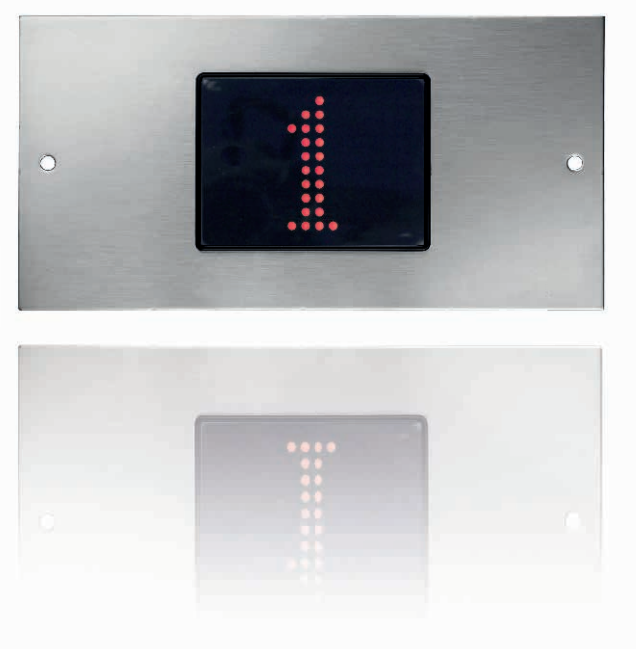
SafeLine®

Quality talks

# SafeLine **FD4**

## Operating instructions



Displays the floors, arrows and scrolling messages.

ENGLISH v3.02
12.2013

# SafeLine **FD4**
## Operating instructions

### TECHNICAL DATA

| | |
|---|---|
| **Supply:** | 24 VDC<br>$I_{max}$ 50 mA |

Supply power and inputs should only use regulates voltage!

| | |
|---|---|
| **Power:** | 1,2 W |
| **Inputs:** | 20-30 VDC<br>$I_{max}$ 1 mA |
| **Floorzone output:** | +20-30 VDC<br>Imax 100 mA |
| **Speaker output:** | 0,6 W at 8Ω<br>0,3 W at 16Ω |
| **Bus:** | RS 485 |
| **Size (H x W x D):** | 61 x 80 x 29 mm. |

ALWAYS USE THE LATEST SAFELINE PRO!
AVAILABLE FOR DOWNLOAD AT WWW.SAFELINE.EU

**safeline.eu**

# Introduction



# Installation



# Configuration



# Operating



# Service

## FD4-BUS

### Function

The FD4-bus enables communication with only two wires (twisted pair, shielded) between multiple FD4 units. Because of this, the PG1 can be used together with external floor displays or one FD4 with parallel inputs can control the other floor displays, or a combination of these. All units must have the same software. All configurations are made in the master/masters. The slaves do only have to be addressed if selective functions are wanted. The slaves behave as the master and ignores its own settings, except “show text message with a large font ” and “blink display”. You cannot send or trigger sound files over the bus.

### Hardware

Serial communication with RS-485 half duplex supports max 32 units on the bus and allows long cables in noisy environments. The speed is 115200 kbs and the ends are terminated with a 120Ω resistor.

## ENCODER

### Signals

Encoders with NPN (ground) or PNP (high) outputs, are selected on the encoder card where also pull-up/down resistors are located.

Signals, A and B are 90° phase shifted.

**Appropriate resolution:** < 3000 pulses/second.

**Car velocity with default setting:** < 2.4m/s.

**Signal amplitude:** 24VDC regulated required.

The signal cables should not be put together with high voltage cables and they should be as short as possible( < 5m)

When using another encoder type the resolution can be configured in SafeLine Pro.

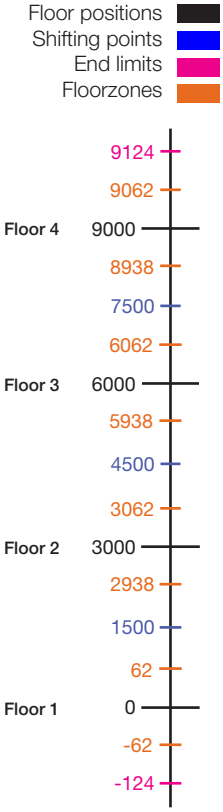
**Default settings:** 100 pulses/revolution => 1240 pulses/m with 92mm circumference wheel.

### Functions

Max 16 floors when using the encoder. If more, reference inputs must be used.

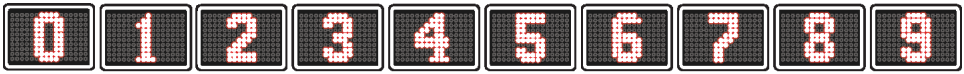
Reference position (0-point): Bottom floor. The other floors are given the reference position plus the distance, given in pulses, as position.

Floorzones are automatically obtained.

