Integration Manual T3

FieldBus

since 1933
WEIGHING TECHNOLOGY

DWC-7B

*** SAFETY REGULATIONS ***

Being under voltage the device must not be opened. Danger of electric shock. Service works at the weighing equipment are permitted only for qualified Personnel. In case of works at the weighing system ALL drives must be switched off and locked.

The related device/system may only be set-up and operated in connection with this documentation. Start-up and operation of a devices/system may only be carried out by **qualified personnel.** Qualified personnel in terms of safety notes of this documentation are persons being authorized to take into operation, to ground and to label the devices, systems and circuits in accordance with the standards of safety engineering.

Index

Revision list

Revision	Datum	Autor	Kapitel	Beschreibung
T3_FBUS7A_V1_0en	12.03.2015	Ratzinger		First Edition
	20.06.2015	Leibner		Basic Translation
T3_FBUS7A_V1_1en	15.09.2015	Ratzinger		General Revision / Einfügen neuer Befehle
T3_FBUS7A_V1_2en	25.07.2016	Krichbaum		General Revision / Insert new status
T3_FBUS7A_V1_26en	30.11.2016	Ratzinger		Corp. Design + Bus-Command4
T3_FBUS7B_V2_00en	14.11.2017	Ratzinger	All	Modifications DWC-7B, Screenshoots for DeviceNet, EthernetIP
T3_FBUS7B_V2_00en	23.11.2021	Ratzinger	All	Detailing, Mailbox, ModbusTCP, Aprol, FC3

Software indication

These instructions are based on following Software versions

W 02.20.04 (Base unit / Weighing system)
P.02.20.04 (Service modules)

In course of the technical progress changes can be carried out at the software. At subsequent software versions therefore, deviations are possible compared to these instructions.

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1 General description

This part of the Service instructions describes the details of communication possibilities by Fieldbus systems of the DWC-7A scale system. It is an extension of the T1-Service instructions but is no separate manual.
It has been moved into a separate part since the Fieldbus system is an option installed into the DWC-7A or DWC-7B system only on client's request.

1.1Symbols

This manual is using the following symbols as special indications:

IMPORTANT INDICATION!
Marks an important indication.

WARNING!
Marks a general warning.

DANGER!
Means that death or severe personal injury may occur if the corresponding precautions are not taken.

*	marks KUKLA-factory standard settings
PLC	Is an industrial digital computer or a programmable logic controller (PLC)

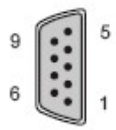
2PROFIBUS-DP

2.1 General

Scale computers of series DWC-7A can be equipped with a ProfiBus DP Interface. This Interface has to be indicated in the order. A subsequent installation on consultation with the manufacturer is possible, too. The interface is licenced by the manufacturer KUKLA and corresponds to the ProfiBus Norm 50170. Optionally beside many other communication solutions also a DP V1 or a ProfiNet-interface can be realised.

2.2 Data transfer rate / Connector assignment

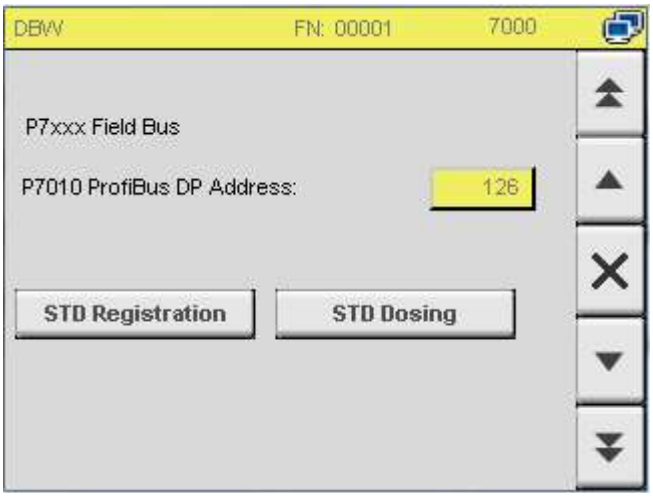
The Interface supports the usual normed data transfer rates up to 12 MBit. In case of higher transfer rates absolutely plugs approved thereto have to be used..

Interface	Pinout		
 9-pin female DSUB connector	Pin	RS485	
	1	Reserved	
	2	Reserved	
	3	RxD/TxD-P	Data[1]
	4	CNTR-P	Transmit enable
	5	DGND	Electrically isolated supply
	6	CP	Electrically isolated supply
	7	Reserved	
	8	RxD/TxD-N	Data\[2]
	9	CNTR-N	Transmit enable\
	CNTR ... Directional switch for external repeater		

It is recommendable to use normed ProfiBus DP plug connectors. The cable heads have to be terminated with terminating resistors.

2.3 Station Address

The station address is adjusted via parameter P7XXX directly at the Operator panel.



Relevant is parameter P7010. Addresses between 3 and 125 may be adjusted.

If Number 126 is adjusted all belonging Fieldbus – Parameters from Group P7xxx are disabled and not active.

AFTER CHANGING THE PROFIBUS-DP ADDRESS THE SCALE COMPUTER HAS TO BE TAKEN OFF VOLTAGE FOR ABOUT 5 SECONDS IN ORDER TO MAKE POSSIBLE TO TAKE OVER THE NEW ADDRESS.

2.4 LED Status messages

Figure	LED	Color	Status	Description
	STATUS	Green	On	Interface module active
		Red	On	CPU starting up
	RxD	Yellow	On	The module receives data via the PROFIBUS DP slave interface
	TxD	Yellow	On	The module sends data via the PROFIBUS DP slave interface

2.5 Data structure / consistence

Please, find details concerning Data structure in the general part of section "General data structure".

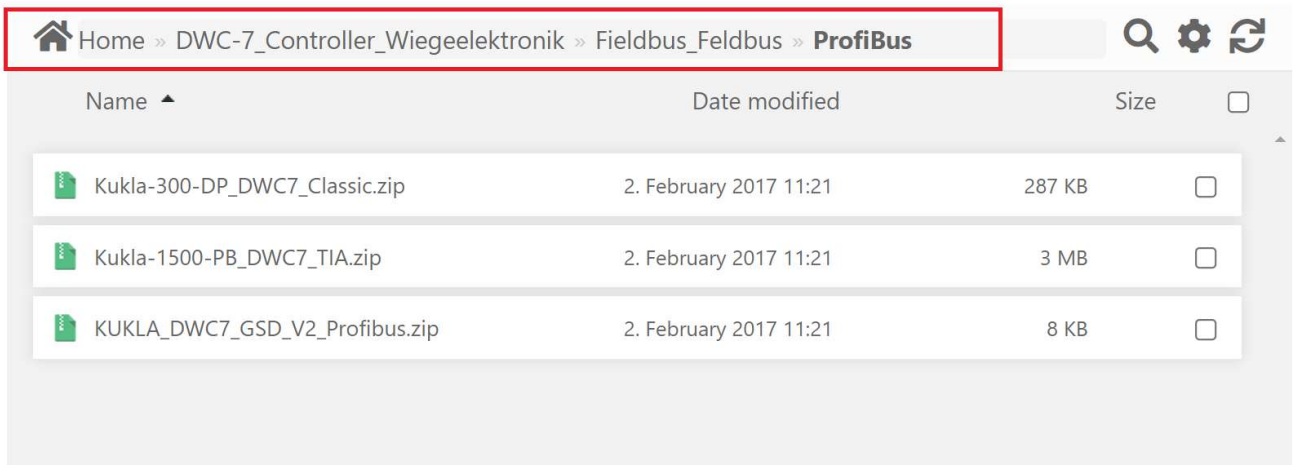
The manufacturer describes in Chapter 9 a sample project for communication with Siemens S7 controllers. The IDE is Step7 Classic or TIA.

2.6 GSD- File

The required master data are supplied on CD or USB-Stick along with the scale computer or can be acquired directly from the manufacturer. Other file sizes than the ones described in this documentation are not possible.

For S7 Systems (300/400 and 1500 CPU´s) a library can be requested by KUKLA, which significantly simplifies the integration of a KUKLA-Controller. Basically, full communication is also – without the library described towards the end of the manual in details – possible.

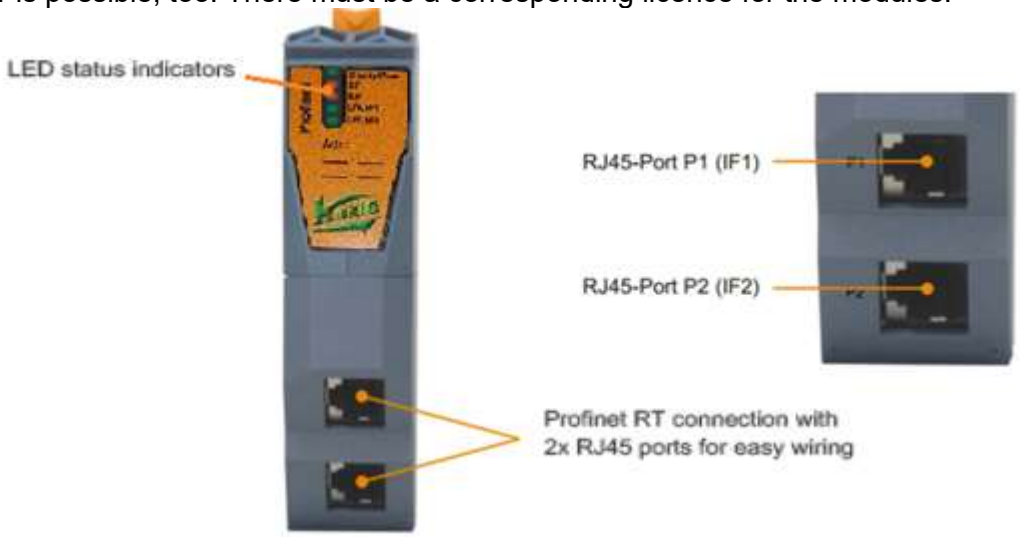
The necessary files are available free of charge in the manufacturer's download area (www.kukla.co.at).



3 PROFINET-IO

3.1 General

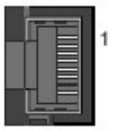
The scale computers of series DWC-7A can be equipped with an optional modular ProfiNet-IO-Interface. This Interface has to be indicated at the order. A subsequent installation on consultation with the manufacturer is possible, too. There must be a corresponding licence for the modules.



Das ProfiNet- Modul has integrated a 2 Port-Switch functionality.

3.2 Data transfer rate / Connector assignment

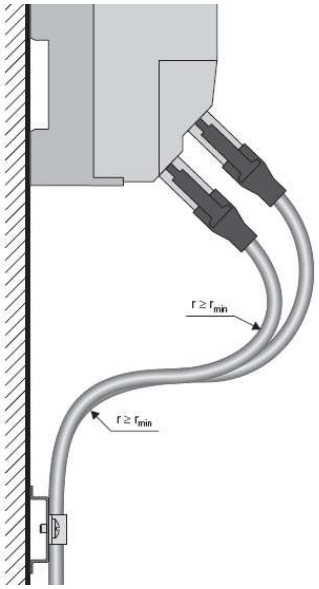
The ProfiNet-Module works as ProfiNet-IO-Device at the ProfiNet. It supports the Data telegram usual at KUKLA. The transfer is done via Twisted-Pair-cable in Full-Duplex-operation with 100 MBit/s. The IP-address adjustments as usual with ProfiNet are set at configuration of the ProfiNet-IO-Controller and later on at run-up of the IO Controller transferred to the module via the DCP-protocol. Alternatively address adjustments can be done via the device-sided Software-interface.

Interface	Pinout		
	Pin	Ethernet	
 1 Shielded RJ45 port	1	RXD	Receive data
	2	RXD\	Receive data\
	3	TXD	Transmit data
	4	Termination	
	5	Termination	
	6	TXD\	Transmit data\
	7	Termination	
	8	Termination	

Following cabling regulations have to be observed:

- Use of CAT5 SFTP cable
- Keeping of bend radius of the cable (Observe cable data sheet)
- Fix the cable beneath the module.

The fixing must be located vertically below the RJ45 connector of the module.



3.3 ProfiNet IP address

The station address – as usual with ProfiNet – is performed by the master program system by external „IP-config process “.

3.4 LED Status messages / Module structure

Figure	LED	Color	Status	Description
	READY/RUN	Green/red	Off	No power to module
		Red	Blinking	Boot error
			On	Communication on the PCI bus has not yet been started
		Green	On	PCI bus communication in progress
	SF	Red	Off	No error
			Cyc. Blinking[1]	DCP signal service triggered via bus
			On	System errors
	BF	Red	Off	No error
			Blinking	No data exchange
			On	No configuration or physical connection error
	L/A IF1/IF2	Green	Off	No link to remote station
			Flickering	A link to the remote station has been established. The LED blinks when Ethernet activity is taking place on the bus.
			On	A link to the remote station has been established.

3.5 Data structure / consistence

Please, find details concerning Data structure in the general part of section "General data structure“.

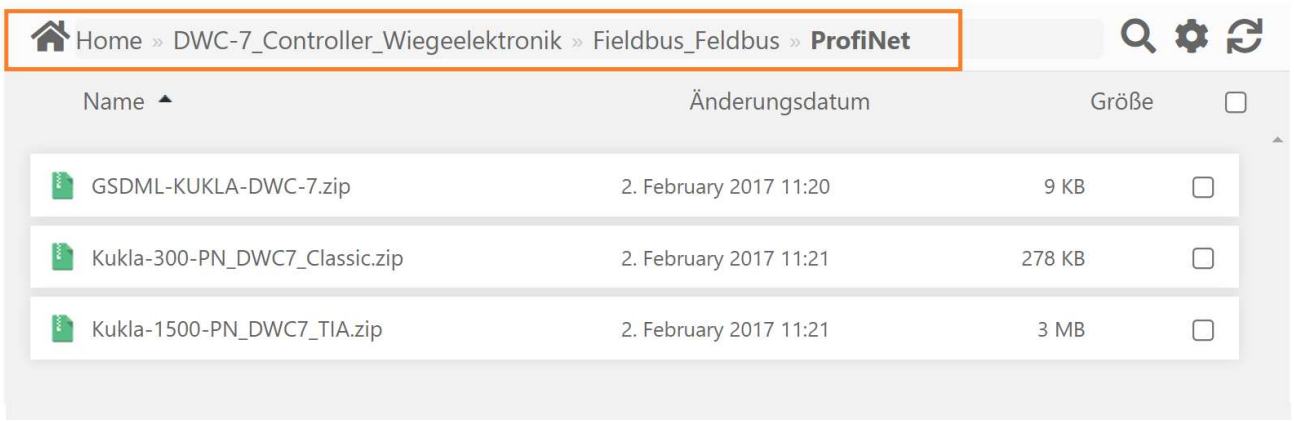
The manufacturer describes in Chapter 9 a sample project for communication with Siemens S7 controllers. The IDE is Step7 Classic or TIA.

3.6 GSDML- File

The required GSD-XML-files are supplied on disk/CD along with the scale computer or can be acquired directly from the manufacturer. Other file sizes than the ones described in this documentation are not possible.

For S7 Systems (300/400 or 1500 CPU´s) a library can be requested by KUKLA, which significantly simplifies the integration of a KUKLA-Controller. Basically, full communication is also – without the library described towards the end of the manual in details – possible.

The necessary files are available free of charge in the manufacturer's download area (www.kukla.co.at).

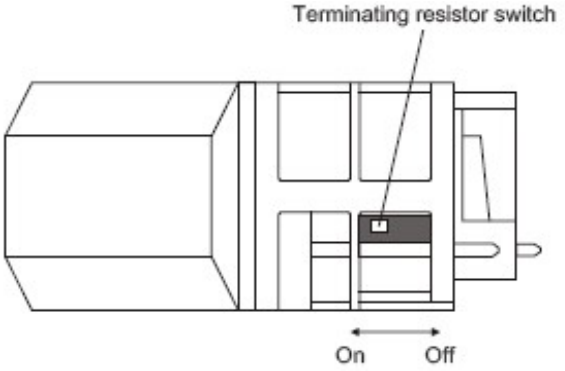


4 DeviceNet

4.1 General

The scale computers of series DWC-7A can be equipped with an optional modular DeviceNet (Slave) – Interface. This Interface has to be indicated at the order. A subsequent installation on consultation with the manufacturer is possible, too. There must be a corresponding licence for the modules.

At the interface module a terminating resistor is already integrated. By means of a switch at the case bottom the terminating resistor is switched on or off, an activated terminating resistor is indicated by the LED "TERM".



It is recommended to integrate the terminating resistor into the plug connector in order to ensure a clean bus termination after disconnecting the participant. The switch at the module thereto always has to be switched off!

4.2 Data transfer rate / Connector assignment

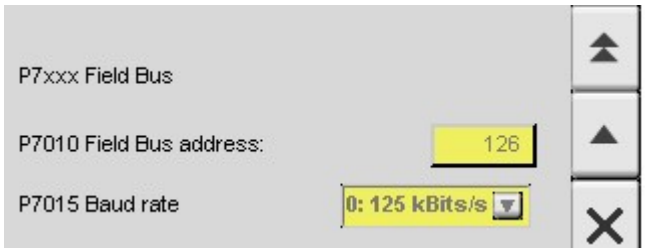
The interface module is equipped with a DeviceNet Slave (Adapter) interface. It supports the data telegram usual at KUKLA. The transfer is done via a specific and suitable DeviceNet-cable.

Interface	Pinout		
 5-pin male multipoint connector	Terminal	DeviceNet	
	1	CAN⊥ (V-)	CAN ground
	2	CAN_L	CAN low
	3	SHLD	Shield
	4	CAN_H	CAN high
	5	V+	Supply voltage[1)]

1) A 24 V Supply voltage can be connected to this connection. The voltage is only led through. The module neither provides it nor needs it.

4.3 Node Number (Stationaddress) / Baudrate

The station address is adjusted via parameter P7010 directly at the Operator panel. Parameter P7015 defines the communication speed on the CAN bus.



