Operator’s/Installation Manual

DRC-200
DESKTOP REPEATER

ERICSSON

REVISION HISTORY

REVISION	DATE	REASON FOR CHANGE
R1A	June - 96	Original
R1B	Sept - 96	Correct Figure 1 and update DCG codes. Minor corrections to text.

NOTICE!

This manual covers Ericsson and General Electric products manufactured and sold by Ericsson Inc.

NOTICE!

Repairs to this equipment should be made only by an authorized service technician or facility designated by the supplier. Any repairs, alterations or substitution of recommended parts made by the user to this equipment not approved by the manufacturer could void the user's authority to operate the equipment in addition to the manufacturer's warranty.

NOTICE!

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DESCRIPTION

The DRC-200 is a state-of-the-art Desktop Repeater for operation in the Land Mobile UHF (450-470 MHz) frequency band.

The repeater operates in the UHF band with a 25 watt (without duplexer connected) RF output. Low power operation of 2 Watts is also available (Dealer programmable). The built-in switching power supply automatically configures itself for operation on 120 VAC or 240 VAC, 50/60 Hz.

The unit features built-in Digital Channel Guard (DCG) and standard Channel Guard (CG) tone squelch. In addition, an external encoder and decoder can be utilized. A programmable CW Identifier is also included.

The radio has been programmed by the dealer. A list of items determining the radio's configuration should be available from the dealer. See page 8 for a list of Dealer Programming Options and page 13 for a blank form for recording the Unit's configuration. The radio's program is stored in non-volatile memory, which does not require a battery back-up.

NOTE

In this manual, the words repeater, radio and unit are used interchangeably.

See Figure 1 below for Repeater Front Panel details.

The Unit comes with the following standard accessories:

- Duplexer, installed
- Microphone Hang-up Clip with mounting hardware
- Operator's/Installation Manual AE/LZT 123 1899
- Duplexer Tuning Manual AE/LZB 119 1910

Optional accessories include:

- Handheld Microphone with Coiled Cable
- Heavy Duty Desk Microphone

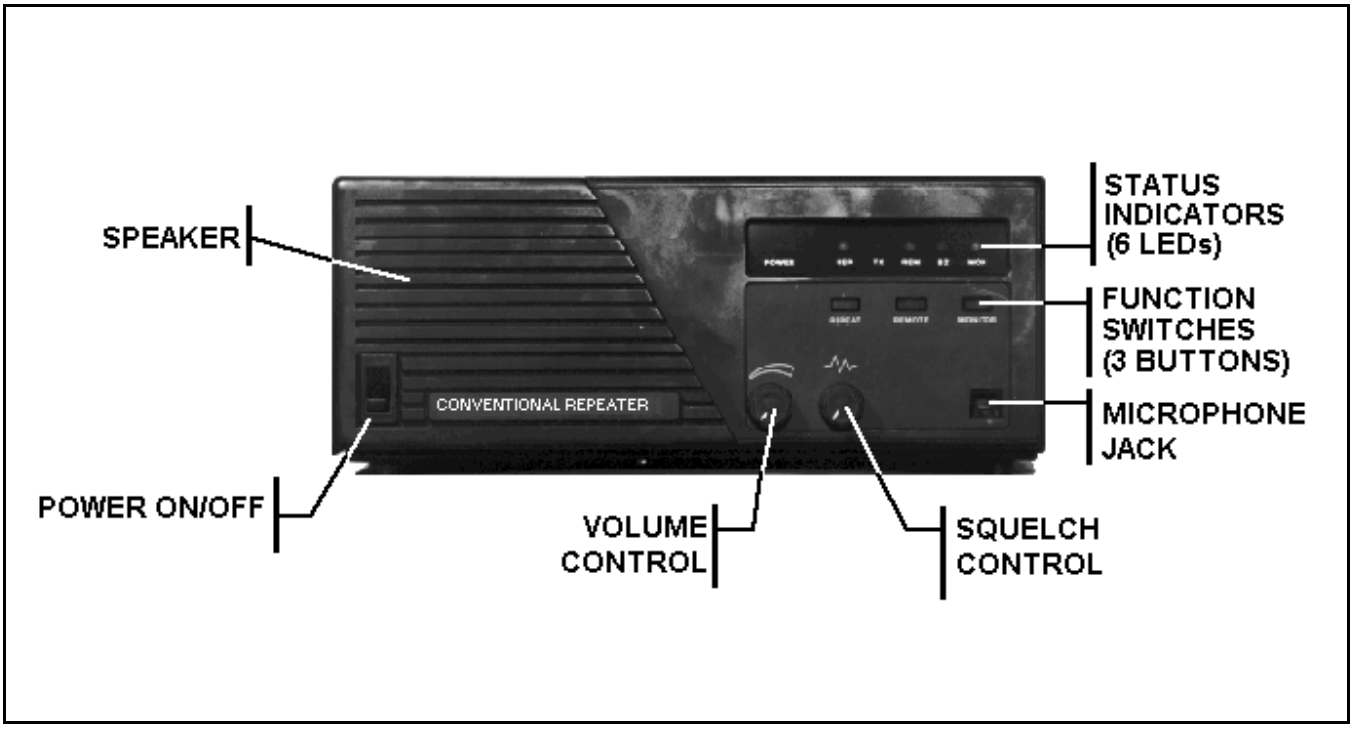

Figure 1 - Front Panel Details

INSTALLATION

NOTE

It is recommended that the repeater and antenna installations be performed by a technician qualified in 2-way radio.

LOCATION CONSIDERATION

Choose a location for the radio that permits several inches of clearance all around. This is necessary for proper heat dissipation, especially around the heat sink mounted on the rear panel.

CABLE CONNECTIONS

1. Install the TX and RX antenna cables on their respective N type connectors. See Figure 2 below.

NOTE

When duplexer is used, antenna connection is made to connector labeled ANTENNA.

2. If used, plug in the cable to the Multifunction Port's DB15 connector. See page 6 for more details.

3. If used, plug in the External Speaker. This disconnects the Unit's internal speaker.

4. Install the microphone's cable in the modular jack located on the front panel. There will be a click when the connector is fully seated.

5. Plug the AC cord into a suitable 120 or 240 AC receptacle.

HANDHELD MICROPHONE

If a handheld microphone is used, a hang-up clip (supplied) can be mounted on the Unit's right side near the front panel. Using the one screw at the upper front corner and the one approximately 2 1/2" below it, install the clip so that the microphone's hang-up button can be easily slid downward in place.

OPERATING CONTROLS AND INDICATORS

This section gives a brief description of each control, button and status indicator. The OPERATION section provides more details on each of these and how they relate to the unit's overall operation.

As each button is pressed, a beep (if enabled; dealer programmable; see Page 8) will be heard. A high frequency beep indicates the ON or enabled state, while a low frequency beep indicates the OFF or disabled state.

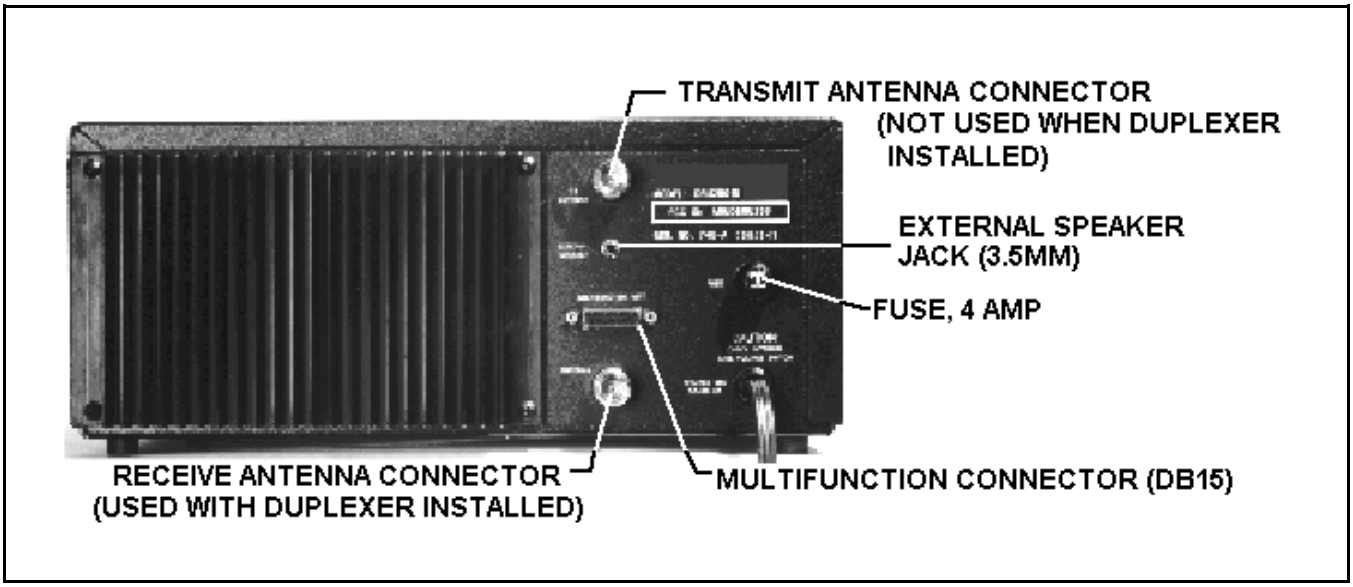

Figure 2 - Rear Panel Details.

