

## User Manual



### Electronic Vibration Monitoring Unit

### ESW<sup>®</sup>-LowCost (hol650)

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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>-LowCost 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>-LowCost 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.

## 2. Packing and the transport

Note:

- The sensor is sensitive to shock. A downfall out lower height to a 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.

## Description and operation instructions

### 3. Application

In all technical environments arise by different events and processes vibration. Often they are to disregarded or even necessary, sometimes but also undesirably, damagingly or even dangerously. This circumstance is valid basically as well as for the frequency and the intensity of the vibration. One additional problem occurs, that such dangerous working conditions arising in a totally unexpected manner or slowly and secretly. Dangerous vibration can be possible on :

- Ventilators, pumps and blowers
- Shakes, separators
- Conveyor belt- and transfer equipment
- Drives
- Equipment-, refinement- and production machines

The reasons for such not unacceptably available vibrations are located for example in mechanical faulty or imbalance, among other sings initiate through overload, void speed or contamination. Father more express in such manner also incorrect handling, loads or adjustment. The consequence is often decreasing of production quality or even production loss, as well imperilment of the security and damage escalation, at the lowest one enlarged wear and tear. Increasing of automation, as well for example high noise level, hinder often some acoustical or visible monitoring. There by offer an early identification, material considerate treatment and damage limitation and considerable ability for cost reduction. On the other hand must of course the expenditure for vibration monitoring be in good relation to value of the system and also to accomplishable amount to the related damage.

### 4. The solution

The electronically vibration monitoring unit ESW<sup>®</sup>-LowCost, is special for such range of applications developed. The unit is useful for monitoring of existing mechanical vibrations, and during overstepping of fixed limit value usable for regulation of the system control environment. This Device operate independently, is a compact unit subsisting sensor and evaluation electronic, housed in a rugged aluminium case. The unit is small and light and there fore in optimal way against environmental influences encapsulated.

The wiring design is particularly free from interference establish. The mounting is simple and without necessity of any special tools possible. Further maintenance work is not necessary! Any electrician could implement the electrical connection.

In order to adjust the unit to optimum, related to the presented vibration problem is in need measurement-, frequency range, response time respectively drop off delay time by factory adaptable. The output of the unit is one switch contact, related to limit range control circuits with an adjustable switch level and (or) analogue output current signal.

## 5. Function

Mounting of the vibration-monitoring unit is generally done on such place, where inadmissible vibration occurs or can be expected. The unit is permanently monitoring the real condition on the machine during the vibration. The noticed mechanical vibration detected by the sensor is transformed to the corresponding electrical signal. The following evaluation electronic, filter and processed measurement value in such way, that output signal, which occurs, allows a clear and on the current situation based opinion of the present mechanical vibration also in the critical range of the monitoring facility.

The output signal is compared with an adjustable reference level. In case the measured value exceed the reference level for longer than the fixed delay time range, then alarm relay will be activated, and is used to drive any warn- or control equipment. In case the measured value falls below of the reference level, the alarm relay will be deactivated after fixed delay time and change the alarm status back to his standard condition. The delay time range, during activation or deactivation of the alarm relay is by customer request, directly by factory in a specified range adjustable.

Additional supply with alarm memory, where the unit after the activation of alarm relay will remain in the alarm status till an external and manually reset will be activated (option), is possible and is preferred used in such cases where the vibration monitoring unit is on difficult accessible places mounted. Through this advanced memory function is every alarm registered. Reset of the alarm memory, through reset button, is from any place or location by variable mounting of one or more in parallel-connected reset buttons possible.

Through an additional analog current output (option) is a current value for estimation available, because this average value corresponds directly to the current vibration situation on the measured location. This value is by any measurement instrument visible and meets the present vibration status.

## 6. Mounting of the vibration monitoring unit

**Attention:** Protect the ESW<sup>®</sup>-LowCost unit definitely against drop, stroke or other mechanical shock!

Before mounting of the vibration-monitoring unit, please define the main vibration direction and select measurement place that is as much as possible free of own vibration and is not belonging to any noise level. The mounting place should also meet sufficiently space to mount the unit exact to the vibration direction.

