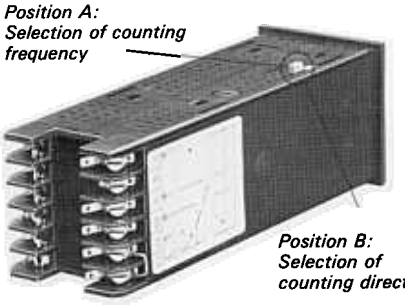
Electronic preselection counters CKP

Selecting the counting direction
Selecting the maximum counting frequency

Position A: Selection of counting frequency



Position B: Selection of counting direction

Counting direction down: without jumper
Counting direction up: with jumper in position B

Counting frequency max. 50i/s: without jumper
Counting frequency max. 300i/s: with jumper in position A

The counter is supplied with two jumpers.

Technical data

General data

Count	
Counting capacity	99,999 Special: 9,999,900 by division of the counting impulses 1/100, combined with coming to rest at coincidence. The first two decades are not displayed, total value being stored in the event of an interruption in the supply voltage.
Counting direction	up or down (selectable by jumper, see 'Selecting the counting direction')
Counting frequency max.	50i/s or 300i/s (selectable by jumper, see 'Selecting the max. counting frequency')
Display	LED 7-segment display, red, 9 × 4.5 mm, with pre-zero suppression and with identification of the negative values by '–' (eg. –9). Special: with fixed LED decimal point .9, .99 or .999
Preselection	by pushbuttons to one level (see 'Operation' for details)
Reset	manual, electrical and automatic (see 'Resetting' for details). Special: with safety pushbutton (requires the use of a pointed object, eg. a pencil)
Data storage	can be supplied with or without (see 'Data storage', page 18 for details)
Mounting	flush-mounting, fixing with clamping spring or front frame and screws, in any mounting position (see page 27 for dimension drawings)
Connections	screw terminals (M3, for wires from min. 0.75⌀ to max. 2 × 1.5⌀) in combination with tags (2.8 × 0.8 mm) for push-on connectors or soldering
Immunity to interference	2.5 kV at inputs and outputs, in conformity with IEC 255-4, test procedure E 5, class III
Ambient temperature	operation: –10 °C to +50 °C. In Store: –25 °C to +65 °C
Climatic conditions	climate G in conformity with DIN 40040
Vibration strength	operational reliability 1g; mechanical strength 2g; in conformity with IEC 68-2-6, test FC in 3 planes at 10...500 Hz
Protection class (front)	IP 40 in conformity with DIN 40050 (IP 54 resp. IP 65 see 'Protection accessories', page 28)
Weight	230 g (DC) resp. 400 g (AC)

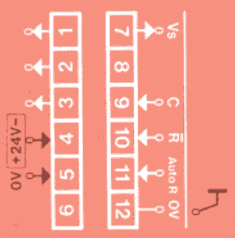
Electrical data

Main supply

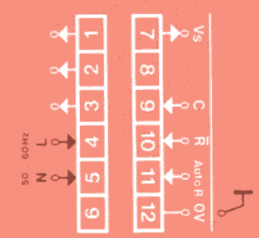
Supply voltage	DC: **24 VDC**; residual ripple max. 5%; voltage tolerance –15%/+20% AC: **24 VAC**, 48 VAC, **110 VAC, 220 VAC**, 240 VAC; 50/60 Hz; voltage tolerance –15%/+10%
Power consumption	approx. 3 W (DC) resp. 6 VA (AC)
Insulation voltage	1.5 kVAC (24...48 VAC) resp. 2.5 kVAC (110...240 VAC) across the main supply and input connections in conformity with VDE 435
Protective measures	
Surge voltage strength	1 kV 1/50 µs (DC) resp. 5 kV 1/50 µs (AC) in conformity with IEC, publication 60
Polarity reversal	integrated diode (pole reversal-resistant)
Over-voltages	short-circuit protected by integrated fuse-links (AC)
Earth connection	recommended protection measures

Main supply connection diagrams

DC



AC



CKP

Operation

The following pushbuttons are provided on the counter for operation:
- the pushbuttons 'SET' (R + ◉P) and one pushbutton per decade for keying-in the preset value
- pushbutton '◉P' for displaying the preset value
- pushbutton 'R' for manual reset

Keying-in the preset value

- Simultaneous, brief actuation of the SET pushbuttons:
  The current preset value is displayed; the display flashes; counting impulses are not accepted.
- The preset value is keyed-in by brief or continuous pressure on the pushbuttons per decade.
- Actuation of pushbutton R: preset value is stored; by means of reset the counter is placed in its ready-to-operate state.

