

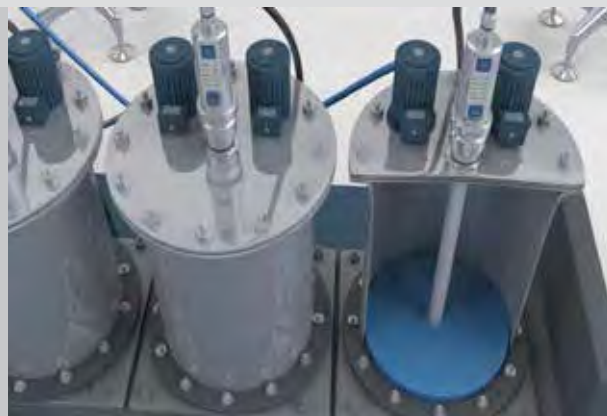
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**RECHNER  
SENSORS**

**CATALOGUE**

**CAPACITIVE  
LEVEL  
MEASURING  
SYSTEMS**

**i-LEVEL**



CE



Registration-No: 1327-01



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#### **Edition June 2013**

With publication of this catalogue all former printed catalogues about RECHNER capacitive filling level systems are invalid.

All specifications are subject to change without notice. (06/2013)

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## GENERAL DESCRIPTION

### i-LEVEL

Capacitive level probe for analogue level measurement with 2 additional switching points. The switching points can be placed inside or outside of the analogue measuring range.

This rod probe with integrated evaluation electronics is based on our patented 3-electrode measuring principle. The measurement is made between the measuring electrode in the probe and the metal container wall (or additional electrode). The measuring area is defined by means of inactive areas that are placed on its top and end. A defined empty adjustment can be made in which it is not necessary to fill the container up to the probe or even to know the material that should be detected. It is not necessary to make a manual pre-selection of the capacity range or of a basic capacity. This is automatically done from the intelligent probe during the initial operation.

### Advantages:

- Analogue measuring range user selectable within the analogue measuring area.
- 2 additional switching points which can be set at any place within or outside of the analogue area. With intelligent PNP /NPN recognition, normally open or normally closed function programmable.
- Analogue outputs available are 0...10 V, 4...20 mA or 0...20 mA
- Supply voltage 18...30 V DC.
- EasyTeach Function.  
On request variants with EasyTeach by wire (ETW) or CANBus interface are available.
- On request Unit also available with fixed programming of analogue range and switching points: „Mount and Go“.
- Electronic lock - prevents undesired changes of the programmed adjustment.

### Housing materials

The applied housing materials are:

**Process connection:** 1", stainless steel VA No. 1.4305 or 1.4404 (FDA conformity)  
Suitable for mounting in hygienic, metallic sealing process adapter  
(see our accessories).

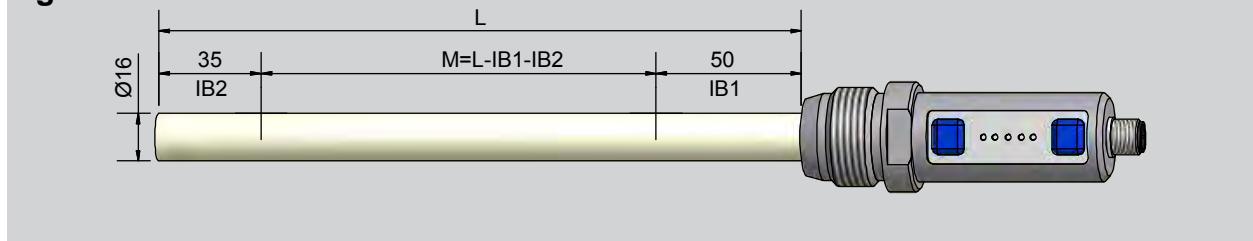
**Probe:** Standard is GFK (glassfibre reinforced plastics),  
On request other plastics are possible, for instance  
PE (Polyethylene)  
PEEK (Polyetheretherketone) FDA 21 CFR 177.2415  
PTFE (Polytetrafluorethylene) FDA 21 CFR 177.1550  
PVC (Polyvinylchloride)  
PVDF (Polyvinylidenfluoride) FDA 21 CFR 177.2510

# MOUNTING

## i-LEVEL

The analogue probe consists of an active range between two inactive ranges. The length of the analogue measuring range is dependent on the total length of the ordered sensor ( $L = 1 \text{ m max.}$ ). The **inactive range 1 (IB1)** stretches down 50 mm from the sensor head. Next is the **analogue measuring range (M)**. The **inactive range 2 (IB2)** serves as screening against material depositions on the sensor tip and with the standard version its length is 35 mm.

