Pressurisation Unit – Fluid Category 5
"Midi-Fill" *Digital* Model – MFD - Datasheet

Description

"Midi-Fill" *Digital* has been designed to comply with the Water Regulations, providing Fluid Category 5 backflow protection for filling and top-up of "non-house" heating or chilled systems. **Filling loops with a Double Check Valve must no longer be used for non-house primary circuits above 45 kW - see Water Regulations**. "Midi-Fill" *Digital* is compact and intended for wall mounting.

The primary components consist of –

- Fluid Category 5 backflow prevention – initial fill & top-up
- Pump – with anti seize daily pulse feature
- High & low pressure cut-outs with boiler control output
- Comprehensive BMS controls
- Digital display, setting buttons and button lock
- Self test monitoring system alerting of pressurisation fault **before** heating system is shut down
- Electronic water meters with monthly excessive filling warning trigger (adjustable)
- Pressure transducer- accurate filling and small differential

The unit is supplied fully assembled and tested. Inlet and outlet stainless steel braided hoses with Servicing Valves and push fit connections are provided to facilitate installation.

Applications

Filling and topping up –

- Primary Heating Systems
- Under Floor Heating
- Refrigerating Equipment
- Chilled Water Circuits
- Cooling Circuits
- Industrial Processes

Digital Controller

The unit is factory commissioned for systems up to 10 m head. For taller buildings, the cold-fill pressure can be increased using the buttons on the front panel. *Note - the buttons can be locked to prevent tampering*. The following adjustments are permitted –

- Cold fill
- High cut-out pressure
- Excessive monthly water consumption warning trigger

The controller ensures a workable program; since settings must be in range. E.g. the low cut-out pressure is automatically adjusted to 0.5 bar below cold fill. The high cut-out pressure cannot be set with less than 0.5 bar above the cold-fill value.

Panel display messages include –

- System healthy
- Last filled date
- Water consumption – since zeroing
- Water consumption – since 1st of that month
- Low level fault
- Low system pressure fault
- High system pressure fault
- Pump fault
- Excessive monthly water usage warning

Model shown - MFD22 *– Fluid Category 5*
Sizes - 15 or 22 mm Supplied with flexible hoses incorporating Servicing Valves

Electronic Water Meter

The "Midi-Fill" *Digital* incorporates a built-in electronic water meter, which determines the system volume; enabling the quantity of inhibitor to be added via a dosing pot. The meter also indicates any system leakage, which again helps with re-dosing after repair. The meter can be zeroed from the panel. An excessive monthly consumption warning feature is also provided, where a second meter reading illustrates the filling since the 1st of the month. If the filling exceeds the user defined trigger value, a visual warning is displayed on the panel and the warning relay closes. *Note – the boiler control is unaffected and the warning will automatically clear on the 1st of each month – if not cleared manually earlier.*

Boiler & BMS Controls Overview

"Midi-Fill" *Digital* addresses the common weakness of pump seizure due to infrequent use by pulsing the pump each day - *no water is admitted into system*. A self test program ensures the pump can generate pressure; otherwise the BMS fault relay activates and the specific fault is displayed on the LCD panel. This self monitoring system warns of faults **before** the system needs topping up and therefore helps avoid low pressure boiler shut down situations. These are invariably disruptive and costly – especially for schools.

The pump can be manually tested during maintenance and disabled during installation using the controls on the panel.

Water Regulations

Clause G24.2 (page 8.24) allows a temporary connecting pipe (quick fill loop) to be used for a **house heating system only** - since the Fluid Category is 3. For non-house applications (e.g. output greater than 45 kW), the risk is Fluid Category 4 and a quick fill loop must not be used – **not even temporarily** (page 6.6, 4a). *For systems less than 45 kW refer to datasheet "Autofill" – model AFCA*. Above 45 kW the system could be filled through an RPZ valve or AB air gap and pump, the latter arrangement is incorporated into the "Midi-Fill" *Digital.*

"Midi-Fill" *Digital* does not require annual servicing and does not need to be notified to the local water company.

