1. Standard display

Actual position display = 311 = 311 or Speed display = 45 = 45 rot.
or error message = A-Err = Output-Error or error message = Err3 = Pos-Error.
All entries are derrived from this display.

2. Zero point and rotation direction adjustment

Based on the standard display

1. set the machine to mechanical zero, regarding the rotation direction of CamCon.
2. press the [−] 4 times and then the [+] key 4 times also.
3. press [F] and hold the key until S 360 with 360° encoder or e.g. S2048 with 2048 imp. encoder or e.g. n 14 with a multiturn encoder is displayed.
4. press the [F] 4 times, rIchO appears. Change the rotation direction with keys [+] or [−].
5. press the [F] key, the display shows 0 123. Set the number after the 0 (123) to 0 0 0, using the [+] or [−] key.
6. exit the menu by pressing the [⎍] key.

3. Cam- and Curve programming

Based on the standard display

1. press the [⎍] key, PA 0 appears. Hold the key until the points vanish PA 0.
2. select a program (product) unisng keys [+] and [−] , e.g. PA 3 = Program 3.
3. press the [⎍] key, Io - - - is displayed, if no cams have been programmed, or e.g. Io 50, if a cam begins at 50 on output 1.
4. use the keys [+] and [−] to select a desired output (curve). See also chapter "7. Ausgangs - bzw. Kurvensymbole".
5. press the [⎍] key 3 times, Ir 0 is displayed or e.g. Ir 50.
6. enter a desired activation point, using the [+] key e.g. Ir 50.
7. then press [⎍] , the display shows IL 50.
8. select the deactivation point with the [+] key IL 80.
9. Press the [⎍] key, Io 50 is displayed.
10. Do you want to program another cam on output 1 ?
11. **NO** then press the [F] key to exit the menu or to select another output. To program another output, start again at point 4.
12. **YES** then press the [⎍] key 2 times, Ii 50 appears on the display.
13. select an additional activation point with the [+] key e.g. Ii 90 and
14. Press the [⎍] key 2 times, the display shows IL 90.
15. select an additional deactivation point with the [+] key e.g. IL 130.
16. Press the [⎍] key, Io 50 is displayed.
17. Do you want to program another cam on output 1 ?
18. **YES** start again at step 12.
19. **NO** then press the [F] key to exit the menu or to select another output. To program another output, start again at point 4.

Note: You can exit the menu any time using the [F] key.

4. Editing Cams and Curves

Based on the standard display

1. press the [⎍] key, [PA 0] appears. Hold the key until the points vanish [PA 0].
2. select a program (product) with keys [+] and [−] e.g. [PA 3] = Program 3.
3. press key [⎍], e.g. [Io 50] is displayed.
4. using keys [+] and [−], select a desired output (curve). See also chapter "7. Ausgangs - bzw. Kurvensymbole".
5. press the [⎍] key, e.g. [In 50] appears.
6. use [+] to search for the activation point of the desired cam e.g. [In 90].
7. press the [⎍] key 2 times, [Ir 90] is displayed.
8. change the activation point with keys [+] and [−] [Ir 95].
9. press [⎍], the deactivation point of the cam appears [IL 130].
10. use [+] and [−] to change the deactivation point [IL 135].
11. press the [⎍] key, [Io 50] is displayed.

Note: You can exit the menu any time using the [F] key.

5. Deleting Cams and Curves

Based on the standard display

1. press the [⎍] key, [PA 0] appears. Hold the key until the points vanish [PA 0].
2. using keys [+] and [−], select a program (product), e.g. [PA 3] = Program 3.
3. press the [⎍] key, e.g. [Io 50] appears.
4. use [+] and [−] to select a desired output (curve). See also chapter "7. Ausgangs - bzw. Kurvensymbole".
5. press the [⎍] key, e.g. [In 50] is displayed.
6. use the [+] key to search for the desired cam e.g. [In 90].
7. then press [⎍] 2 times, the display shows [Ir 90] = Activation Point.
8. press the [⎍] key, the deactivation point of the cam is displayed [IL 130].
9. change the **deactivation point** of the cam to the value of the cam's activation point with the [−] key [IL 90]. This deletes the cam.
10. press the [⎍] key, if all cams were deleted, the display shows [Io ___] otherwise it shows the activation point of the first cam [Io 50].

