CALOR 38

Heat and Cooling Consumption Meter CALOR 38

is used for measuring supplied heat and cooling energy. At the customer's request, it can be adapted for a wide range of applications, such as transfer stations, industrial or residential buildings, individual housing developments, shopping centers, and various technological processes or operations.

It is characterized by high accuracy, repeatability, and stability of metrological parameters.

The device is equipped with several configurable outputs (pulse, status, and additionally an analog current loop 4 ... 20 mA, RS485).

The backlit display has two lines that show supplied energy, volume, instantaneous flow rate, power, and temperatures, as well as date, time, and, in case of a fault, a description of the error.

The meter features a daily archive that stores the energy counter (up to 176 records – days). The stored values are accessible via the RS485 communication interface.

It can be supplemented with additional M-Bus communication modules.

MAIN BENEFITS

- High measurement accuracy across the entire range
- Measures from a temperature difference as low as 0.6 °C
- Capability to measure cooling, e.g., in glycol mixtures, including implemented calculation curves
- Long-term stability of metrological parameters
- Remote as well as local data reading
- Flow sensor can be adapted even for very aggressive liquids
- Contains no moving parts
- Causes no pressure loss
- Separate registers for heat and cooling measurement
- Measurement possible for both positive and negative ΔT

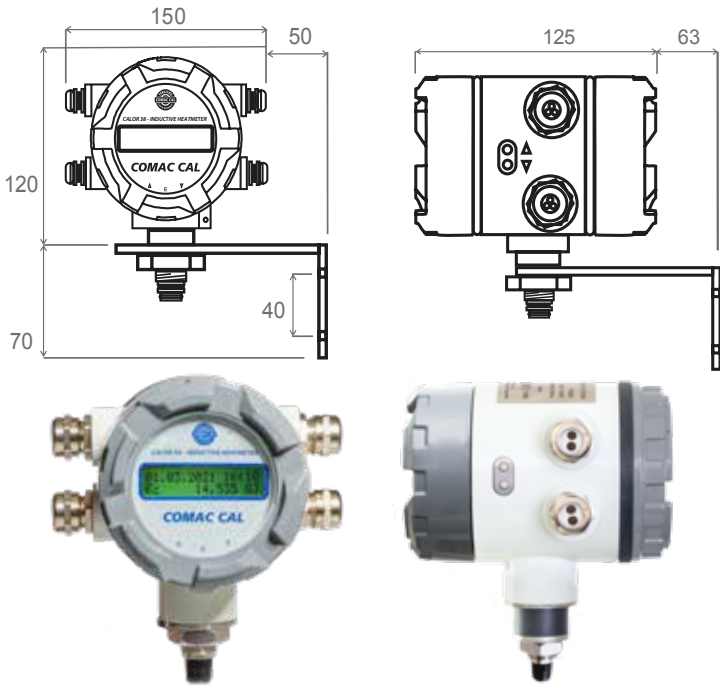
COMAC CAL

TECHNICAL DATA

Power Supply	*230 V AC (+10; -20) %, (50...60) Hz (standard)* *24 V AC/DC with reverse polarity protection*
Power Consumption	*9,6 VA*
Electronics Type	*H – Head-mounted*
Design	*Compact (T_{max} = 90 °C), Remote (minimum cable length 3 m)*
Nominal Diameter	*DN 10 ... DN 600 (other DN available upon request from manufacturer)*
Lining Material (Minimum and maximum temperatures)	*Rubber (hard, soft, certified for drinking water): DN 32 ... DN 600 (Tmin = 0 °C, Tmax = 70 °C)* *Ceramic (upon agreement with manufacturer)* *Rilsan: DN 25 ... DN 200 (T_{min} = -20 °C, T_{max} = 70 °C)* *PVDF: DN 6 ... DN 32 (T_{min} = -40 °C, T_{max} = 140 °C)* *PFA: DN 10 ... DN 250 (T_{min} = -40 °C, T_{max} = 170 °C)* *PTFE: DN 10 ... DN 80 (T_{min} = -40 °C, T_{max} = 140 °C)* *ETFE: DN100 ... DN 600 (T_{min} = -40 °C, T_{max} = 140 °C)*
Electrode Material	*Stainless steel 316 Ti, Hastelloy C, Titanium, Tantalum*
Construction	*All-welded*
Sensor Body Material	*Flanged: stainless steel or carbon steel with polyurethane coating* *Threaded, sandwich: stainless steel 316* *Clamp/Sanitary fittings (DIN 32676/DIN11851): stainless steel 316*
Process Connections	*Flanged (EN1092)* *Threaded, sandwich (EN10226-1)* *Clamp/Sanitary fittings (DIN32676/DIN11851)*
Pressure Rating	*PN10 - PN40*
Min. Conductivity of Medium	*5 µS/cm*
Measuring Range (q_i/q_s)	*1/60, 1/100, 1/200*
Min. temperature difference	*ΔΘ min. 0,6*
Flowmeter Accuracy	*Up to 0,5 % (for 0,1...10 m/s)*
Repeatability	*Up to 0,2 % (for 0,1...10 m/s)*
Pressure Loss	*Negligible*
Additional Electrodes	*Reference grounding and empty pipe detection*
Display	*LCD 2×16 characters, backlit*
Controls	*2× external buttons (value browsing)* *3× internal buttons (value browsing + parameter setting)*
Outputs	*2× pulse/status (max. 400 Hz) (passive / active)* *1× current (4...20 mA) (passive / active)* *(active output can be powered from internal source)* *1× RS485 or M-Bus interface (communication protocol: Modbus/M-Bus)*
Modules	*M-bus, IoT*
Ambient Temperature Range	*5 to 55 °C*
Ingress Sensor Protection	*IP65, IP67, IP68*
Ingress Electronics Protection	*IP65, IP67*

