

# *COMMETER C0321*

**Dual channel thermometer for thermocouples J,K,S**

**Instruction manual**

## ***Manual for use of dual channel thermometer for thermocouples J, K, S COMMETER C0321***

Instrument is designed for measurement of temperature from two thermocouples of types J, K, S with the possibility to display the temperature difference between channels. Measured values are displayed on a dual line LCD display. Instrument compares measured values of temperature with two adjustable levels for each measured channel. Breaking the level is indicated by blinking the proper value on display and by audio indication (switchable). Instrument is equipped with minimum and maximum memory and Hold function. Minimum and maximum values and Hold value are possible to display on the LCD anytime.

### ***Technical parameters:***

#### ***Parameters of measurement (both channels):***

*Range of measurement (with the limitation of connected probe parameters:*

<i>thermocouple J (Fe-Co)</i>	<i>-200 to +750°C</i>
<i>thermocouple K (NiCr-Ni)</i>	<i>-200 to +1300°C</i>
<i>thermocouple S (Pt10%Rh-Pt)</i>	<i>-50 to +1700°C</i>

*Resolution:*

<i>thermocouples J and K</i>	<i>0.1°C from -99.9 to +999.9°C, otherwise 1°C</i>
<i>thermocouple S</i>	<i>0.4°C from -50.0 to +999.9°C, otherwise 1°C</i>

*Accuracy of inputs without probes:*

<i>thermocouples J and K</i>	<i>±(0.1% + 0.4°C) from reading</i>
<i>thermocouple S</i>	<i>±(0.1% + 0.85°C) from reading</i>

*Compatible temperature probes: J,K,S thermocouple with subminiature male thermocouple connector*

*Compensation of thermocouple cold junction temperature: automatic from -10 to +60°C*

*Measuring interval and display reading refresh: approximately 0.7 s in FAST mode  
0.7 to 5 s in dynamic mode*

*Power: battery 9V or ac/dc adapter 12V with NiCd accumulator 9V*

*Average current consumption: 0.3 to 1.3 mA (depending on operation mode)*

*Protection: IP20*

#### ***Operation conditions:***

*Ambient temperature range: -10 to +60 °C*

*Ambient relative humidity range: 5 to 95 % RH, non condensing*

*Outer characteristics in accordance with EN 33-2000-3: normal environment with characteristics AD1, AE1, AF1, AG1, AH1, AK1, AL1, AN1, AP1, AQ1, AR1, AS1, BA1, BE1*

*Storing conditions: temperature -10 to +60 °C relative humidity 5 to 95 % RH*

*Dimensions: 141 x 71 x 27 mm*

*Weight including battery: approximately 150 g*

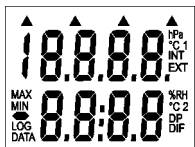
Battery life depends on selected display refresh mode (see below). In FAST mode display is refreshed in shortest possible interval with highest current consumption. In dynamic mode display is refreshed in interval up to 5 s in case measured values remain stable. Refresh interval is shortened to approximately 0.7 s only if measured values change. Current consumption in this mode in usual operation is lower, battery life is up to 4 times longer. The FAST mode is recommend to use only in cases, when slower display response is not acceptable.

Battery voltage drop below 7 V is indicated with blinking of "BAT" in default display mode (displaying of actual values) and FAST mode is automatically cancelled to save the battery. At the same time audio indication of alarms is automatically switched OFF.

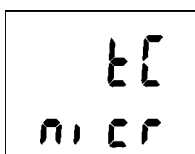
If instrument is supplied from external ac/dc adapter, internal 9V battery should be replaced with rechargeable NiCd accumulator. In usual operation from adapter accumulator is charged only with

small current. If accumulator is totally discharged, its full charging in instrument takes approximately 100 hours. Instrument with accumulator is not recommended for permanent operation without ac/dc adapter plugged. Accumulator works only as a standby source in case of power mains failure.

### Switching ON and OFF the instrument



Connect one or two temperature probes to the connectors before switching ON the instrument. Channel 1 connector is on the left and channel 2 is on the right. Switch ON the instrument by pressing ON/OFF key. After switching ON the instrument all symbols on the LCD are displayed. If the ON/OFF key is being held pressed, all LCD symbols are displayed till the key is released.



Actual selected thermocouple type is then displayed shortly. Symbols **J** or **nicr** (thermocouple K) or **S** indicate actual thermocouple type. If selected thermocouple does not match the probe type connected to the instruments, temperature readings will not be correct and new selection of thermocouple type is necessary (see below).