Note: You can exit the menu any time using the [F] key.

6. Dead time compensation adjustment

Based on the standard display

1. press the [F] key and hold the key until [It 0] appears. Deadtime for output 1 = 0 ms.
2. set to a desired dead time using keys [+] and [−] or
3. press [F] to select the desired output (curve) and then
4. enter the desired dead time with the keys [+] and [−].

Note: You can exit the menu any time using the [⎍] key.

7. Output and curve symbols

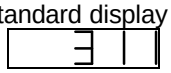
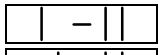
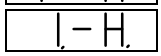
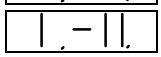
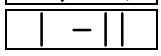
Output No. 1	1	= 1 _____	Output No. 33	1	= 1 Point _____
Output No. 2	2	= 2 _____	Output No. 34	2	= 2 Point _____
Output No. 3	3	= 3 _____	Output No. 35	3	= 3 Point _____
Output No. 4	4	= 4 _____	Output No. 36	4	= 4 Point _____
Output No. 5	5	= 5 _____	Output No. 37	5	= 5 Point _____
Output No. 6	6	= 6 _____	Output No. 38	6	= 6 Point _____
Output No. 7	7	= 7 _____	Output No. 39	7	= 7 Point _____
Output No. 8	8	= 8 _____	Output No. 40	8	= 8 Point _____
Output No. 9	A	= A _____	Output No. 41	A	= A Point _____
Output No. 10	b	= B _____	Output No. 42	b	= B Point _____
Output No. 11	C	= C _____	Output No. 43	C	= C Point _____
Output No. 12	d	= D _____	Output No. 44	d	= D Point _____
Output No. 13	E	= E _____	Output No. 45	E	= E Point _____
Output No. 14	F	= F _____	Output No. 46	F	= F Point _____
Output No. 15	G	= G _____	Output No. 47	G	= G Point _____
Output No. 16	H	= H _____	Output No. 48	H	= H Point _____
Output No. 17	I	= I _____	Output No. 49	I	= I Point _____
Output No. 18	J	= J _____	Output No. 50	J	= J Point _____
Output No. 19	K	= K _____	Output No. 51	K	= K Point _____
Output No. 20	L	= L _____	Output No. 52	L	= L Point _____
Output No. 21	n	= M _____	Output No. 53	n	= M Point _____
Output No. 22	N	= N _____	Output No. 54	N	= N Point _____
Output No. 23	o	= O _____	Output No. 55	o	= O Point _____
Output No. 24	P	= P _____	Output No. 56	P	= P Point _____
Output No. 25	q	= Q _____	Output No. 57	q	= Q Point _____
Output No. 26	r	= R _____	Output No. 58	r	= R Point _____
Output No. 27	S	= S _____	Output No. 59	S	= S Point _____
Output No. 28	T	= T _____	Output No. 60	T	= T Point _____
Output No. 29	U	= U _____	Output No. 61	U	= U Point _____
Output No. 30	v	= V _____	Output No. 62	v	= V Point _____
Output No. 31	w	= W _____	Output No. 63	w	= W Point _____
Output No. 32	X	= X _____	Output No. 64	X	= X Point _____

8. General sysmbols for cam and dead time programming

PA = Program number, o = Output number, ni = New cam input, n = Cam search mode, r = Cam activation point, L = Cam deactivation point, t = Dead time value.