Arrow Valves Ltd
Tel: 01442 823123 Fax: 01442 823234
www.arrowvalves.co.uk
info@arrowvalves.co.uk

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Specification - Mechanical

Connection hoses (supplied)	15 or 22 mm stainless braided metal push fit with serv. valve
Pressure Supply	1.0 bar dynamic min 10 bar max.
Enclosure	Wall mounted with lockable door
Weight (wet)	25 kg
Approval (AB Air Gap)	WRAS 1112062 (MFD22) WRAS 1112063 (MFD15)

Specification – Electrical

Volts/Phase/Frequency	230/1/50
Supply	via 6 A MCB isolator (not supplied) RCBO recommended
Motor type	Induction (brushless)
Low level cut out	Stops pump (BMS & warning lamp on door) – auto reset
Max. current BMS relays	8 A resistive @ 230 V a.c.
Control circuit protection	3 A fuse inside enclosure
Switch Enclosure	IP65
Cable Entries	M20 hole
Solenoid (22 mm only)	230 V 50 Hz IP65
IP Rating EN60529	IP65 (controls)
Power Consumption	535 W
Full Load Current	2.3 A

Adjustable Parameters

Cold Fill	On 0.6 – 3.2 bar (falling) **(max. suggested head 30 m)** *(Higher pressure versions available up to 5 bar – contact us)* Off 0.8 – 3.4 bar (rising)
High cut-out	5.8 bar max (rising) Must be at least 0.5 bar more than cold fill. *E.g. if left at 2.8 bar default, cold fill cannot be set above 2.3 bar*
Electronic water meter monthly trigger point	10 – 1000 Litres

Factory (Default) Settings –

Cold Fill	On 1.2 bar (falling) Off 1.4 bar (rising)
Low cut-out (automatic)	0.5 below cold fill (falling)
High cut-out	2.8 bar (rising)
Electronic water meter monthly trigger point	50 Litres

Boiler & BMS Controls

Three volt free SPST N.O. relays are provided. The operation is as table, where ● = contacts closed. *Note – the warning relay can be connected in parallel to fault relay if required.*

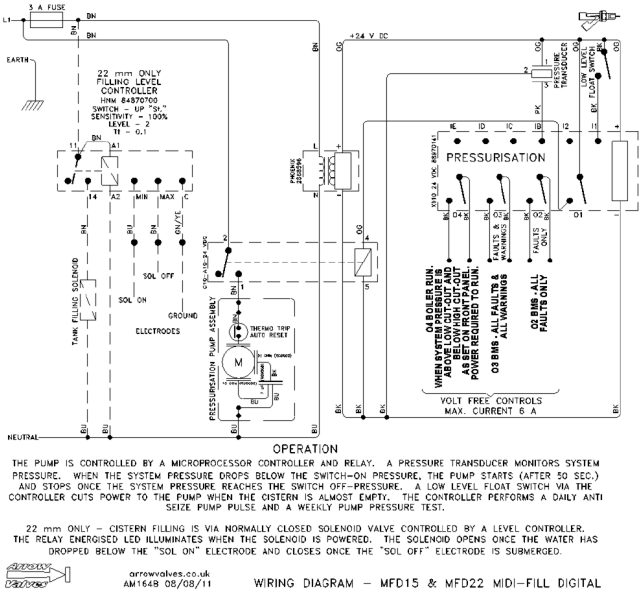
CONDITION	FAULT ONLY	FAULT WARN'	BOILER RUN
PRESSURISATION (RELAY NUMBER)	O2	O3	O4
HEALTHY (no faults or warnings)			●
FAULT - LOW LEVEL (internal tank water level)	●	●	●
FAULT- LOW CUT-OUT (low system pressure)	●	●	
FAULT - HIGH CUT-OUT (system pressure)	●	●	
FAULT - PUMP SEIZED? TRANSDUCER?	●	●	●
WARNING - EXCESSIVE FILLING THIS MONTH		●	●
FILLING DISABLED		●	●

Filling Rates / Boiler Size

The table below shows the filling rates for both the 15 & 22 mm models. The 22 mm version has a fast-filling solenoid in place of a float valve and a faster system filling rate.

Filling Mode	System Pressure	15 mm	22 mm
	bar	Lt/hr	Lt/hr
Filling Rate	1.0	720	1000
Suggested Boiler Size		46 – 200 kW	Above 200 kW

Wiring Diagram



OPERATION

THE PUMP IS CONTROLLED BY A MICROPROCESSOR CONTROLLER AND RELAY. A PRESSURE TRANSDUCER MONITORS SYSTEM PRESSURE. WHEN THE SYSTEM PRESSURE DROPS BELOW THE SWITCH-ON PRESSURE, THE PUMP STARTS (AFTER 50 SEC.) AND STOPS ONCE THE SYSTEM PRESSURE REACHES THE SWITCH OFF-PRESSURE. A LOW LEVEL FLOAT SWITCH VIA THE CONTROLLER CUTS POWER TO THE PUMP WHEN THE CISTERN IS ALMOST EMPTY. THE CONTROLLER PERFORMS A DAILY ANTI SEIZE PUMP PULSE AND A WEEKLY PUMP PRESSURE TEST.