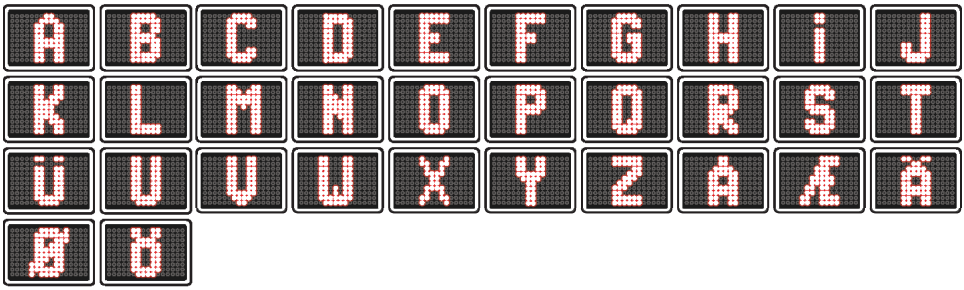


## AVAILABLE SYMBOLS

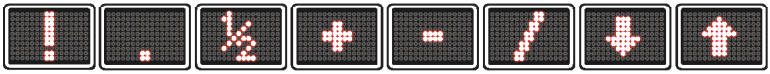
### Numbers



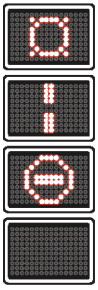
### Letters



### Other



### Special



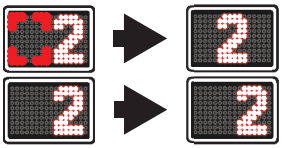
**Sun** - Hidden floor, no indication will be displayed when the car runs past the floor.

**Vertical bar** - Assign fixed message instead of a floor number (always followed by the number [1-8] of a fixed message).

**No entry** - Write “71.EC” as a fixed message in SafeLine Pro.

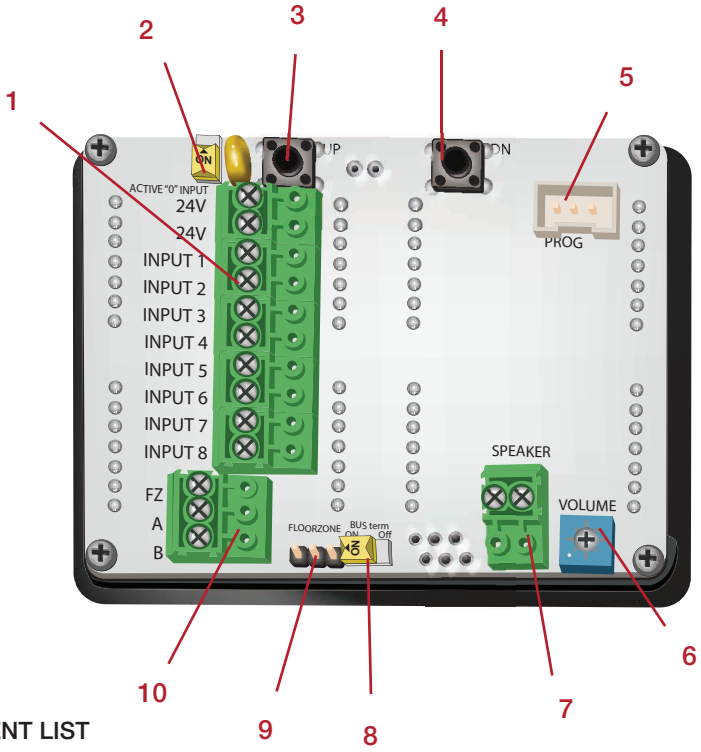
**Space** - Align one symbol to the left or to the right.

### Examples



**Centre a symbol** - Leave the left symbol empty.

**Left/Right align a symbol** - Select the blank “Space” after/before the symbol.




## COMPONENT LIST

1. Connector for inputs and power.
2. DIL-switch - Select input polarity. Off = 24V input signal. On = 0V input signal.
3. UP (Up - Use for configuration).
4. DN (Down - Use for configuration).
5. Rs232 PC connection (use for configuration and firmware updates with SafeLine Pro).
6. Speaker volume. Turn right to increase the volume.
7. Connector for speaker.
8. DIL-switch - Internal termination resistance 120Ω On/Off.
9. Floorzone polarity. Set as +24V by default.
10. Floorzone output and BUS-connector.

**NOTE ! All connections have to be in place before powering up the installation. Changes in the wiring with a powered installation is not allowed.**

## INPUTS

FD4 can handle different signals from a controller, these can be sourced from +24VDC or 0VDC.

### Binary signals

Binary code is a standardized way to control outputs that are used for floor displays.

**Note**: Input 1 to 8 is written from the right.

| Default binary inputs (for 15 floors) | | | |
|---|---|---|---|
| Input 1 | Binary signal 1 | Input 5 | Fixed message 1 |
| Input 2 | Binary signal 2 | Input 6 | Arrow up |
| Input 3 | Binary signal 4 | Input 7 | Arrow down |
| Input 4 | Binary signal 8 | Input 8 | Arrival chime/Floor sound trig |

### Gray code signals

Gray code is an uncommon way to control floor displays. You only change one input at a time, which minimizes the risk of error. It is often used on older controllers.

**Note**: Input 1 to 8 is written from the right.

| Default gray code inputs (for 15 floors) | | | |
|---|---|---|---|
| Input 1 | Gray code 1 | Input 5 | Fixed message 1 |
| Input 2 | Gray code 2 | Input 6 | Arrow up |
| Input 3 | Gray code 3 | Input 7 | Arrow down |
| Input 4 | Gray code 4 | Input 8 | Arrival chime/Floor sound trig |

### Decimal signals (one-floor-per-pin)

The old way to control floor displays are called Decimal or one-floor-per-pin.

