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INDEX

1	Interoperability	2
2	History	2
3	IEC 60870-5-104 Interoperability	3
3.1	System or Device	3
3.2	Network Configuration	3
3.3	Physical Layer	3
3.3.1	Transmission speed	3
3.4	Link Layer	4
3.4.1	Link Transmission Procedure	4
3.4.2	Address Field of the Link	4
3.4.3	Telegram Length	4
3.5	Application Layer	4
3.5.1	Transmission mode for application data	4
3.5.2	Common Address of ASDU	4
3.5.3	Information Object Address	4
3.5.4	Cause of Transmission	4
3.5.5	Length of APDU	5
3.5.6	Selection of standard ADSUs	5

1 Interoperability

The interoperability list is defined as in IEC 60870-5-101 and extended with parameters used in this standard. The text descriptions of parameters which are not applicable to this companion standard are strike-through (corresponding check box is marked black).

This interoperability checklist presents the currently supported functionalities of the BECK IPC IEC60870-5-104 implementation.

Symbol definition in this document:

- function is supported
- function isn't supported
- function isn't supported and isn't defined in the specification

2 History

Ver.	Date	Author	Change
0.1	29.06.2012	dip	First version
0.2	04.02.14	jtz/dip	ADSUs: <15>, <20>, <50>, <58>... <60>
0.3	18.05.2015	jhe	Remove <103> Clock synchronization command
0.4	26.05.2015	jhe	Add <58> - <61>

3 IEC 60870-5-104 Interoperability

3.1 System or Device

- System definition
- Controlling station definition (master/client)
- Controlled station definition (slave/server)

3.2 Network Configuration

- Point-to-point
- Multiple point-to-point
- Multipoint
- Multipoint-star

3.3 Physical Layer

3.3.1 Transmission speed

Unbalanced interchange Circuit V.24/V.28 Standard	Unbalanced interchange Circuit V.24/V.28 Recommended if >1200 bit/s	Balanced interchange Circuit X.24/X.27
<input checked="" type="checkbox"/> 100 bit/s	<input checked="" type="checkbox"/> 2400 bit/s	<input checked="" type="checkbox"/> 2400 bit/s
<input checked="" type="checkbox"/> 200 bit/s	<input checked="" type="checkbox"/> 4800 bit/s	<input checked="" type="checkbox"/> 4800 bit/s
<input checked="" type="checkbox"/> 300 bit/s	<input checked="" type="checkbox"/> 9600 bit/s	<input checked="" type="checkbox"/> 9600 bit/s
<input checked="" type="checkbox"/> 600 bit/s		<input checked="" type="checkbox"/> 19200 bit/s
<input checked="" type="checkbox"/> 1200 bit/s		<input checked="" type="checkbox"/> 38400 bit/s
		<input checked="" type="checkbox"/> 56000 bit/s
		<input checked="" type="checkbox"/> 64000 bit/s

3.4 Link Layer

3.4.1 Link Transmission Procedure

- Unbalanced Transmission
- Balanced Transmission

3.4.2 Address Field of the Link

- One Octet
- Structured
- Two Octet
- Unstructured

3.4.3 Telegram Length

- Maximum characters (Number of Octets)

3.5 Application Layer

3.5.1 Transmission mode for application data

Mode 1 (least significant octet first) as defined in 4.10 of IEC 60870-5-4, is used exclusively in this companion standard.

3.5.2 Common Address of ASDU

- One octet
- Two octets

3.5.3 Information Object Address

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

3.5.4 Cause of Transmission

- One octet
- Two octets (with originator address) Originator address is set to zero if not used

3.5.5 Length of APDU

(system-specific parameter, specify the maximum length of the APDU per system)

The maximum length of the APDU is 253 (default). The maximum length may be reduced by the system.

253	Maximum length of APDU per system
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3.5.6 Selection of standard ADSUs

3.5.6.1 Process information in monitor 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 bit	M_BO_NA_1
<input type="checkbox"/>	<8>	:= Bitstring of 32 bit with time tag	M_BO_TA_1
<input checked="" type="checkbox"/>	<9>	:= Measured value, normalized value	M_ME_NA_1
<input type="checkbox"/>	<10>	:= Measured value, normalized value with time tag	M_ME_TA_1
<input 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 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 tag	M_ME_TC_1
<input 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 type="checkbox"/>	<20>	:= Packed single-point information with status change detection – von lib n. supportet	M_PS_NA_1
<input type="checkbox"/>	<21>	:= Measured value, normalized value without quality 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 type="checkbox"/>	<32>	:= Step position information with time tag CP56Time2a	M_ST_TB_1
<input checked="" type="checkbox"/>	<33>	:= Bitstring of 32 bit with time tag CP56Time2a	M_BO_TB_1

Web
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Version
V 0.4

Datum
26.05.2015

Autor
jtz/dip/jhe

<input checked="" type="checkbox"/>	<34>	:= Measured value, normalized value with time tag CP56Time2a	M_ME_TD_1
<input 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 type="checkbox"/>	<38>	:= Event of protection equipment with time tag CP56Time2a	M_EP_TD_1
<input type="checkbox"/>	<39>	:= Packed start events of protection equipment with time tag CP56Time2a	M_EP_TE_1
<input type="checkbox"/>	<40>	:= Packed output circuit information of protection equipment with time tag CP56Time2a	M_EP_TF_1

Either ASDUs of the set <2>, <4>, <6>, <8>, <10>, <12>, <14>, <16>, <17>, <18>, <19> or of the set <30> – <40> are used.

3.5.6.2 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 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 type="checkbox"/>	<51>	:= Bitstring of 32 bit	C_BO_NA_1

Either the ASDUs of the set <45> – <51> or of the set <58> – <64> are used.

<input checked="" type="checkbox"/>	<58>	:= Single command with time tag CP56Time2a vorhanden zu impl.	C_SC_TA_1
<input checked="" type="checkbox"/>	<59>	:= Double command with time tag CP56Time2a vorhanden zu impl.	C_DC_TA_1
<input checked="" type="checkbox"/>	<60>	:= Regulating step command with time tag CP56Time2a vorhanden zu impl.	C_RC_TA_1
<input checked="" type="checkbox"/>	<61>	:= Set point command, normalized value with time tag CP56Time2a	C_SE_TA_1
<input type="checkbox"/>	<62>	:= Set point command, scaled value with time tag CP56Time2a	C_SE_TB_1
<input type="checkbox"/>	<63>	:= Set point command, short floating point value with time tag CP56Time2a	C_SE_TC_1
<input type="checkbox"/>	<64>	:= Bitstring of 32 bit with time tag CP56Time2a	C_BO_TA_1

3.5.6.3 System information in the monitor direction

<input checked="" type="checkbox"/>	<70>	:= End of initialization	M_EI_NA_1
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3.5.6.4 System information in the control direction

<input checked="" type="checkbox"/>	<100>	:= Interrogation command	C_IC_NA_1
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Version

V 0.4

Datum

26.05.2015

Autor

jtz/dip/jhe



<input checked="" type="checkbox"/>	<101>	:= Counter interrogation command	C_CI_NA_1
<input type="checkbox"/>	<102>	:= Read command	C_RD_NA_1
<input 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 checked="" type="checkbox"/>	<106>	:= Delay acquisition command	C_CD_NA_1
<input type="checkbox"/>	<107>	Test command with time tag CP56Time2a	C_TS_TA_1

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3.5.6.5 Parameter in control direction

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

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3.5.6.6 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 <input type="checkbox"/> or <input checked="" type="checkbox"/> only available in monitor (standard) direction	F_DR_TA_1

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