ELECTRONICS

STANDARD UNIT (HEAD)



DISPLAY UNIT CONTROL

The device is equipped with **two external buttons** located on the side of the electronics housing and **three internal buttons** accessible after unscrewing the front cover.

The external buttons allow **viewing of measured values and settings.** After removing the front cover, the three internal buttons enable **modification of the configuration parameters.**

For more convenient display reading in both **compact and remote versions,** the transmitter unit can be **rotated up to 350°.** Additionally, after loosening the screws beneath the cover, the display itself can be rotated **up to 270°** in all directions, by 90° at a time.

FLOW RANGES

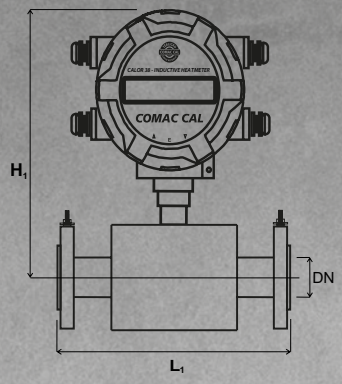
Table of flow ranges q_i/q_s for individual nominal diameter

DN [mm]	*q_i [1/200] [m³/h] (I3)*	*q_i [1/100] [m³/h] (I2)*	*q_i [1/60] [m³/h] (I1)*	*q_p [m³/h]*	*q_s [m³/h]*
DN 10	-	*0,034*	*0,06*	*1,7*	*3,4*
DN 15	*0,038*	*0,076*	*0,13*	*3,8*	*7,6*
DN 20	*0,071*	*0,142*	*0,24*	*7,1*	*14,2*
DN 25	*0,105*	*0,21*	*0,35*	*10,5*	*21*
DN 32	*0,17*	*0,34*	*0,6*	*17*	*34*
DN 40	*0,27*	*0,54*	*0,9*	*27*	*54*
DN 50	*0,42*	*0,84*	*1,4*	*42*	*84*
DN 65	*0,72*	*1,44*	*2,4*	*72*	*144*
DN 80	*1,1*	*2,2*	*3,6*	*110*	*220*
DN 100	*1,7*	*3,4*	*5,6*	*170*	*340*
DN 125	*2,67*	*5,34*	*8,9*	*267*	*534*
DN 150	*3,8*	*7,6*	*13*	*380*	*760*
DN 200	*6,75*	*13,5*	*23*	*675*	*1350*
DN 250	-	*21,1*	*35*	*1057,5*	*2115*
DN 300	-	*30*	*51*	*1525*	*3050*
DN 350	-	*41*	*70*	*2075*	*4150*
DN 400	-	*54*	*90*	*2713*	*5426*
DN 500	-	-	*141*	*4240*	*8480*
DN 600	-	-	*203*	*6100*	*12200*

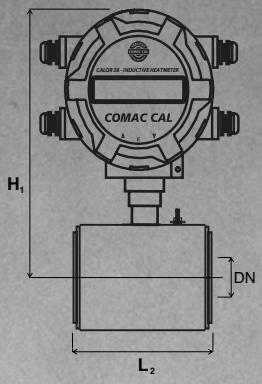
Note:
q_i - minimum flow rate
q_p - permanent (nominal) flow rate
q_s - maximum flow rate