Display of the preset value

Actuation of the pushbutton ◉P: The preset value is displayed without any counter functions being influenced.

Resetting

By means of a manual or electrical reset
- the counter is brought to zero (with counting up) respectively to the preset value (with counting down), and
- the coincidence output is brought to its rest-position (with the exception of preset value zero).
- Counting impulses are not accepted for the duration of the reset.

In the case of automatic reset (jumper connected across 11 and 12), with coincidence
- the counter is brought to zero (with counting up) respectively to the preset value (with counting down), and
- the coincidence output brought to its operating state for 250ms (special: 1s)
- without loss of counting impulses.

Inputs (count and reset)

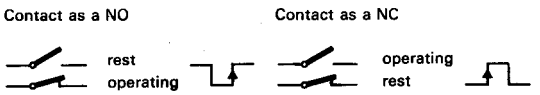
Impulse generator types	contacts, all types of NPN electronic sensors (pull-up) special: contacts, PNP and NAMUR electronic sensors, voltage pulses (pull-down)

Impulse data

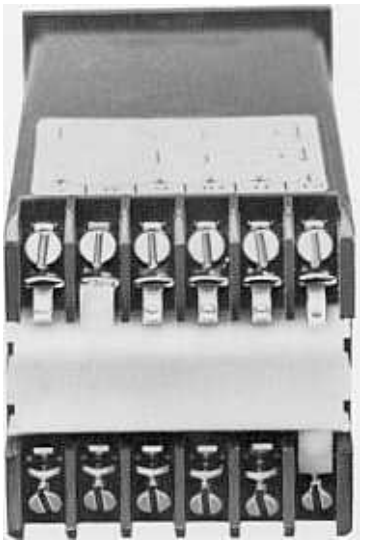
	Count 50 i/s	300 i/s	Reset
Impulse length	min. 10ms	min. 1.65ms	min. 10ms
Impulse interval	min. 10ms	min. 1.65ms	min. 10ms

The positive edge is active for counting. The type of impulse generator and input can determine whether this is situated at the start or the end of the counting impulse.

Example: Contact as impulse generator, pull-up type input

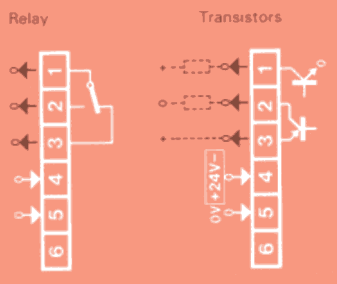


Input voltage	see 'Input data summary', page 19
Input resistance	2.2kΩ (DC) resp. 4.7kΩ (AC)
Protective measures	
Input filtering	RC-filter for high frequencies, digital filter for low frequencies (eg. contact-bounce). Schmitt-trigger with 5V (DC) resp. 2.5V (AC) hysteresis.
Over-voltages	integrated diodes
Interference	see 'Immunity to interference' under 'General data'
Sensor supply	voltage Vs DC: 23VDC (–15%/+20%) AC: 12VDC (–10%/+5%) current max. 25mA SAIA® Proximity Switches of voltage ranges 'G' (NPN/PNP, 3-wire) and 'N' (NAMUR, 2-wire) are compatible with the CKP inputs. The sensor supply is sufficient for 2 proximity switches (eg. count and reset). See also page 31.
Connection diagrams	see 'Input data summary', page 19

