<u>3 DRIVE CONTROLS AND INSTRUMENTATION</u>

3.1 DRIVE CONTROLS



- 1. Battery remote disconnection switch
- 2. Starter and instrumentation switch
- 3. Multi-function control stalk (turn indicators, high-low beam, horn)
- 4. Front floodlights switch
- Instrument Cluster (pos. 5, 6, 7, 8, 9, 10)
- 5. GB oil pressure gauge
- 6. Pneumatic system air pressure gauge
- 7. Fuel-level gauge
- 8. Voltage indicator
- 9. Coolant temperature gauge
- 10. Engine lubrication system oil pressure gauge
- 11. Pilot lamp panel
- 12. Combined indicator
- 13. Sun visor
- 14.Air distributors
- 15. Air recirculation gate outlets
- 16.Switch in-line block (floodlights, heater fan, rear window wipers, "Road train" light)
- 17.Door lock
- 18.Steering wheel
- 19.Indicator control panel
- 20.Windscreen wiper and washer lever switch
- 21.Fault signalling push-button
- 22. Central light switch
- 23. Steering wheel tilt adjustment lever

- 24. Fuel feed control level
- 25.Service brake pedal
- 26.Clutch pedal
- 26a. Knob handle for engine stoppage emergency shutdown
- 27. Gear-shift lever
- 28. Range selector lever
- 29. Fuel feed control lever
- 30. PTO operating lever
- 31. Hydraulic hitch linkage control unit
- 32. Control panel of the differential lock-up, FDA and FPTO (if installed)
- 33. External hydraulic cylinders control handles
- 34. Seat
- 35. PTO independent/synchronous drive changeover lever
- 36, 37. Creeper gear control lever (if installed)
- 38.Parking brake lever



Starter and instrumentation switch (2)

The switch 2 has four positions:

- 0 –OFF;
- I –instruments, pilot lamp block and glow plugs are on; simultaneously, the emergency oil pressure warning lamp on the engine oil pressure indicator lights up and the horn (buzzer) sounds;
- II –the starter is ON (non-fixed position); once the engine has started, the warning lamp goes out and the horn stops;
- III -power supply of the radio set, tape recorder, etc. (by turning the key counterclockwise).



Important: Before to operate the tractor, study the appointment of controls, instrumentation and their functions.

3.2 Combined indicator

The combined indicator (hereinafter referred to as the TSM) displays the information on the operating parameters of the systems and units of the tractor and provides the operator with the data on a disturbance of the operation or failure of any systems.



The TSM comprises the following indicators and signalling lamps:

- 1 speed gauge (pointer indicator);
- 2 engine rotational speed gauge (pointer indicator);
- 3 PTO rotational speed gauge (light indicator);
- 3.1, 3.5 segments of the PTO rotational speed scale (yellow);
- 3.2, 3.3, 3.4 segments of the PTO rotational speed scale (green);
- 4.1, 4.2- indicators of the ranges of the PTO rotational speed scales (yellow);
- 5 light indicator of switching on the high beam of the headlights (blue);
- 6 light indicator of switching on the trailer turn indicators (green);
- 7 light indicator of switching on the tractor turn indicators (green);
- 8 light indicator of application of the parking brake (red);
- 9 light indicator of application of overvoltage of the on-board electric circuit (red);
- 10 light indicator of application of the low level of the coolant (yellow);
- 11 multifunctional indicator;

3.3 Multifunctional Indicator (11)



1 – numerical designation of the position of the gearbox switch (digits from 0 to 6) or alphabetical designation of the reduction gear switch position (letters L, M, H and N);

2- current numerical value of one of the parameters of the tractor systems

System parameters of the tractor:

,4 33533	1. Total astronomical time of running of the engine . The counter accumulates the information on the total time of running of the en-gine when transmitting the message "engine rotational speed" from the engine control unit and saves the same on stopping the engine.
485 min ⁻	PTO rotational speed. In this mode, the PTO rotational speed is displayed in the digital form depending on the signal from the PTO rotational speed sensor.
	Remaining fuel volume. Attention! This mode is only available on the stopped tractor (in the absence of signals from the speed sensors).
42.5	Instant fuel consumption. In this mode, the current value of the instant fuel consumption is displayed
13.Ť	On-board power supply system voltage. In this mode, the current on-board power supply system voltage is displayed.
ž.	Time of work with the remaining fuel. In this mode, the predicted time of work of the engine calculated for the current values of the instant fuel consumption and remaining fuel

NOTE. Switching between indication modes «Total astronomical time of running of the engine», «PTO rotational speed», « Remaining fuel volume» is accomplishing by pressing the button «Mode control»



Diagnostics of the serviceability and connection of the sensors:

1. Diagnostics of the serviceability and connection of the speed sensors:



In case of absence of the signals from the speed sensors for 10-12 seconds, the mes-sage in the form of the digit "0" (zero) characterizing the faulty sensor location (left or right) appears on the LCD.

