

Blister Measuring System

Combined with HVC



Measuring



Controlling



Evaluation / Alarms

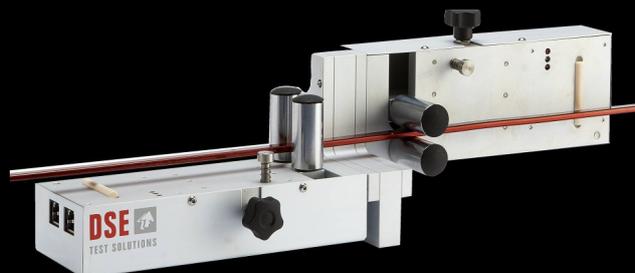


Displaying



Documentation

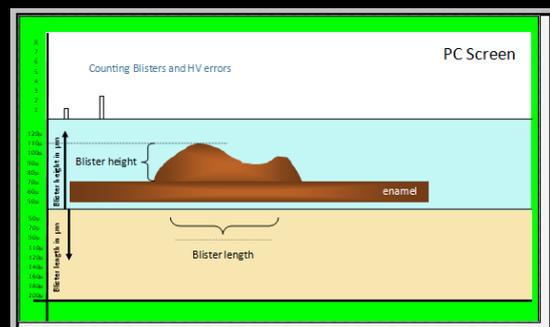
Measuring



Processing



Displaying



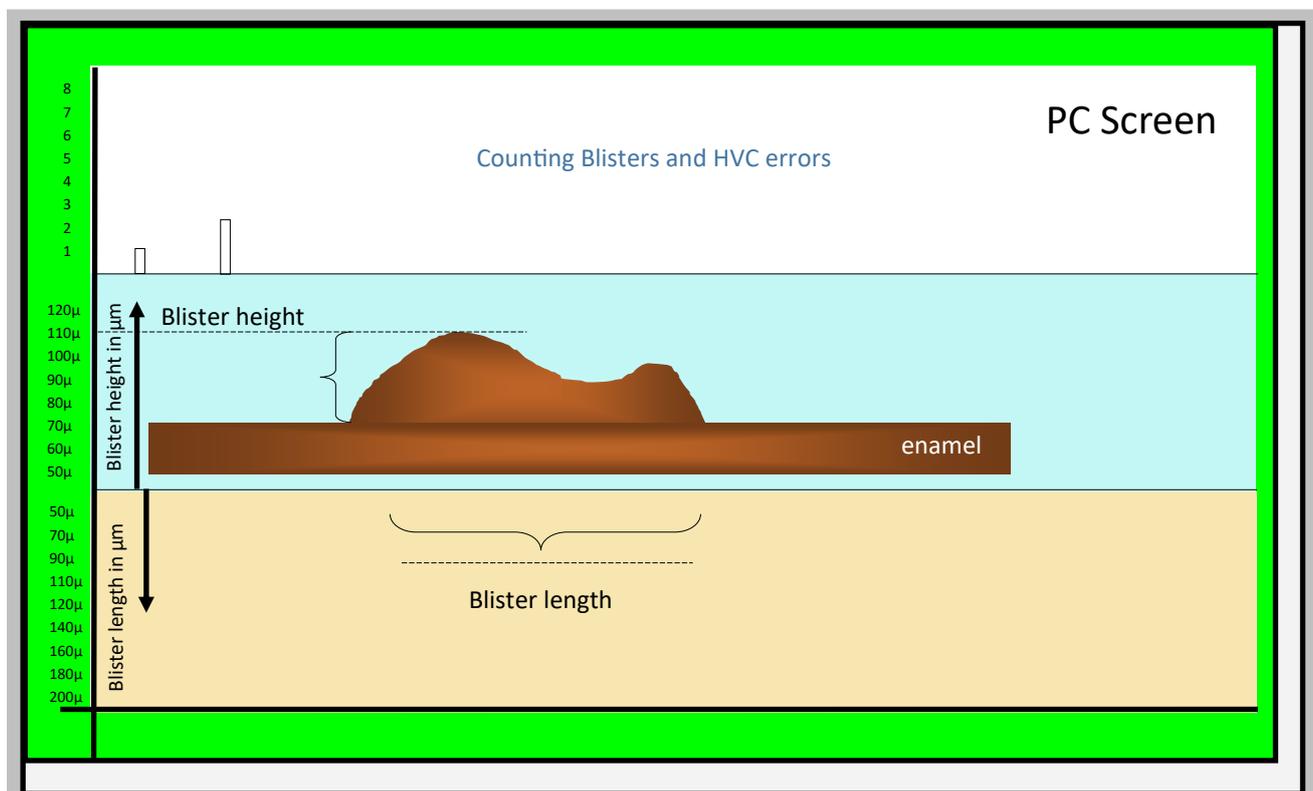
Blister Measuring System

-Designed for automotive requirements



The Blister Measuring System features

- In-line system for measuring blisters and detecting pinholes on flat wire
- Measuring the actual height & length of a blister
- Prompt output e.g. for a marking device when thresholds are exceeded
- Combined Blister and High Voltage Continuity [HVC] in same window
- Detection of minimum distance between errors using Evaluation window
- Separated graphs for HVC and Blister Error Numbers, Blister height & length
- Real-time view on PC screen
- All data records are stored in the database and can be reviewed on request



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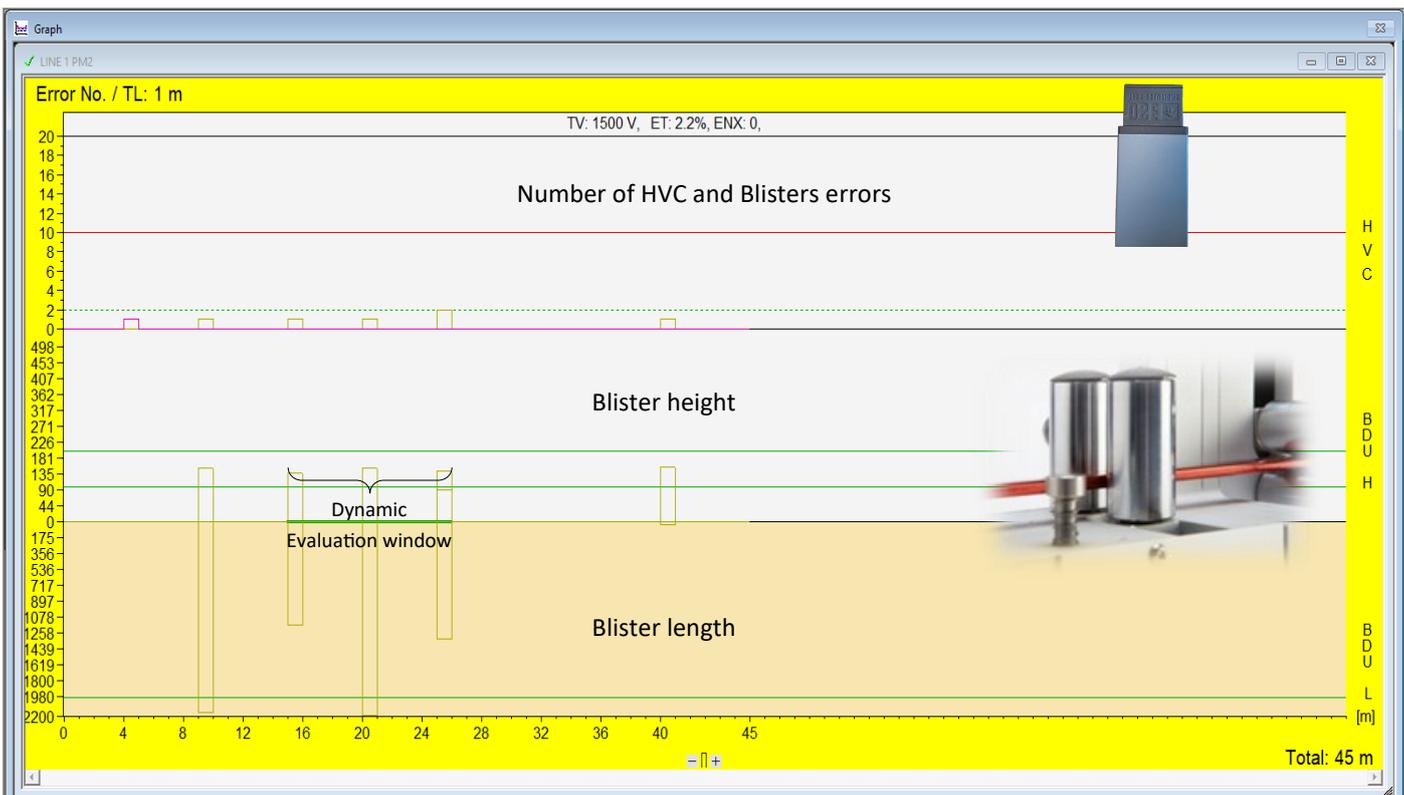
Combine Blister and Pin hole detection in one system

High Voltage continuity tester:

- Detects and counts number of pinholes, cracks and bare wire when user-defined thresholds are exceeded.
- HVC error prompt output.
- Multiple lines per PC.

