

# Conforming Meter Framework Update

Revenue Metering Subcommittee Meeting

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- q Improve meter programming consistency**
- q Ensure proper meter configuration to:**
  - Reduce meter registration difficulties
  - Support IESO meter data processing procedures
- q Improve reliability of daily MV-90 communication with each meter**
  - Include more detail on modems and configuration
- q Format documents as a “set” for all conforming meters for public distribution via IESO website**

**PUBLIC**

IESO\_STD\_0064



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## Conforming Meter Framework

Itron QUANTUM® Q1000

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Issue 2.0

**STANDARD**

## q Framework documents status:

- Itron QUANTUM® Q1000 – completed March 1, 2005
- Itron SENTINEL® - completed March 17, 2005
- GE kV2™ / kV2c™ - completed April 19, 2005
- PML ION® 8x00 – completed July 8, 2005
  - ü Currently waiting for feedback from MSPs using ION 8x00 meters
- Elster ALPHA® / ALPHA Plus® - in development
  - ü Target completion date – Fall , 2005

q Draft copies of each Framework circulated to Meter vendor's technical support staff, MSPs and interested MMPs for comments as they are completed

q Feedback from MSPs and MMPs will be reviewed and included in Final versions of Framework documents for each conforming meter

q Final versions will be issued as a complete “set” via IESO baseline process once remaining Framework documents are finalized

# Themes Common To All Conforming Meter Frameworks

- q **Enable consistent retrieval of all encoded energy register readings to enable automated validation of interval data vs. encoded energy register readings by MV-90**
  - kWh, kVARh, and I<sup>2</sup>h channels
    - ü Tolerance Type = “M-Multiplier method” and
    - ü Readings vs. Pulses Tol. = 100% (1 Meter Multiplier)
  - V<sup>2</sup>h channels
    - ü Tolerance Type = “**P-Percent method**” and
    - ü Readings vs. Pulses Tol. = **5%**
- q **Ensure all available encoded energy readings are properly archived as the start and stop meter readings within each MV-90 P-File/E-File**
  - Stores one set of encoded energy register readings at intervals of 30 days (max.)
  - Ongoing automated MV-90 data reconciliation benefits
  - Meter’s encoded register readings provide primary source of reference data to confirm meter’s accuracy in the event of a meter dispute
- q **Power Outage Status Definitions**
  - Where supported by the meter vendor’s software, each Framework provides instructions to define a minimum acceptable window (3 to 15 seconds) for momentary voltage interruption without flagging the interval with an MV-90 PO status flag
  - The duration of the acceptable window is now under review pending results of MTR Working Group’s recommended process for IESO manual review of all Power Outage MTRs

# Q1000 Framework Highlights (1)

- q **MV-90 master file (MIRT) standard configuration changed to support reading Q1000 meter's encoded registers in kilo units (all channels)**
  - Meter Multipliers for V<sup>2</sup>h and I<sup>2</sup>h (Channels 5 to 10) changed from 1 to 1000
  
- q **Enables automated MV-90 validation of interval data vs. encoded register readings**
  - Validation Method set to 100% of Meter Multiplier for channels 1 to 4 and I<sup>2</sup>h channels
  - Currently Testing the “**Percent Method**” of Validation for V<sup>2</sup>h channels – using **5%** Tolerance
  
- q **IESO Recommended minimum Ke values for Q1000 meter:**
  - kWh / kVARh – 0.008 Watt hours or VAR hours per pulse
  - V<sup>2</sup>h – 0.050 Volts squared hours per pulse
  - I<sup>2</sup>h – 0.001 Amps squared hours per pulse
  
- q **Number of Dials used in MIRT file must be based on reading the Q1000's registers in kilo units and synchronized with the Register Rollover value programmed into each Q1000 meter**

- q Modem Configuration for multiple types of external modems and reference material provided**
- q All new Q1000 meters to be registered using IESO TIM 22**
  - MSPs must use the Current Version of the MIRT Software – Version 1.05.a**
- q IESO staff worked with affected MSPs from December 2004 to March 2005 to revise IESO MV-90 Master File settings for existing TIM 22 Q1000 meters**

