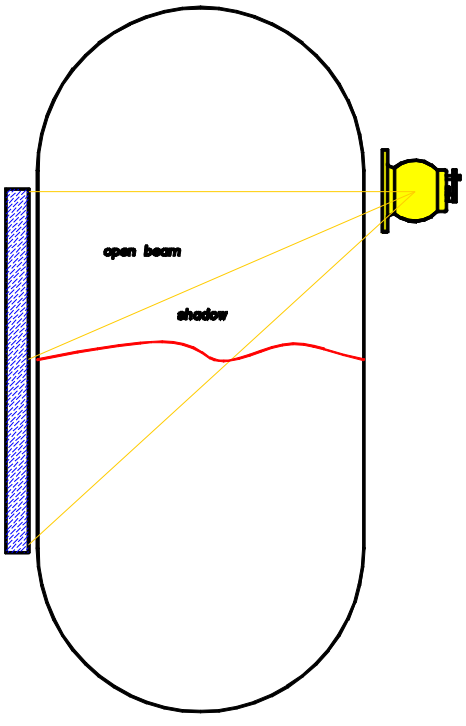
RICHTIG IDEEN GUTE

INDUSTRIEMESSGERÄTE GMBH

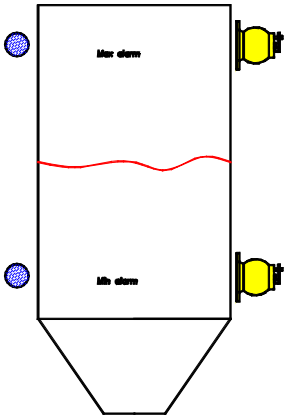
CONTACTLESS
CONTINUOUS LEVEL MEASUREMENT

When X-rays pass through a part of the human body, it is easy to detect differences of areas with higher and such with lower density. Even not skill people know immidiatelly what the picture is telling. The more dense the material is, as easier l the X-rays travel through.
X-rays also are able to irradiate walls. A film or a detector behind the wall can not determine, whether this rays are X-rays or Gamma radiation.
Gamma radiation is not generated in X-ray tubes but comes out of specific atoms. This is much cheaper than an X-ray tube and more stable. Because this Gamma rays are able to penetrate walls, they can be taken like a light barrier. The radiation goes through the walls of a vessel and arrives at the detector.
If it is correctly calculated, the radiation can only pass through if the vessel is empty. If it is full, the absorption is much higher and no radiation comes to the detector.
This describes the level measurement in prinziple.



Example for continuous level

If it only must be decided “FULL” or “EMPTY”, a source and a small detector, both can be seen as a single point, is enough for this measurement.
In many cases the function “YES” or “NO” is not sufficient.
It is asked, where the level is. This needs a continuous signal. The described function can be explained also as a light barrier, i.e. when the detector sees the light, the vessel is empty.
If the light is a long beam, the filling causes a shadow to the detector. Therefore, for a continuous measurement, the beam must cover the whole range. The detector must be able, to see, how long the shadow is.



Example for min-max alarm

It can be seen, which level is covered by the beam. The reason why it becomes a continuous signal is, that with a partly covered detector the intensity goes partly down. According to the intensity the level can be determined, because the intensity is a function of the level.
Unfortunatelly this signal is not linear.
The beam has to irradiate the walls in different angles. Also the distance to the lower part is bigger. Therefore the signal is not linear to the level. But the two influences can be calculated and linearized. In case there are deviations from the theory, the signal can be corrected graphically, if necessary. In most cases, only the empty vessel once has to be scanned.

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Evaluation untit HEICON 21
Calibration, correction of linearization, all can be done with a single board controller. The unit is independent on other instruments, but can communicate with various external instruments. First of all it can be connected to a note book which allows to use all functions via the LCD screen . Addional messages are possible, like Siemens DUST 3964R.
Even ProfiBus DP.
Of course there is also the standard output 4-20mA.
Other output or input signals are available for alarm or start/stopp measurement.

If the vessel has changed, the linearysation can be renewed by an automatic function in the controller or with the note book.

