

# STATOGRAPH

## Probes 6.421



*Figure 1: STATOGRAPH® Standard Probes.*

- Test probes for non-destructive crack detection using eddy-current method
- Individual probes for permanent installation into a test station
- Scanning a track which is produced either by movement of the test part or by moving the probe
- Various types of construction, e.g. round, pointed, flat, angled

## Characteristics

- Probes with differential connection
- normally with clearance compensation
- Track widths from 1.2 mm to 5 mm
- Test frequencies up to 1 MHz or 10 MHz
- High sensitivity
- High electrical and mechanical strength

## Application

- Non-destructive testing for surface flaws using the eddy-current method according to EN 12084
- Testing of ferrous, austenitic, and non-ferrous Material
- Testing mass-produced parts, components, and structures
- Testing in automatic production machines or automatic testing machines
- Testing by robot-guided probes
- Testing the entire parts surface or section-by-section testing of surface areas of particular interest
- Extremely high flaw resolution as of 50  $\mu\text{m}$  flaw depth, depending on surface quality

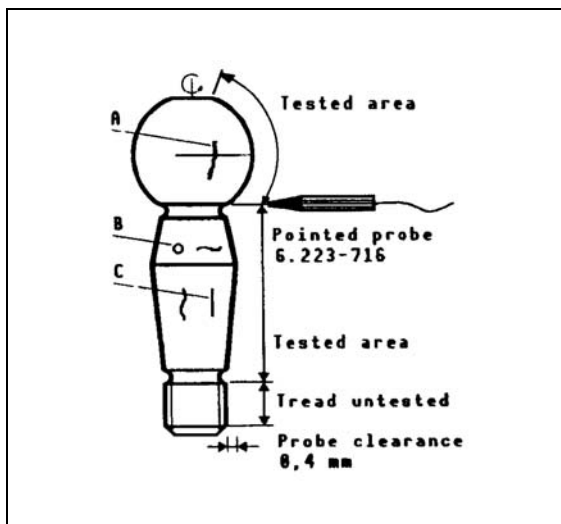


Figure 2 Ball pin testing with probe D. The surface of the rotating ball is scanned fully automatically.

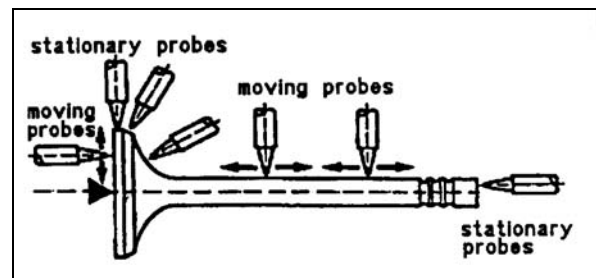


Figure 3 Valve testing with 7 probes simultaneously. Each probe scans one zone of the rotating valve.

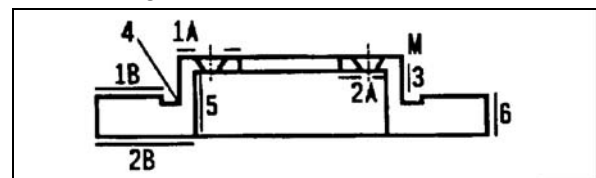


Figure 4 Brake disk testing with 6 individual probes simultaneously. Probes 1 and 2 each scan two zones, probes 3, 4, 5, and 6 each scan one zone on the brake disk.

## Mode of operation

The eddy-current scanning probe with "punctiform" action scans only a small area of the material surface at any given moment, therefore concentrating on a very small section of the overall testing area. In relation to this small section even an extremely small material flaw represents a large disturbance. This results in a very high resolution of the flaw indication.

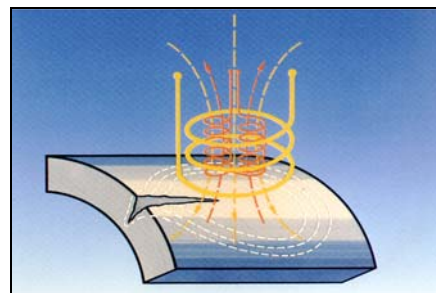


Figure 5 Principle of the eddy-current scanning probe.

## Construction

A mechanically extremely rugged, abrasion-resistant retainer accommodates the probe element at its tip. The tip of the retainer has various shapes, e.g. round, flat, pointed. Additionally it may be angled. This permits the most suitable shape of probe to be selected for the relevant application.

The connection cable is permanently connected to the other end of the probe. For cable lengths please refer to the table below.

A 15-pin cable connector is used for connection. An anti-kink sleeve protects against cable breakage at the transition points.

Depending on the application (test instrument, test probe, distance between instrument and probe) the probe is connected either directly to the STATOGRAPH instrument or by use of an adapter. For details concerning these adapters please see the corresponding

leaflet of the test instrument. Connection schemes for standard applications are given below.

For those applications which cannot be solved with the standard probes described in this leaflet (e.g. because of shape, dimensions, track width, cable length) FOERSTER is able to offer the development of customer-specific probes. Please contact us if your application is not covered by our standard probes.

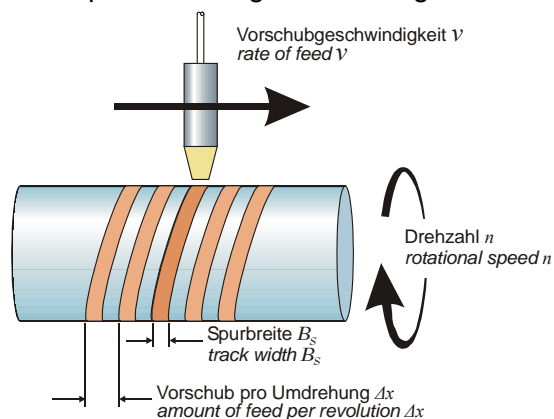
The probes with type numbers 6.223 and 6.420 (8-pin connector, non-shielded probe cable) are not recommended any more. For inquiries regarding spare part delivery and/or technical details please contact your local FOERSTER representative.

For applications with a rotating probe please see the list of product information at the end of this leaflet.

## Planning guide

In a typical application the eddy-current probe is moved parallel to the longitudinal axis of a rotating test part. The superposition of the rotational and the longitudinal movement results in a helical scanning of the whole cylindrical surface under test.

Depending on the track width and the rate of feed of the probe as well as the rotational speed of the test part an entire or an incomplete coverage is resulting.



In order to get an **entire coverage** of the parts surface the amount of feed per revolution  $\Delta x$  may not be larger than the track width  $B_s$  of the probe. For a fixed rotational

speed  $n$  the rate of feed  $v$  has to be adjusted according to:

$$v \leq B_s \cdot n$$

For a **secured detection of crack-like** surface flaws the flaw should be hit by the probe at least twice during the scan. Assuming a complete scanning of the surface this condition results in a minimum crack length  $L$  for a safely detectable longitudinal flaw:

$$L \geq 2 \cdot B_s$$

For a **secured detection of pore-like** surface flaws the lateral detection efficiency of the probe has to be taken into account. Therefore the amount of feed per revolution  $\Delta x$  should be **significantly** less than the track width  $B_s$  of the probe. For all of the probes described in this leaflet the amount of feed should be arranged according to:

$$v \leq 2/3 \cdot B_s \cdot n$$

### Probe D, AK 6.421.01-7787

Standard probe for most of the applications. The track width of 2.5 mm enables for high test speed and high test sensitivity at the same time.

