

TM9400 P25 Mobile Radios

Specifications Manual

MMB-00009 - Issue 12 - November 2023

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1 Introduction

This manual lists some of the regulatory requirements and industry standards that the TM9400 series of mobile radios satisfy, and explains how the radio specifications were derived. Separate chapters compare the performance of the receiver ("Receiver Specifications" on page 11) and of the transmitter ("Transmitter Specifications" on page 15) with requirements specified by the European Telecommunications Standards Institute (ETSI) and the Telecommunications Industry Association (TIA). "[General Specifications](#)" on [page 21](#) provides general radio specifications.

Notice The TM9400 specifications in this manual are typical performance figures and are intended only to provide guidance. They are subject to change without notice and shall not form part of any contract. To establish whether the radio meets the regulatory requirements that apply to you, please contact your regional Tait office.

Notice For known issues and limitations that may cause a radio to perform outside the specifications listed here, see the software release notes for the TM9400. Software release notes are on the Tait Partner Portal, <https://partnerinfo.taitradio.com>

Regulatory Requirements and Industry Standards

Regulatory Requirements

TM9400 radios meet and exceed the following **regulatory requirements** (where applicable):

- CFR Title 47 Part 15
- AS4295
- EN 300 0861
- EN 300 113¹
- EN 300 219¹
- EN 301 489¹
- EN 62368
- RSS-119
- TIA/EIA-603/603-E

¹A regulatory requirement issued by ETSI. ETSI requirements do not apply to radios operating in the 700/800/900MHz frequency bands.

Industry Standards

TM9400 radios also meet and exceed **industry standards** that include:

- Relevant sections of TIA-603-E (Land Mobile FM or PM Communications Equipment Measurement and Performance Standards)
- MIL-STD 810 G (Environmental Engineering Considerations and Laboratory Tests, see also "Environmental" on page 34)

TIA standards are adopted by TIA in accordance with the American National Standards Institute (ANSI) patent policy.

For applicable Ingress Protection (IP) ratings and military standards, as well as details of the applicable Electrostatic Discharge (ESD) standard, see "Environmental" on page 34.

Quality Assurance

Tait is an ISO9001: 2000 and ISO14001: 2004 certified supplier.

Vocoder

TM9400 radios use AMBE+2™ voice coding technology.

Performance Figures

TM9400 specifications were derived by measuring **typical performance** and then averaging that measurement across multiple points in each RF band.

In contrast, all figures quoted as regulatory requirements are **guaranteed minimum performance** figures for equipment operated at standard room temperature, +71.6°F to +82.4°F (+22°C to +28°C) and standard test voltage (13.8VDC).

Performance figures quoted as 'typical' are generally better than performance figures quoted as 'guaranteed minimum'.

Definition of NB and WB

The terms 'narrow bandwidth' and 'wide bandwidth' are used as follows:

Term	Abbreviation	Channel spacing	Modulation 100% deviation
Narrow bandwidth	NB	12.5kHz/15kHz	±2.5kHz
Wide bandwidth	WB	25kHz/30kHz	±5kHz

Frequency Bands

Tait uses a unique alpha-numeric code to represent each frequency band. The frequency codes currently used with the TM9400 series of radios are listed below. These codes are used throughout this manual.

Frequency code	Frequency band
B1	136MHz to 174MHz
HK	378MHz to 470 MHz
H5	400MHz to 470MHz ^a
H7	450MHz to 520MHz ^a
K5	757MHz to 870MHz (Tx)
	757MHz to 776MHz (Rx)
	850MHz to 870MHz (Rx)

^aH5- and H7-band radios are also approved for operation on the Australia and New Zealand Citizens Band frequencies (476.425 to 477.4125MHz). Citizens Band performance limits apply to radios used in this band.

Australia and New Zealand Citizens Band

AS/NZS 4365 deals with the use of frequencies in the 476.425 to 477.4125MHz band. Products capable of operating in this band have been approved for operation in the UHF Citizens Band Radio Service which is licensed in Australia by the ACMA Radiocommunications (Citizens Band Radio Stations) Class Licence and in New Zealand by the MBIE General User Radio Licence for Citizens Band Radio. Operation is subject to conditions contained within those licences.

Repeaters operate by receiving a transmission on one channel and re-transmitting it on another. Operators are required to avoid using local repeater input channels, which will be in the range of 31 to 38 (and 71 to 78 when authorized), unless it is intended to use the repeater facility, and to avoid using local repeater output channels, which will be in the range 1 to 8 (and 41 to 48 when authorized), at any time. Operators must always listen in on a channel (or observe a channel-busy indicator) to ensure it is not already being used before transmitting.

No voice transmissions are permitted on data channels 22 and 23. Equipment meeting this standard will inhibit voice operation on channels 22 and 23.

Operators must be aware of the consequences of narrowband (2.5kHz deviation) transmissions being received on older wideband equipment, and wideband (5.0kHz deviation) transmissions being received on newer narrowband equipment. They should also be aware of the possibility of interference due to older equipment being operated on channels adjacent to new narrowband channels. The list of currently authorized channels can be obtained from the ACMA website in Australia and the MBIE website in New Zealand.

In Australia:

- Except in an emergency, a CB transmitter must not be operated on UHF channels 5 and 35.
- Channel 11 is the customary calling channel for establishing communications.

- Channel 40 is the customary road vehicle channel.

FCC Narrowbanding Regulations

The following information applies to all radios, not just to those sold in countries where FCC regulations apply.

From 1 January 2013 it is an FCC requirement that land mobile radio systems must not operate channels with a bandwidth greater than 12.5kHz in the 150–174MHz and 421–470MHz frequency bands. From this date all radios will be supplied with firmware that requires a software feature license to operate a medium or wide bandwidth channel in these frequency bands.

The 20/25kHz Unrestricted Wideband feature license is available to any customer who is not subject to the relevant FCC regulations, or who has an FCC waiver. Note that this feature license is not required to operate a medium or wide bandwidth channel on the spot frequencies which are exempt from the FCC requirement:

- 152.0075, 157.450, 152.480, 157.740 and 158.460MHz in the 150–174MHz frequency band
- 462.750, 462.775, 462.800, 462.825, 462.850, 462.875, 462.900, 462.925, and 465MHz in the 421–470MHz frequency band.

To obtain the feature license or for more information about it, contact your regional Tait office.

RF Output Power

TM9400 mobile radios are available with >25W and 25W RF output power. These RF output power options are implemented by different main boards in the radio body and mechanically different radio bodies. For information on which control head is currently available with each radio model, contact your regional Tait office.

The >25W radio is available in the following frequency bands:

- B1 (50W)
- HK (40W)
- H5 (40W)
- H7 (40W)
- K5 (30W for 757–806 MHz, 35W for 806–870MHz)

The 25W radio is available in the following frequency bands:

- B1
- H5a
- H7a

^aRadios approved for operation on the Australia and New Zealand Citizens Band have a maximum RF output power of 5W.

Product Codes

The product code (T02-xxxx-xxxx) printed on a radio label identifies both the radio model and the configuration of that particular radio. For a detailed explanation of product codes and how to interpret them, please refer to the TM9300/TM9400 Service Manual (MMB-00004-xx).

Associated Documentation

Title	IPN/Item code
Safety and Compliance Information	MTA-00011-xx
TM9400 User's Guide	MMB-00003-xx
TM9300/TM9400 Installation Guide	MMB-00002-xx
TM9300/TM9400 Service Manual	MMB-00004-xx

Always get the latest issue of a manual from the Tait Partner Portal. Also available on the website are software release notes and technical notes (TNs) which provide technical details not yet in the manuals or solve any problems that may have arisen.

