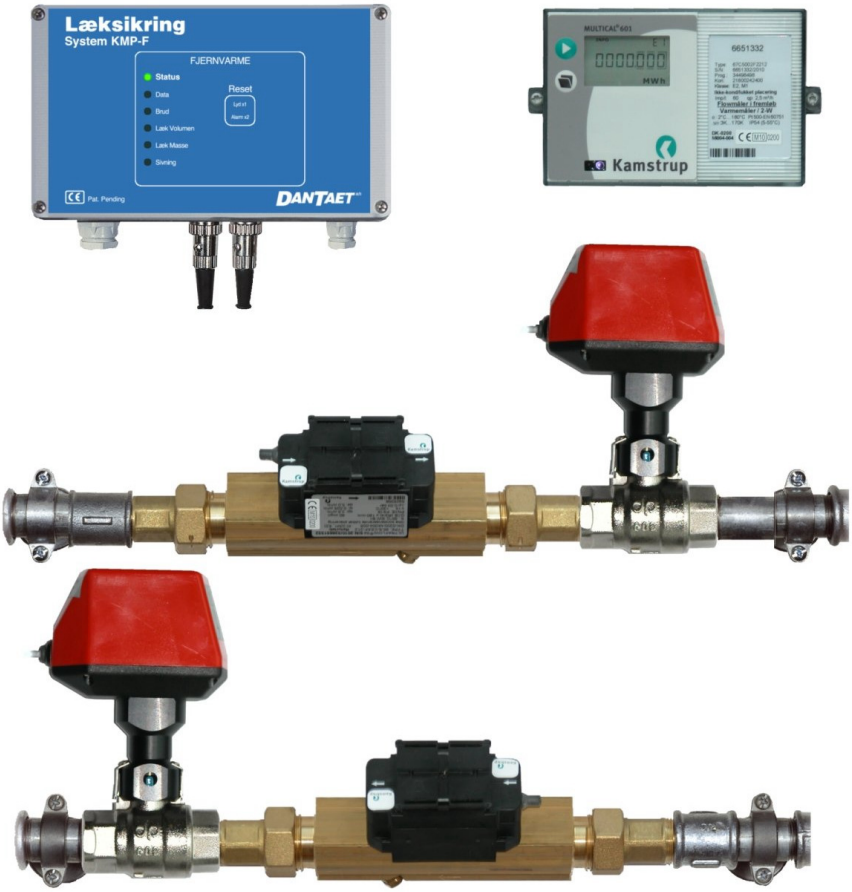
DanTaet System KMP-F

User Manual (UK)



DANTAET a/s
Program 109100 func.spec. 100215

Højmevej 36-38
DK-5250 Odense SV
Ph. +45 63 17 45 00
Fax +45 63 17 45 01

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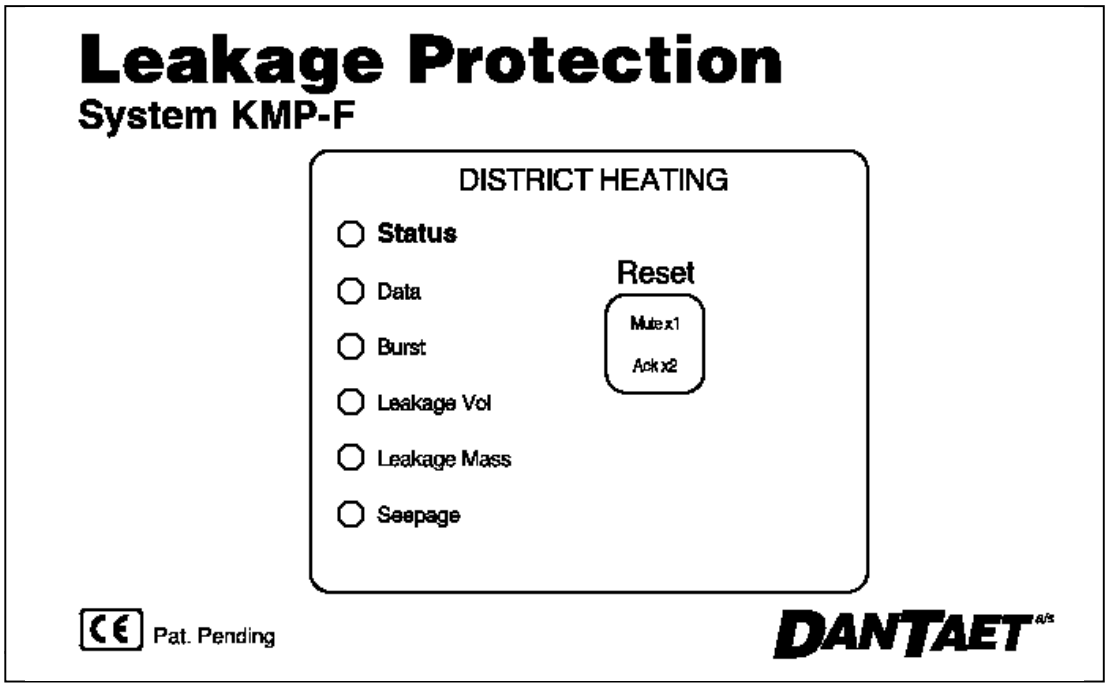
System KMP-F

DanTaet system KMP-F is a system for leakage protection of direct coupled district heating and central heating installations.

