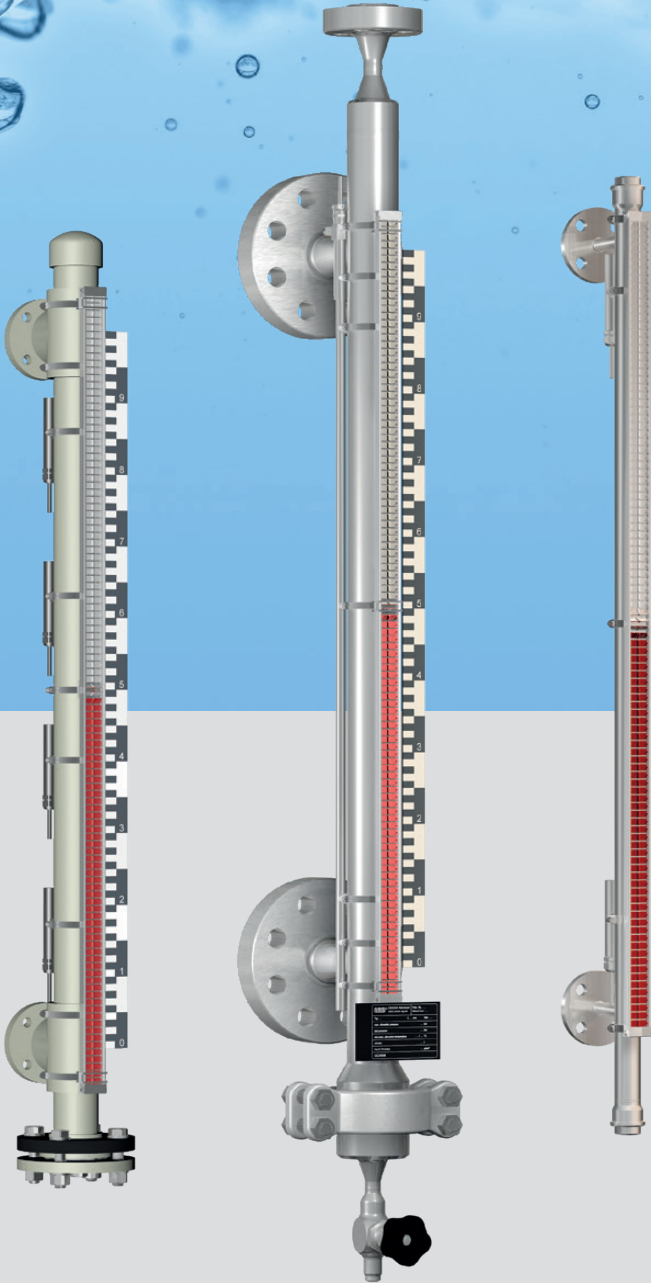




Level Measurement

Visual Level Indicators



Principles of design

● Single-pole Magnet System

The WEKA VLI operating principle is based on the use of a permanent bar magnet system which ensures the safe and reliable activation of visual indication elements (flags), switches and transmitters, even when used on thick-wall high-pressure indicator pipe.

● Magnetic Guide Tape

The patented magnetic guide tape is integrated within the indication rail to ensure the float bar magnet is always aligned like a compass needle to the polarized flags and switches. This ensures continuous reliability of the indicating, switching and transmitter control functions.

● Magnetic Coupling

Every flag of the WEKA indication rail is equipped with its own permanent magnet. Thus the indication flags magnetically interlock with each other and so are kept in a stable position. The patented guide tape further enhances performance through the magnetic damping effect that produces safe and reliable indication of liquid level, even under difficult applications with rapidly changing liquid levels or vibrations.

● Temperature Stability

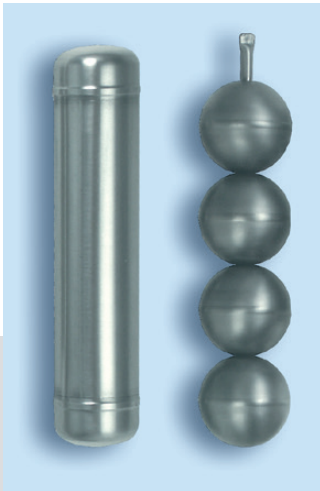
The magnetic materials used in the WEKA System have been selected for optimal performance even at extreme temperatures. Years of experience have proven our preconditioning of components ensuring negligible degradation of magnetic flux.

● Compact Design

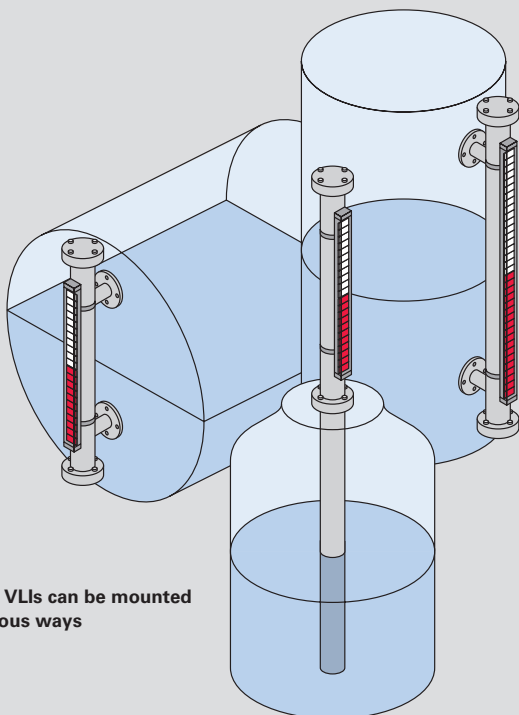
The low weight of the WEKA bar magnet permits the use of lightweight hermetically sealed floats. Compact in size, the WEKA floats ensure the highest possible diameter difference between float OD and tube ID – an important advantage when dirty or highly viscous liquids need to be measured. The short float design also often enables a larger indication range compared to competitive products.

