Watersavers

saving more than just water

WLDS-20 Mk3

MAJOR WATER LEAK DETECTION SYSTEM
INSTALLATION & COMMISSIONING

DESCRIPTION: An electronic control panel used in conjunction with two pulse meters (water meters with pulse output proportional to flow rate) which are installed on the incoming water supply at the site boundary Main (M1) and at the building intake Sub (M2) - in accordance with BREEAM requirements.

The control monitors the flow of water through both meters over a preset period of time and raises an alarm in either of the following situations:

a) When a continuous flow of water passes through the Main (M1) water meter above a preset maximum for a preset period of time.

b) When the flow through the Main (M1) meter exceeds the flow through the Sub (M2) meter by a preset volume – corresponding to a boundary leak between the two meters.

By setting realistic flows and time periods (allowing for usual fluctuations in consumption) any increase above these norms may be detected and dealt with – saving water and limiting damage caused by a major leaks.

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IMPORTANT INFORMATION!

This Water Leak Detection System will not provide protection unless it is set up and commissioned as detailed in section 5

For correct and effective operation the following must be completed:

a) **Appoint a person responsible for:**
i) Understanding how the system works, setting and monitoring the parameters and keeping records accordingly
ii) Being aware of the implications of the alarm and the inability to draw water should a shut off valve be fitted

b) **As water consumption will be unique to each installation it is important to establish periods of high use and low use ie when occupied or unoccupied, day or night, week or weekend etc.**

c) **An initial water audit will establish the daily/weekly patterns of water consumption. Further regular monitoring should be undertaken to fully understand the overall usage including seasonal fluctuations, plant watering, tank filling, vehicle cleaning etc.**

d) **Following electrical & mechanical installation, the following procedures must be undertaken:**
i) Set Time & Date
ii) Set K factors for Main (M1) & Sub (M2) pulse meters
iii) Set High Flow times Monday to Sunday as per the audit
iv) Run the system for 1 week – see section 4
v) Enter maximum flow parameters for both HF & LF times using the readings from the Peak Litres screen

e) **Reboot and the system is ready to run**

2-INSTALLATION INSTRUCTIONS

NB: THE INSTALLATION SHOULD COMPLY WITH LOCAL AND SITE REGULATIONS AND BE CARRIED OUT BY A QUALIFIED ELECTRICIAN.

MECHANICAL

Plumb in pulse water meters according to the manufacturer's instructions. If required plumb in a 24v DC solenoid shut off valve to isolate water supply in the event of an alarm. Consider fitting a bypass so that water may be drawn in event of a power cut or valve failure.

ELECTRICAL

Fix the steel enclosure in a suitable position protected from the elements as close to the pulse meters as is practicable. A 240v 50Hz supply (5A spur) with means of disconnecting the power will be required. The LCD display and keypad should be easily accessible and clearance made to allow the door to open fully.

Connect single phase supply to terminals E, L & N using 0.75 or 1.0 mm² cable - see wiring diagram - Fig 1

Connect Main (M1) pulse meter using 2 core 0.5 or 0.75mm² cable to terminals 1 & 2 – see wiring diagram - Fig 1
Note if a long cable run is required (>10m) use cable of at least 0.75mm^2 screened or armoured cable with sheath earthed at panel end.

Connect Sub (M2) pulse meter using 2 core 0.75mm² cable to terminals 3 & 4 - see wiring diagram - Fig 1

Normally Open contact is available at terminals 11 & 12 used for alarm or BMS - see wiring diagram - Fig 2 & Fig 3

