Operation instruction manual OI/KMICRO-EN Rev. B

KSONIK MICRO
Ultrasonic Level Transmitter

Ultrasonic level measurement with GAP technology
K-TEK Products

Introduction

This operation instruction manual provides the following information:

Power and productivity for a better world™

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1.0 Introduction

The KSONIK MICRO works on the non-contact principle of ultrasonics. A pulse of energy emits from the Transducer at the speed of sound and is detected on its return. The Transmitter can distinguish the difference between the correct echo and other ambient noise. When the signal returns, the KSONIK MICRO measures the time period, and then knowing the speed of sound, it can accurately calculate the distance from the material to the Transducer. The KSONIK MICRO will adjust the 4-20mA output, accordingly.

In distance mode, the KSONIK MICRO measures distance from the transducer. This means the 20mA will be the furthest point and the 4mA will be the closest point.

In level mode, the KSONIK MICRO measures level in a tank. This means at the furthest point or when the tank is empty, the instrument will read 4mA. At the closest point the tank will be full and the instrument will read 20mA.

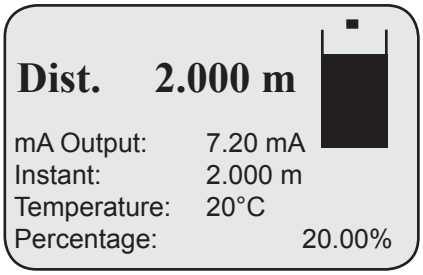
The Open Channel flow meter uses a level measurement from the KSONIK MICRO and converts the reading into a flow measurement.

A microprocessor then controls the output functions of the relay, display and the analogue output signals.

2.0 Quick Start for Distance

KSONIK MICRO was designed to be user friendly with a very simple configuration program. This allows the technician to set up KSONIK MICRO without the aid of a complicated source-code book. There are no references to any codes in KSONIK MICRO. The set up procedure is all menu-driven with the aid of questions and multiple-choice answers.

Aim the transducer at a wall about 2 m away and check the display. It should read the following:



If the reading is above 2.000 m then move the instrument closer to the wall.
If the reading is below 2.000 m then move the instrument away from the wall.
You may now proceed and check other parameters.

3.0 Quick Start for Level

1. Connect up the power to the instrument described on the KSONIK MICRO face label or in the KSONIK MICRO manual under terminal connections on page 51.

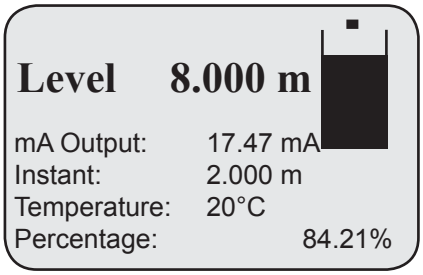
2. Press **SCROLL**

3. Use ▼ ▲ to get to the default security Code 5159 and **ENTER** then press **ENTER**

4. Use ▼ ▲ to select level and then press **ENTER**

5. Press **RUN**

Aim the transducer at a wall about 2.000 m away and check the display. It should read the following:



If the Level reading is below 8.000 m then move the instrument closer to the wall. If the Level reading is above 8.000 m then move the instrument away from the wall. You may now proceed and check other parameters

4.0 Quick Start For Flow

1. Connect up the power to the instrument as described on the KSONIK MICRO face or in the KSONIK MICRO manual under terminal connections on page 51.

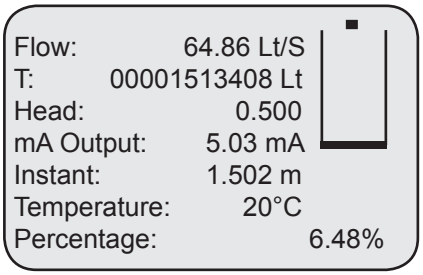
2. Press **SCROLL**

3. Use ▼ ▲ to get to the default security Code 5159 and **ENTER** then press **ENTER**

4. Use ▼ ▲ to select level and then press **ENTER**

5. Press **RUN**

Aim the transducer at a wall about 1.5 m away and check the display. It should read the following:

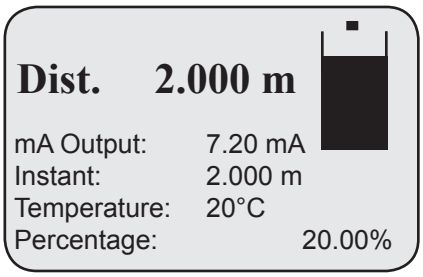


If the head reading is below 0.500 m or below 64.86 Lt/s then move the transducer closer to the wall. If the head reading is above 0.500 m or above 64.86 Lt/s then move the transducer away from the wall. You may now proceed and check other parameters.

5.0 Changing Parameters

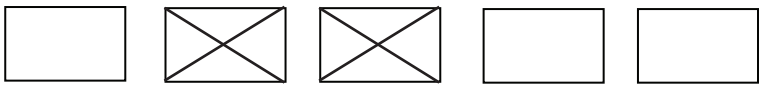
Step 1

Simply press **SCROLL** The SECURITY CODE prompt should be displayed.



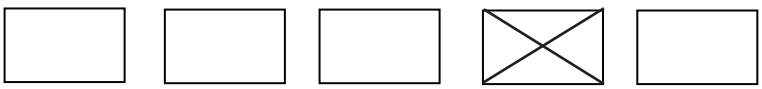
Step 2

Enter the code 5159 by pressing the keys ▼ ▲

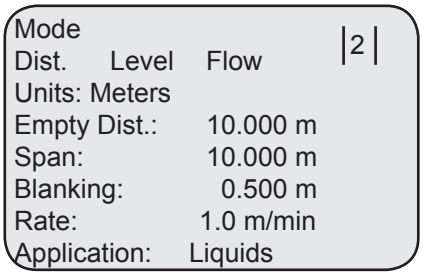


Step 3

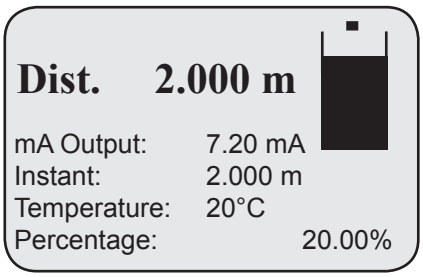
To confirm security code press **ENTER**



If Code has been accepted, the screen will display



If Code has not been accepted, the screen will display

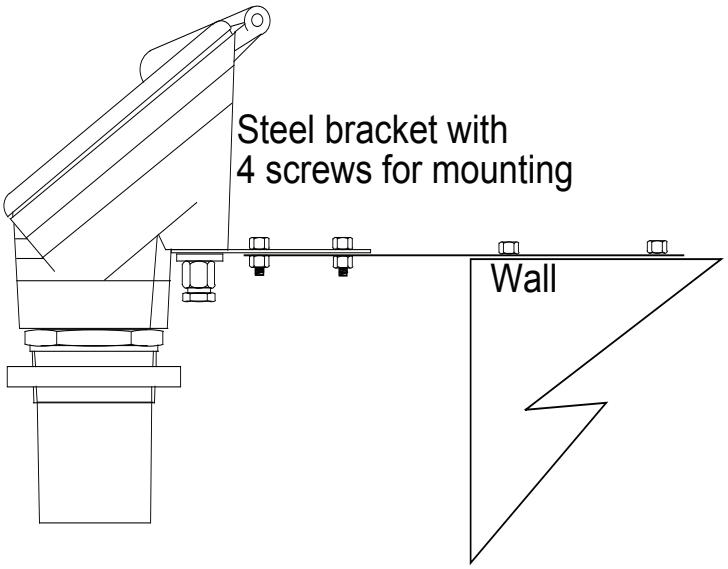


If the security code has been changed and forgotten then contact the nearest K-TEK agent for override code.
To carry on with programming go to page 16.

