



# 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 (ECO configurator is required)

## 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

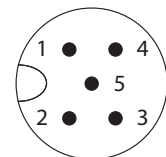


## ELECTRICAL CONNECTION

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

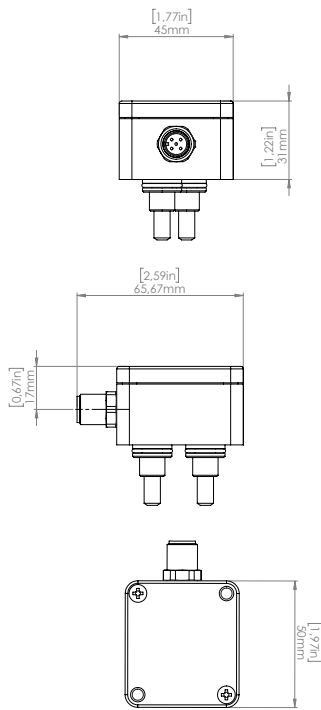
### Pin

- |   |                                |
|---|--------------------------------|
| 1 | +U <sub>b</sub> / Loop+ (24 V) |
| 2 | Digital Output 2 / NAMUR       |
| 3 | GND / Loop-                    |
| 4 | Digital Output 1 / NAMUR       |
| 5 | Active Analog Output           |

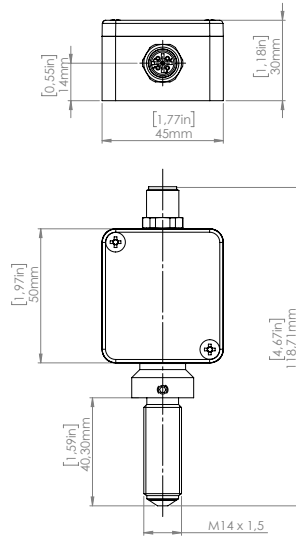


## DIMENSIONS

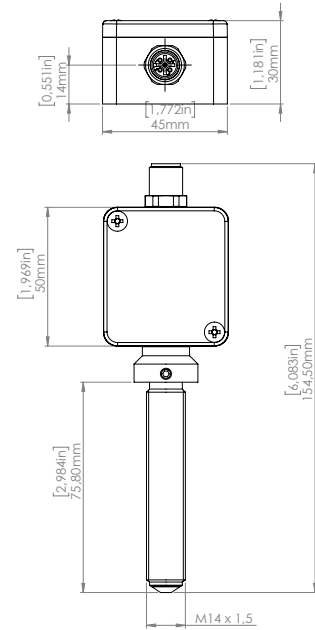
Flush-Mount (1- or 2-Channel)  
40 °C...+80 °C [40 °F...+176 °F]



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
<b>Mounting</b>											
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									
<b>Channel</b>											
1-Channel			1								
2-Channel [DIR, 2 x f] (not available with "Mounting" K & L)			2								
<b>Output Function</b>											
Freq/Pulse+ (PP, NPN, PNP)					P						
Namur Output					N						
4-20mA passive+ Freq/Pulse (NPN)					A						
<b>Advanced Output Function</b>											
None					N						
0-20mA aktiv + Freq/Pulse (PP, NPN, PNP)					V						
0-10V + Freq/Pulse (PP, NPN, PNP)					W						
LED indicator <sup>1)</sup>					I						
<b>Housing / Sensor / IP</b>											
Aluminum / 1.4404 [AISI 316L] / IP 65								A			
Stainless / 1.4404 [AISI 31L] / IP 68								S			
<b>Connector</b>											
M12 Connector (5-pole, male, A-coded), material equivalent housing									P		
<b>Explosion Protection</b>											
None										-	
ATEX + IECEx (Zone 0) <sup>2)</sup>											Ex

<sup>1)</sup> only in combination with output function "P".

<sup>2)</sup> not in combination with extended output function V and W.

## OUTPUT STAGES ELECTRICAL VALUES

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

## EX PROTECTION

**Product Certification Code: T100** (Version: T100-ECO\_D\_EN\_230130\_E001)

### 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
UKCA	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 <sup>3)</sup>	U <sub>i</sub> (V)	I <sub>i</sub> (mA)	P <sub>i</sub> (mW)	C <sub>i</sub> (nF)	L <sub>i</sub> (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

<sup>3)</sup>to common ground [GND / Loop-]