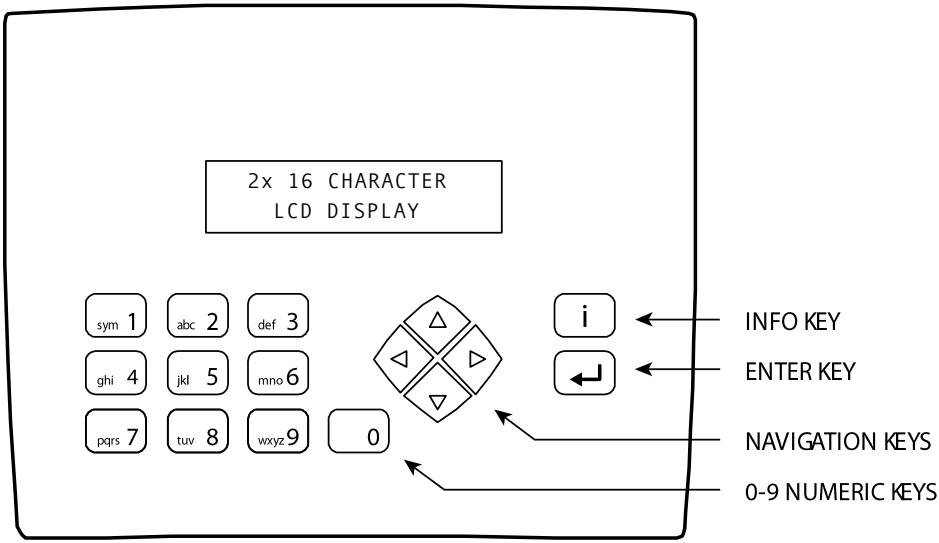
Solenoid Valve a contact is available at terminals 13 & 14 for operating a solenoid shut off valve in the event of an alarm. This may be set for a Normally Closed or a Normally Open valve in 'SOLENOID VALVE SETUP' - see wiring diagram - Fig 4

24v DC supply is available on terminals marked - & + which can be used in conjunction with either contact to suit individual applications – see specifications for ratings.

When the above steps have been completed turn on the electricity supply. After a brief welcome screen showing 'WATERSAVERS WLDS-20 Mk3' the Main screen will show – see section 4

CHECK TIME & DATE AND SET IF NECESSARY – see section 5

3 – LCD DISPLAY & KEYPAD – QUICK GUIDE



SOME USEFUL FUNCTIONS

Alarm Test – press 2 key for 4 seconds

Manual Override – press 6 key for 4 seconds

Valve service – press 8 key for 4 seconds

Serial Number of the WLDS-20 mk3 - press 1 and INFO (i) keys together

The MAIN screen will be return after 3 seconds.

LCD DISPLAY & KEYPAD

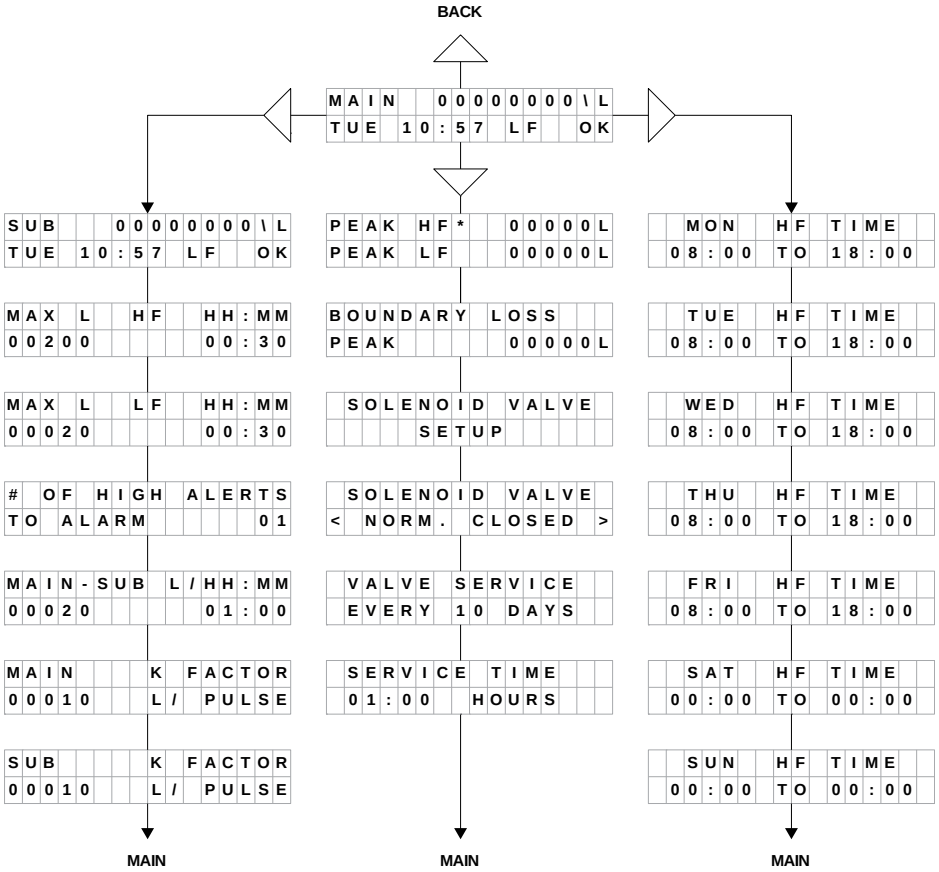
This incorporates a 2 line 16 character LCD display with LED backlighting. The keypad and display enable the user to enter parameters and monitor water flow.