● Multi-functional: Three functions in one system!

- Level indicator
- Level switch
- Level transmitter



Diverse float types are available for the different applications



WEKA VLIs can be mounted in various ways

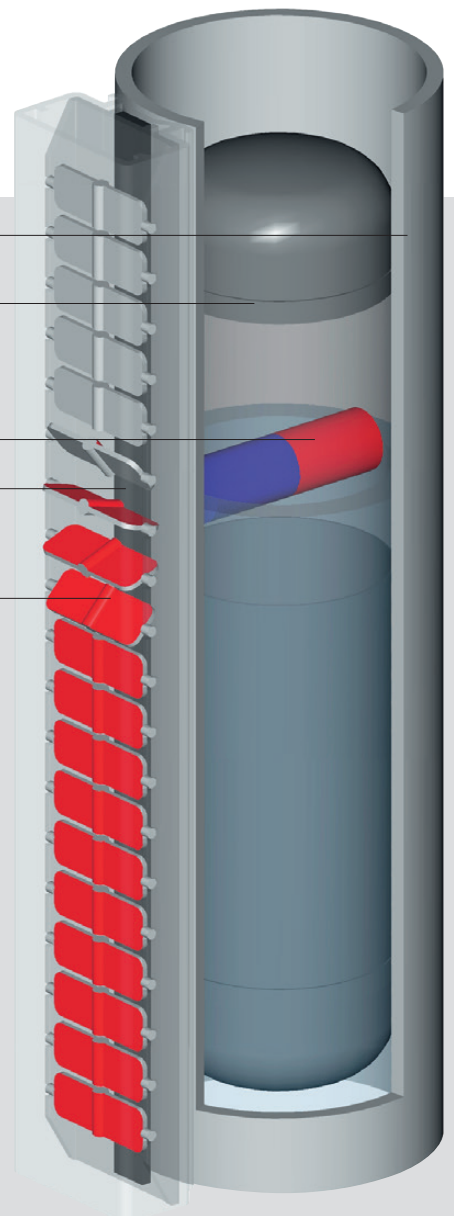
Pipe

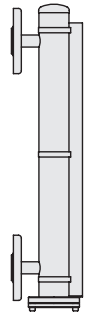
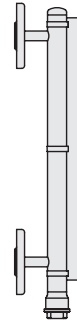
Float

Bar magnet

Magnetic guide tape

Indication flags with integrated permanent magnets





Series	Economy-Line	Economy-Line
Type	34000E	23614E
Execution	A, K	A, K
Max. operating pressure @ 20 °C	up to 6 bar	up to 6 bar
Operating temperature	-40 up to +100 °C	-40 up to +100 °C
Pipe size	OD 33.7 mm	OD 53 mm
Minimum density	> 0.6 g/cm ³	> 0.8 g/cm ³
Recommended viscosity of the fluid	max. 150 cSt	max. 600 cSt
All data are valid for the basic versions		

● Modular Design

The WEKA VLI (Visual Level Indicator) program is built up in a modular system. It can therefore be readily configured to precisely match the requirements of a very wide variety of applications and operating conditions. Within each series the basic execu-

tions-A,-B,-K and-O are available: Upper and lower process connections can be top to bottom or side to side. But also mixed versions with a lateral and side process connection can be ordered.

Execution-A

Upper and lower process ports: top to bottom
Upper float chamber end: threaded cap
Lower float chamber end: threaded flange



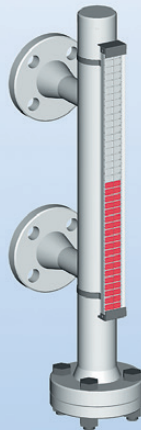
Execution -B

Upper and lower process ports: top to bottom
Upper and lower float chamber ends: threaded flange



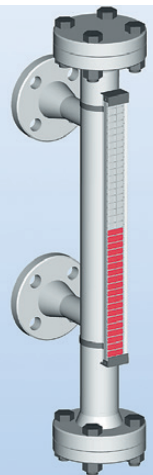
Execution -K

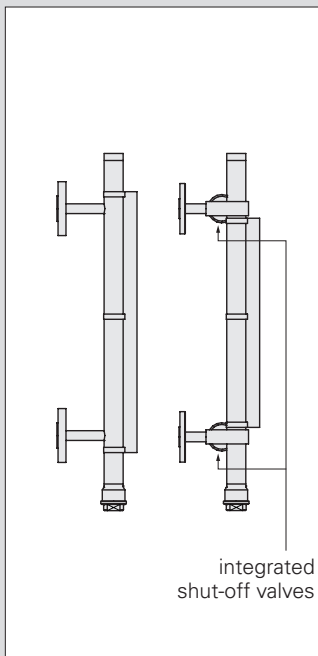
Upper and lower process ports: side to side
Upper float chamber end: cap
Lower float chamber end: service flange



