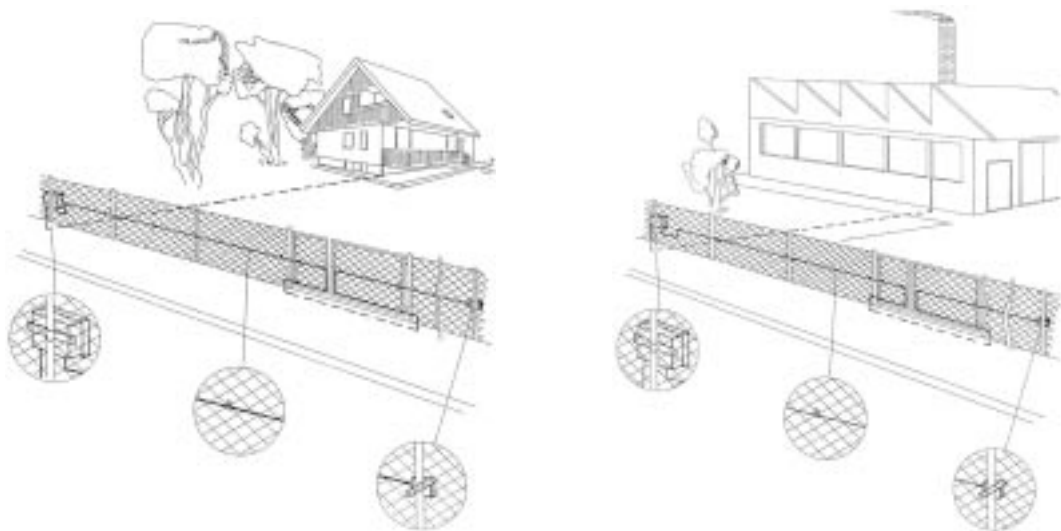
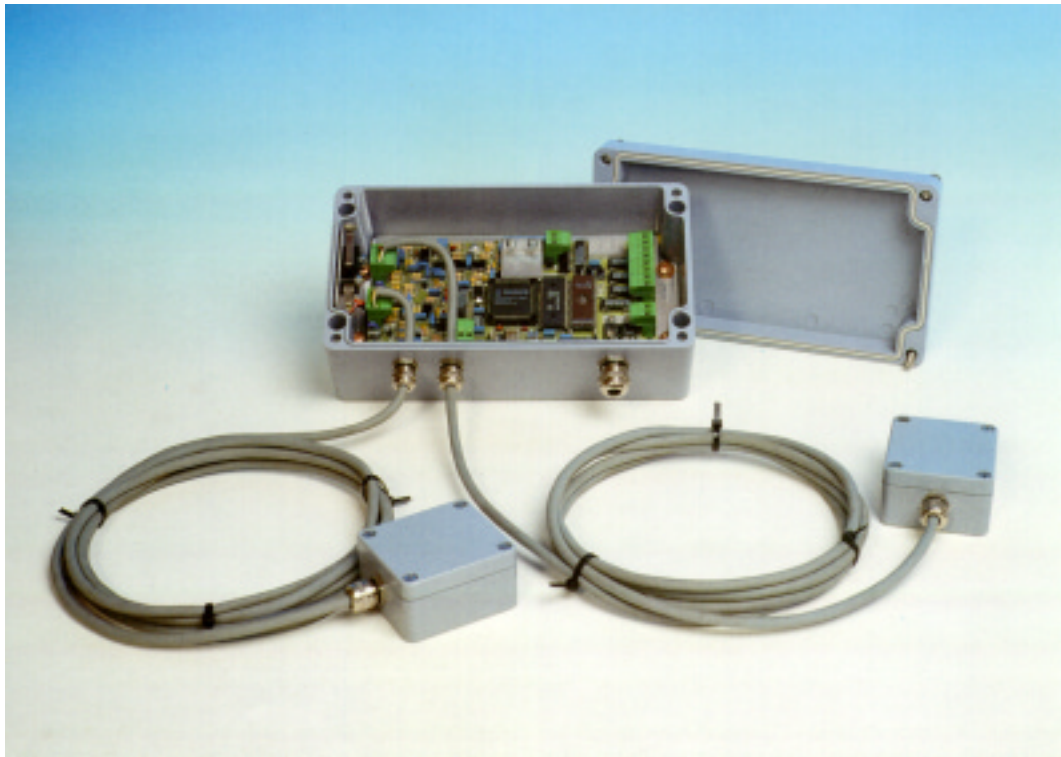


# DETECTOR AN303



USERS GUIDE

ANIKOM

ANIKOM

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Mengeš, February 1998, last change: April 1999*

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## **1. AN303**

It is used for protection of a wired fence in maximum length of two times of 300 m.

AN303 is in essence two units in one unit: two wings of 300 m sensor cable made together 600 m protection with only one unit!

New is also very quality EAVESDROP system for connection directly to loudspeaker or PC computer.

A sensor cable, specially sensible for mechanical vibrations, should be fastened on a fence. The cable ends by an end module on one side. The other cable end is connected to electronic system (main unit), perceiving the activities taking place on a wire.

The AN303 main unit has no its own supply unit and therefore must be connected to an integral system (alarm panel) with additional battery supply.

The principle of getting information out of the sensor cable is patented.

### **1.1 EXIT UNIT FOR THE ALARM**

The AN303 main unit has got four relay outputs for two different types of alarms: an anti - tamper and a burglary alarm. All relay outputs are made in a normal close system (NC). In normal situation (no alarm condition), they are operating. The anti - tamper alarm goes on in different conditions: cutting the sensor cable, short circuit on the sensor cable, switching - off the sensor cable and opening up the top of the main unit casing. The burglary alarm goes on in case of non-allowable activities on the wire fence (climbing over the fence, bumping into the fence, cutting the sensor wire...). It does not go on in case of the wind blowing (except if the fence is broken and it bumps into something because of the wind blowing), hard raining or snowing. It also does not go on if the birds are sitting on the fence.

