Controll modules
for

CamCon DC51

Digitronic Automationsanlagen GmbH

For your attention

This amnual may only be used sensible in connection with the digital camwitches of the CamCon series and the PLC - Logic - modul's. To understand the contexts it is necessary to have read the PLC-Logic - modul's manual first and continue with this handbook. This manual corresponds to the software - version of the controlling module from the 30.4.2009. The company Digitronic Automationsanlagen GmbH reserves the right to make changes which present an improvement of the quality or functionality of the device without prior notice. The instruction manual was created with great care, although it may not be error-proof. We would be grateful for any communication relating to any errors you may have found.

UP-date
You can also obtain this instruction manual on the Internet at **http://www.digitronic.com** in the latest version as PDF file.

Qualified personnel
This device may only be started and operated by qualified staff. By qualified we mean personnel who are entitled to handle, to earth and to lable devices, systems and power circuits in accordance with the technology safety standards.

Liability
(1) The supplier is liable for damages caused by himself or by the owner of the rights up to the sum of the sales price. He is not liable for loss of profits, forfeited savings, intermediate and successive damages.

(2) The above mentioned limits to liability do not apply to insurance of named characteristics and damages which were caused deliberately or through negligence.

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Note:	We have examined the devices of the CamCon series for year 2000 compatibility and have not found any adverse effects on any functions.
Note:	CamCon is a registered trademark of the company Firma Digitronic Automationsanlagen GmbH.
Note:	The devices of the CamCon series comply with the standards for electromagnetic compatibility: EN 55011, EN 55022, EN 55024 Part 2, EN 50082 Part 2, ENV 50140, VDE 0843 Part 2, VDE 0843 Part 4, VDE 0871, VDE 0875 Part 3 ("N"), VDE 0875 Part 11, VDE 0877 Part 2, IEC 801 Part 3, IEC 801 Part 2, IEC 801 Part 4, IEC 801 Part 5.

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1. Introduction

Since a long time, electronic camswitches are used in pressing or punching plants. The Company Digitronic Automationsanlagen GmbH has developed in close cooperation two supervision modules especially for these controlls. They are avaiable as software options, integrated in the PLC-Logic-module of the camswitches.

At the moment we offer an analog as well as a digital supervision module:

- The analog monitoring module can be used to "learn" a reference - curve for the supervision of the force of pressure/punchs/strokes via pressure cell and expansion strips. This will then be cyclical (per turn) compared with the actual curve. If the actual curve rises above or falls below an adjusted value (tolerance) comparing to the reference - curve, the press or punch can be stopped via an input imideatly respectively. the corresponding product is put out. This protects the press, the tools and increases the quality of the product.

- The digital monitoring module can be used to supervise a progress of a production process. E.g. product -, tool free and material detection. Therefore the signal of one or more 24 volt inputs at the device with one or more cams. Multiple variables of the compoaring respectively controlling module can be adjusted e.g. static signals, positive or negative edge detection, number of impulses per lift/stroke and any more. If an error was detected during the comparation, also here the press/punch/stroke can be stopped via an input imideatly respectively the corresponding product is put out.

1.1. Feature of the analog monitoring module

- Angle resolution 360.0 degree (max: 4096 steps).
- Analog resolution 12 Bit (depending on AWA module: 0..20mA or 0..10 Volt).
- Up to 15 monitoring ranges per analog input possible.
- Separately tolerance adjustable in degree and pressure/force for each range.
- Tolerance adjustable for upper and lower pressure/force separately.
- Automatic learning of the reference curve by scan the analog input signals (5 learn cycles necessary).
- Store of the reference curve and tolerance separately for each cam/product programm.
- Two signals to pipe the errors (upper or lower pressure/force separately) to an V - input of the internal CamCon PLC - Logic - Modul (definition/programming necessary by user).
- Maximum force protection for each analog input adjustable.

1.2. Feature of the digital monitoring module

- Any angle resolution possible.
- 6 digital monitoring mode
  off, static, range, counter min., counter exa. and cam aktiv.
- Automatic learning (teach mode) by scan the input signals (5 learn cycles necessary for maximum 8 inputs synchronous).
- Up to 64 inputs to monitor.
- Use of standard 24 Volt inputs.
- Tolerance adjustable in degree.
- Store of reference cams, digital monitoring mode and tolerance separately for each cam/product programm.
- One signal to pipe the errors to an hardware output or to the internal CamCon PLC - Logic - Modul (definition by user necessary).

A condition for using a controll module is the order of software option "PLC - Logik - Modul" with "Analog/Digital supervision" for the CamCon device (option "W") and the existence of the necessary free inputs at the CamCon respectively one or more anolag inputs for analog supervision.

Note: You can use the analog and the digital monitoring module at a CamCon simultaneously.

2. Analog monitoring

Note:　This function can **not** be configured with the Digisoft 2000 WEB interface at the moment. Use for this the classic CamCon DC51 user interface (Communication -> Terminal On - or Offline).