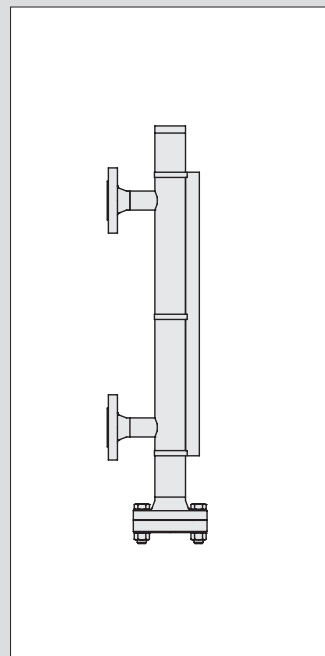
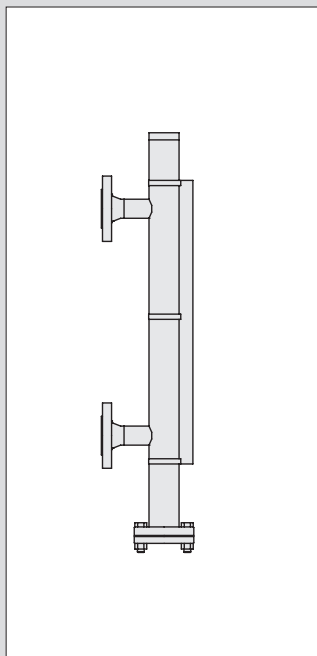
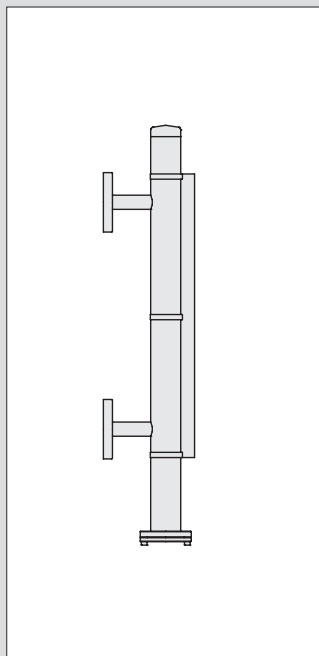
Execution -O

Upper and lower process ports: side to side
Upper and lower float chamber ends: service flange





integrated shut-off valves



Smart-Line 50 34000/34110	Standard 6 23614	Standard 28 34300	Standard 50 32755
A, B, K, O	A, B, K, O	A, B, K, O	A, B, K, O
up to 50 bar	up to 6 bar	up to 28 bar	up to 50 bar
-80 up to +250 °C	-80 up to +150 °C	-100 up to +400 °C	-80 up to +400 °C
OD 33.7 mm	OD 53 mm	OD 53 mm	OD 54 mm
≥ 0.6 g/cm ³	≥ 0.65 g/cm ³	≥ 0.55 g/cm ³	≥ 0.55 g/cm ³
max. 150 cSt	max. 600 cSt	max. 600 cSt	max. 600 cSt

● Wide range of operating conditions

Operating pressures can be from vacuum to 500 bar. Float chambers are available with design pressures up to 630 bar. Liquid densities > 0.3 g/cm³ and media temperatures from 77 K to 673 K (-196 °C to +400 °C) allow use for applications like cryogenic liquid gases LPG/LNG, water hydraulics and steam boilers. Closed floats are available for most liquids at pressures up to 350 bar. Open floats are available for non condensating liquids at pressures up to 630 bar.

● Energy-free, reliable operation

WEKA VLIs are ideally suited for plant start-up operations. The indication function does not require electrical power. The float principle makes this a direct method of level measurement, with definite level indication. The control functions of a VLI are independent of its display function. Therefore the level is always observable, even if the power supply fails.

● Versatility through choice of materials

Standard materials

- Stainless steel 316/316L
1.4404 / 1.4432
1.4435
- Group A4 austenitic steel

Stainless steel materials as option

- 304/304L 1.4301 / 1.4306
1.4307
- (316Ti) 1.4571
- 321 1.4541

Stainless steel with higher molybdenum content, e.g.

- 1.4539 (904L; UNS N08904)
- 254 SMO (UNS 31254)

Nickel alloys and special metals, e.g.

- Inconel[®]/Incoloy[®]/Hastelloy[®]
- Titanium alloys
- Zirconium and Tantalum
- Aluminum alloys

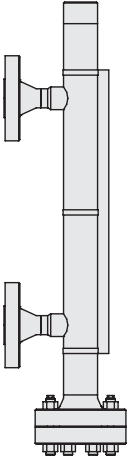
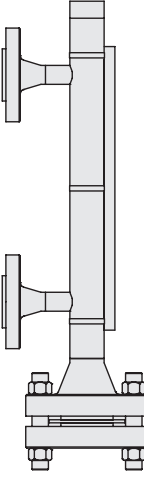
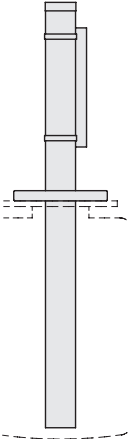
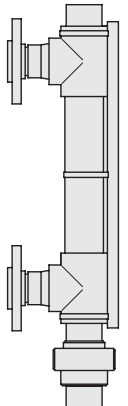
Engineered Plastics

- PVDF, PP, PE, PVC
- ECTFE (Halar) coating
- PTFE-PFA lining
- Teflon-PFA coating

WEKA VLI Level Indicators can be manufactured according to special request in almost any non-magnetic material, subject to physical properties and chemical compatibility.



