INSTRUCTION MANUAL

UVKSZ1

Servo level, density and interface measuring gauge

Type number: 150-0-□□□-□

Software version: V2.2

Serial number:

Date of manufacturing:

April 16th 2002

Serial number on the instruction manual and on the product must be identical

The instruction manual contains 26 pages

Dear User,

You are recommended to read through this instruction manual, before installing this device. For personal and material safety, and for the optimal efficiency of the appliance, the instruction manual should be got to know before installing, using or maintaining.

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1. FUNCTION

This appliance is suitable for the precise measurement of fluid level, density and interface level. It is also possible to program two measuring levels, and within this, the signaling or controls electric circuit of the two lower and the two upper levels can be set at will.

The interface measurement is the measuring of the common level of two, non-mixing fluid with different density, existing in the same tank (e.g. water-petrol, water- mineral oil). The unique construction of the device -with keeping precision- enables to use fluid lock, that prevents the damaging materials from getting up to the compartment of the measuring drum. E.g. water steam, as getting up to the compartment of the measuring drum could cause icing, and that can put the instrument out of order.

It comes from the operational principle of the appliance -opposed to other known devices- that the perception/leading of the changes in level and density does not take a part in creating signs. The moving of the measuring drum, the magnetic coupling, the mechanical apparatus, the frictions of bearings, causing hysteresis are independent from the sensor. These characters have an effect on mainly the precision and the accuracy of the measuring.
These are unique characteristics, as well as the innovation that the measuring wire, moving vertically up and down at the same place, in the center of the fixing edge. In this way at accurate measuring the thermometer (average thermometer; fitting in the perforated vertical pipe that holds the instrument, existing in the tank) does not disturb the operation of the displacer.
In this manner it is possible to apply:

-measuring wire leading unit and fluid lock for the advantageous service of the plant′s operation,

-the appropriate measuring wires (∅0.3, …)

The appliance is suitable for:

-the transmission of the measured data to the checking center, and

-the switching over stages, different from the center,

through its built-in encoder and leading unit.

Local operation of the servo level gauge, closed by authorities is also possible through magnetically coupled serviced channel. The checking of the instrument and the switching over different functions can be done at the place of fixing, without opening the housing and using the central computer.

The structure and system, introduced above (also included the central computer) ensure that the sealed appliance can not be manipulated from outside; constants, parameters, inner calculations (parts of certifying) can not be changed through the computer, only after opening the seal.

If the perforated vertical pipe (built in the tank), the lower and upper calibration levels are worked up, as it is prescribed by EN, the instrument guarantees conditions, certified accounts and measuring.

The central computer has a direct connection (without intermediate processors, transforms, and units) with the servo level gauge that supplies data. The computer just gives directing ordes, asks for data, calculates from the received data and it shows them according to the claim of the user (e.g. according to the requirement of duty accounts).

All instruments are manufactured in explosion proof construction: the servo compartment has an explosion proof housing, the safety of the electric connection compartment is increased. With this construction, the appliances are suitable for being built in oil, gas, and cleaning, chemical tanks. Of course the instruments also can be applied where there is no explosion danger.

The Hungarian Authorities for Measures (OMH) did the inquiry of the instrument and as a result of that it issued the certificational permission.

As a result of this, the appliances (used for measuring, that linked with legal effect) must be certified by OMH, as it is written in the report of the inquiry.

2. THE CONSTRUCTION OF THE SERVO LEVEL GAUGE

The precise determination of the length of the lowered measuring wire is accomplished by the incremental, patented, optical code transmitter, that is fixed onto the magnetically coupled shaft of the calibrated measuring drum of the servo level gauge. The power, occurring in the measuring wire and the changes of this power (which changes because of the lifting power, that has an effect on the displacer) are processed by a very precise, temperature and linearity compensated force measuring unit. The DC servomotor that rotates the measuring drum is controlled by the deviation of the measured and the pre-adjusted (belonging to every single operating function) force values. The processing of the sign of the

encoder, the required measuring wire compensations, the conversation of data into a form that can be transmitted, and the processing of the orders of the computer occure in the built-in central microcontroller. The data of level and density can be directly read from the built-in display. The fitting unit (use for data transmission) enables to send data within max. 1.2 km, in a current loop, in the code system RS485 MODBUS. An overvoltage protecting unit ensures the safety of the input and output channel. Local operation of the servo level gauge (closed by authory), is also possible through magnetically coupled service channel. The checking of the instrument and the switching over different functions can be done at the top of the tank, without opening the housing and using the central computer.

