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A complete and consistent set of configuration parameters is stored in the instrument. These data are the typical values loaded in the instrument prior to shipment from factory.

When it is desired to load the default value of all the configuration parameters, proceed as follows:

If the instrument starts in configuration mode, push the MENU pushbutton.

If the instrument starts in run time mode, by keeping depressed the MENU push-button for more than 5 seconds the instrument will show:

```
CONF
  nomt.
  ADD
```

**NOTE:** If no push-button is depressed for more than 10 s (or 30 s according to "CnF.6" "t.out" [time out selection" C.110] parameter setting), the instrument returns automatically to the normal display mode.

By ▲ or ▼ push-button select "nomt."

## NOTES:

- 1) When modify mode is started, the instrument stops the control and:
  - sets to OFF the control outputs;
  - turns to OFF the bargraph displays;
  - sets analog retransmissions to the retransmitted initial scale value;
  - sets to OFF the alarms;
  - disables the serial link;
  - removes the time out.
- 2) When the modify mode is disabled by V101 (SW3), the ▲ or ▼ push-button pressure has no effect.

Push MENU pushbutton again and select the "Default configuration group" [C.Cxx].

**NOTE:** if the configuration parameters are protected by security code, by ▲ or ▼ pushbuttons set the security code assigned and press the FUNC pushbutton.

By ▲ or ▼ push-button select the desired configuration parameter set "tb.1" (european) or "tb.2" (american)

Push MENU pushbutton again

The central display will show:

```
LOAD
```

and then the display will show:

*CnF.1*

*InPt.*

The default parameter loading procedure of all configuration parameters is ended.

The following is a list of the default configuration parameters loaded during the above procedure:

**TABLE 1 (EUROPEAN)**

Configuration group 1 [C.Dxx]		
PARAM.	VALUE	NOTES
Ln.Fr	50	Hz
PV.SL	CP	
Pb.FL	0	(No filter)
tP.In	1	(Tc K)
OFSt	0	°C
tP.FL	0	(No filter)
A.In.F	-	nonE
A.In.t	-	4-20(4-20mA)

A.I.FL	-	0 (No filter)
A.I.Añ	-	norñ
L.r.On	-	n.ALG

**Configuration group 2 [C.Exx]**

PARAM.	VALUE	NOTES
O1.Fn	ñAin	
O2.Fn	SECn	
O3.Fn	ALr.3	
O6.Fn	PV.rt	
O6.rn	4-20	4-20 mA
O6.Lr	0.00	
O6.Hr	2.00	
O6.FL	0	(No filter)
O7.Fn	nonE	
O7.rn	4-20	4-20 mA
O7.Lr	0.00	
O7.Hr	2.00	
O7.FL	0	(No filter)

**Configuration group 3 [C.Fxx]**

PARAM.	VALUE	NOTES
ñC.Cn	norñ	
ñ.SCL	nO	
ñC.dP	—.	(No decimal figure)

n̄C.E.L	0	
n̄C.E.H	100	
n̄C.A.C	bEFr	
SC.Cn	nor̄n	
S.SCL	nO	
SC.dP	—.	(No decimal figure)
SC.E.L	0	
SC.E.H	100	
SC.A.C	bEFr	

**Configuration group 4 [C.Gxx]**

PARAM.	VALUE	NOTES
Sñ.Fn	Enb	
Cn.tP	Pld	
n̄An.F	Enb	
Añ.UL	buñ.	
n̄.A.t.t	buñ.	
St.Fn	Cnd.b	

**Configuration group 5 [C.Hxx]**

PARAM.	VALUE	NOTES
d1.Fn	nonE	
d1.St	CLSd	
d2.Fn	nonE	
d2.St	CLSd	
d3.St	CLSd	

**Configuration group 6 [C.lxx]**

PARAM.	VALUE	NOTES
G.brG	Pr.Ur	
O.brG	OP.SP	
brG.L	0.00	
brG.H	2.00	
brG.d	10	digits
SP.dS	OP.SP	
t.t.Ac	YES	
t.out	tñ.30	

**TABLE 2 (AMERICAN)**

<b>Configuration group 1 [C.Dxx]</b>		
PARAM.	VALUE	NOTES
Ln.Fr	60	Hz
PV.SL	CP	
Pb.FL	0	(No filter)
tP.In	5	(Tc S)
OFSt	0	°F
tP.FL	0	(No filter)
A.In.F	-	nonE
A.In.t	-	4-20(4-20 mA)
A.I.FL	-	0 (No filter)
A.I.Añ	-	norñ
L.r.Oñ	-	n.ALG

<b>Configuration group 2 [C.Exx]</b>		
PARAM.	VALUE	NOTES
O1.Fn	nAin	
O2.Fn	SECn	
O3.Fn	ALr.3	
O6.Fn	PV.rt	
O6.rn	4-20	4-20 mA
O6.Lr	0.00	
O6.Hr	2.00	

O6.FL	0	(No filter)
O7.Fn	nonE	
O7.rn	4-20	4-20 mA
O7.Lr	0.00	
O7.Hr	2.00	
O7.FL	0	(No filter)

<b>Configuration group 3 [C.Fxx]</b>		
PARAM.	VALUE	NOTES
nC.Cn	norñ	
n.SCL	nO	
nC.dP	---	(No decimal figure)
nC.E.L	0	
nC.E.H	100	
nC.A.C	bEFr	
SC.Cn	norñ	
S.SCL	nO	
SC.dP	---	(No decimal figure)
SC.E.L	0	
SC.E.H	100	
SC.A.C	bEFr	