2. Diagnostics of serviceability of the frequency-type fuel volume sensor (FFVS):



In case of absence of the frequency-type signal from the FFVS for 2 seconds, the "FUEL" message is shown on the LCD for 2 seconds;

3 Diagnostics of serviceability and connection of the CAN-bus to the CI c CAN-interface:



The absence of the signals over the CAN-bus (CI) is accompanied by the message "C-BUS";

Each fault message (Example: 0----, FUEL, C-BUS) is displayed by priority on the LCD regardless the information displayed. When pressing the "Mode" button, the messages shall be scrolled in turn. When viewing the last message and repeated pressing the "Mode" button, the LCD is switched to the display mode over the cycle of the preliminarily specified work parameters.

The fault messages are displayed on the LCD each time the instrument is switched on till the moment of elimination of the cause of the fault.

Notes:

1 - On switching on the CI, the information is displayed on the MI in the indication mode selected before switching off the CI power supply.

2 - In the absence of the information on the vales of the parameters received from the engine control unit only, the respective indication modes are switched off automatically.



3.4 Combination of instruments

Includes 6 gauges (11, 12, 13, 14, 15, 16) with the signal lamps (11a, 12a, 13a, 14a, 15a, 16a)

GB Oil Pressure Gauge - (11).

The gauge scale has three zones:- operating — от 800 до 1500 кРа(8... 15 kgf/cm2); - non-operating (two) — from 400 to 800 κPa (4...8, kgf/cm2) and from 1500 to 1800 κPa (15... 18 kgf/cm2);

(11a) – Emergency signal lamp oil pressure lubrication system for the transmission - is not used.

Pneumatic System Air Pressure Gauge - (12)

The gauge scale has three zones:

- operating: from 500 to 800 kPa (5...8 kgf/cm2); _
- non-operating (2 off): from 0 to 500 kPa (0...5 kgf/cm2) and from 800 to 1000 kPa
- (8...10 kgf/cm2).

The gauge scale is provided with a red pilot lamp (6a) which lights up when the pressure in the pneumatic system drops below 500 kPa (5 kgf/cm2).

Voltage gauge - (13) The device indicates SB voltage on a shut down engine, when the starter key (2) is in position "I". When the engine is running, the indicator shows the voltage at the alternator terminals. A red pilot lamp (13a) is built into the voltage indicator. It lights up, if no charging of an auxiliary storage battery occurs. Shows the process of recharging of the second battery with voltage 24V.

Fuel-Level Gauge - (14) with an amber reserve fuel lamp (14a).

The gauge scale has the following marks: "0 - 1/4 - 1/2 - 3/4 - 1". Do not allow the using of fuel until the "dry tank" condition (an arrow is in the orange color zone).

Engine Coolant Temperature Gauge - (15) with an alarm temperature signal lamp (15a). Read the information from engine control unit (ECU).

The gauge scale has 3 zones: operating — $70-100^{\circ}$ C — green color; non-operating (two) — $40-70^{\circ}$ C and $100-120^{\circ}$ C — red color.

The signal lamp (15a) operates in two modes: A)- switching on and operates in a blinking mode at the temperature of coolant (TOF) from $(109\pm0,5)^{\circ}$ C to $(112\pm0,5)^{\circ}$ C incl. B) – lights continuously at values of TOF (113±0,5) °C and higher.

Engine Lubrication System Oil Pressure Gauge - (16) with a red pilot lamp of the emergency oil pressure drop (16a). Read the information from engine control unit (ECU). The gauge scale has 3 zones:•Operating — from 100 to 500 κ Pa (1-5 kgf/cm2)— green color; non-operating (2 off) – from 0 to 100 kPa (0...1 kgf/cm2) and from 500 to 600 kPa (5...6 kgf/cm2).



Front Window Wiper (1)

On depression of the key-switch (1) the front window wiper is turned ON.

