Küppers Elektromechanik GmbH

Certified according to DIN EN ISO 9001

Technical Datasheet


# VTE* and VTE*-** (Ex)

## Carrier-Frequency Pulse Amplifier

# Index

## Description

The integral carrier-frequency pickup of the VTE detects the r.p. of KEM flow meters. During this process the damping of a carrier-oscillator by the gears or blades is picked up through the meters body and evaluated. The frequency of the resultant amplitude modulation of the carrier is equal to the number of revolutions of the wheel and therefore a standard for the flow rate. The VTE may be operated in two- or three-wire mode and provides current or voltage squarewave pulses.

Types VTE *-** (Ex) are IS-approved according to ATEX 100a Ⓔx II 2G EEx ia IIC T6. Our intrinsically safe barrier typ EWS is recommended to power the IS-approved versions.

## Technical Data

| | |
|---|---|
| Ex protection as per ATEX100a | Ⓔx II 2 G EEx ia IIC T6) |
| Ambient temperature | –20 °C up to +50 °C |
| Medium temperature | max. +120 °C with a distance of at least 25 mm between flow meter and electronic housing<br>max. +150 °C with a distance of at least 65 mm between flow meter and electronic housing |
| Supply voltage UB | 7 up to 29 V DC, 8 up to 29 V DC for Ex versions |
| Quiescent current IR | < 4 mA |
| Frequency range | 3 up to 3,000 Hz according to flow meter |
| Input impedance | < 100 Ω |
| Input | 0.5 up to 500 mV |
| Electrical connection | 3-pin terminals for supply and output signal, max. 2.5 mm²<br>cable gland 4–6 mm<br>or 5-pin Amphenol plug type T3362500<br>for pin connections see page 4 |
| Housing | aluminium, l = 64 mm, w = 58 mm, h = 38 mm |
| Pickup housing | stainless steel as per DIN 1.4104 |
| Ingress protection | IP65 (DIN 40050) |
| Weight | approx. 250 up to 270 g |

| | |
|---|---|
| Outputs | frequency output, selectable:<br>voltage level three-wire NPN/PNP<br><br>a) three-wire active NPN<br>high level: $U_{high}$ > UB – 0.6 V – (2.6 kΩ . $I_{out}$)<br>low level: $U_{low}$ < 0.6 V + (1.3 kΩ . $I_{out}$)<br><br>b) three-wire passive NPN/open collector<br>high level: $U_{high}$ > U – (1.3 kΩ . $I_{out}$)<br>low level: $U_{low}$ < 0.6 V + (1.3 kΩ . $I_{out}$)<br>U is the voltage applied at the output<br>(open circuit voltage) max. 29 V<br><br>c) three-wire active PNP (not for Ex versions)<br>high level: $U_{high}$ > UB – 0.6 V – (150 Ω . $I_{out}$)<br>low level: $U_{low}$ = sperrend<br>Imax. = 60 mA; Pmax. an Rs = 1 W; Rs = 150 Ω<br><br>current level two-wirer<br>high level: $I_{high}$ > 2.2 mA<br>low level: $I_{low}$ < 1.4 mA |

## Safety-relevant parameters (only for Ex versions)

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

| | | | | |
|---|---|---|---|---|
| input: | KL1/KL2: | $U_{max}$ = 30 V<br>$R_i$ = 1.2 kΩ | $I_{max}$ = 150 mA<br>$C_i$ = 0 nF | <br>$L_i$ = 0 |
| output: | KL2/KL3: | $U_{max}$ = 30 V<br>$R_i$ = 1.2 kΩ | $I_{max}$ = 25 mA<br>$C_i$ = 0 nF | $P_{max}$ = 106 mW<br>$L_i$ = 0 |

