

6. Commissioning

Before activating the device for the first time, please check its wiring (see chapter 4. Electrical connections).



Attention: *With induced loads the outputs have to be switched with a freewheeling diode. Covers or inductivities very close to the device inside the switchboard have to be switched with a deletion unit as do those that are wired to or influence the wiring of the device.*

6.1. Complete deletion

After the first activation of the supply voltage the program memory is not in an initialized mode. This leads to the CamCon's display showing uncomprehensible symbols. That is why you (at the first activation of your CamCon) have to put a complete deletion into process as follows:

1. Activate the device (supply with voltage, +24V DC).
2. Wait until the display shows either a number or $\square - \square \square \square$.
3. Press the $\square -$ key four times.
4. Press the $\square +$ key four times.
5. Press the $\square F$ key (about 2sec.), until $\square . \square \square \square$ is displayed.
6. Press the $\square \square$ key (about 2sec.), until the display goes out.
7. Release the $\square \square$ key.

After a while (up to 40sec.) the display is reactivated. This completes the complete deletion. All cams are erased, and all system registers have the standard value.

6.2. Initialization

After an activation of the voltage supply or a complete deletion the CamCon is in the standard mode. This mode normally displays the rotational speed, the angular position of the encoder, or an error message. The error message continues to be displayed until the system registers have been adjusted to the encoder, provided the wiring is correct.

6.2.1. User keys for the system registers

In order to be able to program the system registers, the following key sequence must be maintained:

1. Press the $\square -$ key four times.
2. Press the $\square +$ key four times.
3. Keep the $\square F$ key pressed for about 2 seconds, until the display shows $\square . \square \square \square$.

6.2.2. The encoder resolution

The display \square \square \square \square shows the resolution of the encoder in steps per rotation. The CamCon operates with a standard encoder with a resolution of 360 steps per rotation. The resolution cannot be adjusted or changed.

6.2.3. The F/R change over

After pressing the \square key the display shows \square \square \square \square . The display \square \square \square \square shows that the encoder is counting upwards clockwise, when looking at the shaft. You can reverse the rotational direction of the encoder by pressing the \square or the \square key. \square \square \square \square is displayed.

6.2.4. The zero point correction

If you press the \square key, the display shows e.g.: \square \square \square \square . **123** represents the current angular position of the encoder. After having positioned the drive to mechanical "0", you can also shift the current angular position to "0" by pressing the \square key or the \square key, so that the mechanical and the electronic zero point coincide. The display shows \square \square .

6.2.5. Setting of the programming mode

\square \square \square appears on the display after you press the \square key. Here you can set the mode for cam programming. Pressing either the \square or the \square key results in a change over from programming mode 0 to programming mode 1. The programming mode 1 is easier to use than the programming mode 0, but it is not possible (in programming mode 1) to program several cams on one output.

You can return to the standard display with an additional pressing of the \square key. CamCon should now display the current speed, e.g.: \square \square . If not, please refer to the chapter "Troubleshooting".








6.3. The dead time compensation

Keeping the \square key pressed (for about 2 sec.) in the standard display mode lets the display show \square \square \square . Here you can enter the dead time for output 1 in the range of 0ms to 255ms. By pressing the \square key or the \square key, you can change this value in steps of 1 ms. By pressing the \square key shortly, you can proceed to the next output, and so on. The display shows e.g. \square \square \square . This way you can enter time factors for every single output, so that they are (de)activated earlier. You can abort the programming of the dead time compensation at all times by pressing the \square key.







6.4. Cam programming in programming mode "0"

6.4.1. Selecting a program









The cam programming and the program selection are initiated as follows:

Press the  for about 2 seconds, until the display shows e.g.:  .  .  means that e.g. program 0 is currently selected. By pressing the  or the  key, you have the possibility to select a program of 0 to 7. When the desired program number is adjusted, you can exit the 'Cam programming' mode by pressing the  key.