The system consists of two ultrasonic flow meters attached to a Kamstrup MULTICAL® 601, 602 or 801 Heat Meter, a Control Unit and two electrically actuated valves. The valves are connected to the Control Unit by DIN plugs, and the Heat Meter is hardwired to the Control Unit, from which it fetches flow data.

The Control Unit's front panel contains six indicators and one button:



Green: Heating installation in operation;,no leak, no disturbances.

Yellow: Heating installation in operation, no leak. Valve error or trapped air.

Off: Heating installation cut off. If lower indicator flashes green, a Tightness Test is in progress (OptiTight). If one of the lower four indicators shows fixed or flashing red, the system has determined the presence of a leak from the installation.

Steady or blinking Red: Heating installation in operation, critical system error, leakage protection inoperative, contact DanTaet.

Monitoring

Leakage Vol

The system continually monitors the flow of water into and out of the installation. If the difference between these flows exceeds the set tolerance, a Leakage Volume Alarm is issued, and the installation is cut off.

Seepage (OptiTight®)

The system automatically checks the installation for seepage. The test may be executed from one to four times daily. The default setup performs the test daily at 02:00.
During execution, the heating supply is interrupted for approx. 10 to 45 min. Depending on actual settings. This means that when warm tap water is produced in a heat exchanger , there will be no warm tap water for the duration of the test.

System Test

The system is self-testing.

Alarms are issued for the following system errors:

Meter fault.	Missing or erroneous meter signal.
Valve fault.	A valve fails to shut tight.
Flow fault	A valve has failed to reopen.
Transmitter fault	An attached Liquid or Pressure Sensor is defective.
Power Supply fault	An internal power supply is defective.
Mains Supply fault	Mains power failure. Alarm relay trips.
Communication fault	Data Communcation has ceased

The installation is not cut off on system errors, but the leakage protection is inoperative, and the system needs servicing as soon as possible. Some system faults may reset themselves if normal state recurs spontaneously.

Drain Function

KMP-F may be supplied with a Drain Valve, to evacuate the installation in the event of cut-off for a leakage alarm.
When used with a drain valve, the KMP-F can not provide power for the Kamstrup MULTICAL energy meter.

Operating the system

Operation of system KMP-F is via the front panel which is equipped with six status indicators (LED) and one button. In addition there is a buzzer which makes a tick sound on keypress, and a continuous beep on alarm. The functions are as follows:

Key ”Reset”	Used for alarm acknowledgement and system restart. First keypress mutes the alarm sound, subsequent keypresses acknowledge alarm(s), eventually restoring normal operating mode.
Indicator ”Status”	Shows system status cf. page 3.
Indicator ”Data”	Blinks red with every query from Control Unit to Heat Meter, green with every reply from the Heat Meter.
Indicator ”Burst”	Indicates alarm from attached liquid sensor (option V) or insufficient supply operating pressure (option P).
Indicator ”Leakage Vol”	Shows yellow on leakage warning (volume). Shows red on leakage alarm (volume); blinks after sound is muted.
Indicator ”Leakage Mass”	Indicates critical error on the energy meter. Contact DanTaet.
Indicator ”Seepage”	Blinks green during Tightness Test execution. Shows red on seepage alarm (OptiTight); blinks after sound is muted.

Functional description / Operating modes

During operation, the system will be in one of five different modes:

- Normal operation without disturbance
- Normal operation with disturbance
- Leakage alarm
- System error
- Liquid sensor wet / defective (opt. V)
- Pressure low / sensor defective (opt. P)

Normal operation without disturbance

When mains voltage is first applied to the system, it will assume the Normal Operation mode. In this mode, the ”Status” indicator emits a constant green light. The ”Data” indicator will initially flash rapidly a number of times, whereafter the interval between flashes becomes a steady 10 seconds. All other indicators remain extinguished, except ”Seepage”, whink will flash green during execution of the Tightness Test, and ”Leakage Vol”, which may warn of an impending leakage alarm with the emission of a yellow light.

Normal operation with disturbance

In the presence of a disturbance (valve error or air venting required) the Status indicator switches to emitting a yellow light. Note a disturbance is reset when tighness test begins. If the disturbance persists is is reported again by the tightness test.

Leakage alarm condition

In leakage alarm condition, the control unit cuts off the district heating supply, indicated by the Status indicator being extinguished and by red light (flashing after sound mute) in an alarm indicator, and a constant buzzer sound. The buzzer is muted by a single press to the Reset key. Subsequent activations of the Reset key acknowlegde an alarm. When all alarms have been acknowledged, the system is restarted. The heating installation should be inspected for leakage prior to restarting after an alarm.

