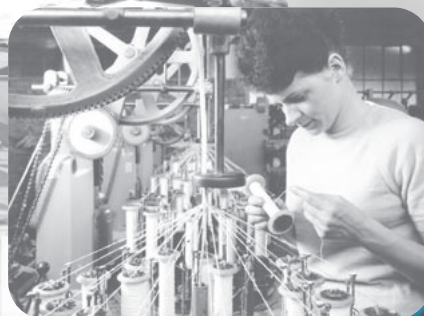


# ADAPTATION FOR ETAS MEASURING TECHNIQUE





TRADITIONAL  
FAMILY BUSINESS  
SINCE 1947

# Adaptation for ETAS measuring technique

## Content

### ■ Introduction

The automobile technical development in automobile industry often faces challenges in wiring sensor systems for measuring tasks. This also applies for application fields of ETAS measuring technique as for example measurement and calibration of parameters and variables of control devices. A typical example is the implementation of measurements in already pre-equipped vehicles in which all cables were already placed. In case that in the measuring chain "control device – port cable – module " only one component isn't compatible, the implementation of the measurements has to be realized by the corresponding adaptation. For this SAB BRÖCKSKES has developed special solutions.

Individual cable lengths, new productions even for very small quantities , individual marking and direct service on site complement our product range.

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## Family business in the third generation

**75** years of experience in cable and wire manufacturing as well as in temperature measurement technology turned a one-man business into a company with more than 550 employees. We prove our strength every year with more than 1500 special products according to customers' requirements. Each product is a new challenge for our creative technical team. We at **SAB** see ourselves as a manufacturer and a service provider – in the sense of true partnership and the greatest possible customer orientation.

Today, the quality of our products is known and appreciated in more than 100 countries around the world. In all product ranges, we are certified according to DIN EN ISO 9001. Furthermore, we have implemented an environmental management system for our company according to DIN EN ISO 14001, an occupational health and safety management system according to NLF/ILO-OSH and DIN ISO 45001, and an energy management system according to DIN EN ISO 50001.

And also for the future, our slogan is: **"WE GO FORWARD!"**

FOUNDED:	1947 by Peter Bröckskes sen. an independent, medium-sized company.
CEO:	Peter Bröckskes and Sabine Bröckskes-Wetten
PLANT/LOCATION:	In Viersen (Lower Rhine) 110.000 m <sup>2</sup> company site.  Own manufacturing from copper conductor to outer sheath.  VDE approved burnchamber and laboratory within the company.
EMPLOYEES/WORKERS:	approx. 430 at the plant in Viersen, 550 worldwide
YEARLY SALES:	over 134 Mio. € worldwide
PRODUCTS:	Special Cables  Measurement Technology  Cable Harnessing
CERTIFICATES AND APPROVALS:	<p>Quality management system acc. to DIN EN ISO 9001 for every manufacturing field</p> <p>Environmental management system acc. to DIN EN ISO 14001</p> <p>Occupational health and safety management acc. to NLF/ILO-OSH and DIN ISO 45001</p> <p>Energy management system acc. to DIN EN ISO 50001</p>





## UL certified cable harness

**SAB** Bröckskes has completed its range of harnessed cables with the certification acc. to UL Standard Wiring Harness „category ZPFW2 (UL)“ and „ZPFW8 (Canada)“ and herewith strengthens its position as cable specialist for cable harness acc. to customer's specification.

Whenever harnessed cables are produced as component part of a final product for the North American and Canadian market, an UL certified cable harness is necessary. With the UL certification **SAB** ensures the detailed traceability of individual components as for example cables, plugs or sleeves and offers highest planning reliability also with special harnessing products.

Underwriter Laboratories Inc. (UL), an independent American test and certification authority confirms the use of the materials and documents required by the final customer according to the UL certification for "Wiring Harness" acc. to ZPFW2 and ZPFW8. In the manufacturer's data base ([www.ul.com](http://www.ul.com)) **SAB** is listed under file no. E473226 as a qualified and reliable manufacturer.

The requirements for UL certified cable harness are controlled by external audits every three months in order to guarantee the high requirements of the UL standards. Besides our cables, also harnessed versions, are tested in our own laboratory with regard to safety and reliability and are marked with the „Wiring Harness Label“.

On request **SAB** is able to manufacture cable harnessing products acc. to customer's specification acc. to UL Wiring Harnesses ZPFW2 and ZPFW8 from the cable to the harness and offers broad advice.

**CERTIFICATE OF COMPLIANCE**

<b>Certificate Number</b>	20150123-E473226
<b>Report Reference</b>	E473226-20150123
<b>Issue Date</b>	2015-JANUARY-23

<b>Issued to:</b>	SAB BROECKSKES GMBH & CO KG GREFRATHERSTRASSE 204-212B POSTFACH 12 01 60 41749 VIERSEN GERMANY
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<b>This is to certify that representative samples of</b>	COMPONENT - WIRING HARNESSSES General Coverage
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Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

<b>Standard(s) for Safety:</b>	Wiring Harnesses, Subject 764, and CSA Inform Wiring Harnesses No. 1
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<b>Additional Information:</b>	See the UL Online Certifications Directory at <a href="http://www.ul.com/database">www.ul.com/database</a> for additional information
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Only those products bearing the UL Certification Mark should be considered as being covered by UL's Certification and Follow-Up Service.