2.1. Preparations for the activation of the analog monitoring

To be able to activate or use the analog monitoring, you first have to switch on the move detection output in the menu **"System configuration**", sub menu "**Special outputs"**, sub menu "**Digital outputs".**

For this purpose, enter the number of a free cam output at the menu point "**Move output**". In the menu-point "**VR Hyst.**" enter a hysteresis of 1 (minimum).

Via the move detction output, the controll module detects a stop of the machine to be able to display the last controlled curve correctly.

Now set the PLC Logic-Module to **"ON"** using the menu **"unit configuration"** submenu **"PLC-configuration"** and set at least 8 inputs (depending of the number of monitored ranges) in the menu - point "**Virt.Inp.**" and for use of the max. force protection set 8 inputs in the menu - point "**Spec.inp.**".
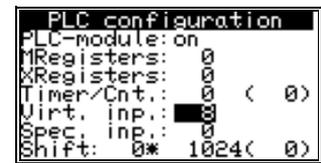
Note:　If the controll module is used in a CamCon of the "Plug in Line"
　　　　 e.g. DC300 or 1756-DICAM, some of the V - inputs are already used. In this case you have to use e.g. for the DC300 the V - inputs 65 and following.

The controll module reports an error via these inputs as well as an leaving of the envelope - curve in the controll range to the PLC - Logic - Module.

In the PLC - Logic the corresponding V - Input has to be linked further on. In the example to the right the V - input 1 was switched and saved to the hardware output O001. Via the input I001 this message is akcknowledged. You can also define another Logic according to your preferences.
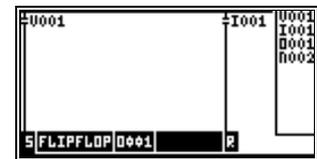
By the error - report system integrasted into the PLC-Logic-Module it is possible to report an error message to the operator of the plant.

2.2. Configure respectively switch on an analog monitoring system

To configure an analog monitoring system, chose in the main menu the menu **"unit configuration"** while the PLC - Logic - module is switched on. Then continue by choosing the menu **"Config. User"** followed by choosing the submenu "**Analog monitoring**".
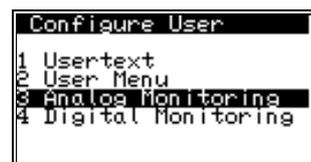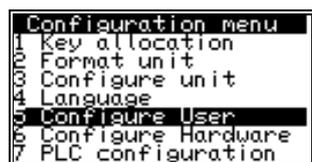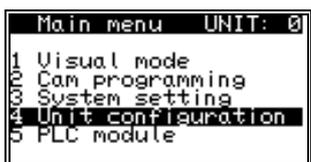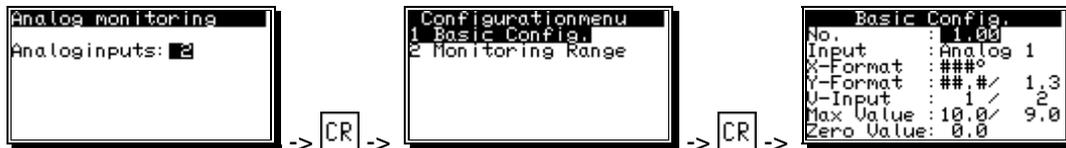

The following menu appears:

2.2.1. Basic Config.

Enter the number of analog inputs that are to be controlled first (maximum is 14, depending on hardware) and confirm with $\boxed{CR}$. If this value is set to 0, the analog controll is switched off.

Note: The hardware is defined in the chapter **"7.5.6.2 Enhanced Hardware Configure"** in the CamCon DC51 manule.

-> $\boxed{CR}$ -> ... -> $\boxed{CR}$ ->

The **"Configurationmenu"** appears, chose here first the menu **"1 Basic Config."**. The Basic Config. menu is now open in which you can configure the basics of analog inputs and the monitor ranges.

By pressing the keys $\boxed{\blacktriangleleft}$ and $\boxed{\blacktriangleright}$ in the menu point **"No.": #**" you choose the analog input you want to configure. Also if you have already configured more then 1 monitor range for the analog input, you can step with this keys from range to range.

You can configure for each analog input up to 16 monitor ranges (1.00 .. 1.15 or 2.00 .. 2.15) by enter the number of the range.

If you have select/chosen your monitor range, you can configure the range by press $\boxed{CR}$ or you can delete the monitor range by pressing the $\boxed{DEL}$ key.

Every monitor range has 6 parameter (menu points) which have to be entered. To jump from menu point to menu point, use the key $\boxed{CR}$ or the keys $\boxed{\blacktriangledown}$ and $\boxed{\blacktriangle}$. For jump back to the monitor range number press $\boxed{ESC}$.
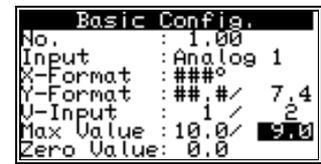
X-Format: Name respectively legend and form of the X Axis of the coordinate system (maximun of 4 characters). E.g. 3 characters with the unit "degree" (°). The space characters "#" will be replaced by the actule value (position) later.

