



Australian Government  
Department of Industry, Science,  
Energy and Resources

National  
Measurement  
Institute

# **NMI M 13-2**

## **Active-energy electricity meters (a.c.)**

Part 2: Test report format

June 2022

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## Preface

This document provides the test report format for active-energy electricity meters (a.c.) to accompany NMI M 13-1, v1.0 (June 2022) *Active-energy Electricity Meters (a.c.), Part 1: Metrological and Technical Requirements*.

This test report format may clarify NMI M 13-1, but it does not add to or alter any requirements.

This document is primarily intended for use by test laboratories that are testing meters against the requirements of NMI M 13-1. This test report format is intended to make testing more efficient and consistent.

Note, the test report format provides for meters with different accuracy classes, connection types and capabilities. Refer to NMI M 13-1 to determine which tests are applicable for a particular meter.

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## 1 Test Information

<b>Test Report</b>	
Report reference number	
Date of issue	
Date of testing	
<b>Laboratory details</b>	
Name	
Address	
Contact details	
<b>Test specification</b>	
Standard	NMI M 13-1, v1.0 (June 2022)
<b>Client details</b>	
Applicant	
Address	

Remarks:

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## 2 Meter Information

Manufacturer	
Model	
Serial number(s)	

Remarks:

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### 3 Meter Specifications

#### Accuracy

Accuracy class  0.2 S  0.5 S  1  2

#### Temperature ranges

	<i>Low</i>	<i>High</i>
Specified operating range	<input type="text"/> °C	<input type="text"/> °C
Limit range of operation	<input type="text"/> °C	<input type="text"/> °C
Storage and transportation	<input type="text"/> °C	<input type="text"/> °C

#### Environment

Indoor/Outdoor  Indoor  Outdoor  Australian outdoor

#### Connection type and design

Connection type	<input type="checkbox"/> Direct connected	<input type="checkbox"/> Transformer-operated
Design type	<input type="checkbox"/> Static	<input type="checkbox"/> Induction
Display type	<input type="checkbox"/> Electronic	<input type="checkbox"/> Electromechanical

#### Electrical and measurement

Number of phases

Number of wires

Number of elements

Reference frequency  $f_{nom}$   Hz

Reference voltage(s)  $U_{nom}$   V AC

Basic current  $I_b$   A *(for direct connected)*

Rated current  $I_n$   A *(for transformer-operated)*

Maximum current  $I_{max}$   A

Meter constant  *(include units)*

Measurement direction(s)  Positive  Negative

#### Internal Clock

Clock type(s)  Synchronous  Crystal

**Enclosure and Protective Class**

Enclosure type

Protective class

**Software/Firmware**

Software/firmware version

**Test Output**

Test output  Optical  Electrical (IEC 62053.31)  Other

If other, describe the test output:

Number of test pulses needed to ensure accuracy of at least 1/10 of the class of meter at different test points.

Current (A)	Power factor	Number of test pulses

**Reference conditions**

Reference temperature  23 °C  Other

If other, specify

**Power supply**

Is the power supply connected to the voltage circuits?  Yes  No

Remarks:

## 4 Metrological Checklist

Refer to indicated clauses in NMI M 13-1

Clause number and requirement (NMI M 13-1)	Value / Remark	Result
<b>3.1 Units of measurement</b>		
Valid units of measurement used		
<b>3.2 Calculated quantities</b>		
Indicated quantity equals value obtained using indicated values with applicable rounding		
If rounding applied it is $\pm 0.5$ minimum measured quantity		
<b>3.4 Information to be displayed on meter exterior</b> – see 5.6 Marking of meter – name-plates		
<b>3.5 Verification mark</b>		
Provision for a verification mark		
<b>3.6 Sealing</b>		
Do mechanical seal protect parameters?		
If not, solid state sealing is required:		
Access to protected parameters protected		
Access to protected parameters recorded		
Records readily accessible		
Record easily identifiable (not confused)		
Reference record marked on meter		
Record shall not repeat in a sequence of less than 99 alterations; record shall persist reliably for at least 2 years and persist through influence and disturbance tests		

## 5 Mechanical requirements

### 5.1 Shock test

Refer to AS 62052.11:2018, 5.2.2.2. IEC 60068-2-27.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

- Meter in non-operating condition, without the packing

Requirement (after test)	Remark	Result
No damage to meter		
No change of information		
Meter shall operate correctly (see below)		

Current (A)	Power factor	Percentage error	MPE by class			
			0.2 S	0.5 S	1	2
$I_b (I_n)$	1		0.2	0.5	1	2

### 5.2 Vibration (sinusoidal) test

Refer to AS 62052.11:2018, 5.2.2.3. IEC 60068-2-6.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

- Meter in non-operating condition, without the packing

Requirement (after test)	Remark	Result
No damage to meter		
No change of information		
Meter shall operate correctly (see below)		

Current (A)	Power factor	Percentage error	MPE by class			
			0.2 S	0.5 S	1	2
$I_b (I_n)$	1		0.2	0.5	1	2

### 5.3 Window

Refer to AS 62052.11:2018, 5.3.

Requirement	Remark	Result
Display is able to be read either through transparent cover or transparent window.		



## 5.4 Display of measured values

Refer to AS 62052.11:2018, **5.10**.

Requirement	Remark	Result
For an electronic display, non-volatile memory shall have a retention time of at least 4 months.		
All displays can be shown with the identification of each tariff applied. For at least 5 s with automatic sequencing.		
The active tariff rate shall be indicated.		
Electromechanical registers are compliant.		
Register shall be able to record and display energy corresponding to maximum current, reference voltage and unity power factor without returning to the same index.		
It shall be impossible to reset cumulative total energy register (without breaking a seal).		

