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# INSTRUCTION MANUAL

Hand-held  
Gauss/Tesla  
Meter

Model 4048

# F.W. BELL

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# F.W. BELL

**PERFORMANCE SPECIFICATIONS  
(GAUSSMETER and PROBE)**

**Full Scale Ranges:** 200 G, 2 KG, 20 KG  
20 mT, 200 mT, 2 T

**Resolution:** 0.1 G, 0.01 mT

**Accuracy:**  
dc ±2.0% of reading, including probe, + (±2 counts)  
ac (45 Hz-100 Hz) ±2.5% of reading, including probe, + (±2 counts)  
(100 Hz-3 KHz) ±2.0% of reading, including probe, + (±2 counts)  
(3 KHz-5 KHz) ±6.0% of reading, including probe, + (±2 counts) (useable with reduced accuracy to 12 KHz)

**Temperature effect:** 0.075%/°C from 25°C, including probe

**Peak hold:** Same as above  
**Accuracy:** Same as above

**Acquisition time:** ac: 150 ms  
dc: 110 ms

**Storage time:** Infinite (digital hold)

**Power:** Four 1.5 V "AA" alkaline batteries (Life >60 hours continuous)

**Temperature limitations:**  
**Operational:** 0°C to +50°C  
**Storage:** -20°C to +60°C

**Meter size:** 4"x7" x 1.75"  
(10.16 cm x 17.78 cm x 4.45 cm)

**Weight:**  
**Net:** 1 lb. (0.45 kg)  
**Shipping:** 2 lbs. (0.90 kg)

**Probe sizes:**  
T-4048-001 transverse 0.165" x 0.057" x 2.5" long  
(0.419 cm x 0.145 cm x 6.35 cm)  
A-4048-002 axial 0.165" x 0.090" x 2.5" long  
(0.419 cm x 0.229 cm x 6.35 cm)

X-4048-003 extension cable 39" (1 m)

**Hand-held  
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**TABLE OF CONTENTS**

Warranty  
Registration Card.....Front Cover Flap  
Specifications.....Inside Front Cover  
General Description.....2  
Instrument Features.....3  
Operating Procedure.....4,5,6  
Physical Description.....7,8,9  
Probe Details.....10  
Function/Mode Capabilities.....11

## GENERAL DESCRIPTION

The F.W. Bell Model 4048 Gauss/Tesla Meter is a precision magnetic field measuring instrument which provides advanced operating features previously found only in higher priced meters.

The Model 4048 and its probe provide a completely portable magnetic field measuring system. A front panel keyboard gives the operator complete control over the calibration and zeroing of the probe as well as the measurement mode and full scale range of the instrument. Unique display prompts are used to assist the operator during initial setup, and to display the measured results. Critical performance parameters are monitored continually, and error messages are displayed whenever any of these parameters fall below preset standards.

## FEATURES

- 200 G, 2 KG, 20 KG, (20 mT, 200 mT, 2 T) full scale ranges
- Auto or manual range switching
- Instant one-button probe zeroing
- User-friendly display prompts
- 3½-digit custom-formatted LCD
- Scale suppression
- ac and dc field response
- True rms ac response to 12 KHz
- ac, dc peak holds
- Gauss and Tesla readout, switch-selectable

Each Model 4048 comes packaged in its own soft-side vinyl case, along with the following:

- 1 Zero Gauss Chamber, YA-111
- 1 Transverse Probe (T-4048-001) in a protective cover

- 1 Probe Extension Cable (X-4048-002)

- 1 Set of 4 "AA" alkaline batteries

- 1 Instruction Manual

### OPTIONAL ACCESSORIES AVAILABLE

- Axial Probe (A-4048-003)

- Hard-side plastic carrying case, with handle

## OPERATING PROCEDURE

### A. INSTALL BATTERIES

Slide the battery door on the back of the unit in the direction indicated. Install 4 "AA" cells, observing the polarity signs for each cell inside the battery compartment. Replace the battery door.

### B. PLUG IN THE PROBE

Plug the probe or extension cable into the connector at the top of the meter. If the cable is used, plug the probe into the cable end. If the probe is not properly plugged in, is missing entirely, or is faulty, the word PROBE on the display will flash.

To remove probe, push black button on probe connector and pull probe away from instrument. DO NOT TWIST.

### C. TURN ON THE METER

Slide the power switch to ON. Initially, the display will indicate "000". Then the CAL NO prompt on the display will flash ON and OFF, indicating the probe is properly plugged in and the instrument is ready to accept the CAL NO of the probe, which is marked on the probe connector label.