6.0 INSTALLATION

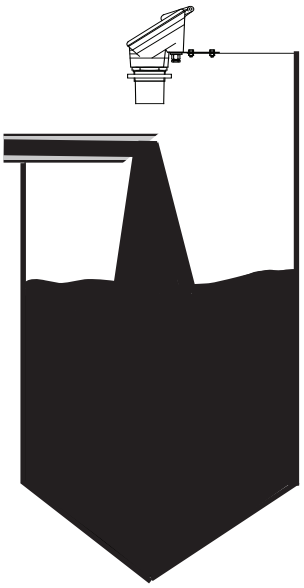
The KSONIK MICRO is protected to IP65. The Transmitter is dust and waterproof so it can be mounted outside. The KSONIK MICRO should be mounted using the bracket supplied. Do not install the KSONIK MICRO in areas of high vibration as this may cause failure. Do not install the KSONIK MICRO in the close vicinity of electrical cable, SCR's or variable speed drives. The installation of KSONIK MICRO is the most important section of this manual and has been divided up into 6 sub sections.

1. The KSONIK MICRO must be fitted at least 0.50 m / 1.64 ft above the highest point of level.
2. Always use the plastic nut. The KSONIK MICRO must be fitted to a rigid support. Use mild steel or a suitable plastic. Do not use stainless steel as this can cause ringing.



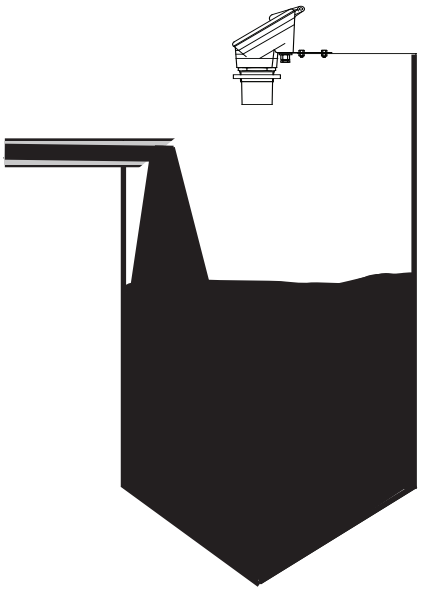
3. The KSONIK MICRO must be perpendicular to the material it is measuring with a clear line of sight and must not be above beams or filling points.

INCORRECT



THIS IS INCORRECT AS THE FILLING POINT IS OBSCURING THE KMICRO'S LINE OF SIGHT

CORRECT

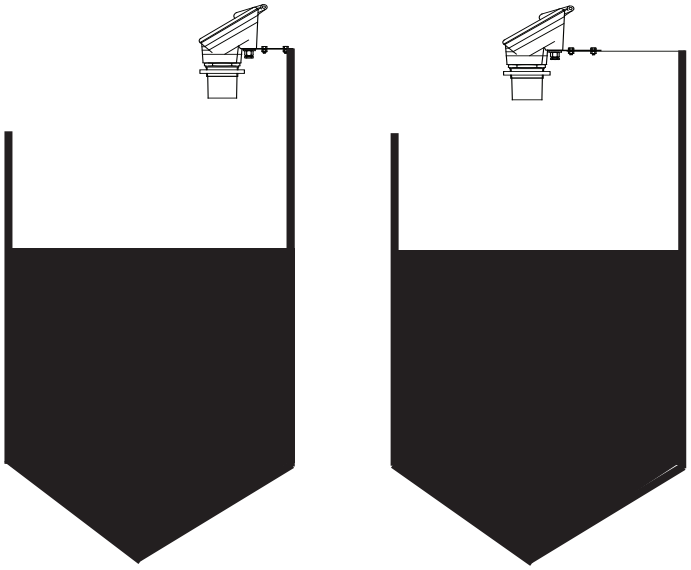


THIS IS CORRECT AS THE FILLING POINT IS NOT OBSCURING THE KMICRO'S LINE OF SIGHT

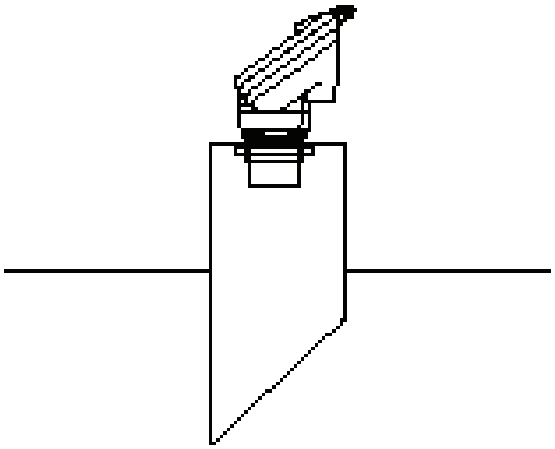
4. The transducer should be perpendicular to liquid level.

5. If the KSONIK MICRO is in a coned vessel, it must be positioned over the cone. This ensures that the Transducer receives the true echo and not one from the sides of the cone.

INCORRECT **CORRECT**



6. When a standpipe is being used it must be as wide as possible; i.e. the pipe diameter must be at least half its height, preferably made of plastic. The base MUST have a 45° chamfer to reduce the echo size from the bottom of the standpipe. No welding should be present on the inside of the pipe as this causes false echoes.



7. If any large electrical equipment is installed in the vicinity, then earthed steel conduit must be used.

7.0 KEY DESCRIPTION

KSONIK MICRO is “user friendly” having only 5 keys and a menu driven display. The keys are listed below with their appropriate functions.

SCROLL This is used to initially access the programming and then to run through the various menus.

▲ This key is used to INCREASE the value in the various commands. This key also starts the simulation mode increasing in level. See page 48 for details.

▼ This key is used to INCREASE the value in the various commands. This key also starts the simulation mode decreasing in level. See page 48 for details.

ENTER When a value has been changed it is only accepted by pressing the ENTER key. The ENTER key while in run mode scrolls through the relay status screen and onscreen KScope screen. See page 32 for details.

RUN When programming is complete, press RUN to return KSONIK MICRO back to the run mode.

7.1 Security Code

To advance to the programming mode the correct security code must be entered. The factory default code is 5159. This code can be changed in the programming mode. If you forget the security code please contact your local ABB agent for the override code.

8.0 Configuration Distance / Level

FLOW MODE		
BASIC	**OPTIONS**	**DEFAULTS**
SECURITY CODE	0-9999	5159
MODE	DISTANCE/LEVEL/FLOW	DISTANCE
UNITS	METERS/FEET	METERS
EMPTY DISTANCE	0.4-15.00 m	10 m
SPAN	0.1-15.00 m	10 m
BLANKING	0.3-14.90 m	0.50 m
RATE OF CHANGE	0.01-20.0 m/min	1.00 m/min
APPLICATION	LIQUIDS/SOLIDS	LIQUIDS
FACTORY RESET	NO/YES	NO
TEMPERATURE COMPENSATION	OFF/ON	OFF
SIMULATE	NO/YES	NO
SET PASSWORD	NO/YES	NO
BACKLIGHT	OFF/ON (1-60MIN) / PERM	2 MIN
LOSSTIME	30-900SEC	300SEC
LOGTIME	3.6mA, 4.0mA, 20mA, 21mA, HOLD	HOLD
FAILSAFE	3.6mA, 4.0mA, 20mA, 21mA, Hold	Hold
ENGINEERING UNITS	NONE, aaa-zzz, AAA-ZZZ,0-9	NONE
MAXIMUM VALUE	0-99999	10000
DECIMAL POINT	0-3	2
ZERO OFF SET	-50 mm TO 50 mm	0
SETUP RELAY	NO/YES	NO
RELAY	OFF/LO/HI	OFF
SETPOINT	SPAN	0 m
RESET POINT	SPAN	0 m
PUMP CYCLE	OFF/FIFO/ROTATE	OFF
CLEAR RELAY	NO/YES	NO
SETUP LINEARISER	NO/YES	NO
ACTIVATE LINEARISER	NO/YES	NO
SETPOINT	1-21	1
HEIGHT	0m-SPAN	0 m
PERCENTAGE	0-100%	0%

8.1 Distance / Level Mode

SECURITY CODE
Security code to advance to programming.
DEFAULT 5159

MODE
Choose between Distance, Level.
DEFAULT Distance

UNITS
Choose between Feet and Meters.
DEFAULT Meters

EMPTY DISTANCE
This is the distance from the face of the transducer to the bottom of the tank.
DEFAULT 10.00 m

SPAN
This figure is the measuring range of the instrument i.e. distance from the bottom of the tank to the highest point being measured. Remember, the material must not approach within 0.50 meters of the transducer face or within the blanking distance of the transducer.
DEFAULT 10.00 m

BLANKING
This is the area where an echo cannot be processed because the return echo would be received while the transducer is still firing.
DEFAULT 0.50 m

RATE OF CHANGE
This is used to set up the rate of change of the level output. The rate of change governs the rate at which the instrument output change. By increasing the rate of change (4.00 m/min) it will allow the KSONIK MICRO to monitor rapid changes in level. If the level moves faster than 1 m/minute in measurement increase the rate of change. If a more stable output is required decrease the rate of change (0.30 m/min).