Press the ◄ key to scroll through the parameter entry screens.

Press the ► key to scroll through the time setting screens from Monday to Sunday.

Press the ▼ key to view monitor screens and solenoid valve setup.

To return to the Main screen press the ▲ key.



WLDS-20 Mk3 LCD SCREENS NAVIGATION MAP

4-MAIN & SUB SCREENS

This is the default screen

M	A	I	N			0	0	0	0	0	0	0	\	L
T	U	E		1	0	:	5	7		L	F			O	K

Example only

The top line shows TOTAL LITRES registered by the Main meter (M1) at the site boundary (similar to a car's milometer). The slash next to the L will change from \ to / to indicate contact closure from the pulse meter. The bottom line shows day of the week, time (24hr format), current High Flow (HF) or Low Flow (LF) status and lastly OK - (flow less than preset maximum or HI - greater than preset maximum.

Press ◄ to show the SUB screen as below:

S	U	B				0	0	0	0	0	0	0	\	L
T	U	E		1	0	:	5	7		L	F			O	K

Example only

This is similar to the MAIN screen but shows the TOTAL LITRES registered at the building intake by the Sub meter (M2). Check that the MAIN and SUB displays increment as water flows through both pulse meters.

NB: Larger pulse meters (1" and above) may produce 1 pulse per 10 or 100 litres and the display will correspondingly be programmed to increment by 10 or 100 litres. Enter the actual number of litres into the preset fields - irrespective of the pulse per litres output.

PLEASE BEAR IN MIND THAT THE ACCURACY OF ANY MEASUREMENT OR DETECTION WILL BE LIMITED TO THE K FACTOR OF THE PULSE METERS USED eg 1, 10 or 100 LITRES.

TO RESET TOTAL LITRES TO ZERO

Main: In MAIN display press and hold '0' key for 4 seconds

Sub: In SUB display press and hold '0' key for 4 seconds.

5-ENTERING PARAMETERS & COMMISSIONING

TO ENTER OR CHANGE A PARAMETER in a particular screen press Enter (Return). You will then see a flashing cursor to prompt you to enter the required value using the keypad. Press Enter again to confirm. Press Enter again and repeat to make further changes.

For correct operation the following procedures MUST be completed:

- **SETTING THE TIME AND DATE**
- **SETTING THE PULSE METER K FACTORS (LITRES PER PULSE)**
- **SETTING HIGH FLOW (HF) TIMES FOR DAYS OF WEEK**
- **SETTING MAXIMUM HIGH & LOW FLOW RATES (FROM PEAK READINGS OBTAINED AFTER THE TEST WEEK)**

****

IMPORTANT

Reboot panel (turn power off / on again) after changing parameters

****

SETTING THE TIME AND DATE

These are set before they leave the factory. If you need to change them proceed as follows:
Press and hold the 'INFO' key for approximately 5 seconds. Use ► key to scroll through INPUTS / OUTPUTS, MB/MI/SB/SI, TIMERS, SYSTEM. Press Enter key at SYSTEM, press Enter key to select TIME & DATE, press Enter key again to select TIME: press Enter key again to enable flashing cursor prompt, enter correct time (in 24Hr clock format) using 0 – 9 keypad. When correct press ► to show flashing cursor on Day. Enter correct day of the month 1-31, cursor then flashes on Month. Enter correct month of year 1-12, cursor then flashes on Year. Enter correct year YYYY then press INFO key 3 times to revert back to Main screen.

SETTING PULSE METER K FACTOR (LITRES PER PULSE)

M	A	I	N				K		F	A	C	T	O	R
0	0	0	1	0			L	/		P	U	L	S	E

Example only (default setting 10)

To reach this screen scroll through the setup screens by pressing ◄ key from the MAIN screen. The default (factory) setting for the K factor of the pulse meters is 10 litres per pulse. To change the K factor press Enter to get the flashing cursor prompt. Enter the new K factor of 1,5,10 or 100 litres per pulse and then press Enter again to confirm. Note that the K factor of MAIN (M1) meter will usually be the same as that of SUB (M2) meter but in some circumstances it may be necessary to enter different values.