6.4.2. Selecting an output

To initiate cam programming press the  key for about 2 seconds, until the display shows e.g.:  . Press the  key again; the display shows e.g.:  . This indicates that there is no programmed cam on output 1 in the 'Output selection' mode. By pressing the  key or the  key you can now select the output on which you want to program cams.






6.4.3. Searching for cams



By pressing the  key you leave the 'Output selection' mode  and enter the mode 'Cam search'  . In the 'Cam search' mode  you can search for the cam activation points by pressing the  key. Every time the  key is pressed, CamCon searches the memory for activation points of the cams on the corresponding output. If no cam has been programmed,  is displayed. If a cam has been programmed over the whole perimeter, the display shows  .

6.4.4. Setting the preset value









You leave the 'Cam search' mode  and enter the 'Preset' mode  with the pressing of the  key. By pressing the  or the  key you can now select a value, e.g. 100. This value is the originator from which cams may either be reconstructed or erased by changing the activation and the deactivation points.





6.4.5. Shifting the activation point

By pressing the  key you leave the 'Preset' mode  and enter the 'Activation point' mode  . A pressing of the  key or the  key shifts the activation point by one step. This is done according to the following system:




A short single pressing of the  key will erase the activation point at the previously displayed preset value, e.g. 100, and then the preset value is increased by 1, e.g. to 101. A short pressing of the  key will lower the preset value (100 in our example) by 1 and then set a new activation point at e.g. 99.

6.4.6. Shifting the deactivation point

Pressing the  key once more leads you from the 'Activation point' mode  into the 'Deactivation point' mode . CamCon will first search for the deactivation point of the current cam (e.g.:   ). By pressing the  or the  key the deactivation point is shifted by one step. This is done according to the following system:

A single short pressing of the  key will set a new switching point at the previously displayed preset value, e.g. 100. Then the preset value is increased by one, e.g. to 101. A short pressing of the  key will lower the preset value, e.g. 100, by 1 and then delete the switching point 99. The new deactivation point is then 99. A further pressing of the  key brings you back to the 'Output selection' mode 

6.4.7. Leaving cam programming

No matter in which programming mode you are, you can always leave cam programming by pressing the  key. The standard display appears  .













6.4.8. Examples for cam programming in the programming mode "0"


6.4.8.1. Programming the first cam


Task:

After a complete deletion of the program memory and a successful initialization of the system, a cam shall be programmed in program 0 for output 2 from 100 to 200.



Solution:

1. Press the  key (for about 2 sec.), until you enter the 'Program selection' mode: P A 0.
2. Press the  key (for about 2 sec.), you enter the 'Output selection' mode | 0 _ _ _ .
3. Press the  key to select output 2, 2 0 _ _ _ .
4. Press the  key, you enter the 'Cam search' mode 2 0 _ _ _ .
5. Press the  key, for the input of the preselection 2 0 1 1 | .
6. Press the  key and keep it pressed until 2 0 1 1 | 0 0 is displayed.
7. If you have released the  key too early or too late, you can adjust the preselection to 100 with the  or the  key.
8. Press the  key, the activation point is displayed.
9. Press the  key to program the deactivation point.
10. Press the  key and keep it pressed until the display shows 2 0 2 0 0 .

CAUTION! Do not keep the key pressed too long. It is best to keep the  key pressed until 190 and then adjust to 200 step by step.

11. Press the  key. You return to the standard display.

NOTE:













When programming the activation and the deactivation points you are programming "on line", i.e. if you keep the  key pressed for too long, the cam will be programmed too long. Although you can correct this subsequently with the  key, the range between the desired end of the cam and cams entered in excess is erased. All cams already programmed in this range are lost.


6.4.8.2. Programming additional cams on an output


Task:

A cam shall be programmed in program 0, on output 2 from 300 to 330 in addition to an already existing cam, e.g. from 100 to 200.