## 5.5 Output device

Refer to AS 62052.11:2018, **5.11**.

Requirement	Remark	Result
The meter shall have a test output device.		

### For electrical test output

Complies with IEC 62053.31		
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### For optical test output

Mechanical and electrical characteristics. Refer to AS 62052.11:2018, **5.11.1**.

Requirement	Remark	Result
Accessible from the front		
Maximum pulse frequency $\leq 2.5$ kHz		
Unmodulated output pulses have the shape shown in Figure D.2.		
Transition time $< 20$ $\mu$ s, verified by a reference receiver diode with $t_r \leq 0.2$ $\mu$ s		

Optical characteristics. Refer to AS 62052.11:2018, **5.11.2**.

Requirement	Remark	Result
Wavelength between 550 nm and 1000 nm.		
On-condition $50 \mu\text{W}/\text{cm}^2 \leq E_T \leq 1000 \mu\text{W}/\text{cm}^2$		
Off-condition $E_T \leq 2 \mu\text{W}/\text{cm}^2$		

## 5.6 Marking of meter – name-plates

Refer to AS 62052.11:2018, **5.12.1** and NMI M 13-1:2022, **3.4**.

Requirement	Remark	Result
a) Manufacturer's name or mark		
b) Model designation		
Space for NMI pattern approval number		
c) Number of phases, number of wires		
d) Serial number and/or property number*		
Year of manufacture		
e) Reference voltage $U_{nom}$		
f) For direct connected: basic current		
For transformer-operated: rated current		
Maximum current		
g) Reference frequency (Hz)		
h) Meter constant		
i) Class index		
j) Reference temperature if not 23 °C.		
k) Double square sign for insulating encased meters of protective class II.		
l) The suitable installation environment: IM for indoor meter AOM for Australian outdoor meter* OM for outdoor meter		

Note (\*): requirements indicated with an asterisk (\*) are AS modifications to the IEC standard.

## 5.7 Marking of meter – connection diagrams and terminal marking

Refer to AS 62052.11:2018, **5.12.2**.

Requirement	Remark	Result
Diagram of connection marked on meter (preferred) or refer to connection diagram		

## 6 Climatic conditions

### 6.1 Temperature range

Refer to AS 62052.11:2018, 6.1.

Temperature ranges (°C)	Meter	Indoor	Outdoor	AOM*	Result
Specified operating range		-10 to +45	-25 to +45	-10 to +55	
Limit range of operation		-25 to +55	-40 to +70	-10 to +70	
Limit range for storage and transportation		-25 to +70	-40 to +70	-25 to +70	

Note (\*): Australian outdoor meter (AOM) is an AS modification to the IEC standard.

### 6.2 Dry heat

Refer to AS 62052.11:2018, 6.3.1. IEC 60068-2-2.

Meter serial no.		At start	At end
Observer:		Temperature (°C):	
Date:		Time (hh:mm):	

- Meter in non-operating condition
- Duration: 72 h

Temperature:

Requirement (after test)	Remark	Result
No damage to meter		
No change of information		
Meter shall operate correctly (see below)		

Current (A)	Power factor	Percentage error	MPE by class			
			0.2 S	0.5 S	1	2
$I_b (I_n)$	1		0.2	0.5	1	2

### 6.3 Cold

Refer to AS 62052.11:2018, 6.3.2. IEC 60068-2-1.

Meter serial no.		At start	At end
Observer:		Temperature (°C):	
Date:		Time (hh:mm):	

- Meter in non-operating condition
- Duration: 72 h

Temperature:

Requirement (after test)	Remark	Result
No damage to meter		
No change of information		
Meter shall operate correctly (see below)		

Current (A)	Power factor	Percentage error	MPE by class			
			0.2 S	0.5 S	1	2
$I_b (I_n)$	1		0.2	0.5	1	2

## 6.4 Damp heat cyclic test

Refer to AS 62052.11:2018, 6.3.3. IEC 60068-2-30.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

- Voltage and auxiliary circuits energised with reference voltage
- Without any current in the current circuits
- Duration: 6 cycles

Upper Temperature:

Requirement (24 h after end of test)	Remark	Result
Conduct Impulse test for robustness with 0.8 voltage – 8 kV*		
No disruptive discharge		
No damage to meter		
No change of information		
No trace of corrosion		
Meter shall operate correctly (see below)		

Current (A)	Power factor	Percentage error	MPE by class			
			0.2 S	0.5 S	1	2
$I_b (I_n)$	1		0.2	0.5	1	2

Note (\*): AS modifications in AS 62052.31:2018, Appendix ZZ.

## 6.5 Protection against solar radiation

Refer to AS 62052.11:2018, 6.3.4 and Appendix ZA\*.

Note (\*): AS modification to the IEC standard.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

- Meter in non-operating condition
- UV lamp output: 21 750 lm to 27 000 lm
- Duration: 48 h and distance of 250 mm

Requirement (after the test)	Remark	Result
For transparent parts – no noticeable deterioration or loss in transparency		
For non-transparent parts – no noticeable effect		
Markings shall not peel or flake, and shall remain legible		

## 7 Electrical requirements

### 7.1 Limit, $x$

Refer to AS 62052.11:2018, 7.1.2.

A number of tests refer to the limit,  $x$ , for changes in the register and test output.

