QUICK
START
GUIDE
BFU-100-H

1) POWERING UP

1. TURNING ON

Ensure the flow meter has been charged before using the instrument.
Press the [ON] button. The meter will then go through a self-checking process and a screen similar to that pictured to the right will appear. If it does not, take a note of the error message and contact your supplier.

```
POS        0 m3
Flow 0.0000 m3/h
Vel  0.0000 m/s
S=000,000 Q=00 I
```
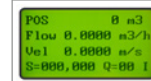
2) PROGRAMMING

1. ENTER TRANSDUCER SCALE FACTOR

1.1) Press keys 'M45' (press [MENU], [4] and [5]) then [ENT].
Key in the new scale factor of the transducer pair and press [ENT].

```
M45
Scale Factor
         1
```

2. ENTER PIPE INFORMATION

2.1) Pipe Outer Diameter
Press keys 'M11' and then [ENT].
The screen should be similar to the one pictured on the right.
Now enter the pipe outer diameter and press [ENT] to confirm.

```
M11
Outer Diameter
       110 mm
```

2.2) Wall thickness
Press the [▼/−] key to scroll down to the next menu or press 'M12' then press [ENT] and input the pipe wall thickness value, press [ENT] to confirm.

```
M12
Wall Thickness
       6.5 mm
```

2.3) Pipe Inner Diameter
Press [▼/−] to scroll down to M13 or press 'M13' [ENT].
The correct ID value should be displayed on the screen.
There is no need to change anything.

```
M13
Inner Diameter
        97 mm
```

2.4) Pipe Material
Press [▼/−] to scroll down to M14 or press 'M14' [ENT] then navigate the menu using [▼/−] until you find the item that matches your pipe material, then press [ENT]. Proceed to step *2.5* if your pipe material is not shown as an available option.

```
M14
Pipe Material
5.PVC
```
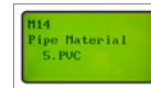
2.5) Sound Speed in Pipe Wall
Press [▼/−] to scroll down to M15 or press 'M15' [ENT].
If you found your pipe material on the list in the previous step the flow meter should already know the sound speed (you can skip this step).
Otherwise press [ENT] and enter the sound speed of your pipe material, press [ENT] again to confirm (this information can be found in the user manual).

```
M15
Pipe Sound Vel
       0 m/s
```

2.6) Pipe Lining
If your pipe has a liner inside enter the lining information on menu windows **M16**, **M17** and **M18**.

```
M16
Liner Material
0.No Liner
```
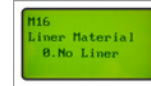
3. ENTER FLUID INFORMATION

3.1) Fluid Type
Press [▼/−] to scroll down to M20 or press 'M20' [ENT], then navigate the menu using the [▼/−] until you find the item that matches your fluid type then press [ENT]. If you do not find a match (non-standard fluid) select "other".
Press [ENT] to confirm and follow the steps in *3.2*.

```
M20
Fluid Type
0.Other
```
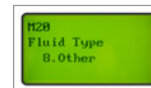
3.2) Sound Speed in Fluid
If you found your fluid type in the previous step the flow meter already has the sound speed therefore you can skip this step. Otherwise press [▼/−] to scroll down to M21 or press 'M21' [ENT]. Key in the sound speed of your fluid and press [ENT] to confirm (this information can be found in the user manual).

```
M21
Fluid Sound Vel
      1482.9 m/s
```

4. ENTER TRANSDUCER INFORMATION

*4.1) Transducer Type*
Press [▼/−] to scroll down to M23 or press 'M23' [ENT].
Here you can select your chosen transducer type.
We offer three varieties: *HS transducer* (for pipes 25-100mm),
HM transducer (for pipes 50-700mm) and *HL transducer* (for pipes 300-6000mm).
Please identify your chosen variety and then press [ENT].

```
M23
Transducer Type
0.Standard-M1
```

4.2) Transducer Mounting Method
Press [▼/−] to scroll down to M24 or press 'M24' [ENT].
Then use the [▼/−] key to select the your mounting method and press [ENT].
(See section 5 opposite for mounting methods).

```
M24
Txducer Mounting
0. V-Method
```
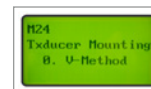
4.3) Transducer Spacing
Press [▼/−] to scroll down to M25 or press 'M25' [ENT].
The displayed value is the mounting spacing between the two transducers.
Write down this number as you will need it later when installing the transducers.

```
M25
Txducers Spacing
      72.8337 mm
```

## 3) SELECTING DISPLAY UNITS

*Measurement Units:*
To select a measurement unit for the BFU-100-H use the ▼ key to scroll down to M30 or press 'M30' ENT. Here you will be presented with the options of English and Metric, navigate using the ▼ to chose your required unit of measurement and press ENT to confirm. As standard the device is supplied with 'metric' as the unit of measurement.

```
M30
Measurement Unit
     Metric
```

