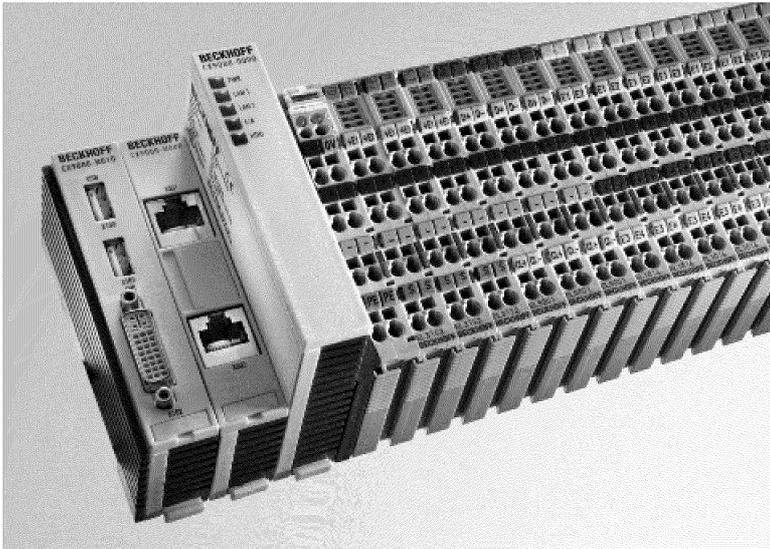


*TwinCAT IEC60870-5-101 controlled station interoperability***Interoperability list according to IEC 60870-5-101**

for TwinCAT PLC Library: IEC 870-5-101 controlled station (slave).



Version: 1.2

Date: 25.03.2011

Here you can [open/save the protocol interoperability document \(zipped PDF\)](#).

Table of contents:

- [General information](#)
 - [Project information](#)

- [Compatibility](#)
 - [System or device](#)
 - [Network configuration](#)
 - [Physical layer](#)
 - [Link layer](#)
 - [Application layer](#)
 - [Selection of standardised ASDUs](#)
 - [Process information in monitoring direction](#)
 - [Process information in control direction](#)
 - [System information in monitoring direction](#)
 - [System information in control direction](#)
 - [Parameter in control direction](#)
 - [File transfer](#)

- [Basic application functions](#)
 - [Station initialization](#)
 - [Cyclic data transfer](#)
 - [Read procedure](#)
 - [Spontaneous transmission](#)
 - [Double transmission](#)
 - [Station interrogation](#)
 - [Clock synchronisation](#)
 - [Command transmission](#)
 - [Counter interrogation](#)
 - [Parameter loading](#)
 - [Parameter activation](#)
 - [Test procedure](#)

- [File transfer](#)
- [Background scan](#)
- [Telegram run time acquisition](#)
- [Appendix](#)
 - [Beckhoff support and service](#)
 - [Beckhoff support](#)
 - [Beckhoff service](#)
 - [Beckhoff company headquarter](#)

General Information

This compatibility list refers to functions supported within IEC 870-5-101.

Compatibility of the individual components has to be agreed for individual projects by all parties involved.

Project information

Projekt No.: _____

Project: _____

Responsible: _____

Date: _____

Compatibility

The selected parameters should be marked in the white control fields as follows:

<input type="checkbox"/>	Function or ASDU is not used
<input checked="" type="checkbox"/>	Function or ASDU is used as specified (preferred option)
<input checked="" type="checkbox"/>	Function or ASDU is used in reverse mode
<input checked="" type="checkbox"/>	Function or ASDU is used in regular and reverse mode

System or device

<input type="checkbox"/>	System definition
<input type="checkbox"/>	Specifications for the control station
<input checked="" type="checkbox"/>	Specifications for the controlled station (slave)

Network configuration

<input checked="" type="checkbox"/>	Point-to-point	<input checked="" type="checkbox"/>	Multipoint-partyline
<input checked="" type="checkbox"/>	Multiple point-to-point	<input type="checkbox"/>	Multipoint-star

Physical layer

Transmission speed:

<input type="checkbox"/>	100 bps	<input checked="" type="checkbox"/>	2400 bps	<input type="checkbox"/>	56000 bps
<input type="checkbox"/>	200 bps	<input checked="" type="checkbox"/>	4800 bps	<input type="checkbox"/>	64000 bps
<input checked="" type="checkbox"/>	300 bps	<input checked="" type="checkbox"/>	9600 bps		
<input checked="" type="checkbox"/>	600 bps	<input checked="" type="checkbox"/>	19200 bps		
<input checked="" type="checkbox"/>	1200 bps	<input type="checkbox"/>	38400 bps		

Link layer

According to this application-related standard, only telegram format FT 1.2, single character 1 and the time monitoring interval are used.

