METERING CODE

FOR

RAJASTHAN GRID

PART-III of Grid Code

(Finalised as per RERC order dated 28.10.2002)

December 2002

Issued by :

RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM Ltd.

Registered Office: Vidyut Bhawan, Janpath, Jyoti Nagar, Jaipur (India)

Cost : Rs. 100.00

METERING CODE FOR RAJASTHAN GRID

INDEX

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"In pursuance of the directions given by RERC in tariff order dated 24.03.2001 and on the basis of approval accorded by Rajasthan Electricity Regulatory Commission, Rajasthan Rajya Vidyut Prasaran Nigam Limited hereby prescribes the "Metering Code for Rajasthan Grid".

1 Introduction

The code prescribes a uniform policy in respect of electricity metering in the different parts of power system of Rajasthan amongst the utilities i.e. RVUN, RVPN and the Distribution Companies in the state and shall form a part of Rajasthan Grid Code.

2 Objective

The objective of the code is to define minimum acceptable metering standards which will effect proper metering of the system parameters for the purpose of accountability, billing of electrical energy and will also provide information which will enable to operate the system in economic manner consistent with license conditions by licensee & RVPN to effect management of generation and transmission in a safe and economical manner.

3 Scope

3.1 The scope of the code covers the practices that shall be employed and the facilities that shall be provided for the measurement and recording of various parameters like active/reactive/apparent power/energy, power factor, voltage, frequency etc.

3.2 The code also specifies the requirement of calibration, testing and commissioning for metering equipments. The code broadly indicates the technical features of various elements of the metering, data-communication and testing system, the procedure for assessment of consumption in case of defective and stopped meters and also lays down guidelines for resolution of disputes between different agencies.

3.3 The date of commencement of this code shall be 1.1.2003 and accordingly the concerned utilities shall commence its implementation.

4 References

The following standards (amended up to date) shall be applicable

as relevant to meters and associated equipment :

(i)	IS 14697	AC Static Transformer Operated Watt hour and Var-hour Meters, class 0.2S and 0.5S – Specification
(ii)	CBIP Technical Report - 88	Specification for AC Static Electrical Energy Meters (to be referred for immunity against AC and DC magnetic induction of external origin – Revision of values at clause 4.6.2 Table 15 – Influence Quantities.)
(iii)	IS 2705	Indian Standard for Current Transformers
(iv)	IS 3156	Indian Standard for Voltage Transformers
(v)	IS 9348	Indian Standard for Coupling Capacitor and Capacitor Divider
(vi)	IS 5547	Indian Standard for Capacitor Voltage Transformers
(vii)	CBIP Technical Report - 111.	Specification for Common Meter Reading Instrument.
(viii)	IS 9000	Basic Environmental Testing Procedures for Electronic & Electrical items.

5 Definitions

All terms not defined herein but are referred in this Code shall be deemed to be as defined in the Grid Code.

5.1 Active Energy

Active Energy means the electrical energy produced, flowing or supplied by an electrical circuit during a time interval, and being the integral with respect to time of the instantaneous power, measured in units of watt hours or standard multiples thereof, that is:

1,000 Wh = 1 kWh

1,000 kWh = 1 MWh

5.2 Active Power

Active Power means the product of voltage and the in-phase component of alternating current measured in units of watts and standard multiples thereof, that is:

1,000 Watts = 1 kW
1,000 kW = 1 MW

5.3 Actual Metering point

Actual metering point means the physical location of current and voltage sensing devices i.e. CTs, VTs and meters at which electricity is metered.

5.4 Apparent Energy

Apparent Energy means the integral with respect to time of the Apparent Power.

5.5 Apparent Power

Apparent Power means the product of voltage and current measured in units of volt amperes and standard multiples thereof, that is:

1,000 VA = 1 kVA
1,000 kVA = 1 MVA

5.6 Base Computer System (BCS)

BCS means Based Computer System meant to handle the data down loaded from meter through CMRI and also process data into desired output forms.

5.7 Central Data Collection System (CDCS)

Central Data Collection System means the computer system located at a central point containing a data base which is regularly updated from the Settlement Instations to which it has dedicated communication links.

5.8 Common Meter Reading Instruments (CMRI or MRI)

CMRI also known as an Interrogation Unit means a meter reading instrument (MRI) with necessary accessories capable of interrogating with various makes of alternating current (ac) static electrical energy meters when loaded with the corresponding meter specific soft-ware(s) called meter reading instrument program(s).

