

## 1. Description

- 5-digit digital display with analogue inputs and integrated totaliser.
- 8 mm high, very clear LED display for easy reading.
- Display range from -19 999 to 99 999 with leading zero blanking
- Programming of the functions or operating parameters via the setting keys. Operating guidance via the display while programming.
- Programmable features:
  - Measuring range
  - Independent decimal point adjustment for the momentary value display and the totaliser display
  - Displayed value for the lowest input signal
  - Displayed value for the highest input signal
  - Adding counter scale factor
  - Adding counter reset mode:
    - electrical
    - manual
    - manual and electrical
    - no reset
  - Digital mains hum suppression (50 or 60 Hz)

## 2. Inputs

### MPI (Pin 4)

Multifunction input. Dependent to the setting of the re-setting function, this input operates as LATCH or RESET input (see 4.10).

In LATCH mode, the current value displayed is frozen, while measurement and adding continue operating in the background.

In RESET mode, the adding counter is reset to 0.

### CURRENT INPUT (Pin 5)

Analogue current measuring input with reverse polarity protection and current limitation to 50 mA maximum.

Connect here the analog + signal wire.

**Attention:** This input (pin 5) is electrically isolated to avoid interference from the supply voltage. Thus, for the measurement, the most negative measurement signal wire is to be connected with the analog reference input (pin 6).

### 0 V MEASUREMENT SIGNAL- analogue reference input (Pin 6)

When electrical isolation between the measuring loop and the supply voltage is not required, connect pin 2 or 3 and this input (0V measurement signal) by means of a bridge.

### VOLTAGE INPUT (Pin 7)

Analog voltage measuring input. Connect to pin 7 the analogue + signal wire. In case of a connection error, the message „Err4“ is displayed.

**Attention:** This input (pin 7) is electrically isolated to avoid interference from the supply voltage. Thus, for the measurement, the most negative measurement signal wire is to be connected with the analog reference input (pin 6).

## 3. Operating parameters adjustment

### 3.1 Switching between the display of the momentary value and of the adding counter

The right key allows switching between the display of the momentary measuring value and the value of the adding counter.

Pressing this key once displays the active function („Act“ or „Tot“) for two seconds. If, during these two seconds, the right key is pressed another time, the active function is switched. This switching is confirmed by the display of „Act“ or „Tot“ during approximately two seconds, and then the device displays the value.

### 3.2 Setting the operating parameters

- a. Hold down both keys on front panel and switch on the supply voltage.
- b. The display shows



- c. After releasing the keys the display alternates between menu title and corresponding menu item at a frequency of 0.5 Hz. After any key is pressed, only the menu item is displayed.
- d. Pressing the right key, the menu item will be switched to next value.  
To input numerical values (e.g. when setting the scaling factor), use the left key to select the decade and the right one to set the value.
- e. Hold down the left key and press the right key to switch to the next menu title.
- f. After programming the last menu item, the programming routine will be left and the new values will be stored by switching the menu item to „YES“. If you chose „NO“, the programming routine will be passed through once again.

## 4. Programming routine

The adjustable parameters of the device are explained in the order of their appearance on the display. Therefore the device is completely programmed after one passage of the programming cycle.

*The upper display representation shows always the factory setting.*

### 4.1 Input signal range

**r. RANGE**

**0.20 mA** 0..20 mA

**4.20 mA** 4..20 mA

**0.10 V** 0..10 V

**2.10 V** 2..10 V

Press the right key to replace the factory setting with one of the other input signal ranges.

### 4.2 Decimal point adjustment (current value)

This setting determines the decimal point for the related display values (4.4 and 4.6). This setting only determines the number of decimal digits, the display value is not affected (no scaling).

**dP. Act**

**0** no decimal place  
 0.0 one decimal place  
 0.00 two decimal places  
 0.000 three decimal places

**0.0000** four decimal places

Press the right key to replace the factory setting with one of the other possibilities.