3. PRINCIPLES OF OPERATION

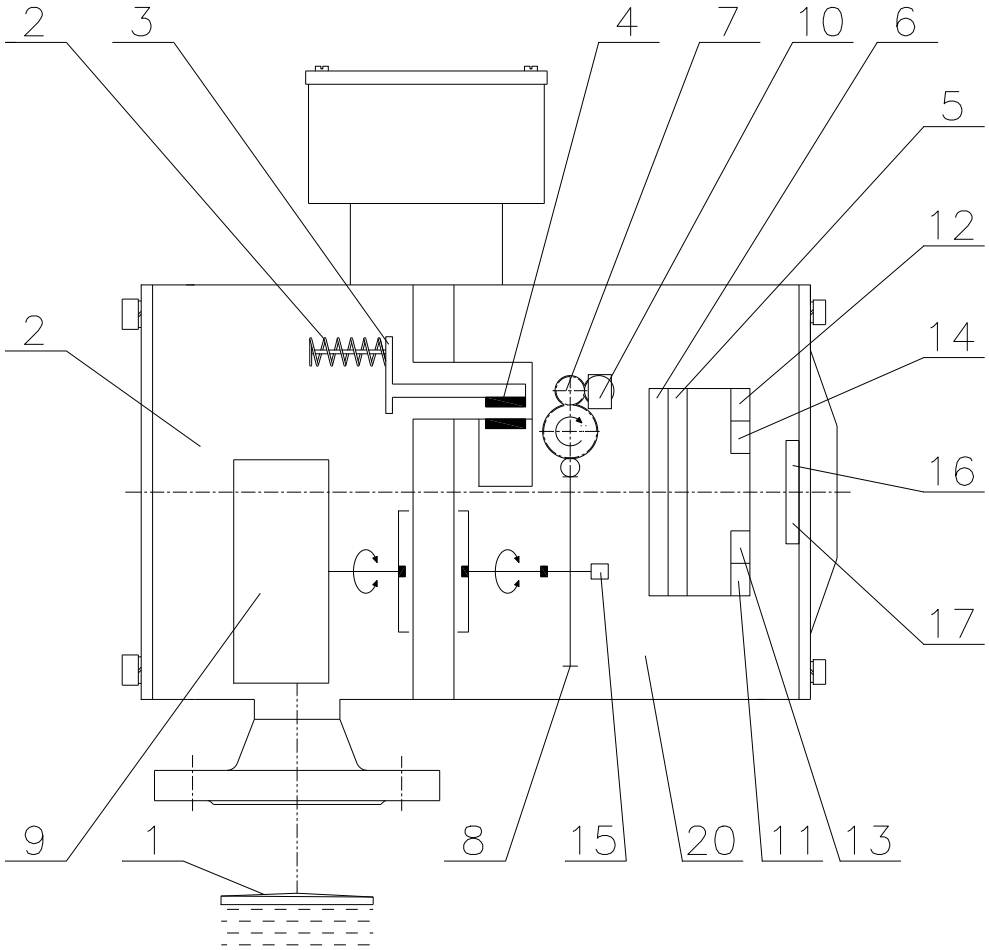
3.1. Level measurement

The appliance operates with the following regulation principles. The measurement of fluid level is analogous, that is shown by the register of the instrument and it is transmitted to the central data collector, after it was transformed into digital by the intelligent encoder of the device. The regulating circuit in the appliance has an integrating character. The operation can be followed on the conceptual drawing (see Figure 1.). At the change of the fluid level, the (1) displacer, balanced by a (2) spring at hanging on a measuring wire, that is led through a directing roller from the (9) measuring drum, moves and turns away the (3) arm which is on the shaft in the (21) technological compartment. The change of the force (that occures on the (3) arm) is transmitted to the (4) electric force transducer by the pushing bar in the (20) servo compartment The electric sign of the (4) electric force transducer is the input of the (5) servo amplifier. The (5) servo amplifier directs the (6) motor controlling unit, compared to the base signal to re-establish the balance. So it makes the (7) motor work according to directions of the changes of level.

The (7) motor rotates the (9) measuring drum (coupled magnetically to the saft of the screw-wheel) through (8) screw gear until it re-balances the (3) arm with the transmission of the measuring wire.

The (7) motor makes the (10) level value display and the (15) encoder through a transmission, so it's motion is in harmony with the turn of the (9) measuring

drum. The measured level can be read on the (10) display at 0.1 mm precision (mechanical, inner level value display). The user is able to read off the level (and density data through the window of the servo level gauge from the (16) electronic display at 0.5mm precision).



1 - Displacer
2 - Spring
3 - Arm
4 - Force transducer
5 - Servo amplifier
6 - Motor controlling unit
7 - Motor
8 - Screw gear

9 - Measuring drum with wire
10 - Level value display (inner mechanical)
11 - Lower level switch
12 - Upper level switch
13 - Lower safety level switch
14 - Upper safety level switch
15 - Encoder
16 - Electronic display
17 - Density display
20 - Servo compartment (explosion proof)
21 - Technological (drum) compertment

3.2. Density measurement

At density measurement the appliance gets into a force measuring condition, after directing the (1) displacer to the required level in he stored fluid and then disconnecting the servo system.

The (17) density display shows a density value, that depends on the fluid density and is proportional of the lifting force, having an effect on the displacer. Its value is calibrated 0-1000kg/m3 on the (17) density display.

