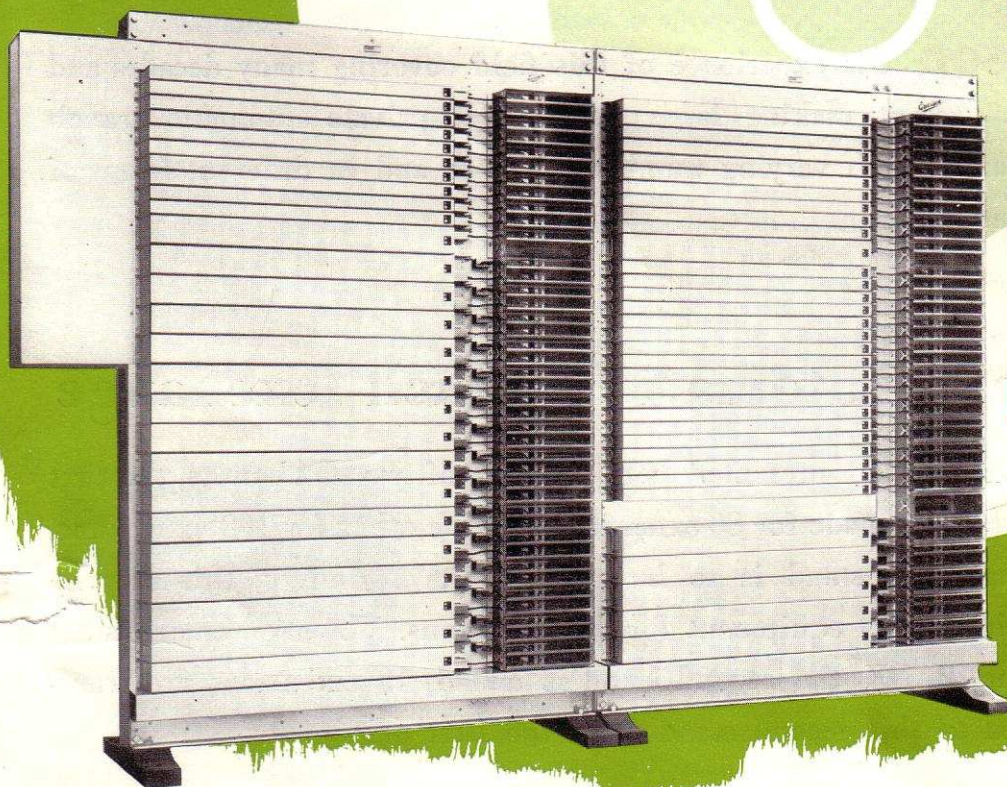


# The Automatic XY-Exchange AHD 32

can answer  
your  
telephone  
problem



*The original XY system*

**Ericsson**  
LM



**Managements and heads of businesses** when confronted with the problem of organising new operations or rationalising an undertaking no longer have to consider whether an internal telephone plant shall be installed but simply decide how the telephone question may best be arranged.

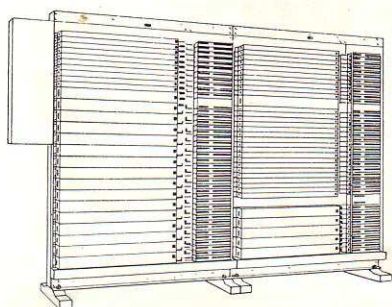
**An efficient solution** is provided in such cases by a private automatic branch exchange. By way of the private automatic branch exchange it is possible to obtain connections from one and the same extension instrument both with persons in the undertaking, internal calls, and with subscribers connected to the public exchange, external calls.

**L M Ericsson** has experience of this field covering many decades and is at present making large numbers of private automatic branch exchanges with varying numbers of lines and in different forms of execution.

## The private automatic branch exchange

**AHD 32** presented here, consists of two stand units, the first of which is made for 80 extensions and the other for 100 extensions. If only one stand is to be used at the beginning, this may be provided with equipment for 90 extensions. When on enlargement of the PABX the second stand is added, 10 extensions are transferred to this second stand from the first one.

As enlargement of the plant is very easy to carry out, this type of PABX is particularly well suited for employment in medium-sized undertakings with a present requirement for 60—120 extensions, estimated to increase later to about 180 extensions. In exceptional cases where even this capacity proves to be insufficient, it is possible to enlarge the exchange to 270 extensions by the addition of a third stand.

