GE
Grid Solutions

IEC 60870-5-103 Client (DCA) for the Multifunction Controller Platform

Conformance Statement

NTEK-A025M-0CS

Version 1.00 Revision 0

Associated Software Release: Version 1.00

imagination at work

General

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Tables

1. Interoperability Tables

In cases where several options are available, for example multiple lengths of address fields, the GE Grid Solutions MCP shall be able to be configured to use the required value.

1.1 Network Configuration (IEC 870-5-101 Section 8.1)

Point to Point - Supported

Multi Point-Party Line - Supported

Multiple Point to Point - Supported

Multi Point Star - Supported

1.2 Physical Layer (IEC 870-5-101 Section 8.2)

Table 1 Physical Layer

Transmission Speed	Control Direction	Monitor Direction
100 bit/s	Not Supported	Not Supported
200 bit/s	Not Supported	Not Supported
300 bit/s	Supported	Supported
600 bit/s	Supported	Supported
1200 bit/s	Supported	Supported
2400 bit/s	Supported	Supported
4800 bit/s	Supported	Supported
9600 bit/s	Supported	Supported
19200 bit/s	Supported	Supported
38400 bit/s	Not Supported	Not Supported
56000 bit/s	Not Supported	Not Supported
64000 bit/s	Not Supported	Not Supported

1.3 Link Layer (IEC 870-5-101 Section 8.3)

- Frame format FT1.2 (*IEC® 870-5-1 Section 6.2.4.2*) of fixed and variable length.
- Single character I, 0xE5, (*IEC 870-5-1 Section 6.2.4.2.3*) - used as a positive acknowledge.
- Single character II, 0xA2, (*IEC 870-5-1 Section 6.2.4.2.3*) - used as a negative acknowledge.
- Fixed CONFIRM time out interval (value is configurable).
- Fixed RESPOND time out interval (value is configurable).

1.4 Link Transmission Procedures

Balanced transmission : Not Supported

Unbalanced transmission : Supported

1.5 Address Field of The Link

Not present (balanced transmission only)	:	Not Supported
One octet	:	Supported
Two octets	:	Not Supported
Structured	:	Supported
Unstructured	:	Supported
Maximum frame length	:	255

1.6 Application Layer (IEC 60870-5-103 Section 8.3)

Transmission Mode for Application Data

Mode 1 (Least significant octet first) for all application data.

Common Address of ASDU

One common address of ASDU (identical with station address) - Supported

More than one common address of ASDU - Supported

(Different from station address)

Information Object Address

No choice. Always ONE Octet.

Cause of Transmission

The size of Cause of Transmission is always ONE octet. The DCA supports the following Cause of Transmission (COT):

Monitor direction:

- Spontaneous (1).
- Cyclic (2).
- Reset frame count bit (3).
- Reset communication unit (4).
- Start / restart (5).
- Power on (6).
- Test mode (7).
- Time synchronization (8).

- General interrogation (9).
- Termination of general interrogation (10).
- Positive acknowledgement of command (20).
- Negative acknowledgement of command (21).

Control direction:

- Time synchronization (8).
- General interrogation (9).
- General command (20).

1.7 DCA Handling of COT in Monitor Direction

Table 2 DCA Handling of COT in Monitor Direction

COT in Monitor Direction	DCA Processing of COT
Spontaneous	The DCA updates the system database with the received values for the data points.
Cyclic	The DCA updates the system database with the received values for the data points.
Reset FCB	The remote device is ready to accept messages. The DCA queues a General Interrogation then followed by a Time Sync request (if required).
Reset CU	The remote device is ready to accept messages. The DCA queues a General Interrogation then followed by a Time Sync request (if required).
Start/Restart	The DCA toggles the devices' Start/Restart pseudo BI point ON then OFF.
Power ON	The DCA toggles the devices' Start/Restart pseudo BI point ON then OFF. The DCA also posts a message to the system log to indicate the device is powered ON.
Test Mode	The DCA updates the system database for the corresponding point flag to indicate Remote Force ON.
Time Synchronization	The DCA updates the device's Time Sync In-Progress pseudo BI point to OFF.
General Interrogation	The DCA updates the system database with the received values for the data points.
General Interrogation Termination	The DCA updates the device's General Interrogation In-Progress pseudo BI point to OFF.
ACK	The DCA returns an ACK to RtDB to indicate success of the general command.
NACK	The DCA returns a NACK to RtDB with the IO_OFF_LINE_ERR status to indicate failure of the general command.

