Electronic systems and system components for agricultural equipment
CONTENTS:

Electronic systems for agricultural equipment

Onboard Information-Control Systems (ICS).................................................. 3
«LIDA-1300» Onboard Computer..................................................................... 4
SKWU-M Monitoring and Control Systems for Application
of Mineral Fertilizers with Weight Indicator................................................. 5
SKWU-O Monitoring and Control System
for Application of Organic Fertilizers.......................................................... 6
SIU-P Management Information Systems
for the Pickup Balers.................................................................................... 7
Universal Management System
for Bailing Machines SUU-P........................................................................ 8
SKM Mass Monitoring Microprocessor Systems........................................... 10
Fertilizer Application System SVK................................................................. 11
Systems for Combine Harvester Output Mapping with
the Remote Monitoring Function SKU.01.................................................. 15

System components for agricultural equipment

Piezoelectric Sensor of Grain Loss DPZP-1.................................................... 17
Piezoelectric Active Sensors of Grain Loss DPZPA...................................... 17
Semiconductor Protective Device PZP-01...................................................... 18
Unified Frequency Display Unit BICH - U.03............................................... 18
Multiple-Tone Reverse Warning Buzzer SZHR - 01..................................... 19
Multiple-Tone Reverse Warning Buzzer SZHR........................................... 19
Signal Switch KS........................................................................................... 22
Motormeter IM-01......................................................................................... 22
Sensors for Fluid Level DUZH..................................................................... 23
**Onboard Information-Control Systems (ICS)**

<table>
<thead>
<tr>
<th><strong>Function</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring and control of operation modes of assemblies and units for combine harvesters by means of the J1939 (CAN) protocol. The systems are designed for installations in combine harvesters KZS-10K, KZS-1218, KZS-1624, KZS-812, KZS-20 and similar ones. There are produced three types of ICS: BIUS.01, BIUS.02, BIUS.03.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Specification</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The systems display parameter values in the specified display range including the velocity of travel; rpm; harvester’s hours, engine operating hours; harvested area; distance traveled (total and current); grain output; fuel level et al.</td>
</tr>
<tr>
<td>The systems control the R.P.M. drop of the driven elements due to slipping and simultaneously provide light, sound and voice alarms.</td>
</tr>
<tr>
<td>The information about relative grain losses is displayed in digital or analog form on each channel (behind the cleaning unit and the straw rack) separately, and displayed on the screen, at the operator’s discretion, per time unit, or per area unit.</td>
</tr>
<tr>
<td>The systems allow operations with external navigation systems and GSM via CAN 2.0B interface.</td>
</tr>
<tr>
<td>On the individual customer orders, the systems may be produced with the below additional functions:</td>
</tr>
<tr>
<td>- crop-yield data logging provided with crop-yield dataloggers*;</td>
</tr>
<tr>
<td>- remote diagnostics of a combine harvester* via GPRS module (remote monitoring terminal device for motor vehicles);</td>
</tr>
<tr>
<td>- viewing the logged fuel consumption data on the personal computer (PC), provided with a “Fiscal agent” software;</td>
</tr>
<tr>
<td>- viewing the abnormal or other statistical data on the personal computer, provided with a “Abnormal statistics” software.</td>
</tr>
<tr>
<td>The system provides for:</td>
</tr>
<tr>
<td>- the possibility of disabling voice messages by operator;</td>
</tr>
<tr>
<td>- the reset by operator of the current readings on the counter for operating hours, distance traveled, harvested area;</td>
</tr>
<tr>
<td>- the availability of an additional event memory;</td>
</tr>
<tr>
<td>- the possibility of choosing a combine harvester from the list, and also the possibility of presetting and changing its parameters*;</td>
</tr>
<tr>
<td>- the possibility to connect a USB flash drive for transferring statistical data and other information to PC*;</td>
</tr>
<tr>
<td>- the mapping function for the crop capacity: the data is provided in form of the data array containing the info about crop capacity, tied to the coordinates*.</td>
</tr>
<tr>
<td>* - only refers to BIUS.01 and BIUS.02</td>
</tr>
</tbody>
</table>
### «LIDA-1300» Onboard Computer

