BLDA1-2
Water Leak Detection Manual

Contents

1) System Overview

This system is fully programmable to suit users requirements. This unit is connected to the water meter installed to the main incoming water supply and optional shut off valve. This meter can be existing but must be fitted with a device that will give a volt free pulse output proportional to the flow rate that can be either 1, 10 or 100 litres per pulse. Designed to monitor the flow of water entering the building or area, the unit raises an alarm and if required, shut off the water supply when;
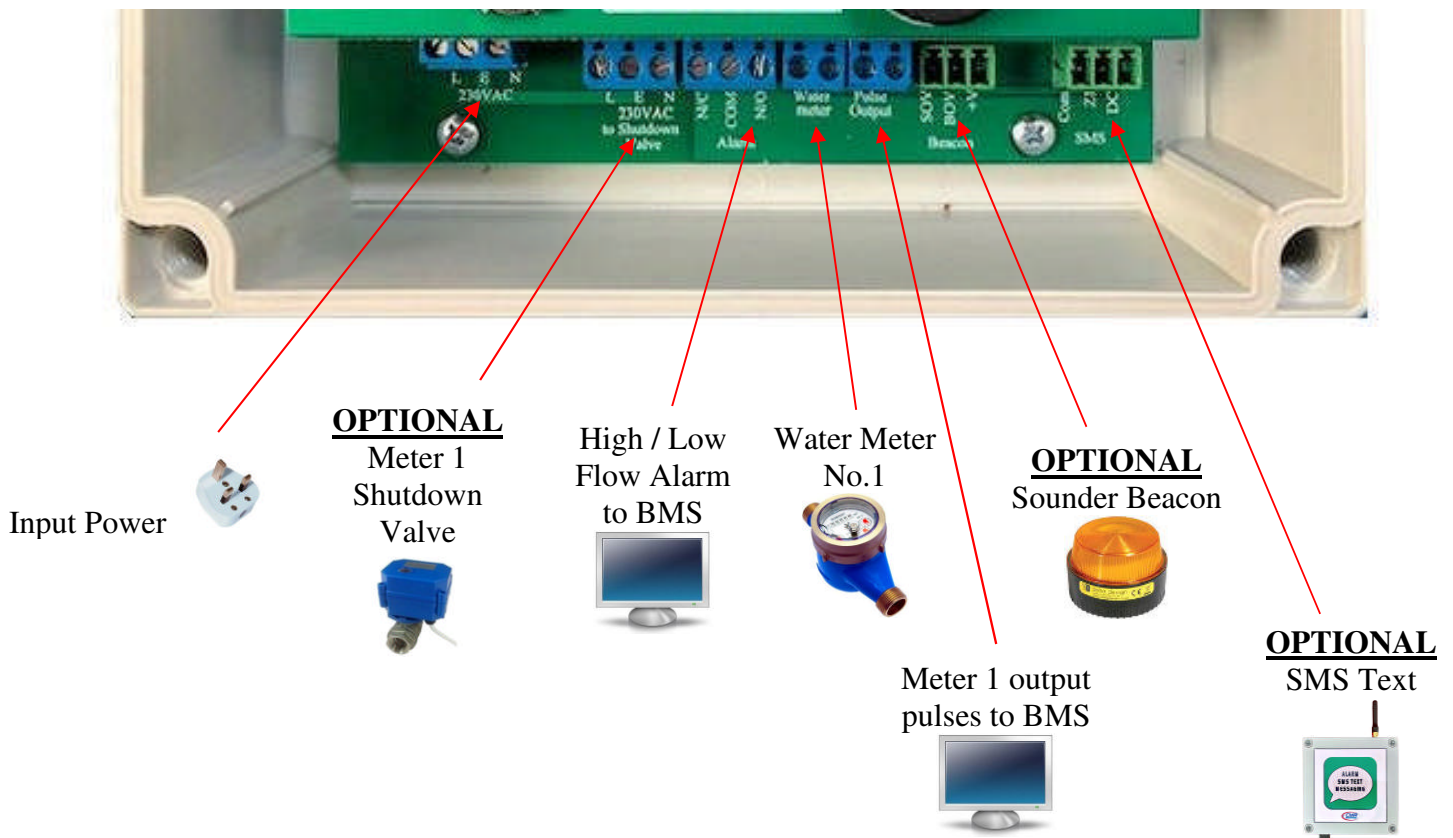
    a. the flow of water exceeds a preset maximum amount of allowable water for a present period of time.

    b. or by detecting a continuous flow of water.