The blister detection finds and continuously measures:

- Counts blisters when user-defined thresholds are exceeded.
- Measure the actual height of the detected blister.
- Calculates the actual length of the detected blister.
- Evaluation window sets the minimum distance between errors.
- Storage of data on Microsoft SQL database for full traceability and later evaluation, label print out.
- Blister error prompt output.
- Multiple lines per PC.

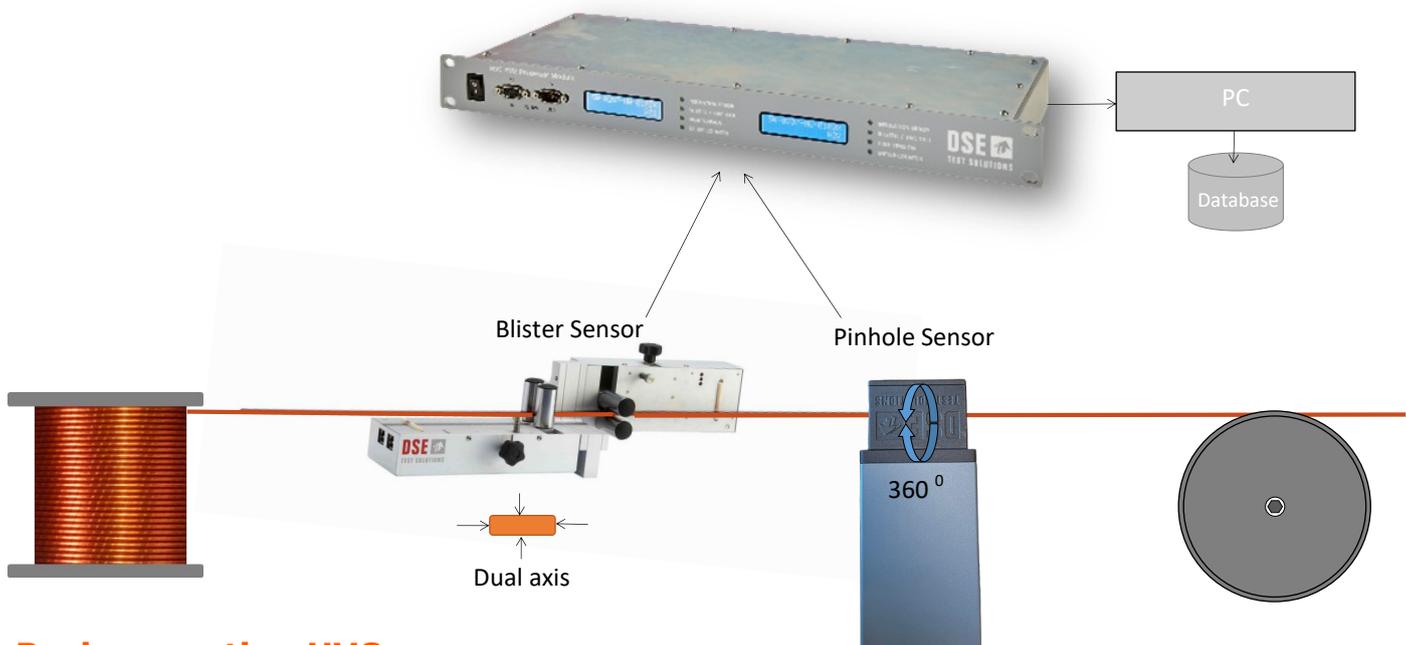
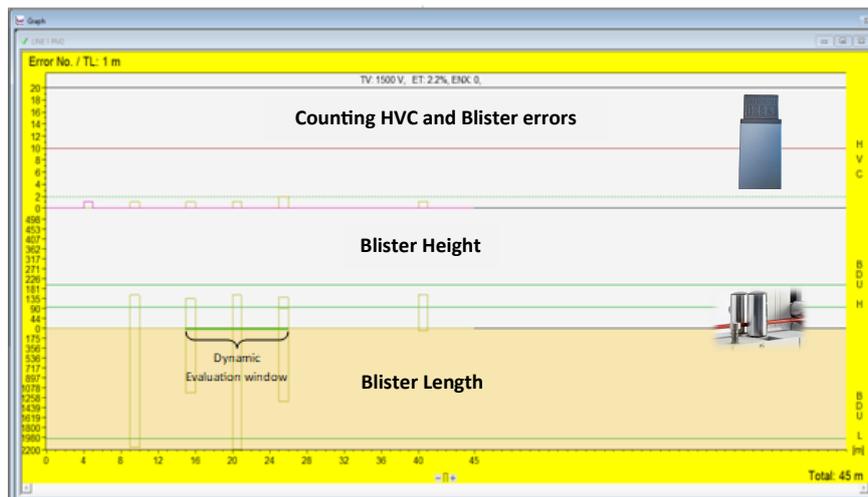


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Combine Blister and Pinhole detection in one system



Basic operation HVC

High Voltage Continuity

When the wire passes through the conductive brushes inside the Electrode, any leakage current will be detected and reflects the insulation properties of the enamel.