Flow Rate Unit:
To choose a flow rate measurement unit use the ▼ key to scroll down to M31 or press 'M31' ENT . Navigate using the ▼ key and press ENT to select your flow rate unit.

```
M31
Flow Rate Units
     m3/h
```
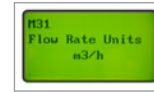
Totaliser Units:
To select a totaliser measurement unit use the ▼ key to scroll down to M32 or press 'M32' ENT. Navigate using the ▼ key until you are on the correct totaliser unit and press ENT to select it.

```
M32
Totalizer Units
0.Cubic Meters
```

Totaliser multiplying unit:
To select the required totaliser multiplying unit use the ▼ key to scroll down to M33 or press 'M33' ENT. Navigate using the ▼ key until you are on the correct totaliser multiplying unit and press ENT to select it.

```
M33
Totlizr Mltplier
   X 1
```

*Please note this change will also vary the flow meters pulse output value.

4) STORING INFORMATION

The BFU-100-H allows users to save site details and load previously saved site files.

Storing application information:
To store site information use the ▼ key to scroll down to M26 or press 'M26' ENT. You will then be asked to enter a name for your application using the keypad. Ensure the name is correct then press ENT to save the site information.

```
M26
Save Parameters
 Select a room
by ENT UP DN
```
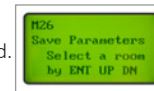
Loading Application information:
To load site information use the ▼ key to scroll down to M27 or press 'M27' ENT. You will then need to select the correct site from the list using the ▼ key then press ENT to load the application information.

```
M27
Load Parameters
 Select a room
by ENT UP DN
```
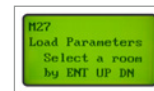
5) INSTALLATION PREPARATION

Mounting Location:
When installing the ultrasonic transducers on to a pipe you should allow for a minimum of 10 diameters upstream of straight pipe and 5 diameters downstream of straight pipe to ensure accurate flow readings.

Preparing your Pipe:
The pipe on which you will be installing the sensors needs to be free from debris- this includes removing any paint or corrosion on the pipe surface.

Sensor Positioning:
V-Method (standard spacing)

V-Method installation is the most widely used method for daily measurement with pipe inner diameters ranging from 1" to 12" (20mm to 300mm). It is also called reflective method.
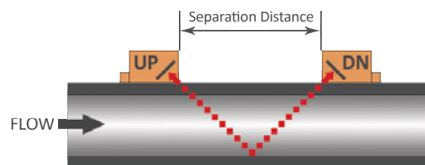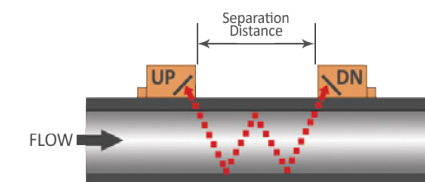
Z-Method

Z-Method is commonly used when the pipe diameter is between 4" to 20" (100mm to 500mm). This method is the most direct for signal transfer and can therefore provide better results than V-Method on many applications.
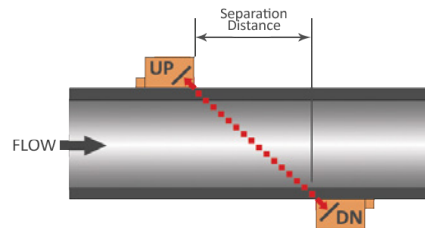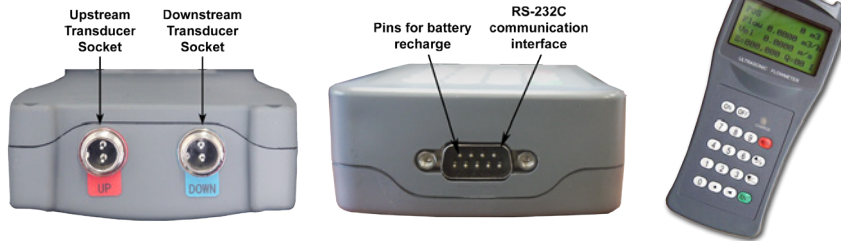
W-Method

W-Method is usually used on plastic pipes with a diameter from 1" and 4" (25mm to 100mm). This method can be effective on smaller pipes that have internal deposits.

6) INSTALLATION OF TRANSDUCERS

1. CONNECTION DIAGRAMS

Upstream Transducer Socket — Downstream Transducer Socket

Pins for battery recharge — RS-232C communication interface

2. INSTALLING HS TYPE TRANSDUCER

2.1) Connect the transducer cables to the main unit (see connection diagram above).

2.2) Move the transducer pair apart so that the mounting spacing between the two transducers is equal to the one shown in menu '**M25**'.

2.3) Apply a single bead of couplant approximately 1/2" (12mm) thick on to the flat, translucent face of the transducers.

2.4) Align the transducer mounting rail with the pipe axis.

2.5) If the pipe material is metal you do not need fix the transducer mounting rail as it will automatically attach to the pipe by magnetic force.

