SVM F27 Compact

Compact heat meter

Users' manual

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1 Installation

1.1 Connection and mounting

F27 may only be installed by trained professionals. We recommend installation according to common industry standards.

1.1.1 Flow part, mounting

The technical data is on chapter 7. NOTE: The sign that indicates the flow direction allowed in the flow sensor. The flow part may be installed vertical or horizontal.

We recommend mounting according to ”Svensk fjärrvärme”. We also recommend shut down valves before and after the flow sensor for easy service. For threaded flow parts replace DN to the threaded size, where 1” is 2.54 cm.

Exemple: Recommended distance for threaded flow part 1” = > 2.54 * 1 * 10 = 25.4 cm

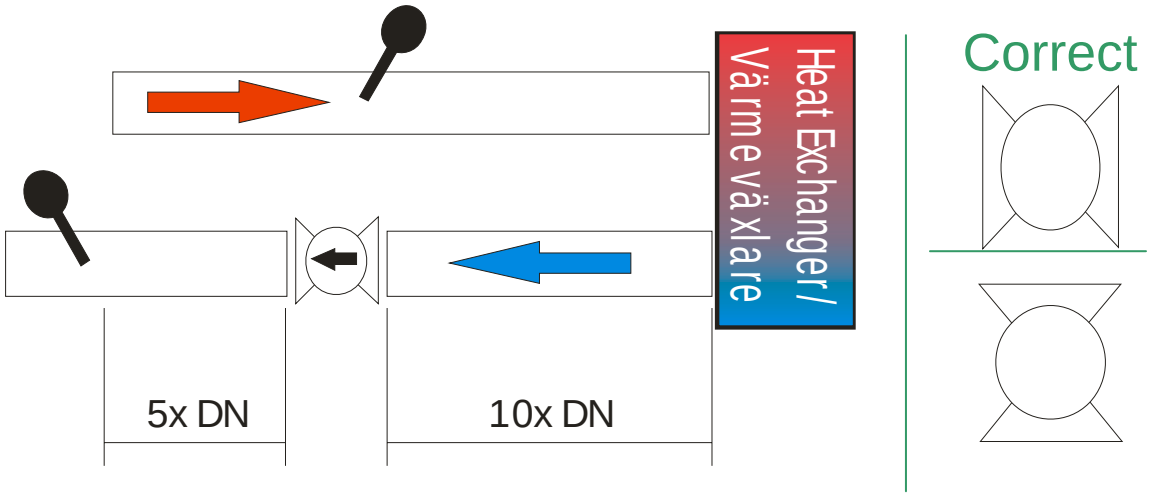


Fig. 1.1.1, Recommended distances to other devices. Horizontal or vertical mounting is allowed.

1.1.2 Temperature sensors, mounting

The temperature sensors should be mounted in the middle of the flow profile. The sensor should be tilt approximately 45° for best temperature measurement.

The temperature sensors are connected to the F27. Depending on size or on delivery options the temperature sensor can be disconnected from the F27. To connect the temperature sensors open the lid on the F27 and connect the temperature sensors.

For some flow parts there TDA26 can be mounted directly into the flow part. Note: Only TDA26 with cut in the nut may be used, see also chapter 6.2.1. The “old” TDA26 without cut will leak when used.

Important! The F27 is set so that the flow part shall be installed on the cold side (L). To change this setting, see chapter 4 service.

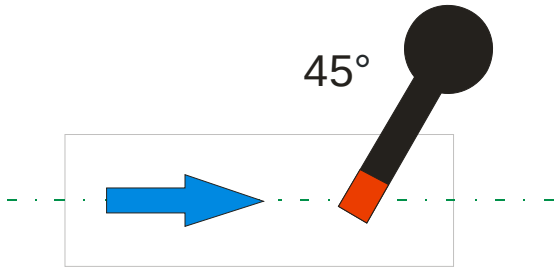


Fig. 1.1.2, Recommended mounting, tip of the temperature sensor in the middle of the tube and tilted 45 degrees.

1.1.3 Calculator, mounting

The calculator part of the F27 can be rotated in 90 degrees on the flow part. F27 robust construction allows any positioning of the calculator part on the flow part, on top, bottom or at the side.

The fastening device can be removed and can be used to wall mount the calculator part of the F27. The pulse cable is the cable between the flow part and the calculator part and is approximately 1 meter. This cable may not be cut or in other way changed.

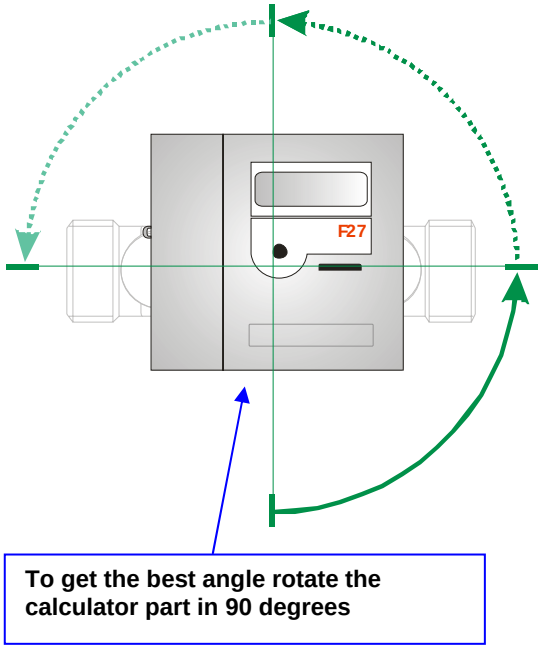


Fig. 1.1.3a, Calculator part can be rotated on the flow part

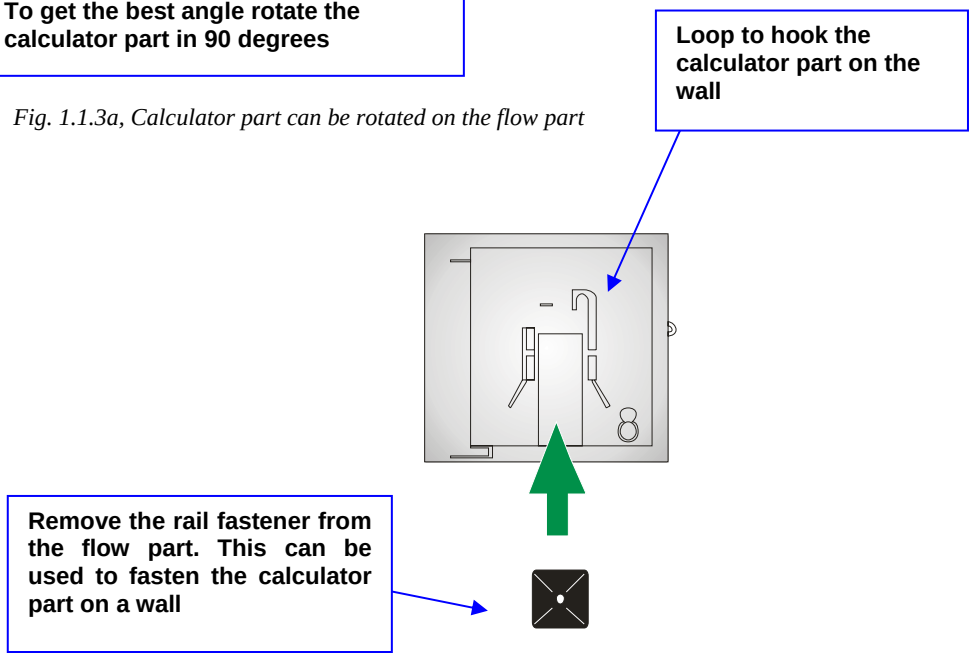


Fig. 1.1.3b, Wall mount the calculator part on the F27

1.2 Start F27

The F27 is delivered in transport mode. This means that the calculator is in a sleep mode, no measurements are done from the calculator. This mode is indicated with a “NO” in the upper left corner of the display. To start the F27 hold the display button in five seconds, until the “no” disappears. Operating, normal mode is indicated with ”10” in the display.

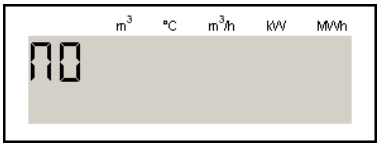


Fig. 1.1a, Display shows transport mode

In service mode some settings in the calculator can be altered, see also chapter 4.

NOTE: The calculator must be set in normal mode before finishing the installation.