A. 7



**Configuration group 4 [C.Gxx]**

PARAM.	VALUE	NOTES
Sn.Fn	Enb	
Cn.tP	Pld	
ñAn.F	Enb	
Añ.UL	buñ.	
ñ.A.t.t	buñ.	
St.Fn	Cnd.b	

**Configuration group 5 [C.Hxx]**

PARAM.	VALUE	NOTES
d1.Fn	nonE	
d1.St	CLSd	
d2.Fn	nonE	
d2.St	CLSd	
d3.St	CLSd	

**Configuration group 6 [C.lxx]**

PARAM.	VALUE	NOTES
G.brG	Pr.Ur	
O.brG	OP.SP	
brG.L	0.00	
brG.H	2.00	
brG.d	10	digits
SP.dS	OP.SP	
t.t.Ac	YES	
t.out	tñ.30	

### ALGORITHMS

The following empirical (derived from experiment) equations are included into the instrument firmware and are applied when the probe sensor voltage is within 1000 and 1300 mV range.

For oxygen potential:  
$$\text{O2(\%)} = \frac{20.9}{\exp((2.3 * E) / (0.0496 * T_k))}$$

For carbon potential:  
$$\%C = \frac{3.792 * e^Z}{6486000 + e^Z} * \text{CO} * \text{COF}$$

For dew point:  
$$\text{D.P. (in}^\circ\text{F)} = \frac{4238.7}{9.55731 - \log_{10} P_{\text{H}_2} + \frac{E - 1267.8}{0.05512 * T_R}} - 460$$

Where:  $Z = \frac{E - 820.7}{0.0239 * T_R}$

E is the sensor input in mV;

$T_R$  is the absolute value in degrees Rankine ( $^\circ\text{F} + 459.67$ );  
 $P_{\text{CO}}$  is the carbon monoxide partial pressure, measured on Carbon monoxide input;  
COF is the Carbon monoxide factor setting (see [RA02] parameter);  
 $P_{\text{H}_2}$  is the partial pressure of hydrogen in atmosphere and it is equal to  $\text{H}_2\text{F}/1000$ ;  
 $T_k$  is the temperature in degree Kelvin  
**NOTE:** H2F is the [RA03] parameter.

### CALIBRATION PROCEDURE

The calibration procedure is enabled by internal dip switch. V101.2 = Off and V101.4 = On. Perform calibration procedure in accordance with jumpers position, otherwise the stored calibration value may be altered.

All calibration parameters are logically divided in groups of two (initial and final scale), followed by a calibration check in which the input is measured and displayed in counts (30000 at fsv for all inputs).

The upper display shows the calibration step (Table A); the lower display shows the action step (Table B); the middle display shows the selection On/Off, or value for Out6/Out7. Use FUNC key to scroll up calibration steps, MAN key to scroll down. Use ▲/▼ keys to select on/off.

B.1

To enable calibration and go to the next action step, push FUNC when "on" is displayed. For CJ calibration, use ▲/▼ keys to set a temperature value in 1/10°C read, with appropriate instrument, between 1 - 3 rear terminal. No timeout is applied in the calibration mode.

The last step is for loading default calibration data. The display will show: CAL on upper display; OFF/ON on middle display, and dFLt on lower display. Use the ▲/▼ key to select "on" and then push FUNC key to load data. No action otherwise.

Note: The default calibration data allows the verification of device functioning though they should not be taken as final calibration values. After the default calibration data loading, it is necessary to perform the proper input calibration.

#### Table A. Calibration Steps

Mnemonic code shown in upper display:

Pb.1	=	Main probe input (0 to 1.5 V)
Pb.2	=	Main probe input (0 to 1.3 V)
tP.In	=	Thermocouple input (0 to 60 mV)
CJ.In	=	CJ input
A.I.ñA	=	Carbon Monoxide auxiliary input (0 to 20 mA)
A.I.5	=	Carbon Monoxide auxiliary input (0 to 5 V)
A.I.10	=	Carbon Monoxide auxiliary input (0 to 10 V)
O6.ñA	=	Out 6 (0 to 20 mA)

O7.ñA	=	Out 7 (0 to 20 mA)
CAL	=	Default data loading

#### Table B. Action Steps

Mnemonic code shown on the middle display:

Lr.	=	Low range calibration
Hr.	=	High range calibration
U.	=	Input calibration verify

Note: During CJ input, verify the temperature is displayed in 1/10°C.

For OUT6/OUT7 calibration proceed as follows:

- Low range calibration ("Lr." action). Set, by using ▲/▼ pushbuttons, a value (from 0 to 5000) to read on rear terminal a  $0 \mu\text{A} \pm 5\mu\text{A}$  current.
- High range calibration ("Hr." action). Set, by using ▲/▼ pushbuttons, a value (from 0 to 5000) to read on rear terminal a  $20 \text{ mA} \pm 5\mu\text{A}$  current.
- Input calibration verify (U action). Set, by using ▲/▼ pushbuttons, a value (from 0 to 8000) to read on rear terminal a current value corresponding to:  $\text{Out} = \text{displayed value}/8000 * 20 \text{ mA}$ .

Note: Rear terminals are 16(+)/17(-) for OUT 6 and 18(+)/19(-) for OUT 7.

B.2



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