WEKA VLI Smart-Line,
Type 34000-K

			
High Pressure – Power	Petro	Top of Tank	Engineered Plastic
Diverse	Diverse	Diverse	Diverse
A, B, K, O	A, B, K, O	–	A, B, K, O
up to 500 bar	up to 630 bar	up to 50 bar	up to 10 bar
–80 up to +400 °C	–80 up to +400 °C	–80 up to +400 °C	according to material
diverse	diverse	diverse	diverse
$\geq 0.6 \text{ g/cm}^3$	$\geq 0.27 \text{ g/cm}^3$	$\geq 0.3 \text{ g/cm}^3$	$> 0.6 \text{ g/cm}^3$
max. 600 cSt	max. 600 cSt	max. 600 cSt	max. 600 cSt

● Excellent Readability

The wide colour contrasted indicating flags are easily and clearly readable, even from far distances. The flag elements are normally red and aluminum coloured, but can be optionally ordered with alternative colour combinations. Difficult liquids in corrosive and high/low temperature applications do not effect the reliable functioning of WEKA VLIs, because the liquid inside the float chamber is totally isolated from the indication rail. For the same reason, readability is not impaired by turbid conditions.

● Level Measurement à la carte

WEKA VLIs can provide an optimal solution for almost any level measuring and control application. For most applications, a suitable indicator can be configured from standard modular components. Special solutions are frequently needed for unusual operating and installation conditions. Our customers can take advantage of our 40 year experience in manufacturing custom level indicators based on the proven WEKA design of magnetic float and indication rail. We cover an extremely wide range of special level instrumentation require-

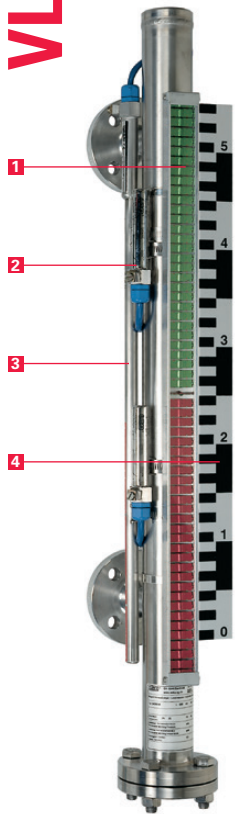
ments. If necessary, the standard interfaces can be adapted to match the requirements of customer's control systems. Magnetic flag elements of WEKA VLI indication rails can be supplied with colour combinations other than the standard colours. The WEKA magnet and indication rail system can also be used for position indication of hydraulic and pneumatic cylinder pistons and pressure accumulator diaphragms. WEKA's extensive custom design expertise can produce reliable instrumentation solutions for linear displacement monitoring requirements.

● Applications

WEKA has accumulated a wealth of knowledge about design and manufacturing of indicators and sensors for special applications. We have many years of practical experience in the use of WEKA VLI Level Indicators in chemical and other process industries, shipbuilding, thermal power plants, hydraulic systems, railways, vehicular applications, petrochemical industries, and refrigeration systems, to name just a few.



Petro-VLI – Our solution for your petrochemical applications



WEKA VLI Standard, Type 34300-K

1 Indication Rails

The indication rails of WEKA VLIs are never in contact with the process media, and are consequently maintenance-free. The flags of these indication rails are 36 mm wide, and therefore easily read even from far distances. The lightweight flags are magnetically coupled to each other and respond positively even at float displacement speeds of 2 meters per second. The special design of WEKA VLIs ensures reliable read-out at all times: the flags hold their positions even in the presence of vibration and temperature variations. For outdoor installations, refrigerant applications and food-processing industries we recommend indication rails with a polyolefin protective tube which is more resistant towards aggressive atmospheres, and also prevents ice formation and condensation.

- The standard indication rail is made of polycarbonate. This is suitable for media temperatures ranging from cryogenic to +150 °C, and has a viewing angle of 240°. The profile has stainless steel end-caps.

- The flags are red and aluminum anodized, but are optionally available with other colour combinations, for example to conform to a process media colour coding scheme.

- For media temperatures up to +250 °C, the rail is made of aluminum and the cover of transparent polycarbonate.

- For media temperatures up to +400 °C, the rail is made of aluminum and the cover of glass. The flags are black and aluminium enamel varnished.

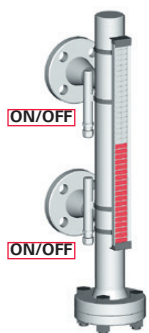


2 Magnetic Switches

WEKA VLIs are available with magnetic switches installed at the rear of the float chamber, actuated by the rear field of the bar magnet in the float. These switches add level detection functions to VLIs. The switches may be connected directly to inputs of PLCs or computer-based systems, or through contactors for control of valves or pumps. The magnetic switches are bi-stable: each is latched in one state (open or closed) on the first pass of the float's bar magnet, and reset to the original state on the second (reverse) pass. The magnetic switches are available as on-off (SPST) or changeover (SPDT) types. The stainless steel housings allow them to be used in practically any type of environment, and with media temperatures up to +350 °C.



Magnetic switches are available in various versions



The number of switching points is limited only by the availability of space. Magnetic switch modules are available for use in highly combustible atmospheres: either as intrinsically safe (Ex i) versions or with pressure-tight explosion-proof (Ex d) housings that conform to the European Directive ATEX/IECEX.