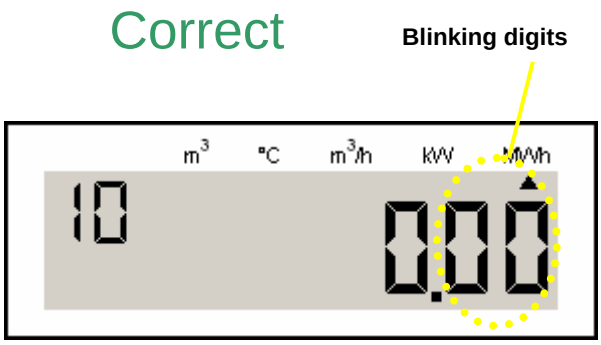


Fig. 1.2b, Normal mode, the F27 measures and calculates energy. The F27 must be set in this mode before finishing the installation

According to EN1434 the calculator must clearly indicate the decimal setting. This is done in F27 by blinking digits

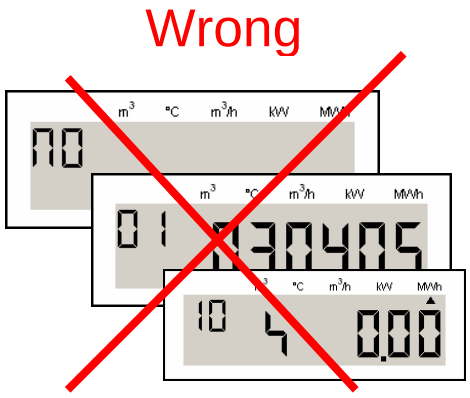


Fig. 1.2c, NOT normal mode, never leave calculator in this mode.

Top, transport mode
middle, Service mode
below, Testmode

1.3 Connections

The connection terminals are placed safely inside the F27.

When the F27 is mains supplied a 1.5 [m] mains cable is delivered with the heat meter.

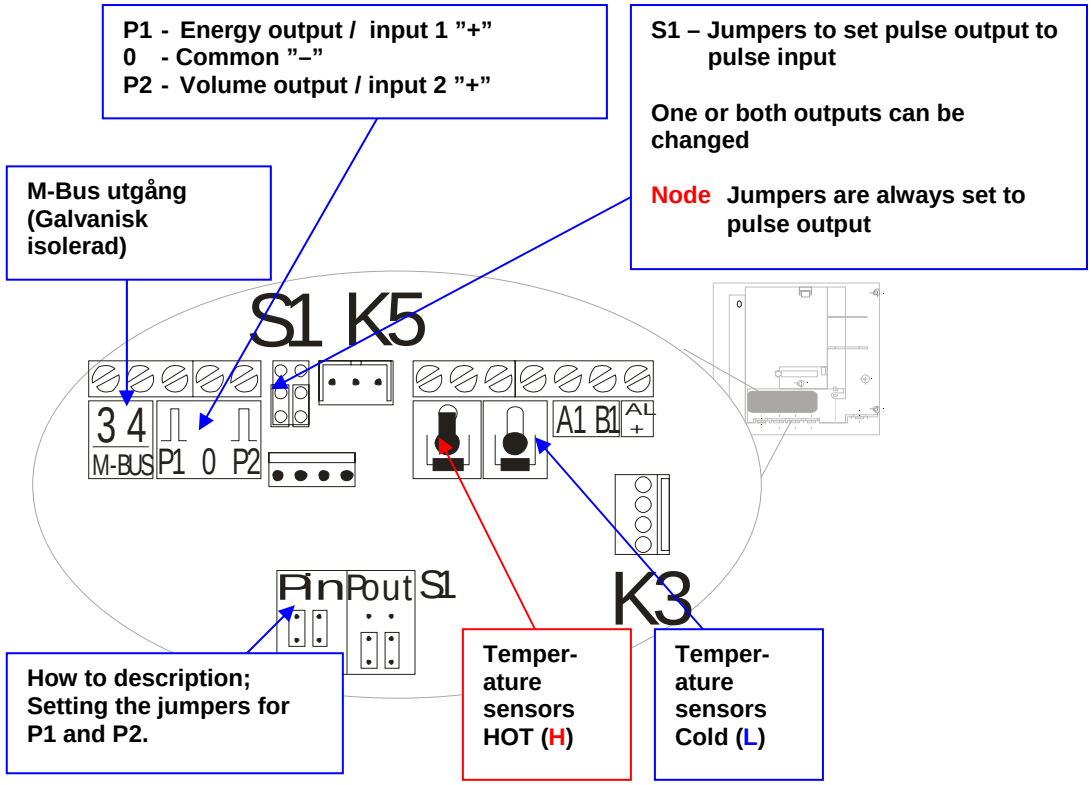


Fig. 1.3a, Connection terminal F27

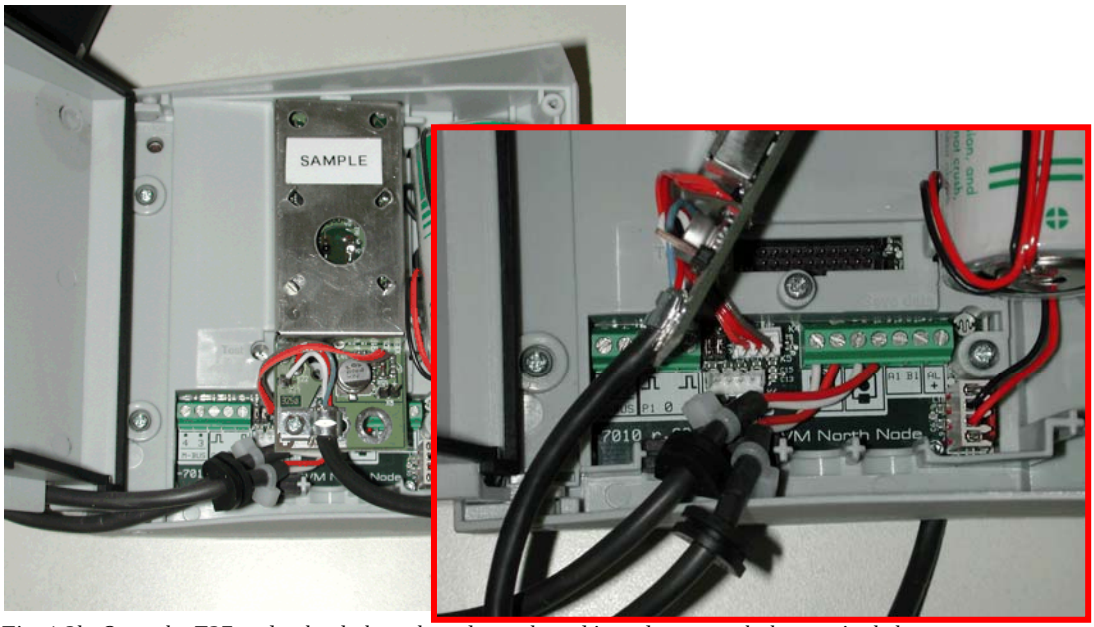
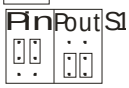


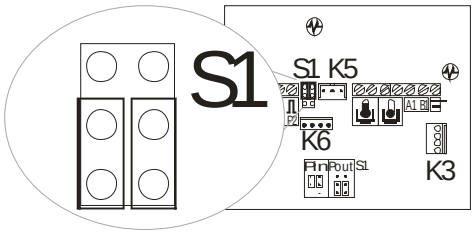
Fig. 1.3b, Open the F27 and unhook the pulse adapter board in order to reach the terminals better.

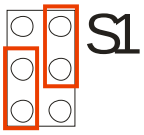
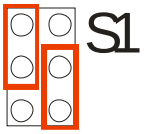
1.3.1.1 Symbol description

Symbol	Description
	M-Bus
	P1 = Pulse output 1 Energy (pulse input 1) ”+” 0 = common ”-” P2 = Pulse output 2 Volume (Pulse input 2) ”+”
	Temperature sensor Hot (H)
	Temperature sensor Cold (L)
	Input/output options
	Alarm output
	Jumper setting description
S1	Jumpers for setting pulse output to input
K3	Connection mains board / battery board
K5	Connection to flow part

1.3.1.2 Jumpers pulse input / pulse output

F27 has two pulse outputs when delivered. These outputs can be changed to one or two inputs.



Setting	Description
	P1 = Pulse output (energy) P2 = Pulse output (volume)
	P1 = Pulse output (energy) P2 = Pulse **input** 2 (seq. ”14”)
	P1 = Pulse **input** 1 (seq. ”13”) P2 = Pulse **input** 2 (seq. ”14”)
	P1 = Pulse **input** 1 (seq. ”13”) P2 = Pulse output (volume)

1.4 Test the installation

When the calculator is correctly installed a few simple installation test can be preformed to verify the function of the F27.