AFTER CHANGING THE DEVICENET-ADDRESS THE SCALE COMPUTER HAS TO BE TAKEN OFF VOLTAGE FOR ABOUT 5 SECONDS IN ORDER TO MAKE POSSIBLE TO TAKE OVER THE NEW ADDRESS.

4.4 LED Status messages / Module structure

Figure	LED	Color	Status	Description
	READY/RUN	Green/red	Off	No power to module
		Green	On	PCI bus communication in progress
		Red	On	Communication on the PCI bus has not yet been started
	MOD/NET	Green/red	Off	Module supply not connected or module is not online
		Green	Blinking	Module is online but the I/O connection is not active
			On	Module is online and the I/O connection is active ("operating")
		Red	Blinking	The red LED blinks if at least one of the following errors has occurred: • Minor fault (recoverable fault) • Connection error • No DeviceNet supply voltage
			On	Critical fault or critical connection error (double MAC ID, bus failure or module defect)
	TxD	Yellow	Flickering or on	Module sending data via the DeviceNet interface
	TERM	Yellow	On	Terminating resistor integrated in the module switched on

4.5 Data structure / consistence

Please, find details concerning Data structure in the general part of section "General data structure “

The manufacturer describes in Chapter 9 a sample project for communication with AB controllers. The programming environment is the Logix Designer.

4.6 EDS- File

The required EDS-files are supplied on CD / USB-Stick along with the scale computer or can be acquired directly from the manufacturer. Other file sizes than the ones described in this documentation are not possible.

The necessary files are available free of charge in the manufacturer's download area (www.kukla.co.at).

5 ETHERNET-IP

5.1 General

The scale computers of series DWC-7B can be equipped with an Ethernet-IP Interface. This Interface has to be indicated at the order. A subsequent installation on consultation with the manufacturer is possible, too. There must be a corresponding licence for the modules.

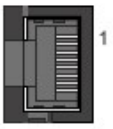
Das ProfiNet- Modul has integrated a 2 Port-Switch functionality.

5.2 Data transfer rate / Connector assignment

The interface module works as EtherNet/IP Adapter (Slave). The transfer is done via Ethernet-cable with /10100 MBit/s. The interface is designed with two RJ45-connectors. Both connections go to an integrated switch. By that Daisy-Chain-cablings at EtherNet/IP are easily possible.

- EtherNet/IP Adapter (Slave)
- Integrated switch for economic cabling

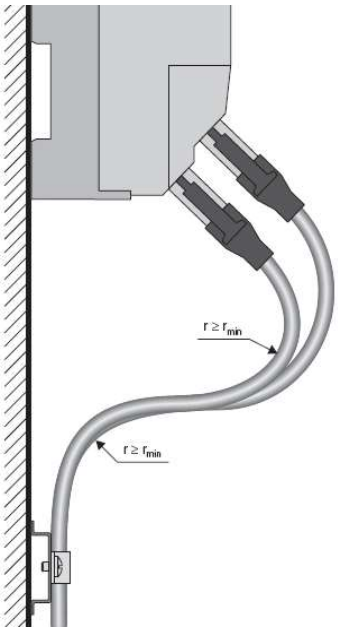
It supports the data telegram usual at KUKLA.

Interface	Pinout		
	Pin	Ethernet	
 1 Shielded RJ45 port	1	RXD	Receive data
	2	RXD\	Receive data\
	3	TXD	Transmit data
	4	Termination	
	5	Termination	
	6	TXD\	Transmit data\
	7	Termination	
	8	Termination	

Following cabling regulations have to be observed:

- Use of CAT5 SFTP cable
- Keeping of bend radius of the cable (Observe cable data sheet)
- Fix the cable beneath the module

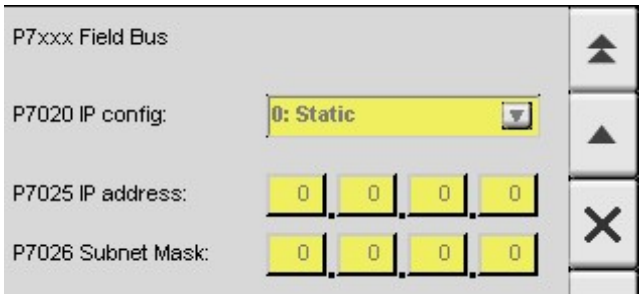
.



The fixing has to be located in vertical direction beneath the RJ45 connector of the module.

5.3 Station address / IP-Address

The IP-address adjustments are – as usual with EthernetIP – set at configuration of the IO-Controller.



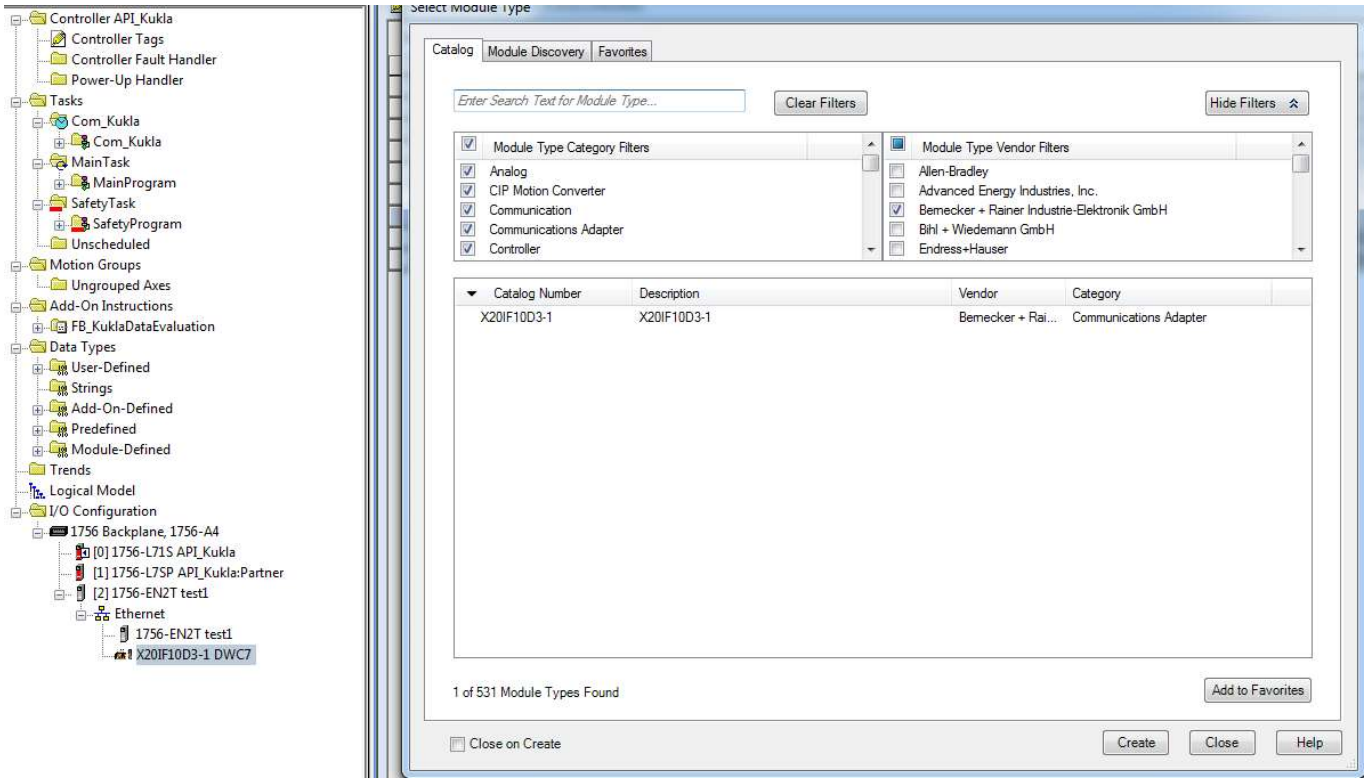
5.4 LED Status messages / Module structure

Figure	LED	Color	Status	Description
	READY/RUN	Green/red	Off	No power to module
		Green	On	PCI bus communication in progress
		Red	Blinking	Boot error
			On	Communication on the PCI bus has not yet been started
	Mod status[1)]	Green	Blinking	Interface module not yet configured
			On	Adapter (Slave) is operational
		Red	Blinking	Recoverable hardware error
			On	Irrecoverable hardware error
		Green/red	Blinking	Initialization / Self-test
			Off	No power to module
	Net status[1)]	Green	Blinking	No active connection
			On	Indicates at least one active connection
		Red	Blinking	Timeout occurred on at least one connection
			On	An IP address has been used repeatedly
		Green/red	Blinking	Initialization / Self-test
			Off	No IP address assigned or module not supplied
	L/A IF1/IF2	Green	Off	No link to remote station
			Flickering	A link to the remote station has been established. The LED blinks when Ethernet activity is taking place on the bus.
			On	A link to the remote station has been established.

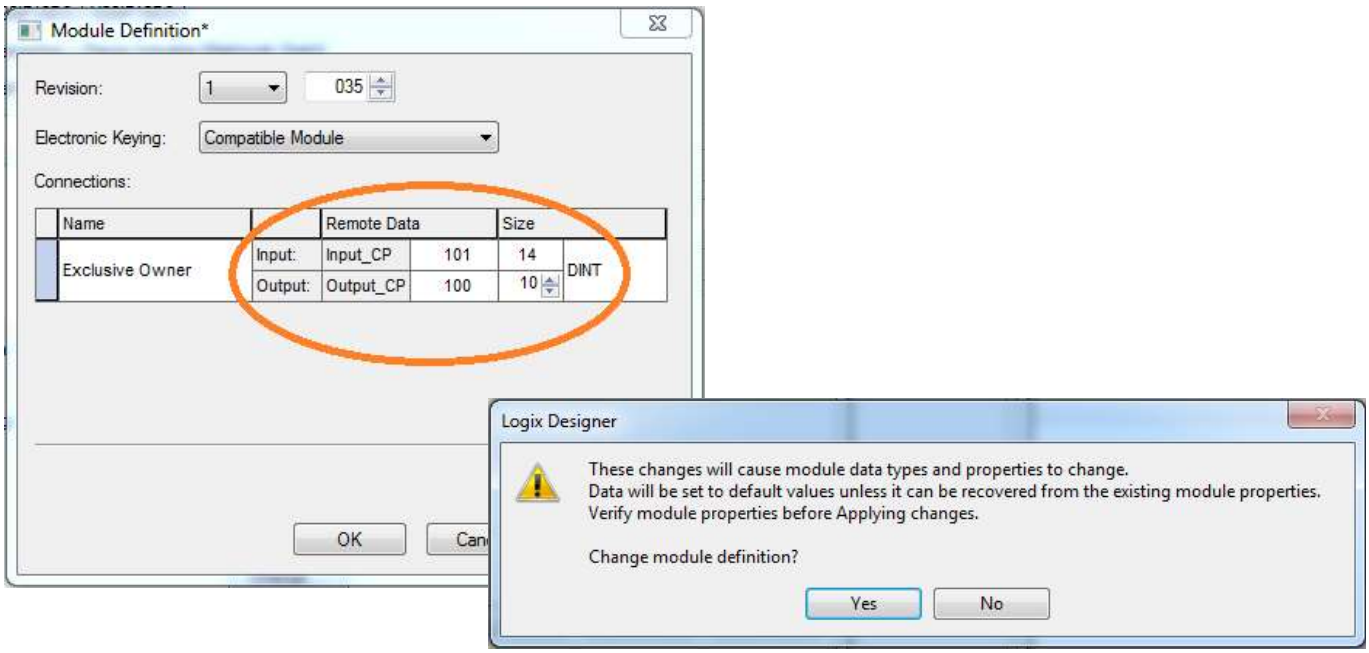
5.5 EDS- File (Electronic Data Sheet)

The necessary EDS files are delivered with the DWC-7B System on CD / USB stick or can be downloaded directly from manufacturer's website (www.kukla.co.at). Other data formats than those described are not possible.

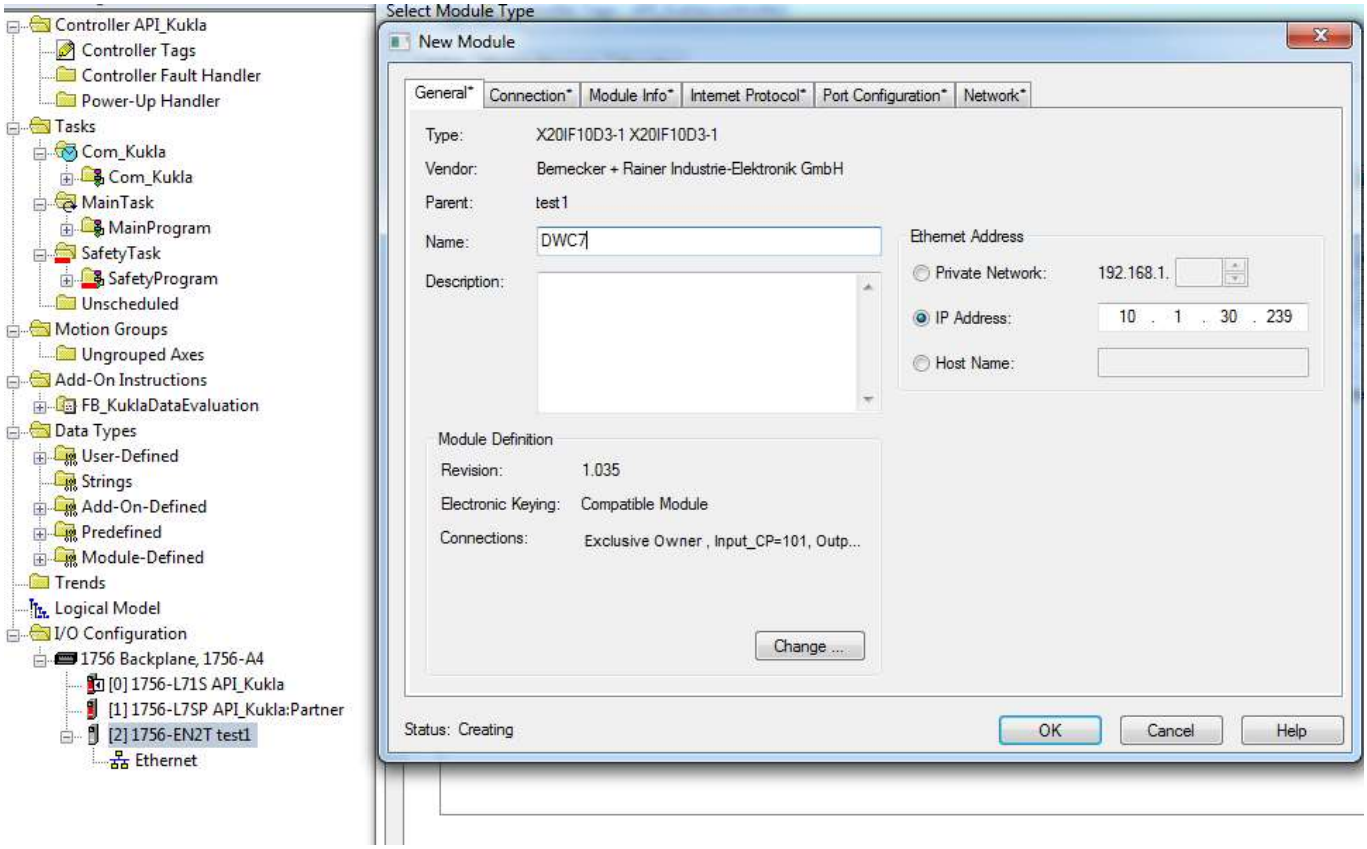
The EDS file must first be integrated into the programming interface of the master controller (PLC).



Next step is the definition of the module:



Now the setup of Name and IP according to the setup of P702x in the DWC-7B.



Thus, the module should be accessible after a download in the PLC.

5.6 Data structure / consistence

Please, find details concerning Data structure in the general part of section "General data structure“.

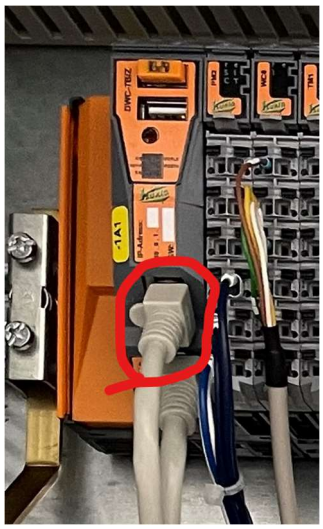
The manufacturer describes later a sample project for communication with AB controllers. The programming environment is the Logix Designer.

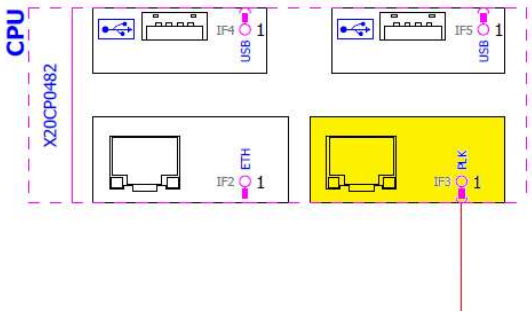
6 MODBUS-TCP or Aprol-Interface

6.1 General

The scale computers of the DWC-7B series can be equipped with a ModbusTCP or BR-Aprol interface. This interface must be specified when ordering. It is the only interface in the entire family that does not have real-time capability, as this cannot be technically implemented within the CPU-Ethernet port itself. After sales installation is also possible in consultation with the manufacturer. A corresponding license must be available for the module.

Communication takes place via the IF3 interface of the main CPU itself.



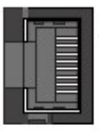


Alternatively, data communication with the Aprol process control system from the manufacturer ABB-BR can be established via this interface as well.

6.2 Data transfer rate / Connector assignment

The interface module works as a ModbusTCP adapter. The transmission takes place via Ethernet cable with / 10100 Mbit / s. The interface is implemented with an RJ45 socket, there is no integrated switch. This means that only one star chain is possible.

It supports the data telegram usual at KUKLA.

