holthausen elektronik GmbH

# User Manual

(Translation of the original instructions)


Picture 1: ESW-Mini with a base plate

## Electronic Vibration Monitoring Unit

## ESW®-Mini (hol550)

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technical modification possible



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## Important information

These operation instructions are to be read through completely and carefully heeded before starting the device. Failure to heed or adhere can result in claims on manufacturer's liability becoming null and void for damages ensuing there from.

Manual action of any manner on the device – with the exception of proper procedures and those described in these operation instructions – lead to forfeit of guarantee and exclusion from liability.

The device is solely intended for the usage as described below. It is particularly not intended for the direct or indirect protection of persons.

holthausen elektronik GmbH assumes no liability whatsoever as regards suitability for some specific purpose.

If any question should remain open, please never hesitate to contact us.

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## 1. Generally basical safety-instrucations

Do not use this device as the sole monitoring device in situations where failure of the device can result in damage to goods or personal injury.

To achieve the desired results, make sure that the device and its technical data are suitable for use with the device/equipment and parameters which you wish to monitor.
.
The sensor is sensitive to shock. A downfall out lower height to a hard substratum can destroy the sensor.

The location where the sensor is installed and the method used for installing the sensor have a decisive impact on the quality of the sensor signal. The sensor may only be installed by appropriately qualified and instructed staff.

Electrical connections must be made by appropriately skilled staff. Connection errors can lead to malfunctioning or failure of, or irreparable damage to, the sensor and the electronics.

The ESW®-Mini should not be used on machines with a very energetic high-frequency solid-borne. Through resonance apparitions in the sensor, the device can indicate a much too great or too small value.

Powerful noise sources for instance inverters, in direct closeness of the sensor, electronics or cabling, can result in faulty behaving of the apparatus.

Potential differences and balance currents in the mass guidance can result in faulty behaving too.

The connection cable is resistant against many but not every type of chemicals. A defective cable can allow chemicals to enter the housing and iireparable damage the electronic, in which case the device would no longer work. The conditions from the mounting surrounding must be checked and the cover material from the cable must be proofed, if it resists these requirements. You can get an overview from the chemical resistance of the cover material from us.

## 1.1 Symbols Used in This Document

**Safety instructions**

Safety instructions in this manual are identified by symbols.
The safety instructions are prefixed by attention-getting words which indicate the level of danger involved.
Observe the safety instructions in all cases and proceed carefully in order to avoid accidents, personal injury and damage to equipment and property.

**DANGER!**

… indicates an imminently hazardous situation that will result in death or serious injury if not avoided.

**WARNING!**

… indicates a potentially hazardous situation that may result in death or serious injury if not avoided.

**CAUTION!**

… indicates a possibly hazardous situation which can may result in minor or moderate injury if not avoided.

**CAUTION!**

… indicates a potentially hazardous situation that may result in property damage if not avoided.

**Tips and recommendations**

*NOTE!*

*…draws your attention to useful tips, recommendations and information for efficient, trouble-free operation.*

# 2. Performance specification

## 2.1. The Problem

Vibrations develop in many technical areas. Often they can be ignored or are even necessary, but sometimes they are also undesirable or dangerous. Dangerous vibration states can also develop from initially unnoticeable vibrations or completely unexpectedly.

The causes often lie in mechanical defects or unbalances or in improper use of the machine in question. The consequences can include a deterioration of product quality, production losses and safety hazards, and as a minimum increased wear.
Increased automation and, for example, high noise levels often hinder acoustic or visual monitoring. Early detection, material treatment and protection and damage limitation offer a significant potential for cost reductions.

## 2.2. Application Area

The ESW®-Mini is used to protect machines, mechanical equipment and devices and last but not least the operating staff against the impacts of excessively high vibration stress. It permanently monitors the level of the vibration and provides a warning if the limit level is exceeded. The current level of the vibration parameter can also be measured at any time via the analog output.

The frequency range and the unit of measurement result from the characteristics of the measured object and the environmental reference. Depending on the measured object occurs the signal estimation according to the crest value or the effective value of the measurement.

The actual measurement is given out in form of a 4 to 20mA analog-signal that can be used without any disturbance for longer cable interconnections.