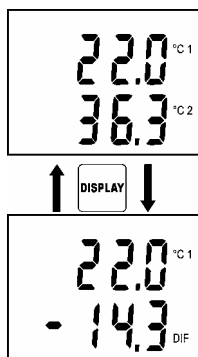
In usual operation instrument then starts the measurement mode and actual measured values are displayed. If instrument is ON, do not disconnect or connect the probes to prevent storing of incorrect value to minimum and maximum memory.

Press MENU key to switch instrument to actual measurement mode.

It is possible to switch OFF the instrument anytime, all instrument setting is kept saved. If 9V battery is disconnected for more than 1 minute all settings will be lost.

### Displaying of actual measured values

In this mode is instrument anytime after switching ON. It is possible to enter this mode from other modes by pressing or by repeating pressing of MENU key. If one of the probes is not connected properly or the temperature is out of measuring range, reading -- is displayed on the appropriate LCD line.

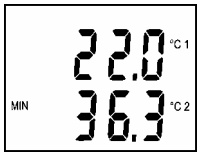


Na horním řádku displeje se zobrazuje teplota 1. kanálu T1 (°C 1), na dolním řádku teplota 2. kanálu T2 (°C 2)

Press DISPLAY key to display other readings. Instrument then displays - temperature of channel T1 on the upper line and difference between channels on the lower line (symbol DIF). Temperature difference (t dif = t1 - t2) is displayed only, if both probes are connected.

### Function HOLD (storing of actual measured values) and minimum a maximum memory

Press HOLD key in the default mode (displaying of actual measured value) to store actual measured values to internal memory (indicated by short beep). Anytime it is possible to display stored values from MENU (see below). Each pressing of the HOLD key in the default mode causes values stored in HOLD memory are replaced with actual ones.



Switched ON instrument permanently updates minimum and maximum memory of each measured values. Press MIN key (resp. MAX key) in the default mode to display minimum (resp. maximum) reading. These minimum and maximum readings are indicated by MIN (MAX) symbols on the LCD. Press DISPLAY key to display minimum (resp. maximum) value of other values. Pressing MIN (MAX) or MENU key again to return to default mode. Minimum and maximum memory is cleared from menu after confirmation selection CLR (see below). Values in HOLD, MIN and MAX memories remain stored even after instrument is switched OFF.

### Functions and settings available from menu

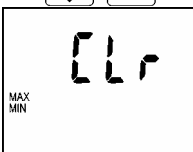
Press MENU key to enter mode of viewing menu items one by one. Press arrow keys up and down to list all menu items. Press MENU key again to return to default mode (displaying of actual measured values).



Press ENTER key to enter alarm setting mode (see below).



This item indicates if audio signaling of alarm indication is switched on (On) or switched off (OFF). Press ENTER key to change actual setting. Notice: if the battery voltage is low, audio indication is out of operation to reduce current consumption independently on this selection.

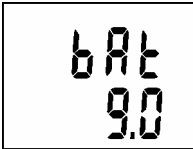


Clearing of minimum and maximum memory of all values. Memory is cleared after pressing ENTER key. Clearing is confirmed by reading YES on the LCD lower display.



Press ENTER key to display values stored in the HOLD memory. Press DISPLAY key to display other stored values. Press MENU key to leave this mode.

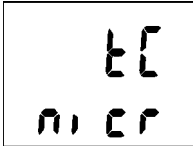




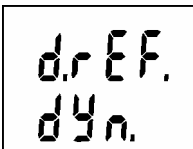
Battery voltage of partially loaded battery is displayed. This value illustrates battery condition.



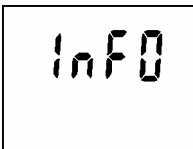
Temperature of thermocouple cold junction is indicated. Temperature is being sensed at the location of probe connector. This temperature is used for automatic compensation of thermocouple cold junction temperature.



Type of actual selected thermocouple is indicated - symbols **J** or **nicr** (K thermocouple) or **S**. Press ENTER key to enter the thermocouple selection mode (procedure is described below). If the selection is not correct, temperature readings are incorrect.

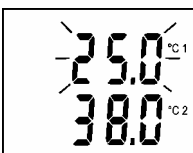


Display refresh mode is indicated. In the FAST mode refreshment is fastest with regular interval approximately 0.7 s. In the dynamic refresh mode (DYN.) each 15 s refresh interval of display is doubled to maximum 5 s if measured values are stable. If measured values change, refresh interval decreases to approximately 0.7 s. This dynamic mode prolongs battery life significantly. Select the desired mode by ENTER key. Notice: if battery voltage is low, the FAST mode is out of operation to reduce current consumption independently on this selection.