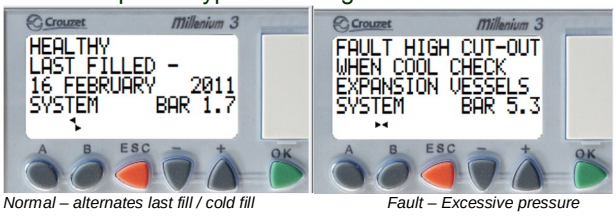
22 mm ONLY – CISTERN FILLING IS VIA NORMALLY CLOSED SOLENOID VALVE CONTROLLED BY A LEVEL CONTROLLER. THE RELAY ENERGISED LED ILLUMINATES WHEN THE SOLENOID IS POWERED. THE SOLENOID OPENS ONCE THE WATER HAS DROPPED BELOW THE "SOL ON" ELECTRODE AND CLOSES ONCE THE "SOL OFF" ELECTRODE IS SUBMERGED.

arrowvalves.co.uk AM164B 08/08/11 WIRING DIAGRAM – MFD15 & MFD22 MIDI-FILL DIGITAL

Note - Solenoid filling on MFD22 mm *AM164B*

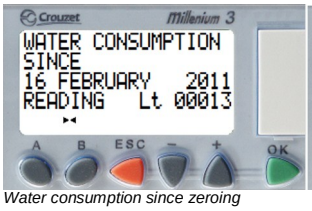
Display

Four examples of typical messages -

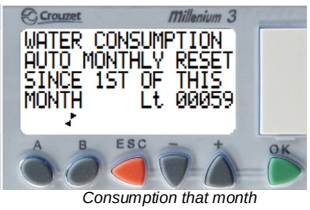


Normal – alternates last fill / cold fill

Fault – Excessive pressure



Water consumption since zeroing



Consumption that month

Materials

Cabinet	Steel (powder coated RAL 7032)
Fittings	Brass or stainless steel

Ancillaries

The sealed heating system requires a correctly sized expansion vessel and controls.

Model - EVCP

Available from Arrow Valves –

- Bespoke programming
- Expansion Vessels - EVCP
- Expansion Vessel Servicing Valve c/w Drain Tap – BVEV
- Dosing Pots - DP
- Dirt & Air Removers (Deaerators) – ADR

Codes and Descriptions

Size	Code	Description
15 mm	MFD15	Midi-Fill *Digital* Pressurisation Unit
22 mm	MFD22	Midi-Fill *Digital* Pressurisation Unit

