Interlock Control System
For the Access Control to e.g. Clean Rooms or Laboratories

In clean rooms, laboratories, hospitals etc. doors may often be opened only when others are closed. The DICTATOR interlock control system facilitates an easy configuration of these relations, without a complex PLC control system. The relations are "programmed" directly by DIP switches. Trained persons not requiring any special programming know-how can modify them on site at any time.

For an easy mounting the components of the newest generation are connected as telephones or networks by cables with RJ45 connectors (exception: ex-proof version). The power pack for the 24 VDC supply is provided with a safety plug.

The interlock doors can be unlocked either by pushing the corresponding key on the terminals or free of contact by a transponder, the transponder system having an integrated access control.

There are two exceptions from the plug-in version (here the complete electrical wiring has to be effected by the customer):

- the ex-proof version,
- the SP interlock control system for flush fitted switch boxes or pattresses.

System Versions

<table>
<thead>
<tr>
<th>Peripheral system</th>
<th>Extremely flexible, modular structure, can be extended at any time, complex special functions possible, also for installations with doors far apart.</th>
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</thead>
<tbody>
<tr>
<td>beginning on page 08.011.00</td>
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<table>
<thead>
<tr>
<th>Central system</th>
<th>For small systems with max. 5 doors (optionally 8 doors). Max. cable length 15 m. Depth of terminals only about 27 mm.</th>
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<tbody>
<tr>
<td>08.019.00 et sqq.</td>
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<table>
<thead>
<tr>
<th>Ex-proof version</th>
<th>For max. 5 doors (optionally 8 doors). Central controller for mounting outside hazardous area, optionally with ex-proof casing. Also not ex-proof doors can be integrated.</th>
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<tr>
<td>beginning on page 08.027.00</td>
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<table>
<thead>
<tr>
<th>Switch box version</th>
<th>The components of the terminals are mounted in an off-the-shelf switch system. Used with central controller, electric connection to be provided by the customer.</th>
</tr>
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<tr>
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</table>
**Interlock Control System**

**DICTATOR Interlock Control System - General Information**

In the DICTATOR interlock control system all doors of the interlock control system are generally locked and are released only temporarily when the operating key of the terminal is pressed. This offers the highest possible safety within the interlock system.

Every door is controlled by a separate control board. With the peripheral system these are integrated in the control terminal of the respective door, with the central system the control boards of all doors forming part of the system are united in a central controller. The ex-proof interlock control system is a modified version of the central system.

**Unlocking the Doors - Options**

The peripheral system as well as the central one of the DICTATOR interlock control systems offer **two basic options to unlock** the doors:

- **Terminals with key**
  (The peripheral system and the one with central controller RJ use the **piezo-type key** with illuminated ring described in the following. Information on the keys in the ex-proof system and those for the SP switch box system can be found on the pages 08.031.00 and 08.040.00.)

- **RFID terminals without key operated by transponder** (integrated access control)

Another possibility to unlock the door is to connect an extern switch, e.g. a large surface switch.

The piezo-type key is ideally suited for its use in clean rooms. It features no mechanical moving parts where dirt could settle and it is not subject to mechanical wear. It offers a very long operational life of 20 million operations. It also is very resistant to environmental influences. Its operation requires only a very slight pressure.

**Indication of the door status**

The illumination on the terminals clearly signals the user whether the respective door can be used or is locked at the moment (**indication of the door status**). The terminals of the peripheral and the central system have an illuminated ring around the operating key. The ex-proof terminals have an extra illuminated green/red indicator:

- **Green**: The door is locked but can be opened by pushing the operating key.
- **Red**: The door is locked. It cannot be opened as it is locked by another open door. The illumination of the ring will return to green as soon as the other door is closed again.
The terminals with piezo-type key and transponder of the peripheral and central interlock control system can be combined at will, also on one door. Both models have the same dimensions.

This allows, if necessary, to equip certain areas of the interlock system with an automatic access control without needing additional devices.

Often certain areas of the interlock system shall be accessible only to a limited group of people. Usually this is controlled by additional access control systems.

DICTATOR now has developed terminals for the interlock system that feature an integrated access control. The piezo-type key is replaced by a RFID system. This allows to change authorizations any time and also to attribute different authorizations within one interlock system.

On both sides of each door different authorizations can be programmed.

Instead of pushing the piezo-type key, the door is unlocked by a transponder. The RFID system has been designed so that it can be operated by off-the-shelf tranponder chips.

The maximum reading distance between terminal and transponder chip is approx. 3 cm.

Transponder chip requirements
- Frequency: 125 kHz
- Storage: 64 Bit
- Type of chip: EM 4100, EM 4102, EM 4200

E.g. DICTATOR transponder chip WD1 (see also page 08.069.00), part no. 710878

Programming
The receivers in the terminals are programmed by a master chip and a delete chip. These should have a different colour than the normal transponder chips.