The high voltage control circuit is designed with an advanced current control and has a built-in current limiter of maximum **100µA** to avoid a spark is damaging the wire insulation or the sensors. Based on the most advanced software platform on the market, the HVC 360 Flexible test system is applicable for testing all types of wire insulation with a test voltage from **350V up to 6kV DC**.

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Setting of HVC test parameters

High Voltage Continuity (HVC)

It is possible to set the High Voltage parameters in a separate HVC pane as shown below.

- Enable/disable the high voltage.
- The test voltage can be set between 350VDC and 6.000VDC.
- The detector threshold can be set between 1 to 99 μ A.
- Setting of the limits for the number of HVC errors and bare wire.

The screenshot shows a software window titled "Line Settings [Best wire]" with a close button (X) in the top right corner. The window has a tabbed interface with tabs for "Spool", "General", "HVC", "Blister", and "Processor Module". The "HVC" tab is selected. The configuration parameters are as follows:

Parameter	Value	Notes
High Voltage Enable :	<input checked="" type="checkbox"/>	
Test Voltage (TV) :	750 V	
Detector Threshold (DT-HVC) :	25 μ A	
HVC Error Number Limits :	10	(Maximum errors in evaluation window)
Bare Wire Warning Limit (BWWL) :	5	(0 = Disable)

At the bottom right of the window, there are "OK" and "Cancel" buttons.



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Setting of Blister test parameters

Blister Detection Unit (BDU)

It is possible to set the blister detection parameters in a separate Blister pane as shown below.

Blister Height (BH-low) detection threshold can be set between 30µm to 490µm. Blister below the threshold setting is not a valid blister and will be suppressed.

Alarm limits for Blister Height (BH-high) can be set within the same range. If a blister is between BH-low and BH-high, it will be registered as a valid blister, when the amount of blisters exceed the limit number of blisters.

Blisters exceeding BH-high limit will be registered as a valid blister regardless of the limit number of blisters.

The same applies for the Blister Length (BL-min) settings.

The Blister Length can be defined between 150µm to 9.999µm and blister length below this value will be suppressed.

It is possible to get a prompt output signal as soon as a blister is detected by checking off the right boxes. This signal can be transferred to a marking device or to the PLC controller.

Line Settings [Best wire]

Spool | General | HVC | **Blister** | Processor Module

Blister Definition

Blister Height (BH-low)
Blisters Height below will be suppressed

>= 30 µm

Blister Length (BL-min)
Blisters Length below will be suppressed

>= 600 µm

Blister

Alarm Limits

>= 60 µm Limit Blister Height (BH-high)

>= 1 Limit number of Blisters
(Maximum number of Blisters in evaluation window)

>= 1000 µm Limit length of blister (BL-max)

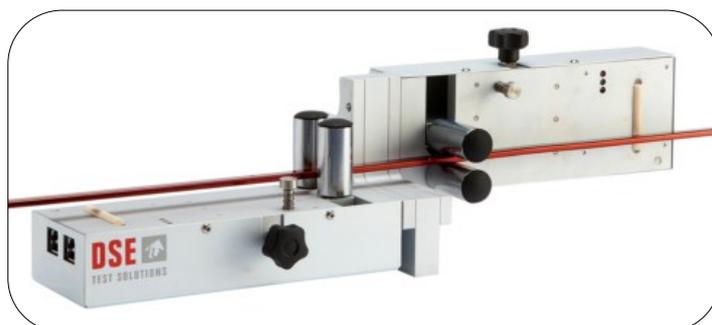
Blister prompt output on processor module

Prompt output active for all blisters detected Enable

Prompt output active for blisters exceeding alarm limits only Enable

Text:

OK Cancel



Blister Measuring System

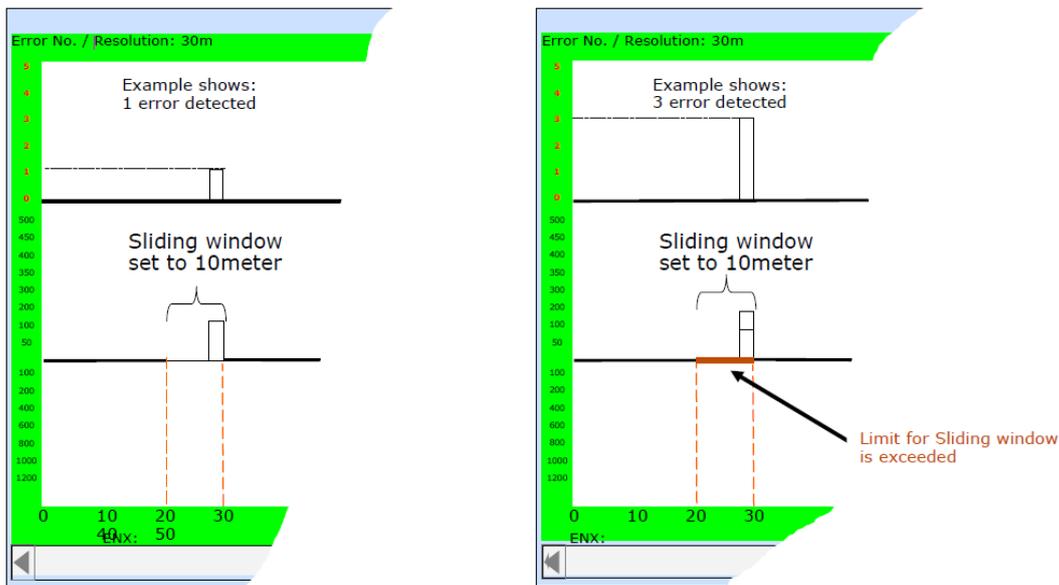
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Evaluation window

The dynamic evaluation window gives the opportunity to set up a limit for how close a distance a number of errors can be accepted. It means constant evaluation of the measuring window defined in the software.

The evaluation window length is entered in meters [m] and this value is used as the resolution of the X-axis.



The above example shows a continuously measuring window of 10 meter. Within this window, maximum 2 errors is accepted.

Display overview



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Alarm features

The Blister Measuring System solution offers significant numbers of alarms configured for supporting the production of wire.

The PM2 processor module has five optical isolated hardware alarm outputs and visible alarms by changing in background colour and changing in the colour of the separated fields in the Histogram for the lines.

Blister and High Voltage Continuity (HVC) Alarms

In case the number of errors per evaluation window exceeds the limits that has been entered as threshold, the monitor background changes colour from green to red (blister error) or changes from green to yellow (HVC error) and the optical isolated output changes status.

This change in status of the hardware output can trigger a relay or be connected directly to a PLC. In case a blank wire is detected, the background starts flashing to provide maximum attention for the operator, if limits are exceeded.

Blister or HVC errors detected.

The changes in the surface of the enamel on all four sides are evaluated continuously.

When a blister is detected, the BMS solution starts measuring/processing both the height and the length of the blister, and the HVC and Blister error counter is being incremented.

This counter is also incremented when a HVC error is detected.

Alarm status

HVC and Blister error counter
Blister Height
Blister Length

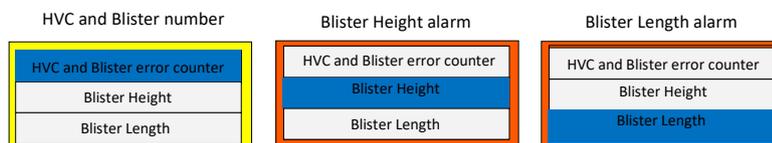
Featuring alarm outputs of marking printer.

Each time a blister and/or a HVC error is detected and the error exceeds the threshold limits, the output is changing status and a pulse is being generated, that can be used for alarm purpose or for a marker as well.

The visible alarms.

To obtain maximum attention of the operator, the colour of the specific field changes.

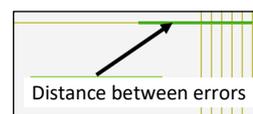
It gives the operator, even from a long distance, the possibility to see what needs attention.



Surveillance of distance between errors.

Knowing the distance between blisters can be important and in the software it is possible to set the number of blisters that can be accepted within the evaluation window.

We call this dynamic feature a evaluation window, so when the number is exceeded the errors occur too close to each other, the line becomes bold as shown above.