## 2.3. Foreseeable Misuse

**WARNING!**
• Never change the limit level to reduce assumed false alarms. Clarify the cause of the alarms.
• Manipulation of the switch contacts of the alarm output or dismantling of the device disable the monitoring function.
• Every modification or change can endanger safety.

## 2.4. Special Features

**The device does not require special maintenance!**

If you send the device to the manufacturer for inspection and checking, please enclose a detailed description of the fault and provide the name of a contact person whom we can contact if we have questions.

### 2.5 Options ex factory

To adjust the device perfectly to the vibration problem, the device can be customer-specific manufactured. The following options can be selected:

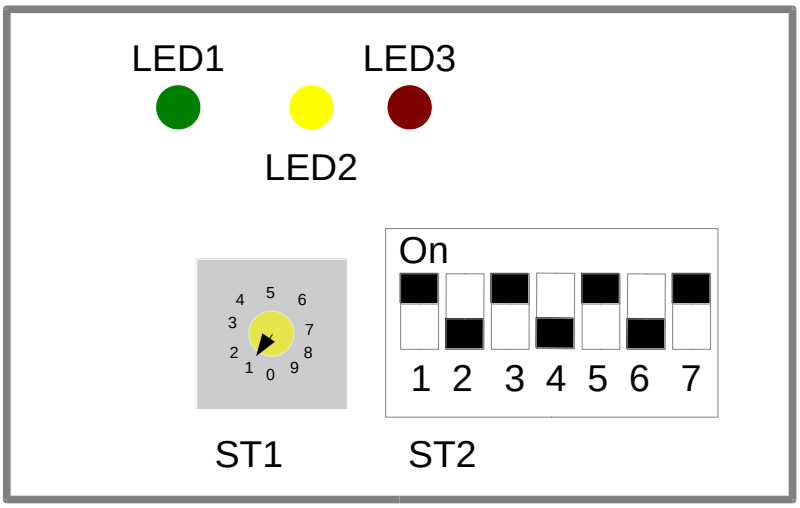
- different measurement parameters
- analog output with range of 0 to 20mA or 4 to 20mA
- with alarm buffer and internal/ external reset or reponse delay and dropout delay
- type and length of the connection cable

## 3.Description of the Device

### 3.1 Display and Operating Elements

*NOTE!*

*Not all functions are present in all versions*




picture 2: Display and operating elements (full equipped,depending on version)

**LED1** The green **Supply Voltage** LED lights up as soon as the device is connected to the power supply.

**LED2** The yellow **Limit Level** LED lights up if the currently measured level exceeds the set limit level.

**LED3** The red **Alarm** LED lights up when the alarm relay is in the "Alarm" position".

**Operating elements**

ST1: The **limit level switch** is used to set the alarm threshold.

ST2: The **dip-switch** is used to activate different settings.(see chapter 4.6)

1. Connection shield – housing
2. Connection shield – internal ground
3. Reset function
4. Set if the device works with or without alarm-buffer and a switch causes a switching edge which reset the alarm-buffer.
5. Analog output 0-20 mA or 4-20mA.
6. Measuring range
7. Measuring range

# 4. Steps Involved for Use of the Device

## 4.1 Identifying the Device

**WARNING!**
Different device versions have different technical data.
The wrong device version can malfunction or fail during use.

Since the technical data are not directly visible on the device, you need to refer to the type label to ensure that you have the right device for the task at hand.

First you need to determine what device version should be used.
You should then check the type label attached to the device.
In addition to the name of the manufacturer and the serial number, the type label also indicates the device version.
If you are in any doubt, please contact the manufacturer to be on the safe side.