Document Conventions

Please follow exactly any instruction that appears in the text as an 'alert'. An alert provides necessary safety information as well as instruction in the proper use of the product. This manual uses the following types of alert:

Notice This alert is used to highlight information that is required to ensure procedures are performed correctly. Incorrectly performed procedures could result in equipment damage or malfunction.



This icon is used to draw your attention to information that may improve your understanding of the equipment or procedure.

Publication Record

Issue	Date	Description
12	November 2023	Minor updates throughout Color Control Head (TCH) content included
11	June 2021	Minor updates throughout Updated battery information Updated specifications
10		NOT RELEASED
9	September 2020	Updated maximum number of supported zones
8	October 2019	Changed EIA-603-D to EIA-603-E(2016)
7	October 2017	Information added for: Added C0 band specifications.

2 Receiver Specifications

This chapter compares the performance of the receiver in a TM9400 radio with receiver requirements specified by ETSI and TIA.

Where an ANSI/TIA or ETSI EN 300 113 test method was used to measure TM9400 performance, this is indicated in parentheses. Where the ETSI test method EN 300 086-1 was used, no test method is named. Please see also the footnotes to the tables.

Notice The TM9400 specifications in this manual are typical performance figures that are intended only to provide guidance. They are subject to change without notice and shall not form part of any contract. To establish whether the radio meets the regulatory requirements that apply to you, please contact your regional Tait office.

For important information about how radio performance figures were derived, see "Introduction" on page 5.

2.1 Analog

Parameter	Compliance limit	Measured performance			
	All bands ^a	B1	HK, H5	H7	K5
Adjacent channel selectivity					
NB channel ^b	> 60dB	65dB	64dB		n/a ^c
WB channel	> 70dB	74dB	73dB		
Adjacent channel selectivity (TIA/EIA603 one-tone test method)					
NB channel	> 60dB	65dB	64dB		63dB
WB channel	> 70dB	74dB	72dB		72dB
Audio distortion at rated audio ^d					
Intentionally left blank	< 5%	0.6%			0.9%
Audio bandwidth					
Intentionally left blank		300–3000Hz (flat or with de-emphasis)			
Audio response ^d					
Intentionally left blank	+1dB, -3dB	+0.5dB, -2.5dB			
Blocking					
Intentionally left blank	> 84dB	> 110dB			n/a
Co-channel rejection					
NB channel	> -12dB	> -7dB			n/a
WB channel	> -8dB	> -2.5dB			
Frequency stability (TIA-603-E)					
Intentionally left blank	±2.5ppm	±0.5ppm			
Intermodulation rejection					
NB channel	> 65dB	72dB	67dB	72dB	n/a
WB channel	> 65dB				
Intermodulation rejection (TIA-603-E)					
NB channel	> 75dB	81dB	76dB	79dB	79dB
WB channel	> 75dB				
Mute opening point (Noise mute)					
Country		8dB SINAD			
City	Intentionally left blank	12dB SINAD			
Hard		20dB SINAD			
Rated audio ^e					
Intentionally left blank	Intentionally left blank	3W into 16Ω load			

Parameter	Compliance limit	Measured performance			
	All bands ^a	B1	HK, H5	H7	K5
Speaker rating					
Intentionally left blank	Intentionally left blank	4W			
Hum and noise (TIA-603-E)					
NB channel	34dB	45dB			
Sensitivity ^f (TIA-603-E)					
NB channel	< -116dBm (0.35μV)	-120dBm	-121dBm	-122dBm	
WB channel	< -116dBm (0.35μV)	(0.22μV)	(0.20μV)	(0.18μV)	
Sensitivity ^g					
NB channel	< -107dBm	-116dBm	-118dBm	n/a	
WB channel	< -107dBm	-118dBm	-119dBm		
Signal displacement bandwidth (TIA-603-E)					
NB channel	> 40%	120%	— ^h		
WB channel	> 40%	90%			
Spurious response rejection					
NB channel	> 70dB	73dB	75dB	72dB	n/a
WB channel	> 70dB	76dB	75dB	72dB	
Spurious response rejection (TIA-603-E)					
NB channel	> 75dB	82dB	85dB	82dB	84dB ⁱ
WB channel	> 75dB	84dB	85dB	82dB	84dB ^h



Sensitivity, distortion, and signal-to-noise figures are for standard operating conditions that include audio de-emphasis.

^aSee "Frequency Bands" on page 7.

^bSee "Definition of NB and WB" on page 6.

^cNot applicable.

^dEN 300 086-1, TIA-603-E and TIA-102 test methods.

^e"dEN 300 086-1, TIA-603-E and TIA-102 test methods." above

^f12dB SINAD.

^g20dB SINAD psophometric weighting.

^hUnavailable at time of publication.

ⁱ1/2-IF spurious response degrades at the edges of the band.

2.2 Digital

	Compliance limit	Measured performance				
Parameter	All bands ^a	B1	Intentionally left blank	H5	H7	K5
Sensitivity ^b (TIA-102)						
	< -116dBm (0.35μV)	-121dBm (0.20μV)		-122dBm (0.18μV)		-123dBm (0.16μV)
Selectivity ^b (TIA-102)						
	> 60dB	62dB				
Selectivity (EN 300 113)						
Intentionally left blank	> 60dB	62dB		61dB		60dB
Residual audio noise ratio (TIA-102)						
	45dB	65dB	— ^c			n/a ^d
Intermodulation rejection (TIA-102)						
	> 75dB	79dB		76dB	78dB	78dB
Spurious response rejection (TIA-102)						
Intentionally left blank	> 80dB	82dB	Intentionally left blank	84dB	82dB	85dB ^e
Co-channel rejection (EN 300 113)						
Intentionally left blank	-12dB			-9dB		
Blocking (EN 300 113)						
Intentionally left blank	> 84dB			> 105dB		> 100dB

^aSee "Frequency Bands" on page 7.

^bP25 Phase 1 C4FM receiver and Phase 2 H-DQPSK receiver.

^cUnavailable at time of publication.

^dNot applicable.

^e1/2-IF spurious response degrades at the edges of the band.

3 Transmitter Specifications

This chapter compares the performance of the transmitter in a TM9400 radio with transmitter requirements specified by ETSI and TIA.

Where an ANSI/TIA or ETSI EN 300 113 test method was used to measure TM9400 performance, this is indicated in parentheses. Where the ETSI test method EN 300 086-1 was used, no test method is named. Please see also the footnotes to the tables.

This equipment is compatible with the emissions listed in the following table.

Notice Some emission designators may not apply in all regions. Not all models support all emission designators. Contact your regional Tait office for details.

Emission Designator	Common Name	Modulation Scheme	Operating Modes
11K0F3E	analog voice	analog FM	NB voice
16K0F3E	analog voice	analog FM	WB voice
6K60F2D	FFSK data	FFSK	NB data - 1200 bps
7K80F2D	FFSK data	FFSK	NB data - 2400 bps
9K60F2D	FFSK data	FFSK	WB data - 1200 bps
10K8F2D	FFSK data	FFSK	WB data - 2400 bps
8K10F1E	P25 Phase 1	C4FM	digital voice
8K10F1D	P25 Phase 1	C4FM	data/control channel
8K10F7W	P25 Phase 1	C4FM	digital voice/data/control channel
8K10F1W	P25 Phase 2	H-CPM	digital voice/data

Notice The TM9400 specifications in this manual are typical performance figures that are intended only to provide guidance. They are subject to change without notice and shall not form part of any contract. To establish whether the radio meets the regulatory requirements that apply to you, please contact your regional Tait office.