Recognized components are incomplete in certain constructional features or restricted in performance capabilities and are intended for use as components of complete equipment submitted for investigation rather than for direct separate installation in the field. The final acceptance of the component is dependent upon its installation and use in complete equipment submitted to UL LLC.

Look for the UL Certification Mark on the product.

  
Bruce Maheshwari, Assistant Chief Engineer, Global Inspection and Field Services  
UL LLC



Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at [www.ul.com/customer-service](http://www.ul.com/customer-service)

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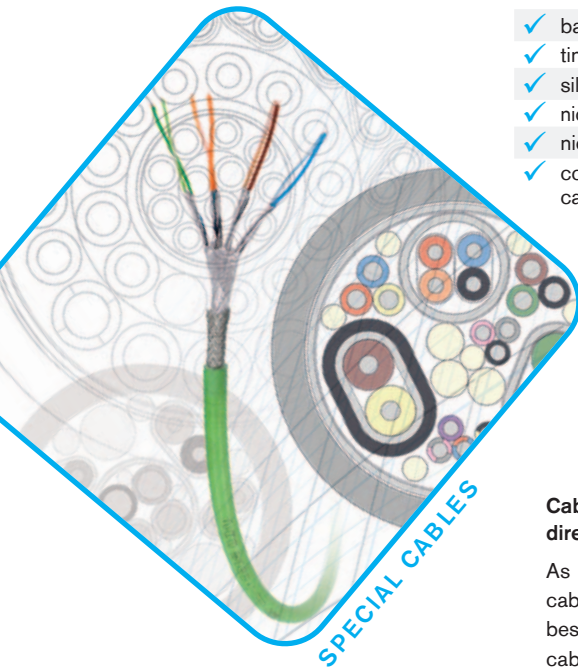
## Production possibilities

### Flexible cables and wires "Made in Germany"

As a leading manufacturer we develop and produce cables for industrial purposes.

Our great variety of materials offer a wide range of possibilities to manufacture your requested product.

The following survey shows an extract from our production range:



#### Conductor Materials:

- ✓ bare copper
- ✓ tinned copper
- ✓ silver plated copper
- ✓ nickel plated copper
- ✓ nickel
- ✓ compensating cable alloys

#### Insulation and Jacketing Materials:

- ✓ PVC
- ✓ Polyethylene
- ✓ Polypropylene
- ✓ Polyurethane
- ✓ TPE
- ✓ SABIX® (zero halogen)
- ✓ Besilen® - Silicone
- ✓ FEP, ETFE, PFA, PTFE
- ✓ Fibreglass

#### Temperature Ranges:

- Thermoplastic Elastomers
- ✓ -50°C up to +145°C
- SABIX®
- ✓ -50°C up to +220°C
- Besilen®
- ✓ -40°C up to +220°C
- FEP, ETFE, PFA
- ✓ -90°C up to +260°C
- Fibreglass
- ✓ +600°C

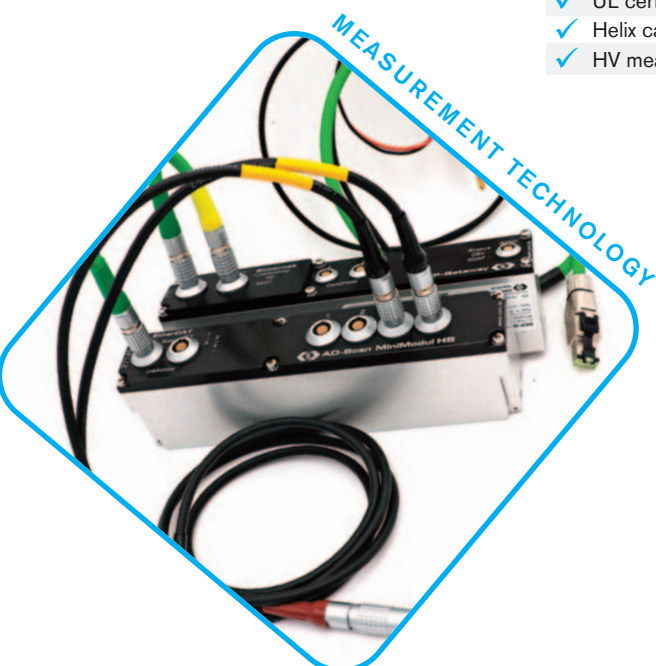
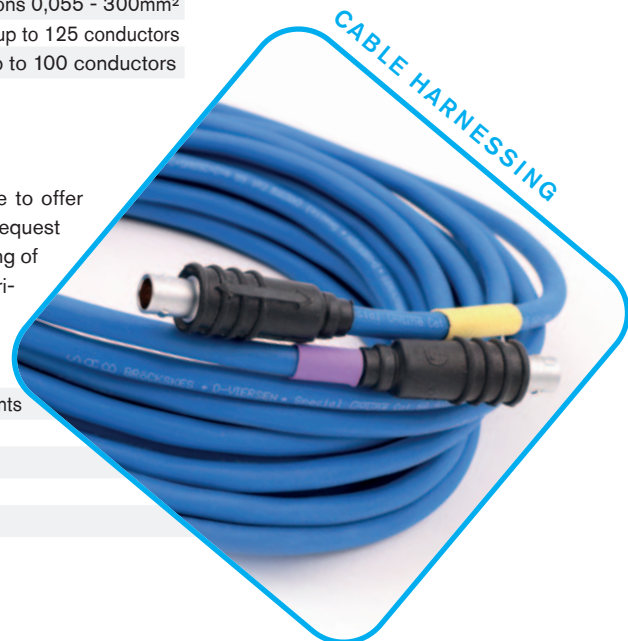
#### Conductors:

- ✓ cross sections 0,055 - 300mm<sup>2</sup>
- ✓ unshielded up to 125 conductors
- ✓ shielded up to 100 conductors

### Cable harnessing directly from the manufacturer SAB:

As a full service partner we are also able to offer cable harnessing acc. to the customers request besides the development and manufacturing of cables. Please trust our long-term experience in the processing of cables and plugs.

- ✓ harnessing acc. to customer's requirements
- ✓ complete cable harness
- ✓ UL certified assemblies
- ✓ Helix cables
- ✓ HV measurement harnessing



### Measuring technique for industrial purpose

Manufacturer of temperature sensors for industrial applications with 75 years of experience!

- ✓ Mineral insulated thermocouples
- ✓ Mineral insulated resistance thermometers
- ✓ Temperature sensors
- ✓ Mobile high voltage temperature measurement technique
- ✓ Temperature sensors for automobile testing

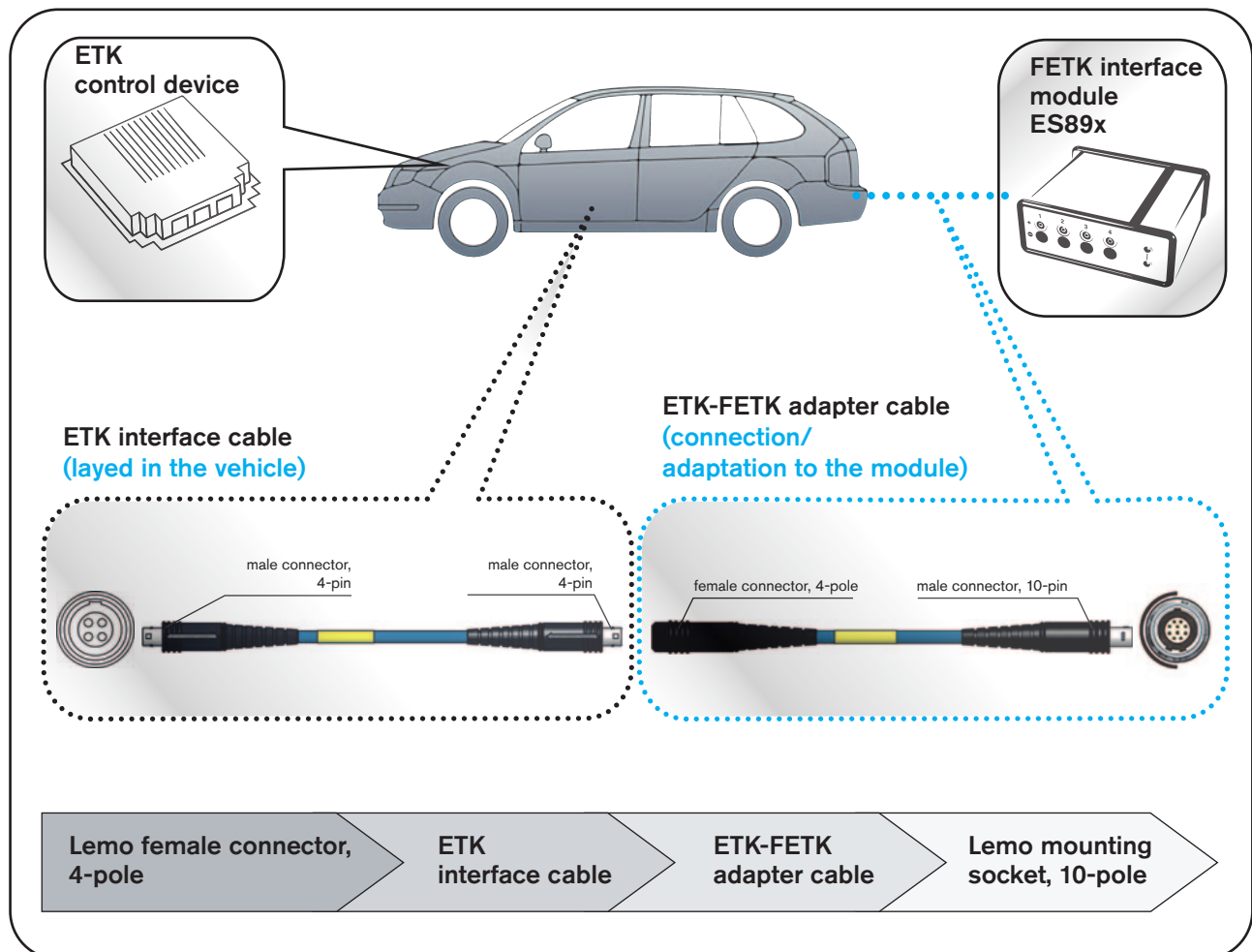
# Interfaces for ETAS measuring technique

## Survey measuring chain

### ■ Application examples

The ETK control device and the ETK interface cable are placed in the vehicle. Nevertheless, a FETK interface module ES89x is used. Now an appropriate adapter cable is needed which makes the ETK interface cable compatible with the FETK interface module ES89x. This is demonstrated in the following figure.