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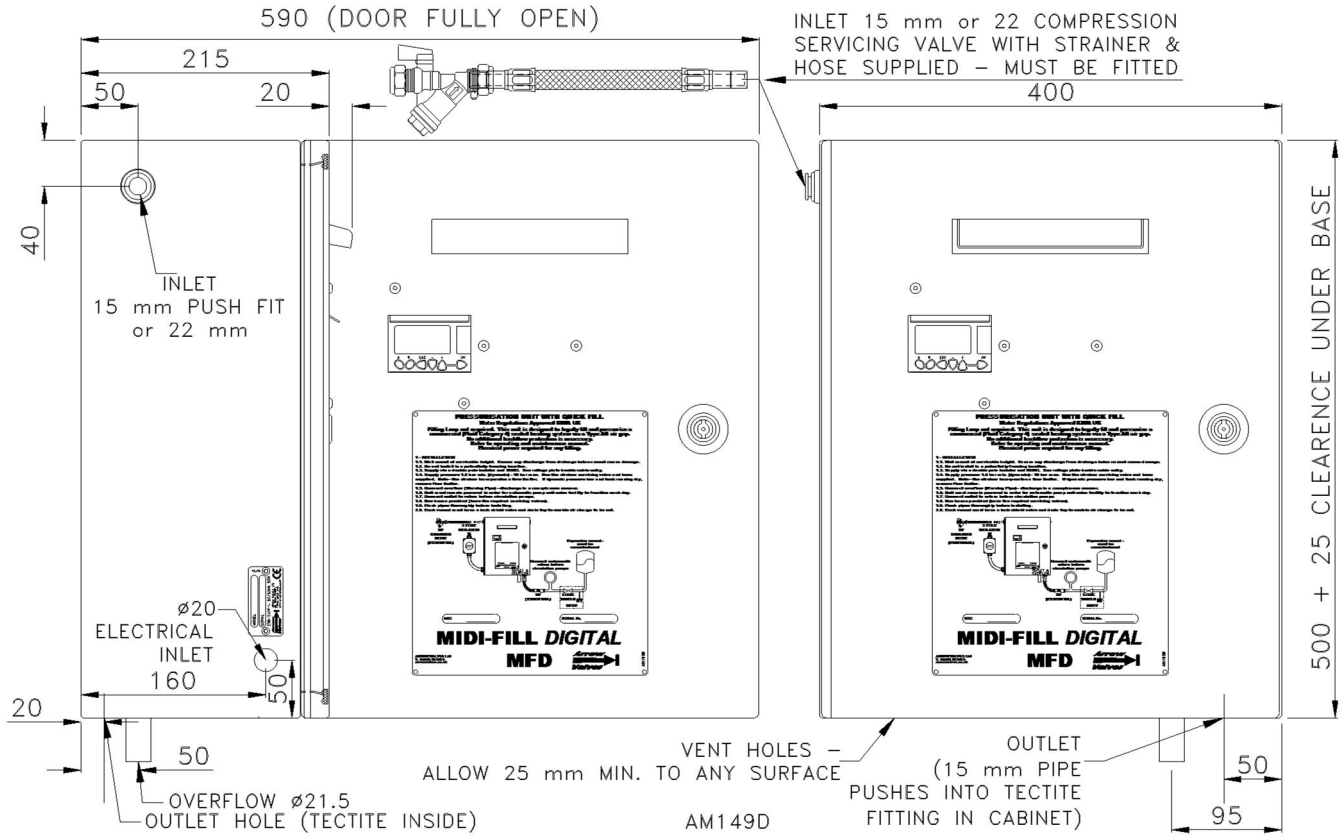
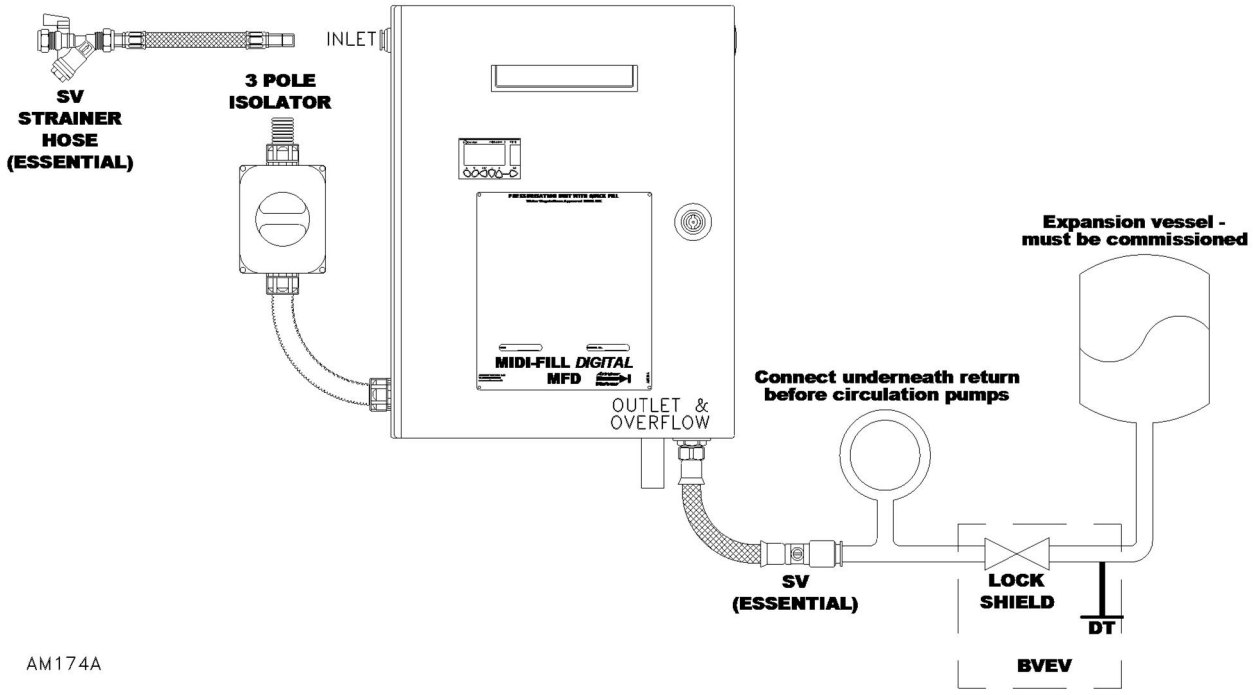
Dimensions



Installation Schematic



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