The CMRI can extract information about energy data, load survey data, meter status and meter anomaly data from the memory of the meter as stored in preset cyclic order for retrieval at later stage.

5.9 Data Concentrator

A centre to club the processed data received from various connected stations for onward transmission through dedicated communication channels to CDCS.

5.10 Demand Period

Demand period means the period over which Active Energy, Reactive Energy or Apparent Energy are integrated to produce average Demand Values. For settlement purpose, unless the context requires otherwise, each Demand Period shall be of 15 minutes duration, one of which shall finish at 24:00 hours as per ABT requirement.

5.11 Demand Values

(a) Demand value energy :- Means active energy, reactive energy or apparent energy drawn during one demand period. One of which shall commence from 00.00 hours.

(b) Demand value power :- Demand values power, expressed in MW, MVAr or MVA, means four times the value of MWh, MVArh or MVAh recorded during any demand period. The demand values are quarter hour demands and these are identified by the time of the end of the Demand Period. One of which shall finish at 24:00 hours.

5.12 Meter

Meter means a device for measurement of Active energy (import/export), reactive energy (lag/lead), apparent energy, active power, reactive power, apparent power, current, voltage, power factor and frequency.

5.13 Metering Equipment

Metering Equipment means meters, measurement transformers (CTs & VTs), metering protection equipment including alarms, circuitry and their associated data collection outstations and wiring which are part of the measuring equipment at or relating to a site.

CT means current transformers and term VT is used to cover either PT or CVT.

5.14 MMI (Man Machine Interface)

Devices / softwares used by operating personnel to interact with computerized system / instrumentation etc.

5.15 Outstation

Outstation means on-site equipment which receives and stores data from a meter(s), and may perform some processing of the data before transmitting the metering data to the Settlement Instation on request. These functions may be facilitated in one or more separate units or be integral with the meter.

5.16 Outstation System

Outstation System [Recording Station(s)] means one or more outstations linked to a single communication line.

5.17 Reactive Power

Reactive Power means the product of voltage and current and the sine of the phase angle between them measured in units of volt amperes reactive and standard multiples thereof, that is:

1,000 VAr = 1 kVAr

1,000 kVAr = 1 MVAr

5.18 Reactive Energy

Reactive Energy means the integral with respect to time of the Reactive Power.

5.19 Remote Transmitting Unit (RTU)

RTU means a unit for data transmission in digital and sequential mode i.e. to transmit low level analogue / digital signals from transducers, switches, relays etc. connected to it and to transmit received signal to devices connected to it.

5.20 Transducer

It is a device to convert high-level parameters (MW, MVA, Amp, Volt etc.) into low-level signals for transmission.

5.21 Settlement Instation

Settlement Instation means a computer based system which collects or receives data on a routine basis from selected out station system and which is linked to CDCS.

6 Ownership

The ownership of the metering system shall belong to the agency in whose premises the metering equipment is physically located.

7 Facility to be Provided on Metering Locations

Each agency/constituent shall make available the required space and the required outputs of the specified current and voltage transformers to facilitate installation of meters and RTUs in their premises and will also provide access to the agency/constituent for operation and maintenance of the equipment.

8 Right to Install Energy Meters

Each constituent of the agency shall extend necessary assistance to the other for installation of the meters and RTUs by providing required access to their premises and equipment. As and when required by the utility, the constituent/agencies shall enable the representatives of the utility with advance notice, to access, inspect, replace, test etc. any of the meters and RTUs for any utility installed in their premises.

9 Type of Meters and Metering Capability

The meters & RTUs to be used shall be suitable for measurement of bulk, interutility energy / power exchanges. The meters shall be all electronic (static) poly phase trivector type having facility to measure active, reactive and apparent energy/power in all four quadrants i.e. a true import export meter. All inter utility trade meters shall be bi-directional while capacitor bank meters and sub-station aux. meters shall be unidirectional if, bidirectional meters already exist, these will not be changed.

The frequency based energy meters suitable for Availability Based Tariff (ABT) shall also be provided.

10 Current and Voltage Transformers

The meter shall be suitable for being connected directly to the secondary of the voltage transformers (VTs) and to the secondary of current transformers (1amp. or 5amp.).

11 Various Standards for Metering Equipment

For commercial transaction between the utilities, the metering shall be 3 phase 4 wire type having following various standards of metering equipment as given in Table–1, while detailed specifications of meters are indicated at Annexure-1.

