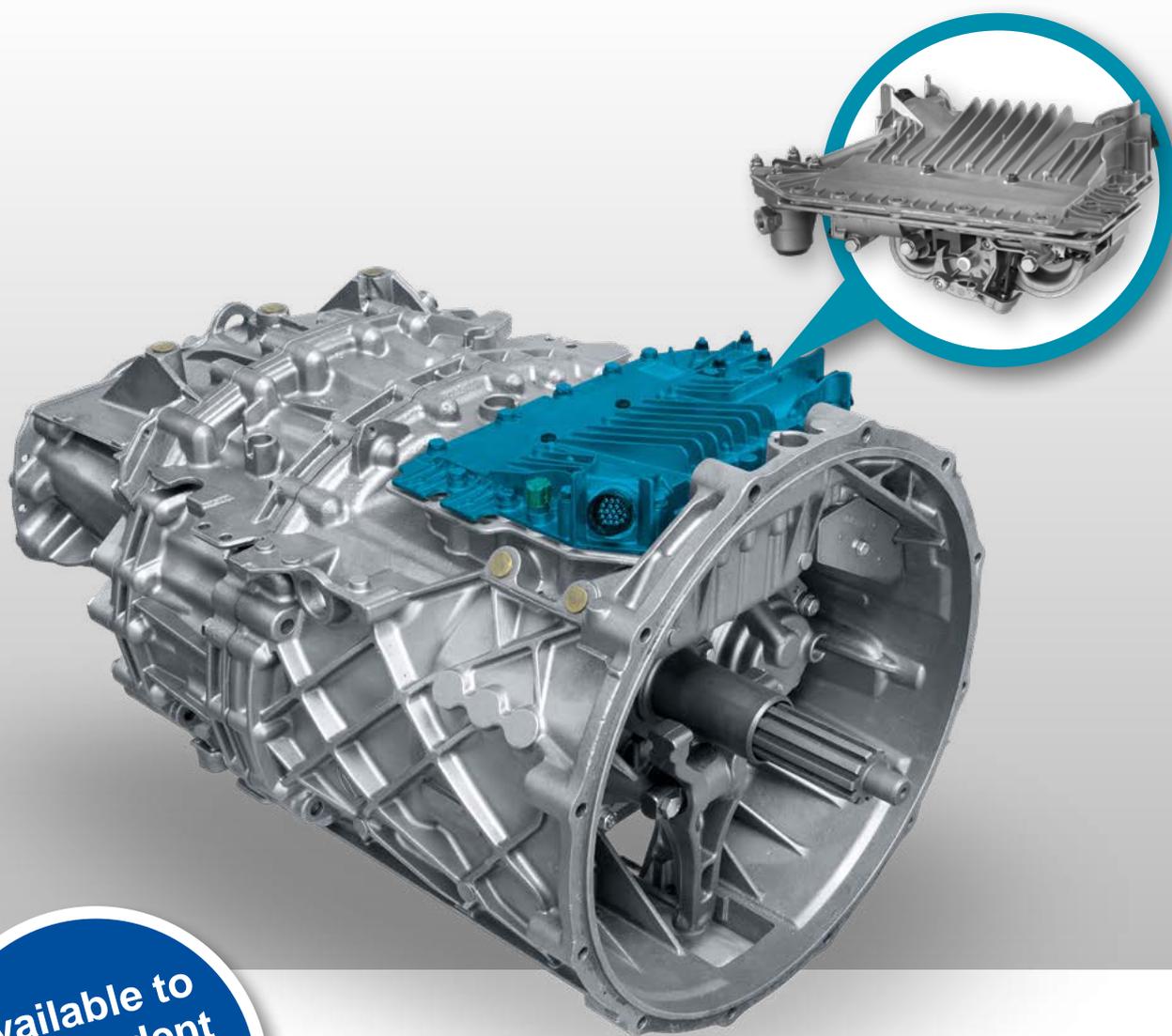


# WABCO AUTOMATED MANUAL TRANSMISSION (AMT)

Aftermarket solutions for gearbox control units  
for ZF transmissions



Available to  
independent  
aftermarket  
workshops!

