

Programming Parameters for Substation and Generation Watthour Meters



1. Scope

This work practice covers the required minimum programming parameters for substation and generation electronic watthour meters.

Meter service categories include substation, generation, transformer bank and intertie.

Power quality settings, communication settings, and optional requested additional functionality are outside the scope of this work practice.

2. Application

This work practice is for use by SCL Stations Meter Electricians who perform watthour meter programming.

This work practice is to be used to verify parameters on existing meters as well as to set parameters on new meters.

3. Introduction

All programmable electronic SCL watthour meters are required to have the minimum preliminary program parameters as stated in Section 4, as well as the applicable parameters described in Section 5.

Not all programming parameters are required for each meter. The programming to be performed is dependent upon the size and type of the system being measured as well as any requested optional programmed options.

4. Preliminary Program Parameters

Preliminary program parameters are the fundamental settings that are required for meter programming. These settings shall be determined by the Stations Meter Electrician Crew Chief and shall support the design of the system being measured.

Preliminary parameters to be set include:

- 3 wire systems shall be programmed as form 35 with L-L voltage.
- 4 wire systems shall be programmed as form 9 with L-L and L-N voltage.
- All meters shall have CT and PT ratios programmed, to display all quantities in primary units.
- Load profile shall be 5-minute intervals, recording MW Del, MVAR Del, MW Rec, MVAR Rec, MVA Del, and MVA for 1095 days.
- Peak Demand shall be 15-minute rolling; (3) 5-minute intervals with timestamp.
- Test Mode shall be set to 6 hours.
- VA calculation shall use sum of phases.
- Advanced security shall be used with a minimum of 2 users: User 1 all access, User 2 read only.

5. Meter Programs

Meter programs are categorized by (1) Standard Type, (2) Metering Unit, (3) Standard Identifier, and (4) Metered Equipment. These parameters help ensure that each meter is programmed in a manner that is consistent with its functionality and creates uniformity throughout the SCL system.

Each program is identified by a Station Meter Programs (SMP) unique identifier. See Table 5a.

Table 5a. Program Unique Identifier Key

Standard Type	Metering Unit	Standard Identifier	Metered Equipment
SMP (Station Meter Programs)	K or M K = Kilo M = Mega	RMP (Revenue Meter Program)	SS or G or B or L SS = Station Service G = Generation B = Bank (transformer bank) L = Line (intertie)

Example:

SMP-KRMPSS = Station Meter Program-KiloRevenueMeterProgramStationService.

Tables 5b and 5c show the required parameters for each program. Table 5b shows parameters for programs with a Kilo metering unit, and Table 5c shows parameters for programs with a Mega metering unit.

In each table, Normal Display Functions are shown first, followed by Alternate Display Functions, Test Mode Displays, Recording Functions, and Output Functions.

All selected parameters associated with a program are marked one of three ways:

- **X:** indicating the value represents an uncompensated power value
- **X/C:** indicating the value represents both uncompensated and compensated power values
- **Optional:** indicating functionality as defined in the Engineering Design Memo.

Table 5b. Meter Programs, Kilo

Program Unique Identifier(s):	SMP-KRMPSS
Normal Display Functions – This is the default mode. When in Normal Display mode, scroll through the following: Complete Display (Segment) Test	
KWh Del	X
KWh Rec	
KVARh Del	X
KVARh Rec	X
KVAh Del	
KVAh Rec	
Peak KW Del	X
Peak KW Rec	X
Peak KVAR Del	X
Peak KVAR Rec	X
Peak KVA Del	
Peak KVA Rec	
Demand Resets	X
Alternate Display Functions – Select Alternate Display mode and scroll through the following (note: Alternate Display Mode automatically reverts to Normal Display after one scroll cycle):	
KW	X
KKVAR	X
MVA	X
Power Factor	X
Battery Life	X
Present Date	X
Present Time	X
Program ID	X
Wh per Disk Rev (Kh)	
Wh per Pulse (Ke)	
Instantaneous Voltage	X
Instantaneous Current	X
Vector Diagram	X
Harmonics	X
Loss Compensation State	X
KWh Del	X
KWh Rec	X
KVARh Del	X
KVARh Rec	X
No. of Nines (Availability)	X
Owner	X
Metered Circuit	X
Location	X
Firmware	X
Frequency	X