Fig. 1

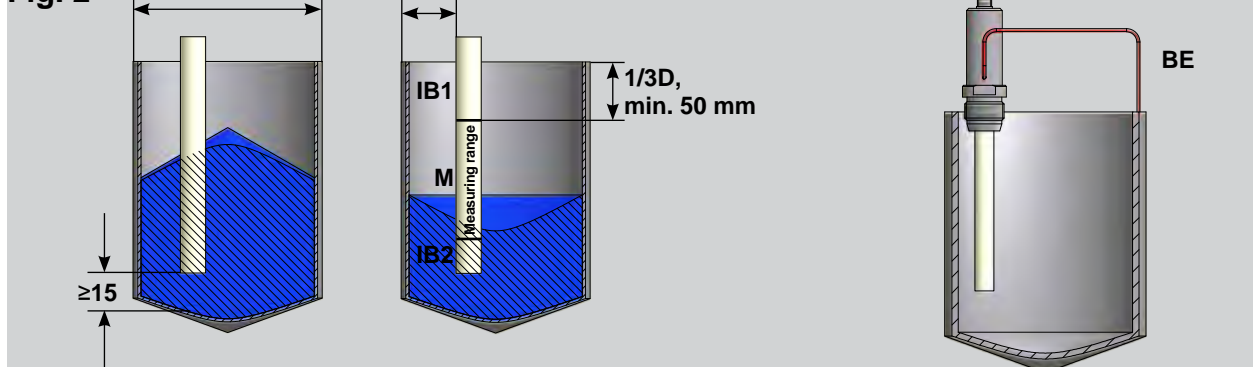


**The measuring range (M)** of the probe must be mounted in a range of the container without change in diameter of the cross section in order to guarantee the linearity of the analogue output signal. Changes in cross section lead to non-linearity, due to conductive installations such as wipers for example.

**The non-active range 1 (IB1)** from the measuring range to the top of the container (if metal) should be not less than 50 mm in order to prevent non-linearity (Fig. 2)

**The non-active range 2 (IB2)** does not require a constant cross section of the container. Thus it can project into the cone of the container.

Fig. 2



**Measuring range (M) non-active range (IB1) non-active range (IB2)**

Do not mount the measuring range in the area of the container with changes in the cross section, like the cone range.

The probe can be mounted centrally or eccentrically. For a measurement independent of the filling cone, we recommend that the probe be mounted at a  $\frac{1}{4}$  of the diameter. The minimum distance between the end of the measuring range and the conductive lid of the container is 50 mm.

Connect the BE over the process connection or by means of the rear screw connection.

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## Adjustment / Application Areas

### EasyTeach Adjustment:

The adjustment of the switching points and of the analogue measuring range is made over the keypad on the stainless steel head. This is supported by a variant of the well-proven EasyTeach technology.

The operation of both the buttons, set and mode, is intuitive and very easy. The built-in LED's reflect each adjustment action and display during normal operation, the switching states of the outputs, or are warning the user in case of a failure. For applications with difficult access to the sensor there are models available which can be adjusted by RECHNER's EasyTeach by wire (ETW) or direct via CAN-Bus.

The general interaction of sensor and control system can be checked with the test mode. With the reset function the sensor can be re-adjusted to the factory setting at any time.

### Application areas:

#### Level control of liquids and bulk materials

The sensors are ideal for level control of liquids or bulk materials with a permittivity between 2 and 80. It is not necessary to know the permittivity of the material to be detected, because the sensor does not have to be pre-set for a specific operating range. Therefore, when different products need be detected, a fast change is easily possible.

