

**DORMA
ES 90/100**

GM Components

SERVICE BUTTON Three uses

(RED)

1. Reset
2. Relearn
3. Activation

RED L.E.D.

Three uses

1. Power on
2. Learn cycle
3. Accepting

commands

FUSE

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F1 = 2amp

GM Service Button

■ 2. RELEARN

a, Hold in the red button for at least 3 seconds, then release.

b, Allow the door to set up.

■ NOTE This will not change any settings.

■ 3. ACTIVATE Press the red button for 1 sec.

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GM Service Button

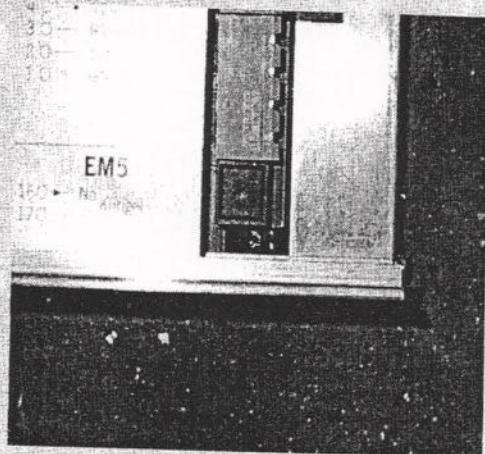
- **1. To RESET**
- **a**, Disconnect the power (kettle lead).
- **b**, Hold in the red button and Reconnect the kettle lead.
- **c**, After 25 seconds the door will move, release the red button.
- **d**, Allow the door to go through it's set up.

- **NOTE** A reset will put all settings back to factory presets.

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Ground Module L.E.D.

- **1. ON,**
Power on
- **2. ON, FLASHING**
Learn cycle
- **3. 3 x FLASHES**
Accepted command
- **4. OFF**
No power



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ES 90 GM Terminals

- 19 0v
- 18 24v + dc
- 17 0v
- 16 Outer Activation
- 15 Night bank
- 14 Night bank
- 13 Lock (lock)
- 12 Lock (unlock)
- 11 Lock 24v +
- 10 Emergency Off
- 9 Emergency Off
- 8 P/s Off
- 7 P/s Automatic *
- 6 P/s Open
- 5 P/s 0v *
- 4,3,2,1 Interface
- and Hand
Programmer

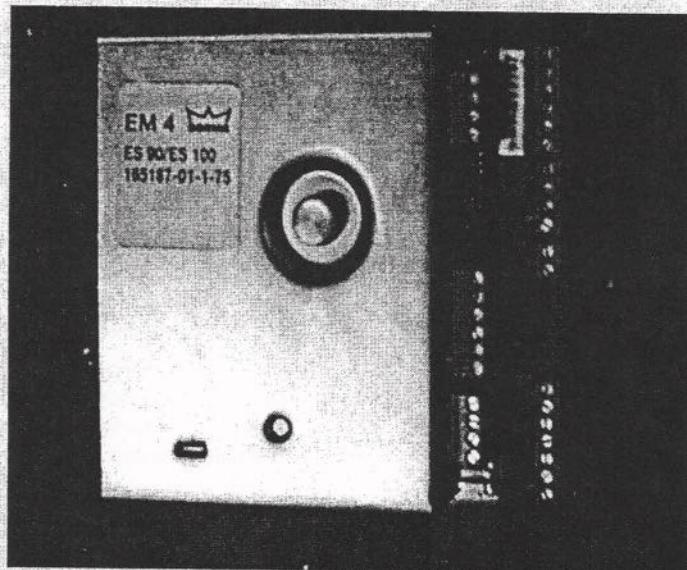
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ES 90 GM notes

- For test purposes only, the GM board will run the operator without an EM board fitted.
- A reset must be performed each time the EM board is installed, or removed to allow the GM to recognise the change.
- The lock output is not protected, and care should be taken when aligning the lock, to avoid damage to the GM.

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EM 4



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EM 4 Terminals

- 1. To 24 are the same as an EM 2 board.
- The light barriers on this board are not interchangeable with an EM 1 or an EM 2.
- The EM 4 will accept the SBK111 light barriers.
- 41. L/B 1 Tx (neg)
- 42. L/B 1 Tx (24vdc +)
- 43. L/B 2 Tx (neg)
- 44. L/B 2 Tx (24vdc +)
- 46. L/B 1 Rx (24vdc +)
- 47. L/B 1 Rx (neg)
- 48. L/B 1 Rx (input)
- 49. L/B 2 Rx (neg)
- 50. L/B 2 Rx (input)
- 51. L/B 2 Rx (24vdc +)

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Commissioning / Adjustment / Functional testing

Work on electrical equipment must only be performed by trained and qualified electricians.

