Holosys M-Bus PulseReader
Models: P2 and P4

Instruction Manual

1. Content

2. Introduction

## 2.1.	Purpose of this document

This document contains a description of the Holosys M-Bus PulseReader device for models P2 and P4.

## 2.2.	Glossary

Term or abbreviation	Description
Holosys M-Bus P2	2-input channel model
Holosys M-Bus P4	4-input channel model

## 2.3.	Relation to other documents

No.	Title	Revision
[1]		
[2]		
[3]		

3. Device description

3.1.   Introduction

Holosys M-Bus P2 and P4 are two models of the device used for connecting measuring equipment (such as electricity, gas or water meters) to an M-bus. Up to four (model P4) or up to two (model P2) meters can be simultaneously connected to the device which then counts pulses from the connected meters and provides their retrieval by the M-bus. M-bus primary and secondary address can be modified independently for every channel so that every channel (and connected meter) acts as an independent M-bus slave.

3.2.   Input channels (ports)

The device model P4 has four while model P2 has two input channels to which meters are connected. These meters must have voltage-free contacts. The device then counts pulses from each channel and provides access to the current status via the M-bus.

Possible configurations for each channel are:

- Primary address
  M-bus primary channel (port) address
- Secondary address (Id)
  M-bus secondary channel (port) address
- Medium
  M-bus medium tag
- Multiplicator
  It is configured as numbers M and D. The counter state is going to be increased by M for Every D detected input pulses.
- Measurement unit
  M-bus measurement unit tag
- Input sampling duration
  Input sampling duration can be set as Long or as Standard.

3.2.1. Tariff counting mode

Besides the mentioned parameters that can be configured for each input channel, it is also possible to configure tariff mode. By activating the tariff counting mode, the pulses from the meter are counted into separate registers depending on current tariff signal. If using P1/P2 Tariff Mode pulse output from the meter must be connected to the first input channel (P1) and tariff signal must be connected to the second channel (P2). For P3/P4 Tariff Mode (available only in P4 Model) pulse counting channel is P3 and tariff channel is P4.

At the moment of the pulse being detected on the first input, the state of the second input (closed or open) determines whether the detected pulses will be added to the first or the second counter. The detected *open→closed* transition on the first input and the *open* second input will add the pulse to the first counter, while the *open→closed* transition on the first input and the *closed* second input will add the pulse to the second counter. The multiplicator settings, as well as the other settings of both counters, continue to be used as if this is the case of counting from two independent digital inputs.

P1 (P3)	P2 (P4)	Description
open→close transition	Open	Pulse added for channel P1 (P3)
open→close transition	Closed	Pulse added for channel P2 (P4)

3.3.   M-bus

A standard M-bus is connected to the device's M-bus interface. The device is configured through the M-bus, and also the current state of the counted input pulses can be read. Each input channel acts as an independent M-bus slave and can be accessed through the independently configured primary and/or secondary M-bus address. Secondary addressing feature makes the device suitable for implementation into M-bus systems with more than 250 slaves.

The available communication speeds are 300, 2400 and 9600 baud. The device automatically recognizes at which speed to communicate so the speed does not need to be configured.

3.4.   Device power supply

The device is power supplied through the M-bus if the M-bus is connected and through the embedded battery if the M-bus is not connected. Shifting to battery supply is done automatically when voltage failure occurs. The input pulses counting function is therefore independent of whether the M-bus is connected or not. To supply the device through the battery, it is necessary to set the embedded jumper, which is disconnected by factory default in order to preserve battery life during storage.

3.5.   Protection against changing configuration data

After the device configuration is done, the device can be protected from further changes of configuration data. After this, it is not possible to change the settings through the M-bus. In order to re-enable settings changes, the embedded key 'Unprotect' needs to be held pressed longer than five seconds.

3.6. Automatic meter readout

Besides reading the current state of each connected meter, it is also possible to read the meter status on a specific date. The device saves the counter state of each channel into special registers on a configured date at midnight. This function is available because of the embedded clock with a calendar function.

This action of storing each channel's counter readout can also be initiated manually by sending the so called 'Freeze' command through the M-bus. The 'Freeze' command can be sent to all connected M-bus slaves (via M-bus broadcast address 255) and then the states of all meters at the moment of command issuing can be collected.

3.7. Device configuration

The device is configured through the M-bus by a specially developed PC application. Configuration is stored into a non-volatile data memory (EEPROM) within the device. Besides the configuration itself, the pulse counter state is also stored within the existing data memory once a day. In case of M-bus failure and battery discharge, the last counters states are going to be restored after device is turn on again.