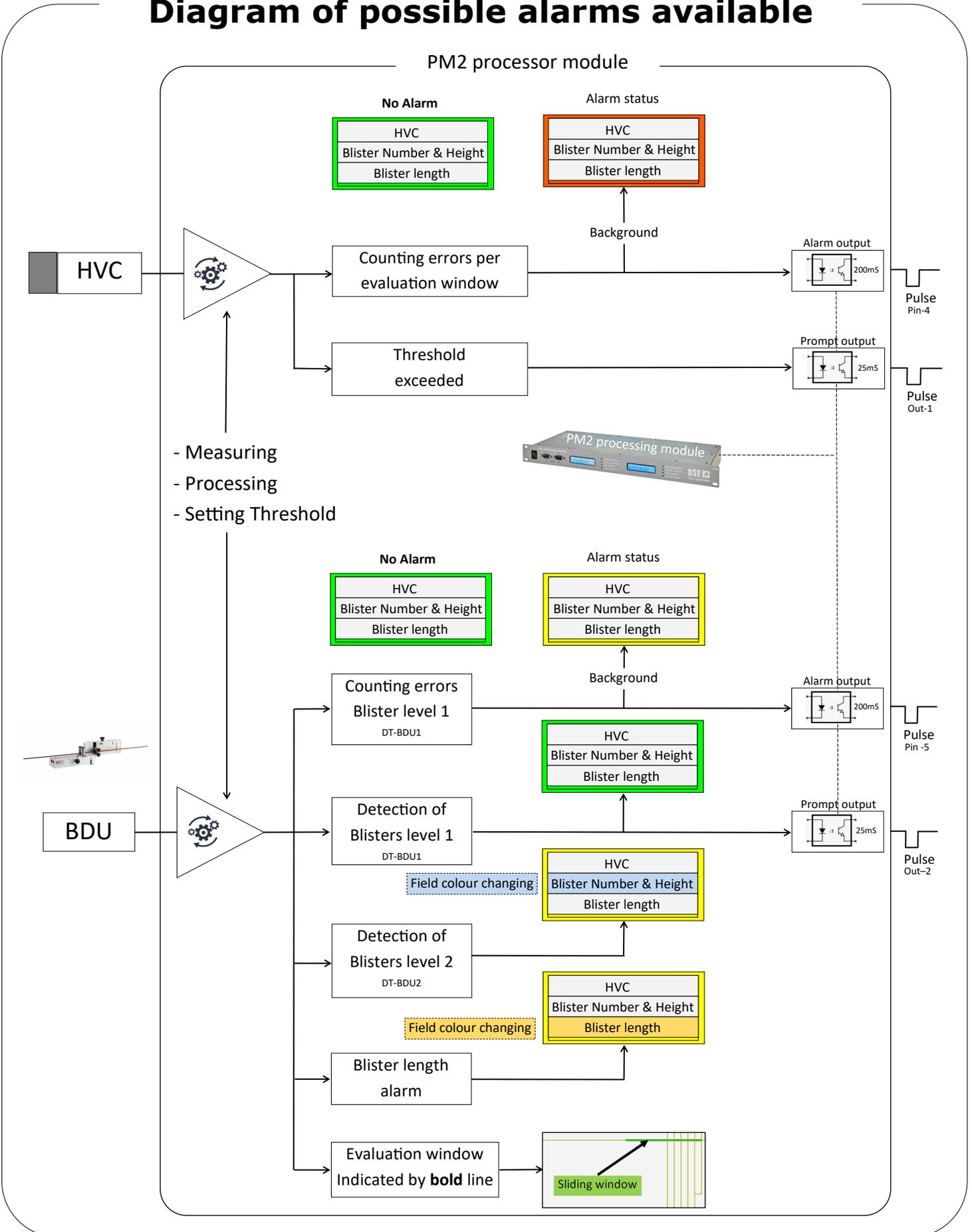


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Diagram of possible alarms available



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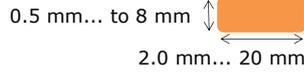


Technical Specifications

Wire dimensions range (BDU)

Height: 0.5 mm - 8.0 mm (0,02 - 0,315")

Width: 2.0 mm - 20.0 mm (0,078 - 0,98")



Blister size limits

Blister heights $\geq 30\mu\text{m}$ can be detected for all 4 sides of the wire.

Blister lengths $\geq 150\mu\text{m}$ can be detected for all 4 sides of the wire.

Threshold settings

Blister height [BH] $\geq 30\mu\text{m}$ — 490 μm

Blister length [BL] $\geq 150\mu\text{m}$ — 9.999 μm

Accuracy

[BH] $\geq 30\mu\text{m}$ —99 μm : +/- 10 μm

[BH] $\geq 100\mu\text{m}$ —490 μm : +/- 10 μm + 2% of reading

Blister Length [BL] is a calculated value based on the Blister height [BH] measurement and the line speed. The accuracy is estimated to be (worst case) +/- 75 μm in the complete range.

