

IEC 101 Profile checklist

The document contains a checklist of the IEC 60870-5-101 functional profile of VAMP devices and WIMO 6CP10.

The checklist template is derived from the IEC standard documentation, edition 2002.

This checklist presents the sets of parameters and alternatives from which subsets have to be selected to implement particular telecontrol systems. Certain parameter values, such as the number of octets in the common address of ASDUs represent mutually exclusive alternatives. This means that only one value of the defined parameters is admitted per system. Other parameters, such as the listed set of different process information in command and in monitor direction allow the specification of the complete set or subsets, as appropriate for given applications. This clause summarizes the parameters of the previous clauses to facilitate a suitable selection for a specific application. If a system is composed of equipment stemming from different manufacturers it is necessary that all partners agree on the selected parameters.

The supported options are marked with black boxes.

The unsupported options are left with white boxes.

In addition, the full specification of a system may require individual selection of certain parameters for certain parts of the system, such as the individual selection of scaling factors for individually addressable measured values.

1. System or device

- System definition
- Controlling station definition (Master)
- Controlled station definition (Slave)

2. Network configuration (network specific parameter)

- Point to point
- Multi-point party line
- Multiple point to point
- Multi-point star

3. Physical layer (network specific parameter)

Transmission speed (control direction)

Unbalanced interchange
circuit V.24/V.28
Standard

- 100 bit/s
- 200 bit/s
- 300 bit/s
- 600 bit/s
- 1200 bit/s

Unbalanced interchange
circuit V.24/V.28
Recommended if > 1200 bit/s

- 2400 bit/s
- 4800 bit/s
- 9600 bit/s

Balanced interchange
circuit X.24/X.27

- 2400 bit/s
- 4800 bit/s
- 9600 bit/s
- 19200 bit/s
- 38400 bit/s
- 56000 bit/s
- 64000 bit/s

Transmission speed (monitor direction)

Unbalanced interchange
circuit V.24/V.28
Standard

- 100 bit/s
- 200 bit/s
- 300 bit/s
- 600 bit/s
- 1200 bit/s

Unbalanced interchange
circuit V.24/V.28
Recommended if > 1200 bit/s

- 2400 bit/s
- 4800 bit/s
- 9600 bit/s

Balanced interchange
circuit X.24/X.27

- 2400 bit/s
- 4800 bit/s
- 9600 bit/s
- 19200 bit/s
- 38400 bit/s

56000 bit/s

64000 bit/s

4. Link layer

4.1 Frame format FT 1.2, single character 1 and the fixed time out interval are used exclusively in this companion standard

Link transmission procedure

- Balanced transmission
- Unbalanced transmission

Address field of the link

- Not present (balanced transmission only)
- One octet
- Two octets
- Structured
- Unstructured

Frame length (number of octets)

Maximum length L – control direction

Maximum length L – monitor direction

NOTE! Repetition time or number of repetitions – not applicable to controlled station with unbalanced transmission procedure

4.2 When using an unbalanced link layer, the following ASDU types are returned in class 2 messages (low priority) with the indicated causes of transmission:

- The standard assignment of ASDUs to class 2 messages is used as follows:

Type identification	Cause of transmission

- A special assignment of ASDUs to class 2 is used as follows:

Type identification	Cause of transmission

NOTE! In response to a class 2 poll, WIMO 6CP10 as controlled station does **not** respond with class 1 data when there is no class 2 data available. Class 1 poll must be used to receive class 1 data.

5. Application layer

5.1 Transmission mode for application data

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

5.2 Common address of ASDU (system specific parameter)

- One octet
- Two octets

5.3 Information object address (system specific parameter)

- One octet
- Structured
- Two octets
- Unstructured
- Three octets ¹

5.4 Cause of transmission (system specific parameter)

- One octet
- Two octets (with originator address)

5.5 Selection of standard ASDUs (station specific parameter)

5.5.1. Process information in monitor direction

- | | | | |
|---|------|---|-----------|
| ■ | <1> | := Single point information | M_SP_NA_1 |
| ■ | <2> | := Single point information with time tag | M_SP_TA_1 |
| ■ | <3> | := Double point information | M_DP_TA_1 |
| ■ | <4> | := Double point information with time tag | M_DP_TA_1 |
| □ | <5> | := Step position information | M_ST_NA_1 |
| □ | <6> | := Step position information with time tag | M_ST_TA_1 |
| □ | <7> | := Bitstring of 32 bit | M_BO_NA_1 |
| □ | <8> | := Bitstring of 32 bit with time tag | M_BO_TA_1 |
| ■ | <9> | := Measured value, normalised value | M_ME_NA_1 |
| ■ | <10> | := Measured value, normalised value with time tag | M_ME_TA_1 |
| ■ | <11> | := Measured value, scaled value | M_ME_NB_1 |
| ■ | <12> | := Measured value, scaled value with time tag | M_ME_TB_1 |

¹ Size of Information object address (two or three octets) defined by configuration parameter.