The (16) electronic display shows the height position of the displacer as well.

3.3. Interface level measurement

At interface measurement the displacer sinks into the thicker substance, after it knocked against that substance. The depth of the sinking depends on the weight of the measuring wire, that burdens the displacer.

4. SPECIFICATION

Main technical characteristics

Measuring range	0...20,000 mm 0...30,000mm
Measuring accuracy	better than ±1 mm
Sensitivity	better than ±0.2 mm
Resolution	0.5 mm

Accuracy of interface measurement	better than ±2 mm at min. 150 kg/m^3 density difference
Accuracy of density measurement	better than ±5 kg/m^3
Follow up speed	about 800 mm/min
Power supply	48 V^{+10}_{-15}% 50/60 Hz
Power consumption	<25 VA
Ambient temperature	-20...+55°C (EExd); -50...+60°C opt
Electric contact class	III.A
Protection class	IP 65 (IEC 529)
Explosion proof protection	Eex de[ia] IIB T6 (EN 50014; 50018; 50019:1992)
Approvement number	06 ATEX 007 X
Relative humidity	30...90%
Storage temperature	-55...+70°C
Mass	about 16.5 kg
Flange size	NA 40

Construction

Material of drum compartment	SST X15CrNiMo 1812
Pressure range of drum compartment	1 bar; 6 or 16 bar optional
Material of drum, drum shaft	AiSi 316 (1.4401)
Material of measuring wire	AiSi 316 (1.4401)
Material of servo compartment	SST X15CrNiMo 1812

Safety switches

2-2 relays
-Type: M3 – 5H Meiser
-Material: Ag-Pd
-Lifetime: 500,000 switching /1A24V DC
-Loading: max. 1A 24V DC, 0.5A 120V AC

Data transfer

Code	serial RTU
Data transfer speed	between 1200 Baud and 115200 Baud
Data safety	CRC
Isolation voltage	500 V_{eff}
Lightning protection	including active components and transformers
Data transfer distance	1200 m (R_{max} 100 ohm C_{max} 100nF) twisted pair

Recommended cable	according to EIA RS-485: ♦ twisted pair ♦ shielded ♦ 24AWG cross section ♦ nominal capacitance: 42 pF/m ♦ nominal impedance: 120 ohm
Receiver	PC
Transferable total measuring range	32,000 mm with 0.5mm resolution
Encoder	free of contact
Data transfer error	less than 0.5 mm between the measuring instrument and the PC

Reference circumstances

Power supply	48 V ± 5% 50Hz
Ambient temperature	20± 5°C
Density of the fluid	
- at level measurement	800 kg/m^3
- at density measurement	1000 kg/m^3
- at interface measurement	oil-water but mean 150 kg/m^3
Diameter of displacer	100 mm

Cable connection

Two pcs. of stuffing box are available on the side of the connection compartment to install the power voltage cables (Pm 16), code- and signal transmission (Pm 13.5). The Ex type cable clampings are suitable for installing cables. Installing should be done according to the prescription on the cover of the connection compartment. The cables should be fixed on the place of installing to avoid pulling. Only copper wire should be used for installing with 0.5-2.5 mm2 cross-section. Cable sleeve should be applied at stranded copper wire.

The influence of changes in temperature on measurement

The length of the measuring wire changes at the effect of changes in temperature. If the servo level gauge is fixed on the top of the perforated vertical pipe (made from the same materials as the measuring wire), the length-change of the measuring wire, caused by the change of temperature, is compensated.

Error from density change

Error caused by the change of wire length is compensated for 800 kg/m^3 density. If the density deviates from the above value, the additional error can be calculated:

$$\Delta l = \left[x_0 + \frac{1i\ m_h}{A_0 \rho_0} \right] \cdot \frac{\rho_0 - \rho_1}{\rho_1}$$

Δl:	additional length error	[m]
$x_{o:}$	immersion of displacer on the upper level	[m]
$l_{i:}$	distance between the upper reference level and the measured level	[m]
m_h:	mass of 1 m wire (0.332 g of ∅ 0.23 mm wire)	[g]
A_o:	cross section of the displacer at the fluid surface	[cm^2]
ρ_o:	reference density	[g/cm^3]
ρ_1:	density on the surface of the fluid	[g/cm^3]

For example: x_0=0.1 cm; l=10 m; m=0.332 g (0.23 mm measuring wire)
A=78,5 cm^2 (∅100 mm displacer)
ρ_0=0.8 g/cm^3; ρ_1=0.9 g/cm^3

$$\Delta l = \left[0{,}1 + \frac{10 \cdot 0{,}332}{78{,}5 \cdot 0{,}8} \right] \cdot \frac{0{,}8 - 0{,}9}{0{,}9} = 0{,}0169\ cm$$

Consequently, the density increased, so the displacer also rises from the fluid with 0.16 mm.

