

# **Documento de Interoperabilidade do Protocolo DNP V3.0 no SAGE**

## Documento de Interoperabilidade

A comunicação do SAGE sob o protocolo DNP V3.0 pode ser estabelecida em canais de comunicação serial assíncrona ou em conexões do protocolo TCP/IP. As opções de uso do protocolo DNP V3.0 em canais de comunicação serial assíncrona estão listadas no documento de interoperabilidade abaixo. Além disso, estão disponíveis no SAGE duas modalidades de transporte do DNP V3.0 sobre TCP/IP:

- *application level* do DNP V3.0 sobre TCP/IP
- *link-level* do DNP V3.0 sobre TCP/IP

A seguir é apresentado preenchido o questionário de interoperabilidade.

<b>DNP V3.00</b> <b>DEVICE PROFILE DOCUMENT</b> 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)		
<b>Vendor Name: CEPEL - Centro de Pesquisas de Energia Elétrica</b>		
<b>Device Name: SAGE - Sistema Aberto de Gerenciamento de Energia</b>		
Highest DNP Level Supported: 3	Device Function	
For Requests : 3	<input checked="" type="checkbox"/> Master   <input checked="" type="checkbox"/> Slave	
For Responses : 3		
Notable objects, functions, and/or qualifiers supported in addition to the Highest DNP levels Supported (the complete list is described in the attached table):  O SAGE suporta todos os importantes requisitos do nível 3 de implementação incluindo as variações de 32 bits. Para maiores detalhes veja a tabela de implementação anexa (Supported Objects, Variations and Qualifiers).  Para tornar este <i>Device Profile Document</i> mais objetivo, estão informadas neste mesmo documento as opções de uso do SAGE como Master, em ligações de aquisição, e como Slave, em ligações de distribuição.		
Maximum Data Link Frame Size (octects):	Maximum Application Fragment Size (octects):	
Transmitted : 292	Transmitted : 2048 (if >2048, must be configurable)	
Received : (must be 292)	Received : 2048 (must be > 249)	
Maximum Data Link Retries:	Maximum Application Retries:	
<input type="checkbox"/> None	<input type="checkbox"/> None	
<input type="checkbox"/> Fixed at _____	<input type="checkbox"/> Fixed at _____	
<input checked="" type="checkbox"/> Configurable, range 1 to 255	<input checked="" type="checkbox"/> Configurable, range 1 to 255	

