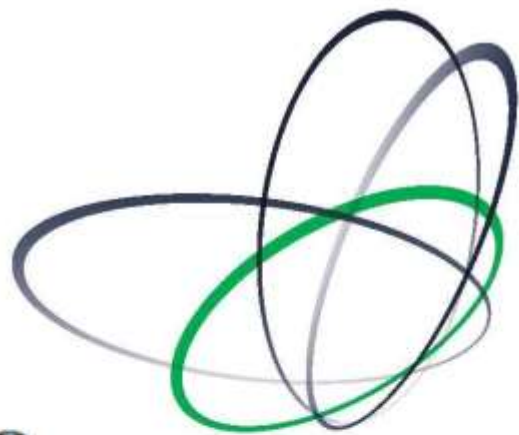


VALVE CONTROL WATER METER COMMUNICATION PROTOCOL



 **i-meter**[®]
Innovative Metering Solutions

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WARNING

Field electrical installers must follow proper safety precautions and all local electrical code requirements during electrical installation, meter wiring, and CT installation. During normal operation of this device, hazardous voltages are present which can cause severe injury or death. It is strongly recommended that only qualified, properly trained personnel should perform installation and servicing.

DISCLAIMER

The information presented in this publication has been carefully checked; however, Intellimeter Canada Inc. (ICI) assumes no responsibility for inaccuracies. The information provided in this document is subject to change without notice.

CUSTOMER SUPPORT

To report any issue, please contact ICI at 905.839.9199. Prior to returning any merchandise to ICI, a return material authorization (RMA) number should be obtained from ICI.

STATEMENT OF CALIBRATION

The accuracy and calibration of our instruments are traceable to Measurement Canada, a division of Industry Canada.

CONFIGURATION

The Water meters can only be configured by Intellimeter Canada Inc. at ICI's factory according to the customers provided panel schedule.

INSTALLATION CHECKLIST

Make sure you have received the right meter as per your order and packing list.

INSTALLATION DISCLAIMER

INTELLIMETER does not accept any responsibility and will not be liable for any loss or damage or expense of any kind whatsoever and howsoever caused by improper installation of its products, be it indirect, special, incidental or consequential damages (including but not limited to damages for loss of business, loss of profits, interruption or the like). Please refer to Intellimeter's Terms and Conditions of Sale available at <https://intellimeter.ca/pages/terms-of-service-privacy-statement>

ELECTRICAL CODE

Installer is responsible for ensuring that all safety and local electrical codes are followed

1. M-BUS TELEGRAMS COMMANDS AND RESPONSES

1.1 General M-bus Commands

Table 1.1.1

Master request						Slave Response
		C	A	CS		
Initialization	10h	40h	A	CS	16h	E5h
Data request	10h	5B/7Bh	A	CS	16h	Data telegrams acc. to Chapter 4.3 and 4.4
Deselection for secondary addressing	10h	40h	FDh	CS	16h	E5h

Table 1.1.2

Master request										Slave Response
		L	L		C	A	CI	CS		
Application reset(All)	68h	04h	04h	68h	53h/73h	A	50h 00h	CS	16h	E5h

Table 1.1.3 Selection of secondary address

68h 0Bh 0Bh 68h	Header of the long frame, L=0Bh = data length
53h/73h FDh 52h	Control field 53/73h=Send/Confirm expected, Address field FDh=addressing through a secondary address, CI field 52h=Slave select
78h 56h 34h 12h	Secondary address = Customer number, e.g. 12345678, it is possible to use wildcards Fh
8Fh 41h	Manufacture ID=418Fh, it is possible to use wildcards FFh
03h	Meter generation 3, it is possible to use wildcards FFh
07h	Device type ID=07h, water meter, it is possible to use wildcards FFh
CS	CS = checksum (1 byte)
16h	Stop character

Table 1.1.4 Enhanced selection

68h 11h 11h 68h	Header of the long frame, L = 11h = data length
53h/73h FDh 52h	Control field 53/73h=Send/Confirm expected, Address field FDh=addressing through a secondary address, CI field 52h=Slave select
78h 56h 34h 12h	Secondary address = Customer number, e.g. 12345678, it is possible to use wildcards Fh
8Fh 41h	Manufacture ID=418Fh, it is possible to use wildcards FFh
03h	Meter generation 3, it is possible to use wildcards FFh
07h	Device type ID=07h, water meter, it is possible to use wildcards FFh
0Ch	DIF: 8-digit BCD, no DIFE, current value
78h	VIF: Fabrication No
04h 03h 02h 01h	1020304
CS	CS = checksum (1 byte)
16h	Stop character