Additional errors at interface measurement

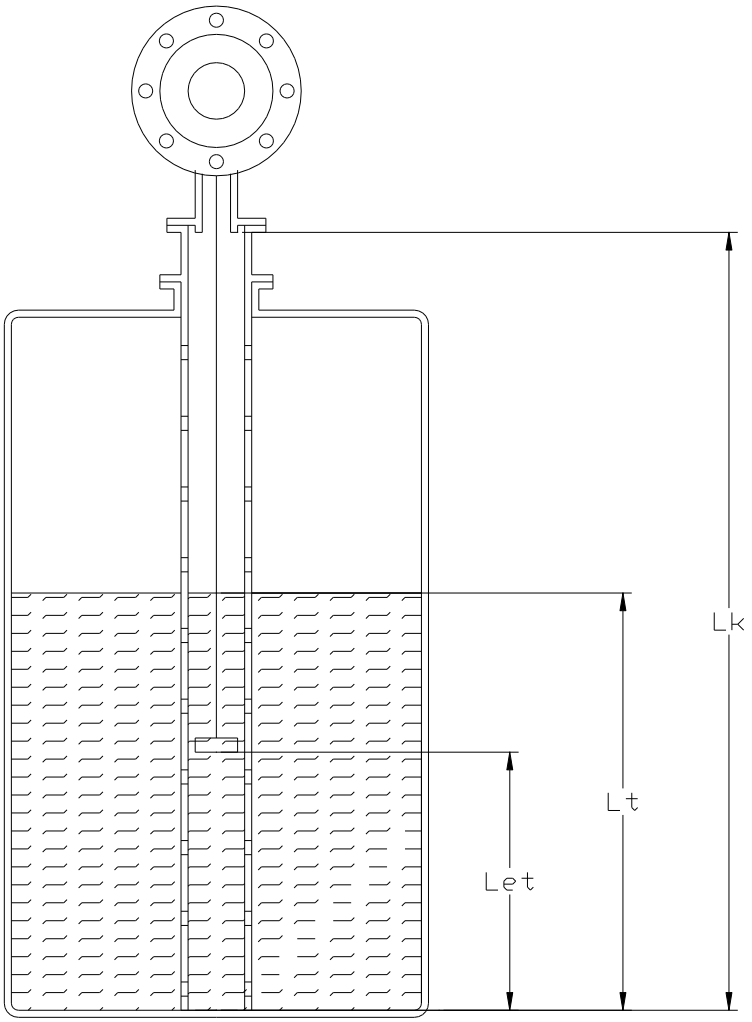
The change of the wire length caused by temperature change: see additional errors at level measurement.

The effect of temperature change for measurement: see additional errors at level measurement.

Correction at level measurement: $(l_k-l_{ét})$x0.0869/m

The calculation of correction value at height of displacer, with respect of the unreeled wire $(l_k-l_{ét})$:

$$H_h[mm]=0.056x(l_k-l_{ét}) \ [m]$$



5. THE OPERATION OF THE SERVO LEVEL GAUGE

The level gauge can be operated manually in the place of installation or through remote control of the data acquisition and display computer. (see. chapter 1 . and 2.)

After the installation of the level gauge, the displacer and cables, the power supply should be turned on. After that the following initialization steps are done by the appliance automatically:

- Calibration data is read from EEPROM memory by the microcontroller.
- The upper reference level is searched and the level counter is cleared.
- Switch to normal mode and the actual liquid level is searched.

Operating modes of level gauge

5.1 Normal mode (level measurement)

After initialization, the level gauge is ready and measure the liquid level continuously which can be read from its display (LCD) in 0.5 mm units together with the tank number (figure 5). As soon as the displacer reached the surface of the liquid, the limit checking is switched on to check the reaching of the two low and high limit levels with the operating of the appropriate relays (see MODBUS registers table). After leaving this mode, the limit checking is turned off, but the relays remain in the state before.

Three other mode can be reached from this mode:

- manual control,
- service mode,
- remote control.

The manual control can be done even in explosion dangerous area with a special device (a magnet). With this magnet, four switches („buttons”) can be operated („pushed”) which form a menu system. The function of the buttons can be seen in the display except for in normal mode. In the normal mode these can be seen in figure 3. To push a button, insert the magnet for a second into the slot in the house of the device.