**Note**: Input 1 to 8 is written from the left.

| Default decimal inputs | | | |
|---|---|---|---|
| Input 1 | Floor 1 | Input 5 | Floor 5 |
| Input 2 | Floor 2 | Input 6 | Arrow up |
| Input 3 | Floor 3 | Input 7 | Arrow down |
| Input 4 | Floor 4 | Input 8 | Chime |

### Pulse signals

Pulse signals are for use with an encoder. By connecting an encoder to FD4 you can show floors, and play floor messages on each floor, regardless to the type of installation and controller.

| Default pulse inputs | | | |
|---|---|---|---|
| Input 1 | Pulse A | Input 5 | Fixed message 2 |
| Input 2 | Pulse A | Input 6 | Fixed message 3 |
| Input 3 | Pulse B | Input 7 | Arrow UP |
| Input 4 | Fixed message 1 | Input 8 | Arrow DN |

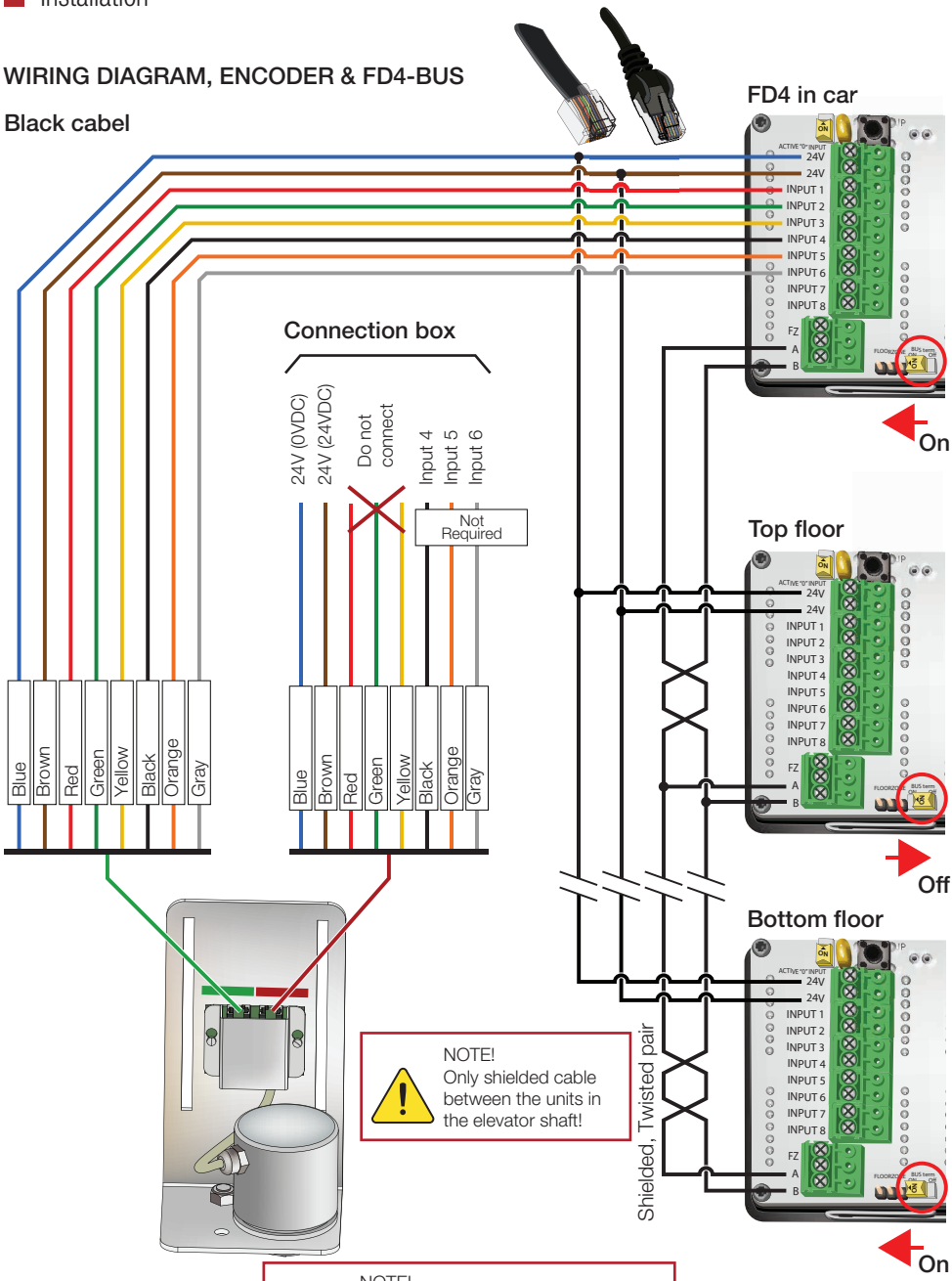
### Signals

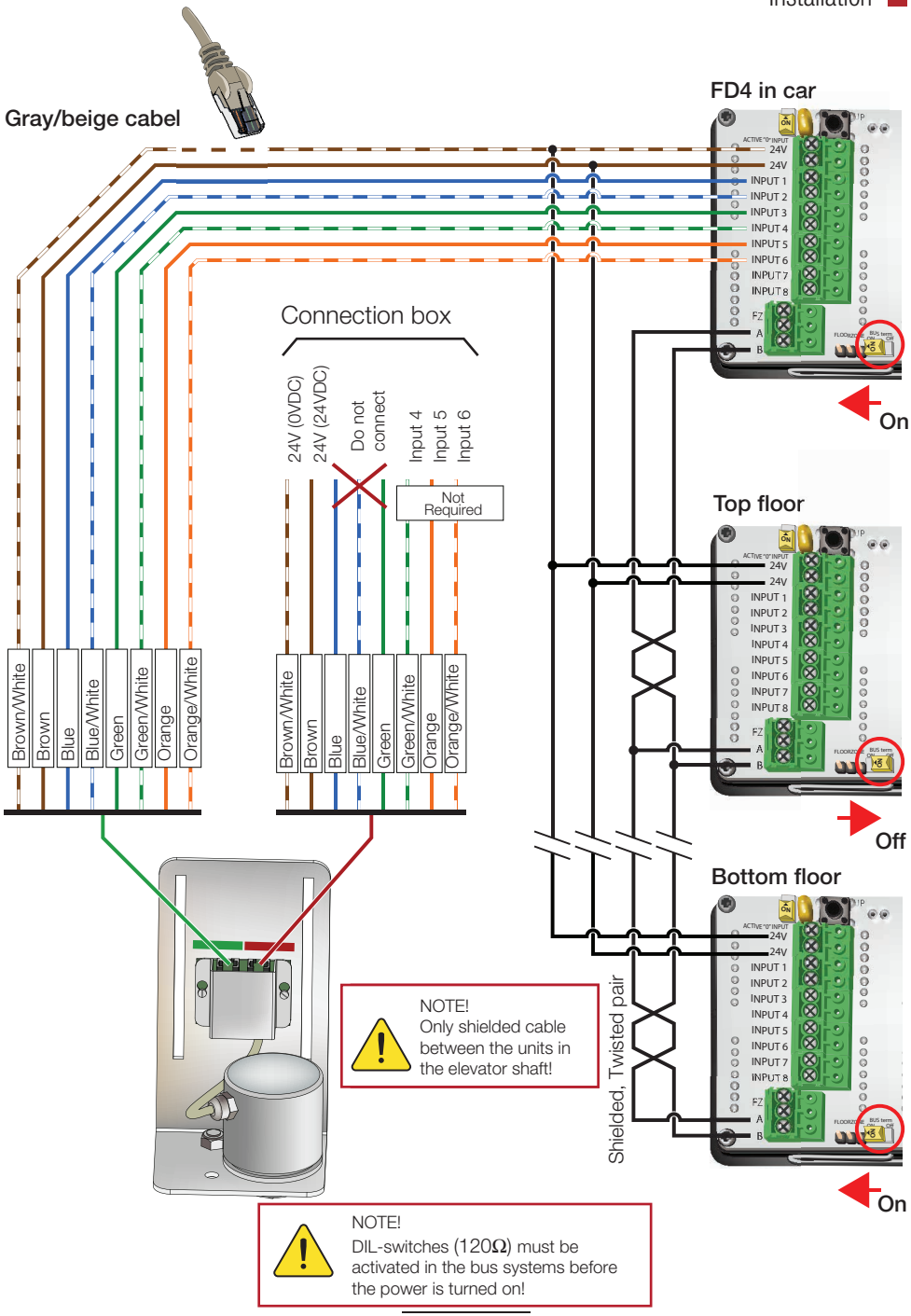
