HST Flow Controller and HST Analyser

Application Examples

Sensor System for Production and Quality Control

Sensor System

Diaper Control Application

Hossbach Sensor Technologie

Diaper Control Application

Description :

The HST Systems for Diaper Control are powerful tools to control, evaluate, visualize and store important product parameters. The measurement is done during production inside the machine and covers every single product. This principle avoids the need to intervene into the production process or control the product at the end of the production line extensively.
There are no comparable systems which empowers the diaper manufacturer to receive such a large number of information about every product and the whole production.
Due to the capacitive measurement principle of the HST Sensors, the whole product composition is included into the measurement, even enclosed, mixed or covered contents.
It is also a very helpful tool for new machine installations, re-builds or product changes to find the optimal settings for the production machine. By the visualization of the product parameters it is also very easy to recognize faulty machine settings, defectives or runaway parameters.

For Diaper Control there are three different applications offered by HST :

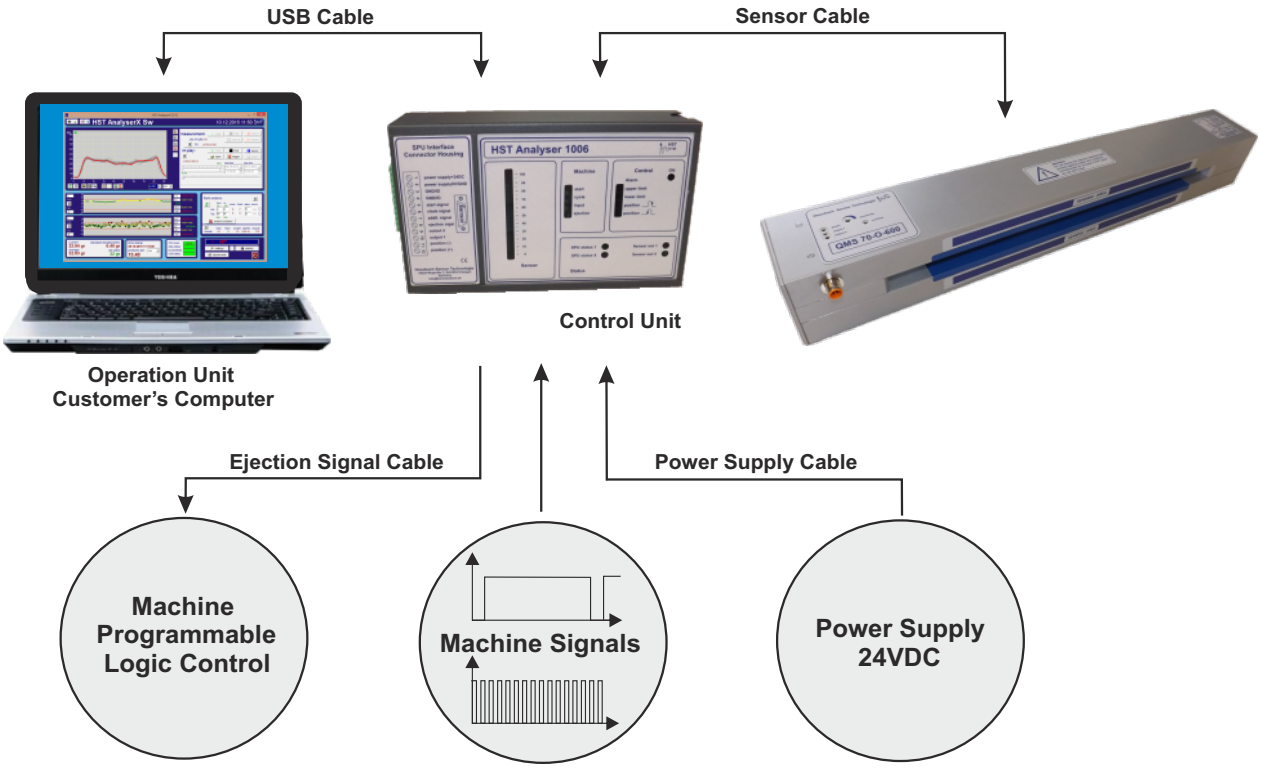
- HST Analyser or HST Flow Controller for product weight and weight distribution evaluation and recording
- HST Flow Controller for real-time product weight and weight distribution control (Profiler)
- HST Flow Controller for basis weight control in two areas and recording

Each of those application has its unique feature to reach a very high level of product quality.
The installation and the calibration of the system is very easy, usually no maintenance is necessary and only little adjustments must be done during operation.
All three HST Systems are working even at high speed, up to a production speed of 1500 products per minute.
Even at this speed each product is measured with all the features of the used system.
As the measurement is done inside the machine always at the same time and at the same position, the objectivity, the repeatability and the accuracy exceeds the end-of-line quality control by checkweighers.

Diaper Control Application

HST Analyser for weight evaluation and recording

System interconnections



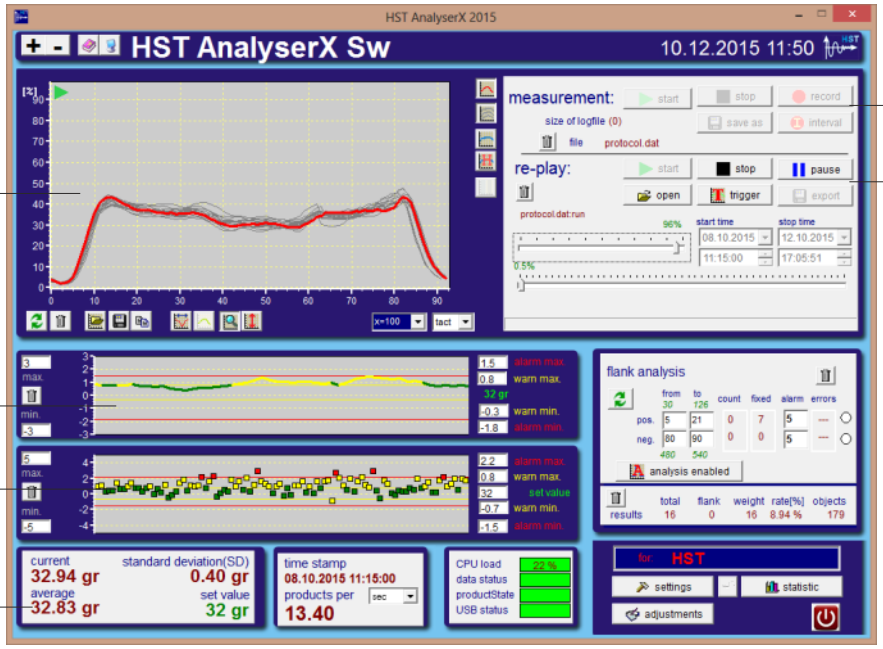
The main interconnections between the HST Analyser System and the production machine are the machine signals. They are essential to let the system know when a product starts and how fast the machine is running, so the system is able to work speed independently.
For machines with stable production speed, the machine signals for speed may not be needed by using the HST Flow Controller instead of the HST Analyser.
Both, HST Analyser and HST Flow Controller are suitable for this application.

The HST Analyser System is designed to work with a computer. A special HST Software for this application brings every feature of the system to any Microsoft Windows computer.
Here the operator has the possibility to store the product data in common folders and process the data in a spreadsheet software or quality management system.

Diaper Control Application

HST Analyser for weight evaluation and recording

Software interface and main features



Product curves: Weight distribution

Average product weight

Single product weight, each point represents the weight of one diaper

Current product data

Control panel for running production

Control panel for recorded data

HST Analyser Software

Main features of the HST Analyser Software :

- Calculate and evaluate weight of each single product
- Show distribution of weight inside product (red product curve)
- Show weight distribution of recent products (grey product curves)
- Show trend or drifts of product average weight in histogram
- Show single product weight of recent products in histogram
- Load product curves of products with ideal weight distribution
- Set the limits for upper and lower product weight tolerances
- Generate statistical data as product average weight, standard deviation, Gaussian curve
- Calibration of the system to product weight and size
- Recording of production (every product parameter in logfiles and CSV-files)
- Replay stored data in offline software version at any computer
- Trigger Analysis; stop at runaway weight distribution at replay
- Error counter for defective products (weight out of specification, product displacement)
- Production speed up to 1500 products per minute