Manual operation of the level gauge

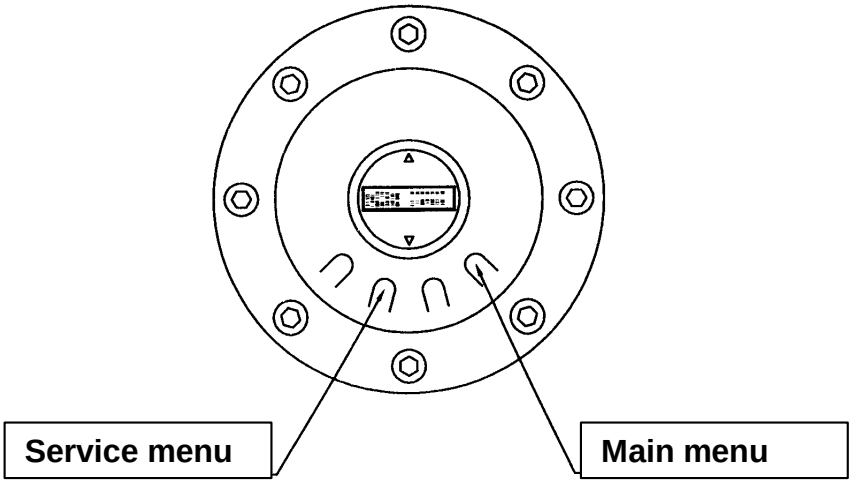


Figure 3
Buttons

Manual control

In the normal mode the right most button activate a menu system (main menu) to select from the following modes:

- Level measurement (SZT)
- Moving of the displacer up and down (MZG)
- Density measurement (SUR)
- Interface level measurement (HAT)

The display can be seen in the following figure:

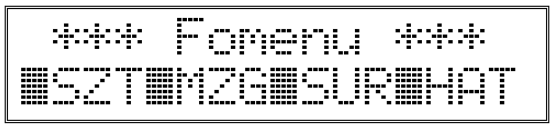


Figure 4.
Main menu

Level measurement (SZT):

After pushing button „SZT” (level measurement) the appliance return to normal mode, where the liquid level is measured and displayed in 0.5 mm unit continuously.

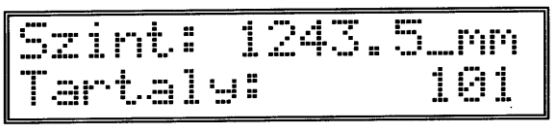


Figure 5.
Readout in normal mode

Moving (MZG):

Pushing of this menu button activates the following submenu:

- Return to previous menu (<<<)
- Down (LE)
- Up (FEL)
- Stop (STP)

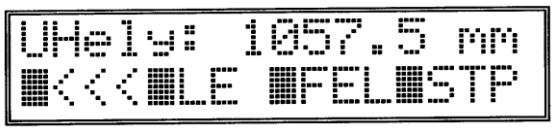


Figure 6.
The moving submenu

Density measurement (SUR):

To measure the density of the liquid, firstly we should measure the liquid level selecting menu button SZT. After that we should move the displacer to the required level where we want to measure the density with MZG. And only after that we should select SUR to density measurement.
The density can be read from the display in kg/m^3 unit.

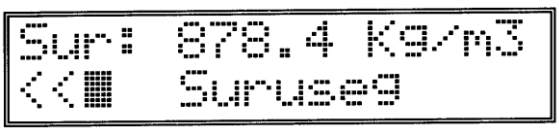


Figure 7.
Density measurement

Interface level measurement (HAT):

Selecting this menu command. The interface level between two liquids with different densities can be measured if they are separating well.
Before interface level measurement, it is recommended to measure the density at different heights to be able to determine that there are two liquids with different densities in the tank.
The interface level is displayed in mm unit.

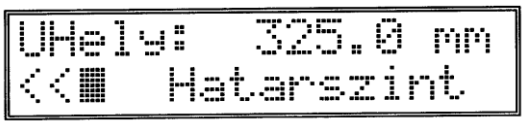


Figure 8.
Interface level measurement

5.2 Service mode

In the normal mode the second button from left activates a menu system (service menu) to select from the following modes:

- Return to normal (level measurement) mode (<<<)
- Calibration of level gauge (KAL)
- Reading of MODBUS registers and peripheries (OLV)
- Moving of the displacer up and down (MZG)

Figure 9.
Service mode

Calibration (KAL):

Pushing of this menu button activates the following submenu:

- Return to previous menu (<<<)
- Lower Reference search (A-U)
- Upper reference search (F-U)
- Reserved for future use (---)

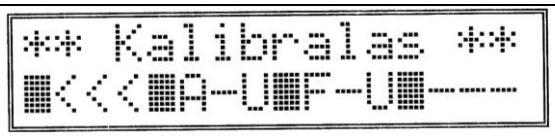


Figure 10.
The Calibration submenu

The calibration of the level gauge must be done in the following order with these menu commands. *The order is very important for the proper operation!*

1. Select Upper Reference Search (F-U). The instrument is search the upper reference level, moving the displacer to reach the upper reference plate. After that it is displays the Upper reference height (FRef). (*It is not the same as the height of the upper reference plate from the bottom of the tank!*) Save the result with pushing button MNT. (Figure 11.). „Saved!!!" is displayed, then we return to the calibration submenu. (The „<<<" button returns to the calibration submenu without saving.)
2. Select Lower Reference Search (F-U). The instrument is searching the lower reference level, moving the displacer to reach the lower reference plate. After that it is displays the Lower reference height (LRef). (*It is not the same as the height of the lower reference plate from the bottom of the tank!*) Save the result with pushing button MNT. (Figure 11.). „Saved!!!" is displayed, then we return to the calibration submenu. (The „<<<" button returns to the calibration submenu without saving.)