b) three-wire passive NPN/OC, version VTE*-3P

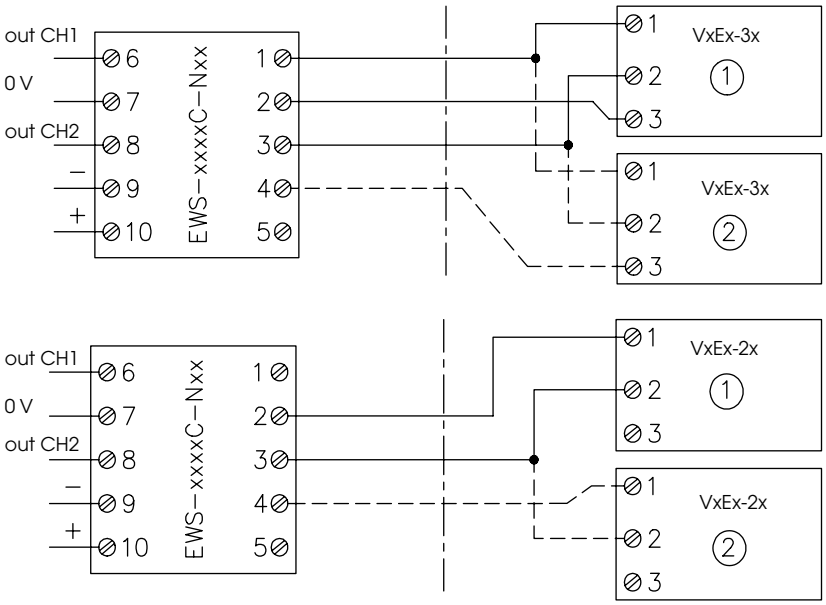
| | | | | |
|---|---|---|---|---|
| input: | KL1/KL2: | $U_{max}$. = 30 V<br>$R_i$ = 1.2 kΩ | $I_{max}$ = 150 mA<br>$C_i$ = 0 nF | <br>$L_i$ = 0 |
| output: | KL2/KL3: | $U_{max}$ = 30 V<br>$R_i$ = 1.2 kΩ | $I_{max}$ = 500 mA<br>$C_i$ = 0 nF | <br>$L_i$ = 0 |

c) two-wire low power, version VTE*-2L

| | | | | |
|---|---|---|---|---|
| in-, ouptut: | KL1/KL2: | $U_{max}$ = 30 V<br>$C_i$ = 100 nF | $I_{max}$ = 150 mA<br>$L_i$ = 0 nF | $P_{max}$ = 175 mW<br>$R_i$ = 0 |
| | KL2/KL3<br>KL3 n. c. | $U_{max}$ = 30 V | $I_{max}$ = 500 mA | |

## Examples for connecting Ex versions

outside hazardous area | inside hazardous area




three-wire connection

EWS-xxxxC-Nxx with one or two VTE*-3*

two-wire connection

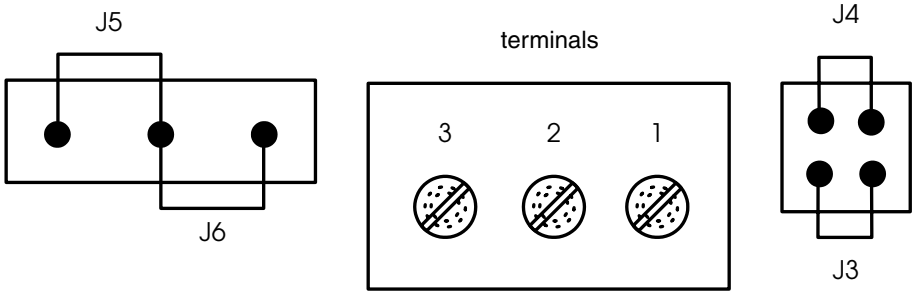
EWS-xxxxC-Nxx with one or two VTE*-2*

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 |

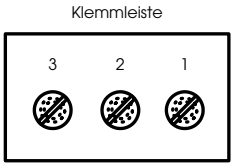


## Electrical connection

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.