**WABCO**

# WABCO AUTOMATED MANUAL TRANSMISSION (AMT) AFTERMARKET REPAIR SOLUTIONS

## GROW YOUR BUSINESS WITH WABCO

Truck maintenance involves many challenges – but with WABCO's automated manual transmission (AMT) solutions, gearbox actuator repair does not have to be one of them. WABCO's AMT technology has been used more than 1.2 million times in heavy duty applications fitted with ZF transmissions since 2000.

Our AMT solutions increase fuel savings through optimised gear-shifting, and help vehicle operators significantly reduce mechanical wear – thereby increasing vehicle uptime. With aftermarket demand expected to be strong and stable across the next decade, equipping your workshop to service our ZF AMT technology represents an excellent return on investment in a market with strong potential for growth.

## ORIGINAL PARTS MATTER

Retaining original equipment has many advantages. It guarantees a perfect fit and offers frictionless operation. WABCO's repair kits cover the widest range of repair cases of gearbox control units used in ZF transmissions, and can be sourced swiftly and easily through our comprehensive worldwide distribution network.

## EASIER THAN YOU THINK – AND COST-EFFECTIVE TOO

Repairing an AMT may appear difficult – but with a WABCO repair kit, the reality is much, much simpler. WABCO offers an extensive portfolio of repair solutions for a failsafe repair of many components and in the majority of cases, this repair will replace the requirement to substitute the entire gearbox control unit. Most of the repair cases for ZF transmissions can be performed without the need for any specialist tools and without the need to disassemble the complete transmission. It's a cost-effective strategy and greatly reduces vehicle downtime. And WABCO wouldn't be WABCO if we didn't make things even easier for you by providing you with:

### Easy diagnostics

Supplied via WABCOWÜRTH, we offer a wide range of diagnostic solutions for fast and precise failure detection on gearbox control units for ZF transmissions.

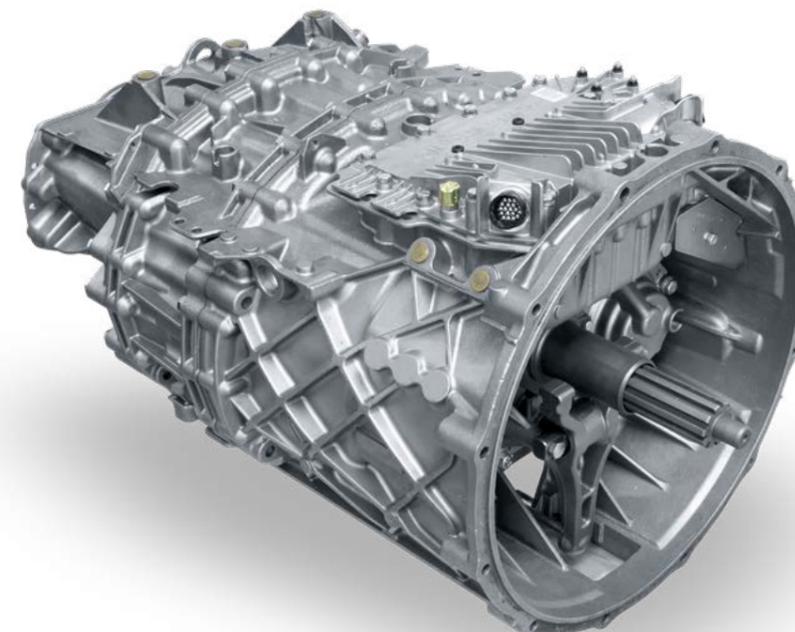
### Tailored repair solutions

WABCO can supply repair kits that are designed to cater for the widest range of gearbox control units repair requirements for ZF transmissions. Reman offers are completing the portfolio.

### Simple teach-in procedure

Our software-guided teach-in procedure is designed to ensure the vehicle is running again with minimal downtime after a repair.

**Find out more detailed information on the following pages.**



## EASY DIAGNOSTICS

Our AMT technology used in ZF transmissions for heavy-duty trucks can be easily diagnosed using multi-brand diagnostic solution supplied by WABCOWÜRTH (W.EASY®) – available for independent aftermarket workshops. It is expertly tailored for WABCO products, resulting in excellent reliability and precision for our gearbox control units repair solutions.