By setting realistic flows and time periods, any increase above the user defined settings will be detected and dealt with by maintenance staff, thereby saving water and limiting damage caused by a major leak.
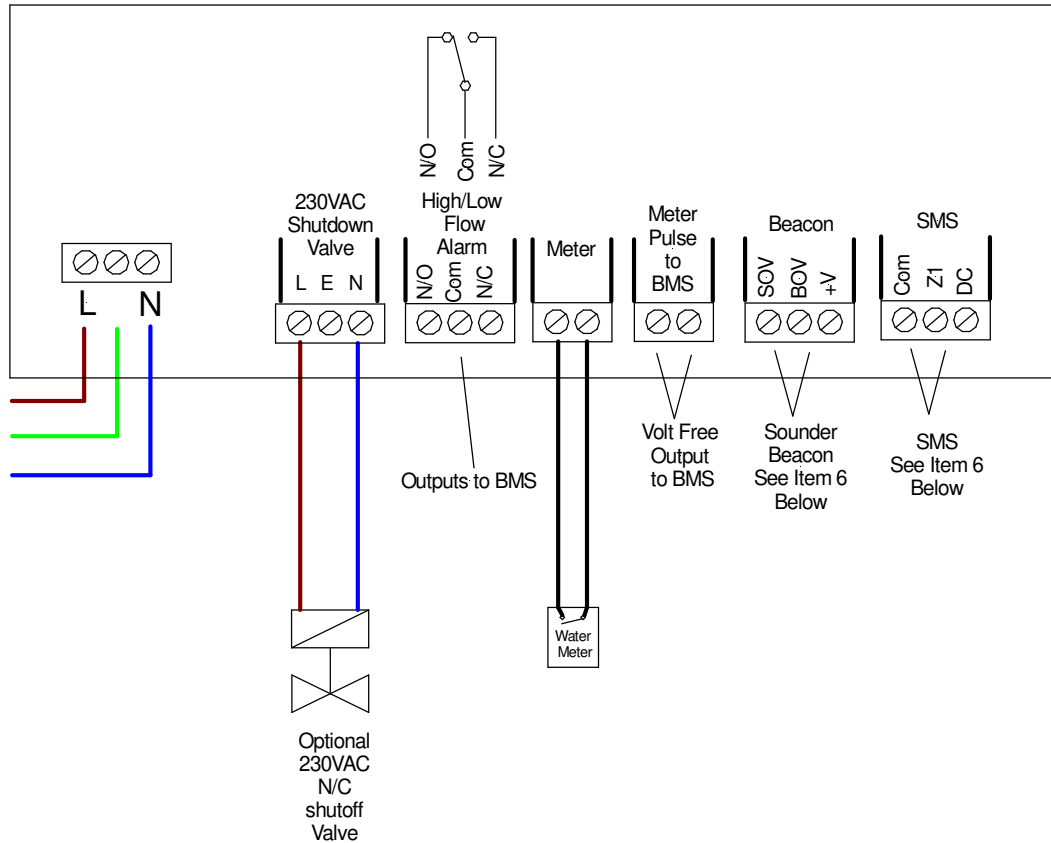
2) Installation

THIS EQUIPMENT SHOULD ONLY BE CONNECTED AND WORKED ON BY A QUALIFIED ELECTRICIAN.

To mount the unit to a wall, first remove the front cover to expose the internal equipment. In the bottom and top corners of the housing there is a fixing point. 3.5mm pozi-drive screws or any screw with a head no bigger than 7mm diameter can be used to fix the housing in place. Cable access into the box should be via cable glands which can be positioned anywhere around the enclosure or on the inside for back entry. Care should be taken not to damage the internal equipment when drilling through the enclosure. A 230VAC power supply should be run from a fused spur to the unit's internal terminal block marked "L", "E" & "N". The fuse within the fused spur should be rated at 5 Amps. The BLDA1-2 unit should be linked to the pulsed water meters by a 1mm² conductor 2 core screened cable up to a maximum 400 meters away. Pulsed water meters usually have BSP thread connections up to 50mm, above 50mm PN16 flanged connections are used. If shutoff valves are required, they should be installed just after the water meter(s) and cabled in a flexible 3 core 230VAC cable rated at 3amps.

Input Power

OPTIONAL
Meter 1 Shutdown Valve

High / Low Flow Alarm to BMS

Water Meter No.1

OPTIONAL
Sounder Beacon

Meter 1 output pulses to BMS

OPTIONAL
SMS Text

3) Wiring Detail

4) Water Solenoid Valves

If the system is supplied with a water shutoff valve, once a water leak has been detected the unit will close the normally open valve thereby stopping the flow of water.

Connection of Water Shutdown Ball Valve

The 230VAC supply to the valves is generated from within the alarm unit. 15 to 25mm valves are supplied with a red and black cable whilst larger valves are red and green. For good practice connect live to the red wire and neutral to the black or green wire.

The Valve is supplied with a short length of cable that will need extending back to the valve terminals within the alarm unit.

WARNING, in order to open properly, this type of valve needs to be powering for at least 3 minutes.

Connection of Water Shutdown Solenoid Valve

The 230VAC supply to the valves is generated from within the alarm unit.