![LIDA-1300 Onboard Computer Image](image)

<table>
<thead>
<tr>
<th>Function</th>
<th>Specification</th>
</tr>
</thead>
</table>
| For the control and optimization of "Lida-1300" grain combine harvester operation; as a warning alarm of operating process set parameters deviation. | The computer is installed in the cab of "Lida-1300" combine harvester as an information display device and provides performance self-monitoring. The following information generated by the computer is displayed on the screens:  
  - Technological cleaning mode (combine harvesting);  
  - Basic driving parameters (transport mode);  
  - The status of sensors;  
  - Suggestions/tips and techniques;  
  - Settings.  
  Computer displays parameter values in a certain range, including the combine speed; number of revolutions (rpm); combine harvester/engine operation time, distance traveled/running hours, both current and total; relative losses of grain while cleaning and straw-walking, etc.  
  The computer controls the rotation speed of combine harvester operative parts and the reduction in rpm drop occurred due to slippage or below the cutoff frequency; switches an audible alarm on and flashes proper icon in excess of the slippage percent or when frequency is below the cutoff.  
  Number of control channels: 2 (threshing drum rpm and fan rpm).  
  Display backlight in the dark and legibility of the display on a sunny day.  
  Setting and adjustment of the grain loss monitor sensitivity based on the crop species.  
  PC power supply: from the onboard network of combine harvester with a rated voltage of 12 V.  
  Maximum power consumption: 20 watts.  
  Operating temperature range: -10 °C up to +45 °C. |
SKWU-M Monitoring and Control Systems for Application of Mineral Fertilizers with Weight Indicator

| Function | Automatic control of mineral fertilizer application and also an automatic dosage control of fertilizer application. The systems are installed in the machines for dosated application of free-running fertilizers. There are produced 4 types of systems:  
| SKWU-M: with color graphic 5.7” LCD display, 640 x 480 resolution, 144 MHz. The system is installed in the machines for dosated application of bulk fertilizers, with fertilizer bin capacity to 10,000 kg;  
| SKWU-M.02: with white/black (monochrome) graphic 5.7” LCD display, 320 x 240 resolution, 16 MHz. The system is installed in the machines for dosated application of bulk fertilizers, with fertilizer bin capacity to 8,000 kg;  
| SKWU-M.03: with white/black (monochrome) graphic 5.7” LCD display, 320 x 240 resolution, 16 MHz. The system is installed in the machines for dosated application of bulk fertilizers, with fertilizer bin capacity to 2,500 kg;  
| SKWU-M.04: with color graphic 5.7” LCD display, 640 x 480 resolution, 144 MHz. The system is installed in the machines for dosated application of bulk fertilizers, with fertilizer bin capacity to 3,500 kg.  
|  
| On the individual customer orders, the system may be equipped with a remote monitoring terminal for implementing the function of GPS navigation and GSM-based data transmission. |

| Specification | The system controls:  
| the velocity of travel;  
| fertilizer input;  
| treated area;  
| machine running hours;  
| the amount (weight) of fertilizer in the bin;  
| PTO rpm.  
| The number of control channels is not less than 4.  
| The accuracy for fertilizer input is not more than 8 %.  
| The system provides for:  
| the possibility of accumulation of statistical data*;  
| the selection of either an automatic or manual operation mode;  
| the calibration function for the fertilizer application rate;  
| the possibility of using GPS navigation (function), data acquisition and transfer over GSM, the function of parallel driving**.  
| When some deviations in the normal operating conditions of the system happen, this is indicated by a text failure message displayed on the screen *.  
| * - the parameter is missing for SKWU-M.02 - SKWU-M.04  
| ** - the parameter is missing for SKWU-M.02, SKWU-M.03 |
SKWU-O Monitoring and Control System for Application of Organic Fertilizers

![Image of SKWU-O system components]