1. Preparations for commissioning

1.1 Basic prerequisites

- The operator has been completely installed.
- The protective earth conductor is connected.
- The back-up storage battery module is plugged in.
- The light barriers are connected.
- The expansion module is plugged in.
- The separately supplied components such as program switch, activators and lock systems have been installed and connected.
- The end stops are adjusted so that at the maximum opening width both (outer) sliding panels come into contact with the stops, and the sliding panels and stationary screens do not collide at their respective sealing profiles when the door is closed.

2. Commissioning

1. Move the door panels to the half-open position.
2. Set the program switch to "OFF".
3. Unlatch the emergency stop switch.
4. Press the service pushbutton while at the same time switching on the mains power.
5. Wait for approx. 20 seconds for the switch-on phase to be completed, and for the control unit to carry out a self-test. The operational status display LED lights up and the door should now slowly close.

In the case of single-panel, rightward opening doors:

If the door opens, the motor connections must be reversed and procedure steps 1 to 5 repeated.

Only during initialisation (loading of default program settings) is the changed counting direction of the incremental encoder detected.

- The door performs a closing cycle.
6. Once it has reached the closed position, set the program switch to "AUTOMATIC".
7. Depress the service pushbutton for approx. 3 seconds.
- The door set now performs a learning cycle: The door opens at creep speed to determine the opening width. Once the door is in the open position, press the panels against the end stops to enable the system to identify the motor type. Opening width and motor type are then stored.
- The door set then tests whether a lock is connected and if so, what type of lock. For this purpose, the door opens and closes a short distance up to three times.
8. Briefly depress the service pushbutton.
- The door opens quickly, the control unit stores the door parameters and then performs a back-up battery test.

When using the ES concealed rod multipoint lock, perform the procedures specified under step 8 overleaf: Concealed rod multipoint lock.

3. Settings

3.1 Expansion module 4 (EM 4)

The control unit is preset so that it is optimised for the most common applications.

By resetting a jumper, the emergency open function can be converted into an emergency close function. For this, unscrew and remove the housing cover of the module.

If another setting should be required, this must be implemented using the hand terminal (HT). (See hand terminal operating instructions).

3.2 Re-instating the default settings

1. Depress the service button while at the same time switching on the mains power.
- The door performs a closing cycle.
2. Once the closed position has been reached, release the service pushbutton and set the program switch to "AUTOMATIC".
- The door performs a learning cycle and then switches all parameters to the default settings.

3.3 Setting the partial opening width

The partial opening width can be set using the program switch in accordance with individual requirements.

1. Set the program switch to "PERMANENT OPEN"
- Door opens at creep speed.
2. Once the required partial opening width has been reached, set the program switch to "PARTIAL OPENING".
- The door stops and the newly set partial opening width is stored.

The program switch function for setting the partial opening width can be disabled using the hand terminal. The partial opening width can then only be set and adjusted using the hand terminal.

4. Functional testing

4.1 Light barriers

1. Interrupt the light barriers individually during the closing cycle.
- The corresponding LED on the expansion module lights up and the door reverses.
2. With the door open, interrupt the light barriers for a period of several seconds.
- The door should remain open as long as the light barrier transmission paths are interrupted.
- Once the obstruction of the light barriers has been removed, the door should close on expiry of the preset hold-open time.

An automatic test of the light barriers is additionally performed prior to each closing cycle.



4.2 Activators

Test all connected activators in the various program switch settings. Perform settings and adjustments for the activators in accordance with the corresponding installation instructions.

4.3 Emergency opening -

operation with back-up battery module

1. Set the program switch to "OFF" and remove mains plug.
 - Lock should not disengage and door should not open.
2. Set program switch to "AUTOMATIC".
 - Door should unlock and open.
3. Re-insert mains plug.
 - Door should close at creep speed.
4. Leave program switch in "AUTOMATIC" setting and remove mains plug.
 - Door should open.

4.4 Emergency stop -

operation with backup battery module

1. Set program switch to "AUTOMATIC" and during the closing cycle, operate the **emergency stop switch**.
 - Door should stop and reverse.

4.5 Lock

Set program switch to "OFF".

- Door should be locked in closed condition.

In all other program switch settings.

- Door should be unlocked.

The lock can be adapted with the hand terminal at the request of the customer.