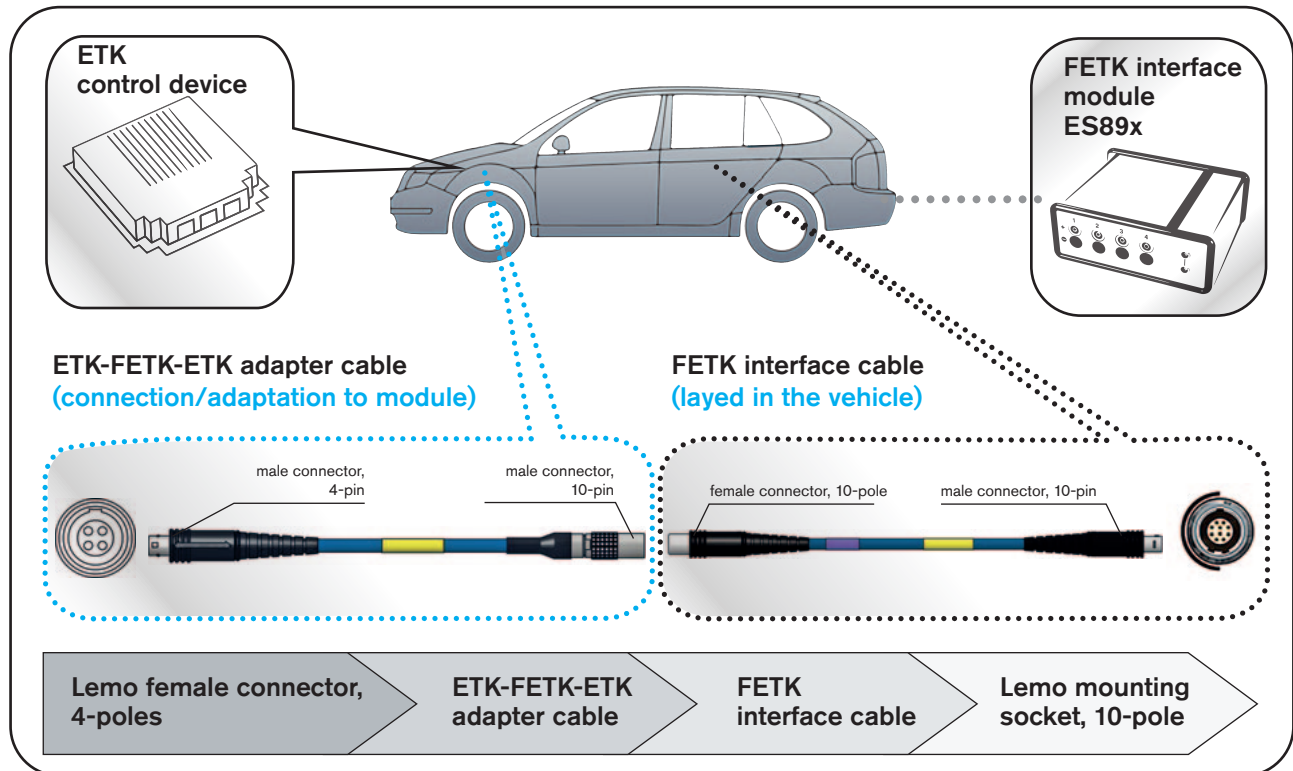
### ■ Application example for catalogue page 9