1- Distance covered  
2- Supply voltage  
3- Treated area  
4- System ON/OFF  
Entry screen “Load Tank”  
16-  
15-  
14-  
13-  
12-  
11-  
10-  
9- Entry screen “Drain Mode”  
8- Entry screen “Settings”  
7- Prompt change of flow rate while in operation  
6- Reset current statistical data  
5- Run time  
13- Current flow rate  
14- Velocity of travel  
15- Remaining volume  
16- Date and time

<table>
<thead>
<tr>
<th>Function</th>
<th>To control major parameters of the machines (units) for application of fertilizers and to control the application process of organic fertilizers. On the individual customer orders, the system may be equipped with a remote monitoring terminal for implementing the function of GPS navigation and GSM-based data transmission. The SKWU-O system is comprised of the display unit (DU), control unit (CU), pulse sensor, lead-wire harness.</th>
</tr>
</thead>
</table>
| **Specification** | The system controls:  
  - the velocity of travel;  
  - fertilizer input;  
  - treated area;  
  - machine running hours;  
  - the level (volume) of liquids.  
  The number of control channels is not less than 5.  
  The load current on each control channel is not more than 4 A.  
  The accuracy for fertilizer input is not more than 10 %.  
  The system provides for:  
  - the possibility of accumulation of statistical data;  
  - the selection of either an automatic or manual operation mode;  
  - the calibration function for the fertilizer application rate;  
  - the possibility of using GPS navigation (function), data acquisition and transfer over GSM, the function of parallel driving.  
  When some deviations in the normal operating conditions of the system happen, this is indicated by a text failure message displayed on the screen.  
  System power: from on-board power supply of the tractor with 12 V nominal voltage. |
# SIU-P Management Information Systems for the Pickup Balers

![SIU-P Management Information Systems for the Pickup Balers](image)

| Function | To monitor the process of forming a roll of the pressed mass by actuating light and audible alarms when the preset values of diameter/roll density are reached, to control (switch on/off) wrap twine/net feeding mechanism drive, to control wrap binding process, to trigger alarm in the end of the binding process, to control opening/closing of the chamber, to count the number of rolls.  
The system has 3 design versions:  
- SIU-P.01 - 8 parameters controlled;  
- SIU-P.02 - 6 parameters controlled;  
- SIU-P.03 - 5 parameters controlled.  
The SIU-P.01, SIU-P.02 systems are installed on PRM-150, PR-F-180B, PR-F-110B, PR-F-145B balers and similar types.  
The SIU-P.03 system is installed on the PRL-150A type baler (flax baler). |
| Specification | Monitored parameters:  
- The attainment of the roll density preset value;  
- The feeder drive auto switching-on;  
- The feeder drive manual switching-on;  
- Wrapping machine operation;  
- The opening (closing) of the chamber;  
- Record of the number of rolls;  
- Safety clutches tripping*;  
- The main clutch  
- The pick-up baler clutch.  
Display type - audible (including voice mail), digital, graphical icon or label.  
Power system - in vehicle network of the tractor with 12 V rated voltage.  
* - For SIU-P.01 |
Universal Management System for Bailing Machines SUU-P

Universal management system for bailing machine SUU-P (hereinafter - the system) designed to control the process of forming the roll of harvested mass of fodder or flax by switching of the light and sound alarm when the roll reaches the specified diameter and density, to control the compression mechanisms, diagnosis of faults, voice announcement in case of emergencies.

The main components of the system are: GTU, input-output unit (hereinafter - IOU), monitoring unit (hereinafter - MU), bunches.

- GTU is designed to display information from IOU, as well as to set the system parameters necessary for its operation. GTU is installed in the tractor cab.

- IOU is designed to collect, process and store the information from the sensors, to control the system operation and shall be adjusted taking into account the design features by programming the initial data from the system manufacturer. IOU is installed on the bailing machine (flax bailing machine).

- MU is used to implement GPS navigation functions and to transfer data via GSM. The monitoring unit is installed in the tractor cab. Bunches are used to connect the components of the system to the power source, to connect them to each other and to the bailing machine.