Requires Data Link Layer Confirmation:				
<input type="checkbox"/> Never <input type="checkbox"/> Always <input type="checkbox"/> Sometimes If 'Sometimes', when ? _____ <input checked="" type="checkbox"/> Configurable If 'Configurable', how ? Somente em ligações de aquisição (master)				
Requires Application Layer Confirmation:				
<input type="checkbox"/> Never <input type="checkbox"/> Always (not recommended) <input checked="" type="checkbox"/> When reporting Event Data (Slave devices only) <input type="checkbox"/> When sending multi-fragment responses (Slave devices only) <input checked="" type="checkbox"/> Sometimes If 'Sometimes', when ? Quando enviarequests em ligações de aquisição (master) <input type="checkbox"/> Configurable If 'Configurable', how ? _____				
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 type="checkbox"/> None	<input type="checkbox"/> Fixed at _____	<input type="checkbox"/> Variable	<input checked="" type="checkbox"/> Configurable
Others _____				
Attach explanation if 'Variable' or 'Configurable checked for any timeout				
Explanation: Data-link time-out é configurado em variável de ambiente. Application-level time-out em Banco de Dados				
Sends/Executes Control Operations:				
Write Binary Outputs	<input checked="" type="checkbox"/> Never	<input type="checkbox"/> Always	<input type="checkbox"/> Sometimes	<input type="checkbox"/> Configurable
SELECT/OPERATE	<input type="checkbox"/> Never	<input type="checkbox"/> Always	<input type="checkbox"/> Sometimes	<input checked="" type="checkbox"/> Configurable
DIRECT OPRATE	<input type="checkbox"/> Never	<input type="checkbox"/> Always	<input type="checkbox"/> Sometimes	<input checked="" type="checkbox"/> Configurable
DIRECT OPRATE-NO ACK	<input checked="" type="checkbox"/> Never	<input type="checkbox"/> Always	<input type="checkbox"/> Sometimes	<input type="checkbox"/> Configurable
Count > 1	<input type="checkbox"/> Never	<input type="checkbox"/> Always	<input type="checkbox"/> Sometimes	<input checked="" type="checkbox"/> Configurable
Pulse On	<input type="checkbox"/> Never	<input type="checkbox"/> Always	<input type="checkbox"/> Sometimes	<input checked="" type="checkbox"/> Configurable
Pulse Off	<input type="checkbox"/> Never	<input type="checkbox"/> Always	<input type="checkbox"/> Sometimes	<input checked="" type="checkbox"/> Configurable
Latch On	<input type="checkbox"/> Never	<input type="checkbox"/> Always	<input type="checkbox"/> Sometimes	<input checked="" type="checkbox"/> Configurable
Latch Off	<input type="checkbox"/> Never	<input type="checkbox"/> Always	<input type="checkbox"/> Sometimes	<input checked="" 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.				
Explanation: Os tempos on-time e off-time para controles 1-pulse e N-pulse são configurados no atributo KCONV de CGF A opção de controle direto ou seleção/execução também é configurada no atributo KCONV de CGF A contagem de pulsos >1 é utilizada no diálogo de raise-lower				

<b>FILL OUT THE FOLLOWING ITEM FOR MASTER DEVICES ONLY:</b>	
Expects Binary Input Change Events: <input type="checkbox"/> Either time-tagged or non-time-tagged for a single event <input checked="" type="checkbox"/> Both time-tagged or non-time-tagged for a single event <input type="checkbox"/> Configurable (attach explanation)	
<b>FILL OUT THE FOLLOWING ITEM FOR SLAVE DEVICES ONLY:</b>	
Reports Binary Input Change Events when no specific Variation requested:  <input type="checkbox"/> Never <input type="checkbox"/> Only time-tagged <input type="checkbox"/> Only non-time-tagged <input checked="" type="checkbox"/> Configurable to send both, one or the other (attach explanation) <b>Explanation: Time-tagged se a origem do evento for SOE</b>	Reports time tagged Binary Input Change Events when no specific variation requested:  <input type="checkbox"/> Never <input checked="" type="checkbox"/> Binary Input Change with Time <input type="checkbox"/> Binary Input Change with Relative Time <input type="checkbox"/> Configurable (attach explanation)
Sends Unsolicited Responses:  <input type="checkbox"/> Never <input checked="" type="checkbox"/> Configurable (attach explanation) <b>Configurado em 'config' de NV1 e 'kconv' de PDF</b> <input type="checkbox"/> Only certain objects <input type="checkbox"/> Sometimes (attach explanation):  <input checked="" type="checkbox"/> ENABLE/DISABLE UNSOLICITED Function codes supported	Sends Static Data in Unsolicited Responses:  <input type="checkbox"/> Never <input type="checkbox"/> When Device Restarts  <input checked="" type="checkbox"/> When Status Flags Change <b>No other options are permitted.</b>
Default Counter Object/Variation:  <input type="checkbox"/> No Counters Reported <input type="checkbox"/> Configurable (attach explanation) <input checked="" type="checkbox"/> Default object : 20 Default Variation: 1 (32 bits with flags) <input type="checkbox"/> Point-by-point list attached	Counters Roll Over at:  <input type="checkbox"/> No Counters Reported <input type="checkbox"/> Configurable (attach explanation) <input type="checkbox"/> 16 Bits <input checked="" type="checkbox"/> 32 Bits <input type="checkbox"/> Other Value: _____ <input type="checkbox"/> Point-by-point list attached
Sends Multi-Fragment Responses: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