4. Device installation

The factory manufactured Holosys M-Bus Ps and P4 devices need to be activated by closing the embedded JP1 jumper. The embedded battery is thereby activated.
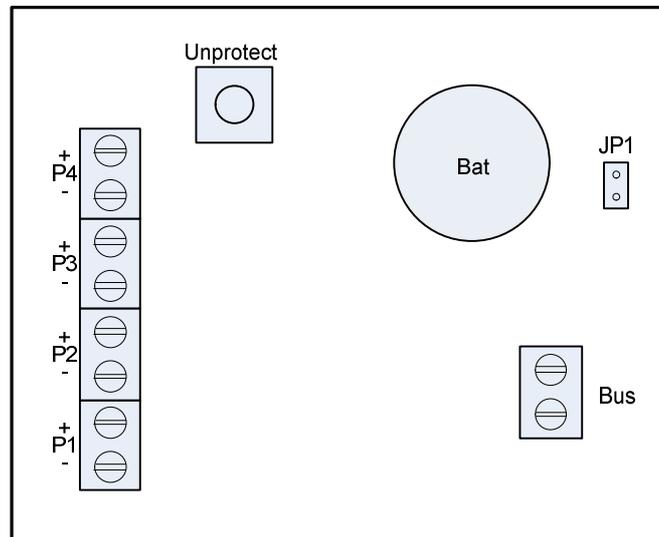

Picture 4.1   Holosys M-Bus Slave P4 scheme

The M-Bus needs to be connected to the M-Bus port, shown on picture 4.1 as 'Bus'. The connection polarity is not important.

The meters pulse outputs are connected to P1, P2, P3 and P4 ports (P3 and P4 ports are not available with P2 device model). An alternative wiring is available for the purpose of tariff counting in a way that the meters pulse outputs are connected to P1 and P3 ports, while P2 and P4 ports are used to determine currently active tariff (P2 port determines the tariff of the meter connected to P1 port, while P4 port determines the tariff of the meter connected to P3 port). The tariff mode can be independently set for the group of P1/P2 and P3/P4 ports.

5. Holosys M-Bus Slave Configurator application
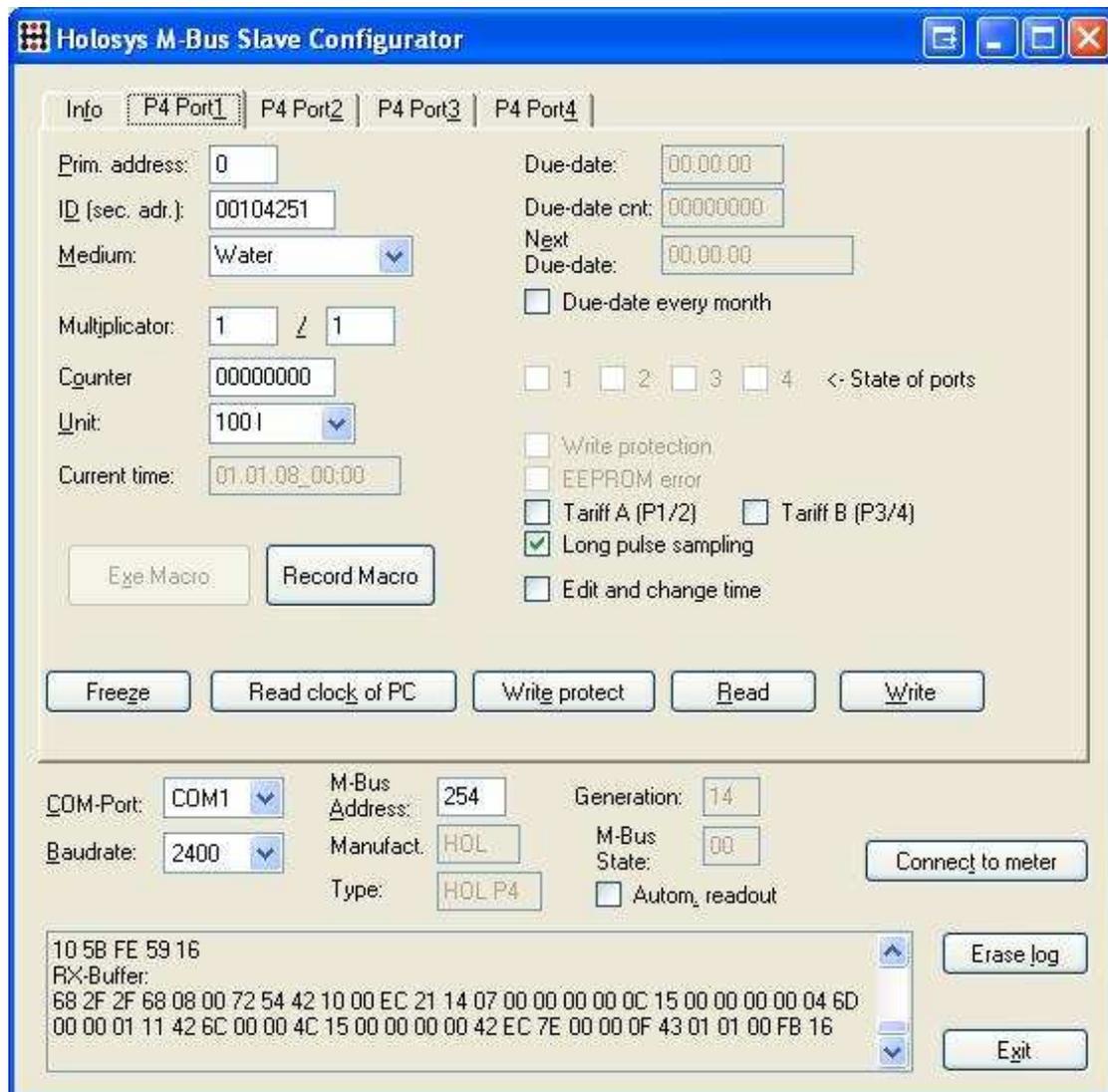
Picture 5.1   Configuration application

