

## User Manual



## Electronic Vibration Monitoring Unit

### ESW<sup>®</sup>-Mini (hol550)

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technical modification possible

holthausen elektronik GmbH is certified according to DIN EN ISO 9001.

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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-indications

Don't use this device as the only invigilator, if a malfunctioning of ESW<sup>®</sup>-Mini could lead to damages on goods or Persons.

To obtain the desired result be sure, that the device with its technical data fits to the bulk of the object you want to supervise.

The sensor is sensitive to shock. A downfall out lower height to a hard substratum can destroy the sensor.

The assembling place and the execution of the assembling of the sensor determine decisively the quality of the sensor signal. The assembling may only happen through qualified and instructed persons.

The electrical hook up is to be done by instructed persons. A mistake by the connection can entail to faulty functions, outfall or ruination of the sensor and electronics.

The ESW<sup>®</sup>-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. Through a damaged cable chemicals could get inside the unit and destroy the electronic. Then the unit would loose their function. Therefore the conditions from the mounting surrounding must be checked. Then the cover material from the cable have to be proofed if it resists these requirements. You can get an overview from the chemical resistance of the cover material from us.

**Safety instructions** in this manual are marked with Symbols.

The safety instructions are introduced by signal words that express the extent of the hazard. Observe the safety and act prudently to prevent accidents, personal injury and property damage.



**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 potentially hazardous situation that 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!**

... highlights useful tips, recommendations and information for efficient, trouble-free operation.

## 2. Packing and the transport



### **CAUTION!**

The sensor is sensitive to shock. A downfall out lower height to an hard substratum can destroy the sensor.

Avoid to kink or tie a knot in the cable.

Keep the electronic in a dry place.

In case of a downfall or heckling or squeezing, could the casing or the operation elements or the board get defects.

With adequate warning-labels and through a qualified packaging and storage, you can protect the sensor and electronics at carriage against influences from outside.

### 3. Appliance documentation

In many technical ranges there are vibrations, frequently are they to neglect or even necessary, but sometimes also undesirable or even dangerous. Beside that, can dangerously vibration-conditions start slinking or occur total unexpected.

The reason for it often lies in mechanical defectives or improper handling of the machine.

The sequences are maybe diminution of the product quality or even loss of production and endangering of the security, at least a raised wear and tear.

Increasing automation as well as a high noise level, prevents often an acoustically or visual surveillance.

Thereby offers early detection, taking care of the material and limitation of damage a considerable potential to the reduction in costs.

The ESW<sup>®</sup>-Mini for the vibration surveillance delivers important information to the running process, provides the proof of slow changes and reacts at exceeding of limit values.

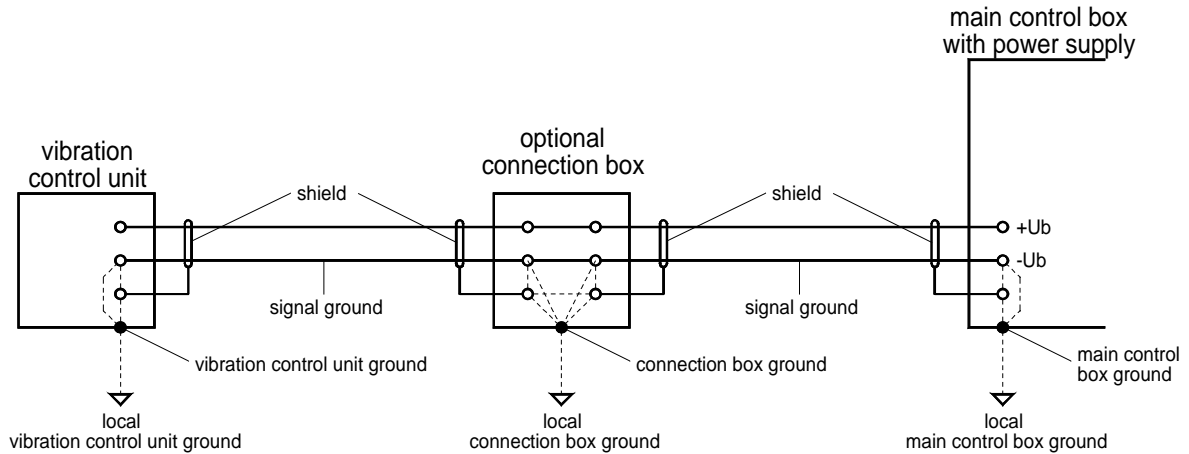
As the unit of measurement, are according to the application, the measured vibration acceleration (measurement of power), the measured vibration velocity (measurement of the energy) or the measured vibration movement (measurement of movement) usual.

