

*- Techno Trade s.a. -*

---

**IEC 60870-5-101  
Interoperability Document for:**

***- T-BOX OS 53xx -***

---

**September 2000 (Second version)**

Including amendment 1 (04/200)

## 8 Interoperability

This companion standard presents 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 selected parameters should be crossed in the white boxes (simply replace «» with «»).

NOTE 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.

### 8.1 Network configuration

(network-specific parameter)

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Point-to-point          | <input checked="" type="checkbox"/> Multipoint-party line |
| <input checked="" type="checkbox"/> Multiple point-to-point | <input type="checkbox"/> Multipoint-star                  |

### 8.2 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 >1 200 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 >1 200 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

### 8.3 *Link layer*

(network-specific parameter)

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 link

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

#### Frame length

**255** Maximum length L (number of octets)

### 8.4 *Application Layer*

#### **Transmission mode for application data**

Mode 1 (Least significant octet first), as defined in clause 4.10 of IEC 870-5-4, is used exclusively in this companion standard.

#### **Common address of ASDU**

(system-specific parameter)

- One octet                       Two octets

#### **Information object address**

(system-specific parameter)

- One octet                       structured
- Two octets                       unstructured
- Three octets

#### **Cause of transmission**

(system-specific parameter)

- One octet                       Two octets (with originator address)

## Selection of standard ASDUs

### Process information in monitor direction

(station-specific parameter)

<input checked="" type="checkbox"/> <1> := Single-point information	M_SP_NA_1
<input checked="" type="checkbox"/> <2> := Single-point information with time tag	M_SP_TA_1
<input checked="" type="checkbox"/> <3> := Double-point information	M_DP_NA_1
<input checked="" type="checkbox"/> <4> := Double-point information with time tag	M_DP_TA_1
<input type="checkbox"/> <5> := Step position information	M_ST_NA_1
<input type="checkbox"/> <6> := Step position information with time tag	M_ST_TA_1
<input type="checkbox"/> <7> := Bitstring of 32 bit	M_BO_NA_1
<input type="checkbox"/> <8> := Bitstring of 32 bit with time tag	M_BO_TA_1
<input checked="" type="checkbox"/> <9> := Measured value, normalized value	M_ME_NA_1
<input checked="" type="checkbox"/> <10> := Measured value, normalized value with time tag	M_ME_TA_1
<input type="checkbox"/> <11> := Measured value, scaled value	M_ME_NB_1
<input type="checkbox"/> <12> := Measured value, scaled value with time tag	M_ME_TB_1
<input checked="" type="checkbox"/> <13> := Measured value, short floating point value	M_ME_NC_1
<input checked="" type="checkbox"/> <14> := Measured value, short floating point value with time tag	M_ME_TC_1
<input checked="" type="checkbox"/> <15> := Integrated totals	M_IT_NA_1
<input checked="" type="checkbox"/> <16> := Integrated totals with time tag	M_IT_TA_1
<input type="checkbox"/> <17> := Event of protection equipment with time tag	M_EP_TA_1
<input type="checkbox"/> <18> := Packed start events of protection equipment with time tag	M_EP_TB_1
<input type="checkbox"/> <19> := Packed output circuit information of protection equipment with time tag	M_EP_TC_1
<input type="checkbox"/> <20> := Packed single-point information with status change detection	M_PS_NA_1
<input type="checkbox"/> <21> := Measured value, normalized value without quality descriptor	M_ME_ND_1

