

# M Series<sup>®</sup> CCT



**ZOLL**<sup>®</sup>  
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# Preface

## How To Use This Manual

This manual insert describes the use of the M Series<sup>®</sup> CCT option.

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**CAUTION!** The user must be familiar with the M Series before operating an M Series CCT. If not familiar with the M Series, read the *M Series Operator's Guide* and relevant option inserts.

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Before operating an M Series CCT, if you are unfamiliar with the M Series, read the *M Series Operator's Guide* and the relevant inserts. Thoroughly read the safety considerations and warnings sections in both the *M Series Operator's Guide* and the relevant option inserts. Consult the *Troubleshooting* section of those manuals if the M Series CCT fails to operate as expected.

This insert includes information only on the features not found in the standard M Series units. Unless otherwise noted in this insert, the M Series CCT features are identical to standard M Series features.

Place this insert in the three-ring binder with the *M Series Operator's Guide* and all other option inserts.

## Safety Summary

The following is a short summary of warnings, cautions, and other safety information related to the M Series CCT option. Additional warnings and cautions are in the text of this insert. Read this section thoroughly before operating the M Series CCT.

- Read the *M Series Operator's Guide* and this manual insert before use.
- The M Series CCT is to be operated by qualified personnel only.
- Do not use in the presence of oxygen-rich atmospheres, flammable anesthetics or other flammable agents (such as gasoline). Do not use near the site of a gasoline spill. Explosion may result.
- Avoid using the M Series CCT adjacent to or stacked on other equipment. If unavoidable, check that the M Series CCT operates normally in this configuration before clinical use.
- The device is protected against interference from radio frequency emissions typical of two-way radios and cellular phones (digital and analog) used in emergency service/public safety activities. Users should assess the device's performance in their typical environment of use for the possibility of radio frequency interference from high-power sources. Radio Frequency Interference (RFI) may be observed as shifts in monitor baseline, trace compression, display brightness changes, or transient spikes on the display.
- The M Series CCT should be installed and put into service according to the Electromagnetic Compatibility (EMC) information provided in this insert.
- Route patient cabling and hoses carefully to avoid patient entanglement, strangulation or compression of hose.
- Do not touch the bed, patient, or any equipment connected to the patient during defibrillation. A severe shock to the operator can result.
- Do not allow exposed portions of the patient's body to come in contact with metal objects, such as a bed frame during defibrillation. Unwanted electrical pathways can result.
- If an alarm occurs while the alarms are suspended, audio alarm tones do not sound, only visual alarm messages display.

## Safety Summary (cont.)

- Do not immerse the M Series CCT device, batteries, cables, or transducers in water, solvents, or cleaning solutions.
- Do not sterilize M Series unit or accessories except as specifically recommended in ZOLL manuals. Reusable transducers should be sterilized per the manufacturer's instructions.
- Connect the ECG-out jack, VGA-out jack, and modem (if available) only to other equipment with galvanically isolated circuits.
- When using the optional VGA video output connector, test system operation with target video display device prior to clinical use. Testing should include the Daily Checkout Procedure (refer to the *M Series Operator's Guide*).
- When using the M Series CCT in an aircraft, fluctuations in cabin pressure can affect invasive blood pressure (IBP) calibration. When cabin pressure fluctuates significantly due to altitude changes, you must rezero the IBP transducer. We recommend that you rezero the IBP transducer (1) After takeoff or landing when cabin pressure has stabilized; (2) Whenever the fluctuation in cabin pressure is equivalent to the change in air pressure that occurs with a 500-foot (152-meter) change in altitude.

## Indications for Use

The M Series CCT indications for use are the same as for the standard M Series. For additional information, refer to the *M Series Operator's Guide* and user inserts for installed options.

## Contraindications for Use

The M Series CCT contraindications for use are the same as for the standard M Series. For additional information, refer to the *M Series Operator's Guide* and user inserts for installed options.

# The M Series CCT

## Introduction

The M Series CCT is an M Series unit with integrated features that provide additional display capabilities. The following sections describe the additional features. A typical M Series CCT front panel is shown in Fig. 1.

