



Bedienungsanleitung

KCT2-6ST-V KC-LED-96-1T-24VDC

Elektronischer Anzeigenzähler
Pulse counter/Position indicator
Compteurs à affichage électroniques
Contatori con display elettronici
Contadores indicadores electrónicos



1 Description

The display counter is a multipurpose device. Depending on the programmed basic function, the device operates like

- the pulse counter (see page 4) or
- the frequency meter (see page 6) or
- the time meter (see page 7)

1.1 Preface



Please read this instruction manual carefully before installation and start-up. Please observe all warnings and advices, both for your own safety and for general plant safety. If the device is not used in accordance with this instruction manual, then the intended protection can be impaired.

1.2 Safety Instructions and Warnings



Please use the device only if its technical condition is perfect. It should be used only for its intended purpose. Please bear in mind safety aspects and potential dangers and adhere to the operating instructions and to this addendum at all times. The safety standards in force for electrical installations are also to be adhered to.

1.3 Use according to the intended purpose

The application area for this device lies in industrial processes and controls, in the fields of manufacturing lines for the metal, wood, plastics, paper, glass, textile and other like industries with a degree of contamination of 2. Over voltages at the terminals of the device must be kept within the limits of Over voltage Category II. The device is not suitable for use in hazardous areas and for areas excluded from EN 61010 Part 1. The device may only be operated indoors as a panel-mounted device. However, in certain conditions, an outdoor operation is also allowed. It may be operated up to an altitude of 2,000 m. Use for any purpose over and beyond this will be deemed as not in accordance with its intended purpose.

If the device is used to monitor machines or processes in which, in the event of a failure of the device or an error made by the operator,

there might be the risk of damaging the machine or causing an accident to the operators, then it is your responsibility to take the appropriate safety measures.

1.4 Mounting in a control panel



Mount the device away from heat sources and avoid direct contact with corrosive liquids, hot steam or similar. When mounting the device, make sure it is sufficiently cooled.

1.5 Mounting instructions

- Remove the mounting clip from the device.
- Insert the device from the front into the panel cut-out, ensuring the front-panel gasket is correctly seated.
- Slide the fixing clip from the rear onto the housing, until the spring clamps are under tension and the upper and lower latching lugs have snapped into place.

1.6 Electrical Installation



This device is powered by the mains voltage! It must be disconnected from the power supply, before any installation or maintenance work is carried out. AC-powered devices must only be connected to the low-voltage network via a switch or circuit breaker.

Installation or maintenance work must only be carried out by qualified personnel.

- Correct operation of the device requires the mandatory use of the appropriate external safety fuse. Advice concerning the recommended fuse protection can be found in the relevant instruction manual. In order to respect the fire protection regulations, 8 A/150 VA shall not be exceeded on the counter in case of a defect!
- Do not wire the terminals of the device that are not used.
- The pin assignment of the connectors, as well as the maximum admissible values, must obligatorily be observed.
- During installation, make sure that the supply voltage and the wiring of the output contacts (if any) are powered by the same mains phase, in order not to exceed the max. voltage of 250 V! The indications of the Instructions

manual must obligatorily be adhered to!

- If the device is equipped with a PE connection, the latter must obligatorily be connected with a low impedance.
- An EMC-compliant installation is a prerequisite to reach EC conformity.

1.7 Advice on noise immunity

All connections are protected against external sources of interference. The installation location should be chosen so that inductive or capacitive interference does not affect the device or its connecting lines! Interference (e.g. from switch-mode power supplies, motors, clocked controllers or contactors) can be reduced by means of appropriate cable routing and wiring.

1.8 Measures to be taken:

- Use only shielded cable for signal and control lines.
- Connect cable shield at both ends.
- The conductor cross-section of the cables should be a minimum of 0.14 mm².
- The shield connection to the equipotential bonding should be as short as possible and with a contact area as large as possible (low-impedance).
- Only connect the shields to the control panel, if the latter is also earthed.
- In case of problems due to ground loops, the shield is to be connected to the reference ground, on the reception side, with low impedance and, on the emission side, via a capacitor of approximately 100nF.
- Install the device as far away as possible from noise-containing cables.
- Avoid routing signal or control cables parallel to power lines.
- Cables and their insulation should be in accordance with the intended temperature, voltage and power ranges. The standards of the respective countries apply.