All alarms go on in case of disconnection of the power supply.

### **1.2 FALSE ALARMS**

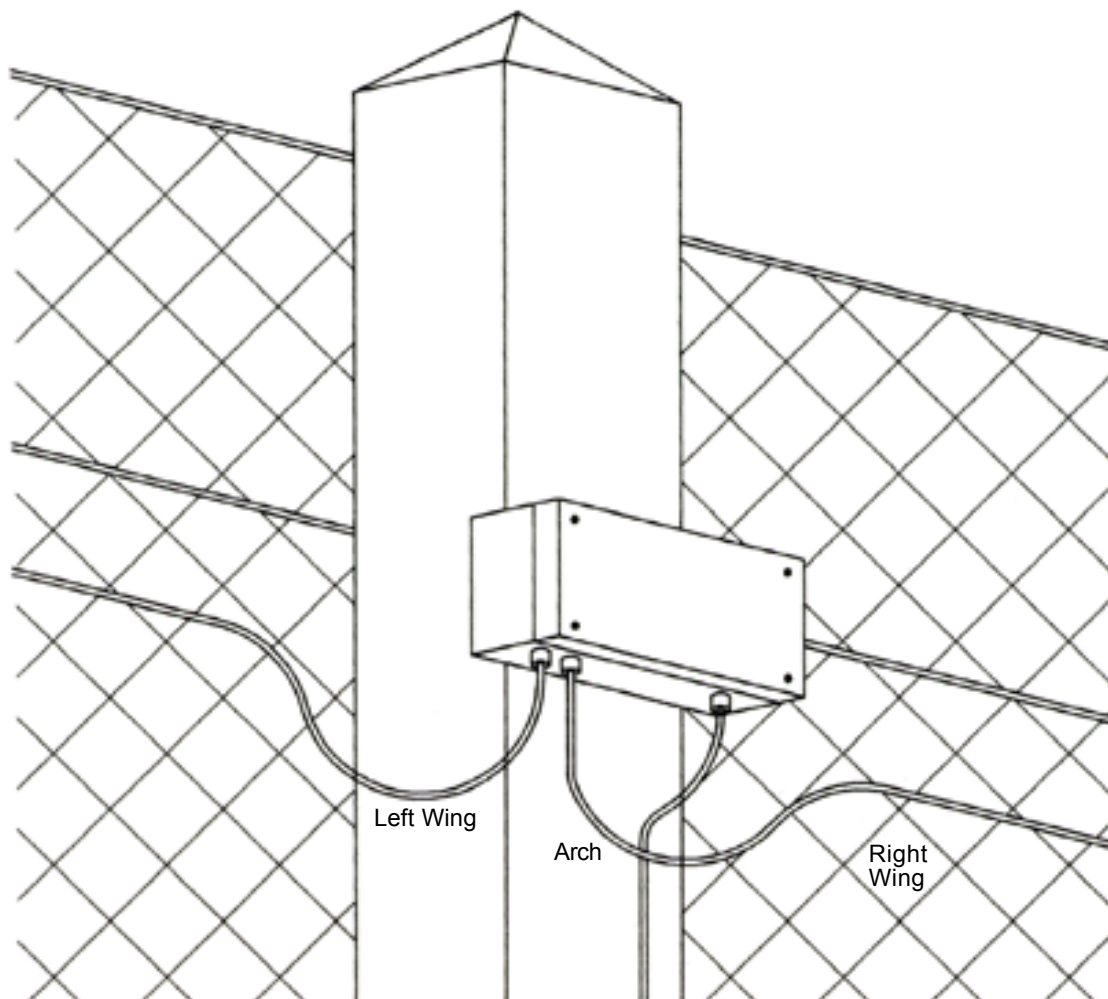
False alarms do not appear due to weather conditions or other electromagnetic causes (high tension wires, power transforming stations), because of the new technology built-in it. Differentiation of an operating system eliminates the electromagnetic disturbances on the spot. Other possible disturbances are eliminated by the DSP processor and its digital filters.

## 2.0 INSTALLATION

Cable AS257 which works as a sensor is installed on a wired fence about 1 m above ground level. Cable is fastened onto a fence in length of 40 - 60 cm by plastic clips. On one side the cable ends by an end module while on the other end it is connected to the main unit. Main unit has got two relays on exit, one for the burglary alarm and the other for the anti - tamper. Main unit must be connected onto an integral system (an alarm panel with additional battery supply and alarm condition information). Maximum security is provided only when these instructions are followed.

### 2.1 INSTALLATION OF THE MAIN UNIT

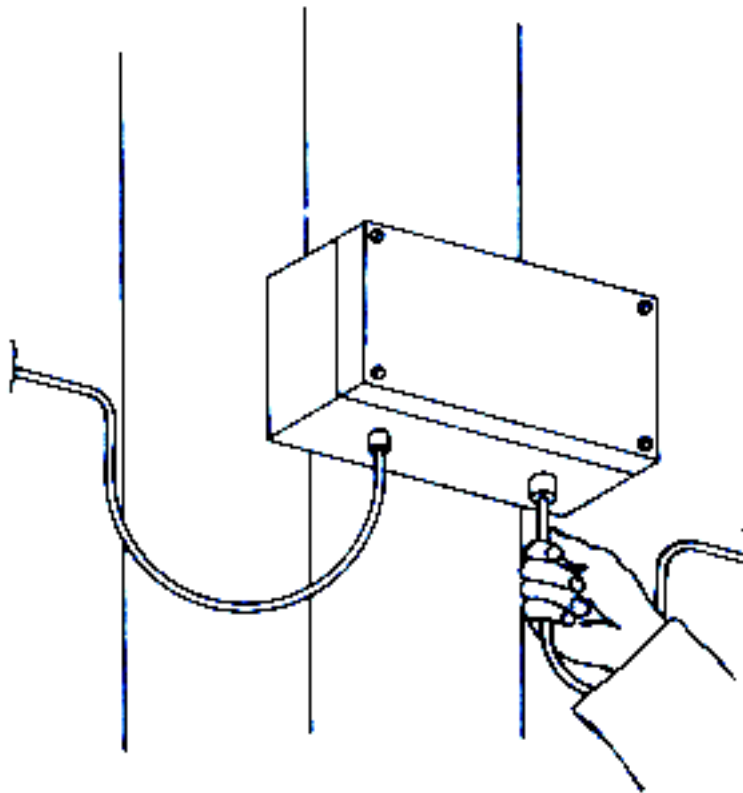
Main unit should be fixed by four screws M5 onto the fence pillar. The main unit should be fixed onto the fence in a way that its casing does not contact the metal parts of the fence. The recommended installation is with cable gland facing to the ground (see picture 1).



