

## Chapter 6

### CONTROL UNIT (REMOTE) TYPE 4189 AND JUNCTION BOX TYPE 4191

#### LIST OF CONTENTS

	Para.		Para.
<i>Introduction</i> ... ..	1	<i>Fine tuning control (RV1)</i> ... ..	15
<i>Low power and AGC switches</i> ... ..	3	<i>RF gain control (RV3)...</i> ... ..	17
<i>Mounting of control unit...</i> ... ..	5	<i>Dimmer (RV2) and dial lamp (LPI)</i> ... ..	18
<i>Circuit description of control unit</i> ... ..	7	<i>TUNE indicating lamp (LP2)...</i> ... ..	19
<i>Channel letter switch (S1)</i> ... ..	8	<i>Milliammeter (MI)</i> ... ..	20
<i>Channel number switch (S2)...</i> ... ..	9	<i>Earth</i> ... ..	21
<i>Power switch (S3)</i> ... ..	11	<i>Junction box Type 4191</i> ... ..	22
<i>Service switch (S4)</i> ... ..	14		

#### LIST OF ILLUSTRATIONS

	Fig.		Fig.
<i>Control unit (remote) Type 4189—front</i> ... ..	1	<i>Control unit (remote) Type 4189—circuit</i> ... ..	4
<i>Rear of control unit</i> ... ..	2	<i>Junction box Type 4191—circuit</i> ... ..	5
<i>Junction box Type 4191</i> ... ..	3		

#### INTRODUCTION

1. Control unit (remote) Type 4189 is designed for either panel or console mounting according to the requirements of the particular installation. All the controls required for operation of the ARI.5874 are brought out to the remote control unit (with two exceptions—*para.* 3) and will be used by the operator for both normal operation and setting up purposes. All the connections from the control unit

to the transmitter and receiver circuits are made via the junction box Type 4191.

2. No “local” control facilities are available and all power and service switching is made at the control unit. The controls and switches on the front panel are given against the circuit references as shown in fig. 1 and 4.