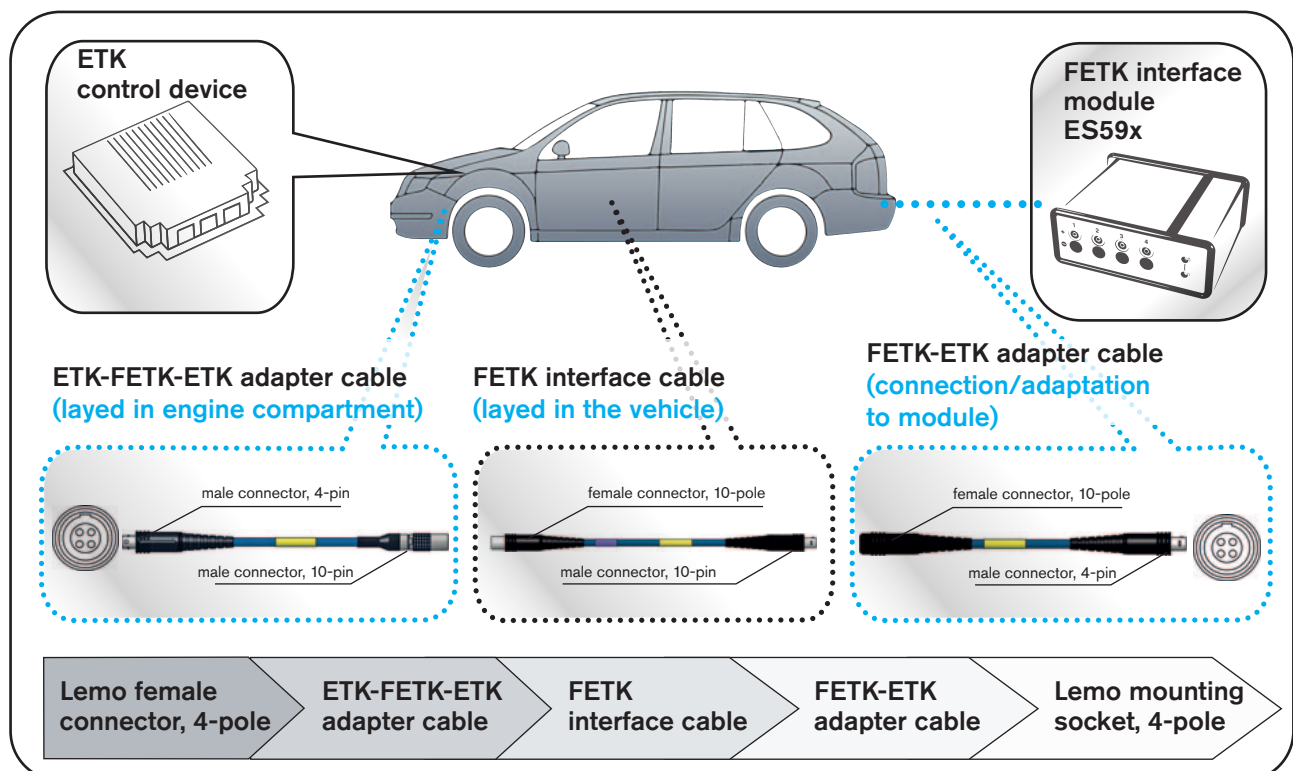
# Interfaces for ETAS measuring technique

## Survey measuring chain

### ■ Application example for catalogue page 10



### ■ Application example for catalogue page 11

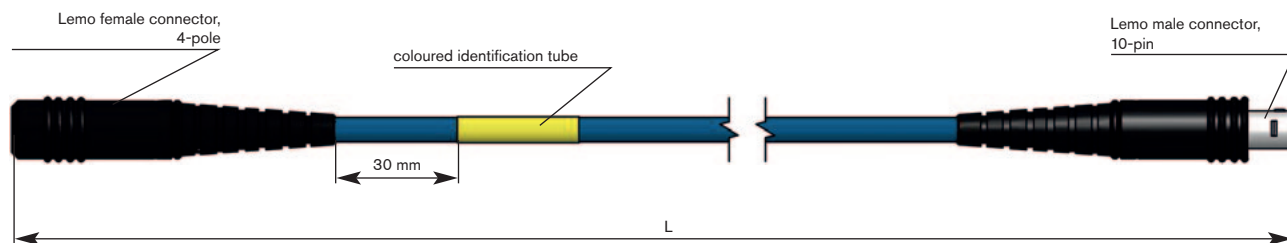




# Adapter cable for ETAS measuring technique

## ETK - FETK adapter

with Lemo female connector 4-pole and Lemo male connector 10-pin



### Application range:

Connection of ETK cable CBM150.1  
with FETK interface module ES89x

#### SURVEY

#### Measuring chain:

Control device:	ETK control device
Interface cable:	ETK interface cable (catalogue page 8)
Adaptation:	ETK - FETK adapter cable (catalogue page 5)
Interface module:	FETK interface module for example ES89x

#### Connector:

Side 1:	Lemo female connector 4-pole
Side 2:	Lemo male connector 10-pin

### Configuration examples:

item no.	sheath material	length „L“ in cm
S3833-4499-00030	PUR	30
S3833-4267-00030	silicone	30

### SAB marking:

item no., order no., length

### PUR Cable data:

Dimension:	2 x 2 x 0,22 mm <sup>2</sup>
Insulation:	TPFK
Screen:	global braiding 100%
Outer sheath:	PUR, colour blue, matt surface
Outer diameter:	approx. 5,5 mm
Min. bending radius:	10 x d
Peak operating voltage:	max. 350 V
Temperature range:	-40°C/+90°C (+125°C / 2500h)
Oil resistance:	very good - TPU acc. to EN50363-10-2

### SILICONE Cable data:

Dimension:	2 x 2 x 0,22 mm <sup>2</sup>
Insulation:	TPFK
Screen:	global braiding 100%
Outer sheath:	Besilen®, colour blue
Outer diameter:	approx. 5,8 mm
Min. bending radius:	10 x d
Peak operating voltage:	max. 350 V
Temperature range	
fixed laying:	-40°C/+180°C
flexible application:	-25°C/+180°C