The detector is a so called scintillation counter. The sensitive part is a scintillator, which converts the Gamma radiation into light. The light can be detected by a photo multiplier, which amplifies the light to an electrical signal. The following electronic is again amplifier, shaper and, very important, stabelizer.
The stabilization makes the detector independent on high degree of temperature changes and aging.
All is enclosed in a stainless steel housing.
The lentgh of the detector, according to the measuring range, can be made in any measure up to 2m.
The housing is completely tight, at least more than IP68.
In case of bigger ranges or because of transport reasons, the detector can be parted, and the parts all can be connected to the evaluation unit.
The detector will be connected to the HEICON 21. It sends the signal and it received the power from it. So 4 wires are necessary and a distance of at least 500m is possible according to the sizes of cores.

Detector LDP 25

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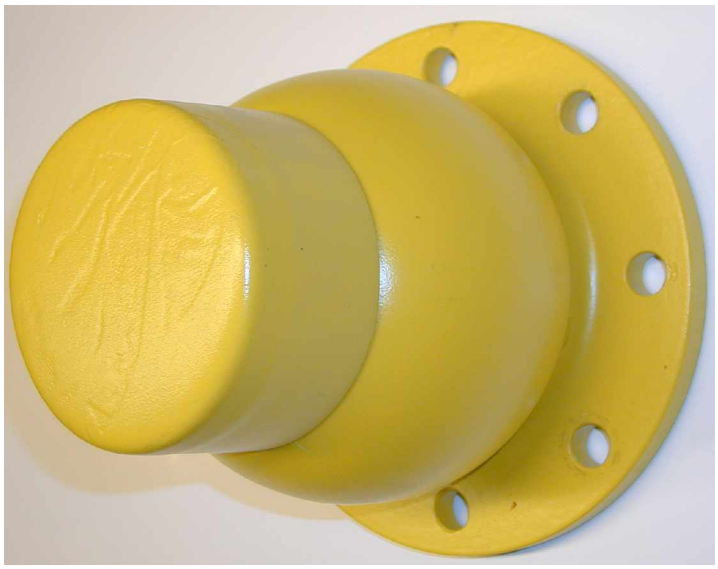
The radiation source is an artificial radioactive material, encapsuled in a double stainless steel housing. The capsule is tested according to many international regulations, so that it is ensured, it can be compared with an X-ray tube.
Of course it radiates in all directions, not only, where the radiation is needed. Therefore the other directions must be shielded. There is an outlet channel, and radiation only comes to the detector.

There are differend shielding also available. Such with a rotating shutter or with a push shutter. The push shutter is better to handle in case of bigger vessels, because the shutter can be opened and close from ground via a long rod or chain.
Also the shieldinding must be chosen according to the angle of the beam, i.e. the range.

According to international rules or laws, the radiation level outside of the shielding normally is so low, that workers can be there all time.



Shielding ABS80L

HEICON 21

Technical Data:

Power supply:	‘	Standard: - 230V-
	‘	Optional: - 115V-, 24V-, 24V=
Counter inputs:	‘	2 galvanically insulated 16 bit counter
	‘	dead time ? 1,5µs
	‘	Maximal count rate $8*2^{16}$ pulses/s (at 8 readouts/s)
Digital inputs:	‘	4 galvanically insulated inputs (switching threshold ? 3V)
	‘	maximal input voltage 24V
	‘	selectable logic for each input
Digital outputs:	‘	Standard: - 3 potential free relays contacts (changers) max. 110V DC, 125V AC max. 1A; max. 30W
	‘	Optional: - 3 electronic Relays outputs galvanically insulated maximal output voltage 30V selectable logic for each output
Current output:	‘	Standard: - 1 Analogue output (galvan. insulated) 0..20mA or 4..20mA adjustable Accuracy ? 0,5% Free scalable Detection of cable break
	‘	Optional: - 2. Current output
General:	‘	illuminated 4-Line-LCDisplay (4x16 Characters)
	‘	keyboard key click and acoustical feedback
	‘	alarm signal
	‘	integrated Watch-Dog function
Operation temperature:	‘	0°-55°C (environment temperature)
Dimensions:	‘	101,4mm (20TE) x 132,5 (3HE) x 160mm (WxHxD)
Weight without housing:	‘	318g
Housing:	‘	IP 65 classification