

ModBus protocol implementation in RK-2014K/KW controller series

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The RK-2014K/KW controller series provides data transmission interface over RS-485 line using the ModBus protocol. This documents provides the implementation details specific to the RK-2014K/KW line of devices.

RS-485 transmission settings:

- baudrate: 2400..115200, specified in device settings (115200 is recommended)
- frame format: 8N1, 8E1, 8O1, 8N2, specified in device settings

ModBus protocol:

- RTU mode
- device slave ID: 1..247, specified in device settings
- supported ModBus commands:
 - 03h – Read Holding Registers
 - 04h – Read Input Registers
 - 06h – Preset Single Register
- maximum number of registers read with single command: 127
- optional additional response delay: 0..9.9ms (0ms is the recommended default)

Error handling:

- the following errors are silently ignored by the device (no response):
 - CRC errors
 - unsupported command issued
 - framing errors (start/stop bits)
 - writing non-existent register (bad address)
 - writing read-only register
 - writing register with value outside allowed range
- reading non-existent register always returns value of 0
- the device currently does not check parity bit and relies on CRC for error detection; the parity bit is still generated if frame mode requires it

Access control:

- all parameters undergo the access restrictions checks
- all parameters operate with one of the following access levels, specified in device settings:
 - NONE – no registers can be read or written

- READ – all registers can be read, no registers can be written
- USER – all registers can be read, only basic settings can be written
- SERVICE – all registers can be read and written

- access levels are specified separately for direct ModBus access, and for access via terminal; in the latter case, access restrictions will be placed on operations performed via remote terminal (e.g. device will not allow editing certain parameters via remote terminal)

Special notes:

- the 03h and 04h ModBus functions read the same register set with no difference in functionality (the controller has only single set of registers); only register addresses matter