Diaper Control Application

HST Analyser for weight evaluation and recording

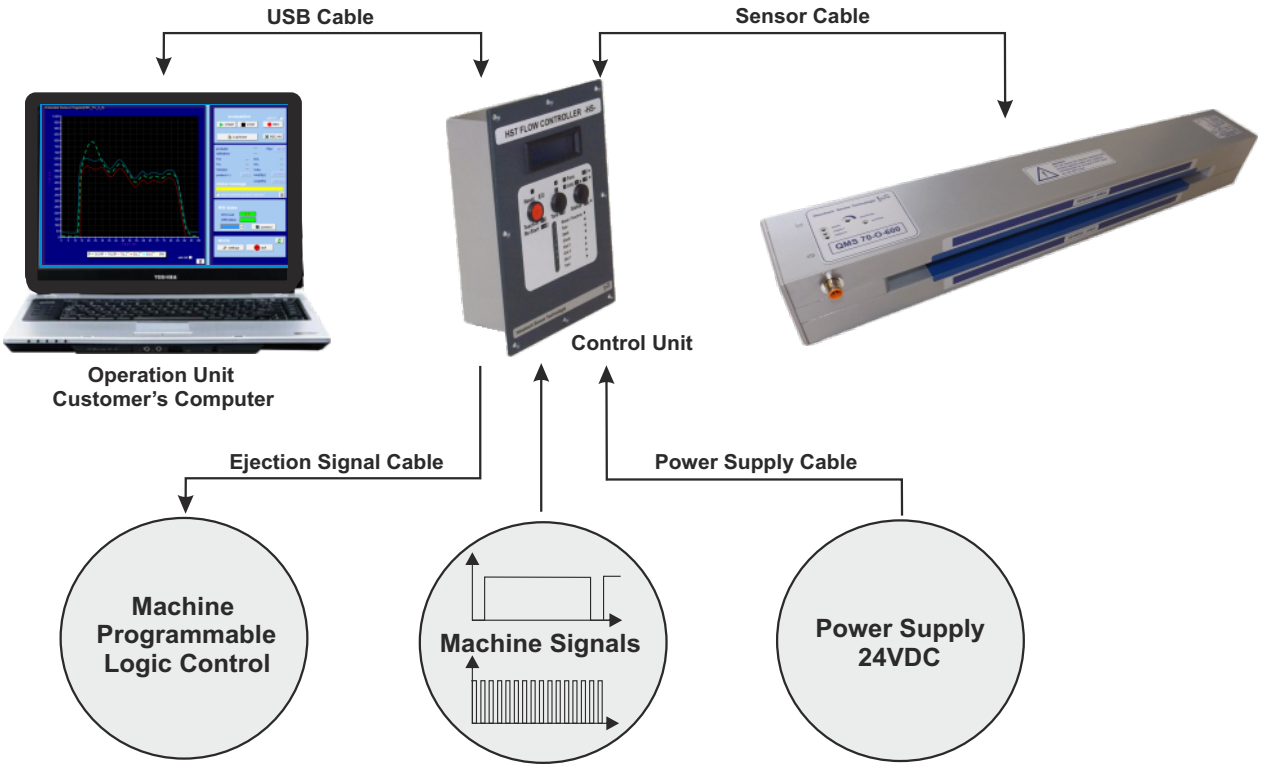
Contents of delivery :

- Standard or customized HST QMS70 - Sensor (e.g. QMS70-O-540)
- HST Analyser 1006 control unit
- HST Analyser Software CD
- HST Analyser Offline Software (on demand)
- Software license
- Operation Manual
- Quick Start Manual
- 5 m sensor cable
- 2 m USB cable
- USB - Ethernet range extender incl. 20 m Ethernet cable (on demand)
- Solid aluminium case for control unit

Diaper Control Application

HST Flow Controller for real-time product weight control

System interconnections



The main interconnections between the HST Flow Controller System and the production machine are the machine signals.They are essential to let the system know when a product starts and how fast the machine is running, so the system is able to work speed independently.

This HST Flow Controller System is designed to work without a computer. It is a independently working system, all evaluations are done by the HST Flow Controller. A computer is only recommended for initial setup to find the ideal settings and position of the product inside the sensor.
By the software also customized setting could be done to optimize the system or change the logic of the switching outputs.

After setting up the system, the computer is disconnected and the HST Flow Controller works as independent system.
It gives output signals (+24VDC, PNP/NPN) for each defective product without time delay. The machine's control unit should be programmed to eject every product which the HST Flow Controller recognized to be defective.

Diaper Control Application

HST Flow Controller for real-time product weight control

Software interface and main features

Product curve:
Weight distribution

Tolerance Curve:
upper limit

Tolerance Curve:
lower limit

Control panel for running production

defective counter and classification

HST Flow Controller Service Program

Note: The shown program interface reflects the internal settings of the HST Flow Controller. All shown elements are used by the HST Flow Controller itself to evaluate the product parameters.

Main features of the HST Flow Controller (Profiler) :

- Calculate and evaluate weight of each single product in realtime
- Evalute distribution of weight inside product (symbolized as green curve in Service Program)
- Set the limits for upper and lower product weight tolerances
- Set the limits for upper and lower tolerance curves
- Control Tara Area (area between two products) for foreign objects
- Error counter for defective products (weight out of specification, product displacement)
- Control product position
- Easy product "Teach In" for system startup
- High Speed measurement up to 3000 products per minute

⇨ Realtime evaluation of each single product

⇨ Evaluation of product single weight, weight distribution, product displacement, foreign objects

⇨ Ejection signal for each product with wrong parameter (e.g. weight out of specification, product at wrong position, tolerance curve violated (see picture))

Save time, by getting feedback immediately from the HST System, if any error occurs !
Save money and raw materials by reducing product components to lowest acceptable quantity !

Diaper Control Application

HST Flow Controller for real-time product weight control

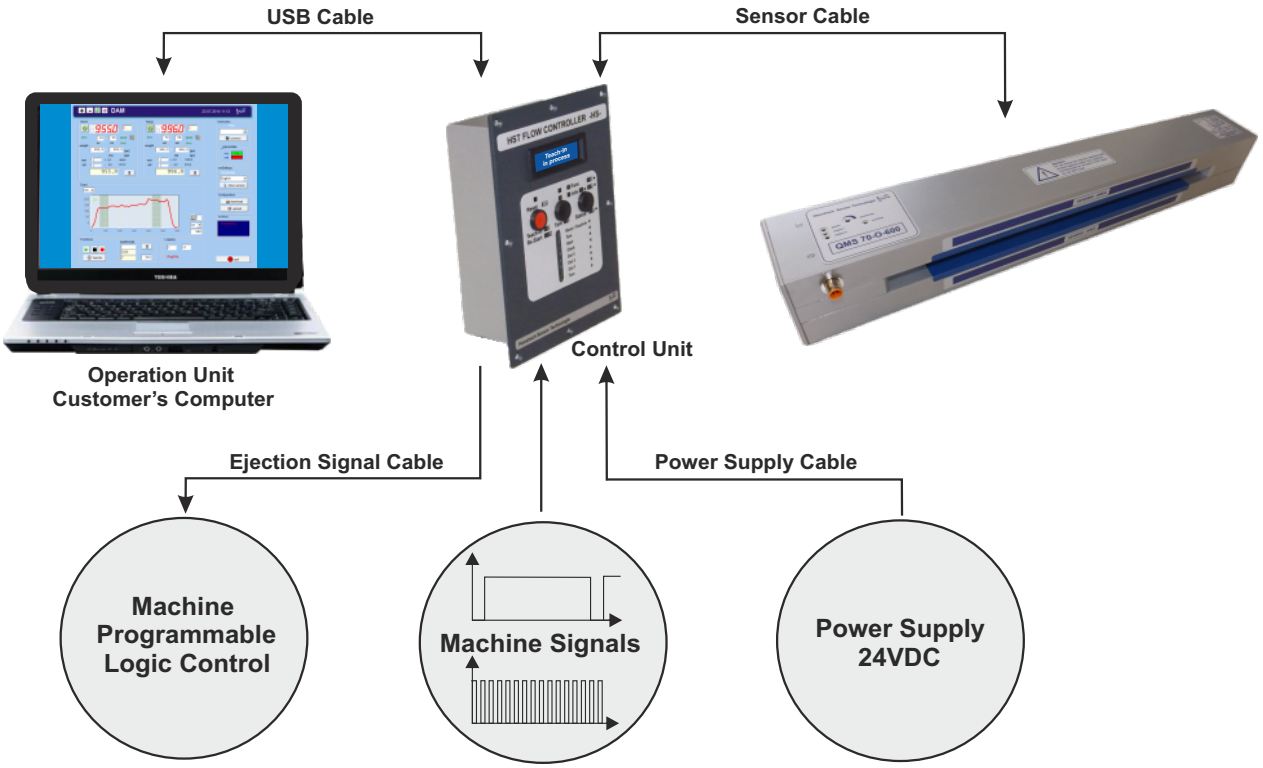
Contents of delivery :

- Standard or customized HST QMS70 - Sensor (e.g. QMS70-O-540)
- HST Flow Controller - High Speed -
- HST Flow Controller Service Program CD
- HST Analyser 1006 control unit (on demand)
- HST Analyser Software CD (on demand)
- HST Analyser Offline Software (on demand)
- Software license
- Operation Manual
- Quick Start Manual
- 5 m sensor cable
- 2 m USB cable
- Connection cable for HST Analyser and HST Flow Controller
- USB - Ethernet range extender incl. 20 m Ethernet cable (on demand)
- Solid aluminium case for control unit

Diaper Control Application

HST Flow Controller for basis weight control in two areas

System interconnections



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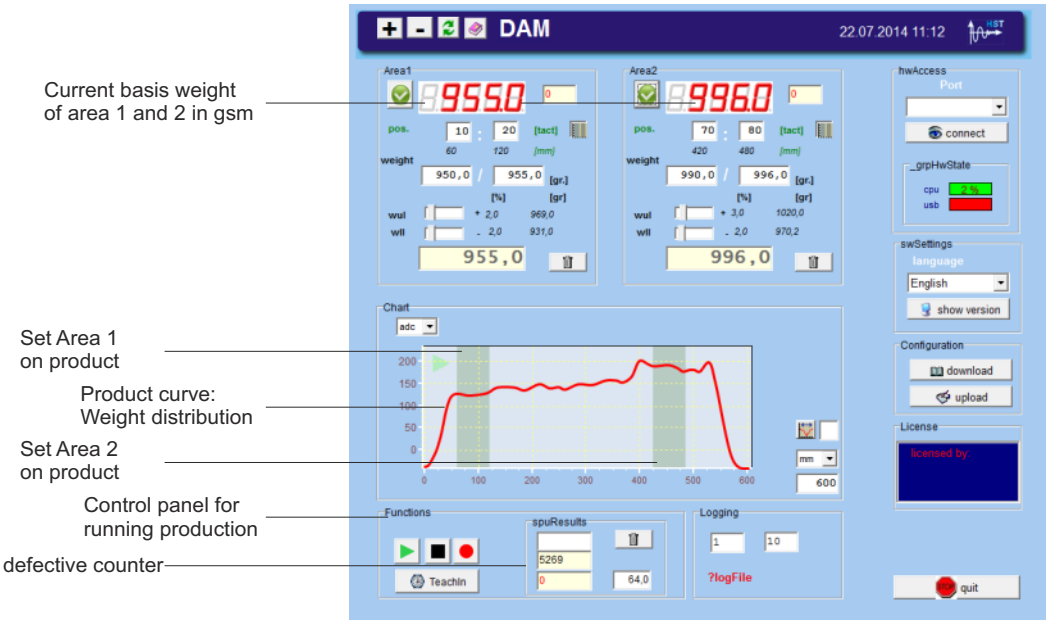
This HST Flow Controller System is designed to work with a computer. A special HST Software for this application brings every feature of the system to any Microsoft Windows computer.
Here the operator has the possibility to store the product data in common folders and process the data in a spreadsheet software or quality management system.

