

8. Outline of operations









8.1. Switching the standard display

Press the **+** key | - || Display of the output channels I-X























8.2. Initialising the system registers

		33	Standard display position/speed (min ⁻¹)
Press the - key 4 times		33	User key for system registers
Press the + key 4 times		-	User key for system registers
Hold the F key (2 sec).	S.	360	Encoder resolution physically
Press the F key	G.	360	Encoder resolution desired.
Press the F key	h y.	0	Actual position hysteresis
Press the F key		0	Measuring system control
Press the F key	r c h	0	Encoder rotation direction change
Press the F key	0	123	Zero point correctionr
Press the F key	0.	166	Speed factor
Press the F key		1000	Range adjustment of the speed display
Press the F key		1000'	Accuracy of the speed display
Press the F key	d A u t	0	Display type
Press the F key	d E.	0	Input of the display change
Press the F key	L	30	Encoder cable length of the SSI interface
Press the F key		04.	Preset Cycle time
Press the F key	E	8	Number of inputs
Press the F key	A	32	Number of outputs
Press the F key	t A	24	Number of outputs with speed compensation
Press the F key	r L	0	Input of the keyboard lock
Press the F key	E 9.	0	Input for error reset
Press the F key	E I.	0	Enable input for the outputs
Press the F key		128	Number of inputs for external program selection
Press the F key	E	1	Take-over input for external program selection
Press the F key	P.	0	Value for actual position preset
Press the F key	P E.	0	Input for triggering the actual position preset
Press the F key	P r y. r A		Storage of the actual position preset
Press the F key	S I	0	Security output (Cycle cam)
Press the F key	r	0	Rotation direction output
Press the F key	0	0	Standstill output
Press the F key		04 y	Speed hysteresis
Press the F key	[- b u s		Communication protocol of the serial interface
Press the F key	G n r.	10	Unit number
Press the F key	P t y P	0	Programming mode
Press the F key	A A u s.	1	Analog output (software version V38)
Press the F key	A =	0	Return to standard display









































8.3. Delay time programming

Press the  key (about 2 sec.)		Standard display
Press the  key shortly		speed compensation for output 1
Press the  key shortly		Switch forward to output 2
Press the  key shortly		Return to standard display

8.4. Cam programming

Press the  key (about 2 sec.)		Standard display
Press the  key shortly		Program selection
Press the  key shortly only)		Output selection
Press the  key shortly		Searching for cam activation point (Mode 0 only)
Press the  key shortly		Enter preset position (Mode 0 only)
Press the  key shortly		Shifting the activation point
Press the  key shortly point		Searching for and shifting the deactivation
Press the  key shortly		Output selection
Press the  key shortly		Select next output
Press the  key shortly		Select previous output
Press the  key shortly		Return to the standard display

8.5. Display the unit configuration

Hold the  key (2 sec)	33	Standard display (position/speed)
Press the  key	10.0 1.4	Software version (Date 10.01.94 or 04)
Press the  key	F. 148	Number of free cams
Press the  key	E. 999	Maximum speed compensation in ms
Press the  key	r. 32H	RAM size in kByte
Press the  key	S. 2H	Size of serial EPROM in kByte
Press the  key	E. 0H	Size of parallel EEPROM in kByte
Press the  key	S. 360	Encoder resolution physically
Press the  key	G. 360	Encoder resolution desired.
Press the  key	h4. 0	Actual position hysteresis
Press the  key	!! 0	Measuring system control
Press the  key	r 1 c h 0	Encoder Rotation direction change
Press the  key	!! 0.166	Speed factor
Press the  key	1000	Range adjustment of the speed display
Press the  key	1.00%	Accuracy of the speed display
Press the  key	dA u t 0	Display type
Press the  key	dE. 0	Input of the display change
Press the  key	L 30	Encoder cable length of the SSI interface
Press the  key	182H	Cycle time in μ s
Press the  key	E 8	Number of inputs
Press the  key	A 32	Number of outputs
Press the  key	E A 24	Number of outputs with speed compensation
Press the  key	r L 0	Input for the keyboard lock
Press the  key	E 9. 0	Input for error reset
Press the  key	E I. 0	Enable input for the outputs
Press the  key	!! 128	Number of inputs for external program selection
Press the  key	!! E 1	Take-over input for external program selection
Press the  key	P. 0	Value for the actual position preset
Press the  key	P E. 0	Input for triggering the actual position preset
Press the  key	P r 4. r A	Storage of the actual position preset
Press the  key	S I 0	Security output (Cycle cam)
Press the  key	!! r 0	Rotation direction output
Press the  key	!! 0 0	Standstill output
Press the  key	0 H 4	Speed hysteresis
Press the  key	C - b u s	Communication protocol of the serial interface
Press the  key	G n r. 10	Unit number
Press the  key	o P. 0	Options
Press the  key	P E y P 0	Programming mode
Press the  key	A A u s. 1	Analog output
Press the  key	33	Return to standard display

9. Troubleshooting

...

9.1. Problem: The display remains dark after activation

Possible cause:

The wiring is probably not correct.

Solution:


Check the wiring.