Address field of the link layer:

<input checked="" type="checkbox"/>	Not available (only balanced transfer)
<input checked="" type="checkbox"/>	One octet
<input checked="" type="checkbox"/>	Two octets
<input checked="" type="checkbox"/>	Structured
<input checked="" type="checkbox"/>	Non structured

Link layer transfer procedure:

<input checked="" type="checkbox"/>	Balanced transfer
<input checked="" type="checkbox"/>	Unbalanced transfer

Telegram length:

Maximum length L	255
------------------	-----

In unbalanced mode some ASDU types are send with low (class 2) priority to the control station.

<input checked="" type="checkbox"/>	Normed assigment of ASDU type to class 2 data
-------------------------------------	---

Type identifier	Cause of transmission
9, 11, 13, 21	<1>
1, 3, 5, 7, 9, 11, 13, 20, 21	<2>

<input type="checkbox"/>	Special assignment of ASDU type to class 2 data
--------------------------	---

Type identifier	Cause of transmission

NOTE: An outstation may return class 1 data when polled for class 2 data if there is no class 2 data available (configuration parameter).

Application layer

Tranfer mode for application data

According to this application-related standard, only mode 1 (octet with the lowest value first) according to 4.10 IEC 60870-5-4 is used.

Common ASDU address

<input checked="" type="checkbox"/>	One octet	<input checked="" type="checkbox"/>	Two octets
-------------------------------------	-----------	-------------------------------------	------------

Address of the information object

<input checked="" type="checkbox"/>	One octet	<input checked="" type="checkbox"/>	Structured
<input checked="" type="checkbox"/>	Two octets	<input checked="" type="checkbox"/>	Non structured
<input checked="" type="checkbox"/>	Three octets		

Cause of transmission

<input checked="" type="checkbox"/>	One octet	<input checked="" type="checkbox"/>	Two octets (with origin address). Preset to 0, if origin address is not available.
-------------------------------------	-----------	-------------------------------------	---

Selection of standardised ASDU's

Process information in monitoring direction

<input checked="" type="checkbox"/>	<1> := Single-point information	M_SP_NA_1
<input checked="" type="checkbox"/>	<2> := Single-point information with time tag	M_SP_TA_1
<input checked="" type="checkbox"/>	<3> := Double point information	M_DP_NA_1