- Check the pulse indicator.
- Check temperature is show in display
- Check pulse value setting
- Check flow part placing
- Check for any error codes

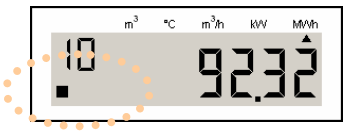


Fig. 1.4a, Flow pulses are indicated with a square

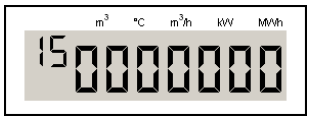


Fig. 1.4b, Seq. "15" error codes

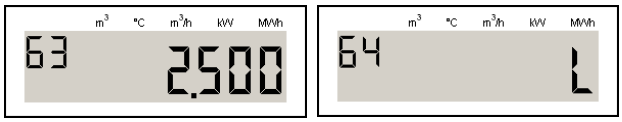


Fig. 1.4c, Seq. "63" pulse value and "64" placing

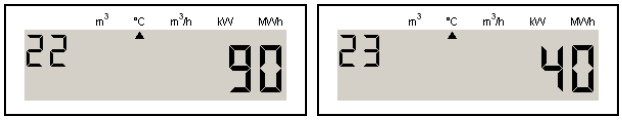


Fig. 1.4c, Seq., "22" temperature hot (H) and "23" cold (L)

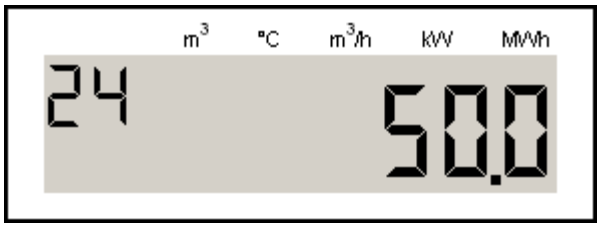


Fig. 1.4d, Seq. "24", temperature difference

2 Dimensions and clarifications

2.1 Cable outlets

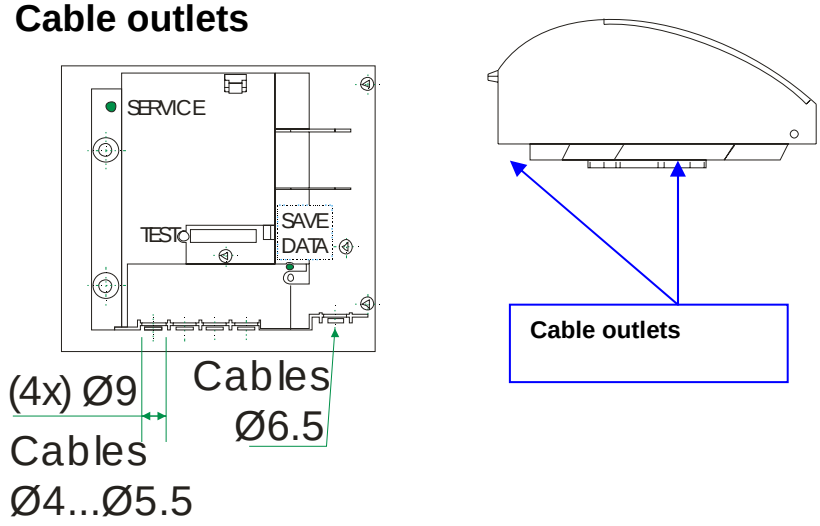


Fig. 2.1, Cable outlets and possible cable size in F27

2.1.1 Cable length

Cable type	Length [m]
Ultrasonic cable, cable between the calculator part and the flow part (may not be cut)	1
Mains cable (only in 230V supplied F27)	1.5

2.2 Dimensions calculator part

Dimmensions in [mm].

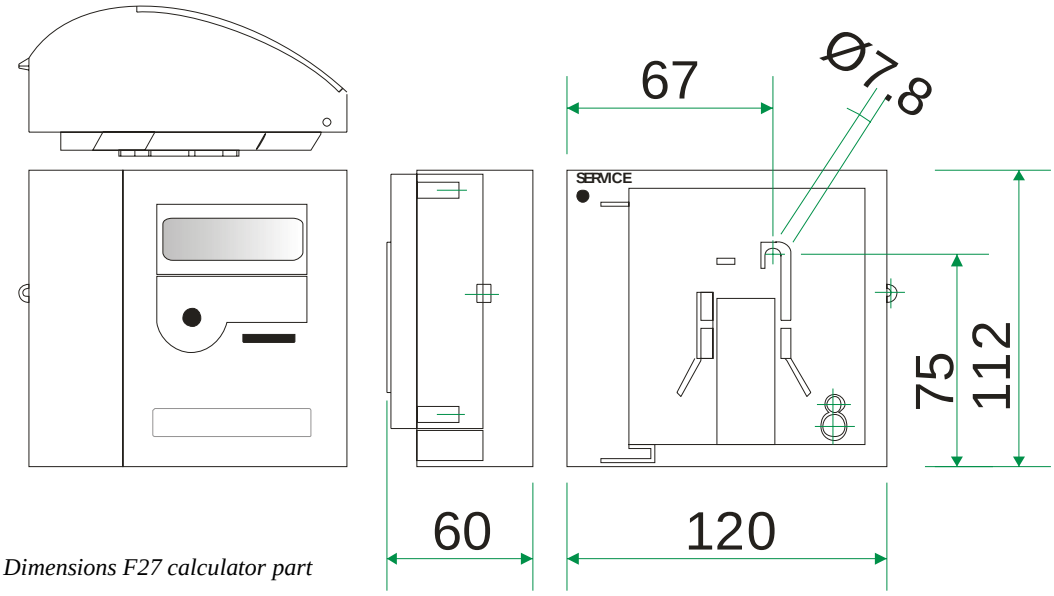
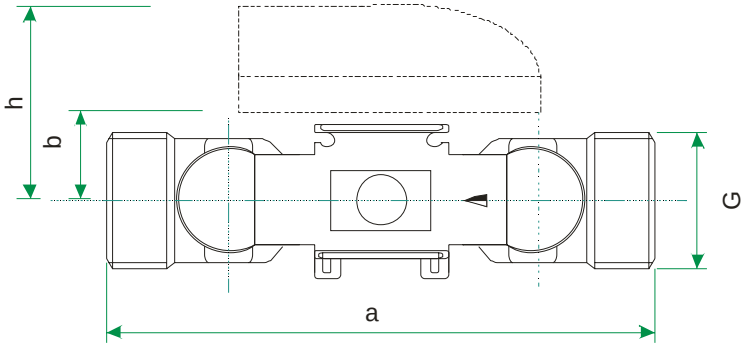


Fig. 2.2, Dimensions F27 calculator part

2.3 Dimensions flow parts

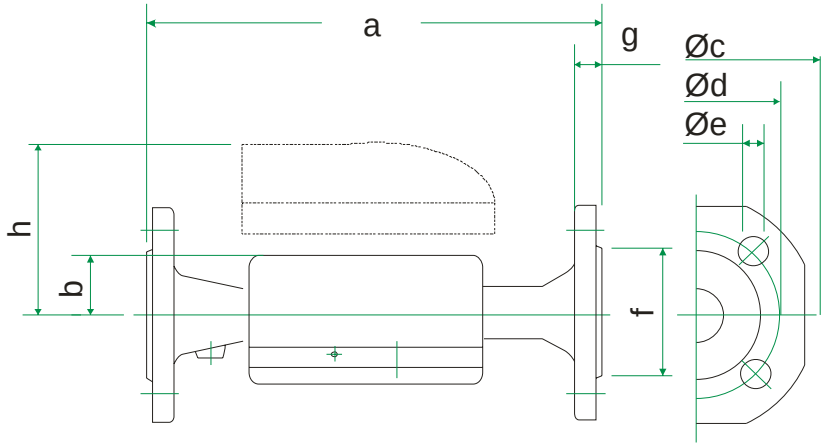
2.3.1 Threaded

Typ	Qp [m³/h]	G	A	b	h
0	0.6	G3/4”	110	-	77
1	1.5	G3/4”	110	-	77
2	0.6	G1”	130	-	77
3	1.5	G1”	130	-	77
4	2.5	G1”	130	-	74
5	3.5	G1¼”	260	51	111
6	6	G1¼”	260	51	111
7	10	G2”	300	68	108



2.3.2 Flanged

Typ	Qp [m³/h]	DN	a	b	h	Øc	Ød HCD	Øe	Ant. Skruv hål	f	g
A	3.5	25	260	51	111	115	85	14	4	68	18
B	6	25	260	51	111	115	85	14	4	68	18
C	10	40	300	48	108	150	110	18	4	88	18
D	15	50	270	46	106	165	125	18	4	102	20
E	25	65	300	52	112	185	145	18	8	122	22
F	40	80	300	56	116	200	160	18	8	138	24
G	60	100	360	68	128	235	190	22	8	158	24



2.4 Clarifications

2.4.1 Momentary flow

The momentary values are displayed in sequence “20”. Momentary flow is in seq. “21”. This calculation is secondary. The time base is 4 seconds and can be altered.

2.4.2 Behavior at high flow

When the flow is higher than qs (upper flow limit) the flow part will give an output until 2.8x qn (permanent flow) and then send an output that equals Kv. See also technical data for Kv.

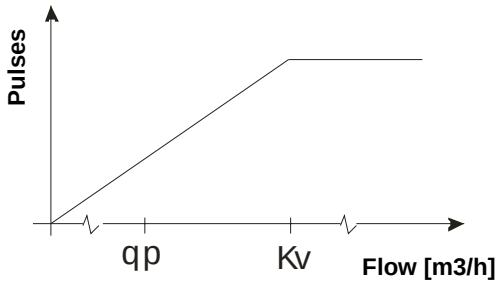


Fig. 2.4.2, At flow over 2.8x qn (Kv) the flow part emits pulses equal to Kv

2.4.3 Store data

All meter data is saved in a ”EEProm” at day shift. When service shall be preformed on the F24 (e.g. change of battery or other) the save data should be preformed. This procedure is done by short circuit the button “save data”. The data save is indicated in the display under seq. “15” with “080”.

