

Mobil-AID®

Dual Field Ionization Chamber Paddle Kit
AID Part No. 705155

Owner's Manual
AID Part No. 69280

| | | |
|-----|---|----|
| 1.0 | Introduction..... | 1 |
| 2.0 | Operating Instructions..... | 2 |
| 2.1 | Paddle Alignment..... | 2 |
| 2.2 | Routine Care and Maintenance..... | 3 |
| 3.0 | Specifications..... | 5 |
| 3.1 | System Performance..... | 5 |
| 3.2 | Physical Parameters..... | 5 |
| 4.0 | Installation Instructions (Not Applicable)..... | 6 |
| 4.1 | Equipment Supplied..... | 6 |
| 5.0 | Calibration (Not Applicable)..... | 7 |
| 6.0 | Diagnostic / Troubleshooting Guide..... | 8 |
| 7.0 | Replacements..... | 10 |
| 7.1 | Replacement Parts List..... | 10 |

1.0 INTRODUCTION

1.0 Introduction

The Mobil-AID dual-field ionization chamber paddle is an important accessory for the field of mobile radiography. It greatly simplifies the use of mobile x-ray generators by working with the automatic exposure control (AEC) to compensate for variations in parameters such as:

- Patient anatomy and size
- Source-to-image distance (SID)
- kVp-dependent response of screen-film combinations

The operator is required only to select a reasonable kVp for the anatomy involved and position the circular ionization chamber field or fields of the Mobil-AID paddle behind the film cassette in line with the anatomy of principle interest. The AEC does the rest, automatically determining the exposure time for the precise milliampere-seconds (mAs) required to give excellent diagnostic radiographs. The results are:

- Reduction in number of x-ray retakes, along with their cost and inconvenience.
- Reduction in patient and operator radiation required to produce good films.
- Films that are not only consistently diagnostic, but that are uniformly exposed by all operators on all shifts and on all AEC equipped generators.

There are a number of differences between the Mobil-AID paddle and other "photo-timer" AEC systems used with stationary x-ray systems. The ion chamber under mobile operating conditions cannot be protected from damage as it is in a table or wall installation. Rather it must be securely mounted inside a very sturdy paddle for rough handling in hospital beds, emergency carts, etc. Since this paddle is so sturdy, it obviously cannot be used in front of the film cassette as are the typical entrance-type ion chambers. Therefore in order not to be seen on the films, the paddle is placed behind the film cassette and operates as an exit-type ion chamber.

2.0 OPERATING INSTRUCTIONS

2.0 Operating Instructions

2.1 Paddle Alignment

The paddle has two fields. For normal chest exposures select both fields. Position Field One behind one lung and Field Two behind the other lung. In this operating mode, paddle positioning is simplified. As usual, center the film cassette behind the patient. Note the tactile finger positions on the paddle and use the appropriate set for the cassette orientation (see Figure 2.1) Align the paddle to the correct height of the patient's lung, and then slip the paddle behind the film cassette to the point where the fingers in the tactile position touch the edge of the cassette.

An alternate method of paddle alignment is to select Field One alone and position Field One in line with the anatomy of principle interest. First hold the paddle in front of the patient with ion-chamber Field One over the desired position. Note how the centimeter marks on the paddle line up with reference to the edge of the cassette (avoid parallax). Then slip the paddle behind the cassette until these measuring marks are at the cassette's edge.

For example, when shooting a normal chest in the anterior- posterior projection, place the ion-chamber field behind the right lung. Or, when shooting a lateral skull align the ion-chamber field with the skull. Or, to follow the course of pneumonia in the left lung with a series of radiographs, always align ion-chamber Field One with the fluid in that particular lung.

Do not align the ion-chamber field with anatomy other than that of principle interest. For example, do not align with the spine to see the lung and do not align with the lung to see the spine as this would obviously not produce the optimum exposures.