(See hand terminal operating instructions)

4.6 Night-bank activator

1. Set program switch to "OFF".
2. Issue an opening signal using the "NIGHT - BANK" activator.
 - The door should unlock and open.
 - The door should close and lock automatically once the user has passed through the door or, at the latest, on expiry of the pre-set "NIGHT - BANK hold-open time".
3. Remove mains plug
4. Issue an opening signal using the "NIGHT - BANK" activator.
 - Door should unlock and open as long as the NIGHT - BANK - signal remains live.
 - With the KT 8 key switch as the activator, the door can also be unlocked if the power is disconnected.
1. Push the door closed by hand.
2. Turn the key switch counter-clockwise.
 - Door should lock.

5. Further information

(GB)

The door system performs a self-test every 4 hours or at appropriate times after the system has been switched on.

In this self-test, an emergency opening cycle is performed under battery power and the control unit is checked for integrity. If the self-test should fail, the door remains in the open position.

The door can be closed by setting the program switch to "OFF".

At the next opening signal, a further self-test is performed.

6. Optional functions

If the functions described below have been implemented, they must be tested as follows.

6.1 Air lock (two doors in tandem)

Depending on the side from which the opening signal is initiated, the first door in the access sequence should initially open and then close.

Only after the first door has closed should the second door open and close.

6.2 Presence detector (bell contact)

Check the bell contact by interrupting the light barriers.

6.3 Door status monitor

Check the audible or visual door status detectors.

6.4 Panic/emergency closing

 The panic/emergency closing function is subject to special statutory regulations. Consequently, it is imperative to ensure compliance with the relevant national regulations.

The panic/emergency closing function must be set using the DIP switches and hand terminal.

Initiate a NIGHT/BANK signal in each of the program switch modes "AUTOMATIC", "EXIT ONLY", "PARTIAL OPEN" and "PERMANENT OPEN".

- The door should close immediately.

The door should not open either when the light barriers are interrupted or when a signal is issued by radar detectors.

Cancelling the panic/emergency closing function:

Set the program switch to "OFF", and then back to the required mode.

Then test all the other functions.

- Opening and reversing via the radar detector.
- Reversing via the light barriers.



7. Force limitation

7.1 Adjusting the static force limits as per ZH 1/494 and pr EN 12650

According to the German standard ZH 1/494, sliding doors can be operated without hinged safety pocket screens to safeguard the nip points provided that the static forces are limited to values less than 150 N. The parameters listed in the following overview should be regarded as a guideline for setting the forces.

ES 90/100 control unit with motor type GR63x25

Force limit CLOSE: 86%

max. force: 147 N

Force limit OPEN: 27%

max. force: 145 N

ES 90/100 control unit with motor type GR63x55

Force limit CLOSE: 80%

max. force: 147 N

Force limit OPEN: 25%

max. force: 149 N

⚠ The factory default settings and the parameters set using a keystroke function "Forces<150 N" on the hand terminal cover all the common door types.

The settings must be individually adjusted for less common door types.

After completion of the setting adjustments, the forces must be checked by measuring at the closing edges and where appropriate corrected.

Additional protection

As additional protection for the area safeguarded by the safety devices, a creep speed travel distance in the OPEN direction must be set for the door at 67% (approx. 20 cm).

The value for the force limit is indicated in the display. The force limit can be set to less than 150 N using a keystroke function.

The reduced force limit restricts the permissible motor current which in turn reduces acceleration and velocity.

7.2 Adjusting the dynamic force limit

as per prEN 12650

The closing edges can also be protected by limiting the dynamic forces and a light barrier, preferably installed at a height of 0,5 m. The following parameters should be regarded as guide values for ensuring that the forces set are in compliance with the standard, and they can be adjusted using the hand terminal.

ES 90/100 control units with motor type GR63x25

Opening speed: 57%

Creep speed CLOSE: 53%

Creep speed distance CLOSE: 100%

Force limit CLOSE: 85%

ES 90/100 control units with motor type GR 63x5 (GB)

Opening speed: 57%

Creep speed CLOSE: 53%

Creep speed distance CLOSE: 100%

Force limit CLOSE: 85%

⚠ After they have been set, the dynamic forces must be checked and corrected at the closing edges in accordance with the ranges specified in prEN 12650.

8. Concealed rod multipoint lock

Technical data

Supply voltage:

The 24V power supply is picked off from terminals 11 and 19 on the basic module.

This power supply also enables emergency unlocking and emergency opening in the event of a power failure provided that the expansion module is fitted with a back-up storage battery.

