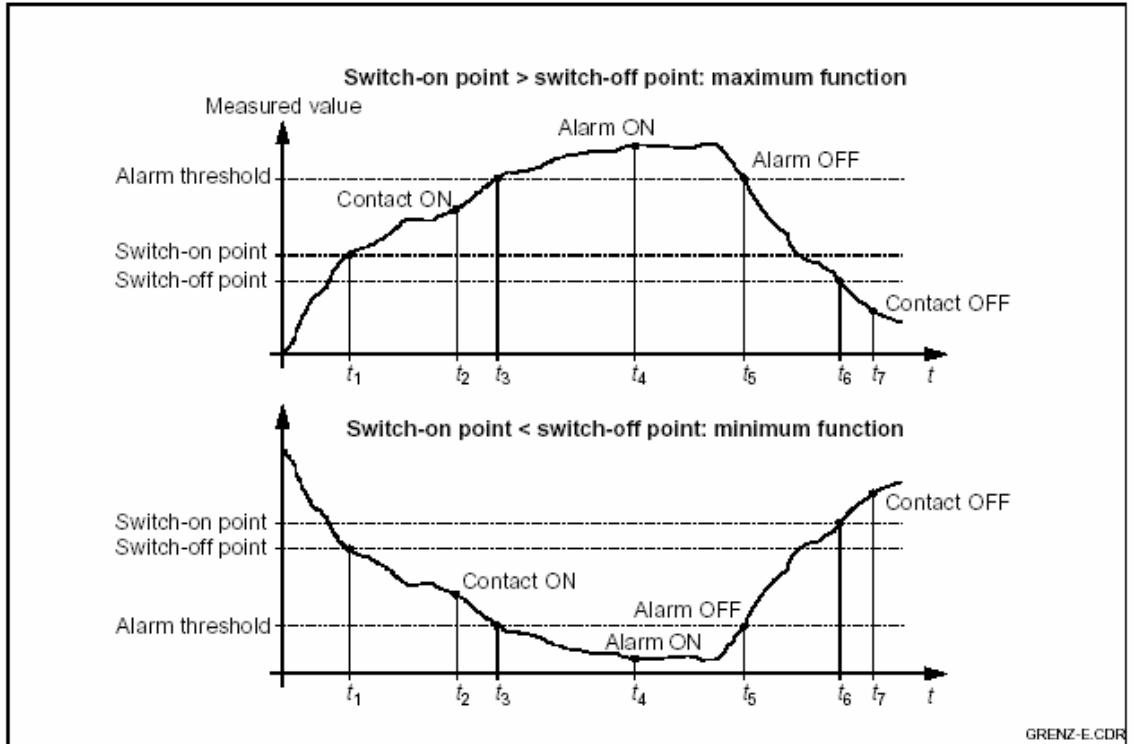
(Min Function)

Alarm Threshold(t_5) , (re-open)

(t_7 , also opens after the dropout delay $t_7 \sim t_6$)

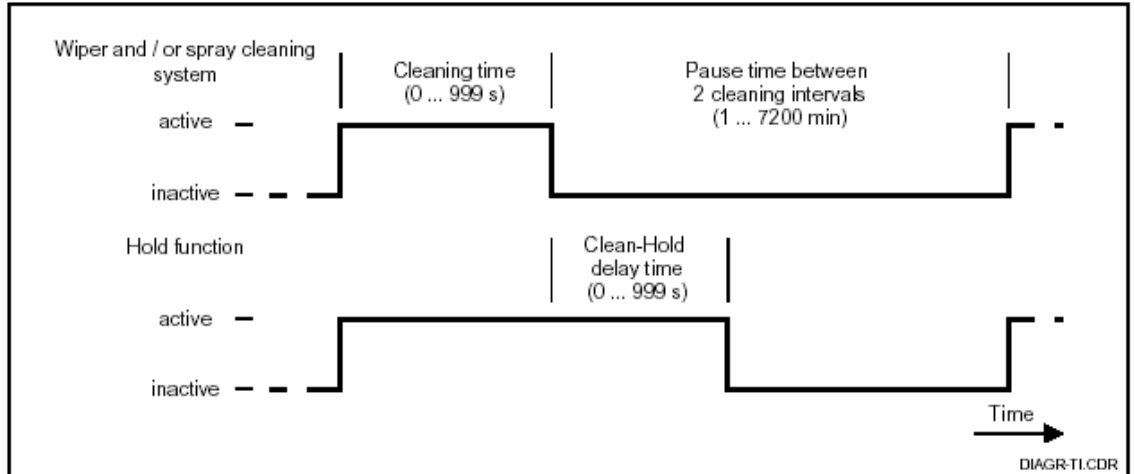
Pickup Delay Dropout Delay 0 , Switch-on Point Switch-off

Point 가 .



