

CHEMICAL INSTRUMENTATION

APPLICATIONS FOR CHEMICAL AND
PHARMACEUTICAL INDUSTRY



OTTECO

CHEMICAL INDUSTRY

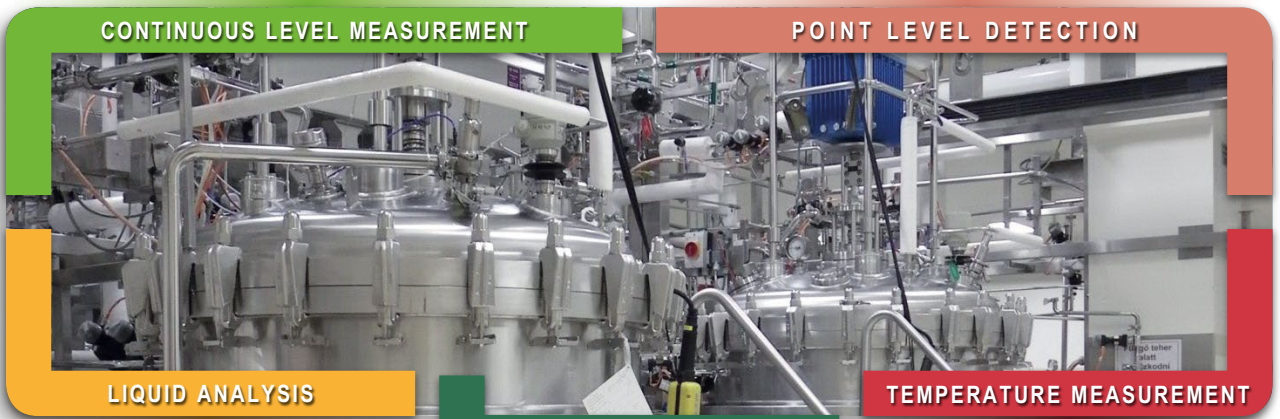
FROM ROAD SALT ... TO SULPHURIC ACID!

Instrumentation and measuring tasks of the chemical and pharmaceutical industry are covered almost fully by the wide range of NIVELCO instruments. From simple float level switches to ultrasonic or microwave radar level transmitters, from pressure transmitters to custody transfer measurement with magnetostrictive transmitters, for all applications can be selected the most suitable NIVELCO instrument with the required operating principle. Environmental and technological measurements are supported by modern liquid analytical transmitters. Instruments are also applicable for using in hazardous environment.

Field transmitters can be easily integrated to process-control systems with **MultiCONT** multichannel process controller or **NIVISION** process visualisation software.

PiloTREK	– pulse burst radar
MicroTREK	– guided wave radar
EasyTREK, EchoTREK	– ultrasonic transmitter
NIVOTRACK	– magnetostrictive transmitter
NIVOCAP	– capacitive transmitter

NIVOCONT	– conductive level switch
NIVOSWITCH	– vibrating fork level switch
NIVOFLOAT	– float level switch
NIVOPOINT	– magnetic tracking level switch
NIVOMAG	– magnetic coupling level switch



CONTINUOUS LEVEL MEASUREMENT

POINT LEVEL DETECTION

LIQUID ANALYSIS

PRESSURE MEASUREMENT

TEMPERATURE MEASUREMENT

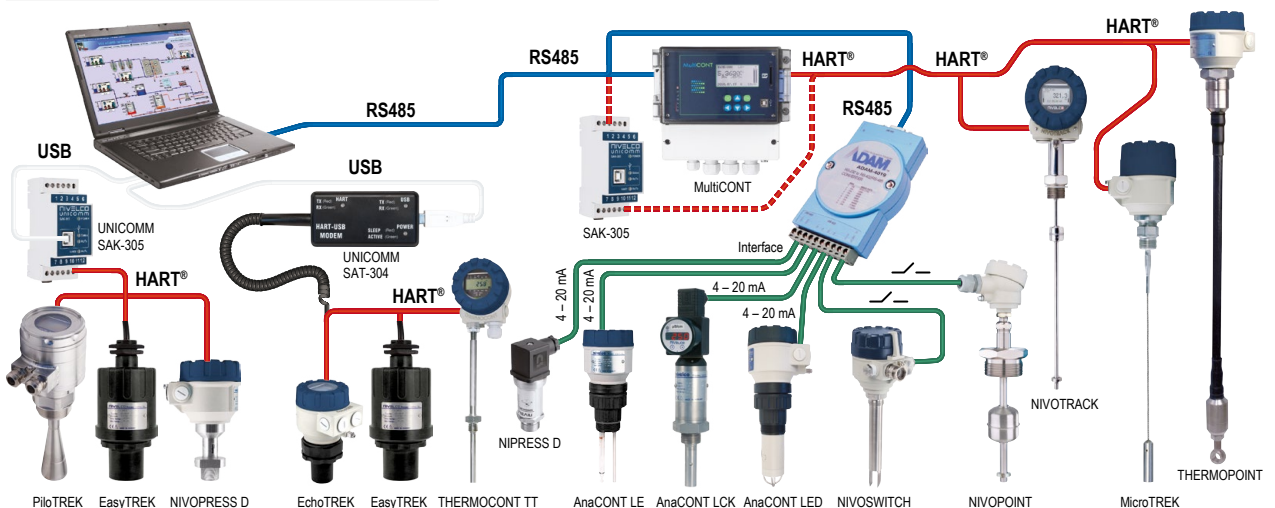
AnaCONT LEP/LER	– pH and ORP transmitters
AnaCONT LED	– dissolved oxygen transmitter
AnaCONT LCK	– conductivity transmitter

NIVOPRESS D	– hydrostatic pressure transmitter
NIPRESS D	– piezoresistive pressure transm.

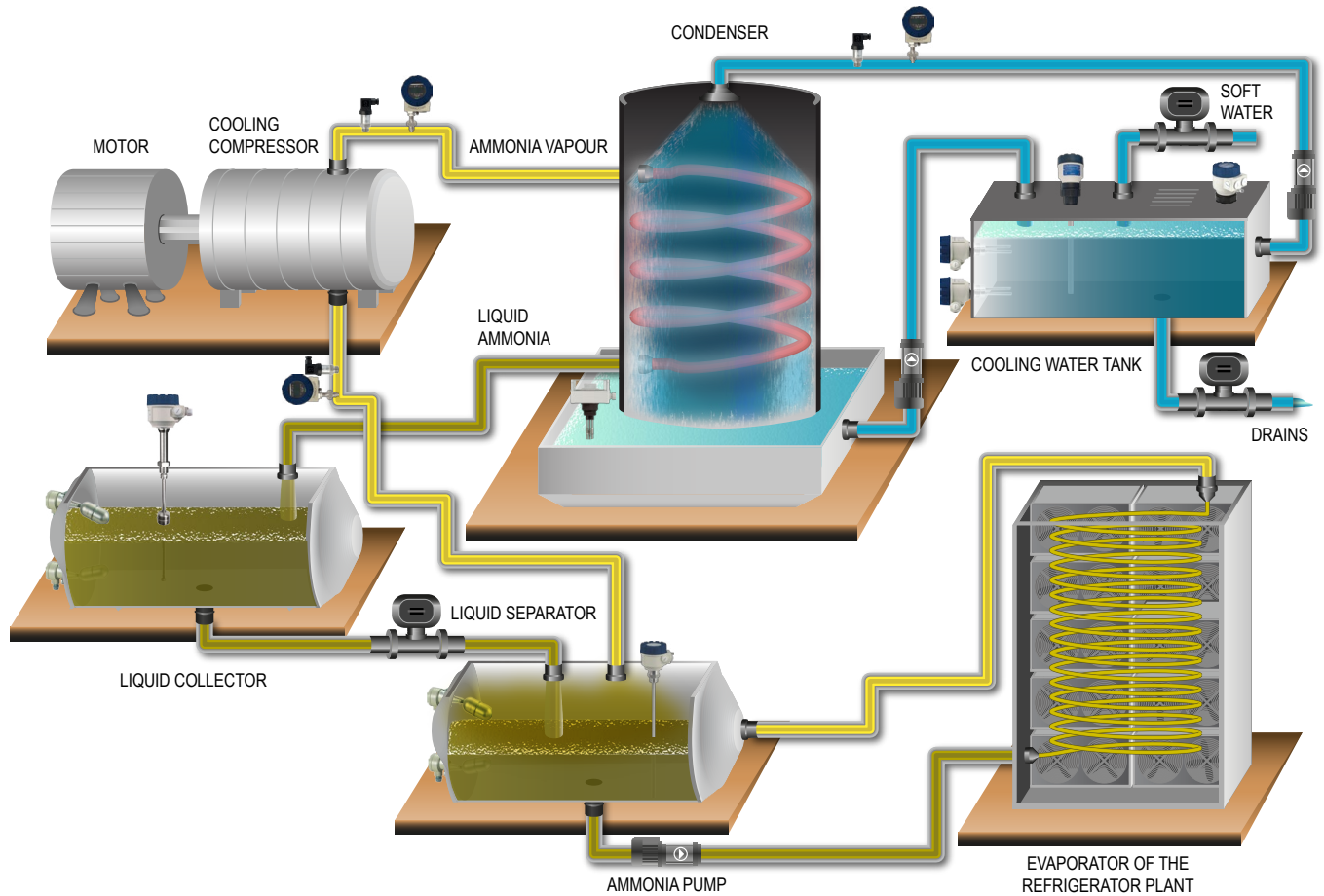
THERMOPOINT	– multipoint temp. transmitter
THERMOCONT TT	– temperature transmitter
THERMOCONT T	– temperature sensor

FIELD INSTRUMENTS IN MEASUREMENT SYSTEMS

Level and analytical transmitters can be connected to the **MultiCONT** process controller, or with the help of suitable interfaces or modems, **NIVELCO** field instruments can provide measurement results and control signals directly to the process control system. **NIVISION** software provides a perfect choice for process visualization, data collection, measurement-database management and process control tasks.



COOLING CIRCULATION PROCEDURE



COMPRESSOR AND COOL DOWN CONDENSER

The first part of a refrigerator plant using ammonia (NH_3) as coolant is the refrigerator compressor which increases the pressure and temperature of the NH_3 . The pressure measurement on the suction and pressure side is accomplished by **NIPRESS DRC-300** pressure transmitters, the temperature measurement is completed by **THERMOCONT TTJ-500** temperature transmitters. The sucking side pressure transmitter performs the power control of the compressor, while the pressure side transmitter controls the condenser. The cooling condenser turns back the NH_3 into liquid phase.



LIQUID COLLECTING AND LIQUID-SEPARATING RECIPIENT

As the ammonium level decreases in the liquid-separator tank, the necessary liquid for the process is refilled from the liquid tank. The continuous level measurement is executed by **NIVOCAP CTR-200** type capacitive level transmitter. This device controls the feeding valve applying the **UNICONT PMM-311** type controller. The upper and lower failsafe switching is executed by **NIVOMAG MKA-210** type level switches. As high level is reached the compressor shuts off, while at low level the ammonium pump is stopped.



COOLING WATER TANK

The condenser cooling water tank ensuring the cooling water for the condenser. The level measurement is accomplished with **EchoTREK SGA-300** ultrasonic level transmitter. The level is kept constant by the help of a **UNICONT PMM-311** controller by actuating a supplementary water valve. Continuous conductance measurement is executed with an **ANACONT LGK-200** type device. The conductivity of cooling water is increasing due to the evaporation in the condenser. At a predetermined value **PMM-311** controller opens the emptying as well as the supplementary valve.



