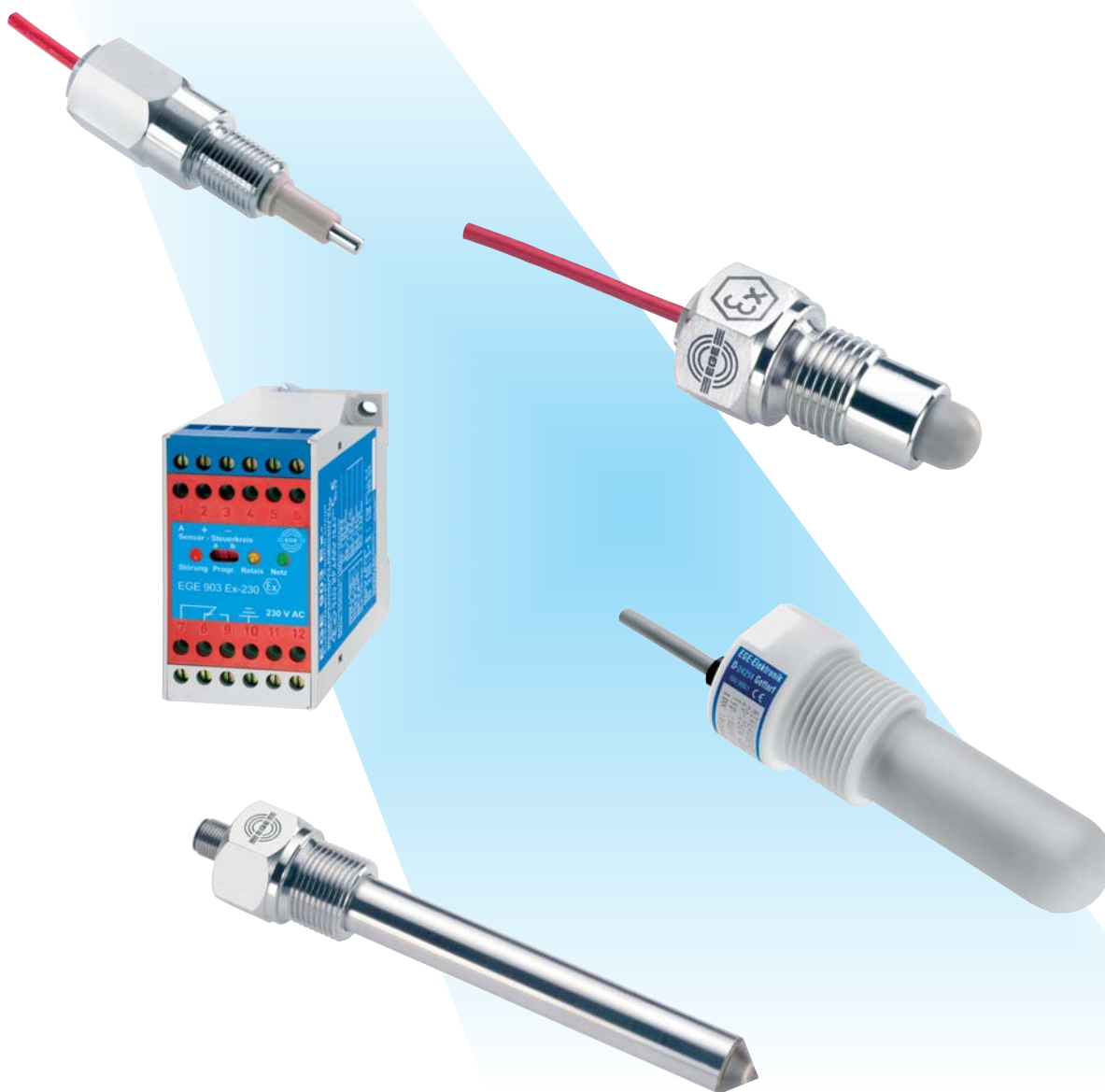


Special-Sensors for Automation



Level Control

Catalogue 2005/2006

Contents

Application notes	2.01 - 2.04
--------------------------------	-------------

Level controller

Integral switches Series KGF/KGMR/KGFR/KA/KB/KFC	2.05 - 2.11
Opto-integral switches Series UFGS/UFS/UFB	2.12 - 2.14
Analog-sensors up to 200 °C Series KFA	2.15
-230 °C-Low temperature Series KGFP	2.16
230 °C-High temperature Series KGFT	2.17
Amplifiers Series KK/KU/KKM	2.18 - 2.19

Level controller for Ex-applications

Ex-sensors Zone 20 - 22 Series KGEX	2.20 - 2.21
Ex-opto sensors Zone 0 Series UFGS...Ex/URFG...Ex	2.22 - 2.23
Ex-sensors Zone 0 Series KEAC	2.24
Ex-sensors Zone 0 up to 200 °C Series KGFT...Ex	2.25
Ex-preamplifier Zone 1 Series KK 030 Ex	2.26
Ex-amplifier Zone 1 Series SF3	2.27
Ex-amplifiers Series EGE 90 Ex/EGE 903 Ex	2.28 - 2.29
Ex-housing for amplifiers Zone 1 / 21 System GAM	2.30

Accessories

Mounting sleeves	2.31
Universal plug system M12	2.32

We reserve the right to make technical alterations without prior notice.

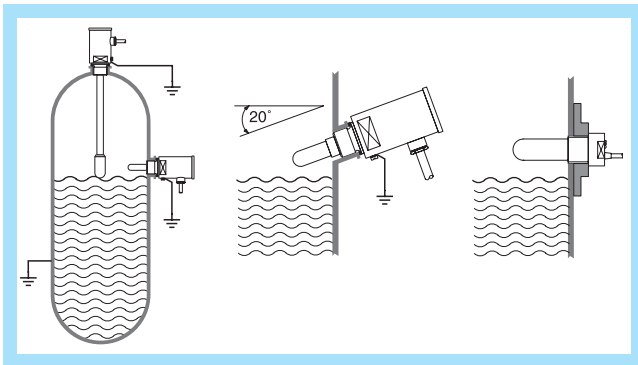
Capacitive sensors

The operation of these level sensors is based on a dielectric measuring method. All media which are surround the sensors measuring electrode, built into the tip of the probe, change the state of dielectric balance between the measuring electrode and the surrounding space. This disturbance in the balance triggers a switching command inside the device. The balance can be adjusted with a built-in potentiometer so that materials with different bulk densities and correspondingly different dielectric constants can be measured optimally. Metallic or metal clad vessels should be earthed. In the case of plastic vessels filled with electrically conductive materials, the latter should be earthed. In the case of plastic vessels filled with non-conducting materials, an earthed metal band applied on the outside of the vessel may be used as a counter-electrode.

Installation

At the side installation of capacitive sensors we prefer to put the sensor tip on an angle of 20 degree to protect sedimentation.

The sensor should be protected against damages by side power effects for example by blungers.



Medium adjustment for capacitive sensors

Level sensors are set in such a way that they switch upon contact with a medium. The medium adjustment should, if possible, take place without removal under operating conditions. If the built-in part of the sensor can be completely submerged or covered during operation, the adjustment must also take place in this state. If only medium contact is possible, the adjustment takes place upon contact. The trimmer potentiometer is protected by a plastic bolt. This bolt must be removed before the desired sensitivity is set. Turning it clockwise increases the response sensitivity. The adjustment potentiometer is turned until the switch output switches through (normally-open contact). You achieve switching point safety by continuing to turn the potentiometer half a turn to one turn. Devices with a LED line are adjusted to two green LEDs. If the medium adjustment has taken place, the plastic bolt must be fixed again.

Laboratory adjustment

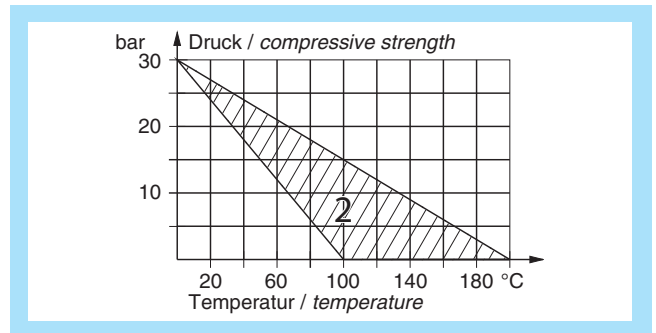
If adjustment cannot be carried out with the sensor mounted in operating position, it can be performed upon a simi-

lar vessel. It must, however, be made sure that this vessel is set upon an earthed metal plate, or that the liquid within the vessel is earthed by means of an introduced wire. The minimum height and minimum diameter of the experimental vessel should be about 10 cm.

