PIG DETECTORS ULIS-A.04&ULIS-A.04-01
ENERGOFLOW AG

OPERATION MANUAL
636128.062 OM

2024

CONTENTS

1.   SAFETY INSTRUCTIONS

All products supplied by Energoflow AG are designed, fabricated and tested to function within specific conditions. These products being sophisticated technical instruments, it is important that the owner and operation personnel strictly adhere both to the information printed on the product and to all instructions provided in this manual prior to installation, operation, and maintenance.

BE SURE ALL PERSONNEL READ AND FOLLOW THE INSTRUCTIONS IN THIS MANUAL AND ALL NOTICES AND PRODUCT WARNINGS.

Main hazards

DANGER: Hazardous Area

The Sensor is installed in hazardous area – on filled oil pipeline and all safety measures related to working in hazardous areas must be strictly followed during installation and use.

WARNING: Hazards through leaks

Operation in leaky condition is not allowed and potentially dangerous. Regularly check leak tightness of equipment in close proximity of the Sensor.

WARNING: Operation in potentially explosive atmospheres

The PIG DETECTOR ULIS-A.04 is suitable for use in potentially explosive atmospheres and complies to the requirements of EN 60079-0:2012+A11:2013 and EN 60079-11:2012

Sensor:

for version ULIS-A.04 〈Ex〉 II 2G Ex ib mb IIB T4 Gb
$-60\ ^0C \le Ta \le +50\ ^0C;$

for version ULIS-A.04-01 〈Ex〉 II 2G Ex mb IIB T4 Gb
$-60\ ^0C \le Ta \le +50\ ^0C.$

Electronics Unit:

for version ULIS-A.04 〈Ex〉 II (2)G [Ex ib Gb] IIB
$-10\ ^0C \le Ta \le +50\ ^0C$

(The Electronics Unit must be installed in Safe Zone).

3

IMPORTANT NOTICES

NOTICE: Process and ambient conditions

The PIG DETECTOR ULIS-A.04 is suitable for use within the parameters of process and ambient conditions specified for the device. It is the user's responsibility to ensure the specified minimum and maximum values are not exceeded during operation.

NOTICE: Designated users

The PIG DETECTOR ULIS-A.04 may only be installed and operated by skilled technicians who, based on their technical training and knowledge, as well as knowledge of the relevant regulations, can assess the tasks given and recognize the hazards involved.
These persons must have exact knowledge on hazards arising from operation, e.g. through hot, toxic, explosive gases or gases under pressure, liquid mixtures or other media as well as adequate knowledge of the system gained through training.

NOTICE: Responsibility of user

Only put the PIG DETECTOR ULIS-A.04 into operation after thoroughly reading the Operation Manual.
Observe all safety information.
If anything is not clear: Please contact the Manufacturer or Manufacturer's authorized representatives.

NOTICE: Correct use

Use the PIG DETECTOR ULIS-A.04 only as described in this Operation Manual.
The manufacturer bears no responsibility for any other use.
Do not carry out any work or repairs on the PIG DETECTOR ULIS-A.04 not described in this manual.
Do not remove, add or change any components in or on the PIG DETECTOR ULIS-A.04 unless such changes are officially allowed and specified by the Manufacturer.
Use only replacement parts specified by the Manufacturer because unauthorized parts and procedures can affect this product's performance, safety, and may result in deadly fire, explosion, release of toxic substances or improper operation.
Otherwise:
Any warranty by the manufacturer becomes void
The PIG DETECTOR ULIS-A.04 can become dangerous
The approval for use in potentially explosive atmospheres is no longer valid.

NOTICE: Special local requirements

Follow all local laws, regulations and operating directives applicable at the installation location.

NOTICE: Retention of documents

These Operating Instructions must be:
 Kept available for reference
 Passed on to new owners.

4

2.   INTRODUCTION

ULIS-A is a non-intrusive ultrasonic pig passage indicator designed for reliable detection of all kinds of pigs used for pigging of filled liquid pipelines. It also provides indication and an estimate of accumulated debris in front of the pig and an estimate of the effectiveness of the pigging procedure.

— The major advantages of the ULIS-A pig detector are:
— Simple, rugged design
— Easy installation and operation
— The non-intrusive design provides zero pressure drop and no obstruction to the flow or the pig and allows for all kinds of applications - high pressure, sour service etc.
— Passage of all types of pigs, spheres etc. can be detected in both directions.
— There are no mechanical moving parts, so no wear or tear, minimum servicing.

The active nature of the ultrasonic device guarantees reliable pig detection eliminating false alarms due to external interferences

3.   OPERATION PRINCIPAL

An ultrasonic signal is generated and transmitted by a clamped-on, non-intrusive sensor across the pipeline and then recorded after being reflected from the opposite side of the pipe wall. The sensor also determines the level of background noise in the pipeline and differentiates it from the signal. The frequency and form of the signal have been chosen to provide stable propagation through the medium and reliable identification over the noise in the pipeline.

A passing pig obstructs the passage of signal which is recorded by the device.

This method, besides providing the highest reliability, provides additional tools for monitoring the pipeline.

The strength of the signal changes with the change in density of the medium and accumulation of paraffin on the walls.

Presence of air bubbles / water droplets in liquid hydrocarbons / suspended particles in the flow also has a distinctive signature in the obtained data and inference about the same may be drawn by analysis of the recorded data using software provided with the device.

By using two devices installed at a known distance to each other, the speed of the pig in the pipeline can also be monitored.

4.   DEVICE DESCRIPTION

The device consists of three parts: the Sensor with a 5m armored and shielded connecting cable, the Electronics Unit and the mounting accessories including the Mounting Contrivance, chain and two fasteners.

Fig.1

1.   The Sensor – the Sensor is an electro-acoustic transducer which acts as the generator and receiver of the ultrasonic signal. On board electronics of the Sensor not only control the signal generation and recording process, but also carry out express analysis of the data and transmit the same in an encoded digital format to the Electronics Unit. The Sensor is directly installed on the filled liquid pipeline in hazardous area and is certified as intrinsically safe and having ingress protection level IP68. The cable from the sensor can be connected to the Electronics Unit directly or through a suitable junction box located close to the Sensor installation point.

Fig.2

6

Energoflow AG

2.   The Mounting Contrivance – The Mounting Contrivance is made of steel suitable for outdoor installation on pipeline and provides secure and reliable positioning of the Sensor in place. The Contrivance has two welded hooks for fasteners connecting the chain and a bottom section made of wieldable carbon steel and can easily be fixed on the pipe line using the chain and fasteners or by 3 point welding. The Sensor is installed inside the Contrivance. The lid of the Contrivance has a hermetic gland for the Sensor cable (fig. 3).
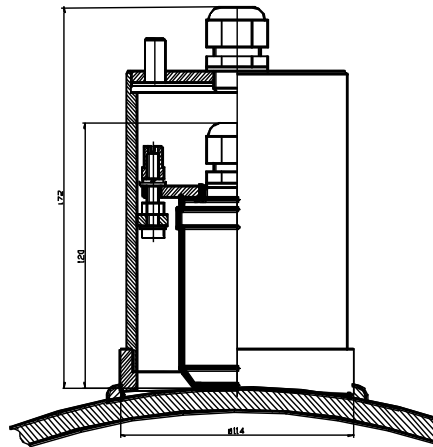