It is allowed to supply the system by separate units and modification required by the consumer, but the system is equipped with optional MU under a separate order.
Technical specifications:

1. The operating temperature range is from -10 °C to +55 °C.
2. The system monitors the following parameters:
   - achievement of the specified density of the roll;
   - roll pre-forming;
   - bailing completion;
   - counting the number of rolls (current, total);
   - length of the bale (for the bailing machine PT-800).
3. The system depending on the type of the bailing machine monitors the following parameters, mechanisms and processes in accordance with Table 1.

<table>
<thead>
<tr>
<th>Parameter, mechanism, process</th>
<th>Type of the bailing machine</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PT-800</td>
</tr>
<tr>
<td>Feeder drive</td>
<td>+</td>
</tr>
<tr>
<td>Speed of the bailing machine</td>
<td>+</td>
</tr>
<tr>
<td>Speed of the pressing belts</td>
<td>-</td>
</tr>
<tr>
<td>Roll (bale) unloading</td>
<td>+</td>
</tr>
<tr>
<td>Compacting pressure</td>
<td>+</td>
</tr>
<tr>
<td>Lubrication system control</td>
<td>+</td>
</tr>
</tbody>
</table>

Note: «+» - available, «-» - not available.

4. Information mentioned in Item 2 is displayed on GTU screen in analog, light and digital form, and has audible warning.
5. The system has the bailing mode selection (twine, mesh).
6. The system has the option of accumulation and output of statistical (alarm) data.
7. The system has the option of displaying the information about failures.
8. The system has the option of using the GPS navigation (function), data collection and data transfer via GSM (optional).
9. The system is powered from the tractor on-board network with the rated voltage U =12 V.
10. The maximum power consumption is not more than 6 W.
11. The load current for each control channel is not more than 2 A.
12. The system weight is not more than 12.0 kg.
13. The degree of GTU protection provided by the casing (casing 2) is IP54 according to GOST 14254-96. The degree of protection of IOU and MU maintained by the casing (casing 2) is IP55 according to GOST 14254-96.
14. The mean time to failure shall be not less than 5 000 h.
15. The average recovery time of the system should be less than 3 hours.
16. The average life should be less than 10 years according to STB 1616-2011.
# SKM Mass Monitoring Microprocessor Systems

To display the dosage measurement of weighted components. The system is installed on the towed and stationary feed dispensers, and is used in the process of forage preparation/blending. The system cannot be used as weigh scales or weigh batcher for commercial purposes.

**System structure includes:**
- Display Unit (DU);
- Input/Output Unit (IOU);
- Tenselectric sensor - 3 pcs.

There are 2 types of this system:
- SKM-01 - indicated information is displayed on 6-segment LEDs, there is an analog link between Display Unit (DU) and Input/Output Unit (IOU);
- SKM-02 - indicated information is displayed on a six-digit LCD, the connection between Display Unit (DU) and Input/Output Unit (IOU) is carried out via CAN bus.

<table>
<thead>
<tr>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weighing display range: 5 up to 5000 kg.</td>
</tr>
<tr>
<td>Zero calibration range: 0,05 up to 5 mV.</td>
</tr>
<tr>
<td>Zeroing range: ± 2% of the maximum weighing range (scale capacity).</td>
</tr>
<tr>
<td>Discrete is selected from “1, 2, 5” range.</td>
</tr>
<tr>
<td>Power system - in vehicle network of the tractor with a rated voltage of 12 V.</td>
</tr>
<tr>
<td>Maximum power consumption: 10 W.</td>
</tr>
<tr>
<td>Weight: 30 kg max.</td>
</tr>
<tr>
<td>Operating temperature range: - 20 °C up to + 45 °C.</td>
</tr>
</tbody>
</table>
Fertilizer Application System SVK

1. DESCRIPTION AND OPERATION
1.1. Purpose of the product

1.1.1. SVK system is designed to control stalk fodder processing using solutions of fertilizers in order to maintain nutritional value and safety of fodder during storage.

1.1.2. SVK system is installed on "Polesye" combine harvesters of ICC-800-36 model and their modifications used in enterprises of the agricultural sector. The system is of mounted type.