Cab Heater Fan Selector Switch (2)

On depressing of the key-switch (2) the ventilator of heating and cooling system is turned ON in the cab. The switch has three positions:

- 1. OFF.
- 2. 1st operational regime (low air supply).
- 3. 2nd operational regime (high air supply).

Rear Floodlights Switch (3)

On depression of the key-switch, rear floodlights and key light indicators are turned ON

Front Floodlights Switch (4)

On depression of the key-switch, front floodlights and key light indicators are turned ON.

"Road train" Sign Light Switch (5)

When the key is pressed, the road train signal and the indicator key lamp light up.

3.5 AIR CONDITIONING AND CAB HEATING SYSTEM



The control panel comprises the switches (1) and (2) 1 –The switch of air consumption;

2 - The switch of the air conditioning and varying the cold and dried air .

3.6 PILOT LAMP UNIT

The pilot lamp unit includes five lamps.

Arrangement of the pilot lamps:



Principle of operation of the pilot lamps:

a) The warning lamp of the emergency oil pressure drop in the HPS lights up when the oil pressure in the hydraulic system of the HPS drops below 0.08 MPa;

b) The warning lamp of maximum clogging of the air cleaner filter lights up when the maximum permissible level of clogging is exceeded and its cleaning is necessary;

c) The rear axle differential locking pilot lamp lights up when the rear axle differential locking is applied;

d) The warning lamp of the brake fluid level lights up when the brake fluid level in the reservoirs of the master brake cylinder drops below the permissible one;

e) The glow plug pilot lamp indicates the operation of the glow plugs.

3.7 Electrical equipment connecting elements



Marking the socket terminals:

- 1 stop light;
- 2 left-hand turn signal;
- 3 left-hand marker light;
- 4 audible signalling device;
- 5 battery disconnect switch;
- 6 right-hand turn signal;
- 7 right-hand marker light;
- 8 socket for plugging in a portable lamp.

A combined multi-function socket is provided for connecting the current-consuming loads of a trailer or trailed agricultural implements, as well as a portable inspection lamp. The socket is installed externally on the rear cab wall.

The socket is designed to be plugged in with the wire braid assembly connectors and portable lamp jack-plug.

3.9 GEAR-SHIFT CONTROL (1523.3/1523B.3)



The gear-shift diagram is shown in the figure on the right (Diagram I). Pushbutton (27a) for engagement of the lowest stage (L) of the GB reduction gear. Pushbutton (27b) for engagement of the highest stage (H) of the GB reduction gear. Range selector lever (28)

A change-over diagram is shown in Fig-ure on the right (Diagram II).

Fuel Feed Control Handle (29)

Pushing the handle in the direction of tractor head-on movement increases the fuel feed and vice versa. The rearmost position of the handle corresponds to minimum idling rotational speed.

3.10 PTO OPERATING And FUEL FEED CONTROL

Fuel Feed Control Handle (29)

Pushing the handle in the direction of tractor head-on movement increases the fuel feed and vice versa. The rearmost position of the handle corresponds to minimum idling rotational speed.¹

PTO operating lever (30)

The lever has two positions:

- Position "T" (brake): outermost rear top position, the PTO is disengaged and the tail-piece is braked.
- Position "F" (friction): outermost front bottom position, the PTO is engaged and the tail-piece rotates;

Fuel Feed Control Handle (29)

Pushing the handle in the direction of tractor head-on movement increases the fuel feed and vice versa. The rearmost position of the handle corresponds to minimum idling rotational speed.



3.11 Control panel of the differential lock, FDA and front PTO shaft (32) (if installed)

The control of the dumping mode shall be only exercised by means of the but-ton located on the RHL control panel (see section "Construction and Operation"). The variant of mounting of the key for controlling the dumping mode on the control panel of the differential lock, FDA and front PTO is not used on the tractors.



Panel of the control unit of the differential lock and FDA (if the front PTO is not in-stalled) 1 – horn push pad; 2 – pilot lamp of engagement of the FDA drive; 3 – FDA drive control switch; 4 – pilot lamp of the differential lock application; 5 – differential lock control switch; 6 – pilot lamp of the highest stage of the GB reduction gear; 7 – pilot lamp of the lowest stage of the GB reduction gear; 8 – fuse block cover.

¹ For stopping the engine or emergency shutdown of the same, an additional handle is provided.