<b>Number of measuring elements, <math>m</math>:</b>		
<b>Reference voltage, <math>U_n</math>:</b>		V
<b>Maximum current, <math>I_{\max}</math>:</b>		A
<b><math>x = 10^{-6} \cdot m \cdot U_n \cdot I_{\max}</math></b>		kWh

### 7.2 Voltage dips and short interruptions

Refer to AS 62052.11:2018, 7.1.2.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

- Voltage and auxiliary circuits energised with reference voltage
- Without any current in the current circuits

Test	$\Delta U$	Duration	Number of interruptions	Restoring time	Change in Register	Change in test output	Limit, $x$ (kW·h)	Result
b)	100%	1 s	3	50 ms				
a)	100%	20 ms	1	n/a				
c)	50%	1 min	1	n/a				

Remarks:

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### 7.3 Impulse test for robustness

Refer to AS 62052.11:2018, 7.3, and AS 62052.31:2017, Appendix ZZ\*.

Note (\*): AS modification to the IEC standard.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

- Impulse test voltage: 10 000 kV.
- Conventional output impedance:  $40 \Omega \pm 10\%$
- Apply to voltage circuits and auxiliary circuits.

Requirement (after test)	Remark	Result
No disruptive discharge		
Meter shall operate correctly (see below)		

Current (A)	Power factor	Percentage error	MPE by class			
			0.2 S	0.5 S	1	2
$I_b (I_n)$	1		0.2	0.5	1	2

## 7.4 Immunity to earth fault

Refer to AS 62052.11:2018, 7.4.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

- Earth fault conditions.
- Current:  $0.5 I_n$  and power factor 1.
- Duration 4 h.

<b>Requirement (after test when meter is back at nominal working temperature)</b>	<b>Remark</b>	<b>Result</b>
No damage to meter.		
Variation in error does not exceed limits (see below)		

<b>Current (A)</b>	<b>Power factor</b>	<b>Variation in error (%)</b>	<b>Limit of variation (%) by class</b>			
			<b>0.2 S</b>	<b>0.5 S</b>	<b>1</b>	<b>2</b>
$I_b (I_n)$	1		0.1	0.3	0.7	1.0

## 7.5 Power consumption

Refer to AS 62053.21:2018, 7.1 / AS 62053.22:2018, 7.1.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

- At reference voltage
- At basic / nominal current.

<b>Circuit</b>	<b>Power consumption</b>	<b>Limit</b>	<b>Remark</b>	<b>Result</b>
Voltage Circuit				
Current Circuit				
Auxiliary power supply				

## 7.6 Influence of short-time overcurrents

Refer to AS 62053.21:2018, 7.2 / AS 62053.22:2018, 7.2.

- For polyphase meters, test phase-by-phase.

### 7.6.1 Direct connected meters

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

- Short-time overcurrent of  $30 I_{max}$ .
- Duration: one half-cycle at rated frequency.

Requirement (after return to initial temperature)	Remark	Result
No damage to meter.		
Variation in error does not exceed limits (see below)		

Current (A)	Power factor	Phase	Variation in error (%)	Limit of variation (%) by class			
				0.2 S	0.5 S	1	2
$I_b$	1			n/a	n/a	1.5	1.5

### 7.6.2 Transformer-operated meters

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

- Short-time overcurrent of  $20 I_{max}$ .
- Duration: 0.5 s.

Requirement (after return to initial temperature)	Remark	Result
No damage to meter.		
Variation in error does not exceed limits (see below)		

Current (A)	Power factor	Phase	Variation in error (%)	Limit of variation (%) by class			
				0.2 S	0.5 S	1	2
$I_n$	1			0.05	0.05	0.5	1.0

## 7.7 Influence of self-heating

Refer to AS 62053.21:2018, 7.3 / AS 62053.22:2018, 7.3.

<b>Meter serial no.</b>		<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>	
<b>Date:</b>		<b>Time (hh:mm):</b>	

- Voltage circuits energised, without any current in the current circuits, for at least 2 h (1 h for class 2).
- Maximum current applied to current circuits.

Requirement	Remark	Result
Variation in error does not exceed limits (see below)		

Current (A)	Power factor	Time after $I_{max}$ applied	Variation in error (%)	Limit of variation (%) by class			
				0.2 S	0.5 S	1	2
$I_b (I_n)$	1			0.1	0.2	0.7	1.0

- Test repeated for 0.5 (inductive) power factor.

Requirement	Remark	Result
Variation in error does not exceed limits (see below)		

Current (A)	Power factor	Time after $I_{max}$ applied	Variation in error (%)	Limit of variation (%) by class			
				0.2 S	0.5 S	1	2
$I_b (I_n)$	0.5 inductive			0.1	0.2	0.7	1.0



## 7.8 Test of immunity to electrostatic discharges

Refer to AS 62052.11:2018, 7.5.2. IEC 61000-4-2.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

- Voltage circuits energised, without any current in the current circuits.
- Number of discharges: at least 10
- Polarity of discharges: the most sensitive polarity

Application	Discharge mode	Test voltage (kV)	Polarity	No. of discharges	Change in Register	Change in test output	Limit, $x$ (kW·h)	Result
Direct	Contact							
Direct	Air							
Indirect, Horizontal coupling plane	Contact							
Indirect, Vertical coupling plane	Contact							

Remarks:

--

Requirement (after test)	Remark	Result
No damage		
Meter shall operate correctly (see below)		

Current (A)	Power factor	Percentage error	MPE by class			
			0.2 S	0.5 S	1	2
$I_b (I_n)$	1		0.2	0.5	1	2

### 7.9 Test of immunity to electromagnetic RF fields

Refer to AS 62052.11:2018, 7.5.3. IEC 61000-4-3.

- Frequency band: 80 MHz to 2400 MHz\*
- Number of discharges: at least 10
- Polarity of discharges: the most sensitive polarity

Note (\*): AS modification to the IEC standard.

#### 7.9.1 Test with current

Refer to AS 62052.11:2018, 7.5.3 a).

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

- Voltage and auxiliary circuits energised with reference voltage.
- Unmodulated test field strength: 10 V/m.

<b>Requirement (during test)</b>	<b>Remark</b>	<b>Result</b>
Behaviour of meter is not perturbed		
Variation in error does not exceed limits (see below)		

<b>Current (A)</b>	<b>Power factor</b>	<b>Limit of variation (%) by class</b>			
		<b>0.2 S</b>	<b>0.5 S</b>	<b>1</b>	<b>2</b>
$I_b (I_n)$	1	1.0	2.0	2.0	3.0

<b>Antenna / facility</b>	<b>Frequency value / range (MHz)</b>	<b>Polarisation</b>	<b>Facing meter</b>	<b>Variation in error (%)</b>	<b>Limit of variation (%)</b>

**7.9.2 Test without current**

Refer to AS 62052.11:2018, 7.5.3 b).

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>				
<b>Date:</b>				
		<b>Temperature (°C):</b>		
		<b>Time (hh:mm):</b>		

- Voltage and auxiliary circuits energised with reference voltage.
- Without current in the current circuits.
- Unmodulated test field strength: 30 V/m.

<b>Requirement (during test)</b>	<b>Remark</b>	<b>Result</b>
Change in register and change in test output within limit (see below)		

<b>Antenna / facility</b>	<b>Frequency value / range (MHz)</b>	<b>Polarisation</b>	<b>Facing meter</b>	<b>Change in Register</b>	<b>Change in test output</b>	<b>Limit, <i>x</i> (kW·h)</b>

## 7.10 Fast transient burst test

Refer to AS 62052.11:2018, 7.5.4. IEC 61000-4-4.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

- Voltage and auxiliary circuits energised with reference voltage.

Requirement (during test)	Remark	Result
Variation in error does not exceed limits (see below)		

Current (A)	Power factor	Limit of variation (%) by class			
		0.2 S	0.5 S	1	2
$I_b (I_n)$	1	1.0	2.0	4.0	6.0

Circuit	Voltage peak (kV)	Polarity (60 s at each)	Variation in error (%)	Limit of variation (%)
Voltage	4	Positive		
		Negative		
Current	4	Positive		
		Negative		
Auxiliary circuit	2	Positive		
		Negative		

## 7.11 Test of immunity to conducted disturbances, induced by radio-frequency fields

Refer to AS 62052.11:2018, 7.5.5. IEC 61000-4-6.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

- Voltage and auxiliary circuits energised with reference voltage
- Frequency range: 150 kHz to 80 MHz
- Voltage level: 10 V

Requirement (during test)	Remark	Result
Variation in error does not exceed limits (see below)		

Current (A)	Power factor	Power or IO Port	Variation in error (%)	Limit of variation (%) by class			
				0.2 S	0.5 S	1	2
$I_b (I_n)$	1			1.0	2.0	2.0	3.0

## 7.12 Surge immunity test

Refer to AS 62052.11:2018, 7.5.6. IEC 61000-4-5.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

- Voltage and auxiliary circuits energised with reference voltage
- Without current in the current circuits.
- Tested in differential mode (line to line)

<b>Requirement (during test)</b>	<b>Remark</b>	<b>Result</b>
Change in register and change in test output within limit (see below)		

<b>Circuit</b>	<b>Test voltage</b>	<b>Phase Angle</b>	<b>Polarity (5 tests at each)</b>	<b>Change in Register</b>	<b>Change in test output</b>	<b>Limit, x (kW·h)</b>
Voltage	4 kV	60°	Positive			
			Negative			
		240°	Positive			
			Negative			
Current	4 kV	60°	Positive			
			Negative			
		240°	Positive			
			Negative			
Auxiliary	1 kV	60°	Positive			
			Negative			
		240°	Positive			
			Negative			

### 7.13 Damped oscillatory waves immunity test

Refer to AS 62052.11:2018, 7.5.7. IEC 61000-4-12.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

- Voltage and auxiliary circuits energised with reference voltage

Requirement (during test)	Remark	Result
Behaviour of meter is not perturbed		
Variation in error does not exceed limits (see below)		

Current (A)	Power factor	Limit of variation (%) by class			
		0.2 S	0.5 S	1	2
$I_b (I_n)$	1	1.0	2.0	2.0	3.0

Circuit	Mode	Test Voltage (kV)	Test frequency (kHz)	Repetition rate (Hz)	Variation in error (%)	Limit of variation (%)
Voltage	Common	2.5	100	40		
			1000	400		
			100	40		
			1000	400		
	Differential	1.0	100	40		
			1000	400		
			100	40		
			1000	400		
Auxiliary	Common	2.5	100	40		
			1000	400		
			100	40		
			1000	400		
	Differential	1.0	100	40		
			1000	400		
			100	40		
			1000	400		

## 8 Accuracy requirements and influence quantities

### 8.1 Limits of error due to variation of the current

Refer to AS 62053.21:2018, 8.1 / AS 62053.22:2018, 8.1.

