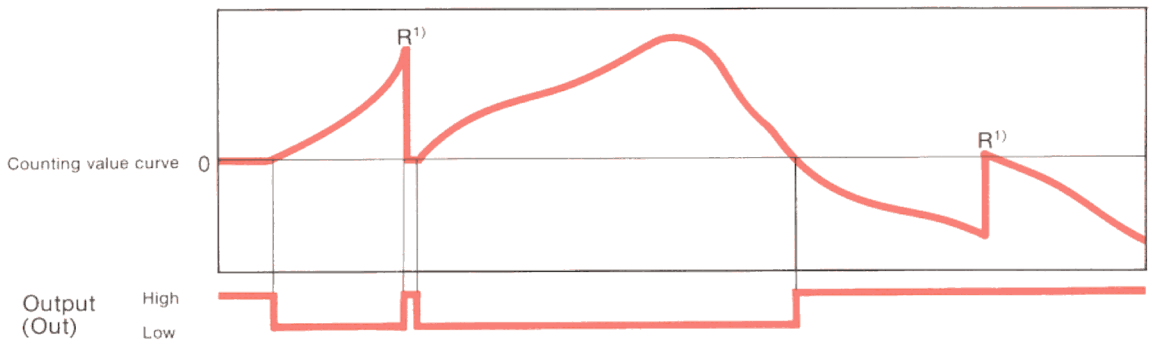
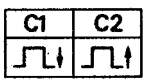
View of the selectable counting functions



1) R: manual or electrical reset

Selectable counting functions

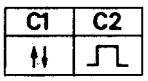
Mode 1



Input C2 counts up
Input C1 counts down

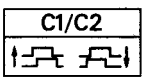
The counting impulses can also arrive simultaneously

Mode 0



C1 specifies the counting direction
C2 counts
C1=High: counter counts up
C1=Low: counter counts down
(See data summary for inputs page 6 and 7)

Mode 2

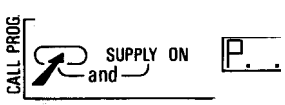


Input C1/C2 phase displaced (signals out of phase by 90°)

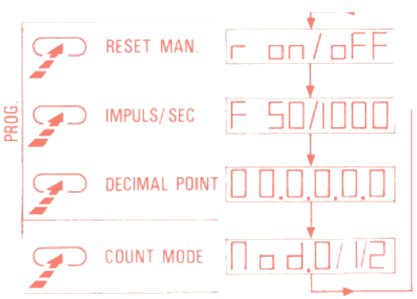
C1 before C2: counter counts up
C2 before C1: counter counts down

Programming

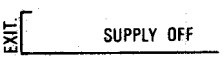
1. Call up the programming mode:
   - press reset key and keep it depressed
   - switch on mains supply
   - keep reset key depressed until 'P' appears on the screen



2. Determine or change the functions:
   - the functions are displayed alternately and can be selected by pressing the key



3. Leave the programming mode:
   - switch off the mains supply.



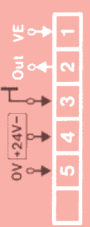
Technical data

CKR

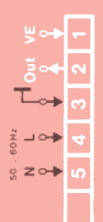
- The possibilities offered by the mask-programmed microprocessor enable various functions to be specified or altered by the operator.
- The following functions can be selected by the reset key: (The bold typeface denotes the standard versions)
  - **with** (on) or without (off) manual zero-resetting,
  - counting frequency of up to a max. of **50** or 1000 pulses per second,
  - **without** or with LED-decimal point (choice of 4 positions),
  - counting function: **differential,** discrimination of sense or phase.
    For details see 'Programming', page 15.
- Choice of the input mode Pull up or Pull down by wire bridges
- On request:
  Electric resetting active at High (>16V or >10V) instead of Low (<3V).

