529 Series

Digital Display w/Analog

1. Description

- 5digit digital display with analog inputs
- LED-Display with 8 mm high characters and very high luminosity
- Display range -19999..99999 with leading zero blanking
- Programming of functions and operating parameters via the setting keys. During programming the display guides the user with text prompts.
- Programmable features:
  Range
  Max. value display yes/no
  Max. value reset yes/no
  Min. value display yes/no
  Min. value reset yes/no
  Decimal point
  Min. input signal
  Displayed value at min. input signal
  Max. input signal
  Displayed value at max. input signal

2. Inputs

LATCH

Static input to freeze the displayed value. If this input (pnp) is supplied with 10..30 VDC the actual value is frozen until the input is released or the signal level gets below 4 V. The calculating of max. and min. value is not affected.

CURRENT INPUT

Analog current input with reverse connection protection and current limitation to max. 50 mA. Connect the signal line with the analog **+** signal with this input.

CAUTION: To prevent interfering signals caused by the supply voltage, this input is isolated from the supply voltage. Connect the signal line with the **-** Signal to the analog reference input.

ANALOG REFERENCE INPUT

If no isolation between measuring circuit and supply voltage is necessary, connect pin 2 or 3 to this input

VOLTAGE INPUT

Analog voltage input. Connect the signal line with the analog **+** signal with this input. In case of reverse connection, the display shows „Err4“.

CAUTION: To prevent interfering signals caused by the supply voltage, this input is isolated from the supply voltage. Connect the signal line with the **-** Signal to analog reference input.

3. Setting of the parameters

3.1 Selecting the displayed value

By pressing the right key, the display can be switched between the current, min., or max. value.

Pressing the right key once the current function („Act“, „Min“ or „Max“) is displayed for 2 seconds. If within this period the right key is pressed again, the current function is changed. The display shows the new current function for two seconds. Afterwards the corresponding value is displayed. If „Min“ or „Max“ is the current function, the value can be resetted by pressing the left key. If neither storing of min. nor max. value is activated in set up, both keys are out of function.

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.
e. Hold down the left key and press the right key to enter and 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.

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4. Programming routine

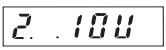
Programmable parameters are shown in succession.
After one pass, the device is fully programmed.
In each case the first shown item is the factory preset.

4.1 Range of input signal

0..20 mA

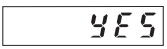
4..20 mA

0..10 V

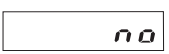


2..10 V

4.2 Max. value display

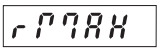


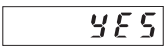
Max. value can be displayed



Max. value wont be displayed, next menu title is skipped

4.3 Max. value reset

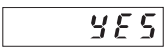




Max. value can be reset by pressing left button. (Current value becomes new max. value)

Max. value can't be reset.

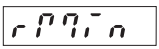
4.4 Min. value display

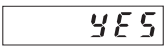


Min. value can be displayed

Min. value wont be displayed, next menu title is skipped

4.5 Min. value reset





Min. value can be reset by pressing left button. (Current value becomes new min. value)

Min. value can't be reset.

4.6 Decimal point

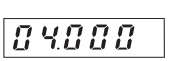
The decimal point is for display only.

0 no decimal place
0.0 one decimal place
0.00 two decimal places
0.000 three decimal places
0.0000 four decimal places

4.7 Min. input signal (only if input signal range is 4..20 mA or 2..10 V)
Input"Lo" should be less than"Hi" input.
(have a look at 4.9 and 9.4)

Depending on chosen input range a) or b) is selected.

a)

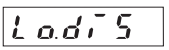


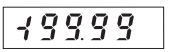
Disregard display decimal point. Enter mA or Volts in 2 left digits with uA or milivolt in right 3 digits.(Use Max. input span detween 0-13V or 35mA for best resolution.)

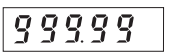
b)

If the unit goes below the set input, display flashes"Lo"and the value.

4.8 Displayed value at min. input signal







Set"Lo"input display value between -19999 and 99999 The selected decimal point is lit.

4.9 Max. input signal (only if input signal range is 4..20 mA or 2..10 V)
This menu title allows a limitation of the display range (have a look at 4.7 and 9.4)

Depending on chosen input range a) or b) is selected.

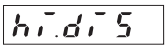
a)

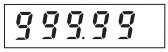
Disregard display decimal point. Enter mA or Volts in 2 left digits with uA or milivolt in right 3 digits.(Use Max. input span detween 0-13V or 35mA for best resolution.)

b)

If unit goes above the set point, display flashes"Hi" and value.(Displays"Err 4" above 13VDC or 35mA input.)

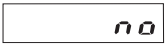
4.10 Displayed value at max. input signal



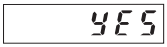


Set“Hi“ input display value between -19999 and 99999 The selected decimal point is lit. Note: Display can be set to go down as input increases by setting“Lo“ display higher than “Hi“ display. (Smaller display span gives more stable display.)

4.11 End of programming



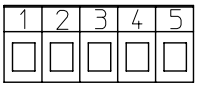
Programming routine will be passed through once again. All parameters can be checked.