X-Format: Name respectively legend and form of the Y Axis of the coordinate system (maximun of 4 characters). E.g 3 characters with the unit "tons" (T). The space characters "#" will be replaced by a value later.

Note: You can enter here for each monitor range of an analog input a different X- and Y-Format but this is not recommended.

V-Input: 2 virtual input numbers of the CamCon PLC - Logic - modul's that reports a leaving of the tolerance range. First number for lower tolerance, second input number for upper tolerance exceeded.

The controll module sets this inputs to high if the tolerance range is exceeded. This has to be further on dealt with in the CamCon PLC - Logic - module, respective adapted to your wishes. If a 0 is entered here, no V - Input is set and the curve is displayed. See also chapter "2.1. Preparations for the activation of the analog monitoring" on page 5.

Note: It is possible to set both, the lower and upper tolerance to one V - input.

Max Value: Scaling of the maximum value that can be meassured. Here you are able to enter the maximum value in the desired unit (e.g. T = tons) that can be measured. If e.g. a "90" was entered, a 12 Bit A/D converter will display a 90 (T) for a measured value of 4095.

/ Force: behind the max. scaling value you can enter the maximum force of the press. If the force exceed this max. value the PLC special input bit 8 will set.

Zero Value: Displayed value for a measured value of zero if the A/D converter has a bit value of 0.

Note: To adjust this two values, you can see behind the menu point **Y-Format**, the actual meassured value of the analog input (e.g. force) in units you have definiert.

If you are finished with the basic configuration, press $\boxed{ESC}$ and enter then the second menu **"2. Monitoring Range"** for configuration of the monitoring ranges/positions.

2.2.2. Monitoring Ranges

With the ▲ and ▼ keys you can select respectively you can scroll from range to range you have configured in the basic configuration (e.g. 1.00 or 1.01).
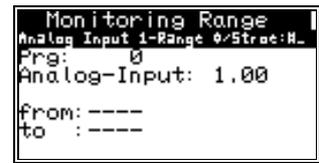
```
┌────────────────────┐
│▌Monitoring Range  ▐│
│                    │
│Prg:     0          │
│Analog-Input:▐1.00▌ │
│                    │
│from: ----          │
│to  : ----          │
└────────────────────┘
```

If you press DEL you can delete the position values of the selected range.

To enter the positions for the monitoring range you can start with the CR key and enter here first the analog input number and then the range. If the range is not defined a selection is not possible. You can also start entering the positions by pressing the ∫ or Ⅼ key.

After you have pressed the CR key you can navigate with the ▲ and ▼ key to the desired menu point.

Headline: Headline of the coordinate system. Here you are able to enter a text with a length of 32 characters. The space character "#" is later replaced through the lift/stroke - number in the automatic - display. A maximum of 3 i.e 5 records (lifts/strokes) can be controlled and displayed (label line 0 = last stroke, 1 = second last stroke, 2 = ... rotations of the machine).

```
┌────────────────────┐
│▌Monitoring Range  ▐│
│Analog Input 1-Range 0/Stroke:H_│
│Prg:     0          │
│Analog-Input: 1.00  │
│                    │
│from: ----          │
│to  : ----          │
└────────────────────┘
```

Prg: Here you can enter the product programm number.

If necessary you can have for each products a special monitor (privat) range. You can enter here the program/product number.
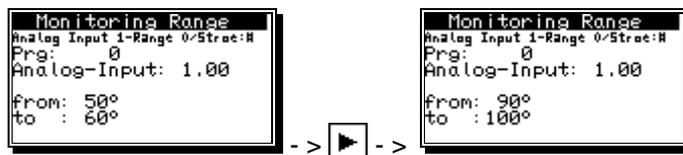
```
┌────────────────────┐
│▌Monitoring Range  ▐│
│Analog Input 1-Range 0/Stroke:H│
│Prg:▐     0▌        │
│Analog-Input: 1.00  │
│                    │
│from: ----          │
│to  : ----          │
└────────────────────┘
```

from: Starting point of a monitoring range in units of actual value, e.g. degree.

to: End point of a monitoring range in units of actual value, e.g. degree.

Note: It is possible to enter in the monitoring range 1.00, 2.00 - 15.00 (multiple range) more then one from: / to: points by press the INS key. In this case, you can scroll/step this ranges by press the keys ◀ and ▶. But **note** the tolerances and the reference/envelope curve for all this ranges are the same.