DEFAULT 1.00 m/min

APPLICATION
This selection can be used to select either liquid or solid applications. The solid application will provide more power to locate the correct echo.
DEFAULT Liquids

FACTORY RESET
This prompt will reset all values entered back to factory setting except the password. Please write down all settings before using this function.
DEFAULT No

TEMPERATURE COMPENSATION
Sets temperature compensation on or off.
DEFAULT Off

SIMULATE
Simulates the level, relay outputs and mA outputs with the rate of change, selected.
DEFAULT No

SET PASSWORD

This prompt will allow you to change the default factory code. Should the factory code be forgotten please contact a local ABB agent for an override password.
DEFAULT No

BACKLIGHT
Choose between switching on the backlight for 1 - 60 minutes, switch off the backlight or to switch the backlight permanently on.
DEFAULT 2 Min

LOSSTIME
This is the amount of time between last receiving a correct echo and going into the Fail-safe condition. This time period is timed in seconds. This cannot be reduced to less than 30 seconds.
DEFAULT 300 Sec

FAILSAFE
If a loss of echo condition is reached then the 4-20mA output will follow the configured settings 3.60mA, 4mA, 20mA, 21mA or Hold the reading at the last recognized echo. This is usually due to a cable being cut or the instrument not being set up correctly.
DEFAULT Hold

ENGINEERING UNITS
This prompt will allow you to display in your own engineering units and can be made up from alphanumeric characters.
DEFAULT None

MAXIMUM VALUE/DECIMAL POINT
This is the maximum value the engineering units can be displayed instead of reading meters (m) or feet (ft).
DEFAULT 10000

After the maximum value is set the number of decimal points can be adjusted.
DEFAULT 2

ZERO OFFSET
Choose between –50 mm to 50 mm for setting the offset of the instrument.
DEFAULT 0

SETUP RELAY
Select yes to enter the relay menu and set up the relay parameters.
DEFAULT No

RELAY
The relay can be used either for a high alarm or a low alarm. A high alarm has its reset below the set point, and a low alarm has its reset above the set point. DEFAULT Off

SET POINT
This is the value where the relay will set.
DEFAULT 0 m
RESET POINT
This is the value where the relay will reset.
DEFAULT 0 m

PUMP CYCLE
Not applicable on this instrument
CLEAR RELAY
Clears the number of cycles as well as the run hours recorded.
DEFAULT No

SETUP LINEARISER
This prompt will allow you to input a curve to linearise the vessel. The span is divided by 21 and you can input the new

height for each point as well as the corresponding percentage fill at that point. KSONIK MICRO prompts you at each point.
DEFAULT No

ACTIVATE LINEARISER
This function activates the lineariser.
DEFAULT No

SET POINT
This is the number at which point the user is inputting a linearised point.

HEIGHT/PERCENTAGE
Height is the distance from the bottom of the tank to a corresponding point where a suitable percentage can be determined.
DEFAULT 0.00 m

Enter the percentage volume of vessel at a corresponding height.
DEFAULT 0.00 %

Set point 1	
Height	0.0 m
Percentage	0.00%

Set point 2	
Height	0.50 m
Percentage	5.00%

Set point 3	
Height	1.00 m
Percentage	10.00%

Set point 4	
Height	1.50 m
Percentage	15.00%

Set point 5	
Height	2.00 m
Percentage	20.00%

Set point 6	
Height	2.50 m
Percentage	25.00%

Set point 7	
Height	3.00 m
Percentage	30.00%

Set point 8	
Height	3.50 m
Percentage	35.00%

Set point 9	
Height	4.00 m
Percentage	40.00%

Set point 10	
Height	4.50 m
Percentage	45.00%

Set point 11	
Height	5.00 m
Percentage	50.00

Set point 12	
Height	5.00 m
Percentage	50.00%

Set point 13	
Height	5.50 m
Percentage	55.00%

Set point 14	
Height	6.00 m
Percentage	60.00%

Set point 15	
Height	7.00m
Percentage	70.00%

Set point 16	
Height	7.50 m
Percentage	75.00%

Set point 17	
Height	8.00 m
Percentage	80.00%

Set point 18	
Height	8.50 m
Percentage	85.00%

Set point 19	
Height	9.00 m
Percentage	90.00%

Set point 20	
Height	9.50 m
Percentage	95.00%

Set point 21	
Height	10.00 m
Percentage	100.00%

8.2 CONFIGURATION FLOW

FLOW MODE		
BASIC	**OPTIONS**	**DEFAULTS**
SECURITY CODE	0-9999	5159
MODE	DISTANCE/LEVEL/FLOW	DISTANCE
UNITS	METERS/FEET	METERS
EMPTY DISTANCE	0.4-15.0 m	2 m
SPAN	0.1-15.0 m	1.5 m
BLANKING	0.3-14.90 m	0.50 m
RATE OF CHANGE	0.01-20.0 m/min	0.50 m/min
APPLICATION	LIQUIDS/SOLIDS	LIQUIDS
FACTORY RESET	NO/YES	NO
TEMPERATURE COMPENSATION	ON/OFF	OFF
SIMULATE	NO/YES	NO
SET PASSWORD	NO/YES	NO
BACKLIGHT	OFF/ON (1-60MIN)/PERM	2MIN
LOSSTIME	30-900SEC	300SEC
FAILSAFE	3.6mA, 4.0mA, 20mA, 21mA, Hold	Hold
FLOW UNITS	SEE LIST	LT/SEC
MAXIMUM VALUE	1-99999	1000
ZERO OFF SET	-50 mm TO 50 mm	0 mm
TOTALISER COUNT	1-1000000	1
TOTALISER UNITS	A-Z, a-z, 0-9	Lt
TOTALISER RESET	NO/YES	NO
FLOW CURVE	SEE LIST	V-NOTCH
SETUP RELAY	NO/YES	NO
RELAY	OFF/LO/HI/COUNTER	OFF
SETPOINT	SPAN	0 m
RESET POINT	SPAN	0 m
PUMP CYCLE	OFF/FIFO/ROTATE	NO
COUNT VALUE	1-1000000	1000
CLEAR RELAY	NO/YES	NO
SETUP LINEARISER	NO/YES	NO
ACTIVATE LINEARISER	NO/YES	YES
SETPOINT	1-21	1
HEIGHT	0m-SPAN	0 m
PERCENTAGE	0-100%	0%

8.3 FLOW MODE

SECURITY CODE
Security code to advance to programming.
DEFAULT 5159

MODE
Choose Flow.
DEFAULT Distance

UNITS
Choose between Feet and Meters.
DEFAULT Meters

EMPTY DISTANCE
This is the distance from the face of the transducer to the bottom of the flume.
DEFAULT 2 m

SPAN
This figure is measuring the range of the instrument i.e. distance from the bottom of the flume to the highest point being measured.
Remember, the material must not approach within 0.5 meters of the transducer face or within the blanking distance of the transducer.
DEFAULT 1.5 m

BLANKING
This is the area where an echo cannot be processed because the return echo would be received while the transducer is still firing.
DEFAULT 0.5 m

RATE OF CHANGE
This is used to set up the rate of change of the level output. The rate of change governs the rate at which the instrument outputs changes. By increasing the rate of change (4.0 m/min) it will allow the KSONIK MICRO to monitor rapid changes in flow. If the level moves faster than 0.5 m/min then increase the rate of change. If a more stable output is required decrease the rate of change (0.3 m/min).
DEFAULT 0.5 m/min