### Probe D, AK 6.421.01-7151

Standard probe with increased test sensitivity at reduced track width (1.5 mm).

### Probe D 6.421.01-7716

Standard probe for those applications where highest test sensitivity to detect even the smallest surface flaws is required. Track width 1.2 mm. No clearance winding.

### Probe D, AK 6.421.01-7061

Probe with notably high track width (5.0 mm) for gaining highest possible test speed. Round cross section.

### Probe D, AK RECT 6.421.01-7401

Probe with notably high track width (5.0 mm) for gaining highest possible test speed. Rectangular cross section.

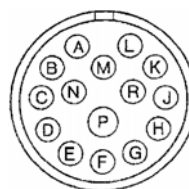
### Probe angled 90°D, AK

Angled probe for test zones with reduced accessibility, e.g. testing the inner surface of bearings, brake pistons, cylinder liners, etc. Various track widths and shapes/dimensions.

## Technical Data

### Connector

- 15-pin Bendix PT 06A 14-15P (SR)



Designation	Drawing no.	Order no.	track width [mm]	test frequency [kHz]	cable length
PROBE D, AK	6.421.01-7787	169 156 2	2,5	up to 1 MHz	3 m
PROBE D, AK	6.421.01-7151	169 155 4	1,5	up to 1 MHz	3 m
PROBE D, AK	6.421.01-7151 M5	182 141 5	1,5	up to 1 MHz	5 m
PROBE D	6.421.01-7716	181 504 0	1,2	up to 10 MHz	3 m
PROBE D, AK	6.421.01-7061	182 474 0	5,0	up to 1 MHz	3 m
PROBE D, AK, RECT	6.421.01-7401	182 473 2	5,0	up to 1 MHz	3 m
PROBE ANGLED 90 D, AK	6.421.01-4102	159 534 2	1,5	up to 1 MHz	2 m
PROBE ANGLED 90 D, AK	6.421.01-4103	150 722 2	0,8	1 MHz	1 m
PROBE ANGLED 90 D, AK	6.421.01-4104	188 014 4	2,5	0,1 to 1 MHz	1 m
PROBE ANGLED 90 D, AK	6.421.01-4105	188 100 0	1,5	0,1 to 1 MHz	2 m

Note: Probes with type numbers 6.223 and 6.420 are not described in this leaflet. For technical or commercial information regarding these probes please consult your local FOERSTER representative.

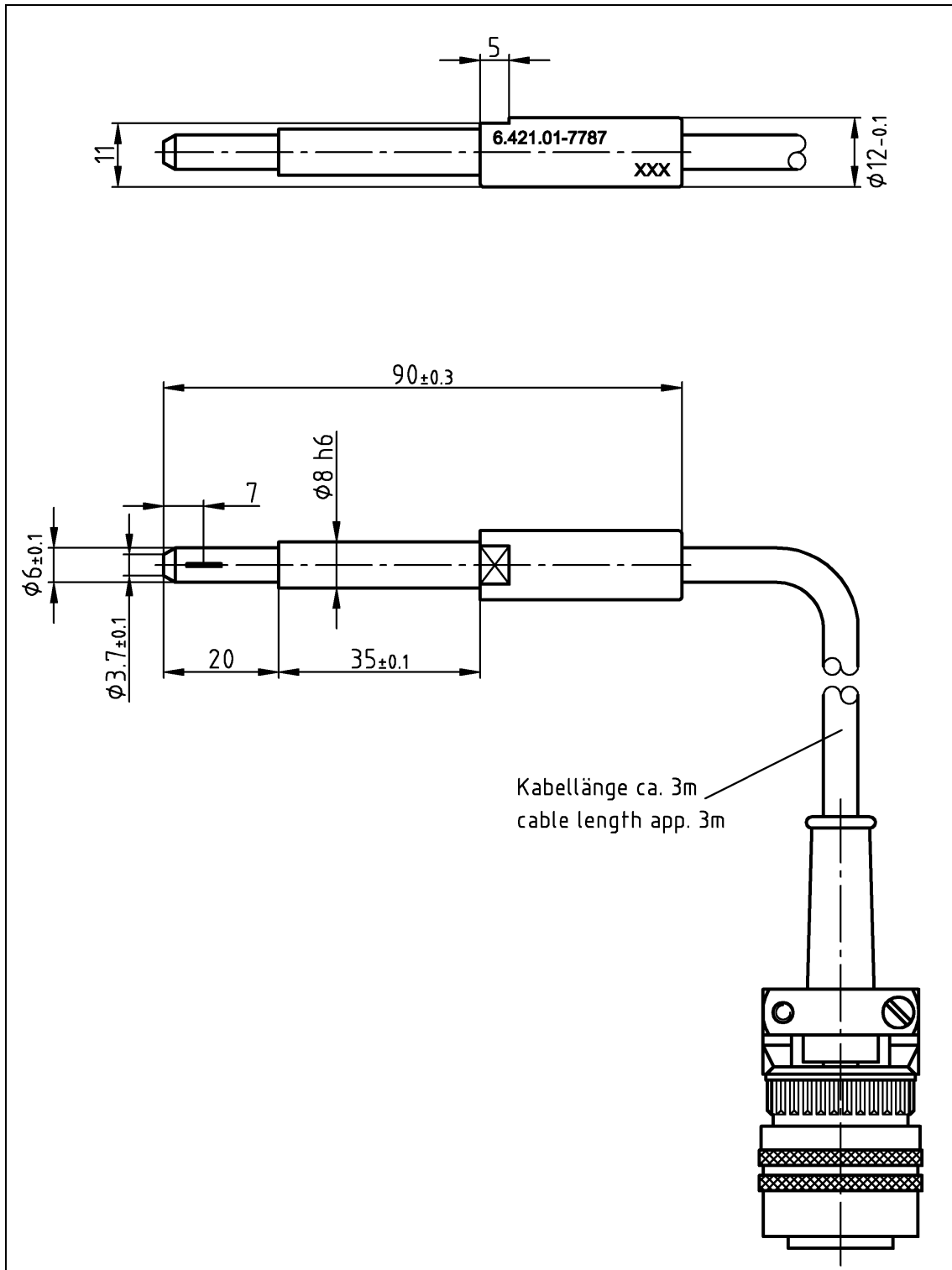


Figure 6 Probe D, AK 6.421.01-7787.

