Operating Instructions

DIGITAL COUNTER
VEK CN1

Version 2002_03

NOTE:

First Printing: 2001

The manufacturer reserves the right to modify, without prior notice, the technical specifications in order to accommodate the latest technical developments. Magnetic Automation Corp. will provide information on the status of existing operating instructions and on any alterations and extensions that may be relevant.

Please read these operation instructions prior to installing the equipment.

Table of Contents

1 Functional Description ____ *4*

1.1 General ____ 4

1.2 Display and Setup ____ 5

1.2.1 User interface buttons ____ 5

1.2.2 Power Failure ____ 5

1.2.3 Display during normal operation ____ 5

1.3 Base menu – Setting the operating modes ____ 6

1.3.1 Modify/Correct current count ____ 6

1.3.2 Set Relay Output manually to "Free" or "Occupied" ____ 6

1.3.3 Display and Counter reset ____ 7

1.3.4 Reset all counters ____ 7

1.4 System menu – Installation specific Settings ____ 8

1.4.1 Operating Modes/ Switching point ____ 9

1.4.2 Count Hysteresis ____ 9

1.4.3 Upper Count Level and lower Count Level ____ 10

1.4.4 Display / Input settings ____ 11

1.4.5 Output settings ____ 11

1.4.6 Power Save Mode ____ 12

1.4.7 Setting the Serial Interface (optional) ____ 12

1.5 Factory Default ____ 12

2 Installation Instructions ____ *13*

2.1 Input voltage ____ 13

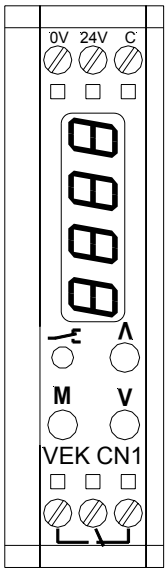
2.2 Reset Input (optional) ____ 14

3 Technical Data ____ *15*

1 Functional Description

1.1 General

4-pin plug for counting inputs
↓



↑
Optional 4-pin plug for RS485-Interface

The digital counter VEK CN1 is designed to control small to medium car-parks. Four (4) counting inputs are used to accept outputs from loop detectors and/or traffic gate controllers. The counting inputs increment or decrement the count and is displayed on the 4-digit display. The output relay is used to turn on/off traffic signs or lot full signs. Available Open space counter and count hysteresis are adjustable. The output relay can be used to directly control a traffic light or a lot full sign.

Characteristics

- Digital counter is specifically developed for small to medium car-parks.
- Vehicle count and open space count.
- 4-digit display
- Totalize counter -999 bis 9999
- 4 noise immunity inputs, each function + / - Reset individually adjustable
- 1 Reset input (optional)
- 1 Relay output 250V, 5A for Traffic lights and Lot Full signs (or others).
- Output is adjustable for automatic, permanent free, permanent occupied.
- Relay is adjustable to Normally Open or Normally closed mode.
- LED to display relay status.
- 4 independent input counters up to 9,999,999 for statistical use independently displayed.
- Available Open space counter and count hysteresis are adjustable.
- Upper and lower counter threshold is adjustable.
- 3 push buttons for user interface.
- Power Supply: 12..24V DC oder AC
- No loss of current data storage in case of power failure.
- Alarm display when power is/was lost.
- Optional RS485-Interface for data polling, setup or direct communication with a traffic sign.
- Compact Plastic housing 0.88" (22,5mm) x 3.15" (80mm) x 3.35" (85mm), with DIN-Rail mount.

1.2 Display and Setup

1.2.1 User interface buttons

The VEK CN1 digital counter is adjusted with the three (3) user interface buttons located on top of the unit. The display shows the current menu and status of the setup. The buttons have following functionality:

Button		Function
M (Mode)	Short	Next Menu, next digit, Cancel settings.
	Long	Activate System menu, Save changes, exit menu.
^ (UP)	Short	Display value increments + 1
	Long	Display value fast increments
v (DOWN)	Short	Display value increments – 1
	Long	Display value fast decrements
Two simultaneously		Cancel changes, back to operating mode.