APPLICATION
This selection can be used to select either liquid or solid applications. The solid application will provide more power to locate the correct echo..
DEFAULT Liquids

FACTORY RESET
This prompt will reset all values entered back to factory setting except the password. Please write down all settings before using this function.
DEFAULT No

TEMPERATURE COMPENSATION
Sets temperature compensation on or off.
DEFAULT Off

SIMULATE
Simulates the head, Relay output and mA output at the rate of change selected.
DEFAULT No
SET PASSWORD
This prompt will allow you to change the default factory code. Should the factory code be forgotten please contact a local ABB agent for an override password.
DEFAULT No

BACKLIGHT
Choose between switching on the backlight for 1-60 minutes, switch off the backlight or to switch the backlight permanently on.
DEFAULT 2 Min

LOSSTIME
This is the time, in seconds, between last receiving a correct echo and going into the Fail-safe condition. Minimum 30 seconds.
DEFAULT 300 Sec

FAILSAFE
If the loss of echo condition is reached then the 4-20mA output will follow the configured settings 3.6mA, 4mA, 20mA, 21mA or Hold the reading at the last recognized echo. This is usually due to a cable being cut.
DEFAULT Hold

FLOW UNITS
Units can be set via the alphanumeric display to the desired value.
DEFAULT LT/SEC

MAXIMUM VALUE
This is the maximum flow rate of the flume.
DEFAULT 1000

ZERO OFFSET
Choose between –50 mm to 50 mm for small errors on the instrument.
DEFAULT 0

TOTALISER COUNT
Choose a value where the counter will increment for a certain unit of flow between 1-1000000 when in Flow mode.
DEFAULT 1

TOTALISER UNITS
Indication of units the totaliser is set up for.
DEFAULT Lt

TOTALISER RESET
Reset the totaliser counter when in Flow mode.
DEFAULT No

FLOW CURVE
The flow element can be selected. Select from the list below:
V-notch (5/2)
Venturi (3/2)
Parshall flume 1- 96 inch
Rectangular weir (3/2)
Own curve (21 point lineariser)
DEFAULT V-Notch

SETUP RELAY
This prompt will allow a user to enter the menu to set up the relay parameters. DEFAULT No

RELAY
The relay can be used either for a high alarm, a low alarm or counter in flow mode. The difference is that a high alarm has its reset below the set point, and a low alarm has its reset above the set point. The counter will output a pulse every time a certain value is reached from the totaliser, which increments by more than a user defined value when in flow mode.
DEFAULT Off

SET POINT
This is the distance value whereby the relay will set.
DEFAULT 0 m

RESET POINT
This is the distance value whereby the relay will reset.
DEFAULT 0 m

PUMP CYCLE
Not applicable on this instrument

COUNT VALUE
Choose a value where the relay will pulse between 1-1000000 when in Flow mode.
DEFAULT 1000

CLEAR RELAY
Clears the number of cycles as well as the run hours recorded.
DEFAULT No

SETUP LINEARISER
This prompt will allow you to input a curve to linearise the flume. The span is divided by 21 and you can input the new height for each point as well as the corresponding percentage fill at that point. KSONIK MICRO prompts you at each point.
DEFAULT No

ACTIVATE
This function activates the lineariser.
DEFAULT Yes

SET POINT
This is the number at which point the user is inputting a linearised point.

HEIGHT/PERCENTAGE
Height is the distance of the flume from the bottom to a point where a suitable percentage volume can be determined.
DEFAULT 0.00 m

Enter the percentage volume of flume at a corresponding distance away from the bottom of the vessel or flume.
DEFAULT 0.00%

Set point 1	
Height	0.0 m
Percentage	0.00%

Set point 2	
Height	0.075 m
Percentage	1.12%

Set point 3	
Height	0.150 m
Percentage	3.16%

Set point 4	
Height	0.225 m
Percentage	5.80%

Set point 5	
Height	0.300 m
Percentage	8.94%

Set point 6	
Height	0.375 m
Percentage	12.50%

Set point 7	
Height	0.450 m
Percentage	16.43%

Set point 8	
Height	0.525 m
Percentage	20.71%

Set point 9	
Height	0.600 m
Percentage	25.30%

Set point 10	
Height	0.675 m
Percentage	30.19%

Set point 11	
Height	0.750 m
Percentage	35.36%

Set point 12	
Height	0.825 m
Percentage	40.79%

Set point 13	
Height	0.900 m
Percentage	46.48%

Set point 14	
Height	0.975 m
Percentage	52.40%

Set point 15	
Height	1.050 m
Percentage	58.57%

Set point 16	
Height	1.125 m
Percentage	64.95%

Set point 17	
Height	1.200 m
Percentage	71.55%

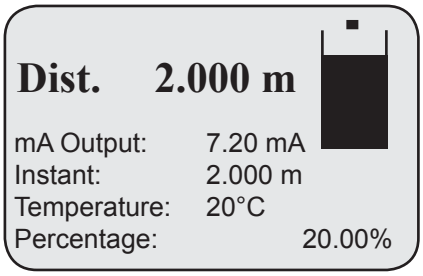
Set point 18	
Height	1.275 m
Percentage	78.37%

Set point 19	
Height	1.350 m
Percentage	85.38%

Set point 20	
Height	1.425 m
Percentage	92.59%

Set point 21	
Height	1.500 m
Percentage	100.00%

9.0 Working with the Key Pad in Run Mode

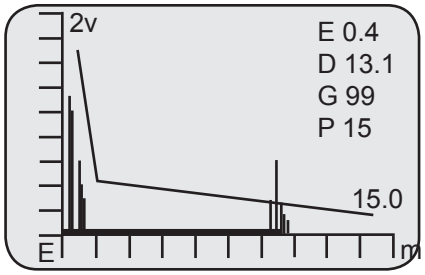


In run mode the **ENTER** key has an alternative function. While in run mode the screen looks similar to the following:

Press **ENTER** once. The screen changes to the status screen of the relays.

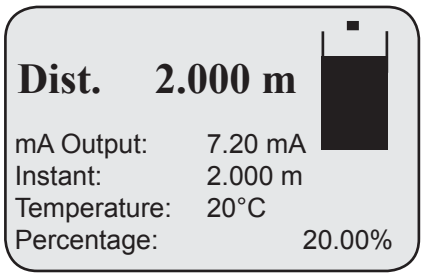
Relay	State	Hour	Cycles
REL 1:	OFF	LO	0	2

Press **ENTER** again and the screen goes to the onscreen KSCOPE.



Note: The screen reverts back to normal run mode within 2 minutes.
Pressing **ENTER** again while in the onscreen KScope screen will revert the screen into normal run mode.

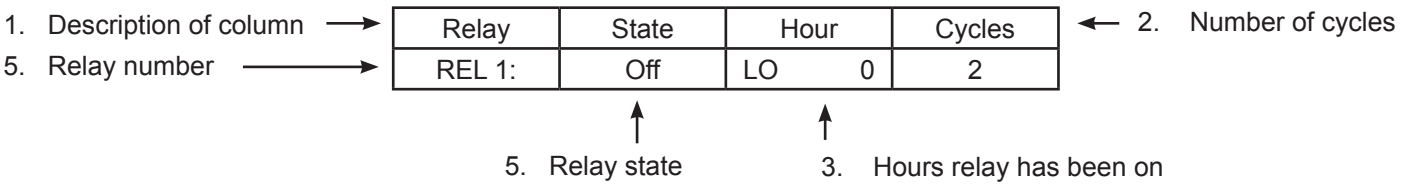
10.0 Run Mode Screen in Distance / Level Mode



1. The graphical representation of the percentage fill of the application.
2. The instantaneous distance that the instrument is measuring at that specific time. Please note that this value can change on each pulse.
3. The temperature, which is being measured at the transducer, if temperature compensation has been enabled.
4. The value of percentage fill of the instrument.
5. The mA output of the instrument.
6. The average Distance/Level value which is calculated.