The choose of mounting place for the vibration-monitoring unit should be decided in such manner, that later adjustment work will be accessibly assured and the unit against distress trough climate, not belonging vibration and electrical disturbance with magnetic or electric fields is protected.

Prepare the corresponding hole to the mounting surface, which has to be with M8-thread (or M12 depended on version) prepared. Around of the mounting surface is sufficiently large and plane place for the unit necessary that should be in vertically manner to the mounting hole and to the direction of the vibration oriented. After the degreased threaded bolt has been spread with a suitable thread safeguarding medium, the device can be screwed on at the measuring place and tightened by hand as far as possible.

After finishing of the mounting procedure the connection wire will be connected. Please make sure that connection cable are flexible enough and on the other hand fix enough to avoid cable own noise level, trough bump generated. Also any dangerous situation for the user for example stumbles and fall should be prevented.

## 7. Connecting the vibration-monitoring unit

**Attention:** All connection operations must be done only from qualified personal and without connected power supply!

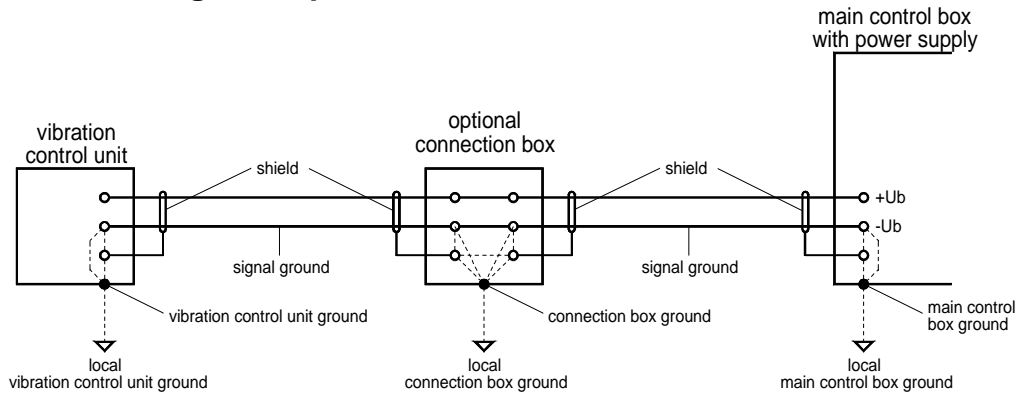
The ESW unit has standardized fixed connection wire. Alternatively is the monitoring unit also with electrical connector available. The connection wire for connection in any electric control box or in case requested to appropriate connection box, which should be one suitable place fixed. The unit require stabilized power voltage of 24V DC  $\pm 10\%$ . The voltage should be of any oscillation or any disruption free. Please don't place the power line near of disruption sources like heavy power line or electronic devices. Additional information for avoiding interference sources; see grounding and shielding explanation described on Page 8 "Grounding-concept".

The maximal power load on the relay contact is 30V and 1A. Please pay attention on working manner of the relays. The description is always related to work mode where power voltage is not activated. After switching of power supply ON, without recognition of an alarm status is alarm relay activated. In case alarm status occurs, power failure or connection wire to the control box is interrupted, will the connection between middle contact and closer contact be disconnected. This circumstance allows control off defects and failures in the connection wire as well in the monitoring unit self.

The optional analog current output could be by factory as current source of 0-20mA or 4-20mA realized. The load should not exceed more than 330Ohm.

In case the unit is equipped with alarm memory (option), additional reset button for the unit is necessary. The reset is activated when control wire is for a short time with ground potential connected.

## 8. Grounding concept



In case there is explicitly isolated installation not requested, is usually through attachment with screws each case to the local machine ground connected.

By factory side is inside of the ESW<sup>®</sup>-LowCost unit with cable point of connection, depended on customer needs, the shielding and / or signal ground with case potential connected.