Having removed and opened the 3-pin socket, connect live to terminal "1", neutral to terminal "2" and Earth to the earth terminal

PLEASE NOTE;

We do not recommend that this type of valve be used and it will NOT be supplied by CMR electrical. However, if this type of valve MUST be fitted, ensure that the arrow on its body is facing the direction of flow, if not, the valve will not stop the flow of water.

5) Relay Outputs

Volt free contacts have been provided for the following and can be found within the unit on the main PCB.

- a) High/Low Flow alarm, contacts rated at 30VDC 1A
- d) Meter output proportional pulses for onward indication

6) Sounder Beacon and SMS Text Messaging

If a beacon or beacon sounder is supplied, connect to the three terminals identified as "Beacon" as follows:

6a) Non-Mutable Beacon or Beacon Sounder

If the beacon or the beacon sounder is to be active (on all the time) until the water leak alarm has been cleared, connect as follows;

Terminal Reference		Connect Beacon / Beacon Sounder terminals to the following terminals
+V		Beacon +V or Strobe /Tone + terminal
BOV		Beacon -V or Strobe /Tone - terminal
SOV		NO connection to this terminal

6b) Mutable Beacon or Beacon Sounder

If the beacon or the beacon sounder is to turn off when the "Mute" push button is pressed connect as follows;

| Terminal Reference		Connect Beacon / Beacon Sounder terminals to the following terminals
+V		Beacon +V or Strobe /Tone + terminal
BOV		NO connection to this terminal
SOV		Beacon -V or Strobe /Tone - terminal

5

6c) Mutable sounder Beacon on all the time

If the beacon is to remain alight all the time an alarm is current but the sounder is to be turned off when the "Mute" push button is pressed connect as follows;

Terminal Reference		Connect Beacon / Beacon Sounder terminals to the following terminals
+V		Strobe and Tone + terminal
BOV		Strobe - terminal
SOV		Tone - terminal

Warning: If the above option "6c" is required, if fitted **remove** the electrical link connected between the second (Strobe -) & third terminals (Tone -) terminals within the sounder.

6.1) Fitting an SCA repeat alarm or SMS / Email messaging system
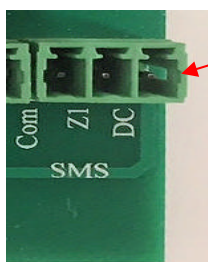
Use the "SMS" terminal block

SCA Terminal No.	SMS Terminal No.		Cable wire colours fitted to the messaging system
+V	DC		RED
Sig	Z1		BLUE
0V	COM		BLACK

7) Push Button Description

External Buttons

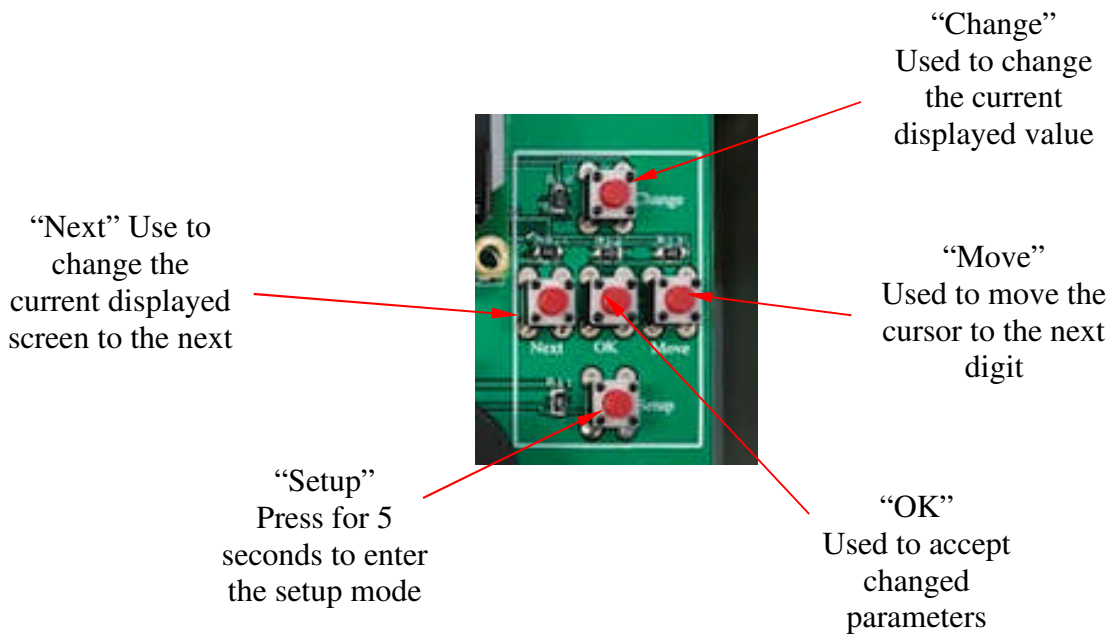"Next Window" Used to display information outlined in item 8 below