The menu is divided in base menu and system menu. During setup the flashing display signalizes that the settings aren't saved yet. If the unit was idle for 30sec. the unit goes back to normal operating mode without saving the changes.

1.2.2 Power Failure

During loss of power the current count values and setup are saved. When the power returns the unit goes back in normal operating mode but signalizes with the flashing display that there was a loss of power and the open space count must be checked and if necessary updated.

Display	Status	Setting	
1234 Flashing	Return after loss of power	^ or v	→ Update open space count
		M	→ Confirm existing count is correct.

1.2.3 Display during normal operation

In normal operating mode you can have the display show either how many vehicles entered the car-park or how many open spaces are left (see 1.4.1Operating Mode/Switching point). The relay status is displayed with the LED-Light. The input status are displayed with 4 dots. Special statuses are directly displayed.

Display	Status
Number, for example **1234**	Normal operation, Current count
Number /**occu** alternating display	Current count, Output manually set to "occupied"
Number /**FrEE** alternating display	Current count, Output manually set to "free".
0000	Reset Input active (Optional)
Dots	Input Status, left to right 1,2,3,4
LED on/off	Output relay status: activated = on/deactivated = off
Display off if unit was idle for 30sec.	Power save mode

Note:

1. If one of the four (4) input counter display is activated the display will not switch back to normal operating display by itself.
2. If the Power save mode is activated the display will turn off when the unit was idle for more than 30 sec. By pressing the M-Button the display can be turned on again (see 1.4.6 Power Save Mode)

1.3 Base menu – Setting the operating modes

The base menu contains all settings for the different operating modes. The existing counts can be displayed, modified and reset to original stage. The relay output can manually be set to "FREE" or "OCCUPIED".

Display	Menu	Setting
1234	Normal Operation, Current Count	M Short → next, next menu item Two buttons simultaneously or M long →**End** = back to normal operation ∧ or ∨ → change M long → save
Ouk	Relay output manually	
Cnk1	Input 1	
Cnk2	Input 2	
Cnk3	Input 3	
Cnk4	Input 4	
rES	Reset all Counters	

1.3.1 Modify/Correct current count

Display	Status	Setting	
1234	Normal Operation	∧ or ∨	→ First digit flashing → modify counter
1234 One digit flashing	Modify Counter	∧ or ∨	→ Digit + / - 1
		∧ or ∨ 1 sec.	→ Fast scroll
		∧ or ∨ 3 sec.	→ 10's → 100's → 1000's
		M short	→ 100's → 10's → 1's → Cancel
		M long	→**Skor** = saved

1.3.2 Set Relay Output manually to "Free" or "Occupied"

If for any reasons the relay output needs to be disabled the output can manually be set to maintain either the always "FREE" or always "OCCUPIED" status.

Display	Status	Setting	
1234	Normal Operation	M 1 x short → **Ouk** = Output status display	
Ouk **Auko** **occu** **FrEE** Alternating	Output Status Display • Automatic • Occupied • Free	M short	→ next, next menu item
		M long	→**End** = back to normal operation
		∧ or ∨	→ Select output status
Auko **occu** **FrEE** blinkend	Selected Output status	∧	→**FrEE** → **Auko** → **occu**
		∨	→**occu** → **Auko** → **FrEE**
		M short	→ Cancel changes
		M Long	→**Skor** = Output status saved

1.3.3 Display and Counter reset

The Inputs can individually count to up to 9,999,999 and can individually be displayed or if necessary reset to zero.

Display	Status	Setting
1234	Normal Operation	M 2 x short →**Cnk1** = Input counter 1 : M 5 x short →**Cnk4** = Input counter 4
Cnk1 ...**4** **1234** Alternating	Display current count 0...9999	M short → next, next menu ^ → Current Input count v → Start the input counter reset
Cnk1 ...**4** **1234.** **.456** Continuously	Display Input count 10.000...9.999.999	
0 flashing	Reset	M long → **Skor** = Reset Input counter M short → Cancel reset

Note:

1. The open space or quantity of passed vehicles count will not be effected during reset of any of the input counts!
3. If one of the four (4) input counter display is activated the display will not switch back to normal operating display by itself.