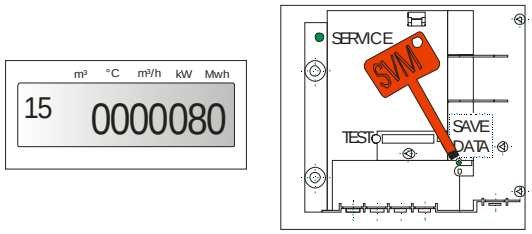


Fig. 2.4.3, Save meter data by short circut ”Save Data”, code ”080” will appear under seq. ”15”

2.4.4 Pulse value for pulses from pulse output

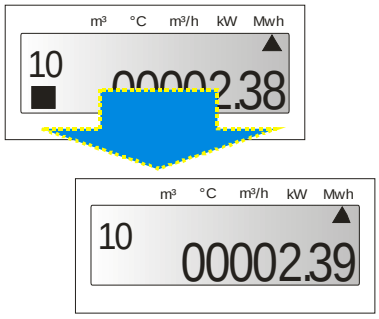


Fig. 2.4.4a, Seq. ”10” (energy), when the last digit increments one one pulse is emitted from the pulse output P1 (if jumpers are set for pulse outputs).

In the example the pulse value is 0.01 [MWh].

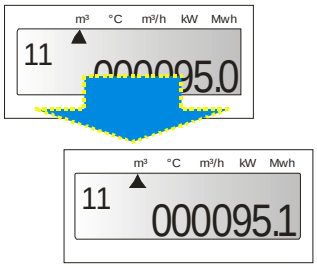


Fig. 2.4.4b, Seq. ”11” (volume) increments one pulse is emitted from P2.

Pulse value 0.1 [m^3] in the example. The last digit and the unit decide the pulse value.

3 Handling

3.1 Maneuver in the display sequence

F27 has an LCD-display where the stored information can be retrieved. The two upper digits in the display indicate the sequence. The left digit indicates in which sequence loop the display is in. Hold the button pressed to change sequence. Too toggle in the sequence press the display button until correct value is acquired.

The display returns to seq. “10” after 60 seconds of inactivity, in the normal mode.

Desciption of the display:

1. Sequence indicator
2. Square indicate flow pulse
3. Value, max 7 digits
4. Arrow point the correct unit for the value

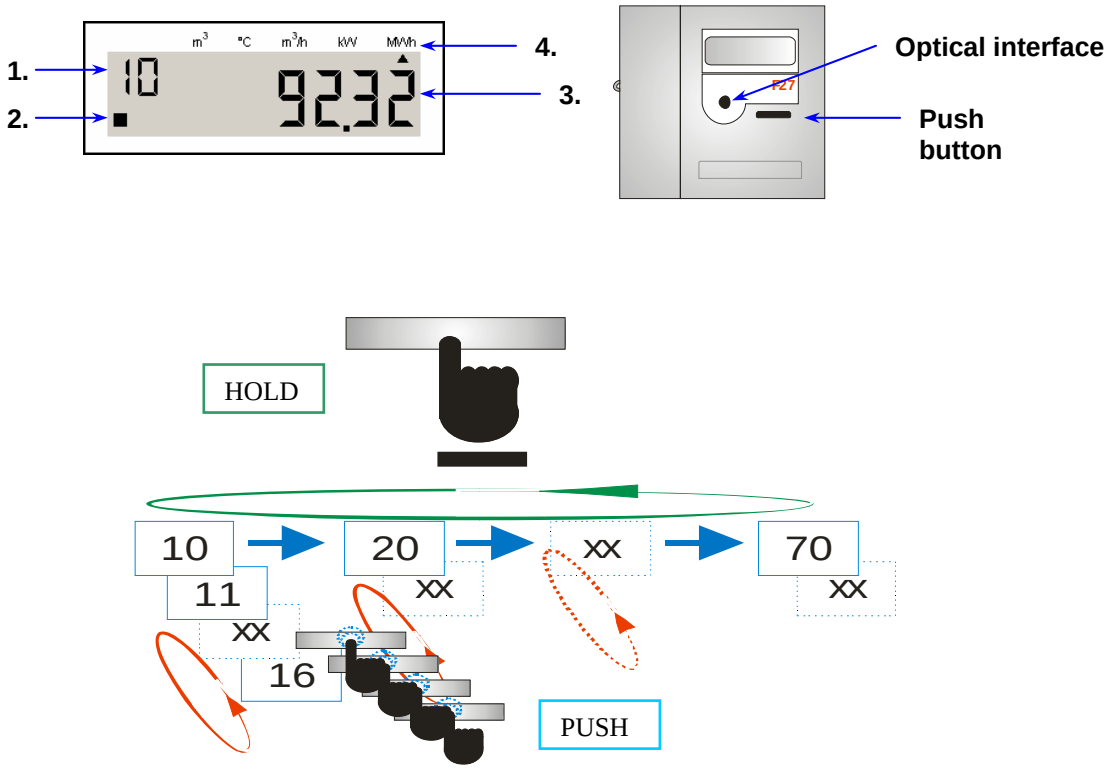


Fig.3.1, Hold to reach next sequence and push to toggle in the sequence

3.2 Display sequence

	Beskrivning
10	Accumulated energy (Default position)
11	Accumulated volume according to flow sensor1
12	Display test, see fig.3.2
13	Accumulated volume for pulse input 1 (Only when F2 fitted with pulse inputs)
14	Accumulated volume for pulse input 2 (Only when F2 fitted with pulse inputs)
15	Error code, see Error code
16	Error time, [Minutes]
20	Momentary power
21	Momentary flow
22	High temperature, 0 decimals
23	Low temperature, 0 decimals
24	Temperature difference, 1 decimals
30	Account days[2], when values are stored, [YYMMDD]
31	Account days[2], Accumulated energy
32	Account days[2], Accumulated volume according to flow sensor
33	Account days[2], Accumulated volume according to energy calculation
34	Account days[2], Accumulated volume pulse input 1, [m3]
35	Account days[2], Accumulated volume pulse input 2, [m3]
36	Possible error code, at time of storage of account days
37	Possible accumulated error time, at the time of storage account days, [Minutes]
3x	Following account days registers (loop back)
40	Monthly registers[3], date when values are stored, [YYMMDD]
41	Monthly registers[3], Accumulated energy
42	Monthly registers[3], Accumulated volume according to flow sensor
43	Monthly registers[3], Accumulated volume according to energy calculation
44	Monthly registers[3], Accumulated volume pulse input 1, [m3]
45	Monthly registers[3], Accumulated volume pulse input 2, [m3]
46	Possible error code, at time of storage of monthly register
47	Possible accumulated error time, at the time of storage, [Minutes]
4x	Following monthly registers (loop back)
50	Operating time, [Hours]
51	Relevant date, [YYMMDD]
52	Relevant time, [HH.MM]
53	Recommended date for battery replacement, [YYMMDD]
60	Communication address, Primary address
A0	Communication address, Secondary address (normally same as meter S/N)
bx	Calculator serial number (S/N)[4]
63	Pulse value [l/p]
64	Placing of flow sensor, [H/L], L = Low
70	Accumulated volume corresponding to accumulated energy
73	Last remote read accumulated energy
74	Time since latest remote read accumulated energy, [Hours]
75	Accumulated total error time, [Minutes]

1 The calculator has two registers for accumulated volume. Value 11, is incremented at the rate of arrived flow pulses. The other register, value 70 is incremented in conjunction with energy calculation.

2 In order to change to the next account day, keep pushing the button until the date starts to increment, then release the button. After the display 37, see

3 table above, the next account day will display. Note: If one hold the “Push button” again, the display reverts to default position (seq. 10).

4 To change to another month, keep pushing the button until the date starts to increment. Release at the requisite month. After display 47, see above, the next stored date will be displayed. Note: If one hold the “Display button” again, the display reverts to default position (seq. 10).

3.3 Error codes

Error codes are displayed in sequence ”15”. The three digits counted from the left combines the error code. The interpretation depends on the position. The error code can consist of more than one error.

Error code (1)	Description
1	Disconnected temperature sensor cold (L)*
2	Temperature sensor cold (L) short circuit
4	Disconnected temperature sensor hot (L)*
8	Temperature sensor cold (L) short circuit

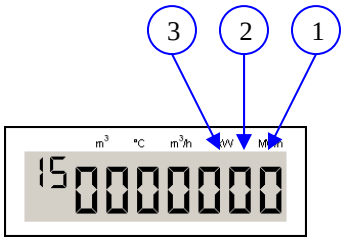


Fig. 3.3a, Displaysequence “15” error codes are displayed here

Error code (2)	Description
1	Electronic error (contact service)
2	I2C error (contact service)
4	Low flow
8	Mains failure (only 230V supplied) / Save data (save data button)

Error code (3)	Description
1	Change battery
2	CPU error (contact service)
4	Error in flow part* (Air in flow part/electronic error)
8	Not used

** Error codes that can appears in a not installed F27*

Error codes that do not appear in the table is an combination of two or more error codes, see table below.