Floor indication depending on different signals.

| Floor | Binary code | Gray code | Decimal code |
|---|---|---|---|
| 0 | 0000 | 0000 | 00000000 |
| 1 | 0001 | 0001 | 10000000 |
| 2 | 0010 | 0011 | 01000000 |
| 3 | 0011 | 0010 | 00100000 |
| 4 | 0100 | 0110 | 00010000 |
| 5 | 0101 | 0111 | 00001000 |
| 6 | 0110 | 0101 | 00000100 |
| 7 | 0111 | 0100 | 00000010 |

## WIRING DIAGRAM, ENCODER & FD4-BUS

### Black cabel

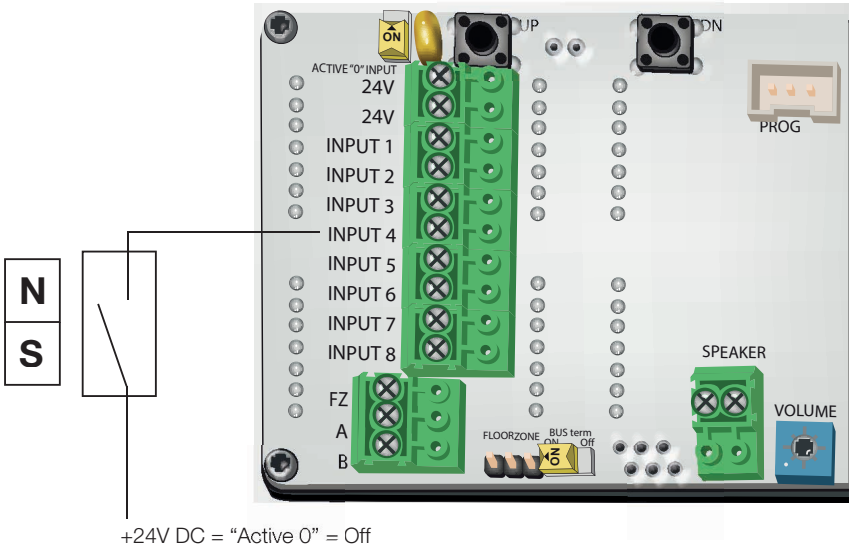




## WIRING DIAGRAM, REFERENCE POINT (ONLY FOR PG-1)

Valid from version 4.15.

- Recommended when the lift car rarely go all the way down to the bottom floor.
- Install a dual-stable magnet switch, eg. Schmersal BN310rz on top of the car.
- Install North/South-magnet in the shaft between the two floors, where the lift car passes by most frequently.