Picture 1: The Main Unit.

This protects the casing from invasion of water. Attention should also be given to the arch of a cable leading into main unit (see picture 1). Arch must have at least 5 cm radius which protects the lower part of the arch from water and ice.

The introduction cables must be properly thick (radius 5 mm for a sensor cable and 8 mm for supplying and signal cable). When cable gland is installed properly, the rubber must embrace and hold the cable. Cable should be fixed strong even when we try to pull it out of the casing (see picture 2).

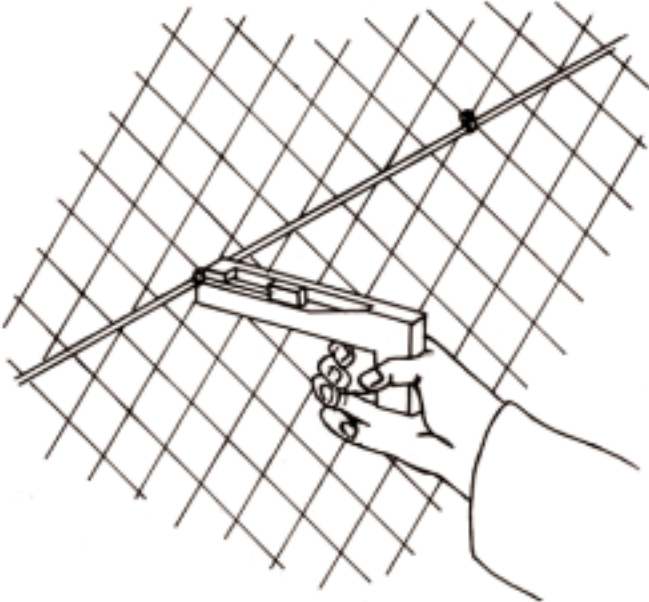


Picture 2: Check the cable strength.

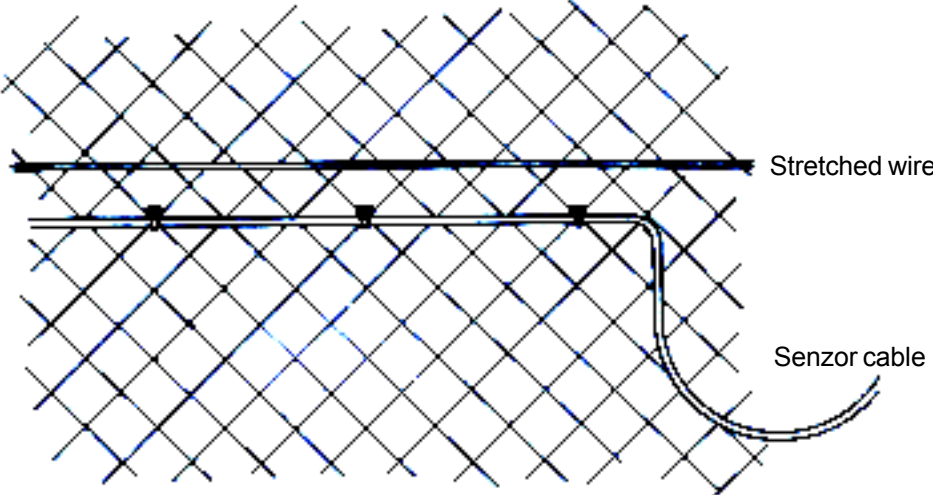
## 2.2 INSTALLATION OF THE CABLE

Cable is fixed onto a wired fence by plastic clips (PLT 2 IM 100). Plastic clips are UV rays resistant and made for an outdoor installation. By using these clips we avoid changing the clips due to moldering. For fixing the clips special tool can be used (see picture 3).

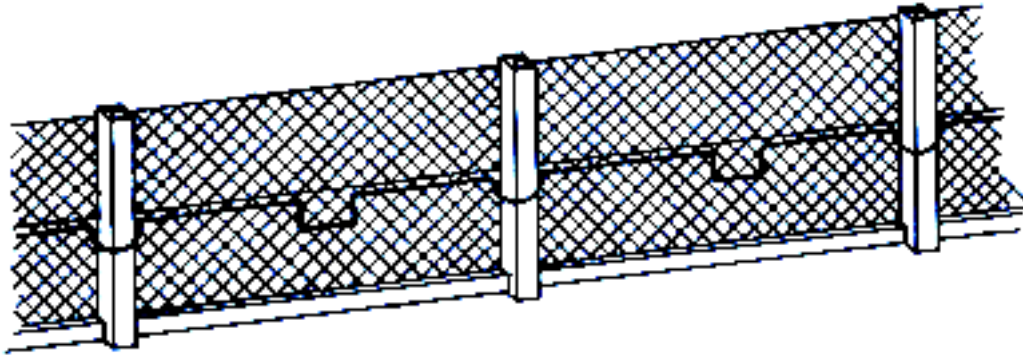
Cable should be fixed every 40 - 60 cm. It must be fixed on the fence and not on the stretched wire that is usually installed at the middle of the fence (see picture 4). An arch should be made every 5 - 10 meters in order to achieve better sensitivity (see picture 5). A smaller arch should also be made at the pillars (radius 10 cm). This arch is made because in case of an error a sensor cable should sometimes be bound up. It also disables wire damages due to extensions of the materials caused by high or low temperatures.