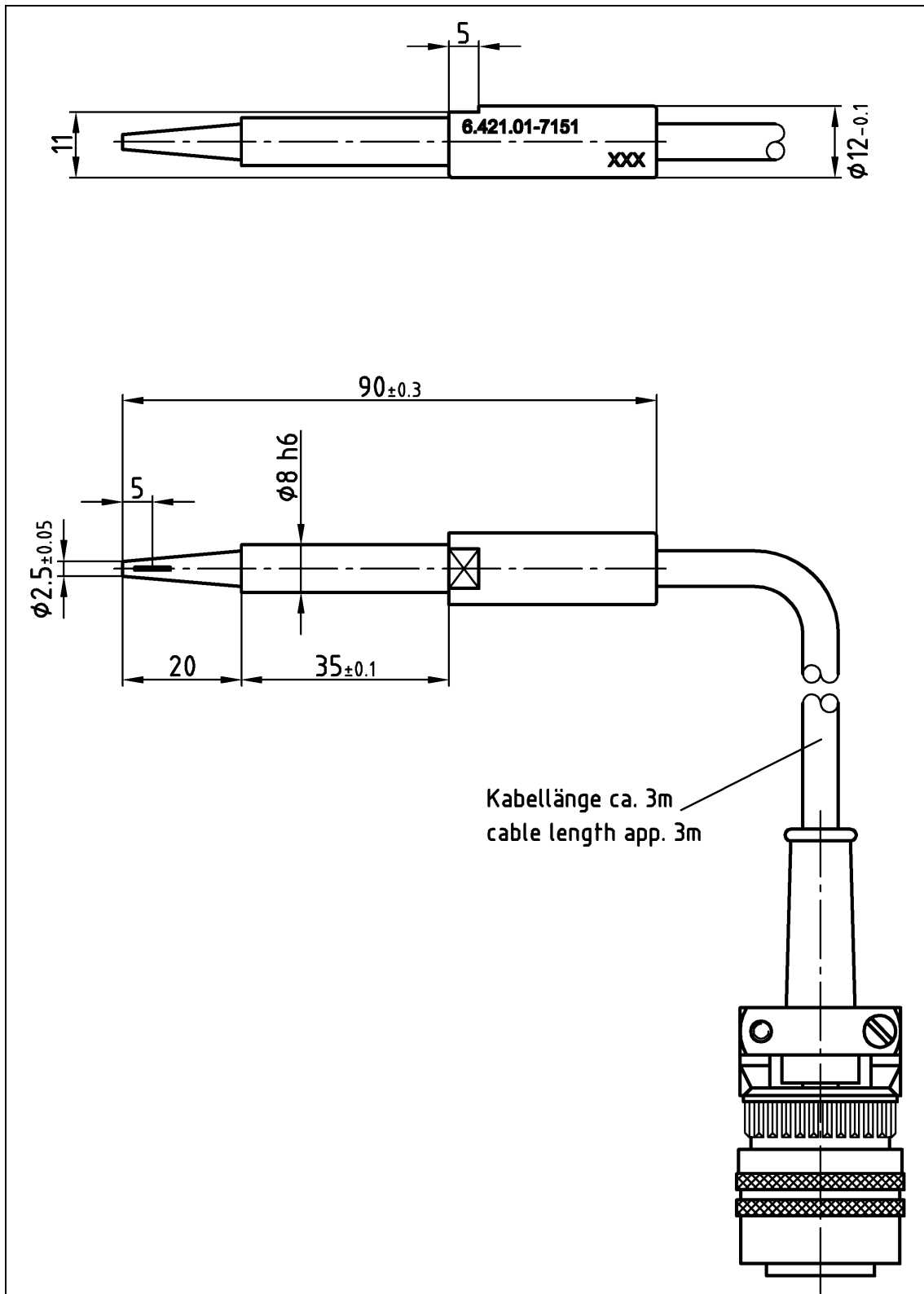


Figure 7 Probe D, AK 6.421.01-7151.

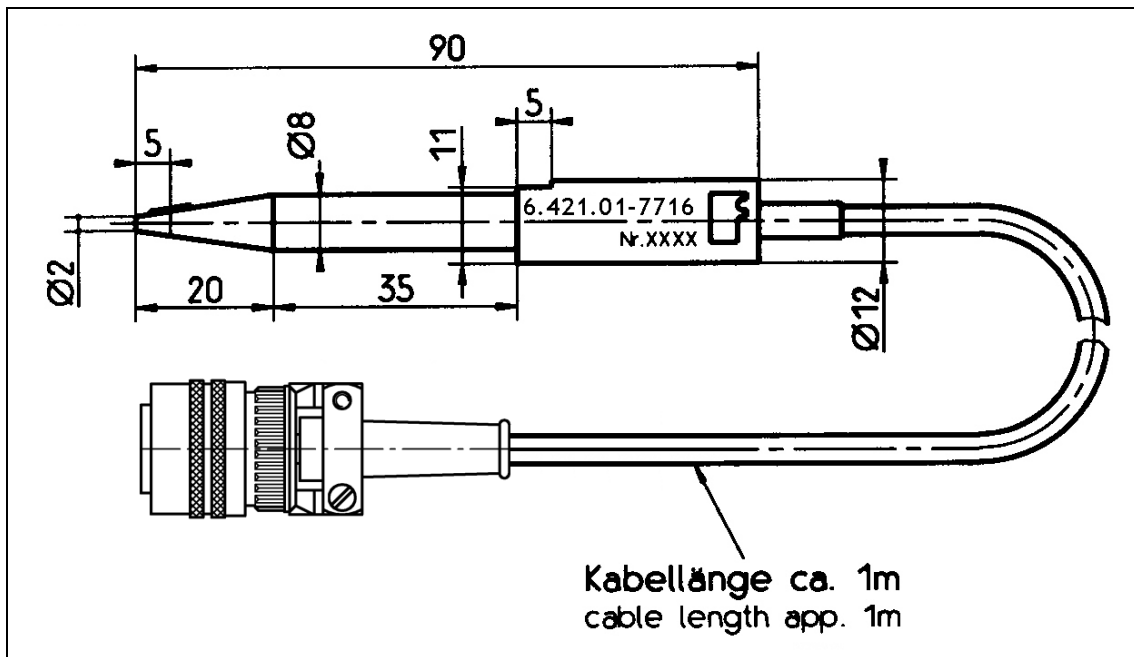


Figure 8 Probe D 6.421.01-7716.