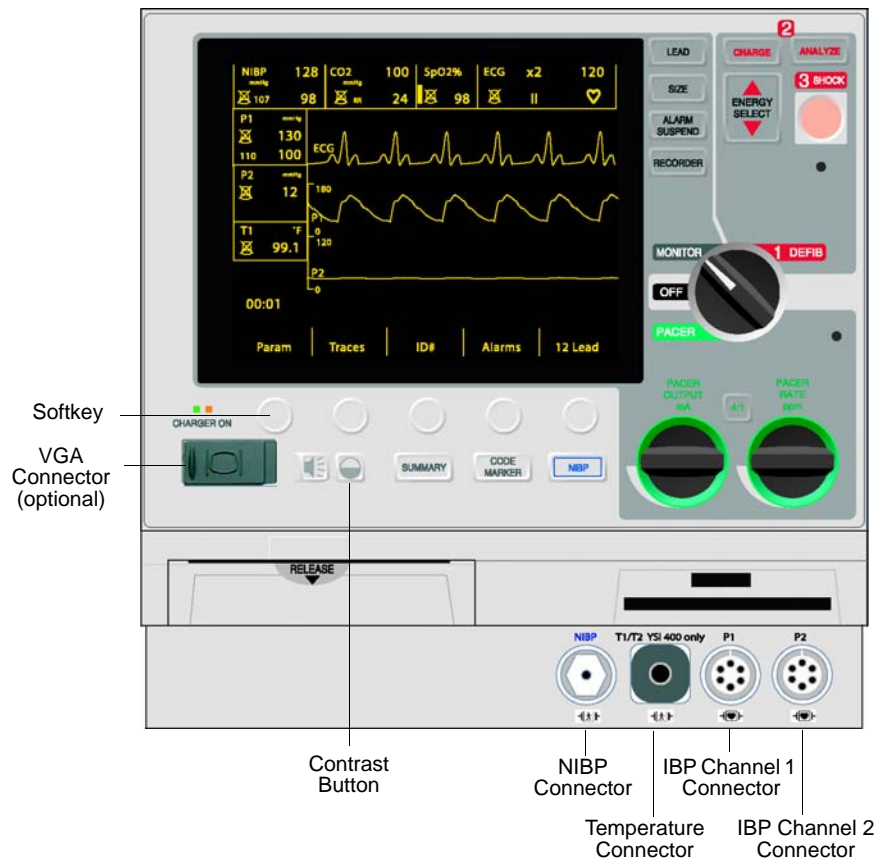


Figure 1: M Series CCT

NOTE: Refer to Section 2 of the *M Series Operator's Guide* for the controls available on both the M Series and the M Series CCT.

## M Series CCT Option

In addition to the standard M Series features, the M Series CCT option can do the following:

- Display three traces simultaneously (Trace 1 is always ECG).
- Select which traces display in addition to ECG.
- Connect to an external VGA display (this feature is optional, only available through special order).
- Configure displayed parameters by color.

## Reading the M Series CCT Display

The M Series CCT display is similar to the M Series display, except for the following:

- M Series CCT units display three traces (except when in **PACER** and **DEFIB** modes, when display messages take the place of Trace 3).
- **IBP** and **Temperature** have data display areas (if the unit has these options).  
The **IBP** and **Temperature** data display areas are described in detail in the **IBP** insert and **Temperature** insert. See Fig. 2 for their location on the display.

The M Series CCT three *Trace display* areas are shown in Fig. 2. The trace type for each display is as follows:

- Trace 1 - reserved for **ECG**.
- Trace 2 - type of trace determined by user.
- Trace 3 - type of trace determined by user.