If setting is correct, the filling level monitor reacts correctly if 50% of the electrode diameter is covered. When mounted vertically, sensors react upon contact with the medium. Reaction time lag is less than 0.25 sec.

Sealings

The sealings used for our sensors are made of PTFE, NBR, FPM or AFM. For water applications with water temperatures up to 150 °C and with pressures less than 5 bar, EDPM O-rings must be used. If the temperatures exceed 100 °C or the pressures are higher special sealings are necessary (2). When ordering sensors for such applications, such special sealings must be ordered too.



Threads

The threads of the sensors in this prospectus are manufactured to DIN ISO 228-1, tolerance class B. They are designated with (") or (G).

If it is necessary to combine different threads, e.g. the sensor-thread made to DIN ISO 228-1 and an inner thread made to DIN ISO 229, such inner thread must be widened by a thread drill.

Sensors for explosion hazardous areas

Fill level monitors for use in zone 0 or zone 20 are operated with the associated amplifiers listed in the respective connection chart. The analysis devices are always operated outside of the ex area. Sensors of the series KGFT...Ex are used in conjunction with an intermediate amplifier, which is approved for installation in zone 1.

Opto-sensors UF../UR..

Optical sensors react to a change of the refraction index within the proximity of the sensor tip when being immersed into fluid. The sensor does not have to be adjusted. In rare cases, the container wall or particles within the fluid may reflect the light emitted by the sensor and thus interfere with the fluid detection. A trial run is recommended in such instances. The sensors are designed to be used with the respectively listed fluids under normal conditions. The chemical compatibility and technical suitability of the sensor should be tested when used with unlisted fluids.

Resistance UFGS..., UFGS...Ex, URFG...Ex

Water / water steam	Monoethylenglycole
Vegetable oil	Glyceric
Diluted acids	Acetone
Diluted bases	Fuels
Ethyl alcohol	Benzol
Methyl alcohol	Diesel
Isopropanol	Motor oil
Isohexan	Hydraulic oil
n-Heptan	Paraffin oil DAB

Glossary

Switching Point

Capacitative level sensors react to conductive materials and non-conductive materials with a dielectrical constant $\epsilon > 1$. The switching point depends on the material.

When the sensor-tip is immersed in a fluid, a switching command inside the device is triggered. This trigger is set between contact with the liquid and some mm more into the liquid. This distance between the tip of the sensor and the trigger is the nominal switching point. The immersion-distance has a negative sign, e. g. -8 mm.

The following table lists the approximate values for the material dependent reduction factors. In practical applications there could be variations, because of the mounting conditions, for example.

Material	ϵ	Sensitivity in % (approx.)
Steel ST 37	Conductive	100
Saltwater	80	100
Marble	8	65
Porcelain	4-5	50
PE	2.3	10
Oil	2.2	10
Wood	2-7	10-60

The water content of an object or a liquid has a decisive influence on the switching point. A high humidity content increases the switching point considerably.

If the sensor is moistened with conductive materials, its function can be impaired when a conductive film builds up that electrically connects the sensor electrode with a metallic conducting side.

Switching point s_p

The switching point or rated operating distance is a device parameter that does not take into account sample variances and external influences such as temperature and supply voltages. Optical sensors are switching by immersing the tip. When the sensor tip is immersed in a fluid, the switching point has a negative sign.

Effective operating distance s_r

The effective operating distance is the operating switching point at nominal voltage and at nominal temperature of 23°C. It is between 90 % and 110 % of the rated operating distance.

Usable operating distance s_u

The usable operating point is in the entire allowable temperature and voltage range is between 80 % and 120 % of the effective operating distance.

Assured operating distance s_a

The assured operating point takes into account all the external influences, sample and media variances and is in the range from 0 % to 72 % of the rated operating distance point. Within this range a guaranteed switching is ensured.

Switching point drift

The operating distances are given for an ambient temperature of 23°C. In the permissible temperature range the switching point varies by less than 15 % from the value at 23°C. The temperature of the measured object has no influence on the switch point.

Hysteresis H

The switching hysteresis describes the distance between the turn on point while immersing in the liquid and the turn off point during the separation of it from the sensor. The hysteresis brings about a stable switching signal even when there are vibrations, temperature drift, or electrical failures. The hysteresis is defined according to EN60947-5-2 to be a maximum 20 % from the real switching point, and carries a value of typically 10 % from the real switching distance s_r for EGE sensors.

Repeating accuracy R

The repeating accuracy describes the maintenance of the switching point after the repeated immersing in the liquid under specified circumstances. EGE sensors have typical tolerances of less than 3 % of the effective operating point.

Switching frequency

The maximum switching frequency of the sensor is determined at nominal switching point S_p when immersing in the water.

Supply voltage

The operating voltage is the voltage range in which EGE sensors function safely. For a constant voltage supply it is important to make sure that the limits are still observed when the residual ripple is included.

Switching current

The switching current indicates the maximum continuous current for the switching output of the sensor at a given ambient temperature. The current carrying capacity is reduced with increasing ambient temperature and is meant for the use of a non inductive load.

Short circuit protection

The short circuit proof ensures the sensor against destruction through a short circuit on the output. After removal of the fault, the output is reactivated. Where a maximum overload current is listed, this should not be exceeded.

Overcurrent release

This value indicates the median value of current at which the short circuit protection responds with a tolerance of $\pm 20\%$.

Reverse polarity protection

The reverse polarity protection prevents destruction of the sensor by a reversal of the polarity of the voltage supply.

Voltage drop U_d

The voltage drop arises in the semiconductor elements of the sensor. It is measured on the active output.

Residual current I_r

The residual current flows in the load current circuit when the output is blocked. The residual current must be considered when switching sensors in parallel.

Minimum load current I_m

The minimum load current is necessary for flawless operation with two-wire devices.

Current consumption

The current consumption is the maximum value of the no-load current I_0 that the sensor can absorb without a load.

Ambient temperature

The ambient temperature indicates the maximum allowable temperature range for the sensor.

Electromagnetic compatibility EMC

The EMC class is a measure of the noise immunity of the sensor against external electrical and magnetic influences. The information is based on the standard EN 61000-6-2.

Switch-on impulse suppression

EGE sensors have a switch-on impulse suppression that blocks the output during the switch-on phase, when the operational voltage is applied.

Protection

The protective system indicates the protection of the sensors against penetration of foreign bodies and water according to EN 60529.

LED-Display

EGE sensors with yellow light-emitting diodes indicate the switching status optically.

Housing material

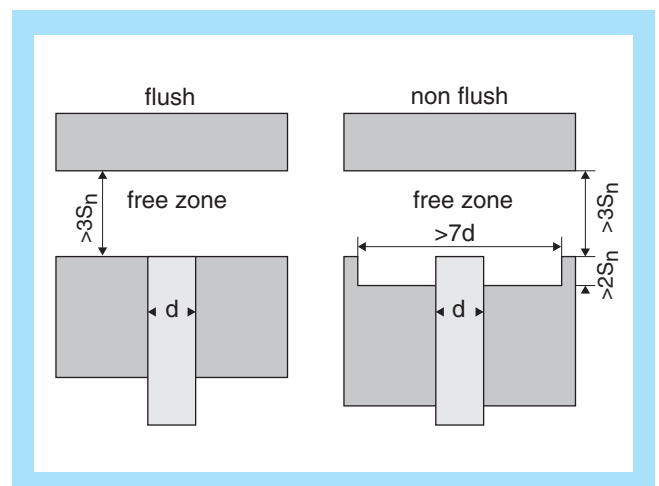
The housing material determines the chemical resistance of the sensor against external influences. For special applications, other housing materials are available.

Connection

The connection of the sensors is accomplished through plug-in connections or cables. Different cable types and lengths are available upon request.

Instructions for mounting

For flush mounting, the sensor can be built into influencing material up to its active surface without changing its characteristics. For non-flush mounting, a metal-free zone around the sensor must be allowed for. A free zone to the material opposite the sensor must be maintained for all sensors.



The indicated free zones are in accordance with the standard EN 60947-5-2.



Collocation

When collocating the sensors, a minimum separation must be kept between the devices in order to avoid mutual influence. When in doubt, a test should be conducted under application conditions. For capacitive sensors, the lateral separation from one another must correspond to at least twice the diameter of the sensor. For separations greater than eight times the diameter no mutual influence is to be expected. For oppositely mounted sensors, a minimal separation of eight times the nominal switching separation should be allowed for.

Torques

In order to prevent destruction of the threaded bushing during fitting, the following maximum torques must not be exceeded:

Design	Metal housing	Plastic housing
M12x1	10 Nm	1 Nm
M18x1	25 Nm	2 Nm
M30x1.5	40 Nm	5 Nm

PTFE sensors may only be tightened by hand.

