deltaflow

deltaflow DF25
Data Sheet

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Overview

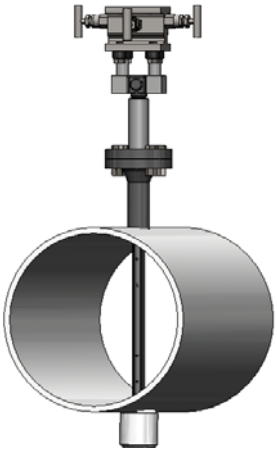

Figure 1 DF25 with flang connection, mounted 3-way-manifold and opposite support

Operational Conditions

- 0 – 250 bar
- -200 – 1240 °C
- DN65 – ID2500
- Media: Gas, Steam, Liquid
- Accuracy: better 1% ,
  When calibrated (e.g. German PTB or factory calibration) up to 0.5% (on request)
- Bi-directional, Measurement Range > 1:30
- Certifications: Ex / ATEX / 3.1 / 2.2 / PED97/23/EG

Materials

- 1.4571 (316Ti)
- 1.4828 (309) (High temperature)
- 1.4539 (904L), Hastelloy C4, Haynes Alloy (oxidizing materials)
- 1.7380 (A182-F12)
- 1.5415 (A204)
- Others on request

Figure 3 : deltaflow with cut ring stud, 3-way-manifold, integrated PT100 and multi variable transmitter

Figure 3: deltaflow for steam with integrated PT100, 3-way-manifold, mounted transmitter and connection box for cables

Accessories

- Differential Pressure Transmitter, Multi Variable Transmitter
- Integrated temperature and/or integrated (static) pressure transmitter
- Weather Protection Box with heater for rough conditions
- Air Purging System LSP (see data sheet LSP) for polluted media (dust load up to 200g/m3)
- Flow Computer flowcom e.g. for measurement of heat transfer

deltaflow Mounting Positions (see also attachment for further information)

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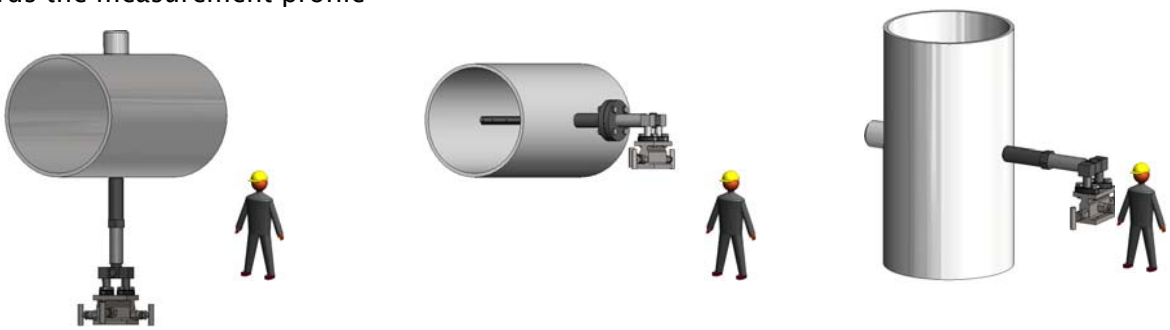
Liquid Service

In order to consider proper venting or draining location depends on type of media and orientation of pipe. To meter liquids, the entire probe should be filled with liquid allowing gas bubbles to vent off. To allow this to happen, the unit should be installed with a slight downward slope from the dp-transmitter towards the measurement profile



Gas Service

For gasses, the installation theory is exactly opposite to that of liquids. The deltaflow should be completely filled with the gas, and condensation should be able to drain freely back into the conduit.

Steam Service

The deltaflow for steam is always installed into the conduit in a horizontal position. The steam condenses in the connection adapters. The differential pressure is then transmitted across the condensate column to the transducer which is located below it.

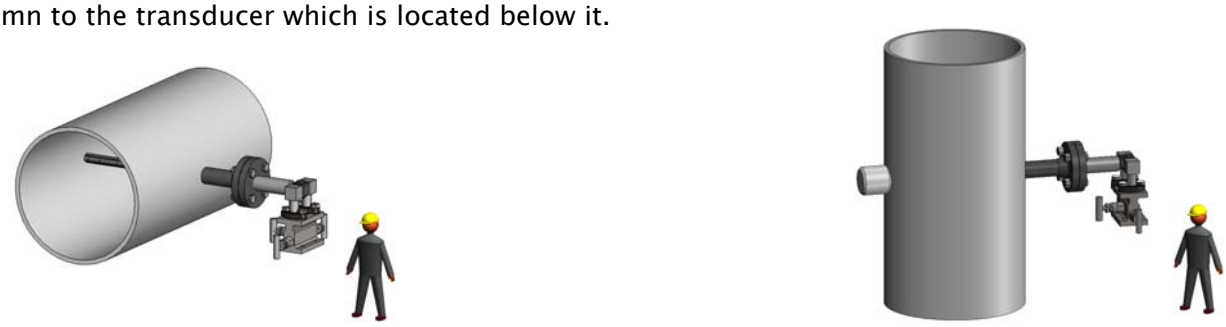


Figure 4 Overview Mounting Possibilities

Type Code

	Fluid	Process connec-tion	Nominal Diam	Inner Diameter of Pipe	Wall Thickness	dp connection	material weld-in parts	designation
DF25	**-**	**-**	**DN ---**	**ID - mm**	**WD - mm**	**-**	**-**	deltaflow integrating pitot tube
	FG							Gas
	FL							Liquid
	FF							humid gases
	FD							Steam
		CR						weld-in-stud with cutring, max PN40
		CF						weld-in-stud with DIN-flange
		CA						weld-in-stud with ANSI-flange
		CP						Quicklock with chain, max. PN6
		CS						Quicklock with spindle
			DN80					nominal diameter max DN80
			DN100					nominal diameter max DN100
			DN125					nominal diameter max DN125
			DN150					nominal diameter max DN150
			DN200					nominal diameter max DN200
			DN250					nominal diameter max DN250
			DN300					nominal diameter max DN300
			DN350					nominal diameter max DN350
			DN400					nominal diameter max DN 400
			DN500					nominal diameter max DN500
			DN...					additional length each 100mm (max DN2500)
				ID_mm				inside diameter (exact) mm
					WD_mm			wall thickness (exact) mm
						AAN		Welding ends SS
						AN2		Thread, 1/2"NPT male
						AOA		Oval flanges for direct transmitter mount SS DIN EN 61518
						ADW		Oval flanges and three way manifold for direct transmitter mount
						AKR		Ball valve 1/2" female SS
						AAE		Needle valve welding ends, SS
						AKO		oval flanges on ball valve for direct transmitter mount SS
						AER		Ermeto fitting
						ASW		Swagelock fitting
						XX		other
							MC	CS
							ME	V4A 1.4571 SS316ti
							MV	VA 1.4539
							MW	Hastelloy C4
							MF	16 Mo 3

Profile/ tube material	Pipe insula-tion	Nominal pressure	Pipe orienta-tion	Integrated-Temp. Meter	Integrated Pressure Meter	Options	Customized Options	
SE								V4A 1.4571 SS316ti
SV								profile: 1.4539 / probe: 1.4571
SVV								profile: 1.4539 / probe: 1.4539
SW								profile: Hastelloy C4 / probe: 1.4571
SWW								profile: Hastelloy C4 / probe: Hastelloy C4
SX								HT 1.4828
SY								Haynes Alloy
	X100							0..100mm
	X125							100..125mm
	X---							additional insulation thickness each 25mm
		PN16						PN 16
		PN40						PN 40
		PN100						PN 100
		PN160						PN 160
		PN250						PN 250
		PNXX						>PN250
		AN150						ANSI 150lbs
		AN300						ANSI 300lbs
		AN400						ANSI 400lbs
		AN600						ANSI 600lbs
		AN900						ANSI 900lbs
		AN1500						ANSI 1500lbs
		ANX						> 1500lbs
			OV					pipe vertical
			OHO					pipe horizontal, installation from top
			OHS					pipe horizontal, installation from side
			OHU					pipe horizontal, installation from bottom
				T3				PT100 in immersion sleeve, max4 00°C, incl. AK
				T4				PT100 in immersion sleeve, 4..20mA0=..100°C
				T5				PT100 in immersion sleeve, 4..20mA0=..200°C
				T6				PT100 in immersion sleeve, 4..20mA0=..300°C
				T7				PT100 in immersion sleeve, 4..20mA0=..400°C
				T8				Typ K in immersion sleeve, 4..20mA0=..0.> 400°C, max 1000°C
				T9				PT100 Ex, 4..20mA for all temperature ranges
					P01			preparation for pressure measurement with G1/2" stud and nut
					P02			preparation for pressure measurement with pressure valve G 1/2"
					P03			preparation for pressure, with pressure valve and steam siphon G1/2"
					P1			absolute pressure transmitter Ex
					P2			absolute pressure transmitter
					P3			absolute pressure transmitter Ex, shut off valve
					P4			absolute pressure transmitter, shut off valve
					P5			absolute pressure transmitter, shut off valve, siphon
						AK1		connection box
						GE1		opposite support
						3.1		material certificate EN 10204
						2.2		material certificate EN 10204
						Ptest		factory pressure test 1,5 times nominal pressure
							Z	Customized Options required, please specify

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Table 1 DF25 Type Code

Type Code in Detail

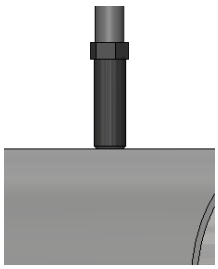
Fluid

Code	Explanation
-**FG**	Please select option FG (Gas) if your medium is a dry gas and neither the conduit nor the ambient pressure contains any condensation to consider. Specifically, dry air and other dried process gasses fall into this category.
-FL	Option FL (liquid) is the correct choice if your medium is a liquid and if boiling (flashing) is not a consideration in either the conduit or the ambient temperature. This category includes the most common liquids such as water, hydrocarbons, etc. Flashing is not generally an issue except in situations involving high temperatures or liquid gasses.
-FF	If you select Option FF (humid gas), your deltaflow can be configured for gasses which (sometimes) contain condensation. This would include, for example, flue gasses after washer or humid air which is being drawn into a cooler environment. deltaflow probes of this sort passed the test in 1996 as quantity measuring devices for polluted, aggressive, and condensating flue gasses.
-FD	If your medium is (water-based) steam, then Option FD is the correct choice. The deltaflow will then come equipped with condensation containers and primary shut-off.

Table 2 Model Code for Media

If your medium happens to be multi phase (such as cryogenic gas or wet steam), we will be happy to help you
find a workable solution. Please contact us.
If your medium is heavily polluted, we would also be happy to help you with our automatic air purging system LSP (see data sheet LSP). We recommend using LSP whenever particle load exceeds 60mg/m3. In most applications *deltaflow operates satisfactorily without cleaning and without maintenance*.

Process Connection

Code	Illustration	Explanation
-CR		Option CR (weld-in stud with cut ring) is the easiest and most economical way to install your deltaflow into a conduit. Simply drill a hole (28 mm) in the conduit, weld the stud into place and insert the deltaflow until it touches the opposite side of the conduit. Tighten the coupling nut, and you are finished. The compression ring stud can be used up to PN40.

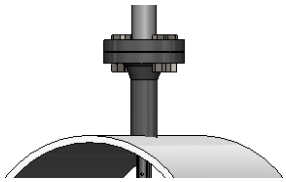
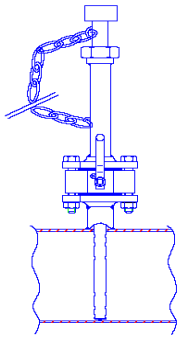
-CF		Weld-in studs with DIN flanges (option CF) are often used in gauge pressure applications. This model is also well suited to high pressure situations, because the flange uses 4 or more mechanically redundant screws to hold the deltaflow in position. The flange is designed to divert pressure in the event of a leak, thereby preventing media from spurting in the direction of the operator. This means that the flange connection method provides an added measure of safety when the deltaflow is used to meter dangerous media under pressure, such as steam.
-CA		Provides the same advantages as option CF, but uses an ANSI flange instead of a DIN flange.
-CP		The deltaflow Quicklock with chain makes it possible to uninstall and then reinstall the deltaflow under certain operating conditions. This is particularly efficient for applications metering extremely dirty media in which the deltaflow must be uninstalled for examination purposes. The deltaflow is manually drawn back into the stud and the ball valve is then shut. At this point the probe can be completely removed. In certain circumstances, the residual contents within the probe may be released to the environment during this procedure. Because option P allows the probe to be manually removed and reinserted, it may only be used up to 6 bar g.
-CS		The deltaflow Quicklock with spindle can be used for the same applications as the deltaflow Quicklock with chain, but the probe is inserted and removed by means of a threaded spindle. This option easily handles applications of up to 40 bar g (up to 100 upon request).

Table 3 Model Code process connection

In addition to these standard formats, we can of course adapt the deltaflow to any other installation conditions
that might exist. If desired, for example, we could provide you with weld-in studs which could be riveted into a
sheet metal channel or cemented into the masonry in a chimney. Previously existing studs can also be used—the

nominal diameter must measure at least DN25 (1”), and we would also need a drawing indicating the critical measurements of the existing studs. We are always happy to fulfill special requirements regarding sealing
surfaces or materials.

Nominal Diameter

The deltaflow DF25 can be used within the nominal diameter range of DN65 through DN 2500 (3” to 100”).
For other diameter measurements, please select a different deltaflow model (DF8 / DF12 / DF44).

Code	Explanation
-DN...	Please specify the nominal diameter of your conduit (metric or ANSI units).

Table 4 Model Code Nominal Diameter

Inner Diameter

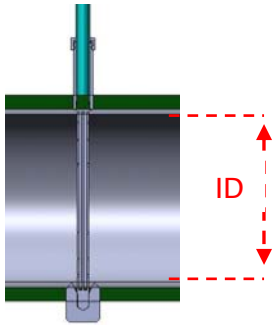
Code	Illustration	Explanation
-ID...		Your deltaflow is custom-built. In order to assure that your deltaflow is ideally suited to your application, we need to know the actual interior diameter and the wall thickness of your conduit. We recommend that this measurement not be taken from your documentation, but rather measured—at the planned sampling site if possible. This is particularly important for applications involving older conduit systems. It is NOT necessary to have this measurement at the bid proposal stage, but it will be required at the time the order is placed.

Table 5 Type Code Inner Diameter

Wall Thickness

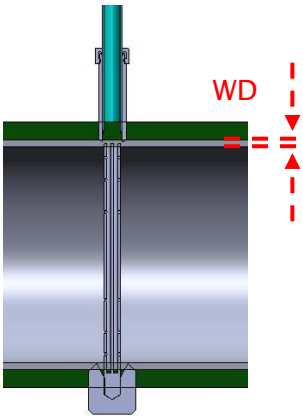
Code	Illustration	Explanation
-WD...		Your deltaflow is custom-built. In order to assure that your deltaflow is ideally suited to your application, we need to know the actual interior diameter and the wall thickness of your conduit. We recommend that this measurement not be taken from your documentation, but rather measured—at the planned sampling site if possible. This is particularly important for applications involving older conduit systems. It is NOT necessary to have this measurement at the bid proposal stage, but it will be required at the time the order is placed.

Table *6 Model Code Wall Thickness*

dp-connection

The dp connection you select establishes the way in which you would like to transfer the differential pressure
metered at the deltaflow to your dp-transmitter. In addition to the connection formats identified below, other
connections can be provided upon request at any time.

Code	Illustration	Explanation
-AAN		With option AAN you will get your deltaflow with welding ends. Here you have to take care about the connection to your transmitter (impulse piping). Can be used for all kind of media.

-AN2		If you enter option AN2, your deltaflow will come equipped with ½" NPT external thread connections. Here you have to take care about the connection to your transmitter (impulse piping). Can be used for all kind of media.
-AOA		If you select option AOA, your deltaflow will be equipped with a flange connection acc. to DIN 19213. Advantage: this feature will allow you to flange most differential pressure transducers directly to the unit without any additional signal conduit. This can save a great deal of time and money. Appropriate for use with all media.
-ADW		In addition to the flange connection (option AOA), the option ADW also comes equipped with a three-way manifold mounted on top of the unit. The three-way manifold makes it possible to install and uninstall the dp-transmitter during operation. It also enables you to perform a zero-point alignment without interrupting your process. As internal piping of the manifold is not capillary free (smaller diameter than 6mm) it is not recommend for humid gases (e.g. biogas)
-AKR		If you select option AKR, you will receive high grade steel ball valves with R ½" internal threads. This is generally used with Humid gasses (no capillary effect) when the dp transmitter is to be installed seperately from the probe. Ball valves can be used up to 70bar (35°C) / 200°C (2 bar).
-AAE		If you order option AAE, your probe will come equipped with a stainless steel needle valve. As a standard it will come with welding ends. Alternatively (please specify) it could also have G ½", NPT-F ½" or Ermeto or Swagelok fittings. Option AAE is generally used for fluids (i.e. feedwater or condensate) and in applications where higher pressures are involved where the dp-transmitter is to be installed in a remote position.

-**AKO**		Option AKO (oval flanges on ball valves) is used primarily for humid gasses (i.e. flue gas after scrubber, biogas etc). If you order your deltaflow with this option, you will be able to mount your dp transducer directly onto the oval flanges, and you will also have a completely capillary-free probe. In other words, any condensation which forms can flow unobstructed back into the conduit. This is significant for achieving high levels of precision. Ball valves can be used up to 70bar (35°C) / 200°C (2 bar).
-**AER**		Ermeto fitting (can be combined with other options)
-**ASW**		Swagelock fitting (can be combined with other options)
-**XX**		Customized Solution. Please use this option if you need special connection and specifiy what exactly you need. If you need this option pls. confer with systec- Controls.

Table 7 Model Code DF25 - dp-connections

Mounting Material (material weld-in parts)

Unless you intend to use an existing connection stud, your deltaflow will be delivered with all studs required for
Installation (see also *process connection*). You must select the material for these studs that is appropriate to your application (normally choosen material should be similar to pipe material)

Code	Explanation
-**MC**	Material: Carbon steel (St35.8 or similar) A standard delivery includes weldable studs made of carbon steel. St35.8 material can be welded to almost all common carbon steel pipe systems with no problems. Appropriate for use in normal to high temperature ranges (up to 450° C) and under normal to medium pressures. Non-corrosive—or relatively non-corrosive— media (air, steam, water).
-**ME**	Weld-in studs can be manufactured of high-grade steel SS316Ti (1.4571) for use under more corrosive conditions. This is usually necessary if the conduits are also constructed of high grade steel. Appropriate for use in normal to high temperatures (up to 550°C) and under normal to high pressures (up to PN400). Corrosive media (salt water, gasses containing HCl).
-**MV**	Material: High-grade steel 904L (1.4539) Weld-in studs can be manufactured of 1.4539 for use under highly corrosive conditions. Appropriate for use in normal to high temperatures (550° C) and under normal to high pressures. Highly corrosive media (gasses containing HCl or SO2, flue gasses prior to wash process).
-**MW**	Material: Hastelloy C4 Weld-in studs can be manufactured of Hastelloy C4 for use under the very most corrosive conditions. Appropriate for use in normal to high temperatures (1000° C) and under normal to high pressures (PN400). Extremely corrosive media (hot, concentrated acids, highly aggressive and condensating flue gasses prior to wash process).
-**MF**	Material: 16Mo3 (1.7380, A182-F22) This is the material used to manufacture boilers. Used primarily in steam and feedwater applications at extreme temperatures and pressures.

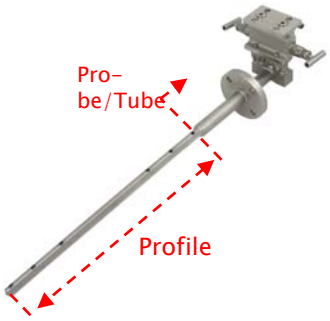
Table 8 Model Code DF25 - Material of mounting material (weld-in parts)

Other materials may also be available; do not hesitate to ask. Please be prepared to tell us what materials are used in your existing pipe system, and we will then research to determine if the appropriate installation material is available and whether it is suitable for welding.

Material of Profile / Probe

deltaflow's patented profile plays a significant role in the flowmeter's accuracy. Because the profile is surrounded
by flowing medium, the mechanical and chemical demands placed on the equipment are especially great. For
this reason, the deltaflow is always constructed of premium high-grade steel (1.4571, V4A, 316Ti). It is also

possible to use an even higher-quality construction material to meet special needs. The material which is not surrounded by flowing medium (called probe material or tube material = the part inside of mounting stud) is much less exposed to harmful influence (e.g. corrosion) and therefore standard material (SS316Ti) is sufficient when profile has to be made of higher grade steel. However the probe material can be made out of higher grade materials if your application requires it.

Code	Illustration	Explanation
-**SE**		Flow profile made of high-grade steel (1.4571, V4A, SS316Ti). Standard material, appropriate to most applications and media (gas, steam, and liquids). Resistant to medium levels of corrosion, and to temperatures up to approximately 550° C. Not appropriate for use in applications where smoke and exhaust contain sulfur particulates (risk of pitting corrosion).
-**SV**		Profile made of high-grade steel 1.4539 (904L), probe material 1.4571 (SS316Ti). High temperature and chemical resistance. Appropriate for use up to approx. 600° C. Durable. Well-suited for smoke and exhaust containing sulfur particulates
-**SVV**		Profile made of 1.4539 (904L) / Probe made of 1.4539 (904L)
-**SW**		Profile made of Hastelloy C4, probe made of 1.4571 (SS316Ti) Higher resistance to temperatures and maximum resistance to chemicals. Appropriate for use up to approx. 1000° C and with concentrated acids. Used primarily in chemical applications.
-SWW		Profile made of Hastelloy C4 / Probe made of Hastelloy C4
-**SX**		Flow profile made of high-temperature steel 1.4828 (309) High temperature resistance, average chemical resistance. Appropriate for use up to 1040° C. High mechanical stability at high temperatures. Can be used, for example, in superheated and live steam up to 650° C (i.e., in power plants).

-**SY**		Flow profile made of high-temperature/high-grade steel Haynes Alloy. Maximum temperature. Appropriate for use up to 1240° C within reducing and oxidizing environments. Maximum durability in HT areas. Typically used in metering gas and exhaust volumes in combustion processes.

Table 9 Model Code DF25 – Materials for Profile and Probe

Pipe Insulation

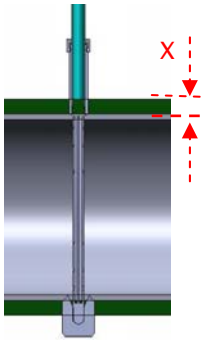
Code	Illustration	Explanation
-**X...**		The standard height of the DF25 weld-in stud is 125 mm. This length allows the stud to extend up to 100 mm beyond the insulation, sufficient to allow the probe to be installed without removing any of the insulation. If the thickness of your insulation is any greater, systec will customize the height of your stud as required.

Table 10 Model Code DF25 – Pipe Insulation

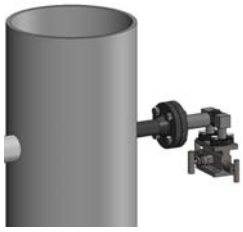
Nominal Pressure

Code	Explanation
-**PN...** (-AN....)	In order to insure that pressure-bearing parts of the deltaflow meet your requirements, please specify the pressure level within your pipe conduits (use PN for DIN pipes; use lbs. for ANSI pipes). The standard pressure level of the deltaflow is PN16 and it is available up to PN250 (liquid, gas) and PN160 (steam)

Table 11 Model Code DF25 – Nominal Pressure Rating

Pipe Orientation

The connections on the deltaflow are designed to accommodate your specific pipe orientation. For liquid service installation should allow remaining air (in internal piping) to vent off. For gas service installation should allow remaining water (e.g. condensate) to drain back into pipe.

Code	Illustration	Explanation
-OV Medium Gas (FG) or humid Gas (FF)		To meter gas in vertical conduits, the deltaflow is always installed in a horizontal position with a slight slant (0..3°) toward the point of the probe (tip of deltaflow is at lower position as flange side). The dp connections are designed at an upward-facing angle. This allows any resulting condensation to easily drain back into the conduit.
-OHO Medium Gas (FG) or humid gas (FF)		For horizontal conduits, we recommend that you install your deltaflow into the pipe from above (12 o'clock position) when you meter gases. Any condensation which develops can drain back to pipe.
-OHS Medium Gas (FG) or humid gas (FF)		It is also possible to install the deltaflow for gas in a horizontal position (3 o'clock position) in horizontal conduits. An incline of 0..3° should be maintained (tip of deltaflow at lower position than flange side) to allow condensation to drain. Connections are installed at right angles facing upwards.
-OV Medium Liquid (FL)		In vertical conduits, the deltaflow is always installed in a horizontal position with a slight upward slant (0..3°) (tip of deltaflow at higher position than flang side) The dp connections are designed at an angle, facing downwards. This allows gas bubbles to vent-off.

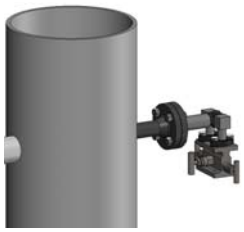
-OHU MediumLiquid (FL)		For horizontal conduits, we recommend that you install your deltaflow for liquids into the conduit from below (6 o'clock position).This ensures that air can vent-off.
-OHS Medium Liquid (FL)		It is also possible to install the deltaflow for liquid horizontally (3 o'clock position) in horizontal conduits A slight incline toward the point of the probe should be maintained in order to allow gas to vent-off (tip of deltaflow at higher position than flange sid, incline of 0…3°)
-OHS Medium Steam (FD)		The deltaflow for steam is always installed horizontally with a slight upward slant (0..3°) (tip of deltaflow at a higher position than flange side).The water-filled impulse lines lead downward to the transmitter (transmitter has to be at lower position, there should be a continous incline between deltaflow and transmitter when using impulse lines)
-OV Medium Steam (FD)		The deltaflow for steam can be also installed horizontally in vertical conduits, with a slight slant (0..3°) (tip of deltaflow at a higher position than flange side). The water filled impulse lines lead downward to the transmitter (transmitter has to be at lower position, there should be a continous incline between deltaflow and transmitter when using impulse lines)

Table 12 Model Code DF25 - Pipe Orientation

Integrated Temperature Meter

There is the possibility to integrate a temperature meter and/or a meter for static pressure in your deltaflow.
On request there are also external screw-in meters available.

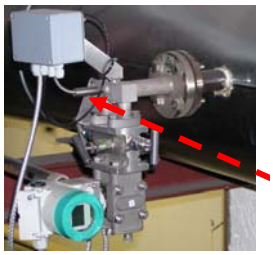
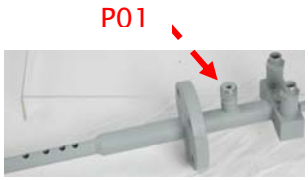
Code	Illustration	Explanation
-**T3**		Integrated PT100 element max. 400°C
-T4		Integrated PT100 with transmitter for 4...20mA output (4...20mA = 0...100°C) Requires Option AK1 (cable box)
-T5		Integrated PT100 with transmitter for 4...20mA output (4...20mA = 0...200°C) Requires Option AK1 (cable box)
-T6		Integrated PT100 with transmitter for 4...20mA output (4...20mA = 0...300°C) Requires Option AK1 (cable box)
-T7		Integrated PT100 with transmitter for 4...20mA output (4...20mA = 0...400°C) Requires Option AK1 (cable box)
-T8		Integrated thermal element (Type K) with transmitter for 4...20mA output (4....20mA=0....XXX °C). Please specify desired measurement range (XXX) Requires Option AK1 (cable box)
-T9		Integrated PT100 with transmitter for 4...20mA output (4...20mA = 0...XXX °C) for ATEX zones (all temperature ranges). Requires Option AK1 (cable box). Please specify desired measurement range (XXX)

Table 13 Model Code DF25 - Integrated meter for temperature

Integrated Pressure Transmitter (for static pressure)

Code	Illustration	Explanation

-P01		preparation for pressure transmitter with G1/2" stud (for use with seperate transmitter)
-P02		preparation for pressure transmitter with G1/2" stud and needle valve G 1/2" (for use with seperate transmitter)
-P03		Preparation for pressure transmitter, with pressure valve and steam siphon, thread-connection G1/2". Siphon is required for steam applications (for use with seperate transmitter)
-P1		absolute pressure transmitter for use in ATEX areas. Output 4...20mA
-P2		absolute pressure transmitter. Output 4...20mA
-P3		absolute pressure transmitter for use in ATEX areas. With needle valve. Output 4...20mA
-P4		absolute pressure transmitter. With needle valve. Output 4...20mA (Same as -P3 but no suited for ATEX area)

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-P5		absolute pressure transmitter with needle valve and siphon (required for steam applications). Output 4...20mA

Table 14 Model Code DF25 - Integrated transmitter for static pressure

Options

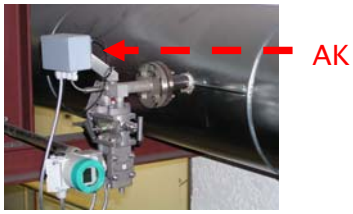
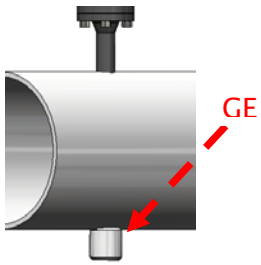
Code	Illustration	Explanation
-**AK1**		Cable box for wiring when using integrated temperature and/or pressure meter. Material: Aluminium. Including Cable Glands
-GE1		Opposite Support. Required when pipe diameter exceeds 1000mm or in case of mechanical stress caused by process parameters (high flow). If necessary or not will be automatically checked by systec Controls with order.
-3.1		Material Certificate acc. To EN 10204 with batch numbers of all used materials. With that option all materials are fully traceable back to steel mill.
-2.2		Factory Certificate acc. To EN10204. This certificate is issued by systec Controls and confirms that this deltaflow was made of a special (desired) material.
-Ptest		Pressure Test with test certificate. Pressure test will be conducted with 1.5 times of your pressure. Test can be conducted with deltaflow up to DN1000 (bigger on request)

Table 15 Model Code DF25 - Options

Code	Explanation
-**Z**	If you need any customized options please ask your systec dealer and/or specify at your order.

Spool Pieces (optional)

deltaflow can be integrated in a spool piece which is then flanged-in (screwed-in, welded-in) your pipe. Spool pieces are commonly used when there is a need for official calibration (e.g. at German PtB or other testing laboratory). Also spool pieces can be used for low flow applications. Here spool pieces come with reductions to reduce pipe diameter (and enlarge flow velocities) and therefore to generate sufficient differential pressure at the deltaflow.

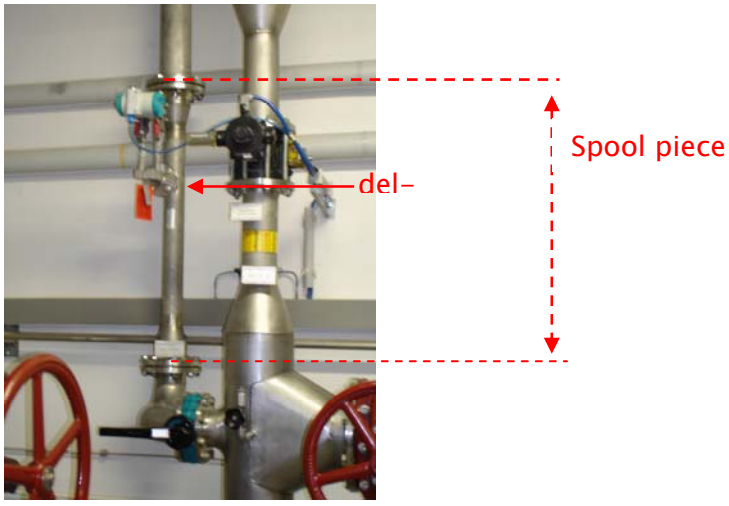


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Figure 5 Spool piece (weld-in type) with integrated deltaflow and reduction in

Type Code for Spool Pieces

	Diameter pipe connection	pipe connection	nominal pressure	diameter reduction	material	note
MS25	**-**	**-**	**-**	**-**		**DF25 spool piece**
	DN80					DN80 (3")
	DN100					DN100 (4")
	DN125					DN125 (5")
	DN150					DN150 (8")
	DN200					DN200 (8")

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DN250					DN250 (10")
DN250					>DN250 (>10")
	W				welding ends
	F				flange (DIN or ANSI RF)
		PN16			PN16, 150lbs
		PN40			PN40, 300lbs
		>PN40			>PN40, 300lbs
			NW-1		reduction by one nominal diameter
			NW-2		reduction by two nominal diameters
			NW-3		reduction by 3 nominal diameters
			NW-4		reduction by 4 nominal diameters
				MC	material CS
				ME	material VA (SS316)
				M?	other materials

Table 16 Using spool pieces – model code for spool piece

Diameter Pipe Connection

Code	Explanation
-**DN...**	Please choose pipe size according to your existing pipe

Table 17 Using spool pieces – nominal pipe diameter

Nominal Pressure

Code	Explanation
-**PN...**	Please choose nominal pressure stage of your existing pipe

Table 18 Using spool pieces – nominal pressure rating

Connection

Code	Illustration	Explanation
-**F**		When choosing this option spool piece will come with flanges

-**W**		When choosing this option spool piece will come with welding ends

Table 19 Using Spool Pieces - Type of connection to existing pipes

Reduction

Reduction means that the size of the measurement section (the place where the integrated delta-flow is) will be reduced. So size of measurement section will be smaller than your existing pipes. This is normally used for low flow applications. This is only necessary seldomly. Please calculate with your deltacalc calculation software or ask your systec dealer.

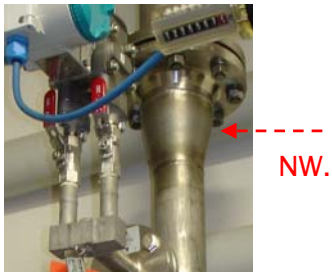
Code	Illustration	Explanation
-**NW-1**		Reduction by one nominal diameter (e.g. from DN200 to DN150)
-NW-2		Reduction by two nominal diameter (e.g. from DN150 to DN100)
-NW-3		Reduction by one nominal diameter (e.g. from DN100 to DN80)
-NW-4		Reduction by one nominal diameter (e.g. from DN80 to DN65)

Table 20 Using Spool Pieces - Reduction

Material

Material of spool piece. Typically you should choose same or similar material as of existing pipe.

Code	Explanation
-MC	Carbon Steel
-MC	Stainless steel 1.4571 (V4A, SS316Ti)
-MC?	Other materials on request

Table *21 Materials for spool pieces*

Other materials are also available on request

Upstream & Downstream Distances with/without use of ImproveIT

The new ImproveIT database makes it possible to use the deltaflow in applications where the inlet runs are very short (see also deltaflow product brochure for further informations. The following table shows upstream and downstream distances (in multiples of inner pipe diameter DI) and the corresponding accuracies when using ImproveIT. [No improveIT possible in case of valves and pumps possible]

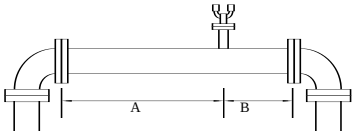
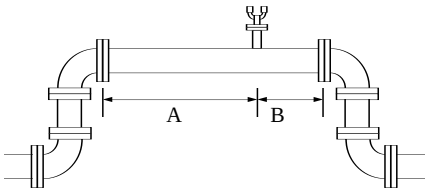
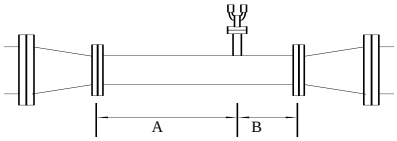
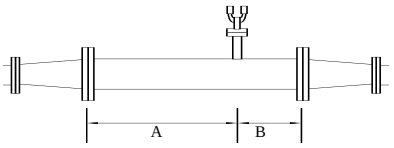
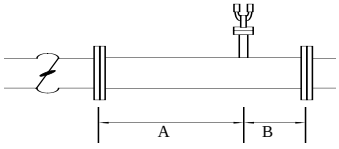
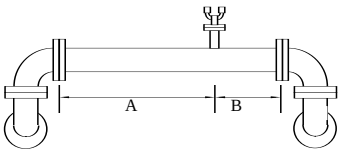
Mounting Situation	Expected Accuracy	Without Improve IT		Using Improve IT	
		Inlet A	Outlet B	Inlet A	Outlet B
	0,5%	14 x DI	3 x DI	7 x DI	3 x DI
	1,0%	**7 x DI**	**3 x DI**	4 x ID	3 x ID
	2,0 %	4 x DI	2 x DI	1 x DI	2 x DI
	0,5%	18 x DI	3 X DI	7 x DI	3 x DI
	1,0%	**9 x DI**	**2 x DI**	4 x ID	3 x ID
	2,0 %	5 x DI	2 x DI	2 x DI	1 x DI
	0,5%	14 x DI	3 x DI	7 x DI	3 x DI
	1,0%	**7 x DI**	**3 x DI**	4 x D	3 X D
	2,0 %	4 x DI	2 x DI	1 x DI	1 x DI
	0,5%	14 x DI	3 x DI	8 x DI	3 x DI
	1,0%	**7 x DI**	**3 x DI**	4 X D	3 X D
	2,0 %	4 x DI	2 x DI	2 x DI	1 x DI
	0,5%	36 x DI	6 x DI		
	1,0%	**24 x DI**	**4 x DI**		
	2,0 %	12 x Di	3 x DI		
	0,5%	24 x DI	6 X DI	12 x DI	3 x DI
	1,0%	**17 x DI**	**4 x DI**	7 x D	3 x D
	2,0 %	9 x DI	3 x DI	2 x DI	2 X DI

Table 22 Required Upstream & Downstream Distances

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Further Information

At www.systec-controls.de -> Products -> deltaflow

- deltaflow product brochure
- deltaflow Installation guide
- deltaflow calculation basics
- deltacalc calculation software for primary elements
- Data sheets of deltaflow types DF8 / DF12 / DF25HDD3 / DF44

Need further information? Do not hesitate to contact us

If you are not sure which deltaflow is right for your application, feel free to ask! We are happy to assist you.
You can find additional detailed information about the deltaflow in the product pages on our web-site.
There (Contact & Information) you will also find a listing of sales representatives in your area and our partners
in other countries. There you have also the possibility to send inquiry using our online formular.

Manufacturer Contact

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