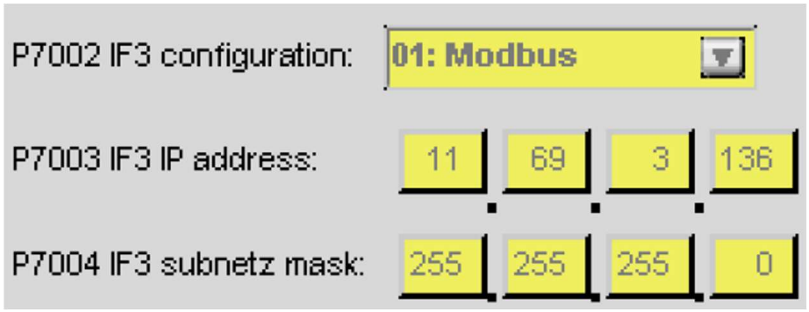
Interface	Pinout		
	Pin	Ethernet	
 1 Shielded RJ45 port	1	RXD	Receive data
	2	RXD\	Receive data\
	3	TXD	Transmit data
	4	Termination	
	5	Termination	
	6	TXD\	Transmit data\
	7	Termination	
	8	Termination	

Following cabling regulations have to be observed:

- Use of CAT5 SFTP cable
- Keeping of bend radius of the cable (Observe cable data sheet)
- Stabilize and shield the cable as shown in the earlier section ProfiNet or EthernetIP

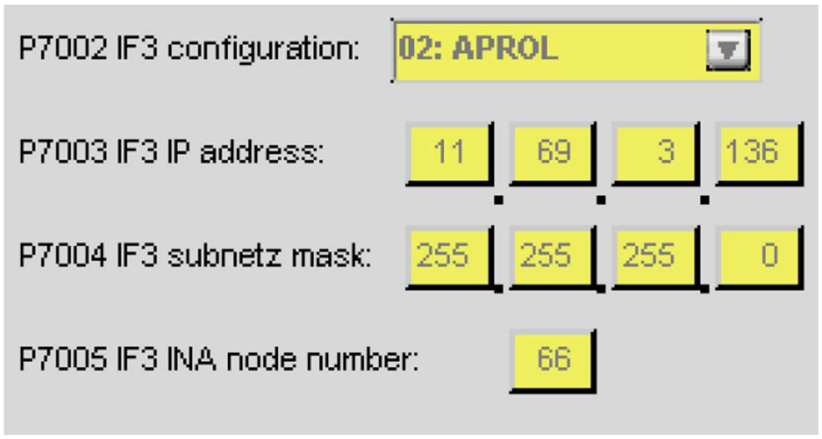
6.3 Station address / IP-Address

With ModbusTCP, the IP address settings are specified via the configuration of the IO controller.



In addition, the ModbusTCP communication must be activated in parameter P7002 so that setpoints can also be recognized as such.

When communicating with an APROL-PLS, the INA node number is also relevant:



6.4 LED Status messages / Module structure

A module definition is not necessary as is the case with other bus systems.

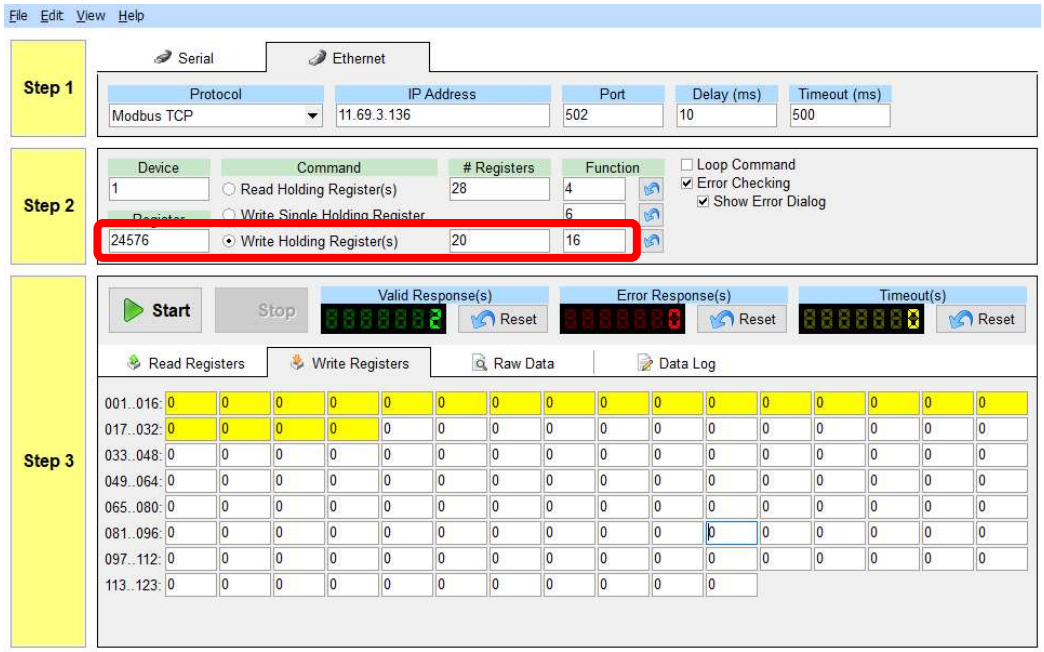
The LED IF3 / PLK in the LED block at the top right indicates every receipt of a data packet with a short flush.

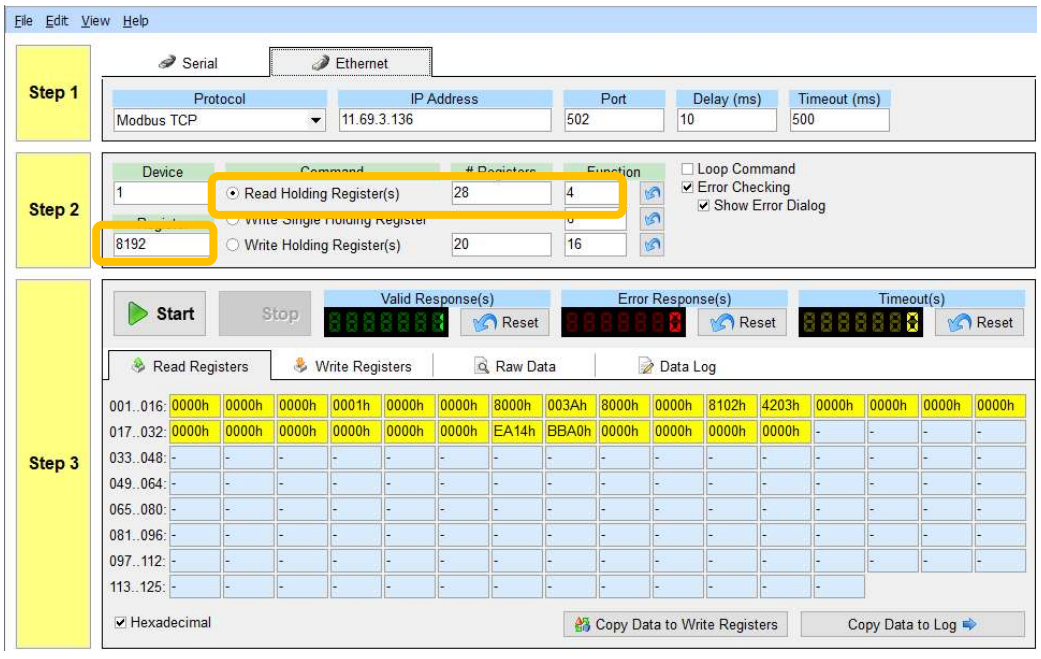
This should make it possible to address the module to the central control after a download.

6.5 Data structure / consistence

Please, find details concerning Data structure in the general part of section "General data structure “

There are simple test programs for a PC for basic ModbusTCP communication checks available, an example is shown below.





6.6 Modbus Register and Functions codes

The Master PLC must write data using Modbus function code 16 (WriteHoldingRegister).
Data can be read via function code 4 (ReadInputRegister) or alternatively via function code 3 (ReadHoldingRegister).

	PLC > DWC7	DWC7 > PLC
00 Doubleword	WR FC16 / r24576 DW00 (P7200)	RD FC4 / r8192 or FC3 / r24608 DW00 (P7400)
01 Doubleword	WR FC16 / r24578 DW04 (P7201)	RD FC4 / r8194 or FC3 / r24610 DW04 (P7401)
02 Doubleword	WR FC16 / r24580 DW08 (P7202)	RD FC4 / r8196 or FC3 / r24612 DW08 (P7402)
03 Doubleword	WR FC16 / r24582 DW12 (P7203)	RD FC4 / r8198 or FC3 / r24614 DW12 (P7403)
04 Doubleword	WR FC16 / r24584 DW16 (P7204)	RD FC4 / r8200 or FC3 / r24616 DW16 (P7404)
05 Doubleword	WR FC16 / r24586 DW20 (P7205)	RD FC4 / r8202 or FC3 / r24618 DW20 (P7405)
06 Doubleword	WR FC16 / r24588 DW24 (P7206)	RD FC4 / r8204 or FC3 / r24620 DW24 (P7406)
07 Doubleword	WR FC16 / r24590 DW28 (P7207)	RD FC4 / r8206 or FC3 / r24622 DW28 (P7407)
08 Doubleword	WR FC16 / r24592 DW32 (P7208)	RD FC4 / r8208 or FC3 / r24624 DW32 (P7408)
09 Doubleword	WR FC16 / r24594 DW36 (P7209)	RD FC4 / r8210 or FC3 / r24626 DW36 (P7409)
10 Doubleword	WR FC16 / r24596 DW40 (P7210)	RD FC4 / r8212 or FC3 / r24628 DW40 (P7410)
11 Doubleword	WR FC16 / r24598 DW44 (P7211)	RD FC4 / r8214 or FC3 / r24630 DW44 (P7411)
12 Doubleword	WR FC16 / r24600 DW48 (P7212)	RD FC4 / r8216 or FC3 / r24632 DW48 (P7412)
13 Doubleword	WR FC16 / r24602 DW52 (P7213)	RD FC4 / r8218 or FC3 / r24634 DW52 (P7413)
14 Doubleword	WR FC16 / r24604 DW56 (P7214)	RD FC4 / r8220 or FC3 / r24636 DW56 (P7414)
15 Doubleword	WR FC16 / r24606 DW60 (P7215)	RD FC4 / r8222 or FC3 / r24638 DW60 (P7415)

Read via Function code 3 (read input registers) or via Function code 4 (read holding registers)

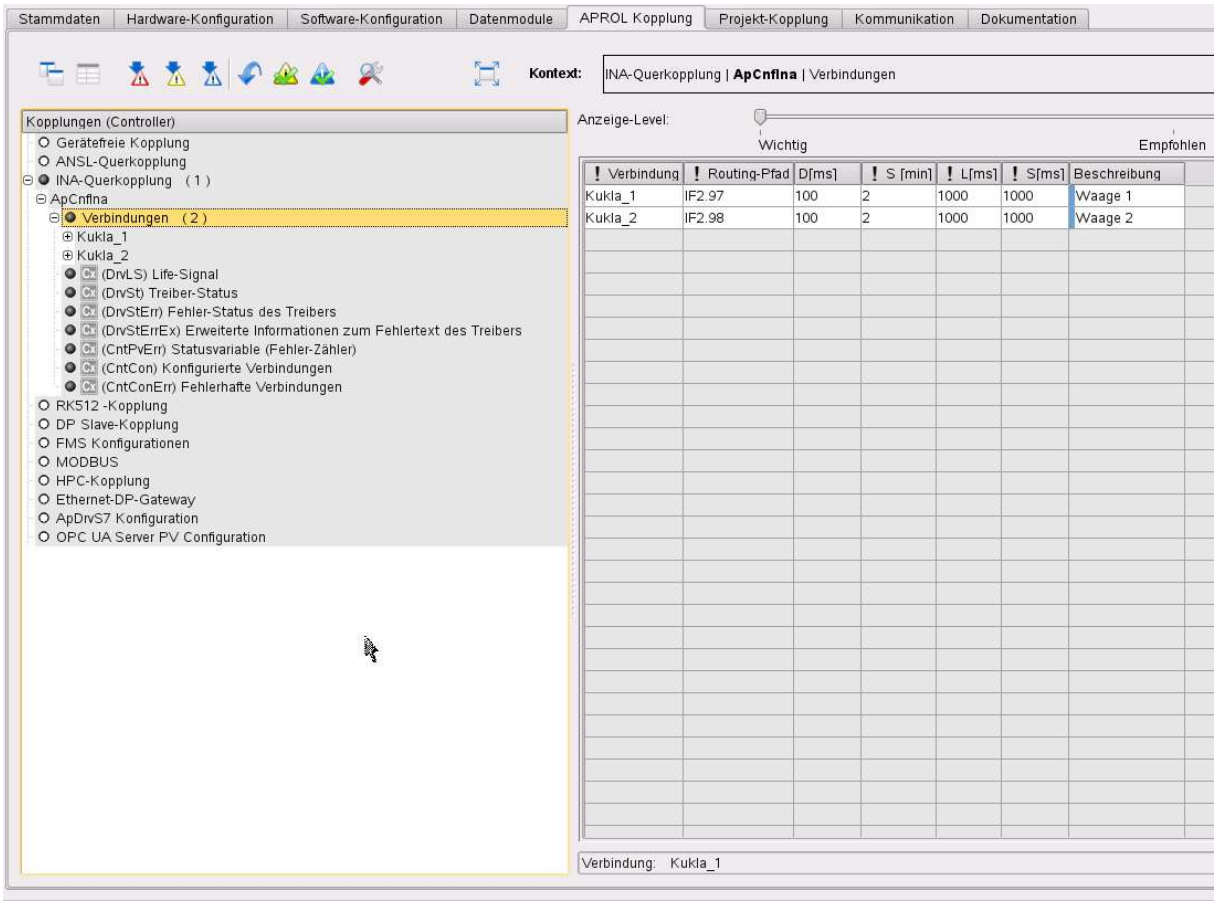
Request:	Address of first register to read (16-bit) Number of registers to read (16-bit)
Normal response:	Number of bytes of register values to follow (8-bit) Register values (16 bits per register)

Write vis Function code 16 (preset/write multiple holding registers)

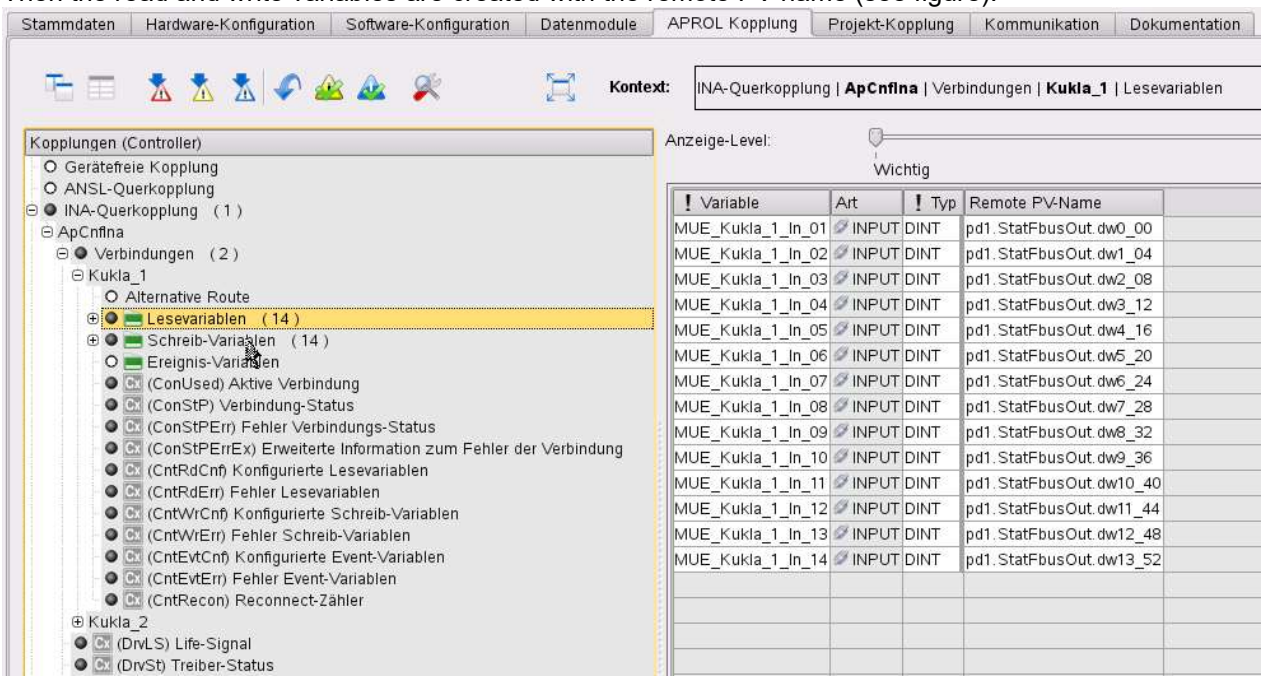
Request:	Address of first holding register to preset/write (16-bit) Number of holding registers to preset/write (16-bit) Number of bytes of register values to follow (8-bit) New values of holding registers (16 bits per register)
Normal response:	Address of first preset/written holding register (16-bit) Number of preset/written holding registers (16-bit)

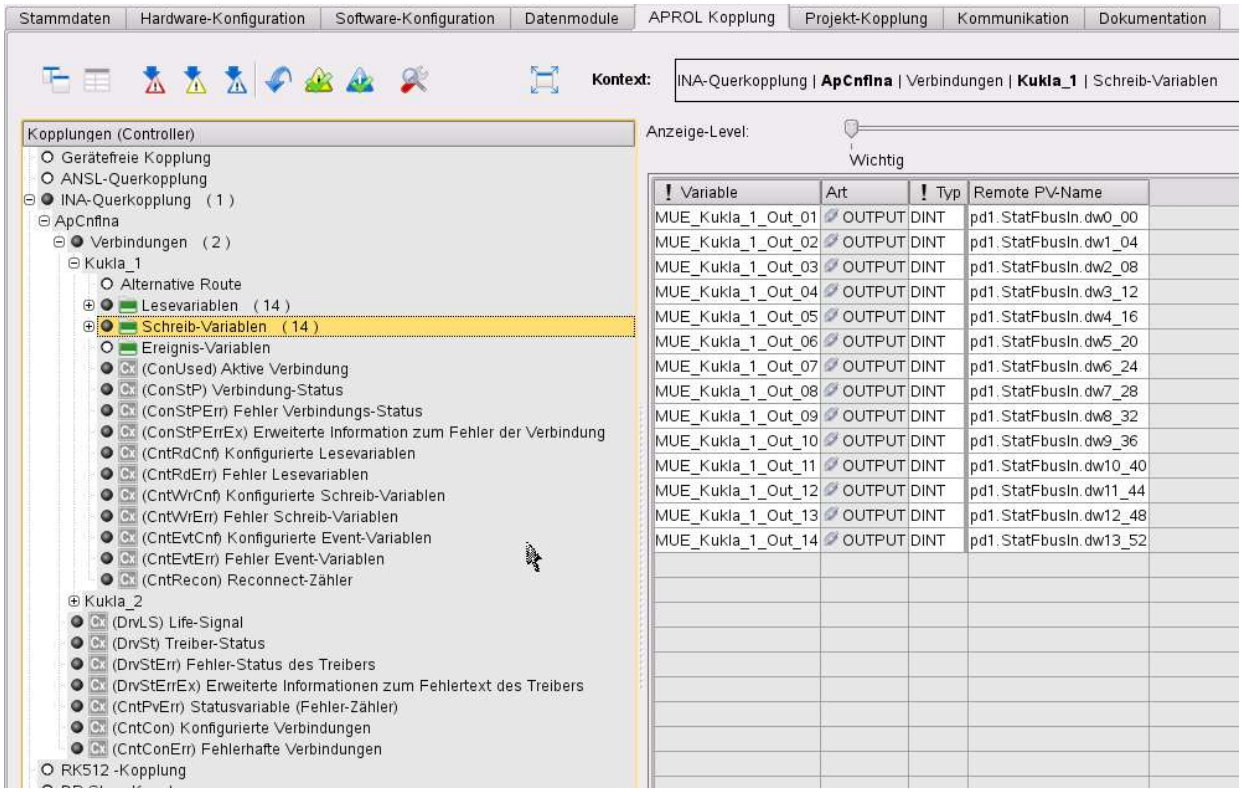
6.7 Aprol Communication

In principle, an INA cross-coupling must be created in the Aprol coupling tab and the number of the scale must be set in the routing path.