+24V DC = “Active 0” = Off

### Configuring

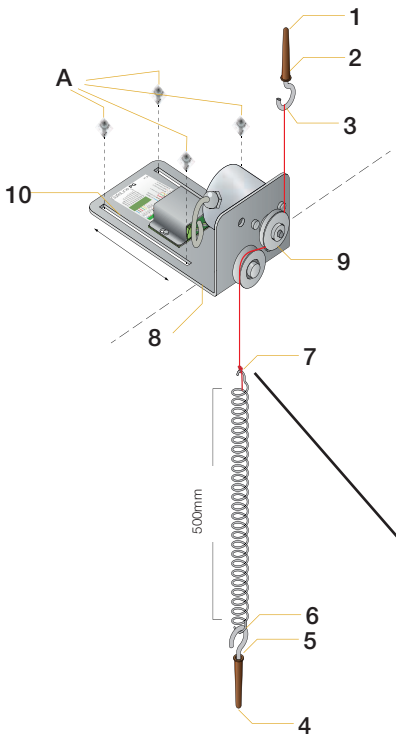
- Registrer all floor levels according to chapter “Encoder learningtrip”, then:
  - » Go to with the lift car to the top floor.
  - » Press “DN” in 1 sec. “Setup pulse” starts gliding over the display.
  - » Press “DN” in 3 sec. “R” is showing.
  - » Go from the top floor level to the bottom level and all the way up to the top floor level again. The reference point is now set.

### Inputs

When FD4 is uses the reference switch function it is set to input 4. Message 1 is moved to input 5, Message 2 to input 6, and so on.

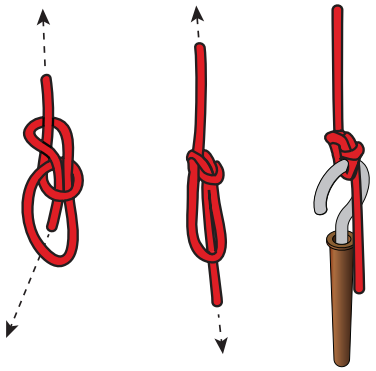
| Default pulse inputs including reference point | | | |
|---|---|---|---|
| Input 1 | Pulse A | Input 5 | Fixed message 1 |
| Input 2 | Pulse A | Input 6 | Fixed message 2 |
| Input 3 | Pulse B | Input 7 | Fixed message 3 |
| Input 4 | Reference point | Input 8 | Fixed message 4 |