Picture 3: Special tool for fixing clips.



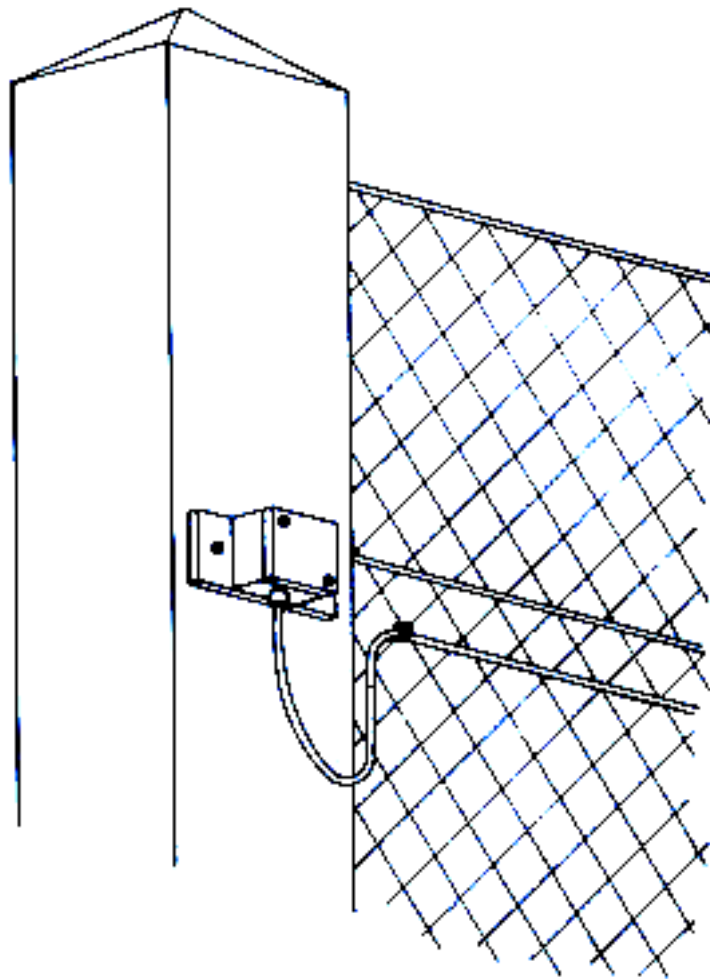
Picture 4: Fixing cable with plastic clips.



Picture 5: The wire fence.

### 2.3 INSTALLATION OF THE END MODULE

The end module should be fixed onto the fence in a way that its casing does not contact the metal parts of the fence. It should be fixed by two screws M4 so that introductory is facing the ground. Sensor cable must make an arch before entering the end module in order to provide the water flowing off (see picture 6).



Picture 6: The End Module.

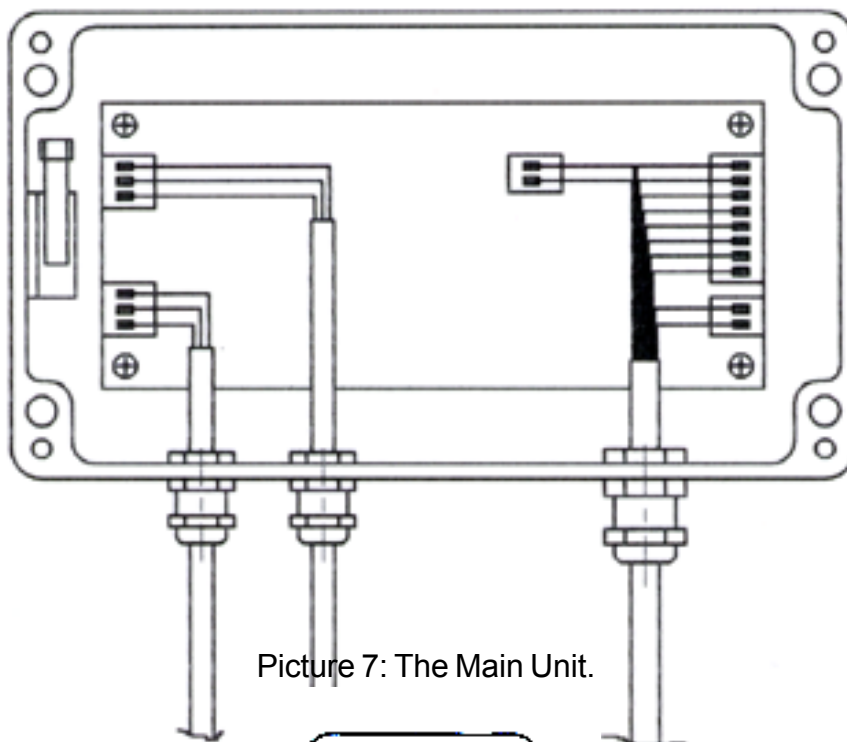


## 2.4 INSTALLATION OF THE SENSOR CABLE

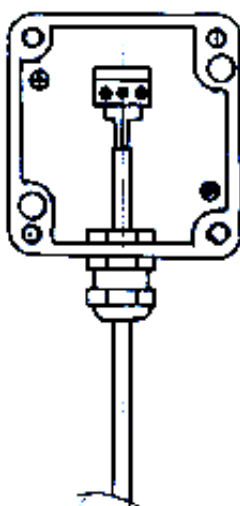
Sensor cable has got a shield and four wires (black, red, yellow and white). Sensor cable is connected at the main unit by a terminal connector FENCE so that black and red are connected to position 1, yellow and white together to position 2 and a shield to position GND.