#### 8.1.1 Direct connected meters – balanced loads

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

Requirement (during test)	Remark	Result
Errors shall not exceed limits (see below)		
Where applicable in both directions		

Direction of energy measurement

Current (A)	Power factor	Percentage error	Error Limit (±%) for class	
			1	2
0.05 $I_b$	1		1.5	2.5
0.1 $I_b$			1.0	2.0
0.2 $I_b$				
$I_b$				
$I_{max}$				
0.1 $I_b$	0.5 inductive		1.5	2.5
0.2 $I_b$			1.0	2.0
$I_b$				
$I_{max}$				
0.1 $I_b$	0.8 capacitive		1.5	N/A
0.2 $I_b$			1.0	N/A
$I_b$				
$I_{max}$				

### 8.1.2 Direct connected meters – single-phase load with balanced polyphase voltages

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

Requirement (during test)	Remark	Result
Errors shall not exceed limits (see below)		
Variation in error (between single-phase load and balanced polyphase load) does not exceed limits (see below)		
Where applicable in both directions		

Current (A)	Power Factor	Error Limits (±%) by class		Limit of variation (±%) by class	
		1	2	1	2
0.1 $I_b$ to $I_{max}$	1	2.0	3.0	1.5	2.5
0.2 $I_b$ to $I_{max}$	0.5 inductive	2.0	3.0	N/A	N/A

Direction of energy measurement

Phase	Current (A)	Power factor	Percentage error	Error Limit (±%)	Variation in error (%)	Limit of variation (±%)
L1	0.1 $I_b$	1				
	0.2 $I_b$					
	$I_b$					
	$I_{max}$					
	0.2 $I_b$	0.5 inductive			N/A	N/A
	$I_b$				N/A	
$I_{max}$				N/A		
L2	0.1 $I_b$	1				
	0.2 $I_b$					
	$I_b$					
	$I_{max}$					
	0.2 $I_b$	0.5 inductive			N/A	N/A
	$I_b$				N/A	
$I_{max}$				N/A		
L3	0.1 $I_b$	1				
	0.2 $I_b$					
	$I_b$					
	$I_{max}$					
	0.2 $I_b$	0.5 inductive			N/A	N/A
	$I_b$				N/A	
$I_{max}$				N/A		



### 8.1.3 Transformer-operated meters – balanced loads

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

<b>Requirement (during test)</b>	<b>Remark</b>	<b>Result</b>
Errors shall not exceed limits (see below)		
Where applicable in both directions		

Direction of energy measurement

<b>Current (A)</b>	<b>Power factor</b>	<b>Percentage error</b>	<b>Error Limit (±%) by class</b>			
			<b>0.2 S</b>	<b>0.5 S</b>	<b>1</b>	<b>2</b>
0.01 $I_n$	1		0.4	1.0	1.5	2.5
0.05 $I_n$						
0.1 $I_n$						
$I_n$			0.2	0.5	1.0	2.0
$I_{max}$						
0.02 $I_n$	0.5 inductive		0.5	1.0	1.5	2.5
0.1 $I_n$						
$I_n$			0.3	0.6	1.0	2.0
$I_{max}$						
0.02 $I_n$	0.8 capacitive		0.5	1.0	1.5	N/A
0.1 $I_n$						
$I_n$			0.3	0.6	1.0	N/A
$I_{max}$						

### 8.1.4 Transformer-operated meters – single-phase load with balanced polyphase voltages

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

Requirement (during test)	Remark	Result
Errors shall not exceed limits (see below)		
Variation in error (between single-phase load and balanced polyphase load) does not exceed limits (see below)		
Where applicable in both directions		

Current (A)	Power Factor	Error Limits (±%) by class				Limit of variation (±%) by class			
		0.2 S	0.5 S	1	2	0.2 S	0.5 S	1	2
0.05 $I_n$ to $I_{max}$	1	0.3	0.6	2.0	3.0	0.4	1.0	1.5	2.5
0.1 $I_n$ to $I_{max}$	0.5 inductive	0.4	1.0	2.0	3.0	N/A	N/A	N/A	N/A

Direction of energy measurement

Phase	Current (A)	Power factor	Percentage error	Error Limit (±%)	Variation in error (%)	Limit of variation (±%)
L1	0.05 $I_n$	1				
	0.1 $I_n$					
	$I_n$					
	$I_{max}$					
	0.1 $I_n$	0.5 inductive			N/A	N/A
	$I_n$				N/A	
$I_{max}$				N/A		
L2	0.05 $I_n$	1				
	0.1 $I_n$					
	$I_n$					
	$I_{max}$					
	0.1 $I_n$	0.5 inductive			N/A	N/A
	$I_n$				N/A	
$I_{max}$				N/A		
L3	0.05 $I_n$	1				
	0.1 $I_n$					
	$I_n$					
	$I_{max}$					
	0.1 $I_n$	0.5 inductive			N/A	N/A
	$I_n$				N/A	
$I_{max}$				N/A		

## 8.2 Ambient temperature variation

Refer to AS 62053.21:2018, 8.2 / AS 62053.22:2018, 8.2.

In the tables below:

- $T_L$  is the lower temperature in the range
- $T_U$  is the upper temperature in the range
- $e_L$  is the error at the lower temperature in the range
- $e_U$  is the error at the upper temperature in the range
- Mean temperature coefficient is calculated as  $\frac{e_U - e_L}{T_U - T_L}$

### 8.2.1 Direct connected meters

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

Requirement (during test)	Remark	Result
The mean temperature coefficient shall not exceed the limits (see below)		
At least four 20 K temperature ranges that span the operating temperature range		

Current (A)	Power factor	Mean temperature coefficient (%/K) by class	
		1	2.0
0.1 $I_b$ to $I_{max}$	1	0.05	0.1
0.2 $I_b$ to $I_{max}$	0.5 inductive	0.07	0.15

