1 Short product description

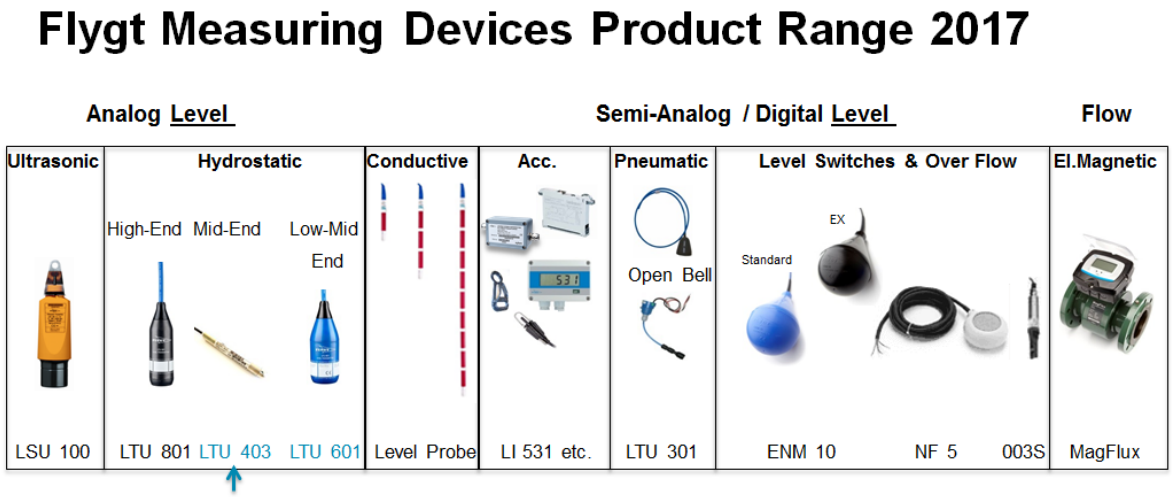
A new Mid-End Level Transmitting Unit (LTU) has been released - the LTU 403 - to compliment the level sensor product range and to replace the LTU 401.
The Flygt LTU 403 is a submersible hydrostatic level transmitting unit, intended for measuring a liquid level.

So why this release of the LTU 403?

Several reasons:

- Imroved EMC capabilities compared to the 401 that was introduced before VFDs like SmartRun became more and more common
- Requests for Modbus to be able to be included in more biddings
- A hydrostatic level transmitter at low cost but having ATEX approval
  (Note: the ATEX for LTU 403 is currently not included in this release. The ATEX has been applied for and will be finished this fall. There will then be a second release when the ATEX is in place for LTU 403 and the TS and IOM will then be updated accordingly)

The LTU 403 is setting new standards of what's possible for waste water installations and combines performance, smart solutions, ModBus with price to out match many of the competition out there.



1.1 Customer values

- Very Appealing
  - Never before have we find a Level Transmitter packed with so much for so little cost
  - Accuracy is 0,35%
  - Temperature range of -20 – 80C
  - Power supply 6-27VDC to also fit battery powered installations
  - LTU 403 has an innovative solution to eliminate the problem of zero shift (due to for example cleaning, covering or mechanical damage of the diaphragm). Just place LTU 403 in free air (zero pressure on the diaphragm) and shorten two wires for ten seconds. This action resets

the 4 mA to zero pressure (and also makes the communication to send zero level in engineering units). No other tool is needed! Remember: Correct zero value is important for the measurement performance!

- LTU 403 has ATEX approval for EX installations (*from the second release planned for this fall)*
- The aim for LTU 403 is to offer great value for the money and to be able to win many biddings