Panel of the control unit of the differential lock, FDA and front PTO

1 – horn push pad; 2 – FDA drive control switch; 3 – pilot lamp of engagement of the FDA drive; 4 – pilot lamp of the differential lock application; 5 – differential lock control switch; 6 – front PTO control switch; 7 – pilot lamp of engagement of the front PTO; 8 – front PTO engagement button; 9 – pilot lamp of the highest stage of the GB reduction gear; 10 – pilot lamp of the lowest stage of the GB reduction gear; 11 – choke.

Note: purpose and principle of operation of the elements of the panel of the control unit of the differential lock, FDA and front PTO (if installed) shown in the figures as well as places of their location, purpose and principle of operation of the elements of control of the GB reduction gear and RHL are provided in the section "Construction and Operation".

3.12 Hydraulic Distributor Control

Hydraulic Distributor Control Levers (33a, 336, 33B)

The control levers are located on the right-hand side panel in the cab. The handle have "neutral", "drop", "floating" and "lift" positions.

The handle (33a) controls the left-hand distributor section, if viewed in the direction of tractor running, and the rear left outlets of the hydraulic system. It can be fixed in the "floating" and "neutral" positions. The handle (336) controls the middle section of the distributor and the middle rear outlets of the hydraulic system. It can be fixed in the "floating" and "neutral".

The handle (33B) controls the right-hand section of the distributor and right-hand rear outlets of the hydraulic system. It can be fixed in all the positions except for the "drop" one.



3.13 PTO Independent/Synchronous and Creeper Gear control PTO Independent/Synchronous Change-Over Handle (35)

The handle (35) has three positions:

•"Independent PTO Engaged": uppermost position;

• "Disengaged" (neutral): midposition;

• "PTO Synchronous Drive Engaged": the extreme bottom position.

Creeper gear control lever (36, 37)

- Creeper gear "Engaged": the rod (13) is depressed and the rod (12) is lifted;
- •Creeper gear "Disengaged": the rod (13) is lifted and the rod (12) is de-pressed

Parking Brake Control Lever (38)

- "Parking brake applied": top position.
- "Parking brake applied": bottom position.



Speed selector of the independent PTO drive (38a) (for tractors with the GB 24x12)

- The speed selector of the independent PTO drive (38a) is located on the left of the clutch casing and has two positions:
- I 540 и 1000 rpm counter-clockwise up to the stop;

II - 651 и 1435 rpm – clockwise up to the stop.

To set the necessary PTO speed, loosen the bolt (A), turn the lever and tighten the bolt (A).



3.14 GB Pump Control, Compressor Drive Release Control and HLL pump engagement spindle

GB Pump Control Lever (39)

Имеет два фиксированных положения:

The lever has two fixed positions:

I – "Engine Driven Pump": the lever (39) is turned counter-clockwise till it locks and fixed with a bolt (A);

II – "Non-operating position": the lever (39) is turned clockwise till it locks.

Working position of the lever: Pump drive from the engine" (the bolt (A) is tightened).

NOTE: When it is necessary to remove the cover (B), set the lever (39) to its non-operating position II. On fitting the cover, return the lever to position I and fix it with the bolt (A).

Compressor Drive Release Handle (40)

The compressor control handle has two positions as follows:

• "Compressor ON": the handle (40) is set with the arrow directed to the right (towards the cab);

• "Compressor OFF": the handle is set with the arrow directed to the left.

Turn the compressor ON when the engine is shut down or running at the minimum idling rpm.

HLL pump engagement spindle (41)

The spindle has two positions:

- "Pump ON": the spindle is turned clockwise against the stop;
- "Pump OFF": the spindle is turned counter-clockwise against the stop.

Prior to turning the spindle (41) to any of the two positions, loosen the bolt (43) by 1.5...2 revolutions and turn the spindle (41) together with the stop plate (42). Tighten the bolt (43).

HLL External Control Panels (right-hand and left-hand) (44)

On pressing the top pushbutton " Π " (Lift), the RHL is raised and on pressing the lower pushbutton "O" (Drop) it is lowered.

WARNING! When using the external control panels, keep well away from the at-tached machine (implement), to avoid severe injuries.

3.15 TRACTOR REVERSIBLE OPERATION POST (BELARUS 1523B/1523B.3)



These tractors are provided with a reversible control post to extend their gang-up capability with the front-end mounted agricultural machinery.