# Q1000 – 3 Element Main Meter Load Profile Configuration

Parameter		Value					
Firmware:		V3.03a or above					
Storage Capacity:		Minimum value set to 10,080 intervals (35 days of 5-minute intervals)					
Interval Length:		5 Minutes (12 intervals/hr)					
Load Profile Channel	Recorded Value	K <sub>e</sub> Value	MV-90 Default Channel Parameters				
			UOM Code	Register Type	Encoder Type	Meter Multiplier	Pulse Multiplier
1	kWh delivered	0.008	01	E	01	PT*CT	(PT*CT*K <sub>e</sub> )/1000
2	kVARh delivered	0.008	03	E	02	PT*CT	(PT*CT*K <sub>e</sub> )/1000
3	kWh received	0.008	01	E	03	PT*CT	(PT*CT*K <sub>e</sub> )/1000
4	kVARh received	0.008	03	E	04	PT*CT	(PT*CT*K <sub>e</sub> )/1000
5	V <sup>2</sup> h (Phase A)	0.050	07	E	05	1000	K <sub>e</sub>
6	V <sup>2</sup> h (Phase B)	0.050	07	E	06	1000	K <sub>e</sub>
7	V <sup>2</sup> h (Phase C)	0.050	07	E	07	1000	K <sub>e</sub>
8	I <sup>2</sup> h (Phase A)	0.001	10	E	08	1000	K <sub>e</sub>
9	I <sup>2</sup> h (Phase B)	0.001	10	E	09	1000	K <sub>e</sub>
10	I <sup>2</sup> h (Phase C)	0.001	10	E	10	1000	K <sub>e</sub>
11	Unconnected / Unused		42				
12	Unconnected / Unused		42				
13	Unconnected / Unused		42				
14	Unconnected / Unused		42				
15	Unconnected / Unused		42				
16	Unconnected / Unused		42				
17	<b>UNSUPPORTED</b>						
18	<b>UNSUPPORTED</b>						
19	<b>UNSUPPORTED</b>						
20	<b>UNSUPPORTED</b>						
21	<b>UNSUPPORTED</b>						
22	<b>UNSUPPORTED</b>						
23	<b>UNSUPPORTED</b>						
24	<b>UNSUPPORTED</b>						

- q **MV-90 master file standard configuration by default supports reading the SENTINEL meter's encoded energy registers in kilo units (channels 1 to 4)**
- q **Enables automated MV-90 validation of interval data vs. encoded register readings**
  - Validation Method set to 100% of Meter Multiplier for channels 1 to 4
- q **IESO STANDARD Ke value for the SENTINEL meter:**
  - kWh / kVARh – 0.025 Watt hours or VAR hours per pulse
- q **Number of Dials used in MIRT file must be set to 9**
  - The SENTINEL's internal encoded registers (kilo units) will not rollover in a normal six year seal period
- q **All new SENTINEL meters to be registered using IESO TIM 30**
  - MSPs must use the Current Version of the MIRT Software – Version 1.05.a
- q **IESO staff worked with affected MSPs in March and April 2005 to revise IESO MV-90 Master File settings for existing TIM 30 SENTINEL meters**

# SENTINEL – 2 or 3 Element Alternate Meter Load Profile Configuration

Parameter		Value					
Firmware:		V2.05 or above					
Storage Capacity:		Minimum value set to 2,880 intervals (10 days of 5-minute intervals)					
Interval Length:		5 Minutes (12 intervals/hr)					
Load Profile Channel	Recorded Value	K <sub>e</sub> Value	MV-90 Default Channel Parameters				
			UOM Code	Register Type	Encoder Type	Meter Multiplier	Pulse Multiplier
1	kWh delivered	0.025	01	E	01	PT*CT	(PT*CT*K <sub>e</sub> )/1000
2	kVARh delivered	0.025	03	E	02	PT*CT	(PT*CT*K <sub>e</sub> )/1000
3	kWh received	0.025	01	E	03	PT*CT	(PT*CT*K <sub>e</sub> )/1000
4	kVARh received	0.025	03	E	04	PT*CT	(PT*CT*K <sub>e</sub> )/1000
5	Unconnected / Unused		42				
6	Unconnected / Unused		42				
7	Unconnected / Unused		42				
8	Unconnected / Unused		42				