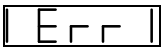
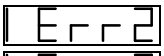
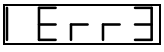
9. Output display

Based on the standard display

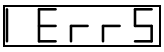
1. no key pressed  = Display for output channels 1 - 16 = 1 - H.
2. [+] Taste festhalten  = Display for output channels 17 - 32 = I - X.
3. [+] Taste festhalten  = Display for output channels 33 - 48 = 1 Point - H Point.
4. [+] Taste festhalten  = Display for output channels 49 - 64 = I Point - X Point.
5. [+] Taste festhalten  = return to point 2.

10. Error messages

After activation the display shows  = EE-Prom error.
The data of the EE-Prom (cam memory) were changed by a disturbance or the EE-Prom has a hardware error. By pressing the [F] key, all data is deleted and has to be reentered.

Display shows  = Pos-Error 1.
Display shows  = Pos-Error 2.
Display shows  = Pos-Error 3.

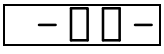
The resolution of the connected measuring system does not comply with the resolution set on the CamCon. The connection cable of the measuring system or the measuring system itself has a fault. The cable used does not have propper mantling. If the connection cable lies near a strong electro-magnetic emitting source (e.g. power current cable, motor cable), it can also result in a Pos - Error (Actual position error). When the problem is taken care of, you can delete the error message simply by pressing the [-] key.

Display shows  = Pos-Error 5.

The measuring system has a fault. Exhange the measuring system.

Display shows  = Out-Error.

Your outputs are overloaded or have short-circuited. Check the wiring and the connected power sources as well as possible inductive loads that are operated without a free wheel or deletion unit. The number of entered inputs may not be correct. A current loss has occurred at an external interface module DC16/IO. When the problem is taken care of, you can delete the error message simply by pressing the [-] key.

Display shows  = no contact to the CamCon DC16.

Check the wiring and the configuration of the serial interface.

11. Checking the software versioni

Based on the standard display

1. press the [−] key and hold the key until [09 10 98] appears = Date 9.10.1998.
   Exit this display with the [⎍] key.

Note: If the date of the software is not that of the 9.10.1998, the order of the system registers can be different.

12. Complete deletion

Based on the standard display

1. press the [−] key 4 times and then the [+] key also 4 times.
2. press the [F] key, and hold it down until the display shows [S 360] with a 360° encoder or e.g. [S2048] with a 2048 imp. encoder or e.g. [n 1=4] with a multiturn encoder.
3. press the [⎍] key, and hold it down until [CLEAr] appears. After a few seconds, the standard display reappears and the device is then ready for new data input.

13. System register adjustment

Based on the standard display

1. Press the [−] key 4 times and then the [+] key also 4 times. set value

Note: Changes of the system registers are made using keys [+] and [−] . You can leave the menu at anytime by pressing the [⎍] key.

2. press [F] , and hold it pressed until the display shows [S 360] = encoder resolution _____
   possible values are: "S.256", "S.360", ..., up to "S.8192" = SSI - Singelturn encoder or "M. 1=4"., "M. 2=4"., ..., up to "M.64=8" = SSI - Multiturn encoder 4096 x 4096.
   [n 1=4] = "M. 1=4" stands for 1 rotation of the generator = 4096 impulses or "M.64=8" stands for 64 rotations of the generator = 4096 impulses.

3. press the [F] key [G. 360] = desired encoder resolution (electronic gear) _____
   possible values: 256 up to 9999. To recalculate the display of the encoder to e.g. millimeters.

4. press the [F] key [hy. 0] = Actual pos. hystersesis _____
   possible values: 0 to 125, but should always be set to 0. Used for dampening the vibrations of the encoder.

5. press the [F] key [=. 0] = encoder control (initiates Pos-Error 5) _____
   possible values: 0 to 9999. 0 = deactivated. Allowed impulses of the encoder per cycle of the cam controller. Creates Pos-Error 5 upon a jump of the actual position (helps with the error search).

