

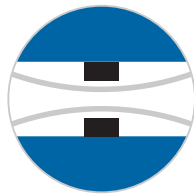
Installation and Operating Instructions

Flow monitor
DDW-DS31-Rp
DDW-DS31-Ga
DDW-DS31-Gi
DDW-DS31-DN



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1 Foreword

These Installation and Operating Instructions are applicable to devices of Series DDW-DS31. Please follow all instructions and information given for installation, operation, inspection and maintenance. The Instructions form a component part of the device and should be kept in an appropriate place accessible to the personnel in the vicinity of the location. Where various plant components are operated together, the operating instructions pertaining to the other devices should also be observed.

2 Safety

2.1 Symbol and meaning



Safety notice

This symbol is placed against all directions/information relating to occupational health and safety in these Installation and Operating Instructions and draws attention to danger to life and limb. Such notices should be strictly observed.

2.2 General safety directions and exemption from liability

This document contains basic instructions for the installation, operation, inspection and maintenance of the variable area flow meter. Non-observance of these directions can lead to hazardous situations for man and beast and also to damage to property, for which Kirchner und Tochter disclaims all liability.

The operator is required to rule out potentially hazardous situations through voltage and released media energy.

2.3 Intended use

The DDW-DS31 flow monitor is used for monitoring the flow of water, oils, and neutral fluids. The device operates on the differential-pressure principle. A drop in the differential pressure occurs at a pipe constriction that is proportional to the square of the volume rate of flow through the pipeline. This differential pressure is used to actuate the micro switch. The user sets the switch locally by a hand wheel in the range of the flow span.



2.4 Information for Operator and operating personnel

Authorized installation, operating, inspection and maintenance personnel should be suitably qualified for the jobs assigned to them and should receive appropriate training and instruction. All persons charged with assembly, mounting, operation, inspection and maintenance duties must have read and understood the operating instructions. Gaskets in contact with the fluid product must be replaced after all maintenance and repair work.

2.5 Regulations and guidelines

In addition to the directions given in these Installation and Operating Instructions, observe the regulations, guidelines and standards, such as DIN EN and for specific applications, the codes of practice issued by DVGW (gas and water) and VdS (underwriters) or the equivalent national codes and applicable national accident prevention regulations.

2.6 Notice as required by the hazardous materials directive

In accordance with the law concerning handling of waste (critical waste) and the hazardous materials directive (general duty to protect), we would point out that all flow meters returned to Kirchner und Tochter for repair are required to be free from any and all hazardous substances (alkaline solutions, acids, solvents etc.).



Make sure that devices are thoroughly rinsed out to neutralize hazardous substances.

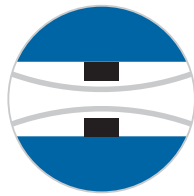
2.7 Transport and storage

Always use the original packing for transport, handling and storage. Protect the device against rough handling, coarse impact, jolts etc.

3 Installation

3.1 Preparatory work prior to installation

Provide the pipe ends at the installation point with the external pipe thread or flanges respectively (type series DN) appropriate to the device. Make sure the installation space at the installation point is in keeping with the dimensions given in the dimensional drawing and the table in chapter 7 - Technical Data.



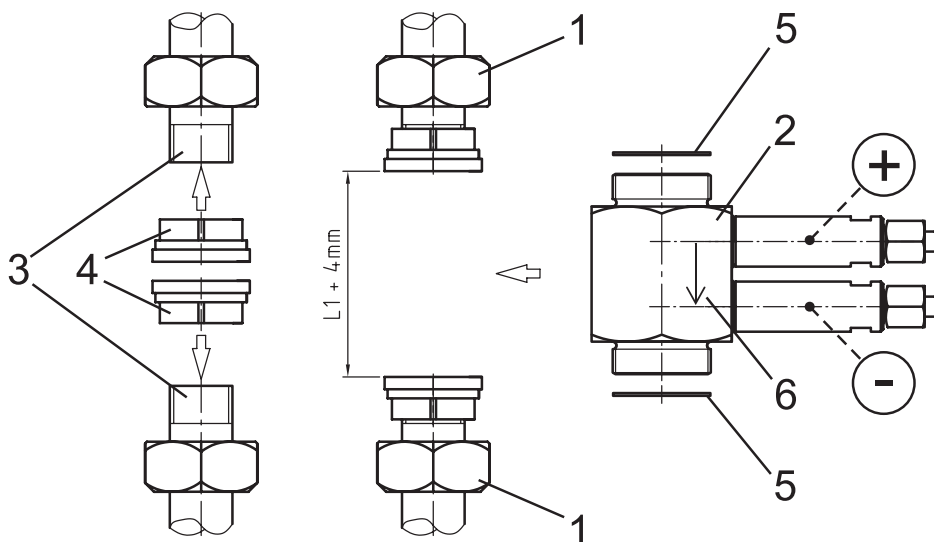
3.2 Installing DDW-DS31 with screw connections

The measuring device is screwed into the pipeline between two inserts that are supplied with the device. The straight, unimpeded inlet and outlet runs should be a minimum of 6 x DN upstream and a minimum of 4 x DN downstream of the location. Between the inserts, leave a gap of $L1 + 4$ mm for the gaskets. The dimensions of $L1$ can be found in section 7.2.

- Cut appropriate threads on the pipe ends (3) (in accordance with the order). Make sure that the ends of the pipe are in alignment.
- Unscrew the union nuts (1) from the DDW-DS31 and slide these on to the pipe ends, with the thread facing towards the device (2).
- Screw the insert (4) to the pipe ends using suitable packing material.
- Position the DDW-DS31 together with the two gaskets (5) between the pipe ends and tighten the union nuts.

Inaccurate measurements are possible due to incorrect installation position. Observe the flow direction during installation [see arrow on the device (6)].

- Pay attention to the direction of flow (see arrow (6) on the device).



1. Union nut
2. DDM
3. Pipe ends (customer side)
4. Inserts
5. Gaskets
6. Arrow for installation direction

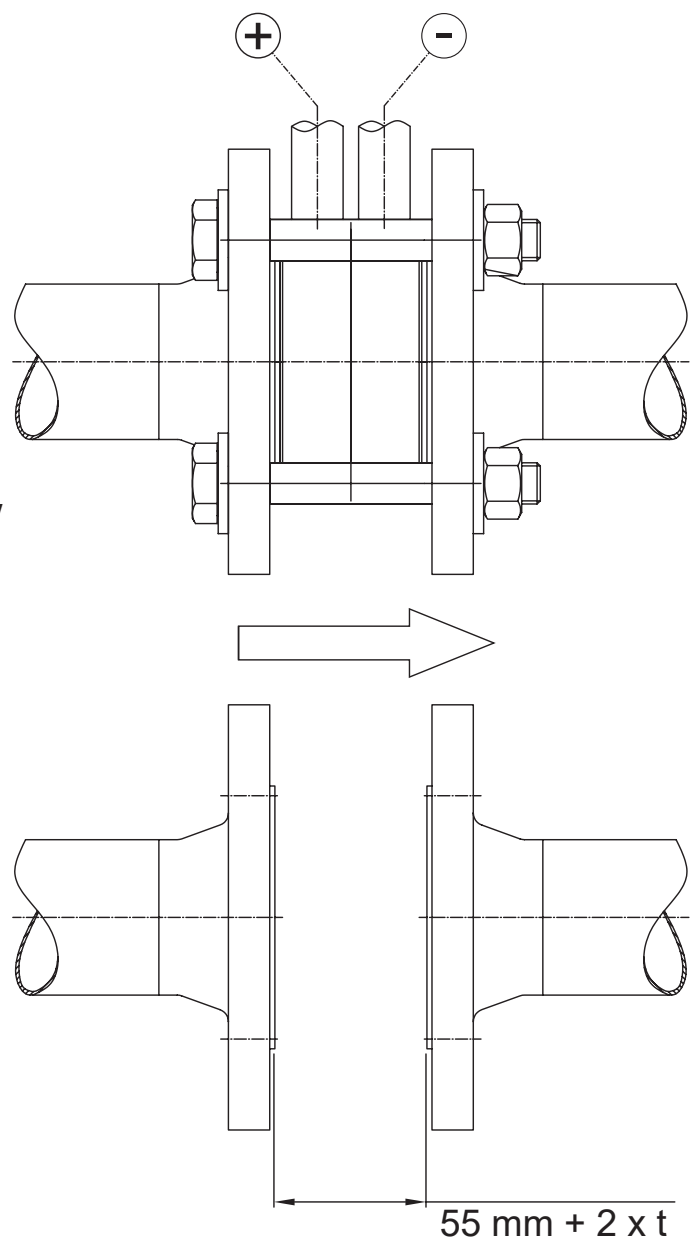


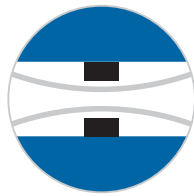
3.3 DDW-DS31 mounted between flanges

The flow meter is mounted between flanges to DIN EN 1092-1 (Type 11 or Type 13). The straight, unimpeded pipe run should be a minimum of 6 x DN upstream and a minimum of 4 x DN downstream of the location. The distance between the flanges should be 55 mm for the ring plus twice the thickness of the gaskets to be used. Make sure that the flanges are in alignment and the sealing faces are parallel to each other. Check that the flanges at the location agree with the details given in the order (standard and pressure rating).

- The distance between the flanges should be at least $55 \text{ mm}^* + 2 \times t$ (thickness of gaskets used).
- Fit half of the screw connections to the interflange connection,
- Mount the orifice, together with the gaskets fitted on both sides, between the two prepared flanges.
- Assemble the remaining screw connections.
- When tightening the screws, make sure that orifice and gaskets are concentric and in alignment with the pipeline.
- Fasten all screw connections uniformly in diagonally opposed sequence.

*(Standard length)
Length can vary order related. Please compare with your order!





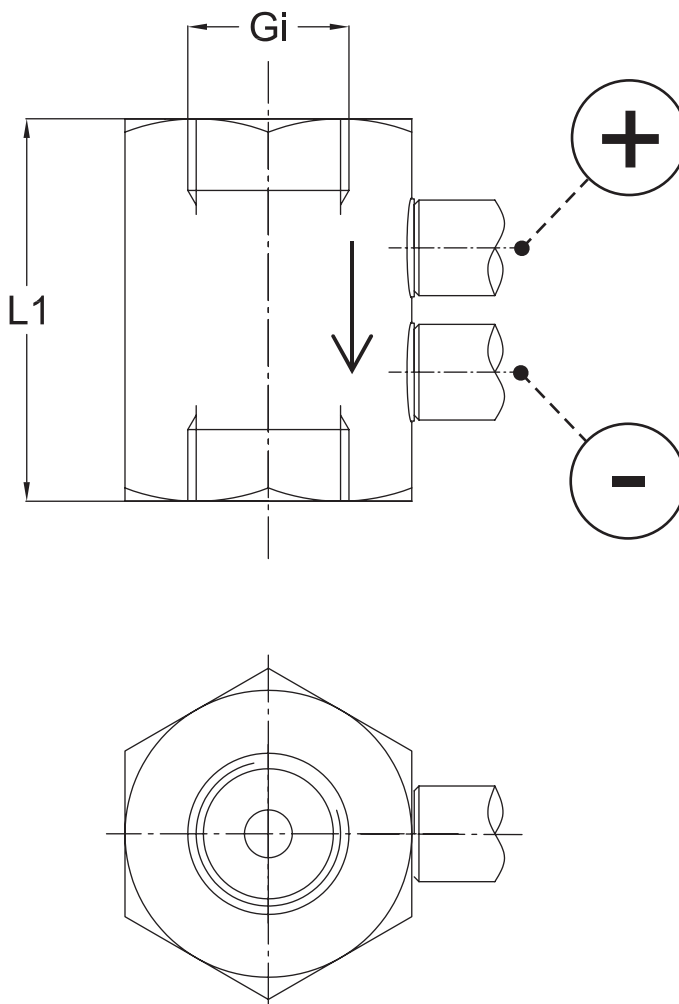
3.4 DDW-DS31 with internal thread

The measuring device is screwed into the pipeline. The straight, unimpeded inlet and outlet runs should be a minimum of 6 x DN upstream and a minimum of 4 x DN downstream of the location. Between the inserts, leave a gap of $L1 + 4$ mm for the gaskets. The dimensions of L1 can be found section 7.2.

- Cut appropriate threads on the pipe ends (in accordance with the order). Make sure that the ends of the pipe are in alignment.
- Screw the device to the pipe ends using suitable packing material.



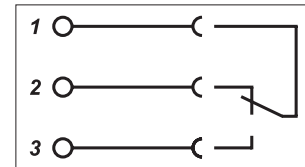
Pay attention to the direction of flow (see arrow on the device).





3.5 Electrical connection

- Only by authorized and qualified personnel.
- Electrical connection of the device to be carried out in accordance with the relevant regulations of the VDE and the regulations of the local power supply utility.
- Before connecting up the device, disconnect the system from power supply.
- Polarity need not be observed (see diagram).
- Provide protective circuit for the contacts in accordance with the contact rating.
- Demand-adapted fuse elements to be connected on the line side.



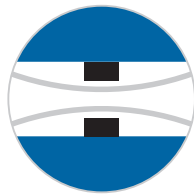
circuit diagram

4 Start-up

- Before start-up, make sure that all electrical supply and switching lines and the measuring orifice have been properly installed. In the case of liquid media, pressure connection lines need to be vented.
- Test all device connections.
- To set the flow: pressurize the pipelines by slowly opening the shut-off valves. On liquid service: carefully evacuate the pipeline.
- Check that all components are leak-tight and if necessary, tighten down threaded joints and screw connections.
- Where the process medium is water, make sure the device is frost-protected.

4.1 Setting the operating point

The required operating point is set by turning the adjusting button. The operating point mark on the rating plate indicates the value set on the scale on the adjusting button.



5 Maintenance and cleaning

The flow monitor is maintenance-free. To ensure reliable operation and a long service life, we recommend that the device be inspected at regular intervals

- check of the indicator
- check of the switching function in connection with follow-on components
- check of the pressure connection lines between orifice plate and differential pressure switch for leak tightness
- check of the electrical connection (clamp connection of cables)

Adapt testing and inspection cycles to environmental operating conditions.

6 Service

All devices with defects or deficiencies should be sent directly to our repair department. In the service area of the Kirchner und Tochter homepage (www.kt-flow.de) you will find the declaration of decontamination as download and more information about returns.

To avoid risks to our employees and the environment, we can only process devices, for which we get a declaration of decontamination certifying that they are safe due to legal regulations. For questions, please contact our sales department, Tel. +49 2065-96090.

6.1 Disposal

Please help to protect our environment and dispose workpieces in conformity with current regulations resp. continue using them.

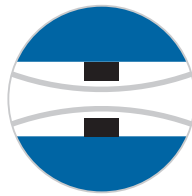


7 Technical data

Materials

DDW-DS31 DN	
Ring	S355, optionally 1.4571
Corrosion protection	Epoxy powder coating, traffic blue (RAL 5017) glossy
Corrosion class	C3
Orifice	1.4571
DDW-DS31 Rp, Gi, Ga	
Pipe union (Rp)	malleable cast iron, zinc plated (Rp only)
Orifice and ring	brass, aluminium hard coated
Gaskets	NBR
Connection between orifice and indicator (DDW-DS31-DN)	
Straight screw-in fitting 1/4"	brass, nickel plated, 1.4571 on request
Screw fitting G 1/4" dia. Ø 8	brass, nickel plated, 1.4571 on request
Cutting ring, union nuts	steel, zinc plated, 1.4571 on request
Steel sealing	steel, zinc plated, with NBR seal
Flow monitor DS31	
Pressure chamber	brass
Measuring diaphragm	FKM
Connection to orifice	brass

other materials on request



7.1 Measuring ranges

DDW-DS31-DN

DN	smallest range [m ³ /h] H ₂ O			biggest range [m ³ /h] H ₂ O		
50	1,2	-	7	8,7	-	52
65	2	-	12	13	-	78
80	3	-	18	19,7	-	118
100	4,7	-	28	30,7	-	184
125	7,3	-	44	48	-	288
150	10,7	-	64	68,8	-	413
200	18,8	-	113	122,5	-	735

in-between ranges possible

DDW-DS31-Rp/Gi/Ga

Rp / Gi	Ga	smallest range [m ³ /h] H ₂ O			biggest range [m ³ /h] H ₂ O		
¼	⅝	0,05	-	0,3	0,2	-	1,2
⅜	¾	0,05	-	0,4	0,4	-	2,3
½	1 ⅛	0,1	-	0,7	0,75	-	4,5
¾	1 ¼	0,2	-	1,3	1,4	-	8,5
1	1 ½	0,35	-	2	2,25	-	13,5
1 ¼	2	0,6	-	3,5	4	-	24
1 ½	2 ¼	0,85	-	5	5,35	-	32
2	2 ¾	1,25	-	7,5	8,65	-	52

in-between ranges possible



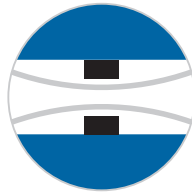
7.2 Dimensions

DDW-DS31-Rp/Gi/Ga				
Rp / Gi	Ga	L ₁	L ₂	SW ^{*)}
¼	⅝	80	124	41
⅜	¾	80	128	46
½	1 ⅛	80	128	46
¾	1 ¼	80	128	50
1	1 ½	80	136	60
1 ¼	2	80	146	70
1 ½	2 ¼	80	149	70
2	2 ¾	90	164	85

DDW-DS31-DN	
DN	d4
50	102
65	122
80	138
100	158
125	188
150	212
200	268

all dimensions in mm

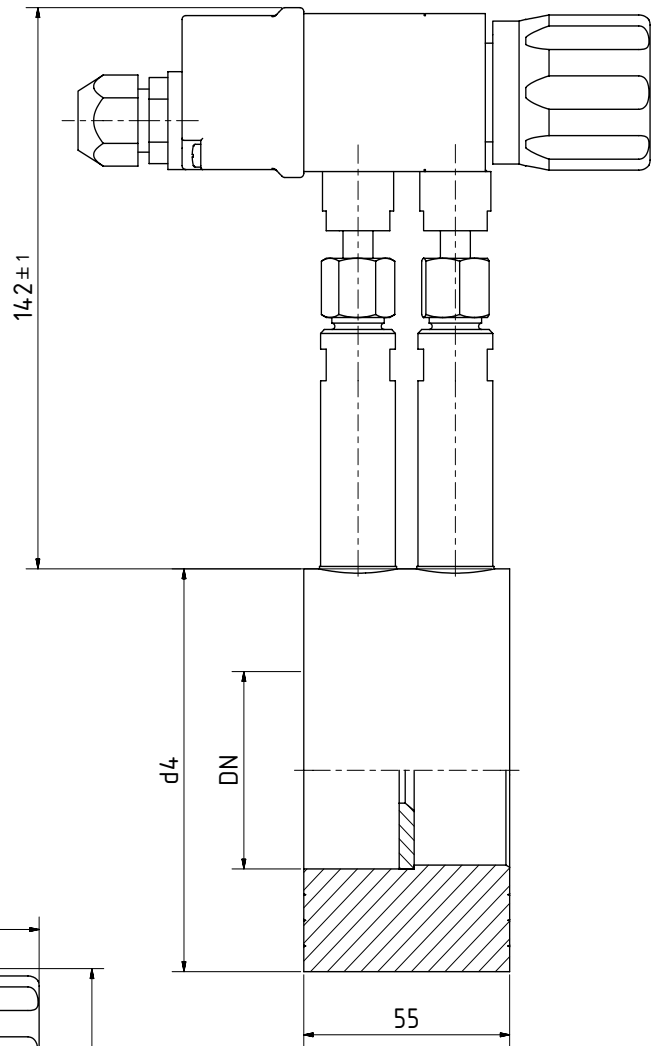
^{*)} wrench width of hexagonal orifice body