Solution:

1. Press the  key (for about 2 sec.), until you enter the 'Program selection' mode: P A 0.
2. Press the  key (for about 2 sec.), you enter the 'Output selection' mode | 0 _ _ _.
3. Press the  key to select output 2, 2 0. | 0 0. The display also shows the begin of the already programmed cam.
4. Press the  key, you enter the 'Cam search' mode 2 n | 0 0.
5. Press the  key for the input of the preselection 2 | | | 0 0.
6. Press the  key and keep it pressed until 2 | | 3 0 0 appears on the display.
7. If you have released the  key too early or too late, you can adjust the preselection to 300 with the  or the  key.
8. Press the  key, the activation point is displayed.
9. Press the  key to program the deactivation point.
10. Press the  key and keep it pressed until 2 L 3 3 0 is displayed.

CAUTION! Do not keep the key pressed too long. It is best to keep the  key pressed until 320 and then adjust to 330 step by step.

11. Press the  key. You return to the standard display.

NOTE:









When programming the activation and the deactivation points you are programming "on line", i.e. if you keep the  key pressed for too long, the cam will be programmed too long. Although you can correct this subsequently with the  key, the range between the desired end of the cam and cams entered in excess is erased. All cams already programmed in this range are lost.


6.4.8.3. Deletion of a particular cam


Task:

You want to delete the cam from 300 to 330 in program 0, on output 2.

Solution:

1. Press the  key (for about 2 sec.), until you enter the 'Program selection' mode: P A 0.
2. Press the  key (for about 2 sec.), you enter the 'Output selection' mode | 0 _ _ _.
3. Press the  key to select output 2, 2 0 1 0 0. The start of the first cam found is displayed.
4. Press the  key, you enter the 'Cam search' mode 2 0 1 0 0.
5. Press the  key, the device searches for the start of the next cam. 2 0 3 0 0 is displayed.
6. Press the  key. The preselection 2 0 3 0 0 is displayed.
7. Press the  key to program the activation point. The display shows 2 0 3 0 0.
8. Press the  key and keep it pressed until the display shows 2 0 3 3 0.

CAUTION! Do not keep the key pressed too long. It is best to keep the  key pressed until 320 and then adjust to 330 step by step.

9. Press the  key. You return to the standard display.


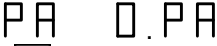



NOTE:

By shifting the cam activation point to the cam deactivation point the programmed cam is deleted. By shifting the activation point beyond the deactivation point deletes the range after the cam (e.g. from 330 to 350). All cams programmed in this range are deleted. A new cam will be placed between 330 and 350 when you move the activation point back to the desired position of 330 !





6.5. Cam programming in programming mode "1"

6.5.1. Selecting a program






The cam programming and the program selection are initiated as follows:



Press the  for, about 2 seconds, until the display shows e.g.:  means that e.g. program 0 is currently selected. By pressing the  or the  key, you have the possibility to select a program of 0 to 7. When the desired program number is adjusted, you can exit the 'Cam programming' mode by pressing the  key.

6.5.2. Selecting an output







If you press the  key during program selection, you enter the mode of the cam programming. The display shows e.g. . This indicates that no cam has been programmed on output 1 in the 'Output selection' mode. By pressing the  key or the  key you can now select the output on which you want to program cams.





6.5.3. Shifting the activation point

By pressing the  key you leave the 'Output selection' mode  and enter the 'Activation point' mode . A pressing of the  key or the  key shifts the activation point by one step. This is done according to the following system:



A short single pressing of the  key will erase the activation point at the previously displayed preset value, e.g. 100, and then the preset value is increased by 1, e.g. to 101. A short pressing of the  key will lower the preset value (100 in our example) by 1 and then set a new activation point at e.g. 99.

