

## **Device Profile Document**

**For  
Communications Protocol DNP3**

**For Use With Cooper Power Systems  
CL-6A Regulator Control**



# CL-6A Device Profile Document

## DNP3

### DEVICE PROFILE DOCUMENT

This document must be accompanied by a table having the following headings:

Object Group	Request Function Codes	Response Function Codes
Object Variation	Request Qualifiers	Response Qualifiers
Object Name (optional)		

Vendor Name: **Cooper Power Systems**

Device Name:

**CL-6A Regulator Control**

**Equipped with Version 1.02.00 Firmware (Front Panel Function Code 89)**

Highest DNP Level Supported:

For Requests **2+**

For Responses **2+**

Device Function:

Master  **Slave**

Notable objects, functions, and/or qualifiers supported in addition to the Highest DNP Levels Supported (the complete list is described in the attached table):

- **Explanations for configurable items can be found in the Cooper Control Interface software and supporting documentation.**
- **This product does not support Frozen Counters**
- **This product supports Octet (Character) Strings Objects 110**

Maximum Data Link Frame Size (octets):

Transmitted **292**

Received **(must be 292)**

Maximum Application Fragment Size (octets):

Transmitted **2048**

Received **2048**

Maximum Data Link Re-tries:

None

Fixed at \_\_\_\_\_

**Configurable, range None to 255**

Maximum Application Layer Re-tries:

**None**

Configurable

Requires Data Link Layer Confirmation:

Never

Always

Sometimes If 'Sometimes', when?

**Configurable** If 'Configurable', how? **Via Cooper Control Interface software.**

Requires Application Layer Confirmation:

- Never
- Always (not recommended)
- When reporting Event Data (Slave devices only)
- When sending multi-fragment responses (Slave devices only)
- Sometimes If 'Sometimes', when ? For non-final fragments in a multi-fragment response.
- Configurable If 'Configurable', how? Via Cooper Control Interface software.

Timeouts while waiting for:

- |                         |  |   |                                   |  |
|-------------------------|--|---|-----------------------------------|--|
| Data Link Confirm       | <input type="checkbox"/> None            | <input type="checkbox"/> Fixed at _____ | <input type="checkbox"/> Variable | <input checked="" type="checkbox"/> Configurable |
| Complete Appl. Fragment | <input checked="" type="checkbox"/> None | <input type="checkbox"/> Fixed at _____ | <input type="checkbox"/> Variable | <input type="checkbox"/> Configurable            |
| Application Confirm     | <input type="checkbox"/> None            | <input type="checkbox"/> Fixed at _____ | <input type="checkbox"/> Variable | <input checked="" type="checkbox"/> Configurable |
| Complete Appl. Response | <input checked="" type="checkbox"/> None | <input type="checkbox"/> Fixed at _____ | <input type="checkbox"/> Variable | <input type="checkbox"/> Configurable            |
| Others _____            |  |   |                                   |  |

Attach explanation if 'Variable' or 'Configurable' was checked for any timeout

Sends/Executes Control Operations:

- |                         |   |  |                                    |                                       |
|-------------------------|---|--|------------------------------------|---------------------------------------|
| WRITE Binary Outputs    | <input type="checkbox"/> Never            | <input checked="" type="checkbox"/> Always | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |
| SELECT/OPERATE          | <input type="checkbox"/> Never            | <input checked="" type="checkbox"/> Always | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |
| DIRECT OPERATE          | <input type="checkbox"/> Never            | <input checked="" type="checkbox"/> Always | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |
| DIRECT OPERATE - NO ACK | <input type="checkbox"/> Never            | <input checked="" type="checkbox"/> Always | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |
| Count > 1               | <input type="checkbox"/> Never            | <input checked="" type="checkbox"/> Always | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |
| Pulse On                | <input type="checkbox"/> Never            | <input checked="" type="checkbox"/> Always | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |
| Pulse Off               | <input type="checkbox"/> Never            | <input checked="" type="checkbox"/> Always | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |
| Latch On                | <input type="checkbox"/> Never            | <input checked="" type="checkbox"/> Always | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |
| Latch Off               | <input type="checkbox"/> Never            | <input checked="" type="checkbox"/> Always | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |
| Queue                   | <input checked="" type="checkbox"/> Never | <input type="checkbox"/> Always            | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |
| Clear Queue             | <input checked="" type="checkbox"/> Never | <input type="checkbox"/> Always            | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |

Attach explanation if 'Sometimes' or 'Configurable' was checked for any operation.