Fig.3

3.   The Electronics Unit is installed remotely and has an array of LEDs as well as a local display and a keyboard. The Electronic Unit must be installed in safe zone. The Electronics unit has an terminal box for various inputs and outputs, the designation of each terminal is depicted inside the lid of the terminal box (fig. 4). All connections should be carried out through suitable cable glands only
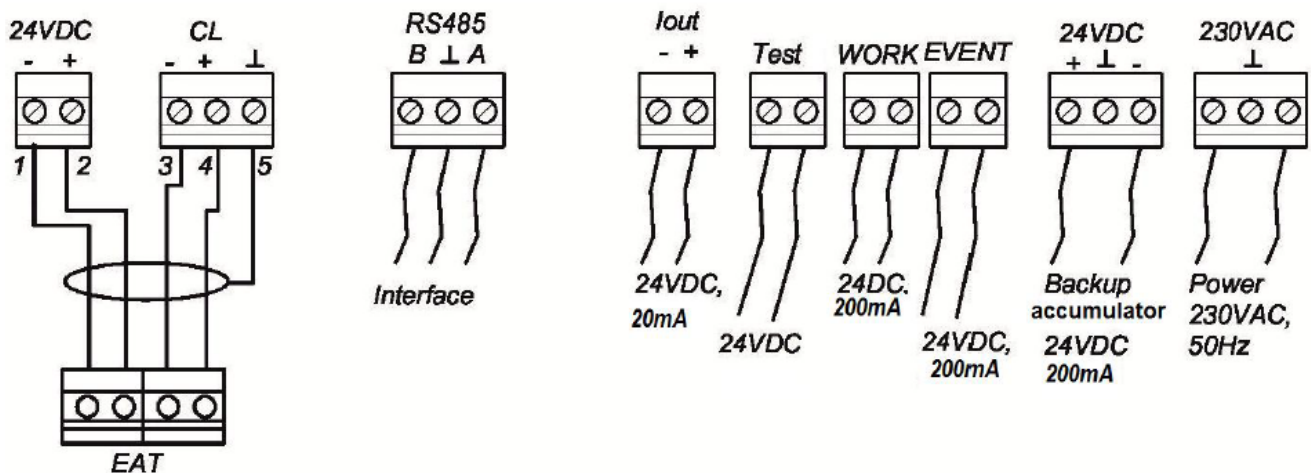

Fig.4

The Electronics unit performs a number of functions:

⎯ It acts as an intrinsically safe power source for the Sensor
⎯ It analyzes the data from the Sensor, carries out autodiagnostics and autoreset functions and provides local indication of pig passage, alarms, device status, power supply etc.
⎯ It maintains an archive of events (pig passages) and alarms.
⎯ It has a local keyboard which can be used for configuring the device and reading the recorded data as well as the parameters of the device.
⎯ It acts as an interface for connecting the device to PC for configuration and data recording and transfer using MODBUS protocol.
⎯ It provides analog and relay outputs for connecting the device to DCS or telemetry system.

7

Energoflow AG

The Electronics Unit has an LED screen and a keyboard. The various indications available on the screen and corresponding keyboard actions are shown below.

Table 1.

Data type (is changed by pressing key «C»)	Display format	Key functions		
		△	⑪	▽
1	**2**	**3**	**4**	**5**
Current event number	XXXnC	Disabled	Disabled	Disabled
Time indication and correction: hours, minutes, seconds	t_HHMMSS	The corrected values increase	Correction mode activation and decimal place select	Corrected values decrease
Date indication and correction: day, month, year	d_DDMMYY			
Set diameter indication	__XXXX_d	The corrected values increase	Correction mode activation and decimal place select	Corrected values decrease
Events archive note number indication for viewing	___XXXnA	The note number increase	The note number, time and date cyclical change	Note number decrease
Event note time indication: hours, minutes, seconds	HHMMSShA			
Event note date indication: day, month, year	DDMMYYdA			
Failure indication: Total error code record in hexadecimal (up to 1,5 bytes) Bits values Err rf. further	XXX_Err	Disabled	Disabled	Disabled

SERVICE DATA

| **1**	**2**	**3**	**4**	**5**
Signal level indication while adaptation	___XXXu2	Disabled	The signal, threshold and interference level cyclical change	Disabled
Detection threshold level indication	___XXXu1			
Interference level indication while adaptation	___XXXu0			
Signal and interference level indication	**XXX__YYY**	Disabled	Calibrating	Disabled
Set indication time by the telemetry* line indication	__XXX_tL	The corrected values increase	correction mode activation and decimal place select	Corrected values decrease
Integration time	XXXX_t1	The corrected values increase	correction mode activation and decimal place select	Corrected values decrease
Zero Shift	XXX_Sh	The corrected values increase	correction mode activation and decimal place select	Corrected values decrease
Events archive note number indication for viewing	XXXE_Err	The note number increase	the note number, time and date cyclical change	Note number decrease
Event note time indication: hours, minutes, seconds	HHMMSShA			
Event note date indication: day, month, year	HHMMSShA			

Energoflow AG

5. MARKING AND SEALING

The detector explosion safety marking is provided on the Electronics Unit and the Sensor as follows:

on the EU front panel for version ULIS-A.04: ⟨Ex⟩ II (2)G [Ex ib Gb] IIB
-10 ^{0}C ≤ Ta ≤ +50 ^{0}C;

Non I.S. Terminals: Um = 250V
Terminal X7:   Uo = 28.35 V, Io = 0.05 A, Po = 1.48 W; Co = 0.1 µF; Lo = 10 mH
Terminal X4:   Uo = 28.35 V, Io = 0.025 A, Po = 0.75 W; Co = 0.1 µF; Lo = 10 mH
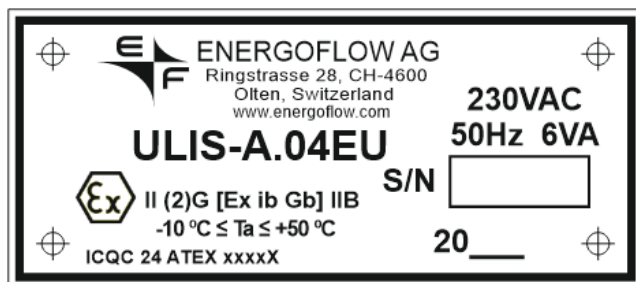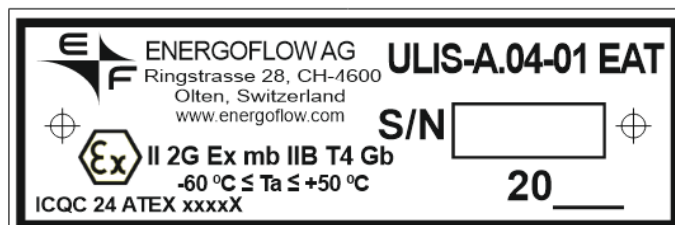

ULIS-A Electronic Unit Label

On the Sensor body – by a shield marked:

for version ULIS-A.04 ⟨Ex⟩ II 2G Ex ib mb IIB T4 Gb
-60 ^{0}C ≤ Ta ≤ +50 ^{0}C;
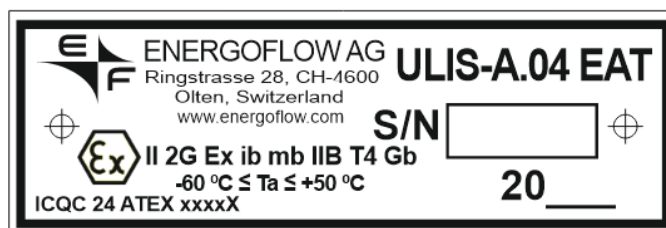
for version ULIS-A.04-01 ⟨Ex⟩ II 2G Ex mb IIB T4 G b
-60 ^{0}C ≤ Ta ≤ +50 ^{0}C;

ULIS-A EAT Label

The Electronics Unit is sealed by the manufacturer by sealing paste applied on two assembly screws, attached to the two opposite (diagonal) Electronics Unit front panel corners.

During operation, the glands of the Sensor communication cable input for the Electronics Unit enclosure and for the external equipment cables (telemetry system and PC communication, test signal delivery, current output etc.) should be sealed.

Note: There are no user serviceable parts in the Sensor and the Electronics Unit. The Sensor and the Electronics Unit are sealed by the manufacturer after testing at the factory and any damage to the seals shall render all or any Manufacturer's warranties void and canceled.