20 K Temperature Range	$T_L$ (°C)	$T_U$ (°C)
Temperatures		

Current (A)	Power factor	Percentage error		Mean temperature coefficient (%/K)	
		$e_L$	$e_U$	Calculated	Limit
0.1 $I_b$	1				
$I_b$					
$I_{max}$					
0.2 $I_b$	0.5 inductive				
$I_b$					
$I_{max}$					

(Repeat for all 20 K temperature ranges)

### 8.2.2 Transformer-operated meters

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

Requirement (during test)	Remark	Result
The mean temperature coefficient shall not exceed the limits (see below)		
At least four 20 K temperature ranges that span the operating temperature range		

Current (A)	Power factor	Mean temperature coefficient (%/K) by class			
		0.2 S	0.5 S	1	2
0.05 $I_n$ to $I_{max}$	1	0.01	0.03	0.05	0.1
0.1 $I_n$ to $I_{max}$	0.5 inductive	0.02	0.05	0.07	0.15

20 K Temperature Range	$T_L$ (°C)	$T_U$ (°C)
Temperatures		

Current (A)	Power factor	Percentage error		Mean temperature coefficient (%/K)	
		$e_L$	$e_U$	Calculated	Limit
0.05 $I_n$	1				
$I_n$					
$I_{max}$					
0.1 $I_n$	0.5 inductive				
$I_n$					
$I_{max}$					

(Repeat for all 20 K temperature ranges)

### 8.3 Voltage variation

Refer to AS 62053.21:2018, 8.2 / AS 62053.22:2018, 8.2.

#### 8.3.1 Direct connected meters

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

Requirement	Remark	Result
Variation in error does not exceed limits (see below)		

Value of  $U_{nom}$

Voltage variation (%)	Current (A)	Power factor	Variation in error (%)	Limit of variation (%) by class	
				1	2.0
+10	0.05 $I_b$	1		0.7	1.0
	$I_b$				
	$I_{max}$				
	0.1 $I_b$	0.5 inductive		1.0	1.5
	$I_b$				
	$I_{max}$				
-10	0.05 $I_b$	1		0.7	1.0
	$I_b$				
	$I_{max}$				
	0.1 $I_b$	0.5 inductive		1.0	1.5
	$I_b$				
	$I_{max}$				
+15	0.05 $I_b$	1		2.1	3.0
	$I_b$				
	$I_{max}$				
	0.1 $I_b$	0.5 inductive		3.0	4.5
	$I_b$				
	$I_{max}$				
-20	0.05 $I_b$	1		2.1	3.0
	$I_b$				
	$I_{max}$				
	0.1 $I_b$	0.5 inductive		3.0	4.5
	$I_b$				
	$I_{max}$				
-50	0.05 $I_b$	1		-100 to +10	
	$I_b$				
	$I_{max}$				
	0.1 $I_b$	0.5 inductive			
	$I_b$				
	$I_{max}$				

### 8.3.2 Transformer-operated meters – class 1

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

Requirement	Remark	Result
Variation in error does not exceed limits (see below)		

Value of  $U_{nom}$

Voltage variation (%)	Current (A)	Power factor	Variation in error (%)	Limit of variation (%) by class
				1
+10	0.02 $I_n$	1		0.7
	$I_n$			
	$I_{max}$			
	0.05 $I_n$	0.5 inductive		1.0
	$I_n$			
	$I_{max}$			
-10	0.02 $I_n$	1		0.7
	$I_n$			
	$I_{max}$			
	0.05 $I_n$	0.5 inductive		1.0
	$I_n$			
	$I_{max}$			
+15	0.02 $I_n$	1		2.1
	$I_n$			
	$I_{max}$			
	0.05 $I_n$	0.5 inductive		3.0
	$I_n$			
	$I_{max}$			
-20	0.02 $I_n$	1		2.1
	$I_n$			
	$I_{max}$			
	0.05 $I_n$	0.5 inductive		3.0
	$I_n$			
	$I_{max}$			
-50	0.02 $I_n$	1		-100 to +10
	$I_n$			
	$I_{max}$			
	0.05 $I_n$	0.5 inductive		
	$I_n$			
	$I_{max}$			

### 8.3.3 Transformer-operated meters – class 0.2 S / class 0.5 S

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

Requirement	Remark	Result
Variation in error does not exceed limits (see below)		

Value of  $U_{nom}$

Voltage variation (%)	Current (A)	Power factor	Variation in error (%)	Limit of variation (%) by class	
				0.2 S	0.5 S
+10	$0.05 I_n$	1		0.1	0.2
	$I_n$				
	$I_{max}$				
	$0.1 I_n$	0.5 inductive		0.2	0.4
	$I_n$				
	$I_{max}$				
-10	$0.05 I_n$	1		0.1	0.2
	$I_n$				
	$I_{max}$				
	$0.1 I_n$	0.5 inductive		0.2	0.4
	$I_n$				
	$I_{max}$				
+15	$0.05 I_n$	1		0.3	0.6
	$I_n$				
	$I_{max}$				
	$0.1 I_n$	0.5 inductive		0.6	1.2
	$I_n$				
	$I_{max}$				
-20	$0.05 I_n$	1		0.3	0.6
	$I_n$				
	$I_{max}$				
	$0.1 I_n$	0.5 inductive		0.6	1.2
	$I_n$				
	$I_{max}$				
-50	$0.05 I_n$	1		-100 to +10	
	$I_n$				
	$I_{max}$				
	$0.1 I_n$	0.5 inductive			
	$I_n$				
	$I_{max}$				

## 8.4 Frequency Variation

Refer to AS 62053.21:2018, 8.2 / AS 62053.22:2018, 8.2.

