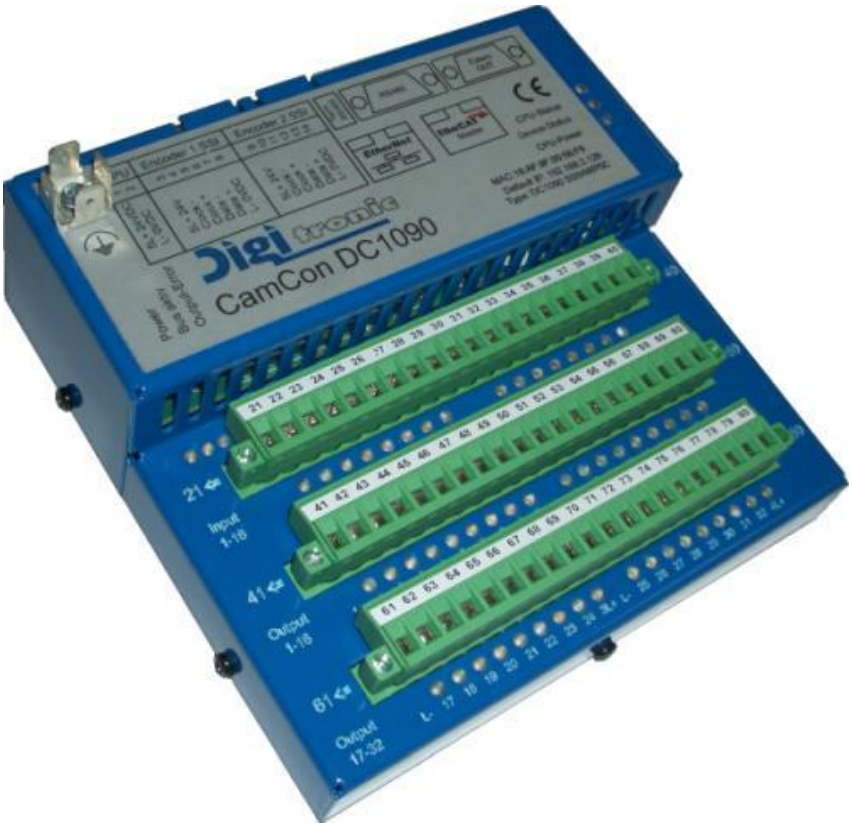
EthernetIP Interface

CamCon DC1090

for Allen Bradley Control**Logix**Ò



Note: Control**Logix**® is a registered trademark of Rockwell Automation.

Digitronic Automationsanlagen GmbH

Auf der Langwies 1 · D - 65510 Hünstetten-Wallbach · Tel. +49 6126 9453-0 · Fax -42
Internet: http://www.digitronic.com · E-Mail: mail@digitronic.com

For your attention

This instruction manual relates to the CamCon DC1090 from 7.2023 Firmware and the DC190.ACD software V1.02. 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.

Update
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.

Protection

Note: CamCon is a registered trademark of the company Firma Digitronic Automationsanlagen GmbH.

Note: The devices of the CamCon series comply with norms: DIN EN 61000-6-2, DIN EN 61000-4-2, DIN EN 61000-4-4, DIN EN 61000-4-5, DIN EN 61000-4-8 and DIN EN 55011 and RoHS 3.

Digitronic Automationsanlagen GmbH
Auf der Langwies 1
D-65510 Hünstetten - Wallbach
Tel. (+49)6126/9453-0 Fax. (+49)6126/9453-42
Internet: http://www.digitronic.com
E-Mail: mail@digitronic.com

Note: Control**Logix**® is a registered trademark of Rockwell Automation.

Table of Contents

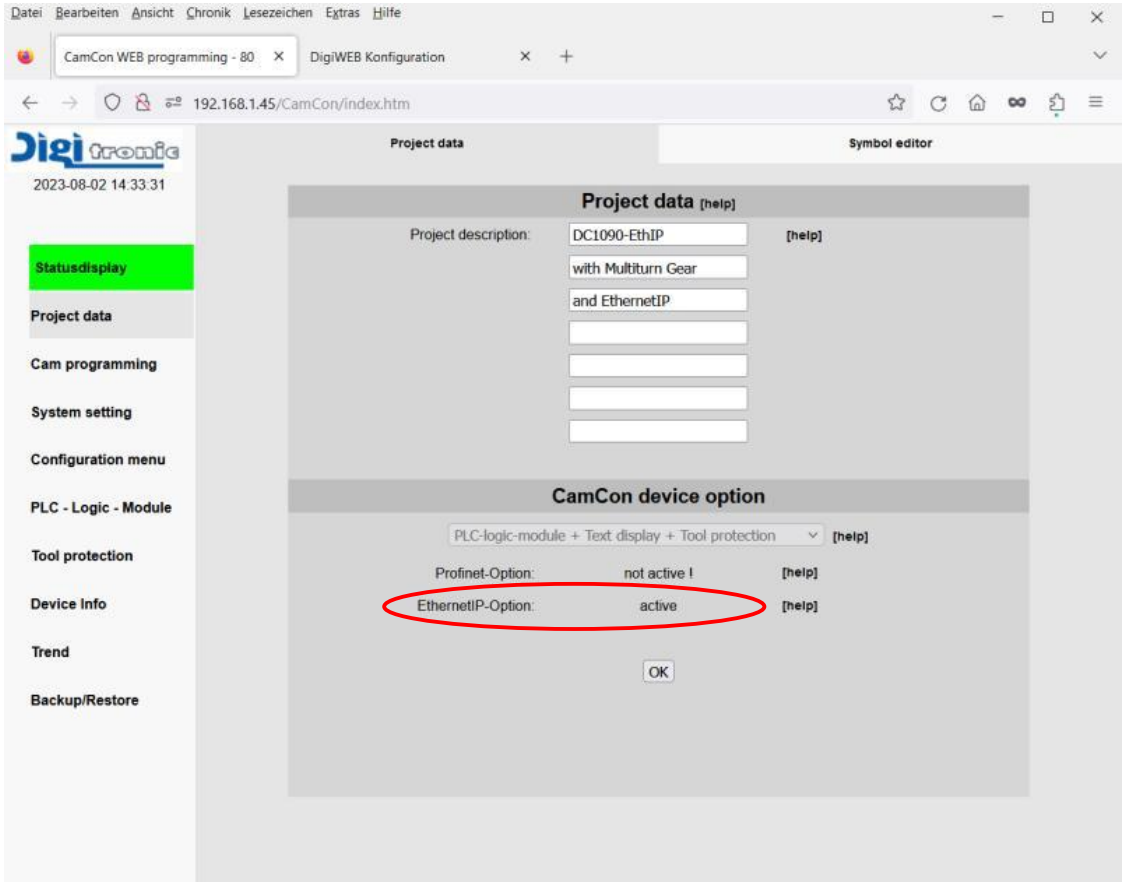
1. Starting

After assembly and before the first switch-on please check the wiring of the device. See CamCon DC1090 manual chapter "**Electrical connections**".

After switching on the power supply, set the IP - address of the CamCon DC1090 to a free IP in the LAN of your PLC. See CamCon DC1090 manual chapter "**Setting the IP-Address**".

To check the network setting of the DC1090, please open a web browser and enter the IP address of the CamCon.

It should be the following WEB - site open:



Now you can configure the CamCon DC1090 completely on this WEB - page as it is written in the manual or you can fully configure the DC1090 by the ControlLogix CPU PLC via the DC1090/190 Program TAGs.

In the event of a fault or an error note also see the manual of the CamCon DC1090.

In the following chapters, we describe how to integrate the CamCon DC1090 into your ControlLogix PLC.

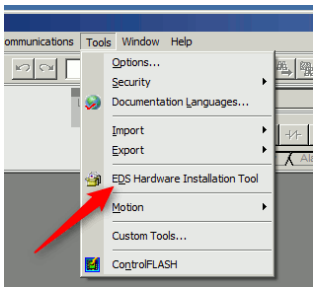
Note: The Ethernet IP interface of the DC1090 is only available with the "**EthernetIP option**" = "**active**" (see above picture.)
On the type plate of the CamCon DC1090 you can see the installed options in the last 4 digits of the order number recognize. See the options that can be ordered on the Digitronic WEB page.

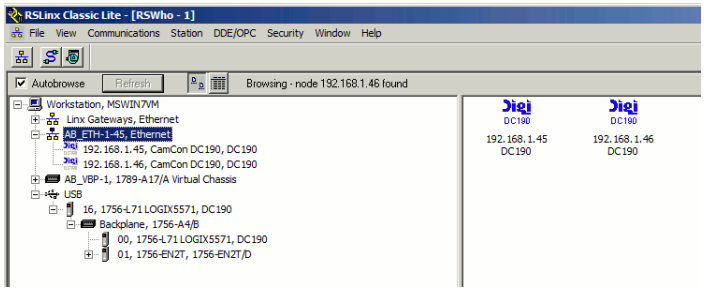
Example: DC1090 SS92***SE00***, this is a DC1090 with the options: PLC - Logig - Module and EthernetIP.

The EthernetIP interface is available for the CamCon DC190 with firmware from 3/2016 or newer and for the CamCon DC1090. Check this under the "**Device Info**" menu.

1.1. Planning the ControlLogix CPU for CamCon DC1090

First install the DC1090 ESD file in your ControlLogix software. To do this, click in "RSLogix 5000" "Tools" menu on "EDS Hardware Installation Tool" and select the DC1090 EDS file (from cdrom or zip file).

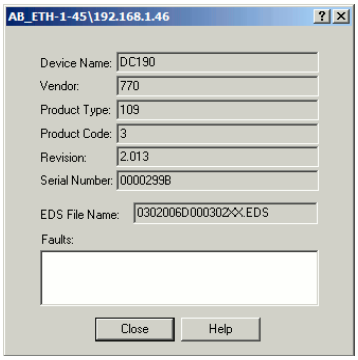




Create then a "**Ethernet Device**" connection in the RSLinx program for the DC1090.

Note: The handling modules (ACD File) in the PLC are the same or compatible for the CamCon DC1090 and the CamCon DC190.

If you click on the DC1090 logo with the right mouse button and select "Device Properties", you get information about the device (see the picture on the right).