### Type Label


*Fig. 2: Type label*

The type label is attached to the device and includes the following information:

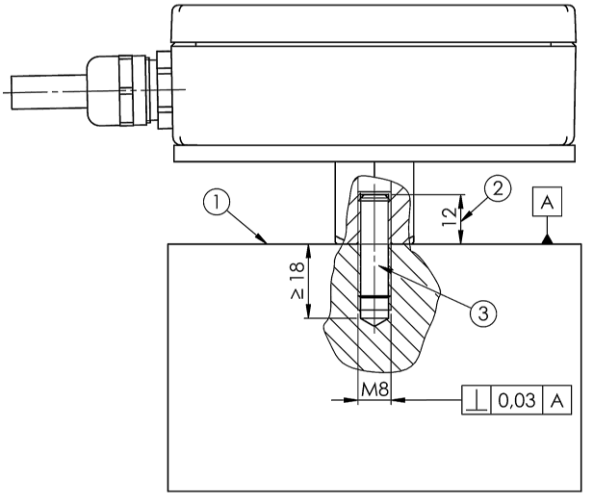
- Type
- Ser. No. xxyy - seq. no. (xx=week, yy=year)
- Manufacturer

## 4.2 Packing, Dispatch and Storage

**CAUTION!**
The device can become damaged if dropped onto a hard surface. The cable can become damaged if it is bent or crushed.

The device must be sealed during transport and storage to protect it against dirt and moisture.
The connecting cable must be coiled with a minimum radius of 100mm and protected against becoming kinked or crushed.
The bare ends of the conductors must be protected against unintentional contact with unknown voltage levels.
During transport, the device must be suitably packed to protect it if it is dropped.

### 4.3 Installing the Device




① mounting surface
② max. screw depth
③ secure grub screw M8x25 with loctite

*Fig. 3: Installation drawing*

In the version with a standard housing, the device is installed on the machine to be monitored using two M4 threaded bolts. A drilling template is provided in Section 6.2. A sufficiently large, flat mounting surface must be available around the mounting position for the device, perpendicular to the mounting holes and the direction of vibration.

With the housing version with a base plate, the device is installed on the machine to be monitored using a central M8 threaded pin. The maximum torque of 30 Nm may not be exceeded, and the force may only be applied via the hexagonal element.

1. The measurement axis of the device must be aligned to the direction of vibration (see the drawing of the housing).
2. The instructions on the device must be complied with in all cases.
3. The mounting surface must be flat, clean and free of paint and rust.
4. The threaded hole(s) must be perpendicular to the mounting surface and free of swarf and other foreign bodies. The threaded hole(s) may also not contain any paint, rust, lubricant or insulation material. This also applies to the threaded hole in the device and to the threaded pin.
5. The threaded pin and the mounting bolts must be secured using a suitable liquid fixing agent to prevent unintentional loosening.
6. The device must be lie solidly on the mounting surface.

**CAUTION!**
When the device has been installed, the connecting cable is laid. Care must be taken that the cable is on the one hand fitted sufficiently flexibly, to ensure that it does not become torn off during excessive vibration. On the other hand it must be laid sufficiently firmly to ensure that it can not itself generate noises due to impacts, that it is protected against damage during normal operation, and that it does not create a risk of accidents due to tripping or stumbling over it. The bend radius of the connecting cable may in no case be less than 70 mm.

### 4.4 Connecting the Cable

Once the cable has been properly laid, the individual wires must be connected in accordance with the wiring diagram (see the data sheet).

> **!** **CAUTION!**
> Check the supply voltage and switch it off when fitting and connecting the device.

### 4.5 Opening and Closing the Measurement Device

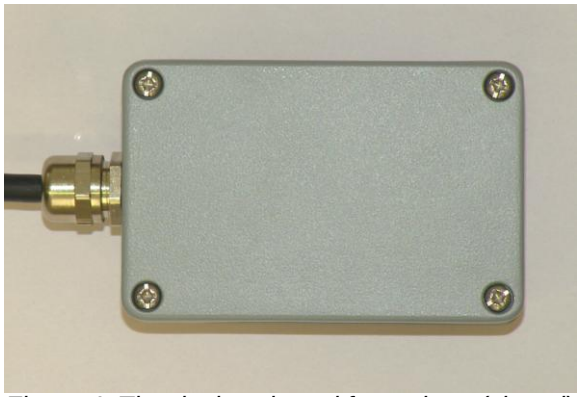


*Figure 4: The device viewed from above(closed)*

*Figure 5: ESW-Mini in full equipment (open)*

- To open the measurement device, the user requires a Size 2 Phillips screwdriver or a flat-head screwdriver with a head width of approx. 6 mm.
- Prior to fitting the cover the seal must be inspected. If it is brittle, deformed or damaged the device can no longer fulfil the requirements of the specified IP protection class.
- It must be ensured that the threads and the interior are free from dirt and oil. The outside and inside of the device may only be cleaned using a clean, dry cloth.