1.3.4 Reset all counters

The open space and passed vehicle counter as well as the four (4) input counters can be reset at ones using following menu:

Display	Status	Setting
1234	Normal Operation	M 6 x short →**rES** = Reset menu
rES	Reset Menu	M long → reset all counters M short → back to normal operation without reset.

The output relay setting manually “FREE” and manually “OCCUPIED” is not effected by this reset.

1.4 System menu – Installation specific Settings

In the system menu all installation specific settings can be made.

Display	Menu Item	Setting
1234	Normal Operation	M long → Display **SYS** = System menu Alternating shows program version; for example A02
S oc **1234** Alternating	Switch threshold 0...9999	M short → next menu item ^ or v → change M long → save Two buttons simultaneously M long →**End** = back in normal operation
HYS **1234** Alternating	Count hysteresis 1...250	
SkP~ **1234** Alternating	Upper Count threshold 0...9999	
SkP_ **-123** Alternating	Lower Count threshold 0...-999	
inP1 ...**4** Alternating **Add** **Sub** **rEs** **no.F**	Input functions • Increment count • Decrement count • Reset count • No function	
rEL Alternating **oc.on** **Fr.on**	Output function • Normally closed • Normally open	
LoPo Alternating **off** **on**	Power Save Mode • off (Display an) an (Display aus)	
Pork	Serial Interface	

1.4.1 Operating Modes/ Switching point

The digital counter can be set to Operating Mode "OPEN SPACE COUNT" or " PASSING VEHICLE COUNT" .
The two options can be selected by setting the Count threshold to:
Threshold = 0 (Default) → Mode "OPEN SPACE COUNT" see 1.4.1.1
Threshold = 1 = 1..9999 → Mode " PASSING VEHICLE COUNT" see 1.4.1.2

Display	Status	Setting	
1234	Normal Operation	M long	→***SµS*** → **S oc** = Threshold
S oc **1234** Alternating	Display Count Threshold	M short M long ^ or v	→ next, next Menu item →**End** = back to normal operation → Change Threshold
1234 one digit flashes	Change Threshold 0...9999	^ or v ^ or v 1 sec. ^ or v 3 sec. M short M long	→ Digit + / - 1 → Fast scroll → 10's → 100's → 1000's → 100's → 10's → 1's → Cancel →**Skor** = save

1.4.1.1 Operating Mode "OPEN SPACE COUNT"

The "OPEN SPACE COUNT" is preferably used when the control audit count of the parking spaces is done when the car-park is full so less open spaces has to be counted. Vehicles leaving the car-park will increment the count (Input 1) and vehicles entering the facility will decrement the count (Input 2). The counter will activate the output relay whenever the open space count is equal or less than "0". The output relay will be released as soon the count reached the adjusted count hysteresis.

1.4.1.2 Operating Mode „PASSING VEHICLE COUNT"

The "PASSING VEHICLE COUNT" is preferably used when the control audit count of the parking spaces is done when the car-park is empty so less occupied parking spaces must be counted. Vehicles entering the car-park will increment the count (Input 1) and vehicles leaving the facility will decrement the count (Input 2). The counter will activate the output relay whenever the vehicle count reaches or is higher than the adjusted maximum. The output relay will be released as soon the count reaches or is lower than the adjusted lower count hysteresis.

1.4.2 Count Hysteresis

With the count hysteresis you can set the amount of vehicles that have to leave the facility after the "OPEN SPACE COUNT" or the "PASSING VEHICLE COUNT" have reached the maximum and triggered the output relay. Factory default is 1.

Display	Status	Setting	
1234	Normal Operation	M long M 1 x short	→***SµS*** → **S oc** →***HµS*** = Count hysteresis
HYS **1234** Alternating	Display Count hysteresis	M short M long ^ Or v	→ next, next menu item →**End** = return to normal operation → Change Count hysteresis
1234 One flashing digit	Change Count hysteresis 1...9999	^ Or v ^ Or v 1 sec. ^ Or v 3 sec. M short M long	→ digit + / - 1 → fast scroll → 10's → 100's → 1000's → 100's → 10's → 1's → cancel →**Skor** = save

1.4.3 Upper Count Level and lower Count Level

The maximum and minimum range of the total count can be adjusted using this menu. This enables the counter to automatically adjust the total in case the maximum or minimum level is reached to prevent a wrongful count to continue. The default is 9999 for the upper and –999 for the lover level.

