

The Sentinel range of water treatment products for domestic central heating systems.



Jetflush

SENTINEL

Jetflush 4 Instruction Manual

 **GE Water & Process Technologies**

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INTRODUCTION

These instructions cover the Sentinel Jetflush 4 domestic central heating system flushing unit.

It is recommended that these instructions are read throughout before commencing any work with the unit, even if you have previous experience of using a high flow flushing system.

You should also be familiar with the Code of Practice for treatment of water in domestic hot water central heating systems BS7593:1992, the Model Water Bylaws, The Health & Safety at Work Act and COSHH regulations and requirements.

The Sentinel Jetflush 4 unit utilises a mechanical method of combining high flow and low pressure together with suitable chemical cleansers in order to clean and restore efficiency to dirty, problematic wet central heating systems. The Sentinel Jetflush 4 unit,

- has been ergonomically designed for ease of use.
- gives at a glance temperature indication.
- includes an automatic mains water cut off device to avoid over filling.
- allows direct dumping to drain for improved speed of flushing.
- provides instant flow reversal during operation.
- creates additional turbulence, which will further enhance cleaning.

GETTING STARTED

Your Jetflush 4 pack comprises;

The Jetflush 4 unit

- 25 metres of 19mm (3/4 inch) flexible yellow tubing
- 15 metres of 12.5mm (1/2 inch) braided green tubing



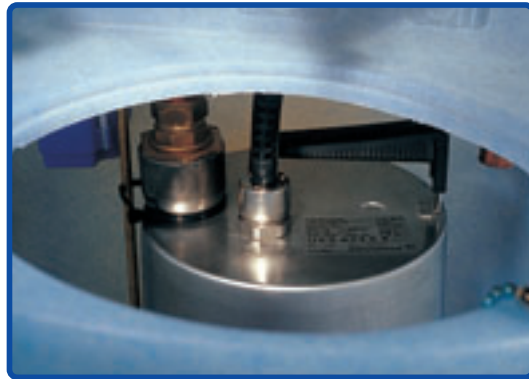
An accessory pack including:

- Hozelock 12.5mm outside tap connector
- 3 off 20mm and 1 off 15mm Geka quick fit valve connectors
- 2 off circulator service valve adapters with black plastic 20mm elbow connectors
- Selection of jubilee clips
- Instruction Manual



The low pressure, high flow, fully submersible Grundfos pump provides the mechanical power for your Jetflush 4 unit allowing:

- optimum flushing of domestic central heating systems
- efficient and thorough cleaning when combined with the recommended chemical cleaner
- an average size system to be completed typically in half a day.



- Attach the 15mm Geka fitting to one end of the green tubing and the Hozelock outside tap adapter (or other suitable mains water connector) to the other end.
- Cut two lengths, typically 3 metres, from the yellow coloured tubing and connect a 20mm Geka valve and a circulator service valve adaptor to each length.
- The last Geka valve should be connected to the remaining yellow tubing.
- Secure all connections with jubilee clips.



Record your serial number in this Instruction Manual (page 16) to aid requests for technical support. It is located near to the power supply cable inlet on the top plate



UNDERSTANDING JETFLUSH 4 CONTROLS

The splash proof mains on/off switch is located on the hand grip immediately behind the Jetflush logo. A standard plug, attached to 5metres of mains cable, allows connection into a domestic outlet socket.



The four Geka quick connection valves, pictured in the open position, are for:

- BLUE: Mains water inlet (Note, an automatic level device on the mains feed allows this valve to be left open unless an operation specifically calls for closure)
- YELLOW: System water dump to drain
- GREEN AND RED: Connection to the central heating system



The valve functions are moulded as symbols into the Jetflush 4 body, beneath each Geka valve, as a visual reminder as to their purpose.



The temperature gauge on the top plate indicates what the temperature of the recirculating water is relative to the pump tolerance of 40°C.



The orange and purple control valves on the top plate determine:

- the direction of water being pumped through the central heating system
- whether water is to be dumped to drain.



Note: The pointers on the control valves must align with the appropriate tail of the arrow on the symbols.