### 8.4.1 Direct connected meters

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

Requirement	Remark	Result
Variation in error does not exceed limits (see below)		

Frequency variation (%)	Current (A)	Power factor	Variation in error (%)	Limit of variation (%) by class	
				1	2.0
+2	0.05 $I_b$	1		0.5	0.8
	$I_b$				
	$I_{max}$				
	0.1 $I_b$	0.5 inductive		0.7	1.0
	$I_b$				
	$I_{max}$				
-2	0.05 $I_b$	1		0.5	0.8
	$I_b$				
	$I_{max}$				
	0.1 $I_b$	0.5 inductive		0.7	1.0
	$I_b$				
	$I_{max}$				



### 8.4.2 Transformer-operated Meters – class 1

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

Requirement	Remark	Result
Variation in error does not exceed limits (see below)		

Frequency variation (%)	Current (A)	Power factor	Variation in error (%)	Limit of variation (%) by class	
				1	
+2	0.02 $I_n$	1		0.5	
	$I_n$				
	$I_{max}$				
	0.05 $I_n$	0.5 inductive		0.7	
	$I_n$				
	$I_{max}$				
-2	0.02 $I_n$	1		0.5	
	$I_n$				
	$I_{max}$				
	0.05 $I_n$	0.5 inductive		0.7	
	$I_n$				
	$I_{max}$				

### 8.4.3 Transformer-operated Meters – class 0.2 S / class 0.5 S

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

Requirement	Remark	Result
Variation in error does not exceed limits (see below)		

Frequency variation (%)	Current (A)	Power factor	Variation in error (%)	Limit of variation (%) by class	
				0.2 S	0.5 S
+2	0.05 $I_n$	1		0.1	0.2
	$I_n$				
	$I_{max}$				
	0.1 $I_n$	0.5 inductive		0.1	0.2
	$I_n$				
	$I_{max}$				
-2	0.05 $I_n$	1		0.1	0.2
	$I_n$				
	$I_{max}$				
	0.1 $I_n$	0.5 inductive		0.1	0.2
	$I_n$				
	$I_{max}$				

## 8.5 Reversed phase sequence

Refer to AS 62053.21:2018, 8.2 / AS 62053.22:2018, 8.2.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

Requirement	Remark	Result
Variation in error does not exceed limits (see below)		

Current (A)	Power factor	Variation in error (%)	Limit of variation (%) by class			
			0.2 S	0.5 S	1	2.0
0.1 $I_b$ (0.1 $I_n$ )	1		0.05	0.1	1.5	1.5

## 8.6 Voltage unbalance

Refer to AS 62053.21:2018, 8.2 / AS 62053.22:2018, 8.2.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

Requirement	Remark	Result
Variation in error does not exceed limits (see below)		

Current (A)	Power factor	Phases interrupted	Variation in error (%)	Limit of variation (%) by class			
				0.2 S	0.5 S	1	2
$I_b$ ( $I_n$ )	1	1 phase – L1		0.5	1.0	2.0	4.0
		1 phase – L2					
		1 phase – L3					
		2 phases – L1, L2					
		2 phases – L1, L3					
		2 phases – L2, L3					

## 8.7 Auxiliary voltage $\pm 15\%$

Refer to AS 62053.22:2018, 8.2.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (<math>^{\circ}\text{C}</math>):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

Requirement	Remark	Result
Variation in error does not exceed limits (see below)		

Reference auxiliary voltage

Voltage (% from reference)	Current (A)	Power factor	Variation in error (%)	Limit of variation (%) by class	
				0.2 S	0.5 S
+15	$0.01 I_n$	1		0.05	0.1
-15					

## 8.8 Harmonic components in the current and voltage circuits

Refer to AS 62053.21:2018, 8.2 and 8.2.1 / AS 62053.22:2018, 8.2 and 8.2.1.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (<math>^{\circ}\text{C}</math>):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

Requirement	Remark	Result
Variation in error does not exceed limits (see below)		

Current (A)	Power factor	Variation in error (%)	Limit of variation (%) by class			
			0.2 S	0.5 S	1	2
$0.5 I_{\max}$	1		0.4	0.5	0.8	1.0

### 8.9 DC and even harmonics in the a.c. current circuit

Refer to AS 62053.21:2018, 8.2 and 8.2.3.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

<b>Requirement</b>	<b>Remark</b>	<b>Result</b>
Variation in error does not exceed limits (see below)		

Current (A)	Power factor	Variation in error (%)	Limit of variation (%) by class	
			1	2
$I_{max} / \sqrt{2}$	1		3.0	6.0

### 8.10 Odd harmonics in the a.c. current circuit

Refer to AS 62053.21:2018, 8.2 and 8.2.2.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

<b>Requirement</b>	<b>Remark</b>	<b>Result</b>
Variation in error does not exceed limits (see below)		

Current (A)	Power factor	Variation in error (%)	Limit of variation (%) by class	
			1	2
$0.5 I_b (0.5 I_n)$	1		3.0	6.0

### 8.11 Sub harmonics in the a.c. current circuit

Refer to AS 62053.21:2018, 8.2 and 8.2.2 / AS 62053.22:2018, 8.2 and 8.2.2.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

<b>Requirement</b>	<b>Remark</b>	<b>Result</b>
Variation in error does not exceed limits (see below)		

Current (A)	Power factor	Variation in error (%)	Limit of variation (%) by class			
			0.2 S	0.5 S	1	2
$0.5 I_b (0.5 I_n)$	1		0.6	1.5	3.0	6.0

### 8.12 Continuous magnetic induction of external origin

Refer to AS 62053.21:2018, 8.2 and 8.2.4 / AS 62053.22:2018, 8.2 and 8.2.3.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

