Kirchner und Tochter
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Installation and Operation Instructions

Differential-Pressure Flow Meter
DDM-EM

A. Kirchner & Tochter GmbH Dieselstraße 17 · D-47228 Duisburg
Fon: +49 2065 9609-0 · Fax: +49 2065 9609-22 Internet: www.kt-flow.de · e-mail: info@kt-flow.de

Version 1.1

Contents

A. Kirchner & Tochter GmbH Dieselstraße 17 · D-47228 Duisburg
Fon: +49 2065 9609-0 · Fax: +49 2065 9609-22 Internet: www.kt-flow.de · e-mail: info@kt-flow.de

1 Foreword

These Installation and Operating Instructions are applicable to Series DDM-EM devices. 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 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 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 DDM-EM differential-pressure flow meters are designed for measuring and monitoring the flow of liquids and gases. They may be installed in the pipeline only between flanges or using threaded pipe connections. Straight, unimpeded lengths of pipe runs must be a minimum of 6 x DN upstream of the location and a minimum of 4 x DN downstream of the location. The required version of the DDM-EM device should be selected on the basis of the nominal diameter and nominal pressure at the location as well as the type of medium.

A. Kirchner & Tochter GmbH Dieselstraße 17 · D-47228 Duisburg
Fon: +49 2065 9609-0 · Fax: +49 2065 9609-22 Internet: www.kt-flow.de · e-mail: info@kt-flow.de

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.

3 Transport and storage

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

4 Installation

4.1 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 the Technical Data chapter

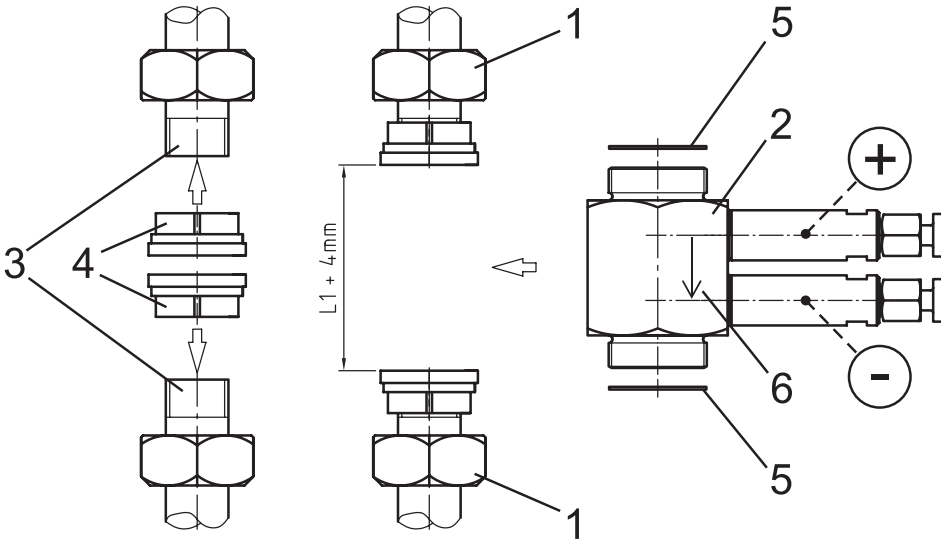
4.2 DDM-EM with screws connection

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 in section 8.4.

- 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 DDM-EM (2) and slide these on to the pipe ends, with the thread facing towards the device (2).
- Screw the inserts (4) to the pipe ends using suitable packing material.

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

- Position the DDM-EM together with the two gaskets (5) between the pipe ends/inserts (3/4) and tighten the union nuts (1).



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

A. Kirchner & Tochter GmbH Dieselstraße 17 · D-47228 Duisburg
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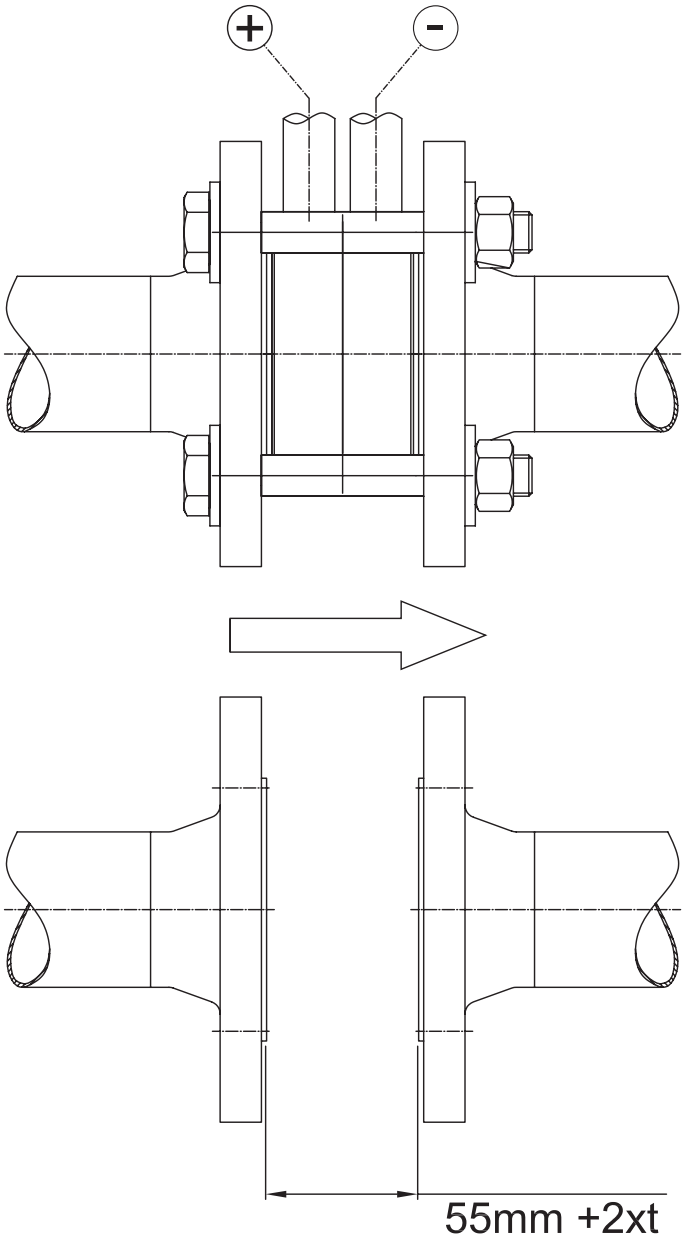
4.3 DDM-EM mounted between flanges

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 55 mm* + 2 x 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.



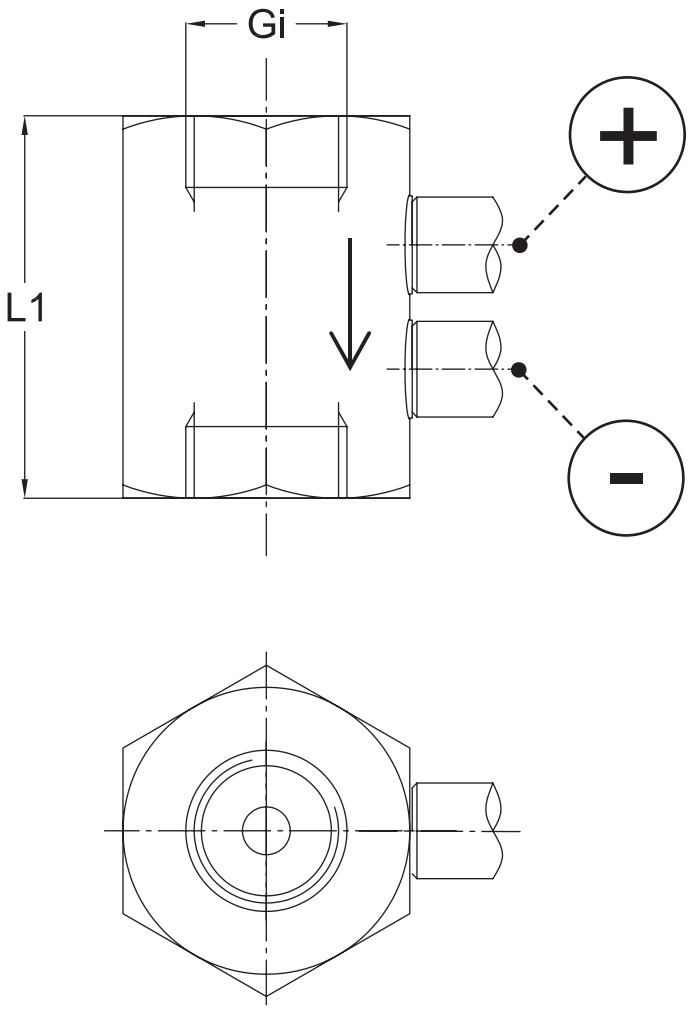
*(Standard length)
Length can vary order related.
Please compare with your order!

4.4 DDM-EM inside 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 in section 8.4.

- 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).



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5 Start-up

The device must be properly installed before it is started up. Carry out the following before initial start-up:

- Pressure the measuring line
- Test the leak-tightness of all components of the measuring orifice

5.1 Display

The 3½ digit LED display normally indicates the current flow rate (m³/h, L/min etc.).

(Note: the units shown in the illustrations of this document can be different from those of the actual instrument).

The two LED lamps above the 3½ digit LED display respectively indicate the status of the two limit relays/solid-state switches ❶ and ❷ (LED on = relay contacts closed/solid-state switch on).

The preset of the display is performed at the factory according to order specifications. Changes can be done according do the following instructions (see section 5.2).

While the instrument is in setup mode, the 3½ digit LED display either indicates the selected menu option or a setup parameter value. The instrument continues its pressure monitoring functions even while it is in setup mode, except under either of two circumstances.

One is when, the limit switching delay time is changed the existing delay must time out first. The other is when the look-up table (for conversion of measured values) is re-programmed (see section 5.2.7). In these circumstances, the output signal value and the limit relay/switch states are frozen until the changes are finalized.

5.2 Setup

The instrument has comprehensive setup options by means of which it can be optimized for any specific measuring or control application. This section of the document provides information and instructions about each of the setup parameters

Depending on the instrument configuration ordered (e. g.: without transmitter signal output/with voltage signal output/with current signal output) some of the menu options may not available. Some setup parameters may be consequentially excluded. For example, if the instrument is ordered without a transmitter output, all signal conversion programming options are omitted in the setup menu (see section 5.2.6 „Signal Conversion and Transfer Functions").

All instrument settings can be conveniently done from a PC connected to the instrument through a serial interface adaptor. All set-up parameters can be viewed and changed on the PC screen. Also, the entire instrument set-up configuration can be loaded, stored on the PC's hard disk drive, and printed out for plant/process documentation purposes. Further information about this PC software is given in the software documentation.

5.2.1 Selecting the Unit of Pressure Measurement

Make the necessary electrical connections (signal, power supply) to the instrument. Its pressure sensor must be pressure-free (i. e. vented to atmosphere; typically by disconnecting the pressure line/s). The current valid unit of measurement is indicated by one of the back-lighted symbols to the right of the digital display.

To change the unit of measurement, first press ⇨ then search for parameter *Ein* using ▲. Next press ⇨ again and select another unit of measurement using ▲ or ▼. Then press again ⇨ to store the selection, and *Ein* will appear again in the digital display.

To exit the setup mode, press ▼ until *ESC* appears, and then press ⇨.

The current pressure measured value is indicated again, and the appropriate symbol of the unit of measurement (to the right of the digital display) is lighted. The digital display is limited to a count of ±1999. Therefore, all the available units of measurement may not be suitable for selection for a given application.

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5.2.2 Zero Point Checking and Adjustment

If the instrument has been de-pressurized (vented to atmosphere) and does not indicate precisely zero, note this non-zero value. Using the setup parameter *oFI*, you can trim this offset to exactly zero. If the indicated non-zero value is positive, this value must be entered and stored as a negative offset value, and vice versa.

If the instrument was in use before zero setting is done, values of setup parameters *oFI* and *nP* would have been previously programmed. In this case, set both values to zero, read the actual zero offset, and then use this value for *oFI* for zero point correction, as described in the previous paragraph. Note: The registered value is a pure number: no decimal point is indicated. After correcting the zero offset, the pressure connections can be made again.

5.2.3 Damping and Zero Stabilization

If the media is subject to excessive pressure fluctuations, the displayed readings and the transmitter output signal can be stabilized using the instrument's *dAN* and *nP* setup parameters. The setup parameter *dAN* has the effect of a pulsation damper (on the displayed measurements, output signal and limit detection, - not on the sensor itself!). It adds a time-constant (averaging filter) in the user selectable range of 0.0 to 100.0 sec. When the damping is set to maximum, it took more than 2 minutes to reach the final value for a full scale pressure jump. In many cases fluctuating pressure readings do not cause a problem, except when the plant/equipment is at zero (differential) pressure condition and readings fluctuate near about zero value. The setup parameter NP is meant to take of this. Its value defines the number range across zero (similar to the zero offset correction number), within which the measured value is forced to zero. If a value of 8 is set for *nP* any pressure measurement in the range -0.08 to +0.08 bar (or -8 to +8 kPa) displayed as zero. Only when the actual pressure is outside this range will the display indicate a non-zero value. The actual and displayed pressures will agree starting from double the value of the NP setting (in the given example: 0.16 bar or 16 kPa).

5.2.4 Output Signal Setting

The transmitter output signal depends primarily on the measured pressure. However, this signal can be adapted to meet users‘ application requirements precisely. The basic pressure range (as marked on the product identification label) and the type of output signal (voltage or current) always remain unchanged for a particular instrument unit.

The setup parameters *nA* (measuring range starting point) and *nE* (measuring range end point) specify the pressure values between which the measurements are expected to be. Both values can selected anywhere within the specified measuring range of the instrument (e. g., 400 kPa). This user-programmed pressure range will correspond to the output signal (current or voltage) range, which will be as specified on the product identification plate: e.g., 0 ... 10 V or 4 ... 20 mA. If *nA* is lower than *nE*, the signal is said to have a positive slope: i.e., the output signal increases as the pressure increases.

If *nE* is lower than *nA*, the output signal has a negative slope: e. g., the output signal decreases as the pressure increases.

The difference between the values of *nA* and *nE* must be at least 25 % of the specified measuring range of the instrument (100 kPa for 400 kPa instrument example mentioned above). The software does not permit a smaller pressure span to be entered (the instrument will not allow storing of, nor exit from an invalid span).

Note: If you change *nA* and/or *nE* the look-up table (see section .5.2.6 and 5.2.7.) that existed up to that instant is deleted!

A. Kirchner & Tochter GmbH Dieselstraße 17 · D-47228 Duisburg
Fon: +49 2065 9609-0 · Fax: +49 2065 9609-22 Internet: www.kt-flow.de · e-mail: info@kt-flow.de

5.2.5 Output Signal Limiting (Namur)

The three setup parameters *oG1*, *oG2* and *oEr* specify the limits of the signal output current or voltage that are not to be exceeded, irrespective of the actual pressure.

These limit values have higher priority than the *nA* and *nE* pressure span settings. These settings serve mainly to prevent control systems from interpreting brief pressure excursions outside the measuring range as error.

With the *oG1* parameter, the limit value for the minimum output signal is determined. The output signal cannot underrun this value. Generally this parameter is only expedient for devices with an output signal of 4 ... 20 mA, because on these devices a value below 3.8 mA is often evaluated as an error signal.

With the *oG2* parameter, the limit value for the maximum output signal is determined. The output signal cannot exceed this value. This parameter can be used for all outputs (voltage and current) in order to limit the maximum value to e.g. 10.2 V.

With the *oEr* parameter, the value for the error signal is determined. The value specified with *oEr* is emitted as an output signal if the device detects an internal error and work no longer correctly. However, not all possible errors and defects can be detected by the device.

If you set *oG1* = *oG2* = 0, the output signal is no longer checked for limits. If you set *oG1* to the maximum value (11 V or 21 mA), you can change using *oG2* the output signal independent of pressure from zero to the maximum value. It is not necessary to leave the menu item; the output is then carried out immediately. You then operate the device as a signal transmitter and can then easily check the other signal processing.

5.2.6 Signal Conversion and Transfer Functions *F*

In certain cases other process variables are derived from primary pressure measurement. Examples are flow rate derived from differential pressure across an orifice plate and liquid level derived from hydrostatic pressure of liquid measured at the bottom of the tank.

Such derivations often involve non-linear transfer functions, while it is necessary for the output signal to be linearly proportional to the derived variable (e. g. liquid volume in a tank in m³, or flow rate in cm³/sec).

The setup parameter *F* allows the user to select the appropriate signal conversion function from those available:

• 0: Linear characteristic (default)

• 1: Square root extraction

• 2: Horizontal cylindrical tank

• 3 ... 30: Look-up table with 3 to 30 pairs of values

Whenever you change the value of *F*, the program will create a new table. All previous table values are rejected and replaced with new linear entries.

The tables for types *F* = 0 to *F* = 2 are not visible. Here internal values are used for table calculation. These values cannot be modified.

For *F* = 3 ... 30, you only have influence on the 1 ... 28 intermediate values (see section 5.2.7) you only have access to the start and end value via the *nA* and *nE* parameters.

If the parameters *nA* and *nE* are changed, the table will be deleted and *F* = 0 is set.

At the start of measuring range (*nA*), 0% is emitted by the output signal (e.g. 0 mA).

At the end of measuring range (*nE*), 100% is emitted by the output signal (e.g. 20 mA).

Whenever the value of *F* is changed, the instrument internally generates a new look-up table. All previous table values are deleted and replaced by new linear progression values.

5.2.7 Look-up Table Programming (F = 3 ... 30)

If the value of F is larger than or the same as 3, there is a submenu Lin. Here you can access all table values except for the start of the table (nA) and the end (nE).

This submenu has its own entry and exit point, which is represented with End. The table is not saved until you switch back to this point in the main menu, meaning that you switch back using the ⇨ key to the Lin parameter.

If the table is not structured correctly, an error message Err will appear at this point, and you will not be able to exit the submenu. The table consists of 3...30 value pairs. On a device with a power output, the first value pair is {i02|P02}.

The initial value i02 determines the level of the output signal. The second value P02 determines at which pressure the output signal should be emitted.

Then come the value pairs {i02|P02} ... {i30|P30}.

The entry of or changes to the table values via the membrane keyboard is extremely strenuous and prone to errors. It is only intended as an emergency solution in case access to the PC adaptor is not possible.

The table is correct if the following applies for all signal values: the value is larger than the previous value. For the pressure values, therefore, either the larger (rising characteristic curve) or the lower (falling characteristic curve) apply accordingly. A transition from a rising to a falling characteristic curve or vice versa is not permitted.

5.2.8 Limit Setting

The two limit switching outputs ❶ and ❷ (relay contacts or solid-state switches) are each configured by four setup parameters:

Switching output ❶ is configured by parameters *r1A*, *r1E*, *r1d* and *r1F*.
Switching output ❷ is configured by parameters *r2A*, *r2E*, *r2d* and *r2F*.

r1A determines the switch-off point, and *r1E* determines the switch-on point for switching output ❶.

The values are set in the valid measuring unit.

Together, both the *r1A* and *r1E* parameters determine the switching function of switching output ❶:

If *r1A* is smaller than *r1E*, the output switches on if the measuring value exceeds *r1E*. It does not switch off until the measuring value underruns *r1A* (hysteresis function).

If *r1A* and *r1E* are equal, the output switches on if the measuring value exceeds *r1E* and off if the measuring value underruns *r1A*.

If *r1A* is larger than *r1E*, the output switches on if *r1E* < measuring value < *r1A* applies (window function).

Both parameters can be set independently across the entire measuring range.

If the measuring unit is switched, the switch points are recalculated accordingly. Here rounding errors may cause deviations in the last point.

r1d allows the reaction of the switching output ❶ to be delayed by 0.0 to 100.0 s. This value applies equally for switch-on and switch-off.

r1F reverses the function of the switching output. If the value = 1, the switching output functions as an NO contact, if the value = 2, the switching output functions as an NC contact.

(❶ & ❷ see image in section 5.1)

5.2.9 Password

The last menu item -P- serves for the input of a password. A value of 001 to 999 can be selected as a password. The value 000 renders the password function invalid.

If a password was assigned, a text PAS is shown after ESC and ⇨ and you must enter the right value by using ⇨ and ▲▼. Only by doing so you will be able to access all other menu items. In the event of an error, the reading goes back to the start of the menu ESC.

If the password is forgotten, it can only be reset by the manufacturer or overwritten via the PC adapter.

5.2.10 Display Options

The dO parameter allows smoothing the displayed values in cases where they are frequently deviating. The filter function is similar to the dAN function, but acts only upon the display, having no impact on the output signal. Additionally the display can be turned off partially (dO = -1), only the setpoint LEDs are driven) or completely (dO = -2).

5.2.11 Reset to default values

The rES function will reset all parameters to default when activated. Default values can be defined only by using the PC interface.

5.2.12 Free Unit

If the device is configured to have a “free“ third unit (membrane symbol: 🡻) then the display can be scaled as desired by using the parameters NAF NEF dPF.

The measuring range as defined by parameters NA and NE is rescaled to NAF and NEF. Here the table function (F) is also taken into account. The dPF value controls the position of the decimal point

5.3 Overview of Setup Parameters

When the instrument is turned on, it briefly displays the software version number, and then switches automatically to normal operating mode. Pressing ⇨ causes the setup menu to be called up, indicated by ESC on the digital display.

After that, by pressing ▲ repeatedly, each of the setup parameters is called up in sequence:

Note: Depending on the version of the instrument that was ordered,some of the individual parameters might not be available.

PAS Password input (appears only if password function has been enabled). Values: 001 to 999

dAM Damping (time constant). Range of values = 0.0 to 100.0 sec

dO Damping (display only), range of values 0 ... 100.
Additional: -1 = no digital value and -2 = display turned off completely.

r1A Switching output 1: turn-off point.

r1E Switching output 1: turn-on point.

r1d Switching output 1: delay. Range of values = 0.0 to 100.0 sec. This values applies equally for turn-on and turn-off delays.

r1F Switching output 1 action. If R1F = 1, acts as NO contacts. If R1F = 2, acts as NC contacts.

r2A Switching output 2: turn-off point.

r2E Switching output 2: turn-on point.

r2d Switching output 2: delay. Range of values = 0.0 to 100.0 sec. This values applies equally for turn-on and turn-off delays.

r2F Switching output 2 action. If R1F = 1, acts as NO contacts. If R1F = 2, acts as NC contacts.

Ein Unit of measurement. The selection is indicated by the lighted symbol to the right of the digital display. A particular unit can be selected only if it can be meaningfully represented within the basic measuring range of the instrument.

A. Kirchner & Tochter GmbH Dieselstraße 17 · D-47228 Duisburg
Fon: +49 2065 9609-0 · Fax: +49 2065 9609-22 Internet: www.kt-flow.de · e-mail: info@kt-flow.de

nA Measuring range start point. The value of the measured variable corresponding with the minimum alue of the output signal (0 V, 0 mA or 4 mA, depending on the instrument version).

nE Measuring range end point. The value of the measured variable corresponding with the maximum value of the output signal (10 V or 20 mA, depending on the instrument version).

dPF Position of decimal place for free unit.

nAF Measuring range start point (displayed value) for free unit.

nEF Measuring range end point (displayed value) for free unit.

nP Zero stabilization. Range = 0 to 100 counts. The value spans symmetrically around the actual zero point.

oFI Zero offset correction, input 1. Range = -100 to +100 counts.

F Signal conversion function. 0 = linear, 1 = square root, 2 = horizontal cylindrical tank, 3 ... 30 = look-up table.

Lin Look-up table entry (sub-menu).

oG1 Output signal limiting, minimum.

oG2 Output signal limiting, maximum.

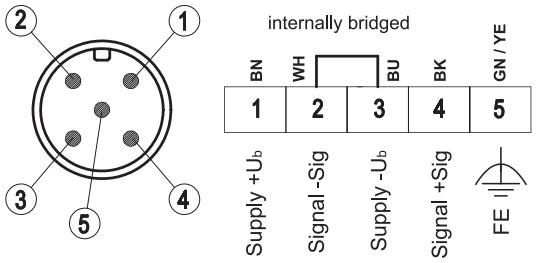
oEr Fault signaling (output signal value on detection of instrument fault).

rES Reset all values to default. (Default values can be defined only by using the PC interface.)

-P- Password setting. Permissible password values = 001 to 999. „000“ disables password protection.

5.4 Electrical Connections, Switching Output

Connector 1: Power Supply and Output



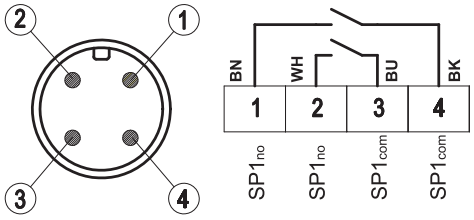
Switching outputs:

Switching output ① is configured by parameters *r IR*, *r IE*, *r Id*, and *r IF*. Switching output ② is configured by parameters *r IR*, *r IE*, *r Id*, and *r IF*.

Power supply voltage and output signal load:

Nominal supply voltage and the operating supply voltage range are indicated in the technical data (see section 8). The maximum output signal loads are indicated in the technical data (see section 8).

Connector 2: Switching contact (NO)



The signal ground line is internally connected to the instrument ground, and serves only as an alternative ground connection for the output signal. This usually increases the noise margin.

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.

7 Disposal

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

A. Kirchner & Tochter GmbH Dieselstraße 17 · D-47228 Duisburg
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8 Technical data

Measuring principle	differential pressure measurement on the orifice DDM-EM
Perm. ambient temperature	-10 ... + 70 °C
Perm. medium temperature [1)]	standard -10 ... + 70 °C, max. 130 °C (insulated line) optionally HT-Type above 130 °C
Pressure loss	ca. 30 ... 60 % of differential pressure [2)]
Pressure resistance	16 bar
Protection class	IP 65 acc. to DIN EN 60529
Measurement accuracy	5 % of measurement range end value
Display unit	electronic differential pressure transmitter with 3½ digit LED display and 4 ... 20 mA, 0 ... 10 V output
In-between flange (DN)	for PN 10/PN 16 flanges acc. to DIN EN 1092-1 shape A & B
Pipe union (Rp)	two-part pipe fitting: insert with cylindrical internal thread acc. to DIN EN 10226-1 (ISO 7-1)
External thread (Ga)	cyl. external thread acc. to DIN EN ISO 228
Internal thread (Gi)	cyl. internal thread acc. to DIN EN ISO 228

1) medium must not freeze

2) is detailed in the offer

8.1 Technical data display unit EM

Nominal voltage	24 V DC/AC
Perm. operating voltage	12 … 32 V DC/AC
Output signal	0 … 20 mA, 4 … 20 mA, 0 … 10 V three-wire
Protection class	IP 65 acc. EN 60529
Signal load	
Current output 0/4 … 20 mA	$U_b \leq 26$ V: $R_L \leq (U_b - 4\ V) / 0{,}02\ A$, $U_b > 26$ V $R_L \leq 1100\ \Omega$
Voltage output 0 … 10 V	$U_b < 15$ V: $R_L \geq 10\ k\Omega$, $U_b \geq 15$ V: $R_L \geq 2\ k\Omega$
Power consumption	ca. 2 W/VA
Programmable switching contacts	
2 sets of voltage free relay contactsas make (no) or break (nc) contact	U_{max} = 32 V DC/AC, I_{max} = 2 A, P_{max} = 64 W/VA
2 sets of voltage free solid state relay SPST as make (no) or break (nc) contact	U = 3 … 32 V DC/AC, I_{max} = 0,25 A, P_{max} = 8 W/VA
Display	3½ stellige LED *)
Password	001 ... 999 (000 = no password protection)

*) Display range is max. 3000. For larger flow rates the next higher measurement unit has to be chosen.

8.1.1 Programming display unit EM

Damping	0 ... 100 s (10 / 90% step response time) for signal output, display separated
Switch output ❶ ❷	activation point, deactivation point, response time delay (0 ... 100 s)
Switching function	make (no) or break (nc) contact
Measuring range unit	bar, kPa, „free unit“ start value, end value and decimal place for „free unit“
Zero suppression	0 ... 100 digits[1)]
Measurement range start/end	set as required within the basic measurement range [2)]
Zero point correction	± 100 digits[3)]
Curve conversion	linear, square rooted, horizontal cyl. tank, table (3 ... 30 entries)

Notes:

1) Measured value deviations up to 100 counts symmetric about zero are set to zero. Used for zero drift suppression.

2) Maximum effective turn-down ratio = 4:1. Only the output signal is affected. Transfer function is inverted if start value > end value.

3) Zero calibration setting may change with mounting orientation

8.1.2 Connections

Electrical connections	Two round-shell multi-pin connector sockets (M12, male) Connector 1: 5-pin: power input and analog signal output Connector 2: 4-pin: relay contacts / solid-state switch outputs
Pressure connections	G 1/8 female threads with optional cutting ring fittings for 6 or 8 mm tube

8.2 Type series

DDM-EM DN	measuring orifice sandwiched between flanges
DDM-EM Rp	measuring orifice with pipe fitting
DDM-EM Gi	measuring orifice with internal threads
DDM-EM Ga	measuring orifice with external threads

A. Kirchner & Tochter GmbH Dieselstraße 17 · D-47228 Duisburg
Fon: +49 2065 9609-0 · Fax: +49 2065 9609-22 Internet: www.kt-flow.de · e-mail: info@kt-flow.de

8.3 Technical data of orifice

8.3.1 Connection

DDM-DN	between flanges PN10 or PN16 acc. to DIN EN 1092-1
DDM-Rp	two-part pipe fitting: insert with cylindrical internal thread acc. to DIN EN 10226-1 (ISO 7-1)
DDM-Ga	Cylindrical male thread according to DIN ISO 228 T1.
DDM-Gi	Cylindrical female thread according to DIN ISO 228.

8.3.2 Materials

DDM-EM DN	
Ring	S355, optionally 1.4571
Corrosion protection	epoxy paint, kiln-dried, traffic blue (RAL 5017), satin finished
Corrosion class	C2
Orifice	1.4571
DDM-EM Rp, Gi, Ga	
Pipe union (Rp)	malleable cast iron, zinc plated
Orifice and ring	brass, optionally 1.4571
Gaskets	NBR
Connection between orifice and indicator	
Straight screw-in fitting ¼“	brass, nickel plated, 1.4571 on request
Screw fitting G ¼“ 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
Indicator EM	
Parts in contact with media	Brass, NBR, FKM
Measuring diaphragm	NBR
Housing	polyamide PA 6.6

other materials on request

8.4 Dimensions

8.4.1 Dimensions for DDM-EM DN

DN *)	d4	H
50	102	282
65	122	302
80	138	318
100	158	338
125	188	368
150	212	392
200	268	448

*) Inside diameter made after details provided of pipe inside diameter.

8.4.2 Dimensions for DDM-EM Rp

Rp *)	L1	L2	SW	H
¼	80	124	41	200
⅜	80	128	46	203
½	80	128	46	203
¾	80	128	50	205
1	80	136	60	210
1 ¼	80	146	70	215
1 ½	80	149	70	215
2	90	164	85	222

*) Inside diameter made after details provided of pipe inside diameter.

8.4.3 Dimensions for DDM-EM Gi/Ga

Gi *)	L	SW	H
¼	80	41	200
⅜	80	46	203
½	80	46	203
¾	80	50	205
1	80	60	210
1 ¼	80	70	215
1 ½	80	70	215
2	90	85	222

*) 0Inside diameter made after details provided of pipe inside diameter.

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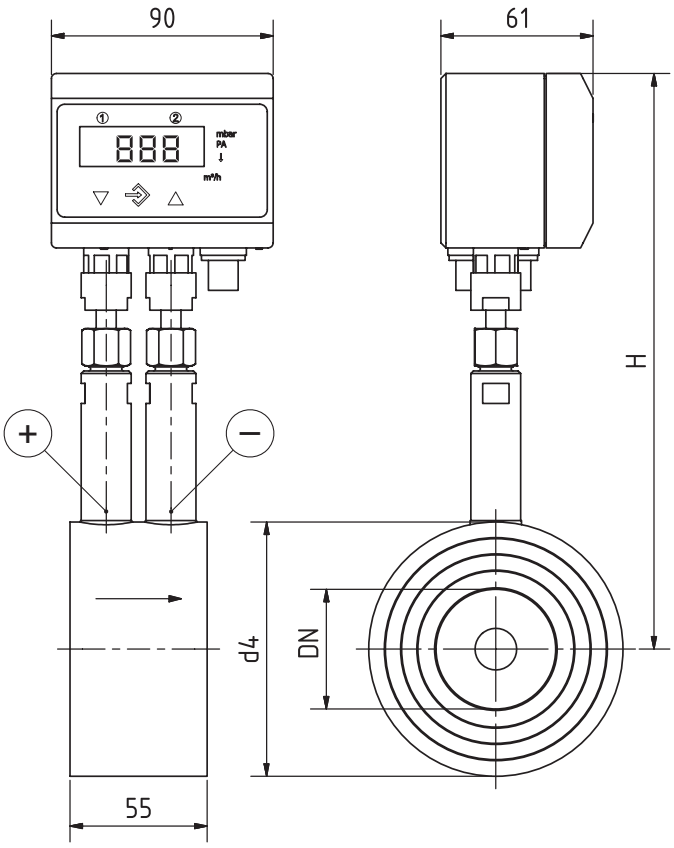
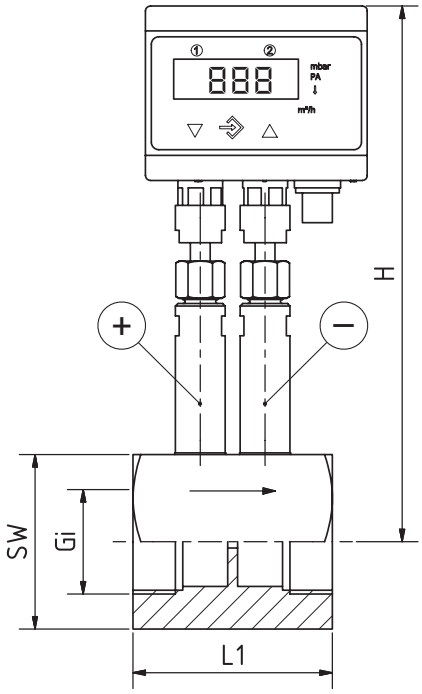
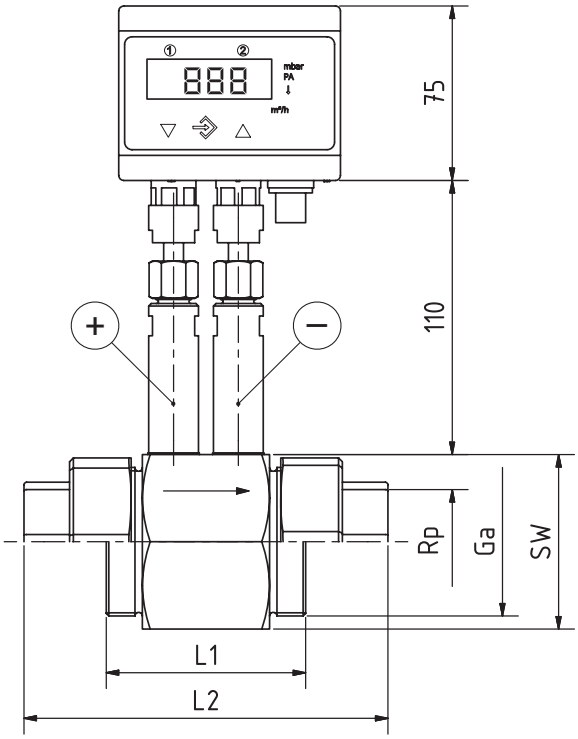
DDM-EM DN



DDM-EM Gi



DDM-EM Ga/Rp



8.5 Measuring ranges

8.5.1 Water

Connection: screwed pipe union/internal thread/for external thread

Rp/Ga/Gi	smallest measuring range [m³/h] H_2O			largest measuring range [m³/h] H_2O		
¼	0,075	-	0,3	0,3	-	1,2
⅜	0,1	-	0,4	0,575	-	2,3
½	0,175	-	0,7	1,125	-	4,5
¾	0,325	-	1,3	2,125	-	8,5
1	0,5	-	2	3,375	-	13,5
1 ¼	0,875	-	3,5	6	-	24
1 ½	1,25	-	5	8	-	32
2	1,875	-	7,5	13	-	52

in-between ranges possible

Connection for in-between flange assembly

DN	smallest measuring range [m³/h] H_2O			largest measuring range [m³/h] H_2O		
50	1,75	-	7	13	-	52
65	3	-	12	19,5	-	78
80	4,5	-	18	29,5	-	118
100	7	-	28	46	-	184
125	11	-	44	72	-	288
150	16	-	64	103,25	-	413
200	28,25	-	113	183,75	-	735

in-between ranges possible

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8.5.2 Air

Connection: screwed pipe union/internal thread/for external thread

Rp/Ga/Gi	smallest measuring range [m³/h] air [1)]			largest measuring range [m³/h] air [1)]		
¼	0,75	-	3	2	-	8
⅜	1,25	-	5	3,5	-	14
½	1,5	-	6	5,25	-	21
¾	2	-	8	11,25	-	45
1	3	-	12	13,5	-	54
1 ¼	6	-	24	27	-	108
1 ½	8,75	-	35	37,5	-	150
2	12,5	-	50	67,5	-	270

[1)] at STP (0 °C and 1013 mbar), in-between ranges possible

Connection for in-between flange assembly

DN	smallest measuring range [m³/h] air [1)]			largest measuring range [m³/h] air [1)]		
50	13,5	-	54	67,5	-	270
65	20,25	-	81	125	-	500
80	30	-	120	187,5	-	750
100	52,5	-	210	212,5	-	1080
125	90	-	360	437,5	-	1750
150	112,5	-	450	650	-	2600
200	187,5	-	750	1000	-	4000

[1)] at STP (0 °C and 1013 mbar), in-between ranges possible

Die Geräte der Firma **Kirchner und Tochter** sind nach den einschlägigen EG/EU CE Richtlinien geprüft.
Auf Anfrage erhalten Sie eine entsprechende Konformitätserklärung.
Änderungen ohne vorherige Ankündigung bleiben vorbehalten. Die aktuell gültige Version unserer Dokumentation finden Sie unter www.kt-flow.de.

Das **Kirchner und Tochter** QM-System ist nach DIN EN ISO 9001:2015 zertifiziert.
Es wird eine systematische Qualitätsverbesserung in ständiger Anpassung an die immer höher werdenden Anforderungen betrieben.

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