Despite the compact sensor design it can be used for reasonably high temperature applications. The material temperature at the sensor rod can be up to 100 °C, provided that it is ensured that the temperature at the sensor head does not exceed 55 °C. If required the sensor is available with an additional temperature buffer in order to protect the electronics temperatures that are too high.

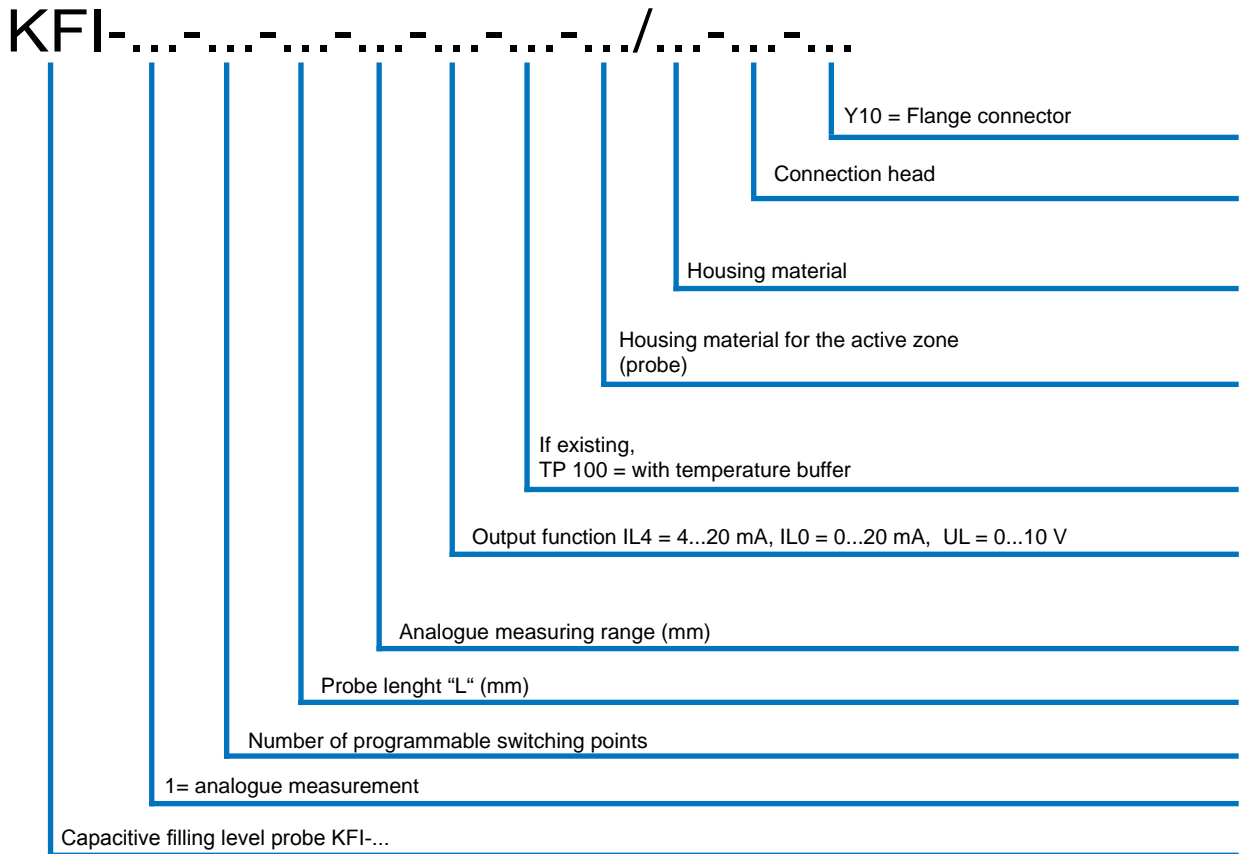
The analogue measurement in a vertically conducting area in a metal container is linear. The use of a jacket tube is not necessary, as is the case for other sensors on the market.

Within the cone of the container the deviation is basically defined by the container geometry that means by the distance between sensor and container wall. Because of the highly increasing or decreasing distance a direct linear measurement is not possible in this area. However the good repeatability of the measurement makes it possible to apply a corrective curve in the control system in order to achieve a linear measuring signal. Alternatively it is also possible to use a jacket tube or another suitable counter electrode.