GLAXOSMITHKLINE – VACCINE FACTORY



GLAXOSMITHKLINE was intended on replacing the capacitive level transmitters on the vaccine fermentors so they were searching for new instruments on the market. The fermentors play central role in the vaccine production process and considering the fact that the production system consists of one-week long cycles the primary demand was the highest possible reliability. Any measurement error or failure might result unsuccessful oneweek production cycle generating significant losses.



At least ± 1 % accuracy continuous level measurement of different pH and density liquids (for example high purity water, washing liquid, fermentation liquid) was a strict requirements against the level transmitters and the instrument must have linearization table for volume calculation. The fermentors are regularly sterilized with steam and decontaminated so the instruments have to bear 150 °C (302°F) medium temperature. The fermentors have vibrating motors so the instruments have to measure reliably during strong vibration along with the medium movement caused by the mixing.



The other essential requirement was the easy integration to the existing automation system and the high hygienic requirements involving special demands of the pharmaceutical environment. At the end of the rod probe there should be no closing element due to cleaning considerations and all wetted parts should be made from $Ra < 0.4$ surface roughness 316Ti stainless steel and full PFA coating. NIVELCO's MicroTREK HHO-412-4 type guided microwave level transmitters meet all these requirements, so GSK decided to replace the capacitive level transmitters. This special type was uniquely manufactured for the first time for this project.



AGROKÉMIA SELLYE CO. – PESTICIDE PRODUCTION



In this plant they change the properties of the pesticide agent by adding emulsifiers and auxiliary materials which make it soluble in water. This process – called EC formatting – enables pesticide agent to be solved in water and the final result is what we known as sprayable pesticide.



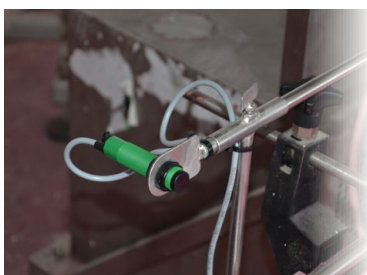
The organic solvents of the plant are stored in 10 outside laying tanks equipped with NIVOTRACK MTC-522-8 type magnetostrictive level transmitters with 1mm resolution.



Output signals of the transmitters are displayed in a MultiCONT PRC-24A-5 Ex multichannel process controller which transfers the measurement data to the NIVISION process visualization software. The software performs stock management and fills the calibration report after the comparison with the stored receipt.



Mixing of the emulsions is done in a 10 m³ (2 641 gal) vacuum tank. The filled material is measured by load cells under the tank. The temperature is measured by THERMOCONT TBC 521-8 Ex ATEX certified temperature transmitter mounted into the bottom of the tank.

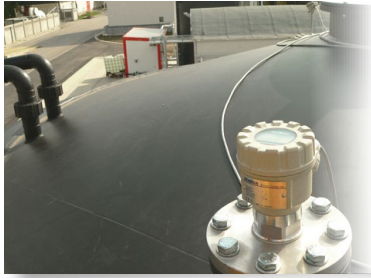


The solved medium from the mixing tank is forwarded to 2 pieces of 20 m³ (5 283 gal) so called "batch" tanks so be able to provide equal quality. Level measurement of the tanks is done by EchoTREK SGF-380-8 Ex compact ultrasonic level transmitters as well temperature is measured by THERMOCONT TBC-521-8 Ex temperature transmitters.

A sample from this tank is examined for quality control reasons and when the laboratory approves the quality of the semi-finished product then it is allowed to go packaged. Dosing machines fills the processed material into containers. Number of the containers passing through the filling line was counted by NIREL IRV-111-1 infrared sensors.