Instructions for operation

Serial connection

For the serial connection of two wire or three wire sensors the individual voltage drops are added together. Therefore there is a lesser operational voltage at the disposal of the load. The addition of the switch-on delay times should be noted.

Parallel connection

The parallel connection of two wire sensors can only be conditionally recommended since the residual currents are added together and flow through the load. For the parallel connection of three wire sensors, the current consumption of the individual devices is added together. Since this current does not flow through the load, the maximum number of parallel connectable three wire sensors depends only on the power supply.

Approval for safety applications

Sensors for personal security must have a qualification approval according to EN 954-1 and must be labeled accordingly. Sensors that are not labeled must not be used for applications of this kind.

Valid standards

- EN 60947-5-2
Control units; low voltage control units, auxiliary switch, proximity switch
- EN 61000-6-4
Electromagnetic compatibility (EMC)
Interference emissions in the industrial area
- EN 61000-6-2
Electromagnetic compatibility (EMC)
Generic standards immunity for industrial environments
- EN 61000-4-2 (ESD)
Electrostatic discharging immunity
- EN 61000-4-3 (HF radiated)
Radiated radio-frequency electromagnetic field immunity test
- EN 61000-4-4 (Burst)
Electrical fast transient/burst immunity test
- EN 61000-4-5 (Surge)
Surge immunity test
- EN 60529
Protective systems, IP-designation
- EN 50014
Electrical apparatus for potentially explosive atmospheres
– General requirements
- EN 50020
Electrical apparatus for potentially explosive atmospheres
– Intrinsic safety "i"
- EN 50281
Electrical apparatus for use in the presence of combustible dust

Authorisations

TÜV-cert Zertifizierungsstelle - Deutschland
(technical monitoring certification agency - Germany)

Zertifizierungen

- TÜV-cert ISO 9001
- TÜV-cert Quality control production
Attachment IV of the EC-Guidelines 94/9/EG
- TÜV Nord Re-cancelling certificate according to EN 10204

Color code: BK = black BN = brown BU = blue GN = green YE = yellow GY = grey PK = pink WH = white

LEVEL CONTROLLER

Integral switch



Series KGF
PTFE housing
M14x1

DC 10...33 V



Design	DC PNP M14x1	
Dimensions		
Switching point sp [mm]	-2	-2
Switching output		
ID-No.	P20130	P21106
Type	KGF 014 GSP	KGF 014 GOP
Supply voltage [V]	10...33 DC	
Switching current [mA]	200	
Short circuit proof	•	
Overcurrent release [mA]	800	
Reverse protection	•	
Voltage drop [V]	1	
Minimum load current [mA]	-	
Current consumption [mA]	4	
Switching frequency [Hz]	10	
Ambient temperature [°C]	-25...+75	
EMC-class	A	
Protection [EN 60529]	IP 67	
LED display	•	
Housing material	PTFE	
Connection	2m PVC-cable 3x0.34 mm ²	
Switching current		
Accessories	Fixing nuts are part of delivery	

LEVEL CONTROLLER

Integral switch



Series KGF
PTFE housing
M30x1.5

AC 20...250 V
DC 10...55 V



Design	AC M30x1.5		DC PNP M30x1.5	
Dimensions				
Switching point sp [mm]	-3	-3	-3	-3
Switching output				
ID-No.	P20002	P20003	P20051	P20052
Type	KGF 030 WS	KGF 030 WO	KGF 030 GSP	KGF 030 GOP
Supply voltage [V]	20...250 AC		10...55 DC	
Switching current [mA]	400		400	
Short circuit proof	-		•	
Overcurrent release [mA]	-		800	
Reverse protection	-		•	
Voltage drop [V]	8 AC		1 DC	
Minimum load current [mA]	5		-	
Current consumption [mA]	2.5		4	
Switching frequency [Hz]	10		10	
Ambient temperature [°C]	-25...+75			
EMC-class	A			
Protection [EN 60529]	IP 67			
LED display	•			
Housing material	PTFE			
Connection	2 m PVC-cable 0.5 mm ²			
Switching current				

Accessories Fixing nuts are part of delivery

LEVEL CONTROLLER

Integral switch



Series **KGf/KGMR**
G3/4 thread

AC 20...250 V
DC 10...55 V



Design	AC G3/4		DC PNP G3/4		DC PNP G3/4
Dimensions					
Switching point sp [mm]	-2	-2	-2	-2	-3
Switching output					
ID-No.	P20005	P20006	P20055	P20056	P21101
Type	KGf 075 WS	KGf 075 WO	KGf 075 GSP	KGf 075 GOP	KGMR 107 GSP
Supply voltage [V]	20...250 AC		10...55 DC		10...55 DC
Switching current [mA]	400		400		300
Short circuit proof	-		•		•
Overcurrent release [mA]	-		800		800
Reverse protection	-		•		•
Voltage drop [V]	8 AC		1 DC		1.5 DC
Minimum load current [mA]	5		-		-
Current consumption [mA]	2,5		4		4
Switching frequency [Hz]	10		10		10
Ambient temperature [°C]	-25...+75		-25...+75		-25...+75
EMC-class	A		A		A
Protection [EN 60529]	IP 67		IP 67		IP 67
LED display	•		•		•
Housing material	PTFE		PTFE		PTFE/AISI 316 Ti
Sealing material	-		-		Viton
Connection	2 m PVC-cable 0.5 mm ²				
Switching current					

LEVEL CONTROLLER

Integral switch



Series KGFR
PTFE housing
G1 thread

AC 20...250 V
DC 10...55 V



Design	AC G1		DC PNP G1	
Dimensions				
Switching point sp [mm]	-6	-6	-6	-6
Switching output				
ID-No.	P20009	P20010	P20063	P20064
Type	KGFR 100 WS	KGFR 100 WO	KGFR 100 GSP	KGFR 100 GOP
Supply voltage [V]	20...250 AC		10...55 DC	
Switching current [mA]	400		400	
Short circuit proof	-		•	
Overcurrent release [mA]	-		800	
Reverse protection	-		•	
Voltage drop [V]	8 AC		1 DC	
Minimum load current [mA]	5		-	
Current consumption [mA]	2.5		4	
Switching frequency [Hz]	10		10	
Ambient temperature [°C]	-25...+75			
EMC-class	A			
Protection [EN 60529]	IP 67			
LED display	•			
Housing material	PTFE			
Connection	2 m PVC-cable 0.5 mm ²			
Switching current				

LEVEL CONTROLLER

Integral switch



Series KA
G1 thread

DC 10...55 V



Design	DC PNP G1 L = 45 mm	DC PNP G1 L = 120 mm
Dimensions		
Switching point sp [mm]	-8	-8
Switching output		
ID-No.	P21010	P21011
Type-sensor length L	KA-L45-GPP	KA-L120-GPP
Supply voltage [V]	10...55 DC	
Switching current [mA]	400	
Short circuit proof	•	
Overcurrent release [mA]	800	
Reverse protection	•	
Voltage drop [V]	2	
Minimum load current [mA]	-	
Current consumption [mA]	4	
Switching frequency [Hz]	5	
Ambient temperature [°C]	housing: -25...+70 / sensor tip: -25...+120	
EMC-class	A	
Protection [EN 60529]	IP 67	
LED display	•	
Housing material	PTFE / AISI 316 Ti	
Sealing material	Viton	
Compressive strength [bar]	30 (25°C)	
Connection	terminal screws	
Switching current		
Accessories		

LEVEL CONTROLLER

Integral switch



Series KB
G1 thread

DC 10...55 V



Design	DC PNP G1			
Dimensions				
Switching point sp [mm]	-8	-8	-8	-8
Switching output				
ID-No.	P21012	P21013	P21014	P21015
Type-sensor length L	KB-L200-GPP	KB-L400-GPP	KB-L600-GPP	KB-L1000-GPP
Supply voltage [V]	10...55 DC			
Switching current [mA]	400			
Short circuit proof	•			
Overcurrent release [mA]	800			
Reverse protection	•			
Voltage drop [V]	2			
Minimum load current [mA]	-			
Current consumption [mA]	4			
Switching frequency [Hz]	5			
Ambient temperature [°C]	housing: -25...+70 / sensor tip: -25...+120			
EMC-class	A			
Protection [EN 60529]	IP 67			
LED display	•			
Housing material	PTFE / AISI 316 Ti			
Sealing material	Viton			
Compressive strength [bar]	16 (25°C)			
Connection	terminal screws			
Switching current				