<input checked="" type="checkbox"/>	<4> := Double point information with time tag	M_DP_TA_1
<input checked="" type="checkbox"/>	<5> := Step position information	M_ST_NA_1
<input checked="" type="checkbox"/>	<6> := Step position information with time tag	M_ST_TA_1
<input checked="" type="checkbox"/>	<7> := Bitstring of 32 bits	M_BO_NA_1
<input checked="" type="checkbox"/>	<7> := Bitstring of 32 bits with time tag	M_BO_TA_1
<input checked="" type="checkbox"/>	<9> := Measured value, normalized	M_ME_NA_1
<input checked="" type="checkbox"/>	<10> := Measured value, normalized value with time tag	M_ME_TA_1
<input checked="" type="checkbox"/>	<11> := Measured value, scaled value	M_ME_NB_1
<input checked="" type="checkbox"/>	<12> := Measured value, scaled value with time tag	M_ME_TB_1
<input checked="" type="checkbox"/>	<13> := Measured value, short floating point value	M_ME_NC_1
<input checked="" type="checkbox"/>	<14> := Measured value, short floating point value with time	M_ME_TC_1
<input checked="" type="checkbox"/>	<15> := Integrated totals	M_IT_NA_1
<input checked="" type="checkbox"/>	<16> := Integrated totals with time tag	M_IT_TA_1
<input checked="" type="checkbox"/>	<17> := Event of protection equipment with time tag	M_EP_TA_1
<input checked="" type="checkbox"/>	<18> := Packed start events of protection equipment with time tag	M_EP_TB_1
<input checked="" type="checkbox"/>	<19> := Packed output circuit information of protection equipment with time tag	M_EP_TC_1
<input checked="" type="checkbox"/>	<20> := Packed single-point information with status change detection	M_PS_NA_1
<input checked="" type="checkbox"/>	<21> := Measured value, normalized value without quantity descriptor	M_ME_ND_1
<input checked="" type="checkbox"/>	<30> := Single-point information with time tag CP56Time2a	M_SP_TB_1
<input checked="" type="checkbox"/>	<31> := Double-point information with time tag CP56Time2a	M_DP_TB_1
<input checked="" type="checkbox"/>	<32> := Step position information with time tag CP56Time2a	M_ST_TB_1
<input checked="" type="checkbox"/>	<33> := Bitstring of 32 bits with time tag CP56Time2a	M_BO_TB_1
<input checked="" type="checkbox"/>	<34> := Measured value, normalized value with time tag CP56Time2a	M_ME_TD_1
<input checked="" type="checkbox"/>	<35> := Measured value, scaled value with time tag CP56Time2a	M_ME_TE_1
<input checked="" type="checkbox"/>	<36> := Measured value, short floating point value with time tag CP56Time2a	M_ME_TF_1
<input checked="" type="checkbox"/>	<37> := Integrated totals with time tag CP56Time2a	M_IT_TB_1
<input checked="" type="checkbox"/>	<38> := Event of protection equipment with time tag CP56Time2a	M_EP_TD_1
<input checked="" type="checkbox"/>	<39> := Packed start events of protection equipment with time tag CP56Time2a	M_EP_TE_1
<input checked="" type="checkbox"/>	<40> := Packed output circuit information of protection equipment with time tag CP56Time2a	M_EP_TF_1

Process information in control direction

<input checked="" type="checkbox"/>	<45> := Single command	C_SC_NA_1
<input checked="" type="checkbox"/>	<46> := Double command	C_DC_NA_1
<input checked="" type="checkbox"/>	<47> := Regulating step command	C_RC_NA_1
<input checked="" type="checkbox"/>	<48> := Set point command, normalized value	C_SE_NA_1
<input checked="" type="checkbox"/>	<49> := Set point command, scaled value	C_SE_NB_1
<input checked="" type="checkbox"/>	<50> := Set point command, short floating point value	C_SE_NC_1
<input checked="" type="checkbox"/>	<51> := Bitstring of 32 bits	C_BO_NA_1
<input checked="" type="checkbox"/>	<58> := Single command with time tag CP56Time2a	C_SC_TA_1
<input checked="" type="checkbox"/>	<59> := Double command with time tag CP56Time2a	C_DC_TA_1
<input checked="" type="checkbox"/>	<60> := Regulating step command with time tag CP56Time2a	C_RC_TA_1
<input checked="" type="checkbox"/>	<61> := Set point command, normalized value with time tag CP56Time2a	C_SE_TA_1
<input checked="" type="checkbox"/>	<62> := Set point command, scaled value with time tag CP56Time2a	C_SE_TB_1
<input checked="" type="checkbox"/>	<63> := Set point command, short floating point value with time tag CP56Time2a	C_SE_TC_1
<input checked="" type="checkbox"/>	<64> := Bitstring of 32 bits with time tag CP56Time2a	C_BO_TA_1

System information in control direction

<input checked="" type="checkbox"/>	<70> := End of initialization	M_EI_NA_1
-------------------------------------	-------------------------------	-----------

System information in control direction

<input checked="" type="checkbox"/>	<100> := Interrogation command	C_IC_NA_1
<input checked="" type="checkbox"/>	<101> := Counter interrogation command	C_CI_NA_1
<input checked="" type="checkbox"/>	<102> := Read command	C_RD_NA_1
<input checked="" type="checkbox"/>	<103> := Clock synchronization command	C_CS_NA_1
<input checked="" type="checkbox"/>	<104> := Test command	C_TS_NA_1
<input checked="" type="checkbox"/>	<105> := Reset process command	C_RP_NA_1
<input type="checkbox"/>	<106> := Delay acquisition command	C_CD_NA_1
<input checked="" type="checkbox"/>	<107> := Test command with time tag CP56Time2a	C_TS_TA_1