The WABCOWÜRTH diagnostic software is clearly structured, with an easy-to-operate interface. All critical diagnostic functions are displayed, enabling swift and straightforward system analysis. This includes:

- Automatic system scan
- Display and delete functions for fault codes
- Selection, reading and comparison of actual values
- Actuators
- Calibration and coding

### How to order

W.EASY can be ordered via the WABCOWÜRTH distribution network. Each W.EASY diagnostic solution consists of a basic package, to which individual software/hardware can be added. For further details, please visit [www.wabcowuerth.com](http://www.wabcowuerth.com)



## TAILORED REPAIR SOLUTIONS

WABCO offers tailored repair kits, consisting of genuine WABCO parts, for frictionless, cost-efficient repairs. Vast experience working with OE manufacturers and WABCO's long-established reputation for high quality ensure each individual part will fit perfectly, without the compromise of last-minute rework.

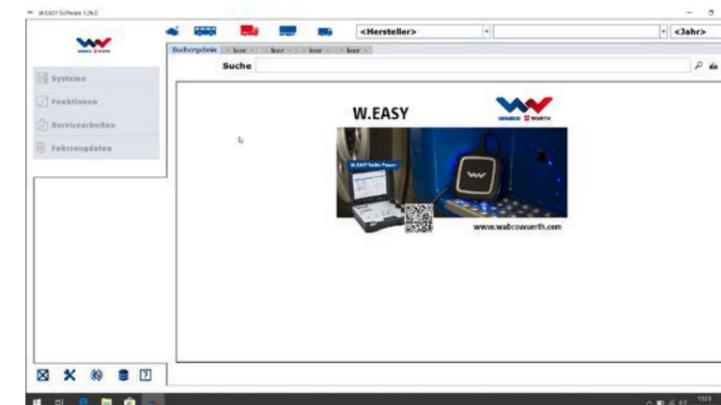


WABCO makes AMT repair as straightforward as possible by offering clear and detailed drawings for each repair kit, providing clarity for the workshop technician by explaining what is inside the package and where each component is located.

## SIMPLE TEACH-IN PROCEDURE

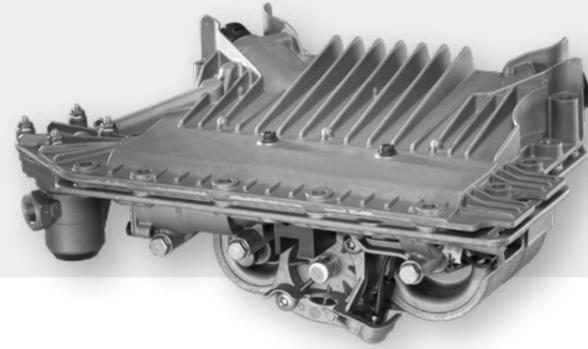
Following repair, a teach-in procedure must be performed on the gearbox control unit. It could not be easier with the multi-brand diagnostic solution W.EASY offered by WABCOWÜRTH. Simply:

1. Connect the system via the on-board diagnostics (OBD) interface.
2. Start the teach-in procedure via the WABCOWÜRTH diagnostic.
3. Follow the instructions given by the software.



## FUNCTIONALITY

The WABCO gearbox control unit used in commercial vehicles equipped with ZF transmissions makes driving easier, safer and more comfortable by automating the shifting process.



The gearbox actuator (GS 3.X) is used in commercial vehicles with a maximum of 16 gears. It is designed to perform swift gear changes, intelligently adapting to the specific driving situation. The GS range is an electronically-driven pneumatic actuator with four cylinders (Gear, Gate, Range, Split) and an integrated Electronic Control Unit (ECU) for shifting the gears of an AMT.

### Application

WABCO AMT solutions are used with ZF transmissions on trucks and busses from DAF, Iveco and MAN.

There are different generations of ZF gearbox actuators on the market:

- Generation 3.0 for trucks launched in 2000
- Generation 3.3 for trucks launched in 2005
- DAF-only generation 3.6 launched in 2012.
- Variants for bus application GS 3.0 (421 355 022 0) and GS 3.3 (421 355 023 0) are also available.