Table-1

Sr. No.	Particulars	Main Meter	Back up Meter	Capaci - tor Bank Meter	Sub-station Auxiliary Meter	Inter Discoms Meter	Second-ary Back up Meter
1	2	3	4	5	6	7	8
(1)	Accuracy class						
(a)	Meter	0.2 S	0.5 S	0.5 S	1.0	0.5 S	0.5 S
(b)	CTs	0.2	Existing 0.5 /1.0	Existing 0.5 /1.0	Existing 0.5 /1.0	Existing 0.5 /1.0	Existing 0.5 /1.0
(c)	PTs / CVTs	0.2	Existing 0.5 /1.0	Existing 0.5 /1.0	Existing 0.5 /1.0	Existing 0.5 /1.0	Existing PTs 0.5 /1.0
(d)	CT-PT sets for 33kV & 11kV feeders	0.2	Existing	Existing	Existing	Existing	Existing
1	2	3	4	5	6	7	8
(2)	Salient aspect of meters						
(a)	Phase angle and ratio error compensat-ion of CTs & PTs	Not to be provid ed	Not to be provided	Not to be provided	Not to be provided	Not to be provided	Not to be provided
(b)	Communic-ation port						
(i)	Communic-ation optical port	Yes	Yes	No	No	Yes	Yes
(ii)	Communic-ation port for remote reading	Yes	Yes	No	No	Yes	Yes
(3)	Whether an Import & Export both features are required	Yes	Yes	Yes	No	Yes	Yes
(4)	Meter memory for	Yes	Yes	No	No	Yes	Yes

	75 days						

11.2.1 The test terminal blocks shall be provided on all meters to facilitate testing of meters in situ. Main & back up meters of inter state / major generating stations shall be having the feature of draw out type modular units and shall have automatic CT short circuiting so that meter can be taken out for testing without shut down requirements.

11.2.2 Meters of inter state / major generating stations shall be capable of powered with 230 volt alternating current auxiliary supply and 110 volt or 220 volt DC supply of the substation so that metering core of PT/CVT is never loaded and in case of shut down on feeder/breaker, meter can be interrogated locally or remotely. It will normally be powered by AC auxiliary supply and will be switched over to DC supply only when AC auxiliary supply fails .

11.2.3 The meter shall have battery back-up (2 years), for its Real Time Clock (RTC).

11.2.4 The meters shall be equipped with necessary hardware/software to suit tariff requirements as may be called for from time to time.

11.2.5 Wherever feasible CTs of capacitor banks shall be either vectorially connected with main/backup meter using Interposing Current Transformers (ICTs). All new capacitor banks shall be procured with meter(s) having storage capacity of half hourly data in memory, reading by push button, MRI & RS-232 communication, separate registration of drawl/injection for above/preselected voltage ranges. Only one such meter may be provided for all capacitor banks of a substation on same bus and having CT with the same ratio or otherwise paralleled with ICTs.

11.2.6 Whenever check/back up meters for inter utility metering are proposed to be provided by a

discom, then its accuracy shall be same as that of main meter.

12 Measuring Equipments

12.1 Meters

12.1.1 The meter shall be 3 phase 4 wire type, capable to record and display import and export kWh, kVArh, kVAh and maximum demand in kW and kVA for 3 phase 4 wire AC balanced/unbalanced load for a power factor having range of zero lagging to unity to zero leading in all 4 quadrants. In addition, meter shall also be capable of displaying, on demand, the present status of supply/load, missing potential, CT polarity, current unbalance, anomaly occurrence and logging of occurrences as well as load survey data etc. which shall be down loaded to a user friendly “Basic Computer Software” (BCS) through portable data collection devices or CMRI which shall be connected to optical communication port of the meter. Meter shall be equipped with self-diagnostic features also and be capable of recording average values based on their integration on time base for kWh, kVArh, kVAh for at least 75 days. Meter shall be capable of measuring fundamental as well as total energy including harmonics separately.

12.1.2 Energy measurement during demand period will be such that sampling in the meter is synchronized with the end of the time block otherwise energy measured in a demand period but not stored in that period shall be carried forward.

12.1.3 An LED glow or pulse output coincident with end of each demand period need be provided in the meter so as to ensure that demand integration coincided the preset time block.

12.1.4 Display

12.1.4.1 Present meter status, real time and date, cumulative energy registers, voltage, currents, power factor, present demand, frequency and meter serial number shall be available on demand through push button.