- q **kV2 / kV2c meters MUST be programmed using GE MeterMate software with an “Advanced Billing Measure” or “Summation Register” (S0 – “S zero”) that correlates directly with the energy registered in each of channels 1 to 4 of the Load Profile Recorder**
- q **MV-90 master file standard configuration by default supports reading the kV2 / kV2c meter’s “Advanced Billing Measure” (encoded energy registers) in kilo units (channels 1 to 4)**
- q **Enables automated MV-90 validation of interval data vs. encoded register readings**
  - **Validation Method set to 100% of Meter Multiplier for Channels 1 to 4**
- q **IESO STANDARD Ke value for the kV2 / kV2c meter:**
  - **kWh / kVARh – 0.05 Watt hours or VAR hours per pulse AND**
  - **Scale Factor** Programmed into the meter should be set to **1 (ONE)**
- q **Number of Dials programmed into the meter and used in MIRT file must be set to 6**
  - **The kV2 / kV2c’s internal encoded registers (kilo units) for this meter will not rollover in a normal six year seal period**
- q **All new kV2 / kV2c meters to be registered using IESO TIM 29**
  - **MSPs must use the Current Version of the MIRT Software – Version 1.05.a**

# kV2 / kV2c – 2 or 3 Element Alternate Meter Load Profile Configuration

Parameter		Value					
Firmware:		V1.2 or above (kV2) or V1.3 or above (kV2c)					
Storage Capacity:		Minimum value set to 10 days or more					
Interval Length:		5 Minutes (12 intervals/hr)					
Load Profile Channel	Recorded Value	K <sub>e</sub> Value	MV-90 Default Channel Parameters				Pulse Multiplier
			UOM Code	Register Type	Encoder Type	Meter Multiplier	
1	kWh delivered	0.05	01	E	S0	PT*CT	(PT*CT*K <sub>e</sub> * Scale Factor)/1000
2	kVARh delivered	0.05	03	E	S0	PT*CT	(PT*CT*K <sub>e</sub> * Scale Factor)/1000
3	kWh received	0.05	01	E	S0	PT*CT	(PT*CT*K <sub>e</sub> * Scale Factor)/1000
4	kVARh received	0.05	03	E	S0	PT*CT	(PT*CT*K <sub>e</sub> * Scale Factor)/1000
5	Unconnected / Unused		42				
6	Unconnected / Unused		42				
7	Unconnected / Unused		42				
8	Unconnected / Unused		42				
9	Unconnected / Unused		42				
10	Unconnected / Unused		42				
11	Unconnected / Unused		42				
12	Unconnected / Unused		42				
13	Unconnected / Unused		42				
14	Unconnected / Unused		42				
15	Unconnected / Unused		42				
16	Unconnected / Unused		42				
17	<b>UNSUPPORTED BY MV-90</b>						
18	<b>UNSUPPORTED BY MV-90</b>						
19	<b>UNSUPPORTED BY MV-90</b>						
20	<b>UNSUPPORTED BY MV-90</b>						

S 'zero'

The IESO requires the kV2 / kV2c meter to be programmed with a **Scale Factor of 1**

# ION 8x00 Framework Highlights

- q **IESO worked with PML and Itron to develop an enhanced MV-90 TIM module for the ION 8x00 meters that supports reading the 8x00 meters' V<sup>2</sup>h and I<sup>2</sup>h encoded registers**
  - IESO has verified proper operation of this new functionality
  - IESO now has this new TIM in our MV-90 production system
  - We have recently worked with one MSP to verify proper functionality of a new MIRT file setup using this Framework for an ION 8500 meter change in our MV-90 production system
  
- q **Enables automated MV-90 validation of interval data vs. encoded register readings**
  - Validation Method set to **100%** of Meter Multiplier for channels 1 to 4 and I<sup>2</sup>h channels
  - Currently Testing the **"Percent Method"** of Validation for V<sup>2</sup>h channels – using **5%** Tolerance
  
- q **Number of Dials used in MIRT file must be based on reading the encoded registers in kilo units (channels 1 to 4) and unit hours (channels 5 to 10) and synchronized with the ION 8x00 meter's two programmed Register Rollover values**
  
- q **Modem Configuration described in detail for this meter – Modemgate etc.**
  
- q **All new ION 8x00 meters (Firmware V.218 and above) to be registered using IESO TIM 99**
  - MSPs must use the Current Version of the MIRT Software – Version 1.05.a

