

# **NORMA 6003/NORMA 6003+/ NORMA 6004/NORMA 6004+**

Power Analyzer



## Getting Started Manual

PN 5130608

June 2019, Rev. 3, 2/20

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## ***Introduction***

The Fluke NORMA 6003/ NORMA 6003+/ NORMA 6004/NORMA 6004+ Power Analyzers (the Product or Analyzer) are portable high-bandwidth power analyzers. The Product has these optional accessories, the Fluke current clamp 80i-2010s and the high voltage probe U1500s.

The Product provides these benefits:

- Multiple channels for voltage and current.
  - Motor Speed and Torque measurements (NORMA 6003+, NORMA 6004+)
  - 0.1 % accuracy, 500 kHz bandwidth, 200 ksp/s sample rate.
  - Electrical isolation between channels to avoid a short circuit.
  - Flexible configurations according to the measuring requirements, synchronize 2 Analyzers to configure 6 to 8 channels or split measurements.
  - 9.6 cm thickness makes it easy to use in narrow locations.
- 5000 mAh Li-ion battery for approximately 10 hours continuous operation without a power supply.
  - CAT III 1000 V, CAT IV 600 V rating
  - 100 ms-1 s configurable update rate, 32 GB storage available for continuous recording.
  - Main functions: Meter, Scope, Trend, Harmonic, Phasor.
  - USB and RS485 interface with open communication protocol.
  - Simple UI for better operation experience, suitable for in-field application.
  - PC software (Fluke Power Analyzer Software) for online measuring, data downloading, and analysis.

## **How to Contact Fluke**

Go to Fluke's website at [www.fluke.com](http://www.fluke.com) to read the User Manual and find more information about your Product. To register your product, visit <http://register.fluke.com>.

To view, print, or download the latest manual or manual supplement, visit <http://us.fluke.com/usen/support/manuals>.

To contact Fluke, call one of the following telephone numbers:

- Technical Support USA: 1-800-44-FLUKE (1-800-443-5853)
- Calibration/Repair USA: 1-888-99-FLUKE (1-888-993-5853)
- Canada: 1-800-36-FLUKE (1-800-363-5853)
- Europe: +31 402-675-200
- Japan: +81-3-6714-3114
- Singapore: +65-6799-5566
- China: +86-400-810-3435 (service) or +86-400-921-0835 (repair)
- Brazil: +55-11-3530-8901

- Anywhere in the world: +1-425-446-5500

## **Safety**

A **Warning** identifies conditions and procedures that are dangerous to the user.

### **Warning**















**To prevent possible electrical shock, fire, or personal injury:**

- **Read all safety information before you use the Product.**
- **Use the Product only as specified, or the protection supplied by the Product can be compromised.**
- **Comply with local and national safety codes. Use personal protective equipment (approved rubber gloves, face protection, and flame-resistant clothes) to prevent shock and arc blast injury where hazardous live conductors are exposed.**

- Examine the case before you use the Product. Look for cracks or missing plastic. Carefully look at the insulation around the terminals.
- Do not use the Product around explosive gas, vapor, or in damp or wet environments.
- Use Product-approved measurement category (CAT), voltage, and amperage rated accessories (probes, test leads, and adapters) for all measurements.
- Do not use test leads if they are damaged. Examine the test leads for damaged insulation and measure a known voltage.
- Do not use the HOLD function to measure unknown potentials. When HOLD is turned on, the display does not change when a different potential is measured.
- Do not use the Product if it is damaged.
- Do not use the Product if it operates incorrectly.
- The battery door must be closed and locked before you operate the Product.
- Remove all probes, test leads, and accessories before the battery door is opened.
- Do not work alone.
- Use only the external mains power supply included with the Product.
- Do not exceed the Measurement Category (CAT) rating of the lowest rated individual component of a Product, probe, or accessory.
- Do not touch voltages >30 V ac rms, 42 V ac peak, or 60 V dc.
- Do not apply more than the rated voltage, between the terminals or between each terminal and earth ground.
- Measure a known voltage first to make sure that the Product operates correctly.
- Disable the Product if it is damaged.