Timing Declarations:

- Time base drift over a ten minute time period: 60 milliseconds
- Maximum time delay measurement error: 30 milliseconds
- Maximum Internal time reference error when set from the protocol: 30 milliseconds
- Maximum Response Time: 300 milliseconds
- Accuracy of Event measurement: 2000 milliseconds (OBJ 22 & 32), 200 milliseconds (OBJ 12)
- Maximum Select to Execute delay: Configurable to 655 seconds
- Maximum delay from Startup to IIN1-4 assertion: 18 Seconds

Numeric Event Generation:

Default ~ Deadband:

Event generated when  $Abs|(VALUENEW - VALUEOLD)| > \text{Deadband}$

Collision Avoidance Method:

- None
- Implemented per TB 9804-007

**FILL OUT THE FOLLOWING ITEM FOR MASTER DEVICES ONLY**

**Expects Binary Input Change Events:**

- Either time-tagged or non-time-tagged for a single event
- Both time-tagged and non-time-tagged for a single event
- Configurable (attach explanation)

**FILL OUT THE FOLLOWING ITEMS FOR SLAVE DEVICES ONLY**

<p>Reports Binary Input Change Events when no specific variation requested:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Never</li> <li><input type="checkbox"/> Only time-tagged</li> <li><input type="checkbox"/> Only non-time-tagged</li> <li><input checked="" type="checkbox"/> Configurable to send both, one or the other (attach explanation)</li> </ul>	<p>Reports time-tagged Binary Input Change Events when no specific variation requested:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Never</li> <li><input checked="" type="checkbox"/> Binary Input Change With Time</li> <li><input type="checkbox"/> Binary Input Change With Relative Time</li> <li><input type="checkbox"/> Configurable (attach explanation)</li> </ul>
<p>Sends Unsolicited Responses:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Never</li> <li><input checked="" type="checkbox"/> Configurable (attach explanation)</li> <li><input type="checkbox"/> Only certain objects</li> <li><input type="checkbox"/> Sometimes (attach explanation)</li> <li><input checked="" type="checkbox"/> ENABLE/DISABLE UNSOLICITED Function codes supported</li> </ul>	<p>Sends Static Data in Unsolicited Responses:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Never</li> <li><input type="checkbox"/> When Device Restarts</li> <li><input type="checkbox"/> When Status Flags Change</li> </ul> <p>No other options are permitted.</p>
<p>Default Counter Object/Variation:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> No Counters Reported</li> <li><input checked="" type="checkbox"/> Configurable (attach explanation)</li> <li><input type="checkbox"/> Default Object</li> <li><input type="checkbox"/> Default Variation</li> <li><input type="checkbox"/> Point-by-point list attached</li> </ul>	<p>Counters Roll Over at:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> No Counters Reported</li> <li><input type="checkbox"/> Configurable (attach explanation)</li> <li><input type="checkbox"/> 16 Bits</li> <li><input type="checkbox"/> 32 Bits</li> <li><input type="checkbox"/> Other Value _____</li> <li><input checked="" type="checkbox"/> Point-by-point list attached</li> </ul>
<p>Sends Multi-Fragment Responses: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>	
<p>Filtering is performed based on Source Address: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>	
<p>Device Supports Multi-Master Mode: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>	

## CL-6A Implementation Table

This table describes the objects, function codes, and qualifiers used in the CL-6A