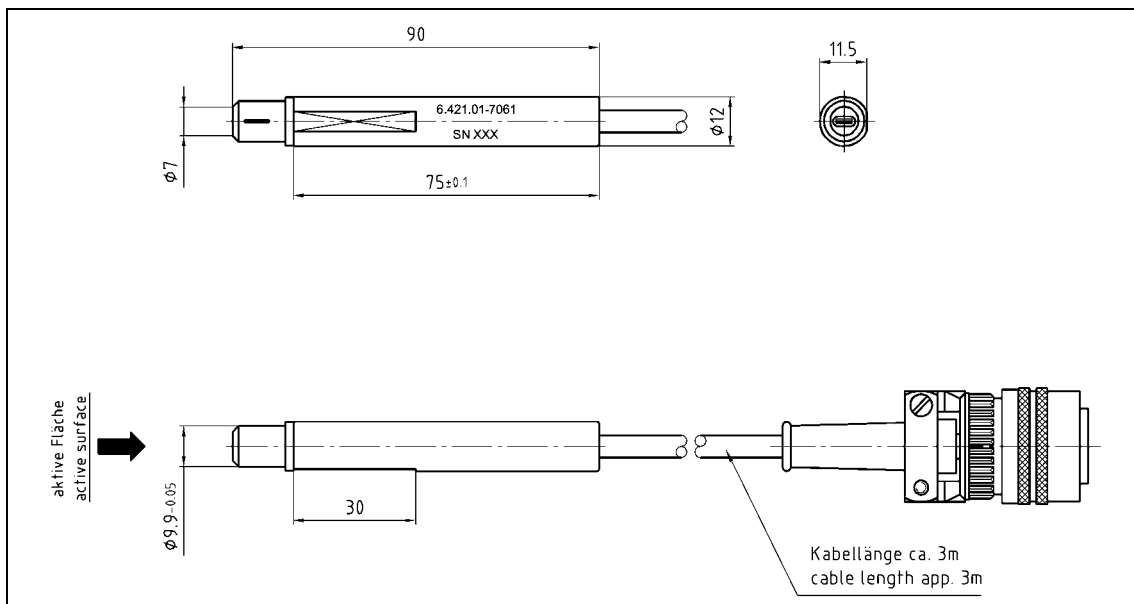


Figure 9 Probe D, AK 6.421.01-7061.

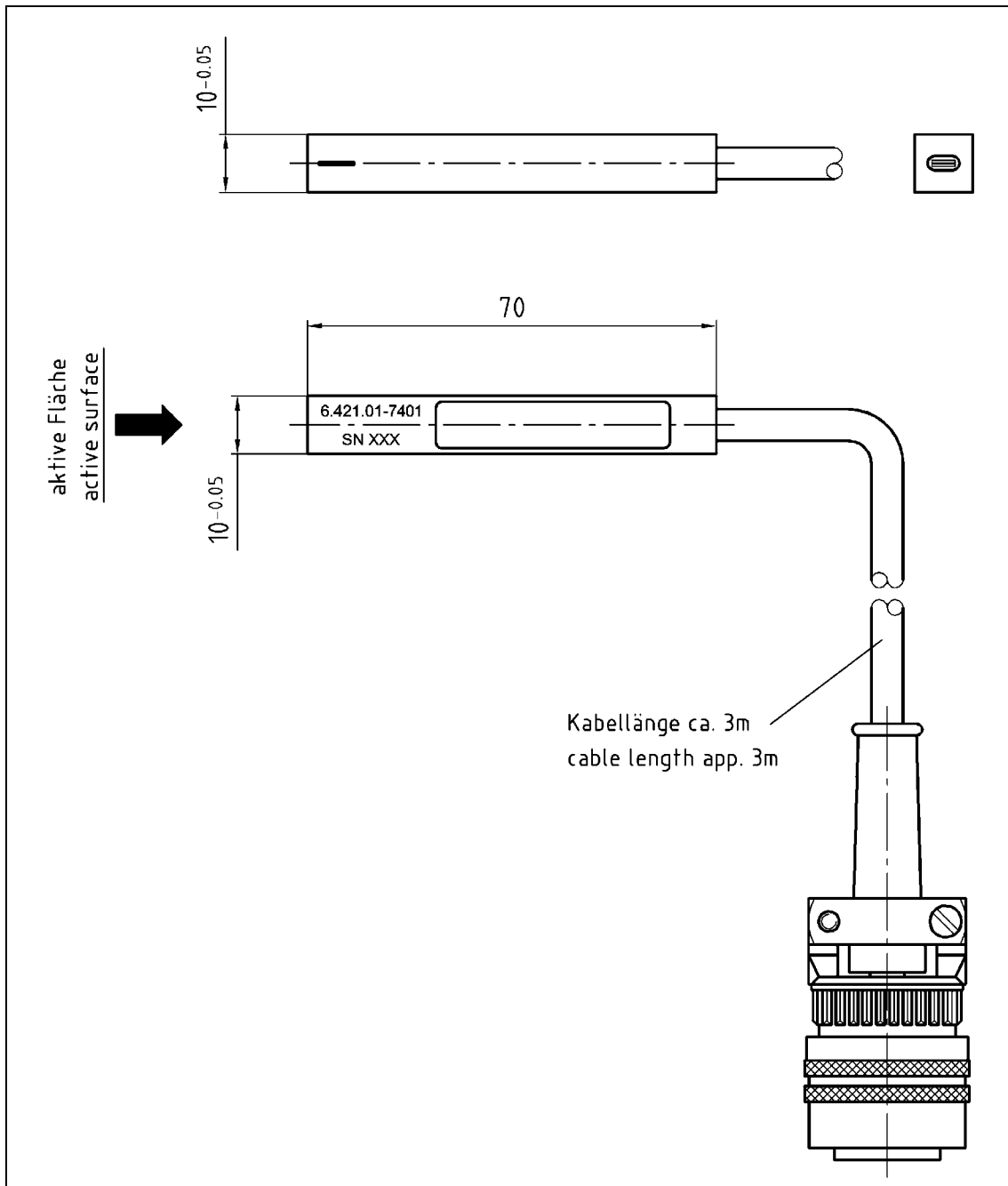


Figure 10 Probe rectangular D, AK 6.421.01-7401.