Press ◄ key to show the setting screen for the SUB meter and repeat as above.

SET HIGH FLOW (HF) TIMES FOR DAYS OF WEEK

		M	O	N			H	F		T	I	M	E		
	0	8	:	0	0		T	O		1	8	:	0	0	

Example only

To reach this screen scroll through the setup screens by pressing ► key from the MAIN screen.

This screen and the six following screens enable a daily time period to be entered during which high usage is anticipated. During these time periods High Flow parameters apply. See - **SETTING MAXIMUM HIGH FLOW RATE**

Times outside this period are by default low usage during which time Low Flow parameters apply. See - **SETTING MAXIMUM LOW FLOW RATE**

Press Enter to show the flashing cursor. Enter the time period FROM and then TO using the numeric keys (in 24Hr format). Confirm by pressing the Enter key. Press ► key to continue to the next day of the week or press ◄ key for the previous day.

IT IS IMPORTANT THAT THE FOLLOWING IS READ AND UNDERSTOOD

Example: The default High Flow (HF) time settings are from 08:00 to 18:00 Mon to Fri with no High Flow (HF) time period set on Sat or Sun. This would apply to a typical office installation where the High Flow parameters would apply during the working (occupied) day and the Low Flow (LF) parameters would apply at night and over the weekend (unoccupied).

For a restaurant or club where High Flow (HF) times span midnight eg from 8pm to 3am, simply swap the HF & LF times and settings. Enter the times of *low usage* as HF during the day eg from 03:00 to 20:00 with the corresponding flow settings.
HF settings do not have to be greater than LF settings, they are just labels.

SETTING MAXIMUM HIGH FLOW RATE

M	A	X		L			H	F			H	H	:	M	M
0	0	2	0	0							0	0	:	3	0

Example only (default setting 9999)

To reach this screen scroll through the setup screens by pressing ◄ key from the MAIN screen. This screen shows the maximum allowable number of litres that pass in a preset time period (default 30mins) before a High Alert is registered during periods of high flow (HF).
Press ◄ key to show the above screen. Press Enter to show the flashing cursor. Enter the maximum number of litres using the 0-9 numeric keys. Confirm by pressing Enter key. Press Enter again to confirm the preset time period.

NB: THE PRESET TIME PERIOD CAN BE REDUCED FOR VERY HIGH FLOW OR INCREASED FOR VERY LOW FLOW.

SETTING MAXIMUM LOW FLOW RATE

M	A	X		L			L	F			H	H	:	M	M
0	0	0	2	0							0	0	:	3	0

Example only (default setting 9999)

To reach this screen scroll through the setup screens by pressing ◄ key from the MAIN screen.

This screen shows the maximum allowable number of litres that pass in a preset time period (default 30mins) before a High Alert is registered during periods of low flow (LF). Press ◄ key to show the above screen. Press Enter to show the flashing cursor. Enter the maximum number of litres using the 0-9 numeric keys. Confirm by pressing Enter key. Press Enter again to confirm the preset time period.

SETTING NUMBER OF ALERTS BEFORE ALARM

#		O	F		H	I	G	H		A	L	E	R	T	S
T	O		A	L	A	R	M							0	1

Example only (default setting 1)

To reach this screen scroll through the setup screens by pressing ◄ key from the MAIN screen.

This setting is the number of consecutive times that the maximum flow rate is exceeded before raising the alarm. The default setting is 1 which means that the alarm will be raised as soon as the maximum flow is exceeded. Increase this number only if sporadic high usage is expected. Press ◄ or ► keys to go to other screens or press ▲ key to return to Main screen.

SETTING M1-M2 Litres (BOUNDARY LOSS)

M	A	I	N	-	S	U	B		L	/	H	H	:	M	M
0	0	0	2	0							0	1	:	0	0

Example only (default setting 9999)

To reach this screen scroll through the setup screens by pressing ◄ key from the MAIN screen.