## PG-1 INSTALLATION



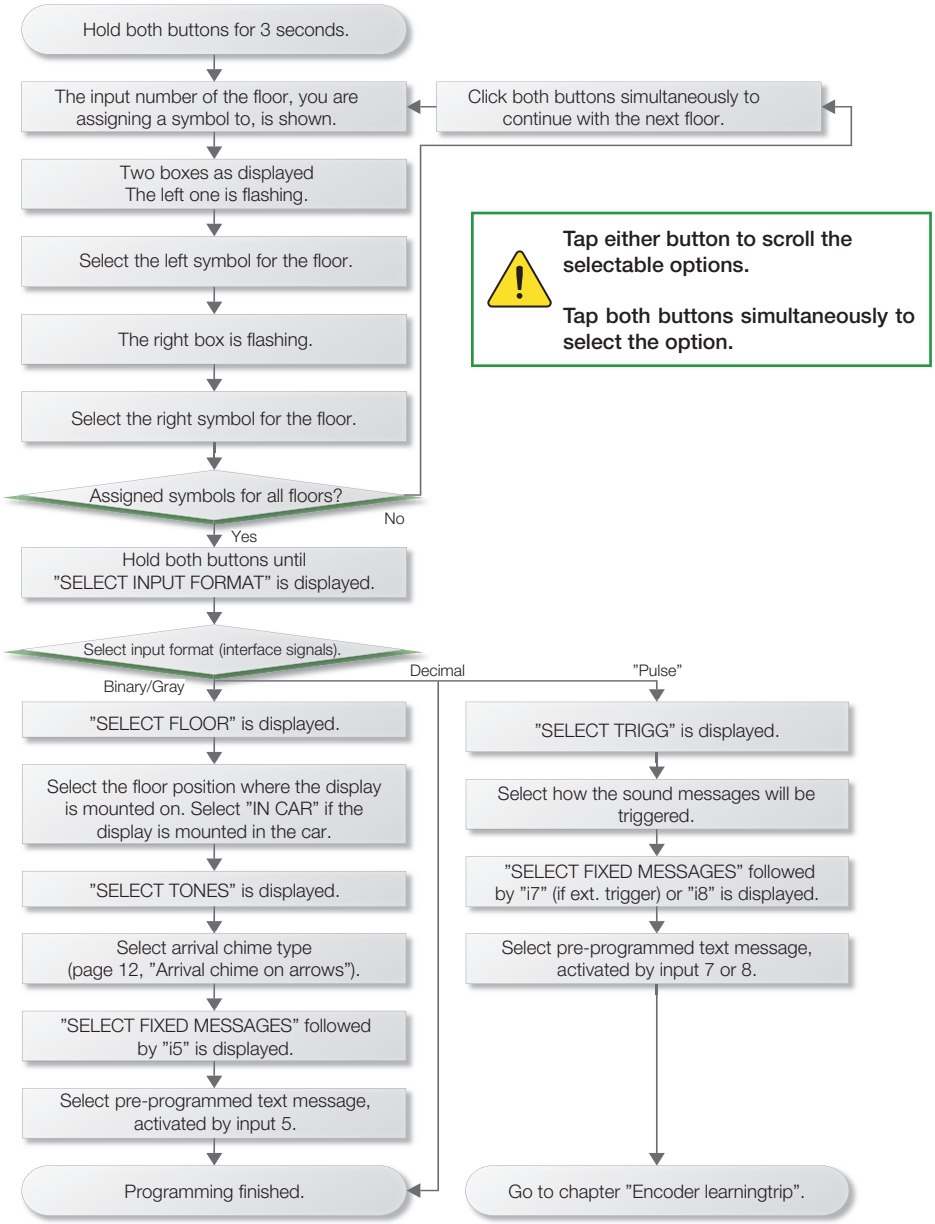

1. Drill min. 45 mm with 8 mm drill in the shaft top and insert the plug.
2. Insert the hook into the plug and tighten.
3. Roll down the rope to the bottom of the shaft and make a solid knot in the shaft top.
4. Measure and adjust the rope so the it runs straight in the shaft. Drill min. 45 mm with 8 mm drill in the pit and insert the plug.
5. Insert the hook into the plug and tighten.
6. Mount the spring into the hook.
7. Insert the rope, stretch the spring so the lenght will be min 500mm, and make a solid knot.
8. Adjust and mount the encoder plate with screws (A) so the encoder wheel will line with the rope and the encoder plate is firmly fastned in the lift car roof.
9. Mount the rope so it will run through both of the wheels (As the picture).
10. Connect the cables according to diagram.
11. For start up, see manual.

**Recomended knot for loops**



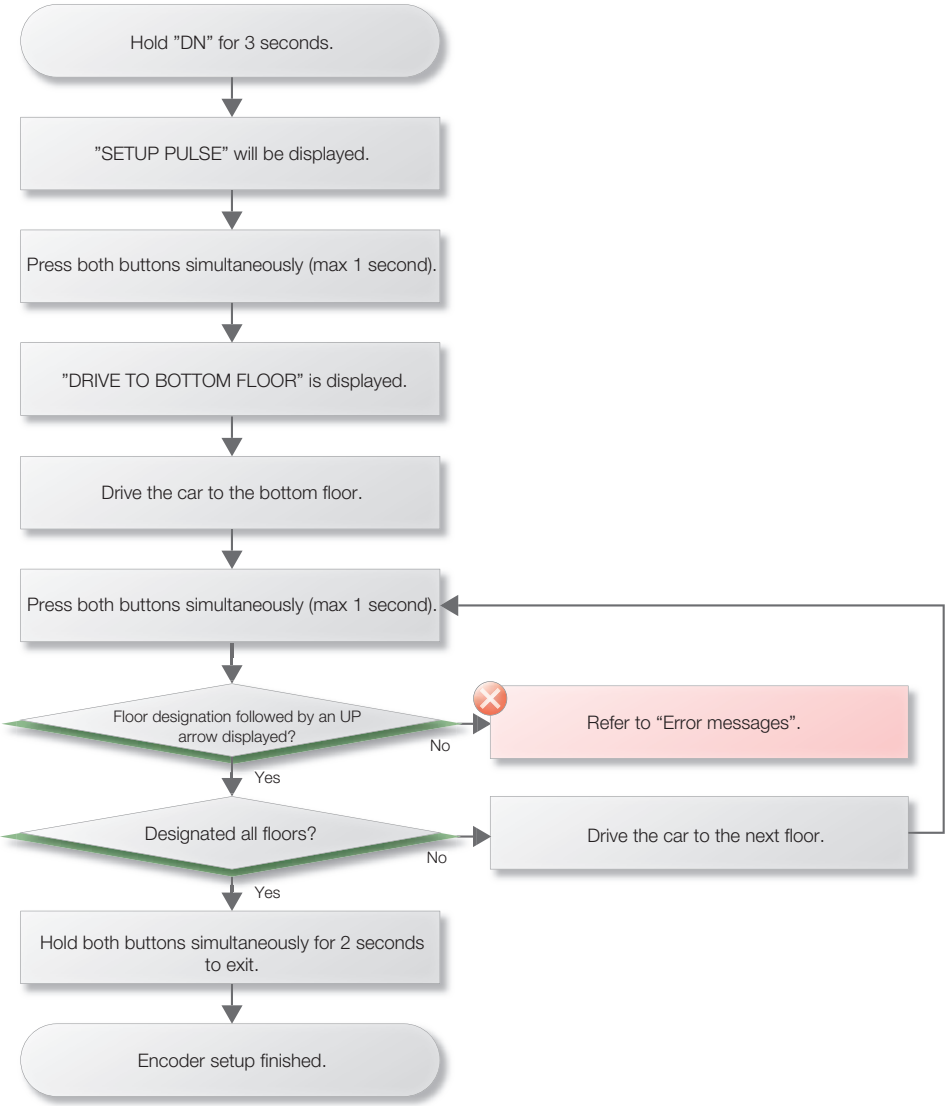
## CONFIGURATION

Configuration of the FD4 is made with SLPro or the ”UP” & ”DN” buttons on the back.



## ENCODER LEARNINGTRIP

Setup the encoder intervals. Available olny if the input type is set to “Pulse” and you have an encoder. Once the installation has been started, all the earlier positions will be erased (sound files and symbols will not be deleted). The FD4 will return to normal mode after 120 seconds of inactivity.



## FUNCTIONS

**Triggering sound messages.** (Only available with encoders).
- NONE: No sound messages.
- FLOORS: Activates when floor changes.
- EXT: Activates with a signal on input 8(external).
- RET: The car is slowing down to a floor(retardation).
- STOP: When the car has stopped.

