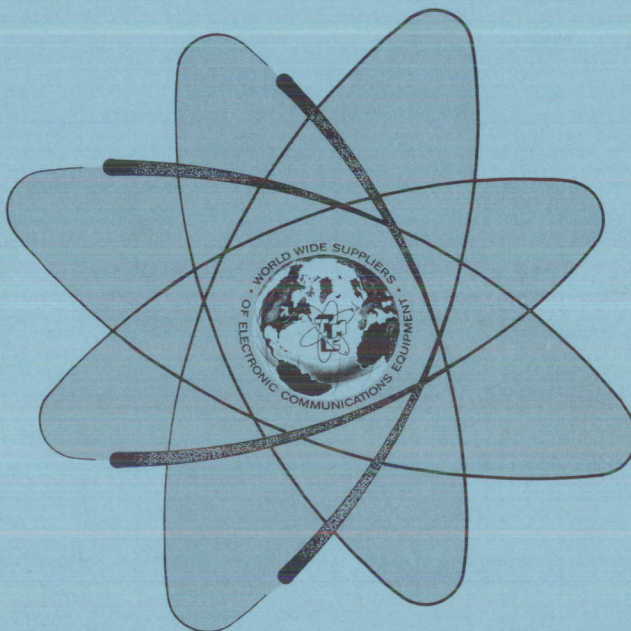


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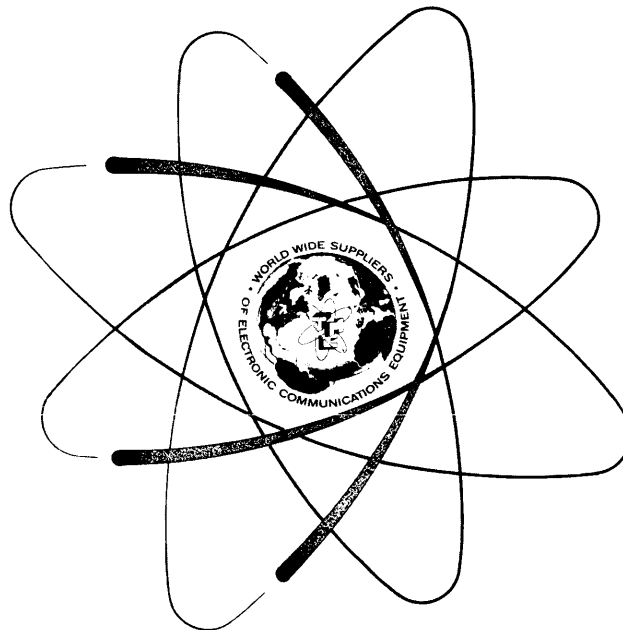
SYSTEM
INSTALLATION INSTRUCTIONS
for
MEDIUM FREQUENCY TRANSMITTER MFTR-10KE-5
ANTENNA TUNER MAT-5
REMOTE PROGRAMMER RTPR-1YA



THE TECHNICAL MATERIEL CORPORATION
MAMARONECK, N.Y.

OTTAWA, ONTARIO

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INSTALLATION INSTRUCTIONS

MFTR-10KE Transmitter

EQUIPMENT INSPECTION

The transmitter has been assembled, calibrated, and tested at the factory before shipment. Inspect all packages for possible transit damage. While following the procedural installation instructions, carefully unpack each crate as indicated. Inspect all packing material for parts which may have been shipped as loose items.

With respect to equipment damage for which the carrier is liable, the Technical Materiel Corporation will assist in describing methods of repair and the furnishing of replacement parts.

UNCRATING METHODS

The following information briefly outlines general uncrating methods. These methods must be adhered to when unpacking the transmitter to prevent equipment damage. Keep in mind the information, previously discussed, on equipment inspection.