Example: Error code 5 at position 1 = > 1 + 4, temperature sensor hot (H) disconnected, temperature sensor cold (L) disconnected, probably temperature sensor not connected.

Error code	Error code combination
3	1 + 2
5	1 + 4
6	2 + 4
7	1 + 2 + 4
9	1 + 8
A	2 + 8
B	1 + 2 + 8
C	4 + 8
D	1 + 4 + 8
E	1 + 2 + 4 + 8

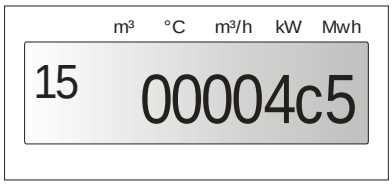


Fig. 3.3b, Example 2 Error code “4c5” is shown

1. *”5” => 1+4 = Both temperature sensors disconnected.*
2. *”C” => 4+8 = No 230V connected and low flow*
3. *”4” = Error in flow part, probably air in flow part*

This is a very common error in F27 that is not installed

Similar code battery supplied F27 is ”445”

4 Service

A seal must be broken in order to set F27´s calculator part in service mode. The service mode can be accessed using a push button and a dull thin screwdriver, see below 4.1.1. To set the calculator back into the normal mode use the same procedure as setting the calculator in service mode. Service mode is indicated with “00” in the display.

Note Any changes made in the service mode will be permanet first when the next service sequence is reached. Example when time is changed hold the button pressed until changing the date is reached.

4.1.1 To set the calculator into service mode

1. Hold the “service button” pressed with a thin dull screwdriver.
2. Hold the “service button” pressed and at the same time hold the “push button” pressed.
   Wait in 5 seconds
3. Release the “push button”.
4. First then release the ”service button”.

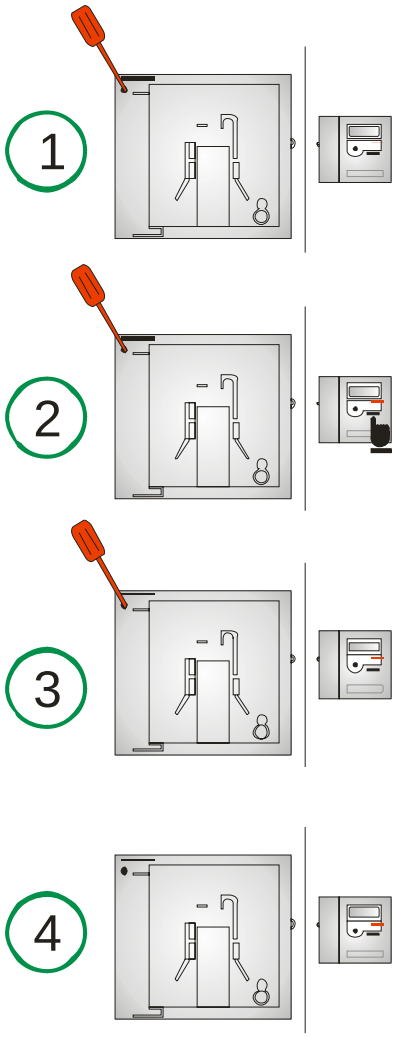


Fig. 4.1, Set the calculator into service mode

Changing of the display when entering the service mode:

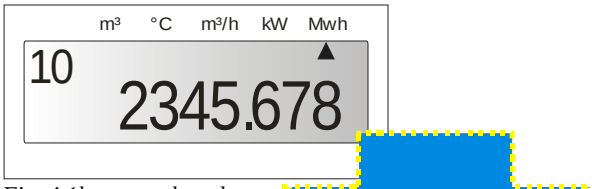


Fig. 4.1b, normal mode

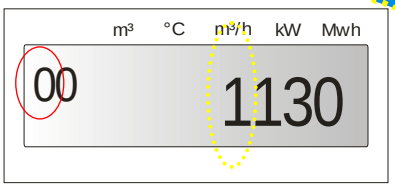


Fig. 4.1c, Service mode is indicated with a ”0” on the left digit, a value digit is also blinking.

4.1.2 Exit service mode

There are two way to exit the service mode

1. Use the same procedure as setting the calculator in service mode.
2. Hold the ”push button” pressed until the sequence reaches ”0A”. Then push the “push button” so that the value changes to “1” and HOLD the “push button” pressed.

4.2 Maneuver in the service mode

The value digit that blinks in the service mode is also the value that can be changed at this time. HOLD the ”push button” pressed until the blinking value changes to the correct position to be changed. Push the “button” until correct value is acquired. HOLD the button until the next service sequence is reached. Now the change is stored.

Note The calculator must reach the next service sequence until changed value is stored.

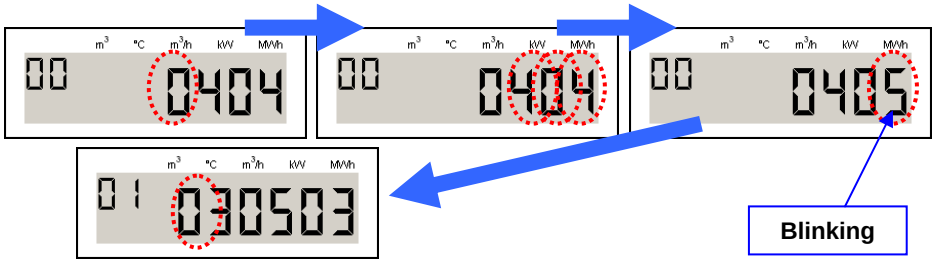


Fig. 4.2a, Changing time from “4:04” to “4:05”

1. **Jump to digit to be changed,** HOLD ”push button” pressed until correct digit blinks.
2. **Change value of digit,** press the “push button” until the correct value is acquired.
3. **Go to next service sequence to store the change,** HOLD the “push button” until next service sequence is reached. Then exit the service sequence, se även fig. 3.5.2b.

Exit the service sequence through sequence “0A”:

1. HOLD the “push button” pressed until service sequence is reached
2. Release the “push button”, the value blinking should be “0”
3. Press the “push button” once the value changes to “1” (exit service mode).
4. HOLD the “push button” until sequence “10” is reached.

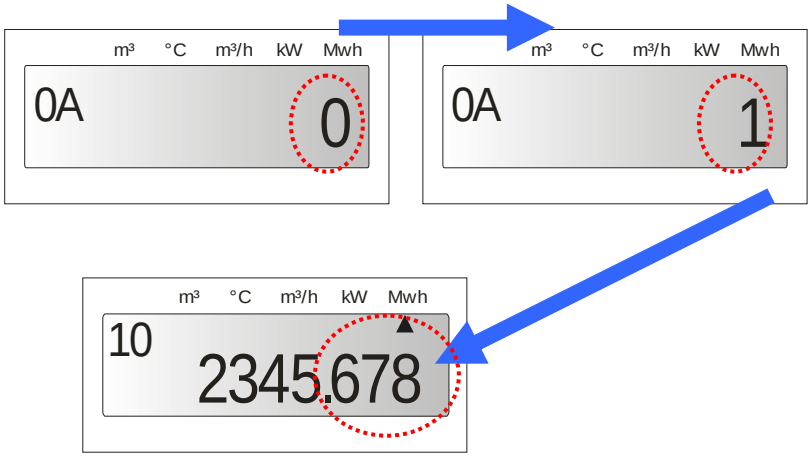


Fig. 4.2b, Exit service mode in service sequence”0A”

4.3 Service sequence table

Service sequence	Description
00	Time, hhmm
01	Date, YYMMDD
02	**Pulse value, 4 digits (no decimals)**
03	**Decimal placing, 0-4**
04	Account day 1, MMDD
05	Account day 2, MMDD
06	Primary address (in 3 digits). ex. “5” is set “005” in display.
07	Reset error time, 0 = Reset (standard) 1 = Do not reset error time
08	Flow part placing, 0 = Cold (L), STANDARD 1 = Hot (H)
09	Battery change date, YYMMDD. Do not change without consulting Metrima AB
0A	**Exit Service mode** **1 = Exit service mode** **0 = Return to “00”**

Table 4.3, Service sequence,
hh – hour, mm – minute, YY – Year, MM – Month, DD – Day

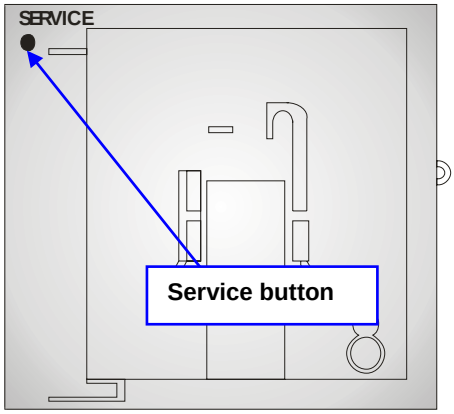


Fig. 4.3a, Service button

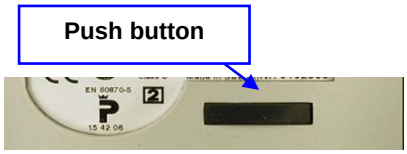


Fig. 4.3b, Push button

Note Wrong setting in the service mode can result in wrong calculation or measurements.