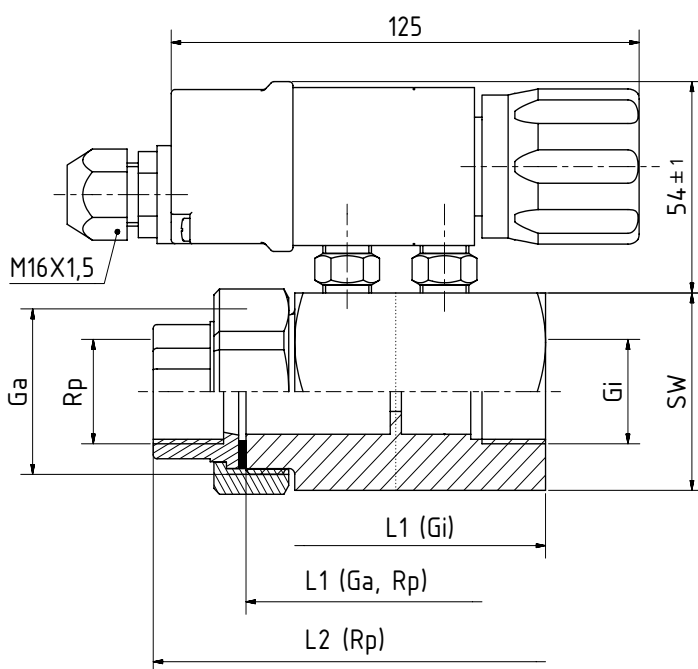
DDW-DS31

Flow monitor

DDW-DS31-DN



DDW-DS31-Rp/Gi/Ga



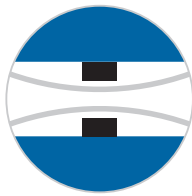


7.3 General technical data

Readable setting range	30 – 100 %	
Monitoring span	1:3	
Perm. process temperature	0 ... +80 °C/100 °C ¹⁾	
Perm. ambient temperature	0 ... +80 °C	
Max. working pressure	16 bar	
Differential pressure	600 mbar	
Reproducibility	3 % FS	
Hysteresis	5 % at Q _{max} , 10 % at Q _{min}	
Switching range	infinitely adjustable in the range of 33 – 100% of flow rate	
Switching function	change over, usable as NO or NC ²⁾	
Type of protection	IP54	
Max. supply voltage	250 V AC	30 V DC
Max. switching current	3 A	0,4 A
Max. contact rating	500 VA	10 W
Electrical connection	permanently installed cable, 2,5 m, optionally angle plug or LED angel plug	
Connection without LED		
Connection with LED		
Connection:		
In-between flange (DN)	for PN 10/PN 16 flanges acc. to DIN EN 1092-1 shape A & B	
Pipe union (Rp)	nut with parallel external fastening screw thread to DIN ISO 228 Part 1, insert with fitting thread to DIN 2999, ISO 7-1	
External thread (Ga)	parallel external fastening screw thread to DIN ISO 228 Part 1	
Internal thread (Gi)	parallel internal fastening screw thread to DIN ISO 228	

¹⁾ HT-design

²⁾ meets the requirements of protection acc. to the Low Voltage Directive 2014/35/EU (LVD)



DDW-DS31

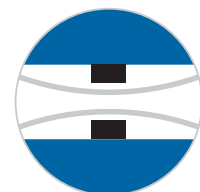
Flow monitor

Notes



Kirchner und Tochter

Durchflussmesstechnik seit 1951



The devices from **Kirchner und Tochter** have been tested in compliance with applicable EC/EU CE-regulations of the European Community.

The respective declaration of conformity is available on request. Subject to change without notice. The current valid version of our documents can be found at www.kt-flow.de.

The **Kirchner und Tochter** QM-System is certified in accordance with DIN EN ISO 9001:2015. The quality is systematically adapted to the continuously increasing demands.