## Symbols

Table 1. Symbols

Symbol	Description	Symbol	Description
	WARNING. RISK OF DANGER.		WARNING. HAZARDOUS VOLTAGE. Risk of electric shock.
	Consult user documentation.		Fuse
	AC (Alternating Current)		DC (Direct Current)
	Double Insulated		Earth
	Application around and removal from uninsulated hazardous live conductors is permitted.	 Li Ion	Battery
	Conforms to relevant South Korean EMC Standards.		Conforms to European Union directives.
	Certified by CSA Group to North American safety standards.		Conforms to relevant Australian Safety and EMC standards.
<b>CAT III</b>	Measurement Category III is applicable to test and measuring circuits connected to the distribution part of the building's low-voltage MAINS installation.		
<b>CAT IV</b>	Measurement Category IV is applicable to test and measuring circuits connected at the source of the building's low-voltage MAINS installation.		



**Table 1. Symbols (cont.)**

Symbol	Description
 Li-ion	This product contains a Lithium-ion battery. Do not mix with solid waste stream. Spent batteries should be disposed of by a qualified recycler or hazardous materials handler per local regulations. Contact your authorized Fluke Service Center for recycling information.
	This product complies with the WEEE Directive marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste. Product Category: With reference to the equipment types in the WEEE Directive Annex I, this product is classed as category 9 "Monitoring and Control Instrumentation" product. Do not dispose of this product as unsorted municipal waste.

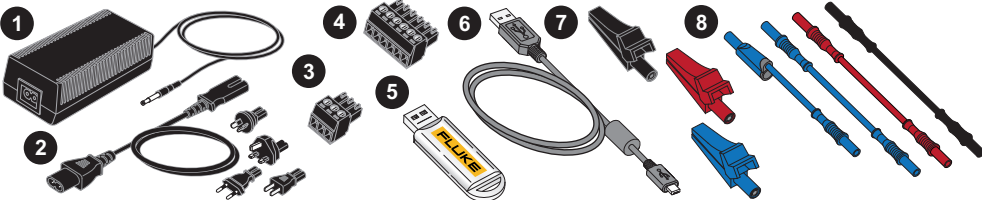
## ***Product Familiarization***

Check the contents of the soft case for completeness. If something in the soft case is damaged or missing, contact your distributor or the nearest sales or service office. See [Table 2](#) for a list of included accessories and [Table 3](#) for optional accessories.



**Figure 1. The Product**

**Table 2. Accessories**



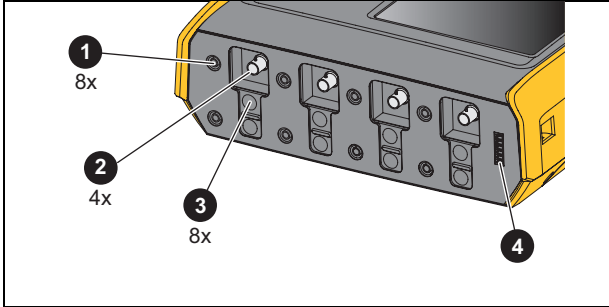
Item	Accessory	Part Number	Item	Accessory	Part Number
1	Power Supply Adapter (CAT IV 600 V)	4829014	7	4 Channel Model Test Lead Set for NORMA 6004/6004+:	5098494
2	Power line cord (for China)	4894155		0.18 m cables: (8) blue	
	Power line cord (for international)	4894137		1.5 m cables: (4) black, (4) red (4) blue	
	Mains Adapter set (for international)	4894143	Alligator clips: (4) black, (4) red (4) blue		
3	485 / synchrony adapter (3.81 mm, black, 3 pin)	5094687	8	3 Channel Model Test Lead Set for NORMA 6003/6003+:	5098502
4	Speed / torque adapter (3.81 mm, black, 6 pin) NORMA 6003+, NORMA 6004+	5094693		0.18 m cables: (6) blue	
5	USB Flash Drive for PC SW	4739818		1.5 m cables: (3) black, (3) red (3) blue	
6	USB (mini B) cable	5126257		Alligator clips: (3) black, (3) red (3) blue	
				Soft case (not shown)	5101220