System error condition

System errors render the system inoperative, and are signalled by a red light in the Status indicator (flashing after sound mute). The district heating supply remains open, unless the system has previously reported a leakage alarm that remains unacknowledged. System errors require servicing, and you must contact DanTaet a/s.

Liquid sensor wet / defective

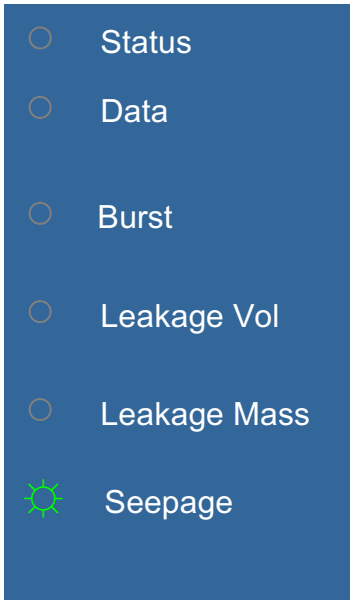
If an attached liquid sensor gets wet, alarm is issued with sound and fixed yellow light in ”Leakage Mass” (flash after sound mute). If configured to cut off the installation for this error, KMP-F extinguishes the Status indicator, and the district heating supply is cut off. A defective liquid sensor is signalled by System Error and a fixed yellow light in Burst.

Low Operating Pressure / Pressure Sensor Defective

On insufficient operating pressure, alarm is given by ”Leakage Mass” blinking yellow; the installation cut-off and ’Status’ extinguished. A defective pressure sensor is signalled by System Error and a fixed yellow light in Burst.

Normal condition

Normal monitoring. The Data indicator flashes red/green for communication to/from the energy meter.



Tightness test in progress. The district heating supply is temporarily interrupted.

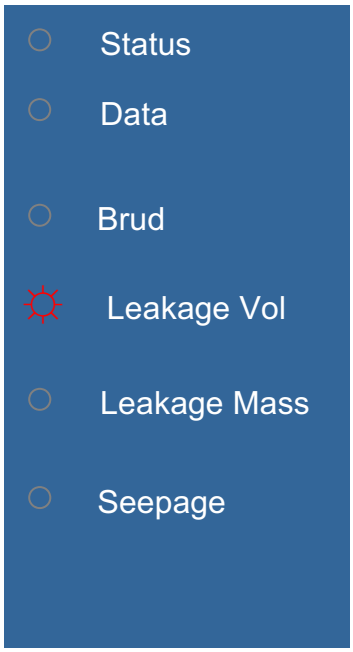
Leakage Vol warning. A second measurement is taken. If this is normal, the warning is withdrawn; otherwise a leakage alarm is issued (Leakage Vol).

Disturbance

Monitoring with disturbance:
Status indicator is yellow.
A valve can not close fully, or air is trapped in the installation.

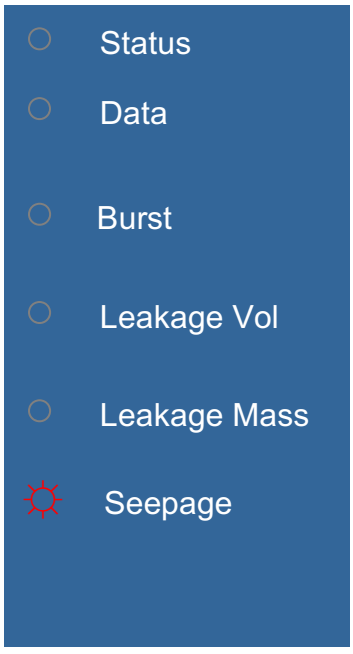
Leakage alarm condition

Leakage alarm (volume). The instal-lation has been cut off.



Leakage alarm (volume) after sound mute. The installation is cut off.

Seepage alarm. The installation has been cut off.

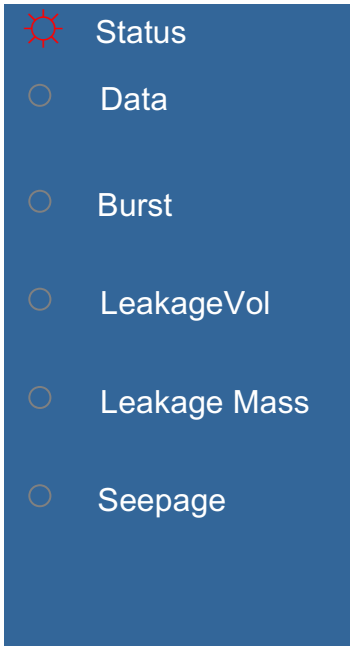


Seepage alarm after sound mute. The instal-lation has been cut off.