### 4.6 Starting Up the Device

First the settings must be made in accordance with the instructions. The power supply is then switched on and a start-up test is executed. The LEDs, the analog output and the relay switching states should be monitored during the test. On completion of the test the device the cover is then replaced.

> **!** **CAUTION!**
> **Switching actions on the relay contacts in the start-up phase can be incorrectly interpreted during the subsequent evaluation.**

## 4.7 Ground connection settings( ST2: S1 and S2)

**WARNING!**
Potential-differences and excessive leakage currents can be result into signal scatters and large equalizing currents, that could cause errors at the measurement mode or even destruction inside of the device.

For a flexible reaction at different situations, it´s possible to connect different grounds differently with the switch S1 and S2 of the dip switch.

| Connection shield to housing | Connection shield to internal ground | S1 | S2 |
|---|---|---|---|
| | | OFF | OFF |
| x | | ON | OFF |
| | x | OFF | ON |
| x | x | ON | ON |

table 1: grounding connection

## 4.8 Setting the Limit Level

**WARNING!**
The correct limit level depends on the measurement task and may not be changed without careful consideration of the impacts.
If a large number of alarms are generated, the reason for these should first be established rather than simply changing the limit level.

• To change the limit level, first the device must be opened.

• The desired limit level is then set using the limit level step switch. The step switch is marked with the numbers 0 to 9. Switch position 1 corresponds to a limit level of 10%, position 6 corresponds to a limit level of 60%, and position 0 corresponds to a limit level of 100% of the measurement range. The switch does not have an end stop and can be rotated through 360° without a risk of damage.

• Having set the limit level, the device is then closed again.

### Version with step switch (ST1)

The step switch is adjustable with a small screwdriver, blade width 3mm. On top of the step switch there are numbers from 0 till 9. The number 1 means, the limit value of 10%, for example the number 6 correspond to the limit value of 60% and 0 means 100% from the measurement range. The switch has no mechanical limitation and could be turned over 360°, without any risk.

### 4.8.2 Version with potentiometer (ST1)

The potentiometer is adjustable with a small screwdriver, blade width 3mm. Around of the potentiometer exists a scale with numbers from 10 till 100. The number 10 means 10% of the measurement range and 100 means 100%. This potentiometer has a continuous adjustable range, with a turning angle of 300° between both mechanical limits.

Please take care during the adjustment, not to destroy or to shift any other adjustment element. You should absolutely safe the unit for entering of dirt, humidity or other alien element. After finishing the adjustment, make sure to close the unit perfectly and check that the cover is solid close

## 4.9 Set measurement range (ST2: S6 and S7)

**There are devices with a fixed measurement range and devices with adjustable measurement range.**

**WARNING!**
The selected measuring range must not be change carelessly.
If the alarms accumulate, the reasons for the alarms have to be found and stopped.

To change the measurement range, you can use the 2 DIP-switches. At the lower position the DIP-switches are turned OFF, equivalent to “0” level, at the higher position equivalent to “1” level the DIP-switches are switched ON.

The measurement range in the following should be understand like an example. Other measurement ranges are realizable in specified ranges on customer request.

Please take care during the adjustment, not to destroy or to shift any other adjustment element. You should absolutely safe the unit for entering of dirt, humidity or other alien element. After finishing the adjustment, make sure to close the unit perfectly and check that the cover is solid closed.

| Measurement range | | Position | |
|---|---|---|---|
| **Version 1** | **Version 2** | **S6** | **S7** |
| 10mm/s | 15mm/s | OFF | OFF |
| 20mm/s | 30mm/s | ON | OFF |
| 50mm/s | 45mm/s | OFF | ON |
| 60mm/s | 60mm/s | ON | ON |

table 2: set of measurement range ( example)

## 4.10 Set analog output (ST2: S5)

The analog output supplies 0-20mA or 4-20mA optionally

| output range | S5 |
|---|---|
| 0 bis 20mA | ON |
| 4 bis 20mA | OFF |

.table 3: analog output range

## 4.11 Set alarm memory function and trigger reset function (ST2:S4)

If the device is equipped with the alarm-buffer, a button can be intended for the external reset. For a reset, the corresponding control line must be set with the push-button to the ground potiential of the device for a brief time. If there is an optional occupancy, the button S4 of the dip switch can be used to perform a reset.