To train the transponder chips you firstly hold a delete chip close to the receiver, then the master chip and after this the transponder chips to be trained. With the master chip you can delete the access authorization of individual tranponder chips any time.

To administer the issued authorizations you use a PC with a RFID reading device to read the transponder chip identifications.

In case transponder chips which meet the a.m. requirements are already being used in the building, these can directly be read. Then there is no need of extra transponder chips in the interlock control system.

Indication of the door status
The terminals of the transponder series signal the actual status of the door and the reception standby by three different luminous diodes. The function of the green and red LED corresponds to the illuminated ring of the piezo-type keys.

Green: The door is locked but can be opened by transponder.
Red: The door is locked. It cannot be opened as it is locked by another open door. The illumination of the ring will return to green as soon as the other door is closed again.
Blue: The blue LED informs about the recognition of the transponder chips.
Interlock Control System

DICTATOR Interlock Control System -
General Information, cont.

The interlock control system is a very flexible system. Without needing a time-consuming new programmation, the complete interlock control system can easily be adapted to changing requirements.

"Programming"

One of the main features of the DICTATOR interlock control system is the very easy "programming" of the relations between the doors. No computing skills at all are needed.

All relations are adjusted by DIP switches.

The peripheral version features these DIP switches directly in the control terminals.

In the central system they are placed on the circuit boards in the central controller.

The relations between the doors can be adapted any time. It is also easily possible to later enlarge the interlock control system.

More detailed information and a programming example can be found on page 08.009.00.

On the same circuit board (either in the control terminal or in the central controller) you can adjust by a potentiometer the time during which the door will remain unlocked, i.e. the door can be opened after the operating key has been pressed. It is of no importance whether the door is really opened or not. The period to be adjusted depends on whether it is an interlock for people or material.

Emergency-Open Switch

The door terminals of the peripheral and the central interlock control system are available either with just an operating key or with an additional emergency-open switch.

In case of an emergency the door can be unlocked by means of the emergency-open switch even while being locked by the interlock control system. The switch remains locked after having been pressed. In order to reactivate the interlock control system the emergency-open switch has to be unlocked by turning. After a short delay the system is ready to work again.

If necessary, the emergency-open switch can be protected by an extra cover against unauthorised use (cover prepared for a lead seal, see page 08.045.00).

Two different emergency-open functions are possible:

- Local emergency-open (LNA): unlocks only the door of the respective terminal.
- Global emergency-open (GNA): unlocks all doors of the group.
Interlock Control System

DICTATOR Interlock Control System - General Information, cont.

The DICTATOR interlock control system is a modular system which can also integrate non-system components. Depending on the chosen version it also offers a great variety of additional possibilities.

Some of the options mentioned in the following are not possible in the ex-proof version of the system or the system for switch range SP. Details about these two versions and the possible options can be found beginning on page 08.027.00 or 08.037.00.

Locking Devices

To lock interlock doors bar magnets, electric strikes etc. can be used. A big choice can be found in the catalogue beginning on page 08.047.00.

But already installed locking devices can also be included in the DICTATOR interlock control system. For this purpose they have to meet the following requirements:
- they dispose of a feedback contact which is closed when the door is closed (if necessary, it can be mounted separately),
- they function with 24 VDC and
- they are locked with current (requirement of the EltvTR).

Access Controls

Access controls can be connected to all terminals of the interlock control system (only exception are the ex-proof ones). There are two options for their functioning:
- entering the access code automatically releases the door.
- in addition to entering the access code the piezo-type key of the terminal has to be pressed.

A choice of access control systems can be found beginning on page 08.067.00.

Access control systems that are already installed have to have a potential-free make contact (NO) (switching time about 1 sec.). If possible, the access control system should function with 24 VDC as it then can be fed by the power pack of the interlock control system.

Additional Switches (e.g. Large Surface Switches)

The DICTATOR interlock control system allows also to connect large surface switches or something similar to adapt the interlock control system optimally to the needs of the users. Large surface switches are very convenient when the persons passing through the interlock door have to carry something and therefore don’t have empty hands or when they are handicapped.

Integration of Emergency Exits

Interlock control systems often also include emergency exits. These have to be equipped according to the requirements of the EltvTR (German standard for electrical locking systems on emergency exits).

For this purpose DICTATOR has developed as a special component the emergency exit terminal which has been tested and approved by the TÜV Thüringen. This terminal can easily be integrated in a DICTATOR interlock control system.

Door Operators

Especially in clean rooms interlock control systems form part of a production process. There doors often should open automatically. The DICTATOR interlock control system also easily allows to integrate door operators in the interlock system. The door operator should have the following characteristics:
- automatic closing or a separate control device for a closing command.
- signal output "door closed" (NO). (If not available, a separate feedback contact has to be mounted.)