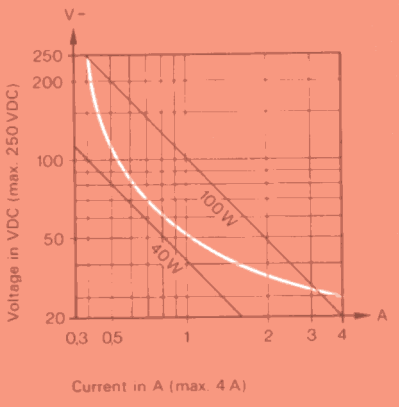


View of the universal connection possibilities (version with data storage)

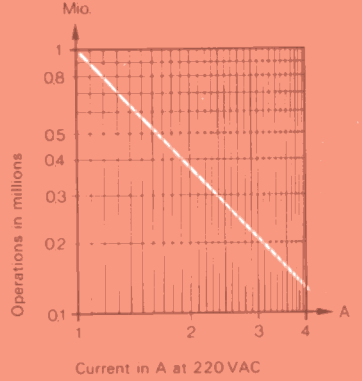
Output connection diagrams



Breaking capacity direct current



Electrical life-expectancy



Outputs

Type of outputs	DC: relay (changeover contact) or transistors PNP (for control) and NPN (for signalling) AC: relay (changeover contact) **Important note:** – Where the preset value is zero, the coincidence output remains in its operating state. – The transistor version is to be given preference where electronic circuits are being controlled.
Relay output	
Breaking capacity	direct current: see graph opposite, $P_{max.}$ (resistive) 120 W alternating current: 4 A/250 VAC (AC1, resistive load), $P_{max.}$ 1000 VA 1 A/250 VAC (AC11, inductive load) in conformity with VDE 0660, sections 1 and 2
Insulation voltage	2.5 kV across contacts and coil
Life expectancy	mechanical: 20 million operations electrical: see graph opposite With an inductive load a spark suppression is imperative for protection of the contacts (see page 30).
Transistor outputs	
Voltage	10...45 VDC
Current	max. 500 mA (PNP) resp. 100 mA (NPN)

Data storage

The electronic preselection counter CKP can be supplied optionally with or without a data storage.

Data storage version

In the event of an interruption in the main supply > 5 ms
– preset value, counter reading and state of coincidence output are stored, and
– the coincidence output – where in operating state – is brought to its rest position for the duration of the supply voltage interruption.

A CMOS memory plus two Ni-Cd batteries are used for the data storage. Guaranteed duration of data storage with fully charged batteries: min. 4 months at +25 °C or 4 weeks at +50 °C.

The counter is supplied with discharged batteries. To fully charge the batteries, the counter must be connected to the main supply for 22 hours. A 10 % duty cycle (eg. 2½ hours per day) is sufficient to maintain the batteries in a fully charged state.

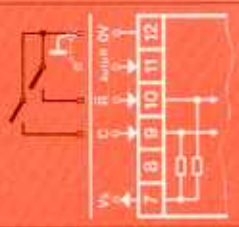
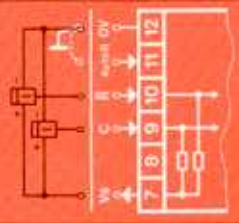
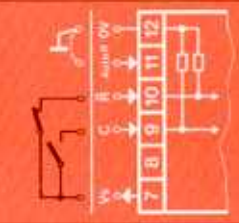
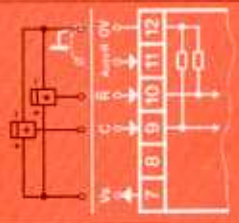
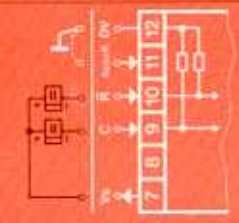
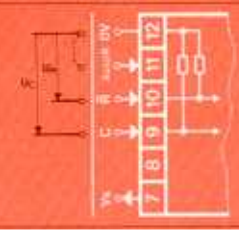
Important note: In no cases may the batteries be employed to supply external consumers.

Version without data storage

Circumstances after connection of the main supply or after an interruption > 25 ms:
– preset value zero
– counter reading zero
– coincidence output in operating state (without main supply the coincidence output reverts to the rest state).