**Table 3. Optional Accessories**

Accessory	Part Number
Voltage Test Lead Set (single channel): 1.5 m cables: (1) red, (1) black, (2) blue	5098516
Extra battery Fluke BP 291	3894688
Alligator Clip Set (single channel): (1) red, (1) black, (2) blue	5098525
U1500s (high voltage probe)	5098906
80i-2010s (current clamp)	5098880
⚠ 11 A Fuse	803293

**Back Panel**

**Table 4. Back Panel**



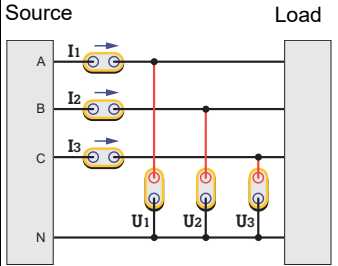
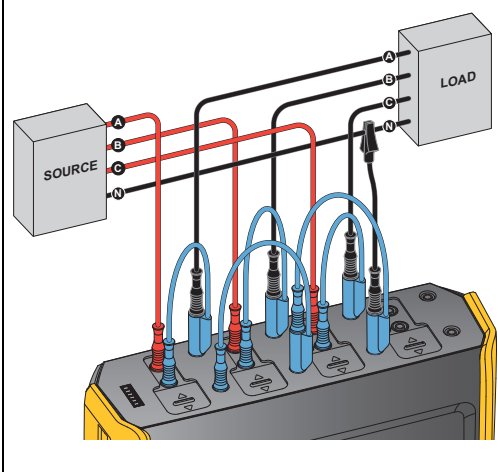
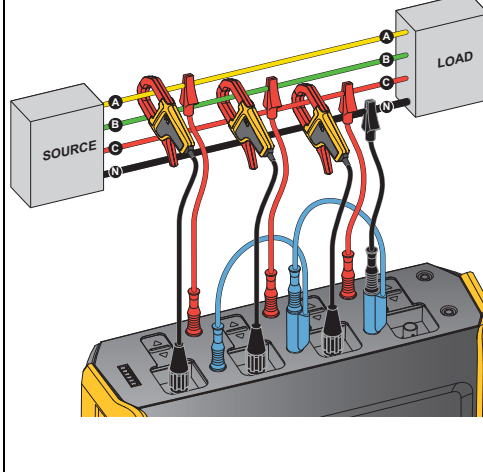
1	Voltage Ports
2	External Current Sensor Ports
3	Current Ports
4	Motor Speed/Torque Ports (NORMA 6003+/ NORMA 6004+)

## Product Connections

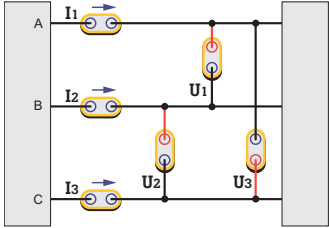
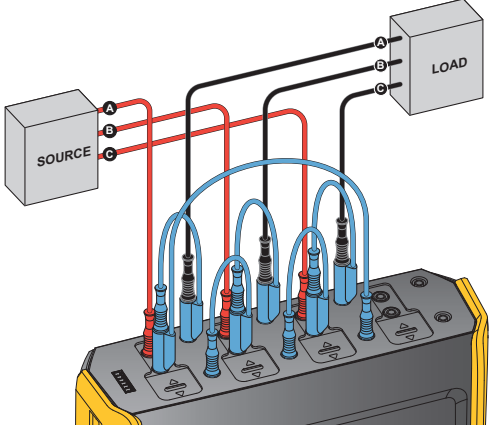
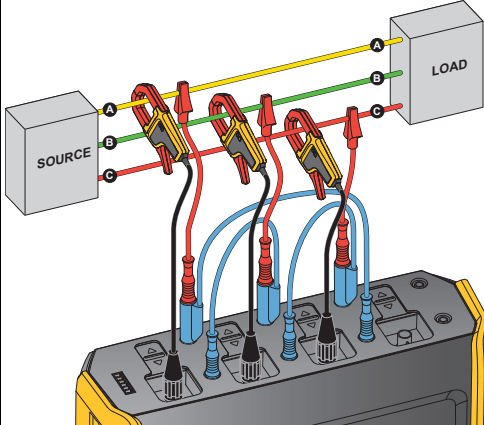
Fluke provides a safety test lead kit set configured to prevent a phase-to-phase or phase-to-neutral short circuit. See 8 in Table 2. Use the stackable

connector on the Product side only. Do not use test leads with dual stackable connectors.