Then the read and write variables are created with the remote PV name (see figure).




Stammdaten
Hardware-Konfiguration
Software-Konfiguration
Datenmodule
APROL Kopplung
Projekt-Kopplung
Kommunikation
Dokumentation
Kontext:
INA-Querkopplung | ApCnfIna | Verbindungen | Kukla_1 | Schreib-Variablen
Kopplungen (Controller)
Gerätefreie Kopplung
ANSL-Querkopplung
INA-Querkopplung (1)
ApCnfIna
Verbindungen (2)
Kukla_1
Alternative Route
Lesevariablen (14)
Schreib-Variablen (14)
Ereignis-Variablen
(ConUsed) Aktive Verbindung
(ConStP) Verbindung-Status
(ConStPErr) Fehler Verbindungs-Status
(ConStPErrEx) Erweiterte Information zum Fehler der Verbindung
(CntRdCnf) Konfigurierte Lesevariablen
(CntRdErr) Fehler Lesevariablen
(CntWrCnf) Konfigurierte Schreib-Variablen
(CntWrErr) Fehler Schreib-Variablen
(CntEvtCnf) Konfigurierte Event-Variablen
(CntEvtErr) Fehler Event-Variablen
(CntRecon) Reconnect-Zähler
Kukla_2
(DrvLS) Life-Signal
(DrvSt) Treiber-Status
(DrvStErr) Fehler-Status des Treibers
(DrvStErrEx) Erweiterte Informationen zum Fehlertext des Treibers
(CntPvErr) Statusvariable (Fehler-Zähler)
(CntCon) Konfigurierte Verbindungen
(CntConErr) Fehlerhafte Verbindungen
RK512 -Kopplung
Anzeige-Level:
Wichtig
Variable
Art
Typ
Remote PV-Name
MUE_Kukla_1_Out_01 OUTPUT DINT pd1.StatFbusIn.dw0_00
MUE_Kukla_1_Out_02 OUTPUT DINT pd1.StatFbusIn.dw1_04
MUE_Kukla_1_Out_03 OUTPUT DINT pd1.StatFbusIn.dw2_08
MUE_Kukla_1_Out_04 OUTPUT DINT pd1.StatFbusIn.dw3_12
MUE_Kukla_1_Out_05 OUTPUT DINT pd1.StatFbusIn.dw4_16
MUE_Kukla_1_Out_06 OUTPUT DINT pd1.StatFbusIn.dw5_20
MUE_Kukla_1_Out_07 OUTPUT DINT pd1.StatFbusIn.dw6_24
MUE_Kukla_1_Out_08 OUTPUT DINT pd1.StatFbusIn.dw7_28
MUE_Kukla_1_Out_09 OUTPUT DINT pd1.StatFbusIn.dw8_32
MUE_Kukla_1_Out_10 OUTPUT DINT pd1.StatFbusIn.dw9_36
MUE_Kukla_1_Out_11 OUTPUT DINT pd1.StatFbusIn.dw10_40
MUE_Kukla_1_Out_12 OUTPUT DINT pd1.StatFbusIn.dw11_44
MUE_Kukla_1_Out_13 OUTPUT DINT pd1.StatFbusIn.dw12_48
MUE_Kukla_1_Out_14 OUTPUT DINT pd1.StatFbusIn.dw13_52

7 General data structure

Generally, always 10 Double words have to be transferred as nominal data by the superior control.

As usually the scale computer is able to collect a variety of data, always 14 Double words are signalled back to the superior system. To each process data double word via the corresponding parameter number individually can be allocated, which value exactly on this field is sent.

7.1 Set point - and process data fields

	PLC > DWC	DWC > PLC
00 Double word	BusIn DW00 (P7200)	BusOut DW00 (P7400)
01 Double word	BusIn DW01 (P7201)	BusOut DW01 (P7401)
02 Double word	BusIn DW02 (P7202)	BusOut DW02 (P7402)
03 Double word	BusIn DW03 (P7203)	BusOut DW03 (P7403)
04 Double word	BusIn DW04 (P7204)	BusOut DW04 (P7404)
05 Double word	BusIn DW05 (P7205)	BusOut DW05 (P7405)
06 Double word	BusIn DW06 (P7206)	BusOut DW06 (P7406)
07 Double word	BusIn DW07 (P7207)	BusOut DW07 (P7407)
08 Double word	BusIn DW08 (P7208)	BusOut DW08 (P7408)
09 Double word	BusIn DW09 (P7209)	BusOut DW09 (P7409)
10 Double word	BusIn DW10 (P7210)	BusOut DW10 (P7410)
11 Double word	BusIn DW11 (P7211)	BusOut DW11 (P7411)
12 Double word	BusIn DW12 (P7212)	BusOut DW12 (P7412)
13 Double word	BusIn DW13 (P7213)	BusOut DW13 (P7413)
14 Double word	BusIn DW14 (P7214)	BusOut DW14 (P7414)
15 Double word	BusIn DW15 (P7215)	BusOut DW15 (P7415)

Absolute values are transferred as 1/10 kg numbers or in kg (see detail indications).
Per cent values are transferred as values with 1/100 per cent resolution (e.g. 74.83 % corresponds to number value 7483).

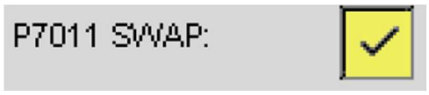
Alternatively, if required, the protocol can be expanded to 16 double words in both directions.
This alternative is only recommended for special applications and customers in consultation with the manufacturer, since the normally published device master data may have to be adjusted by the customer himself. This option is activated using parameter P7000 with the setting "01:64 BYTE" instead of the standard "00: STD"

7.2 Enidian Format (Byte order / Endianness)

Byte order (byte order or endianness) designates the memory organization for INT and DINT value. This is especially important for detecting control bits!

It always depends on the Master-System how data's are stored there. Some systems, such as SIMATIC S7 systems, save the least significant bit of a number at the highest address.
Bit fields (status and control double words) are usually also transmitted as double words by the DWC-7 base unit.
With AllenBradely controls, the least significant bit is usually on the lowest byte address (0.0-0.7,1.0-1.7, 2.0-2.7,3.0-3.7).
With Siemens-S7 controls, the first bit begins on the most significant address (3.0-3.7,2.0-2.7, 1.0-1.7,0.0-0.7)

A DWC-7B base unit can, for example, automatically turn the bits for AB controls by activating swap parameter P7011.



7.3 REAL numbers

As option available numbers are transmitted as floating point format.
It is expressly pointed out that the sample libraries provided by KUKLA for higher-level controls are NOT suitable for floating point operations.

7.4 Data structure recommended by KUKLA:

(Details see following chapter)

00 Double word	12: Bus ABS 1 [kg/h] *	50: P3 Capacity [kg/h] *
01 Double word	21: Bus Command 1 *	44: Counter A [kg] *
02 Double word	22: Bus Command 2 *	45: Counter B [kg] *
03 Double word	00: ---	32: BusControlBits *1
04 Double word	04: Bus percent 1 *	33: BusControlBits 2 *
05 Double word	05: Bus percent 2 *	35: BusStatusBits 1 *
06 Double word	00: ---	36: BusStatusBits 2 *
07 Double word	00: ---	02: Drive WB [%] *
08 Double word	23: Bus Command 3	01: Feeder setpoint [%] *
09 Double word	24: Bus Command 4	08: g3-load [%] *
10 Double word		22: Speed [%] *
11 Double word		03: 0% output [%] / Spare *
12 Double word		03: 0% output [%] / Spare *
13 Double word		03: 0% output [%] / Spare *

7.5 Details Bus Setpoints (Process In)

BusSet - Doublewords		
Denomination	Description	Format
00: ---	Data FIELD is unused	
01: ---	reserved	
02: ---	reserved	
03: ---	reserved	
04: Bus percent 1	Bus Setpoint percent 1	%-Value
05: Bus percent 2	Bus Setpoint percent 2	%-Value
06: Bus percent 3	Bus Setpoint percent 3	%-Value
07: Bus percent 4	Bus Setpoint percent 4	%-Value
08: Bus ABS 1	BusAbsolute value - buffer 1	Absolut
09: Bus ABS 2	BusAbsolute value - buffer 2	Absolut
10: Bus ABS 3	BusAbsolute value - buffer 3	Absolut
11: Bus ABS 4	BusAbsolute value - buffer 4	Absolut
12: Bus ABS 1 [kg/h]	Bus Kilo Setpoint 1 (e.g. Capacity Setpoint)	kg

13: Bus ABS 2 [kg/h]	Bus Kilo Setpoint 2	kg
14: Bus ABS 3 [kg/h]	Bus Kilo Setpoint 3	kg
15: Bus ABS 4 [kg/h]	Bus Kilo Setpoint 4	kg
16: Bus ABS 1 [1/10 kg/h]	Bus Dekagramm -Setpoint 1	1/10 kg
17: Bus ABS 2 [1/10 kg/h]	Bus Dekagramm -Setpoint 2	1/10 kg
18: Bus ABS 3 [1/10 kg/h]	Bus Dekagramm -Setpoint 3	1/10 kg
19: Bus ABS 4 [1/10 kg/h]	Bus Dekagramm -Setpoint 4	1/10 kg
20: ---	reserved	
21: Bus Command 1	BusCommand-Double word 1 (see following Bit-list)	Bitfield[32]
22: Bus Command 2	BusCommand-Double word 2 (see following Bit-list)	Bitfield[32]
23: Bus Command 3	BusCommand-Double word 3 (see following Bit-list)	Bitfield[32]
24: ---	reserved	
25: Parameter Number	Special function on consultation with manufacturer	
26: Parameter Value	Special function on consultation with manufacturer	
27: ---	reserved	
28: ---	reserved	
29: ---	reserved	
30: DWC3/5 CMD	Compatiblity for old DWC3/5 Systems Commands	
31: DWC3/5 SW1_2	Compatiblity for old DWC3/5 Systems Systemen SW	
32: DWC3/5 SW3_4	Compatiblity for old DWC3/5 Systems SW	
33: DWC3/5 SL1	Compatiblity for old DWC3/5 Systems SL	
34: DWC3/5 SL2	Compatiblity for old DWC3/5 Systems SL	

	Digital control commands to the scale computer	
Bus Command 1	*0x00000001*	*00: -*
	0x00000002	*01: QUANTITY COUNTER B PRINT / CLEAR*
	0x00000004	*02: QUANTITY COUNTER C PRINT / CLEAR*
	0x00000008	*03: REMOTE START (static contact)*
	0x00000010	*04: CONVEYOR SYSTEM RUNS*
	0x00000020	*05: REMOTE-MODE*
	0x00000040	*06: PANEL-MODE*
	0x00000080	*07: MIS RUN*
	0x00000100	*08: SYNC-PULSE (Absolute value tare)*
	0x00000200	*09: DRIVE FAULT*
	0x00000400	*10: DELETE ERROR*
	0x00000800	*11: PANEL START (rising edge)-*
	0x00001000	*12: FIELD INPUT 1 (switches FIELD RELAY 1)*
	0x00002000	*13: FIELD INPUT 2 (switches FIELD RELAY 2)*
	0x00004000	*14: FIELD INPUT 3 (switches FIELD RELAY 3)*
	0x00008000	*15: FIELD INPUT 4 (switches FIELD RELAY 4)*
	0x00010000	*16: FIELD INPUT 5 (switches FIELD RELAY 5)*
	0x00020000	*17: FIELD INPUT 6 (switches FIELD RELAY 6)*
	0x00040000	*18: FIELD INPUT 7 (switches FIELD RELAY 7)*
	0x00080000	*19: LIVE BIT*
	0x00100000	*20: TENSION CLEANING CHAIN*
	0x00200000	*21: >0< START*
	0x00400000	*22: START TEST (Testweight)*
	0x00800000	*23: START MATERIALTEST*
	0x01000000	*24: SUSPEND MEASURING*
	0x02000000	*25: ENABLE REGULATOR (Feeder operation)*
	0x04000000	*26: FEEDER REDUCTION (Feeder operation)*
	0x08000000	*27: JOG Feeder*
	0x10000000	*28: -*
	0x20000000	*29: REFILLING INDICATOR (Loss-in-weight-dosing)*
	0x40000000	*30: START BATCH (Batch mode)*
	0x80000000	*31: INTERRUPT BATCH (Batch mode)*
Bus Command 2	*0x00000001*	*32: EMPTYING SYSTEM (Batch mode)*
	0x00000002	*33: FINE STREAM (Batch mode)*
	0x00000004	*34: BATCH REMOT SETPOINT (Batch mode)--*
	0x00000008	*35: FEEDINGCHANNEL x1 (Batch mode)*
	0x00000010	*36: FEEDINGCHANNEL x2 (Batch mode)*
	0x00000020	*37 --*
	0x00000040	*38: COUNTING TO G2*
	0x00000080	*39: CALCULATE DRY WEIGHT*
	0x00000100	*40: ADAPT SPAN (Check weigher)*
	0x00000200	*41: –*
	0x00000400	*42: BELT MISRUN LEFT–*
	0x00000800	*43: BELT MISRUN RIGHT*
	0x00001000	*44: BELT EDGE SENSOR ON (Belt steering device)*
	0x00002000	*45: BELT EDGE SENSOR OFF (Belt steering device)*
	0x00004000	*46: STEERING DEV EXTENDED (Belt steering device)*
	0x00008000	*47: STEERING DEV RETRACTED (Belt steering device)*
	0x00010000	*48: –*
	0x00020000	*49: SLIPDETECTION –*
	0x00040000	*50: TACHO INPUT (not usable for Bus / too fast pulses)*
	0x00080000	*51: EMERGENCY DEVICE (indication only)*
	0x00100000	*52: VOLUMETRIC Mode*
	0x00200000	*53:-*
	0x00400000	*54: DRIVE LOCK*
	0x00800000	*55: LOCAL-Mode*
	0x01000000	*56: LOCAL START (edge controlled)*
	0x02000000	*57: LOCAL STOP (edge controlled)*
	0x04000000	*58: CENTRAL OPERATION*
	0x08000000	*59: -*
	0x10000000	*60: JOG MAIN DRIVE*

	0x20000000	*61: -*
	0x40000000	*62: -*
	0x80000000	*63: -*
Bus Command 3	*0x00000001*	*64: CHANNEL 1 START (support drives)*
	0x00000002	*65: CHANNEL 1 STOP (support drives)*
	0x00000004	*66: -*
	0x00000008	*67: -*
	0x00000010	*68: CHANNEL 2 START (support drives)*
	0x00000020	*69: CHANNEL 2 STOP (support drives)*
	0x00000040	*70: -*
	0x00000080	*71: -*
	0x00000100	*72: CHANNEL 3 START (support drives)*
	0x00000200	*73: CHANNEL 3 STOP (support drives)*
	0x00000400	*74: -*
	0x00000800	*75: -*
	0x00001000	*76: CHANNEL 4 START (support drives)*
	0x00002000	*77: CHANNEL 4 STOP (support drives)*
	0x00004000	*78: -*
	0x00008000	*79: -*
	0x00010000	*80: CHANNEL 5 START (support drives)*
	0x00020000	*81: CHANNEL 5 STOP (support drives)*
	0x00040000	*82: -*
	0x00080000	*83: -*
	-	*reserved*
Bus Command 4	*0x00000001*	*96: XD1 pulse (speed monitor sensor auxiliary drive 1)*
	0x00000002	*97: XD1 run (run indication from auxiliary drive 1)*
	0x00000004	*98: XD1 fault (external fault at auxiliary drive 1)*
	0x00000008	*99: -*
	0x00000010	*100: -*
	0x00000020	*101: XD2 pulse (speed monitor sensor auxiliary drive 2)*
	0x00000040	*102: XD2 run (run indication from auxiliary drive 2)*
	0x00000080	*103: XD2 fault (external fault at auxiliary drive 2)*
	0x00000100	*104: -*
	0x00000200	*105: -*
	0x00000400	*106: XD3 pulse (speed monitor sensor auxiliary drive 3)*
	0x00000800	*107: XD3 run (run indication from auxiliary drive 3)*
	0x00001000	*108: XD3 fault (external fault at auxiliary drive 3)*
	0x00002000	*109: -*
	0x00004000	*110: -*
	0x00008000	*111: XD4 pulse (speed monitor sensor auxiliary drive 4)*
	0x00010000	*112: XD4 run (run indication from auxiliary drive 4)*
	0x00020000	*113: XD4 fault (external fault at auxiliary drive 4)*
	0x00040000	*114: -*
	0x00080000	*115: -*
	0x00100000	*116: XD5 pulse (speed monitor sensor auxiliary drive 5)*
	0x00200000	*117: XD5 run (run indication from auxiliary drive 5)*
	0x00400000	*118: XD5 fault (external fault at auxiliary drive 5)*
	0x00800000	*119: -*
	0x01000000	*120: -*
	-	*reserved*
Please, find details concerning the BusCommands in the Parameter description of the Digital inputs (P60xx). The physical inputs as well as the BusCommands are connected in parallel.		

