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ZOE



2" pipe mounting kit



Wall mounting kit

- Battery operation or external DC power supply
- LCD-display, background lighting
- 1 pulse input (NPN, PNP, NAMUR, reed switch)
- Scalable pulse output
- Sensor supply
- Free scaling
- Housing for wall or pipe mounting





Description

The electronic units ZOE are specifically designed for the calculation and display and of flow rates and volume flow of flowmeters. The device operates via battery or external power supply. The ZOE can be connected with flowmeters with pulse or frequency output.

The electronic shows flow rate, daily counter (resettable) and total counter. Mass units can be set.

All customised programme settings remain saved even after a battery exchange. The housing of ZOE is weather resistant and has protection category IP66/67 (Nema 4X). The electronics is housed in a UV-resistant, glass-fibre reinforced nylon housing with stainless steel screws and FPM seals.

The instruments are suitable for harsh indoor or outdoor environments and comply with EU Directive 2004/108/EC (Electromagnetic Compatibility).

Significant Characteristics

- Scalable, resettable and total volume counter
- Plastic housing for wall or pipe mounting
- Universal pulse input
- Linearisation function
- Battery life with 3,6 V AA lithium or 2xAA standard alkaline cell
- Optional: wall or pipe mounting

Additionally for ZOE-ZE:

- External supply 9-28 V_{DC}
- Scalable pulse output
- Sensor supply
- Background lighting for LC display

Technical Details

External power supply: 9-28 V_{DC}
power consumption max. 40 mA
(only ZOE-ZE)

Battery for operation: 1 x 3.6 V lithium size AA or 2 x 1.5 V
alkaline cell size AA

Battery life: using 3.6 V lithium with
2200 mAh: up to 5 years (at 50µA);
using 2 x alkaline cells with
2600 mAh each: up to 2 years
(at 50µA)

Display: LC display (for ZOE-ZE white back-ground lighting)
height of digits for: 5 digits volume flow: 13 mm
8 digits volume counter: 8 mm
display of battery power

Mounting options: meter mount, wall or pipe mounting

Measuring input:* universal, configurable (NPN, PNP, NAMUR Coil, reed switch or active)
input frequency: 0.1 ... 1000 Hz

Signal amplitude for sensor type
Induction coil: ACt > 80 mVpp, COIL > 250 mVpp

High-Low-threshold

Binary inputs: approx. 0.7 V

Measuring rate: 1 s

Units for volume flow: ml/m, l/m, l/h, m³/h, gpmUK, gpmUS, gphUK, gphUS, user

Units for volume counter: ml, l, m³, galUs, galUK, user

Control input (only ZOE-ZExxx3): for part counter resetting

Linearisation: 1 ... 9 interpolation points, can be deactivated

Accuracy of volume flow measurement: <0.1% of reading (depending on scaling and resolution)

Sensor supply (only ZOE-ZExxx3): 8 V_{DC}, max. 25 mA (for external supply >10 V_{DC})

Pulse output (only ZOE-ZExxx3): NPN, Open Collector, max. 30 V_{DC}, max. 50 mA

Operation: 4 buttons

Housing: plastic, PA6, GF-reinforced

Protection: IP66/67

Cable entry: 3xM20x1.5 or 1/2" NPT (prepared)

Electrical connection: plug-in terminals wire size max. 0.75 mm²

Retention of meter readings in case of power failure: cyclic, non-volatile memory

Ambient temperature: -20 °C ≤ T_{ambient} ≤ 80 °C

Storage temperature: -25 °C ≤ T_{storage} ≤ 80 °C (without battery)