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.

Particular attention should be donated to the assembling place of the sensor, decisively is the source of the signal that shall be measured and its mean vibration direction. The assembling place of the sensor and alignment of the measurement axis of the sensor have to be selected so that the vibration possibly can be measured directly without interferences, subdued crossings or defective couplings.

#### 4. Grounding-concept



If an isolated installation is not explicitly requested, usually through the screw of the components the casing is connected to the local machine ground.

The cable shielding, the box ground and the signal ground could be connected, inside an optional terminal box, dependent on local facts and requirements.

Inside the ESW<sup>®</sup>-Mini, depending on customer request, the shielding and / or signal ground is connected with the case potential, by the factory.

⇒ Connection to the local Ground

In big facilities with considerable energy consumption and distances between the machines such a big potential difference could be built up, that substantial balancing current will occur on the ground network. Depending on the intensity of such currents are disturbances or damaging of the unit the result!

Potential differences could also arise on machines, with small distances, not clear crossings of the ground potential (painting) or movable parts (feathers, suspension mounting) could be the reason for regular potential-steps.

High energetic frequency interferences could also be added to the measurement signal wire by inductively or through capacity coupling and could change the real existing measurement value! In this way could for example parallel going elements act as coupling capacity and winded grounding cable act like a choke.



#### CAUTION!

Ground is not equal everywhere!

- Check the situation
- Plan the grounding concept
- Select the facility / realization



## 5. Function

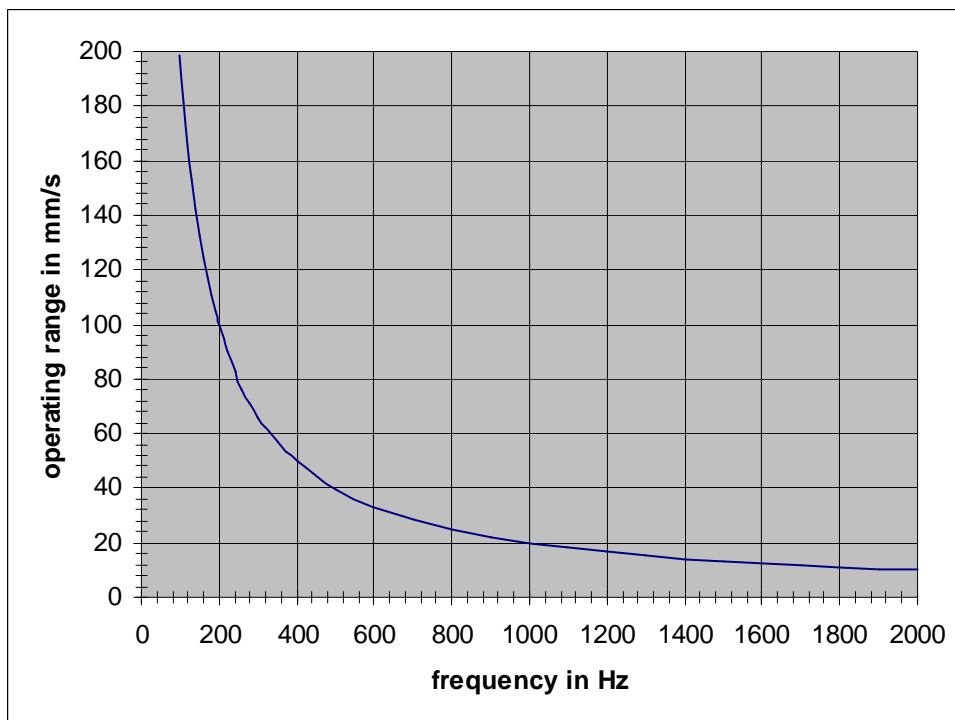
The vibration-monitoring unit is generally mounted on the place, where inadmissible vibration occurs or can be expected. The unit is permanently monitoring the real condition or situation on the machine. The noticed mechanical vibration detected by the sensor will be transformed to a corresponding electrical signal.