7.6 Description of Bus actual values (Process data out)

ProcessData / BusOut- Double words		
Denomination	Description	Format
00: P3 Capacity [%]	Current actual capacity at discharge point	%-Value
01: Feeder setpoint [%]	Variable for Feeder drive	%-Value
02: Drive WB [%]	Variable for dosing Drive (weighing belt,dosing screw etc.)	%-Value
03: 0% output [%]	Zero value Output (primarily for adjustment works)	%-Value
04: 50% output [%]	50% - value Output (primarily for adjustment works)	%-Value
05: 100% output [%]	100% - value Output (primarily for adjustment works)	%-Value
06: g1-load [%]	Current load on measuring length Output	%-Value
07: g2-load [%]	Current load at dosing point g2 Output	%-Value
08: g3-load [%]	Current load am dosing point Output	%-Value
09: Scaling 2 [%]	Scaling factor 2 for internal data scalings	%-Value
10: Setpoint output [%]	Feedback of current Set point	%-Value
11: P2 Capacity [%]	Current dosing capacity at dosing point in per cent	%-Value
12: P1 Capacity [%]	Current Capacity on measuring length in per cent	%-Value
13: Deviation [%]	Deviation between nominal and actual dosing capacity	%-Value
14: Batch Finestream [%]	Batch control: variable for analog Fine stream	%-Value
15: Feeder Deviation [%]	Current Feeder deviation	%-Value
16: Distance-FIFO	Special functions: Path delay fifo	%-Value
17: Transfervalue 1	Special functions: Transfer value 1 for Data transfer	%-Value
18:Transfervalue 2	Special functions: Transfer value 2 for Data transfer	%-Value
19: Gross-Load [%]	Subtraction system: Gross weight for downstream scale	%-Value
20: Bin Load [%]	Currently Bin weight in %	%-Value
21: PreBin-Regulator [%]	Variable for Pre-bin regulator	%-Value
22: Speed [%]	Current Belt speed in per cent	%-Value

24: TW [%]	Currently used test weight in %	%-Value
25: g1RR-Load [%]	Side weight evaluation: Load rightmost	%-Value
26: g1R-Load [%]	Side weight evaluation: Load right	%-Value
27: g1L-Load [%]	Side weight evaluation: Load left	%-Value
28: g1LL-Load [%]	Side weight evaluation: Load leftmost	%-Value
29: g1 total [g]	Absolute weight at g1 section in g	Gramm
30: g3 total [g]	Absolute weight at g3 section in g	Gramm

32: BusControlBits 1	Bus Controlbits-Doubleword 1 (see following List)	Bitfield[32]
33: BusControlBits 2	Bus Controlbits-Doubleword 2 (see following List)	Bitfield[32]
34: BusControlBits 3	Bus Controlbits-Doubleword 3 (see following List)	Bitfield[32]

35: BusStatusBits1	Error / Status-Doubleword 1 (see following List)	Bitfield[32]
36: BusStatusBits2	Error / Status-Doubleword 2 (see following List)	Bitfield[32]

41: Counter A [Countingunit]	EndlessCounter A in parameterized Counter unit	
42: Counter B [Countingunit]	ShiftCounter B in parameterized Counter unit	
43: Counter C [Countingunit]	ShiftCounter C in parameterized Counter unit	
44: Counter A [kg]	non-resettable Endless counter A in kg	kg
45: Counter B [kg]	ShiftCounter B in kg	kg
46: Counter C [kg]	ShiftCounter C in kg	kg
47: Counter A [1/10 kg]	non-resettable EndlessCounter A in 100g resolution	1/10 kg
48: Counter B [1/10 kg]	ShiftCounter B in in 100g resolution	1/10 kg
49: Counter C [1/10 kg]	ShiftCounter C in in 100g resolution	1/10 kg
50: P3 Capacity [kg/h]	Current Conveying capacity at discharge point P3 in kg/h	kg
51: P3 Capacity [1/10 kg/h]	Curr. Conveying capacity at discharge point P3 in 1/10 kg/h	1/10 kg
---		
53: WC 1 [%]	Current value at weighing channel 1	%
54: WC 2 [%]	Current value at weighing channel 2	**%**
55: WC 3 [%]	Current value at weighing channel 3	**%**
56: WC 4 [%]	Current value at weighing channel 4	**%**
57: WC5 [%]	Current value at weighing channel 5	**%**
58: Target occupancy [%]	Load Setpoint	%
59: PreBin Zone1 [g]	PreBin weight in Area 1	g
60: PreBin Zone2 [g]	PreBin weight in Area 2	g
61: PreBin Zone3 [g]	PreBin weight in Area 3	g
62: PreBin Zone4 [g]	PreBin weight in Area 4	g
63: PreBin Sum [%]	PreBin Total weight in percent	%-Value
64: PreBin Absolut [g]---	PreBin Total weight absolute in percent	g
65: Parameter- Number	Special function on consultation with manufacturer	
66: Parameter- Value	Special function on consultation with manufacturer	

68: g1Rright [abs]	Total weight Belt section right hand side	
69: g1Left [abs]	Total weight Belt section left hand side	

74: AW[%]		
75: DWC 3/5 Statusword	Compatibility to former DWC3/5 Statusword	
76: DWC3/5 Relaisword	Compatibility to former DWC3/5 Relaisword	
77: DWC3/5 IW1_2	Compatibility to former DWC3/5 Inputwords	

78: DWC3/5 IW 3_4	Compatibility to former DWC3/5 Inputwords	
79: DWC3/5 IL1	Compatibility to former DWC3/5 Input double word	
80: DWC3/5 IL2	Compatibility to former DWC3/5 Input double word	
81: P2 Capacity [kg/h]	Actual Capacity at optional dosing point P2 in kg/h	
82: AI 00	Actual reading of first analog input channel AI00	Prozent
83: AI 01	Actual reading of second analog input channel AI01	Prozent
84: AI 10	Actual reading of third analog input channel AI10	Prozent
85: AI 11	Actual reading of first analog input channel AI11	Prozent
90: Counter A [kg] REAL	Counter A in kg as real number	
91: Counter B [kg] REAL	Counter B in kg as real number	
92: Counter C [kg] REAL	Counter C in kg as real number	
100: P3 [kg/h] REAL	Actual Capacity am P3-Point as real number	

Bus ControlBits 1	*Digital control commands from scale computer*	
	0x00000001	*00:--*
	0x00000002	*01: WARNING (Sum signal)*
	0x00000004	*02: READY TO OPERATE*
	0x00000008	*03: CONVEYING SYSTEM STOPPED (inversely usable as Belt runs)*
	0x00000010	*04: EMPTY-MESSAGE*
	0x00000020	*05: G3 MIN-LOAD*
	0x00000040	*06: G3 MAX LOAD*
	0x00000080	*07: PANEL Mode active--*
	0x00000100	*08 REMOTE- Mode active*
	0x00000200	*09: DEVIATION*
	0x00000400	*10: SLIP*
	0x00000800	*11: TEST / TARE RUNS*
	0x00001000	*12: LAY ON TEST WEIGHT*
	0x00002000	*13: MAIN DRIVE ON*
	0x00004000	*14: FEEDER ON*
	0x00008000	*15: FEEDER REDUCTION*
	0x00010000	*16: FEEDER DIRECTION (dosing drum control)*
	0x00020000	*17: FEEDER OPEN (dosing drum control)*
	0x00040000	*18: FEEDER CLOSED (dosing drum control)*
	0x00080000	*19: -*
	0x00100000	*20: MOTOR SCALE (Batch mode)*
	0x00200000	*21: BATCH ENABLE (Batch mode)*
	0x00400000	*22: COARSE STREAM (Batch mode)*
	0x00800000	*23: FINE STREAM (Batch mode)*
	0x01000000	*24: -*
	0x02000000	*25: FILLING WEIGHING BIN (Loss-in-weight dosing)*
	0x04000000	*26: BIN EMPTY (Loss-in-weight dosing)*
	0x08000000	*27: MOVEMENT ERROR (Loss-in-weight dosing)*
	0x10000000	*28: DEVIATION DETECTED (Check weigher)*
	0x20000000	*29: -*
	0x40000000	*30: COUNTER SIGNAL (not usable via Bus !)*
	0x80000000	*31: LIVE BIT (inverted to Input signal)*
Bus ControlBits 2	*Digital control commands from the scale computer*	
	0x00000001	*32: FIELDRELAY 1 (reads FIELD OPTO 1)*
	0x00000002	*33: FIELDRELAY 2 (reads FIELD OPTO 2)*
	0x00000004	*34: FIELDRELAY 3 (reads FIELD OPTO 3)*
	0x00000008	*35: FIELDRELAY 4 (reads FIELD OPTO 4)*
	0x00000010	*36: FIELDRELAY 5 (reads FIELD OPTO 5)*
	0x00000020	*37: FIELDRELAY 6 (reads FIELD OPTO 6)*
	0x00000040	*38: FIELDRELAY 7 (reads FIELD OPTO 7)*
	0x00000080	*39: -*
	0x00000100	*40: -*
	0x00000200	*41: STEERING-COMMAND (2 point regulator)*
	0x00000400	*42: -*
	0x00000800	*43: BELT MISRUN*
	0x00001000	*44: -*
	0x00002000	*45: LOCAL ACTIVE*
	0x00004000	*46: -*
	0x00008000	*47: -*
	0x00010000	*48: -*
	0x00020000	*49: BELTSTEERING PULL*
	0x00040000	*50: BELTSTEERING PUSH*
	0x00080000	*51: AUXILIARY DRIVE 1 ON*
	0x00100000	*52: AUXILIARY DRIVE 2 ON*
	0x00200000	*53: AUXILIARY DRIVE 3 ON*
	0x00400000	*54: AUXILIARY DRIVE 4 ON*
	0x00800000	*55: AUXILIARY DRIVE 5 ON*
	0x01000000	*56:*
	0x02000000	*57:*

	0x04000000	*58:*
	0x08000000	*59:*
	0x10000000	*60: Behälter max*
	0x20000000	*61: Behälter min*
	0x40000000	*62: SF Waagenantrieb EIN*
	0x80000000	*63: SF*
	Digital control commands from the scale computer	
Bus CommandBits 3	*0x00000001 to 0x80000000*	*reserved*

See details about function of control bits under digital Outputs (P64xx). BusCommandbits are similar to physical digital Outputs (DO).

	Digital status information's from the scale computer	
Bus StatusBits 1	*0x00000001*	*S00: WC 0 fault LOAD CELL mV FAULT CHANNEL 1 (Standard)*
	0x00000002	*S01: WC 1 fault LOAD CELL mV FAULT CHANNEL 2*
	0x00000004	*S02: WC 2 fault LOAD CELL mV FAULT CHANNEL 3*
	0x00000008	*S03: WC 3 fault LOAD CELL mV FAULT CHANNEL 4*
	0x00000010	*S04: WC 4 fault LOAD CELL mV FAULT CHANNEL 5*
	0x00000020	*S05: WC 5 fault LOAD CELL mV FAULT CHANNEL 6*
	0x00000040	*S06: -*
	0x00000080	*S07: -*
	0x00000100	*S08: BELT EMPTY*
	0x00000200	*S09: DISCHARGE END WEIGHT LESS THAN MIN*
	0x00000400	*S10: DISCHARGE END WEIGHT GREATER THAN MAX*
	0x00000800	*S11: -*
	0x00001000	*S12: DRIVE/ TACHO FAULT*
	0x00002000	*S13: SYNC ERROR (Belt Startmarker)*
	0x00004000	*S14: FEEDER ERROR*
	0x00008000	*S15: BELT MIS RUN*
	0x00010000	*S16: SLIP*
	0x00020000	*S17: DRIVE STOPPED*
	0x00040000	*S18: Set point ERROR*
	0x00080000	*S19: DEVIATION –*
	0x00100000	*S20: -*
	0x00200000	*S21: BELT MIS RUN LEFT*
	0x00400000	*S22: BELT MIS RUN RIGHT*
	0x00800000	*S23: TENSION CLEANING CHAIN (autom. cleaning device)*
	0x01000000	*S24: TARE ERROR*
	0x02000000	*S25: TEST ERROR*
	0x04000000	*S26: FILLING REQUIREMENT (Loss-in-weight-dosing)*
	0x08000000	*S27: MOVEMENT ERROR (Loss-in-weight-dosing)*
	0x10000000	*S28: DECENTRALE IO OFFLINE*
	0x20000000	*S29: -*
	0x40000000	*S30: EMERGENCY AKTIV*
	0x80000000	*S31: FELDBUS OFFLINE (Kommunikation zur übergeordneten Steuerung)*
	Digital status information's from the scale computer	
Bus StatusBits 2	*0x00000001*	*S32: MM00 Error*
	0x00000002	*S33: MM00 Inverter failure*
	0x00000004	*S34: MM00 Offline*
	0x00000008	*S35: -*
	0x00000010	*S36: MM01 Error*
	0x00000020	*S37: MM01 Inverter failure*
	0x00000040	*S38: MM01 Offline*
	0x00000080	*S39: -*
	0x00000100	*S40: MM10 Error*
	0x00000200	*S41: MM10 Inverter failure*
	0x00000400	*S42: MM10 Offline*
	0x00000800	*S43: -*

	0x00001000	*S44: MM11 Error*
	0x00002000	*S45: MM11 Inverter failure*
	0x00004000	*S46: MM11 Offline*
	0x00008000	*S47: -*
	0x00010000	*S48: XD1 speed monitoring*
	0x00020000	*S49: XD1 fault*
	0x00040000	*S50: -*
	0x00080000	*S51: XD2 speed monitoring*
	0x00100000-	*S52: XD2 fault*
	0x00200000	*S53: -*
	0x00400000	*S54: XD3 speed monitoring*
	0x00800000	*S55: XD3 fault*
	0x01000000	*S56: -*
	0x02000000	*S57: XD4 speed monitoring*
	0x04000000	*S58: XD4 fault*
	0x08000000	*S59: -*
	0x10000000	*S60: XD5 speed monitoring*
	0x20000000	*S61: XD5 fault*
	0x40000000	*S62: -*
	0x80000000	*S63: -- -*
See details about function of status bits under error messages Outputs (P22xx andP23xx). Bus Statusbits are similar to status display messages.		

7.7 Transfer of additional Data's via Mailbox (PA-Code und PA-Wert)

If additional process data or parameters in the DWC-7 base unit are to be read or written via fieldbus, this is possible to do this with the integrated mailbox system.

7.7.1 Activation of the Mailbox- Systems

The manufacturer recommends the following parameterization in order to activate the PLC send mailbox and the PLC receive mailbox at all.

Command channel PLC > DWC-7	Response channel DWC-7 > PLC
P7206_BusSet_DW24 = 25 Mailbox Number P7207_BusSet_DW28 = 26 Mailbox Value	P7412_BusAct_DW48 = 65 Mailbox Number P7413_BusAct_DW52 = 66 Mailbox Value

7.7.2 Expiry of a request

Basically, the higher-level system must always first describe the command channel. The following command codes are possible:

7.7.3 Command codes for process data's via Mailbox

In principle, the command channel must always be written by the higher-level system first. The following command codes are possible:

Mailbox Number Write	Mailbox Number Read	Parameter designation	Unit
Gruppe Statuswerte			
	3	Actual measured Tachometer Frequenz	Hz
	4	Beltspeed absolut	Mm/s *10
	7	Tachoimpulse per tare cell	
	8	Actual tare cell in use	
	9	Total number of tare cells	
	10	Max numbers of tare cells	
	12	Testcounter T	in counting resolution
	13	Result of last test weight test	Pos/Neg deviation in percent
	20	Number of Flash-Parameter write cycles	
	21	Deviation of last Material test	percent
	41	Actual start page HMI Interface	
	42	FN-Number oft he system	
	43	Serial number of the base unit	
	103	Raw – Signal Bin of LossIn Weight feeder	
	114	Current state of LossIn Weight feeder	
	200	State parameter lock	
	210	Status Input-Bitcommands 00..31 (DI)	
	211	Status Input-Bitcommands 32..63 (DI)	
	212	Status Input-Bitcommands 64..95 (DI)	
	213	Status Input-Bitcommands 96..127 (DI)	

	220	Status Output-Bitcommands 00..31 (DO)	
	221	Status Output-Bitcommands 32..63 (DO)	
	222	Status Output-Bitcommands 64..95 (DO)	
	230	Status Warnings 00..31	
	231	Status Warnings 32..63	
	232	Status Warnings 64..95	
	240	Status Ready to Operate 00..31	
	241	Status Ready to Operate 32..63	
	242	Status Ready to Operate 64..95	
	300	Area weight / master speed	
	301	Area weight / setpoint	
	302	Area weight / working width	
	316	Feeder death length absolute	mm
	317	Actual Feeder- death length	percent
	500..505	Currently meassured value at WC00..WC05	microvolts * 10
	510..515	Row value at weifh channel WC00..WC05	Microvolts * 10
	520..525	Tare currently in use	microvolts * 10
	530..533	Analog Input signal at AI00..AI03	absolut
	534..537	Analog Input signal at AI00..AI03	percent
	550..557	Analog Input signal at AO00..AO13	absolut
	534..537	Analog Input signal at AO00..AO13	percent
	570	MoviMot MM00 command word	Hex
	571	MoviMot MM00 setpoint	Zahl
	572	MoviMot MM00 statusword	Hex
	573	MoviMot MM00 actual current amps	Hex
	576..581	MoviMot MM01 datas	
	582..587	MoviMot MM02 datas	
	588..593	MoviMot MM03 datas	
	600..607	Status digital Inputs DI00..DI07	binär
	610..613	Status digital Inputs DI10..DI13	binär
	620..623	Status digital Inputs DI20..DI23	binär
	630..633	Status digital Inputs DI30..DI33	binär
	640..643	Status digital Inputs DI40..DI43	binär
	650..653	Status digital Outputs DO00..DO03	binär
	660..665	Status digital Outputs DO10..DO15	binär
	670..675	Status digital Outputs DO20..DO25	binär
	680..685	Status digital Outputs DO30..DO35	binär
	800	Actual number of material test	
	801	Act. No of last material test	
	802	Width of change at last material test	
	803	Actual number of test weight test	
	804	Actual number of last test weight test with change	
	805	Width of change at last test wight test	
	806..809	Average tare WC00..WC03.	microvolts * 10
	810..813	difference tare to offset WC00..WC03.	microvolts * 10
	814..817	difference tare to offset WC00..WC03.	percent
	818..821	Former deviation WC00..WC03	
	822	Actual number of tare	
	900	Store parameter- file fail-safe	

	901	Read parameter file	

The “Command codes for scales” group also allows specific program functions such as saving data to be triggered in the base unit.