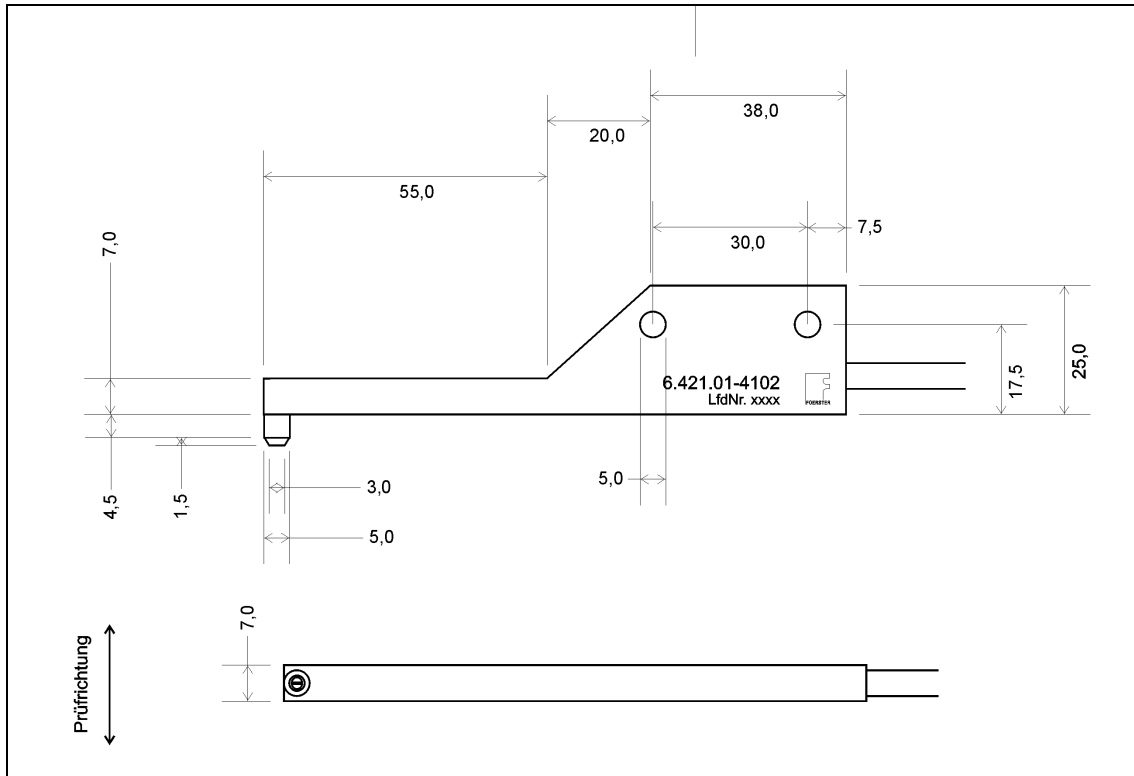


Figure 11 Probe angled 90 D, AK 6.421.01-4102.

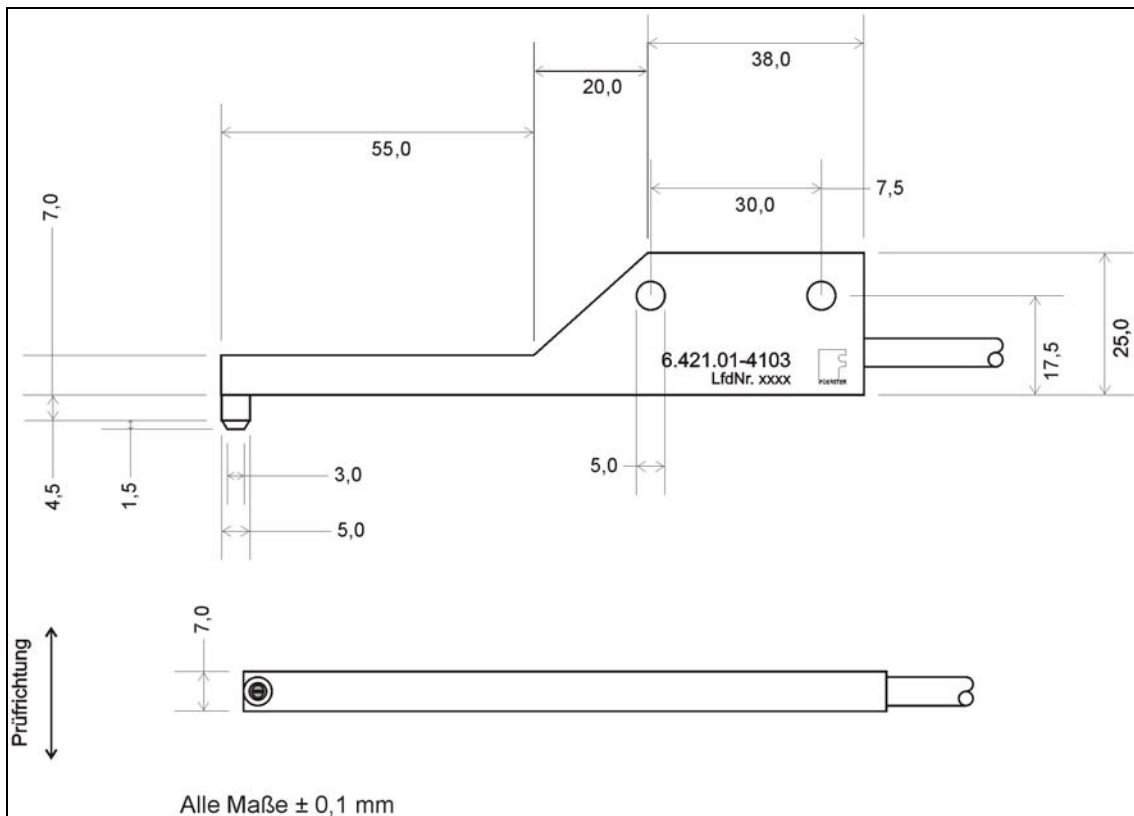


Figure 12 Probe angled 90 D, AK 6.421.01-4103.

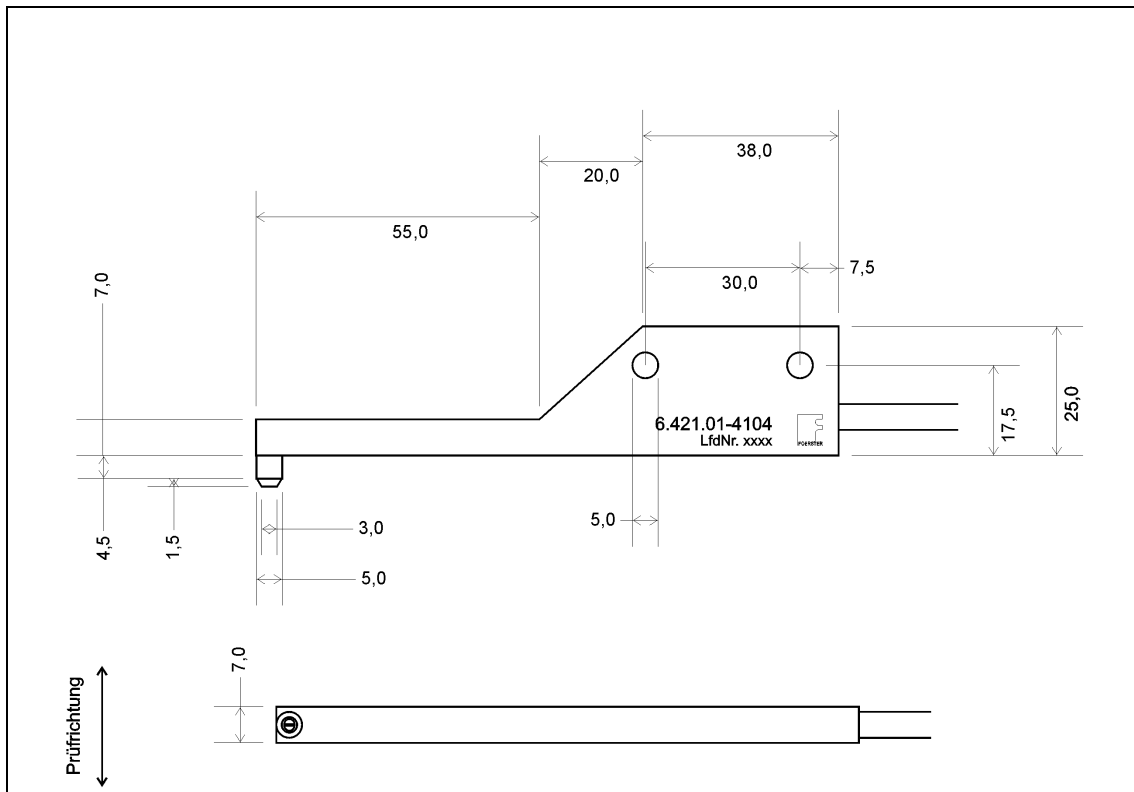


Figure 13 Probe angled 90 D, AK 6.421.01-4104.

