

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 L₁
- <49> Earth fault L₂
- <50> Earth fault L₃
- <51> Earth fault forward, i.e. line
- <52> Earth fault reverse, i.e. busbar

3.3.5 Fault indications in monitor direction

INF Semantics

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