Line speed: 6 - 35 m/minutes

General data (BDU)

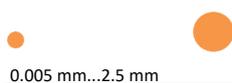
Dual unit for blister detection on 4 sides

- Supply Voltage: 24Volt
- Dimensions (D x W x H): 420 x 140 x 100 mm
- Ambient temperature: 10°C - 35°C
- Net weight: 1.8 kg

General data (HVC)

Electrode tops

Standard



Up to...2.5 mm
AWG 10

Part No.: 71876

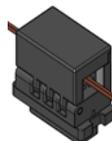


Mid range

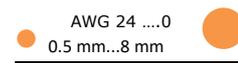


Up to 5 mm
Up to 5 mm

Part No.: 71880



Heavy wire



Up to 8 mm
Up to 26 mm

Part No.: 71901



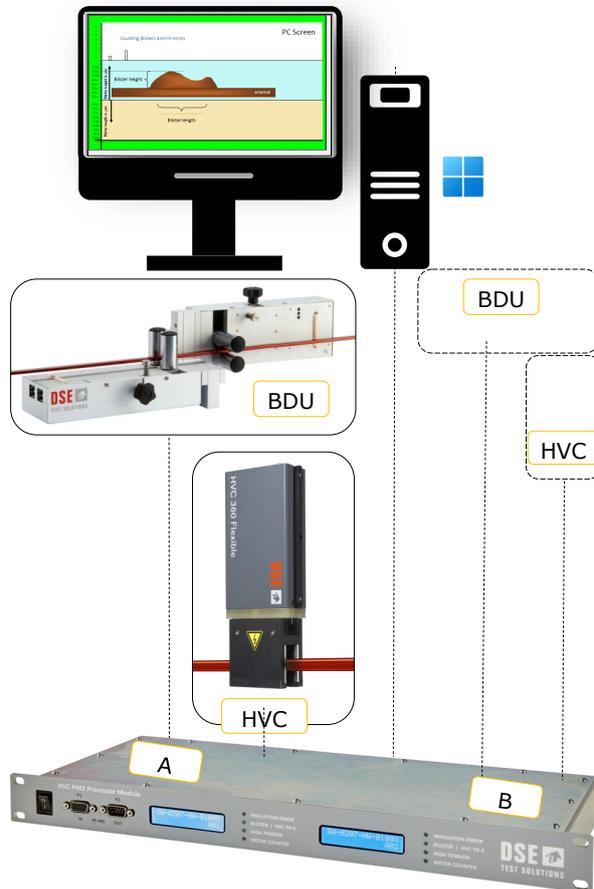
General data (HVC)

Measuring Head

- Supply Voltage: 24 Volt
- Dimensions (D x W x H): 190 x 90 x 48 mm
- Ambient temperature: 10°C - 35°C
- Net weight: 0.7 kg (excl. the electrode top)

PC: The system operates from a standard PC with the following minimum requirements: Windows 10/11, 16GB RAM, 500GB HDD

Database: MS SQL local or central server



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Technical Specifications

General data (PM2 Processor Module)

The Processor Module controls both the HVC electrode systems and the BMS detection system. It collects, evaluates, and compresses all data and transfers the results to the PC database.

- Compact single or dual channel option
- I/O interface, including 24Volt 650mA power supply to the electrode systems (HVC measuring head and Blister Measuring System)
- Optical isolated outputs for warning/alarms
- Optical isolated prompt signal when an error is detected
- Information display on the front panel
- Serial RS485 interface (internal from A-B)
- Humidity: 0-80% no condensation
- Weight: 2.5 kg single/ 3.0 kg dual channel
- Line voltage: 100-230VAC± 10% 50/60Hz with protective ground
- Power consumption max. 40W
- Accuracy: +/- 3µm

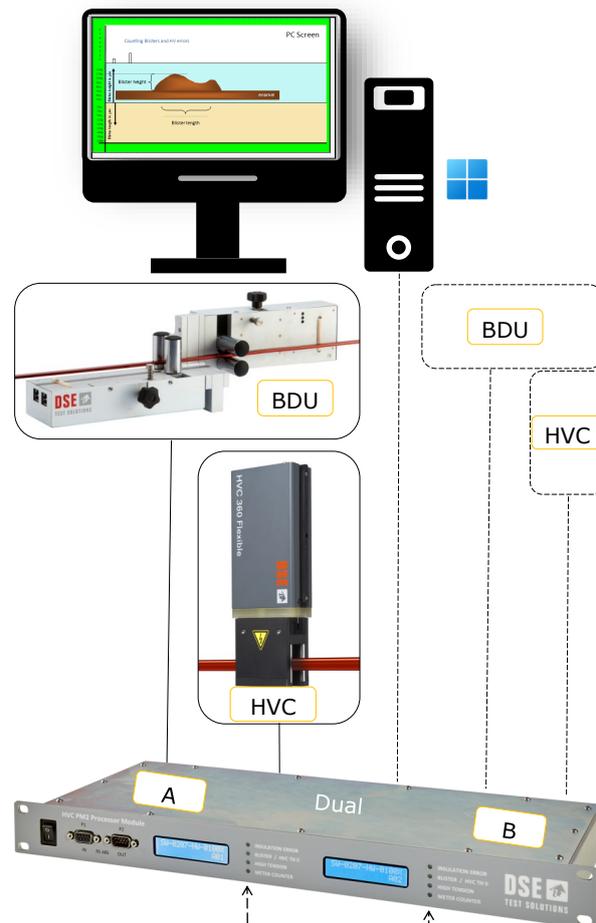
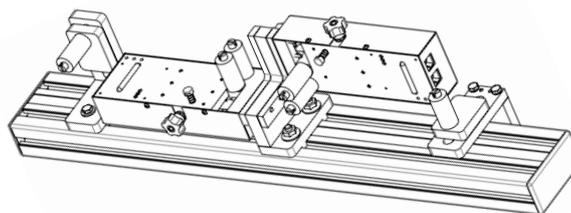
Visual indication