1.9 Start-up

The following points must be checked before starting up the device:

1. Does the available supply voltage match the supply voltage of the device?
2. Is the supply voltage connected to the good terminals of the device?
3. For DC-powered devices, does the supply voltage respect the polarity?
4. Is the device set and programmed correctly (function; for counters, max. counting frequency)?

1.10 Failure possibilities and causes

No display:

- No power supply.

Keys cannot be operated:

- Key lock input is activated

Counter does not count:

- Wrong or reversed wiring of the counting input
- Setting of an input signal not matching the pulse generator
- Polarity (NPN/PNP) reversed
- Gate input is active
- No ground connection between the pulse generator and the counter
- Maximum counting frequency exceeded
- Signal levels do not reach the switching threshold of the counter
- Factor too small

Output signal is missing:

- Wrong output connection
- No ground connection to the following device

If, despite all, your device still does not operate, contact your local representative or call us directly for technical support.

When sending your device back, please attach a short description of the failure, of the programming and of the connection diagram, in order to allow us to reproduce a possibly existing defect and to repair your device as quickly as possible.

2. Setting of the operating parameters

a Press both front side keys keys and switch on the supply voltage or, if the supply voltage is already on, press both keys simultaneously during 5 s.

P r o d E

E o u n t

Operating mode pulse counter. Continued in point 4. of pulse counter on page 4

b. The display shows

P r o U

t R c h o

Operating mode frequency meter. Continued in point 4. of frequency meter on page 6

c. After releasing the keys, the display shows

n o

t i m e r

Operating mode time meter. Continued in point 4. of time meter on page 7

c1. Hold the left key pressed and press the right key to leave the programming operation.

c2. Press the right key to switch to

y E S

d. Hold the left key pressed and press the right key to switch to the first parameter.

e. After releasing the keys, the display alternates between the menu title and the current menu item setting. After pressing any key, only the menu item setting is displayed.

f. Pressing the right key, the menu item setting will be switched to the next value. If figures are to be input (e.g. when setting the scaling factor), select first the decade using the left key, and then set the value using the right key.

g. Hold the left key pressed and press the right key to switch to the next menu item.

h. The last menu title "EndPro" allows, when selecting "Yes", to exit the programming menu and to take over (store) the new values. If "no" is selected, the programming routine is repeated, the latest values set remaining active. They can now be checked again or modified.

3. Programming routine

The first menu item is the selection of the basic operating mode, which determines the functions of the device.

Pulse counter/Position indicator

(Operating mode pulse counter)

1. Description

- 6-digit display counter with SET/RESET-function
- Red LED display, character height 14 mm
- Display range from -199 999 to 999 999
- Leading zeros suppression
- Programming via two setting keys on the front side
- During programming, the display guides the user with text prompts
- Counter operating modes:
Count input INP A + count direction input INP B (Cnt.Dir)
Differential count INP A – INP B (up.dn)
Totalising INP A + INP B (up.up)
Count Up/Down INP A 90° INP B x 1 (quAd)
Count Up/Down INP A 90° INP B x 2 (quAd2)
Count Up/Down INP A 90° INP B x 4 (quAd4)
- With AC power supply: sensor supply voltage 24 V DC $\pm 15\%$ /100 mA
- Optional optocoupler output

2. Inputs

INP A

Dynamic count input.

INP B

Dynamic count input.

SET/RESET

Dynamic SET/RESET input. Linked in parallel to the red SET/RESET key. Resets the counter to the predefined setting value.

3. Optocoupler output (optional)

Active if count value < 0. Simple preset counter can be realized, when using subtract mode.

4. Programming routine

The programmable parameters of the device are described below, in the order in which they can be set. The device is fully programmed after one pass of the routine.

