Installation and operation manual

MBus I-7188E1-ML Concentrator
(with Modbus TCP Gateway function)

GDAŃSK 09.2006
v. 2.0.1.

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General description

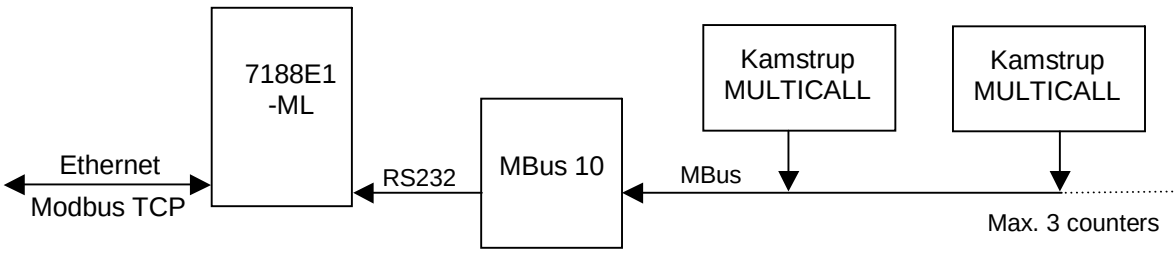
Introduction.

This manual describes basic functions of I-7188E1-ML converter, required for its configuration and installation in place of destination.

Application.

I-7188E1-ML converter (called **Converter**) is designed for conversion between MBus protocol of thermal energy meters Kamstrup Multical (called **MBus Meters**) and Modbus TCP protocol. For proper operation Converter requires additional external converter of electric standard MBus to RS232 of MBus10 type. One Converter is able to operate up to three MBus Meters. Higher number of MBus Meters may be connected after expansion of Converter firmware functionality. If Your system requires connection of higher number of meters, contact our sale department, please.
Typical installation configuration is presented below.

Converter installation block diagram.



I-7188-ML Converter operation principle

Converter from Ethernet side operates as Modbus TCP Slave on TCP port with number 502. This allows for receiving incoming TCP connections from Modbus TCP master. Received query in processed by Converter, which in return sends appropriate values of Modbus registries, depending on query syntax.

In Modbus TCP query it is necessary to specify Modbus=1 address, which relates to all Converter Modbus registries. Optionally it is possible to use Modbus addresses, individually assigned to individual MBus Meters with use of FTP configuration files. Due to this, when meter is temporarily disconnected from Converter, Converter will not return

any Modbus TCP response. This may be used to detect communication failure with given MBus Meter.

In case of using Modbus=1 address, converter will always return last value, read from MBus Meter, independently from communication correctness or its failure through MBus interface. Detailed description of Modbus registries address space and their relations with parameters read from meters are presented in further documentation part.

Regardless of communication, Modbus TCP Converter asks in cycles through MBus interface all connected MBus Meters and converts read data to Modbus registries standard. Data refreshing from MBus Meters is performed every 60 seconds.

Converter functionality description

1. Converter cooperates with maximum three thermal energy meters Kamstrup MULTICAL 66CDE lub Kamstrup MULTICAL III, and assures conversion of monitored parameters (according to specification described below) to Modbus TCP communication standard.
2. Communication with Meters is performed with use of MBus protocol, and it is necessary to equip them with MBus protocol communication modules.
3. Devices I-7188E1-ML and MBus10 are supplied with 12-25 V DC. Maximum current of both devices is 1A.
4. Converter communication is performed by loading appropriate configuration text files to mini FTP server, built in the Converter.
   It does not apply to Ethernet interface parameters. Those parameters should be configured through Converter serial port RS232. After Converter activation in Ethernet network those parameters may be then remotely modified through TELNET console.
5. Converter requires for operation in Ethernet network setting of static configuration parameters, i.e.:
   a. IP: in form of xxx.xxx.xxx.xxx
   b. SUBNET MASK: xxx.xxx.xxx.xxx
   c. GATEWAY: xxx.xxx.xxx.xxx
   d. MBus Meters addresses are defined as last two digits of meter serial number, or up to 250.
6. Converter operates up to 16 concurrent Modbus TCP connections, i.e. at the same time up to 16 remote Modbus TCP clients may query converter for data.

Accesories supplied with Converter

Full set of I-7188E1-ML Converter and MBus10 includes:

1. Converter with symbol I-7188E1 (one serial communication port COM1-RS232) operating communication in Modbus TCP slave protocol.
2. Converter of electric standard RS232-MBus of MBus10 type.
3. There is software installed in Converter, adjusting it to realizing proper conversion functions from MBus to Modbus protocol.
4. Cable for Converter configuration from PC computer through port RS232.
5. Cable connecting Converter MBus 10 with Converter, terminated with drawer connection BH10 on one end (MBus 10 side) and with pipe ends on the other end (I-7188E1 side).
6. FDD 1,44" or CD, containing software "7188xw.exe", allowing for converter configuration through serial port RS232.
7. DIN installation strip, approximately 15 cm long.
8. Set of clamped pipe ends.

Configuration

Converter configuration procedure is divided into two stages.
In the **first stage** it is necessary to configure Ethernet network interface parameters through serial port RS232.
In the **second stage**, if necessary, it is possible to configure other Converter parameters. However configured default parameters usually allow for proper Converter operation. The exception are MBus meters addresses, which must be defined each time by uploading appropriate configuration text files to FTP server.

Local configuration - RS232

Connecting Converter to PC computer

To start Converter local configuration procedure, connect supplied RS232 cable to Converter COM1 port according to terminals description on cable ends. Connect DB9 plug to serial port RS232 of PC computer. It is very important to connect terminal "INIT*" to power supply ground (GND).
Details of individual connections are shown below.
After all above connections turn on Converter power supply.

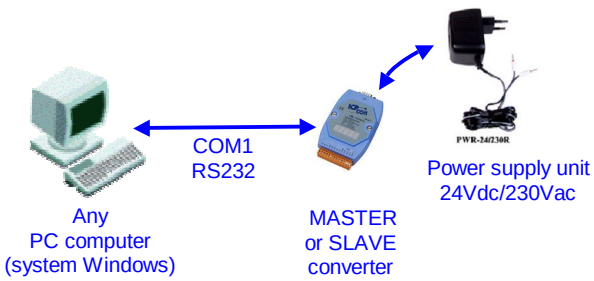


Fig. Block diagram of connections for Converter configuration

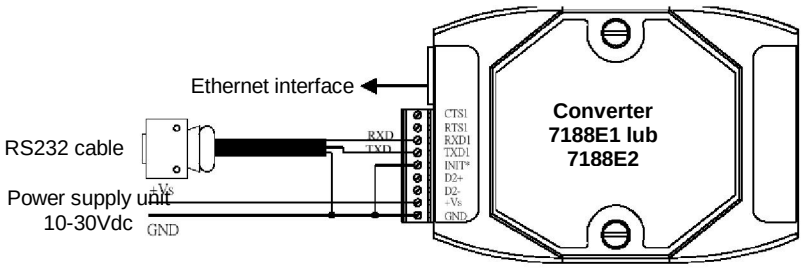
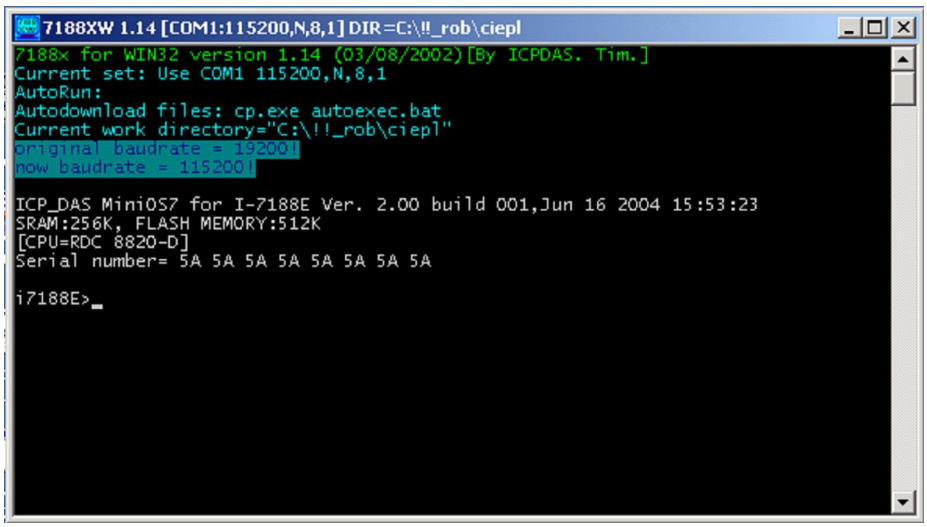