### 4.3 Minimum input signal

Only for the 4..20 mA or 2..10 V measuring ranges (this menu item is skipped with the other ranges). This function allows monitoring the sensor. If the measured value falls below the minimum value defined here, the message "lo" is displayed. The sensor used is faulty. The values displayed are not added.

**Lo Act**

a) **04.000** Factory setting

**20.000** Maximum setting

b) **2.000** Factory setting

**10.000** Maximum setting

According to the selected measuring range (4..20 mA or 2..10 V), the device asks for programming of a) or b). With the left key select the decade, then use the right key to determine the measurement value that is to correspond to the minimum value.

### 4.4 Value displayed for the minimum input signal

A display value between -19999 and 99999 can be allocated to the lowest input value. When the display values for the lowest and the highest input signal are defined, the system displays a display value corresponding to the analogue measurement value, as shown in Example 9.1 on page 4, with a momentary throughput in kg/second.

**Lo d15**

**-199.99** Factory setting

**999.99** Maximum setting

With the left key select the decade, then use the right key to determine the value, for example "0". The decimal point adjustment is taken into consideration.

### 4.5 Maximum input signal

Only for the 4..20 mA or 2..10 V measuring ranges. This function allows monitoring the sensor. If the measured value exceeds the maximum value defined here, the message "hi" is displayed. The sensor used is faulty. The values displayed are not added.

**hi Act**

a) **04.000** Minimum setting

**20.000** Factory setting

b) **2.000** Minimum setting

**10.000** Factory setting

According to the selected measuring range, the device asks for programming of a) or b).

### 4.6 Value displayed for the maximum input signal

**hi d15**

**-199.99** Factory setting

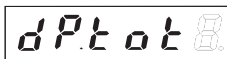
**999.99** Maximum setting

A display value between -19999 and 99999 can be allocated to the highest input value. With the left key select the decade, then use the right key to determine the value. The decimal point adjustment is taken into consideration.

#### 4.7 Decimal point setting (adding counter)

The adding counter adds the values measured with a reading frequency of 1 second.

As for the momentary values, the number of decimals to be used to display the added value can be defined. The number of decimals does not affect the accuracy of the display. However, the maximum expected added value to be displayed must be taken into account. If, as in Example 9.1, the planned sum is 1000, one decimal can be selected at the maximum.

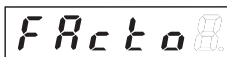


Factory setting

**Attention:** in all cases, sufficient digits must be reserved to allow displaying the expected added value, in order to avoid the device acting like a tachometer and going from "99999" to "0", losing the result of the measurement. If the 5-digit display proves to be insufficient, the display range can be extended using the "Factor" (4.8) and the "Scale" (4.9).

#### 4.8 Factor

For an optimum matching of the measuring signal, the displayed values can be weighted by a factor. If, for example, the momentary value is to be displayed in a small unit like grams, but the added total must be displayed in kilograms or tons, define the corresponding factor (multiplier):



Select the decade with the left key, then use the right key to define a factor between 0.0001 and 9.9999.

*Note: the factor and the scale only affect the adding counter. Total scale = Factor x Scale!*

#### 4.9 Scale

The scale allows extending the display range of the adding counter (or reducing it for a very fine adjustment).



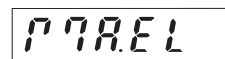
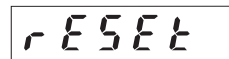
Select the required scale using the right key: 10, 1, 0.1 or 0.01

In Example 9.2 on page 5, the tank has a capacity exceeding 100000 l. Using a scale of 0.01 allows displaying the sum in hectoliters. Since the scale (multiplier) only affects the sum, the momentary throughput remains displayed in liters/second.

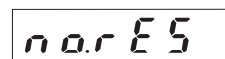
*Note: the factor and the scale only affect the adding counter. Total scale = Factor x Scale!*

#### 4.10 Resetting mode

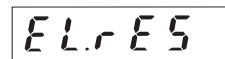
The device offers four resetting possibilities for the adding counter. This setting determines the function of the MPI input.



Manual (using the red key) and electrical resetting. The MPI input operates as a RESET input. When activated, it resets the adding counter to 0.