9.2. Problem: The display shows: EE.Err

Possible cause:

The EEPROM's data was erased or damaged by malfunctions. One of the present data storage medias (EEPROM or EPROM) was renewed or is defect.

Solution:


By pressing the  key, all data is erased. During the deletion process the display shows CLEAR. Please contact your customer's service.

9.3. Problem: The display shows: I.Err 1

Possible cause:

The encoder is connected incorrectly.

Solution:


Check the wiring to the encoder, concerning the manual. When the error is corrected, press the  key to clear the error message.

9.4. Problem: The display shows: I.Err 2

Possible cause:

The encoder is not connected or connected incorrectly

Solution:


Check the wiring to the encoder or the input of the encoders resolution. Regard also the encoder's manual. When the error is corrected, press the  key to clear the error message.

9.5. Problem: The display shows: I.Err 3

Possible cause:

The encoder resolution of the connected encoder is not the encoder resolution set at the device.

Solution:


Check the input of the encoder resolution and the set cable length. Regard also the encoder's manual. When the error is corrected, press the  key to clear the error message.

9.6. Problem: The display shows: I.Err 5

Possible cause:

Measuring system control has triggered. The CamCon detected an inadmissible step of the actual value. The measuring system is possibly wrong.

Solution:

Test the input of the measuring system's preset and the set cable length, or increase the admissible actual value steps. See also chapter "7.1.5. Measuring system control" on page 24 and regard the measuring system's manual. When the error is corrected, press the  key to clear the error message.

9.7. Problem: An error happens during operation.


The display shows: I.Err 1, I.Err 2, I.Err 3 or I.Err 5.

Possible cause:

The encoder's connection cable or the encoder itself is defect. A cable without shielding or twin wiring was used. Also the position of the connection cable, e.g. next to a strong electro-magnetic interference point (e.g. high-voltage cable, motor-cable) can cause an I-Error.

Solution:

Check the encoder's wiring or the change the encoder device. Build up covers or lay the connection-cable elsewhere. Please also regard the encoders manual.

When the error is corrected, press the  key to clear the error message.

9.8. Problem : The display shows: A-Err

Possible cause:

Your outputs are overloaded or have short circuited. Check the wiring and connected power, as well as possible inductive loads that are operated without a free wheel or a deletion unit.

The number of entered inputs is not correct.


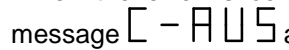
At an external interface module (e.g. DC91/IO or DC16/IO) the power supply failed.

Solution:

Check the wiring and the connection-cable as well as possible inductive loads, which are run without a free wheel or a deletion unit.

See chapter 4.3. The outputs on page 17.

See chapter 7.1.14. Number of inputs on page 27.

When the error is corrected, press the  key to clear the error message. During this time the message  appears for a short time. CamCon tries to reset the outputs during this time.

Attention: *Unfavourable 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.*



9.9. Problem: Outputs do not react

Possible cause:

An error message is displayed.

No power supply is connected to the outputs.

The enable input is not active.

The control - inputs of the CamCon are locked by an S5 or an S5L1 respective 3964r interface.

Solution:

Check the displayed error-message.

Connect the power supply.

Enable the Outputs with the enable input, see also chapter 7.1.19. Enable input on page 27

Un-lock the control-inputs.

See also the S5-L1-coupling's manual.

9.10. Problem : The display shows: t1.Err

Possible cause:

Every change in the system setting influences the available memory. Your changes of the system parameters (e.g. increasing the encoder resolution) have shifted an already programmed speed compensation above the memory range. At every further pressing of a key, the display shows output numbers concerned.

Solution:

This error can be recovered by changing the corresponding speed compensation or increasing the cycle time.

Please also regard chapter 11. Calculation the RAM storage-requirement for on page 45.

9.11. Problem : The display shows: E.Full

Possible cause:

Too little memory in the EEPROM available for cam programming

Solution:

Please contact your customer service. Also, read the chapter 10. Calculation EEPROM cam storage on page 44.

10. Calculation EEPROM cam storage

In the CamCon you have the opportunity to extend the **EEPROM** Cam storage. The storage space required for programming is influenced by the following factors:

1. Basic requirement	= 256 Bytes
2. Per cam	= 12 Bytes
3. Per set delay time for Speed Compensation	= 12 Bytes
4. Per name for an output	= 24 Bytes
5. Per set key / code	= 66 Bytes
6. For a special measuring system	= 66 Bytes
7. For direct or "actual" program selection	= 12 Bytes
8. Per set program name	= 48 Bytes
9. Per line of the OP function	= 72 Bytes

The value is generated by the CamCon with the following formula:

Storage requirements in Bytes	=	Basic needs
	+	Number of cams * 12
	+	Number of delay times for Speed Compensation * 12
	+	Number of output names * 24
	+	Number of user keys * 66
	+	66 when the special measuring system is available.
	+	12 when "on Pos" program selection is set.
	+	48 * number of set program names.
	+	72 * number of set lines of the OP function.

Example 1: The Cam Switch Unit is supposed to have 8 Programs each with 16 cams and Speed Compensation for 16 outputs.