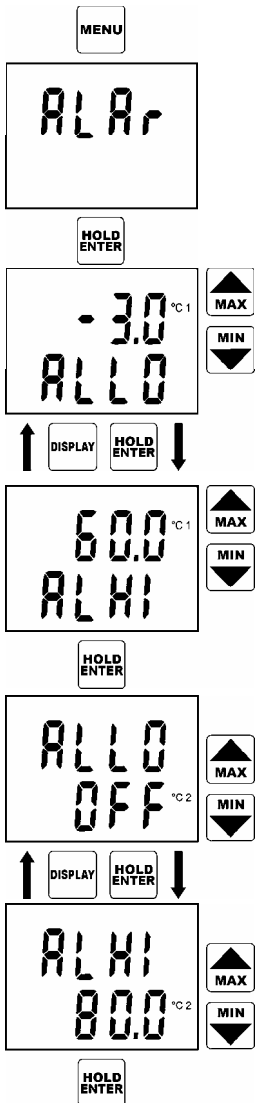


Pressing of ENTER key causes displaying service information on software version (upper LCD line) together with instrument configuration on the LCD lower line.

### Alarm indication and setting



It is possible to set lower and upper limit for each measured quantity (T1 temperature, T2 temperature and the difference T1-T2). Breaking of the limit is indicated by blinking of the appropriate value on the display. If a new alarm was indicated (i.e. it was not active in the previous measurement), display starts to display the value out of limits. If at least one alarm is active, audio indication can be activated, if menu AUDI "On" is selected (see setting described above). Alarm activation of each value can be disabled by setting lower alarm limit of the desired value up to its maximum. This is indicated by OFF reading at the position of numeric value. Value of upper limit of the same alarm is indifferent.



To set alarms press MENU key, select ALAR from menu items and confirm by pressing ENTER key.

Reading ALLO indicates adjusted lower alarm limit. Set the desired value by means of the arrow keys. Press and hold the arrow key UP to make value increase fast. Press and hold the arrow key DOWN to make value decrease fast. Release the arrow key and press ENTER to confirm new limit.

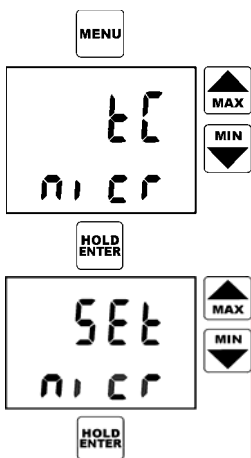
Reading ALHI indicates adjusted upper limit of the same alarm. Set the desired value in the same way as in above lower limit. If needed it is possible to get back to lower limit setting of the same alarm by pressing DISPLAY key. Press ENTER key to confirm new upper limit.

Then you are offered to set alarm of other input value (here temperature of channel 2). The procedure is the same as the above temperature limit setting. Alarm activation of each value can be disabled by setting lower alarm limit of the desired value up to its maximum. This is indicated by OFF reading at the position of numeric value. Value of upper limit of the same alarm is indifferent.

After pressing ENTER key it is possible to set alarm limits for temperature difference between channels.

Anytime it is possible to leave the alarm setting mode by pressing MENU key. New adjusted limits up to pressing MENU key are stored in memory.

### Selection of thermocouple type



Select menu item tC to select thermocouple type. Confirm the desired thermocouple type by pressing ENTER.

Reading SET indicates the mode of selection of thermocouple type. Use the arrow keys to select the desired thermocouple type - symbols J or nicr (K thermocouple) or S at the lower LCD line. Confirm by pressing ENTER.

Anytime it is possible to leave the thermocouple type setting mode by pressing MENU key without any change of thermocouple type.

## Battery replacement

Low battery voltage is indicated on the display with blinking reading "BAT". It is necessary to replace it with new one as soon as possible. Battery is located under small cover on the instrument lower side. It is absolutely necessary to replace battery with instrument switched OFF, otherwise AUDI (from menu selections) and data in memory HOLD, MIN and MAX will be lost. For the same reason do not disconnect the battery for longer than 1 minute even if instrument is switched OFF. If it happens (or if battery is totally discharged), it is necessary in appropriate menu selection to set again LCD refreshment mode (d.REF.), alarm audio indication (AUDI) and clear the minimum and maximum memory (CLR). If the instrument does not work after replacement of totally discharged battery (LCD does not indicate any symbol), remove the battery and leave the instruments without any battery for 30 minutes. Then contact the new battery and set the above menu items.

## Commeter instruments passed the following electromagnetic compatibility (EMC) tests:

radiation:	EN 55022	class B
immunity:	EN 61000-4-2	(levels 4/8 kV, class A)
	EN 61000-4-3	(intensity of electromagnetic field 3 V/m, class B)
	EN 61000-4-4	(levels 1/0,5 kV, class A)
	EN 61000-4-6	(intensity of electromagnetic field 3 V/m, class B)
	EN 61000-4-11	(class A)
	EN 61000-4-5	(class A)