The following evaluation electronic, filters and treats the measurement signal on such way, that an output signal occurs, which allows a clear and topical judgment also in the critical range.

The output signal is compared with an adjustable reference level. In case the measured value exceed the reference level for longer than the specific delay time, an alarm relay will be activated, to drive any warn- or control-functions. By customer request the delay time is directly adjusted by the factory.

In case the measured value falls below of the reference level, the alarm relay will change back to neutral position after the end of the delay time. Also this time can, by customer request, directly be fixed by factory.

Operating range in relation to the frequency (valid for the internal sensor ADXL321):

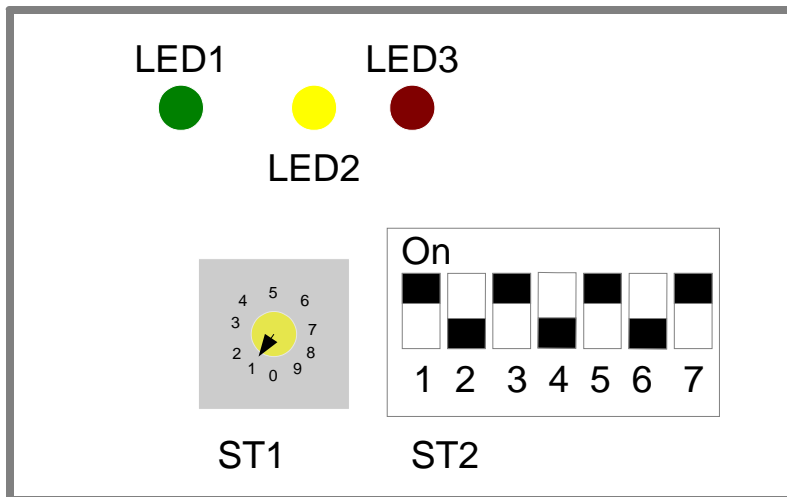


## 6. Visual and tactile elements



*NOTE!*

*Not all functions are present in all versions*



Draw: Insight and full equipped (depending on version)

LED1 (green): power on connected

LED2 (yellow): Measuring is greater than settled range

LED3 (red): as long as the alarm relay in the alarm setting remains

## 7. Switching of the measurement range (option) (ST2: S6 and S7)

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

## 8. Limit range adjustment (ST1)

One of the main goals of the device is, after exceeding a specified measurement value, to activate the alarm relay for execution of specified effects. In order to meet real conditions at the measurement place, the switch level of the measurement value could be adjusted. For this reason there is an adjustment element in the device to set the limit of the measurement value between 10% and 100%. This adjustment should only be done by qualified persons, when the device is disconnected from the power supply. Dependent on the version of the device, the adjustment element is a step switch or a potentiometer.

