Service Training

# FT65 - FENDT introductory course
# Vario series

FT65

Marktoberdorf
AGCO GmbH - Johann-Georg-Fendt-Str. 4 - D-87616 Marktoberdorf
FENDT is a worldwide brand of AGCO


September 2016
5047
EAME
English

# Subject to changes and additions

**IMPORTANT:**
*This document is valid from the chassis number noted. The last valid chassis number could not be determined at the time of creation. Use AGCONET or contact FENDT Technical Service to ascertain whether a current wiring diagram set is available with an updated chassis number range.*

Due to further developments to the vehicle, the content of this document is subject to change.

The relevant accident prevention regulations must be observed, as must as any generally acknowledged safety, industrial medicine and traffic regulations. The manufacturer does not accept liability for damage resulting from unauthorized modifications to the machine.

# FT65 - FENDT introductory course - Vario series

# 1. Safety briefing

# 1.1 Safety briefing

## 1.1.1 Safety briefing

| | |
|---|---|
| **Contractor:** | See supplementary sheet (list of participants as per supplementary sheet) |
| **Project:** | Training course at the Technical Service training center |
| **Instructor:** | Training leader |

**Reference has been made to:**

**Compliance with the relevant accident prevention regulations**

☐ **Local conditions**

(workplace environment, emergency exit routes, fire extinguishers, switch boxes, extraction systems)

☐ **Responsibilities**

(First-aiders)

☐ **Fire prevention**

☐ **Separation of waste**

☐ **Personal protective equipment**

☐ **Cleanliness and tidiness**

☐ **Traffic on the work premises/training premises**

**Restriction of access for other branches of industry**

**No smoking or alcohol**

☐ **Working under specific risk**

Measurements on running machines — "Operator's Manual MOD_081"

☐ **Working on working platforms**

☐ **Driving the tractor**

☐ In front of the training building/on the circuit — "work instruction MOD 86-10A"

**NOTE:**

Due to the employment of the instructor, neither the contractor nor its representatives are responsible for work safety within the training center.

**Important telephone numbers:**

| | | |
|---|---|---|
| **Rescue:** |  | **7777** |
| **Emergency medics:** |  | **210** |
| **First aiders in the training center:** |  | **901** Mr Porer<br>**905** Mr Haf |

| | | |
|---|---|---|
| **Fire:** |  | **211** |
| **Fire warden:** |  | **7632** Mr Einsiedler |
| |  | **01752297775** |
| **Gate:** |  | **245** |

By signing here, the signatory confirms within the role of contractor that the contents of the training will be disseminated accordingly among the employees of the contractor.

# 2. Presentation

# 2.1 Technical specification

## 2.1.1 Overview of current Fendt wheeled tractor models

| Tractor: FENDT - series 200 V,F,P Vario | | | |
|---|---|---|---|
| **Model** | **Chassis number** | **Emission levels** | **Equipment** |
| **207** | **232**/.../ (V)<br>**239**/.../ (F) | **S3** Tier 3b EU (2017) | Vario joystick, Profi joystick |
| **208** | **233**/.../ (V)<br>**240**/.../ (F) | **S3** Tier 3b EU (2017) | Vario joystick, Profi joystick |
| **209** | **234**/.../ (V)<br>**241**/.../ (F)<br>**251**/.../ (P) | **S3** Tier 3b EU (2017) | Vario joystick, Profi joystick |
| **210** | **235**/.../ (V)<br>**242**/.../ (F)<br>**252**/.../ (P) | **S3** Tier 3b EU (2017) | Vario joystick, Profi joystick |
| **211** | **236**/.../ (V)<br>**243**/.../ (F)<br>**253**/.../ (P) | **S3** Tier 3b EU (2017) | Vario joystick, Profi joystick |

| Tractor: FENDT - series 200 S Vario | | | |
|---|---|---|---|
| **Model** | **Chassis number** | **Emission levels** | **Equipment** |
| **207** | **300**/.../ | **S3** Tier 3b EU (2017) | |
| **208** | **301**/.../ | **S3** Tier 3b EU (2017) | |
| **209** | **302**/.../ | **S3** Tier 3b EU (2017) | |
| **210** | **303**/.../ | **S3** Tier 3b EU (2017) | |
| **211** | **304**/.../ | **S3** Tier 3b EU (2017) | |

| Tractor: FENDT - series 300 Vario | | | |
|---|---|---|---|
| **Model** | **Chassis number** | **Emission levels** | **Equipment** |
| **310** | **347**/21/... (Professional)<br>347/21/ from 5001 (type approval "Mother Regulation")<br>**347**/23/... (Power)<br>347/23/ from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, Profi, ProfiPlus |
| **311** | **348**/21/... (Professional)<br>348/21/ from 5001 (type approval "Mother Regulation")<br>**348**/23/... (Power)<br>348/23/ from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, Profi, ProfiPlus |
| **312** | **349**/21/... (Professional)<br>349/21/ from 5001 (type approval "Mother Regulation")<br>**349**/23/... (Power)<br>349/23/ from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, Profi, ProfiPlus |
| **313** | **350**/21/... (Professional)<br>350/21/ from 5001 (type approval "Mother Regulation")<br>**350**/23/... (Power)<br>350/23/ from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, Profi, ProfiPlus |

| Tractor: FENDT - series 500 Vario | | | |
|---|---|---|---|
| **Model** | **Chassis number** | **Emission levels** | **Equipment** |
| **512** | **435**/21/... (Professional)<br>435/21/ from 5001 (type approval "Mother Regulation")<br>**435**/23/... (Power)<br>435/23/ from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, PowerPlus, Profi, ProfiPlus |
| | **435**/22/... (Professional)<br>435/22/ from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | Profi, ProfiPlus |
| **513** | **436**/21/... (Professional)<br>436/21/ from 5001 (type approval "Mother Regulation")<br>**436**/23/... (Power)<br>436/23/ from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, PowerPlus, Profi, ProfiPlus |
| | **436**/22/... (Professional)<br>436/22/ from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | Profi, ProfiPlus |
| **514** | **437**/21/... (Professional)<br>437/21/ from 5001 (type approval "Mother Regulation")<br>**437**/23/... (Power)<br>437/23/ from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, PowerPlus, Profi, ProfiPlus |

| Tractor: FENDT - series 500 Vario | | | |
|---|---|---|---|
| **Model** | **Chassis number** | **Emission levels** | **Equipment** |
| | **437**/22/... (Professional)<br>437/22/ from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | Profi, ProfiPlus |
| **516** | **438**/21/... (Professional)<br>438/21/ from 5001 (type approval "Mother Regulation")<br>**438**/23/... (Power)<br>438/23/ from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, PowerPlus, Profi, ProfiPlus |
| | **438**/22/... (Professional)<br>438/22/ from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | Profi, ProfiPlus |

| Tractor: FENDT - series 700 Vario | | | |
|---|---|---|---|
| **Model** | **Chassis number** | **Emission levels** | **Equipment** |
| **714** | **738**/21/... (Professional)<br>738/21/ from 6001 (type approval "Mother Regulation")<br>**738**/23/... (Power)<br>738/23/ from 6001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, PowerPlus, Profi, ProfiPlus |
| | **738**/22/... (Professional)<br>738/22/ from 6001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | Profi, ProfiPlus |
| | **738**/25/... (Professional)<br>738/25/ from 6001 (type approval "Mother Regulation") | **EEA** (G3) Russia | Profi, ProfiPlus |

| Tractor: FENDT - series 700 Vario | | | |
|---|---|---|---|
| **Model** | **Chassis number** | **Emission levels** | **Equipment** |
| **716** | **739**/21/... (Professional)<br>739/21/ from 6001 (type approval "Mother Regulation")<br>**739**/23/... (Power)<br>739/23/ from 6001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, PowerPlus, Profi, ProfiPlus |
| | **739**/22/... (Professional)<br>739/22/ from 6001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | Profi, ProfiPlus |
| | **739**/25/... (Professional)<br>739/25/ from 6001 (type approval "Mother Regulation") | **EEA** (G3) Russia | Profi, ProfiPlus |
| **718** | **740**/21/... (Professional)<br>740/21/ from 6001 (type approval "Mother Regulation")<br>**740**/23/... (Power)<br>740/23/ from 6001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, PowerPlus, Profi, ProfiPlus |
| | **740**/22/... (Professional)<br>740/22/ from 6001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | Profi, ProfiPlus |
| | **740**/25/... (Professional)<br>740/25/ from 6001 (type approval "Mother Regulation") | **EEA** (G3) Russia | Profi, ProfiPlus |
| **720** | **741**/21/... (Professional)<br>741/21/ from 6001 (type approval "Mother Regulation")<br>**741**/23/... (Power)<br>741/23/ from 6001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, PowerPlus, Profi, ProfiPlus |
| | **741**/22/... (Professional)<br>741/22/ from 6001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | Profi, ProfiPlus |

| Tractor: FENDT - series 700 Vario | | | |
|---|---|---|---|
| **Model** | **Chassis number** | **Emission levels** | **Equipment** |
| | **741**/25/... (Professional)<br>741/25/ from 6001 (type approval "Mother Regulation") | **EEA** (G3) Russia | Profi, ProfiPlus |
| **722** | **742**/21/... (Professional)<br>742/21/ from 6001 (type approval "Mother Regulation")<br>**742**/23/... (Power)<br>742/23/ from 6001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, PowerPlus, Profi, ProfiPlus |
| | **742**/22/... (Professional)<br>742/22/ from 6001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | Profi, ProfiPlus |
| | **742**/25/... (Professional)<br>742/25/ from 6001 (type approval "Mother Regulation") | **EEA** (G3) Russia | Profi, ProfiPlus |
| **724** | **743**/21/... (Professional)<br>743/21/ from 6001 (type approval "Mother Regulation")<br>**743**/23/... (Power)<br>743/23/ from 6001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, PowerPlus, Profi, ProfiPlus |
| | **743**/22/... (Professional)<br>743/22/ from 6001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | Profi, ProfiPlus |
| | **743**/25/... (Professional)<br>743/25/ from 6001 (type approval "Mother Regulation") | **EEA** (G3) Russia | Profi, ProfiPlus |

| Tractor: FENDT - series 800 Vario | | | |
|---|---|---|---|
| **Model** | **Chassis number** | **Emission levels** | **Equipment** |
| **822** | **839**/21 or 23/... (1-circuit/2-circuit)<br>839/21 or 23/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, PowerPlus, Profi, ProfiPlus |
| | **839**/22,24/... (1-circuit/2-circuit)<br>839/22,24/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | |
| | **839**/25,26/... (1-circuit/2-circuit)<br>839/25,26/... from 5001 (type approval "Mother Regulation") | **EEA** (G3) Russia | |
| **824** | **840**/21,23/... (1-circuit/2-circuit)<br>840/21,23/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, PowerPlus, Profi, ProfiPlus |
| | **840**/22,24/... (1-circuit/2-circuit)<br>840/22,24/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | |
| | **840**/25,26/... (1-circuit/2-circuit)<br>840/25,26/... from 5001 (type approval "Mother Regulation") | **EEA** (G3) Russia | |
| **826** | **841**/21,23/... (1-circuit/2-circuit)<br>841/21,23/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, PowerPlus, Profi, ProfiPlus |
| | **841**/22,24/... (1-circuit/2-circuit)<br>841/22,24/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | |
| | **841**/25,26/... (1-circuit/2-circuit)<br>841/25,26/... from 5001 (type approval "Mother Regulation") | **EEA** (G3) Russia | |

| Tractor: FENDT - series 800 Vario | | | |
|---|---|---|---|
| **Model** | **Chassis number** | **Emission levels** | **Equipment** |
| **828** | **842**/21,23/... (1-circuit/2-circuit)<br>842/21,23/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, PowerPlus, Profi, ProfiPlus |
| | **842**/22,24/... (1-circuit/2-circuit)<br>842/22,24/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | |
| | **842**/25,26/... (1-circuit/2-circuit)<br>842/25,26/... from 5001 (type approval "Mother Regulation") | **EEA** (G3) Russia | |

| Tractor: FENDT - series 900 Vario | | | |
|---|---|---|---|
| **Model** | **Chassis number** | **Emission levels** | **Equipment** |
| **927** | **950**/21,23/... (1-circuit/2-circuit)<br>950/21,23/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, PowerPlus, Profi, ProfiPlus |
| | **950**/22,24/... (1-circuit/2-circuit)<br>950/22,24/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | |
| | **950**/25,26/... (1-circuit/2-circuit)<br>950/25,26/... from 5001 (type approval "Mother Regulation") | **EEA** (G3) Russia | |
| **930** | **951**/21,23/... (1-circuit/2-circuit)<br>951/21,23/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, PowerPlus, Profi, ProfiPlus |
| | **951**/22,24/... (1-circuit/2-circuit)<br>951/22,24/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | |

| Tractor: FENDT - series 900 Vario | | | |
|---|---|---|---|
| **Model** | **Chassis number** | **Emission levels** | **Equipment** |
| | **951**/25,26/... (1-circuit/2-circuit)<br>951/25,26/... from 5001 (type approval "Mother Regulation") | **EEA** (G3) Russia | |
| **933** | **952**/21,23/... (1-circuit/2-circuit)<br>952/21,23/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, PowerPlus, Profi, ProfiPlus |
| | **952**/22,24/... (1-circuit/2-circuit)<br>952/22,24/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | |
| | **952**/25,26/... (1-circuit/2-circuit)<br>952/25,26/... from 5001 (type approval "Mother Regulation") | **EEA** (G3) Russia | |
| **936** | **953**/21,23/... (1-circuit/2-circuit)<br>953/21,23/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, PowerPlus, Profi, ProfiPlus |
| | **953**/22,24/... (1-circuit/2-circuit)<br>953/22,24/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | |
| | **953**/25,26/... (1-circuit/2-circuit)<br>953/25,26/... from 5001 (type approval "Mother Regulation") | **EEA** (G3) Russia | |
| **939** | **954**/21,23/... (1-circuit/2-circuit)<br>954/21,23/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | Power, PowerPlus, Profi, ProfiPlus |

| Tractor: FENDT - series 1000 Vario | | | |
|---|---|---|---|
| **Model** | **Chassis number** | **Emission levels** | **Equipment** |
| **1038** | **527**/23/...<br>527/23/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | PowerPlus, Profi, Profi-Plus |
| | **527**/24/...<br>527/24/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | |
| | **527**/26/...<br>527/26/... from 5001 (type approval "Mother Regulation") | **EEA** (G 3) Russia | |
| **1042** | **528**/23/...<br>528/23/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | PowerPlus, Profi, Profi-Plus |
| | **528**/24/...<br>528/24/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | |
| | **528**/26/...<br>528/26/... from 5001 (type approval "Mother Regulation") | **EEA** (G 3) Russia | |
| **1046** | **529**/23/...<br>529/23/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | PowerPlus, Profi, Profi-Plus |
| | **529**/24/...<br>529/24/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | |
| | **529**/26/...<br>529/26/... from 5001 (type approval "Mother Regulation") | **EEA** (G 3) Russia | |

| Tractor: FENDT - series 1000 Vario | | | |
|---|---|---|---|
| **Model** | **Chassis number** | **Emission levels** | **Equipment** |
| **1050** | **530**/23/...<br>530/23/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); EU | PowerPlus, Profi, Profi-Plus |
| | **530**/24/...<br>530/24/... from 5001 (type approval "Mother Regulation") | **S4** (Level 4, Tier 4f); NA | |
| | **530**/26/...<br>530/26/... from 5001 (type approval "Mother Regulation") | **EEA** (G 3) Russia | |

## 2.1.2 Overview of technical data for 200 Vario S3 to 1000 Vario S4

**Technical data for 200 Vario V/F/P S3**

| Technical data for 200 Vario V/F/P S3 | | | | | |
|---|---|---|---|---|---|
| **Model** | **V/F 207** | **V/F 208** | **V/F/P 209** | **V/F/P 210** | **V/F/P 211** |
| **Rated power ECE R 120** | 53 kW / 72 HP | 60 kW / 81 HP | 67 kW / 91 HP | 73 kW / 99 HP | 74 kW / 101 HP |
| **motor** | AGCO Power 3-cylinder 33 AWI, water-cooled with turbocharger | | | | |
| Injection type/emissions optimisation | Common rail/EGR/DOC | | | | |
| Displacement/rated engine speed | 3.3 l/2100 rpm | | | | |
| **Gearbox** | | | | | |
| Gearbox type (drive train) | Infinitely variable Vario gearbox (ML70) | | | | |
| Rear axle/rear brakes | HA70/ring piston brake | | | | |
| Driving range (forwards/reverse) | AWD: 0,02 km/h to 40 km/h/0,02 km/h to 25 km/h | | | | |
| Maximum speed | 40 km/h | 40 km/h | 40 km/h | 40 km/h | 40 km/h |
| **Front axle** | | | | | |
| Manufacturer/axle type | Planetary steering axle (DANA)/rigid axle | | | | |
| Spring travel | ± 40 mm | | | | |
| **Hydraulics** | | | | | |
| Type | Electrohydraulic standard power lift (EPC) with shock load stabilizing system | | | | |
| Hydraulic pump output | Tandem pump (33 l/min + 42 l/min)/Load Sensing system (33 l/min + 71 l/min) optional | | | | |
| Operating pressure | 200 bar | | | | |
| **Vehicle concept** | | | | | |
| Integrated housing | Monoblock design | | | | |

**Technical data for 200 Vario Standard S3**

| Technical data for 200 Vario Standard S3 | | | | | |
|---|---|---|---|---|---|
| **Model** | **207** | **208** | **209** | **210** | **211** |
| **Rated power ECE R 120** | 53 kW / 72 HP | 60 kW / 81 HP | 67 kW / 91 HP | 73 kW / 99 HP | 74 kW / 101 HP |
| **motor** | AGCO Power 3-cylinder 33 AWI, water-cooled with turbocharger | | | | |
| Injection type/emissions optimisation | Common rail/EGR/DOC | | | | |
| Displacement/rated engine speed | 3.3 l/2100 rpm | | | | |
| **Gearbox** | | | | | |
| Gearbox type (drive train) | Infinitely variable Vario gearbox (ML75) | | | | |
| Rear axle/rear brakes | HA75/ring piston brake | | | | |
| Driving range (forwards / reverse) | AWD: 0,02 km/h to 40 km/h/0,02 km/h to 25 km/h | | | | |
| Maximum speed | 40 km/h | 40 km/h | 40 km/h | 40 km/h | 40 km/h |
| **Front axle** | | | | | |
| Manufacturer/axle type | Planetary steering axle (DANA)/rigid axle | | | | |
| Spring travel | ± 40 mm | | | | |
| **Hydraulics** | | | | | |
| Type | Electrohydraulic standard power lift (EPC) with shock load stabilizing system | | | | |
| Hydraulic pump output | Tandem pump (33 l/min + 42 l/min)/Load Sensing system (33 l/min + 71 l/min) optional | | | | |
| Operating pressure | 200 bar | | | | |
| **Vehicle concept** | | | | | |
| Integrated housing | Monoblock design | | | | |

**Technical data for 300 Vario S4**

| Technical data for 300 Vario S4 | | | | |
|---|---|---|---|---|
| **Model** | **310** | **311** | **312** | **313** |
| **Equipment variants** | Power/Profi/ProfiPlus | | | |
| **Rated power ECE R 120** | 74 kW/100 HP | 83 kW/113 HP | 90 kW/123 HP | 97 kW/133 HP |
| **motor** | AGCO Power 4-cylinder 44 AWF HD, water-cooled with turbocharger | | | |
| Injection type/emissions optimisation | Common rail/EGR/DOC/SCR | | | |
| Displacement/rated engine speed | 4,4 l/2100 rpm | | | |
| **Gearbox** | | | | |
| Gearbox type (drive train) | Infinitely variable Vario gearbox (ML75) | | | |
| Rear axle/rear brakes | HA75/ring piston brake | | | |
| Driving range (forwards / reverse) | AWD: 0,02 km/h to 40 km/h/0,02 km/h to 20 km/h | | | |
| Maximum speed | 40 km/h | 40 km/h | 40 km/h | 40 km/h |

| Technical data for 300 Vario S4 | | | | |
|---|---|---|---|---|
| **Model** | **310** | **311** | **312** | **313** |
| **Front axle** | | | | |
| Manufacturer/axle type | Planetary steering axle (DANA)/rigid axle | | | |
| Spring travel | ± 40 mm | | | |
| **Hydraulics** | | | | |
| Type | Constant current system (Power)/Load sensing system for Profi and ProfiPlus (optional with Power) | | | |
| Hydraulic pump output | Power 84 (46 l/min + 38 l/min) optional 110 l/min/Profi and ProfiPlus 110 l/min | | | |
| Operating pressure | 200 bar | | | |
| **Vehicle concept** | | | | |
| Integrated housing | Half frame design | | | |

**Technical data for 500 Vario S4**

| Technical data for 500 Vario S4 | | | | |
|---|---|---|---|---|
| **Model** | **512** | **513** | **514** | **516** |
| **Equipment variants** | Power/PowerPlus/Profi/ProfiPlus | | | |
| **Rated power ECE R 120** | 91 kW/124 HP | 98 kW/133 HP | 110 kW/150 HP | 120 kW/163 HP |
| **motor** | Deutz 4-cylinder TCD 4.1 L04F 4V, water-cooled with turbo-charger | | | |
| Injection type/emissions optimisation | Common rail/EGR/DOC/DPF/SCR | | | |
| Displacement/rated engine speed | 4,1 l/2100 rpm | | | |
| **Gearbox** | | | | |
| Gearbox type (drive train) | Infinitely variable Vario gearbox (ML90) | | | |
| Rear axle | HA90 | | | |
| Travel range:<br>Range I (forwards/reverse)<br>Range II (forwards/reverse) | Travel range I: 0,02 km/h to 28 km/h/0,02 km/h to 17 km/h<br>Travel range II: 0,02 km/h to 50 km/h/0,02 km/h to 33 km/h | | | |
| Maximum speed | 50 km/h | | | |
| **Front axle** | | | | |
| Manufacturer/axle type | Planetary steering axle (DANA)/rigid axle | | | |
| Spring travel | ± 50 mm | | | |
| **Hydraulics** | | | | |
| Type | Load-sensing system for Power and Profi | | | |
| Hydraulic pump output | Power and PowerPlus 75 l/min (optionally 110 l/min)/Profi and ProfiPlus 110 l/min (optionally 158 l/min) | | | |

| Technical data for 500 Vario S4 | | | | |
|---|---|---|---|---|
| **Model** | **512** | **513** | **514** | **516** |
| Operating pressure | 200 bar | | | |
| **Vehicle concept** | | | | |
| Integrated housing | Half frame design | | | |

**Technical data for 700 Vario S4**

| Technical data for 700 Vario S4 | | | | | | |
|---|---|---|---|---|---|---|
| **Model** | **714** | **716** | **718** | **720** | **722** | **724** |
| **Equipment variants** | Power/PowerPlus/Profi/ProfiPlus | | | | | |
| **Rated power ECE R 120** | 106 kW/144 HP | 120 kW/163 HP | 133 kW/181 HP | 148 kW/201 HP | 163 kW/222 HP | 174 kW/237 HP |
| **motor** | Deutz 6-cylinder TCD 6.1 L06 4V, water-cooled with turbocharger | | | | | |
| Injection type/emissions optimisation | Common-Rail/AGR/CSF/SCR | | | | | |
| Displacement/rated engine speed | 6,1 l/2100 rpm | | | | | |
| **Gearbox** | | | | | | |
| Gearbox type (drive train) | ML180 | | | | | |
| Rear axle/rear brakes | HA140/to activate the brake, a V-notch is used to press the brake covering at the brake discs. | | HA140/to activate the brake, a V-notch is used to press the brake covering at the brake discs. | | | |
| Travel range:<br>Range I (forwards/reverse)<br>Range II (forwards/reverse) | Travel range I: 0,02 km/h to 28 km/h/0,02 km/h to 17 km/h<br>Travel range II: 0,02 km/h to 50 km/h/0,02 km/h to 33 km/h | | | | | |
| Maximum speed | 50 km/h | | | | | |
| **Front axle** | | | | | | |
| Manufacturer/axle type | Planetary steering axle (ZF)/rigid axle | | | | | |
| Spring travel | ± 50 mm | | | | | |
| **Hydraulics** | | | | | | |
| Type | Load-sensing system for Power and Profi | | | | | |
| Hydraulic pump output | Power and PowerPlus 109 l/min (optionally 152 l/min)/Profi and ProfiPlus 152 l/min (optionally 193 l/min) | | | | | |
| Operating pressure | 200 bar | | | | | |
| **Vehicle concept** | | | | | | |
| Integrated housing | Half frame design | | | | | |

**Technical data for 800 Vario S4**

| Technical data for 800 Vario S4 | | | | |
|---|---|---|---|---|
| **Model** | **822** | **824** | **826** | **828** |
| **Equipment variants** | Power/PowerPlus/Profi/ProfiPlus | | | |
| **Rated power ECE R 120** | 166 kW/226 HP | 181 kW/246 HP | 195 kW/265 HP | 211 kW/287 HP |
| **motor** | Deutz 6-cylinder TTCD 6.1 L06 4V, water-cooled with two-stage charging | | | |
| Injection type/emissions optimisation | Common-Rail/AGR/CSF/SCR | | | |
| Displacement/rated engine speed | 6,1 l /2100 rpm | | | |
| **Gearbox** | | | | |
| Gearbox type (drive train) | Infinitely variable Vario gearbox (ML260) | | | |
| Rear axle/rear brakes | HA220/ring piston brake | | | |
| Travel range:<br>Range I (forwards/reverse)<br>Range II (forwards/reverse) | Travel range I: 0,02 km/h to 35 km/h/0,02 km/h to 20 km/h<br>Travel range II: 0,02 km/h to 60 km/h/0,02 km/h to 33 km/h | | | |
| Maximum speed | 60 km/h | | | |
| **Front axle** | | | | |
| Manufacturer/axle type | Planetary steering axle (DANA)/rigid axle | | | |
| Spring travel | ± 60 mm | | | |
| **Hydraulics** | | | | |
| Type | Load-sensing system for Power and Profi | | | |
| Hydraulic pump output | All equipment variants 152 l/min (optionally 205 l/min) | | | |
| Operating pressure | 200 bar | | | |
| **Vehicle concept** | | | | |
| Integrated housing | Half frame design | | | |

**Technical data for 900 Vario S4**

| Technical data for 900 Vario S4 | | | | | |
|---|---|---|---|---|---|
| **Model** | **927** | **930** | **933** | **936** | **939** |
| **Equipment variants** | Power/PowerPlus/Profi/ProfiPlus | | | | |
| **Rated power ECE R 120** | 202 kW/275 HP | 224 kW/305 HP | 247 kW/336 HP | 269 kW/366 HP | 291 kW / 396 HP |
| **motor** | Deutz 6-cylinder TTCD 7.8 L6 4V, water-cooled with two-stage charging | | | | |
| Injection type/emissions optimisation | Common-Rail/AGR/CSF/SCR | | | | |
| Displacement/rated engine speed | 7,8 l/2100 rpm | | | | |
| **Gearbox** | | | | | |
| Gearbox type (drive train) | Infinitely variable Vario gearbox (260) | | | | |

| Technical data for 900 Vario S4 | | | | | |
|---|---|---|---|---|---|
| **Model** | **927** | **930** | **933** | **936** | **939** |
| Rear axle/rear brakes | HA260F/to activate the brake, a V-notch is used to press the brake covering at the brake discs. | | | | |
| Travel range:<br>Range I (forwards/reverse)<br>Range II (forwards/reverse) | Travel range I: 0,02 km/h to 35 km/h/0,02 km/h to 20 km/h<br>Travel range II: 0,02 km/h to 60 km/h/0,02 km/h to 33 km/h | | | | |
| Maximum speed | 60 km/h | 60 km/h | 60 km/h | 60 km/h | 60 km/h |
| **Front axle** | | | | | |
| Manufacturer/axle type | Planetary steering axle (DANA)/individual wheel suspension | | | | |
| Spring travel | ± 157 mm | | | | |
| **Hydraulics** | | | | | |
| Type | Electrohydraulic standard power lift (EPC) with shock load stabilizing system | | | | |
| Hydraulic pump output | All equipment variants 152 l/min (optionally 205 l/min) | | | | |
| Operating pressure | 200 bar | | | | |
| **Vehicle concept** | | | | | |
| Integrated housing | Monoblock design | | | | |

**Technical data for 1000 Vario S4**

| Technical data for 1000 Vario S4 | | | | |
|---|---|---|---|---|
| **Model** | **1038** | **1042** | **1046** | **1050** |
| **Equipment variants** | PowerPlus/Profi/ProfiPlus | | | |
| **Rated power ECE R 120** | 291 kW / 396 HP | 320 kW / 435 HP | 350 kW / 476 HP | 380 kW / 517 HP |
| **motor** | MAN D2676 LE 121 water-cooled with VTG turbocharger | | | |
| Injection type/emissions optimisation | Common rail/EGR/SCR | | | |
| Displacement | 12,4 l/1700 rpm | | | |
| **Gearbox** | | | | |
| Gearbox type (drive train) | Infinitely variable Vario gearbox (ML400) | | | |
| Rear axle/rear brakes | HA400/ring piston brake | | | |
| Driving range (forwards / reverse) | 0,02 km/h to 60 km/h/0,02 km/h to 33 km/h | | | |
| Maximum speed | 60 km/h | | | |
| **Front axle** | | | | |
| Manufacturer/axle type | Planetary steering axle (DANA)/individual wheel suspension | | | |
| Spring travel | ± 157 mm | | | |
| **Hydraulics** | | | | |
| Type | Electrohydraulic standard power lift (EPC) with shock load stabilizing system | | | |

| Technical data for 1000 Vario S4 | | | | |
|---|---|---|---|---|
| **Model** | **1038** | **1042** | **1046** | **1050** |
| Hydraulic pump output | Power Plus 165 l/min (optionally 220 l/min)/Profi and Profi-Plus 165 l/min (optionally 220 l/min or 430 l/min with second pump 210 l/min) | | | |
| Operating pressure | 200 bar | | | |
| **Vehicle concept** | | | | |
| Integrated housing | Monoblock design | | | |

## 2.1.3 Maintenance schedule

**FENDT 714 Vario, 716 Vario, 718 Vario, 720 Vario, 722 Vario, 724 Vario**

**From chassis number 738 .. 0101, 739 .. 0101, 740 .. 0101, 741 .. 0101, 742 .. 0101, 743 .. 0101**

For work during and after the running-in period and for workshop work after the 5th routine service

**IMPORTANT:**
*Consult the fuels and lubricants list in this maintenance manual for the respective types and quantities of oil.*

**NOTE:**
*The technical service carried out must be documented by the dealer in the Service Record Book and by with an on-line Internet application in AGCONET (see Service Bulletin 45/08)!*

| Technical service | | | Regular[1] | | Daily | Work to be carried out | Information and technical data on materials[2] |
|---|---|---|---|---|---|---|---|
| 1. | 2. | 3. | Annually or every 500 hours | Every 2 years or every 2000 hours | | See also: Operator's Manual<br>Service and maintenance | Filling levels are determined with a dipstick or by overflow at level bungs etc. |
| 50 h | 500 h | 1000 h | | | | | |
| | | | | | | **Engine** | |
| | | | | | X | Check engine oil level. | After 100 running hours, add oil to the MAX mark on the dipstick.<br>Wait until level is just above the MIN marking. Do not fill above MAX marking. |
| | X | X | X | | | Perform stationary regeneration of diesel particulate filter. | If the last stationary regeneration was over 50 hrs ago.<br>Stationary regeneration must always be performed before changing the engine oil.<br>If the soot load is low (green status display), stationary regeneration must be triggered via Serdia. |
| X | X | X | X | | | Change engine oil and filter cartridge.[3] | |
| | X | X | X | | | Change the AdBlue® filter cartridge. | |

| Technical service | | | Regular[1] | | Daily | Work to be carried out | Information and technical data on materials[2] |
|---|---|---|---|---|---|---|---|
| 1. | 2. | 3. | Annually or every 500 hours | Every 2 years or every 2000 hours | | See also: Operator's Manual<br>Service and maintenance | Filling levels are determined with a dipstick or by overflow at level bungs etc. |
| 50 h | 500 h | 1000 h | | | | | |
| | | | X | | | Change AdBlue® breather filter. | |
| | | | | X | | Check valve clearances, adjust if necessary - workshop function. | **Valve clearance:** Intake valve 75°, exhaust valve 120° (corresponds to 0.3/0,5 mm clearance) when the engine is cold (max. 50°C) locknut tightening torque 20 Nm. |
| | | X | X | | | Replace fuel filter element. | Repeat more often if engine performance begins to drop. |
| | | | | | X | Drain fuel pre-filter. | |
| | | | As required | | | Replace fuel pre-filter | Repeat more often if engine performance begins to drop. |
| X | X | X | X | | | Check poly-V belt. | |
| X | X | X | | | X | Check coolant level, top up if necessary. | **Coolant level:** With the engine cold, top up if necessary with clean, demineralized water containing anti-freeze to between the MIN and MAX mark on the expansion reservoir. |
| X | X | X | X | | | Visual check of coolant hoses for leaks. | |
| | | | | X | | Change coolant. | A concentration of 35–50% vol. of antifreeze and anticorrosion inhibitor is necessary throughout the year, even in frost-free areas.<br>Add anti-freeze as indicated in Fendt Service Bulletin 11/02. |

| Technical service | | | Regular[1] | | Daily | Work to be carried out | Information and technical data on materials[2] |
|---|---|---|---|---|---|---|---|
| 1. | 2. | 3. | Annu-ally or every 500 hours | Every 2 years or every 2000 hours | | See also: Operator's Manual<br>Service and maintenance | Filling levels are determined with a dipstick or by over-flow at level bungs etc. |
| 50 h | 500 h | 1000 h | | | | | |
| | | | | | As required | Check, and if necessary clean, the cooling fins on the engine, gearbox and air conditioning. | Blow out with compressed air or a dust aspirator. |
| | | X | | X<br>1000 h or if warning appears | | Change air filter main cartridge. | Main cartridge must not be blown out or cleaned. After the third replacement of the main cartridge or if the main cartridge was damaged, the safety cartridge must also be replaced. |
| X | X | X | X | | | Check the air filter suction line for leaks; check maintenance switch and indica-tion on multiple display. | There should be no cracks on the intake hoses. |
| | | | | | | **Transmission, rear axle final drives and front PTO** | |
| | | | | | X | Check oil level in gearbox. | |
| | | | | X | | Change the gearbox oil and replace the gearbox oil suction filter. | |
| X | | X | 1000 h<br>To<br>Display | | | Replace gearbox oil pressure filter. | If the "pressure filter dirty" symbol appears on the multiple display, replace the filter as soon as possible. |
| X | | X | X | | | Check the oil level at the rear axle drives. | **Oil level:** Fill to overflow mark at filler hole. |

| Technical service | | | Regular[1] | | Daily | Work to be carried out | Information and technical data on materials[2] |
|---|---|---|---|---|---|---|---|
| 1. | 2. | 3. | Annually or every 500 hours | Every 2 years or every 2000 hours | | See also: Operator's Manual<br>Service and maintenance | Filling levels are determined with a dipstick or by overflow at level bungs etc. |
| 50 h | 500 h | 1000 h | | | | | |
| | X | | | X | | Oil change at rear axle final drives.<br>**NOTE:** *On the rear bar axle version, the oil quantity and type do not change.* | |
| | X | | | X | | Front PTO: change transmission oil and pressure filter | |
| X | | X | X | | | Check the oil level of the front PTO transmission | **Oil level:** up to overflow on filler hole. |
| | | | | | | **Front axle** | |
| | X | | X | | | Check oil level in differential. | Wait until level is just above the MIN marking. Do not fill above MAX marking. |
| | X | | X | | | Check oil level of drive hubs. | Oil level up to overflow at level bung, top up if necessary. |
| X | | X | | 1000 h | | Oil change for differential and drive hubs. | |
| X | X | X | X | | | Check toe-in and adjust if necessary. | **Toe-in:** 0 +2 mm. |
| | | | | | | **Hydraulic system** | |
| | | 2000 h<br>1000 h | | 2000 h<br>1000 h | | Change the oil along with the return filter, breather filter and control pressure fine filter. | |

| Technical service | | | Regular[1] | | Daily | Work to be carried out | Information and technical data on materials[2] | |
|---|---|---|---|---|---|---|---|---|
| 1. | 2. | 3. | Annually or every 500 hours | Every 2 years or every 2000 hours | | See also: Operator's Manual<br>Service and maintenance | Filling levels are determined with a dipstick or by overflow at level bungs etc. | |
| 50 h | 500 h | 1000 h | | | | | | |
| | | 1000 h | | 1000 h | | With **biodegradable oils**:<br>Change the oil along with the return filter, breather filter and control pressure fine filter. | | |
| | | | | | | | **Also permissible:** | For temperatures over 10 °C, HD-SAE 20W-20 acc. to API-CD |
| | | | As required | | | Sieve filter external pressure supply | | If the external pressure supply does not function properly. |
| | | | | | | **Electrical, electronic systems** | | |
| | X | X | X | | | Check battery electrolyte level; if necessary top up with distilled water. Not applicable to maintenance-free batteries. | Level approx. 15 mm above the top of the plates. Open-circuit voltage with battery fully charged 12.75 V. | |
| X | X | X | X | | | Check lighting and signaling system and all monitoring and warning systems for correct operation. Check diagnostic memory and rectify any faults. | Short circuit sensor. A fault message (symbol) must appear on the multiple display accompanied by an intermittent audible signal. | |
| X | X | X | X | | | Check software versions and interconnection of the electronic components and update if necessary. | Complete tractor programming with EOL program and tractor calibration — check interconnection. If required, explain new control functions. | |

| Technical service | | | Regular[1] | | Daily | Work to be carried out | Information and technical data on materials[2] |
|---|---|---|---|---|---|---|---|
| 1. | 2. | 3. | Annually or every 500 hours | Every 2 years or every 2000 hours | | See also: Operator's Manual<br>Service and maintenance | Filling levels are determined with a dipstick or by overflow at level bungs etc. |
| 50 h | 500 h | 1000 h | | | | | |
| X | X | X | X | X | X | Setting the next customer service interval | Setting the service counter using the diagnostic software<br>Checking and entering workshop contact data in the terminal |
| | | | | | | **Compressed air system** | |
| X | X | X | X | | X | Check tank. | Pull cable to operate drainage valve.<br>If water runs out of the drain valve, replace the air dryer cartridge and drain all tanks. |
| | | X | | | 1000 h | Cartridge change | |
| | | | | | | **Assemblies/general** | |
| | X | X | X | | | Change fresh air and recirculation filter on heater, air conditioning and fan. | Repeat more frequently if fan output begins to fall. |
| X | X | X | X | | | Check that bolted connections are tight, especially the wheels, engine, gearbox, front axle, body and hydraulics; tighten if necessary. Only tighten hydraulic screw connections in the event of a leak. In particular, check the steering hydraulic hoses and the front hydraulic system for chafing points. | Check hydraulic hoses and replace if they show signs of damage. Check for loose parts or missing safety devices. Switch off engine before tightening pressure lines. With front axle suspension, also unload pressure in the lines. |
| X | X | X | X | | | Check functioning of the sunblind, replace clamping strips as necessary. | |
| | | | | 1500 h | | Check hose clamps on the air intake and coolant pipes, tighten as necessary. | Switch off engine before tightening hose clamps. |

| Technical service | | | Regular[1] | | Daily | Work to be carried out | Information and technical data on materials[2] |
|---|---|---|---|---|---|---|---|
| 1. | 2. | 3. | Annually or every 500 hours | Every 2 years or every 2000 hours | | See also: Operator's Manual<br>Service and maintenance | Filling levels are determined with a dipstick or by overflow at level bungs etc. |
| 50 h | 500 h | 1000 h | | | | | |
| X | X | X | X | | | Check the trailer hitch. | Swivel joint on trailer hitch: max. play 3 mm |
| X | X | X | X | | | Check and correct tire pressures, if necessary. | See technical data. |
| X | X | X | X | | | For lubrication of greasing points refer to lubrication chart, lubricate all joints. | |
| X | X | X | X | | | Test drive the tractor, checking braking efficiency, adjust if necessary. | From 20 km/h, the tractor must come to standstill within a stopping distance of 4 m to 6 m. |
| X | X | X | X | | | Check electro-hydraulic steering. | Warning and fault messages that indicate a malfunction in the electro-hydraulic steering may not appear on the multiple display. |

[1] Max. values Whichever comes first. More frequent maintenance is recommended in difficult operating conditions. Always have the main service carried out before long idle periods.

[2] For authorised trade names, refer to the current Fendt fuels and lubricants list, which is available from authorized Fendt workshops as a technical service bulletin.

[3] If the diesel fuel contains more than 0.5% sulphur, the oil replacement intervals must be halved. Use only diesel fuel approved in accordance with EN 590 (see technical service bulletin 04/2016)

**NOTE:**

*When carrying out any maintenance work, instructions on how to avoid accidents and how to handle materials (including disposal) must be observed.*

## 2.2 Faults

### 2.2.1 Structure of fault codes

Warning and fault messages are indicated by symbols on the multiple display on the instrument panel. The warning lamp also flashes and a warning signal sounds.

If a fault code is displayed, additional fault codes can be called up for the exact determination of faults. These fault codes are stored automatically and can be called up in the workshop for rapid troubleshooting.

**Fault code 06.1.01 as an example on the multiple display**

(A) Number of faults
(B) Fault currently on display
(C) Fault code

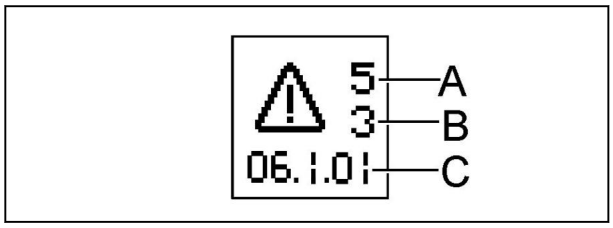



*Fig. 1*

The fault code consists of characters (hexadecimal numbers, letters up to F), which are separated from each other with full stops and so form three groups of characters.

**The first group** consists of two characters and can contain numbers and letters. This group indicates the **fault location**, e.g. 06 — the fault is in the area of the rear PTO.

List of fault locations:

- 00 = instrument cluster
- 01 = EDC engine control
- 02 = Vario terminal
- 03 = multifunction armrest (MFA)
- 04 = gearbox
- 05 = comfort hydraulics (AWD, differential lock)
- 06 = rear PTO
- 07 = front PTO
- 08 = rear power lift (EPC)
- 09 = front power lift
- 0A = electric auxiliary control valves
- 0B = TeachIn
- 0D = VarioDoc
- 0E = VarioGuide
- 0F = central electrical system (ZE)
- 10 = air-conditioning system (HVAC)
- 11 = instrument panel
- 12 = tire pressure monitoring system (TPMS)
- 14 = front loader
- 15 = front axle suspension
- 17 = ISO bus implement control (joystick)
- 18 = track guidance preparation (EHL)
- 1A = ABS
- 1D = diesel engine
- 1E = diesel engine
- 1F = basic control unit (EXT)
- 20 = VarioGuide CEA

**The second group** consists of a number and indicates the **fault weighting**, e.g. 1 — medium-severity fault.

- 0 = high
- 1 = medium
- 2 = low

**The third group** consists of two characters (numbers and letters) and is a **sequential number**, which is used to sort the fault codes.

- 01... = sequential number

In the fault code lists for the "electrical auxiliary spool valves", fault codes with an X can be found in the third character group, e.g. 0A.1.X0 or 0A.1.X7. The X stands for the valve number. If, for example, the fault codes 0A.1.10 and 0A.1.37 are displayed, this means the following:

- 0A.1.10 = position 1 valve does not report on CAN
- 0A.1.37 = position pickup sensor fault for position 3 valve

## 2.2.2 Confirming, calling up, deleting fault codes

### Confirm fault code

Cancelling a fault code does not remove the fault; it is simply no longer displayed.


Press button repeatedly until no more fault codes are indicated on the display.

**NOTE:**
*Each stored fault code must be cleared individually. The message will be displayed again the next time the tractor is started up.*

### Call up fault code

Press button, the first main menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press button, the following image appears on the multiple display.

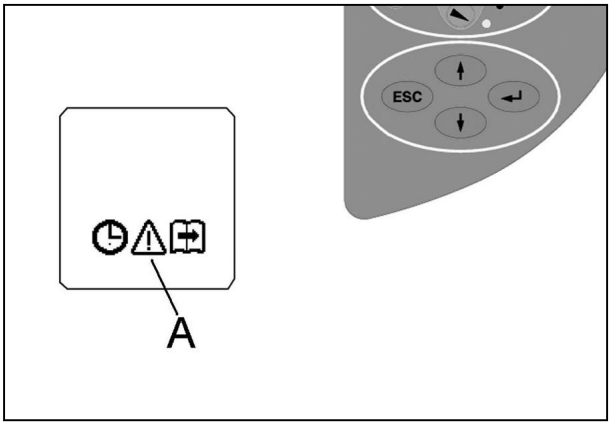
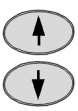



*Fig. 2*

(A) Number of faults
(B) Fault currently on display
(C) Störcode



Press one of the buttons and the faults are displayed one after the other along with their fault code.

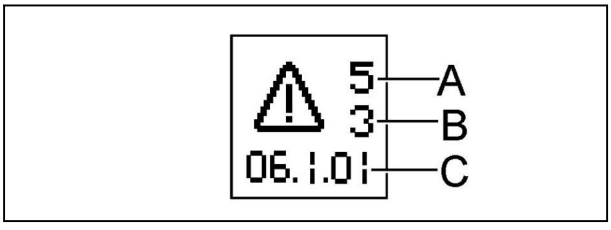



*Fig. 3*

**Delete fault code**

First call up the fault code, making a note of it if necessary.

Press button, the following image appears on the multiple display.

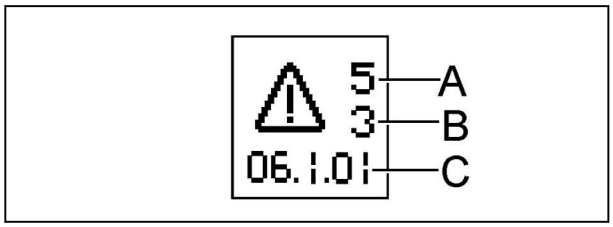



*Fig. 4*

Press buttons (A), (B) and (C) (both arrow keys) simultaneously.

All fault codes in the fault memory of A007 - Instrument panel are deleted.

**NOTE:**
*Fault codes are also stored in the A050 - ECU, basic control unit and, where necessary, in the A099 - Engine control ECU.*
*Fault codes can only be deleted from the A050 and A099 using the appropriate diagnostic software.*

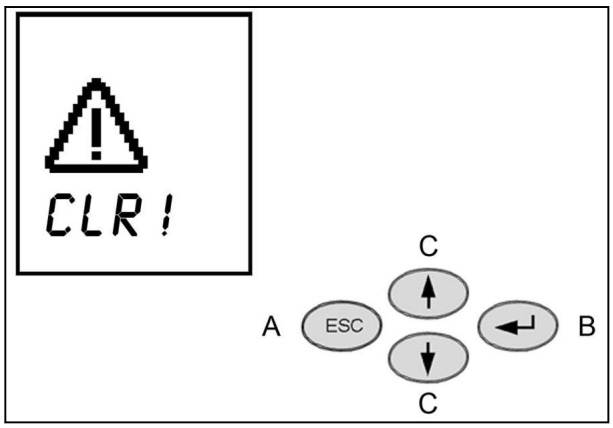



*Fig. 5*

## 2.2.3 Fault code 00.0.00 -

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 00.0.01 | **A050** basic control unit ECU | Bus fault EDC, no speed setting to EDC | Engine malfunction | EOL programming |
| 00.0.02 | **A103** NT01/02 terminal | Terminal BUS fault, does not report to BUS | | EOL programming |
| 00.0.03 | **A100** MFA, multifunction armrest | Multifunction armrest BUS fault, does not report to BUS | | EOL programming |
| 00.0.04 | **A050** basic control unit ECU | Transmission BUS fault, no setpoint value to actuator unit | Functions non-operational, no display | EOL programming |
| 00.0.05 | **A050** basic control unit ECU | Bus fault AR/Diff. | Functions non-operational, no display | EOL programming |
| 00.0.06 | **A050** basic control unit ECU | Rear PTO bus fault | Functions non-operational, no display | EOL programming |
| 00.0.07 | **A050** basic control unit ECU | Front PTO BUS fault | Function non-operable, no display | EOL programming |
| 00.0.08 | **A050** basic control unit ECU | Rear EPC BUS fault | Function non-operable, no display | EOL programming |
| 00.0.09 | **A050** basic control unit ECU | Front EPC BUS fault | Function non-operable, no display | EOL programming |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 00.0.0A | **A050** basic control unit ECU | Bus fault, el. valve | Function non-operable, no display | EOL programming |
| 00.0.0B | **A050** basic control unit ECU | Teach-in function BUS fault | Function non-operable, no display | EOL programming |
| 00.0.0D | **A101** VarioDoc ECU | VarioDoc BUS fault | Function non-operable, no display | EOL programming |
| 00.0.0E | **A102** VarioGuide GNSS ECU | VarioGuide BUS fault | Function non-operable, no display | EOL programming |
| 00.0.0F | **A111** central electrical system ECU | Central electrical system BUS fault | Function non-operable, no display | EOL programming |
| 00.0.10 | **A050** basic control unit ECU | Air conditioning system BUS fault | Function non-operable, no display | EOL programming |
| 00.0.11 | **A050** basic control unit ECU | Electrical control panel BUS fault | Function non-operable, no display | EOL programming |
| 00.0.15 | **A050** basic control unit ECU | Bus fault, VA suspension | Function non-operable, no display | EOL programming |
| 00.0.16 | **A050** basic control unit ECU | EPC CAN BUS fault<br>Auto mode | Function non-operable, no display | EOL programming |
| 00.0.17 | **A050** basic control unit ECU | Bus fault, Vario control unit | | EOL programming |
| 00.0.18 | **A050** basic control unit ECU | Electro-hydraulic steering (EHL) BUS fault | | EOL programming |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 00.0.19 | **A050** basic control unit ECU | ISO task BUS fault | | EOL programming |
| 00.0.1D | **A050** basic control unit ECU | EDC17 reports incorrectly to instrument panel — BUS fault | | EOL programming |
| 00.0.1F | **A050** basic control unit ECU | Fault management BUS fault | | EOL programming |
| 00.0.21 | **A050** basic control unit ECU | On-board computer BUS fault | | EOL programming |
| 00.1.4D | **A007** instrument panel | Checksum<br>Menu images, instrument panel memory faulty | Display fault in instrument panel | EOL programming |
| 00.1.4E | **A007** instrument panel | Checksum<br>Warning images, instrument panel memory faulty | Display fault in instrument panel | EOL programming |
| 00.1.4F | **A007** instrument panel | Checksum GD table | Display fault in instrument panel | EOL programming |
| 00.1.50 | **A007** instrument panel | VDO instrument panel EEPROM not programmed | Malfunctions in instrument panel | EOL programming |
| 00.1.54 | **B060** compressed air supply sensor (circuit 1) | Sensor faulty<br>Signal fault | Function non-operable<br>Compressed air display,<br>4WD is switched on until the next cold start | |
| | | 12 V supply fault | A007 - instrument panel | |
| 00.1.55 | **B084** hydraulic oil level sensor | Sensor faulty<br>Signal fault | | |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 00.1.59 | **B007** immersed tube fuel-level sensor | Sensor faulty,<br>Signal fault | No display | |
| 00.1.5A | **B019** compressed air supply sensor (circuit 2) | Sensor faulty,<br>Signal fault | Function non-operable<br>Compressed air display,<br>4WD is switched on until the next cold start | |
| | | 12 V supply fault | A007 - instrument panel | |
| 00.1.71 | **A128** control panel for right/left dashboard | Enter key | Button non-operable | |
| 00.1.72 | **A128** control panel for right/left dashboard | ESC button | Button non-operable | |
| 00.1.73 | **A128** control panel for right/left dashboard | Up button | Button non-operable | |
| 00.1.74 | **A128** control panel for right/left dashboard | Down button | Button non-operable | |
| 00.1.75 | **A128** control panel for right/left dashboard | Enter button pressed > 30s | Button non-operable<br>or button released | |
| 00.1.76 | **A128** control panel for right/left dashboard | Esc button pressed > 30s | Button non-operable<br>or button released | |
| 00.1.77 | **A128** control panel for right/left dashboard | Up button pressed > 30s | Button non-operable<br>or button released | |
| 00.1.78 | **A128** control panel for right/left dashboard | Down button pressed > 30s<br>operated | Button non-operable<br>or button released | |
| 00.1.A8 | **B060** compressed air supply sensor (circuit 1) | Compressed air supply circuit 1, vacuum | 4WD is switched on until the next cold start | |

## 2.2.4 Fault code 04.1.00 -

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 04.1.04 | **B017** clutch pedal sensor | Sensor faulty,<br>Signal fault | Loss of comfort control/ function in final speed control;<br>No cruise control function,<br>TMS is switched off | |
| | | Faulty 8.5 V supply | A013, fuse 05 | |
| 04.1.05 | **B039** high-pressure sensor 2 | Sensor faulty,<br>Signal fault | TMS is switched off<br>Transmission protection function active (engine power is limited to 70 percent) | |
| | | 12 V supply fault | A013, fuse 31 | |
| 04.1.06 | **B055** foot throttle sensor | Sensor faulty,<br>Signal fault | Emergency mode if throttle pedal mode is active, TMS is switched off | |
| | | Faulty 8.5 V supply | A013, fuse 19 | |
| 04.1.07 | **B008** high-pressure sensor 1 | Sensor faulty,<br>Signal fault | Pressure spikes in the transmission are no longer monitored,<br>TMS is switched off<br>Transmission protection function active (engine power is limited to 70 percent) | |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| | | 12 V supply fault | A013, fuse 32 | |
| 04.1.08 | **B016** travel range detection sensor | Sensor faulty,<br>Signal fault | TMS is switched off | |
| | | Faulty 8.5 V supply | A013, fuse 06 | |
| 04.1.19 | **A050** basic control unit ECU | Error on reading-in throttle pedal parameters | | |
| 04.1.20 | **A100** MFA, multifunction armrest | Throttle pedal resolution potentiometer<br>EEPROM checksum incorrect or not calibrated | Throttle pedal mode not possible, TMS is switched off | Calibration code "4010" |
| 04.1.22 | **A100** MFA, multifunction armrest | Throttle pedal resolution potentiometer faulty,<br>Signal fault | TMS is switched off | |
| 04.1.23 | **A100** MFA, multifunction armrest | Joystick signal "Tempomat cruise control ON" faulty | Continuation in emergency mode possible | |
| 04.1.24 | **S080** hand brake switch | Faulty switch,<br>Signal fault | TMS is switched off,<br>4WD is switched on | |
| 04.1.25 | **A100** MFA, multifunction armrest | Joystick "F/R quick reverse" signal faulty | TMS is switched off | |
| 04.1.26 | **A100** MFA, multifunction armrest | Accelerator pedal mode button faulty,<br>Signal fault | Throttle pedal mode inoperable | |
| 04.1.28 | **A009** actuator unit<br>VR incremental encoder | Faulty path signal | Continuation in emergency mode possible | |
| 04.1.29 | **A100** MFA, multifunction armrest | Joystick signal "park position" faulty | TMS is switched off | |
| 04.1.2A | **B015** bevel pinion sensor | Sensor faulty,<br>Direction signal faulty | Continuation in emergency mode possible | |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 04.1.2B | **A100** MFA, multifunction armrest<br>Travel speed range selection button I/II | Faulty button,<br>Signal fault | | |
| 04.1.2C | **A100** MFA, multifunction armrest<br>Neutral/Active Standstill button | Faulty button,<br>Signal fault | Continuation in emergency mode possible | |
| 04.1.2D | **S157** forward - reverse shuttle switch<br>Forward/reverse shuttle switch on control stalk | Faulty forward travel signal | TMS is switched off | |
| 04.1.2E | **S157** forward - reverse shuttle switch<br>Forward/reverse shuttle switch on control stalk | Faulty reverse travel signal | TMS is switched off | |
| 04.1.2F | **A100** MFA, multifunction armrest<br>Joystick | Joystick signal "v-" faulty<br>(joystick to rear) | Continuation in emergency mode possible | |
| 04.1.31 | **B014** collecting shaft sensor | Sensor faulty,<br>Direction signal faulty | Continuation in emergency mode possible | |
| 04.1.32 | **A100** MFA, multifunction armrest<br>Joystick activation button | Faulty button, signal fault | Continuation in emergency mode possible | |
| 04.1.33 | **A100** MFA, multifunction armrest | Faulty joystick signal "v+" (joystick forward) | Continuation in emergency mode possible | |
| 04.1.3D | **A050** basic control unit ECU | Derating parameter checksum error<br>(Error occurs when there is a reduction in engine power due to an exhaust system fault) | Continuation in emergency mode possible | |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 04.1.3E | **A050** basic control unit ECU | Derating active<br>(Restrictions due to exhaust system) | Engine torque is reduced,<br>max. engine speed is limited,<br>TMS is switched off | Read out engine fault with SERDIA |
| 04.1.42 | **B014** collecting shaft sensor | Sensor faulty,<br>Speed signal faulty | Continuation in emergency mode possible | |
| | | Faulty 8.5 V supply | A013, fuse 07 | |
| 04.1.45 | **B015** bevel pinion sensor<br>(=road speed) | Sensor faulty,<br>Speed signal faulty | Continuation in emergency mode possible | |
| | | Faulty 8.5 V supply | A013, fuse 08 | |
| 04.1.46 | **Y004** clutch/turbo-clutch solenoid valve | Pressure does not drop when the TK valve is opened | TK valve jams, TK valve external energizing | |
| 04.1.47 | **B016** travel range detection sensor<br>**Y002** travel speed range I solenoid valve<br>**Y003** travel speed range II solenoid valve | Travel speed range selector: Does not come out of gear when travel speed range valve is energized | Travel speed range detection sensor faulty, incorrect valve connected or valve is faulty | |
| 04.1.48 | **B016** travel range detection sensor<br>**Y002** travel speed range I solenoid valve<br>**Y003** travel speed range II solenoid valve | Travel speed range selector: Cannot shift to neutral | Travel speed range detection sensor faulty, incorrect valve connected or valve is faulty | |
| 04.1.49 | **S017** filter contamination switch | Plausibility error | Switch supplies incorrect information (engine is off and switch displays contamination) | |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 04.1.50 | **S017** filter contamination switch | Filter clogged | No further indication of clogging | Switch function not active at oil temperature below 50° |
| 04.1.53 | **B009** discharge temperature sensor | "Transmission oil temperature more than 110°C" | transmission damage if journey is continued! | |
| 04.1.56 | **S017** filter contamination switch | Faulty switch,<br>Signal line fault | | |
| 04.1.58 | Transmission hydraulics | Transmission slip monitor<br>Transmission output speed deviates by more than 30% from setpoint value | May occur at extremely low temperatures in isolated cases; repeated occurrence under normal conditions causes a rise in oil temperature and further transmission damage; TMS is switched off | ("Ideal ratio/actual ratio" comparison)<br>Fault not active if turbo-clutch (TK) function is on - clutch is depressed,<br>check clutch from actuator unit |
| 04.1.59 | **A050** basic control unit ECU | Emergency mode has been activated manually | Transmission emergency mode | |
| 04.1.61 | **A050** basic control unit ECU<br>**Y002** travel speed range I solenoid valve | Faulty actuation of travel speed range I valve | Cannot switch to travel speed range I | |
| 04.1.62 | **A050** basic control unit ECU<br>**Y003** travel speed range II solenoid valve | Faulty actuation of travel speed range II valve | Cannot switch to travel speed range II | |
| 04.1.63 | **A050** basic control unit ECU<br>**Y005** speed governor solenoid valve | Valve actuation for mechanical speed limiter faulty | | |
| 04.1.64 | **A050** basic control unit ECU<br>**Y004** clutch/turbo-clutch solenoid valve | Turbo-clutch solenoid valve actuation faulty,<br>fuse F56 faulty | TK valve cannot be actuated manually, i.e. tractor must not be driven! | |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 04.1.69 | **S053** driver presence switch | Seat switch faulty<br>(Error code is output by the "hand brake warning message" function) | | |
| 04.1.70 | **A100** MFA, multifunction armrest<br>Cruise control button, C1 | Faulty button,<br>Signal fault | Cruise control 1 cannot be activated | |
| 04.1.71 | **A100** MFA, multifunction armrest<br>Cruise control button, C2 | Faulty button,<br>Signal fault | Cruise control 2 cannot be activated | |
| 04.1.76 | **S047** engine brake switch | Switch faulty or communication error to EDC,<br>Signal fault | TMS is switched off | |
| 04.1.77 | **A100** MFA, multifunction armrest<br>Joystick acceleration rate I…IV | Signal fault | Only rate III available in the event of a fault | |
| 04.1.78 | **S053** driver presence switch | Faulty switch,<br>Signal fault | TMS is switched off | |
| 04.1.79 | **A050** basic control unit ECU | Output for reverse warning signal not OK<br>(Current > 2500 mA or short circuit) | | |
| 04.1.82 | **B014** collecting shaft sensor<br>**B015** bevel pinion sensor<br>**B016** travel range detection sensor | Plausibility error<br>(=speeds do not match) fault output as of 5 km/h | Continuation in emergency mode possible | |
| 04.1.83 | **B014** collecting shaft sensor<br>**B015** bevel pinion sensor | Plausibility error<br>(=speeds do not match)<br>Fault output as of 5 km/h | Continuation in emergency mode possible | |
| 04.1.84 | **A100** MFA, multifunction armrest<br>Joystick switch (V, R, VR, cruise control, default position) | Plausibility error<br>(=signals do not match) | Continuation in emergency mode possible | |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 04.1.85 | **B085** camshaft speed sensor<br>**B088** crankshaft speed sensor | Engine speed sensors do not supply plausible speed curves. Output speed increase or decrease is outside limits. | Continuation in emergency mode possible | |
| 04.1.86 | **B008** high-pressure sensor 1<br>**B039** high-pressure sensor 2 | Plausibility error in both pressure sensors | TMS is switched off<br>Transmission protection function active (engine power is limited to 70 percent) | |
| 04.1.87 | **S157** forward - reverse shuttle switch | Plausibility error at F/R switch, quick reverse | F/R switch inoperable, quick reverse on steering wheel adjustment, S079 switch, | Check the forward/ reverse shuttle switch |
| 04.1.89 | **B009** discharge temperature sensor | Plausibility error, transmission temperature | | |
| 04.1.8A | **B017** clutch pedal sensor<br>**S074** starter lockout switch/clutch pedal limit switch | Plausibility error; electrical clutch pedal (TK line not opened when clutch pedal depressed) | | |
| 04.1.8F | | Currently selected tire circumference is too small | - The speed display is no longer correct in certain circumstances<br>- Transmission controls no longer working correctly in certain circumstances (e.g. TMS, final speed control, cruise control) | Enter correct tire circumference |
| 04.1.94 | **A050** basic control unit ECU<br>**A100** MFA, multifunction armrest | Faulty CAN communication between e-box and CAN joystick | | |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 04.1.A1 | **A009** actuator unit | Turn angle is not reached within 2 seconds. | Continuation in emergency mode possible | Mechanical check: check smooth adjustment action in emergency mode.<br>Refer to Service Information 26/04 |
| 04.1.A2 | **A009** actuator unit<br>**A050** basic control unit ECU | CAN Bus actuation fault | Continuation in emergency mode possible | Check CAN bus |
| 04.1.A3 | **A009** actuator unit | Fault or logic error in incremental sensor signal (actual position signal) | Continuation in emergency mode possible | |
| 04.1.A4 | **A009** actuator unit | Fault or logical error signal in EST. | Continuation in emergency mode possible | |
| 04.1.A5 | **A009** actuator unit | Initial reference (=zero position) could not be found during ignition ON | Continuation in emergency mode possible | Refer to Service Information 26/04 |
| 04.1.A6 | **A009** actuator unit | Reference point signal fault during operation | Continuation in emergency mode possible | |
| 04.1.B0 | All bus users | Initialisation error<br>TeachIn fault | Restricted CAN bus data communication | Check CAN bus |
| 04.1.B1 | **A050** basic control unit ECU | Fatal error, range change (e.g. valve fault)<br>TeachIn fault | Emergency mode | |
| 04.1.B5 | **A050** basic control unit ECU | Checksum error rate parameters, quick reverse for Tractor Management System (TMS) | TMS is switched off | EOL programming |
| 04.1.B7 | **B009** discharge temperature sensor | Incorrect checksum | | EOL programming |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 04.1.CB | **A100** MFA, multifunction armrest | Warning message: Travel range button "under excessive pressure" | | |
| 04.1.CF | **A050** basic control unit ECU | Internal error, A050 basic operating system | | |
| 04.1.D5 | **A050** basic control unit ECU | Communication error during workshop mode | Emergency mode, transmission | Perform restart |
| 04.1.E1 | **A050** basic control unit ECU | Traction control regulator parameters (ML transmission adjustment) not plausible or read incorrectly | Emergency mode | EOL programming |
| 04.1.E2 | **A050** basic control unit ECU | Traction control regulator parameters not plausible (B008/B039) or read incorrectly. | Emergency mode | EOL programming |
| 04.1.E3 | **A050** basic control unit ECU | Checksum error, parameter for throttle pedal mode | Emergency mode<br>TMS is switched off | EOL programming |
| 04.1.E5 | **A050** basic control unit ECU | Checksum error for range control, speed limiting valve etc. faulty | Range control not possible | EOL programming |
| 04.1.E6 | **A050** basic control unit ECU | Incorrect checksum, load limit control parameters | Emergency mode, transmission | EOL programming |
| 04.1.E7 | **A050** basic control unit ECU | Incorrect checksum, joystick parameters | Possible to drive with default values | EOL programming |
| 04.1.E9 | **A050** basic control unit ECU | Speed selection parameters incorrect | | EOL programming |
| 04.1.EA | **A050** basic control unit ECU | Error in checksum parameter for transmission teeth number | Continuation in emergency mode possible | EOL programming |
| 04.1.EB | **B016** travel range detection sensor | Checksum error or<br>range control calibration missing | | Calibration code "4003" |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 04.1.EC | **B055** foot throttle sensor | No calibration or drifted, changed values | Continuation in emergency mode possible | Calibration code "4005" |
| 04.1.ED | **B017** clutch pedal sensor | No calibration or drifted, changed values | Continuation in emergency mode possible | Calibration code "4001" |
| 04.1.EE | **A050** basic control unit ECU Transmission characteristic | No calibration or drifted, changed values | Continuation in emergency mode possible | Calibration code "4007" |
| 04.1.EF | **A050** basic control unit ECU Turbo-clutch characteristic | No calibration or drifted, changed values | Continuation in emergency mode possible | Calibration code "4009" |
| 04.1.F0 | **A050** basic control unit ECU | Checksum parameter for transmission calibration incorrect | Transmission cannot be calibrated | EOL programming |
| 04.1.F1 | **A050** basic control unit ECU | Checksum parameter for stationary control incorrect | Emergency mode | EOL programming |
| 04.1.F2 | **A050** basic control unit ECU | Characteristic offset deviation outside permitted range | Only fault code display | |
| 04.1.F3 | **A050** basic control unit ECU | Ratio restriction checksum faulty | Emergency mode, transmission | EOL programming |
| 04.1.F4 | **A050** basic control unit ECU | EXT memory could not be reserved | Continuation in emergency mode possible | EOL programming |
| 04.1.F5 | **A050** basic control unit ECU | Checksum error, "instance for selecting the optimum speed source" parameter | | EOL programming |
| 04.2.40 | **B016** travel range detection sensor | Transmission travel speed range is not recognized correctly | | Calibration code "4003" |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 04.2.41 | **A050** basic control unit ECU<br>**B009** discharge temperature sensor | Condition for switching switch level not fulfilled. | | |
| 04.2.51 | **B009** discharge temperature sensor | Transmission oil temperature >95°C | Switching from travel speed range 2 to travel speed range 1 | |
| 04.2.52 | **B009** discharge temperature sensor | Transmission oil temperature >105°C | Continuing to drive will cause<br>transmission damage | |
| 04.2.D0 | **A050** basic control unit ECU | Workshop mode: Ratio restriction active | | After workshop mode is complete, the restart function must be performed |