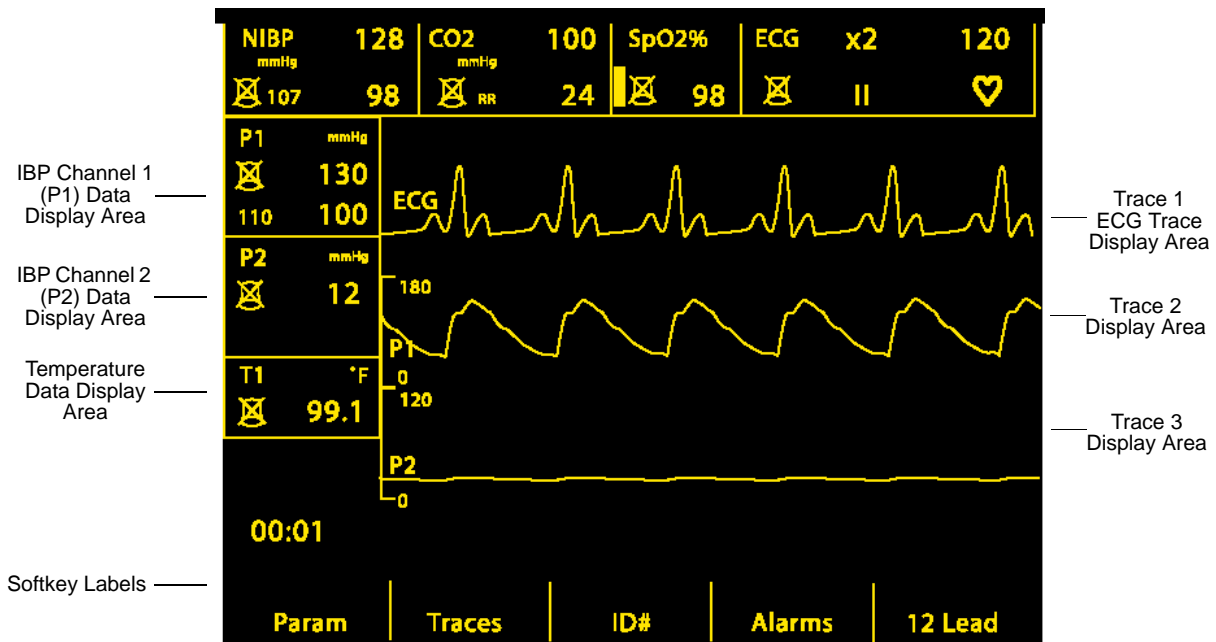


Figure 2: M Series CCT display

NOTE: Depending on the options included in the M Series CCT, the front panel and display may slightly differ from the illustrations in this insert. Each data display area is explained in detail in the applicable option inserts.

# Using the M Series CCT options

The following sections describe how to use the M Series CCT option.

## Changing the Display Traces

Trace 1 always displays the ECG waveform. You may select or change the waveform display for Traces 2 and 3. If the unit has the appropriate options, you can choose from the following parameters:

- 3 Lead ECG (uses all three display channels)
- IBP Channel 1 (P1)
- IBP Channel 2 (P2)
- EtCO<sub>2</sub>
- SpO<sub>2</sub>

When the unit is in **PACER** or **DEFIB** mode, display messages take the place of Trace 3.

Any changes made remain in effect until either the settings are changed or for 10 seconds after the M Series is turned off (the 10 second interval allows settings to remain in effect when the battery is changed).

Trace 2 and 3 are factory configured to be OFF when the unit is powered up. However, they can be configured to display specific parameters on power-up (refer to the *M Series CCT Configuration Guide*).

To select the displayed waveforms:

1. Press the Traces softkey (if the “Traces” softkey label is not displayed, press the Return softkey until “Traces” displays, and press the Traces softkey).

The *Traces* menu display is shown in Fig. 3:



Figure 3: Traces Menu

2. Press the Select softkey to select “3 Lead ECG”, “Set Trace 2”, or “Set Trace 3.”
3. Press the Enter softkey.
4. If “3 Lead ECG” is selected:
  - Traces 2 and 3 are set to ECG with each lead based on the active lead group. Trace 1 remains set with the **LEAD** hard key. For example, if Trace 1 is set to Lead II with the **LEAD** hard key, Trace 2 and 3 to are set to Lead I and Lead III respectively.
  - For units with 12 Lead ECG option, Custom Lead groups may be set based on preconfigured choices. For additional information, refer to the *M Series CCT Configuration Guide* and *12 Lead Operator’s Guide*.