## 9. 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.

## 10. 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 closed.

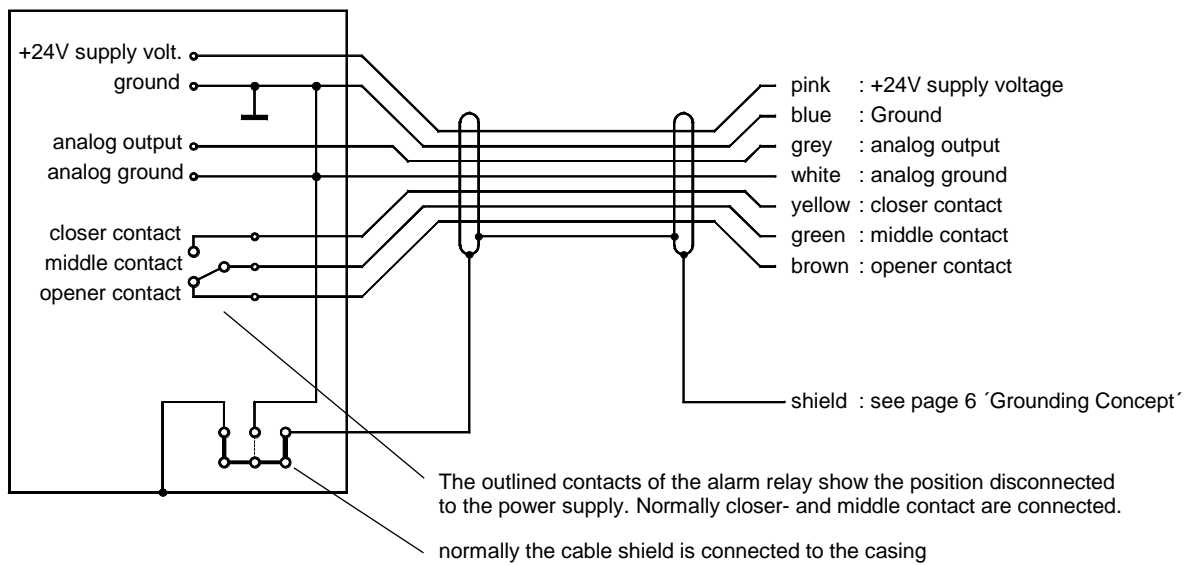
## 11. Cable connection draft



### CAUTION!

Please notice the cable connection information in the specific technical data for each Version.

ESW<sup>®</sup>-Mini (example shows version 005)



## 12. Mounting and maintenance

The sensor can only take up the vibrations and transmit them, which really arrive on his assembling place. Therefore the choose of the right assembling place is very important.

Also the method of mounting has decisive influence on the quality of the sensor signal and has to be done very carefully.

### 12.1 Mounting of the vibration monitoring unit



#### **CAUTION!**

The mounting is to be done by qualified persons!  
Protect the sensor definitely against drop, stroke  
and other mechanical shock!

Before mounting the vibration monitoring unit, please define the main vibration direction and than select the measurement place, which is as much as possible free of own vibration and interferences and has enough space to mount the ESW<sup>®</sup>-Mini exact to the vibration direction (picture 1, page 13).

With help of appropriate drill template (picture 3 and picture 4, page 14) it's easy to place the corresponding hole to the mounting place. Around of the mounting place is a sufficiently large and plane place for the unit necessary, it should be oriented vertically to the mounting holes and to the direction of the vibration. After finishing the mounting, the connection wire and also the sensor wire (by external sensor) will be placed.

Please make sure that connection cable is flexible enough not to tear off by excessive vibrations, on the other hand it should be firmly fixed to avoid making noise itself, to be safe for damage in normal work and not to become a trip wire.

Please note the minimum bending radius in the technical datasheet.

In the case of using a mounting plate a maximum torque of 30Nm is to be kept. The power transmission must be influenced only at the hexagonal bolt.

### 12.2 Connection of the vibration monitoring unit



#### **ATTENTION!**

All the connection work may exclusively be carried out through qualified persons and only in the non-voltage condition!