## WABCO REMAN SOLUTIONS

Supporting our repair kit range, WABCO Reman Solutions offers both – a mechanical repair kit as well as complete devices (without software on ECU).

WABCO Reman Solutions does not simply re-build for function, we remanufacture for perfection using the latest technologies and industry knowhow gained from Original Equipment manufacturing. Every WABCO Reman Solutions product performs to the same standards as the original product and is given the same warranty as a new product, guaranteeing a quality that you can truly rely on!



**ECO** LOGICAL  
NOMICAL

**WABCO**  
REMAN SOLUTIONS

### REMAN mechanical repair kit

| WABCO Reman number | Description  | Cross references |            |
|--------------------|--|------------------|------------|
|                    |  | WABCO            | ZF         |
| 421 355 950 R      | GS 3.0/3.3 repair unit (lower part) without ECU<br>Gasket set 421 355 928 2 is selling separately. | 421 355 950 2    | 6009274088 |

### REMAN complete devices for AMT specialists

The GS devices mentioned below are sold without software (empty ECU).

To purchase these products directly, a special contract is required. The alternative option is to purchase them via one of our dedicated distributors. For more information, please contact your local WABCO sales representative.

| WABCO Reman number | Description  | Cross references |                          |
|--------------------|--|------------------|--------------------------|
|                    |  | WABCO            | ZF                       |
| 421 355 011 R      | Gearbox actuator GS 3.0 Standard, without software | 421 355 011 0    | 6009274069<br>6009074900 |
| 421 355 012 R      | Gearbox actuator GS 3.3 Standard, without software | 421 355 012 0    | 6009297007<br>6009097900 |
| 421 355 015 R      | Gearbox actuator GS 3.6 Standard, without software | 421 355 015 0    | 6009297017               |
| 421 355 022 R      | Gearbox actuator GS 3.0 Bus, without software      | 421 355 022 0    | 6009274070<br>6009074901 |
| 421 355 023 R      | Gearbox actuator GS 3.3 Bus, without software      | 421 355 023 0    | 6009297008<br>6009097901 |