6. press the [F] key [rich0] = encoder rotation direction switch _____
   possible values: 0 or 1. Is used to switch the rotation direction of the encoder (0 = positive und 1 = negative).

7. press the [F] key [0 123] = registered zero point to 0 with keys [+] and [−].

8. press the [F] key [1.0.166] = speed factor _____
possible values: 0.001 to 9.999. With a 360° encoder 0.166. Is used to adjust the speed display to e.g. turns per hour.

9. press the [F] key [1000U] = Area adjustment of the speed display _____
possible values: 1 to 9999. This value should correspond with the maximum speed of the machine. Is used to adjust the speed display.

10. press the [F] key [1.001] = accuracy of the speed display _____
possible values: 0.01 to 9.99. Is used to adjust the speed display.

11. press the [F] key [dAuto] = Display type _____
possible values: Auto., Spee. or Pos. displayed value on the standard display.

12. press the [F] key [dE 0] = Input for the display change _____
possible values: 0 to the number of registered inputs. 0 = deactivated.
This helps selection of the displayed value in the standard display.

13. press the [F] key [L. 30] = encoder-cable length of the SSI interface _____
possible values: 0 to 1000. Should be no more than 300 and at least 30. Length of the cable connecting CamCon and the encoder.

14. press the [F] key [0µ] = plan cycle time in µs _____
possible values: 0 to 9999. Should always be 0. Plan cycle time is only set in special cases.

15. press the [F] key [E. 0] = number of inputs = 8 at DC16 without DC16/IO. _____
possible values: 0, 8, 16, 24, 32, 40, 48, 56 or 64. Has to correspond to the actual number of inputs. E.g. 1xDC16 and 2xDC16/IO = 1x8 + 2x16 = 40.

16. press the [F] key [A. 8] = number of outputs = 16 at DC16 without DC16/IO _____
possible values: 8, 16, 24, 32, 40, 48, 56 or 64. Has to correspond with the actual number of outputs. E.g. 1xDC16 and 2xDC16/IO = 1x16 + 2x16 = 48.

17. press the [F] key [tA. 0] = number of outputs with deadtime compensation _____
possible values: 0 to number of registered outputs. 0 = no deadtime compensation possible. Can reduce the cycle time.

18. press the [F] key [CL. 0] = input for the keyboard lock (programing disabled) _____
possible values: 0 to number of registered inputs. 0 = deactivated.
Is used to prevent programming. When registered input = 1, then programming is no longer possible.

19. press the [F] key [1 1] = number of programs (formats) for external selection _____
possible values: 1 to 512. At a value of 512, 10 inputs are needed for the external program selection.

20. press the F key IIE. 0 = receiving input for external program selection _____
possible values: 0 to number of registered inputs. 0 = deactivated. Receives the external program number upon a positive flank.

21. press the F key P. 0 = value for the position preset _____
possible values: 0 to maximum position - 1. External reset through an input (only active, if the following register is **not** 0).

22. press the F key PE. 0 = input for the activation of the position preset _____
possible values: 0 to number of registered inputs. 0 = deactivated. Sets the actual position to the position preset upon a positive flank on the input.

23. press the F key PrY.rA = storage of the position preset _____
possible values: RA = RAM or EE = EE-Prom. Stores the position preset into RAM or EE-Prom, since EE-Prom has limited writing access.

24. press the F key SI 0 = security output (rotary cam) _____
possible values: 0 to number of registered outputs . 0 = no security output. This output is always 1, if everything is OK.

25. press the F key Ir. 0 = rotation direction output _____
possible values: 0 to number of registered outputs. 0 = no rotation direction output. This output is 1 with a positive rotation and 0, if negative.

26. press the F key I0. 0 = standstill output _____
possible values: 0 to number of registered outputs. 0 = no standstill output. This output is 1 when the machine is running and 0, when the machine is stands still.

27. press the F key 0HY = speed hysteresis _____
possible values: 0 to maximum rotation. Should always be as small as possible. Is the setting of the switch level for the two previous registers.

