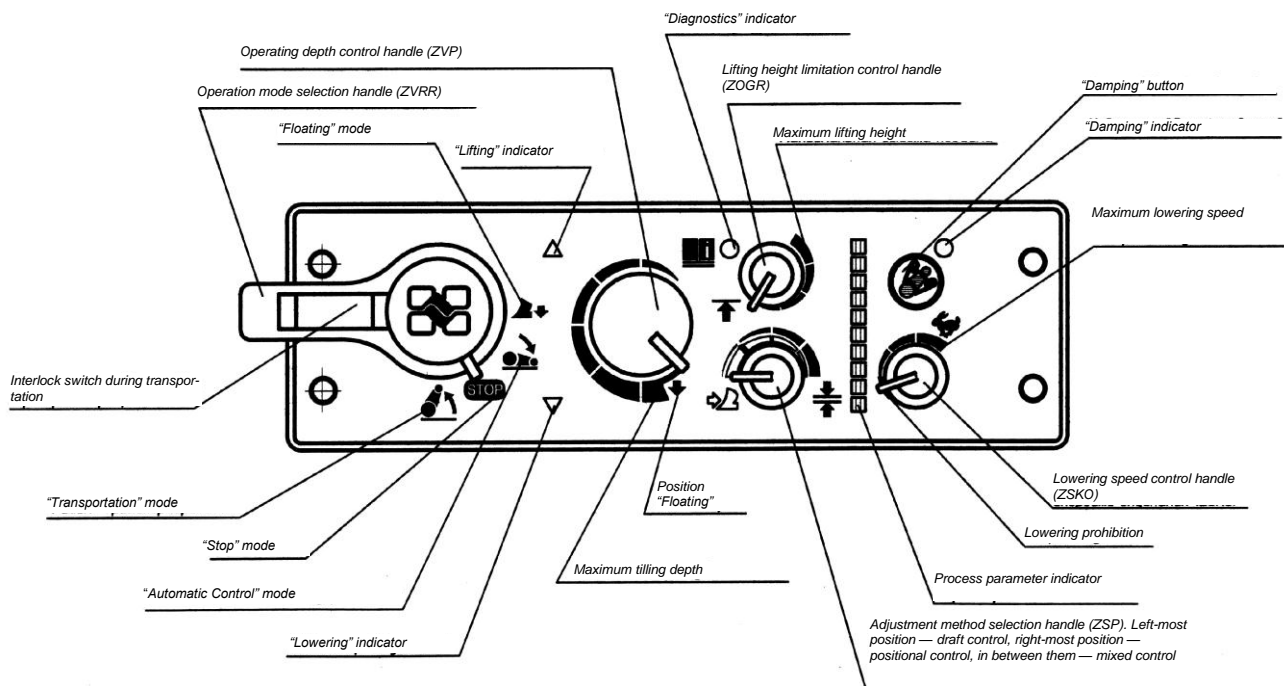


LINKAGE CONTROL SYSTEM EHR
(made in Belarus, JSC “IZMERITEL”)

AMENDMENT
to the Manual of KIROVETS Tractors
K-744R1, K-744R2, K-744R3, K-744R4
(744P-0000010ИЭ)

General

The rear linkage control system provides for operation with mounted implements in the following modes: manual control with external buttons, positional, power and combined control, floating, transportation, transportation with vibration dampening.



Rear linkage control panel

System operation modes

System operation modes are given in Table 1.

Table 1

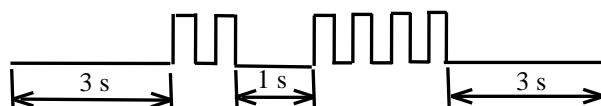
| Operation mode | Position of controls and indication of mode |
|----------------|--|
| STOP | Set the mode selection handle of the control panel to STOP position. The system doesn't respond to external actions, operation of the system is blocked. Control of electrohydraulic regulator (EHR) is possible only from external buttons. |