□	<13>	:= Measured value, short floating point value	M_ME_NC_1
□	<14>	:= Measured value, short floating point value with time tag	M_ME_TC_1
■	<15>	:= Integrated totals	M_IT_NA_1
■	<16>	:= Integrated totals with time tag	M_IT_TA_1
□	<17>	:= Event of protection equipment with time tag	M_EP_TA1
□	<18>	:= Packed start events of protection equipment with time tag	M_EP_TB1
□	<19>	:= Packed output circuit information of protection equipment with time tag	M_EP_TC_1
□	<20>	:= Packed single point information with time tag	M_PS_NA_1
□	<21>	:= Measured value, normalised value without quality descriptor	M_ME_ND_1
■	<30>	:= Single point information with time tag CP56Time2a	M_SP_TB_1
■	<31>	:= Double point information with time tag CP56Time2a	M_DP_TB_1
□	<32>	:= Step position information with time tag CP56Time2a	M_ST_TB_1
□	<33>	:= Bitstring of 32 bit with time tag CP56Time2a	M_BO_TB_1
■	<34>	:= Measured value, normalised value with time tag CP56Time2a	M_ME_TD_1
■	<35>	:= Measured value, scaled value with time tag CP56Time2a	M_ME_TE_1
□	<36>	:= Measured value, short floating point value with time tag CP56Time2a	M_ME_TF_1
■	<37>	:= Integrated totals with time tag CP56Time2a	M_IT_TB_1
□	<38>	:= Event of protection equipment with time tag CP56Time2a	M_EP_TD_1
□	<39>	:= Packed start events of protection equipment with time tag CP56Time2a	M_EP_TE_1
□	<40>	:= Packed output circuit inform.of protection equip. with time tag CP56Time2a	M_EP_TF_1

5.5.2. Process information in control direction

■	<45>	:= Single command	C_SC_NA_1
■	<46>	:= Double command	C_DC_NA_1
□	<47>	:= Regulating step command	C_RC_NA_1

- <48> := Set point command, normalized value C_SE_NA_1
- <49> := Set point command, scaled value C_SE_NB_1
- <50> := Set point command, short floating point value C_SE_NC_1
- <51> := Bitstring of 32 bit C_BO_NA_1
- <133> := SPA buffer (for transparent SPA communication)² C_SB_NA_1

5.5.3. System information in monitor direction

- <70> := End of initialization M_EI_NA_1

5.5.4. System information in control direction

- <100> := Interrogation command C_IC_NA_1
- <101> := Counter interrogation command C_CI_NA_1
- <102> := Read command C_RD_NA_1
- <103> := Clock synchronization command C_CS_NA_1
- <104> := Test command C_TS_NB_1
- <105> := Reset process command C_RP_NC_1
- <106> := Delay acquisition command C_CD_NA_1

5.5.5. Parameter in control direction

- <110> := Parameter of measured value, normalised value P_ME_NA_1
- <111> := Parameter of measured value, scaled value P_ME_NB_1
- <112> := Parameter of measured value, short floating point value P_ME_NC_1
- <113> := Parameter activation P_AC_NA_1

5.5.6. File transfer

- <120> := File ready F_FR_NA_1
- <121> := Section ready F_SR_NA_1
- <122> := Call directory, select file, call file, call section F_SC_NA_1
- <123> := Last section, last segment F_LS_NA_1

² Private ASDU

- <124> := Ack file, ack section F_AF_NA_1
- <125> := Segment F_SG_NA_1
- <126> := Directory F_DR_TA_1

5.5.7. Type identification and cause of transmission assignments

Shaded boxes are not required.

Blank = function or ASDU is not used.

Mark type identification/cause of transmission combinations: ■ - supported

Type identification		Cause of transmission (COT)																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	20 to 36	37 to 41	44	45	46	47
<1>	M_SP_NA_1				■										■					
<2>	M_SP_TA_1		■																	
<3>	M_DP_NA_1				■										■					
<4>	M_DP_TA_1		■								■ 3	■								
<5>	M_ST_NA_1																			
<6>	M_ST_TA_1																			
<7>	M_BO_NA_1																			
<8>	M_BO_TA_1																			
<9>	M_ME_NA_1				■										■					
<10>	M_ME_TA_1		■																	
<11>	M_ME_NB_1				■										■					
<12>	M_ME_TB_1		■																	
<13>	M_ME_NC_1																			
<14>	M_ME_TC_1																			
<15>	M_IT_NA_1 ⁴				■															
<16>	M_IT_TA_1		■																	

³ In accordance with the standard, the indications caused by remote and local commands should be reported using COT <11> and <12> instead of <3>.

⁴ Extension to the standard: COT <5>.

Type identification		Cause of transmission (COT)																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	20 to 36	37 to 41	44	45	46	47
<17>	M_EP_TA_1																			
<18>	M_EP_TB_1																			
<19>	M_EP_TC_1																			
<20>	M_PS_NA_1																			
<21>	M_ME_ND_1																			
<30>	M_SP_TB_1			■																
<31>	M_DP_TB_1			■																
<32>	M_ST_TB_1																			
<33>	M_BO_TB_1																			
<34>	M_ME_TD_1			■																
<35>	M_ME_TE_1			■																
<36>	M_ME_TF_1																			
<37>	M_IT_TB_1			■																
<38>	M_EP_TD_1																			
<39>	M_EP_TE_1																			
<40>	M_EP_TF_1																			
<45>	C_SC_NA_1						■	■	■	■	■							■		■
<46>	C_DC_NA_1						■	■	■	■	■							■		■
<47>	C_RC_NA_1																			
<48>	C_SE_NA_1																			
<49>	C_SE_NB_1																			
<50>	C_SE_NC_1																			
<51>	C_BO_NA_1																			
<70>	M_EI_NA_1			■																
<100>	C_IC_NA_1						■	■			■									
<101>	C_CI_NA_1						■	■												

Type identification		Cause of transmission (COT)																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	20 to 36	37 to 41	44	45	46	47
<102>	C_RD_NA_1					■												■		■
<103>	C_CS_NA_1						■	■												
<104>	C_TS_NA_1																			
<105>	C_RP_NA_1						■	■												
<106>	C_CD_NA_1						■	■												
<110>	P_ME_NA_1																			
<111>	P_ME_NB_1																			
<112>	P_ME_NC_1																			
<113>	P_AC_NA_1																			
<120>	F_FR_NA_1																			
<121>	F_SR_NA_1																			
<122>	F_SC_NA_1																			
<123>	F_LS_NA_1																			
<124>	F_AF_NA_1																			
<125>	F_SG_NA_1																			
<126>	F_DR_TA_1																			
<133>	C_SB_NA_1						■	■												

General mapping rules for VAMP 200 series and WIMO 6CP10 devices :

- binary data changes are reported using ASDU types M_SP_Tx_1 with COT spontaneous,
- binary data status with ASDU type M_SP_NA_1 can be accessed using general interrogation (C_IC) or read command (C_RD),
- object state changes are reported using ASDU types M_DP_Tx_1 with COT spontaneous,
- object state value can be accessed using general interrogation (C_IC) or read command (C_RD),
- analog measurement value changes (based on deadband supervision) are reported using ASDU types M_ME_Tx_1 with COT spontaneous,
- analog measurement values with ASDU type M_ME_Nx_1 can be accessed using general interrogation (C_IC) or read command (C_RD),
- analog data values for fault events are reported using ASDU types M_ME_Tx_1 with COT spontaneous,
- latest analog data values for fault events with ASDU type M_ME_Tx_1 (with time tag) can be also accessed using read command (C_RD),
- energy values are reported using ASDU type M_IT_Tx_1 with COT spontaneous upon counter interrogation command (C_CI),

- energy values with ASDU type M_IT_NA_1 can be also accessed using read command (C_RD),
- control commands on binary points including control objects can be performed using both single command (C_SC) and double command (C_DC),
- time tag format (short time tag or full time tag) can be selected for all data using a general parameter of the IEC101 protocol interface,
- analog data format (normalized or scaled) can be selected for all data using a general parameter of the IEC101 protocol interface,
- transparent SPA communication over IEC 60870-5-101 is performed using ASDU type C_SB_NA_1,
- control procedures (C_SC, C_DC, C_IC, C_CI) are completed with sending ASDU with COT activation termination,
- reset process command (C_RP) will initialize only the protocol interface, without resetting the device; optional activation confirmation response with positive result will not be generated; only in case of discarded erroneous reset process command an activation confirmation response with negative result will be sent.