Fig. Detailed diagram of connections for Converter configuration

Operator console "7188xw.exe"

Converter in configured with use of "7188xw.exe" program, included on supplied CD. It is communication interface in form of text terminal between master PC computer and Converter. Through serial port RS232 it is possible to configure Converter and perform software update.
7188xw.exe program is designed for operation in Windows 2000/NT system. In case of Windows 98 system use it is necessary to use 7188x.exe program.
Exemplary terminal window view after 7188xw.exe program activation is shown below:



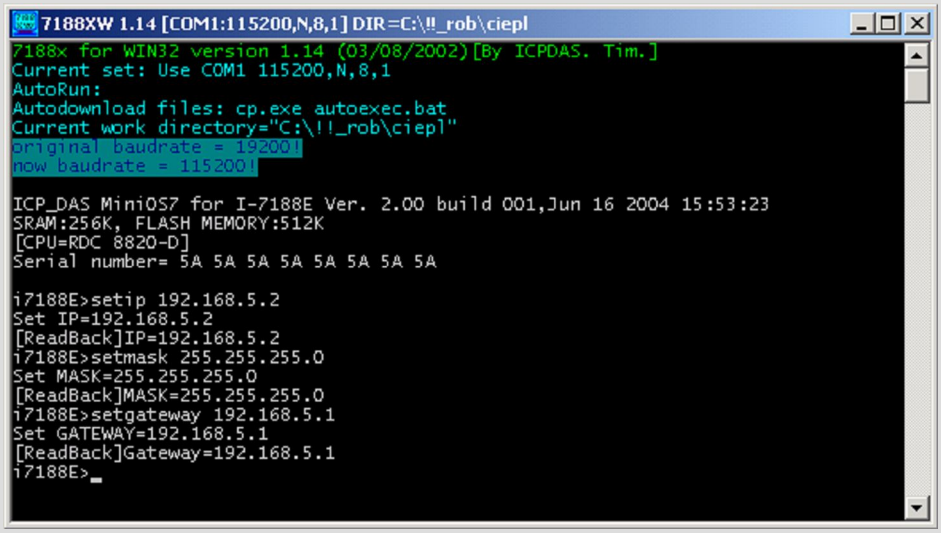
Optionally it is possible to use Hyperterminal program, configuring serial port parameters as: 115200, 8, N, 1, no parity control.

Available commands for Ethernet network protocol configuration

From operator console level user may assign network configuration static parameters to controller:

- IP number using "**setip**" command
  example: „setip 192.168.5.56"+'Enter'
- subnet mask (MASK) using "**setmask**" command
  example: „setmask 255.255.255.0"+'Enter'
- gate (GATEWAY) using "**setgateway**" command
  example: „segateway 192.168.5.1"+'Enter'

Result of exemplary entering of configuration procedure is shown below:



NOTES:

1. IP number and default gate (GATEWAY) **MUST** be configured as addresses of the same Ethernet network segment. If they are programmed as addresses of different subnets, it may cause improper operation of 7188E1 controller.
2. If in Ethernet network, where 7188E1 devices are installed, the is **no computer with GATEWAY function**, e.g. when communication within the same network segment is realized, then it is necessary to configure default gate as IP number of any computer of the same network segment.
   It is important, because 7188E1 device during restart performs communication test through triple sending ICMP packet to address configured as GATEWAY. If computer with that address is not available in network, then 7188E1 device restart procedure may be prolonged of 3 to 4 . seconds
   In particular for case described in that paragraph it is possible to program IP address of another 7188E1 device from mutually communicating pair as GATEWAY.

Examples of correct and incorrect configuration of network address (IP,MASK, GATEWAY)

Below there are examples of correct and incorrect configuration of network addresses

Example of **CORRECT** configuration of IP and GATEWAY numbers:

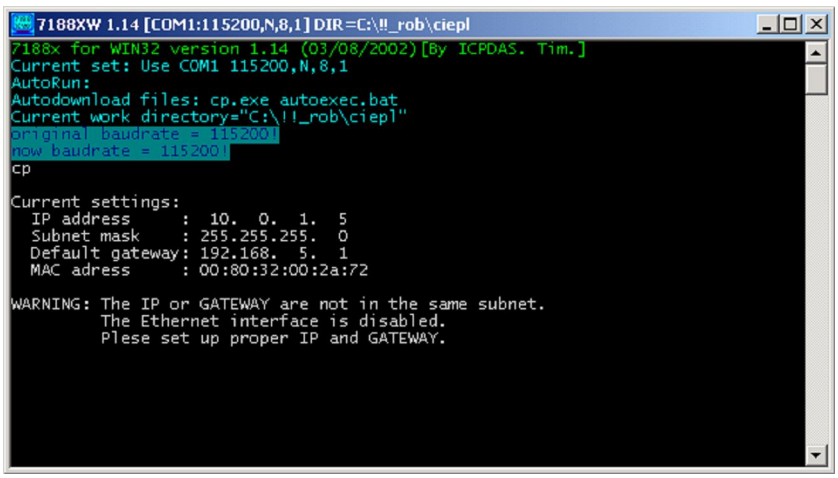
- IP = 192.168.1.175
- GATEWAY = 192.168.1.1 or 192.168.1.156 or 192.168.1.x or ....
- MASK = 255.255.255.0

Example of **INCORRECT** configuration of IP and GATEWAY numbers:

- IP = 10.0.1.5
- GATEWAY = 10.0.45.1 or 192.168.0.1 or 192.168.5.5 or .....
- MASK = 255.255.255.0

- Converter does not accept IP and GATEWAY from different subnets.

Below there is message presented, which appears in console window "7188xw.exe" after command *"cp"+'Enter'* in case of incorrectly configured network interface parameters (IP, MASK, GATEWAY).

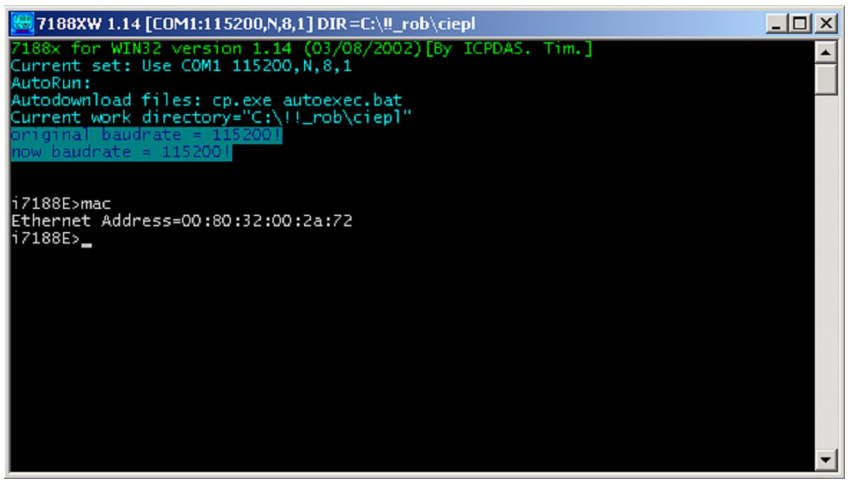


Auxiliary commands, available in "7188xw.exe" console

Besides Ethernet network interface parameters configuration, from "7188xw.exe" console level it is possible to:

Check Converter MAC address

Command: *"mac"+'Enter'*
After its execution in console window Current Convertr MAC address is displayed.
Example of this command execution is shown below:



Remote configuration – TCP/Ethernet

After initial configuration of network interface parameters (IP, MASK, GATEWAY) through port RS232, Converter may be connected to Ethernet network and configured through that interface with use of Telnet console.
Brand new Converter has defaul parameters configured. Usualy such configuration is sufficient for correct Converter operation.
Remote configuration may be also performed after Converter installation in place of destination.

