

HOUSE EXCHANGE SYSTEM No. 4**Facilities**

1 General. This Instruction describes the facilities provided in a House Exchange System No. 4 (HES No. 4) which has been given the sales name 'Keymaster 2 + 10'. This system provides inter-communication between stations with direct access from these stations to exchange lines.

2 Definitions.

(a) Multiple station. - A multiple station is one equipped with a Telephone, Intercom No. 4/1 (F, L or CB) which is an instrument based on the 700-type telephone design. Multiple stations are linked by a multiple cable and are normally confined to one building but the cable may be extended to stations in nearby buildings, if signalling limits are not exceeded.

(b) Non-multiple extension. - This is an extension station connected to the multiple by a two-wire line and a relay-unit. The extension is equipped with a Telephone No. 710 (F, L or CB).

(c) Main station. - This is the multiple station where incoming calls always give an audible signal, and which assists non-multiple extensions with calls to other stations. The main station also controls some of the additional facilities which may be added to the system.

3 Capacity of installation. A HES No. 4 comprises two exchange lines and up to ten stations; exceptionally, one additional multiple station can be provided. A total of four non-multiple extensions or private circuits may be fitted in lieu of four multiple stations. The system also includes a Power-unit No. 52A and an exchange line relay-unit, together with a relay-unit for each non-multiple extension or private circuit that has been provided; these units are all wall-mounted.

4 Extension plan arrangements. Extension Plans 1, 1A, and 4 internal only, may be provided at a non-multiple extension, if the appropriate limits given in TRANSMISSION, Telephone, B3567 are not exceeded at the most remote instrument of the extension plan.

Extension telephones cannot be associated with multiple stations, and it is not possible to work two multiple station telephones in parallel.

5 Connexion to public exchange. The HES No. 4 works on CB principles but may be connected to any type of public exchange. In CBS and LB areas, an auxiliary unit must be fitted in the exchange lines to provide the necessary CB conditions.

The HES No. 4 is not suitable for shared service.

6 Lamp signals. Telephones, Intercom, No. 4/1 are equipped with four lamps. The lamp adjacent to each exchange line press-button glows at all stations when that exchange line is in use. The appropriate lamp at the right-hand end of the station identification label glows only at that station which is engaging the line.

7 Exchange calls.

(a) Incoming to system. - Incoming exchange calls are signalled visually at all multiple stations, except those prohibited exchange line service, by lamps which are adjacent to the press-buttons of the exchange lines. At all stations, the lamp associated with the line on which the call is being received flashes in sympathy with the ringing, then glows steadily when the call is answered.

All Telephones, Intercom, No. 4/1 are fitted with standard magneto bells and up to five bells in series may be rung simultaneously from the public exchange except where the ringing supply is from a low-power source, e.g. a vibrator, when only one or two bells may be rung; see also para. 13.

For incoming exchange call ringing at non-multiple extensions see para. 9.

(b) Incoming to private circuit. - In special instances incoming exchange calls may be extended to private circuits [see (f) and para. 11].

(c) Outgoing from multiple stations. - Direct connexion to the public exchange from any multiple station with full facilities is obtained by pressing the press button of the selected exchange line. The lamp adjacent to the press-button glows at all stations to indicate that the line is engaged and the appropriate lamp at the right-hand end of the station identification label glows at the engaging station. Exchange calls are normally secret [see (k)].

(d) Outgoing from non-multiple extension. - Direct connexion to the exchange from any non-multiple extension with full facilities is obtained by pressing the EXCH button in the Telephone No. 710. Selection of the line to be used is determined automatically by the relay-unit which connects the extension to the multiple cable.

(e) Exchange service restriction or prohibition. - Access to the exchange lines may be restricted at selected multiple stations and non-multiple extensions, so that calls may be originated or received under the control of the main station only. Exchange service may be prohibited to selected multiple stations and non-multiple extensions.

(f) Main station control. - Incoming exchange calls intended for non-multiple extensions or private circuits can only be transferred to these extensions via the main station. The main station also controls the transfer of an exchange call from a non-multiple extension to another non-multiple extension, multiple station, or private circuit. It is not possible for a private circuit to transfer an exchange call. The main station also controls exchange service to stations with restricted facilities.

(g) Transfer facility. - An incoming or outgoing exchange call may be transferred from one multiple station to another, or from a non-multiple extension via the main station to another non-multiple extension or multiple station without releasing the exchange connexion.

On installations with two exchange lines, a multiple station may hold a call on one exchange line while transferring a call incoming on the other line. The main station must assist in the transfer of exchange calls to or from non-multiple extensions or multiple stations with restricted facilities. During the transfer of an exchange call from one multiple station to another, the change of the exchange line lamp from flashing to a steady glow indicates that the receiving station is ready to accept the call. Pressing the exchange line release (R) button at the transferring station completes the transfer of the call, and this may be visually confirmed by the station engaging lamp, which dims at the transferring station and glows at the receiving station when transfer has occurred.

(h) Hold facility. - Any multiple station may hold an exchange call while making an intercom call to another station on the system. In the exchange line hold condition, the subscriber on the exchange line cannot hear the conversation between the holding station and the called station. On installations with two exchange lines, any multiple station with full facilities may hold one exchange line while making a call on the other exchange line. During the holding of an exchange line its line engaged lamp, adjacent to the exchange line press-button, will flash at all stations two to three times per second.

