SECTION 5 ADJUSTMENT PROCEDURES

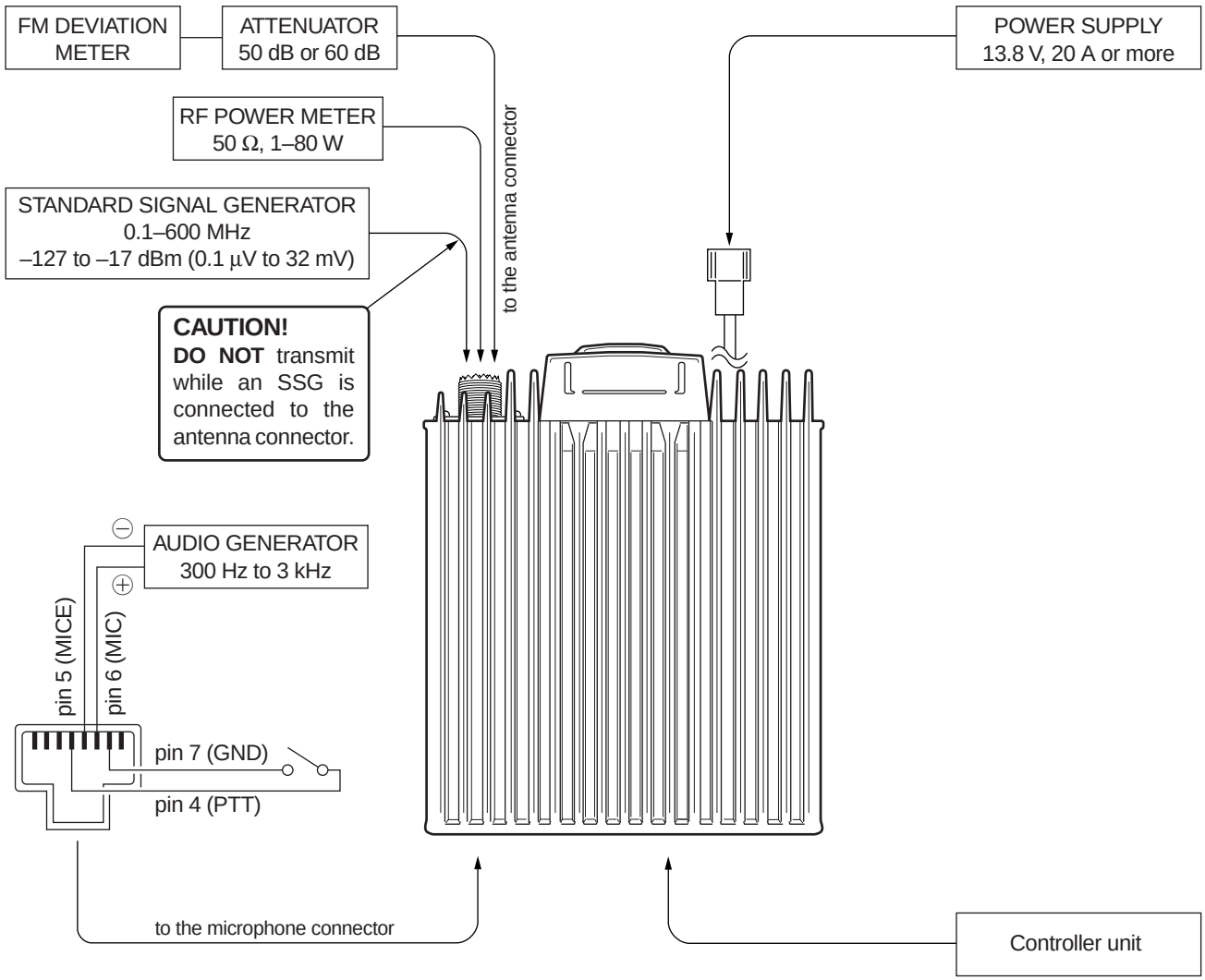
5-1 PREPARATION

All adjustments in this section must be performed on wide bandwidth condition unless specified otherwise.
(Narrow bandwidth is selectable for Europe and Italy vertions only.)

