

**FLUKE®**

**9062**

*Motor and Phase Rotation Indicator*

**Users Manual**

PN 2438554

April 2005

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# 9062

## ***Introduction***

The Fluke 9062 Motor and Phase Rotation Indicator (hereafter referred to, “the 9062”) is a handheld, battery-operated instrument designed to detect the rotary field of three-phase systems and determine motor-rotation direction.

## ***Contacting Fluke***

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

USA: 1-888-44-FLUKE (1-888-443-5853)

Canada: 1-800-36-FLUKE (1-800-363-5853)

Europe: +31 402-675-200

Japan: +81-3-3434-0181

Singapore: +65-738-5655

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

USA Service: 1-888-99-FLUKE (1-888-993-5853)

Or, visit Fluke's Web site at [www.fluke.com](http://www.fluke.com).

To register your product, visit [register.fluke.com](http://register.fluke.com)


## ***Unpacking the 9062***



The 9062 ships with the following items:

- 3 test leads
- 3 test probes
- 3 alligator clips
- 9 V battery
- Users Manual

If an item is damaged or missing, contact the place of purchase immediately.

## ***Safety Information***

A  **Caution** identifies conditions and actions that may damage the 9062.

A   **Warning** identifies conditions and actions that pose hazard(s) to the user.

**⚠ ⚠ Read First: Safety Information**

**To avoid possible electric shock or fire, do the following:**

- **Read the following safety information carefully before using or servicing the instrument.**
- **Adhere to local and national safety codes.**
- **Individual protective equipment must be used to prevent shock and injury**
- **Use of instrument in a manner not specified by the manufacturer may impair safety features/protection provided by the equipment.**
- **Avoid working alone.**
- **Inspect the test leads for damaged insulation or exposed metal. Check test lead continuity. Damaged leads must be replaced. Do not use the 9062 if it looks damaged.**
- **Be careful when working above 30 V ac rms, 42 V ac peak and 60 V dc. Such voltages pose a shock hazard.**
- **When using the probes, keep fingers away from probe contacts. Keep fingers behind the finger guards on the probes.**










- **Measurements can be adversely affected by impedances of additional operating circuits connected in parallel or by transient currents.**
- **Verify operation on a known source prior to measuring hazardous voltages (voltages above 30 V ac rms, 42 V ac peak and 60 V dc).**
- **Do not use the 9062 with any of the parts removed.**
- **Do not use the 9062 around explosive gas, vapor, or dust.**
- **Disconnect the test leads from power sources and the 9062 before changing the battery.**
- **Do not use the 9062 in a wet environment.**



## Symbols

The following symbols appear on the 9062 or in this manual.

**Table 1. Symbols**

	Risk of electric shock		Earth
	Risk of Danger. Important information. See manual.		AC or DC
	Hazardous voltage.		Recycling information
	Equipment protected by double or reinforced Insulation		Conforms to EU directives.
	Battery	CAT III	OVERVOLTAGE (Installation) CATEGORY III, Pollution Degree 2 per IEC1010-1 refers to the level of Impulse Withstand Voltage protection provided. Equipment of OVERVOLTAGE CATEGORY III is equipment in fixed installations (e.g., electricity meter and primary over-current protection equipment.

## Elements of the 9062

Indicators, buttons, and jacks are shown in Figure 1.

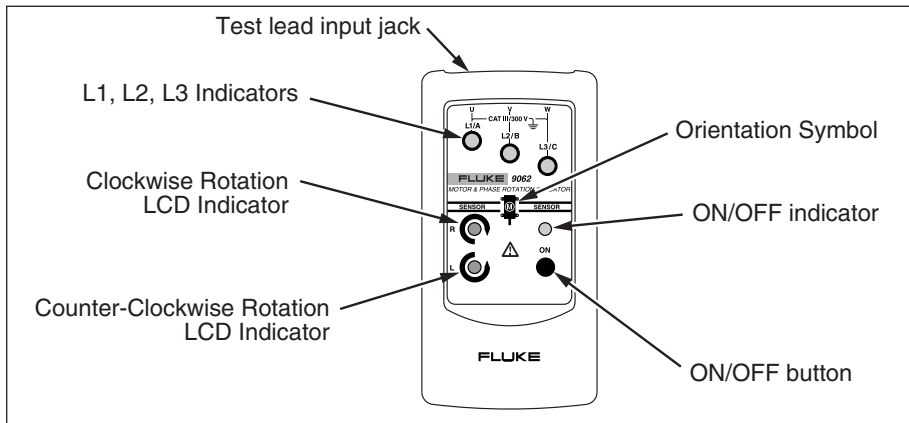


Figure 1. The 9062 Motor and Phase Rotation Indicator

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## **Using the Motor & Phase Rotation Indicator**

### **Determine Rotary Field Direction**




































To determine the rotary field direction:

1. Connect one end of the test leads to the 9062. Make sure the L1, L2, and L3 test leads are connected to the corresponding input jacks.
2. Connect the test probes to the other end of the test leads.
3. Connect the test probes to the three mains phases. Press the ON/OFF button. The green ON indicator shows that the instrument is ready for testing.