Cable should be ripped as close as possible to the terminal connector (see picture 7).

On the end module the cable should be connected to a terminal connector: black and red together to position 1, yellow and white together to position 2, a shield to position G. Cable should be ripped as close as possible to the terminal connector (see picture 8).

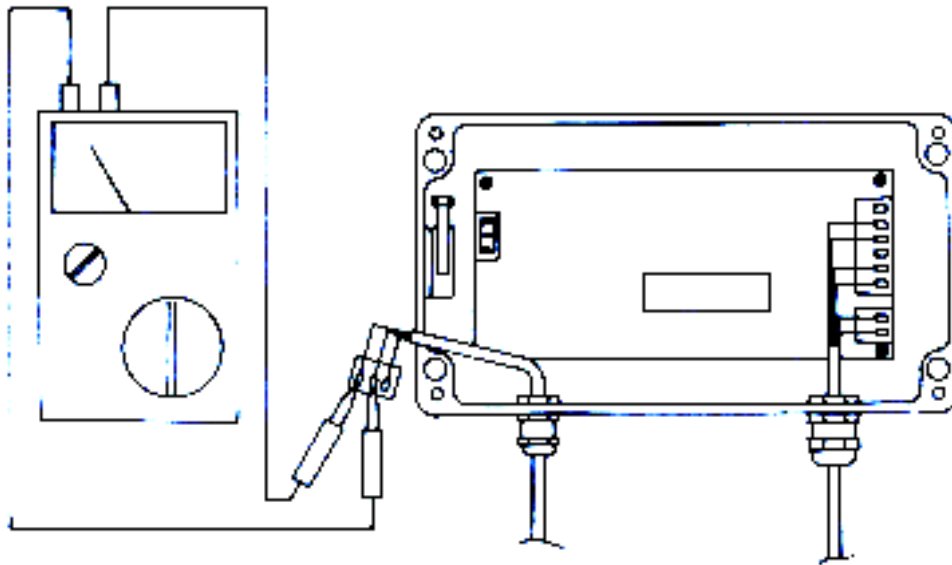


Picture 7: The Main Unit.



Picture 8: The End Module.

Before connecting the supply it is necessary to check the cable impedance. The end module must be connected. The FENCE connector on the side of the main unit must be switched off. Between the connector points on the sensor cable resistance of approximately 640 k $\Omega$  must be measured by Ohmmeter (Universal tool, see picture 9). Maximum tolerance should not be more than 50 k $\Omega$  in any of the three measuring. In case of a higher impedance value we must make sure that end module has been connected properly and check if the sensor cable is damaged.



Picture 9: Measuring the sensor cable with Ohmmeter.

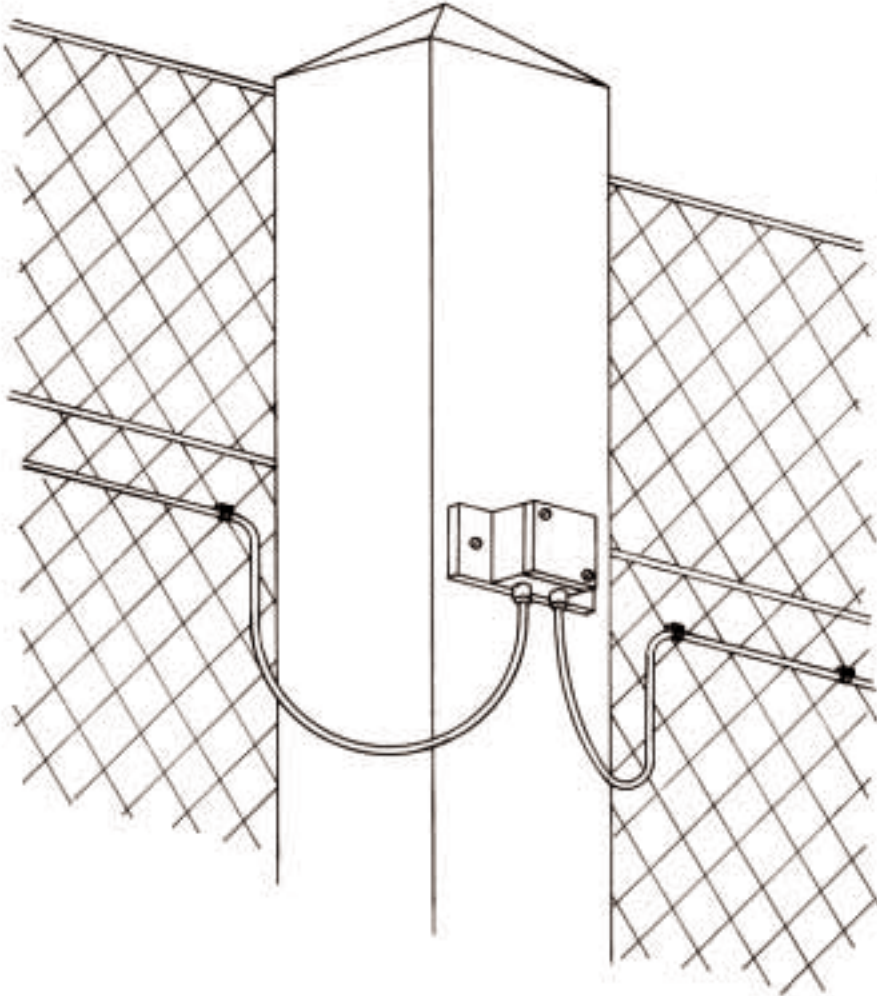
## 2.5 INSTALLATION OF THE SUPPLY AND THE ALARM OUTPUTS

Supplying and the output signal should be connected to the main unit by a shield alarm cable with eight or more wires (2 x 1,5 + 8 x 0,22). Supply is 12 V DC or AC. Supply voltage can swing between 10 and 15 volts. If supply voltage is higher than 15 V, AP3012 power unit must be used.