THE RELAY STATE SCREEN

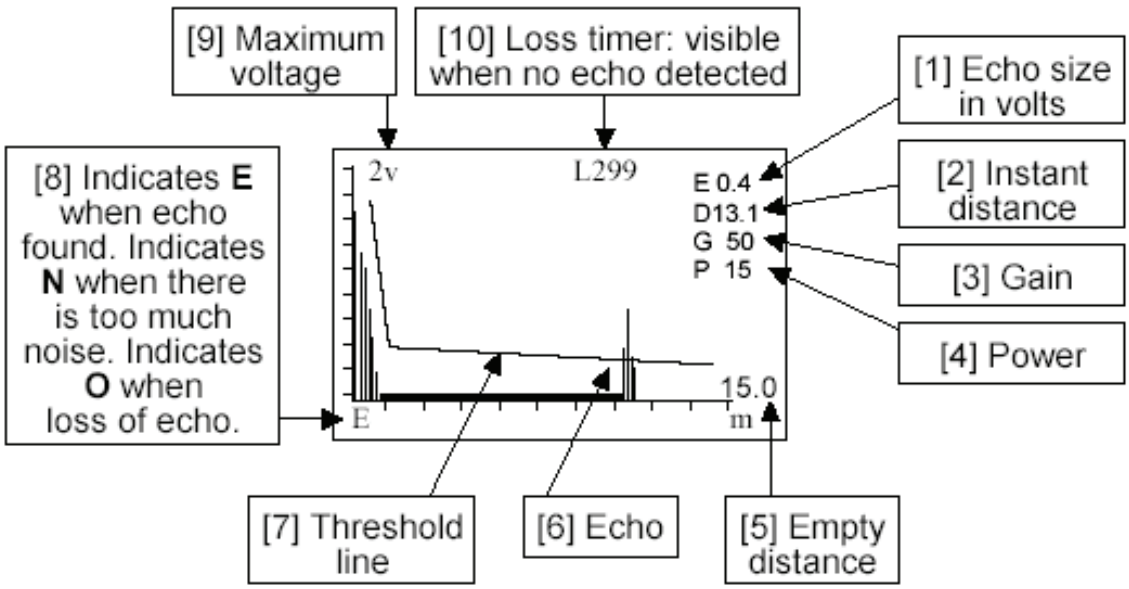
Press **ENTER** while in run mode to get the RELAY STATE SCREEN.



1. Relay state headings.
2. The number of cycles the relay has been through.
3. The number of hours the relay has been on.
4. The state at which the relay is at ON, OFF, HI, LO and CO-Counter.
5. The relay indication number.

11.0 Onscreen KScope

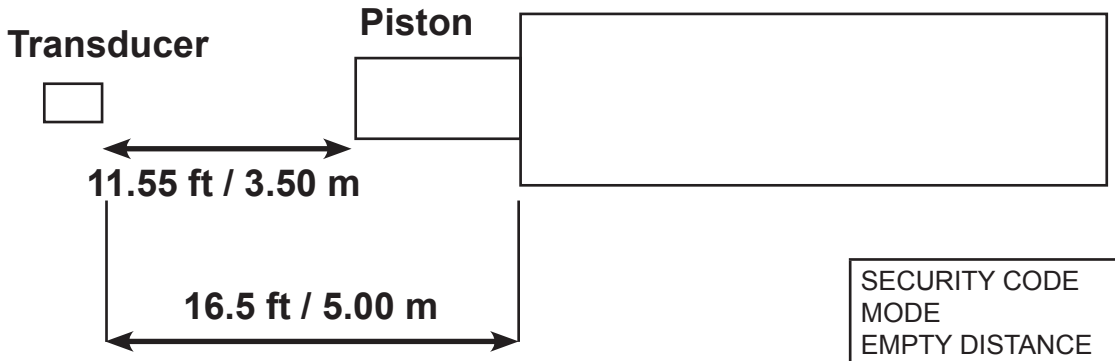
Press **ENTER** twice while in run mode in order to get to the onscreen KScope.



1. The maximum returned echo size in volts e.g. 0.4V
2. Displayed instant distance from transducer to substance or object being measured. e.g.13.1 m
3. The Gain needed to get the particular returned echo signal to give a particular measurement. e.g. 50%
4. The amount of power needed to obtain an echo. e.g. 15% power
5. Maximum distance or span. e.g. 15.0 m
6. Graphical representation of the echo received by the transducer.
7. Threshold line whereby any echoes below this line will not be accepted.
8. Indication of good echo, noise, or loss of echo. e.g. E for good echo, N for noise or O for loss of echo.
9. The maximum voltage scale of the Onscreen KScope.
10. The echo loss timer started when no signal is present.

12.0 EXAMPLES

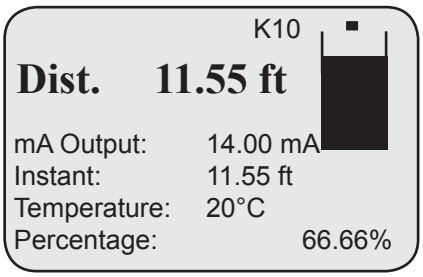
12.1 Distance measurement



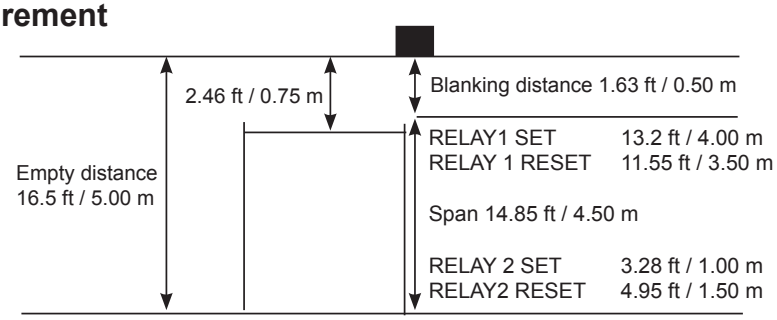
SECURITY CODE	5159
MODE	DISTANCE
EMPTY DISTANCE	16.5 ft / 5.00 m
SPAN	14.85 ft / 4.50 m
BLANKING	1.63 ft / 0.50 m
RATE OF CHANGE	3.28 ft/min / 1.00 m/min

The above application deals with a moving piston: The maximum range for the piston is 16.5 ft / 5.00 m and the closest the piston can get to the transducer is 1.63 ft / 0.50 m (Due to the blanking of the transducer).

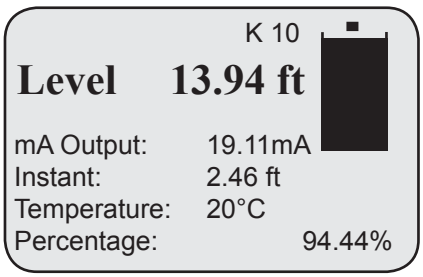
Shown to the right is what the KSONIK MICRO will display on the above application. The analogue output should be approximately 14.66mA.



12.2 Level measurement

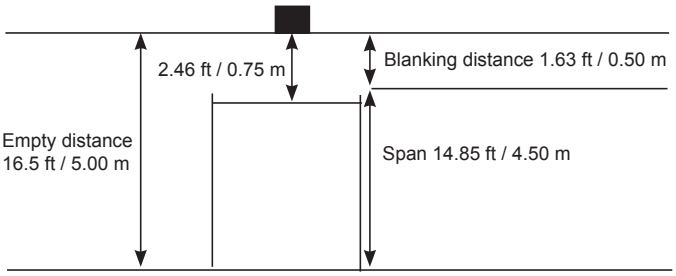


TIP: Set the relay set and reset point further apart to avoid the relays from chattering.
Below is what KSONIK MICRO will display on the above application. Relay 1 will switch on (set) when the level rises above 13.2 ft / 4.00 m and reset when the level goes below 11.55 ft / 3.50 m. Relay 2 will switch on (set) when the level drops below 3.28 ft / 1.00 m and reset when the level goes above 4.95 ft / 1.50 m.