The orange control valve has three operating positions:

1. YELLOW WASTE PIPE: dump water to drain.
2. RED RADIATOR: flow through the system is instantly and safely reversed.
3. GREEN RADIATOR: allows water to be circulated around the system.



The purple control valve has only two positions:

1. YELLOW WASTE PIPE: dump water to drain.
2. WHITE JETFLUSH 4 UNIT: water is circulated around the system via Jetflush 4.



USING JETFLUSH 4 TO CLEAN CENTRAL HEATING SYSTEMS

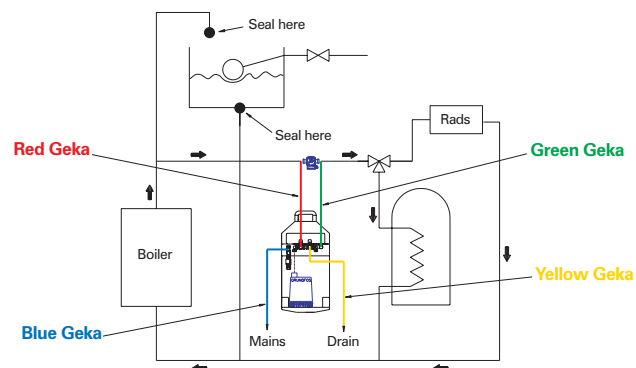
- Determine if the central heating system to be cleaned is open or closed (sealed) i.e. pressurised.
- If appropriate, open the three port valve if the system is of a 'Y' configuration or both motorised valves if it is an 'S' type.
- Set the room thermostat so that the boiler remains constantly on. Adjust the boiler thermostat so that the water temperature is below 40°C and switch it on.

Note that this temperature must not be exceeded otherwise the pump will automatically trip out and time will be needed before normal operation can be resumed.



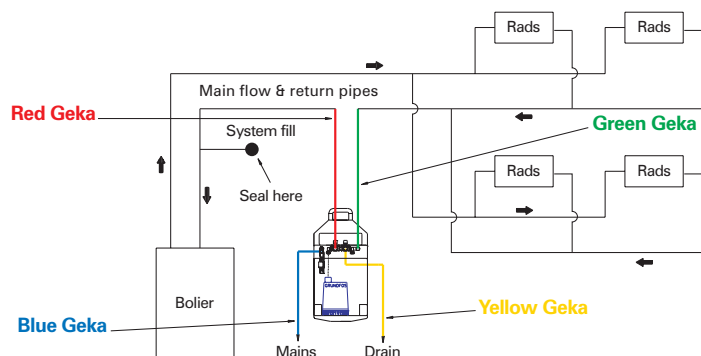
- Conduct a survey of the system.
- Record the temperatures reached by all the radiators and identify those with substantial cold spots.
- Note the settings of any TRV's and then make sure all the radiator valves are opened to their maximum.
- Take a sample of the system water and keep to one side for reference purposes.

Open or Fully Pumped System - Y Plan



- Seal the system at the F and E tank at the two positions shown using suitable bungs available from plumber's merchants.

Connected to a sealed system via flow or return pipes



- Use the alternate location shown if the system is closed (sealed).
- Connect Jetflush 4 to the system using the above diagrams as a guide
- For closed systems ensure
 - the unit is connected as shown, i.e. in series with the circulator
 - the circulator is electrically isolated so that it cannot pump

! Note: As a last resort, Jetflush 4 may be connected across radiator tails; however, this method does not allow full control over the rate or direction of flow since it is now connected in parallel across the system and not in series. Consequently cleaning efficiency will be impaired.

For open systems the circulator should be isolated and removed so that Jetflush 4 can be connected in its place. Removal is preferred for any system whenever this is possible.



With the circular clear plastic splash guard in place and all Geka valves closed:

- Fill the unit with water by turning on the mains supply tap and opening the blue Geka valve.
- Open the red and green Geka valves and switch on the pump.
- Let the water circulate for two or three minutes.



! Note 1: The water level will drop below the top level of the pump and will be restored automatically. However, if the level continues dropping switch off the pump, close all the Geka valves and investigate the water loss immediately.

! Note 2: An optional bund is available for Jetflush 4 to contain any accidental spillages.