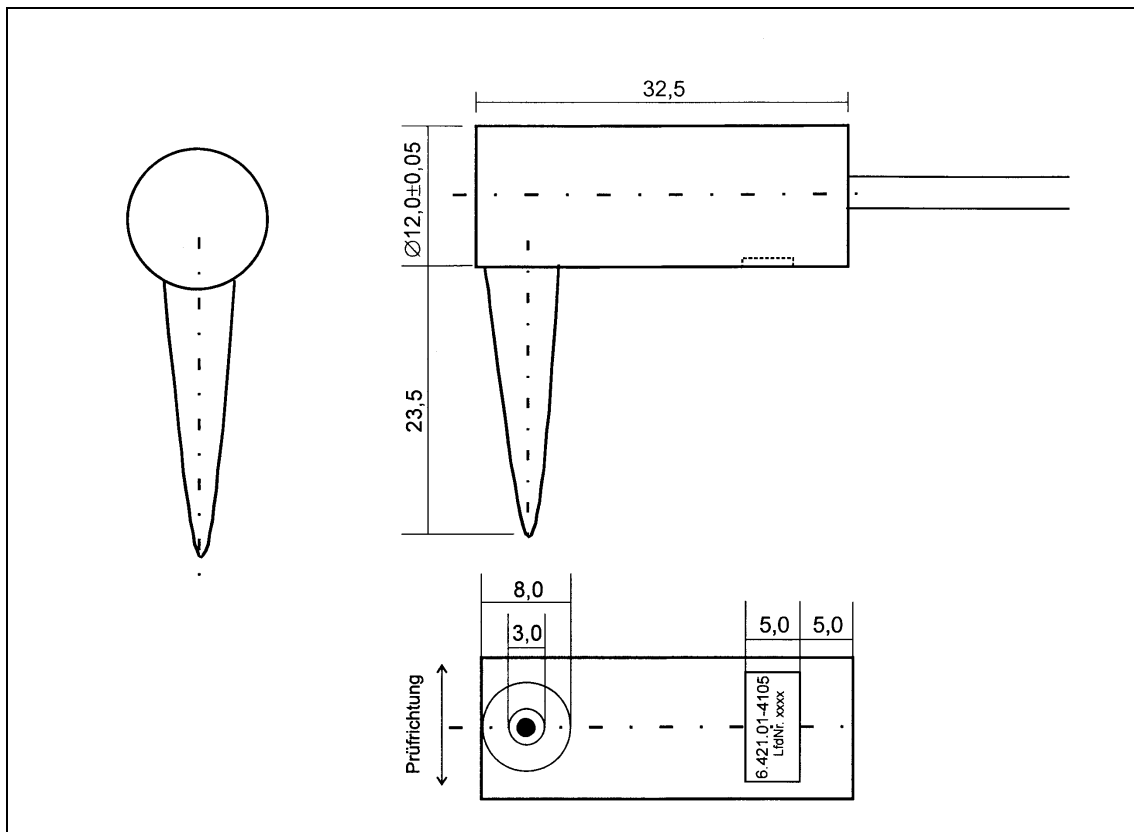


Figure 14 Probe angled 90 D, AK 6.421.01-4105.

# Connection scheme STATOGRAPH ECM

## Probes 6.421 with 15-pin connector

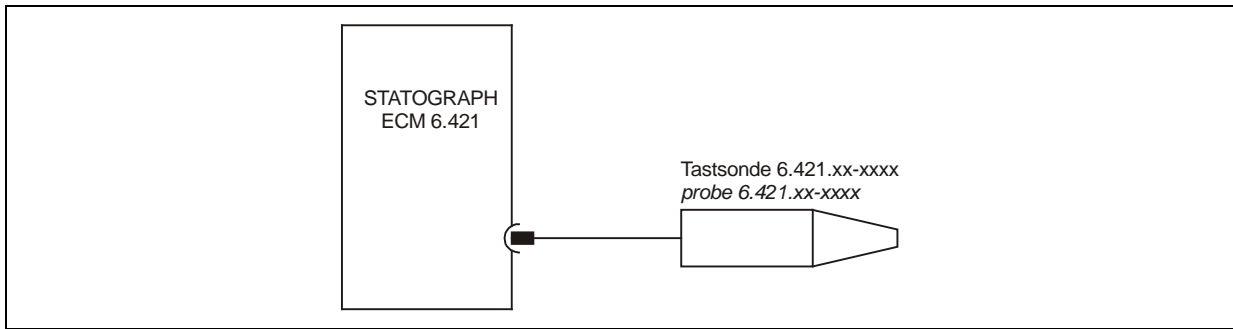


Figure 15 Connection directly to STATOGRAPH ECM for short distance.

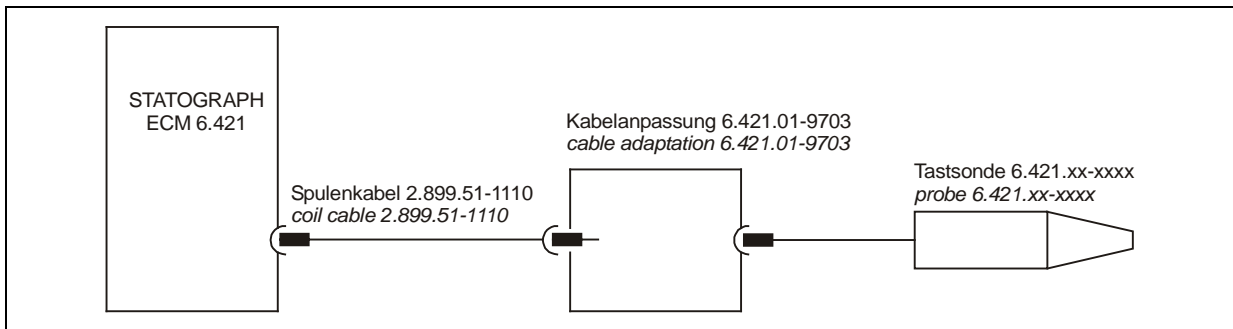


Figure 16 Connection with Cable Adaptation for large distance.

## Probes 6.223 with 8-pin connector

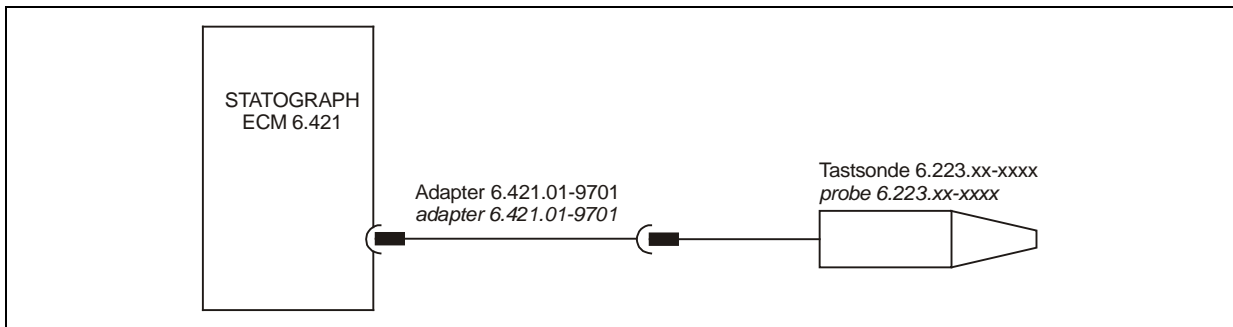


Figure 17 Connection with Cable Adapter for short distance.