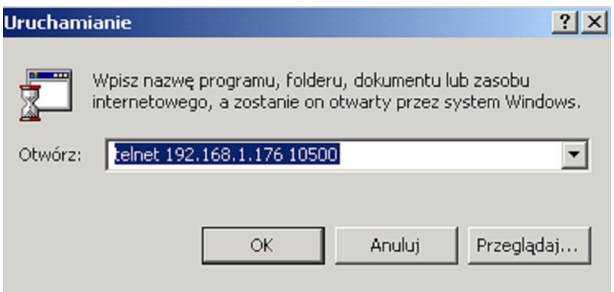
General notes

7188En device may be configured with use of Telnet console, available as standard tool is Windows2000/NT/XP system.
Program is started by clicking "Start" button in Windows taskbar, and selecting "Run" command. In window type: telnet *nnn.nnn.nnn.nnn TCPport*, where:

nnn.nnn.nnn.nnn – IP number of 7188E1 device to connect with
TCPport –TCP port number

Used TCP ports numbers are described in further paragraph of this manual.

Exemplary use of Telnet program is shown below:



Used TCP communication ports

The following TCP ports numbers are implemented in the device:

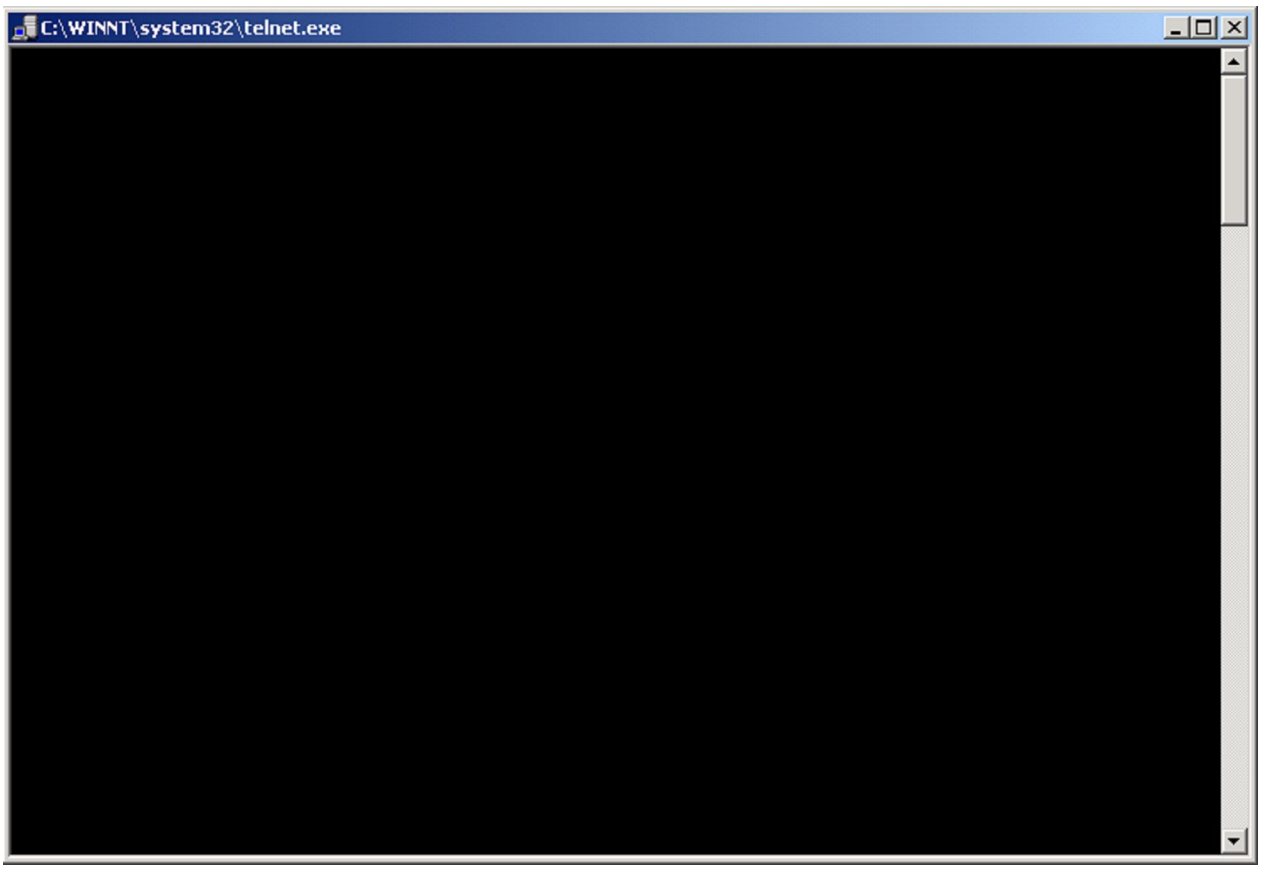
1. **502** – ModbusTCP communication – sending of communication frames between MASTER and SLAVE Converters.
2. **10500** – port used for communication correctness tracking
3. **10750** – port used for Converter configuration
4. **11000** – SATCHWELL communication – sending of communication frames for SATCHWELL controllers. Protocols SNP and NCP.

”Telnet.exe” console start in Converter configuration modea

To start Telnet console for remote Converter configuration, use the following command

‘telnet *nnn.nnn.nnn.nnn* 10750’