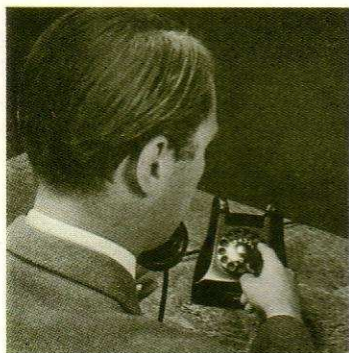




## The traffic capacity of this PABX

is extremely great, each stand unit being constructed to provide a maximum of 10 internal call facilities, *i. e.*, a total of 20 internal call facilities for 180 extensions. The exchange is made to provide a maximum of 20 external call facilities besides. If only one stand is supplied, *i. e.*, if the number of extensions does not exceed 90, the external call facilities

of this exchange are decreased to 15. As regards diagram the exchange is so constructed that internal and external calls are established over different connecting routes. Thus, if the exchange is installed for 180 extensions and maximum traffic capacity, there may be carried on *at one time* 40 calls (20 internal and 20 external) in the exchange.



### Automatic connection

by means of the telephone instruments' dials is provided for both internal calls and outgoing public exchange calls, while incoming public exchange calls are handled in one or two operator instruments served by operators. When the operator is absent and after office hours, these calls can be dealt with from extension instruments fixed in advance.

## The capacity of the operator instrument

is 10 or 15 public exchange lines. The highest number of two-way public exchange lines one operator can attend to and provide a good service has been found in practice to be 15, and therefore the greater operator instrument is intended for 15 public exchange lines. If the PABX is provided with the maximum number of public exchange lines, *i. e.* 20,

then two operators should be employed, each being allotted an operator instrument for 10 lines. The public exchange lines are divided between the two operator instruments in such a way that the most even load possible is ensured. If traffic is low at certain periods, concentration of the service to a single operator may be arranged by a switch.



### Serving of the operator instrument

is extremely simple and quick, as all operation is performed by the pressing of various easily accessible keys. Even the selection of numbers is done on a keyboard. Ringing of disengaged instruments or testing on busy instruments is done automatically. The operator instrument is of attractive appearance and small enough to be placed on an ordinary desk or table.

## Among the many traffic facilities

available in this branch exchange attention is particularly drawn to the facility of inquiry to other local extensions while an external call is proceeding and the possibility of automatic transfer of a public exchange call from one local extension to another. Another valuable feature is that the calls of chief execu-

tives may be given priority and that the operator can break in on a call to warn those speaking that another call, either specially important or long distance, is waiting to be connected. All these traffic facilities and several others are described in the following pages.



## Internal and Outgoing Calls Connected Automatically

● Internal calls are obtained automatically—a number is dialled and the branch exchange automatically rings the person wanted. If connection is wanted to the public exchange lines, "0" is first dialled and connection is immediately made by the branch exchange to the public exchange. The design of the branch exchange is such that connection to the public service is obtained, even if all internal call facilities are occupied.

## Call from Outside Handled by Keyset

● An incoming call from the public service is signalled in an operator's instrument. The operator answers and can quickly pass the call on—she simply presses keys in her instrument and the branch exchange automatically rings the extension wanted. If the person is already busy with another call, the operator can inform him that another call is waiting and, if required, she can break off the call in process in favour of the new one, or she can switch the new one to waiting. In the latter case, the wanted local extension is automatically rung when the first call ends.

## Call from Outside is Handled even when the Operator is Absent

● At any time the operator leaves her place, such as the end of the day, she presses a night-connection key in her instrument and this night-connects all public exchange lines to one or more fixed local extensions. A call from outside is then connected direct to one of these extensions, according to the public line on which the call comes, and from there if necessary it may be automatically transferred to another extension.