CALOR 38

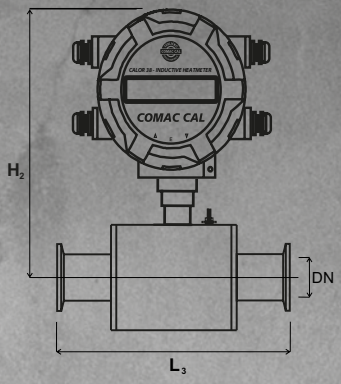
FLANGED CONNECTION
(EN 1092)



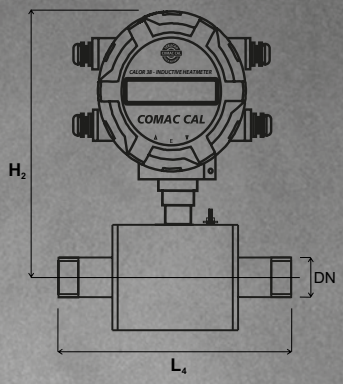
SANDWICH CONNECTION

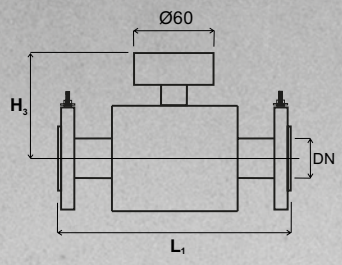


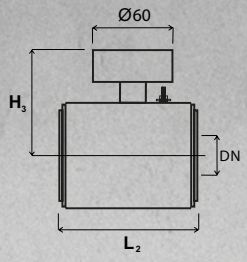
CLAMP / SANITARY
FITTING (DIN32676/DIN11851)

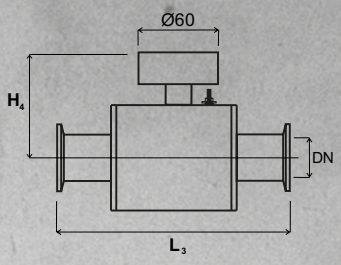


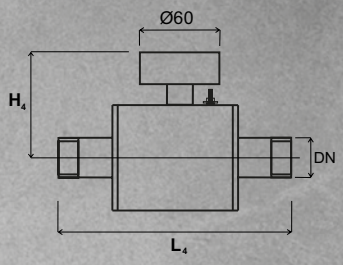
THREADED CONNECTION
(EN 10226-1)