OBJECT			REQUEST (DNP message components parsed by the CL-6A)		RESPONSE (DNP message components reported by the CL-6A)	
Obj	Var	Description	Func Codes (dec)	Qual Codes (hex)	Func Codes (dec)	Qual Codes (hex)
1	0	Binary Input - All Variations	1,22	00,01,06		
1	1	Binary Input	1	00,01,06	129	00,01
1	2	Binary Input with Status	1	00,01,06	129	00,01
2	0	Binary Input Change - All Variations	1	06,07,08		
2	1	Binary Input Change without Time	1	06,07,08	129,130	17,28
2	2	Binary Input Change with Time	1	06,07,08	129,130	17,28
2	3	Binary Input Change with Relative Time	1	06,07,08		
10	0	Binary Output - All Variations	1	00,01,06		
10	1	Binary Output				
10	2	Binary Output Status	1	00,01,06	129	00,01
12	0	Control Block - All Variations				
12	1	Control Relay Output Block	3,4,5,6	17,28	129	Echo of request
12	2	Pattern Control Block	5,6	17,28		
12	3	Pattern Mask	5,6	00,01		
20	0	Binary Counter - All Variations	1,7,8,9,10,22	00,01,06		
20	1	32-Bit Binary Counter	1	00,01,06	129	00,01
20	2	16-Bit Binary Counter	1	00,01,06	129	00,01
20	3	32-Bit Delta Counter	1	00,01,06		
20	4	16-Bit Delta Counter	1	00,01,06		
20	5	32-Bit Binary Counter without Flag	1	00,01,06	129	00,01
20	6	16-Bit Binary Counter without Flag	1	00,01,06	129	00,01
20	7	32-Bit Delta Counter without Flag	1	00,01,06		
20	8	16-Bit Delta Counter without Flag	1	00,01,06		
21	0	Frozen Counter - All Variations	1,22	00,01,06		
21	1	32-Bit Frozen Counter	1	00,01,06		
21	2	16-Bit Frozen Counter	1	00,01,06		
21	3	32-Bit Frozen Delta Counter	1	00,01,06		
21	4	16-Bit Frozen Delta Counter	1	00,01,06		
21	5	32-Bit Frozen Counter with Time of Freeze				
21	6	16-Bit Frozen Counter with Time of Freeze				
21	7	32-Bit Frozen Delta Counter with Time of Freeze				
21	8	16-Bit Frozen Delta Counter with Time of Freeze				
21	9	32-Bit Frozen Counter without Flag	1	00,01,06		
21	10	16-Bit Frozen Counter without Flag	1	00,01,06		
21	11	32-Bit Frozen Delta Counter without Flag				
21	12	16-Bit Frozen Delta Counter without Flag				
22	0	Counter Change Event - All Variations	1	06,07,08		
22	1	32-Bit Counter Change Event without Time	1	06,07,08	129,130	17,28
22	2	16-Bit Counter Change Event without Time	1	06,07,08	129,130	17,28
22	3	32-Bit Delta Counter Change Event without Time	1	06,07,08		
22	4	16-Bit Delta Counter Change Event without Time	1	06,07,08		
22	5	32-Bit Counter Change Event with Time	1	06,07,08	129,130	17,28
22	6	16-Bit Counter Change Event with Time	1	06,07,08	129,130	17,28
22	7	32-Bit Delta Counter Change Event with Time				