### D. CALIBRATE THE PROBE TO THE METER

At this point one of two conditions exist:

a) The number displayed matches the calibration number of the installed probe. If this is the case, press the ENTER/RESET key once then proceed to step E, "Zero probe."

b) The number displayed does not match the calibration number on the probe. If this is the case, proceed as follows to enter the correct calibration number.

1. Press the RANGE/CAL NO "U" key. The display will show 001.

2. Press ENTER/RESET. This enters the first digit of the calibration number, which is always 1. The display now shows 010.

3. Press the RANGE/CAL NO "U" key as many times as necessary to display the second numeral of the cal number.

NOTE: If the "U" key is pressed too many times and the numeral is too large, you can either keep pressing the "U" key until the correct numeral is displayed, or you press the RANGE/CAL NO "D" key to decrease the numeral to the correct value.

4. Press ENTER/RESET. Now the "1", the second numeral and "0" are displayed.

5. Press the RANGE/CAL NO "U" key as many times as necessary to display the third numeral of the cal number.

6. Press ENTER/RESET. Now the "1", the second, the third numerals and "0" are displayed.

7. Press the RANGE/CAL NO "U" key as many times as necessary to display the fourth numeral of the cal number.

8. Press the ENTER/RESET key twice, once to enter final digit, and once to enter 4-digit calibration number into the gaussmeter's memory. The flashing CAL NO prompt should

disappear, and a flashing ZERO PROBE prompt should appear. In addition, the display should change to "———".

### E. ZERO PROBE

A zero Gauss chamber is supplied with the gaussmeter. When fully inserted into the chamber, the probe is protected from stray magnetic fields. Press the ZERO "PB" key. The instrument will then read approximately 00.0, and will automatically go into the dc, autorange, Gauss mode. The probe and meter are now ready to make accurate dc magnetic field measurements.

NOTE: See Physical Description section for using other functions and ranges.

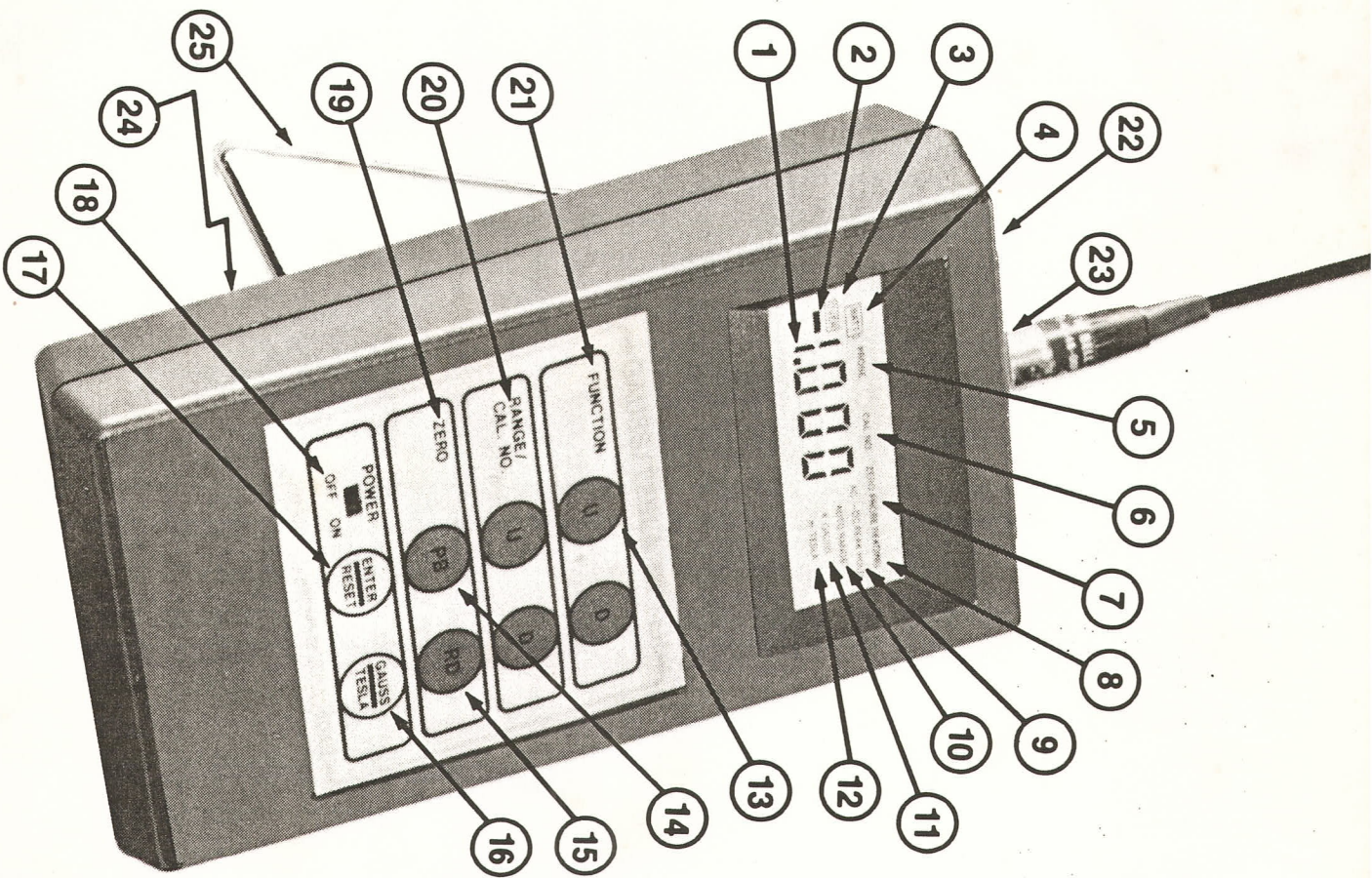
## PHYSICAL DESCRIPTION:

(See Figure 1 on next page)

### A. DISPLAY:

1. READOUT: 3½-digit custom-formatted LCD indicates Gauss, k Gauss, Tesla, m Tesla.
2. POLARITY: Readout will indicate positive when the north magnetic field enters the (transverse) probe when the probe flat is aligned with the black button on the connector, and (axial probe) when the north magnetic field enters the tip parallel to the probe axis. (See Figure 2).
3. OVERRANGE: **OVER** is illuminated when field being measured is greater than the instrument range setting. Readout also indicates EEE error. To obtain a usable indication, push the RANGE/CAL NO button to increase range.
4. BATTERY LOW INDICATOR: **BATT** illuminates when the internal battery voltage is insufficient for accurate measurements.
5. PROBE: When probe is not plugged into instrument, PROBE blinks.
6. CAL NO: When instrument is first turned on CAL NO flashes, indicating instrument is ready for entry of probe calibration number.
7. ZERO PROBE: Flashing ZERO PROBE indicates probe is ready to be zeroed.
8. ZERO READING: This feature offers the ability to suppress a large field reading so that small variations in the field can be seen.
9. AC-DC PEAK HOLD: In the dc peak hold mode, the instrument holds and displays either positive or negative peak. In ac peak hold mode, instrument holds and displays peak ac field. Reading is held indefinitely in both modes.
10. AUTO RANGE: Indicates instrument is in the Auto Range Mode. Auto Range is disabled when instrument is in the Peak Hold Mode.

(Continued Next Page)



- 11. GAUSS or K GAUSS: Indicates either k Gauss or Gauss, dependent upon range.
- 12. m TESLA or TESLA: Indicate either m Tesla or Tesla dependent upon range.

**B. SWITCH PAD:**

- 13. "U" & "D": Used to step thru FUNCTION and RANGE/CAL NO modes.
- 14. "PB": Depress to zero the probe.
- 15. "RD": Depress to suppress reading.
- 16. GAUSS/TESLA: Depress to select either Gauss or Tesla readout.
- 17. ENTER/RESET: Depress ENTER to enter information. Depress RESET to reset peak hold.
- 18. POWER: Slide to turn on or off.
- 19. ZERO: Zero function indicates button to be depressed to zero the probe and suppress reading.
- 20. RANGE/CAL NO: Indicates buttons to be depressed to be used to enter CAL NO and to select range.
- 21. FUNCTION: Depress to select instrument function dc, ac, dc peak hold.

**C. CASE:**

- 22. CASE: High impact, high dielectric, ABS precision-molded plastic.
- 23. PROBE JACK: Probe or extension cable plug into this jack.
- 24. BATTERY COMPARTMENT: Accessed by sliding compartment door. Holds 4 "AA" cells.
- 25. BAIL: Used to support instrument in upright position. Pulls away from case at button.

