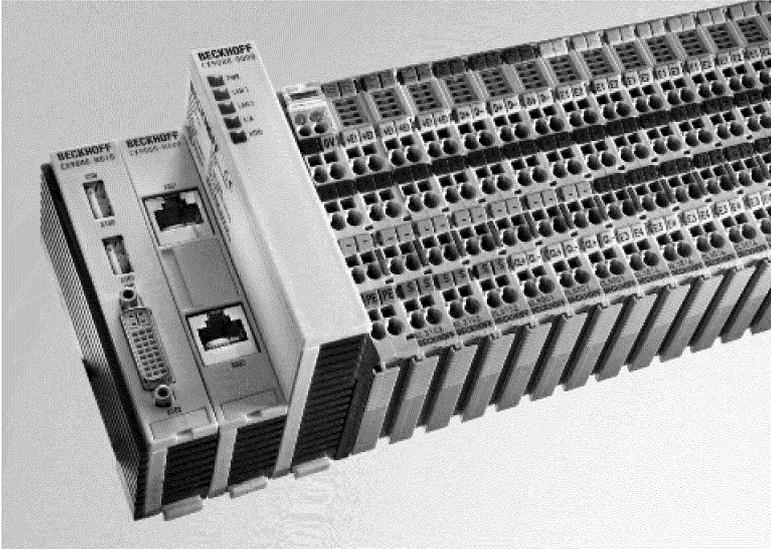


TwinCAT IEC60870-5-104 control station interoperability**Interoperability list according to IEC 60870-5-104**

for TwinCAT PLC Library: IEC 870-5-104 control station (master)



Version: 1.3

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

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General Information

This compatibility list refers to functions supported within IEC 870-5-104.

<input type="checkbox"/>	Fields marked with are not used with TCP/IP coupling via IEC 870-5-104.
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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 checked="" type="checkbox"/>	Specifications for the control station (master)
<input type="checkbox"/>	Specifications for the controlled station

Network configuration

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

Physical layer

Transmission speed:

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

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

Link layer transfer procedure:

<input type="checkbox"/> Symmetric transfer
<input type="checkbox"/> Asymmetric transfer

Telegram length:

<input type="checkbox"/> Maximum length L

Application layer**Transfer 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 type="checkbox"/> One octet	<input checked="" type="checkbox"/> Two octets
------------------------------------	--

Address of the information object

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

Cause of transmission

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

Length of the APDU

(system-specific parameter, the maximum length of the APDU must be specified for each system)

The maximum length of the APDU is 253 (unless specified otherwise). The maximum length may be reduced, depending on the system.

253	Maximum length of the APDU for each system
-----	--

Selection of standardised ASDU's**Process information in monitoring direction**

<input checked="" type="checkbox"/> <1> := Single-point information	M_SP_NA_1
<input 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 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 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 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 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 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 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 type="checkbox"/>	<16> := Integrated totals with time tag	M_IT_TA_1
<input type="checkbox"/>	<17> := Event of protection equipment with time tag	M_EP_TA_1
<input type="checkbox"/>	<18> := Packed start events of protection equipment with time tag	M_EP_TB_1
<input 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 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 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 type="checkbox"/>	<102> := Read command	C_RD_NA_1
<input checked="" type="checkbox"/>	<103> := Clock synchronization command	C_CS_NA_1
<input type="checkbox"/>	<104> := Test command	C_TS_NA_1

<input type="checkbox"/>	<105> := Reset process command	C_RP_NA_1
<input type="checkbox"/>	<106> := Delay acquisition command	G_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 transfer

Number	Cause of transfer
<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

Interoperability

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>	
		p e r / c y c	b a c k	s p o n t	i n i t	r e q	a c t	a c t c o n	d e a c t	d e a c t c o n	a c t t e r m	r e t r e m	r e t l o c	f i l e	i n r o	r e q c o	u n k n o w n t y p e	u n k n o w n C O T	u n k n o w n C A A	u n k n o w n I O A	
<1>	M_SP_NA_1		X	X								X	X		X						
<2>	M_SP_TA_1																				
<3>	M_DP_NA_1		X	X								X	X		X						
<4>	M_DP_TA_1																				
<5>	M_ST_NA_1		X	X								X	X		X						
<6>	M_ST_TA_1																				
<7>	M_BO_NA_1		X	X											X						
<8>	M_BO_TA_1																				
<9>	M_ME_NA_1	X	X	X											X						
<10>	M_ME_TA_1																				
<11>	M_ME_NB_1	X	X	X											X						
<12>	M_ME_TB_1																				
<13>	M_ME_NC_1	X	X	X											X						
<14>	M_ME_TC_1																				
<15>	M_IT_NA_1			X												X					
<16>	M_IT_TA_1																				
<17>	M_EP_TA_1																				
<18>	M_EP_TB_1																				
<19>	M_EP_TC_1																				
<20>	M_PS_NA_1		X	X								X	X		X						
<21>	M_ME_ND_1	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																	
<34>	M_ME_TD_1			X																	
<35>	M_ME_TE_1			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																				
<48>	C_SE_NA_1						X	X	X	X	X							X	X	X	X
<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																				

Interoperability

<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																			
<103>	C_CS_NA_1			X		X	X										X	X	X	X
<104>	C_TS_NA_1																			
<105>	C_RP_NA_1																			
<106>	C_CD_NA_1																			
<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

<input checked="" type="checkbox"/>	Remote initialization
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Cyclic data transmission

<input checked="" type="checkbox"/>	Cyclic data transmission
-------------------------------------	--------------------------

Read procedure

<input type="checkbox"/>	Read procedure
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Spontaneous transmission

<input checked="" type="checkbox"/>	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 information 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 type="checkbox"/>	Direct setpoint command transmission
<input type="checkbox"/>	Command .selection and execution
<input 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 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
--------------------------	--

Test procedure

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

File transfer

File transfer in monitoring direction:

<input type="checkbox"/>	Transparent fiel
<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
--------------------------	-------------------------------

Definition of time outs

Parameter	Default value	Comments	Selected value
t0	30s	Timeout of connection establishment	
t1	15s	Timeout of connection establishment	
t2	10s	Timeout for acknowledgements, if no data telegrams are transferred $t_2 < t_1$	
t3	20s	Timeout for sent test telegrams in the event of long idle states	

Maximum range of all time outs: 1 to 255 s, accuracy 1 s.

Maximum number k of unacknowledged APDU in I-format and latest APDU acknowledgement (w)

Parameter	Default value	Comments	Selected value
k	12 APDU	Maximum difference between the number of reception sequences and the number of send sequences	
w	8 APDU	Latest acknowledgement after receipt of w APDU in I format	

Maximum range of values k: 1 to 32767 (2¹⁵ -1) APDU, accuracy 1 APDU.

Maximum range of values w: 1 to 32767 APDU, accuracy 1 APDU (w should not exceed two thirds of k).

Port number

Parameter	Value	Comments
Port number	2404	in all cases

RFC-2200 suite

RFC 2200 is an official Internet Standard which describes the state of standardization of protocols used in the Internet as determined by the Internet Architecture Board (IAB). It offers a broad spectrum of actual standards used in the Internet. The suitable selection of documents from RFC 2200 defined in this standard for given projects has to be chosen by the user of this standard.

<input checked="" type="checkbox"/>	Ethernet 802.3
<input type="checkbox"/>	Serial interface X.21
<input type="checkbox"/>	Other selection from RFC 2200
	List of RFC-2200 documents to be used
1.	
2.	
3.	
4.	
5.	
6.	
7.	etc.

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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