1.8 Standard Information Numbers in Monitor Direction

Table 3 Standard Information Numbers in Monitor Direction

	Information Number	Semantics	Type ID Used	Supported
System Functions	0	End of general interrogation	8	✓
	0	Time synchronization	6	✓
	2	Reset Frame Count Bit (FCB)	5	✓
	3	Reset Communication Unit (CU)	5	✓
	4	Start/Restart	5	✓
	5	Power On	5	✓
Status Indications	16	Auto-recloser active	1	✓
	17	Tele-protection active	1	✓
	18	Protection active	1	✓
	19	LED reset	1	✓
	20	Monitor direction blocked	1	✓
	21	Test mode	1	✓
	22	Local parameter setting	1	✓
	23	Characteristic 1	1	✓
	24	Characteristic 2	1	✓
	25	Characteristic 3	1	✓
	26	Characteristic 4	1	✓
	27	Auxiliary input 1	1	✓
	28	Auxiliary input 2	1	✓
	29	Auxiliary input 3	1	✓
	30	Auxiliary input 4	1	✓
Supervision Indications	32	Measurand supervision I	1	✓
	33	Measurand supervision V	1	✓
	35	Phase sequence supervision	1	✓
	36	Trip circuit supervision	1	✓
	37	I>> backup operation	1	✓
	38	VT fuse failure	1	✓
	39	Tele-protection disturbed	1	✓
	46	Group warning	1	✓
	47	Group alarm	1	✓
Earth Fault	48	Earth fault L1	1	✓
	49	Earth fault L2	1	✓
	50	Earth fault L3	1	✓

	Information Number	Semantics	Type ID Used	Supported
Indications	51	Earth fault forward (i.e. line)	1	✓
	52	Earth fault reverse (i.e. busbar)	1	✓
Fault Indications	64	Start / pick-up L1	2	✓
	65	Start / pick-up L2	2	✓
	66	Start / pick-up L3	2	✓
	67	Start / pick-up N	2	✓
	68	General Trip	2	✓
	69	Trip L1	2	✓
	70	Trip L2	2	✓
	71	Trip L3	2	✓
	72	Trip I>> (back-up operation)	2	✓
	73	Fault location X in Ohm	4	✓
	74	Fault forward/line	2	✓
	75	Fault reverse/busbar	2	✓
	76	Tele-protection signal transmitted	2	✓
	77	Tele-protection signal received	2	✓
	78	Zone 1	2	✓
	79	Zone 2	2	✓
	80	Zone 3	2	✓
	81	Zone 4	2	✓
	82	Zone 5	2	✓
	83	Zone 6	2	✓
	84	General start / pick-up	2	✓
	85	Breaker failure	2	✓
	86	Trip measuring system L1	2	✓
	87	Trip measuring system L2	2	✓
	88	Trip measuring system L3	2	✓
	89	Trip measuring system E	2	✓
	90	Trip I>	2	✓
	91	Trip I>>	2	✓
	92	Trip IN>	2	✓
	93	Trip IN>>	2	✓
Auto Reclosure Indications	128	CB >on by AR	1	✓
	129	CB >on by long-time AR	1	✓
	130	AR blocked	1	✓
Measurands	144	Measurand I	3, 9, 140	✓
	145	Measurands I, V	3, 9, 140	✓

	Information Number	Semantics	Type ID Used	Supported
	146	Measurands I, V, P, Q	3, 9, 140	✓
	147	Measurands IN, VEN	3, 9, 140	✓
	148	Measurands IL1,2,3, VL1,2,3, P, Q, f	3, 9, 140	✓
Generic Functions	240	Read headings of all defined groups	10	×
	241	Read values or attributes of all entries of one group	10	×
	243	Read directory of a single entry	11	×
	244	Read value or attribute of a single entry	10	×
	245	End of General interrogation of generic data	10	×
	249	Write entry with confirmation	10	×
	250	Write entry with execution	10	×
	251	Write entry aborted	10	×