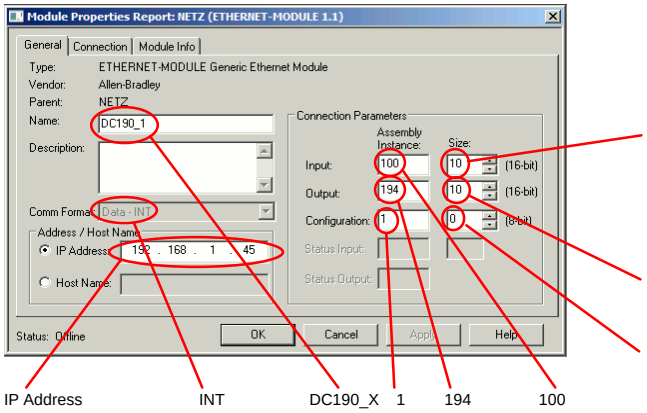


Next step is;

Open your RSLogix 5000 Project and insert a "**ETHERNET-MODULE Generic Ethernet Module**" into the "**I/O Configuration**" of the PLC.

Note: The minimum RPI time (update time) of the DC1090 with EthernetIP interface is 1ms.

Input the parameters (e.g. IP Address..) shown in the next diagram:



This value corresponds to the number of hardware outputs of the CamCon DC1090; it must be adapted to the requirements of the device. The CamCon can administer up to maximum 200 outputs. In addition, a further 6 Bytes are necessary for the status display and for communication.
These are described in chapter "1.1.1. The I - Range" on page 6.
If the actual value and the speed are to be translated into realtime, then 2 INT must be added for the actual value and 1 INT for the speed value. See Chapter "2.5. Transferring actual value and speed into realtime" on page 23.

Above this value you set the number of Bits which are then sent to the CamCon in cycles.
These are used as enable Bits for the cams of the CamCon and must be set to 1, so that the respective output can be switched on when the cam is active.

always 0 (Configuration range not used)

Note: If you have multiple devices DC1090 in your project, choose the name DC1090_1, DC1090_2 etc.
The sample program already contains two CamCon DC1090 with this name. If you do not change this names, no need to be changed later the communication path in the program.

The next step is copy the sample program in your own project. See chapter "2. Communication between ControlLogix 1756 CPU and CamCon DC1090" on page 7.

1.1.1. The I - Range

In the I-Range of the CamCon DC1090/190 component group, the following information is transferred:

INT 0,1: reserved (0 = OK, not 0 = error)
INT 2: Internal communication range of the CamCon.
Bit 0-7 = not in use.
Status range for MSG commands.
Bit 8 = CMD_OK = Last written message successful.
Bit 9 = CMD_IN_USE = Command is being carried out.
Bit 10 = CMD_ERROR = Error at execution of last written message.
Bit 11-14: = not in use.
Bit 15 = EXOR_BIT = This Bit toggles after each execution of a written message.

INT 3,.. and all of the following contain the Output Bits of the CamCon.

Example: 32 Outputs with active real time transfer for speed (Speed analogue = yes) and position display (Actual value output = Bin.).
INT 3 = Status outputs 1 - 16.
INT 4 = Status outputs 17 - 32.
INT 5 = Actual speed as 15 Bit values with signs and an offset of 8000Hex, scaled to 100% value in the CamCon. (See the calculation example in the DC190 program, i.e.Chapter "2.5. Transferring actual value and speed into realtime" on page 23.)
INT 6,7 = Actual position as 32 Bit value

Note: In addition to the described Status Bits, an output parameter of the CamCon can be set as a safety output, i.e. as RUN - Control. (Chapter "2.3.6. TAG "DC_1_SYSTEM_CONFIG" Value: DINT[25]" on page 12) which is switched off when an error occurs. If this is not active, the exact error can be found by checking the status question (Chapter "2.3.13. TAG "DC_3_STATUS"" on page 21).

1.1.2. The O - Range

The cam outputs of the CamCon DC1090/190 must be enable by the ControlLogix PLC.

For this purpose, the value: DINT[66] / Enable_input in the Controller TAG (See chapter 2.3.6. TAG "DC_1_SYSTEM_CONFIG") must set to 255. Then the outputs are disabled until enable by the PLC via EthernetIP.

The enable bits of the CamCon DC1090/190 are located in the output range. The ControlLogix PLC must set a respective bit to enable each output at a time, so this can be switched on by the Cam Controller. Bit 0 in the first INT "DC190_1:X:O.Data[0]" is the ebable bit for output 1 of the CamCon. Bit 0 in the second INT "DC190_1:X:O.Data[1]" is the bit for output 17 of the CamCon etc..

The enable or the O - Range bits are associated with the CamCon outputs AND (Output switch-off). This is done without delay through the cycle time by the ControlLogix.

Note: If the Ethernet connection between the ControlLogix and the DC1090/190 is interrupted, the cam outputs are disabled again within a short time (depending on the set RPI Time).
The cam outputs are also disabled immediately when the ControlLogix PLC goes to STOP.

Note: If the CamCon DC1090/190 PLC - Logic - Module is switched on, the enable bits are made available as V - inputs to the PLC - Logic - Module. See the Instruction Manual of the PLC - Logic - Module (Order Nr.: H-SPS/E).
In case of interruption of the Ethernet connection or stopping the PLC - CPU, only the S6 BIT of CamCon PLC Logig module is reset here.

1.1.3. The C - Range

The configuration range of the CamCon DC1090/190 with EthernetIP is not used currently.

2. Communication between ControlLogix 1756 CPU and CamCon DC1090/190

Communication between the ControlLogix CPU and the CamCon DC1090 takes place via EthernetIP and is comparable to the 1756-DICAM plugin module.

Some function components are needed and "User-Defined" Data types which are available under Order Nr.: "BS DC1090-ETH/HB" or "BS DC190-ETH/HB".

Note: The handling modules in the PLC are the same or compatible for the CamCon DC1090 and the CamCon DC190.

NOTE: If parameters, cams or delay times are cyclically written, then the EEPROMS data memory is destroyed after short time. If this is however necessary for certain reasons, then the EEPROM must lock. See chapter "2.3.4. TAG "DC_0_EEPROM_LOCK"" on page 10

2.1. Installation of the Software

The software RSLogix 5000 Project V20.03 is available on cdrom or in the internet. The project name is "DC190-VX-XX" with version.

You can read about the software version in the "DC190_1" program characteristics (right mouse button).

For installation the following **consecutive** steps must be carried out:

- Open the desired project in a RSLogix 5000 session.
- Add to the I/O configuration for the first CamCon with the name "DC190_1" as described in Chapter "1.1. Planning the ControlLogix CPU for CamCon DC1090".
- Open the sample project in a second RSLogix session.
- Copy into your own project via clipboard (Copy+Paste) from the "Data Types" all "User-Defined" projects of the DC1090/190.
- Copy into your own project via clipboard (Copy+Paste) all DC190_1 "Alias Controller Tags" of the DC1090/190 project and also all "DC190_2" if desired.

  Note: The sample project also contains some "Controller Tags" like "INPUT_X" or "Timer" etc. as an example. These can be deleted later.
- Copy the "DC190_1" and if desired "DC190_2" progam from the sample project into the "Main-Task" of your project.
- Change the indizes for the number of outputs and the type for the number of cams for each output in the "DC190_X TAG" DC_2_PRG_CAM[x].

  If you apply the PLC - Logic - Module of the CamCon DC1090/190 you also change the indizes of the DC_1_SYSTEM_CONFIG_PLC[x] TAGs to the number of necessary link networks.

TIP: The programing software DIGISOFT enables programing the PLC - Logic - module also "Offline" with the PLC - Logic - module's editor. This programing can be transfered by an L5K - export i.e. import to the ControlLogix. For this purpose see also the DIGISOFT manual chapter "Export"

- Enter the necessary data in the "Program TAG" DC_1_SYSTEM_CONFIG.
- Installation is now complete.

In the "Main Program" and in the sub-programs "DC190_USER _..." of the "DC190_1" program are some examples how the program can be used. These can be deleted or changed by the user, only the JSR instruction to the program DC_1_MAIN must be maintained.

Note: Programs that begin with the name "DC_" control the comunication and should only be changed with intent.

2.2. General Information on the Software

The data transfer between CamCon DC1090/190 and ControlLogix is carried out through "CIP Generic Messages".

All parameters, cams, delay times and status displays of the CamCon can be written and read. These are divided into 256 DINTs each (0..255) in 255 data-ranges (1..255) and are predefined through "User-Defined" TAGs in the RSLogix 5000 software.

Each TAG represents a dataset and consists initially of an address (ADR) and a fixed number of DINTs into which those data are placed which are to be read or written.

The address (ADR) TAG is based on the "DC_9_HEADER" and the "DC_9_CMD_BITS "User-Defined" TAG. Initially the range numbers (RANGE), the offset in the range (OFFSET) and the number of DINTs (DATA_LEN) which are to be transferred must be entered. At the present time a maximum of 120 DINTs can be transferred with on MSG. Via the TAG "DC_9_CMD_BITS" a flag READ or WRITE is placed on the dataset. For the status display the bits data transfer running (RUN), Data Transfer successfully executed (OK) and Data Transfer was not successfully executed (ERROR), are stored in the CMD_BITS.

Note: The description of the individual TAGs and the meaning of the data can be found in chapter "2.3. The TAGs of the DC190 Program" on page 9.

The dataset filled with the address and the used data can now be transferred into the subprogram DC_9_DATA_WRITE and DC_9_DATA_READ of the DC190 program. The subprogram is called by the programs DC_2_ALL. Here the read and write bits of the individual datasets are evaluated and the transfer programs are called. Each write or read access always requires initially a write - and then a second write or read message respectively. The two progams WRITE and READ see to the correct procedure and set or reset the respective bits in the dataset after successful transfer. If the data transfer takes longer than 5 seconds, control bit DC_5_STATUS_COMM_TIMEOUT is set and the dataset is confirmed with an error message and the command is repeated. An error message through the CamCon to a dataset is signified by the Control Bit DC_5_STATUS_COMM_ERROR.

Further subprograms in the DC190_X program are:

DC190_USER_XXXX	Programs are starting with DC190_USER_ program that can be modified by the user and serve as an example how communication can be used.
Note:	The DC_1_MAIN program must be called in one of these programs by a JSR instruction.
DC_1_MAIN:	DC190 main program, calls up DC_0_INIT once, calls up the subprogram DC_2_ALL, calculates the actual realtime speed, checks the status, and carries out an error reset every 5 seconds when an error message has been reported.
DC_0_INIT:	Initializing of all general data and of the datasets, calling up the subprogram "DC_0_INIT_LOOP" with a FOR loop. In case of a change of cam and delay time tables the number of loops is also changed.
DC_0_INIT_LOOP:	Subprogram of DC_0_INIT.
DC_2_ALL:	Here the read and write bits of the individual datasets are evaluated and the transfer programs are called. In case of a change of cam and delay time tables the number of loops is also changed.
DC_2_ALL_CAM_LOOP:	Subprogram of DC_2_ALL.
DC_2_ALL_PLC_LOOP:	Subprogram of DC_2_ALL.
DC_2_ALL_TZK_LOOP:	Subprogram of DC_2_ALL.