Very Flexible

- The LTU 403 starts with a standard range of 4-20mA output level transmitters but offer also two part numbers that includes both 4-20mA output as well as ModBus output
- These two part numbers are ready to be used for either 4-20mA or ModBus; all wires are there so only one part number is needed really to be able to use the level transmitter for both 4-20mA installations as well as ModBus RS 485 installations
- For the 4-20mA standard versions, we have made sure to cover many common measurement ranges and cable lengths
- For the ModBus versions (two part numbers), the pressure range is scalable via Modbus and other sensor values and parameters are accessible via Modbus RTU e.g. for installation in a fieldbus network. The turn down is 10:1 for the two ModBus versions. In other words one sensor can cover several measurement ranges which can drastically reduce the number of sensors on stock.
- The slim design with a sensor body diameter of 20mm makes the 403 fit even the most narrow of installations and makes it possible to use slimmer stiller tubes for the best protection of any submersible level transmitter. The LTU 403 is also excellent for deep water level measurement such as deep wells in mining where the installations often is in narrow spaces. The LTU 403 can measure to depths down to 400 meters water column and the PUR cable is reinforced with Kevlar and has a max tensile strength of 800 N!
- Special versions can be delivered on demand for any range within 0-0,5m to 0-400m and with up to 1000m kevlar reinforced cable! Contact me at krister.bjornsson@xyleminc.com for a Special Tender! From 1pc to any nr of pcs!
- The LTU 403 is the recommended level transmitter for SmartRun due to its slim cable design and EMC results of the noise suppressing electronics inside

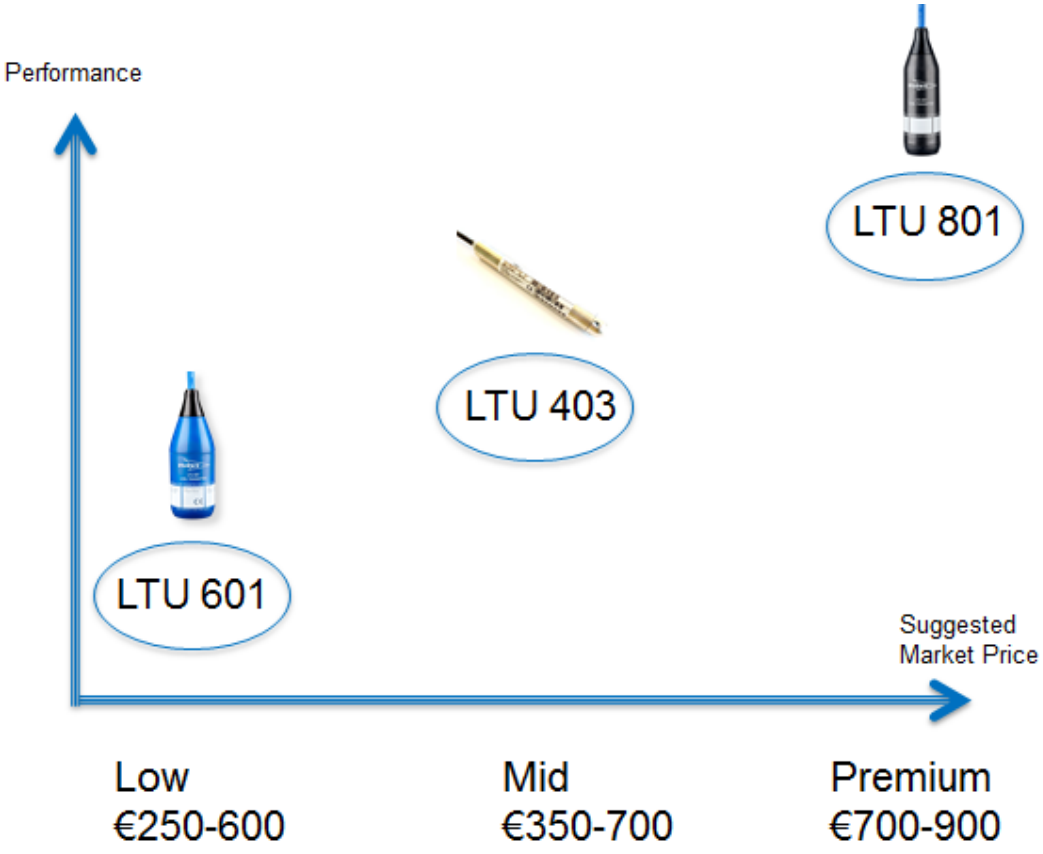
Very Service Friendly

- Innovative Autozero function as standard. Just shorten two wires.
- Redesigned protection cap for extra security when cleaning/hosing the 403 due to a clogging event in the long term perspective. Installing the 403 inside a stiller tube with holes along the length for the water to reach the 403 is recommended
- The tried and true molding technology of the big brother LTU 701 that was replaced by the LTU 801 recently, is included also on the LTU 403, meaning completely casted/molded electronics for highest possible reliability even for hydrogen sulphide.