Display	Status	Setting
1234	Normal Operation	M long →**SμS** → **S oc** M 2 x short→**SkP~** = upper level 0...9999 M short →**SkP_** = lover level –999...0
SkP~ /_ **1234** Alternating	Display Count level	M short → next, next menu item M long →**End** = return to normal operation ^ Or v → Change count level
1234 One flashing digit	Change Count Level 0...9999	^ Or v → Digit + / - 1 ^ Or v 1 sec. → fast scroll ^ Or v 3 sec. → 10's → 100's → 1000's M short → 100's → 10's → 1's → Cancel M long →**Skor** = save

1.4.4 Display / Input settings

Independent from each other the inputs can be set to:

- *Incrementing*
- *Decrementing*,
- *Reset* Count
- *No function*

Display	Status	Setting
1234	Normal Operation	M long →***SμS*** → **S oc** M 4 x short →**InP1** = Function Input 1
inP1 ...**4** Alternating **Add** **Sub** **rEs** **no.F**	Display Input function 1 to 4 • Incrementing • Decrementing • Reset count • No function	M short → next Input, next menu item M long →**End** = return to normal operation ^ Or v → Change function
Add **Sub** **rEs** **no.F** Flashing	Change Function	^ →**no.F** → **rEs** →**Sub** →**Add** v →**Add** → **Sub** →**rEs** →**no.F** M short → Cancel M long →**Skor** = save

Factory default is Incrementing for Input 1 and 3 and decrementing for Input 2 and 4.

1.4.5 Output settings

The output relay can be adjusted to Normally Open (NO) or Normally Closed (NC):

Display	Status	Setting
1234	Normal operation	M Short →***SμS*** → **S oc** M 8 x short→**rEL** = Relay function
rEL Alternating **Fr.on** **oc.on**	Display Relay function • If free NC • If full NC	M short → next , next Menu item M long →**End** = return to normal operation ^ Or v → Change function
Fr.on **oc.on** Flashing	Change relay function	^ →**Fr.on** → **oc.on** v →**oc.on** → **Fr.on** M short → Cancel M long →**Skor** = save

Factory default is Normally Open mode for the output relay.

1.4.6 Power Save Mode

If the Power Save Mode is activated the display turns if there was no activity on the user interface for more then 30sec. The count function continuous to run in the background. The Power Save Mode can be adjusted using following menu:

Display	Status	Setting
1234	Normal Operation	M long →**SμS** → **S oc** M 9 x short →**LoPo** = Power Save Mode
LoPo Alternating **Off** **On**	Display Power Save Mode • OFF (Display On) • ON (Display Off)	M short → next, next menu item M long →**End** = return to normal operation ^ Or v → Change Function
Off **On** Flashing	Change Function	^ →**off** → **on** v →**on** → **off** M short → Cancel M long →**Skor** = Save

1.4.7 Setting the Serial Interface (optional)

Currently not available.

1.5 Factory Default

All parameter and counter can be reset to factory default using following procedure:

Display	Status	Setting
		Turn off power to the unit for longer then 2 seconds.
1234 Flashing	Return after power failure	Press two buttons simultaneously →**Err**
Err Flashing	System error	M long →**Skor** = Reset to factory default →**0000** flashing = factory default M short → Cancel, Restart without factory default settings

After the reset to factory default all parameters are set to the following (see table below) and all counters are set to zero (0).