System error condition

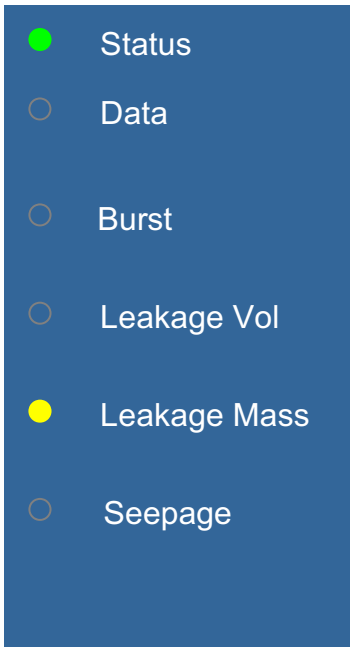
A critical system error has occurred, and the system is inoperative. The district heating supply is open. The system needs servicing as soon as possible, and you must contact DanTaet.

System error.
The district heating installation is open.

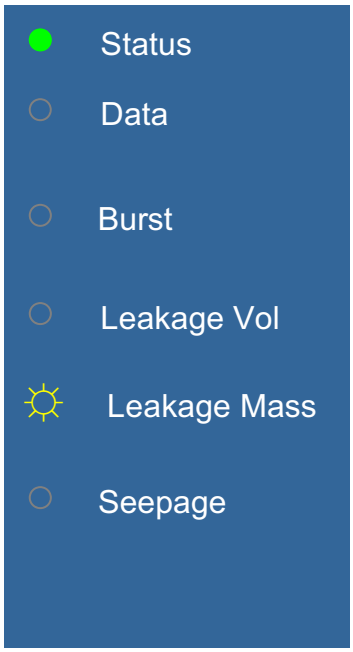


System error after sound mute. The district heating installation is open.

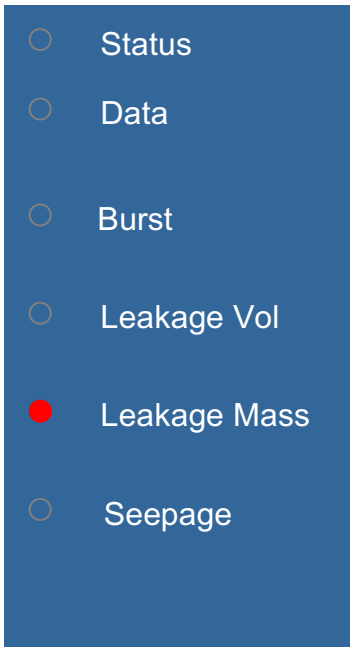
Liquid sensor wet



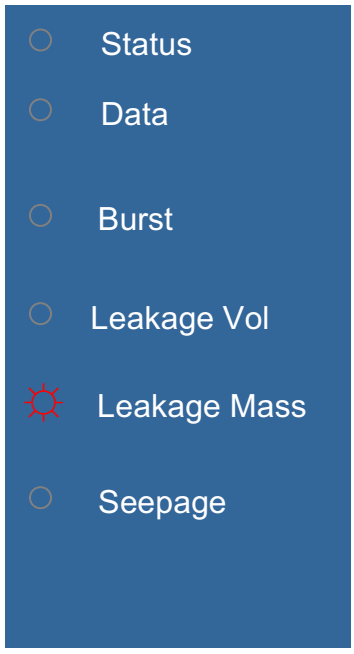
Alarm: attached liquid sensor is wet. The heating installation remains open.
(Jumper F5 out)



Alarm for wet liquid sensor after sound mute.

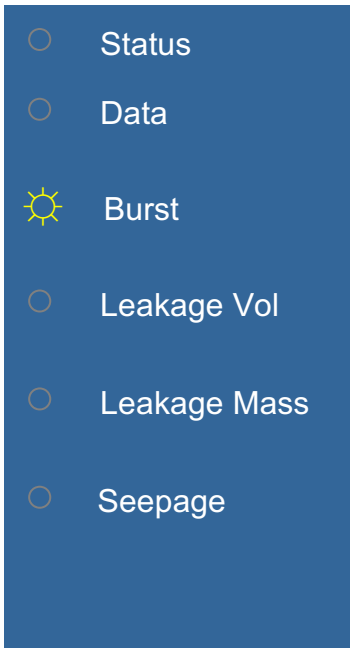


Alarm: attached liquid sensor is wet. The installation is cut off.
(Jumper F5 inserted)



Alarm for wet liquid sensor after sound mute.

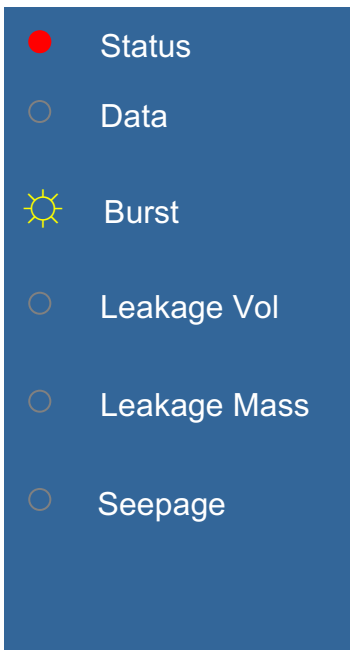
Low Operating Pressure



Operating pressure low.
The installation has been cut off.

Liquid / Pressure Sensor defective

Alarm: attached liquid sensor defective.
The installation remains open.