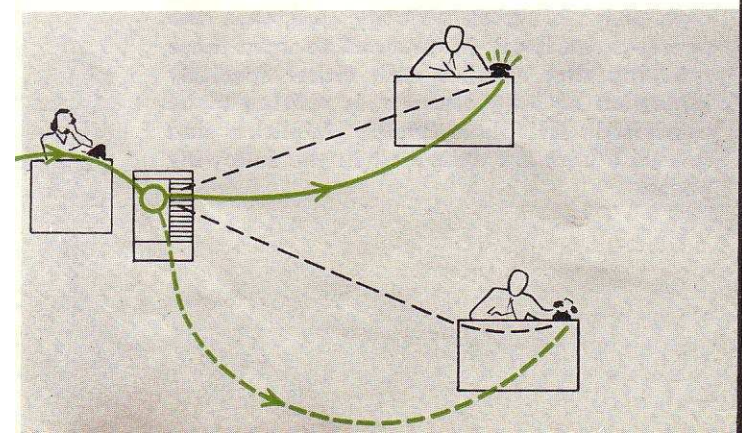
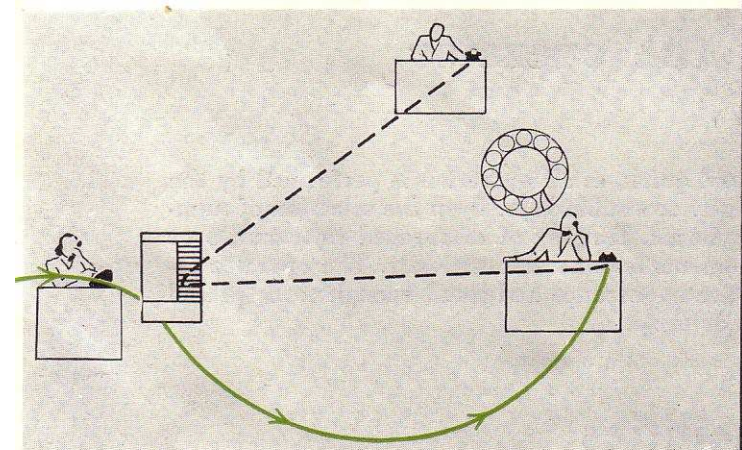
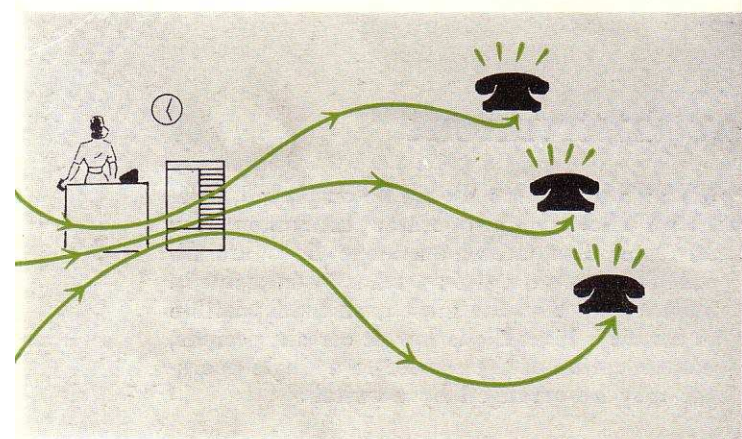
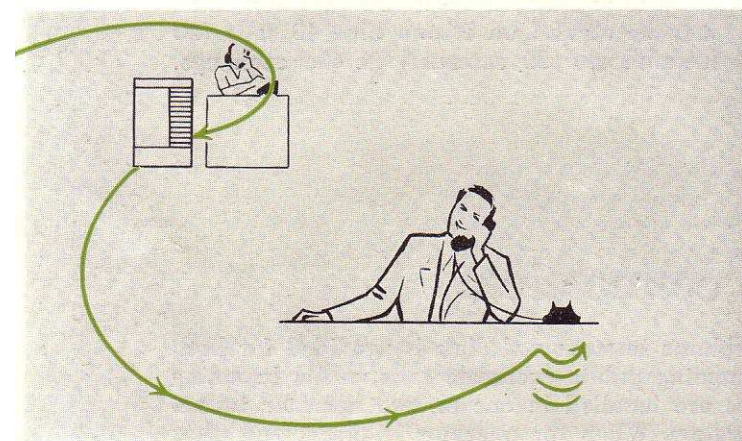
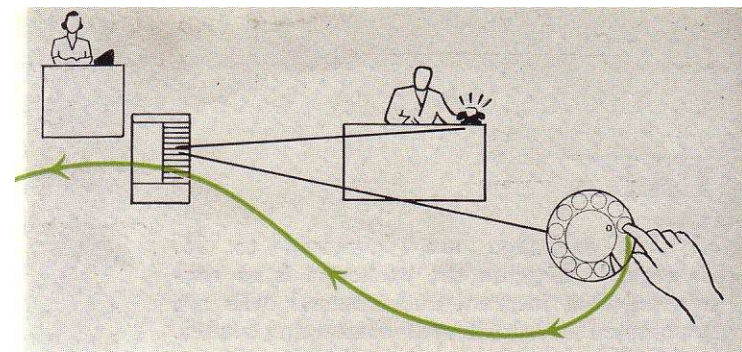
To ensure that no call is held up in the operator's instrument if the operator has left it without pressing the night-connection key, calls are automatically switched over to the fixed local extensions if the operator does not answer a call in about  $\frac{1}{2}$  minute.