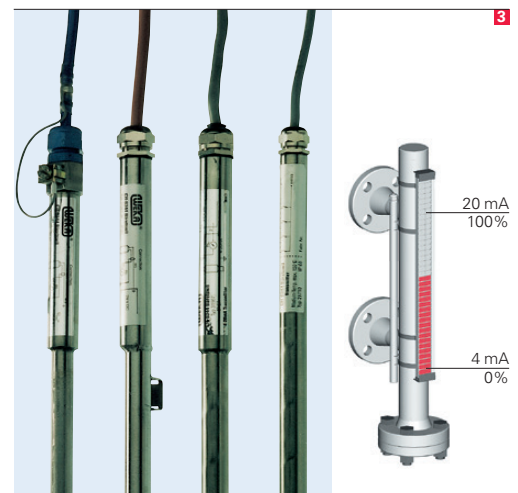
3 Transmitters

WEKA VLIs are available with an optional electronic transmitter to provide a continuously variable electrical signal that can be fed to a remote level indicator, PID controller, recorder or PLC. This can be in the form of a 3-wire (current or resistance) or 2-wire (current loop) output. These transmitters are available for media temperatures up to +350 °C. A choice of output connections are available: plug-in connector, terminal box, or pre-wired cable lead. Transmitters are optionally available for use in highly combustible atmospheres: either as intrinsically safe (Ex i) versions or with pressure-tight explosion-proof (Ex d) housings that conform to the European Directive ATEX/IECEX.

4 Measuring Scales

Measuring scales are available with printed or engraved aluminium dibond or stainless steel scales. The standard scale division is 10 cm: users may optionally order other scale divisions.

Detailed information about the WEKA VLI product range, including accessories, is available at our website www.weka-ag.ch.



Transmitters make the visual indicator to a level transmitter

Keeping Liquids and Gases under control

Learn more about the history of the WEKA and how WEKA has managed to reach the top of the world market!

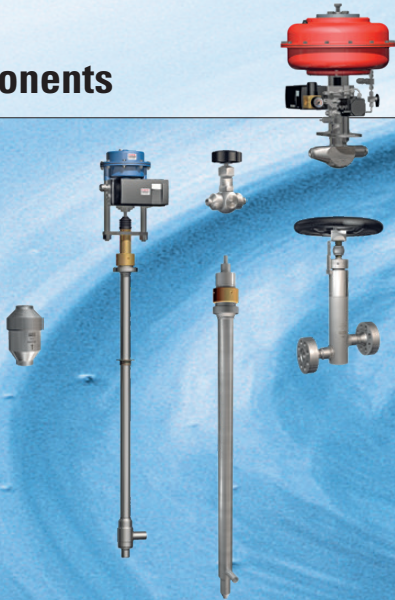
- 1940** Arthur **W**elter and August **K**arrer founded **WEKA**. Purpose of the business was manufacture and sale of lead fittings. Within only two years it became necessary to move into larger production facilities.
- 1949** Reorganisation as WEKA AG.
- 1962** The original version of the WEKA Magnetic Level Indicator was patented. WEKA moved ahead in the area of measurement and control technology.
- 1978** WEKA produced the first cryogenic valves and couplings.
- 1979** WEKA heralded the step across the Atlantic with the signing of a license contract with GEMS Sensors Division of IMO Industries for the manufacture of WEKASureSite Magnetic Level Indicators in the USA.
- 1981** Successful start in the USA and take-over from IMO Industries. The Founders sell the company after 40 years of operations. WEKA becomes a part of the IMO Group, Lawrenceville, N.J.
- 1991** New facilities in Bäretswil, approx. 25km south-east of Zurich.
- 1995** Take-over the european manufacturing from GEMS tank level instruments.
- 1997** WEKA as a part of the Gems Sensors Group becomes part of the DANAHER Corporation, USA.
- 2001** WEKA became a member of the Arca Group, a well-known German company for control valves.
- 2002** The Total Quality Management System of WEKA has successfully been audited by the German Lloyd according ISO 9001 and PED module H and H1. At the same time the welding approval was renewed.
- 2003** The QS-System has been approved according to ATEX.
- 2007** WEKA integrates personnel and manufacturing facilities of Flowserve S.A. in La Chaux-de-Fonds (Switzerland) including «Bättig» Valve program MicroFlow and LowFlow Valves.
- 2007** WEKA introduces SAP All-in-One for all business processes successfully within short time.
- 2009** WEKA became the approval by Zelm Ex according to IECEx.
- 2017** WEKA implements Lean Management and focuses on efficient processes and continuous improvement to achieve maximum customer benefit.
- 2018** WEKA proves its sustainable behaviour by achieving the second-best rating by the independent testing company EcoVadis.

A member of the ARCA Flow Group:



Valves and Cryogenic Components

Control and shut-off valves
Check valves
Safety valves
Transfer line couplings
Flow meters
Ejectors



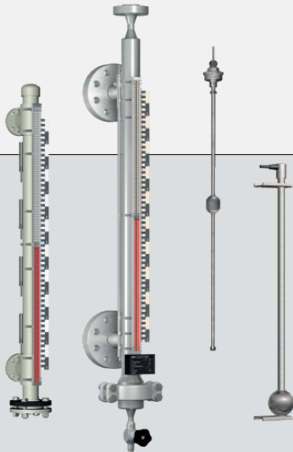
Certified according
ISO 9001

Certified according
PED

Certified according
ATEX/IECEx

Level Measurement

Bypass Visual Level Indicators
Top of Tank Visual Level Indicators
In-Tank Tank Level Indicators



Services

Engineering, development and project management
Service and Support



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info@weka-ag.ch · www.weka-ag.ch**

Member of the **ARCA** Group
FLOW



Level Measurement

Tank Level Instruments



Member of the  Group

TLI Industry

In mechanical and plant engineering, WEKA can fully exploit its many years of expert experience in the field of level measurement. Professional, high-quality and durable products are appreciated by all customers.