■ REQUIRED TEST EQUIPMENT

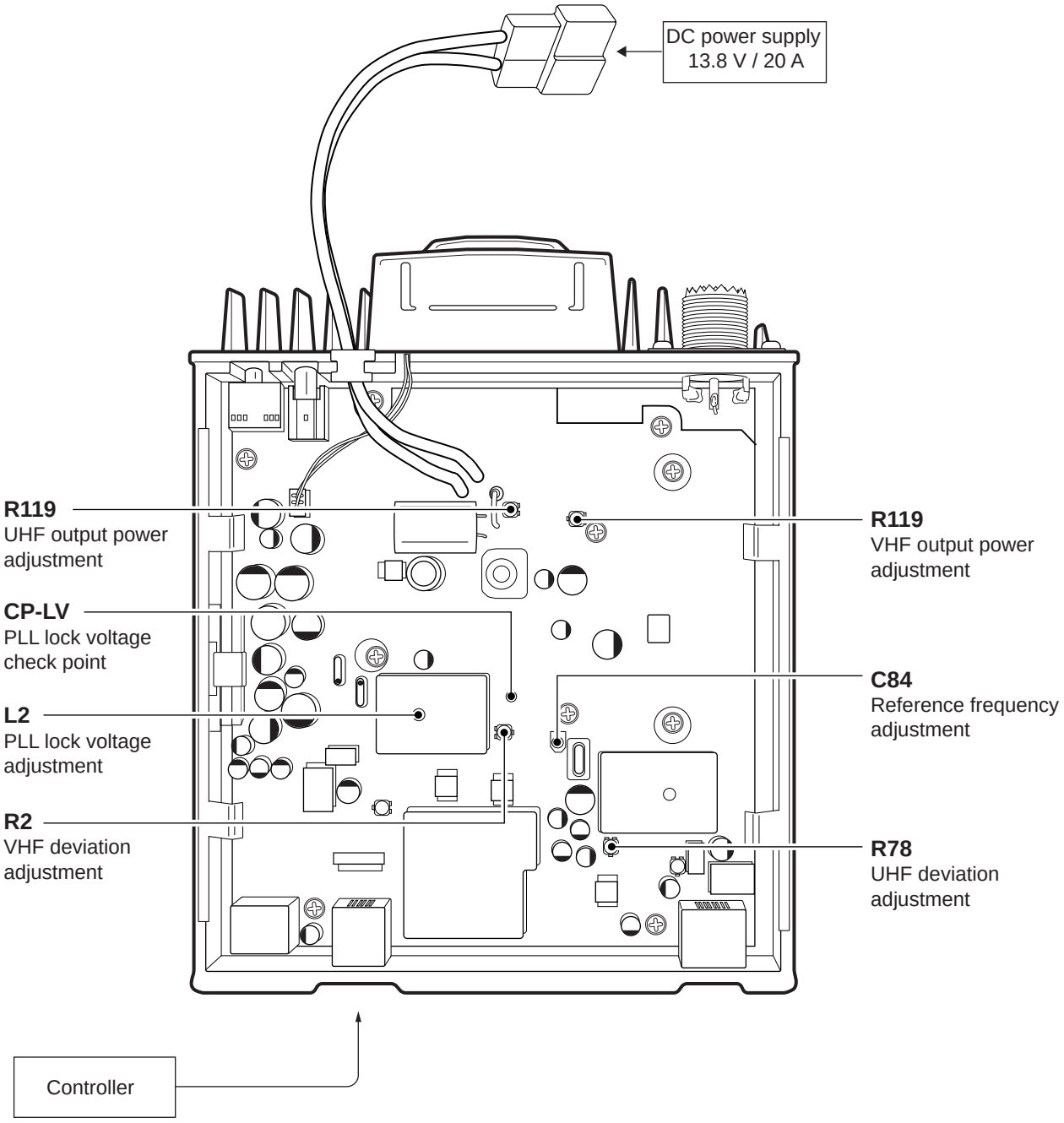
EQUIPMENT	GRADE AND RANGE	EQUIPMENT	GRADE AND RANGE
DC power supply	Output voltage : 13.8 V DC Current capacity : 20 A or more	Audio generator	Frequency range : 300–3000 Hz Measuring range : 1–500 mV
RF power meter (terminated type)	Measuring range : 1–80 W Frequency range : 100–600 MHz Impedance : 50 Ω SWR : Less than 1.2 : 1	Standard signal generator (SSG)	Frequency range : 0.1–600 MHz Output level : 0.1 µV–32 mV (–127 to –17 dBm)
Frequency counter	Frequency range : 0.1–600 MHz Frequency accuracy : ±1 ppm or better Sensitivity : 100 mV or better	Oscilloscope	Frequency range : DC–20 MHz Measuring range : 0.01–20 V
FM deviation meter	Frequency range : 30–600 MHz Measuring range : 0 to ±10 kHz	AC millivoltmeter	Measuring range : 10 mV–10 V
DC voltmeter	Input impedance : 50 kΩ/V DC or better	External speaker	Input impedance : 8 Ω Capacity : 4 W or more
		Attenuator	Power attenuation : 50 or 60 dB Capacity : 100 W or more