Parameters in control direction

<input type="checkbox"/>	<110> := Parameter of measured values, normalized value	P_ME_NA_1
<input type="checkbox"/>	<111> := Parameter of measured values, scaled value	P_ME_NB_1
<input type="checkbox"/>	<112> := Parameter of measured values, short floating point value	P_ME_NC_1
<input type="checkbox"/>	<113>:= Parameter activation	P_AC_NA_1

File transfer

<input type="checkbox"/>	<120>:= File ready	F_FR_NA_1
<input type="checkbox"/>	<121>:= Section ready	F_SR_NA_1
<input type="checkbox"/>	<122> := Call directory, select file, call file, call section	F_SC_NA_1
<input type="checkbox"/>	<123> := Last section, last segment	F_LS_NA_1
<input type="checkbox"/>	<124> := Ack file, ack section	F_AF_NA_1
<input type="checkbox"/>	<125>:= Segment	F_SG_NA_1
<input type="checkbox"/>	<126> := Directory (blank or X, available only in monitor [standard] direction)	F_DR_TA_1

Type identifier and cause of transmission assignments (station-specific parameters)

The combination of type identifier / cause of transmission is marked as:

Shaded	Function or ASDU are not required.
Empty	Function or ASDU is not used.
<input checked="" type="checkbox"/>	Only used in standard direction
<input checked="" type="checkbox"/>	Only used in reverse direction
<input checked="" type="checkbox"/>	Used in both directions

Cause of transmission

Number	Cause of transmission
<0>	Not used
<1>	Periodic, cyclic
<2>	Background scan
<3>	Spontaneous
<4>	Initialized
<5>	Request or requested
<6>	Activation (ACT)
<7>	Activation confirmation (ACTCON)
<8>	Deactivation (DEACT)
<9>	Deactivation confirmation (DEACTCON)
<10>	Activation termination (ACTTERM)
<11>	Return information caused by a remote command
<12>	Return information caused by a local command
<13>	File transfer
<20..36>	General interrogation

<37..41>	Counter interrogation
<44>	Unknown type identification
<45>	Unknown cause of transmission
<46>	Unknown address of ASDU
<46>	Unknown information object address

Type identification		Cause of transmission																		
		<1>	<2>	<3>	<4>	<5>	<6>	<7>	<8>	<9>	<10>	<11>	<12>	<13>	<20..36>	<37..41>	<44>	<45>	<46>	<47>
		per / cyc	back	spont	init	req	act	act con	deact	deact con	act term	ret rem	ret loc	file	inro	reqco	unknown type	unknown COT	unknown CAA	unknown IOA
<1>	M_SP_NA_1		X	X		X						X			X					
<2>	M_SP_TA_1			X		X						X								
<3>	M_DP_NA_1		X	X		X						X			X					
<4>	M_DP_TA_1			X		X						X								
<5>	M_ST_NA_1		X	X		X						X			X					
<6>	M_ST_TA_1			X		X														
<7>	M_BO_NA_1		X	X		X									X					
<8>	M_BO_TA_1			X		X														
<9>	M_ME_NA_1	X	X	X		X									X					
<10>	M_ME_TA_1			X		X														
<11>	M_ME_NB_1	X	X	X		X									X					
<12>	M_ME_TB_1			X		X														
<13>	M_ME_NC_1	X	X	X		X									X					
<14>	M_ME_TC_1			X		X														
<15>	M_IT_NA_1			X												X				
<16>	M_IT_TA_1			X												X				
<17>	M_EP_TA_1			X																
<18>	M_EP_TB_1			X																
<19>	M_EP_TC_1			X																
<20>	M_PS_NA_1		X	X		X						X			X					
<21>	M_ME_ND_1	X	X	X		X									X					
<30>	M_SP_TB_1			X		X						X								
<31>	M_DP_TB_1			X		X						X								
<32>	M_ST_TB_1			X		X						X								
<33>	M_BO_TB_1			X		X														
<34>	M_ME_TD_1			X		X														
<35>	M_ME_TE_1			X		X														
<36>	M_ME_TF_1			X																
<37>	M_IT_TB_1			X												X				
<38>	M_EP_TD_1			X																
<39>	M_EP_TE_1			X																
<40>	M_EP_TF_1			X																
<45>	C_SC_NA_1						X	X	X	X	X						X	X	X	X
<46>	C_DC_NA_1						X	X	X	X	X						X	X	X	X
<47>	C_RC_NA_1						X	X	X	X	X						X	X	X	X
<48>	C_SE_NA_1						X	X	X	X	X						X	X	X	X

