

# **Freyr SCADA and Embedded Solutions**

**Software Document**

**DNP / IEEE1815 Driver Object and variation Support**

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# 1 Object and Variation

This section provides the table containing the supported objects and variation.

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object	Variation	Description	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)
1	0	Binary Input - All Variations (Variation 0 is used to request default variation)	1(Read), 22(Assign Class)	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129(Response)	00, 01, 02, 17, 18,27,28
1	1	Binary Input - Packed Format	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28
1	2	Binary Input with Status	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129	00, 01, 02, 17, 18,27,28

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object	Variation	Description	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)
2	0	Binary Input Change - All Variations (Default variation)	1	06,07,08	129	17, 18,27,28
2	1	Binary Input Change without Time	1	06,07,08	129, 130 (Unsolicited Response)	17, 18,27,28
2	2	Binary Input Change with Time	1	06,07,08	129, 130	17, 18,27,28
2	3	Binary Input Change with Relative Time	1	06,07,08	129, 130	17, 18,27,28
3	0	Double-bit Binary Input - All Variations (Variation 0 is used to request default variation)	1(Read), 22(Assign Class)	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129(Response)	00, 01, 02, 17, 18,27,28
3	1	Double-bit Binary Input – Packed Format	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object	Variation	Description	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)
3	2	Double-bit Binary Input	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129	00, 01, 02, 17, 18,27,28
4	0	Double-bit Binary Input Change - All Variations (Default variation)	1	06,07,08	129	17, 18,27,28
4	1	Double-bit Binary Input Change without Time	1	06,07,08	129, 130 (Unsolicited Response)	17, 18,27,28
4	2	Double-bit Binary Input Change with Time	1	06,07,08	129, 130	17, 18,27,28
4	3	Double-bit Binary Input Change with Relative Time	1	06,07,08	129, 130	17, 18,27,28

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object	Variation	Description	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)
10	0	Binary Output - All Variations	1(Read), 22(Assign Class)	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129	00, 01, 02, 17, 18,27,28
10	1	Binary Output	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28
10	2	Binary Output Status	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object	Variation	Description	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)
12	0	Control Block - All Variations				
12	1	Control Relay Output Block	3(Select), 4(Operate), 5 (Direct Operate), 6 (Direct Operate NR)	17, 28	129	echo of request
20	0	Binary Counter - All Variations	1(Read), 22(Assign Class) 7(Immediate Freeze ), 8 ( Immediate Freeze - No Response ), 9 ( Freeze and Clear ), 10 ( Freeze and Clear – No Response )	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129	00, 01, 02, 17, 18,27,28

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object	Variation	Description	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)
20	1	32-Bit Binary Counter	1,	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28
20	2	16-Bit Binary Counter	1,	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28
20	5	32-Bit Binary Counter without Flag	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28
20	6	16-Bit Binary Counter without Flag	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty)	129,	00, 01, 02, 17, 18,27,28

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object	Variation	Description	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)
				17, 18,27,28 (index)		
21	0	Frozen Counters - All Variations	1(Read), 22(Assign Class)	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129(Response)	00, 01, 02, 17, 18,27,28
21	1	32-Bit Frozen Counter	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28
21	2	16-Bit Frozen Counter	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28



OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object	Variation	Description	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)
21	5	32-Bit Frozen Counter with Time of Freeze	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28
21	6	16-Bit Frozen Counter with Time of Freeze	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28
21	9	32-Bit Frozen Counter without Flag	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28
21	10	16-Bit Frozen Counter without Flag	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object	Variation	Description	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)
22	0	Counter Change Event - All Variations	1	06,07,08	129	17, 18,27,28
22	1	32-Bit Counter Change Event without Time	1	06,07,08	129, 130	17, 18,27,28
22	2	16-Bit Counter Change Event without Time	1	06,07,08	129, 130	17, 18,27,28
22	5	32-Bit Counter Change Event with Time	1	06,07,08	129, 130	17, 18,27,28
22	6	16-Bit Counter Change Event with Time	1	06,07,08	129, 130	17, 18,27,28
23	0	Frozen Counter Events - All Variations	1	06,07,08	129	17, 18,27,28
23	1	32-Bit Frozen Counter Event without Time	1	06,07,08	129, 130	17, 18,27,28
23	2	16-Bit Frozen Counter Event without Time	1	06,07,08	129, 130	17, 18,27,28
23	5	32-Bit Frozen Counter Event with Time	1	06,07,08	129, 130	17, 18,27,28
23	6	16-Bit Frozen Counter Event with Time	1	06,07,08	129, 130	17, 18,27,28