## Changing the Display Traces (cont.)


4. If “3 Lead ECG” ...(cont.)
  - Standard lead groups are listed below.
    - I, II, III
    - aVR, aVL, aVF
    - V1, V2, V3
    - V4, V5, V6
5. If “Set Trace 2” or “Set Trace3” is selected:  
The *Trace Options* menu displays (see Fig. 4):



Figure 4: Trace Options Menu

6. Press the Select softkey to select the type of waveform you want to display. You cannot select a waveform that is already displayed.
7. Press the Enter softkey. The unit displays the waveform for the selected parameter. To change the other trace, repeat steps 1 through 7.

## Connecting to an External VGA Display (monitor)

An external VGA display (monitor equipped with industry standard 15-pin VGA connector) can be connected to an M Series CCT unit that is equipped with the optional VGA connector (  symbol) on the front panel shown in Fig. 1.

To connect the VGA display:

1. Open the rubber boot to expose the connector.
2. Attach the monitor's cable to the connector.

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**WARNING!** Always test the M Series CCT with the target VGA display prior to clinical use. The tests should include the Daily Checkout Procedure (refer to *M Series Operator's Guide*).

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To conserve battery life, the VGA output port is not active when the M Series CCT is initially powered up.

To enable or disable the VGA output port:

1. Press the **CONTRAST** button (see Fig. 1 on page 1), the *Contrast* menu appears (see Fig. 5):

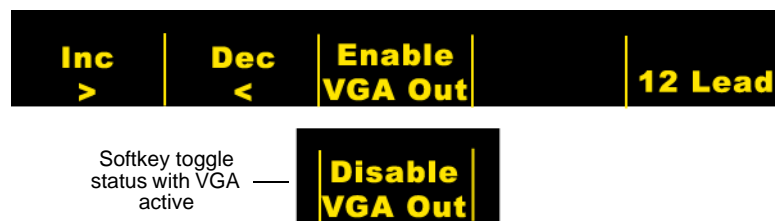


Figure 5: Contrast menu

2. To enable (activate) the VGA output port, press the Enable VGA Out softkey; the port is enabled and the softkey label toggles to “Disable VGA Out.”

**NOTE:** The softkey toggles according to current state of the port.

**NOTE:** When the port is enabled and the M Series CCT is powered down (turned off or battery is removed) and then powered up within 10 seconds, the port remains enabled. When power is off for more than 10 seconds, the port is disabled (the default state).

3. To disable (deactivate) the VGA output port, press the Disable VGA Out softkey; the port is disabled and the softkey label toggles to “Enable VGA Out.”

## Configuring Displayed Parameters by Color

The M Series CCT allows you to select the colors used to display numerics and waveforms associated with each physiological parameter (e.g.: ECG, SpO<sub>2</sub>, EtCO<sub>2</sub>, NIBP, Invasive pressure 1 and pressure 2, Temperature, etc.).

The parameter display colors available are Red, Cyan, Purple, Blue, Green, Yellow, and White.

Parameter display colors are factory configured as indicated below.

Parameter	Color
ECG	Green
SpO <sub>2</sub>	Yellow
EtCO <sub>2</sub>	Blue
NIBP	White
Temp	Purple
P1	Red
P2	Cyan
ART	Red
PA	Yellow
CVP	Cyan
ICP	White

To reconfigure a parameter's display color, please refer to the *M Series CCT Configuration Guide*.

# Maintenance

Perform all periodic maintenance of the M Series CCT per the *M Series Operator's Guide* and the supplemental inserts for any other options.

# Specifications

Unless described below, M Series CCT specifications are identical to M Series specifications. Refer to the *M Series Operator's Guide* for details.

Table: General Specifications

Size: w/ NIBP, IBP, Temp: w/o NIBP, IBP, Temp:	10.2" (25.9 cm) high x 10.3" (26.2 cm) wide x 8.7" (22.1 cm) deep 8.6" (21.8 cm) high x 10.3" (26.2 cm) wide x 8.7" (22.1 cm) deep
Weight:	17.2 lbs (7.8 kg) with Multi-function cable and battery 19.2 lbs (8.71 kg) with above and paddles
ac Power:	100-120 V, 50/60 Hz; 220-240 V, 50 Hz; 220 VA
dc Input (Optional):	10-29 V, 130 W
Device Classification:	Class I and internally powered per EN 60601-1 Class II and internally powered per EN 60601-1 (DC input only)
Design Standards:	Meets or exceeds UL 2601, AAMI DF-39, AAMI DF-2, IEC 601-2-4, EN 60601-2-25, and EN 60601-2-27
Patient Safety:	All patient connections are electrically isolated.