LEVEL CONTROLLER

Integral switch



Series KFC
G1/2 thread

DC 18...33 V

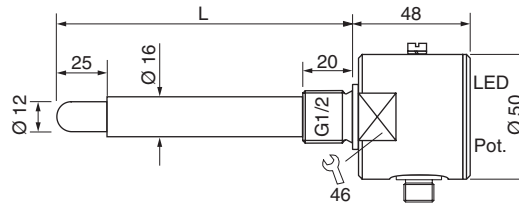
Stainless steel housing

PTFE-sensor

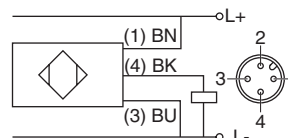
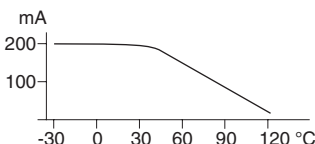


Design DC PNP G1/2

Dimensions



Switching point sp [mm]	-6			
Switching output				
ID-No.	P21161	P21162	P21163	P21164
Type-sensor length L	KFC 050 GSP-L50	KFC 050 GSP-L100	KFC 050 GSP-L200	KFC 050 GSP-L400
Supply voltage [V]	18...33 DC			
Switching current [mA]	200			
Short circuit proof	•			
Overcurrent release [mA]	250			
Reverse protection	•			
Voltage drop [V]	2			
Minimum load current [mA]	-			
Current consumption [mA]	10			
Switching frequency [Hz]	5			
Ambient temperature [°C]	housing: -25...+75 / sensor tip: -25...+120			
EMC-class	A			
Protection [EN 60529]	IP 67			
LED display	•			
Housing material	AISI 316 Ti / PTFE			
Sealing material	FFKM (Kalrez)			
Compressive strength [bar]	16 (25°C)			
Connection	M12 plug system			
Switching current				



Accessories Connecting cable type SLG 3... SLW 3..., see page 2.32

LEVEL CONTROLLER

Opto-integral switch



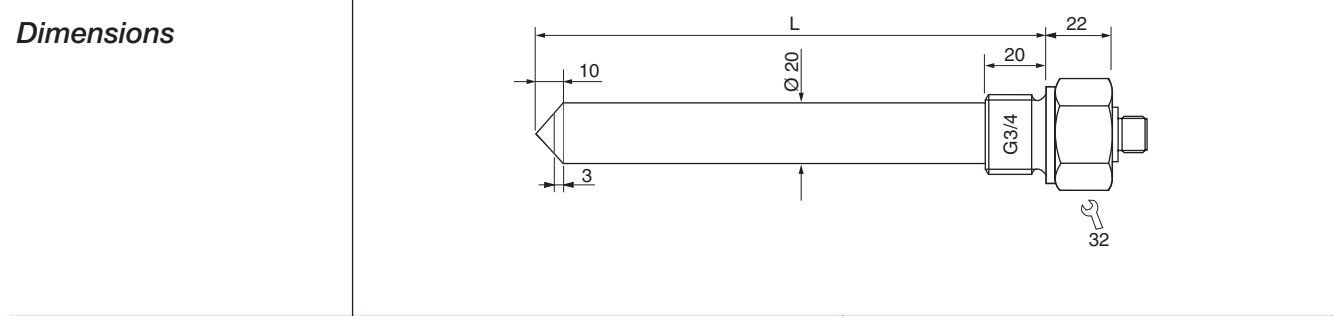
Series UFGS
Opto glass-sensor
G3/4 thread

DC 10...33 V

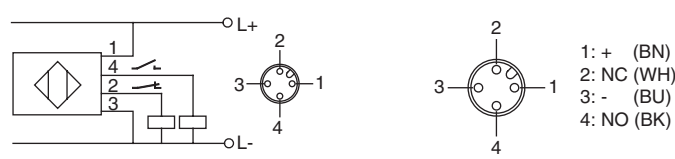
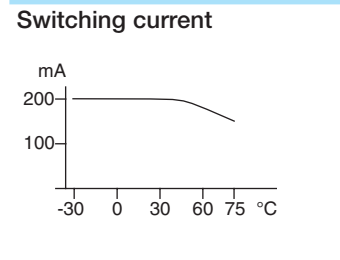
Resistant to detergents
Resistant to hydraulic oil • motor oil



Design DC PNP G3/4



Switching point sp [mm]	-10	
Switching output		
ID-No.	P21181012	
Type-sensor length L [mm]	UFGS 075 GSOP-L120	Sensor length The total length L of the sensors is specified by appending "Lxxx" to the type. xxx: length in mm Preferred excess lengths ID-No. 200 mm: L200 P21181020 400 mm: L400 P21181040 1000 mm: L1000 P21181100
Supply voltage [V]	10...33 DC	
Switching current [mA]	200	
Short circuit proof	•	
Overcurrent release [mA]	250	
Reverse protection	•	
Voltage drop [V]	2	
Minimum load current [mA]	-	
Current consumption [mA]	10	
Switching frequency [Hz]	5	
Ambient temperature [°C]	-25...+70	
EMC-class	A	
Protection [EN 60529]	IP 67	
LED display	plug with LED	
Housing material	AISI 316 Ti / glass	
Sealing material	FFKM (Kalrez)	
Compressive strength [bar]	16 (25°C)	
Connection	M12 plug system	



Accessories Connecting cable type SLW 4-2 LED (Z01157), see page 2.32

LEVEL CONTROLLER

Opto-integral switch



Series UFS
G3/4 thread

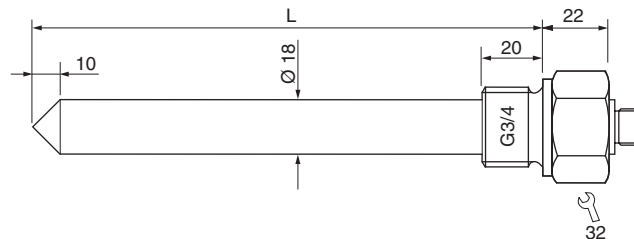
DC 10...33 V

Plug connection

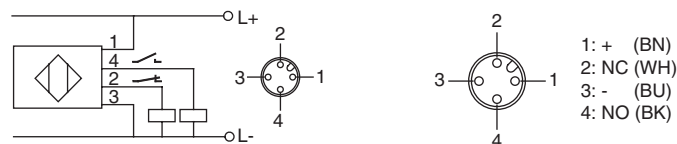
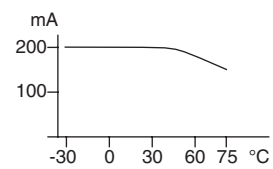


Design DC PNP G3/4

Dimensions



Switching point sp [mm]	-10	-10	-10	-10	-10
Switching output					
ID-No.	P21121	P21122	P21123	P21124	P21125
Type	UFS 075 GSOP-L100	UFS 075 GSOP-L200	UFS 075 GSOP-L400	UFS 075 GSOP-L600	UFS 075 GSOP-L1000
Supply voltage [V]	10...33 DC				
Switching current [mA]	200				
Short circuit proof	•				
Overcurrent release [mA]	250				
Reverse protection	•				
Voltage drop [V]	2				
Minimum load current [mA]	-				
Current consumption [mA]	10				
Switching frequency [Hz]	5				
Ambient temperature [°C]	-25...+70				
EMC-class	A				
Protection [EN 60529]	IP 67				
LED display	plug with LED				
Housing material	AISI 316 Ti / Polysulfon				
Sealing material	Viton				
Compressive strength [bar]	16 (25°C)				
Connection	M12 plug system				
Switching current					



Accessories Connecting cable type SLW 4-2 LED (Z01157), see page 2.32

LEVEL CONTROLLER

Opto-integral switch



Series UFB

G1 thread

DC 10...33 V

Connection box



Design	DC PNP G1				
Dimensions					
Switching point sp [mm]	-10	-10	-10	-10	-10
Switching output					
ID-No.	P21126	P21127	P21128	P21129	P21130
Type	UFB 100 GSOP-L100	UFB 100 GSOP-L200	UFB 100 GSOP-L400	UFB 100 GSOP-L600	UFB 100 GSOP-L1000
Supply voltage [V]	10...33 DC				
Switching current [mA]	200				
Short circuit proof	•				
Overcurrent release [mA]	250				
Reverse protection	•				
Voltage drop [V]	2				
Minimum load current [mA]	-				
Current consumption [mA]	10				
Switching frequency [Hz]	5				
Ambient temperature [°C]	housing: -25...+70 / sensor tip: -25...+90				
EMC-class	A				
Protection [EN 60529]	IP 67				
LED display	•				
Housing material	AISI 316 Ti / Polysulfon				
Sealing material	Viton				
Compressive strength [bar]	16 (25°C)				
Connection	terminal screws				
Switching current					