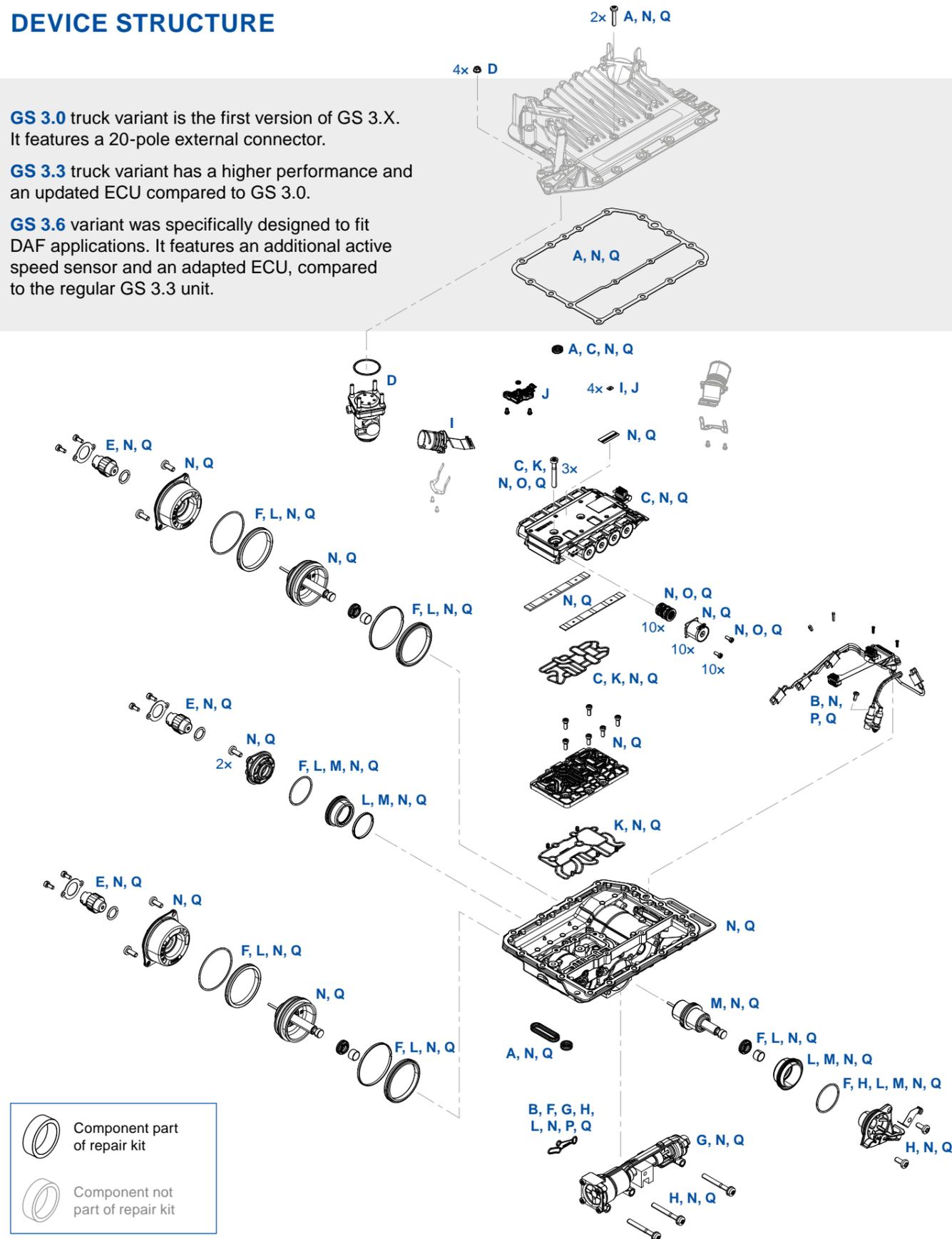
# REPAIR SOLUTIONS FOR TRUCK VARIANTS

## DEVICE STRUCTURE

**GS 3.0** truck variant is the first version of GS 3.X. It features a 20-pole external connector.

**GS 3.3** truck variant has a higher performance and an updated ECU compared to GS 3.0.

**GS 3.6** variant was specifically designed to fit DAF applications. It features an additional active speed sensor and an adapted ECU, compared to the regular GS 3.3 unit.



## OVERVIEW OF REPAIR KITS

| Position | Main component                                   | WABCO number  | Cross references ZF |
|----------|--|---------------|---------------------|
| A        | Gasket set between ECU and lower actuator        | 421 355 928 2 | 501.323.922         |
| B        | Connector bridge and sealing for gate-cylinder   | 421 355 929 2 | 501.321.146         |
| C        | Solenoid block + screws, gaskets                 | 421 355 930 2 | 501.321.147         |
| D        | Pressure limiting valve                          | 421 355 931 2 | 501.320.849         |
| E        | 1 distance sensor + o-ring and screws            | 421 355 932 2 | 501.321.148         |
| F        | Repair kit for range-, gear- and split-cylinder  | 421 355 933 2 | 501.321.149         |
| G        | Complete sleeve cylinder + gasket                | 421 355 934 2 | 501.321.182         |
| H        | End cover for gear-cylinder + screws             | 421 355 936 2 | 501.322.661         |
| I        | Repair kit electrical connector                  | 421 355 943 2 | 501.323.630         |
| J        | Pressure sensor                                  | 421 355 946 2 | 501.323.627         |
| K        | Sealings for seat                                | 421 355 947 2 | 501.330.103         |
| L        | Sealing kit for range-, gear- and split-cylinder | 421 355 948 2 | 501.324.253         |
| M        | Pistons and sealings for gear-cylinder           | 421 355 949 2 | 501.324.254         |
| N        | Gearbox unit lower part (GS 3.0/GS 3.3)          | 421 355 950 2 | 600.927.408.8       |
| O        | Single valve                                     | 421 355 951 2 | 501.323.914         |
| P        | Connector bridge and sealing for gate-cylinder   | 421 355 954 2 | 501.330.983         |
| Q        | Gearbox unit lower part (GS 3.6)                 | 421 355 956 2 | -                   |