For important information about how radio performance figures were derived, see "Introduction" on page 5.

3.1 Analog

Parameter	Compliance limit	Measured performance					
	All bands ^a	B1		Intentionally left blank	HK, H5, H7		K5
		25W	50W		25W	40W	30/35W
Audio distortion at 1kHz with 60% modulation ^b							
	< 2%	0.6%		Intentionally left blank	0.6%		1.4%
Audio response ^b							
	+1dB, -3dB	+0.5dB, -2.5dB			+0.6dB, -2dB		
Conducted emissions							
< 1GHz	< -36dBm	-38dBm	n/a ^c	Intentionally left blank	-38dBm	n/a	n/a
> 1GHz	< -30dBm	-40dBm			-36dBm		
Conducted emissions (TIA-603-E)							
25W radios	> 64dBc	75dBc	Intentionally left blank		84dBc		
> 25W radios	> 67dBc		87dBc	Intentionally left blank		94dBc	> 75dBc
FM hum and noise (TIA-603-E)							
NB channel ^d	> 34dB	47dB	47dB	Intentionally left blank	51dB	50dB	40dB
WB channel	> 40dB	48dB	48dB		52dB	55dB	48dB
Adjacent channel power (TIA-603-E)							
NB channel	60dBc	65dBc	66dBc	intentionally left blank	64dBc	65dBc	65dBc
WB channel	70dBc	74dBc	76dBc	intentionally left blank	73dBc	74dBc	73dBc
Wideband noise ^e							

Parameter	Compliance limit	Measured performance					
	All bands ^a	B1		Intentionally left blank	HK, H5, H7		K5
		25W	50W		25W	40W	30/35W
100kHz offset	n/a (Tait in-house test only)	-130dBc/Hz		intentionally left blank	-135dBc/Hz		-126dBc/Hz
1MHz offset		-145dBc/Hz			-142dBc/Hz		-138dBc/Hz
1.5MHz offset		n/a			n/a		n/a
4MHz offset		n/a			-147dBc/Hz		-145dBc/Hz
12MHz		n/a			n/a		n/a
10MHz offset		-154dBc/Hz			-148dBc/Hz		-146dBc/Hz
45MHz offset		n/a			n/a		n/a
Modulation							
Intentionally left blank		Analog FM					
Modulation limiting ^b							
NB channel	±2.5kHz	±2.2kHz					
WB channel	±5.0kHz	±4.4kHz					
RF power output ^b							
High		25W	50W		25W	40W	30/35W ^f
Medium		10W	25W		10W	25W	25W
Low		5W	15W		5W	15W	10W
Very low		1W	10W		1W	10W	2W
Transmit timer							
Intentionally left blank		Programmable. 1 to 250 seconds, or 0 (no timer)					
Duty cycle							
25W radios at 25W ^g (+60°C ambient temperature)		33% ^h	n/a			n/a	n/a
25W radios at 5W ⁱ (+40°C ambient temperature)		100% ^j	n/a			n/a	n/a

Parameter	Compliance limit	Measured performance					
	All bands ^a	B1		Intentionally left blank	HK, H5, H7		K5
		25W	50W		25W	40W	30/35W
> 25W radios at rated output power ^g At 16V." below (+60°C ambient temperature)	n/a	20% ^k			20% ^k	20% ^k	

^a See "Frequency Bands" on page 7.

^bEN 300 086-1 and TIA-603-E test methods.

^cNot applicable.

^dSee ["Definition of NB and WB" on page 6](#).

^eThese figures are typical across the frequency band and can vary ± 6 dB with frequency.

^f30W for 757–806MHz, 35W for 806–870MHz.

^gAt 16V.

^h2min Tx, 4min Rx.

ⁱAt 13.8V.

^jContinuous Tx.

^k1min Tx, 4min Rx.

3.2 Digital

Parameter	Compliance limit	Measured performance					
	All bands ^a	B1		Intentionally left blank	HK (40w only), H5, H7		K5
		25W	50W		25W	40W	30/35W
Modulation							
Intentionally left blank		FFSK, C4FM, H-CPM					
Adjacent channel power ratio (TIA-102)							
P25 Phase 1	67dBc	67dBc					
P25 Phase 2	65dBc	65dBc					
Adjacent channel power ratio (EN 300 113)							
Intentionally left blank	60dBc	60dBc	n/a ^b		60dBc	n/a	n/a
Transient adjacent channel power ratio (EN 300 113)							
Intentionally left blank	50dBc	58dBc	n/a		56dBc	n/a	n/a
Transmitter power attack time (TIA-102)							
Intentionally left blank	< 50ms	35ms		43ms	38ms	39ms	
Transmitter encoder attack time (TIA-102)							
Intentionally left blank	< 100ms	57ms		67ms	62ms	61ms	
Throughput delay (TIA-102)							
Intentionally left blank	< 125ms	55ms	50ms		55ms	47ms	
Modulation fidelity (TIA-102)							
Intentionally left blank	< 5%	0.5%		0.5%	0.6%	0.6%	

^aSee ["Frequency Bands" on page 7.](#)

^bNot applicable.

4 General Specifications

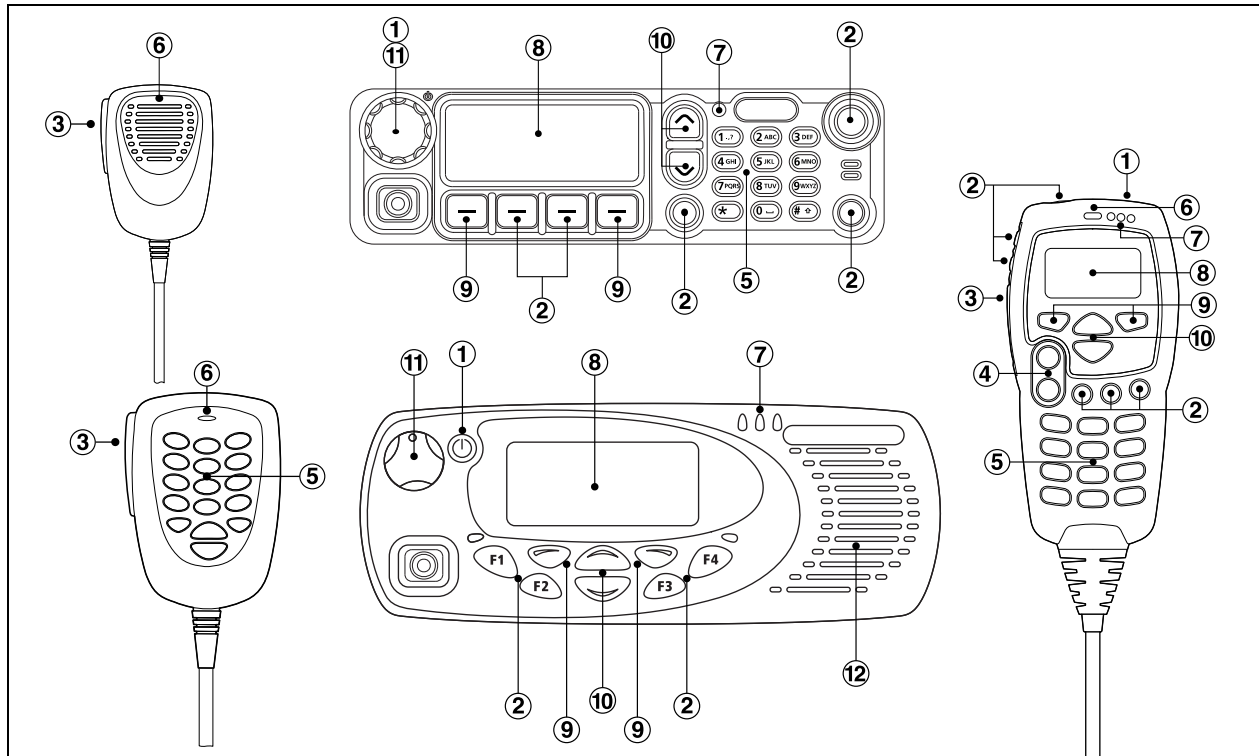
This chapter provides general specifications for the TM9400 mobile radios.