POWER ON/OFF Switch

Power ON/OFF is a rocker switch. Press in at the top end to turn the unit ON. Press in at the bottom end of it to turn the radio OFF.

The indicator (LED) at the left end of the window (labeled **POWER**) should be lighted green when the unit is ON.

VOLUME Control

Use this knob to vary the receiver's audio output level. This also varies the audio level to an external speaker.

SQUELCH Control

NOTE

Do not turn the knob to maximum clockwise position. Turning the SQUELCH control significantly past (clockwise) the threshold of quieting may adversely reduce receiver sensitivity and communications range.

Use this knob to eliminate speaker noise when not receiving a transmission. For proper operation, turn the knob counter-clockwise until noise is heard. Then turn the knob clockwise until the noise just disappears.

NOTE

When adjusting the squelch control, the Radio should be in the MONITOR Mode.

MONITOR Button

Pressing this button toggles the unit into and out of the Monitor Mode. When the unit is in the Monitor Mode, the yellow LED labeled **MON** will be lighted. Also, any input signal to the unit's receiver can be heard, even if it has tone coding such as CG or DCG.

REPEAT Button

Pressing this button toggles the unit into and out the Repeater Mode. The yellow LED labeled **REP** is lighted when the Repeater Mode is enabled. The unit will NOT transmit as a repeater unless the Repeater Mode is enabled.

REMOTE Button

Not used.

REM Indicator

Not used.

BZ Indicator

This green LED labeled **BZ** will be lighted whenever a signal is received. In other words, the channel is busy (in use).

TX Indicator

When the repeater's transmitter section is activated, the red indicator labeled **TX** will be lighted.

MULTIFUNCTION CONNECTOR

The female DB15 connector, labeled MULTIFUNCTION PORT and located on the rear panel, provides for interfacing to a remote control device (DC, Tone or Local), an Interconnect Control panel or for RS232 data input. See Figure 3 for pin configuration. The purpose and/or specification of each pin is as follows:

Pin No.	Purpose/Specification
1	Ground
2	Remote PTT; a low (ground) will cause the Unit to transmit with User No. 1's tone and the Remote TX Audio (Pin 7).
3	Remote RX Audio Output; buffered de-emphasized receiver audio.
4	Data PTT; a low (ground) will cause the Unit to transmit with Data In audio (Pin 11).
5	Interconnect PTT; a low (ground) will cause the Unit to transmit with User #16 tone and the Interconnect TX Audio (Pin 14).
6	Switched +13.8 VDC; provides a low current (less than 1 A) voltage source.
7	Remote TX Audio Input; is pre-emphasized by the Unit.
8	Carrier Operated Signal (COS); output will be low (transistor turned on) when the Repeater's squelch opens (breaks), regardless if Repeater's audio is muted or not.

Continued

Continued

Pin No.	Purpose/Specification
9	Discriminator's Audio Output; buffered unprocessed (not de-emphasized) audio.
10	Interconnect RX Audio Output; buffered de-emphasized receiver audio.
11	Data In; 4800 BAUD (2400 Hz) Maximum.
12	Remote Audio B. Not Applicable
13	External CG/DCG Input; modulates the VCO/Reference Oscillator; External Encoding must be selected for the Encode Tone.
14	Interconnect TX Audio Input; is pre-emphasized by the Unit.
15	Interconnect Control Output; goes Low when User #16 tone is decoded (or if the External Decode pin is low).

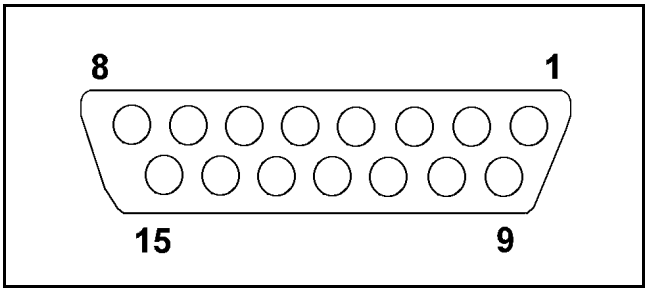

Figure 3 - DB15 Connector Pin Positions - Rear Panel View.