1.2. Specifications

1.2.1. The operating temperature range is from +1°C to +45°C, the extreme temperatures range is from -5°C to +55°C.

1.2.2. The system displays the parameters in accordance with Table 1.

<table>
<thead>
<tr>
<th>Displayed parameter</th>
<th>Unit</th>
<th>Displayed range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specified flow rate (discharge rate)</td>
<td>l/min</td>
<td>From 1.00 to 10.00</td>
</tr>
<tr>
<td>Current flow rate (fluid flow rate)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amount of the fluid used</td>
<td>l</td>
<td>From 1 to 300</td>
</tr>
</tbody>
</table>

1.2.3. The system monitors the following parameters and mechanisms:
- Online change in the volume of the fluid (fertilizer) feed;
- Switching on the pump;
- Presence of herbage in the silage spout.

1.2.4. Deviation of the fluid feed from the specified value is ± 5%.

1.2.5. The system has the mode selection - automatic or manual.

1.2.6. The system has the option of accumulation and output of statistical (alarm) data.

1.2.7. The system is powered from the on-board network of the combine harvester with the rated voltage of 24 V.

1.2.8. The maximum power consumption does not exceed 150 W.

1.2.9. The load current in the control channel is not more than 10 A.

1.2.10. The bunch insulation resistance shall be not less than 20 MOhm.

1.2.11. The system weight is (14 ± 1) kg.

1.2.12. Overall and mounting dimensions of the main components of the system are shown in Figures 1 - 3.

1.2.13. The degree of protection of the display unit (hereinafter - DU) maintained by the casing (casing 2) is IP53 according to GOST 14254. The degree of protection of the control unit (hereinafter - CU) maintained by the casing (casing 2) is IP65 according to GOST 14254.

1.2.14. The mean time to failure (during the warranty period) shall be not less than 115 hours according to STB 1616-2011.

1.2.15. The average recovery time is not more than 3 hours.
2. DESIGN AND OPERATION

2.1. Configuration of the system
2.1.1. The main components of the system are shown in Figure 1.

![Figure 1](image)

1 – control unit; 2 – display unit; 3 – filter;
4 – flow sensor (flow meter);
5 – electric pump; 6 – spray unit;
7 – mini-valve; 8 – weight sensor;
9 – connecting hoses; 10 – canister assembly.

Note - The spray unit includes the interception device with the individual filter and a slot nozzle ST110.04
2.2. Appearance of DU front panel and the viewports
2.2.1. Appearance of DU front panel, the mode screen and the function keys are shown in Figure 2.

Figure 2
Figure 3

Icon of the pump switch on

Pump capacity scale
Systems for combine harvester output mapping with the remote monitoring function SKU.01 (hereinafter - the system) is designed to determine the yield of grain crops in relation to the coordinates as a part of combine harvesters, universal power means.

SKU.01 system includes: graphical terminal unit (hereinafter - GTU); input-output unit (hereinafter - IOU); GPS positioning unit (hereinafter - PU); humidity sensor; tilt sensor; optical sensors; bunches.

GTU is designed to display information from various sensors and to implement the dialogue "operator-combine harvester". GTU is installed in the cab of the combine harvester.

IOU is designed to collect information from the units and working bodies of the combine harvester, convert and transfer it to CAN-network. IOU is installed in a special cabinet for connecting to the electric circuit of the combine harvester.

PU is designed to determine the driving speed and the location of the combine harvester on the plain and height. PU is installed in the combine harvester cab. GPS antenna and GSM antenna are connected to PU. GPS antenna is designed to receive signals of GPS/ NAVSTAR satellite navigation system in WGS-84 coordinate system. GSM antenna is designed to communicate with a remote computer system (server).

The humidity sensor is used to determine moisture in the grain flow. It is installed in the bottom of the feed auger casing.

The tilt sensor is used to measure the combine harvester tilt relative to the vertical plane. It is mounted on a horizontal plane of the combine body parallel to the Earth's surface.
Optical sensors are used to determine the quantity of grain passing through the combine harvester grain elevator per unit time. It is mounted in the side walls of the casing of the grain elevator.