NOTE! To requests C_RD (cause of trans. <5>) or C_Sx_ (cause of trans. <6>) including incorrect parameters the device responds with cause of trans. <44>, <45>, <46> or <47> (COTs diagnosing the reason of negative response).

6. Basic application functions

6.1 Station initialisation (station specific parameter)

- remote initialisation

6.2 Cyclic data transmission (station specific parameter)

- Cyclic data transmission

6.3 Read procedure (station specific parameter)

- Read procedure

6.4 Spontaneous transmission (station specific parameter)

- Spontaneous transmission

6.5 Double transmission of information objects with cause of transmission spontaneous (system specific parameter)

Mark each information type where both a type ID without time and corresponding type ID with time are issued in response to a single spontaneous change of a monitored object.

The following type identifications may be transmitted in succession caused by a single status change of an information object. The particular information object addresses for which double transmission is enabled are defined in a project-specific list.

- Single-point information M_SP_NA_1, M_SP_TA_1, M_SP_TB_1 and M_PS_NA_1
- Double-point information M_DP_NA_1, M_DP_TA_1 and M_DP_TB_1
- Step position information M_ST_NA_1, M_ST_TA_1 and M_ST_TB_1

- Bitstring of 32 bit M_BO_NA_1, M_BO_TA_1 and M_BO_TB_1
- Measured value, normalized value M_ME_NA_1, M_ME_TA_1, M_ME_ND_1 and M_ME_TD_1
- Measured value, scaled value M_ME_NB_1, M_ME_TB_1 and M_ME_TE_1
- Measured value, short floating point number M_ME_NC_1, M_ME_TC_1 and M_ME_TF_1

6.6 Station interrogation (system or station specific parameter)

■ Global

- | | | |
|----------------------------------|-----------------------------------|-----------------------------------|
| <input type="checkbox"/> Group 1 | <input type="checkbox"/> Group 7 | <input type="checkbox"/> Group 13 |
| <input type="checkbox"/> Group 2 | <input type="checkbox"/> Group 8 | <input type="checkbox"/> Group 14 |
| <input type="checkbox"/> Group 3 | <input type="checkbox"/> Group 9 | <input type="checkbox"/> Group 15 |
| <input type="checkbox"/> Group 4 | <input type="checkbox"/> Group 10 | <input type="checkbox"/> Group 16 |
| <input type="checkbox"/> Group 5 | <input type="checkbox"/> Group 11 | |
| <input type="checkbox"/> Group 6 | <input type="checkbox"/> Group 12 | |

NOTE! Information object addresses assigned to global interrogation group are marked in the application mapping document.

6.7 Clock synchronisation (station specific parameter)

■ Clock synchronisation

- Day of week used
- RES1, GEN (time tag substituted/ not substituted) used
- SU-bit (summertime) used

6.8 Command transmission (object specific parameter)

- | | |
|---|--|
| <input checked="" type="checkbox"/> Direct command transmission | <input checked="" type="checkbox"/> Select and execute command |
| <input type="checkbox"/> Direct set point command transmission | <input type="checkbox"/> Select and execute set point command |
| <input checked="" type="checkbox"/> No additional definition | <input type="checkbox"/> C_SE ACTTERM used |
| <input type="checkbox"/> Short pulse duration (duration determined by a system parameter in the outstation) | |
| <input type="checkbox"/> Long pulse duration (duration determined by a system parameter in the outstation) | |
| <input type="checkbox"/> Persistent output | |

6.9 Transmission of integrated totals (station or object specific parameter)

- Mode D: freeze by counter-interrogation command, frozen values reported spontaneously
- Mode A: local freeze with spontaneous transmission
- Mode B: local freeze with counter interrogation
- Mode C: freeze and transmit by counter interrogation commands
- Counter request
 - General request counter
 - Request counter group 1
 - Request counter group 2
 - Request counter group 3
 - Request counter group 4
- Counter freeze without reset
- Counter freeze with reset
- Counter reset

NOTE! Addresses per group have to be defined.