INSTRUMENT SELECTION



PiloTREK – Non-contact microwave level transmitter

- High precision level measurement of liquids, slurries, emulsions
- Plastic, aluminium or stainless steel housing
- Level measurement in high temperature and high pressure applications



MicroTREK – Guided microwave level transmitter

- Level, distance or volume measurement
- Liquids, powders, granules with $\epsilon_r \geq 1.4$
- Stainless steel or FEP, PFA, PP coated probe
- Medium with turbulent surface, dense dust, vapour
- For all tank shapes, for narrow vessels



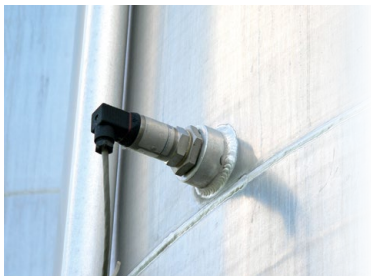
EasyTREK / EchoTREK – Ultrasonic level transmitters for liquid

- Non-contact level measurement of liquids and slurries
- Level, volume or weight calculation and display
- Tank filling / emptying control
- Open channel flow metering
- High or low fail-safe detection
- Reliable measurement in challenging applications such as vapour/fume, stirrer, and foam
- Remote programming



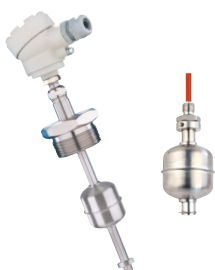
NIVOTRACK – Magnetostrictive level transmitter

- Liquids with min. 0.4 kg/dm^3 (0.4 oz/ft^3) specific gravity
- For normal or dust explosive materials
- For chemicals, solvents, hydrocarbons
- Supplementary level transmitter for NIVOFLIP magnetic flip indicator
- 99-point linearization



NIVOSWITCH – Vibrating fork level switch

- Level switch of liquids, powders, granules
- For low/high fail safe limit switch
- Relay or electronic output
- PFA coated versions for aggressive media



NIVOPOINT – Magnetic tracking level switch

- Liquids with minimum 0.4 kg/dm^3 (0.4 oz/ft^3) specific gravity
- Multi-point level switch in closed tanks
- For chemicals with dense vapour or gas layer above the surface
- For foaming liquids





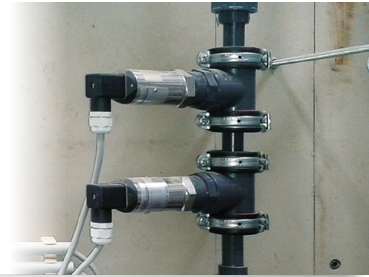
NIVOCONT K – Conductive level switch

- Electronic level switch
- For conductive liquids with min. 10 $\mu\text{S}/\text{cm}$ (10 EC) conductivity
- Separate or compact versions
- Fail-safe indication and pump control
- Water inrush indicator



NIPRESS D – Piezoresistive pressure transmitter

- Ceramic or stainless steel flush diaphragm
- Relative or absolute measurement mode
- For high pressure up to 2000 bar (29.000 psig)
- For vacuum, overpressure and absolute pressure measurement
- Environmental engineering, medical technology, laboratory techniques



THERMOCONT T – Temperature sensor

- Temperature range from -50 °C up to +600 °C (- 58 °F ... + 1112 °F)
- For temperature metering of liquids, vapours, gases
- Can be mounted to tanks, tubes, furnaces, boilers or other special technological places
- Special versions for unique applications



THERMOCONT TT – Temperature transmitter

- For normal and hazardous media
- For temperature metering of liquids, vapours, gases
- Temperature transmitting for far distances
- Temperature metering in tanks, tubes, furnaces or boilers



AnaCONT LE – pH/ORP transmitter

- Compact and integrated types
- Checking of water quality
- Water production, wastewater treatment
- Wide probe selection according to the application
- Wide range of accessories



AnaCONT LED – Dissolved oxygen transmitter

- Compact DO transmitter
- Checking of water quality
- Water production, wastewater treatment
- Wide probe selection according to the application
- Wide range of accessories