In general, the scope of this manual does not allow a complete description of all possibilities. If you have any further questions, it is recommended to contact the manufacturer.

7.7.4 Command Code Parameterdatas via Mailbox

If instead the value 10000 is added to the parameter number in the command channel, a new value can be sent to the base device in the mailbox value. In this case, the base unit usually responds with the new value if it could be accepted or with the old value if an implausible value was sent.

Group Scaleparameter- Settings			
11000-11999	1000-1999	Parameter group P1xxx Waagendaten	See T2 Parameter Manual
12000-12999	2000-2999	Parameter group P2xxx Limit / Warning	See T2 Parameter Manual
13000-13999	3000-3999	Parameter group P3xxx Dosing	See T2 Parameter Manual
14000-14999	4000-4999	Parameter group P4xxx Sonder Funktionen	See T2 Parameter Manual
15000-15999	5000-5999	Parameter group P5xxx Analog I/O	See T2 Parameter Manual
16000-16999	6000-6999	Parameter group P6xxx Digital I/O	See T2 Parameter Manual
17000-17999	7000-7999	Parameter group P7xxx Fieldbus	See T2 Parameter Manual
18000-18999	8000-8999	Reserved	
19000-19999	9000-9999	Not usable because these are OP-7 parameters which are internal in the operator panel.	

The group "Status values" allows an acyclic request of process data which is not part of the standard protocol. The associated mailbox value in irrelevant for this group.

The group "Command codes for Scale" allows specific program functions, such as the saving of data in the base unit. For some command codes, the associated mailbox value of the command channel is also relevant.

The group "Scale parameter settings" allows a query of a specific parameter number. All you have to do is send the parameter number in the mailbox number of the command channel. In the next telegram, the parameter number under Mailbox number is returned at the response channel and the current setting value of this parameter under Mailbox value.

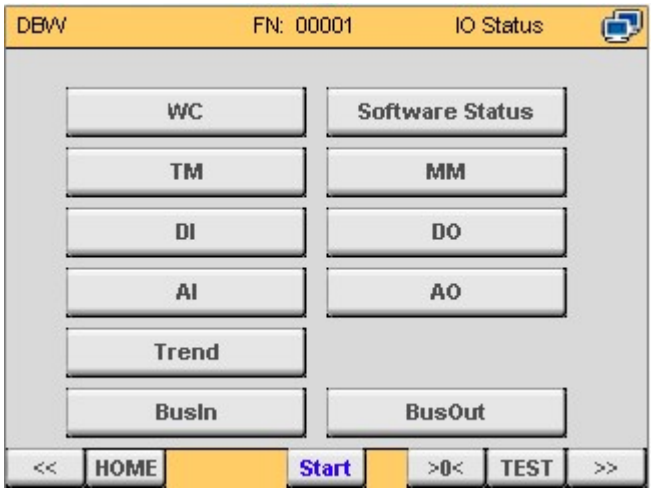
In this way, the higher-level system can query all current settings using a query-and-response procedure.

If the value 10000 is added to the parameter number in the command channel instead, a new value can be sent to the base unit in the mailbox value. In this case, the base unit usually responds with the new value if it could be accepted or the old value if the change has denied.

For the first time, new parameter values are only stored in the RAM of the base unit, which is not protected against power failure.
A permanent storage in the FLASH memory must be initiated via a separate command after the end of the last change.

In general, new parameter values must NOT be sent if the parameterization mode is activated on an operator panel. The corresponding status bit should be permanently checked before the send command.
For “Legal for Trade” verified systems, this option is generally prohibited and thus blocked.

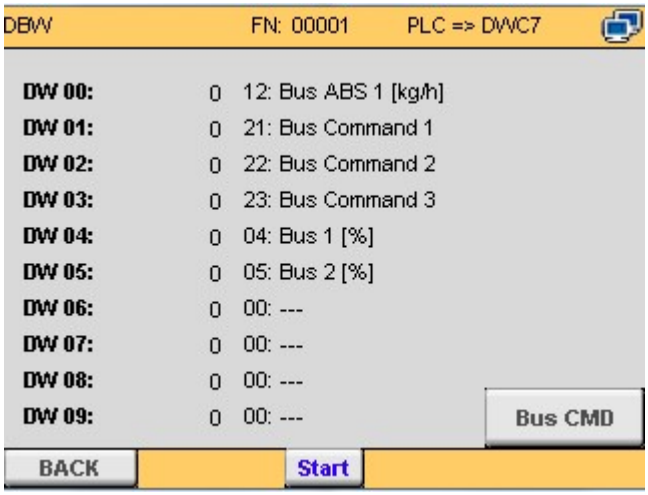
8 Testscreen for Fieldbus-Interface



It is possible to control the data transfer of the Fieldbus interface. Thereto the arrow keys bottom left or right have to be pressed so often until this selection appears.

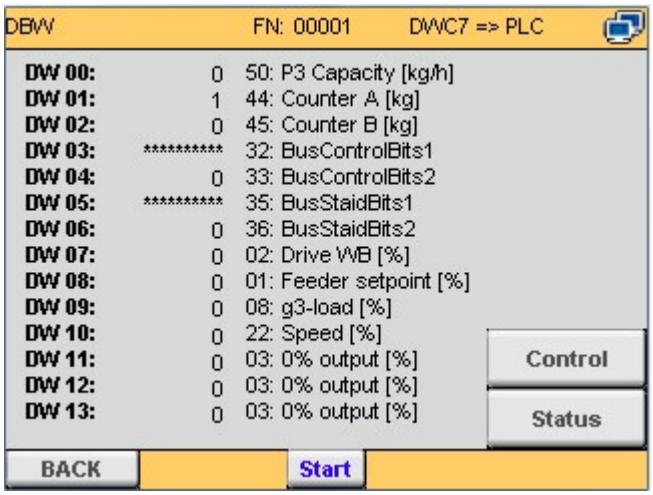
BusIn indicates the DWC-7 Set points

BusOut indicates the DWC-7 actual values



BusIn / DWC-7 Set points

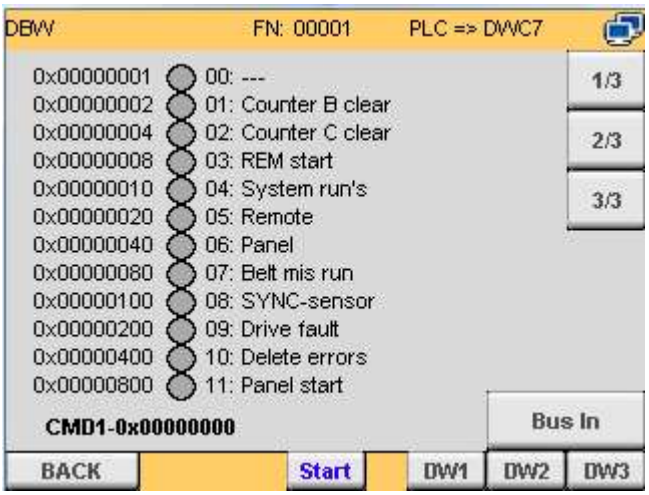
The input values transferred by the central control are represented.



BusOut / DWC-7 actual values

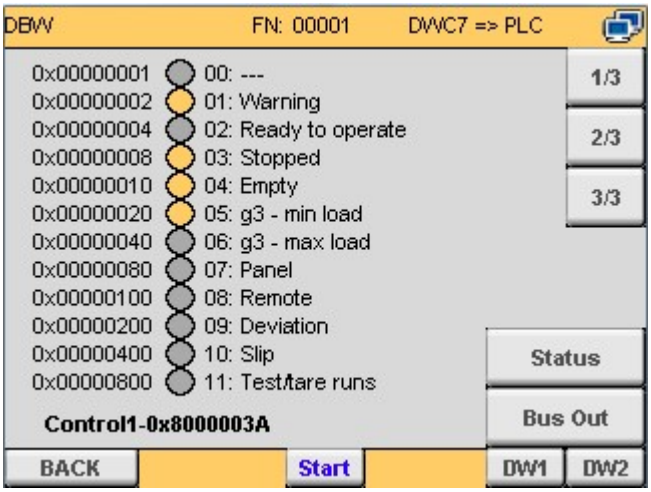
The process data transferred to the central control are represented.

The representation of the number values is done in the decimal number system. Additionally, the denomination of the data field is represented in clear text corresponding to the parameterisation in group P71xx.



BusIn / DWC-7 BusCommand DW 1-3

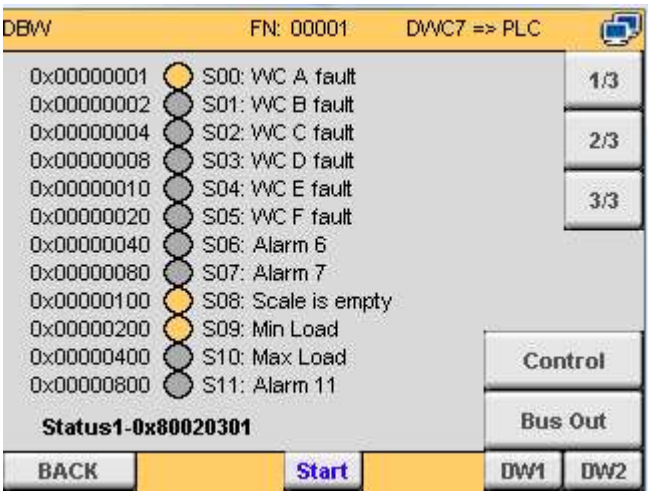
Via „Bus CMD“ button the detail display of the possible BusCommands are activated. Hereby the respective double word is broken into bits. By pressing the button DW1-DW3 (bottom right) it can be switched between the double words.
The switching takes place through the button „1/3“, „2/3“ and „3/3“ on the right top of the page.
In the first column the bit mask is represented in HEX. In the second column the switch status of the respective command is located and in the last column the digital control command is located.



BusOut / DWC-7 Control Bits 1-3

The detailed representation of control bits DW1 and DW2 will be presented by the control button among Feld Bus Out.

The operation takes place as described in the previously image.

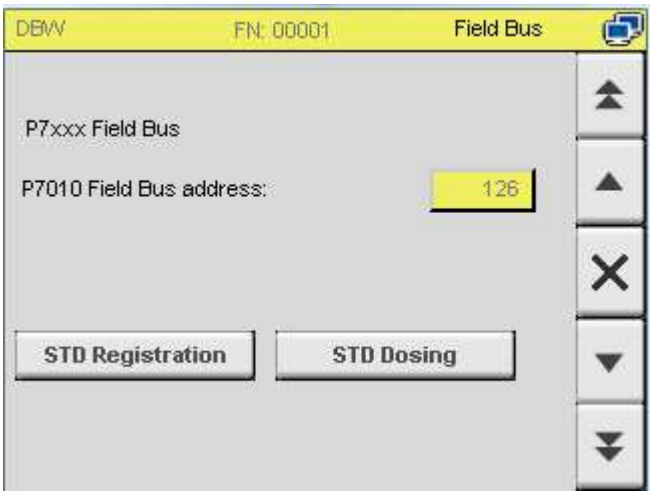


BusOut / DWC-7 Control Bits 1-3

The detailed representation of the status double word 1 and 2 will be presented by the status button among Feld Bus Out.
The handling is identical to the double words for control bits and command bits.

9 PARAMETER DESCRIPTION (P7xxx)

9.1 General Fieldbus Parameters (P70xx)



Parameter group **„Fieldbus“** permits adjustment and change of communication possibilities to a central control.

These functions are available only if a Fieldbus option has been acquired and licenced by the manufacturer.

P7000	**Protocoll:**		**INT**
	Selection: 00: STD 01: 64 BYTE	Range:	0-1
Description:	This parameter determines the length of the process data.		
Indication:	This parameter should always be set to 00: STD. The variant 01: 64BYTE with 16 double words communication in both directions should only be considered after consulting the manufacturer.		
Dependence:	All sample programs and device master data are always designed for variant 00: ST.		

P7002	**IF3 Konfiguration:**		**INT**
	Selection: 00: Not active 01: Modbus 02: APROL	Range:	0-2
Description:	This parameter determines the function of the top IF3 Ethernet interface directly on the CPU.		
Indication:			
Dependence:	If a fieldbus processor is active on the right NEXT to the CPU, this parameter must be set to "00: Not active".		

P7010	**Fieldbus address:**		**INT**
	Selection Profibus 1..124 Device-Net 1..63	Range:	1-125 1-63
Description:	This parameter defines the Profibus address or the DeviceNet node number..		
Indication:	This parameter is visible only if into the scale computer a licenced Fieldbus card has been installed and correctly recognized by the system.		

Dependence:	ProfiBus card or DeviceNet card installed and licensed. (R9700) In addition, the correct firmware must be loaded in the base unit

P7015	Baudrate:		INT
	Selection 0: 125 kBit/s 1: 250 kBit/s 2: 500 kBit/s	Range:	0-2
Description:	This parameter defines the communication speed on the DeviceNet / CAN bus.		
Indication:	DeviceNet usually does not support auto-scan of the transmission speed, such as ProfiBus.		
Dependence:	DeviceNet card installed and licensed. (R9700) In addition, the correct firmware must be loaded in the base unit		

P7020	IP-Config:		INT
	Selection 0: static 1: BOOTP 2: DHCP	Range:	0-2
Description:	This parameter determines the type of IP address for EthernetIP slaves.		
Indication:	If “1:BOOTP” or”2: DHCP” is selected, suitable address servers must be integrated into the network.		
Dependence:	EthernetIP- Feldbuskarte eingebaut und lizenziert. (R9700) Zusätzlich muss die richtige Firmware für EthernetIP im Basisgerät geladen sein		

P7025	IP-Address:		INT
	Selection: 0.0.0.0	Bereich:	0.0.0.0 – 255.255.255.255
Description:	This parameter determines the IP address of the EthernetIP slave.		
Indication:	A setting is only possible if the selection “0: static” is active in parameter "P7020_IP Config".-		
Dependence:	see P7020		

P7026	Subnetz-Maske:		INT
	Selection: 0.0.0.0	Bereich:	0.0.0.0 – 255.255.255.255
Description:	This parameter determines the Subnet Mask of the EthernetIP slave.		
Indication:	see P7025		
Dependence:	see P7020		

9.2 Setpoints and Commands via Fieldbus (P72xx)

P7200	BusIn DW0:		INT
Selection:	00: --- 01: --- 02: --- 03: --- 04: Bus 1 [%] 05: Bus 2 [%] 06: Bus 3 [%] 07: Bus 4 [%] 08: Bus ABS 1 09: Bus ABS 2 10: Bus ABS 3 11: Bus ABS 4 12: --- 13: --- 14: --- 15: --- 16: --- 17: --- 18: --- 19: --- 20: --- 21: Bus Command 1 22: Bus Command 2 23: Bus Command 3 24: Bus Command 4 25: Bus Command 5 26: --- 27: --- 28: Mailbox number 29: Mailbox value 30: DWC3/5 CMD 31: DWC3/5 SW1_2 32: DWC3/5 SW3_4 33: DWC3/5 SL1 34: DWC3/5 SL2	Range:	0-34
Description:	This parameter determines how the 1st input Setpoint-Double word DW0 of the Fieldbus-Set point range is used		
Indication:	Please, find details concerning function in the previous chapters.		

P7201	BusIn DW1:		INT
Selection:	see P7200	Range:	0-30
Description:	This parameter determines how the 2nd input Setpoint-Double word DW1 of the Fieldbus-Set point range is used.		
Indication:	Please, find details concerning function in the previous chapters.		

P7202	BusSoll DW2:		INT
Selection:	see P7200	Range:	0-30
Description:	This parameter determines how the 3rd input Setpoint-Double word DW2 of the Fieldbus-Set point range is used.		

Indication:	Please, find details concerning function in the previous chapters.

P7203	BusIn DW3:		INT
	Selection: see P7200	Range:	0-30
Description:	This parameter determines how the 4th input Setpoint-Double word DW3 of the Fieldbus-Set point range is used.		
Indication:	Please, find details concerning function in the previous chapters.		

P7204	BusIn DW4:		INT
	Selection: see P7200	Range:	0-30
Description:	This parameter determines how the 4th input Setpoint-Double word DW4 of the Fieldbus-Set point range is used.		
Indication:	Please, find details concerning function in the previous chapters.		

