MV-90 and ION technology

This technical note provides all the necessary information to configure and use a PowerLogic™ ION™ meter with MV-90 meter data collection and processing application. It assumes that the reader is already familiar with MV-90.

In this document

Additional information

◆ For meter wiring and configuration details, refer to your meter's documentation, available from www.schneider-electric.com.

◆ For the latest TIM-ION and TIM_ION application notes, or for more information on using or configuring MV-90, MVWIN, MV-COMM, MVLT, MVTCP/IP and MVP, refer to the UTS/ITRON support group at www.itron.com.

◆ For the latest version of ION Setup, go to www.schneider-electric.com.

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Hazard categories and special symbols

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this manual or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, can result in death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, can result in minor or moderate injury.

CAUTION

CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, can result in equipment damage.

📝 NOTE

Provides additional information to clarify or simplify a procedure.

Please Note

Electrical equipment should be installed, operated, serviced and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

Safety precautions

Installation, wiring, testing and service must be performed in accordance with all local and national electrical codes.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E in the USA or applicable local standards.

- This equipment must only be installed and serviced by qualified electrical personnel.

- Turn off all power supplying this device and the equipment in which it is installed before working on the device or equipment.

- Always use a properly rated voltage sensing device to confirm that all power is off.

- Connect protective ground (earth) before turning on any power supplying this device.

- Replace all devices, doors and covers before turning on power to this equipment.

Failure to follow these instructions will result in death or serious injury.

Introduction

MV-90 software (developed by UTS/ITRON) is a multi-vendor translation system that collects and analyzes data from a variety of different brands of meters. One of the unique features of MV-90 is its ability to log information coming from several different brands of meters, each with their own unique data formats. MV-90 can then manipulate that data using Translation Interface Modules (TIM), without extensive knowledge of the device of origin. Each TIM acts as a protocol translator specific to a device type, and converts some pre-defined data from a meter to the MV-90 database format. The TIM used for ION meters is called TIM_ION.

📝 NOTE

Make sure that you have the latest version of the TIM_ION to help access any new features or enhancements.

Translation Interface Module (TIM_ION) features

TIM_ION is available as both an EXE and a DLL file; the DLL file is designed for use with MVCOMM. The TIM_ION has been available since MV-90 version 3.1 SP1 (release 506 for DOS and Windows).

Some features work only with the latest release of MV-90, TIM_ION, and/or version of ION meter firmware.

TIM_ION module offers the following features and capabilities. It reads:

◆ anywhere from 1 to 16 data channels.

◆ cumulative and interval data.

◆ binary/register data.

◆ the meter's Event Log.

◆ the meter's time.

◆ the meter's data over serial, modem, or Ethernet communication links.

TIM_ION module also supports:

◆ manual and auto time-set of the meter's clock, while ensuring that auto-time sets will not cause the meter to cross an interval boundary.

◆ both standard and advanced ION security modes.

◆ daisy-chain topologies.

◆ MV-90, MVWIN, MV_COMM, MVLT, MVTCP/IP, MVP.

Terminology

For a better understanding of MV-90 and the ION meters, it is necessary to know that:

◆ an ION "Meter" is an MV-90 "Recorder".

◆ an ION "Data Recorder source" is an MV-90 "Channel".

◆ an ION "Integrator Rollover" is an MV-90 "Channel's Number of Dials".

◆ TIM is a "Translation Interface Module".

◆ E-Files are "Engineering Unit" data, which is the standard MV-90 data format.

Configuring an ION meter for MV-90

Make sure you have up-to-date support for MV-90 features by downloading the latest version of ION Setup from www.schneider-electric.com.

The factory template for ION meters is already configured for integration into your MV-90 system. No meter programming is required. The factory template information is listed in the *ION Device Template Reference*, available from www.schneider-electric.com.

There are three basic steps to implement your ION meter's factory-standard revenue information into your MV-90 system:

1. Confirm your Load Profile (revenue log) data sources (MV-90 channels).

2. Export the Master.dat file for your meter or print out your meter's configuration report for manual data entry. See "Generating a Master.dat file" on page 8.

3. Import the Master.dat file into your MV-90 system to configure MV-90 channel and source information.

4. In your MV-90 system, go to Master File Maintenance and go to the **Recorder > Comm** tab. Enter the **Connect Type** for your meter that matches the MV-90's Port Connection Type.

You can now access your ION meter through your MV-90 system and download revenue data.

This section describes how to use ION Setup to customize data logging, set communication port protocols, and export HHF files

Data logging configuration

> 📝 **NOTE**
>
> For instructions on how to configure your meter's data recorders and integrators, refer to your meter's documentation.

For the TIM_ION module to acquire data from an ION meter, the meter must be configured as follows:

◆ All the required parameters must be linked to inputs of Data Recorder 1.

> 📝 **NOTE**
>
> Data Recorder 1 is labeled as the Revenue Log on most ION utility meters.

◆ At least one input of Data Recorder 1 must be linked; the maximum number of inputs is 16.

◆ Data Recorder 1 recording must be triggered between 1 and 60 times per hour.

> 📝 **NOTE**
>
> Any changes to the data recorder registers will erase the data recorder contents. To avoid data loss, download the recorder's data before changing data recorder registers.

◆ If integrated values are logged, set the integrator's rollover value to 10^6 or 10^7 (IEEE 754). Refer to the *ION Device Template Reference* for details regarding the factory configuration of your meter.

◆ For MV-90 to read register/binary data, this data must be mapped as per "Appendix 2" on page 17. This is the default for all ION meter firmware (however, not all meter platforms support all data types).

