

FLUKE®

9062

Motor and Phase Rotation Indicator

Users Manual

PN 2438554

April 2005

© 2005 Fluke Corporation. All rights reserved. Printed in China
All product names are trademarks of their respective companies.

LIMITED WARRANTY AND LIMITATION OF LIABILITY

This Fluke product will be free from defects in material and workmanship for two years from the date of purchase. This warranty does not cover fuses, disposable batteries, or damage from accident, neglect, misuse, alteration, contamination, or abnormal conditions of operation or handling. Resellers are not authorized to extend any other warranty on Fluke's behalf. To obtain service during the warranty period, contact your nearest Fluke authorized service center to obtain return authorization information, then send the product to that Service Center with a description of the problem.

THIS WARRANTY IS YOUR ONLY REMEDY. NO OTHER WARRANTIES, SUCH AS FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSED OR IMPLIED. FLUKE IS NOT LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, ARISING FROM ANY CAUSE OR THEORY. Since some states or countries do not allow the exclusion or limitation of an implied warranty or of incidental or consequential damages, this limitation of liability may not apply to you.

Fluke Corporation
P.O. Box 9090
Everett, WA 98206-9090
U.S.A.

Fluke Europe B.V.
P.O. Box 1186
5602 BD Eindhoven
The Netherlands

Table of Contents

Title	Page
Introduction.....	1
Contacting Fluke	1
Unpacking the 9062	2
Safety Information	2
Symbols.....	5
Elements of the 9062	6
Using the Motor & Phase Rotation Indicator	7
Determine Rotary Field Direction	7
Non-Contact Rotary Field Indication	9
Determine the Motor Connection	12
Magnetic Field Detection.....	13
Maintaining the 9062.....	13
Cleaning.....	13
Replacing and Disposing of the Batteries	14
Specifications	17

List of Tables

Table	Title	Page
1.	Symbols	5
2.	Reliable Motor Test Requirements	11

List of Figures

Figure	Title	Page
1.	The 9062 Motor and Phase Rotation Indicator.....	6
2.	Phase Indication Table	8
3.	Motor Rotation	10
4.	Battery Replacement	16

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.

To register your product, visit 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

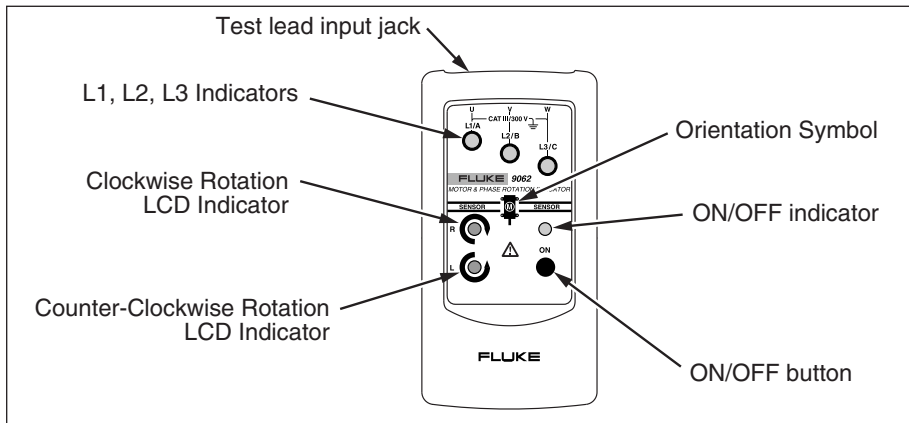
The following symbols appear on the 9062 or in this manual.

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.



bby03f.eps

Figure 1. The 9062 Motor and Phase Rotation Indicator

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)

bby01f.eps

Non-Contact Rotary Field Indication

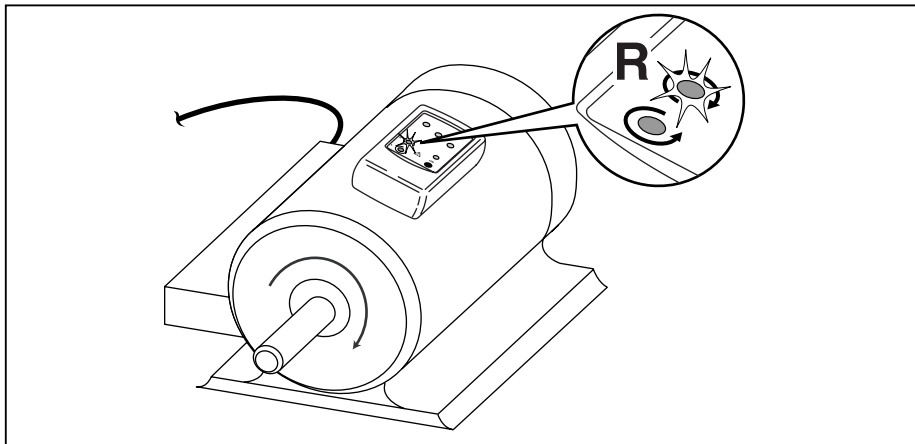
For non-contact rotary field indication:

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.



bby02f.eps

Figure 3. Motor Rotation

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

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.

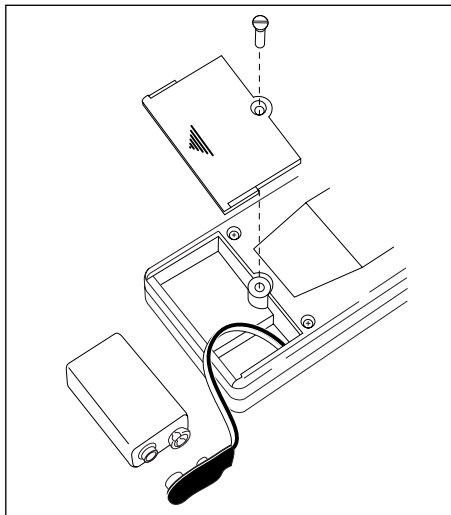
To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the battery indicator  appears.



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.



bby04f.eps

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