■ CONNECTION



5-2 PLL AND TRANSMITTER ADJUSTMENTS

ADJUSTMENT		ADJUSTMENT CONDITION	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
PLL LOCK VOLTAGE	1	• VHF displayed freq. : 145.000 MHz • Receiving	MAIN	Connect a digital multi-meter or oscilloscope to the check point CP-LV.	1.65 V	MAIN	L2
PLL REFERENCE FREQUENCY	1	• UHF displayed freq. : 450.000 MHz [USA] 440.000 MHz other • Output power : Low • Transmitting	Rear panel	Loosely couple the frequency counter to the antenna connector.	450.0000 MHz [USA] 440.0000 MHz other	MAIN	C84
UHF OUTPUT POWER	1	• UHF displayed freq. : 445.000 MHz [USA] 435.000 MHz other • Output power : High • Transmitting	Rear panel	Connect an RF power meter to the antenna connector.	35 W	MAIN	R121
	2	• Output power : Low • Transmitting			2–7 W		Verify
	3	• Output power : Mid-L • Transmitting			8–15 W		
	4	• Output power : Mid-H • Transmitting			16–24 W		
VHF OUTPUT POWER	1	• VHF displayed freq. : 145.000 MHz [EUR] 146.000 MHz other • Output power : High • Transmitting	Rear panel	Connect an RF power meter to the antenna connector.	50 W	MAIN	R119
	2	• Output power : Low • Transmitting			2–7 W		Verify
	3	• Output power : Mid-L • Transmitting			8–15 W		
	4	• Output power : Mid-H • Transmitting			16–24 W		
FREQUENCY DEVIATION	1	• UHF displayed freq. : 445.000 MHz [USA] 435.000 MHz other • Output power : Low • Connect an audio generator to the [MIC] connector and set as: 1 kHz/ 80 mV [USA] 1 kHz/ 20 mV other • TONE : OFF • Set an FM deviation meter as: HPF : 50 Hz LPF : 20 kHz De-emphasis: OFF Detector : (P–P)/2 • Transmitting	Rear panel	Connect an FM deviation meter to the antenna connector through an attenuator.	±4.8 kHz	MAIN	R78
	2	• VHF displayed freq. : 145.000 MHz [EUR] 146.000 MHz other • Output power : Low • Transmitting			±4.8 kHz		R2
	3	• IF bandwidth : Narrow [EUR, ITA] only • Transmitting			±2.0–±2.8 kHz		Verify


DC power supply
13.8 V / 20 A
R119
UHF output power adjustment
CP-LV
PLL lock voltage check point
L2
PLL lock voltage adjustment
R2
VHF deviation adjustment
R119
VHF output power adjustment
C84
Reference frequency adjustment
R78
UHF deviation adjustment
Controller

5-3 RECEIVER ADJUSTMENTS

The receiver adjustments must be performed after PLL ADJUSTMENTS.