Main supply connection diagrams

DC



AC



General data

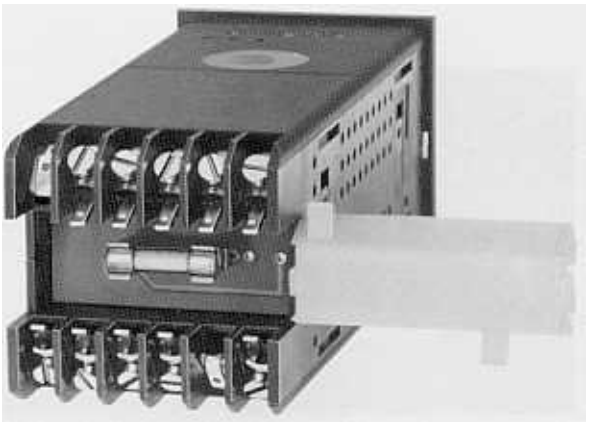
Count	
Counting capacity	–99,999...999,999 (exceeding the counting capacity is indicated by the illumination of the pre-zeros)
Counting direction	Up and down
Counting frequency max.	50i/s or 1000i/s For selecting (see 'Programming', page 2)
Display	LED 7-segment display, red, 9×4.5mm with pre-zero without or with LED decimal point .9, .99, .999, .9999 (see 'Programming', page 2)
Reset	To zero; manual and electrical or electrical only (see 'Programming', page 2) Special: with safety push button (requires the use of a pointed object, e.g. a pencil)
Data storage	All operating data are stored in the event of a supply failure without an auxiliary voltage (EAROM)
Mounting	Flush-mounting, fixing with clamping spring or front frame and screws, in any mounting position
Connections	Screw terminals (M3, for wires from min. 0.75mm² to max. 2×1.5mm²) in combination with tags (2.8×0.8mm) for push-on connectors or soldering
Immunity to interference	2.5kV at inputs and outputs, in conformity with IEC255-4, test procedure E5, class III
Ambient temperature	Operation: –10°C to +50°C, In store: –25°C to +65°C
Climatic conditions	Climate F in conformity with DIN40040
Vibration strength	Operational reliability 2g; mechanical strength 2g, in conformity with IEC68-2-6, test FC in 3 planes at 10...500Hz
Protection class (Front)	IP40 in conformity with DIN40050 (IP54 or IP65 with protection cover, see ordering details page 8)
Weight	190g (DC) or 350g (AC)

Electrical data

Main supply

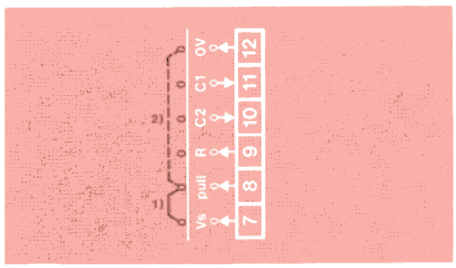
Supply voltage	DC: **24V–;** residual ripple max. 5%; voltage tolerance –15%/+20% AC: **24V**~, 48V~, **110V**~, **220...240V**~; 50/60Hz; voltage tolerance –15%/+10%
Power consumption	Approx. 3.5W (DC) resp. 6VA (AC)
Insulation voltage	1.5kV~ (24...48V~) resp. 2.5kV~ (110...240V~) across the main supply and input connections in conformity with VDE0435
Protective measures	
Surge voltage strength	1kV 1/50µs (DC) resp. 5kV 1/50µs (AC) in conformity with IEC, publication 60
Polarity reversal	Pole reversal-resistant with integrated diode
	Short-circuit protected by integrated fuse-links (AC)
	Recommended protective measures

SAIA



Short-circuit proof by means of the easily accessible fuse

Selection of type of input or impulse generator



1) Pull up:
- Position of the jumper on delivery (terminals 7 and 8)
- Inputs C1, C2 and R activated via 0 V

2) Pull down:
- Jumper is to be displaced on terminals 8 and 12
- Inputs C1, C2 and R activated via Vs

Important: With the version Pull-down, input R must either be driven or connected to Vs in order to bring reset to its rest position (special version 'R active at High' on request).