Interoperability

<49>	C_SE_NB_1						X	X	X	X	X							X	X	X	X	
<50>	C_SE_NC_1						X	X	X	X	X								X	X	X	X
<51>	C_BO_NA_1						X	X	X	X	X								X	X	X	X
<58>	C_SC_TA_1						X	X	X	X	X								X	X	X	X
<59>	C_DC_TA_1						X	X	X	X	X								X	X	X	X
<60>	C_RC_TA_1						X	X	X	X	X								X	X	X	X
<61>	C_SE_TA_1						X	X	X	X	X								X	X	X	X
<62>	C_SE_TB_1						X	X	X	X	X								X	X	X	X
<63>	C_SE_TC_1						X	X	X	X	X								X	X	X	X
<64>	C_BO_TA_1						X	X	X	X	X								X	X	X	X
<70>	M_EI_NA_1				X																	
<100>	C_IC_NA_1						X	X	X	X	X								X	X	X	X
<101>	C_CI_NA_1						X	X			X								X	X	X	X
<102>	C_RD_NA_1					X													X	X	X	X
<103>	C_CS_NA_1			X			X	X											X	X	X	X
<104>	C_TS_NA_1						X	X											X	X	X	X
<105>	C_RP_NA_1						X	X											X	X	X	X
<106>	C_CD_NA_1																		X	X	X	X
<107>	C_TS_TA_1						X	X											X	X	X	X
<110>	P_ME_NA_1																		X	X	X	X
<111>	P_ME_NB_1																		X	X	X	X
<112>	P_ME_NC_1																		X	X	X	X
<113>	P_AC_NA_1																		X	X	X	X
<120>	F_FR_NA_1																		X	X	X	X
<121>	F_SR_NA_1																		X	X	X	X
<122>	F_SC_NA_1																		X	X	X	X
<123>	F_LS_NA_1																		X	X	X	X
<124>	F_AF_NA_1																		X	X	X	X
<125>	F_SG_NA_1																		X	X	X	X
<126>	F_DR_TA_1																					

Basic application functions

Station initialization

Remote initialization

Cyclic data transmission

Cyclic data transmission

Read procedure

Read procedure

Spontaneous transmission

Spontaneous transmission

Double transmission of information objects with cause of transmission spontaneous

The following type identifications may be transmitted in succession caused by a single status change of an information object. The particular

information object addresses for which double transmission is enabled are defined in a project specific list.

<input type="checkbox"/>	Single point informaion M_SP_NA_1, M_SP_TA_1, M_SP_TB_1 und M_SP_NA_1
<input type="checkbox"/>	Double point information M_DP_NA_1, M_DP_TA_1 und M_DP_TB_1
<input type="checkbox"/>	Step position information M_ST_NA_1, M_ST_TA_1 und M_ST_TB_1
<input type="checkbox"/>	Bitstring of 32 bits M_BO_NA_1, M_BO_TA_1 und M_BO_TB_1
<input type="checkbox"/>	Measured value, normalized value M_ME_NA_1, M_ME_TA_1, M_ME_ND_1 und M_ME_TD_1
<input type="checkbox"/>	Measured value, scaled value M_ME_NB_1, M_ME_TB_1 und M_ME_TE_1
<input type="checkbox"/>	Measured value, short floating point number M_ME_NC_1, M_ME_TC_1 und M_ME_TF_1

Station interrogation

<input checked="" type="checkbox"/>	Global
<input checked="" type="checkbox"/>	Group 1
<input checked="" type="checkbox"/>	Group 2
<input checked="" type="checkbox"/>	Group 3
<input checked="" type="checkbox"/>	Group 4
<input checked="" type="checkbox"/>	Group 5
<input checked="" type="checkbox"/>	Group 6
<input checked="" type="checkbox"/>	Group 7
<input checked="" type="checkbox"/>	Group 8
<input checked="" type="checkbox"/>	Group 9
<input checked="" type="checkbox"/>	Group 10
<input checked="" type="checkbox"/>	Group 11
<input checked="" type="checkbox"/>	Group 12
<input checked="" type="checkbox"/>	Group 13
<input checked="" type="checkbox"/>	Group 14
<input checked="" type="checkbox"/>	Group 15
<input checked="" type="checkbox"/>	Group 16

The allocation of information object addresses to each individual group must be specified in a separate table.