Either the Clockwise or Counter Clockwise Rotary indicator illuminates showing the type of rotary field direction present.

#### **⚠ ⚠ Warning**

**The rotary indicator lights even if the neutral conductor, N, is connected instead of L1, L2, or L3. Refer to Figure 2 (also shown on the back of the 9062) for more information.**

	 Off	 On	 not defined			
Phase indication			L1	L2	L3	
Phase rotation						
rotat. right						
rotat. left						
L1 missing						
L2 missing						
L3 missing						

**Figure 2. Phase Indication Table (shown on the rear of the 9062)**

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### ***Non-Contact Rotary Field Indication***

For non-contact rotary field indication:

1. Disconnect all test leads from the 9062.
2. Position the Indicator on the motor so that it is parallel to the length of the motor shaft. The Indicator should be one inch or closer to the motor. See Figure 3.
3. Press the ON/OFF button. The green ON indicator shows that the instrument is ready for testing.

Either the Clockwise or Counter Clockwise Rotary indicator illuminates showing the type of rotary field direction present.

*Note*

*The Indicator will not operate with engines controlled by frequency converters. The bottom of the 9062 should be oriented towards the drive shaft. See the Orientation Symbol on the 9062.*

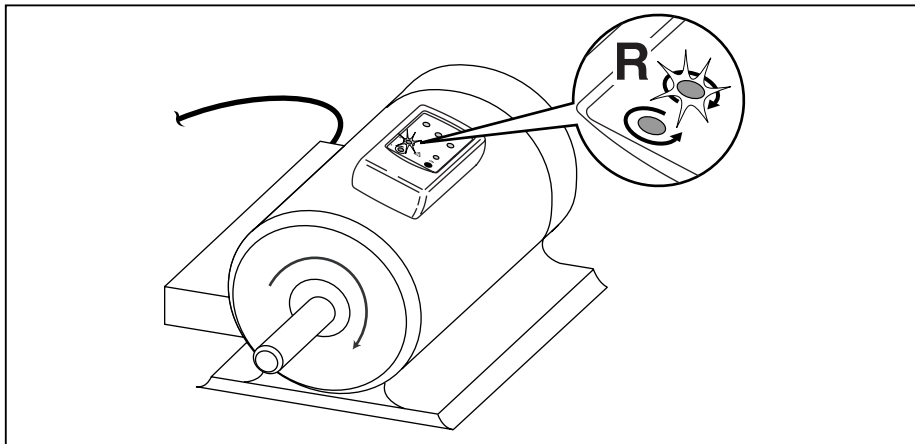


Figure 3. Motor Rotation

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**Motor & Phase Rotation Indicator**  
*Using the Motor & Phase Rotation Indicator*

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See Table 2 for the minimum motor diameter and number of pole pair to obtain a reliable test result.

**Table 2. Reliable Motor Test Requirements**

Number of Pole Pair	Rotary Number of Rotary Field (1/min) at Frequency (Hz)			Angle Between Poles °	Min. Ø of Motorcase cm
	16 2/3	50	60		
1	1000	3000	3600	60	5.3
2	500	1500	1800	30	10.7
3	333	1000	1200	20	16.0
4	250	750	900	15	21.4
5	200	600	720	12	26.7
6	167	500	600	10	32.1
8	125	375	450	7.5	42.8
10	100	300	360	6	53.5
12	83	250	300	5	64.2
16	62	188	225	3.75	85.6

***Determine the Motor Connection***

1. Connect one end of the test leads to the 9062. Make sure the L1, L2, and L3 test leads are connected to the corresponding jack.
2. Connect the alligator clamps to the other end of the test leads.
3. Connect the alligator clamps to the motor connections, L1 to U, L2 to V, L3 to W.
4. Press the ON/OFF button. The green ON indicator shows that the instrument is ready for testing.
5. Turn the motor shaft half a revolution towards the right.