Alarm for defective liquid sensor after sound mute.

Liquid sensor option

System KMP-F may be attached one or two liquid sensors type LS-X after installation of liquid sensor interface ILS-C. The liquid sensor LS-X responds to aggregate water touching both its electrodes, and can thus via the control unit issue an alarm and, if desired, close the cut-off valves when wet.

Liquid sensores are placed where there is risk of aggregate water, e.g. under an old, untrusted radiator or joint, or by a floor drain.
Jumper F5 determines if the cut-off valves must close for a wet liquid sensor.

A liquid sensor alarm remains active while the sensor is wet, and is automatically reset when the sensor gets dry. It is consequently necessary to remove the aggregate water and wipe the sensor dry in order to reset the alam.

The liquid sensor condition is permanently monitored, and errors such as a broken or shorted cable are reported as system errors on the front panel as previously described.

Liquid sensor setting: jumper row F

Pos 4: Liquid sensor attached.
No jumper = no liquid sensor installed
Jumper = liquid sensor installed
Pos 5: Wet liquid sensor cuts off installation (Jumper = yes)

Functional testing of liquid sensor
These steps constitute a functional test of the liquid sensor:

1. Check liquid sensor configuration on jumper row inside control unit front cover (see above).
2. Put a wet rag over the liquid sensor.
3. After ten seconds, the control unit must issue an alarm and (if so configured) activate the cut-off valves.

Remove the rag and wipe the liquid sensor dry, and the control unit must revert to the normal condition.

Liquid sensor interface "ILS-C".

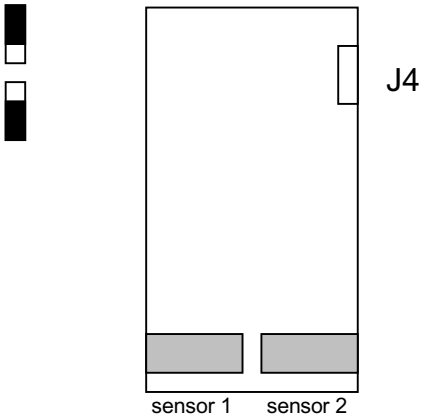
The system accepts an ILS-C module. Up to two liquid sensor may be attached to the module. The following conditions are checked continuously:

1:	Dry condition	OK
2:	Wet condition	Alarm: "Liquid sensor wet"
3:	Disconnected sensor	Alarm: "Liquid sensor defectivet"
4:	Shorted sensor	Alarm: "Liquid sensor defective"

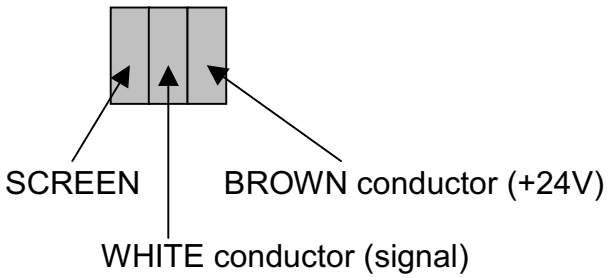
Jumper J4 selects number of attached sensors as follows (top of circuit board, near heatsink):

J4: 1-2 2 sensors attached.

J4: 2-3 1 sensor attached.



A liquid sensor employs a 2-conductor screened cable. This is connected as follows:



Note:

1: ’Sensor 1’ MUST be employed when one sensor only is attached.

2: When two sensors are installed, the system can not discern between the two, but rather see the two as one common sensor albeit physically apart.

Checking and setting the clock

System KMP-F contains a watch to control execution of the OptiTight™ tightness test. Daylight Savings Time is set/unset automatically. The clock has a limited accuracy. A facility has therefore been provided to check and set the closk as follows:

Checking the clock

1. Depress the Reset key for 5 seconds until you hear a series of short beeps.
2. Release the key, and all indicators will turn green.
3. A beep is issued for every hour on the clock (count..).
4. All indicators now turn red.
5. A beep is issued for every minute on the clock (count..)
6. The system now reverts to normal operation.

Example:
Green indicators and nine short beeps (nine hours)
Red indicators and 15 short beeps (15 minutes)
The clock has the time as 9:15

Setting the clock

1. Depress the Reset key for 5 seconds until you hear a series of short beeps.
2. Release key briefly during the beep series, and depress again for five seconds.
3. Top indicator turns green, and setting of clock must commence within six seconds. (Green light jumps to a lower indicator each second).
4. Hours are set first. Press the Reset key once for each hour you want on the clock.
5. Let the green light proceed through the bottom indicator (6 sec).
6. Top indicator now turns red, and setting of minutes must commence within six seconds. (Red light jumps to a lower indicator each second).
7. Now press the Reset key once for each minute you want on the clock.
8. Let the red light proceed through the bottom indicator (6 sec), whereby the time is set.
9. The system now reverts to normal operation.