## Inquiry Can be Made to other Extensions during External Call

● If during an external call one wants to make inquiry to another person in the undertaking, this may be done from the telephone used for the call proceeding, by dialling the figure "1" and then the number of the wanted extension. On completion of the inquiry, return is made to the original call by dialling the figure "1". Inquiry can also be made to the operator and to persons outside the undertaking while a call is proceeding.

## External Calls Can be Automatically Transferred to other Local Extensions

● If after making inquiry to a person inside the undertaking it is desired to transfer the external call to him, one simply puts down the receiver while the other person's receiver is still lifted. The external call is then automatically switched over to the other extension. Transfer of an external call may also be transferred to the operator.





## Extensions May be Barred for External Call

● Extensions may at will be made open, semi-barred and barred. Those having *open extensions* can receive calls from outside and themselves make public exchange calls. Persons with *semi-barred extensions* can receive calls from outside, but cannot call persons outside. Persons with *barred extensions* cannot carry on calls over the public exchange lines and external calls cannot be transferred to these extensions. Inquiry can, however, be made to them. In cases where automatic district traffic is provided, open extensions may be barred for this traffic if desired.

By having barred extensions the number of public exchange calls is reduced and as lower subscriptions are usually charged for these instruments than for the open and semi-barred instruments, the running cost of the plant will for this reason be smaller.

## Priority for Leading Executives

● A number of extension instruments may be given the facility of always getting through to other local extensions, even when these are busy. This privilege may suitably be provided for the high executives, or other persons who for some reason must not be kept waiting until a busy extension becomes free.

## Some Extensions Can be Called by Common Numbers

● If certain persons each having an extension instrument perform similar work, such as a pool of stenographers, it may be convenient to have common numbers, group numbers, for these extensions. When such a number is dialled, the first unoccupied instrument in the group is rung. It is also possible to call each extension by an individual number, by which only the wanted instrument is rung.