General requirements

There is a wide range of level measurement applications in mechanical and plant engineering. Here, the versatile range of WEKA products can be used.

Whether basic requirements for elementary level measurement in general industry applications or up to highly specialised applications in the high-pressure and high-temperature range, WEKA is ready to provide customer-specific solutions. The close relationships with our customers make an important contribution to finding the perfect solution which is desired for the respective process.



Typical applications

- Pulp and paper industry
- Steel rolling mills and foundries
- Dyeworks in the textile industry
- Packaging industry
- Heating, ventilation and air-conditioning
- Incinerating plants
- Refrigeration plants
- Filter plants
- Automotive industry
- Lubrication units in general mechanical engineering
- Boiler engineering
- Tank farms

TLI Marine

The shipbuilding industry is the most traditional area in which level measurement instruments are applied. For decades, WEKA has supplied these customers, providing its expertise with simple and high-quality instruments.

General requirements

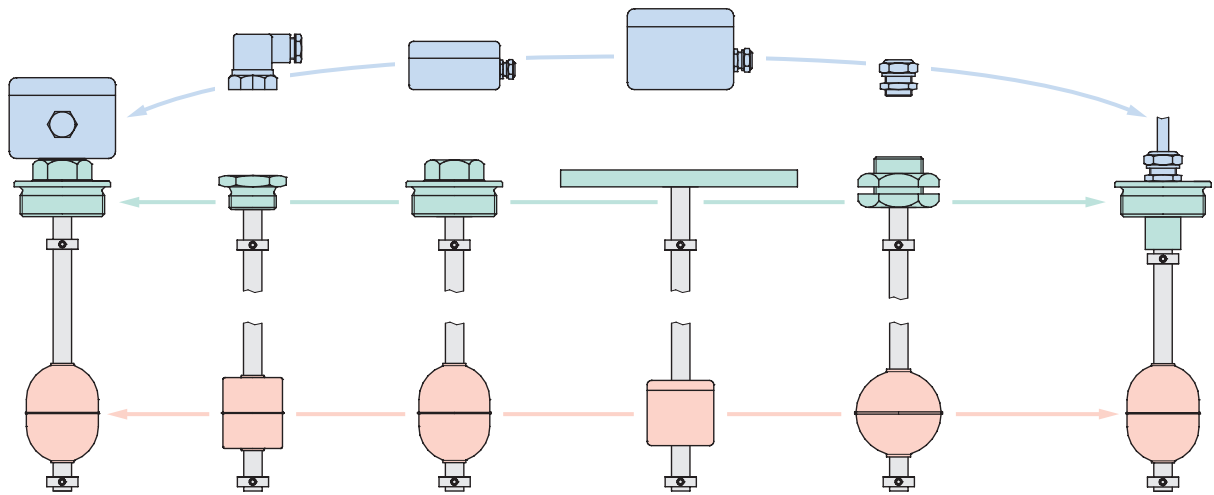
For decades, the traditional shipbuilding industry has been using level measurement instruments for the wide variety of operating liquids aboard. The price pressure is immense for building companies. WEKA offers very efficient and favourable level measurement versions in its versatile range of products.

For FPSO (Floating Production Storage and Offloading Unit) ships with completely installed movable drilling towers, storage and transfer stations, specialised applications in the high-pressure and high-temperature range are also used in many cases. WEKA is ready to provide customer-specific solutions.

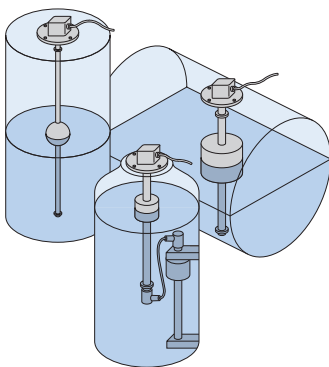


Typical applications

- Freshwater
- Wastewater
- Fuel
- Lubrication
- Incinerating plants
- Boiler engineering
- Tank farms



Technical Data	Type XM-/XT-800E	Type XM-/XT-825E	Type XT-800R
Resolution	5 mm	2.5 mm	5 mm
Tube size	OD 13 mm	OD 13 mm	OD 13 mm
Max. length	3 m	1.5 m	3 m
Material	316/316L	316/316L	316/316L
Special features			



1 WEKA TLIs can be mounted in various ways

● WEKA TLI: Tank Level Instruments

WEKA TLIs optimally complement the range of WEKA VLIs (Visual Level Indicators). Wherever physical conditions prevent a bypass type level measuring installation, a WEKA TLI product would be the preferred alternative. The TLI sensor is installed directly on the tank, and provides a reliable level measurement signal output that can be fed to a remote indicator or control system. A wide choice of standard accessories and fittings allow TLI sensors to be configured to meet virtually any tank level measurement requirement. **2** These sensors can even be installed at the bottom of tanks, oriented vertically upwards.