Reversible operation control elements:

- additional rear steering column with a metering pump;
- duplicated pedal drives for the clutch, brakes and fuel feed;
- operator's seat reversal mechanism;
- extra horn push pad and emergency engine operation mode warning device;
- reverse cock.



ATTENTION!

- 1. The reversible operation post of the tractor is intended for use only when performing field operations while running in reverse.
- 2. Make sure you have interlocked the forward-movement brake pedals prior to running in reverse.
- 3.NEVER drive the tractor in reverse on public roads or when performing jobs not associated with agricultural farming, as well as when loading/unloading the tractor proper.

3.16 Controls of the Reversible Operation post.

Additional controls are settled in the rear part of the cab, its location is shown on the pic. below:

- 1 Clutch pedal. Stepping on the pedal disengages the clutch. Removing the foot from the pedal re-engages the clutch.
- 2 Tractor steering wheel (rearranged from the forward movement column (9)).
- 3 Brake pedal. Stepping on the pedal applies both the tractor brakes and pneumatic actuator of the trailer brakes.
- 4 Fuel feed control pedal. When depressed, the fuel feed increases.
- 5 Horn push pad.
- 6 Fuel feed control lever. The rearmost position (in reverse) corresponds to the maximum fuel feed while the foremost position to the engine shutdown.
- 7 GB range selector lever (refer to Shifting Diagram I).
- 8 GB gear-shift lever (refer to Shifting Diagram II).
- 9 Forward-movement steering column.



To drive the tractor in reverse, proceed as follows:

- interlock the forward-movement brake pedals;
- remove the steering wheel from the column and fit it on the additional steering column.

To do this, screw off the steering-wheel fixing hand-wheel, rearrange the steering wheel and fix it at the required height;

- install the reversing seat for operation in the reverse mode;
- Switch the clutch control to the re-verse move.

3.17 Changing of Steering Wheel Position

Steering Wheel (18)

1. The position of the steering wheel can be changed in height within the span of 100 mm.

To perform the adjustment, proceed as follows:

- Remove the cover (2);
- Turn out the clamp (1) by 3...5 turns;
 - Pull or push the steering wheel (18) to the position being convenient for you;
- Tighten the clamp and refit the cover.
- 2. The tilt of the steering column is adjustable within the range from 25° to 40° with the increments of 5°. To change the steering column tilt, pull the handle (23) and tilt the column with the steering wheel to the required position, release the handle and slightly turn the column to the fixed position.







3.18 The BELARUS Seat

The seat is considered to be adjusted correctly to the operator's weight, if it takes up half of its

IMPORTANT! Prior to starting the work on the tractor, adjust the seat to the position being the most convenient for you. Perform all the adjustments while sitting on the seat. travel under the operator's weight (suspension travel: 100 mm).

Seat adjustment:

To the operator's weight: from 50 to 120 kg.

It is performed by means of the handle (1). To adjust the seat to a heavier weight, it is necessary to reset the pawl of the handle (1) to the position "A" and to tighten the springs by reciprocating motion. To adjust the seat to lighter weight, it is necessary to reset the pawl to the position "B" and loosen the springs by reciprocating motion.

Back inclination adjustment: from 15° to 20° . It is performed by means of the handwheel (2). To increase the back inclination angle, it is necessary to turn the hand-wheel clockwise, and to reduce the same – counter-clockwise.

Longitudinal adjustment of the seat: 160 mm. It is performed by means of the handle (3). To move the seat forward or backward, it is necessary to lift and pull the handle, shift the seat and release the handle. The seat will be fixed automatically in the required position. Height adjustment 60 mm. The seat has three height positions: "bottom", "medium" and "top". To transfer the seat from the "bottom" position to the "medium" one or from the "medium" to the "top" one, it is necessary to lift smoothly the seat until the operation of the click work (the characteristic click is heard). To transfer the seat from the "top" position to the "bottom" one, it is necessary to lift the seat up to the stop and in an abrupt movement and then drop it. Note: It is impossible to transfer the seat from the medium position into the bottom one.



"Reverse" position (for BELA-RUS-1523B/1523B.3 tractors with reversible control post) To transfer the seat to the "reverse" position, it is necessary to turn out the clamps D and lead them out from the slots of the brackets of the panel E, lift the lever F and turn the seat by 180°. Lift the seat and pull it in an abrupt motion. Lead the screws G into the slots of the brackets of the panel E, turn on the nut I until it rests against the brackets and tighten the clamps I with the torque of 44 ... 56 Nm.



