

D.0037710002

Operating instructions (Translation)



Indicator AS 8

Table of Content

1	General	4
1.1	About the documentation	4
1.2	Manufacturer's address	4
1.3	Symbolism	4
2	Safety	6
2.1	Intended use	6
2.2	Personnel qualification and training	6
2.3	Basic safety instructions	6
2.4	Basic hazards	7
3	Device description	8
3.1	Functional principle	8
3.2	Possible versions	9
3.3	Type key	11
4	Technical data	12
4.1	General information	12
4.2	Electrical data	13
5	Transport and storage	14
5.1	Transport	14
5.2	Storage	14
6	Electrical connection	15
6.1	Terminal assignment	15
6.2	Setting for the supply voltage	16
6.3	Terminal layout: Supply voltage	17
6.4	Terminal layout: Sensor operating voltage	18
6.5	Terminal layout: Relay contacts	19
6.6	Terminal layout: Analogue output	19
6.7	Terminal layout: Printer	20
6.8	Configuration via serial interface	22
7	Operation start-up	23
7.1	Preparation	23
7.2	Input	23

7.2.1	Start input	23
7.2.2	Changing the menu code	24
7.2.3	Changing the input value	24
7.2.4	End input	24
7.3	Dip switch	25
7.3.1	Setting for the measured variable	25
7.3.2	Setting for the time basis	26
7.4	Input parameter	27
7.4.1	Overview menu code numbers	27
7.4.2	Menu code 00	28
7.4.3	Menu code 01	29
7.4.4	Menu code 02	29
7.4.5	Menu code 03 - 06	30
7.4.6	Menu code 07	31
7.4.7	Menu code 08	32
8	Maintenance	33
9	Repairs	34
9.1	Safety instructions for repair	34
9.2	General	34
9.3	Detecting and eliminating failures	35

1 General

1.1 About the documentation

These operating instructions describe the installation and operation of the following device:

Indicator AS 8

The device is manufactured in different versions. Information about the version concerned in the individual case can be found on the device's type plate.

These operating instructions are a component of the device and must be kept accessible for the personnel near the device at all times.

If you have any questions about these operating instructions, please contact the manufacturer.

1.2 Manufacturer's address

KRACHT GmbH
 Gewerbestraße 20
 DE 58791 Werdohl
 phone: +49 2392 935-0
 fax: +49 2392 935-209
 email: info@kracht.eu
 web: www.kracht.eu

1.3 Symbolism



DANGER

Identification of an immediate hazard, which would result in death or severe bodily injury if not avoided.



WARNING

Identification of a potential medium risk hazard, which would lead to death or severe bodily injury if not avoided.

**CAUTION**

Identification of a low risk hazard, which could lead to minor or medium bodily injury if not avoided.

**NOTICE**

Flagging of notices to prevent property damage.



Identification of basic safety instructions. Non-compliance can lead to hazards for people and the device.



Flagging of special user tips and other especially useful or important information.

2 Safety

2.1 Intended use

1. The unit is provided to display and evaluate fluid flow.
2. The device may only be operated with KRACHT flow meters or transmitters with incremental input signals.
3. The unit must not be used in areas with potentially explosive atmospheres, in medical equipment areas or in areas of usage according to DIN EN 61010-1:2011-07; VDE 04-1:2011-07.
4. The device may be operated only in usual industrial atmospheres. If there are any aggressive substances in the air, always ask the manufacturer.
5. Operation of this unit is only permissible with compliance with these operating instructions.
Deviating operating conditions require the express approval of the manufacturer.
6. In case of any use of the device not according to specification, any warranty is voided.

2.2 Personnel qualification and training

The staff designated to assemble, operate and service the device must be properly qualified. This can be through training or specific instruction. Personnel must be familiar with the contents of this operating instructions.



Read the operating instructions thoroughly before use.

2.3 Basic safety instructions



1. Comply with existing regulations on accident prevention and safety at work along with any possible internal operator regulations.
2. Pay attention to the greatest possible cleanliness.
3. Wear suitable personal protection equipment.
4. Do not remove, make illegible or obliterate type plates or other references on the device.
5. Do not make any technical changes on the device.
6. Maintain and clean the device regularly.
7. Use spare parts approved by the manufacturer only.

2.4 Basic hazards



WARNING

Exposed electrical components!

Supply voltage 120 V AC / 230 V AC

1. Follow the special safety regulations during all work on electrical installations.
2. Only allow electricians to work on electrical systems.
3. Only use connection lines that are resistant to ambient influences and media.



WARNING

Malfunction!

Risk of injury due to operating mistakes or failure of the unit when controlling plants or process sequences.

1. Suitable safety precautions must be taken when the device is used.
2. In case of a fault or change of the operating behaviour, put the unit out of service.

3 Device description

3.1 Functional principle

Devices of the type series AS 8 are display and control devices. The different measurements and displays are defined via the variant selection.

The display unit is freely programmable after defining the variants. Program using three buttons that are accessible after removing the front panel. For the version with membrane keypad, the entry is made directly on the front panel.

Display and control units of the type series AS 8 process incremental input signals from KRACHT flow meters and other transducers.

If the unit is operated with a flow meter that has one sensor, it is referred to as single-channel sampling.

If the unit is operated with a flow meter that has two sensors, it is referred to as two-channel sampling. The two-channel scanning facilitates a higher measuring resolution and detection of the direction of the flow rate.

Two relays are always available for external subsequent processing. An analogue output or a serial interface are available depending on the version.

Variants

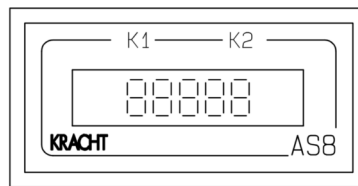
Standard

The AS 8 standard version is a display unit for dynamic flow and volume measurement.

The input signals are filtered in the unit, converted, and computed into the physical sizes of flow rate or volumes.

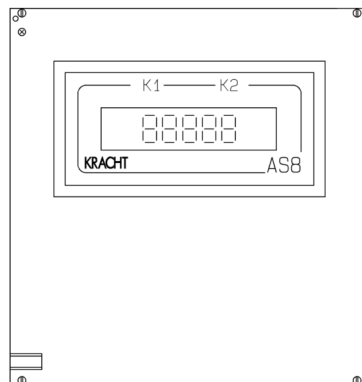
3.2 Possible versions

Installed unit AS 8



Standard

AS 8 as 19" plug-in unit



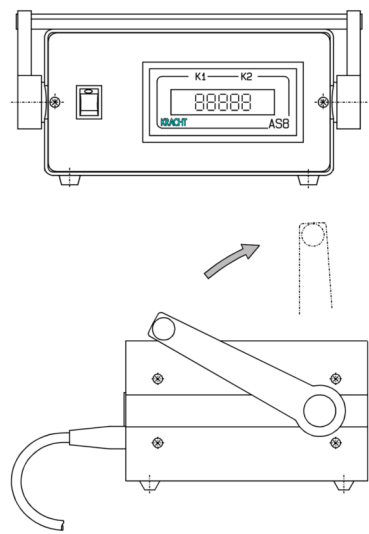
The AS 8 is installed in a 19" front panel 3U 25TE.

All connections of the AS 8 are wired to a Euro card and are available there on a 32-pin male multipoint connector for further processing.

Wiring of the AS 8 to the male multipoint connector

<i>PIN Male multipoint connector</i>	<i>Terminal AS 8</i>	<i>Code</i>
ac2	8	12 V Encoder supply
ac4	10	Channel 1
ac6	11	Channel 2
ac8	12	Totalization release
ac10	13	Printer release
ac12	14	TXD / Analogue output (+)
ac14	15	RXD / Analogue output (-)
ac16	5	Relay contacts 1
ac18	6	Relay contacts 2
ac20	n.c.	
ac22	2	Power supply (GND, N)
ac24	1	12/24 V DC, 120/230 V AC (+, L)
ac26	3	PE
ac28	n.c.	
ac30	7	Relay contacts Basis
ac32	9	0 V

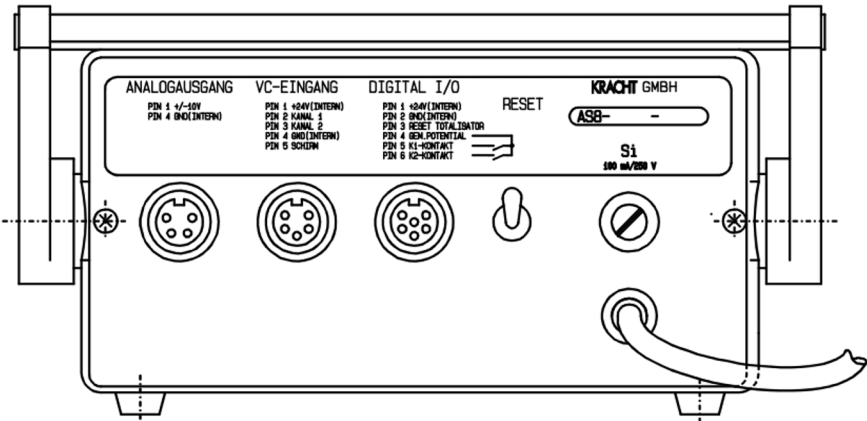
AS 8 in desktop housing



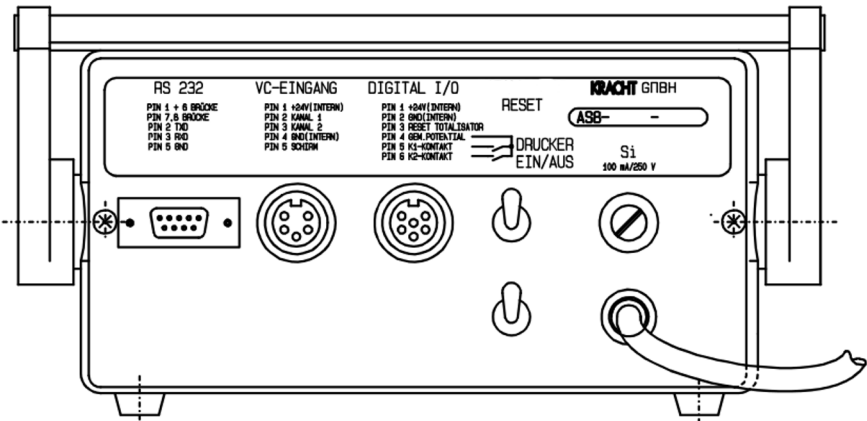
AS 8 in desktop housing is available in "Analogue output" and "Serial interface" versions.

Rear view

Version: Analogue output



Version: Serial interface



3.3 Type key

Ordering example AS 8								
AS 8	-	U	-	230		...	/	F
1.		2.		3.		4.		5.

Explanation of type key AS 8					
1.	Product name				
2.	Output signal				
	U	Analogue output Tension	RS	Serial interface RS 232	
	I	Analogue output Current	O	without analogue output Only with 12 V and 24 V (RS 232 available)	
3.	Supply voltage				
	230	230 V AC - 50/60 Hz	24	24 V DC	
	120	120 V AC - 60 Hz	12	12 V DC	
4.	Variants				
	No specification	Standard Flow and volume measurement			
	RP	Flow rate controller			
	DOS	Dosing program (without analogue output)			
	ZM	Cylinder stoke measurement			
	A2F	Flow rate indication and addition display			
	D2F	Flow rate indication and difference display			
	D2C	Volume indication and difference display			
	VA	Ratio display			
	V2F	Flow rate indication and ratio display			
	PUR	Flow rate indication, ratio display and ratio controller			
	TOR	Gate window measurement			
	FM20	Flow rate indication switchable to all KRACHT flow meters			
	SIM	Simulator for flow meter			
	5.	Keypad			
		No specification	Buttons behind the front panel		
F		With membrane keypad			

4 Technical data

4.1 General information

General information AS 8			
Display	Principle		7 Segment LED 13,2 mm; Red
	Display		0.000 - 9999. (Floating point number display)
	Overflow	(>9999)	Display: 9999.
		(<9999)	Display: -9999.
	Status		LEDs K1 and K2 for Relays 1 and 2
Ambient temperature	Operating temperature		0 °C - 60 °C
	Storage temperature		-25 °C - 85 °C
Keypad	Version	Standard	3 Keys Behind the front panel
		F	3 Keys on the front panel
Material		Housing	Plastic
Dimensions Height x Width x Depth [mm]		Front frame	96 mm x 48 mm, DIN 43700
		Installation depth	approx. 122 mm With connector strip
		Panel cutout	92 ^{+0,5} mm x 45 ^{+0,5} mm
Electrical connection		Installed unit	15 Pinned screw terminal block
		AS 8 as 19" plug-in unit	32 pin male multipoint connector
		AS 8 in desktop housing	Attaching plug
Protection class (DIN 40050)			IP 54
Weight			0,4 kg

4.2 Electrical data

Electrical data AS 8		
Processor		PIC17C42
Mains adapter	Supply voltage	230 V AC (-10% - +6%) / 50-60 Hz
		120 V AC (-10% - +6%) / 60 Hz
		24 V DC
		12 V DC
	Power consumption	approx. 3,5 W
Digital input (2x)	Sensor operating voltage (1)	24 V DC \pm 20%, 50 mA
		12 V DC \pm 20%, 50 mA
	Input impedance	$\geq 7500 \Omega$
	Input amplitude	low ≤ 9 V
		high ≥ 12 V
		Typical switching time 1 ms
Analogue output (1x)	Adjustable as voltage output or current output with jumper	
	Power output	± 10 V, 0 - 10 V, 2 - 10 V / Burden ≥ 1 k Ω Resolution 10 bit, short-circuit proof
	Current output	± 20 mA, 0 - 20 mA, 4 - 20 mA / Burden $\leq 250 \Omega$ Resolution 10 bit, short-circuit proof
Sensor input (1x / 2x) (2 x One-channel) (1 x Two-channel)	Input impedance	$\geq 7500 \Omega$
	Input amplitude	low ≤ 9 V
		high ≥ 12 V
	Flow rate measuring principle	Permanent period measurement (Rising edge)
		Gate window measurement
	Max. input frequency	1 Hz - 2500 Hz
Serial interface (1x) RS 232	Cable length	≤ 15 m
	Input voltage	max. ± 30 V
	Input current	typ. ± 3 mA at ± 9 V input voltage
	Output current	typ. ± 3 mA
	Setting	9600 baud, 8 bit, no parity, 1 stop bit
Relay contacts (2x)		One closer each 24 V / 1 A Resistive load Typical switching time 6 ms
(1) Sensor: Flow meter, Measuring transducer		

5 Transport and storage

5.1 Transport

- After receipt, check the device for transport damages.
- If transport damage is noticed, report this immediately to the manufacturer and the carrier. The device must then be replaced or repaired.
- Dispose of packing material and used parts in accordance with the local stipulations.

5.2 Storage

In case of storage, a dry, dust-free and low-vibration environment is to be ensured. The device is to be protected against influences from weather, moisture and strong fluctuations of temperature.

6 Electrical connection

6.1 Terminal assignment

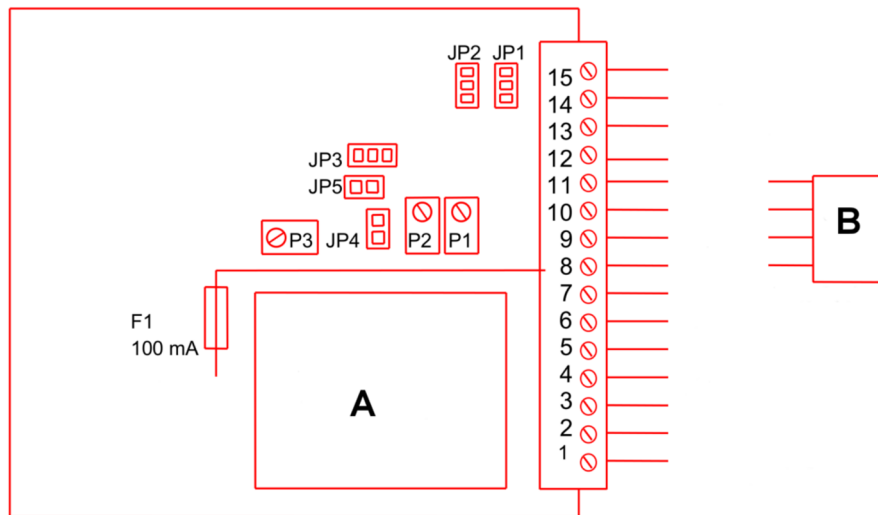
The electrical connections are on screw terminals.



For reasons of protection against contact according to EN 61010, conductor connection must only be provided with ferrules with insulating caps. Do not use connections not assigned by the factory for any other purpose.

We recommend shielding all sensor connection cables and grounding the shielding on the evaluation unit to avoid interference. The sensor connection cables should not be routed in the same cable harness as the mains supply and the output contact cables.

Terminal assignment: Screw terminal



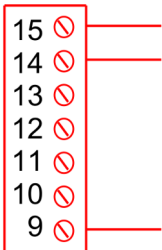
A = Transformer / DC/DC converter

B = Sensor

Explanation

Terminal 1	Power supply	Terminal 9	0 Volt (Sensor)
Terminal 2		Terminal 10	Channel 1
Terminal 3	PE	Terminal 11	Channel 2
Terminal 4	Shield	Terminal 12	Totalization release
Terminal 5	Relay contacts 1	Terminal 13	Printer release
Terminal 6	Relay contacts 2	Terminal 14	Printer interface
Terminal 7	Relay contacts Basis	Terminal 15	or
Terminal 8	24 Volt (Sensor)		Analogue output

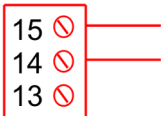
Terminal assignment: Printer interface



Explanation

Terminal 9	GND
Terminal 14	TXD
Terminal 15	RXD

Terminal assignment: Analogue output

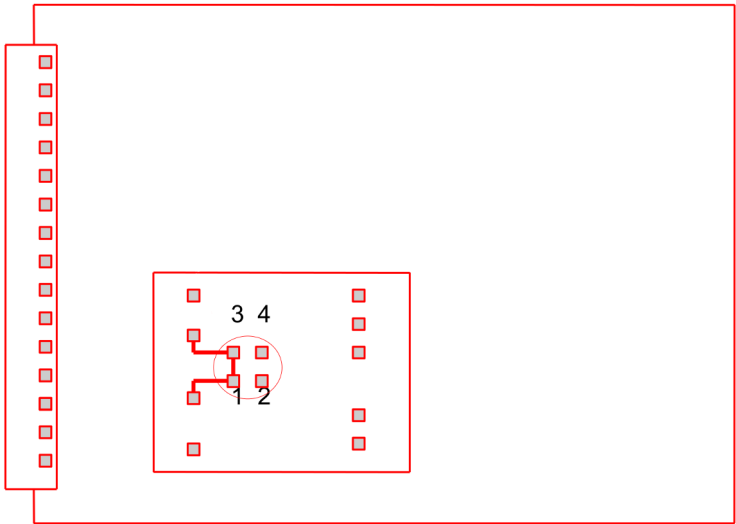


Explanation

Terminal 14	PLUS
Terminal 15	MINUS

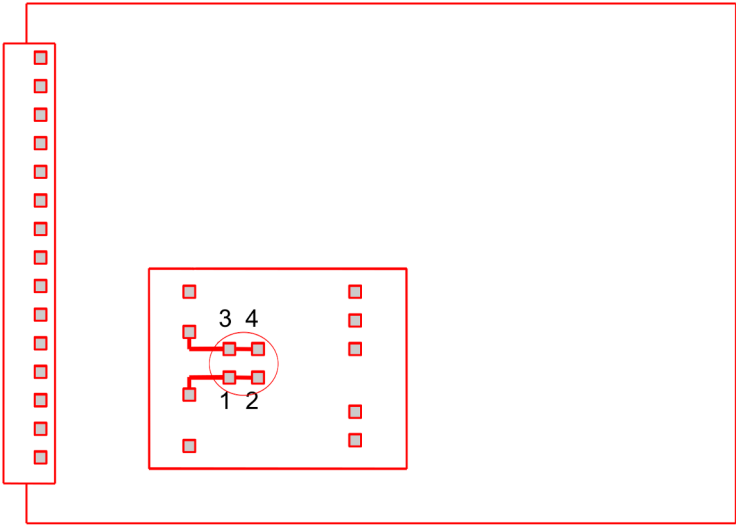
6.2 Setting for the supply voltage

Supply voltage 230 V AC - 50/60 Hz



(PCB view from below)
Close soldering bridge 1 to 3

Supply voltage 120 V AC - 60 Hz



(PCB view from below)
Close soldering bridge 1 to 2
Close soldering bridge 3 to 4

6.3 Terminal layout: Supply voltage

The device is operated with an AC voltage 230 V AC / 120 V AC or with a DC voltage 24 V DC / 12 V DC.

Information about the version concerned in the individual case can be found on the device's type plate.

Terminal assignment: Alternating current 240 V AC / 120 V AC	
Terminal 1	L
Terminal 2	N
Terminal 3	PE

Terminal assignment: DC voltage 12 V DC / 24 V DC	
Terminal 1	+
Terminal 2	GND
Terminal 3	PE



Fire protection

On the device mains side, use the external fuse recommended on the voltage plate.

According to EN 61010, 8 A / 150 VA (W) must never be exceeded in the event of a fault.

Recommended external fuse for 120 V AC / 230 V AC supply voltage: 100 mA.

6.4 Terminal layout: Sensor operating voltage

The device is operated with flow meters or transmitters with incremental input signals.



Sensor operating voltage

Connect the sensor supply voltage to Terminals 8 and 9. Do not use the sensor supply voltage to supply ungrounded inductive or capacitive loads. The sensor supply voltage is not short-circuit proof.

Terminal assignment: Sensor operating voltage

	Tension	Max. permissible current
Terminal 8	24 V DC \pm 20 %	50 mA
Terminal 9	0 V	

The residual ripple of the sensor supply voltage depends on the load.

Signal input

If the unit is operated with a flow meter that has two sensors, it is referred to as two-channel sampling.

If the unit is operated with a flow meter that has one sensor, it is referred to as single-channel sampling.

Terminal assignment: Signal input

	1-Channel design	2-Channel design
Terminal 10	X	X
Terminal 11	-	X



Sensor supply voltage for 12 V version devices

For 12 V version devices, connect the sensor supply directly through the voltage supply (power supply unit) on the control cabinet side. Connect terminal 9 (GND) to the power supply ground.

6.5 Terminal layout: Relay contacts

The device has two relay contacts.



The relays are equipped with normally open contacts.
Maximum switching voltage: 30 Volt
Maximum switching current: 1 A Ω Load

Terminal assignment: Relay contacts

Relay	Contacts (signal)	Connection (Basis)
K0	Terminal 5	Terminal 7
K1	Terminal 6	

6.6 Terminal layout: Analogue output

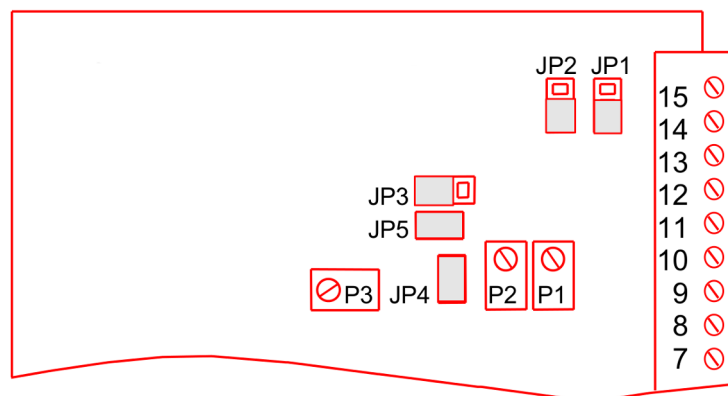
The device has an analogue output or a serial interface, depending on the version.

Terminal assignment: Analogue output

Terminal 14	PLUS
Terminal 15	MINUS

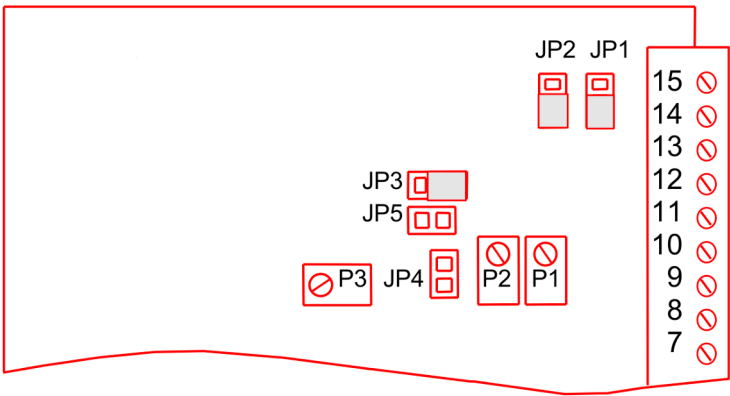
The current output / voltage output setting is made internally using jumpers.

Setting: JP - Current output



The gain can be set at P1.
The offset can be set at P2

Setting: JP - Power output



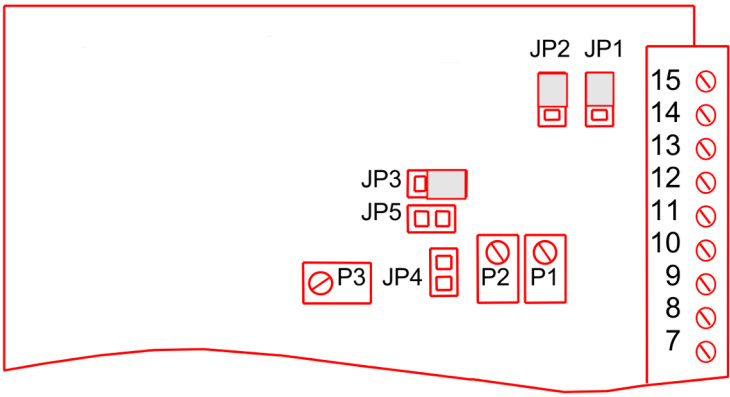
The gain can be set at P1.
The offset can be set at P2

6.7 Terminal layout: Printer

The device has an analogue output or a serial interface, depending on the version.

The analogue output or serial interface is set internally using jumpers.

Setting: JP - Serial interface



Terminal assignment: Serial interface	
Terminal 15	RXD
Terminal 14	TXD
Terminal 9	GND

**RS 232 Configuration**

9600 Baud, 8 Bit, No Parity, XON/XOFF

There is no hardware handshake.



Use a shielded data cable.

The serial interface can be operated both as a printer interface and for "configuration" of the AS 8. No switching between the operating modes is required.

In the printer interface mode, the selected data is output as ASCII characters via the serial interface.

Every second the current display value is printed followed by a CR LF.

Example:

Display value	Printout	ASCII-String
3.500	+ 3.500	2 B 33 2E 35 30 30 0D 0A

The current display value is printed out.

A printout is triggered by a rising edge at the digital input. With continuous current supply, the values are transferred to the serial interface every second.

6.8 Configuration via serial interface

The device is coupled to a PC or PLC via the serial interface.

The PC or the PLC can specifically change parameters of the AS 8 using an ASCII character string.

The device distinguishes the different values by means of a code letter. No protocol is run.

The character string is received completely as an ASCII string and echoed on acceptance. Only one ASCII string at a time can be received. On receipt of a faulty string, an ERROR string is sent.

Example for VC 0,04

Code letter	Input value	String	ASCII-String
A	Pulse size flow meter	A0.040	41 30 2E 30 34 30
B	Maximum value analogue output	B3.500	42 33 2E 35 30 30
C	Damping of digital filters	C9999.	43 39 39 39 39 2E
D	Switch-on relay 1	D0.000	44 30 2E 30 30 30
E	Relay OFF phase value 1	E1.000	45 31 2E 30 30 30
F	Switch-on relay 2	F1.500	46 31 2E 35 30 30
G	Relay OFF phase value 2	G3.000	47 33 2E 30 30 30
	ERROR-String (Echo)	ERROR0	45 62 62 5F 62 30

7 Operation start-up

7.1 Preparation

Before every start-up, the unit must be adapted to the connected flow meter.

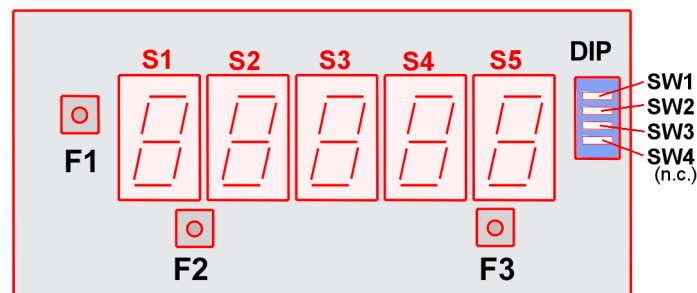
7.2 Input

The procedure for entering all values is always the same.

Program using three buttons that are accessible after removing the front panel. **[F1; F2; F3]**

- Remove the plastic frame.
- Remove the front panel.

For the version with membrane keypad, the entry is made directly on the front panel. **[only F1; F2; F3]**



DIP: See [section 7.3 "Dip switch"](#)

7.2.1 Start input

- Press and hold F1 for four seconds.
 - Segments S1, S2 and S3 are dimmed.
 - Segments S4 and S5 display menu code number 00.

7.2.2 Changing the menu code

- Press key F1 briefly to run through the menu code numbers.
 - Select menu code number.
- Press key F3 briefly to confirm the menu code number selection.
 - A four-digit input value will appear. (S2 - S5)

See also [section 7.4.1 "Overview menu code numbers"](#)

7.2.3 Changing the input value

The dot marks every activated segment that was changed.

- Press key F3 briefly to change the input value.
- Press key F2 briefly to change the active segment.

After entering the values, the comma has to be set at the correct decimal point.

Return to the menu code number level:

- Briefly press button F1.
 - Segments S1, S2 and S3 are dimmed.
 - Segments S4 and S5 display menu code number 00.
- Release button F1.

7.2.4 End input

- Press and hold F1 for four seconds.
 - The display mode is activated.

Reattach the front panel to the unit.

- Put on the front panel.
- Clamp on the plastic frame.

7.3 Dip switch

7.3.1 Setting for the measured variable

SW1	Parameter	Default settings
OFF	Litres	X
ON	US gallon	

Alternatively, the following measurement variables can be set via the pulse volume:

- Millilitre
- Gram
- Millimetre
- Metres
- Kilogram

Example: Setting for the measured variable VC 1

Parameter	Pulse volume flow meter		Conversion factor		Density factor medium		Input value menu code 00
Millimetre	1,036	x	1000	x	1,000	=	1036
Metres	1,036	x	1000	x	1,230	=	1274
Kilogram	1,036	x	1	x	1,230	=	1.274
...							

Example: Calculation of life part

Position or speed measurement of a cylinder

Piston diameter: 10 cm

Flow meter: VC 1

$$\text{Factor per pulse} = \frac{\text{Impulse volume VC 1}}{\text{Piston diameter area}} = \frac{1,036 \text{ cm}^3}{78,54 \text{ cm}^2} = 0,01319 \text{ cm} \quad 0,1319 \text{ mm}$$

Parameter	Factor per pulse		Conversion factor		Input value menu code 00
Millimetre	1,036	x	1000	=	1036
Metres	1,036	x	1000	=	1274
Kilogram	1,036	x	1	=	1.274
...					

7.3.2 Setting for the time basis

SW2	SW3	Time basis	Default settings
OFF	OFF	Minute	X
OFF	ON	Minute	
ON	OFF	Hour	
ON	ON	Second	

7.4 Input parameter

7.4.1 Overview menu code numbers

Menu code	Standard setting		User value		Function
	Input value	Unit	Input value	Unit	
00	0.040	[cm ³ /Imp]		[cm ³ /Imp]	Pulse volume flow meter
01	3.500	[l/min]		[⁽¹⁾]	Maximum value analogue output
02	0.400	-		-	Damping of digital filters (Permanent period measurement)
		[S]		[S]	Gate time in seconds (Variant: TOR)
03	9999.	[l/min]		[⁽¹⁾]	Switch-on relay 1 ⁽²⁾
04	9999.	[l/min]		[⁽¹⁾]	Relay OFF phase value 1 ⁽²⁾
05	9999.	[l/min]		[⁽¹⁾]	Switch-on relay 2 ⁽²⁾
06	9999.	[l/min]		[⁽¹⁾]	Relay OFF phase value 2 ⁽²⁾
07	0000.				
	X _ _ _				Relay 2
					0 Flow
					1 1
	_ X _ _				Relay 1
					0 Flow
					1 Volume
	_ _ X _				Analogue output
					0 Flow
					1 Volume
	_ _ _ X				Display
					0 Flow
					1 Volume
08	0000.				
	X _ _ _				Analogue output
					0 0 - 20 mA
					1 4 - 20 mA
	_ X _ _				Analogue output
					0 Bipolar
					1 Unipolar
	_ _ X _				Error display
					0 Activated
					1 Blocked
	_ _ _ X				Count input (Flow meter)
					0 Two-channel
					1 One-channel

⁽¹⁾ As per the menu code number 07

⁽²⁾ If the input value is 9999., the relays are switched off.

7.4.2 Menu code 00

Pulse volume flow meter				
Flow meter	Impulse volume [cm ³ /Imp]	Input value Menu code 00		Flow meter version
		Display: l	Display: ml	
VC 0.025	0.025	0.025	25.00	Two-channel
VC 0.04	0.040	0.040	40.00	
VC 0.1	0.100	0.100	100.0	
VC 0.2	0.245	0.245	245.0	
VC 0.4	0.400	0.400	400.0	
VC 1	1.036	1.036	1036.	
VC 3	3.000	3.000	3000.	
VC 5	5.222	5.222	5222.	
VC 12	12.000	12.00	not possible	
VC 16	16.000	16.00	not possible	
VCA 0.04	0.040	0.040	40.00	One-channel
VCN 0.04	0.040	0.040	40.00	
VCA 0.2	0.200	0.200	200.0	
VCN 0.2	0.200	0.200	200.0	
VC 0.2 AL	0.245	0.245	245.0	Two-channel
VCA 2	2.000	2.000	2000.	One-channel
				Two-channel
VCA 5	5.222	5.222	5222.	One-channel
VCG 2	2.000	2.000	2000.	Two-channel
VCG 5	5.222	5.222	5222.	
VCL 0.1	0.100	0.100	100.0	
SVC 4	0.255	0.255	255.0	Two-channel
SVC 10	1.418	1.418	1418.	
SVC 40	5.130	5.130	5130.	
SVC 100	9.820	9.820	9820.	
SVC 250	18.25	18.25	not possible	
TM 0.275 - TM 4000	See rating plate/accompanying documents			One-channel

7.4.3 Menu code 01

The "Maximum value analogue output" function can only be set for devices in the "analogue output" version.

In menu code number 01 - "Maximum value analogue output", the maximum value is entered that corresponds to an output of 20 mA.

Example:

Maximum value analogue output: 3.500 l/min

If the flow is 3.500 litres/minute, 20 mA is shown on the display.

If the flow is 0.000 litres/minute, 0 mA or 4 mA are shown on the display.

(See also: Menu code 08 - Analogue output - 0: 0 - 20 mA / 1: 4 - 20 mA)

With an analogue output the flow measurement or volume measurement is freely selectable.

(Menu code 07 - Analogue output - 0: Flow / 1: Volume)

7.4.4 Menu code 02

Under Menu code 02 you can set the filter value or the gate time for the frequency measurement.

Permanent period measurement

Permanent period measurement allows very fast measurements. A digital filter makes smoothing possible where there are great fluctuations in flow, thus settling the display.

The larger the value entered, the greater the filter effect.

- Programming value 0.000 - no filter effect
- Programming value 9999. - maximum filter effect



Input signals smaller than 1 Hz are not processed.

Gate window measurement (Variant: TOR)

In the case of gate window measurement, the impulses are counted within a programmed gate window and converted to flow using the counter's impulse volume. The gate time measurement creates a steady display.

The smallest gate window that can be set is 0.1 seconds.

7.4.5 Menu code 03 - 06

Relay 1 is programmed in menu code number 03 (ON phase) and menu code number 04 (OFF phase). Relay 2 is programmed in menu code number 05 (ON phase) and menu code number 06 (OFF phase).

Possible switching functions:

Make-contact function

The contact is closed when the switch-on value is reached.

Example:

Switch-on relay: 2.500

Relay OFF phase value: 9999.

Entering 9999. in the OFF phase value has the consequence that only the ON phase value is evaluated.

Break-contact function

The contact is opened when the switch-off value is reached.

Example:

Switch-on relay: 0.000

Relay OFF phase value: 3.000

Entering 0.000. in the ON phase value has the consequence that only the OFF phase value is evaluated.

Window function

Example:

Switch-on relay: 2.500

Relay OFF phase value: 3.000

The relay contact switches in as soon as the On phase has been reached.
The relay contact switches off as soon as the OFF phase has been exceeded.

7.4.6 Menu code 07

The menu code number 07 includes several functions:

X _ _ _ - Relay 2

- 0: Flow
- 1: Volume

_ X _ _ - Relay 1

- 0: Flow
- 1: Volume

_ _ X _ - Analogue output

- 0: Flow
- 1: Volume

_ _ _ X - Display

- 0: Flow
- 1: Volume

7.4.7 Menu code 08

The menu code number 08 includes several functions:

X _ _ _ - Analogue output

- 0: 0 - 20 mA
- 1: 4 - 20 mA

_ X _ _ - Analogue output

- 0: Bipolar
- 1: Unipolar

_ _ X _ - Error display (for two-channel operation)

- 0: Activated
- 1: Blocked

_ _ _ X - Count input

- 0: Two-channel
- 1: One-channel

If the unit is operated with a flow meter that has two sensors, it is referred to as two-channel sampling.

If the unit is operated with a flow meter that has one sensor, it is referred to as single-channel sampling.

See [section 7.4.2 "Menu code 00"](#)

In two-channel flow meters, the correct pulse sequence of the channels can be monitored. False pulses are not counted so they do not change the volume measurement.

If the unit detects a fault, "FAUL" appears in the display.



Switch-off of error display

The error display can be switched off.

Menu code 08 - Count input

- 0 - Two-channel = Release error display
- 1 - One-channel = Block of error display

8 Maintenance

The device is maintenance-free.

9 Repairs

9.1 Safety instructions for repair



WARNING

Exposed electrical components!

Supply voltage 120 V AC / 230 V AC

1. Follow the special safety regulations during all work on electrical installations.
2. Only allow electricians to work on electrical systems.
3. Only use connection lines that are resistant to ambient influences and media.



WARNING

Malfunction!

Risk of injury due to operating mistakes or failure of the unit when controlling plants or process sequences.

1. Suitable safety precautions must be taken when the device is used.
2. In case of a fault or change of the operating behaviour, put the unit out of service.

9.2 General

The repairs covers:

1. Troubleshooting
Determination of damage, pinpointing and localisation of the damage cause.
2. Elimination of damage
Elimination of the primary causes and replacement or repair of defective components. The repair is generally made by the manufacturer.

Repairs by manufacturer

- Before returning the device, fill in the *return notification* form. The form can be filled in online and is available as a pdf file download.



Barriers and instructions

All barriers and warning signs removed during this must be attached to their original position on completing maintenance and/or repairs.

9.3 Detecting and eliminating failures

Failure		Potential causes	Possible measures
1.1	LED display <i>No LED display illuminates</i>	Power failure	Check the supply cable
			Check the fuses
		Unit defective	To be fixed/replaced by manufacturer
1.2	LED display <i>FAUL</i>	Incorrect programming	Check programming (08 - Count input)
		Sensor on flow meter defective	See operating instructions: Associated flowmeter
In case of unidentified faults, request help from the manufacturer or return the unit to the manufacturer for inspection.			