



AF-E 400 Quick Start

Magnetisk-induktiv flödesmätare



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1 Förord



För detaljerade instruktioner, tekniska data, godkännande och ytterligare information använd QR koden på enheten / förpackningen eller gå till www.krohne.com.

2 Säkerhetsanvisningar

- Enheten är en underkomponent avsedd för integration i ett överordnat system.
- Läs detta dokument före installation och uppstart och behåll det under hela dess drifttid.
- Enheten måste vara anpassad för applikationen och omgivningsförhållandet utan några restriktioner.
- Använd endast enheten för avsett ändamål (→ Funktioner och).
- Använd endast enheten för avsedda media (→ Tekniska data).
- Om inte driftsinstruktioner eller tekniska data följs kan skador på person eller egendom uppstå.
- Tillverkaren har inget ansvar för konsekvenser orsakade av felaktig hantering eller användning av produkten.
- Installation, elektrisk anslutning, programmering, drift och underhåll måste utföras av kvalificerad personal.
- Skydda enhet och kablar mot skador.

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3 Uppstart

Om enheten används med fabriksinställning övervakas det volymetriska flödet med en växlande signal och en analog signal.

Processvärdena för volymflöde och temperatur och mätarens avlästa värden (ström och sparade värden) samt felmeddelanden kan läsas i displayen.

Alla processvärden och meddelanden är tillgängliga via IO-link interfacet oberoende konfiguration av övriga utgångar.

En simuleringsmodell förenklar inställningen av givaren.

3.1 Funktioner med fabriksinställning

Utgång OUT1:

- Växlande signal för volymflöde (hysteresfunktion normalt öppen, PnP, SP1 och rP1)
- Uppmätt värde dämpning 0,6 sekunder, ingen uppstartsfördröjning och minimum lågflödesavstängning.
- I händelse av fel växlar utgången till AV (OFF)

Utgång OUT2:

- Analog signal för volymflöde (mätområde ej skalerat)
- I händelse av fel går utsignalen till 3,5 mA

Display:

- Text på engelska, tecknens färg svart/vit
- Simultan display för aktuella processvärden för volymflöde, temperatur och summeringsverk.
- Låg uppdateringsfrekvens, 75% display ljusstyrka

3.2 Programmeringsalternativ

- Utsignaler OUT1 och OUT2 (temperatur eller volymflöde; växlande, puls,frekvens, analog eller summering)
- Ändring av flödesriktning, avläsning av volymflöde
- Svarstider för volymflödesmätning (dämpning mätvärde, uppstartfördröjning, lågflödesavstängning)
- Felsignaler
- Standardvy för display (måtenhet, processvärden, summaverk, refresh rate, rotation, ljusstyrka, processvärdeberoende färgbyte på tecknen)

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The unit monitors liquid media. It detects flow velocity, volume flow (volumetric flow quantity/time), consumed quantity and medium temperature.

4.1 Pressure Equipment Directive (PED)

The units comply with the Pressure Equipment Directive and are designed and manufactured for group 2 fluids according to the sound engineering practice. Use of group 1 fluids on request.

4.2 Applications

Conductive liquids with the following properties:

- Conductivity: $\geq 20 \mu\text{S/cm}$
- Viscosity: $< 70 \text{ mm}^2/\text{s}$ at $40 \text{ }^\circ\text{C}$; $< 70 \text{ cSt}$ at $104 \text{ }^\circ\text{F}$



This is a class A product. This product may cause radio interference in domestic areas.

- ▶ If required, take appropriate EMC screening measures.

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5 Installation



CAUTION!

If the medium temperature is above $50 \text{ }^\circ\text{C}$ ($122 \text{ }^\circ\text{F}$) parts of the housing can increase in temperature to over $65 \text{ }^\circ\text{C}$ ($149 \text{ }^\circ\text{F}$).

- > Risk of burns.
- ▶ Protect the housing against contact with flammable substances and unintentional contact.
- ▶ Apply the supplied warning label to the sensor cable.



- ▶ Ensure that the system is free of pressure during installation.
- ▶ Ensure that no media can leak at the mounting location during installation.



The unit can be installed independently of the orientation if the following is ensured:

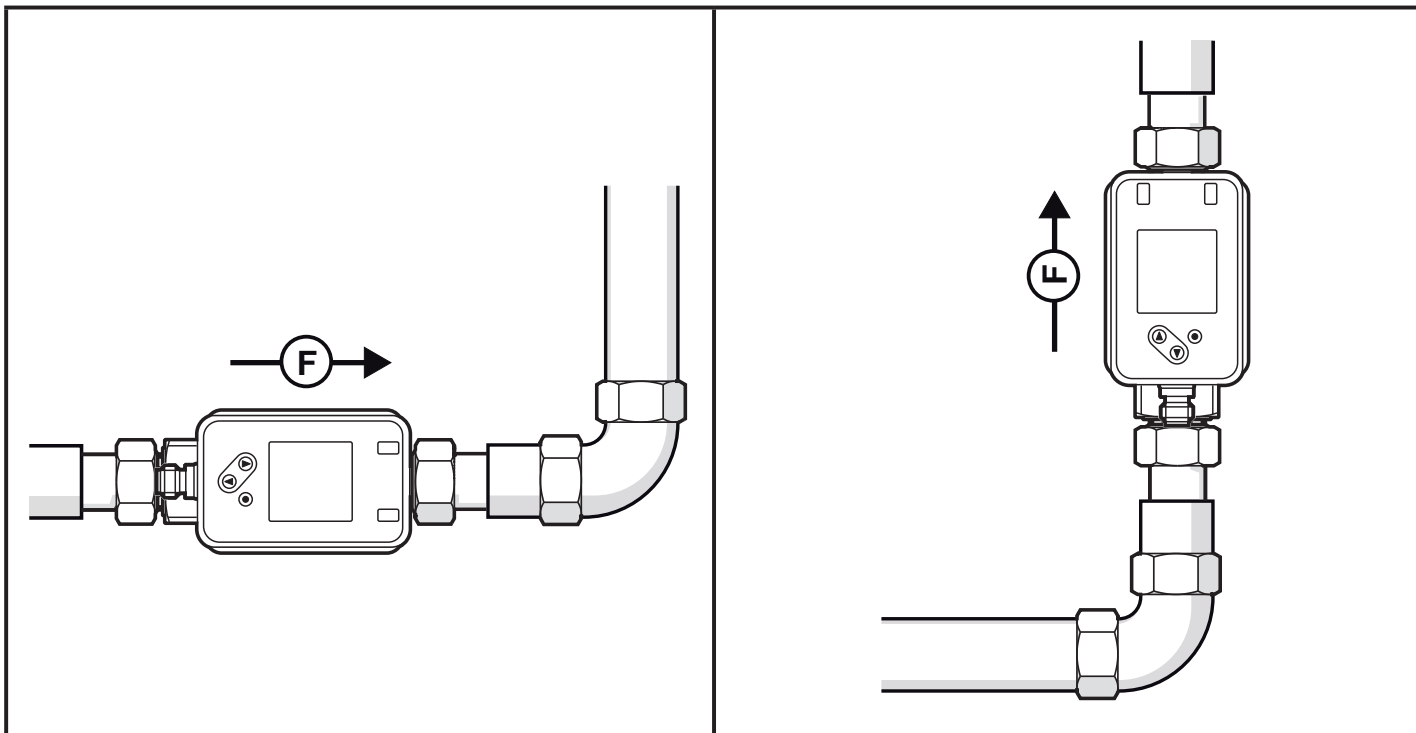
- No air bubbles can form in the pipe system.
- The pipes are always completely filled.



Calming sections on the sensor's inlet or outlet side are not necessary.

5.1 Recommended installation position

- ▶ Install the unit so that the measuring pipe is always completely filled.
- ▶ Install in front of or in a rising pipe.




F = volumetric flow direction

5.2 Non-recommended installation position

- Directly in front of a falling pipe
- In a falling pipe
- Directly in front of the spout of a pipe
- On the suction side of a pump
- At the highest point of the pipe system

5.3 Ground

 If installed in an ungrounded pipe system (e.g. plastic pipes), the unit must be grounded (functional earth).

Ground brackets for the M12 connector are available as accessories
→ www.krohne.com.

5.4 Installation in pipes

The units with a G thread can be installed in the pipes using adapters.
Information about the available mounting accessories at www.krohne.com.

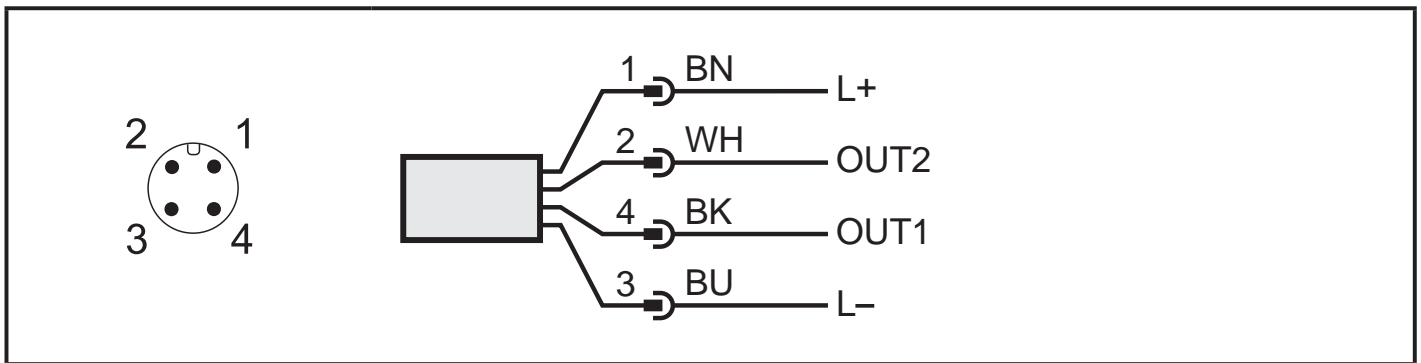
A correct fit of the unit and ingress resistance of the connection are only ensured using Krohne adapters.

6 Electrical connection



The unit must be connected by a qualified electrician.
Voltage supply according to EN 50178, SELV, PELV.

- ▶ Disconnect power.
- ▶ Connect the unit as follows:



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Colours to DIN EN 60947-5-2

BK: black; BN: brown; BU: blue; WH: white

Pin	Connection
4 (OUT1)	<ul style="list-style-type: none"> • switching signal for volumetric flow • switching signal for temperature • switching signal for volumetric flow direction • switching signal for preset counter • pulse signal for quantity meter • frequency signal for volumetric flow • frequency signal for temperature • IO-Link • OFF
2 (OUT2/InD)	<ul style="list-style-type: none"> • switching signal for volumetric flow • switching signal for temperature • switching signal for volumetric flow direction • analogue signal for volumetric flow • analogue signal for temperature • input for external meter reset signal (InD) • OFF

7 Set-up

After power on and expiry of the power-on delay time of approx. 5 s the unit is in the Run mode (= normal operating mode). It carries out its measurement and evaluation functions and generates output signals according to the set parameters.

- During the power-on delay time the outputs are switched as programmed:
 - ON with normally open function (Hno / Fno)
 - OFF with normally closed function (Hnc / Fnc)
 - ON for detection of flow direction (dir.F)
 - OFF for frequency output (FRQ)
 - OFF for consumed quantity monitoring (ImP)
- If output 2 is configured as analogue output, the output signal is at 20 mA during the power-on delay time.

8 Parameter setting



CAUTION

If the medium temperature is above 50 °C (122 °F) parts of the housing can increase in temperature to over 65 °C (149 °F).

> Risk of burns.

- ▶ Do not touch the device with your hands.
- ▶ Use another object (e.g. a ballpoint pen) to carry out settings on the unit.

Parameters can be set before installation or during operation.



If you change parameters during operation, this will influence the function of the plant.

- ▶ Ensure that there will be no malfunctions in your plant.

During parameter setting the unit remains in the operating mode. It continues to monitor with the existing parameter until the parameter setting has been completed.



The parameters can also be set via the IO-Link interface.

9 Operation

The process values to be displayed permanently can be preset. A standard unit of measurement can be defined for the volumetric flow measurement and temperature measurement.

As an option for the preset standard display, the display can be changed by pressing the button [▲] or [▼].

10 Troubleshooting

The unit has many self-diagnostic options. It monitors itself automatically during operation.

Warnings and error states are displayed even if the display is switched off. Error indications are also available via IO-Link.

The status signals are classified according to NAMUR recommendation NE107.










If several diagnostic events occur simultaneously, only the diagnostic message of the event with the highest priority is displayed.

If a process value fails, the other process values are still available.



Additional diagnostic functions are available via IO-Link → IODD interface description at www.krohne.com.

Process value line	Title line	Status LED	Type	Description	Output behaviour	Troubleshooting
ERROR	ERROR	---	⊗	Unit faulty / malfunction	FOU	Replace device.
Off	Off	---	⊗	Supply voltage too low	off	Check supply voltage. Change setting [diS.B]
---	---	---	⊗	Device temperature too high, display off	OU	Check device temperature.
---	---	---	⚠	Device temperature too high, display brightness reduced	OU	Check device temperature.

Process value line	Title line	Status LED	Type	Description	Output behaviour	Troubleshooting
PARA	Parameter Error	---	⊗	Parameter setting outside the valid range	FOU	Repeat parameter setting.
ERROR	Flow Error	---	⊗	Error volumetric flow measurement	FOU	Check volumetric flow measurement. Replace device.
ERROR	Temp Error	---	⊗	Error in temperature measurement	FOU	Check temperature measurement. Replace device.
cr.OL	Critical over limit	---	⊗	Detection zone exceeded	FOU	Check volumetric flow range / temperature range.
cr.UL	Critical under limit	---	⊗	Detection zone not reached	FOU	Check volumetric flow range / temperature range.
---	Short circuit OUT1/OUT2	OUT1  OUT2 		Short circuit OUT1 and OUT2	---	Check switching outputs OUT1 and OUT2 for short circuit or excessive current
---	Short circuit OUT1	OUT1 		Short circuit OUT1	---	Check switching output OUT1 for short circuit or excessive current
---	Short circuit OUT2	OUT2 		Short circuit OUT2	---	Check switching output OUT2 for short circuit or excessive current
OL	Over limit	---		Measuring range exceeded	OU	Check volumetric flow range / temperature range.
UL	Under limit	---		Measuring range not reached	OU	Check volumetric flow range / temperature range.

Process value line	Title line	Status LED	Type	Description	Output behaviour	Trouble-shooting
Lock via key	---	---		Setting buttons on the unit locked, parameter change rejected	OU	Unlock unit
Lock via communication	---	---		Parameter setting locked via push-buttons, parameter setting is active via IO-Link communication	OU	Finish parameter setting via IO-Link communication.
Lock via system	---	---		Setting buttons locked via parameter setting software, parameter change rejected	OU	Unlock the unit via IO-Link interface using the parameter setting software.
IO-Link	IO-Link flash	OUT1 OUT2		IO-Link function for optical identification of the unit active	OU	Deactivate IO-Link function.

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Error In the event of an error, the outputs react according to the setting under [FOU1] and [FOU2].

Warning

LED flashes

LED flashes quickly

11 Maintenance, repair and disposal

As a rule, no measures for maintenance are necessary.

- ▶ Define regular calibration intervals according to the process requirements.
Recommendation: every 12 months.

If media with a tendency to build-up are used:

- ▶ Check measuring pipe at regular intervals and clean it, if necessary.

Only the manufacturer is allowed to repair the unit.

- ▶ After use dispose of the unit in an environmentally friendly way in accordance with the applicable national regulations.