3.19 Grammer MSG85/721 Seat (if installed)

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IMPORTANT! Prior to starting the work on the tractor, adjust the seat to the position being the most convenient for you. Perform all the adjustments while sitting on the seat.

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Seat adjustment:

To the operator's weight: from 50 to 120 kg with the indication of the weight with the step of 10 kg. It is performed by means of the handle (1). To adjust the seat to a heavier weight, it is necessary to turn the handle clockwise and to adjust the same to a lighter weight – counter-clockwise.

Back inclination adjustment from -10° to 35° . It is performed by means of the lever (2). Lift the lever up to the stop, tilt the back and release the lever. The fix will be fixed in the necessary position.

Longitudinal adjustment of the seat: 150 mm. It is performed by means of the handle (3). To move the seat forward or backward, it is necessary to lift and pull the handle, shift the seat and release the handle. The seat will be fixed automatically in the required position.

Height adjustment 60 mm. The seat has three height positions: "bottom", "medium" and "top". To transfer the seat from the "bottom" position to the "medium" one or from the "medium" to the "top" one, it is necessary to lift smoothly the seat until the operation of the click work (the characteristic click is heard). To transfer the seat from the "top" position to the "bottom" one, it is necessary to lift the seat up to the stop and in an abrupt movement and then drop it.



Note: It is impossible to transfer the seat from the "medium" position to the "bottom" one.

3.20 RHL Control Panel RHL Control Panel Manufactured by the BOSCH Company IIY-03 RHL Control Panel Manufactured by the Izmeritel Plant



1 – damping knob; 2 – damping warning lamp; 3 – handle for adjusting the tillage depth (clockwise – shallower, counter-clockwise – deeper); 4 – red diagnostic alarm; 5 – handle for adjusting the limitation of lifting the hitch linkage (clockwise – maximum lifting, counter-clockwise – minimum lifting); 6 – handle for adjusting the drop rate (clockwise – quicker, counter-clockwise – slower); 7 – handle for selecting the adjustment method (clockwise – position one, counter-clockwise – draft one, in-between them – combined method); 8 – hitch linkage drop warning lamp (green); 9 – hitch linkage drop lifting lamp (red); 10 – hitch linkage control handle (upwards – lifting, downwards – drop, extra pressing down the handle in its bottom position – plough entry for ploughing, middle position – disengaged); 11 – interlocking switch (transportation) – locks mechanically the handle (10) in the top position by shifting the switch to the right; 12 – RHL position indicator (green, top mark of the scale: the RHL is in the top position).

The sequence of operations of controlling the rear hitch linkage is as follows:

Set the adjustment method by means of the handle (7) depending on the nature of job;

- set the working depth and height of the implement lifting in the transport position by means of the handles (3) and (5), respectively;
- the hitch linkage is dropped by shifting the handle (10) to the bottom fixed position. In this case, the lamp (8) lights up;

In the process of work, it is necessary to adjust the optimum conditions of operation of the trailed equipment:

- by means of the handle (7), set the combination of the adjustment methods;
- by means of the handle (6), set the correction rate;
- by means of the handle (3), set the tillage depth.

The sensitivity of the adjustments is assured by an automatic adaptive system which suppresses the excessively high adjustment rate in case of draft control. In this case, the average adjustment occurrence (frequency) is approximately equal to 2 Hz.

In case of intensive heating of the system, it is good practice to reduce the frequency of adjustment by shifting the handle (7) towards the position control mode and the handle (6) in the direction of the "turtle" symbol.

In case of swallowing-up (spring-out) of the plough when coming across patches of consolidated soils or hollows, force the plough deeper into soil by pressing the handle (10) to the bottom position. When been released, the handle (10) will return to its fixed position "drop" to the depth set by means of the handle (3).

Raising of the tillage implement is achieved by shifting the handle (10) to its upper position. The lamp (9) lights up at the time of lifting.

ATTENTION! To avoid failure of the HLL pump, NEVER operate the tractor unless the lamp (9) would go out after the implement is out of soil.