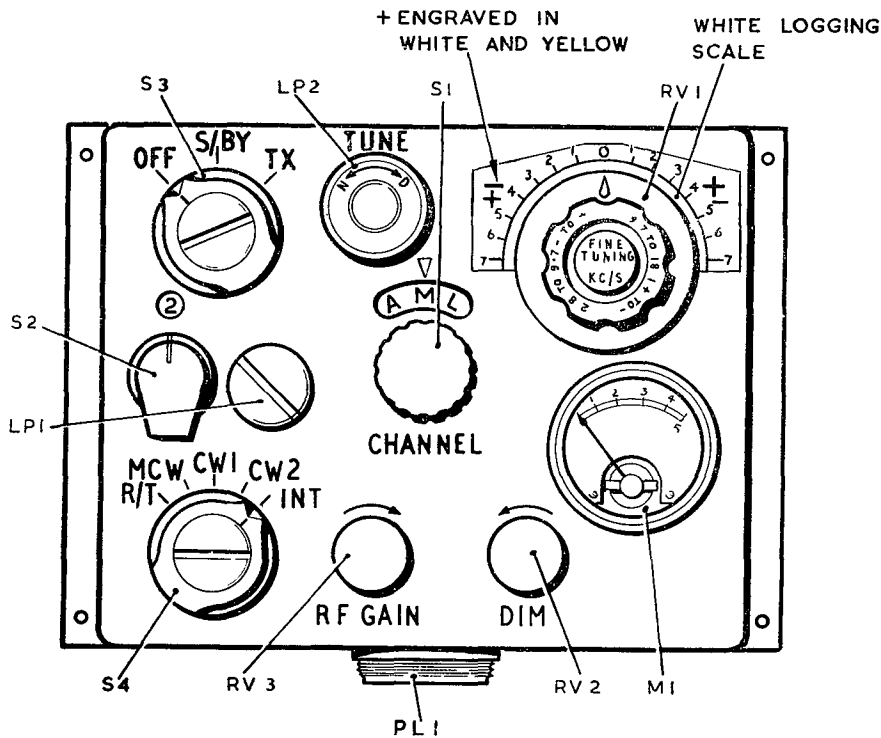


Fig. 1. Control unit (remote) Type 4189 front

Item	Circuit Ref.	Description
Channel letter switch	S1	Starts the channel selector motor and open circuits the motor relay when the channel has been selected.
Channel number switch	S2	Selects one of the two 12 channel groups 1A to 1M or 2A to 2M
Power switch	S3	3-position switch (OFF-S/BY-TX). s/BY (Standby). Switches on receiver and heaters of transmitter, and P.A. valves blower motor. TX. Switches on transmitter HT.
Service switch	S4	Selects one of the following services on both transmitter and receiver. R/T. In this position the switch earths the R/T-MCW line. MCW. Places transmitter on MCW by earthing MCW/CW relay. CW1. Puts transmitter in CW condition by releasing RT/MCW line. Puts receiver in CW condition by earthing receiver CW line. CW2. Condition as for CW1 but additional relay in receiver operates which changes the IF bandwidth. INT. The INTertune facility is given by switching on the transmitter oscillator and breaking the receiver mute line, thus enabling the receiver to be tuned back to the transmitter.
FINE TUNING	RV1	This controls a Desynn motor affecting the frequency of the receiver by a variation of plus or minus 7 kc/s. It may also be used as a beat note control.
RF GAIN	RV3	Gain control of receiver.
DIM	RV2	Dimmer for channel number and letter switches window illumination.
TUNE	LP2	Tuning indicator dimmed by an iris. Glows when any tuning operation is in progress or when the receiver is left in the INTERTUNE position. The lamp will not glow when the transmitter is switched to MANUAL.
Meter	M1	The meter is calibrated 0-5 and indicates aerial excitation when the transmitter is on "mark". The meter will not indicate if either the transmitter or wire aerial coupling unit is left on MANUAL.

**RESTRICTED**

**Note . . .**

**FINE TUNING control.** The dial against this control reads error plus-or-minus in the range 2.8 to 9.7 Mc/s and minus-or-plus for 9.7 to 18.1 Mc/s., i.e. the calibration changes sign at 9.7 Mc/s. As indicated in fig. 1, the plus and minus signs are marked in pairs coloured yellow and white, respectively to correspond to the frequency ranges engraved on the control knob. A white band adjacent to the edge of the knob is intended as a logging scale for pencil marking.

**Low power and AGC switches**

**3.** In addition to the controls and switches on the remote control unit, switches are provided for the operation of the transmitter on low power and for the operation of the receiver with or without automatic gain control.

**4.** The low power switch is provided as part of the aircraft radio installation and is normally mounted close to the remote control unit. The AGC ON/OFF switch is mounted on the front panel of the receiver.

**MOUNTING OF CONTROL UNIT**

**5.** To facilitate either panel or console mounting of the control unit, two angle brackets are provided which may be fitted either to the rear of the control unit cover for panel mounting or at the front of the cover for console mounting.

**6.** The 25-way plug Mk. 4 (PL1) is mounted on a detachable plate which may be fitted to the underside of the control unit for panel mounting, or to the rear of the control unit for console mounting. The wiring loom to the plug is so arranged that it allows for the movement of the plug mounting plate from one position to the other without disturbance of the connections.

**CIRCUIT DESCRIPTION OF CONTROL UNIT**

**7.** The circuit of the remote control unit is not complete in itself for obvious reasons ; the following description, therefore, is devoted to the interconnection of the switches and controls with the circuits of the other units within the installation. The circuit of the control unit is shown in fig. 4.

**Channel letter switch (S1)**

**8.** There are seven connections from the channel letter switch, six of these are to pins A-F of plug PL1 and the seventh is earthed to the control unit chassis. The outgoing connections from PL1 are via the junction box to the receiver. The circuit details are in Chap. 7.

**Channel number switch (S2)**

**9.** The channel number switch has two wiring connections, one to earth on the control unit chassis and one to pin 0 of PL1. The outgoing connection from PL1 is via the junction box to the receiver and control and drive unit.