Resetting

By means of a manual or electrical reset
- the counter is set to zero
- output 'Out' is active
- counting impulses are not accepted for the duration of the reset.

Inputs (count and reset)

Impulse generator types
- Contacts, electronic encoder NPN, incremental shaft encoder NPN (Pull up input mode).
- Contacts, electronic encoder PNP or NAMUR, voltage pulses, incremental shaft encoder PNP (Pull down input mode).

The input mode is selected by a jumper.

Impulse data

	count 50i/s	1000i/s	Reset
Impulse length	min. 10ms	min. 0.5ms	min. 10ms
Impulse interval	min. 10ms	min. 0.5ms	min. 10ms

For counting, the positive signal edge is active. Whether this is situated at the beginning or end of the counting impulse can be determined by the type of impulse generator and the input mode.

Example: Contact as impulse generator, input mode pull-up.

Contact normally open (NOC): rest / operating

Contact normally closed (NCC): operating / rest

Operating mode of counting inputs

The operating modes of counting inputs C1 and C2 are defined by programming. (see 'Programming', page 4).

Mode	C1	C2	
1	↓	↑	The counting impulses can also arrive simultaneously
0	↕		↓ C1=0V ↑ C1=Vs
2	↑	↓	↓ C2 before C1 ↑ C1 before C2

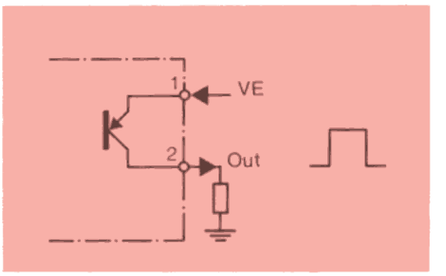
Input voltage	See 'Data summary for inputs', page 6 and 7
Input resistance	2.2kΩ (DC) or 4.7kΩ (AC)
Protective measures	
Input filtering	RC filter, Schmitt trigger with hysteresis of 5V (DC) or 2.5V (AC)
Over-voltages	integrated diodes
Interference	See immunity to interference under 'General data'
	Voltage Vs DC: 23V– (–15%/+20%) AC: 12V– (–10%/+5%) Current max. 25mA SAIA® Proximity Switches, voltage range 'D/G/R' (NPN/PNP, 3-wire) and 'N' (NAMUR, 2-wire) are compatible with the CKR inputs. The sensor supply is sufficient for 2 proximity switches (e.g. count and reset)
Connection diagrams	See 'Data summary for inputs', page 6 and 7

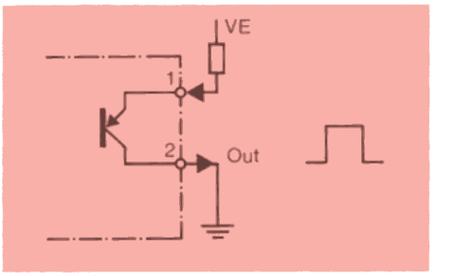
Function diagrams

Output (Out)

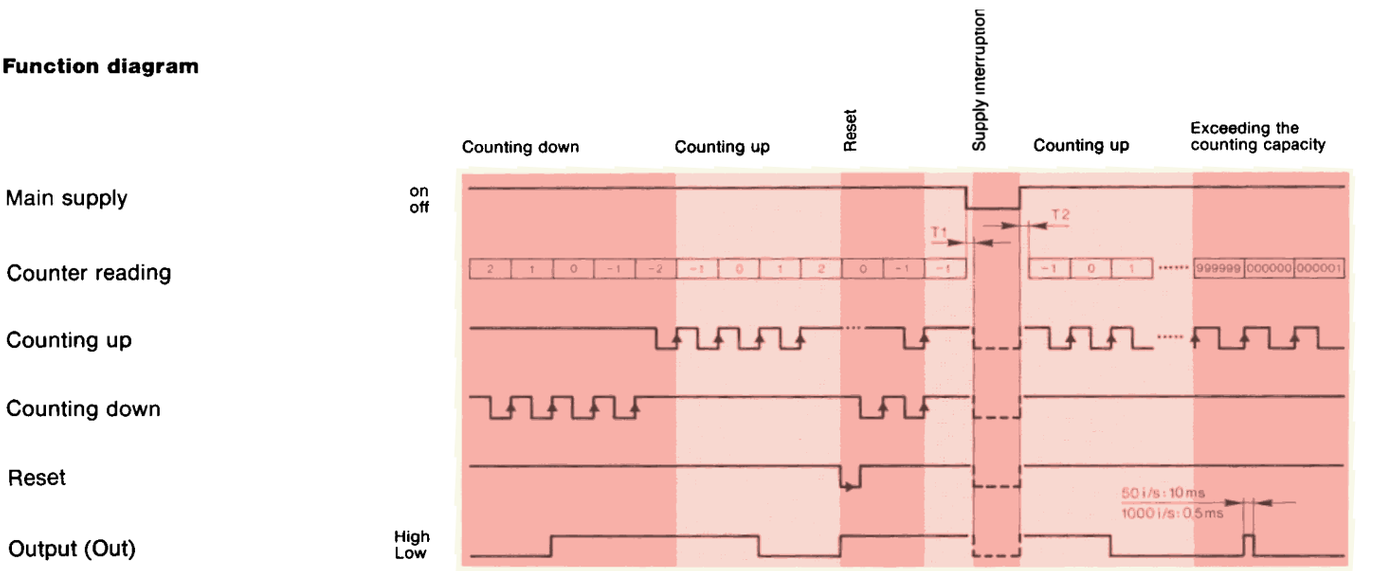
Function of the output	The transistor conducts – at counter state ⩽ zero – when the maximum counting capacity is exceeded (10ms switching duration at 50i/s or 0.5ms at 1000i/s)
Input voltage VE	10...30V–
Voltage drop	max. 1.5V at 100mA
	Galvanically separated by Optocoupler

Output connection diagrams





Function diagram

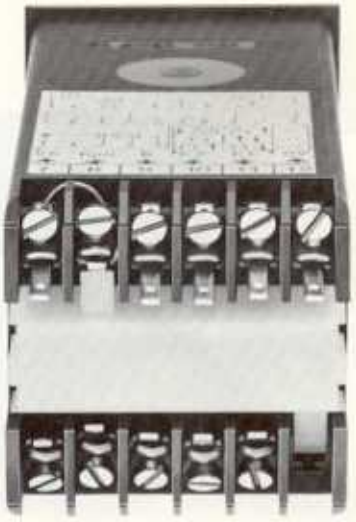


Delay times T

T1 max. 50ms delay between switching off main supply and end of counting (count or reset impulses are accepted).

T2 max. 150ms delay between switching off main supply and the counter ready-to-operate state.

No count impulses are taken into account during the reset impulse or the period of actuation of the push button 'R'.



View of the universal connection possibilities

Data summary for inputs

Input mode	Impulse generator	Input voltage DC version	Input voltage AC version	Input signal (impulse) Count	Input signal (impulse) Reset	Input connection diagram
Pull up – Input C and R driven via 0 V – Jumper across connections 7–8	**Contact** NO[1] undamped / damped NC[2] damped / undamped	23 V / 0 V	12 V / 0 V			
	NPN proximity switch NO[1] undamped / damped NC[2] damped / undamped	16 V / 3 V	10 V / 3 V			
	Incremental shaft encoder – with NPN output – phase-lag 90° – ×1 evaluation	16 V / 3 V	10 V / 3 V	up / down C1 C2		