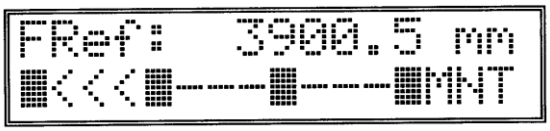


Figure 11.
Upper Reference Search

Read (OLV):

The MODBUS variables and the peripheries can be read using this command. The FEL/LE buttons moves the list up/down, the <<< button returns to previous menu, the CSP selects between the following three groups:

- *MODBUS 3x Variables.* Displays the read only variable group (See also the table in chapter MODBUS registers)
- *MODBUS 4x Variables.* Displays the read and write variable group (See also the table in chapter MODBUS registers)

- *Peripheries.* The operation of the ADC and DAC can be checked. When we go to the variable DAC, the displacer should be remaining in the same position if the ADC and DAC operate well.

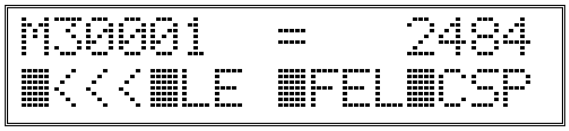


Figure 12.
The Read submenu

Moving (MZG):

Same as in manual control.
The operating modes and the menu system of the level gauge can be seen in figure 13.

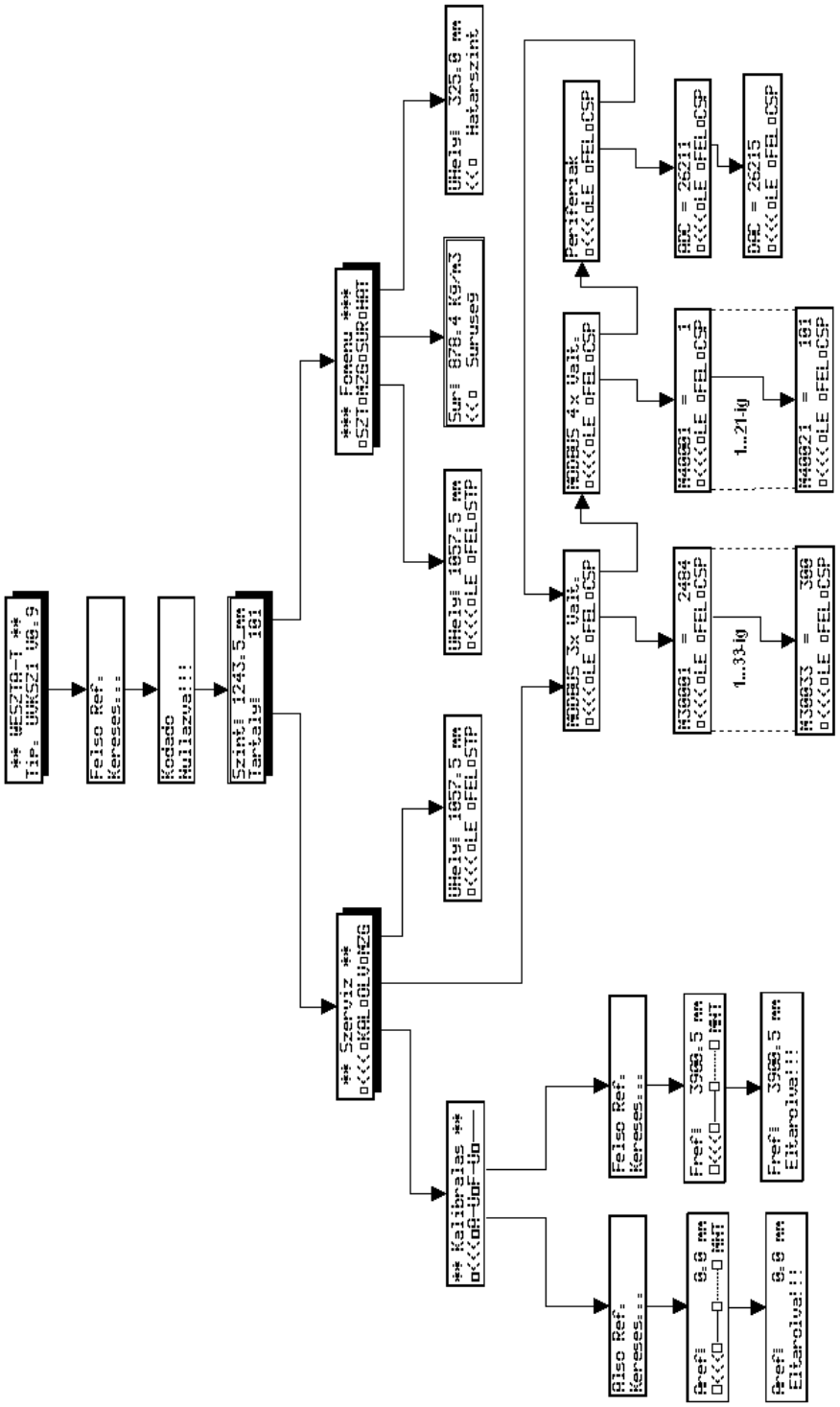


Figure 13.
The operating modes and the menu system of the level gauge

5.3 Remote control of level gauge

The level gauge can be controlled remotely from a PC through RS485 serial port with MODBUS messages.
Reading the data of level gauge can be done in every mode, but remote control can be done only from normal mode. During processing of the remote command „Remote Control" can be read from the display. During this manual operation is not possible.

Properties of data transmission:

- MODBUS RTU protocol
- The elements of the frame: 1 start bit
  8 data bits
  2 stop bits
- CRC (Cyclic Redundancy Check) error detection.

Formats of MODBUS messages:

Start	Address	Function	Data	CRC	Stop
T1-T2-T3-T4	8 bit	8 bit	n x 8 bit	16 bit	T1-T2-T3-T4

Implemented MODBUS Register groups:

- 3x Read only registers
- 4x Read and write registers

Implemented MODBUS Function codes:

- 03 Read Holding Registers
- 04 Read Input Registers
- 06 Preset Single Register
- 16 Preset Multiple Registers

The MODBUS registers of level gauge

F	Log. Addr.	Ph. Addr.	Length	Description	Name	Factor	Unit
3x (04)	30001	0000	2byte	Level	SZINT	0.5	mm
	30002	0001	2byte	Density	SURUSEG	0.03815	kg/m3
	30003	0002	2byte	Displacer Position	UHELY	0.5	mm
	30004	0003	2byte	Status	STATUS		
	30005	0004	2byte	Error Register	HREG		
	30006	0005	2byte	Rope force	EHOM		
	30007	0006	2byte	Reference height	THEIGHT	0.5	mm
	30008	0007	2byte	Displacer number	USORSZ		Év/No.