## 2.2.5 Fault code 0A.1.00 -

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| **X stands for the valve number, e.g. 0A.1.10 = position 1 valve does not report to CAN or 0A.1.37 = position pickup sensor error in position 3 valve** | | | | |
| 0A.1.X0 | **Y176** position 1 spool valve (yellow)<br>**Y177** position 2 spool valve (blue)<br>**Y178** position 3 spool valve (red)<br>**Y179** position 4 spool valve (green)<br>**Y180** position 5 spool valve (brown)<br>**Y182** position 7 spool valve (olive)<br>**Y183** position 8 spool valve (gray) | Valve does not report to CAN<br>**(X=valve number)** | Valve moves to neutral and locks | |
| 0A.1.X1 | **Y176** position 1 spool valve (yellow)<br>**Y177** position 2 spool valve (blue)<br>**Y178** position 3 spool valve (red)<br>**Y179** position 4 spool valve (green)<br>**Y180** position 5 spool valve (brown)<br>**Y182** position 7 spool valve (olive)<br>**Y183** position 8 spool valve (gray) | EEPROM inconsistent<br>**(X=valve number)** | Valve moves to neutral and locks | |
| 0A.1.X2 | **Y176** position 1 spool valve (yellow)<br>**Y177** position 2 spool valve (blue)<br>**Y178** position 3 spool valve (red)<br>**Y179** position 4 spool valve (green)<br>**Y180** position 5 spool valve (brown)<br>**Y182** position 7 spool valve (olive)<br>**Y183** position 8 spool valve (gray) | Undervoltage (where U < 8V)<br>**(X=valve number)** | Valve moves to neutral and locks | |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 0A.1.X3 | **Y176** position 1 spool valve (yellow)<br>**Y177** position 2 spool valve (blue)<br>**Y178** position 3 spool valve (red)<br>**Y179** position 4 spool valve (green)<br>**Y180** position 5 spool valve (brown)<br>**Y182** position 7 spool valve (olive)<br>**Y183** position 8 spool valve (gray) | Overvoltage, safe<br>(where U > 18 V)<br>**(X=valve number)** | Valve moves to neutral and locks | |
| 0A.1.X4 | **Y176** position 1 spool valve (yellow)<br>**Y177** position 2 spool valve (blue)<br>**Y178** position 3 spool valve (red)<br>**Y179** position 4 spool valve (green)<br>**Y180** position 5 spool valve (brown)<br>**Y182** position 7 spool valve (olive)<br>**Y183** position 8 spool valve (gray) | Valve spool stops short (frequent cause: control pressure dips briefly or oil too viscous at very low temperatures)<br>**(X=valve number)** | Valve moves to neutral and locks | |
| 0A.1.X5 | **Y176** position 1 spool valve (yellow)<br>**Y177** position 2 spool valve (blue)<br>**Y178** position 3 spool valve (red)<br>**Y179** position 4 spool valve (green)<br>**Y180** position 5 spool valve (brown)<br>**Y182** position 7 spool valve (olive)<br>**Y183** position 8 spool valve (gray) | High overvoltage (> 45V)<br>**(X=valve number)** | Valve moves to neutral and locks | |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 0A.1.X6 | **Y176** position 1 spool valve (yellow)<br>**Y177** position 2 spool valve (blue)<br>**Y178** position 3 spool valve (red)<br>**Y179** position 4 spool valve (green)<br>**Y180** position 5 spool valve (brown)<br>**Y182** position 7 spool valve (olive)<br>**Y183** position 8 spool valve (gray) | Final stage error (pilot control solenoid valve)<br>**(X=valve number)** | Valve moves to neutral and locks | |
| 0A.1.X7 | **Y176** position 1 spool valve (yellow)<br>**Y177** position 2 spool valve (blue)<br>**Y178** position 3 spool valve (red)<br>**Y179** position 4 spool valve (green)<br>**Y180** position 5 spool valve (brown)<br>**Y182** position 7 spool valve (olive)<br>**Y183** position 8 spool valve (gray) | Position pickup sensor error<br>**(X=valve number)** | Valve moves to neutral and locks | |
| 0A.1.X8 | **Y176** position 1 spool valve (yellow)<br>**Y177** position 2 spool valve (blue)<br>**Y178** position 3 spool valve (red)<br>**Y179** position 4 spool valve (green)<br>**Y180** position 5 spool valve (brown)<br>**Y182** position 7 spool valve (olive)<br>**Y183** position 8 spool valve (gray) | Valve actuator does not return to neutral position (frequent cause: valve actuator mechanically jams (pilot control or main actuator) caused by contamination in hydraulics area)<br>**(X=valve number)** | Valve remains deflected when engine is on; valve locks,<br>Pilot pressure OFF | |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 0A.1.X9 | **Y176** position 1 spool valve (yellow)<br>**Y177** position 2 spool valve (blue)<br>**Y178** position 3 spool valve (red)<br>**Y179** position 4 spool valve (green)<br>**Y180** position 5 spool valve (brown)<br>**Y182** position 7 spool valve (olive)<br>**Y183** position 8 spool valve (gray) | Valve actuator not in neutral position when switched on (frequent cause: valve actuator mechanically jams (pilot control or main actuator) caused by contamination in hydraulics area)<br>**(X=valve number)** | Valve remains deflected when engine is on; valve locks,<br>Pilot pressure OFF | |
| 0A.1.XA | **Y176** position 1 spool valve (yellow)<br>**Y177** position 2 spool valve (blue)<br>**Y178** position 3 spool valve (red)<br>**Y179** position 4 spool valve (green)<br>**Y180** position 5 spool valve (brown)<br>**Y182** position 7 spool valve (olive)<br>**Y183** position 8 spool valve (gray) | Valve spool is deflected too far<br>**(X=valve number)** | Valve moves to neutral and locks | |
| 0A.1.XB | **Y176** position 1 spool valve (yellow)<br>**Y177** position 2 spool valve (blue)<br>**Y178** position 3 spool valve (red)<br>**Y179** position 4 spool valve (green)<br>**Y180** position 5 spool valve (brown)<br>**Y182** position 7 spool valve (olive)<br>**Y183** position 8 spool valve (gray) | Floating position is not reached<br>**(X=valve number)** | Valve moves to neutral and locks | |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 0A.1.XC | **Y176** position 1 spool valve (yellow)<br>**Y177** position 2 spool valve (blue)<br>**Y178** position 3 spool valve (red)<br>**Y179** position 4 spool valve (green)<br>**Y180** position 5 spool valve (brown)<br>**Y182** position 7 spool valve (olive)<br>**Y183** position 8 spool valve (gray) | Manual actuation (occurs when a valve is deflected from its neutral position)<br>**(X=valve number)** | All valve positions, no function;<br>Valve locked,<br>Pilot pressure OFF | |
| 0A.1.XD | **Y176** position 1 spool valve (yellow)<br>**Y177** position 2 spool valve (blue)<br>**Y178** position 3 spool valve (red)<br>**Y179** position 4 spool valve (green)<br>**Y180** position 5 spool valve (brown)<br>**Y182** position 7 spool valve (olive)<br>**Y183** position 8 spool valve (gray) | Pilot control actuator jams<br>**(X=valve number)** | Valve locked,<br>Pilot pressure OFF | |
| 0A.1.XE | **Y176** position 1 spool valve (yellow)<br>**Y177** position 2 spool valve (blue)<br>**Y178** position 3 spool valve (red)<br>**Y179** position 4 spool valve (green)<br>**Y180** position 5 spool valve (brown)<br>**Y182** position 7 spool valve (olive)<br>**Y183** position 8 spool valve (gray) | RAM or FLASH test fault<br>**(X=valve number)** | Valve moves to neutral and locks, pilot pressure OFF | |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 0A.1.XF | **Y176** position 1 spool valve (yellow)<br>**Y177** position 2 spool valve (blue)<br>**Y178** position 3 spool valve (red)<br>**Y179** position 4 spool valve (green)<br>**Y180** position 5 spool valve (brown)<br>**Y182** position 7 spool valve (olive)<br>**Y183** position 8 spool valve (gray) | No setpoint message,<br>no configuration message,<br>setpoint message not plausible,<br>configuration message not plausible.<br>Potentiometer/PW error<br>**(X=valve number)** | Valve moves to neutral and locks<br>Pilot pressure OFF | |
| 0A.1.A2 | **A050** basic control unit ECU | More valves connected than registered via EOL programming | | |
| 0A.1.A4 | **A050** basic control unit ECU | Checksum error when reading the parameters for valve heating | Deactivation of valve heating function | |
| 0A.1.B0 | **A100** MFA, multifunction armrest<br>Crossgate lever | Crossgate lever is not calibrated | Crossgate lever not working | Calibration code "1001" |
| 0A.1.B1 | **A100** MFA, multifunction armrest<br>Crossgate lever | Crossgate lever X axis faulty or engaged when ignition switched on | Crossgate lever not working | |
| 0A.1.B2 | **A100** MFA, multifunction armrest<br>Crossgate lever | Crossgate lever Y axis faulty or engaged when ignition switched on | Crossgate lever not working | |
| 0A.1.B3 | **A100** MFA, multifunction armrest<br>Crossgate lever | Crossgate lever missing (both axes) | Crossgate lever not working | |
| 0A.1.B5 | **A100** MFA, multifunction armrest | Joystick center position recognition faulty (electrical fault) or engaged when ignition switched on | Valve position not functioning,<br>lock valve | |
| 0A.1.B6 | **A100** MFA, multifunction armrest | Linear module 1 (rocker) not calibrated | Valve position not functioning | Calibration code "1003" |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 0A.1.B7 | **A100** MFA, multifunction armrest | Linear module 1 (rocker) faulty or engaged when ignition switched on | Valve position not functioning,<br>lock valve | |
| 0A.1.B8 | **A100** MFA, multifunction armrest | Linear module 2 (rocker) not calibrated | Valve position not functioning | Calibration code "1004" |
| 0A.1.B9 | **A100** MFA, multifunction armrest | Linear module 2 (rocker) faulty or engaged when ignition switched on | Valve position not functioning,<br>lock valve | |
| 0A.1.BA | **A100** MFA, multifunction armrest | Linear module 3 (rocker) not calibrated | Valve position not functioning | Calibration code "1005" |
| 0A.1.BB | **A100** MFA, multifunction armrest | Linear module 3 (rocker) faulty or engaged when ignition switched on | Valve position not functioning,<br>lock valve | |
| 0A.1.BC | **A100** MFA, multifunction armrest | Linear module 4 (rocker) not calibrated | Valve position not functioning | Calibration code "1006" |
| 0A.1.BD | **A100** MFA, multifunction armrest | Faulty linear module 4 (rocker) | Valve position not functioning,<br>lock valve | |
| 0A.1.C0 | **A100** MFA, multifunction armrest | MFA not fitted | No auto mode,<br>Valve locked | |
| 0A.1.C1 | **A050** basic control unit ECU<br>**A100** MFA, multifunction armrest | MFA GD fault in button used by hydraulics | Valve locked | |
| 0A.1.C2 | **A100** MFA, multifunction armrest | Faulty MFA button (total lock) | Total unlocking not possible,<br>valves locking | |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 0A.1.C6 | **A128** control panel for right/left dashboard<br>Cargo front loader tool lock button | Faulty button,<br>Signal fault | Function non-operable | |
| 0A.1.C7 | **A128** control panel for right/left dashboard<br>Cargo front loader suspension button | Faulty button,<br>Signal fault | Function non-operable | |
| 0A.1.C8 | Cargo front loader tool lock solenoid valve | Solenoid valve faulty | Function non-operable | |
| 0A.1.C9 | Cargo front loader suspension solenoid valve | Solenoid valve faulty | Function non-operable | |
| 0A.1.CA | **A050** basic control unit ECU | Steering axle checksum incorrect | Steering axle deactivation | EOL programming |
| 0A.1.CD | **R019** front-loader detection resistor (MK)<br>**X4006** - Cargo cable coupling | Front loader detection input error | | |
| 0A.1.CE | Auxiliary control units | Valve actuator does not return to neutral position | Valve remains deflected when engine is on, valve locks, pilot pressure OFF | |
| 0A.1.CF | Auxiliary control units | Floating position is not reached | Valve moves to neutral and locks | |
| 0A.1.D0 | **A100** MFA, multifunction armrest<br>Button for hydraulic circuit 3 | Faulty button,<br>Signal fault | Button inoperable until next trouble-free cold start | |
| 0A.1.D1 | **A100** MFA, multifunction armrest<br>Button for hydraulic circuit 4 | Faulty button,<br>Signal fault | Button inoperable until next trouble-free cold start | |
| 0A.1.D2 | **A100** MFA, multifunction armrest<br>Red raise/lower/floating position button on joystick | Faulty button,<br>Signal fault | Valve position not functioning,<br>Valve locked | |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 0A.1.D3 | **A100** MFA, multifunction armrest<br>Green raise/lower/floating position button on joystick | Faulty button,<br>Signal fault | Valve position not functioning,<br>Valve locked | |
| 0A.1.D4 | **S021** external raise front power lift button<br>**S022** external lower front power lift button | Double actuation (button possibly stuck)<br>Faulty button,<br>Signal fault | Valve in neutral | |
| 0A.1.D5 | **S022** external lower front power lift button | Faulty button,<br>Signal fault | Button inoperable until next trouble-free cold start | |
| 0A.1.D6 | **S021** external raise front power lift button | Faulty button,<br>Signal fault | Button inoperable until next trouble-free cold start | |
| 0A.1.D7 | **B084** hydraulic oil level sensor | Sensor faulty,<br>Signal fault | Fill level is no longer monitored | |
| 0A.1.D8 | **B084** hydraulic oil level sensor | Warning, hydraulic oil tank | Warning display only | |
| 0A.1.D9 | **B084** hydraulic oil level sensor | Hydraulic oil tank empty | Valves are locked and pilot control is switched off | |
| 0A.1.DA | **B013** hydraulic oil temperature sensor | Warning, hydraulic oil temperature too high | Warning display only<br>(without storing) | |
| 0A.1.DB | **B013** hydraulic oil temperature sensor | Hydraulic oil temperature too high | Is stored | |
| 0A.1.DC | **B013** hydraulic oil temperature sensor | Warning, hydraulic oil temperature not plausible | Warning display only | |
| 0A.1.DD | **S119** hydraulic oil filter contamination switch | Filter clogged | Warning display only | |
| 0A.1.DE | **S119** hydraulic oil filter contamination switch | Faulty switch,<br>Signal fault | Warning display only | |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 0A.1.DF | **Y176** position 1 spool valve (yellow)<br>**Y177** position 2 spool valve (blue)<br>**Y178** position 3 spool valve (red)<br>**Y179** position 4 spool valve (green)<br>**Y180** position 5 spool valve (brown)<br>**Y182** position 7 spool valve (olive)<br>**Y183** position 8 spool valve (gray) | Priority volume greater than pump volume | | |
| 0A.1.E0 | **A050** basic control unit ECU | Steering axle volume greater than pump volume | | |
| 0A.1.EC | **Y173** trailer brake release solenoid valve | Solenoid valve faulty | | |
| 0A.1.ED | **A128** control panel for right/left dashboard | ABV activation button faulty | | |
| 0A.1.EE | **Y023** solenoid valve for compressed air pilot control system | Solenoid valve faulty | Compressed air pilot control system is switched off | |
| 0A.1.F0 | **Y032** control pressure solenoid valve | +UB short circuit | No valve actuation possible | |
| 0A.1.F2 | **Y032** control pressure solenoid valve | Current too high, faulty valve (short circuit to earth) | No valve actuation possible | |
| 0A.1.F3 | **Y032** control pressure solenoid valve | Break in wiring | No valve actuation possible | |
| 0A.1.F4 | **Y181** front power lift control valve | Short circuit to earth or +UB or break in wiring | No raising possible | |
| 0A.1.F5 | **Y181** front power lift control valve | Short circuit to earth or +UB or break in wiring | No lowering possible | |
| 0A.1.F6 | **Y060** rear hydraulic oil preheater solenoid valve | Actuation fault | No further valve heating possible | |
| 0A.1.F7 | **Y061** middle hydraulic oil preheater solenoid valve | Actuation fault | No further valve heating possible | |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 0A.1.F9 | **Y012** suspension loading/oil preheating solenoid valve | Loading valve fault | | |
| 0A.1.FA | **S067** external raise valve actuation button | Faulty button,<br>Signal fault | Button inoperable until next trouble-free cold start | |
| 0A.1.FB | **S068** external lower valve actuation button | Faulty button,<br>Signal fault | Button inoperable until next trouble-free cold start | |
| 0A.1.FC | **S067** external raise valve actuation button<br>**S068** external lower valve actuation button | Double actuation, faulty button, signal fault | | |
| 0A.1.FD | **Y082** lock lower link stabilizer solenoid valve | Solenoid valve faulty | No locking possible | |
| 0A.1.FE | **Y083** release lower link stabilizer solenoid valve | Solenoid valve faulty | No opening possible | |
| 0A.2.92 | **A100** MFA, multifunction armrest | Linear module 1 (rocker) stuck | | |
| 0A.2.93 | **A100** MFA, multifunction armrest | Linear module 2 (rocker) stuck | | |
| 0A.2.94 | **A100** MFA, multifunction armrest | Linear module 3 (rocker) stuck | | |
| 0A.2.95 | **A100** MFA, multifunction armrest | Linear module 4 (rocker) stuck | | |
| 0A.2.96 | **A100** MFA, multifunction armrest | Crossgate lever (horizontal) stuck | | |
| 0A.2.97 | **A100** MFA, multifunction armrest | Crossgate lever (horizontal) stuck | | |
| 0A.2.9A | **A100** MFA, multifunction armrest | Right joystick actuation, one of the three buttons is stuck | | |
| 0A.2.9B | **A100** MFA, multifunction armrest | Left joystick actuation, one of the three buttons is stuck | | |
| 0A.2.A8 | **A100** MFA, multifunction armrest | Crossgate lever double actuation "yellow" | | |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 0A.2.A9 | **A100** MFA, multifunction armrest<br>Crossgate lever | Crossgate lever double actuation "blue" | | |
| 0A.2.AA | **A100** MFA, multifunction armrest<br>Joystick | Joystick double actuation, right | | |
| 0A.2.AB | **A100** MFA, multifunction armrest<br>Joystick | Joystick double actuation, left | | |
| 0A.2.AC | **A100** MFA, multifunction armrest | Linear module 1 double actuation (rocker) | | |
| 0A.2.AD | **A100** MFA, multifunction armrest | Linear module 2 double actuation (rocker) | | |
| 0A.2.AE | **A100** MFA, multifunction armrest | Linear module 3 double actuation (rocker) | | |
| 0A.2.AF | **A100** MFA, multifunction armrest | Linear module 4 double actuation (rocker) | | |
| 0A.2.CB | **A050** basic control unit ECU | Steering axle active | | |
| 0A.2.CC | **A050** basic control unit ECU | Steering axle not active | | |

## 2.2.6 Fault code 1D.0.00 -

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| **If the following errors occur (1D.0 etc.), they must be deleted in the engine control unit following error correction with SERDIA!** | | | | |
| 1D.0.09 | **B086** rail pressure sensor | Opening of rail DBV valve recognized | Message appears, indicating that the engine will stop after approx. five minutes | Read out the KWP code using SERDIA/Fendias |
| 1D.0.40 | **B102** AdBlue temperature/level sensor | Reduction in power as fill level is too low (with warning bleeper) | Top up AdBlue | |
| 1D.0.42 | AdBlue | Reduction in power due to AdBlue quality (with warning bleeper) | | |
| 1D.0.44 | **A099** engine control ECU (EDC 17) | Reduction in power due to incorrect AdBlue conversion rate (with warning bleeper) | | |
| 1D.0.46 | **A099** engine control ECU (EDC 17) | Reduction in power as manipulation of the SCR system was detected (with warning bleeper) | | |
| 1D.0.62 | **B086** rail pressure sensor | Rail pressure fault | | Read out the KWP code using SERDIA/Fendias |
| 1D.0.A1 | **B090** oil pressure sensor | Engine oil pressure too low | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.00 | **A099** engine control ECU (EDC 17) | Original Deutz error | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.01 | **B090** oil pressure sensor | Broken wire or short circuit.<br>Oil pressure outside of setpoint range | | Read out the KWP code using SERDIA/Fendias |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 1D.1.02 | **B087** fuel low pressure sensor | Broken wire or short circuit<br>Fuel low pressure outside setpoint range | Check fuel system; air may be in the system or the fuel filter may be blocked | Read out the KWP code using SERDIA/Fendias |
| 1D.1.03 | **B092** boost pressure/charge air temperature sensor | Broken wire or short circuit<br>Limits exceeded or specified values not reached | Reduced power | Read out the KWP code using SERDIA/Fendias |
| 1D.1.04 | **B086** rail pressure sensor | Broken wire or short circuit<br>Rail pressure outside setpoint range | Message appears, indicating that the engine will stop after approx. 5 minutes | Read out the KWP code using SERDIA/Fendias |
| 1D.1.05 | **B089** engine temperature sensor (Deutz) | Coolant temperature sensor: break in wiring or short circuit. Coolant temperature outside setpoint area | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.07 | **B085** camshaft speed sensor<br>**B088** crankshaft speed sensor | Camshaft sensor faulty or no signal; crankshaft sensor faulty or no signal; camshaft/crankshaft speed signals out of phase | Starting possible after prolonged unsuccessful attempt, engine runs "rough" | Read out the KWP code using SERDIA/Fendias |
| 1D.1.08 | **Y091** fuel dispensing unit<br>**B086** rail pressure sensor | Dispensing unit not connected,<br>Short circuit to battery or earth<br>Rail pressure outside setpoint range | Message appears, indicating that the engine will stop after approx. five minutes | Read out the KWP code using SERDIA/Fendias |
| 1D.1.0A | **B085** camshaft speed sensor<br>**B088** crankshaft speed sensor | Engine overspeed<br>Value exceeded, pushing mode | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.0C | **K063** heater flange relay | Broken wire or short circuit<br>Actuation faulty | Preheater inoperable | Read out the KWP code using SERDIA/Fendias |
| 1D.1.0D | **S034** coolant level switch | Coolant level too low | | Read out the KWP code using SERDIA/Fendias |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 1D.1.10 | **B102** AdBlue temperature/level sensor | Broken wire or short circuit,<br>Fill level too low,<br>Temperature limit exceeded or not reached | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.11 | **Y120** AdBlue metering valve | Broken wire or short circuit<br>Current value too low<br>Nozzle jammed<br>Coolant line to metering valve crushed | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.12 | **A084** AdBlue module | Broken wire or short circuit,<br>Current value too low,<br>Limit exceeded or not reached<br>Return valve fault,<br>Pressure too low,<br>General module fault | Check AdBlue filter,<br>Check the intake opening on the **B102** AdBlue temperature/ level sensor,<br>Check the AdBlue suction line from the **B102** AdBlue temperature/level sensor to the AdBlue module<br>Check relay K090,<br>Check earth points | Read out the KWP code using SERDIA/Fendias |
| 1D.1.13 | **A082** nitrogen oxide NOx sensor 1, upstream of SCR | Current value too low or wire break,<br>NOx Sensor CAN message faulty | Check fuse F60 | Read out the KWP code using SERDIA/Fendias |
| 1D.1.14 | **A083** nitrogen oxide NOx sensor 2, downstream of SCR | Current value too low or wire break<br>NOx Sensor CAN message faulty | Check fuse F60 | Read out the KWP code using SERDIA/Fendias |
| 1D.1.15<br>**for 700 series** | **B236** exhaust gas temperature upstream of SCR sensor | Broken wire or short circuit<br>Limit exceeded or specified value not reached | | Read out the KWP code using SERDIA/Fendias |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 1D.1.15<br>**for 500 series** | **B244** - Exhaust gas temperature upstream of SCR sensor | Broken wire or short circuit<br>Limit exceeded or specified value not reached | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.16 | SCR general | NOx conversion rate insufficient<br>- SCR catalytic converter faulty<br>- Insufficient AdBlue quality | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.17 | **A099** engine control ECU (EDC 17)<br>**Y095** injector 1<br>**Y096** injector 2<br>**Y097** injector 3<br>**Y098** injector 4<br>**Y100** injector 5<br>**Y101** injector 6 | Misfiring on one or more injectors<br>Broken wire or short circuit | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.19 | **Y222** Visco fan (Viscotronic) | Broken wire or short circuit<br>Limits exceeded or specified values not reached | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.1B | **A099** engine control ECU (EDC 17) | EDC internal error | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.1C | **M001** starter | Broken wire or short circuit<br>Terminal 50 signal faulty | | Read out the KWP code using SERDIA/Fendias |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 1D.1.1D | DBV rail | Pressure-limiting valve (DBV) has reached maximum number of switching operations.<br>DBV has exceeded maximum permitted opening time | Replace rail pressure DBV and **B086** rail pressure sensor.<br>Reset "rail pressure DBV counter" using SERDIA | |
| 1D.1.20 | **S047** engine brake switch<br>**Y170** engine brake solenoid valve | Valve or switch wire break or short circuit | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.21 | **B092** boost pressure/charge air temperature sensor | Charge air temperature too high | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.22 | **B004** vacuum switch (air filter) | Air filter contaminated | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.23 | **A077** immobilizer ECU<br>**A099** engine control ECU (EDC 17) | No manipulation protection | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.24 | **A099** engine control ECU (EDC 17) | Engine starting problems (e.g. fault in injection system) | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.25 | **A084** AdBlue module<br>**E216** AdBlue suction and return line heater<br>**E217** AdBlue pressure line heater | Cable iced up, pressure too high or low, heater faulty, return valve jammed | Check fuse F55,<br>Check relay K091 and K092,<br>Check earth points | Read out the KWP code using SERDIA/Fendias |
| 1D.1.26 | **A084** AdBlue module | Not possible to empty system | | Read out the KWP code using SERDIA/Fendias |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 1D.1.29 | Exhaust gas temperature upstream of turbo | Broken wire or short circuit,<br>Limit value outside setpoint range | | |
| 1D.1.30 | **A136** wastegate ECU | Current value too low or wire break,<br>CAN message from/to actuator faulty,<br>other actuator error | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.31 | **B195** AdBlue quality sensor | Insufficient AdBlue quality | Check AdBlue quality | Read out the KWP code using SERDIA/Fendias |
| 1D.1.32 | **B102** AdBlue temperature/level sensor | AdBlue level too low | Top up AdBlue | Read out the KWP code using SERDIA/Fendias |
| 1D.1.34 | **B192** CSF differential pressure sensor | Broken wire or short circuit<br>Pressure difference outside limit value | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.35 | **A134** exhaust gas recirculation ECU | Internal fault, calibration fault,<br>CAN message from/to actuator faulty,<br>Other actuator fault | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.37 | **B191** exhaust gas pressure upstream of turbo sensor | Broken wire or short circuit<br>Limit exceeded | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.38 | **B193** exhaust temperature upstream of CSF sensor | Broken wire or short circuit<br>Limit exceeded | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.39 | **B194** pressure downstream of CSF sensor | Broken wire or short circuit<br>Limit exceeded | | Read out the KWP code using SERDIA/Fendias |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 1D.1.3A | **B102** AdBlue temperature/level sensor | AdBlue tank temperature not in operating range | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.3B | **A133** air intake throttle ECU | Broken wire or short circuit<br>Overcurrent, incorrect angle | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.4C<br>**for 700 series** | **B236** exhaust gas temperature upstream of SCR sensor | Measured value is illogical | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.4C<br>**for 500 series** | **B244** - Exhaust gas temperature upstream of SCR sensor | Measured value is illogical | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.4E | **A099** engine control ECU (EDC 17) | DPF regeneration monitoring | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.4F | **A099** engine control ECU (EDC 17) | SCR regeneration | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.54 | **A099** engine control ECU (EDC 17) | Temperature outside target range | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.60 | **B086** rail pressure sensor | Leak detected | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.65 | **B092** boost pressure/charge air temperature sensor | Boost pressure outside target range | | Read out the KWP code using SERDIA/Fendias |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 1D.1.66 | **A134** exhaust gas recirculation ECU | EGR flow | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.68 | **B218** venturi differential pressure sensor | Short circuit to battery or broken wire | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.69 | **A134** exhaust gas recirculation ECU | Actuator blocked or sluggish | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.76 | **A099** engine control ECU (EDC 17)<br>**Y095** injector 1<br>**Y096** injector 2<br>**Y097** injector 3<br>**Y098** injector 4<br>**Y100** injector 5<br>**Y101** injector 6 | Fault in one or more injectors | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.79 | **B217** temperature downstream of venturi sensor | Electrical fault | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.7A | **B194** pressure downstream of CSF sensor | Plausibility error | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.7C | **B092** boost pressure/charge air temperature sensor | Boost pressure too high | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.A5 | **B089** engine temperature sensor (Deutz) | Coolant temperature too high | | Read out the KWP code using SERDIA/Fendias |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 1D.1.A9 | **A099** engine control ECU (EDC 17) | SCR lines,<br>SCR pressure monitoring/return line | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.AA | **A099** engine control ECU (EDC 17) | SCR monitoring, crystallization,<br>Standstill requested | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.AB | **A099** engine control ECU (EDC 17) | SCR, emissions not met,<br>Emissions efficiency test, emissions above upper physical value | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.AC | **A099** engine control ECU (EDC 17) | DPF, ash/soot load of particulate filter,<br>Warning/shut-off threshold for ash load exceeded | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.B2 | **A099** engine control ECU (EDC 17) | Fault in voltage supply | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.B5 | **Y170** engine brake solenoid valve | | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.B6 | **Y170** engine brake solenoid valve | | | Read out the KWP code using SERDIA/Fendias |
| 1D.1.BA | **A099** engine control ECU (EDC 17) | CAN bus fault | | Read out the KWP code using SERDIA/Fendias |
| 1D.2.06 | **B055** foot throttle sensor | Broken wire or short circuit<br>Signal does not match idle sensor signal | Speed maintained, can be used with hand throttle by increasing speed briefly | Read out the KWP code using SERDIA/Fendias |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 1D.2.0B | **A099** engine control ECU (EDC 17) | CAN BUS fault | | Read out the KWP code using SERDIA/Fendias |
| 1D.2.18 | **B076** exterior temperature sensor | Broken wire or short circuit<br>Limits exceeded or specified values not reached | | Read out the KWP code using SERDIA/Fendias |
| 1D.2.1A | **B091** water in fuel sensor | Broken wire or short circuit<br>Water level above setpoint range | Draining water | Read out the KWP code using SERDIA/Fendias |
| 1D.2.1E | **Y169** AdBlue tank heater solenoid valve | Broken wire or short circuit<br>Valve jammed | Check fuse F52,<br>Check relay K083 | Read out the KWP code using SERDIA/Fendias |
| 1D.2.1F | **A077** immobilizer ECU<br>**A099** engine control ECU (EDC 17) | Immobilizer fault | | Read out the KWP code using SERDIA/Fendias |
| 1D.2.41 | **B102** AdBlue temperature/level sensor | Reduction in power as fill level is too low (without warning bleeper) | Top up AdBlue | |
| 1D.2.43 | AdBlue | Reduction in power due to AdBlue quality (without warning bleeper) | | |
| 1D.2.45 | **A099** engine control ECU (EDC 17) | Reduction in power due to incorrect AdBlue conversion rate (without warning bleeper) | | |
| 1D.2.47 | **A099** engine control ECU (EDC 17) | Reduction in power as manipulation of the SCR system was detected (without warning bleeper) | | |
| 1D.2.49 | **A099** engine control ECU (EDC 17) | Torque reduction without fault in order to protect the engine | | Read out the KWP code using SERDIA/Fendias |
| 1D.2.52 | **A133** air intake throttle ECU | | | Read out the KWP code using SERDIA/Fendias |

| Fault code | DIN brief description | Cause | Consequences | Note/remedy |
|---|---|---|---|---|
| 1D.2.77 | **A099** engine control ECU (EDC 17)<br>**Y095** injector 1<br>**Y096** injector 2<br>**Y097** injector 3<br>**Y098** injector 4<br>**Y100** injector 5<br>**Y101** injector 6 | Fault in one or more injectors | | Read out the KWP code using SERDIA/Fendias |
| 1D.2.AF | **A099** engine control ECU (EDC 17) | Oil change request due to excessively frequent requests for standstill regeneration | | Read out the KWP code using SERDIA/Fendias |
| 1D.2.B3 | **A099** engine control ECU (EDC 17) | Fault in voltage supply | | Read out the KWP code using SERDIA/Fendias |
| 1D.2.B8 | **A099** engine control ECU (EDC 17) | Ambient pressure | | Read out the KWP code using SERDIA/Fendias |
| 1D.2.F0 | **A099** engine control ECU (EDC 17) | | | Read out the KWP code using SERDIA/Fendias |

## 2.2.7 General information on calibration

To compensate for mechanical and electrical tolerances in sensors, the sensors concerned must be calibrated.

If a sensor is replaced, it must also be calibrated.

**The following sensors and functions require calibration**

1. EPC rear calibration (depth control code 8001 and rear power lift position code 8002)
2. Front EPC calibration (code 9001 and code 9002)
3. Calibration, crossgate lever (hydraulic auxiliary valves) (code 1001)
4. Calibration of linear modules 1–4; for hydraulic auxiliary spool valves (code 1003–1006)
5. Front axle suspension calibration (code 7666)
6. Steering angle sensor calibration (2401)
7. VarioGuide steering valve calibration (Code 2403)
8. Rear PTO engagement time calibration (code 6034)
9. Front PTO engagement time calibration (code 7034)
10. Drive clutch pedal calibration (code 4001)
11. Hand throttle calibration (code 4002)
12. Travel range selector calibration, (code 4003)
13. Foot throttle pedal calibration (code 4005)
14. Transmission ratio characteristic calibration (code 4007)
15. Turbo-clutch function calibration (code 4009)
16. Accelerator pedal resolution Calibration,(code 4010)
17. Heater valve Calibration,(no code)
18. Maintenance — change windscreen wiper (300°) (no code)
19. Speed display calibration (no code)

**NOTE:**
*Observe the calibration sequence.*
*Calibrations 1 to 9 as well as 17 to 19 can be performed in any order.*
***Calibrations 10 to 15 must be performed in sequence and as a block** (transmission calibration)*
*The transmission emergency operation must not be switched on during calibration.*
*(In case of transmission calibration, transmission oil temperature should be higher than approx. 40 °C.)*

If incorrect values are detected or the conditions are not met, the message **ERROR** appears. If calibration completes successfully, **OK** is displayed, and the new sensor settings are stored. Data is only accepted when the ignition key is turned to position "0". Wait for at least 15 seconds before switching on the ignition again.

**Menu levels on the A007 - Instrument panel**

**If no error message is present:**

Press "Return." The first main menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return". The second main menu level appears on the multiple display.

Second main menu on the A007 instrument panel

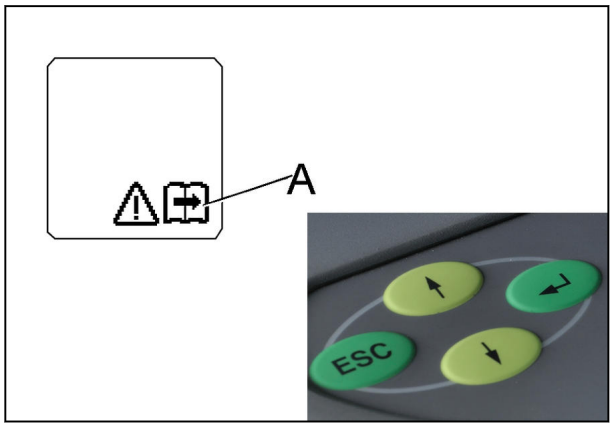



*Fig. 6*

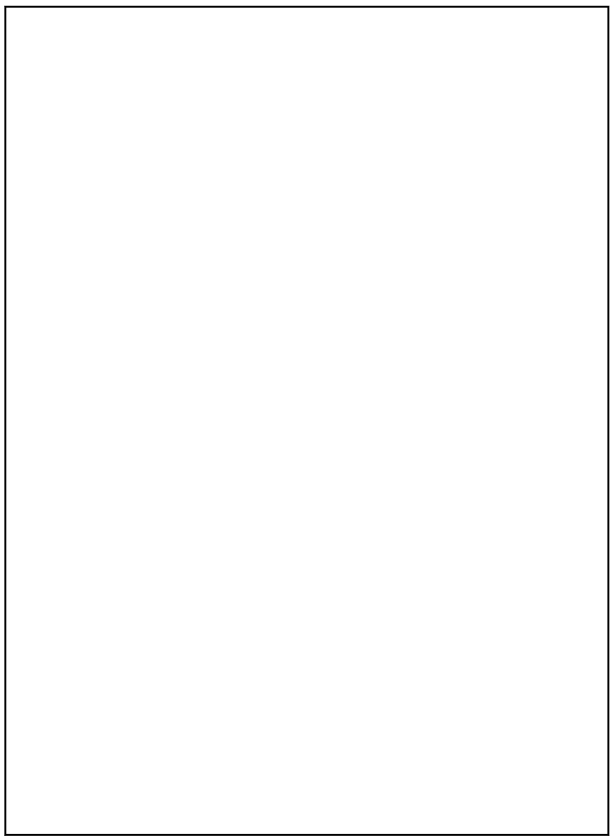


*Fig. 7*

Transmission menu (A)

Front PTO menu (B) (for front PTO only)

Front power lift menu (C) (for EPC front power lift only)

Front axle suspension menu (D)

Rear PTO menu (E)

Rear power lift menu (F)

Hydraulics menu (G)

Steering menu (H)

Heater valve menu and windscreen wiper (300°) menu (J)

**Transmission menu**

Transmission menu

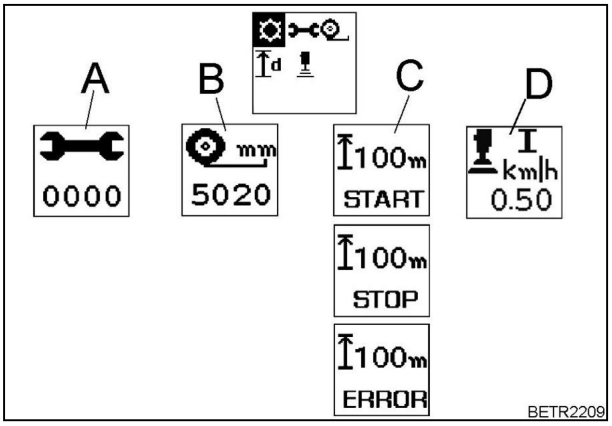



*Fig. 8*

Transmission calibration, display (A)

Change wheel circumference, display (B)

Calibrating speed display (C)

Change acceleration rate I display (D) (Note: Adjustment range from 0,02 km/h ... 0,5 km/h possible)

**Rear PTO menu**

Rear PTO menu

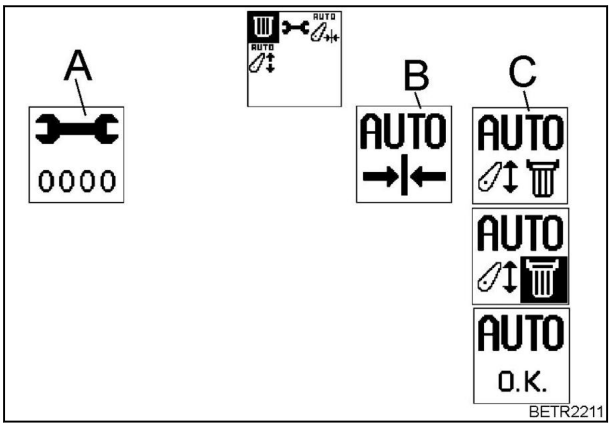



*Fig. 9*

Rear PTO calibration, display (A)

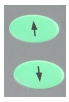

Select factory setting for auto mode switch-on point, display (B) (see also: Operating Manual)


Change auto mode switch-on point, display (C) (see also: Operating Manual)

**Heater and windscreen wiper (300°) menu**

**Move windscreen wiper (300°) to tool change position**

- The heating valve calibration/windscreen wiper menu level appears on the multiple display.



Press one of the buttons repeatedly until the symbol (A) flashes.

Press button.

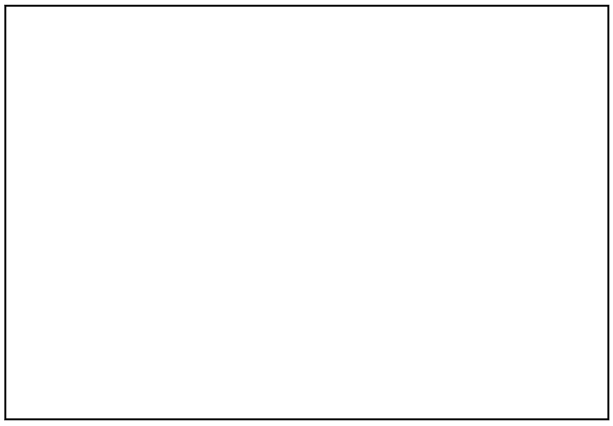


*Fig. 10*

- The symbol to the left appears on the multiple display.
- The windscreen wiper moves to a horizontal position.
- The wiper blade can be changed in this position.

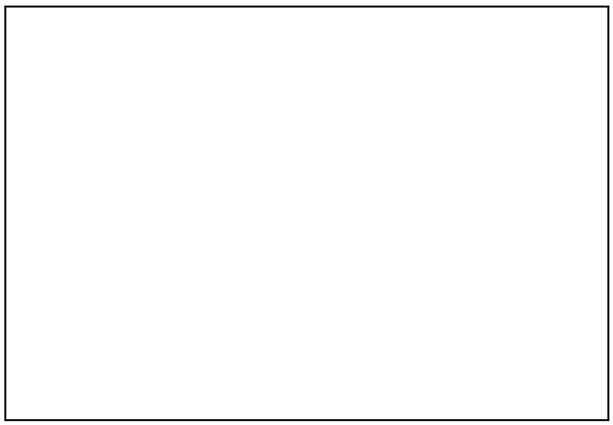


*Fig. 11*


Press the button several times to return to the default display in the instrument panel.

- Once the wiper blade has been changed, the windscreen wiper can be moved to the default position using the combination switch (F).

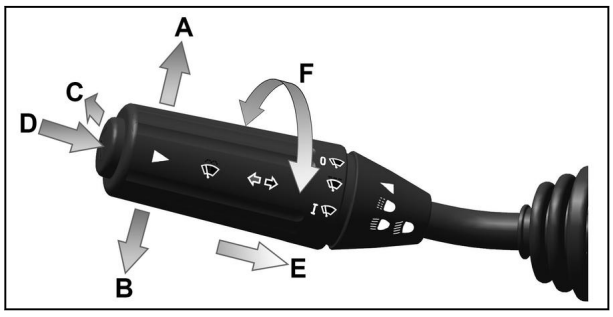



*Fig. 12*

**Adjusting heater valve**

Press the button until the heater symbol flashes.

The calibration process is automatic (approx. 30 seconds).

The heater valve stepper motor is opened and closed slowly.

**NOTE:**
*The display flashes during the calibration process.*

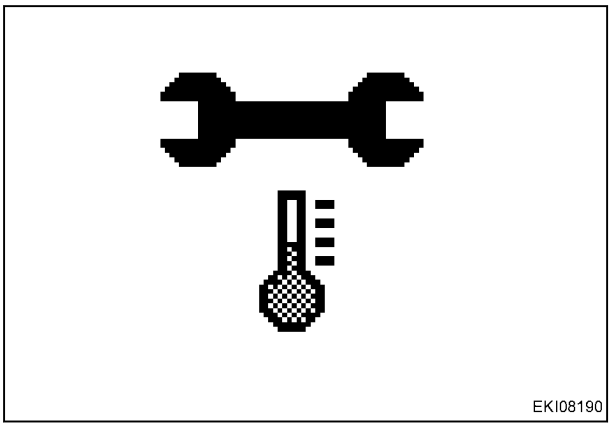



*Fig. 13*

If incorrect values are detected or the conditions are not met, the message **ERROR** appears.

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

**NOTE:**
*Settings are only stored when the ignition key has been turned to the "0" position. Wait for at least 15 seconds before switching on the ignition again.*

## 2.2.8 Calibration code 1001 (crossgate lever)

**Important: The following preparatory steps must be carried out.**

- Hand brake applied
- Ignition ON
- If fault messages are displayed, the faults must be confirmed one by one.

**IMPORTANT:**
*Refer to Service Information 18/2012.*


Press ESC to confirm the warning and fault messages displayed on the **A007** - Instrument panel.

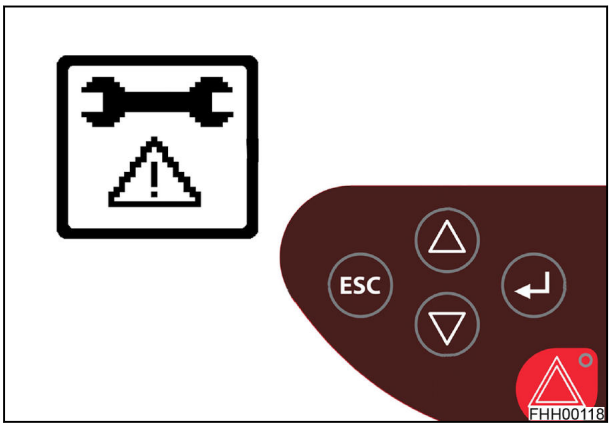



*Fig. 14*

Press "Return." The first main menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes

Press "Return". The second main menu level appears on the multiple display.

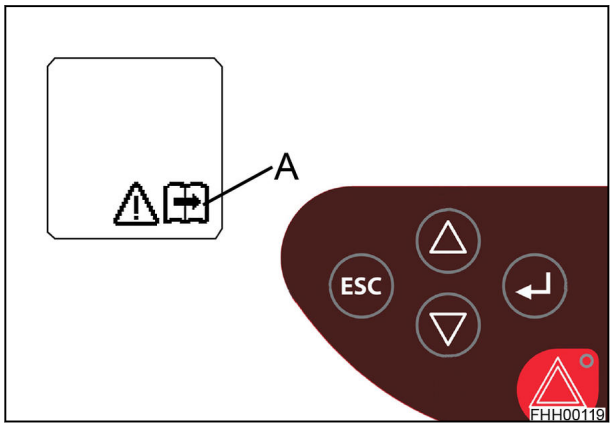



*Fig. 15*

The second main menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return" to confirm.

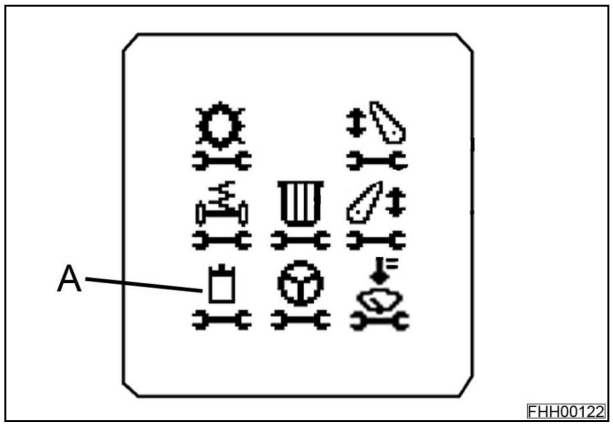



*Fig. 16*

The auxiliary spool valve menu appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return" to confirm.

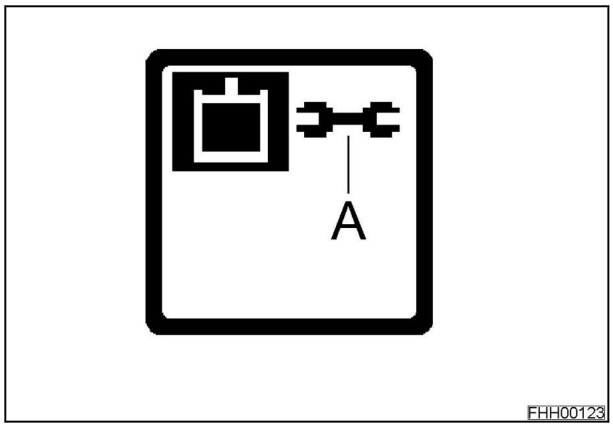



*Fig. 17*

Input code **1001**

Press one of buttons until desired number is displayed.

Press "Return" to confirm.

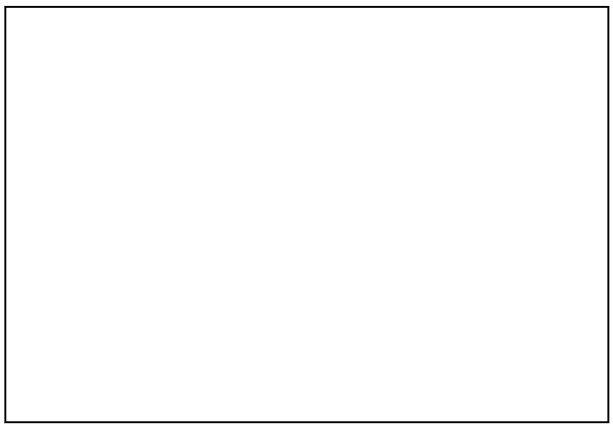


*Fig. 18*

Release crossgate lever (centres automatically).

Press "Return" to confirm this position.

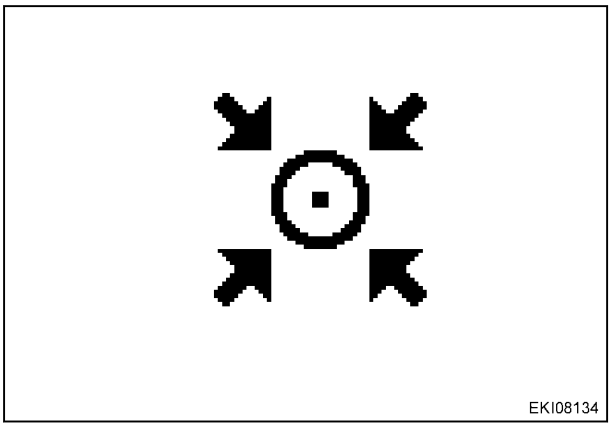



*Fig. 19*

Push crossgate lever to right and exert excessive pressure against spring.

Hold crossgate lever.

Press "Return" to confirm this position.

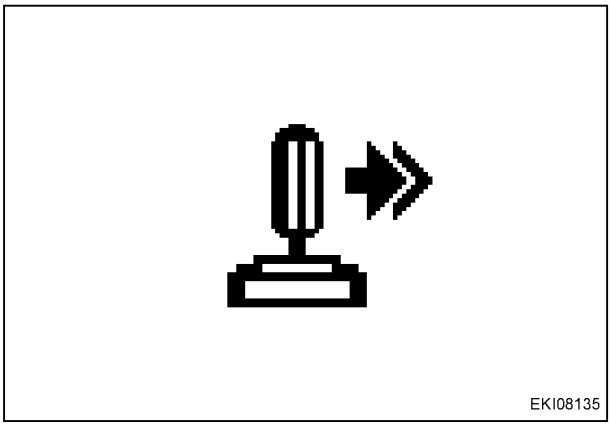



*Fig. 20*

Push crossgate lever to left (exert excessive pressure against spring).

Hold crossgate lever.

Press "Return" to confirm this position.

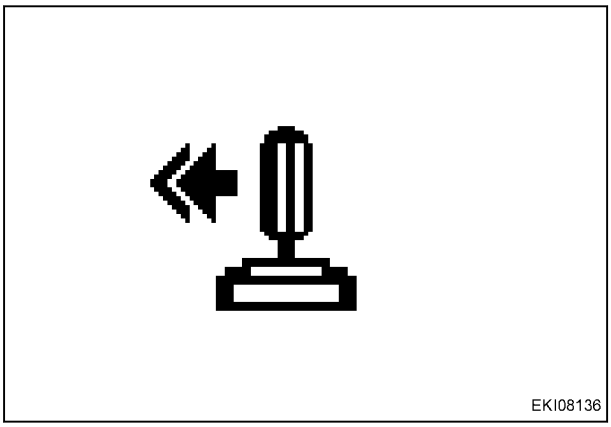



*Fig. 21*

Push crossgate lever forward (exert excessive pressure against spring).

Hold crossgate lever.

Press "Return" to confirm this position.

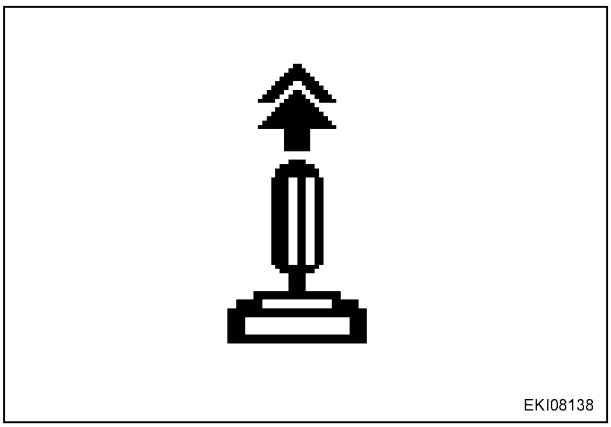



*Fig. 22*

Pull crossgate lever backwards (exert excessive pressure against spring).

Hold crossgate lever.

Press "Return" to confirm this position.

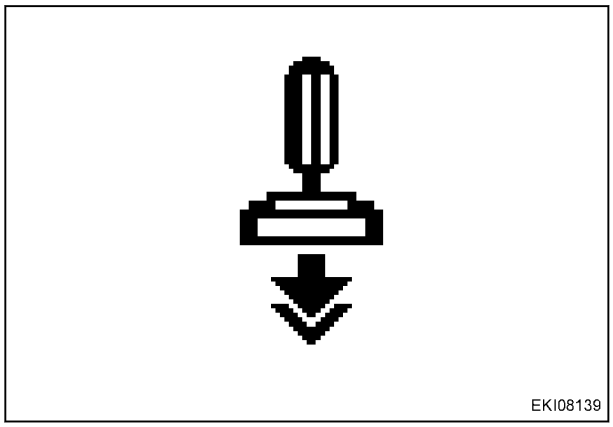



*Fig. 23*

First move the crossgate lever to the right, and exert and hold excessive pressure on the spring.

In this position, move the crossgate lever forwards and exert excessive pressure on the spring.

Hold crossgate lever.

Press "Return" to confirm this position.

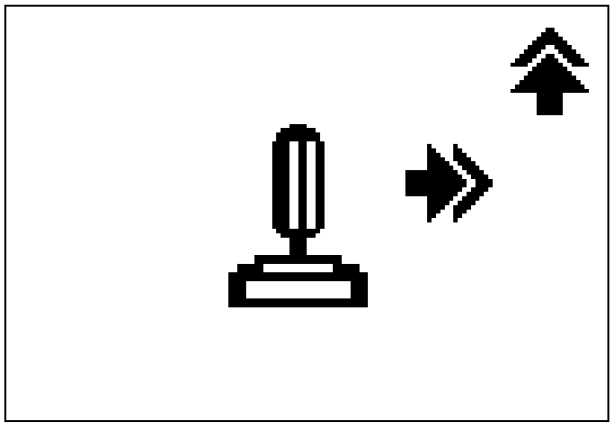


*Fig. 24*

First move the crossgate lever to the right, and exert and hold excessive pressure on the spring.

In this position, move the crossgate lever backwards and exert excessive pressure on the spring.

Hold crossgate lever.

Press "Return" to confirm this position.

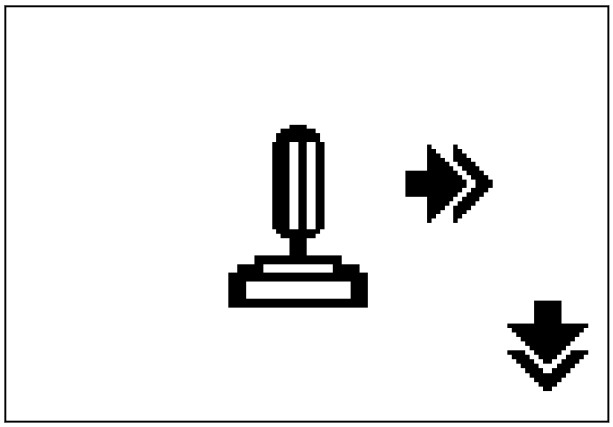


*Fig. 25*

First move the crossgate lever to the left, and exert and hold excessive pressure on the spring.

In this position, move the crossgate lever backwards and exert excessive pressure on the spring.

Hold crossgate lever.

Press "Return" to confirm this position.

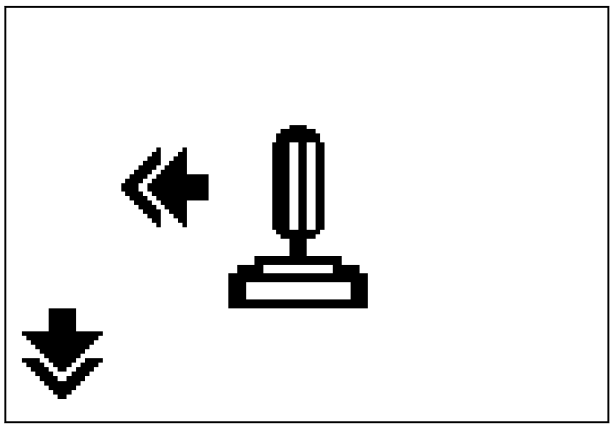


*Fig. 26*

First move the crossgate lever to the left, and exert and hold excessive pressure on the spring.

In this position, move the crossgate lever forwards and exert excessive pressure on the spring.

Hold crossgate lever.

Press "Return" to confirm this position.

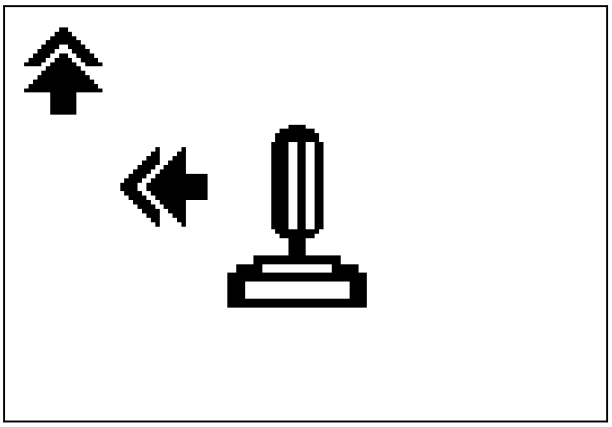


*Fig. 27*

Push crossgate lever to right (do not exert excessive pressure against spring).

Hold crossgate lever.

Press "Return" to confirm this position.

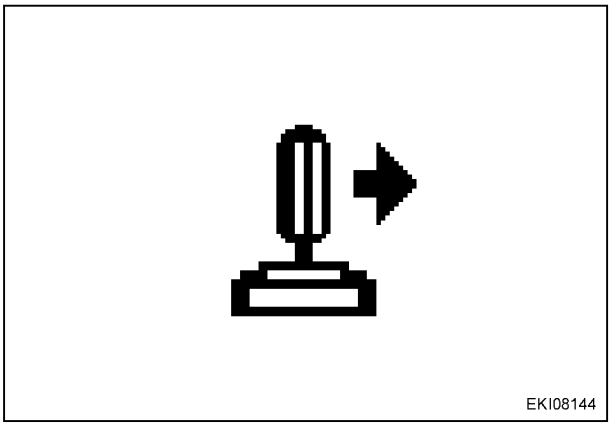



*Fig. 28*

Push crossgate lever to left (do not exert excessive pressure against spring).

Hold crossgate lever.

Press "Return" to confirm this position.

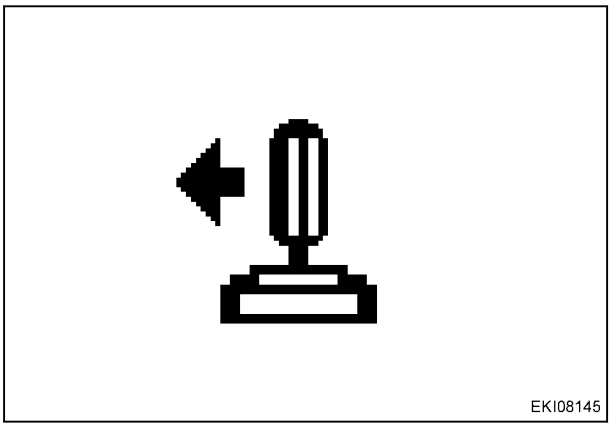



*Fig. 29*

Push crossgate lever forwards (do not exert excessive pressure against spring).

Hold crossgate lever.

Press "Return" to confirm this position.

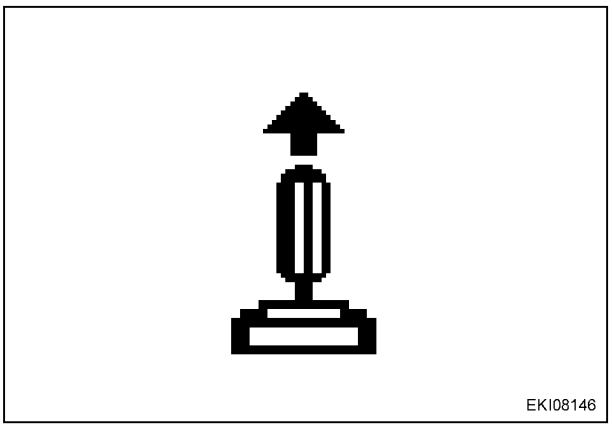



*Fig. 30*

Pull crossgate lever backwards (do not exert excessive pressure against spring).

Hold crossgate lever.

Press "Return" to confirm this position.

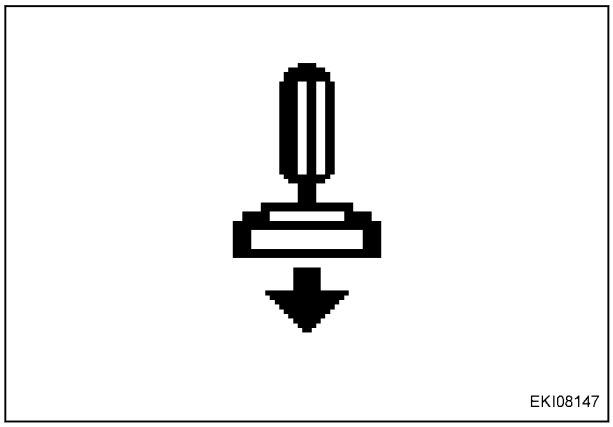



*Fig. 31*

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

**NOTE:**
*Settings are only adopted when the ignition key has been turned to "0" position. Wait for at least 15 seconds before switching on the ignition again.*

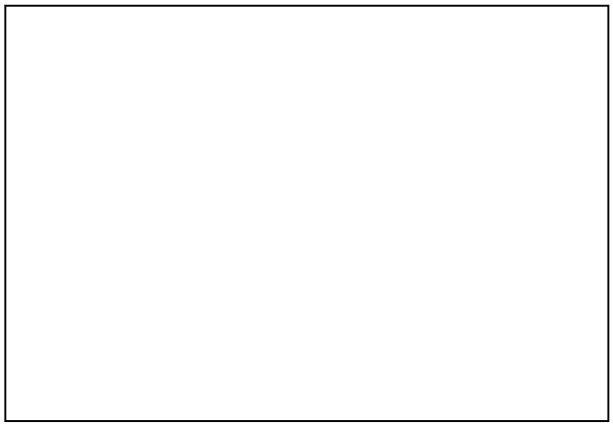


*Fig. 32*

If incorrect values are detected or the conditions are not met, the message **ERROR** appears.

**1001** = calibration code

**FXX** = fault code

**NOTE:**
*See also: fault code for calibration 1001*

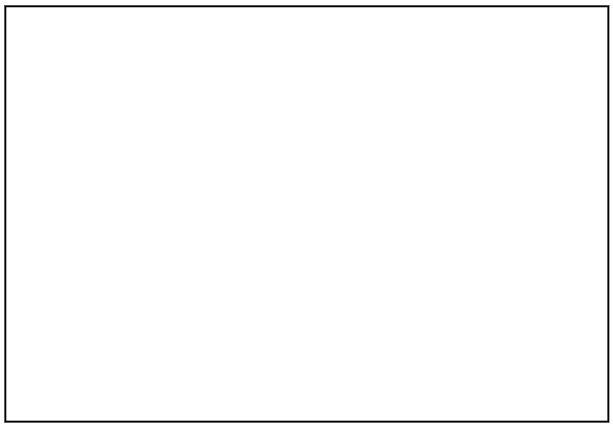


*Fig. 33*

## 2.2.9 Calibration code 7666 (front axle suspension)

**8. Calibrating the front axle suspension (7666)**

**WARNING:**
**Once the input code has been confirmed, the tractor will raise and lower automatically!**

**Important: The following preparatory steps must be carried out.**

- Position the tractor on a flat, level surface
- Hand brake applied
- Start engine.
- If fault messages are displayed, the faults must be confirmed one by one.

ESC

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel.

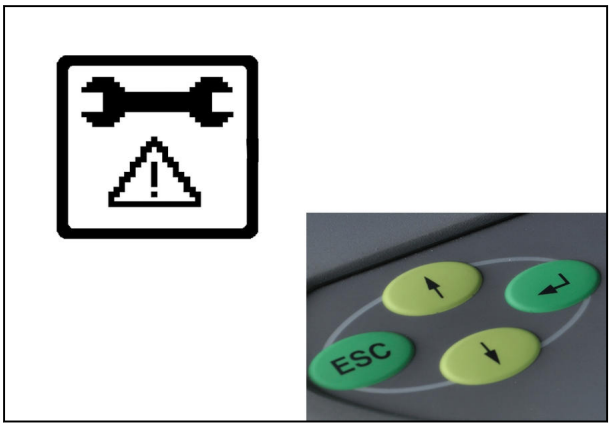



*Fig. 34*

Press "Return." The first main menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return". The second main menu level appears on the multiple display.

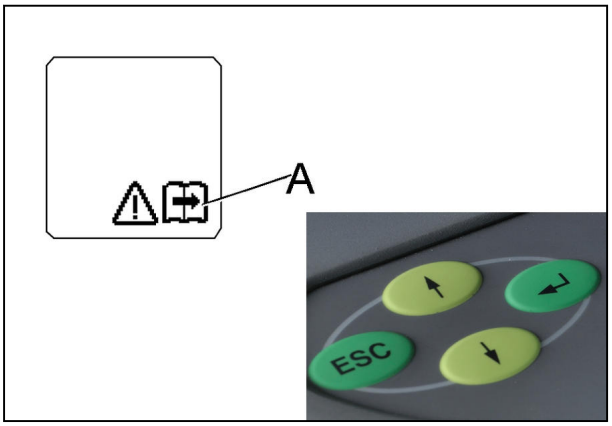



*Fig. 35*

The second main menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return" to confirm.

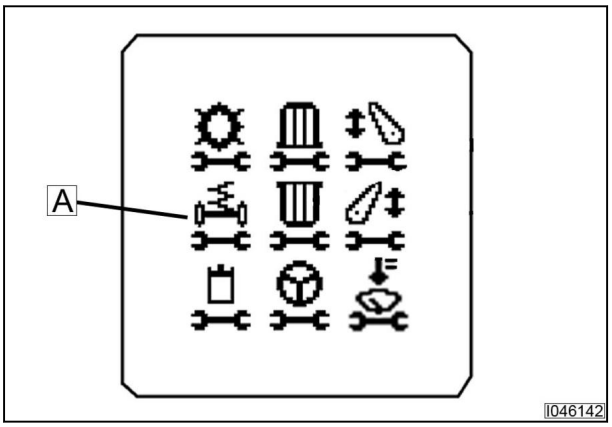



*Fig. 36*

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return" to confirm.

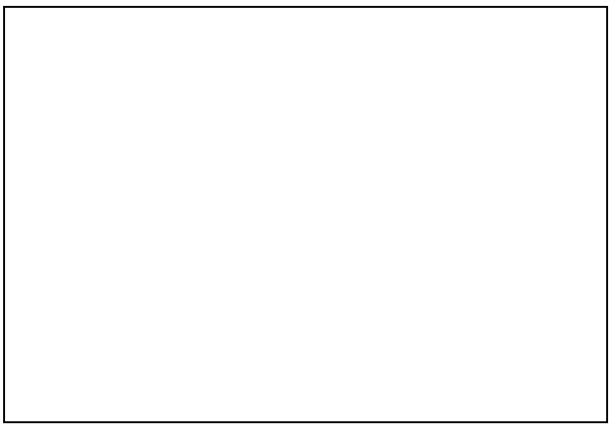


*Fig. 37*

**WARNING:**
**Once the input code has been confirmed, the tractor will raise and lower automatically!**

Input code **7666**

Press one of the buttons until the desired number is displayed.

Press "Return" to confirm.

The flashing arrow indicates the desired limit position.

The tractor is raised to the upper limit position.

Press "Return" to confirm the upper limit position.

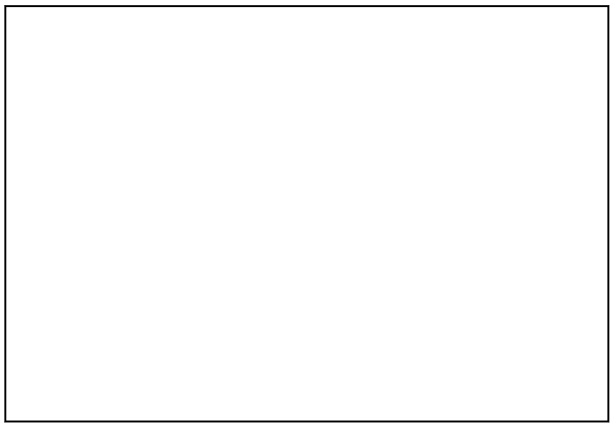


*Fig. 38*

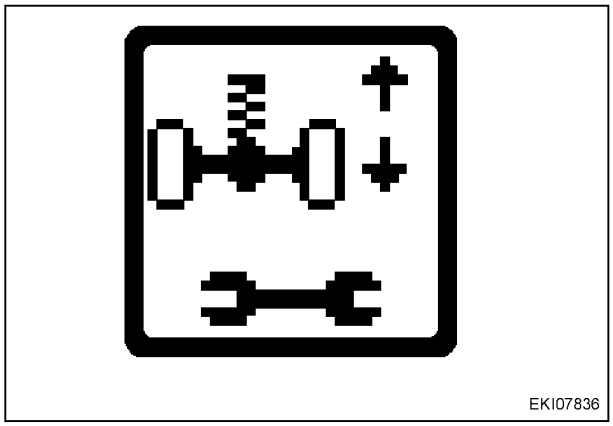



*Fig. 39*

The flashing arrow indicates the desired limit position.