9

6. DEVICE SPECIFICATIONS

Application: Pig passage detection and Pipeline Fluid Monitoring

Pipe diameter ranges - version 1: 150 ...550mm;
version 2: 350...1200 mm

Maximum pipe thickness: 50 mm

Maximum speed of pig: 8 m/s

Minimum pig length: not less than pipe diameter

Ambient temperature:

Sensor :-60 …. +50°C ; Electronics Unit : -10….+50°C

Power supply of Electronics Unit: 230 VAC/50 Hz or 24 VDC Power consumption: less than 6 W,

Maximum distance between the sensor installed on the pipeline and Electronics Unit: not more than 300 m

Ex Markings :

Sensor: for version ULIS-A.04 〈Ex〉 II 2G Ex ib mb IIB T4 Gb
-60 ^{0}C ≤ Ta ≤ +50 ^{0}C;

for version ULIS-A.04-01 〈Ex〉 II 2G Ex mb IIB T4 Gb
-60 ^{0}C ≤ Ta ≤ +50 ^{0}C;

Electronics Unit: for version ULIS-A.04 〈Ex〉 II (2)G [Ex ib Gb] IIB
-10 ^{0}C ≤ Ta ≤ +50 ^{0}C

10

Ingress protection:

Sensor: IP68; Electronics Unit: IP65

Outputs:

1 analog output (4...20 mA), 2 Relay outputs (SPDT), RS-485

Inputs: 1 (Relay coil)

Local Display and keypad on Electronics Unit for configuration and data display

Software provided for configuration and data recording & visualization

LED indication (on Electronics unit): Power/Error, Telemetry, Alarm & Pig passage

The overall dimensions and weight data are represented in Table 2 below: Table 2.

Detector element	Overall dimensions, mm, max.	Weight, kg, max.
Electronics Unit	280 * 250 * 130	1,5
Sensor	Ø 125 x 60	1,2

7. INSTALLATION PROCEDURE

Selecting the place for installation of the Sensor and Electronics unit

For installing the Sensor, select a horizontal straight section of the pipe without dents, cavities or welds, so that the closest valve or restriction or any other local resistance (angle, bend, branch) is at least at a distance not less than 0.5 times the pipe outer diameter from the planned installation point. In order to avoid false indications caused by air bubbles, it is recommended to install the Sensor at an angle of 45 – 90 degree to the vertical axis.

The Electronics Unit must be installed in a safe zone (operator station, block box, instrumentation panel) in strict accordance with the local regulations concerning hazardous zones. The distance between the Sensor and Electronics unit along the cable run (the cable length between the Sensor and the Electronics Unit) must not exceed 300 m.
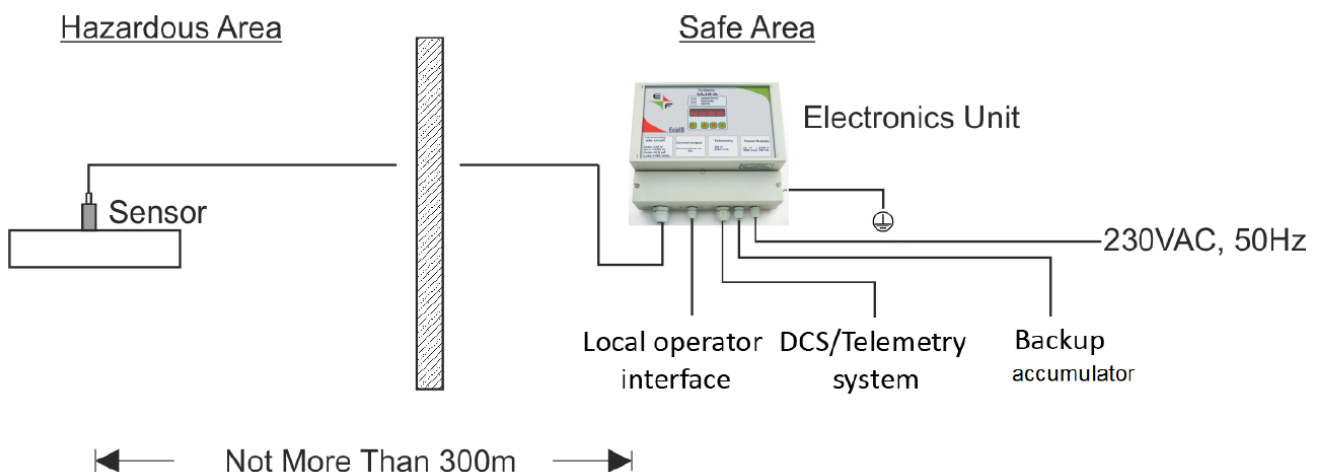

Fig.5

11

Energoflow AG

Installing the Sensor

Clean an area on the pipe surface approximately 20cm x 20 cm (sufficient for installing the mounting contrivance). Remove any isolation if present and strip the paint layer so as to expose the pipe surface and scrub and clean it till shining smooth metallic surface is available. Install the Mounting Contrivance so that it covers the cleaned area and secure it in place either by welding (3 points) or with the help of the chain and fasteners as shown below
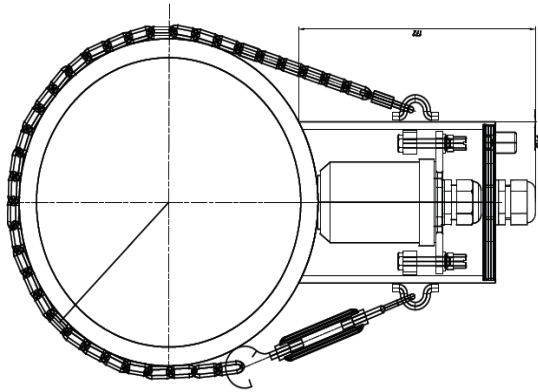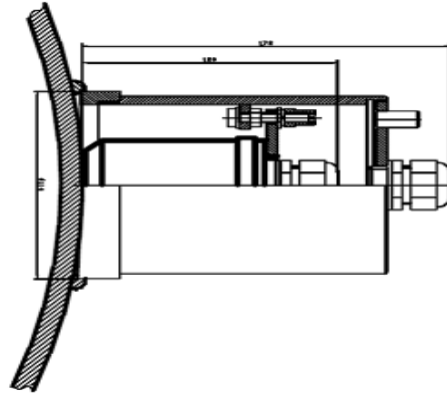

Fig.6

Fig.7

The isolating gasket is positioned on the Sensor followed by the fixing plate by passing the cable and gland of the Sensor through them. Then the cable is passed through the hermetic gland of the lid of the Mounting Contrivance.

Fig.8

Energoflow AG

Liberally apply the provided lubricant to the base of the Sensor and fix it inside the Mounting Contrivance by means of the fixing plate and nuts. The nuts must be tightened alternately and gradually so that the Sensor is perpendicular to the pipe surface and the base of the Sensor is pressed tightly to the pipe surface.

Wiring up the device

Carry out connections as described below:

Earth connections

Terminals are provided on the sides of the Electronics Unit which should be connected to the earthing of the instrumentation line.

Connecting the Sensor to the Electronics Unit

The connection can be carried out directly or through a junction box. Two armored and shielded twisted pairs (2x2x0.75) should be used for connecting the corresponding terminals of the sensor to the Electronics Unit. (see Fig.9 Below)

Connecting power supply to the Electronics Unit

The Electronics Unit should be connected to power supply 230 VAC / 50 Hz or 24 VDC as shown in Fig.9 below. A standby 24 VDC accumulator battery (not provided by the manufacturer, must be procured locally) can also be connected to the device for providing automatic backup in case of power failure (see Fig.9 below). When power is on, the top LED on the front panel of the Electronics Unit starts glowing. Blinking of this LED is an indication of error in device operation.