Bunches are used to connect the components of the system to the power source, to connect them to each other and to the combine harvester.

It is allowed to supply the system by separate units and in the modifications required by the consumer.

Technical specifications:
1. The operating temperature range is from -10 °C to +50 °C.
2. The system monitors the following parameters:
   - Grain humidity;
   - Tilt angle;
   - Grain volume (current, total);
   - Treated area (current, total).
3. Information mentioned in Item 2 is displayed on GTU screen in analog, light and digital form, and has audible warning.
4. The system has the option to calibrate the humidity sensor, tilt sensor, optical sensors and the actual grain weight.
5. The system has the option of collecting data from the sensors, their recording to the portable data medium (memory card) for later transfer of the information to the PC.
6. The system has the option to display information about failures.
7. The system is powered from the on-board network with the rated voltage of 12 V or 24 V.
8. The maximum power consumption does not exceed 100 W.
9. The system weight is not more than 3.0 kg.
10. The degree of protection against ingress of foreign bodies and water according to GOST 14254:
    - IP54 (Category 2) for GTU and PU;
    - IP65 (Category 2) for all other units.
11. The mean time to failure shall be not less than 10 000 hours.
12. The average recovery time of the system should be less than 3 hours.
13. The average life should be not less than 8 years according to STB 1616-2011.
### Piezoelectric Sensor of Grain Loss DPZP-1

<table>
<thead>
<tr>
<th>Function</th>
<th>Designed for mechanical energy conversion of grain fall on the sensor working surface to an equivalent electrical signal. Mounted on combine harvesters.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specification</td>
<td>The maximum output voltage from the sensor when millet, wheat (rye, barley), oat, maize or pea grains fall - not less than 100 mV. Electrical capacity - not less than 1.2 nF. Weight - not more than 0.4 kg.</td>
</tr>
</tbody>
</table>

### Piezoelectric Active Sensors of Grain Loss DPZP-A

<table>
<thead>
<tr>
<th>Function</th>
<th>Designed for mechanical energy conversion of grain fall on the sensor working surface to a square-shape electric signal. Operate together with an on-board computer or monitor unit mounted on combine harvesters to control losses of grain after straw shaking and cleaning. There are two types of sensors: square (4 versions) and tubular (2 versions).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specification</td>
<td>Output signal amplitude at a nominal supply voltage of 12 V is not less than 5 V. Output pulse duration is in the range from 1 to 7 ms. Maximum load current - not more than 100 mA.</td>
</tr>
</tbody>
</table>

DPZP-A-T

DPZP-A-P
Semiconductor Protective Device PZP-01

Semiconductor protective device PZP-01 TV BY 200007171.024-2005 is designed for protection of combine harvester electric circuits against voltage pulse electric loads.

Specification

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output voltage when connecting the load</td>
<td>From 0.5 to 1.2 V</td>
</tr>
<tr>
<td>Weight, max</td>
<td>0.04 kg</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>From -40 to +70 °C</td>
</tr>
</tbody>
</table>

Unified Frequency Display Unit BICH - U.03

Designed to work as part of the kit of electronic components of the automated control system of technological modes of combine harvester operation.

The unit indicates and controls the following parameters: speed; threshing drum speed; cleaning fan speed; motor crankshaft speed; actual operating time; current travel; actual treated area; current performance; reduction of the threshing drum speed.
Multiple-Tone Reverse Warning Buzzer SZHR - 01

<table>
<thead>
<tr>
<th>Function</th>
<th>Designed for warning about reverse movement of a vehicle by means of an acoustic signal. Mounted on combine harvesters.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specification</td>
<td>Sound pressure level at the distance of 4 m - not less than 80 dB&lt;br&gt;Power - on-board combine harvester network at Un = 24 V.&lt;br&gt;Power consumption - not more than 10 W&lt;br&gt;Weight - not more than 0.3 kg</td>
</tr>
</tbody>
</table>

Multiple-Tone Reverse Warning Buzzer SZHR

Multiple-Tone Reverse Warning Buzzer SZHR TY BY 200007171.021-2005 is designed for warning about reverse movement of a vehicle by means of an acoustic signal.