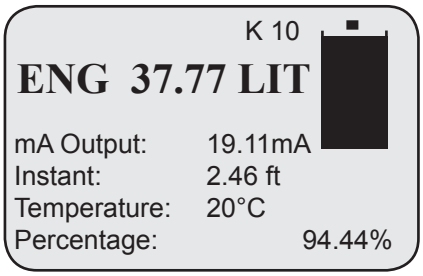


SECURITY CODE	5159
MODE	LEVEL
EMPTY DISTANCE	16.5 ft / 5.00 m
SPAN	14.85 ft / 4.50 m
BLANKING	1.63 ft / 0.50 m
RATE OF CHANGE	3.28 ft/min / 1.00 m/min
SETUP RELAYS	
RELAY 1	YES
RELAY 1 SET	HI
RELAY 1 RESET	13.2 ft / 4.00 m
RELAY 2	11.55 ft / 3.50 m
RELAY 2 SET	LO
RELAY 2 RESET	3.28 ft / 1.0 m
	4.95 ft / 1.50 m

12.3 Level Measurement and Engineering Units

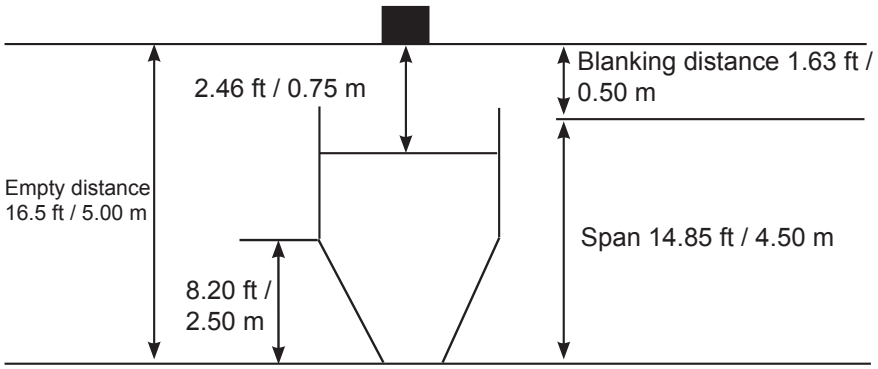


Below is what KSONIK MICRO will display on the above application. The analogue output should be approximately 19.11 mA.

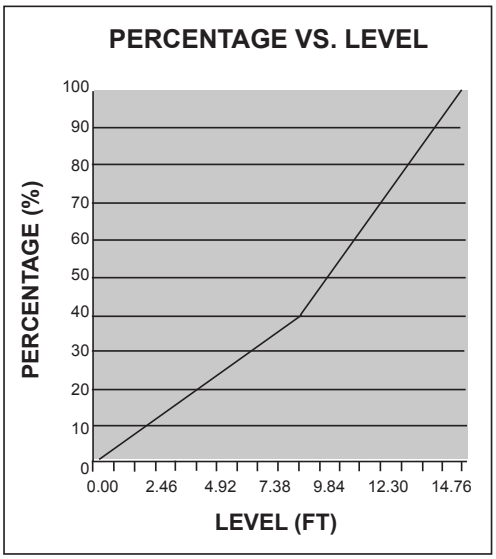


SECURITY CODE	5159
MODE	LEVEL
EMPTY DISTANCE	16.5 ft / 5.00 m
SPAN	14.85 ft / 4.50 m
BLANKING	1.63 ft / 0.50 m
RATE OF CHANGE	3.28 ft/min / 1 m/min
ENGINEERING UNITS	LIT
MAXIMUM VALUE	40.00
DECIMAL POINT	40.00

12.4 Level Measurement Using the Lineariser Function



SECURITY CODE	5159
MODE	LEVEL
EMPTY DISTANCE	16.5 ft / 5.00 m
SPAN	14.85 ft / 4.50 m
BLANKING	1.63 ft / 0.50 m
RATE OF CHANGE	3.28 ft/min / 1.00 m/min
SETUP LINEARISER	YES
ACTIVATE LINEARISER	YES
0.00 ft	0%
8.20 ft	40%
14.77 ft	100%



Note: Due to the curve of the graph being linear only 3 points are needed from the linearisers.

Before setting up the lineariser, check all other parameters are calculated for your application.

1. Scroll through the menus with either the **SCROLL** or **ENTER** until the menu SETUP LINEARISER appears.

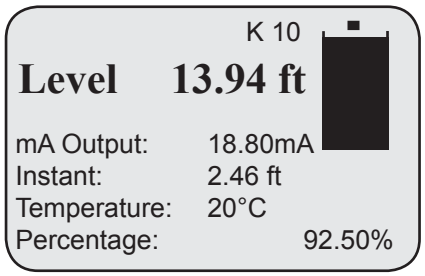
2. Use ▼ ▲ to select YES and then Press **ENTER**

3. A prompt ACTIVATE LINEARISER will appear. Use ▼ ▲ to select YES and then press **ENTER**

4. Set up each of the 21 points of the lineariser as needed by using ▼ ▲ and then pressing **ENTER** when the correct value is entered in each point of the lineariser.

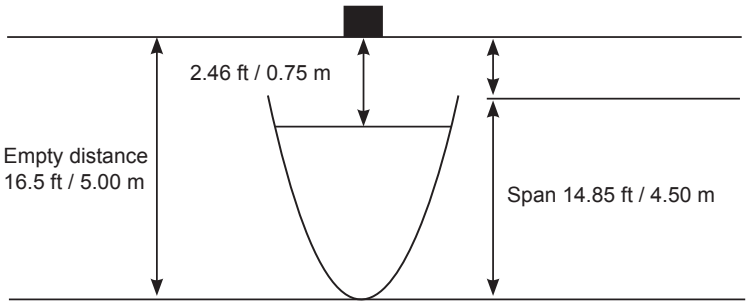
RUN

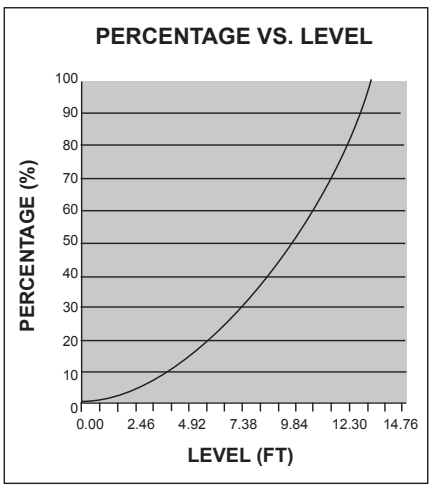
Shown to the left is what KSONIK MICRO will display on the above application. The analogue output should be approximately 18.80mA.



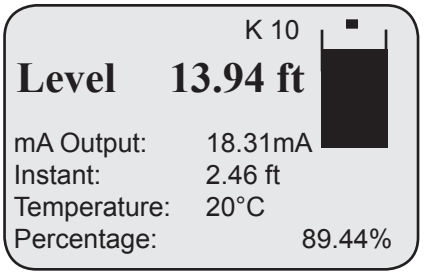
12.5 Level Measurement Using the Linearisor Function with a Non-Linear Vessel

SECURITY CODE	5159
MODE	LEVEL
EMPTY DISTANCE	16.39 ft / 5.00 m
SPAN	14.76 ft / 4.50 m
BLANKING	1.63 ft / 0.50 m
RATE OF CHANGE	3.28 ft/min / 1.00 m/min
SETUP LINEARISER	YES
ACTIVATE LINEARISER	YES
0.00 ft	0.00%
0.74 ft	0.25%
1.48 ft	1.00%
2.22 ft	2.25%
2.95 ft	4.00%
3.69 ft	6.25%
4.43 ft	9.00%
5.17 ft	12.25%
5.91 ft	16.00%
6.64 ft	20.25%
7.38 ft	25.00%
8.12 ft	30.25%
8.86 ft	36.00%
9.60 ft	42.25%
10.34 ft	49.00%
11.07 ft	56.25%
11.81 ft	64.00%
12.55 ft	72.25%
13.29 ft	81.00%
14.03 ft	90.25%
14.77 ft	100%





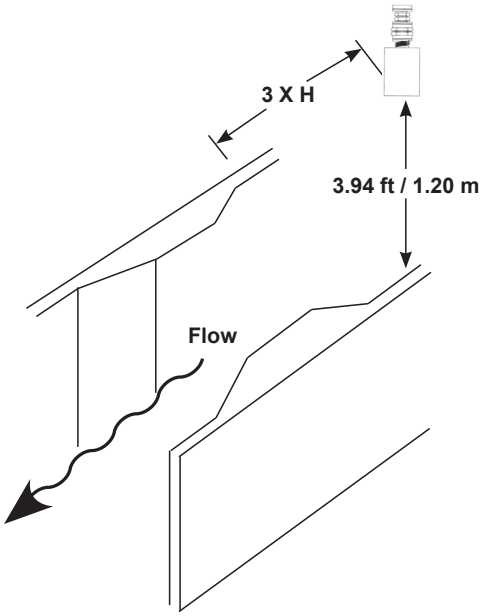
Note: Due to the curve of the graph being non-linear all 21 points are needed from the lineariser. Shown to the right is what KSONIK MICRO will display on the above application. The analogue output should be approximately 18.31 mA.