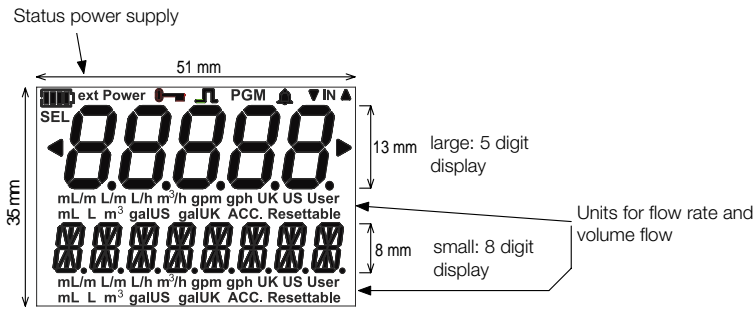
* For battery operation: passive reed switches or induction coils can be used as sensor. Other sensors requiring sensor supply for operation cannot be used for battery operation.



Configurable Display Layouts

<p>Rate/Part</p>	<p>Rate/Total</p>	<p>Total/Part</p>	<p>Part/Total</p>
<p>Part/Rate</p>	<p>Total/Rate</p>	<p>Alt/Total</p> <p>For this layout, the bigger display will alternate b/w partial totaliser and flow, while the smaller display is fix and will show accumulated totaliser.</p>	<p>Part/Alt</p> <p>For this layout, the smaller display will alternate b/w total and flow, while the bigger display is fix and will show partial totaliser.</p>
<p>Alt/Rate</p>	<p>Rate/Alt</p> <p>For this layout, the bigger display will alternate b/w partial and accumulated total, while the smaller display is fix.</p>	<p>Rate/Alt</p>	<p>Rate/Alt</p> <p>For this layout, the smaller display will alternate b/w partial and accumulated total, while the bigger display is fix.</p>

Configuration	5 digits display	8 digits display
Rate/Part	Rate display	Part
Total/Part	Total	Part
Part/Rate	Part	Rate display
Alternating/Total	Alternating display between Rate display and Part	Total
Alternating/Rate	Alternating display between Total and Part	Rate display
Rate/Total	Rate display	Total
Part/Total	Part	Total
Total/Rate	Total	Rate display
Part/Alternating	Part	Alternating display between Total and Rate
Rate/Alternating	Rate display	Alternating display between Total and Part



Order Details (Example: ZOE-ZE K M F 3 0 0)

Model	Electronics	Housing type	Electrical connection/ cable gland	Input	Power supply	Options	Special
ZOE-	ZB = rate totaliser without external power supply/with battery	0 = universal mount (standard, round plastic without wall mounting kit/without holes) K = universal mount (round plastic with wall mounting kit)	M = 3x M20x1.5 cable entry N = 3x 1/2" NPT cable entry	F = pulse/frequency input	B ¹⁾ = battery for operation	0 = without	0 = without Y = special (please specify in clear text)
	ZE = rate totaliser with external power supply/with battery	M = universal mount (round plastic for retrofitting DON)			3 ²⁾ = 9-28 V _{DC} , battery for operation, pulse output		

¹⁾ Only available with ZOE-ZB

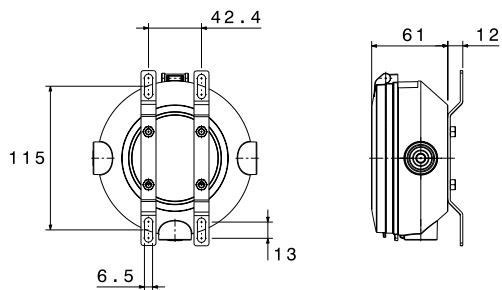
²⁾ Pulse output, sensor supply and LCD backlight only with external power supply. Only available with ZOE-ZE