6.10 Parameter loading (object specific parameter)

- Threshold value
- Smoothing factor
- Low limit for transmission of measured value
- High limit for transmission of measured value

6.11 Parameter activation (object specific parameter)

- Act/deact of persistent cyclic or periodic transmission of the addressed object

6.12 Test procedure (station specific parameter)

- Test procedure

6.13 File transfer (station specific parameter)

- File transfer in monitor direction
- File transfer in control direction

6.14 File transfer (file transfer in monitor direction)

- Transparent file
- Transmission of disturbance data of protection equipment
- Transmission of sequences of events

A>1RF:<CR>

F>1R1S1:<CR>

NOTE! The checksum is omitted.

SPA response is returned by the controlled station in full format, with transaction ID of the SPA request message placed before the start character <. Checksum as well as <CR> and <LF> characters must be placed at the end of the message.

EXAMPLES of SPA responses:

A<LF><1D:WIMO6CP10:XX<CR><LF>

F<LF><1D:0.8:XX<CR><LF>

COMMENT: If Transaction ID is not included in SPA request message, the request is still processed and there will be no Transaction ID in the SPA response.

The transfer procedure is the same as for commands. Transparent SPA request is sent in C_SB_NA_1 ASDU with COT <6> - activation. Transparent SPA response is returned in C_SB_NA_1 ASDU with COT <7> - activation confirmation.

IEC 101 datalist

A.

1. Single Point Information table in VAMPSET

Column name	Type	Description
Index	Numeric (read only)	Information object address. Starting from 0002h.
GI	On/Off	Determines whether the object is included in response to General Interrogation request message. Default value is OFF.
EVENT	On/Off	Determines whether change events for the object are put into Class 1 buffer. Default value is OFF.
Item	Dropdown	Associated database item.

For this type of information object the possible cause of transmission can be: spontaneous (change event with time tag), request/requested and interrogated (static value without time tag in response to read command or interrogation command). The time tag format is determined by the interface configuration (general time tag format selection parameter).

Note! Information object address 0001h is reserved for an SPI object: Class 1 buffer overflow indication (BOV1).

Single Point Information table in VAMPSET

Default information object addresses		Item
Decimal	Hexadecimal	
2	0002h	Digital input 1
3	0003h	Digital input 2
4	0004h	Digital input 3
5	0005h	Digital input 4
6	0006h	Digital input 5
7	0007h	Digital input 6
8	0008h	Enable autoreclosing
9	0009h	Reclose locked
10	000Ah	ARReq1
11	000Bh	ARReq2
12	000Ch	ARReq3
13	000Dh	ARReq4
14	000Eh	ARReq5
15	000Fh	ARShot1
16	0010h	ARShot2
17	0011h	ARShot3
18	0012h	ARShot4

19	0013h	ARShot5
20	0014h	Critical ARReq
21	0015h	I> start
22	0016h	I>> start
23	0017h	I>>> start
24	0018h	I> trip
25	0019h	I>> trip
26	001Ah	I>>> trip
27	001Bh	I2> start
28	001Ch	I2> trip
29	001Dh	T> start
30	001Eh	T> trip
31	001Fh	CBFP start
32	0020h	CBFP trip
33	0021h	Io> start
34	0022h	Io>> start
35	0023h	Io> trip
36	0024h	Io>> trip
37	0025h	Io>>> start
38	0026h	Io>>>> start
39	0027h	Io>>> trip
40	0028h	Io>>>> trip
41	0029h	Uo> start
42	002Ah	Uo>> start
43	002Bh	Uo> trip
44	002Ch	Uo>> trip
45	002Dh	IoDir> start
46	002Eh	IoDir>> start
47	002Fh	IoDir> trip
48	0030h	IoDir>> trip
49	0031h	-
50	0032h	-
51	0033h	-
52	0034h	-
53	0035h	-
54	0036h	-
55	0037h	-
56	0038h	-
57	0039h	-
58	003Ah	-
59	003Bh	-
60	003Ch	-
61	003Dh	-
62	003Eh	-
63	003Fh	-
64	0040h	-
65	0041h	-
-	-	IDir> start
-	-	IDir>> start
-	-	IDir>>> start
-	-	IDir>>>> start
-	-	IDir> trip
-	-	IDir>> trip

