

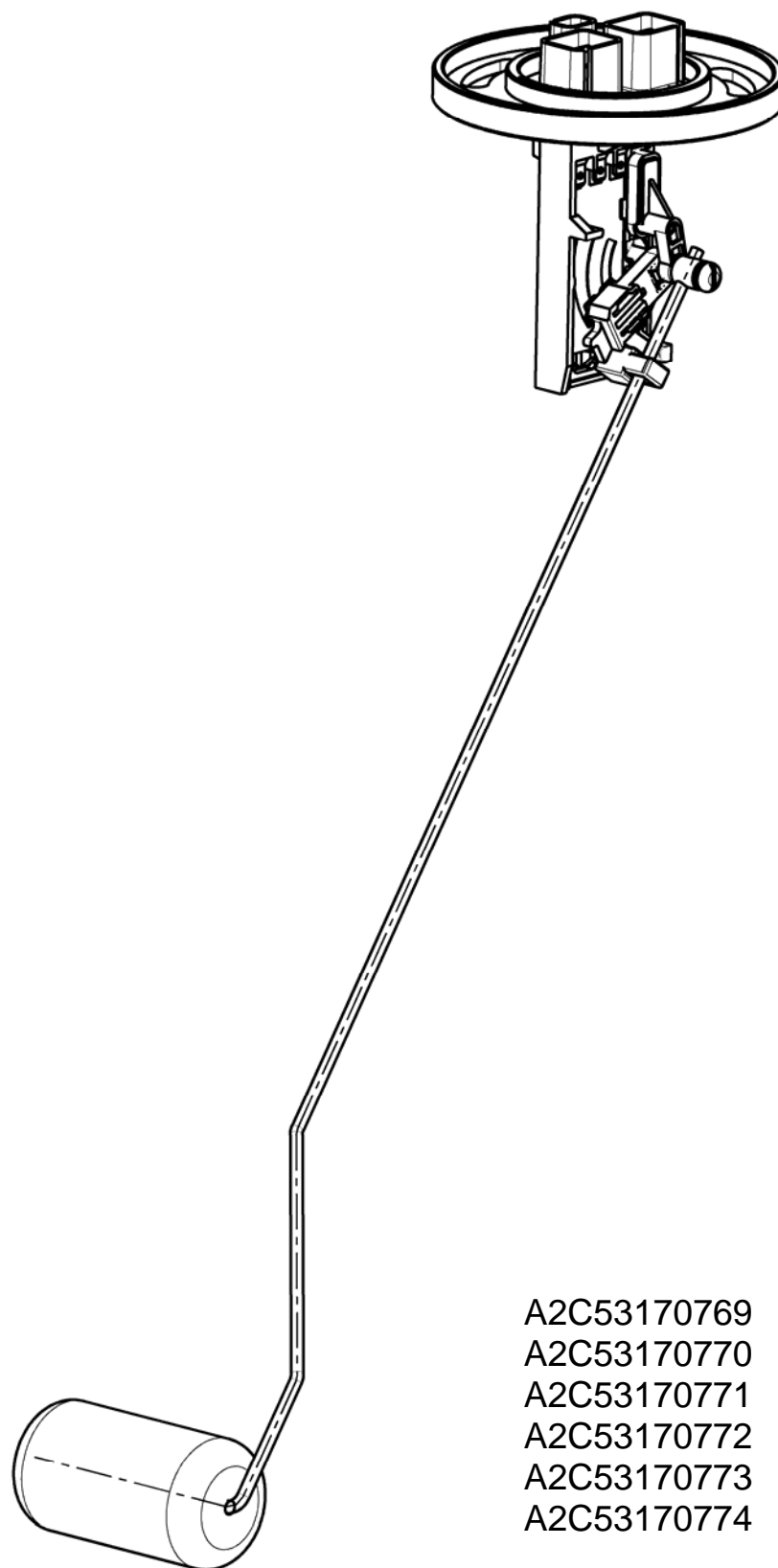
# Adjustable Fuel Lever Arm Sender Sensors



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## Adjustable Fuel Lever Arm Sender Specification

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A2C53170769  
A2C53170770  
A2C53170771  
A2C53170772  
A2C53170773  
A2C53170774

# Adjustable Fuel Lever Arm Sender Specification

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# Adjustable Fuel Lever Arm Sender Specification

## 1. General Description

### 1.1 Purpose

The adjustable lever arm sender measures the fuel level within a closed tank and is connected via an electrical output to a fuel gauge. As an option, adjustable fuel level sensors with an integrated warning contact can be used in order to also indicate whether a certain minimum fuel level has been reached.

To support different tank depths both sensor variants are equipped with an adjustable lever arm.

### 1.2 Component Function

The sensors lever arm and float is hinged to a contact system which in conjunction with a potentiometer creates an ohmic resistance. This ohmic resistance of the open potentiometer depends on the fuel level.