No resetting possible. The MPI input operates as a LATCH input. The momentary value displayed is frozen.



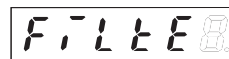
Only electrical resetting. The Reset pushbutton is idle. The MPI input operates as a RESET input. When activated, it resets the adding counter to 0.



Only manual reset. The MPI input operates as a LATCH input. The momentary value displayed is frozen.

#### 4.11 Filter

Using the right key, select the hum suppression filter corresponding to the mains supply frequency: 50 or 60 Hz.



## 4.12 End of programming

EndPr

no

The programming routine is performed once again. The values input can be checked and modified.

YES

The programming routine is finished and the values entered are taken as the new parameter values. The device is then ready to operate.

## 5. Connection

- 1 10 - 30 V DC
- 2 0V (GND) } linked
- 3 0V MPI } linked
- 4 MPI
- 5 CURRENT INPUT
- 6 0V MEASUREMENT SIGNAL
- 7 VOLTAGE INPUT

1	2	3	4	5	6	7
□	□	□	□	□	□	□

## 6. Technical data

### Supply voltage:

10..30 V DC

### Maximum consumption:

50 mA

### Display:

5 digits - 7-segment LED's, height 8 mm

### Measuring ranges:

0..10 V DC

2..10 V DC

0..20 mA

4..20 mA

### Resolution: 14 bits

### Measuring speed: 1 s<sup>-1</sup>

### Accuracy: 0.03 % ± 1 digit

### Linearity: < 0.01 % ± 1 digit at 20°C ambient temperature

### Temperature drift:

± 2 digits over the whole ambient temperature range

### Ambient temperature: -10°C .. +50°C

### Storage temperature: -25°C .. +70°C

### Current measurement:

Input resistance: appr. 100 Ω at 5 mA  
appr. 70 Ω at 20 mA

Voltage drop: 1.5 V DC maximum

Current limitation: 50 mA

### Voltage measurement:

Input resistance: appr. 1 MΩ

Maximum input voltage: 30 V DC

### Mains hum suppression:

Digital filtering 50 Hz or 60 Hz

### Data recording:

via EEPROM (capacity : 1x10<sup>6</sup> recording cycles or 10 years)

### Interference immunity:

EN 50081-2 ; EN 55011 class B ; EN 50082-2

Maximum deviation 12 digits

Weight: appr. 50g

Protection: IP 65 (on the front)

## Cleaning:

The front side of the device is to be cleaned only with a wet cloth.

## 7. Delivery specification

- Digital display 530
- Panel mounting clip
- Bezel for screw mount, panel cut-out 50 x 25 mm
- Bezel for clip mount, panel cut-out 50 x 25 mm
- Sealing
- 1 sheet with self-adhesive symbols

## 8. Order code

6.530.012.300

## 9. CODIX 530 operating examples :

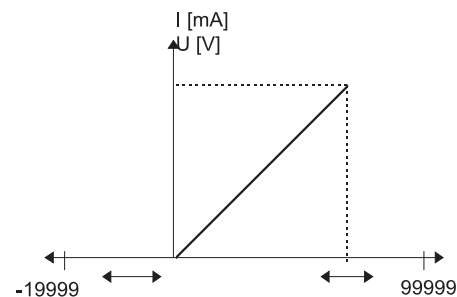
### 9.1 Weight measurement with totaling

A throughput measurement is to be used to define the quantity of granulate. The measuring sensor delivers 20 mA at full throughput (= 10 kg/second).

The measuring range selected will be the one ranging from 0 to 20 mA. Allocate 0 to the lowest input signal, 10 to the highest input signal. To display the added value in tons, set the factor to 0.001.

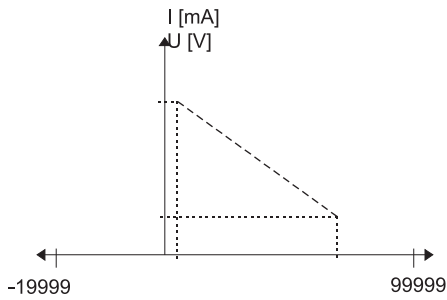
*Attention: the decimal point is only used for displaying purposes. With a momentary value display of 10.0, the value 100 would be added in the adding counter! This point is to be considered accordingly when setting the factor.*

If the momentary throughput is to be displayed with one decimal, the factor is to be set to 0.0001.