Table 1.1.5 Setting the primary address

68h 06h 06h 68h	Header of the long frame, L = 06h = data length
53h/73h A 51h	Control field 53/73h=Send/Confirm expected, Address field A, CI field 51h=Master to slave data send
01h	DIF: 8 Bit Integer/Binary, no DIFE, current value
7Ah	VIF: Primary address
12h	18, Un-configured water meter default an address to 0
CS	CS = checksum (1 byte)
16h	Stop character

Table 1.1.6 Setting the secondary address

68h 09h 09h 68h	Header of the long frame, L = 09h = data length
53h/73h A 51h	Control field 53/73h=Send/Confirm expected, Address field A, CI field 51h=Master to slave data send
04h	DIF: 32 Bit Integer/Binary, no DIFE, current value
6Dh	VIF: Date and time (data type F)
2Ah 2Dh 61h 19h	2011-09-01 13:42
CS	CS = checksum (1 byte)
16h	Stop character

Table 1.1.7 Setting the date and time

68h 09h 09h 68h	Header of the long frame, L = 09h = data length
53h/73h A 51h	Control field 53/73h=Send/Confirm expected, Address field A, CI field 51h=Master to slave data send
04h	DIF: 32 Bit Integer/Binary, no DIFE, current value
6Dh	VIF: Date and time (data type F)
2Ah 2Dh 61h 19h	2011-09-01 13:42
CS	CS = checksum (1 byte)
16h	Stop character

1.2 Special M-bus Command

Table 1.2.1

Master Request											
	L	L		C	A	CI	DIF	Telegram code (2byte)	Telegram (multi byte)	CS	
68h	L	L	68h	53h/73h	A	51h	0Fh	Acc table 1.2.2.1		CS	16h

Table 1.2.2

Slave Response												
	L	L		C	A	CI	DIF	VIF	Secondary address	Response (multi byte)	CS	
68h	L	L	68h	08h	A	78h	0Ch	79h	78h 56h 34h 12h	Acc table 1.2.2.1	CS	16h

Table 1.2.2.1

Function	level	Telegram code	Telegram	Response	Decoding
Setting daily settle time	0	0Ah 00h	01h 42h 13h	0Fh 4Ch 50h	Daily settle time = 13:42
Setting monthly settle date			02h 01h	0Fh 4Ch 50h	Monthly settle date=1st
Setting daily settle time and monthly settle date			03h 42h 13h 01h	0Fh 4Ch 50h	Daily settle time=13:42, monthle settle date=1st
read daily settle time			00h	0Fh 42h 13h 01h	Daily settle time = 13:42
Read data of daily settle	0	0Ch 00h		Acc table 1.2.2.1.2	
Read history data of the date	0	34h 00h	12h 10h 16h	Acc table 1.2.2.1.4	Read date yymmdd 16/10/12, response data of the day
Setting valve control water meter	0	80h 00h	Acc table 1.2.2.1.5	0Fh 4Ch 50h	Parameters of valve control water meter
Valve operating	0	81h 00h	Acc table 1.2.2.1.6	0Fh 00h 00h	Sending code : 0000h, valve operating code respons : Valve status (current status, voltage low..etc) , acc table 1.2.2.1.7
Read extral data of valve control water meter	0	89h 00h	01h	0Fh	response :
				00h 00h 00h 00h	Valve control water meter parameters

				00h 00h	Valve status (current status if voltage low, etc.)
				34h 12h	At least 4660 seconds between 2 recharges, or the recharge will be rejected. 0 for no limit.
				01h03h C8h 00h 30h F8h	01h, type (1, by water volumn 2, by dollar amount) 03h, decimal number, 3 decimals 00C8h, valve shut at 1, 0.200m ³ F830h, valve shut at 2, - 2.000m ³
				02h03h C8h 00h 30h F8h	02h, type (1, by water volumn 2, by dollar amount) 03h, decimal number, 3 decimals 00C8h, valve shut at 1, 0.200 \$ F830h, valve shut at 2, - 2.000 \$
				01h 02h 03h	** for pre-pay settlement
		02h		0Fh	response :
				01h 03h	** for pre-pay settlement
				78h 56h 34h 12h	** for pre-pay settlement
				01h 02h	** for pre-pay settlement
				12h 00h	** for pre-pay settlement
				78h 56h 34h 12h	** for pre-pay settlement
				78h 56h 34h 12h	** for pre-pay settlement
				13h 12h 11h 17h	** for pre-pay settlement
				01h 02h	** for pre-pay settlement
				78h 56h 34h 12h	** for pre-pay settlement
				13h 12h 11h 17h	** for pre-pay settlement
				22h 05h	Water tempersture : 13.14°C
				1Dh 10h	Capacity voltage : 4.125V
				6Dh 01h	Battery voltage : 3.65V
				34h 12h	Firmware version : 12.34
			34h 12h	Hardware version : 12.34	