### Added by amendment 1 (04/2000)

<input checked="" type="checkbox"/> <30> := Single-point information with time tag CP56Time2a	M_SP_TB_1
<input checked="" type="checkbox"/> <31> := Double-point information with time tag CP56Time2a	M_DP_TB_1
<input type="checkbox"/> <32> := Step position information with time tag CP56Time2a	M_ST_TB_1
<input type="checkbox"/> <33> := Bitstring of 32 bits with time tag CP56Time2a	M_BO_TB_1
<input checked="" type="checkbox"/> <34> := Measured value, normalized value with time tag CP56Time2a	M_ME_TD_1
<input type="checkbox"/> <35> := Measured value, scaled value with time tag CP56Time2a	M_ME_TE_1
<input checked="" type="checkbox"/> <36> := Measured value, short floating point number with time tag CP56Time2a	M_ME_TF_1
<input type="checkbox"/> <37> := Integrated totals with time tag CP56Time2a	M_IT_TB_1
<input type="checkbox"/> <38> := Event of protection equipment with time tag CP56Time2a	M_EP_TD_1
<input type="checkbox"/> <39> := Packed start events of protection equipment with time tag CP56Time2a	M_EP_TE_1
<input type="checkbox"/> <40> := Packed output circuit information of protection equipment with time tag CP56Time2a	M_EP_TF_1

### Process information in control direction

(station-specific parameter)

<input checked="" type="checkbox"/> <45> := Single command	C_SC_NA_1
<input checked="" type="checkbox"/> <46> := Double command	C_DC_NA_1
<input type="checkbox"/> <47> := Regulating step command	C_RC_NA_1
<input checked="" type="checkbox"/> <48> := Set point command, normalized value	C_SE_NA_1
<input type="checkbox"/> <49> := Set point command, scaled value	C_SE_NB_1
<input checked="" type="checkbox"/> <50> := Set point command, short floating point value	C_SE_NC_1
<input type="checkbox"/> <51> := Bitstring of 32 bit	C_BO_NA_1

### System information in monitor direction

(station-specific parameter)

<input type="checkbox"/> <70> := End of initialization	M_EI_NA_1
--	-----------

### System information in control direction

(station-specific parameter)

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

### Parameter in control direction

(station-specific parameter)

<input checked="" type="checkbox"/> <110> := Parameter of measured value, normalized value	P_ME_NA_1
<input type="checkbox"/> <111> := Parameter of measured value, scaled value	P_ME_NB_1
<input checked="" type="checkbox"/> <112> := Parameter of measured value, short floating point value	P_ME_NC_1
<input type="checkbox"/> <113> := Parameter activation	P_AC_NA_1

### File transfer

(station-specific parameter)

<input type="checkbox"/> <120> := File ready	F_FR_NA_1
<input type="checkbox"/> <121> := Section ready	F_SR_NA_1
<input type="checkbox"/> <122> := Call directory, select file, call file, call section	F_SC_NA_1
<input type="checkbox"/> <123> := Last section, last segment	F_LS_NA_1
<input type="checkbox"/> <124> := Ack file, ack section	F_AF_NA_1
<input type="checkbox"/> <125> := Segment	F_SG_NA_1
<input type="checkbox"/> <126> := Directory	F_DR_TA_1

## 8.5 Basic application functions

### Station initialization

(station-specific parameter)

Remote initialization

### General Interrogation

(system- or station-specific parameter)

global

group 1

group 2

group 3

group 4

group 5

group 6

group 7

group 8

group 9

group 10

group 11

group 12

group 13

group 14

group 15

group 16

Addresses per group have to be defined

### Clock synchronization

(station-specific parameter)

Clock synchronization

### Command transmission

(object-specific parameter)

Direct command transmission

Direct set point command transmission

No additional definition

Short pulse duration (duration determined by a system parameter in the outstation)

Long pulse duration (duration determined by a system parameter in the outstation)

Persistent output

Select and execute command

Select and execute set point command

C\_SE\_ACTTERM used

### Transmission of Integrated totals

(station- or object-specific parameter)

Counter request

Counter freeze without reset

Counter freeze with reset

Counter reset

General request counter

Request counter group 1

Request counter group 2

Request counter group 3

Request counter group 4

Addresses per group have to be defined

### Parameter loading

(object-specific parameter)

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

### Parameter activation

(object-specific parameter)

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

### File transfer

(station-specific parameter)

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