Küppers Elektromechanik GmbH

Certified according to DIN EN ISO 9001

Technical Datasheet

IF* and VIE*-** (Ex)

Inductive Pickups and Amplifiers for Extreme Fluid Temperatures

Description

The main advantage of the IF* pickup is its resistance to extreme temperatures. Special versions with separate pickup and amplifier as shown below are available for fluid temperatures ranging from -273°C up to +350°C. The max. permissible temperature varies in accordance with the type of flow meter used, it is defined as follows:

max. +150°C for SRZ helical flow meters
max. +180°C for ZHM gear flow meters
max. +350°C for HM turbine flow meters

The IF pickup and VIE* amplifier are also available in a compact design which combines both units in one.

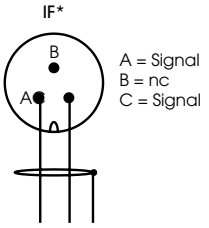
Principle

The IF* inductive pickup detects the r.p.m. of a KEM turbine-, helical- or gear flow meter. Each passage of a rotorblade or gear respectively changes the magnetic field of the pickup and an alternating voltage is induced in the pickup because of the change in magnetic flux. The VIE* will amplify the sinusoidal output voltage of the pickup and convert it to a current or voltage squarewave signal with a number of pulses per time unit proportional with the instantaneous flow rate.

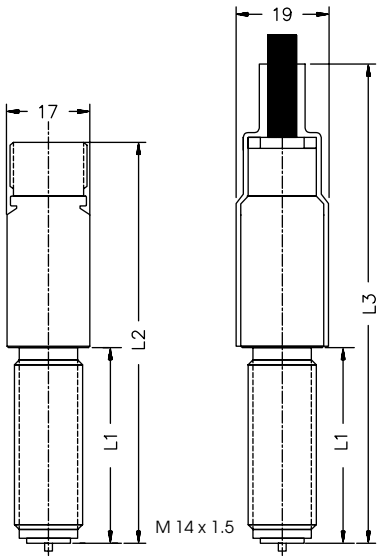
The VIE* amplifier may be operated in two- or three-wire connection. A lowimpedance input transmitter provides isolation and high resistance to interference.

IS-approved versions as per ATEX 100a Ex II 2G EEx ia IIC T6 are available. Our intrinsically safe power supply and separation amplifier type EWS is recommended to power the IS versions.

Technical Data IF

max. fluid temperature:	+120°C (IF*), +240°C (IF*.HT), +350°C (IF*.HTK)	
max. ambient temperature:	+125°C (special version IFL-HT up to +200°C available)	
electrical connection:	IF*: 3-pin amphenol plug type 8001-10SL-3P-FP-A3 and socket type MS3106A-10SL-35, max. Ø 22mm IF*.PG: 3m NF cable blue	
output resistor:	< 100Ω	
weight:	IFK, IFR: approx. 70g, IFL, IFS: approx. 90g; IF3: approx. 50g	
inductivity:	< 25mH	
number of windings:	approx. 1,325	
core Ø:	0.08 mm	
Ex-protection ATEX 100:	Ex II 2 G EEx ia IIC T6	
pickup housing:	stainless steel as perDIN 1.4101	

Dimensional Drawing (mm)



Type	L1	L2	L3
IFK	40	86	99
IFR	40	86	99
IFL	80	126	139
IFS	80	126	139
IFE	40	185	
IF3	22	67	

Ordering Information

IF*.- Ex**

Ex = Ex-protected version ATEX 100 Ex II 2 G EEx ia IIC T6

PG = with cable sleeve 4–6 mm and 3m cable
HT = high temperature version for up to +240°C
HTK = with heat sink for up to +350°C (no Ex-version)

K = short, for ZHM 02–04 and HM series
L = long, for ZHM 02–07 and HM series
R = short for ZHM 01 and SRZ series
S = long for ZHM 01 and SRZ series up to +150°C fluid temp.
E = extra long for flow meters with heat jacket
3 = for HM series (follow-up of IG 03)