- For radio compliance specifications, see "Regulatory Requirements and Industry Standards" on page 5
- For receiver performance specifications, see "Receiver Specifications" on page 11
- For transmitter performance specifications, see "Transmitter Specifications" on page 15

The product code printed on the radio label identifies both the radio model and the configuration of that particular radio. For an explanation of product codes, please refer to the TM9300/TM9400 Service Manual (MMB-00004-xx).

4.1 Radio Controls, Connectors and Dimensions

Figure 4.1 User Interfaces



	Name	Function
1	On/off	Long press to switch on/off
2	Function keys	Programmed for frequently used options
3	PTT (press-to-talk)	Press and hold to transmit, release to listen
4	Volume up/down	Press up/down to increase/decrease volume
5	Alphanumeric keys	Press to enter numbers and letters
6	Microphone	Where voice is spoken, held 2 inches (5cm) from the mouth.
7	Status LED indicator(s)	Information on the state of the radio
8	Display	Shows current status of radio, function icons, menus, and messages
9	Left/right selection keys	Action determined by the text above the selection key
10	Scroll keys	Navigate through menus, messages, or predefined options using scrolling
11	Volume control	Rotate left/right to decrease/increase speaker volume
12	Speaker	Where received audio and audible indicators are heard

Figure 4.2 Dimensions of U-bracket installation of radio with TCH3 control head (25W radio shown)