-	-	IDir>>> trip
-	-	IDir>>>> trip
-	-	U> start
-	-	U>> start
-	-	U>>> start
-	-	U> trip
-	-	U>> trip
-	-	U>>> trip
-	-	U< start
-	-	U<< start
-	-	U<<< start
-	-	U< trip
-	-	U<< trip
-	-	U<<< trip
-	-	fX start
-	-	fXX start
-	-	fX trip
-	-	fXX trip
-	-	F< start
-	-	F<< start
-	-	F< trip
-	-	F<< trip
-	-	Line 1 fault
-	-	Line 2 fault
-	-	Line 3 fault
-	-	P< start
-	-	P<< start
-	-	P< trip
-	-	P<< trip
-	-	df/dt start
-	-	df/dt trip
-	-	U1< start
-	-	U1<< start
-	-	U1< trip
-	-	U1<< trip
-	-	Z< start
-	-	Z<< start
-	-	Z< trip
-	-	Z<< trip
-	-	X< start
-	-	X<< start
-	-	X< trip
-	-	X<<trip
-	-	Uof3< start
-	-	Uof3< trip
-	-	Uf< start
-	-	Uf< trip
-	-	Q< start
-	-	Q< trip
-	-	dI> trip
-	-	dI>> trip
-	-	I'> start
-	-	I'>> start

-	-	I> trip
-	-	I>> trip
-	-	I'2> start
-	-	I'2> trip
-	-	Digital Input 7
-	-	Digital Input 8
-	-	Digital Input 9
-	-	Digital Input 10
-	-	Digital Input 11
-	-	Digital Input 12
-	-	Digital Input 13
-	-	Digital Input 14
-	-	Digital Input 15
-	-	Digital Input 16
-	-	Digital Input 17
-	-	Digital Input 18
-	-	Digital Input 19
-	-	Digital Input 20
-	-	Digital Input 21
-	-	Digital Input 22
-	-	Digital Input 23
-	-	Digital Input 24
-	-	Digital Input 25
-	-	Digital Input 26
-	-	Digital Input 27
-	-	Digital Input 28
-	-	Digital Input 29
-	-	Digital Input 30
-	-	Digital Input 31
-	-	Digital Input 32
-	-	Z1< Start
-	-	Z1< Trip
-	-	Z2< Start
-	-	Z2< Trip
-	-	Z3< Start
-	-	Z3< Trip
-	-	Z4< Start
-	-	Z4< Trip
-	-	Z5< Start
-	-	Z5< Trip

2. Double Point Information table in VAMPSET

Column name	Type	Description
Index	Numeric (read only)	Information object address. Starting from 1001h.
GI	On/Off	Determines whether the object is included in response to General Interrogation message. Default value is OFF.
EVENT	On/Off	Determines whether change events for the object are put to Class 1 buffer. Default value is OFF.
Item	Dropdown	Associated database item.

For this type of information object the possible cause of transmission can be: spontaneous (change event with time tag), request/requested and interrogated (static value without time tag in response to read command or interrogation command). The time tag format is determined by the interface configuration (general time tag format selection parameter).

Points mapped to DPI

Default information object addresses		Item
Decimal	Hexadecimal	
4097	1001h	Obj1 state
4098	1002h	Obj2 state
4099	1003h	Obj3 state
4100	1004h	Obj4 state
4101	1005h	Obj5 state
4102	1006h	Obj6 state
4103	1007h	Obj7 state
4104	1008h	Obj8 state
4105	1009h	-
4106	100Ah	-
4107	100Bh	-
4108	100Ch	-
4109	100Dh	-
4110	100Eh	-
4111	100Fh	-
4112	1010h	-
4113	1011h	-
4114	1012h	-
4115	1013h	-
4116	1014h	-
4117	1015h	-
4118	1016h	-
4119	1017h	-
4120	1018h	-
4121	1019h	-
4122	101Ah	-
4123	101Bh	-
4124	101Ch	-
4125	101Dh	-
4126	101Eh	-
4127	101Fh	-
4128	1020h	-

3. Analog Input table in VAMPSET

Column name	Type	Description
index	Numeric (read only)	Information object address. Starting from 4001h.
GI	On/Off	Determines whether the object is included in response to General Interrogation message. Default value is OFF.
EVENT	On/Off	Determines whether change events for the object are put to Class 1 buffer. Default value is OFF.
Deadband	Numeric	Deadband value for change supervision and change event generation (valid only if EVENT checkbox is set ON). By default = 1.
Max	Numeric	Maximum data value for defining the value range as – Max .. +Max. This range is transformed to the range –1 .. +1 to produce the normalized value for ASDU. By default = 1000.
Item	Dropdown	Associated database item.

The ASDU type for this table is either measured value, normalized or measured value, scaled depending on the interface configuration (general measurement format selection parameter).