This is the potential loss of water between the MAIN (M1) and the SUB (M2) meters. **Bear in mind that due to the limits of measurement and the K factors of the pulse meters, a minimum amount of 2x the K factor should be used.**
To change the number of litres press Enter to get the flashing cursor prompt. Enter the required figure using the keypad and confirm by pressing Enter again.

Next enter the time over which the number of litres are to be measured ie 20 litres in one hour. Enter the required time using the 0-9 numeric keys then confirm by pressing Enter key. Press ◄ or ► keys to go to other screens or press ▲ key to return to Main screen.

PROTECTION OFF (MANUAL OVERRIDE)

P	R	O	T	E	C	T	I	O	N		O	F	F		
T	I	M	E	O	U	T					0	1	:	0	0

Example only (default setting 1 hour)

This function is used when for example drawing off large volumes of water in order that the alarm is not raised. To select this function press and hold the '6' key (m for manual) for 4 seconds. The above screen will show. After the Timeout period (default 1 hour) the panel will return to fully protected operation. Press Enter to change the default period. The Timeout period may be set from 1 minute to 45 hours. To cancel 'Protection Off' press ▲ key to return to MAIN screen.

EXTERNAL HF/LF INPUTS

Instead of using the internal time clock to set time periods of expected High Flow and Low Flow, the WLDS-20 has inputs for connection to BMS or similar to select HF or LF protection. These are located on the green upper (input) terminal block at the rear of the controller.
Connect input I 5 (terminal 10) to +24v to enable external High/Low flow.
Connect input I 4 (terminal 11) to +24v to select High Flow. (Low flow if open circuit)

5-SOLENOID VALVE SETUP

The WLDS-20 mk3 has new features that enable the installer to select either a Normally Closed (default) or a Normally Open solenoid shutoff valve to be used in conjunction with the panel.

Furthermore an optional regular servicing routine may be used in order to prolong the active life of the solenoid valve and to reduce the risk of the valve sticking open or closed due to inactivity and/or possible calcification.

We recommend the valve is serviced at least once per week.

The 4 solenoid valve setup screens are located after the Monitoring screens by pressing the ▼ key from the MAIN screen.

	S	O	L	E	N	O	I	D		V	A	L	V	E	
						S	E	T	U	P					

SELECT NORMALLY CLOSED OR NORMALLY OPEN

	S	O	L	E	N	O	I	D		V	A	L	V	E	
<		N	O	R	M	.		C	L	O	S	E	D		>

The default setting is for a Normally Closed valve. Press ► key to change to Normally Open, press ◄ key to select Normally Closed. Press ▼ for the following screen:

SELECT VALVE SERVICE INTERVAL

	V	A	L	V	E		S	E	R	V	I	C	E		
	E	V	E	R	Y		1	0		D	A	Y	S		

To change the service interval press Enter key. The number of days will flash. Enter the number of days required from 1 to 30 days. Press Enter key to confirm.
To disable this function enter 0 days.

We recommend the valve is serviced at least once per week.

ENTER THE VALVE SERVICE TIME

	S	E	R	V	I	C	E		T	I	M	E	
	0	1	:	0	0			H	O	U	R	S	

Choose a time of the day when there will be least disruption from the valve being opened and closed eg in the early hours of the morning. The default time is 01:00.

The following screen will indicate the valve service in progress:

	V	A	L	V	E		S	E	R	V	I	C	E
	I	N		P	R	O	G	R	E	S	S	.	.

MANUAL VALVE SERVICE

To initiate a manual valve service at any time, press key 8 (V) for 4 seconds.

VALVE SERVICE FUNCTION

The valve service function consists of opening and closing the valve for 5 fixed cycles of 2 seconds OPEN then 2 seconds CLOSED therefore lasting a total time of 20 seconds.

6-MONITORING SCREENS

PEAK NUMBER OF LITRES

P	E	A	K		H	F	*			0	0	1	6	0	L
P	E	A	K		L	F				0	0	0	1	0	L

Example only

This screen stores the peak value measured during both High flow and Low flow time periods. The asterisk shows the current HF/LF status.
Press ▼ key to go to the screen below or press ▲ key to return to the Main screen.

NB THESE READINGS WILL REMAIN UNTIL RESET – SEE NOTE BELOW

PEAK BOUNDARY LOSS

B	O	U	N	D	A	R	Y		L	O	S	S			
P	E	A	K							0	0	0	1	0	L

Example only

This screen stores the peak boundary loss (M1-M2 litres).
Press ▲ key to go to the previous screen or press ▼ key to return to MAIN screen.