### 1.3 Application

This document describes the functional, electrical and mechanical characteristics of the adjustable lever arm sender and its requirements on the system (interfaces and environment).

The specified adjustable lever arm sender is a component of the engine management system. The interface gauge / the adjustable lever arm sender is also described in this document.

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## 2. Design

### 2.1 Dimensions

The major dimensions and the interface dimensions of the adjustable lever arm sender are specified on the customer drawing.

### 2.2 Lever Arm Fixing

The lever arm fixed to the contact system and flange via a bolt and clamping screw. After the lever arm has been shortened, it can be adapted to the tank dimension via the clamping screw. The contact system is connected to the lever arm and circularly moves on the thick-film network depending the float position. The locking of the retaining clip and lever arm has a defined free travel which compensates minor movements of the lever arm caused by e.g. sea waves. This compensation improves lifetime of the contact system and thick-film network..

### 2.3 Resistor Core (Thick-Film Network)

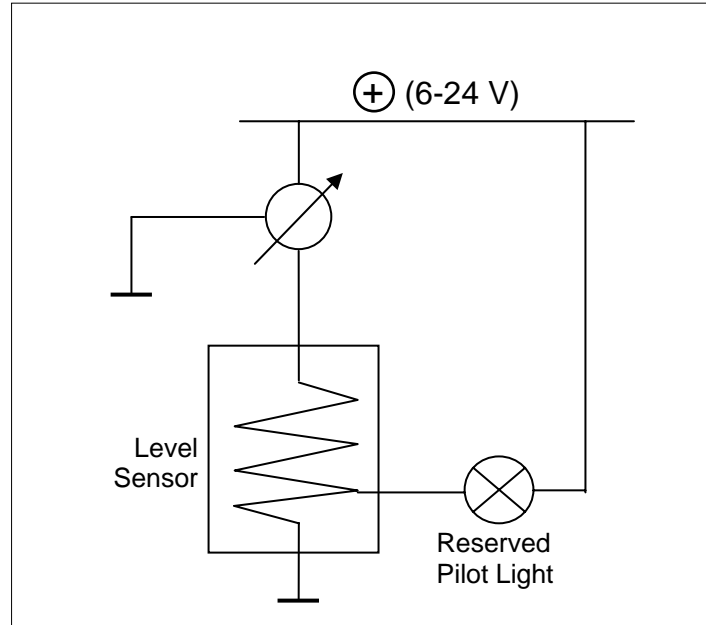
The resistor core (comparable to a potentiometer) consists on a ceramic substrate carrier and an applied resistance paste. Depending on the position of the contact system, variable resistance values are submitted.

### 2.4 Connector

Two contacts (three contacts for warning contact version) for all input and output signals are integrated into the adjustable lever arm sender. The connector version and the pin configuration is specified in the manual. In case the sensor is not connected the contact tabs are protected with socket housings. Slots in the socket housings prevent contact corrosion as water is directly led outside.

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## 2.5 Schematic



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## 3. Interface Description

### 3.1 Electrical Interface

The adjustable lever arm sender is connected to the gauge. The position of the lever arm with the float is displayed on the gauge.

In order to avoid damage caused by mishandling of the adjustable lever arm sender the following requirements and specifications must be considered:

#### 3.1.1 Voltage

Operating Voltage: 6...28 V

Nominal Voltage: 12/24 V

#### 3.1.2 Connector

- Gauge/signal 6,3x0,8 DIN 46247 (blade terminal)
- Ground 6,3x0,8 DIN 46247 (blade terminal)
- Warning contact 2.8x0,8 DIN 46247 (blade terminal)

### 3.2 Mechanical Interface

This information is specified in details in customer drawing

mounting geometry	see customer drawing
mounting hole Ø	40 / 60 mm
footprint	71 mm x 71 mm
Working inside tank	see the customer drawing
connector position	90° to flange
total weight	approx. 0,059 kg

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## 4. Functional Characteristics

### 4.1 Resistance values

A2C53170769:	90...2 $\Omega$	(full...empty)
A2C53170770:	33,5...240 $\Omega$	(full...empty)
A2C53170771:	180...2,5 $\Omega$	(full...empty)
A2C53170772:	90...2 $\Omega$	(full...empty, with warning contact)
A2C53170773:	33,5...240 $\Omega$	(full...empty, with warning contact)
A2C53170774:	180...2,5 $\Omega$	(full...empty, with warning contact)

### 4.2 Warning contact

Warning contact at ~15% rest volume.  
Further details see customer drawing.

### 4.3 Working space

See customer drawing.



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## 5. Strength test

### 5.1 Vibration

One or more functions of the DUT do not perform as specified during exposure to the test parameters but return to normal operation after the end of exposure.

No changes may occur which affect the performance of the DUT (e.g. sealing functions or legibility of lettering and labels).