12.1.4.2 Any interrogation/read operation shall not delete or alter any stored meter data.

12.1.5 Memory

(a) Numerical values of voltage/current, power factor and cumulative energy registers as well as anomalies/tempered details alongwith date and time of logging of and restoration of anomalies (subject to the meter memory space) shall be logged in the meter memory and shall be available for retrieving with the help of the data collection devices (CMRI) through meter optical port and down loading to BCS.

(b) Memory in a static trivector meter shall not get 'erased' after reading or retrieving of data through MRI. Data shall be retained for a minimum of 75 days or shall not get erased from meter until replaced by fresh data. However, desired data can be erased from MRI, when memory of an MRI becomes full after downloading of readings of a number of meters, as there is fixed space made available in MRI for:

(i) Energy registers.

(ii) Load survey data.

(iii) Anomaly data etc.

When a fresh data is logged in the memory, the oldest data shall disappear automatically.

12.2 Current Transformers

Three current transformers shall be used for 3 phase 4 wire measurement system. The secondary current rating of the CTs shall be 1 ampere particularly for 400kV and 220kV sub-stations but in other cases it may be 5 ampere. Either dedicated current transformers or dedicated core of current transformers shall be provided for metering and that wherever feasible, CTs (or their cores) feeding to main meters and backup/check meters will be sepa 9 The errors of the current transformers shall be checked in the lab or at site. However if such facilities are not available, CT test

certificates issued by Govt. test house or Govt. recognized test agency shall be referred to.

The total burden connected to each current transformer shall not exceed the rated burden of CT.

12.3 Voltage transformers

12.3.1 Either electromagnetic voltage transformers (VT) or capacitive voltage transformers (CVT) may be used for metering purpose. Hereinafter term VT is used to cover either PT or CVT. The secondary voltage per phase shall be $110/\sqrt{3}$ volts per phase. Either dedicated voltage transformers or dedicated core of voltage transformers shall be provided for metering and that wherever feasible, VTs (or their cores) feeding to main meters and backup/check meters will be separate. VT fuses of proper rating shall be provided at appropriate locations in the circuit.

12.3.2 The errors of the VTs shall be checked in the lab or at site. However if such facilities are not available, VT test certificates issued by Govt. test house or Govt. recognized test agency shall be referred to.

The total burden connected to each VT shall not exceed the rated burden of VT.

12.4 The current transformers and voltage transformers shall meet the requirements as per the relevant standards. Where a combined CT/PT unit is provided, the accuracy shall be as specified under relevant IS. Minimum acceptable specification are enclosed at following Annexures :-

(i)	Current Transformers	- Annexure -2A
(ii)	CVTs	- Annexure-2B
(iii)	Single phase PTs	- Annexure-2C
(iv)	33 kV CTPT Set	- Annexure-2D

13 Testing Arrangements

13.1 Two types of test facilities shall be available:

(a) Automatic meter test bench with high accuracy, static source and 0.02S class electronic reference standard meter. One bench shall be located at

each Discom headquarters (i.e. at Jaipur, Ajmer and Jodhpur). These benches with 0.02 class reference standard shall also be used for checking and calibration of portable testing equipments.

(b) Portable test set with static source and electronic reference meter of 0.1 class shall be used for verification and joint testing of accuracy of static trivector meters at site on regular/routine basis.

13.2 Separate test termi 10 locks for testing of main and check meters shall be provided so that when one meter is under testing, the other meter continues to record actual energy during testing period. Where only one/main meter exists, an additional meter shall be put in circuit to record energy during the testing period of the main meter so that while the main meter is under testing, the other meter can record energy during the period of meter under testing.

14 Metering System

14.1 The metering system shall comprise of main, check, backup and secondary backup meters. In the event of main meter or more than one meter becoming defective the order of precedence for billing shall be (a) main (b) check (c) backup (d) secondary backup.

14.2 Generating Stations

Meters shall be installed on each generator as well as on each auxiliary transformer and outgoing feeders at generating stations to work out energy generated and net energy delivered by the power station in the power system.