2.0 OPERATING INSTRUCTIONS

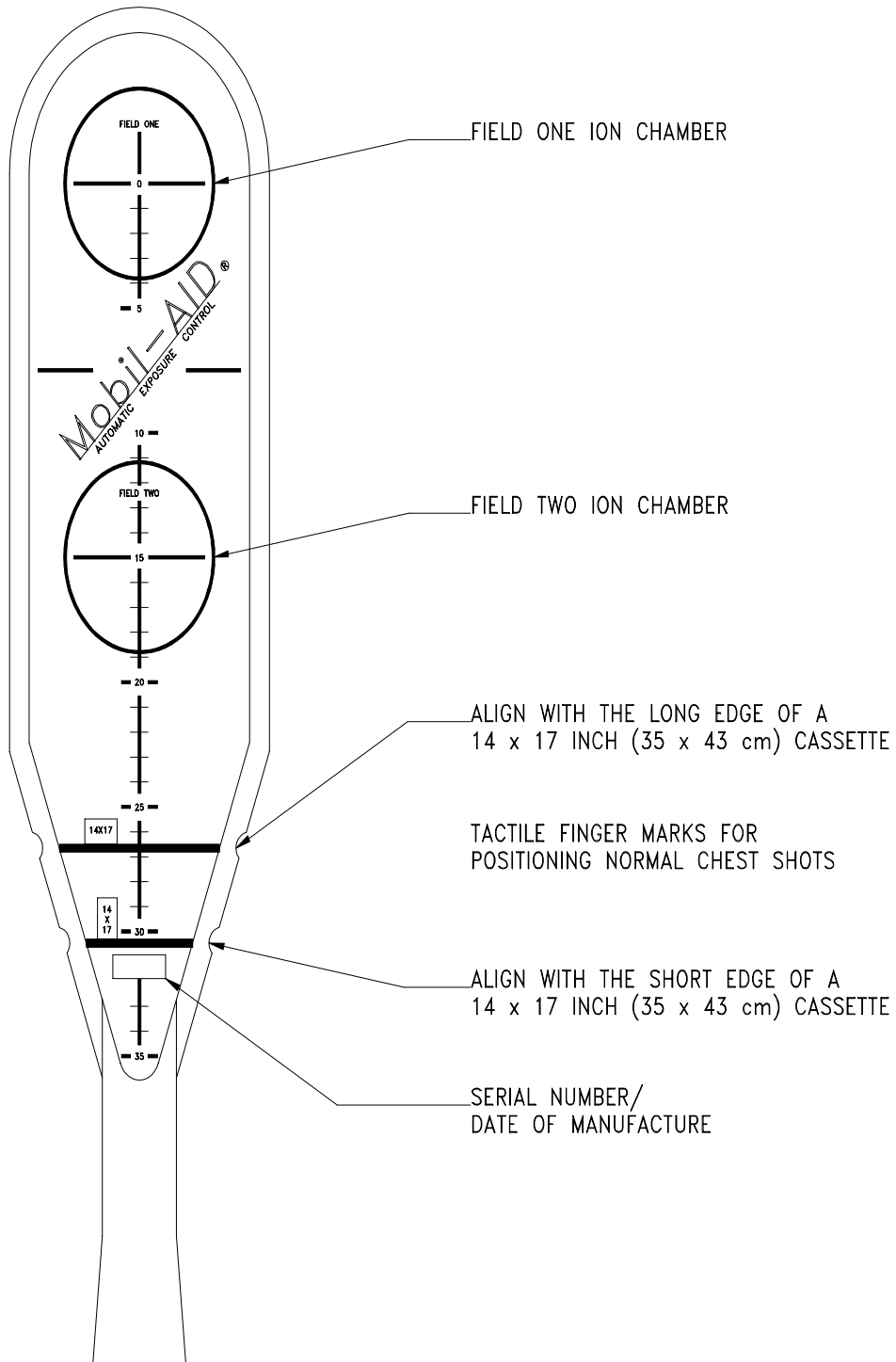
2.2 Routine Care and Maintenance

- Do clean the paddle with a weak detergent cleaning solution. Turn off the x-ray generator key switch when cleaning the paddle.
- Do inspect the paddle cable periodically for evidence of damage (e.g. paddle cable run over by the generator wheels, paddle cable wrapped around the vertical column of the generator, etc.).
 - Do not use the paddle as a lever to turn or lift the patient.
 - Do not sterilize the paddle in an autoclave. If desired, the paddle can be encased in a sterile plastic bag during the x-ray examination.
 - Do not attempt to open the paddle. It is sealed liquid tight and is therefore not field serviceable. The manufacturer cannot be responsible for units that show evidence of tampering.

2.0 OPERATING INSTRUCTIONS

Figure 2.1

Mobil-AID Paddle



3.0 SPECIFICATIONS

3.0 Specifications

The following specifications apply to performance of the Mobil-AID paddle alone:

3.1 System Performance

kVp Range / Screen-film Speed

Generally, screen-film combinations from approximately 50 to 600 may be accommodated throughout the range from 50 to 150 kVp. Variations in cassettes make it difficult to be more specific, but even greater range may be possible.