6.1: Switch-on & Switch-off, Pickup delays & Dropout delays

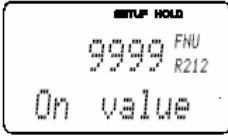
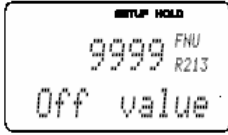


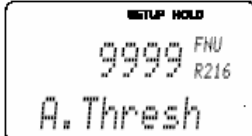
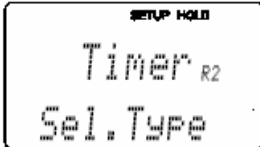

6.1.2



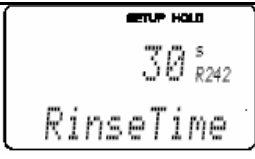
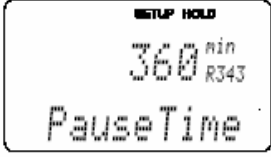
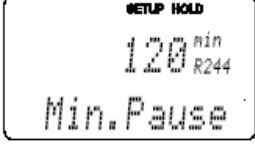




6.5: Cleaning Time & Pause Time & Delay Time

	Field	()		Remarks
R	RELAY			
R1		Rel 1 Rel 2 Rel 3 Rel 4		Rel3(water)and Rel4(cleaner) () 가 ChemoClean Rel4
R2(1)	Configure limit contactor for Turbidity measurement	LC PV=limit TU(1) LC =Limit contactor T2(2) PID Controller (3) Timer(4) Clean=ChemoClean(5)		PV= Process Value. R1 Rel4 ChemoClean Switch-on ENTER Switches off 가
R211	R2(1) ON/OFF	Off On		Limit Contactor 가 OFF





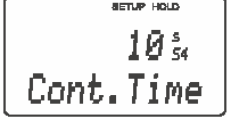



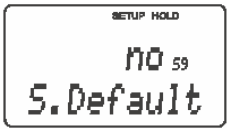
OUM 223 Transmitter for Turbidity and Solids Content

	R212	Switch-on Point	9999 NTU 9999 FNU 9999 ppm 3000 ppm 9999 mg/l 3000 mg/l 300.0 g/l 3g/l 99.99 kg/l 99.99t/m3 200.0%		Switch-on Point Switch-off Point
	R213	Switch-off Point	9999 NTU 9999 FNU 9999 ppm 3000 ppm 9999 mg/l 3000 mg/l 300.0 g/l 3g/l 99.99 kg/l 99.99t/m3 200.0%		Switch-off (switch-on point > switch-off point) or (switch-on point < switch-off point) and this implements a hysteresis (see Fig.6.10).
	R214	Pickup Delay	0 s 0 ~ 2000 s		0 Switch off/on Contact on/off가
	R215	Dropout Delay	0 s 0 ~ 2000 s		
	R216	Alarm Threshold ()	9999 NTU 9999 FNU 9999 ppm 3000 ppm 9999 mg/l 3000 mg/l 300.0 g/l 3g/l 99.99 kg/l 99.99t/m3 200.0%		Threshold가 가
	R2(4)	(Timer)	LC PV=limit TU(1) LC =Limit contactor T2(2) PID Controller (3) Timer(4) Clean=ChemoClean(5)		
	R241	R2(4) ON/OFF	Off On		

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	R242		30s 0 ... 999 s		
	R243		120 min 1 ... 7200 min		
	R244		120 min 1 ... 3600 min		
	R2(5)	ChemoClean (Rel3, 4)	LC PV=limit TU(1) LC =Limit contactor T2(2) PID Controller (3) Timer(4) Clean=ChemoClean(5)		
	R251	R2(5) ON/OFF	Off On		
	R252	R2(5) ON/OFF	Off On		
	R241	R2(5) ON/OFF	Off On		

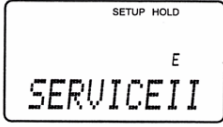

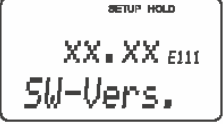
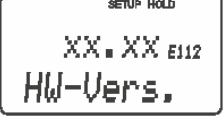
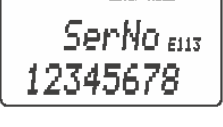
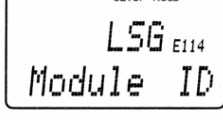
6.7 Service 1