If you press the # key on the selected range then this range will moved/switch into the "privat" programm number you have entering in the **"Prg:"** menu point.
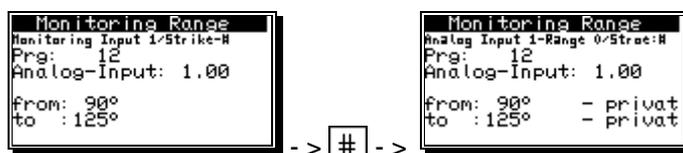
Example 1: This monitoring is active from 50° - 60° and 90° - 100° and is use global for all programm numbers.

```
┌──────────────────┐        ┌──────────────────┐
│▌Monitoring Range▐│        │▌Monitoring Range▐│
│Analog Input 1-Range 0/Stroke:H│  │Analog Input 1-Range 0/Stroke:H│
│Prg:     0        │        │Prg:     0        │
│Analog-Input: 1.00│        │Analog-Input: 1.00│
│                  │        │                  │
│from: 50°         │        │from: 90°         │
│to  : 60°         │        │to  :100°         │
└──────────────────┘        └──────────────────┘
```
-> ▶ ->

Example 2: This monitoring is active from 45° - 125°, global for all programm numbers and has a own tolerances and reference curve.

```
┌──────────────────┐
│▌Monitoring Range▐│
│Analog Inp.1 range 1/Stroke:H│
│Prg:     0        │
│Analog-Input: 1.01│
│                  │
│from: 45°         │
│to  :125°         │
└──────────────────┘
```

Example 3: This monitoring is active from 90° - 125° and is only for product programm 12.

```
┌──────────────────┐        ┌──────────────────┐
│▌Monitoring Range▐│        │▌Monitoring Range▐│
│Monitoring Input 1/Strike-H│  │Analog Input 1-Range 0/Stroke:H│
│Prg:    12        │        │Prg:    12        │
│Analog-Input: 1.00│        │Analog-Input: 1.00│
│                  │        │                  │
│from: 90°         │        │from: 90°   - privat│
│to  :125°         │        │to  :125°   - privat│
└──────────────────┘        └──────────────────┘
```
-> # ->

## 2.3. Analog monitoring in the automatic mode

The display or status messages of the controlling module are done in the standard display of the CamCon. This is done by selecting **"Display"** in the main menu or by pressing the key ESC in the main menu.

At the "Standard Display" you see: The active program number, the relative speed as a bargraph, the actual position or the absolute velocity.
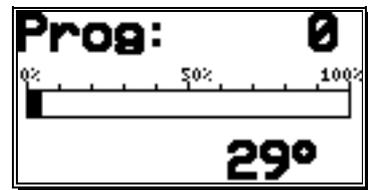
If the machine is runs slow, the actual position is displayed. With increasing speed, the device switches the display at 5% of the adjusted final speed and shows the the actual speed.

To get the status display of the first analog monitoring, you can switch the display using the key ▶ respectively browse through the displays by using ◀ and ▶ . For example the display to the right appears for the 1st respectively the one down for the 2nd monitoring range.
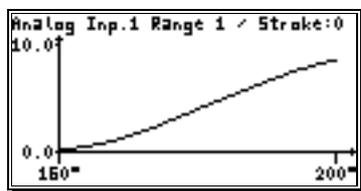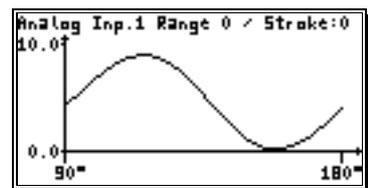
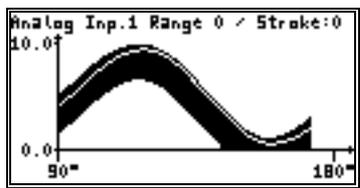Here you are now able to choose or display the measured values for the last three turns by pressing the keys ▼ and ▲ .

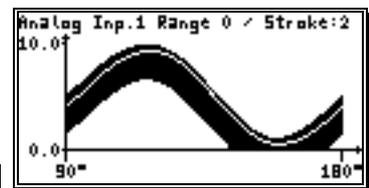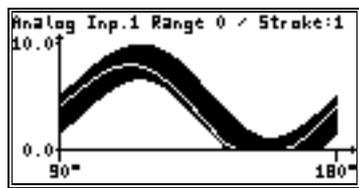You also have the possibility to use the "zoom" menu by pressing the keys CR .
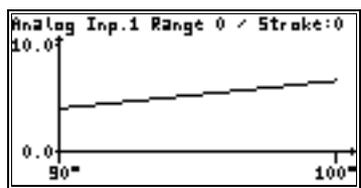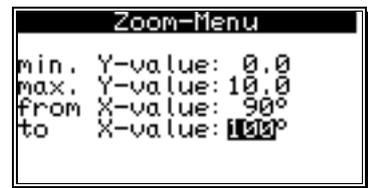
Here you can to refine the display of the curve by defining the start- or endvalues of the X - and Y - axis of the coordinate system.
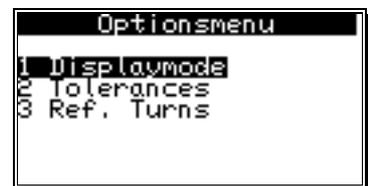
Look at the left image.

Example for last three turns/strokes:

2.4. Optionsmenu for the analog monitoring

If a controll curve is displayed you can get to the **"Optionsmenu"** by pressing # . It has three submenus: 1. display mode, 2. tolerances and 3 reference revolutions.