2.3. The TAGs of the DC190 Program

The programm TAGs described here are derived from the predefined "User-Defined" TAGs.

2.3.1. The General TAGs of DC190 Program

Type	Name	Data	Description
Alias to DC190 Controler TAG	DC190_COMM_Range	DC190:I.Data[2]	Alias for controller Input TAG of DC1090/190
Alias to DC190 Controler TAG	DC190_STATUS_COMM_AKTIV	DC190:I.Data[0]	Alias for controller Input TAG of DC1090/190
BOOL	DC190_STATUS_COMM_ERROR	0..1	Displays a command error
BOOL	DC190_STATUS_COMM_TIMEOUT	0..1	Displays a communication timeout
Alias to DC190 Controler TAG	DC190_STATUS_Realtime_actual_value	DC190:I.Data[6]	Alias for controller Input TAG of DC1090/190 In the example the realtime actual value of the CamCon DC1090/190 lies here.
REAL	DC190_STATUS_Realtime_Speed		The actual realtime speed value after calculation (see HELP_SPEED).
Alias to DC190 Controler TAG	DC190_STATUS_Realtime_Speed_Help	DC190:I.Data[5]	Help realtime speed value from DC1090/190 in this example
Alias to DC190 Controler TAG	DC190_STATUS_RUN_CONTROL	DC190:I.Data[4].15	Displays the run control bit of the DC1090/190 in this example 1 = OK / 0 = Error
Alias to DC190 Controler TAG	DC190_STATUS_V0_OUTPUT	DC190:I.Data[4].13	Displays the Bit, no movement in this example (speed = 0)
Alias to DC190 Controler TAG	DC190_STATUS_VR_OUTPUT	DC190:I.Data[4].14	Displays the Bit, for the direction of movement in this example
DINT	HELP	Loop counter 0..1000 etc.	Help variable for loop counter
Alias to BOOL	HELP_CMD_ERROR	DC190_COMM_Range.10	Error during execution of write message
Alias to BOOL	HELP_CMD_IN_USE	DC190_COMM_Range.9	Command in progress
Alias to BOOL	HELP_CMD_OK	DC190_COMM_Range.8	Last write message successfully done
Alias to BOOL	HELP_EXOR_BIT	DC190_COMM_Range.15	This Bit toggles after execution of a write message
BOOL	HELP_EXOR_BIT_SAVE	0..1	Communication Help Bit
INT	HELP_SPEED	-32767..+32767	Help variable for calculating realtime speed
DINT	LOOP_CAM	0..NMB_OUTPUTS	Loop-counter for TAG: DC_2_PRG_CAM[] for Cam programingerung.
DINT	LOOP_CAM_CHK	-1..NMB_OUTPUTS	Counter for the TAG's elements: DC_2_PRG_CAM[] with set OK Bit. If this value equals ANZ_OUTPUTS the TAG: DC_2_PRG_CAM_OK is set to 1.
DINT	LOOP_DTC	0.. NMB_DTC_OUTPUTS	Loop-counter for TAG: DC_2_PRG_DTC[] for delay-time programing.
DINT	LOOP_DTC_CHK	-1.. NMB_DTC_OUTPUTS	Counter for the TAG's elements: DC_2_PRG_DTC[] with set OK Bit. If this value equals ANZ_DTC_OUTPUTS the TAG: DC_2_PRG_DTC_OK is set to 1.
DINT	LOOP_PLC	0..NMB_PLC_LOGIC	Loop counter for the TAG: DC_1_SYSTEM_KONFIG_SPS[] for DC1090/190 SPS - Logic - module programing.
DINT	LOOP_PLC_CHK	-1..NMB_PLC_LOGIC	Counter for the elements of the TAG: DC_1_SYSTEM_KONFIG_SPS[] with se OK Bit. If this value equals the NMB_PLC_LOGICthe controller TAG: DC_1_SYSTEM_KONFIG_SPS_OK is set to1.
DINT	LOOP_PLC_GET	0.. NMB_PLC_GET_VALUE	Loop counter for the TAG: DC_2_PLC_GET_VALUE[]
DINT	LOOP_PLC_GET_CHK	-1..NMB_PLC_GET_VALUE	Counter for the elements OK of the TAG: DC_2_PLC_GET_VALUE[]
DINT	LOOP_PLC_SET	0.. NMB_PLC_SET_VALUE	Loop counter for the TAG: DC_2_PLC_SET_VALUE[]
DINT	LOOP_PLC_SET_CHK	-1..NMB_PLC_SET_VALUE	Counter for the elements OK of the TAG: DC_2_PLC_SET_VALUE[]
DC_9_MSG_BUFFER	MSG_BUFFER_TMP	DC_9_MSG_BUFFER	Help buffer for communication
DC_9_MSG_BUFFER	MSG_BUFFER_TMP_2	DC_9_MSG_BUFFER	2. Help buffer for communication
DINT	MSG_STATUS	0..2	Status of MSG transfer / 0 = No MSG / 1 = 1.MSG run / 2 = 2.MSG run.
DINT	NMB_CAM_OUTPUTS	1..62	Number of components (cams per output) from the cam table (for the creation of automatic parameters for the FOR - loops)
DINT	NMB_DTC_OUTPUTS	1..200	Number of components (cams with DTC) from the delay time table (for the creation of automatic parameters for the FOR - loops)
DINT	NMB_OUTPUTS	1..200	Number of components (outputs) from the cam table (for the creation of automatic parameters for the FOR - loops)
DINT	NMB_PLC_GET_VALUE	1..896	Number of components of the PLC_GET_VALUE table
DINT	NMB_PLC_LOGIC	1..896	Number of components from the PLC - Logic - Module table (for the creation of automatic parameters for the FOR - loops)
DINT	NMB_PLC_SET_VALUE	1..896	Number of components of the PLC_SET_VALUE table
TIMER	STATUS_R_TIMER	every 5 seconds	Timer for cyclic reading of the status question
TIMER	TIMEOUT_R	maximum 5 seconds	Data transfer, read Timeout Timer
TIMER	TIMEOUT_W	maximum 5 seconds	Data transfer, write Timeout Timer

2.3.2. TAG "ADR"

The ADR TAG of the individual datasets always consists on the data range, the offset, the data length and the control bits. Via the range and the offset the function, i.e. the parameters, cams or delay time values are selected. If more validators are necessary, then it is determined via the data length how much is to be read or written. Data transfer is released and monitored by the control bits.

Type	Name	Description
DC_9_HEADER	ADR	Address consists of:
DINT[0]	RANGE	Data range number
DINT[1]	OFFSET	Offset in the data range
DINT[2]	DATA_LEN	Length of transferred data
DC_9_CMD_BITS	CMD	Command bits consist of:
DC_9_CMD_BIT	WRITE	Dataset to be written Note: Not ev99ery dataset can be written
DC_9_CMD_BIT	RUN	Dataset transfer in progress
DC_9_CMD_BIT	OK	Dataset transfer completed and OK
DC_9_CMD_BIT	ERROR	Dataset transfer completed with Error or Timeout In a Timeout; the DC1756DICAM Program attempts to send the dataset again
DC_9_CMD_BIT	READ	Dataset to be read Note: Not every dataset can be read

For easy presentation purposes, the following tag description will always show one line with the range, offset and the length. The bits WRITE, RUN and READ must always be 0 in this definition. In case a data transfer is interrupted by a power cut of the CPU, these must be set to 0 during initialisation (See Program DC_0_INIT).

2.3.3. TAG "DC_0_CLEAR_ALL"

Type	Name	Data	Description
DC_9_HEADER	ADR	205,1,1	Address
DINT[0]	DATA	-1	If this dataset is transferred, the CamCon is completely erased Note: write only is possible

2.3.4. TAG "DC_0_EEPROM_LOCK"

Type	Name	Data	Description
DC_9_HEADER	ADR	205,4,1	Adresse
DINT[0]	EEProm_Lock	0..1	0 = EEProm not blocked 1 = EEProm blocked, no write to the EEProm **Warning:** The EEProm must be blocked, if data is written frequently (cyclic) to the component group; otherwise the EEProm memory is destroyed. Changes on cams, parameters etc. which are written after the memory has been blocked are lost after switching OFF and ON.

2.3.5. TAG "DC_0_HW_RESET"

Type	Name	Data	Description
DC_9_HEADER	ADR	205,2,1	Adresse
DINT[0]	DATA	-1	When this dataset is transferred, a Hardware Reset is released on the CamCon. This corresponds to switching operating power OFF and ON. Note: write only is possible

2.3.6. TAG "DC_1_SYSTEM_CONFIG"

With the transfer of this TAG the parameters of the CamCon DC1090/190 are complete.