District heating plumbing

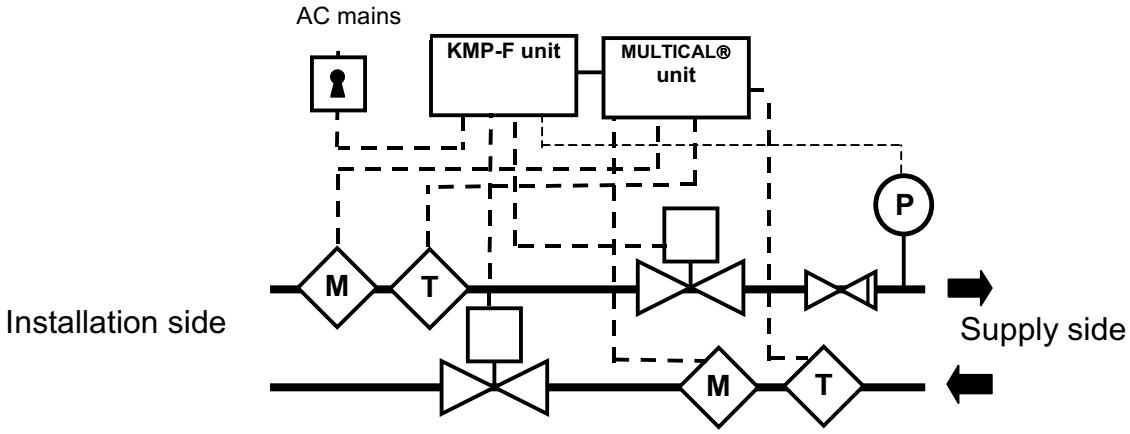
Meters and valves are installed as illustrated.

Meter

Kamstrup energy meter / ultrasonic flow meters must be installed in accordance with the manufacturer's instructions.

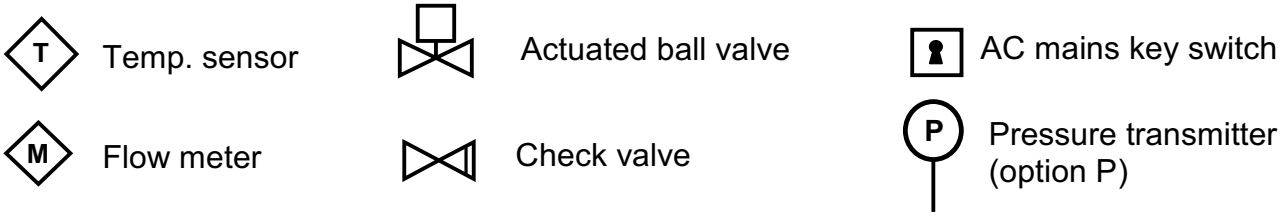
Cut-off valves

Electrically actuated ball valves, 24Vac supplied from the control unit. The are no special demands for the orientation of the cut-off valves, but a configuration with the actuator hanging below the valve body should be avoided. Check valve must be located in the Return pipe outboard of the cut-off valve. If the system comprises a pressure transmitter, this must be located outboard of the check valve to always permit registration of operating pressure in the distribution pipe.



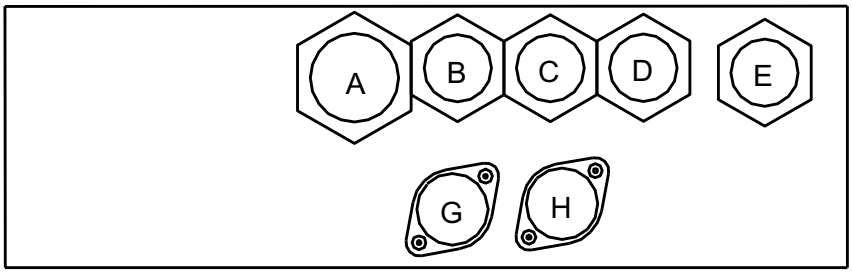
District heating installation system KMP-F

Legend:



Socket / gland placement

KMP-F



A: AC mains
B: Liquid sensor PG9
C: Alarm relay PG9
D: Alarm relay PG9
E: Data cable for MC