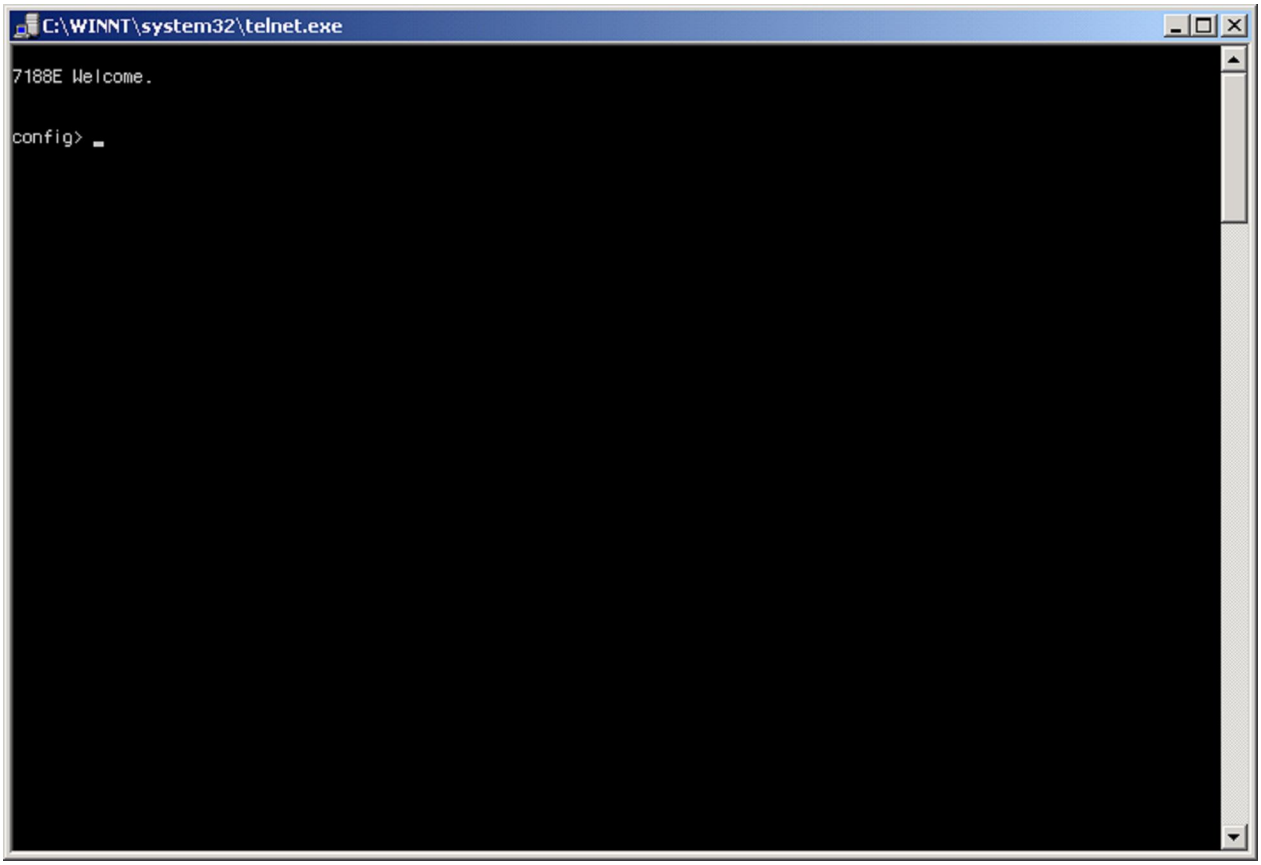
Access to Converter configuration is protected by default with password: ‘1234 5678’ (space between 4 and 5). Enter that password from keyboard, when window shown below appears:



Finish password entering with ‘Enter’ key.

CAUTION: Entered password is not displayed in terminal window.

If password is entered correctly, then it will be confirmed by displaying the following Telnet application window:



Operator may then enter further devices configuration commands.

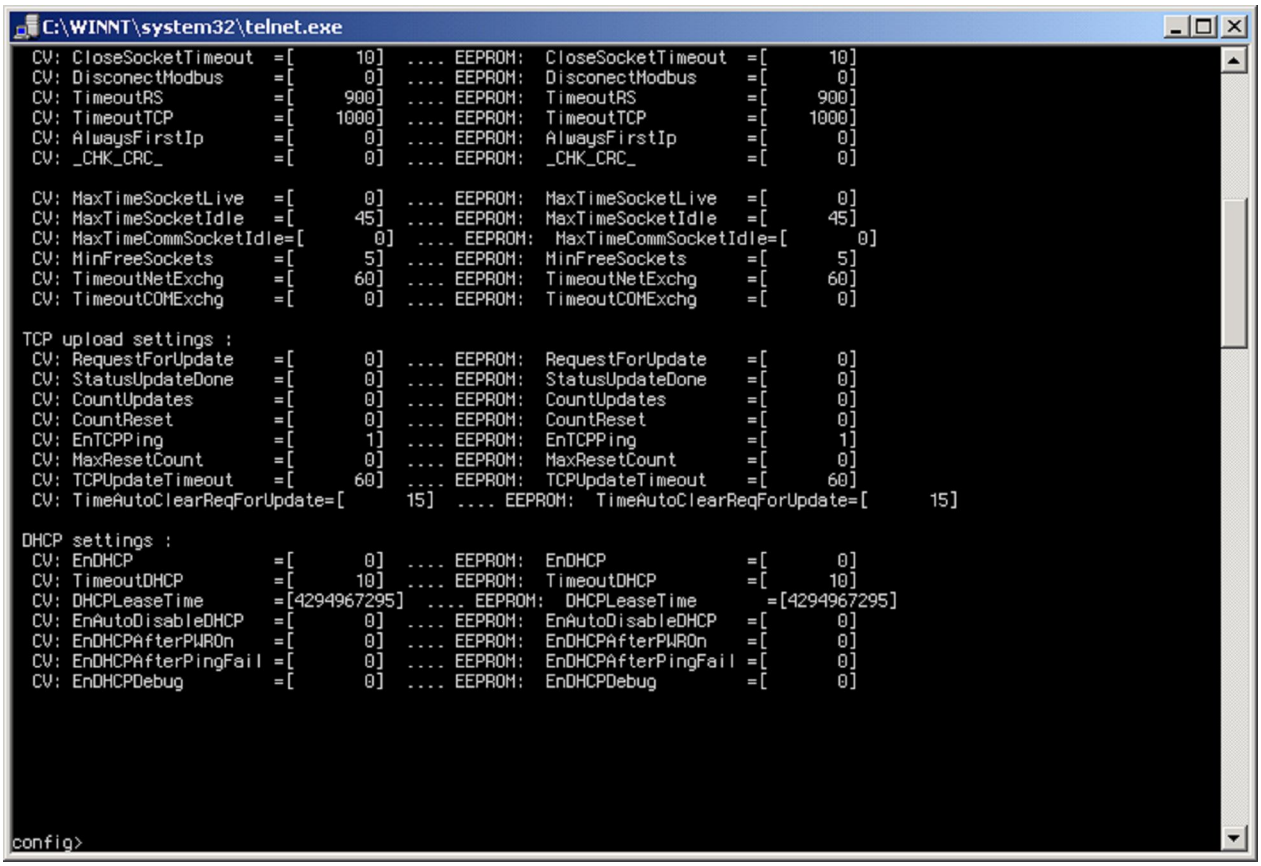
Details of their syntax with detailed description are presented in next chapter.

Configuration commands, available through "Telnet.exe"

1. Reading of current configuration:

Description	command causes displaying of current configuration parameters in console window
Syntax	**GETCONF**
Parameters (description)	None
Performed operation result	Displaying of current configuration parameters on screen
Example of use	Getconf