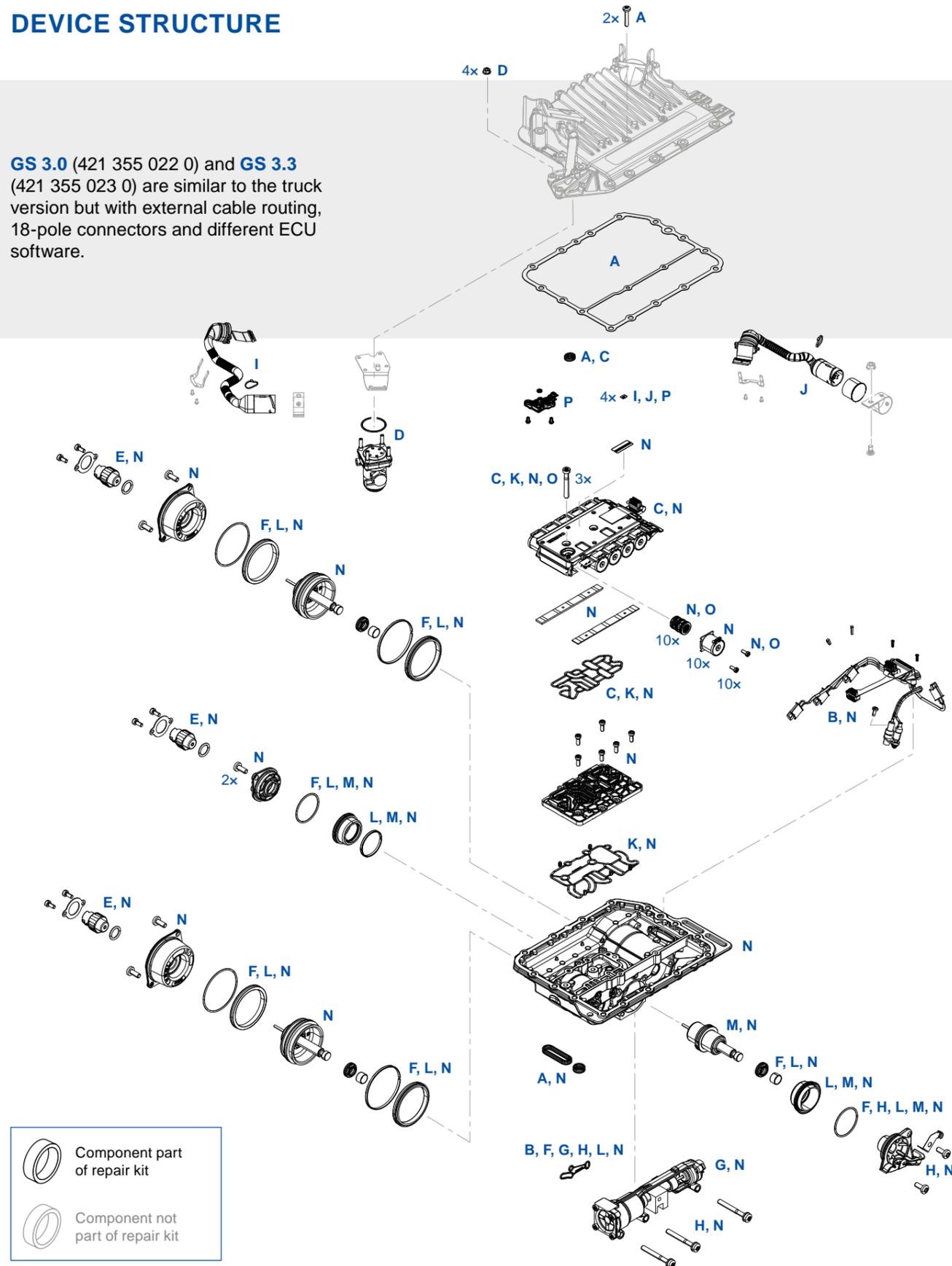
## REPAIR KITS FOR BASIC DEVICES

| Position | Repair kit    | Basic device                              |                                |                                |                                |
|----------|---------------|---|--------------------------------|--------------------------------|--------------------------------|
|          |               | Variant: GS 3.0 truck                     | GS 3.3 truck                   |                                | GS 3.6 DAF truck               |
|          |               | WABCO: 421 355 011 0<br>ZF: 600 927 406 9 | 421 355 012 0<br>600 929 700 7 | 421 355 014 0<br>600 939 776 9 | 421 355 015 0<br>600 929 701 7 |
| A        | 421 355 928 2 | ✓   | ✓                              | ✓                              | ✓                              |
| B        | 421 355 929 2 | ✓   | ✓                              | ✓                              | -                              |
| C        | 421 355 930 2 | ✓   | ✓                              | ✓                              | ✓                              |
| D        | 421 355 931 2 | ✓   | ✓                              | ✓                              | ✓                              |
| E        | 421 355 932 2 | ✓   | ✓                              | ✓                              | ✓                              |
| F        | 421 355 933 2 | ✓   | ✓                              | -                              | ✓                              |
| G        | 421 355 934 2 | ✓   | ✓                              | -                              | ✓                              |
| H        | 421 355 936 2 | ✓   | ✓                              | -                              | ✓                              |
| I        | 421 355 943 2 | ✓   | ✓                              | -                              | ✓                              |
| J        | 421 355 946 2 | ✓   | ✓                              | -                              | -                              |
| K        | 421 355 947 2 | ✓   | ✓                              | ✓                              | ✓                              |
| L        | 421 355 948 2 | ✓   | ✓                              | -                              | ✓                              |
| M        | 421 355 949 2 | ✓   | ✓                              | -                              | ✓                              |