Connecting the PC to the Electronics Unit

The software provided with the device must be installed on the PC in a separate folder. Download or transfer the executable installation file to the PC and double click – then follow the installation procedure as guided. (see Fig.9 Below)

The device can be connected to the PC through a RS485/USB converter (not provided by the manufacturer, must be procured locally) using a twisted pair. Make sure that the corresponding driver is installed on the PC. (see Fig.9 Below)

Connecting the device to the telemetry system or DCS

The device provides a 4...20 mA output configured to show the signal level and 2 relay outputs for pig passage and alarm indication. The device also has a 24VDC input for remote "test" command from the DCS/telemetry system. The connections should be carried out through corresponding terminals using shielded twisted pair wires. (see Fig.9 Below)

13

Energoflow AG

ULIS-A
Terminals of Electronics Unit
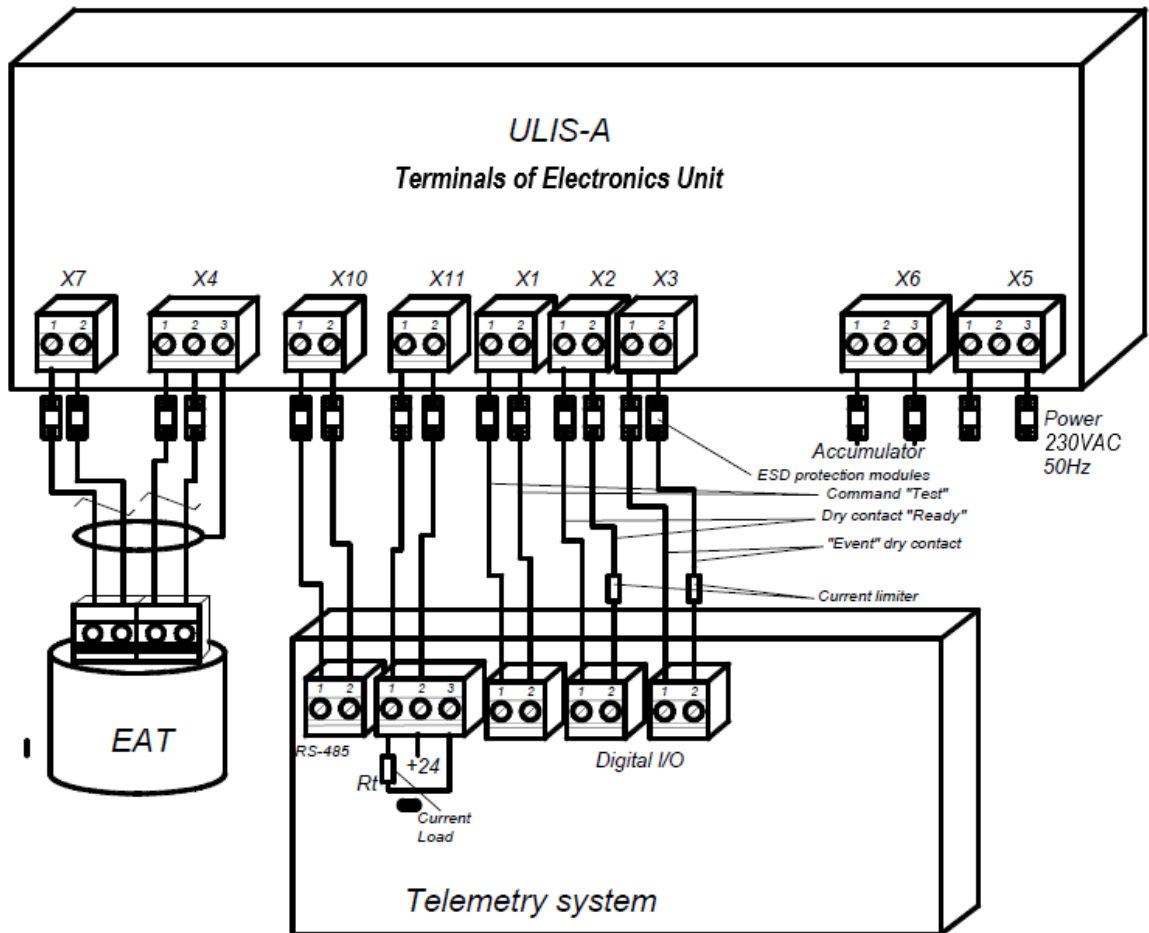
8. CONFIGURING THE DEVICE

Before you start, measure and determine the outer circumference or outer diameter of the pipeline and thickness of the pipe wall at the point of sensor installation.

Configuring the device from the Electronics Unit

Switch on the power.

Press "C" to enter the Menu. Consecutive parameters are accessed by pressing "C", corrections are made by using key "Enter" and "up" and "down" (See table 1 above). During the configuration mode, when the parameters are being changed, the power LED will start blinking. In this mode the device will not register pig passages.

Enter the correct time (XX XX XXt) and Date (XX XX XXd)

Enter the value of diameter (XXXXd). The permissible range is 150 ...1500 depending on the version purchased (for pipeline sizes 150 … 550 mm or 350 … 1500 mm).

14

Energoflow AG

If you want to use the self adaptation feature of the device, enter a diameter value less than 100; the device will automatically adapt to correct effective diameter value on its own.

Check the "Signal ...Noise" values on the display Menu (XXX YYY) – the Signal value should settle in the range of 150 – 240 and the noise value should be in the range of 30 -55. If the signal value is more than 240, it can be decreased by reducing the parameter Ti.

Press Enter to exit the configuration mode – the power LED will stop blinking and start glowing steadily.

Check the Error status on the Electronics Unit display – it should be "000_Err". Optionally, check that the "Power" LED is not blinking. Otherwise take measures as described in Annexure B to eliminate the error.

Configuring the device from PC

Switch on the power of the device and start the software.

Press "connect to ULIS" and select the correct port when prompted.

Press "synchronise" - the date and time of the device will be synchronized with the PC.

Enter the diameter of the pipeline. The permissible range is 150 ...1500 depending on the version purchased (for pipeline sizes 150 … 550 mm or 350 … 1500 mm)

If you want to use the self adaptation feature of the device, enter a diameter value less than 100; the device will automatically adapt to correct effective diameter value on its own.

Press "write to Ulis". The device will enter the adaptation mode.

Graph of noise and signal values will appear on the screen. Once the Signal value settles in the range of 150 – 255 and the noise value settles in the range of 30 -55, signal threshold values will be automatically set by the device. In the lower left part of the screen the date and time of the adaptation achieved will be shown and the error status shall be 0.

Press "read from Ulis" and check all the parameters.

If the signal value is more than 255, it can be decreased by reducing the parameter Ti.

Check the Error status on the PC screen– it should be "000". Otherwise take measures as described in Annexure B to eliminate the error.

9. OPERATION

At the passage of the pig (or sphere) the event LED will light up for a brief period, the event will be recorded in the archive with the corresponding date and time. Then the device resets automatically and the event LED is off till the next event. The archives can be read directly from the display or by using the software (See Annexure A for instructions on using the software).

Any errors or alarms are indicated by the blinking of the power LED and are also recorded in corresponding archive.

The device reset interval can be set by changing the parameter "tL" from 10 to 255s.

On the software screen, pig passage will be visible as a drop in signal below the noise

15

Energoflow AG

threshold and its sharp return to value equal to the signal threshold or higher. The return of the signal to the threshold value is registered as the moment of pig passage.

The debris and paraffin preceding the pig can be seen on the screen as a gradual decrease in signal value.