The burglary alarm output is on the terminal connector OUTPUT on the position 1 and 2 (NC) for FENCE 1 and on the position 5,6 for FENCE 2. The anti - tamper alarm output is on the terminal connector OUTPUT on the positions 3 and 4 (NC) for FENCE 1 and on the position 7,8 for FENCE 2 (see picture 11).

## 2.6 HOW TO REPAIR A CUT OFF CABLE

It has to be connected with a connecting module AC-300. Installing of the connecting module is shown in picture No. 10. Generally the installation is the same as installation of the end module (see 2.3). AC-300 connecting module has two cable glands and two connectors with three positions marked as 1, 2 and G. Cable must be connected to a terminal connector so that black and red go together on position 1, while yellow and white go together on a position 2, shield on position G. Cable should be ripped as close as possible to the terminal connector. This should be so for the both cables.



Picture 10: The Connecting Module AC-300.

### 3.0 OPERATION BALANCE AND CONTROL

Detector AN303 is balanced by three key pads and three digit display.

There are four parameters for adjust: sensitivity for left wing (input FENCE 1), sensitivity for right wing (input FENCE 2), beat number for left wing and beat number for right wing. All other parameters are preset by Anikom.

In case a MENU key is pressed, display shows function. In the moment the MENU key is released, display shows value of the function. With keys + and - the value of the function (parameter) can be changed.

In the first time (when display is blank) key MENU is pressed, the function is SENSITIVITY FENCE 1. The display shows **FE.1** (see Table 1). In the moment the MENU key is released, display shows for example **032**. With keys + and - value of "SENSITIVITY FENCE 1" can be changed between values 0 (minimum sensitivity) and 100 (maximum sensitivity).

If the MENU key is pressed in that moment, function SENSITIVITY FENCE 2 is reached.

If the MENU key is pressed in that moment, function BEAT NUMBER FENCE 1 is reached (display shows "**bE.1**"). In that moment the MENU key is released, display shows for example **003**. With keys + and - value of BEAT NUMBER FENCE 1 can be changed between values 1 and 10.

If the MENU key is pressed in that moment, function BEAT NUMBER FENCE 2 is reached.

After that (if MENU key is pressed) COUNTER OF ALARM 1 can be seen and then COUNTER OF ALARM 2.

If 5 seconds newer key is pressed, display become blank and AN303 leaves program mode.

Table 1 shows all functions.

| FUNCTION               | DISPLAY | POSSIBLE VALUES | CHANGEABLE BY + AND - KEY | COMMENTS                 |
|------------------------|---------|-----------------|---------------------------|--------------------------|
| SENSITIVITY OF FENCE 1 | FE.1    | from 0 to 100   | YES                       |                          |
| SENSITIVITY OF FENCE 2 | FE.2    | from 0 to 100   | YES                       |                          |
| BEAT NUMBER OF FENCE 1 | bE.1    | from 1 to 10    | YES                       |                          |
| BEAT NUMBER OF FENCE 2 | bE.2    | from 1 to 10    | YES                       |                          |
| COUNTER OF ALARM 1     | CA.1    | from 0 to 999   | NO                        | counter can not be reset |
| COUNTER OF ALARM 2     | CA.2    | from 0 to 999   | NO                        | counter can not be reset |

Table 1: Programing function.

### 3.1 SENSITIVITY SETTING

In the first time (when display is blank) key MENU is pressed, the function is SENSITIVITY FENCE 1. The display shows **FE.1** (see Table 1). In the moment the MENU key is released, display shows for example **032**. With keys + and - value of "SENSITIVITY FENCE 1" can be changed between values 0 (minimum sensitivity) and 100 (maximum sensitivity).

If the MENU key is pressed in that moment, function SENSITIVITY FENCE 2 is reached. The display shows **FE.2** (see Table 1). In the moment the MENU key is released, display shows for example **032**. With keys + and - value of "SENSITIVITY FENCE 2" can be changed between values 0 (minimum sensitivity) and 100 (maximum sensitivity).

### 3.2 BEAT NUMBER SETTING

The MENU key is pressed three times. Display shows **BE.1** (function BEAT NUMBER FENCE 1). If the MENU key is released, display shows current value of beat number fence 1. This value can be between 1 and 10. With keys + and - value of "BEAT NUMBER FENCE 1" can be changed.

If the MENU key is pressed in that moment, function BEAT NUMBER FENCE 2 is reached. If the MENU key is released, display shows current value of beat number fence 2. This value can be between 1 and 10. With keys + and - value of "BEAT NUMBER FENCE 2" can be changed.

If the beat number is set to 1, alarm is launched after first beat on the fence, if the beat number is set to 2, alarm is launched after second beat on the fence etc.

This function is very useful when for example playground is nearby and often happen to beat ball to the fence. If beat number is set for example to 3, then first beat (in this case the ball) will not launch alarm.

### 3.3 ALARM COUNTER (FENCE 1 AND FENCE 2)

The MENU key is pressed five times. Display shows **CA.1** (function COUNTER ALARM 1). If the MENU key is released, display shows value of counter alarm 1. This value can be between 0 and 999. Counter can not be reset or adjust by user.

Counter alarm 1 is increased every time alarm 1 is launched.

If the MENU key is pressed in that moment, function COUNTER ALARM 2 is reached. The display shows **CA.2** (see Table 1). If the MENU key is released, display shows value of counter alarm 2. This value can be between 0 and 999. Counter can not be reset or adjust by user.