Diaper Control Application

HST Flow Controller for basis weight control in two areas

Software interface and main features



HST Flow Controller Double Area Software

Main features of the HST Flow Controller (Double Area Control) :

- Calculate and evaluate basis weight of two different areas on the product in gsm
- Define areas to be controlled (green bars)
- Set upper and lower limits for basis weight separately in both areas
- Visualize weight distribution inside product (red curve)
- Calibrate product length
- Set recording parameters (recording frequency, recording length)
- Record product data in CSV-file (time stamp, basis weight, limits)

- Save time by eliminating the very time consuming procedure to measure the basis weight in a finished product
- Get reliable data of complex product parameter very easily
- Store and evaluate production data over years

Diaper Control Application

HST Flow Controller for basis weight control in two areas

Contents of delivery :

- Standard or customized HST QMS70 - Sensor (e.g. QMS70-O-540)
- HST Flow Controller - High Speed -
- HST Flow Controller Double Area Measurement Software CD
- Software license
- Operation Manual
- Quick Start Manual
- 5 m sensor cable
- 2 m USB cable
- USB - Ethernet range extender incl. 20 m Ethernet cable (on demand)
- Solid aluminium case for control unit

Sensor System for Production and Quality Control

Sensor System

Folding Control Application

Hossbach Sensor Technologie

Folding Control Application

HST Flow Controller for folding control

Description :

The HST Systems for Folding Control is a powerful realtime System to detect wrong or insufficient foldings, weight specifications, foreign bodies in a product or in foil welding seams (e.g. sanitary napkins).

Due to the sophisticated capacitive measurement principle, the Sensor measures the whole product even in its completely wrapped state at the end of a production line. In this state no optical or gravimetrical method is able to detect the shape, the folding or weight distribution of the product.

The HST Sensor and the HST Flow Controller -High Speed- are fast enough to measure all product parameters featured by the system even at high speed up to 3000 products per minute without any loss of information.

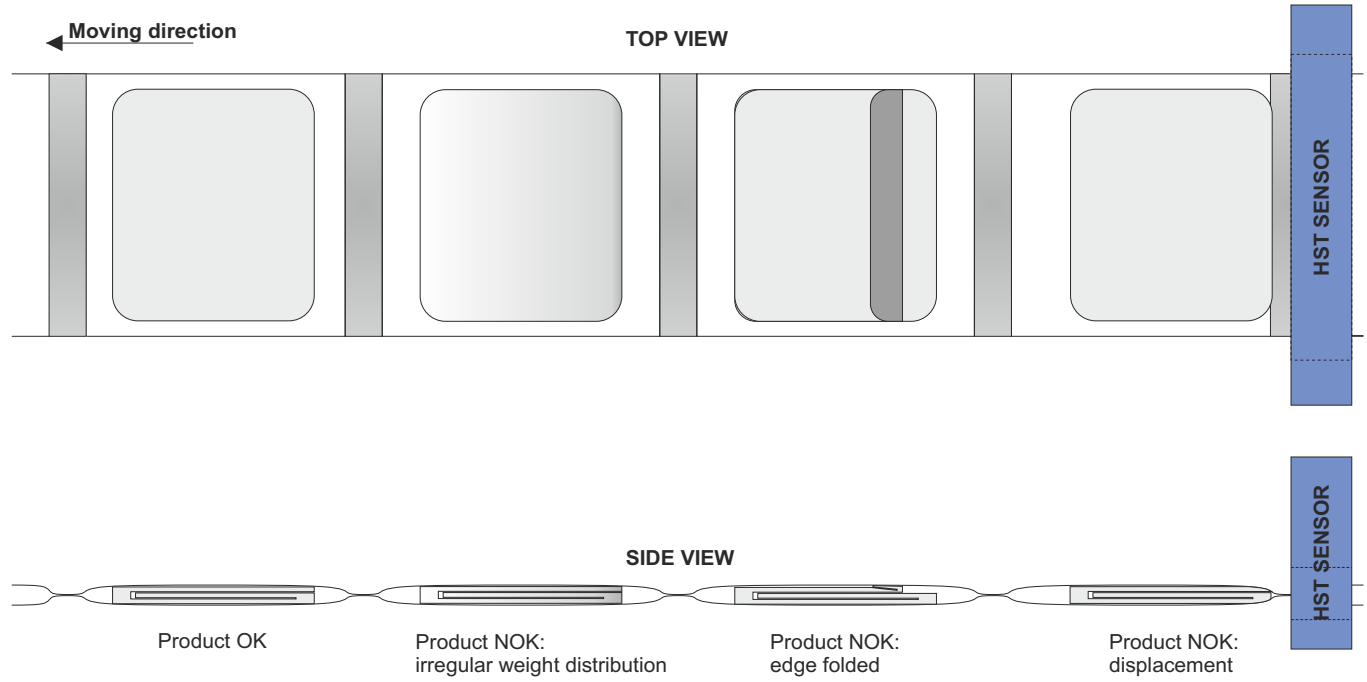
All three outputs of the HST Flow Controller could be assigned to a specific error on the product. This enables the operator to see immediately which kind of error occured inside the machine. The classification of errors helps spotting the location inside the machine where re-adjustments might be required.

Bringing the system into operation is very easy. The Sensor needs only little space and is located where the product should be measured but still is guided as uncut endless product or by a conveyor belt.
Also the operation is very easy, once taken into operation, the HST System usually does not need any re-adjustment or calibration at all. It runs with the machine over years, it only will be recogniced when an error occurs on the product.

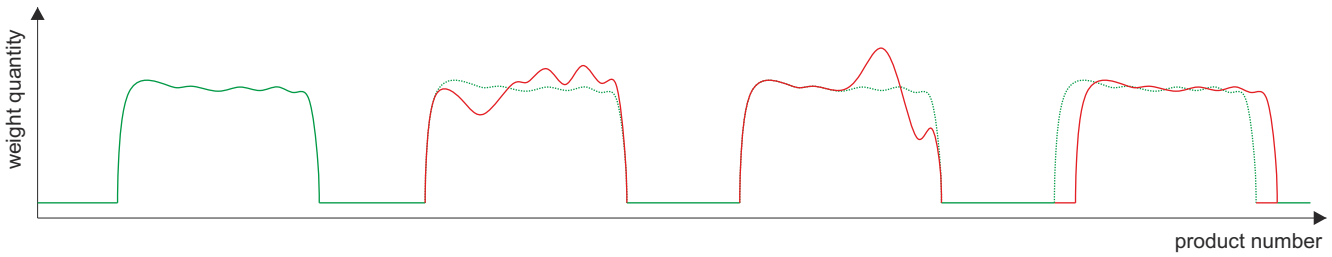
Folding Control Application

HST Flow Controller for folding control

Example: Sanitary Napkin



Weight distribution, product profile:



Description :

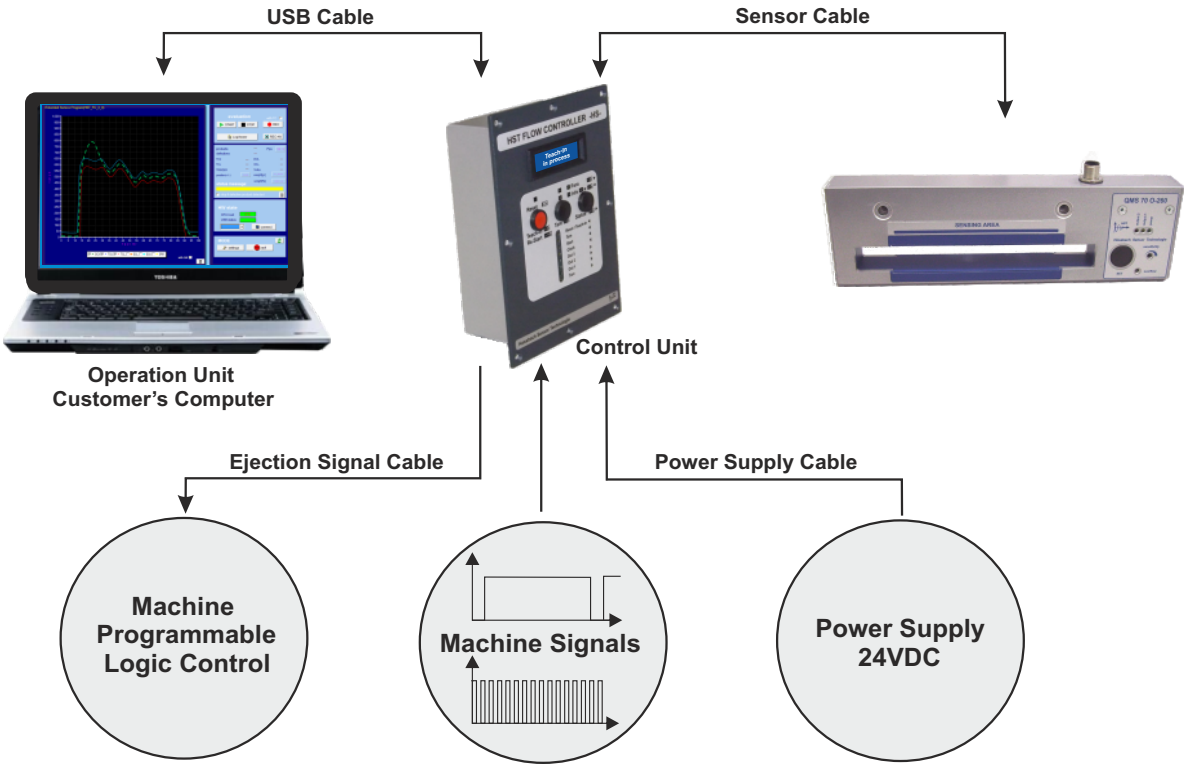
The HST Systems for Folding Control "scans" the weight distribution of each single product in real-time and converts it into a weight profile.
All products may have the same weight, so the detection of a faulty product is not possible with common methods. After a simple "Teach In" procedure the HST System knows, how a good product should look like and where it is positioned. The learned product profile is taken for comparison with all following products. This enables the HST System to detect any error inside the product caused by faulty weight distribution.