	Field	()		Remarks
S	SERVICE 1			
S1		ENG=English GER=German FRA=French ITA=Italian NEL=Dutch ESP=Spanish		field S1 가
S2		S+C= CAL= Setup= none= No		S= C=
S3		Off On		OFF 가
S4		10 s 0 ~ 999 s		
S5		0 0 ~ 9999		(2.1) PLUS or MINUS ENTER
S6				Reserved: no function at present.
S7	Display order code			order code . The delivery state is displayed.
S8				
S9		no Sens=sensor dates Factly=factory settings		: Factly = Sensor type(A1), Operating mode(B1), Language(S1) 가 Sens =

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S10		no Displ=display test		
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6.8 Service 2

	Field	()		Remarks
E	SERVICE 2			
E(1) E(2) E(3) E(4)	Select module	Contr=controller (1) Trans=transmitter(2) MainB=mainboard (3) Rel=relay (4)		
E111 E121 E131 E141				가
E112 E122 E132 E142				가
E113 E123 E133 E143				가
E114 E124 E134 E144	Module identification			가

6.9 Calibration

* 3

*

* 3

*

* 1

:

* PLUS MINUS (return to C15,
C29, C35). 가 ,

ERR ,

가

* 가 . Hold delay (field S4) ,

가

3

3

가

3%, 33%,

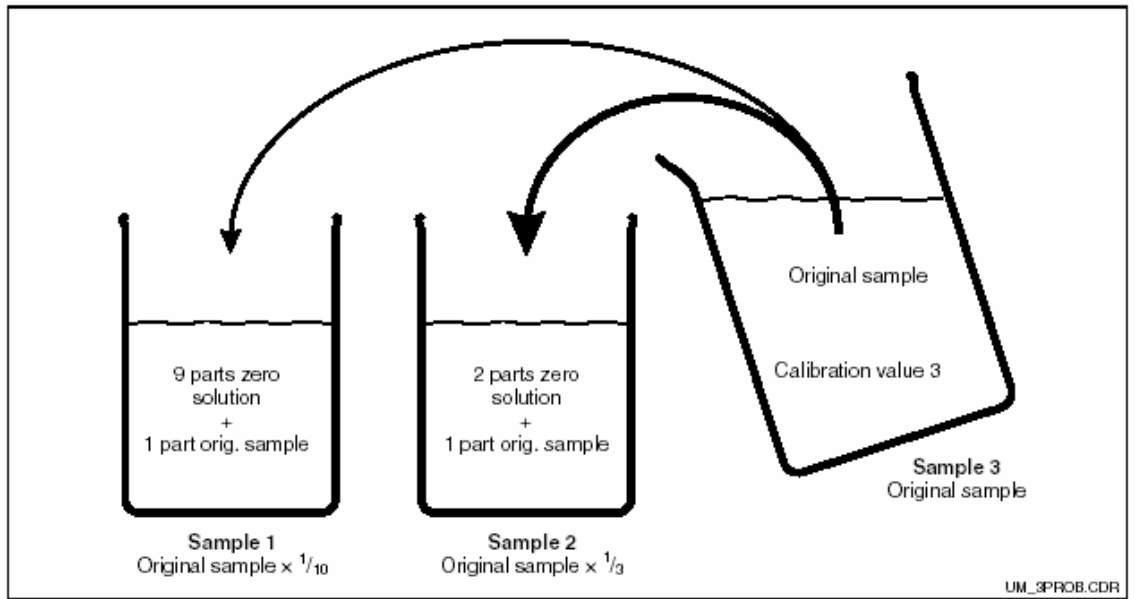
100%

가

가

3%, 10%, 100%

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가 3

가 SS(MLSS)

* ,

* 3 10% 가

* ,

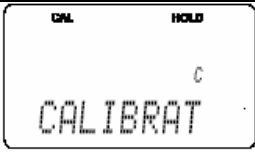
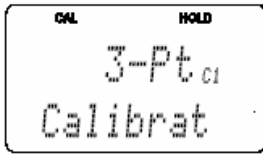
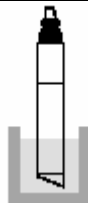
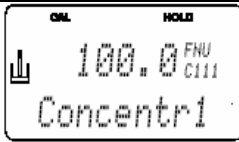
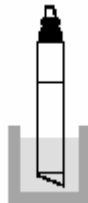
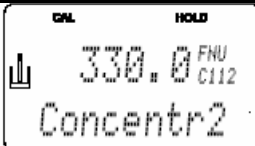
* Gas bubble barrier 3.0%