"Mute" Use to silence the audible warning

"Water On" Used to reset the system after an alarm has been muted and turn ON the water shutdown valve if fitted

This button can also be used to place the unit into 4 hour "No Alarm Generated" period to allow tanks etc. to fill

Internal Setup Buttons

"Change"
Used to change
the current
displayed value

"Next" Use to
change the
current displayed
screen to the next

"Move"
Used to move the
cursor to the next
digit

"Setup"
Press for 5
seconds to enter
the setup mode

"OK"
Used to accept
changed
parameters

8) Display Screens

The unit will revert back to the first screen after two and a half minutes. Each press of the "Next Window" button will first show what the next window will be, before displaying it. This is provided to allow quick motoring through the screens to the desired information.

Normal screen - if "next Window" button isn't pressed, the unit will revert back to this screen after two and a half minutes.
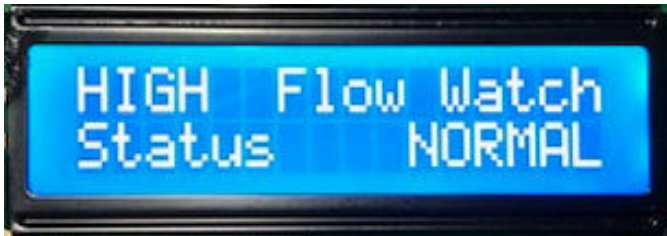
Current Flow Watch Type: Low or High

Alarm status: Normal or Alarm

Press the "Next Window" button once, the following page 1 window will appear after 2 seconds.
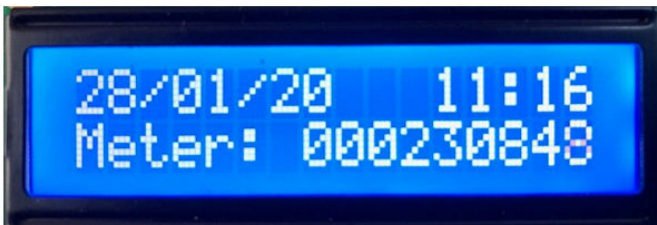
Date and Time

Total Meter Reading

Press the "Next Window" button once more, the following page 2 window will appear after 2 seconds.

High Flow (occupied) time period

Press the "Next Window" button once more, the following page 3 window will appear after 2 seconds.

Maximum and Minimum HIGH Flow
Recorded readings

Press the "Next Window" button once more, the following page 4 window will appear after 2 seconds.

Current Period is the volume of water
that has flowed within the allocated
time period normally set to 10 mins

Press the "Next Window" button once more, the following page 5 window will appear after 2 seconds.

Max Period Flow is the maximum
volume of water that the unit has ever
seen within the allocated time period
normally 10 mins

Press the "Next Window" button once more, the following page 6 window will appear after 2 seconds.

High Flow ALARM limits, the total
Number of Litres over what period of time.
i.e., 350/L 00:10Hrs, if the unit sees 350 litres
within 9 minutes the unit will go into alarm

Press the "Next Window" button once more, the following page 7 window will appear after 2 seconds.
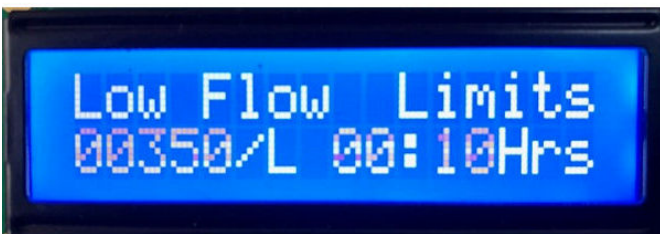
Low Flow ALARM limits, the total
Number of Litres over what period of time.
i.e., 350/L 00:10Hrs, if the unit sees 350 litres
within 9 minutes the unit will go into alarm

9) Overview for Setting Up The System

IMPORTANT

The Leak Detection System will not work correctly until it has been setup and commissioned as detailed below. You will need to nominate a person responsible for the operation and understanding of the system. This must include how to setup the system, keeping records and being aware what the alarms mean and their implications. Water consumption is unique for each installation; therefore, it is important to establish Low and High flow periods i.e., when the building is occupied or unoccupied. An initial investigation will be required to establish the weekly / daily patterns of water consumption. Further investigation should be undertaken at regular intervals to understand the overall usage including fluctuations such as filling water tanks.

Setting up the system will require;

1) Set or confirm the pulse per litre ratio for the fitted meter

2) Set or confirm the approximate high and low water usage and timeout period

3) Confirm or set the time, date and day

4) Set or confirm the constant flow alarm timers

5) Set the High Flow times between Monday to Sunday, this is the occupied (day time) period

Setup Procedure 1

If the setup parameters as detailed above are known, enter them using the following procedures *(item 10)*. Once the system has been initially setup, let the system run for at least a week ignoring any generated alarms. At the end of this period, re-enter setup and adjust the maximum High & Low flow water volume and time periods based on the readings from the maximum litres displayed on page five *(see 8 above)*.