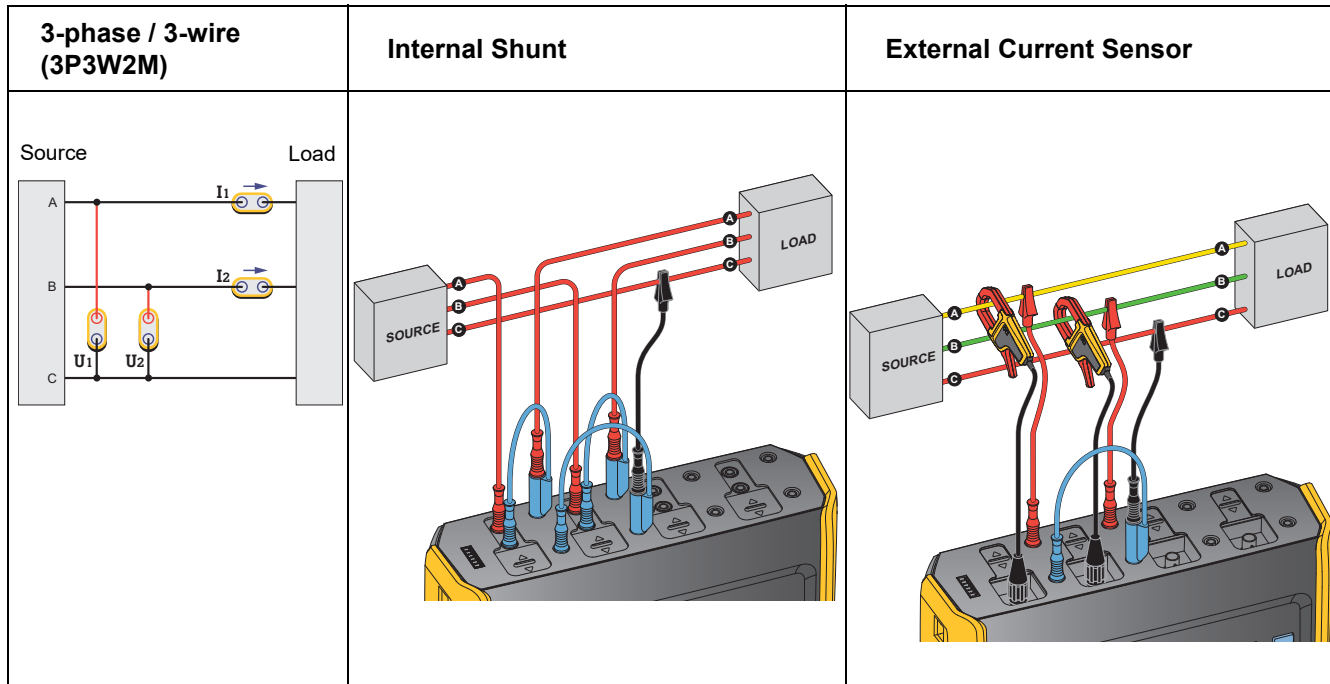
**Table 5. 3-Phase Connections**

3-phase / 4-wire (3P4W3M)	Internal Shunt	External Current Sensor
<p>Source</p>  <p>Load</p>		

**Table 5. 3-Phase Connections (cont.)**

3-phase / 3-wire (3P3W3M)	Internal Shunt	External Current Sensor
<p>Source Load</p> 		