G: Flow valve
H: Return valve

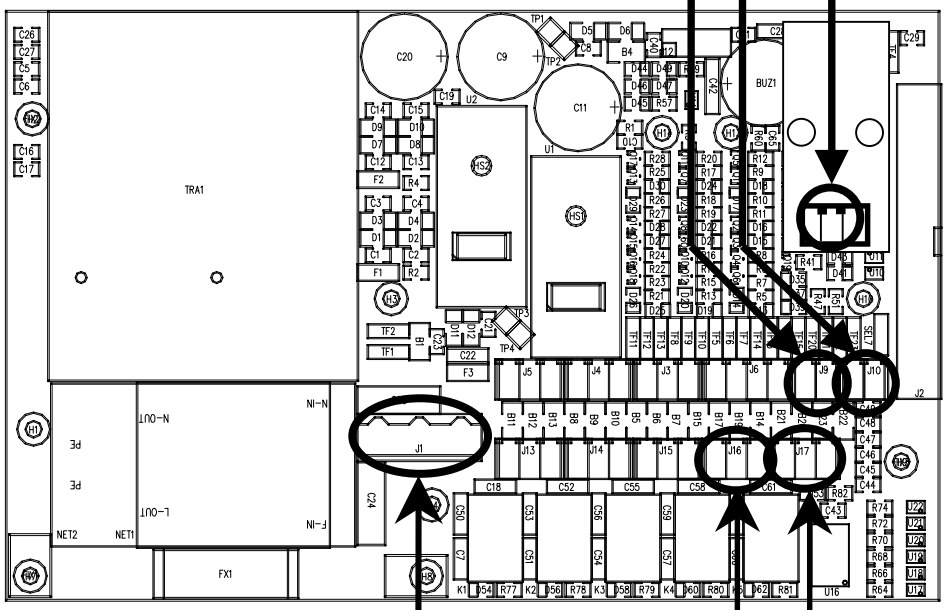
Electrical installation

Valves connect to the control unit with the preinstalled connectors. Connection of KMP-F to mains, control signals, data communication and remote alarm is illustrated here. MULTICAL® is installed as prescribed by Kamstrup. MULTICAL® 601 must be fitted with top module 67-05.

Digital Input 2
Input J10 internal 12Vdc (+ | -)
Pri (Jumper F2 in): Ext. Valve control
Sec (Jumper F2 out): Ext. Tightness Test Inhibit
Jumper F3 sets mode close/open

Digital Input 1
Input J9: internal 12Vdc (+ | -)
Pri (Jumper F1 in): Ext. Reset
Sec (Jumper F1 out): Ext. Tightness Test Trigger

KMP interface
L-to-R: GND-Req-Data



Mains attachment
240Vac PE - N - L

Signal relay
Output J16: Max. 24Vac NC-COM-NO
Floating relay, energized in the normal state (COM-NO engaged).

Alarm relay
Output J17: Max. 24Vac NC-COM-NO
Floating relay, energized in the normal state (COM-NO engaged).

KMP-F Installation Verification Checklist

Plumbing:
- forward meter installed *un-insulated* in the forward flow pipe (warmer)
- electronics housing of forward meter located on the side of the meter +/-45°
- arrow on forward meter points in the direction of flow
- red temperature sensor in/at forward meter
- 5xDN strainght pipe section ahead of forward meter input port
- **orange** cut-off valve at output port of forward meter
- actuator of forward cut-off valve not hanging below pipe
- return meter installed *un-insulated* in the return flow pipe (cooler)
- electronics housing of return meter located on the side of the meter+/-45°
- arrow on return meter points in the direction of flow
- blue temperature sensor in/at return meter
- 5xDN strainght pipe section ahead of return meter input port
- **light blue** cut-off valve at output port of return meter
- actuator of return cut-off valve not hanging below pipe
- check valve installed with correct orientation outboard of return cut-off valve
- optional pressure sensor (opt. P) installed in return pipe outboard of check valve

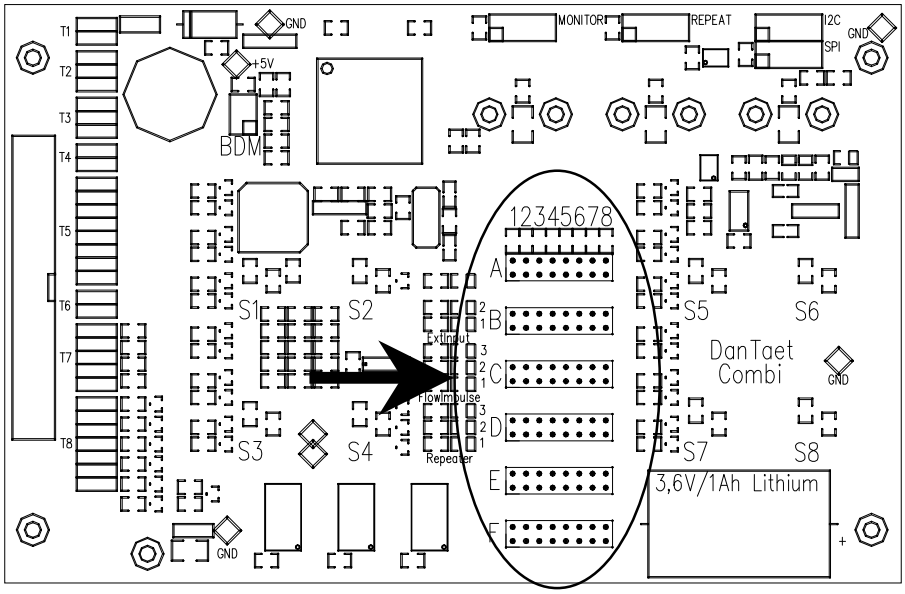
Electrical (MULTICAL):
- red temperature sensor connected to T1
- blue temperature sensor connected to T2
- if **Meter in Flow pipe**: forward meter connected to V1, return meter to V2
- if **Meter in Return pipe**: return meter connected to V1, forward meter to V2
- data module DATA/REQ/GND connected White/Brown/Screen
- power supply from panel transformer or KMP-F (24Vac)

Setting of monitoring parameters

System KMP-F comes with default factory settings, but may be adapted to suit the actual installation by relocating jumpers situated inside the front panel of the control unit..
A jumper is a black plastic covered metal clip used to electrically connect two pins over which it is inserted. Using tweezers or small pliers to relocate jumpers may be helpful.