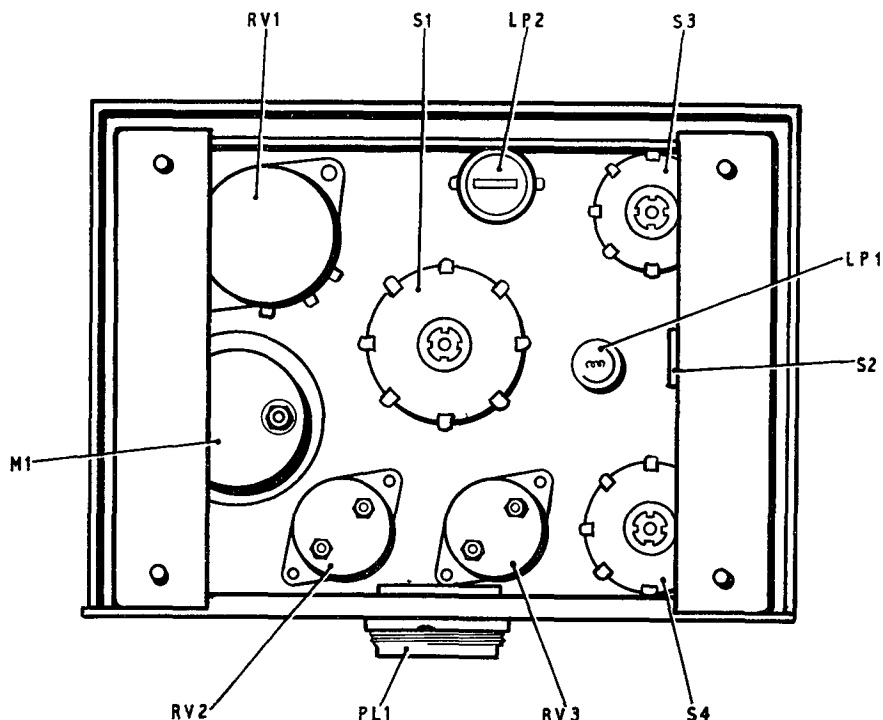
**10.** When the channel number switch is in position 2 an earth line is connected to relays 4(3)RL1 and 4(3)RL2 in the receiver, and relays 1RL3, 1RL4 and 1RL5 in the control and drive unit. In each case the relays change over the connections of the control circuits from one range of 12 crystals etc. (1A-1M), to the second range of 12 crystals etc., (2A-2M).

**Power switch (S3)**

**11.** The power switch has three positions OFF-s/BY-TX. In the s/BY and TX positions pin V of PL1 is earthed via the switch ; the outgoing connections from pin V are to relays in the receiver and control and drive unit. These relays switch on the receiver and the heaters of the transmitter.

**12.** The switch is also connected to pin W of PL1 so that in the tx position the 19V supply from the receiver is connected to the MG start relay 3RL8 and the interlock relay 3RL9 in the power and radio unit.

**13.** In the s/BY and TX positions of the switch, the 19V supply from the receiver is also connected to the TUNE lamp LP2 which by virtue of its connection to pin J of PL1 will be operated by an earth on the "mute" line in the receiver or an earth on the switch sector S4C in the INTertune position.



**Fig. 2. Rear of control unit**

**Service switch (S4)**

14. This is a 5-position switch giving the following facilities :—

RT—MCW—CW1—CW2—INTertune. The connections to PL1 are as follows :—

Switch position	Switch sector	Plug pin	Function
R/T	S4A	—	—
R/T	S4B	—	—
R/T	S4C	H	(see MCW)
MCW	S4A	—	—
MCW	S4B	M	Earths MCW/RT line
MCW	S4C	H	Connects MUTE line to MUTE line J.
CW1	S4A	Z	Earths CW1 line.
CW1	S4B	L	Earths MCW/CW line.
CW1	S4C	H	(See MCW)
CW2	S4A	Y	Earths CW2 line.
CW2	S4B	L	(See MCW)
CW2	S4C	H	(See MCW)
INT	S4A	—	—
INT	S4B	J	Operates TUNE lamp LP2 and earths MUTE line to relays in the power and radio unit and the transmitter.
INT	S4C	—	—