Normalized value is calculated using Max parameter which determines the range for the data (-Max ... +Max). Scaled value is produced directly by the relay application software by setting the scaling parameter. Measurement values have no time tags when read upon request (static value in response to read command or interrogation command, cause of transmission request/requested and interrogated). Change events (based on dead-band supervision) are sent with time tags with cause of transmission spontaneous in Class 1.

The time tag format is determined by the interface configuration (general time tag format selection parameter).

Points mapped to M_ME_Nx

Default information object addresses		Item
Decimal	Hexadecimal	
16385	4001h	Phase current IL1
16386	4002h	Phase current IL2
16387	4003h	Phase current IL3
16388	4004h	Phase voltage UL1
16389	4005h	Phase voltage UL2
16390	4006h	Phase voltage UL3
16391	4007h	Line voltage U12
16392	4008h	Line voltage U23
16393	4009h	Line voltage U31
16394	400Ah	Io residual current
16395	400Bh	Io2 residual current
16396	400Ch	Calculated Io

16397	400Dh	Residual voltage
16398	400Eh	Active power
16399	400Fh	Reactive power
16400	4010h	Apparent power
16401	4011h	Power factor
16402	4012h	Cosine phi
16403	4013h	Frequency
16404	4014h	-
16405	4015h	-
16406	4016h	-
16407	4017h	-
16408	4018h	-
16409	4019h	-
16410	401Ah	-
16411	401Bh	-
16412	401Ch	-
16413	401Dh	-
16414	401Eh	-
16415	401Fh	-
16416	4020h	-
-	-	IL1 RMS
-	-	IL2 RMS
-	-	IL3 RMS
-	-	P RMS
-	-	Q RMS
-	-	S RMS
-	-	IL1 demand
-	-	IL2 demand
-	-	IL3 demand
-	-	P demand
-	-	Q demand
-	-	S demand
-	-	PF demand
-	-	CosPhi demand
-	-	f demand
-	-	P RMS demand
-	-	Q RMS demand
-	-	S RMS demand
-	-	IL THD
-	-	IL1 THD
-	-	IL2 THD
-	-	IL3 THD
-	-	U THD
-	-	Ua THD
-	-	Ub THD
-	-	Uc THD
-	-	I'L1
-	-	I'L2
-	-	I'L3
-	-	I'o calc
-	-	dIL1
-	-	dIL2
-	-	dIL3

-	-	FL1 RMS
-	-	FL2 RMS
-	-	FL3 RMS
-	-	FL1 demand
-	-	FL2 demand
-	-	FL3 demand
-	-	FIL THD
-	-	FIL1 THD
-	-	FIL2 THD
-	-	FIL3 THD
-	-	External AI 1
-	-	External AI 2
-	-	External AI 3
-	-	External AI 4
-	-	External AI 5
-	-	External AI 6
-	-	External AI 7
-	-	External AI 8
-	-	External AI 9
-	-	External AI 10
-	-	External AI 11
-	-	External AI 12
-	-	External AI 13
-	-	External AI 14
-	-	External AI 15
-	-	External AI 16
-	-	Z12 Primary
-	-	Z23 Primary
-	-	Z31 Primary
-	-	Z12 Secondary
-	-	Z23 Secondary
-	-	Z31 Secondary
-	-	Z12 Angle
-	-	Z23 Angle
-	-	Z31 Angle

4. Analog events table in VAMPSET

Column name	Type	Description
Index	Numeric (read only)	Information object address. Starting from 4801h.
EVENT	On/Off	Determines whether change events for the object are put to Class 1 buffer. Default value is OFF.
Item	Dropdown	Associated database item.

The ASDU type for this table is either measured value, normalized or measured value, scaled depending of the interface configuration (general selector parameter). These analog values are fault event related and are sent with time tags. The time tag format is determined by the interface configuration (general time tag format selection parameter).

For this type of information object the possible cause of transmission can be: spontaneous (analog event with time tag).

The latest value (with time tag) can be also accessed using read command, cause of transmission request/requested.

Points mapped to M_ME_Tx

Default information object addresses		Item
Decimal	Hexadecimal	
18433	4801h	Fault current of I>
18434	4802h	Fault current of I>>
18435	4803h	Fault current of I>>>
18436	4804h	Fault reactance
18437	4805h	Last fault current
18438	4806h	Fault value of PS1
18439	4807h	Fault value of PS2
18440	4808h	Fault value of PS3
18441	4809h	Fault value of PS4
18442	480Ah	Fault value of PS5
18443	480Bh	Fault value of PS6
18444	480Ch	Fault value of PS7
18445	480Dh	Fault value of PS8
18446	480Eh	-
18447	480Fh	-
18448	4810h	-

5. Energy values table in VAMPSET

Column name	Type	Description
Index	Numeric (read only)	Information object address. Starting from 5001h.
CI	On/Off	Determines whether the object is included in response to Counter Interrogation message. Default value is ON.
Item	Dropdown	Associated database item.