[1]) NO=normally-open
[2]) NC=normally-closed

CKR

Pull down[1]
– Input C and R driven via Vs
– Jumper across connections 8–12

Input mode	Impulse generator	Input voltage DC version	Input voltage AC version	Input signal (impulse) Count	Input signal (impulse) Reset	Input connection diagram[1]
Pull down[1]	**Contact**	23 V / 0 V	12 V / 0 V			
	PNP proximity switch PNP NO[4] damped / undamped NC[5] undamped / damped	16 V / 3 V	10 V / 3 V			
	NAMUR proximity switch undamped / damped	15 V / 4 V	9 V / 4 V			
	Incremental shaft encoder – with PNP output – phase-lag 90° – ×1 evaluation	16 V / 3 V	10 V / 3 V	up / down		
	Voltage pulses[3] i.e., when using an external sensor supply	30 V / 16 V / 3 V / –30 V	50 V / 10 V / 3 V / –50 V		[2]	

[1] Important: With input mode pull-down, input R must either be driven or connected to Vs in order to bring the reset to its state.
[2] In order that a voltage supply interruption does not cause a reset, the voltage must be maintained at input R for min. 80 ms.
[3] The impulse converter supplied as an accessory (order No. CJ 820) is to be used to carry out trouble-free electrical resetting with a voltage pulse or the special version 'R active at High' (on request).
[4] NO=normally-open [5] NC=normally-closed

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From October 1987:
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Ordering details

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
C	K	R	8	6	2				0	N	0	

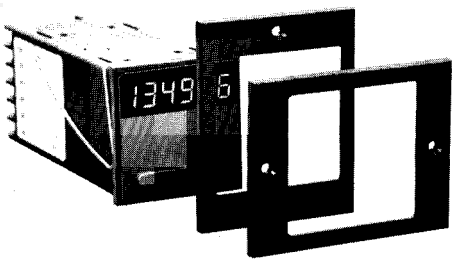
Supply voltage

M4 24V–

B4 24V, 50/60Hz
C1 48V, 50/60Hz
C8 110V, 50/60Hz
E1 220...240V, 50/60Hz

N manual standard-reset
A manual reset with safety push-button

Mounting
A fixing with front frame 60×75mm
E fixing with clamping spring



Fixing by means of clamping spring or front frame and screws

Flexible cover CJ 335 (IP 54)

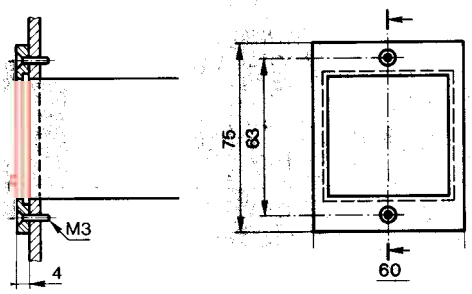
Note: The bold typeface denotes the standard versions. Ordering can be by means of the above ASN-code or in plain language.
Example: Differential counter CKR
24V–, fitting with clamping spring or CKR 862 M4 N0N0 E

Accessories (to be ordered separately)

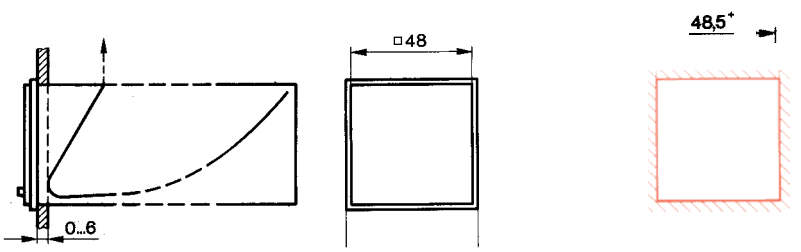
CJ 320 Transparent, rigid cover (IP 65) for mounting E
CJ 330 Transparent, flexible cover (IP 54) for mounting E
CJ 335 Transparent, flexible cover (IP 54) for mounting A
CJ 350 Protective cover alone (replacement)
CJ 820 Impulse converter

Dimension drawings

Mounting type 'A'



Mounting type 'E'



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