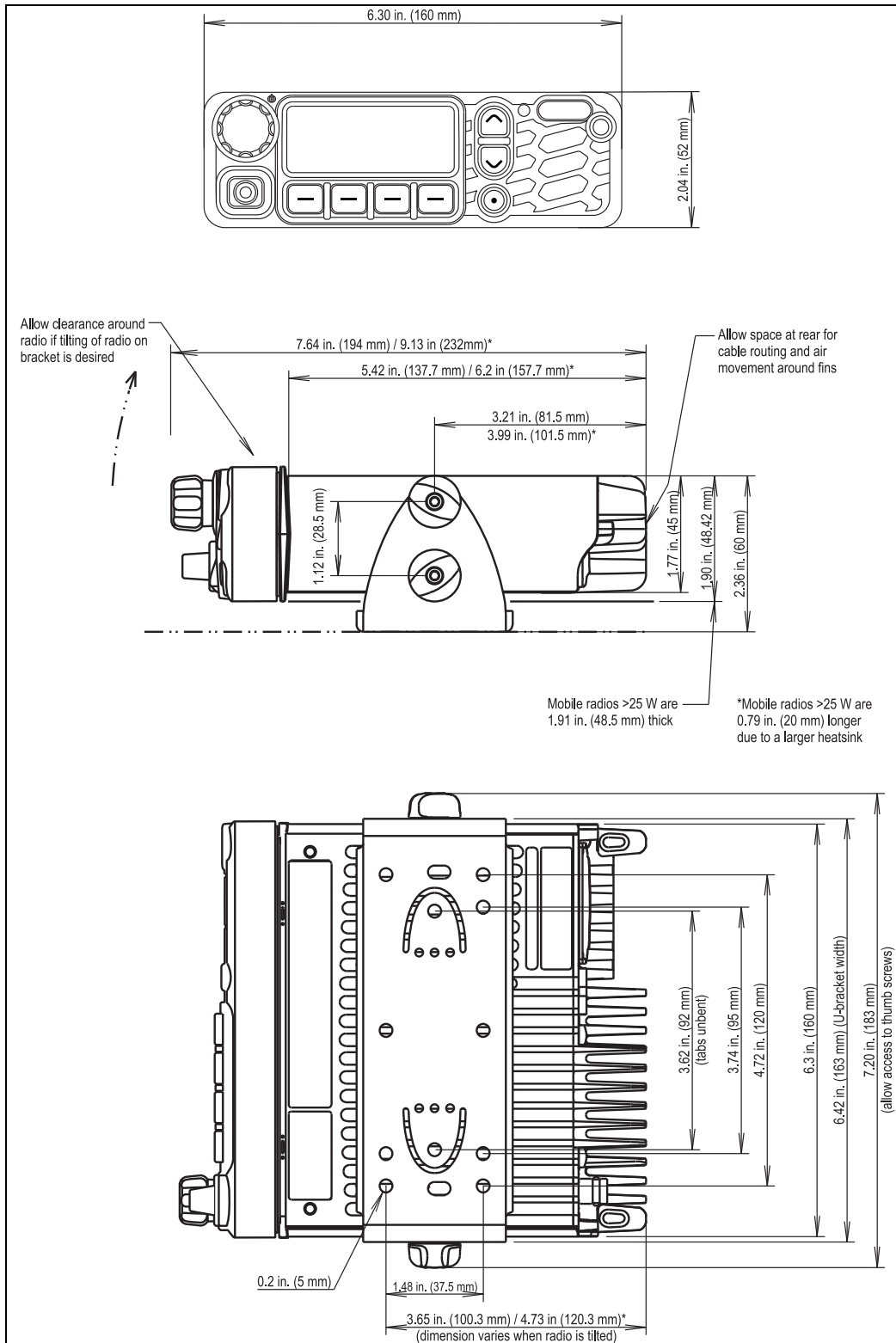


Figure 4.3 TCH4: Dimensions of Remote Color Control Head Installation

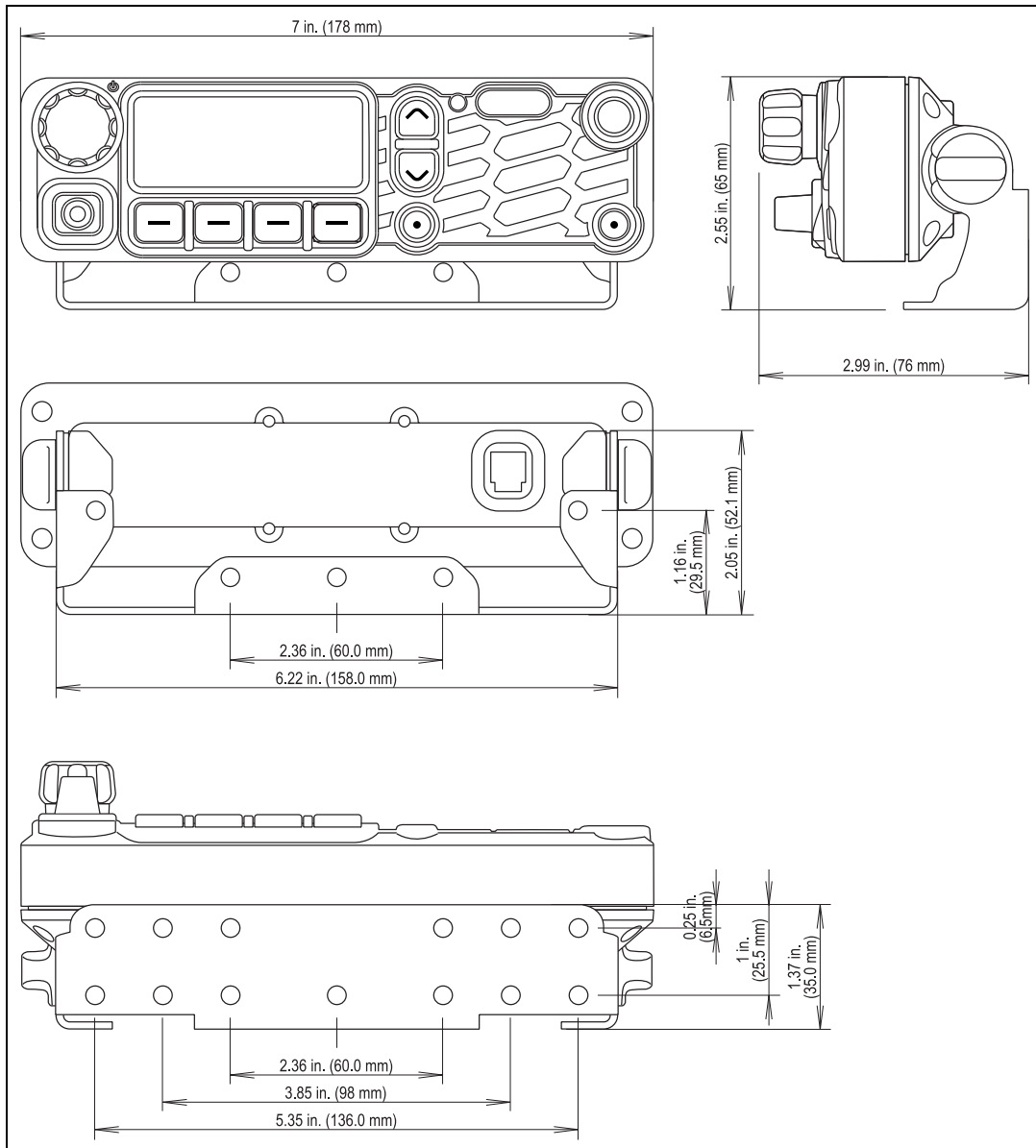


Figure 4.4 TCH6: Dimensions of Remote Color Control Head Installation

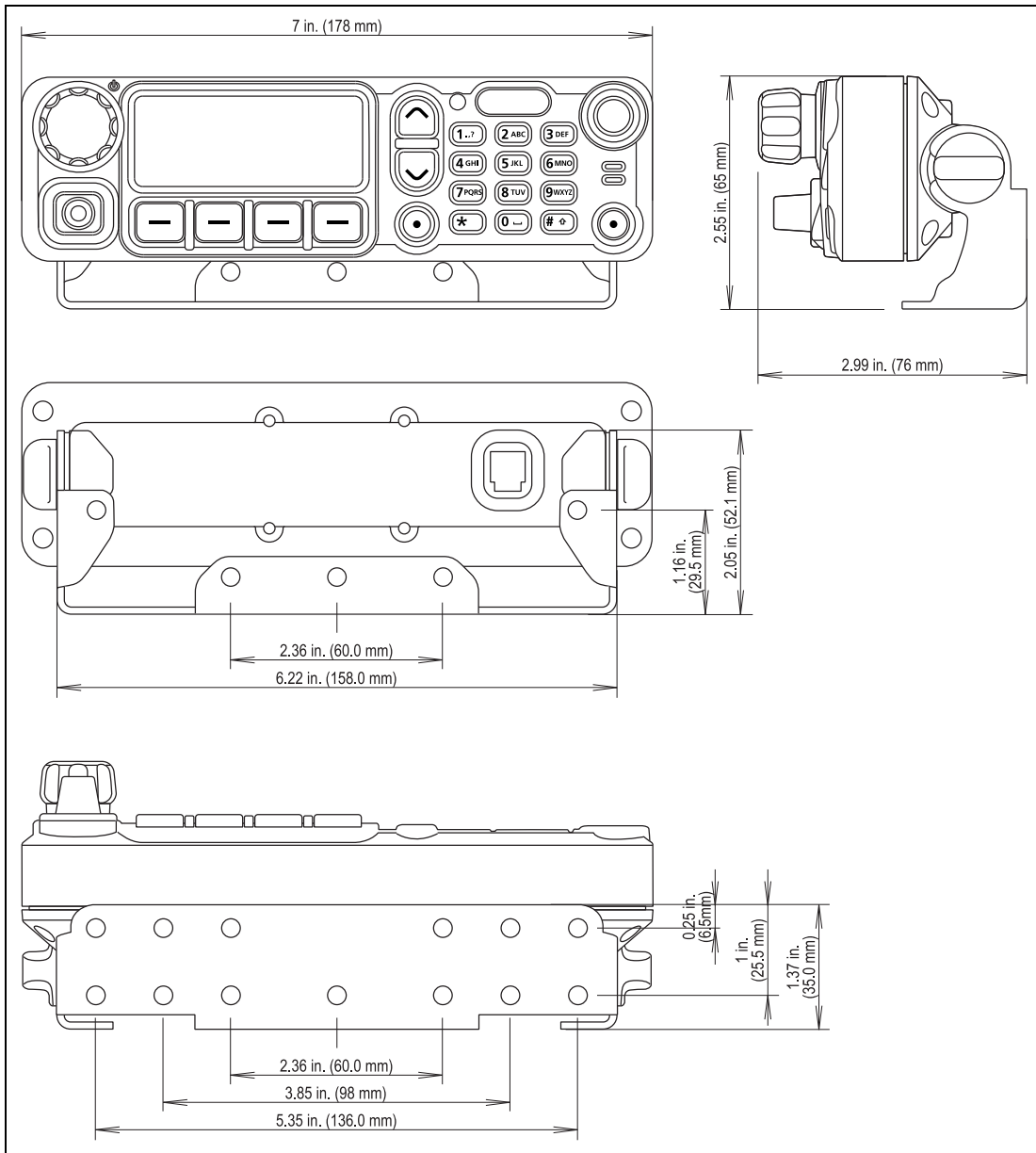


Figure 4.5 Dimensions of radio with programming control head or remote body interface (25W radio shown)

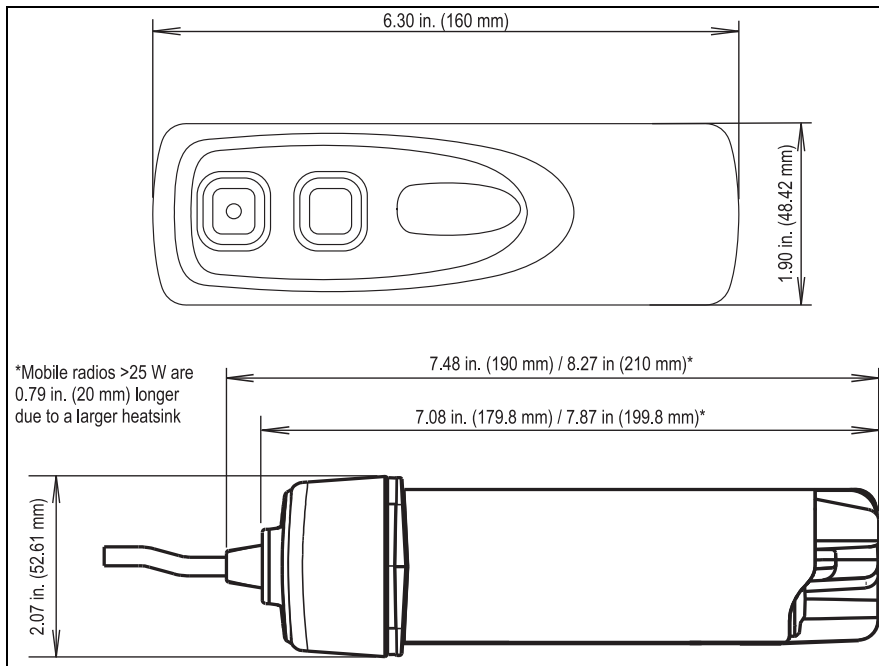


Figure 4.6 Connectors of the radio body (25W radio shown)