- The preinstalled fluid filter on the other hand is there to eliminate the chances that moisture would find its way down the cable between the cores/wires and reach the molded electronics!

Sales Arguments	**Customer Benefits**
- More robust design	=> EMC prepared => Less service visits => less costs & more time for other things
- Cost effective	=> If the ModBus version is chosen, the customers have both 4-20mA output as well as ModBus output and can choose as they wish at the time of the installation from only one part nr on the shelf!
- Maintenance prepared	=> 0 point drift due to wear, deformation and corrosion can be fixed by shortening two wires => less chance of false level measurements => less replacement cases
- High performance	=> More versatile => cover more applications with less types of level transmitters

Differentiation towards the end customers



Flygt Hydrostatic Level Transmitter Range Differentiation

	LTU 601	LTU 403	LTU 801
Pricing	Low-Mid	Mid	Premium
Supply voltage range:	10-30VDC	6-27VDC	10-30VDC
Temperature range:	-10 – 60°C	-20-80°C	-20 – 70°C
Accuracy, FS:	0,5%	0,35%	0,1%
Measurement Principle & diaphragm:	Piezo/SS	Piezo/SS	Ceramic
Printed part nr info:	Yes	No	Yes
Suitability for sea water:	Yes	Yes	Yes
Heavy weight for higher chance of no effect of turbulence	Yes	No	Yes
Very large protective holes for less chance of clogging:	Yes	No	Yes
Reprogrammable Ranges:	No	Yes	Yes
Built-in surge protection:	No	No	Yes
ATEX/cUL:	No	ATEX (to come)	Yes
Auto Zero	No	Yes	No
ModBus & 4-20mA output in the same unit	No	Yes	No

1.2 Functionality

The Flygt level sensor LTU 403 is used to measure a liquid level and to give a standard 4-20mA direct current output signal, proportional to the measured level, to a control system or use ModBus communication over RS 485

LTU 403 consists of a measurement probe with the diameter 20 mm. The probe has a 316L stainless steel measuring diaphragm for high corrosion resistance. The probe are suspended in its connection cable. The cable is reinforced with a Kevlar cord and can be delivered in lengths up to 1000 m on special Tenders to for instance, deep wells in the Mining sector.

LTU 403 has a piezoresistive sensor connected to the media by means of a diaphragm. The media pressure acts on the diaphragm and is transferred to the sensor through a pressure intermediate oil. Since this oil completely fills the volume between the diaphragm and the sensor, the diaphragm movement is very small when the pressure changes. To obtain atmospheric pressure on the back side of the sensor (for reference pressure) it is connected to the surrounding through a capillary tube inside the probe cable.

LTU 403 has microcomputer-based electronics, which communicate with the outside world with 4 to 20 mA signal as well as MODBUS communication (two specific part numbers in the LTU 403 range). The electronics measure and converts the output signal from the pressure dependent sensor bridge to digital values. The digital value is converted to analog for the 4 to 20 mA current loop. The digital value (two specific part numbers in the LTU 403 range) can also be read via MODBUS communication in optional engineering units, percentage or current. LTU 403 can be configured/ calibrated fully by means of a PC via MODBUS communication (two specific part numbers in the LTU 403 range).

2 Compatibility

The LTU 403 is specifically engineered to withstand the harsh environmental conditions typically encountered by Flygt pumps: VFDs, sewage, slurry and viscous liquids as well as sea water. The LTU 403 is well adapted to the prevalent control systems on the market including, of course the Flygt range of pump controllers.

3 Approvals, testing and results

3.1 Approvals

Electromagnetic Compatibility (EMC) 2014/30/EU:
EN 61326–1, EN 61326–2, EN 61326–3

Pressure Equipment Directive:
APED 1999/AFS 1999:4

3.2 Testing

The LTU 403 has been trialed in installations in the Stockholm area and also been evaluated in the HQ laboratory according to QT-plan where issues such as high pressure hosing, EMC, impact, heat etc. have been tested and documented.

LTU 403 has been re-designed by Flygt to better fit our installations

- Flygt designed protection cap for high pressure hosing
- Flygt improved EMC electronics to for instance VFDs
- Flygt improved circuit board fit inside the 403 for the 403 to withstand a drop into concrete and other high impacts such as well walls

4 Known limitations

No known limitations.

5 Technical information/data

The LTU 403 is delivered in a complete package containing an LTU 403, cable holder and a description on how to install the level transmitter.

Technical Specifications and Installation Manual in English, French, Spanish, Swedish, German, Dutch, Croatian and Italian can be found on the site for Technical Product Information (TPI): http://oasis.xyleminc.com/tpi/tpi.asp

Range interval, m	Cable length, m	Output type with auto-zero function		Replacement for LTU401 part number	Part number
		4–20 mA	Modbus		
0 - 3.5	8	x		-	85 01 82
0 - 5.0	10	x		83 77 23	85 01 83
0 - 5.0	20	x		83 77 24	85 01 84
0 - 5.0	50	x		83 77 25	85 01 85
0 - 10.0	15	x		83 77 26	85 01 86
0 - 10.0	20	x		83 77 27	85 01 87
0 - 20.0	30	x		-	85 01 88
0 - 10.0	10		x	-	85 03 79
0 - 20.0	25		x	-	85 03 80

6 Release, Stock, Price Information and Additional Information

The part numbers will be available for order from June 2017. The 2017 IPL-pricing is shown below:

Part number	IPL Price (SEK)	Suggested End Customer Price
85 01 82	6000	€350-700
85 01 83	6200	€350-700
85 01 84	7200	€350-700
85 01 85	10200	€350-700
85 01 86	6700	€350-700
85 01 87	7200	€350-700
85 01 88	8200	€350-700
85 03 79	7400	€350-700
85 03 80	9200	€350-700

The release material can be be found on Oasis > Business Units > Transport > Launches and Campaigns > Product releases > http://oasis.xyleminc.com/en-us/Home/business-segments/transport/launches-campaigns/product-releases/Pages/default.aspx.

The release package include:

- LTU 403 product presentation
- Pictures for commercial and internal use
- Tender Specification/narrative text for the LTU 403
- Manual (TPI)
- Value Proposition
- Application Note (TPI) regarding the ModBus versions (two part numbers) and the PI MEP7 Modbus Software Kit

7 Accessories

- The upcoming xxxxxx (to be taken out) PI MEP7 Modbus Software Kit includes a software on CD-ROM and a battery powered RS 485 connection tool (modem) for connecting the LTU 403 to the PC. This allows for the ModBus version of LTU 403 to be scaled. The PI MEP7 Modbus Tool software for Windows can also be used for reading of values, configuration, calibration and documentation. The software can configure transmitter specific values and perform maintenance, output signal and factory calibration. *Note: the part number will be updated in the M&C price list when available. See http://oasis.xyleminc.com/en-us/Home/sales-support/prices/Pages/default.aspx*

RS 485 connection tool

PI MEP7 Modbus Software

- The LI 531 Field Level Indicator is an accessory for the indication of the measured level

• 3½-digit easy readable LCD display.
• Delivered as a complete digital indicator in IP65 plastic cabinet
• Supplied from 4-20 mA current signal
• Internal calibration of zero and span with optional placing of the decimal point

Calibration and adjustments are done on the back of the indicator.

Usage of LI 531 demands no need for measuring or test equipment.

- The junction box is an accessory for connecting the Flygt range of analog level sensors: LTU 403, LTU 601, LTU 801 and LSU 100 to a Flygt pump controller. It provides flexibility in both new and existing installations, it is easy to use and install and it has a sturdy aluminium casing to withstand harsh environments. The enclosure's protective rating of IP 67 makes the Junction Box suitable for mounting outdoors.

The junction box further more provides solutions to several practical issues:

- Provides protection for splicing the sensor cable, with extension of the screened control cable to the RTU, including branching of the vent tubing in the sensor cable.
- Lightning protection by means of a surge arrester.
- Noise/interference protection in VFD applications.
- Testing the sensor setup, by means of an internal power control LED.

- Spare cable holder in galvanized steel for cable diameter 6-10,5mm. Suitable for Hydrostatic level Transmitters like LTU 403, LTU 601 and LTU 801.

Note: The sensor cable has to be supported without any sharp bends to prevent blocking the small air hose inside.

- Installations in EX-applications must be done in accordance with local rules and regulations.

Intrinsically safe circuits are required for the automatic control system. - Use an EX-safety barrier (e.g. Flygt Part. no. 843055).