Setup Procedure 2

If setup parameters are not known, enter setup mode and set both the high and low flow timers *(see 11 below)* to 00:00. This will stop the unit from alarming i.e., permanent sleep mode. Run for at least a week, at the end of this period, re-enter setup and adjust the maximum High & Low flow water volume and time periods based on the readings from the maximum litres displayed on the page 5 *(see 8 above)*.

REMINDER: YOU MUST ADD A TIME IN THE PERIOD TIMER TO TAKE THE SYSTEM OUT OF PERMANENT SLEEP MODE.

How To Enter The Setup Routine

Press the "setup" push button, the internal sounder will rapidly pulse. This is to help stop persons from inadvertently altering the setup parameters. You MUST keep the "Setup" button pressed ignoring the pulsing horn until the display changes to the meter pulse rate screen at which time the pulsing horn will stop.

Please note;
YOU WILL ONLY HAVE 5 MINUTES TO CHANGE THE SETINGS BEFORE THE SYSTEM EXITS SETUP WITHOUT SAVING ANY CHANGES.

Internal Setup Push Button		Function
Next		Each press of this button will move to the next parameter setup screen without any changes to the current screen. To exit Setup, keep pressing this button until one of the screens in section 8 appears.
Change		With the curser flashing over a parameter or digit, press this button to change the parameter or digit to the next value. If you make a mistake, keep pressing the button until the correct value is displayed.
Move		Use this button to move the curser to the next digit in a parameter. If you keep pressing this button it will rotate the flashing cursor through all the digits, back to the most significant digit.
OK		You MUST press this button to save any parameter changes. The curser will then move to the next parameter or screen.

10) Setting Up The Meter Pulses Per Litre

Note; If the "OK" button is not pressed, the new setting will NOT be saved.
The system can be set to 1, 10 or 100 litres per pulse

Set to 1, 10 or 100 Litres per pulse

Actions required;
a) To move on to the High & Low flow screen below, without making any changes to the pulse rate press the "Next" button.
b) Press the "OK" button to accept Meter's litre per pulse or;
c) Press the "Change" button, each press will change the litres per pulse to 001, or 010 or 100 then back to 001 on the next press. When the correct Meter pulse rate is displayed press the "OK" button to accept, this will save the change and move to the next screen.

11) Setting Up High and Low Maximum Allowable Litres and Time Period

Note; If the "OK" button is not pressed, the new setting will NOT be saved.
The maximum litres can be set to between 00000 and 99999 litres, the time setting can be set between 00:00 to 24:00 hours


Set High and Low flow Alarm settings

Actions required;

a) To move on to the Clock setup below, without making any changes to the High or Low Flow maximum litres or alarm timer press the "Next" button.

b) Press the "OK" button to accept High Flow litres and move onto the High Flow alarm timer or;

c) Press the "Change" button, each press will increment the most the significant digits between 0 and 9, press again to return back to 0. When the correct number is displayed, press the "Move" to move to the next digit or the "OK" button to save the new setting and move on to the High Flow timeout period timer. Repeated presses of the "Move" button, will allow the cursor to rotate through the number back to the most significant digit of the number.

d) With the cursor flashing on the most significant hours digit, repeat steps a, b and c above until the required time is displayed and press "OK" to save and move on to the Low Flow maximum litres.

e) With the cursor flashing on the most significant Low Flow maximum litres digit, repeat steps a, b, c and d above.

f) When finished press the "OK" button to accept the changes and move to the next screen.

12) Setting Up The Clock

Note; The time format only allows for a maximum 23.59 hours and NOT 24:00
**   If the "OK" button is not pressed, the new setting will NOT be saved.**
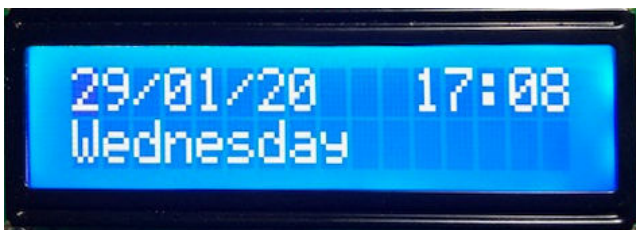
Day, Month, Year and 24-hour time

Day of the week

You will only be allowed to enter a valid day, date and time. If you try to exceed the normal clock format the display will automatically display the minimum for that parameter i.e. if the display shows the time as 23:00 with the cursor flashing over the "2", one more press on the "Change" button will result in the display showing 20:00. The clock has automatic leap year and UK summer time compensation.