Note: The menus **"1 Displaymode"** and **"2 Tolerances"** are separately adjustable for every monitoring range.

2.4.1. Optionsmenu, "1 Displaymode"

Here you are able to switch on (Yes) or off (No) the tolerance/envelope display bar by using the keys ◀ and ▶ .
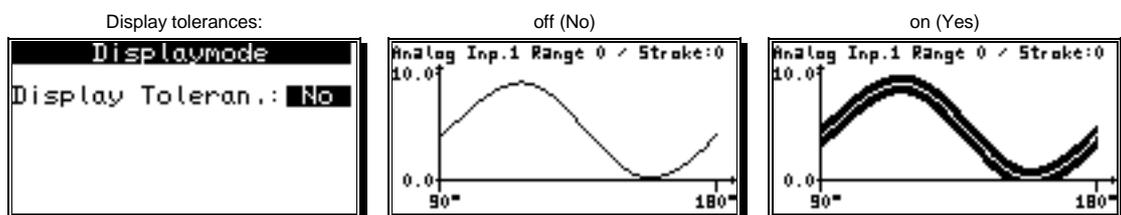
2.4.2. Optionsmenu, "2 Tolerances"

After having entered the user key (key for cam programming) enter the maximum +X / -X and +Y / -Y tolerances for the measured reference revolution/stroke here.

tolerances: measured reference revolution   tolerance/envelope curve
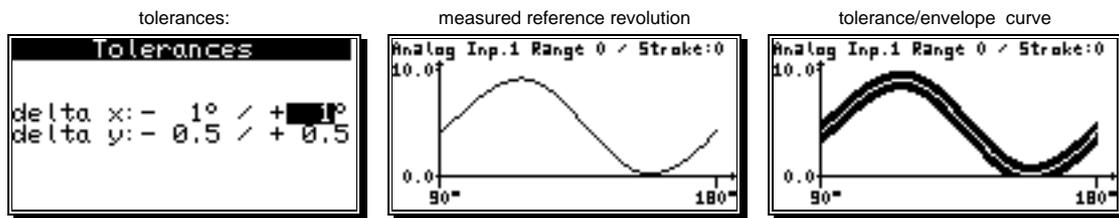
The CamCon also calculates a respectively tolerance curve for the controll range of the analog value with this values. If this range is left during an rotation, the corresponding V-input in the PLC-Logic-module is set for this time.

Example:

tolerances: measured reference revolution   tolerance/envelope curve
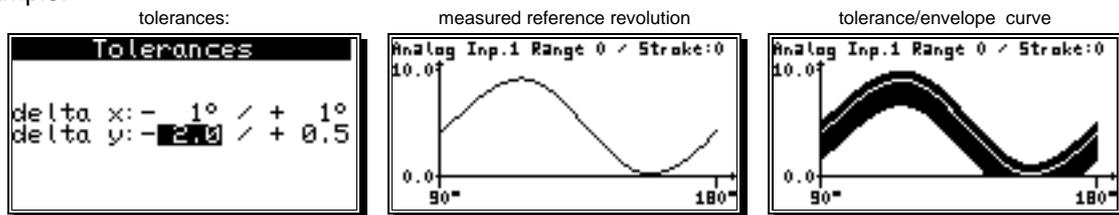
2.4.3. Optionsmenu, "3 Ref. Turns" recording

This menu is used for the record the reference turn/stroke in a **normal** production process. This means, all parameters of the plant as for example speed, pressure, height of lift, lubrication, strength of the material and so, have to correspond to the values of the running plant later.

After the input of the user key (key for cam programing) the values of the last five revolutions are constantly record to the CamCon's RAM. The PLC special input bit 7 will set so long as you stay at this menu.
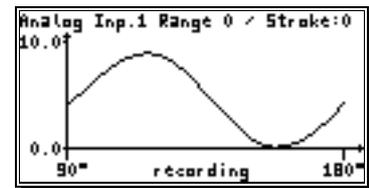
If the recording runs, you also have the possibility to change or refine the recorded curves by zooming or switching of the axises using the keys ◄, ►, ▼ and ▲. See also chapter "2.3. Analog monitoring in the automatic mode" on page 8.

After at least 5 reference turns/strokes in which the production progress of the plant correspond to your wishes, you have to stop the plant in a position out of the controll/monitored range (e.g. OT at 0°).

! Attention :   In the last turn/stroke before the plant is stoped the **normal** production process must **not** be interrupted.

2.4.3.1. Reference-Menu

If the plant is stopped you can enter the **"Reference-Menu"** by press the ESC key.


