

Paging, PG3

INTERWORK DESCRIPTION



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GENERAL

Function block PG3 is the system’s interface to external paging equipment with serial loop signaling. Examples of this type of equipment are systems designed according to the ESPA 4.4.3 standard.

Other systems with loop interface can also be connected, but in such cases the different interface variants of PG3 should be compared in detail with the interface of the paging equipment. A signaling alternative that makes optimum use of the functions of both the PBX and the external paging equipment should be chosen. In most cases the external equipment also offers different interface variants.

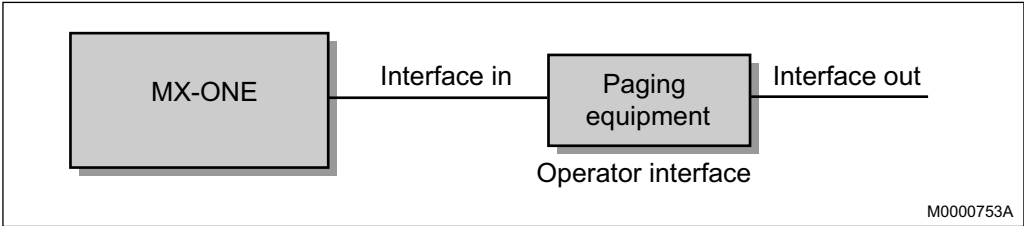


Figure 1: Interface between PG3 and external paging equipment

The loop interface characteristics are as follows (see 2 Paging interface with loop signalling. on page 4).

- The a- and b-wires are used to transmit line signals from the PBX to the paging equipment, such as seizure and pulsing.
- The a- and b-wires are used for reception of line signals (tones) sent from the paging equipment to the PBX, such as proceed-to-send and paging-in-progress signals.
- The a- and b-wires are used for two-way radio speech connections and for DTMF tone signaling from the PBX to the paging equipment.
- All numerical information sent from the PBX to the paging equipment (such as paging codes, mode digits and display messages) is in serial form and transmitted over the speech wires, either by pulsing or by DTMF tone signaling.

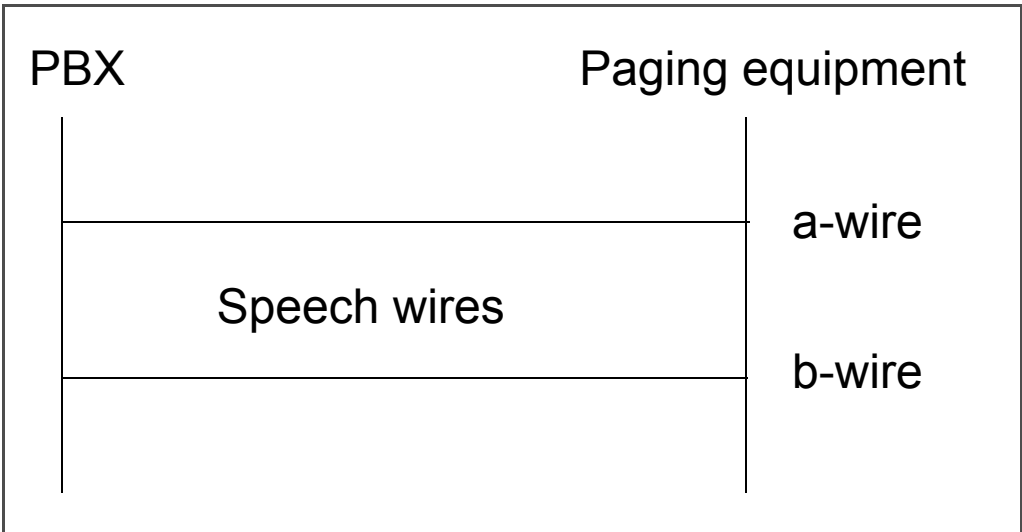


Figure 2: Paging interface with loop signaling.

PG3 can handle the following signals:

Signals to paging equipment

Seizure

Digit sending

Clear-forward

Signals from paging equipment

Proceed-to-send

Paging-in-progress

2 INTERFACE IN

2.1 GENERAL

Two different signaling diagrams may be used.

Subscriber signaling

The following products are to be used for subscriber signaling:

TLU44

TLU75

TLU83

These products are equivalent in terms of functions. Since the transmission level are adapted to different markets they may vary somewhat.

Tie-line signaling

TLU35 is to be used for tie line signaling.

The boards have two identical individuals (0, 1). All individuals are equivalent and are connected via individual speech wires.

Note: Channels for different search areas must not be connected on one and the same device board. No tie lines or announcing machines must be connected on a device board with paging channels. Only channels of the same signaling type are allowed in a given search area.

2.2 LOGICAL INTERFACE

PG3 handles signals in the interface to the external paging equipment.

2.2.1 SEIZURE

After a channel for calling the paging equipment has been reserved in the PBX, a seizure signal is immediately sent to the paging equipment through a low-resistance loop.

See parameter description for *PAGING*, parameter VAR for PG3.