## 4.12 Normal use of the device

During normal use the level of the analog output can be monitored to determine whether and to what extent the level of vibration changes depending on the use of the machine.
If the indicated vibration level changes abruptly, the reason for this should be determined.
Correct seating and proper condition of the device should be checked on a regular basis.

## 4.13 Removal of the Device

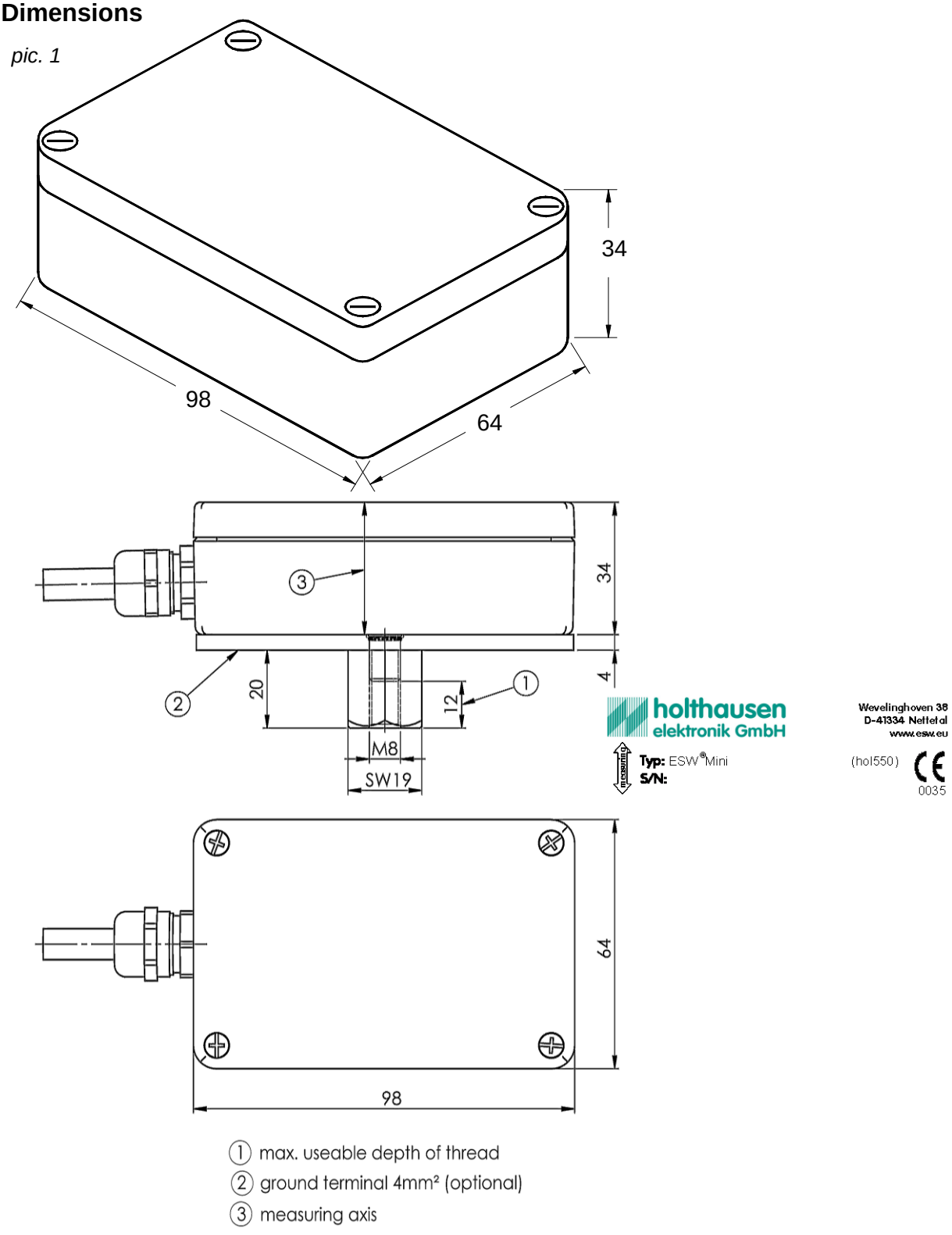
> **!** **CAUTION!**
> To avoid short-circuits and false alarms, make sure that the power supply and the signal evaluation are switched off and/or disconnected.