SYSTEM OPERATION IS DEPENDANT UPON THE CLOCK'S DAY, DATE, TIME AND DAY OF THE WEEK BEING SET CORRECTLY.

Actions required;

a) To move on to the continuous flow alarm screen below, without making any changes to the clock press the "Next" button.

b) Press the "OK" button to accept the displayed Day, Month, Year, Time and move to the day of the week setting.

c) Press the "Change" button, each press will change the digits between 0 and its maximum and back to 0 again. When the correct number is displayed press the "Move" to move to the next digit or the "OK" button to save the new setting and move on to the Day of the week setting. Repeated presses of the "Move" button, will enable the cursor to rotate through all of the day, month, year and time digits until it is back to the most significant day digit. If a mistake is made, keep pressing the "Move" button until you reach the required digit. Press "OK" to save.

d) With the cursor flashing on the day of the week, press the "Change" button until the correct day is displayed. Once correct, press the "OK" button to move to the next setup screen.

13) Set The Continuous Flow Alarm Time Periods
Note: If the "OK" button is not pressed the new setting will NOT be saved. Both timers can be set to a maximum of 59.

No flow time for a period of time in hours

The system looks for a period measured in minutes, where there is no water flow (no water meter pulses), over a period measured in hours. If water stops flowing for longer than the first time period (02Mins), it is presumed that there is not a leak. However, if water continues to flow without a break for example one meter pulse every minute, for a period equal to the second time period (03Hrs) an alarm will be raised.

Example: When the system is set at one pulse per litre, if the system sees one litre of water flowing say every minute (one meter pulse every minute) without a break for three hours, the system will go into "Constant Flow Alarm". However, if during the 03 hour period there is no water flow, just once for say three minutes (no meter pulses for 3 minutes), the system will not go into alarm.

A new timeout period starts again every time the system sees no flow (no meter pulses) that exceeds the mins setting. The screen above shows that there must be a break in water flow (no meter pulses) for at least 2 minuets within a 3-hour period. To disable this feature, set the minutes (Mins) to 00.

Please note;
SETTING EITHER THE "Mins" OR "Hrs" TO 00 WILL INHIBIT THIS FEATURE.

Actions required;
a) To move on to the High Flow screen, without making any changes press the "Next" button.
b) Press the "OK" button to accept and save the displayed Mins time and move to the Hrs time or;
c) Press the "Change" button, each press will change the digits between 0 and its maximum and back to 0 again. When the correct number is displayed press the "Move" to move to the next digit or the "OK" button to save the new minutes time and move on to the hours' time. Repeated presses of the "Move" button, will enable the cursor to rotate through the digits until it's back to the most significant digit. If a mistake is made, keep pressing the "Move" button until you reach the required digit.
d) Repeat steps a and c above to adjust the hours' time.
e) Press the "OK" button to save and move onto Monday's high flow times.

14) Set the High Flow time periods for the day of the week

Note;   If the "OK" button is not pressed, the new setting will NOT be saved. The time setting can be set between 00:00 to 24:00 hours

    High Flow Period

You will need to set the high flow period for each day of the week starting at Monday. This time period would normally be when the building is occupied i.e., an office block could be 07:00 to 18:30 Monday to Friday, 07:00 to 12:00 Saturday and unoccupied on Sunday.

Actions required;
a) To move on to the next High Flow screen, without making any changes press the "Next" button.
b) Press the "OK" button to accept and save the displayed start time and move to the end time or;
c) Press the "Change" button, each press will change the digits between 0 and its maximum and back to 0 again. When the correct number is displayed press the "Move" to move to the next digit or the "OK" button to save the new start time and move on to the end time. Repeated presses of the "Move" button, will enable the cursor to rotate through both hour digits until its back to the most significant digit. If a mistake is made, keep pressing the "Move" button until you reach the required digit.
d) Repeat steps a and c above to adjust the stop time.
e) Press the "OK" button to save and move onto Tuesday's high flow times.

With the next High Low Times screen on display, repeat steps a) through e) for all the days of the week. You MUST press "OK" or "Next" after setting up Sundays High Flow period to finish setting up the system and displaying the main screen.

15) How to Reset the Unit After an Alarm
Once the unit detects an unusual flow of water it will alarm by flashing the display, sounding the internal sounder, start the external sounder beacon if fitted, operate the BMS alarm contact, operate the Text messaging unit if fitted and turn off the water if a shutdown valve is fitted. When this happens, press the "Mute" button to stop all sounders and investigate the cause of the excessive water flow. Once you are happy that no leak exists, press the "Water On" button to reset the unit back to normal running.

16) Place the Unit into a 4-hour SLEEP Mode
If a large volume of water is required, for example to fill a water tank; the system can be placed into a 4-hour sleep period where it will ignore all water flow. This feature will only work if there are no current alarms, with the display status showing as NORMAL. To place the unit into Sleep Mode, press and keep pressing the "Water On" push button until the beeping stops and the display changes to:

The unit will remain in this mode with the minutes ticking down until the time period is up when it will revert back to normal mode. This feature can be cancelled at anytime by pressing the "Mute" push button.