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object	Variation	Description	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)
30	0	Analog Input - All Variations	1(Read), 22(Assign Class) 7(Immediate Freeze ), 8 ( Immediate Freeze - No Response ), 9 ( Freeze and Clear ), 10 ( Freeze and Clear – No Response )	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129(Response)	00, 01, 02, 17, 18,27,28
30	1	32-Bit Analog Input	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28
30	2	16-Bit Analog Input	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object	Variation	Description	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)
30	3	32-Bit Analog Input without flag	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28
30	4	16-Bit Analog Input without flag	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28
30	5	Single-precision float – point with flag	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object	Variation	Description	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)
31	0	Frozen Analog Input - All Variations	1(Read), 22(Assign Class)	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129(Response)	00, 01, 02, 17, 18,27,28
31	1	32-Bit Frozen Analog Input	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28
31	2	16-Bit Frozen Analog Input	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28
31	3	32-Bit Frozen Analog Input with Time of Freeze	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty)	129,	00, 01, 02, 17, 18,27,28

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object	Variation	Description	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)
				17, 18,27,28 (index)		
31	4	16-Bit Frozen Analog Input with Time of Freeze	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28
31	5	32-Bit Frozen Analog Input without Flag	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28
31	6	16-Bit Frozen Analog Input without Flag	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object	Variation	Description	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)
31	7	Single-precision float – point with flag	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28
32	0	Analog Change Event - All Variations	1	06,07,08	129	17, 18,27,28
32	1	32-Bit Analog Change Event without Time	1	06,07,08	129, 130	17, 18,27,28
32	2	16-Bit Analog Change Event without Time	1	06,07,08	129, 130	17, 18,27,28
32	3	32-Bit Analog Change Event with Time	1	06,07,08	129, 130	17, 18,27,28
32	4	16-Bit Analog Change Event with Time	1	06,07,08	129, 130	17, 18,27,28
32	5	Single-precision float – point Analog Change Event with out Time	1	06,07,08	129, 130	17, 18,27,28

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object	Variation	Description	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)
32	7	Single-precision float – point Analog Change Event with Time	1	06,07,08	129, 130	17, 18,27,28
33	0	Frozen Analog Event - All Variations	1	06,07,08	129	17, 18,27,28
33	1	32-Bit Frozen Analog Event without Time	1	06,07,08	129, 130	17, 18,27,28
33	2	16-Bit Frozen Analog Event without Time	1	06,07,08	129, 130	17, 18,27,28
33	3	32-Bit Frozen Analog Event with Time	1	06,07,08	129, 130	17, 18,27,28
33	4	16-Bit Frozen Analog Event with Time	1	06,07,08	129, 130	17, 18,27,28
33	5	Single-precision float – point Frozen Analog Change Event with out Time	1	06,07,08	129, 130	17, 18,27,28



OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object	Variation	Description	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)
33	7	Single-precision float – point Frozen Analog Change Event with Time	1	06,07,08	129, 130	17, 18,27,28
40	0	Analog Output Status - All Variations	1(Read), 22(Assign Class)	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129(Response)	00, 01, 02, 17, 18,27,28
40	1	32-Bit Analog Output Status	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28
40	2	16-Bit Analog Output Status	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object	Variation	Description	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)
40	3	Single-precision float – point Analog Output Status	1	00, 01 ,02 (start-stop) 06 (no range, or all) 07, 08 ,(limited qty) 17, 18,27,28 (index)	129,	00, 01, 02, 17, 18,27,28
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	Analog Output – Single-precision float –point	3, 4, 5, 6	17, 28	129	echo of request
50	1	Time and Date	2(Write)	07 (Quantity = 1)	129	07 (quantity = 1)
60	1	Class 0 Data	1	06	129	
60	2	Class 1 Data	1	06,07,08	129	
			20 (Enable Unsolicited), 21,(Disable Unsolicited)	06		

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object	Variation	Description	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)	Application Layer Function Codes (Decimal)	Qualifier Codes (hex)
60	3	Class 2 Data	1	06,07,08	129	
			20 (Enable Unsolicited), 21,(Disable Unsolicited)	06		
60	4	Class 3 Data	1	06,07,08	129	
			20 (Enable Unsolicited), 21,(Disable Unsolicited)	06		
80	1	Internal Indications		00		
			2(write)	index=7		