The ESW<sup>®</sup> has a fixed connection wire. To make further connections easy lead the cable into a switchbox or control center. The requested power supply is 24V DC ( $\pm 10\%$ ) and should be stabilized without any disruption and interferences. The power line should not be placed near to any disruption sources, like a rectify. For additional information to the issue interference sources, grounding and shielding, see on page 6 the "grounding-concept".

The maximal power load on the relay contacts is 30V and 1A. Please pay attention to the working method of the relay. The description of the relay contacts is always related to a voltage less condition. After switching of power supply ON, without an alarm condition, the alarm relay is attracted.

In case of an alarm, voltage drop or disconnection, the connection between middle contact and closer contact is interrupted. This circumstance allows to control if there is a faulty or a breakdown.

The optional analog current output is realized by factory as a current of 4 to 20mA. The load should not exceed more than 500Ohm.

If the unit is equipped with an alarm memory, an external reset button is necessary. The reset is activated, when the control wire is connected for a short time with ground potential of the unit.

### **13. Safety measure**

At regular function the sensor delivers a short-circuit current, on which the measurement signal is modulated on. The evaluation electronic controls the signal and gives alarm, as soon as the signal has leaved its allowed range. So are sensor failure, disconnection and short circuit of the sensor cable controlled permanently. The alarm relays have attracted in quiescence. At alarm, voltage outfall and cable fraction of the switching cable becomes alert condition signalled. The analog output gives a 4 to 20mA signal. Sinks the electric energy against 0mA or rises it distinct over 20mA, signals that cable fraction or short circuit.

### **14. How the ESW<sup>®</sup>-Mini works**

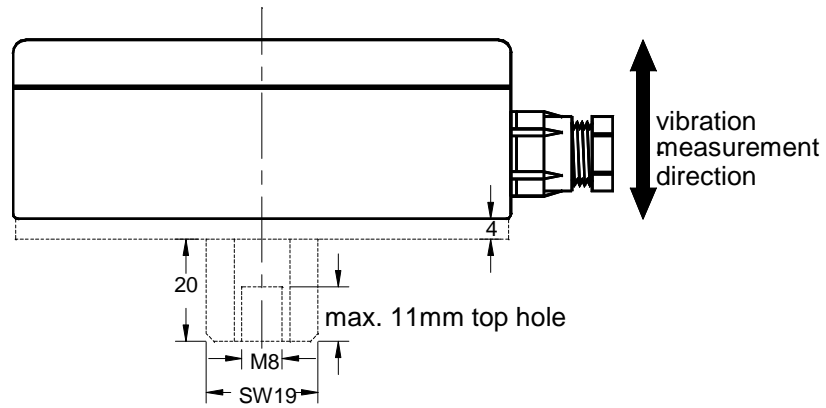
The evaluation works maintenance free and needs no one further attention. It must be secured, that the apparatus settings can not be manipulated unchecked. In the daily work should sporadically be checked, whether the display shows realistically values. Too great or too small values can point out to changes at the machine, to the measurement settings or to the environmental reference conditions. The ideal settings for the device may be different from machine to machine and must be adjusted if necessary.