949 км
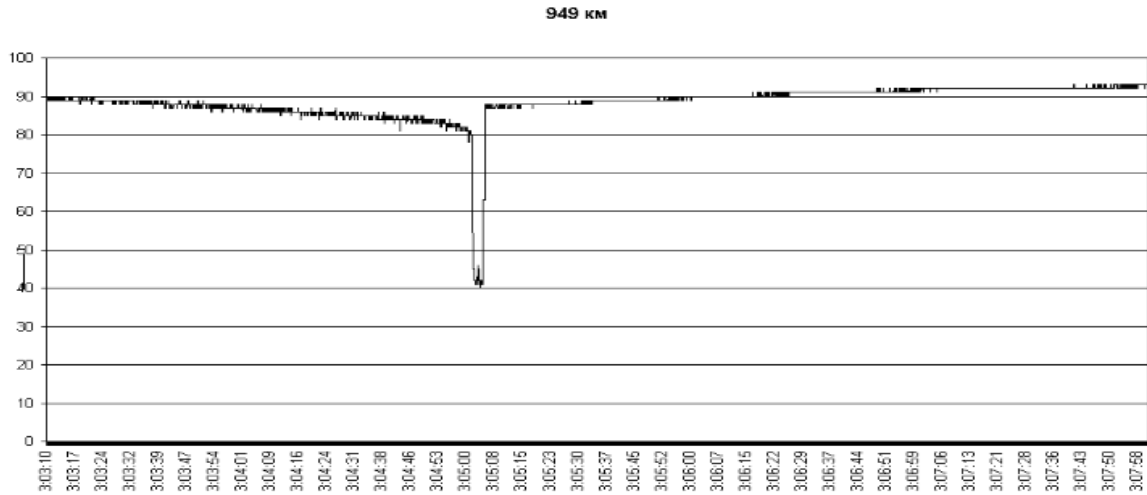
Presence of air bubbles and droplets of water or suspended solids are seen as irregular high amplitude short fluctuations of the signal curve .

Passage of bubbles   Pig passage
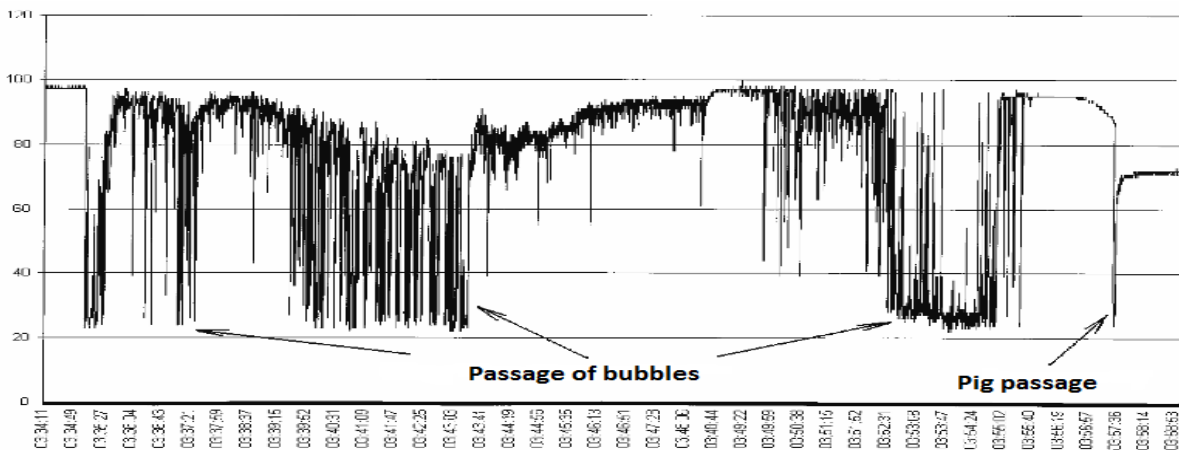
Change in the density of the fluid in the pipeline can be observed as a change of the signal level since the acoustic permeability of the medium varies with density.
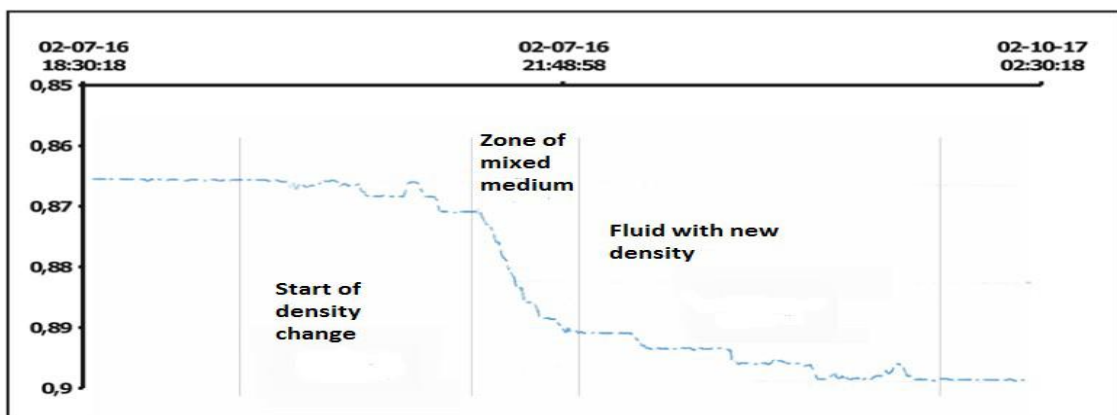
Once configured, the device carries out autodiagnostics and autoadaptation every time the

16

Energoflow AG

power is switched on. Autodiagnostics without switching off power can also be carried out remotely from the DCS or telemetry system by providing 24 VDC to the corresponding terminals of Electronics Unit for a short interval (0.5 ...3 seconds).

The LED's on the Electronics Unit front panel provide the following information:

Table 2

Indicator	State	Interpretation
«Power/ Error »	Not glowing	Power supply disabled
	Glowing constantly	Normal operation mode
	Blinking	Failure (read the extra information on the display, ref. further)
«Telemetry »	Glowing	The remote check-up signal is applied
	Not glowing	The remote check-up signal is not applied
«Alarm»	Glowing	A pig is detected and a signal is being sent to the telemetry system/DCS/PC or autodiagnostics/autoadaptation is taking place
	Not glowing	No pigs detected, device ready

10. SERVICING AND MAINTENANCE

A list of possible malfunctions and remedies are provided below:

Table 3

Malfunction, its occurrence and complementary signs	Possible cause	Eliminating method
The display not functioning when the power is "on"	No line voltage.	According to the applicable rules eliminate the line voltage lack
	The line cable wire is broken.	Switch off the detector. Disconnect the power cable from the line. With an ohmmeter, check the resistance value of line cable wire and the transformer primary winding. If the resistance exceeds 1 kOm replace the line cable.
The message "ERROR» appears on the display	The signal cable is damaged. The Sensor installation is incorrect.	Check the signal cable connection. Examine the Sensor mounting place and try to reinstall the Sensor.
Time indication failure, timer failure.	Real time clock operation failure	Reset date and time

If the malfunction detected is not described in the table 7, contact the manufacturer or his authorized representatives.

The device may diagnose and record errors during operation which can be seen on the corresponding menus of the Electronics Unit and software. At the occurrence of an error the power LED will start blinking. A list of possible errors and suggested remedies is provided in Annexure B.

17

Energoflow AG

ANNEXURE A

Instructions for using software provided with ULIS – A.04

The software is used to configure, manage, and remove data from the indicator passage cleaning unit ULIS-A modification 04.