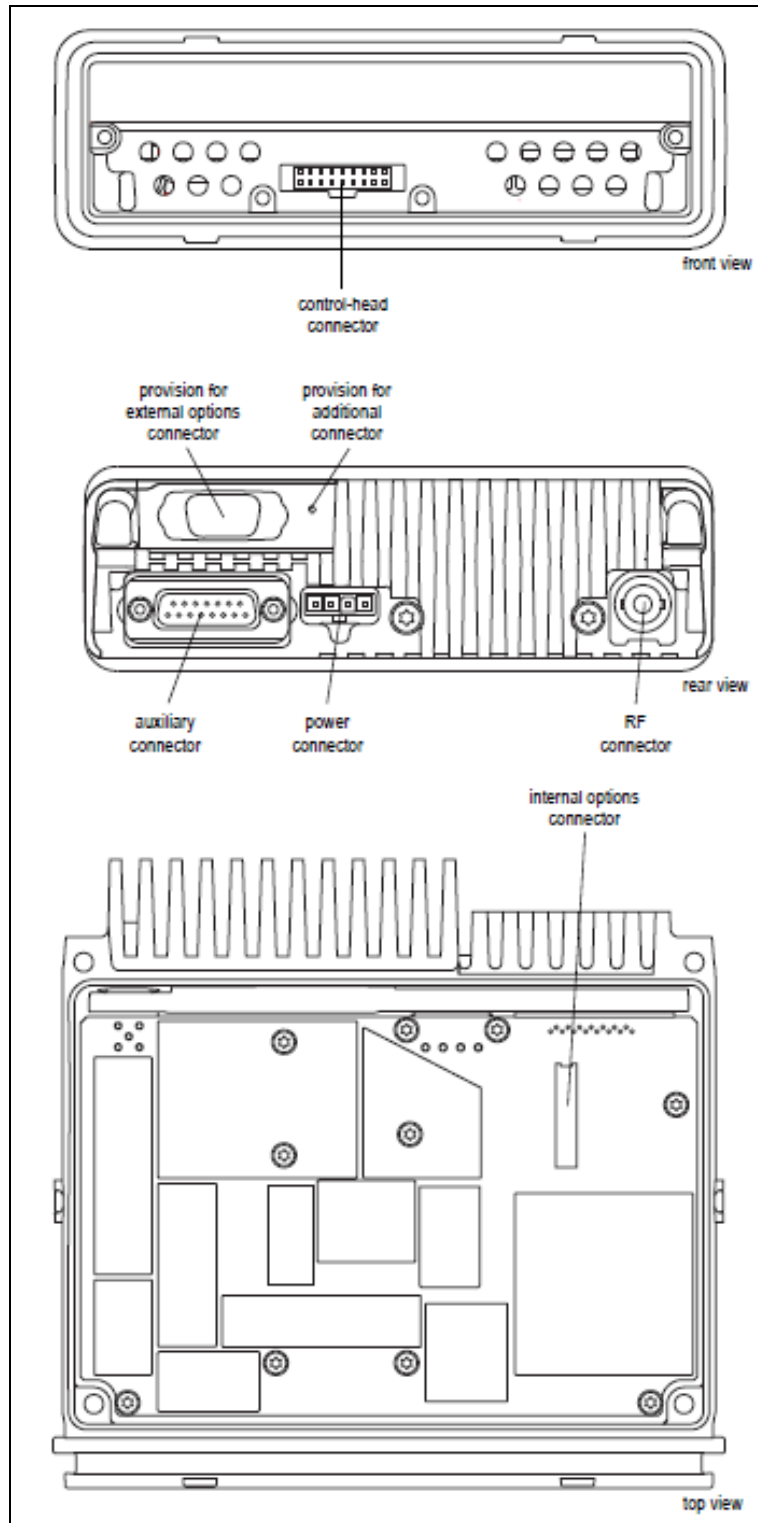


Figure 4.7 Connectors of the large control head

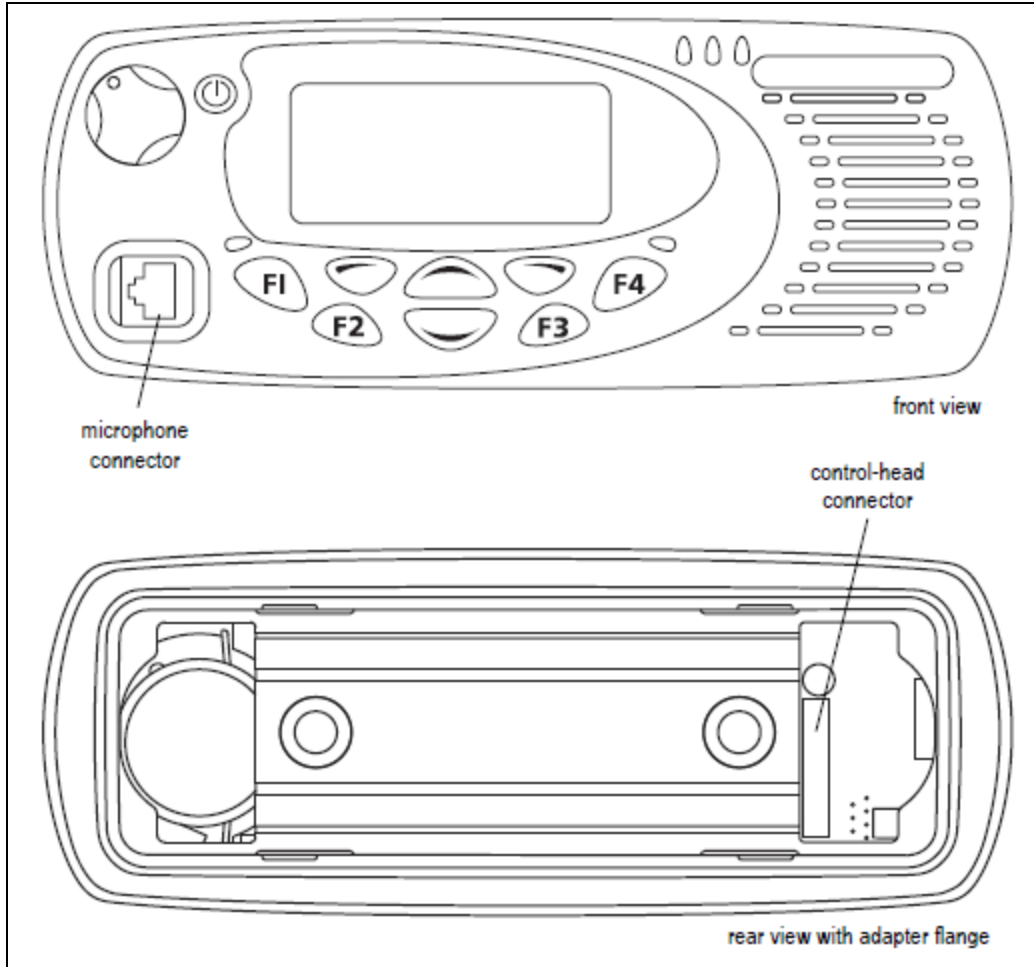


Figure 4.8 Dimensions of remote large control head installation

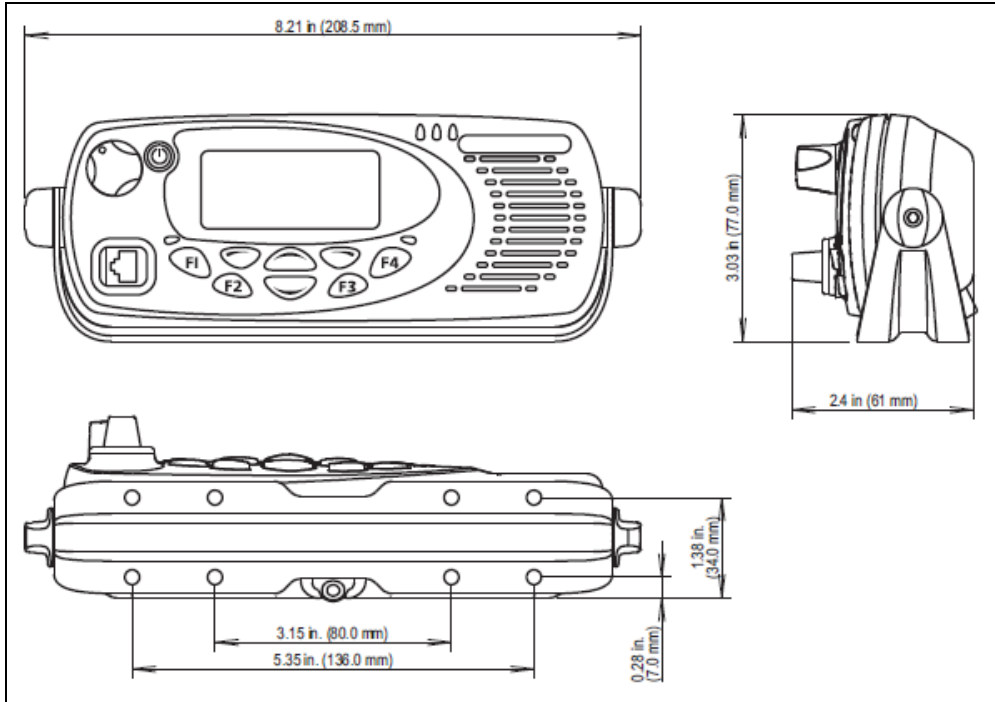
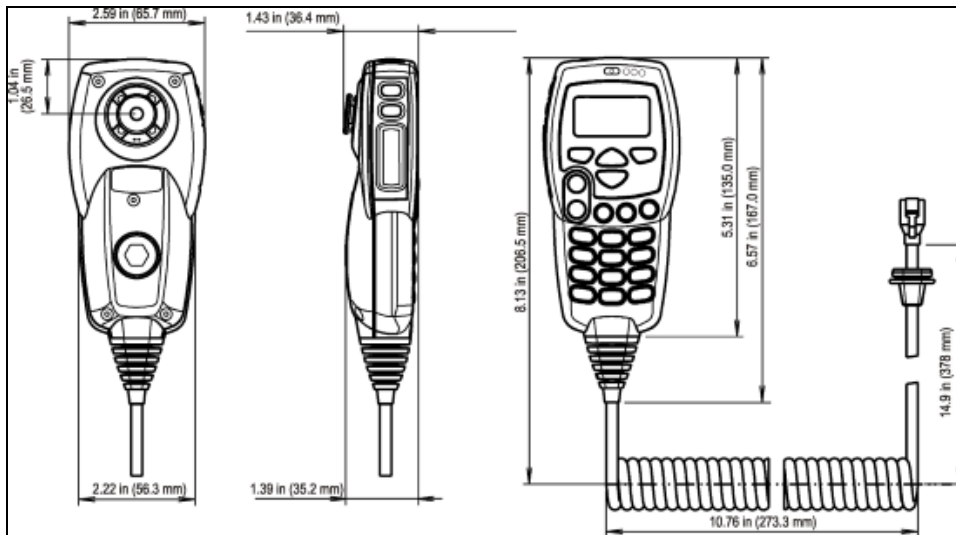


Figure 4.9 Dimensions of hand-held control head



4.2 User Interface

4.2.1 Control Heads

	Large control head	Hand-held control head	TCH3	TCH4	TCH6
Display	4-line graphical (160x64 pixels)	4-line graphical (96x62 pixels)	Color RGB LCD display (154x422 pixels)	Color RGB LCD display (154x422 pixels)	Color RGB LCD display (154x422 pixels)
Connectors	one 8-way RJ45 (microphone/programming)	one 8-way RJ45 (programming)	One 8-way RJ45 (microphone/programming)	one 8-way RJ45 (microphone/programming)	One 8-way RJ45 (microphone/programming)
Keypad					
Function keys	4	6	4	5	5
Scroll keys	✓	✓	✓	✓	✓
Selection keys	✓	✓	✓	✓	✓
Volume keys		✓			
Alphanumeric keys	Via keypad microphone (if connected)	✓	Via keypad microphone (if connected)	Via keypad microphone (if connected)	✓
LED status indicators (Status LED and Function Key LED)					
Status LED	3	3	1 (tricolor)	1 (tricolor)	1 (tricolor)
Function Key LED	2	None	F3 & F4 display labels	F3 & F4 display labels	F3 & F4 display labels
Push-to-talk (PTT) button	Via connected microphone	On left side	Via microphone	Via microphone	Via microphone
Hookswitch and hanger plate	Included with microphone	Included with control head	Included with microphone	Included with microphone	Included with microphone