Communications configuration

For MV-90 to communicate with an ION meter using a serial port, the meter's serial communication protocol must be set to ION. No communications protocol is required if MV-90 is connected to the meter using Ethernet.

> 📝 **NOTE**
>
> Refer to "Appendix f: Using EtherGate and ModemGate" on page 27 for details on communicating using EtherGate or ModemGate.

If MV-90 is to synchronize the time on an ION meter, the clock module in the meter must be set to accept time synchronization on the port used for MV-90 communication. If MV-90 is using the Ethernet communications port, you can also specify the time synchronization source protocol.

Refer to your meter's user documentation for information on configuring your meter's clock module and communications, and the *Time Synchronization and Timekeeping* technical note for detailed information on time synchronization of ION meters.

Advanced Security

If you have enabled Advanced Security on your meter, you must consider the following password values in your MV-90 system.

> 📝 **NOTE**
>
> Refer to your meter's documentation for information on configuring Advanced Security on your meter.

For the TIM Assignments Password Length field, refer to "TIM_ION Module assignment" on page 12.

Phone Password 1 is required only when Advanced Security has been set up in the meter; otherwise, it is left blank. If Advanced Security is enabled, all passwords in the Phone Password 1 field are entered as a two-digit user identity (ID) followed by a password of up to 8 digits. There are two possible types of passwords:

◆ Numeric: Password can be a numeric value, and MV-90 recognizes numeric passwords up to 8 digits long.

  ◆ For example: user ID 4 with a password of 7654321 sets the password 1 field to "047654321".

◆ Alphanumeric: Passwords can also be a case-sensitive word of up to 6 characters with no blanks or special characters.

  ◆ For example: user ID 8 with a password of "SLeePY" sets the password 1 field to "08SLeePY".

Generating a Master.dat file

In order to recognize and communicate with your meter, the MV-90 software needs a Master.dat configuration file containing your meter's information. The Master file can be created manually in the MV-90 software, or you can use ION Setup software (version 2.1 and later) to automatically generate the Master file. ION Setup allows you to save the Master file to load into the MV-90 database, or you can print a hardcopy to enter the configuration information manually.

📝 NOTE

If ION Setup does not have the option for you to automatically create a Master file for your meter, you can print out the meter's configuration file and manually enter the meter data into your MV-90 system. Refer to "Troubleshooting" on page 19 for instructions on how to generate the meter's configuration file from ION Setup.

Using ION Setup

1. Open the Setup Assistant for your meter. See the ION Setup Help for instructions.

2. Select **Reports**.

3. Select MV-90 Report and click **Display**. The MV-90 assistant appears.

A	Matches the Customer ID in your MV-90 system.
B	Matches the TIM Number in your MV-90 system.
C	Select Auto Timeset to enable the MV-90 Auto Timeset feature.

4. Enter or review the information that is used to identify the meter in the MV-90 database.

◆ The **Customer ID** and the **TIM Number** must match the customer ID and TIM number in your MV-90 system.

📓 **NOTE**

The **Customer ID** cannot contain spaces or special characters.

◆ **Auto Timeset** enables the automatic timeset feature on your MV-90 recorder (refer to "Auto Timeset" on page 15).

◆ **MV-90 User** allows you to select a user ID that is different than the one you are currently using to access the meter, for meters that are using Advanced security. If you select a different user, you are prompted for the user password. Refer to "Supported MV-90 TIM Functions" on page 17 for more information on users and passwords.

Enter the appropriate information in the fields and click **OK**. The MV-90 configuration report is generated for the meter.

5. Click **Save As** to save the file as an MV-90 Master file (Master.dat) or **Print** to print a hardcopy.

📓 **NOTE**

When saving your Master.dat file, make sure your filename is compatible with your MV-90 system.

Refer to "MV-90 database configuration" on page 12 for details on importing your Master.dat information into your MV-90 system.

Configuration for HHF files

This section describes how to configure ION Setup if you are doing revenue log data collection using .HHF files.

Using ION Setup

1. Open ION Setup and connect to your meter. See the ION Setup Help for instructions.

2. If the Setup Assistant window is displayed, close it by clicking **Exit**.

3. Select your meter, and select **Tools > Options.**

4. Select the **HHF** tab.

5. Enter your MV-90 configuration information. For **File Format**, select **E-File** for standard engineering unit MV-90 data.

6. Click **OK** to save your HHF settings.

Generating HHF files

You must enter your MV-90 HHF file configuration details before you can export and save .HHF files from ION Setup to load into your MV-90 system.

Using ION Setup

1. Open the Setup Assistant for your meter. See the ION Setup Help for instructions.

2. Select **Reports**.

3. Select **Load Profile**, and click **Display**. The Upload Log Records dialog is displayed.

4. Select the records you want to upload and click **OK**. The Load Profile dialog is displayed.

5. Select **Print** to print a hardcopy or select **Save As** to save the data. If you have selected **Save As**, the Save As window appears.

   ◆ Go to the **Save as type** drop down menu and select **Hand Held Format File (*.HHF).**

   ◆ Navigate to where you want to save your HHF file and click **Save**.

Disabling power quality event logging

You can disable Sag/Swell and Transient event logging to reduce the amount of data logged and speed up MV-90 downloads of revenue data.

📝 **NOTE**

The Sag/Swell and Transient features are not available on all meters.

Using ION Setup

1. Open the Setup Assistant for your meter. See the ION Setup Help for instructions.

1. Select **Logging > Event Log**.

2. Select the Sag/Swell *EvPriority* register and click **Edit.**

3. Enter your meter password if prompted.

4. Set *EvPriority* to zero (0) to disable Sag/Swell event logging and click **OK**.

5. Repeat steps 3 through 4 for Transient (if present).

Enabling loss of potential event logging

Loss of potential (voltage) events can be enabled and logged in your meter's event log using ION Setup. This information can be used by MV-90 to provide phase loss event reporting.