Here you can quit the recording without any changes of the reference curve by choose **"5 Exit Ref."** or you can go gack to the recording menu by choose **"1 Display plot"**.
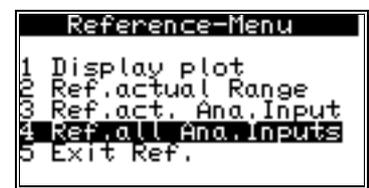
To accept the recorded curves you can choose **"2 Ref.actual Range"** for calculate the reference curve for the actual selected monitor range, choose **"3 Ref.act Ana.Input"** for all ranges for the actual analog input or you can choose **"4 Ref.all Ana.Inputs"** for all ranges for all analog inputs.

If you say **"Yes"** for the following query the 5 curves will be averaging and store in the CamCon`s EEProm. The "**Security output**" will switch off for this time.


This average curve is now used for the new calculation of the tolerance in production progress (see also menu **"2 Tolerances"**).
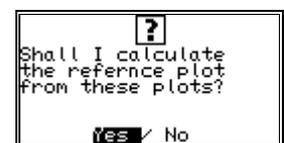
3. Digital monitoring
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3.1. Preparation for the activation of the digital monitoring

To activate respectively use the controll module you first have to switch on ("**ON**") the PLC-Logic-module in the menu "**Unit configuration**", submenbu "**PLC configuration**". In the menupoints **"MRegisters"** and **"Timer/Cnt."**.At least 8 registers and 8 Timer/Counter have to be adjusted.
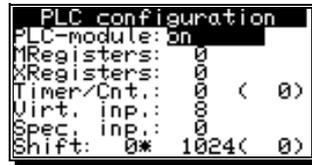

The digital monitoring module needs 4 free networks per digital input from the PLC - Logic - Module (e.g. M -, X - registers or physical output bits O).

Note: Since the software version 3/2009, the monitoring modes will by store for each product programm number separately.

3.2. Digital monitoring configuration respectively switching on

To configure an digital monitoring system choose in the main menu the menu **"unit configuration"** while the PLC - Logic - module is switched on. Then continue by choosing the menu **"Config. User"** followed by choosing the submenu "**Digital monitoring**"..
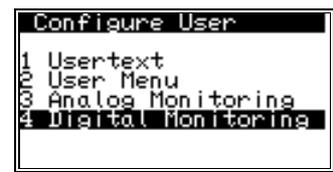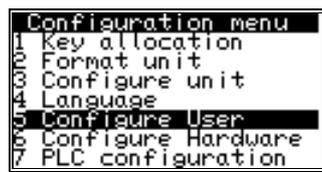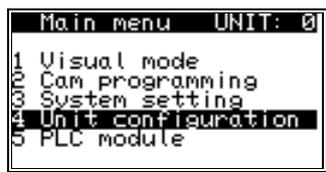
The menu displayed to the right with the first, still empty, supervision appears. Now configure the first controlling here.
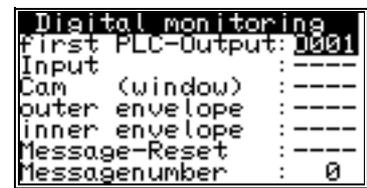
By pressing the keys ◄ and ► you are able to browse through the controlling (if you created more than one). For every digital monitoring 7 values have to be put in. You can switch from menupoint to menupoint by pressing CR or via the keys ▼ and ▲. By pressing INS a new controlling is created. By pressing DEL in the menu point "**from PLC-output**" a controlling is deleted. A value in one of the 7 menupoints can be entered respective changed by using the keys ⌐ and L, and via the numbers 0 ... 9.

Note: If a value in the menupoint "**from PLC-output**" is changed, a new controlling is created. If this one must be alternated, it has to be deleted by using the keyDEL first, and later on re-entered newly.

After the input respectively alternation of the corresponding values, the PLC-Logic-module is automatically programmed with 4 networks depending on the adjusted control mode after the selected **"PLC-output"**. The controll - mode is set respectively entered in the automatic display. At the moment, you can choose between 6 different modes. See also chapter "3.3. Digital monitoring in the automatic mode" on page 12.

! Attention: The four PLC - Logic - networks after the selected output - or register numbers will be deleted/overwritten. This can cause a loss of data in an allready exscisting PLC -Logic - Program.

A description of the 7 values follows:

1. "**From PLC-output:**".
   Here you can adjust after which PLC-Logic-modules output the 4 linkage images for the digital monitoring are used. These are newly created or overwritten according to the selected controlling mode. Additionally the triggering of the digital monitoring is reported to switch of the plant or put out a product. If a flag is entered here, it has to be processed in the PLC-Logic to switch on or off a physical output.
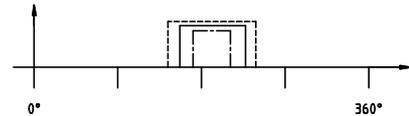   e.g. after flag 1 = M001
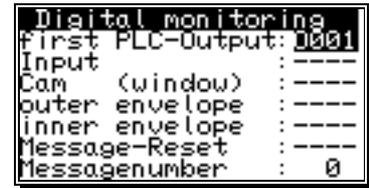
2. "**Input:**"
   This is the inputnumber respectively the input signal that is used for controlling. If a signal lies in the range of a window-cam plus/minus the tolerance, no message is reported.
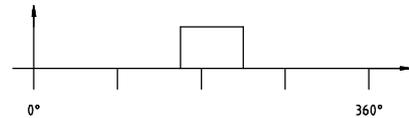   e.g. Input 2 = I002.