# TYPE CODE



## Capacitive Filling Level Probe



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## Capacitive Filling Level Probe - KFI

Series: **i-LEVEL**

Analogue current output 4...20 mA

2 programmable limit value switching points

- Integrated evaluation electronics
- Housing material: GFK, 16 mm Ø
- Connection head and process connection stainless steel VA no. 1.4305
- Process connection G1"
- Multifunction probe: Automatic identification of NPN / PNP function
- Normally open / normally closed function switchable
- Probe length max. 1000 mm
- Electronic lock

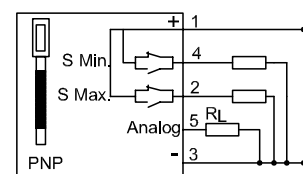
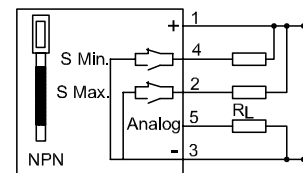
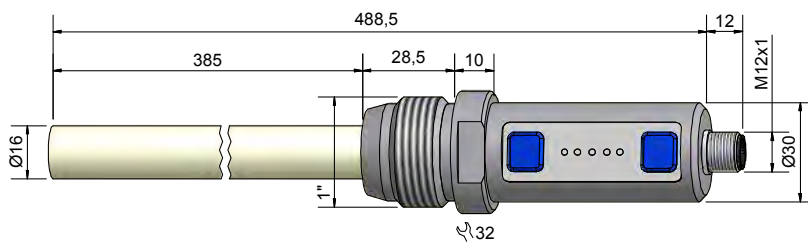
Certificate:



### Technical data

Active zone [mm]	300 mm
Electrical version	5 - pin DC
Output function	Analogue, 2 limit value switching points, Normally open / normally closed switchable
<b>Type</b>	<b>KFI-1-2-385-300-IL4-GFK/VA-G1"-Y10</b>
<b>Art.-No.</b>	<b>KI 0001</b>
Operating voltage ( $U_B$ )	18...30 V DC
Permitted residual max.	5 %
Load resistance ( $R_L$ )	$\leq 400$ Ohm
Output current ( $I_a$ )	100 mA
Power consumption (outputs no-load)	0,8 W
Analogue output	4...20 mA
Switching frequency max.	1 Hz
Permitted ambient temperature	-25...+55 °C
Permitted ambient temperature ( for active zone)	-25...+100 °C
Pressure	10 bar
LED-Display	Green / yellow
Protective circuit	Built-in
Degree of protection IEC 60529	IP 67
Norm	EN 60947-5-2*
Connection	Flange connector M 12 x 1
Housing material	VA No. 1.4305 / polyester
Active zone	GFK

\*Where applicable



Other housing materials for the active zone (probe), like PE, PTFE, PVDF or PEEK on request.

Made in Germany

All specifications are subject to change without notice. (06/2013)





## Capacitive Filling Level Probe - KFI

Series: **L&V&L**

Analogue current output 4...20 mA

2 programmable limit value switching points

- Integrated evaluation electronics
- Housing material: GFK, 16 mm Ø
- Connection head and process connection stainless steel VA no. 1.4305
- Process connection G1"
- Multifunction probe: Automatic identification of NPN- / PNP function
- Normally open / normally closed function switchable
- Probe length max. 1000 mm
- Electronic lock

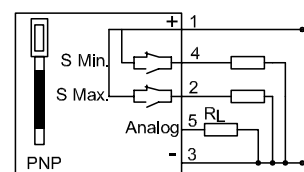
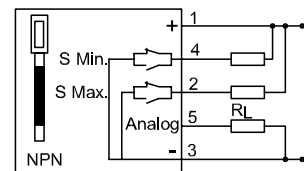
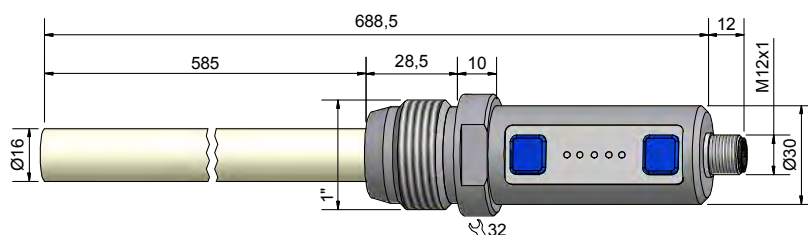
Certificate:



### Technical data

Active zone [mm]	500 mm
Electrical version	5 - pin DC
Output function	Analogue, 2 limit value switching points, Normally open / normally closed switchable
<b>Type</b>	<b>KFI-1-2-585-500-IL4-GFK/VA-G1"-Y10</b>
<b>Art.-No.</b>	<b>KI 0002</b>
Operating voltage ( $U_b$ )	18...30 V DC
Permitted residual max.	5 %
Load resistance ( $R_L$ )	$\leq 400$ Ohm
Output current ( $I_b$ )	100 mA
Power consumption (outputs no-load)	0,8 W
Analogue output	4...20 mA
Switching frequency max.	1 Hz
Permitted ambient temperature	-25...+55 °C
Permitted ambient temperature ( for active zone)	-25...+100 °C
Pressure	10 bar
LED-Display	Green / yellow
Protective circuit	Built-in
Degree of protection IEC 60529	IP 67
Norm	EN 60947-5-2*
Connection	Flange connector M 12 x 1
Housing material	VA No. 1.4305 / polyester
Active zone	GFK

\*Where applicable



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Other housing materials for the active zone (probe), like PE, PTFE, PVDF or PEEK on request.

Made in Germany



## Capacitive Filling Level Probe - KFI

Series: **-L&V&L**

Analogue voltage output 0...10 V

2 programmable limit value switching points

- Integrated evaluation electronics
- Housing material: GFK, 16 mm Ø
- Connection head and process connection stainless steel VA no. 1.4305
- Process connection G1"
- Multifunction probe: Automatic identification of NPN- / PNP function
- Normally open / normally closed function switchable
- Probe length max. 1000 mm
- Electronic lock

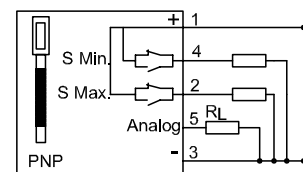
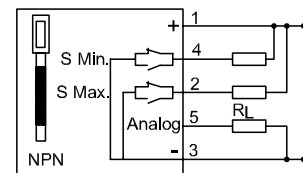
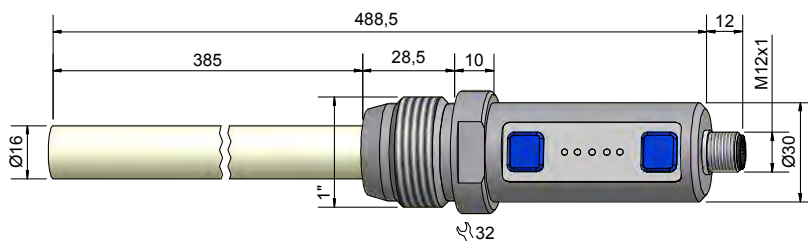
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### Technical data

Active zone [mm]	300 mm
Electrical version	5 - pin DC
Output function	Analogue, 2 limit value switching points, Normally open / normally closed switchable
<b>Type</b>	<b>KFI-1-2-385-300-UL-GFK/VA-G1"-Y10</b>
<b>Art.-No.</b>	<b>KI 0003</b>
Operating voltage ( $U_B$ )	18...30 V DC
Permitted residual max.	5 %
Load resistance ( $R_L$ )	$\geq 2$ K Ohm
Output current ( $I_a$ )	100 mA
Power consumption (outputs no-load)	0,8 W
Analogue output	0...10 V
Switching frequency max.	1 Hz
Permitted ambient temperature	-25...+55 °C
Permitted ambient temperature (for active zone)	-25...+100 °C
Pressure	10 bar
LED-Display	Green / yellow
Protective circuit	Built-in
Degree of protection IEC 60529	IP 67
Norm	EN 60947-5-2*
Connection	Flange connector M 12 x 1
Housing material	VA No. 1.4305 / polyester
Active zone	GFK

\*Where applicable



Other housing materials for the active zone (probe), like PE, PTFE, PVDF or PEEK on request.