| N        | 421 355 950 2 | ✓   | ✓                              | -                              | -                              |
| O        | 421 355 951 2 | ✓   | ✓                              | -                              | ✓                              |
| P        | 421 355 954 2 | -   | -                              | -                              | ✓                              |
| Q        | 421 355 956 2 | -   | -                              | -                              | ✓                              |

# REPAIR SOLUTIONS FOR BUS VARIANTS

## DEVICE STRUCTURE

**GS 3.0** (421 355 022 0) and **GS 3.3** (421 355 023 0) are similar to the truck version but with external cable routing, 18-pole connectors and different ECU software.



## OVERVIEW OF REPAIR KITS

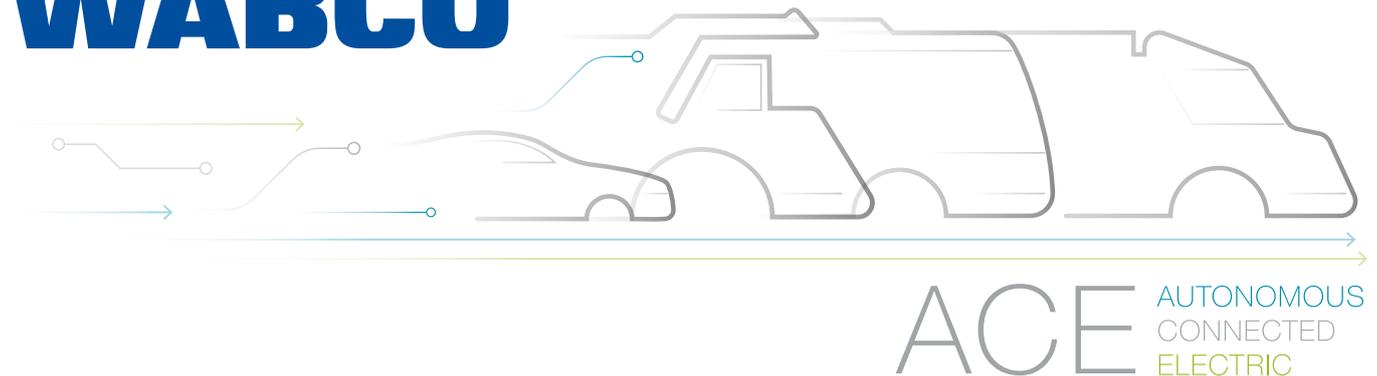
| Position | Main component                                   | WABCO number  | Cross references ZF |
|----------|--|---------------|---------------------|
| A        | Gasket set between ECU and lower actuator        | 421 355 928 2 | 501.323.922         |
| B        | Connector bridge and sealing for gate-cylinder   | 421 355 929 2 | 501.321.146         |
| C        | Solenoid block + screws, gaskets                 | 421 355 930 2 | 501.321.147         |
| D        | Pressure limiting valve                          | 421 355 931 2 | 501.320.849         |
| E        | 1 distance sensor + o-ring and screws            | 421 355 932 2 | 501.321.148         |
| F        | Repair kit for range-, gear- and split-cylinder  | 421 355 933 2 | 501.321.149         |
| G        | Complete sleeve cylinder + gasket                | 421 355 934 2 | 501.321.182         |
| H        | End cover for gear-cylinder + screws             | 421 355 936 2 | 501.322.661         |
| I        | Cable  | 421 355 944 2 | 501.323.629         |
| J        | External cable (vehicle)                         | 421 355 945 2 | 501.323.628         |
| K        | Sealings for seat                                | 421 355 947 2 | 501.330.103         |
| L        | Sealing kit for range-, gear- and split-cylinder | 421 355 948 2 | 501.324.253         |
| M        | Pistons and sealings for gear-cylinder           | 421 355 949 2 | 501.324.254         |
| N        | Gearbox unit lower part (GS 3.0/GS 3.3)          | 421 355 950 2 | 600.927.408.8       |
| O        | Single valve                                     | 421 355 951 2 | 501.323.914         |
| P        | Pressure sensor                                  | 421 355 946 2 | 501.323.627         |