CKP

Input data summary

Type of input	Impulse generator	Input voltage DC version	Input voltage AC version	Input signal (pulse) Count	Input signal (pulse) Reset	Input connection diagrams [1]
Pull-up – inputs C and R driven via 0 V – standard version	Contact	23 V / 0 V	12 V / 0 V			
	NPN proximity switch NO [4]: undamped / damped NC [4]: damped / undamped	16 V / 3 V	10 V / 3 V			
Pull-down [1] – inputs C and R driven via Vs – special version	Contact	23 V / 0 V	12 V / 0 V			
	PNP proximity switch NO [4]: damped / undamped NC [4]: undamped / damped	16 V / 3 V	10 V / 3 V			
	NAMUR proximity switch undamped damped	15 V / 4 V	9 V / 4 V			
	Voltage pulses [3] in when using an external impulse generator supply	30 V / 16 V / 3 V / −30 V	50 V / 10 V / 3 V / −50 V		[2]	

[1] Important: With the special version Pull-down, input R must either be driven or connected to Vs in order to bring reset to its rest position.

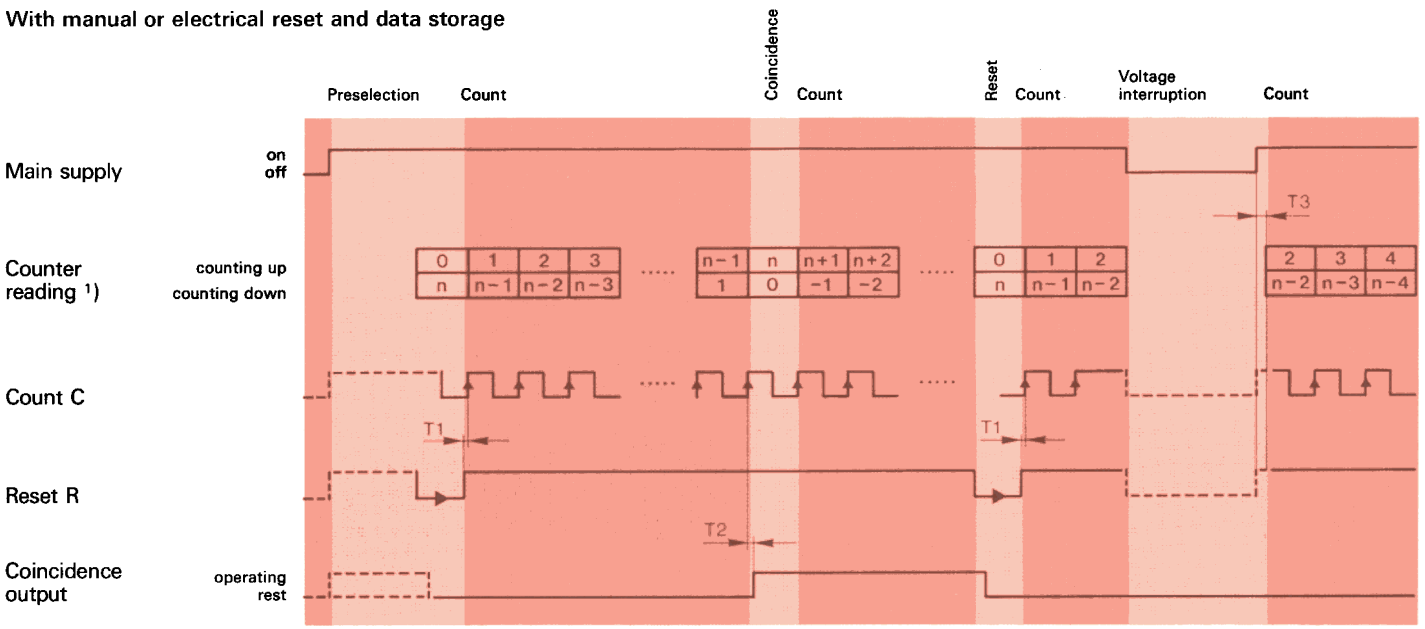
[2] Voltage supply must be maintained at input R for 800 ms in order that a voltage interruption does not cause reset.

[3] The impulse converter supplied as an accessory (order No. CJ820) is to be used to carry out trouble-free electrical resetting with a voltage pulse.