- a. Remove wire straps or bands from around crates with a pair of snips.
- b. Unless otherwise specified, remove nails from three sides of the crates with a nail puller. Do not use a claw hammer, pinch bar, etc.
- c. When the sides of a crate have been removed, the moisture-proof paper must be ripped off. If a knife is used, care should be exercised not to mar equipment.
- d. If equipment is not packed in a cardboard carton, it may be removed from the crate as prescribed in the installation procedure.
- e. If after removing moisture-proof paper a cardboard carton is encountered, carefully open with a case cutter.

f. Where applicable, remove the following:

- (1) Creased cardboard blocking pieces.
- (2) Barrier bag.
- (3) Tape.
- (4) Molded cushioning.
- (5) Cellulose wadding.
- (6) Tissue paper.

g. An inventory of the equipment should be made at this time. As parts are unpacked, they should be marked off on the packing list or equipment supplied list. Table 1-1 lists equipment supplied in each crate.

TABLE 1-1. EQUIPMENT SUPPLIED

CAUTION

Since the Exciters are calibrated for their respective transmitters, they should not be interchanged.

<u>Crate Number</u>	<u>Contents</u>
<u>Transmitter 1</u>	
1	One directional Coupler, DC-104-2 One Power Amplifier Tube V900 Seven 140 watt resistors R800 thru R806 Loose Items
2	One Main Frame
3	One H.V. Transformer, TMC part number TF364
4	One Driver Drawer
5	One Exciter Drawer, less MFE-1 Exciter
6	One MFE-1 Medium Frequency Exciter
7	One 380 vac Line Input Transformer, TMC part number TF419
8	One Auxiliary Frame
9	One MAT-5 Antenna Tuner
<u>Transmitter 2</u>	
Crate 10 thru 18	Same as 1 thru 9
<u>Transmitter 3</u>	
Crate 19 thru 27	Same as 1 thru 9
28	One Equipment Cabinet complete with Programmer and Tone Equipment
29	Coaxial Cable (1000 feet)
30	Andrews Connectors for coaxial cable

TABLE 1-2. EQUIPMENT REQUIRED BUT NOT SUPPLIED

	<u>Equipment</u>	<u>Purpose</u>
1.	Box Wrenches, assorted sizes	Fastening mounting hardware
2.	Open End Wrenches, assorted sizes	Same as item 1
3.	Spin Tights, sizes: 3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 9/16	Same as item 1
4.	Socket Wrench Set, socket sizes to 1-1/8	Same as item 1
5.	Screwdrivers, Flat Head, assorted sizes	Same as item 1
6.	Screwdrivers; Phillips-head assorted	Same as item 1
7.	Crowbar	Open packing crates
8.	Fork-Lift or equivalent	Moving heavy objects (e.g. packing crates and voltage transformers)
9.	Case cutter	Open cardboard packing cases
10.	Nail puller	Open packing crates
11.	Pair of snips	Cutting strap bands

PREPARATION FOR ASSEMBLY

- a. Carefully position CRATE #2 upright, unpack and remove Main Frame.
- b. Remove rear, left, and right shields. Remove Fuse panel from front of Transmitter.
- c. Position frame on desired installation location.
- d. Carefully position CRATE #8 upright, unpack and remove Auxiliary Frame.
- e. Remove protective shields to prepare for 380 vac transformer installation.
- f. Position Auxiliary Frame on the left side of main frame as viewed from front.

WARNING

DO NOT CONNECT PRIMARY POWER (380 volts)
UNTIL DIRECTED TO DO SO.

INSTALLATION OF HIGH VOLTAGE TRANSFORMER T800

CAUTION

Transformer T800 is extremely heavy. Use
fork-lift or some lifting device when at-
tempting installation.

- a. Remove transformer from CRATE #3, position transformer in such a
manner that when installed in the bottom of main frame, the front
of transformer will be in the front of the transmitter.
- b. Move all Leads aside that may be in the path of the transformer
prior to actual installation, remove transformer mounting bolts.
- c. Position transformer in frame with front of transformer facing
front of transmitter.
- d. Connect cables to transformer in the following manner: (Refer to
figure 1).

(A) Rear High Voltage Transformer Connections
(White Teflon Insulated Wires)

<u>FROM</u>	<u>CONNECT</u>	<u>TO</u>
C801	Connect	R806
C800	Connect	R800
C804	Connect	Ground Side of L800

Connect Red/White lead marked R803 to the
junction point of R803 and R804.