Accessories

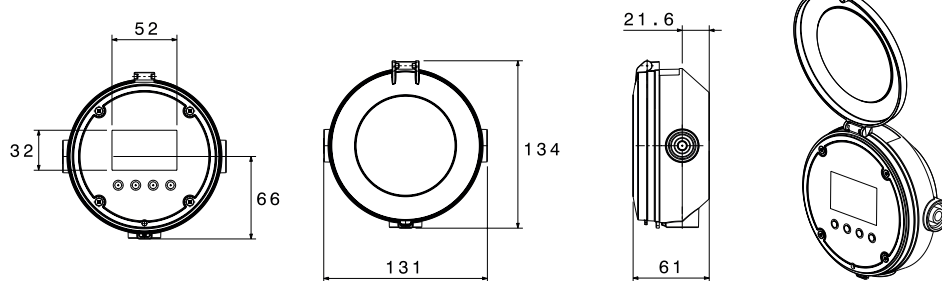
Description	Model	Image
Stainless steel wall mounting kit (comprising of 2x mounting brackets incl. accessories)	ERS-ZOK-023618	
Stainless steel 2" pipe mounting kit	ERS-ZOK-529001	

Dimensions [mm]

ZOE-ZxK



ZOE-ZxM



ZOK



2" pipe mounting kit



Wall mounting kit



- LCD-display, background lighting
- 2 pulse inputs (NPN, PNP, NAMUR, reed switch etc.)
- Analogue, switching, pulse, relay output, status output
- Sensor supply
- Free scaling
- Universal housing, panel mounting or field housing





Description

The electronic units ZOK-Xx are specifically designed for the calculation, display and transfer of calculations and flow rates of flow meters with pulse or frequency outputs. The instruments display flow rate, day counter (resettable) and total counter in the operator-selected units. A clear multilingual menu guides you through the programming of the device that largely eliminates the requirement of constant usage of operating manual. All user-specific program settings are retained even when changing the battery.

The electronics options ZOK-ZxK are weather resistant and adequately reflect IP66/67 (NEMA 4X). The electronics is housed in a UV-resistant, glass-filled nylon housing with stainless steel screws and FPM seals.

The option ZOK-ZxP is in a panel housing 96x96 mm with protection class IP44. The option ZOK-ZxF is available in powder coated aluminum extruded housing with plastic lids and appropriate protection class IP66/67. The instruments are suitable for harsh indoor or outdoor environments and comply with EU Directive 2004/108/EC (Electromagnetic Compatibility).

Significant Characteristics

- Battery life or external powered, graphic LCD-display resettable and cumulative totaliser, 5 digit main value display, configurable
- Robust field or panel mountable housing
- Simple programming
- Universal pulse inputs
- Display backlighting
- Status output
- Scalable pulse output
- Optional: wall or pipe mounting

Technical Details

External power supply: 5 ... 28 V_{DC} (without using the analogue output)
8 ... 28 V_{DC} (with using the analogue output)
12 ... 28 V_{DC} with relay output
max. power consumption:
with DC supply voltage approx. 70 mA (with full backlight, without outputs)

Ex versions: U_i = 28 V
I_i = 100 mA
P_i = 0.7 W

See table on page 7 for details

Battery (battery for operation): 3.6 V / 2200 mAh
Lithium size AA

Battery life in battery mode: dependant on the chosen sleep mode
max. 17 months
min. 3 months

Display: LCD, graphic 128x64,
backlight adjustable (only with external supply)

Size of main display value: 12.5 mm

Display resolution of main display value: 5 digits, based on measuring range end value

Engineering units displayed: litres, millilitres, gallons (US or UK), barrel, m³, user defined engineering units displayed

Input scaling range: 0.001 ... 99,999.999 with 3 floating decimal points

Mounting: meter mount, wall, surface, pipe or panel mount, field mount

Measuring inputs*: 2 x pulse input, type: NPN, PNP, NAMUR, Reed, Hall, active (configurable with software)
Input frequency: 0.1 ... 1000 Hz,
max. Input amplitude 30 V_{DC}