6.5.4. Shifting the deactivation point

Pressing the  key once more leads you from the 'Activation point' mode  into the 'Deactivation point' mode . CamCon will first search for the deactivation point of the current cam (e.g.: ). By pressing the  or the  key the deactivation point is shifted by one step. This is done according to the following system:

A single short pressing of the  key will set a new switching point at the previously displayed preset value, e.g. 100. Then the preset value is increased by one, e.g. to 101. A short pressing of the  key will lower the preset value, e.g. 100, by 1 and then delete the switching point 99. The new deactivation point is then 99. A further pressing of the  key brings you back to the 'Output selection' mode .

6.5.5. Leaving cam programming

No matter in which programming mode you are, you can always leave cam programming by pressing the **F** key. The standard display appears  .


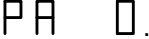

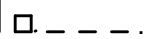

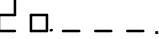

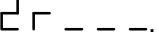

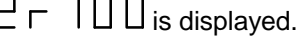





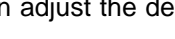



6.5.6. Examples for cam programming in the programming mode "1"

6.5.6.1. Cam programming

Task:

After a complete deletion of the program memory and a successful initialization of the system, a cam shall be programmed in program 0 for output 2 from 100 to 200.

Solution:


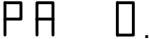

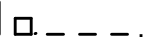





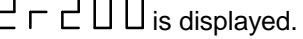



1. Press the  key (for about 2 sec.), until you enter the 'Program selection' mode: .
2. Press the  key (for about 2 sec.), you enter the 'Output selection' mode .
3. Press the  key to select output 2, .
4. Press the  key for the programming of the activation point .
5. Press the  key and keep it pressed until  is displayed.
6. If you released the  key too early or too late, you can adjust the preselection to 100 with the  or the  key.
7. Press the  key to program the deactivation point.
8. Press the  key and keep it pressed until the display shows .
9. If you have released the  key too early or too late, you can adjust the deactivation point to 200 with the  or the  key.
10. Press the **F** key. You return to the standard display.

6.5.6.2. Deletion of cams

Task:

You want to delete the cam 100 to 200 on output 2 in program 0.

Solution:

1. Press the  key (for about 2 sec.), until you enter the 'Program selection' mode: .
2. Press the  key (for about 2 sec.), you enter the 'Output selection' mode .
3. Press the  key to select output 2, . The start of the found cam is displayed.
4. Press the  key to program the activation point. The display shows .
5. Press the  key and keep it pressed until  is displayed.
6. If you released the  key too early, shift the deactivation point to 200 by repeatedly pressing the  key. If you released the  key too late, do not correct it ! The cam is then already erased. Shifting the activation point backwards programs a new cam in consequence. This cam should be deleted.
7. Press the **F** key. You return to the standard display.

7. Outline of operations

7.1. Switching the standard display

		2	3	3	
Press the + key shortly		P	2	3	5
Press the - key shortly		2	3	3	

Display of program and speed display (min⁻¹)

Position display

Display of program and speed display (min⁻¹)

7.2. Programming the system constants

		2	3	3	
Press the - key shortly		2	3	3	
Press the - key shortly		2	3	3	
Press the - key shortly		2	3	3	
Press the - key shortly		2	3	3	
Press the + key shortly		P	2	3	5
Press the + key shortly		P	2	3	5
Press the + key shortly		P	2	3	5
Press the + key shortly		P	2	3	5
Press the F key about 2 sec.		0	3	6	0
Press the F key shortly		r	1	0	0
Press the F key shortly		0	1	2	3
Press the F key shortly		P	r	0	
Press the F key shortly		2	3	3	

Display of program and speed display (min⁻¹)

User key for system constants

User key for system constants

User key for system constants

User key for system constants

User key for system constants

User key for system constants

User key for system constants

User key for system constants

Encoder resolution

Encoder F/R switching

Zero point correction

Cam programming mode

Display of program and speed display (min⁻¹)

7.3. Dead time programming

		2	3	3	
Press the F key about 2 sec.		0	1	0	
Press the F key shortly		0	2	0	
...					
Press the □ key shortly		2	3	3	

Display of program and speed display (min⁻¹)

Dead time compensation for Output 1

Go to Output 2

Display of program and speed display (min⁻¹)
You return to the standard display.