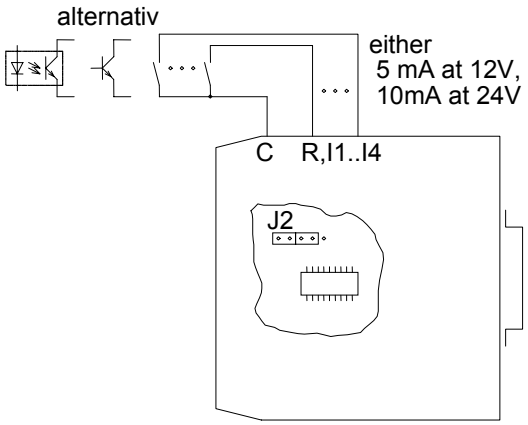
Parameter		Setting	
Ouk	Relay output	**Auko**	Automatic
S oc	Switch Point	**0**	0 = Open Space Count
HyS	Count hysteresis	**1**	one vehicle
SkP¯	Upper count level	**9999**	9999
SkP_	Lower count level	**-999**	-999
InP1	Function Input 1	**Add**	incrementing
InP2	Function Input 2	**Sub**	decrementing
InP3	Function Input 3	**Add**	incrementing
InP4	Function Input 4	**Sub**	decrementing
rEL	Output functionality	**oc.on**	Normally Open Mode
LoPo	Power Save Mode	**oFF**	aus, Anzeige immer aktiv

2 Installation Instructions

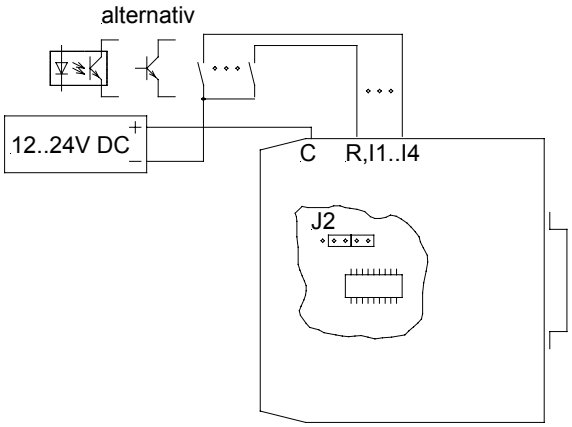
2.1 Input voltage

All inputs are provided with Opto couplers. To activate the inputs you can either use the internal switching voltage or use an external supply. When using an external supply you must first change the internal jumper setting of the control board. To do so carefully open the controller housing and set the jumper J2 in accordance with the drawing and table below.

Attention! The control board consists of electrostatic sensitive components. If working on the control boards please use electrostatic save measurements to prevent any damage to the components. Do not touch the board or any of the components!



Internal supply is does not use the Opto couplers.



External supply uses the Opto couplers.

Power Supply	Input power	Attention
12..24V DC	Internal Jumper J2 to the left	• ONLY ONE POWER SUPPLY FOR ALL COUNTERS • DO NOT CONNECT TERMINAL „C“. THE INPUTS ARE CONNECTED TO GROUND (0V).
12..24V AC	Internal Jumper J2 to the left	• DO NOT CONNECT MULTIPLE COUNTERS IN PARALLEL!
12..24V AC oder DC	External 12..24V DC Jumper J2 to the right	• USE ONLY ONE EXTERNAL POWER SUPPLY FOR ALL INPUTS!

2.2 Reset Input (optional)

Using one of the inputs as count reset input all counts can be reset to 0 when a signal is applied. According to the relay output setting the relay switches to “OPEN” or “OCCUPIED”. The reset does not effect the adjusted parameters.

3 Technical Data

Measurements	3" (79mm) x3/4" (22,5mm) x3.50" (90 mm) (HxWxL without Plug)
Protection Class	IP 40
Power Supply	12V to 24V AC/DC ±10%
Power Consumption	max. 2 W
Operating Temperature	-20 °C to +70 °C
Storage Temperature	-40 °C to +70 °C
Humidity	max. 95 % non-condensing
Count	Total –999 bis 9.999 Per count input up to 9.999.9999
Inputs	Opto Coupled, 4 Inputs
Minimum input time	50ms
Input current	5mA at 12V 10mA at 24V
Relay Output	Form C
Isolation	Basisisolierung für 230V, Sicherheits- und Warnhinweise beachten!
Max. Current Rating	AC: 250V / 4A / 125VA DC: 220V / 2A / 60W 0,25W / 10mV / 1mA
Fuse	none, must be external