Connecting to the Electronics Unit of ULIS – A.04

The Electronics Unit of ULIS-A.04 is equipped with a RS-485 interface. To run the software you need to connect your computer (laptop) via an appropriate interface adapter, such as ICP 7520, I7520, USB-RS485 or another, to the terminals of the electronic unit ULIS-A.04.
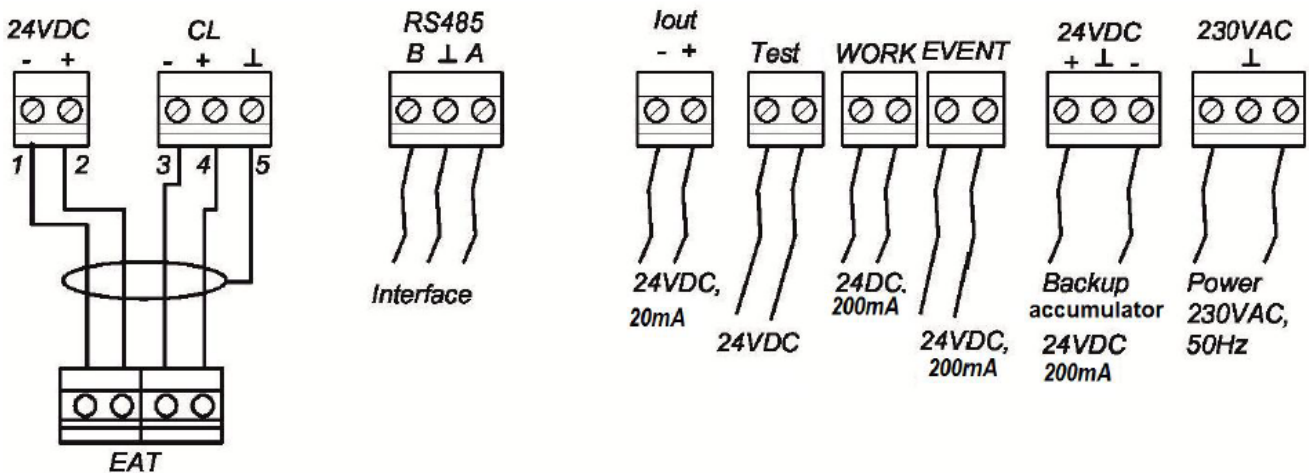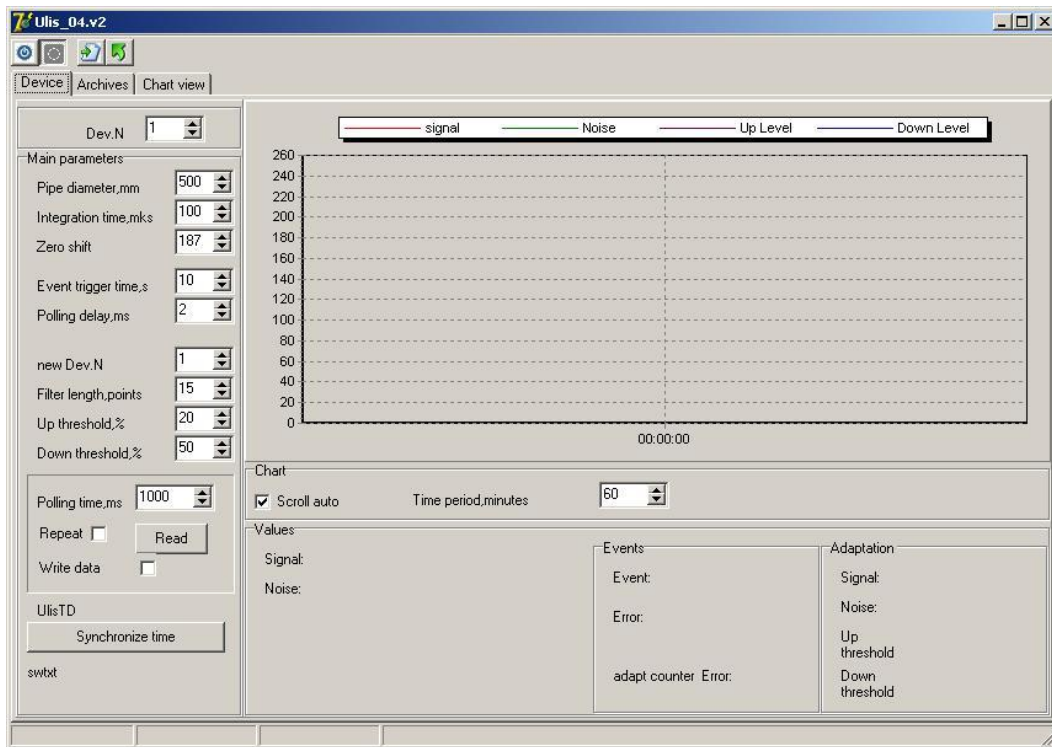

Connecting cable should be a shielded "twisted pair" with impedance 120 Ohm.

Working with the software.

Upon running the program ULIS-04.exe, the main window of the software appears.

In the main window, there are following buttons in the top left corner:

- connect to COM port
- Disconnect COM port
- Write to ULIS
- Read from ULIS

18

Energoflow AG

Below these, there is the Device tab with following parameters :

Device number - the current network device number (default is 1).

Pipe diameter - diameter of the pipe in millimeters.

Integration time - Measuring time in microseconds.

Zero shift - zero shift. level is set by the device in the process of adaptation.

Event trigger time - time during which "Event" contact in the closed position when pig passage is registered

Polling delay, ms. - the time between the receipt of a response from the device program and prior to the issuance of a new data request.

The new number of the device - the device assigning a new network number. After installing a new device in the network, you need to change accordingly the "number of the device." Otherwise, the connection to the device is interrupted.

Filter length - the size of the smoothing filter of the measured amplitude. The maximum value is 51. The increase in size of the filter results in more smoothing, but this increases the minimum length of the pig, which can be registered by the device. The default value - 15.

The Up threshold,% - percentage of signal incidence at which the indicator starts to monitor the possibility of pig passage

The Down threshold,% - percentage of signal incidence at which the indicator registers the presence of a pig.

The signal "events" is generated when the signal increases and crosses the up threshold level after dropping at least up to down threshold level.

19

Data exchange interval control panel

On the panel the following parameters are provided:

Polling time, ms - period between polling of current status

Repeat - ON / OFF repeat polling indicator

Read - button for single query of the current status

Write data - enabling / disabling of saving the current data to a file. The file name is automatically generated.

The center of the screen is occupied by the time based trend graph which also shows the upper and lower thresholds.

Under the trend graph, the following tabs are located:

Synchronize time - set to display the date and time in accordance with the date and time of the computer.

The data on current error status, current signal value, thresholds set, Tag No. of last recorded pig passage and corresponding date and time are also provided under the trend graph on the main window.

By pressing the "Archives" tab on the main window, the "archives" window is opened. There are two columns of archives in the window - "Event" and "Alarm", each carrying the Tag number of the corresponding "Event" or "Alarm" and the date and time of recording. Under each column, "Read" and "Save" buttons are provided which allow the user to read the corresponding data from the Electronics Unit of the currently active device and record it.