17) *How to initially setup the high "HF" and low "LF" flow alarm settings*

The 5 digit number (00040/L) is the amount of water in litres allowed to flow without an alarm
The 00:10 is the 24 hour time that its allowed to flow for. So the display above will allow up to
40 litres of water to flow within a 10 minute period. If say 42 litres flowed for 10 minuets
The unit would go into alarm and turn the water off. It is worth noting that at normal water
pressure, a power shower will consume 150L in 10 minutes, an electric shower 120L.

To help setup the correct alarm setting for your application use the form below.
Flow is dependent upon the pipe size and the water pressure. Normal mains water
 is approximately 3 Bar. Unless you use a garden hose a 10 minute period should be sufficient.
If you use a hose pipe, set the period to how long you normally have the hose turned on.

For a 10 minuet "HF" period read off the red table below for the amount of water. If the pressure
is unknown, use the figures highlighted in RED

Sample flow time in minutes   10   The maximum flow is for information only

Pipe Size		Suggested "HF"setting				Maximum possible flow of water		
in mm	after 3 Bar	3-6 Bar	6 Bar Minuets		after 3 Bar	3-6 Bar	6 Bar Minuets
15	**72**	144	216		*90*	*180*	*270*
22	**152**	304	456		*190*	*380*	*570*
28	**256**	512	768		*320*	*640*	*960*
35	**400**	800	1200		*500*	*1000*	*1500*
42	**592**	1184	1776		*740*	*1480*	*2220*

For a 20 minuet "HF" period read off the red table below for the amount of water.
Sample flow time in minutes   20   The maximum flow is for information only

Pipe Size		Suggested "HF"setting				Maximum possible flow of water		
in mm	after 3 Bar	3-6 Bar	6 Bar Minuets		after 3 Bar	3-6 Bar	6 Bar Minuets
15	**144**	288	432		*180*	*360*	*540*
22	**304**	608	912		*380*	*760*	*1140*
28	**512**	1024	1536		*640*	*1280*	*1920*
35	**800**	1600	2400		*1000*	*2000*	*3000*
42	**1184**	2368	3552		*1480*	*2960*	*4440*

The low flow "LF" setting should be set for night time when only a toilet or sink will be used. As the average toilet uses approximately 9-11 litres and a bathroom sink 6-8 litres, we would suggest that the "LF" setting be **00030L** (30 litres) **for 00:10** (10 minutes)

18) Water Meters

MJ- SDC
Multi-jet water meter with dry dial

C€ EN 14154

WRAS APPROVED PRODUCT

The **VuAqua MJ-SDC** is a multi-jet mechanical water meter with dry type dial counter suitable for a variety of metering applications including general purpose, tenant billing and commercial metering tasks available in sizes DN15 (1/2") to DN50 (2").

Key Features

- Multi-jet impellar meter type
- Compact design for most metering applications
- Approved: EN14154+A1+A2,OIML R-49: 2006(E)
- Dry dial (frost resistant)
- Meter body material is epoxy coated brass
- Drinking water approved : WRAS

- Shielded from Magnetic interference
- BSP fittings supplied (nuts, tails & washers)
- Maximum pressure of 16 bar
- Maximum temperature of 30°C (T30)
- Pulse Output option: Vmax=24AC/DC, Imax=0.01A
- Tamper evident wire lock & seal, Inlet NRV option

Dimensions
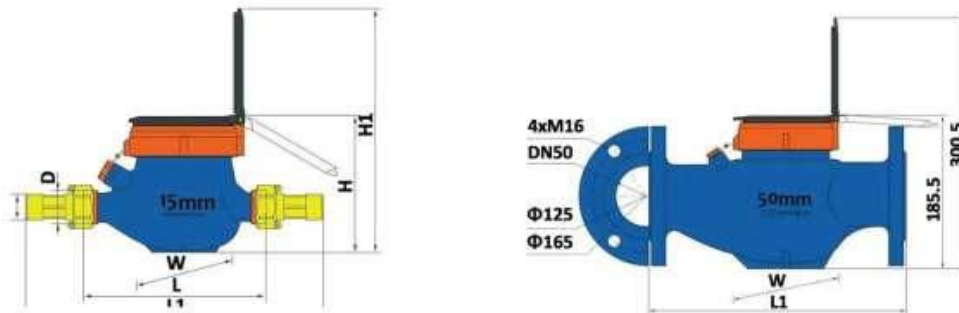
| Size	DN15	DN20	DN25	DN32	DN40	DN50	DN50-flange
L	165	190	260	260	300	300	300
L1*	259	294	380	384	431	448	
D	G3/4B	G1B	G1-1/4B	G1-1/2B	G2B	G2-1/2B	
d	R1/2	R3/4	R1	R1-1/4	R1-1/2	R2	
H	107.5	107.5	117.5	117.5	141.5	177	185.5
H1	191	191	206.5	206.5	256.5	292	300.5
W	94	94	98	98	122	145	165

*L1= the total length with connection and the gasket without compression.