**Arrival chime on arrows**
FD4 can chime selective:
- EN81-70: UP = 1 chime / Down = 2 chime.
- 3-tone: Three tones in all cases (Default in SafeLine Pro).
- Wave: Play a wav-file instead of a tone.

**Arrival chime on Trig** (not in pulse mode)
Input 8 is set to trig as by default. When the input is active the FD4 will play an acoustic signal, 3-Tone. If sound files are downloaded to FD4 it will play up the message depending on which floor input FD4 have.

**Arrows**
Can be shown selective as Hall direction arrows (blink or fixed), as car direction arrows (Scrolling) or be displayed with floor numbers. Depending on configuration, arrows will be shown when input 6 and 7 or 7 and 8 are active. See input schematics in SafeLine Pro. To make them selective for each floor, the address has to be given. Changing the input format may give you different settings. If using bus, you only have to connect arrows to one FD4.

**Fixed message**
When the input for fixed message is active, the FD4 will scroll horizontally “OVERLOAD”. The text can be changed to “SERVICE” or “OVERLOAD” in the “SELECT FIXED MESSAGE” programming step. Use SafeLine Pro to write your own text (max 26 characters).

**Long text as floor label**
Display the text of a fixed message as a floor label by assigning the floor label as § or | (Vertical bar) followed by the number of the fixed message.

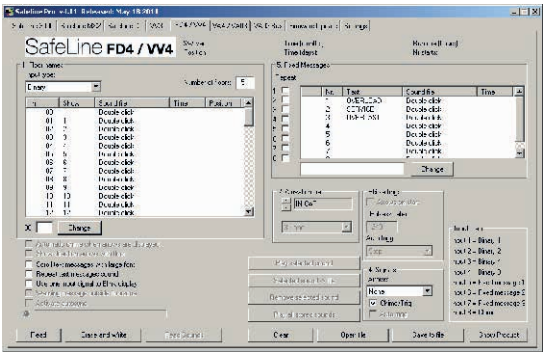
**Sounds**
FD4 can be used as a voice announcer. The built-in memory is 2 MB, and allows 120 sec of audio at 16 KHz, or 240 sec at 8 KHz. The sound files shall be of wav-format - 8 or 16KHz, 16 bit, MONO. File names are limited to 59 characters. Both floors and fixed messages can be complemented with sounds. Use SafeLine Pro to add sound files.

**Service log. Only available with encoders.**
The FD4 automatically stores running data, which can be read with SafeLine Pro:
- Service (months)
- Service (days)
- Runtime = Total runtime in hours.
- Nr Starts = Number of starts
- Current position

**Reset service log. Only available with encoders.**
Keep “DN” pressed when powering the floor display.

**Extra functions - Using SafeLine Pro**

- Automatic chime when arrows are displayed.
- Show direction arrows with floor number.
- Scroll text messages with large font.
- Repeat text message sounds.
- Use one input to blink display.
- Warning messages outside floorzone.




**Manual reset of positions.**

(Only when using an encoder)

To store the floor positions within the floor display unit:

- Run the car to the bottom floor and cut the power to the floor display.
- Press the “UP“-button when powering the floor display.

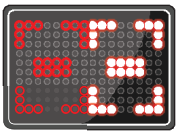
**Reset the FD4**

To reset to factory settings:

- Press both buttons before powering up the FD4 untill “Erasing” is shown.
  This deletes all data, except the travelling logs, and the settings will be reset to factory settings.

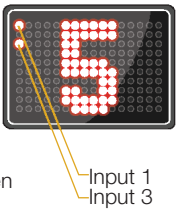
**Power-saving mode**

- Assign “--” as label for input floor 0.
  If all inputs are inactive, all displays will turn black.



**Debug mode**

- When in normal mode, click “DN”.
- Turn debug mode off by clicking “DN”.
  The LEDs of the matrix will be lit correspondingly to the inputs.
  Starting from the top LED, going to the 8th LED, in the left column.
  Top left indicates input 1 and so on.




**Bus Test**

- When in normal mode. Click “UP”.
  You can now measure the tension on the BUS-A and BUS-B terminal of the FD4. A healthy bus is at 5V DC, but must be atleast 3V DC to function.
- Click “UP” again. BT (BUS test) starts blinking. The tension will switch between +5V and -5V on BUS-A and BUS-B every 5 seconds.
- Press both buttons to leave Bus-Test mode.

**Brightness**

- When in normal mode. Click “UP” (You are now in Bus test-mode).
- Click “DN”. Use “UP”/”DN” buttons to raise/lower the brightness of the display.
- Press both buttons at the same time or wait 10 seconds to leave Brightness-mode.

**Warning message outside floorzone. Only available with encoders.**

- Fixed message 4 will be displayed when elevator stops outside floorzone. Default message “MIND YOUR STEP“.

## TROUBLESHOOTING FD4

Use the latest version of SafeLine Pro. Available for download at **www.safeline.eu**. If sound files are downloaded to a FD4 v4.04 or later with an older version of SafeLine Pro than v3.22, the sound files will not be played.

**Solutions**:
- Use the latest version of SafeLine Pro.
- or hold the "UP" button when powering the FD4. **Note**: Input format may not be set as Pulse.