Energoflow AG
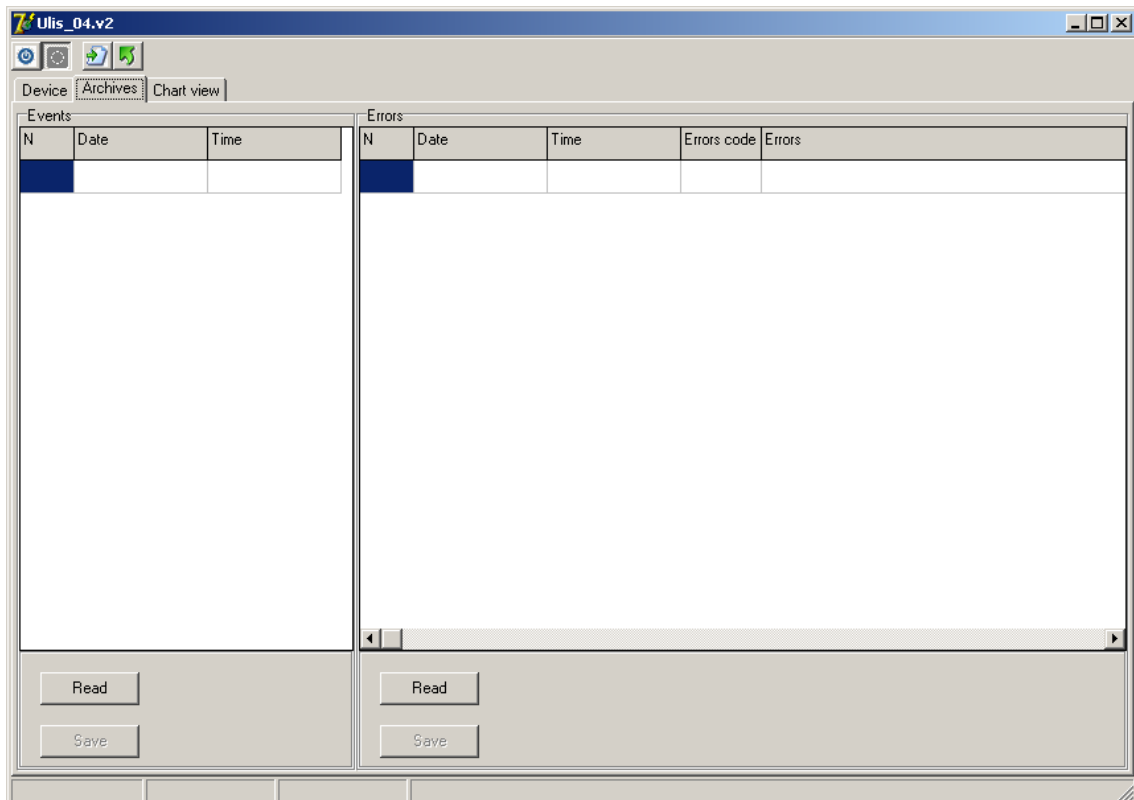
The "View Graph" button activates a window where previously saved trend graphs can be loaded and viewed by using the button "Download" and selecting the file to be viewed in the dialogue box.
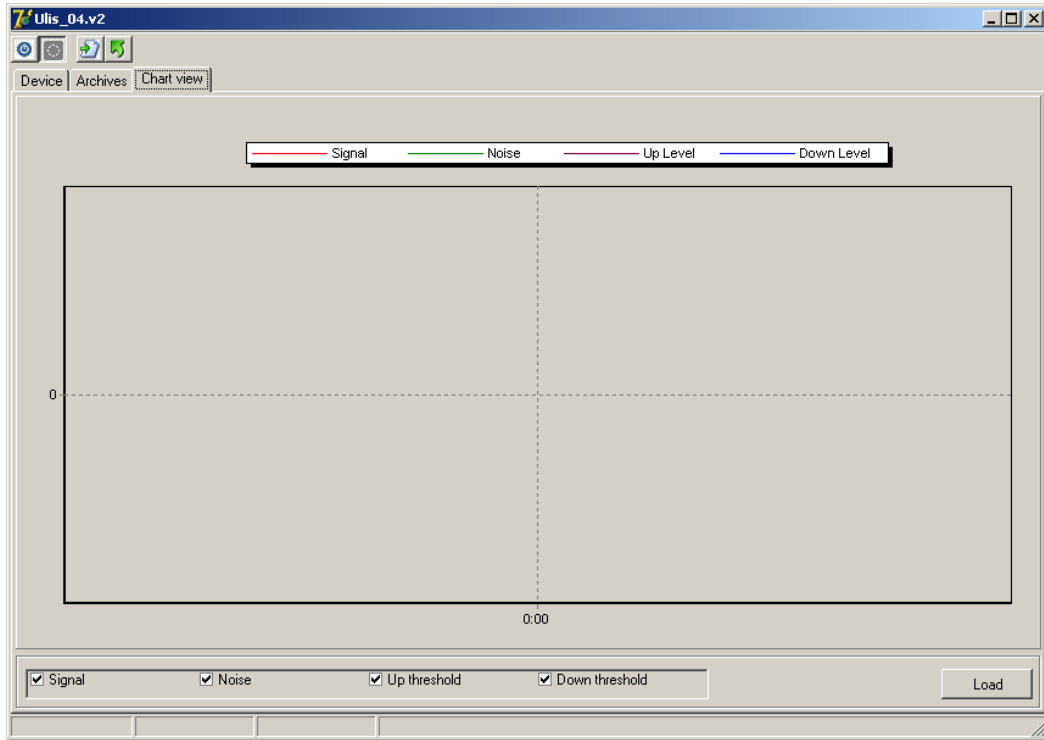
Working with the Software

Click button "Connect to Ulis" and in the resulting dialog box, select the communication port of the PC to which the Electronics Unit is connected. Establish communication with the Electronics Unit by pressing "Enter". Upon successful connection, the currently connected device will appear in the settings bar of the main window.

For continuous reading of data, select tab " Repeat ". To save the trends to the hard disc of the PC, select tab "Write to file".

If the connection fails, check the connection of the communication cable of RS-485 COM, port number of the PC, network device number. To change the COM port, close the connection button and then click again and select the desired number.

Press button "Read from ULIS" - current data from the device will be displayed in the appropriate fields.

21

Energoflow AG

ANNEXURE B

Errors Codes

During self diagnosis, ULIS can detect 8 various types of status alarms indicating error in operation or an event to be recorded. These are recorded in the "Alarms" archive along with the time and date of occurrence and are depicted by following abbreviations:

Error code	Description	Recommended corrective measures
DT	error of internal clock	Reset the date and time, if the error persists – contact the manufacturer
NA	error of transmission of parameters to the Sensor	Check cable connection between Sensor and the Electronics Unit, if the error persists – contact the manufacturer
AS	error of "Events" archive	Contact the manufacturer
AP	error of "Alarms" archive	Contact the manufacturer
ADP	error of adaptation	1. Check the correctness of installation of sensor 2. Reinstall the sensor at a different location 3. Check cable connection between Sensor and the Electronics Unit, if the error persists – contact the manufacturer
DAT	error of communication with Sensor	Check cable connection between Sensor and the Electronics Unit, if the error persists – contact the manufacturer
LS	error «Low signal» occurs when signal from Sensor is reduced to the level that does not allow normal operation of the device or does not change for a long time (over 3 hours)	1. Check the correctness of installation of sensor 2. Reinstall the sensor at a different location 3. Check cable connection between Sensor and the Electronics Unit, if the error persists – contact the manufacturer
ON	Power switched on	No corrective action needed

The current error status during operation can be seen on the local display as a 3 digit hexadecimal number in the format "xyz_Err" as well as on the main window of the software as a 3 digit hexadecimal number xyz. Here the first digit x represents error codes ADP, DAT, LS ,ON and their combinations, the second digit y represents error codes DT, NA, AS, AP and their combinations whereas the third digit z is always 0.

X				Y				Z			
8	4	2	1	8	4	2	1	8	4	2	1
ON	LS	DAT	ADP	AP	AS	NA	DT	0	0	0	0

22

Energoflow AG

The error status for each possible value of x and y is given in tables below.

X

Displayed value	Description	Error
0	No Error	-
1	Adaptation Error	ADP
2	error of communication with Sensor	DAT
3	(=1+2)	ADP;DAT
4	poor signal from	LS
5	(=4+1)	ADP;LS
6	(=2+4)	DAT;LS
7	(=1+2+4)	ADP;DAT;LS
8	power switched on	ON
9	(=1+8)	ADP,ON
A	(=2+8)	DAT;ON
B	(=1+2+8)	ADP;DAT;ON
C	(=4+8)	LS;ON
D	(=1+4+8)	ADP;LS;ON
E	(=2+4+8)	DAT;LS;ON
F	(=1+2+4+8)	ADP;DAT;LS;ON