14.2.1 For measurement of energy supplied by major generating stations within the state, meters shall be provided on each outgoing feeder at the power station designated as main meter for billing purpose. Meters shall also be provided on the other end of the above EHV feeders to serve as secondary back-up meter. Meters on each generator & each auxiliary transformer shall work as backup meters. The consumption recorded by main meter shall be compared with the consumption recorded by secondary backup meter

on EHV feeder to work out transmission losses as well as to monitor the correct functioning of both meters. In case of any defect or major deviations in the consumption recorded between both the meters of EHV feeder at a later stage of their installation, the average percentage difference of consumption between main meter and secondary backup meter based on last one year figures shall be added / subtracted *or* compensated in the consumption recorded by the secondary backup meter.

14.2.2 Mini Hydel Stations

For the energy supplied by mini hydel stations to the RVPN or Discom as the case may be, CT/VT units of 11/33kV voltage rating having two identical metering cores with main and check meters shall be provided at energy transfer points preferably at the genera **11** ation.

14.3 Metering for Transfer of power through interstate lines and lines connected to major generation stations:

14.3.1 Metering equipment shall be provided at receiving end of interstate EHV lines.

14.3.2 The above meters provided on interstate lines, and on the lines connected to major generating stations within the state shall have following facilities:

(a) Metering equipment shall have external / internal modem so as to be capable of remote transmission of all data available in the meter memory through any of the information link viz. radio frequency, Public Switched Telephone Network (PSTN), Power Line Carrier Communication (PLCC) lines, V-SAT Network, Mobile and other means of telemetry like private network of transco or low power radio.

(b) The metering equipment shall be of draw out type modular metering units with facility of automatic CT short circuiting. Meter mounting shall be projection type or rack type as per space and site requirement.

(c) The meters shall be capable of powered up with 230V, AC auxiliary supply and 110V or 220V DC supply of sub-station so that

metering cores VT is never loaded. The meter will normally be powered up by AC auxiliary supply and will be switched over to DC supply only when AC auxiliary supply fails.

(d) The meter shall be capable of data transmission to RTU's as well Intelligent Electronic Device (IED). The format / protocol of communication for data retrieval and data telex should be made known to owner of meter by meter supplier.

14.4 Metering between Transco & Discoms

14.4.1 For measurement of power delivered by RVPN to Discoms, following type of metering shall be provided on the LV side of EHV transformers (33kV or 11kV):

(a) Main Meters: The main meters shall be provided on LV secondary side of EHV transformers with dedicated CTs, VTs / CT-VT sets of 0.2 class accuracy.

(b) Back-up Meters: [illegible] back-up meters shall be provided on the [illegible] g CT / VTs having 0.5 class accuracy of the 33/11 kV outgoing feeders.

(c) Secondary backup meters: Secondary backup meters shall be provided at a later stage on EHV side of the transformers on the existing CTs and VTs.

14.4.2 Whenever check / back up meters for inter utility metering are proposed to be provided by a Discom(s), then its accuracy shall be same as that of main meter.

14.4.3 The meters to be provided shall have the following facilities:

(a) Metering equipment shall have external / internal modem so as to be capable of remote transmission of all data available in the meter memory through any one of the information link viz. radio frequency, Public Switched Telephone Network (PSTN) , Power Line Carrier Communication (PLCC) lines, V-SAT Network, Mobile and other means of telemetry like private network of transco or low power radio.

(b) The meter mounting shall be projection type or rack type as per space and site requirement.

(c) The meters shall be capable of data transmission to RTUs as well as IED. Format/protocol of data retrieval & data telex should be made known to owner of meter by meter supplier.

14.5 Inter Discom Metering

The energy meters shall be provided at such points of the power lines connecting two Discoms so that the line in between is not tapped by the either Discoms.

14.6 Sub-station Auxiliary Consumption Metering

The RVPN's sub-stations auxiliary consumption shall be recorded on HV/LV side of station auxiliary transformers as mutually agreed through class 1.0 static kWh meters.

14.7 Time Synchronization

The time synchronization in all the meters under clause 14.0 should be from base computer through communication system and modem. The base computer shall be equipped with GPS signal receiver for time synchronization of the meters connected through relevant communication system and modem. As a standb 13 sure, the CMRI will be used for time synchronization of the individual meter. There should also be provision in the base computer to synchronize time at preset time daily with respect to GPS clock of SLDC or central billing station.

15 Remote Transmitting Unit (RTU)

15.1 Following data (instantaneous system parameters) shall be made available through transducers and RTUs from selected individual stations to sub-load despatch centre and load despatch centre continuously.

(a) MW (Import/export).

(b) MVAr (Lag plus lead).

(c) Voltage.

(d) Current.

(e) Frequency.

(f). The status of various isolators, circuit breakers and transformer tap positions.

RTUs & Transducers requirement shall not be considered wherever meters have the capability of transmitting various parameters to SLDC / sub LDC exists.

15.2 The accuracy of the transducers shall be 0.2% of span.

15.3 The transducers and RTU's shall conform to relevant international / national standards.

15.4 The transducers shall be 3 phase 4 wire type for MW and MVAr measurement purposes.

15.5 Single transducer giving output of MW, MVAr, voltage, frequency and ampere shall be preferred in place of individual transducers for each metering point. The transducers shall be connected to 0.2 class CTs and VTs and housed inside the meter box of the check meter meant for metering purpose.

15.6 Since the above metering scheme is for commercial metering purpose therefore the complete CT wiring including energy meter, meter test terminal block and transducers shall be housed in the metering cubicle which shall be kept sealed. The output of the transducers shall be connected to RTU through screened signal cable. The RTUs shall be located in the PLCC room. The size of the CT & VT cable to the transducer shall be same as that provided in the metering circuit.

15.7 The various data collec 14 ' transducers and fed to RTU shall be processed in th RTU and output will be provided in digital telegraphic form. Transmission of these data to the load despatch centre can be through any of the information link like Radio frequency, PLCC (Power Line Carrier Communication), PSTN (Public Switched Telephone Network), VSAT, Mobile and other means of Telemetering like private network of Transco or low power radio.The data shall be again processed at load despatch end in Data Concentrator Unit and converted to analog data and displayed on the monitor screen. The RTU shall be utilized for monitoring and also for remote control of feeders / breakers located at remote sub-stations.

15.8 Format/protocol of data retrieval & data telex should be made known to owner by the supplier.

16 Monthly Meter Reading and Collection of Data

The RVPN and concerned Vitran Nigams/Utpadan Nigam shall jointly read the meters through their authorized representatives on 1st of every month at 12.00 Hrs. and shall retrieve meter

reading data. A copy of meter reading sheet duly signed will be supplied by RVPN to Vitran Nigam or RVUN as the case may be and one copy shall be kept sealed for future reference. Wherever meters are in position or in operation the tele-metered data shall be retrieved from the optical communication port of the meter.

17 System for Joint Inspection, Testing & Calibration

17.1 The metering points between RVUN, RVPN and Discoms shall be regularly inspected twice in a year or at an interval as mutually agreed jointly by both the agencies involved for despatch and receipt of energy. Since the static trivector meters are calibrated through softwares at the manufacturers works, therefore during joint inspection only accuracy of the meters and functioning shall be verified and certified jointly by both the agencies. In case of any doubt or defect, the meter shall be replaced then and there or calibrated. In later case, error correction as determined will be applied to the meter reading for the purpose of billing contingency referred at clause 21 & comparing their readings. To cover for loss of time, spare meters shall always be kept available with the agency to whom the meter/metering point belongs. After testing, the meter shall be sealed and a joint report shall be prepared giving details of testing work carried out, old seals removed, new seals affixed etc. The agenc whose premises the meter is located shall be respons r proper security, protection of the metering equipment and sealing arrangement.

17.2 Joint inspection shall also be carried out as and when difference in meter readings (so corrected) exceeds the sum of maximum error as per accuracy class of main & back up meter. The meters provided at the sending end as well as at the receiving end shall be jointly tested/calibrated on all loads and power factors as per relevant standard through static phantom load .

18 Sealing

18.1 All tariff metering system shall be jointly sealed by the representative of the concerned parties as per the procedure agreed upon.

18.2 No seal, applied pursuant to this metering code, shall be broken or removed except in the presence of or with the prior consent of the agency affixing the seal or on whose behalf the seal has been affixed unless it is necessary to do so in circumstances where (i) both main and check meters are malfunctioning or there occurs a fire or similar hazard

and such removal is essential and such consent can not be obtained (ii) such action is required for the purpose of attending to the meter failure. Where verbal consent is given it must be confirmed in writing forthwith.

18.3 Each party shall control the issue of its own seals and sealing pliers, and shall keep proper register/record of all such pliers and the authorized persons to whom these are issued.

19 Access to Equipment & Data

Each constituent of the agency (Utility) on request with advance notice, shall grant full right to metering equipment for other agency's employees, agents/duly authorized representative for inspecting, testing, calibrating, sealing, replacing the damaged equipment, collecting the data, joint reading recording and other functions necessary and as mutually agreed.