The tractor is lowered to the lower limit position.

Press "Return" to confirm the lower limit position.

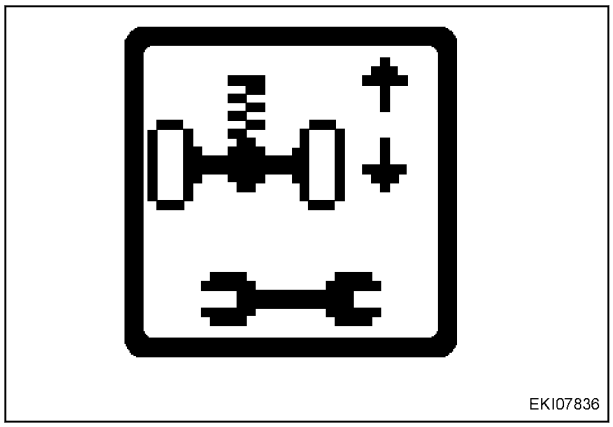



*Fig. 40*

If incorrect values are detected or the conditions are not met, the message **ERROR** appears.

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

**NOTE:**
*Settings are only adopted when the ignition key has been turned to "0" position. Wait for at least 15 seconds before switching on the ignition again.*

If incorrect values are detected or the conditions are not met, the message **ERROR** appears.

**7666** = calibration code

**FXX** = fault code

**NOTE:** *See also: "Fault code for calibration code 7666"*

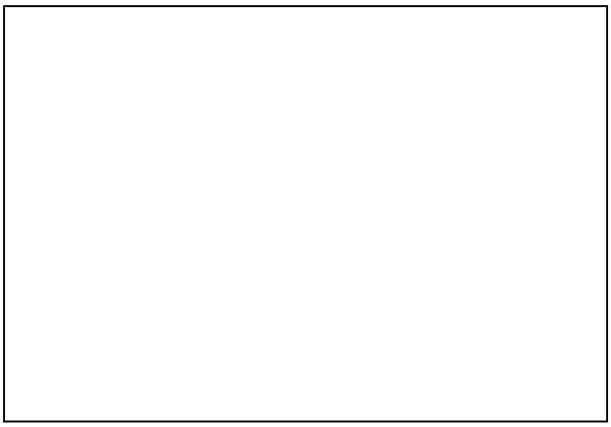


*Fig. 41*

## 2.2.10 Calibration code 4001 (clutch pedal)

**12. Calibrating the clutch pedal**

**The following preparatory steps must be carried out**

- Ignition ON
- Hand brake applied
- If fault messages are displayed, the faults must be confirmed one by one.


Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel.

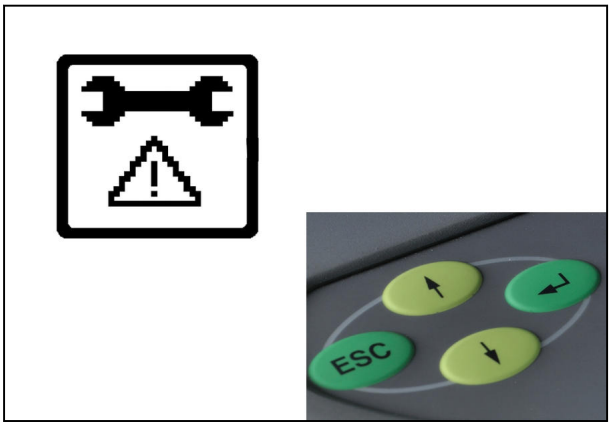



*Fig. 42*

Press "Return." The first main menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return". The second main menu level appears on the multiple display.

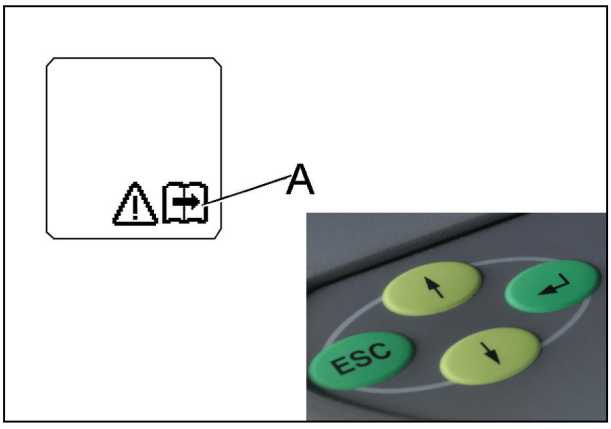



*Fig. 43*

The second main menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return" to confirm.

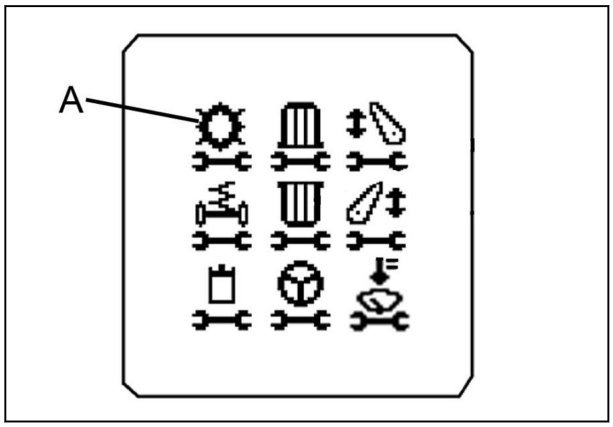



*Fig. 44*

The transmission menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return" to confirm.

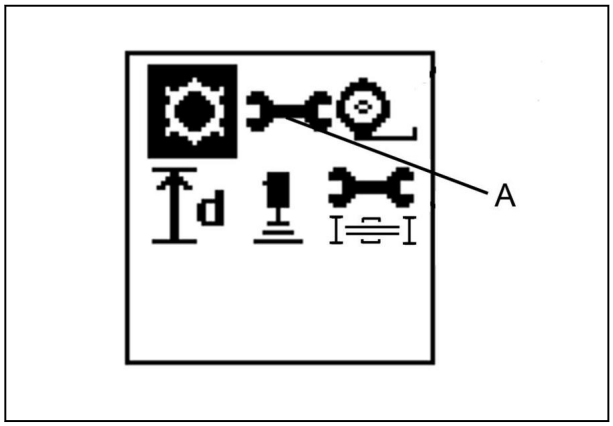



*Fig. 45*

Input code **4001**

Press one of buttons until desired number is displayed.

Press "Return" to confirm.

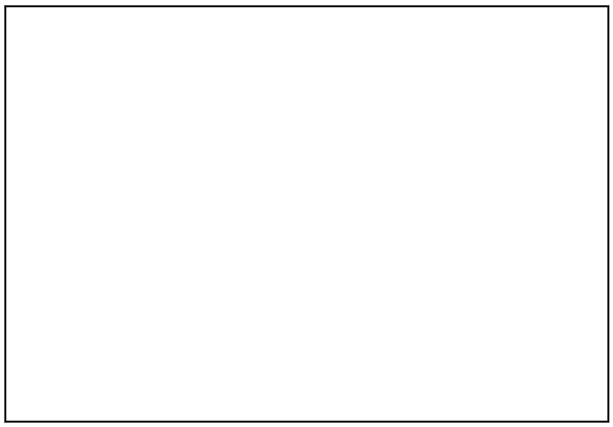


*Fig. 46*

Clutch pedal **not** depressed

Press "Return" to confirm.

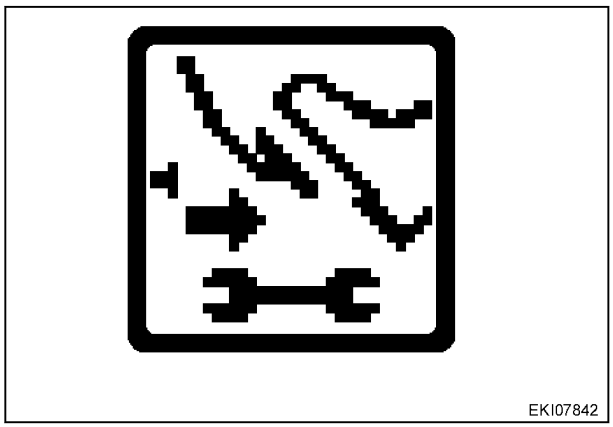



*Fig. 47*

Clutch pedal depressed

Press "Return" to confirm.

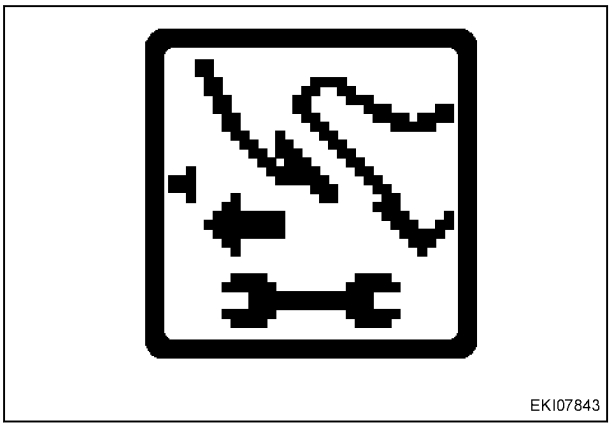



*Fig. 48*

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

**NOTE:**
*Settings are only adopted when the ignition key has been turned to "0" position. Wait for at least 15 seconds before switching on the ignition again.*

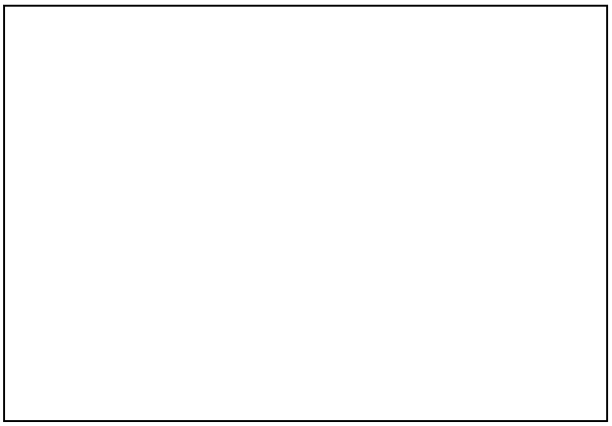


*Fig. 49*

If incorrect values are detected or the conditions are not met, the message **ERROR** appears.

**4001** = calibration code

**FXX** = error code (see table)

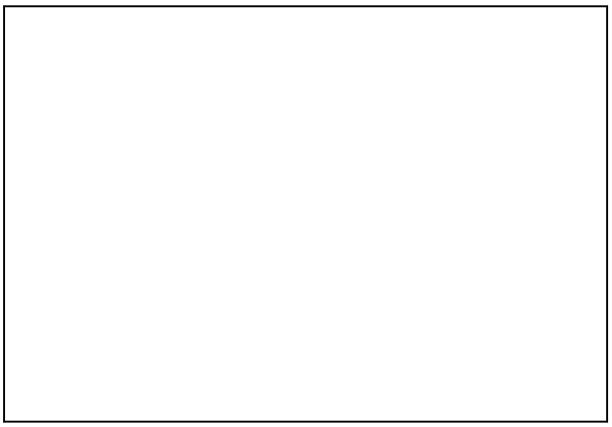


*Fig. 50*

## 2.2.11 Calibration code 4002 (hand throttle)

**13. Calibrating the hand throttle (4002)**

**The following preparatory steps must be carried out**

- Hand brake applied
- Ignition ON
- If fault messages are displayed, the faults must be confirmed one by one.

ESC

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel.

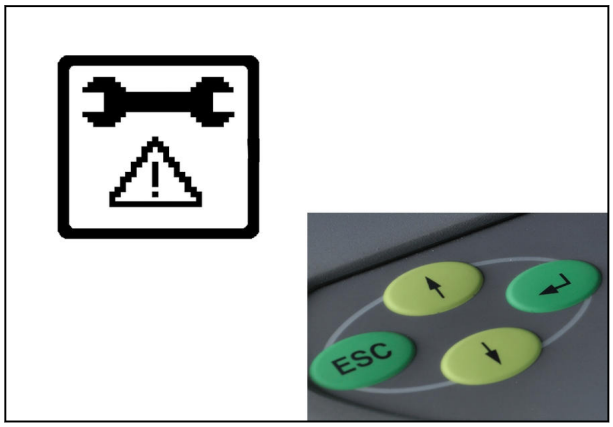



*Fig. 51*

Press "Return." The first main menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return". The second main menu level appears on the multiple display.

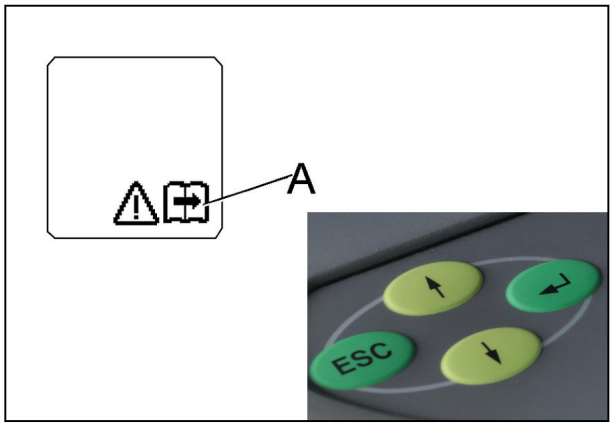



*Fig. 52*

The second main menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return" to confirm.

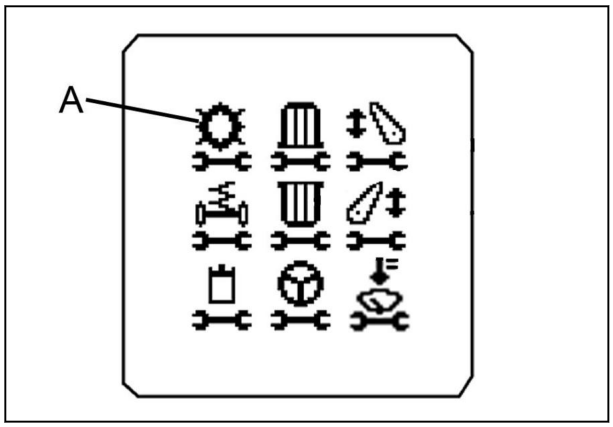



*Fig. 53*

The transmission menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return" to confirm.

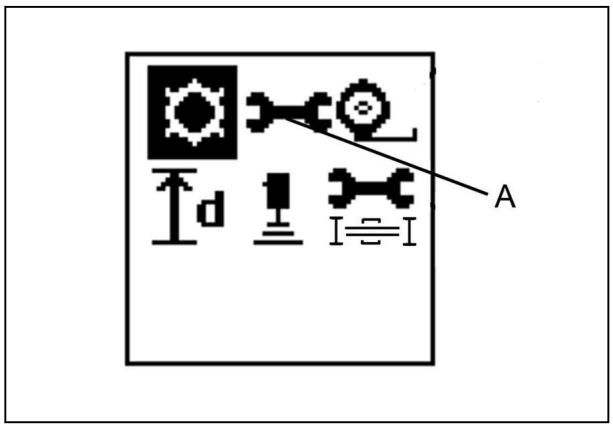



*Fig. 54*

Input code **4002**

Press one of buttons until desired number is displayed.

Press "Return" to confirm.

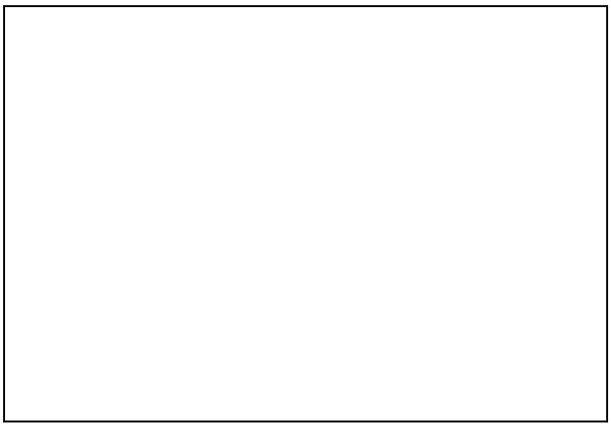


*Fig. 55*

Turn the hand throttle to the **maximum** position.

Press "Return" to confirm.

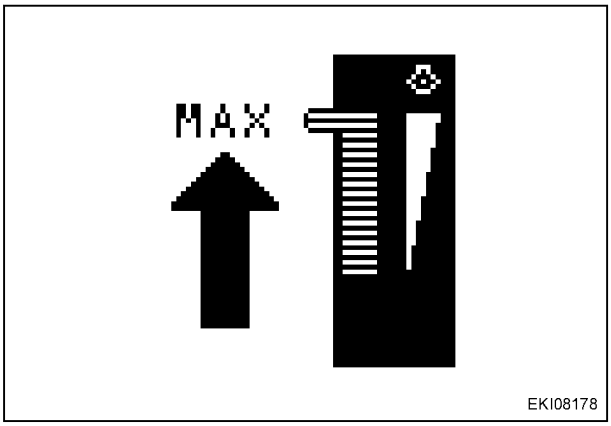



*Fig. 56*

Turn the hand throttle to the **minimum** position.

Press "Return" to confirm.

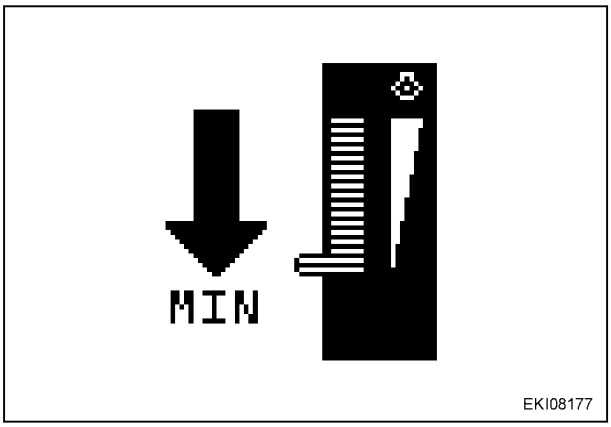



*Fig. 57*

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

**NOTE:**
*Settings are only adopted when the ignition key has been turned to "0" position. Wait for at least 15 seconds before switching on the ignition again.*

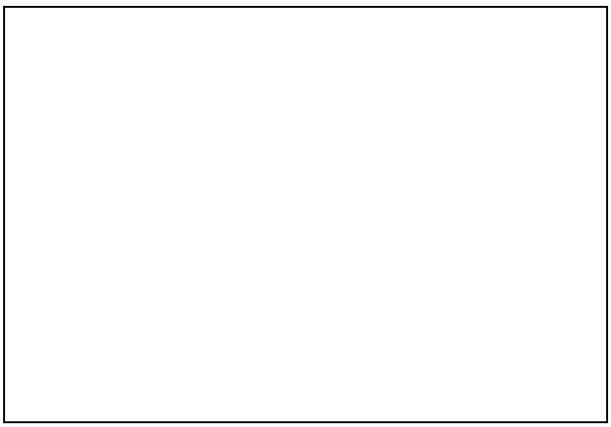


*Fig. 58*

If incorrect values are detected or the conditions are not met, the message **ERROR** appears.

**4002** = calibration code

**FXX** = error code (see table)

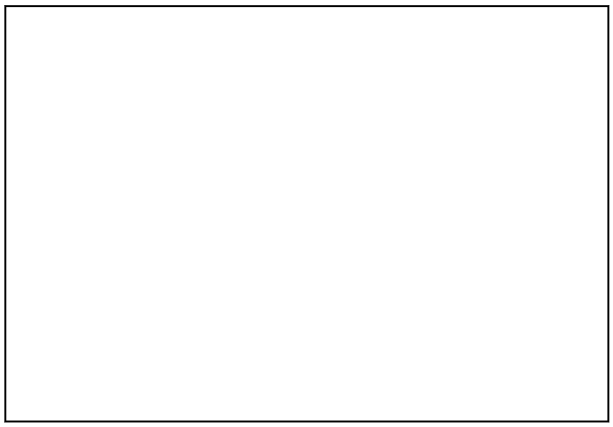


*Fig. 59*

## 2.2.12 Calibration code 4003 (travel speed range selector)

**14. Calibrating the travel speed range selector (4003)**

**The following preparatory steps must be carried out**

- Transmission oil temperature is approx. 40 °C
- Hand brake applied
- Start engine.
- Clutch pedal depressed
- Engine speed approx. 800 rpm (idle speed)
- If fault messages are displayed, the faults must be confirmed one by one.


Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel.

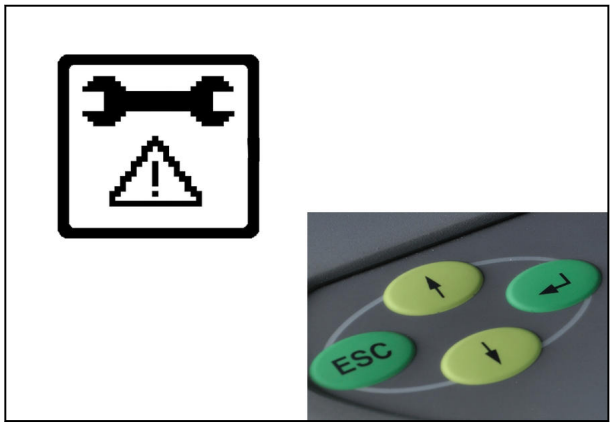



*Fig. 60*

Press "Return." The first main menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return". The second main menu level appears on the multiple display.

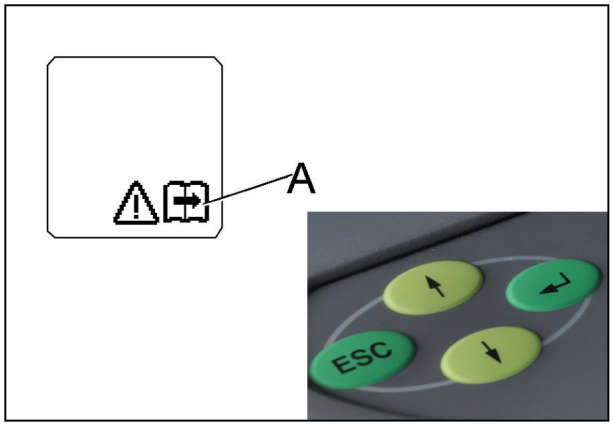



*Fig. 61*

The second main menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return" to confirm.

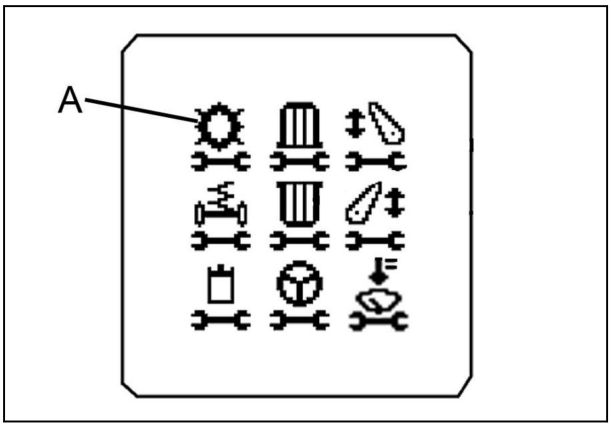



*Fig. 62*

The transmission menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return" to confirm.

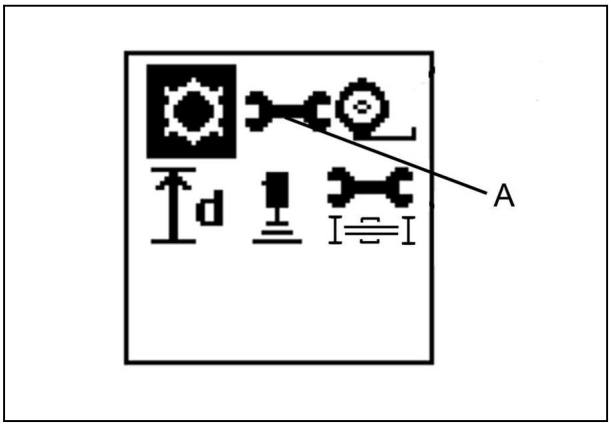



*Fig. 63*

Input code **4003**

Press one of buttons until desired number is displayed.

Press "Return" to confirm.

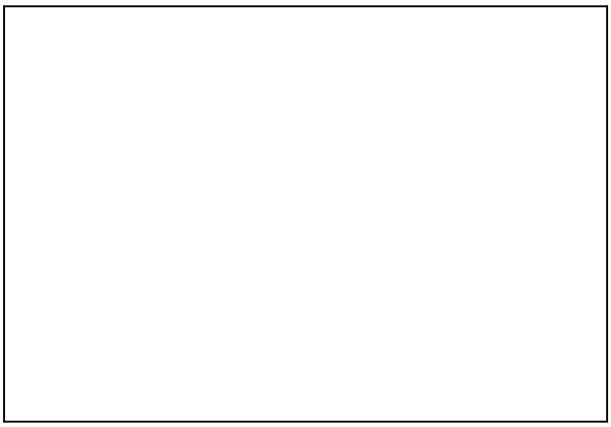


*Fig. 64*

Travel speed range I is displayed and enabled automatically.

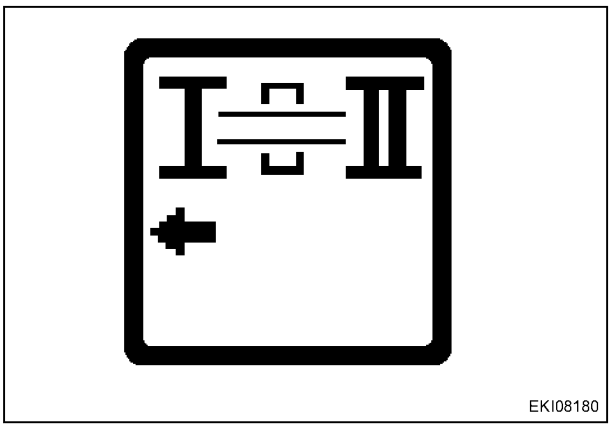



*Fig. 65*

Travel speed range II is displayed and enabled automatically.

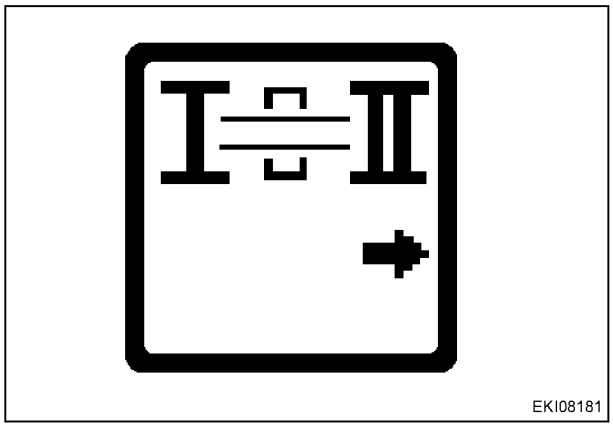



*Fig. 66*

The center position is displayed and enabled automatically.

If incorrect values are detected or the conditions are not met, the message **ERROR** appears.

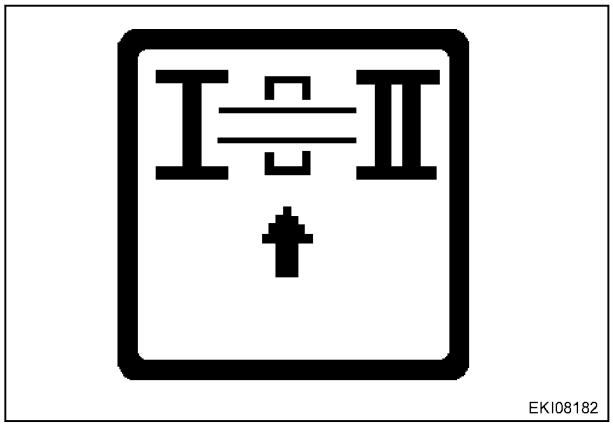



*Fig. 67*

If calibration is completed without errors, the screen appears and the new settings are saved.


Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel.

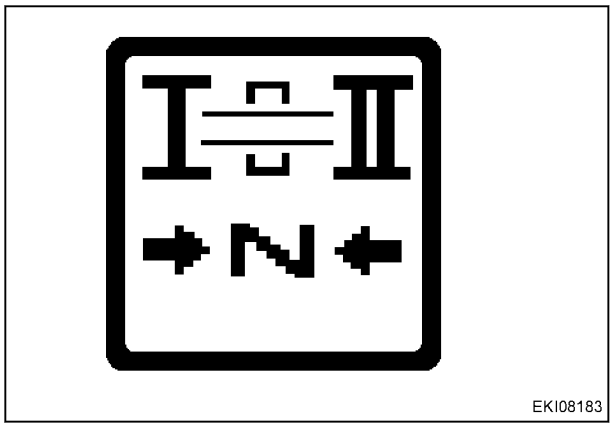



*Fig. 68*

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

**NOTE:**
*Settings are only adopted when the ignition key has been turned to "0" position. Wait for at least 15 seconds before switching on the ignition again.*

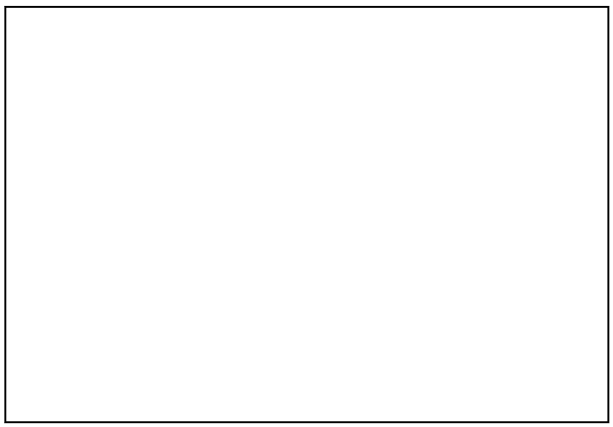


*Fig. 69*

If incorrect values are detected or the conditions are not met, the message **ERROR** appears.

**4003** = calibration code

**FXX** = fault code

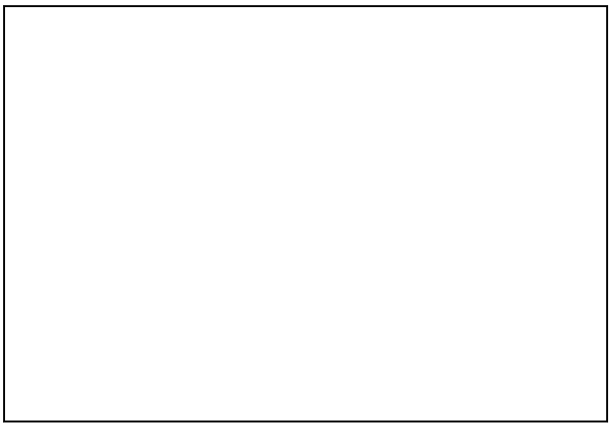


*Fig. 70*

## 2.2.13 Calibration code 4005 (foot throttle/accelerator pedal)

**15. Calibrating the foot throttle/accelerator pedal (4005)**

**The following preparatory steps must be carried out**

- Hand brake applied
- Ignition ON
- If fault messages are displayed, the faults must be confirmed one by one.


Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel.

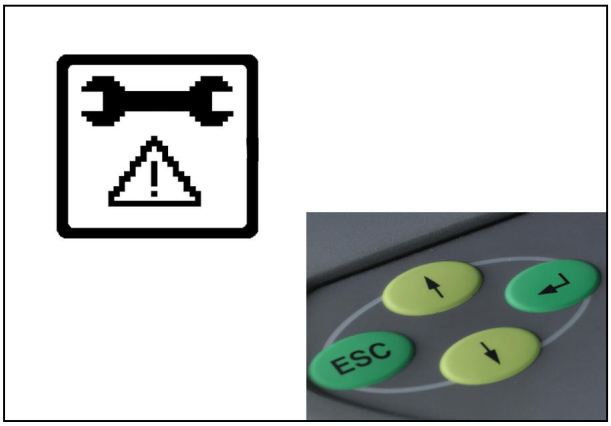



*Fig. 71*

Press "Return." The first main menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return". The second main menu level appears on the multiple display.

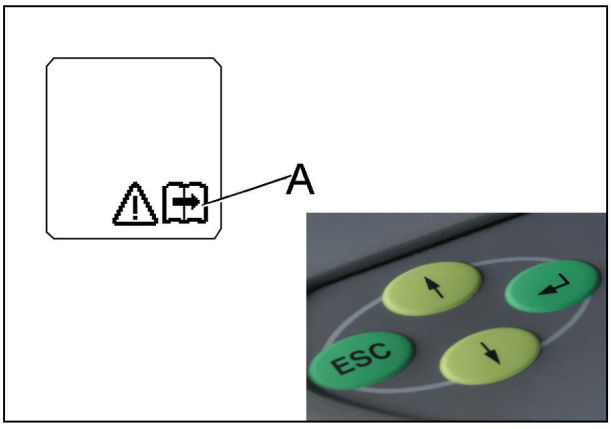



*Fig. 72*

The second main menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return" to confirm.

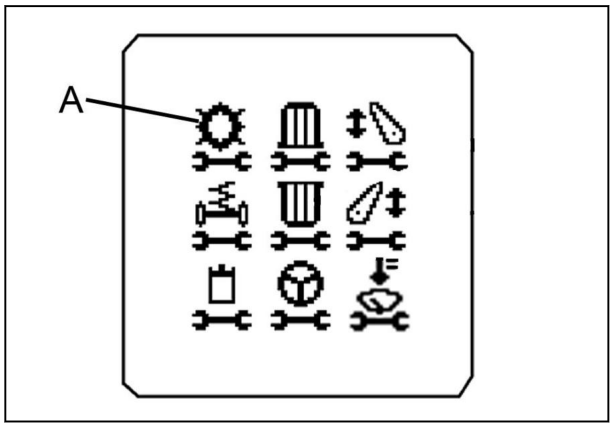



*Fig. 73*

The transmission menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return" to confirm.

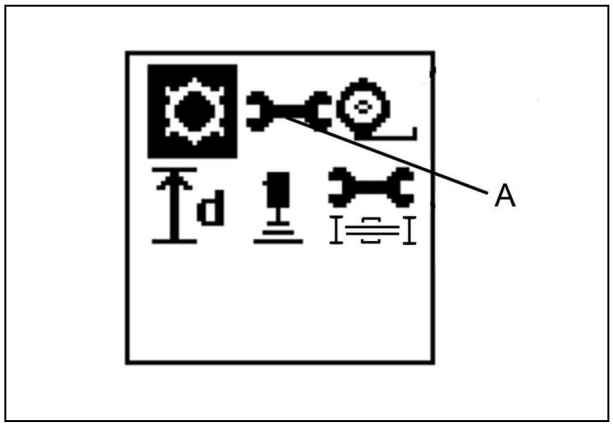



*Fig. 74*

Input code **4005**

Press one of buttons until desired number is displayed.

Press "Return" to confirm.

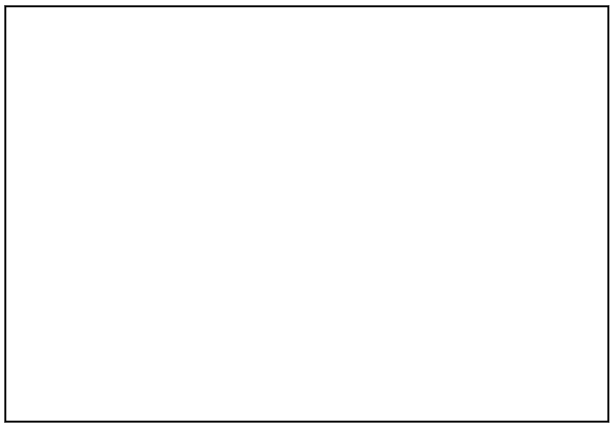


*Fig. 75*

**Fully depress** the foot throttle/driving pedal

Press "Return" to confirm.

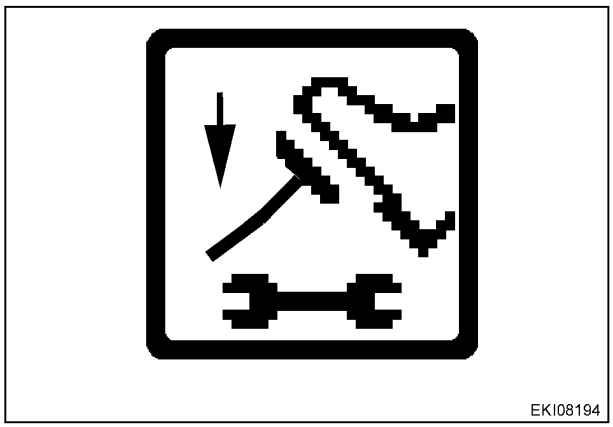



*Fig. 76*

Foot throttle/driving pedal **in idle position**

Press "Return" to confirm.

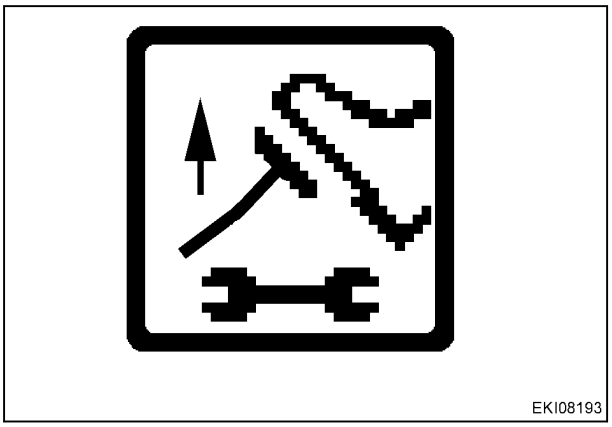



*Fig. 77*

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

**NOTE:**
*Settings are only adopted when the ignition key has been turned to "0" position. Wait for at least 15 seconds before switching on the ignition again.*

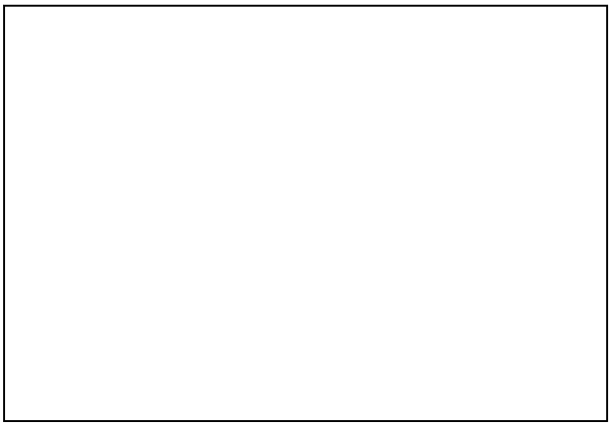


*Fig. 78*

If incorrect values are detected or the conditions are not met, the message **ERROR** appears.

**4005** = calibration code

**FXX** = fault code

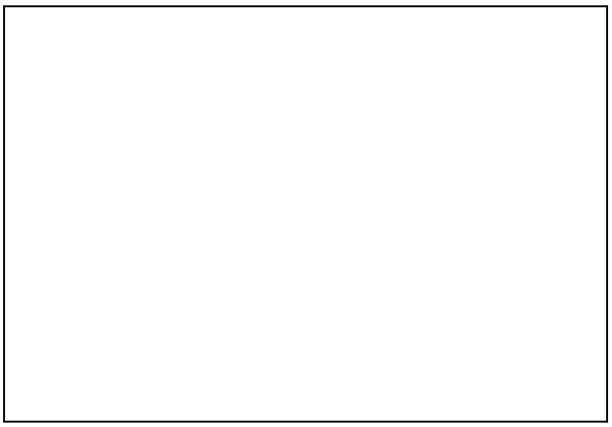


*Fig. 79*

## 2.2.14 Calibration code 4007 (transmission ratio characteristic)

**16. Calibrating the transmission ratio characteristic**

**The following preparatory steps must be carried out:**

- Transmission oil temperature is approx. 40 °C
- Hand brake applied
- Start engine.
- Tractor stationary (speed below 0,01 km/h)
- Engine speed 1600 rpm ± 30 rpm
- The engine speed must not drop below 1400 rpm during calibration

- No error messages from speed sensors (sensor, engine speed and B014 sensor, hydrostatic collecting shaft)
- Neutral switch not in neutral (LED off), transmission is engaged (active standstill)
- Range selector in neutral (normal after calibration of the travel range selector (code 4003))

  Manually set the transmission to neutral via the emergency operation if necessary.
- Clutch pedal not depressed
- If fault messages are displayed, the faults must be confirmed one by one.


Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel.

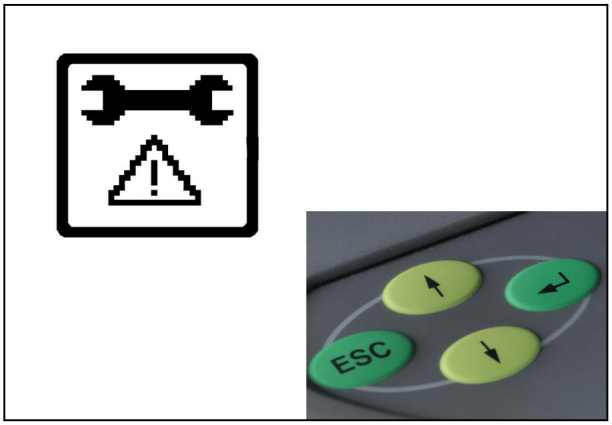



*Fig. 80*

*Transmission in active standstill* display


Press "ESC" to confirm

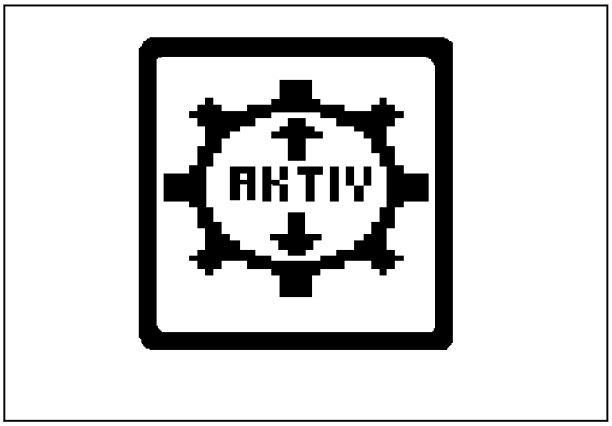



*Fig. 81*

"Transmission in neutral" display


Press "ESC" to confirm

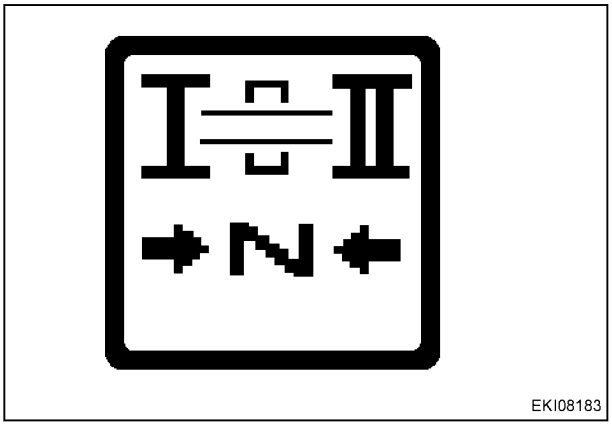



*Fig. 82*

Press "Return." The first main menu level appears on the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes

Press "Return". The second main menu appears in the multiple display

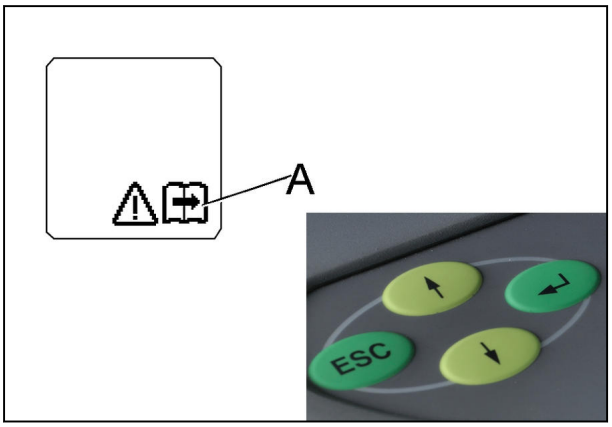



*Fig. 83*

The second main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes

Press "Return" to confirm

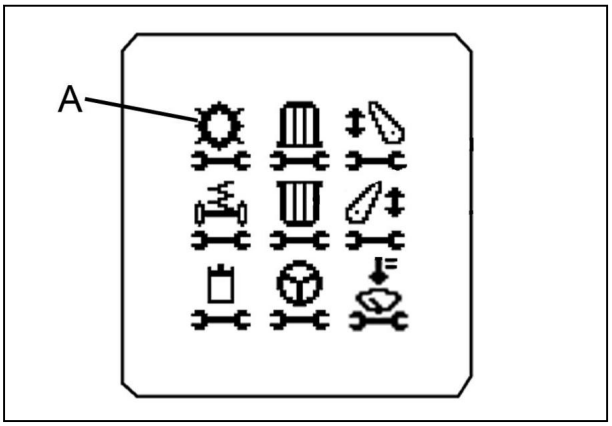



*Fig. 84*

The transmission menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes

Press "Return" to confirm

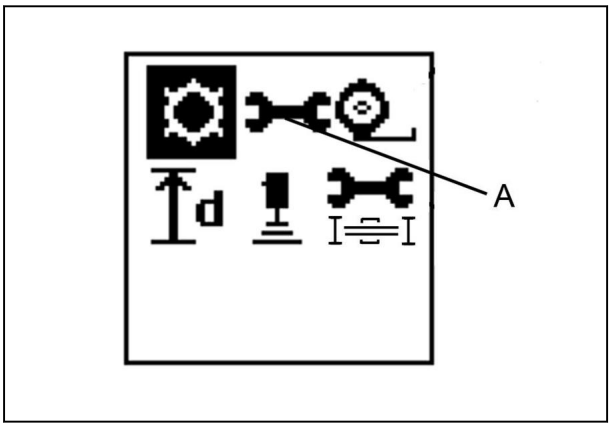
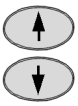



*Fig. 85*

**NOTE:**
*Since the transmission automatically reverts to neutral after 15 sec. when the hand brake is applied, reactivate the transmission as necessary.*

Input code **4007**



Press one of buttons until desired number is displayed

Press "Return" to confirm

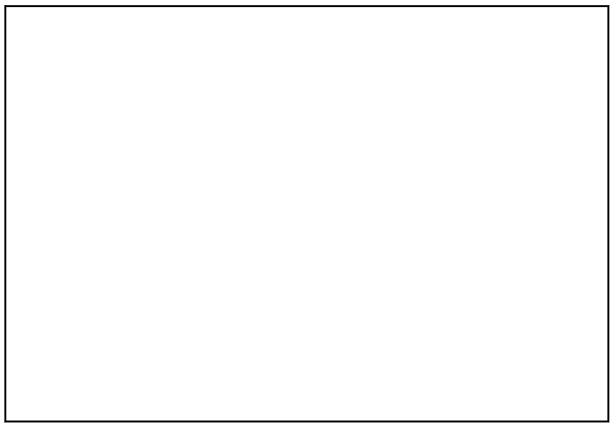


*Fig. 86*

Test steps one (Step1)

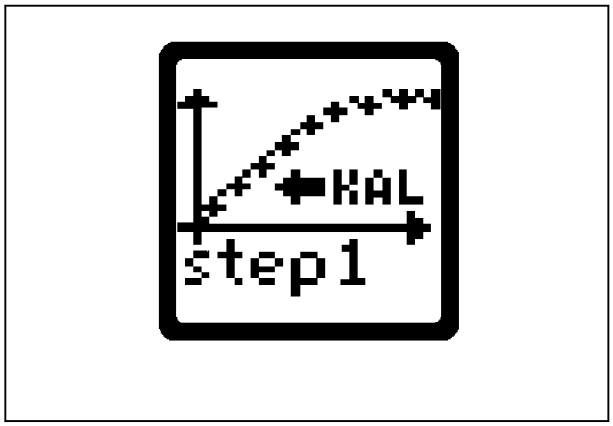



*Fig. 87*

to seven (Step 7) run automatically

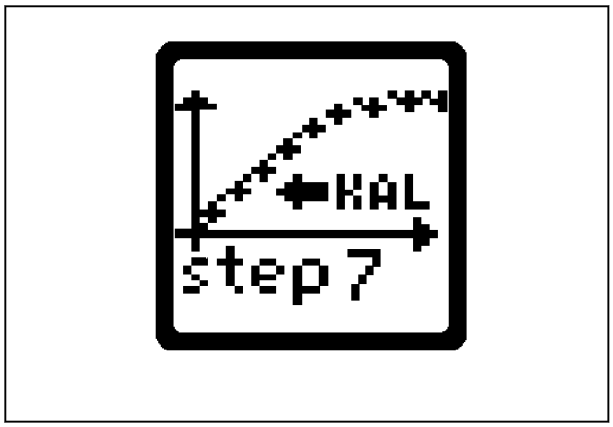



*Fig. 88*

If calibration completes successfully, the image is displayed and the new sensor values are saved


Press "ESC" to confirm

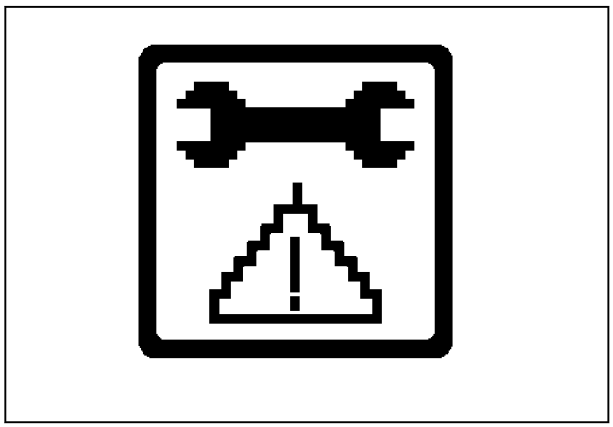


*Fig. 89*

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

**NOTE:**
*Settings are only stored when ignition key has been turned to "0" position.*
*Wait for at least 15 seconds before switching on the ignition again.*

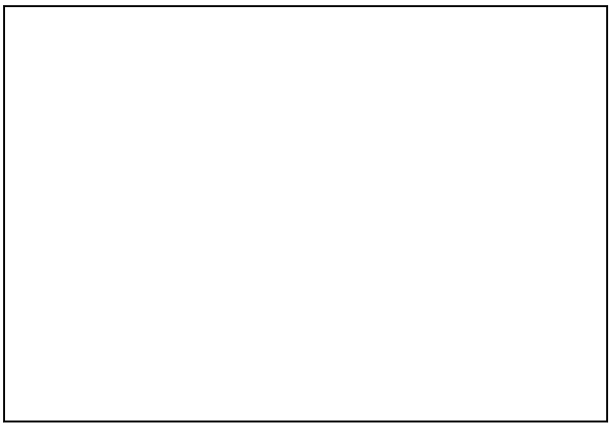


*Fig. 90*

If incorrect values are detected or the conditions are not met, an **ERROR** message appears

(4007) calibration code

( FXX) error code (see table)

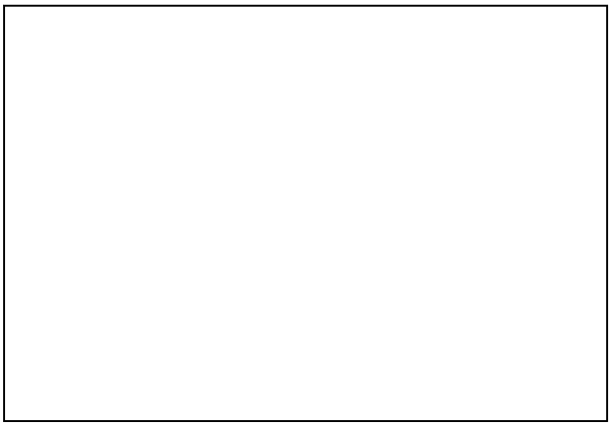


*Fig. 91*

**Graphic overview of transmission ratio calibration**

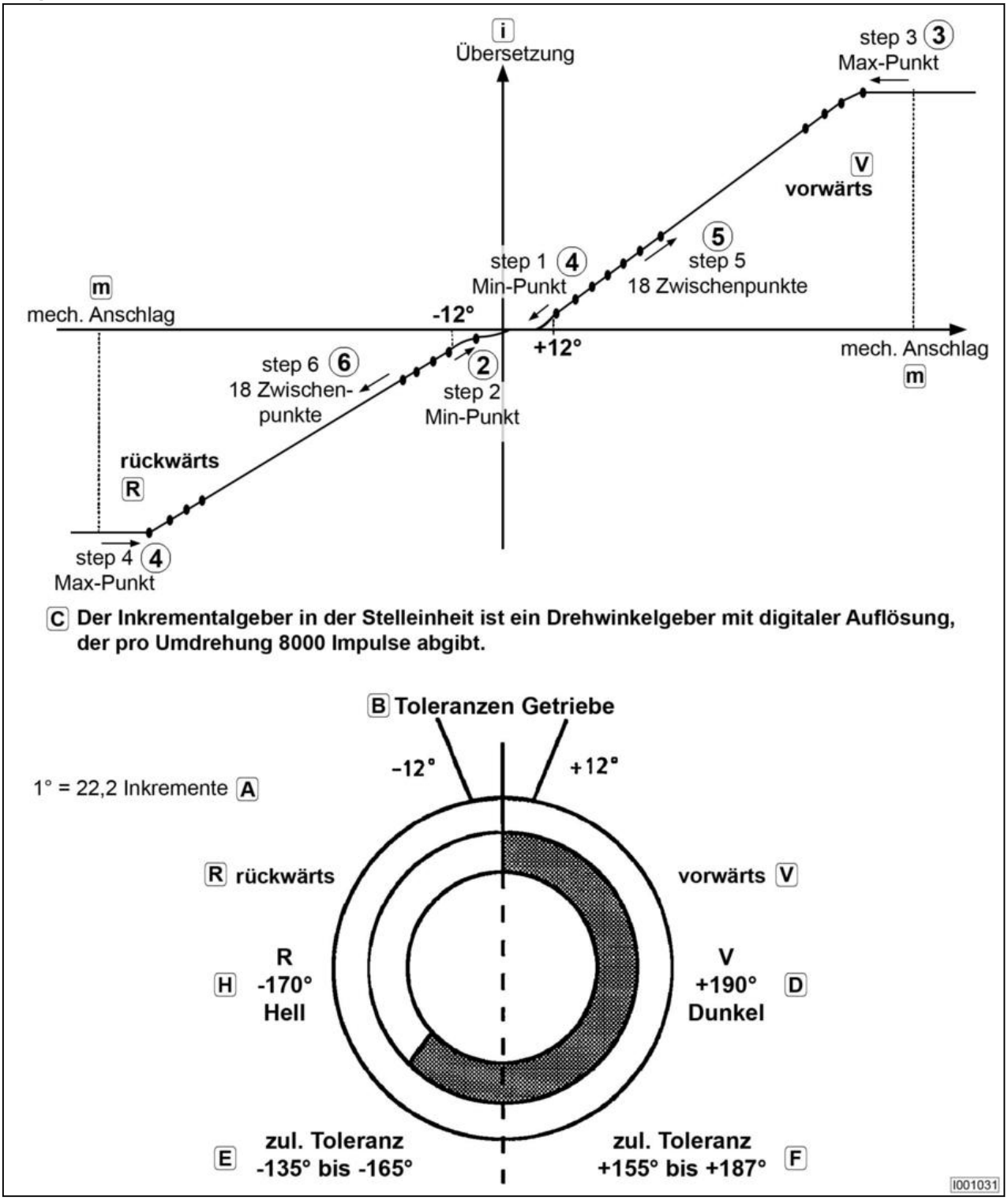



*Fig. 92*

## 2.2.15 Calibration code 4009 (turbo-clutch function)

**17. Calibrating the turbo-clutch function (4009)**

**The following preparatory steps must be carried out**

- Transmission oil temperature is approx. 40 °C
- Start engine.

- Engage transmission travel range II with the switch in the **A100** - Multifunction armrest (MFA)
- Hand brake applied Caution: The tractor may start moving during calibration
- Tractor stationary (speed below 0,01 km/h)
- Engine speed 1100 rpm ± 40 rpm
- Engine speed drops to approx. 800 rpm during the calibration operation
- If fault messages are displayed, the faults must be confirmed one by one.


Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel.

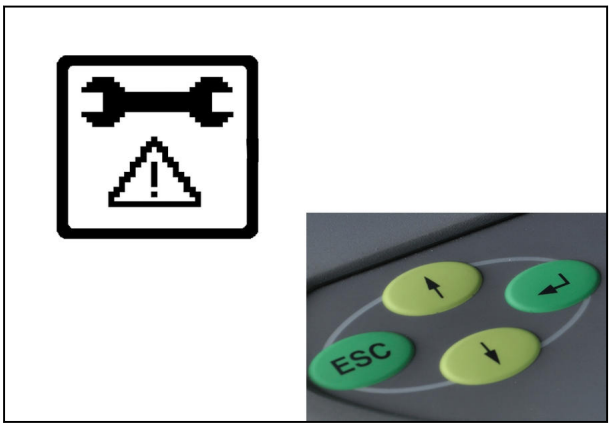



*Fig. 93*

Press "Return." The first main menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return". The second main menu level appears on the multiple display.

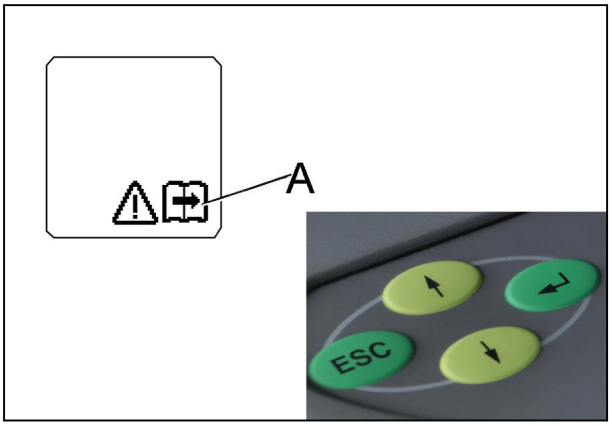



*Fig. 94*

The second main menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return" to confirm.

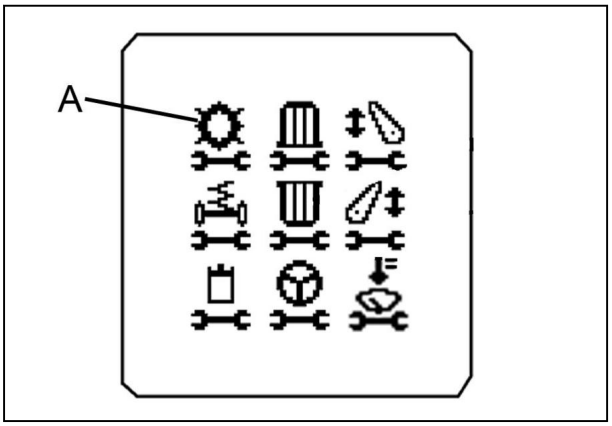
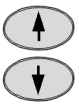



*Fig. 95*

The transmission menu level appears on the multiple display.



Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return" to confirm.

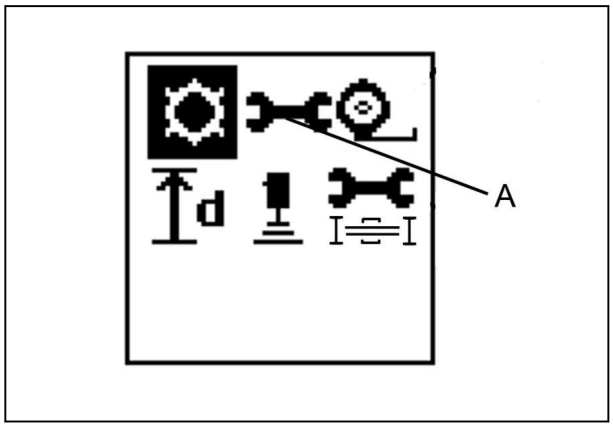
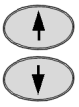



*Fig. 96*

Input code **4009**



Press one of buttons until desired number is displayed.

Press "Return" to confirm.

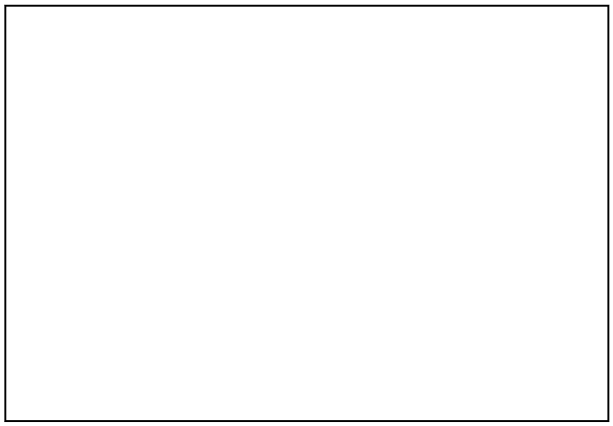


*Fig. 97*

The calibration process runs automatically from this point.

The following images appear alternately.

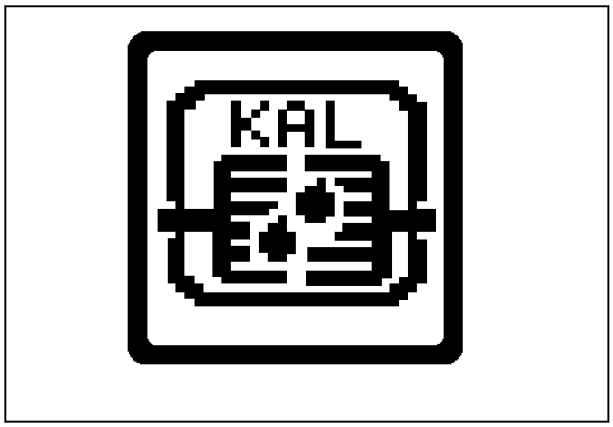



*Fig. 98*

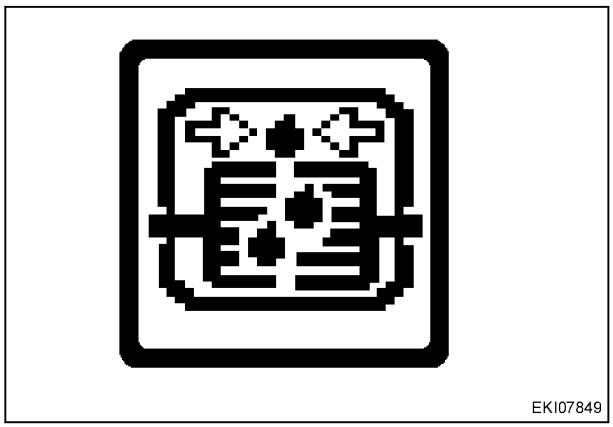



*Fig. 99*

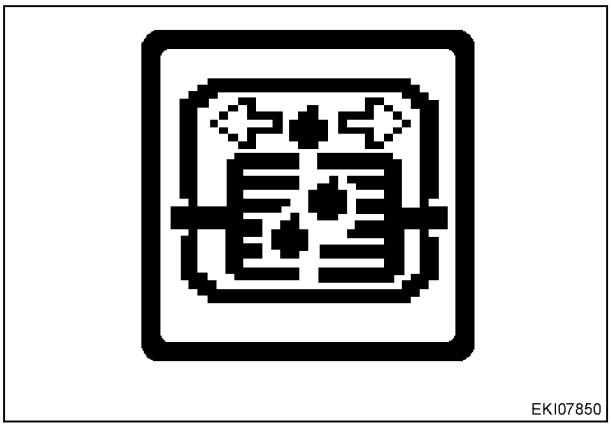



*Fig. 100*

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

**NOTE:**
*Settings are only adopted when the ignition key has been turned to the "0" position. Wait for at least 15 seconds before switching on the ignition again.*

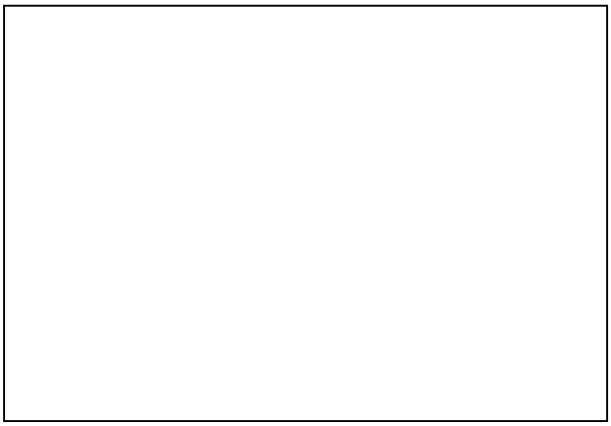


*Fig. 101*

If incorrect values are detected or the conditions are not met, the message **ERROR** appears.

**4009** = calibration code

**FXX** = fault code

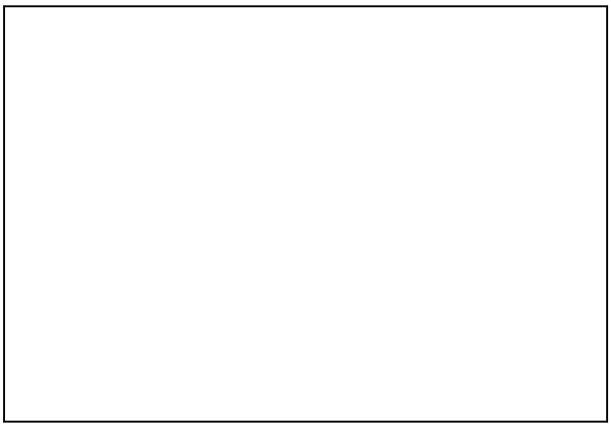


*Fig. 102*

## 2.2.16 Calibration code 4010 (accelerator pedal resolution)

**18. Calibrating the accelerator pedal resolution (4010)**

**The following preparatory steps must be carried out**

- Hand brake applied
- Ignition ON
- If fault messages are displayed, the faults must be confirmed one by one.

ESC

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel.

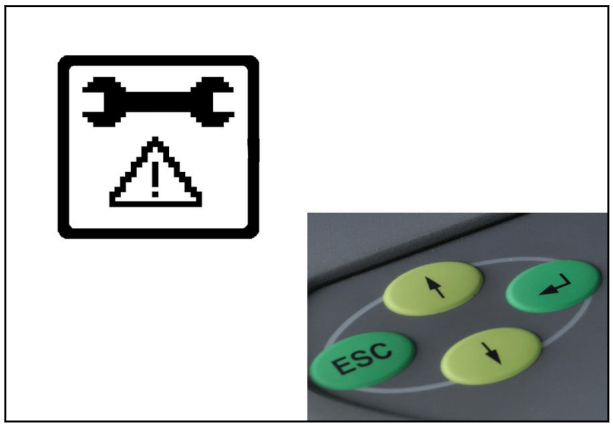



*Fig. 103*

Press "Return." The first main menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return". The second main menu level appears on the multiple display.

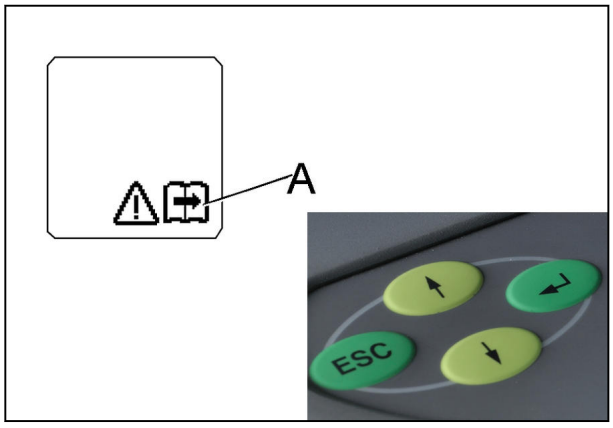



*Fig. 104*

The second main menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return" to confirm.

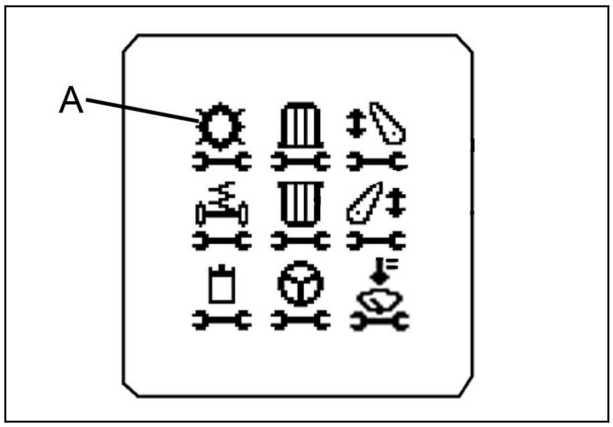



*Fig. 105*

The transmission menu level appears on the multiple display.