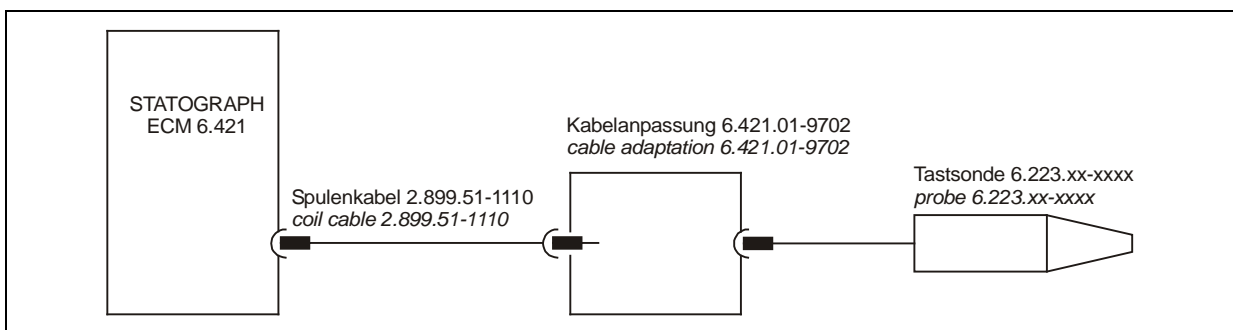


Figure 18 Connection with Cable Adaptation for large distance.

## Connection scheme STATOGRAPH DS

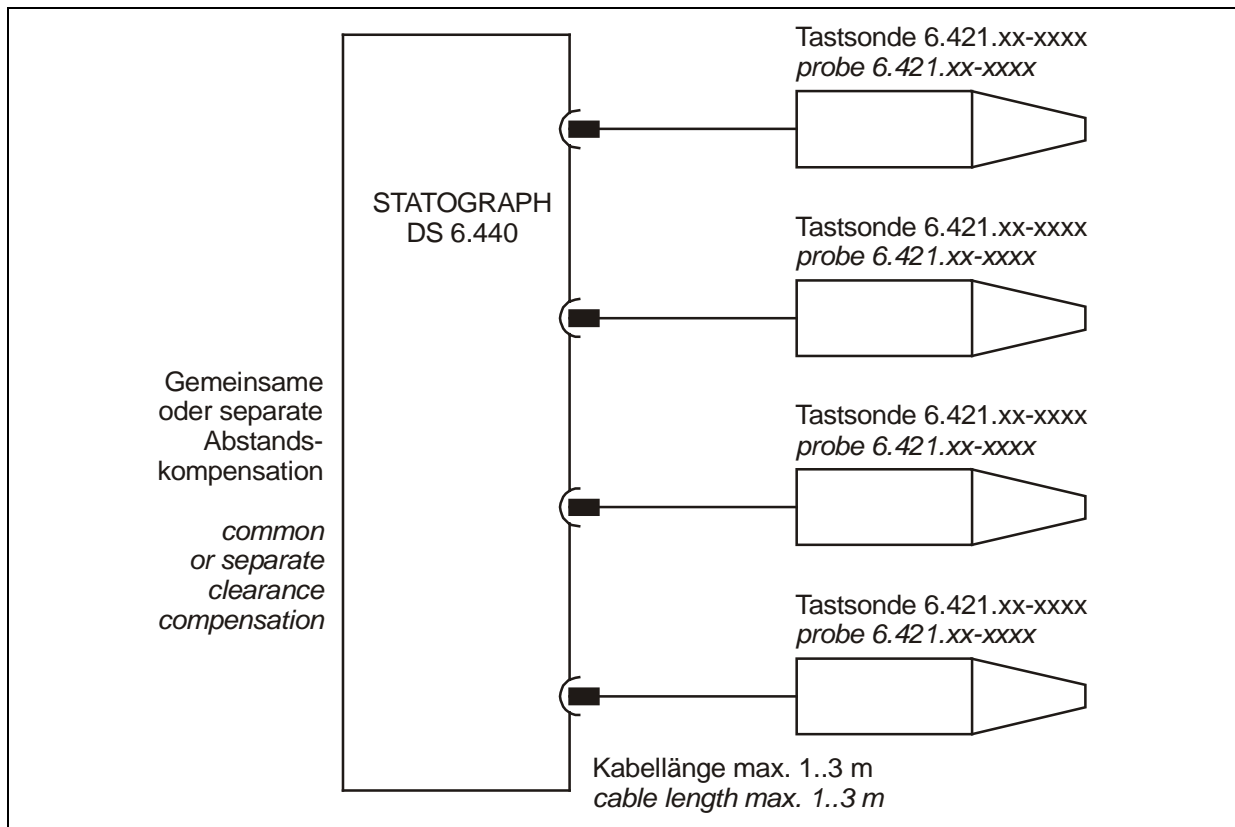


Figure 19 Connection directly to STATOGRAPH DS for short distance.