Table1.2.2.1.1 Device Status

	BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9	BIT8
0	Aux battery normal	Wireless signal normal	No alarm history				Main board normal	No sealing broken
1	Aux battery low	Wireless low	Alarm in history				Main board error	Sealing broken detected

	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
0	In factory	Reset sealing	Sensor normal	Pipe normal	Usage normal	Battery normal	Water temperature normal	
1	Out of factory	Set sealing	Sensor error	Pipe empty alarm	Water usage unusual	Battery low	Low water temperature	

Table1.2.2.1.2 Daily Settle Data

0Ch	DIF: 8-digit BCD, no DIFE, current value
94h	VIF: Volume(1/100 m ³)
3Bh/3Ch	VIFE: Positive volume or negative volume
78h 56h 34h 12h	123456.78m ³
0Fh	DIF: Manufacturer-specific data
42h 13h	Daily account time 13:42

Table1.2.2.1.3 Data of Today

0Ch	DIF: 8-digit BCD, no DIFE, current value
94h	VIF: Volume(1/100 m ³)
3Bh/3Ch	VIFE: Positive volume or negative volume
78h 56h 34h 12h	123456.78m ³
0Fh	DIF: Manufacturer-specific data
01h 09h 11h 20h	Current date=2011-09-01

Table1.2.2.1.4 History Data of the Date

0Ch	DIF: 8-digit BCD, no DIFE, current value
94h	VIF: Volume(1/100 m ³)
3Bh	VIFE: Positive volume
78h 56h 34h 12h	123456.78m ³
0Ch	DIF: 8-digit BCD, no DIFE, current value
94h	VIF: Volume(1/100 m ³)
3Ch	VIFE: Negative volume
78h 56h 34h 12h	123456.78m ³
02h	DIF : 16 digits biniary, current value
6Ch	VIF : YMD (time : type G)

61h 19h

Date (YY/MM/DD): 11/09/01

Table1. 2.2.1.5 Valve Control Water Meter Parameters

BIT31-BIT8	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Reserved	1b, automatic open/close allowed	1b, Step water meter	0b,regular water meter data frame 1b,pre-pay water meter data frame	1b,backup step water meter activated	00b,reserved 01b,account by month 10b,account by quarter 11b,account by year		00b,regular water meter mode 01b,valuemn pre-set mode 10b,dollar value pre-set mode 11b,reserved	

Table1.2.2.1.6 Valve Control Code

BIT15-BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
reserved	1b,automatic open/close	1b,unlock	1b,locking status	1b,force operating	0b,close 1b,open

valve control code BIT4-BIT0 combination

BIT4	BIT3	BIT2	BIT1	BIT0	Operating
0	0	0	0	0	Open (not operational in locked or pre-set mode)
0	0	0	0	1	Close (not operational in locked or pre-set mode)
X	0	0	1	0	Open, according to the remain of pre-set
X	0	0	1	1	Close, according to the remain of pre-set
0	0	1	0	X	Lock current status, no further operating allowed
X	0	1	1	0	Open and lock ; meter will ignore the remain of the pre-set
X	0	1	1	1	Close and lock ; meter will ignore the remain of the pre-set
0	1	X	0	X	Unlock only
X	1	X	1	0	Unlock and open
X	1	X	1	1	Unlock and close
1	X	0	0	X	Automatic control

Table 1.2.2.1.7 Valve Status

BIT15-BIT11	BIT10	BIT9	BIT8	BIT7-BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Reserved	1b,open requested, over usage pre-set	00b, pre-set remains 01b, over usage alarm level 1,10b, over usage alarm level 2 11b, reserved		Reserved	1b, power on BUS	1b, capacity voltage low	1b, locked	1b, motor not running	0b, current status unknown 1b, open/close	0b, close 1b, open

							operation confirmed
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1.3 Slave Response in Normal Mode

Table 1.3.1 (Water meter: device type ID=07h)