Y

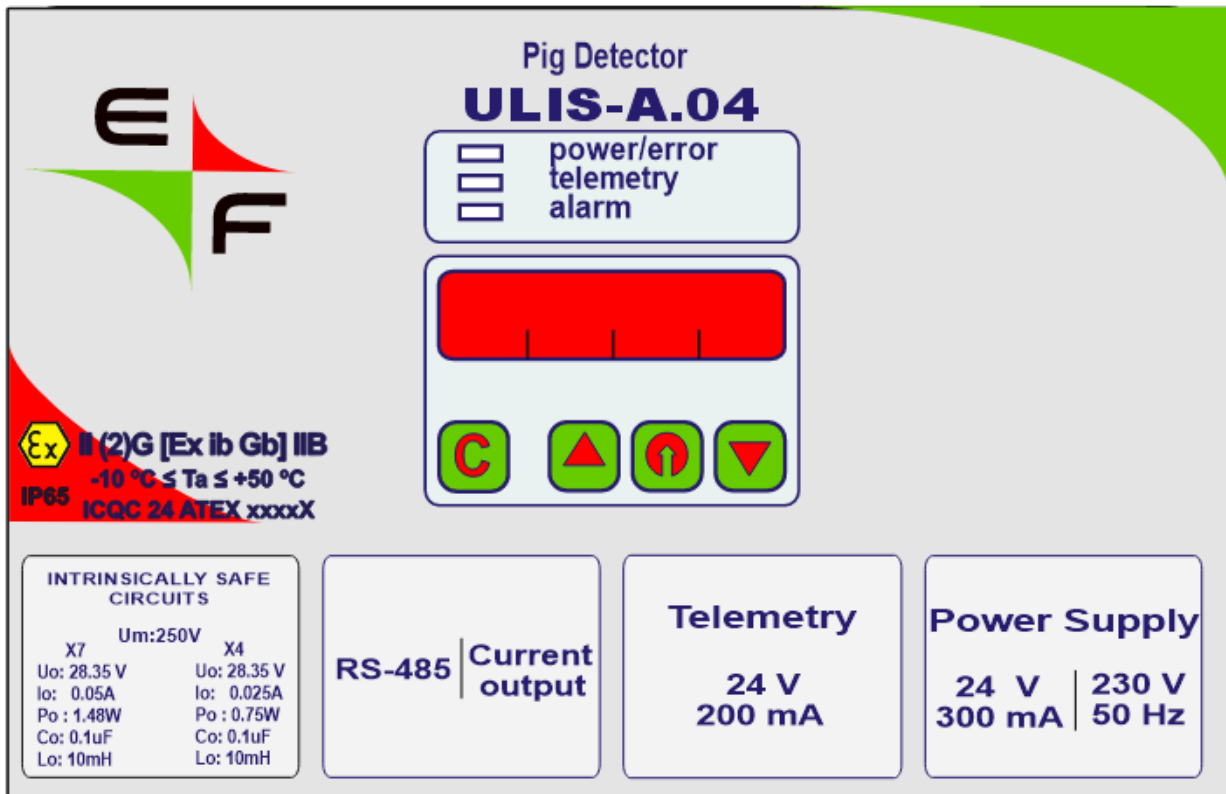| Displayed value	Description	Error
0	No Error	-
1	Inner clock error	DT
2	error of transmission of parameters to the Sensor	NA
3	(=1+2)	DT;NA
4	events archive error	AS
5	(=4+1)	DT;AS
6	(=2+4)	NA;AS
7	(=1+2+4)	DN;NA;AS
8	«Alarms» archive error	AP
9	(=1+8)	DT;AP
A	(=2+8)	NA;AP
B	(=1+2+8)	DT;NA;AP
C	(=4+8)	AS;AP
D	(=1+4+8)	DT;AS;AP
E	(=2+4+8)	NA;AS;AP
F	(=1+2+4+8)	DT;NA;AS;AP

23

Energoflow AG

If more than one errors are present the displayed value shall be sum of all errors — eg. «320_Err» indicates that there is problem in adaptation and no signal from the sensor as well as error in transmitting parameters to the Sensor

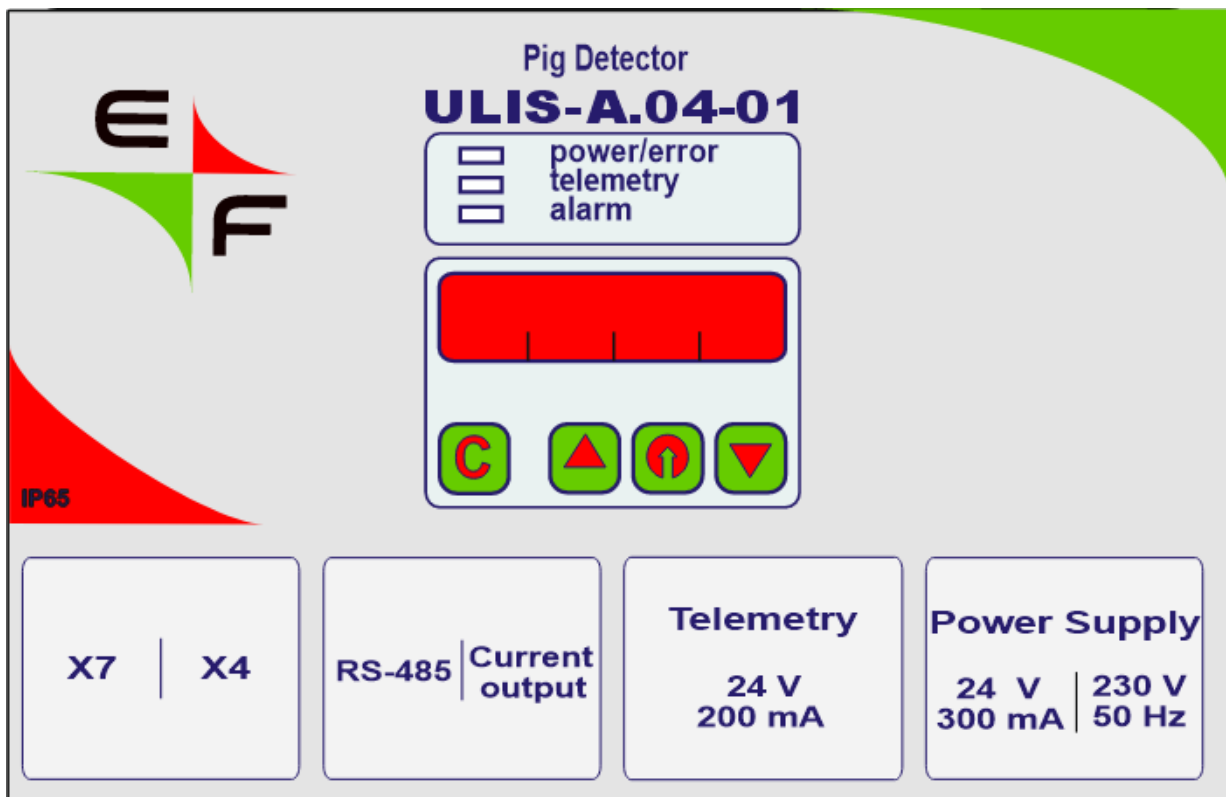error code 320 – is interpreted as follows:

1 digit (z) =0
2 digit (y) =2.   NA(20) – error of parameters transmission to the Sensor;
3 digit (x) =3.   3=1+2;
100 – error of adaptation.
200 – error of communication with Sensor

A record is written in the "Alarms" archive every time when error code changes.

24

ANNEXURE C

ULIS-A FRONT PANEL

Pig Detector
ULIS-A.04

power/error
telemetry
alarm

C ▲ ⏻ ▼

⟨Ex⟩ II (2)G [Ex ib Gb] IIB
-10 °C ≤ Ta ≤ +50 °C
IP65 ICQC 24 ATEX xxxxX

INTRINSICALLY SAFE CIRCUITS

Um:250V

X7	X4
Uo: 28.35 V	Uo: 28.35 V
Io: 0.05A	Io: 0.025A
Po : 1.48W	Po : 0.75W
Co: 0.1uF	Co: 0.1uF
Lo: 10mH	Lo: 10mH

RS-485 | Current output

Telemetry
24 V
200 mA

Power Supply
24 V | 230 V
300 mA | 50 Hz

for version ULIS-A.04

Pig Detector
ULIS-A.04-01

power/error
telemetry
alarm

C ▲ ⏻ ▼

IP65

X7 | X4

RS-485 | Current output

Telemetry
24 V
200 mA

Power Supply
24 V | 230 V
300 mA | 50 Hz

for version ULIS-A.04-01

25

Energoflow AG