Press one of the buttons repeatedly until the symbol (A) flashes.

Press "Return" to confirm.

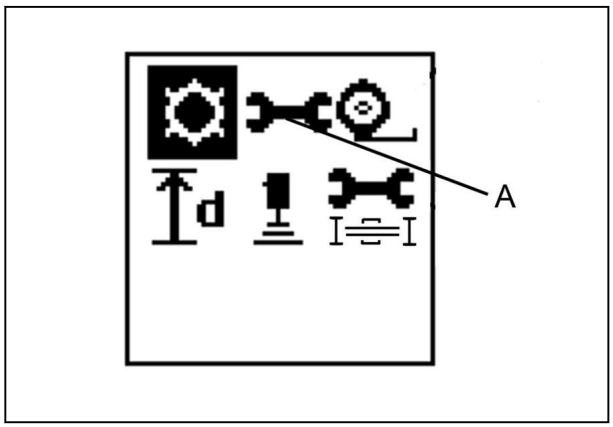



*Fig. 106*

Input code **4010**

Press one of buttons until desired number is displayed.

Press "Return" to confirm.

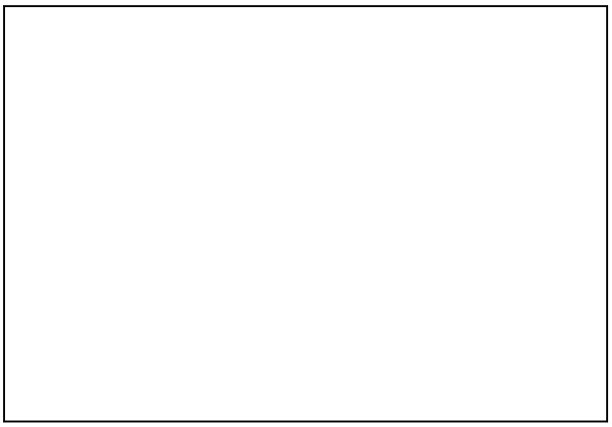


*Fig. 107*

Set "accelerator pedal resolution" sliding switch to *maximum*.

Press "Return" to confirm.

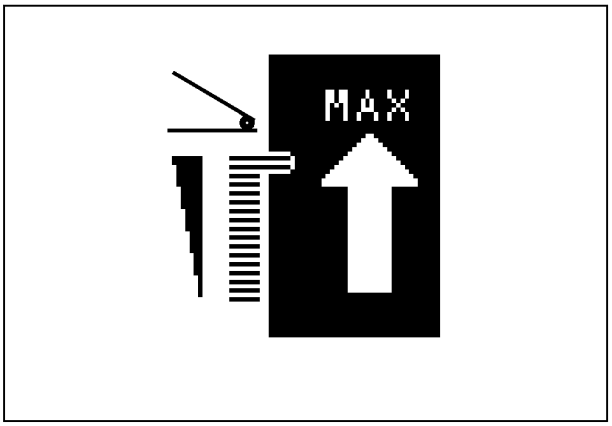



*Fig. 108*

Set "accelerator pedal resolution" sliding switch to *minimum*.

Press "Return" to confirm.

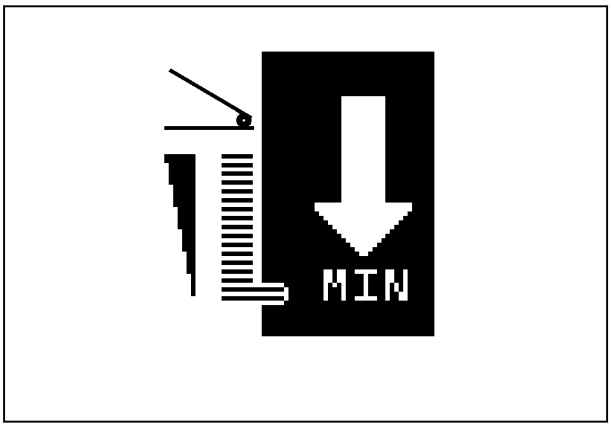



*Fig. 109*

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

**NOTE:**
*Settings are only adopted when the ignition key has been turned to "0" position. Wait for at least 15 seconds before switching on the ignition again.*

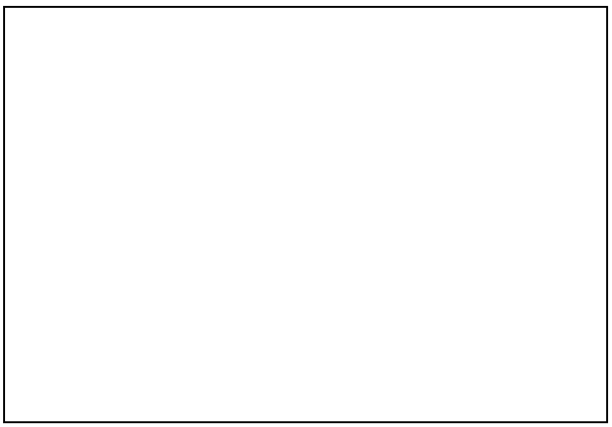


*Fig. 110*

If incorrect values are detected or the conditions are not met, the message **ERROR** appears.

**4010** = calibration code

**FXX** = fault code

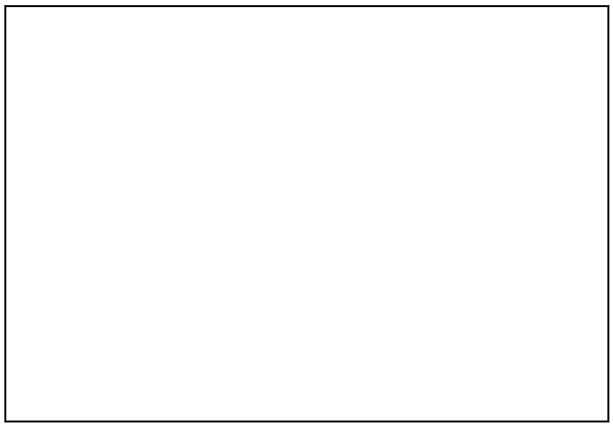


*Fig. 111*

## 2.2.17 Calibration fault codes

**Fault code for calibration code 1001**

| Fault code | Cause | DIN short description |
|---|---|---|
| F01 | Preliminary conditions for calibration not satisfied | **A050** basic control unit ECU<br>**A100** MFA, multifunction armrest |
| F02 | Calibrated values are faulty | |
| F03 | **A100** MFA, multifunction armrest not responding | |
| F08 | Calibration taking too long (more than 30 seconds) | |
| F09 | User terminated calibration with "ESC" | |

**Fault code for calibration code 1003**

| Fault code | Cause | DIN short description |
|---|---|---|
| F01 | Preliminary conditions for calibration not satisfied | **A050** basic control unit ECU<br>**A100** MFA, multifunction armrest<br>Linear module, brown |
| F02 | Calibrated values are faulty | |
| F03 | **A100** MFA, multifunction armrest not responding | |
| F08 | Calibration taking too long (more than 30 seconds) | |
| F09 | User terminated calibration with "ESC" | |

**Fault code for calibration code 1004**

| Fault code | Cause | DIN short description |
|---|---|---|
| F01 | Preliminary conditions for calibration not satisfied | **A050** basic control unit ECU<br>**A100** MFA, multifunction armrest<br>Linear module, purple |
| F02 | Calibrated values are faulty | |
| F03 | **A100** MFA, multifunction armrest not responding | |
| F08 | Calibration taking too long (more than 30 seconds) | |
| F09 | User terminated calibration with "ESC" | |

**Fault code for calibration code 1005**

| Fault code | Cause | DIN short description |
|---|---|---|
| F01 | Preliminary conditions for calibration not satisfied | **A050** basic control unit ECU<br>**A100** MFA, multifunction armrest<br>Linear module, olive |
| F02 | Calibrated values are faulty | |
| F03 | **A100** MFA, multifunction armrest not responding | |
| F08 | Calibration taking too long (more than 30 seconds) | |
| F09 | User terminated calibration with "ESC" | |

**Fault code for calibration code 1006**

| Fault code | Cause | DIN short description |
|---|---|---|
| F01 | Preliminary conditions for calibration not satisfied | **A050** basic control unit ECU<br>**A100** MFA, multifunction armrest<br>Gray linear module |
| F02 | Calibrated values are faulty | |
| F03 | **A100** MFA, multifunction armrest not responding | |
| F08 | Calibration taking too long (more than 30 seconds) | |
| F09 | User terminated calibration with "ESC" | |

**Fault code for calibration code 2401**

| Fault code | Cause | DIN short description |
|---|---|---|
| F01 | Preliminary conditions for calibration not satisfied | **A050** basic control unit ECU<br>**B168** steering angle sensor |
| F04 | Switching between “reverse operation” and “normal operation” | |
| F08 | Calibration taking too long (more than 30 seconds) | |
| F09 | User terminated calibration with "ESC" | |
| F10 | Plausibility of "center position" calibration value | |
| F11 | Plausibility of "left stop" calibration value | |
| F12 | Plausibility of "right stop" calibration value | |
| F13 | Plausibility of calibration values with each other | |
| F20 | Steering wheel sensor behavior for "center position" not as expected | |
| F21 | Steering wheel sensor behavior for "left stop" not as expected | |
| F22 | Steering wheel sensor behavior for "right stop" not as expected | |

**Fault code for calibration code 2403**

| Fault code | Cause | DIN short description |
|---|---|---|
| F01 | Preliminary conditions for calibration not satisfied | **A050** basic control unit ECU |
| F02 | Front wheels are not straight | |
| F03 | Manual steering wheel actuation during calibration | |
| F04 | Switching between “reverse operation” and “normal operation” | |
| F05 | Handbrake not applied | |
| F06 | No movement in direction "steering to left" | |
| F07 | No movement in direction "steering to right" | |
| F08 | Calibration taking too long | |
| F09 | User terminated calibration with ESC | |
| F11 | Plausibility: Signal in direction "steering to left" | |
| F12 | Plausibility: Signal in direction "steering to right" | |
| F30 | Error when switching off the spool position monitoring | |
| F31 | Error when switching the spool position monitoring back on | |

**Fault code for calibration code 4001**

| Fault code | Cause | DIN short description |
|---|---|---|
| F01 | User terminated calibration with "ESC" | **A050** basic control unit ECU<br>**B017** clutch pedal sensor |
| F02 | Pedal in rest position: Signal greater than allowed (22 $mA_{DC}$) | |
| F03 | Pedal in rest position: Signal smaller than allowed (2 $mA_{DC}$) | |
| F04 | Pedal fully depressed: Signal greater than allowed (22 $mA_{DC}$) | |
| F05 | Pedal fully depressed: Signal smaller than allowed (2 $mA_{DC}$) | |
| F06 | Calibrated min. and max. values are too close together<br>Minimum difference of 10 $mA_{DC}$ necessary | |
| F07 | Calibration taking too long (more than 30 seconds) | |
| F08 | Transmission in "Active standstill" (Remedy: Put transmission into neutral) | |

**Fault code for calibration code 4002**

| Fault code | Cause | DIN short description |
|---|---|---|
| F02 | Calibrated values are faulty | **A050** basic control unit ECU<br>**A100** MFA, multifunction armrest hand throttle |
| F03 | **A100** MFA, multifunction armrest not responding | |
| F08 | Calibration taking too long (more than 30 seconds) | |
| F09 | User terminated calibration with "ESC" | |

**Fault code for calibration code 4003**

| Fault code | Cause | DIN short description |
|---|---|---|
| F01 | User terminated calibration with "ESC" | **A050** basic control unit ECU |
| F02 | Speed above 0,1 Km/h | |
| F03 | Engine speed below 600 rpm | |
| F04 | Engine speed above 900 rpm | |
| F05 | Transmission not in neutral | |
| F06 | Clutch not depressed | |
| F07 | - **B015** bevel pinion sensor faulty | |
| F08 | - **B014** collecting shaft sensor faulty | |
| F09 | Faulty speed signal from engine | |
| F10 | Neutral switch, joystick faulty ( **A100** MFA, multi-function armrest) | |
| F11 | - **B016** travel range detection sensor faulty | |
| F12 | - **Y002** travel speed range I solenoid valve faulty | |
| F13 | - **Y003** travel speed range II solenoid valve faulty | |
| F20 | Calibrated values for neutral position incorrect | |
| F21 | Calibrated values for travel speed range I incorrect | |
| F22 | Calibrated values for travel range II incorrect | |
| F23 | Calibrated values do not match | |
| F30 | Error reading from EEPROM ( **A050** basic control unit ECU) | |
| F31 | Error while writing to EEPROM ( **A050** basic control unit ECU) | |

**Fault code for calibration code 4005**

| Fault code | Cause | DIN short description |
|---|---|---|
| F21 | Transmission in "ACTIVE STANDSTILL".<br>(Remedy: Put transmission into neutral) | **A050** basic control unit ECU<br>**B055** foot throttle sensor |
| F22 | Signal smaller than 3 $mA_{DC}$ | |
| F23 | Signal greater than 21 $mA_{DC}$ | |
| F24 | Rotation angle of **B055** foot throttle sensor is too great (more than 250 steps) | |
| F25 | Distance between idle and full throttle too short (less than 12 $mA_{DC}$) or<br>**B055** foot throttle sensor incorrectly calibrated | |
| F26 | Distance between idle and full throttle too short (less than 70%) or<br>**B055** foot throttle sensor incorrectly calibrated | |
| F27 | Time for a calibration increment exceeded<br>(longer than 60 seconds) | |
| F28 | Internal error in the **A050** basic control unit ECU<br>Error while saving calibrated values to EEPROM<br>(EOL reprogramming may be necessary) | |
| F30 | User interrupted with ESC | |

**Fault code for calibration code 4007**

| Fault code | Cause | DIN short description |
|---|---|---|
| F02 | **A009** actuator unit reporting a fault<br>Frequent cause of fault:<br>During previous fault-generated calibration exit, no "Key reset (ignition OFF/ON)" was carried out | **A050** basic control unit ECU |
| F03 | **A009** actuator unit fails to control the specified value exactly.<br>Check that the transmission adjustment is smooth. | |
| F04 | Transmission ratio adjustment not effected within 8 sec.<br>Check that the transmission adjustment is smooth. | |
| F05 | Step 1 = **A009** actuator unit does not find neutral point 0 in forwards direction.<br>Step 2 = **A009** actuator unit does not find neutral point 0 in reverse direction.<br>Check connection of **A009** actuator unit to actuator shaft. | |

| Fault code | Cause | DIN short description |
|---|---|---|
| F06 | See under error message F05 | |
| F07 | Step 2: The neutral points of the transmission control system for forwards and reverse travel are too far apart, more than 8°. Check connection of **A009** actuator unit to actuator shaft. | |
| F08 | Step 3: Max. transmission ratio forward point not found. Target value min. 155°, max. 187°<br>Step 4: Max. transmission ratio reverse point not found. Target value min. 136°, max. 165°.<br>Check connection of **A009** actuator unit to actuator shaft. | |
| F09 | Step 3: Forward actuator shaft adjustment greater than 155°. but transmission rotation reacts less than 155°<br>Step 4: Reverse actuator shaft adjustment greater than 135°. but transmission adjustment reacts below 135°<br>Check connection of **A009** actuator unit to actuator shaft. | |
| F10 | Transmission ratio characteristic illogical e.g. shifted forward and reverse detected.<br>Repeat calibration. See also error message F 2.<br>Check rotational direction signal from **B014** collecting shaft sensor | |
| F11/12 | Step 7: check Step 1 to Step 6 values. ML transmission ratio not OK.<br>Repeat calibration. See also error message F 2.<br>Then check hydrostatic power branch, e.g. via emergency operation. | |
| F13 | 1. End of line programming incorrect (before step 1)<br>2. Values stored in the **A050** basic control unit ECU are illogical<br>Remedy:<br>1. Perform end of line programming again<br>2. See 1. Replace **A050** basic control unit ECU if necessary | |
| F14 | See F 11/F 12 | |

| Fault code | Cause | DIN short description |
|---|---|---|
| F15 | Maximum forward and/or reverse transmission ratio not achieved.<br>Remedy:<br>Repeat calibration (see also F2). Then check hydraulic power distribution system if necessary, e.g. using emergency operation. | |
| F50 | User interrupted with "ESC" | |
| F51 | Speed above 0,1 km/h | |
| F52 | Engine speed below 1400 rpm | |
| F53 | Handbrake not applied | |
| F54 | Faulty speed signal from **B015** bevel pinion sensor | |
| F55 | Faulty speed signal from **B015** bevel pinion sensor | |
| F56 | Faulty speed signal from engine | |
| F57 | Clutch pedal depressed | |
| F58 | - **B017** clutch pedal sensor faulty | |
| F59 | Travel range I button was actuated | |
| F60 | Travel range I button faulty | |
| F61 | Travel range II button was actuated | |
| F62 | Travel range II button faulty | |
| F63 | Range control I/II is not in neutral<br>- Range selector in neutral (normal after calibration of the travel range selector (code 4003))<br>- Manually set the transmission to neutral via the emergency operation if necessary | |
| F64 | Electrical fault in **Y005** speed governor solenoid valve | |

**Fault code for calibration code 4009**

| Fault code | Cause | DIN short description |
|---|---|---|
| F01 | User terminated calibration with ESC | **A050** basic control unit ECU<br>**Y004** clutch/turbo-clutch solenoid valve |
| F02 | Calibration in emergency mode not possible | |
| F03 | Internal error in the **A050** basic control unit ECU:<br>Error while saving calibrated values to EEPROM<br>(EOL reprogramming may be necessary) | |
| F04 | Road speed greater than 0,1 km/h. | |

| Fault code | Cause | DIN short description |
|---|---|---|
| F05 | Engine speed too low when starting calibration<br>Nominal engine speed = 1100 +/- 40 rpm | |
| F06 | Engine speed too low during calibration<br>Nominal engine speed = 1100 +/- 400 rpm | |
| F07 | Faulty speed signal from engine | |
| F08 | Driving range II not engaged | |
| F09 | - **B016** travel range detection sensor faulty | |
| F10 | Transmission not in neutral | |
| F11 | Neutral button faulty ( **A100** MFA, multifunction armrest) | |
| F12 | Clutch pedal depressed | |
| F13 | - **B017** clutch pedal sensor faulty | |
| F14 | Transmission pressure too high when starting calibration (above 100 [bar]) | |
| F15 | Transmission pressure too high when starting calibration (above 200 [bar]) | |
| F16 | - **B008** high-pressure sensor 1 faulty | |
| F17 | - **S015** hand brake switch faulty | |
| F18 | Handbrake not applied | |
| F19 | Fault in **A009** actuator unit | |
| F20 | Fault in **Y004** clutch/turbo-clutch solenoid valve | |
| F21 | Plausibility error:<br>Power consumption of **Y004** clutch/turbo-clutch solenoid valve to transmission high pressure illogical | |
| F22 | Error in transmission ratio | |
| F23 | Plausibility error:<br>Power consumption on **Y004** clutch/turbo-clutch solenoid valve illogical<br>(e.g. short circuit in Y004 solenoid valve) | |

**Fault code for calibration code 4010**

| Fault code | Cause | DIN short description |
|---|---|---|
| F02 | Calibrated value of the current actuator position is invalid | **A050** basic control unit ECU<br>**A100** MFA, multifunction armrest |
| F03 | **A100** MFA, multifunction armrest not responding | |
| F08 | Calibration taking too long (more than 30 seconds) | |
| F09 | User terminated calibration with ESC | |

**Fault code for calibration code 7666**

| Fault code | Cause | DIN short description |
|---|---|---|
| F01 | User terminated calibration with ESC | **A050** basic control unit ECU<br>**B003** front-axle suspension position sensor |
| F02 | Raising the suspension takes too long (longer than 40 seconds) | |
| F03 | Lowering the suspension takes too long (longer than 40 seconds) | |
| F04 | Calibrated min. and max. values are too close together | |
| F05 | Internal error in the **A050** basic control unit ECU<br>Error while saving calibrated values to EEPROM<br>(EOL reprogramming may be necessary) | |
| F06 | Engine speed too low | |
| F07 | Road speed too high (greater than 0,1 km/h) | |

**Fault code for calibration code 8001**

| Fault code | Cause | DIN short description |
|---|---|---|
| F01 | Preliminary conditions for calibration not satisfied | **A050** basic control unit ECU<br>**A100** MFA, multifunction armrest |
| F02 | Calibrated values are invalid | |
| F03 | **A100** MFA, multifunction armrest not responding | |
| F08 | Calibration takes too long (more than 60 seconds) | |
| F09 | User terminated calibration with "ESC" | |

**Fault code for calibration code 8020**

| Fault code | Cause | DIN short description |
|---|---|---|
| F01 | User terminated calibration with "ESC" | **A139** - Cargo Profi ECU<br>**B212** rotation angle sensor of the front loader jib |
| F02 | Calibration taking too long (more than 30 seconds) | |
| F15 | Sensor fault: **B212** rotation angle sensor of the front loader jib | |
| F16 | Road speed is too high | |
| F32 | Incorrect values were found during calibration<br>(Calibration is not valid) | |

**Fault code for calibration code 8021**

| Fault code | Cause | DIN short description |
|---|---|---|
| F01 | User terminated calibration with "ESC" | **A139** - Cargo Profi ECU<br>**B214** tipping cylinder (length measurement) sensor |
| F02 | Calibration taking too long (more than 30 seconds) | |
| F15 | **B214** tipping cylinder sensor is faulty<br>- Break in the wiring<br>- Short circuit to earth | |
| F16 | Road speed is too high | |
| F17 | Front loader fork is too high/low (the quick-change frame cannot move fully through the working range)<br>Raise the front loader fork at least 30 percent | |
| F32 | Incorrect values were found during calibration<br>(Calibration is not valid) | |
| F33 | No calibration of the front loader fork<br>(Calibration 8020) | |

**Fault code for calibration code 8022**

| Fault code | Cause | DIN short description |
|---|---|---|
| F01 | User terminated calibration with "ESC" | **A139** - Cargo Profi ECU<br>**B213** tilt sensor on coupling arm "pendulum" |
| F02 | Calibration taking too long (more than 30 seconds) | |
| F15 | **B213** tilt sensor is faulty<br>- Break in the wiring<br>- Short circuit to earth | |
| F16 | Road speed is too high | |
| F32 | Incorrect values were found during calibration<br>(Calibration is not valid) | |

**Fault code for calibration code 8023**

| Fault code | Cause | DIN short description |
|---|---|---|
| F01 | User terminated calibration with "ESC" | **Front loader hysteresis**<br>**A139** - Cargo Profi ECU<br>**B210** raise lift cylinder sensor<br>**B211** sensor, lower lift cylinder<br>**B212** front loader fork sensor |
| F03 | Cancel calibration<br>- Release crossgate lever<br>- Release 4th circuit button | |
| F15 | **B212** tilt sensor is faulty<br>- Break in the wiring<br>- Short circuit to earth | |
| F16 | Road speed is too high | |
| F18 | Tipping cylinder could not be fully retracted by quick-change frame<br>(no more than 95 percent) | |
| F32 | Incorrect values were found during calibration<br>(Calibration is not valid) | |
| F33 | No calibration 8020 (front loader fork) | |
| F34 | No calibration 8021 (tip cylinder for quick-change frame) | |
| F35 | No calibration 8022 (tilt) | |
| F37 | Unknown front loader type | |

**Fault code for calibration code 9001**

| Fault code | Cause | DIN short description |
|---|---|---|
| F01 | Preliminary conditions for calibration not satisfied | **A050** basic control unit ECU<br>**A100** MFA, multifunction armrest |
| F02 | Calibrated values are invalid | |
| F03 | **A100** MFA, multifunction armrest not responding | |
| F08 | Calibration taking too long (more than 30 seconds) | |
| F09 | User terminated calibration with "ESC" | |

**Fault code for calibration code 9002**

| Fault code | Cause | DIN short description |
|---|---|---|
| F01 | Calibrated values are invalid or incorrect | **A050** basic control unit ECU<br>**B040** front power lift position sensor |
| F02<br>(Release control only) | Resistance value is incorrect,<br>Linkage may not be in the lower end position<br>**Y172** release control solenoid valve with incorrect electrical connection | |

**Fault code for calibration of tire circumference**

| Fault code | Cause | DIN short description |
|---|---|---|
| F01 | Calculated tire circumference is too small | **A050** basic control unit ECU |
| F02 | Calculated tire circumference is too large | |
| F03 | Calculated impulse total per meter of traveling distance too small for radar sensor | |
| F04 | Calculated impulse total per meter of traveling distance too large for radar sensor | |
| F06 | Internal error in the **A050** basic control unit ECU:<br>Error while saving calibrated values to EEPROM<br>(EOL reprogramming may be necessary) | |

**Fault code for calibration of heater valve**

| Fault code | Cause | DIN short description |
|---|---|---|
| F01 | Calibration not permitted (engine speed too low or faulty) | **A050** basic control unit ECU |
| F02 | Calibration takes too long (more than 60 seconds) | |
| F03 | Electrical fault on **M049** heater valve | |

# 3. Operation

# 3.1 Operating controls

## 3.1.1 Instrument panel

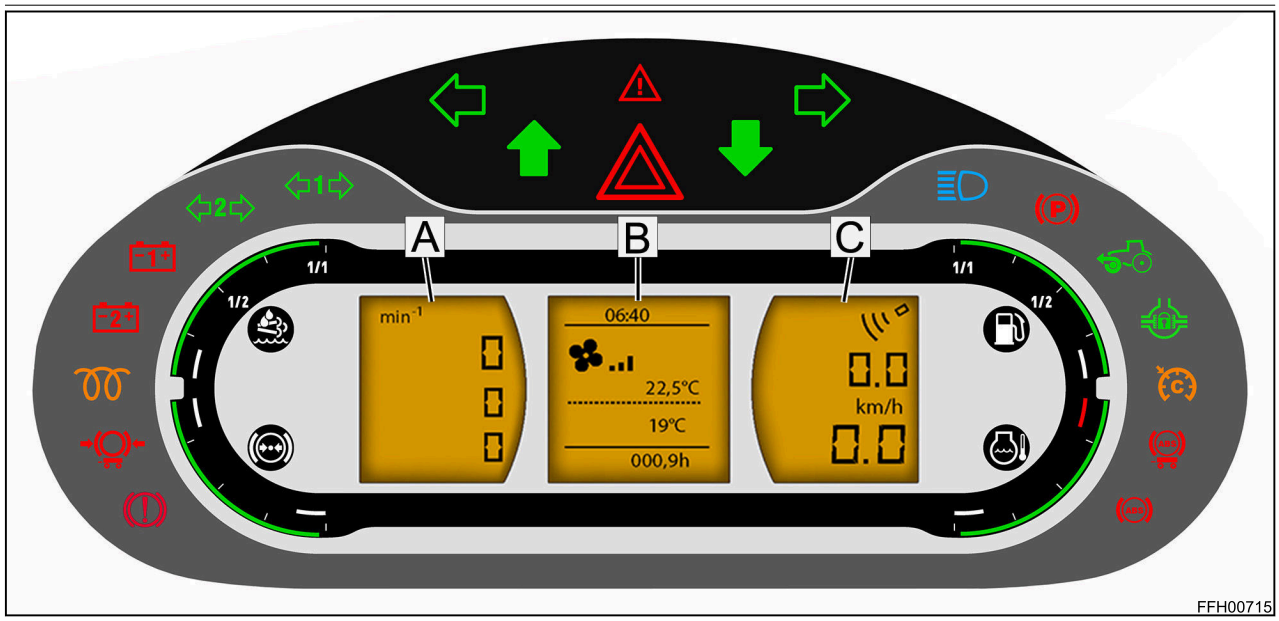



*Fig. 1*

(A) Operating status display, displays engine and PTO speeds.

(B) Multiple display, displays time, operating hours, air conditioning system, warning and fault messages.

(C) Operating status display, displays speed information.

| | | | |
|---|---|---|---|
| | Warning light | | Warning flasher unit |
| | Left direction indicator | | Right direction indicator |
| | Forward travel direction | | Reverse travel direction |
| | Direction indicator repeater for 1st trailer | | High beam |
| | Direction indicator repeater for 2nd trailer | | Indicator lamp for parking brake |
| | Charging indicator 1 (right side), alternator not charging | | 4WD engaged |
| | Charge indicator 2 (left side), alternator not charging | | Differential lock engaged |
| | Preheater indicator | | Cruise control enabled |

| | | | |
|---|---|---|---|
|  | Hydraulic trailer brake |  | ABS function indicator for trailer |
|  | Red: Brake pressure too low<br>Yellow: Sensor faulty |  | ABS function indicator (only on the Vario 900 if the tractor is equipped with ABS) |
|  | AdBlue® tank contents |  | Fuel supply |
|  | Compressed air supply |  | Engine temperature |

## 3.1.2 Operating status display

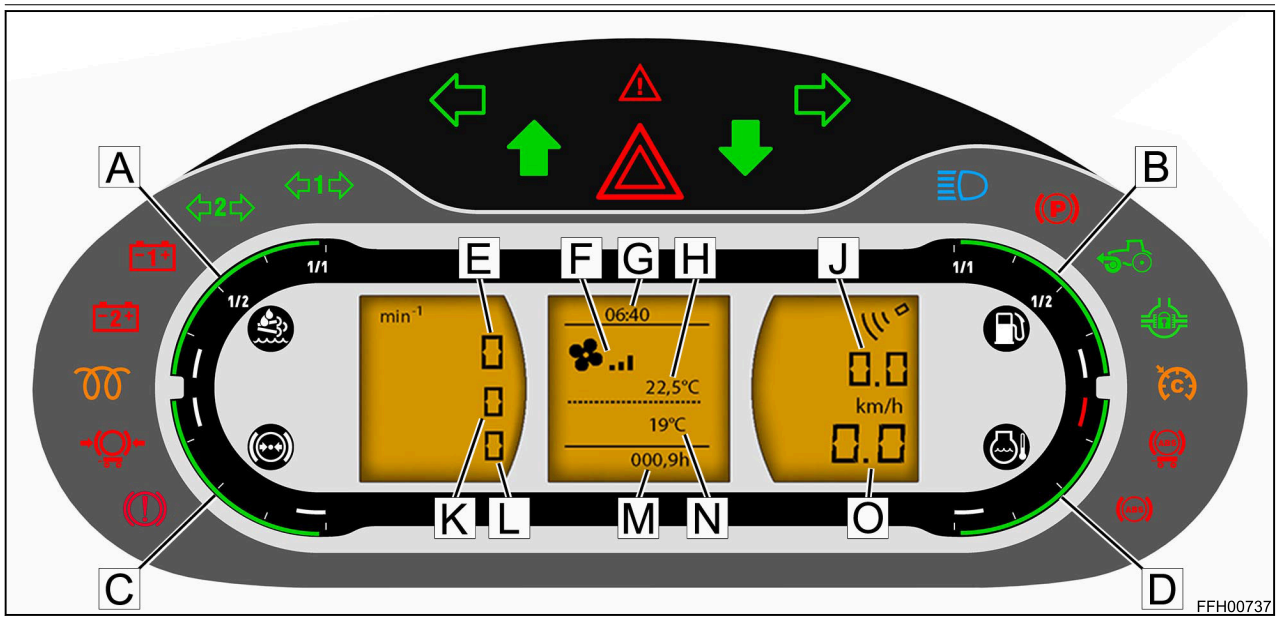



*Fig. 2*

(A) **AdBlue® display (DEF)**

**NOTE:**
*DEF = **D**iesel **E**xhaust **F**luid*

Gage in red range, low AdBlue® volume. Top up AdBlue®.

Gage flashing in red range, AdBlue® volume is very low. Top up AdBlue®.

(B) **Fuel supply**

Display in red zone, fuel supply is low. Fill up with fuel.

Display flashes in red zone, fuel supply is very low. Fill up with fuel.

(C) **Compressed air supply (if present)**

Display flashes in the red zone, working pressure has not yet been reached.

Display in the green zone, working pressure has been reached.

(D) **Engine temperature**.

When the bar reaches the red zone, relieve the engine load immediately and allow to cool for about 2 minutes at 1000 rpm; then turn the engine off.

(E) **Engine speed**
(F) **Fan speed**
(G) **Time**
(H) **Setpoint temperature**
(J) Speed display with **radar sensor** (option).
(K) **Rear PTO speed**
(L) **Front PTO speed**
(M) **No. of operating hours**

**NOTE:**
*The default display is the time and the number of operating hours.*
*This is interrupted for warnings, fault messages and on-board computer functions.*

(N) **Outside temperature**
(O) **Speed display**

(determined from the tire circumference)

**NOTE:**

*For a precise reading, adjust the speed display under operating conditions.*

## 3.1.3 Multiple display

**Control keys for multiple display**

(A) Return to previous menu level.
(B) Key for browsing through the menu levels and setting functions.
(C) Key for calling up menu levels and entering settings.

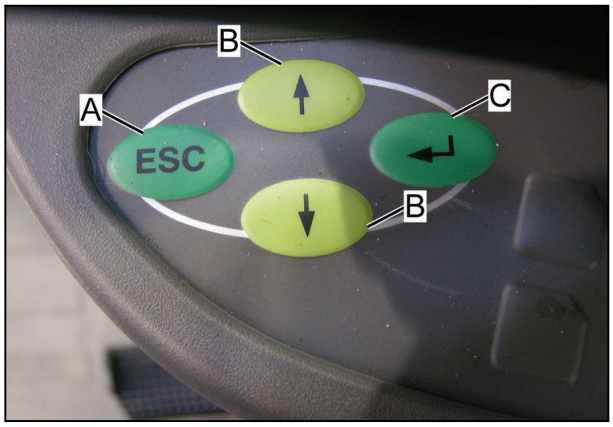



*Fig. 3*

**Default display**

(A) Hydraulic oil gage
(B) Time
(C) Fan speeds
(D) Setpoint temperature
(E) Outside temperature
(F) Operating hours

**NOTE:**
*After approx. 10 seconds, the hydraulic oil gage switches to the air conditioning and ventilation display.*

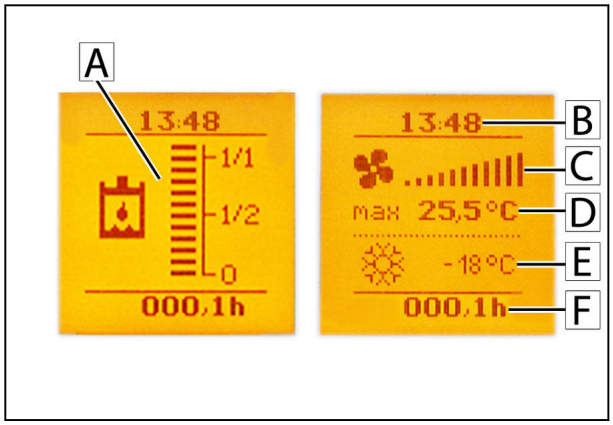



*Fig. 4*


Press the button to switch between the hydraulic oil gage and the air conditioning and ventilation display.

**First main menu level**

Press key; the following menu appears.

Fault memory

Change menu level

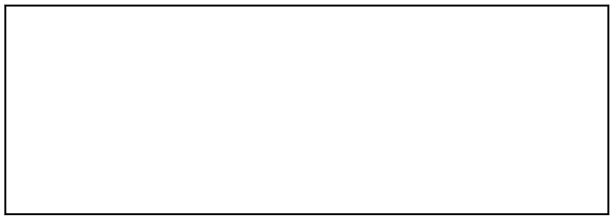


*Fig. 5*

**Second main menu level**

Use the control keys to select the required menus.

Transmission calibration menu, display (A) appears.

Front PTO calibration menu, display (B) appears.

**NOTE:**
*Only appears if front PTO is fitted.*

Front power lift calibration menu, display (C) appears.

**NOTE:**
*Only displayed if comfort front power lift control is fitted*

Front axle suspension calibration menu, display (D) appears.

Rear PTO calibration menu, display (E) appears.

EPC calibration menu, display (F) appears.

Hydraulic system calibration menu, display (G) appears.

Steering calibration menu, display (H) appears.

Heating valve and windscreen wiper calibration menu, display (J) flashes.

**NOTE:**
*Calibration runs automatically.*

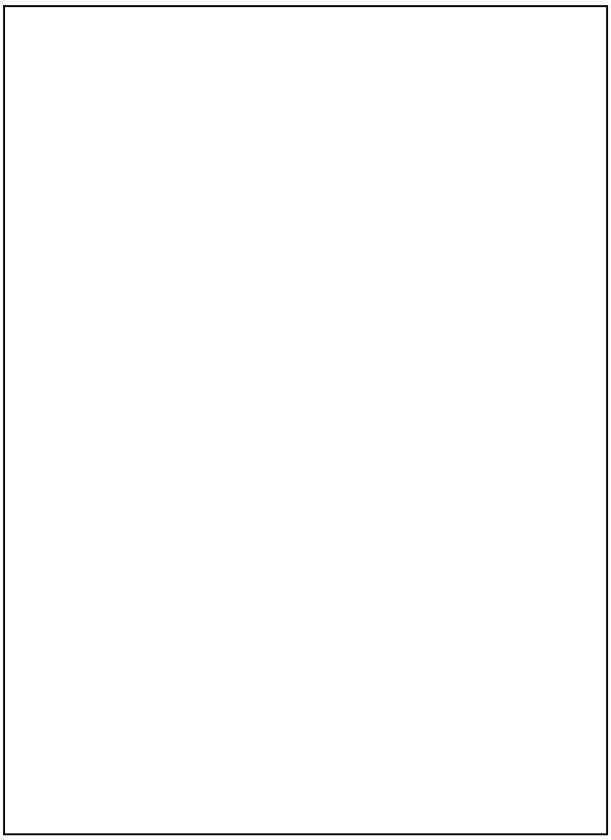


*Fig. 6*

**Transmission calibration menu**

Use the control keys (see image) to select the required menus.

Transmission calibration, display (A) appears.

Tire circumference display, display (B) appears.

**NOTE:**
*Tire circumference specified by default. Tire circumference can be changed manually. When the speed displays are calibrated, the tire circumference is stored automatically.*

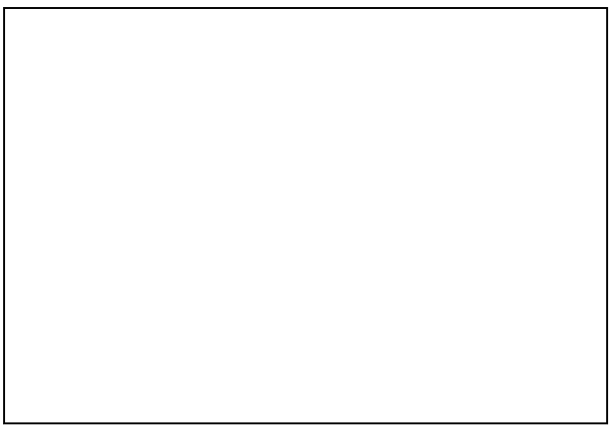


*Fig. 7*

Calibrate tire circumference/radar sensor, display (C) appears

**NOTE:**
*Possible adjustment range from 30 m to 100 m.*

Change acceleration rate for level I, display (D) appears.

**NOTE:**
*Possible adjustment range from 0,02 km/h to 0,5 km/h.*

Display (E) appears in emergency operation.

**Rear PTO calibration menu**

Use the control keys (see image) to select the required menus.

Rear PTO calibration, display (A) appears.

Choose default settings for the switch-on point for automatic mode, display (B) appears.

Change switch-on point for automatic mode, display (C) appears.

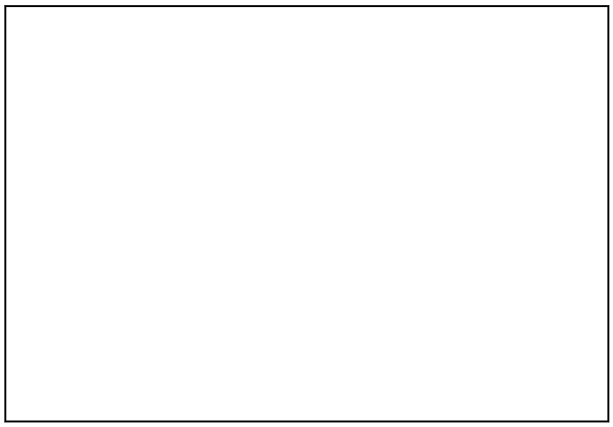


*Fig. 8*

## 3.1.4 Control panel

**Control panel for 200 Vario Standard S3**

(1) Keypad on the multifunction center

(2) Joystick

(3) EPC controls

(4) Armrest for electric control valves (optional)

(5)5 Sockets and switches

(6) Rotary control for EPC

(7)6 Automatic air-conditioning system (optional)

(8) Trailer hitch remote control

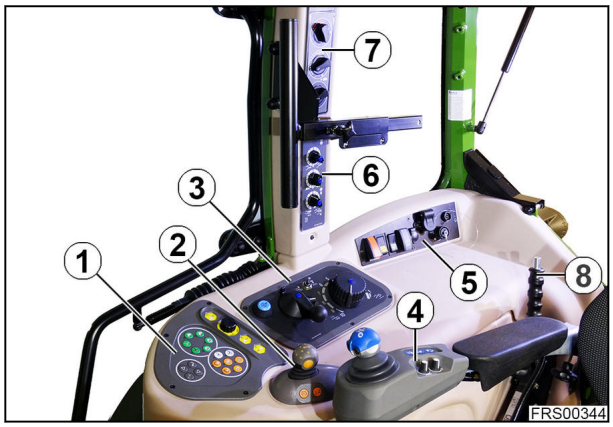



*Fig. 9*

**Control panel for 200 Vario V/F/P S3**

Vario joystick version without crossgate lever

(A) Linear modules for operating hydraulic valves
(B) EPC control panel
(C) PTO operation
(D) Joystick
(E) Under the armrest, hydraulic setting functions

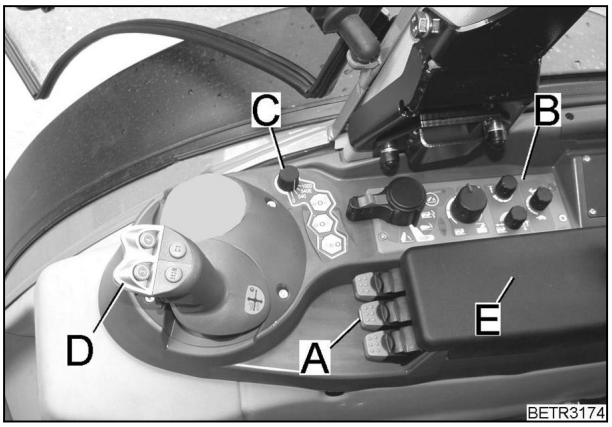



*Fig. 10*

Vario joystick version with crossgate lever

(A) Linear modules for operating hydraulic valves
(B) EPC control panel
(C) PTO operation
(D) Joystick
(E) Crossgate lever
(F) Under the armrest, hydraulic setting functions

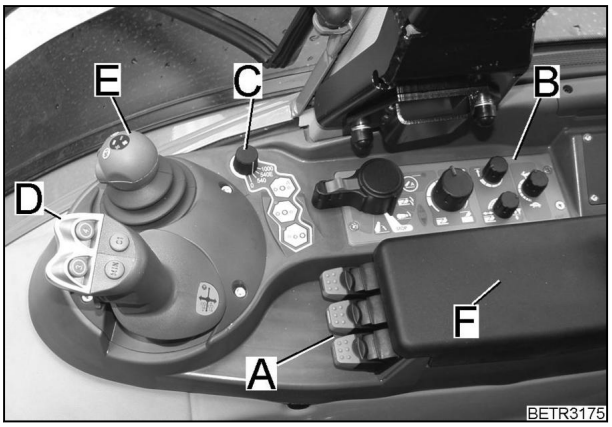



*Fig. 11*

Professional joystick version

(A) Linear modules for operating hydraulic valves
(B) EPC control panel
(C) Mini hydraulics — optional V, F
(D) PTO operation
(E) Joystick
(F) Tilt angle mark (three-point linkage)
(G) Under the armrest, hydraulic setting functions
(H) Crossgate lever

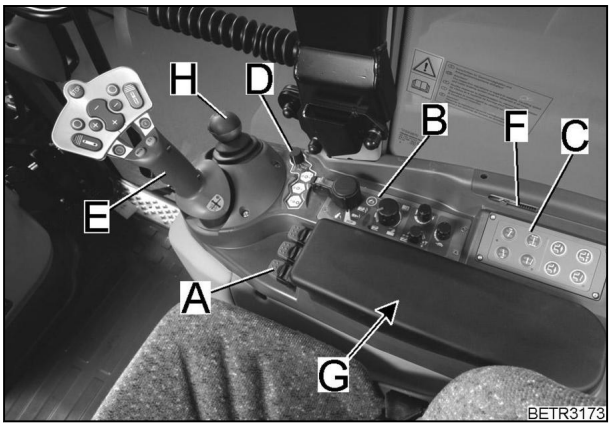



*Fig. 12*

**Control panel for 300 Vario S4**

Power version

(A) Joystick
(B) EPC controls
(C) EPC and PTO control unit
(D) Throttle pedal resolution
(E) Keypad on the multifunction center
(F) Hand throttle

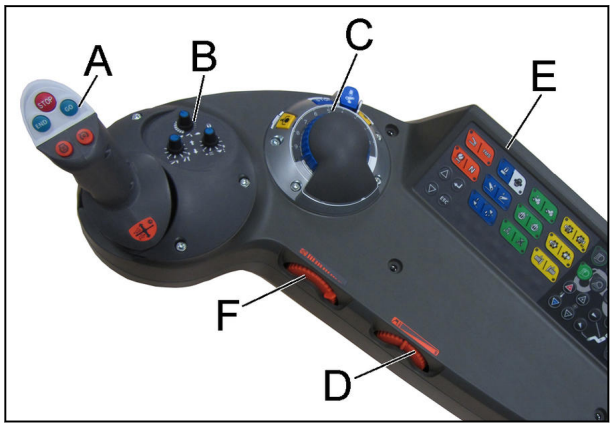



*Fig. 13*

Profi and ProfiPlus version

(A) Joystick
(B) Crossgate lever
(C) EPC and PTO control unit
(D) Throttle pedal resolution
(E) Keypad on the multifunction center
(F) Hand throttle
(G) Vario terminal

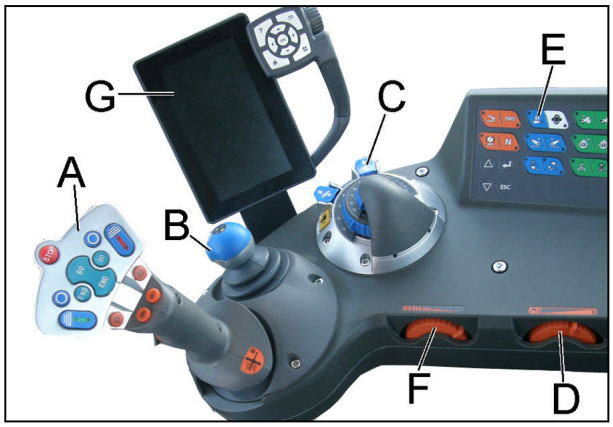



*Fig. 14*

**Control panel for 500 – 700 Vario S4**

Power and PowerPlus version

(A) Joystick
(B) Crossgate lever
(C) EPC and PTO control unit
(D) Throttle pedal resolution
(E) Multifunction armrest keypad
(F) Storage compartment
(G) Hand throttle
(H) Vario terminal

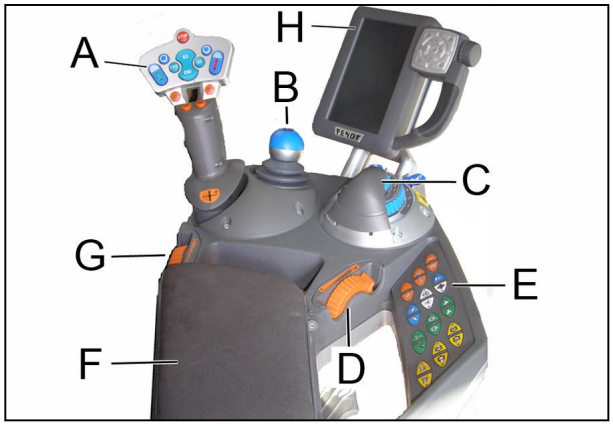



*Fig. 15*

Profi (10.4" terminal optional) and ProfiPlus version

(A) Joystick
(B) Crossgate lever
(C) EPC and PTO control unit
(D) Throttle pedal resolution
(E) Multifunction armrest keypad
(F) Oddments tray and electric mirror adjustment
(G) Hand throttle
(H) Linear modules for operating hydraulic valves.
(J) Vario terminal

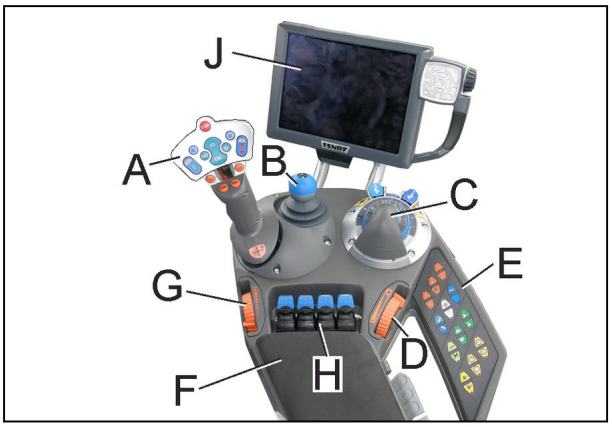



*Fig. 16*

**Control panel for 800 – 900 Vario S4**

Power and PowerPlus version

(A) Joystick
(C) EPC and PTO control unit
(D) Throttle pedal resolution
(E) Multifunction armrest keypad
(F) Oddments tray and electric mirror adjustment
(G) Hand throttle
(H) Linear modules for operating hydraulic valves.
(J) Vario terminal

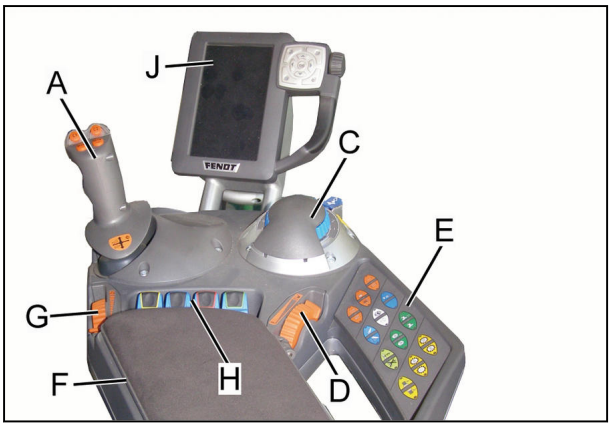



*Fig. 17*

Profi (10.4" terminal optional) and ProfiPlus version

(A) Joystick
(B) Crossgate lever
(C) Vario terminal
(D) EPC and PTO control unit
(E) Holder for mobile phone
(F) Throttle pedal resolution
(G) Multifunction armrest keypad
(H) Linear modules for operating hydraulic valves.
(I) Oddments tray and electric mirror adjustment
(J) Hand throttle

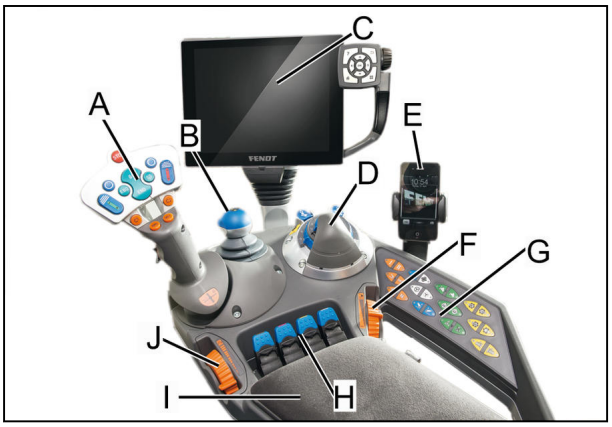



*Fig. 18*

**Control panel for 1000 Vario S4**

PowerPlus version

(A) Joystick
(B) Vario terminal
(C) EPC and PTO control unit
(D) Throttle pedal resolution
(I) Multifunction armrest keypad
(F) Linear modules for operating hydraulic valves.
(G) Oddments tray and electric mirror adjustment
(H) Hand throttle

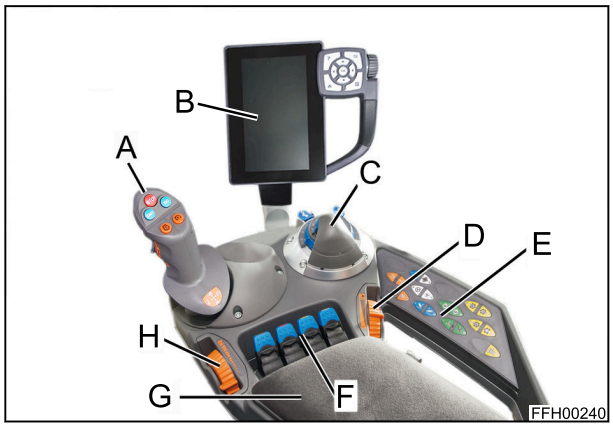



*Fig. 19*

Profi (10.4" terminal optional) and ProfiPlus version

(A) Joystick
(B) Crossgate lever
(C) Vario terminal
(D) EPC and PTO control unit
(I) Holder for mobile phone
(F) Throttle pedal resolution
(G) Multifunction armrest keypad
(H) Linear modules for operating hydraulic valves.
(I) Oddments tray and electric mirror adjustment
(J) Hand throttle

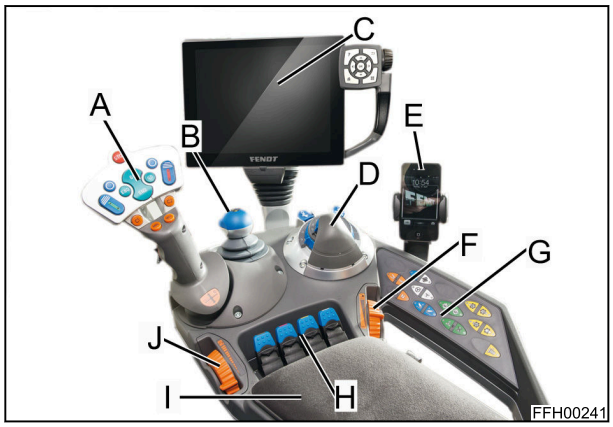



*Fig. 20*

## 3.1.5 Joystick

**Joystick for 200 Vario Standard S3**

(1) Transmission ratio change

(2) Activation button

(3) Cruise control

(4) Acceleration behaviour (LED lights up in phase I).

**NOTE:**
*If the vehicle is at a standstill, a change in transmission ratio or travel direction is only carried out if the activation key is pressed.*


*Fig. 21*

### Joystick for 200 Vario V/F/P S3, Vario joystick version

(A) Change of forward transmission ratio
(B) Change of reverse transmission ratio
(C) Change of travel direction
(D) Cruise control ON
(E) Activation button

**NOTE:**
*If the vehicle is at a standstill, a change in transmission ratio or travel direction is only carried out if the activation key is pressed.*

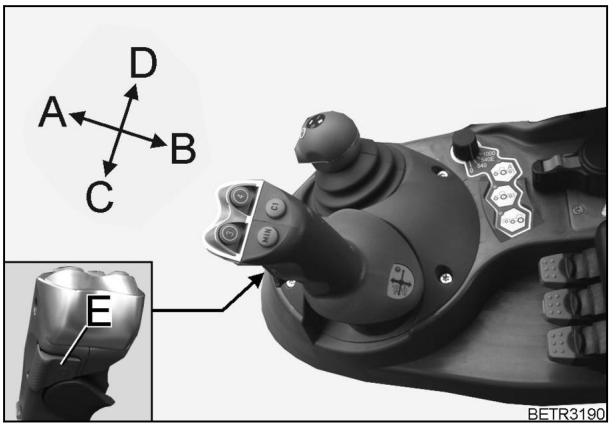



*Fig. 22*

### Additional functions: Hydraulic circuits 3 and 4.

Additional third and fourth hydraulic circuit functions of implements can be operated electronically (e.g. stock collectors, front loader etc.). The third and fourth hydraulic circuits can be operated using the buttons on the crossgate lever or the two buttons on the joystick. The button/ switching behavior for the buttons can be configured.

- Switch 3rd hydraulic circuit on and off with button (A).
- Switch 4th hydraulic circuit on and off with button (B).

**NOTE:**
*If the LED in the button is lit, the corresponding connecting box is energized.*

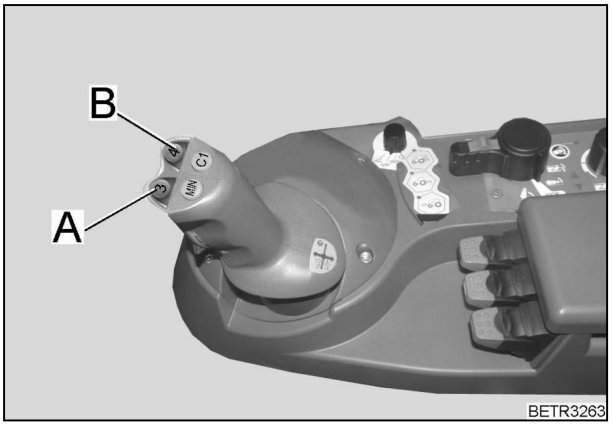



*Fig. 23 Vario joystick version without crossgate lever*

### Joystick for 200 Vario V/F/P S3, Profi joystick version

(A) Change of forward transmission ratio
(B) Change of reverse transmission ratio
(C) Change of travel direction
(D) Cruise control ON
(E) Activation button

**NOTE:**
*If the vehicle is at a standstill, a change in transmission ratio or travel direction is only carried out if the activation key is pressed.*

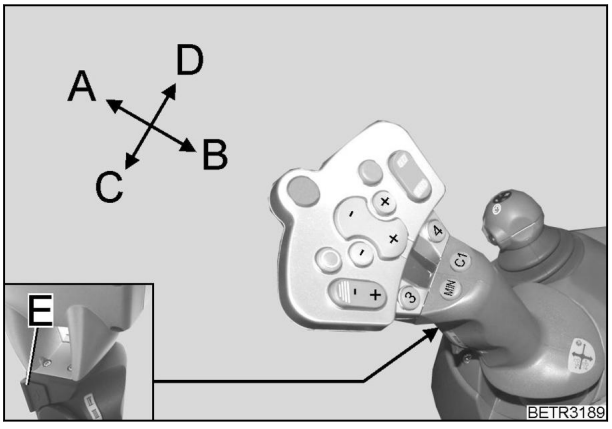



*Fig. 24*

### Actuate valves on joystick

(A) = raise

(B) = Lower/press

(C) = floating position

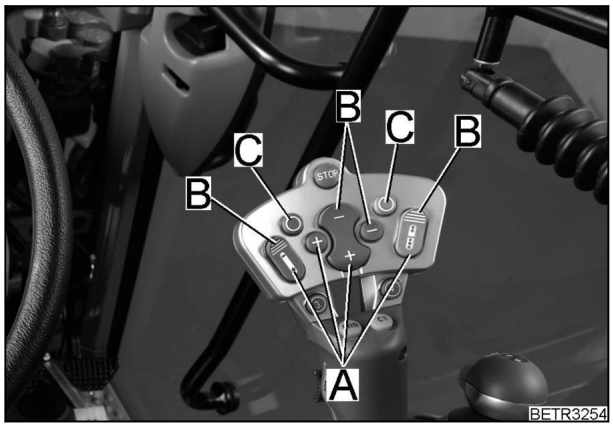



*Fig. 25*

**Control options with the joystick**

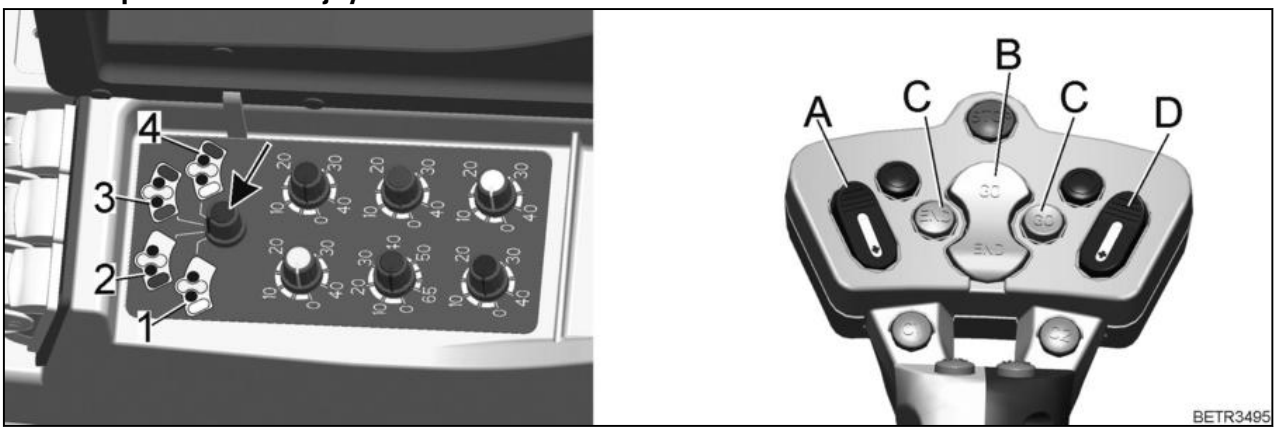



*Fig. 26*

**NOTE:**

*The rotary control (see arrow) can be used to change operation at the joystick.*

| | (A) | (B) | (C) | (D) |
|---|---|---|---|---|
| Position 1 | Green (valve 4) | Yellow (valve 1) | Blue (valve 2) | Rear linkage. |
| Position 2 | Red (valve 3) | Yellow (valve 1) | Blue (valve 2) | Rear linkage. |
| Position 3 | Blue (valve 2) | Red (valve 3) | Green (valve 4) | Rear linkage. |
| Position 4 | Green (valve 4) | Yellow (valve 1) | Blue (valve 2) | Red (valve 3) |

*4-valve version (4+0)*

| | (A) | (B) | (C) | (D) |
|---|---|---|---|---|
| Position 1 | Brown (valve 5l) | Yellow (valve 1) | Blue (valve 2) | Rear linkage. |
| Position 2 | Red (valve 3) | Yellow (valve 1) | Blue (valve 2) | Rear linkage. |
| Position 3 | Brown (valve 5l) | Red (valve 3) | Green (valve 4) | Rear linkage. |
| Position 4 | Brown (valve 5l) | Yellow (valve 1) | Blue (valve 2) | Red (valve 3) |

*4-valve (3+1)/5-valve (4+1) version*

| | (A) | (B) | (C) | (D) |
|---|---|---|---|---|
| Position 1 | White (valve 6) | Yellow (valve 1) | Blue (valve 2) | Rear linkage. |
| Position 2 | Red (valve 3) | Yellow (valve 1) | Blue (valve 2) | Rear linkage. |
| Position 3 | Brown (valve 5l) | Yellow (valve 1) | Blue (valve 2) | Red (valve 3) |
| Position 4 | White (valve 6) | Yellow (valve 1) | Blue (valve 2) | Red (valve 3) |

*5-valve version (3+2), 6 valves (4+2)*

**Joystick for 300 Power and 1000 Vario S4 PowerPlus**

(A) STOP

- Rear power lift automatic mode:

  Linkage remains stationary
- Rear PTO automatic mode:

  Disengage PTO

(B) END

- Rear power lift automatic mode:

  "Raise" function
- Rear PTO automatic mode:

  Disengage PTOs

(C) GO

- Rear power lift automatic mode:

  "Control" function
- Rear PTO automatic mode:

  Engage PTOs

(D) Activate engine speed
(E) Activate/switch cruise control
(F) Activation button
(G) Select acceleration rate

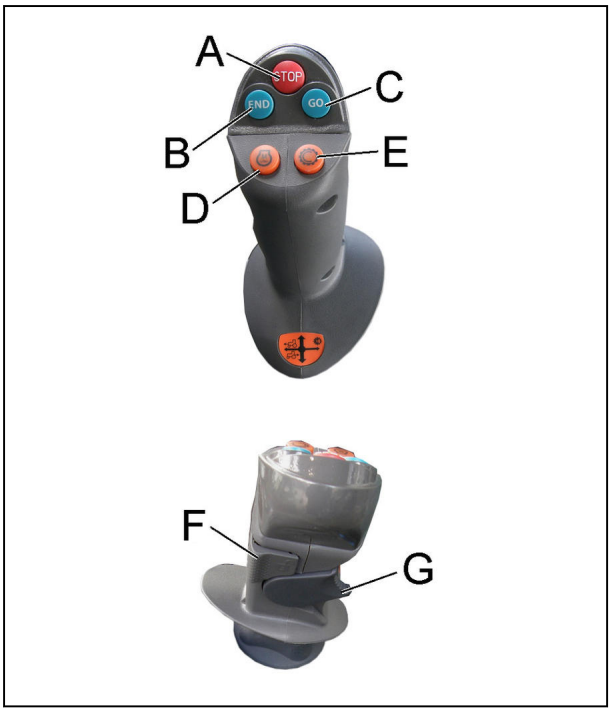



*Fig. 27*

**Joystick for 800 – 900 Vario S4 Power and PowerPlus**

(A) Activate cruise control 1
(B) Activate cruise control 2
(C) Activate min. engine speed
(D) Activate max. engine speed
(E) Select acceleration rate
(F) Activation button

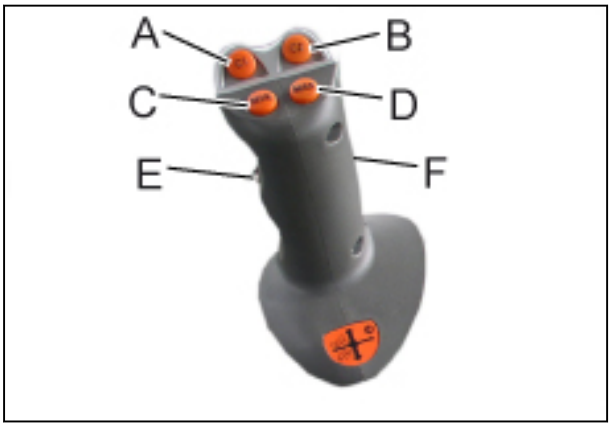



*Fig. 28*

**Joystick for 300 – 1000 S4**

**Version 300 Vario S4 Profi and ProfiPlus, all versions 500 – 700 Vario S4, 800 – 900 Vario S4 Profi and ProfiPlus, 1000 Vario S4 Profi and ProfiPlus**

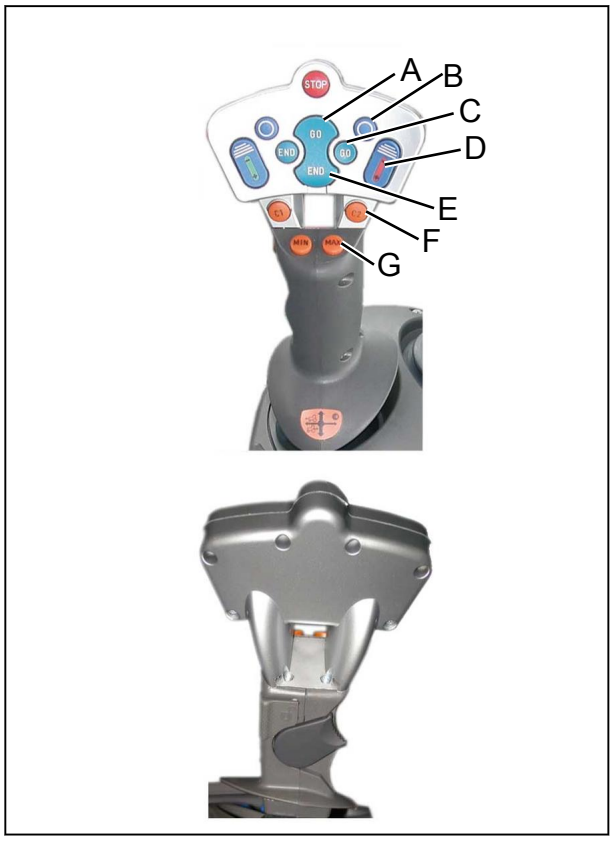



*Fig. 29*

(A) GO 1

- Variotronic TI:

  Start/end sequence GO 1
- Rear power lift automatic mode:

  "Control" function
- Rear PTO automatic mode:

  Engage rear PTO

(B) Floating position; red valve

(C) GO 2

- Variotronic TI:

  Start/end sequence GO 2
- Front power lift automatic mode:

  "Control" function
- Rear PTO automatic mode:

  Activate front PTO

(D) Raise/lower red valve

(E) END 1

- Variotronic TI:

  Start/end sequence END 1
- Rear power lift automatic mode:

  "Raise" function
- Rear PTO automatic mode:

  Disengage rear PTO

(F) Activate cruise control 2

(G) Activate max. engine speed

**NOTE:**
*The button assignment shown is only applicable for the Fendt settings.*

(H) Activate min. engine speed
(I) Select acceleration rate
(J) Activate cruise control 1
(K) Raise/lower green valve
(L) END 2

- Variotronic TI:

  Start/end sequence END 2
- Front power lift automatic mode:

  "Raise" function
- Rear PTO automatic mode:

  Disengage front PTO

(M) Floating position; green valve
(N) STOP

- Front/rear power lift automatic mode:

  Linkage remains stationary
- Front/rear PTO automatic mode:

  Disengage PTOs

(O) Activation button

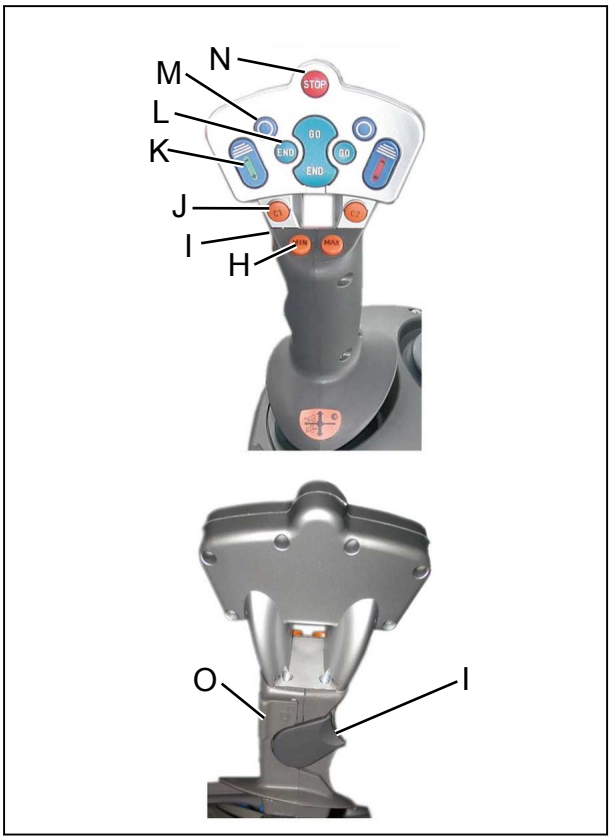



*Fig. 30*

## 3.2 Other operating controls for 700 Vario S4

### 3.2.1 Multifunction armrest keypad

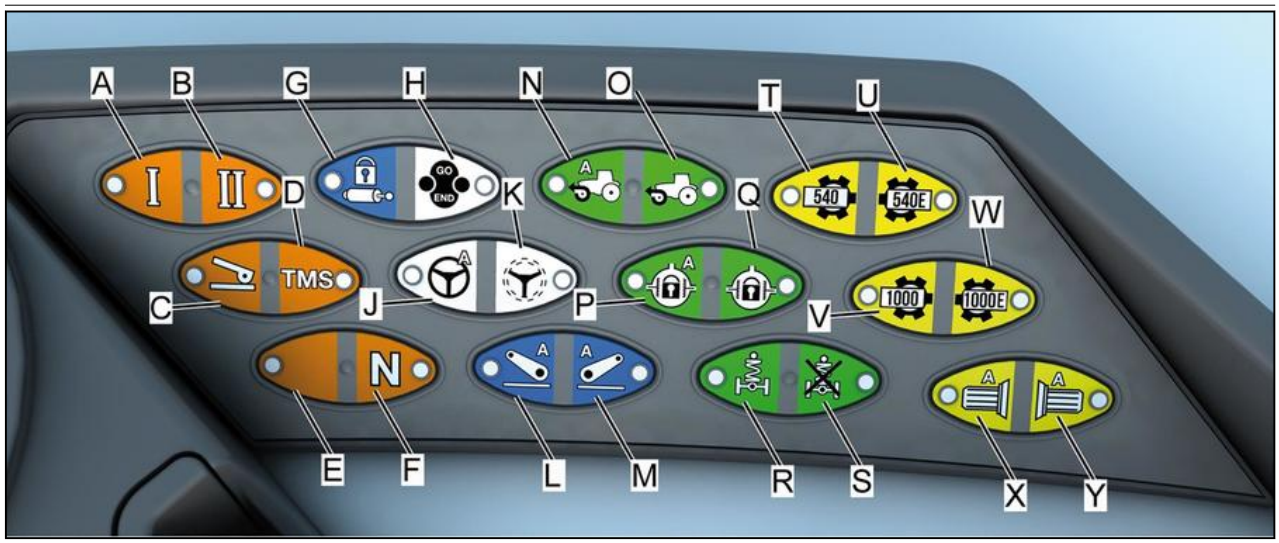



*Fig. 31*

(A) Travel speed range I
(B) Travel speed range II
(C) Throttle pedal mode ON - OFF
(D) Tractor Management System (TMS) ON - OFF
(E) -
(F) Transmission neutral ON - OFF
(G) Lock for hydraulic valves ON - OFF
(H) Variotronic TeachIn ON - OFF
(J) VarioGuide ON - OFF
(K) VarioGuide standby mode ON - OFF
(L) Automatic front linkage mode ON - OFF
(M) Automatic rear linkage mode ON - OFF
(N) Automatic 4WD mode ON - OFF
(O) Permanent 4WD (100%) ON - OFF
(P) Automatic differential lock mode ON - OFF
(Q) Differential lock 100% ON - OFF
(R) Front axle suspension mode
(S) Front axle lock mode
(T) Rear PTO speed selection level 540
(U) Rear PTO speed selection level 540E
(V) Rear PTO speed selection level 1000
(W) Rear PTO speed selection level 1000E
(X) Automatic front PTO mode ON - OFF
(Y) Automatic rear PTO mode ON - OFF

**NOTE:**
*If the LED next to the pressed button is lit, the required function is activated.*

## 3.2.2 Dashboard

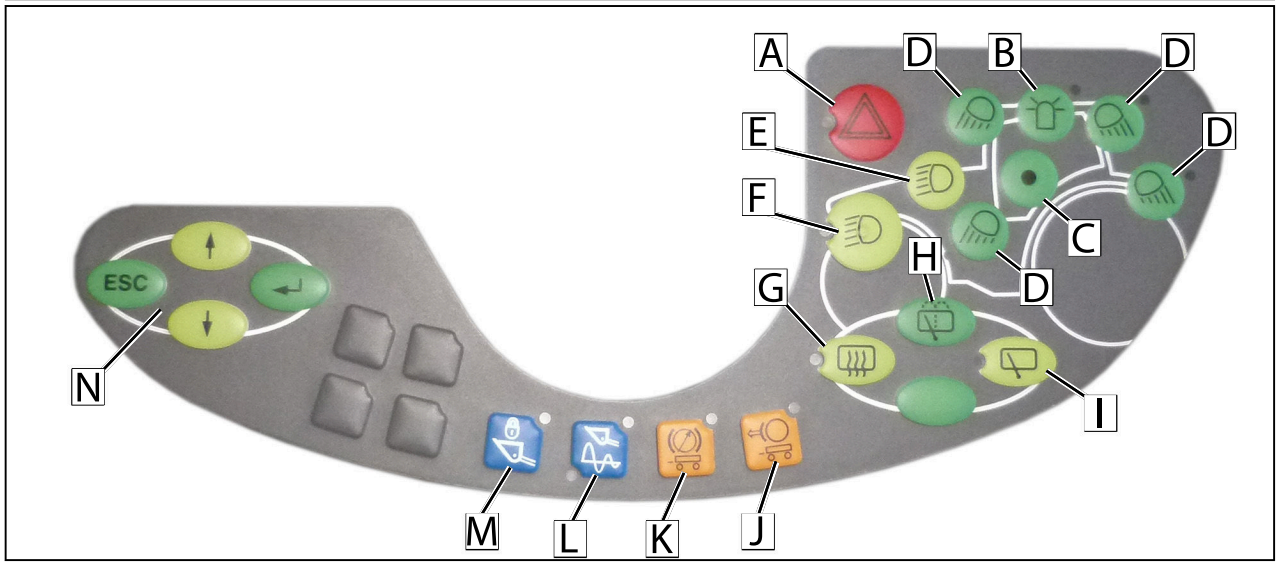



*Fig. 32*

(A) Hazard warning light ON - OFF
(B) Rotating beacon ON - OFF
(C) Main switch for work lights ON - OFF (The work lights that were last switched on can be switched on and off together)
(D) Work lights ON - OFF
(E) Additional headlight (standard with front power lift)
(F) Headlights and marker lights ON - OFF. (When the preheat and starter switch is set to "0", only the marker lights [parking lights] are switched on)
(G) Rear windscreen heater and rear view mirror heater with automatic shut-off function ON - OFF

**NOTE:**
*The rear windscreen heater must be activated. The rear view mirror heater automatically switches on at temperatures below +12 °C and remains switched on until the tractor is restarted*

(H) Rear windscreen washer system (wipers run automatically)
(I) Rear windscreen wiper intermittent operation ON - OFF

**NOTE:**
*The length of an interval can be set. Switch windscreen wiper intermittent operation on and off, and then on and off again. The period of time before it is switched on for the second time is adopted as the new interval if it is shorter than the default interval.*

(J) Hydraulic trailer brake pressure release
(K) not functioning
(L) Activate shock load stabilizing system, vibration damping system
(M) Tool lock
(N) Control keys for multiple display

**NOTE:**
*The required function is activated if the LED next to the button lights up.*
*When the preheat and starter switch is set to "1" (engine off), the relevant LED flashes when a work light is switched on. Press the button again to switch the work light on.*
*If the headlight was switched on for longer than two minutes while the engine was running, the additional headlights (E) and/or the front headlights (F) (where there is no front power lift) will be switched on for at least one minute when the doors are opened.*

## 3.2.3 EPC operating controls

### Control panel

(A) Quick lift switch, quick entry
(B) Depth control
(C) STOP button: All EPC functions are terminated.