#### **Vibration**

In the vibration test the correct functioning of the DUT under a load similar to practice is tested. Profile and duration of the vibration shall make fatigue obvious. The vibration test is not a wear test.

The DUT shall be mounted in installation position on the vibrator table/sliding table by means of suitable holders. Cables and hose connections as well as related add-on parts shall be properly mounted. Cables and hoses shall be supported in accordance with installation conditions without influencing the DUT.

The specified values refer to directly mounted devices. The acceleration measuring point is the interface between test table and DUT.

Orientation of DUT and test sequence shall be documented in the test report.

As vibration load may occur in the vehicle at low and high temperatures, the vibration load test is performed with a temperature profile acc. to "temperature cycle". Electrical operation as specified in section for the endurance test.

#### **Requirements:**

All lines are connected acc. to vehicle installation on instrument.

All functions of the DUT perform as specified and after exposure to the test parameters.

No disturbing noise may occur for any operating type.

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## Testing

### Aim

In the tank area is a wide band random vibration.

### Test

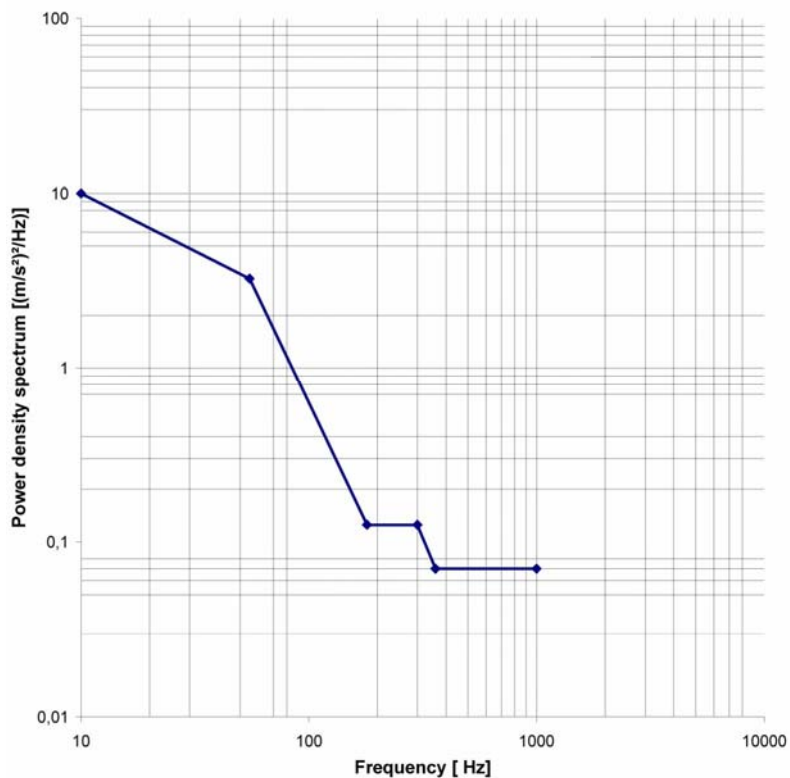
Excitation with wide band random vibrations  
 Procedure according to DIN EN 60068-2-64.

Test duration for each spatial axis:

8h

Actual acceleration value:

19.7 m/s<sup>2</sup>



**Wide band random vibration profile**  
**Wide band random vibration profile values**

Frequency (Hz)	Power density spectrum decreased by -3dB [(m/s <sup>2</sup> ) <sup>2</sup> /Hz]
10	10
55	3.25
180	0.125
300	0.125
360	0.07
1000	0.07

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## 5.2 Plug Resilience and Pull-out Strength

Plug resilience according to Table Connector types and forces:  
Forces shall not be carried by solder points.

Test rate: 100 mm/min

Flat terminal on the device	Plug resilience/pull out strength
6,3 x 0,8	≥ 150 N
2,8 x 0,8	≥ 80 N

### Resistance to Environmental Factors

The DUT shall not be subjected to any further testing.

#### Aim

Resistance to environmental factors of the flange is tested.  
Test position corresponds to as-installed position.

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## 6. Environment / Installation Parameters

### 6.1 Medium

Measured medium is:

Diesel fuel	acc. to DIN EN 590 and DIN EN 14214
Premium unleaded fuel	acc. to DIN EN 228 (ROZ $\geq$ 95.0; MOZ $\geq$ 85.0)
Central hydraulic system fluid	acc. to TL 521 46

### 6.2 Temperature Range

Operating temperature:	-25°C to +70°C
Storage temperature:	-40°C to +80°C

### 6.3 Installation Parameters

See the customer drawing.