LEVEL CONTROLLER

Analog sensor



Series KFA
up to 200 °C

4...20 mA output



Design	G1/2		KU 120 GI
Dimensions			
Sensing length M [mm]	100	200	
Output	-	-	
ID-No.	P21151	P21152	P21153
Type-sensor length L	KFA 150-L135	KFA 150-L235	KU 120GI
Supply voltage [V]		-	24 DC ± 20%
Output current [mA]		-	4...20
Current consumption [mA]		-	50
Working resistance [Ω]		-	50...400
Reaction frequency [Hz]		2	5
Ambient temperature [°C]		-35...+200	-20...+60
EMC-class		A	A
Protection [EN 60529]		IP 68	IP 65
LEM-connection		IP 54	IP 54
LED display		-	•
Housing material		PEEK / AISI 316 Ti	AL
Sealing material		PTFE	-
Compressive strength [bar]		16	-
Connection	2 m PTFE-cable / LEM 01 plug system		M12 plug system
Plug system LEM 01			
Accessories			Connecting cable SLG 3-2 for M12 plug

LEVEL CONTROLLER

-230 °C-Low temperature



Series KGFP

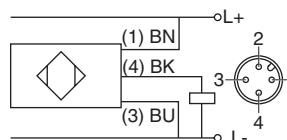
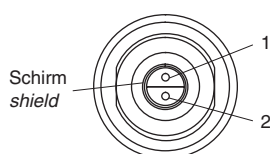
Sensor for connection to an external amplifier

Detection of liquid gases



Design	G1/2	KU 125...
Dimensions		
Switching point sp	adjustable	
Switching output		
ID-No.	P21167	P21166
Type	KGFP 050	KU 125 GPP
Medium temperature [°C]	-230...+80	-
Cable temperature [°C]	-80...+120	-
Supply voltage [V]	-	24 DC ± 20%
Current consumption [mA]	-	50
Switching current [mA]	-	400
Hysteresis [%]	-	10 (adjustable)
Switching frequency [Hz]	-	10
Ambient temperature [°C]	-	-20...+60
EMC-class	-	A
Protection [EN 60529]		
housing	IP 68	IP 65
plug	IP 67	IP 67
LED display		•
Power on LED		•
Housing material	AISI 316 Ti / PCTFE	AL
Connection	2m PTFE-cable with LEM 02 plug system	M12 plug system

Plug system LEM 02



Accessories

Connecting cable type SLG 3... or SLW..., see page 2.32

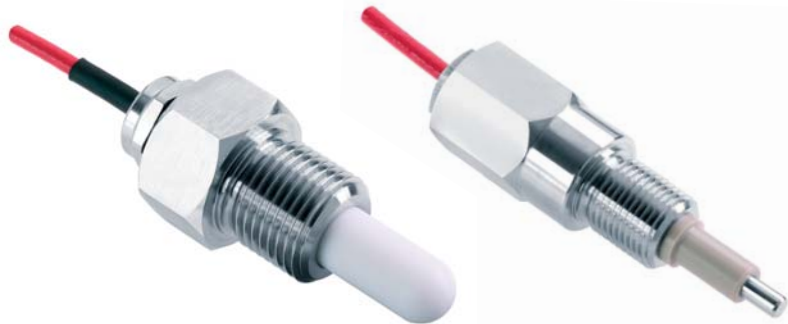
LEVEL CONTROLLER

230 °C-High temperature



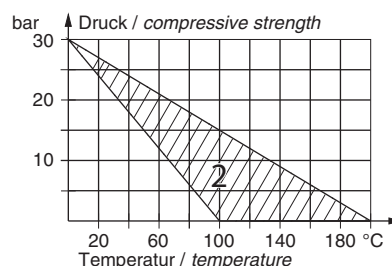
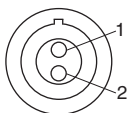
Series KGFT

Sensor for connection to an external amplifier



Design	G1/4	G1/2	G1/4	G1/2	G1/4
Dimensions					
Switching point sp [mm]	-6	-6	-6	-6	-6
ID-No.	P21092	P21093	P21119	P21120	P21108
Type	KGFT 025	KGFT 050	KGFT 125	KGFT 150	KGFT 325
Temperature range [°C]	-35...+180	-35...+180	-35...+200	-35...+200	-35...+230
Protection [EN 60529]					
sensor	IP 68	IP 68	IP 68	IP 68	IP 68
plug LEM 01	IP 54	IP 54	IP 54	IP 54	IP 54
Compressive strength [bar]	10	10	30	30	0.5
Housing material	PTFE / 316 Ti	PTFE / 316 Ti	PEEK / 316 Ti	PEEK / 316 Ti	PEEK / 316 Ti
Sealing material	Viton	Viton	PTFE	PTFE	EP
Connection	2 m PTFE-cable with LEM 01 plug system				
	For special applications the seal must be separate determined. The combination of pressure and temperature is in that case of great importance (see diagram). Special EPDM seals will be used on customer request for water applications up to +150 °C and pressure up to 5 bar. For applications of media temperatures higher than +100 °C or the pressures are higher special seals are necessary (2).				

Plug system LEM 01



Required amplifiers: KK 030 GSP , KU 120...,KK 030 S, KKM 125 GR, see page 2.18 - 2.19

LEVEL CONTROLLER

Amplifiers



Series KK-KU

For sensors KGFT
up to +230 °C

IP 67 Protection

LED display



Design	KK 030...	KU 120...		
Dimensions				
Switching point sp	adjustable	adjustable		
Switching output				
ID-No.	P21095	P21107	P21118	P21117
Type	KK 030 GSP	KU 120 GPP-24	KU 120 WP-230	KU 120 WP-115
Supply voltage [V]	16...55 DC	24 DC ± 20%	230 AC ± 10%	115 AC ± 10%
Current consumption [mA]	15		50	
Switching current max. [mA]	200		400	
Hysteresis [%]	10		10 (adjustable)	
Switching frequency [Hz]	15		5	
Ambient temperature [°C]	-5...+60		-20...+60	
EMC-class	A		A	
Protection [EN 60529]	IP 67		IP 65	
LEM-Connection	IP 54		IP 54	
LED display	LED yellow		LED-array	
Power on LED	LED green		•	
Housing material	AISI 316 Ti		AL	
Sensor Connection	LEM 01 plug		LEM 01 plug	
Connection	M12 plug system	M12 plug system	2 m PVC-cable 4x0.75 mm ²	
Plug system LEM 01				

Accessories Connecting cable type SLG 3... or SLW 3..., see page 2.32

LEVEL CONTROLLER

Amplifier with remote adjustment



Series KKM

For remote adjustment of level sensors

For connection cable up to 200 m length

For sensors series KGFT



Design	Pre-amplifier KK 030 S	Amplifier KKM 125
Dimensions		
Switching point SP	remote adjustable	
Switching output		
ID-No.	P21154	P21155
Type	KK 030 S	KKM 125 GR
Supply voltage [V]	-	24 DC ± 20%
Current consumption [mA]	30	70
Output	-	relay-NO
LED display	•	LED array
Switching voltage max. [V]	-	230 AC 250 DC
Switching current max. [A]	-	1 AC 1 DC
Switching power max.	-	125 VA 60 W
Ambient temperature [°C]	-25...+60	-20...+60
Protection [EN 60529]	IP 54	screws: IP 20 / housing: IP 40
Housing material	AISI 316 Ti	PC
Connection	M12 plug system	terminal screws
Plug system LEM 01		
M12-plug system		

Notice The amplifier KK 030 S must be operated together with the amplifier KKM 125

LEVEL CONTROLLER

Ex -Sensor Zone 20



**Series KGEX
Zone 20**

**Ex II 1D T 95 °C
Category 1**

**Proximity switches
Level controller**

Intrinsically safe



Design	M18x1	M30x1.5	G1	G3/4
Dimensions				
Installation flush (f) non flush (nf)	LED Pot.	LED Pot.	LED Pot.	LED Pot.
Nominal sensitivity [mm]	8 nf	10 nf	-10	-5
ID-No.	P21157	P21158	P21159	P21160
Type	KGEX 018	KGEX 030	KGEX 100	KGEX 107
Ambient temperature [°C]	-25...+75			
Ex marking	II 1D T 95°C			
Certificate no.	TÜV 03 ATEX 2046			
Maximum values	Ci = negligibly small Li = negligibly small Ii = 80 mA Ui = 12.6 V Pi = 252 mW			
Only for the connection to certified intrinsically safe circuits with the following maximum values:				
Housing material	PVDF	PTFE	PTFE	PTFE / AISI 316 Ti Viton
Protection [EN 60529]	IP 67			
Connection	2 m PVC-cable 3x0.5 mm ²			
For the connection to amplifiers EGE 903 Ex				
Other Dust-Ex sensors find you in our catalogue „ATEX Dust-Ex“				
Notice	Fixing nuts are part of delivery			

