

ECO Series Impulse Amplifier

Single / double tap with different output functions

FEATURES

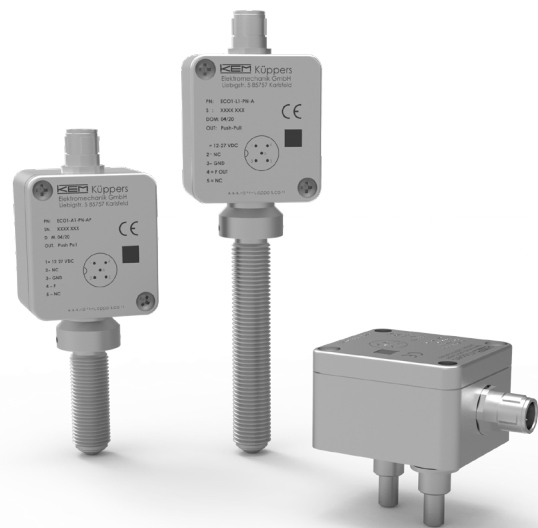
- Compact design for flow meters
- Medium temperatures up to +150°C [+302°F]
- Scalable analog and digital outputs
- Flow direction detection
- Customer configurable
- Linearisation with up to 20 points possible
- Integrated Medium Temp. Measurement

BENEFITS

- ▶ Suitable for all mechanical meters
- ▶ Wide range of applications with one device
- ▶ User-friendly same functionality for all Mechanical Meters
- ▶ Short delivery times
- ▶ Optimized for inventory

TECHNICAL DATA

Mounting:	Flush-Mount (1- or 2-Channel) Screw-In M14x1.5 (1-Channel)
Power Supply (Vcc):	12 ... 28 VDC, regulated
Current Consumption:	< 25 mA
Frequency Range:	1 ... 5.000 Hz; suitable for all KEM volumetric counters
Output Stages:	Push-Pull active, PNP, NPN NAMUR 4-20 mA passive + Freq/Pulse (NPN) 0-20 mA active + Freq/Pulse (PP, NPN, PNP) 0-10 V active + Freq/Pulse (PP, NPN, PNP)
Output Signal:	1:1- Frequency or Direction signal & doubled Frequency scaled output values LED indicator for status display
Temperature Measurement:	±1 °C ±0.5 %
Ambient Temperature:	-40 °C ... +60 °C [-40 °F ... +140 °F]
Medium Temperature:	Flush-Mount (1- or 2-Channel) -40 °C ... +80 °C [-40 °F ... +176 °F] Screw-In M14x1.5 (1-Channel) -40 °C ... +120 °C [-40 °F ... +248 °F] -40 °C ... +150 °C [-40 °F ... +302 °F]
Housing Material:	Aluminium die casting alloy 231 or Stainless Steel
Sensor Probe Material:	1.4404 [AISI 316L] all Variants
Protection Class:	Aluminium IP65 Stainless Steel IP68 with closed electrical connection
Weight:	approx. 200 g

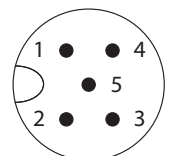


ELECTRICAL CONNECTION

(Short circuit proof, Reverse polarity protected)
M12 Connector (5-pole, male, A-coded)

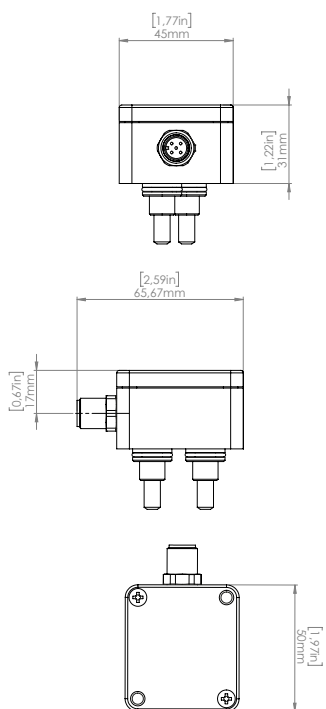
Pin

1	+U _b / Loop+ (24 V)
2	Digital Output 2 / NAMUR
3	GND / Loop-
4	Digital Output 1 / NAMUR
5	Active Analog Output

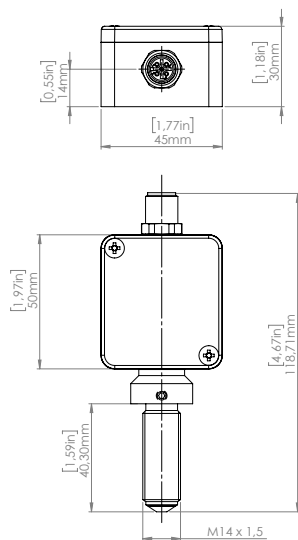


DIMENSIONS

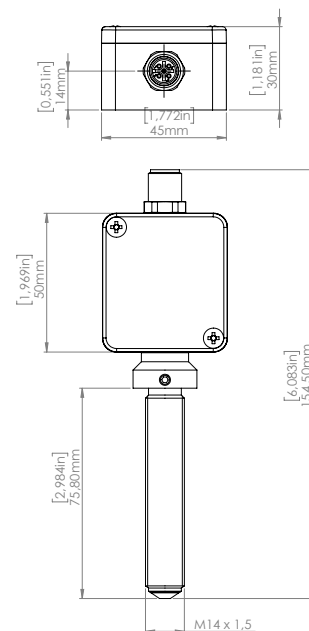
Flush-Mount (1- or 2-Channel)
40 °C...+80 °C [40 °F...+176 °F]



Screw-in M14x1.5 short (1-Channel)
-40 °C ... +120 °C [-40 °F ... +248 °F]



Screw-in M14x1.5 long (1-Channel)
-40 °C ... +150 °C [-40 °F ... +302 °F]



MODEL CODE

	ECO	X	X	-	X	X	-	X	X	-	X
Mounting											
Flush-mount / ZHM 01/3-03 [+80°C; +176°F]		C									
Flush-mount / ZHM 04 [+80°C; +176°F]		E									
Screw-in M14x1.5 [+120°C; +248°F] / ≤ZHM 04, SRZ & HM		K									
Screw-in M14x1.5 [+150°C; +302°F] / ZHM, SRZ & HM		L									
Channel											
1-Channel											1
2-Channel [DIR, 2 x f] (not available with "Mounting" K & L)											2
Output Function											
Freq/Pulse+ (PP, NPN, PNP)											P
Namur Output											N
4-20mA passive+ Freq/Pulse (NPN)											A
Advanced Output Function											
None											N
0-20mA aktiv + Freq/Pulse (PP, NPN, PNP)											V
0-10V + Freq/Pulse (PP, NPN, PNP)											W
LED indicator ¹⁾											I
Housing / Sensor / IP											
Aluminum / 1.4404 [AISI 316L] / IP 65											A
Stainless / 1.4404 [AISI 31L] / IP 68											S
Connector											
M12 Connector (5-pole, male, A-coded), material equivalent housing											P
Explosion Protection											
None											-
ATEX + IECEx + cCSAus (Zone 0) ²⁾											Ex

¹⁾ only in combination with output function "P" and housing/sensor/IP protection "A".

²⁾ not in combination with extended output function "V" and "W".

Additional conditions for North American CSA certification:

Only ECOs with product code T*10 and an M12 stainless steel plug, can be used as Type 3 for outdoor use. All other configurations may only be used indoors.

OUTPUT STAGES ELECTRICAL VALUES

NPN		R_{load} I_{load} $U_{ext.}$ $+U_b$	<table border="0"> <tr> <td>min.</td> <td>max.</td> </tr> <tr> <td>10 kΩ</td> <td></td> </tr> <tr> <td></td> <td>15 mA</td> </tr> <tr> <td></td> <td>28 V</td> </tr> <tr> <td>11,5 V</td> <td>28 V</td> </tr> </table>	min.	max.	10 kΩ			15 mA		28 V	11,5 V	28 V	$V_{outlow} = 1800 \Omega \times I_{load}$				
min.	max.																	
10 kΩ																		
	15 mA																	
	28 V																	
11,5 V	28 V																	
PNP		R_{load} I_{load} U_{load} $+U_b$	<table border="0"> <tr> <td>min.</td> <td>max.</td> </tr> <tr> <td>10 kΩ</td> <td></td> </tr> <tr> <td></td> <td>15 mA</td> </tr> <tr> <td></td> <td>28 V</td> </tr> <tr> <td>11,5 V</td> <td>28 V</td> </tr> </table>	min.	max.	10 kΩ			15 mA		28 V	11,5 V	28 V	$V_{outhigh} = +U_b - 0,5 V - (1800 \Omega \times I_{load})$				
min.	max.																	
10 kΩ																		
	15 mA																	
	28 V																	
11,5 V	28 V																	
Push-Pull		R_{load} I_{load} U_{load} $+U_b$	<table border="0"> <tr> <td>min.</td> <td>max.</td> </tr> <tr> <td>10 kOhm</td> <td></td> </tr> <tr> <td></td> <td>15 mA</td> </tr> <tr> <td></td> <td>28 V</td> </tr> <tr> <td>11,5 V</td> <td>28 V</td> </tr> </table>	min.	max.	10 kOhm			15 mA		28 V	11,5 V	28 V	$V_{outlow} = 1800 \Omega \times I_{load}$ $V_{outhigh} = +U_b - 0,5 V - (1800 \Omega \times I_{load})$				
min.	max.																	
10 kOhm																		
	15 mA																	
	28 V																	
11,5 V	28 V																	
NAMUR		R_{low} R_{high} $U_{ext.}$ $+U_b$	<table border="0"> <tr> <td>min.</td> <td>max.</td> </tr> <tr> <td>typ.</td> <td>1525 Ω</td> </tr> <tr> <td>typ.</td> <td>10 kΩ</td> </tr> <tr> <td></td> <td>12 V</td> </tr> <tr> <td>11,5 V</td> <td>28 V</td> </tr> </table>	min.	max.	typ.	1525 Ω	typ.	10 kΩ		12 V	11,5 V	28 V					
min.	max.																	
typ.	1525 Ω																	
typ.	10 kΩ																	
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11,5 V	28 V																	
4 - 20 mA passiv + Frequenz/Puls (NPN)		R_{burden} I_{loop} $+U_b$ +NPN	<table border="0"> <tr> <td>min.</td> <td>max.</td> </tr> <tr> <td></td> <td>600 Ω</td> </tr> <tr> <td></td> <td>21 mA</td> </tr> <tr> <td>21,6 V</td> <td>28 V</td> </tr> <tr> <td></td> <td>28 V</td> </tr> </table>	min.	max.		600 Ω		21 mA	21,6 V	28 V		28 V	$R_{burden\ max.} = (+U_b - 21,6) / 0,004 A$ $+U_b = 21,6 V + (R_{burden} \times 0,004 A)$ like NPN				
min.	max.																	
	600 Ω																	
	21 mA																	
21,6 V	28 V																	
	28 V																	
4 - 20 mA aktiv + Frequenz/Puls (PP, PNP, NPN)		R_{burden} I_{loop} U_{out} $+U_b$ +NPN +PNP +PP	<table border="0"> <tr> <td>min.</td> <td>max.</td> </tr> <tr> <td></td> <td>1000 Ω</td> </tr> <tr> <td></td> <td>21 mA</td> </tr> <tr> <td></td> <td>25 V</td> </tr> <tr> <td>11,5 V</td> <td>28 V</td> </tr> <tr> <td></td> <td>28 V</td> </tr> <tr> <td></td> <td>28 V</td> </tr> </table>	min.	max.		1000 Ω		21 mA		25 V	11,5 V	28 V		28 V		28 V	For burden > 350 Ω: $R_{burden\ max.} = ((+U_b - 11,5 V) / 0,021 A) + 350 \Omega$ $+U_b = 11,5 V + (0,021 A \times (R_{burden} - 350 \Omega))$ like NPN like PNP like PP
min.	max.																	
	1000 Ω																	
	21 mA																	
	25 V																	
11,5 V	28 V																	
	28 V																	
	28 V																	
0 - 10 V aktiv + Frequenz/Puls (PP, PNP, NPN)		R_{load} I_{load} U_{out} $+U_b$ +NPN +PNP +PP	<table border="0"> <tr> <td>min.</td> <td>max.</td> </tr> <tr> <td>10 kΩ</td> <td></td> </tr> <tr> <td></td> <td>25 + 15 mA</td> </tr> <tr> <td></td> <td>25 V</td> </tr> <tr> <td>15 V</td> <td>28 V</td> </tr> <tr> <td></td> <td>28 V</td> </tr> </table>	min.	max.	10 kΩ			25 + 15 mA		25 V	15 V	28 V		28 V	like NPN like PNP like PP		
min.	max.																	
10 kΩ																		
	25 + 15 mA																	
	25 V																	
15 V	28 V																	
	28 V																	

EX PROTECTION

Product Certification Code: T100 (Version: T100-ECO_D_EN_230130_E002)

Approvals

CSA-c	Ex ia IIC T4 Class I, Division 1, Groups A, B, C & D
cCSAus	Class I, Zone 0 AEx ia IIC T4
IECEX	Ex ia IIC T4 Ga
ATEX	II 1G Ex ia IIC T4 Ga

Temperature

-40°C ≤ Tamb ≤ +60°C -40°C ≤ Tproc ≤ +60°C	Without distance requirement
-40°C ≤ Tamb ≤ +50°C -40°C ≤ Tproc ≤ +80°C	Minimum distance of 30mm between the T100 housing and the mechanical meter top mounted.
-40°C ≤ Tamb ≤ +50°C -40°C ≤ Tproc ≤ +95°C	Minimum distance of 30mm between the T100 housing and the mechanical meter. A top mounted T100 is prohibited!

Design Values Supply and Puls/Frequency Outputs

Description	Connection ³⁾	U _i (V)	I _i (mA)	P _i (mW)	C _i (nF)	L _i (μH)
Power Supply	+24V / Loop+	28V	93	650	74.75	470
Digital Output 1	Dig. Out 1	28V	93	650	74.75	470
Digital Output 2	Dig. Out 2	28V	93	650	74.75	470

³⁾to common ground [GND / Loop-]