| Operation mode | Position of controls and indication of mode |
|-------------------------------------|--|
| TRANSPORTATION (linkage lifting) | <p>Set the mode selection handle of the control panel to position TRANSPORTATION. Adjust linkage lifting height with the lifting height limitation handle.</p> <p>Indicator LIFTING illuminates at the control panel upon linkage lifting.</p> <p>In case of necessity (during transportation), lock the mode switching during transportation with the switch located on the mode selection handle.</p> <p>If needed, press button DAMPING to activate the mode of damping mechanical vibrations in the course of transportation.</p> |
| FLOATING (linkage lowering) | <p>Adjust linkage lowering speed with the lowering speed adjustment handle. Set the mode selection handle to the "FLOATING" position, while holding the handle in the desired position by hand.</p> <p>Indicator LOWERING illuminates at the control panel upon linkage lowering.</p> <p>Extreme left position of the lowering speed adjustment handle is lowering prohibition.</p> |
| AUTOMATIC CONTROL | <p>Shift the mode selection handle to position AUTOMATIC CONTROL.</p> <p>Set control method with the control method selection handle — positional, draft or mixed.</p> <p>Set required cultivation depth with the soil cultivation depth adjustment handle.</p> <p>In the course of operation, indicators LIFTING and LOWERING light up and go out by turns. Extinction of both indicators LIFTING and LOWERING means that the minimum mismatch between set and measured parameters is achieved in the system and the system is in the dead zone.</p> <p>In the modes of mixed and draft control, "blinking" of the "LIFT" LED is possible with the "MAXIMUM LIFTING HEIGHT" handle in the max position.</p> |

System diagnostics and troubleshooting

System diagnostics is not performed in mode STOP (system operation is blocked).

The fault code lights up at the indicator DIAGNOSTICS as per diagram given in Fig.



Fault code “24” is given as an example.

Fault codes are given in Table 2.

Table 2

| Code | Short description of fault | Troubleshooting method |
|------|--|--|
| 11 | Open circuit of upper solenoid | Check wires connected to the solenoid. If they are not faulty check the solenoid. Replace it in case of fault. |
| 12 | Open circuit of lower solenoid | Check wires connected to the solenoid. If they are not faulty check the solenoid. Replace it in case of fault. |
| 13 | Short circuit (SC) in solenoid circuits | Check the system solenoid circuits for SC. |
| 14 | SC of button LIFTING of the remote panel | Check the button for SC. |
| 15 | SC of button LOWERING of the remote panel | Check the button for SC. |
| 16 | Voltage at power supply source +9.5 V (for controllers MK-03-03 and MK-04-04) is below 9.25 V or above 9.75 V. Voltage at power supply source +5 V (for controller MK-04-04) is below 4.7 V or above 5.2 V | Check supply circuits for a short circuit to in-vehicle electric mains, frame. Eliminate SC, if found. |
| 19 | System power supply value is below 10.7 V or above 16 V | Check the voltage at output from the voltage converter. If necessary, replace it. Fault code triggering is also possible at a long-term starter operation (low voltage for more than 6 seconds). If this is the case, switch over the operation mode selection potentiometer after a successful engine start-up to position ‘transport’, ‘automatic control’, ‘stop’ several times before the fault code goes out. |
| 22 | Position sensor failed | 1. Check that the position sensor is installed correctly according to the section “Method for installing and adjusting the cam and position sensor”. 2. Check that there is a supply voltage at the sensor connector pins. When it is there and there are no visible damage to the cable replace the sensor. |

| Code | Short description of fault | Troubleshooting method |
|--------|---|--|
| 23 | Soil cultivation depth control potentiometer failed | Replace the control panel. |
| 24 | Height limitation control potentiometer failed | Replace the control panel. |
| 28 | Operation mode selection potentiometer failed | Replace the control panel. |
| 31, 32 | Force sensor 1, force sensor 2 failed, respectively | Check that there is a supply voltage at the sensor connector pins. When it is there and there are no visible damage to the cable replace the sensor. |
| 34 | Lowering speed control potentiometer failed | Replace the control panel. |
| 36 | Control method selection potentiometer failed | Replace the control panel. |
| 97 | No solenoid current via LOWERING channel in the absence of solenoid open circuit and short-circuit between controller contacts 14, 6 (earth of solenoids) | Check contacts 14, 1 for SC In case of a short circuit (resistance below 1.5 Ohm), eliminate it or otherwise replace the controller. |
| 98 | No solenoid current via channel LIFTING in the absence of solenoid open circuit and SC between controller contacts 2, 6 (earth of solenoids) | Check contacts 2, 1 for SC In case of a short circuit (resistance below 1.5 Ohm), eliminate it or otherwise replace the controller. |
| 99 | Current drain via one or two channels LIFTING, LOWERING. | Replace the controller. |
| - | No lowering or lifting of the linkage when controlled from the main control panel. No indication of fault. | Check EHR. If it's not faulty, replace the controller. |

After mode DIAGNOSTICS, the system shall be returned to operating condition as follows:

- switch off power supply and in 3–4 s switch it back on.