Power consumption:

29 mA; locking and unlocking: approx. 50 mA

Temperature range:

-20°C to 60°C

8.1 Prerequisites

- Control unit of the concealed rod multipoint lock is fitted.
- Cabling has been installed and connected in accordance with the wiring diagrams.
- ESU or jumper has been inserted at input "ESU".
- Jumper is set at input "Concealed rod multipoint lock ON".

8.2 Commissioning

1. In the DOOR CLOSED position, set the lock type using the hand terminal (see menu 4 "Door types" in the sub menu "Special system"). Then select the lock type option "Setting via hand terminal" / "Concealed rod multipoint lock". This setting procedure must be repeated after each initialisation operation.
 - After the learning cycle, the setting is retained.
2. Initiate an opening signal.
 - The setting is stored once the door reaches the OPEN position.
3. Set the program switch to "OFF".
 - The concealed rod multipoint lock should engage.
 - The red fault LED should flash.
 - The buzzer should emit three signal tones.

⚠ If the buzzer emits just one signal tone, the connections "Motor +/-", "Lock/Unlock", and/or "Limit switch, locked/unlocked" must be reversed.



4. Check the wiring and perform a directional test. In so doing, monitor the signals at the control unit of the concealed rod multipoint lock.
 - After a locking signal has been emitted, the locking rod must move down and the bottom limit switch must be closed.
5. Set the program switch of the ES90/100 control unit to "AUTOMATIC".
 - The concealed rod multipoint lock should unlock.
 - The red fault LED should flash once.
 - The buzzer should emit a single signal tone.

8.3 Settings

Setting the motor trip current using the potentiometer on the control unit of concealed rod multipoint lock.

1. Turn the potentiometer counter-clockwise to its limit.
2. Engage and disengage the concealed rod multipoint lock several times while observing the green LED.
3. Gradually turn the potentiometer clockwise until the green LED briefly flashes.
 - The current limit has now been reached.
4. Turn the potentiometer a further small degree clockwise until the LED is extinguished.
 - This completes the setting operation.

Check the limit switches and adjust as appropriate.

Check the position of the "Locked" and "Unlocked" limit switches and re-adjust as necessary.

The switches must be firmly closed in their respective end positions and the rack should not yet have reached its mechanical limit.

Setting DIP switch 1 (fault LED).

DIP switch 1 in position "ON".

- The LED fault indicator is switched on.

DIP switch 1 in "OFF" position.

- The LED fault indicator is switched off.

Setting DIP switch 2 (signal tone).

DIP switch 2 in "ON" position:

- The audible signal emitter is switched on.

DIP switch 2 in "OFF" position:

- The audible signal emitter is switched off.

8.4 Functional tests

Concealed rod multipoint lock ON:

- A jumper or a switch (in the case of FST doors) from terminal 12 to 13 places the system on standby.

Fault LED (red), selectable via DIP switch:

- 1x flash means unlocking successfully completed.
- 3x flashes means locking successfully completed.
- Lights up when both limit switches are either open or closed in the idle state.
- Continuous light signals fault.

Buzzer, selectable via DIP switch

(GB)

- 1x signal means unlocking successfully completed.
- 3x signals means locking successfully completed.
- Continuous signal indicates fault; shutdown after 1 minute.

Standby LED (green)

- Lights up when the motor overcurrent monitor responds.

⚠ The lock may only be operated in the "OFF" program switch position.

Unlocking:

- Unlocking is performed on receipt of an input signal.

Locking:

- Locking is performed on receipt of an input signal.
- The STOP output disables the door operator during the locking and unlocking operation.
- If the locking or unlocking operation is not completed within 2 seconds, a short audible alarm signal is emitted.
- The attempted locking operation is repeated twice.
- After a fault, the faulted direction is tested a second time.

Fixing the limit positions

- Self-locking performed by short-circuited motor in the locked and unlocked position.

Night/bank

- With this input signal, it is also possible to perform an emergency unlocking or an emergency opening operation when the program switch is set to "OFF" or if there is a power failure.

ESU

When the input is open, the anti-tamper output is set.

Fault acknowledgement

Once a fault has been rectified, the alarm signal can be cancelled by briefly switching to the "OFF" program switch position (acknowledgement/reset sequence).

- Limit switch OPEN sets the "Unlocked" output.
- Limit switch CLOSED sets the "Locked" output.

Manual unlocking

- Operation of the manual unlocking mechanism interrupts the motor connection (at pre-adjusted limit positions).
- Locking and unlocking can be performed manually.