3 가 .1 Read


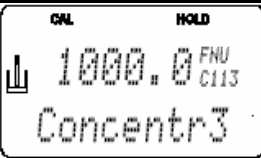

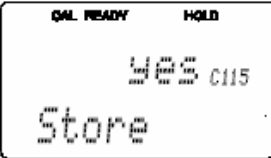
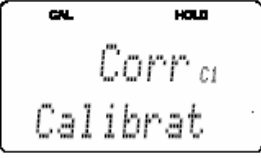
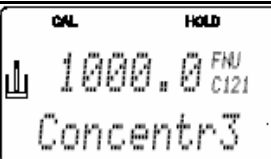
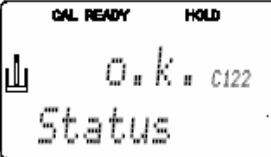
가 가 2

	FNU	ppm or mg/l	g/l	%
Data set No. 1	formazine (read only)	SiO ₂ (read only)	activated sludge (read only)	concrete residual water (read only)
Data set No. 2	formazine (editable)	kaolin (editable)	activated sludge (editable)	concrete residual water (editable)
Data set No. 3	formazine (editable)	SiO ₂ (editable)	activated sludge (editable)	concrete residual water (editable)

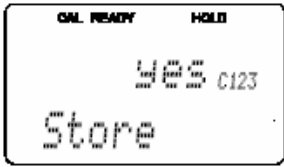
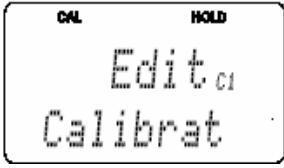
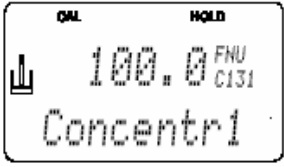

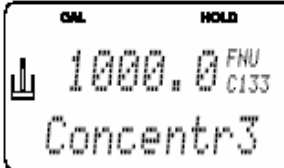


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	Field	()		Remarks
C	CALIBRATION : Calibration			
C1(1)		<p>3 Pt = Three-point calibration(1)</p> <p>)</p> <p>Corr = Three-point correction (2)</p> <p>Edit = Fitting with reflection effects(3)</p> <p>Refl = Fitting with reflection effects(4)</p> <p>1-Pt = Single-point calibration(5)</p> <p>Data = Calibration data(6)</p>		OCS 140/240 & 963 : 0.05 mg/l OCS 141/241 : 0.01mg/l
(Sample 1)				가
C11 1	1			
(Sample 2)				가
C112	2			C112 >= 1.1*C111

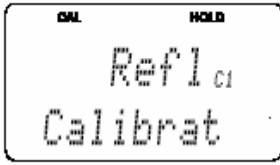
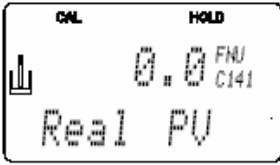
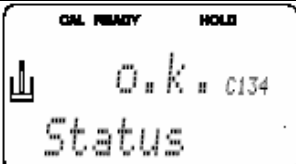
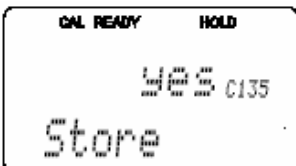
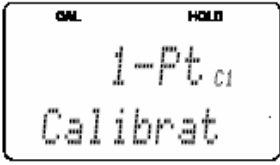
OUM 223 Transmitter for Turbidity and Solids Content

		(Sample 3)			가
	C113	3			C113 >= 1.1*C112
	C114		o.k. Exxx		Abortion Warning Warning E045 ← E084 ← E084 20% 50% 200% C161 ... C163
	C115	?	yes no new		C114 Exxx no new new 가 , C yes, no
	C1(2)		3 Pt = Three-point calibration(1) Corr = Three-point correction (2) Edit = Fitting with reflection effects(3) Refl = Fitting with reflection effects(4) 1-Pt = Single-point calibration(5) Data = Calibration data(6)		
	C121	3	Current value from C113 entire measuring range		가 (1/10, 1/3, 1)
	C122		o.k. Exxx		

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	C123	?	yes no new		C122 Exxx no new new C 가 , yes, no
	C1(3)		3 Pt = Three-point calibration(1) Corr = Three-point correction (2) Edit = Fitting with reflection effects(3) ReFl = Fitting with reflection effects(4) 1-Pt = Single-point calibration(5) Data = Calibration data(6)		
	C131	1 ()	Current value from C111 entire measuring range		(1/10, 1/3, 1) 가
	C132	2 ()	Current value from C112 C132 >= 1.1*C131		
	C133	3 ()	Current value from C113 C133 >= 1.1*C132		C122 Exxx no new new C 가 , yes, no
	C134		o.k. Exxx		
	C135	?	yes no new		C134 Exxx no new new C 가 , yes, no