Figure 1  
8

Transverse Probe  
Model T-4048-001

Axial Probe  
Model A-4048-002

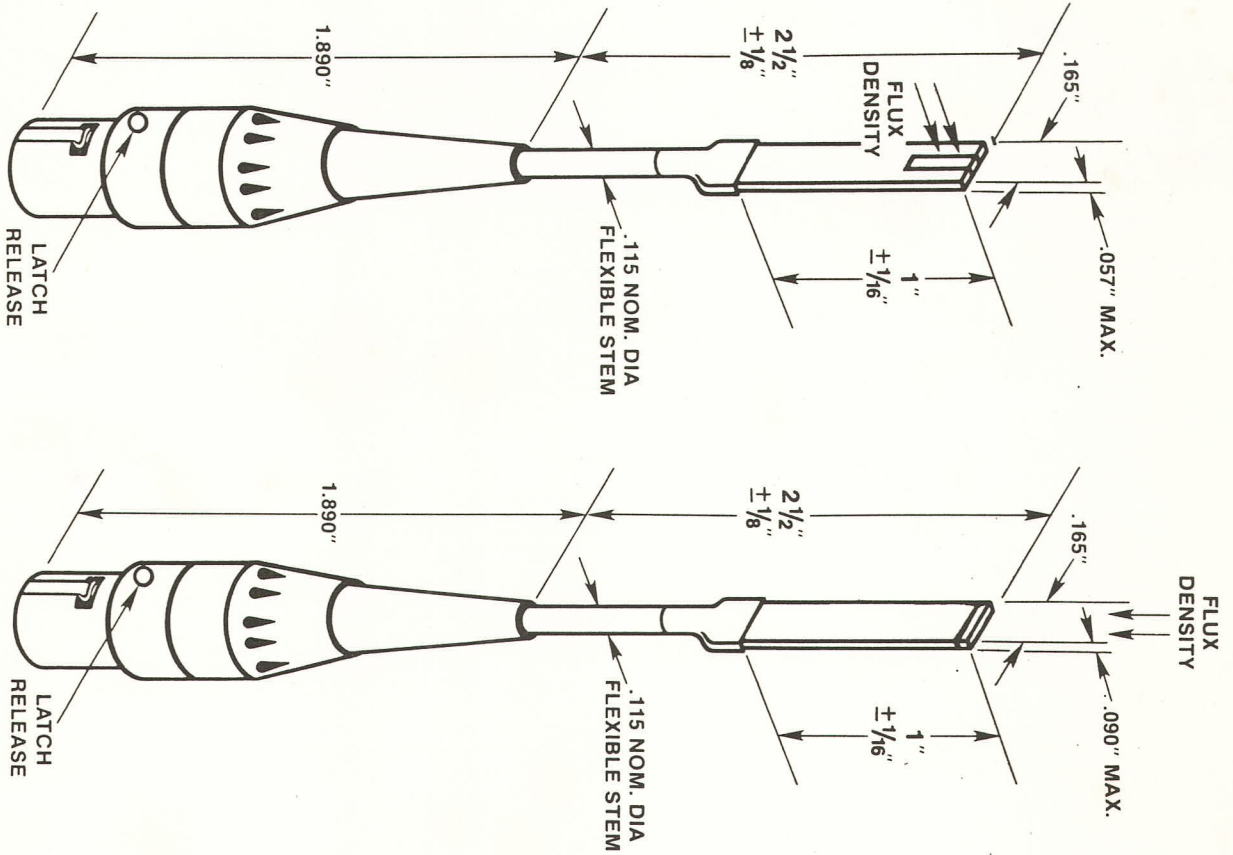


Figure 2

## Interrelationships of Function and Mode Capabilities

Mode or Key	dc	ac	dc Peak Hold	ac Peak Hold	Zero Reading	Zero Probe	Auto Range	Range Change
dc								
ac	N/A							
dc Peak Hold	N/A	N/A						
ac Peak Hold	N/A	N/A	N/A					
Zero Reading	Yes	Yes	No	No				
Zero Probe	Yes	Yes	No	No	No			
Auto Range	Yes	Yes	No	No	No	Yes		
Range Change	Yes	Yes	No	No	No	N/A	Depends on Mode	
Function Change	Yes	Yes	Yes	Yes	No	N/A	Yes	N/A

## WARRANTY

F.W. BELL, INC. warrants each instrument of its manufacture to be free from defects in material and workmanship. Our obligation under this warranty is limited to servicing or adjusting free of charge any GAUSSMETER/PROBE returned to our factory for that purpose. This warranty covers GAUSSMETER/PROBE which, within 1 year after delivery to the original purchaser, shall be returned with transportation charges prepaid by the original purchaser, and which upon examination shall disclose to our satisfaction to be defective. If it is determined that the defect has been caused by misuse or abnormal conditions of operation, repairs will be billed at cost after submitting an estimate to the purchase.

F.W. BELL, INC. reserves the right to make changes in design at any time without incurring any obligations to install same on units previously purchased.

This warranty is expressly in lieu of all other obligations or liabilities on the part of F.W. BELL, INC., and F.W. BELL, INC. neither assumes nor authorizes any other person to assume for them any other liability in connection with the sales of F.W. BELL, INC. GAUSSMETER/PROBE.

### DAMAGE IN SHIPMENT

The instrument should be examined and tested as soon as it is received. If it does not operate properly, or is damaged in any way, immediately file a claim with the carrier. The claim agent will provide report forms. A copy of the completed form should be forwarded to us. We will then make necessary arrangements for repair or replacement.