Counter alarm 2 is increased every time alarm 2 is launched.

### 3.4 EAVESDROP

On connector EAVESDROP either loudspeaker or PC audio card can be connected.

When sensor wire is shaken, sound is amplified and carried to the EAVESDROP connector. In loudspeaker is heard what happen on sensor cable.

For switch off one wing of EAVESDROP pin 2 or 3 must be connected on ground (see Table 3).

Volume of eavesdrop signal can be adjusted directly on loudspeaker (attenuator made from resistors or wire potentiometer) or on PC computer.

If signal is connected directly to loudspeaker, junction J150 an J151 must be inserted (see Picture 11). If signal is connected to PC computer audio card, J150 and J151 must not be inserted!

If the system compound of several AN303 connected together also J150 and J151 must not be inserted! In that case signal can not be connected to loudspeaker. It must be connected to PC computer audio card.

#### 3.4.1 LED DIODES FENCE 1,2 BURST

LED D3 and D4 lit in case of shake sensor wire. In the same time sound in loudspeaker can be heard.

LED D4 lit in case of shake sensor wire 1 (FENCE 1), LED D3 lit in case of shake sensor wire 2 (FENCE 2).

### 3.5 POWER SUPPLY VOLTAGE SHOW

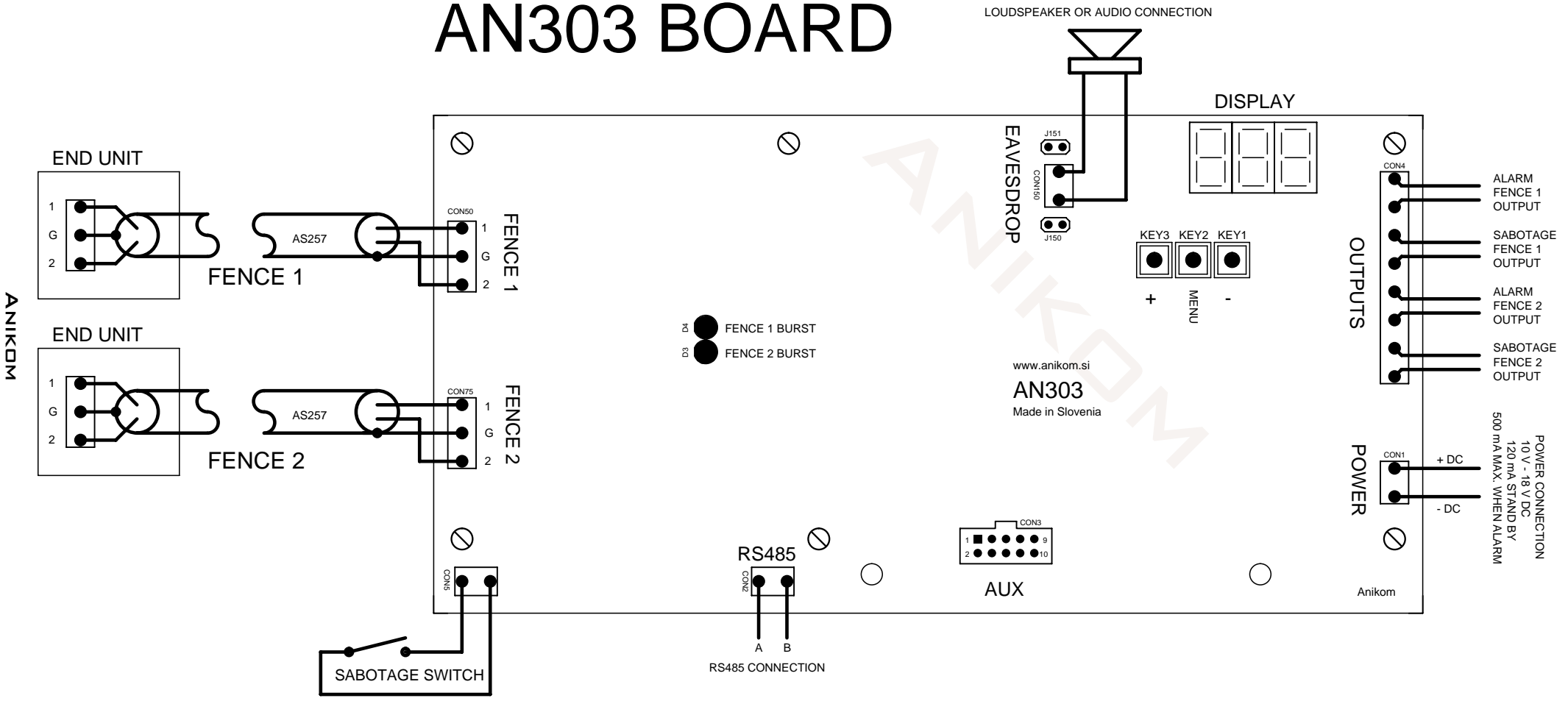
By pressing sabotage switch (at left side of AN303 box) power supply voltage is measured. After one second voltage is displayed on display (for example if supply voltage is 12,3 V, display displayed value 12.3).

This function is very useful in case of very long supply cables from Power Supply Unit to AN303 unit. The voltage drop on power supply cables can be so high that input voltage on AN303 is too low.

The voltage must be between 10.0 V and 15.0 V. If the voltage is bellow 10.0 V, nonstability can be expected in work of AN303.

If the voltage is higher than 15.0 V some parts of AN303 can be too warm. In this case AP3012 unit is recommended for drop voltage. AP3012 unit can be mounted directly to AN303 box.

# AN303 BOARD



Picture 11: Connections of The Main Unit

#### 4.0 CONDITIONS SHOW ON DISPLAY

If nothing is happened, display is blank. Display has two main functions: to show parameters (see Table 1) in program mode and to show events (see Table 2).