Made in Germany

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## Capacitive Filling Level Probe - KFI

Series: **L&V&L**

Analogue voltage output 0...10 V

2 programmable limit value switching points

- Integrated evaluation electronics
- Housing material: GFK, 16 mm Ø
- Connection head and process connection stainless steel VA no. 1.4305
- Process connection G1"
- Multifunction probe: Automatic identification of NPN- / PNP function
- Normally open / normally closed function switchable
- Probe length max. 1000 mm
- Electronic lock

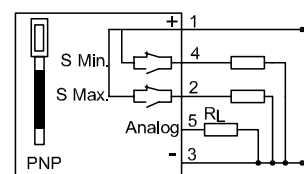
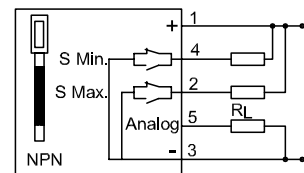
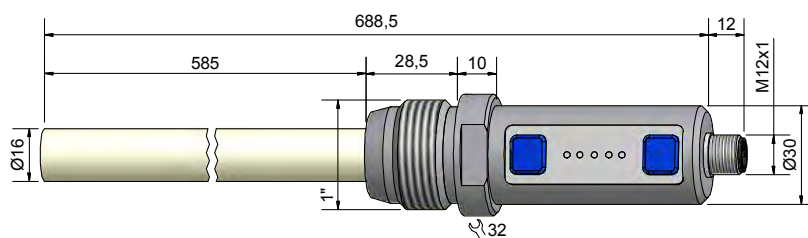
Certificate:



### Technical data

Active zone [mm]	500 mm
Electrical version	5 - pin DC
Output function	Analogue, 2 limit value switching points, Normally open / normally closed switchable
<b>Type</b>	<b>KFI-1-2-585-500-UL-GFK/VA-G1"-Y10</b>
<b>Art.-No.</b>	<b>KI 0004</b>
Operating voltage ( $U_b$ )	18...30 V DC
Permitted residual max.	5 %
Load resistance ( $R_L$ )	$\geq 2$ K Ohm
Output current ( $I_b$ )	100 mA
Power consumption (outputs no-load)	0,8 W
Analogue output	0...10 V
Switching frequency max.	1 Hz
Permitted ambient temperature	-25...+55 °C
Permitted ambient temperature (for active zone)	-25...+100 °C
Pressure	10 bar
LED-Display	Green / yellow
Protective circuit	Built-in
Degree of protection IEC 60529	IP 67
Norm	EN 60947-5-2*
Connection	Flange connector M 12 x 1
Housing material	VA No. 1.4305 / polyester
Active zone	GFK

\*Where applicable



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Other housing materials for the active zone (probe), like PE, PTFE, PVDF or PEEK on request.

Made in Germany

## **ACCESSORIES**

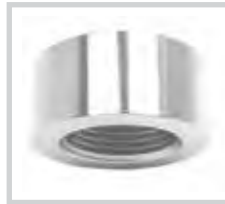
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## WELDED SOCKET G1“

For container and tubes



Type	Art. No.
AP 35	196368



Type	Art. No.
BP 35	196369

## MILK TUBE FITTING ACCORDING TO DIN 11851 G1“

Cone nut



Type	Art. No.
FP 35 - DN 40	196371
GP 35 - DN 50	196372
LP 35 - DN 65	196373

Coupling nut



Type	Art. No.
FÜ 15 - DN 40	196374
GÜ 15 - DN 50	196375
LÜ 15 - DN 65	196376

Varivent



Type	Art. No.
HP 35 -DN50 Type N	196377
IP 35 - DN 25 Type F	196378

Triclamp



Type	Art. No.
TP 35	196379

DRD-Flange



Type	Art. No.
GA 35	196380

## SEALING PLUG G1“

Sealing plug



Type	Art. No.
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