OBJECT			REQUEST (Master->Slave)		RESPONSE (Slave->Master)	
Obj	Var	Description	Func Code (dec)	Qual Code (hex)	Func Code (dec)	Qual Code (hex)
1	0	Binary Input - All Variations	1	00, 01, 06		
1	1	Binary Input	1	00, 01, 06	129, 130	00, 01
1	2	Binary Input with Status	1	00, 01, 06	129, 130	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	parse only		
10	0	Binary Output - All Variations	1	00, 01, 06		
10	1	Binary Output	1	00, 01, 06	129, 130	00, 01
10	2	Binary Output Status	1	00, 01, 06	129, 130	00, 01
12	1	Control Relay Output Block	3,4,5	17, 28	129	echo
20	0	Binary Counter - All Variations	1,7,8,9,10	00, 01, 06		
20	1	32-Bit Binary Counter	1	00, 01, 06	129, 130	00, 01
20	2	16-Bit Binary Counter	1	00, 01, 06	129, 130	00, 01
20	5	32-Bit Binary Counter without Flag	1	00, 01, 06	129, 130	00, 01
20	6	16-Bit Binary Counter without Flag	1	00, 01, 06	129, 130	00, 01
21	0	Frozen Counters - All Variations	1	00, 01, 06		
21	1	32-Bit Frozen Counter	1	00, 01, 06	129, 130	00, 01
21	2	16-Bit Frozen Counter	1	00, 01, 06	129, 130	00, 01
21	9	32-Bit Frozen Counter without Flag	1	00, 01, 06	129, 130	00, 01
21	10	16-Bit Frozen Counter without Flag	1	00, 01, 06	129, 130	00, 01
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	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
30	0	Analog Input - All Variations	1	00, 01, 06		
30	1	32-Bit Analog Input	1	00, 01, 06	129, 130	00, 01
30	2	16-Bit Analog Input	1	00, 01, 06	129, 130	00, 01
30	3	32-Bit Analog Input without flag	1	00, 01, 06	129, 130	00, 01
30	4	16-Bit Analog Input without flag	1	00, 01, 06	129, 130	00, 01
30	5	Short Floating-Point Analog Input	1	00, 01, 06	129, 130	00, 01
30	6	Long Floating-Point Analog Input	1	00, 01, 06	129, 130	00, 01
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	ShortFloat Anl. Change Event without Time	1	06, 07, 08	129, 130	17, 28
32	6	LongFloat Anl. Change Event without Time	1	06, 07, 08	129, 130	17, 28
32	7	ShortFloat Anl. Change Event with Time	1	06, 07, 08	129, 130	17, 28
32	8	LongFloat Anl. Change Event with Time	1	06, 07, 08	129, 130	17, 28
40	0	Analog Output Status - All Variations	1	00, 01, 06		
40	2	16-Bit Analog Output Status	1	00, 01, 06	129, 130	00, 01
41	2	16-Bit Analog Output Block	3,4,5	17, 28	129	echo
50	0	Time and Date - All Variations				
50	1	Time and Date	1	07	129	07

OBJECT			REQUEST (Master->Slave)		RESPONSE (Slave->Master)	
Obj	Var	Description	Func Code (dec)	Qual Code (hex)	Func Code (dec)	Qual Code (hex)
			2	07		
52	0	Time Delay - All Variations				
52	1	Time Delay Coarse			129	07
52	2	Time Delay Fine			129	07
60	1	Class 0 Data	1	06		
60	2	Class 1 Data	1	06, 07, 08		
			20, 21	06		
60	3	Class 2 Data	1	06, 07, 08		
			20, 21	06		
60	4	Class 3 Data	1	06, 07, 08		
			20, 21	06		
80	1	Internal Indication	2	07		
100	1	Short Floating Point	1	00, 01, 06	129, 130	00, 01 17, 28
No Object			13			
No Object			23			