Every show on display lasting 5 seconds. After that time display becomes blank.

| DISPLAY | FUNCTION                         | COMMENT                             |
|---------|----------------------------------|-------------------------------------|
| AL.1    | Alarm on input 1 (FENCE 1)       | alarm lounded                       |
| AL.2    | Alarm on input 2 (FENCE 2)       | alarm lounded                       |
| OP.1    | Open wires on input FENCE 1      | sensor cable is not connected       |
| OP.2    | Open wires on input FENCE 2      | sensor cable is not connected       |
| CL.1    | Short wires on input FENCE 1     | sensor cable is in short circuits   |
| CL.2    | Short wires on input FENCE 2     | sensor cable is in short circuits   |
| OL.1    | OK on input FENCE 1              | sensor cable is connected right way |
| OL.2    | OK on input FENCE 2              | sensor cable is connected right way |
| CAS.    | Open of case AN303               |                                     |
| I2.0    | Meassure of power supply voltage | power supply voltage is displayed   |

Table 2: Conditions show on Display.



## 5.0 AUXILIARY (AUX) CONNECTOR

There are input, output and power supply pins on auxiliary connector for communication card purpose.

Individual pins are described in Table 3. Input pins are in TTL mode (0 V - switch on, 5 V - switch off). There are pull-up resistors build in for inputs.

Outputs is 0 V - off, 5 V - on.

Maximum current for power supply pins can be 100 mA.

| PIN | FUNCTION    | INPUT/ OUTPUT/<br>POWER SUPPLY | COMMENTS                               |
|-----|-------------|--------------------------------|--|
| 1   | GND         | power supply                   | ground                                 |
| 2   | EAVESDROP 1 | input                          | 1 - switch on<br>0 - switch off        |
| 3   | EAVESDROP 2 | input                          | 1 - switch on<br>0 - switch off        |
| 4   | ALARM 1     | output                         | 1 - on<br>0 - off                      |
| 5   | SABOTAGE 1  | output                         | 1 - on<br>0 - off                      |
| 6   | ALARM 2     | output                         | 1 - on<br>0 - off                      |
| 7   | SABOTAGE 2  | output                         | 1 - on<br>0 - off                      |
| 8   | GND         | power supply                   | ground                                 |
| 9   | VCC 5V      | power supply                   | power supply for<br>communication card |
| 10  | 12 V        | power supply                   | power supply for<br>communication card |

Table 3: AUX connector.

## **6.0 TECHNICAL SYSTEM CHARACTERISTICS**

- main unit in a waterproof aluminium casing IP 65 (220 x 120 x 80 mm)
- main unit weight: 1720 g
- end module in a waterproof aluminium casing IP 65 (55 x 55 x 35 mm)
- end module weight: 210 g
- sensor wire: outside radius: 5 mm
- electronics with DSP microprocessor
- temperature limitations: from minus 30 degrees to plus 70 degrees
- dynamic of the system: > 70 dB
- power supply 12 V DC
- power consumption at 12 V is cca. 120 mA and cca. 500 mA when alarm
- Outputs are made with two relays, one for the alarm condition and the other for the anti -  
tamper.
- The alarm system has got an expected serial data output, where a printer or a PC computer  
can be connected for observing the activities on the fence, according to the shape, strength  
and time of the activities in the sensor wire (option).

## **7.0 PARTS AND ADDITIONAL PARTS OF THE AN303 DETECTOR**

### **Parts of the AN303 detector are:**

- Main unit in a waterproof aluminium casing (IP 65) 220 mm x 120 mm x 80 mm.
- 2 pcs. ending unit AK300 in a waterproof aluminium casing (IP65) 55 mm x 55 mm x 35 mm.

### **Additional parts of the AN303 detector:**

- 2 x sensor cable up to 300 m length.
- UV protected plastic clips for fixing the sensor cable type V-01 UV.
- Connecting module AC-300, used for connection of the cut off sensor cable.
- AP3012 is power supply unit for reducing power supply voltage from 24 V AC to 12 V DC. It is indispensable in case of long power supply cables. This unit is built directly in AN303 box.

## 8.0 ERRORS

| ERRORS  | POSSIBLE CAUSE   | HOW TO FIX IT  |
|---|--|--|
| 1.) LED D4 or/and D3 blinking, the burglary alarm turns on all the time, although there are no activities on the fence. | The ending module is not galvanically detached from the metal fence. | Fix the ending module galvanically detached from the metal fence (see 2.3)   |
|   | Isolation and shield in sensor cable are damaged.                    | Connect the cable by AC-300 module. If a long part of the cable is damaged, use two AC-300 modules and add a new piece of a sensor cable in between. |
|   | Water in the ending module.  | Open the ending module and dry it in warm air.   |
|   | Water in main unit.  | Open the main unit and dry it in warm air.   |
|   | Sensor cable, connected to the main unit is more than 300 m long.    | Shorten the sensor cable to 300 m and repeat the measuring.  |
| 2.) The alarms turn on all the time, although there are no activities on the fence.                                     | See error No. 3.   |  |
|   | Error on the main unit.  | Service repair is needed.  |

| ERRORS   | POSSIBLE CAUSE   | HOW TO FIX IT   |
|--|--|---|
| 3.) Although switch on and off the sabotage switch nothing happened. | There is no supply.                                      | Switch on the supply (see 2.5).   |
|  | Supply voltage is too low.                               | Too high voltage drop on supply cables. Change cables with bigger one or increase supply voltage. |
|  | Error on the main unit.                                  | Service repair is needed.   |
| 4.) Everithing works correctly, but relay outputs are not operating. | Signal wires are connected on a wrong terminal position. | Check the connection of the signal wires (see 2.5).   |
|  | Relays are out of order.                                 | Relays have to be changed. Service needed.  |

## 9.0 DISTRIBUTION AND SERVICE

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