## An Incoming Call Can be Connected to Several Persons in Succession

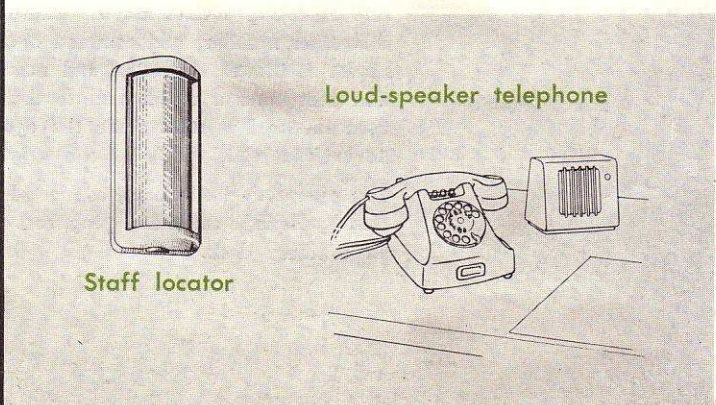
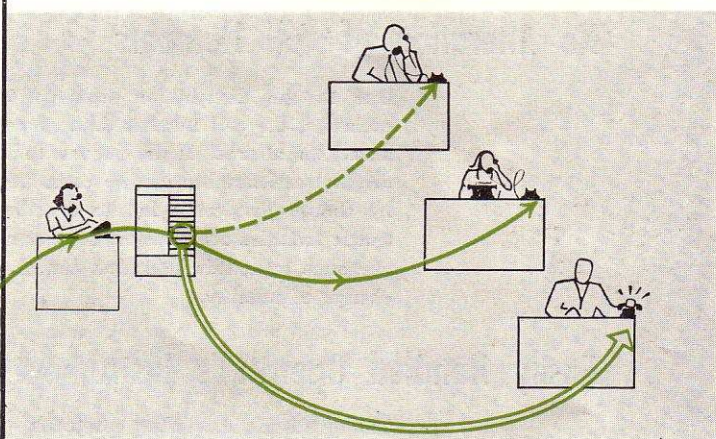
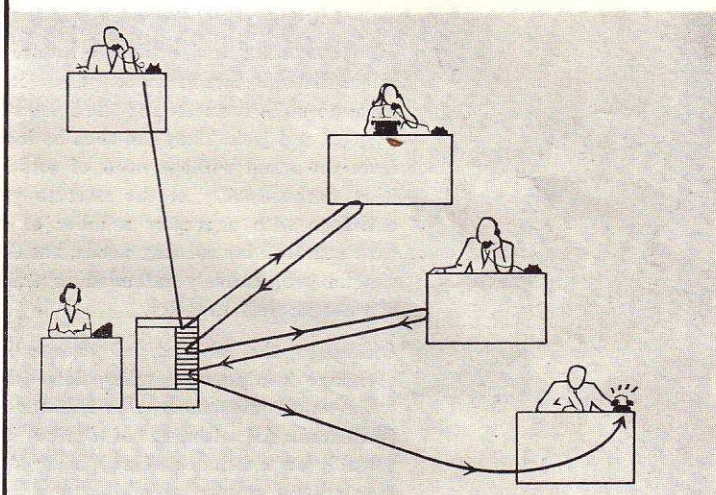
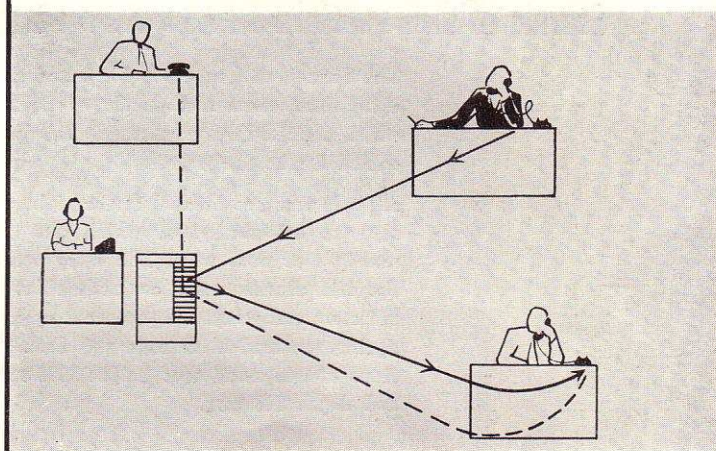
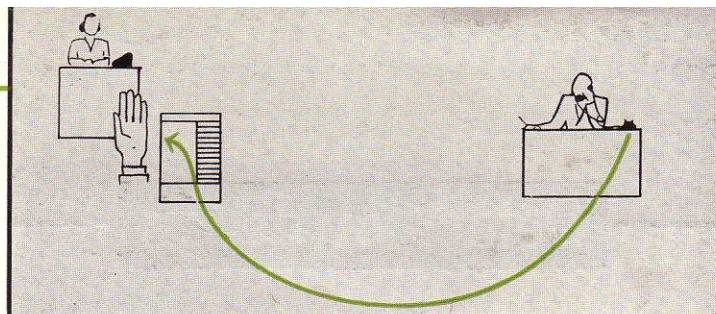
● If a subscriber of the public exchange wishes to speak to several persons in the undertaking one after the other, he informs the operator and before passing on the call she operates a key which prevents disconnection at the end of each successive call. When the extension receiver is put down at the close of the conversation, the call lamp is again lit in the operator's instrument and the operator can switch the call over to the next extension wanted. After switching over to the last of the wanted extensions the operator restores the key and disconnection of the last call proceeds in the usual manner.

## Special Devices May be Supplied if Required

● The branch exchange is so designed that it may be furnished with a large number of special traffic facilities, the addition of which appreciably increase the range of employment of the exchange. The more important of these extra traffic facilities are:

- Staff location
- Conference calls
- Junction traffic with other branch exchanges
- Loud-speaker telephones
- Connecting over of (unanswered) calls

Further particulars of the construction and properties of these devices will be supplied on request.