"Telnet.exe" console view after getconf command:



```
C:\WINNT\system32\telnet.exe
 CV: CloseSocketTimeout  =[      10]  .... EEPROM:  CloseSocketTimeout  =[      10]
 CV: DisconectModbus     =[       0]  .... EEPROM:  DisconectModbus     =[       0]
 CV: TimeoutRS           =[     900]  .... EEPROM:  TimeoutRS           =[     900]
 CV: TimeoutTCP          =[    1000]  .... EEPROM:  TimeoutTCP          =[    1000]
 CV: AlwaysFirstIp       =[       0]  .... EEPROM:  AlwaysFirstIp       =[       0]
 CV: _CHK_CRC_           =[       0]  .... EEPROM:  _CHK_CRC_           =[       0]

 CV: MaxTimeSocketLive   =[       0]  .... EEPROM:  MaxTimeSocketLive   =[       0]
 CV: MaxTimeSocketIdle   =[      45]  .... EEPROM:  MaxTimeSocketIdle   =[      45]
 CV: MaxTimeCommSocketIdle=[       0]  .... EEPROM:  MaxTimeCommSocketIdle=[       0]
 CV: MinFreeSockets      =[       5]  .... EEPROM:  MinFreeSockets      =[       5]
 CV: TimeoutNetExchg     =[      60]  .... EEPROM:  TimeoutNetExchg     =[      60]
 CV: TimeoutCOMExchg     =[       0]  .... EEPROM:  TimeoutCOMExchg     =[       0]

TCP upload settings :
 CV: RequestForUpdate    =[       0]  .... EEPROM:  RequestForUpdate    =[       0]
 CV: StatusUpdateDone    =[       0]  .... EEPROM:  StatusUpdateDone    =[       0]
 CV: CountUpdates        =[       0]  .... EEPROM:  CountUpdates        =[       0]
 CV: CountReset          =[       0]  .... EEPROM:  CountReset          =[       0]
 CV: EnTCPPing           =[       1]  .... EEPROM:  EnTCPPing           =[       1]
 CV: MaxResetCount       =[       0]  .... EEPROM:  MaxResetCount       =[       0]
 CV: TCPUpdateTimeout    =[      60]  .... EEPROM:  TCPUpdateTimeout    =[      60]
 CV: TimeAutoClearReqForUpdate=[      15]  .... EEPROM:  TimeAutoClearReqForUpdate=[      15]

DHCP settings :
 CV: EnDHCP              =[       0]  .... EEPROM:  EnDHCP              =[       0]
 CV: TimeoutDHCP         =[      10]  .... EEPROM:  TimeoutDHCP         =[      10]
 CV: DHCPLeaseTime       =[4294967295]  .... EEPROM:  DHCPLeaseTime       =[4294967295]
 CV: EnAutoDisableDHCP   =[       0]  .... EEPROM:  EnAutoDisableDHCP   =[       0]
 CV: EnDHCPAfterPWROn    =[       0]  .... EEPROM:  EnDHCPAfterPWROn    =[       0]
 CV: EnDHCPAfterPingFail =[       0]  .... EEPROM:  EnDHCPAfterPingFail =[       0]
 CV: EnDHCPDebug         =[       0]  .... EEPROM:  EnDHCPDebug         =[       0]

config>
```

After that command all available configuration parameters are displayed. User should however modify only parameters described in this manual.

CAUTION: all configuration parameters do not fit in one console window. To view all of them, use scroll bar on the console right side.

2. Configuration of serial port COM1 parameters

Description	command allows to configure parameters of the first serial port COM1
Syntax	**SETCOM [PORT] [BAUD] [DATA_FORMAT] [PARITY] [STOPBITS]**
Parameters (description)	[port] –COM port number – in this case 1 [baud] – transmission rate [data_format] - data format [parity] – parity [stopbits] – stop bits number
Performed operation result	Saving new COM1 configuration in EEPROM memory
Notes	Restart 7188E1 devices after configuration parameters modification.
Example of use	setcom 1 4800 8 1 1

3. Setting timeout (response time) for communication through Ethernet network

Description	command allows to set timeout (response time) in TCP communication session in Ethernet network
Syntax	**SETTIMEOUTTCP [TIMEOUT]**
Parameters (description)	[TIMEOUT] –timeout in [ms]
Performed operation result	Saving new timeout value in EEPROM memory
Notes	Restart 7188E1 devices after configuration parameters modification.
Example of use	settimeouttcp 1000

Recommended configuration for I-7188E1-ML Converter

Configuration shown below is set by default in each new I-7188E1-ML Converter.

```
Serial port COM 1 :
 CV: COM1Port            =[       1]  .... EEPROM:  COM1Port            =[       1]
 CV: COM1Baud            =[    2400]  .... EEPROM:  COM1Baud            =[    2400]
 CV: COM1Data            =[       8]  .... EEPROM:  COM1Data            =[       8]
 CV: COM1Parity          =[       1]  .... EEPROM:  COM1Parity          =[       1]
 CV: COM1Stop            =[       1]  .... EEPROM:  COM1Stop            =[       1]

Serial port COM 2 :
 CV: COM2Port            =[       2]  .... EEPROM:  COM2Port            =[       2]
 CV: COM2Baud            =[    9600]  .... EEPROM:  COM2Baud            =[    9600]
 CV: COM2Data            =[       8]  .... EEPROM:  COM2Data            =[       8]
 CV: COM2Parity          =[       0]  .... EEPROM:  COM2Parity          =[       0]
 CV: COM2Stop            =[       1]  .... EEPROM:  COM2Stop            =[       1]

TCP/IP ports :
 CV: ModbusPort          =[     502]  .... EEPROM:  ModbusPort          =[     502]
 CV: ConfigPort          =[   10750]  .... EEPROM:  ConfigPort          =[   10750]
 CV: DebugPort           =[   10500]  .... EEPROM:  DebugPort           =[   10500]
 CV: EnDebug             =[       1]  .... EEPROM:  EnDebug             =[       1]
 CV: SatchPort           =[   11000]  .... EEPROM:  SatchPort           =[   11000]

Main config settings :
 CV: Pause               =[       4]  .... EEPROM:  Pause               =[       4]
 CV: iModbusID           =[       1]  .... EEPROM:  iModbusID           =[       1]
 CV: PingAtStart         =[       1]  .... EEPROM:  PingAtStart         =[       1]
 CV: EnPassword          =[       1]  .... EEPROM:  EnPassword          =[       1]
 CV: HostEnable          =[       0]  .... EEPROM:  HostEnable          =[       0]
 CV: EnFirConfig         =[       0]  .... EEPROM:  EnFirConfig         =[       0]
 CV: EnAcceptBroadcast   =[       0]  .... EEPROM:  EnAcceptBroadcast   =[       0]

 CV: NumberConnectTrials =[       3]  .... EEPROM:  NumberConnectTrials =[       3]
 CV: ConnectingTimeout   =[     500]  .... EEPROM:  ConnectingTimeout   =[     500]
 CV: CloseSocketTimeout  =[      10]  .... EEPROM:  CloseSocketTimeout  =[      10]
 CV: DisconectModbus     =[       0]  .... EEPROM:  DisconectModbus     =[       0]
 CV: TimeoutRS           =[     900]  .... EEPROM:  TimeoutRS           =[     900]
 CV: TimeoutTCP          =[    1000]  .... EEPROM:  TimeoutTCP          =[    1000]
 CV: AlwaysFirstIp       =[       1]  .... EEPROM:  AlwaysFirstIp       =[       1]
 CV: _CHK_CRC_           =[       0]  .... EEPROM:  _CHK_CRC_           =[       0]

 CV: MaxTimeSocketLive   =[       0]  .... EEPROM:  MaxTimeSocketLive   =[       0]
 CV: MaxTimeSocketIdle   =[     120]  .... EEPROM:  MaxTimeSocketIdle   =[     120]
 CV: MaxTimeCommSocketIdle=[       0]  .... EEPROM:  MaxTimeCommSocketIdle=[       0]
 CV: MinFreeSockets      =[       5]  .... EEPROM:  MinFreeSockets      =[       5]
 CV: TimeoutNetExchg     =[     720]  .... EEPROM:  TimeoutNetExchg     =[     720]
 CV: TimeoutCOMExchg     =[       0]  .... EEPROM:  TimeoutCOMExchg     =[       0]

TCP upload settings :
 CV: RequestForUpdate    =[       0]  .... EEPROM:  RequestForUpdate    =[       0]
 CV: StatusUpdateDone    =[       0]  .... EEPROM:  StatusUpdateDone    =[       0]
 CV: CountUpdates        =[       0]  .... EEPROM:  CountUpdates        =[       0]
 CV: CountReset          =[       0]  .... EEPROM:  CountReset          =[       0]
 CV: EnTCPPing           =[       1]  .... EEPROM:  EnTCPPing           =[       1]
 CV: MaxResetCount       =[       0]  .... EEPROM:  MaxResetCount       =[       0]
 CV: TCPUpdateTimeout    =[      60]  .... EEPROM:  TCPUpdateTimeout    =[      60]
 CV: TimeAutoClearReqForUpdate=[      15]  .... EEPROM:  TimeAutoClearReqForUpdate=[      15]

DHCP settings :
 CV: EnDHCP              =[       0]  .... EEPROM:  EnDHCP              =[       0]
 CV: TimeoutDHCP         =[      10]  .... EEPROM:  TimeoutDHCP         =[      10]
 CV: DHCPLeaseTime       =[4294967295]  .... EEPROM:  DHCPLeaseTime       =[4294967295]
 CV: EnAutoDisableDHCP   =[       0]  .... EEPROM:  EnAutoDisableDHCP   =[       0]
 CV: EnDHCPAfterPWROn    =[       0]  .... EEPROM:  EnDHCPAfterPWROn    =[       0]
 CV: EnDHCPAfterPingFail =[       0]  .... EEPROM:  EnDHCPAfterPingFail =[       0]
 CV: EnDHCPDebug         =[       0]  .... EEPROM:  EnDHCPDebug         =[       0]

WWW settings :
 CV: WWWPort             =[      80]  .... EEPROM:  WWWPort             =[      80]
 CV: TimeoutWWW          =[      60]  .... EEPROM:  TimeoutWWW          =[      60]
```

```
 CV: TimeoutInWWWPacket  =[      25]  .... EEPROM:  TimeoutInWWWPacket  =[      25]
 CV: EnWWW               =[       1]  .... EEPROM:  EnWWW               =[       1]
 CV: EnWWWFirewall       =[       0]  .... EEPROM:  EnWWWFirewall       =[       0]
 CV: EnWWWPassword       =[       1]  .... EEPROM:  EnWWWPassword       =[       1]
 CV: EnWWWWrite          =[       0]  .... EEPROM:  EnWWWWrite          =[       0]

FTP settings :
 CV: FTPPort             =[      21]  .... EEPROM:  FTPPort             =[      21]
 CV: FTPPortData         =[      20]  .... EEPROM:  FTPPortData         =[      20]
 CV: TimeoutFTP          =[      30]  .... EEPROM:  TimeoutFTP          =[      30]
 CV: EnFTP               =[       1]  .... EEPROM:  EnFTP               =[       1]
 CV: EnFTPFirewall       =[       0]  .... EEPROM:  EnFTPFirewall       =[       0]
 CV: EnFTPPassword       =[       1]  .... EEPROM:  EnFTPPassword       =[       1]
 CV: EnFTPWrite          =[       0]  .... EEPROM:  EnFTPWrite          =[       0]
 CV: TimeoutFTPDataTransfer=[      10]  .... EEPROM:  TimeoutFTPDataTransfer=[      10]


Special :
 CV: ATMTimeout          =[    1000]  .... EEPROM:  ATMTimeout          =[    1000]
 CV: EnATM               =[       0]  .... EEPROM:  EnATM               =[       0]
 CV: ATMSegmentSize      =[      25]  .... EEPROM:  ATMSegmentSize      =[      25]
 CV: EnModemReset        =[       0]  .... EEPROM:  EnModemReset        =[       0]
 CV: ModemResetTimeout   =[      45]  .... EEPROM:  ModemResetTimeout   =[      45]
 CV: ModemResetPause     =[    3000]  .... EEPROM:  ModemResetPause     =[    3000]


Others :
 CV: EnTerminalEcho      =[       0]  .... EEPROM:  EnTerminalEcho      =[       0]
 CV: DiskAProtect        =[      12]  .... EEPROM:  DiskAProtect        =[      12]
 CV: DiskBProtect        =[      15]  .... EEPROM:  DiskBProtect        =[      15]
 CV: DiskCProtect        =[      15]  .... EEPROM:  DiskCProtect        =[      15]
 CV: EnCheckInitPin      =[       0]  .... EEPROM:  EnCheckInitPin      =[       0]

 CV: Password1           =[1234]  .... EEPROM:  Password1           =[1234]
 CV: Password2           =[5678]  .... EEPROM:  Password2           =[5678]
 CV: CryptIdent          =[no crypt]  .... EEPROM:  CryptIdent          =[no crypt]
 CV: Command1            =[+++]  .... EEPROM:  Command1            =[+++]
 CV: Command2            =[ath]  .... EEPROM:  Command2            =[ath]
```