Time Control

Depending on the type of the DICTATOR interlock control system there are different possibilities to reopen certain doors of the interlock system only after an adjustable period. This can be achieved either directly by some terminals or by an additional time control unit.
Discretion Circuit

The interlock control system allows to establish a discretion/delaying circuit for any doors. These doors cannot be opened from the outside even when all other doors are closed, as long as they are locked from the inside by a separate switch (e.g. for undisturbed changing).

Relay Controlled Additional Functions

The control terminals of the peripheral system and the control boards of the central system dispose of different signal outputs/status indications. They all can be used for transmission to a facility management system. The peripheral interlock control system allows also for many relay based additional functions. Among these are:
- Starting a ventilation/heating.
- Switching on/off lighting.
- Controlling a pressure compensation.
- Optical/acoustic warning signals.

Number of Doors in Interlock Systems

The DICTATOR interlock control system has been designed for smaller interlock systems. Due to its very easy mounting, wiring and "programming" the DICTATOR interlock control system represents an ideal solution to the always increasing requirements regarding hygiene and clean rooms.

The number of doors in the interlock control system depends on the type of the interlock control system.

**Peripheral interlock control system**

The standard version of the peripheral system has been designed for up to 8 doors. But it also can be used for more doors if the doors can be combined to several groups. At a maximum there can be controlled 8 groups of doors with 8 doors each.

**Central interlock control system**

The version with the central controller has been designed for installations with up to 5 doors. But also the central system is flexible and can be extended to up to 8 doors. But this system requires that all connected doors have to be within the reach of a 15 m cable to the central controller.

**Ex-proof interlock control system**

The ex-proof system is based on the central control system and therefore also can control only up to 5 doors. Same as the central interlock control system this system can be extended to a maximum of 8 doors. But here the ex-requirements have to be observed.

**SP interlock control system for flush fitted switch boxes or pattresses**

The interlock control system for the switch system LS 990 uses the central controller of the ex-proof version which has to be wired on site. The maximum number of doors corresponds to the one of the central system.

Just ask us. We will work out a free of charge offer with a solution proposal.
Interlock Control System - Programming

The following matrix helps you to determine the position of the DIP switches on the control boards. Just mark for each door which other door(s) may be open at the same time and which one(s) must stay locked (see example below).

There are 3 positions for the DIP switches:
Position +: defines the door for which the relations are set (basis door)
Position -: this door is locked as long as the "basis door" is open.
Position 0: this door can be opened even though the "basis door" is open, too.

<table>
<thead>
<tr>
<th>Door number</th>
<th>Admissible state of the other doors of the interlock system depending on the open &quot;basis door&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of the basis door</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
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<tr>
<td>4</td>
<td>0</td>
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<tr>
<td>5</td>
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<td>6</td>
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<td>7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

Clean room interlock system with 5 doors

Required relations (determined by the customer)

<table>
<thead>
<tr>
<th>Door open</th>
<th>Door locked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door 1</td>
<td>Door 2</td>
</tr>
<tr>
<td>Door 2</td>
<td>Doors 1, 3 and 4</td>
</tr>
<tr>
<td>Door 3</td>
<td>Doors 2 and 4</td>
</tr>
<tr>
<td>Door 4</td>
<td>Doors 2, 3 and 5</td>
</tr>
<tr>
<td>Door 5</td>
<td>Door 4</td>
</tr>
</tbody>
</table>
DICTATOR Interlock Control System - Summary

On the following pages you will find detailed information about the different types of the DICTATOR interlock control system and the components which can be used for upgrading the peripheral as well as the central version.

Peripheral interlock control system
Overview page 08.011.00
Components page 08.012.00
Control terminals ST3 page 08.013.00
Operating terminals BT3 page 08.014.00
Distribution box page 08.015.00
Connection cables page 08.017.00
Order information page 08.018.00

Central interlock control system
Overview page 08.019.00
Components page 08.020.00
Central controller RJ page 08.021.00
Operating terminals BTZ page 08.023.00
Operating terminals BT3 page 08.024.00
Connection cables page 08.025.00
Order information page 08.026.00

Ex-proof interlock control system
Overview page 08.027.00
Components page 08.028.00
SK central controller page 08.029.00
Operating terminals BTZ EX page 08.031.00
Ex-proof locking magnet page 08.032.00
Order information page 08.036.00

SP interlock control system for flush fitted switch boxes or pattresses
Overview page 08.037.00
Components page 08.038.00
SK central controller page 08.039.00
Operating terminals for switch range page 08.040.00
Order information page 08.041.00

Additional components for the peripheral and the central type
Emergency exit terminal page 08.043.00
Time control unit page 08.044.00
Mounting accessories page 08.045.00
Order information page 08.046.00