MV-90 phase loss event details:

MV-90 event description	MV-90 event code	MV-90 effect handle	Event priority
Potential A inactive	A0	6064	*EvPriority* value from the meter's Sag/Swell module
Potential B inactive	A1	6065	
Potential C inactive	A2	6066	

Using ION Setup

1. Open the Setup Assistant for your meter. See the ION Setup Help for instructions.

2. Select **Logging > Event Log.**

3. Select *PhaseLossEnable* and click **Edit**.

4. Choose **ON** (to enable loss of potential logging) or **OFF** (to disable loss of potential logging) from the **Select PhaseLossEnable** pop-up window and click **OK**.

MV-90 database configuration

To import ION meter data into your MV-90 data management system, your MV-90 system needs the latest TIM_ION and a configuration (*.cfg) file. You also need a Master.dat file for each ION meter.
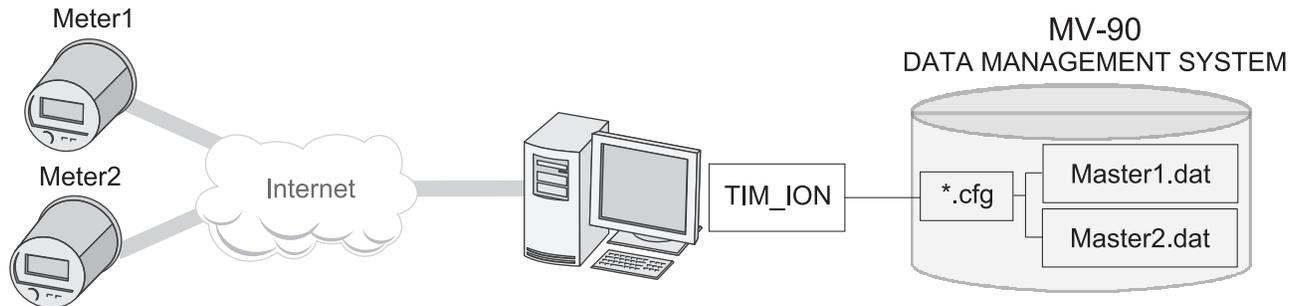
Refer to "TIM_ION Module assignment" on page 12 for details on how to set up the TIM_ION in your MV-90 system, refer to "Generating a Master.dat file" on page 8 to generate a Master file from ION Setup, and refer to "Appendix a: MV-90 configuration files" on page 22 for details on MV-90 configuration files.

The configuration procedure covers the following areas:

◆ TIM_ION Module Assignment

◆ Communications Setup

◆ Recorder and Channel Configuration

◆ Advanced Security

◆ Troubleshooting

TIM_ION Module assignment

If the TIM_ION does not show up in the list of available TIMs, you must import it into your MV-90 system and assign it a number. Relevant parameters are described below.

1. In your MV-90 system, go to **System Control > System Parameters** > **TIM Assignments**.

2. Right-click and select **Add** (or go to **Edit > Add**).

3. Select the first available number and assign it to TIM_ION.

📝 **NOTE**

The TIM_ION number must match the TIM Number in your Master file.

TIM Assignment Parameters

Parameter	Description
Program Name	TIM_ION
Protocol	ION
Manufacturer	Schneider Electric
Devices	7700ION; this TIM will work with 7330ION, 7350ION, 7500ION, 7550ION, 7600ION, 7650ION, 7700ION, 8300ION, 8400ION, 8500ION, 8600ION, 8650ION, 8800ION.
TIM Message Level	Level 5 is recommended.
Default config file	If a default configuration file is used, it can be specified here. Refer to "Appendix a: MV-90 configuration files" on page 22
Device ID Length	"0" (zero) is recommended as this allows a variable length. See "Device ID Length" on page10.
Device ID Type	The TIM_ION module supports all Device ID formats: hexadecimal, numeric or alphanumeric. Alphanumeric is recommended. Check "Device ID Type:" on page10 for examples.
Password Length	"0" (zero) is recommended as this allows a variable length. This allows for differences between the Phone password 1 and 2 fields.
Password type	Alphanumeric.
Interval Bits	16
Comm Parameters Tab	
Parity	None
Data Bits	8
Stop bits	1

Communications setup

Refer to your MV-90 user documentation for instructions on creating and configuring workgroups and workstations.

1. In your MV-90 system, go to **System Controls > System Parameters**.

2. Select **Communications WS** and expand to view all ports.

3. Configure each port with the appropriate data link.

📝 NOTE

The data link must match the recorder's communication connection type for that port. Refer to "Appendix e: Master file settings for TCP/IP" on page 26 for communications settings for Ethernet connected meters.

Recorder and Channel Configuration

Setting up the Master file for an MV-90 recorder requires that you add and configure an ION meter (the MV-90 recorder) and its data recorder (the MV-90 channel) in MV-90. Guidelines are presented below.

> ✎ **NOTE**
>
> Only the technical parameters are described. Information parameters (i.e., customer's address) are not described.

Import a Master File to MV-90

The easiest way to set up an MV-90 recorder is to import a Master.dat file to help configure the technical parameters. You can generate a Master.dat file from ION Setup; refer to"Generating a Master.dat file" on page 8.

1. Copy the Master.dat file to the MV-90 root folder.

2. Click **Master File Maintenance**. In the Master File Maintenance screen, go to **File > Import Master File**.

3. Master.dat is the default file name.

   You should see all records imported successfully.