- Add the recommended cleaning chemical to the unit, replacing the splash guard.
- Continue circulating the solution until fifteen minutes has elapsed from the time the water was first circulated, (it is not critical if this time is exceeded).



- Reversing the flow every five minutes or so by turning the orange control valve between the red and green radiators will improve this initial cleaning process. The pump can be left running during this operation.



! Note: Whilst the chemical is being circulated, it is important to ensure that all radiator lock shield valves, wheelheads or TRV's are in the fully open position and that the boiler is maintaining the water at a temperature of about 40°C.

- After the fifteen-minute period, the hot water circuit and all but one of the radiators should be isolated.
- Continue circulation through the radiator that has been left open.
- If during the primary checks, any radiators were identified as having cold spots, it is best to start with these.
- Periodically reverse the flow with the orange control valve.



- Banging the radiator with a rubber mallet or the flat of a hand will help to dislodge stubborn debris.
- Once the entire surface of the radiator has warmed up, the radiator should be isolated and the next radiator tackled.

After all radiators, and the hot water circuit, have been flushed the secondary flush can proceed.

- Switch off the boiler.
- Close the red and green Geka valves.
- With the pump still running close the blue Geka valve and open the yellow one.



- Turn both the orange and purple control valves to the yellow waste pipe and let the contaminated water reduce to below the pump level in the tank.
- Turn off the pump and open the blue Geka valve.
- When the unit has refilled open the red and green Geka valves and turn the orange control valve to the green radiator.
- Start the secondary flush by turning on the pump and when water flowing to drain approximately matches the clarity of the water in the Jetflush 4 unit isolate the radiator and open the next so it too may be flushed clear.

! Note 1: The pump will dump water to drain faster than the Jetflush 4 unit can fill, so switch off the pump as necessary to allow the level of the water in the unit to be restored. Alternatively the yellow Geka valve may be partly closed so as to balance the water being pumped to drain with the water filling the unit.

! Note 2: Badly fouled radiators may benefit by reverse flushing to speed up the time taken for the dump water to clear, to achieve this:

- Turn the orange control valve to the red radiator.
- Reverse the flow periodically by turning the orange control valve periodically back and forth between the green and red radiators.

- When all the radiators and the heating circuit have been flushed open all radiator valves.
- Flush the entire system until the water being dumped to drain, which may now be a faint straw colour, is clear.

Sample this water using a Turbidity Tube test procedure.

- Keep flushing until a reading of less than 100ppm is achieved.
- Alternatively a conductivity reading can be made, flushing being continued until the reading is within 10% of the value for the mains water supply to the property.
- Turn off the blue Geka valve and allow the pump to run until the water level in the Jetflush 4 unit is just above the bottom of the pump.
- Close the yellow Geka valve.
- Turn the purple control valve to the white Jetflush 4 unit.



- Add Sentinel X100 scale and corrosion inhibitor to the Jetflush 4 unit.
- Allow to re-circulate for 10 minutes.
- Take a sample of the system water and test the level of Sentinel X100.
- If necessary add more inhibitor chemical, re-circulate and test again.

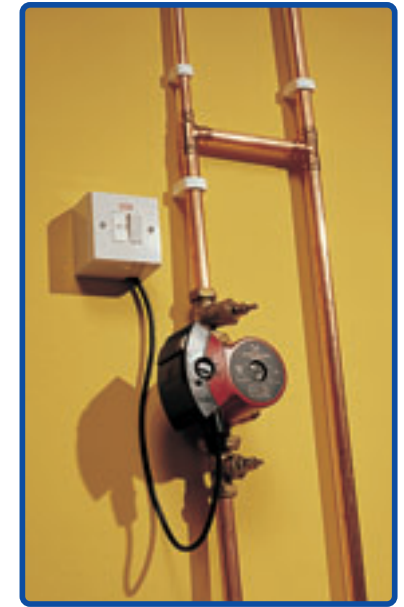


- Stop the pump, close the red and green Geka valves and open the yellow Geka valve.
- Turn the orange and purple control valves to the yellow waste pipes.
- Restart the pump
- When the water in the Jetflush 4 unit has been pumped out close the yellow Geka valve and switch off the pump.
- Turn off the mains water supply and open the blue Geka valve.
- Disconnect the hoses from the mains water and the central heating system, allowing any water to drain back into Jetflush 4.
- Disconnect the hoses from Jetflush 4 and close any open Geka valves.