MULTIPLE CG/DCG DECODE

The unit's built-in decoder can be programmed to accept up to 16 different user's CG tones or DCG codes and properly decode each one. There can be any combination of tones or codes as long as the total is not more than 16. User No. 16's tone or code is always associated with Interconnect Control.

The tone or code that is actually transmitted is not the original one received, but one that is re-generated by the unit. The generated tone or code can be a different tone or code, as determined by the unit's configuration programmed by the dealer. For example, if the CG tone received is No. 12 (100.0 Hz), the Unit can be programmed to transmit No. 18 (123.0 Hz) or even a DCG code. However, a received tone (or code) cannot be re-generated for more than one tone (or code), whether it is the same or different tone (code). For example, if received tone No. 12 is to be re-generated as No. 18, it then cannot also be re-generated as No. 23 .

One of the 16 different tones or codes can be an input from an external encoder. The external encoder signal has priority over the Unit's built-in encoder.

OPERATION

INITIAL

Turn on the unit. If squelch hasn't been set yet, put the unit into the Monitor Mode. If the yellow MON LED is not lighted, press the MONITOR button. Set the Volume Control approximately to its 9 o'clock position. Then turn the Squelch Control counter-clockwise until "noise" is heard.

At this time, the Volume Control can now be set for the desired audio listening level. It can also be set later, when an actual signal is being received. The Volume Control has no effect on the transmitter audio.

Now turn the Squelch knob clockwise slightly past the point where the noise just disappears. This is the proper position for all normal squelched operations. If "noise" is occasionally heard, turn the Squelch Control slightly more clockwise. If desired, the unit can now be taken out of the Monitor Mode by pressing the MONITOR button. The MON indicator should turn off.

GENERAL

If the unit is to be used as a self-controlling (receiver operation) repeater, press the REPEAT button to light the REP LED.

PTT OPERATION

The operation of the radio's PTT function has 5 priority levels (1 being the highest) as follows:

1. Local (front panel jack) microphone.
2. Remote, if enabled (REM LED on).
3. DATA (via DB15 connector).
4. Interconnect Control panel.
5. Receiver, if REPEAT Mode enabled (REP LED on).

Although no repeater set-up would likely be configured to accept all 5 PTTs, it is quite possible that at least two of the five would be utilized. For example, the receiver's PTT action and the front panel's PTT would probably be used during the repeater's initial installation and its checkout.

What the effect of prioritizing the various PTTs means is that the TX audio of the PTT with the higher priority will always be transmitted. For example, if the unit is receiving a mobile unit, the audio being transmitted (repeated) is from the receiver. Then if a remote control PTT is activated, the audio from the remote is now transmitted (repeated).

MAINTENANCE

NOTE

All adjustments affecting transmitter power output, carrier frequency or modulation MUST be performed by a qualified electronics technician.

CAUTION

Do NOT tamper with internal adjustments. Damage to the equipment and/or improper operation may result.

Service Reminder

Have the Repeater checked periodically by a qualified electronics technician. A Maintenance Manual, AE/LZB 119 1882, is available.

SIMPLIFIED TROUBLESHOOTING

Perform the simple checks indicated below prior to returning the Unit for service.

Trouble	Check
No reception.	Check antenna connections.
No sound.	AC power cord. Volume control setting. Check External speaker connection.
Doesn't repeat mobile's transmission.	Is REP indicator lighted?. If not, press REPEAT button.

NOTE

For In-Warranty service information, refer to the *Limited Warranty And Repair Information* paragraph.

For future reference, please record:

Product Code _____

FCC Identifier_____

Serial No._____

Date Purchased_____

Dealer_____

SUMMARY OF DEALER'S PROGRAMMING OPTIONS

1. Users – 1 to 16 users can be uniquely defined by: their decode/encode tone or code; whether or not there will be a courtesy beep; whether or not there will be an encoding tone or code transmitted during Hang Time. User No. 1 is frequently referred to as the "Boss tone". User No. 16 is reserved for Interconnect Control applications. A user may consist of one or many subscribers (or mobile units) assigned to the same tone or code.

   It should be noted that if no user tones (or codes) are selected, the unit will respond to any carrier received. In other words, if the unit is in the Repeater Mode it will repeat any carrier received, regardless if the carrier is tone (or code) encoded or not.