4.3.1 FlexServ.exe

With a PC program ”FlexServ.exe” even more parameters can be changed, se ”service manual” for more information.

Note Wrong set calculator will measure and calculate wrong.

4.4 Service flow part

The service on the flow part should be preformed by a certified test laboratory. For more instructions see the service manual.

Cleaning of the tube:

1. For small sizes, the two measuring sensor should be removed. Then use a brush to clean the tube.
2. For larger sizes of the flow part, clean the flow part with a brush directly.

NOTE: This may only be preformed by trained qualified service personnel.

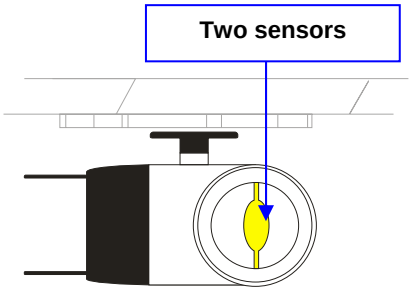


Fig. 4.4, Small flow parts the two measuring sensor must be removed before claning

5 Test

5.1 Verifying the calculator

Verification of the calculator's measurement accuracy is undertaken in the test mode, where the energy value/flow sensor pulse is issued via the HF-output at the service adapter. For each flow sensor pulse, measurement takes place on the temperature sensors and a pulse burst corresponding to the measured energy of the meter is issued.

To test (verify) the measurement accuracy of the calculator by means of HF-pulses proceed as follows:

1. While short circuiting the test button with “Test key”, hold the “Push button” until the display mode changes.
2. The calculator now enters test mode. This is indicated by a flash symbol being displayed.
3. Connect fixed resistance for simulation of Pt100 via terminal block units Nos. 5-6 (flow) and 7-8 (return).
4. Connect a pulse generator via terminal block unit Nos. 10-11 (connection 11 is ground) in order to simulate flow sensor pulses. Note: Voltage level is max. 3V.
5. Connect an OPTO-head/interface with HF-pulse interface at the front.
6. Simulate a flow sensor pulse after which the meter issues an (approximately) 20 kHz pulse burst corresponding to 100*k*dt pulses via the HF-output. “k” is the energy factor. (kWh/°C/m3) and dt is the difference between simulated flow and return temperatures.

   Example: Rf=138.50Ω (100.00°C), Rr=127.07Ω (70.00°C) => dt=30.00°C, k=1.141 gives 100*1.141*30 = 3423 pulses
7. The next flow sensor pulse can be sent immediately after the HF-pulse burst from the meter has been dispatched.

To leave test mode proceed as follows:

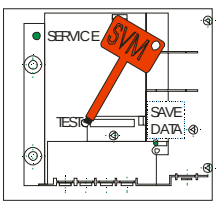
1. While short circuiting the test button hold the “Display Button”.
2. The calculator now enters operation mode.
3. Connect Optical head with HF-pulsinterface on front.

To verify (test) the measurement accuracy of the meter with help of the display, first set up connections in accordance with points 3 and 4 above for testing by means of HF-pulses. Testingis undertaken in the meter's operation mode. Proceed as follows:

1. Supply flow sensor pulses until the energy display is incremented one step.
2. Supply flow sensor pulses with a maximum frequency of 12 Hz until the display has been stepped appropriate numbers of steps.
3. Errors in testing decrease with the number of steps made during the test. If the meter is programmed for 1.0 liter/pulse and resolution for display of energy is 0.001MWh, this means that 10 steps on the display correspond to 288.85 pulses from the flow sensor with selected temperatures in accordance with the above. The testing error is maximum + - 1 pulse, which, in the example, corresponds to 0.35%.

5.1.1 Set calculator in Test mode

To set the calculator into “test mode”. Short circuit the “test button” and at the same time press the push button, release the push button and then release the ”test button. The method is similar to setting the calculator into “service mode”, see chapter 4.1.



5.2 Test flow part

The PCB-board controls the flow part. Several selas are on the PCB-board that protects the different modes on the flow part.

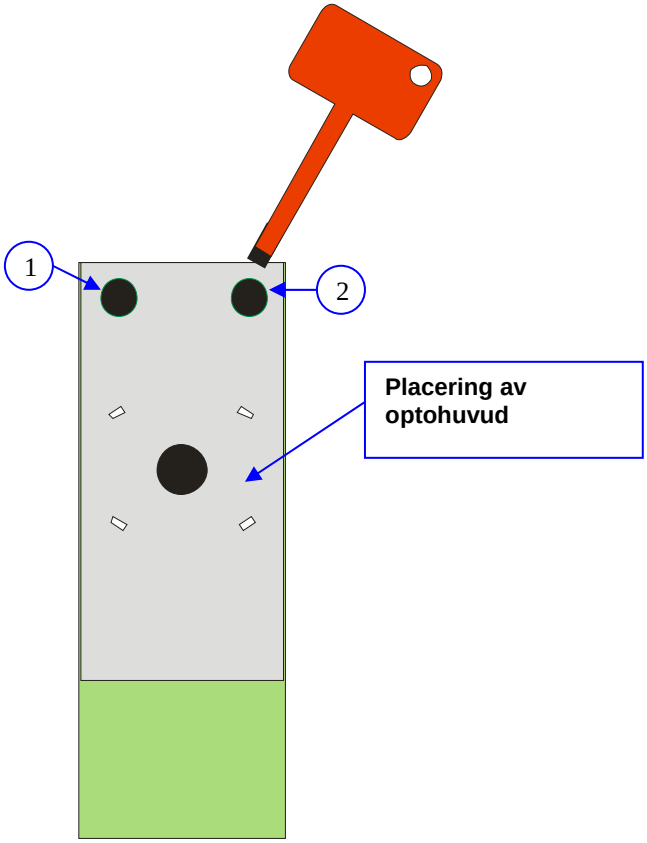
5.2.1 High frequency pulses

Breaking the seal (1) and short circuit the button will set the flow part into sending high frequence pulses. These pulses are equal to the flow and can be read through an Optical head. Using the PC-program “PappaWin” test results can be read from the flow part. For more detailed description see manual ”TKB3412c_engl.pdf”.

5.2.2 Calibration flow part

Breaking seal (2) and short circuit the button will set the flow part into calibration mode. With an Optical head and using the PC-program “PappaWin” the flow part can be calibrated. In this mode the flow part also emits high frequency pulses. For more detailed instructions see ”TKB3412c_engl.pdf”.