The first values stated correspond to the factory settings

4.1 Polarity of the inputs

inp ol

npn

npn: switching for 0 V

pnp

pnp: switching for +U_B

4.2 Switching on the 30 Hz filter (INP A, INP B)

filter

off

30 Hz filter off (f_{\max})

on

30 Hz filter on

4.3 Input mode

inp ol

cnt.dir

Count input and count direction input
INP A: Count input
INP B: Count direction input

up.dn

Differential input
INP A: count input adding
INP B: count input subtracting

up.up

Totalising
INP A: count input adding
INP B: count input adding

quAd

Quadrature input
INP A: count input 0°
INP B: count input 90°

quAd 2

Quadrature input with pulse doubling
INP A: count input 0°
INP B: count input 90°
Each pulse edge of INP A will be counted

quAd 4

Quadrature input with pulse quadrupling
INP A: count input 0°
INP B: count input 90°
Each pulse edge of INP A and INP B will be counted.

4.4 Multiplying factor

FRctor

000001

It can be set from 00.0001 up to 99.9999.

999999

The decimal point is set to 4 decimal places.
„0“ is not accepted!

4.5 Dividing factor

d.u.s0

000001

It can be set from 00.0001 up to 99.9999.

999999

The decimal point is set to 4 decimal places.
„0“ is not accepted!

4.6 Decimal point

dP

The decimal point defines the way of displaying the count values. It does not affect counting.

0

0 no decimal place

0.0

0.0 one decimal place

0.00

0.00 two decimal places

0.000

0.000 three decimal places

4.7 SET/RESET Mode

rESnr

rRnEL

manual reset via the red SET/RESET key and electrical reset via the SET/RESET input

no rES

no reset (red SET/RESET key and SET/RESET input locked)

EL rES

only electrical reset via the SET/RESET input

rRnrE

only manual reset via the red SET/RESET key

4.8 SET value

SEtPt

199999

The device will be set to the set point by pressing the red SET/RESET key or activating the SET/RESET input.

999999

SET value -199999... 999999 (number of decimal places depends on the decimal point option)

For programming the decimal point see 4.6

4.9 End of programming

EndPro

no

The programming routine is repeated once more. The values set until now can be checked and modified.

yES

The programming routine will be left and all values set will be stored as new parameters. Afterwards the device is ready for operation.

Tachometer/Frequency meter

(Operating mode frequency meter)

1. Description

- 6 digit frequency meter
- Red LED display, character height 14 mm
- Display range from 0 to 999 999
- Leading zeros suppression.
- Programming via two setting keys on the front side
- During programming, the display guides the user with text prompts
- Value conversion and display in 1/s or 1/min
- With AC power supply: sensor supply voltage 24 V DC $\pm 15\%$ /100 mA
- Optional optocoupler output

2. Inputs

INP A

Dynamic count input.

3. Optocoupler output (optional)

Active at f=0. Can be used e.g. to activate a „No operation“ lamp.

4. Programming routine

The programmable parameters of the device are described below, in the order in which they can be set. The device is fully programmed after one pass of the routine.

The first values stated correspond to the factory settings

4.1 Polarity of the inputs

INPOL

npn switching for 0 V

pnP switching for +UB

4.2 Switching on the 30 Hz filter

FILT

30 Hz filter off (f_{max})

30 Hzfilter on

4.3 Multiplying factor

FRC

000001

It can be set from 00.0001 up to 99.9999.

999999

The decimal point is set to 4 decimal places.
„0“ is not accepted!

4.4 Dividing factor

DIV

000001

It can be set from 00.0001 up to 99.9999.

999999

The decimal point is set to 4 decimal places.
„0“ is not accepted!

4.5 Decimal point

DP

The decimal point defines the resolution

0

no decimal place

0.0

one decimal place

0.00

two decimal places

0.000

three decimal places

4.6 Display mode

DISPN

5EL - I

Value conversion and display in 1/s

PRN - I

Value conversion and display in 1/min

4.7 Max. time to wait until „0“ is displayed

This parameter indicates, how long it takes, when measuring is active, until „0“ is displayed.

UDRT

00.1

Max. time to wait 00.1 s (min. value)

99.9

Max. time to wait 99.9 s

4.8 End of programming

EndPr0**no**

The programming routine is repeated once more. The values set until now can be checked and modified.

yes

The programming routine will be left and all values set will be stored as new parameters. Afterwards the device is ready for operation.