## 7. Testing

The adjustable lever arm sender successfully passes the following tests:

- Environmental Tests
  - Aging in circulated air (DIN EN 60068-2-14)
  - Thermal Shock Test (DIN EN 60068-2-14)
  - Salt Spray Test (DIN EN 60068-2-11)
  - Humidity Test (DIN EN 60068-2-30)
  - Leak tightness with respect to air
  - Pressure Restance (DIN 53 758)
  - Sealing against dust and water spray (DIN 40050-9)
  - Plug Resilience and Pull-out strength
  - Resistance to chemical agents
  - Protection against ignition of surrounding flammable gases (ISO 8846)
- Endurance Tests:
  - Life Test (1000h)
  - Vibration test

More specific data on these tests can be supplied on demand.

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## 8. List of Abbreviations

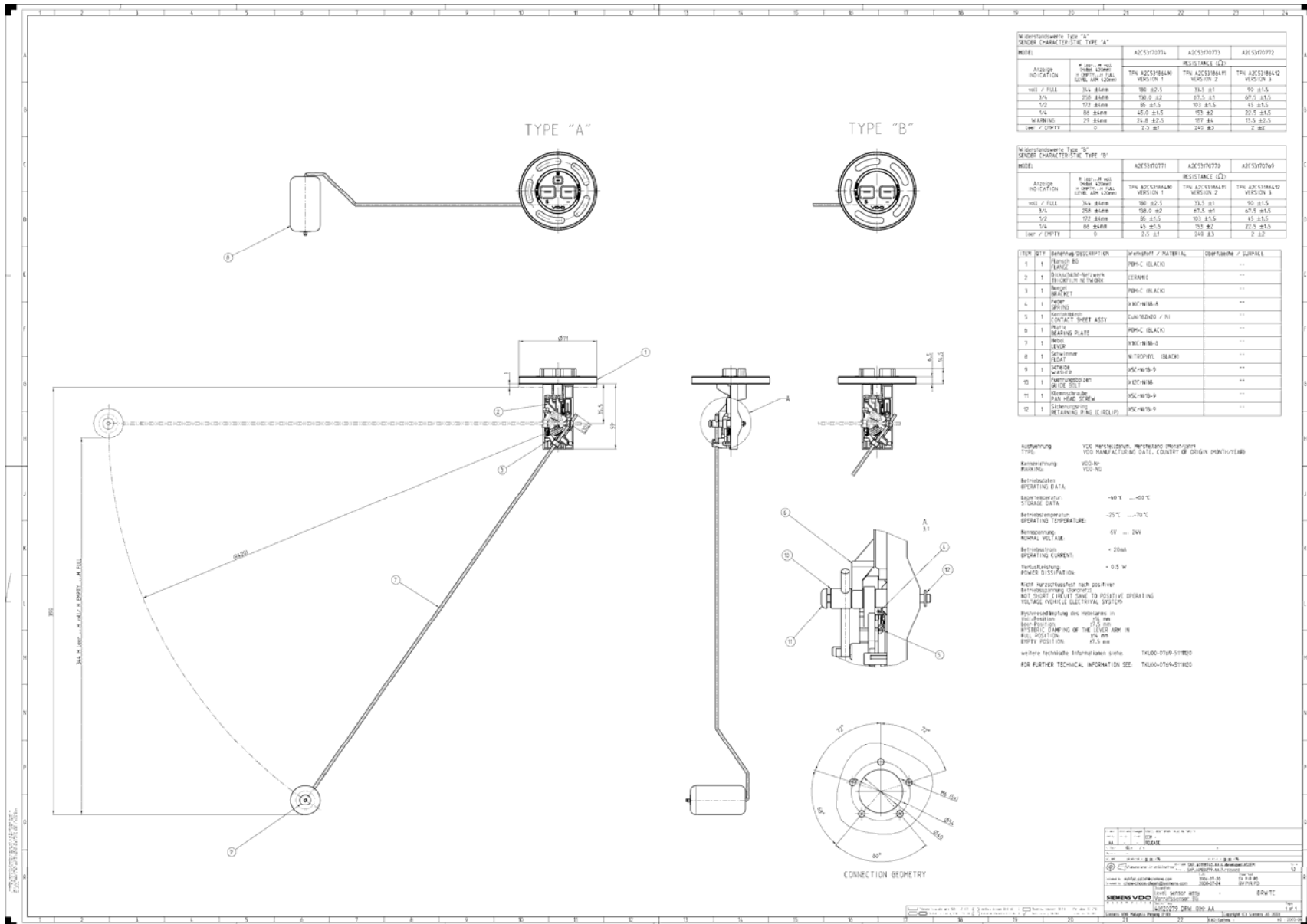
DUT	device under test
IP	impact protection
TFN	Thick film network

## 9. Warranty Terms

Siemens VDO Trading reserves the right to reject any warranty claims made by the customer pending a thorough investigation of the circumstances.

The limited liability stated in the General Terms and Conditions of Business will have to be taken into account.

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