

CIRCUIT DESCRIPTION HL-350V_{DX}

Outline of Each Unit

1. TX Unit:

Part of the output power of the transceiver is detected at J101, so that the carrier controlled solid-state switching circuit turns ON/OFF IC201 (NJM2072D) and Q202 (2SC1959Y), activating the TX/RX change-over relay.

The RF signal inputted from J101 is amplified from 10W to 80W through DRIVER AMP Q1 (MRF247), and further amplified to the rated powers of 250W to 300W through MAIN AMP Q1 ~ Q5 (MRF247 x 4). RF input level can be selected to 10W, 25W or 50W by the POWER LEVEL SELECT SWITCH SW1.

At the 10W input, the RF signal is directly connected to DRIVER AMP so that the maximum gain can be attained.

At the 25W input, the RF signal goes through ATT1 (3dB) to be attenuated for a proper input level, and is then fed into DRIVER AMP. At the input of either 10W or 25W, the output power can be reduced approx. half by using the POWER LEVEL SELECT SWITCH.

At the 50W input, RL4 becomes activated to have DRIVE AMP by-passed so that the RF signal directly drives MAIN AMP to the power of 300W. The maximum current at the 300W output is approx. 36A where the heat dissipation is designed to be held as low as possible.

The base bias of each of Q2 through Q5 is controlled by Q7 (2SC1173Y). The combined power of 250W to 300W is fed through LPF and then sent out through J102.

A multimeter is incorporated into the HL-350V_{DX} to exactly take hold of the working conditions. By switching the Meter Switch, W (RF OUT: Output Power), SWR (Standing Wave Ratio), or VCC (Power Line Voltage) can be monitored.

Wattage and SWR are detected by a directional coupler. SWR can be directly read out with the meter at or above a certain output power (above 50W) as a result of the use of Divider IC203 (NJM4200D). The divider is stably fed with +5V from three-terminal Regulator IC205 (NJM78L05A), and -5V from DC-DC Converter IC202 (ICL7660CPA).

2. RX Unit:

The RX Pre-Amp utilizes GaAs FET Q6 (MGF1302) and three-terminal Regulator IC1 (78L05A), so that a high gain amplification with low noise characteristics is achieved.

When to operate the RX pre-amp alone, with POWER SWITCH turned OFF, turn ON RX AMP SWITCH. Then, carrier controlling IC201 (NJM2072D) and switching transistor Q201 (2SA966) will supply voltage to Relay RL5 and the pre-amp at the RX status, so that a reception gain of approx. 15dB is obtained.

At the TX status, the voltage supplied to RL5 and the pre-amp becomes zero, where the output power of the transceiver inputted from J101 is outputted directly from J102 to the antenna.

3. WARNING Circuit:

The almost all part of WARNING circuit is incorporated into the control unit inside the front panel where tight RF shielding is provided.

Each detection unit utilizes a CM-type directional coupler, Excessive Input Detection Circuit being installed at the input side of DRIVER AMP, and SWR Detection circuit being installed at the output side of MAIN AMP.

Each detected voltage is amplified by OP Amp. IC204 (NJM2904D) and the relay controlling transistor Q203 (2SC3419Y) respectively, and turns OFF Power Supply Relays (RL6 and RL7) to halt the transmission in case a warning status is detected.

Two thermal sensors (SW101 and SW102) are installed. SW102 increases the voltage of the line flow fan from 13VDC to 20VDC causing the line flow fan to effectively run at its full speed when the temperature of the heat sink exceeds 50°C.

SW101 turns OFF the power of the carrier controlled switching circuit to halt the transmission preventing the power transistor from being damaged when the temperature of the heat sink exceeds 70°C.

The HL-350V DX utilizes an indirect power supply circuit where the power is turned ON/OFF by the Power Relays (RL6 and RL7). Diode D24 (1N5402) being inserted in series to the wound coil of the relays, no current will be run in the wound coil even if POWER SWITCH is inadvertently turned ON with a wrong DC power polarity connection. Thus, the relays will not be activated, so that a safe protection is secured.

If 24VDC is inadvertently connected, Zener Diode (05Z16A) will not turn ON Relay Controlling Transistor Q203 (2SC3419Y) preventing Power Relays (RL6 and RL7) from being activated.