To electrically disconnect the device from the machine and physically remove it from the machine, the power must first be disconnected from all connections to prevent short-circuits.
The downstream evaluation is then to be prepared for the disconnection, to avoid false alarms.
The cable connections can then be disconnected from the device.
The cable glands and clamps are then dismantled and the cable removed up to the device. The device can now be unscrewed and removed together with the cable.
All loose and sharp-edged parts are then re-secured or removed.
The mounting holes for the device must be protected using suitable sealing plugs.
The removal of the device must be indicated on the machine.

## 5. Technical data

### 5.1 Dimensions

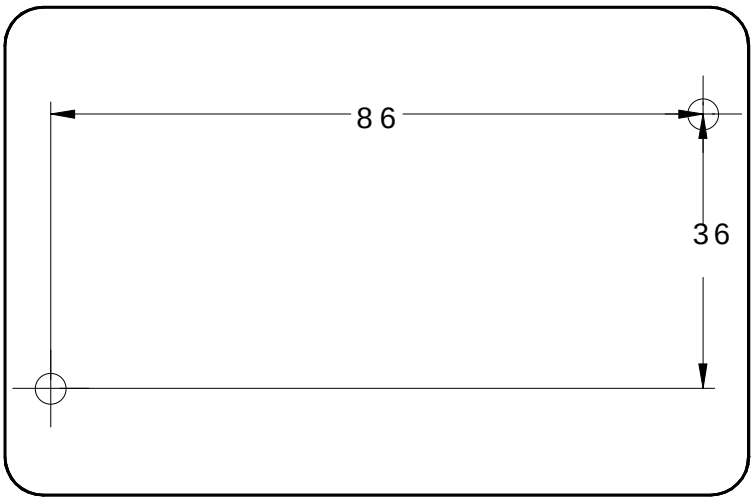
*pic. 1*




① max. useable depth of thread
② ground terminal 4mm² (optional)
③ measuring axis

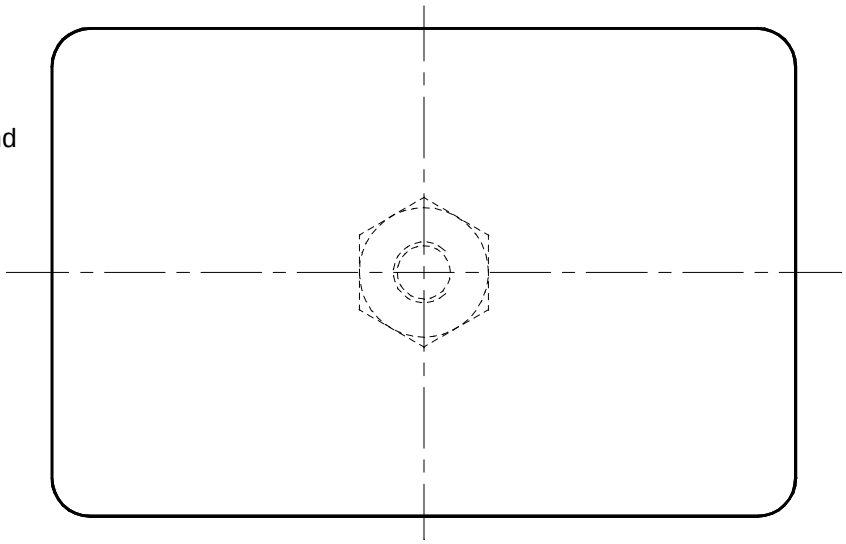
## 5.2 Drilling template

*pic. 3*
standard case




attached by
2 screws M4

*pic. 4*
case with
ground plate and
attachment bolt



attached by
1 thread pin M8