OBJECT			REQUEST (DNP message components parsed by the CL-6A)		RESPONSE (DNP message components reported by the CL-6A)	
Obj	Var	Description	Func Codes (dec)	Qual Codes (hex)	Func Codes (dec)	Qual Codes (hex)
22	8	16-Bit Delta Counter Change Event with Time				
23	0	Frozen Counter Event - All Variations	1	06,07,08		
23	1	32-Bit Frozen Counter Event without Time	1	06,07,08		
23	2	16-Bit Frozen Counter Event without Time	1	06,07,08		
23	3	32-Bit Frozen Delta Counter Event without Time	1	06,07,08		
23	4	16-Bit Frozen Delta Counter Event without Time	1	06,07,08		
23	5	32-Bit Frozen Counter Event with Time	1	06,07,08		
23	6	16-Bit Frozen Counter Event with Time	1	06,07,08		
23	7	32-Bit Frozen Delta Counter Event with Time				
23	8	16-Bit Frozen Delta Counter Event with Time				
30	0	Analog Input - All Variations	1,22	00,01,06		
30	1	32-Bit Analog Input	1	00,01,06	129	00,01
30	2	16-Bit Analog Input	1	00,01,06	129	00,01
30	3	32-Bit Analog Input without Flag	1	00,01,06	129	00,01
30	4	16-Bit Analog Input without Flag	1	00,01,06	129	00,01
30	5	Short Floating Point Analog Input	1	00,01,06	129	00,01
30	6	Long Floating point Analog Input				
30	7	Extended Floating Point Analog Input				
31	0	Frozen Analog Input - All Variations				
31	1	32-Bit Frozen Analog Input				
31	2	16-Bit Frozen Analog Input				
31	3	32-Bit Frozen Analog Input with Time of Freeze				
31	4	16-Bit Frozen Analog Input with Time of freeze				
31	5	32-Bit Frozen Analog Input without Flag				
31	6	16-Bit Frozen Analog Input without Flag				
32	0	Analog Change Event - All Variations	1	06,07,08		
32	1	32-Bit Analog Change Event without Time	1	06,07,08	129,130	17,28
32	2	16-Bit Analog Change Event without Time	1	06,07,08	129,130	17,28
32	3	32-Bit Analog Change Event with Time	1	06,07,08	129,130	17,28
32	4	16-Bit Analog Change Event with Time	1	06,07,08	129,130	17,28
32	5	Short Floating Point Analog Change Event	1	06,07,08	129,130	17,28
32	6	Long Floating Point Analog Change Event				
32	7	Short Floating Point Analog Chg Event w/ Time	1	06,07,08	129,130	17,28
33	0	Frozen Analog Event - All Variations				
33	1	32-Bit Frozen Analog Event without Time				
33	2	16-Bit Frozen Analog Event without Time				
33	3	32-Bit Frozen Analog Event with Time				
33	4	16-Bit Frozen Analog Event with Time				
33	5	Short Floating Point Frozen Analog Event				
33	6	Long Floating point Frozen Analog Event				
33	7	Extended Floating Point Frozen Analog Event				
40	0	Analog Output Status - All Variations	1	00,01,06		
40	1	32-Bit Analog Output Status	1	00,01,06	129	00,01
40	2	16-Bit Analog Output Status	1	00,01,06	129	00,01
40	3	Short Floating point Analog Output Status	1	00,01,06	129	00,01
41	0	Analog Output Block - All Variations				
41	1	32-Bit Analog Output Block	3,4,5,6	17,28	129	Echo of request
41	2	16-Bit Analog Output Block	3,4,5,6	17,28	129	Echo of request
41	3	Short Floating point Analog Output Block	3,4,5,6	17,28	129	Echo of request
50	0	Time and Date - All Variations				
50	1	Time and Date	1,2	07, qty=1	129	Echo of request
50	2	Time and Date with Interval				
51	0	Time and Date CTO - All Variations				
51	1	Time and Date CTO				
51	2	Unsynchronized Time and Date CTO				

OBJECT			REQUEST (DNP message components parsed by the CL-6A)		RESPONSE (DNP message components reported by the CL-6A)	
Obj	Var	Description	Func Codes (dec)	Qual Codes (hex)	Func Codes (dec)	Qual Codes (hex)
52	0	Time Delay - All Variations				
52	1	Time Delay Coarse			129	07, quantity=1
52	2	Time Delay Fine			129	07, quantity=1
60	0	Not defined				
60	1	Class 0 Data	1	06		
60	2	Class 1 Data	1 20,21,22	06,07,08 06		
60	3	Class 2 Data	1 20,21,22	06,07,08 06		
60	4	Class 3 Data	1 20,21,22	06,07,08 06		
70	1	File Identifier				
80	1	Internal Indications	2	00, index=7		
81	1	Storage Object				
82	1	Device Profile				
83	1	Private Registration Object				
83	2	Private Registration Object Descriptor				
90	1	Application Identifier				
100	1	Short Floating Point				
100	2	Long Floating Point				
100	3	Extended Floating Point				
101	1	Small Packed Binary-Coded Decimal				
101	2	Medium Packed Binary-Coded Decimal				
101	3	Large Packed Binary-Coded Decimal				
		No object (Cold Restart)	13		129	
		No object (Delay Measurement)	23		129	
110		String Data	01 02	06,07,08 07	129 129	00,01 Echo of request
111		String Change Events				

**Table 1 - Level 3 Implementation**