Type	Name	Data	Description
DC_9_HEADER	ADR	203,0,66	Adresse
DINT[0] alue	Measuring_system_type	-1, 0..20	Here you select your measuring system. 0 = 256 SSI Single turn Grey 1 = 360 SSI Single turn Grey 2 = 512 SSI Single turn Grey 3 = 1000 SSI Single turn Grey 4 = 1024 SSI Single turn Grey 5 = 2048 SSI Single turn Grey 6 = 4096 SSI Single turn Grey 7 = 8192 SSI Single turn Grey 8 = AWA/SSI 8 Bit 9 = AWA/SSI 12Bit 10 = 4096x4096 SSI Multiturn 4096Imp.= 1 Turn 11 = 4096x4096 SSI Multiturn 4096Imp.= 2 Turn 12 = 4096x4096 SSI Multiturn 4096Imp.= 4 Turn 13 = 4096x4096 SSI Multiturn 4096Imp.= 8 Turn 14 = 4096x4096 SSI Multiturn 4096Imp.= 16 Turn 15 = 4096x4096 SSI Multiturn 8192Imp.= 2 Turn 16 = 4096x4096 SSI Multiturn 8192Imp.= 4 Turn 17 = 4096x4096 SSI Multiturn 8192Imp.= 8 Turn 18 = 4096x4096 SSI Multiturn 8192Imp.= 16 Turn 19 = 4096x4096 SSI Multiturn 8192Imp.= 32 Turn 20 = 4096x4096 SSI Multiturn 8192Imp.= 64 Turn **Note:** For CamCon DC190 with firmware version 3/2016 and CamCon DC1090, the SSI - interface can be switched from "encoder 1 SSI" to "Encoder 2 SSI" and/or interface B. This is controlled by the bit 30 of this register. For example: 0x40000001 = 360 SSI singleturn Gray on interface B 0x40000007 = 8192 SSI singleturn Gray 0x40000014 = 4096x4096 SSI multiturn 8192Imp. = 64 Turn or select a specific one -1 = Special measuring system
DINT[1]	Special_measuring_system_type	0..7	Special measuring system type 0 = SSI - Measuring system 1 = Parallel - Measuring system 2 = Incremental - i.e. Hiperface - Measuring system. 3 = Multiturn - Measuring system 4 = PLL - Measuring system 5 = Timer - Measuring system 6 = RS232 - Measuring system 7 = AG615 at 360° - Measuring system
DINT[2]	SMS_Parameter_1		Special measuring system depends on Parameter 1. See Chapter "2.3.7. Special measuring system TAGs"
DINT[3]	SMS_Parameter_2		Special measuring system depends on Parameter 2. See Chapter "2.3.7. Special measuring system TAGs"
DINT[4]	SMS_Parameter_3		Special measuring system depends on Parameter 3. See Chapter "2.3.7. Special measuring system TAGs"
DINT[5]	SMS_Parameter_4		Special measuring system depends on Parameter 4. See Chapter "2.3.7. Special measuring system TAGs"
DINT[6]	SMS_Parameter_5		Special measuring system depends on Parameter 5. See Chapter "2.3.7. Special measuring system TAGs"
DINT[7]	SMS_Parameter_6		Special measuring system depends on Parameter 6. See Chapter "2.3.7. Special measuring system TAGs"
DINT[8]	Value_hysteresis	0..125	The value hysteresis This value is necessary to suppress fluttering of the outputs during unsteady value gathering. The exact value can only be obtained by trial and error, but it has to be as small as possible or always 0. Hysteresis can be set between 0 and maximum 1/4 of the total resolution but it must not exceed maximum of 125 Impulses.
DINT[9]	Speed_maximum	0..9999	Maximum speed for measuring system control (Impulses per cycle) The value to be entered is calculated from the actual cycle time of the CamCon, from the physical resolution of the measuring systems and the speed of the machine. Example: Cycle time = 0.5ms / resolution = 360 / speed of the machine = 180 min $^{-1}$. $$\text{Value} = \frac{\text{Resolution} * \text{machine speed}}{60 * 1000} * \text{cycle time} + \text{safety reserve}$$ $$\frac{360 * 180}{60 * 1000} * 0.5 + 5 = 5.54 \approx \mathbf{6}$$ The result is rounded up and entered. If the CamCon now registers an actual value jump of more than 6 impulses, an error message **"Pos-Err:5"** is created. If a zero is entered, the control is switched off. The Resolution must be entered as a physical value (no transmission factor).
DINT[10]	Transmission_multiplier	-99999... 99999	The multiplier for electronic transmission serves for measuring range transformation. The physical measuring range, for example of a rotational angle encoder, is transformed into a new and for the user effectively visible measuring range (actual value). **Note:** The counting direction of the measuring systems is marked by the prefix.

DINT[11]	Transmission_divider	1..99999	Divider for electronic transmission **Example:** In the event of a full turn of the rotational angle encoder with 360 steps per rotation, a machine drives around 1000mm. If the display of the position is no longer supposed to be in angle degrees but in mm, the motor must be set to the factor **1000 / 360** with the effect, that the display will no longer change in one-step increments since the resolution is not influenced. If you select, for example **100 / 360**, the actual value is calculated down to a process range of up to 100. The position display is given then in cm, whereby moving the decimal point is not possible.
DINT[12]	Measuring_system_movement	0..1	Measuring system type 0 = Rotational (for example: eccentric presses, packaging machine) 1 = Linear (for example: toggle press, positioning) **Warning:** If during linear path measuring the value is outside the stipulated range, the CamCon switches off with the error message **"Pos-Err 3".**
DINT[13]	Starting_point_line_measuring_system	-9999999... 9999999	Start value for linear measuring system Here you state the required start value of the process range. Also you can set a negative value.
DINT[14]	Offset_measuring_system	minimum... maximum possible actual value	Offset for measuring system The Offset is deducted from the physical actual value and thus gives you the option of moving the zero point. **Note:** If you have selected a linear movement and the turning direction is set to minus, then the offset must be a value smaller than zero (for example -359).
DINT[15]	Preset_value_measuring system	minimum.. maximum possible actual value	Setting a preset value for an actual value in the measuring system when a positive limit on the CamCon preset input is found. By setting the preset value to zero you can create an external zero signal, in order to, for example, synchronise the position of the machine with the acual value of the CamCon.
DINT[16]	Preset_input_measuring_system	0.. Number_cam_ Inputs	Preset Input for measuring system 0 = Preset OFF The actual value can be changed with a positive limit on the CamCon Preset Input.
DINT[17]	Zero_power_fixed_preset	0..1	Preset fixed zero power 0 = zero power not fixed 1 = zero power fixed **Warning**: At a value of 1the EEProm can be destroyed by cyclical writing! **Note:** This parameter also affects the setting of the actual value. See Chapter "2.3.9. TAG "DC_1_SYSTEM_SET_ACTUAL_VALUE"" on page 20.
DINT[18]	Speed_factor	1..999999999	Speed factor The speed is measured by increments i.e. impulses per second which the measuring system gives out after calculation through the electronic gear (USER resolution). But, if you want to display the speed, for example in U/min. or in items per minute or status, you willhave to set a conversion factor. With a "Speed factor" of 100000, the speed value shows "User resolution" / second. Factor for U/min = 60 / User resolution * 100000. Example: 16666 = at 360° "User resolution" or 732 = at 8129 Imp "User resolution"
DINT[19]	Max_speed_value	2..999999999	100% - Speed value This value served the adaptation of the speed display and must always be set to 10% more than the maximum expected speed of the device.
DINT[20]	Speed_display_accuracy	1..999	Accuracy or damping of the speed indicator 100 = 1.00% Oscillation of the speed indicator can be limited to a maximum value. This is achieved by damping through a low pass, which results in a smoothing of the display, i.e. a kind of middle value is created. The smaller the entered value, the smoother the speed display will be.
DINT[21]	Switchover_mode_display	0	This value has no function in the CamCon DC1090/190.
DINT[22]	Input_switchover_display	0	This value has no function in the CamCon DC1090/190.
DINT[23]	Cable_length	0..1000	Cable length between the SSI - measuring system and the CamCon and between the external input/output extension and the CamCon in meters. This value is necessary, since the cable lengths determines the maximum possible speed of serial data transfer. The longer the entered cable length, the slower the data communication and the higher the cycle time (Default = 30 meters).
DINT[24]	Cycle_time	0..10000	The expected cycle time in µs, i.e. actual cycle time when this value is read. The expected cycle time is for example necessary when a measuring system is connected to it, which allows only one reading of the data within a specific time.
DINT[25]	Safety_output	0.. Number_cam_ Outputs	Safety Output i.e. Run-Control In order to have the option of controlling the CamCon in situations such as short circuits on output channels or errors in path measuring, a rotary cam can be programmed for a single output. This output is only switched off when an error occurs and serves as a safety output. In the case of a program change the safety output is temporarily set back. See also DINT[36] on page DINT[36] on page 13. "**0**" means that no safety output has been programmed.
DINT[26]	Send_actual_realtime_value	0..2	Output of actual realtime value on the I-range 0 = No actual realtime output 1 = Output actual value in grey code 2 = Output actual value in binary code Always set CamCon DC1090/190 to 2.
DINT[27]	Turning_direction_output	0.. Number_cam_ Outputs	Rotational direction output This switches over when the speed hysteresis is exceeded. When the direction of the movement is positive, output is switched on and if it is negative, it is switched off. "**0**" means that no rotational direction output has been programmed.
DINT[28]	Hold_output	0.. Number_cam_ Outputs	No movement output This output switches on, when the actual speed exceeds the set hysteresis value. "**0**" means that no standstill output was programmed. **Note for the Holt_output also:** DINT[69] Value: Hold_output_hysteresis
DINT[29]	Speed_hysteresis	0.. Max_speed_value	Speed hysteresis For the rotational direction output and the standstill output the speed hysteresis must be set. This value is necessary for defining a switch threshold at which the switch-over takes place.
DINT[30]	Number_cam_inputs	0..200 (only multiples of 8)	Number of cam-switch inputs When the "PLC - Logic - Option" is switched off, the number of hardware inputs must be entered at the CamCon. If the option inputs is built into the device, 8 or otherwise 0 must be entered. Note: The option X = "external Interface" and the connected extension device require that the number of inputs correspond exactly to the number of electrical inputs, since the short-circuit recognition of the CamCon reacts to the number of inputs.