Paddle / Ion Chamber

| | |
|-----------------------------------|--|
| Ion chamber field size | Nominal 7.6cm (3 inch) diameter by 1cm (0.38 inch) thick |
| Number of ion chamber fields | 2 |
| Reproducibility | ≤0.05 coefficient of variation |
| Mechanical scale | Paddle position scale in centimeters |
| Paddle size H x W x L cm (inches) | 1.3 x 13.5 x .54.5 (0.5 x 5.3 x 21.5) |
| Paddle weight kg (lbs) | 1.0 (2.2) |
| Cable Length retracted | 0.9m (3 feet) |
| Cable Length extended | 4.6m (15 feet) |

Power is provided by the mobile x-ray generator:

| Voltage | Interface Connection | Maximum current |
|--------------------------|----------------------|-----------------|
| Ground (0 VDC) | pin 9 | |
| + 11.4VDC to + 15.75 VDC | pin 1 | 0.5A |
| - 11.4VDC to - 15.75 VDC | pin 6 | 0.5A |

3.2 Physical Parameters

Temperature and Humidity

| | |
|-----------|---|
| Storage | -55 degrees C to 85 degrees C, 95% RH |
| Operating | 0 degrees C to 50 degrees C, 90% RH, non-condensing |

Dimensions, Weight (Nominal)

| | Size H x W x L cm (inches) | Weightkg (lbs.) |
|--------------|---|-----------------|
| Paddle | 1.3 x 13.5 x 54.5 (0.5 x 5.3 x 21.5) | 1.0 (2.2) |
| Paddle Cable | Retracted: 0.9m (3 feet) Extended: 4.6m (15 feet) | 0.3 (0.7) |

4.0 INSTALLATION INSTRUCTIONS

4.0 Installation Instructions (Not Applicable)

4.1 Equipment Supplied

The Mobil-AID paddle kit, 705155, includes the following cables and hardware:

| Description | P/N |
|-------------------------------|-------|
| Owner's manual | 69280 |
| Paddle holder assembly | 70591 |
| Cable, paddle (external) | 75058 |
| Paddle/dual field ion chamber | 77075 |

The physical installation, electronic interface, calibration and regulatory compliance testing of this unit is the responsibility of the mobile x-ray generator manufacturer.

5.0 CALIBRATION

5.0 Calibration (Not Applicable)

The Mobil-AID dual field paddle is a sealed, factory calibrated unit which requires no field calibration. Calibration of the mobile x-ray generator's AEC is the responsibility of the mobile x-ray generator's manufacturer.

6.0 DIAGNOSTIC / TROUBLESHOOTING GUIDE

6.0 Diagnostic / Troubleshooting Guide

Faultfinding - Diagnostics

The following is a list of possible problems and their likely corrections. The list is not comprehensive. Additional questions should be referred to the factory or service center. It is assumed that the mobile x-ray generator is in proper working order, and this should be confirmed by normal manual operation of the mobile x-ray generator after simply switching off the AEC.

Preliminary Checks:

Check to see that the mobile x-ray generator operates properly with the AEC power turned off.

Check the paddle to see that it is not physically damaged.

Check the paddle cable to see that it is not physically damaged.

Check to see that the cable connectors are securely fastened and held in place with appropriate hardware.

Check to see that the cable is routed and secured to avoid sharp edges and moving parts.

Check the paddle output at pin 8 of the paddle cable using a storage oscilloscope. Look for a positive ramping signal rising from 0.00VDC. External Trigger using the signal at pin 2 of the paddle cable (Exposure Start).

6.0 DIAGNOSTIC / TROUBLESHOOTING GUIDE

SYMPTOM: Erratic mAs and exposure times.

Check to see that the film's Optical Density (OD) remains relatively constant from shot to shot in spite of changes in mAs. If not:

- Check the regulated power supplies (+/-12V and +5V).
- Check the connections of the paddle and paddle cables.
- Check the continuity of the external paddle cable in both the extended and relaxed (coiled) conditions.
- Check the paddle output using a storage oscilloscope. Look for a positive ramping signal rising from 0.00VDC.

SYMPTOM: Exposures are too light or too dark at some kVp settings.

The kVp selected may be too low for the anatomy being radiographed. Operation of the Mobil-AID paddle below 54kVp is not recommended when using certain lead-backed cassettes.

- Check the paddle output using a storage oscilloscope. Look for a positive ramping signal rising from 0.00VDC.
- Use a higher kVp setting.

The kVp selected may be too high for the anatomy being radiographed. Operation of the Mobil-AID AEC is not recommended for exposures less than 0.4mAs.

- Use a lower kVp setting.
- Use a larger SID.
- Use a slower speed screen-film/grid combination.