T800 Primary Secondary Connections

NOTE

To simplify transformer installation wiring
each terminal on the transformer has been
designated an arbitrary number from one to
six. The corresponding wires have also
been so designated, connect each cable to
the corresponding number (refer to figure 1).

- (1) Connect the six cable (3 heavy insulated primary cables, and 3 teflon insulated secondary cables).

CAUTION

When transformer wiring is complete check each lead for correct wiring as per the instructions provided in this section or the Schematic Diagram.

Secure all associated hardware used for transformer connections. This completes installation and wiring.

- (2) Remove R800, R801, R802, R803, R804, R805, and R806 from CRATE #1.
- (3) Place each resistor into the corresponding clip holders (one set or two clips per resistor).
- (4) Refer to the reference symbol number on the melamine mounting board for correct mounting of resistors. (Each resistor has been marked with corresponding reference symbol number).

NOTE

When mounting resistors into spring clips apply pressure at the end of resistor. DO NOT FORCE THE RESISTOR INTO SPRING CLIPS BY APPLYING PRESSURE TO THE MIDDLE OF RESISTOR.

Remove masking tape from High Voltage Contactor.

INSTALLATION OF DRIVER DRAWER

- a. Carefully position CRATE #4 upright, unpack and remove Driver Drawer.
- b. Extend Driver Drawer chassis slides out from transmitter frame and install Driver Drawer in its respective position on chassis tracks. (Slides located directly above main Power panel).
- c. Connect associated cables to Driver Drawer chassis jacks (cables are marked with mating "P" and "J" numbers for ease of installation).
- d. Press slide buttons and push drawer back into its respective position.
- e. Secure drawer to frame with equipment mounting hardware.

INSTALLATION OF DIRECTIONAL COUPLER - DC104-2 (DC900)

- a. Remove DC104-2 from CRATE #1.
- b. Remove mounting hardware on mounting brackets (save hardware).
- c. Place mounting bracket around top portion of DC104-2 (top portion of DC104-2 is the metal end opposite the teflon insulated end of the DC104-2).
- d. Install DC104-2 thru top access hole on right side of PA section.
- e. Secure mounting brackets to top portion of PA Frame thus securing DC104 into place.

NOTE

DC104 when properly installed may appear to be loose, however, this is normal, without unbalance output connector installed on DC-104-2. Plug-in diode elements should be orientated as follows:

"25KW" - arrow pointing "UP" towards output transmission line.
"10KW" - arrow pointing down towards transmitter frame.

- f. Remove tape from output lead (output lead connected to PA filter.)
- g. Position output strap exercising extreme care that connection on output filter does not become distorted. connect output strap to DC104-2, secure with hardware provided.
- h. Note plug-in diode elements in DC104-2; connect small coaxial lead marked "FWD" to plug adjacent to the "25KW" diode element. Connect small coaxial lead marked REFL to plug adjacent to the "10KW" diode element.

EXCITER DRAWER INSTALLATION

- a. Carefully position CRATE #5 upright, unpack and remove Exciter Drawer.
- b. Exciter Drawer should be positioned directly above the Driver Drawer, therefore extend exciter drawer chassis tracks out from the frame and

install Exciter Drawer in its respective position and engage chassis tracks with slides.

- c. Remove top cover. Connect all cable plugs to their respective jacks. (Plugs and jacks are marked with "P" and "J" numbers for ease of installation. Remove masking tape on plug in relays.

EXCITER INSTALLATION

- a. Carefully position CRATE #6 upright, unpack and remove MFE-1 Exciter.
- b. Position MFE-1 Exciter into open slot in Auxiliary Frame.
- c. Connect loose cables to rear panel of Exciter.
- d. Slide Exciter Drawer into Auxiliary Frame and fasten Exciter with mounting hardware provided.

INSTALLATION OF 380 VAC LINE INPUT TRANSFORMER (TF419)

CAUTION

Transformer TF419 is extremely heavy. Use fork-lift or some lifting device when attempting installation.