⇒ Connection to the local Ground

(Standard delivery condition for ESW<sup>®</sup>-LowCost with cable is the cable shield and the signal ground **not** with case of the unit connected!)

By the ESW<sup>®</sup>-LowCost with “Tuchel” device connector could by factory, dependent on customer request the signal ground with case potential be connected. The cable shield could be on the customer site through the connection to the ground contact of the connector with case ground of the unit also connected.

(By standard delivery of the unit with connector is the ground contact with the case by mechanical contact connected and signal ground is **not** with case of the unit connected!)

Inside of optional plug in box could also cable shielding, box ground and signal ground by choice and dependent on local facts and requirements be connected.

Inside of big facilities with considerable energy consumption and relevant distances between machines could such big voltage potential differences being build up, that substantial balancing current on the ground network will occur. Dependent on intensity of such currents could arise any interference's or damaging of the vibration-monitoring unit could be the result.

Voltage potential differences could also arise on machines, with small distances not clear crossing of ground potential for example painted colour or movable parts like suspension mounting.

Energetic high frequency interference energy could also be to the measurement signal wire by inductive or trough capacity coupling added and change the real existing measurement value! In this way could for example parallel going elements act as coupling capacity and wind grounding cable act as inductivity

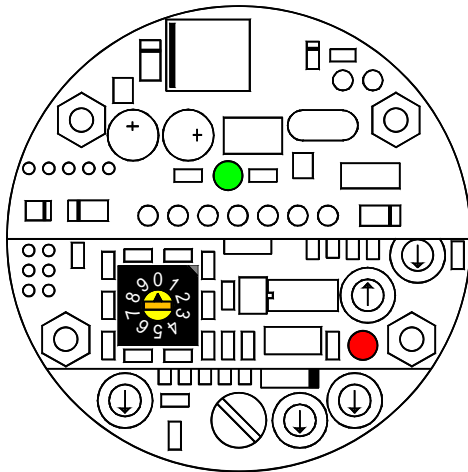
**Memorize: Ground is not equal everywhere!**

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



## 9. Limit range adjustment

One of the main goals of the unit is after exceeding of specified measurement value to activate the alarm relay for execution of specified effects. In order that the switch level of measurement value should meet real conditions on measurement place and should also to the environment be adaptable, is the limit value in the unit adjustable. For this reason is the unit equipped with step switch element with whom the limit value between 10% and 100% of the measurement value could be fixed. This Adjustment should be done only from qualified personal and only without connection to the power supply. The step switch is with small screwdriver blade width 3mm adjustable. On top of the step switch exist numbers 0 till 9. Here by means the number 1 one limit value of 10%, for example the number 6 the limit value of 60% and the number 0 means 100% from total measurement range. The switch doesn't have any mechanical limitation and could be turned around 360° without any trouble.



Please take care during the adjustment, don't use by mistake or destroy any other adjustment elements. You should prevent absolutely entering of dirty, humidity or another alien elements in to the housing off the unit. Make sure after finishing of the adjustment to close the unit perfectly. Please check that the cover is in a sticky manner closed.

## 10. Additional instructions

In general any maintenance on the unit is not necessary. But please check from time to time whether the parts of vibration monitoring unit like cover, cable or extended sensor are not loosened or damaged by vibration.

Further more should be continuously insured that no qualities of the power supply and environmental conditions disturbance by electrical or magnetically fields and mechanical pressure like shock and push not succeeding are changed. In such case a new specification for the unit will be necessary.