LEVEL CONTROLLER

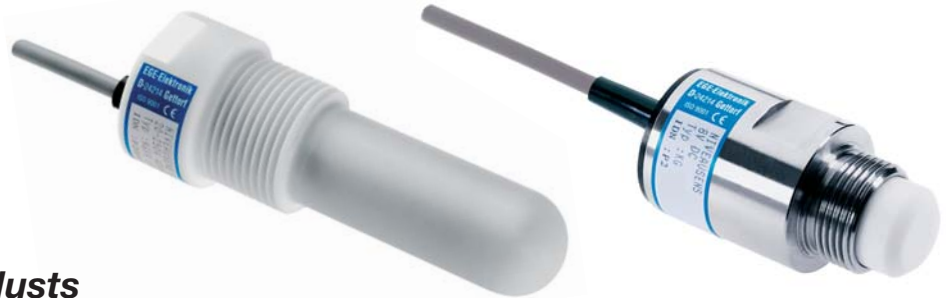


Ex -Sensor Zone 22

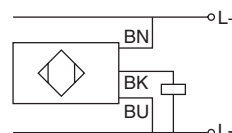
Series KGEX Zone 22

Ex II 3D T 80 °C
Category 3

Proximity switches
Level controller
for non-conductive dusts



Design	M18x1	M30x1.5	DC PNP G1	DC PNP G3/4
Dimensions				
Installation flush (f) non flush (nf)	LED Pot.	LED Pot.	LED Pot.	LED Pot.
Switching point sp [mm] (Adjustable range)	5 f (1...7)	10 f (3...15)	-6	-3
ID-No.	P21170	P21171	P21172	P21173
Type	KGEX 018 GSP	KGEX 030 GSP	KGEX 100 GSP	KGEX 107 GSP
Ex marking	II 3D T 80 °C			
Supply voltage	10...55 DC			
Switching current [mA]	300			
Short circuit proof	•			
Overcurrent release [mA]	800			
Reverse protection	•			
Voltage drop max. [V]	1.5			
Current consumption [mA]	4			
Switching frequency [Hz]	25	25	10	10
Ambient temperature [°C]	-25...+70			
EMC-class	A			
LED display	•			
Housing material	brass-nickel / PPO	brass-nickel / PPO	PTFE	PTFE / AISI 316 Ti Viton
Protection [EN 60529]	IP 67			
Connection	2 m PVC-cable 3x0.5 mm ²			



Notice Fixing nuts are part of delivery

LEVEL CONTROLLER



Ex -Sensor Zone 0

Series **UFGS..Ex**
Opto glass-sensor

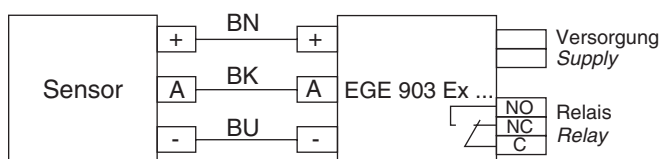
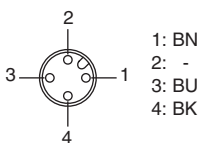
Ex II 1 G EEx ia IIC T6...T4
Category 1

Resistant in kerosine • motor fuels

3-wire sensor, intrinsically safe



Design	G3/4	
Dimensions		
Switching point sp [mm]	-10	
ID-No.	P21183012	<p>Sensor length</p> <p>The total length L of the sensors is specified by appending "Lxxxx" to the type.</p> <p>xxxx: length in mm</p> <p>Preferred excess lengths ID-No.</p> <p>200 mm: L200 P21183020</p> <p>400 mm: L400 P21183040</p> <p>1000 mm: L1000 P21183100</p>
Type-sensor length L [mm]	UFGS 075 Ex-L120	
Ex marking	II 1 G EEx ia IIC T6...T4	
Certificate no.	TÜV 01 ATEX 1662	
Ambient temperature for temperature classes [°C]	T6: 75 T5: 90 T4: 100	
Max. power Pi [mW]	252	
Housing material	AISI 316 Ti / glass	
Sealing material	FFKM (Kalrez)	
Tightening torque [Nm]	100	
Ambient temperature [°C]	-25...+70	
Protection [EN 60529]	IP 67	
Compressive strength [bar]	16	
Connection	M12 plug system	



Accessories plug M12, SBW-DC or SBG-DC

LEVEL CONTROLLER



Ex -Sensor Zone 0

Series URFG..Ex
Opto glass-sensor

Ex II 1 G EEx ia IIC T6...T4
Category 1

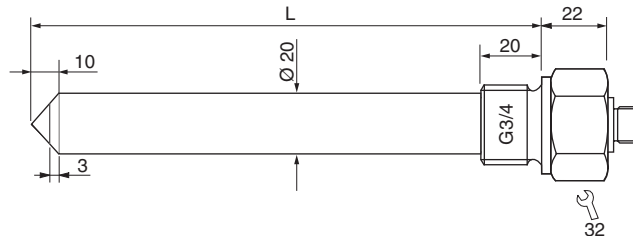
Resistant in kerosine • motor fuels

2-wire sensor, intrinsically safe

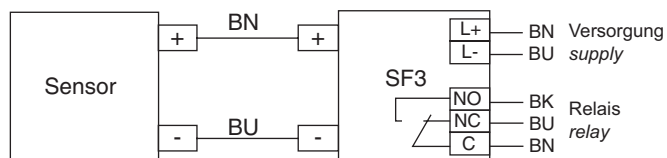
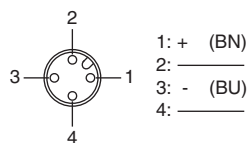


Design **G3/4**

Dimensions



Switching point sp [mm]	-10	<p>Sensor length</p> <p>The total length L of the sensors is specified by appending "Lxxxx" to the type.</p> <p>xxxx: length in mm</p> <p>Preferred excess lengths ID-No.</p> <p>200 mm: L200 P21185020</p> <p>400 mm: L400 P21185040</p> <p>1000 mm: L1000 P21185100</p>
ID-No.	P21185012	
Type-sensor length L [mm]	URFG 075 Ex-L120	
Ex marking	II 1G EEx ia IIC T6	
Certificate no.	TÜV 00 ATEX 1632	
Ambient temperatur for temperature classes [°C]	T6: 70 T5: 80 T4: 100	
Maximum values	li = 154 mA Ui = 23.1 V Pi = 890 mW	
Housing material	AISI 316 Ti / glass	
Sealing material	FFKM (Kalrez)	
Tightening torque [Nm]	100	
Ambient temperature [°C]	-25...+70	
Protection [EN 60529]	IP 67	
Compressive strength [bar]	16	
Connection	M12 plug system	



Accessories **plug M12, SBW-DC or SBG-DC**

LEVEL CONTROLLER

Ex-Sensor Zone 0



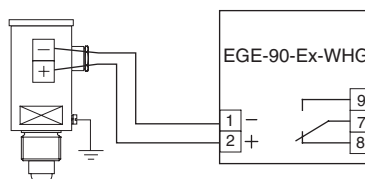
Series KEAC

Ex EEx ia IIC T6...T4
Category 1

Medium up to 120 °C
Sensor length up to 1 m



Design	G1				
Dimensions					
Sensitivity adjustable					
Switching point sp [mm]	-8	-8	-8	-8	-8
ID-No.	P21086	P21087	P21088	P21089	P21090
Type-sensor length L [mm]	KEAC-L80	KEAC-L200	KEAC-L400	KEAC-L600	KEAC-L1000
Ex marking	EEx ia IIC T6...T4				
Certificate no.	TÜV 96 ATEX 1095				
Ambient temperature for temperature classes [°C]	T6: 80 T5: 95 T4: 120				
Max. power Pi [mW]	50				
Housing material	AISI 316 Ti / PTFE				
Sealing material	Viton				
Force thread [Nm]	100				
Sensitivity	adjustable with pot				
Ambient temperature [°C]	housing: -25...+75 / sensor tip: -40...+120				
Protection [EN 60529]	IP 67				
Compressive strength [bar]	30				
Connection	terminal screws				



Notice different materials on request

LEVEL CONTROLLER



Ex -Sensor Zone 0

Series KGFT
up to 200 °C

Ex **EEx ia T6...T3**
Category 1



Design	G1/4	G1/2
Dimensions		
Switching point sp [mm]	-8	-8
ID-No.	P21149	P21150
Type	KGFT 125 Ex	KGFT 150 Ex
Ex marking	EEx ia IIC T6...T3	
Certificate No.	TÜV 01 ATEX 1670	
Ambient temperature for temperature classes [°C]	T6: 80 T5: 95 T4: 130 T3: 195	
Max. power Pi [mW]	110	
Housing material	AISI 316 Ti / PEEK	
Sealing material	PTFE	
Torque [Nm]	50	100
Ambient temperature [°C]	-35...+200	
Protection [EN 60529]	IP 68	
LEM-connection	IP 54	
Compressive strength [bar]	30	
Connection	2 m PTFE-cable plug system LEM 01	
Plug system LEM 01		
Accessories	Required amplifiers KK 030-Ex and EGE 903...	