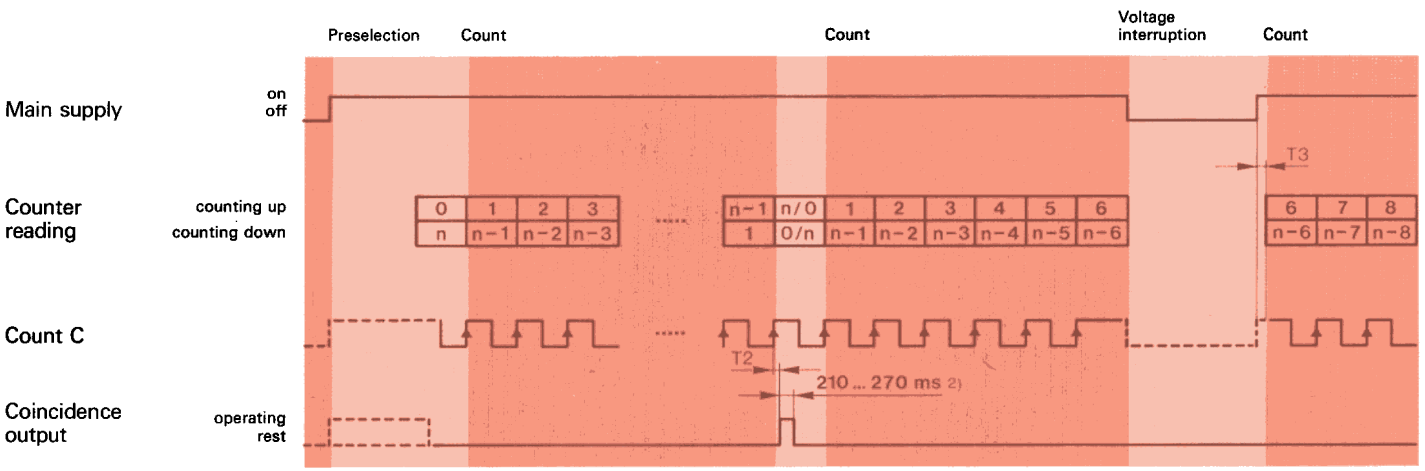
[4] NO = normally-open / NC = normally-closed.

Function diagrams

With manual or electrical reset and data storage



With automatic reset and data storage



[1]) Special: Counting comes to rest with coincidence
[2]) Special: Coincidence output pulse duration 1 s (840...1100 ms)

Delay times T

T1 delay between reset input (positive edge) and acquisition of counting impulses	3.9...9.6 ms
T2 delay between counting input and operating state of the coincidence output	9.9...15.6 ms at 50 i/s, with relay 6.6...7.6 ms at 300 i/s, with relay 3.9...9.6 ms at 50 i/s, with transistors 0.6...1.6 ms at 300 i/s, with transistors
T3 delay between switching on main supply and counter ready-to-operate state	approx. 80 ms (AC) resp. approx. 40 ms (DC)

CKP

Ordering details

Summary of the special versions

- Division of the counting impulses 1/100 (counting capacity 9,999,900) in combination with counting coming to rest with coincidence
- Fixed LED decimal point
- Pull-down: for sensors PNP, NAMUR and voltage pulses
- Counting coming to rest with coincidence
- Pulse duration at coincidence output with automatic reset 1s (an accumulation with division 1/100 and/or the coming to rest of the counting is not possible).

Production where required:

- Alteration of preset value without loss of counter reading, however no counting impulses being taken into account during alteration.

Version with LED decimal point and reset by means of safety pushbutton

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
C	K	P		1					0			

2 output relay
7 output transistors (24VDC only)

0 pull-up, without data storage
1 pull-up, with data storage
4 pull-down, without data storage
5 pull-down, with data storage

Supply voltage
M4 24VDC
B4 24VAC, 50/60Hz
C1 48VAC, 50/60Hz
C8 110VAC, 50/60Hz
D4 220VAC, 50/60Hz
D6 240VAC, 50/60Hz

N manual standard-reset
A manual reset with safety pushbutton
B counting comes to rest with coincidence
T 1s pulse duration with automatic reset

N counting capacity 99,999
B counting capacity 9,999,900 (division 1/100)