Storage requirement in Bytes = 256 Bytes + (8 Programs * 16 * 12 Bytes) + (16 * 12 Bytes)

Storage requirement = 1984 Bytes

Example 2: The Cam Switch Unit is supposed to have 20 programs each with 16 cams and 16 delay times for Speed Compensation.

Storage requirement in Bytes	=	256 Bytes
	+	(20 Programs * 16 * 12 Bytes)
	+	(16 TZK * 12 Bytes)
	+	(16 Output names * 24 Bytes)
	+	(1 User keys * 66 Bytes)

Storage requirement = 4738 Bytes

Warning: Through alterations in the storage structure of the CamCon software, the extent to which storage capacity is used up can differ from software version to software version!

11. Calculation the RAM storage-requirement for CamCon

The required **RAM**-main storage (not similar to the constant value - Camstorage or the EEPROM) depends on 7 factors:

- | | |
|---|--|
| 1. Standard consumption | (approximately 100000 Byte) |
| 2. Number of outputs | (8 to 200 in steps of 8 outputs). |
| 3. Cycle time | (displayed in milliseconds). |
| 4. Actual value/measuring system resolution | (displayed in impulses) |
| 5. Maximal Speed-compensation | (0 to 9999.9 in steps of 100 microseconds). |
| 6. Mode of program selection | (the double amount of storage is required).
(See also chapter "7.4.1. Program selection" on page 36). |
| 7. Size of the EE-Prom storage | (EE-Prom - storage size in Byte for Cache). |

The RAM - storage requirement is calculated by the following formula:

$$\text{storage requirement in Bytes} = \text{standard consumption} + \frac{\text{Number of outputs} * \text{Actual value resolution} * (2 \text{ If program Mode not slow})}{8} + \frac{\text{max. delay-time} * 4}{\text{cycletime}} + \text{EE-Prom size}$$

Example 1: The camswitch with a resolution of 360°, an EE-Promstorage of 32kByte, 16 outputs, a speed-compensation of 1000ms and a cycletime of 250µs needs:

$$\text{Storage requirement in Bytes} = 100000 + \frac{16 * 360}{8} + \frac{1000 * 4}{0.250} + 32768$$

$$\text{Storage requirement in Bytes} = 100000 + 720 + 16000 + 32768$$

$$\text{Storage requirement in Bytes} = 149488 = \text{ca. } 150\text{kByte}$$

Example 2: The camswitch with a resolution of 8192°, an EE-Promstorage of 48kByte, 64 outputs, a speed-compensation of 500ms and a cycletime of 250µs, needs:

$$\text{Storage requirement in Bytes} = 100000 + \frac{64 * 8182}{8} + \frac{500 * 4}{0.250} + 49152$$

$$\text{Storage requirement in Bytes} = 100000 + 65536 + 8000 + 49152$$

$$\text{Storage requirement in Bytes} = 222688 = \text{ca. } 220\text{kByte}$$

Note: If the required RAM - storage requirement greater than the CamCons total amount of storage, you need to reduce the measuring system's resolution.

Attention: Changings in the storage-structure of the CamCon software the storage requirement can alternate at different software-versions!

12. Technical data

Multi functional display for programming	7- segment, 5 digits, 13mm
Number of outputs	8, 16, 24, 32.
Analog output	for speed display (optional).
Display of the output states.....	one LED for each of 16 outputs, can be switched to another 16 outputs
Number of programmable cams	150, optionally 600, 2500, 3700 or 10500, as per size of the EEPROM
Number of programs.....	999
Cycle time (switching speed)	from 100µs on, is adjusted according to the needs (optimized)
Dead time compensation (DTC)	can be adjusted separately for each output
Adjustment range of the DTC	0 up to 999ms, differs with encoder type and memory
Accuracy of the DTC.....	+0 to -1 steps
Encoder input.....	synchronous serial (SSI), parallel data input, gray coded
Measuring system SSI	AAG6007 (standard) AAG612-2048, AAG612-4096, AAG612-8192, AAG626 oder AAG66107.
Zero point correction	electronic adjustment by CamCon
Rotation direction of the encoder	is programmed by CamCon
Length of the connection cable	
between the encoder and CamCon	300 m
Data security / storage	EEPROM
Supply voltage.....	24V DC ± 20 %
Encoder supply	24V DC through the supply voltage of the CamCon
Current absorption	300mA without encoder and outputs
Output voltage.....	+24V DC, plus-switching
Output current	500mA per output, short circuit proof permanent current (see chapter 4.3. The outputs)
Connections for:	
Encoder.....	through plug block pins
Voltage supply.....	through plug block pins
Cam outputs	through plug block pins
Operating temperature.....	0°C to +55°C
Cover type for:	
Front plate / full sight gate.....	IP 67 / IP 55
Cabinet.....	IP 54
Dimensions	see fig. page 12
Front gate part	138 ⁺¹ x 138 ⁺¹ mm
Cabinet (switch plate cabinet by DIN 43700).....	144 x 144 x 63mm (WxHxD)
Cover of front plate	Full-sight gate, can be locked with security key(optional).
Weight.....	about 1000g

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