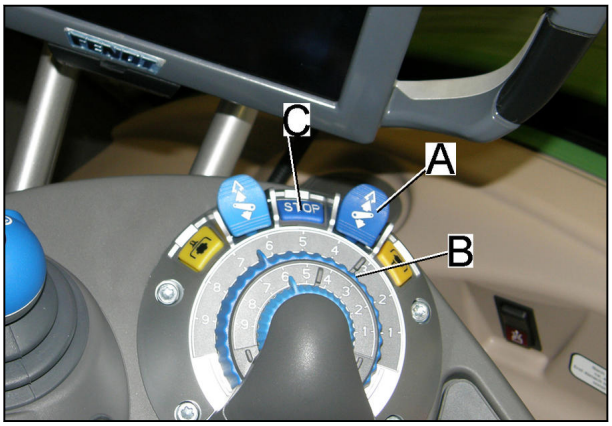



*Fig. 33*

### Quick lift switch

(A) Lower – implement is set to the value selected by the depth control.
(B) Quick entry

**NOTE:**
*If the quick-lift switch is actuated, the value set for depth control is not reached. When the switch is released, it returns to the set value.*

(C) Raise – implement is moved to the value selected by the lift height limit

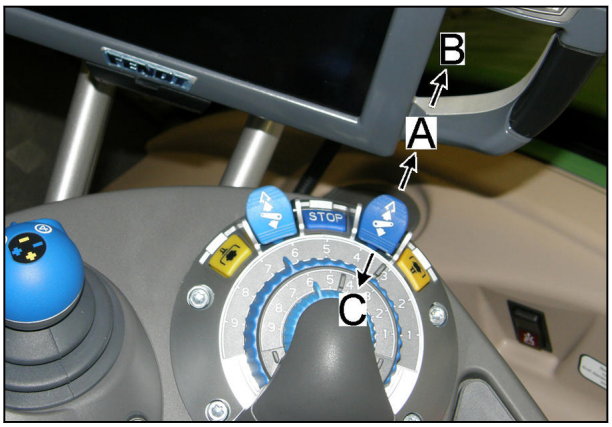



*Fig. 34*

### Depth control

The depth control (A) can be used for precise setting of the linkage working depth.

### Floating position for rear power lifts with SA/DA function

The DA function must be switched off for the floating position. If the lower end position is not reached when lowering, i.e. the mounted implement is resting on the ground, the floating position is activated. The lower end position is set with depth control.

### Floating position for rear power lifts without DA function

If a value greater than 9.5 is set during depth control, the floating position of the rear power lift is activated as soon as the mounted implement is resting on the ground.

### Direction of rotation for depth control

Rotational direction right = raise linkage

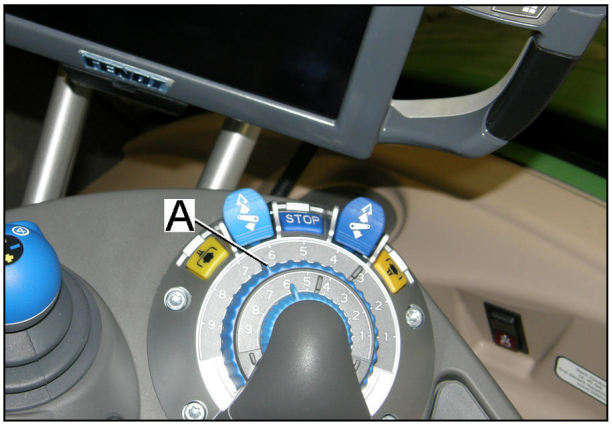



*Fig. 35*

Rotational direction left = lower linkage

If the depth control is used to set the linkage floating position, then the symbol for the floating position appears in the status line in the Varioterminal next to the rear power lift symbol.


*Fig. 36*

If the floating position of the rear power lift is active, the symbol for floating position (A) appears on the Varioterminal in the tractor information display next to the rear power lift symbol.

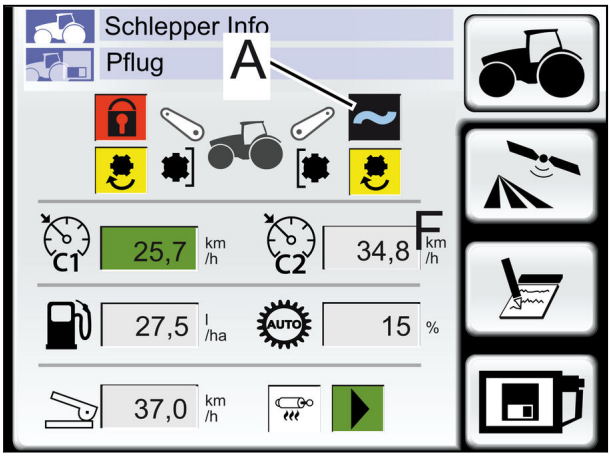



*Fig. 37*

**External rear controls**

Pressure switch (A) to the left or right of the rear lamp for raising or lowering the linkage.

**NOTE:**
*External operation is possible at any position of the depth control. External operation has priority over other operating controls. After external operation, the rear power lift is locked.*

**NOTE:**
*When using external controls, the hydraulic lower linkage lock is always set to manual lock (safety); the implement is centered. After unlocking the power lift, it remains on manual lock.*

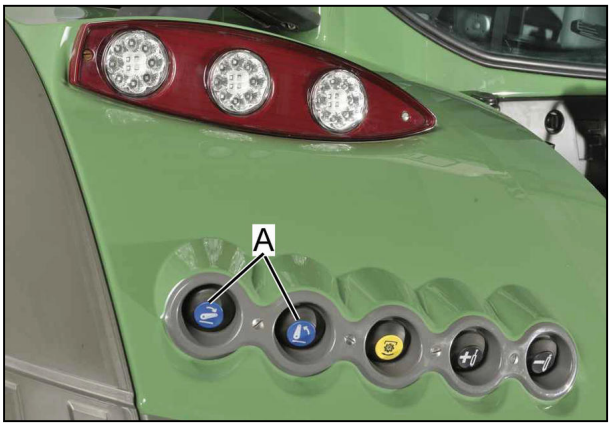



*Fig. 38*

## 3.2.4 Safety switch

**DANGER:**
**Press the STOP key (C) to stop undesired movements of the power lift.**

- STOP button (C)

When the safety lock is activated, the power lift does not work, i.e. after pressing the STOP key, the rear power lift is shifted into Stop mode. The

Stop symbol 

is displayed on the terminal next to the rear power lift status indicator.

**The safety lock becomes active in any of the following situations:**

1. When the ignition is switched off and on.
2. When starting the tractor.
3. If there is a fault in the electrical circuit.
4. By connecting or disconnecting an external sensor.

Stop mode can be suspended by actuating the quick-lift switch for the rear power lift.

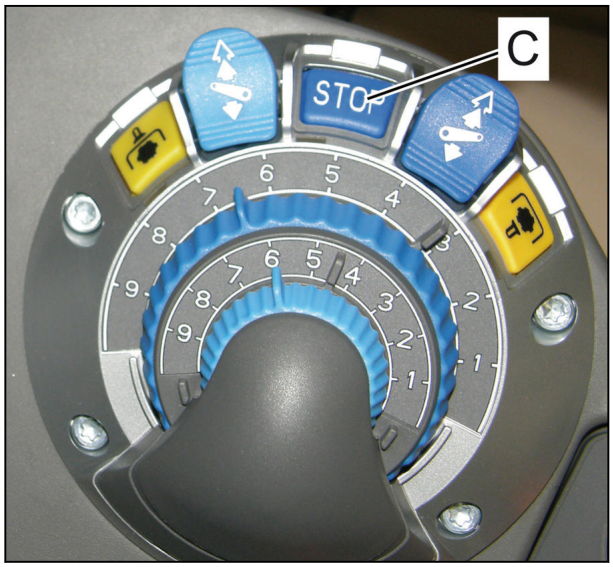



*Fig. 39*

## 3.2.5 Crossgate lever and linear module

**Crossgate lever**

**Operating the valves with the crossgate lever**

(A) Raise
(B) Lowering/pressure
(C) Floating position

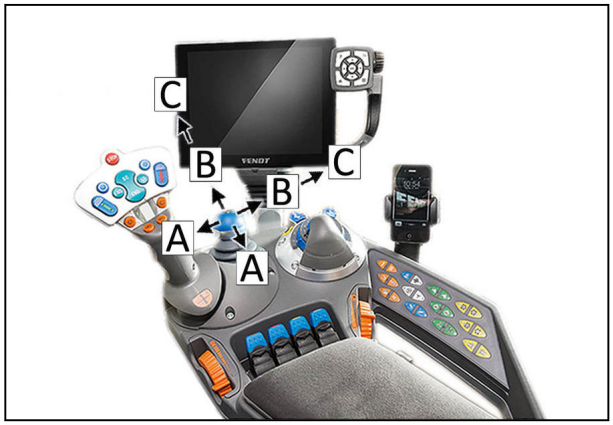



*Fig. 40*

### Use of the 3rd or 4th hydraulic circuit

Use buttons (A) on crossgate lever to operate the 3rd or 4th hydraulic circuit.

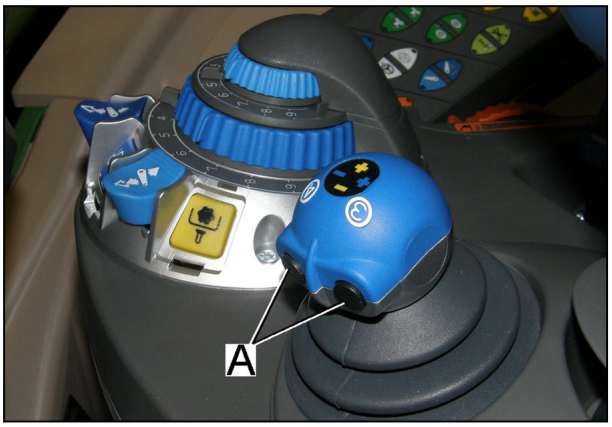



*Fig. 41*

### Linear module

### Operate the valves with the linear module

(A) Raise
(B) Lowering/pressure
(C) Floating position

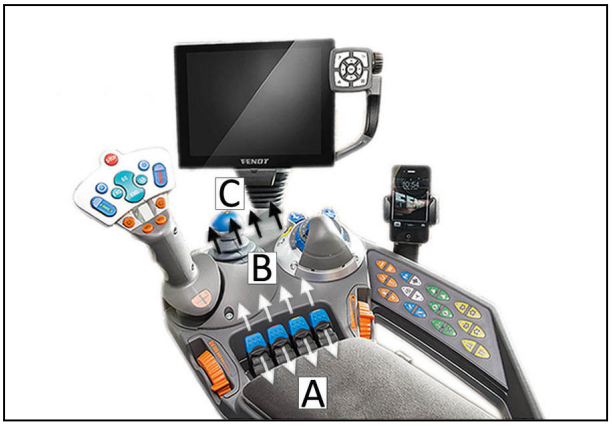



*Fig. 42*

# 3.3 Terminal

## 3.3.1 Terminal overview

**Brief overview of the two terminals**

| | 7-inch Vario terminal | 10.4-inch Vario terminal |
|---|---|---|
| **Hardware** | | |
| Screen diagonals | 7 inches | 10.4 inches |
| Resolution | 480 x 800 | 800 x 600 |
| Number of colors | 262,000 | 16 million |
| Ports | USB, Ethernet | USB, Bluetooth, Ethernet, 2x camera |
| Anti-reflective coating | + | + |
| Touch screen | + | + |
| External control panel | + | + |
| Internal memory | 1 GB | 4 GB |
| **Applications** | | |
| Tractor operation | + | + |
| VarioGuide | - | + |
| VarioGuide light | + | - |
| VarioDoc | - | + |
| ISOBUS implement control | + | + |
| Variotronic TI | + | + |
| Management of implement settings | + | + |
| 2 cameras | - | + |
| Map display | + | + |
| 4 info screens | - | + |

**NOTE:**
*In this Operator's Manual, operation of the tractor is displayed on the large Vario terminal as standard; differences are pointed out as necessary.*

## 3.3.2 Terminal display

**10.4-inch Vario terminal display**

(A) Touch screen
(B) External control panel

It is possible to operate the 10.4-inch Vario terminal with the touch screen (A) or with the aid of the external control panel (B).

**NOTE:**
*Not all functions are available using touch screen. Some functions can only be activated using the external control panel.*

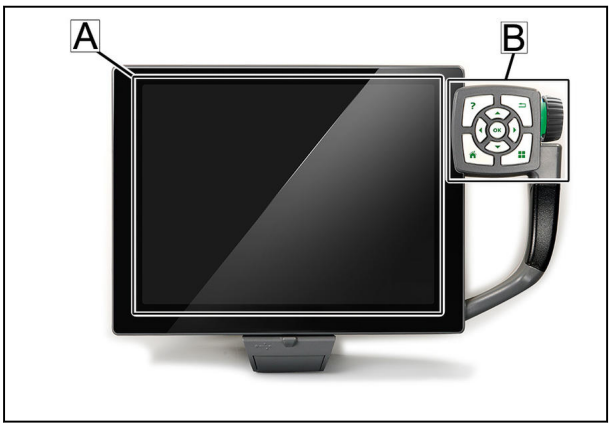



*Fig. 43*

Pull flap (A) open to reveal the USB ports.

**NOTE:**
*USB ports are only provided for maintenance purposes in the authorized dealer workshop or for when required, e.g. for a mobile phone charging cable.*

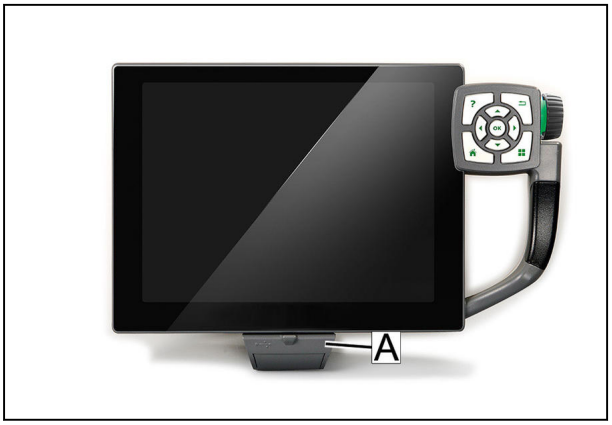



*Fig. 44*

**7-inch Vario terminal display**

(A) Touch screen
(B) External control panel

It is possible to operate the 7-inch Vario terminal with the touch screen (A) or with the aid of the external control panel (B).

**NOTE:**
*Not all functions are available using touch screen. Some functions can only be activated using the external control panel.*

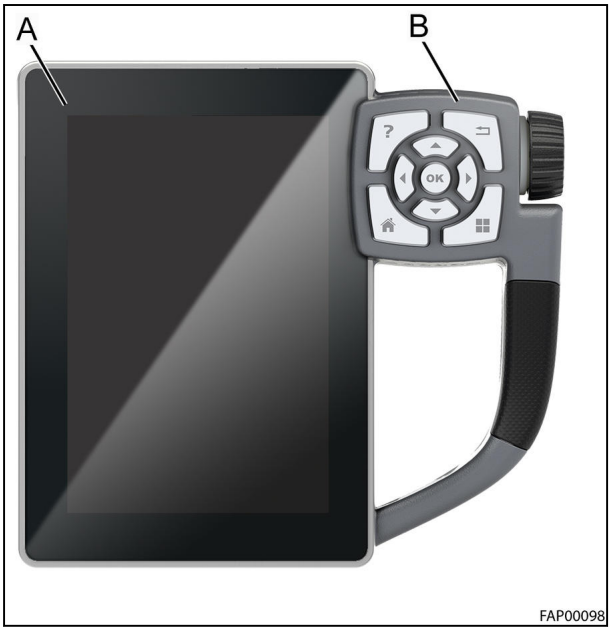



*Fig. 45*

On the 7-inch Vario terminal, the flap (A) for the USB ports must be pushed first to unlock it. The flap will then open automatically. Misuse may cause damage to the opening mechanism.

**NOTE:**
*USB ports are only provided for maintenance purposes in the authorized dealer workshop or for when required, e.g. for a mobile phone charging cable.*

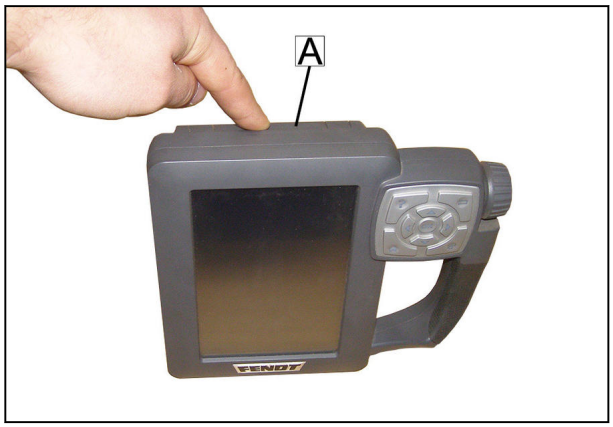



*Fig. 46*

## 3.3.3 External control panel

Keys on the external control panel

(A) Help key
(B) ESC key
(C) Rotary wheel
(D) 10.4" terminal: Key positioning
7" terminal: Selection menu applications
(E) Home key
(F) Navigation keys (left - right / up - down) for cursor operation
(G) Confirmation key (press rotary wheel to the left)

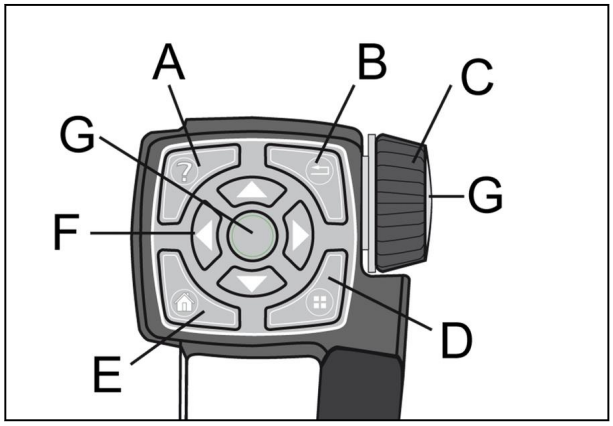



*Fig. 47*

**Key functions**

| | Key | Function |
|---|---|---|
| A | Help | Call up the digital Operator's Manual on the terminal |
| B | ESC | Jump up one menu level |
| | | Jump to the first level if the key is kept pressed (more than 2 s) |
| C | Rotary wheel | (Dynamic) setting of numbers or selection from lists by turning the wheel |
| | | Confirmation (equivalent to the OK button in the middle of the navigation keys) by pressing the wheel |
| D | Positioning | 10.4" terminal: Positioning of applications on the screen |
| | | 7" terminal: Selection menu applications |

| | Key | Function |
|---|---|---|
| E | Home | The tractor information screen is always shown in the top right quarter when the Home key is pressed. The current applications are retained in the other quarters and set to their starting condition (retracted) |
| F | Cursor keys | Terminal operation by moving the focus frame |
| G | Confirmation key | Key for confirmation of input |

## 3.3.4 Page layout and screen allocation

### 7-inch terminal layout

The screen is divided into 3 sections:

In the example opposite, the tractor information screen can be seen in the top half.

The valve information screen can be seen in the bottom half.

The status bar is located at the very bottom.

**NOTE:**
*Occupation of the screen areas with the various applications is described in the chapter Screen allocation.*

**NOTE:**
*In this Operator's Manual, operation of the tractor is displayed on the large Vario terminal as standard; differences are pointed out as necessary.*


*Fig. 48*

### 10.4-inch terminal layout

The screen is subdivided into 4 equal sections:

In the adjoining example, the camera view can be seen in the top left area of the display.

The tractor information screen is in the top right.

The two sections in the bottom left and bottom right are occupied by the map view.

**NOTE:**
*Occupation of the screen areas with the various applications is described in the chapter Screen allocation.*


*Fig. 49*

### 10.4-inch terminal screen allocation

When the "positioning view" is shown by actuating the appropriate key provided on the external control panel, symbols are displayed on each of the four screen sections for the application groups that can be displayed there.

Soft keys for application groups:

(A) Tractor applications (tractor functions, VarioGuide functions, VarioDoc functions and setup functions)

(always placed in the top right)
(B) Interactive map displays
(C) Info+ (pre-configured screens with important information)
(D) ISOBUS implement applications
(E) Camera applications

Additional soft keys

(F) Confirmation of selection and leave the page
(G) Leave the page without accepting the selection
(H) Switch between day/night mode

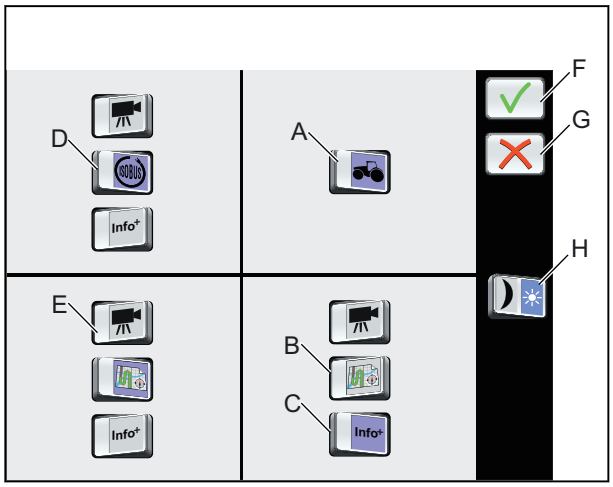
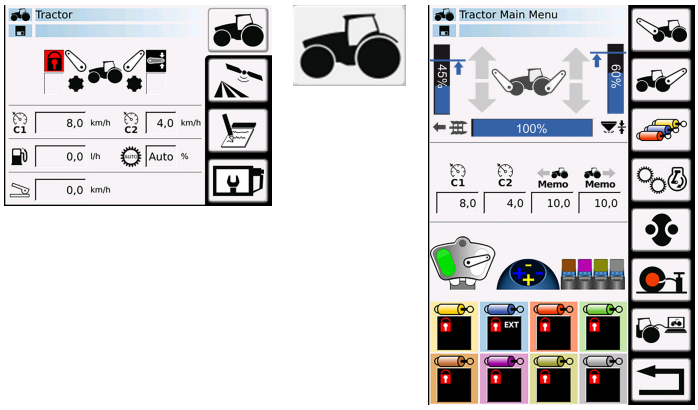


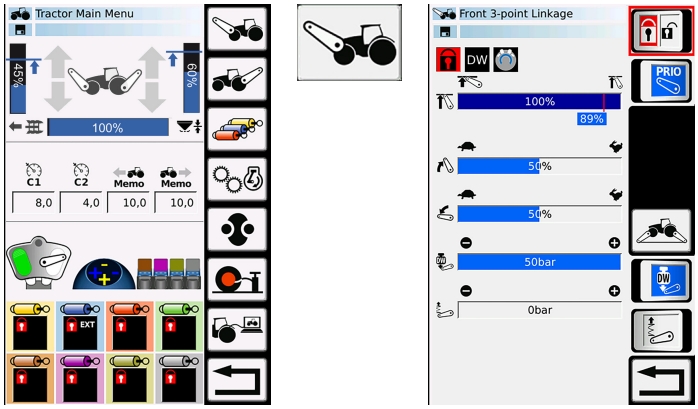

*Fig. 50*

## 3.3.5 Menu overview of tractor operation

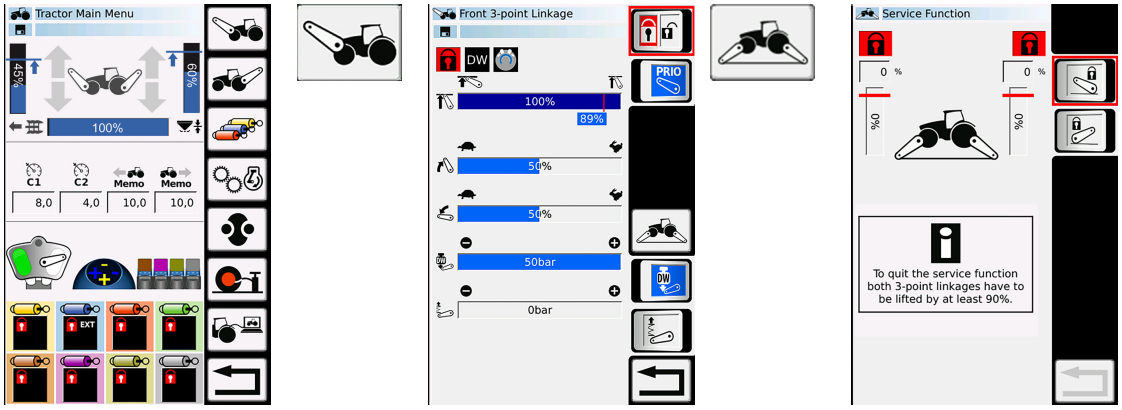
### Call up the tractor main page



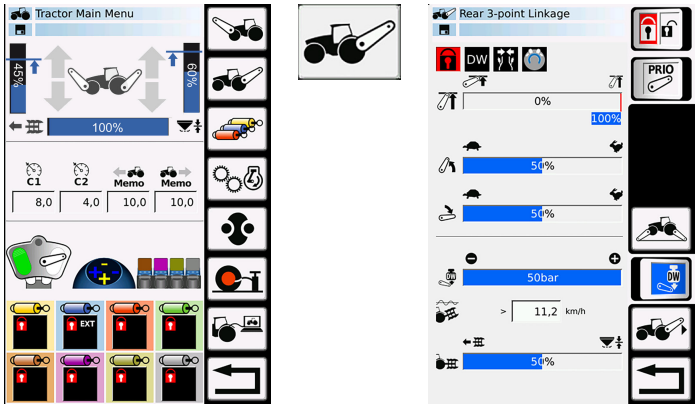
## Call up front power lift



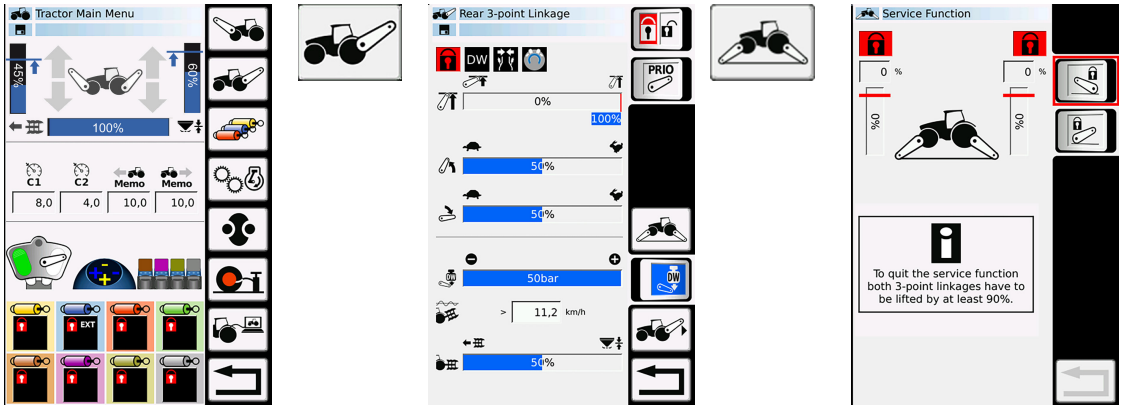

## Call up workshop mode



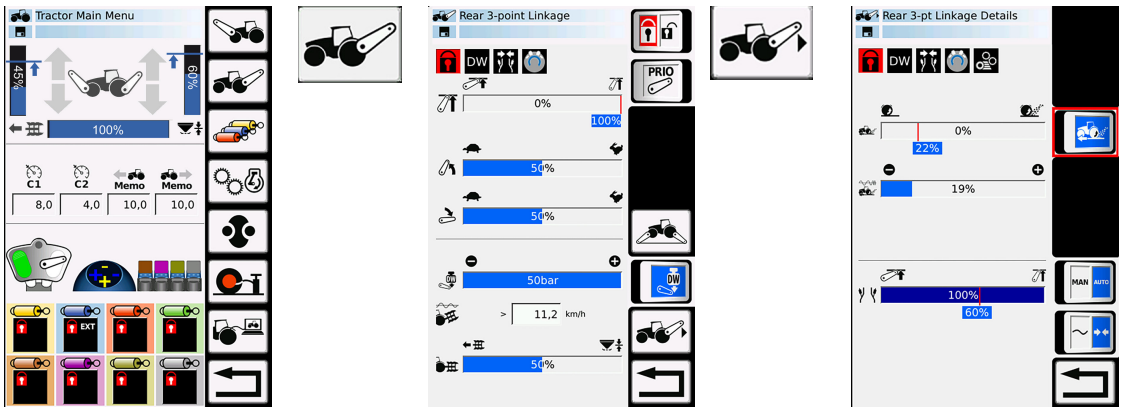

## Call up rear power lift



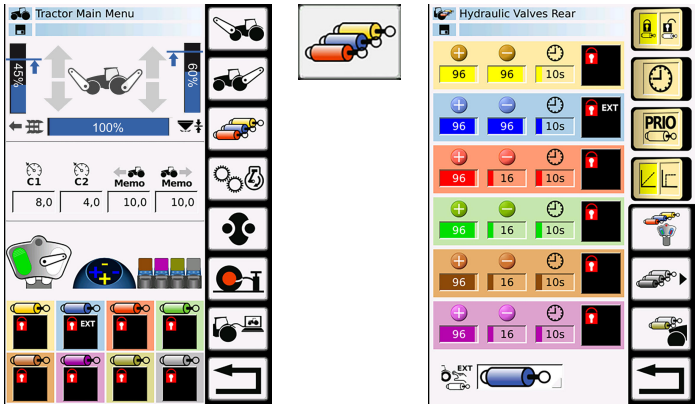
## Call up workshop mode



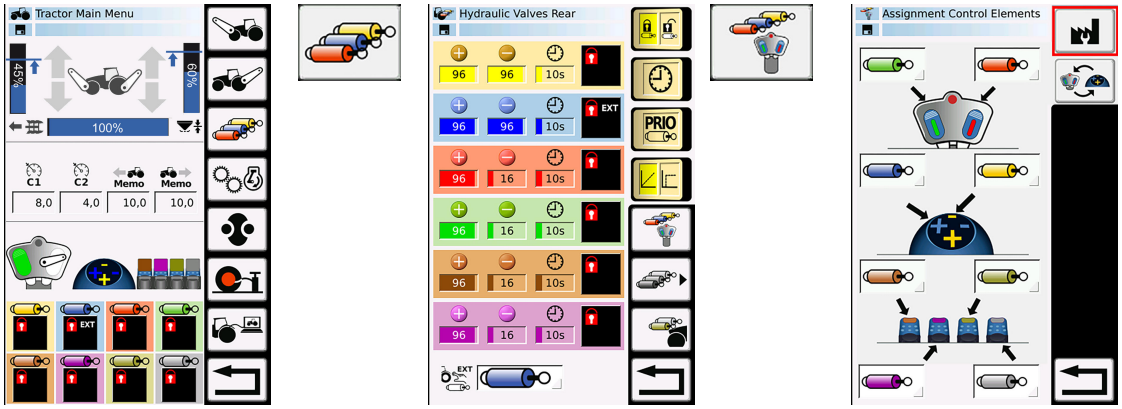

## Call up rear power lift details



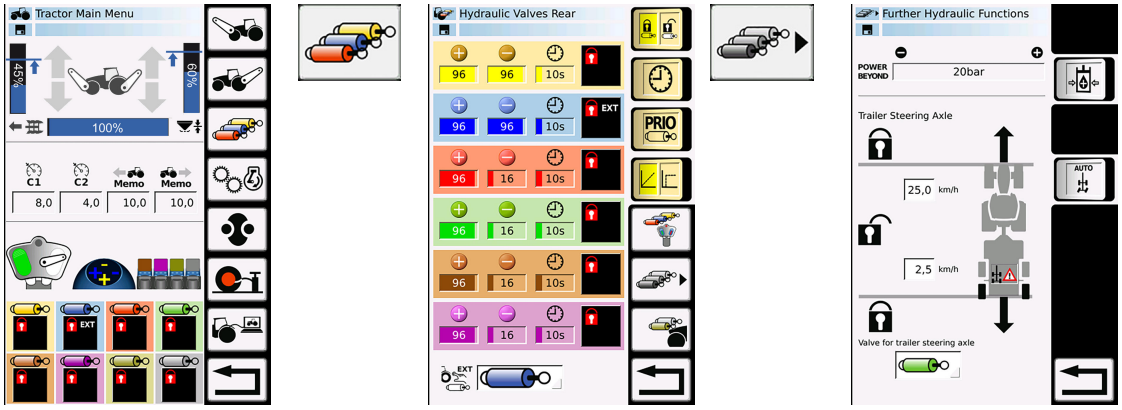

## Call up rear EHS valves



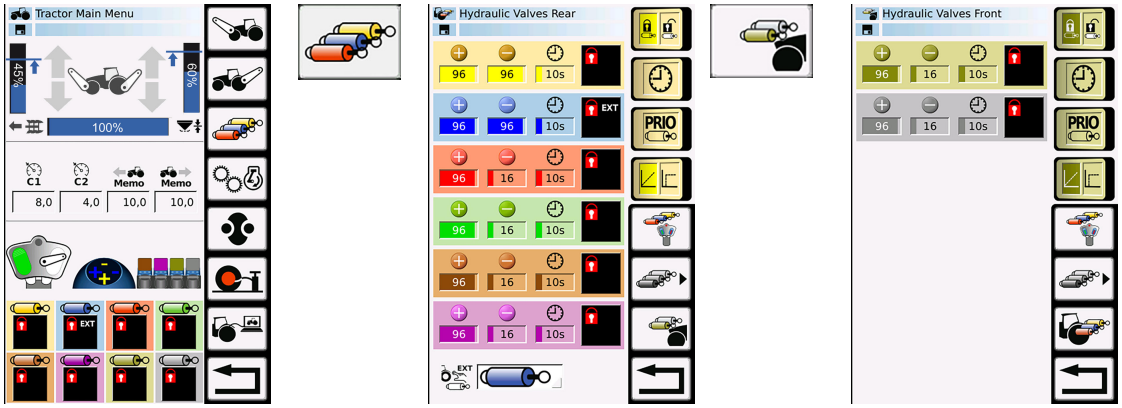
## Call up other elements assignment



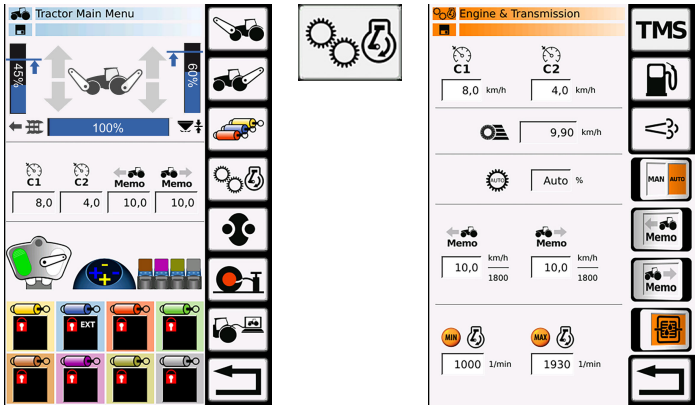

## Call up further hydraulic functions



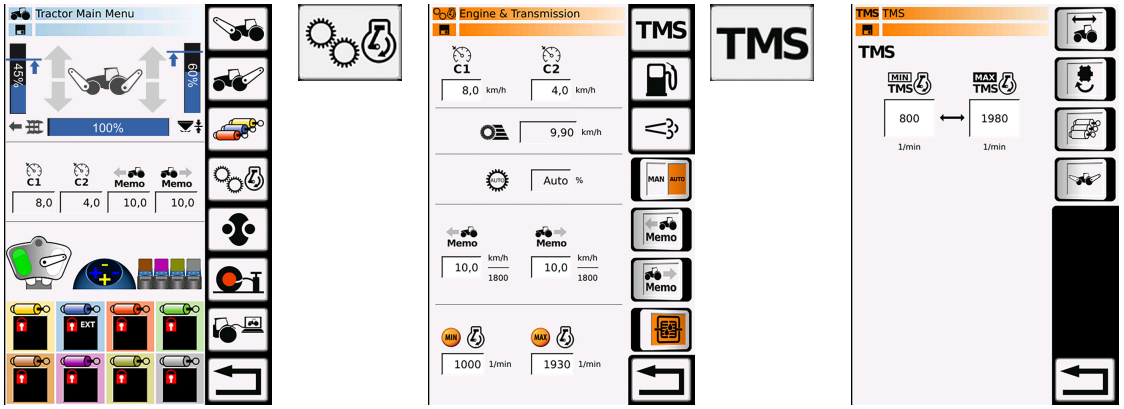

## Call up front EHS valves



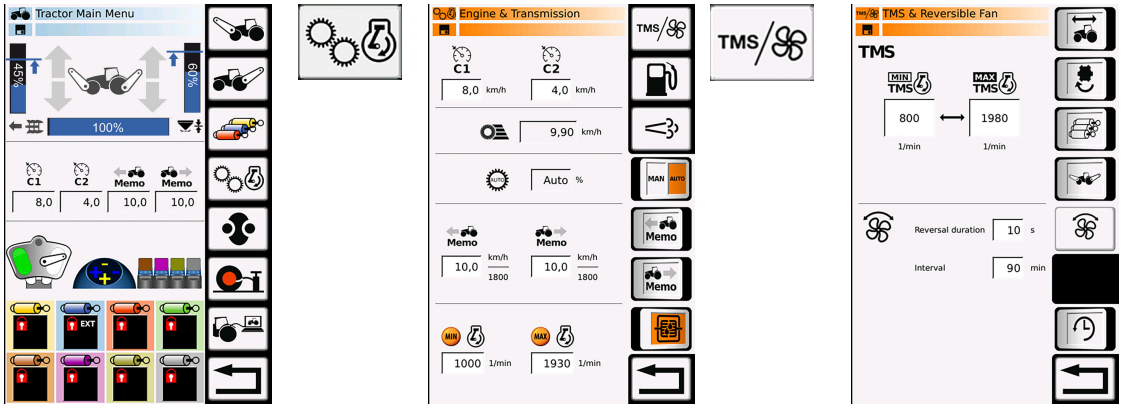
## Go to - Engine and transmission



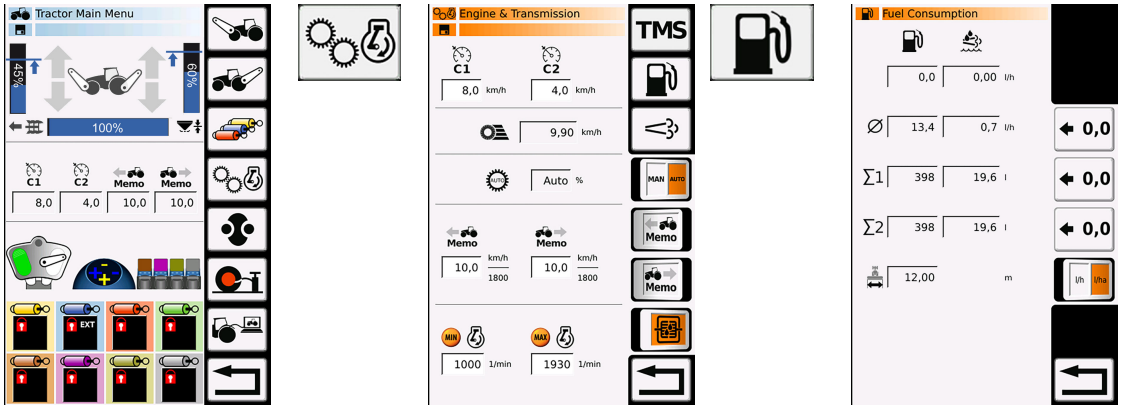

## Call up TMS



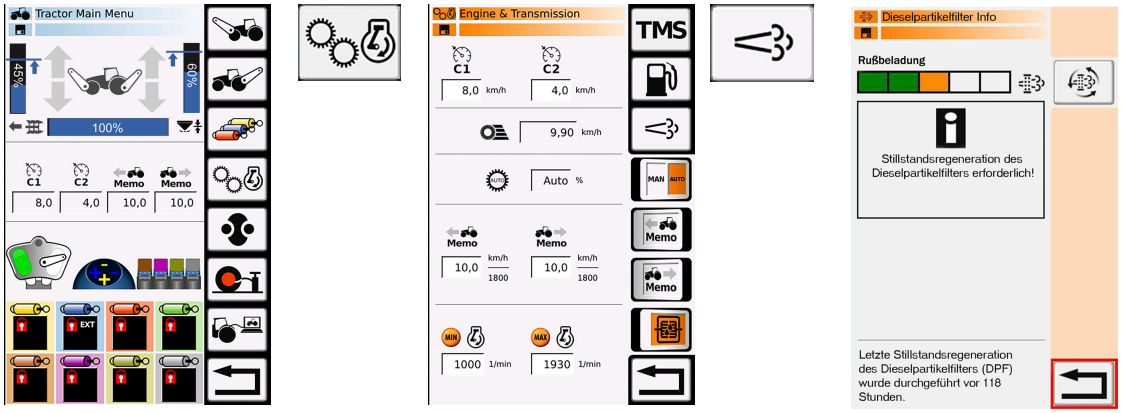

## Call up TMS (with reversible fan) (models 800, 900)



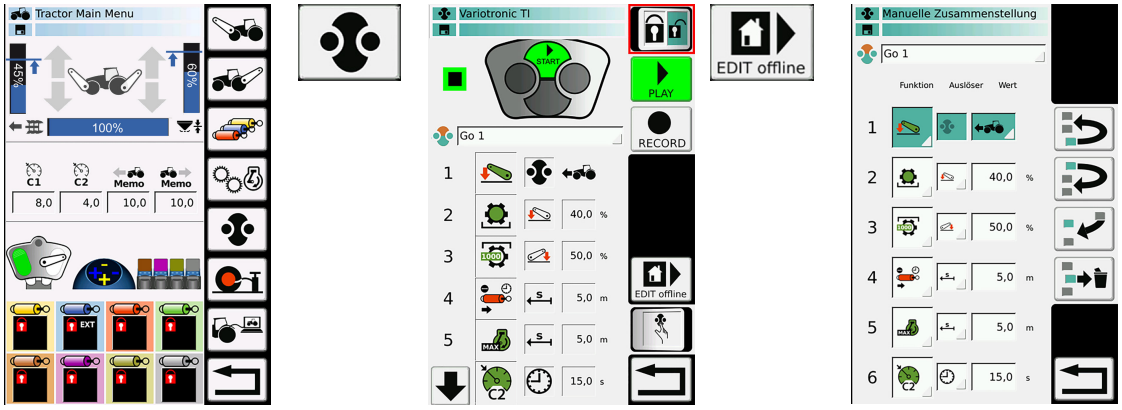
## Call up consumption measurement



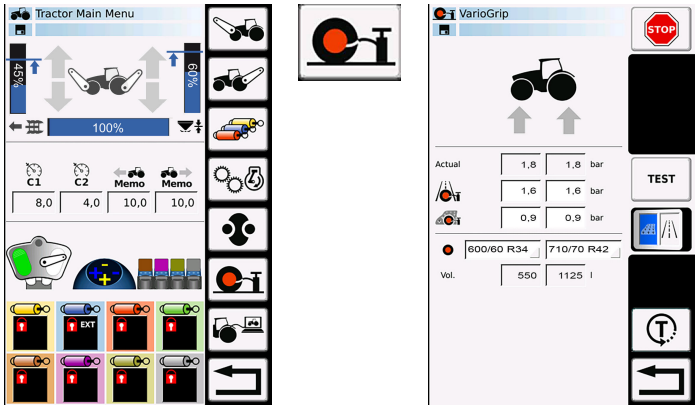

## Call up diesel particle filter



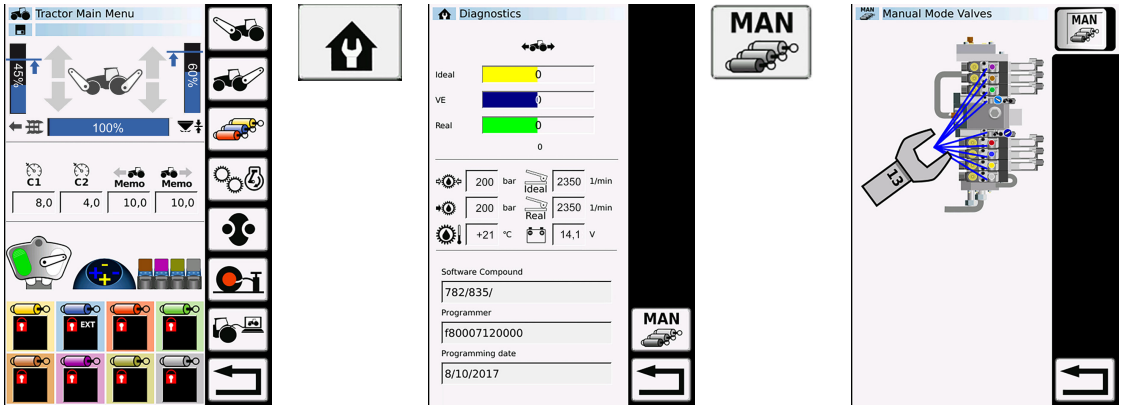

## Call up Variotronic TI



### Call up tire pressure monitoring system




### Go to - Diagnostics




## 3.3.6 Information regarding terminal simulation

**NOTE:**
*Further processes and functions are described in the operating instructions for the Varioterminal.*
*A terminal simulation is available at* ***http://terminal.fendt.com****. However, not all functions can be executed in the terminal simulation.*

## 3.3.7 Tasks for terminal settings

**Task: Implement the following settings on the Vario terminal.**

### Basic settings for the terminal

1. Set up the screen layout:
   - Top right: tractor settings
   - Bottom right: info display
   - Bottom left: info display
   - Top left: camera
   - After setting up the layout, configure the quick jumps in the info display in the bottom-left corner (Engine & Transmission and EHS Valve Block 1)
2. Open the "Terminal settings" page
   - Set the language to "English"
   - Check the date and time

**Basic settings for driving**

1. Select the transmission gearbox menu and enter the following values:
   - Cruise control C1 to 7 km/h and C2 to 30 km/h
   - Load limit control to automatic or manual 15%
   - Memo position forward to 19 km/h, reverse to 9 km/h, activated
   - Activate the TMS speed range 900 rpm to 1300 rpm with the control unit
   - Set the consumption display to 0, activate l/ha and adjust the working width to 4 m

**Basic settings for the hydraulic system**

1. Select the front power lift menu and enter the following values:
   - Lifting height: 90 percent
   - Lifting speed: 80 percent
   - Lowering speed: 60 percent
2. Select the rear power lift menu and enter the following values:
   - Lifting height: 90 percent
   - Lifting speed: 80 percent
   - Lowering speed: 60 percent
3. Select the control units menu and enter the following values:
   - DA yellow +80 l, -40 l, time 15 s activated, priority
   - DA blue +50 l, -50 l, time 10 s activated
   - DA red external
   - Actuation of DA yellow on olive finger tip
   - Actuation of DA blue on gray finger tip

**"TeachIn" setting, headland management**

1. Select the TeachIn menu and set the following values for the "GO 1" button
   - Lower the front power lift
   - Maximum speed memory on when front power lift position above 50 percent
   - Lower rear power lift by 4 m during forward travel
   - Rear PTO on when rear power lift position above 50 percent
   - DA yellow on when time over 0.2 s
   - Forward cruise control C1 to 3 m
2. An error occurs when you are entering the values:
   - Configure the maximum speed memory according to the rear PTO position, depending on the rear power lift position
   - Configure the DA yellow according to the front power lift position
3. At button "END 1"
   - Disengage cruise control
   - Raise front power lift by pressing a button
   - Raise rear power lift by 4 m during forward travel
   - Rear PTO off when rear power lift position above 40 percent
   - MIN speed memory on over 2 s
   - DA yellow off when time over 1 s
   - DA blue on when time over 2 s

**Save settings under a device name**

1. Select the save devices menu
2. Save the data under your name

FENDT

# 4. motor

# 4.1 Fuel system

## 4.1.1 Fuel system

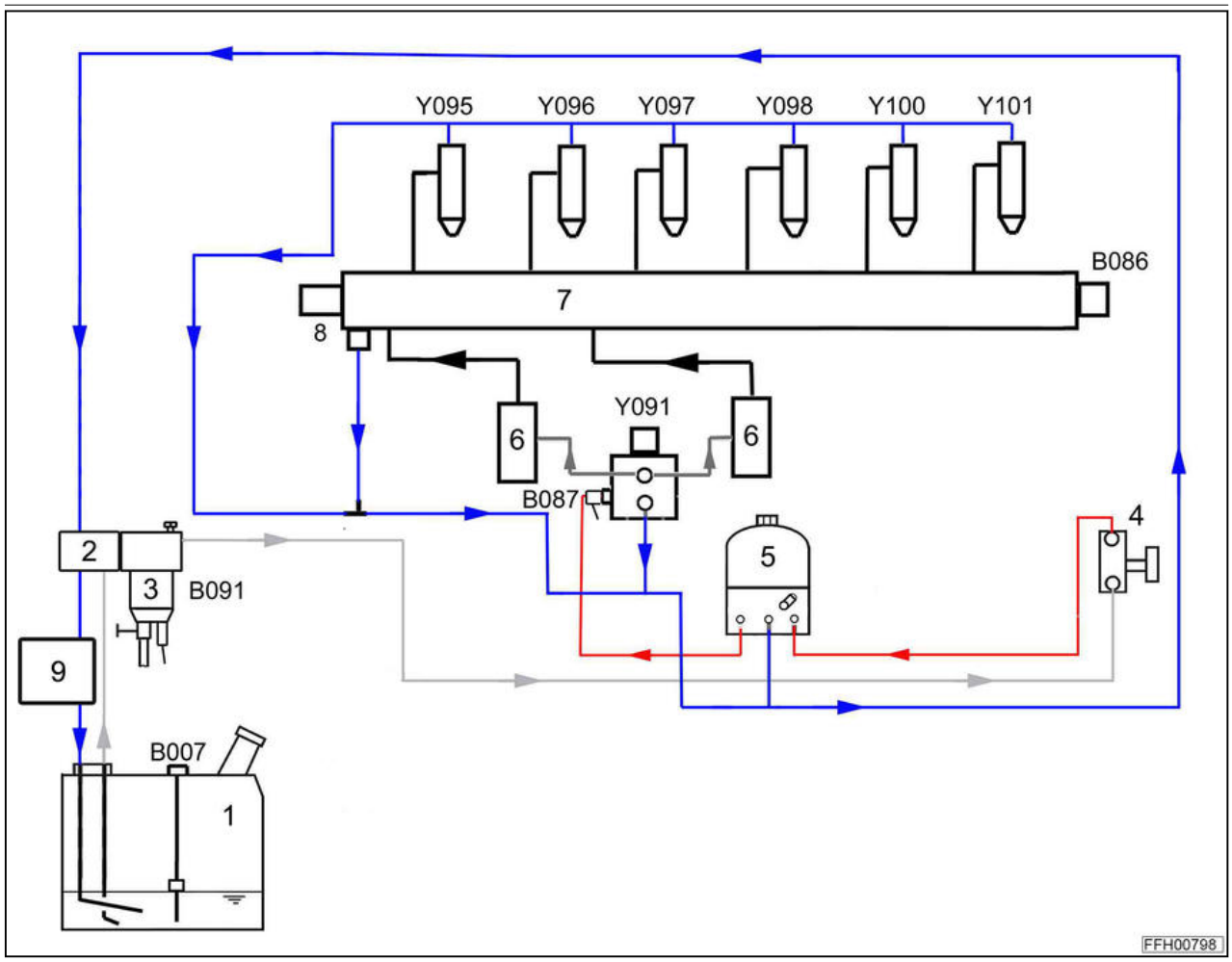



*Fig. 1*

(1) Fuel tank
(2) Thermostatic valve with heater and hand pump
(3) Water sedimentor (pre-filter)
(4) Fuel pump
(5)5 Main fuel filter
(6) High-pressure pump
(7)6 Common rail (high-pressure accumulator)
(8) High-pressure limiting valve
(9) Fuel cooler (only from a construction date of 02/2017)

**B007** immersed tube fuel-level sensor
**B086** rail pressure sensor
**B087** fuel low pressure sensor
**B091** water in fuel sensor
**Y091** fuel dispensing unit
**Y095** injector 1
**Y096** injector 2
**Y097** injector 3
**Y098** injector 4
**Y100** injector 5
**Y101** injector 6

| Component | Function |
|---|---|
| **B007** immersed tube fuel-level sensor | Fuel display on<br>A007 - instrument panel |
| **B086** rail pressure sensor and high-pressure limiting valve DBV | **B086 rail pressure sensor:**<br>Detects actual pressure (approx. 400 bar to 1600 bar in the rail [high-pressure accumulator])<br>**High-pressure limiting valve:**<br>Limits the max. pressure (approx. 1800 bar) |
| **B087** fuel low pressure sensor | Detects low fuel pressure "primary fuel pressure" (approx. 6 bar) |
| **B091** water in fuel sensor | Detects the water level in the water sedimentor. |
| Thermostatic valve | Directs the fuel from the return into either the tank or back into the feed, depending on the temperature of the fuel. |
| **Y091** fuel dispensing unit | Controls the fill quantity of the high-pressure pumps and thus also the pressure in the rail (high-pressure accumulator). |
| **Y095** injector 1<br>**(on the flywheel)** | Injector |
| **Y096** injector 2 | |
| **Y097** injector 3 | |
| **Y098** injector 4 | |
| **Y100** injector 5 | |
| **Y101** injector 6 | |

## 4.1.2 Diesel high-pressure pump: Bosch CP 4.1

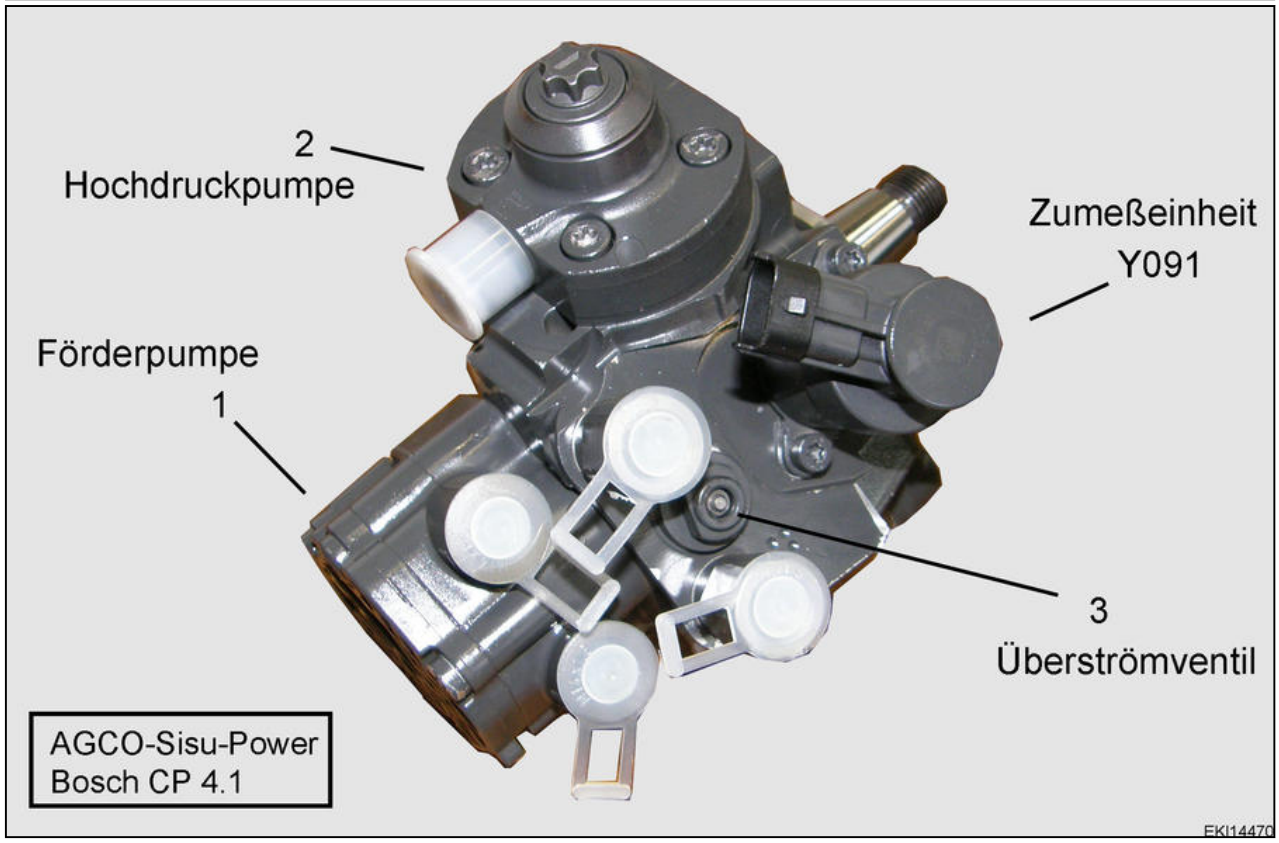



*Fig. 2 Diesel high-pressure pump (Bosch CP 4.1)*

(1) supply pump
(2) High-pressure pump
(3) Overflow valve (5 bar to 6 bar)
Y091 Metering unit

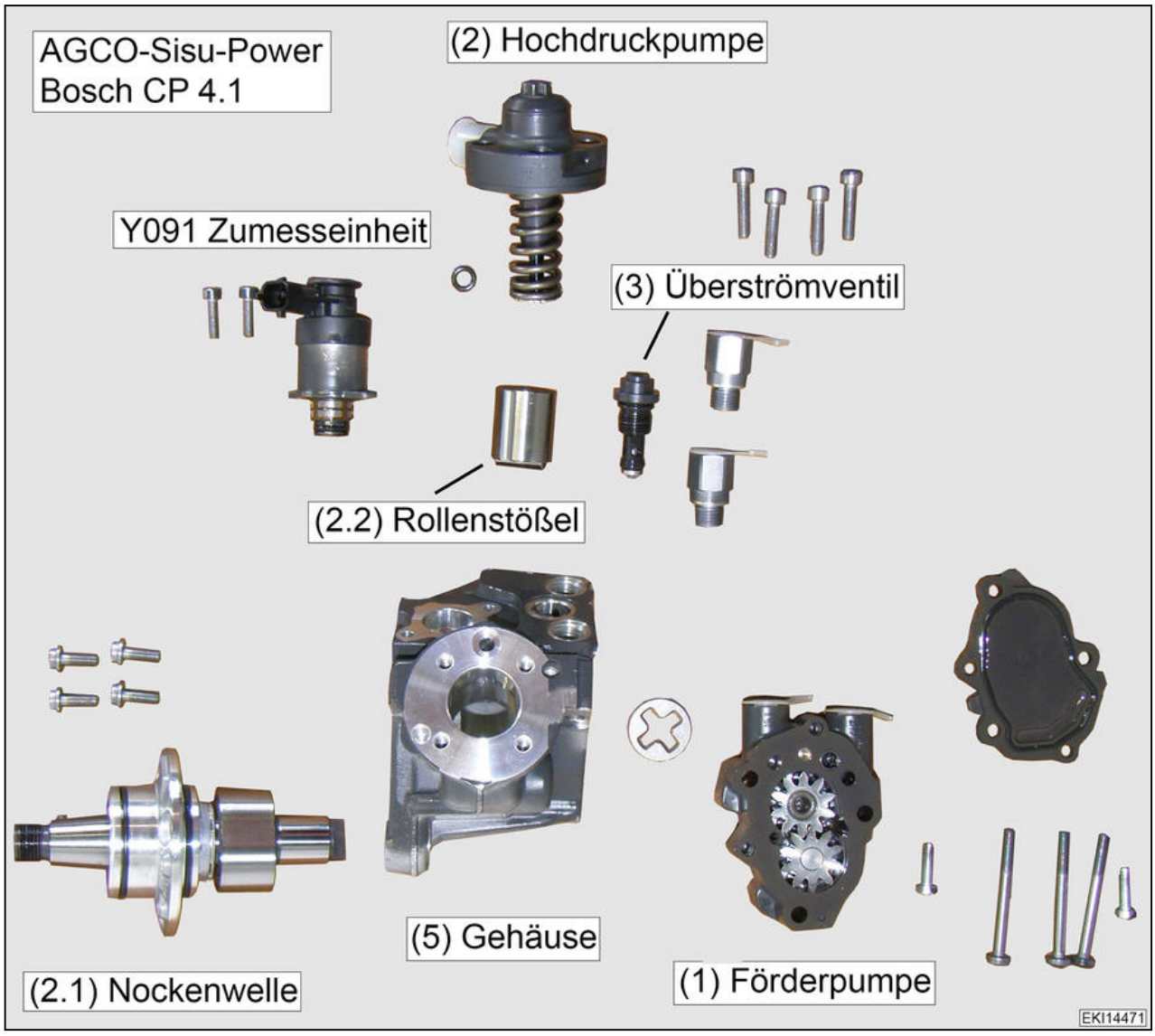



*Fig. 3 Diesel high-pressure pump (Bosch CP 4.1)*

(1) supply pump
(2) High-pressure pump
(2.1) Camshaft
(2.2) Roller tappets
(3) Overflow valve (5 bar to 6 bar)
Y091 Metering unit