	30009	0008	2byte	For internal use only			
	30010	0009	2byte	Displacer weight	UTOM	0.01	g
	30011	0010	2byte	Displacer volume	UTERF	0.01	cm3
	30012	0011	2byte	Rope weight	KSULY	10-6	g/cm
	30013	0012	2byte	For internal use only			
	30014	0013	2byte	Rope diameter	KATM	10-5	mm
	30015	0014	2byte	Softver version	SVER	0.1	Num
	30016	0015	2byte	Gauge identifier	GIDEN		Év/No.
	30017-30022	0016-0021	16byte	Guage type	GTYPE		
	30023	0022	2byte	For internal use only			
	30024	0023	2byte	For internal use only			
	30025	0024	2byte	For internal use only			
	30026	0025	2byte	For internal use only			
	30027	0026	2byte	For internal use only			
	30028	0027	2byte	For internal use only			
	30029	0028	2byte	For internal use only			
	30030	0029	2byte	For internal use only			
	30031	0030	2byte	For internal use only			
	30032	0031	2byte	For internal use only			
	30033	0032	2byte	Lower Reference height			
4x (03/06/16)	40001	0000	2byte	Command Register	FUNCR		
	40002-40011	0001-0010	20byte	Parameter array[10]	FUNCP		
	40012-40020	0011-0019	8byte	Not used			
	40021	0020	2byte	Tank identifier	TIDEN		
	40022	0021	2byte	Emergency high limit	LHIHI	0.5	mm
	40023	0022	2byte	High limit	LHI	0.5	mm
	40024	0023	2byte	Low limit	LLO	0.5	mm
	40025	0024	2byte	Emergency low limit	LLOLO	0.5	mm
	40026	0025	2byte	Communication parameter	CADDR		

The maximum number of registers can be read with one MODBUS message: 10. Registers after address 40021 is stored in EEPROM, so they must be written with separate MODBUS messages.

Commands and its parameters:

Command	Parameter[20]	Description
0		STOP
1		LEVEL MEASUREMENT (NORMAL MODE)
2	Required position[0]	GOTO POSITION
3	Required position[0]	DENSITY MEASUREMENT
4		INTERFACE LEVEL MEASUREMENT
5		UPPER REFERENCE SEARCH
6		LOWER REFERENCE SEARCH
7		ENABLING LIMIT CHECK
8		DISABLING LIMIT CHECK
9		FOR FUTURE USE

The command code should be written into register 40001. The command code defines a state, in which the level gauge remains until it got a different command code.
The parameter belongs to command 2 and 3 (required displacer position) should be written into register 40002 in 0.5 mm unit.
Commands 5 –8 are service commands. Command 7 and 8 are for check the limit relays. They are active only for the first Command 1 (level measurement) which enables the limit checking again as soon as the displacer reach the surface of the liquid.