LEVEL CONTROLLER



Ex -Preamplifier Zone 1

Series KK 030 Ex

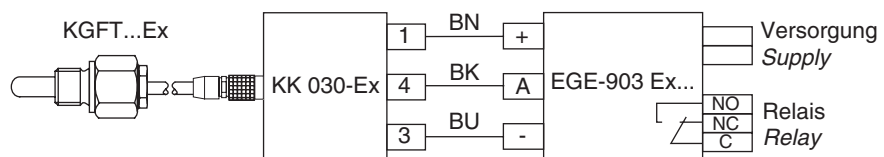
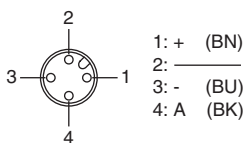
Ex II (1) 2G EEx ia IIC T6...T4

Installation in Zone 1
Intrinsically safe

For connection of sensors
series KGFT...Ex



Design	KK 030 Ex for the connection to amplifiers EGE 903 Ex...
Dimensions	
ID-No.	P21144
Type	KK 030 Ex
Ex marking	II (1) 2 G EEx ia IIC T6...T4
Certificate no.	TÜV 01 ATEX 1671
Ambient temperature for temperature classes [°C]	T6: 75 T5: 90 T4: 120
Max. power PI [mW]	252
Housing material	AISI 316 Ti
Torque [Nm]	50
Sensitivity adjustable	•
Ambient temperature [°C]	-25...+60
Protection [EN 60529]	IP 54
LED display	•
Connection	plug system LEM 01 / M12 plug system



Accessories Connecting cable type SLG 3..., SLW 3..., see page 2.32

LEVEL CONTROLLER

Ex -Amplifier Zone 1



Series SF3

Gas Ex II (1) 2G EEx em [ia/ib] IIC T6

Installation in Zone 1

For the connection of 160 Ω Thermo-sensors
For the connection of Opto-level sensors



Design	SF3				
Dimensions					
ID-No.	P21174				
Type	SF3				
Supply voltage [V]	24 DC +15 / -10%				
Ex marking	II (1) 2G EEx em [ia/ib] IIC T6				
Certificate no.	TÜV 04 ATEX 2447				
Ambient temperature for temperature classes [°C]	T6 : 35 T5 : 50 T4 : 85				
Maximum values	U ₀ = 23.1 V I ₀ = 154 mA P ₀ = 890 mW C ₀ = 86 nF L ₀ = 0.4 mH				
Connectable sensors	Opto-level sensors (URF...) / Level sensors (R _i = 160 Ω)				
Output relay	increased safety		intrinsically safe		
Switching voltage [V]	250 AC	250 DC	60 DC	24 DC	EEx ib IIC 30 V
Switching current [A]	2 AC	0.3 DC	0.8 DC	2 DC	IIC: 0.1 DC IIB: 0.25 DC IIA: 0.34 DC
Switching power	cos φ \geq 0.7 / L/R \leq 200 ms				
Ambient temperature [°C]	-20...+60				
Protection [EN 60529]	IP 54				
Housing material	PA, Aluminium				
Connection	sensor: tabs size 6.3-0.8 (DIN 46244)			relay/supply: 2 m PVC-cable, 0.5 mm ²	

LEVEL CONTROLLER

Ex-Amplifiers



Series EGE 90 Ex

AC-Voltage supply

DC-Voltage supply

LED display

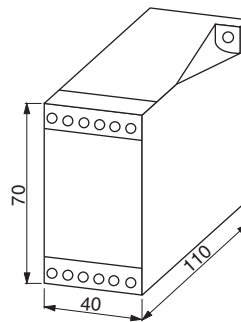
Cable break and short circuit monitoring

Connection to 2-wire sensors

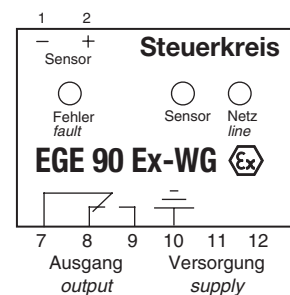
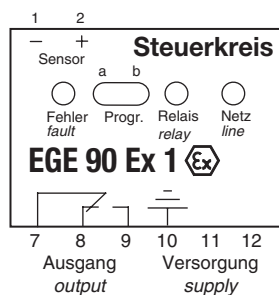


Design **EGE 90 Ex...**

Dimensions



ID-No.	P30340	P30341	P31035	P30342	P31036
Type	EGE 90 Ex1-230	EGE 90 Ex1-115	EGE 90 Ex1-24	EGE 90 Ex-WG 230	EGE 90 Ex-WG 24
Supply voltage [V]	230 AC +10/-15%	115 AC +10/-15%	24 DC ±15%	230 AC +10/-15%	24 DC ±15%
Certificate no.	TÜV 97 ATEX 1148				
Ex marking	II (1) GD [Ex ia] IIC				
Maximum values	$U_o = 12.6\text{ V}$ $I_o = 15.9\text{ mA}$ $P_o = 50\text{ mW}$ $C_o = 1.15\text{ }\mu\text{F}$ $L_o = 120\text{ mH}$				
Output	relay / change over				
Switching voltage max. [V]	250 AC / 24 DC				
Switching current max. [A]	4 AC / 4 DC				
Switching power	$\cos \varphi > 0.7 / L/R < 200\text{ ms}$				
Ambient temperature [°C]	-20...+60				
Protection [EN 60529]	IP 20				
Connection	terminal screws				



LEVEL CONTROLLER

Ex-Amplifiers



Series EGE 903 Ex

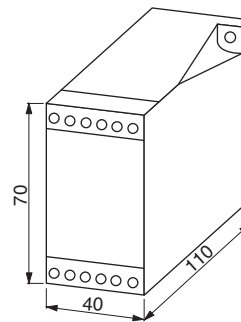
**AC-Voltage supply
DC-Voltage supply**

**LED display
Cable break and short circuit monitoring
Connection to 3-wire sensors**

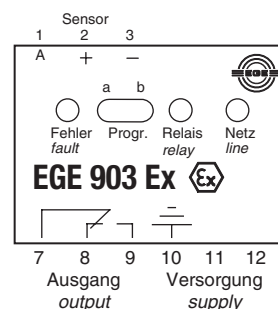


Design **EGE 903 Ex...**

Dimensions



ID-No.	P21141	P21142	P21143
Type	EGE 903 Ex-230	EGE 903 Ex-115	EGE 903 Ex-24
Supply voltage [V]	230 AC +10/-15%	115 AC +10/-15%	24 DC ±15%
Certificate no.	TÜV 01 ATEX 1663		
Ex marking	II (1) GD [EEx ia] IIC		
Maximum values	$U_o = 12.6 \text{ V}$ $I_o = 80 \text{ mA}$ $P_o = 252 \text{ mW}$ $C_o = 270 \text{ nF}$ $L_o = 5.4 \text{ mH}$		
Output	relay / change over		
Switching voltage max. [V]	250 AC / 24 DC		
Switching current max. [A]	4 AC / 4 DC		
Switching power	$\cos \varphi > 0.7 / L/R < 200 \text{ ms}$		
Ambient temperature [°C]	-20...+60		
Protection [EN 60529]	IP 20		
Connection	terminal screws		



LEVEL CONTROLLER



Ex -housing for amplifier Zone 1/21

System GAM

Dust Ex II 2D IP 66 T65°C

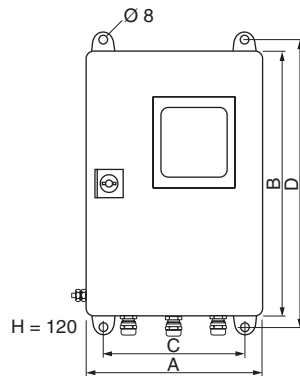
Gas Ex II (1) 2G EEx em [ia/ib] II CT6

For installation of amplifiers
within Zone 1/21



Design GAM...