Speaker	Internal 16Ω 3W	None ^a	Internal 8Ω 4W	Internal 8Ω 4W	None ^a
Microphone	Via connected microphone; covert microphone (internal)	Internal	Via connected microphone	Via connected microphone; covert microphone (internal)	Via connected microphone; covert microphone (internal)
Volume	Rotary control	Volume keys	Rotary control (continuously rotating)	Rotary control (continuously rotating)	Rotary control (continuously rotating)

	Large control head	Hand-held control head	TCH3	TCH4	TCH6
On-off	On-off key	On-off key	Push-switch on volume knob	Push-switch on volume knob	Push-switch on volume knob

^aSee the TM9300/TM9400 Installation Guide for details (MMB-00002-xx).

4.3 Radio Body

Connectors					
RF	50Ω BNC or mini-UHF				
Power	Between 10.8 and 16V DC, negative ground - supply voltage ripple: <10mV _{pp} (8kHz to 200kHz) - noise: <500mV _{pp} (800Hz to 8kHz) or 100mV _{pp} if connected directly to a battery				
Auxiliary	15-way D-range ^a				
Internal options	18-pin Micro-MaTch connector ^b				
Speaker ^c	Optional external (using power connector), balanced load configuration. Maximum power into:				
	4Ω		6Ω		8Ω
	RMS Power	Peak Power	RMS Power	Peak Power	RMS Power Peak Power
	20W	40.5W	13.5W	27W	10W 20W
Microphone	Optional auxiliary (e.g. handsfree)				
On-off	Optional external (e.g. ignition sense)				

^aIncludes 1 serial, 3 input, 4 I/O, 1 audio tap in, 1 audio tap out.

^bIncludes 1 serial, 7 I/O, 1 audio tap in, 1 audio tap out.

^cPower specifications based on full-volume squelch-open measurements at standard test voltage (13.8VDC).

4.4 Radio Size, Weight, and Finish

	Depth	Width	Height	Weight
Body (25w)	5.9in (150mm)	6.3in (160mm)	1.8in (45mm) ^a	37.01oz (1050g)
Body (>25W)	6.7in (170mm)	6.3in (160mm)	1.9in (48.5mm) _b	44.9oz (1270g)
Large control head	1.97in (50mm) ^b	7.2in (184mm)	2.8in (71mm)	12oz (340g)
Large remote control head	2.4in (61mm) _d	7.2in (184mm)	2.8in (71mm)	14.1oz (400g)
Hand-held control head	1.38in (35mm)	2.56in (65mm)	5.31in (135mm) ^c	10.2oz (289g)
TCH4 remote head	2.83in (72mm)	7.0in (178mm)	2.04in (52mm)	9.94oz (282g) ^d
TCH3 local control head	1.97in (50mm) ^b	6.3in (160mm)	2.04in (52mm)	7.23oz (205g) ^e
TCH6 remote control head	2.83in (72mm)	7.0in (178mm)	2.04in (52mm)	8.18oz (232g)

^a2in (52mm) across the chassis flange.

^bIncluding the control knob.

^cHeight measured to top of curly cord connector.

^dExcludes the U-bracket and microphone.

^eWith loom attached.

Weight (accessories)		
Rugged microphone	7oz (200g)	Intentionally left blank
Keypad microphone	7.5oz (212g)	
U-bracket for LCH remote control head	4.6oz (130g)	
U-bracket for TCH4 & TCH6 remote control head	4.76oz (135g)	

Finish	Plastic: black, with coarse texture. Keys and keypads: silicone rubber. Aluminium: diecast
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4.5 Environmental

Operating temperature	-22°F to +140°F (-30°C to +60°C)		
Ingress Protection (IP) rating	The radio body and control head, when installed correctly with seals and socket bungs, is IP54 rated. This includes the standard and keypad microphones, and hand-held control head.		
Electrostatic Discharge (ESD) standard	International Electrotechnical Commission (IEC) 61000-4-2		
Military standard (MIL-STD)	MIL-STD-810G		
		Method	Procedure
	Low pressure	500.5	2
	High temperature	501.5	1 and 2
	Low temperature	502.5	1 and 2
	Temperature shock	503.5	1
	Solar radiation	505.5	1
	Rain	506.5	1 and 3
	Humidity	507.5	2
	Salt fog	509.5	1
	Dust	510.5	1 and 2
	Vibration	514.6	1
	Shock	516.6	1, 5 and 6

See also "Regulatory Requirements and Industry Standards" on page 5.

4.6 Frequencies and Channels

	B1			H5		H7		K5
	25W	50W		25W	40W	25W	40W	30/35W
Frequency increments								
2.5kHz, 3.125kHz, 5kHz, 6.25kHz								
Channel spacing								
NB channel	12.5kHz/15kHz							
WB channel	25kHz/30kHz							
Frequency range (MHz), see "Frequency Bands" on page 7								
Frequency stability, see "Receiver Specifications" on page 11								
IF bandwidth								
NB channel	7.5kHz							
WB channel	15kHz							
RF power output ^a								
High	25W	50W	Intentionally left blank	25W	40W	25W	40W	30/35W ^a
Medium	10W	25W		10W	20W	10W	20W	25W
Low	5W	15W		5W	15W	5W	15W	10W
Very low	1W	10W		1W	10W	1W	10W	2W

^a30W for 757–870MHz, 35W for 806–870MHz.

4.7 Number of Networks, Zones, Channels and Groups

	Minimum	Maximum	
		Standard	With optional software license
Conventional networks	1	26	26
Zones	1	50	100
Channels (simplex or semi-duplex)	1	1000	2000
Talk groups	1	50	50
Total talk group members	1	1000	2000
Scan/vote groups	0	300	300
Members per group	2	50	50
Total scan/vote group members	0	2000	2000

4.8 Operational Features

	Analog operation	P25 digital operation
Channels: simplex or semi duplex, with repeater talkaround option	✓	✓ ^a
Voting/scanning	✓	✓
Predefined status messaging	✓	✓
GPS	Direct connect (send and receive position reports), GPS display	Direct connect (send and receive position reports), GPS display
2-tone signaling format	Decode only	✓
5-tone Selcall	✓	✓
CTCSS signaling format	✓	✓
DCS signaling format	✓	✓
DTMF signaling format	Encode only	✓
MDC1200 signaling format	✓	✓
Emergency: Lone Worker inactivity detection	✓	✓

^aP25 conventional only.

4.9 P25 Phase 1 and Phase 2 Features

P25 Phase 2 is an extension of P25 Phase 1. A Phase 2 radio can still use the less spectrally-efficient Phase 1 features.

		P25 Phase 1	P25 Phase 2
Standard	Unit-to-unit call	✓	✓
	PSTN calls	✓	✓ ^a
	Supplementary messages	✓	✓
	Group call	✓	✓
	Emergency	✓	✓
	Pre-emption	limited	✓
	Encryption	✓	✓
Motorola-specific	Dynamic regrouping	✓	✓
	Supergroup	✓	✓

^aAvailable but not field-tested at the time of publication.

4.10 Current Consumption

Current consumption was tested using radios in conventional mode with current radio hardware. All measurements were made in the middle frequencies of each band. Battery voltage was 13.8V, and radios transmitted into a 50Ω load.

4.10.1 Radio Body when Off or Receiving

Radio off (no links fitted)	3mA
Radio off (links LK1, LK2, LK3 fitted) (using ignition control to switch radio on and off)	4mA
Radio on stand-by (links LK1, LK2, LK3 fitted) (using ON/OFF key on control head to switch radio on and off)	60mA
Receiver idle (not scanning)	120mA
Receiver active, mute on	120mA
Receiver active, 3W audio into 16W	680mA
Receiver active, 10W audio into 4W	2A

4.10.2 Radio Body When Transmitting

Power output	B1		HK (40W only), H5/H7		K5
	25W	50W	25W	40W	30/35W
High	4.7A	8A	5.5A	7.2A	8.8A
Medium	3.2A	5.5A	3.2A	4.8A	6.6A
Low	2.3A	4.5A	2.2A	4.1A	4.2A
Very low	1.5A	3.6A	1.7A	3.3A	2A

4.10.3 Control Head Only

Notice The standard control head configurations assume the use of a standard microphone. If the keypad microphone is used, add 60mA to the figures listed below.

Large Control Head - Local Configuration

Backlighting off, standby, LCD heater off	25mA
Backlighting on high, standby, LCD heater off	50mA
Backlighting on high, standby, LCD heater on	295mA

Large Control Head - Remote Configuration

The remote configuration comprises the remote body interface, control head interface box (radio powered), remote control head interface, and the control head itself.

Backlighting on high, standby, LCD heater off	75mA
Backlighting on high, standby, LCD heater on	320mA
Backlighting on high, full speaker audio, LCD heater off	540mA
Backlighting on high, full speaker audio, LCD heater on	785mA

Hand-held Control Head - Remote Configuration

The remote configuration has the hand-held control head connected directly to the remote body interface. The remote interface kit is not used.

Backlighting off	30mA
Backlighting on high	50mA

TCH Control Heads

TCH3: Local Mount Control Head with Speaker	
Backlighting off, standby	33mA
Backlighting on, standby	93mA
TCH4: Remote Control Head with Speaker	
Backlighting off, standby	64mA
Backlighting on, standby	116mA
Backlighting on, full speaker audio	784mA
Backlighting on, full speaker audio, with CHIB ^a	176mA (body) ^b
	756mA (CHIB)
TCH6: Remote Control Head with Keypad	
Backlighting on high, standby, LCD heater off	44mA
Backlighting on high, standby, LCD heater on	123mA

^aA locally powered CHIB is required when the TCH4 is installed >6m from the radio body

^bCurrent is sourced from the radio body, not the CHIB