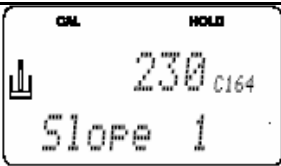
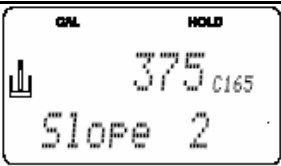
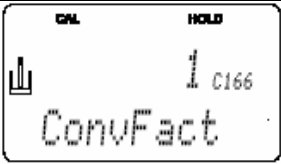
OUM 223 Transmitter for Turbidity and Solids Content

	C1(4)		3 Pt = Three-point calibration(1) Corr = Three-point correction (2) Edit = Fitting with reflection effects(3) Refl = Fitting with reflection effects(4) 1-Pt = Single-point calibration(5) Data = Calibration data(6)		5ppm, 2FNU/
	C141		0.0 NTU 0.0...2.0NTU 0.0 FNU 0.0...2.0FNU 0.0 ppm 0.0...5.0ppm 0.0 mg/l 0.0...5.0 mg/l		FNU, NTU, ppm, mg/l.
	C142		o.k. Exxx		
	C143	?	yes no new		C142 Exxx no new new C 가, yes, no
	C1(5)		3 Pt = Three-point calibration(1) Corr = Three-point correction (2) Edit = Fitting with reflection effects(3) Refl = Fitting with reflection effects(4) 1-Pt = Single-point calibration(5) Data = Calibration data(6)		For FNU : Adapter C164, C165 For ppm, mg/l 500 Adapter C164, C165, C166 For g/l, % C166. 3 1

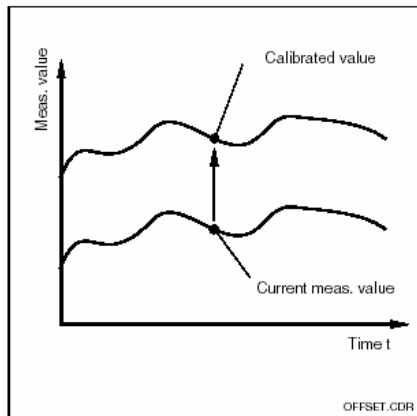
OUM 223 Transmitter for Turbidity and Solids Content


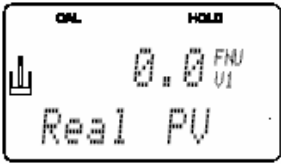
	C151				
	C152		o.k. Exxx		
	C153	?	yes no new		C152 Exxx no new new C 가 , yes, no
	C1(6)		3 Pt = Three-point calibration(1) Corr = Three-point correction (2) Edit = Fitting with reflection effects(3) Refl = Fitting with reflection effects(4) 1-Pt = Single-point calibration(5) Data = Calibration data(6)		
	C161	1			(=100%)
	C162	2			(=100%)
	C163	3			(=100%)

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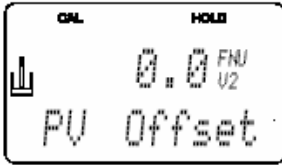
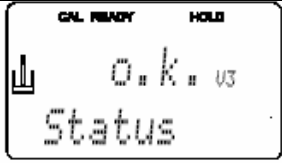
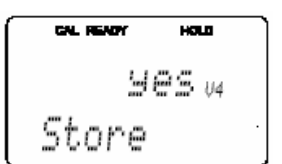
	C164	Slopr 1			Slope 1
	C165	Slopr 2			Slope 2
	C166				

6.10 Offser


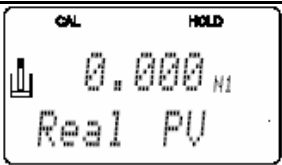
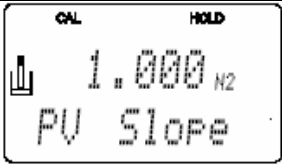
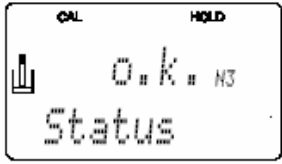


	Field	()		Remarks
V	OFFSET			
V1				


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V2	OFFSET			
V3		o.k. Exxx		
V4	OFFSET	Yes no new		V3가 Exxx no new new V 가 , yes, no

6.11 Slope

	Field	()		Remarks
N	SLOPE			
N1				
N2	SLOPE			
N3		o.k. Exxx		

OUM 223 Transmitter for Turbidity and Solids Content

N4	SLOPE	Yes no new		N37 Exxx no new new N 가 , yes, no
----	-------	------------------	---	--