12.6 Venturi flume

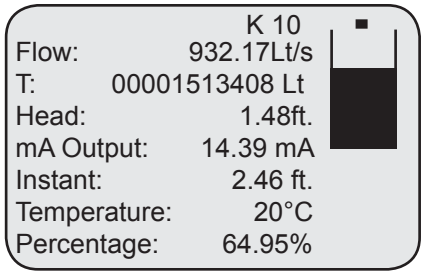
This is an example of a Venturi Flume application. The transducer is mounted 3.94 ft / 1.20 m above the zero of the flume, this is the Empty Distance. The Span is 1.97 ft / 0.60 m and the Blanking Distance is 1.97 ft / 0.60 m. The transducer must be fitted 3 x maximum head upstream. There is an external counter connected to the relay counter. The water flow must not dam up and cause a build-up inside the flume.

Please Note! The Empty Distance is to the zero of the flume and not the bottom of the flume.



SECURITY CODE	5159
MODE	FLOW
EMPTY DISTANCE	3.94 ft / 1.20 m
SPAN	1.97 ft / 0.60 m
BLANKING	1.97 f / 0.60 m
RATE OF CHANGE	3.28 ft/min / 1.00 m/min
FAIL TIMER	300
FAIL SAFE	HOLD
FLOW UNITS	Lt/sec
MAXIMUM FLOW	1435
FLOW CURVE	Venturi
SETUP RELAYS	YES
RELAY 1	Counter
RELAY 1 COUNTER VALUE	1000
RELAY 2	HI
RELAY 2 SET	1.64 ft / 0.50 m
RELAY 2 RESET	1.61 ft / 0.49 m
TOTALISER RESET	NO
ZERO OFFSET	0

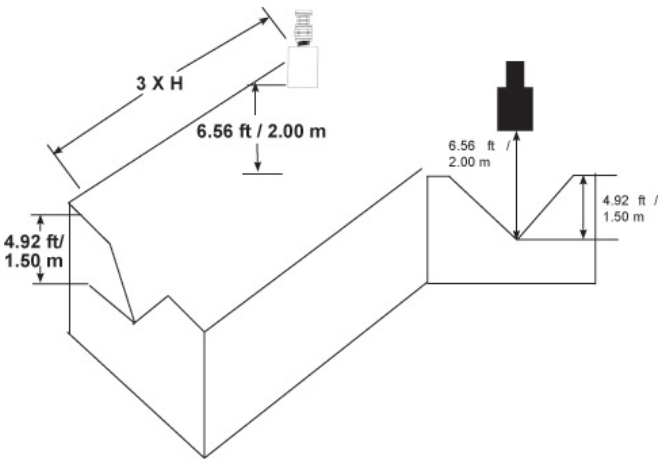
Below is what KSONIK MICRO will display on the above application. The relay will drive the counter for every 1000 Lt/s and 1m³ of flow. TIP: Set the relay set and reset point further apart to avoid the relays from chattering. The analogue output should be approximately 14.39 mA. Relay 2 would set at above 1.64 ft / 0.50 m and reset at below 1.61 ft / 0.49 m.



12.7 V-Notch

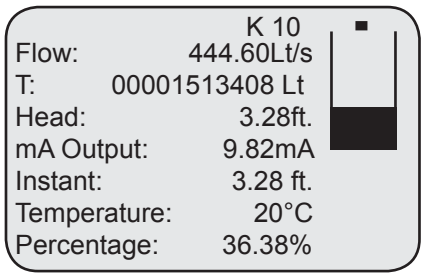
This is an example of a V-Notch application. The transducer is mounted 6.56 ft / 2.00 m above the Notch in the V, this is the Empty Distance. The Span is 4.92 ft / 1.50 m and the Blanking Distance is 1.64 ft / 0.50 m. The transducer must be fitted 3 x maximum head-height upstream. There is an external counter connected to the relay counter. The water flow must not dam up and cause a build-up behind the weir.

Please Note! The Empty Distance is to the bottom of the V-Notch and not the bottom of the weir.



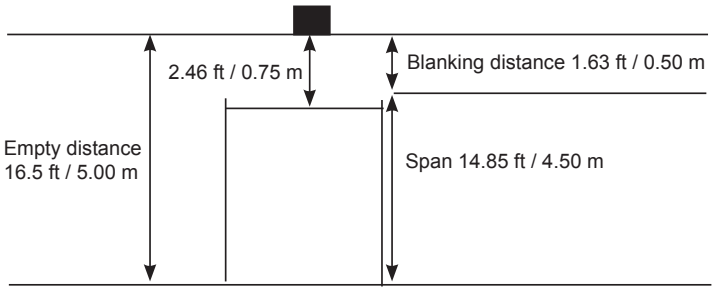
TIP: Set the relay set and reset point further apart to avoid the relays from chattering.

Below is what KSONIK MICRO will display on the above application. The relay will drive the counter for every 1000 counts. The analogue output should be approximately 9.82 mA. Relay 2 will set above 4.76 ft / 1.45 m and reset below 4.43 ft / 1.35 m.



SECURITY CODE	5159
MODE	FLOW
EMPTY DISTANCE	6.56 ft / 2.00 m
SPAN	4.92 ft / 1.50 m
BLANKING	1.64 ft / 0.50 m
RATE OF CHANGE	3.28 ft/min / 1.00 m/min
FAIL TIMER	300
FAIL SAFE	HOLD
FLOW UNITS	Lt/sec
MAXIMUM FLOW	1222
FLOW CURVE	V-NOTCH
SETUP RELAYS	YES
RELAY 1	Counter
RELAY 1 COUNTER	1000
RELAY 2	HI
RELAY 2 SET	4.76 ft / 1.45 m
RELAY 2 RESET	4.43 ft / 1.35 m
TOTALISER RESET	NO
ZERO OFFSET	0

12.8 Working with the Simulator



TIP: Set the relay set and reset point further apart to avoid the relays from chattering.

Set up instrument with the following parameters.

SECURITY CODE	5159
MODE	LEVEL
EMPTY DISTANCE	16.5 ft / 5.00 m
SPAN	14.85 ft / 4.50 m
BLANKING	1.63 ft / 0.50 m
RATE OF CHANGE	3.28 ft/min / 1.00 m/min
SETUP RELAYS	YES
RELAY 1	HI
RELAY 1 SET	13.2 ft / 4.00 m
RELAY 1 RESET	11.55 ft / 3.50 m
RELAY 2	LO
RELAY 2 SET	3.28 ft / 1.00 m
RELAY 2 RESET	4.95 ft / 1.50 m

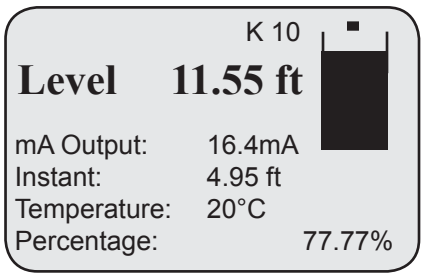
In order to activate the simulator proceed with the following:

1. Scroll through the menus with either the **SCROLL** or **ENTER** until the option Simulate appears.
2. Use ▼ ▲ to select YES and then press **ENTER**
3. Press **RUN** to exit the menu.
4. Press ▼ or ▲ to start the simulator to increase or decrease the level at the rate of change.