When the power supply system receives 12 V, indicators DIAGNOSTICS and DAMPING shall light up, then indicator DAMPING shall go out:

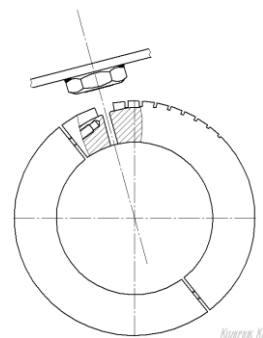
- shift the mode selection handle to mode STOP and then to the required mode.

Method of cam and position sensor installation and adjustment

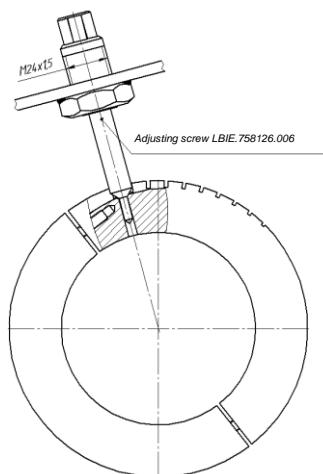
For a correct installation of cam and position sensor, do the following:

- using remote buttons, lift the linkage for the maximum height (pump operation for safety valves is not allowed at the point of maximum lifting);

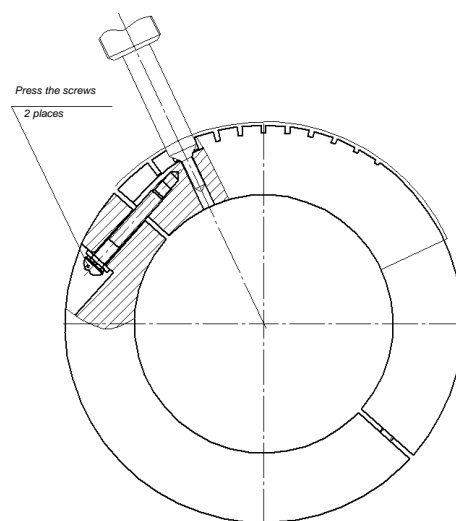
- mount the cam on the turning shaft roughly, with a partial tightening of cam screws, so as to have the bracket threaded part hole on the same axis with the hole for cam adjusting screw;

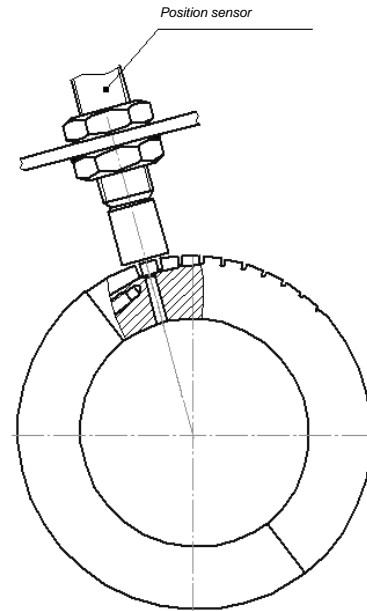


- while turning the cam, screw in the adjusting screw (put in the tractor SPTA) so that it enters in the cam hole.



- tighten the cam screws





- screw out the adjusting screw and screw in the DP-01P position sensor instead all the way in the cam, then screw out the position sensor by 1.5 turns back to provide for a clearance between the sensor and the cam.

- start the tractor, move the lifting height limitation sensor to the maximum lifting height position, the operating mode selection handle to the transportation position;
- in case of a non-stopping correction for height (seen by the LIFTING indicator at the linkage control panel), lower the linkage and screw the position sensor out by a half of turn;
- repeat the previous paragraph until a successful completion of the correction for height ('lifting' indicator shall go out at the upper position of the linkage);
- fix the position sensor with lock nut.

Maintenance

The system is to be regularly maintained.

Service personnel must carry out once per month:

- system cleaning from dust and dirt;
- inspection of indication elements.