The level register (SZINT)

At Initialization (STATUS.I = 1) this register is 0. After initialization the level gauge switch to normal mode and the RT bit of STATUS register shows when the value of the level register is real time: STATUS.RT=1 (the displacer is on the surface of the liquid). After changing mode, the register store its value (the last valid level), but no longer real time STATUS.RT=0.

Displacer position register (UHELY)

The actual position of the displacer. It is refreshed in every mode. During initialization (STATUS.I = 1) it is not valid!

Density register (SURUSEG)

After initialization, it is 0. It is refreshed during density measurement and stores its value until next density measurement. It is important, that before a density measurement the level (SZINT) register contain a valid level.

Status register (STATUS)

I	RT		ER			M1	M0	F7	F6	F5	F4	F3	F2	F1	F0

I: Initialization is in progress
RT: The level is real time (refreshed)
ER: Emergency levels are monitored (relays will switch)
Mode bits: M1:M0
M1:M0 = 00 - Normal mode (level measurement)
01 - Manual control (Manual button is pushed)
10 - Service mode (Service button is pushed)
Command bits: F7:F0
Same as the command codes of the Command register.

Error register (HREG)

													FM	QB	ED

ED: EEPROM Data error
QB: Quadruple board is not responding
FM: Force measurement error (ADC error or the force board is not calibrated well)

This register contains the Rope Force in 0.01g unit after the initialization, in Density measurement mode. This information used only during the calibration of the device, bear no importance for the user.

The Error register should be checked only in Normal (Level measurement) mode after initialization by the user program!

Communication parameter register (CADDR)

MODBUS address [16:8]	Baud Rate [7:0]

The MODBUS address: 1 – 255.

The Baud Rate can be set according to the following table:

CADDR[7:0]	SW[3:1]	Baud Rate
0	000	1200
1	001	2400
2	010	4800
3	011	9600
4	100	19200
5	101	38400
6	110	57600
7	111	115200

The communication parameters should be changed in the following steps:

1. Write the new communication parameters into the CADDR register.
2. After that (5 sec) the instrument will communicate with the new parameters.

In case of losing communication with the device after the change, it is possible to read the actual parameters in the device using the manual MODBUS register read menu.

The communication parameters can also be set in the communication board using DIL switches after removing the front cover with the following steps:

1. Turn off the appliance.
2. Remove the front cover.
3. Pull out the electronic after releasing the screw of the telescope holder.
4. The communication board is the uppermost board of the electronic unit with the label of „RS485 Communication Board”.
5. The DIL switch is on the right side of the board. Set switch 4 to ON. Set Baud rate with switch 1 – 3 according to the SW column of the previous table (0: OFF, 1: ON).

6. Turn on the appliance and write the new communication parameters into CADDR communicating with the device using MODBUS address 1 and the Boad rate set by the switch.
7. Turn off the appliance.
8. Set switch 4 to OFF.
9. Reassemble the electronic unit and the cover.

If even after this last procedure cannot establish the communication with the device, please contact with the manufacturer.

6. RANGE OF TYPES

Designation: UVKSZ1 Level, density and interface level measuring instrument

Type: 150 - □ - □ □ □ - □ /K

Design of gauge	
0	Normale casing
2	Avarage temperature transmitter directly connected to the level gauge

Pressure range	
1	Normale pressure
2	High pressure

Ambient temperature °C	
1	-20…+60
1	-50…+60

Measuring functions	
1	Level measuring
2	Level, interface level and density easuring

Level limit switches	
0	missing
1	1 upper limit
2	2 upper limit
3	1 lower limit
4	2 lower limit
5	1 upper, 1 lover limit
6	1 upper, 2 lower
7	2 upper, 1 lower
8	2 upper, 2 lower

Individually ordered units

Measuring wire

Material of the measuring wire: stainless steel

Execution of the measuring wire:

∅ 0.3 mm wire for refined products

Calibration compartment

Fluid lock

Coupling of the average thermometer

7. INSTALLATION

The instrument contains all level data referring to the tank, so nothing needs to be set at the cover of the tank. The servo level gauge may be plugged after it was fixed on the tank, the displacer was fixed on the measuring wire and the wiring was accomplished. You should make the appliance work according to the 5th chapter. You should take care of that the belonging servo level gauge should be fixed on the appropriate tank (calibration data). The data plate also contains the technical characteristics of the instrument.

8. PACKING

The instrument is in a wood or paper box. The packing materials inside the box ensures safety and they protect the appliance at transportation by railway or car. Before unwrapping, it has to be sure, that there are no marks of injury on the package.
The instruments in unopened should be stored in a covered place. After unwrapping, the appliances should be stocked in a non-polluted, closed place at 30-90% relative humidity.

9. GUARANTEE

Weszta-T Kft. undertakes an 18-month guarantee from delivery and a 12-month guarantee from installation.

These guarantees end, if the user opens the sealed device within this time, accomplishes untechnical operation or maintenance.