20 Operation and Maintenance of the Metering System

20.1 The operation and maintenance of the metering system includes proper installation, regular maintenance of the metering system, checking of errors of the CTs, VTs and meters, proper laying of cables and protection thereof, regular/daily reading r and regular data retrieved through MRI & BCS, a g any breakdown/fault on the metering system etc.

20.2 The maintenance of the meters shall be the exclusive responsibility of the owner of the meters, the ownership of meters has been indicated at clause 6 above.

21 Procedure for Assessment of Consumption in case of Defective and/or Stopped Meters

Whenever a meter goes defective, the consumption recorded by the check meter / backup meter / secondary backup (i.e. receiving end meters) shall be referred. The details of the malfunctioning along with date and time and snaps shot parameters along with load survey shall be retrieved from the main meter. The exact nature of the mal-functioning shall be brought out after analysing the data so retrieved and the consumption / losses recorded by the main meter shall be assessed accordingly. If main as well as back up metering systems become defective, the assessment of energy consumption for the outage period shall be done from the backup meters by the concerned parties as mutually agreed or at the level of Metering Committee (vide clause 23).

22 Replacement of Defective or Stopped Meter

The owner of the meter shall maintain spare inventory of meters in sufficient quantity, so that down - time is minimized.

23 Metering Committee

23.1 RVPN shall be responsible for managing and serving the Metering code among the constituents for discharging its obligation under the licence.

23.2 The Grid Code Review Panel shall establish a Metering Committee in accordance with Grid Code and such Committee shall consist of the following:

(a) A Chairman who is an officer designated by RVPN.

(b) A Member (Secretary) who is also an officer from RVPN.

(c) One representative from each of the RVUN, JVVN, AVVN & JdVVN.

(d) One member from Power Grid (NRLDC).

(e) One Member from IPP's (functioning) & major CPPs (with installed capacity exceeding 50 MW) connected to the RVPN's transmission system.

23.3 The rules to be followed by the Committee in conducting their business shall be formulated by the Committee themselves and shall be approved by Grid Code Review Panel. The Committee shall meet at least once in six months and conduct the following functions.

(a) To keep Metering Code and its working under scrutiny and review.

(b) To consider all requests for amendment to the Metering Code which any user makes.

(c) To publish recommendations for changes to the Metering Code together with the reason for the change and any objection, if applicable.

(d) To issue guidance on the interpretation and implementation of the Metering Code.

24 Mechanism for Dispute Resolution

Any disputes relating to metering with RVUN / DISCOM / other utilities shall be settled in accordance with procedures given under relevant PPAs or Bulk Supply Agreements as the case may be.

25 Two Part and ABT Capability

25.1 The ABT compliant meter will have provision to compute and store average active and reactive energy and load data with respect to system frequency and the integration of the data

i.e. average Wh & Varh, and average frequency for 15 minutes block will be available in each meter.

Minimum acceptable specification of these meters shall be as per column 1 and 2 of Annexure-1.

Meters shall also have reactive high and reactive low volt ampere hour registers for total drawl, high & low system voltage drawl. The Discom-wise summation of kWh, kW, PF, demand scheduled interchange/ unscheduled interchange will be done at the main computer station provided at central billing station or at Load Despatch Centre.

25.2 The metering arrangement between RVPN and Discom

The metering arrangement between RVPN and Discom shall comprise of static trivector meter on the LV side of EHV Transformer.

(a) Frequency based ABT compliant meters shall be provided on 220 kV / 132 kV lines feeding each Discom. The fun 18 f these meters will be as under:

(i) To measure Discom-wise schedule and unschedule interchange of energy.

(ii) To monitor and measure Discom-wise kW/kVAr, kVA demand, hourly power factor and MVAr flow including MVAr exchange above 103% and below 97% of rated system voltage.

For this purpose, the various parameters shall be integrated at one centrally located station preferably at load despatch centre at Jaipur through computer and suitable software.

(b) Static trivector meters to be provided on LV secondary side of all EHV transformers. The function/duty of this meter will be as under:

(i) Measurement of kWh energy supplied to Discoms for billing purpose.

(ii) KW/kVA demand and power factor, hourly as well monthly caused by Discom on each EHV transformer.

26 Dynamic Code

To have a dynamic code is very valuable aspect because there is continuous and very fast upgradation in the technology of metering and communication, therefore the Code may be reviewed periodically.

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