DINT[31]	Number_cam_outputs	24..200 (only multiples of 8)	Number of cam-switch outputs When the "PLC - Logic- Option" is switched off, the number of hardware outputs must be entered at the CamCon (24). In addition it is possible to make up to 200 cam outputs available via the back plane bus of the ControlLogix. Note: The option X = "external Interface" with the connected extension devices require that the number of outputs correspond exactly to the number of electrical outputs.
DINT[32]	Number_outputs_with_DTC	0.. Number_cam_ outputs (only multiples of 8)	Number of outputs with Speed Compensation Here you enter the number of Speed Compensating cam outputs which are available to the CamCon. The number of outputs should not exceed the absolutely necessary maximum, otherwise you waste storage space and cycle time unnecessarily.
DINT[33]	Input_keyboard_lock	0	This value has no function in the CamCon DC1090/190 and must always be 0.
DINT[34]	Number_Input_for_external_ progam_selection	0	This value has no function in the CamCon DC1090/190 and must always be 0.
DINT[35]	Strob_Input_of_external_pro gram_selection	0	This value has no function in the CamCon DC1090/190 and must always be 0.
DINT[36]	Program_selection_mode	0..2	Program selection mode 0 =slow, 1 = direct, 2 = by actual value **slow:** The selected program is constructed cam by cam. This kind of program change does not require any additional RAM storage, but during program switching at full speed complications on the machine can occur. In this case, the safety output of the CamCon is temporarily switched off. **direct:** In a buffer store the selected program is constructed cam by cam and then quickly changed. This kind of program change needs double storage space for the cam construction and the outputs are never undefined. The safety output of the CamCon is not switched off in this case. **by actual value:** In a buffer the selected program is constructed cam by cam. You must wait until the machine passes a specific actual value and then execute a sudden program change. This kind of program change also needs double storage space for the cam construction and the outputs are never undefined. The safety output of the CamCon is not switched off in this case.
DINT[37]	Actual_value_progam_select ion_mode_2	minimum.. maximum possible actual value	Change-over point when the program select mode is set to 2.
DINT[38]	Number_of_analog_outputs	0	This value has at present no function in the CamCon DC1090/190 and must always be 0.
DINT[39]	Realtime_speed_output	0..1	Realtime speed output 0 = no realtime speed output 1 = realtime speed output switched on
DINT[40]	Number_internal_analog_out put	0	This value has no function in the CamCon DC1090.
DINT[41]	Offset_int_analog_output_1	0	This value has no function in the CamCon DC1090.
DINT[42]	Offset_int_analog_output_2	0	This value has no function in the CamCon DC1090.
DINT[43]	Factor_int_analog_output_1	0	This value has no function in the CamCon DC1090.
DINT[44]	Factor_int_analog_output _2	0	This value has no function in the CamCon DC1090.
DINT[45]	Plc_logic_module_status	0..2	Plc - Logic - Module / 0 = OFF / 1 = ON/ 2 = ON / remanend **Warning:** Before you switch on the Plc - Logic - Module, it is essential, that you read the instruction manual of the Plc - Logic - Module. You can access this instruction manual at the address "http://www.digitronic.com" as a PDF file.
DINT[46]	Number_hardware_inputs	0..200 (only multiples of 8)	Number of hardware inputs **Note:** This value is only applied if the Plc - Logic - Module is switched on.
DINT[47]	Number_hardware_outputs	0..200 (only multiples of 8)	Number of hardware outputs = I - Range of ControlLogix **Note:** This value is only applied if the Plc - Logic - Module is switched on.
DINT[48]	Number_plc_register	0..248 (only multiples of 8)	Number of "PLC - Logic - Module" register **Note:** This value is only applied if the Plc - Logic - Module is switched on.
DINT[49]	Number_plc_x_register	0..248 (only multiples of 8)	Number of "PLC - Logic - Module" X - register **Note:** This value is only applied if the Plc - Logic - Module is switched on.
DINT[50]	Number_plc_timer_ counter	0..200 (only multiples of 8)	Number of "PLC - Logic - Module" Timer/Counter **Note:** This value is only applied if the Plc - Logic - Module is switched on.
DINT[51]	Number_plc_v_inputs	0..248 (only multiples of 8)	Number of "PLC - Logic - Module" V - Inputs = 0 - Range of ControlLogix **Note:** This value is only applied if the Plc - Logic - Module is switched on.
DINT[52]	Number_plc_s_inputs	0..248 (only multiples of 8)	Number of "PLC - Logic - Module" S - Inputs **Note:** This value is only applied if the Plc - Logic - Module is switched on.
DINT[53]	Master_program	0..1	Master - Program / 0 = OFF / 1 = ON Here you have the option of defining program or related product cams. These are necessary if, for example, you process several products with your machine which have only few product related differences in the cam program. It is a way of saving considerable cam storage space (EEProm), since the cams which are not product dependent need not be repeatedly programmed.
DINT[54]	Master_program_number	0..32767	Master Program Number Enter the Master Program Number under which the Master cams are to be stored.
DINT[55]	Master_output_1_32	Bits 0-31	Master Program Output 1 - 32, Radix := Binary Here you defined a bit mask which cam output is a Master Output.
DINT[56]	Master_output_33_64	etc.	Output 33 - 64
DINT[57]	Master_output_65_96	"	etc.
DINT[58]	Master_output_97_128	"	"
DINT[59]	Master_output_129_160	"	"
DINT[60]	Master_output_161_192	"	"
DINT[61]	Master_output_193_224	"	"
DINT[62]	Master_output_225_248	"	"
DINT[63]	DC300_interrupt	0	This value has no function in CamCon DC1090.

DINT[64]	Number_plc_shift_register	0..200 (only multiples of 8)	Number of shift registers in the Plc - Logic - Module **Attention:** **If a shift register is defined, the variable "speed max" is set to 16, because in one cycle of the DC1090 a maximum of 16 bits of the shift register can be shifted.** See also chapter 2.3.6. TAG "DC_1_SYSTEM_CONFIG" Value: DINT[9]. **Note:** This value is rounded up and only then applied when the Plc - Logic - Module is switched on
DINT[65]	Max_shift_size	0..999999	Maximum length of a shift register in the Plc - Logic -Module. **Note:** This value is rounded up and only then applied, when the Plc - Logic - Module is switched on.
DINT[66]	Enable_input	0..200 or 255	A 24VDC signal at the input with that number will enable the cam outputs, no signal disables or locks the cam outputs. If this value is set to **"0"**, the "enableling function is inactive and the cam outputs are permanentely enabled. **Note:** If the CamCon PLC logic module is turned on, this input acts on the cam outputs "N" (not the "O" outputs). **Note for DC1090/190:** Set here a 255 for the CamCon DC1090/190 with EthernetIP communication. This is necessary because the CamCon DC1090/190 cam outputs are only enabled when the communication with the ControlLogix PLC was established.
DINT[67]	Error_quit_input	0..200	A positive edge (+24V DC) at the input number shown here, quitting an error like "Pos-Error": 1,2,3 and 5 **but not** an output error. **Note:** The use of this input with DC1090/190 is not necessary or useful, because the same function is possible by use of the TAG: "DC_4_QUIT_ERROR".
DINT[68]	Number_of_NLT	0..246	Here you have to enter the number of NLT tables you need. The maximal value is 246. Do not enter here more then necessary tables because each of the tables need memory and cycle time. **Note:** The programming of the NLT on the ControlLogix is not possible currently. Set this value to 0 to switch of the NLT.
DINT[69]	Hold_output_hysteresis	0..99	Set here a hysteresis for the switch point of the Hold_output. You can set the value in percent of the DINT[29] Value Speed_hysteresis from 0 upto 99%. **Note for this value also:** DINT[28] Value: Hold_output

Note: You will find the minimum/maximum possible actual value in Chapter "2.3.14. TAG "DC_3_STATUS_FULL" Value: DINT[27]" and Chapter "2.3.14. TAG "DC_3_STATUS_FULL" Value: DINT[28]" on page 22.

2.3.7. Special measuring system TAGs

A special measuring system is necessary if you cannot connect or use any of the predefined SSI - measuring systems to the CamCon.

2.3.7.1. TAG "DC_1_SYSTEM_CONFIG_ENC_0_SSI"

Type	Name	Data	Description
DINT[0]	REC	-1	Always -1 = recognition of special measuring system **Note:** For CamCon DC190 with firmware version 3/2016 and CamCon DC1090, the SSI - interface of the cam controller can be switched from "encoder 1 SSI" to "Encoder 2 SSI" and/or interface B. This is controlled by the bit 30 of this register. For example: 0x40000001 = 360 SSI singleturn Gray on interface B 0x40000007 = 8192 SSI singleturn Gray 0x40000014 = 4096x4096 SSI multiturn 8192Imp. = 64 Turn For a special measuring system to interface B (Encoder 2 SSI), the bit must be low. 0xFFFFFFFF (-1) = 1 special measuring SSI - Interface 0xBFFFFFFF (-1073741825) = special measuring 2. SSI - Interface The choice of 2 SSI - Interface as a measuring system is not stored retentively and is at lost a restart
DINT[1]	TYP	0	Type 0 = SSI Measuring system
DINT[2]	BIT	2..25	Measuring system resolution in bits Enter the number of the used data bits of the SSI - measuring system. Resolution of, for example 1000 Impulses, this corresponds to 10 bits.
DINT[3]	LSB	2..25	Position of the LSB (Offset) in the delivered encoder value from which the evaluation is to be started. For a 1000 Impulse SSI - measuring system the position of the LSB is on position 10. For more accurate information please consult the instruction manual for your measuring system.
DINT[4]	CAPP	0..65536	Capping for encoders which have no binary resolution. At 1000 Impulses this would be (1024 - 1000) / 2 = 12.
DINT[5]	ERROR	14 25 / 26	Bit position of the SSI - Error bit Standard rotating angle encoders of the Stegmann company use the bit position 14. At this SSI - Position it is necessary to transfer a 0.
DINT[6]	RES1	0	Reserve 1
DINT[7]	RES2	0	Reserve 2

Copy this data range to the beginning of the data range tag "DC_1_SYSTEM_CONFIG" with the ”COP” command or enter the value directly in the DC_1_SYSTEM_CONFIG TAG. After the transfer of this dataset the SSI - special measuring system is set.

2.3.7.2. TAG "DC_1_SYSTEM_CONFIG_ENC_1_PAR"

Type	Name	Data	Description
DINT[0]	REC	-1	always -1 = Recognition of the special measuring system
DINT[1]	TYP	1	Type 1 = parallel measuring system
DINT[2]	RESOLUTION	2..65536	Measuring system resolution Please state the resolution of the parallel measuring systems (for example 500 Impulses)
DINT[3]	INPUT	0... Number_cam_outputs - resolution in bits	Input number from which evaluation is to be started This is the input of the lowest value bits (LSB). At a resolution of 500 impulses 9 bits of resolution are needed. The CamCon calculates from the position of the LSBs automatically the position of the remaining inputs, that is in ascending order. Please make sure that you are not going outside the input range of the CamCon.
DINT[4]	MODE	0..1	Coding of parallel measuring systems 0 = Gray code 1 = Binary code **Warning:** The parallel binary code should only be used in exceptional circumstances. Please contact your customer service.
DINT[5]	RES1	0	Reserve 1
DINT[6]	RES2	0	Reserve 2
DINT[7]	RES3	0	Reserve 3

Copy this data range to the beginning of the data range tag "DC_1_SYSTEM_CONFIG" with the ”COP” command or enter the value directly in the DC_1_SYSTEM_CONFIG TAG. After the transfer of this dataset the parallel special measuring system is set.

2.3.7.3. TAG "DC_1_SYSTEM_CONFIG_ENC_2_INK" or Hiperface

Type	Name	Data	Description
DINT[0]	REC	-1	always -1 = Recognition for special measuring system
DINT[1]	TYP	2	Type 2 = INK or Hiperface Measuring system
DINT[2]	RESOLUTION	2..131072	Measuring system resolution Enter the maximum necessary impulse number. This value is then the maximum resoluton which the CamCon will evaluate. If more impulses are counted than set for the resolution, then the CamCon begins to count from zero again. But, if the movement system was set to **"linear"** (TAG = Measuring system_movement), then the CamCon switches to **"Clear...."** or **"Pos-Err: 3"**. In this case the resolution must be made higher or the actual value must be reset by means of a Clear or Preset signal.
DINT[3]	DIV	0..11	Divisor of impulses, 0 = *4, 1 = *2, 2 = *1, 3 = /2, 4 = /3..... The divider divides or multiplies the incoming impulses of the measuring systems with this value. The following dividers can be entered: "***4**", "***2**", "***1**", "**/2**", "**/4**", "**/8**", "**/16**", "**/32**", "**/64**", "**/128**", "**/256**", "**/512**". If the divisor is set to "***4**" = 0, this means that a measuring system with 500 impulses resolution makes available 2000 impulses to the device (quadrupling).
DINT[4]	MODE	0..7	Clear Modes, 0=C1&C2, 1=/C1&C2..... 7=C2 neg. edge or C1 Here you set the function of the additional inputs C1 and C2. You can select from 8 possible function types: "**C1 & C2**" If Input C1 is high and C2 is high, the counter is set to zero. "**/C1 & C2**" If Input C1 is low and C2 is high, the counter is set to zero. "**C1 & /C2**" If Input C1 is high and C2 is low, the counter is set to zero. "**/C1 & /C2**" If Input C1 is low and C2 is low, the counter is set to zero. "**C1 : W**" If Input C1 is high, the counter is set to zero. If Input C2 is high, impulses are no longer counted (Wait). "**/C1 : W**" If Input C1 is low, the counter is set to zero. If Input C2 is high, impulses are no longer counted (Wait). "**C1 or á C2**" The counter is set to zero, if Input C1 is high if or if the signal changes an Input C2 from low to high. "**C1 or â C2**". The counter is set to zero, if Input C1 is high or if the signal changes an Input C2 from high to low.
DINT[5]	RES1	0	Reserve 1
DINT[6]	RES2	0	Reserve 2
DINT[7]	RES3	0	Reserve 3

Copy this data range to the beginning of the data range tag "DC_1_SYSTEM_CONFIG" with the ”COP” command or enter the value directly in the ”DC_1_SYSTEM_CONFIG” tag. After the transfer of this dataset the incremental special measuring system is set.