## REPAIR KITS FOR BASIC DEVICES

| Position | Repair kit    | Basic device                              |                                |
|----------|---------------|---|--------------------------------|
|          |               | Variant: GS 3.0 bus                       | GS 3.3 bus                     |
|          |               | WABCO: 421 355 022 0<br>ZF: 600 927 407 0 | 421 355 023 0<br>600 929 700 8 |
| A        | 421 355 928 2 | ✓   | ✓                              |
| B        | 421 355 929 2 | ✓   | ✓                              |
| C        | 421 355 930 2 | ✓   | ✓                              |
| D        | 421 355 931 2 | ✓   | ✓                              |
| E        | 421 355 932 2 | ✓   | ✓                              |
| F        | 421 355 933 2 | ✓   | ✓                              |
| G        | 421 355 934 2 | ✓   | ✓                              |
| H        | 421 355 936 2 | ✓   | ✓                              |
| I        | 421 355 944 2 | ✓   | ✓                              |
| J        | 421 355 945 2 | ✓   | ✓                              |
| K        | 421 355 947 2 | ✓   | ✓                              |
| L        | 421 355 948 2 | ✓   | ✓                              |
| M        | 421 355 949 2 | ✓   | ✓                              |
| N        | 421 355 950 2 | ✓   | ✓                              |
| O        | 421 355 951 2 | ✓   | ✓                              |
| P        | 421 355 946 2 | ✓   | ✓                              |

Information on WABCO products can be found in our Customer Centre ([www.wabco-customercentre.com](http://www.wabco-customercentre.com)) by entering the product number in the “Search Products” field. Please contact your WABCO partner for further information: [www.wabco-auto.com/Get-in-touch](http://www.wabco-auto.com/Get-in-touch)

# WABCO



## ZF Friedrichshafen AG

ZF is a global technology company and supplies systems for passenger cars, commercial vehicles and industrial technology, enabling the next generation of mobility. ZF allows vehicles to see, think and act. In the four technology domains Vehicle Motion Control, Integrated Safety, Automated Driving, and Electric Mobility, ZF offers comprehensive solutions for established vehicle manufacturers and newly emerging transport and mobility service providers. ZF electrifies different kinds of vehicles. With its products, the company contributes to reducing emissions and protecting the climate.

ZF, which acquired WABCO Holdings Inc. on May 29, 2020, now has 162,000 employees worldwide with approximately 260 locations in 41 countries. In 2019, the two then-independent companies achieved sales of €36.5 billion (ZF) and \$3.4 billion (WABCO).

With the integration of WABCO, the leading global supplier of braking control systems and other advanced technologies that improve the safety, efficiency and connectivity of commercial vehicles ZF will create a new level of capability to pioneer the next generation of solutions and services for original equipment manufacturers and fleets globally. WABCO, with almost 12,000 people in 40 locations worldwide, will now operate under the ZF brand as its new Commercial Vehicle Control Systems division.

# WABCO