Table: Display Specifications

Screen Type:	Active Matrix Color LCD
Screen Size:	6.5" (16.51 cm) diagonal
Number of Pixels:	640 x 480
Sweep Speed:	25 mm/s
Video Output:	Industry standard VGA, 640 x 480, 60 Hz (optional)

Table: Battery Specifications (XL Battery Pack)

Type:	Rechargeable, sealed lead acid
Weight:	3.7 lbs (1.68 kg)
Voltage:	2 volts/cell; 5 cells wired in series
Recharge Time:	7.2 hours or less with integral charger
Operating Time; For a new, fully charged XL battery pack at 20°C:	60 defibrillator discharges at maximum energy (200 J), or 2.5 hours minimum of continuous ECG and SpO <sub>2</sub> monitoring, or 1.5 hours of continuous ECG, SpO <sub>2</sub> , EtCO <sub>2</sub> , IBP, and Temperature monitoring/pacing at 60 mA, 70 beats per minute.

## Specifications (cont.)

Table: Environmental Specifications

Operating Temperature:	32° to 122° F (0° to 50° C)
Storage and Shipping Temperature:	-4° to 140° F (-20° to 60° C) NOTE: The M Series CCT device may not perform to specifications when removed from storage at either the upper or lower extreme temperature limits and immediately put into use.
Humidity:	5 to 95% relative humidity, noncondensing.
Vibration:	Mil Std 810 E, Minimum Integrity Test
Shock:	IEC 68-2-27, 50g 6mS half sine
Operating Pressure:	594 to 1060 millibars
Material Ingress:	IEC 529, IP23
Electromagnetic Compatibility (EMC):	CISPR 11 Class B - Radiated and Conducted Emissions
Electromagnetic Immunity:	AAMI DF-2: 1996, EN 61000-4-3: 2002, 15 V/m
Electrostatic Discharge:	AAMI DF-2: 1996, EN 61000-4-2: 1995
Conducted Susceptibility:	IEC 61000-4-4: 1995, EN 61000-4-5: 1995, EN 61000-4-6: 1996

## IEC 60601-1-2 Specifications

This section provides specification tables for the M Series CCT as per IEC 60601-1-2.

### Electromagnetic Emissions Declaration

Guidance and manufacturer's declaration — electromagnetic emissions for the M Series CCT.

The M Series CCT is intended for use in the electromagnetic environment specified below. The customer or user of the M Series CCT should ensure that it is used in such an environment.		
<b>Emissions test</b>	<b>Compliance</b>	<b>Electromagnetic environment – guidance</b>
RF Emissions CISPR 11	Group 1	The M Series CCT uses RF energy for its internal function only. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF Emissions CISPR 11	Class B	The M Series CCT is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic Emissions IEC 61000-3-2	Class A	
Voltage Fluctuations/ Flicker Emissions IEC 61000-3-3	Complies	


## Electromagnetic Immunity Declaration (EID)

Guidance and manufacturer's declaration — electromagnetic immunity for the M Series CCT.

The M Series CCT is intended for use in the electromagnetic environment specified below. The customer or user of the M Series CCT should ensure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6kV contact ±8 kV air	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines Not applicable	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV differential mode ±2 kV common mode	±1 kV differential mode ±2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines. IEC 61000-4-11	<5% $U_T$ (>95% dip in $U_T$ ) for 0.5 cycle 40% $U_T$ (60% dip in $U_T$ ) for 5 cycles 70% $U_T$ (30% dip in $U_T$ ) for 25 cycles <5% $U_T$ (>95% dip in $U_T$ ) for 5 seconds	<5% $U_T$ (>95% dip in $U_T$ ) for 0.5 cycle 40% $U_T$ (60% dip in $U_T$ ) for 5 cycles 70% $U_T$ (30% dip in $U_T$ ) for 25 cycles <5% $U_T$ (>95% dip in $U_T$ ) for 5 seconds	Mains power quality should be that of a typical commercial or hospital environment. If the user of the M Series CCT requires continued operation during power mains interruptions, it is recommended that the M Series CCT be powered by an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field. IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of typical location in a typical commercial or hospital environment.
NOTE: $U_T$ is the ac mains voltage prior to the application of the test level.			