28. press the F key nULtI = communication protocol of the serial interface (multi)
possible values: Cam-BUS, Standard, Multi, S5-L1 and 3964r. This has to be set to **"Multi"**.

Attention !: The CamCon CT10 Terminal does **not** support the modes S5-L1 and 3964R at this time. Because of this, you may not use the modes **"S5-L1"** or **"3964R"**, because they make communication to the CamCon DC16 impossible.

29. press the F key Gnr. 0 = unit number _____
possible values: 0 to 63. This has to be set to **0**.

Attention !: If the CamCon CT10 Terminal is operated without the switching of inputs, the unit number may not differ from **0**, otherwise communication to the CamCon DC16 is impossible.

30. press the F key PtYP.0 = programming mode _____
possible values: 0 or 1. Should always be set to 0. Simplifies cam programming, if you want to program just one cam per output. This instruction manual was created for programming mode 0.

14. Allocating of the system registers for printout

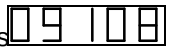
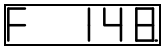
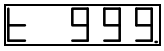
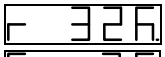
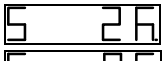
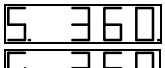
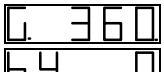
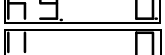
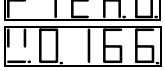
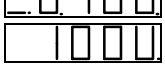
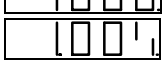
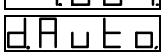
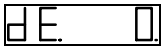
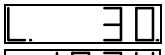
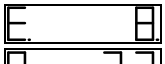
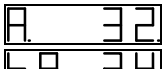
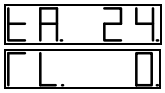
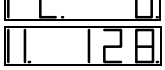
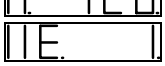
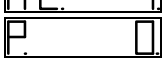
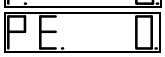
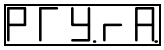
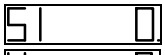
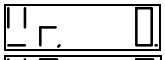
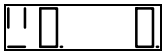
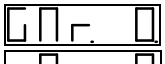
The following table corresponds with a printout of the system registers of the CamCon DC16 with the DIGISOFT V1.85 PC software. The bold numbers in brackets are the numbers of chapter "13. Systemregister eingeben" in front of the system registers.

```
|                          |                              |                          |
| S Y S T E M D A T A      | INFO: Meas. system           | INFO: Meas. system       |
|                          | SSI Singleturn      (2)      | SSI Singleturn           |
|    general text          | 360 Gray            (2)      | 360 Gray                 |
|     input only           | Meas. system:SSI    (2)      | Meas. system:SSI         |
|       possible           | Hy./Vmax:   0(4)/ 0(5)       | Res./Offset:  9/  9      |
|       via PC.            | Gear: (6)  1(3)/  1          | Break       :     76     |
|                          | Format  :########°           | SSI-Errorbit: 14         |
|                          |                              |                          |
|                          |                              |                          |
|--------------------------+------------------------------+--------------------------|
|                          |                              |                          |
| INFO: pos. adjustment    | INFO: Speed                  | INFO: Cable l./Cycle     |
| System   :rotatory       | Factor:   0.16666 (8)        | Cable length : 150m   (13)|
| Offset   :       0°  (7) | Format:####U/min             | plan Cyc.time:2.000ms (14)|
| Preset   :       0°  (21)| 100%  :  20U/min  (9)        |                          |
| P-In/Type:  0(22)/RAM(23)| Exact : 1.00%     (10)       |                          |
|                          | Display:Automatic (11)/0(12)|                          |
|                          |                              |                          |
|                          |                              |                          |
|                          |                              |                          |
|--------------------------+------------------------------+--------------------------|
|                          |                              |                          |
| INFO: Special outputs    | INFO: System upgrade         | INFO: Hardware           |
| Security outp.:    0 (24)| Inp.: 56 (15) Outp: 40 (16)  | Phys.Inp. : 56  (=15)    |
| Pos. printout   :Exp.    | DTC Outp.  :  0        (17)  | Phys.Outp.: 40  (=16)    |
| FR-Output       :  0 (25)| T-Lock-Inp.:  0        (18)  | CP-Type :No Bus          |
| V<>0 Output     :  0 (26)| Ext.Prg.max:    1      (19)  |                          |
| FR Hyst.  :   0U/min (27)| Ext.Prg.Ein:  0        (20)  |                          |
| Speed analog    : Ja     | Prg.-Select:slow             |                          |
| Analog cams     :  0     |                              |                          |
|                          |                              |                          |
|--------------------------+------------------------------+--------------------------|
|                          |                              |                          |
| INFO: PLC                |                              |                          |
| PLC-Module :Off          |                              |                          |
|                          |                              |                          |
|                          |                              |                          |
|                          |                              |                          |
|                          |                              |                          |
|                          |                              |                          |
|                          |                              |                          |
|                          |                              |                          |
```