For visualisation of the product profiles the HST Flow Controller Sevice Program could be used.
Here also customized parameters as weight or profile tolerances for the evaluation and output signals could be set.

Folding Control Application

HST Flow Controller for folding control

System interconnections



The main interconnections between the HST Flow Controller System and the production machine are the machine signals.They are essential to let the system know when a product starts and how fast the machine is running, so the system is able to work speed independently. For constant high-speed production lines, the machine signals for speed may not be necessary, as the HST Flow Controller is here able to calculate it on its own.

This HST Flow Controller System is designed to work without a computer. It is a independently working system, all evaluations are done by the HST Flow Controller. A computer is only recommended for initial setup to find the ideal settings and position of the product inside the sensor.
By the software also customized setting could be done to optimize the system or change the logic of the switching outputs.

After setting up the system, the computer is disconnected and the HST Flow Controller works as independent system.
It gives output signals (+24VDC, PNP/NPN) for each defective product without time delay. The machine's control unit should be programmed to eject every product which the HST Flow Controller recognized to be defective.

Folding Control Application

HST Flow Controller for folding control

Contents of delivery :

- Standard or customized HST QMS70 - Sensor (e.g. QMS70-O-260)
- HST Flow Controller - High Speed -
- HST Flow Controller Service Program CD
- Software license
- Operation Manual
- Quick Start Manual
- 5 m sensor cable
- 2 m USB cable
- USB - Ethernet range extender incl. 20 m Ethernet cable (on demand)
- Solid aluminium case for control unit

Sensor System for Production and Quality Control

Sensor System

Small Object Detection

Hossbach Sensor Technologie

HST Small Object Detection

HST Flow Controller for small object detection

Description :

The HST Systems for Small Object Detection is a powerful realtime system to detect small foreign objects or particles on an endless or intermittent product.

It is for example used to detect glue lumps or paper cuts on a carrier foil. The sensor recognizesany irregularity on the product and the customized set up HST Flow Controller evalutes according to the size and position of the object, if the product is faulty or still meets the specifications.

As an additional feature, the system also is able to detect if components (as labels, velcro fastener, etc.) on the product are missing or in the wrong position.

It is a very fast sensor system, it also works reliable in real-time even in high speed production lines.

The HST Flow Controller gives an output signal for each faulty product, which is used for ejection of this product at the end of the production line or at the next ejection point.

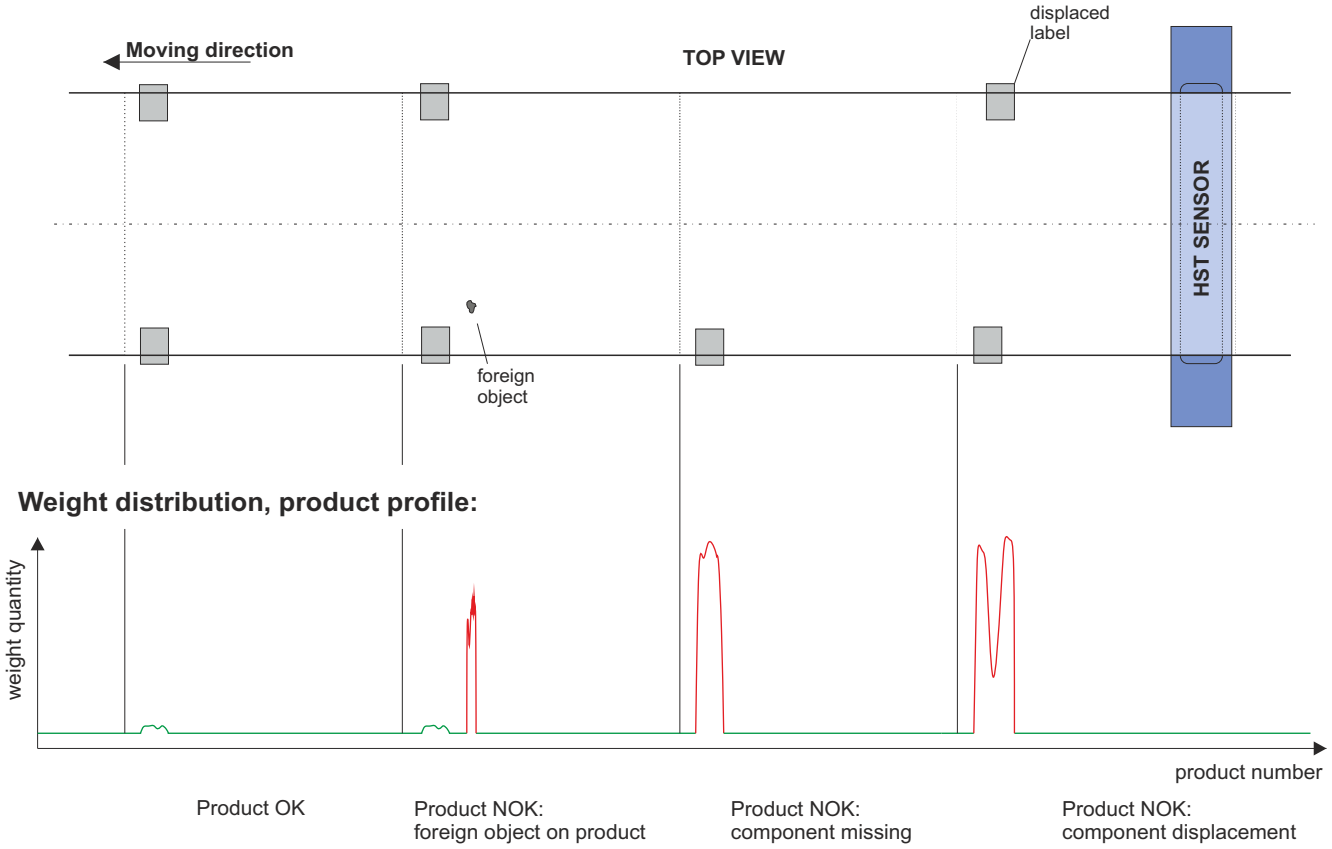
Bringing the system into operation is very easy. The Sensor needs only little space and is located where the product should be measured but still is guided as uncut endless product or by a conveyor belt.

The included HST Flow Controller Service Software enables a fast adjustment of the sensor.

Also the operation is very easy, once taken into operation, the HST System usually does not need any re-adjustment or calibration at all. It runs with the machine over years, it only will be recogniced when an error occurs on the product.

HST Flow Controller for small object detection

Example: Endless foil / nonwoven material with label



Description :

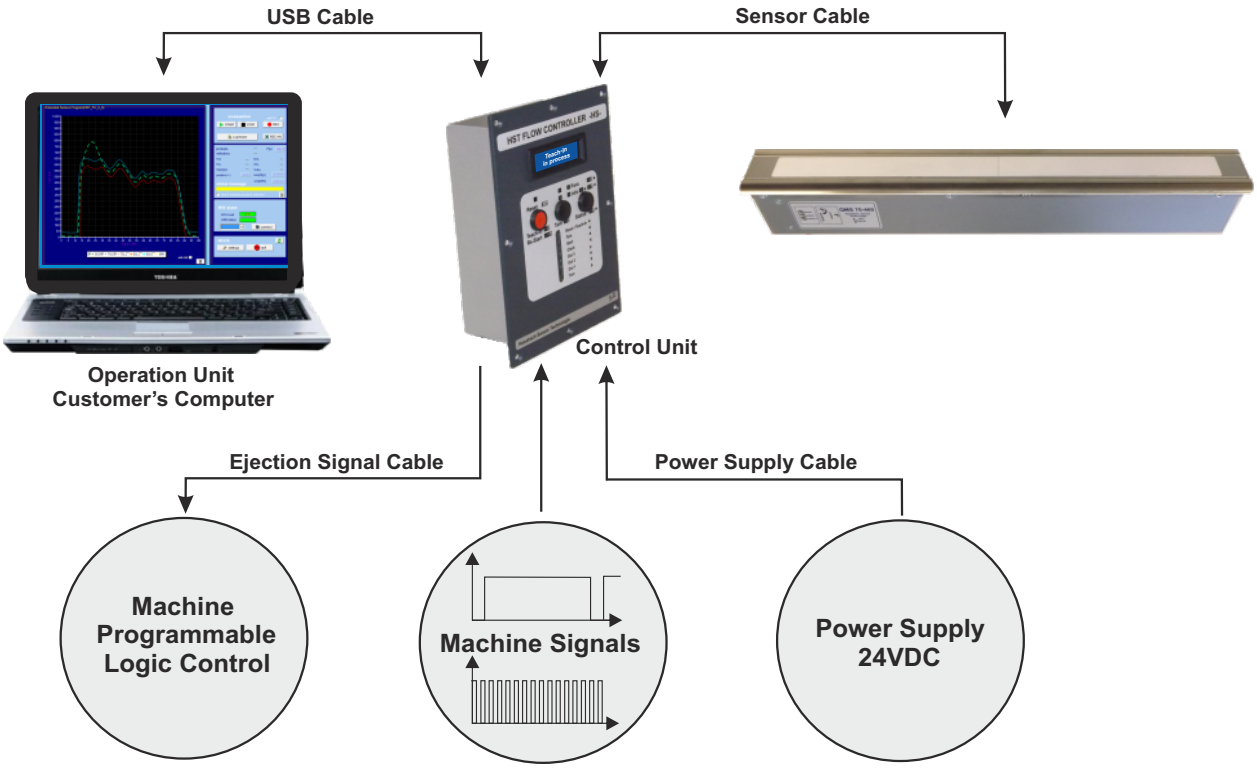
The HST Systems for Small Object Detection is designed to scan products for objects, which are very small related to the product size.