Auxiliary contact for alarm systems

Provided on the bottom limit switch of the concealed rod multipoint lock is an additional limit switch with a change-over contact for indicating the locked position. This can be connected to an alarm system.



Fault (floating contact),

Further processing of signal in the event of a malfunction.

Tamper (floating contact):

Further processing of signal in the event of tamper detection.

⚠ The brown wire of the cable must be connected last to PIN 11 (or remove the plug during installation) as otherwise a short circuit may occur due to the fact that the 24V power supply from the back-up battery is still available even when the mains is disconnected.

⚠ The floor keeps should always be kept clean and free of dirt by the operator.

9. Familiarisation

Once the commissioning and functional tests have been performed on the door set, the operating instructions should be handed over to the client/user and they should be properly familiarised with both the documentation and the system.

10. Further information

The ES90/100 Revision 8 (Rev. 8) control unit is a further development of the old ES90/100 control system.

The commissioning procedure is the same for both control types!

The Rev. 8 control differs from the older control unit in respect of the following points:

1. It has a larger EPROM.
The EPROMs can not be used in the pre-Rev. 8 control units.
2. ES 90/100 control, Rev. 8, with concealed rod multipoint lock.
The concealed rod multipoint lock can only be connected to Rev. 8 controls.
The lock type must be programmed using the hand terminal.
If the enabled lock type is a concealed rod multipoint lock, the "Locking contact" input on the EM 4 is converted to a disabling input for the concealed rod multipoint lock.
3. Adjusting the force limit value.
The force limit can be adjusted to a value below 150 N and retrieved using the hand terminal.
4. The CP 90 program selector (aka "control panel") can be also connected.
5. After connecting the mains power, the incremental encoder test function can be switched off.
6. Night-bank function in all "AUTOMATIC" programs.
This means that the night-bank hold-open time applies in all program switch positions.

7. Disable functions

The hand terminal can be used to implement various disable functions.

8. In the event of a short circuit:

The mains plug merely has to be disconnected for 2 to 3 seconds and then re-connected again.

9. Expansion modules with Transil diodes on the soldered side cannot be plugged into the basic module Rev. 8 due to mechanical incompatibility.

10. In the case of Rev. 8 basic modules (GM), there is only one consecutive manufacturing serial number.

This number is located on the plug (1-4) to which the hand terminal is connected.

11. Operation without an expansion module or backup battery module:

If the door system is operated without an expansion module and without the backup battery module, the secondary trip loop is tested every four hours (Function as per backup battery test but without the door moving).

(GB)



Troubleshooting

See also Commissioning / Adjustment / Functional testing.

In the event of faults during start-up or operation, first check the following points:

- Mains power available?
- Emergency stop pushbutton unlatched?
- Program switch in the correct position?
- Light barrier transmission paths clear and light barriers clean?
- Door obstructed?
- Door panels easy to move (counter-rollers, floor guides)?
- Fuse OK?
- All external activators, emergency stop switches, program switches and locks correctly wired?
- All plugged connections firmly in place?

⚠ For connection of the interconnecting cable, completely open the corresponding terminal by unwinding the screw in a counter-clockwise direction. Insert the wire and tighten the screw.

For installation work, remove plugs 11/12/13 in order to disconnect the control unit.

If the fault should not be remedied by any of the above, use the hand terminal (HT) for fault analysis. Further aids are provided by the diagnostics display on the expansion module and the information for fault rectification given in the following table.

Fault	Possible cause	Remedy
Door operates jerkily and in an uncontrolled manner.	Plug connectors Cable on incremental encoder Incremental encoder mode: on motor/return pulley	Correctly fit the plug connectors or swap over the wires.  Check the incremental encoder mode with the HT. 0 = on motor 1 = on the return pulley
After the "4-hourly self-test", the door remains stationary in OPEN - position. (only in the case of control units with an expansion module)	Back-up battery not fully recharged, or now spent	Check back-up battery voltage. Check operating hours with HT. Change back-up battery.
Door remains open in all program switch settings	Light barriers (LS) Emergency stop switch	Check light barrier function by observing the LEDs on EM 4 and HT Jumper the inputs at the connector. If this rectifies the fault, check the emergency stop switch and replace as necessary; test with HT.
Door does not open in the program switch settings "EXIT ONLY" and "PARTIAL OPENING".	Activator internal/external	Remove connector for activator, and jumper input. If this rectifies the fault, check the 24V power supply. If also OK, check the activator and replace as necessary.
Door will not open in program switch setting "AUTOMATIC" and "PERMANENT OPEN"	Emergency stop switch	Jumper inputs at the connector. If this rectifies the fault, replace the emergency stop switch
Door opens in program switch setting "OFF"		Adjust or replace program switch.
Door stays open (Servicedisplay is off)	Short-circuit*	Disconnect control unit from mains power and connect it again after approx 3 seconds.