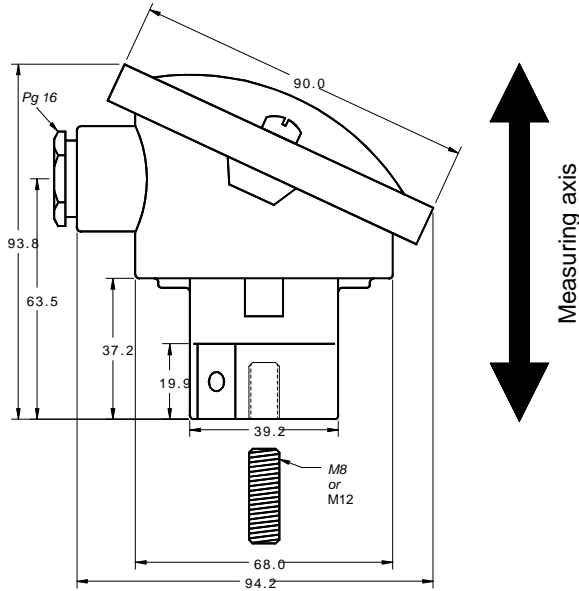
Should be absolute unrealistic values suddenly indicated by the unit, please check first of all the fixed mechanical conditions of the unit and then measurement place regarding possible sources of own vibration like for example loosely parts.

In case any problems occur please contact the manufacture!

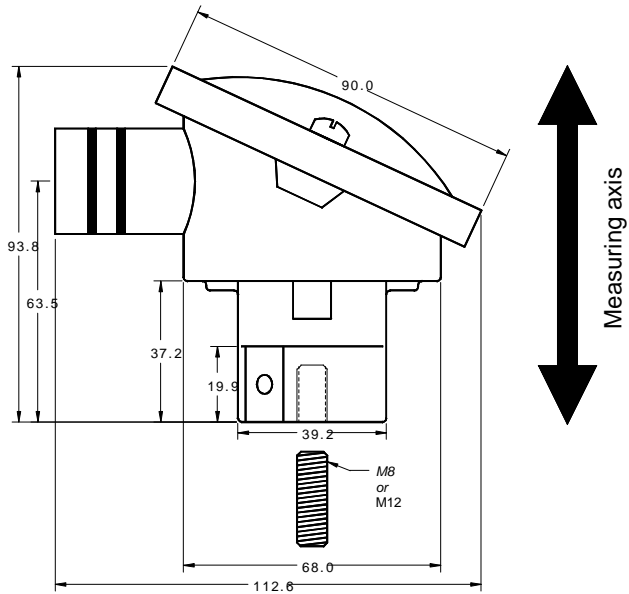
We are every time ready to help you with recommendation and support.

## 11. Mechanical data

### Version with cable connection



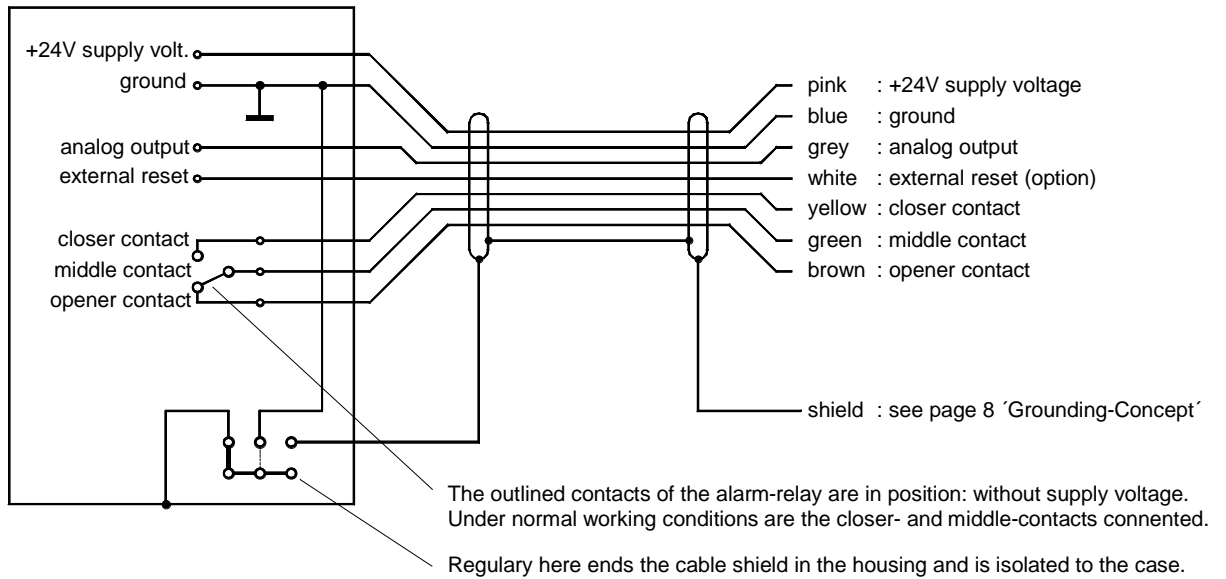
### Version with Tuchel device connector