NB THESE READINGS WILL REMAIN UNTIL RESET – SEE NOTE BELOW

NB Using your readings from the above screens add a safety margin of 10-15% for the maximum flow parameters. eg if your peak reading is 150 litres then enter 165 - 173 litres as the maximum.

IMPORTANT – IMPORTANT – IMPORTANT – IMPORTANT -

RESETTING PEAK READINGS

This must be done following an alarm event or before a repeat test week is carried out. To reset these readings press and hold the 0 key for 4 seconds while this screen is active.

7-WLDS-20 ALARMS

If either preset parameters are exceeded, the NO & NC contacts will change over and one of the following screens will be shown. If this situation occurs, reset the panel by rebooting (turning power off then on again) and investigate as follows:

EXCESS FLOW ALARM

E	X	C	E	S	S		F	L	O	W	!				
R	E	B	O	O	T		T	O		R	E	S	E	T	

If this screen shows check the **PEAK NUMBER OF LITRES**
See Section 6 - monitoring screens.

BOUNDARY LOSS ALARM

B	O	U	N	D	A	R	Y		L	E	A	K	!		
R	E	B	O	O	T		T	O		R	E	S	E	T	

If this screen shows check the **PEAK BOUNDARY LOSS**
See Section 6 - monitoring screens.

EXTERNAL INPUT ALARM

E	X	T	E	R	N	A	L		A	L	A	R	M	!	
R	E	B	O	O	T		T	O		R	E	S	E	T	

An external alarm input is available for the connection of ancillary equipment such as tape leak sensing to be interfaced to the WLDS-20 mk3 panel. Input I3 is located at terminal 12 on the upper green terminal block. When this input is connected to +24v for 1 second the above screen will show and the alarm will be raised.

ALARM/VALVE TEST

To test the operation of the alarm and/or solenoid shutoff valve if fitted, press and hold the '2' key (a for alarm). After 4 seconds the alarm contacts will changeover for as long as the key is pressed. Release the key to cancel.

ADDITIONAL RELAY OUTPUTS

Two additional relay contact outputs are available for ancillary circuits such as autodiallers etc. These are located on the lower green (output) terminal block at the rear of the controller.The Normally Open contact is O2 – terminals numbered 10 & 11 The Normally Closed contact is O3 – terminals numbered 8 & 9

8-TROUBLESHOOTING

BLANK LCD SCREEN

Check power is present, check wiring, check mains fusing. Green light on PSU indicates 24v is OK. Check DC fuse. This is located at right hand side of PSU in grey housing. Lift grey lid at top edge to reveal fuse. Replace if necessary with spare 20x5mm 1A quick blow fuse located in upper compartment.

LITRES DISPLAY ON MAIN/SUB SCREEN NOT INCREMENTING

Check water is flowing – pulse meters will indicate water flow on their dials. To check the pulse meter disconnect from panel and check that its contacts open and close as water flows through it using a multimeter set to 'continuity'. The panel can be checked by short circuiting terminals 1 & 2 or 3 & 4 and watching Main or Sub screens respectively. This should cause the total litres display to increment by the K factor each time the terminals are shorted.

EXCESS FLOW ALARM TRIPS WITH NO OBVIOUS LEAK

View the PEAK NUMBER OF LITRES screen (section 6) to check if the flow has exceeded the preset maximum flow. Check time settings. Check K factor has been entered correctly.

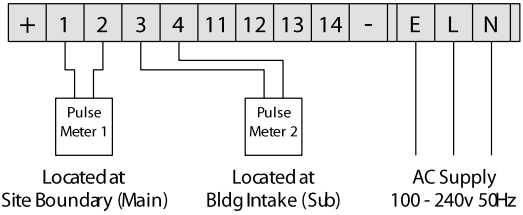
BOUNDARY ALARM TRIPS WITH NO OBVIOUS LEAK

View the PEAK BOUNDARY LOSS screen (section 6) to check if the flow exceeds the preset flow. Check time settings. Check K factor has been entered correctly.