REINSTATE THE SYSTEM

- Replace the circulator pump and remove the seals from the F and E tank if the system is an open one.
- Pipework, which has been altered to allow for isolation, must be made good to ensure safety during normal operation.
- For pressurised systems remove the seal from the mains supply fill point and re-pressurise.
- Return TRV's to their original positions.



Switch on the boiler and allow the system to come up to temperature, without resetting the thermostat.

- Re-examine the radiators, bleed as necessary and then record your observations after they have reached their maximum temperatures. Compare with the original readings, using a suitable report form.
- Adjust the boiler thermostat to its normal operating value and re-set the room thermostat to its original level.
- Make a final check that all is satisfactory.
- Complete any final details of the report form and leave a copy with the customer.

Domestic Central Heating System Survey Report														
Customer Name						Customer Address								
Radiator Survey		Prior to Flushing				TRV	Radiator Survey		After to Flushing					
Rele	Time	SL	TL	C	SH		TH	Rele	Time	SL	TL	C	SH	TH
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
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16														

Water	Type of System	Conductivity Testing
Mains	Single Pipe	Mains Water
Boiler	Pressure	Radiator Water - Before
Output	Monitors	Radiator Water - After
	Airic Quantity	1:100 Inhibitor Test
	Quality	
Pump		
Water	F&E Tank	
Type	Condition	Sign/Date
Condition		

SUMMARY OF JETFLUSH 4 OPERATIONS

STEP	OPERATION	RADIATORS	GEKA VALVES				CONTROL VALVE POSITION			PUMP
			BLUE	RED	YELLOW	GREEN	ORANGE	PURPLE		
1	Fill Jetflush 4 With Mains Water	ALL	OPEN	CLOSED	CLOSED	CLOSED	Green RADIATOR	White JF4	OFF	
2	Circulate System	ALL	OPEN	OPEN	CLOSED	OPEN	Green RADIATOR	White JF4	ON	
3	Add Cleaning Chemical	ALL								
4	Circulate System	ALL	OPEN	OPEN	CLOSED	OPEN	Green RADIATOR	White Jetflush4	ON	
5	Circulate System - Reverse Flow	ALL	OPEN	OPEN	CLOSED	OPEN	Red RADIATOR	White Jetflush4	ON	
6	Individual Clean	1	OPEN	OPEN	CLOSED	OPEN	Red RADIATOR	White Jetflush4	ON	
7	Individual Clean - Reverse Flow	1	OPEN	OPEN	CLOSED	OPEN	Green RADIATOR	White Jetflush4	ON	
8	Repeat 6 to 7 For Remaining Rads									
9	Reduce Tank Level	1	CLOSED	CLOSED	OPEN	CLOSED	Yellow Waste	Yellow Waste	ON	
10	Fill Jetflush 4 With Mains Water	1	OPEN	OPEN	OPEN	OPEN	Green RADIATOR	Yellow Waste	OFF	
11	Secondary Flush - Dump, by balancing yellow Geka valve, until clarity matches tank water. Reverse flow if necessary.	1	OPEN	OPEN	OPEN	OPEN	Green RADIATOR	Yellow Waste	ON	
12	Repeat 11 For Remaining Rads									
13	Final Flush To Drain, Open all Rads	ALL	OPEN	OPEN	OPEN	OPEN	Green RADIATOR	Yellow Waste	ON	
14	Reduce Tank Level	ALL	CLOSED	OPEN	OPEN	OPEN	Green RADIATOR	Yellow Waste	ON	
15	Add Sentinel X100, Test Level	ALL	CLOSED	OPEN	CLOSED	OPEN	Green RADIATOR	White Jetflush4	ON	
16	Empty Tank	ALL	CLOSED	CLOSED	OPEN	CLOSED	Yellow Waste	Yellow Waste	ON	
17	Isolate Mains, Disconnect Hoses (from system first)	ALL	OPEN	OPEN	OPEN	OPEN	Green RADIATOR	White Jetflush4	OFF	

FAULT FINDING AND RECTIFICATION

NO FLOW ON FILL LINE

- Check mains pressure is above 1.0 bar.
- Check inlet and fill valves are open.