An intelligent sensor logic calculates automatically the difference between both lateral sides of the product. This enables a very high amplification of the sensor signal.
While the product is symmetrical, the sensor sends no signal to the HST Flow Controller. As soon as an irregularity occurs (as a foreign object, displaced component, hole in material) the product is no more symmetrical and the HST Flow Controller evaluates this as an error of product composition. An ejection signal is given by the HST Flow Controller for a defective product.

For visualisation of the product profiles the HST Flow Controller Sevice Program could be used.
Here also customized parameters as profile tolerances for the evaluation and output signals could be set.

HST Flow Controller for small object detection

System interconnections



The main interconnections between the HST Flow Controller System and the production machine are the machine signals.They are essential to let the system know when a product starts and how fast the machine is running, so the system is able to work speed independently.

This HST Flow Controller System is designed to work without a computer. It is a independently working system, all evaluations are done by the HST Flow Controller. A computer is only recommended for initial setup to find the ideal settings and position of the product on the sensor.
Also customized setting could be done by the software to optimize the system or change the logic of the switching outputs.

After setting up the system, the computer is disconnected and the HST Flow Controller works as independent system.
It gives output signals (+24VDC, PNP/NPN) for each defective product without time delay. The machine's control unit should be programmed to eject every product which the HST Flow Controller recognized to be defective.

HST Flow Controller for small object detection

Contents of delivery :

- Standard or customized HST QMS70 - Sensor (e.g. QMS70-460)
- HST Flow Controller - High Speed -
- HST Flow Controller Service Program CD
- Software license
- Operation Manual
- Quick Start Manual
- 5 m sensor cable
- 2 m USB cable
- USB - Ethernet range extender incl. 20 m Ethernet cable (on demand)
- Solid aluminium case for control unit

Sensor System

Granulate Pulse Control

HST SAP / Granulate Pulse Control

HST Analyser for Pulse Control

Description :

The HST Analyser System in combination with the QMS70 SAP-T is a powerful system to evaluate and visualize a product flow transported by air stream. The sensor is installed in between the pipe, where the product is transported in. By this installation the measurement is done without affecting the material flow and the measurement could be done for 100% control of the production.

Many kinds of granulate or powder are transported efficiently in pipes by airstream. In technological advanced production machines the dosing of granulate in a multi-component product also is done by using this technique. To measure the material quantity and the weight distribution inside the airstream no common measuring method is satisfactorily accurate.

The QMS70 SAP-T is able to measure the total weight of each single pulse of granulate or measure the flow rate of a continuous flow.
By using the sophisticated HST Analyser Software, the weight distribution of granulate/powder inside a "cloud" could be measured, evaluated, visualized and recorded.
These features of the HST System not only could be used for production control purposes, but also for initial set up of the parameters for the airstream and the infeed of material.

Due to the very fast sensor electronic, there nearly is no limit in product speed. Rates of 40 m/s and more are no problem for the HST Sensor System.

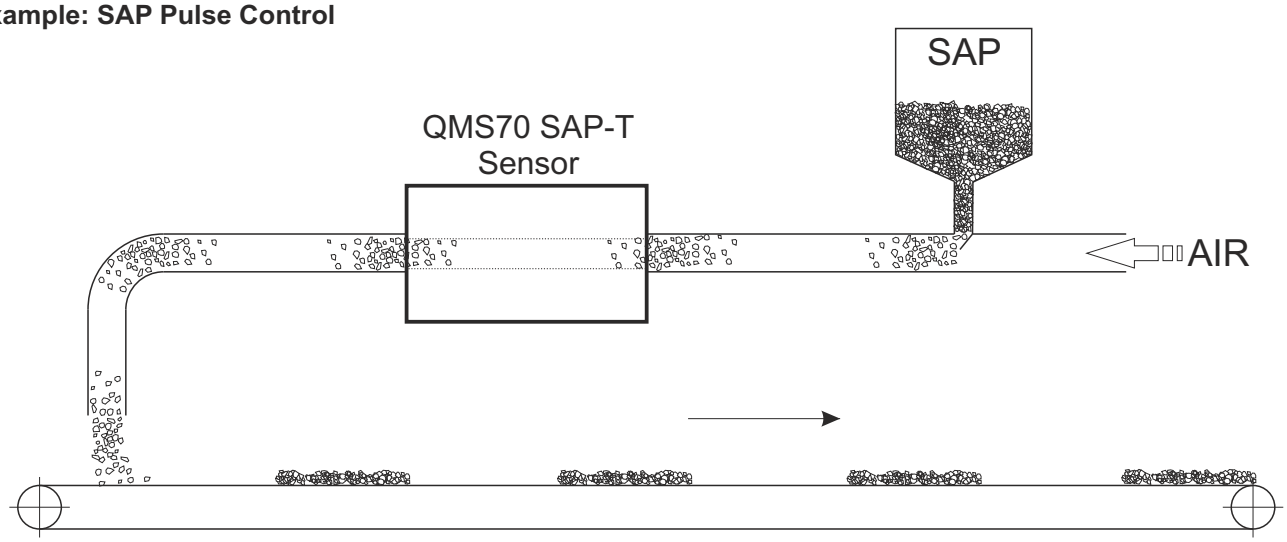
Bringing the system into operation is very easy. The Sensor is installed in between the pipe, where the granulate is mixed completely with air.

Also the operation is very easy, once taken into operation, the HST System usually does not need any re-adjustment at all.

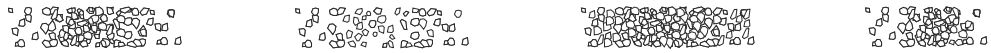
HST SAP / Granulate Pulse Control

HST Analyser for Pulse Control

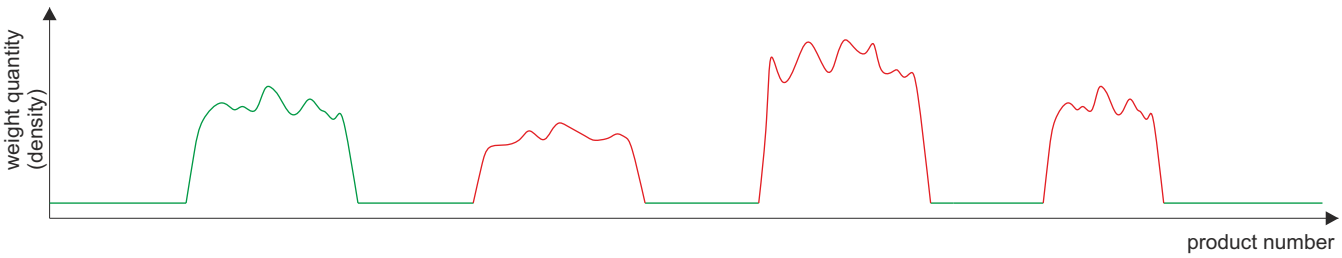
Example: SAP Pulse Control



SAP pulses:



Weight distribution in SAP pulse, product profile:



Product OK

Product NOK:
weight to low
(density too low)

Product NOK:
weight too high
(density too high)

Product NOK:
weight to low
(pulse too short)

Visualisation, evaluation and recording in HST Analyser Software:

HST SAP / Granulate Pulse Control

HST Analyser for Pulse Control

Example: SAP Pulse Control

Description :

The HST Systems for SAP / Granulate Pulse Control is a very fast system to evalute in-line the material flow transported by airstream. Due to its robust design and the sophisticated electronics, the sensor can measure even high speed pulses without the loss of information.

Bulk materials as pellets, granulate, powder or dust are measured inside the tunnel shaped sensor. The electric field of the sensor measures every particle of the voluminous material and transfers its measuring value to the HST Analyser.

By using the HST Analyser Software, the pulse parameters as single pulse weight, pulse length and relative density are visualized and evaluated.

Commonly also the shape of the pulse itself is important. The structure of the material "cloud" with areas of different densities determines the result and qualitiy of the material distribution inside the final product. Optimizing the structure of the pulse now is very easy by using the HST Software. Here the weight distribution is visualized and any change of parameters as material infeed to the transportation pipe or airstream will be visible immediately on the computer screen.

HST Analyser for Pulse Control

Contents of delivery :

- HST QMS70 SAP-T Sensor
- HST Analyser 1006 control unit
- HST Analyser Software CD
- HST Analyser Offline Software (on demand)
- Software license
- Operation Manual
- Quick Start Manual
- 5 m sensor cable
- 2 m USB cable
- USB - Ethernet range extender incl. 20 m Ethernet cable (on demand)
- Solid aluminium case for control unit

Sensor System

SAP/Granulate Flow Control

HST SAP / Granulate Flow Control

Features :

- single-sided sensor for flow rate measurement
- measure descrete portions or continuous flow of powder, granulate,pellets, SAP, etc.
- real-time evaluation of flow rate
- system calibrated to flow rate and upper/lower limits
- output signals from Flow Controller if limits exceeded
- independent of environmental influences in a wide range
- switching output +24V
- analog output 0...+10V
- +24VDC +/- 10% operation voltage
- robust aluminium housing, size 162 x 91x 104mm stainless steel slide and ceramic electrode

Description :

The QMS 70 SAP sensor in combination with the HST Flow Controller and the taring mechanic is a reliable and precise solution to measure flow rates of bulk material as powder, granulate, pellets or SAP.