## 12. Cable connection draft

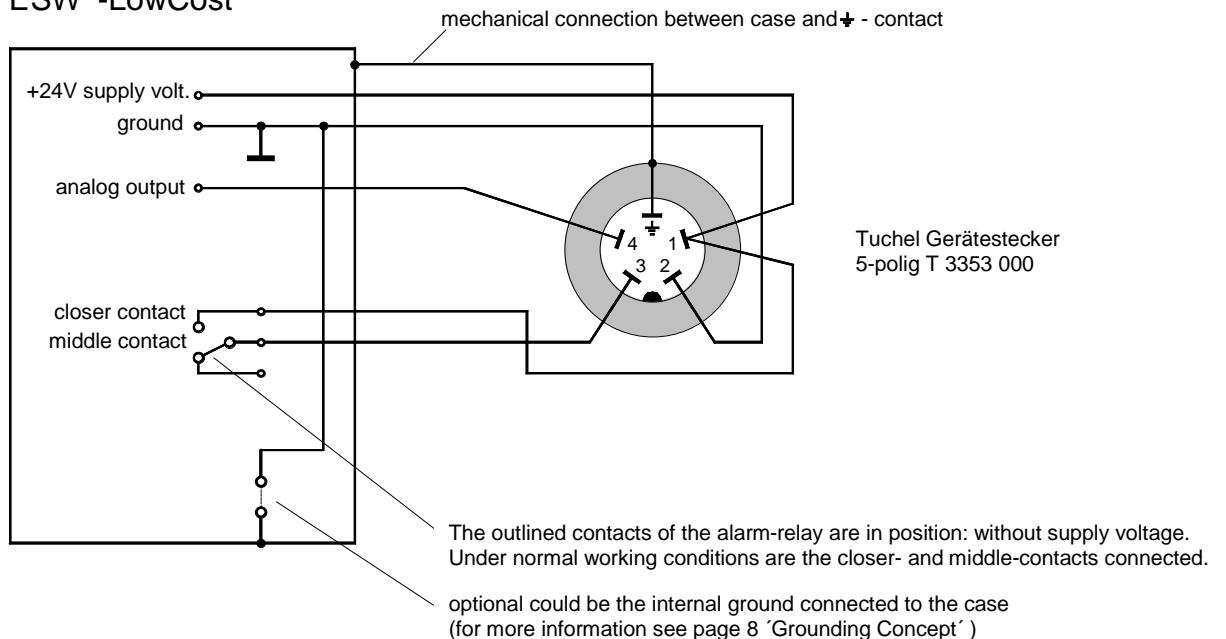
### Version with cable connection

#### ESW<sup>®</sup>-LowCost



### Version with Tuchel device connector

#### ESW<sup>®</sup>-LowCost



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## **Declaration of Conformity**

### **Application of Directive 2004/108/EC**

**we hereby declare, that the construction of:**  
**multifunctional vibration control unit for the vibration  
monitoring**

**ESW<sup>®</sup>-LowCost (hol650)**

**complies to the following norms:**

**EN 61000 - 6 - 4      interference emissions**

**EN 61000 - 6 - 2      interference immunity**

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**Manager                              Michael Holthausen**

**Place                                      Nettetal  
Date                                        17.05.2007**

**Signature**



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