Relay 1 will set above 13.3 ft / 4.00 m and reset below 11.55 ft / 3.50 m
Relay 2 will set below 3.28 / 1.00 m and reset above 4.95 ft / 1.50 m.

5. Press **RUN** to stop or start the simulator.

NOTE: In order for the instrument to go back to normal measurement mode, go back to the menus and select NO for the Simulate option or reset the power to the instrument.



13.0 FAULT FINDING

There are three categories of possible faults:
- The malfunction of the instrument
- Loss of echo and
- Wrong reading.

The biggest problem is to identify the malfunction. If the instrument is not working satisfactorily then remove the transmitter to the workshop. Connect the power and aim the KSONIK MICRO to a wall about 2.00m away, making sure that it is perpendicular to the wall. Now reset the instrument by the factory reset prompt. KSONIK MICRO should now read 2.00m. If it does not read the above then there is a malfunction with the instrument and it should be returned for repair.

If the above works and it still does not work in the field then there are many possible problems. Please check below for possibilities.

Loss of Echo
Check that the KSONIK MICRO is not being used on a solid or agitated surface, as agitated surfaces and solids do not reflect as much signal as flat surfaces. Aim the Transducer straight down. Check if the Transducer face is dirty.

Wrong Reading, Always Reading Close to the Transducer
Do not reduce the blanking distance below 0.50 m / 1.64 ft unless consultation has been made with K-TEK. Electrical noise can cause this error. Remove noise.

Wrong Reading, Anywhere in Tank
Check to see if there is a reflection from the wall. Please note that a piece of wire across a tank can be a big enough obstruction for an echo to be accepted.

Are the parameters correct? Reset to factory default and check that KSONIK MICRO reads correctly. If the factory settings are OK then your parameters need changing. Re-check them with a tape measure.

Wrong Reading, Erratic
Reduce Rate of Change. Not many levels move faster than 1 meter/minute.
Make sure the application is set up correctly. On liquid applications it is very important that the liquid application is selected. Solid applications are only used for objects or substances being measured, which are in a solid form.

Wrong Reading, Slow
Increase Rate of Change.

14.0 TERMINAL CONNECTIONS

Connections:

Power Supply
Ground
+ 20/30Vdc

Output
+ 4-20mA
- Ground

Relay Output
N/O relay contact
COM relay contact
N/C relay contact

14.1 ABB RMA Form

ABB
No.5, Lane 369, Chuangye Road,
KangQiao Town, Pudong District,
Shanghai 201319, P. R. China
Tel: +86 21 6105 6666
Fax: +86 21 6105 6992
www.abb.com/level

***** IMPORTANT CUSTOMER NOTICE: PLEASE READ PRIOR TO RETURNING PRODUCTS TO ABB*****

Be sure to include the Return Authorization (RA) number on the shipping label or package to the attention: Customer Service. A copy of this document should also be included with the packing list. ABB wants to maintain a safe work environment for its employees. In the event, the returned product or material has been in contact with a potentially hazardous chemical, per federal regulations, the customer must provide evidence of decontamination and the related chemical composition and characteristics. In order to expedite your return, please include the applicable Material Safety Data Sheets (MSDS) and decontamination tags by affixing these documents in close proximity to the shipment label for identification purposes. (January 18, 2006)

Return Autorization Form	
Customer:	Date:
Contact Name:	Product:
Contact Email:	Serial No:
Contact Phone:	Job No:
Contact Fax:	Service Rep:

Completed by Customer

Reason:

Problem Found: None

Action Requested: None

Is expedited return shipping requested? ☐ Yes

If yes, please provide a purchase order or your shipper's account number (ex FedEx or UPS).
ABB pays return transport via standard ground shipments only.

Account #:

If purchase order is issued, a copy of purchase order must be included with return authorization documentation.

Is ABB authorized to repair items determined to be non-warranty? ☐ Yes

If yes, a copy of purchase order must be included with return authorization documentation.

Customer PO#:		Date:	

Has product been in contact with any potentially hazardous chemical? ☐ Yes

If yes, documentation product and forward MSDS to ABB. "ATTN: Customer Service"

Return Repaired Product to Address	
Shipping Address:	Billing Address:
	Ship Via:

15.0 Declaration of Conformity

The KMICRO COMPACT complies with conformity in accordance with the following tests.

Electromagnetic Compatibility

Susceptibility:	EN50082-1	EN801-2,3,4,	
	EN50082-2	ENV50140	ENV50204
		EN61000-4-2	ENV50141
		EN61000-4-4	
Emission:	EN50081-2	EN55011	
	EN50081-1	EN55022	EN60555-2,3
Safety:	BSEN61010-1		

CE Conformity Declaration

The KMICRO COMPACT is in accordance with EN50081-2 1993 and EN50082-2 1995.
Johannesburg, South Africa, 28 December 2005.

Eric Fauveau

Eric Fauveau
ABB

16.0 Warranty

5 YEAR WARRANTY FOR:
KM26 Magnetic Liquid Level Gauges; MagWave Dual Chamber System; LS Series Mechanical Level Switches (LS500, LS550, LS600, LS700, LS800 & LS900); EC External Chambers, STW Stilling Wells and ST95 Seal Pots.

3 YEAR WARRANTY FOR:
KCAP300 & KCAP400 capacitance switches. BETA Pressure and Temperature Switches have a limited factory guarantee, excluding wetted parts & consumables.

2 YEAR WARRANTY FOR:
AT100, AT100S and AT200 series transmitters; RS80 and RS85 liquid vibrating fork switches; RLT100 and RLT200 reed switch level transmitters; TX, TS, TQ, IX and IM thermal dispersion switches; IR10 and PP10 External Relays; MT2000, MT5000, MT5100 and MT5200 radar level transmitters; RI100 Repeat Indicators; KP paddle switches; A02, A75 & A77 RF capacitance level switches and A38 RF capacitance level transmitters; Buoyancy Level Switches (MS50, MS10, MS8D & MS8F); Magnetic Level Switches (MS30, MS40, MS41, PS35 & PS45).

1 YEAR WARRANTY FOR:
KM50 gauging device; AT500 and AT600 series transmitters; LaserMeter and SureShot series laser transmitters; LPM200 digital indicator; DPM100 digital indicators; APM100 analog indicators; KVIEW series digital indicators and controllers; SF50 and SF60 vibrating fork switches, KB Electro-Mechanical Continuous Measuring Devices, KSONIK ultrasonic level switches, transmitters & transducers, ChuteMaster Microwave Transmitter / Receiver and TiltMaster Switches.

SPECIAL WARRANTY CONSIDERATIONS:
ABB does not honor OEM warranties for items not manufactured by ABB (i.e. Palm Pilots). These claims should be handled directly with the OEM.

ABB will repair or replace, at ABB's election, defective items which are returned to ABB by the original purchaser within the period specified above from the shipment date of the item and which is found, upon examination by ABB, to its satisfaction, to contain defects in materials or workmanship which arose only under normal use and service and which were not the result of either alterations, misuse, abuse, improper or inadequate adjustments, applications or servicing of the product. ABB's warranty does not include onsite repair or services. Field service rates can be supplied on request.

If a product is believed to be defective, the original purchaser shall notify ABB and request a Returned Material Authorization before returning the material to ABB, with transportation prepaid by the purchaser. (To expedite all returns/repairs from outside of the United States, consult ABB's customer service team (service@ktekcorp.com) to determine an optimal solution for shipping method and turnaround time.) The product, with repaired or replaced parts, shall be returned to the purchaser at any point in the world with transportation prepaid by ABB for best-way transportation only. ABB is not responsible for expedited shipping charges. If the product is shipped to ABB freight collect, then it will be returned to the customer freight collect.

If inspection by ABB does not disclose any defects in material or workmanship, ABB's normal charges for repair and shipment shall apply (minimum 250.00 USD).

The materials of construction for all ABB products are clearly specified and it is the responsibility of the purchaser to determine the compatibility of the materials for the application.

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17.0 Customer Support

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