   The number of successfully imported records will equal the number of data channels (data recorder sources) configured on your recorder (ION meter).

> ✎ **NOTE**
>
> MV-90 does not allow a duplicate Device ID. You can modify your meter's Tag2 value to change its Device ID.

Manually create a Master File

To manually add and configure an ION meter as an MV-90 recorder, go to **Databases > Master File > Maintenance**. You must add a customer in order to create a new recorder and configure channels with the settings listed below.

Recorder Master file parameters

Set the Recorder parameters according to the listings below:

Parameter	Value	Details
Recorder (Recorder screen)		
Device ID	Meter's Tag 2 or Serial #	Although it can be set in the Master file in three different ways, the recommended method of generating a Recorder device ID is as an alphanumeric string of variable length ("0") based on the TAG2 value from the Factory module of the meter. If the TAG2 in the meter's Factory module is blank, the TAG2 value is the serial number of the meter. The standard format of the meter's serial number is xx-xxxxxxxx-xx. Hyphens must be included. The TIM_ION is also backward compatible with the legacy method of using the ION meter communication port Unit ID formatted as either: ◆ a 4-digit hexadecimal equivalent of the decimal unit ID configured into your ION meter for the appropriate communication port. ◆ a 5-digit decimal number, based on the decimal unit ID configured into your ION meter for the appropriate communication port. Example**:** If the unit ID of COM port 1 of your meter is 1234, the 5-digit numeric device ID is 01234 (add a leading zero to the 4-digit unit ID). The 4 digit hexadecimal equivalent device ID is 04D2. If the meter's serial number or Tag2 are the Device ID, then Phone Password 2 must be the meter's Unit ID. Refer to "Appendix e: Master file settings for TCP/IP" on page 26 for Ethernet Device ID values.
Call/Ret mode	**AN** (Answer mode)	Must be set to **AN** (Answer mode). ION meters do not initiate calls in MV-90.
Interval per hour	Minimum 1, maximum 60	How many times per hour the meter logs data. The minimum is 1 (once per hour) and the maximum is 60.
Active channels	Minimum 1, maximum 16	Should exactly match the number of data recorder sources (MV-90 channels) set up in the meter (between 1 and 16).
More (Recorder Screen)		
TIM Number	See Details	The number mapped to your TIM_ION module.
Device follows DST	**No**	Must be set to **No**. ION meters can follow DST, but the data and event timestamps are returned to MV-90 in GMT, and MV-90 applies the appropriate time zone and DST offsets according to the Master file parameters.
Time Zone Adjust	See Details	Time difference, in minutes, between local meter time and local MV-90 time. For example, if the MV-90 machine is in Texas, and the meter is in California, Time Zone Adjust = 120.
Auto Timeset	**Yes**	Must be set to **Yes**. The TIM_ION module can set the time in ION devices, and Auto Timeset helps ensure that this does not cause the meter to cross an interval boundary. Refer to "Generating a Master.dat file" on page 8 for details on how to select this option.

Parameter	Value	Details
Memory size (Kb)	0	This defines the size of the recorder RAM.
TIM Config File	See Details	Use one of two methods to provide the required information: ◆ Short hand method: T=x where x is the time difference between Standard Local Time at the meter location and GMT. It is a decimal value of 1 to 3 characters between -12 and 12. For example, if the meter is in California, then T=-8 ◆ Config File method: Insert the name of the TIM config file (See Appendix a: MV-90 configuration files for more details).
Daisy Chain	See Details	It is possible to connect to ION meters so that you can read more than one meter in a single phone call. To read daisy-chained meters, the master/slave daisy-chain flag is set to Master for the first meter and Slave for the rest. The device ID of the master is entered into every Master ID field in the chain. The Slave ID is the next meter to interrogate on the same call. The Slave ID of the last meter on the daisy chain is always blank.
	Comm (communications) screen	
Phone number – MV-90	See Details	Your remote site phone number. Refer to "Appendix e: Master file settings for TCP/IP" on page 26 for Ethernet connected meters or "Appendix f: Using EtherGate and ModemGate" on page 27 for EtherGate and ModemGate connected meters.
Baud Rate	See Details	As configured at your remote site. This matches the baud rate configured on your ION meter for the appropriate communications port, and is typically set to 9600 baud.
Phone Password 2	See Details	◆ If the Device ID is set to the meter's serial number or Tag2, this must be set to your meter's actual COM port UNIT ID, typically 5 digits in length if decimal or 4 digits in length if hexadecimal. ◆ If you are communicating via Ethernet, Phone Password 2 must be set to 00100 (decimal) or 0064 (hexadecimal) for a direct connection to the Ethernet meter. ◆ If you are using ModemGate or EtherGate communications, refer to "Appendix f: Using EtherGate and ModemGate" on page 27. ◆ Otherwise, this value can be left blank.
Answer window	See Details	00012400 or as per ION meter setup.
Days	"A"	'A' or as per ION meter setup.
Connect Type	See Details	If you have imported the meter's Master.dat file from ION Setup, this should be the only value you need to manually enter. This parameter must match the communication port's connection type. Refer to "Communications setup" on page 13. For Ethernet connections, refer to "Appendix e: Master file settings for TCP/IP" on page 26.