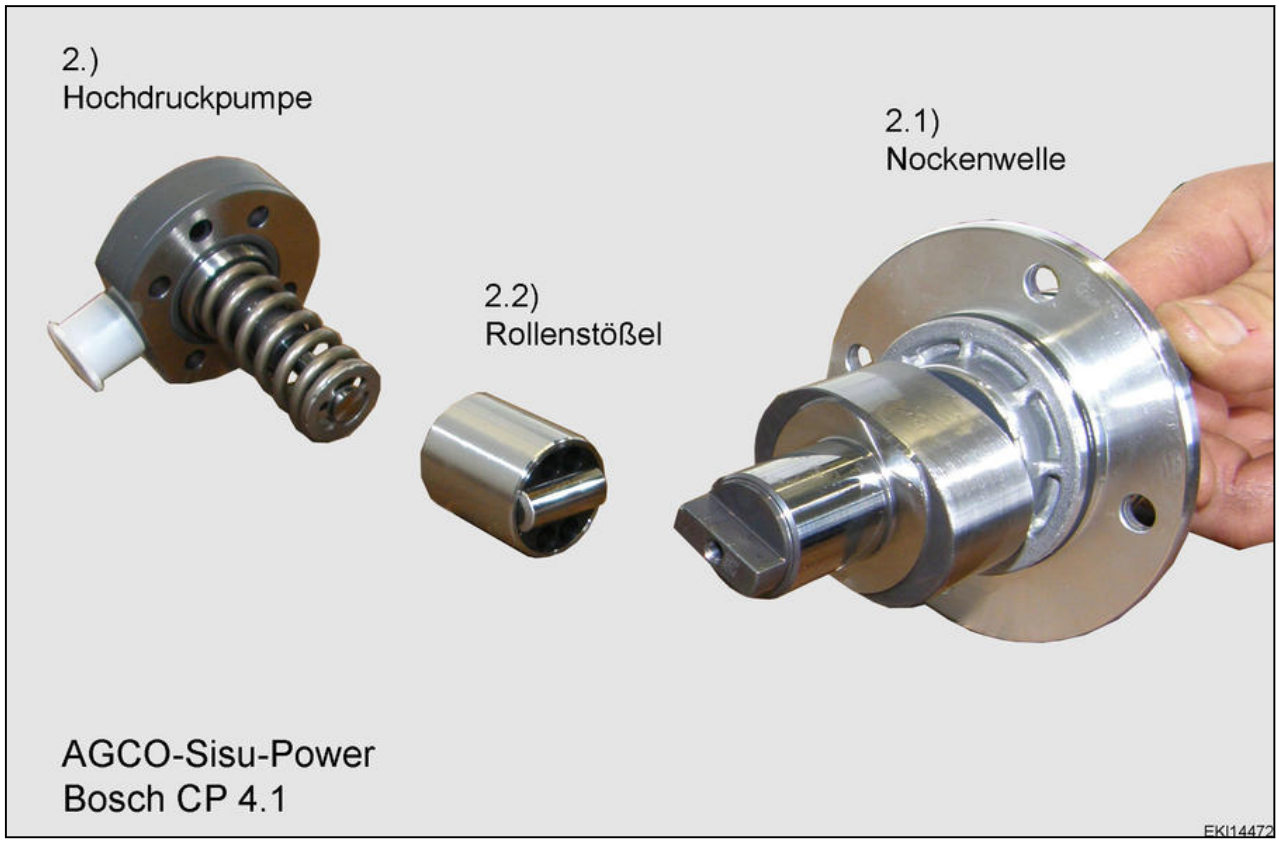



*Fig. 4 High-pressure pump and camshaft*

(2) High-pressure pump
(2.1) Camshaft
(2.2) Roller tappets

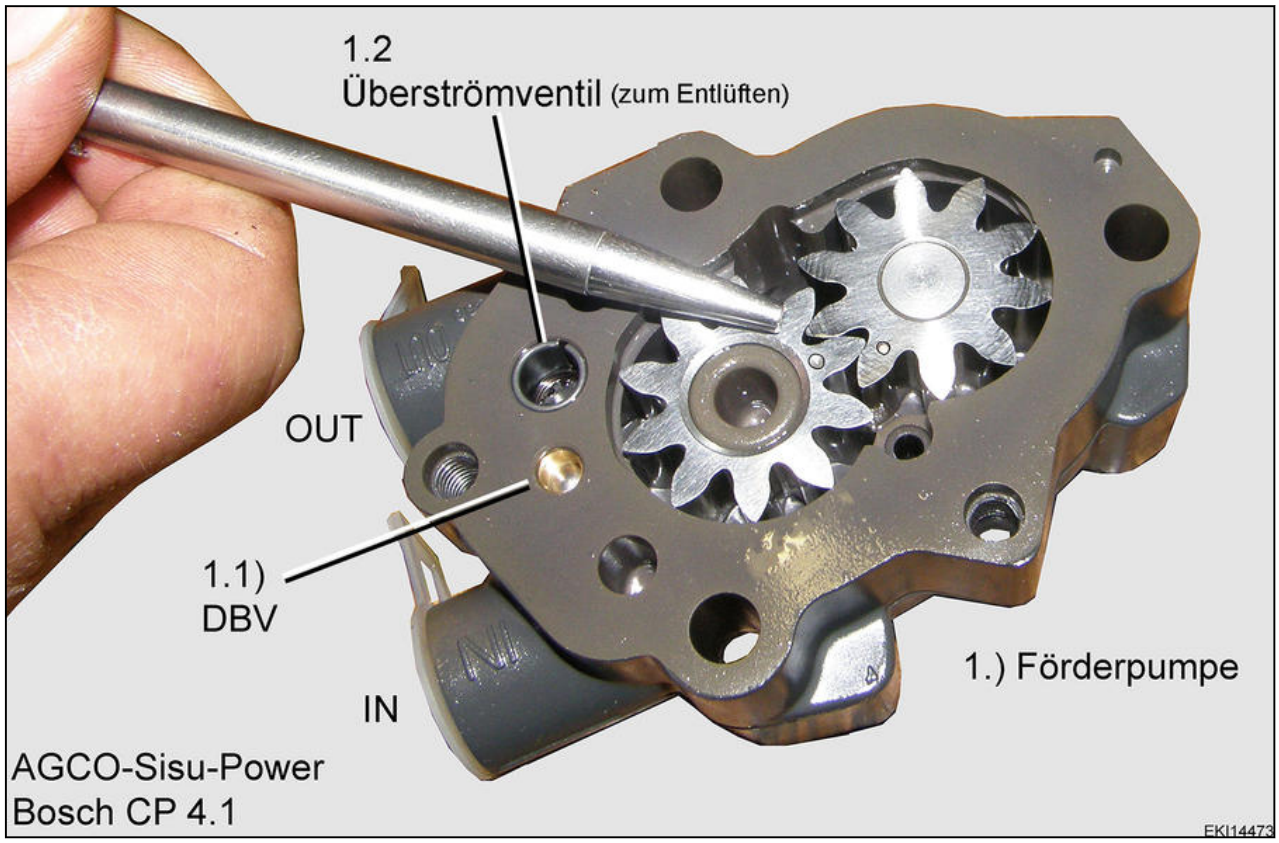



*Fig. 5 fuel delivery pump*

(1) supply pump
(1.1) Pressure relief valve approx. 12 bar
(1.2) Overflow valve

IN Vacuum side
OUT Pressure side

**NOTE:**
*The feed pump gears have assembly markings.*

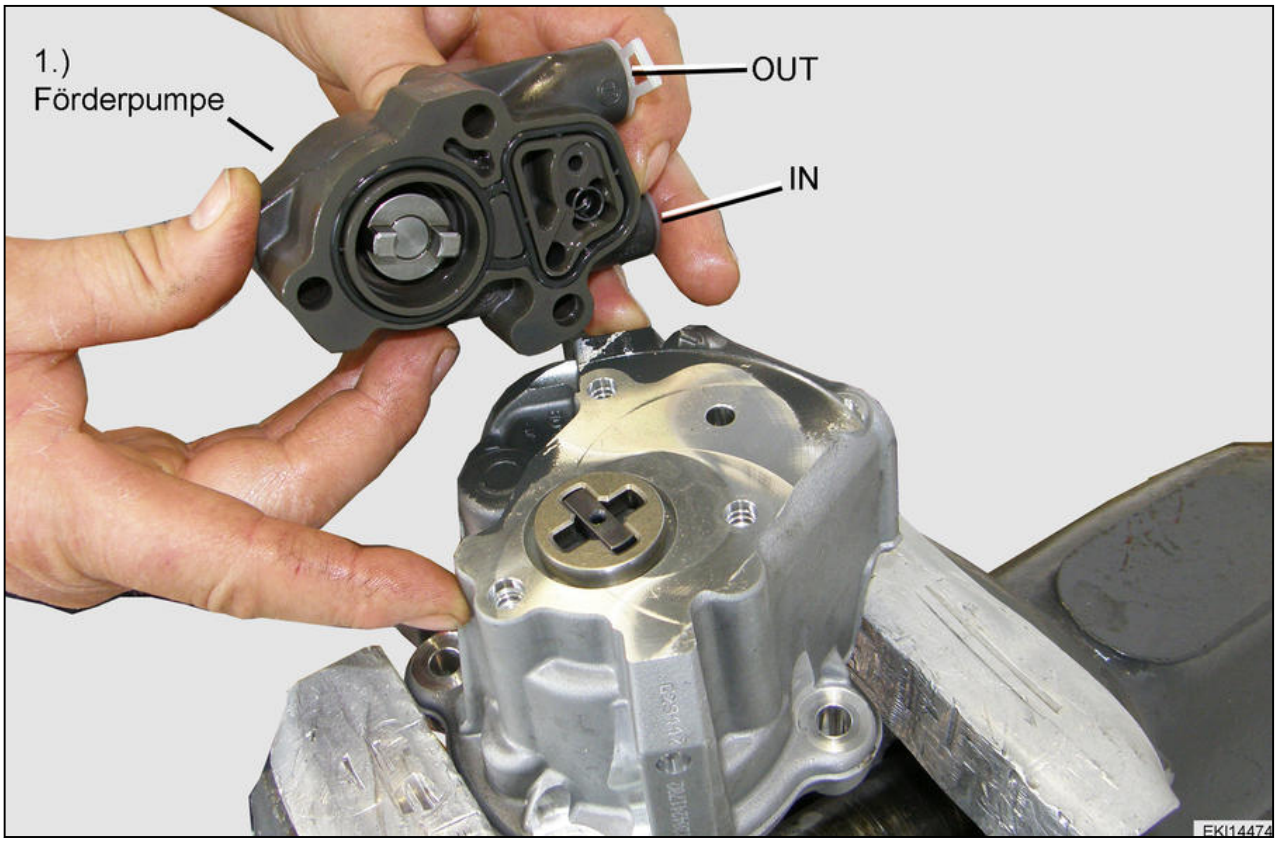



*Fig. 6 Fuel pump*

(1) supply pump
IN Vacuum side

OUT Pressure side

## 4.2 Exhaust gas system

### 4.2.1 Exhaust after-treatment

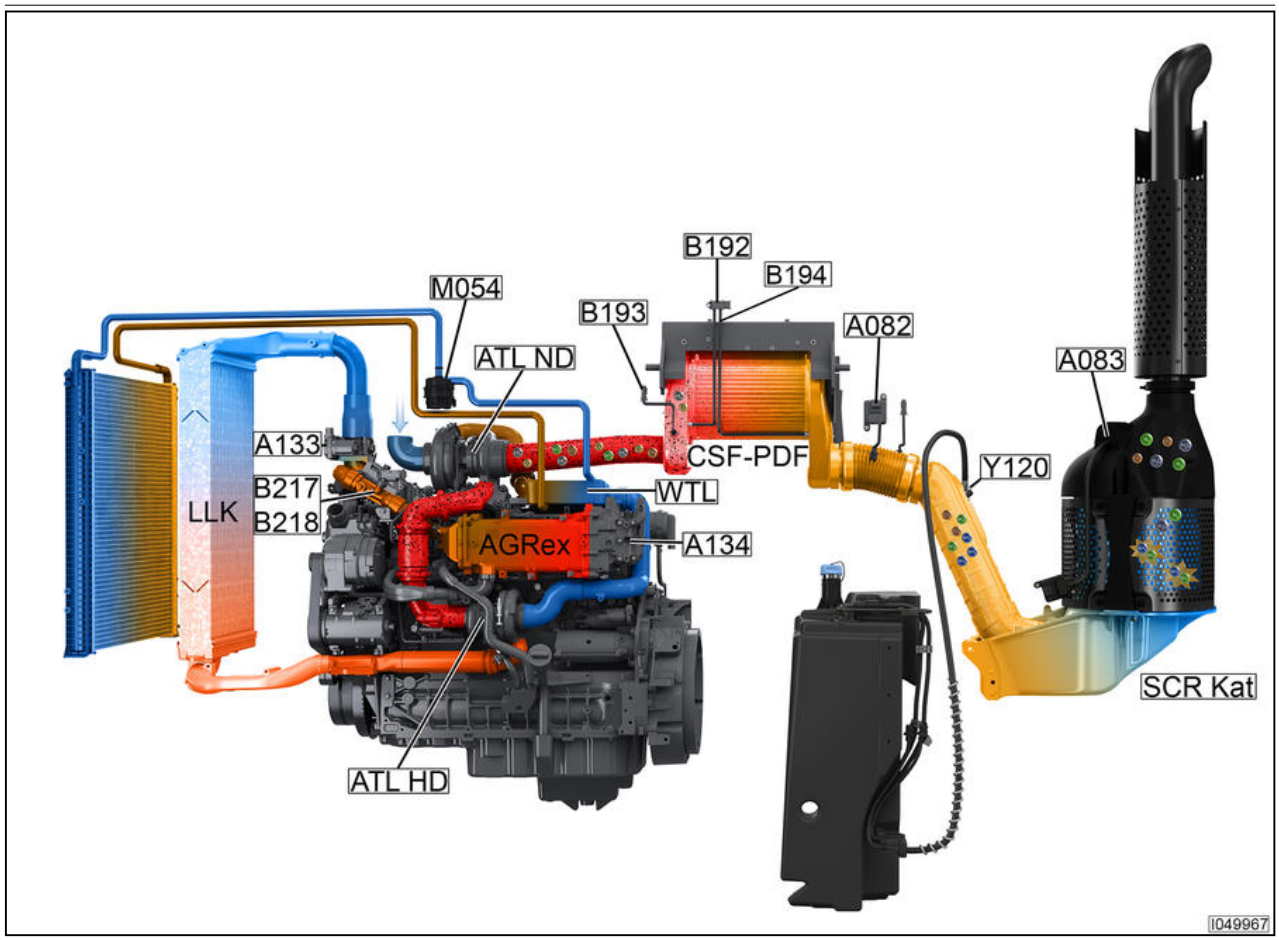



*Fig. 7 Deutz TTCD 6.1, charge air and exhaust gas after-treatment*

**A082** nitrogen oxide NOx sensor 1, upstream of SCR
**A083** nitrogen oxide NOx sensor 2, downstream of SCR
**A133** - air intake throttle ECU
**A134** - exhaust gas recirculation ECU
**B192** CSF differential pressure sensor
**AGRex** External exhaust gas recirculation
**ATL HD** High-pressure exhaust gas turbocharger
**ATL ND** Low-pressure exhaust gas turbocharger
**B193** - exhaust temperature upstream of CSF sensor
**B217** - temperature downstream of venturi sensor
**B218** - venturi differential pressure sensor
**CSF-PDF** CSF diesel particulate filter
**LLK** Intercooler
**M054** - cooling water pump
**SCR cat** SCR catalytic converter
**WTL** Water-cooled intercooler
**Y120** AdBlue metering valve

| Exhaust after-treatment | |
|---|---|
| **Item** | **Function** |
| Two-stage<br>Charging | **Two-stage charging (ATL ND and ATL HD) for optimizing combustion**<br>Two-stage intake boosting involves two turbochargers of different sizes connected in series with a bypass control (wastegate) and two intercoolers. The first turbocharger (ATL ND) is designed to be the low-pressure turbocharger, the second turbocharger (ATL HD) is designed to be the high-pressure turbocharger. First, the fresh air is pressurized in the low-pressure stage. This involves the relatively small high-pressure compressor operating at a higher pressure level with a low volume flow so that it can deliver the required air mass flow.<br>Two-stage charging can achieve a particularly good level of compressor efficiency. At low engine speeds, the wastegate valve (A136) is closed so that both turbochargers operate. This results in a very fast and high build-up of boost pressure. If the engine speed increases, the wastegate valve opens until only the low-pressure compressor is still operating. The charging then seamlessly adjusts to meet the engine requirements. |
| AGRex | **A134 AGRex exhaust gas recirculation for reducing NOx**<br>At low engine power --> no exhaust gas recirculation<br>At high engine power --> exhaust gas recirculation –>reduction in burning speed in the combustion chamber --> low combustion temperature --> reduction in NOx |

| Exhaust after-treatment | |
|---|---|
| **Item** | **Function** |
| DPF-CSF | **CSF diesel particulate filter: Unburned hydrocarbons (HC) are reduced and particles (PM) are filtered from the exhaust gas and burned.**<br><br>CSF particulate filter:<br><br>• Closed particulate filter with ceramic substrate.<br>• Substrate with catalytic coating to reduce the soot combustion temperature.<br>• Monitoring of the CSF particulate filter soot load and ash load through "extrapolation" load model:<br>- A099 - engine control unit and (fuel injection volume, B086 rail pressure)<br>- B192 - differential pressure sensor on CSF particulate filter<br>- B193 - exhaust gas temperature upstream of CSF particulate filter<br>- B105 - exhaust gas temperature upstream of SCR catalytic converter<br>- B191 - exhaust gas pressure upstream of turbocharger<br>- B217/B218 - exhaust gas recirculation<br><br>CSF diesel particulate filter with three regeneration stages:<br><br>1. Continuous, independent soot burn-off from an exhaust gas temperature of approx. 250 °C.<br>2. Support under extreme partial load through automatic "heat mode" (via throttle in suction manifold and combustion parameters)<br>3. Filter regeneration is possible in the workshop using the FENDIAS diagnostics program (Serdia) and/or Vario terminal: "active regeneration at a standstill"<br><br>Active regeneration<br><br>The exhaust gas temperature is raised using the throttle (approx. 550 °C). There is also a later diesel injection into the combustion chamber. Unburned diesel passes into the CSF particulate filter, which causes the soot load in the CSF filter to burn off. The high exhaust gas temperature causes urea deposits in the SCR catalytic converter to break down. The active regeneration can cause some unburned fuel to enter the engine oil (approx. 1 percent per active regeneration). After five active regenerations, the engine oil must be changed.<br><br>**Recommendation:** Perform active regeneration at the 500-hour engine oil change interval before you change the oil.<br><br>Advantage: The CSF filter and SCR catalytic converter are burned clean and the monitoring electronics for the soot load condition in the CSF filter are reset to the starting condition.<br><br>**NOTE:** *The burn-off of soot in the CSF filter results in ashes. If the ash load in the CSF filter rises to 100 percent, the CSF filter must be replaced with a new CSF filter.* |
| SCR cat | **SCR catalytic converter for reducing NOx (nitrogen oxides)**<br><br>• The A099 engine control unit records the fuel injection volume (engine power)<br>• The A082 sensor records the NOx concentration upstream of the catalytic converter<br>• The B194 sensor records the exhaust gas pressure downstream of the DPF<br>• The B105 sensor records the exhaust gas temperature upstream of the catalytic converter<br><br>The A099 engine control unit uses these parameters to calculate the AdBlue dosage. The AdBlue is added to the exhaust gas system by means of the Y120 flow valve. The A083 NOx downstream of catalytic converter sensor is used to monitor the functionality of the catalytic converter |

## 4.2.2 CSF particulate filter (reduction of soot particles)

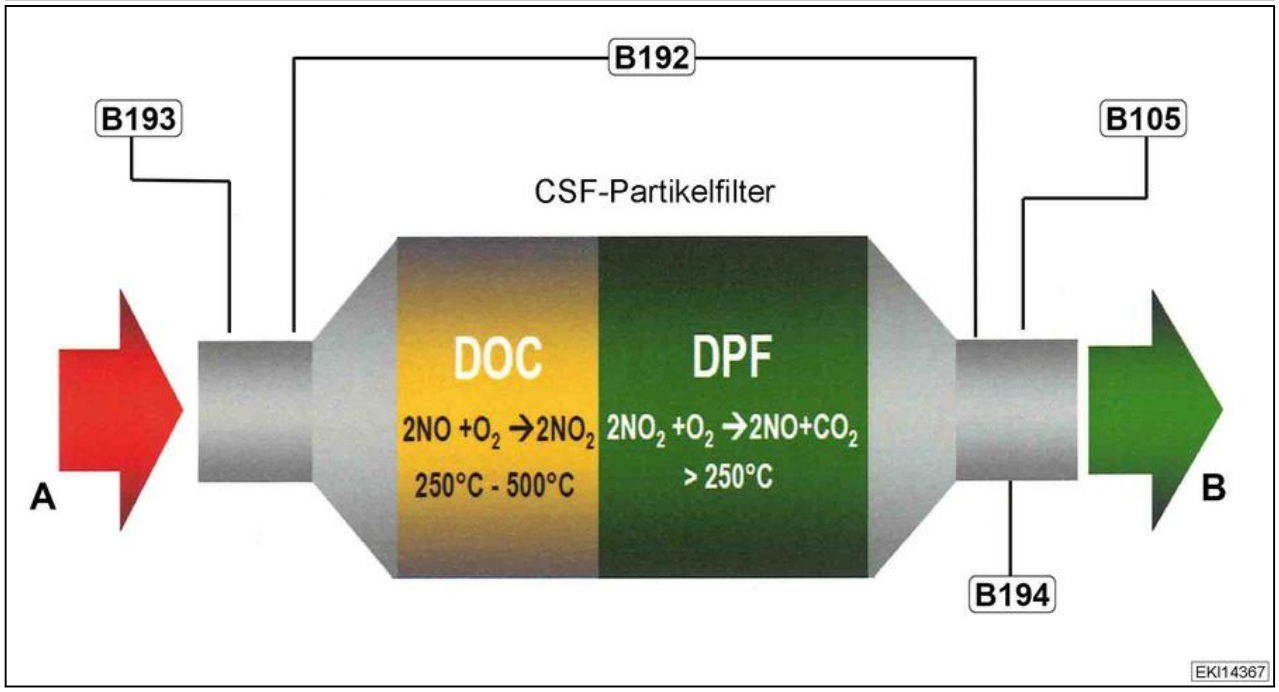



*Fig. 8 CSF (coated soot filter)*

**CSF particulate filter**

The soot deposited in the CSF particulate filter is continuously and independently burned off. This process is known as CRT (continuous regeneration trap). The CRT process is based on the fact that soot with nitrogen dioxide ($NO_2$) can be burned off at exhaust gas temperatures of 300 °C to 400 °C in the diesel particulate filter (DPF). The procedure is reliable at these temperatures if the $NO_2$/soot ratio is greater than 8:1. In order to use this procedure, a diesel oxidation catalyst (DOC) that oxidizes NO to form $NO_2$ is located upstream of the diesel particulate filter (DPF). This means that the conditions for regeneration as per the CRT procedure are generally provided in normal operation. This method is also called passive regeneration, as the soot is burned off without the need to initiate active measures.

At exhaust gas temperatures above 500 °C, the soot burns off independently in the diesel particulate filter (DPF). Adding $NO_2$ through the diesel oxidation catalyst (DOC) is no longer necessary.

For exhaust gas temperatures below 250 °C, the diesel oxidation catalyst (DOC) is not yet able to operate. This means that no $NO_2$ is produced and therefore no soot is burned off in the diesel particulate filter (DPF). In this case, the A134 throttle in the suction manifold is partially closed and the diesel injection is adjusted. As a result, the exhaust gas temperature increases to above 250 °C and the diesel oxidation catalyst can perform its function. This process is known as "heat mode".

If soot is not burned off completely, the soot load in the diesel particulate filter (DPF) increases. An excessive soot load in the diesel particulate filter can be detected by:

- Calculation by the A099 engine control unit in line with the engine load spectrum.
- The B192 sensor, which records the differential pressure at the diesel particulate filter (DPF).

The A099 engine control unit emits a warning message, which is displayed on the A103 terminal. In this case, active filter regeneration must be performed via the A103 terminal. This active filter regeneration is also known as DPF stationary regeneration.

Recommendation: Perform active filter regeneration in the workshop using a dynamometer, as this then ensures that the exhaust gas temperature rises quickly.

### 4.2.3 SCR catalytic converter

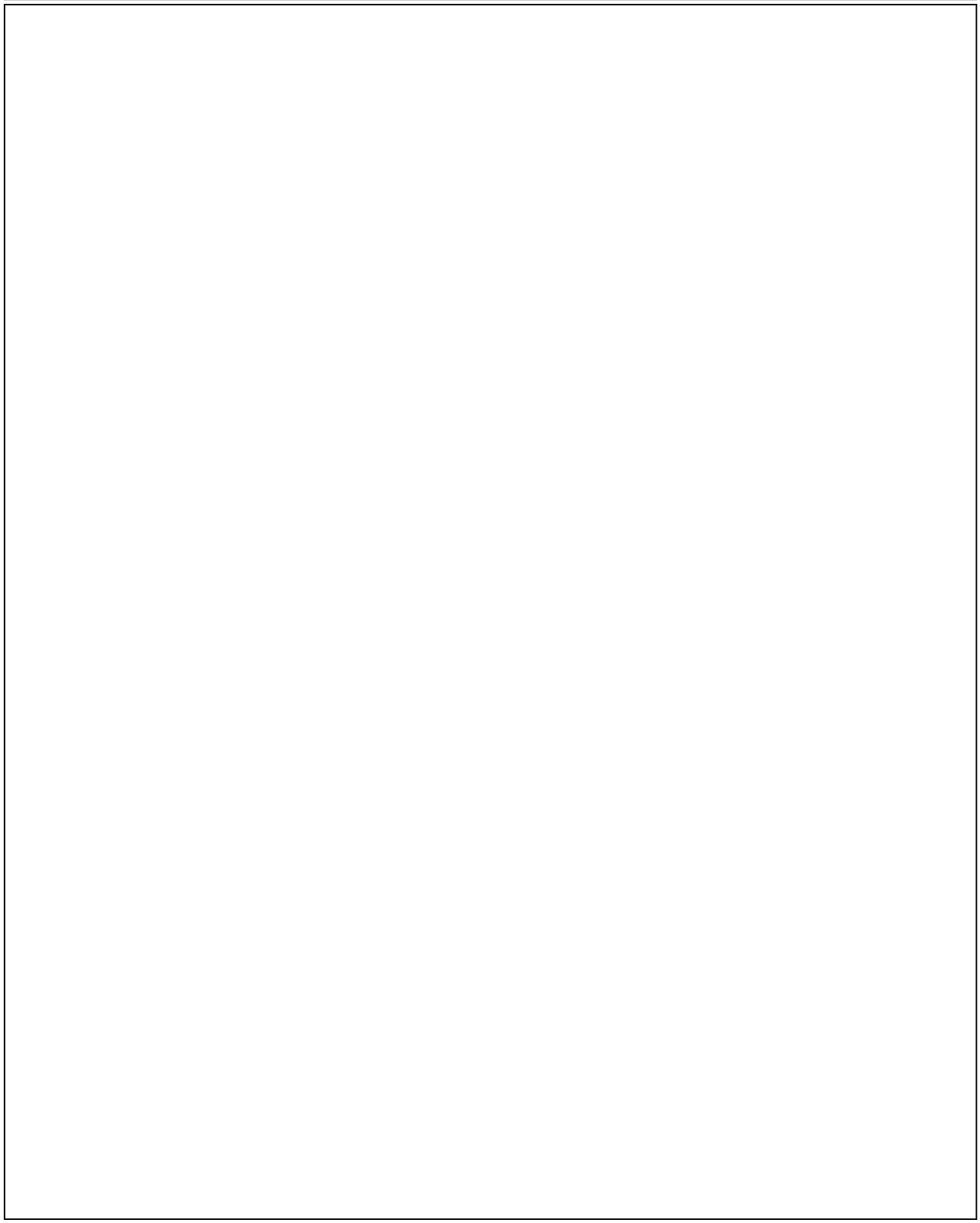


*Fig. 9*

(B) Tank ventilation
(DV) Pressure valve
(H) Tank heater
(HF) Main filter
(P) Pump
(SI) Suction strainer

(SV) Suction valve
(TA) AdBlue tank
(VF) Pre-filter

| Item | Designation | Function |
|---|---|---|
| - | AdBlue® container | • AdBlue supply |
| B102 | AdBlue temperature/level sensor<br>"Level sensor" | • Determines the AdBlue fill level [l]<br>• Determines the AdBlue temperature [°C]<br>• Tank heater (engine coolant)<br>• Tank ventilation with filter<br>• Intake duct with suction strainer<br>• Return line |
| E216 | Tube heater | • Tube heater on suction line (S)<br>• Tube heater on return pipe (R) |
| E217 | Tube heater | • Tube heater on pressure line (p) |
| A084 | AdBlue module "Feed module"<br>(Bosch DNOX 2.2) | • Suction strainer in intake socket (S)<br>• Temperature sensor (determines the AdBlue temperature)<br>• 4/2-directional valve for emptying the system<br>• Speed-regulated membrane pump (feed volume and pressure)<br>• AdBlue main filter (change interval is 500 running hours)<br>• AdBlue main filter heater<br>• Restrictor with non-return valve (9 bar) in return connection (R)<br>• Pressure sensor 9 bar |
| Y120 | AdBlue flow valve<br>Y120 - flow valve is cooled:<br>• AdBlue injection volume<br>• Coolant for diesel engines | • AdBlue dosing amount (using timed energizing)<br>• Injection volumes depend on engine load (36 to 7200 g/h) |
| Y169 | AdBlue tank heater solenoid valve | • Directs coolant to the B102 sensor |

**Operating conditions of the SCR catalytic convertor**

| Conditions | Function | Test |
|---|---|---|
| Fill tank with AdBlue<br>• Europe: DIN 700 70 (AdBlue)<br>• USA: API certified DEF<br>• Japan: JIS K2247<br>AdBlue is not a hazardous material and is assigned to the lowest water hazard class<br>• Deutz designation: Urea<br>• North American designation: DEF (Diesel Exhaust Fluid)<br>• European designation: AdBlue | AdBlue is a non-toxic aqueous urea solution that converts nitrogen oxides (NOx) in the emissions to non-hazardous nitrogen ($N_2$) and water ($H_2O$).<br>To complete the chemical reaction, a catalytic converter temperature of approx. 250 °C is required.<br>The nitrogen oxide (NOx) is reduced by approx. 85% in the catalytic converter. | AdBlue quality can be tested using refractometer X899.980.338.000.<br>32.5% urea<br>67.5% demineralized water |
| **Outside temperature below -2 °C**<br>B076 - sensor (F800/900) | **AdBlue filter heater switches on:**<br>A084 - AdBlue module | |
| **Outside temperature below 0 °C**<br>B076 - sensor (F800/900) | **Tube heater switches on:**<br>E216 - AdBlue suction line heater<br>E216 - AdBlue return pipe heater<br>E217 - AdBlue pressure line heater | |
| **Outside temperature above 0 °C**<br>B076 - sensor (F800/900) | **AdBlue filter heater switches off**:<br>A084 - AdBlue module | |
| **Outside temperature above 5 °C**<br>B076 - sensor (F800/900) | **Tube heater switches off:**<br>E216 - AdBlue suction line heater<br>E216 - AdBlue return pipe heater<br>E217 - AdBlue pressure line heater | |
| **Coolant temperature above 65 °C**<br>B089 - sensor<br>and<br>**Calculated catalytic converter temperature above 150 °C**<br>B236 sensor | The **A082 NOx sensor upstream of the catalytic converter** is preheated for approx. 120 seconds and starts detecting NOx values [ppm].<br>The **A083 NOx sensor downstream of the catalytic converter** is preheated for approx. 120 seconds and starts detecting NOx values [ppm]. | FENDIAS- Diagnostics<br>SERDIA Engine diagnostics:<br>SCR overview |

| Conditions | Function | Test |
|---|---|---|
| **Calculated catalytic converter temperature above 200 °C**<br>B236 sensor | **The diaphragm pump in the A084 AdBlue module (feed module) is speed-regulated.**<br>Pressure in the A084 AdBlue module builds up to approx. 9 bar.<br>System is now ready for dispensing | FENDIAS- Diagnostics<br>SERDIA Engine diagnostics:<br>SCR overview |
| **AdBlue temperature in tank above -5 °C**<br>B102 - "level sensor"<br>**If the outside temperature is below 0 °C**<br>B076 - sensor (F800/900)<br>the<br>**heating progress of the AdBlue™ lines must be OK.**<br>E216, E217 - tube heating<br>A084 - AdBlue filter heater<br>**Calculated catalytic converter temperature between 250 °C and 700 °C**<br>B236 sensor<br>**Coolant temperature below approx. 65 °C**<br>B089 - sensor<br>**=>**<br>**A082 NOx sensor upstream of the catalytic converter** not yet detecting NOx values<br>**A083 NOx sensor downstream of the catalytic converter** not yet detecting NOx values<br>**A099 engine control unit (F800/900) detects:**<br>• The engine load (calculated)<br>• The catalytic converter temperature (calculated)<br>Using these values, the A099 engine control unit calculates the optimal AdBlue injection volume. | The A099 engine control unit is then controlled by a mapping field when regulating<br>• **AdBlue pressure**<br>• **AdBlue flow rate**<br>(adjustable speed of diaphragm pump — A084 AdBlue module)<br>• **AdBlue injection volume**<br>(timed energizing of Y120 flow valve) | FENDIAS- Diagnostics<br>SERDIA engine diagnostics<br>SCR overview |

| Conditions | Function | Test |
|---|---|---|
| **AdBlue temperature in tank above -5 °C**<br>B102 fill level sensor<br>**If the outside temperature is below 0 °C**<br>B076 - sensor (F800/900)<br>the<br>**heating progress of the AdBlue™ lines must be OK**<br>E216, E217 - tube heating<br>A084 - AdBlue filter heater<br>**Calculated catalytic converter temperature between 250 °C and 700 °C**<br>B236 sensor<br>**Coolant temperature above approx. 65 °C**<br>B089 - sensor<br>**=>**<br>**A082 - sensor NOx upstream of catalytic converter**<br>determines NOx value in exhaust gas<br>**A083 - sensor NOx downstream of catalytic converter**<br>determines NOx value in cleaned exhaust gas<br>**A099 engine control unit (F800/900) detects:**<br>• The engine load (calculated)<br>• The catalytic converter temperature (calculated)<br>• The proportion of NOx in exhaust gas upstream of the catalytic converter<br>• The proportion of NOx in exhaust gas downstream of the catalytic converter<br>Using these values, the A099 engine control unit calculates the optimal AdBlue injection volume. | The A099 engine control unit is then controlled by a mapping field when regulating, depending on NOx value (A082 and A083)<br>• **AdBlue pressure**<br>• **AdBlue flow rate**<br>(adjustable speed of diaphragm pump — A084 AdBlue module)<br>• **AdBlue injection volume**<br>(timed energizing of Y120 flow valve) | FENDIAS- Diagnostics<br>SERDIA Engine diagnostics:<br>SCR overview |

**General information on AdBlue crystallization**

The formation of deposits in the SCR catalytic converter is a complex mechanism involving the deposit and decomposition of urea and its secondary products. The deposits should reach a balanced state that does not impair the function of the SCR system. Deposits become critical if they have a crucial effect on the

flow and distribution of the AdBlue spray. This may cause the SCR system to tip over, which in turn will cause a considerable amount of deposits to form. The deposits can be removed at temperatures of approx. 350 °C and above.

The decrystallization function helps to reduce the amount of deposits in the catalytic converter.

# 5. Vario transmission

# 5.1 Function

## 5.1.1 Transmission control system functional sequence

### Transmission type ML180

M Marschall, designer of this development
L Power splitting, mechanical and hydrostatic power transmission
180 Size of continuously variable transmission

### ML180 transmission

The ML180 is a continuously variable transmission for forwards and reverse travel. Power transmission can be hydrostatic or mechanical, or hydrostatic and mechanical. The following always applies:

- Slow forward travel: high hydrostatic transmission power/low mechanical transmission power
- Fast forward travel: low hydrostatic transmission power/high mechanical transmission power

For a detailed explanation, see transmission function plan

### Hydrostatic power splitting

The ML transmission unit is flexibly mounted in the transmission housing. The transmission housing is also the oil reservoir for the hydrostatic drive.

Oil filling: Fendt Extra Trans 10W-40 or STOU oil, viscosity SAE 10W-40 or 15W-40

First filling: approx. 58 l

Refilling: approx. 47 l (when changing oil)

For the functional sequence, see the Transmission gearbox hydraulic circuit diagram

The servo pump draws in oil through the suction filter. The temperature sensor (B009) monitors the temperature of the transmission oil. Flow through the oil cooler is temperature-dependent. This means that if the transmission oil is cold, little oil flows through the oil cooler, while most flows through the bypass valve. The bypass valve opens when the differential pressure exceeds approx. 3,5 bar. The transmission oil temperature is monitored by the temperature sensor.

The servo pump generates the system pressure for the ML control valves and comfort control valves. The system pressure of approx. 18 bar is restricted by the pressure relief valve and restrictor orifice.

### Two different pressures

1. System pressure for the ML transmission control system and comfort control pressure for the rear PTO clutch, rear PTO shaft control, differential lock and 4WD switchover approx. 18 bar

2. High pressure in ML transmission max. 550 bar + 15 bar

Pressure filter contamination is monitored by a pressure switch (S017) as a function of the transmission oil temperature. Pressure filter contamination is not monitored if the transmission oil temperature is below 50 °C. Two non-return valves (2V1 and 2V2) alternately feed cooled transmission oil into the high-pressure circuit. Hot transmission oil is discharged from the high-pressure circuit via the flushing valve (2V5).

The high pressure circuit comprises:

- Variable displacement pump (2P1)
- Variable displacement motor (2A1)
- Two non-return valves (2V1 and 2V2)
- two pilot-operated pressure relief valves (2V3 and 2V4)
- Flushing valve (2V5)
- Clutch/turbo-clutch pressure relief valve (4V4)
- High-pressure safety valve (4V7)

- Test connection (PH)

The servo cylinders (3A1 and 3A2) on the variable-displacement pump and motor are actuated by two 4/3-directional control valves (3V1 and 3V2). The 4/3-directional control valves are mechanically actuated by the actuator shaft (3Z1). The actuator shaft (3Z1) is rotated as required by the actuator unit (A009), thereby setting the correct quantity of oil to be supplied or consumed. The variable-displacement pump (2P1) and variable-displacement motor (2A1) swivel accordingly.

In the emergency mode switch position, the actuator shaft (3Z1) is actuated manually from the cab. In the emergency mode switch position, the transmission is automatically locked at approx. 30 km/h after the engine has been started.

If the clutch pedal, hand brake or neutral switch is operated, the high-pressure circuit is depressurised by the two high-pressure limiting valves (2V3 and 2V4).

The clutch and turbo-clutch function is controlled by the pressure relief valve (4V4).

**NOTE:** *Filling the ML180 transmission with oil*
*During normal maintenance work, e.g. for a transmission oil change, the transmission oil should be added as in a normal mechanical gear transmission. If there is no oil in the high-pressure circuit, the transmission must be filled from an external pressurized filling unit. During filling, the transmission oil is additionally filtered through connection PU (measuring point M5). If the oil pressure filling is not performed, the variable-displacement pump (2P1) and variable-displacement motor (2A1) may become damaged as a result of dry running.*

**Electrical/electronic control**

The CAN BUS is a data line and connects various components (also called users) with each other. If a large quantity of data is to be transmitted, the voltage in the CAN bus (positive and negative cable) increases.

In the FENDT 800 Vario, data is transmitted via 4 CAN buses.

- **G BUS** - transmission BUS
- **K BUS** - comfort BUS
- **V BUS** - valve BUS
- **ISO BUS** - For attaching ISO implements

The voltage level can be checked at the CAN bus sockets. The actuator unit (A009) controls the actuator shaft, thereby changing the transmission ratio in the ML transmission. The actuator unit (A009) comprises:

1. Drive for emergency mode (required in case of failure of the electronic control system)
2. Clutch for the drive
3. Increment sensor: position sensor with digital resolution emitting 8000 pulses per revolution
4. Transmission i = 192:1 (electric motor to actuator shaft)
5. 12 $V_{DC}$ electric motor; 0.4 A to 7 A; actuator unit (A009) no-load speed of 4500 rpm
6. Slip clutch 2,5 Nm to 3,5 Nm, less than 5 Nm at socket wrench of the emergency actuation.

When ignition is switched on, the actuator unit (A009) searches for the reference point (approx. neutral point between forward and reverse travel) When the engine has started, the actuator unit (A009) locates the reference point (precise neutral point between forward and reverse travel)

**Load limit control** (restricting the reduction in engine speed or adaptation to the engine speed)

The engine speed is reduced when a load is applied. The electronics change the transmission ratio towards slow so that the engine speed does not drop too far. Load limit control is always enabled once the engine is started. However, the reduction in engine speed can be adjusted from 0 to 30 percent (see operator's manual). The default setting for load limit control is 14%

The electronics detect the setpoint engine speed from the position of the throttle pedal by means of the analogue position sensor (potentiometer) on the pedal.

**Control, setpoint transmission ratio has been reached.**

The tractor is placed under load and the engine speed drops. The load limit control only ever changes the transmission ratio towards slow.

The load limit control is enabled by:

Reduction in engine speed of over 180 rpm + set value.

| Example: | |
|---|---|
| Engine speed according to throttle pedal position | 2000 rpm |
| Load limit control setting 10% = | 200 rpm |
| 2000 rpm - 180 rpm = 200 rpm = | 1620 rpm |

This means that the load limit control changes the transmission ratio towards "slow" from a speed of 1620 rpm. Theoretically, the load limit control will adjust the transmission ratio whilst under load until the road speed reaches zero.

**NOTE:**
*Since the load limit control only changes the transmission ratio towards slow, it is beneficial to switch on cruise control. If the engine speed rises again with cruise control switched on, the transmission ratio is restored to the maximum stored speed. Control using the load limit control + cruise control can be dampened or accelerated using the accelerator ramp switch on the joystick.*

**Sensors**

- Crankshaft speed sensor (B088) and camshaft speed sensor (B085) measure the engine speed and report it to the engine control unit. This is transmitted to the A050 basic control unit via the G bus.
- The Hall sensor collecting shaft (B014) and bevel pinion (B015) measure rotational speed and detects the direction of rotation.
- High-pressure sensor (B008) transmits the current oil pressure in the high-pressure circuit to the electronic system.
- Clutch pedal sensor (B017) electronically monitors clutch pedal travel. Before the clutch is engaged, the transmission ratio is reduced. Starting up in travel speed range I approx. 5 km/h, starting up in travel speed range II approx. 10 km/h.
- Travel speed range detection sensor (B016) electronically monitors range control travel.
- Temperature sensor (B009) monitors the temperature of the transmission oil. Temperatures above 110 °C are logged with a fault code.
- Rotary position sensor (B055) electronically monitors the pedal travel of the throttle pedal.
- Transmission neutral/turbo-clutch solenoid valve (Y004) controls the turbo-clutch function. The high-pressure valves open depending on the engine speed.
- Speed governor solenoid valve (Y005) cancels the speed restriction to approx. 30 km/h when the electronics are operational. Speed governing is cancelled if 800mA ± 50 mA is applied to the solenoid.
- The filter contamination pressure switch (S017) monitors clogging of the pressure filter on the ML transmission.
- Hand brake switch: When the hand brake is applied, the two high-pressure valves open. The two F/R lamps flash. The transmission is switched to neutral.
- The joystick is in the multifunction armrest.

## 5.1.2 Transmission function diagram

**Planet gear diagram**

(A) Planetary carrier (driven from the engine)
(B) Ring gear (drive to pump)
(C) Planet gear
(D) Sun gear (drive to collecting shaft)

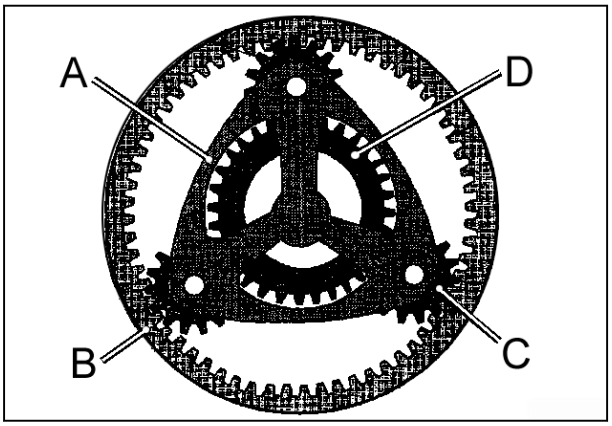



*Fig. 1*

**Transmission diagram**

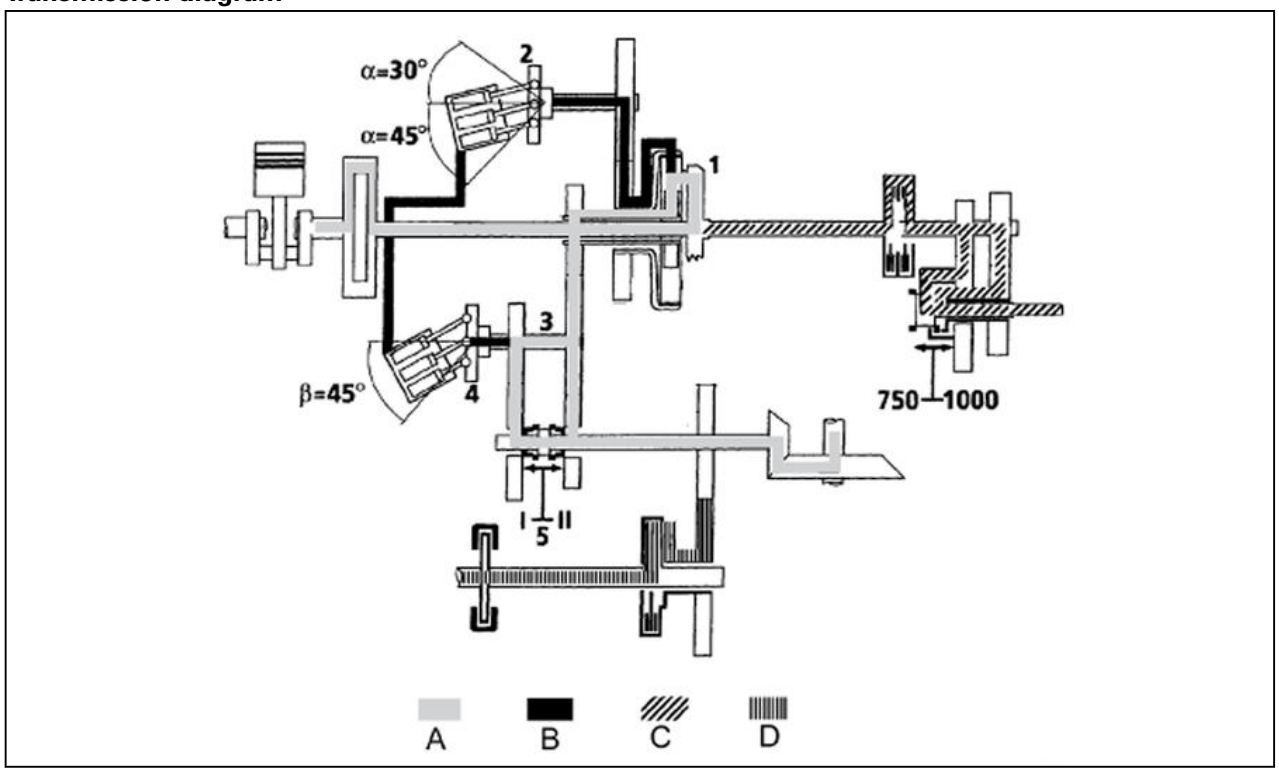



*Fig. 2*

(A) Mechanical power flow
(B) Hydrostatic power flow
(C) PTO drive
(D) 4WD
(1) Planet gear
(2) Hydrostatic pump
(3) Collecting shaft
(4) Hydrostatic motor
(5)5 Range control

**Operating status: Active standstill**

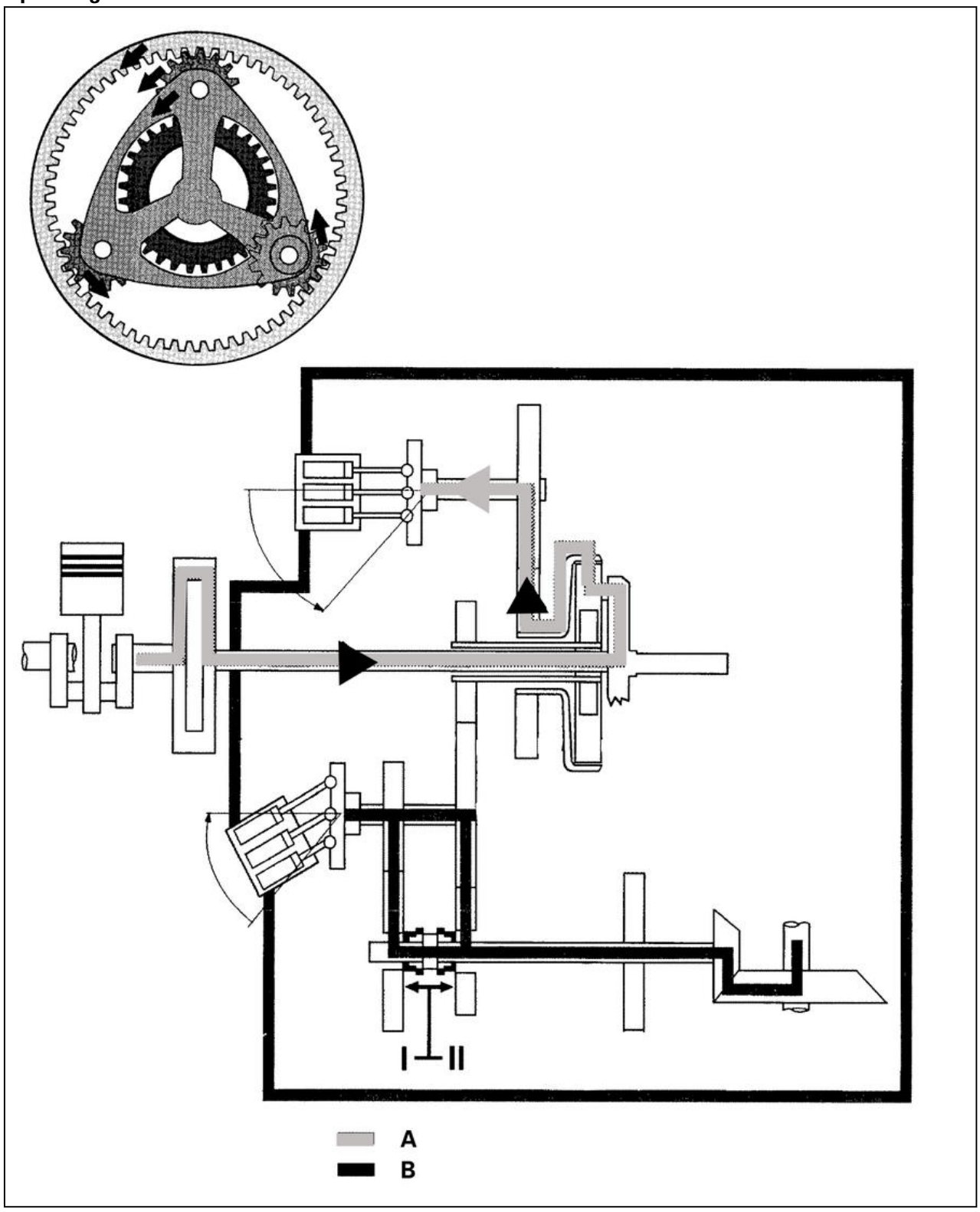



*Fig. 3*

**Engine running, tractor stationary**

(A) Mechanical power flow

(B) Hydrostatic power flow

**Operating status: Start off**

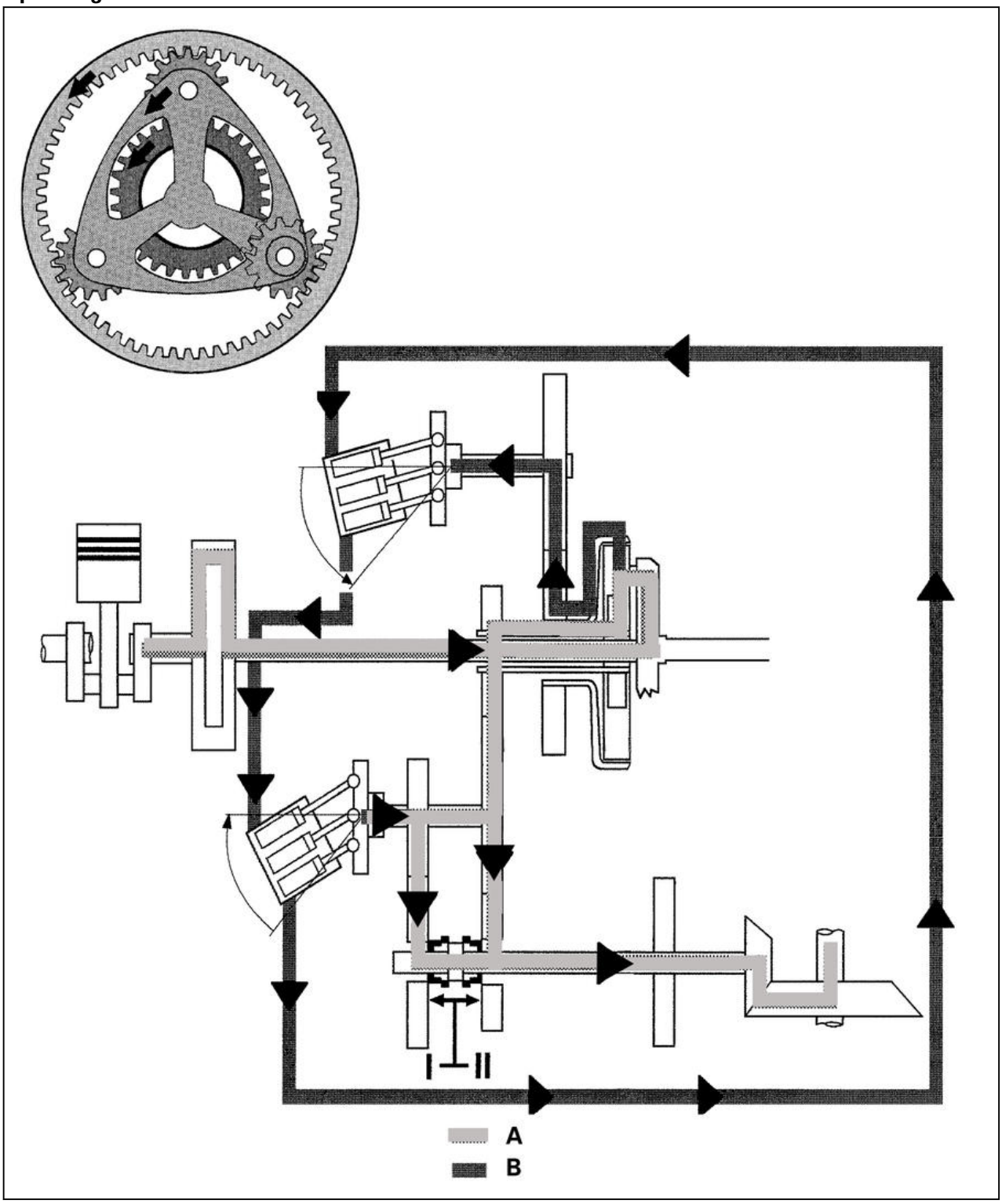



*Fig. 4*

**Power transmission:** 1% mechanical and 99% hydrostatic

(A) Mechanical power flow

(B) Hydrostatic power flow

**Operating status: Driving at average speed**

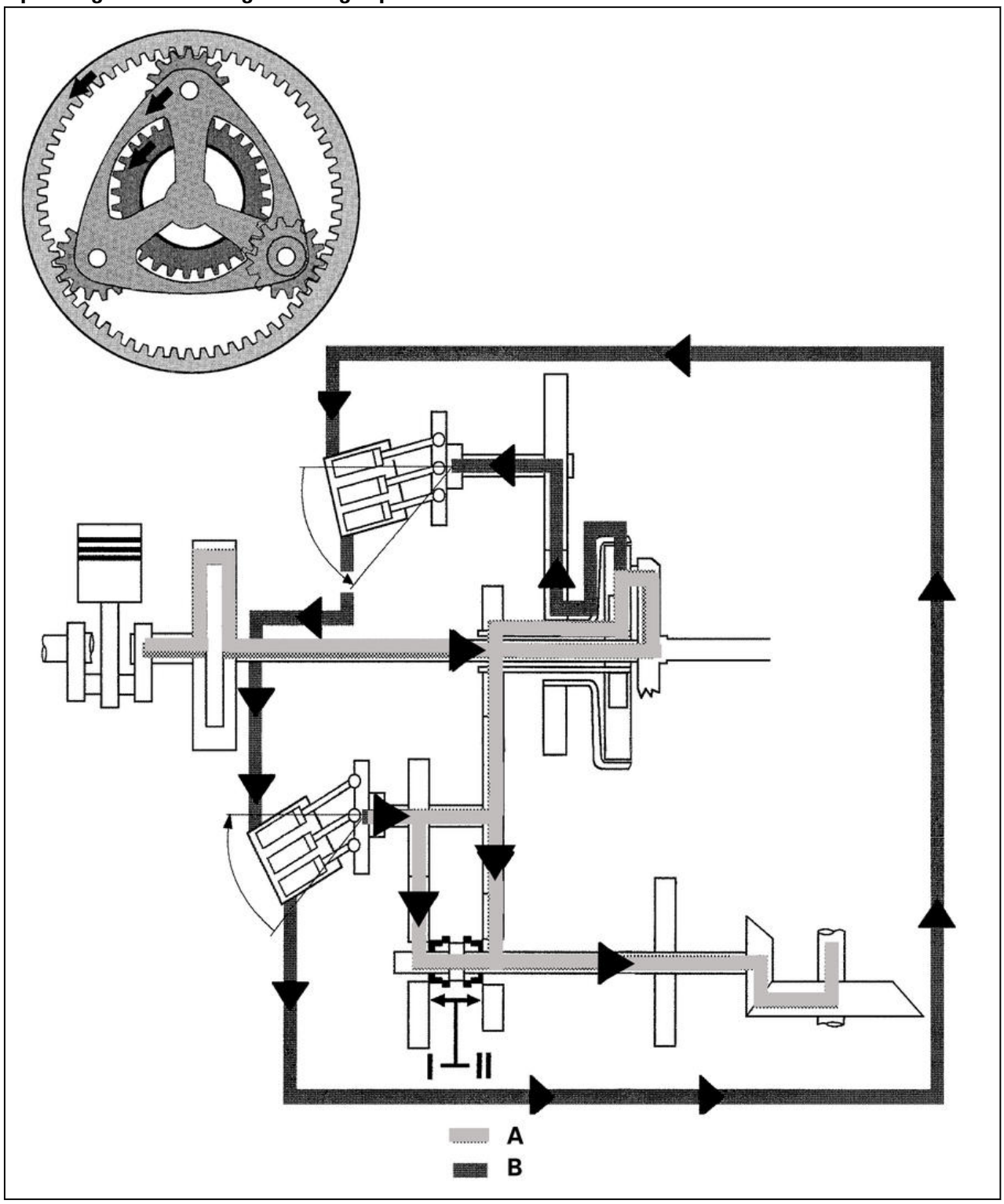



*Fig. 5*

**Power transmission:** 50% mechanical and 50% hydrostatic

(A) Mechanical power flow

(B) Hydrostatic power flow

**Operating status: Transport**

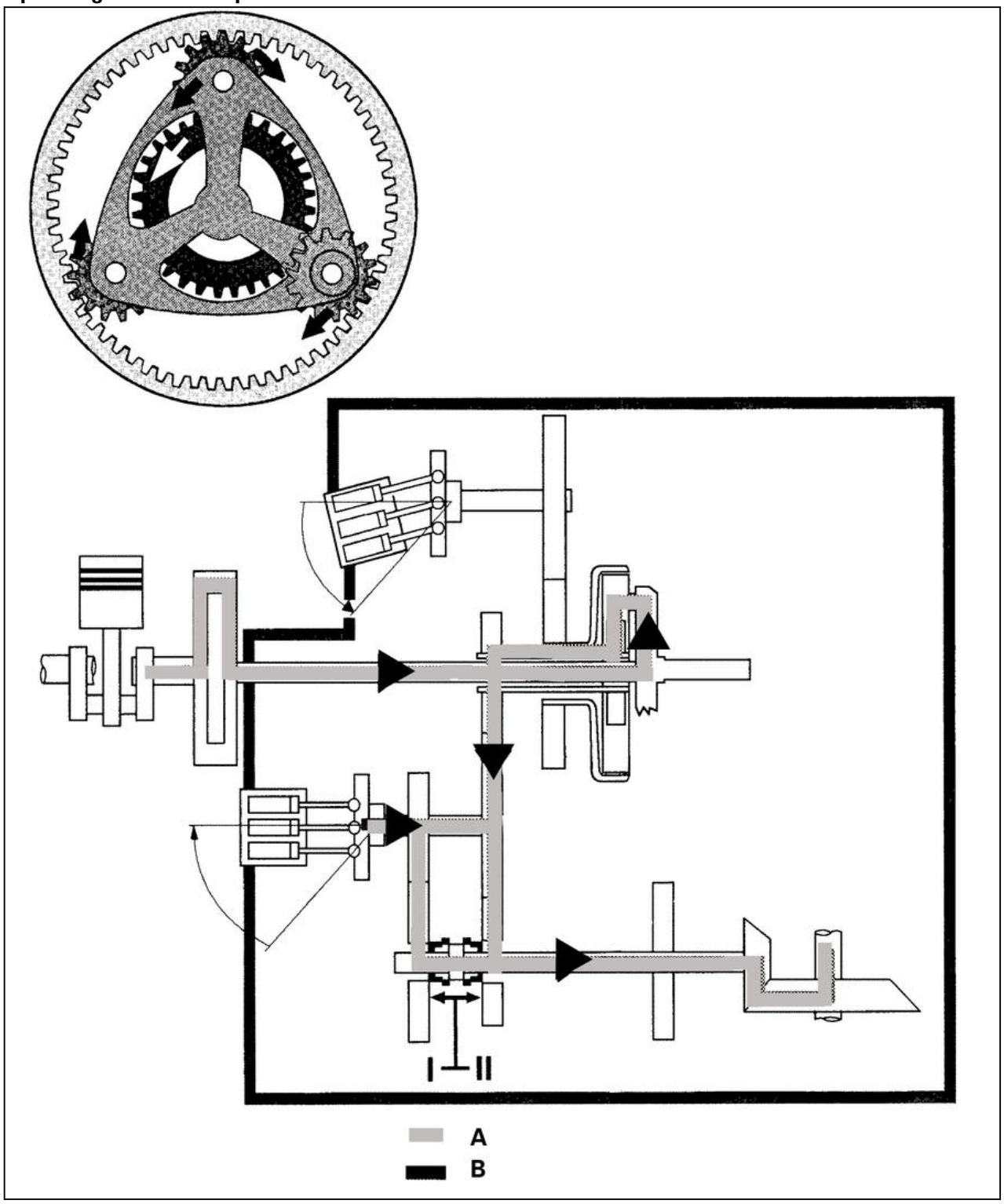



*Fig. 6*

**Power transmission:** Hydro motor 0° swung out, thus 100% mechanical

(Speed is dependent on engine speed)

(A) Mechanical power flow

(B) Hydrostatic power flow

**Operating status: Driving in reverse at average speed**

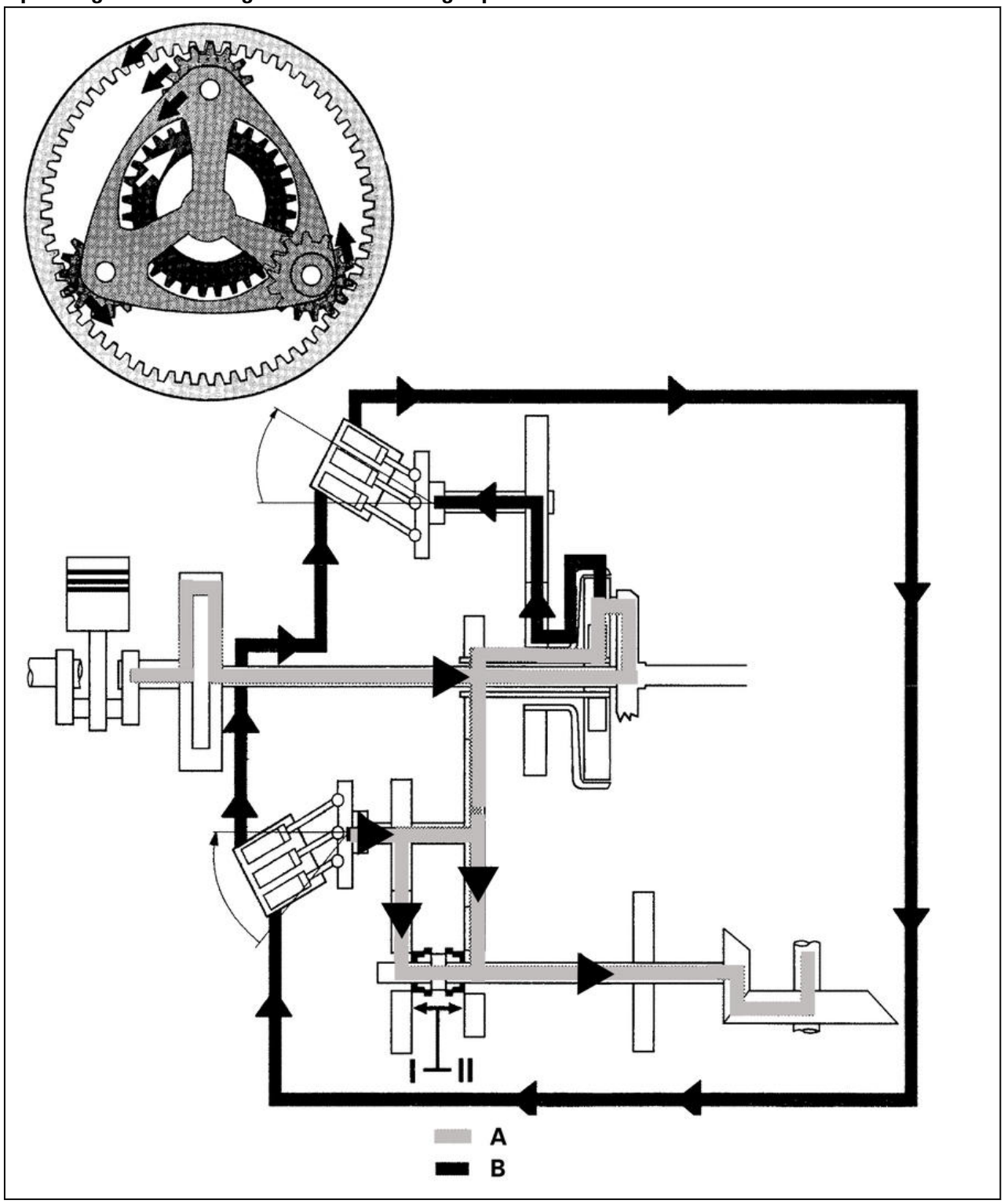



*Fig. 7*

**Power transmission:** 100% hydrostatic

Ring gear rotates faster than the comBUStion engine

(A) Mechanical power flow

(B) Hydrostatic power flow

## 5.1.3 Transmission diagram ML400

**Presentation of transmission diagram: engine running, tractor stationary (active standstill)**

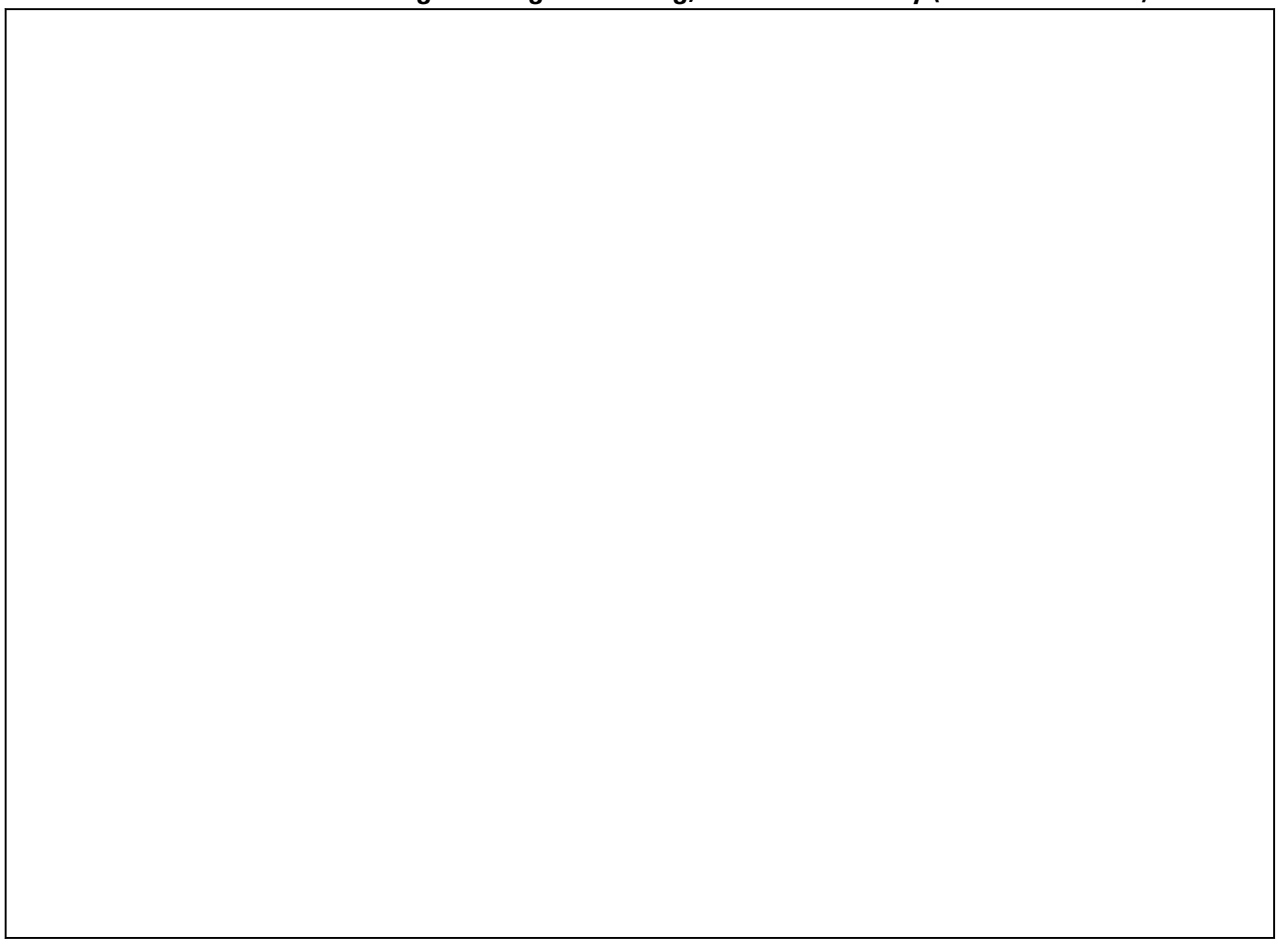


*Fig. 8*

(1) Planet gear
(2) Hydrostatic pump (HP)
(3) Collecting shaft
(4) Hydrostatic motor 1 (HM1)
(5) Hydrostatic motor 2 (HM2)
(6) 4WD clutch (AK)
(7) disc clutch (engagement of HM2)
(8) Towing position to rear axle
(9) Towing position to front axle
(10) Vibration damper (hydrodamp)
(A) Planetary carrier (drive from comBUStion engine)
(B) Planet gear
(C) Ring gear (drive to hydrostatic pump)
(D) Sun gear (drive to collecting shaft)
(HA) Rear axle
(VA) Front axle

**Active stationary**

- Hydrostatic pump HP (2) is swung in and therefore at zero delivery.
- Hydrostatic motor HM1 (4) is swung out to 45°.
- Hydrostatic motor HM2 (5) is swung out to 45°.