2.2.2 DIGIT SENDING

Digits are sent via the interface on speech wires, either by pulsing or by DTMF key sending. The numerical information is composed in the PBX on the basis of the procedure used and the categories of the paged person. The format and content of the numerical information can be controlled in PG3.

See parameter description for *PAGING*, parameter VAR for PG3.

2.2.2.1 *Paging code only*

In its simplest form the numerical information consists only of the paging code, which is used by the external paging equipment to address the wanted receiver. The length of the paging code is determined when allocating a paging receiver to a person, that is,

when inserting the paging code. See parameter description for *PAGING*, parameter VAR for PG3.

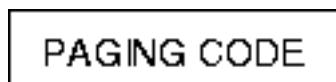


Figure 3:

Paging code containing 2-4 digits

When only the paging code is used, the paging equipment cannot discriminate between different types of call. All types of call are indicated in the same way on the paging receivers.

2.2.2.2

Paging code and mode digit

A paging code and a mode digit are to be used when it is necessary to discriminate between different types of call, for example:

- calls to one person/a group of persons
- external/internal calls
- paging with/without voice addressing
- paging via display
- alarms/acknowledgment of alarms

The mode digit may assume values between 0 and 9, each of the ten values being reserved for a given type of call. See parameter description for *PAGING*, parameter VAR for PG3.

The mode digits for the types of call that the system must be able to discriminate between are to be programmed/strapped in different ways in the external paging equipment.

Example: the number of code characters on the display of the paging receiver, or the number of bleeps, will vary for different mode digits.

If the paging equipment does not include any facility for programming of mode digits, the mode digit can be varied in PG3. The market parameter used here is a conversion table by which a change from the standard mode digit to an optional mode digit is provided. The contents of the conversion table are determined by the paging equipment.

The mode digit is normally sent after the paging code. PG3 can, however, also be programmed for sending of the mode digit before the paging code. See parameter description for *PAGING*, parameter VAR for PG3.

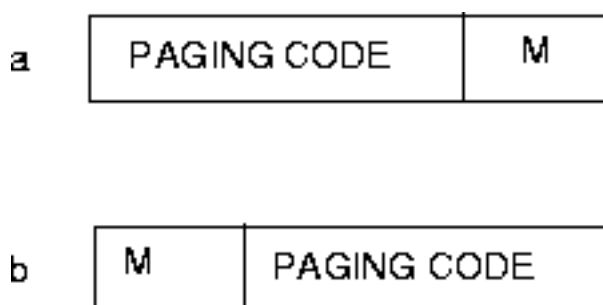


Figure 4:

Paging code containing 2-4 digits
1 mode digit (M).

2.2.2.3 Numerical message for display

In addition to a paging code and a mode digit, a numerical message can be transmitted and presented on the display of the paging receiver.

The contents of a display message are composed as follows:

- In standard paging: automatically by using the A- and/or B-number, based on the paged person's category. See parameter description for *PAGING*, parameter PCAT.
- Initiation of alarms: automatically by using the alarm group code based on the paging data of the initiating party. See parameter description for *PAGING*, parameter CODE.
- Paging with display message: by using the procedure digits.

A display message is formatted in PG3 so as to form up to 10 digits in A-number transmission, and up to 5 digits in B-number transmission. An optional display message is limited to 10 digits by PG3. Either 0 or * can be used as gap character. If * is used, digits should be transmitted by DTMF. Note that a display message need not contain any gap characters.

See parameter description for *PAGING*, parameter VAR for PG3.

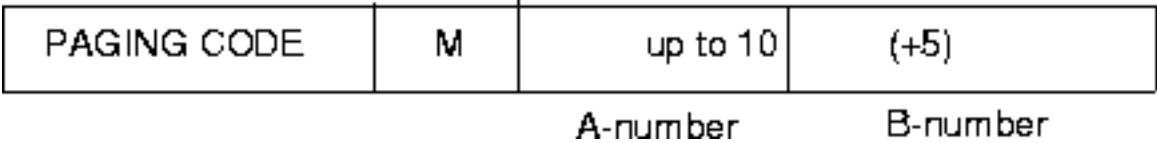


Figure 5:
Automatic transmission of directory numbers.



Figure 6:
Transmission of optional display message.

2.2.3 FORWARD CLEARING (CLEAR-FORWARD SIGNAL)

The channel is cleared by the PBX in the following traffic cases:

- On meet-me voice paging when the party that initiated the paging operation replaces his handset.
- When the time supervisory function "total holding time for paging channel" expires. See parameter description for *PAGING*, parameter THO.
- An incorrect signal is received from the paging equipment, or an expected signal fails to appear (for instance, a proceed-to-send signal).

When the channel is cleared, the speech wires resume idle state. The channel is normally free-marked 300 ms later and can then receive a new call. Where necessary, the time between clearing and free-marking can be prolonged by another 1-9 seconds. See parameter description for *PAGING*, parameter TBL.