**Table 5. 3-Phase Connections (cont.)**



**Table 6. Controls**

	<p><b>1</b></p> <p>Power Button ⓘ</p>	Turn on/off the Analyzer	
	<p><b>2</b></p>	Screen	LCD screen
	<p><b>3</b></p>	Function Keys	Select from the on-screen options
	<p><b>4</b></p> <p>Controls ⏪ ⏩ ⏴ ⏵</p>	Controls	<p><b>BACK</b> - Go to previous screen</p> <p><b>SELECT</b> - Accept the selection</p> <p>Directional keys to move the cursor.</p>
	<p><b>5</b></p>	Interface Keys	<p><b>HOLD</b> - Hold or release current screen</p> <p><b>SAVE</b> - Save data, configuration, or screen shot.</p> <p>Function keys</p> <p><b>METER</b> / <b>SCOPE</b> / <b>TREND</b> / <b>PHASOR</b> / <b>HARMONIC</b></p>
	<p><b>6</b></p> <p>☀</p>		<p>Backlight (single press)</p> <p>Screen shot (hold for 2 seconds)</p>
	<p><b>7</b></p> <p><b>MEMORY</b></p>		View/Manage data in SD card
	<p><b>8</b></p> <p><b>SYSTEM</b></p>		Instrument information, instrument settings, communication settings, and calibration settings

## **Maintenance**

Before each use, inspect the Analyzer. Look for cracks or missing portions of the housing and output cable insulating cover and for loose or weakened components.

### **⚠⚠ Warning**

**To prevent electric shock:**

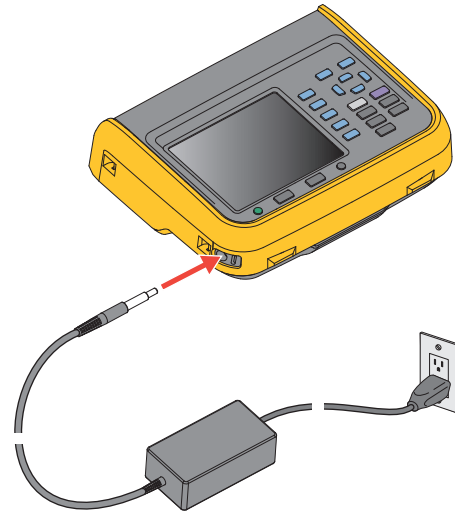
- **Use only specified replacement parts.**
- **Have an approved technician repair the Product.**
- **Do not perform any service procedures unless you are qualified to do so.**
- **Read the *Safety* information at the beginning of this manual before proceeding.**

## **Cleaning and Storage**

Periodically wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents.

If the Analyzer is not used for long time periods (>60 days), remove the battery and store the battery separately.

## **Battery**



**Figure 2. Charge the Battery**

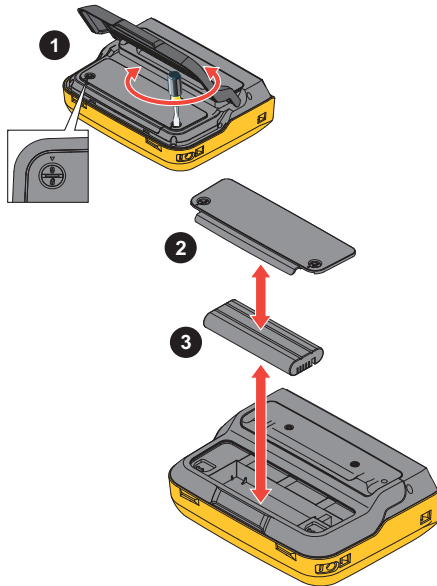
### **⚠⚠ Warning**

**To prevent electrical shock, remove all probes, test leads, and accessories before the battery door is opened.**



**⚠⚠ Warning**

To prevent possible electrical shock, fire, or personal injury, charge the battery when the low battery indicator shows to prevent incorrect measurements.