Element	Explanation
COM-Port	Serial port to which M-Bus is connected
Baudrate	M-Bus communication speed. Speeds of 300, 2400 and 9600 can be selected. Attention must be brought to the fact that selected speed has to be supported by connected communication device also (M-bus level converter).
M-Bus Address	Primary address used for communication with connected M-Bus

Holosys M-Bus Slave Configurator application

	slave. If only one device is connected, communication can be achieved through address 254 (it is not necessary to know the exact primary address of connected device).
Connect to meter	Initiates the request for data retrieval from the connected device
Manufact.	Displays a three-letter tag of the connected device manufacturer
Generation	Displays the connected device version
Type	Displays the connected device type
M-Bus State	Displays the connected device state
Autom. readout	If it is turned on, then the device is going to read itself automatically after each data input into the device in order to check the data entered
Log-Window	Communication is automatically logged and displayed in this window
Erase log	Erases the communication log-window
Exit	Exits the application
Primary address	Mbus primary address of the selected port (0-250).
ID (sec. adr.)	Mbus secondary address of the selected port. This value matches the device serial number by factory default. This value can be configured as 8-digit number.
Medium	Describes the measurement medium of the meter connected to the device channel (e.g. water, electricity, gas)
Multiplicator	Describes the increase of the counter's internal state after detecting a pulse on the input channel. The numerator can be set from zero (without counting) to 99, and the denominator from 1 to 256.
Unit	Describes the physical size of the meter connected to the device channel.
Counter	Current device state. Value can also be configured (an 8-digit number).
Current time	Current date and time of the internal clock in format DD.MM.YY_hh.mm. This data can be changed only after turning on 'Edit and change time'. 'Read clock of PC' key is used to automatically fill in the value of this field with the current time read from PC. Date and time refer to the whole device, not to individual device channels.
Due-date	Displays the last date of the automatic meter readout in format DD.MM.YY.
Due-date cnt.	State of stored counter which was active during the last automatic meter readout.
Next Due-date	Sets the next date during which the automatic meter readout is going to be activated in format DD.MM.YY. The counter value will be stored on the configured date at midnight (beginning of the day).
Due-date every month	If it is turned on, then automatic meter readout will be activated every month on the day configured by the parameter 'Next Due-date'. E.g. if 'Next Due-date' is set on '01.06.08', then the configured month and year are going to be ignored and on the each first day of a month, the automatic meter readout will be activated.
State of ports	Displays state of all ports. Check mark denotes that the given port is closed (short-circuited)