(j) Exchange line engaged. - At multiple stations the lamps adjacent to the exchange line press-buttons provide a visual indication when the line is engaged. The exchange line press-button must not be operated when its associated lamp is glowing; to do so may cut off an established call. The lamps adjacent to the conference press-button, i.e. at the right-hand end of the station identification label, provide a visual indication as to when a station is engaging the exchange line, the lamp glowing only at the engaging station.

(k) Secrecy and monitoring. - Exchange calls are normally secret but a monitoring facility may be given to the main or other selected multiple station. This facility is restricted to one station at any installation and is not for continuous use as it degrades transmission.

8 Local intercommunication calls.

(a) Multiple stations. - There is direct calling between all multiple stations on the system.

Independent calls between stations in pairs, up to the capacity of the system may proceed simultaneously without mutual interference, but they are not secret and a station may break in by calling one of the engaged stations.

(b) Calling a station engaged on an exchange call. - At a calling multiple station a buzzer signal is normally given if the called multiple station is engaged on, or holding, an exchange line [see (c)].

If the called station is a non-multiple extension the buzzer signal is given only when the exchange line is engaged speaking, not during hold conditions.

Private circuits cannot hold or transfer exchange calls, and a buzzer signal will always be received when a private circuit is engaged on an exchange line call.

(c) To allow a multiple station to call a multiple station engaged on an exchange call. - The facility may be given whereby a multiple station may be called while it is engaged on an exchange call. The called station then answers the intercom call by pressing its own station calling press-button. This facility cannot be provided at installations consisting of eleven stations as a multiple station's own calling press-button is no longer available to answer the calling station. Stations with the facility of being called while engaged on an exchange line do not return an engaged signal to calling stations.

(d) Multiple station calling non-multiple extension or private circuit. - There is direct calling from all multiple stations to any non-multiple extension or private circuit. Calls at the non-multiple extension are answered by operating the EXTN press-button.

(e) Non-multiple extension calling multiple station. - A non-multiple extension wishing to call a multiple station first calls the main station by pressing the EXTN button fitted in the Telephone No. 710. The main station then asks the required multiple station to call the non-multiple extension.

(f) Non-multiple extension calling non-multiple extension or private circuit. - A non-multiple extension wishing to call another non-multiple extension or private circuit first calls the main station by pressing the EXTN press-button fitted in the Telephone No. 710. The main station then calls the required extension or private circuit and completes the connexion via a connect circuit at the main station. The call must be released by restoration of the connect keys on receipt of a clear signal from each of the extensions or circuits.

(g) Private circuit calling multiple station. - The private circuit calls the main station which then asks the required multiple station to call the private circuit, i.e. the call is reverted.

(h) Private circuit calling non-multiple extension or private circuit. - The private circuit first calls the main station and the procedure is then the same as described in (f).

(j) Conference calls. - Any multiple station may call all, or any number of other multiple stations, non-multiple extensions and private circuits, and then speak to them simultaneously.

Any non-multiple extension or private circuit, with the assistance of the main station may call all, or any number of other multiple stations, non-multiple extensions and private circuits, and then speak to them simultaneously.

9 Night service to non-multiple extensions. An individual or number of non-multiple extensions may be given night service by means of a key at the main station. The incoming exchange call is then extended to ring the bell at a non-multiple extension. It can be arranged that one selected line only, or both lines are signalled at a particular non-multiple extension.

Exchange service continues to be available at all stations and intercom calls are not affected by night service conditions.

10 Night service to private circuits. When the facility is allowed, a private circuit may be given night service for incoming calls only by switching at the main stations. The incoming exchange line ringing is then extended over the private circuit. Exchange service is not affected at multiple stations and non-multiple extensions when a private circuit is on night service. Intercom calls between multiple stations and non-multiple extensions are not affected, but a private circuit on night service cannot be included.

11 Association with a PBX. A HES No. 4 installation may be associated with a PBX in several ways.

(a) An extension from a PBX may be connected as an exchange line at the HES No. 4. All facilities available to PBX extensions including operator recall, are also available to HES No. 4 stations.

(b) Subject to satisfactory transmission, a HES No. 4 non-multiple extension may be terminated as an exchange line or private circuit on the distant switchboard. Exchange calls can be extended only from the HES No. 4.

(c) A Relay-unit Q 524 fitted in place of a multiple station and terminated at the PBX as an extension will usually provide all normal inter-switchboard facilities between a HES No. 4 and a PBX.

12 Extension bells and buzzers. Extension magneto bells may be provided in lieu of, or in addition to, the instrument bell at multiple stations. The total number of bells to be rung simultaneously from the public exchange must not exceed five, except where the ringing supply is from a low-power source when only one or two bells may be rung. In special circumstances alternative ringing arrangements may be used; these sometimes include the use of a local ringing converter.

One additional magneto bell may be provided at a non-multiple station for intercom signalling purposes.

Loud sounding bells or buzzers may also be provided (see Q 3015).

13 Telephones with hearing-aid handsets. The Handset No.4 should be used to provide hearing-aid facilities at multiple stations and non-multiple extensions.

14 STD facilities. Meters No. 19 may be fitted to the exchange lines (see Q 3015).

References:- Q 3015
(TD.2.3.3.) TRANSMISSION, Telephone, B 3567

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