PUMP DOES NOT RUN

- Check that unit is plugged in.
- Check the fuse in the plug.
- Check the socket outlet is live.
- Check for breaks in the mains cable.
- Check that the thermometer gauge is not in the red zone.
- If the pump still does not run and the light is on at the switch, then there is an internal fault in the pump.

PUMP RUNS BUT THERE IS NO FLOW IN TO THE TANK

- Check that the red and green Geka valves are open.
- Check that the circulator service valves are open.
- Check that all radiator valves are open.
- Check that 'closed system' circulator is pumping.

PUMP RUNS BUT WATER WILL ONLY CIRCULATE IN ONE DIRECTION

- Non return valve fitted in heating circuit.
- Another valve in circuit acting as a check valve.

WATER LEVEL IN TANK CHANGES WHEN BLUE AND YELLOW GEKA VALVES ARE CLOSED

- Header tank not satisfactorily isolated.
- Leak on heating circuit.

WARRANTY AND SERVICE

PLEASE NOTE

FOR EFFICIENCY AND HEALTH AND SAFETY REASONS, THE SENTINEL JET FLUSH UNIT IS DESIGNED TO WORK AT TEMPERATURES NO GREATER THAN 40°C

- The pump will 'cut out' if this temperature is exceeded and will only reset when cool.
- The Sentinel Jetflush 4 unit must not be subjected to freezing conditions even when empty.
- Failure to adhere to this notice may result in permanent damage to the unit and will invalidate any warranty claim.

Record your Serial Number here

AFTER SALE WARRANTY

Your Sentinel Jetflush 4 unit is covered by a parts warranty for a period of one year from date of purchase. Please complete and return the enclosed card in order to validate your warranty.

Should you have any problems with your unit, please contact the **Sentinel Helpline on 01942 26 36 26** for more assistance.

The following items are NOT covered by the warranty:

Physical damage to the unit occurring after purchase

- Component failure due to the system having been run with water exceeding 40°C.
- Damage caused by freezing.

MAINTENANCE

The Sentinel Jetflush 4 unit has been designed to give a long service life with minimal maintenance. However, a few simple tasks need to be undertaken after every clean or periodically to ensure that the unit remains in top condition and continues to deliver outstanding performance.

Post use

After each time the Sentinel Jetflush 4 unit is used it should be thoroughly cleaned to remove deposits flushed out from the heating circuit that have accumulated in the bottom of the tank.

Routine

The connection hoses and mains power cable should be periodically examined for signs of abrasion or wear and replaced if necessary.

SPECIFICATION DATA

Product Name:

Sentinel JETFLUSH 4 Flushing Unit

Height	900mm
Diameter	450mm
Weight Empty	35.5 kg
Weight Working	75 kg
Power supply	240v 50 Hz Single Phase
Full load current	4.4 Amps
Locked rotor current	16.5 Amps
Input power watts	940
Fuse rating	13 Amps
Pump ref	AP 12.40.06.1
Cable length	5 metres
Power connection	13 Amp plug
Motor insulation	IP68 Class F
Inlet connection	15mm Geka connector with flexible hose
Drain connection	20mm Geka connector with flexible hose
Recirculation connections	20mm Geka connector with flexible hose
Max inlet pressure	75 psi (5 bar)
Max drain pressure	20 psi (1.3 bar)
Max recirculation pressure	20 psi (1.3 bar)
Working recirculation pressure	15 psi (1.0 bar)
Max inlet flow at 5 bar	30 lpm
Max drain flow	35 lpm
Max recirculation flow	50 lpm
Typical working recirculation flow	40 lpm
Max temperature re-circulating liquid	40°C
Optional bund diameter	680 mm
Optional bund height	285 mm

FURTHER INFORMATION

For more information on Sentinel Jetflush 4 and Sentinel's comprehensive range of water treatment products visit www.gewater.com/sentinel or call 0151 420 9595.

Accessory Kit

Jetflush 4 Accessory kits will be available from your Jetflush stockist comprising:

- Survey Sheets
- Infra-red thermometer
- Conductivity Meter
- Turbidity Tube
- X100 Test Kit