It is important to get familiar with the following features of starting up the system for control of the rear hitch linkage:

- 1. After starting the engine, the diagnostics lamp (4) lights up to indicate that the control system is serviceable and locked;
- 2. To unlock the system, it is necessary to set the lift/drop handle (10) to the working position several times. When it will be done, the diagnostics lamp (4) goes out.
- 3. With the system is unlocked, the first engagement is performed at automatically limited rate of lifting of the rear hitch linkage from safety considerations. Next setting of the handle (10) to the working position removes the restriction on the lift rate.
- 4. The rear hitch linkage can be lifted and dropped from the external posts

located on the rear wheel fenders in any control modes (the handles can be set arbitrarily). In this case, the control system operated from the cab is blocked.

WARNING! When using the external control posts, NEVER stand between the tractor and the machine to be attached. To avoid accidents, it is strictly prohibited to use the buttons for mechanical displacement of the electric valves of lifting and dropping the hitch linkage which are intended for adjusting the control system by qualified experts.

ATTENTION! To prevent further penetration of tools (plough and the like) in case of tractor emergency stop, put the handle (10) to its "neutral" position. When already on move, shift the handle to the "drop" position (the plough will enter the soil to the prescribed operating depth).

Aside from the above-described functions, the electronic control system of the rear hitch linkage has a "damping" function (quenching of oscillations of the mounted implement when in transport).

To switch on the damping mode, proceed as follows:

- set the handle (10) to the "Lift" position (on doing this, the RHL is raised to its top position and automatically disengaged);
- press the "damping" button (1) (when it will be done, the RHL will move downwards by 3% of the full RHL travel) and the "damping" lamp (2) will go out.

ATTENTION!

- 1. The "Damping" function is only operative when the handle (10) is set to the "Lift" position.
- 2. When on field jobs (ploughing, cultivation, and the like), the "Damping" function switch shall be in its "OFF" position.

Diagnostics of Faults

Thee BOSCH electrohydraulic control system has the self-diagnostics feature and, in case of detection of a fault, it generates coded data for the operator by means of a diagnostics warning lamp on the control panel. When no faults are detected in the system after starting the engine, the warning lamp is in constant glow. After manipulations of the RHL control handle upwards or downwards, the warning lamp goes out. When the control handle is set downwards, a green warning lamp lights up to indicate the drop of the RHL; when the handle is set upwards, a red warning lamp to indicate the lifting of the RHL.

If any faults are detected in the system (after starting the engine), the diagnostics warning lamp begins to give the coded information on the fault and, if required, cause the system to block.

The fault code is generated in the form of a two-digit number, the first digit of which is equal to the number of flashes of the warning lamp after a long pause. The second digit is the number of flashes after a short pause. For example, a long pause – lamp flashes three times, a short pause – the lamp flashes six times. This means that the system has a fault with a "36" code. Should several faults be detected, the system indicates one fault code after another, one by one, separated with a prolonged pause.

The system subdivides all the faults into three groups: major, average, and minor faults.

If *major* faults are detected, the adjustment operations are stopped and the system is disabled. It can be controlled neither from the main control panel nor from the external button posts. The diagnostics warning lamp indicates the fault code. The operation of the system is only resumed when the fault is eliminated and the engine is restarted.

In case of **average** faults, the adjustment procedure is stopped and the system is blocked. It cannot be controlled from the main control panel, but can be controlled from the external button posts. The diagnostics warning lamp indicates the fault code. The operation of the system is only resumed when the fault is eliminated and the engine is restarted.

In case of *minor* faults, the diagnostics warning lamp shows its code. The system is still can controlled without blocking. When the fault is eliminated, the diagnostics warning lamp goes out.

If any fault is detected by the system, proceed as follows:

- 1. Stop the engine.
- 2. Set the controls on the main control panel of the RHL as follows:
 - The hitch linkage control handle to the OFF position;
 - The lift limit adjusting handle to the "0" position;
 - The soil working depth adjustment handle to the "0" position;
 - The drop rate adjustment handle to the middle position;

- The "draft-position" mode adjustment handle to the middle position.
- 3. Start up the engine and, if no faults are detected, proceed with field jobs. If the defects have not been eliminated in such a way, carry out malfunction diagnosis of the system and eliminate the troubles.

For a list of possible troubles, their diagnostics methods and remedies, see the section "Troubleshooting".

ATTENTION!

- 1. The electrical connectors of the hitch linkage control system shall be only disconnected with the engine stopped.
- 2. The specified voltage values shall be only measured on a running engine in compliance with safety regulations for handling the live electrical products.
- 3. The pin numbering in the bundle connectors is indicated on the base elements of the connectors.