2. Channel Guard Tones – any one of 50 CG Tones can be programmed for any user. The Tone used for a User's decode (receive) tone can either be the same, or different, from the user's encode (transmit) tone. The same decode tone can not be used for more than one user. However, the same encode tone could be used for all 16 users if desired.

3. Digital Channel Guard Codes – any one of 104 DCG Codes can be programmed for any user. The Code used for a user's decode (receive) code can either be the same, or different, from the user's encode (transmit) code. The same decode code can

not be used for more than one user. However, the same encode code could be used for all 16 users if desired.

4. External Encoder/Decoder – any one of the 16 user tones or codes can be programmed for using an external encoder.

5. Courtesy Beep – each user can be programmed to provide a beep for 100 milliseconds after the originating transmission is stopped. This signals the receiving unit(s) that the originating unit has quit transmitting.

6. Button Beep – the unit can be programmed to either beep or not beep whenever one of the buttons (REPEAT, MONITOR) is pressed. A high frequency beep indicates the button's associated function is enabled. A low frequency beep indicates the function is disabled. Error beeps are not affected by this Option's selection.

7. Low RF Power – the unit can be set to High (Normal) RF Power Out or Low RF Power Out. Low Power Out can be manually adjusted to approximately 2 Watts.

8. Time-Out Timer – the unit's Time-Out (carrier control) Timer can either be disabled or set to allow a transmission of 15, 30 or 60 seconds or 2, 4, 8 or 16 minutes duration.

9. Hang Time – the unit's Hang Time (drop-out delay) can be disabled (0 seconds) or set from 1 to 15 seconds, in 1 second increments. Hang Time is the duration of time starting either with the release of any PTT Switch or when the unit's received carrier drops while in the Repeater Mode.

10. Encoded Hang Time – the unit's transmission during Hang Time can be either encoded or not, depending upon the user's configuration.

11. CW Ident – the unit can be programmed to transmit a Continuous Wave (CW) Morse Code Identification (Ident) consisting of 1 to 8 characters comprised of any of the 26 letters (standard English alphabet) and any number 0 through 9.

12. CW Ident Interval – the unit can be programmed to send its CW Ident upon activation of any PTT (except DATA PTT) after every 15, 30, 60 or 90 minutes of activity. The unit will also automatically send its CW Ident upon the first PTT (except DATA PTT) after power up and after every 10 minutes of inactivity.

Channel Guard Tones (CTCSS) 50 Tones

CTCSS tones are specified by a code number in the PC programmer. The following is the relationship between the code number and the resulting CTCSS tone frequency in Hz.

Code 000 = No Tone = Carrier Squelch

001 = 67.0	011 = 97.4	021 = 136.5	031 = 192.8	041 = 165.5
002 = 71.9	012 = 100.0	022 = 141.3	032 = 203.5	042 = 171.3
003 = 74.4	013 = 103.5	023 = 146.2	033 = 210.7	043 = 177.3
004 = 77.0	014 = 107.2	024 = 151.4	034 = 218.1	044 = 183.5
005 = 79.7	015 = 110.9	025 = 156.7	035 = 225.7	045 = 189.9
006 = 82.5	016 = 114.8	026 = 162.2	036 = 233.6	046 = 196.6
007 = 85.4	017 = 118.8	027 = 167.9	037 = 241.8	047 = 199.5
008 = 88.5	018 = 123.0	028 = 173.8	038 = 250.3	048 = 206.5
009 = 91.5	019 = 127.3	029 = 179.9	039 = 69.4	049 = 229.1
010 = 94.8	020 = 131.8	030 = 186.2	040 = 159.8	050 = 254.1

Digital Channel Guard Codes 104 codes

CDCSS codes are specified by a code number in the PC programmer. The following is the relationship between the PC programming code number and the resulting TIA/EIA CDCSS code and its inverted equivalent.