The values displayed can be shifted freely within the display range

A reversed allocation of the value to be displayed to the signal allows to program also descending operating curves. In this case, the device does not display the filling level any more, but the quantity removed.



### 9.2 Throughput measurement with totalising

The throughput and, alternately, the total quantity are to be displayed.

The measuring sensor has linear characteristics (in the case of non-linear sensors, linearizing elements are to be connected). It delivers 4 mA at rest and 20 mA at maximum throughput, which corresponds, in this example, to 90 l/min.

Select under "Range" the measuring range from 4 to 20 mA and, for the maximum "hi.act" and minimum "lo.act" input signals, the corresponding factory setting. Allocate the display value 0 to the lowest input signal "lo.act", and the display value 1.5 (in liters/second) to the highest input signal "hi.act".

Set the adding counter decimal point "dp.tot" according to the maximum expected quantity: for a 100 000 l installation, select zero decimal and, since this still is not sufficient, extend the display range by two digits with a "Scale" of 0.01, as to display the total volume in hectoliters.

Press the right key to switch between the momentary value display and the adding counter value display.

Different factors also allow displaying the total volume in other units, for example, with the factor 2, in 0.5-l bottles, or, with the factor 2.6420, in gallons.

### 9.3 Kilometers measurement with totaling

The instantaneous speed in km/h and the total running time of an engine on a testing stand are to be displayed. The measuring sensor delivers 4 mA at rest and 20 mA at maximum speed, which corresponds, in this example, to 180 km/h.

Select under "Range" the measuring range from 4 to 20 mA and, for the maximum «hi.act » and minimum «lo.act » input signals, the corresponding factory setting.

Allocate the display value 0 to the lowest input signal "lo.display", and the display value 180 to the highest input signal "hi.display".

This way the device displays the instantaneous speed in km/h.

Set the adding counter decimal point "dp.tot" according to the maximum planned test time, for example, for a 24-hour test at maximum speed, four digits before the decimal point will be sufficient.

The sample rate of the adding counter is 1 second. To add the covered distance, use the factor to adjust the speed per second:  $1/3600=0.00027778$ , which corresponds, at maximum speed, to 0.05 km/sec.

So set the factor to 0.0278 and the scale to 0.01. This way, after 24 hours, the rounding error would be only 3 km, which, for a total distance of 4320 km, would correspond to 0.7‰.

## CODIX product range:

Type	Function	Supply voltage	Dimensions
Single function devices			
520	Totaliser	10-30 VDC	DIN 48 x 24 mm
521	Totaliser/Position indicator	10-30 VDC	DIN 48 x 24 mm
522	Frequency meter/tachometer	10-30 VDC	DIN 48 x 24 mm
523	Short time meter/hour meter	10-30 VDC	DIN 48 x 24 mm
524	Multifunction device Totaliser/Position indicator or frequency meter/tachometer or short time meter/hour meter	10-30 VDC	DIN 48 x 24 mm
Combined devices			
525	Totaliser and frequency meter	10-30 VDC	DIN 48 x 24 mm
526	2 totalisers	10-30 VDC	DIN 48 x 24 mm
527	Totaliser and hour meter	10-30 VDC	DIN 48 x 24 mm
528	2 hour meter	10-30 VDC	DIN 48 x 24 mm
Analogue input devices			
529	Digital display with analogue inputs Input ranges: 0-10 V, 2-10 V, 0-20 mA, 4-20 mA	10-30 VDC	DIN 48 x 24 mm
530	Digital display with analogue inputs and integrated totaliser Input ranges: 0-10 V, 2-10 V, 0-20 mA, 4-20 mA	10-30 VDC	DIN 48 x 24 mm

Situation 1.99. The CODIX family is constantly been extended.