

See TI E7 B 1643

P.O. ENGINEERING DEPT.  
ENGINEERING INSTRUCTIONS

TELEGRAPHS  
TELEPRINTER  
J 1013

## TRANSMITTER, AUTOMATIC No. 2E

### Description and Operation

1. **Scope of Instruction.** This Instruction details the differences between the Transmitters, Automatic Nos. 2E and 2D and also describes the construction and operation of those parts which differ. The various features which are common to both machines are not described in this Instruction because the necessary information is contained in J 1011 and J 1012, to which reference should be made. Adjustments are described in J 5011 and J 5013 and details of spare parts and the procedure for obtaining them are given in the series of Instructions J 5301 to J 5309.

2. **General.** The features of the Transmitter, Automatic No. 2E which differ from those on the Transmitter, Automatic No. 2D are detailed below:-

(a) Electromagnetic clutch-release mechanism to provide remote control of the transmitter head. This is suitable for pulsed operation to enable the transmitter-head mechanism to be released, character by character, if required.

(b) Improved ratchet and clutch assembly, which reduces variation in the pawl "pick-up" time, and has a shock-absorbing device for the ratchets.

(c) Tape-out mechanism, for detecting the absence of tape in the transmitter head, and associated change-over contacts (micro-switch), which require to be reset by the operation of a push-button on the transmitter stand, when tapes are inserted.

(d) Tight-tape mechanism and associated change-over contacts (micro-switch) for indicating the "tight-tape" condition.

(e) Stroboscopic disk fitted to the transmitter main driving-gear wheel, to enable motor speed to be checked by means of a 20 c/s. neon tester ("Tester, TG 5181").

(f) Tape-control-lever latch, for holding the tape-control-lever arm securely, when in the fully-raised position.

(g) A lead from the governor contacts is brought out, via a fuse and the signal cord, to enable a relay external to the machine to be operated when the machine reaches governed speed. This feature is only suitable for use when the motor is operated from a 160-V. (80V. + 80V.) D.C. supply. The fuse and straps in this lead must be disconnected if the machine is used on D.C. mains supplies. A silicon-carbide disk is connected across the governor contacts to reduce the voltage peaks on this lead, and thus reduces sparking, with consequent increase in the life of the contacts.

(h) All external connexions except the three conductors of the motor power cord are terminated on a 33-way plug on the machine base. A double-ended 33-way 30-inch cord ("Cord, Test, No. 33/30A"), which is not included with the machine, will normally be required for extending the signalling connexions to the position equipment.

(j) A send-receive switch is not provided.

(k) The connexions of the No. 2E machine are shown in Dgm. TG(L) 1252.

## DESCRIPTION AND OPERATION

3. **Striker-type transmitter mechanism.** The construction, and operation, of this mechanism are the same as that of the "Transmitter, Automatic No. 2D", which is described in J 1012.

4. **Clutch mechanism.** The clutch mechanism incorporates staggered twin 30-tooth ratchets. These give a "pick-up" time variation of about  $\pm 1\frac{1}{2}$  mS. as compared with  $\pm 5$  mS. for No. 2D machines, and enable the machines to be used for special applications, such as in conjunction with time-division multiplex systems, in which the transmitter-head mechanism needs to be released, character by character, by means of external control pulses.

A single shock absorber has been provided to limit the impact shock of the pawls as they engage with the ratchets; it consists of a semi-circular spring clutch band, which is fitted in a channel in the main fibre gear-wheel, and which engages with an arm clamped to the ratchet shaft.

At the moment of pawl impact, the shock is limited to the figure which causes the spring band to slip. At times other than at the moment of pawl impact, the torque on the ratchet shaft is well below that needed to cause the spring band to slip and, consequently, it acts merely as a through coupling.

5. **Clutch-release mechanism.** The clutch detent for releasing and arresting the clutch is controlled by means of a small 2500-ohm electromagnet, which has a roller mounted on its armature to engage with a sloping face of the detent. When the electromagnet operates, the roller engages the detent lever which, in turn, releases the pawls and allows them to engage with the ratchets to commence transmission.

6. **Tape-out mechanism.** This provides a means of detecting the absence of tape in the transmitter head. The mechanical part of the mechanism involves the following changes and additions to the transmitter-head mechanism:-

The transmitter cam-sleeve has a flat section cut in its periphery at the front end. Tensioned against this track, by means of a spring, is a "tape-out" seeker-cam lever. This is attached to the tape-out pecker, which protrudes through the pecker guide-plate in line with the peckers and opposite the feed wheel. Thus the "tape-out" pecker is capable of rising once during every revolution of the cam.

If a tape is in position, the pecker is prevented from rising but, when the tape runs out, the pecker rises and causes its associated seeker-cam lever to rise. This, in turn, lifts the "tape-out" latch-control lever extension, which projects through from the rear of the head. The latch-control lever rotates about its pivot, and releases the latch to release the resetting lever and "tape-out" micro-switch. The switch contacts, which are normally connected in series with the clutch electromagnet, are disconnected; the electromagnet is released; the detent engages the pawls and the transmitter mechanism is brought to rest.

If a new tape is loaded into the head, the "tape-out" pecker will be depressed, but this action alone will not allow the electromagnet to re-operate to re-commence transmission, until the reset button is manually depressed to restore the latch and reset the micro-switch.

The release of the latch-control lever allows the "tape-out" seeker-cam lever and its associated pecker to restore to normal, ready to detect a further "tape-out" condition.

**7. Tight-tape mechanism.** This is similar to that used on the No. 2D machine, the main difference being that the tape-control lever, instead of controlling the detent direct, is made to operate a micro-switch which is normally connected externally in series with the clutch electromagnet. An inclined plate is attached to the rear end of the control lever and this is positioned relative to the micro-switch plunger, so that when the control lever is fully lowered, the plunger is depressed, the switch operated and the circuit for the clutch electromagnet is thus completed. The operation of the clutch electromagnet causes the detent to release the pawls, thereby allowing the transmitter mechanism to function.

When, however, a "tight-tape" condition is applied, the tape-control lever is lifted, and the inclined plate rides up across the micro-switch plunger, releasing the switch. This, in turn, disconnects the circuit for the clutch electromagnet, which releases and allows the detent to arrest the pawls, so bringing the transmitter mechanism to rest.

On the removal of the "tight-tape" condition, the tape-control lever drops and the inclined lever rides down across the micro-switch plunger, causing the switch to re-operate and complete the circuit for the clutch electromagnet. This causes the detent to release the pawls and allows transmission to continue.

**8. Tape-control-lever latch.** This consists of a spring latch mounted on the head stand and situated adjacent to the tape-control lever. It is provided to hold the tape-control lever securely in the fully-raised position, when required.

**9. Speed checking facilities.** For 50-baud working, the normal method of checking motor speed is by viewing the 12 segments on the governor cover through a "Stroboscope No. 19". A stroboscopic disk is also fitted to the fibre transmitter-driving gear-wheel to allow the use of a 20 c/s. neon tester ("Tester, TG 5181"), when appropriate.

References:- J 1011, J 1012, J 5011, J 5013, J 5301 to J 5309  
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