1.9 Standard Information Numbers in Control Direction

Table 4 Standard Information Numbers in Control Direction

	Information Number	Semantics	Type ID Used	Supported
System Functions	0	General interrogation	7	✓
	0	Time synchronization	6	✓
General Commands	16	Auto-recloser On/Off	20	✓
	17	Tele-protection On/Off	20	✓
	18	Protection On/Off	20	✓
	19	LED reset	20	✓
	23	Activate Characteristic 1	20	✓
	24	Activate Characteristic 2	20	✓
	25	Activate Characteristic 3	20	✓
	26	Activate Characteristic 4	20	✓
Generic Functions	240	Read headings of all defined groups	21	×
	241	Read values of attributes of all entries of one group	21	×
	243	Read directory of a single entry	21	×
	244	Read value or attribute of a single entry	21	×
	245	General interrogation of generic data	21	×
	248	Write entry	10	×
	249	Write entry with confirmation	10	×

	Information Number	Semantics	Type ID Used	Supported
	250	Write entry with execution	10	×
	251	Write entry abort	10	×

1.10 Supported Application Functions

Table 5 Supported Application Functions

Application Functions	Supported
Station initialization with Reset Communication Unit (CU)	✓
Station initialization with Reset Frame Count Bit (FCB)	✓
General Interrogation	✓
Time Synchronization of remote device	✓
Broadcast Time Synchronization	×
General Command Transmission	✓
Test Mode	✓
Blocking of Monitor Direction	✓
Transmission of Disturbance Data	×
Generic Services	×
Private Data (Only for known ASDU Type ID as configured)	×

1.11 Miscellaneous

Table 6 Miscellaneous Functions

Measurand	Support Max. MVAL= 1, 2 times of rated value	Support Max. MVAL= 2, 4 times of rated value
Current L_1	✓	✓
Current L_2	✓	✓
Current L_3	✓	✓
Voltage L_{1-E}	✓	✓
Voltage L_{2-E}	✓	✓
Voltage L_{3-E}	✓	✓
Active Power P	✓	✓
Reactive Power Q	✓	✓
Frequency f	✓	✓
Voltage L_1 - L_2	✓	✓

Note: The DCA does not perform scaling of ASDU Type 4 measurand values.

1.12 Selections of Standard Application Service Data Units

Table 7 Process Information in Monitor Direction

PROCESS INFORMATION IN MONITOR DIRECTION				
Type ID	**Description**	**Supported**	**SCADA Data Types**	**RtDB Type**
1	Time-tagged message.	✓	DI	Binary Input
2	Time-tagged message with relative time. Note: Fault Number is ignored.	✓	DI	Binary Input
3	Measurands Type I.	✓	AI	Analog Input
4	Time-tagged measurands with relative time.	✓	AI	Analog Input
5	Identification message.	✓	N/A	N/A
6	Time synchronization.	✓	N/A	N/A
8	General interrogation termination.	✓	N/A	N/A
9	Measurands Type II.	✓	AI	Analog Input
10	Generic data.	×		
11	Generic identification.	×		
23	List of recorded disturbances.	×		
26	Ready for transmission of disturbance data.	×		
27	Ready for transmission of a channel.	×		
28	Ready for transmission of tags.	×		
29	Transmission of tags.	×		
30	Transmission of disturbance values.	×		
31	End of transmission.	×		
140	Measurands Type II - Not Compatible.	✓	AI	Analog Input

Table 8 Process Information in Control Direction

PROCESS INFORMATION IN CONTROL DIRECTION				
Type ID	**Short Name**	**Description**	**Supported**	**SCADA Data Types**
6		Time Synchronization.	✓	N/A
7		General interrogation initiation.	✓	N/A
10		Generic data.	×	
20		General command.	✓	DO
21		Generic command.	×	
24		Order for disturbance data transmission.	×	
25		Acknowledgement for disturbance data transmission.	×	

Note: The DCA discards data in monitor direction that is listed as not supported.

MODIFICATION RECORD

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