Channel Master File parameters

Refer to the following configuration parameters:

Parameter	Value	Details
	Channel screen	
Unit of Measure	Refer to Details	For the TIM_ION this is "1" for kWh readings and "3" for kVARh readings.
Set Number	Refer to Details	Must be unique (or set to 0) for each channel, except for channels that are to be added together. Example: If channels 1 and 3 are kWh that are to be added together, then they must have the same Set Number. All the other channels must have different Set Numbers.
Register type	Both Encoder and Visual	

Parameter	Value	Details
Encoder type	Refer to Details	◆ If the channel is used for interval data, and validation is to be performed by MV-90 on this channel, the Encoder Type has to be set as per the table in Appendix 2. ◆ If the channel is used for a non-cumulative value such as Volts, Amps, kW, kVAR, kVA, and no register read is required, then the Encoder type must be '**NO**'. ◆ If the channel is used for a cumulative value (interval values computed as deltas) such as V2h, I2h, kWh, kVARh, set the Encoder type to '**CV**'. ◆ If the channel is accepting the cumulative output of a digital pulse, set the Encoder type to "**CV**". ◆ If cumulative values are to be read by MV-90 as is, set the Encoder Type to '**NO**'.
Number of Dials	Refer to Details	This is the number of digits where the rollover of a cumulative value occurs. For example: If the kWh Integrator module of your ION device is set to rollover at 10^7 (or 10,000,000) then the Number of Dials for the corresponding channel is 7 (seven).
Power Flow	Refer to Details	Delivered for DEL or Import data, Received for REC or Export data
Multipliers and Readings screen		
PT/CT Ratio	Refer to Details	1 for V2H and I2H channels, 0 for all other channels.
Meter Multiplier	Refer to Details	1 if the meter is set up to return primary data, or the (PT ratio) * (CT ratio) if the meter is set up to return secondary data. Refer to Note.
Pulse Multiplier	Refer to Details	In order that recorder data successfully validates against meter data, this field must have the same value as the Meter Multiplier. Refer to Note.

📝 **NOTE**

Meter multiplier and pulse multiplier values are configured for MV-90 standard checking based on whether the recorder (meter) is recording primary or secondary data.

For standard (E-File) data format, the meter multiplier and the pulse multiplier must be the same value.

Supported MV-90 TIM Functions

Initialize Recorder

The "initialize recorder" function sets the time in the meter, checks where to allow load profile to start and sets the MV-90 database to accept the data.

All Read

This function reads all the load profile data available from the meter. Use the All Read function for the first read of meter data.

Partial Read

This function reads the meter load profile data from the last read date to the most current interval. If the last date read is before the initialization date, the first record in the load profile, or in the incorrect format, then the TIM automatically converts the partial read to ALL READ, and reads all data available after the initialization date.

📝 **NOTE**

Partial/Full reads should be done at least two intervals apart or two intervals after an initialization in order to help correctly process cumulative values.

Setting Passwords

You cannot set the user 1 (usually the highest-level user) password at the same time as additional users. This process works best when user 1 (USER01) is pre-established in the Master file. You can then set the passwords for other advanced security users established in the meter setup.

Password 1 may be set if the meter is using the Advanced Security module. Password 1 will consist of a two-digit user identifier (00-16) followed by up to 6 alphanumeric characters or up to 8 numeric digits. The password change function and initialization function has the ability to set any ION user's password (in TIM_ION releases after 11/19/02).

If the user identifier (ID) matches the user ID of the password 1 field, the Master file will be updated. The Password Change and Initialize function requests will write the Password if the WRITEPW keyword exists in the TIM configuration file or the password is entered in the New Password Field on the Manual Remote Interrogation screen.

The Password 1 field in the MV-90 Master File will be updated if the new password's user ID matches the user ID of the password in the Master file. The password 1 field will also be updated if the password 1 field is currently blank and the new password is for user 1.

If password 1 is blank and it is updated with user 1's password, the DEFAULTPW keyword in the configuration file will no longer specify the default password because the password 1 field is no longer blank. The user ID and password (provided as the default password in the TIM configuration file or entered in the Master File) must have the appropriate security to update the password parameters.

Default Advanced Meter Password DEFAULTPW=UUPPPPP (supported after version 11/19/02)
The value UU indicates the user ID and PPPPP represents the password for that user ID. The default password is used if no password is present in the Password 1 field in the MV-90 Master File. The user ID and password (setup as the default password in the TIM Config file or entered in the Master File) must have the appropriate security to update the password parameters.

Write New Password to Meter WRITEPW =UUPPPPPP (supported after version 11/19/02)
If the meter's password is set or the meter is initialized, new-password is the password that will be changed in the meter (in the IONTM password format of UUPPPPP). Any user ID can be changed, provided that the password defined in the Password 1 field or the default password (if no Password 1 defined) has the proper permissions. There may be multiple (up to 15) WRITEPW keywords used within a single configuration file to set the password for multiple user ID's on a single change password or initialization function request. If the new-password has the same User ID as the password defined in the Password 1 field in the MV-90 Master File, it will automatically be updated to the new password. If the Password 1 field is blank, it will update the field with the new-password if the user ID in the new-password is user ID 1 (01).

Set Time

This function adjusts the meter time using the current MV-90 system time. The time stored in an ION meter is in the Universal Time Coordinate (UTC/ GMT) by default. In order to calculate the "time to set", the system time is adjusted using the time zone offset in the Master file and the T= parameter from the configuration (CFG) file. The time zone offset in the ION meter must match the T= value. Refer to "Appendix a: MV-90 configuration files" on page 22 for more information on configuration file set up.

Update DST Times

Although ION meters can display local time with or without DST applied, this function is not needed and not used by the TIM_ION module.

Data Retrieval

Since intervals are timestamped by the ION meter, two special cases are handled by TIM_ION:

◆ Gaps in intervals are filled with zero values and marked as 'Missing Data' in the interval status.

◆ Overlaps are kept and marked as 'Time Reset' in the interval status.

TIP

Perform a data retrieval step to verify your recorder's configuration.