3. "**Cam (window):**".
   The cam-output indicated here is used for the controlling as window signal. The Cam for this output is entered in the automaticdisplay an used as controlling range.
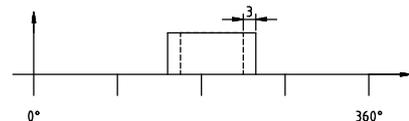   e.g. cam-output 1 = N001.

4. "**Hullcurve outside:**"
   The selected Cam-output defines the outer range of the window-cam in the controlling mode "Range" in which the input signal has to be 0. The Cam for this output is calculated and programmed automatically via the entered window-cam and the selected tolerance (e.g. 3°).
   e.g. cam-output 2 = N002.

5. "**Hullcurve inside:**".
   The selected Cam-output defines the inner range of the window-cam in the controlling mode "Range" in which the input signal has to be 0. The Cam for this output is calculated and programmed automatically via the entered window-cam and the selected tolerance (e.g. 3°)
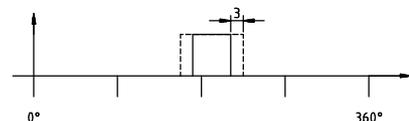
   e.g. cam-output 3 = N003.

6. "**Message-Reset:**".
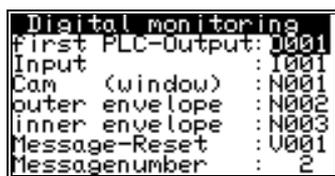   By this signal a triggered controlling is reset respectively started anew.
   e.g. key DEL on the foilkeyboard of the CamCon DC51=S046

7. "**Textmessage number:**".
   The number of a textmessage, displayed if the controll is triggered. This text has to be pu into the PLC-Logic-module itself.

A complete configuration is shown here:

3.3. Digital monitoring in the automatic mode

The displaying respective the switching "on" or "off" of a digital monitoring is done in the standard display of the CamCon. This is reached via the main menu point **"display"** or by pressing the key ESC while being in the main menu.
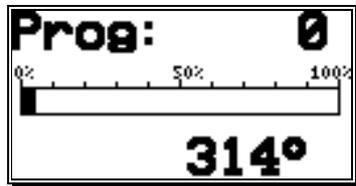
At the "Standard Display" you see: The active program number, the relative speed as a bargraph, the actual position or the absolute velocity.

If the machine is runs slow, the actual position is displayed. With increasing speed, the device switches the display at 5% of the adjusted final speed and shows the the actual speed.

To select the first digital monitoring press the key ▶ oftentimes until the first digital monitoring is displayed. By pressing the keys ◀ and ▶ you are able to browse through the different controllings. In the display to the upper right the assigned PLC - output is displayed.

By pressing the keys CR the particular controlling is adjusted in realtion to the production ssettings. After having entered the user key (for Cam programing) a free text with a maximum length of 17 characters is entered wich describes the controlling's function.

Note: This text is also the output name of the window Cam in the CamCon's **"Cam programming"** menu.

After having pressed the key CR the text is saved and the device switches on to the selection of a controlling mode. Six different modes and one automatic detection mode may be adjusted here. These modes are: **"Off"**, **"Static"**, **"Range"**, **"Counter min."**, **"Counter exact"**, **"Cam active"** and **"Auto"**.

By pressing the keys ◀ and ▶ the desired mode may be selected, by confirming with the key CR it is adopted and the CamCon's PLC - Logic - Module is automatically programed now. A description of the different controlling modes follows.

3.3.1. Controlling mode "Off"

The controlling is switched of, respectively inactive. No message is displayed.

3.3.2. Controlling mode "Static"

In this mode the input signal has to be active always. You can choose between high and low active input signal. A message is displayed respectively the corresponding PLC - output is set to "1" (e.g. M001) if the input signal does not meet the adjusted signal level.
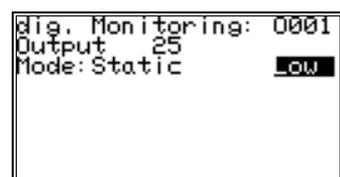
The signal level can be chosen after the overtaking of the mode using the keys ◀ and ▶ and taken over by confirming with the CR key.

3.3.3. Controlling mode "Range"

In the "**range**" mode the input signal within the entered Cam (window) must be active and inactive out of the entered Ca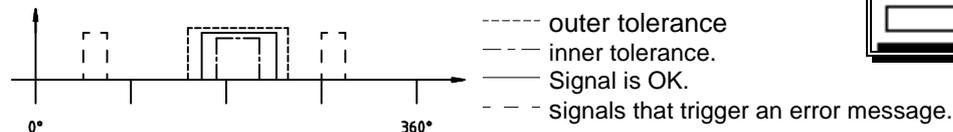m (window). You can choose between a high and low active input signal and enter a tolerance in which the input signalis not controlled.