The ASDU type for this table is integrated totals. These are energy values and pulse counter values (DI counters).

These data form a single (general) group and can be requested by counter interrogation command. Upon this command all values are memorized (frozen) and reported with time tags and cause of transmission spontaneous (Mode D).

The time tag format is determined by the interface configuration (general time tag format selection parameter).

These data can be also accessed using read command, without time tags, with cause of transmission request/requested.

COMMENT: Energy values as scaled values (exact copy from DB item, scaling is done in VAMPSET, this determines the unit: 1kW, 10kW, 100kW, 1MW).

Points mapped to M_IT

Default information object addresses		Item
Decimal	Hexadecimal	
20481	5001h	Exported energy
20482	5002h	Exported reactive energy
20483	5003h	Imported energy
20484	5004h	Imported reactive energy
20485	5005h	DI1 counter
20486	5006h	DI2 counter
20487	5007h	-
20488	5008h	-

6. Double Command (SBO) table in VAMPSET

Column name	Type	Description
Index	Numeric (read only)	Information object address. Starting from 8801h for two-step control.
Item	Dropdown	Associated database item.

Two-step control operations can be applied only to the following application data: Obj1...Obj6.

Points mapped to SBO

Default information object addresses		Item
Decimal	Hexadecimal	
34817	8801h	Obj1 state (Open/Close)
34818	8802h	Obj2 state (Open/Close)
34819	8803h	Obj3 state (Open/Close)
34820	8804h	Obj4 state (Open/Close)
34821	8805h	Obj5 state (Open/Close)
34822	8806h	Obj6 state (Open/Close)
34823	8807h	-
34824	8808h	-

7. Single Command table in VAMPSET

Column name	Type	Description
Index	Numeric (read only)	Information object address. Starting from 8001h for one-step control.
Item	Dropdown	Associated database item.

Different information object addresses will be used for one-step and two-step control on the same application items such as Obj1..Obj6.

Points mapped to DO table

Default information object addresses		Item
Decimal	Hexadecimal	
32769	8001h	Reset Latches
34817	8002h	AR enable
34818	8003h	Alarm relay 1
34819	8004h	Alarm relay 2
34820	8005h	Alarm relay 3
34821	8006h	Alarm relay 4
34822	8007h	Alarm relay 5
34823	8008h	Setting group 1
34824	8009h	Setting group 2
34825	800Ah	Remote/Local
34826	800Bh	Virtual input 1
34827	800Ch	Virtual input 2
34828	800Dh	Virtual input 3
34829	800Eh	Virtual input 4
34830	800Fh	-
34831	8010h	-
-	-	Obj1 state (Open/Close)
-	-	Obj2 state (Open/Close)
-	-	Obj3 state (Open/Close)
-	-	Obj4 state (Open/Close)
-	-	Obj5 state (Open/Close)
-	-	Obj6 state (Open/Close)

B. Protocol configuration

Available parameters for IEC 101 protocol

Parameter	Default value	Description
Bitrate	9600	Bitrate used for serial communication.
Parity	Even	Parity used for serial communication.
Slave address	1	Link layer address.
Slave address size	2	Link layer address size.
ADSU address	1	Application layer address.
ASDU address size	2	Application layer address size.
Cause of transmission size	1	Read only.
Information object address size	2	2 or 3 octets. 3-octet addresses are created from 2-octet addresses by adding MSB with value 0.
Time tag format	Short	Short or Full. The parameter determines time tag format: 3-octet time tag or 7-octet time tag.
Measurements format	Scaled	Scaled or Normalized. The parameter determines measurement data format: normalized value or scaled value.

VAMP Ltd
P.O.Box 810
FI-65101 VAASA
Finland

Visiting Address:
Vaasa Airport Park
Yrittäjänkatu 15
Vaasa, Finland

Tel: +358 20 753 3200
Fax: +358 20 753 3205
Email: vamp@vamp.fi
<http://www.vamp.fi>



ISO 9001:2000
certified company



We reserve the rights to product alterations without prior notice.
Copyright © Vamp Ltd. All trademarks are the property of their respective holders.