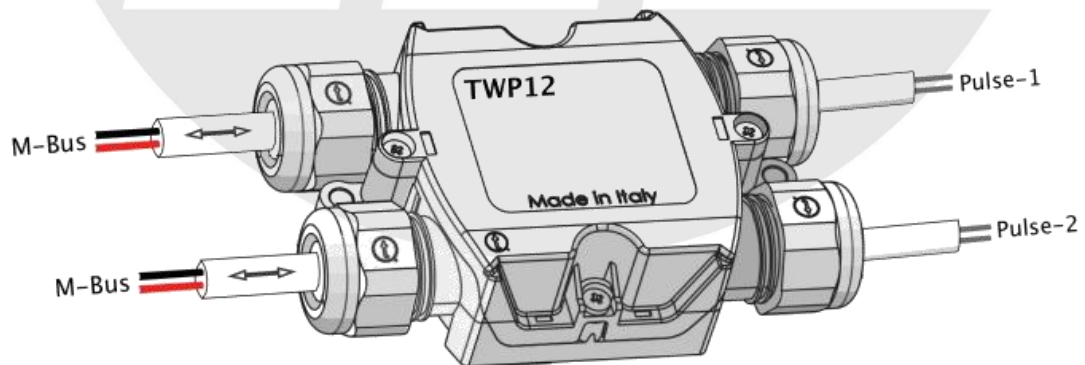


# M-Bus Pulse Collector Twin-Pulse Instruction Manual





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## 1 GENERAL DESCRIPTION

Twin-Pulse is a pulse counter designed for metering applications. It is an M-Bus based device and operates in slave configuration. It can manage simultaneously up to two pulse inputs. The meters connected must be provided with a floating pulse output (float reed contact/float open collector).

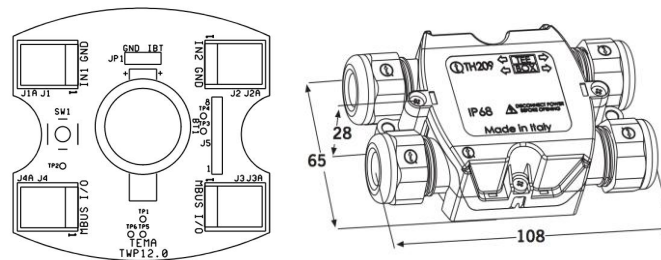
The Twin-Pulse has a single primary address and a single secondary address for both counter for quick installation and easy management of readings.

Care must be taken that each input is assigned the correct count line.

The two counter inputs are identified as J1 (counter 1) and J2 (counter 2).

Follow the instructions below to install the device.

For the device set-up it is strongly recommended to use the TwinCom software wizard.



### 1.1 TECHNICAL SPECIFICATIONS

Counter inputs	2 inputs: input J1 counter 1, input J2 counter 2
Input requirements	Floating contacts only (reed or open collector pulser)
Max. closed contact resistance	10 K $\Omega$
Max. line impedance with open contact	C < 2.2 nF
Minimum detectable pulse length	38 ms
Battery type	CR 2032
Estimated battery life	1 year without M-Bus connection
Communication protocol	Standard M-Bus
Supported Baud rates	300, 2400, 9600 bps
Secondary address	8 digit BCD, flash memory storage
Power consumption of bus connected module	1.4 mA (<1 unit load)
Data sent from device	<ul style="list-style-type: none"> <li>Primary address</li> <li>Manufacturer ID</li> <li>Device type (counter, etc.)</li> <li>Generation number</li> <li>Progressive message number</li> <li>Warnings</li> <li>Reading data format info</li> <li>Instantaneous value of counter 1 and counter 2</li> </ul>
Alarms	Battery life < 1 month
Housing protection rating	IP68
Operating temperature	0 °C – 55 °C

Storage temperature	-20 °C – 70 °C
Humidity (noncondensing)	10% – 70%

## 1.2 DEFAULT PARAMETERS

When the device is activated for the first time the following default parameters are available.

Primary address	0
Serial port setting	8 bit even parity 2400 bps
Counters set-up (both counters)	Medium water, 10 liter/pulse, counter = 0, multiplier 1/1

## 1.3 TWIN-PULSE INSTALLATION PROCEDURE

The installation procedure consists of three steps:

- 1) module activation
- 2) wire connections
- 3) parameter configuration

### 1.3.1 Module Activation

The TwinPulse must be activated before connection:

- open the plastic housing
- insert the power jumper on JP1 in IBT position

**Note** In the final series, two positions and a central pin will be available in the JP1 jumper:



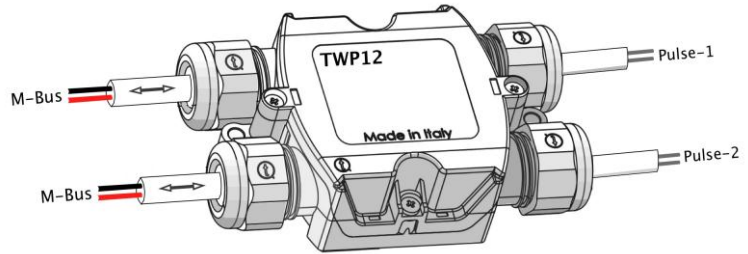
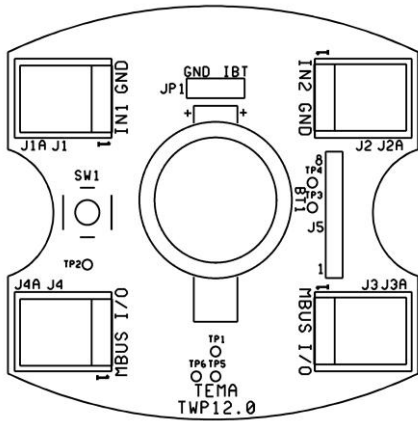
GND: the device is kept OFF; this position is described in the section "Resetting Default Parameters".

IBT: *Insert Battery* to activate the module; it will be supplied with power by the battery even when disconnected from the bus.

### 1.3.2 Connections

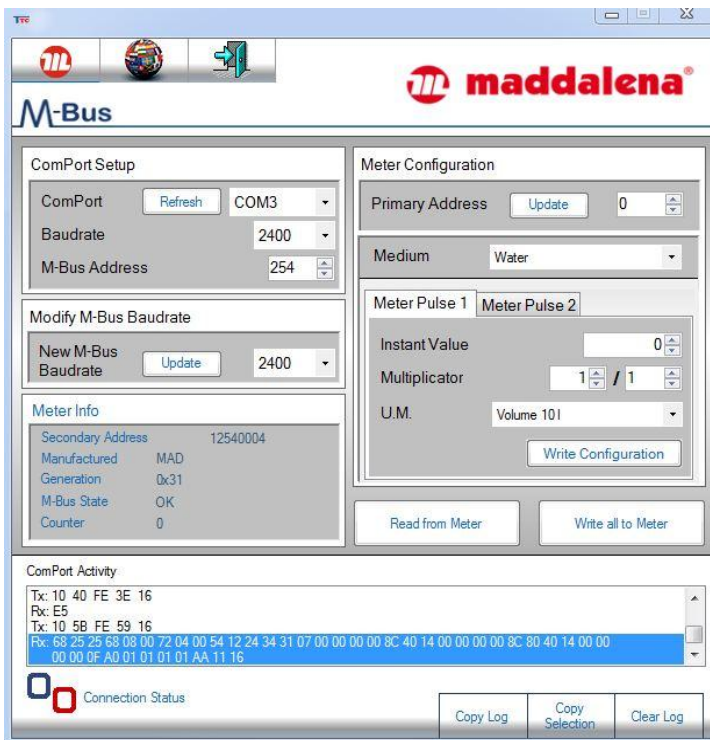
- Connect the pulse cable 1 to J1-IN1
- Connect the pulse cable 2 to J2-IN2
- Connect the Bus to J3 or J4 (J3 e J4 are hard wired together).





### 1.3.3 Device Configuration

In order to configure the module an M-Bus master and the TwinCom software are required. By clicking on *Connect to meter*, the following display appears:



**Multiplicator rules:**  
setting N/D the counter increases of N units every D pulses detected

Now it is possible to set up the general parameters and those of each pulse meter. Select *Write* to transfer the data to the meter.

### 1.4 RESETTING DEFAULT PARAMETERS

If the device does not answer to commands (if the baud rate set is not suitable for the master or if during writing the cable has been disconnected and there is no battery power supply), it is possible to reset the meter's at factory default parameters. Follow the below steps:

- 1) Disconnect the device from the bus
- 2) Move the jumper from JP1 position IBT to the GND position
- 3) Wait at least 10 minutes

- 4) Re-position JP1 on IBT
- 5) Reconnect the device to the bus

To speed up the resume of device do the following:

- 1) Disconnect the device from the bus
- 2) Remove the jumper JP1
- 3) Short-circuit pins 1 and 2 of connector J5 with a wire or tweezers
- 4) Insert JP1
- 5) Reconnect the device to the bus.

## 1.5 DESCRIPTION OF THE TELEGRAM RSP\_UD TRANSMITTED BY THE MODULE

The telegram consists of the following fields.