In most cases set configuration parameters are sufficient for correct Converters operation and should not be modified.
Technical support for these devices may be obtained directly from the producer:

TechBase Sp. z o.o.
www.a2s.pl
support@a2s.pl
tel. +48 58 345 39 22

Remote FTP configuration – defining of meters MBus addresses

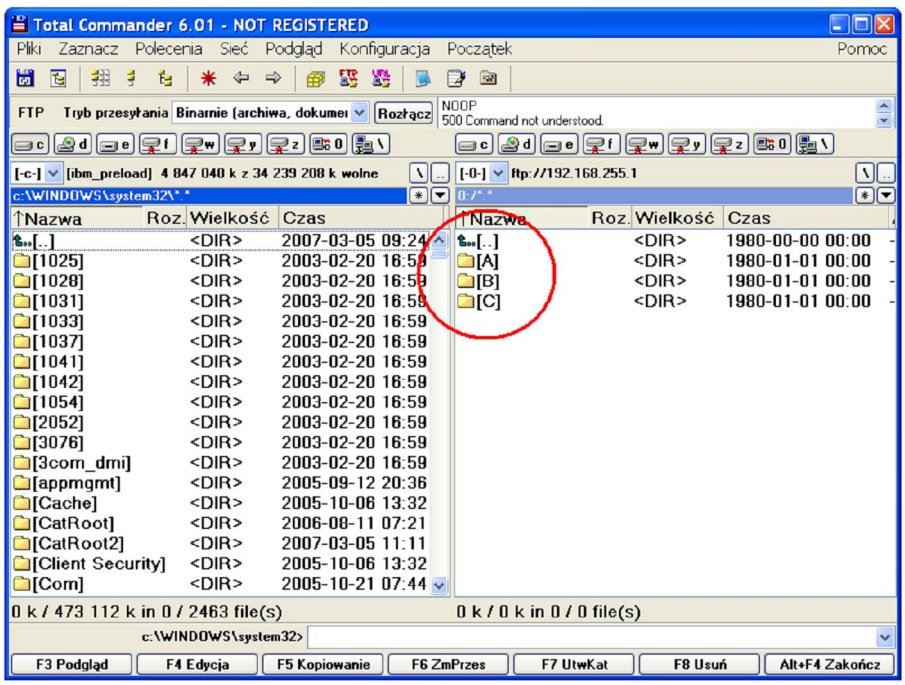
General information

With use of FTP server, built in the converter, it is possible to configure MBus addresses of thermal energy meters, connected to Converter. It is realized by uploading three text files, containing MBus addresses, to \\B folder, available through FTP server. Detailed description of configuration process is presented in further manual part.