P7205	BusIn DW5:		INT
	Selection: see P7200	Range:	0-30
Description:	This parameter determines how the 5th input Setpoint-Double word DW5 of the Fieldbus-Set point range is used.		
Indication:	Please, find details concerning function in the previous chapters.		

P7206	BusIn DW6:		INT
	Selection: siehe P7200	Range:	0-30
Description:	This parameter determines how the 6th input Setpoint-Double word DW6 of the Fieldbus-Set point range is used.		
Indication:	Please, find details concerning function in the previous chapters.		

P7207	BusIn DW7:		INT
	Selection: siehe P7200	Range:	0-30
Description:	This parameter determines how the 7th input Setpoint-Double word DW7 of the Fieldbus-Set point range is used.		
Indication:	Please, find details concerning function in the previous chapters.		

P7208	BusIn DW8:		INT
	Selection: siehe P7200	Range:	0-30
Description:	This parameter determines how the 8th input Setpoint-Double word DW8 of the Fieldbus-Set point range is used.		
Indication:	Please, find details concerning function in the previous chapters.		

P7209	BusIn DW9:		INT
	Selection: siehe P7200	Range:	0-30

Description:	This parameter determines how the 9th input Setpoint-Double word DW9 of the Fieldbus-Set point range is used.
Indication:	Please, find details concerning function in the previous chapters.

9.3 Actual values and Control/Statusbits via Fieldbus (P74xx)

P7400	BusOut DW0:		INT
Selection:	00: P3 Capacity [%] 01: Feeder setpoint [%] 02: Drive WB [%] 03: 0% output [%] 04: 50% output [%] 05: 100% output [%] 06: g1-load [%] 07: g2-load [%] 08: g3-load [%] 09: Scaling 2 [%] 10: Setpoint output [%] 11: P2 Capacity [%] 12: P1 Capacity [%] 13: Deviation [%] 14: Batch Finestream [%] 15: Feeder Deviation [%] 16: Distance-FIFO 17: Transfervalue 1 18:Transfervalue 2 19: Gross-Load [%] 20: Bin Load [%] 21: PreBin-Regulator [%] 22: Speed [%] 23: --- 24: TW [%] 25: g1RR-Load [%] 26: g1R-Load [%] 27: g1L-Load [%] 28: g1LL-Load [%] 29: g1 total [g] 30: g3 total [g] 31: --- 32: BusControlBits1 33: BusControlBits2 34: BusControlBits3 35: BusStatusBits1 36: BusStatusBits2 37: BusStatusBits3 38: --- 39: --- 40: Tare test step 41: Counter A [kg] 42: Counter B [kg] 43: Counter C [kg] 44: Counter A [kg] 45: Counter B [kg] 46: Counter C [kg] 47: Counter A [1/10 kg] 48: Counter B [1/10 kg] 49: Counter C [1/10 kg] 50: P3 Capacity kg/h 51: P3 Capacity 1/10 kg/h 52: --- 53: LC 1 [%] 54: LC 2 [%] 55: LC 3 [%] 56: LC 4 [%]	Range:	0-80

57: LC5 [%]
58: Load Setpoint [%]
59: PreBin weight in Zone 1
60: PreBin weight in Zone 2
61: PreBin weight in Zone 3
62: PreBin weight in Zone 4
63: PreBin Total weight in percent
64: PreBin Total weight absolute in gram
65: Parameter- Number
66: Parameter- Value
67: ---
68: g1Rright [abs]
69: g1Left [abs]
70: ---
74: AW[%]
75: DWC 3/5 Statuswort
76: DWC3/5 Relaiswort
77: DWC3/5 IW1_2
78: DWC3/5 IW 3_4
79: DWC3/5 IL1
80: DWC3/5 IL2
81: P2 Capacity [kg/h]
82: AI 00
83: AI 01
84: AI 10
85: AI 11
90: Counter A [kg] REAL
91: Counter B [kg] REAL
92: Counter C [kg] REAL
100: P3 [kg/h] REAL

Description:	This parameter determines which value via the 1st actual value-Double word DW00 of the Fieldbus output range is transferred to a central control.
Indication:	Please, find details concerning function in the previous chapters.

P7401	**BusOut DW1:**		**INT**
	Selection: see P7400	Range:	0-80

Description:	This parameter determines which value via the 2nd actual value-Double word DW01 of the Fieldbus output range is transferred to a central control.
Indication:	Please, find details concerning function in the previous chapters.

P7402	**BusOut DW2:**		**INT**
	Selection: see P7400	Range:	0-80

Description:	This parameter determines which value via the 3rd actual value-Double word DW02 of the Fieldbus output range is transferred to a central control.
Indication:	Please, find details concerning function in the previous chapters.

P7403	**BusOut DW3:**		**INT**
	Selection: see P7400	Range:	0-80

Description:	This parameter determines which value via the 4th actual value-Double word DW03 of the Fieldbus output range is transferred to a central control.
Indication:	Please, find details concerning function in the previous chapters.

P7404	BusOut DW4:		INT
	Selection: see P7400	Range:	0-80
Description:	This parameter determines which value via the 5th actual value-Double word DW04 of the Fieldbus output range is transferred to a central control.		
Indication:	Please, find details concerning function in the previous chapters.		

P7405	BusOut DW5:		INT
	Selection: see P7400	Range:	0-80
Description:	This parameter determines which value via the 6th actual value-Double word DW05 of the Fieldbus output range is transferred to a central control.		
Indication:	Please, find details concerning function in the previous chapters.		

P7406	BusOut DW6:		INT
	Selection: see P7400	Range:	0-80
Description:	This parameter determines which value via the 7th actual value-Double word DW06 of the Fieldbus output range is transferred to a central control.		
Indication:	Please, find details concerning function in the previous chapters.		

P7407	BusOut DW7:		INT
	Selection: see P7400	Range:	0-80
Description:	This parameter determines which value via the 8th actual value-Double word DW07 of the Fieldbus output range is transferred to a central control.		
Indication:	Please, find details concerning function in the previous chapters.		

P7408	BusOut DW8:		INT
	Selection: see P7400	Range:	0-80
Description:	This parameter determines which value via the 9th actual value-Double word DW08 of the Fieldbus output range is transferred to a central control.		
Indication:	Please, find details concerning function in the previous chapters.		

P7409	BusOut DW9:		INT
	Selection: see P7400	Range:	0-80
Description:	This parameter determines which value via the 10th actual value-Double word DW09 of the Fieldbus output range is transferred to a central control.		
Indication:	Please, find details concerning function in the previous chapters.		

P7410	BusOut DW10:	INT

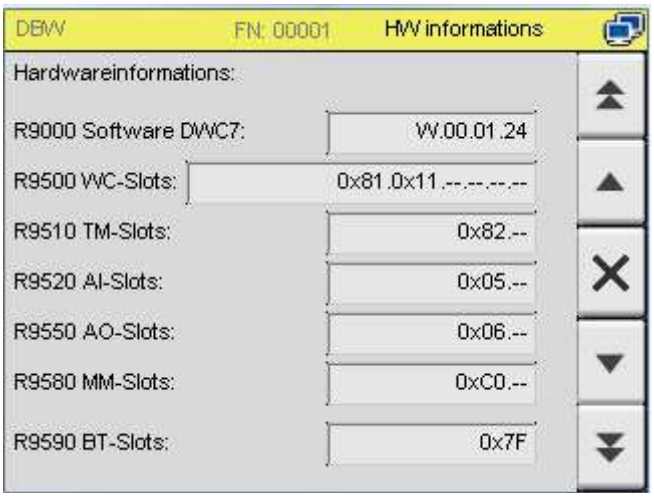
	Selection: see P7400	Range:	0-80
Description:	This parameter determines which value via the 11th actual value-Double word DW10 of the Fieldbus output range is transferred to a central control.		
Indication:	Please, find details concerning function in the previous chapters.		

P7411	BusOut DW11:		INT
	Selection: siehe P7400	Range:	0-80
Description:	This parameter determines which value via the 12th actual value-Double word DW11 of the Fieldbus output range is transferred to a central control.		
Indication:	Please, find details concerning function in the previous chapters.		

P7412	BusOut DW12:		INT
	Selection: siehe P7400	Range:	0-80
Description:	This parameter determines which value via the 13th actual value-Double word DW12 of the Fieldbus output range is transferred to a central control.		
Indication:	Please, find details concerning function in the previous chapters.		

P7413	BusOut DW13:		INT
	Selection: siehe P7400	Range:	0-80
Description:	This parameter determines which value via the 14th actual value-Double word DW13 of the Fieldbus output range is transferred to a central control.		
Indication:	Please, find details concerning function in the previous chapters.		

R9700	FieldbusSlot:		INT
	Selection: None	Range:	
Beschreibung:	This read only parameter shows the type of the Fieldbus card recognized by the system.		
Indication:	This parameter is set by the scale computer itself and is unchangeable by the user.		

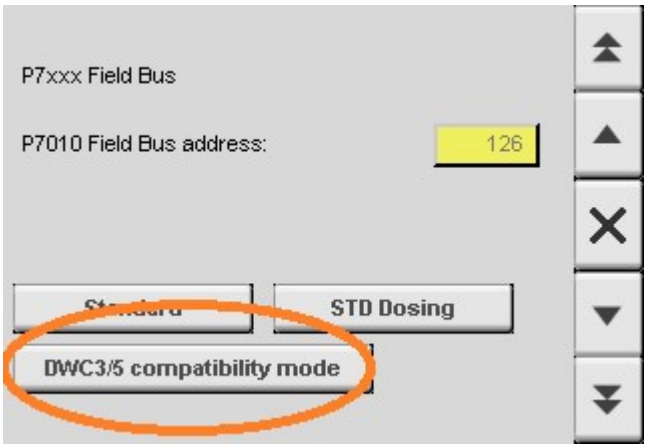


9.4 Compatiblity-mode to former DWC-3 and DWC-5 Systems

In critical cases, the parameters Bus in- and output parameters can be set to compatibility mode, largely represent the bit patterns of old KUKLA DWC-5 devices.
This mode should only be used if a short-term adaptation of the higher-level control program in the PLC is not possible. The DWC-7 communication standard must be used in any case for new systems.

For new plants, the DWC-7 communication standard must be used in any case.
The manufacturer took over the old interface as far as possible, various special and extra functions could NOT be transferred for internal technical reasons.
Therefore, this mode is recommended by the manufacturer only as a last line of defense!

The hardware description files, depending on the bus system used (GSD, EDS, GDML, etc.), must be changed in any case due to hardware IDs differences.



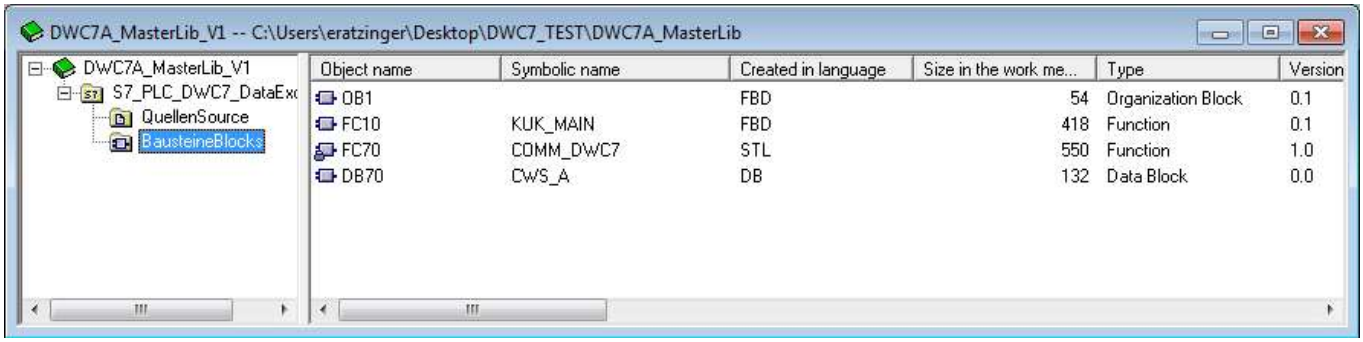
This button automatically parameterizes the data fields (P72xx and P74xx) to the old protocol.

10 Library and Samples for Master-PLC's (Siemens / Allen Bradley)

Sample projects can be downloaded from the manufacturer's website (www.kukla.co.at). They are designed as an integration aid for the end customer.

10.1 Communication to S7- PLC's (ProfiBus / ProfNet)

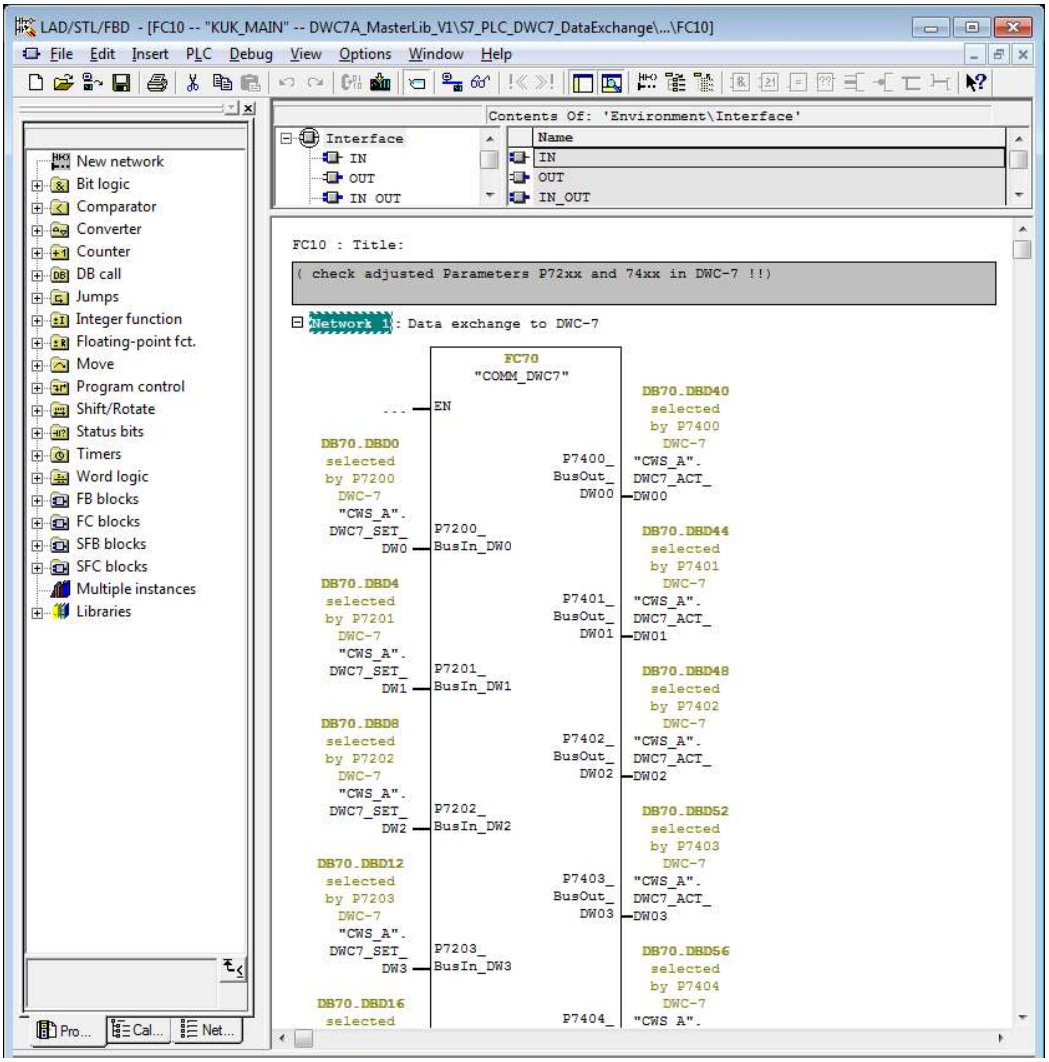
For easy integration of DWC-7 devices in a local S7 a suitable library can be requested by KUKLA



Following blocks are relevant:

FC 10 calls on the KUKLA prepared real communication block FC70.
DB70 contains the communication data's.

Note the bit order of the command and status bit fields!
See previous chapter, the first bit (00 ....) Starts at Siemens S7 controllers typically at the most significant address (3.0-3.7,2.0-2.7, 1.0-1.7,0.0-0.7).