* Response of control units in the event of a short circuit.



The 24V power supply for radar detectors, electro-mechanical locks and the motor connection are of short-circuit-proof design.

In the event of a short circuit, the power supply unit interrupts all secondary voltages and the operating status display is extinguished. After rectification of the short circuit, the power supply unit does not automatically switch on again! Remove mains plug, wait approx. 3 seconds and then re-insert mains plug.



Troubleshooting for concealed rod multipoint lock

Fault	Possible cause	Remedy
Motor does not respond.	<p>Fault</p> <p>Manual unlocking has interrupted motor supply.</p>	<p>Operate the program switch in the sequence: "AUTOMATIC" - "OFF" - "AUTOMATIC".</p> <p>Check the continuity from terminal 17 to terminal 20.</p>
<p>Key switch in position: "Unlocked"</p> <ol style="list-style-type: none"> 1. Sliding panels are unlocked. 2. Sliding panels move twice against the upper stop and are then re-locked. <p>Fault LED lights up. Signal tone emitted.</p>	<p>The "Unlocked" limit switch has not been activated.</p>	<p>Connect voltmeter to the terminals of the limit switch. Initiate closing cycle. During the closing cycle, the voltmeter display must show 0V.</p> <p>Or</p> <p>Remove the cable connection for the limit switch from the control unit. Attach the multimeter and operate the lock using the manual unlocking mechanism.</p>
<p>Set program switch from "AUTOMATIC" to "OFF".</p> <ol style="list-style-type: none"> 1. Sliding panels are unlocked. 2. Sliding panels move twice against the upper stop and are then re-locked. <p>Fault LED lights up. Signal tone emitted.</p>		<p>During the closing cycle, the multimeter display should show 0 Ω. Adjust the limit switches.</p> <p>Cancel fault signal by operating the program switch in the following sequence: "OFF" - "AUTOMATIC" or "AUTOMATIC" - "OFF" - "AUTOMATIC"</p>
<p>Key switch in "Locked" position:</p> <ol style="list-style-type: none"> 1. Sliding panels are locked. 2. Sliding panels move twice against the lower stop and are then unlocked. <p>Fault LED lights up. Signal tone emitted.</p>	<p>The "Locked" limit switch is not being activated.</p>	<p>Connect voltmeter to the limit switch. Initiate closing cycle. During the closing cycle, the voltmeter display must show 0V.</p> <p>Or</p> <p>Remove the cable connection for the limit switch from the control unit. Attach the multimeter and operate the lock using the manual unlocking mechanism.</p>
<p>Key switch in position: "Automatic"</p> <ol style="list-style-type: none"> 1. Lock remains unlocked <p>Fault LED lights up. Signal tone emitted.</p>		<p>During the closing cycle, the multimeter display should show 0 Ω. Adjust the limit switches.</p> <p>Cancel fault signal by operating the program switch in the following sequence: "OFF" - "AUTOMATIC" or "AUTOMATIC" - "OFF" - "AUTOMATIC"</p>
Fault cannot be cancelled using the program switch.	<p>"OFF" connection of the program switch interrupted.</p>	<p>Check connection at pin 5. Perform a reset (remove plugs 11/12/13 from the ES90 control unit and then re-insert after approx. 2 seconds).</p>
Sliding door no longer accepts any opening signal.	<p>Lock has been pulled over the limit switch by hand. The ES90/100 control then receives a stop signal.</p>	<p>Move the lock using the manual unlocking mechanism back to its end position or operate the lock back into its end position using the key switch.</p>



Diagnostics port Service displays

(GB)

Operational display, basic module (GM)

Once the mains power has been switched on, the power supply unit is energised. This takes about 20 seconds, after which the LED lights up.

LED-display	Condition	Function
●	Normal mode	Normal mode - Mains power available, power supply unit energised
○	Off	unit not receiving mains power
●	Flashing (frequency 2 Hz)	Learning cycle - parameters are being determined and stored

● = LED on ○ = LED off ● = LED flashing

Function display, expansion module:

LED 1 and LED 2 signal an interrupted light barrier transmission path. LEDs light up prior to each closing cycle during the light barrier test.