ADJUSTMENT		ADJUSTMENT CONDITION	OPERATION
SENSITIVITY	1	• Turn into sensitivity setting mode.	• Connect a JIG1 to the [MIC] connector, then turn power ON.
	2	• Select an adjustment channel by pushing 1st or 2nd switch from the top on the left side. • Connect an SSG to the antenna connector and set as: Frequency : Same as displayed Level : 3.2 µV* (–97 dBm) Deviation : ±3.5 kHz Modulation : 1 kHz • Receiving	• Push upper switch on the right side to store sampling data into memory.
	3	• Same adjustments as step 2 for another 4 channels.	• Push upper switch on the right side to store sampling data into memory at each adjustment. • Verify the display color will change after adjustment the last channel, then turn power OFF and disconnect a JIG1 from the [MIC] connector.
S-METER	1	• Turn into S-meter setting mode.	• Connect a JIG2 to the [MIC] connector, then turn power ON.
	2	• Select an adjustment channel by pushing 1st or 2nd switch from the top on the left side. • Displayed frequency : 127.200 MHz • Mode : AM • Connect an SSG to the antenna connector and set as: Level : 1.6 µV* (–103 dBm) Modulation : 1 kHz / 30 % • Receiving	• Verify that S-meter shows S3 (2 dots), then push upper switch on the right side to store sampling data into memory.
	3	• Displayed frequency : 145.200 MHz • Mode : FM • Set an SSG as: Level : 1.0 µV* (–107 dBm) Deviation : ±3.5 kHz Modulation : 1 kHz • Receiving	
	4	• Displayed frequency : 360.200 MHz • Mode : AM • Set an SSG as: Level : 1.6 µV* (–103 dBm) Modulation : 1 kHz / 30 % • Receiving	
	5	• Displayed frequency : 360.200 MHz • Mode : FM • Set an SSG as: Level : 1.0 µV* (–107 dBm) Deviation : ±3.5 kHz Modulation : 1 kHz • Receiving	
	6	• Displayed frequency : 445.200 MHz [USA] 435.200 MHz other • Mode : FM • Receiving	
	7	• Displayed frequency : 900.200 MHz • Set an SSG as: Level : 6.3 µV* (–91 dBm) Deviation : ±3.5 kHz Modulation : 1 kHz • Mode : FM • Receiving	• Verify that S-meter shows S3 (2 dots), then push upper switch on the right side to store sampling data into memory. • Verify the display color will change after adjustment the last channel, then turn power OFF and disconnect a JIG2 from the [MIC] connector.

*This output level of a standard signal generator (SSG) is indicated as SSG's open circuit.

RECEIVER ADJUSTMENTS (continued)

ADJUSTMENT		ADJUSTMENT CONDITION	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
SQUELCH (UHF)	1	• UHF displayed freq. : 445.000 MHz [USA] 435.000 MHz other • Set the squelch level to 22 % using the HM-98 microphone. • R229 : Max clockwise • set an SSG as: Level : 14 µV* (–85 dBm) • Receiving	Speaker		At the point where the signal just appears.	MAIN	R229
(VHF)	2	• VHF displayed freq. : 145.000 MHz [EUR] 146.000 MHz other • Set the squelch level to 22 % using the HM-98 microphone. • R196 : Max clockwise • set an SSG as: Level : 14 µV* (–85 dBm) • Receiving					R196

*This output level of the standard signal generator (SSG) is indicated as SSG's open circuit.