

4-30 compliance and ION meters

This technical note outlines the compliance of PowerLogic™ ION™ meters with the International Electrotechnical Commission’s IEC 61000-4-30 (4-30) standard, and is intended for personnel with knowledge of power quality and power quality standards.

NOTE: If you have an ION7650 meter, install the power quality version of the meter template (PQ template, for example, 7650_v355_FAC-PQ_V3.4.0.0.1.dcf) in order to support 4-30 power quality functionality.

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Additional Information

For additional information regarding operation and installation of these meters, see the following documents available for download from the website:

- your meter’s user guide and installation information
- *ION Reference*

You can use StruxureWare™ Power Monitoring Expert to generate 4-30 reports from your meter’s data. Refer to the Reports online help for more information.

For a complete description of the 4-30 standard, refer to the IEC website at www.iec.ch and the IEC publications catalog at www.iec.ch/searchpub/cur_fut.htm

Third-party lab certifications are available. Please contact your sales representative for details.

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Safety information

Important information



Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in death** or serious injury.

WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in death** or serious injury.

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result in minor or moderate injury**.

NOTICE

NOTICE is used to address practices not related to physical injury.

Please note

Electrical equipment should be installed, operated, serviced and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

Notices

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As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication.

Safety precautions

Installation, wiring, testing and service must be performed in accordance with all local and national electrical codes.

DANGER

ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E in the USA, CSA Z462 or applicable local standards.
- Turn off all power supplying this device and the equipment in which it is installed before working on the device or equipment.
- Always use a properly rated voltage sensing device to confirm that all power is off.
- Replace all devices, doors and covers before turning on power to this equipment.

Failure to follow these instructions will result in death or serious injury.

Introduction

IEC 61000-4-30 overview

The 4-30 standard defines methods for measurement and interpretation of power quality parameters in 50/60 Hz AC power supply systems. The standard describes measurement methods for relevant parameters to obtain reliable, repeatable and comparable results using any compliant meter and regardless of the environmental conditions.

Relevant power quality parameters in 4-30 are: power frequency; magnitude of supply voltage; flicker; supply voltage dips and swells; voltage interruptions; transient voltages; supply voltage unbalance; voltage harmonics and interharmonics; mains signaling on the supply voltage and rapid voltage changes; and measurement of underdeviation and overdeviation parameters.

For each parameter measured, 4-30 defines three classes of measurement performance:

- **Class A parameter performance:** This class of performance is used where precise measurements are necessary. Class A performance can be used to verify standards compliance or resolve settlement metering. Any 4-30 parameter based on the same signal, measured with separate class A compliant devices, will produce matching results within the specified margin of uncertainty for that parameter.
- **Class S parameter performance:** This class of performance is used for statistical applications such as surveys or power quality assessment, possibly with a limited subset of parameters. Although class S uses equivalent intervals of measurement as class A, the class S processing requirements are lower.
- **Class B parameter performance:** This class of performance is defined in order to avoid making many existing instruments designs obsolete.

ION implementation of 4-30

This section outlines 4-30 compliance in ION meters.

Meter firmware versions and 4-30 edition compliance

Meter ¹	Firmware version	IEC 61000-4-30 compliance
ION7400	all	Class S, Edition 2
ION7650	330 up to 355	Class A, Edition 1
ION7650	355 and later	Class A, Edition 2
ION8650A	400 and later	Class A, Edition 2
ION8650B	400 and later	Class S, Edition 2
ION8800A	330 up to 340	Class A, Edition 1
ION8800A	340 and later	Class A, Edition 2
ION8800B	330 up to 340	Class A, Edition 1
ION8800B	340 and later	Class S, Edition 2
PM8000	all	Class S, Edition 2

1. ION8650C and ION8800C meters do not support 4-30 functionality.

Class A measurement performance ($U_{din} = 230 \text{ VAC RMS L-N}$)

Parameter	Range	Accuracy
5.1 Power Frequency	42.5 - 69 Hz	+/-0.005 Hz
5.2 Magnitude of Supply Voltage	1 - 200% of U_{din} (Edition 1) 10 - 150% of U_{din} (Edition 2)	+/-0.1% of U_{din}
5.3 Flicker	0 - 20 Pst (Edition 1) 0.2 - 10 Pst (Edition 2)	+/-5% of reading
5.4 Supply Voltage Dips & Swells	10 - 200% of U_{din}	Amplitude +/-0.2% of U_{din} Duration +/-1 cycle
5.5 Voltage Interruptions	N/A	N/A
5.7 Supply Voltage Unbalance	0 - 5%	+/-0.15% of reading for both zero and negative sequence
5.8 Voltage Harmonics	2 times the limit from IEC 61000-2-4 Class 3, calculated up to the 50th harmonic	IEC 61000-4-7:2002 Class 1
5.9 Voltage Interharmonics	2 times the limit from IEC 61000-2-4 Class 3, calculated up to the 50th harmonic	IEC 61000-4-7:2002 Class 1
5.10 Mains Signaling Voltage	0 - 15% of U_{din}	1 - 3% of U_{din} , +/-0.15% of U_{din} ; 3 - 15% of U_{din} , +/-5% of measured value
5.12 Measurement of Underdeviation and Overdeviation Parameters	1 - 200% of U_{din} (Edition 1) 10 - 150% of U_{din} (Edition 2)	+/-0.1% of U_{din}

NOTE: The ION8800 tolerates 200% of U_{din} as per the requirements of IEC 61000-4-30 section 6 (range of influence quantities and steady-state verification).

Class S measurement performance (U_{din} = 230 VAC RMS L-N)

Parameter	Range	Accuracy
5.1 Power Frequency	42.5 - 69 Hz	+/-0.005 Hz
5.2 Magnitude of Supply Voltage	10 - 150% of U _{din}	+/-0.1% of U _{din}
5.3 Flicker	0.2 - 10 Pst	+/-5% of reading
5.4 Supply Voltage Dips & Swells	10 - 200% of U _{din}	Amplitude +/-0.2% of U _{din} Duration +/-1 cycle
5.5 Voltage Interruptions	N/A	N/A
5.7 Supply Voltage Unbalance	0 - 5%	+/-0.15% of reading for both zero and negative sequence
5.8 Voltage Harmonics	2 times the limit from IEC 61000-2-4 Class 3, calculated up to the 40th harmonic	IEC 61000-4-7:2002 Class 1
5.9 Voltage Interharmonics	Not provided	Not provided
5.10 Mains Signaling Voltage	0 - 15% of U _{din}	1 - 3% of U _{din} , +/-0.15% of U _{din} ; 3 - 15% of U _{din} , +/-5% of measured value
5.12 Measurement of Underdeviation and Overdeviation Parameters	Not provided	Not provided

4-30 recording considerations

Because of the ION framework update rate, power quality events starting or ending very close to a 4-30 interval boundary may be entered in the data recorder as occurring in the previous or subsequent 4-30 reporting interval. Additionally, 4-30 flagging is not retained when the meter is powered down, so if the meter is power-cycled in the middle of a 4-30 reporting interval, the ION framework will lose any flagging information for the intervals in progress at the time, for power quality events occurring prior to the power cycle.