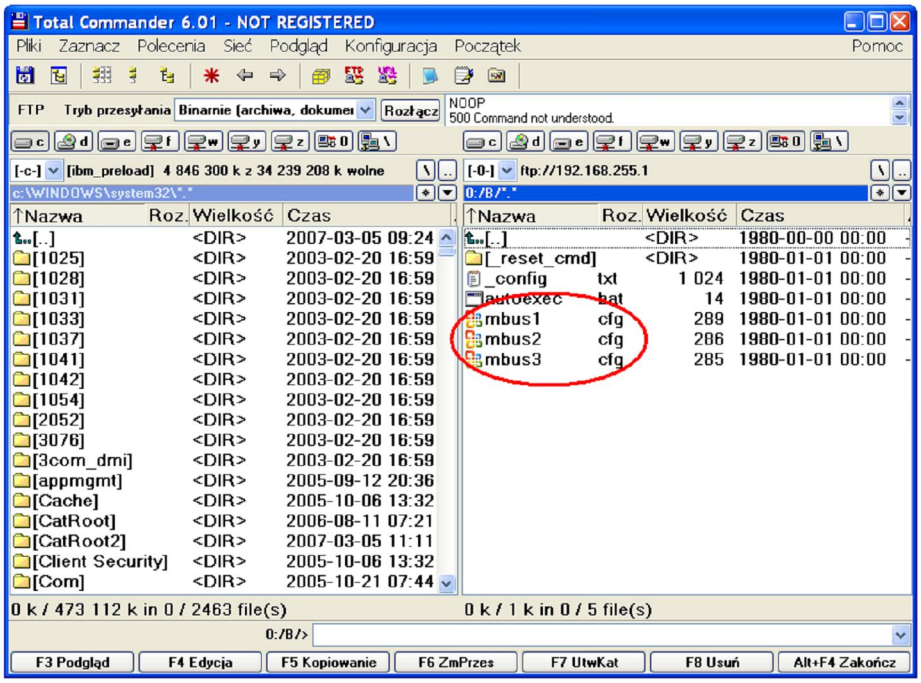
Establishing connection with Converter FTP server

To connect with Converter FTP server use any FTP client application, using active FTP mode. It is recommended to use Total Commander.
During logging to FTP server specify the following user name and password:
User: **Ad357in**
Hasło: **Ad357in**

After correct logging in to FTP server in client window three subdirectories of main directory, named: \\A , \\B i \\C .

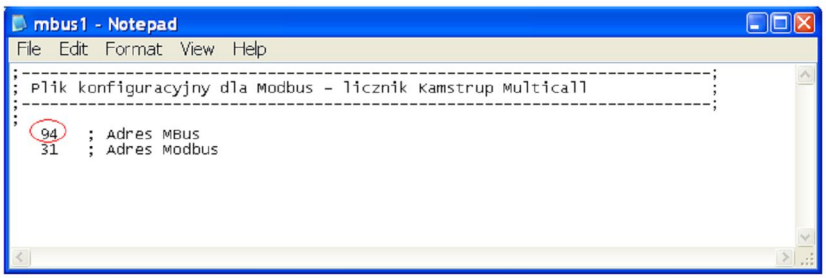


Go to \\B directory, where three configuration files for individual meters are located.



Changing meters Mbus addresses.

File "mbus1.cfg" relates to the first MBus meter, file "mbus2.cfg" to the second one, etc. Files content may be viewed with any text files editor, e.g. Notepad. Exemplary file, opened in Notepad is shown below:



To modify Meter Mbus address, change the first value, located next to *; Adres MBus* comment. In example above change value 94.
The second parameter defines Modbus address, connected with given meter, and its use is not necessary, if master software uses Modbus=1 address during Converter query.

CAUTION!
Configuration files content may be only viewed directly on FTP server. In case of any modification copy all files to PC computer disk, modify them locally, remove files from Converter and upload their modified version.
Removing any single file from given Converter directory removes all files from that directory!

Modbus address space

Below there is map of Modbus registries presented, available in I-7188E1-ML Converter.

						Zakres rejestru		Zakres wartości		
Numer rejestru Modbus	Typ urządzenia zdalnego	Nazwa Parametru	Komentarz	jedno-stka	**Read Only**	min	max	min	max	Typ zmiennej 1-integer 2-float 3-inny
40001	I-7188E	DiagCounter	Licznik diagnostyczny - zwiększa się około 18 razy na sekundę			0	30000	0	32766	1
40006		Reset7188E	uswienie wartości różnej od 0 resetuje konwerter I-7188E			0	1	0	1	1
Pierwszy licznik Kamstrup - MULTICAL										
40100		ErrorCom	Błąd komunikacji I-7188EX<-> licznik		TAK	0	4	0	4	1
40101		ModbusAddr	**Modbus** adres dla pierwszego licznika		TAK	0	250	0	250	1
40102		MBusAddr	Adres licznika w sieci Mbus (dwie ostatnie cyfry lub do 250)		TAK	0	250	0	250	1
40103		CounterType	Typ licznika - zidentyfikowany przez firmware I-7188EX			0	65535	0	65535	1
40106	MULTICAL	TempForward	Temp. Zasilania	°C	TAK	0	9.999e+007	0	9.999e+007	2
40107	=		- liczba zmiennoprzecinkowa float - 32 bit							
40108	=	TempReturn	Temp. Powrotu	°C	TAK	0	9.999e+007	0	9.999e+007	2
40109										
40110		FlowTemporary	Przepływ chwilowy	m3/h	TAK	0	9.999e+007	0	9.999e+007	2
40111			- liczba zmiennoprzecinkowa float - 32 bit							
40112		Energy	Energia	GJ	TAK	0	9.999e+007	0	9.999e+007	2
40113			- liczba zmiennoprzecinkowa float - 32 bit							
40114		Flow	Przepływ narastająco / objętość	m3	TAK	0	9.999e+007	0	9.999e+007	2
40115			- liczba zmiennoprzecinkowa float - 32 bit							
40116		HourCounter	Czas pracy	h	TAK	0	9.999e+007	0	9.999e+007	2
40117			- liczba zmiennoprzecinkowa float - 32 bit							
40118		Power	Moc chwilowa	kW	TAK	0	9.999e+007	0	9.999e+007	2
40119			- liczba zmiennoprzecinkowa float - 32 bit							
40120		Status	Kod informacyjny (kod błędu)	-	TAK	0	255	0	255	1
40121		SPARE								
40122		CounterA	Licznik wejścia impulsowego A		TAK	0	9.999e+007	0	9.999e+007	2
40123			- liczba zmiennoprzecinkowa float - 32 bit							
40124		CounterB	Licznik wejścia impulsowego B		TAK	0	9.999e+007	0	9.999e+007	2
40125			- liczba zmiennoprzecinkowa float - 32 bit							
40126		CustomerNo	Numer klienta - część 1 (x100000000)	-	TAK	0	9999	0	999900000000	3
40127			- część 2 (x10000)			0	9999	0	99990000	
40128			- część 3 (x1)			0	9999	0	9999	

						Zakres rejestru		Zakres wartości		
Numer rejestru Modbus	Typ urządzenia zdalnego	Nazwa Parametru	Komentarz	jedno-stka	Read Only	min	max	min	max	Typ zmiennej 1-integer 2-float 3-inny
Rejestry zapisane w postaci liczb stałoprzecinkowych. Pierwszy licznik Kamstrup.										
40204		S_HourCounter	Czas pracy - część 1 (x1000)	h	TAK	0	9999	0	99990000	3
40205			- część 2 (x1)			0	9999	0	9999	
40206		S_FlowTemporary	Przepływ chwilowy - część 1 (x10000)	m3/h	TAK	0	9999	0	99990000	3
40207			- część 2 (x1)			0	9999	0	9999	
40208			- część 3 (x0.001)			0	999	0	0,999	
40210		S_Flow	Przepływ narastająco / objętość - część 1 (x10000)	m3	TAK	0	9999	0	99990000	3
40211			- część 2 (x1)			0	9999	0	9999	
40212			- część 3 (x0.001)			0	999	0	0,999	
40214		S_Power	Moc chwilowa - część 1 (x10000)	kW	TAK	0	9999	0	99990000	3
40215			- część 2 (x1)			0	9999	0	9999	
40216			- część 3 (x0.001)			0	999	0	0,999	
40218		S_Energy	Energia - część 1 (x10000)	GJ	TAK	0	9999	0	99990000	3
40219			- część 2 (x1)			0	9999	0	9999	
40220			- część 3 (x0.001)			0	999	0	0,999	
40223		S_TempForward	Temperatura zasilania - część 1 (x1)	ºC	TAK	0	200	0	200	3
40224			- część 2 (x0.001)			0	9999	0	0.999	
40227		S_TempReturn	Temperatura powrotu - część 1 (x1)	ºC	TAK	0	200	0	200	3
40228			- część 2 (x0.001)			0	999	0	0.999	
40262		S_LA	Licznik wejścia impulsowego A - część 1 (x10000)	?	TAK	0	9999	0	99990000	3
40263			- część 2 (x1)			0	9999	0	9999	
40264			- część 3 (x0.001)			0	999	0	0,999	
40270		S_LB	Licznik wejścia impulsowego B - część 1 (x10000)	?	TAK	0	9999	0	99990000	3
40271			- część 2 (x1)			0	9999	0	9999	
40272			- część 3 (x0.001)			0	999	0	0,999	
40289		S_CustomerNo	Numer klienta - część 1 (x100000000)	-	TAK	0	9999	0	999900000000	3
40290			- część 2 (x10000)			0	9999	0	99990000	
40291			- część 3 (x1)			0	9999	0	9999	