Reading Telegram (meter→Master)				
Field Code	No. Byte	Value (hex)	Description	Notes
Start field	1	68	Start message	
L field	1	25	Message lenght	
L field	1	25	Message lenght	
Start field	1	68	Start message	
C field	1	08	Control Field	
A field	1	nn	Primary address (0..250)	
CI field	1	72	Control Information field	
SN field	4	xx xx xx xx	Serial number 8 digit BCD	
M field	2	xx xx	Manufacturer	
Generation	1	xx	Generation	
Medium	1	xx	Medium	
Count	1	xx	Message counter	
Status	1	xx	Warning Flags: bit 7: - bit 6: - bit 5: - bit 4: - bit 3: - bit 2: battery life aprox 1 mounth bit 1: application error (not used) bit 0: application busy (not used)	
Signature	2	xx xx	Segnature code	
DIF	2	8C, 40	Data Information Field	
VIF	1	xx	Value Information Field of counter 1	
Data	4	xx xx xx xx	Instantaneous value of counter 1	
DIF	3	8C, 80, 40	Data Information Field	
VIF	1	xx	Value Information Field of counter 2	
Data	4	xx xx xx xx	Instantaneous value of counter 2	
DIF	1	0F	Start of manufacturer specific fields	
Data	1	A0	Twin Pulse version	
Data	1	xx	Numerator of counter 1	

Reading Telegram (meter→Master)				
Field Code	No. Byte	Value (hex)	Description	Notes
Data	1	xx	Denominator of counter 1	
Data	1	xx	Numerator of counter 2	
Data	1	xx	Denominator of counter 2	
Data	1	xx	Free for service	
CS	1	xx	Check sum	
End Field	1	16	End of message	

## 1.6 DESCRIPTION OF THE CONFIGURATION TELEGRAM SND\_UD

The master sends the following telegram for slave configuration.

Some fields cannot be modified: write FF (hex).

### 1.6.1 Example of Configuration Telegram

- primary address 10
- secondary address 12540004
- counter 1 litres, water, 11223344
- counter 2, m3, water, 55667788
- multiplier 1/1 both inputs.

Master → slave:

68 25 25 68 53 FE 51 01 7A 0A 07 79 04 00 54 12 FF FF FF 07 8C 40 13 44 33 22 11 8C 80 40 16 88 77 66  
 55 0F A0 01 01 01 01 6D 16

Slave → master:

E5

Configuration Telegram (Master→Meter)				
Field Code	No. Byte	Value (hex)	Description	Notes
Start field	1	68	Start message byte	
L field	1	25	Message length	
L field	1	25	Message length	
Start field	1	68	Start message byte	
C field	1	53 / 73	Control Field	
A field	1	xx	Primary address	
CI field	1	51	Control Information field	
DIF1	1	01	Data Information Field	
VIF1	1	7A	Value Information Field	
Data	1	0..250	New primary address	
DIF2	1	07	Data Information Field	
VIF2	1	79	Value Information Field	
Data	4	xx xx xx xx	New secondary address (not writeable)	
MAN	2	FF FF	Manufacturer (not writeable)	
Generation	1	FF	Generazione dispositivo (not writeable)	
Medium	1	xx	medium	Counter 1
DIF3	2	8C, 40	Data Information Field	Counter 1
VIF3	1	xx	Value Information Field 1	Counter 1
Data	4	xx xx xx xx	Instantaneous value of counter 1	Counter 1
DIF4	3	8C, 80, 40	Data Information Field	Counter 2
VIF4	1	xx	Value Information Field 2	Counter 2
Data	4	xx xx xx xx	Instantaneous value of counter 2	Counter 2
DIF5	1	0F	Start of manufacturer specific data	

Configuration Telegram (Master→Meter)				
Field Code	No. Byte	Value (hex)	Description	Notes
Data	1	A0	Version: Twin Pulse ver. A.0	
Data	1	xx	Numerator 1	Counter 1
Data	1	xx	Denominator 1	Counter 1
Data	1	xx	Numerator 2	Counter 2
Data	1	xx	Denominator 2	Counter 2
CS	1	xx	Check sum	
End Field	1	16	End of message	

## 2 APPENDX A

### 2.1 DEVICE TYPE IDENTIFICATION TABLE (MEDIUM)

Device type identification (previously called Medium)	Code	
	binary	hex
Other	0000 0000	00
Oil	0000 0001	01
Electricity	0000 0010	02
Gas	0000 0011	03
Heat	0000 0100	04
Steam	0000 0101	05
Warm Water (30 °C ... 90 °C)	0000 0110	06
Water	0000 0111	07
Heat Cost Allocator	0000 1000	08
Compressed Air	0000 1001	09
Cooling load meter (Volume measured at return temperature: outlet)	0000 1010	0A
Cooling load meter (Volume measured at flow temperature: inlet)	0000 1011	0B
Heat (Volume measured at flow temperature: inlet)	0000 1100	0C
Heat/Cooling load meter	0000 1101	0D
Bus/System component	0000 1110	0E
Unknown Medium	0000 1111	0F
Reserved	...	10 to 14
Hot water ( $\geq 90$ °C)	0001 0101	15
Cold water	0001 0110	16
Dual register (hot/cold) Water meter (see NOTE )	0001 0111	17
Pressure	0001 1000	18
A/D Converter	0001 1001	19
Reserved	...	1Ah to 20h
Reserved for valve	0010 0001	21h
Reserved		22h to FFh