# ION 8x00 – 3 Element Main Meter Revenue Log Configuration

Parameter		Value					
Firmware:		V2.32					
Storage Capacity:		Minimum value set to 10,080 intervals (35 days of 5-minute intervals)					
Interval Length:		5 Minutes (12 intervals/hr)					
Load Profile Channel	Recorded Value	UOM	MV-90 Default Channel Parameters				
			Direction of Power Flow	Register Type	Encoder Type	Meter Multiplier	Pulse Multiplier
1	kWh delivered int	01	Delivered	E	01	PT*CT	PT*CT
2	kVARh delivered int	03	Delivered	E	05	PT*CT	PT*CT
3	kWh received int	01	Received	E	02	PT*CT	PT*CT
4	kVARh received int	03	Received	E	06	PT*CT	PT*CT
5	V <sup>2</sup> h (Phase A) int	07	Delivered	E	11	1	1
6	V <sup>2</sup> h (Phase B) int	07	Delivered	E	12	1	1
7	V <sup>2</sup> h (Phase C) int	07	Delivered	E	13	1	1
8	I <sup>2</sup> h (Phase A) int	10	Delivered	E	14	1	1
9	I <sup>2</sup> h (Phase B) int	10	Delivered	E	15	1	1
10	I <sup>2</sup> h (Phase C) int	10	Delivered	E	16	1	1
11	Unconnected	42					
12	Unconnected	42					
13	Unconnected	42					
14	Unconnected	42					
15	Unconnected	42					
16	Unconnected	42					

# Alpha / Alpha Plus Framework In Progress - Highlights to Date

- q **MV-90 master file standard configuration by default supports reading the Alpha / Alpha Plus meter's encoded energy registers in kilo units (channels 1 to 4)**
- q **Enables automated MV-90 validation of interval data vs. encoded register readings**
  - Validation Method set to 100% of Meter Multiplier for channels 1 to 4
- q **IESO STANDARD Ke value for the Alpha and Alpha Plus meters:**
  - kWh / kVARh – 0.05 Watt hours or VAR hours per pulse
- q **Testing to Date indicates Alpha and Alpha Plus meters will only supply MV-90 with an encoded energy reading for EITHER kWh delivered OR kWh received but NOT BOTH**
  - Validation issues possible for metering installations where bi-directional kWh flow occurs regularly
  - MSP must program the meter to ensure it provides an encoded energy register reading for kWh in the direction of dominant energy flow
- q **All new Alpha meters to be registered using IESO TIM 26**
- q **All new Alpha Plus meters to be registered using IESO TIM 25**
- q **MSPs must use the Current Version of the MIRT Software – Version 1.05.a**



Power to Ontario.  
On Demand.

# Alpha / Alpha Plus – 2 or 3 Element Alternate Meter Load Profile Configuration

Parameter		Value					
Firmware:		V2.3 or above					
Storage Capacity:		Minimum value set to 2,880 intervals (10 days of 5-minute intervals)					
Interval Length:		5 Minutes (12 intervals/hr)					
Load Profile Channel	Recorded Value	K <sub>e</sub> Value	MV-90 Default Channel Parameters				
			UOM Code	Register Type	Encoder Type	Meter Multiplier	Pulse Multiplier
1	kWh delivered	0.05	01	E*	01	PT*CT	(PT*CT*K <sub>e</sub> )/1000
2	kVARh delivered	0.05	03	E	02	PT*CT	(PT*CT*K <sub>e</sub> )/1000
3	kWh received	0.05	01	E*	03	PT*CT	(PT*CT*K <sub>e</sub> )/1000
4	kVARh received	0.05	03	E	04	PT*CT	(PT*CT*K <sub>e</sub> )/1000

**Note: Testing to date indicates that the Alpha / Alpha Plus meters will only supply MV-90 with an encoded energy register reading for EITHER kWh delivered OR kWh received but NOT BOTH.**

**MSP must program the meter to ensure it provides an encoded energy register reading for kWh in the direction of dominant energy flow.**

- q ION 8x00 series meters Framework Document**
  - Review MSP feedback – September, 2005
- q Develop New Framework Document for Alpha Meter**
  - Potential issue with enabling automated MV-90 validation of interval data vs. encoded register readings for kWh delivered (channel 1) and kWh received (channel 3)
  - Additional investigation and testing required
- q Complete additional MV-90 testing for each conforming meter to summarize known error codes related to:**
  - Incorrect Device ID, Password(s), Unit ID (multi-drop) etc.
- q Include Framework Documents for all conforming meters as a package in IESO Baseline process**
  - Establish location on IESO website for Framework documents
  - Most likely via a link from the “Conforming Meter List” page

- q All incoming MIRT files will be validated by IESO Hotline staff based on the content of all new / updated Meter Framework documents**
- q IESO staff will work with affected MSPs to resolve any inconsistent MV-90 Master Files settings identified for any existing compliant meters**
- q Develop overview training session to present all Conforming Meter Framework documents in detail to the MSP User Group and affected IESO Settlements staff**

## Questions and Feedback ?