# 5.2 Emergency mode

## 5.2.1 Driving in emergency mode

### General

Two types of emergency operation are available:

1. Transmission adjustment via the multiple display (all current series).

2. Mechanical transmission adjustment via the auxiliary lever (from 500 Vario S4 to 1000 Vario S4).

This is possible due to the different transmission control units.

### Transmission control unit

### Slim version, from 200 Vario to 300 Vario S4

This transmission control unit does not permit mechanical transmission adjustment. The transmission adjustment is only possible via the multiple display.

**A074** - Slim actuator unit

Right side of tractor on transmission housing

Remove right rear wheel and panel

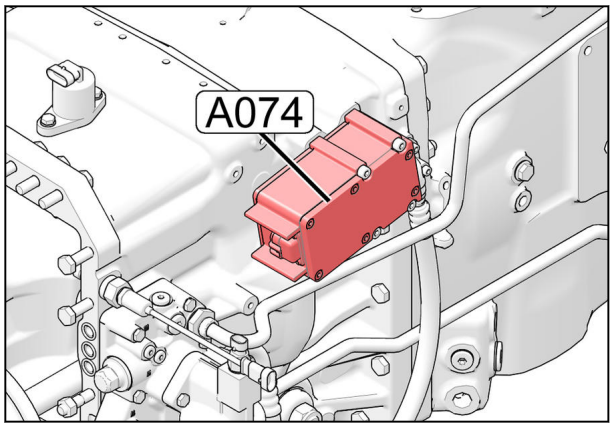



*Fig. 9*

### Normal version, from 500 Vario S4 to 1000 Vario S4

Both types of emergency mode are possible.

A009 - actuator unit

X037 - separation point on actuator unit

On the right side of the transmission

Remove right rear wheel.

Remove metal panel

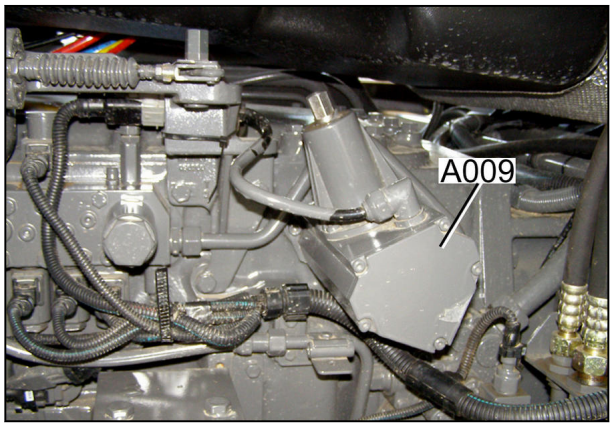



*Fig. 10*

### 1. Transmission adjustment via the multiple display

If the transmission ratio can no longer be adjusted using the electronic system due to actual or indicated faults, the transmission adjustment can be performed electronically via the keypad. If the forward/reverse arrows are no longer displayed on the instrument panel, this indicates a fault in the gear ratio setting. For emergency mode, the power circuit for the transmission must first be activated. Depending on the fault, the transmission ratio can then be adjusted using the keypad.

**Activate clutched traction**

**NOTE:**
*Only one clutched traction can be activated! Neither a change of direction nor a change of speed ratio can be activated.*

**Switch-on conditions**

- Engine is running.
- Emergency mode available; no forward or reverse arrows in the instrument panel.
- Clutch pedal fully depressed.
- No turboclutch valve fault.
- No clutch pedal sensor fault
- No fault in engine speed sensor/bus connection to engine.


Press button. The first main menu level appears on the multiple display.


Press one of the buttons repeatedly until the symbol (A) flashes.

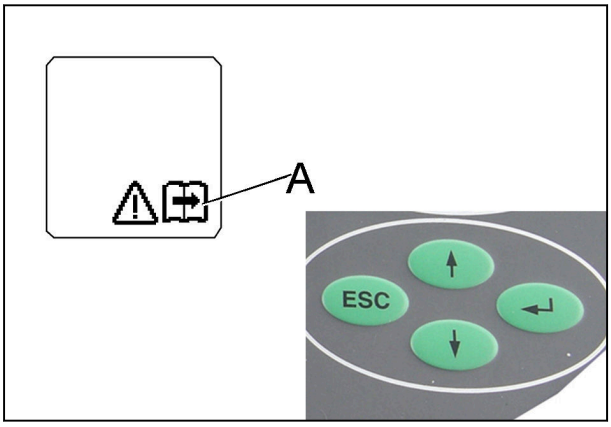
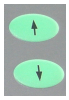


*Fig. 11*


Press button. The second main menu level appears on the multiple display.


Press one of the buttons repeatedly until the symbol (A) flashes.

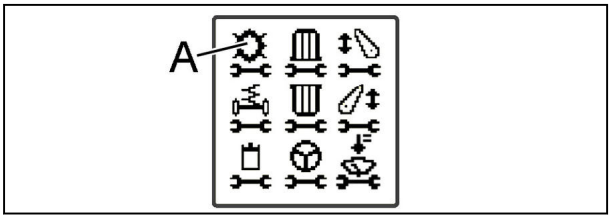
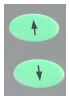


*Fig. 12*


Press button. The image opposite appears on the multiple display.


Press one of the buttons repeatedly until the symbol (A) flashes.

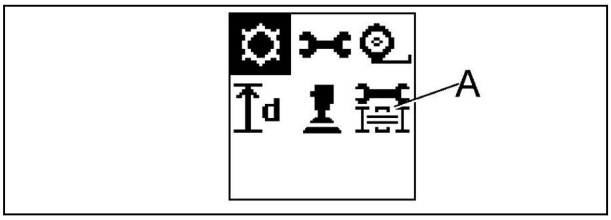


*Fig. 13*

- Depress clutch pedal fully.


Press button.

**Symbol (A) appears:**

- Clutched traction available.

**NOTE:**
*If there is a clutched traction, proceed with "Mechanical selection of gear ratio".*

**Symbol (B) appears:**

- Clutched traction not available.

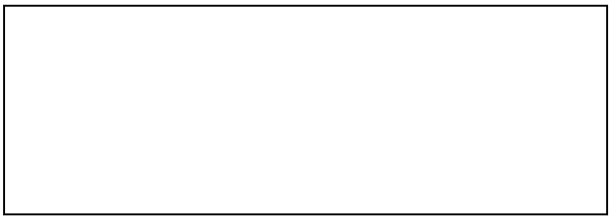


*Fig. 14*

**NOTE:**
*If there is no clutched traction, emergency operation is not possible. Vehicle must be towed.*

**Drive with the arrow buttons (transmission control unit OK)**

**NOTE:**
*The clutch pedal must be engaged carefully, as a gear ratio or a travel direction may be preselected!*

**NOTE:**
*When travelling uphill, do not disengage the clutch! Maximum road speed approx. 10 km/h.*

**NOTE:** *When using emergency operation, travel direction indicators are no longer active.*

In emergency mode, there are two potential options for transmission adjustment. If the transmission adjustment can still be made using the keys on the keypad, the adjacent image is displayed after the emergency mode is activated.

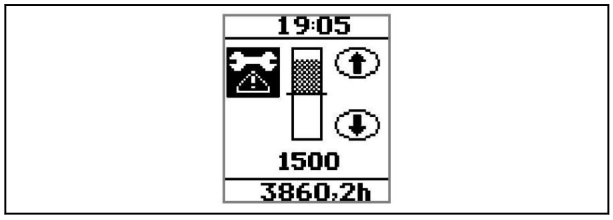



*Fig. 15*

Image(A)appears in emergency mode.

- Frictional connection of the transmission present
- No transmission control unit fault ((04.1.A1) to(04.1.A6)).

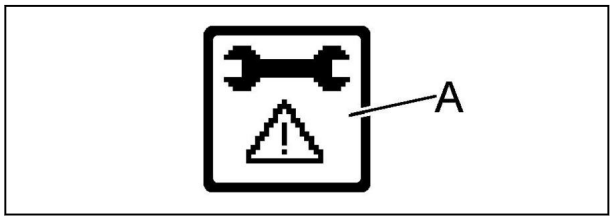



*Fig. 16*


Press key multiple times (confirm error code). The image opposite appears on the multiple display.

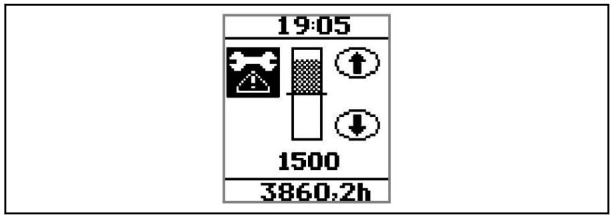



*Fig. 17*

**NOTE:**
*The number (1500 in this example) is used to display the gear ratio. If the transmission ratio is changed by the operator using the arrow keys on the control panel, the value in the display also changes. If 0 is displayed, the transmission is engaged without travel direction — only if*(A) *is not displayed.*

The required transmission ratio is adjusted using the arrow keys. If the clutch is released with the transmission in the neutral position, the tractor is set in motion by actuating the arrow keys.

**NOTE:**
*If the symbol*(A) *is displayed, there is no transmission of power available at the transmission. Power circuit must be activated.*

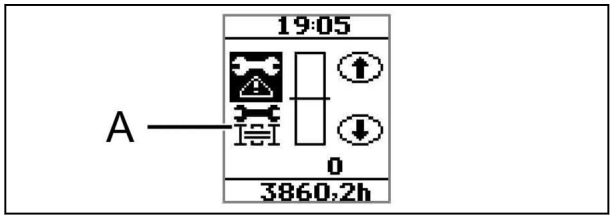



*Fig. 18*

**Exit emergency mode**

- Stop the tractor.
- After switching the ignition OFF, wait approx. 5 seconds.
- Ignition ON, emergency operation is ended.

**2. Mechanical transmission adjustment via the auxiliary lever**

**Access to the auxiliary lever for 500 – 700 Vario S4**

- Remove part of the floormat by pulling it out

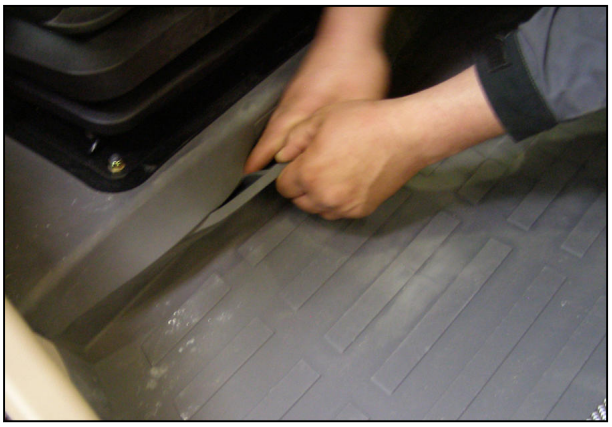


*Fig. 19*

- Use your right hand to hold up the floor mat and at the same time use your left hand to push the floor mat into the corner This allows the floor mat to be pulled out from under the side panel and folded down

*Fig. 20*

- Unscrew bolts (E) and remove cover


*Fig. 21*

**Access to the auxiliary lever for 800 – 1000 Vario S4**

- Partially remove floormat, by pulling the floormat on the right next to the operator's seat out.

*Fig. 22*

- Pull back the floormat until the cover (A) of the emergency operation is exposed.

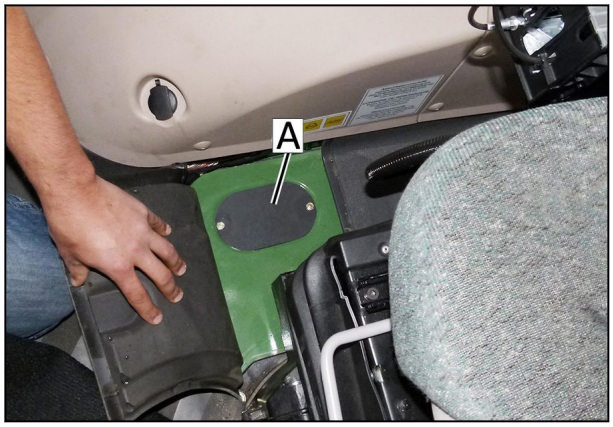



*Fig. 23*

- Unscrew bolts (B) and remove cover.

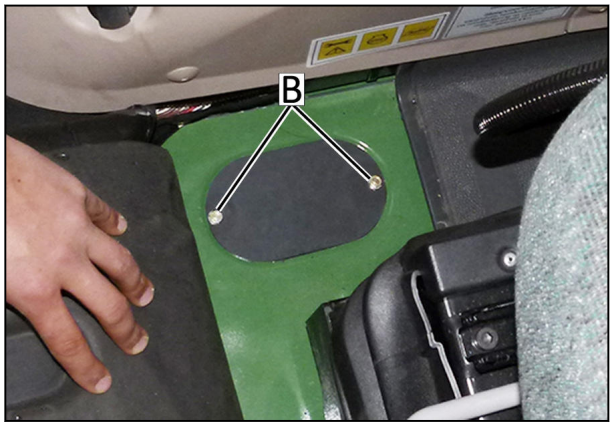



*Fig. 24*

**Drive with auxiliary lever (transmission control unit faulty)**

**NOTE:**
*Do not use the auxiliary lever if the gear ratio can be set electronically (with keypad).*
*When setting the gear ratio, only the auxiliary lever supplied should be used, otherwise the clutch in the transmission control unit may be overtorqued (maximum permissible torque 10 Nm.*

**NOTE:**
*The gear ratio can only be adjusted mechanically if a travel range is set. If no travel range is set, refer to the chapter "Set travel range".*

**NOTE:**
*The clutch pedal must be engaged carefully, as a gear ratio or a travel direction may be preselected!*

**NOTE:**
*When travelling uphill, do not disengage the clutch! Maximum road speed approx. 30 km/h.*

**Switch-on conditions**

- Engine is running.
- Transmission adjustment unit is faulty.
- Emergency mode available (no forward or reverse arrows in the instrument panel).
- Clutch fully depressed.
- No turboclutch valve fault.
- No clutch pedal sensor fault.
- No fault in engine speed sensor/bus connection to engine.

**NOTE:**
*The clutched traction must be activated, see above.*

- Open or remove cover in cab floor.

  **NOTE:**
  *See the chapter "Access to mechanical emergency operation"*
- Attach auxiliary lever (A) to transmission adjustment.

**NOTE:**
*Auxiliary lever is included in the standard delivery and is located in the tool box.*

- Carefully engage clutch pedal.

The tractor starts moving in the last selected travel direction and accelerates up to the selected transmission ratio.

- If the auxiliary lever is pulled to the left when in forward travel, the tractor accelerates. If the auxiliary lever is pulled to the right, the tractor decelerates. The tractor is braked.
- If the auxiliary lever is pulled to the right when in reverse travel, the tractor accelerates. If the auxiliary lever is pulled to the left, the tractor decelerates. The tractor is braked.

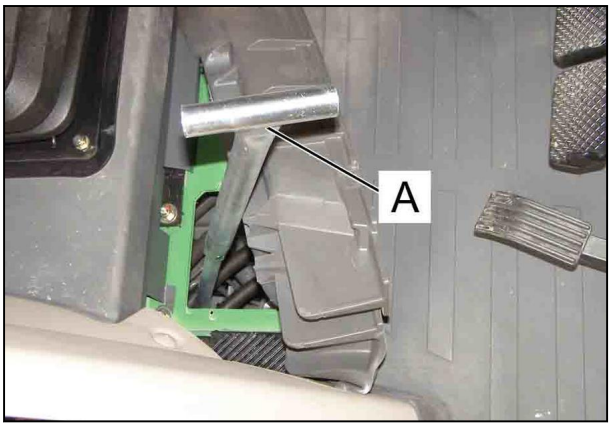


*Fig. 25*

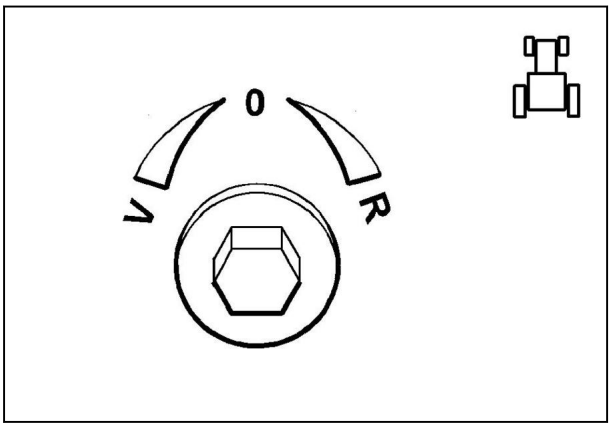


*Fig. 26*

**Exit emergency mode**

- Stop the tractor.
- After switching the ignition OFF, wait approx. 5 seconds.
- Ignition ON, emergency operation is ended.

**Set travel range**

**DANGER: When putting the transmission into the neutral position, there is a danger of the tractor rolling away. Chock the vehicle to prevent it from rolling away.**

**NOTE:**
*In the current series, the travel range selector is only available from 500 Vario S4 to 900 Vario S4.*

**Mechanical travel range selector 500 – 700 Vario S4**

**NOTE:**
*Shown without the left rear wheel for clarity.*

**Selector direction:**

Bottom — travel speed range I (field)

Center — towing position (neutral)

Top — travel speed range II (road)

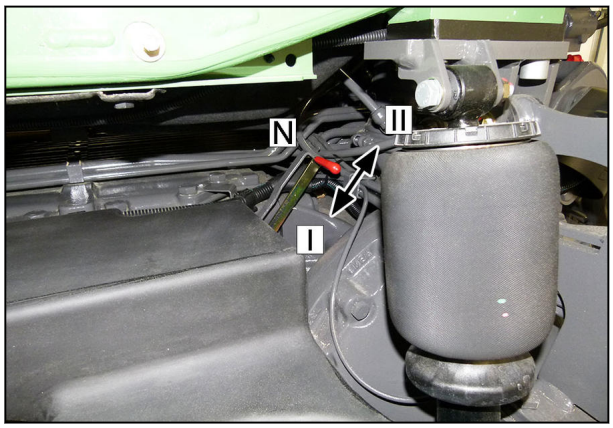



*Fig. 27*

**Mechanical travel range selector 800 – 900 Vario S4**

**NOTE:**
*For greater clarity, this is shown without the right rear wheel and with the linings removed.*

- Attach auxiliary lever to the travel speed range selector.
- Depress the clutch pedal.

**NOTE:**
*An extension can be used as an aid for selecting the operating range.*
*The max. travel speed for any range selection is 2 km/h.*

**Selector direction:**

Right – travel speed range I (field)

Center – neutral position N (neutral)

Left – travel speed range II (road)

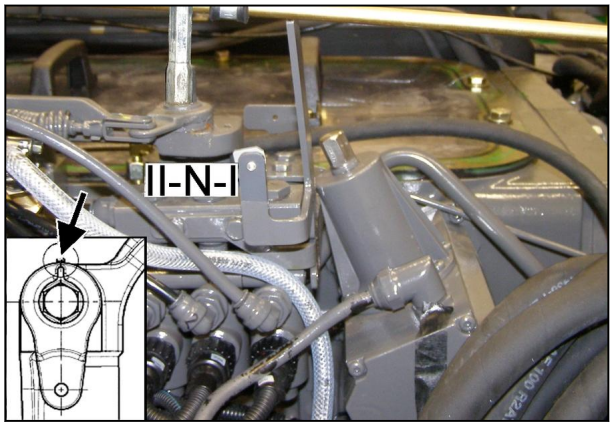



*Fig. 28*

## 5.2.2 Towing

**WARNING:**
**Towing the tractor is not possible or permitted, as this may damage the transmission.**

**WARNING:**
**Towing is only possible once the transmission has been put into the neutral position mechanically. If this is not the case, then towing will cause the transmission to be damaged.**
**Before towing, please make sure that there is sufficient oil in the axles and transmission, particularly if there is visible oil loss!**

**DANGER:**
**Before putting the transmission into the mechanical towing position, secure the vehicle to prevent it from rolling away.**

**NOTE:**
*Maximum speed 10 km/h*
*Maximum distance 8 km*

**Procedure**

- Engine off.
- Apply the parking brake.
- Open the cover in the cab floor, see "Access to the auxiliary lever" (only required from 800 to 900 Vario S4).
- Use the gear selector (from 200 to 700 Vario S4 and 1000 Vario S4) or auxiliary lever (800 and 900 Vario S4) to put the gearbox into the neutral position.
- Turn the ignition to position I. Display for mechanical neutral position appears in the multiple display.

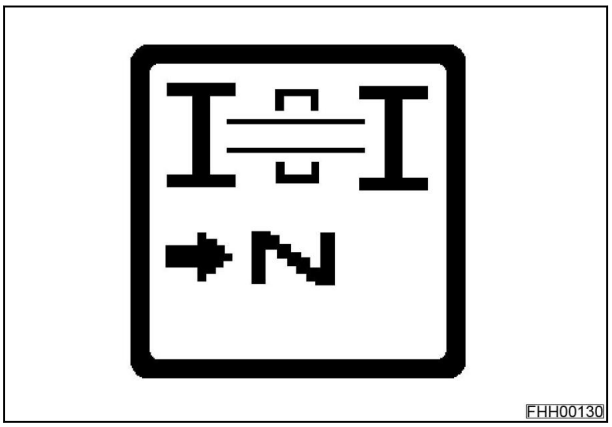



*Fig. 29*

- Use a tow bar to connect the towing vehicle to the tractor. Secure the tractor to prevent it from rolling away.
- Release the parking brake. If it is not possible to release the parking brake, perform an emergency release.
- When parking, secure the vehicle to prevent it from rolling away.

**NOTE:**
*In the current series with two travel ranges (500 – 900 Vario S4), the calibration code 4003 can also be used to put the gearbox into the neutral position. However, the engine must be capable of running. See "Calibration code 4003 (travel range selector)".*

**WARNING:**
**If the engine is not running, the hydraulic braking and steering assistance will not function. When there is no pressure in the compressed air system, the hand brake is locked. This means that when the service brake is operated, there will be no braking effect and greater effort is required for steering, which renders the vehicle uncontrollable. This may result in an accident.**
**Tow the vehicle, if possible, with the engine running. If this is not possible, ensure that the lack of braking effect and the more difficult steering do not pose additional hazards for yourself and other road users. Towing is generally permitted only with use of a tow bar. Use only the specified trailer points on the vehicle for towing. Do not attach any aids such as tow bars, chains or cables to implements, or any aids such as tow chains or cables to or in the cab.**

**NOTE:**
*After towing, use the gear selector or auxiliary lever to return the gearbox to the engaged position.*

**Mechanical neutral position**

**200 Vario V/F/P S3**

Switch the gearbox with the lever.

A Gearbox in neutral

E Gearbox coupled with axle drive

**NOTE:**
*Position of the lever: rear left on the linkage.*

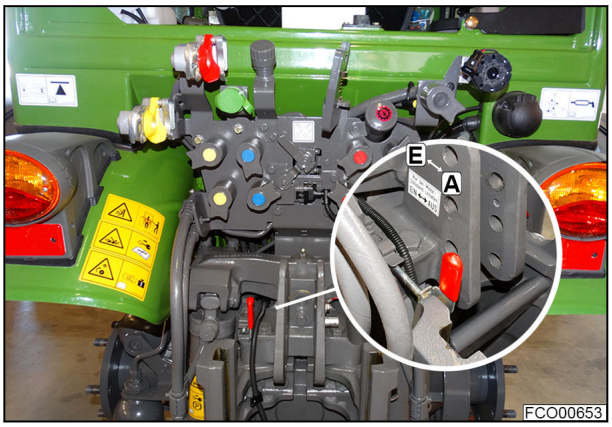



*Fig. 30*

**200 Vario S3 and 300 Vario S4**

Put the transmission in neutral with lever (A).

**NOTE:**
*Position of the lever: rear left under the cab.*

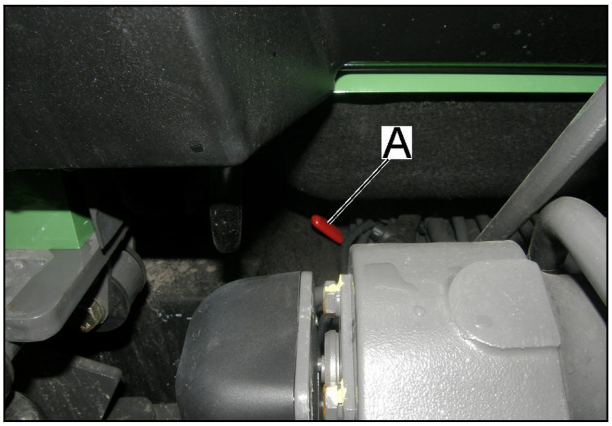



*Fig. 31*

**500 – 700 Vario S4**

Position lever (A) on the left-hand side under the cab to the marking (B) (neutral position of travel range).

**NOTE:**
*Shown without the left rear wheel for clarity.*

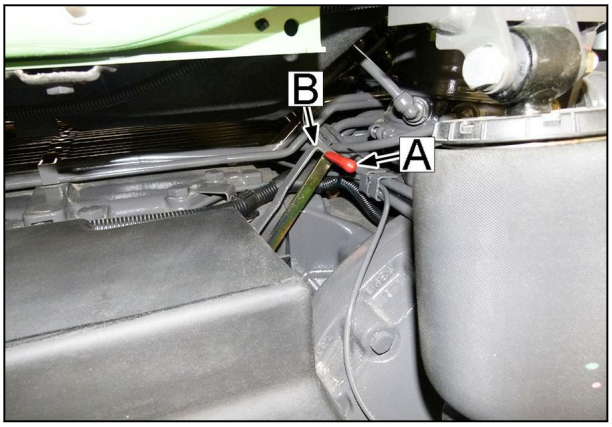



*Fig. 32*

### 800 – 900 Vario S4

Attach auxiliary lever (located in the tool box) on the travel range selector. Shift transmission into neutral (arrowed).

**NOTE:**
*Position of the travel range selector: on the right under the cab. To do this, open the cover in the cab floor.*
*For greater clarity, this is shown without the right rear wheel and with the lining removed.*

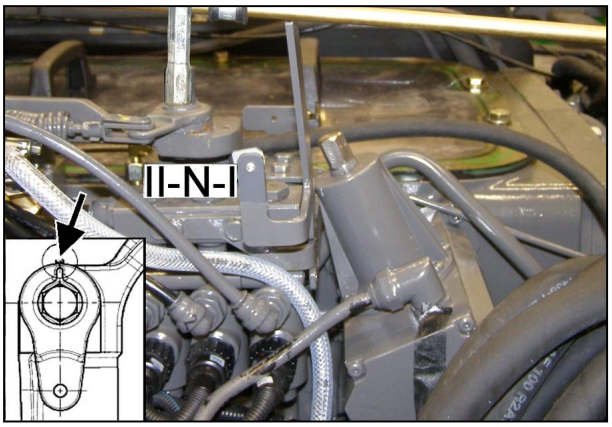



*Fig. 33*

### 1000 Vario S4

Press up the locking plate (B) and thus unlock the neutral position.

Unlock gear lever (A) and pull it backwards until the lever clicks into place.

**NOTE:**
*Position of the lever: rear right under the cab.*

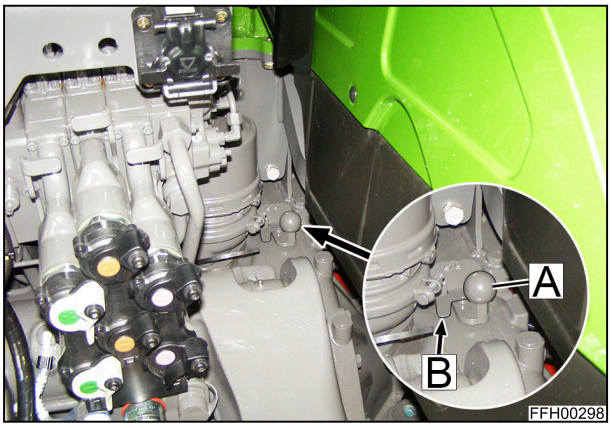



*Fig. 34*

It may happen that the gearbox will not switch into neutral because the switching mechanism is loaded (front axle drive and rear axle drive interlocked against each other). In this case you need to jack up at least one front wheel or create pressure by quickly pumping the auxiliary pump (arrow) at the rear end of the tractor. This opens the 4WD clutch, and the drive train is relieved. Then you should be able to switch into neutral.

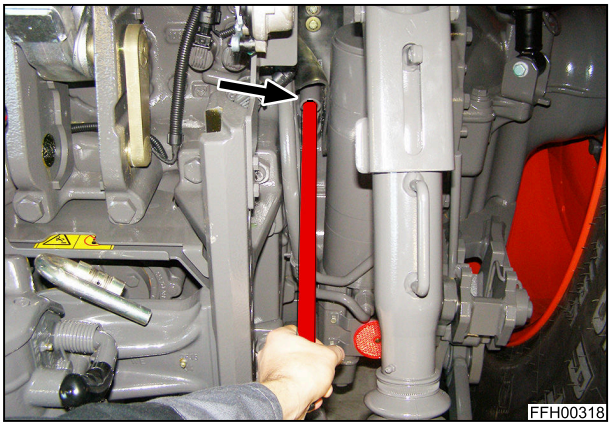



*Fig. 35*

**Layout of towing position for 1000 Vario S4**

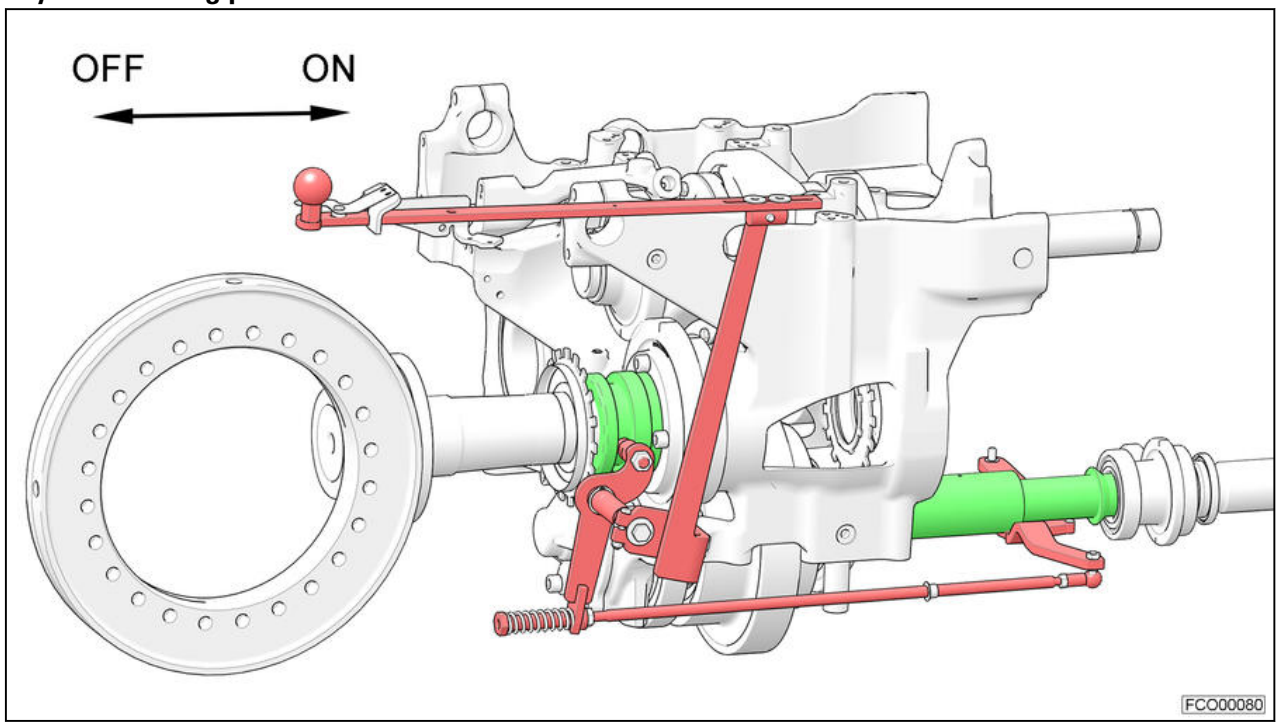



*Fig. 36*

ON Towing position ON

OFF Towing position OFF

# 6. Electrical system/electronics

# 6.1 Procedure

## 6.1.1 Button & switch functionality

The purpose of the buttons & switches are to supply a digital signal to the E-box. By operating the S1 button or switch, it opens or closes so that with S1 open there is a total resistance of 510 ohms and with the S1 closed there is a total resistance of 121 ohms. The E-box (A002/A050) generates a U1 basic signal voltage that is reduced to the U2 voltage by the resistances to earth.

**Measure signal voltage at pin 2 and pin 1**

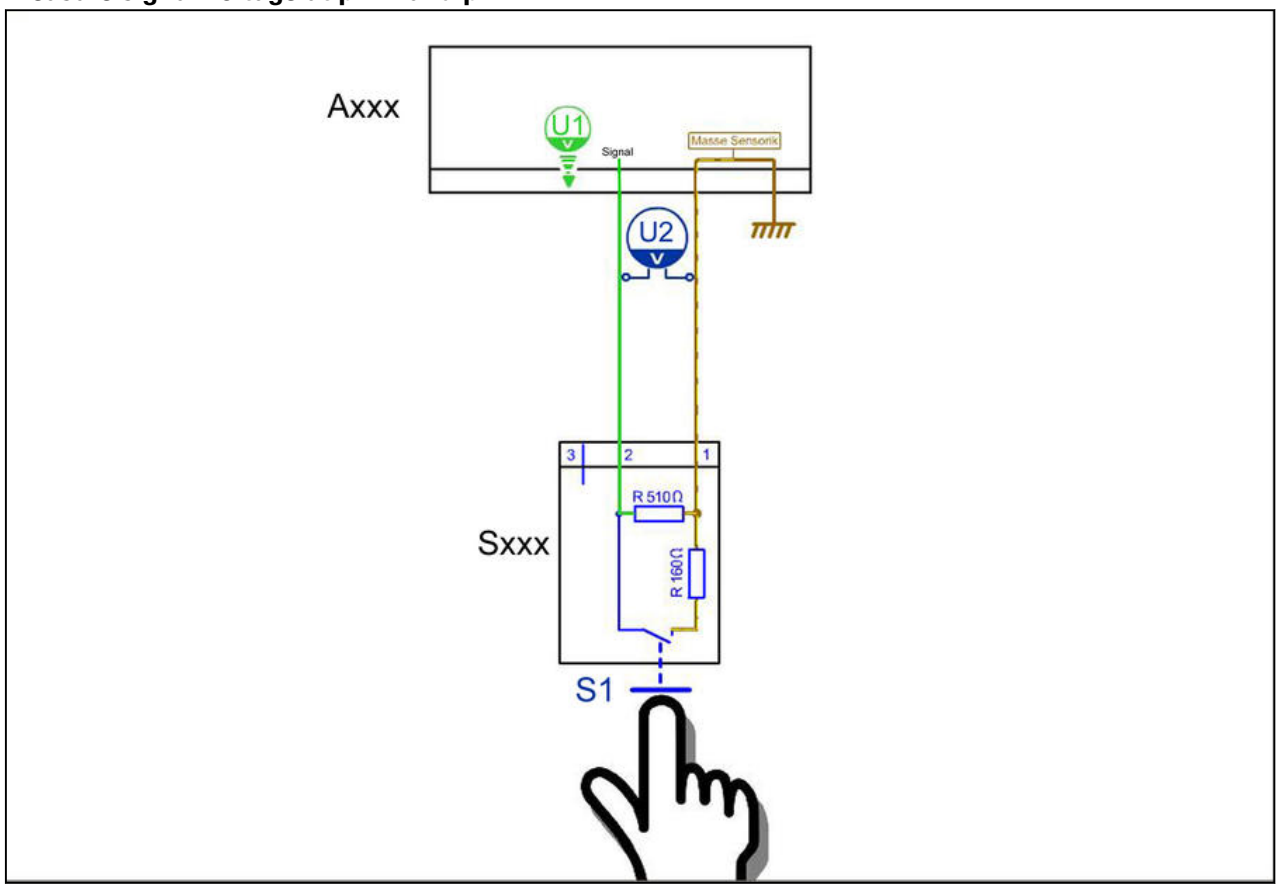



*Fig. 1*

| Axxx E-box | Sxxx button or switch |
|---|---|
| **A002** comfort ECU e.g.: 700 COM II<br>**A050** basic control unit ECU e.g.: 900 COM III | Pin assignment on buttons or switches<br>1 = earth<br>2 = signal<br>3 = control LED supply (not always fitted) |

| Basic signal voltage | A050 | A002 |
|---|---|---|
| U1 | 6.1 V | 8.0 V |

| Voltage | S1 | A050 | A002 |
|---|---|---|---|
| U2 | Open | | |
| | Closed | | |

**Error pattern for a break in the signal wiring**

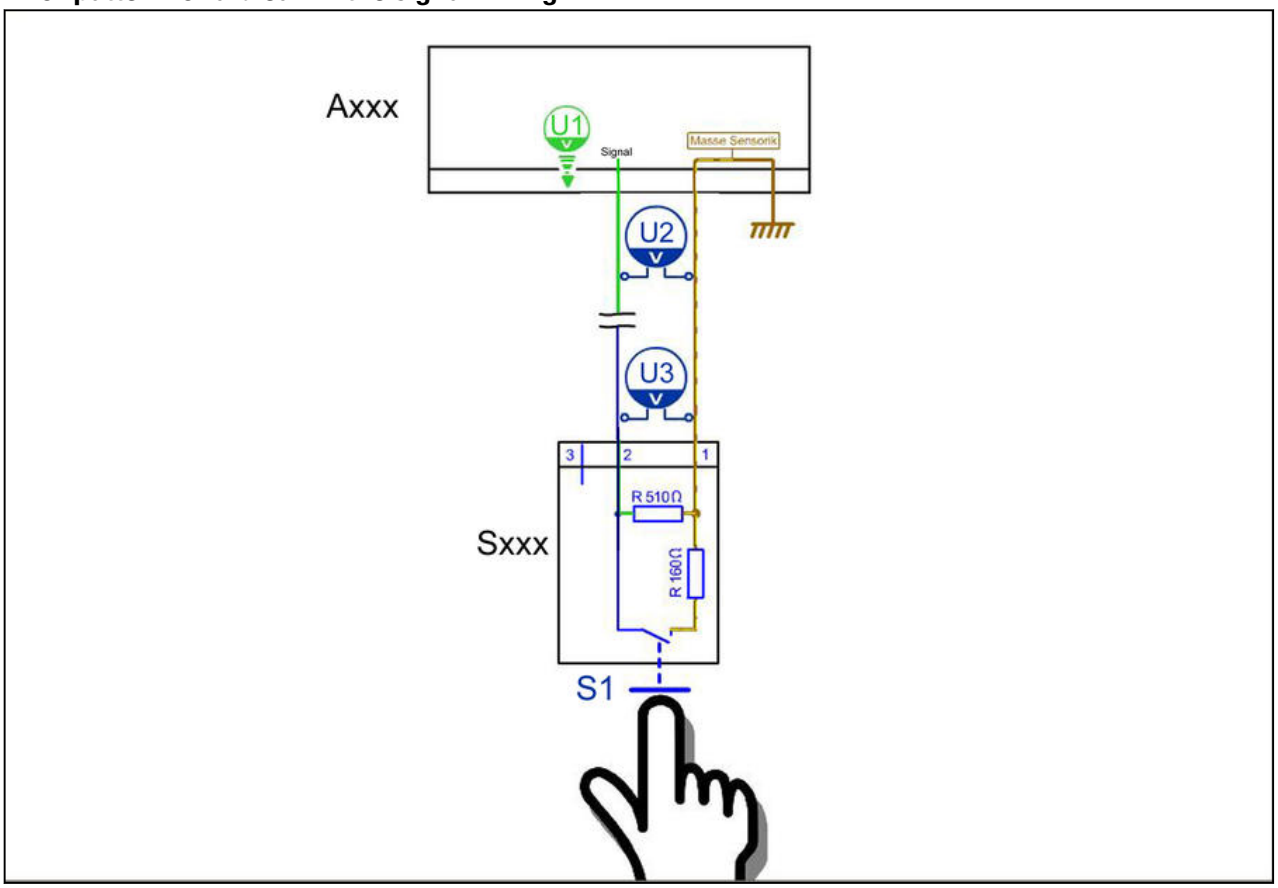



*Fig. 2*

| Voltage | A050 | A002 | Note |
|---|---|---|---|
| U1 | | | Switch ignition ON. E-box must send out the basic signal voltage |
| U2 | | | The basic signal voltage must be present up to the point of the break. |
| U3 | | | |

**Error pattern for a short circuit in the signal wiring**

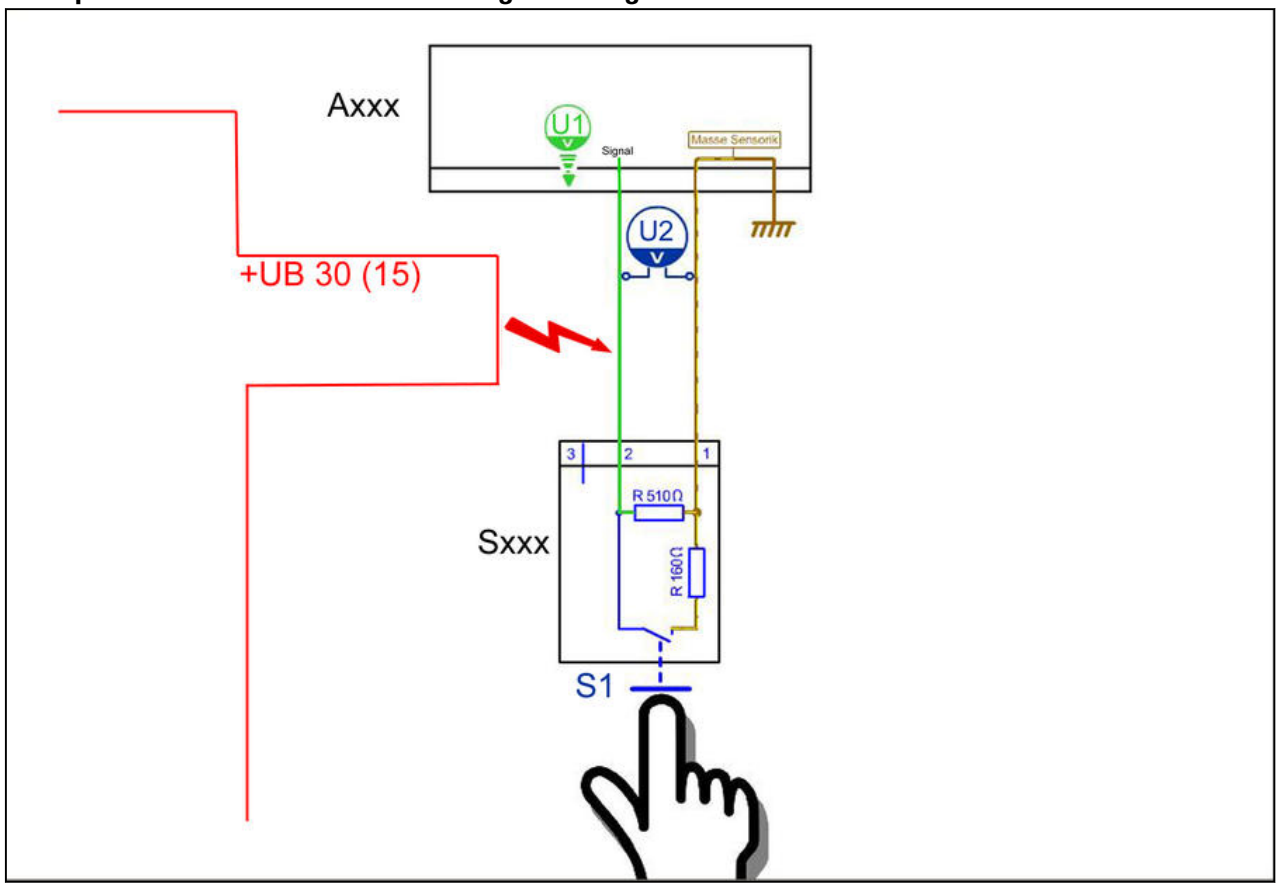



*Fig. 3*

| Voltage | A050 | A002 | Note |
|---|---|---|---|
| U2 | | | |
| **Diagnostic steps** | | | |
| 1. Disconnect the button or switch<br>Measure at the plug | | | Switch has a short circuit |
| | | | Short circuit in the signal wiring or the E-box is faulty |
| 2. on the E-box<br>Open the bridge from the adapter box<br>Measure to the E-box | | | Short circuit in the signal wiring |
| | | | E-box faulty |

**Error pattern for an earth connection in the signal wiring**

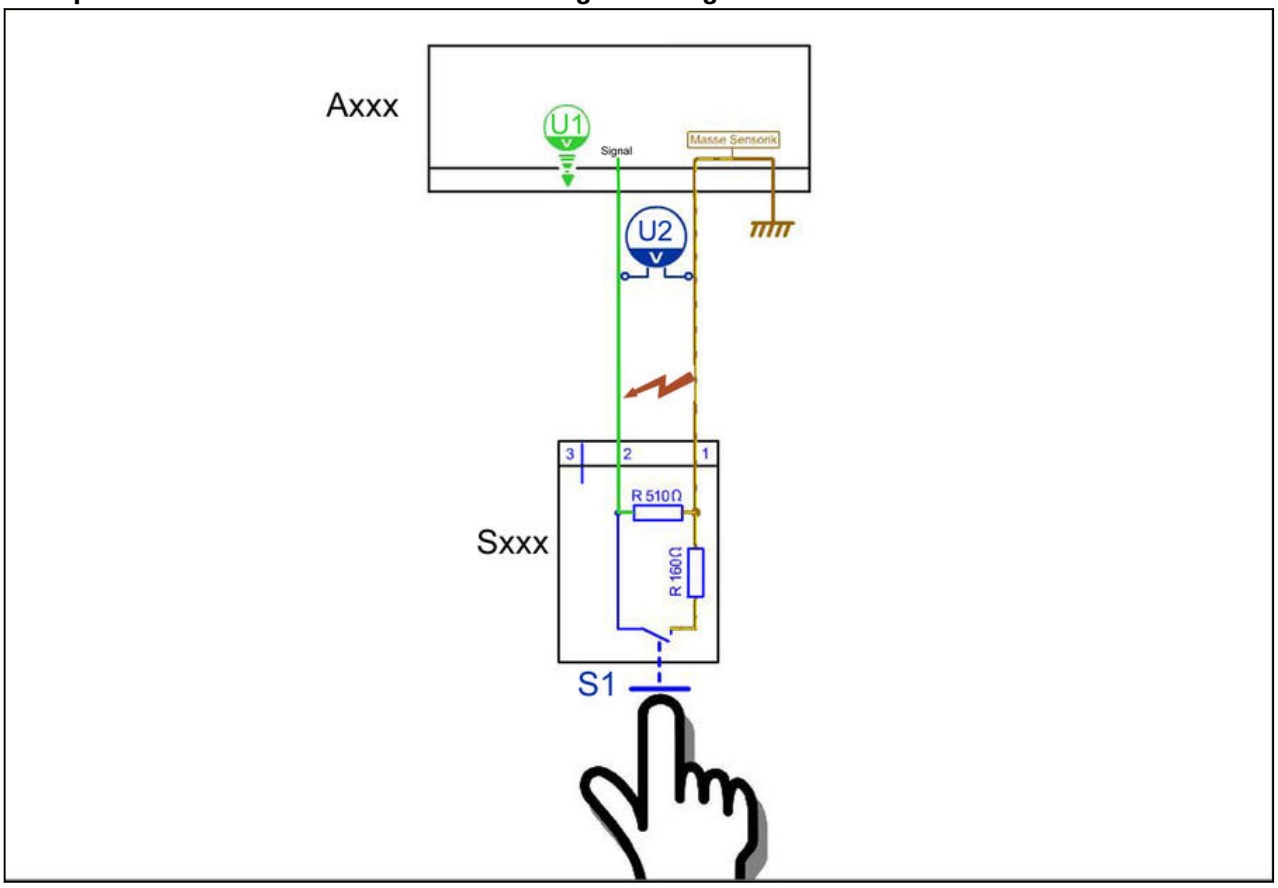



*Fig. 4*

| Voltage | A050 | A002 | Note |
|---|---|---|---|
| U2 | | | |
| Diagnostic steps | | | |
| 1. Button | | | Button has an earth connection |
| Disconnect | | | Break in the wiring, earth connection in the signal wiring or E-box is faulty |
| 2. on the E-box | | | Break in wiring |
| Measure with adapter box | | | Earth connection in the signal wiring or E-box is faulty |
| 3. Open bridge | | | Earth connection in the signal wiring |
| on adapter box | | | |
| Measure to the E-box | | | E-box faulty |

| DIN | Designation |
|---|---|
| **A009** actuator unit | |
| **B014** collecting shaft sensor | |
| **B015** bevel pinion sensor | |
| **S005** right brake switch | |
| **S006** left brake switch | |
| **S017** filter contamination switch | |
| **S019** left external rear PTO button | |
| **S020** right external rear PTO button | |
| **S021** raise external front power lift button | |
| **S022** lower external front power lift button | |
| **S025** variable displacement pump pressure monitoring switch | |
| **S027** right raise external rear power lift button | |
| **S028** right lower external rear power lift button | |
| **S029** left raise external rear power lift button | |
| **S030** left lower external rear power lift button | |
| **S045** reverse drive control switch | |
| **S053** operator's seat switch | |
| **S067** raise external valve actuation button | |
| **S068** lower external valve actuation button | |
| **S079** forward/reverse shuttle switch | |
| **S080** hand brake switch | |
| **S086** right brake wear indicator switch | |
| **S087** left brake wear indicator switch | |

*Other buttons or switches fitted on the tractor:*

**Switches without diagnostic capability for breaks in wiring are:**

**Measure the signal voltage at pin 2 and pin 1**

**Switch open**

Resistance R = infinite => signal voltage = **6.1 $V_{DC}$ (A050), 8.0 $V_{DC}$ (A002)**

**Switch closed**

Resistance R = approx. 0 ohms => signal voltage = **0 $V_{DC}$**

| DIN | Designation |
|---|---|
| **S026** steering pump flow monitor switch | |
| **S075** wheel-driven steering pump flow-monitor switch | |

**NOTE:**
*See also*
*Functional description: electronics box*
*Electrical wiring diagrams*
*Electrical/Electronic components — measuring and testing*

## 6.1.2 Hall sensor operation

The purpose of the Hall sensor is to measure the speed. The rotation of the impulse disk or gear wheel on the Hall sensor opens or closes the S2 sensor switch.

Impulse disk position A indicates that the impulse disk is at a low point: sensor switch open.

Impulse disk at position B indicates that the impulse disk is opposite the Hall sensor: sensor switch closed.

Power supply diagnostics are available for the Hall sensor, i.e.:

Supply OK = S1 diagnostics switch closes

The basic signal voltage from the E-box is reduced.

**Measure supply at pin #3 and pin #1**

Voltage = **12 to 14 $V_{DC}$** (depending on on-board voltage)

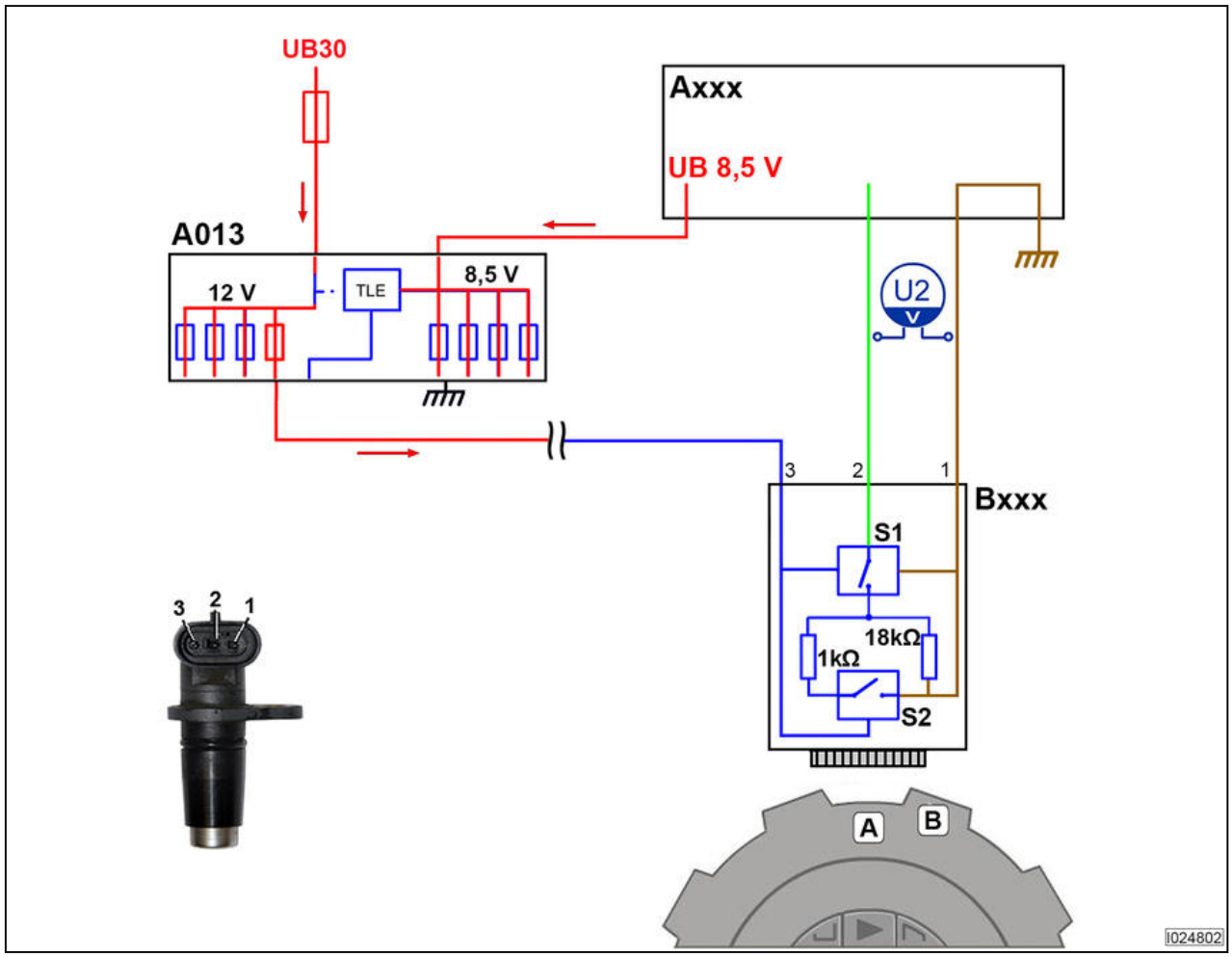



*Fig. 5*

| | |
|---|---|
| **A013** microfuses PCB | **Bxxx**- Hall sensor |
| **Axxx**- E-box<br>**A002** comfort ECU e.g.: 700 COM II<br>**A050** basic control unit ECU e.g.: 900 COM III | Pin assignment on the sensor<br>1 = earth<br>2 = signal<br>3 = supply |

| Supply | Switch S1 (Diagnostics) | Switch S2 (Frequency) | Signal voltage | | Fault code |
|---|---|---|---|---|---|
| | | | A050 | A002 | |
| 0 $V_{DC}$ | Open | Open | | | Yes |
| 12 $V_{DC}$ | Closed | open / closed | | | No |

**Measure signal voltage at pin 2 and pin 1**

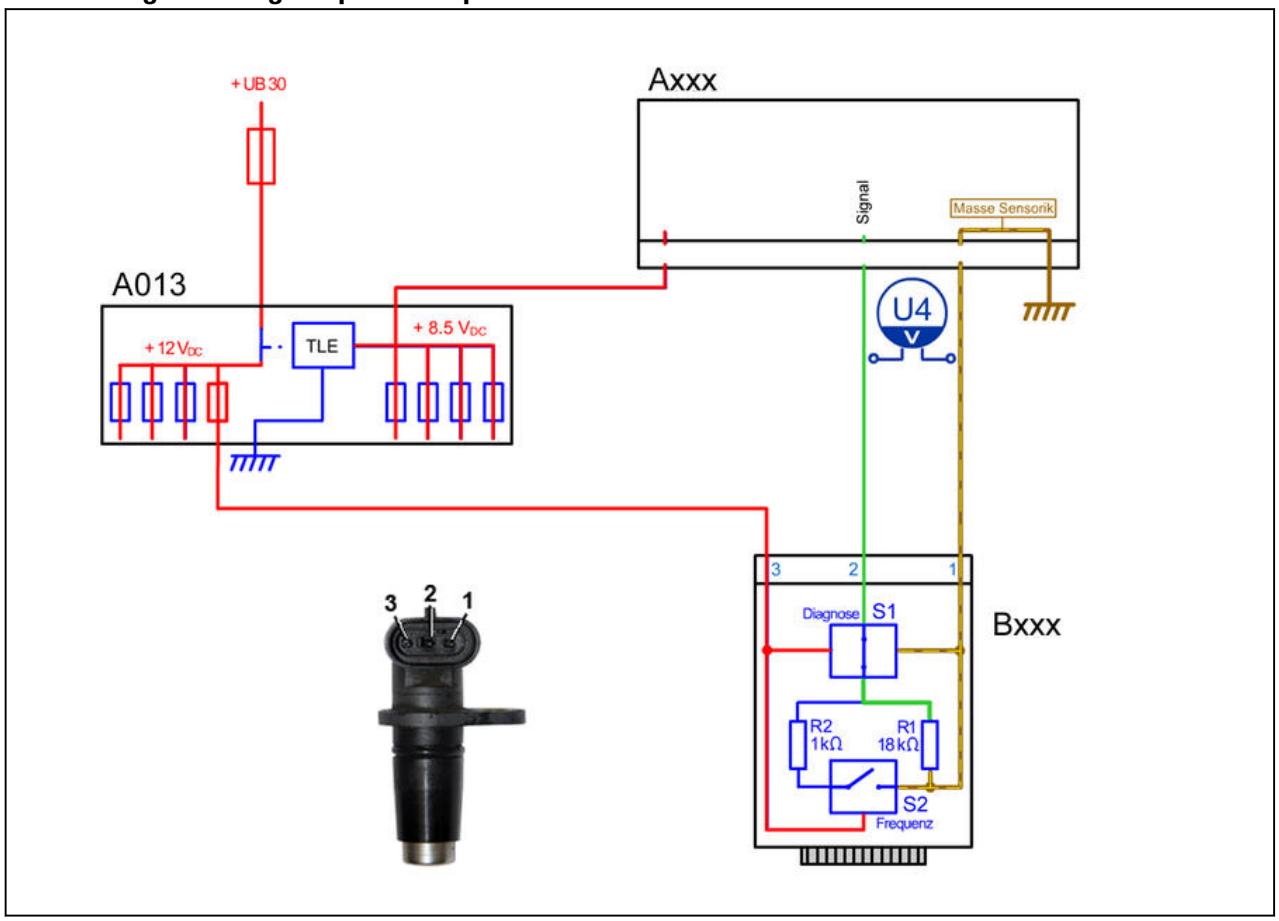



*Fig. 6*

| Voltage | S1 | S2 | A050 | A002 |
|---|---|---|---|---|
| U4 | Closed | Open | | |
| | Closed | Closed | | |

**Error pattern for break in the signal wiring**

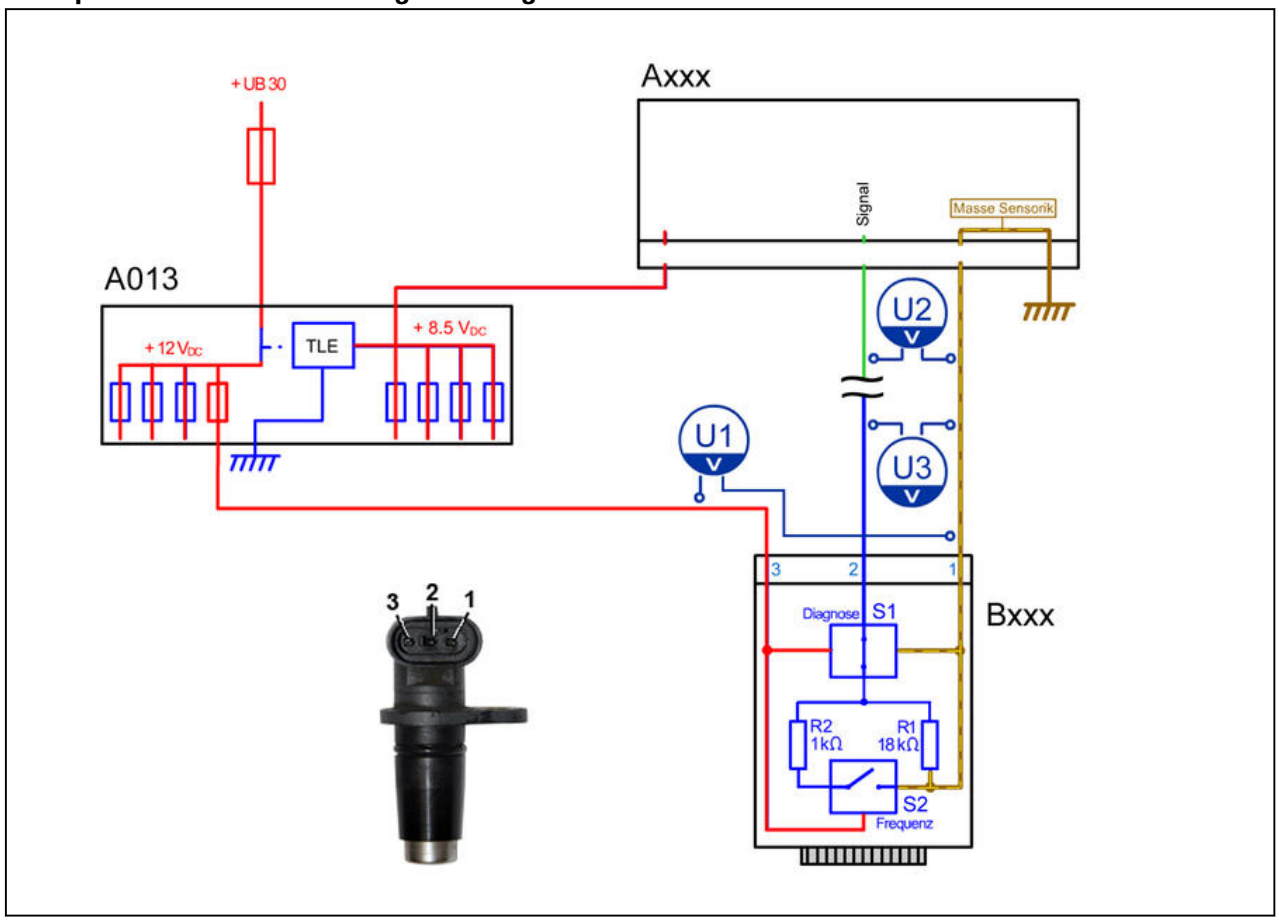



*Fig. 7*

| Voltage | A050 | A002 | Note |
|---|---|---|---|
| U1 | | | Switch on the ignition; the E-box must send out the stabilized voltage of 8.5 V, thus closing the TLE in the microfuse board supply and the power supply is activated. |
| U2 | | | The basic signal voltage must be present up to the point of the break. |
| U3 | | | G816.970.020.040 passive sensor<br>Ratchet wheel position is not important<br>Plug color black |
| | | | G931.970.020.042 active sensor<br>Voltage value dependent on impulse disk position<br>Plug color gray |