7.0 REPLACEMENTS

7.0 Replacements

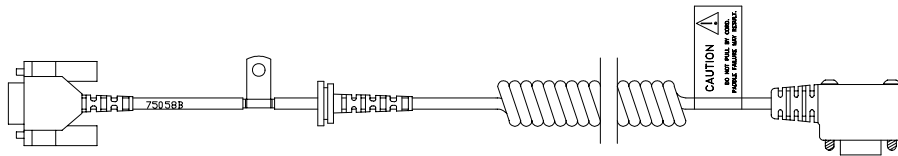
7.1 Replacement Parts List

The following spare parts and assemblies are available for field replacement purposes. Repair of electronic circuit assemblies should be on a replacement basis and defective assemblies sent to the factory for evaluation and repair.

| PART NO. | DESCRIPTION |
|----------|------------------------|
| 69280 | Owner's Manual |
| 70591 | Paddle Holder Assembly |
| 75058 | External Paddle Cable |
| 77075 | Dual-Field Paddle |

Figure 7.1

75058 Paddle Cable



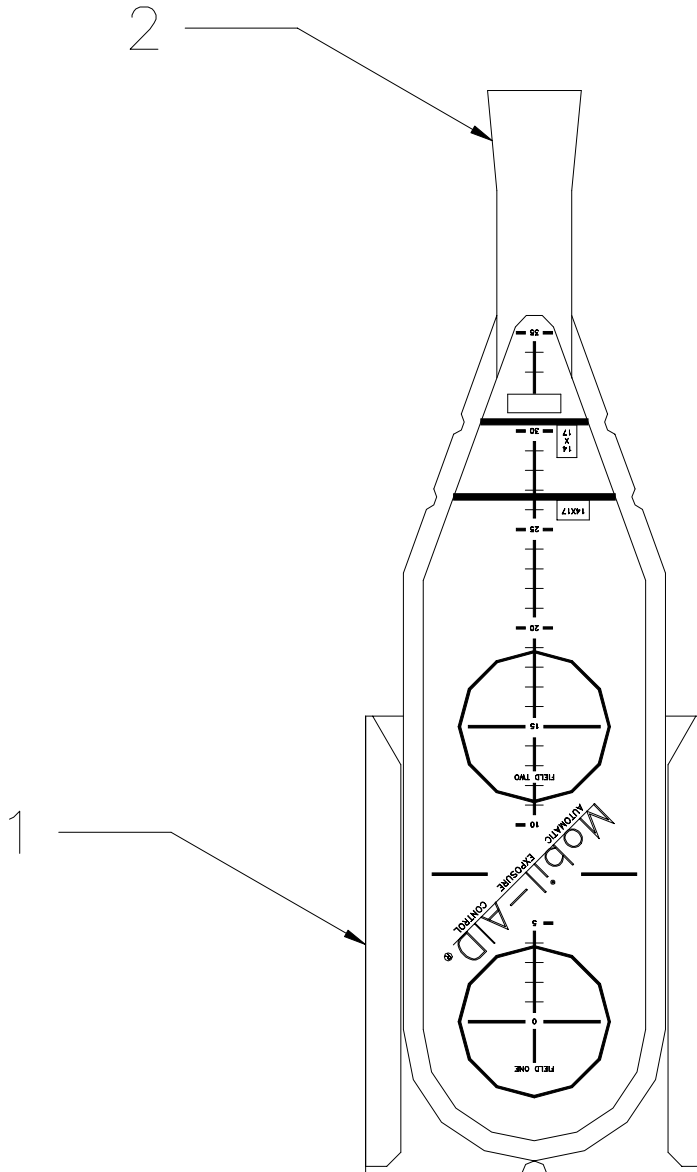
Paddle Pin-out

| 9-pin sub-d connector | Function | Direction |
|-----------------------|---------------------------------|-----------|
| 1 | + 11.4VDC to + 15.75 VDC | Input |
| 2 | Exposure Start (low-active) | Input |
| 3 | Both Fields Select (low-active) | Input |
| 4 | No Connection | None |
| 5 | Paddle Interlock (low-active) | Output |
| 6 | - 11.4VDC to - 15.75 VDC | Input |
| 7 | Ground (0 VDC) | Input |
| 8 | Paddle Signal (Positive Ramp) | Output |
| 9 | Ground (0 VDC) | Input |

7.0 REPLACEMENTS

Figure 7.2

Dual-Field Paddle and Paddle Holder Assembly



| ITEM | OEM ID | DESCRIPTION |
|------|--------|-------------------------|
| 1 | 70591 | Paddle Holder Assembly. |
| 2 | 77075 | Paddle Ion Chamber |