● Float technology

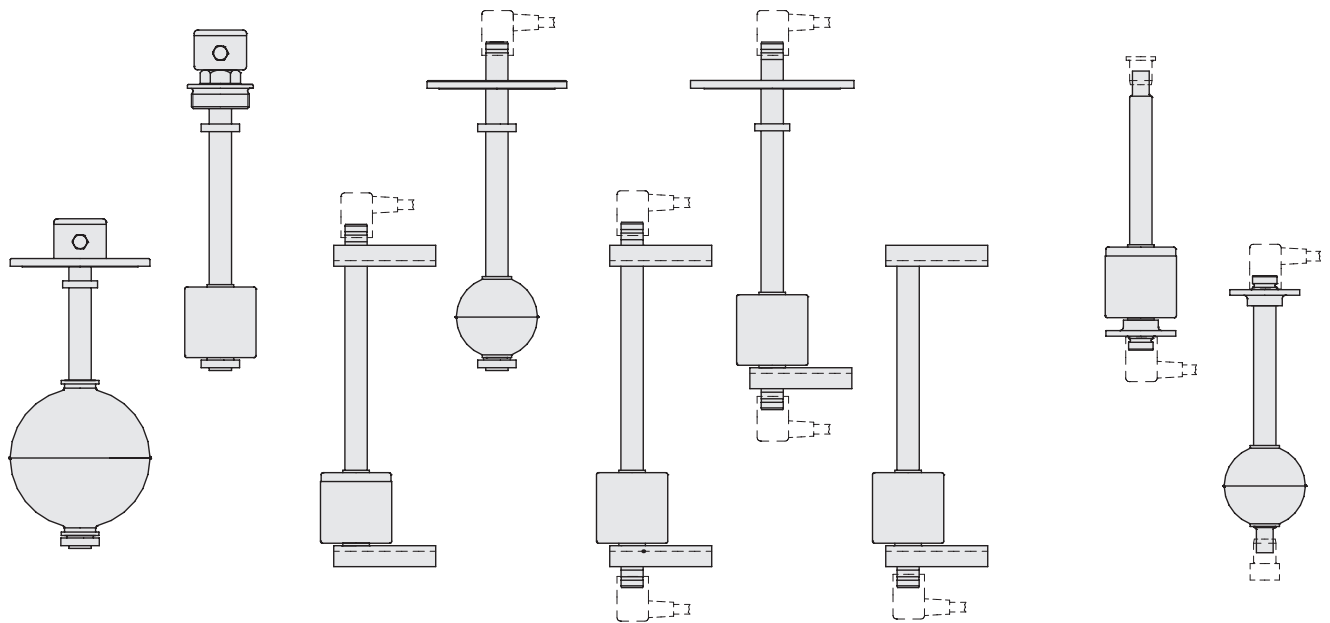
TLIs take advantage of the proven highly reliable float technology providing extremely accurate liquid level sensing under almost all operating conditions.

Advantage 1: Floats follow the true liquid surface, rather than extrapolate results from indirect indications such as pressure sensing or echo location. They

operate flawlessly in tanks with curved walls **2** or other shapes without clear vertical access, where other liquid level technologies may be unable to function properly.

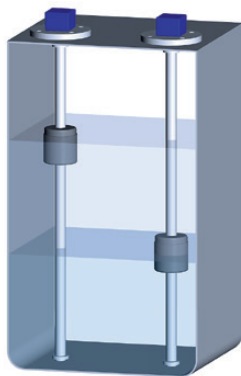
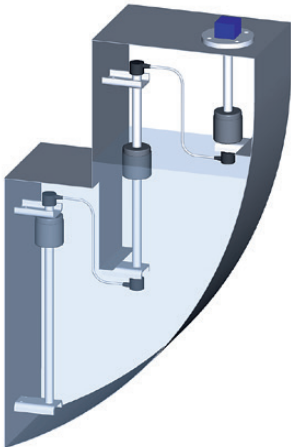
Advantage 2: Floats feature the unique capability to monitor liquid interface levels in virtually any tank size or shape **3**. Any two liquids with differing densities ($> 0.1 \text{ g/m}^3$) contained together (oil and water etc.), WEKA float type sensors keep operators aware of the interface level position. The principle of measurement with WEKA TLI sensors effectively eliminate the problems that foam and waves cause with other types of level sensors.

Advantage 3: Floats and the magnetically actuated reed switch counterparts are accurate and repeatable. Measurement accuracy of other technologies can be influenced by changes in pressure or temperature and often require complex expensive electronics and continual adjustment on recalibration.



Technical Data	Type XM-/XT-36000E	Type XM-/XT-140000E	Type XM-/XT-140000EN
Resolution	12.7 mm	5 mm	5 mm
Tube size	OD 32 mm	OD 32 mm	OD 32 mm
Max. length	5 m per sensor	5 m per sensor	5 m per sensor
Material	stainless steel	stainless steel	stainless steel
Special features		low stray field, shock-resistant up to 400 g	deadline minimised, low stray field, shock-resistant up to 400 g

2
Combination of several TLIs



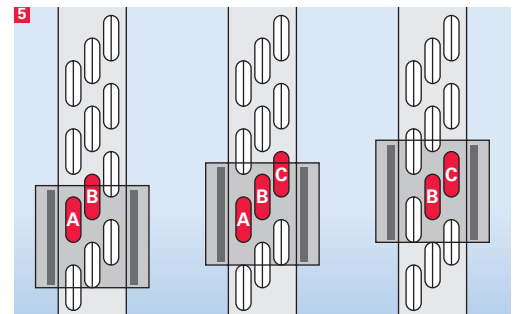
3
Liquid level measurement in tanks with interface levels

4
Operating Principle

The level sensors are vertically mounted in the tank and cable connected to a remote receiver. A voltage divider extends over the full distance within the sealed transmitter stem, with magnetic reed switches tapped in at regular intervals. As the float moves with liquid level changes, it magnetically closes a series of reed switches in sequence, thus varying the tapped-off portion of the voltage divider. WEKA TLI sensors are completely electronic; the float is the only moving part. The float is designed in a way so that its movement results in a self cleaning action. Therefore these sensors require very little maintenance.