**Figure 3. Battery Installation**

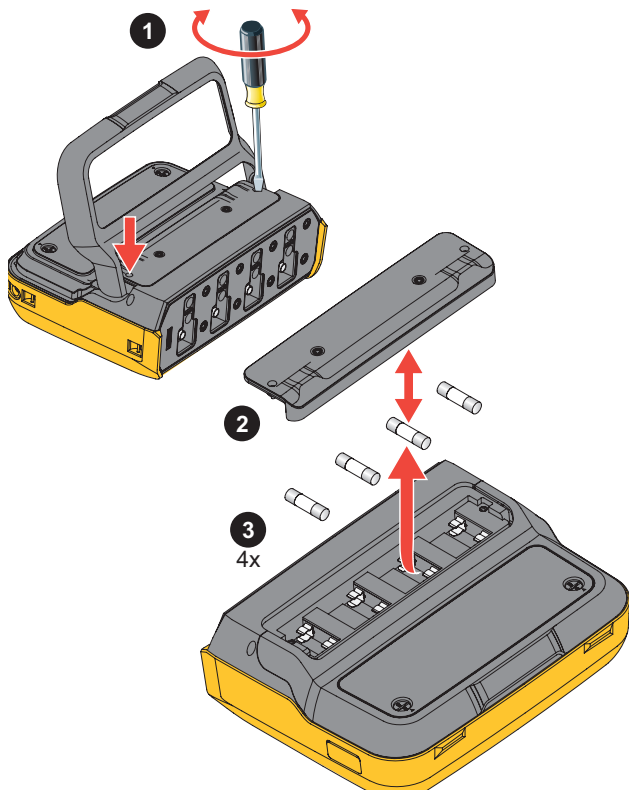
## **Fuse Replacement**

**⚠⚠ Warning**

To prevent electrical shock, remove all probes, test leads, and accessories before the fuse door is opened.

To change the fuses:

1. Turn off the power, disconnect the power cord, and disconnect all test leads.
2. Open the tilt stand and using a Phillips screwdriver, remove the screws on the fuse door, and then remove the door.
3. For each fuse, gently use a flat-bladed screwdriver to pry open the clip and remove the fuse.
4. Replace the fuse.
5. Replace the fuse door.



**Figure 4. Fuse Replacement**

## Specifications

Maximum voltage between any Terminal and Earth Ground .....	1000 V
Size (HxWxL).....	298 mm x 215 mm x 96 mm
Weight.....	3.5 kg
Display .....	5.7 in TFT LCD 640x480
Operating Temperature... ..	0 °C to 40 °C (with battery adapter) -10 °C to + 50 °C (battery only)
Storage Temperature .....	-30 °C to 60 °C (without battery) -20 °C to 60 °C (with battery)
Operating Humidity .....	Non-condensing (<10 °C) ≤90 % RH (at 10 °C to 30 °C) ≤75 % RH (at 30 °C to 40 °C) ≤45 % RH (at 40 °C to 50 °C)
Operating Altitude .....	2000 m
Storage Altitude .....	12 000 m
Ingress Protection .....	IEC 60529: IP50 (Terminals Connected)
Battery	
Type.....	Li-ion Fluke BP 291, 10.8 V/5000 mAh, 54 Wh IEC 62133 UN 38.3
Battery life.....	10 hours (Typical)
Safety	
General.....	IEC 61010-1: Pollution Degree 2
Measurement.....	IEC 61010-2-030 CAT IV 600, CAT III 1000 V

**Electromagnetic Compatibility (EMC)**

- International.....IEC 61326-1: Industrial  
Electromagnetic Environment;  
IEC 61326-2-2  
CISPR 11: Group 1, Class A

*Group 1: Equipment has intentionally generated and/or uses conductively-coupled radio frequency energy that is necessary for the internal function of the equipment itself.*

*Class A: Equipment is suitable for use in all establishments other than domestic and those directly connected to a low-voltage power supply network that supplies buildings used for domestic purposes. There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted and radiated disturbances.*

*Caution: This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.*

*Emissions that exceed the levels required by CISPR 11 can occur when the equipment is connected to a test object.*

- Korea (KCC).....Class A Equipment (Industrial  
Broadcasting & Communication  
Equipment)

*Class A: Equipment meets requirements for industrial electromagnetic wave equipment and the seller or user should take notice of it. This equipment is intended for use in business environments and not to be used in homes.*

- USA (FCC) .....47 CFR 15 subpart B. This product is considered an exempt device per clause 15.103.