Code	DCS	Inv. DCS	Code	DCS	Inv. DCS	Code	DCS	Inv. DCS	Code	DCS	Inv. DCS	Code	DCS	Inv. DCS
051	023	047	072	131	364	093	251	165	114	371	734	135	532	343
052	025	244	073	132	546	094	252	462	115	411	226	136	546	132
053	026	464	074	134	223	095	255	446	116	412	143	137	565	703
054	031	627	075	143	412	096	261	732	117	413	054	138	606	631
055	032	051	076	145	274	097	263	205	118	423	315	139	612	346
056	036	172	077	152	115	098	265	156	119	431	723	140	624	632
057	043	445	078	155	731	099	266	454	120	432	516	141	627	031
058	047	023	079	156	265	100	271	065	121	445	043	142	631	606
059	051	032	080	162	503	101	274	145	122	446	255	143	632	624
060	053	452	081	165	251	102	306	071	123	452	053	144	654	743
061	054	413	082	172	036	103	311	664	124	454	266	145	662	466
062	065	271	083	174	074	104	315	423	125	455	332	146	664	311
063	071	306	084	205	263	105	325	526	126	462	252	147	703	565
064	072	245	085	212	356	106	331	465	127	464	026	148	712	114
065	073	506	086	223	134	107	332	455	128	465	331	149	723	431
066	074	174	087	225	122	108	343	532	129	466	662	150	731	155
067	114	712	088	226	411	109	346	612	130	503	162	151	732	261
068	115	152	089	243	351	110	351	243	131	506	073	152	734	371
069	116	754	090	244	025	111	356	212	132	516	432	153	743	654
070	122	225	091	245	072	112	364	131	133	523	246	154	754	116
071	125	365	092	246	523	113	365	125	134	526	325			

ACCESSORIES

The following accessories are available:

KRD 103 121/11	PC Programming Kit (consists of the following)	
	KRD 103 121/12	Programming Software
	KRD 103 121/13	Instruction Sheet
	KRD 103 121/14	Interface Adapter
	KRD 103 121/15	Programming Cable
KRD 103 121/31	Handheld Microphone	

You may use this form to record the Unit's configuration.

User	Memo	Decode Tone (Hz) or Code	Encode Tone (Hz) or Code	Encode During Hang Time	Courtesy Beep	Notes/Comments
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
				Y/N	Y/N	

Receive Frequency:_____MHz

Transmit Frequency:_____MHz

RF Output Power:_____(High/Low or record Watts)

Beep on Button Press:_____(Yes/No)

Time-Out Timer:_____❑ Seconds❑ Minutes

Hang Time:_____Seconds

CW Ident Interval:_____Minutes

CW Ident:_____(up to 8 characters)

LIMITED WARRANTY

A. Ericsson Inc. (hereinafter "Seller") warrants to the original purchaser for use (hereinafter "Buyer") that the Equipment manufactured by Seller shall be free from defects in material, workmanship and title and shall conform to its published specifications. With respect to any Equipment not manufactured by Seller (except for integral parts of Seller's Equipment to which warranties set forth above shall apply), Seller gives no warranty and only the warranty, if any, given by the manufacturer shall apply. Batteries are excluded from this warranty but are warranted under a separate Nickel-Cadmium Battery Warranty.

B. Seller's obligations set forth in Paragraph C below shall apply only to failures to meet the above warranties (except as to title) occurring within the following periods of time from the date of sale to the Buyer and are conditioned on Buyer's giving written notice to Seller within thirty (30) days of such occurrence:

1. for fuses, incandescent lamps, vacuum tubes and non-rechargeable batteries, operable on arrival only.

2. for parts and accessories (except as noted in B.1) sold by Seller's Service Parts Operation, ninety (90) days.

3. for all other Equipment of Seller's manufacture, one (1) year.

C. If any Equipment fails to meet the foregoing warranties, Seller shall correct the failure by repairing Buyer's Equipment or providing Buyer, at Seller's option, with either a new or reconditioned unit of Equipment. Any repaired or replacement unit furnished by Seller hereunder shall be warranted for the remainder of the warranty period of the original Equipment purchased by Buyer.

D. Seller's obligations under Paragraph C shall not apply to any Equipment, or part thereof, which: (i) has been modified or otherwise altered other than pursuant to Seller's written instructions or written approval; or (ii) is not properly stored, installed, used, maintained or repaired; or (iii) has been subjected to any other kind of misuse or detrimental exposure or has been involved in an accident; or (iv) is incorporated into another product; or (v) is purchased or serviced outside the United States.

E. The preceding paragraphs set forth the exclusive remedies for claims (except as to title) based upon defects in the Equipment, whether the claim is in contract, warranty, tort (including negligence), strict liability or otherwise, and however instituted. Upon the expiration of the warranty period, all such liability shall terminate. The foregoing warranties are exclusive and in lieu of all other warranties, whether oral, written, expressed, implied or statutory. NO IMPLIED OR STATUTORY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE SHALL APPLY. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, SPECIAL, INDIRECT OR EXEMPLARY DAMAGES.

F. This warranty applies only within the United States.

ECR-5473

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