Signal amplitude for sensor type induction coil: Act/COIL > 80mVpp

High-Low-threshold Binary inputs: approx. 1 V

Direction Detection with Quadrature Signal: Phase angle ±5° to ±65°

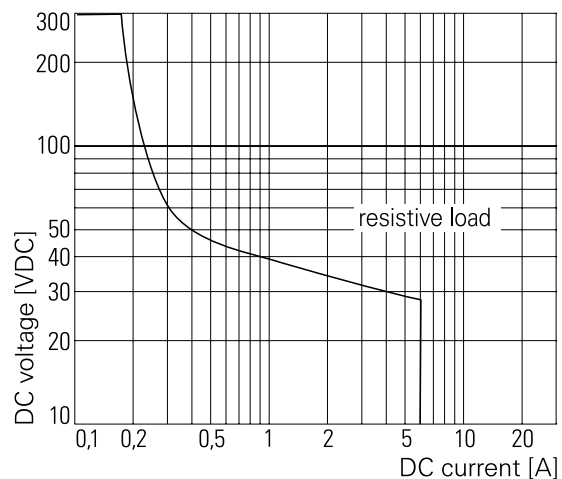


Basic accuracy of flow measurement:	<0.1 % of reading (the accuracy of the displayed value depends on the adjusted scale and display resolution)
Sensor supply:	8 V _{DC} , max. 30 mA (with external supply > 10 V _{DC})
Arithmetic functions:	A + B, A - B with scalable analogue output
Outputs	
Status output:	transistor output, Push-Pull (PP), max. 300 mA, overload protection
Relay outputs (only -Z2):	potential-free changeover contacts, max. switching voltage 230 V _{AC/DC} , max. current load dependent (see diagram)
Solid-state relay output (only E2/E5):	max. switching voltage: 30 V _{DC} R _{ON} = 1700 Ω, R _{OFF} > 10 GΩ to be used with NAMUR-isolated switching amplifier
Switching outputs:	transistor output PNP, NPN or Push-Pull (PP), with software configurable, max. output current: 300 mA (source/sink), overload protection
Pulse output:	transistor output, Push-Pull (PP), max. 300 mA, overload protection
Analogue output:	4 - 20 mA, 2-conductor loop operation or 3-wire operation (current source or sink) selectable by external wiring, free scaling, max. load: 750 Ω at 24 V _{DC} , 250 Ω at 14 V _{DC} , 150 Ω at 12 V _{DC} , Resolution: 16 bits
Operation:	4 buttons
Housing:	plastic, PA6, GF-enhanced
Protection:	IP66/67 (not for panel mounting)
Cable entry:	3xM20x1.5 or 1/2" NPT (prepared, not for panel mounting device)
Electrical connection:	plug-in terminals
ATEX Certification:	Ⓔ II 2G Ex ia IIC T4 Gb
IECEX Certification:	Ex ia IIC T4 Gb
Ambient temperature:	ZOK-Z: -20... +80 °C ZOK-E: -20... +60 °C

Additional Data for Options ZOK-ZxP and ZOK-ZxF

Power supply:	12 ... 28 V _{DC} (supply option -6) 90 - 260 V _{AC} (supply option -0) battery operation only with ZOK-ZxF with supply option 3
<i>See table on page 7 for details</i>	
Sensor supply:	8 V with supply voltage ≥ 8,5 V _{DC} (supply option -3) 8 V or 24 V selectable (supply option -0 and 6). Max 30 mA.
Relay outputs:	potential-free changeover contacts, max. switching voltage 230 V _{AC/DC} , max. current load dependent (see diagram)
Analogue output (at ZOK-Z5P):	4 - 20 mA, 3-wire, current source
Housing:	ZOK-ZxP panel mounted, 96x96 mm, depth 60 mm degree of protection front IP65, backside IP20 ZOK-ZxF aluminium housing with plastic lid PA6 117 x 117 mm, depth 127 mm
Protection:	IP65
Cable entry:	3xM16x1.5/2xPG13.5 for ZOK-ZxF 3xscrew terminals for ZOK-ZxP
Retention of meter readings in case of power failure:	in integrated, non-volatile memory
Ambient temperature:	-20... +80 °C

Max. DC load breaking capacity





Instrument/Functions overview ZOK...

Function	Z1P/Z1F	Z1K/M/0	Z2P/Z2F	Z2K/M/0	Z5P/Z5F	Z3K/M/0/F	Z5K/M/0	E1K/M	E2K/M/0	E3K/M/0	E5K/M/0
Dual counter	X	X			X	X	X	X		X	X
Dosing function			X	X					X		
Controller function					X	X	X			X	X
Certification											
ATEX/IECEX Certification								X	X	X	X
Power supply											
DC-supply	X	X	X	X	X	X	X	X	X	X	X
AC-supply	X		X		X						
Battery operation (output deactivated) ²⁾		X				X		X		X	
Battery included in shipment ³⁾		X				X		X		X	
Sensor supply (only with external power supply)											
Sensor supply	8 V/ 24 V	8 V	8 V/ 24 V	8 V	8 V/ 24 V	8 V	8 V	8 V	8 V	8 V	8 V
Electrical outputs (only with external supply)											
Relay outputs			X	X	X		X		with solid-state relay board ¹⁾		with solid-state relay board ¹⁾
Status outputs	X	X	X	X	X	X	X				
Analogue outputs					3L	2L/ 3L	3L			2L/ 3L	3L
Pulse outputs					X	X	X				with solid-state relay board ¹⁾
LCD-display											
Selectable units	X	X	X	X	X	X	X	X	X	X	X
Decimal point	X	X	X	X	X	X	X	X	X	X	X
Accumulative total	X	X	X	X	X	X	X	X	X	X	X
Resettable total	X	X	X	X	X	X	X	X	X	X	X
Linearisation	X	X			X	X	X	X	X	X	X
Rate display	X	X	X	X	X	X	X	X	X	X	X
Backlighting	X	X	X	X	X	X	X				
Arithmetic functions	X	X			X	X	X	X	X	X	X

¹⁾ Solid-state relay board serves as a galvanic separation to be used in hazardous area

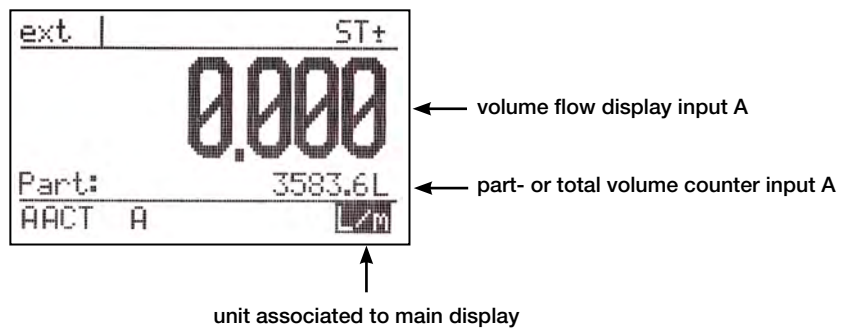
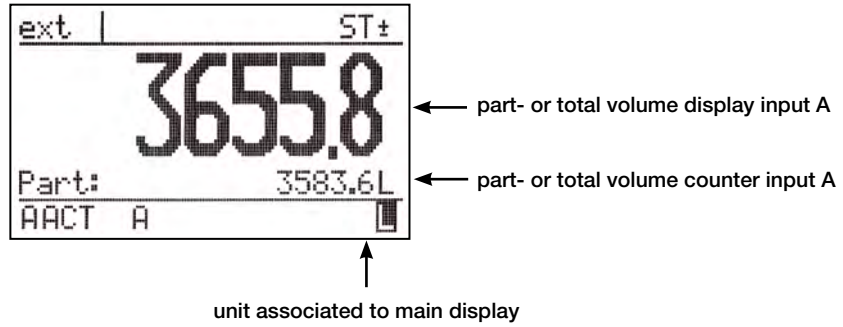
²⁾ Battery operation only applicable with a passive sensor (e.g. reed switch)

³⁾ Shipment without battery with option N.



Display

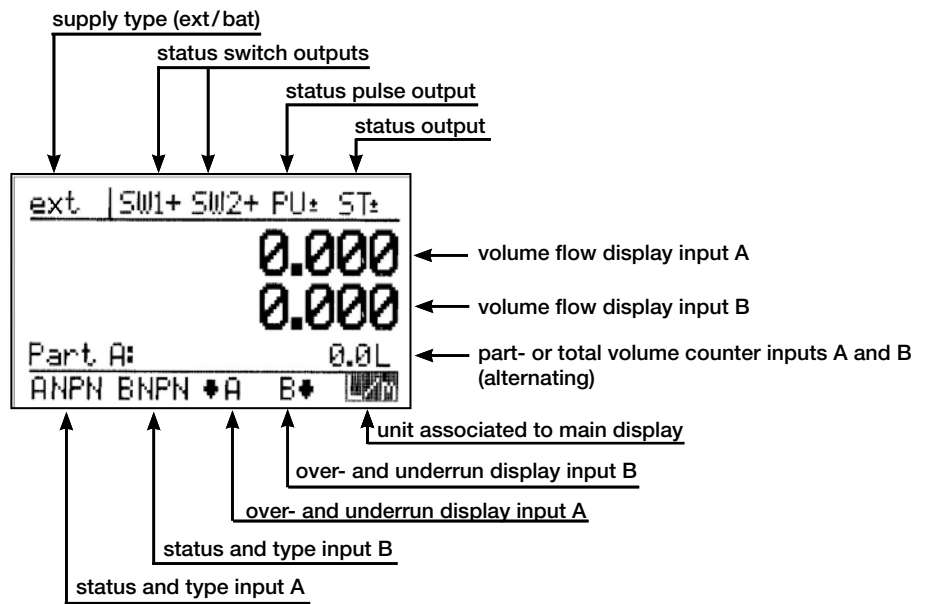
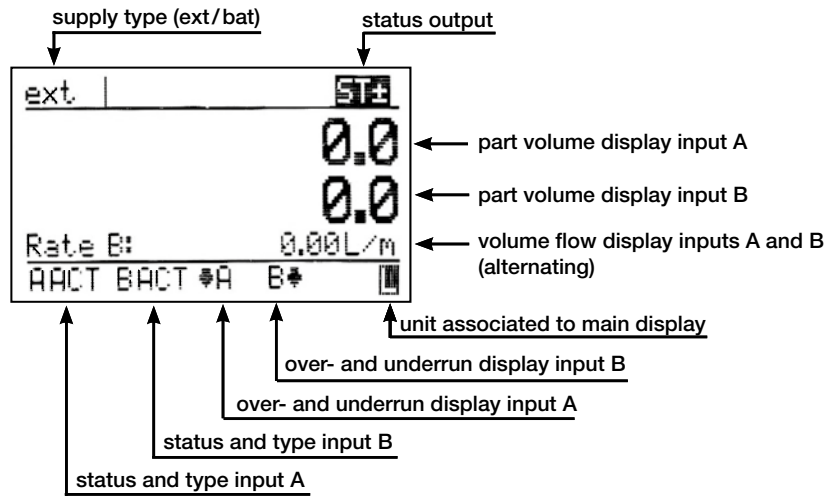
Display layout in measuring mode single channel (ZOK-Z1/E1/Z3/E3/E5)



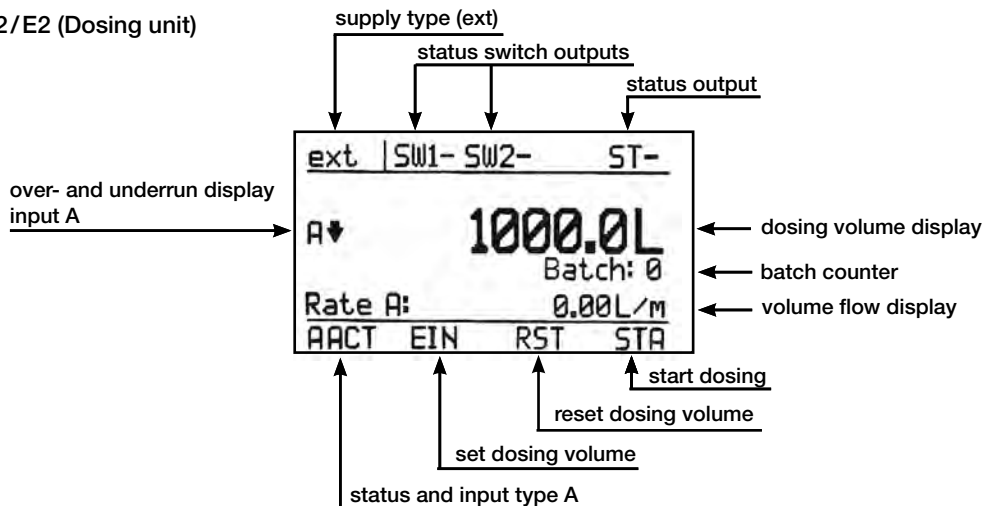


Display (continued)

Display layout in measuring mode for dual channel (ZOK-Z1/E1/Z3/E3/E5)



ZOK-Z2/E2 (Dosing unit)





Order Details (Example: ZOK-Z1 K M F 3 0 0)

Model	Electronics	Housing type	Electrical connection/ cable gland	Input	Power supply	Options	Special
ZOK-	Z1 = dual totaliser LCD Z2²⁾ = dosing unit LCD Z3 = rate totaliser LCD, 4-20 mA Z5 = as Z3 with 2 relays E1 = as Z1 with ATEX/IECEX approval E2²⁾ = as Z2 with ATEX/IECEX approval E3 = as Z3 with ATEX/IECEX approval 4-20 mA, without pulse- and switching outputs E5⁶⁾ = as E3 with 4-20 mA and pulse- and switching outputs	0 = universal mount (standard, round plastic without holder plates/without holes) K = universal mount (standard, round plastic with holder plates) M = universal mount (round plastic for retrofitting DON) P¹⁾ = panel mount 96x96 F¹⁾ = field housing	M³⁾ = 3 x M20x1.5 cable entry 2³⁾ = 3 x 1/2" NPT cable entry K⁹⁾ = terminal on the back N⁴⁾ = 3xM16x1.5 cable entry	F = pulse/frequency input	3²⁾ = 5...28 V _{DC} , battery 0²⁾ = 90...260 V _{AC} 6²⁾ = 12...28 V _{DC}	0 = without R²⁾ = 2 relays G⁷⁾ = 2 x solid-state relays P⁸⁾ = 3 x solid-state relays	0 = without Y = special (please specify in clear text) N = Shipment without battery

¹⁾ Not for ZOK-E1, E2, E3 and E5 ²⁾ See table below ³⁾ Only for housing ZOK-xxK, ZOK-xxM, ZOK-xx0 ⁴⁾ In preparation
⁶⁾ Option E5 possible only with remote I.S.isolator ⁷⁾ Standard for ZOK-E2 ⁸⁾ Standard for ZOK-E5 ⁹⁾ For ZOK-ZxP

Overview of electrical options and corresponding housings

Model	Electronics	Housing	Supply voltage		Relay option	solid-state relays	
			Option	Battery option			
ZOK	Z1	0/K/M	3	standard	no	no	
		P	6/0	no			
		F	3/0	yes (with voltage option 3)			
	Z2	0/K/M	6	no	standard		
		P	6/0				
		F					
	Z3	0/K/M/F	3	yes	no		
	Z5	0/K/M	6	no	standard		
		P	6/0	no	standard		
		F	6/0	no	standard		
	E1/E3 ¹⁾	K/M	3	standard	no		standard
	E2/E5 ¹⁾	K/M	3	no			