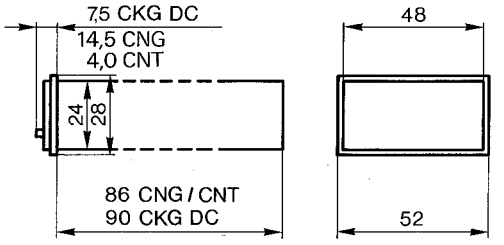
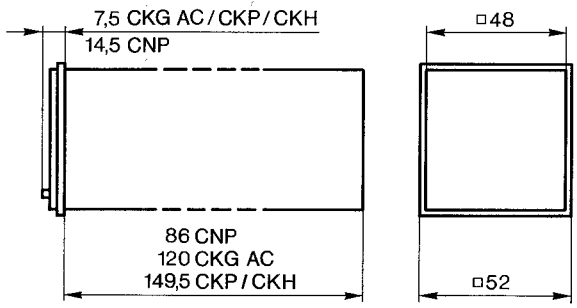
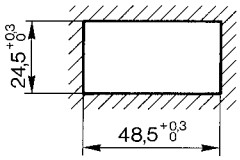
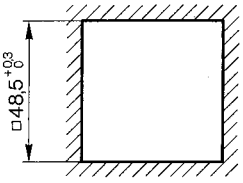
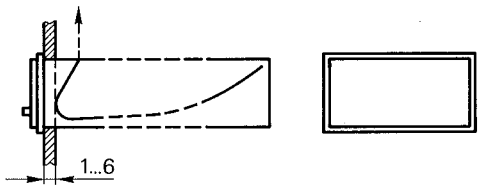
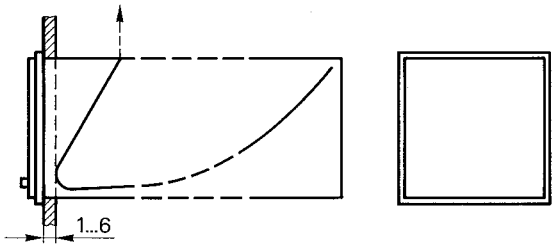
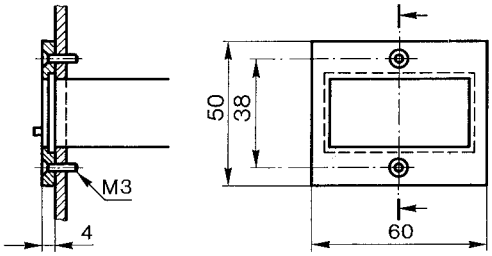
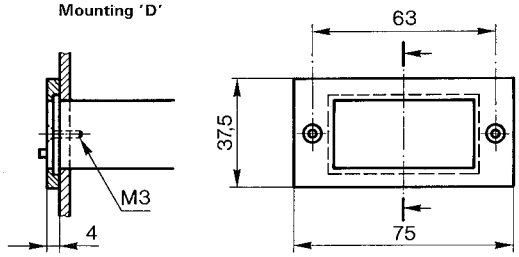
0 without LED decimal point
1 with LED decimal point .9
2 with LED decimal point .99
3 with LED decimal point .999

Mounting (see page 27)
A fixing with front frame 60 × 75mm
E fixing with clamping spring

Note: The bold typeface denotes the standard versions.
Ordering can be by means of the above ASN-code or in plain language.
Example: Electronic preselection counter CKP
with relay output, pull-up, with data storage; 220V/50Hz,
manual standard-reset, fixing with front frame
or
CKP 211 D4 N0N0 A

Important: The earlier type classification does not correspond with the new ASN-code!

Dimension drawings

	CNG/CNT/CKG DC	CNP/CKG AC/CKP/CKH
Dimensions		
Cut-out for flush-mounting applicable to both methods of fixing		
Fixing with clamping spring. The clamping spring is supplied with the counter when mounting 'E' is quoted in the ordering details.		
Fixing with front frame and 2 countersunk-head screws M3/90°. The front frame is supplied with the counter when the ordering details include mounting 'C', 'D' or 'A'	Mounting 'C'  Mounting 'D' 	Mounting 'A'