NOTE: such a meter registers water flow above a limit temperature in a separate register with an appropriate tariff ID. Note that this table has been expanded with optional elements from EN 1434-3.

## 2.2 PRIMARY VIF'S (MAIN TABLE)

The first section of the main table contains integral values, the second typically average values, the third typically instantaneous values and the fourth block contains parameters (E: extension bit).

The extension bit (MSB) signals that more detailed or extended descriptions (data field extension = DIFE) bytes follow. E = 1 if other VIFE or DIFE follow. Normally leave E = 0.

Primary VIF-codes		Range	
Coding	Description	Range Coding	Range
E000 0nnn	Energy	$10^{(nnn-3)}$ Wh	0,001 Wh to 10 000 Wh
E000 1nnn	Energy	$10^{(nnn)}$ J	0,001 kJ to 10 000 kJ
E001 0nnn	Volume	$10^{(nnn-6)}$ m <sup>3</sup>	0,001 l to 10 000 l
E001 1nnn	Mass	$10^{(nnn-3)}$ kg	0,001 kg to 10 000 kg
E010 00nn	On Time	nn = 00b seconds nn = 01b minutes nn = 10b hours nn = 11b days nn = 11 days	Duration of meter power-up
E010 01nn	Operating Time	coded like OnTime	Duration of meter accumulation
E010 1nnn	Power	$10^{(nnn-3)}$ W	0,001 W to 10 000 W
E011 0nnn	Power	$10^{(nnn)}$ J/h	0,001 kJ/h to 10 000 kJ/h
E011 1nnn	Volume Flow	$10^{(nnn-6)}$ m <sup>3</sup> /h	0,001 l/h to 10 000 l/h
E100 0nnn	Volume Flow ext.	$10^{(nnn-7)}$ m <sup>3</sup> /min	0,000 l/min to 1 000 l/min
E100 1nnn	Volume Flow ext.	$10^{(nnn-9)}$ m <sup>3</sup> /s	0,001 ml/s to 10 000ml/s
E101 0nnn	Mass flow	$10^{(nnn-3)}$ kg/h	0,001 kg/h to 10 000 kg/h
E101 10nn	Flow Temperature	$10^{(nn-3)}$ °C	0,001 °C to 1 °C
E101 11nn	Return Temperature	$10^{(nn-3)}$ °C	0,001 °C to 1 °C
E110 00nn	Temperature Difference	$10^{(nn-3)}$ K	1 mK to 1000 mK
E110 01nn	External Temperature	$10^{(nn-3)}$ °C	0,001 °C to 1 °C
E110 10nn	Pressure	$10^{(nn-3)}$ bar	1 mbar to 1 000 mbar
E110 1100	Date (actual or associated with a storage number/function)		data field =0010b, type G
E110 1101 (b)	Date and time (actual or associated with a storage number/function)		data field= 0100b, type F
E110 1101 (b)	Extendend time point (actual or associated with a storage number/function)	Time to s	data field= 0011b, type J
E110 1101 (b)	Extented Date and Time Point (actual or associated with a storage number/function)	Time and date to sec.	data field= 0110b, type I

Primary VIF-codes		Range	
Coding	Description	Range Coding	Range
E110 1110	Units for H.C.A.		Dimensionless
E110 1111	Reserved for a future third table of VIF-extensions		
E111 00nn	Averaging Duration	nn coded like OnTime	
E111 01nn	Actuality Duration	nn coded like OnTime	
E111 1000	Fabrication No	See E3	
E111 1001	(Enhanced) Identification		
E111 1010	Address		For EN 13757-2: one byte link layer address, data type C (x = 8) For EN 13757-4: data field 110b (6 byte Header-ID) or 111b (Full 8 byte Header)

Note b: Meaning depends on data field.

### 3 BIBLIOGRAFY

Editore	Agg.	Cod. di Riferimento	Titolo/Descrizione
CEN	2005	prEN 13757-3	Communication systems for and remote reading of meters - Part 3: Dedicated application layer
M-Bus Usergroup	Version 4.8 November 11, 1997		The M-Bus: A Documentation