¹⁾ Without backlighting



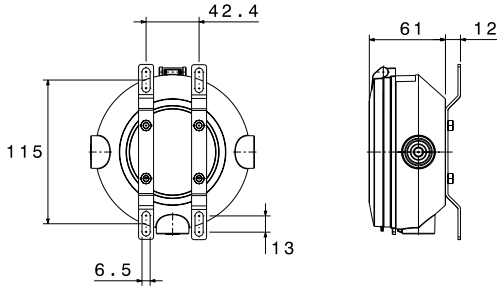
Accessories

Description	Model	Image
Stainless steel wall mounting kit (comprising of 2 x mounting brackets incl. accessories)	ERS-ZOK-023618	
Stainless steel 2" pipe mounting kit	ERS-ZOK-529001	
Cooling fin for high temperature flowmeter	ERS-ZOK-023619	
Batterypack ATEX/IECEx, 3,6 V	ERS-BATEX036	
2" pipe mount kit for ADI, stainless steel	ERS-ADI-209038	
Wall mounting for aluminium field housing for type ADI, continuously adjustable	ERS-ADI-209035	

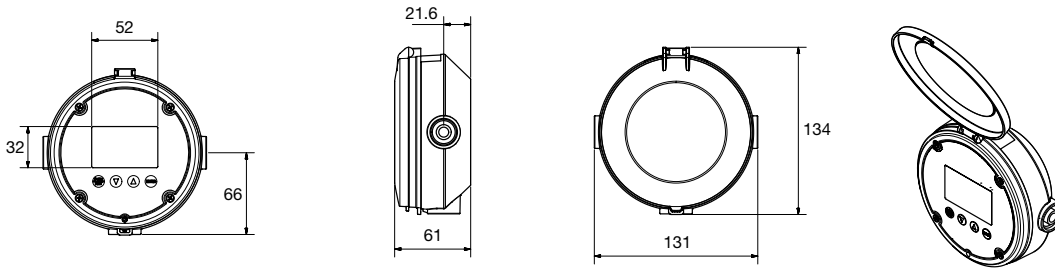
ERS-BATEX036 is part of standard scope of delivery of ZOK-E1/E3 (Shipment without battery with option N)

Dimensions [mm]

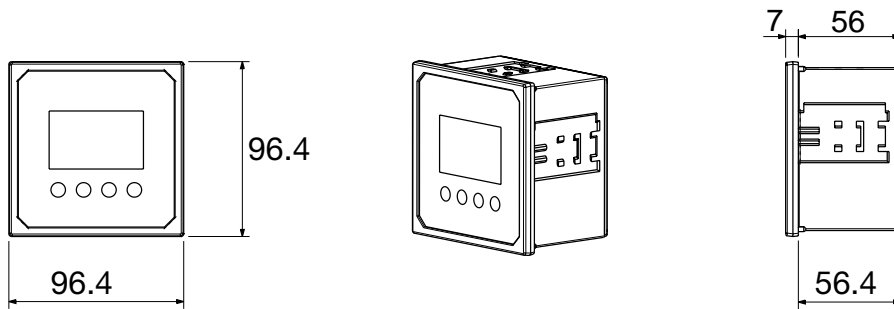
ZOK-ExK/-ZxK



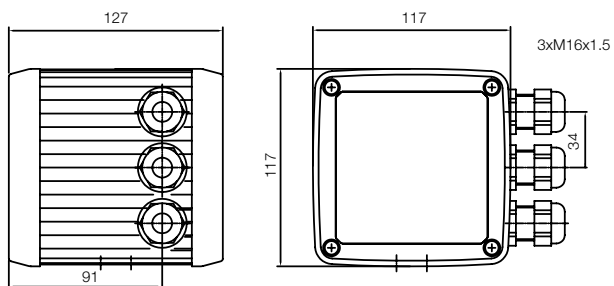
ZOK-ExM/-ZxM



ZOK-ZxP



ZOK-ZxF



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