Time meter

(Operating mode time meter)

1. Description

- 6 digit time meter with SET/RESET function
- Red LED display, character height 14 mm
- Display range from 0 to 999 999
- Leading zeros suppression.
- Operation indicator: the decimal point of the lowest digit blinks while the count is active.
- Programming via two setting keys on the front side
- During programming, the display guides the user with text prompts
- Time meter operating modes
 - Counting while INP B is inactive (GAtE.Lo)
 - Counting while INP B is active (GAtE.hi)
 - Count Start/Stop with INP B edge (InB.Inb)
 - Count Start with INP A edge, count Stop with INP B edge (InA.Inb)
- Counting ranges h; min; s; h.min.s
- With AC power supply: sensor supply voltage 24 V DC $\pm 15\%$ /100 mA
- Optional optocoupler output

2. Inputs

INP A

Start input (depending on the input mode chosen)

INP B

Start/Stop or gate input (depending on the input mode chosen)

SET/RESET input

Dynamic SET/RESET input. Linked in parallel to the red RESET key. Resets the counter to the predefined setting value.

3. Optocoupler output (optional)

On active counting the output alternates at a frequency of 1 Hz between active and inactive.

4. Programming routine

The programmable parameters of the device are described below, in the order in which they can be set. The device is fully programmed after one pass of the routine.

The first values stated correspond to the factory settings

4.1 Polarity of the inputs

inp_{oL}

npn npn: switching for 0 V

inp_p pnp: switching for +U_B

4.2 Switching on the 30 Hz filter (INP A, INP B)

off

off 30 Hz filter off
Start/Stop inputs not damped

on 30 Hz filter on
Start/Stop inputs damped for use with mechanical switches.

4.3 Input mode

start

start Start/Stop via Inp B. counting while Inp B (Gate) not active or open

start⁻ Start/Stop via Inp B. counting while Inp B (Gate) active (High level with pnp; Low level with npn)

inb⁻ inb Count Start/Stop via INP B (LOW-HIGH edge with pnp; HIGH-LOW edge with npn). Every active edge changes the counter status.

inA inb Count start via INP A, stop via INP B. (LOW-HIGH edge with pnp; HIGH-LOW edge with npn)

4.4 Operating mode

seconds

seconds Time unit: seconds (accuracy depending on position of the decimal point*)

min Time unit: minutes (accuracy depending on position of the decimal point*)

hour Time unit: hours (accuracy depending on position of the decimal point*)

h⁻m⁻s Time units: Hours:Minutes:Seconds (decimal point setting is ignored)

*0, 0.1, 0.01, 0.001 means: time measurement in 0, 0.1, 0.01, 0.001 time units

4.5 Decimal point

dp

The decimal point defines the resolution of the programmed time unit.

0	1
0.0	1/10 (0,1)
0.00	1/100 (0,01)
0.000	1/1000 (0,001)

4.6 SET/RESET mode

reset

reset manual reset via the red SET/RESET key and electrical reset via the SET/RESET input

no reset no reset (red SET/RESET key and SET/RESET input locked)

el reset only electrical reset via the SET/RESET input

manual reset only manual reset via the red SET/RESET key

4.7 SET value

SEtPt

000000

The device will be set to the set point by pressing the red SET/RESET key or activating the SET/RESET input.

999999

SET value 0 ...999 999 or 99.99.99 (number of decimal places depends on the decimal point option)

4.8 End of programming

EndPro

no

The programming routine is repeated once more. The values set until now can be checked and modified.

YES

The programming routine will be left and all values set will be stored as new parameters. Afterwards the device is ready for operation.

5. Technical data

Supply voltage

AC power supply: 90 ... 260 V AC/max. 6 VA
ext. fuse protection: T 0.1 A

DC power supply: 10 ... 30 V DC/max. 50 mA
with inverse-polarity protection ext. fuse protection: T 0.1 A

Display: 6 digits, red 7 segment
LED display, height 14 mm

Data retention: EEPROM

Polarity of the inputs:
Programmable, npn or pnp
for all inputs

Input resistance:
appr. 5 kOhm

Count frequency pulse counter:

AC power supply:	90 ... 260 V AC	
Input level:	Standard	
typ. Low Level:	2,5 V	
typ. High Level:	22,0 V	
Fmax:	kHz	
CntDir	60	
UpDown	25	
Up.Up	25	
Quad1	25	
Quad2	25	
Quad4	15	