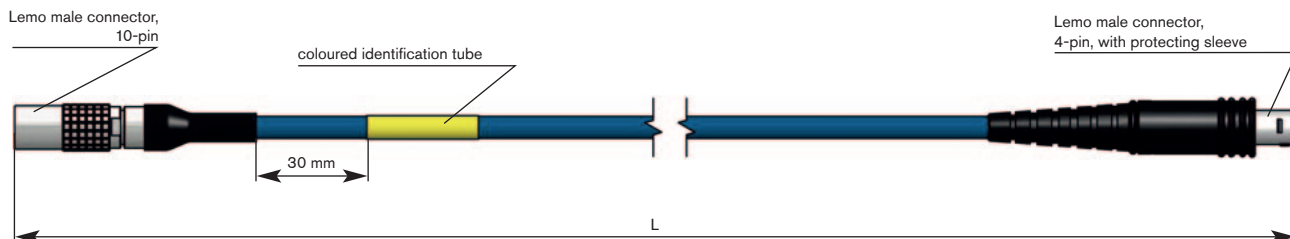
### Further service issues:

- individual marking by shrinkable sleeve as for example with internal material no. or barcode

# Adapter cable for ETAS measuring technique

## ETK - FETK - ETK adapter

with Lemo male connector 10-pin and Lemo male connector 4-pin



### Application range:

#### Connection of FETK cable CBE.260.1 with ETK control device\*

\*Note: If the FETK cable is layed in the vehicle and is used as interface cable between ETK control device and ETK interface module the adaption is necessary towards control device and interface module.

#### SURVEY

#### Measuring chain:

Control device:	ETK control device
Adaptation:	ETK-FETK-ETK adapter cable (catalogue page 5)
Interface cable:	FETK interface cable (catalogue page 10)
Adaptation:	FETK - ETK adapter cable (catalogue page 7)
Interface module:	ETK interface module for example ES59x FETK interface module for example ES89x

#### Connector:

Side 1:	Lemo male connector 10-pin
Side 2:	Lemo male connector 4-pin

#### Configuration examples:

item no.	sheath material	length „L“ in cm
S3833-4493-00030	PUR	30
S3833-4500-00030	silicone	30

#### SAB marking:

item no., order no., length

#### PUR Cable data:

Dimension:	2 x 2 x 0,22 mm <sup>2</sup>
Insulation:	TPFK
Screen:	global braiding 100%
Outer sheath:	PUR, colour blue, matt surface
Outer diameter:	approx. 5,5 mm
Min. bending radius:	10 x d
Peak operating voltage:	max. 350 V
Temperature range:	-40°C/+90°C (+125°C / 2500h)
Oil resistance:	very good - TMPU acc. to EN50363-10-2

#### SILICONE Cable data:

Dimension:	2 x 2 x 0,22 mm <sup>2</sup>
Insulation:	TPFK
Screen:	global braiding 100%
Outer sheath:	Besilen®, colour blue
Outer diameter:	approx. 5,8 mm
Min. bending radius:	10 x d
Peak operating voltage:	max. 350 V
Temperature range	
fixed laying:	-40°C/+180°C
flexible application:	-25°C/+180°C



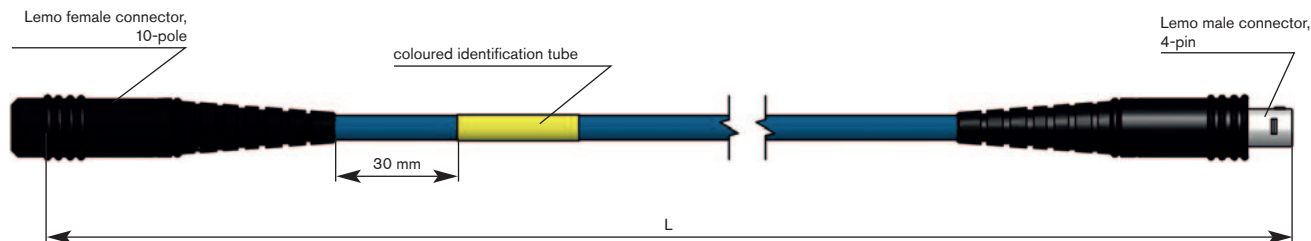
#### Further service issues:

- individual marking by shrinkable sleeve as for example with internal material no. or barcode

# Adapter cable for ETAS measuring technique

## FETK - ETK adapter

with Lemo female connector 10-pole and Lemo male connector 4-pin



### Application range:

#### Connection of FETK cable CBE.260.1 with ETK interface module for example ES59x\*

\*Note: If the FETK cable is layed in the vehicle and is used as interface cable between ETK control device and ETK interface module the adaption is necessary towards control device and interface module.

#### SURVEY

#### Measuring chain:

Control device:	ETK control device
Adaptation:	ETK-FETK-ETK adapter cable (catalogue page 5)
Interface cable:	FETK interface cable (catalogue page 10)
Adaptation:	FETK - ETK adapter cable (catalogue page 7)
Interface module:	ETK interface module for example ES59x

#### Connector:

Side 1:	Lemo female connector 10-pole
Side 2:	Lemo male connector 4-pin

#### Configuration examples:

item no.	sheath material	length „L“ in cm
S3833-4501-00030	PUR	30
S3833-4502-00030	silicone	30

#### SAB marking:

item no., order no., length

#### PUR Cable data:

Dimension:	2 x 2 x 0,22 mm <sup>2</sup>
Isolation:	TPFK
Screen:	global braiding 100%
Outer sheath:	PUR, colour blue, matt surface
Outer diameter:	approx. 5,5 mm
Min. bending radius:	10 x d
Peak operating voltage:	max. 350 V
Temperature range:	-40°C/+90°C (+125°C / 2500h)
Oil resistance:	very good - TPU acc. to EN50363-10-2