# Details of design

## Stands of Light-weight Design, Aluminium Enamelled

The branch exchange for 180 extensions consists of two aluminium enamelled stands of light-weight design, in which all fixed relay sets and other parts are fitted and cabled at the factory.

All selectors are located at the right of each stand on a separate selector panel which also holds the selector multiple of bare wire. The relay sets are assembled at the left of the stand on both sides of a relay panel. Selectors and relays are protected by closely fitting covers against mechanical damage and dust. The overall dimensions of one stand are: height 2070 mm, width 1390 mm and depth 500 mm.

## Connecting Devices are Detachable

The connecting devices, *i. e.*, selectors and relay sets for internal traffic facilities and public exchange lines, form separate units connected to the fixed cabling of the stand by plug and jack. They can thus be inserted and removed from the stand without need of soldering. Consequently it is not necessary at the start to provide the branch exchange with a greater number of connecting devices than required for existing needs, but the branch exchange can be progressively extended as traffic grows, until it reaches its full capacity.

Owing to the division of connecting devices in the exchange into separate units, detachable from the stand by a single movement, the maintenance is very much facilitated. All cleaning of devices can be done comfortably on a bench and any faulty devices may be sent to a central service place for repair.

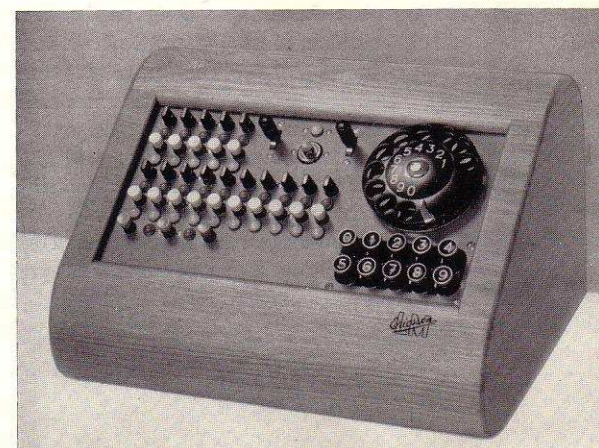
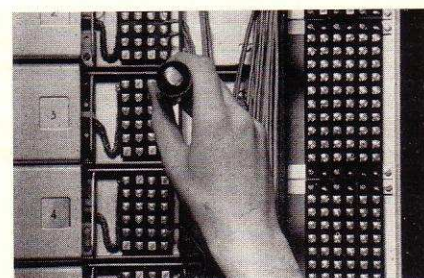
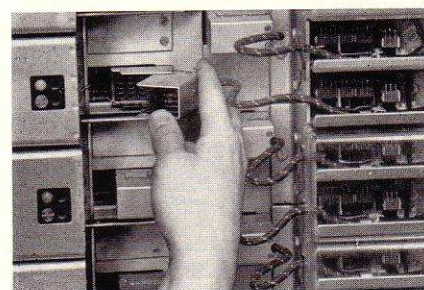
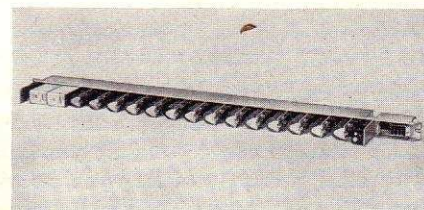
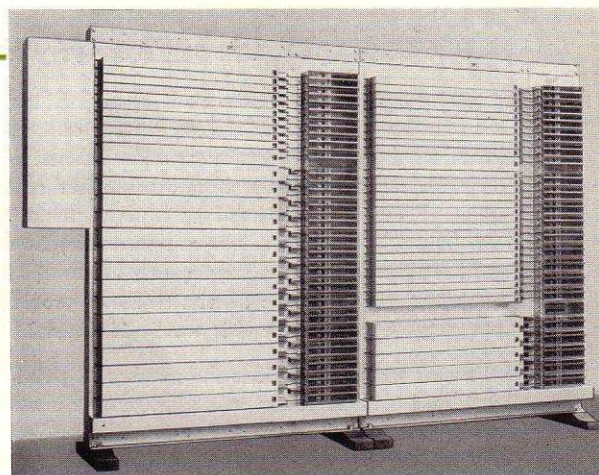
## No Alteration of Call Numbers

Due to the distribution frame fitted in the branch exchange, the call number first given to a person need never be altered. If he moves to another room, his original call number can be connected to his new place by simple jumpering in the distribution frame. If his traffic facilities are changed, such as allowing him public exchange calls, this alteration can also be made without change of number.

