

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

STANDARD



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Conforming Meter Framework

Itron QUANTUM® Q1000

Issue 2.0

- q Original Meter Framework documents prepared for ION 8x000 series and Q1000 Meters in mid 2002**
- q Original Framework documents were “internal” IMO documents used to assist Metering and Settlement Production staff**
- q Framework documents provided to MSPs, MMPs, and meter vendors on request**
- q Framework documents for other conforming meters had not yet been developed**

- 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 – in development
 - ü Target completion date June 1, 2005
 - Elster ALPHA® / ALPHA Plus® - in development
 - ü Target completion date June 15, 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 in July 2005**
- q **Final versions will be issued as a complete “set” 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**

- q Power Outage Status Definitions**
 - Frameworks each detail methodology to define minimum acceptable window (3 to 15 seconds) for momentary voltage interruption without flagging the interval with an MV-90 PO status flag**

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 V²h and I²h (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 I²h channels**
 - **Currently Testing the "Percent Method" of Validation for V²h channels – using 5% Tolerance**

- q **IESO Recommended minimum Ke values for Q1000 meter:**
 - **kWh / kVARh – 0.008 Watt hours or VAR hours per pulse**
 - **V²h – 0.050 Volts squared hours per pulse**
 - **I²h – 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 _e 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 _e)/1000
2	kVARh delivered	0.008	03	E	02	PT*CT	(PT*CT*K _e)/1000
3	kWh received	0.008	01	E	03	PT*CT	(PT*CT*K _e)/1000
4	kVARh received	0.008	03	E	04	PT*CT	(PT*CT*K _e)/1000
5	V ² h (Phase A)	0.050	07	E	05	1000	K _e
6	V ² h (Phase B)	0.050	07	E	06	1000	K _e
7	V ² h (Phase C)	0.050	07	E	07	1000	K _e
8	I ² h (Phase A)	0.001	10	E	08	1000	K _e
9	I ² h (Phase B)	0.001	10	E	09	1000	K _e
10	I ² h (Phase C)	0.001	10	E	10	1000	K _e
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	UNSUPPORTED						
18	UNSUPPORTED						
19	UNSUPPORTED						
20	UNSUPPORTED						
21	UNSUPPORTED						
22	UNSUPPORTED						
23	UNSUPPORTED						
24	UNSUPPORTED						

- 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 _e 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 _e)/1000
2	kVARh delivered	0.025	03	E	02	PT*CT	(PT*CT*K _e)/1000
3	kWh received	0.025	01	E	03	PT*CT	(PT*CT*K _e)/1000
4	kVARh received	0.025	03	E	04	PT*CT	(PT*CT*K _e)/1000
5	Unconnected / Unused		42				
6	Unconnected / Unused		42				
7	Unconnected / Unused		42				
8	Unconnected / Unused		42				

kV2 / kV2c Framework Highlights

- q **kV2 / kV2c meters MUST be programmed using GE MeterMate software with an “Advanced Billing Measure” or “Summation Register” (S0) 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 MUST be set to 1
- 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 _e 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	$(PT*CT*K_e * \text{Scale Factor})/1000$
2	kVARh delivered	0.05	03	E	S0	PT*CT	$(PT*CT*K_e * \text{Scale Factor})/1000$
3	kWh received	0.05	01	E	S0	PT*CT	$(PT*CT*K_e * \text{Scale Factor})/1000$
4	kVARh received	0.05	03	E	S0	PT*CT	$(PT*CT*K_e * \text{Scale Factor})/1000$
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	UNSUPPORTED BY MV-90						
18	UNSUPPORTED BY MV-90						
19	UNSUPPORTED BY MV-90						
20	UNSUPPORTED BY MV-90						

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

ION 8x00 Framework In Progress - Highlights To Date

- 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' V²h and I²h encoded registers**
 - IESO has verified proper operation of this new functionality
 - IESO currently conducting “normal” new TIM tests prior to updating the IESO 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 I²h channels
 - Currently Testing the “Percent Method” of Validation for V²h 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 will be described in detail for this meter – Modemgate etc.**

- q **All new ION 8x000 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	MV-90 Default Channel Parameters					
		UOM Code	Register Type	Encoder Type	Meter Multiplier	Pulse Multiplier	
1	kWh delivered	01	E	01	PT*CT	PT*CT	
2	kVARh delivered	03	E	05	PT*CT	PT*CT	
3	kWh received	01	E	02	PT*CT	PT*CT	
4	kVARh received	03	E	06	PT*CT	PT*CT	
5	V ² h (Phase A)	07	E	11	1	1	
6	V ² h (Phase B)	07	E	12	1	1	
7	V ² h (Phase C)	07	E	13	1	1	
8	I ² h (Phase A)	10	E	14	1	1	
9	I ² h (Phase B)	10	E	15	1	1	
10	I ² h (Phase C)	10	E	16	1	1	
11	Unconnected / Unused	42					
12	Unconnected / Unused	42					
13	Unconnected / Unused	42					
14	Unconnected / Unused	42					
15	Unconnected / Unused	42					
16	Unconnected / Unused	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**



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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 _e 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 _e)/1000
2	kVARh delivered	0.05	03	E	02	PT*CT	(PT*CT*K _e)/1000
3	kWh received	0.05	01	E*	03	PT*CT	(PT*CT*K _e)/1000
4	kVARh received	0.05	03	E	04	PT*CT	(PT*CT*K _e)/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 Update existing Framework Document for ION 8x00 series meters**
 - Target for June 1, 2005

- q Develop New Framework Document for Alpha Meter**
 - Target for June 15, 2005
 - ü 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)
 - ü Additional investigation and testing required

- q Include Framework Documents for all conforming meters as a package in IESO Baseline process - July 2005**
 - Establish location on IESO website for Framework documents

- 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**

Questions ?