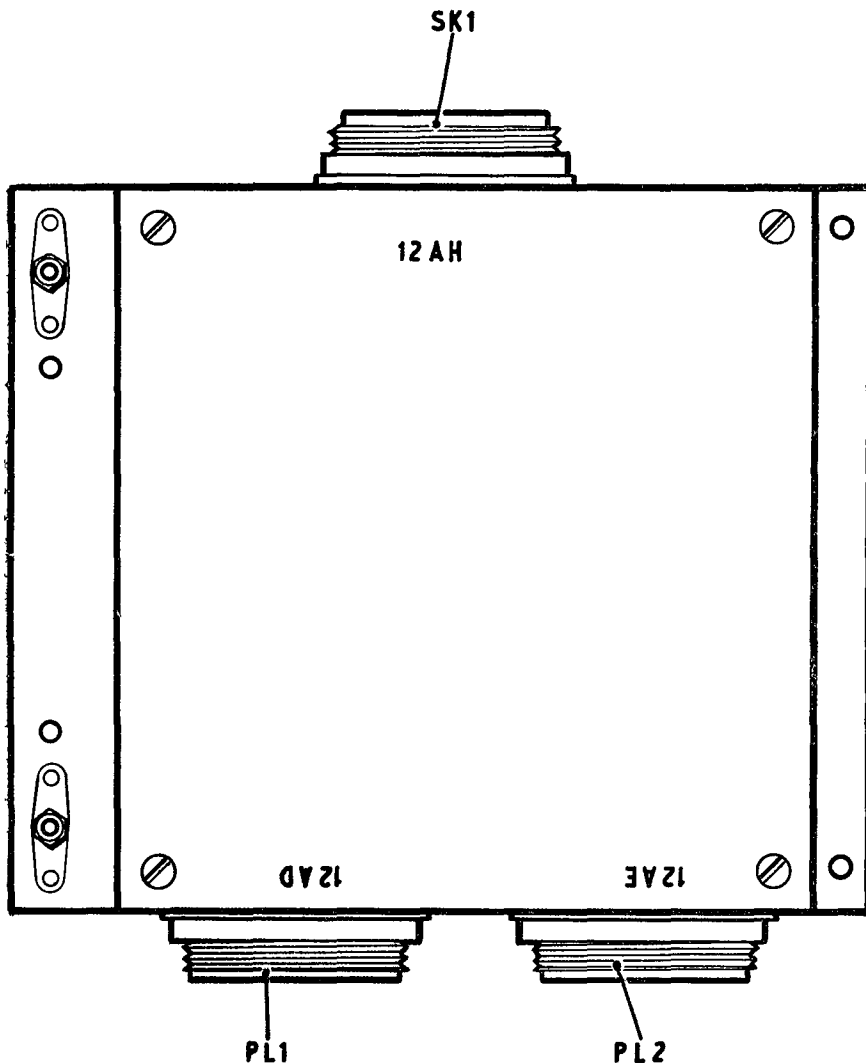


Fig. 3. Junction box Type 4191

**Fine tuning control (RV1)**

15. Desynn control having three out-going connections to PL1, pins P, Q and R; these are connected to the Desynn motor in the receiver IF unit via the junction box.

16. A fourth connection from pins of PL1 supplies 19V via the dropping resistor R1 to the fine tuning control (RV1). The control is earthed to the chassis of the control unit.

**RF gain control (RV3)**

17. The RF GAIN control is connected between earth and pin U of PL1 ; the out-going connection is to the receiver RF unit.

**Dimmer (RV2) and dial lamp (LP1)**

18. The dimmer control is connected between the dial lamp LP1 and the 19V supply at pin S of PL1. The other side of the dial lamp is earthed to the control unit chassis.

**TUNE indicating lamp (LP2)**

19. The TUNE lamp is connected between the switch sector S3A and pin J of PL1 (para. 11).

**RESTRICTED**

**Milliammeter (M1)**

20. The meter gives an indication of aerial excitation (calibrated 0-5) and is connected between pins T and N of PL1. The out-going connections are to the aerial tuning unit of the particular aerial system in use.

**Earth**

21. The earth connection of the control unit chassis is taken via pin G of PL1 to the general earth line of the equipment.

**Note . . .**

*Pins K and X of PL1 are not connected.*

**JUNCTION BOX TYPE 4191 (fig. 3)**

22. Junction box Type 4191 is interposed between the control unit (remote) Type 4189 and the transmitting and receiving circuits of the ARI.5874.

23. It is bulkhead mounted with one multipole socket connecting with a cable to the remote control unit and two multipole plugs connecting one to the receiver Type R.4187 and one to the transmitter control circuits in the control unit Type 4190.