DC power supply:	24	12 V DC
Input level:	Standard	
typ. Low Level:	2,5	2,0 V
typ. High Level:	22,0	10 V
Fmax:	kHz	kHz
CntDir	60	20
UpDown	25	15
Up.Up	25	15
Quad1	25	15
Quad2	25	15
Quad4	15	15

Count frequency Tachometer:

Frequency measurement
Accuracy <0.1 %
Measuring principle:
< 38 Hz: period measurement
> 38 Hz: gating time measurement
gating time 26,3 ms

AC power supply:	90 ... 260 V AC	
Input level:	Standard	
typ. Low Level:	2,5 V	
typ. High Level:	2,0 V	
Fmax:	kHz	
Tacho	60	

DC power supply:	24	12 V DC
Input level:	Standard	
typ. Low Level:	2,5	2,0 V
typ. High Level:	22,0	10 V
Fmax:	kHz	kHz
Tacho	60	20

Counting ranges time meter:

Seconds	0.001 s ... 999999 s
Minutes	0.001min ... 999999 min
Hours	0.001 h ... 999999 h
h.min.s	00 h 00 min 01 s ... 99 h 59 min 59 s
Accuracy	<50 ppm

Minimum pulse length for the Reset input:

5 ms

Input sensitivity:

Standard sensitivity:

AC power supply	Low: 0 ... 4 V DC High: 12 ... 30 V DC
DC power supply	Low: 0 ... 0,2 x U _B [V DC] High: 0,6 x U _B ... 30 V DC

Pulse shape: any,
Schmitt-Trigger inputs

Optocoupler output (optional):

NPN optocoupler with open collector and open emitter; max. switching performance: 30 V DC/15 mA

Sensor supply voltage:

AC power supply 24 V DC ±15 %/100 mA

Ambient temperature:

-20 ... +65 °C

Storage temperature:

-25 ... +70 °C

Altitude: to 2000 m

EMC:

Noise emission: EN 55 011 Class B
Noise immunity: EN 61 000-6-2

Device safety:

Design to: EN61010 Part 1
Protection Class: Class 2
Application area: Soiling Level 2

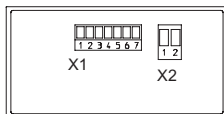
Housing: For front panel mounting:
96 x 48 mm
acc. to DIN 43700,
RAL7021, dark grey

Weight: appr. 150 g

Protection: IP 65 (front)

Cleaning: The front of the units is to be cleaned only with a soft wet (water !) cloth.

6. Terminal assignment



X1 Terminal assignment

Pin	AC Version	DC Version
1	Optocoupler output Collector	
2	Optocoupler output Emitter	
3	SET (n.c for frequency meter)	
4	INP B (n.c for frequency meter)	
5	INP A	
6	GND	n.c.
7	+24 Vout	n.c.

X2 Terminal assignment

Pin	AC Version	DC Version
1	90 ... 260 V AC	0 V DC (GND)
2	90 ... 260 V AC	10 ... 30 V DC

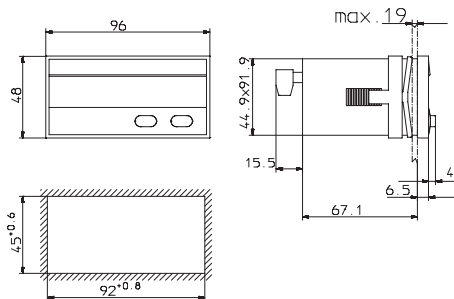
7. Delivery includes:

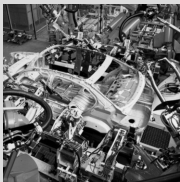
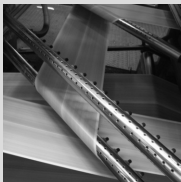
Digital display
2 pin screw terminal RM 5.08
7 pin screw terminal RM 3.81
Panel mounting clip
Seal
Multilingual operating instructions

8. Ordering code:

90-260VAC: KCT2-6ST-V
10-30VDC: KC-LED-96-1T-24VDC

9. Dimensions:





FACTORY AUTOMATION – SENSING YOUR NEEDS

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