Proportional to the quantity of product flow, the sensor gives an analog output which is evaluated by the Flow Controller.
Two different operational modes allowes the operator whether to evaluate the flow rate in grams per product or in percentage flow rate. These two modes are independant of the type of flow rate (descrete portions or continuous flow).

The signal interface to the machine‘s PLC is bi-directional.
For synchronisation, the Flow Controller needs a +24V signal from the machine at the beginning of each product.
In the operational mode for percentage flow rate and continuous flow, there no signal is needed by the PLC.
At exceeding or dropping the pre-set tolerances for the flow rate quantity, the Flow Controller gives a +24V switching output to the machine.

To get the maximum accuracy from the system, the taring mechanic moves the SAP sensor away from the product flow in adjustable temporal distances. The taring procedure lasts several seconds and the sensor is calibrated to zero automatically.

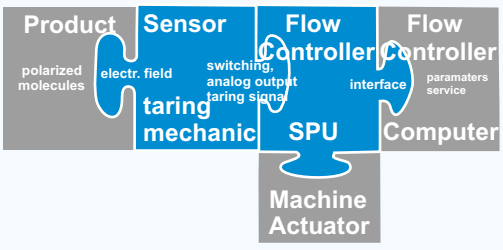
The system works independently from a computer or the software.
By using the HST SAP software, the product flow can be visualized, recorded and stored.
It also is used to calibrate the system and upload customized settings to the Flow Controller.

The QMS70 SAP operates being as all QMS sensors independent of all optical characteristics like colour, transparency, contrast and ambient light. They have no effect on the measurement.

Building Blocks :

Hossbach equipment

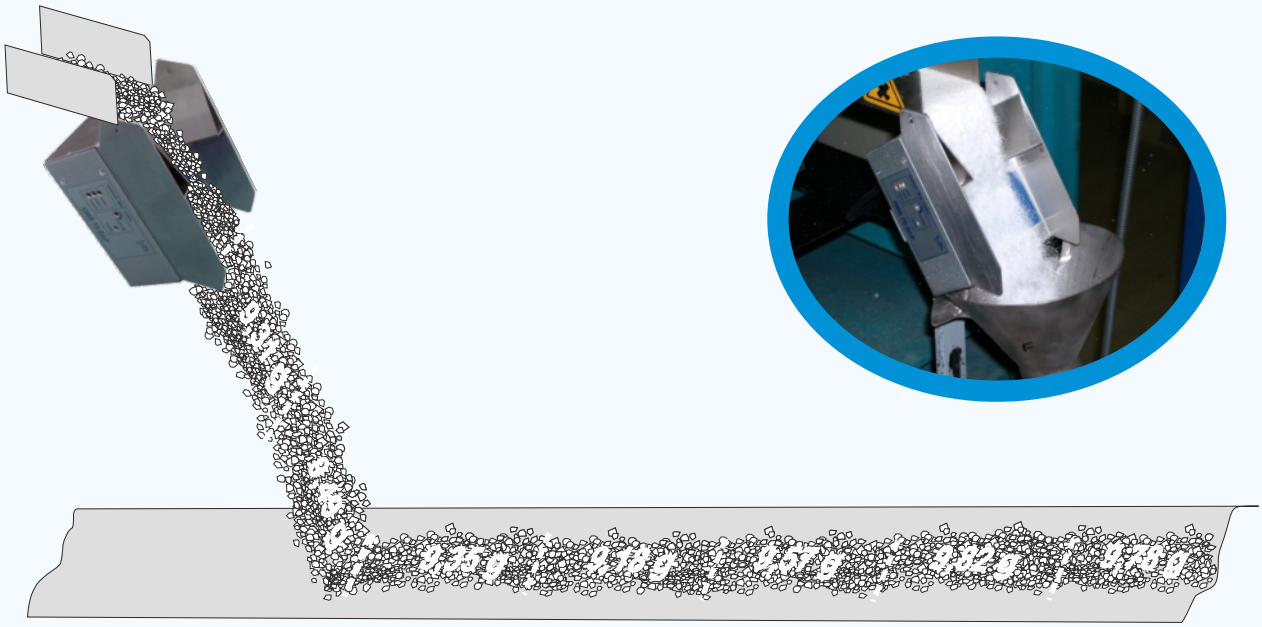
machine line device



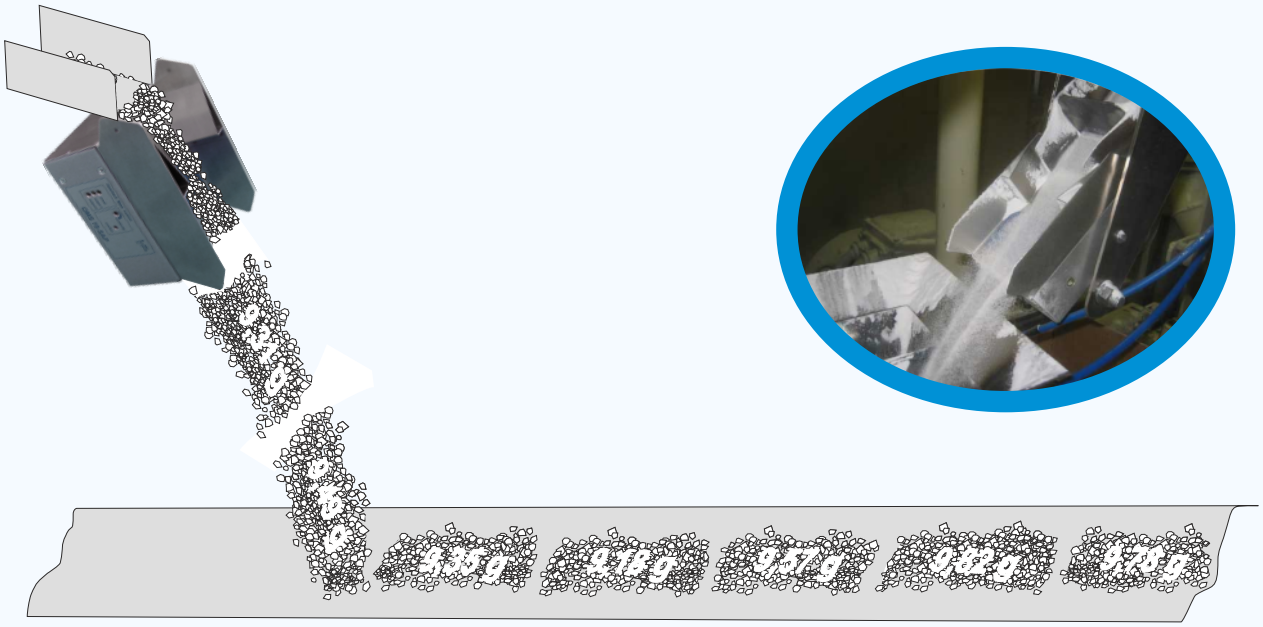
Applications

-system calibrated to weight-

continuous flow of material like granulate, powder : **flow control**



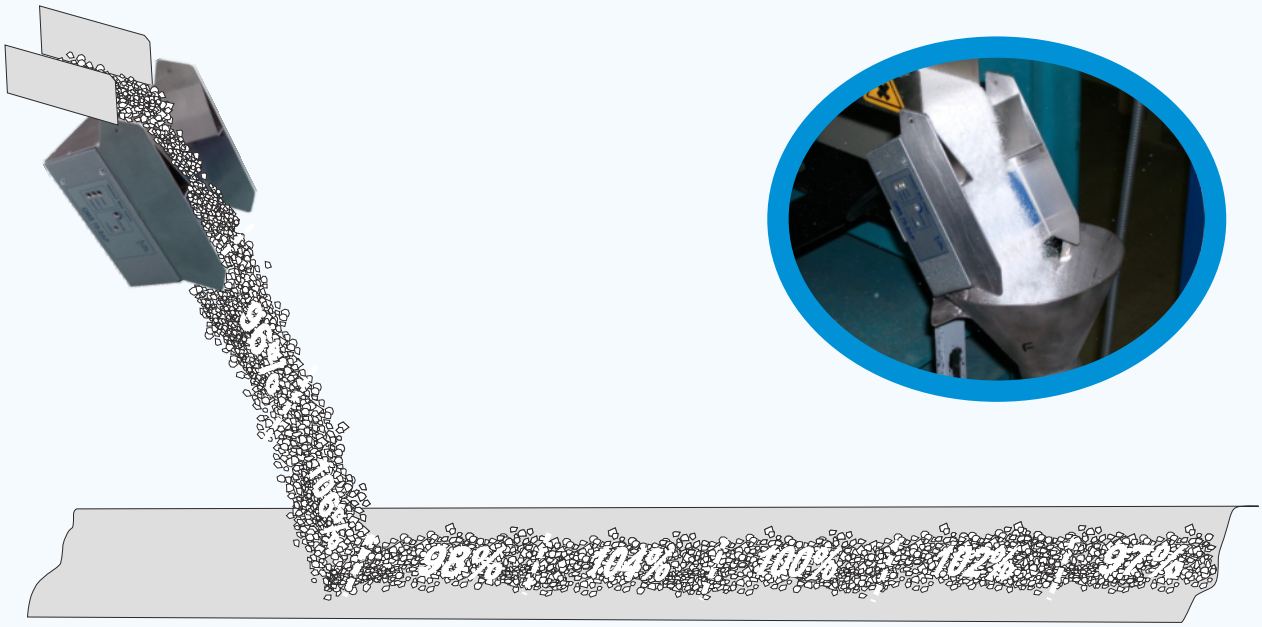
discrete portions of material like granulate, powder : **flow control**