### **15. Maintenance**

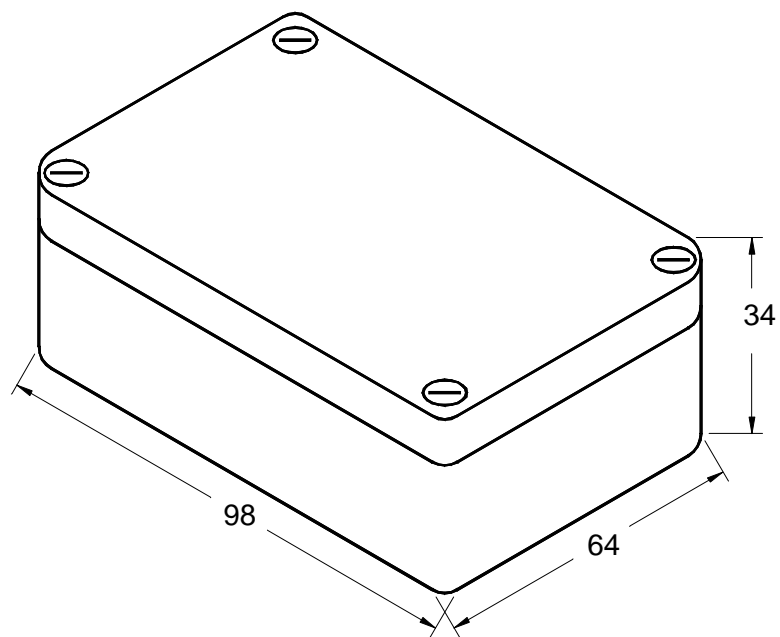
The device needs no special maintenance. The maintenance restricts to exchange defected parts. Should the equipment be sent to the fabricators for restoration, it is helpful if even the sensor and a detailed error description is subjoined. Please name a contact person for further inquiry.

## 16. Mechanical data

pic. 1



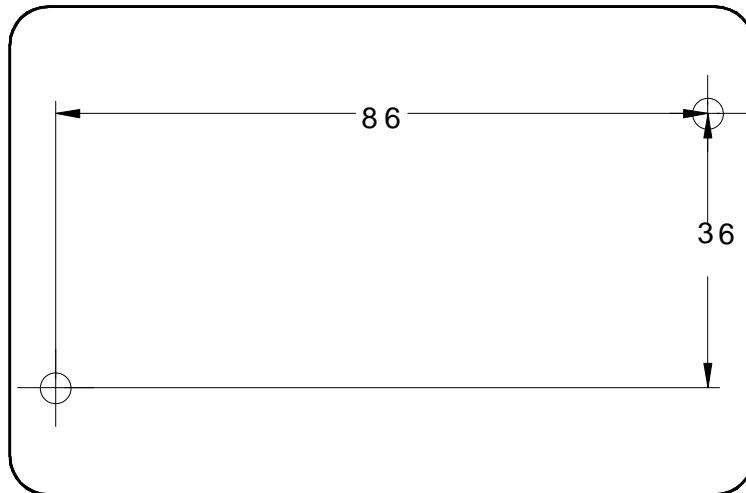
pic. 2





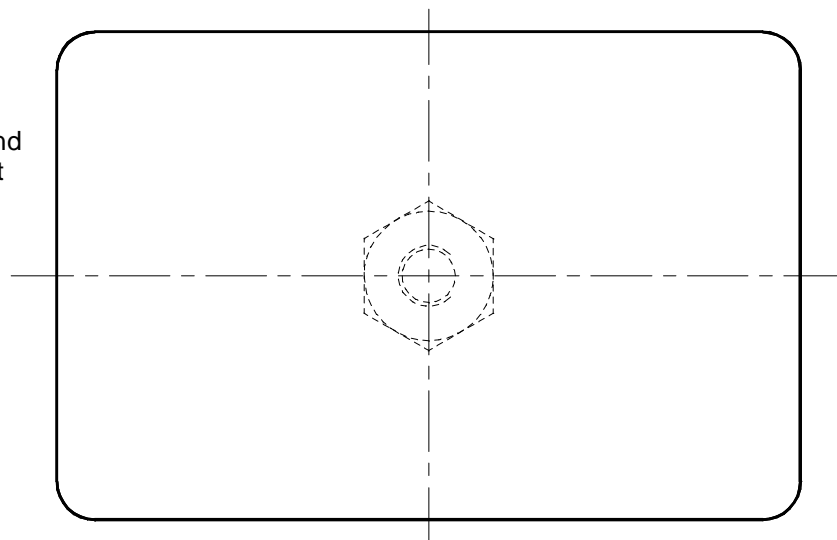
## 17. Drill template

*pic. 3*  
standard case



attached by  
2 screws M4

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



attached by  
1 thread pin M8