Picture 6



5.3 Seals

1. Installation seal
2. Electronic seal

3. Test seal calculator (inside calculator)
4. Service seal calculator

5. Calibration seal flow part
6. Service seal flow part

7. Flow part seal

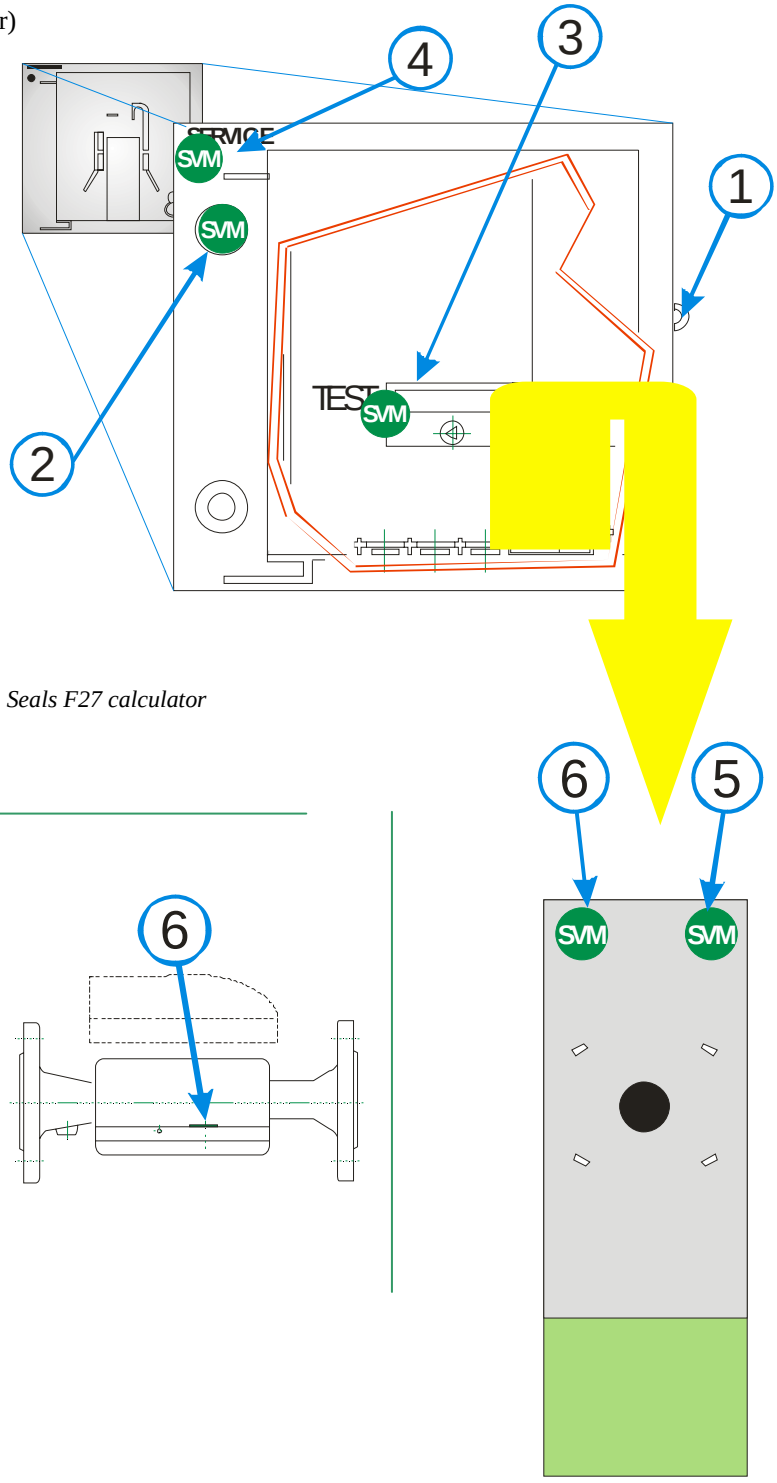


Fig. 5.3a, Seals F27 calculator

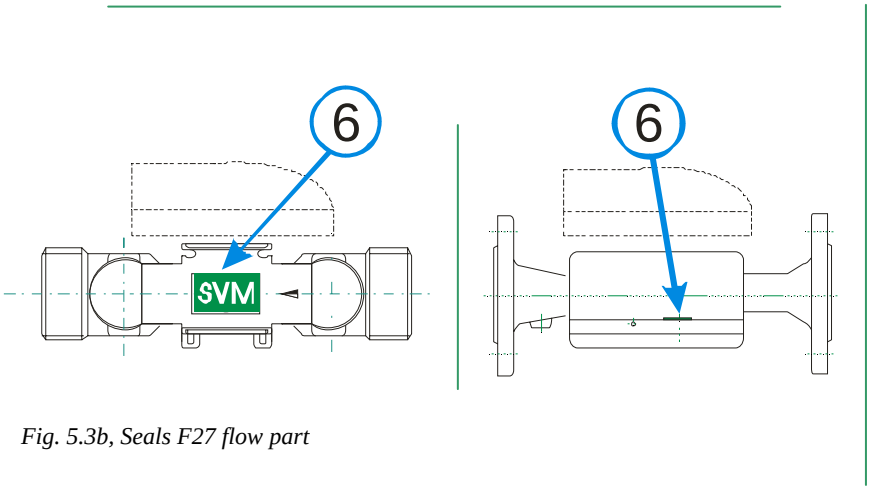


Fig. 5.3b, Seals F27 flow part

6 Technical data

6.1 Technical data flow part

Accuracy class	2*
Environmental class	C
Metrological class	1:100 (dynamic range)
Installation orientation	Horizontal or Vertical
Installation placing	Return or supply
Temperature range	+10°C -- +130°C
Max. temperature	+150°C in max. 2000h
Max. flow	2.8 x qp
Medium	Water

** Qp 2.5 accuracy class 3*

6.2 Technical data temperature sensors

Temperature sensors are connected to the F27 when delivered. There can be different types of temperature sensors depending on the delivery order. For more technical information on the different temperature sensors, see documentation for that temperature sensor.

6.2.1 Technical data TDA26

Only TDA26 with a cut in the nut can be mounted directly into the flow part. The old type will cause a leakage.

Sensor type	Pt100/Pt500
Resistance acc. to	IEC751
Max RMS sensor current	8 [µA]
Measuring range	0 - 140 [°C]
Tolerance	Class B
Temp. difference	2 – 100 [°C]
Temp. Step response	1.8 [s]
Min. immersion depth	20 [mm]
Pressure	PN16
Dimensions	
Diameter	3.5 [mm]
Length	26 [mm]
Resistance (2-wire cable)	0,2955 [Ω]
Cable length	2 [m]
Cable type	Silicone, PUR or PVC

Swedish	SP	SP WT 98:01 P 15 42 02
German	PTB	22.70/99.06

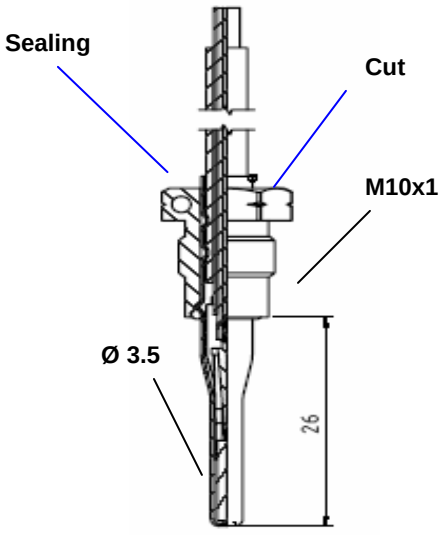


Fig. 6.21, TDA26 Dimensions
Only TDA26 with a cut in the nut can be used in V700 and F27 flow parts.

When used TDA26 without a cut in the nut there is a risk for lekage.

6.3 Technical data calculator

6.3.1 Mains supplied

Battery	3.6V – 18 Ah 10 years operation
Mains	230V±10%, 45-65Hz, battery 1 Ah as spare*

* At mains failure the spare battery will automatically take charge. The flow part will not be supplied from the spare battery

6.3.2 Temperature sensors

Approved and matching pares type PT100 or PT500 are to be used. Maximum sensor current (RMS): 4μA

Calbe area [mm^2]	Max. cable length for PT100 sensors [m]
0.22	2.5
0.50	5.0
0.75	7.5
1.50	15.0

6.3.3 Temperature range

Temperature range	10 - 130°C (190°C)
Temperature difference	2 – 120K

6.3.4 Ambient temperature & Temperature class

F27 comply with the prerequisites for Environmental Class C according to EN1434.

Ambient temperature Storage/Transport	-20°C to +70°C
Ambient temperature operation	+5°C to +55°C

6.3.5 Flow sensor placing

F22 can be configured for flow sensor placed in high or low end of the pipe (supply or return pipe). This is marked H = high or L = Low. In the display sequence “64.

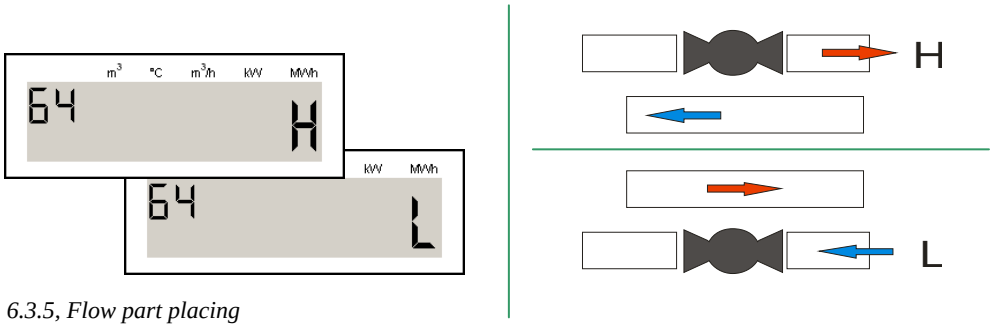


Fig. 6.3.5, Flow part placing

6.3.6 Maximum values for power

The values below are valid for energy unit [MWh] and standard decimal setting.

Pulse value [l/p]	Max. power [MW]
1.0	3.3
10.0	33.0
100.0	330.0
2.5	3.3
25.0	33.0
250.0	330.0

6.3.7 Dynamic behavior

pulses is five (5) seconds or longer. If the time between pulses is less than five seconds, measurement takes place each five seconds. When the period between the flow sensor pulses exceeds 60 seconds, a measurement takes place every 60th second. For this measurement only the temperature is updated.

6.3.8 Data output interface

M-Bus acc. EN1434-3	OPTO-interface (EN60870-5) and bus connection (terminal) galvanic isolated

6.3.9 Pulse output
(either pulse output or pulse input on F27)

F22 is equipped with two pulse outputs as standard of the type ”Open collector” for energy (Pulse output 1) and volume (Pulse output 2).

Pulse output 1 (energy)
Energy, one (1) pulse per display update in the energy register (seq. “10”).