## TROUBLESHOOTING FD4-BUS

**Nothing works**
- Check the supply voltage and check if something is displayed on all floor displays.
- Common supply voltage and ground to all floor displays.
- Use shielded twisted pair cable.
- Check polarity: A-A and B-B.
- Termination resistor 120 ohm/internal termination resistor-switch in both ends of the bus activated.
- Measure the resistance between A and B. Should be close to 60 ohms.
- Measure the resistance between A and +24VDC, A and ground. The same with B. Should be no short circuits.
- Connect all units in one loop. Avoid long stubs from the main.
- Verify that all floor displays have v4.00 software or newer.

**One or multiple floor displays do not work**
- Check the supply voltage for the floor displays.
- Check polarity: A-A and B-B.
- Verify that all floor displays have v4.00 software or newer.
- Floor displays that are not connected to an encoder may not be setup as "PULSE".
- Try triggering an input on the one that doesn't work and see if it could send information.
- Measure the bus system (Bus Test, page 14)

**Display wrong floor on all floor displays**
- If the encoder is used, no other floor signals may be connected to any floor display on the bus. Run the car to the end floors for correction.
- If the controller system's floor signals are used, they should only be connected to one unit in the bus. Check if "input format" is selected.

**One or multiple floor displays shows fixed messages and arrows, but not the correct floor labels**
- Floor displays that are not connected to an encoder may not be setup as "PULSE".

**No arrival chime or arrow is displayed**
- If the encoder is used and should generate a trigg, check if it is setup as "STOP" or "Retardation".
- Check connection of arrows and trigg, as well as configuration of it in the floor display. Arrows and trigg should only be connected to one unit on the bus.

**One or multiple units displays no arrows or arrival chime**
- Address is wrong on affected displays.

**One or multiple floor displays shows the same fixed message constantly, instead of floor lables**
- Trigg a new fixed message or restart the floor display.
- Disconnect the units, one at a time, on the bus system, until it stops.

## TROUBLESHOOTING PG-1

**Nothing works**
- Verify the FD4 and encoder are both connected to a common regulated 24VDC.
- Verify the cables to the FD4 is connected according to the illustration “Wiring diagram, Encoder“. Make sure the red/green cables are not switched.
- Avoid long cables to A and B channels. Avoid putting them near high voltage cables.
- Make sure the rope is correctly mounted on and is aligned with the wheels, and the spring tension is correct.

**Error messages during learning trip**
- If 1!, 2!, 3! is displayed between the floors instead of an arrow, a signal is missing in the correlating input.
- If ! is displayed, multiple signals are missing or two floors have the same position.
- If WD is displayed, the last floor is beneath the previous floor.
- Check the supply voltage to the encoder and measure with a multimeter on A and B channels to ground as the wheel on the encoder is very slowly rotated. The voltage should alternate between high (24V) and low (0V).

**Does not switch floors**
- Read the configuration with SafeLine Pro and verify the floor settings. Floor 1 should be on pos 0. Higher floors should have a higher pos. 1 pulse is about 1 mm, so about 3000 pulses between the floors is normal. Redo the learning trip if it doesn’t seem correct.
- If still not functioning correctly, check the supply voltage.

**Displays wrong floor**
- The FD4 is out of position and needs to be corrected. Run to the end floors. (The error occurs when the drift is too great to be corrected when stopped or 3 following errors. Highest risk on elevators that seldom or never reaches the end floors.) From V4.06 and SafeLine Pro V3.22, the current position is displayed in the top of the window of SafeLine Pro, when reading the parameters. Update to the latest firmware for the most accurate corrections. If it doesn’t help, it’s recommended to switch to the orange line, which drift less.

**Plays the wrong sound but displays the correct floor**
- If configured to trigg on retardation, the trigger might be activated before the floors are switched. Drift is the problem. Refer to the previous section or change to trigg on stop. The problem is shown on half/short floors first.
- Trigg on STOP if the car is slow or is unsteady.

**Does not play sounds**
- Check that there are sounds on the unit and the trigger is correctly setup. Use external trigger to verify if the signals are working. Trigg on STOP if car is slow or unsteady.

**Switching floor while car is standing still**
- Check the current position by reading 2 times with SafeLine Pro(V4.06 and SafeLine Pro 3.22 or later). If the position is changed by more than a few pulses, the input signals are malfunctioning.
- Supply power to the encoder is not regulated or heavy noice is picked up in the cables. Keep the cables away from high voltage cables and use a regulated 24VDC power supply.

# SERVICE REPAIR FORM

SafeLine®
www.safeline.eu

**Return procedure**

Safeline accepts only returns which are accompanied by a completed Service form or a simular serviceform from buyer.

If the product has been purchased from one of our distributors the buyer must first contact the distributor concerned in each country for assistance.

For more information about our distrubutors, refer to www.safeline.eu.

**All returns must be sent well packed.**

For more information about repairs, refer to www.safeline.eu or contact Mikael Bogefors.

**Return address:**
SafeLine Sweden
ATT: Mikael Bogefors
Antennvägen 10
135 48 Tyresö
SWEDEN

**Contact person:**
Mikael Bogefors
Phone: +46(0)8-448 73 90
Fax: +46(0)08-447 79 31
E-mail: mikael.bogefors@safeline.se

**Faulty unit**
- ○ SafeLine 3000
- ○ SafeLine MX2
- ○ SafeLine SL1
- ○ SafeLine SL2
- ○ SafeLine SLCC
- ○ SafeLine SL6
- ○ _____

Service order number: _____
Product: _____
Contact person: _____
Phone to contact person: _____
E-mail to contact person: _____
Company: _____
Phone to Company: _____
Shipping address: _____

Error symptoms: _____
_____
_____

Probable cause: _____
_____
_____

Reference: _____

Date: _____

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