------ outer tolerance
---- inner tolerance.
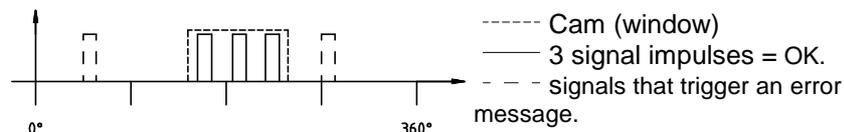——— Signal is OK.
- - - signals that trigger an error message.

A message is displayed respectively the corresponding PLC output is set to "1" (e.g. M001) if the input signal in the inner tolerance range is active and active above the outer tolerance range. Both tolerance ranges are calculated from an entered Cam.

At first the signal level can be selected after the adjusting of a mode by using the keys ◄ and ► and taken over by using the key CR. A tolerance value is entered and taken over by using the CR key. Now the keys ⎍ or ⎑ have to be used to enter the range Cams (window). This is taken over by using the key CR. The PLC-logic is now automatically programmed and the controlling is active.
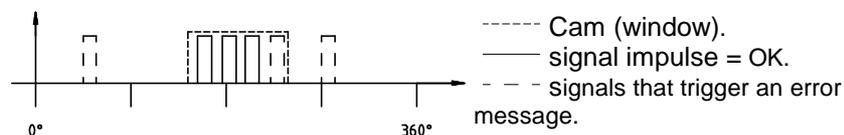
3.3.4. Controlling mode "Counter min."

In the **"counter min"** mode, the input signal has to be at least n-times (counter value) active within the entered Cam (window). The edges are counted from active to passive (negative edge). You can choose between high and low active input signal.

------ Cam (window)
——— 3 signal impulses = OK.
- - - signals that trigger an error message.

If a signal input gets active out of a window Cam or if not enough negative edges (at least three) are counted, a message is displayed respectively the corresponding PLC - output is set to "1" (e.g. M001 or O001). If more than three edges are detected, no error is displayed.

3.3.5. Controlling mode "Counter exa."

In the "**counter exa.**" mode, the input signal has to get active within the entered Cam (window) exact n - times (counter value). It can be chosen between high and low active input signal..

------ Cam (window).
——— signal impulse = OK.
- - - signals that trigger an error message.

If the signal input out of the window cam is active, or more than n (e.g. 3) negative edges are counted a message is displayed respectively the corresponding PLC-output is set to "1" (e.g. M001 or O001).

3.3.6. Controlling mode "Cam active"

In the **"Cam active"** the input signal within the entered Cam (window) has to be active. You can choose between high and low active input signal. Out of the cam window the input signal is not controlled.

```
dig. Monitoring: 0001
Output    1
Mode: Cam activ    Low

        1°      100°
```

------ Cam (window).
──── signal = OK.
─ ─ ─ signal, that triggers an error message.
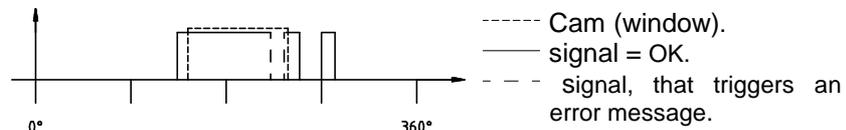
If a signal input within the window Cam gets inactive a message is displayed, respectively the corresponding PLC - output switches to "1" (e.g. M001 or O001).

3.3.7. Automatic detection mode "Auto"

If you choose the controlling mode **"Auto"** and you have entered a tolerace, the CamCon can record the signals of the dedicated digital input and use this recordings to automatic detect the digital monitoring mode.

```
dig. Monitoring: 0005
Output    1
Mode: Auto
tolerance:        0°
```

To start the recording you need to press the $\boxed{\#}$ key if the mode **"Auto"** is selected. After entering the user key (key for cam programing) and a additional security query, the CamCon needs 5 turns/strokes to detect the average and calculate the monitoring mode.

```
dig. Monitoring: 0005
Output    1
Mode: Auto
tolerance:        4°
```
-> $\boxed{\#}$ ->
```
         ?

Start Modedetection?

       Yes / No
```
-> **"Yes"** ->
```
dig. Monitoring: 0005
Output    1
Mode: Range       Low
tolerance:        4°

        50°      89°
```

After this, the digital monitoring is immediately running and is ready for the production progress.

Note: You can learn and detect maximal 8 number of digital input at ones.

3.3.8. Error message

If the digital monitoring detects an error, an error message is displayed in the standard respectively automatic display (see the picture to the lower right). The displayed text has to be entered in the PLC - Logic - Module in the corresponding output signal before. See also the PLC - Logic - module's manual.

If this text is not entered, a message like e.g. the one shown to the right is displayed.

```
Message!
Digital monitoring
reports error!

Info :   1
```

```
Info        2

Info :   2
```