9-WIRING DIAGRAMS

WLDS-20 mk3 wiring diagram showing connections for supply and pulse meters

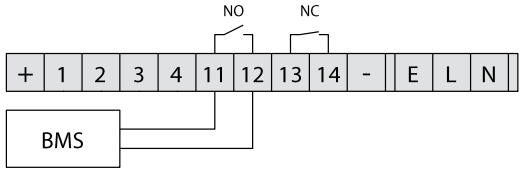
Fig 1



Connection of electric supply and two pulse water meters M1 & M2

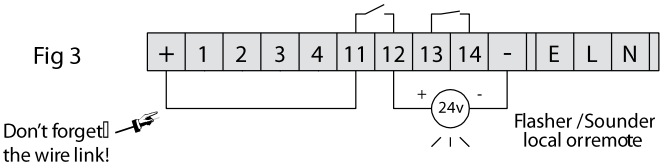
Wiring alarm options for BMS, flasher/sounder and solenoid shut off valve

Fig 2



Connection to Building Management System - BMS
Normally open contact closes in Alarm situation

Fig 3



Connection of 24v DC Flasher / Sounder - activated in Alarm situation

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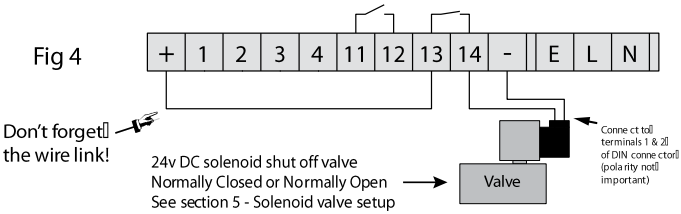
Fig 4



Shut off valve - valve is arranged to be open via contact allowing water to flow. In alarm situation the valve closes - shutting off water.

10-NOTES

Installation details

Contact name/s .....

Mobile number .....

Installation date ..... Serial number .....

Main (M1) meter K factor ..... Sub (M2) meter K factor .....

Alarm details .....

Settings

High Flow (HF) max litres Time period _ _ : _ _

Low Flow (LF) max litres Time period _ _ : _ _

M1-M2 Boundary max litres Time period _ _ : _ _

Hi Alerts to alarm .....

High Flow (HF) times - use 24hr format

Mon _ _ : _ _ to _ _ : _ _ Tue _ _ : _ _ to _ _ : _ _

Wed _ _ : _ _ to _ _ : _ _ Thu _ _ : _ _ to _ _ : _ _

Fri _ _ : _ _ to _ _ : _ _ Sat _ _ : _ _ to _ _ : _ _

Sun _ _ : _ _ to _ _ : _ _

WE RECOMMEND THE ABOVE FIGURES ARE REVIEWED EVERY 6 MONTHS

11-SPECIFICATION

Power requirements: Universal input 100-240v AC 50/60Hz, power consumption 30W

Pulse Meter inputs: 24v DC 5mA maximum for two reed switch type pulse meters, suitable for 1, 5, 10 or 100 litres per pulse output

Alarm output: Normally Open free relay contact rated at 5A resistive load 250v AC / 30V DC

Valve output: Free relay contact rated at 5A resistive load 250v AC / 30V DC programmable as Normally Open or Normally Closed with timed service function - see section 5

Additional outputs: two alarm contacts are available – please see section 7 WLDS-20 Alarms

24v DC PSU: 1.1A maximum available for powering alarm or valve

Parameters: Maximum Flow: Litres input range 1 – 32,767, time period range 1 minute - 45 hours, number of High Alerts to alarm: 1-99. Boundary Loss: Litres input range 1 – 32,767, time period range 1 minute – 45 hours. 7 day timer allows daily High Flow periods to be entered.

External HF/LF input: overrides internal clock – see section 5

External Alarm input: enables ancillary equipment such as tape sensing to be interfaced to the WLDS-20 mk3 panel – see section 7

LCD display: 2x 16 ASCII character with LED backlight

Keypad: with tactile feedback, 0-9 numeric keys plus navigation keys for parameter setting and monitoring

Real Time clock: displaying day and time (24Hr format) with automatic GMT/BST changeover Battery backed (10 year life)

Connections: via DIN rail terminals maximum conductor size 4mm², cable entry via stuffing glands in gland plate

Enclosure: Steel wall mounting overall dimensions 300 x 300 x 150mm (W x H x D) RAL7035 powder coated

Protection: to IP65 (nearest NEMA 4X) overall weight 5kg

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