*Note*

*The bottom of the 9062 should be oriented towards the drive shaft . See the Orientation Symbol on the 9062.*

Either the Clockwise or Counter Clockwise Rotary indicator illuminates showing the type of rotary field direction present.



### ***Magnetic Field Detection***

To detect a magnetic field, place the 9062 to a solenoid valve.

A magnetic field is present if either the Clockwise or the Counter Clockwise Rotary indicator illuminate.

### ***Maintaining the 9062***

This section provides basic maintenance information.

#### **Caution**

**To avoid damaging the 9062:**

- **Do not attempt to repair or service the 9062 unless qualified to do so.**
- **Make sure that the relevant calibration, performance test, and service information is being used.**

### ***Cleaning***

Periodically wipe the case with a damp cloth and mild detergent. Clean only with soap and water and remove any residue afterwards.


**⚠ Caution**

To avoid damaging the 9062:

- Do not use abrasives or solvents. Abrasives or solvents will damage the 9062 case.
- Prior to cleaning, remove test leads from the 9062.

**Replacing and Disposing of the Batteries****⚠⚠ Warning**

To avoid electric shock, disconnect the test leads from the source before opening the 9062 for battery replacement.

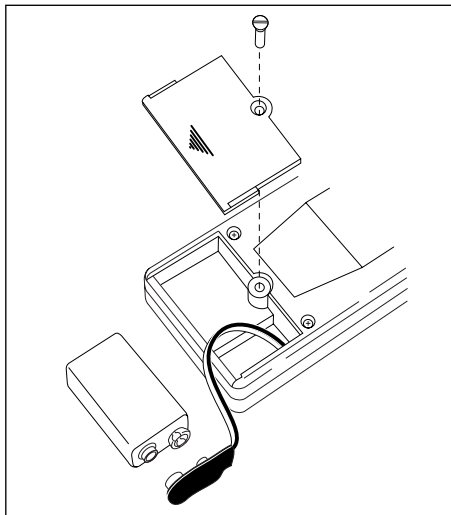
To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the battery indicator  appears.



*The 9062 contains alkaline batteries. Do not dispose of these batteries with other solid waste. Used batteries should be disposed of by a qualified recycler or hazardous materials handler. Contact your authorized Fluke Service center for recycling information.*

The 9062 uses a 9 V battery (supplied). To replace the battery, follow these steps and refer to Figure 4:

1. Disconnect test leads from any power source.
2. Remove the holster.
3. Place the 9062 face down on a nonabrasive surface and loosen the battery-door screw with a flat-blade screwdriver.
4. Lift the battery access lid away from the 9062.
5. Replace the battery as shown in Figure 4. Observe the battery polarity shown in the battery compartment.
6. Secure the battery access lid back in position with the screw.
7. Place the 9062 back in the holster.



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**Figure 4. Battery Replacement**

## **Specifications**

### **Environmental**

**Operating Temperature**  
0 °C to +40 °C

**Operating Altitude**  
2000 m

**Pollution Degree**  
2

**Type of Protection**  
IP 40

### **Mechanical Specifications**

**Size**  
124 x 61 x 27 mm (4.9 x 2.4 x 1.1 in)

**Weight**  
150 g (0.3 lbs)

**Humidity**  
15 % to 80 %

## **Safety Specifications**

### **Electrical Safety**

Meets DIN VDE 0411, IEC 61010 DIN,  
VDE 0413-7, EN 61557-7, IEC 61557-7

**Maximum Operating Voltage ( $U_{me}$ )**  
400 V AC for all ranges

**Protection Level**  
CAT III, 300 V

### **Electrical Specifications**

**Battery**  
9 V alkaline, IEC 6LR61

**Current Consumption**  
max 20 mA

**Battery Life**  
minimum 1 year for average use

***Determine Rotary Field Direction***

**Nominal Voltage Rotary Direction**

1 to 400 V AC

**Nominal Voltage Phase Indication**

120 to 400 V AC

**Frequency Range ( $f_n$ )**

2 to 400 Hz

**Test Currents ( $I_n$  per phase)**

less than 3.5 mA

***Non-Contact Rotary Field Indication***

**Frequency Range ( $f_n$ )**

2 to 400 Hz

***Determine the Motor Connection***

**Nominal Test Voltage ( $U_{me}$ )**

1 to 400 V AC

**Nominal Test Currents ( $I_n$  per phase)**

less than 3.5 mA

**Frequency Range ( $f_n$ )**

2 to 400 Hz