2.2.4 PROCEED-TO-SEND SIGNAL

This signal is sent from the paging equipment to confirm that the seizure was successful and to indicate that the paging equipment is ready to receive digits. PG3 starts the digit sending on receipt of this signal. The signal may either be received in the form of a 425 Hz tone message on the speech wires or be omitted. See parameter description for *PAGING*, parameter VAR for PG3. Use of the proceed-to-send signal is recommended.

2.2.5 PAGING-IN-PROGRESS SIGNAL

This signal indicates that a paging operation is going on. The signal is in the form of a 425 Hz tone message.

2.2.6 DISTURBANCE MARKING

If the signaling diagram includes a proceed-to-send signal from the paging equipment, PG3 will supervise the reception of this signal. The absence of a proceed-to-send signal will result in disturbance-marking of the channel, which means that the channel will be used only if there are no other free channels in the paging area. When a new problem-free proceed-to-send signal arrives, the disturbance marking is erased automatically.

2.2.7 AUTOMATIC BLOCKING

The detection of a power failure on the line results in automatic blocking of the paging channel. When the power returns, the channel is deblocked automatically. As far as tie lines are concerned, test connections are also set up (for example, once every minute in blocked channels) to see if the line is OK. If the line is ready for use, the channel is deblocked automatically.

2.3 ELECTRICAL INTERFACE

2.3.1 SUBSCRIBER SIGNALING: TLU44, TLU75, TLU83

In the paging equipment the a-wire is fed by 6-48 V or -6 - -48 V, and the b-wire is connected to 0 V.

In idle state there is a high resistance between the a- and b-wires (>200 kohm).

Transmission levels (dBr):

Table 1

	TLU44/1	TLU75/1
Short line, input	-4	-3

Short line, output	+1	-3
Long line, input	-2	-
Long line, output	-1	-

Note: Some boards can have different variants on different markets, and their transmission levels can differ from those above.

For TLU83 details, refer to TLU83, ANALOG TRUNK DESCRIPTION.

Input impedance:

600 ohms (nominal value at 800 Hz).

2.3.2

TIE LINE SIGNALING: TLU35

Power feed < 800 ohms relative to 0 and -48 V, or an external voltage connected to the board front, for example -60 V.

Transmission levels (dBr):

TLU35

Short line, input-3

Short line, output-4

Long line, input -5

Long line, output-2

Input impedance: 251 ohms + (825 ohms // 115 nF).

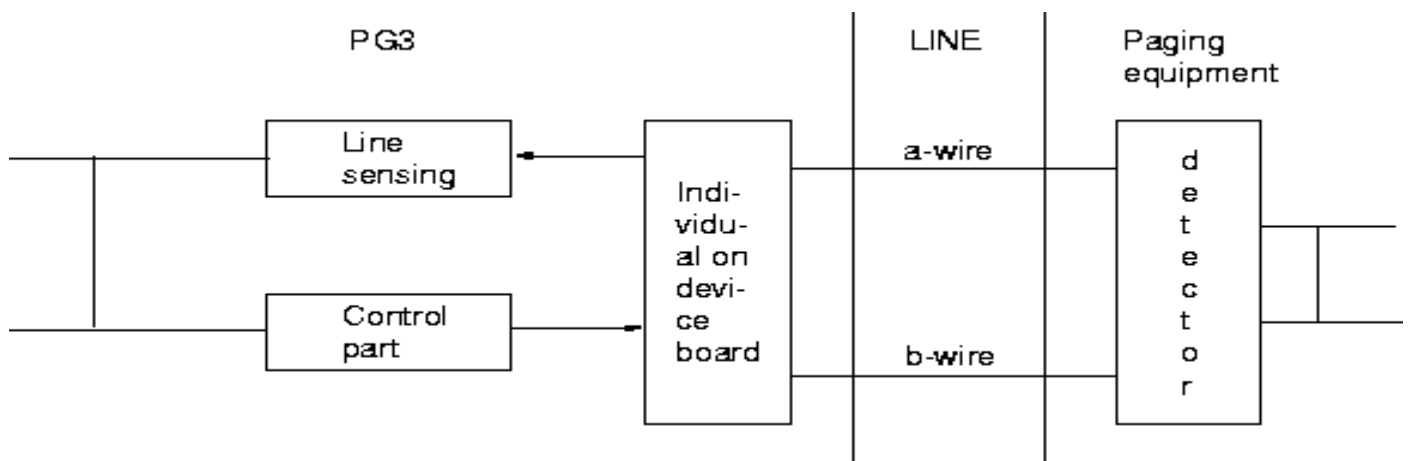


Figure 7: Electrical interface.

2.4

MECHANICAL INTERFACE

The external paging equipment is connected to the PBX via the MDF.

2.5

PROTOCOLS

The protocol (signaling diagram) varies for different paging equipments.

Interworking Application for PG3 describes a signaling diagram according to recommendation ESPA 4.4.3.

The signaling diagram can be modified with a parameter. See parameter description for *PAGING*, parameter VAR for PG3.

3

INTERFACE OUT

Since this interface varies with the different types of paging equipment used, it is not described here.

4

OPERATOR INTERFACE

The PG3 interface in the PBX is programmed via the I/O interface of the PBX. See the operational directions for *PAGING*.