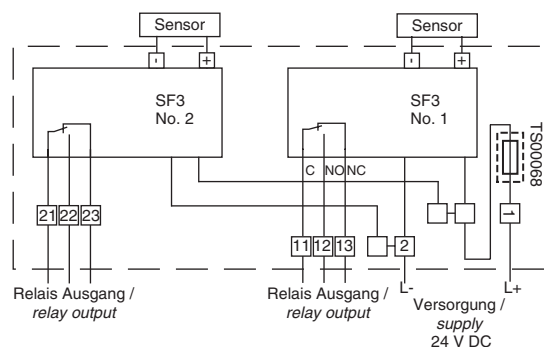
Dimensions



Type	ID-No.	A	B	C	D	Amount of SF3
GAM-SF1530	P21175	150	300	110	320	1
GAM-SF2030	P21176	200	300	160	320	2
GAM-SF3030	P21177	300	300	260	320	4
GAM-SF3040-5	P21178	300	400	260	420	5
GAM-SF3040	P21179	300	400	260	420	6

ID-No.	P21175	P21176	P21177	P21178	P21179
Type	GAM-SF1530	GAM-SF2030	GAM-SF3030	GAM-SF3040-5	GAM-SF3040
Housing dimensions [mm]	150x300x120	200x300x120	300x300x120	300x400x120	300x400x120
Number of amplifiers	1	2	4	5	6
Ex marking	II (1) 2G EEx em [ia/ib] IIC T6 bzw. II 2D IP 66 T65 °C				
Certificate no.	TÜV 04 ATEX 2555 X				
Ambient temperature for temperature classes [°C]	T6: 27 T5: 42 T4: 60				
Electrical connection	connection terminals 2.5 mm ²				
Relay output	connection terminals 1.5 mm ²				
Power supply	sensor: tabs nominal size 6.3 - 0.8 mm (DIN 46244)				
Sensor connection	4...8				
Cable diameter [mm]	-20...+60				
Ambient temperature [°C]	sheet steel case, lacquered				
Housing material	IP 66				
Protection [EN 60529]					

Example:
Schematic for the installation of two amplifiers in a GAM-SF2030 housing.



ACCESSORIES

Mounting sleeves



It is not necessary to empty the vessel for routine sensor inspection.

PTFE housing for high chemical resistance

O-ring moisture barrier



Design	KNM-35	KNM-20	KPM-35
Dimensions			
ID.-No.	P40501	P40500	P40502
Type	KNM-35	KNM-20	KPM-35
Housing material	PTFE	PTFE	Crastin
Torque max. [Nm]	1	1	3
Compressive strength [bar]	3	3	6
Thread	G1 1/4	G3/4	G1 1/2
For sensor type	KNK-025...	KNK-015...	KNK-025...
Usefully sensors	see in our catalogue „Capacitive proximity switches“		

Fitting in of sleeves and sensors

Mounting sleeves are used for lateral or vertical passage through the vessel side. In order to ensure full pressure resistance, the thread should be screwed into the vessel threaded bush over a length of approximately 20 mm. If this is not possible because the vessel side is too thin, a suitable bush must be installed. However, the threaded passage should not be longer than the thread on the mounting sleeve. The interior thread must comply with DIN ISO 228. Sealing of the thread is either carried out with hemp and a sealing paste according to DIN-DVGW, or with PTFE sealing tape if higher chemical resistance is required. In any case, chemical resistance of the seal must be checked for this application. When screwing in the sleeve, maximum admissible torque must not be exceeded.

Metallic or metal clad vessels should be earthed. In the case of plastic vessels filled with electrically conductive materials, the latter should be earthed. In the case of plastic vessels filled with non-conducting materials, an earthed metal band applied on the outside of the vessel may be used as a counter electrode. For fitting the sensor, the closing ring is unscrewed from the

mounting sleeve. The sensor connecting cable must be fitted through the closing ring and the sensor fitted into the sleeve. After this, the closing ring is screwed back into the mounting sleeve, until the gasket is firmly pressed against the sensor housing. This ensures that no external humidity will penetrate into the mounting sleeve, as this might lead to sensor switching failures.

Sensor compensation

To start with, the plastic screw which protects the compensating potentiometer against humidity must be removed. The screw-driver blade used for compensation should be narrower than 2.4 mm. The sensor is now fitted into the sleeve, and the vessel filled to a level allowing for complete immersion of the sleeve. Beginning at the left limit, turn the potentiometer clockwise until the switching output is operated (NO), after which the potentiometer is turned further clockwise about one revolution. The switching output of the sensor should now be closed. In case of very small bulk densities and corresponding small dielectric constant, it may be necessary to turn only half a revolution.

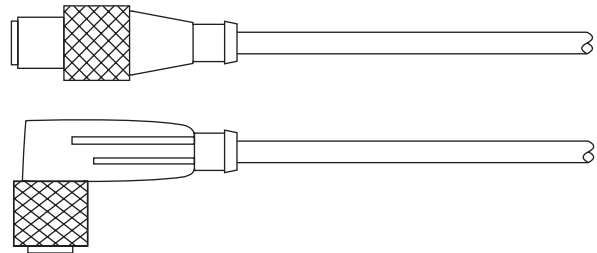
ACCESSORIES

Universal plug system M12



System SL

Cable plug finished with cable
Self locking screw plug
Protection IP 67



Cable plug housing, straight	Cable plug housing, angular	DC	DC
		<p>3-wire</p> <p>1: BN 2: - 3: BU 4: BK</p>	<p>5-wire</p> <p>1: BN 2: WH 3: BU 4: BK 5: GY</p>
SLG...	SLW...	DC	DC

TYPE	ID-NO.	DESIGN
SLG 3-2	Z01076	Cable plug housing M12x1 DC, straight 2 m PVC-cable 3x0.34 mm ²
SLG 3-5	Z01077	Cable plug housing M12x1 DC, straight 5 m PVC-cable 3x0.34 mm ²
SLW 3-2	Z01078	Cable plug housing M12x1 DC, angular 2 m PVC-cable 3x0.34 mm ²
SLW 3-5	Z01079	Cable plug housing M12x1 DC, angular 5 m PVC-cable 3x0.34 mm ²
SLW 3-2-LED	Z00052	Cable plug housing M12x1 DC, angular 2 m PVC-cable 3x0.34 mm ² PNP with LED
SLG 4-2	Z00445	Cable plug housing M12x1 DC, straight 2 m PVC-cable 4x0.25 mm ²
SLG 4-5	Z00449	Cable plug housing M12x1 DC, straight 5 m PVC-cable 4x0.25 mm ²
SLW 4-2	Z00446	Cable plug housing M12x1 DC, angular 2 m PVC-cable 4x0.25 mm ²
SLW 4-5	Z00450	Cable plug housing M12x1 DC, angular 5 m PVC-cable 4x0.25 mm ²
SLW 4-2-LED	Z01157	Cable plug housing M12x1 DC, angular 2 m PVC-cable 4x0.25 mm ² PNP with LED
SLG 5-2	Z01150	Cable plug housing M12x1 DC, straight 2 m PVC-cable 5x0.34 mm ²
SLW 5-2	Z01151	Cable plug housing M12x1 DC, angular 2 m PVC-cable 5x0.34 mm ²

ELECTRICAL DATAS

Protection	IP 67	Rated voltage	250 VDC
Volume resistance	≤ 5mΩ	Isolation groupe	C to VDE 0110
Switching resistance	4A (CSA=3A)	Testing voltage	2.0 KV eff.
Temperature range	-25 °C...+80 °C		

Notice

Sensors with NC output are connected to 4 pole cable plug housings. In this case, the break output is connected to the white lead (connection 2).

PROCESS SENSORS

A selection



Flow Controller

- Electronical monitoring of flow
- Lubrication
- Minimum dose 1 ml/min
- Reaction time 0.5 s



Metal Detectors

- Detection of metal parts
- For harsh environment
- Large sensing range up to 400 m
- Monitoring of bulk materials



Ultrasonic

- Switching distance up to 3000 mm
- Level monitoring
- Watertight housing
- Teach-in functions



Pressure Controller

- Compact model with digital display
- Monitoring in pipes and containers
- Pressure up to 16 bar
- Level up to 10 m (± 1 cm)
- Programmable



Temperature Controller

- Compact model with digital display
- Monitoring in pipes and containers
- Temperature $-40...+120$ °C ($\pm 0,3$ °C)
- Pressure up to 200 bar
- Multi use output NO/NC + analog



Infrared Detectors

- Measurement of temperature
- Monitoring of hot media
- Position control