Jumper enlarged.
Front and side views.

Caution: Disconnect the mains supply prior to opening the front cover of the control unit.



Jumper settings

Jumper row A: IRPT

Pos 1-4 = Impulse value 1-10-100-1000 l/imp
Pos 5-8 = Impulse duration 20-50-100-200 msek

Jumper row B: OptiTight Trigger

Pos 1-4 = Flow limit 20-40-60-80% Qp (none = close valves half way only)
Pos 5-8 = Execution (0)-1-2-3-4 x/day, equidistant from base time.

Jumper row C: OptiTight execution, signal relay J16

Pos 1-4 = Duration-10-20-40 min (none = no tightness test)
Pos 5 = Leakage and Liquid Sensor alarms to signal relay
Pos 6 = System alarms to signal relay
Pos 7 = Cut-off (Pump Stop) to signal relay
Pos 8 = Air Venting Required to signal relay

Jumper row D: Volume flow monitor

Pos 1-4 = Static tolerance 5-2-1-0.5 % Qp (none = monitor off)
Pos 5-8 = Dynamic tolerance 10-5-2-1 % Qact (none = 20% Qact)

Jumper row E: Mass flow monitor

Pos 1-4 = Static tolerance 2-1-0.5-0.2 % Qp (none = monitor off) (default)
Pos 5-8 = Dynamic tolerance 10-5-2-1 % Qact (none = 20% Qact)

Jumper row F: Options

Pos 1 On/Off = Digital input 1 Pri/Sec function (Reset/TT trig)
Pos 2 On/Off = Digital input 2 Pri/Sec function (Valve control/Thermal switch)
Pos 3 On/Off = Digital input 2 function mode close/open
Pos 4 On/Off = Liquid sensor installed/not installed
Pos 5 On/Off = Wet liquid sensor does/does not close valves
Pos 6 On/Off = Tightness test using both valves/return valve only
Pos 7 On/Off = Large/small flow meter when CCC code is ambiguous
Pos 8 On/Off = MULTICAL® supplied from mains/battery

Jumper F7 is set from the flow meter's Qp rating and the energy meter's CCC code (= last three digits of the **Prog** code on the meter front) as shown in the following table. If actual CCC code does not appear in table, jumper F7 placement is irrelevant.

CCC code	Meter Qp rating	Jumper F7
111	1,5	Out
111	2,5	In
112	1,5	Out
112	2,5	In
113	3,5	Out
113	6,0	In
114	10	Out
114	15	In
120	15	Out
120	25	In
121	1,5	Out
121	2,5	In
123	0,7	Out
123	1,0	In
124	1,5	Out
124	2,5	In
125	1,0	Out
125	1,5	In
126	1,0	Out
126	2,5	In
127	2,5	Out
127	3,5	In
136	2,5	Out
136	3,0	In
137	6,0	Out
137	10	In
138	6,0	Out
138	10	In
139	1,5	Out
139	2,5	In
140	3,5	Out
140	5,0	In
143	10	Out
143	15	In
144	25	Out
144	40	In
163	0,6	Out
163	1,0	In
168	15	Out
168	25	In
192	600	Out
192	1000	In

EU declaration of conformity

DANTAET a/s
Højmevej 36-38
DK-5250 Odense SV
Tel: +45 63 17 45 00
Fax: +45 63 17 45 01
dantaet@dantaet.dk
www.dantaet.dk
Giro: 4 49 32 22
A/S reg. no. 158240
SE no. 10 70 13 09

CE

EU-Overensstemmelseserklæring
ifølge retningslinierne 89/336/EØF og 73/23/EØF

EU Declaration of Conformity
in accordance with the following directives
89/336/EEC and 73/23/EEC

*DanTaet Electronics a/s erklærer hermed at systemfamilien **KMP-F** er fremstillet i overensstemmelse med ovennævnte direktiver samt i henhold til følgende standarder:*

*DanTaet Electronics a/s hereby declare that the system family **KMP-F** has been designed and manufactured in conformity with the above directives and in accordance with the following standards:*

EMC

Immunitet / Immunity
DS/EN 61000-6-1:2002, DS/EN 61000-6-2:2002

Emission
DS/EN 61000-6-3:2002. DS/EN 61000-6-4:2002

Sikkerhed / Safety

DS/EN 61010-1:2001

Det er en forudsætning at DanTaet Electronics a/s installationsvejledninger er fulgt.

It is on condition that DanTaet Electronics a/s guideline for installations is followed.

Odense, 22. marts 2007

Erik Nielsen
Adm. direktør / President
DanTaet Electronics a/s

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