**NOTE:**
*The G931.970.020.042 active sensor was introduced from build date 04/2009.*
*Please note KDM 02/2010*

**Error pattern for a short circuit in the signal wiring**

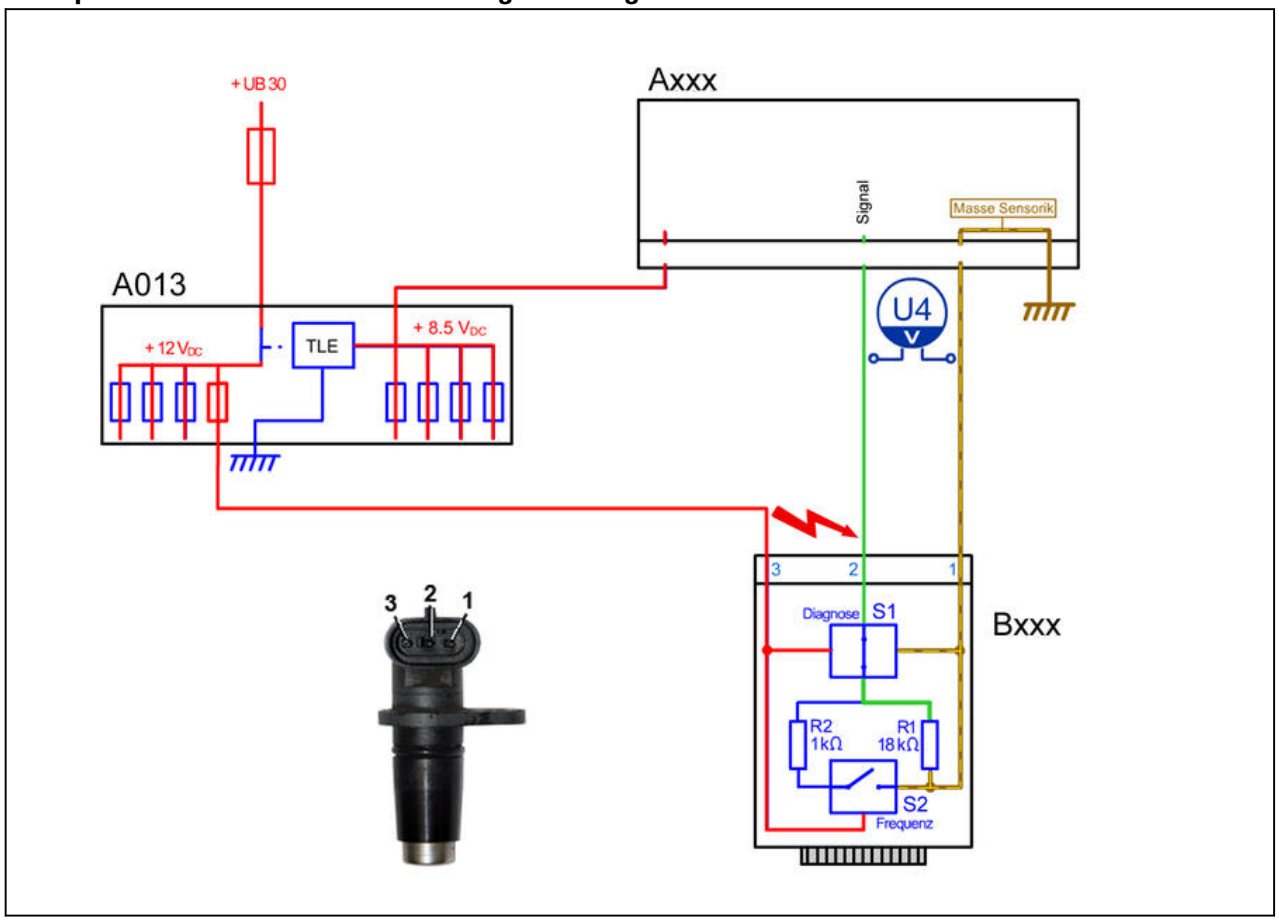



*Fig. 8*

| Voltage | A050 | A002 | Note |
|---|---|---|---|
| U4 | | | |
| Diagnostic steps | | | |
| 1. Disconnect sensor | | | Sensor has a short circuit |
| | | | Short circuit in the signal wiring or the E-box is faulty |
| 2. on the E-box | | | Short circuit in the signal wiring |
| Open the bridge from the adapter box | | | E-box faulty |

**Error pattern for an earth connection in the signal wiring**

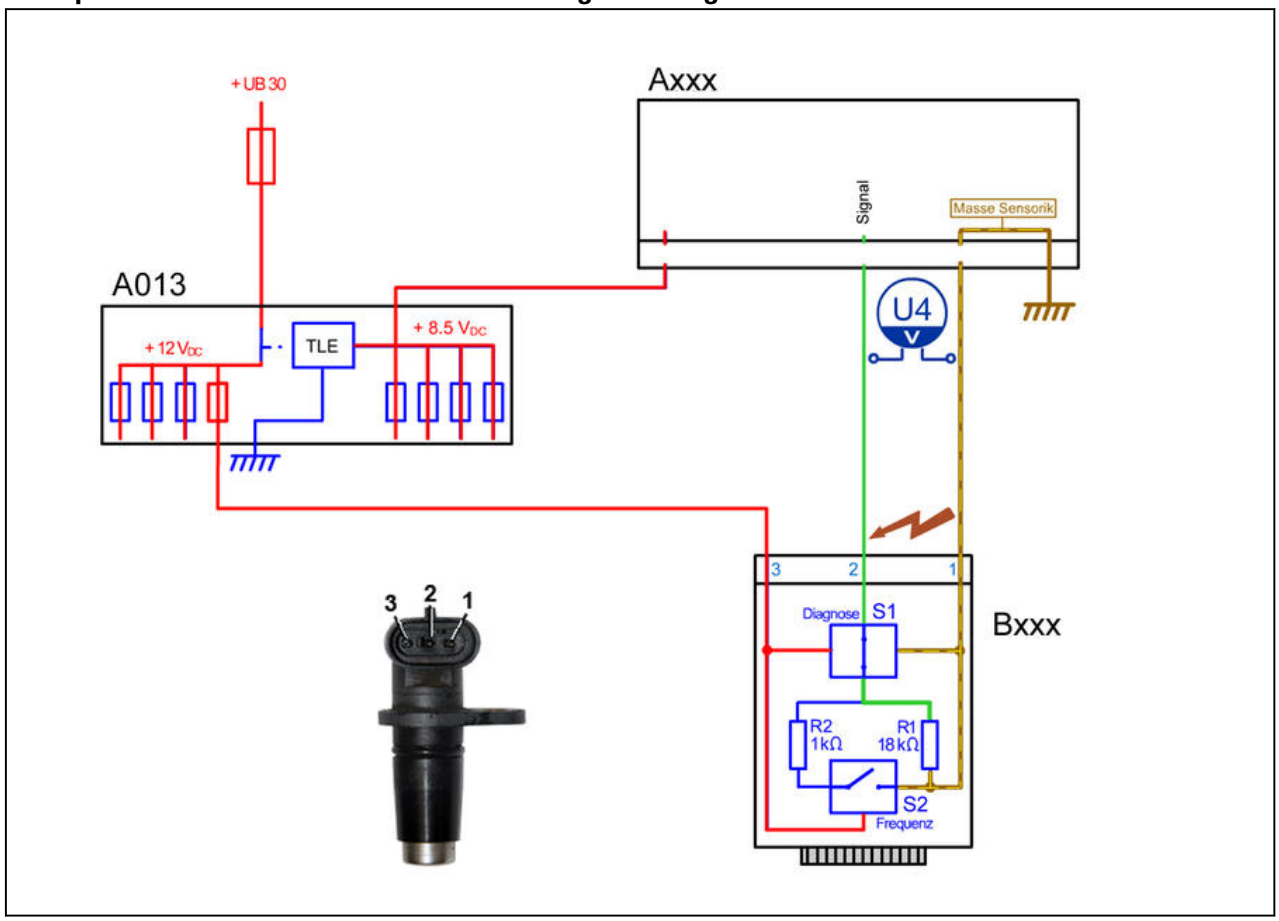



*Fig. 9*

| Voltage | A050 | A002 | Note |
|---|---|---|---|
| U4 | | | |
| Diagnostic steps | | | |
| 1. Disconnect sensor | | | Sensor has earth connection |
| | | | Break in the wiring, earth connection in the signal wiring or E-box is faulty |
| 2. Measure with the adapter box on the E-box | | | Break in wiring |
| | | | Earth connection in the signal wiring or E-box is faulty |
| 3. Open bridge and measure at adapter box | | | Earth connection in the signal wiring |
| | | | E-box faulty |

| DIN | Designation | Note |
|---|---|---|
| **B002** | front PTO speed sensor | |
| **B010** | engine speed sensor | |
| **B014** | collecting shaft sensor (speed) | 8.5 V supply |

| DIN | Designation | Note |
|---|---|---|
| **B015** bevel pinion sensor (speed) | | 8.5 V supply |
| **B020** rear PTO (stub shaft) speed sensor | | |
| **B021** rear PTO (clutch) speed sensor | | |

*Hall sensors fitted on the tractor are:*

## 6.1.3 Rotary position sensor function, when used as a current divider

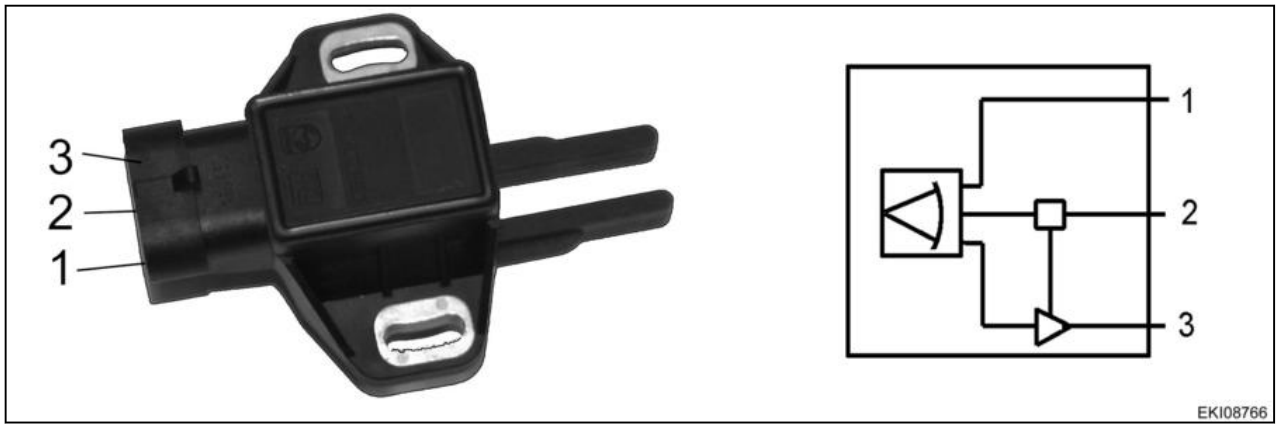



*Fig. 10*

**Position sensor (angle/current) pin assignment**

1 = earth

2 = +supply

3 = signal

**Description of position sensor function (angle/current)**

The position sensor is used to detect angles.

The sensor is supplied with **8.5 VDC** by the ECU/EXT.via the **A013** microfuses PCB .

The earth of the rotary position sensor goes to the ECU/EXT **(sensor system earth)**.

The position sensor is equipped with an **electronic current divider**, which sends a signal current of **4–20 mA** to the E-box depending on the angular position.

Measured with the adapter cable, a signal voltage of **0.6–4.2 $V_{DC}$** is generated.

If the supply (positive or earth) is not OK, no signal is transmitted; an error code appears. The E-box **does not** supply basic signal voltage.

**To compensate for mechanical and electrical tolerances in sensors, the sensor must be calibrated.**

*Fig. 11*

**Measure the supply and signal voltage**

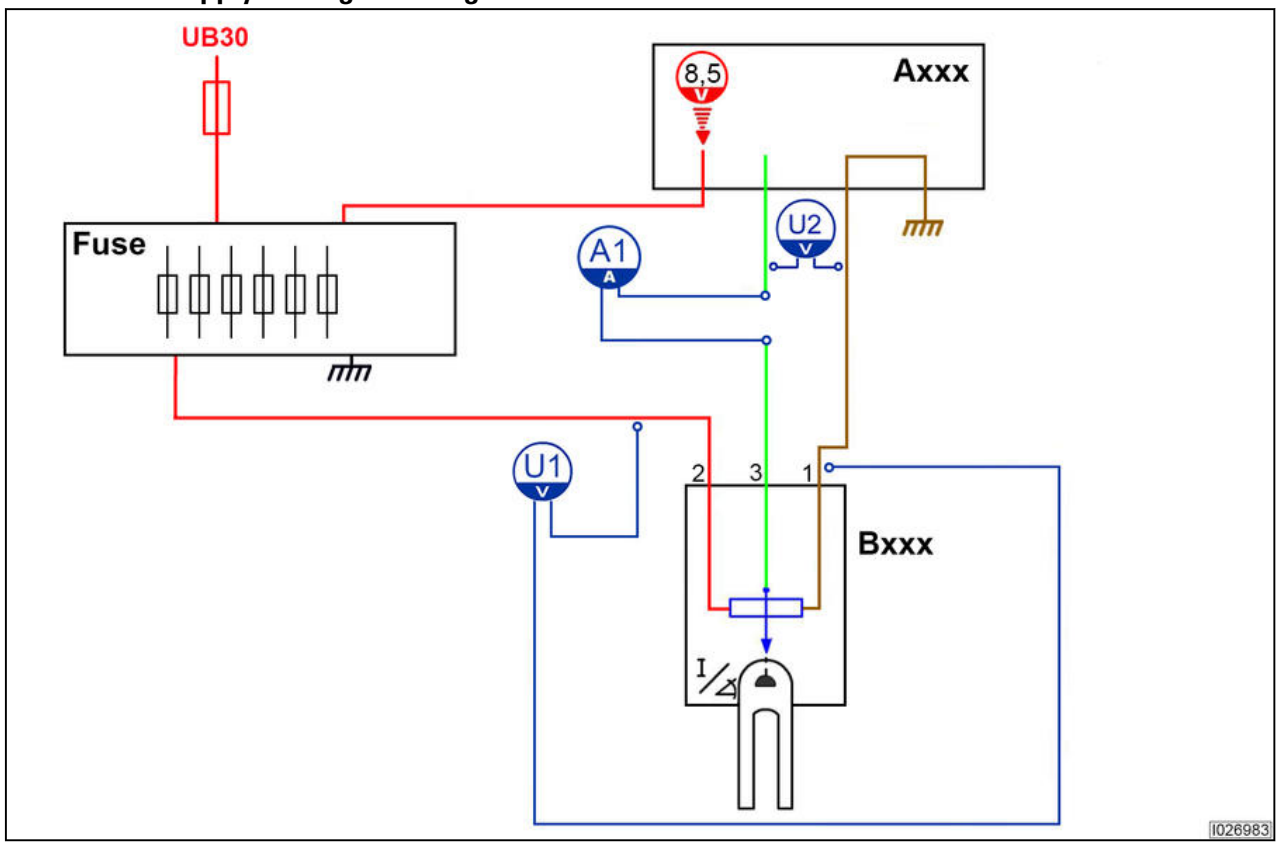



*Fig. 12*

| | |
|---|---|
| **A013** microfuses PCB | **Bxxx** rotary position sensor |
| **Axxx**- E-box<br>**A002** comfort ECU e.g.: 700 COM II<br>**A050** basic control unit ECU e.g.: 900 COM III | Pin assignment on the sensor<br>1 = earth<br>2 = supply<br>3 = signal |

| Supply | Reading | Note |
|---|---|---|
| U1 | 8.5 V | Ignition ON,<br>E-box supplies 8.5 V (stabilized) voltage,<br>Microfuse OK |

| Signal | Reading | Note |
|---|---|---|
| A1 | 4–20 mA | Depending on the sensor position,<br>the current is processed in the E-box (current input) |
| U2 | | The voltage can be easily measured using the adapter cable (at the sensor).<br>(connected in parallel to the multimeter) |

**Error pattern for a break in the signal wiring**

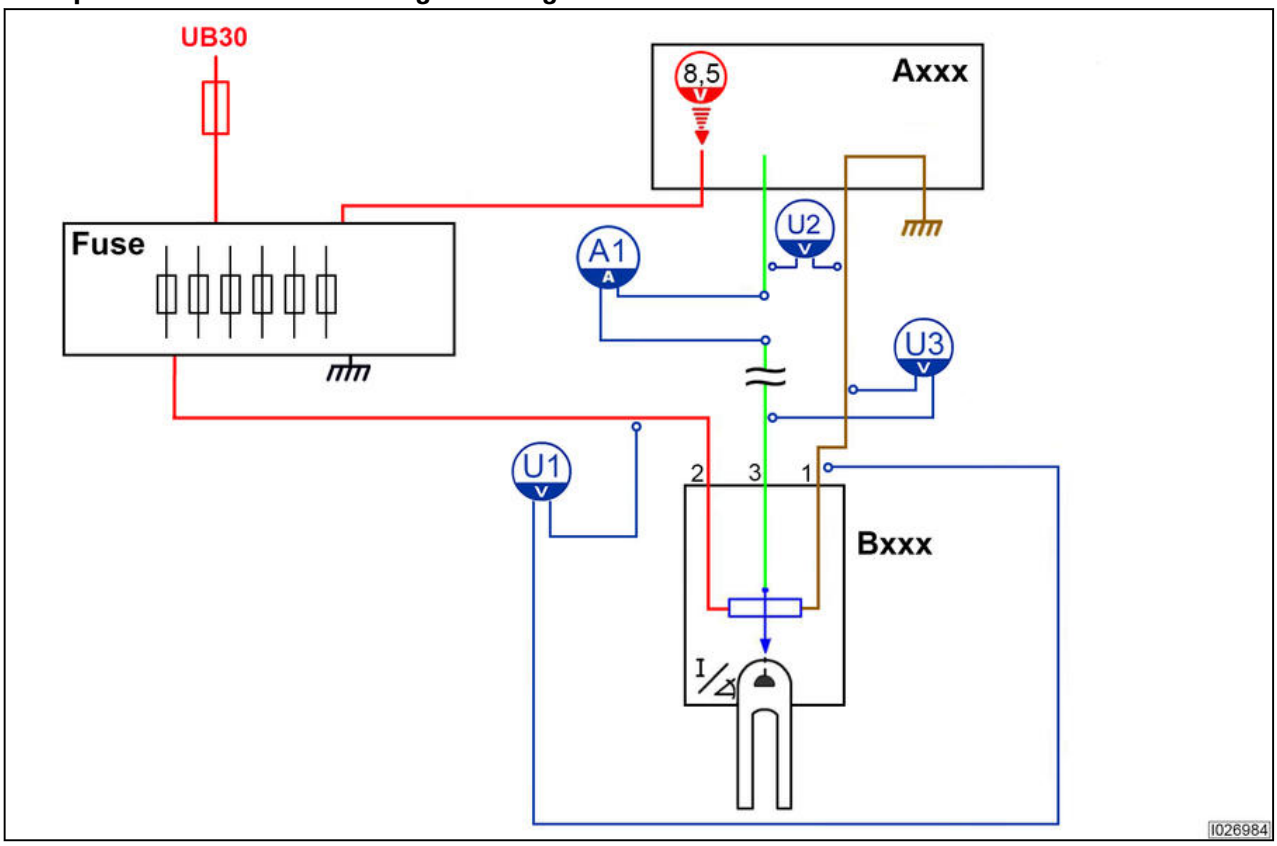



*Fig. 13*

| | Reading | Note |
|---|---|---|
| U1 | 8.5 V | Ignition ON,<br>E-box supplies 8.5 V (stabilized) voltage,<br>Microfuse OK |
| A1 | 0 mA | No current flow when there is a break in the wiring |
| U2 | | The signal comes from the sensor,<br>(**no** basic signal voltage from the E-box at the current input) |
| U3 | | Sensor tries to supply a current.<br>A current cannot flow due to a wiring break, therefore voltage is used.<br>Voltage is **not** dependent on the sensor position. |

**Error pattern for a short circuit in the signal wiring**

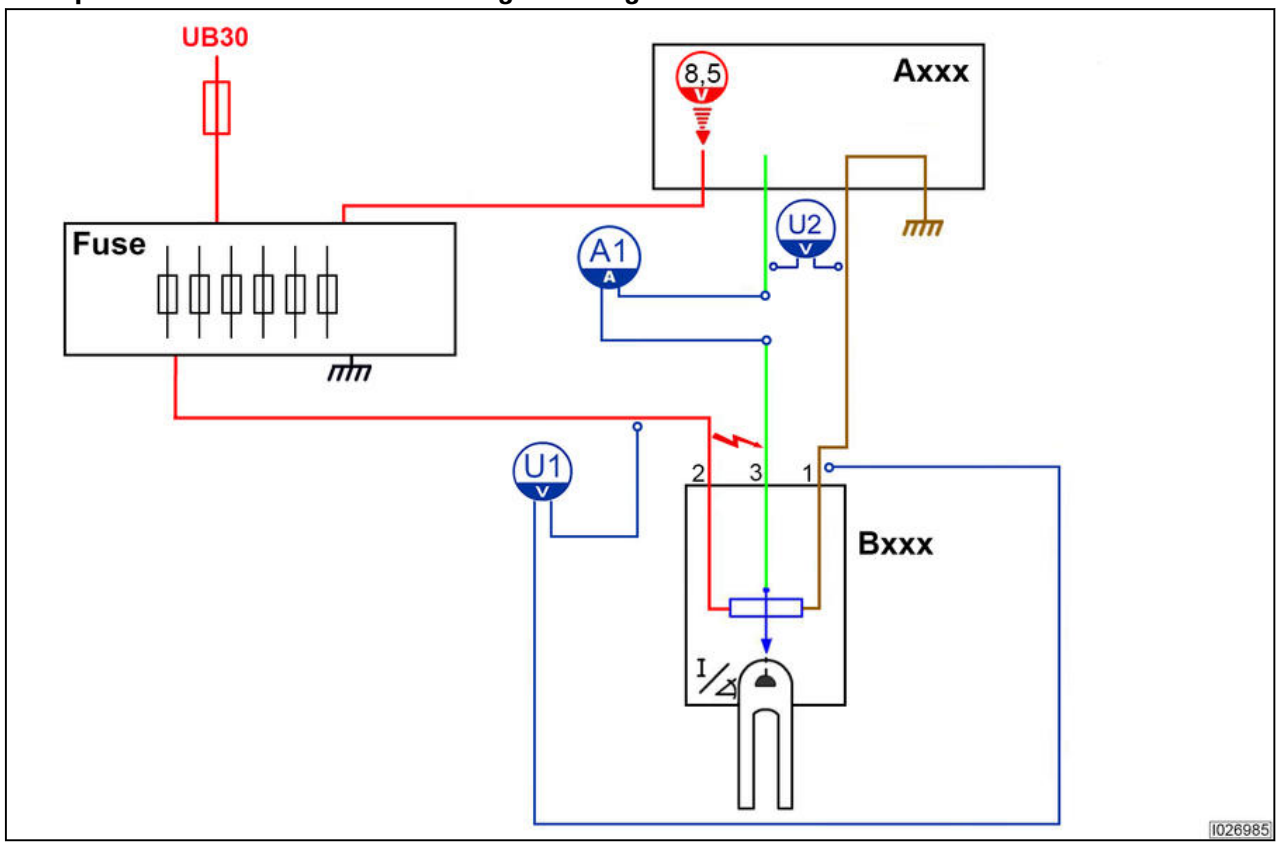



*Fig. 14*

| | U2 | Note |
|---|---|---|
| Error pattern | | Short circuit due to supply |

| Diagnostic steps | U4 | |
|---|---|---|
| 1. Disconnect sensor | | Sensor has a short circuit |
| | | Short circuit in the signal wiring or the E-box is faulty |
| 2. At the E-Box open the bridge of the adapter box<br>Measure to the E-box | | Short circuit in the signal wiring |
| | | E-box faulty |

**Error pattern for an earth connection in the signal wiring**

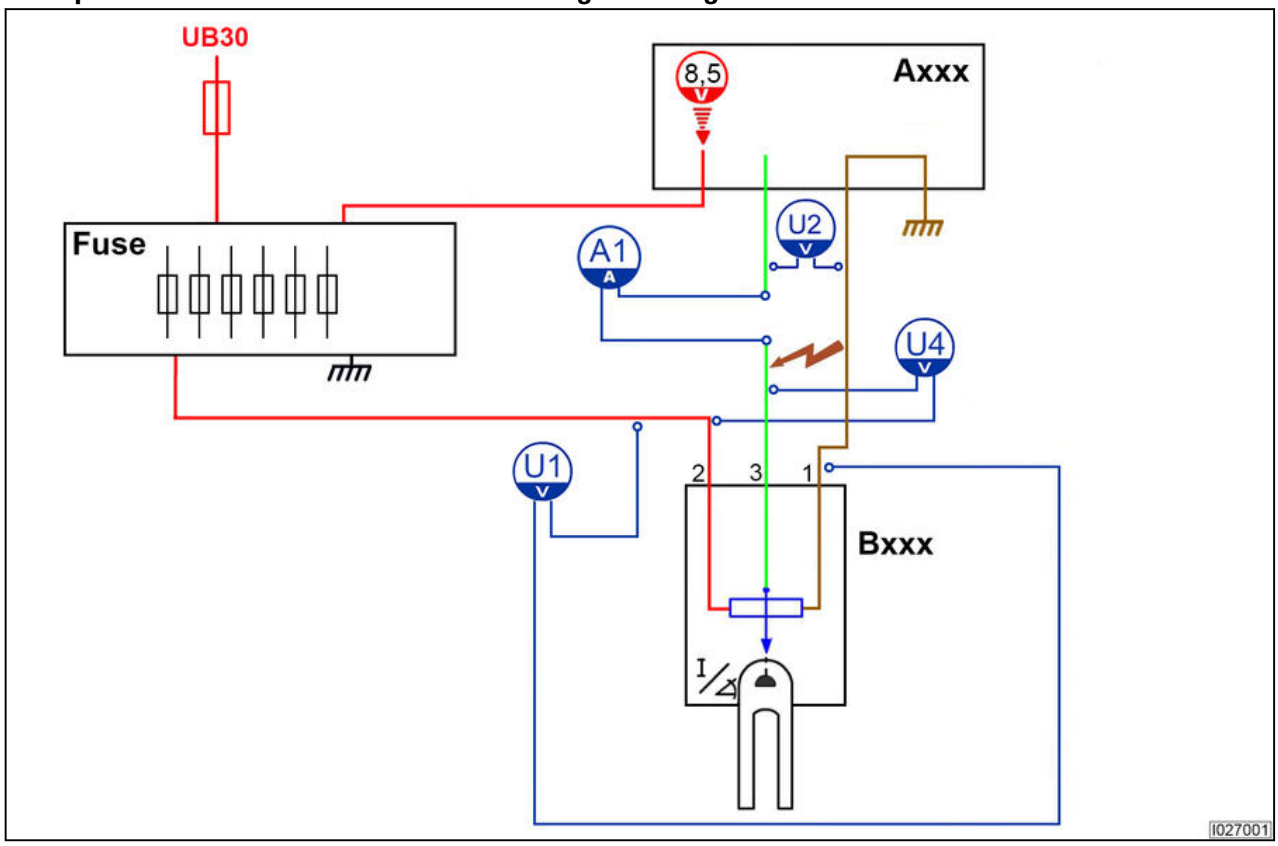



*Fig. 15*

| | U2 | Note |
|---|---|---|
| Error pattern | | U1=8.5 V, the sensor can only provide a signal if it has a power supply |

| Diagnostic steps | U4 | |
|---|---|---|
| 1. Connect multimeter U4 | | Earth connection in the sensor, wire or E-box |
| 2. Disconnect sensor | | Sensor faulty |
| | | Earth connection in the wire or E-box |
| 3. Open bridge on adapter box | | E-box faulty |
| | | Earth connection in signal line |

| DIN | Designation | Note |
|---|---|---|
| **B016** travel range detection sensor | | |
| **B017** clutch pedal sensor | | |
| **B040** front power lift position sensor | | |
| **B055** foot throttle sensor | | Combination sensor (current divider/ voltage reducer) |

| DIN | Designation | Note |
|---|---|---|
| **B066** left wheel position sensor | | |
| **B067** steering angle sensor | | |
| **B068** right wheel position sensor | | |

*Other rotary position sensors (angle/current) that are installed on the tractor:*

**To compensate for mechanical and electrical tolerances in sensors, the sensor must be calibrated.**

**NOTE:**
*See also*
*Functional description: electronics box*
*Electrical wiring diagrams*
*Electrical/Electronic components — measuring and testing*

# 6.2 Measure and test

## 6.2.1 Measure and test

### A007 - Instrument panel

| Connect the X899.980.208.100 adapter box to the A007 instrument panel using the X899.980.208.204 adapter cable | |
|---|---|
| Pin at separation point | Pin on the adapter box (68-pin) |
| X101 separation point "yellow" (1 to (26) | 1 to 26 |
| X100 separation point "blue" (1 to (26) | 31 to 56 |

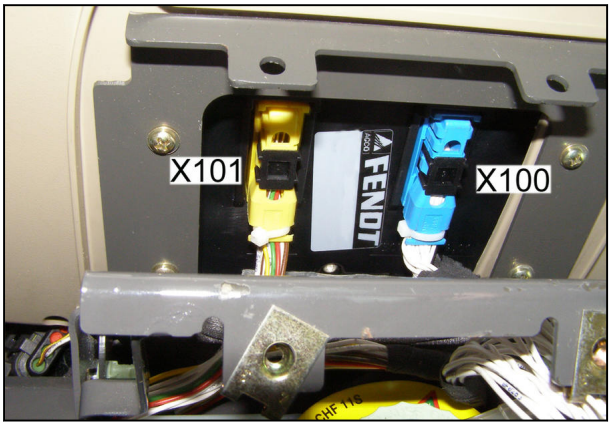



*Fig. 16*

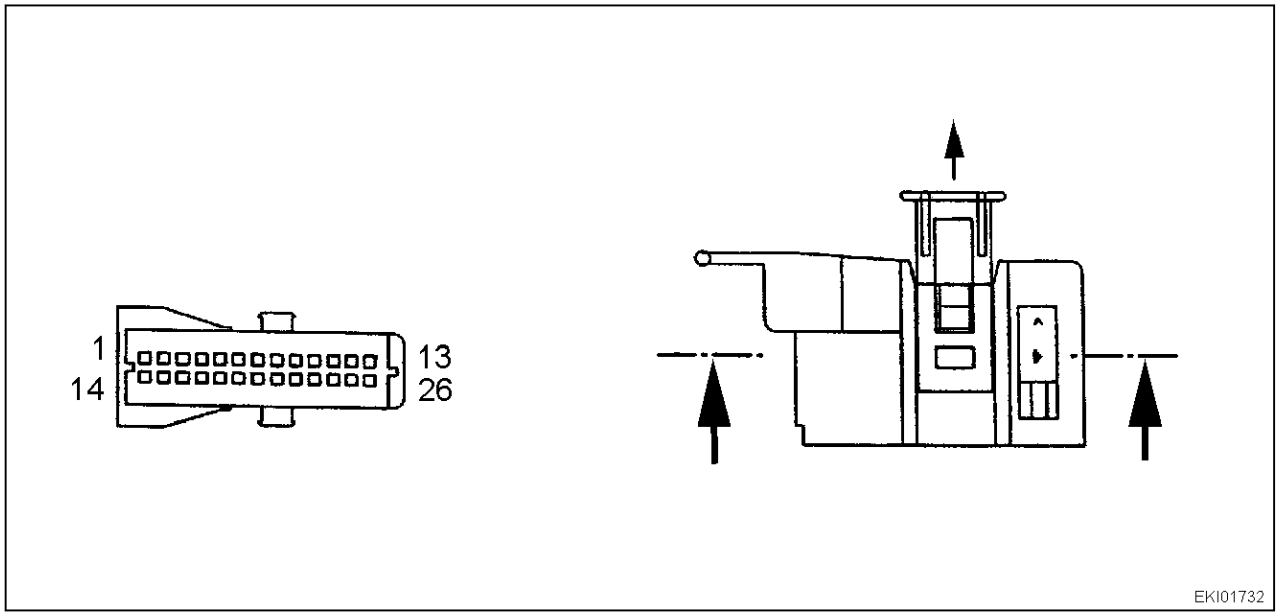



*Fig. 17 Plan view onto the handle shell (connector)*

| X101 separation point "yellow" UB 30 (battery voltage) | | | | |
|---|---|---|---|---|
| **Test** | **Pin** | **Specified value** | **condition** | **Possible cause of fault** |
| Supply | 8 | 12.0 VDC | Engine OFF,<br>Ignition OFF | Fuse (F59) in X1446 fuse holder or in wiring set (see also electrical wiring diagram for supply to electronics) |
| | | 14.0 VDC | Engine is running | |
| Electronics earth | 12 | | | |
| Supply | 8 | Voltage drop max. 1 VDC from last reading | Also connect approx. 55 W bulb | Voltage must remain stable even under load. If voltage drop is greater than approx. 1 VDC, remove contact resistors (e.g. at fuse). |
| Electronics earth | 12 | | | |

*Measure the supply voltage (UB 30) for the **A007** instrument panel*

| X101 separation point "yellow" UB 15 (switched voltage, ignition switch) | | | | |
|---|---|---|---|---|
| **Test** | **Pin** | **Specified value** | **condition** | **Possible cause of fault** |
| Supply | 9 | 0 VDC | Ignition OFF | Fuse (F42) in X1445 fuse holder or in wiring set (see also electrical wiring diagram for supply to electronics) |
| | | 14.0 VDC | Ignition ON | |
| Electronics earth | 12 | | | |
| Supply | 9 | Voltage drop max. 1 VDC from last reading | Also connect approx. 55 W bulb | Voltage must remain stable even under load. If voltage drop is greater than approx. 1 VDC, remove contact resistors (e.g. at fuse). |
| Electronics earth | 12 | | | |

*Measure the supply voltage (UB 15) for the **A007** instrument panel*

**NOTE:**
*If voltage drop is greater than approx. 1 VDC, remove contact resistors (e.g. at fuse).*

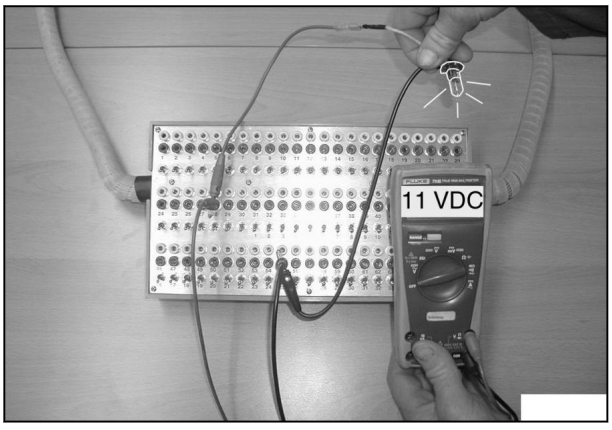



*Fig. 18*

**B020 - Rear PTO stub shaft speed sensor**

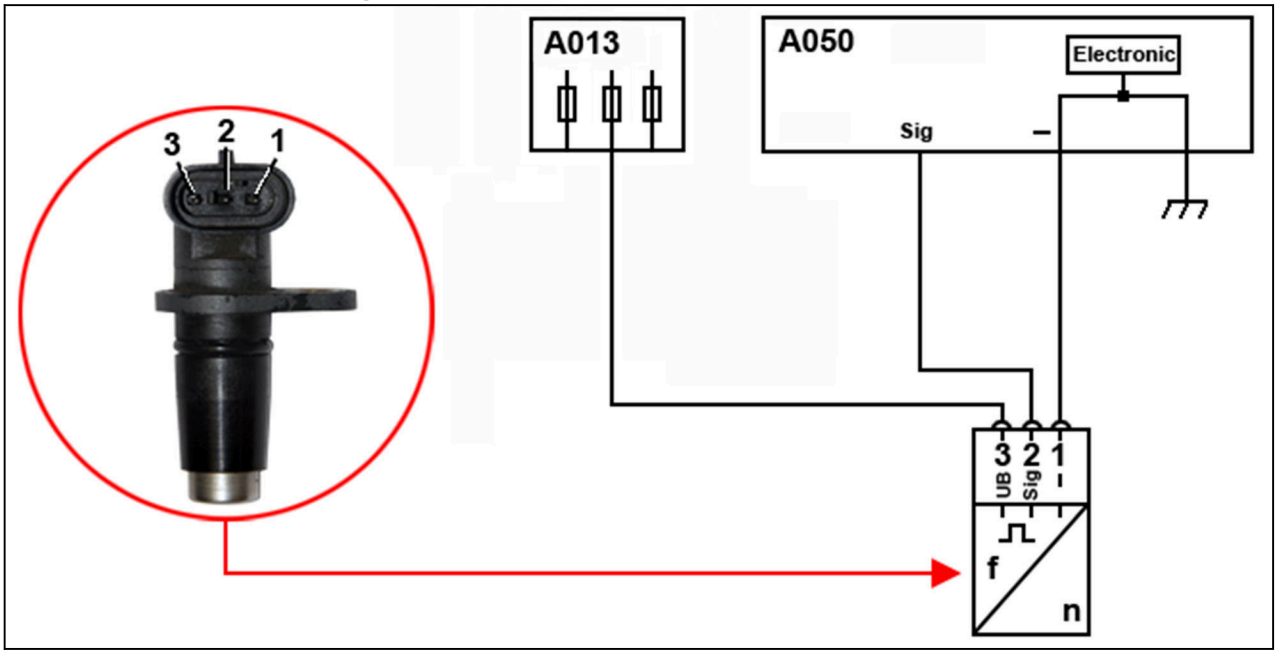



*Fig. 19*

| Pin assignment | B020 - Rear PTO stub shaft speed sensor | A050 - Basic control unit ECU (EXT) |
|---|---|---|
| Earth | #1 (X169 | #A46 (X1403) |
| Signal | #2 (X169) | #A10 (X1403) |
| +UB | #3 (X169) | - |

**Measurement at component - separation point X169**

| Test | Pin | Specified value | condition | Note |
|---|---|---|---|---|
| +UB | pin 3 | 12 $V_{DC}$ to 14 $V_{DC}$ | Ignition ON | Microfuse (S35) in A013 or wiring faulty. |
| Earth | pin 1 | | | |
| Signal | pin 2 | approx. 1.6 $V_{DC}$ | Rear PTO rotates | **Unplug component:**<br>If measured value is 0 $V_{DC}$: fault in **A050** - Basic control unit ECU (EXT) or in wiring.<br>If measured value is 6.4 $V_{DC}$: fault with the component. |
| | | 1.0 $V_{DC}$ or 5.0 $V_{DC}$ | Rear PTO stationary | |
| Earth | pin 1 | | | |

**Recommended tools**

- Diagnostic PC with current FENDIAS software
- X899.980.246.205 adapter cable - connection to sensor
- Adapter box X899.980.304.000

- Adapter cable X899.980.304.201 - connection to adapter box

**B055 - Foot throttle sensor**

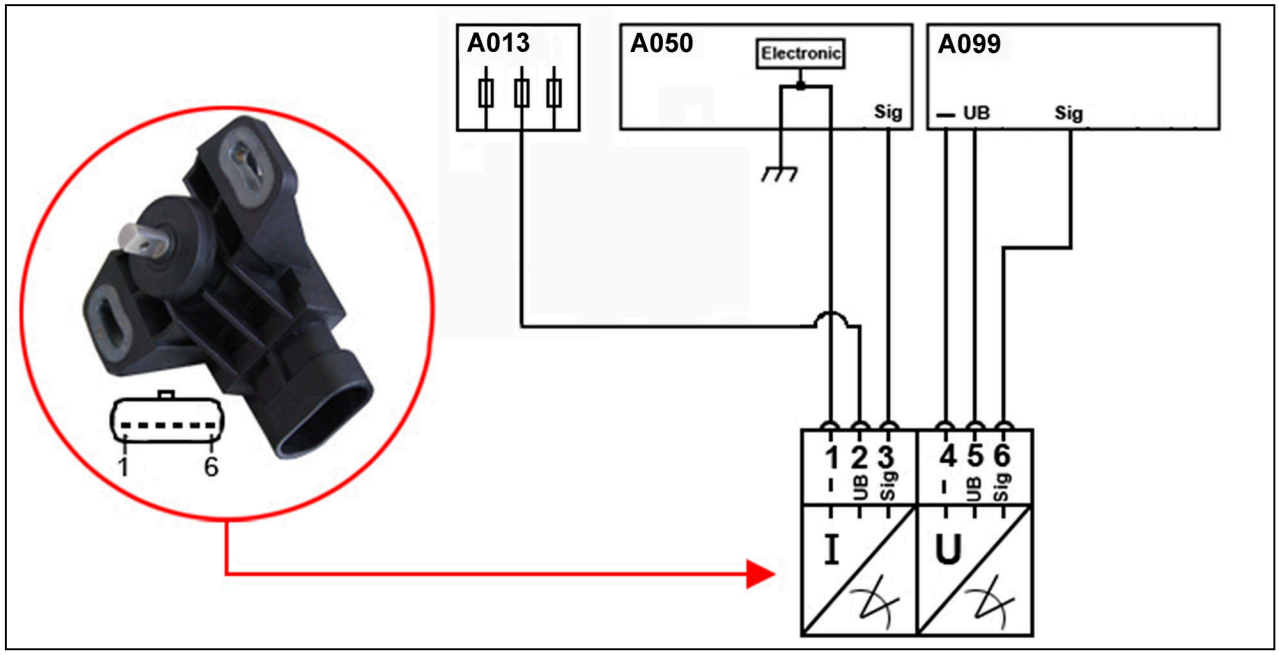



*Fig. 20*

| Pin assignment | B055 - Foot throttle sensor | A050 - Basic control unit ECU (EXT) |
|---|---|---|
| Earth | #1 (X898 | #A45 (X1403) |
| +UB | #2 (X898) | - |
| Signal | #3 (X898) | #B18 (X1402) |

| Pin assignment | B055 - Foot throttle sensor | A050 - Basic control unit ECU (EXT) |
|---|---|---|
| Earth | #4 (X898) | #A84 (X2186) |
| +UB | #5 (X898) | #A20 (X2186) |
| Signal | #6 (X898) | #A29 (X2186) |

**Measurement at component - separation point X898**

| Test | Pin | Specified value | condition | Note |
|---|---|---|---|---|
| +UB | pin 2 | 8.5 $V_{DC}$ | Ignition ON | Microfuse (S19) in A013 or wiring faulty. |
| Earth | pin 1 | | | |

| | | | | |
|---|---|---|---|---|
| +UB | pin 5 | 5.0 $V_{DC}$ | Ignition ON | A099 - engine control ECU or wiring faulty. |
| Earth | pin 4 | | | |

| | | | | |
|---|---|---|---|---|
| Signal | pin 3 | 4.0 $V_{DC}$ | Foot throttle not actuated | |
| | | 1.0 $V_{DC}$ | Foot throttle actuated | |
| Earth | pin 1 | | | |

| | | | | |
|---|---|---|---|---|
| Signal | pin 6 | 0.6 $V_{DC}$ | Foot throttle not actuated | |
| | | 4.3 $V_{DC}$ | Foot throttle actuated | |
| Earth | pin 4 | | | |

**Measurement at A050 - Basic control unit ECU (EXT) - separation point X1402**

**NOTE:**
*Remove bridge at contact #18 on adapter box.*

| Test | Pin | Specified value | condition | Note |
|---|---|---|---|---|
| Signal | #B18 | 19 $mA_{DC}$ | Foot throttle not actuated | Remove bridge at pin #18 on adapter box |
| | | 5 $mA_{DC}$ | Foot throttle actuated | |

**Measurement on A099 engine control ECU (EDC 17) — separation point (X2186)**

**NOTE:**
*Remove bridge at contact #29 on adapter box.*

| Test | Pin | Specified value | condition | Note |
|---|---|---|---|---|
| Signal | #A29 | ? $mA_{DC}$ | Foot throttle not actuated | Remove bridge at pin #29 on adapter box |
| | | ? $mA_{DC}$ | Foot throttle actuated | |

**Recommended tools**

- Diagnostic PC with current FENDIAS software
- Adapter cable X899.980.246.208 - connection to sensor
- Adapter box X899.980.304.000
- Adapter cable X899.980.304.201 - 58-pin connection to adapter box for X1402 (B)
- Adapter cable X899.980.304.206, 91-pin connection to adapter box for X2186 (A)

**NOTE:**

**S027/S028/S029/S030 - external (rear power lift) buttons**

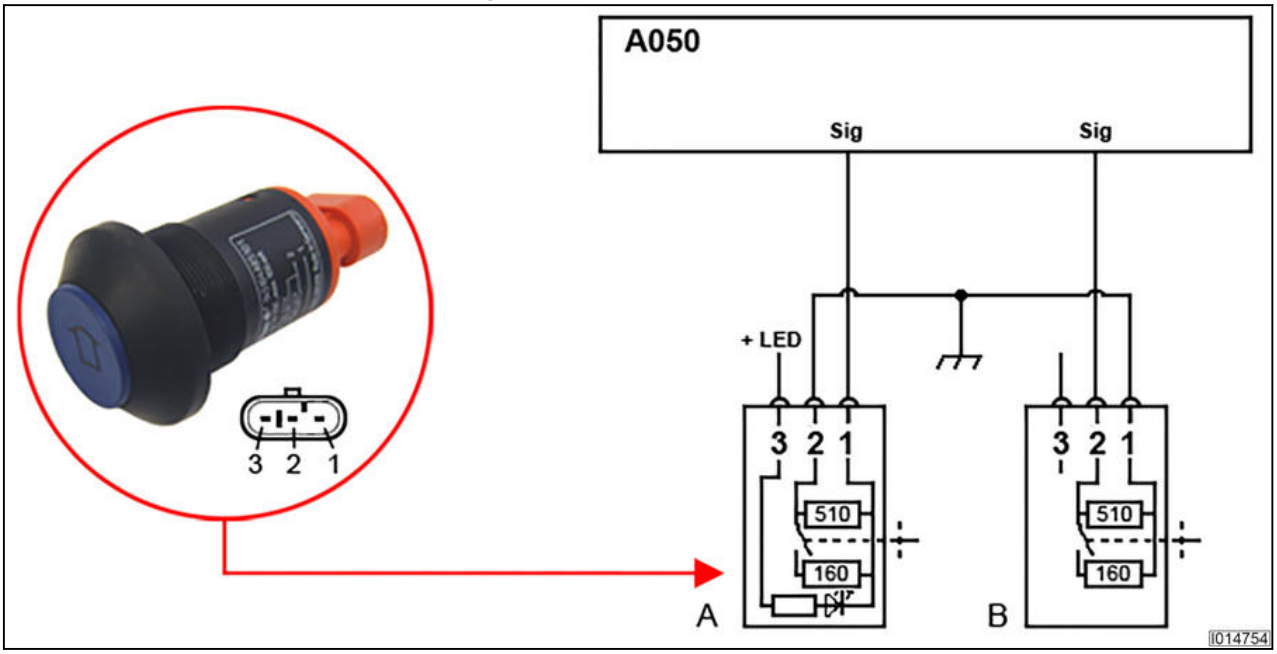



*Fig. 21 (A) Variant with indicator lamp, (B) variant without indicator lamp*

| Pin assignment | S027 - right external rear power lift raise button | A050 - basic control unit ECU (EXT) |
|---|---|---|
| Signal | #1 (X237) | #B37 (X1402) |
| Earth | #2 (X237) | #A46 (X1403) |

| Pin assignment | S028 - right external rear power lift lower button | A050 - basic control unit ECU (EXT) |
|---|---|---|
| Signal | #1 (X238) | #B12 (X1402) |
| Earth | #2 (X238) | #A46 (X1403) |

| Pin assignment | S029 - left external rear power lift raise button | A050 - basic control unit ECU (EXT) |
|---|---|---|
| Signal | #1 (X239) | #B39 (X1402) |
| Earth | #2 (X239) | #A46 (X1403) |

| Pin assignment | S030 - left external rear power lift lower button | A050 - basic control unit ECU (EXT) |
|---|---|---|
| Signal | #1 (X240) | #B48 (X1402) |
| Earth | #2 (X240) | #A46 (X1403) |

**Measurement at component**

| Test | Pin | Specified value | condition | Note |
|---|---|---|---|---|
| Resistance | pin 1 | 510 ohms | Button **not** pressed | |
| | | 121 ohms | Button pressed | |
| Earth | pin 2 | | | |

| | | | | |
|---|---|---|---|---|
| Signal | pin 1 | 3.7 $V_{DC}$ | Button **not** pressed | **Unplug component:** |
| | | 1.8 $V_{DC}$ | Button pressed | If measured value is 0 $V_{DC}$: There is a fault with the wiring or the A050 ECU |
| Earth | pin 2 | | | If measured value is 6.2 $V_{DC}$: fault in component. |

**Recommended tools**

- Diagnostic PC with current FENDIAS software
- X899.980.246.205 adapter cable - connection to sensor
- Adapter box X899.980.304.000
- Adapter cable X899.980.304.201 - connection to adapter box

## 6.2.2 Component position

**A007** - Instrument panel

Cab, at top in steering column unit


*Fig. 22*

**B020** - Rear PTO (stub shaft) speed sensor

**B021** - Rear PTO (clutch) speed sensor

**NOTE:**
*Flange PTO version*

Rear of tractor, rear of the rear axle cover

Detach panel

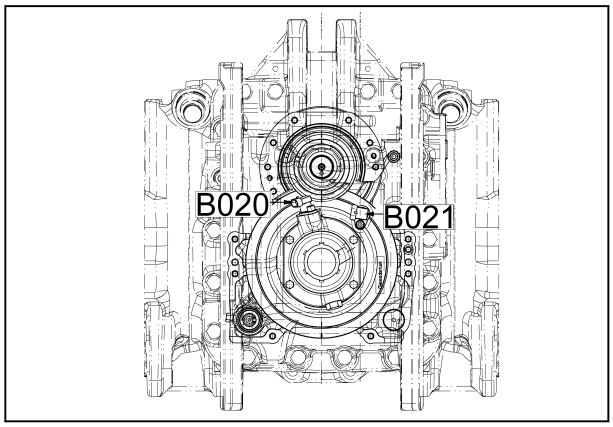



*Fig. 23*

**B055** - Foot throttle sensor

Cab, on left foot throttle

Detach cover

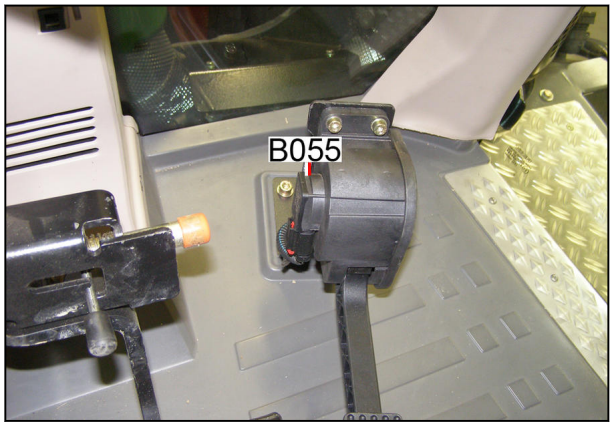



*Fig. 24*

**S027** - Right external raise rear power lift button

**S028** - Right external lower rear power lift button

Rear of tractor, on right mudguard


*Fig. 25*

**S029** - Left external raise rear power lift button

**S030** - Left external lower rear power lift button

Rear of tractor, on left mudguard

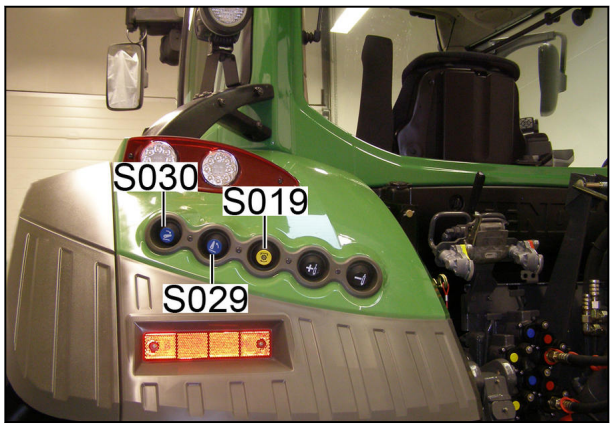



*Fig. 26*

# 6.3 CAN BUS

## 6.3.1 Description of CAN bus system

### Description

In a bus system, all components are connected to a common data line via short branch lines. This reduces the wiring requirements and allows additional components to be connected more easily.

A Controller Area Network (CAN) connects several components with equal priority over two data lines. All subscribers are called nodes. The nodes are positioned on the data line like the bus stops on a bus route, hence the name "bus". Bus. The CAN bus is a serial bus system.

A CAN bus means that, for example, data from electrical control valves is no longer sent to the electronics box from each valve individually, with numerous specific lines for different data. Instead, data is collected on site, directly at the valve, and is then collected, pre-processed, digitized and only then sent via the bus. In so doing, the nodes filter out unimportant data after having been programmed appropriately, so that this data does not need to be transported at all.

### Signal transmission

To protect the system from electrical interference, one bit is simultaneously represented on two lines: CAN-Low and CAN-High. The first line carries the logical signal and the second line carries the inverted data signal. This is called a differential signal.

All the information is sent and received via this data line. The information is coded as numerical signals (0 or 1). Each component recognizes the messages intended for it and processes these messages.

The CAN may be in one of two different states:

- Bus is logically high: recessive state
- Bus is logically low: dominant state

The dominant state represents a logical zero: if a component puts a logical zero on the bus, it overwrites the logical one of another node.

The "neutral" voltage is 2.5 $V_{DC}$ on an active bus (LBS). On a passive bus (K-Bus, G-Bus) the lines are given a pre-voltage of 1.6 $V_{DC}$ or 3.2 $V_{DC}$.

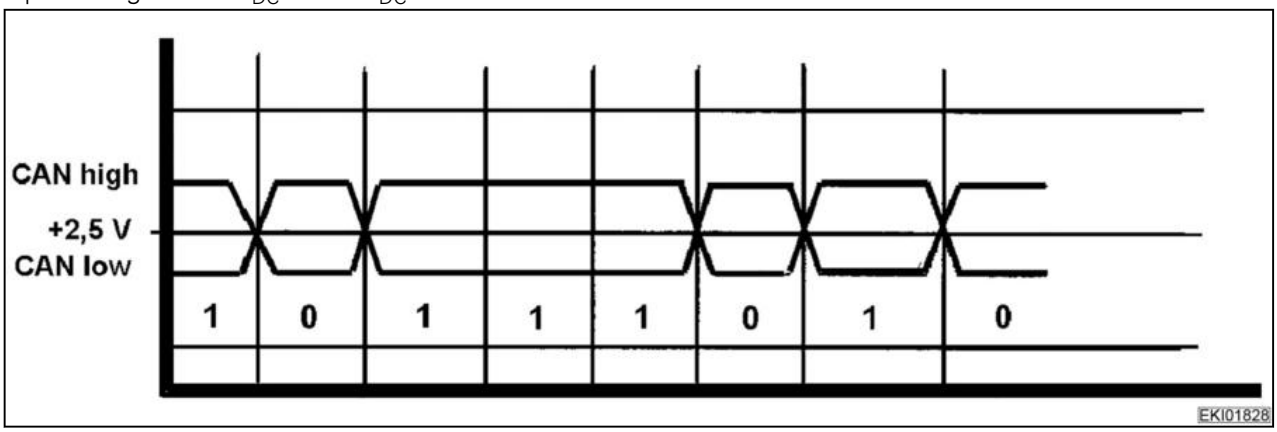



*Fig. 27*

On a passive CAN bus, the two parallel-switched terminating resistances are checked. On an active CAN bus, a voltage value is determined.

The transmission rates are as follows:

- K-Bus (main bus): 100 kBit/s
- G-Bus: 250 kBit/s
- LBS Bus: 125 kBit/s
- ISO Bus: 250 kBit/s

**Frame**

Communication occurs via telegram. The design of a telegram is standardized and labelled as a Frame. One frame is made up of seven parts:

*Fig. 28*

| Part | Designation | Description |
|---|---|---|
| 1 | Start field | Synchronizes all control units (dominant) |
| 2 | Allocation field | Information for receivers and priority information (identifier) |
| 3 | Control field | Contains details of the size of the following data field |
| 4 | Data field | Contains the actual information |
| 5 | Test field | Contains a 15-bit checksum plus end marking |
| 6 | Confirmation field | Contains the correct receipt confirmation from other subscribers |
| 7 | End field | Marks the end of the message |

**Collision test**

Each subscriber may send messages to another subscriber unrequested. This means that several subscribers may want to send messages at the same time. The message with the lowest identifier is permitted to be sent. All subscribers who are not allowed to send messages then become receivers of the message with the highest priority, and re-attempt to send when the bus is free. This process is known as bit arbitration.

## 6.3.2 FENDT 300 Vario S4 electronics concept - Profi/ProfiPlus

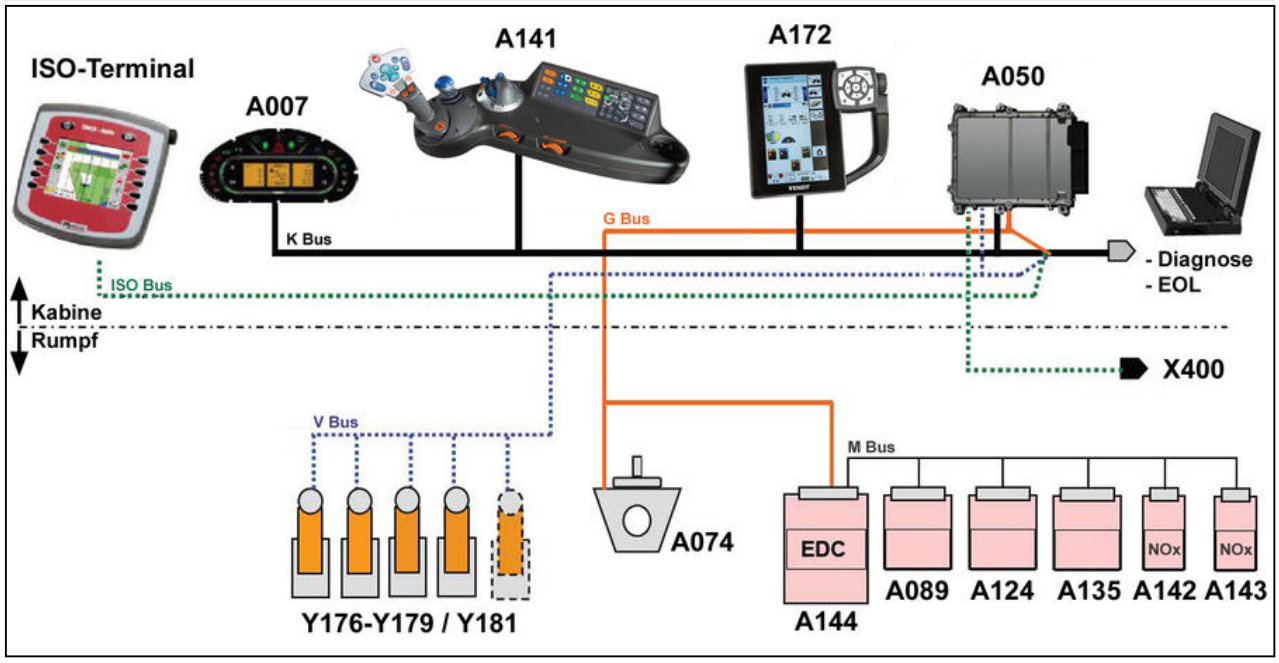



*Fig. 29*

**Comfort bus**

**A007** - Instrument panel

**A050** - Basic control unit ECU (EXT)

**A141** - Multifunction center (MFC)

**A172** - NT0x terminal

**Transmission bus (G bus)**

**A050** - Basic control unit ECU (EXT)

**A074** - Slim actuator unit

**A144** - Engine control unit ECU (EDC 17)

**Engine bus (M bus)**

**A050** - Basic control unit ECU (EXT)

**A089** - Exhaust gas recirculation actuator unit

**A124** - Wastegate ECU

**A135** - Air mass measurement sensor

**A142** - Nitrogen oxide sensor 1, upstream of SCR catalytic converter

**A143** - Nitrogen oxide sensor 2, downstream of SCR catalytic converter

**A144** - Engine control unit ECU (EDC 17)

**Valve bus (V bus)**

**A050** - Basic control unit ECU (EXT)

**Y176** - Position 1 spool valve (yellow)

**Y177** - Position 2 spool valve (blue)

**Y178** - Position 3 spool valve (red)

**Y179** - Position 4 spool valve (green)

**Y181** - Front power lift valve

**ISO-Bus**

**A050** - Basic control unit ECU (EXT)

**X400** ISO socket (rear)

FENDT

# 7. Hydraulics

# 7.1 Basics

## 7.1.1 Task sheet: Hydraulic pumps

Name the hydraulic pumps.

_____

*Fig. 1*

_____

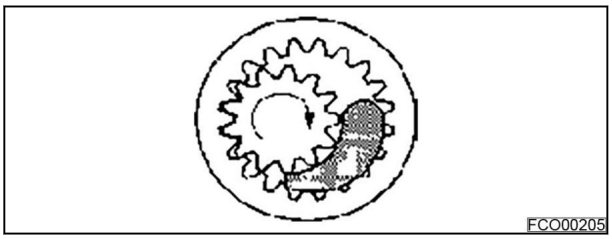



*Fig. 2*

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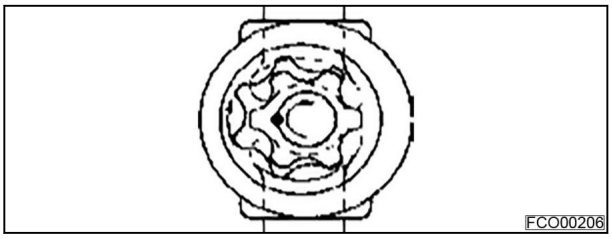


*Fig. 3*

_____

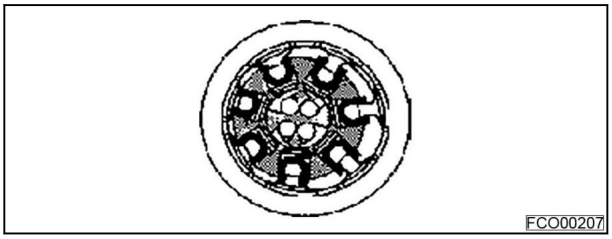


*Fig. 4*

_____

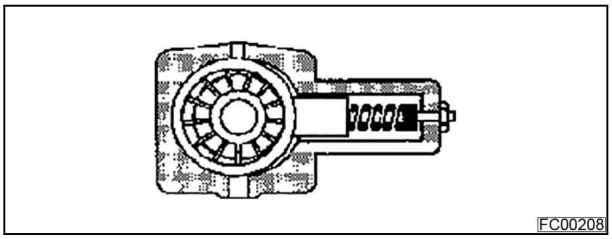


*Fig. 5*

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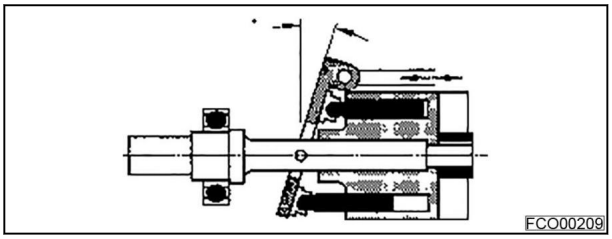


*Fig. 6*

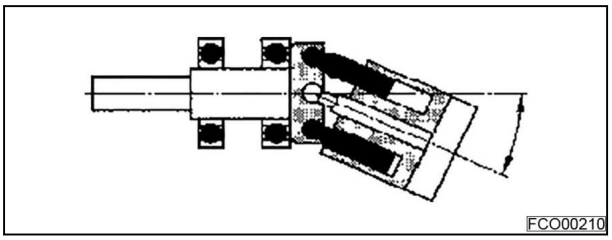


*Fig. 7*

## 7.1.2 Basic hydraulic systems

**Open system**

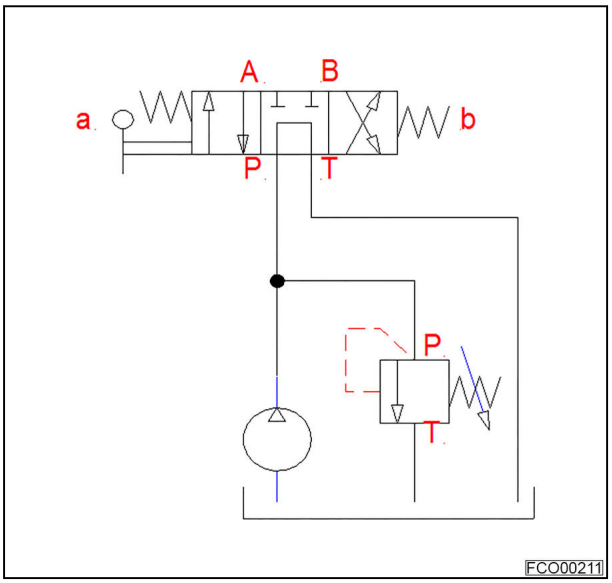


*Fig. 8*

**Note:**

## Closed system

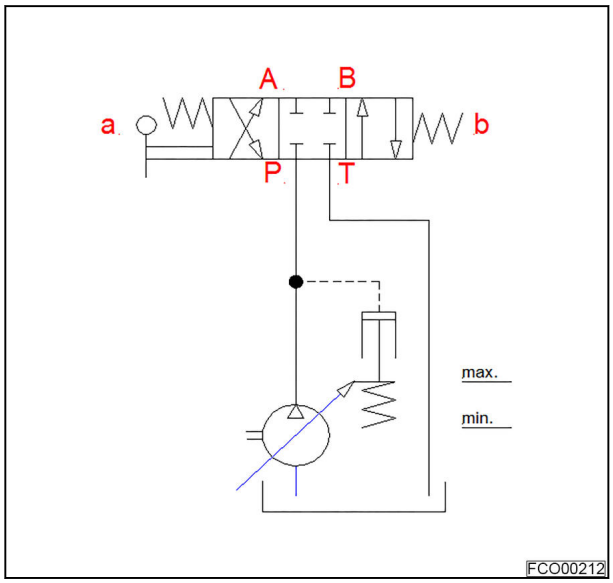


*Fig. 9*

**Note:**

*Fig. 10*

## Load sensing

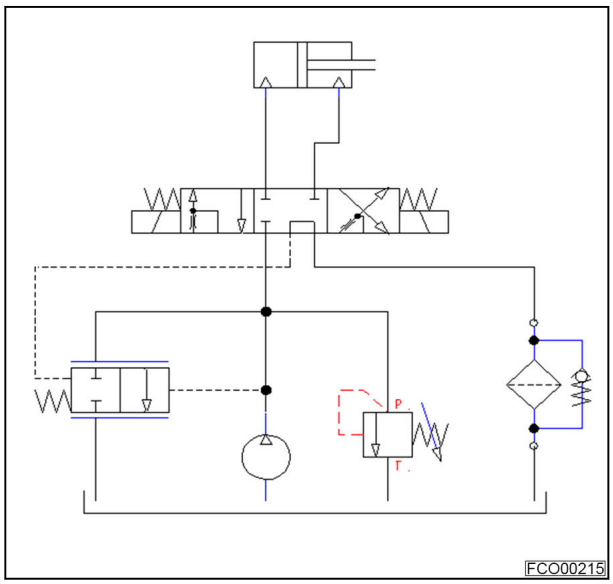


*Fig. 11*

**Note:**

## Load sensing

*Fig. 12*

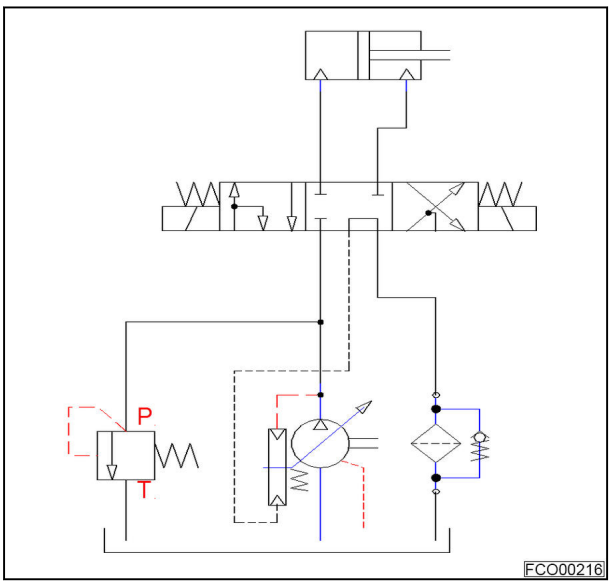


*Fig. 13*

**Note:**

## 7.1.3 Task sheet: Carry out hydraulic measurement

**Tools**

- Workshop Service Manual (fax template)


*Fig. 14*

**Duty**

Enter the pressure of the hydraulic measurement in the table.

| | |
|---|---|
| Working pump pressure, valves locked | |
| Working pump pressure, valves unlocked | |
| Working pump pressure, valve red + deflected | |
| LS pressure, valves locked | |
| LS pressure, valves unlocked | |
| LS pressure, valve red + deflected | |
| Steering pump pressure, steering not actuated | |
| Pressure of the steering when at left or right stop point | |
| LS pressure of the steering when at left or right stop point | |

**Notes**