## EID for Life-Support Functions

Guidance and manufacturer's declaration – electromagnetic immunity – for life-supporting equipment and systems.

The life-support functions <sup>a</sup> of the M Series CCT are intended for use in the electromagnetic environment specified below. The customer or user of the M Series CCT should ensure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz outside ISM bands <sup>b</sup>	10 Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the M Series CCT, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.  <b>Recommended separation distance</b>  $d = 0.35 \sqrt{P}$  $d = 1.2 \sqrt{P}$
	10 Vrms 150 kHz to 80 MHz in ISM bands <sup>b</sup>	10 Vrms	
Radiated RF IEC 61000-4-3	10 V/m 80 MHz to 2.5 GHz	20 V/m	$d = 0.6 \sqrt{P}$ 80 MHz to 800 MHz $d = 1.2 \sqrt{P}$ 800 MHz to 2.6 GHz  where P is the maximum output power rating of the transmitter in watts according to the transmitter manufacturer and d is the recommended separation distance in meters. <sup>c</sup> Field strengths from fixed RF transmitters, as determined by electromagnetic site survey, <sup>d</sup> should be less than the compliance level in each frequency range. <sup>e</sup> Interference may occur in the vicinity of equipment marked with the following symbol:  
NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies. NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.			

a. The life-support functions on the M Series CCT are defined to be any function associated with ECG monitoring, pacing, defibrillation, and shock analysis. Specifically, these functions include, but are not limited to, the ECG waveform monitoring from leads or pads, the pacing pulse output, QRS detection, defibrillation energy discharge, and shock advisory functions.

b. The ISM (industrial, scientific, and medical) bands between 150 kHz and 80 MHz are 6.765 MHz to 6.795 MHz; 13.553 MHz to 13.567 MHz; 26.957 MHz to 27.283 MHz; and 40.66 MHz to 40.70 MHz.

c. The compliance levels in the ISM frequency bands between 150 kHz and 80 MHz and in the frequency range 80 MHz to 2.5 GHz are intended to decrease the likelihood that mobile/portable communications equipment could cause interference if it is inadvertently brought into patient areas. For this reason, an additional factor of 10/3 is used in calculating the recommended separation distance for transmitters in these frequency ranges.

d. Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the M Series CCT is used exceeds the applicable RF compliance level above, the M Series CCT should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the M Series CCT.

e. Over the frequency ranges 150 kHz to 80 MHz field strength should be less than 10 V/m.

## Recommended Separation Distances from RF Equipment for the M Series CCT Life-Support Functions

Recommended separation distances between portable and mobile RF communications equipment and the M Series CCT.

The life-support functions<sup>a</sup> of the M Series CCT are intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The customer or user of the M Series CCT can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the M Series CCT as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of equipment (in watts)	Separation distance according to frequency of transmitter (in meters)			
	150 kHz to 80 MHz outside ISM bands	150 kHz to 80 MHz in ISM bands	80 MHz to 800 MHz	800 MHz to 2.5 GHz
	$d=0.35 \sqrt{P}$	$d=1.2 \sqrt{P}$	$d=0.6 \sqrt{P}$	$d=1.2 \sqrt{P}$
0.01	0.035	0.12	0.06	0.12
0.1	0.11	0.38	0.19	0.38
1	0.35	1.2	0.6	1.2
10	1.1	3.8	1.9	3.8
100	3.5	12	6	12

For transmitters rated at a maximum output power not listed above, the recommended separation distance  $d$  in meters can be determined using the equation applicable to the frequency of the transmitter, where  $P$  is the maximum output power rating of the transmitter in watts according to the transmitter manufacturer.