7.4. Cam programming

		2	3	3	
Press the □ key about 2 sec.		P	A	0	
Press the □ key shortly		1	0	0	
Press the □ key shortly		1	0	0	
Press the □ key shortly		1	1	0	
Press the □ key shortly		1	r	0	
Press the □ key shortly		1	L	2	0
Press the □ key shortly		1	0	0	
Press the + key shortly		2	0	3	0
Press the F key shortly		2	3	3	

Display of program and speed (min⁻¹)

Program selection

Selecting an output

Searching for cam activation point (only in mode "0")

Enter position of preselection (only in mode "0")

Shifting the activation point

Searching for and shifting the deactivation point

Selecting an output

Selecting the next output

Display of program and speed display (min⁻¹)

8. watch doc

The CamCon deactivates all output within 1ms when an error occurs. This behavior can be used as an extreme error message. Program a cam over the whole range of a chosen output (0 to 360 degrees) (security cam). This output should be slaved into the emergency deactivation circuit. To be able to program a security cam over the whole range.

After the security cam has been programmed, the display shows e.g.: $\square \square \square \square \square \square \square \square$.

9. Troubleshooting

Problem:

The display remains dark after activation.

Solution:

The wiring is probably not correct. Check the wiring.

Problem:

The display shows: $I - E \square \square$.

Solution:

Either the encoder is connected incorrectly or not at all, or the encoder resolution of the connected encoder does not coincide with the input encoder resolution. Check the wiring to the encoder or the input of the encoder resolution. When the error is corrected, press any key to clear the error message of the display.

Problem:

The display shows: $A - E \square \square$.

Solution:

Your outputs are overloaded or have short circuited. Check the wiring and the connected power as well as any inductive loads, that are operated without a free wheel or a deletion unit. An output can supply up to 500mA of current. When the error is corrected, press any key to clear the error message of the display.



Caution:

Infavourable cable routing can lead to the deactivation of the outputs, since it builds up a potential that is redirected into the outputs at the closing of a contact. With induced loads the outputs have to be switched with a freewheeling diode. Covers or inductivities very close to the device inside the switchboard have to be switched with a deletion unit as do those that are wired to or influence the wiring of the device.

10. Technical data of the CamCon

Multifunctional display for programming	7-segment, 5-digits, 13mm
Number of outputs	16
State display of the outputs.....	a red LED each
Number of programable cams	500
Number of programs.....	8
Cycle time, (switching speed)	1ms
Dead time compensation (DTC)	for each output
Range of the DTC.....	0 to 255ms
Exactness of the DTC.....	+0 to -1 step
Encoder input.....	synchronous serial (SSI), gray coded
Encoder type.....	AAG60007
Encoder resolution.....	360 steps / rotation
Zero point correction	electronical adjustment inside CamCon
Rotatory direction of the encoder.....	is programmed by CamCon
Length of the connecting cable between encoder and CamCon	200m
Data security/memory	EEPROM
Supply voltage.....	24V DC \pm 20%
Encoder supply voltage.....	with 24V DC over supply voltage of CamCon
Current reception	200mA without encoder and outputs
Output current.....	500mA, short circuit proof permanent current (see 4.3. The outputs)
Output voltage.....	24V DC, pluse switching

Connections for:

Encoder.....	through plug block clips
Voltage supply.....	through plug block clips
Cam outputs	through plug block clips
Operating temperature.....	0°C to +55°C

Cover type for:

Front plate / full sight gate.....	IP 67 / IP 55
Cabinet.....	IP 40
Dimensions	see fig. on page 10
Front plate part.....	138 x 138mm + 1
Cabinet (switch plate cabinet by DIN 43700).....	144 x 144 x 63mm (WxHxD)
Cover of the front plate	Full sight gate, can be locked with security key
PC - connection	with PC30 Software package
Weight.....	about 600g

11. Keyword table

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