

## IEC60870-5-103 Interoperability Document

### 1 Physical layer

#### 1.1 Electrical interface

☒ EIA RS-485

☐ Number of loads ..... for one protection equipment

NOTE – EIA RS-485 standard defines unit loads so that 32 of them can be operated on one line. For detailed information refer to clause 3 of EIA RS-485 standard.

#### 1.2 Optical interface

☐ Glass fibre

☐ Plastic fibre

☐ F-SMA type connector

☐ BFOC/2,5 type connector

#### 1.3 Transmission speed

☒ 9 600 bit/s

☒ 19 200 bit/s

☒ 38 400 bit/s

☒ 57 600 bit/s

☒ 115 200 bit/s

### 2 Link layer

There are no choices for the 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

- ☒ One COMMON ADDRESS OF ASDU (identical with station address)
- ☐ 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

- ☒ <0> End of general interrogation
- ☒ <0> Time synchronization
- ☒ <2> Reset FCB
- ☒ <3> Reset CU
- ☒ <4> Start/restart
- ☒ <5> Power on

#### 3.3.2 Status indications in monitor direction

##### INF Semantics

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

### 3.3.3 Supervision indications in monitor direction

#### INF Semantics

- ☒ <32> Measurand supervision I
- ☒ <33> Measurand supervision V
- ☒ <35> Phase sequence supervision
- ☒ <36> Trip circuit supervision
- ☒ <37> I>> back-up operation
- ☒ <38> VT fuse failure
- ☒ <39> Teleprotection disturbed
- ☒ <46> Group warning
- ☒ <47> Group alarm

### 3.3.4 Earth fault indications in monitor direction

#### INF Semantics

- ☒ <48> Earth fault L<sub>1</sub>
- ☒ <49> Earth fault L<sub>2</sub>
- ☒ <50> Earth fault L<sub>3</sub>
- ☒ <51> Earth fault forward, i.e. line
- ☒ <52> Earth fault reverse, i.e. busbar

### 3.3.5 Fault indications in monitor direction

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

- ☒ <128> CB 'on' by AR
- ☒ <129> CB 'on' by long-time AR
- ☒ <130> AR blocked

### 3.3.7 Measurands in monitor direction

#### INF Semantics

- ☒ <144> Measurand I
- ☒ <145> Measurands I, V
- ☒ <146> Measurands I, V, P, Q
- ☒ <147> Measurands  $I_N$ ,  $V_{EN}$
- ☒ <148> Measurands  $I_{L1,2,3}$ ,  $V_{L1,2,3}$ , 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 or 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

- ☒ <0> Initiation of general interrogation
- ☒ <0> Time synchronization

### 3.4.2 General commands in control direction

#### INF Semantics

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

### 3.4.3 Generic functions in control 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 or attribute of a single entry
- ☒ <245> General interrogation of generic data
- ☐ <248> Write entry
- ☐ <249> Write entry with confirmation
- ☒ <250> Write entry with execution
- ☐ <251> Write entry abort

### 3.5 Basic application functions

- ☐ Test mode
- ☐ Blocking of monitor direction
- ☐ Disturbance data
- ☒ Generic services
- ☒ 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 L <sub>1</sub>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Current L <sub>2</sub>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Current L <sub>3</sub>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Voltage L <sub>1-E</sub>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Voltage L <sub>2-E</sub>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Voltage L <sub>3-E</sub>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Active power P	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Reactive power Q	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Frequency f	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Voltage L <sub>1</sub> - L <sub>2</sub>	<input checked="" type="checkbox"/>	<input type="checkbox"/>