<b>Requirement</b>	<b>Remark</b>	<b>Result</b>
Variation in error does not exceed limits (see below)		

Current (A)	Power factor	Position of magnet	Variation in error (%)	Limit of variation (%) by class			
				0.2 S	0.5 S	1	2
$I_b (I_n)$	1	Front		2.0	2.0	2.0	3.0
		Left-hand side					
		Right-hand side					
		Top					
		Bottom					

### 8.13 Magnetic induction of external origin 0.5 mT

Refer to AS 62053.21:2018, 8.2 / AS 62053.22:2018, 8.2.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

<b>Requirement</b>	<b>Remark</b>	<b>Result</b>
Variation in error does not exceed limits (see below)		

Current (A)	Power factor	Variation in error (%)	Limit of variation (%) by class			
			0.2 S	0.5 S	1	2
$I_b (I_n)$	1		0.5	1.0	2.0	3.0

### 8.14 Operation of accessories

Refer to AS 62053.21:2018, 8.2 / AS 62053.22:2018, 8.2.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

Requirement	Remark	Result
Variation in error does not exceed limits (see below)		

- Accessories are energized intermittently
- Value of current is 0.05  $I_b$  for class 1 / class 2 direct-connected meters, 0.05  $I_n$  for class 1 / class 2 transformer-operated meters, and 0.01  $I_n$  for class 0.2 S / class 0.5 S transformer-operated meters.

Current (A)	Power factor	Accessory	Variation in error (%)	Limit of variation (%) by class			
				0.2 S	0.5 S	1	2
	1			0.05	0.1	0.5	1.0

### 8.15 Initial start-up of the meter

Refer to AS 62053.21:2018, 8.3.1 / AS 62053.22:2018, 8.3.1.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

Requirement	Remark	Result
Meter shall be functional within 5 s of reference voltage being applied to terminals		

### 8.16 Test of no-load condition

Refer to AS 62053.21:2018, 8.3.2 / AS 62053.22:2018, 8.3.2.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

- Voltage of 115% of  $U_n$  applied to voltage circuits
- No current (open-circuit)

Test period:

Requirement	Remark	Result
During the no-load condition, no more than one pulse from the test output		

### 8.17 Starting

Refer to AS 62053.21:2018, **8.3.3** / AS 62053.22:2018, **8.3.3**.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

Starting current:

<b>Requirement</b>	<b>Remark</b>	<b>Result</b>
Meter shall start and continue to register – positive direction		
Meter shall start and continue to register – negative direction (if applicable)		

### 8.18 Meter constant

Refer to AS 62053.21:2018, **8.3.4** / AS 62053.22:2018, **8.3.4**.

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>		<b>Temperature (°C):</b>		
<b>Date:</b>		<b>Time (hh:mm):</b>		

Meter constant:

<b>Requirement</b>	<b>Remark</b>	<b>Result</b>
The relationship between the test output and the indication is as marked on the name-plate (meter constant)		

## 9 Time keeping accuracy of internal clocks

Refer to AS 62052.11:2018, **ZC1**. AS 62054.21:2006, **7.5.2**.

### 9.1 Synchronous

#### 9.1.1 Mains Supply

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>			<b>Temperature (°C):</b>	
<b>Date:</b>			<b>Time (hh:mm):</b>	

Testing period: 30 days

Test temperature: 23°C

Date		Time		Difference (s)	Variation (s/day)	
		Ref	Test		Result	Limit
Start						0.167
End						

#### 9.1.2 Operational Reserve

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>			<b>Temperature (°C):</b>	
<b>Date:</b>			<b>Time (hh:mm):</b>	

Testing period: 36 h

Test temperature: 23°C

Spring       battery/super-capacitor/primary cell

Date		Time		Difference (s)	Variation (s/day)		
		Ref	Test		Result	Limit - Spring	Limit - Battery
Start						120	1
End							

### 9.2 Crystal-controlled

#### 9.2.1 Mains Supply

<b>Meter serial no.</b>			<b>At start</b>	<b>At end</b>
<b>Observer:</b>			<b>Temperature (°C):</b>	
<b>Date:</b>			<b>Time (hh:mm):</b>	

Testing period: 30 days

Test temperature: 23°C

Date		Time		Difference (s)	Variation (s/day)	
		Ref	Test		Result	Limit
Start						0.5
End						



### 9.2.2 Operational Reserve

<b>Meter serial no.</b>	
<b>Observer:</b>	
<b>Date:</b>	

	<b>At start</b>	<b>At end</b>
<b>Temperature (°C):</b>		
<b>Time (hh:mm):</b>		

Testing period: 36 h  
 Test temperature: 23°C

Date		Time		Difference (s)	Variation (s/day)	
		Ref	Test		Result	Limit
Start						
End						1

### 9.2.3 High Temperature

<b>Meter serial no.</b>	
<b>Observer:</b>	
<b>Date:</b>	

	<b>At start</b>	<b>At end</b>
<b>Temperature (°C):</b>		
<b>Time (hh:mm):</b>		

Testing period: 24 h  
 Test temperature: 45°C

Date		Time		Difference (s)	Variation (s/day)	
		Ref	Test		Result	Limit
Start						
End						0.15

### 9.2.4 Low Temperature

<b>Meter serial no.</b>	
<b>Observer:</b>	
<b>Date:</b>	

	<b>At start</b>	<b>At end</b>
<b>Temperature (°C):</b>		
<b>Time (hh:mm):</b>		

Testing period: 24 h  
 Test temperature: -10°C

Date		Time		Difference (s)	Variation (s/day)	
		Ref	Test		Result	Limit
Start						
End						0.15