- a. Remove 380 vac Line transformer from CRATE #7, position transformer in such a manner that when installed in the bottom of auxiliary frame, the front of transformer will be facing the left side of the transmitter.
- b. Move all leads aside that may be in the path of the transformer prior to actual installation, remove transformer mounting bolts.
- c. Position transformer in Auxiliary frame on transformer mounting plate.
- d. Bolt transformer to mounting plate using mounting bolts.

INSTALLATION PROCEDURE FOR PA TUBE V-900

1. Remove PA tube from CRATE #1. The PA tube weighs approximately 60 pounds, lift tube from crate being careful not to injure personnel or damage tube on removal.

2. Remove one half of PA TUBE AIR DUCT by unfastening dzus fasteners and screws.
3. Remove metal band around PA TUBE AIR DUCT by unfastening take up screw, and sliding off band from tube socket.
4. Turn WING nut in a clockwise direction.
5. Carefully place tube in tube socket.
6. Slowly turn knurled head on bottom of tube holder until tube seats correctly.
7. Turn WING nut in a counter clockwise direction and lower tube into socket.
8. Replace other parts in the reverse order from when they were removed.

INTERNAL WIRING INSTRUCTIONS FOR TRANSMITTER

A. Primary Power (Refer to Installation Drawing)

NOTE

Transmitter primary power interconnect cables are shipped in the Main Frame with one end connected to Main Frame AC input terminals. The power cables must be routed through the access hole provided, for connection to 230 v terminals on Line transformer located in Auxiliary Frame.

Route power cables through access hole on bottom left side of Main Frame; pull cables through access hole on bottom right side of Auxiliary Frame.

Connect transmitter power cables to Line Input Transformer, T1 as follows:

Heavy insulated white lead connect to a 230 terminal on T1.

Heavy insulated purple lead connect to next 230 terminal on T1.

Heavy insulated gray lead connect to next 230 terminal on T1.

Heavy insulated black and white lead connects to neutral terminal on T1.

Small white lead from transformer T2 connects to 230 terminal on T1.

Small purple lead from transformer T2 connects to 230 terminal on T1.

B. Line-Relay K1 Connections

1. There are three heavy insulated leads connected to one side of of Line Relay K1. Connect these leads to the 380 vac terminals on Line Input transformer T1.
2. Connect small black/white wire to neutral terminal on line input transformer T1.
3. Connect small purple wire to phase 2 terminal (heavy purple) on line relay K1.

REMOTE PROGRAMMER INSTALLATION

NOTE

The RTPR-1YA programmer and tone equipment are installed in a separate cabinet for convenience and ease of installation.

Carefully unpack CRATE #28 and remove cabinet containing RTPR-1YA programmer, FSS-1 Frequency Shift Sender and Audio Tone Sender RAS-2.

Locate the cabinet in a location convenient for connection to the transmitter Auxiliary Frame barrier strip TB1.

MAT-5 ANTENNA TUNER INSTALLATION

Refer to Antenna Tuner Hookup diagram for connections from Antenna Tuner to Antenna Connector J2 on Auxiliary Frame.

NOTE

The MAT-5 Antenna Tuner is shipped completely assembled. Installation consists of selecting the desired installation location and making control cable and RF connections. (Refer to MAT-5 technical manual for information regarding impedance matching).

Carefully unpack CRATE #9 and remove MAT-5 Antenna Tuner.

Refer to MAT-5 installation diagram for mounting hole and cabling information. Determine the antenna and transmission line impedance characteristics for each selected channel before actually applying RF power

through the Antenna Tuner, and connect the straps as required from the motorized band switch to the appropriate taps on input and output matching coils (L1 and L2). (Each channel position on motorized band switch must be connected to impedance matching taps on matching coils.)

NOTE

A suitable Impedance Bridge, Generator, and Receiver combination (or equivalent) should be used to determine the proper tap connections versus Antenna impedance. (Refer to MAT-5 technical manual for information regarding impedance matching.)