Connection to the motor vehicle, depending on the wishes of the customer, is made by means of:
- terminals KS-502602 TY BY 200026033.012-2008
- pin connector for 2 terminals 0-0282104-1 of «AMP» company*

* - The mate for the pin connector for 2 terminals 0-0282104-1 of «AMP» company is supplied with SZHR at the request of the customer.
Specification

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sound pressure level at the distance of 1 m, min</td>
<td>80 dB</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>on-board network 12 V on-board network 24 V</td>
</tr>
<tr>
<td>Power consumption, max</td>
<td>10 W</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>from -40 °C to +60 °C</td>
</tr>
<tr>
<td>Weight, max</td>
<td>0.3 kg</td>
</tr>
<tr>
<td>Housing protection level</td>
<td>IP57</td>
</tr>
</tbody>
</table>

**SZHR installation, connection and overall dimensions**

![Diagram of SZHR installation and connections](image)

**Figure 1**
SZHR installation, connection and overall dimensions

Figure 2

<table>
<thead>
<tr>
<th>Pin connector</th>
<th>Circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td>-</td>
</tr>
</tbody>
</table>

Pin connector for 2 terminals 0-0282104-1 company «AMP»
**Signal Switch KS**

![Signal Switch KS image]

**Function**
- Designed for switching of incoming circuit signals to an outgoing circuit.
- Mounted on combine harvesters.
- The switch has two versions:
  - KS – 3/1 - switching of three-wire incoming circuit signals to a single-wire outgoing circuit;
  - KS – 4/1 - switching the four-wire incoming circuit to a single-wire outgoing circuit.

**Specification**
- Weight - not more than 0.17 kg

---

**Motormeter IM-01**

![Motormeter IM-01 image]

**Function**
- Designed for displaying the run time of the agricultural machine motor.
- The motormeter ensures the beginning of motor run counting when 21.6 to 32 V command voltage is supplied to it.
- The beginning of the motor run counting is voltage supply to the motormeter power bunch block, at that the information appears on the display in (10 – 15) s.
- When counting the motor run time, a separating character of hours and minutes is flickering in second’s beat, and when the counting stops, flickering ceases.

**Specification**
- The motor run time range display is from 00000 – 00 to 99999 h – 59 min.
- Resolution - 1 minute.
- Weight - not more than 0.2 kg.
Sensors for Fluid Level DUZH

DUZH-T.01

DUZH-MA.01

**Function**

Sensors are used in agricultural machinery and installed on combine harvesters manufactured by JSC “Lidagroprommash”.

There are two types of sensors:

- DUZH-MA.01 – emergency oil sensor of fluid level - to convert the oil level in the oil tank into the equivalent resistance and to initiate the signal on the minimum oil level through switching the signal lamp.
- DUZH-T.01 – oil sensor of fluid level - to convert the oil level in the oil tank into the equivalent resistance.

DUZH-T.01 sensor operates in conjunction with a special display or information monitor that converts the resistance into the fuel level values.

**Specification**

Sensor resistance depending on the position of the float corresponds to:

<table>
<thead>
<tr>
<th>Float position</th>
<th>Resistance, kOhm</th>
</tr>
</thead>
<tbody>
<tr>
<td>All floats are in the highest position</td>
<td>not more than 0.002</td>
</tr>
<tr>
<td>Float 1 is in the lower position</td>
<td>0.6 ± 0.1</td>
</tr>
<tr>
<td>Floats 1, 2 are in the lower position</td>
<td>2.2 ± 0.2</td>
</tr>
<tr>
<td>Floats 1, 2, 3 are in the lower position</td>
<td>7.5 ± 0.8</td>
</tr>
<tr>
<td>All the floats are in the lowest position</td>
<td>∞</td>
</tr>
<tr>
<td>Max. weight, kg</td>
<td>0.7</td>
</tr>
</tbody>
</table>

The floats are counted from the bunches – 1, 2, 3, 4