IEC 60870-5-103

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The IEC 60870-5-103 protocol is a companion standard for the informative interface of protection equipment.Standard IEC 60870-5-103 was prepared by IEC technical committee 57 (Power system control and associated communications).It is a companion standard for the basic standards in series IEC 60870-5:

Standard IEC 60870-5-103 defines communication between protection equipment and devices of a control system (supervisor or RTU) in a substation.

Standard IEC 60870-5-103 defines a multipoint communication protocol via which information can be exchanged between a control system (supervisor or RTU) and one or more protection devices. The control system is the master and the protection devices are the slaves. Each slave is identified by a unique address between 1 and 254. Address 255 is reserved for broadcast frames.

IEC 60870-5-103 Master

Configuring datapoints

WCC Lite supports IEC 60870-5-103 Master protocol over serial link (according EIA RS-485). Its full functionality list can be found in a IEC 60870-5-103 PID Interoperability List.

To use IEC 60870-5-103 Master in WCC Lite, it has to configured via an Excel configuration. This configuration contains two Excel sheets where parameters have to be filled in - Devices and Signals.

Devices parameters table:

Parameter	**Type**	**Description**	**Mandetory**
name	string	User-friendly name for a device	No
description	string	Description of a device	No
device_alias	string	Alphanumeric string to identify a device	Yes
enable	boolean	Enabling/disabling of a device	Yes

protocol	string	Must be set "IEC 60870-5-103 master"	Yes
device	string	Communication port (PORT1 or PORT2)	Yes
baudrate	integer	Communication speed, bauds/s	Yes
databits	integer	Data bit count for communication	Yes
stopbits	integer	Stop bit count for communication	Yes
parity	string	Communication parity option (none/even/odd)	Yes
flowcontrol	string	Communication device’s flow control option. Available options (case insensitive) - ”no” or ”none”, ”sw” or ”software”, ”hw” or ”hardware”.	No
link address	integer	Address of device (link)	Yes
asdu_address	integer	Application Service Data Unit adress	Yes
time_sync_interval_sec	integer	Time frame between Time Synchronization requests in seconds	Yes
gi_interval_sec	integer	Time frame between General Interrogation requests in seconds	Yes
poll_interval_ms	integer	Polling interval in milliseconds. Time frame between two telegrams from master. Default - 100	No
event_history_size	integer	Maximum count of events in event log. Default - 0	No
poll_timeout_ms	integer	Timeout of waiting for incoming request	No
serial_delay	integer	Communication device’s serial delay in milliseconds. Time frame in which master station is not TX’ing after last RX byte. Default: 50	No

poll_retry_count	integer	Number of retries of failed requests before announcing that device is in Error state	No

Signals parameters table:

Parameter	**Type**	**Description**	**Mandetory**
signal_name	string	User-friendly name of a signal	No
device_alias	string	Device alias from a Devices tab	Yes
signal_alias	string	Unique signal name to be used	Yes
source_device_alias	string	device_alias of a source device	For commands
source_signal_alias	string	signal_alias of a source signal	For commands
enable	boolean	Enabling/disabling of a signal	
log_size	integer	Space for signal in event log	
gi	boolean	Including/excluding signal from General Interrogation. Default - 0 (exclude)	
common_address	integer	Address of a device	
function	integer	Function number	
info_address	integer	Information address	
info_number	integer	Information number	
data_type	integer	ASDU type identificator	
fleeting	boolean	Mark signal as fleeting type. Fleeting signals have go to DPI::OFF after defined time	
normalise_time_ms	integer	Time in milliseconds between station receiving DPI::ON and automatically switching to DPI::OFF. Default - 100.	If fleeting is used

IEC 60870-5-103 has an additional signal which can be configured to show communication status. It is used to indicate if the slave device has disconnected from master (WCC Lite). To configure such signal, two columns should be filled with particular values. To a newly created additional signal one should make job_todo equal to device_status and tag_job_todo equal to communication_status.

Debugging a IEC 60870-5-103 Master aplication

If configuration for IEC 60870-5-103 devices is set up, the handler for the protocol will start automatically. If a configuration is missing or contains errors, the protocol will not start. It is done intentionally to decrease unnecessary memory usage.

If IEC 60870-5-103 does not work properly (e.g. no communication between devices, data is corrupted, etc.), a user can launch a debug session from command-line interface and find out why link is not functioning properly or use WCC Utility to do that.

To launch a debugging session, a user should stop the iec103-master process and run the iec103-master command with respective flags. There is two posibilities to run debugging mode:

- use WCC Utility tab Debug (introduced in version v.1.3 with WCCOS firmware version v1.5.0);
- use console to run command inside the device;

> bellow described parameters for debugging is accesbile over console (SSH).

```
iec103-master parameters:
```

```
-h [--help] Display help information
```

```
-V [--version] Show package version
```

```
-d< debug level > Set debugugging level
```

```
-c [--config] Config path
```

```
-r [--raw] Show raw telegram data
```

```
-f [--frame] Show frame data
```

```
-R [--readyfile] Ready notification file
```

Revision #3

Created Tue, Sep 29, 2020 3:52 PM by Raimundas Slavinskas

Updated Fri, Jan 29, 2021 8:42 AM by Raimundas Slavinskas