LED indicators for the following functions:

- Insulation Error
- Blister Error
- High Tension
- Meter Counter

Accessories

Mounting Bracket (Part no.: 46262)

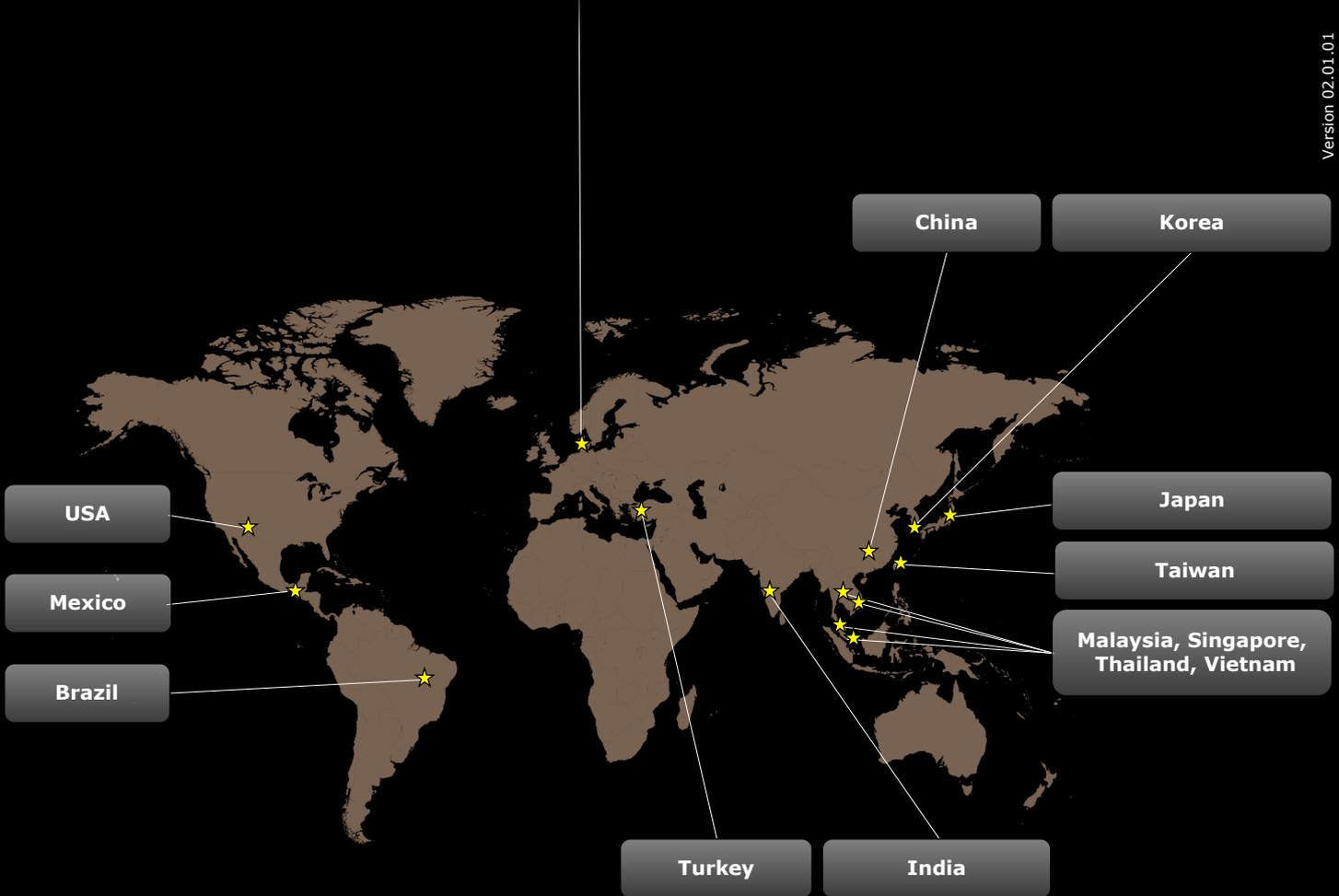


Note: For most reliable result, the wire must be guided and aligned in both direction.





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Version 02.01.01

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