**Electrical Specifications**

**Modules**

- NORMA 6003 .....3 Voltage + 3 Current
- NORMA 6003+ .....3 Voltage + 3 Current + 1 Motor
- NORMA 6004 .....4 Voltage + 4 Current
- NORMA 6004+ .....4 Voltage + 4 Current + 1 Motor
- Sample Rate .....200 ksps
- Data Update Rate ..... 100 ms, 200 ms  
500 ms, 1 s

**Voltage**

- Range ..... 10 V, 100 V, 1000 V
- Crest Factor ..... CF ≤2
- Maximum voltage..... 10 % over load
- Input Impedance .....2 MΩ / 10 pF (Typical)
- Temperature
- Coefficient.....0.05 x (Spec)/k
- Sample Rate .....200 ksps
- Bandwidth ..... 1000 V range: 500 kHz  
100 V range: 200 kHz  
10 V range: 100 kHz

**Accuracy - Accuracy (% reading + % range)**

Range	DC	AC	
		10 Hz to 1 kHz	10 kHz
<b>1000 V</b>	0.1 + 0.1	0.1 + 0.1	5 + 0.5
<b>100 V</b>	0.1 + 0.1	0.1 + 0.1	5 + 0.5
<b>10 V</b>	0.1 + 0.2	0.1 + 0.2	5 + 0.5

### **Current**

#### **Shunt**

Range ..... 0.1 A, 1 A, 10 A  
 Crest Factor .....  $CF \leq 2$   
 Maximum current ..... 10 % over load  
 Input Impedance .....  $0.025 \Omega$  (Typical)

#### **BNC**

Range ..... 0.1 V, 1 V, 10 V  
 Crest Factor .....  $CF \leq 2$   
 Maximum voltage ..... 10 % over load  
 Input Impedance .....  $100 \text{ k}\Omega / 100 \text{ pF}$   
 Temperature  
 Coefficient .....  $0.05 \times (\text{Spec})/k$   
 Sample Rate ..... 200 ksp/s  
 Bandwidth ..... 10 A range: 500 kHz,  
                                   1 A range: 200 kHz,  
                                   0.1 A range: 100 kHz,  
                                   10 V range: 500 kHz,  
                                   1 V range: 200 kHz,  
                                   0.1 V range: 100 kHz

**Accuracy** - Accuracy (% reading + % range)

Range	DC	AC	
		10 Hz to 1 kHz	10 kHz
<b>10 A</b>	0.1 + 0.2	0.1 + 0.1	5 + 1
<b>1 A</b>	0.1 + 0.5	0.1 + 0.2	5 + 1
<b>0.1 A</b>	0.1 + 2	0.1 + 1	5 + 1
<b>10 V</b>	0.1 + 0.1	0.1 + 0.1	5 + 1
<b>1 V</b>	0.1 + 0.2	0.1 + 0.1	5 + 1
<b>0.1 V</b>	0.1 + 1	0.1 + 0.5	5 + 1

### **Motor (NORMA 6003+, NORMA 6004+)**

Voltage Range .....  $\pm 10 \text{ V dc}$ , 10 % overload  
 Voltage Channels ..... 2  
 Input Impedance .....  $1.1 \text{ M}\Omega$  (Typical)  
 Temperature  
 Coefficient ..... 0.05 Inherent uncertainty/K  
 Sample Rate ..... 200 ksp/s  
 Accuracy at dc ..... 0.1 % reading + 0.1 % range  
 Pulse Channels ..... 3  
 Pulse logic  
   high threshold ..... 2 V (Typical)  
   low threshold ..... 0.8 V (Typical)  
 Maximum pulse  
   frequency ..... 100 kHz

### **Frequency Domain Measurement**

Frequency Accuracy ..... 0.05 % range + 0.05 % reading  
 Harmonics ..... 100 order, up to 6 kHz