Inductive Pickup

Marking of the pickup

KEM Küppers Elektromechanik GmbH
CE 0123 Ex II 2 G EEx ia IIC T6

BVS 03 ATEX E 206
IF*-** Nr. 1234567

Technical Data VIE

Ex-protection 100a:	Ⓔx II 2 G EEx ia IIC T6, BVS 03 ATEX E 207
allowable ambient temperature:	–20°C up to +50°C
fluid temperature: (not relevant for type VIEG)	max. + 120°C with a distance of at least 25mm max. + 150°C with a distance of at least 65mm between flow meter and amplifier housing
supply voltage UB:	+7 up to 29 VDC
quiescent current IR:	< 4mA
frequency range:	7 up to 3,000Hz according to flow meter
input impedance:	< 100Ω
input:	0.5 up to 500mV
electrical connection:	one or two 3-pin terminals for inductive pickup, amplifier, supply and output signals, max. wire size 2.5mm²
housing:	aluminium, L = 64, B = 58, H = 37 (mm) one or two cable sleeves type PG7
pickup housing:	stainless steel as per DIN 1.4104
protection class:	IP65 (DIN 40050)
weight:	approx. 400g
outputs:	frequency output, selectable: *voltage level three-wire NPN/PNP* a) three-wire active NPN high level: U_{high} > UB – 0.6V – (2.6kΩ . I_{out}) low level: U_{low} < 0.6V + (1.3kΩ . I_{out}) b) three-wire passive NPN/open collector high level: U_{high} > U – (1.3kΩ . I_{out}) low level: U_{low} < 0.6V + (1.3kΩ . I_{out}) U is applied at the output, max. 29V c) three-wire active PNP (not available for Ex-versions) high level: U_{high} > U – 0.6V – (150Ω . I_{out}) low level: U_{low} = blocking $I_{max.}$ = 60mA, $P_{max.}$ an R_S = 1W, R_S = 150Ω current level two-wire DIN 19234 NAMUR high level: I_{high} > 2.2mA low level: I_{low} < 1.1mA

Safety-relevant parameters (only for Ex-versions)

a) three-wire active NPN, version VIE*-3A

Input:	terminal 1 and 2:	$U_{max.}$ = 30 V R_i = 1,2 kΩ	$I_{max.}$ = 150 mA C_i = 0	Li = 0
Output:	terminal 2 and 3:	$U_{max.}$ = 30 V R_i = 1,2 kΩ	$I_{max.}$ = 25 mA C_i = 0	$P_{max.}$ = 106 mW L_i = 0

b) three-wire passive NPN/open collector, version VIE*-3P

Input:	terminal 1 and 2:	$U_{max.}$ = 30 V R_i = 1,2 kΩ	$I_{max.}$ = 150 mA C_i = 0	 L_i = 0
Output:	terminal 2 and 3:	$U_{max.}$ = 30 V R_i = 1,2 kΩ	$I_{max.}$ = 500 mA C_i = 0	 L_i = 0

c) two-wire DIN 19234 NAMUR, version VIE*-2N

In-, output:	terminal 1 and 2:	$U_{max.}$ = 30 V C_i = 100 nF	$I_{max.}$ = 150 mA L_i = 0	$P_{max.}$ = 175 mW R_i = 0
	terminal 2 and 3: terminal 3: n. c.	$U_{max.}$ = 30 V	$I_{max.}$ = 500 mA	

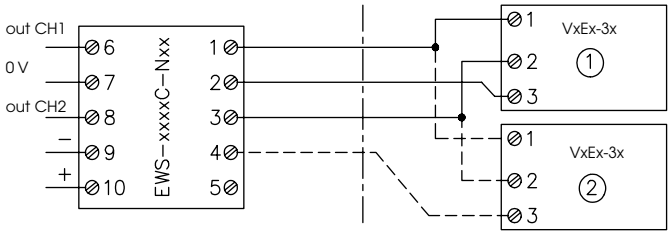
d) version VIEG-**

Input:	terminal 5 and 6:	$U_{max.}$ = 0,8 V R_i = 15 Ω	$I_{max.}$ = 2 mA C_i = 0	 Leq = 10 mH

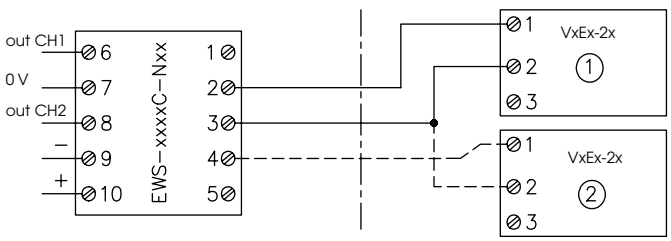
Connect only pickups of the following safety-relevant values to input terminals 5 and 6:

$U_{max.}$ = 30 V	$I_{max.}$ = 65 mA
$P_{max.}$ = 25 mW	L/R < 2,4 mH/Ω

Examples for connecting Ex-versions



three-wire connection
EWS-xxxxC-Nxx with one or two off
VIE*-3*



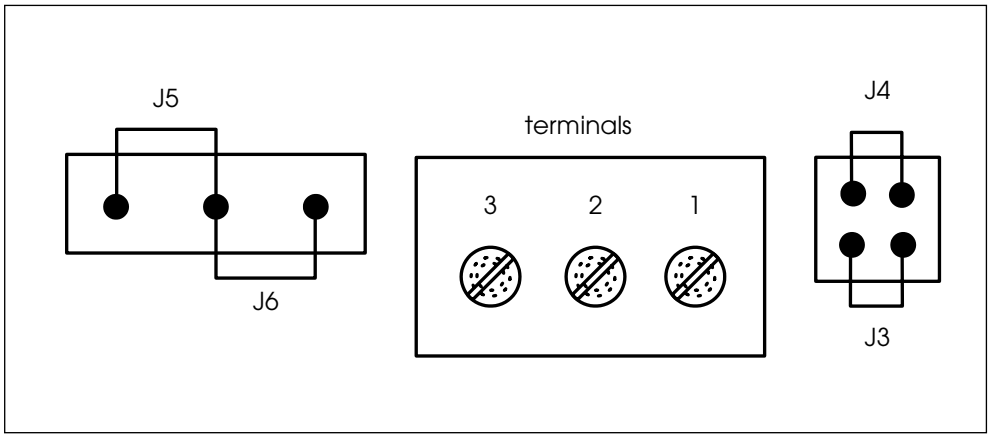
two-wire connection
EWS-xxxxC-Nxx with one or two off
VIE*-2*

EWS = intrinsically safe power supply and separation amplifier

Adjusting the output mode

The output mode is adjustable via jumpers located on the amplifier board. The table below is also printed on the inside of the housing top. With Ex-versions the output mode is adjusted by KEM according to customers' specifications and cannot be changed afterwards.

output mode	*Jumper J3*	*Jumper J4*	*Jumper J5*	*Jumper J6*
two-wire (current level)	off	on	off	off
three-wire active NPN	on	off	off	on
three-wire active PNP (PLC)	on	off	on	off
three-wire passive NPN	off	off	off	on

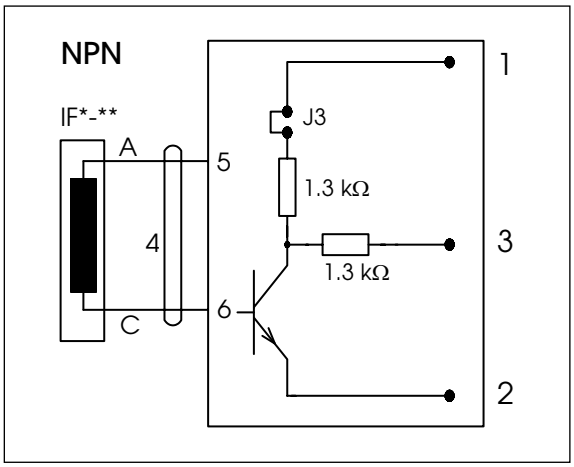


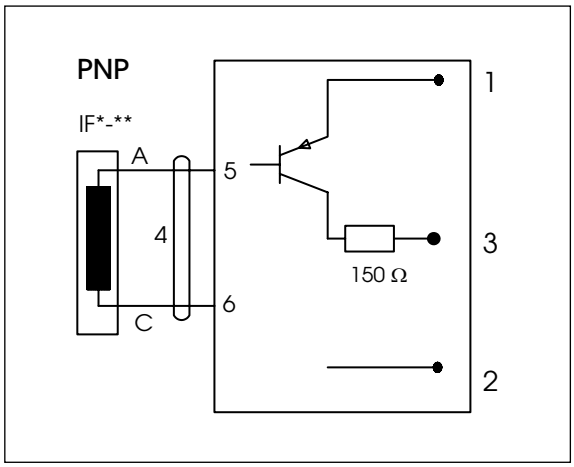
Electrical connection

The electrical connection is to be effected via one or two 3-pin terminals inside the amplifier which are accessible via cable sleeves 4–6 mm.