5
Voltage Divider Ensures Consistent Accuracy

The WEKA voltage divider uses a cascade series of reed switches and resistors tapped in a 2-3-2 sequence producing a voltage signal which is directly proportional to the liquid level and assures high repeatability.



For each float travel the distance between the reeds will be shown as voltage difference by the output device. Inaccuracies are limited to this distance plus the tolerance of the output device and circuit. This, in combination with the rugged design of the sensors, makes the measuring principle the first choice for the toughest Navy applications for surface or submarine vessels.

6
Voltage (XM) or current (XT) output what's the difference?

All XM sensors work on the voltage divider principle. Voltage output between 0 V and the supply voltage is proportional to the liquid level. The XT versions operate the same as the XM but have an integrated 4...20 mA signal converter.



XM-55000E (ROLI)

Flexible, coiled sensor with 12.7 mm resolution, to be inserted on site in a prefabricated, non-magnetic pipe (Ø 32 mm or Ø 42 mm). Ideal for liquid level (interface) measurement in deep tanks, up to 25 m. Choice of materials for «engineered» corrosion resistance.



Signal Conditioners

MU-10, MU-80, MU-80-Ex, ... These signal conditioners convert the passive voltage signal (XM sensors) into a standardized, impressed 4...20 mA signal in 2-wire technology (XT sensors). The selection of conditioner depends on the planned service, i.e. shock-tested (proven) or intrinsically safe areas.



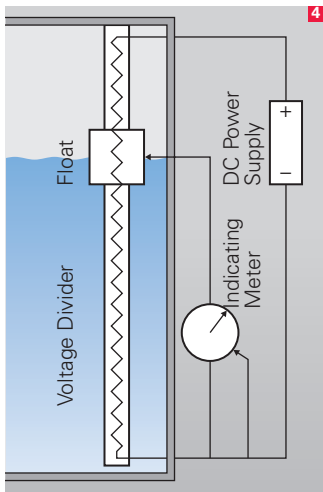
Individual Solutions

For special applications we offer individual solutions in the area of mounting and electrical output, i.e. for railways (picture) with extended internal resistance values, plug connectors with higher enclosure and mounting elements according to customer requirements.



LS-240E

Compactly sized, slosh shielded level switch with one or two switch points for bilge alarm applications or other harsh environments. Bracket or flange mounting, with fixed or plugged cable connection. Also low-stray-field versions are available.



4 The voltage divider principle allows a simple adaptation to the input voltage

● **Conformance To European Directives**

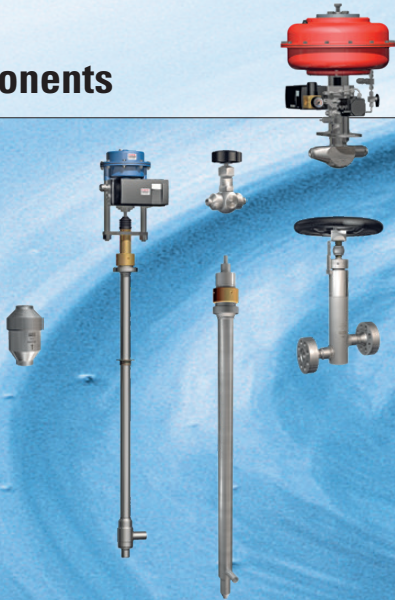
WEKA level sensors are precision-fabricated by qualified and highly experienced welders using carefully supervised methods. This guarantees that the TLI sensor stem tube and its process connection segment form a truly integral sealed assembly that meets Directive PED. Therefore it can be treated as a flanged component without the need for further certification. WEKA TLI level sensors are also conform to Directive ATEX relating to explosion protection, and therefore provide the additional advantage of zone separation in hazardous areas. Since conformity assessments for individual products are frequently modified and extended, please verify the current status of these from the latest edition of the relevant WEKA product data sheet.

● **Applications**

WEKA doesn't limit you with the standard designs cataloged here. Our experienced engineering staff will customize Tank Level Instruments to meet your specific requirements. If you do not find an answer for your application like e.g. integrated temperature sensors, explosion protection, slosh tubes, special connections, mounting elements or special materials, please contact your local representative or visit our website under www.weka-ag.ch. WEKA has accumulated considerable application know-how that is available to our customers for special applications and tailor made solutions. We have many years of experience with standards and specifications in most application areas such as chemical process industries, railways, and automotive vehicles and others.

Valves and Cryogenic Components

Control and shut-off valves
Check valves
Safety valves
Transfer line couplings
Flow meters
Ejectors



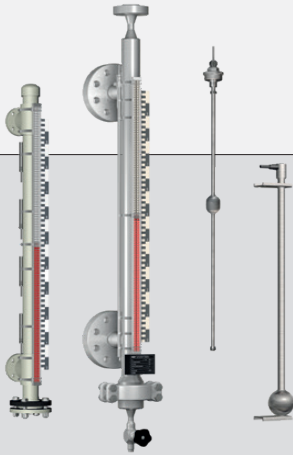
Certified according
ISO 9001

Certified according
PED

Certified according
ATEX/IECEx

Level Measurement

Bypass Visual Level Indicators
Top of Tank Visual Level Indicators
In-Tank Tank Level Indicators



Services

Engineering, development and project management
Service and Support



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