#### SILICONE Cable data:

Dimension:	2 x 2 x 0,22 mm <sup>2</sup>
Insulation:	TPFK
Screen:	global braiding 100%
Outer sheath:	Besilen®, colour blue
Outer diameter:	approx. 5,8 mm
Min. bending radius:	10 x d
Peak operating voltage:	max. 350 V
Temperature range	
fixed laying:	-40°C/+180°C
flexible application:	-25°C/+180°C



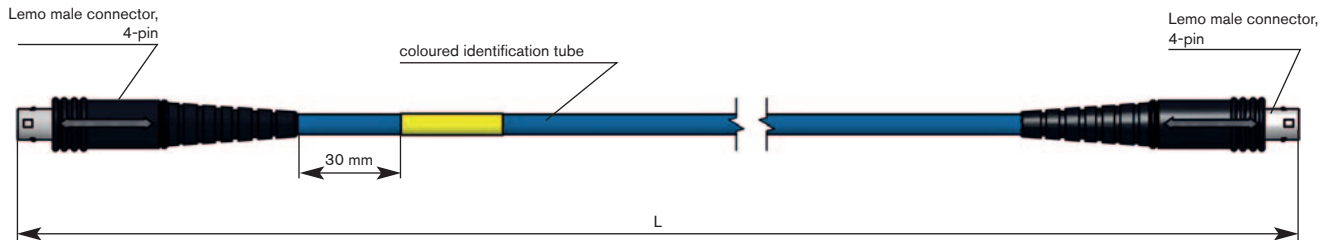
#### Further service issues:

- individual marking by shrinkable sleeve as for example with internal material no. or barcode

# Interface cable for ETAS measuring technique

## ETK interface cable

with Lemo male connector 4-pin at both sides



### Application range:

Connection of ETK control device with ETK interface module for example ES59x

#### SURVEY

#### Measuring chain:

Control device:	ETK control device
Interface cable:	ETK interface cable
Interface module:	ETK interface module for example ES59x

#### Connector:

Side 1:	Lemo male connector 4-pin
Side 2:	Lemo male connector 4-pin

### Configuration examples:

item no.	sheath material	length „L“ in cm
S3833-4219-00100	PUR	100
S3833-4218-00100	silicone	100

### SAB marking:

item no., order no., length

### PUR Cable data:

Dimension:	2 x 2 x 0,22 mm <sup>2</sup>
Isolation:	TPFK
Screen:	global braiding 100%
Outer sheath:	PUR, colour blue, matt surface
Outer diameter:	approx. 5,5 mm
Min. bending radius:	10 x d
Peak operating voltage:	max. 350 V
Temperature range:	-40°C/+90°C (+125°C / 2500h)
Oil resistance:	very good - TMPU acc. to EN50363-10-2

### SILICONE Cable data:

Dimension:	2 x 2 x 0,22 mm <sup>2</sup>
Isolation:	TPFK
Screen:	global braiding 100%
Outer sheath:	Besilen®, colour blue
Outer diameter:	approx. 5,8 mm
Min. bending radius:	10 x d
Peak operating voltage:	max. 350 V
Temperature range	
fixed laying:	-40°C/+180°C
flexible application:	-25°C/+180°C



### Further service issues:

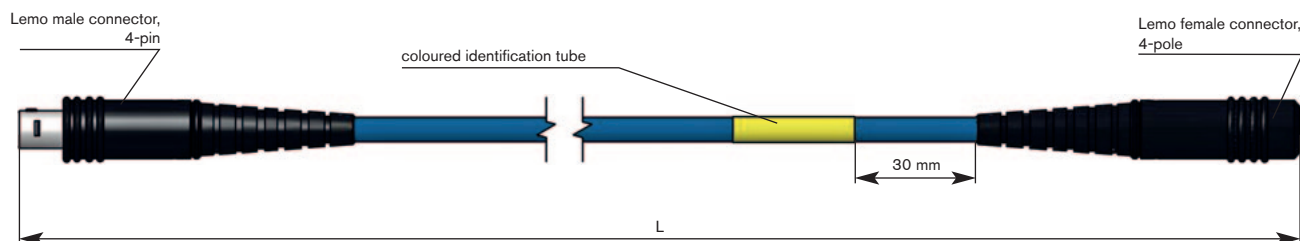
- individual marking by shrinkable sleeve as for example with internal material no. or barcode



# Extension cable for ETAS measuring technique

## ETK extension

with Lemo male connector 4-pin and Lemo female connector 4-pole



### Application range:

Extension of ETK interface cable and connection to ETK interface module for example ES59x

#### SURVEY

#### Measuring chain:

Interface cable:	ETK interface cable (catalogue page 8)
Extension cable:	ETK extension cable
Interface module:	ETK interface module for example ES59x