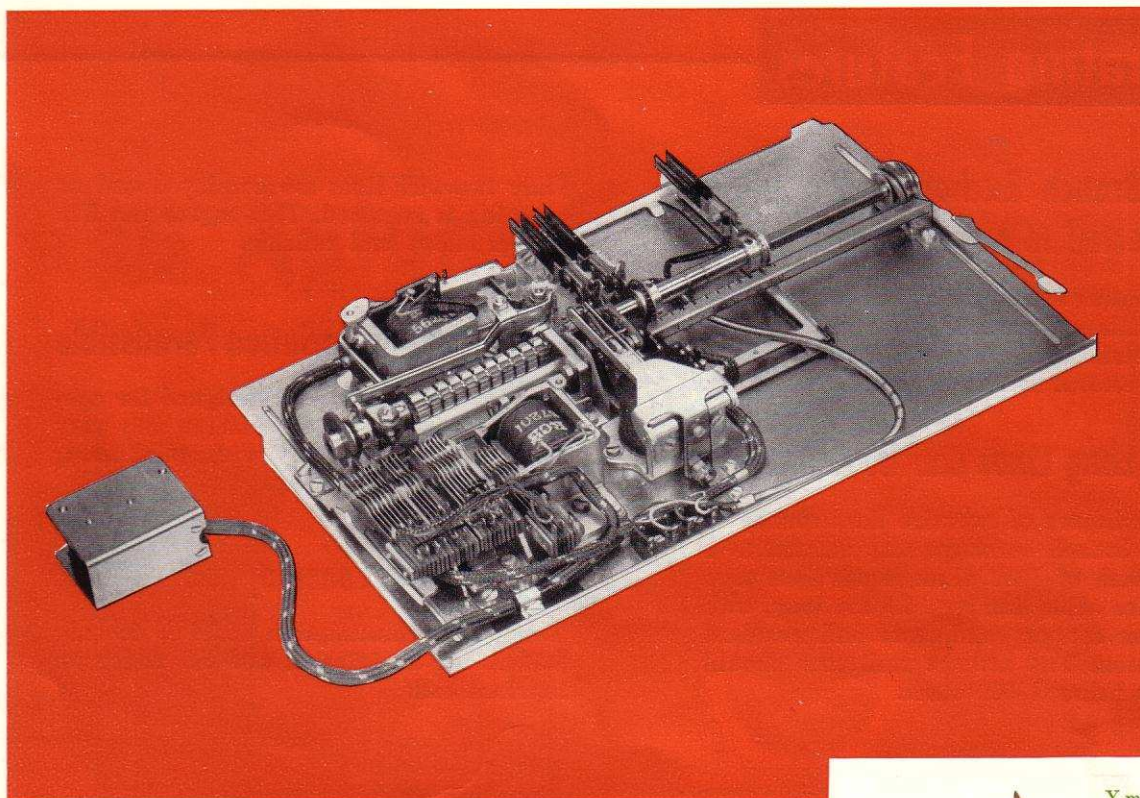
## Easily Handled Operator's Instrument

The operator's instrument comprises — in addition to the components of an ordinary extension instrument — separate operating devices for the external lines, keyset for subscriber numbers and common operating devices. The keyset facilitates operation and makes it quicker. The dial constitutes a supplement to the keyset and is also used in the few cases when the operator has to make an external call.

The operator's instrument, connected to a wall termination by flexible cable and plug, can easily find place on an ordinary desk.

