

## AQ2xx IEC 60870-5-103 Interoperability List

### 1. Physical layer

#### 1.1 Electrical interface

- |                                     |  |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | EIA RS-485                             |
| <input type="checkbox"/>            | Number of loads, 32, for one equipment |

#### 1.2 Optical interface

- |                          |                         |
|--------------------------|-------------------------|
| <input type="checkbox"/> | Glass fibre             |
| <input type="checkbox"/> | Plastic fibre           |
| <input type="checkbox"/> | F-SMA type connector    |
| <input type="checkbox"/> | BFOC/2,5 type connector |

#### 1.3 Transmission speed

- |                                     |             |
|-------------------------------------|-------------|
| <input checked="" type="checkbox"/> | 9600 bit/s  |
| <input checked="" type="checkbox"/> | 19200 bit/s |

### 2. Link layer

There are no choices for link layer.

### 3. Application layer

#### 3.1 Transmission mode for application data

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

#### 3.2 Common address of ASDU

- |                                     |   |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | One Common address of ASDU (identical with station address) |
| <input type="checkbox"/>            | More than one Common address of ASDU                        |

#### 3.3 Selection of standard information numbers in monitor direction

##### 3.3.1 System functions in monitor direction

	INF	Semantics
<input checked="" type="checkbox"/>	<0>	End of general interrogation
<input checked="" type="checkbox"/>	<0>	Time synchronization
<input checked="" type="checkbox"/>	<2>	Reset FCB
<input checked="" type="checkbox"/>	<3>	Reset CU
<input checked="" type="checkbox"/>	<4>	Start/restart
<input checked="" type="checkbox"/>	<5>	Power on

### 3.3.2 Status indications in monitor direction

	INF	Semantics
<input checked="" type="checkbox"/>	<16>	Auto-recloser active
<input type="checkbox"/>	<17>	Teleprotection active
<input type="checkbox"/>	<18>	Protection active
<input checked="" type="checkbox"/>	<19>	LED reset
<input type="checkbox"/>	<20>	Monitor direction blocked
<input type="checkbox"/>	<21>	Test mode
<input type="checkbox"/>	<22>	Local parameter setting
<input checked="" type="checkbox"/>	<23>	Characteristic 1
<input checked="" type="checkbox"/>	<24>	Characteristic 2
<input checked="" type="checkbox"/>	<25>	Characteristic 3
<input checked="" type="checkbox"/>	<26>	Characteristic 4
<input type="checkbox"/>	<27>	Auxiliary input 1
<input type="checkbox"/>	<28>	Auxiliary input 2
<input type="checkbox"/>	<29>	Auxiliary input 3
<input type="checkbox"/>	<30>	Auxiliary input 4

### 3.3.3 Supervision indications in monitor direction

	INF	Semantics
<input checked="" type="checkbox"/>	<32>	Measurand supervision I
<input type="checkbox"/>	<33>	Measurand supervision V
<input type="checkbox"/>	<35>	Phase sequence supervision
<input type="checkbox"/>	<36>	Trip circuit supervision
<input type="checkbox"/>	<37>	I>> back-up operation
<input type="checkbox"/>	<38>	VT fuse failure
<input type="checkbox"/>	<39>	Teleprotection disturbed
<input type="checkbox"/>	<46>	Group warning
<input type="checkbox"/>	<47>	Group alarm

### 3.3.4 Earth fault indications in monitor direction

	INF	Semantics
<input type="checkbox"/>	<48>	Earth fault L1
<input type="checkbox"/>	<49>	Earth fault L2
<input type="checkbox"/>	<50>	Earth fault L3
<input type="checkbox"/>	<51>	Earth fault forward, i.e. line
<input type="checkbox"/>	<52>	Earth fault reverse, i.e. busbar

### 3.3.5 Fault indications in monitor direction

	INF	Semantics
<input type="checkbox"/>	<64>	Start /pick-up L1
<input type="checkbox"/>	<65>	Start /pick-up L2
<input type="checkbox"/>	<66>	Start /pick-up L3
<input checked="" type="checkbox"/>	<67>	Start /pick-up N
<input type="checkbox"/>	<68>	General trip
<input type="checkbox"/>	<69>	Trip L1
<input type="checkbox"/>	<70>	Trip L2
<input type="checkbox"/>	<71>	Trip L3
<input type="checkbox"/>	<72>	Trip I>> (back-up operation)
<input type="checkbox"/>	<73>	Fault location X in ohms
<input type="checkbox"/>	<74>	Fault forward/line
<input type="checkbox"/>	<75>	Fault reverse/busbar
<input type="checkbox"/>	<76>	Teleprotection signal transmitted
<input type="checkbox"/>	<77>	Teleprotection signal received
<input type="checkbox"/>	<78>	Zone 1
<input type="checkbox"/>	<79>	Zone 2
<input type="checkbox"/>	<80>	Zone 3
<input type="checkbox"/>	<81>	Zone 4
<input type="checkbox"/>	<82>	Zone 5
<input type="checkbox"/>	<83>	Zone 6
<input checked="" type="checkbox"/>	<84>	General start /pick-up
<input checked="" type="checkbox"/>	<85>	Breaker failure
<input type="checkbox"/>	<86>	Trip measuring system L1
<input type="checkbox"/>	<87>	Trip measuring system L2
<input type="checkbox"/>	<88>	Trip measuring system L3
<input type="checkbox"/>	<89>	Trip measuring system E
<input checked="" type="checkbox"/>	<90>	Trip I>
<input checked="" type="checkbox"/>	<91>	Trip I>>
<input checked="" type="checkbox"/>	<92>	Trip IN>
<input checked="" type="checkbox"/>	<93>	Trip IN>>

### 3.3.6 Auto-reclosure indications in monitor direction

	INF	Semantics
<input type="checkbox"/>	<48>	CB 'on' by AR
<input type="checkbox"/>	<49>	CB 'on' by long-time AR
<input type="checkbox"/>	<50>	AR blocked

### 3.3.7 Measurands in monitor direction

	INF	Semantics
<input type="checkbox"/>	<144	Measurand I
<input type="checkbox"/>	>	
<input type="checkbox"/>	<145	Measurands I, V

	>
	<146 Measurands I, V, P, Q
	>
	<147 Measurands IN, VEN
	>
X	<148 Measurands IL1,2,3, VL1,2,3, P, Q, f
	>

### 3.3.8 Generic functions in monitor direction

	INF	Semantics
	<240	Read headings of all defined groups
	>	
	<241	Read values or attributes of all entries of one group
	>	
	<243	Read directory of a single entry
	>	
	<244	Read value of attribute of a single entry
	>	
	<245	End of general interrogation of generic data
	>	
	<249	Write entry with confirmation
	>	
	<250	Write entry with execution
	>	
	<251	Write entry aborted
	>	

## 3.4 Selection of standard information numbers in control direction

### 3.4.1 System functions in control direction

	INF	Semantics
X	<0>	Initiation of general interrogation
X	<0>	Time synchronization

### 3.4.2 General commands in control direction

	INF	Semantics
X	<16>	Auto-recloser on/off
	<17>	Teleprotection on/off
	<18>	Protection on/off
X	<19>	LED reset
	<23>	Active characteristic 1
	<24>	Active characteristic 2
	<25>	Active characteristic 3
	<26>	Active characteristic 4

### 3.4.3 Generic functions in control direction

INF	Semantics
<input type="checkbox"/>	<240 Read headings of all defined groups >
<input type="checkbox"/>	<241 Read values or attributes of all entries of one group >
<input type="checkbox"/>	<243 Read directory of a single entry >
<input type="checkbox"/>	<244 Read value of attribute of a single entry >
<input type="checkbox"/>	<245 General interrogation of generic data >
<input type="checkbox"/>	<248 Write entry >
<input type="checkbox"/>	<249 Write entry with confirmation >
<input type="checkbox"/>	<250 Write entry with execution >
<input type="checkbox"/>	<251 Write entry abort >

### 3.5 Basic application functions

<input type="checkbox"/>	Test mode
<input type="checkbox"/>	Blocking of monitor direction
<input checked="" type="checkbox"/>	Disturbance data
<input type="checkbox"/>	Generic service
<input checked="" type="checkbox"/>	Private data

### 3.6 Miscellaneous

Measurands are transmitted with ASDU 3 as well as with ASDU 9. As defined in 7.2.6.8, the maximum MVAL can either be 1,2 or 2,4 times the rated value. No different rating shall be used in ASDU 3 and ASDU 9, i.e. for each Measurand there is only one choice.

Measurand	Max. MVAL=rated value times		
	1,2	or	2,4
Current L1	<input type="checkbox"/>		<input checked="" type="checkbox"/>
Current L2	<input type="checkbox"/>		<input checked="" type="checkbox"/>
Current L3	<input type="checkbox"/>		<input checked="" type="checkbox"/>
Voltage L1-E	<input type="checkbox"/>		<input checked="" type="checkbox"/>
Voltage L2-E	<input type="checkbox"/>		<input checked="" type="checkbox"/>
Voltage L3-E	<input type="checkbox"/>		<input checked="" type="checkbox"/>
Active power P	<input type="checkbox"/>		<input checked="" type="checkbox"/>
Reactive power Q	<input type="checkbox"/>		<input checked="" type="checkbox"/>
Frequency f	<input type="checkbox"/>		<input checked="" type="checkbox"/>
Voltage L1-L2	<input type="checkbox"/>		<input checked="" type="checkbox"/>