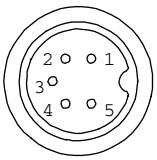
3-pin screw terminals

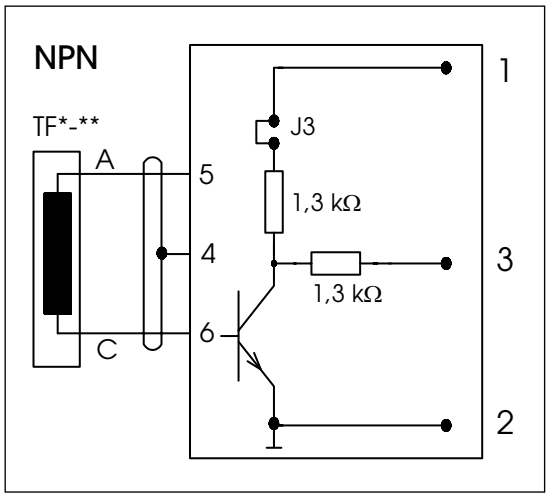
1 = +UB
2 = 0 V/GND
3 = Signal

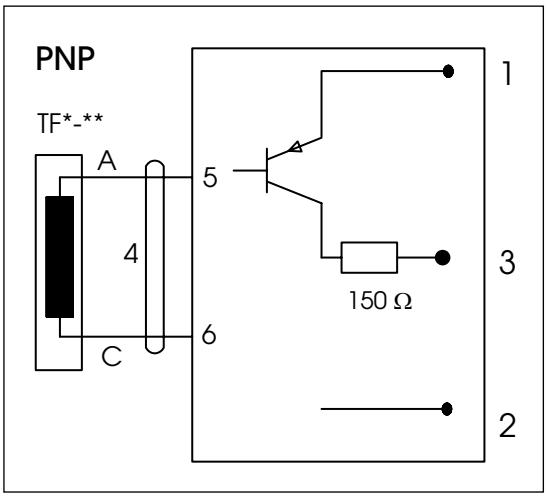



5-pin plug

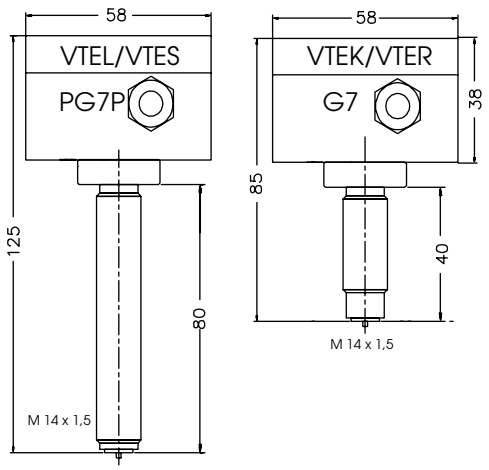
1 = +UB
2 = Signal
3 = 0 V/GND
4 = n. c.
5 = n. c.



## Dimensional drawings (mm)




## Ordering Information

**VTE* - ****

K = short version with pickup for ZHM 02–04 and HM series
L = long version with pickup for ZHM 02–07 and HM series
R = short version with pickup for ZHM 01 and SRZ series
S = long version with pickup for ZHM 01 and SRZ series up to +150°C (medium)

Extension for electrical connection:
»ST« 5-pin amphenol plug type T3362500
without extension: internal 3-pin screw terminals

**VTE* - ** (Ex), Ex protection as per ATEX 100 II 2 G EEx ia IIC T6**

2L = two-wire current level low power
3A= three-wire voltage level active NPN
3P = three-wire voltage level passive NPN/OC

K = short version with pickup for ZHM 02–04 and HM series
L = long version with pickup for ZHM 02–07 and HM series
R = short version with pickup for and SRZ series
S = long version with pickup for ZHM 01 and SRZ series up to +150°C (medium)

## 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 +50C (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 2G Ex ia IIC T4

BVS 03 ATEX E 207
VTE*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 1 = Ub, 2 = 0 V; 3 = n.c.

Three-wire connection

KEM Küppers Elektromechanik GmbH
CE 0123 Ex II 2G Ex ia IIC T4

BVS 03 ATEX E 207

VTE*-3* 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
VTE*-3A: Ii = 25 mA; Pi = 106 mW
VTE*-3P: Ii = 0.5 A
KL 1 = Ub; 2 = 0 V; 3 = output

The sticker indicates year of manufacture and person in charge of test.

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