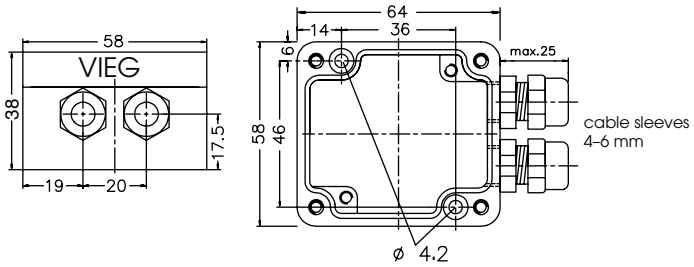
pin connection compact versions:
1 = +UB
2 = 0V/GND
3 = output signal

pin connections separated versions type VIEG
1 = +UB
2 = 0V/GND
3 = output signal
4 = 0V/GND/shield
5 = signal IF-coil
6 = signal IF-coil

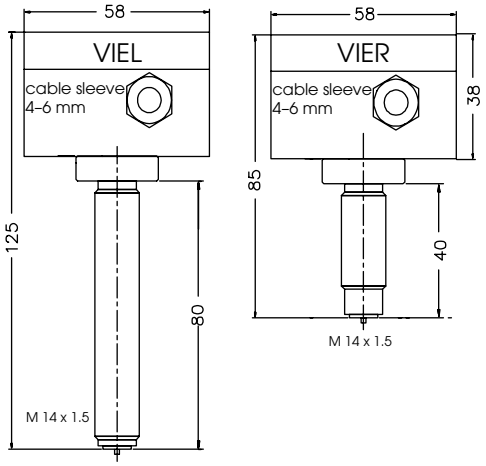




Dimensional Drawings (mm)



VIEG
separated version without pickup



VIE*
compact version with pickup

Ordering Information

VIE*

EG= separated version: amplifier without pickup
EK= short version with pickup for ZHM 02–04 and HM series depending on size
EL = long version with pickup for ZHM 02–07 and HM series depending on size
ER= short version with pickup for ZHM 01 and SRZ series
ES = long version with pickup for ZHM 01 and SRZ series up to +150°C fluid temperature.

VIE* - ** Ex, Ex-protection ATEX100 Ex II 2 G EExia IIC T6

2N= two-wire DIN 19234 NAMUR
3A= three-wire active NPN
3P = three-wire passive NPN/open collector

EG= separated version: amplifier without pickup
EK= short version with pickup for ZHM 02–04 and turbines depending on size
EL = long version with pickup for ZHM 02–07 and turbines depending on size
ER= short version with pickup for ZHM 01 and SRZ-series
ES = long version with pickup for ZHM 01 and SRZ series up to +150°C fluid temperature

Notes on Installation

The following has to be adhered to:

a) Installation instructions for electrical devices
Installation instructions for associated intrinsically-safe devices
The »Special conditions for safe use« as per EC-Type Examination Certificate

b) The amplifier has to be installed in a way that the max. ambient temperature does under no circumstances exceed +50°C (consider self heating).

c) With cables care should be taken, that the max inductivity and capacity of the respective voltage or gas group are not exceeded.

d) Exceeding or falling below the regular measuring range will cause invalid frequency output signals.

e) Shielded cables are to be used as connecting lines.

f) Generally, supplied units have to be connected by an expert according to EMC stipulations.

Marking of the pulse amplifier

Two-wire connection

KEM Küppers Elektromechanik GmbH
CE 0123 Ex II 2 G EEx ia IIC T6

BVS 03 ATEX E 207
V*E*2* Nr. 12345678
-20°C ≤ Ta ≤ 50 °C
KL 1/2 Ui =30 V, Ii = 150 mA, Pi = 175 mW, Ci = 100 nF, Li = 0
KL 2/3 Ui =30 V, Ii = 500 mA
KL 5/6 Ui = < 0,8 V, Ii < 2 mA, Ri = 15 Ω, Ci = 0, Ii = 10 mH 1)
KL 1 = Ub, 2 = 0 V, 3 = n.c.
KL 4 = Schirm, 5/6 = Spule[1]

Three-wire connection

KEM Küppers Elektromechanik GmbH
CE 0123 Ex II 2 G EEx ia IIC T6

BVS 03 ATEX E 207
V*E*-3* Ser.Nr. 12345678
-20°C ≤ Ta ≤ 50°C
KL 1/2 Ui =30 V, Ii = 150 mA, Ri = 1,2 kΩ, Ci = 0, Li = 0
KL 2/3 Ui =30 V, Ri = 1,2 kΩ, Ci = 0, Li = 0
VIE*-3A: Ii = 25 mA, Pi = 106 mW
VIE*-3P: Ii = 0,5 A
KL 5/6 Ui = < 0,8 V, Ii < 2 mA, Ri = 15 Ω, Ci = 0, Ii = 10 mH 1)
KL 1 = Ub, 2 = 0 V, 3 = output
KL 4 = Schirm, 5/6 = Spule[1]

1) only type VIEG
The sticker indicates year of manufacture and person in charge of test.

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