24. There are no components in the junction box other than wiring and the circuit diagram given in fig. 5 is self-explanatory. The details of the plugs and socket are given below :—

SK1—Marked 12AH (25-way socket, fixed, multipole, position 0) Ref. No. 10HA/14162Z. This is connected via cable AH to the remote control unit.

PL1—Marked 12AD (25-way plug, fixed, multipole, position 3) Ref. No. 10HA/14152Z. This is connected via cable AD to plug PL7 on the receiver.

PL2—Marked 12AE (25-way plug, fixed, multipole, position 0) Ref. No. 10HA/14153Z. This is connected via cable AE to plug PL2 on control unit Type 4190.

25. Details of the connectors between the junction box, remote control unit, receiver, and control and drive unit are given in Chap. 10.

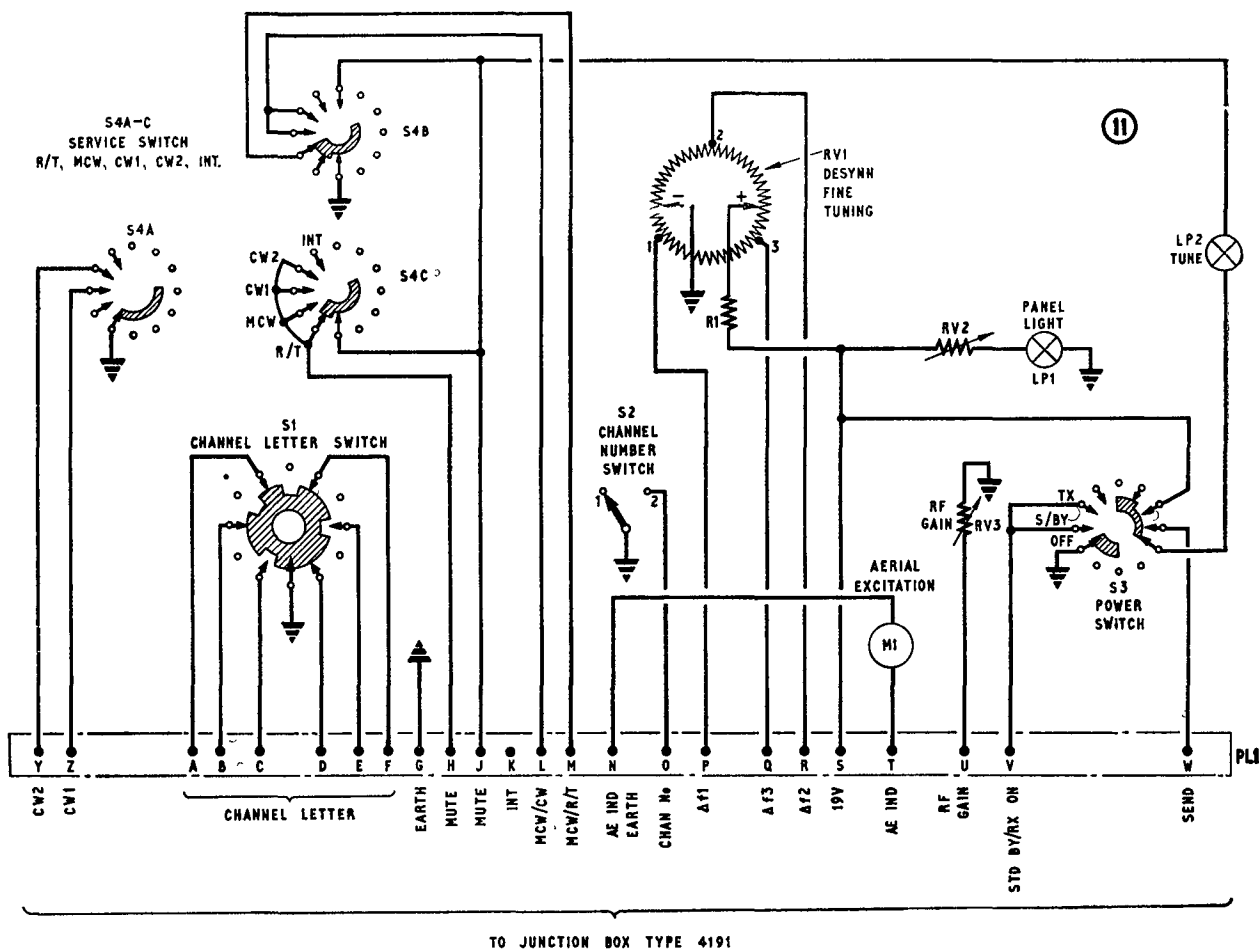
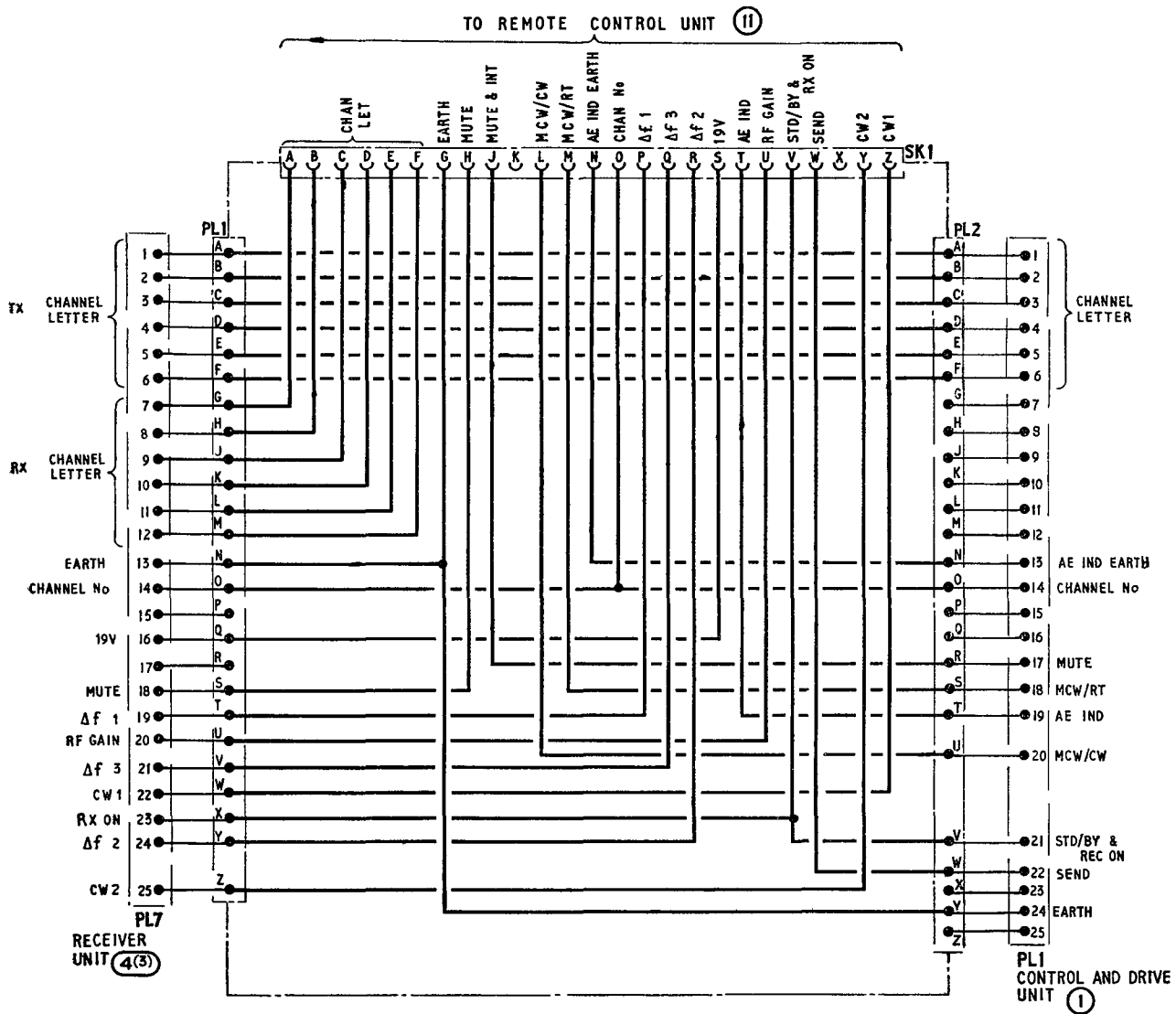


Fig. 4. Control unit (remote) Type 4189—circuit



**RESTRICTED**