EXTERNAL CONNECTIONS (Refer to Auxiliary Frame Wiring Diagram)

A. Remote Programmer to Auxiliary Frame

1. Connect cable pair (phone line) from "REC SIG" terminal on FSS-1 (located on rear unit) to "TONE OUTPUT" terminal on rear of Auxiliary Frame (TB1-(8) and (9)).
2. Connect cable pair (phone line) from "XMTR SIG" terminal on FSS-1 (located on rear of unit) to "TONE INPUT" terminal on rear of Auxiliary Frame (TB1-(10) and (11)).
3. Connect Programmer Cabinet AC Strip to 230 VAC Source.

NOTE

Check all connections made in previous paragraphs to insure proper installation. Installation drawing and wiring diagrams should be used during and after installation to insure proper installation.

CAUTION

INSURE THAT EXTERNAL 380 V BREAKER IS OFF BEFORE MAKING CONNECTIONS TO TRANSMITTER.

- C. Connect three phase 380 vac input lines to input side of contactor K1 (located in bottom of Auxiliary Frame) as indicated on Installation diagram.

PRELIMINARY CHECK-OUT PROCEDURE

1. Set all POWER switches on transmitter and units mounted in programmer cabinet to the OFF position.
2. Set H.V. breaker to OFF position.
3. Clear all Installation personnel from rear and sides of transmitter before applying primary 380 vac input to transmitter.
4. Apply primary power to transmitter and perform the following operations:

<u>OPERATION</u>	<u>NORMAL INDICATIONS</u>
1. Set MAIN POWER/OVERRIDE switch to OVERRIDE position.	
2. Press both Auxiliary Frame breakers to ON position (breakers CB1 and CB2 located in rear of Auxiliary Frame).	
3. Set MAIN POWER BREAKER (on main frame) TO ON position.	MAIN POWER indicator should light. CHANNEL indicator should light. Exciter STANDBY indicator should light. MAIN blower must operate.

CAUTION

Main blower must rotate in a clockwise direction as viewed from the front or right side of the transmitter. If Main blower rotates counterclockwise, turn transmitter OFF, turn external primary breaker OFF, and reverse two of the 380 volt three phase input cables at contactor K1 located in bottom of Auxiliary Frame.

<u>OPERATION</u>	<u>NORMAL INDICATIONS</u>
Set FSR-1 POWER switch to ON	POWER indicator should light.
Set Antenna Tuner Control Power switch to ON	POWER indicator should light.
Set Tone Control Unit Power switch to ON	POWER indicator should light.
Set RDCR-1YA Decoder Power switch to ON	POWER indicator should light.

OPERATION

NORMAL INDICATIONS

Programmer Cabinet

Set RTPR-1YA Programmer POWER switch to ON	POWER indicator should light.
Set FSS-1 POWER switch to ON	POWER indicator should light.
Set RAS-2 POWER switch to ON	POWER indicator should light.

The foregoing turn on procedure insures correct installation and power input cabling to the transmitter system. should abnormal indications occur, proceed as follows:

- a. Turn transmitter OFF.
- b. Turn external 380 vac breaker OFF.
- c. Check and verify that installation is complete and correctly done.
- d. Circuit breakers CB1 and CB2 must be pressed to ON position.
- e. MAIN POWER/OVERRIDE switch must be in OVERRIDE position.

Once transmitter installation has been completed and verified for correctness, all protective covers and shields must be affixed to the transmitter before applying High Voltage.

Turn transmitter OFF, turn primary power to transmitter OFF. Install all shields and covers on the right, left rear and front of transmitter frame. The covers and shields must be installed on transmitter to complete interlock circuitry within the transmitter.

Refer to Operator's Manual for operating procedures on transmitter, Antenna Tuner and Programmer.

Unpack CRATE #29 and #30 remove coaxial cable and connectors. Assemble connectors on both ends of coaxial cable and connect one end to DC104 directional coupler (located on top of transmitter). Connect other end to RF Input of MAT-5 Antenna Tuner.

CAUTION

DO NOT MAKE ANY SHARP BENDS IN COAXIAL CABLE.