Küppers Elektromechanik GmbH

Certified according to DIN EN ISO 9001

Technical Datasheet

EWS

Intrinsically Safe Supply and Separation Amplifier

Index

Description

The EWS is an intrinsically safe supply unit and separation amplifier. The EWS supplies KEM pickups installed in hazardous areas and transmits the output frequency of these pickups. The EWS must be installed outside hazardous areas. All in- and output circuits are isolated.

Intrinsically safe supply circuit 12 V to supply intrinsically safe KEM pickups installed in hazardous areas in threewire technique.

Two intrinsically safe signal input circuits ATEX 100a ⟨Ex⟩ II 2 G [EEx ia] IIC to connect pickups as per DIN 19234 (NAMUR) in two-wire technique and active and passive pickups. LEDs will indicate short circuit and line breakage.

Options

- Frequency doubling and detection of ratio nal direction
- Failure signalling relay for NAMUR mode

Outputs

- Open-Collector
- PLC output active 24 V
- NAMUR DIN 19234

Technical Data

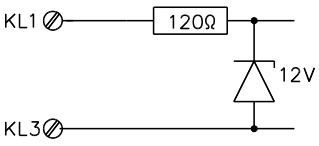
Input Circuits (Intrinsically Safe) Terminals KL1, KL2, KL3, KL4

Ex-protection ATEX 100a ⟨Ex⟩ II 2 G [EEx ia] IIC BVS 03 ATEX E 208

Supply Circuits Terminals KL1, KL3

Outputs and mains supply are isolated.

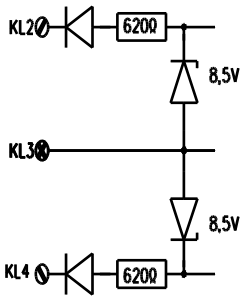
open circuit voltage	12 V ±5 %
series resistor	120 Ω
max operating current	20 mA
short circuit current	Imax. = 110 mA (short circuit proof)
parameters for safety regulations	Umax. = 12,6 V Imax. = 110 mA Pmax. = 342 mW Li ≈ 0; Ci ≈ 0



Signaleingänge KL 2, KL 3, KL 4

- Intrinsically safe signal input circuits according to DIN 19234 NAMUR for Connection of active and passive pickups
- Isolation of outputs and mains supply (no isolation of signal inputs and the intrinsically safe supply circuit)
- Separate indication of short circuit and line breakage for each channel by a red LED

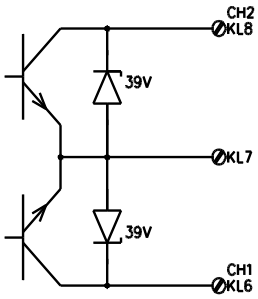
open circuit voltage	8.5 V
short circuit current	15 mA (short-circuit proof)
max. power	30 mW
switch rate fmax.	5 kHz for outputs as per DIN 19234
duty cycle	1:1
switch time	200 µs (under test conditions)
switch current difference	0.25 mA ± 0.15 mA
switch level	on - transistor conducting ≤ 1.65 ±0.15 mA off - transistor blocked ≥ 1.85 ±0.2 mA
switch state for line breakage (LB)	I < 150 µA transistor conducting
switch state for short circuit (KS)	RL < 360 Ω transistor blocked
safety-relevant parameters	Umax. = 12.6 V Imax. = 18 mA Pmax. = 55 mW Li ≈ 0; Ci ≈ 0 version EWS - xxxxC-NSx - ** - ** (option) Umax. = 40 V Imax. = 1.5 A



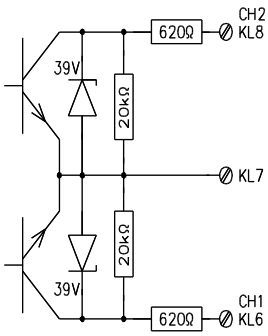
Outputs (not intrinsically safe) terminals KL6, KL7, KL8

The intrinsically safe input circuits are isolated from the mains supply and the outputs which are not intrinsically safe.

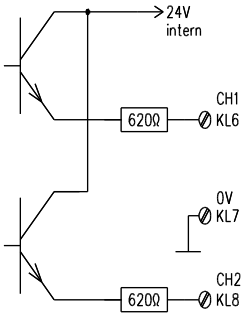
Open Collector NPN 0 V for both outputs common.	
Imax.	100 mA
Umax.	30 V
UCEmin.	1 V
UCEmax..	1.5 V
swicht rate fmax.	2.5 bis 5 kHz according to external wiring and duty cycle
max. transmission fmax. (typical figures)	U < 5 V; R < 2 kΩ; fmax. < 5 kHz U < 12 V;R < 1 kΩ; fmax. < 5 kHz U < 12 V;R < 2 kΩ; fmax. < 4,5 kHz U < 24 V;R < 5 kΩ; fmax. < 3 kHzz duty cycle 1:1; R = pullup; U = applied voltage



DIN 19234 (NAMUR) 0 V for both outputs common.	
low level	< 1 mA
high level	> 2.2 mA
Umax.	30 V
Imax..	25 mA
Pmax.	0.4 W
switch rate fmax.	5 kHz (duty cycle 1:1)



active 24 V/PLC version 0 V for both outputs common.	
high level	> 22 V – (620 Ω × Iout) max. 30 V
low level	blocking
Imax.	10 mA/chanel
short circuit resistance	max. 2 h
switch rate fmax.	2 up to 3.5 kHz according to external wiring and duty cycle



Supply Terminals KL9, KL10		
supply voltage	power consumption	
AC, 45-65 Hz	230 V + 15% –10 % 115 V ± 10 % ca. 24 V ± 10 %	Version xxxAC approx. 4.5 VA approx. 6 VA with option SP Version 24 DC approx. 3 VA
DC	20-35 V	approx. 5 VA with option SP

Further Technical Data	
ambient temperature	0 up to +50 °C
ingress protection housing	IP20
housing	plastics
dimensions	l = 70 mm, w = 45 mm, h = 115 mm and 125 mm with option SR
installation	mounting rail DIN EN 50022-35 or wall mounting
terminals	electric shock hazard protection as per VDE 0106/100
wire size	max. 2 × 2.5 mm²
weight	350 up to 450 g

Options

Frequency Doubling and Detection of Rotational Direction

The EWS doubles the frequency of two frequency signals which are phase-shifted by 90° (± 30°). The duty cycle of the doubled frequency is variable. The EWS detects the rotational direction by the phase.

Outputs (non-intrinsically safe)	
forward/backwards detection	channel 1 (terminals KL 6, KL 7) transistor conducting (channel 2 leads) transistor blocked (channel 2 lags)
doubled frequency	channel 2 (KL 8, KL 7)

The following applies:

- The output transistor of channel 1 (terminals KL6, KL7) conducts, if the input signal 2 (KL 4) leads.
- For type TD pickups in gear flow meters connected as shown on page 6: The output transistor of channel 1 conducts, if the arrow direction on the type plate of the gear flow meter and the flow direction are the same.

Failure Signalling Relay for NAMUR Mode
potential free relay contact: Umax. = 30 V, Imax. = 100 mA, Ri = 12 Ω

The relay will drop out with:

- Drop in operating voltage
- Short circuit or line breakage of one or both intrinsically safe signal input circuits terminals KL4, KL3 or KL2, KL3

Notes for the User:

a) Please consider the following:
   - Installation specifications for associated devices which are intrinsically safe
   - The »Safety regulations for electrical devices«
   - The »Special conditions for safe use« as per EC-Type Examination Certificate

b) The EWS must be installed outside hazardous areas.

c) The max length for cables to connect pickups or amplifiers is 500 metres.

d) Max ambient temperature must not exceed +50 °C (please also consider self heating). A gap of at least 30 millimetres should be kept between two EWS units.

e) The inputs are suitable for both active and passive pickups.

f) When the max switch frequency is bypassed, no output signal will be available. Therefore a bypassing of the max. switch frequency has to be avoided with safety-relevant measurements. The max. switch frequency depends on the duty cycle of the input signals and the wiring of the outputs (cf. technical data »outputs«).

g) For detection of the rotational direction, the frequency signals of the pickup must be of the same frequency and be phase-shifted by 90° (± 30°). If this is not the case, you will receive undefined output signals.

Connections

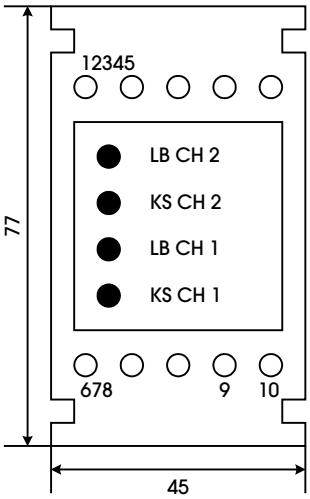
Terminal Connections:

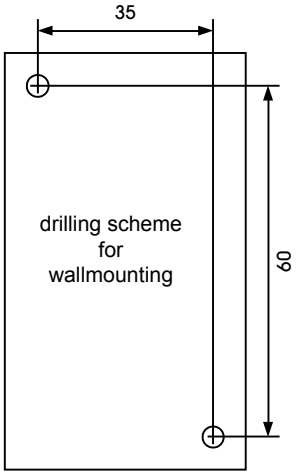
Intrinsically safe current circuits

1 = UB +12 V
intrinsically safe supply
2 = inpunt channel 1
3 = 0 V pickup supply and
signal input circuits
4 = input channel 2
5 = n. c.

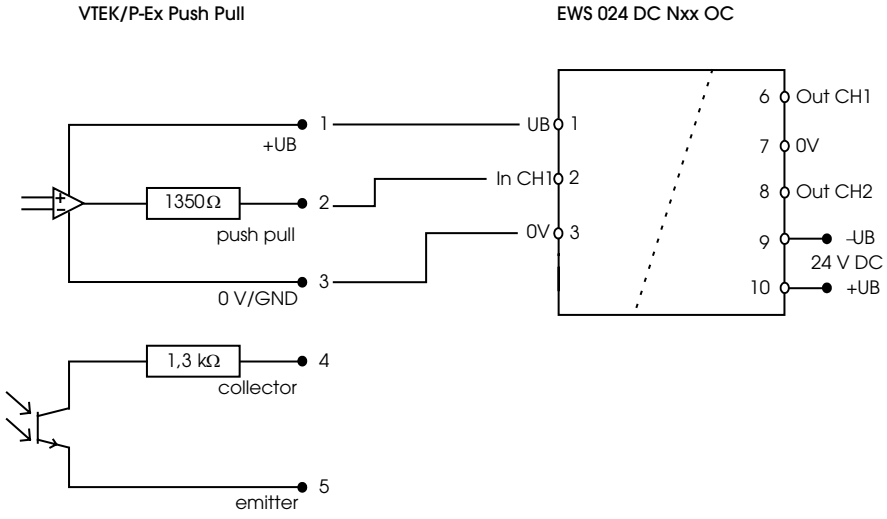
not intriusically safe current circuits

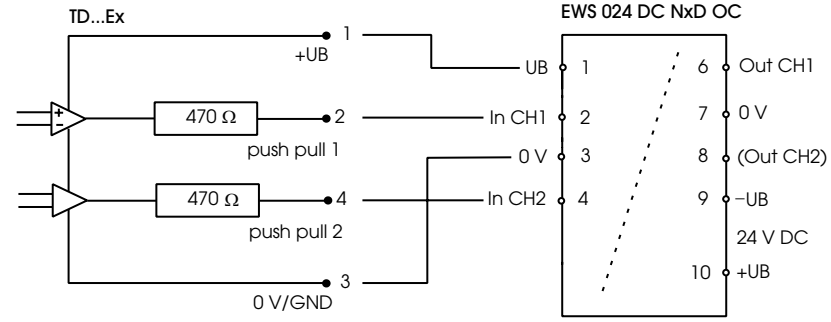
6 = output channel 1
(flow direction)
7 = 0 V of signal outputs
8 = output channel 2 (2x f)
9 = –UB
10 = +UB
14 = failure-signalling relay
15 = failure-signalling relay



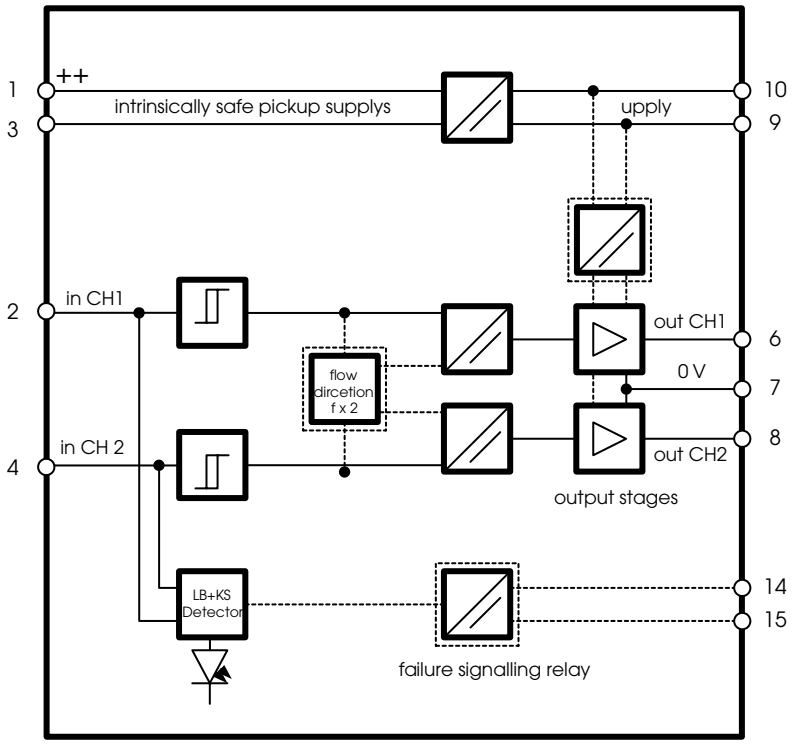


Wiring Example:





Wiring Diagram



Ordering Information

EWS xxxxC Nxx ** **

SR = failure-signalling relay (only for NAMUR input signals)

Outputs:
OC = open collector (standard)
NA = NAMUR (DIN 19234)
SP = active 24 V (PLC output)

Inputs:
Nxx = standard, cf. »input circuits«, page 2
NxD = reverse-flow detection and doubled frequency

Supply Voltage

230A =	230 VAC	+15 %,	–10 %	45 to 65 Hz
110A =	110 VAC	±10 %		45 to 65 Hz
024A =	24 VAC	±10 %		45 to 65 Hz
024D =	24 VDC			

Marking

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

BVS 03 ATEX E 208
EWS xxxxx-Nxx-xx Nr. 1234567
0° C ≤ Ta ≤ 50 °C

KL1/3
Umax = 12.6 V; Imax = 110 mA; Pmax = 342 mW
Ci = 0; Li = 0

KL2/3 and KL3/4
Umax = 12.6 V; Imax = 18 mA; Pmax = 55 mW
Ci = 0; Li = 0

Special conditions for safe operation

The EWS described above is an »affiliated intrinsically safe device«. It must not be installed in hazardous areas. The device shall only be connected with intrinsically safe devices of a certified type or such corresponding to paragraph 1.3, EN 50020:1994. This connection must be in a way that the intrinsic safety is maintained.

For a safety factor of 1.5 the electrical parameters of connection (leads and intrinsically safe device) must not exceed the following (maximum) values:

pickup supply: terminal 1 and KL3: C = 1 µF; L = 3 mH
signal inputs: terminal 2–3 and terminal 4–3: C = 1 µF; L = 100 mH

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