Clock synchronization

<input checked="" type="checkbox"/>	Clock synchronization
-------------------------------------	-----------------------

Command transmission

<input checked="" type="checkbox"/>	Direct command transmission
<input checked="" type="checkbox"/>	Direct setpoint command transmission
<input checked="" type="checkbox"/>	Command .selection and execution
<input checked="" type="checkbox"/>	Setpoint command .selection and execution
<input checked="" type="checkbox"/>	C_SE ACTTERM used
<input checked="" type="checkbox"/>	No additional definition
<input type="checkbox"/>	Short pulse duration (duration determined by a system parameter in the outstation)
<input type="checkbox"/>	Long pulse duration (duration determined by a system parameter in the outstation)
<input type="checkbox"/>	Persistent output
<input type="checkbox"/>	Supervision of maximum delay in command direction of commands and setpoint commands
	Maximum allowable delay of commands and setpoint commands

Counter interrogation

<input checked="" type="checkbox"/>	Counter read
<input checked="" type="checkbox"/>	Counter freeze without reset

<input checked="" type="checkbox"/>	Counter freeze with reset
<input checked="" type="checkbox"/>	Counter reset
<input checked="" type="checkbox"/>	General counter request
<input checked="" type="checkbox"/>	Request counter group 1
<input checked="" type="checkbox"/>	Request counter group 2
<input checked="" type="checkbox"/>	Request counter group 3
<input checked="" type="checkbox"/>	Request counter group 4
<input checked="" type="checkbox"/>	Mode A: Local freeze with spontaneous transmission
<input checked="" type="checkbox"/>	Mode B: Local freeze with counter interrogation
<input checked="" type="checkbox"/>	Mode C: Freeze and transmit by counter-interrogation commands
<input checked="" type="checkbox"/>	Modus D: Freeze by counter-interrogation command, frozen values reported simultaneously

Parameter loading

<input type="checkbox"/>	Threshold value
<input type="checkbox"/>	Smoothing factor
<input type="checkbox"/>	Lower limit value for transmission of measured values
<input type="checkbox"/>	High limit value for transmission of measured values

Parameter activation

<input type="checkbox"/>	Activation/deactivation of cyclic or periodic transmission of the addressed object
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Test procedure

<input checked="" type="checkbox"/>	Test procedure
-------------------------------------	----------------

File transfer

File transfer in monitoring direction:

<input type="checkbox"/>	Transparent file
<input type="checkbox"/>	Transmission of event sequences
<input type="checkbox"/>	Transmission of disturbance data of protection equipment
<input type="checkbox"/>	Transmission of sequences of recorded analog values

File transfer in control direction:

<input type="checkbox"/>	Transparent file
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Background scan

<input checked="" type="checkbox"/>	Background scan
-------------------------------------	-----------------

Telegram run time acquisition

<input type="checkbox"/>	Telegram run time acquisition
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Appendix

Beckhoff support and service

Beckhoff and their partners around the world offer comprehensive service and support, making available fast and competent assistance with all questions related to Beckhoff products and system solutions.

Beckhoff Support and Service is available to you wherever you are in the world, and can be reached by telephone, fax or e-mail. The contact addresses for your country may be found in the list of Beckhoff branches and partner firms.

Beckhoff support

Support offers you comprehensive technical assistance, helping you not only with the application of individual Beckhoff products, but also with other, wide-ranging services:

- World-wide support;
- Design, programming and commissioning of complex automation systems;
- Extensive training program for Beckhoff system components

Please contact your Beckhoff branch office or representative for local support and service on Beckhoff products!

Beckhoff service

The Beckhoff Service Center supports you in all matters of after-sales service:

- On-site service;
- Repair service;
- Spare parts service;
- Hotline service

Please contact your Beckhoff branch office or representative for local support and service on Beckhoff products!

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