Holosys M-Bus Slave Configurator application

Write protection	Displays whether the device is protected against changing configuration data. If it is protected (there is a check mark) then it is not possible to send new configuration data to the device through the configuration application (only current states can be read). If the protection needs to be removed, then it is necessary to hold 'Unprotect' key on the device pressed longer than 5 seconds.
EEPROM error	Displays whether an error is detected within the non-volatile data memory. If it is detected, then the device has to be re-configured.
Tariff A (P1/2)	Activation of the tariff mode on channels P1 and P2. If the tariff mode is activated then P1 port will be used for counting, and P2 port for determining the current tariff
Tariff B (P3/4)	Activation of the tariff mode on channels P3 and P4. If the tariff mode is activated then P3 port is going to be used for counting, and P4 port for determining the current tariff
Long pulse sampling	Needs to be activated if the capacitive load connected to the ports is too large.
Edit and change time	Enables modifying the current device time ('Current time') and date of the next automatic counter readout ('Next Due-date').
Freeze	Sends command which performs automatic counter readout and after that the device stores new data for 'Due-date' and 'Due-date cnt'.
Read clock of PC	Reads current date and time of PC and writes it into the field 'Current time'.
Write protect	Sends a command to the device to activate the protection against changing configuration data.
Read	Refreshes data on the current page (current device channel)
Write	Sends data from the current page to the device (current device channel). After the device receives these data, it stores them within the non-volatile data memory.

- 'Current time', 'Next due-date', 'Write protection', 'Long pulse sampling' data and 'Freeze' command always refer to all device channels.
- Along with activated tariff counting, input pulses are added to channels as if pulse has physically arrived to two different ports and therefore it is necessary to make sure that multiplicator settings are properly configured for both channels.

6. Technical information

Information about contact inputs:

Port potential	floating, ground resistance > 1MΩ
Contact resistance	open >1MΩ, closed <2kΩ
Max. capacity (including powerlines)	2nF short, 12nF long sampling
Min. pulse duration	33 ms
Min. pause between pulses	33 ms
Max. pulse speed	15 Hz
Contact current	30 μA
Contact voltage	2.5…3.6V

Consumption (model P2):

Power supply principle	Power supply from M-Bus with automatic transfer to battery during voltage failure on M-Bus
Current during operation on M-Bus	1 unit load 1UL = 1.5 mA
Consumption during battery operation	30 μA (long sampling)
Minimum battery life (25°C)	Standard: ~ 11 months
	Option: ~ 6 years
	Premium: ~ 7 years
Minimum backup during a 10-year work-life (25°C) (days per year)	Standard: ~ 32 days/year
	Option: ~ 180 days/year
	Premium: ~ 210 days/year
Short sampling	Extends battery life by ~12%

Consumption (model P4):

Power supply principle	Power supply from the M-Bus with automatic transfer to battery during voltage failure on the M-Bus
Current during work on M-Bus	2 unit loads 2 UL = 3mA
Consumption during battery operation	35 μA (long sampling)
Minimum battery life (25°C)	Standard: ~ 9 months
	Option: ~ 5 years
	Premium: ~ 6 years
Minimum backup during a 10-year work-life (25°C) (days per year)	Standard: ~ 25 days/year
	Option: ~ 140 days/year
	Premium: ~ 180 days/year
Short sampling	Extends battery life by ~25%

M-Bus information:

Standard	EN1434-3
M-Bus standy current (MARK current L)	L < 1.5 mA (modelP2)
	L < 3 mA (model P4)
M-Bus current (SPACE current H)	H = L (standby current) +13 mA typ.
M-Bus drive	Texas Instruments TSS721
Protective resistance	2x215 Ω
Data transfer speed	300, 2400, 9600 baud with automatic speed detection
Addressing (each port)	1 primary and 1 secondary address
Data structure	Structure type - variable structure (Low Byte First, CI: 72h)
	Length - 53 Bytes
	Data Records:
	1. counter
	2. date and time
	3. date of last reading
	4. counter of last reading
	5. date of next reading
	6. manufacturer parameters
Configuration	Identification number, medium, primary address, Pulse constant, measurement unit, tariff mode, Date and time, date of next reading, Can be parameterized through SND_UD telegram

Environment:

Operating temperature range	-20° to 60°C
Storage temperature	-20° to 70°C
Humidity	up to 70% (without condensation)

Housing:

Material	Thermoplastic
Dimensions w x h x l	75x74x40mm
Color	light grey
Protection level	IP54
Assembly	screws to the surface
Port dimensions	0,14 to 1,5mm2