Troubleshooting

MV-90 Debug Log

The MV-90 system can be configured to generate debug files. The TIM (meter communications) file '*.rd' contains valuable information such as:

◆ Date of the TIM_ION

◆ Time zone configuration method used (i.e. T=-8; ION.CFG)

◆ Device ID in hexadecimal format

◆ Successful response to Read request

◆ MV-90 error messages

NOTE

Refer to the MV-90 system's online help for information on the TIM (meter communication) debug file.

How to Export a Master File from MV-90

1. Go to **Databases** > **Master File**.

2. Select **Export Master File**.

3. Change the default Master.dat file name if desired.

The number of successfully exported records will equal the number of data channels configured within MV-90. A file with the specified filename is created within the MV90/Master folder.

Master File Report

1. Go to **Databases > Master File > List Master File**.

2. Choose the default options of **List Combined Files** and **By ID**.

3. Enter the Customer ID and run the report.

☞ TIP

To view a Master file, open it with Microsoft Notepad.

ION Setup

It is also possible to use ION Setup as a troubleshooting tool for MV-90 by using the "Meter Configuration Report" available in the Setup Assistant. To view/print a meter configuration report in ION Setup:

1. Open ION Setup in single device mode (this helps ensure ION Setup connects to the appropriate device).

2. Once connected to the meter, open Setup Assistant and click **Reports**.

3. Click **Meter Configuration**, then click **Display**.

ION Setup generates a meter configuration report. The report contains information useful as a troubleshooting tool for the MV-90.

Example of Meter/Channel Master File Entries

The following is a sample of a MV-90 Master File configuration for an ION8600 meter with a factory default configuration. These values may vary depending on your meter type and configuration.

📝 **NOTE**

You must first perform a TIM assignment by creating an entry for the TIM_ION.

Master File: Recorder Master File Maintenance	Values
Intervals per hour/ daily	4
Call/retrieval mode	AN
TIM number	Created within TIM assignments
Device ID	Meter Serial Number
Master File: Remote Interrogation	**Values**
BAUD rate	9600
Auto timeset	Y (if MV-90 is used to time sync the meter)
TIM config file	T= -8 (time zone offset or name of '<filename>.cfg')*
Channel Master FIle Maintenance	**Values**
Unit of Measure code	1=kWh; 3=kVARh
Meter multiplier	1 (if primary units); CT * PT (if secondary units)
Pulse multiplier	1 (if primary units); CT * PT (if secondary units)
Register type	B (both encoder and visual)
Number of dials	7 (cumulative integrator rollover setting)
Encoder type	kWh del = 1; kWh rec = 2; kVARh del = 5; kVARh rec = 6
Enter optional data	Y (power flow direction: D=delivered; R=received)

* Refer to "Appendix a: MV-90 configuration files" on page 22.

Appendix a: MV-90 configuration files

The following points give additional information about MV-90 configuration files:

> 📝 **NOTE**
>
> Quotation marks ("") in the descriptions are for clarity and are not part of the parameters.

◆ "T=xx" in the Master file's "Config file" field is sufficient for MV-90 to read ION meters and an actual config file is NOT required.

◆ Configuration files can have any legal DOS name, and usually have a .CFG extension.

◆ The default location is the main MV-90 directory for DOS RI_IMP and the Master directory for WINDOWS RI_COMM/MV_COMM; however, any valid path name may be used.

◆ Comments may be added by placing an exclamation mark, '!', in the first column of any line.

◆ Each parameter must be on a separate line and beginning in column 1. Spaces are not allowed.

◆ The configuration file can be created and/or edited with any text editor, such as Notepad.

Configuration file for MV-90

The following parameters are allowed in an MV-90 config file; only "T=n" is required for standard (E-File) data.

Parameter	Description
T=n	See "Example of Meter/Channel Master File Entries" on page 21.
R=n	Should be equal to the "Data Recorder 1 depth" set in the meter.* (1 to 4 digits: maximum FFFF) This parameter is a hexadecimal number of history log records setup in the meter.
RDIG=n	Number of digits before a cumulative channel rollover occurs. It is a decimal number (if rollover is set at 1 million then RDIG=6).
ROF=n	Maximum negative progression of a cumulative channel in an interval before it is assumed a rollover has occurred. Value is expressed as a **percentage** of the rollover value and entered as a whole number (50% entered as '50' not '0.5').
RECBUF=n (supported after 11/01/99)	Set to '15' to minimize connection time with the meter. Set to '1' for remote sites with limited communications. This parameter defines an integer number between 1 and 15 that represents the number of records requested in each read command.
EVENT_CUTOFF=n (supported after 11/01/99)	Defaults to 0 (zero) to read all events. Set above 255 if no events are to be logged. This parameter defines which meter events will be imported in MV-90. Only meter events with a priority equal to or greater than EVENT_CUTOFF are recorded in MV-90's event log.

Parameter	Description
TO=n (supported after 2/28/00)	1200 (12 seconds) is an adequate value. Allowed values are 100 - 12000. This parameter defines the number of hundredths of seconds to wait for the meter to return the first character of its response.
ITO=n (supported after 2/28/00)	1000 (10 seconds) is an adequate value. This parameter defines the inter-character timeout. It is the number of hundredths of seconds to wait for each byte of data from the meter after the previous byte has been received.

*   R is no longer required (11/09/99). The recorder depth is read from the meter, but this value may be included to override the meter settings. This is useful when you do not want to read all of the sources (MV-90 channels) of Data Recorder 1.

Config file for MVLT, MVP

The following are the parameters allowed in an MVLT or MVP config file; DEVID, T, CHAN, INPHR, CV are required.