Programming routine will be left and the new parameters will be stored. Afterwards the device is ready to use.

5. Connections

1 10-30 VDC
2 0 V (GND)
3 0 V LATCH
4 LATCH
5 CURRENT INPUT
6 ANLOGUE REFERENCE INPUT
7 VOLTAGE INPUT



6. Technical data

Supply voltage:
10...30 VDC
Max. current consumption:
50 mA
Display:
5digit LED-Display, 8 mm high characters
Range of input signals
0..10 VDC
2..10 VDC (Adjustable)
0..20 mA
4..20 mA (Adjustable)
Resolution: 14 bits over full range.
Measuring frequency: 2 s^{-1}
Accuracy: 0.03% ± 1 digit
Linearity:
< 0.01% ± 1 digit at an ambient temperature of 20 °C
Temperature drift: ± 2 digits acc. to full range
Ambient temperature: +14°F...+122°F (-10 °C...+50 °C)
Storage temperature: -13°F...+158°F (-25 °C...+70 °C)
Current measuring:

Input resistance:	appr. 150ohm at 5mA
	appr. 90ohm at 20mA
Voltage drop:	max. 1.8 VDC
Current limitation:	50 mA

Voltage measurement:

Input resistance:	appr. 1 Mohm

Max. input signal level: 30 VDC(shows“Err4“ above 13VDC)
Elimination of power line hum:
digital filter at 50 Hz
Data retention:
via EEPROM 1 Mio.memory cycles or 10 years
Noise immunity:
EN 50081-2; EN 55011 class B; EN 50082-2
max. drift ± 12 digits
Weight: appr. 50 g
Protection: IP 65 (front)
Cleaning:
The front of the unit is only to be cleaned with a soft wet (water !) cloth.

7. Dimensions:

W = 1.88“ (48mm) H = .944“ (24mm) D = 2.32“ (59mm)

8. Cutout:

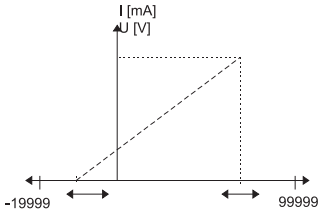
W = 1.78“ (45.2mm) H = .876“ (22.3mm)

With adaptor: W = 1.97“ (50mm) H = 0.99“ (25mm)

9. Examples:

9.1 Temperature measurement

A temperature sensor with linear characteristic (non-linear sensors, e.g. thermocouples have to be linearised) supplys 0 V at -10 °C and 10 V at 80 °C. 0..10 V is chosen as input range.
Assign -10 as „displayed value at min. input signal“ to the lowest input level (0 V) and 80 as „displayed value at max. input signal“ (10V). The device is now tuned to the sensor, measurement values and their corresponding display values in between are calculated.



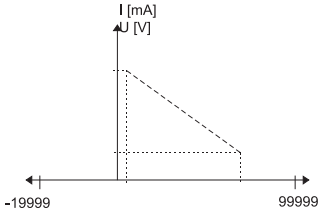
Displayed value can be freely adjusted to the input value inside the display range.

9.2 Level measurement

A level sensor with linear characteristic (non-linear sensors haveto be linearised) supplys 19 mA at full tank and 5 mA at empty tank. If the tank is filled up, 10 m^3 should be displayed and if the tank is empty 0 m^3 should be displayed. 4..20 mA is chosen as input range.
Assign 0 as „displayed value at min. input signal“ to the lowest input level (5 mA) and 10 as „displayed value at max. input signal“ (19 mA). The device is now tuned to the sensor, measurement values and their corresponding display values in between are calculated.

9.3 Drawn quantity

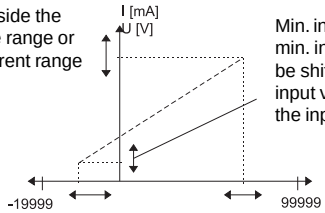
Instead of the level, the drawn quantity should be displayed.
Again 4..20 mA is chosen as input range. Assign 10 as „displayed value at min. input signal“ to the lowest input level (5 mA) and 0 as „displayed value at max. input signal“ (19 mA).



9.4 Level measurement with limitated display range

A third example is level measurement with limited display range, that means a tank with 10 m^3 have to be filled up at best to 8 m^3 and its the level should not decrease below 1 m^3. At values > 8 m^3 the display shows „hi“ and at values < 1 m^3 the display shows „lo“.
4..20 mA is chosen as input range.
Assign 0 as „displayed value at min. input signal“ to the lowest input level and 10 as „displayed value at max. input signal“to the highest input level.
Additionally at menu title „min. input signal“ the value which corresponds to the 1 m^3 level, e.g. 5.6 mA is programmed. Do the same with the value which corresponds to the 8 m^3 level, e.g. 16.8 mA.
At input levels > 16.8 mA „hi“ will be displayed and at input levels < 5.6 mA „lo“.

Max. input voltage or max. input current can be shifted inside the input voltage range or the input current range



Min. input voltage or min. input current can be shifted inside the input voltage range or the input current range

Displayed value can be freely adjusted to the input value inside the display range.