NOTE 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2: The ISM (industrial, scientific, and medical) bands between 150 kHz and 80 MHz are 6.765 MHz to 6.795 MHz; 13.553 MHz to 13.567 MHz; 26.957 MHz to 27.283 MHz; and 40.66 MHz to 40.70 MHz.

NOTE 3: An additional factor of 10/3 is used in calculating the recommended separation distances for transmitters in the ISM frequency bands between 150 kHz and 80 MHz and in the frequency range 80 MHz to 2.5 GHz to decrease the likelihood that mobile/portable communications equipment could cause interference if it is inadvertently brought into patient areas.


NOTE 4: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

a. The life-support functions on the M Series CCT are defined to be any function associated with ECG monitoring, pacing, defibrillation, and shock analysis. Specifically, these functions include, but are not limited to, the ECG waveform monitoring from leads or pads, the pacing pulse output, QRS detection, defibrillation energy discharge, and shock advisory functions.

## EID for Non-Life-Support Functions

Guidance and manufacturer’s declaration – electromagnetic immunity – for non-life-supporting equipment and systems.

The non-life-support functions<sup>a</sup> of the M Series CCT are intended for use in the electromagnetic environment specified below. The customer or user of the M Series CCT should ensure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	<p>Portable and mobile RF communications equipment should be used no closer to any part of the M Series CCT, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.</p> <p><b>Recommended separation distance</b></p> $d = 1.2 \sqrt{P}$ $d = 0.23 \sqrt{P} \quad 80 \text{ MHz to } 800 \text{ MHz}$ $d = 0.47 \sqrt{P} \quad 800 \text{ MHz to } 2.6 \text{ GHz}$ <p>where <math>P</math> is the maximum output power rating of the transmitter in watts according to the transmitter manufacturer and <math>d</math> is the recommended separation distance in meters.</p> <p>Field strengths from fixed RF transmitters, as determined by electromagnetic site survey,<sup>b</sup> should be less than the compliance level in each frequency range.<sup>c</sup></p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	15 V/m	

NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

a. The non-life-support functions on the M Series CCT are defined to be any function not listed as a life-support function in the “EID for Life-Support Functions” table (Note a). Specifically, these functions are the Invasive Blood Pressure (IBP) channels, the Temperature channels, the Non-invasive Blood Pressure (NIBP), End-Tidal CO<sub>2</sub> (EtCO<sub>2</sub>), and SpO<sub>2</sub>.

b. Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the M Series CCT is used exceeds the applicable RF compliance level above, the M Series CCT should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the M Series CCT.

c. Over the frequency ranges 150 kHz to 80 MHz field strength should be less than 3 V/m.

## Recommended Separation Distances from RF Equipment for the M Series CCT Non-Life-Support Functions

Recommended separation distances between portable and mobile RF communications equipment and the M Series CCT.

The non-life-support functions<sup>a</sup> of the M Series CCT are intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The customer or user of the M Series CCT can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the M Series CCT as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of equipment (in watts)	Separation distance according to frequency of transmitter (in meters)		
	150 kHz to 80 MHz $d = 1.2 \sqrt{P}$	80 MHz to 800 MHz $d = 0.23 \sqrt{P}$	800 MHz to 2.5 GHz $d = 0.47 \sqrt{P}$
0.01	0.12	0.02	0.05
0.1	0.38	0.07	0.15
1	1.2	0.23	0.47
10	3.8	0.73	1.5
100	12	2.3	4.7

For transmitters rated at a maximum output power not listed above, the recommended separation distance  $d$  in meters can be determined using the equation applicable to the frequency of the transmitter, where  $P$  is the maximum output power rating of the transmitter in watts according to the transmitter manufacturer.

NOTE 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

a. The non-life-support functions on the M Series CCT are defined to be any function not listed as a life-support function in the "EID for Life-Support Functions" table (Note a). Specifically, these functions are the Invasive Blood Pressure (IBP) channels, the Temperature channels, the Non-invasive Blood Pressure (NIBP), End-Tidal CO<sub>2</sub> (EtCO<sub>2</sub>), and SpO<sub>2</sub>.