Pulsutgång 2 (volym)
Volume, one (1) pulse per display update in the flow register (seq. “11”).

The last digit and the unit decide the pulse value, see chapter 2.4.4.

Pulse duration	[ms]	250
Voltage	[V]	3 – 30
Max current	[mA]	20

6.3.10 Pulse input
(either pulse input or pulse output on F27)

F22 is equipped with two pulse inputs as standard. The pulse inputs can be used for measuring of other meter with pulse outputs, such as cold and hot water meters, gas, electricity meters and other meters. The pulse inputs can be set as volume registers. These registers accumulate the pulses into two volume registers with the value [m3].

Frequency	[Hz]	12
Min. Pulse frequency	[ms]	40
Max. Voltage	[V]	3

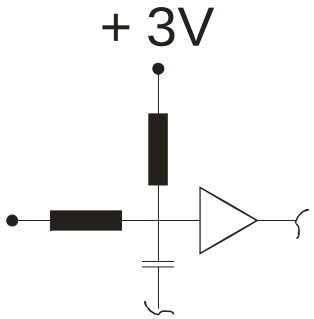


Fig. 6.3.10, Schematics pulse input

6.3.11 Alarm output

The F22 is equipped with one alarm output as standard of the type “Open collector”. The alarm output sends a pulse every hour as long as an error code exists. The pulse duration 250 [ms] for pulse and alarm output can be altered using the “FlexServ.exe” version 2 or higher in 125ms steps.

Alarm frequency when an error exists		Once every hour
Pulse length	[ms]	250

7 Appendix

7.1 Decimal setting for F27

Decimal setting according to industry standard

Pulsvärde [l/p]	MWh	GJ	m³	KWh	MBTU	kW	m³/h
1.0	0.001	0.001	0.001	0.1	0.001	0.01	0.001
10	0.01	0.01	0.01	1	0.01	0.1	0.01
100	0.1	0.1	0.1	-	0.1	1	0.1
1000	1	1	1	-	1	1	1
2.5	0.001	0.01	0.01	0.1	0.01	0.01	0.001
25	0.01	0.1	0.1	1	0.1	0.1	0.01
250	0.1	1	1	-	1	1	0.1
2500	1	1	1	-	1	1	1

Table A1, The options marked "-" should not be used. For the pulse inputs the decimal setting follow the same table setting as for the volume register [m3].

7.1.1 Decimal setting for pulse inputs F27

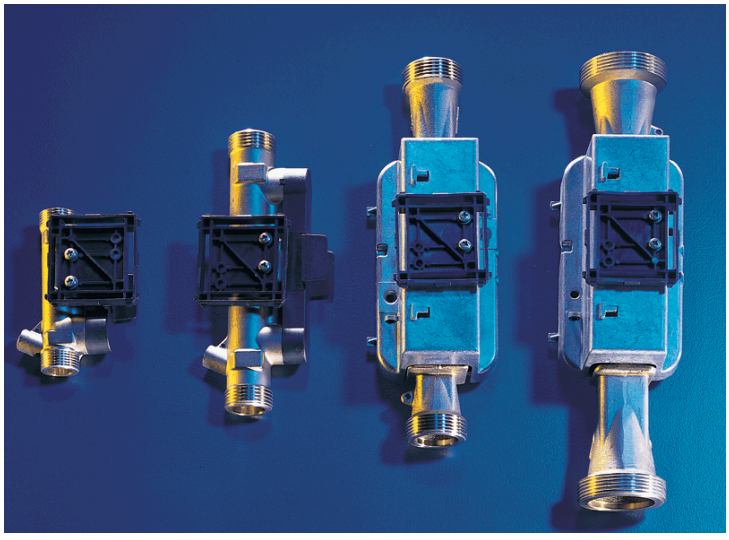
Pulsvärde [l/p]	m³
1.0	0.001
10	0.01
100	0.1
1000	1
2.5	0.01
25	0.1
250	1
2500	1

7.2 Articlenumber F27

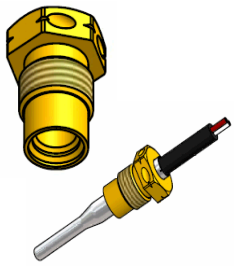
7.2.1 F27 Threaded

F27 ABCDEFGHIJ KLM

A	1	Pt100 2-wire measurement, flow sensor in low (L) temp.
A	2	Pt100 2-wire measurement, flow sensor in high (H) temp.
B	1	Battery supply (3.6V – 16Ah)
B	3	Mains supplied 230V (with backup battery 1.0 Ah)
C	1	Pulse weight 2.5 [l/p] at qp= 3.5/6.0 [m³/h]
C	5	Pulse weight 1 [l/p] at qp= 0.6 / 1.5 / 2.5 [m³/h]
C	6	Pulse weight 10 [l/p] at qp= 10.0 [m³/h]
D	0	kWh [kW m³ m³/h]
D	1	MWh [kW m³ m³/h]
D	2	GJ [kW m³ m³/h]
D	3	MBTU [kW m³ m³/h]
D	4	MBTU [kUSG kW USG/m]
E	-	Standard order
E	S	Special, extra ordering information enclosed with order. Example customer information
F	H	Pulse output, STANDARD. Jumpers for pulse inputs 1000[l/p].
G	1	No backlight **(STANDARD)**
G	0	Backlight (option, ONLY in F27 mains supplied)
H	0	qp= 0.6 [m³/h], 110[mm], G3/4″ PN16 C5 1 l/p
H	1	qp= 1.5 [m³/h], 110[mm], G3/4″ PN16 C5 1 l/p
H	2	qp= 0.6 [m³/h], 130[mm], G1″ PN16 C5 1 l/p
H	3	qp= 1.5 [m³/h], 130[mm], G1″ PN16 C5 1 l/p
H	4	qp= 2.5 [m³/h], 130[mm], G1″ PN16 C5 1 l/p
H	5	qp= 3.5 [m³/h], 260[mm], G1 1/4″ PN16 C1 2.5 l/p
H	6	qp= 6.0 [m³/h], 260[mm], G1 1/4″ PN16 C1 2.5 l/p
H	7	qp=10.0 [m³/h], 300[mm], G2″ PN16 C6 10 l/p
H	8	qp= 1.0 [m³/h], 130[mm], G1″ PN16 C5 1 l/p
I	-	No temperature sensor eqipped with F27
I	1	TDA26 temperature sensor, 2m silicone (ONLY qp=0.6 – qp=2.5 can a TDA26 be mounted directly in the flow sensor)
I	3	TL045, 2m silicone
I	S	Special temperature sensors, specified separately on order
J	1	Standard mounting
KLM	#00	Country code



F27 threaded flow parts



Only TDA26 temperature sensors with a cut in the nut may be used in the flow part.

TDA26 without a cut in the nut will leak.

F27 Flanged

F27 ABCDEFGHIJ KLM

A	1	Pt100 2-wire measurement, flow sensor in low (L) temp.
A	2	Pt100 2-wire measurement, flow sensor in high (H) temp.
B	1	Battery supplied (3.6 – 16Ah)
B	3	Mains supplied 230V (with backup battery 1.0 Ah)
C	1	Pulse weight 2.5 [l/p] endast qp=3.5/6 [m³/h]
C	2	Pulse weight 25 [l/p] endast qp=40/60 [m³/h]
C	6	Pulse weight 10 [l/p] endast qp=10/15/25 [m³/h]
D	0	KWh
D	1	MWh
D	2	GJ
D	3	MBTU
D	4	MBTU [kUSG kW USG/m]
E	-	Standard order
E	S	Special, extra information enclosed with order. Example customer information
F	H	Pulsingångar, STANDARD. Bygling för pulsingångar, 1000[l/p].
G	1	No backlight **(STANDARD)**
G	0	Backlight (option, ONLY in F27 mains supplied)
H	A	qp= 3.5 [m³/h], 260[mm], DN25, flange PN25 C1 2.5 l/p
H	B	qp= 6.0 [m³/h], 260[mm], DN25, flange PN25 C1 2.5 l/p
H	C	qp=10.0 [m³/h], 300[mm], DN40, flange PN25 C6 10 l/p
H	D	qp=15.0 [m³/h], 270[mm], DN50, flange PN25 C6 10 l/p
H	E	qp=25.0 [m³/h], 300[mm], DN65, flange PN25 C6 10 l/p
H	F	qp=40.0 [m³/h], 300[mm], DN80, flange PN25 C2 25 l/p
H	G	qp=60.0 [m³/h], 300[mm], DN100, flange PN16 C2 25 l/p
I	-	No temperature sensor equipped with F27
I	3	TL045, 2m silicone sensor
I	S	Special temperature sensors, specified separately on order
J	1	Standard mounting
KLM	#00	Country code

F27 flanged flow parts

Stockholm, Sweden

Created:	2005-01-05
Author:	Johan Tsung
Rev. date	**2006-05-22**
Rev.by:	EW
Filename:	F27 Manual [2-02-02E].doc
Revision no:	0.183

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