Parameter	Description
DEVID=n	Device ID of the meter (see "Example of Meter/Channel Master File Entries" on page 21) and must be the first entry of each configuration block. The configuration for this device continues until the next DEVID= or the end of the CFG file.
UNIT=XXXX or UNIT=ddddd	Must be specified if the device ID is either the meter's serial number or Tag 2. Refer to "Example of Meter/Channel Master File Entries" on page 21.
R=n	See "Configuration file for MV-90" on page 22.
T=n	See "Configuration file for MV-90" on page 22.
CHAN=n	Number of channels in the meter; It has to match the number of inputs to Data Recorder 1 in this meter.
INPHR=n	Number of intervals per hour recorded by the meter.
CV=n":	Channel number of a channel that records a cumulative value. There must be an entry for each channel that stores cumulative data.
RDIG=n	See "Configuration file for MV-90" on page 22.
ROF=n	See "Configuration file for MV-90" on page 22.
RECBUF=n	See "Configuration file for MV-90" on page 22.
EVENT_CUTOFF=n	See "Configuration file for MV-90" on page 22.

Example of MVLT configuration file:

DEVID=01234
CHAN=4
INPHR=4
T=-5
RECBUF=15
EVENT_CUTOFF=65000
CV=1
CV=3

Appendix b: Register map for data validation

MV-90 encoder type	Data type	ION Integrator module #	ION handle number	MV-90 encoder type	Data type	ION Integrator module #	ION handle number
'CV'	Value Recorded on last interval	N/A	N/A	'55'	kwh Q1	INT 55	#5FB7
'NO'	Interval data only; No Register read	N/A		'56'	kwh Q2	INT 56	#5FB8
'01'	KWh imp del	INT 1	#58B0	'57'	kwh Q3	INT 57	#5FB9
'02'	KWh exp rec	INT 2	#58B1	'58'	kwh Q4	INT 58	#5FBA
'03'	KWh tot (del + rec)	INT 3	#58B2	'59'	kQh Del D	INT 59	#5FBB
'04'	Kwh Net (del rec)	INT 4	#58B3	'60'	kQh rec D	INT 60	#5FBC
'05'	kvarh imp del	INT 5	#58B4	'61'	kwh del A current season	INT 61	#5FBD
'06'	kvarh exp rec	INT 6	#58B5	'62'	kwh rec A current season	INT 62	#5FBE
'07'	kvarh tot del + rec	INT 7	#58B6	'63'	kwh del B current season	INT 63	#5FBF
'08'	kvarh net del – rec	INT 8	#58B7	'64'	kwh rec B current season	INT 64	#5FC0
'09'	kvah imp del	INT 9	#58B8	'65'	kwh del C current season	INT 65	#5FC1
'10'	kvah exp rec	INT 10	#58B9	'66'	kwh rec C current season	INT 66	#5FC2
'17'	kvarh Q1	INT 17	#5C3B	'67'	kwh del D current season	INT 67	#5FC3
'18'	kvarh Q2	INT 18	#5C3C	'68'	kwh rec D current season	INT 68	#5FC4
'19'	kvarh Q3	INT 19	#5C3D	'69'	kvar del A current season	INT 69	#5FC5
'20'	kvarh Q4	INT 20	#5C3E	'70'	kvar rec A current season	INT 70	#5FC6
'21'	kvah Q1	INT 21	#5C3F	'71'	kvar del B current season	INT 71	#5FC7
'22'	kvah Q2	INT 22	#5C40	'72'	kvar rec B current season	INT 72	#5FC8
'23'	kvah Q3	INT 23	#5C41	'73'	kvar del C current season	INT 73	#5FC9
'24'	Kvah Q4	INT 24	#5C42	'74'	kvar rec C current season	INT 74	#5FCA
'33'	kvah tot del + rec	INT 33	#5FA1	'75'	kvar del D current season	INT 75	#5FCB
'34'	kvah net del – rec	INT 34	#5FA2	'76'	kvar rec D current season	INT 76	#5FCC
'47'	kQh Del	INT 47	#5FAF	'77'	kvah del A current season	INT 77	#5FCD
'48'	kQh rec	INT 48	#5FB0	'78'	kvah rec A current season	INT 78	#5FCE
'49'	kQh Del A	INT 49	#5FB1	'79'	kvah del B current season	INT 79	#5FCF
'50'	kQh rec A	INT 50	#5FB2	'80'	kvah rec B current season	INT 80	#5FD0
'51'	kQh Del B	INT 51	#5FB3	'81'	kvah del C current season	INT 81	#5FD1
'52'	kQh rec B	INT 52	#5FB4	'82'	kvah rec C current season	INT 82	#5FD2
'53'	kQh Del C	INT 53	#5FB5	'83'	kvah del D current season	INT 83	#5FD3
'54'	kQh rec C	INT 54	#5FB6	'84'	kvah rec D current season	INT 84	#5FD4

Appendix c: Validation setup

When collecting encoded meter readings, there are several types of validation that may be checked in the validation process. These depend on the values in SYSTEM PARAMETERS; VALIDATION; TOLERANCE TYPE. See the MV-90 Reference Guide and MV-90 help-files (especially MV-90 DOS help).

Tolerance Type	Description
M	Compares the difference as a percentage of the meter multiplier. This is intended to allow comparison of the difference between the sum of the intervals and the difference of the last and current meter reads as a percentage of a dial rotation.
P	Percentage comparison of the difference of the meter reads with the total meter energy reading. As the reading goes up, a set percentage of the reading can be "error".
Q	Difference between the interval sum and the meter reads is expressed as a percentage of an average of the past 30 days of data. This allows the "error" to be larger when the readings are large and smaller when the readings are small.
D	Checks P, if P fails, checks M.
E	Checks P, if P fails, checks Q.
N	None.