68h L L 68h	Header of the long frame
08h A 72h	Control field 08h=User data, Address field A, CI field 72h=Variable Data Respond
78h 56h 34h 12h	Secondary address = Customer number, e.g. 12345678
8Fh 41h	Manufacture : ID=418Fh
01h	Meter generation 1
07h	Devide type ID=07h water meter
Access NO.	Z = Read-out meter (1 byte)
Status	S = Status (1 byte) acc. to table 4.3.1.1
00h 00h	Signature
0Ch	DIF: 8-digit BCD, no DIFE, current value
94h	VIF: have VIFE, volume (unit: 1/100m ³)
3Bh	VIFE : Positive Volume
78h 56h 34h 12h	123456.78m ³
0Ch	DIF: 8-digit BCD, no DIFE, current value
94h	VIF: have VIFE, volume (unit: 1/100m ³)
3Ch	VIFE : Negative Volume
78h 56h 34h 12h	123456.78m ³
0Bh	DIF: 6-digit BCD, no DIFE, current value
59h	VIF: Flow temperature (unit: 1/100°C)
56h 34h 12h	1234.56°C
0Ch	DIF : 8-digit BCD, no DIFE, current value
3Ah	VIF: Volume flow (unit: 1/10000m ³ /h)
78h 56h 34h 12h	1234.5678 m ³ /h
0Ah	DIF: 4-digit BCD, no DIFE, current value
69h	VIF : pressure (unit : 1/100bar = 1kPa)
34h 12h	1234 kPa
0Ch	DIF: 8-digit BCD, no DIFE, current value
26h	VIF : running HR (unit: hour)
78h 56h 34h 12h	12345678h
3Ch	DIF: 8-digit BCD, no DIFE, Value during error state
22h	VIF: Operating Time (unit:hour)
78h 56h 34h 12h	Error hour=12345678h
0Ch	DIF: 8-digit BCD, no DIFE, current value

22h	VIF: main board on time (unit: hour)
78h 56h 34h 12h	12345678h
06h	DIF: 48 Bit Integer/Binary, no DIFE, current value
6Dh	VIF: Date and time (data type I)
10h 2Ah 0Dh 61h 19h 00h	11-09-01 13:42:16
0Fh	DIF: Manufacturer-specific data
00h 00h	Device status byte, acc. to table 1.2.2.1.1
CS	CS = checksum (1 byte)
16h	Stop character

Table 1.3.1.1 Device status byte

	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
0	reserved	positive flow rate	Reserved	No temporary error	No permanent error	Not power low	Acc to table 1.3.1.1.1	
1		negative flow rate		Temporary error	Permanent error	Power low		

Table 1.3.1.1.1

BIT1	BIT0	Application status
0	0	No Error
0	1	Application Busy
1	0	Any Application Error
1	1	Reserved

Table 1.3.2 Valve control basic frame format (default frem) (water meter: device type ID=07h)

68h L L 68h	Header of the long frame
08h A 72h	Control field 08h=User data, Address field A, CI field 72h=Variable Data Respond
78h 56h 34h 12h	Secondary address = Customer number, e.g. 12345678
8Fh 41h	Manufacture ID=418Fh
01h	Meter generation 1
07h	Device type ID=07h water meter
Access NO.	Z = Read-out meter (1 byte)
Status	S = Status (1 byte) acc. to table 1.3.1.1
00h 00h	Signature
0Ch	DIF: 8-digit BCD, no DIFE, current value
14h	VIF: have VIFE, volume (unit: 1/100m ³)
78h 56h 34h 12h	123456.78m ³
0Bh	DIF: 6-digit BCD, no DIFE, current value
59h	VIF: Flow temperature (unit: 1/100°C)
56h 34h 12h	1234.56°C

0Ch	DIF : 8-digit BCD, no DIFE, current value
3Ah	VIF: Volume flow (unit: 1/10000m ³ /h)
78h 56h 34h 12h	1234.5678 m ³ /h
06h	DIF: 48 Bit Integer/Binary, no DIFE, current value
6Dh	VIF: Date and time (data type I)
10h 2Ah 0Dh 61h 19h 00h	11-09-01 13:42:16
0Fh	DIF: Manufacturer-specific data
00h 00h	Device status byte, acc. to table 1.2.2.1.1
00h 00h	Valve status
00h 00h	Valve drive capacity voltage
00h	Decimal number of the remain dollar value
78h 56h 34h 12h	Remain dollar : 305419896\$
03h	Decimal number of the remain volumn
A0h 86h 01h 00h	Remain volumn : 100.000m ³
03h	Accumulate consuming of current accounting cycle
78h 56h 34h 12h	12345.678m ³
01h	Current step level
02h	Decimal number of current step level
78h 56h 34h 12h	Current step level:123456.78元/m ³
02h	Decimal number of current pre-set volume
78h 56h 34h 12h	Current pre-set volumn:123456.78m ³
CS	CS = checksum (1 byte)
16h	Stop character

Thank you for giving us the opportunity to serve you. We appreciate your business and the confidence you have placed in us.

Please visit us @ <https://intellimeter.ca>
or call us @ 905-839-9199 if you need any further assistance.