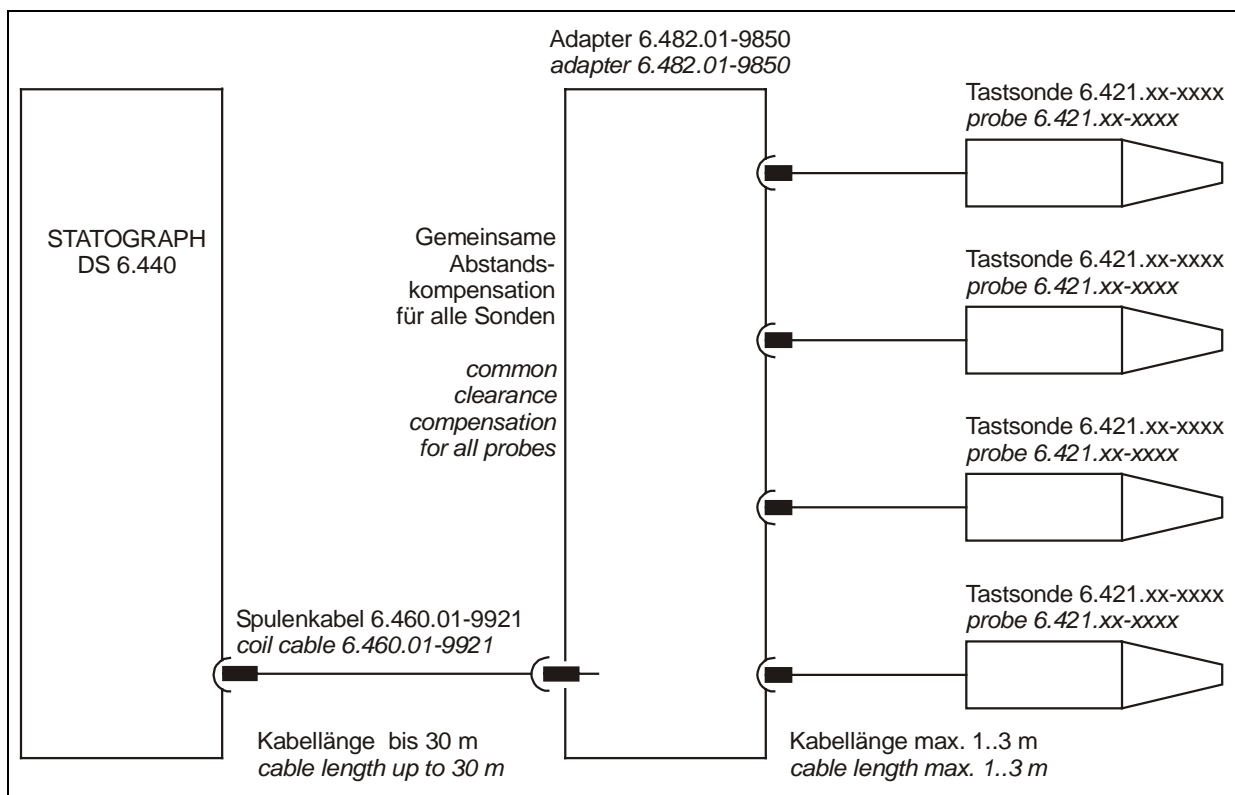


Figure 20 Connection for large distance with common clearance compensation for all probes.

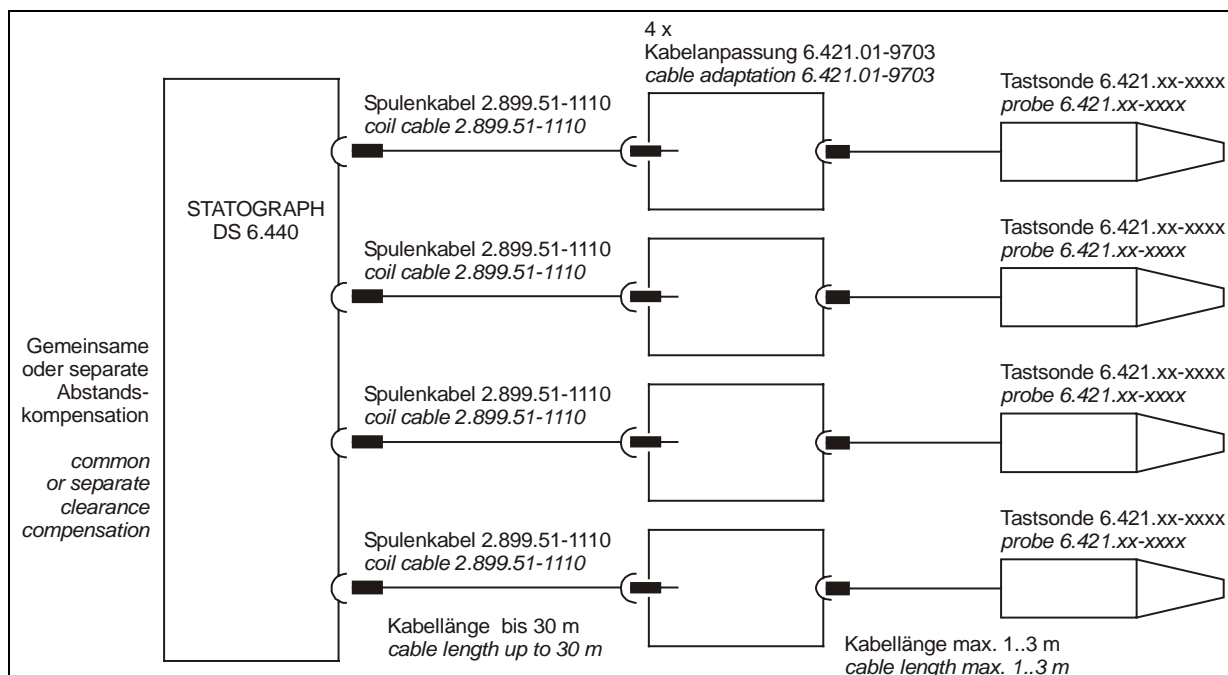


Figure 21 Connection for large distance with common clearance compensation for all probes or individual clearance compensation for each probe.

## Product information

### Leaflets

STATOGRAPH ECM 6.421	107 521 7
STATOGRAPH DS 6.440	183 326 0
Rotating Probe 6.481	130 094 6
Transmitter System CIRCOSCAN H 6.482	157 548 1

### Application infos

Ball pin	134 837 0
Valve seat ring	134 838 8
Components and structure	135 444 2
Brake drum	136 379 4
Drive shafts	137 133 9
Ball housing	139 288 3
Brake disk	142 270 7
Axially symmetrical parts	142 497 1
Yoke shaft	145 759 4
Steering knuckle axle for passenger cars	146 072 2
Shock absorber axle	146 800 6
Brake piston	148 831 7

Should you have any special problems please contact:

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Information and illustration may be subject to change.

Order No. 144 728 9  
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Author SIE/CT

## Ordering information

Designation		Drawing No.	Order No.
TEST CABLE DS 1.5M		6.460.01-9921 M1.5	<b>166 595 2</b>
TEST CABLE DS 3M		6.460.01-9921 M3	<b>181 233 5</b>
TEST CABLE DS 5M		6.460.01-9921 M5	<b>166 481 6</b>
TEST CABLE DS 10M		6.460.01-9921	<b>165 078 5</b>
SENSOR ADAPTER	2-4 SENSOR	6.482.01-9850	<b>167 760 8</b>
COIL CABLE 1.5M		2.899.51-1110 M1.5	<b>183 858 0</b>
COIL CABLE 3M		2.899.51-1110 M3	<b>140 793 7</b>
COIL CABLE 5M		2.899.51-1110 M5	<b>149 743 0</b>
COIL CABLE 10M	PLUG VERSION STRAIGHT-NOT F.DS	2.899.51-1110	<b>138 161 0</b>
CABLE ADAPTION	F. PROBE CABLE 15/15 CONTACT	6.421.01-9703	<b>126 939 9</b>
CABLE ADAPTION	F. PROBE CABLE 8/15 CONTACT	6.421.01-9702	<b>122 300 3</b>
ADAPTER 0.2M	PROBE CABLE 8/15 CONTACTS	6.421.01-9701 M0.2	<b>113 898 7</b>
ADAPTER 1M	PROBE CABLE 8/15 CONTACTS	6.421.01-9701 M1	<b>158 874 5</b>
ADAPTER 3M	PROBE CABLE 8/15 CONTACTS	6.421.01-9701 M3	<b>149 608 5</b>