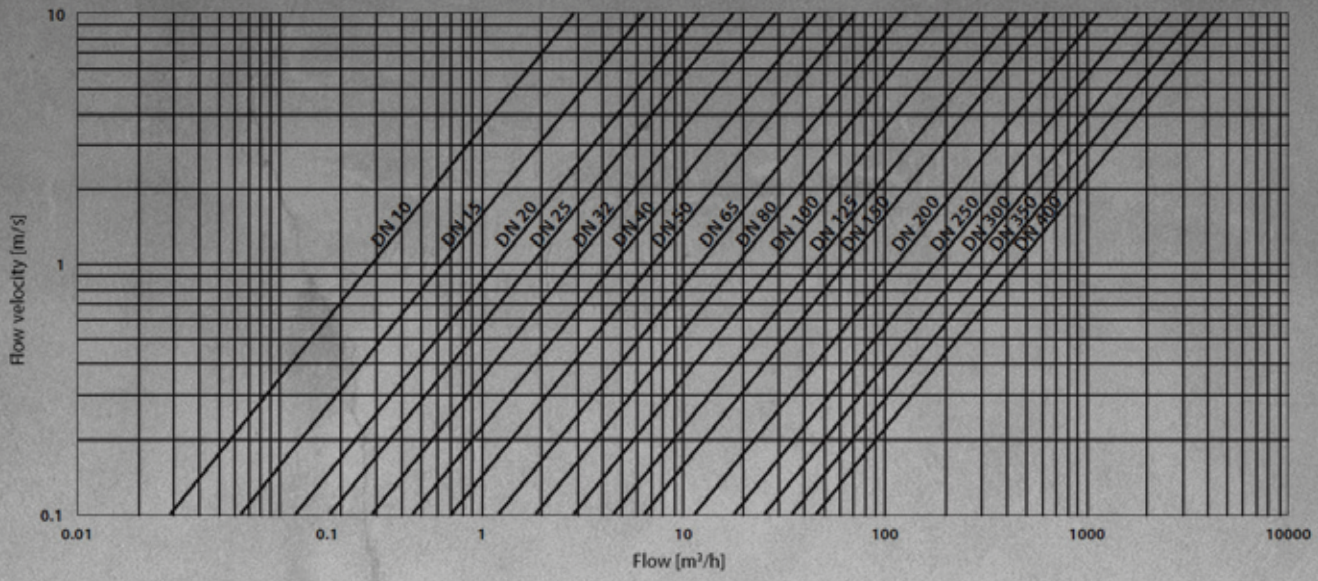




DIMENSIONAL TABLE

Connection [mm]	Installation length [mm]				Total height [mm]			
					Compact version		Remote version	
	Flanged	Sandwich	Clamp / Sanitary Fitting	Threaded	Flanged	Threaded	Flanged	Threaded
DN	L1	L2	L3	L4	H1	H2	H3	H4
10	200	90	180	190 (3/8")	173	197	86	90
15	200	90	180	190 (1/2")	173	197	86	90
20	200	90	180	200 (3/4")	173	202	86	95
25	200	90	180	200 (1")	178	207	91	100
32	200	90	190	230 (1 1/4")	183	214	96	105
40	200	110	210	245 (1 1/2")	188	220	101	113
50	200	110	230	254 (2")	196	230	109	123
65	200	130	277	277 (2 1/2")	206	–	119	–
80	200	130	285	285 (3")	213	–	126	–
100	250	200	–	–	226	–	139	–
125	250	200	–	–	239	–	152	–
150	300	200	–	–	254	–	167	–
200	350	200	–	–	284	–	197	–
250	450	–	–	–	327	–	240	–
300	500	–	–	–	352	–	265	–
350	550	–	–	–	382	–	295	–
400	600	–	–	–	412	–	325	–
500	600	–	–	–	892	–	797	–
600	600			–	1025	–	930	–

DIAGRAM OF VOLUME FLOW RATE VS. INSTANTANEOUS FLOW VELOCITY



PRODUCT ORDER CODE

C38/DNxxx/Ax(m)/Bx/Cx/Dx/Ex/Fx/Gx/Hx/Ix/Jx/Kx/Lx/Mx/Nx

DN (nominal diameter)
DN... 10 ... 600

A (design)
A1... compact
A2... remote (cable length 3 ... 30 m, T_{max} 150 °C)
A3... remote (cable length 3 ... 30 m, T_{max} 80 °C

B (connection)
B1... flanged
B2... wafer
B3... threaded
B4... dairy fitting
B5... clamp
B6... flanged SS304
B7... flanged SS316

C (pressure rating)
C1... PN10 (DIN)
C2... PN16 (DIN)
C3... PN25 (DIN)
C4... PN40 (DIN)
C5... PN63 (DIN)
C6... PN100 (DIN)
C7... 10K (JIS)
C8... 20K (JIS)
C9... 40K (JIS)
C10... Class 150 (ANSI)
C11... Class 300 (ANSI)

D (lining)
D1... hard rubber
D2... soft rubber
D3... rubber drinking water approved
D4... PTFE
D5... PFA
D6... ceramic*
D7... ETFE
D8... PVDF*
D9... RILSAN*

E (electrodes)
E1... stainless steel 316 Ti
E2... hastelloy C
E3... titanium
E4... tantalum

F (IP protection)
F1... IP65
F2... IP67
F3... IP68

* On request

N (meter install. location)
N1... return pipe
N2... supply pipe

M (min. temperature differences)
M5... dT=0,6°C, med. temp. to 170 °C

L (Pt500 temp. sensor cable length)
L1... 4m
L2... 6m
L3... 8m
L4... 10m
L5... 12m
L6... 15m

K (welded nozzles)
K1... NO
K2... YES

J (insertion lengths)
J1... 36mm
J2... 86mm
J3... 100mm
J4... 136mm
J5... 176mm

I (measuring range q_i/q_s)
I1... 1/60
I2... 1/100
I3... 1/200

H (power supply)
H1... 230 VAC
H2... 24 VAC/DC
H8... 110 VAC

G (output)
G1... pulse/switch (flow switch)
G2... pls./sw. + 4 ... 20 mA
G3... pls./sw. + RS485
G4... pls./sw. + 4 ... 20 mA + RS485 (RS485 support M-bus/Modbus RTU protocols)

ACCESSORIES / Optional Modules:

- Módulo M-bus
- NB IoT module

PRECISION COMAC CAL MEASUREMENT

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