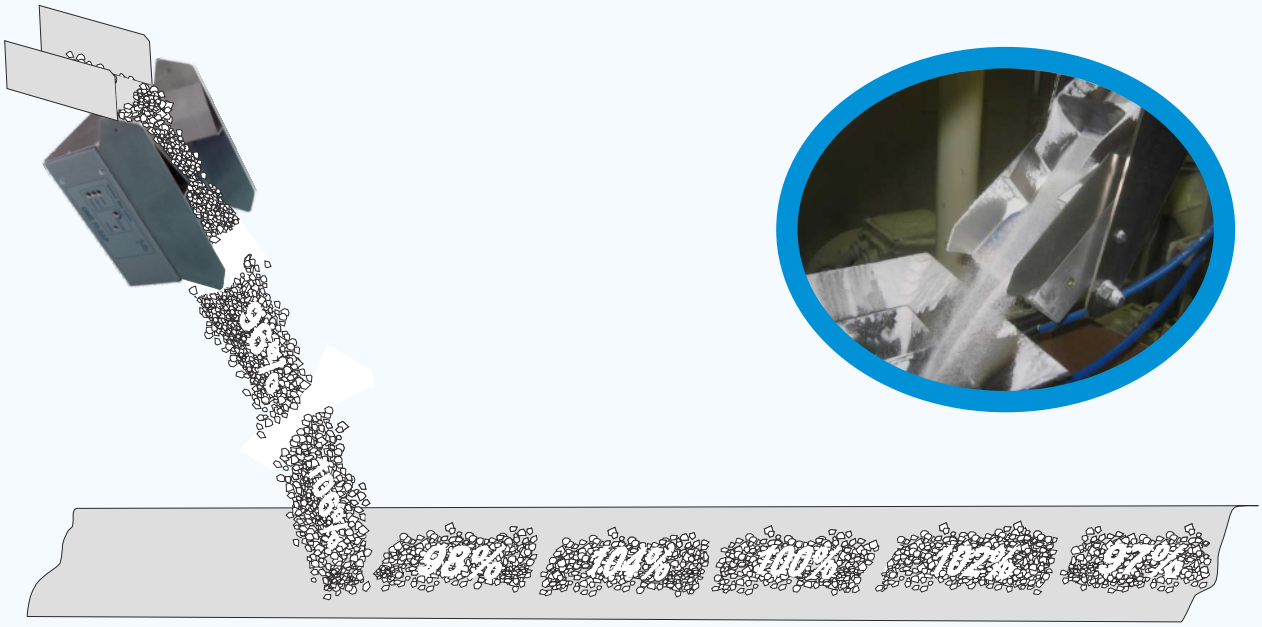
Applications

-system calibrated to percentage flow rate-

continuous flow of material like granulate, powder : **flow control**



discrete portions of material like granulate, powder : **flow control**

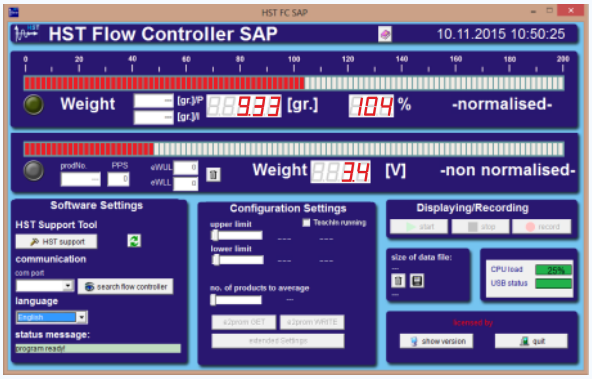


HST SAP / Granulate Flow Control

Delivery Extent

Control Unit

including :
- Sensor Interface
- Interface for external machine control units
- Interface for taring mechanic
- USB interface for PC
- Shielded USB cable



HST Flow Controler Software

Sensor incl. taring mechanic

Sensor Cable

Package

HST SAP / Granulate Flow Control

Technical Data Sensor :

sensitivity :	high
measurement mode :	permanent, auto-taring
lowest detectable weight quantity :	< 10 mg
accuracy :	typ. < 1 % depending on material quantity and material characteristics
evaluation time :	< 1ms
active sensing area :	approx. 60 x 50 mm
measurement by :	single sided electrode

external taring :	automatically by Flow Controller
output :	analog voltage output 0...10V
operation voltage : sensor	+24VDC ±10% supply by Flow Controller
operation voltage : taring mechanic	+24VDC ±10% typ. 1,5 A
mounting :	2 pre-drilled bolt holes, M6, back side of taring mechanic
dimension :	154 x 191 x 274 mm incl. taring mechanic

weight :	4800 gr. 5050 gr. incl. 5m cable
operation temperature range :	10°C ...40° C
storage temperature range :	0°C ...50°C
meets or exceeds standard and requirements :	EN 50011:2007 class A EN 61326-1:2006
protection type	IP 60

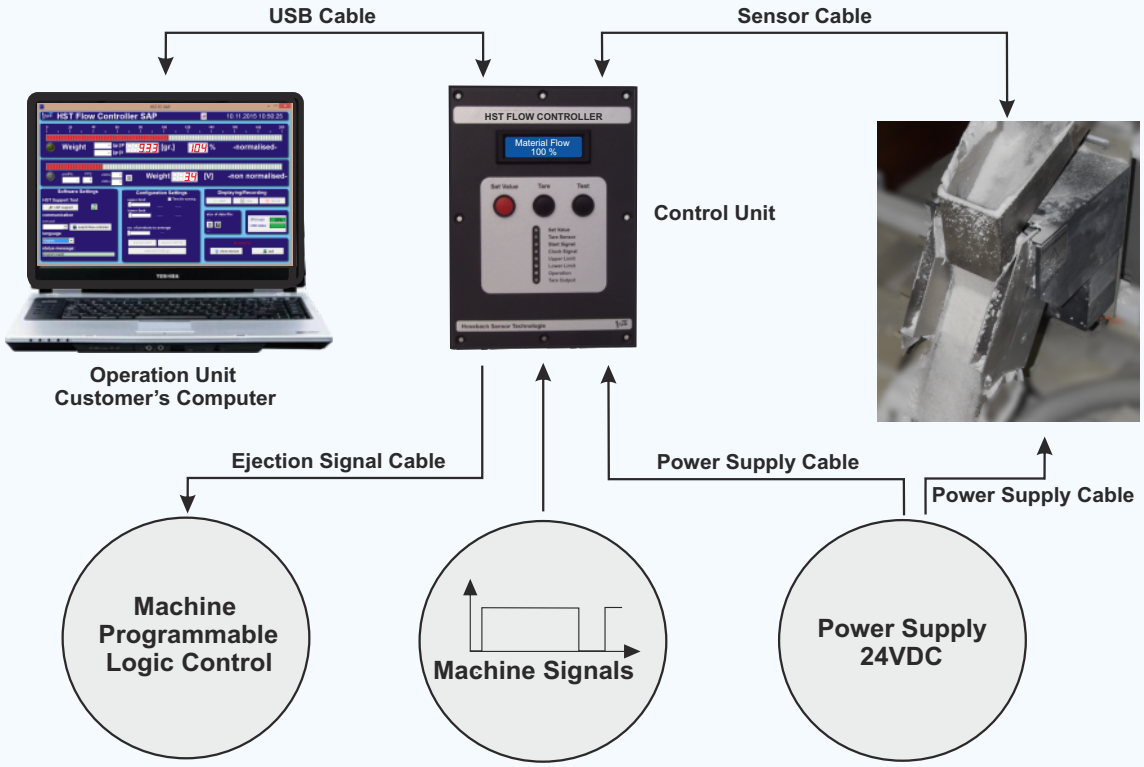
CE

Technical Data Flow Controller :

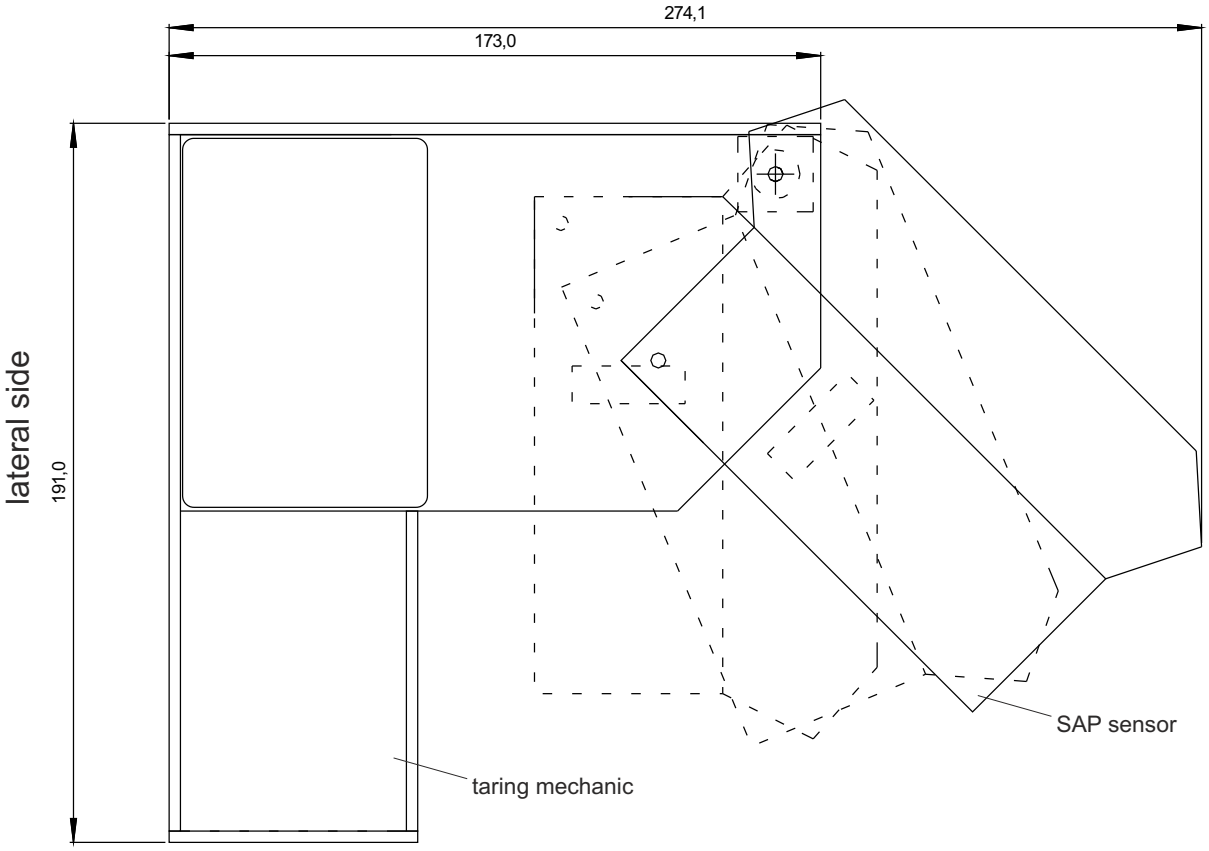
Visualisation :	2 x 16 character displax
measurement rate :	> 1000 /sec
adjustment :	automated teach-Procedure
switching outputs :	PNP 24V/20 mA, opto-coupler
switching inputs :	24V/10 mA, opto-coupler
analog output :	0...5V...10V
PLC and power supply interface :	12-pin removable screw connector
sensor interface :	15-pin SUB-D female connector
Analyser, Profiler interface :	9-pin SUB-D female connector
PC interface :	USB connector
operation voltage :	+24VDC +- 10%
power consumption :	typ. 300 mA
dimension, HxWxD :	210 x 150 x 64 mm
weight :	1050 gr.
mounting	eight 4 mm holes for wall mounting
operation temperature range :	10...40° C
storage temperature range :	0...50° C
meets or exceeds standard and requirements :	EN 61326-1:2006 EN 50011:2007 class A
protection type :	IP 50

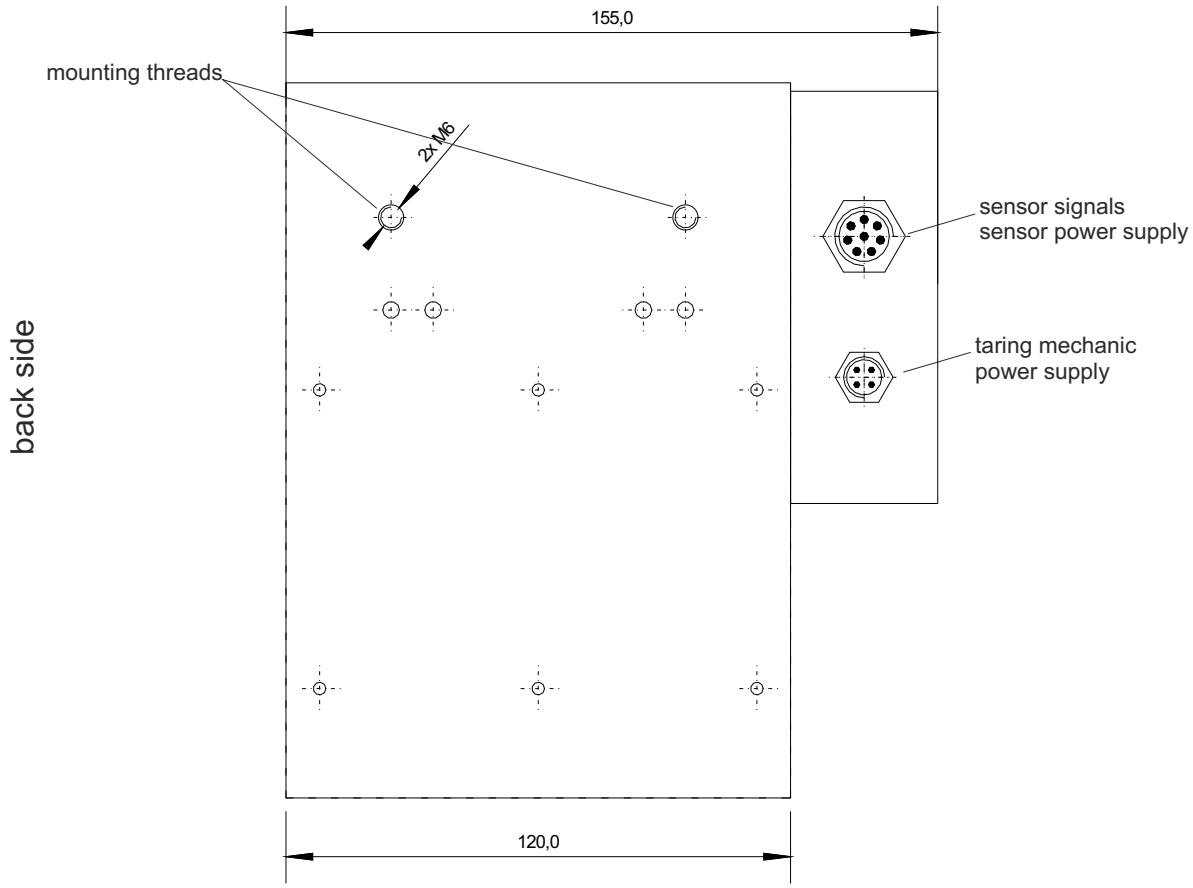
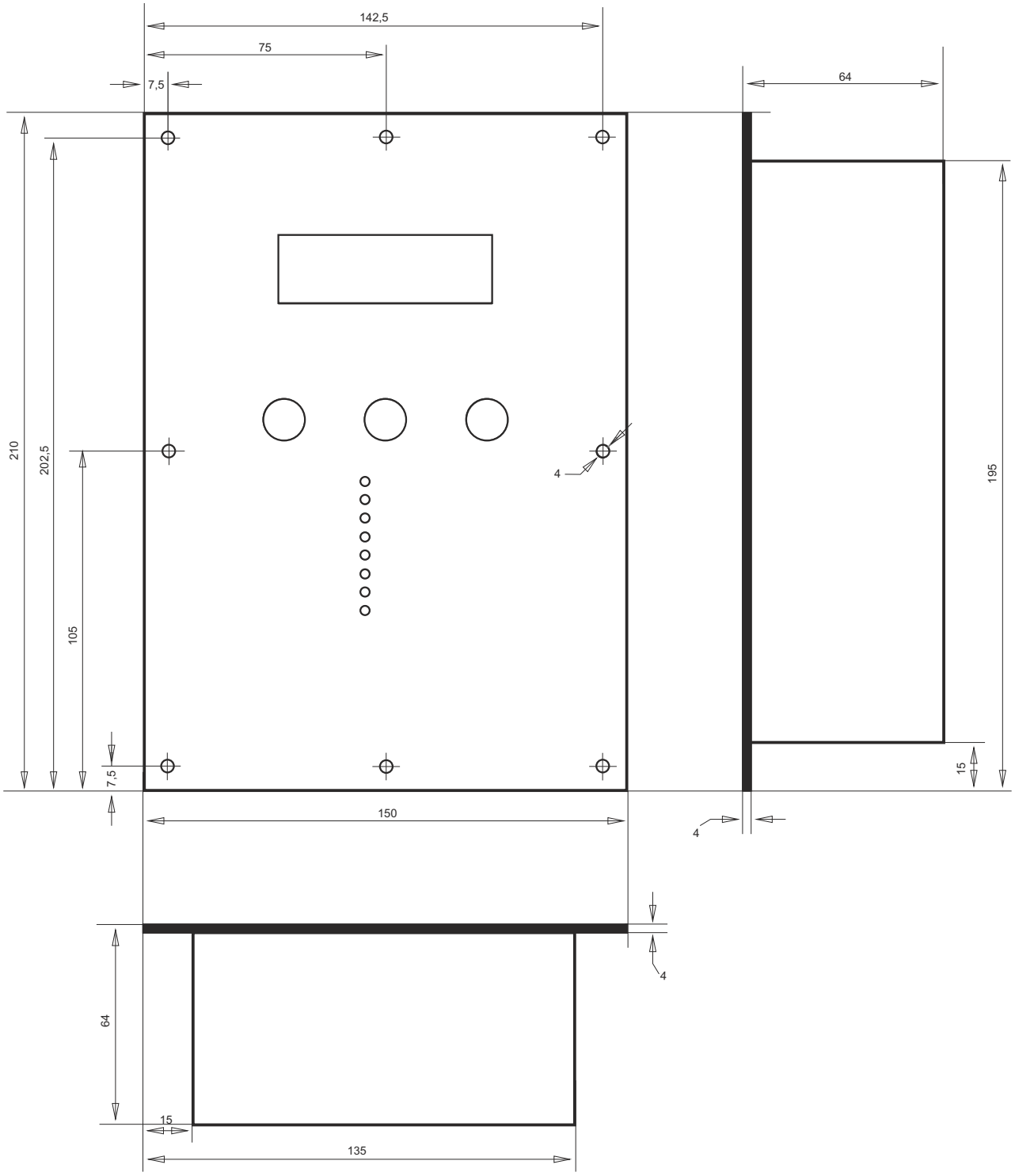
System Overview

Interconnections : PC for configuration + monitoring



dimensions taring mechanic incl. SAP- sensor [mm]





dimensions Flow Controller [mm]