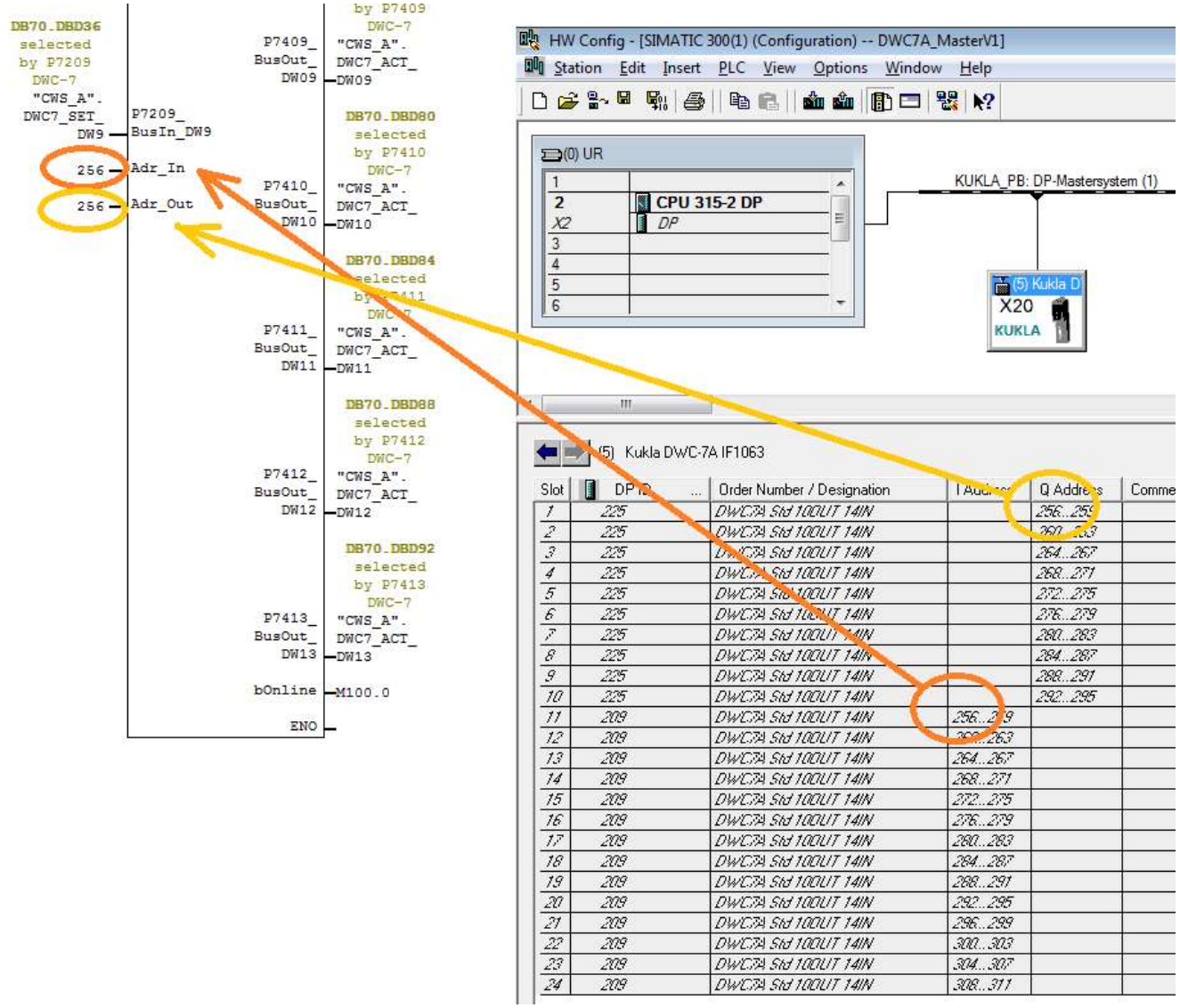


All nominal values, who will be sent from SPS to DWC-7, are connected on the left chip side. All process data values, who be sent from the scale to the central SPS, are connected on the right side.

In this example the dates will be saved in data block DB70, the user can also connect other data blocks or flags.

10.2 Integration Hardware-Addresses

Very important is the right connection of the variables Adr_In and Adr_Out at the bottom of the block.



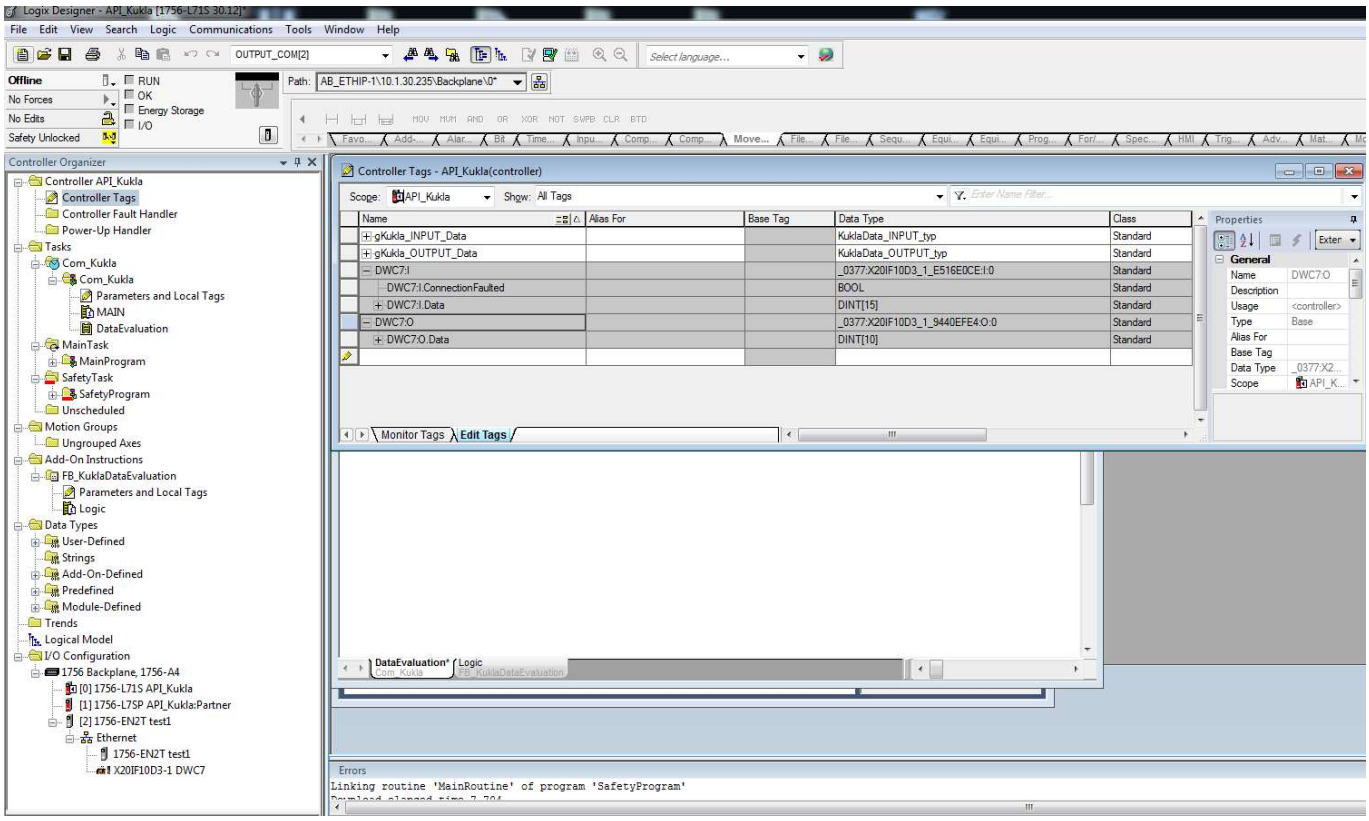
The basic addresses provide the connection between the decentralized peripherals and the communication block FC70. If more DWC-7 are coupled onto one SPS are the necessarily result a new address for every new device.

For each additionally DWC-7 on the same bus the FC70 must be called again in a new network. In this case of course new memory variables have to be connected (e.g. by copy DB70 to DB7x).

10.3 Communication to A&B PLC‘s (DeviceNet / EthernetIP)

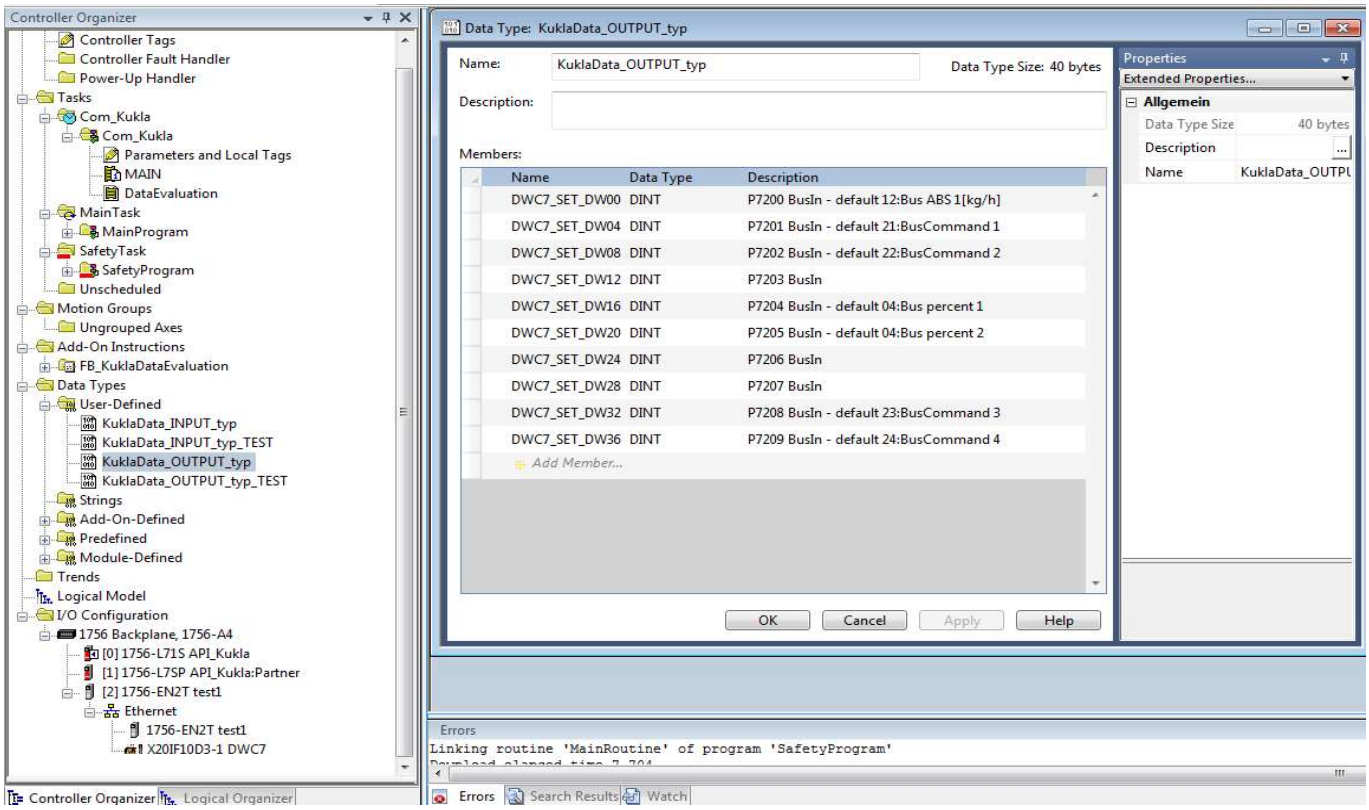
For communication with Allen Bradley controllers, a general sample project is available. It is a template for the data integration. However, this sample project must be adapted if necessary.

In the template, two communication structures are created, one defines the receive data, the other the send data to the DWC-7 base unit.

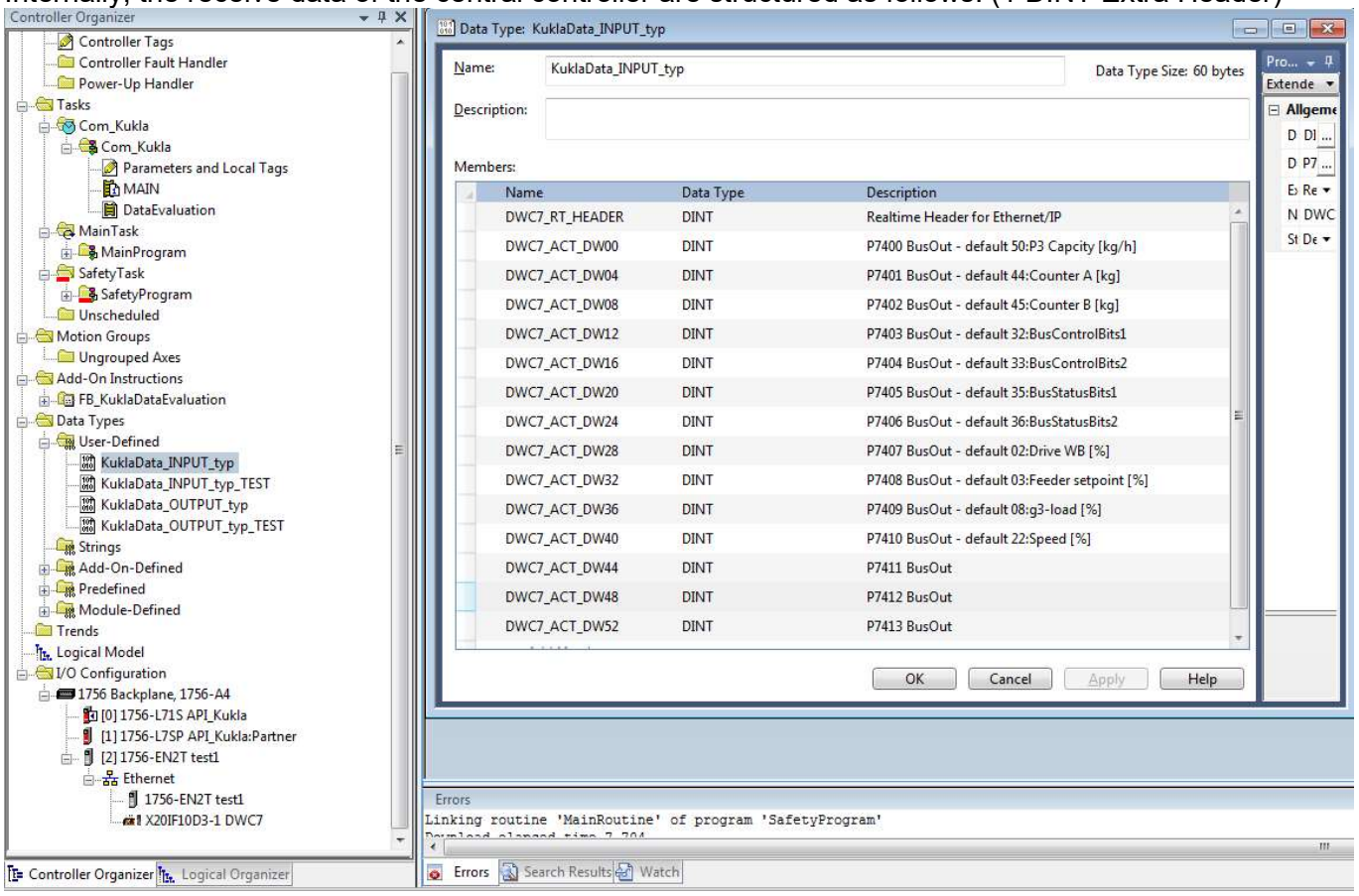


Note the bit order of the command and status bit fields!
See previous chapter, the first bit (00 ....) is usually at the lowest byte address (0.0-0.7,1.0-1.7, 2.0-2.7,3.0-3.7) at AB controllers.

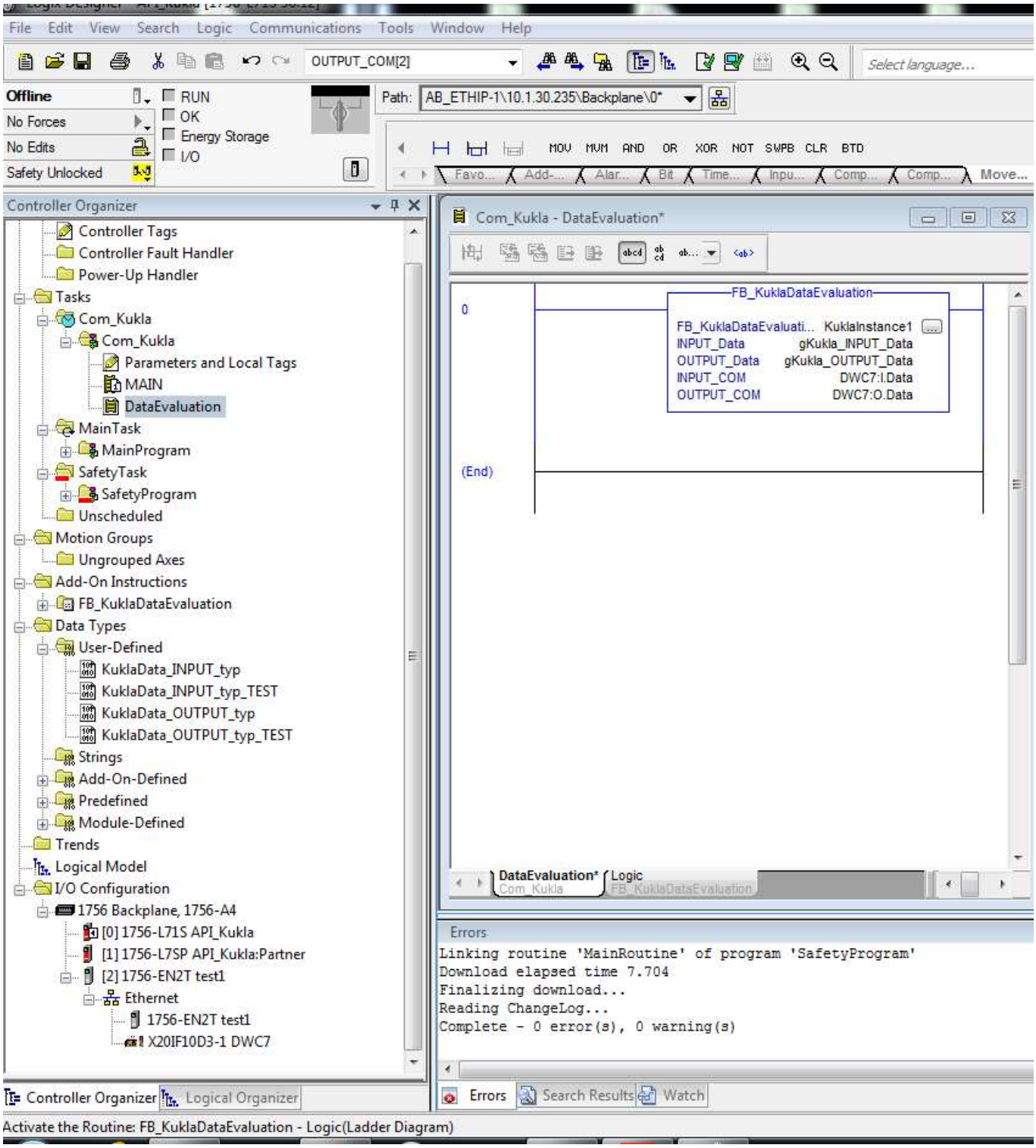
Internally, the transmission data of the central control is structured as follows:



Internally, the receive data of the central controller are structured as follows: (1 DINT Extra Header)



The data exchange itself takes place in the ladder diagram:



Notes: