



Instruction Manual

DTL08

Compact Calorimetric Flowmeter for Air



PKP Prozessmesstechnik GmbH
Borsigstraße 24
D-65205 Wiesbaden-Nordenstadt
Tel.: ++49-(0)6122-7055-0
Fax: ++49-(0)6122-7055-50
Email: info@pkp.de

The DTL08 is a micro controller based airflow monitor which watches gaseous flows from 0.1m/s to 30m/s. It provides a 4-20mA as well as a 0-10V-DC output. Also it provides a 0-10V-DC output based on the temperature. Electronic and sensor are monitored for function.

Technical Data:

Type	DTL08 standard	DTL08 separated sensor
supply voltage	24V DC	24V DC
supply voltage tolerance	+/- 5%	+/- 5%
surge category	II	II
supply voltage signal	green LED	green LED
power consumption	4VA	4VA
ambient temperature	-20..+50°C	-20..+50°C
flow voltage output	0..10V, linear	0..10V, linear
load resistor	Ra =10kOhm	Ra =10kOhm
flow current output	4..20mA, linear	4..20mA, linear
load resistor	Ra = 0,4kOhm	Ra = 0,4kOhm
flow temperature output	0..10V, linear	0..10V, linear
load resistor	Ra =10kOhm	Ra =10kOhm
relays output	changeover contact,	changeover contact,
clamp 9/10/11	open or closed at flow	open or closed at flow
switching load	250V AC 0,25A	250V AC 0,25A
minimum switching load	10mA / 5V DC	10mA / 5V DC
function at flow	switch point set with potentiometer	switch point set with potentiometer
transistor output (max.150mA)	open collector, isolator at flow	open collector, isolator at flow
reproduceability of measurement values	± 2%	± 2%
for identical condition		
temperature dependence of output	± 1% EW / 10K	± 1% EW / 10K
accuracy (by 22°C, 35% r.F.1013mbar)	+/- 5% of measurement range	+/- 5% of measurement range
measurement error	± 1% of measurement range/ ± 0,5K / ± 1mbar	± 1% of measurement range/ ± 0,5K / ± 1mbar
start up time	55sec	55sec
media temperature*	-25..+80°C	-25...+120°C, optional +250 or 350°C*
temperature gradient	30K/min	30K/min
switch point	set by potentiometer	set by potentiometer
measurement range standard*	0,1-10 m/s	0,1-10 m/s
measurement range max	0,1-30m/s; optional up to 70m/s	0,1-30m/s; optional up to 70m/s
volume flow max	49100 m³/h	49100 m³/h
volume flow max	49100 l/min	49100 l/min
sensor type	mounted	seperate F3.X or F8.X
immersion depth approx.	130/50/165/300mm	50/130/165/300mm
process connection	PG7 optional M16x1,5, G1/2", M20x1,5	PG7 optional M16x1,5, G1/2", M20x1,5
sensor material	MS, nickel plated, stainless steel	MS, nickel plated, stainless steel
pressure resistance	10bar	10bar
control sensor	yes	yes
broken wire detection	yes	yes



Electrical connection

Terminal Block

1	+24V (supply voltage)	
2	GND (supply voltage)	
3	flow temperature output	0...10V (related to Clamp 2)
4	flow voltage output	0...10V (related to Clamp 2)
5	not used	
6	flow current output	4..20mA (-)
7	flow current output	4..20mA (+)
8	transistor output	150mA max./ open collector, isolator at flow
9	relay output	nc normally open (clamp 9/10)
10	relay output	
11	relay output	nc normally closed (clamp 10/11)

Connection sensor	F3	F8
Clamp 4	yellow	blue
Clamp 3	white	black
Clamp 2	brown	red
Clamp 1	green	brown

Displayed elements

Green LED	supply voltage on / flashes during initiation
Yellow LED	operational readiness / flashes in use
Red LED 1 – 10	flow in 10 percentage steps (1.LED = 0-10% of the adjusted measurement range, 2.LED = 11-20% of the adjusted measurement range and so on)
Flashing red LED	displaying the adjusted break point Without display: break point can only be set in use of the potentiometer (placed above the DIP switch)

ATTENTION: Do not connect clamp 2 with 6 !

Relay output 1 changeover contact **Function of the relay contacts** **Device in use (normal voltage on) without flow**

Clamp 9	Opener	(Clamp 9/10)
Clamp 10	Middle pin	
Clamp 11	Closer	(Clamp 10/11)
Contat rating	24V DC, 2,A max. / 250V AC, 0,25A max.	

Switching output transistor max. power 150 mA.

Operating elements

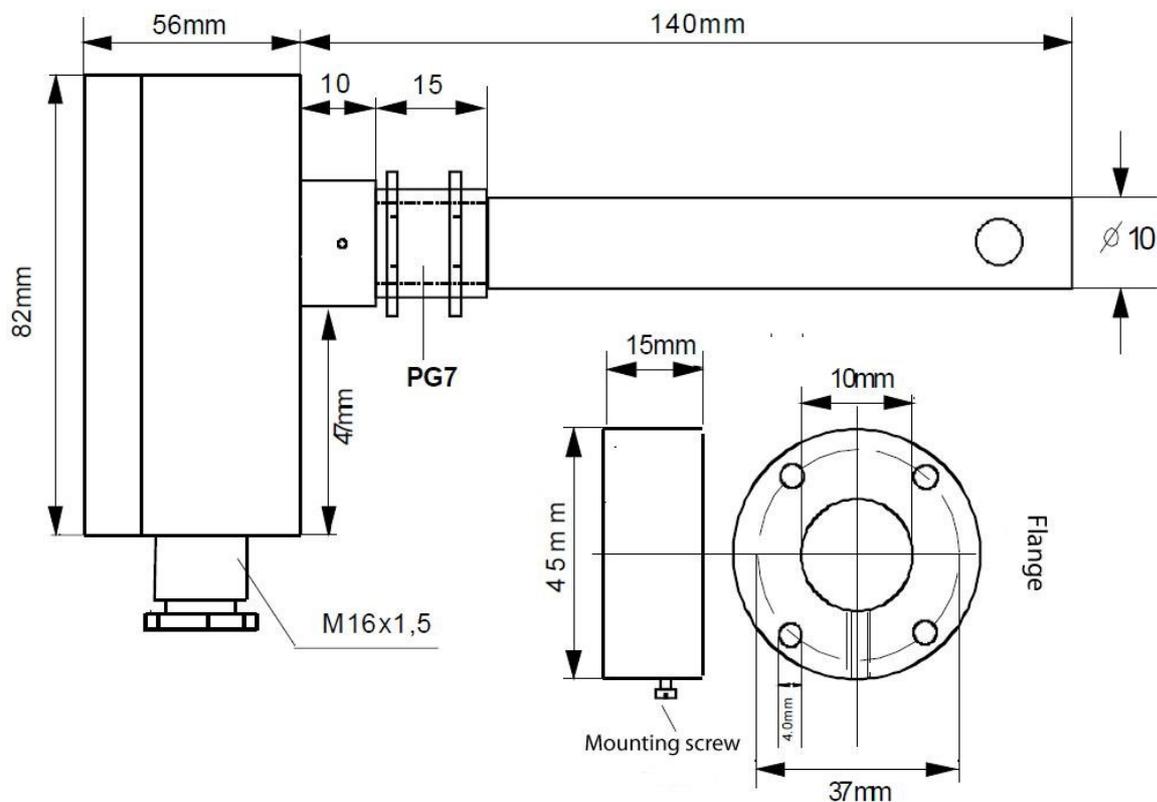
Button T1	(placed at the top left corner of the pcb)
Button T2	(placed at the top right corner of the pcb)
Potentiometer	Breaking point adjustment from 1 to 100 % of the preset measurement range

DIP Switch (S1 bis S8)

S1..7 configuration:

Number Dip-Switch	function „ON“	function „OFF“
S8	Not used	Not used
S7 velocity dimension	m ³ /h	m/s
S6 slow down/ damping factor	100 (high)	35 (low)
S5 flow range	3 m/s - 1000 m ³ /h	
S4 flow range	30 m/s - 2000 m ³ /h	
S3 flow range	16 m/s - 10000 m ³ /h	
S2 flow range	10 m/s - 5000 m ³ /h	
S1 flow range	1 m/s - 1000 m ³ /h	

Dimensions: depth of box about 86mm

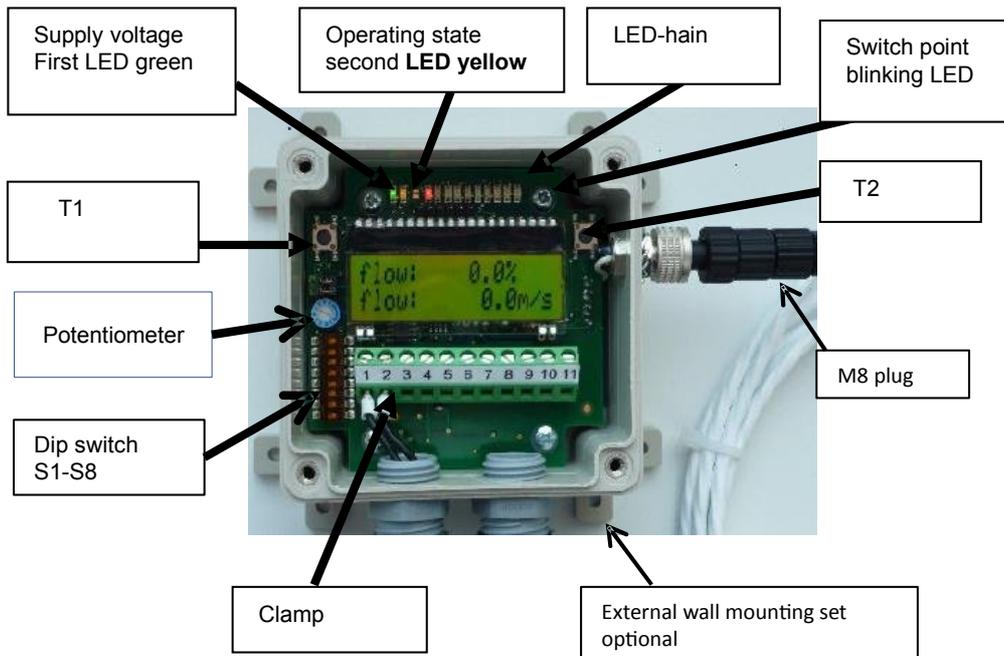


Intended usage

The DTL08 (with or without LCD) is manufactured for the monitoring of gaseous media at flows/volumes within its provided technical characteristics. Its application areas are e.g. climate- and cooling installations, machines and equipments for filter monitoring, monitoring in clean rooms, monitoring of supply air (heating register), monitoring of volume flows and others.

Setting up a DTL08

The LED-chain shows the actual flow relatively to the maximum flow (e.g.: max. flow=10m/s, 3 LEDs enlighthend, means 30% respectively 3m/s). If the most right LED blinks, the flow is above the maximum flow. The switch point is set by the potentiometer. The set switch point is shown by a blinking LED in the LED-chain.



Additional switch point possibilities 1: relatively

If the switch-point-mode (menu marker 6: "Alarm") is set to "flow%" you will be asked to set a count from 1 to 99. This count suits the switch point in percent to the maximum flow. E.g.: max. flow=10m/s, switch point set to 50%, means actual 5m/s.

Additional switch point possibilities 2: Reference

If the switch-point-mode (menu marker 6: "Alarm") is set to "ref%" you will be asked to set a count from 1 to 99. This count suits an automatically gathered value which is gathered in 120s after leaving the menu. While the value is gathered the monitoring device measures the flow and after 120s the device calculates an average value. From this average value the switch point will be calculated.

Menu

The menu is handled with two buttons which can be found above the display. To get into the menu you need to press and hold T1 for about 3s.

Marker	Display		Select	Explanation
	<i>German</i>	<i>Englisch</i>		
1	language	language	deutsch/englisch	menu language
2	geschw dim	flow dim	m/s, m ³ /h, l/min	flow dimension
3	geschw max	flow max	0...80m/s	maximum flow
4	Rohr Durchm	pipe diam	1...2500mm	pipe diameter
5	Alarm	alarm	Pot, flow%, ref%	alarm selection
6	alarm hyst	alarm hyst	0...99%	alarm hysteresis
7	alarm verz	alarm del	0...255s	alarm delay
8	start verz	start del	0...300s	start up delay
9	kal fakt	cal fact	30...255%	calibration factor

Menu handling with T1 and T2 (T1=continue, T2=select/set).

To save your settings you need to go through the menu until "save and exit" is shown on the display. Pushing T2 you can select "save and exit" and push button T1 to save your settings.

The structure of the menu may vary due to limitations to your application and can not be modified by you!

Attention! If you change the display from m/s to another dimension (m³/h, l/min) it is unavoidable to reset the switch point and the measurement range! If the device was set to 5m/s it will react at 5l/h! In order to simplify the handling, you can inform us while ordering about your preferred unity and we will preset these.

Information: The LC-Display is covered with a transparent foil to guard it from harm. You can strip it carefully off to enlarge the contrast of the display.

Display of the measurement results

The DTL08 LCD has different ways of displaying the actual flow and temperature measurement results. By default, the first row displays the actual temperature absolutely. The second row displays the absolute flow. With pushing T2 you can change the display:

- pushing T2 once: first row: flow relatively, second row: flow absolutely
- pushing T2 twice: first row: temperature relatively, second row: temperature absolutely



Signal outputs

The output relay provides an opener/closer (depending on model) or a potential free change-over-contact. The switch point of the transistor output is set with potentiometer analogically to the relay output.

Following analogue outputs are provided as well:

output	dependence	
0..10V DC	temperature	clamp 3 (+) and 2 (ground)
0..10V DC	flow / volume flow	clamp 4 (+) and 2 (ground)
4..20mA DC	flow / volume flow	clamp 7 (+) and 6 (ground)

Do not connect clamp 2 with 6 !