Table 5b. Meter Programs, Kilo, continued

Program Unique Identifier(s):	SMP-KRMPSS
Test Mode Displays – Select Test Mode and scroll through the following:	
Wh per Pulse (Kt)	X
KWh Del Test	X
KWh Rec Test	X
KVARh Del Test	X
KVARh Rec Test	X
KVAh Del Test	X
KVAh Rec Test	X
Multiplier	X
KW Block Del Test	X
KW Block Rec Test	X
Recording Functions – Set up a load profile recording for the following:	
Interval 5 min	X
Interval 15 min	
Interval 60 min	
KWh Del	X
KWh Rec	X
KVARh Del	X
KVARh Rec	X
KVAh Del	
KVAh Rec	
MV-90	Optional
Output Functions – Set up the following output functionality:	
KW	Optional
KVAR	Optional
KWh Del Pulses	Optional
KWh Rec Pulses	Optional
KVARh Del Pulses	Optional
KVARh Rec Pulses	Optional

Table 5c. Meter Programs, Mega

Program Unique Identifier(s):	SMP-MRMPSS	SMP-MRMPB	SMP-MRMPL	SMP-MRMPG
Normal Display Functions – This is the default mode. When in Normal Display mode, scroll through the following:				
Complete Display (Segment) Test				
MWh Del	X	X	X	X
MWh Rec		X	X	
MVARh Del	X	X	X	X
MVARh Rec	X	X	X	X
MVAh Del				
MVAh Rec				
Peak MW Del	X	X	X	X
Peak MW Rec	X	X	X	X
Peak MVAR Del	X	X	X	X
Peak MVAR Rec	X	X	X	X
Peak MVA Del				
Peak MVA Rec				
Demand Resets	X	X	X	X
Alternate Display Functions – Select Alternate Display mode and scroll through the following (note: Alternate Display Mode automatically reverts to Normal Display after one scroll cycle):				
MW	X	X	X	X/C
MVAR	X	X	X	X/C
MVA	X	X	X	X/C
Power Factor	X	X	X	X
Battery Life	X	X	X	X
Present Date	X	X	X	X
Present Time	X	X	X	X
Program ID	X	X	X	X
Wh per Disk Rev (Kh)				
Wh per Pulse (Ke)				
Instantaneous Voltage	X	X	X	X
Instantaneous Current	X	X	X	X
Vector Diagram	X	X	X	X
Harmonics	X	X	X	X
Loss Compensation State	X	X	X	X
MWh Del	X	X	X	X/C
MWh Rec	X	X	X	X/C
MVARh Del	X	X	X	X/C
MVARh Rec	X	X	X	X/C
No. of Nines (Availability)	X	X	X	X
Owner	X	X	X	X
Metered Circuit	X	X	X	X
Location	X	X	X	X
Firmware	X	X	X	X
Frequency	X	X	X	X

Table 5c. Meter Programs, Mega, continued

Program Unique Identifier(s):	SMP-MRMPSS	SMP-MRMPB	SMP-MRMPL	SMP-MRMPG
Test Mode Displays – Select Test Mode and scroll through the following:				
Wh per Pulse (Kt)	X	X	X	X
KWh Del Test	X	X	X	X/C
KWh Rec Test	X	X	X	X/C
KVARh Del Test	X	X	X	X/C
KVARh Rec Test	X	X	X	X/C
KVAh Del Test	X	X	X	X/C
KVAh Rec Test	X	X	X	X/C
Multiplier	X	X	X	X
KW Block Del Test	X	X	X	X/C
KW Block Rec Test	X	X	X	X/C
Recording Functions – Set up a load profile recording for the following:				
Interval 5 min	X	X	X	X
Interval 15 min				
Interval 60 min				
MWh Del	X	X	X	X/C
MWh Rec	X	X	X	X/C
MVARh Del	X	X	X	X/C
MVARh Rec	X	X	X	X/C
MVAh Del				
MVAh Rec				
MV-90	Optional	Optional	Optional	X
Output Functions – Set up the following output functionality:				
MW	Optional	Optional	Optional	X/C
MVAR	Optional	Optional	Optional	Optional
MWh Del Pulses	Optional	Optional	X	X/C
MWh Rec Pulses	Optional	Optional	X	
MVARh Del Pulses	Optional	Optional	Optional	Optional
MVARh Rec Pulses	Optional	Optional	Optional	Optional

6. Sources

Eltrich, Patrick; Station Meter Electrician and subject matter expert for 2530.05
 (patrick.eltrich@seattle.gov)

Everist, Arlen; Station Meter Electrician, subject matter expert, and originator of 2530.05
 (arlen.everist@seattle.gov)