2.6) If the pipe is a not metal push the transducer handle against the pipe and either hold it during the measurement or use the banding strip to fix the mounting rail to the pipe.

3. INSTALLING HM TYPE TRANSDUCER

3.1) Connect the transducer cables to the main unit (see connection diagram above).

3.2) Move the transducer pair apart so that the mounting spacing between the two transducers match the displayed value shown in menu '**M25**'.

3.3) Apply a single bead of couplant approximately 1/2" (12mm) thick on to the flat, translucent face of the transducers.

3.4) Align the transducer mounting rail with the pipe axis.

3.5) If the pipe material is metal you do not need fix the transducer mounting rail as it will automatically attach to the pipe by magnetic force.

3.6) If the pipe is a not metal you can use the metal chains provided to secure the transducer mounting rail to the pipe.

4. INSTALLING HL TYPE TRANSDUCER

4.1) Mark the transducer installation location on the pipe surface according to the mounting spacing given in menu '**M25**'. You may need to make a paper template to help you accurately locate the transducer position, especially if you plan to use Z-Method for the installation.

4.2) Connect the mounting fixture around the pipe and leave the chain loose so you can slip the transducer underneath.

4.3) Apply a single bead of couplant approximately 1/2" (12mm) thick on to the flat, translucent face of the transducers.

4.4) Slip the transducer under the clamp fixture and tighten the screw and do the same for the other transducer.

4.5) If the pipe material is metal you do not need the clamp fixtures as the transducers will automatically attach to the pipe by magnetic force.

4.6) Finally, connect the transducer cables to the main unit (see connection diagram above).

7) DIAGNOSTICS

On the main unit press `MENU`, `9` and `0` then `ENT` to load the 'Strength and Quality' window.

There are three important numbers displayed on this window:
1. Transit-time ratio (**%**)
2. Signal strength (**S**)
3. Signal quality (**Q**)

For the most accurate readings their
values should fall within these ranges.

%: 97% - 103%
S: 600 - 990
Q: 60 - 99

```
M90      0.0000%
Strenth+Quality
S=000.000 Q-00
Detect No Signal
```
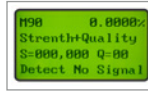
If your values are not within these ranges you will need to check the parameters you have entered. If you believe your entries are correct and the three numbers are still not in range you may need to check your installation.

Here are some tips:
- Moving transducers closer to or away from each other will increase or decrease the transit-time ratio (**%**).
- Make sure the transducer mounting area on the pipe is coating-free and smooth.
- Do not use excessive couplant on either the transducer face or the pipe surface.
- The sound speed information in menu 'M92' might also be useful for debugging.
  The displayed value should be close to the one you have entered in programming *2) 3.2*.
  If you have entered the fluid type in step *2) 3.1* instead and you do not know the fluid sound speed you can find this information in the appendix of the user manual.

If all the three of your parameters are within range your installation is complete and you are ready to see your measurement results on menu window 'M00'.

* Please note that the menu images shown are for illustration only.

8) ERROR CODES

Error codes can be found as a single letter in the lower right corner on the menu windows of M00, M01, M02, M03 and M08.

CODE	MESSAGE	CAUSES	SOLUTIONS
R	*System Normal*	No error	
I	*No Signal*	(1) Unable to receive signals	(1) Adjust measuring location
		(2) Transducers installed incorrectly	(2) Clean and polish pipe surface
		(3) Loose contact or not enough couplant between transducer and pipe outer surface.	(3) Make sure there is enough couplant
		(4) Pipe liners are too thick or the deposition inside of the pipe is too thick.	(4) Check the transducer cables
		(5) Transducer cables are not properly connected	
J	*Hardware Error*	Hardware problem	Contact the manufacturer
H	*PoorSig Detected*	(1) Poor signal detected	(1) Adjust measuring location
		(2) Transducers installed incorrectly	(2) Clean and polish pipe surface
		(3) Too much fouling (corrosion, deposition, etc.)	(3) Make sure there is enough couplant
		(4) The pipe liner is too thick	(4) Check the transducer cables
		(5) Problem with transducer cables	
Q	*Frequ OutputOver*	The actual frequency for the Frequency Output is out of the range specified by the user	Check the values entered in window M66, M67, M68 and M69 and use a larger value in M69
F	*System RAM Error*	(1) Temporary problems with RAM, RTC	(1) Turn on the power again
	Date Time Error	(2) Permanent problems with hardware	(2) Contact the manufacturer
	CPU or IRQ Error		
	ROM Parity Error		
1 2 3	*Adjusting Gain*	Instrument is in the progress of adjusting the gain for the signal and the number indicates the progressive steps	No need for action
K	*Empty Pipe*	No liquid inside the pipe, incorrect setup in M29	Relocate the meter to where the pipe is full of liquid enter 0 in M29

? ASK US

Still having problems?
If you are having trouble installing the BFU-100-H or if you have a technical query call our freephone number on 0800 027 7786 and talk to our experts- they will be happy to help.

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