2.3.7.4. TAG "DC_1_SYSTEM_CONFIG_ENC_3_MULTI"

Type	Name	Data	Description
DINT[0]	REC	-1	always -1 = Recognition for special measuring system
DINT[1]	TYP	3	Type 3 = Multi-turn measuring system for AAG626 or AAG66107 This measuring system is needed, if you have to drive a multi-turn angle encoder with non-binary number revolutions.
DINT[2]	RESOLUTION	2..65536	Measuring system resolution **Example 1:** You have a turntable with a gear ration of 3 to 1, whereby the angle encoder makes three turns and the turntable one turn. These three revolutions correspond now to 360 impulses (360 Degrees). The following entries are necessary to achieve this: Resolution = 360 / Turn = 3 / Div = 1. **Example 2:** You have a turntable with a gear ratio of 12.5 to 1, whereby the angle encoder makes 12.5 turns and the turntable one turn. These 12.5 revolutions now correspond to 3600 impulses (360.0 Degrees). The following entries are necessary to achieve this: Resolution = 3600 7 Turn = 25 / Div = 2. **Warning:** This measuring system works only in connection with a multi-turn angle encoder with 4096 x 4096 impulses resolution (Type: AAG66107 or AAG626) and must not be through more than 512 revolutions of the angle encoder without power supply.
DINT[3]	TURN	1..999	Number of turns of the encoder
DINT[4]	DIV	1..999	Divider for uneven turns or 1
DINT[5]	RES1	0	Reserve 1
DINT[6]	RES2	0	Reserve 2
DINT[7]	RES3	0	Reserve 3

Copy this data range to the beginning of the data range tag "DC_1_SYSTEM_CONFIG" with the ”COP” command or enter the value directly in the ”DC_1_SYSTEM_CONFIG” tag. After the transfer of this dataset the multi-turn special measuring system is set.

2.3.7.5. TAG "DC_1_SYSTEM_CONFIG_ENC_4_PLL"

Type	Name	Data	Description
DINT[0]	REC	-1	always -1 = Recognition for special measuring system
DINT[1]	TYP	4	Type 4 = PLL - Measuring system The PLL measuring system (Phase - Lock - Loop) calculates the path from time Interpolation of a single measuring impulse. For example: If you have fixed an initiator to your turntable and you would like to calculate the actual position at constant speed without attaching a further measuring system, then the PLL measuring system is the right choice.
DINT[2]	IMPULSES	2..8192	Impulses per input signal
DINT[3]	NUMBER_ IMPULSE	1..8192	Number of input impulses for one revolution
DINT[4]	ERROR	0..8192	Error window
DINT[5]	IMPULS_ INPUT	1.. Number_cam_inputs	Impulse - Input
DINT[6]	CLEAR_INPUT	0.. Number_cam_inputs	Clear - Input
DINT[7]	ERROR_ OUTPUT	0.. Number_cam_outputs	Error - Output

Copy this data range to the beginning of the data range tag "DC_1_SYSTEM_CONFIG" with the ”COP” command or enter the value directly in the ”DC_1_SYSTEM_CONFIG” tag. After the transfer of this dataset the PLL special measuring system is set.

2.3.7.6. TAG "DC_1_SYSTEM_CONFIG_ENC_5_TIMER"

Type	Name	Data	Description
DINT[0]	REC	-1	always -1 = Recognition for special measuring system
DINT[1]	TYP	5	Type 5 = Timer Measuring system
DINT[2]	RESOLUTION	2..65536	Measuring system resolution The timer path simulation makes it possible to create paths or actual time values without measuring system, that is on a time basis. In that case, the Cam Switch Unit behaves in a similar way as a washing machine control system.
DINT[3]	TIME	1..10000	Time per step in ms
DINT[4]	STOP_INPUT	0 - Number_cam_inputs	Stop - Input (release) A high signal at this input lets the timer run, a low signal at this input stops the timer. If you do not want to have a stop input, simply insert "**0**".
DINT[5]	CLEAR_INPUT	0 - Number_cam_inputs	Clear - Input A high signal at this input leaves the timer at **"0"**. If you do not want a Clear - Input, simply insert "**0**".
DINT[6]	RES1		Reserve 1
DINT[7]	RES2		Reserve 2

Copy this data range to the beginning of the data range tag "DC_1_SYSTEM_CONFIG" with the ”COP” command or enter the value directly in the DC_1_SYSTEM_CONFIG TAG. After the transfer of this dataset the timer special measuring system is set.

2.3.7.7. TAG: "DC_1_SYSTEM_CONFIG_ENC_7_AG615"

Type	Name	Data	Description
DINT[0]	REC	-1	alwaysr -1 = Recognition for special measuring system
DINT[1]	TYP	7	Type 7 = Measuringsystem AG615 This SSI Speciale measuring system makes a Multi-Turn i.e. Use measuring sytem of an AAG615-8192 Single - Turn measuring system. As a result, one gets severally revolutions at the DC1090/190 per a single Turn of the AG615.
DINT[2]	RESOLUTION	2..8192	Resolution of the measuring system per Turn
DINT[3]	TURNS	1..999	Number of Turns per revolution of the measuring system
DINT[6]	RES1		Reserve 1
DINT[6]	RES2		Reserve 2
DINT[6]	RES3		Reserve 3
DINT[7]	RES4		Reserve 4

Copy this data range using the "Copy" command at the beginning of the data-range of the TAG "DC_1_SYSTEM_CONFIG" or directly enter the values into the TAG: DC_1_SYSTEM_CONFIG. After the transmission of this data-record, the AG615 is set.

2.3.7.8. TAG: "DC_1_SYSTEM_CONFIG_ENC_8_SPEED_SIM"

Type	Name	Data	Description
DINT[0]	REC	-1	recognition for special measuring systems
DINT[1]	TYP	8	Type 8 = measuring system simulator This measuring system simulator enables creating way- or actual time-values without needing a measuring system (on the base of time). On the contrary to the Timer-measuring system a higher speed is possible.
DINT[2]	RESOLUTION	2..65536	measuring system resolution
DINT[3]	INC_SECOND	1..10000	Speed in Impulses i.e. Increments per second.
DINT[4]	HALT_INPUT	0 - Number of_NSW_inputs	Halt - input (enableling). A high Signal at this input sets the simulator to go, a low signal at this input stops the simulator. If you do not want a Halt input, simple enter a 0 here.
DINT[5]	CLEAR_INPUT	0 - Number of_NSW_inputs	Clear - input A high signal at this input sets the timer to **"0"**. If you do not want a Clear - input, simply enter a "0" here.
DINT[6]	RES1		Reserve 1
DINT[7]	RES2		Reserve 2

This datarange can be copied directly to the beginning of the data-range of the TAG "DC_1_SYSTEM_CONFIG" by using the "copy" command or directly enter the values into the TAG: DC_1_SYSTEM_CONFIG. After a transmission of this data record the simulator - special measuring system.

2.3.7.9. TAG: "DC_1_SYSTEM_CONFIG_ENC_9_HIPER"

Type	Name	Data	Description
DINT[0]	REC	-1	always 1 as Recognition for special measure systems
DINT[1]	TYP	9	Type 9 = HIPER - measure systems with Roll - Over - Function This special measuringh system is used if the DC0190/190 is equiped with a HIPER - Face - or Incremental - measuring system-input and an odd translation of the gear would cause an adding measuring error..
DINT[2]	MUL	1..9999	Multipliertfor the HIPER - gear.
DINT[3]	DIV	1..4095	Divisor for the HIPER - gear.
DINT[4]	RESOLUTION	2..131072	Enter here the maximum required number of impulses. This values is the resolution to which the CamCon is evaluated. If more impulses than the set resolution value are counted, the Camcon re-starts counting at 0. If the moving system was set to **"linear"** (TAG = measuring system_moving), the CamCon switches to "Clear" respective "Err: 3", a case in which the resolution has to be set to a greater value or the actual value has to be reset by creating a Clear- or Preset-signal.
DINT[5]	MODE	0..7	Clear Modes, 0=C1&C2, 1=/C1&C2..... 7=C2 neg. edge or C1 Set the aditional input's C1 and C2 functions here. You can choose between 8 possible types of functions : "**C1 & C2**" If input C1 is high and C2 high, the counter is set to 0. "**/C1 & C2**" If input C1 is low and C2 high, the counter is set to 0. "**C1 & /C2**" If input C1 is high and C2 low, the counter is set to 0. "**/C1 & /C2**" If input C1 is low and C2 low, the counter is set to 0. "**C1 : W**" If input C1 is high, the counter is set to 0. If input C2 is high, no more impulses will be countedt (Wait). "**/C1 : W**" If input C1 is low, the counter is set to 0.If input C2 is high ist, no more impulses will be countedt (Wait). "**C1 or á C2**" The counter is set to 0, if input C1 is high or the signal at the input C2 changes from low to high. "**C1 or â C2**". The counter is set to 0, if input C1 is high or the signal at the input C2 changes from high to low.
DINT[6]	RES1		Reserve 1
DINT[7]	RES2		Reserve 2

Copy this data range, using the "COP" command to the begining of the datarange of the TAG "DC_1_SYSTEM_CONFIG" or transfer the values directly into the TAG: DC_1_SYSTEM_CONFIG. After the transmission of this data record, the HIPER - special measuring system.

2.3.8. TAG "DC_1_SYSTEM_CONFIG_PLC[X]"

The company Digitronic Automationsanlagen GmbH has been known for a long time within the industry as a supplier and developer of electronic cam-switch mechanisms. Long-standing experience gained in a close working relationship with the users with regard to linking PLC control systems and cam-switch mechanism have been taken into account in the development of the CamCon PLC Logic Module. The result is a PLC Software which works in the CamCon parallel to the cam-switch mechanism. The input and outputs of the cam-switch mechanism are linked without external logic and without requiring hardware, such as locking mechanisms, timers, Set - Reset functions, counters, markers and therefore work within the same cycle time as the cam-switch mechanism. This combination guarantees the best way of exploiting the Speed Compensation of the cam-switch mechanism and of the logic of the PLC, without loss of switching speed through slower external switching components (for example relays, units of time, central PLC control with high cycle times).

The tags DC_1_SYSTEM_CONFIG_PLC[X] provide the programming of the PLC - Logic - Module of the CamCon DC1090/190. Before you switch on and program the PLC - Logic - Module, it is essential that you consult the user instruction manual for the PLC - Logic - Modules. You can access this instruction manual in the Internet at http://www.digitronic.com as a PDF file.

Type	Name	Data	Description
DC_1_SYSTEM_CONFIG_PLC[X]	Index X	1.. 2*200 + 2*248	Array for PLC - Logic - Module, one component for each network
DC_9_HEADER	ADR	216,0,36	Address Note: at the present time only write is possible
DINT[0]	TYP_OPMX	0..1015	Type in the PLC - Logic - Module Range O = 0 Range P = 256 Range M = 512 Range X = 768 + Number
DINT[1]	FUNK	0..9	Function 0 = Standard, 1=SR-FlipFlop, 2=Data-FlipFlop...
DINT[2]	VALUE_1	0..999999	Preset value for Timer, Counter, signal number or length of shift register
DINT[3]	VALUE_2	0..65536	Reset field or DTC Value 1 (ON) for shift register
DINT[4]	VALUE_3	0..65536	DTC Value 2 (OFF) for shift register
DINT[5]	VALUE_4	0..65536	Shift register Mode 0 = standard, DTC, 1 = DTC ON / OFF, 2 = time cam
DINT[6]	R0_S0	0..65536	1. Path symbol 0
DINT[7]	R0_S1	0..65536	2. Path symbol 0
DINT[8]	R0_S2	0..65536	3. Path symbol 0
DINT[9]	R0_S3	0..65536	4. Path symbol 0
DINT[10]	R0_S4	0..65536	5. Path symbol 0
DINT[11]	R0_S5	0..65536	6. Path symbol 0
DINT[12]	R1_S0	0..65536	1. Path symbol 1
DINT[13]	R1_S1	0..65536	2. Path symbol 1
DINT[14]	R1_S2	0..65536	3. Path symbol 1
DINT[15]	R1_S3	0..65536	4. Path symbol 1
DINT[16]	R1_S4	0..65536	5. Path symbol 1
DINT[17]	R1_S5	0..65536	6. Path symbol 1
DINT[18]	R2_S0	0..65536	1. Path symbol 2
DINT[19]	R2_S1	0..65536	2. Path symbol 2
DINT[20]	R2_S2	0..65536	3. Path symbol 2
DINT[21]	R2_S3	0..65536	4. Path symbol 2
DINT[22]	R2_S4	0..65536	5. Path symbol 2
DINT[23]	R2_S5	0..65536	6. Path symbol 2
DINT[24]	R3_S0	0..65536	1. Path symbol 3
DINT[25]	R3_S1	0..65536	2. Path symbol 3
DINT[26]	R3_S2	0..65536	3. Path symbol 3
DINT[27]	R3_S3	0..65536	4. Path symbol 3
DINT[28]	R3_S4	0..65536	5. Path symbol 3
DINT[29]	R3_S5	0..65536	6. Path symbol 3
DINT[30]	R4_S0	0..65536	1. Path symbol 4
DINT[31]	R4_S1	0..65536	2. Path symbol 4
DINT[32]	R4_S2	0..65536	3. Path symbol 4
DINT[33]	R4_S3	0..65536	4. Path symbol 4
DINT[34]	R4_S4	0..65536	5. Path symbol 4
DINT[35]	R4_S5	0..65536	6. Path symbol 4

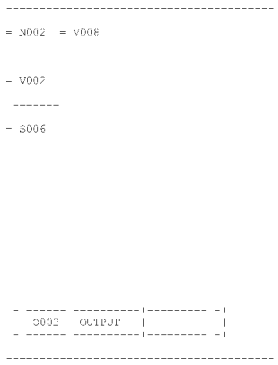
For the output ranges O and P up to 200 and for the register ranges M and X up to 248 Logic - networks can be programmed. You can develop the required Logic OFFLINE with the DIGISOFT PC Program. This program is able to print out the necessary data, which has to be entered into this TAG, as decimal numbers.

You can then enter these data into the respective tag and transfer these to the CamCon.

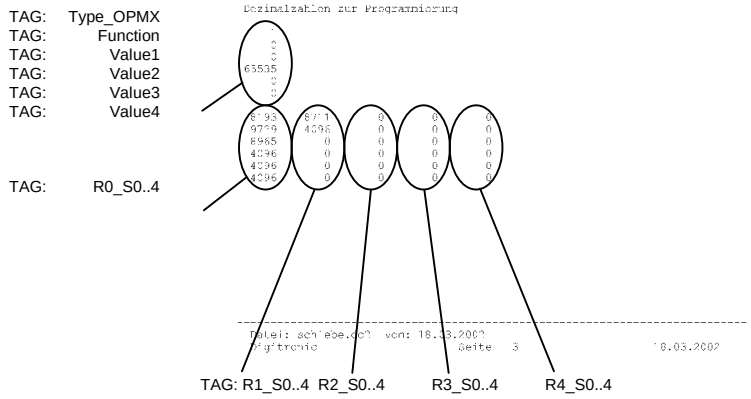
TIP: With the PC software DIGISOFT for the CamCon, an L5K - file can be created, that can be imported into the RSLogix 5000 Program. This requires the English handling components.

Example:

In this example output 2 can only be switched on, if input S006 (ControlLogix in RUN) is active, cam output 2 and the V002 - input (ControlLogix O - Range) are active or the V008 - input (ControlLogix O - Range) is active.



If you enter the following numbers into a TAG of the array and send the dataset to the CamCon, the network will be programmed and the program will be executed immediately.



2.3.8.1. TAG: DC_1_SYSTEM_CONFIG_PLC_OK"

This TAG is set by the DC190 - program, if in **all** of the TAG: DC_1_SYSTEM_CONFIG_PLC[X]'s elements, the Bit "ADR.CMD.OK" is set.

Now you are able to detect if all elements of the PLC - Logic - program have been written without any errors into the CamCon DC1090.

2.3.9. TAG "DC_1_SYSTEM_SET_ACTUAL_VALUE"

Type	Name	Data	Description
DC_9_HEADER	ADR	201,0,1	Adress
DINT[0]	ACTUAL_VALUE	minimum.. maximum possible actual value	Set actual value If this dataset is transferred, then on the CamCon the actual value is set to the transmitted value.. This is identical with the preset function. See Chapter "2.3.6. TAG "DC_1_SYSTEM_CONFIG" Value: DINT[16]" on page 12. **Note:** If an incremental or Hiperface input is used as measuring system, then the error message **"Pos-Err:3"** or **"Clear.."** can be confirmed through this dataset and the CamCon started. **Warning:** The setting of the actual value can be stored in the EEProm at zero current. See Chapter "2.3.6. TAG "DC_1_SYSTEM_CONFIG" Value: DINT[17]" on page 12. This is not meaningful however with an incremental - and/or a Hiperface input.

2.3.10. TAG "DC_2_PRG_CAM[X].CAM[Y]"

Type	Name	Data	Description
DC_2_PRG_CAM[X]	Index X	8.. Number_cam_outputs	Array cam outputs, one component for each output
DC_9_HEADER	ADR	XXX,1,YYY	Address, XXX = 1..200 = Output 1..200, YYY = 2..124 maximum 62 cams Array for cams, one component for each output XXX = Index + 1 YYY = Number of components from DC_2_PRG_CAM_CAM * 2, z.B. 3 * 2 = 6
DC_2_PRG_CAM_CAM CAM[Y]	Index Y (z.B. = 3)	1..62	Array for cams - one component for each cam DC_2_PRG_CAM_CAM for example 3. Maximum 62 cams can be transferred
DC_2_PRG_CAM_CAM	Index	0	Cam 1
DINT[0]	ON	minimum.. maximum-possible actual value	Switch-on point for cam 1 For minimum possible actual value see Chapter "2.3.14. TAG "DC_3_STATUS_FULL" Value: DINT[27]" on page 22. For maximum possible actual value see Chapter "2.3.14. TAG "DC_3_STATUS_FULL" Value: DINT[28]" on page 22.
DINT[1]	OFF	minimum.. maximum-possible actual value	Switch-off point for cam 1
DC_2_PRG_CAM_CAM	Index	1	Cam 2
DINT[0]	ON	minimum.. maximum-possible actual value	Switch-on point for cam 2
DINT[1]	OFF	minimum.. maximum-possible actual value	Switch-off point for cam 2
DC_2_PRG_CAM_CAM	Index	2	Cam 3
DINT[0]	ON	minimum.. maximum-possible actual value	Switch-on point for cam 3
DINT[1]	OFF	minimum.. maximum-possible actual value	Switch-off point for cam 3

If one of these datasets is transferred, all previously programmed cams on this output are erased and replaced by new cam values. If during the transfer the error Bit "DC_5_STATUS_COMM_ERROR" is set, please check for free storage space in the EEProm. See Chapter "2.3.14. TAG "DC_3_STATUS_FULL" Value: DINT[20]" on page 22.

Note: Programming is always performed in the actually running program (online) or in the product program. That means a changed cam becomes active instantly.

2.3.10.1. TAG: DC_2_PRG_CAM_OK"

This TAG is set by the DC190 - program, if in **all** elements of the TAG: DC_2_PRG_CAM[X] the Bit "ADR.CMD.OK" is set.

By this you are able to detect if all elements i.e. Cams have correctly been send into the CamCon DC1090.

2.3.11. TAG "DC_2_PRG_CHANGE"

Type	Name	Data	Description
DC_9_HEADER	ADR	201,2,1	Adress
DINT[0]	Program_number	0..32767	Actual program number or product number when reading If this dataset is written, the program number or product number is set to the sent value. See also Chapter "DINT[36]" on page 13.