						Zakres rejestru		Zakres wartości		
Numer rejestru Modbus	Typ urządzenia zdalnego	Nazwa Parametru	Komentarz	jedno-stka	Read Only	min	max	min	max	Typ zmiennej 1-integer 2-float 3-inny
Drugi licznik Kamstrup - MULTICAL										
40300		ErrorCom	Błąd komunikacji I-7188EX<-> licznik		TAK	0	4	0	4	1
40301		ModbusAddr	**Modbus** adres dla pierwszego licznika		TAK	0	250	0	250	1
40302		MBusAddr	Adres licznika w sieci Mbus (dwie ostatnie cyfry lub do 250)		TAK	0	250	0	250	1
40303		CounterType	Typ licznika - zidentyfikowany przez firmware I-7188EX			0	65535	0	65535	1
40306	MULTICAL	TempForward	Temp. Zasilania	°C	TAK	0	9.999e+007	0	9.999e+007	2
40307	=		- liczba zmiennoprzecinkowa float - 32 bit							
40308	=	TempReturn	Temp. Powrotu	°C	TAK	0	9.999e+007	0	9.999e+007	2
40309										
40310		FlowTemporary	Przepływ chwilowy	m3/h	TAK	0	9.999e+007	0	9.999e+007	2
40311			- liczba zmiennoprzecinkowa float - 32 bit							
40312		Energy	Energia	GJ	TAK	0	9.999e+007	0	9.999e+007	2
40313			- liczba zmiennoprzecinkowa float - 32 bit							
40314		Flow	Przepływ narastająco / objętość	m3	TAK	0	9.999e+007	0	9.999e+007	2
40315			- liczba zmiennoprzecinkowa float - 32 bit							
40316		HourCounter	Czas pracy	h	TAK	0	9.999e+007	0	9.999e+007	2
40317			- liczba zmiennoprzecinkowa float - 32 bit							
40318		Power	Moc chwilowa	kW	TAK	0	9.999e+007	0	9.999e+007	2
40319			- liczba zmiennoprzecinkowa float - 32 bit							
40320		Status	Kod informacyjny (kod błędu)		TAK	0	255	0	255	1
40321		SPARE								
40322		CounterA	Licznik wejścia impulsowego A		TAK	0	9.999e+007	0	9.999e+007	2
40323			- liczba zmiennoprzecinkowa float - 32 bit							
40324		CounterB	Licznik wejścia impulsowego B		TAK	0	9.999e+007	0	9.999e+007	2
40325			- liczba zmiennoprzecinkowa float - 32 bit							
40326		CustomerNo	Numer klienta - część 1 (x1000000000)	-	TAK	0	9999	0	9999000000000	3
40327			- część 2 (x10000)			0	9999	0	99990000	
40328			- część 3 (x1)			0	9999	0	9999	

						Zakres rejestru		Zakres wartości		
Numer rejestru Modbus	Typ urządzenia zdalnego	Nazwa Parametru	Komentarz	jedno-stka	Read Only	min	max	min	max	Typ zmiennej 1-integer 2-float 3-inny
Rejestry zapisane w postaci liczb stałoprzecinkowych. Drugi licznik Kamstrup.										
40404		S_HourCounter	Czas pracy - część 1 (x1000)	h	TAK	0	9999	0	99990000	3
40405			- część 2 (x1)			0	9999	0	9999	
40406		S_FlowTemporary	Przepływ chwilowy - część 1 (x10000)	m3/h	TAK	0	9999	0	99990000	3
40407			- część 2 (x1)			0	9999	0	9999	
40408			- część 3 (x0.001)			0	999	0	0,999	
40410		S_Flow	Przepływ narastająco / objętość - część 1 (x10000)	m3	TAK	0	9999	0	99990000	3
40411			- część 2 (x1)			0	9999	0	9999	
40412			- część 3 (x0.001)			0	999	0	0,999	
40414		S_Power	Moc chwilowa - część 1 (x10000)	kW	TAK	0	9999	0	99990000	3
40415			- część 2 (x1)			0	9999	0	9999	
40416			- część 3 (x0.001)			0	999	0	0,999	
40418		S_Energy	Energia - część 1 (x10000)	GJ	TAK	0	9999	0	99990000	3
40419			- część 2 (x1)			0	9999	0	9999	
40420			- część 3 (x0.001)			0	999	0	0,999	
40423		S_TempForward	Temperatura zasilania - część 1 (x1)	°C	TAK	0	200	0	200	3
40424			- część 2 (x0.001)			0	9999	0	0.999	
40427		S_TempReturn	Temperatura powrotu - część 1 (x1)	°C	TAK	0	200	0	200	3
40428			- część 2 (x0.001)			0	999	0	0.999	
40462		S_LA	Licznik wejścia impulsowego A - część 1 (x10000)	?	TAK	0	9999	0	99990000	3
40463			- część 2 (x1)			0	9999	0	9999	
40464			- część 3 (x0.001)			0	999	0	0,999	
40470		S_LB	Licznik wejścia impulsowego B - część 1 (x10000)	?	TAK	0	9999	0	99990000	3
40471			- część 2 (x1)			0	9999	0	9999	
40472			- część 3 (x0.001)			0	999	0	0,999	
40489		S_CustomerNo	Numer klienta - część 1 (x100000000)	-	TAK	0	9999	0	999900000000	3
40490			- część 2 (x10000)			0	9999	0	99990000	
40491			- część 3 (x1)			0	9999	0	9999	

trzeci licznik analogicznie (offset dla rejestrów modbus), tj.:

40500 MULTICAL

...

I-7188E1-ML <-> MBus Meter communication errors codes

In registries with numbers:

1. 40100 (16-bit registry with address 100) – for first MBus Meter
2. 40300 (16-bit registry with address 100) – for second MBus Meter
3. 40500 (16-bit registry with address 100) – for third MBus Meter

Statuses of communication between Converter and given MBus meter are signalled. Value of that registry may be used for identification of possible communication problems between I-7188E1-ML Converter and MBus Meters.

Individual values signal the following communication states:

Value of registry 40100, 40300, 40500	Description
0	Communication with MBus Meter and data conversion to Modbus standard performed correctly.
1	Data conversion from MBus to Modbus impossible due to reading of unknown MBus header. Such situation takes place in case of connecting unknown MBus Meter type.
2	MBus communication operation reached timeout. Communication process will be repeated in 10 seconds. Such state may sometimes occur, when meter is busy with other calculations – it is such described in Kamstup Multicall producer's documentation.
3	Data conversion from MBus performed with checksum error. Communication process will be repeated in 10 seconds.
4	Given meter is turned off. Configuration file not uploaded to FTP server.
5	Given meter is not refreshed yet after restart/Converter supply turn on. Such state is reported until the first communication process.