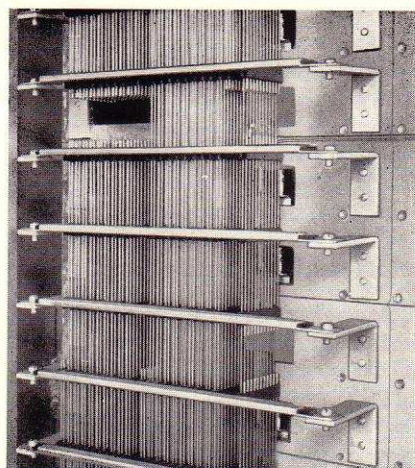
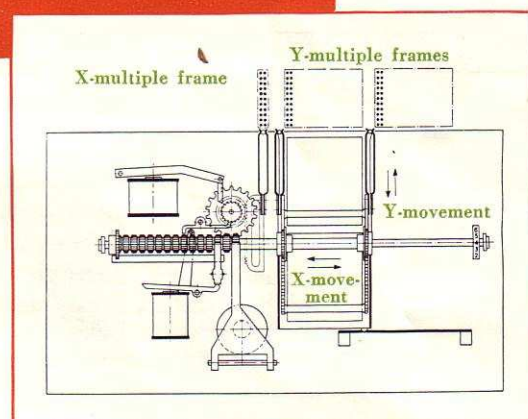






## Step-by-step Driven XY Selectors with Bare Wire Multiple

The selector devices consist of step-by-step driven 100-line selectors, assembled on a flat base where all parts are easily accessible for inspection and cleaning. In the stand the selectors are inserted in separate selector compartments, at the back of which the bare wire multiple of the selectors are fitted. The multiple comprises a number of multiple frames, each containing  $2 \times 11$  bare wires moulded in insulation strips of moulding material. The multiple frames are placed parallel to each other, making the multiple very rigid, taking up little space and facilitating inspection.



In the setting of the selectors the wiper arms make two straight movements at right angles to each other. They first move lineally along the multiple, the X-movement, and then go into the selected multiple frame, the Y-movement. As the wiper arm movement may be considered as taking place along the X and Y axes in a right-angled coordinate system, the selector has been given the name of XY-selector. Restoration to home position takes place immediately by spring action. All selectors in the branch exchange are identical in construction.

The fronts of the selectors are covered by transparent plastic, enabling the setting of the selectors to be noted with ease. As the whole back of the multiple is covered complete protection against dust for selectors and multiples is ensured.



## Operating Features

### ■ The Branch Exchange Can be Connected to Any Public Exchange

The branch exchange may be connected to automatic or manual public exchange of any system. The manual exchange may have either central battery or local battery feed.

### ■ Even Long Lines Can be Connected

The resistance of two-wire lines connected to the branch exchange may amount to a maximum of 1000 ohms, equivalent to a two-wire cable line app. 5.0 km long, with 0.5 mm copper conductors and standard insulation. The leakage resistance should not be below 15000 ohms.

Only two-wire lines are employed and no earthing is required. This makes the line system cheap and reliable.

### ■ Great Voltage Variation Permissible

The branch exchange is designed for operating on 24 V, but the voltage may vary between 22 V and 28 V without affecting the operating reliability.

### ■ Low Power Consumption

The power consumption at 24 V is only 0.25 A for an internal and 0.5 A for an external call.

## Assembly

Great attention has been given to making the branch exchange as simple and quick as possible to assemble on the spot. The exchange is sent out from the factory with all fixed equipment, such as selector multiple, line relay sets, jacks etc. ready fitted and wired. Thus the assembly is confined to connection of extension lines, public exchange lines, operator's instrument and

power plant, and fitting of the detachable connecting devices in their places in the stand.

As the whole stand and its fixed equipment, as also the detachable connecting devices, are carefully tested before leaving the factory, no time-consuming testing need be undertaken before putting the branch exchange into service.

## Service

By having all the connecting devices of the exchange detachable by way of plugs and jacks, it has proved possible to deal with the service in a most convenient manner.

Thus if fault should arise in the exchange during operation, all that is required is to localize the fault to a given connecting device and then take this out from the stand for closer inspection. The operation of the exchange is not disturbed by the removal of the connected device, and traffic can go on without interruption except where a common unit is affected.

If on a closer examination it is found that the fault can be put right by simple adjustment, soldering of a detached wire or the like, such

work can naturally be done on the spot, and the unit thus repaired is re-plugged in the stand.

If, however, the fault is of such a nature that the fitter cannot detect it at once, he should immediately dispatch the unit to the L M Ericsson's nearest representative. The representative may have facilities for repairing the unit and return it to the customer or, if this would take up too much time, he can send a new unit which the fitter can immediately plug into the stand and put into operation.

This manner of procedure ensures rapid and reliable service for the private branch exchange, even at places where L M Ericsson has no representative.