2.3.12. TAG "DC_2_PRG_DTC[X]"

Type	Name	Data	Description
DC_2_PRG_DTC[X]	Index X	8.. Number_outputs_with_DTC	Array for delay time values, one component for each output
DC_9_HEADER	ADR	XXX,251,3	Address, XXX = 1..200 = delay time for output 1..200 XXX = Index + 1
DINT[0]	DTC_TYP	0..2	Configuration of Speed Compensation 0 = Standard or Speed Compensation for switch-on and switch-off points equal. 1 = Speed Compensation for switch-on and switch-off different 2 = The output is set to time - cam Notes about the effects of Speed Compensation can be found in the DC1090 and DC190 manual
DINT[1]	DTC1	0.. maximum possible DTC	Value 1 Type = 0 = Delay time value for switch-on and switch-off points in 100µs Type = 1 = Delay time value for switch-on points in 100µs Type = 2 = Delay time value for switch-on points on time - cam in 100µs
DINT[2]	DTC2	0.. maximum possible DTC or switch time	Value 2 With Type = 0 = not used With Type = 1 = delay time value switch-on and switch-off points in 100µs With Type = 2 = switch-on time in 100µs. The switch-on time applies to all switch points (cams) on the cam path (output).

If one of these datasets is transferred, all previously programmed cams on this output are erased and replaced by new cam values. If during the transfer the error bit "DC_5_STATUS_COMM_ERROR" is set, please check for free storage space in the EEProm. See Chapter "2.3.14. TAG "DC_3_STATUS_FULL" Value: DINT[20]" on page 22.

Note: Programming is always performed online or in the product program. That means a changed delay time becomes active instantly.

2.3.12.1. TAG: DC_2_PRG_DTC_OK"

This TAG is set by the DC190 - program, if in **all** elements of the TAG: DC_2_PRG_DTC[X] the bit "ADR.CMD.OK" is set.

By this you are able to detect that all elements i.e. delay times have been entered correctly into the CamCon DC1090.

2.3.13. TAG "DC_3_STATUS"

Type	Name	Data	Description
DC_9_HEADER	ADR	201,34,1	Adress
DINT[0]	Status	0..8, 255	This dataset should be read in cycles. An error message will be shown adjacent to the CamCon. Note: reading only possible 0 = Status OK no error message 1 = Pos Error 1 2 = Pos Error 2 3 = Pos Error 3 4 = Output Error 5 = Pos Error 5 6 = EEProm write overload 7 = not defined 8 = RAM FULL 255 = EE-Prom Error See Chapter "Error messages and removal of errors". in the DC1090 or DC190 manual. **Note:** If a safety output parameters (RUN - Control) has been created, then read is not necessary as long as this is active.

Note: In the DC190 - program this TAG is read every 5 seconds, if the safety output i.e. the run-controll-bit are not active. If a value unequal 0 or an error-message is detected as status the program tries to acknowledge this error-message by the writing of the TAG: "DC_4_QUIT_ERROR" automatically.

2.3.14. TAG "DC_3_STATUS_FULL"

Type	Name	Data	Description
DC_9_HEADER	ADR	201,0,37	Address This dataset should be read when the system configuration is changed. Here the minimum and maximum possible actual value is display. Note: This dataset can only be read.
DINT[0]	Actual_value	minimum.. maximum-possible actual value	Current actual value
DINT[1]	Speed	minimum.. maximum-possible Speed.	Current speed
DINT[2]	Programm_number	0..32767	Current program number
DINT[3]	Analog_value_1	0	Analog value on analog cam ...
DINT[4]	Analog_value_2	0	"
DINT[5]	Analog_value_3	0	"
DINT[6]	Analog_value_4	0	"
DINT[7]	Analog_value_5	0	"
DINT[8]	Analog_value_6	0	"
DINT[9]	Analog_value_7	0	"
DINT[10]	Analog_value_8	0	"
DINT[11]	Analog_value_9	0	"
DINT[12]	Analog_value_10	0	"
DINT[13]	Analog_value_11	0	"
DINT[14]	Analog_value_12	0	"
DINT[15]	Analog_value_13	0	"
DINT[16]	Analog_value_14	0	"
DINT[17]	HW_Plc	0	This value is always 0 in CamCon DC1090
DINT[18]	CPU_68332	0	This value is always 0 in CamCon DC1090
DINT[19]	Temp	-20..+80	Current temperature in the device **Warning:** The permitted temperature range is between 0 and +50°. Outside this range errors or demage can occur.
DINT[20]	Free_cams	0..ca.65000	Number of cams or delay times for Speed Compensation which can still be stored Delay times for separate switch-on and switch-off points require double storage space.
DINT[21]	Use_cams	0..ca.65000	Number of programmed cams
DINT[22]	DTC_max	0..up to 40000	Maximum possible Speed Compensation in ms. **Warning:** It is not allowed set "Delay times" are higher than this value.
DINT[23]	Ram_size	16777216	Size of built-in RAM storage Currently: 16777216 Byte
DINT[24]	Ram_free	0..e.g. 9592892	Size of free Ram storage in bytes
DINT[25]	EEProm_ser	785648Byte	Size of the EEProm in byte
DINT[26]	EEProm_par	0	This value is always 0 in CamCon DC1090
DINT[27]	Min_actual_value	-999999.. +999999	Minimum possible actual value. **Warning:** It is not allowed set cam value or parameter lower than this value.
DINT[28]	Max_actual_value	-999999.. +999999	Maximum possible actual value. **Warning:** It is not allowed set cam value or parameter higher or equal than this value..
DINT[29]	Prog_max	32768	Maximum number of programs (products) which can be administered **Note:** The number of programmable cams depends on the size of EEProm storage capacity.
DINT[30]	Use_DTC	0..10000	Number of programmed delay times for Speed Compensation
DINT[31]	Firmware_Z_1_4	'18.0'	Firmware data character 1..4",
DINT[32]	Firmware_Z_5_8	'3.20'	Firmware data character 5..8",
DINT[33]	Firmware_Z_9_12	'02$00§00'	Firmware data character 9..12", e.g.: '18.03.2002'
DINT[34]	Status	0..8, 255	See Chapter "2.3.13. TAG "DC_3_STATUS"" on page 21.
DINT[35]	EE_write_Counter	0.. 2.000 Million	EEProm/Flash write counter **Warning:** If a value higher than 1 Million is reached here, there is the danger of loss of data.
DINT[36]	CPU_Type	3	CPU Type Currently Type 3 -> DC1090

2.3.15. TAG "DC_4_QUIT_ERROR"

Type	Name	Data	Description
DC_9_HEADER	ADR	205,3,1	Adress
DINT[0]	DATA	-1	If this dataset is transferred, an error message **"Pos-Err: 1,2,3,5", "Output-Error"** adjacent to the CamCon must be confirmed. Note: write only possible

Note: Using the DC190 - program the TAG "DC_3_STATUS" is read every 5 seconds, if the safety output i.e. the Run - controll - Bit is not active.
If an error message is detected, the program tries by writing this TAG, to acknowledge them automatically.

2.3.16. TAG: "DC_5_PRG_ACTUAL"

Type	Name	Data	Description
DINT	DC_5_PRG_ACTUAL	0..32767	Program number to be introduced. If this and the value in TAG "DC_2_PRG_CHANGE" is different, a program change is created.

2.4. The Controller TAGs

2.4.1. TAG Range "DC190_X_MSG_...."

Type	Name	Data	Description
MESSAGE	DC190_1_MSG_ADR_R:	-	"CIP Generic Messages" TAG for addresses write when reading and first DC1090/190.
MESSAGE	DC190_1_MSG_ADR_W:	-	"CIP Generic Messages" TAG for adresses write when writing.
DC_9_MSG_BUFFER	DC190_1_MSG_BUFFER_TMP:	-	Temporary messages buffer for reading and writing consists of 1 * DC_9_HEADER and 126 * DINTs. This will be used for **each** write or read message as send or receive buffer.
MESSAGE	DC190_1_MSG_DATA_R:	-	"CIP Generic Messages" TAG for data reading
MESSAGE	DC190_1_MSG_DATA_W:	-	"CIP Generic Messages" TAG for data writing.

2.4.2. TAG Range "DC190_X_OUTPUT/STATUS...."

Type	Name	Data	Description
INT	DC190_X_OUTPUT_1_16_ENABLE	DC190_X:0.Data[0]	Alias for the O - Range in which the enable for output 1 - 16 must be entered.
INT	DC190_X_OUTPUT_17_32_ENABLE	DC190_X:0.Data[1]	Alias for the O - Range in which the enable for output 17 - 32 must be entered.
INT	DC190_X_OUTPUT_33_48_ENABLE	DC190_X:0.Data[2]	Alias for the O - Range in which the enable for output 33 - 48 must be entered.
INT	DC190_X_OUTPUT_49_64_ENABLE	DC190_X:0.Data[3]	Alias for the O - Range in which the enable for output 49 - 64 must be entered.
INT	DC190_X_STATUS_1_16_OUTPUT	DC190_X:I.Data[3]	Alias for the I - Range in which the bits for Output 1 - 16 lie.
INT	DC190_X_STATUS_17_32_OUTPUT	DC190_X:I.Data[4]	Alias for the I - Range in which die bits for Output 17 - 32 lie.
INT	DC190_X_STATUS_33_48_OUTPUT	DC190_X:I.Data[5]	Alias for the I - Range in which die bits for Output 33 - 48 lie.
INT	DC190_X_STATUS_49_64_OUTPUT	DC190_X:I.Data[6]	Alias for the I - Range in which die bits for Output 49 - 64 lie.

2.5. Transferring actual value and speed into realtime

The CamCon DC1090 is able to send the actual value and the current speed in real time as an input word (I.Data) to the ControlLogix CPU.

2.5.1. Speed

The realtime speed output is switched ON or OFF. See Chapter 2.3.6. TAG "DC_1_SYSTEM_CONFIG" Value: DINT[39]. If realtime transfer is switched on, a 16 bit wide value is entered after the last CamCon output in the I - Range of the ControlLogix. From the transferred value the scaling of the CamCon must be calculated. First a value of 32768 must be subtracted (SUB) and the intermediate result **INT** (HELP_SPEED) must be stored. This value is then recalculated to result in the actual speed value by use of a CPT command and the 100% speed value (Chapter "2.3.6. TAG "DC_1_SYSTEM_CONFIG" Value: DINT[19]" on page 12).

Current speed (DINT) = HELP_SPEED * DINT[19] / 32768

2.5.2. Actual value

The realtime actual value output is switched ON or OFF. See Chapter 2.3.6. TAG "DC_1_SYSTEM_CONFIG" Value: DINT[26]. If the realtime transfer is switched on (DINT[26] = 2), a 32 bit wide value will be entered behind the last CamCon output or, if switched on, behind the realtime speed value in the I-Range of the ControlLogix. This value can be used further immediately without recalculation. If the maximum actual value is larger than 32767 or smaller than -32767, then a conversion of the 2 INTs from the I - Range to a DINT must be made.

3. Keyword register