Additional length options available:

Size	DN15	DN20	DN25	DN32	DN40	DN50	DN50 Flange
	110	160	160	160	200	280	280
	120		220	230	245		
	130		225				
L	145						
	170						
	190						

Technical Data

Size	DN	DN15	DN20	DN25	DN32	DN40	DN50
R	Q3/Q1	R80 for Horizontal Installation					
Q4	m³/h	3.125	5	7.875	12.5	20	31.25
Q3	m³/h	2.5	4	6.3	10	16	25
Q2	l/h	50	80	126	200	320	500
Q1	l/h	31.25	50	78.75	125	200	312.5
Max. Reading	m³	99999.9999					
Min. Reading	Litre	0.05					
Pressure Loss	ΔP	ΔP <63 at Q3					
Max. Pressure	Bar	16					
Max. Temperate	°C	30 (Max 50 Degreess is possible)					
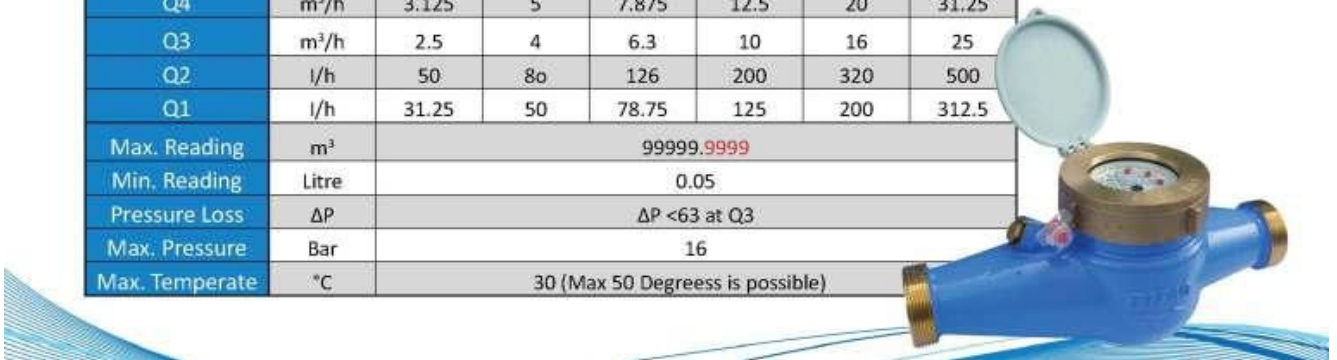
19) Water Meter Installation

Before installing the water meter, make sure that the meter has been chosen correctly. Check that the nominal diameter, flow rate, working temperature and pressure are compatible with actual installation conditions.

1. It is recommended that a straight length of pipe the same diameter as the meter and equivalent in length to 10 times the meter diameter is fitted immediately prior to the meter inlet and 5 times the meter diameter after the meter.

2. Before installing the meter make sure that the two sections of cut pipe are positioned correctly and supported where necessary, clean them carefully (especially if the pipes are empty) and allow water to flow for some time using a section of pipe instead of the meter, to remove any scale/debris leftover from the disturbance to the pipe.

3. Install the meter in a place protected from frost if possible (insulate with lagging materials during the winter months) and locate in the lowest part of the pipe work in order to avoid accumulation of air within the measuring chamber.

4. Install the meter in a position where it can be easily read, but is not accessible for tampering. Locate the meter where it will be safe from disturbance and damage from passing objects.

5. Install the meter so that the water is flowing in the same direction as the arrow shown on the body and in the position recommended by the manufacturer, following any indications on the dial. For guaranteed performance according to ISO 4064, meters should be installed in a perfectly horizontal plain. Accuracy may be reduced if installed in a vertical orientation.

6. It is advisable to install isolation valves upstream and downstream of the meter, in order to make the maintenance or verification of the meter possible. The installation of an internal or external non-return valve is also recommended.

7. There should be no restriction of the pipe at the meter inlet, and flange joints where used, should not obstruct the flow of water into the meter body. Any regulation of the flow should be carried out on the outlet side of the meter.

IMPORTANT:
Before putting in to operation, it is necessary to purge the pipe and meter of air (for this operation it may be necessary to rotate the meter) Valves must be opened slowly so as not to allow any air present within the pipe work to damage the meter by over running it's internal measuring mechanism.

20) Maintenance
The system should be fully tested using the commissioning procedure at least once a year for correct operation and if fitted, a check made to ensure that the shutoff valve operates correctly. All cables should be inspected at the same time for signs of damage, dirt contamination or mis-placement.