Since ION meters typically have a meter multiplier of 1.0, the tolerance percentage either needs to be large, or based on the P or Q methods. Since this setting is in the system parameters, it affects all validations for the workstation.

Appendix e: Master file settings for TCP/IP

Only customers who have the additional MV-TCP can use TCP/IP communications to do MV-90 interrogations of ION meters. See your ITRON EIS sales representative if you need to license the MV-TCP package option.

When using the built-in TCP/IP port on the ION meter, the following settings are used:

Parameter	Description
MV-90 Phone Number	xxx.xxx.xxx.xxx/7700 (IP address, slash, port 7700)
Phone Password 2	Must be the same as the unit ID. For Ethernet meters, the unit ID is **0064h** or **00100** decimal.
Connect Type	Must match port Connection Type (TCPIP). Refer to "Communications configuration" on page 7.

Appendix f: Using EtherGate and ModemGate

You can import data from serial ION devices into MV-90 using the EtherGate or ModemGate communications configuration. Refer to your meter documentation and *The ION meter as a ModemGate* or *The ION meter as an Ethernet gateway* technical notes for more information.

Since MV-90 can only communicate with one meter on an RS-485 bus at a time, meters on an RS-485 bus should be connected or pooled together. By using pooling, you can also help minimize simultaneous communication retry attempts.

EtherGate and ModemGate only support one single connection. Make sure that no other systems are attempting to connect to your EtherGate or ModemGate serial devices and conflicting with MV-90.

📝 **NOTE**

Create and verify your EtherGate and ModemGate sites in ION Setup or ION Enterprise software before configuration in MV-90.

ModemGate settings are as follows:

Parameter	Description
MV-90 Phone Number	Your remote site phone number
Phone Password 2	The Unit ID of the serial meter's communication port
Connect Type	The port Connection Type (MODEM). Refer to "Communications configuration" on page 7.

EtherGate settings are as follows:

| Parameter	Description
MV-90 Phone Number	◆ xxx.xxx.xxx.xxx/7801 (IP address and COM1 EtherGate) ◆ xxx.xxx.xxx.xxx/7802 (IP address and COM2/COM4 EtherGate)
Phone Password 2	The Unit ID of the serial meter's communication port
Connect Type	The port Connection Type (TCPIP). Refer to "Communications configuration" on page 7.

📝 **NOTE**

The ION7700 meter can EtherGate simultaneously to COM2 and COM3 using port 7800.

Use of the TCP/IP protocol with ION meters may be subject to any limitations on ITRON's TCP package.

ModemGate/EtherGate example

In this example, the serial meter is connected via RS-485 (COM1) to the RS-485 (COM1) port on the gateway meter.

Serial meter   Gateway meter

RS485   Ethernet or
                                Telephone line
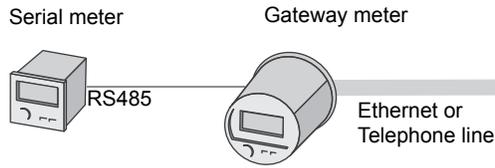
The serial meter's COM1 port settings are:

Comm mode	RS485
Protocol	ION
Baud	9600
Unit ID	124

📝 NOTE

Refer to your meter's documentation or the *Troubleshooting serial communications* technical note for more information on configuring serial communications for ION meters.

The gateway meter's serial COM1 port settings are:

Comm mode	RS485
Protocol	◆ ModemGate ◆ EtherGate
Baud	9600
Unit ID	100

📝 NOTE

There are no gateway-specific settings on the modem or Ethernet communications ports of the gateway meter.

The serial meter's MV-90 Master file must be configured as follows to access to the serial meter through the gateway meter via MV-90:

Phone # - MV-90	◆ remote site phone number (ModemGate) ◆ xxx.xx.xx.xxx/7801 (EtherGate)
Unit Address	124
Connect Type	◆ MODEM (Modem port connection type) ◆ TCPIP (Ethernet port connection type)

All other serial meter MV-90 Master file settings are based on the serial meter's configuration.

Appendix g: Using MVP with TIM_ION

The following parameters are allowed when using MVP meter data management and billing software with TIM_ION:

Parameter	Description
MVP.EXE	Dated after 7/01/00*
TIM_ION.EXE	Dated after 7/01/00*. TIM_ION can only be run on MVP with routs or by using a configuration file. The configuration file must be stored in the MVP directory on the handheld PC.
Message Level	Set to 5.

* Both the MVP.EXE & TIM_ION.EXE should be dated after 7/01/00. Because of the size of TIM_ION.EXE, it is recommended that the number of TIMs loaded on the handheld be kept to a minimum. Also, since TIM_ION can generate large debug files, it is recommended that the message level be kept to a low value. Message Level 5 generates a smaller debug file than message level 6, and overwrites the current debug.rd/.wr file.

With MVP and the Config file method, you can read the meter using a user ID, password, and one of the following must be provided:

Parameter	Description
Device ID	Must match exactly the DEVID=line in the configuration file, and must match the unique device ID in the MV-90 Master file. Device ID may be filled in at the MVP ID prompt - this ID must match whatever is being used in the MV-90 Master file as a device ID.
UNIT ID	Must match a UNIT=line in the .CFG file. The TIM reads the TAG2 and Serial number fields from the meter to determine the proper device ID. The Unit ID is entered on the MVP screen field for Password2. This must match what MV-90 uses in the password2 field.

📝 NOTE

ION meters allow separate Unit IDs for each communications port on the meter. Each port used to collect data on a meter must use the same Unit ID to be recognized as the same device by MV-90. This must uniquely identify the meter in the MV-90 database.