The registers of positions 28, 29 and 30 are not printed out, since they can only be entered ONLINE during operation. All other varibales of this printout cannot be edited with the CamCon CT10 Terminal. For this task you need a PC or a CamCon DC51/T4 Terminal.

15. Viewing the system registers

Based on the standard display

1. Press the [−] key and hold until the display shows  = software version from 09.10.1998.
2. Press the [F] key  is displayed. = number of free cams.
3. Press the [F] key  is displayed. = maximum possible DTC in ms
4. Press the [F] key  is displayed. = size of RAM in kByte
5. Press the [F] key  is displayed. = size of serial EPROM in kByte
6. Press the [F] key  is displayed. = size of parallel EEPROM in kByte
7.(2) Press the [F] key  is displayed. = encoder resolution
8.(3) Press the [F] key  is displayed. = desired encoder resolution
9.(4) Press the [F] key  is displayed. = position hysteresis
10.(5) Press the [F] key  is displayed. = measuring system control
11.(6) Press the [F] key  is displayed. = encoder rotation direction switch
12.(8) Press the [F] key  is displayed = speed factor
13.(9) Press the [F] key  is displayed. = area adjustment of the speed display
14.(10) Press the [F] key  is displayed. = accuracy of the speed display
15.(11) Press the [F] key  is displayed. = display type
16.(12) Press the [F] key  is displayed. = input for the display change
17.(13) Press the [F] key  is displayed. = encoder cable length of the SSI interface
18. Press the [F] key  is displayed. = cycle time in µs
19.(15) Press the [F] key  is displayed. = number of inputs
20.(16) Press the [F] key  is displayed. = number of outputs
21.(17) Press the [F] key  is displayed. = number of outputs with dead time compensation (DTC)
22.(18) Press the [F] key  is displayed. = input for the keyboard lock
23.(19) Press the [F] key  is displayed. = number of programs for external program selection
24.(20) Press the [F] key  is displayed. = receiving input for external program selection
25.(21) Press the [F] key  is displayed. = value for position preset
26.(22) Press the [F] key  is displayed. = input for the initiation of the position preset
27.(23) Press the [F] key  is displayed. = storage of the position preset
28.(24) Press the [F] key  is displayed. = security output
29.(25) Press the [F] key  is displayed. = rotation direction output
30.(26) Press the [F] key  is displayed. = standstill output
31.(27) Press the [F] key  is displayed. = speed hysteresis
32.(28) Press the [F] key  is displayed. = communication protocol of the serial interface (Multi)
33.(29) Press the [F] key  is displayed. = unit number
34. Press the [F] key is displayed. = options
35.(30) Press the [F] key is displayed. = programming mode

Note : You can leave this menu at any time by pressing the [⎍] key.