#### Connector:

Side 1:	Lemo male connector 4-pin
Side 2:	Lemo female connector 4-pole

### Configuration example:

item no.	length „L“ in cm
S3833-4568-00100	100

### SAB marking:

item no., order no., length

### Cable data:

Dimension:	2 x 2 x 0,22 mm <sup>2</sup>
Isolation:	TPFK
Screen:	global braiding 100%
Outer sheath:	Besilen®, colour blue
Outer diameter:	approx. 5,8 mm
Min. bending radius:	10 x d
Peak operating voltage:	max. 350 V
Temperature range	
fixed laying:	-40°C/+180°C
flexible application:	-25°C/+180°C



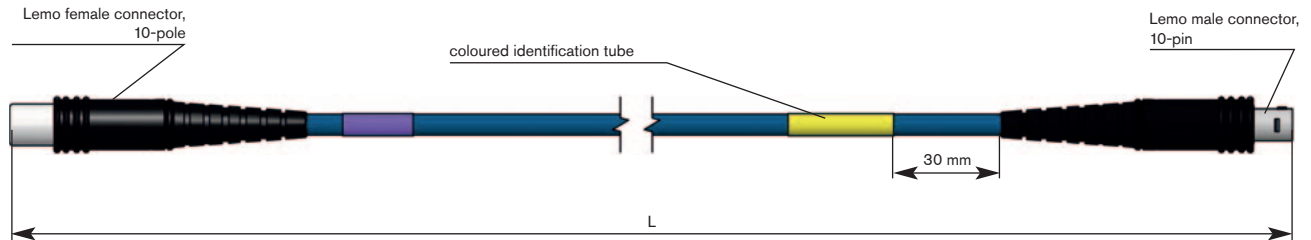
### Further service issues:

- individual marking by shrinkable sleeve as for example with internal material no. or barcode

# Interface cable for ETAS measuring technique

## FETK interface cable

with Lemo female connector 10-pole and Lemo male connector 4-pin



### Application range:

Connection of FETK control device with FETK interface module for example ES89x

#### SURVEY

#### Measuring chain:

Control device:	FETK control device
Interface cable:	FETK interface cable
Interface module:	FETK interface module for example ES59x

### Cable data:

Dimension:	4 x 2 x AWG26 + 2 x AWG24
Isolation:	TPFK
Screen:	global braiding 100%
Outer sheath:	PUR, colour blue, matt surface
Outer diameter:	approx. 6,6 mm
Min. bending radius:	10 x d
Peak operating voltage:	max. 90 V
Temperature range:	-40°C/+90°C (+125°C / 2500h)
Oil resistance:	very good - TMPU acc. to EN50363-10-2

### Connector:

Side 1:	Lemo female connector 10-pole
Side 2:	Lemo male connector 10-pin

### Configuration example:

item no.	length „L“ in cm
S1631-4013-00300	300

### SAB marking:

item no., order no., length



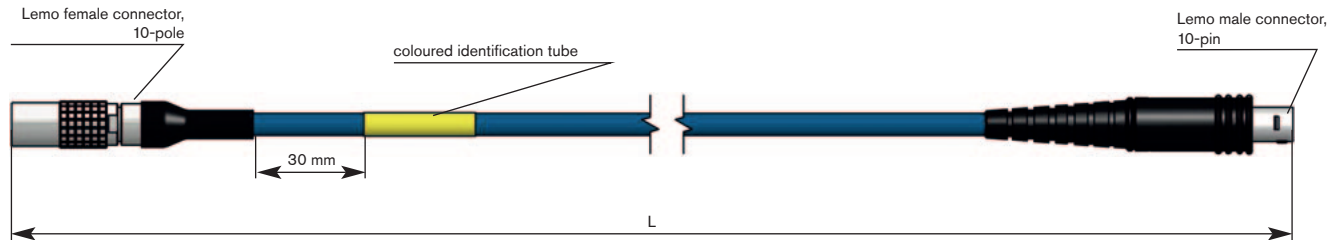
#### Further service issues:

- individual marking by shrinkable sleeve as for example with internal material no. or barcode

# Extension cable for ETAS measuring technique

## FETK extension

with Lemo female connector 10-pole and Lemo male connector 10-pin



### Application range:

Extension of FETK interface cable and connection to FETK interface module for example ES89x

#### SURVEY

#### Measuring chain:

Interface cable:	FETK interface cable (catalogue page 10)
Extension cable:	FETK extension cable
Interface module:	FETK interface module for example ES59x

#### Connector:

Side 1:	Lemo female connector 10-pole
Side 2:	Lemo male connector 10-pin

### Configuration example:

item no.	length „L“ in cm
S1631-4112-00100	100

### SAB marking:

item no., order no., length

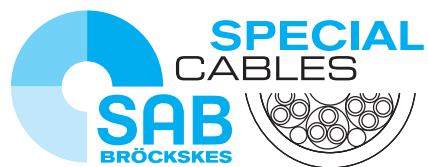
### Cable data:

Dimension:	4 x 2 x AWG26 + 2 x AWG24
Isolation:	TPFK
Screen:	global braiding 100%
Outer sheath:	PUR, colour blue, matt surface
Outer diameter:	approx. 6,6 mm
Min. bending radius:	10 x d
Peak operating voltage:	max. 90 V
Temperature range	-40°C/+90°C (+125°C / 2500h)
Oil resistance:	very good - TMPU acc. to EN50363-10-2



### Further service issues:

- individual marking by shrinkable sleeve as for example with internal material no. or barcode



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