Flow Measurement

KRACHT®

- Gear Pumps
- Flow Measurement
- Hydraulics
- Valves

Electronics

SD 1, AS 8, ASR 14, ASR 30



KRACHT®

Your fluid solution partner

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SD 1 / SD 1 service – General information

View SD 1



Function

- The plug-in display SD 1 is a universal, on-site display for all volume counter systems made by KRACHT that are fitted with a plug connection in accordance with DIN 43650.
- The display is simply inserted between the plug and the plug base of the volume counter. Either the flow or the volume can be displayed. For external downstream processing, the same square-wave signals are available that are used by standard counters.
- The plug-on display can be retrofitted to existing volume counters. To do this, remove the amplifier board in the plug of the existing volume counter.
- The plug-on display is freely programmable. Setting is done via two buttons. The programmed data are stored in an EEPROM so they are retained even in the event of a power failure.
- The plug-on display is optionally available with a flow/volume proportional power outlet (0 … 20 mA, 4 … 20 mA) or two programmable relay contacts. In this case there are no square-wave signals.

View SD 1 service



Function and product characteristics

- The SD 1 service display is a universal, on-site display for all KRACHT flow measuring equipment with DIN 43650-type plug connection.
- The display is simply plugged onto the plug base of the flow meter.
- The SD 1 and the sensors of the volume counter are powered by the battery pack.
- There is no need for a separate power supply.
- If the battery packs are empty, the unit can be operated and recharged using the included charger.
- The pulse volume is freely selectable.
- Programming is done with two buttons
- The set data are stored in an FRAM, and are thus retained even if the batteries are empty.
- The battery pack allows for service times of approx. 30 hours without recharging.

SD 1 / SD 1 service – Technical data

SD 1

Power adapter	
Power supply	18 VDC … 28 VDC optional 10 … 19 VDC
Max. power consumption	approx. 120 mA
General data	
Display	Principle 7-segment LED, 7.62 mm, red Display 0.000 … 9999 with floating point Overflow (> 9999): Display 9999
Keyboard	Two buttons behind front panel
Housing material	Aluminium
Dimensions	Height without plug approx. 35 mm, width approx. 60 mm, depth approx. 60 mm
Protection (DIN 40050)	IP 65
Weight	approx. 0.12 kg
Connections	Angle plug DIN 43650 (4-pin), reverse polarity protected
Analogue output (optional)	Power outlet (optional) 0 … 20 mA, 4 … 20 mA Apparent resistance≤ 250 ohm, with 18 … 28 VDC supply Apparent resistance≤ 50 ohm, with 10 VDC supply Resolution 10 bit, short-circuit proof
Pulse output	Incremental signal
Pulse amplitude	approx. 0.8 x supply voltage, load-dependant
Pulse with symmetric output signal	Square-wave, duty factor per channel: 1:1, ± 15%
Pulse offset between channels	90°, ± 30°
Output power per channel	0.3 W max., short circuit-proof
Ambient conditions	
Operating temperature	0 … 60 °C
Storage temperature	-25 … 85 °C

SD 1 service

Power supply	
Battery pack	6 VDC
Service life	approx. 30 hours
Charger	
Input voltage	230 VAC
Charging voltage	max. 700 mA
Charging time	approx. 4 hours
General data	
Display	Principle: 7-segment LED, 7.62 mm, red Display 0.000 … 9999 with floating point Overflow (> 9999): Display 9999
Keyboard	Two front-panel mounted buttons
Housing material	Aluminium
Dimensions	Height without plug approx. 35 mm, width approx. 60 mm, depth approx. 60 mm
Protection type (DIN 40050)	IP 65
Weight	approx. 0.46 kg
Connections	Angle plug DIN 43650 (4-pin), reverse polarity protected
Ambient conditions	
Operating temperature	0 … 60 °C
Storage temperature	-10 … 85 °C

SD 1 – Type key / Dimensions / Electrical connection

Example

SD 1	R	24	/	V
1	2	3		4

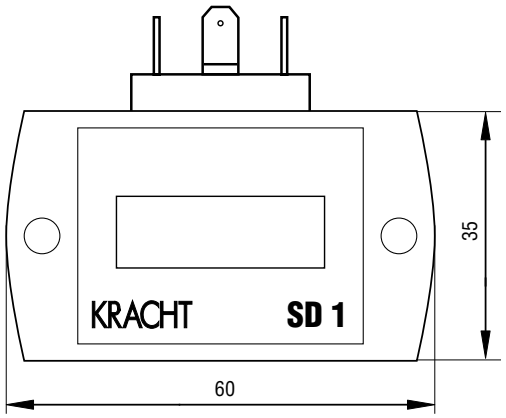
1 Product name

2 output signal	
R	Square-wave signal (incremental signal)
I	Power outlet 0 … 20 mA, 4 … 20 mA
K	Two relay contacts 24 VDC / 1A

3 Supply voltage	
24	24 VDC
12	12 VDC

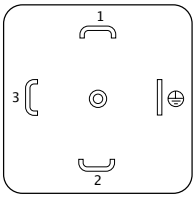
4 Design version	
	Flow measurement
V	Volume measurement

Dimensions



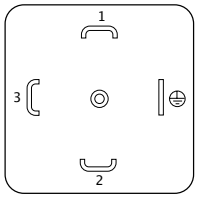
Electrical connection

Version: K



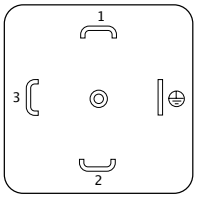
PIN 1 = 12/24 VDC
PIN 2 = GND
PIN 3 = Relay 1
PIN ⏚ = Relay 2

Version: I



PIN 1 = 12/24 VDC
PIN 2 = GND
PIN 3 = 0/4-20 mA
PIN ⏚ = –

Version: R

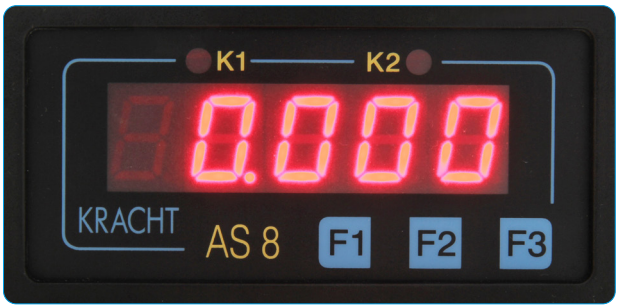


PIN 1 = 12/24 VDC
PIN 2 = GND
PIN 3 = channel 1
PIN ⏚ = channel 2

The /V = volume measurement version has sum clearance on pin ….⏚

AS 8 – General information

View



View: AS 8 with membrane keyboard.
The AS 8 is also available with keys behind the front panel.

Function

- The AS 8 processes incremental input signals produced by KRACHT volume counters and other detectors.
- The input signals are filtered in the unit, converted, and computed into the physical sizes of flow rate or volumes.
- Either the flow or the volume can be displayed.
- Two relays, an analogue output or a serial interface are available for external downstream processing.
- The AS 8 is optionally available with a membrane keyboard, removing the need to take off the front panel to modify the settings.

Product characteristics

- EMC-compliant design (electromagnetic tolerance)
- Programmable control unit
- Application for KRACHT volume counters and other transducers with 24 V incremental signals.
- Supply voltage
  230/120 V-50/60 Hz, 24 VDC, 12 VDC
- Integrated power supply 24 VDC – 50 mA
- Flow and volume measurement
- Digital filters for smoothing
- Two programmable relays
- Selectable analogue output
  Power: ± 20 mA
  0 … 20 mA
  4 … 20 mA
  Voltage: ± 10 V
  0 … 10 V
- Serial interface RS 232
- Selectable time base (s, min, h)
- Selectable units to be displayed
- Installation device with DIN dimensions
  Option: tabletop device or 19” slot

AS 8 – Technical data

Supply	230 VAC, + 6% … – 10% / 50 – 60 Hz, optionally 120 VAC, 24 VDC, 12 VDC
Power consumption	approx. 3.5 W
Sensor supply	24 VDC ± 20%, 50 mA
General data	
Display	Principle: 7-segment LED, 13.2 mm, red Display: 0,000 … 9999 with floating point Overflow (> 9999): Display 9999 Overflow (> -9999): Display -9999 Status indicator: LEDs K1 and K2 for Relays 1 and 2
Keyboard	three buttons behind front panel; optional membrane keyboard
Housing	Switch panel installation housing, plastic
Front frame	96 x 48 mm, DIN 43700
Installation depth	approx. 122 mm with connector strip
Panel cut-out	92 x 45 mm, tol. +0.8 x +0,6 mm
Protection type (DIN 40050)	IP 54 with proper switch panel assembly
Weight	approx. 0.4 kg
Connections	15-pin screw terminal block
2 relay contacts	each with 1 shut-off element, 24 V / 1 A, typ. cycle time 6 ms
2 digital inputs	
Input impedance	≥ 7500 ohm
Input amplitude	min. ≤ 9 Volt, max. ≥ 12 Volt
Cycle time	typ. 1 ms
1 analogue output	Can be set to voltage output or current output with jumper
Voltage output or current output	± 10 Volt, 0 … 10 Volt, 2 … 10 Volt / apparent resistance ≥ 1 kohm, resolution10 Bit, short-circuit protected ± 20 mA, 0 … 20 mA, 4 … 20 mA / apparent resistance ≤ 250 ohm, resolution 10 bit, short-circuit proof
1 volume counter input	
Input impedance	≥ 7500 ohm
Input amplitude	low ≤ 9 Volt, high ≥ 12 Volt
Flow measurement principle	Period measurement (rising flank) / gate window measurement on request
Maximum input frequency	1 Hz … 2500 Hz
Measuring range of totaliser	2 x 10^9 Pulse
Serial interface	
RS 232	Cable length ≤ 15 m
Input voltage	max. ± 30 V
Input current	typ. ± 3 mA with ± 9 V input voltage
Output voltage	typ. ± 3 mA
Setting	9600 baud, 8 bit, no parity, 1 stop bit
Cable	Recommended: shielded data line
Ambient conditions	
Operating temperature	0 … 60°C
Storage temperature	-25 … 85°C

AS 8 – Type key

Example

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

1 Product name

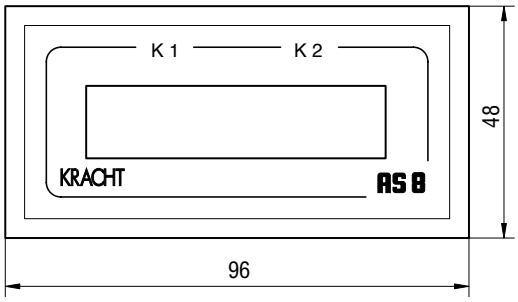
2 Output signal	
U	Voltage ± 10 V
I	Current ± 20 mA
RS	Serial interface RS 232
O	without analogue output (RS 232 available) only with 12 and 24 Volt

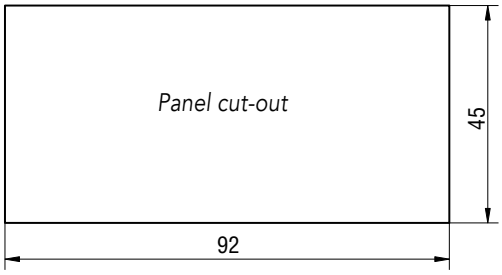
3 Supply voltage	
230	230 V – 50/60 Hz
120	120 V – 50/60 Hz
24	24 VDC
12	12 VDC

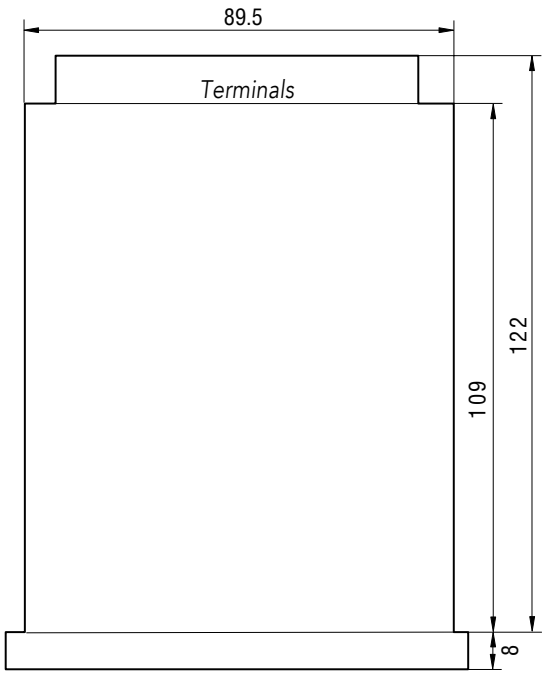
4 Versions	
	Standard (flow and volume measurement)
RP	flow controller
DOS	dosing programme
ZM	cylinder stroke measurement
A2F	flow and sum display
D2F	flow and difference display
D2C	volume and difference display
VA	ratio display
V2F	flow and ratio display
PUR	flow and ratio display, ratio control
FM20	flow display switchable to all KRACHT volume counters
SIM	Simulator for volume counter

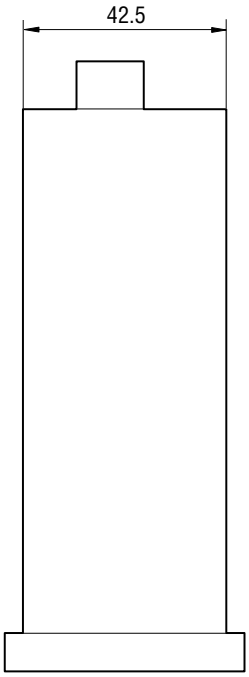
5 Keyboard	
	keys behind front panel
F	with membrane keyboard

AS 8 – Dimensions





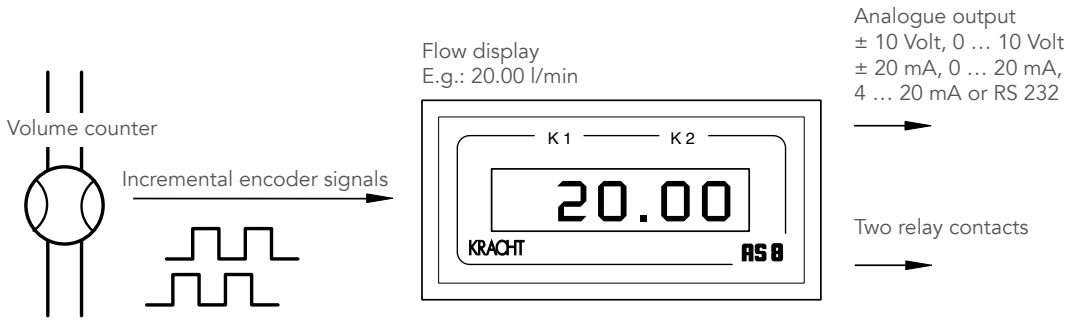




Dimensions in mm

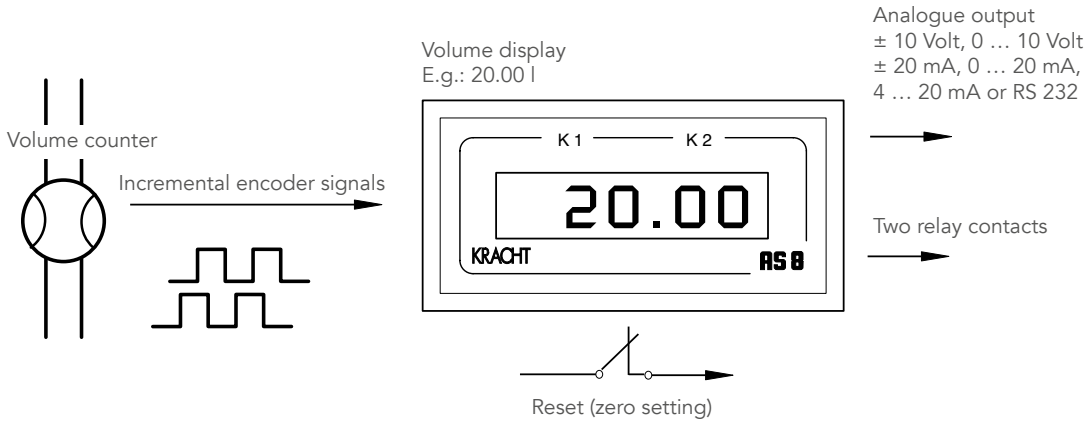
AS 8 – Standard

Flow measurement



Flow display
- The incremental input signals are filtered, converted and calculated into the dimension "flow".
- Selectable display units are the physical dimensions l/h, l/min, l/s, or Usgal/h, Usgal/min, Usgal/s.

Volume measurement



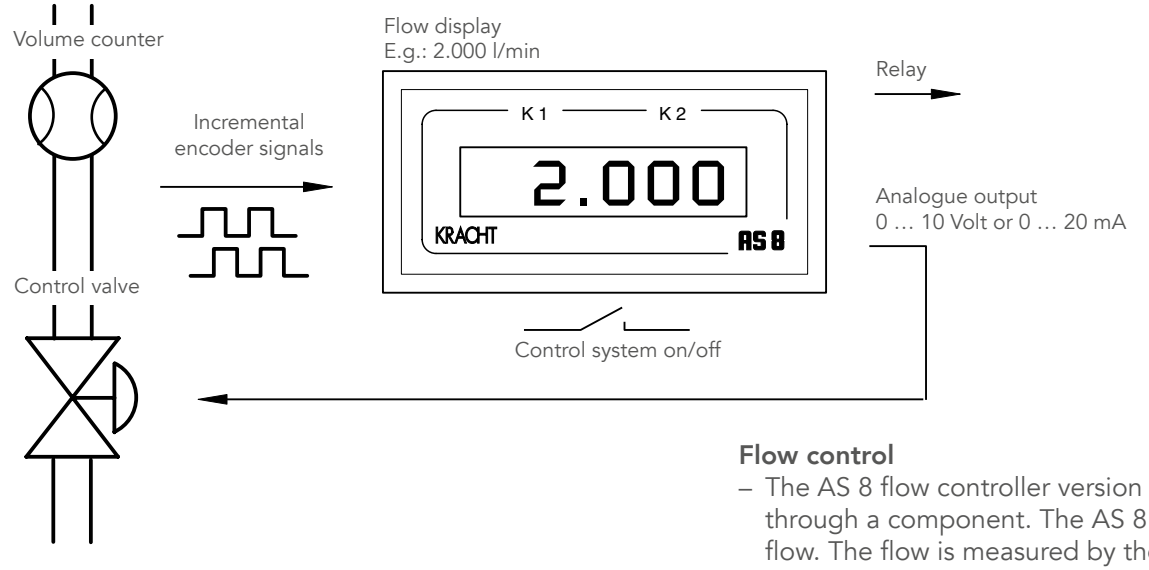
Volume display
- The incremental input signals are added and calculated with a programmable factor to produce the dimension "volume".
- Selectable display units are the physical dimensions l and Usgal.
- A 24 Volt digital input allows for the sum to be reset to zero.

Functional characteristics

- The standard-version AS 8 is a display and control unit for dynamic flow and volume measurement. Setting is done with three buttons which are accessible when the front panel is removed, or with the membrane keyboard (design variant F).
- Toggling between display units is done with the dip switch. The dip switch is located behind the front panel.
- Two programmable relays, an analogue output or a RS 232 serial interface are available for external downstream processing.
- The integrated 24 VDS supply allows for a direct connection of the volume counter.
- The measuring instrument of the AS 8 type series are available as switch panel installation units, tabletop units or 19" plug-in units.

AS 8 – RP

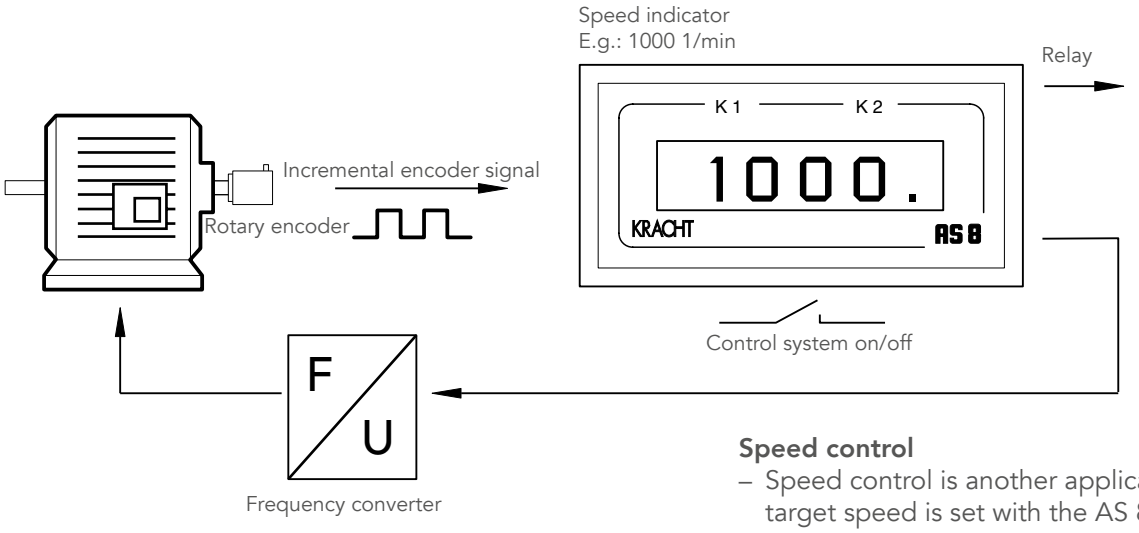
Flow control



Flow control

- The AS 8 flow controller version controls the flow through a component. The AS 8 is set to the target flow. The flow is measured by the volume counter and delivered to the AS 8 as a square-wave signal.
- The control unit output is connected to a steady valve via a regulating transformer or controls the speed of a transfer pump.

Speed control



Speed control

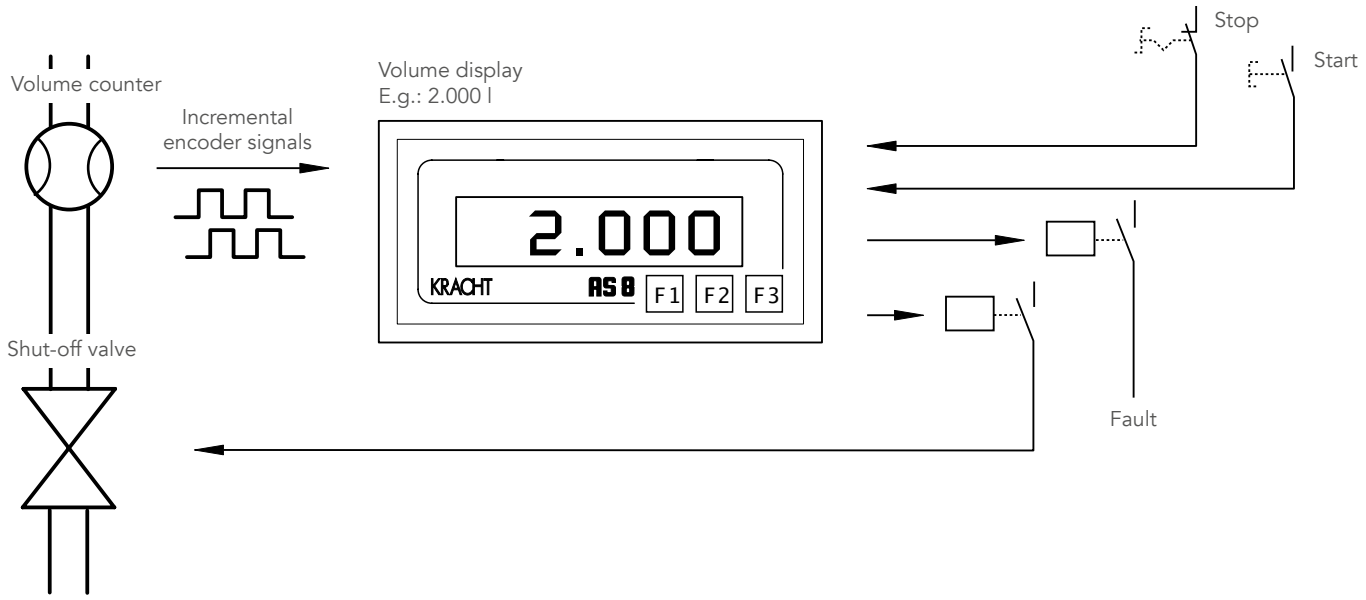
- Speed control is another application example. The target speed is set with the AS 8. The actual speed is measured by the rotary encoder and delivered to the AS 8 as a square-wave signal.
- The control unit output is connected with the motor via a frequency converter to control speed.

Functional characteristics

- Two relay contact enable signalling when the permissible error tolerances are exceeded.
- Programming and adjustment is done via three buttons that are accessible after removing the front panel. For the "membrane keyboard version" there is no need to remove the front panel.
- The integrated 24 VDS encoder supply allows for a direct connection of the volume counter.
- The measuring instruments of the AS 8 type series are available as switch panel installation units, table-top units or 19” plug-in units.

AS 8 – DOS

Dosing

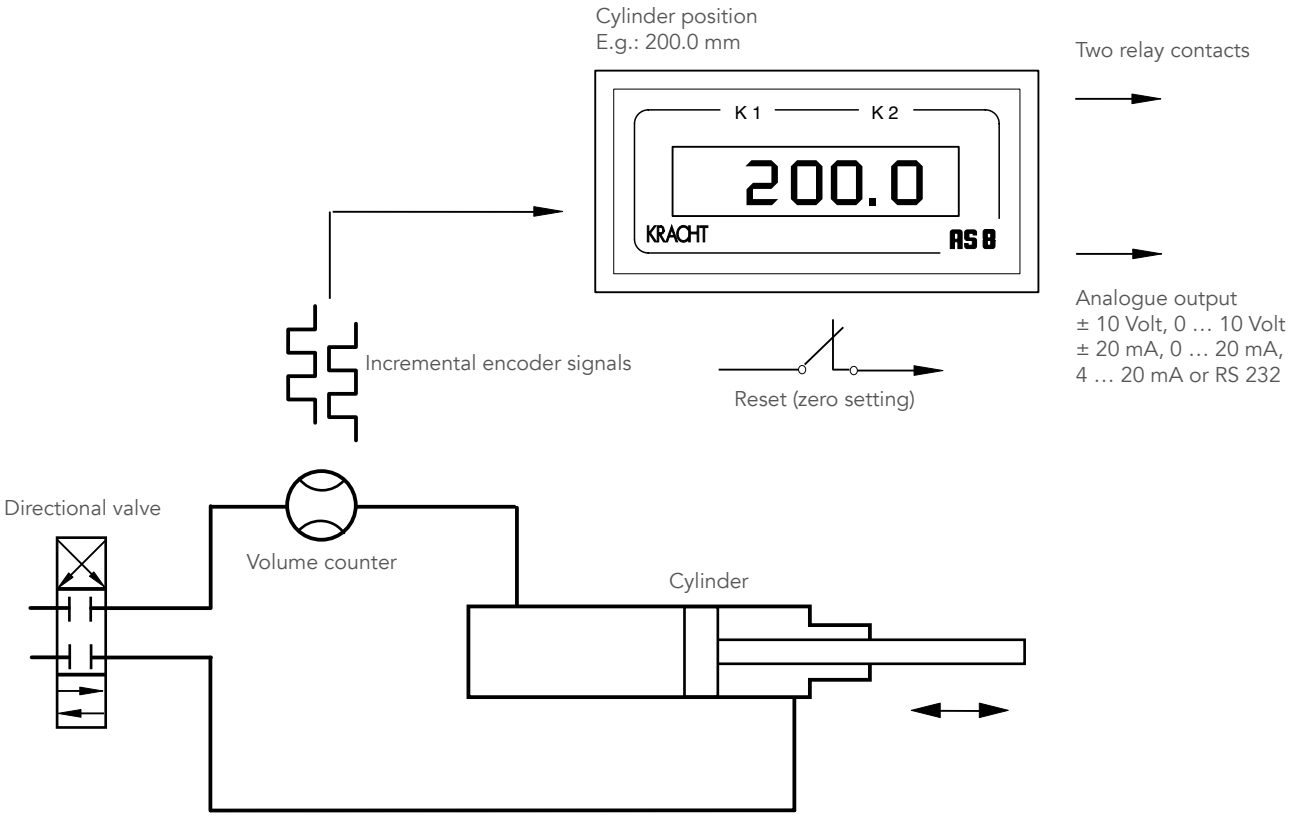


Functional characteristics

- The AS 8 version DOS is tailored to dosing equipment needs and offers standardised dosing functions for a plethora of applications. The programme version DOS can be connected to a volume counter to form a dosing circuit.
- Six dosing quantities (programmes) can be entered. The dosing quantities can be queried via the membrane keyboard.
- The dosing process is initiated via the digital input Start. The AS 8 sets the last filling quantity to zero and actuate the dosing valve. Volume flow is measured by the volume counter and delivered to the AS 8 as a square-wave signal. The AS 8 totalises the input signals. The dosing valve is switches off once the target quantity has been delivered.
- A second relay contact provides fault signalling capabilities.
- Programming and adjustment is done via the three buttons of the membrane keyboard. The input value are arranged into menus.
- The integrated 24 VDS encoder supply allows for a direct connection of the volume counter.
- The measuring instruments of the AS 8 type series are available as switch panel installation units, tabletop units or 19" plug-in units.

AS 8 – ZM

Cylinder stroke measurement

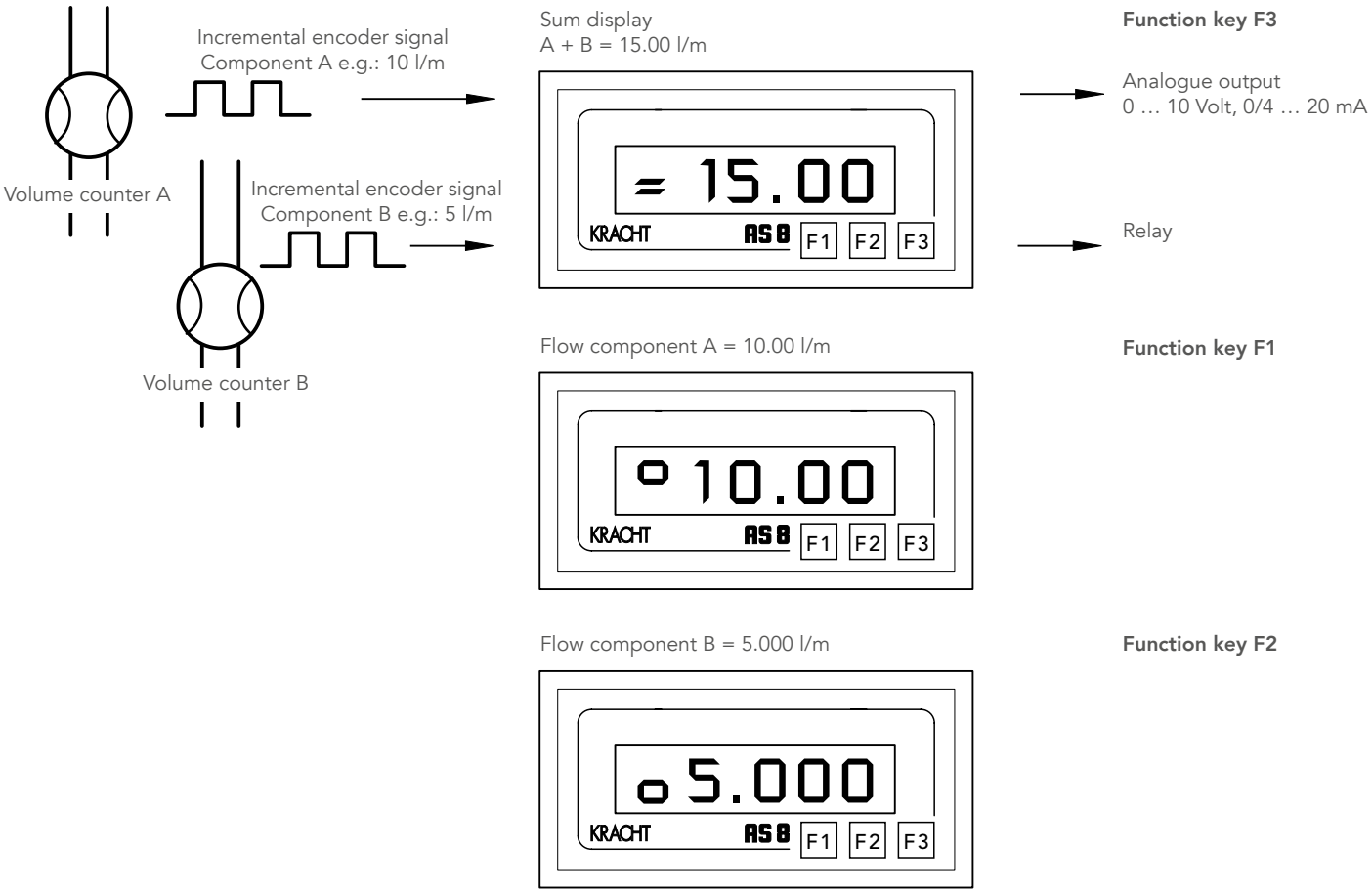


Functional characteristics

- In connection with a volume counter, the AS 8 - cylinder stroke measurement version enables indirect measurement of hydraulic drive movements. For this purpose, a control line-mounted volume counter generates pulses proportionally to the flow and displays the direction of flow.
- The electric pulses are computed into the physical dimensions flow and volume or path and velocity. Incorrect measurements caused by end position leaks can be prevented with a programmable trap frequency. Pulses are not processed until the flow exceeds the trap frequency.
- Two relays, an analogue output or a RS 232 serial interface are available for external downstream processing.
- Programming and adjustment is done via three buttons that are accessible after removing the front panel. For the "membrane keyboard" version, there is no need to remove the front panel.
- The integrated 24 VDS encoder supply allows for a direct connection of the volume counter.
- The measuring instruments of the AS 8 type series are available as switch panel installation units, table-top units or 19” plug-in units.

AS 8 – A2F

Flow and sum measurement

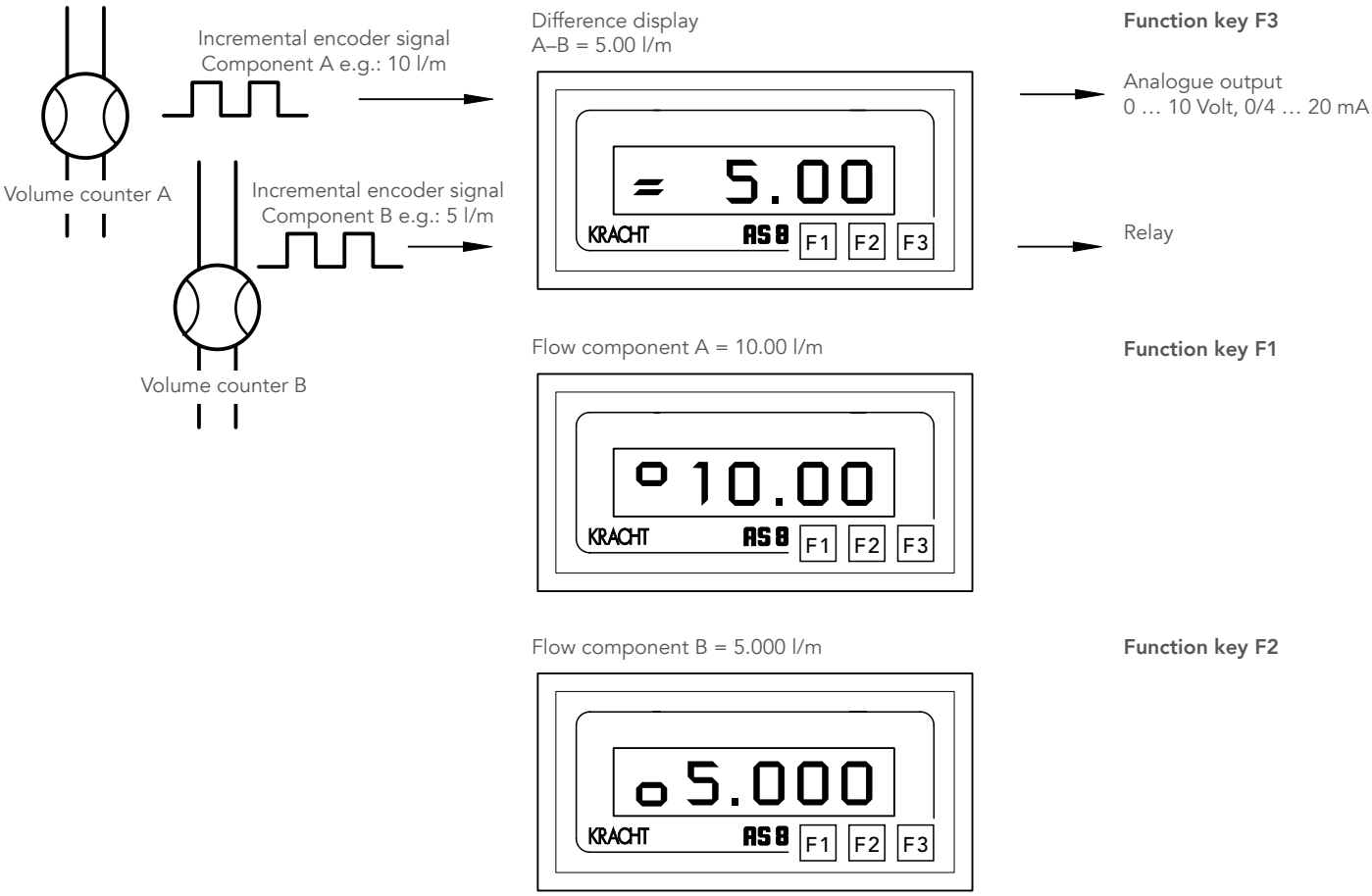


Functional characteristics

- The version AS 8 - A2F can be connected to two volume counters and displays the flow of components A and B as well as the sum A+B.
- Toggling between display values is done with the function keys F1, F2 and F3.
- A density factor can be set for each volume counter to enable density computation for mass determination.
- A square-wave signal is required from each volume counter. The input signals are filtered, converted and computed into the flow of component A, component B and sum A+B.
- Programming and adjustment is done via the three buttons of the membrane keyboard. The input values are arranged into menus.
- Two relays and an analogue output are available for external downstream processing.
- The integrated 24 VDS encoder supply allows for a direct connection of the volume counter.
- The measuring instruments of the AS 8 type series are available as switch panel installation units, tabletop units or 19" plug-in units.

AS 8 – D2F

Flow and difference measurement

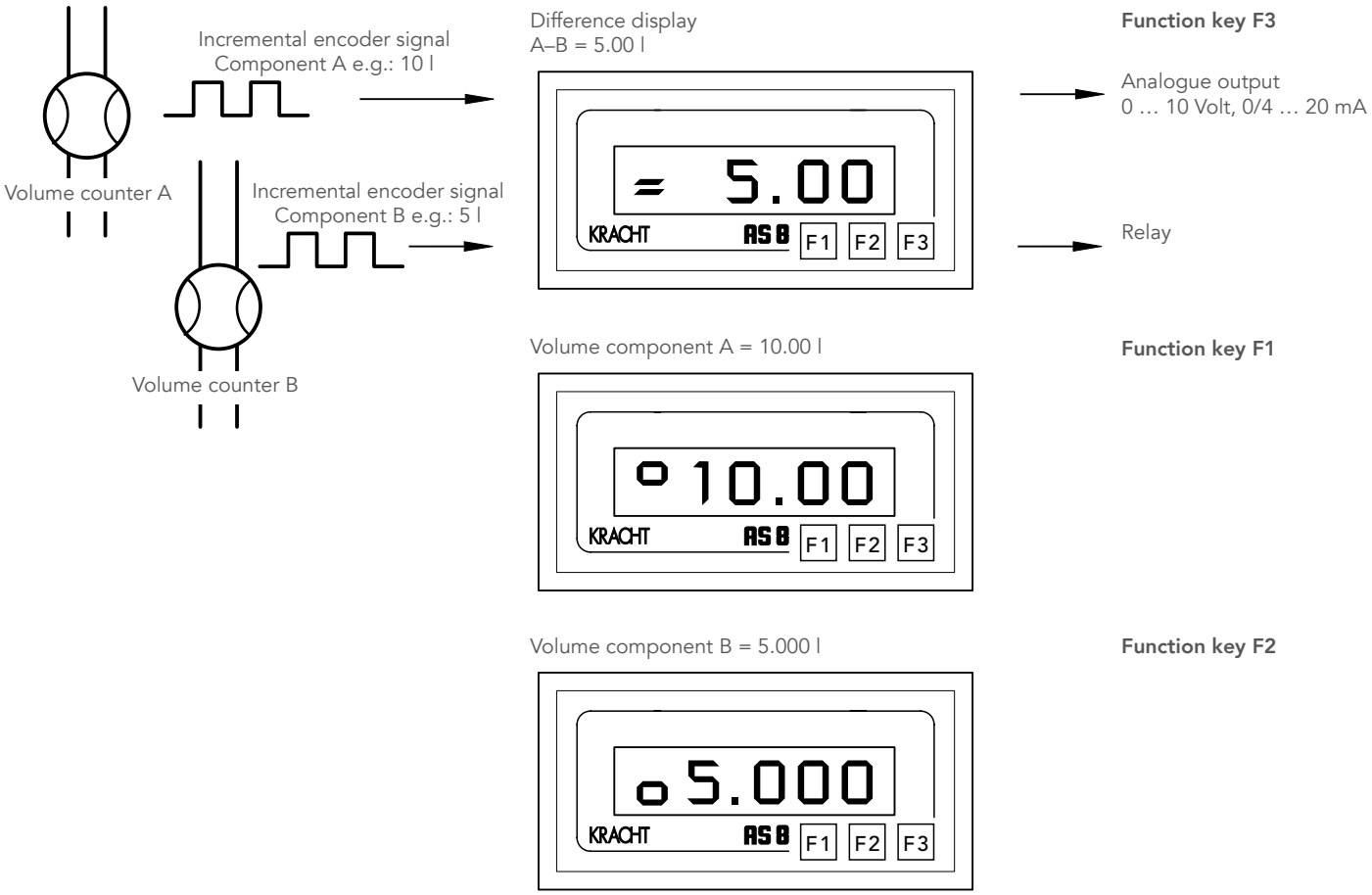


Functional characteristics

- The version AS 8 - A2F can be connected to two volume counters and displays the flow of components A and B as well as the difference A-B.
- Toggling between display values is done with the function keys F1, F2 and F3.
- A density factor can be set for each volume counter to enable density computation for mass determination.
- A square-wave signal is required from each volume counter. The input signals are filtered, converted and computed into the flow of component A, component B and difference A-B.
- Programming and adjustment is done via the three buttons of the membrane keyboard. The input values are arranged into menus.
- Two relays and an analogue output are available for external downstream processing.
- The integrated 24 VDS encoder supply allows for a direct connection of the volume counter.
- The measuring instruments of the AS 8 type series are available as switch panel installation units, tabletop units or 19" plug-in units.

AS 8 – D2C

Volume and difference measurement

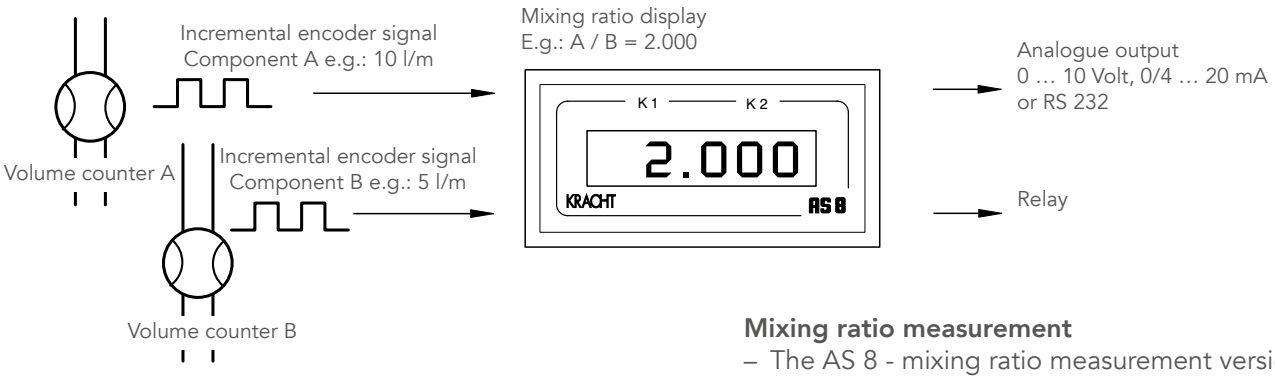


Functional characteristics

- The version AS 8 - D2C can be connected to two volume counters and displays the volume of components A and B as well as the difference A-B.
- Toggling between display values is done with the function keys F1, F2 and F3.
- A density factor can be set for each volume counter to enable density computation for mass determination.
- A square-wave signal is required from each volume counter. The input signals are filtered, converted and computed into the volume of component A, component B and difference A-B.
- Programming and adjustment is done via the three buttons of the membrane keyboard. The input values are arranged into menus.
- Two relays and an analogue output are available for external downstream processing.
- The integrated 24 VDS encoder supply allows for a direct connection of the volume counter.
- The measuring instruments of the AS 8 type series are available as switch panel installation units, tabletop units or 19" plug-in units.

AS 8 – VA

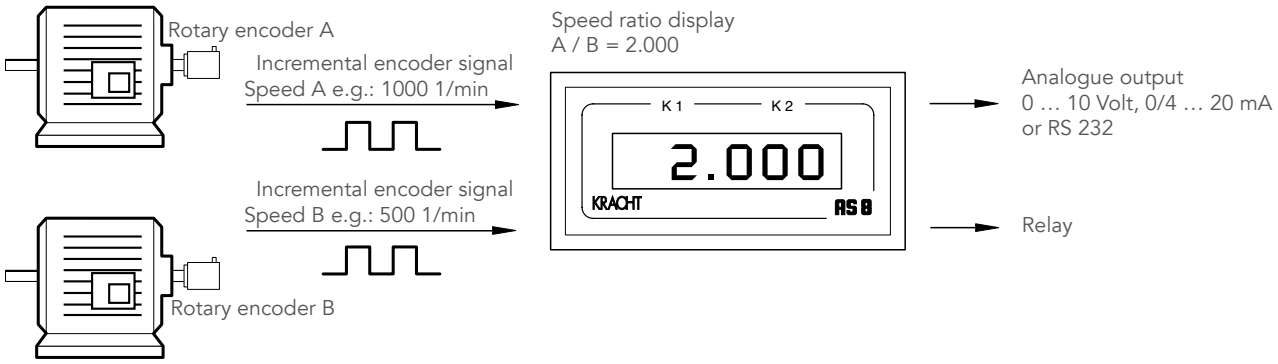
Mixing ratio measurement



Mixing ratio measurement

– The AS 8 - mixing ratio measurement version displays the mixing ratio between two components.
– A square-wave signal is required from each volume counter. The input signals are filtered, converted and computed into a mixing ratio.

Speed ratio measurement



Speed ratio measurement

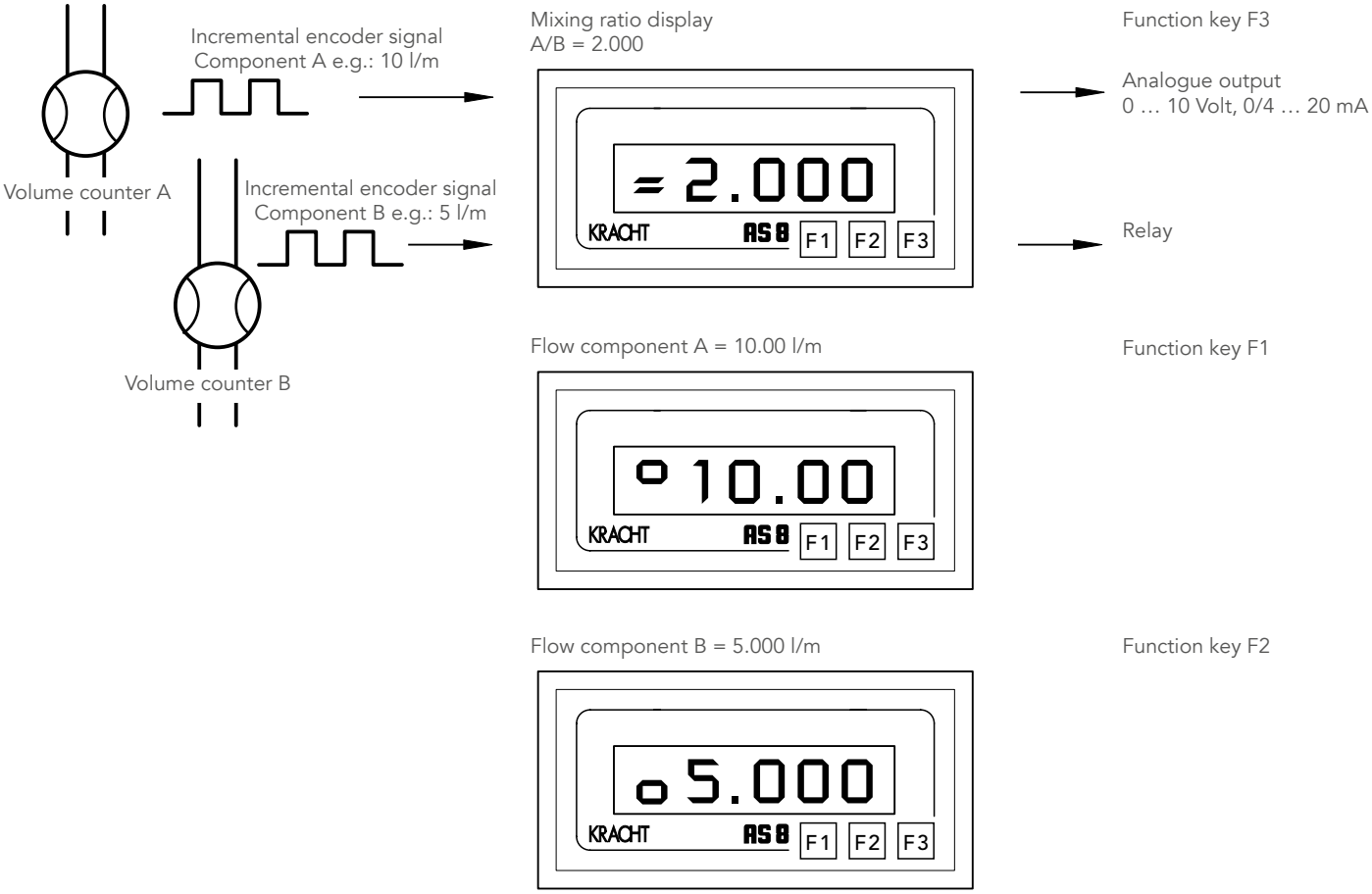
– Speed ratio measurement is another application example. The pulse sequences A and B from the rotary encoders are measured and displayed as speed ratio by the AS 8.

Functional characteristics

– Two programmable relays, an analogue output or a RS 232 serial interface are available for external downstream processing.
– Programming and adjustment is done via three buttons that are accessible after removing the front panel. For the "membrane keyboard" version, there is no need to remove the front panel.
– The integrated 24 VDS encoder supply allows for a direct connection of the volume counter.
– The measuring instruments of the AS 8 type series are available as switch panel installation units, table-top units or 19” plug-in units.

AS 8 – V2F

Flow and mixing ratio measurement

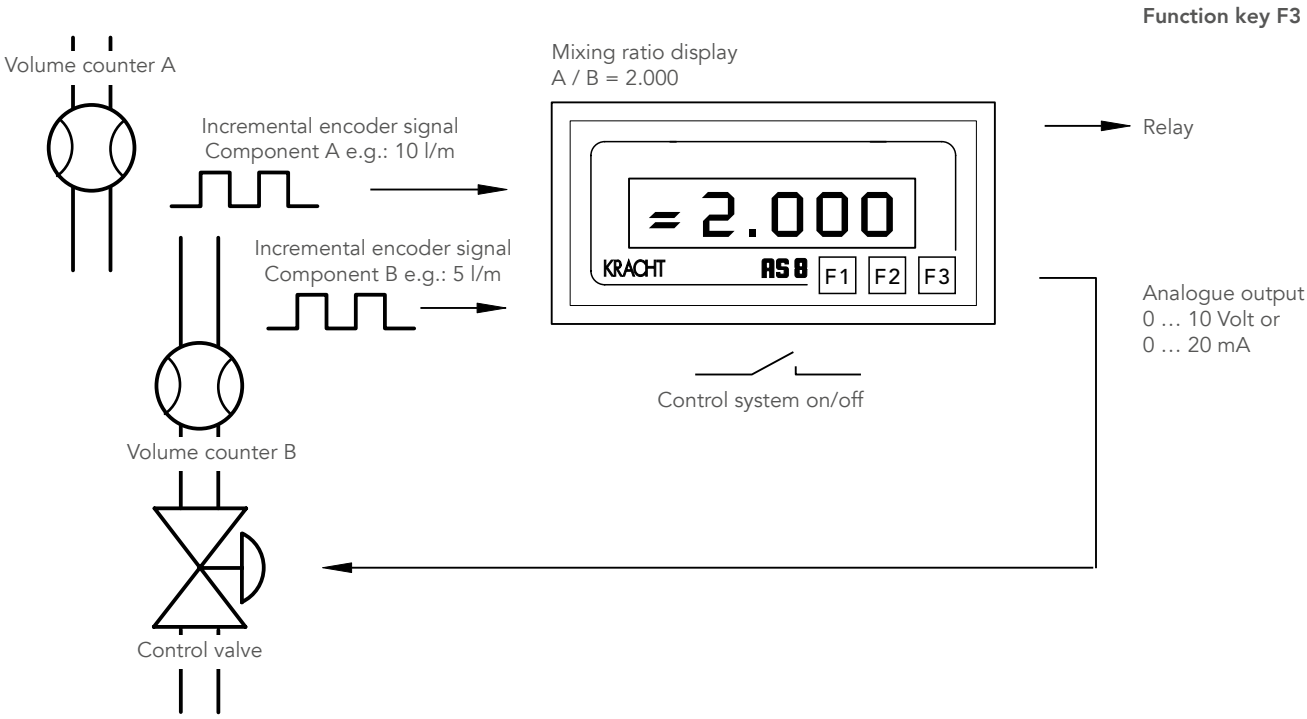


Functional characteristics

- The version AS 8 - V2F can be connected to two volume counters and displays the flow of components A and B as well as the mixing ratio A/B.
- Toggling between display values is done with the function keys F1, F2 and F3.
- A density factor can be set for each volume counter to enable density computation for mass determination.
- A square-wave signal is required from each volume counter. The input signals are filtered, converted and computed into the flow of component A, component B and mixing ration A/B.
- Programming and adjustment is done via the three buttons of the membrane keyboard. The input values are arranged into menus.
- Two relays and an analogue output are available for external downstream processing.
- The integrated 24 VDS encoder supply allows for a direct connection of the volume counter.
- The measuring instruments of the AS 8 type series are available as switch panel installation units, tabletop units or 19” plug-in units.

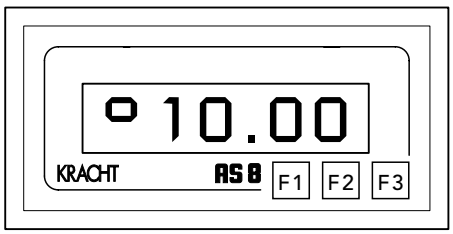
AS 8 – PUR

Flow and mixing ratio control



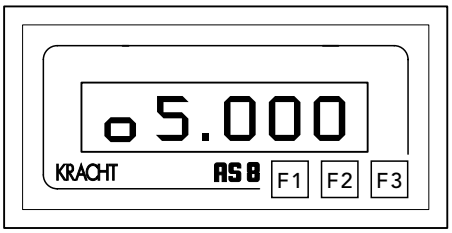
Function key F2

Flow component A = 10.00 l/m



Function key F1

Flow component B = 5.000 l/m



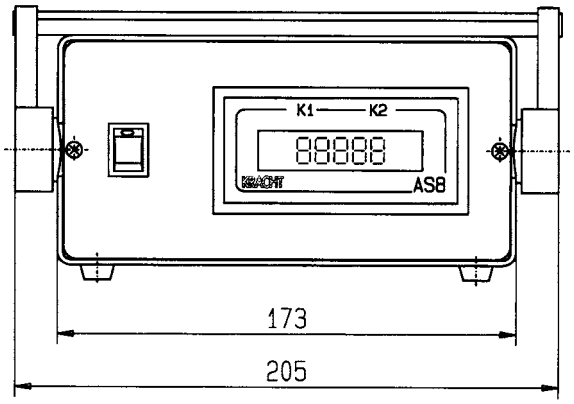
Functional characteristics

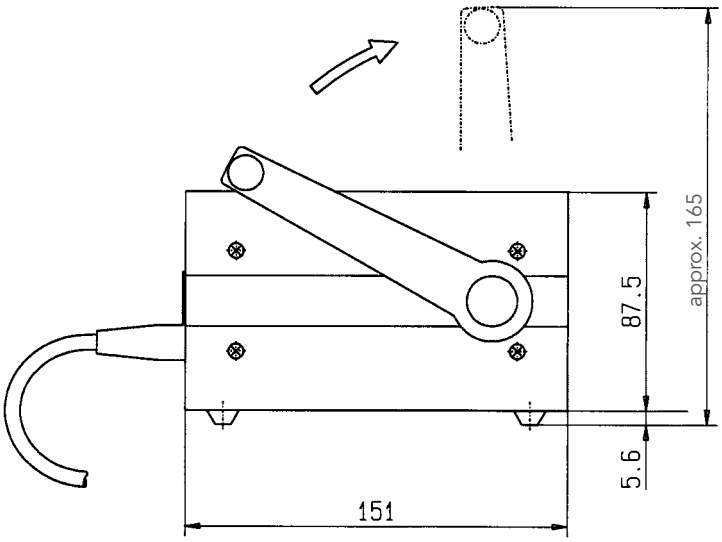
- The version AS 8-PUR controls the mixing ratio between two components and displays the flow of components A and B as well as the mixing ratio A/B.
- Toggling between display values is done with the function keys F1, F2 and F3.
- The target mixing ratio between the leading component A and component B are set with the AS 8. Volume flows are measured by the volume counters and delivered to the AS 8 as a square-wave signal. The input signals are filtered, converted and computed into the flow of component A, component B and mixing ration A/B. The control unit output is connected to a steady valve via a regulating transformer or controls the speed of a transfer pump.
- Two relay contact enable signalling when the permissible error tolerances are exceeded.
- Programming and adjustment is done via the three buttons of the membrane keyboard. The input values are arranged into menus.
- The integrated 24 VDS encoder supply allows for a direct connection of the volume counter.
- The measuring instruments of the AS 8 type series are available as switch panel installation units, tabletop units or 19" plug-in units.

Table-housing AS 8 – dimensions

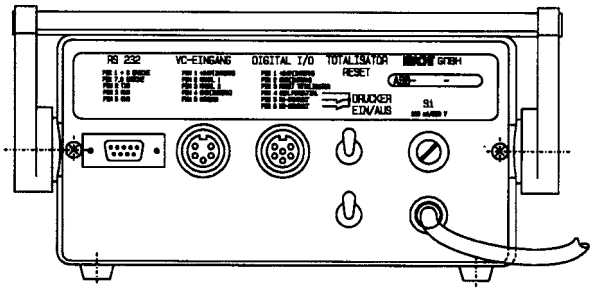
Table housings with analogue output or serial interface are available.

Front view

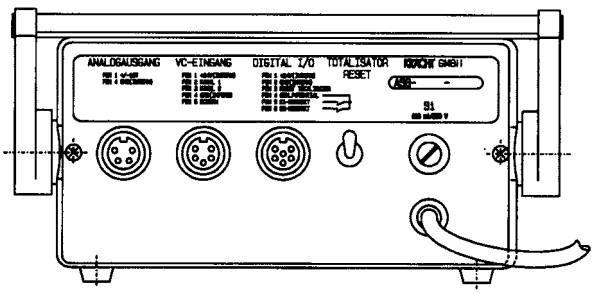




Rear view with RS 232



Rear view with analogue output



Dimensions in mm

ASR 14 – Function and product characteristics

View



Function

- The ASR 14 integrates control, operation and visualisation functions.
- The ASR 14 processes signals from incremental encoders.
- A Can-bus interface allows for connection of further input/output channels.
- The programming of the ASR 14 can be optimised to match to the respective application.
- Ideal for controlling filling processes (e.g., gearbox oil filling).

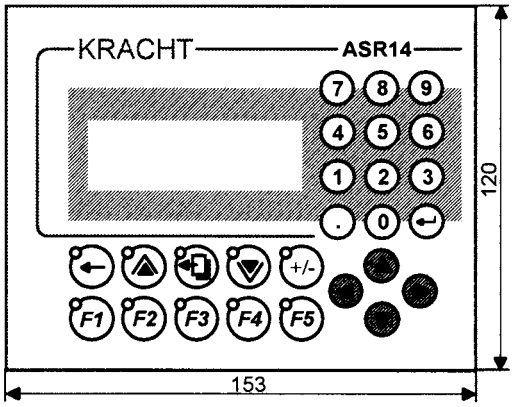
Product characteristics

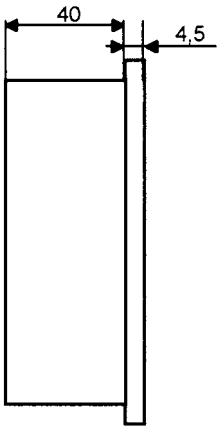
- Backlit LC display with 4 x 20 characters.
- Application for KRACHT flow meters and other transducers with 24 V incremental signals.
- Supply voltage 24 V DC.
- 16 digital inputs including 2 counter inputs, single-channel or 1 counter input, dual-channel.
- 16 digital outputs.
- Flow or volume measurement.
- With RS232 interface.
- With CAN-bus interface.

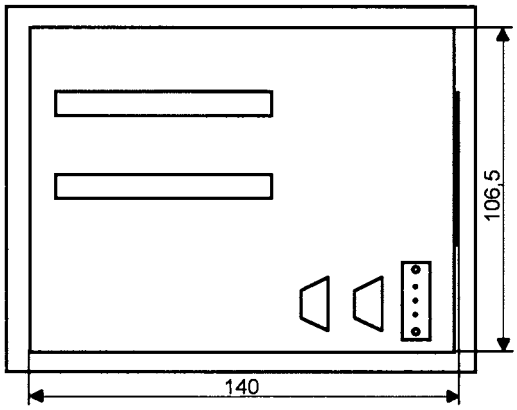
ASR 14 – Technical specifications

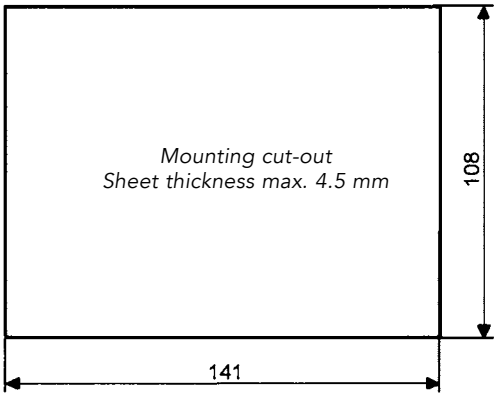
Power adapter	
Supply	24 V DC
Power consumption	max. 6 W
General data	
Display	LC display, black/white, 4 x 20 characters, backlight
Keyboard	26 function keys (10 with LED)
Housing	Switching panel rack
Front frame	153 x 120 x 46.1 mm (W x H x D)
Installation depth	41.6 mm
Panel cut-out	141 x 108 mm
Protection type	IP 65 (front side)
Weight	approx. 0.5 kg
Operating conditions	
Ambient temperature	0 … 50 °C
Operating humidity	10 … 90 % (no condensation)
Storage temperature	-20 … 60 °C
Storage humidity	5 … 95 % (no condensation)
Inputs/outputs	
Digital inputs	16, including 2 counter inputs, single-channel or 1 counter input, dual-channel
Input voltage	24 V DC
Input current at 24 V	approx. 10 mA
Digital outputs	16
Switching voltage	24 V DC
Output voltage	0.5 A
Interfaces	
Type 1	RS232
Version	9-pin DSUB plug
Electric isolation	No
Max. baud rate	115.2 kbit/s
Type 2	CAN bus
Version	9-pin DSUB plug
Electric isolation	Yes

ASR 14 – Dimensions





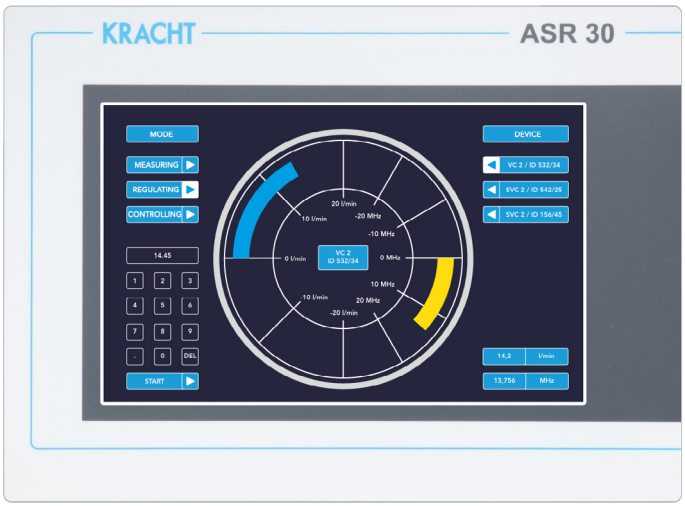




Dimensions in mm

ASR 30 – Function and product characteristics

View



Function

- The ASR 30 is a control unit which is operated via touch screen. The unit can be extended with manual control units to accommodate a great number of different fluidic applications.
- The ASR 30 processes signals from incremental encoders.
- Standardised programmes are available for different applications.
- The number of inputs and outputs can be adapted to special applications.
- Transistor outputs, analogue outputs and various bus systems are available for external downstream processing.
- The computed values can be presented as diagrams on a website.
- Several displays and/or PCs or tablets can be used for operation.

Product characteristics

- Application for KRACHT flow meters and other transducers with 24 V incremental signals.
- Up to 250 expansion modules can be connected.
- Analogue inputs enable the connection of pressure transducers, temperature sensors and similar detectors.
- The internal voltage is monitored for over- and undervoltage.
- The input signals are filtered and converted in the device and calculated to the corresponding physical values.

Extension modules

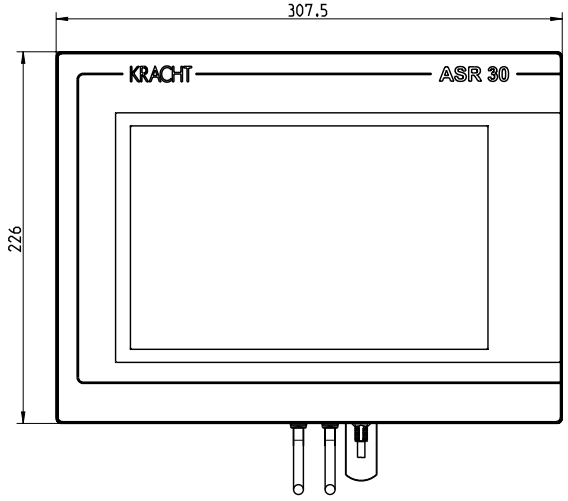
- Digital signal processing modules
- IO-Link
- Counter card for input frequencies of up to 300 kHz 24V DC
- Digital In / Out
- Analogue In / Out
- Bus modules
  - CANopen
  - DeviceNet
  - PROFIBUS
  - CAN
  - POWERLINK
  - Modbus
  - EtherNet
  - OPC UA
  - PROFINET
  - EtherCAT

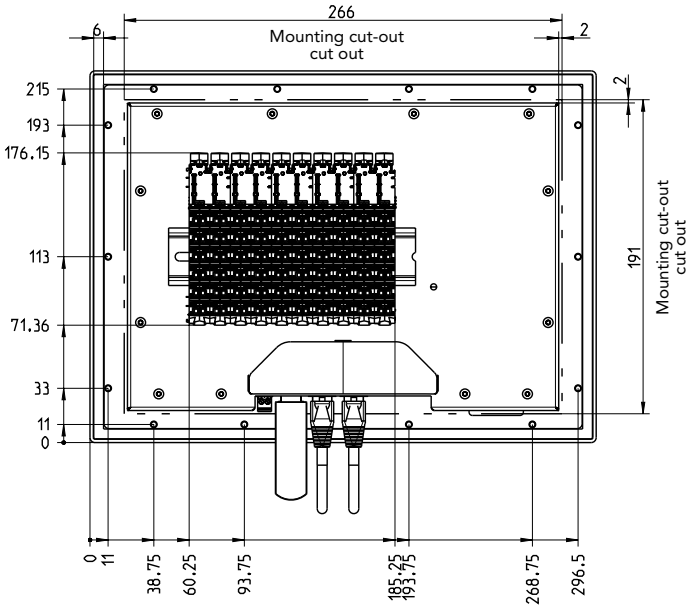
Further modules on request.

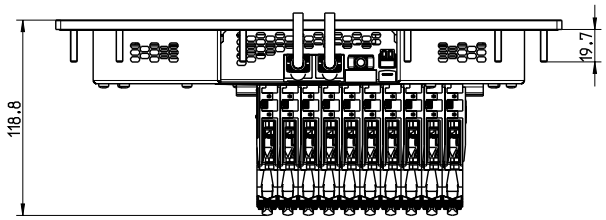
ASR 30 – Technical data

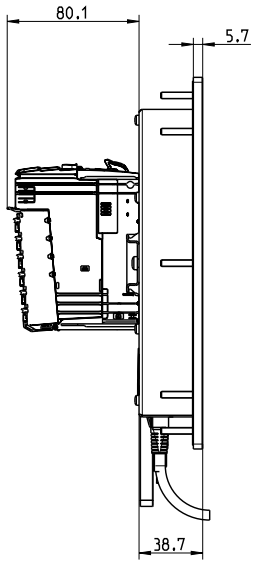
Power adapter	
Supply	24 VDC -15% / +25%
Power consumption	2.9 W CPU + 16 W display
General data	
Display	10.1" WXGA-TFT display (1280 x 800 pixels), 16.7 million colours, TFT Multitouch, backlighted, LED, typ. 500 cd/m²
Protection type	IP65 front, IP20 rear
Weight	approx. 1.3 kg
Operating conditions	
Mounting position	vertical ± 25°
Ambient temperature	-20 … 60°C (subject to installation and mounting height, >2000 m above see level = temperature decrease 0.5°C per 100 m altitude difference)
Storage temperature	-20 … 80°C
Extension modules	
Analogue input module Analogue output module	± 10 V or 0 - 20 mA / 4-20 mA 12 bit resolution (higher resolution is possible) ± 10 V or 0 - 20 mA / 4-20 mA 12 bit resolution (higher resolution is possible)
Digital input module Digital output module	24 VDC 24 VDC / 0.5 A

ASR 30 – Dimensions









Dimensions in mm

Product portfolio

Gear Pumps



Low and high-pressure gear pumps for lubricating oil, hydraulic, process and test bench applications, fuel and metering systems.

Flow Measurement



Gear, turbine and screw type flow meters and electronics for volume and flow, metering and consumption in the chemical industry, hydraulic, process and test bench technology.

Hydraulics



Single and multistage high-pressure gear pumps, gear motors and valves for construction machinery, municipal vehicles, agricultural vehicles, special vehicles and truck bodies.

Valves



Cetop valves for all requirements stationary and mobile applications. Pressure, switching and stop valves with pipe connection for high flow rates. Special valves.

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Electronics/EN/06.2021
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