S1..5 If no switch of the number 1 to 5 is adjusted on "on", the factory-provided preset of the measurement range is key, which is 30m/s, not related to the position of the switches 6 and 7. To activate the preset measurement range of the switches 1 to 5, one of these DIP-switches needs to be adjusted on "on". If more than one switch of the switches 1 to 5 is active, the switch with the highest number is relevant and in correlation to this switch the related measurement range is basis.

ATTENTION: Overwrites the measuring ranges set in the menu !

S6 & 7 are active, if at least one of the switches 1 to 5 is adjusted on "on". If you change the unity of the speed, a re-start is required.

S8 free



What to do if flow monitor does not operate properly:

Problem	Cause	Solution
green LED darkened	wrong or wrongly connected supply voltage	check supply voltage
no recognition of flow	wrong or wrongly installed sensor	check sensor installation and sensor number
sensor show abnormal sensitivity	sensor is polluted	clean sensor (refer to "cleaning the sensor"!))
no signal output	check the connections	Disconnect clamp 2 with 5 – Restart If the problem is not resolved contact SEIKOM Support

DTL08

Compact Calorimetric Mass Flow Sensor for Air

- **current and voltage outputs for mass flow rate**
- **limit switch**
- **additional analogue output for temperature**
- **measuring range: 0,1...30 m/s**
- **max. pressure: 10 bar, max. temperature: 80 °C**
- **insignificant pressure drop**
- **no moving parts**
- **unaffected by duct diameter, pressure and temperature**



Description:

Model DTL08 mass air flow sensors function according to the proven-reliable calorimetric principle. The sensor tip contains a resistor which is electronically heated. The air flowing around the sensor tip removes heat from it, thus changing its electrical resistance value. A second, unheated resistor detects the air temperature.

The temperature difference between both resistors is proportional to the flow rate and thus to the flow volume. Model DTL08 mass air flow sensors are microprocessor based and come standard with linear analogue outputs for flow rate and temperature as well as a limit contact.

Typical applications:

Model DTL08 mass air flow sensors are economical, high performance units. These devices are used in applications where the flow of straight, non-turbulent air streams has to be measured or monitored. Such applications include the following: HVAC, air-supply systems, air-compressor monitoring, air-consumption measurement, leak monitoring, cooling circuits, and the like.

Models:

- DTL08.ALS...:** linear analogue output for air flow,
linear analogue output for temperature,
switch output for flow
- DTL08.ALCD...:** linear analogue output for air flow,
linear analogue output for temperature,
switch output for flow
LCD-display

Technical Data:

- Measuring range:** 0,1...30 m/s
- Analogue output flow:** 4...20 mA (Ra = 200 Ohm)
0...10 V (Ra = 10 kOhm)
with dip-switches adjustable:
0,1...1 m/s
0,1...3 m/s
0,1...10 m/s
0,1...16 m/s
0,1...30 m/s
- Analogue output temperature:** 0...10 V (Ra = 10 kOhm)
- Relay output:** 1 changeover, 250 VAC, 0,25 A
min. load: 10 mA, 5 VDC
switching point: adjustable with potentiometer
- Transistor output:** open drain, max. 150 mA
conductive: adjusted switching point
understepped
switching point overstepped
non conductive: switching point overstepped
- Power supply:** 24 VDC \pm 5 %
- Max. power consumption:** 4 VA
- Accuracy ¹⁾:** \pm 5 % of measured range end value
- Reproducibility ¹⁾:** \pm 2 %
- Temperature range:**
Ambient: -20 ... +50 °C
Medium: -25 ... +80 °C
- Temperature gradient:** 30 K/min
- Max. pressure:** 10 bar
- Process connection:** threaded PG7 (standard)
mounting flange;
adapter M16 x 1,5 or G1/2 male thread
- Insertion depth:** 130 mm, other sensor lengths on request
- Sensor diameter:** 10 mm
- Sensor material:** brass, nickel plated
- Electronic housing:**
Material: plastic
Dimensions: LxWxH = 56x84x82 mm
- Protection cl. (housing):** IP65
Protection cl. (sensor): IP54

1) Referenz conditions: inlet zone > 10 x DN, outlet zone > 10 x DN, laminar flow, air at 0 °C and 1.013 bar

Order Code:

Order number: DTL08. ALS. 30. 1. 0

Compact calorimetric flowmeter for air

Models:

ALS = analogue outputs for flow
and temperature, limit contact
ALCD = additional LCD-Display

Default setting of analogue output:

01 = 0.1...1 m/s
08 = 0.1...3 m/s
10 = 0.1...10 m/s
16 = 0.1...16 m/s
30 = 0.1...30 m/s

Process connection:

1 = PG7 threaded connection (7 mm)
2 = mounting flange
3 = M16x1,5 male (with adapter)
4 = G 1/2 male thread (with adapter)

Options:

0 = without
9 = please specify in plain text

Dimensions:

