Operating instruction manual OI/KSIII-EN Rev. C

KSONIK III
Ultrasonic Level Transmitter

Long range ultrasonic level/flow transmitter
K-TEK Products

Introduction

This operating instruction manual provides the following information:

Power and productivity
for a better world™

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1.0 Introduction

KSONIK III works on the non-contact principle of ultrasonics. A pulse of energy emits from the transducer at the speed of sound and is detected upon its return. The transmitter can distinguish the difference between a correct echo and other ambient noise. When the signal returns, KSONIK III 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 III can measure distance, level, open channel flow and differential.

In distance mode the KSONIK III 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 III 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 III and converts the reading into a flow measurement. The Differential Level uses the dual functionality of the KSONIK III to obtain a differential level reading. The KSONIK III uses both transducer inputs, which take a level measurement. The KSONIK III then compares the two level measurements to get the difference in levels. The output is then proportional to the differential between these two levels. A microprocessor then controls the output functions of the relays, display and the analogue output signals.

2.0 QUICK START

2.1 Quick Start For Distance

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

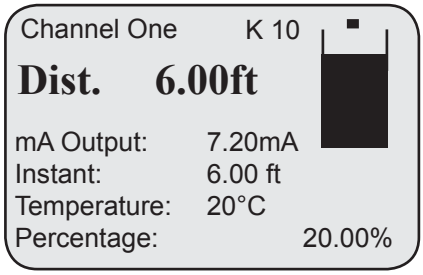
1. Connect up the power and the transducer connections to channel one as described on the KSONIK III board or in the KSONIK III manual under terminal connections on page 33.

PLEASE NOTE, ALL CONNECTORS ARE CAPABLE OF BEING UNPLUGGED FROM THE PCB

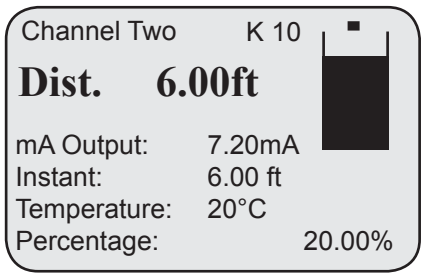
Connect the second transducer if a dual unit was purchased.

2. Aim the transducer at a wall about 6 ft. away and check the display. It should read the following:

- If the reading is above 6.00 ft then move the transducer closer to the wall.
- If the reading is below 6.00 ft then move the transducer away from the wall.
- You may now proceed and check other parameters.
    - Please note if no transducer is connected to Channel Two there will be no reading and the channel will go the loss of echo routine.
    - Please note this example is for a K10.
    - Please note if you have purchased a K20 or K60. You will have to check the distance at 20 ft. and select the correct transducer first.



Showing Channel One



Showing Channel Two

2.2 Quick Start for Level

1. Connect up the power and the transducer connections to Channel One and if a dual unit was purchased connect Channel Two as described on the KSONIK III board or in the KSONIK III manual under terminal connections.
PLEASE NOTE: ALL CONNECTORS ARE CAPABLE OF BEING UNPLUGGED FROM THE PCB.

2. Press **SCROLL**

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

4. If a dual unit was purchased select which channel is to be set up to be level and which transducer type is used by using ▼ ▲ and **ENTER** to select choice.

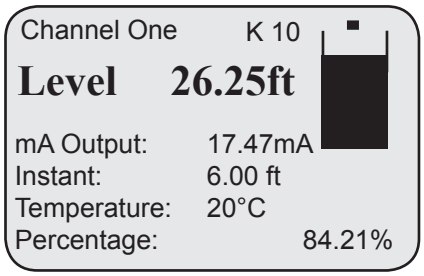
5. Select transducer Type which is being used either a K10, K20 or K60 using the ▼ ▲ and to select choice.

6. Press **ENTER** to scroll through the menus until the section MODE appears.

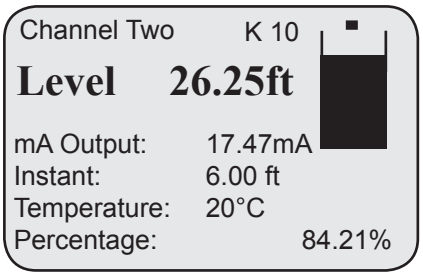
7. Press ▼ ▲ and **ENTER** to select LEVEL.

8. Press **RUN**

Aim the transducer at a wall about 6 ft away and check the display. It should read the following for a K10 transducer.



Showing Channel One



Showing Channel Two

If the Head reading is below 1.64 ft then move the transducer closer to the wall.
If the Head reading is above 1.64 ft then move the transducer away from the wall.
You may now proceed and check other parameters.

- Please note if no transducer is connected to Channel Two there will be no reading and the channel will go to the loss of echo routine.

2.3 Quick Start for Flow

1. Connect up the power and the transducer connections to Channel One and if a dual unit was purchased connect Channel Two as described on the KSONIK III board or in the KSONIK III manual under terminal connections.
PLEASE NOTE: ALL CONNECTORS ARE CAPABLE OF BEING UNPLUGGED FROM THE PCB.

2. Press **SCROLL**

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

4. If a dual unit was purchased select which channel is to be set up as a flow meter and which transducer type is used by using ▼ ▲ and **ENTER** to select choice.

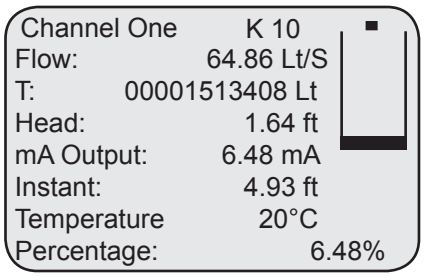
5. Select transducer Type which is being used either a K10, K20 or K60 using the ▼ ▲ and to select choice.

6. Press **ENTER** to scroll through the menus until the section MODE appears.

7. Press ▼ ▲ and **ENTER** to select FLOW.

8. Press **RUN**

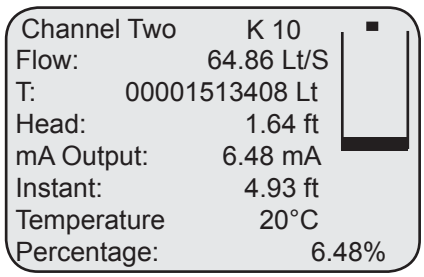
Aim the transducer at a wall about 4.92 ft away and check the display. It should read the following for a K10 transducer.



Showing Channel One

Showing Channel One

Connect the second transducer if a dual unit was purchased.



Showing Channel Two

Showing Channel Two

If the Head reading is below 1.64 ft then move the transducer closer to the wall.
If the Level reading is above 1.64 ft then move the transducer away from the wall.
You may now proceed and check other parameters.

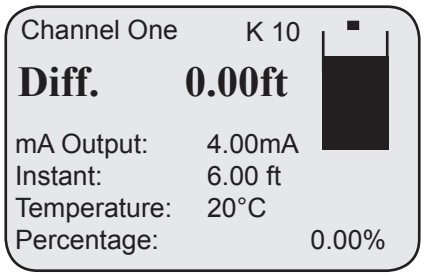
- Please note if no transducer is connected to Channel Two there will be no reading and the channel will go to the loss of echo routine.
- The totalizer should increase every second.

2.4 Quick Start for Differential Level

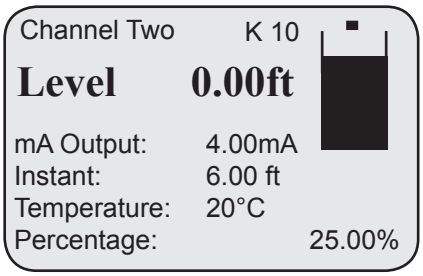
1. Connect up the power and the transducer connections to Channel One and Channel Two as described on the KSONIK III board or in the KSONIK III manual under terminal connections.
DIFFERENTIAL LEVEL FOR THE KSONIK III IS ONLY AVAILABLE FOR THE DUAL UNIT. **PLEASE NOTE: ALL CONNECTORS ARE CAPABLE OF BEING UNPLUGGED FROM THE PC**B.

2. Press **SCROLL**
3. Use ▼ ▲ to get to the default security Code 5159 and then press **ENTER**
4. In the menu, Select channel and choose both transducers by using the ▼ ▲ and **ENTER** to select choice.
5. Select transducer Type which is being used by either a K10, K20 or K60 using the ▼ ▲ and **ENTER** to select choice.
6. Press **ENTER** to scroll through the menus until the section MODE appears.
7. Press ▼ ▲ and **ENTER** to select Diff. for differential.
8. Press **RUN**

Aim both transducers at a wall about 6.00 ft. away and check the display. It should read the following for a K10 transducer.



Showing Channel One



Showing Channel Two

Showing the differential

Showing the level of Transducer One

If the instant on both channels reading is below 6.0 ft for the level then move the transducer Two closer to the wall.
If the instant on both channels reading is above 6.0 ft for the level then move the transducer Two further away from the wall.

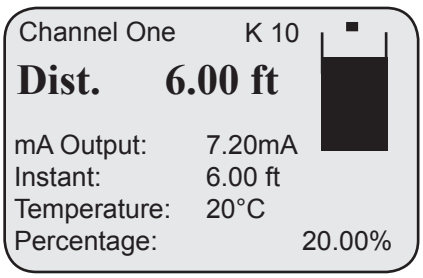
Once the level is correct, move transducer One closer to the wall to get an increase in differential output.

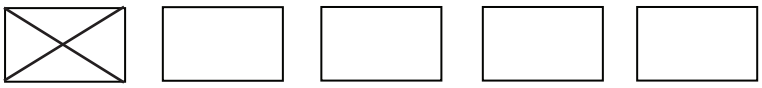
You may now proceed and check other parameters.

- Please note if no transducer is connected to Channel Two there will be no reading and the channel will go to the loss of echo routine. Output 1 is the Differential output. Output 2 is Level of transducer Two.

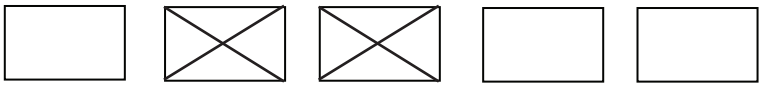
3.0 CHANGING PARAMETERS

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

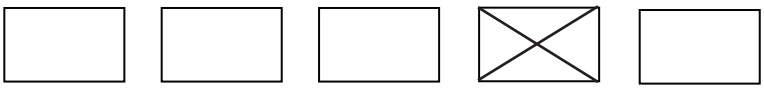




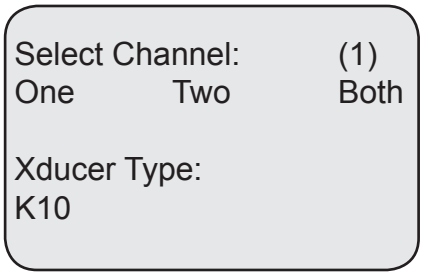
2. Enter the code 5159 by pressing the ▼ ▲ keys.



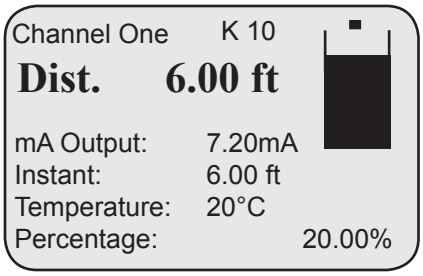
3. To confirm security code press **ENTER**



If Code has been accepted, the screen will display:

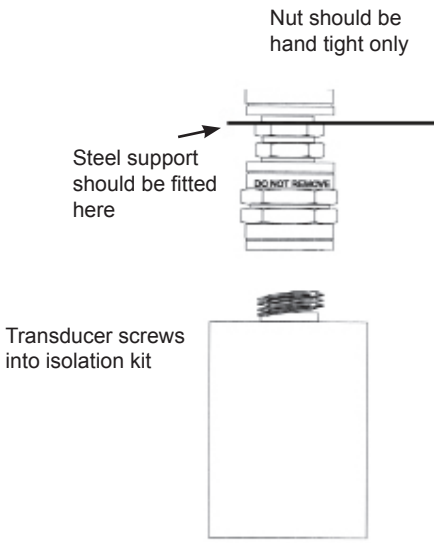


If Code has not been accepted, the screen will display:



If the security code has been changed and forgotten then contact the nearest ABB agent for override code. To carry on with programming go to page 8.

4.0 INSTALLATION



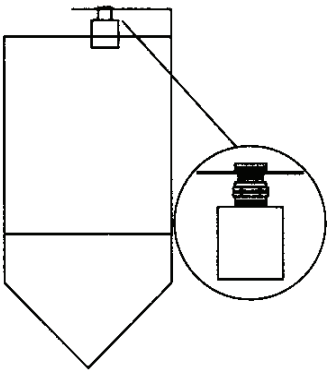
The transmitter is weather proof so it can be mounted outside. Although KSONIK III is protected to IP65 it is recommended that it be installed inside another suitable enclosure. The LCD display should not be facing direct sunlight as this can cause the display to fail. KSONIK III should be fixed to a wall or chassis plate using the four holes provided.

- Do not install KSONIK III in areas of high vibration as this may cause failure.
- Do not install KSONIK III in the close vicinity of electrical cable, SCR's or variable speed drives.

The installation of the transducer is the most important section of this manual and has been divided into 7 sub sections.

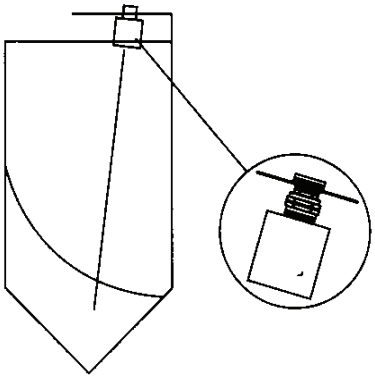
1. The transducer must be fitted at the normal blanking distance above the highest point of level. Check the specification for the blanking distance.
2. Always use the plastic isolation kit. This kit must be fitted to a rigid support and must not be allowed to swing. Use mild steel or a suitable plastic. Do not use stainless steel as this can cause ringing and may increase the blanking distance.
3. The transducer must be perpendicular to the material it is measuring with a clear line of sight and not above beams or filling points.

Liquid Level Measurement



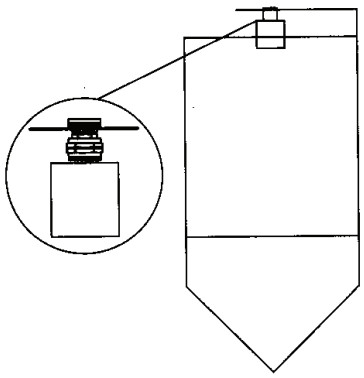
Transducer at 90 deg to surface.

Solid Level Measurement

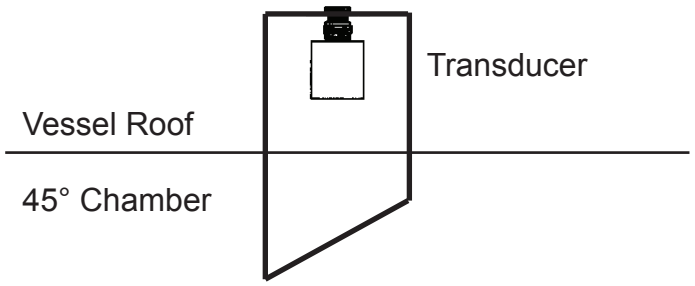


Transducer at 90 deg to surface.

4. If the transducer is in a coned vessel, it must be positioned over the middle of the cone. This ensures that the transducer receives the true echo and not one from the sides of the cone.



5. When a standpipe is being used it must be as wide as possible and preferably be made of plastic. The base MUST have a 45 degree 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. Always increase the blanking 5.91 in / 150 mm past the end of the standpipe.



6. If any large electrical equipment is installed in the vicinity, then earthed steel conduit must be used.
7. An extension of up to 328 ft / 100 m using RG62U cable is possible. All connections must be soldered together. It is advisable to install the transducer cable inside steel conduit, especially if large electrical spikes (interference) are present.

4.1 Key Description

KSONIK III 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 DECREASE the value in the various commands. This key also starts the simulation mode increasing in level. See page 29 for details.
▲	This key is used to INCREASE the value in the various commands. This key also starts the simulation mode increasing in level. See page 29 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 and mA output graphc. See page 21 for details.
RUN	When programming is complete, press RUN to return KSONIK III back to the run mode.

4.2 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.

5.0 CONFIGURATION DISTANCE / LEVEL

DISTANCE / LEVEL MODE		
BASIC	**OPTIONS**	**DEFAULTS**
SECURITY CODE	0-9999	5159
CHANNEL SELECT	ONE/TWO/BOTH	ONE
TRANSDUCER SELECT	K10/K20/K60	K10
MODE	DISTANCE/LEVEL/FLOW/DIFF	DISTANCE
UNITS	FEET/METERS	FEET
EMPTY DISTANCE	1.3-49.2/3.6-98.4/3.6-196.8 FT	32.81 FT
SPAN	0.33-49.2/0.33-98.4/0.33-196.8 FT	32.81 FT
BLANKING	0.98-48.87/3.28-98.07/3.28-196.47 FT	1.65 FT
RATE OF CHANGE	0.03-65.6 FT/MIN / 0.01-20.0 M/MIN	3.28 FT/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 (1-6MIN)/PERM	2MIN
LOSSTIME	30-900SEC	300SEC
FAILSAFE	3.6mA, 4.0mA, 20mA, 21mA, HOLD	HOLD
ENGINEERING UNITS	NONE, aaa-zzz, AAA-ZZZ, 0-9	NONE
MAXIMUM VALUE	0-99999	100000
DECIMAL POINT	0-3	2
ZERO OFF SET	-0.16 FT TO 0.16 FT	0
SETUP RELAYS	NO/YES	NO
RELAY1 TO RELAY 5	OFF/LO/HI	OFF
CHANNEL SELECT	ONE/TWO/BOTH	ONE
SETPOINT	SPAN	1.65 FT
PUMP CYCLE	OFF/FIFO/ROTATE	OFF
CLEAR RELAYS	NO/YES	NO
SETUP LINEARIZER	NO/YES	NO
ACTIVATE LINEARIZER	NO/YES	NO
SETPOINT	1-21	1
HEIGHT	0 FT-SPAN	0 FT
PERCENTAGE	0-100%	0%

5.1 Distance / Level Mode

SECURITY CODE
Security code to advance to programming.
DEFAULT 5159

CHANNEL SELECT
Selection between setting up Channel One, Channel Two or setting both the channels at the same time with the same configuration.
DEFAULT Channel One

TRANSDUCER SELECT
Choose between K10, K20 or K60 transducers. Please make sure that the correct transducer is selected. Once the transducer is selected all parameters saved for that particular channel will be deleted and the channel will revert to a distance mode of operation.
DEFAULT K10

MODE
Choose between Distance, Level, or Differential. Differential option is only available with the dual unit.
DEFAULT Distance

UNITS
Choose between Feet and Meters.
DEFAULT Feet

EMPTY DISTANCE
This is the distance from the face of the transducer to the bottom of the tank.
DEFAULT 32.8 ft for K10

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 1.65 feet (for the K10) of the transducer face or within the blanking distance of the transducer.
DEFAULT 32.8 ft for K10

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 1.65 ft for K10

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 (13.1 ft/min) it will allow the KSONIK III to monitor rapid changes in level. If the level moves faster than 3.28 ft/minute in measurement increase the rate of change. If a more stable output is required decrease the rate of change (1.0 ft/min).
DEFAULT 3.28 ft/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

5.1 DISTANCE / LEVEL MODE (continued)

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
Set 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 –0.16 ft to 0.16 ft for setting the offset of the instrument.
DEFAULT 0

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

5.1 DISTANCE / LEVEL MODE (continued)

RELAY1
The relays 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. The relays can also be set up to have pump cycling enabled.
DEFAULT Off

CHANNEL
The channel to which the relay corresponds.
DEFAULT ONE

SET POINT
This is the value where the relay will set.
DEFAULT 1.65 ft

RESET POINT
This is the value where the relay will reset.
DEFAULT 1.65 ft

PUMP CYCLE
Select the type of pump control that is required. The KSONIK III has two pump cycling routines which can be used to efficiently distribute the run cycles between various pumps that serve a common purpose. The ROTATE pump routine will use the relay set points configured for the pumps that require cycling, and rotate these set points among the pumps with the COMPLETION of each cycle. NOTE: The COMPLETION of a cycle is reached once all pumps have switched OFF.

The FIFO (First In First Out) routine will use the relay set points configured for the pumps that require cycling, and rotate these set points among the pumps for subsequent cycles.

NOTE: The FIFO routine ensures that the lead pump will always switch off first.
HINT: It is advisable to configure the reset points for the pumps that require cycling to the same level.
DEFAULT Off

CLEAR RELAYS
Clears the number of cycles as well as the run hours recorded for the particular relay specified.
DEFAULT No

RELAY2
As above.
DEFAULT Off

RELAY3
As above.
DEFAULT Off

RELAY4
As Above.
DEFAULT OFF

RELAY 5
As Above.
DEFAULT OFF

5.1 DISTANCE / LEVEL MODE (continued)

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 III 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 linearized 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 ft
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	1.64 ft
Percentage	5.00%
Set point 3	
Height	3.28 ft
Percentage	10.00%
Set point 4	
Height	4.92 ft
Percentage	15.00%
Set point 5	
Height	6.56 ft
Percentage	20.00%
Set point 6	
Height	8.20 ft
Percentage	25.00%
Set point 7	
Height	9.84 ft
Percentage	30.00%
Set point 8	
Height	11.48 ft
Percentage	35.00%
Set point 9	
Height	13.12 ft
Percentage	40.00%
Set point 10	
Height	14.76%
Percentage	45.00%
Set point 11	
Height	16.41 ft
Percentage	50.00%

Set point 12	
Height	18.05 ft
Percentage	55.00%
Set point 13	
Height	19.69 ft
Percentage	60.00%
Set point 14	
Height	21.33 ft
Percentage	65.00%
Set point 15	
Height	22.97 ft
Percentage	70.00%
Set point 16	
Height	24.61 ft
Percentage	75.00%
Set point 17	
Height	26.25 ft
Percentage	80.00%
Set point 18	
Height	27.89 ft
Percentage	85.00%
Set point 19	
Height	29.53 ft
Percentage	90.00%
Set point 20	
Height	31.17 ft
Percentage	95.00%
Set point 21	
Height	32.81 ft
Percentage	100.00%

6.0 CONFIGURATION FLOW

FLOW MODE		
BASIC	**OPTIONS**	**DEFAULTS**
SECURITY CODE	0-9999	5159
CHANNEL SELECT	ONE/TWO/BOTH	ONE
TRANSDUCER SELECT	K10/K20/K60	K10
MODE	DISTANCE/LEVEL/FLOW	DISTANCE
UNITS	FEET/METER	FEET
EMPTY DISTANCE	1.31-49.2 ft / 0.4-15.0 m	6.56 FT
SPAN	0.33-48.21 ft / 0.1-14.7 m	4.92 FT
BLANKING	0.98-48.87 ft. / 0.3-14.9 m	1.64 FT
RATE OF CHANGE	0.03-65.6 FT/MIN/ 0.01-20.0 M/MIN	1.64 FT/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	2 MIN
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	-0.16 ft TO 0.16 ft	0 ft
TOTALIZER COUNT	1-1000000	1
TOTALIZER UNITS	A-Z, a-z, 0-9	Lt
TOTALIZER RESET	NO/YES	NO
FLOW CURVE	SEE LIST ON PAGE 18	V-NOTCH
SETUP RELAYS	NO/YES	NO
RELAY1 TO RELAY3	OFF/LO/HI/COUNTER	OFF
SETUP LINEARISER	NO/YES	NO
ACTIVATE LINEARISER	NO/YES	YES
SETPOINT	1-21	1
HEIGHT	0 ft - SPAN	0 FT
PERCENTAGE	0-100%	0%

6.1 Flow Mode

SECURITY CODE
Security code to advance to programming.
DEFAULT 5159

CHANNEL SELECT
Selection between setting up Channel One, Channel two or setting both the channels at the same time with the same configuration.
DEFAULT Channel One

TRANSDUCER SELECT
Choose between K10, K20 or K60 transducers. Please make sure that the correct transducer is selected. Once the transducer is selected all parameters saved for that particular channel will be deleted and the channel will revert to a distance mode of operation.
DEFAULT K10

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 6 ft

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 1.65 feet of the transducer face or within the blanking distance of the transducer.
DEFAULT 4.92 ft

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 1.65 ft

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 (13 ft/min) it will allow the KSONIK III to monitor rapid changes in flow. If the level moves faster than 1.65 ft/min then increase the rate of change. If a more stable output is required decrease the rate of change (1.0 ft/min).
DEFAULT 1.65 ft/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

6.1 FLOW MODE (continued)

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 -0.16 ft to 0.16 ft for small errors on the instrument.
DEFAULT 0

TOTALIZER 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

6.1 FLOW MODE (continued)

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

RELAY1
The relays 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 totalizer, which increments by more than a user defined value when in flow mode. The relays can also be set up to have pump cycling enabled.
DEFAULT Off

CHANNEL
The channel to which the relay corresponds.
DEFAULT On

SET POINT
This is the distance value whereby the relay will set.
DEFAULT 1.65 ft

RESET POINT
This is the distance value whereby the relay will reset.
DEFAULT 1.65 ft

PUMP CYCLE
Select the type of pump control that is required. The KSONIK III has two pump cycling routines which can be used to efficiently distribute the run cycles between various pumps that serve a common purpose. The ROTATE pump routine will use the relay set points configured for the pumps that require cycling, and rotate these set points among the pumps with the COMPLETION of each cycle. **NOTE:** The COMPLETION of a cycle is reached once all pumps have switched OFF. The FIFO (First In First Out) routine will use the relay set points configured for the pumps that require cycling, and rotate these set points among the pumps for subsequent cycles. **NOTE:** The FIFO routine ensures that the lead pump will always switch off first. **HINT:** It is advisable to configure the reset points for the pumps that require cycling to the same level.
DEFAULT No

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

6.1 FLOW MODE (continued)

CLEAR RELAYS
Clears the number of cycles as well as the run hours recorded for particular relay specified.
DEFAULT No

RELAY2
As above.
DEFAULT Off

RELAY3
As above.
DEFAULT Off

RELAY4
As above.
DEFAULT Off

RELAYS
As above.
DEFAULT Off

SETUP LINEARIZER
This prompt will allow you to input a curve to linearize 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 III prompts you at each point.
DEFAULT No

ACTIVATE
This function activates the linearizer.
DEFAULT Yes

SETPOINT
This is the number at which point the user is inputting a linearized point.

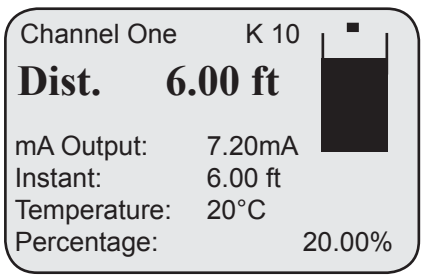
HEIGHT/PERCENTAGE
Height is the distance of the flume from the bottom to a point where a suitable percentage volume can be determined.
DEFAULT 0.00 ft

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	0.27 ft
Percentage	1.12 %
Set point 3	
Height	0.49 ft
Percentage	3.16 %
Set point 4	
Height	0.74 ft
Percentage	5,80 %
Set point 5	
Height	0.98 ft
Percentage	8.94 %
Set point 6	
Height	1.23 ft
Percentage	12.50 %
Set point 7	
Height	1.48 ft
Percentage	12.50 %
Set point 8	
Height	1.72 ft
Percentage	20.71 %
Set point 9	
Height	1.97 ft
Percentage	25.30 %
Set point 10	
Height	2.22 ft
Percentage	30.19 %
Set point 11	
Height	2.46 ft
Percentage	35.36 %

Set point 12	
Height	2.71 ft
Percentage	40.79 %
Set point 13	
Height	2.95 ft
Percentage	46.48 %
Set point 14	
Height	3.20 ft
Percentage	52.40 %
Set point 15	
Height	3.45 ft
Percentage	58.57 %
Set point 16	
Height	3.69 ft
Percentage	64.95 %
Set point 17	
Height	3.98 ft
Percentage	71.55 %
Set point 18	
Height	4.18 ft
Percentage	78.37 %
Set point 19	
Height	4.43 ft
Percentage	85.38 %
Set point 20	
Height	4.68 ft
Percentage	92.59 %
Set point 21	
Height	4.92 ft
Percentage	100.00%

7.0 Working with the Key Pad in Run Mode

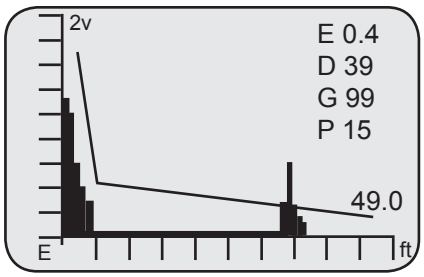


In run mode the **ENTER** key has an alternative function.

While in run mode the screen looks similar to the following:

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

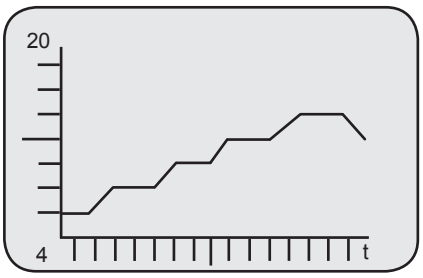
Relay	State	Hour		Cycles
REL 1:	OFF	LO	0	2
REL 2:	ON	HI	1	2
REL 3:	ON	HI	3	5
REL 4:	OFF	LO	0	0
REL 5:	INACTIVE			



mA Output Screen

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

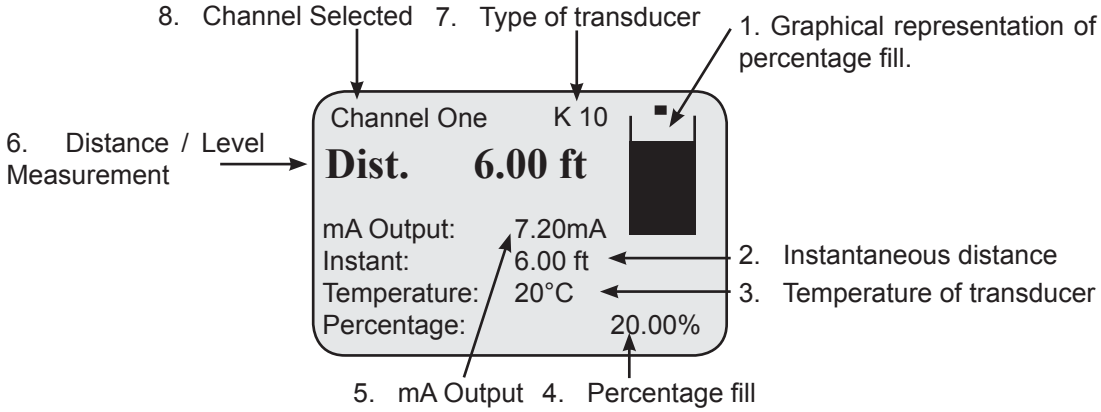
Note: The screen reverts back to normal run mode within 2 minutes



Pressing **ENTER** again while in the onscreen KScope screen will revert the screen into normal run mode.

Pressing **ENTER** again while in the onscreen KScope screen will revert the screen into normal run mode.

7.1 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.
7. Type of transducer used.
8. Channel Selected.

7.2 THE RELAY STATE SCREEN

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

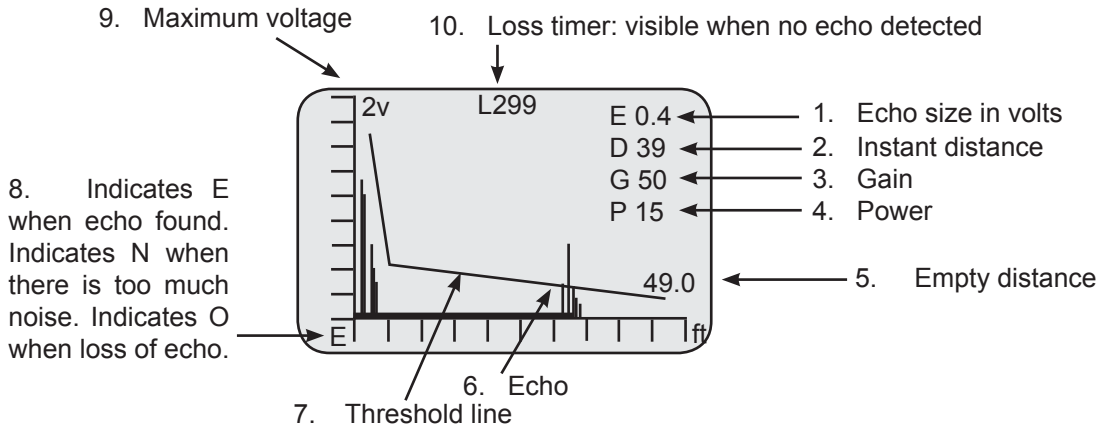
Relay	State	Hour		Cycles
REL 1:	OFF	LO	0	2
REL 2:	ON	HI	1	2
REL 3:	ON	HI	3	5
REL 4:	OFF	LO	0	0
REL 5:	INACTIVE			

1. Description of column
2. Number of cycles
5. Relay number
4. Relay state
3. Hours relay has been on

1. Relay state headings.
2. The number of cycles each relay has been through.
3. The number of hours each 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.

7.3 ONSCREEN KScope

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

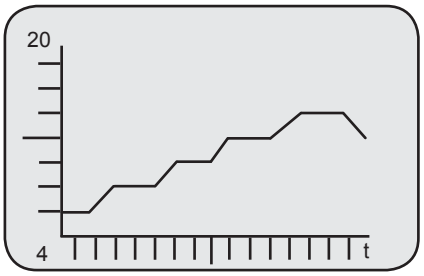


1. The maximum returned echo size in volts e.g. 0.4V
2. Displayed instant distance from transducer to substance or object being measured. e.g. 39 ft
3. The Gain needed to get the particular returned echo signal to give a particular measurement. e.g. 50%
4. The amount of power needed to obtain an echo. e.g. 15% power
5. Maximum distance or span. e.g. 49 ft
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.

See page 37 for details of KScope

7.4 mA GRAPH SCREEN

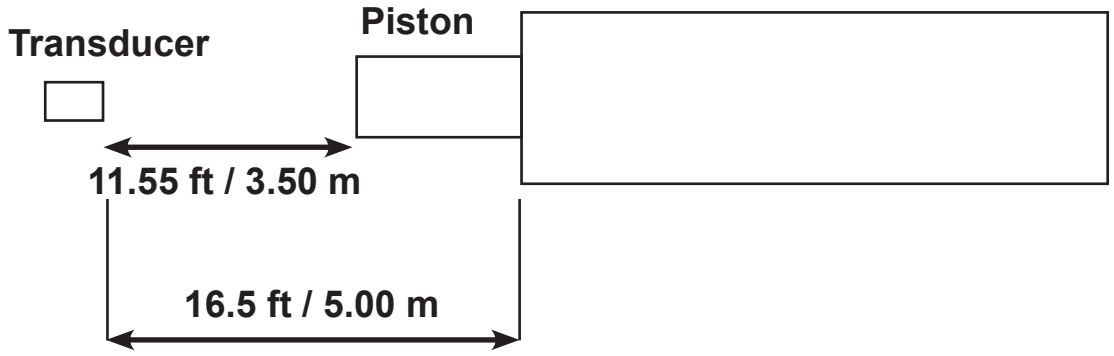
Displays mA output over time.



mA Output Screen

8.0 Examples

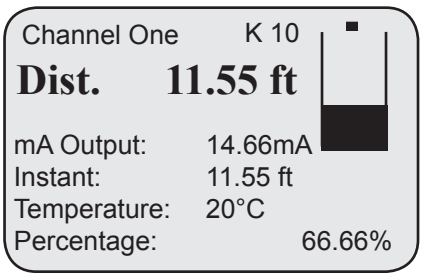
8.1 Distance Measurement



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).

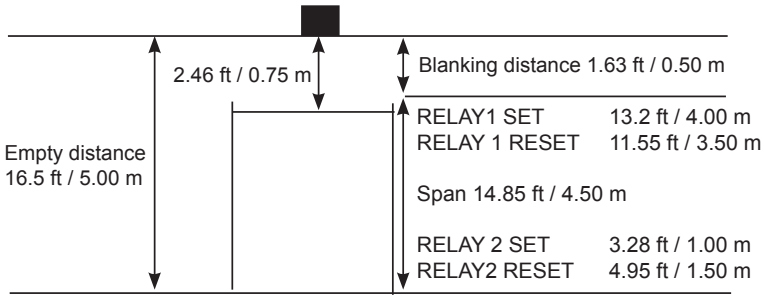
SECURITY CODE	5159
MODE	DISTANCE
EMPTY DISTANCE	16.5 ft / 5.00 m
SPAN	14.85 ft / 4.50 m
BLANKING	1.63 ft / 0.50 m
RATE OF CHANGE	3.28 ft/min / 1.00 m/min

Below is what KSONIK III will display on the above application.

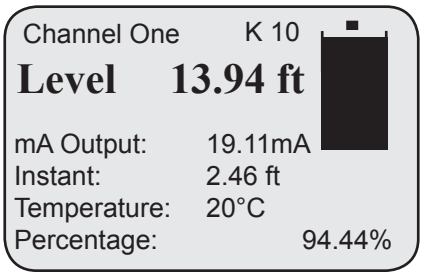


The analogue output should be approximately 14.66mA.

8.2 Level Measurement

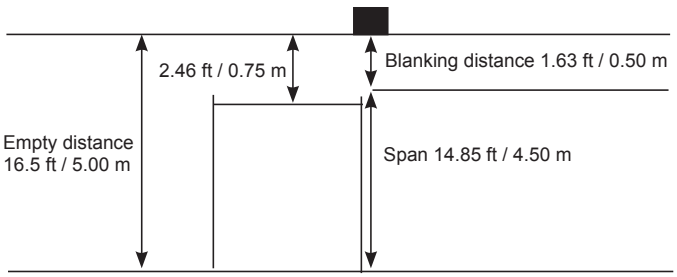


TIP: Set the relay set and reset point further apart to avoid the relays from chattering.
Below is what KSONIK III will display on the application above. Relay 1 will switch on (set) when the level rises above 13.2 ft / 4.00 m and reset when the level goes below 11.55 ft / 3.50 m. Relay 2 will switch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

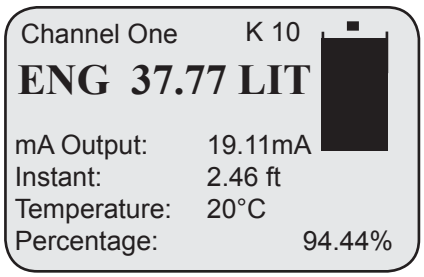


SECURITY CODE	5159
MODE	LEVEL
EMPTY DISTANCE	16.5 ft / 5.00 m
SPAN	14.85 ft / 4.50 m
BLANKING	1.63 ft / 0.50 m
RATE OF CHANGE	3.28 ft/min/1.00 m/min
SETUP RELAYS	YES
RELAY 1	HI
RELAY 1 SET	13.2 ft / 4.00 m
RELAY 1 RESET	11.55 ft / 3.50 m
RELAY 2	LO
RELAY 2 SET	3.28 ft / 1.00 m
RELAY 2 RESET	4.95 ft /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

8.3 Level Measurement and Engineering Units

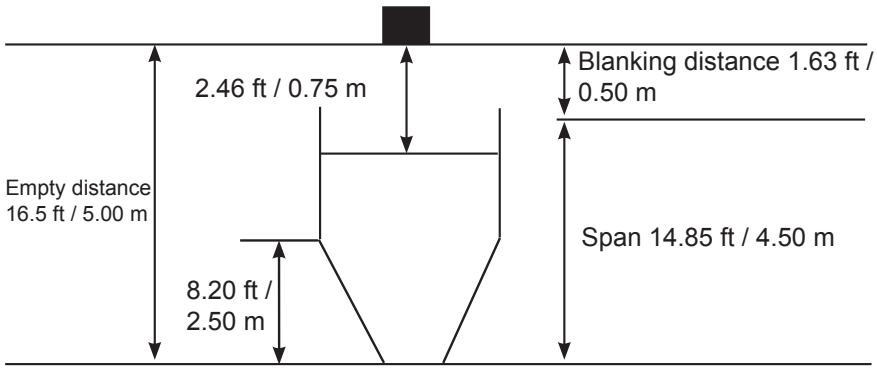


Below is what KSONIK I will display on the above application.
The analogue output should be approximately 19.11 mA.

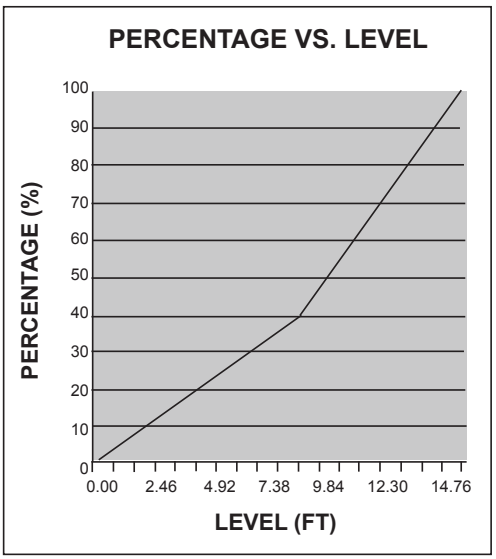


SECURITY CODE	5159
MODE	LEVEL
EMPTY DISTANCE	16.5 ft / 5.00 m
SPAN	14.85 ft / 4.50 m
BLANKING	1.63 ft / 0.50 m
RATE OF CHANGE	3.28 ft/min / 1 m/min
ENGINEERING UNITS	LIT
MAXIMUM VALUE	40.00
DECIMAL POINT	40.00

8.4 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%

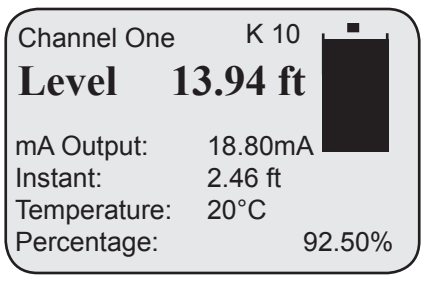


Note: Due to the curve of the graph being linear only 3 points are needed from the linearizer.

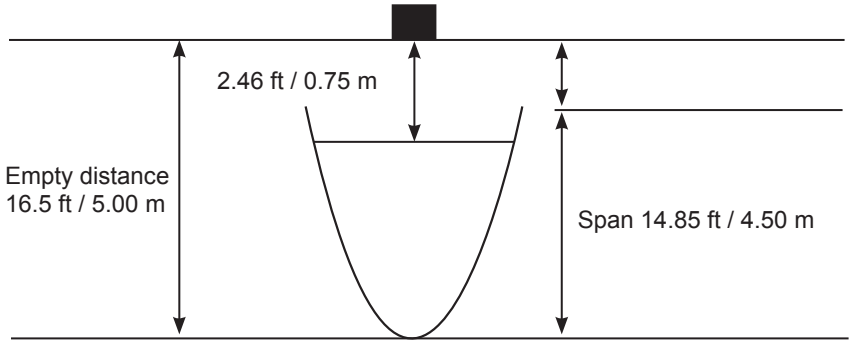
Before setting up the linearizer, check all other parameters are calculated for your application.

1. Scroll through the menus with either the **SCROLL** or **ENTER** until the menu SETUP LINEARIZER appears.
2. Use ▼ ▲ to select YES and then press **ENTER**
3. A prompt ACTIVATE LINEARIZER will appear. Use ▼ ▲ to select YES and then press **ENTER**
4. Set up each of the 21 points of the linearizer as needed by using ▼ ▲ and then pressing **ENTER** when the correct value is entered in each point of the linearizer.
5. When finished press **RUN**

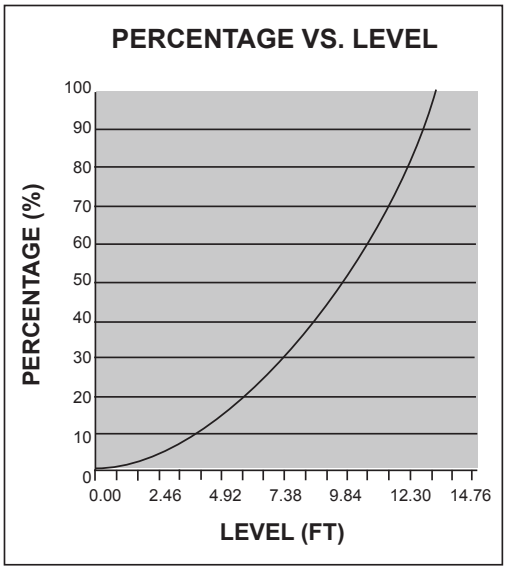
Shown to the left is what KSONIK III will display on the above application. The analogue output should be approximately 18.80mA.

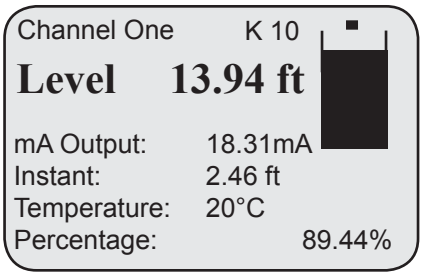


8.5 Level Measurement Using the Lineariser Function with a Non-Linear Vessel



SECURITY CODE	5159
MODE	LEVEL
EMPTY DISTANCE	16.5 ft
SPAN	14.76 ft
BLANKING	1.63 ft
RATE OF CHANGE	3.28 ft/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%

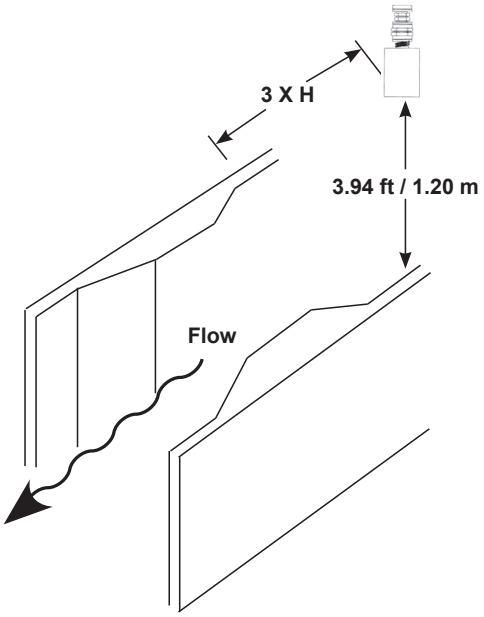




Note: Due to the curve of the graph being non-linear all 21 points are needed from the lineariser.
The display shown to the bottom right is what KSONIK III will display on the above application. The analogue output should be approximately 18.31 mA.

8.6 Venturi flume

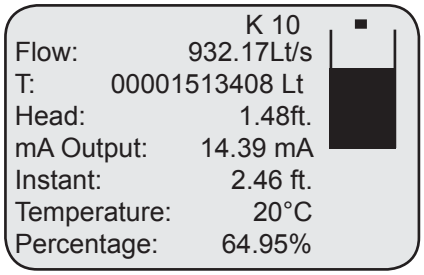
This is an example of a Venturi Flume application. The transducer is mounted 3.94 ft / 1.20 m above the zero of the flume, this is the Empty Distance. The Span is 1.97 ft / 0.60 m and the Blanking Distance is 1.97 ft / 0.60 m. The transducer must be fitted 3 x maximum head upstream. There is an external 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 ft / 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

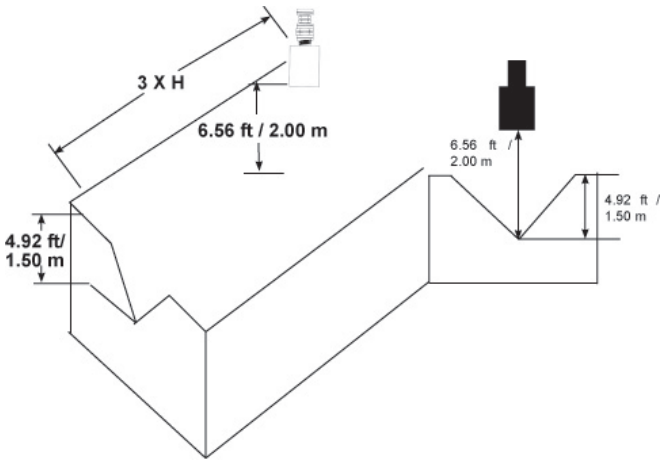
Shown to the right is what KSONIK III will display on the above application. The relay will drive the counter for every 1000 Lt/s and 1m³ of flow. The analogue output should be approximately 14.39 mA. Relay 2 would set at above 1.64 ft / 0.50 m and reset at below 1.61 ft / 0.49 m. TIP: Set the relay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



8.7 V-Notch

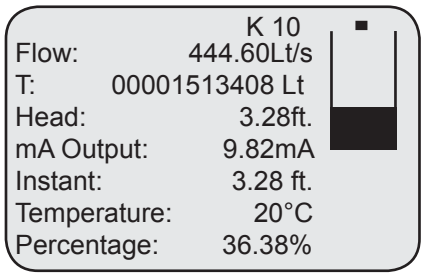
This is an example of a V-Notch application. The transducer is mounted 6.56 ft / 2.00 m above the Notch in the V, this is the Empty Distance. The Span is 4.92 ft / 1.50 m and the Blanking Distance is 1.64 ft / 0.50 m. The transducer must be fitted 3 x maximum head-height upstream. There is an external 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.*



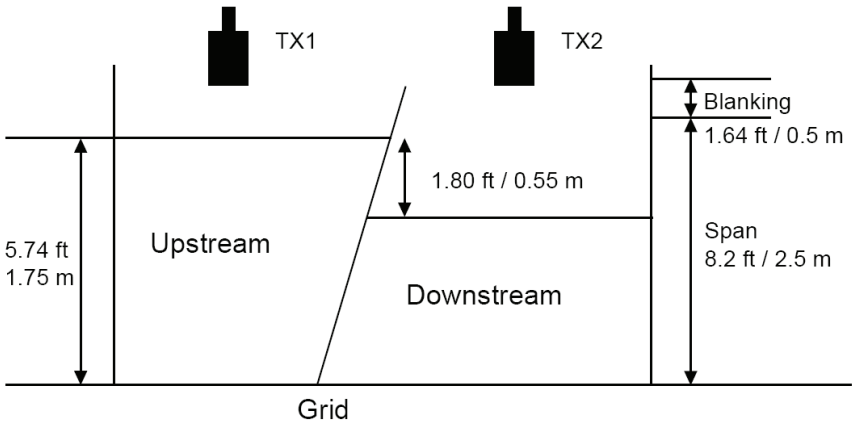
TIP: Set the relay set and reset point further apart to avoid the relays from chattering.

Below is what KSONIK III 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.



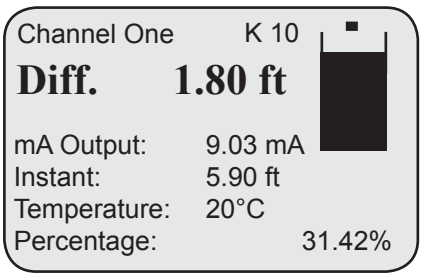
SECURITY CODE	5159
MODE	FLOW
EMPTY DISTANCE	6.56 ft / 2.00 m
SPAN	4.92 ft / 1.50 m
BLANKING	1.64 ft / 0.50 m
RATE OF CHANGE	3.28 ft/min / 1.00 m/min
FAIL TIMER	300
FAIL SAFE	HOLD
FLOW UNITS	Lt/sec
MAXIMUM FLOW	1222
FLOW CURVE	V-NOTCH
SETUP RELAYS	YES
RELAY 1	Counter
RELAY 1 COUNTER	1000
RELAY 2	HI
RELAY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

8.8 Differential Level Measurement

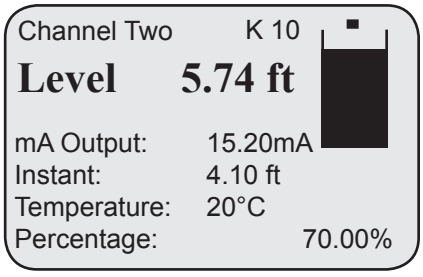


SECURITY CODE	5159
SELECT CHANNEL	BOTH
XDUCER TYPE	K10
MODE	DIFF
EMPTY DISTANCE	9.84 ft / 3.00 m
SPAN	8.20 ft / 2.50 m
BLANKING	1.64 ft / 0.50 m
RATE OF CHANGE	3.28 ft/min / 1 m/min
SETUP RELAYS	YES
RELAY 1	HI
RELAY 1 SET	2.30 ft / 0.70 m
RELAY 1 RESET	1.65 ft / 0.50 m
RELAY 2	HI
RELAY 2 SET	4.26 ft / 1.3 m
RELAY 2 RESET	3.28 ft / 1.0 m
ZERO OFFSET	O
TEMPERATURE COMPENSATION	NO

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



Showing the differential



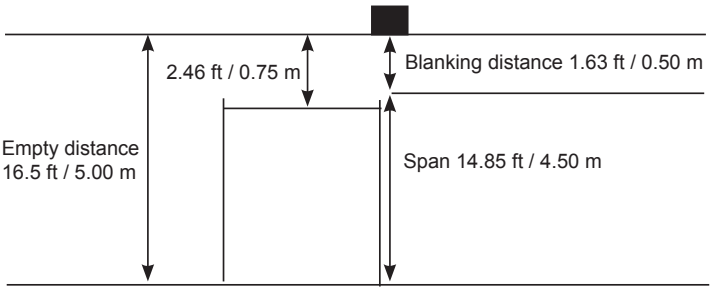
Showing the level of the Transducer One

If the downstream level is 3.94 ft / 1.20 m and the upstream level is 5.74 ft / 1.75 m then the differential level is 1.80 ft / 0.55 m. The analogue output should be approximately:

- 15.2 mA for analogue 2
- 9.03 mA for analogue 1

Relay 1 will set when the Diff is above 2.30 ft / 0.70 m and reset below 1.64 ft / 0.50 m. Relay 2 will set above 4.26 ft / 1.30 m and reset below 3.28 ft / 1.00 m. This is an upstream level alarm.

8.9 Working with the Simulator



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

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

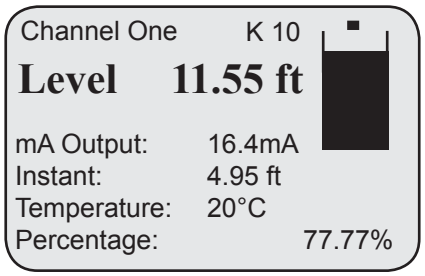
In order to activate the simulator proceed with the following:

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.

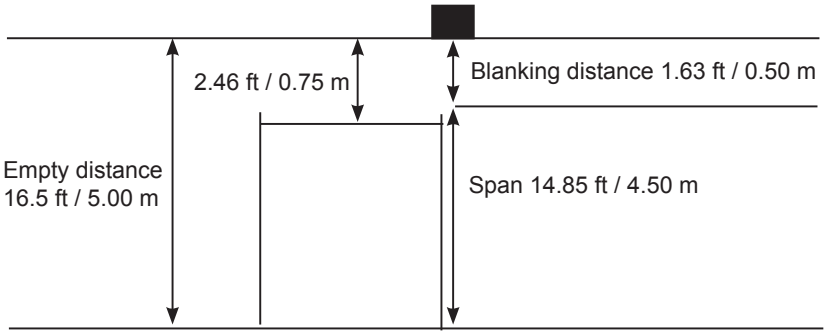
5. Press **RUN** to stop or start the simulator.

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.



8.10 FIFO (First In First Out) Pump cycling

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	4.95 ft / 1.50 m
RELAY 1 RESET	3.28 ft / 1.00 m
PUMP CYCLING	FIFO
RELAY 2	HI
RELAY 2 SET	11.55 ft / 3.50 m
RELAY 2 RESET	8.20 / 2.50 m
PUMP CYCLING	FIFO
RELAY 3	HI
RELAY 3 SET	13.2 ft / 4.00 m
RELAY 3 RESET	9.84 ft / 3.00 m
PUMP CYCLING	FIFO



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

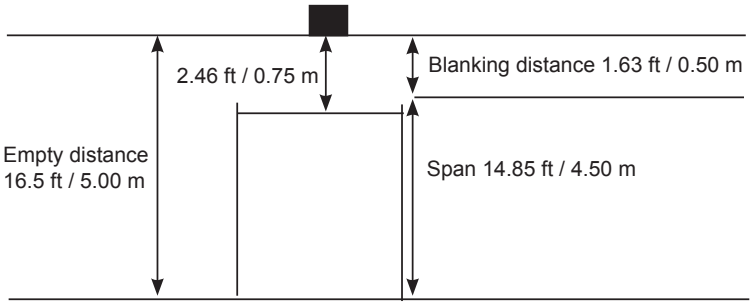
The following will occur in the FIFO pump cycling routine:

Relay	Status	Time on in hrs
Sequence 1 Level 4.27 ft		
Relay 1	OFF	0
Relay 2	OFF	0
Relay 3	OFF	0
Sequence 2 Level 7.22 ft		
Relay 1	ON	1
Relay 2	OFF	0
Relay 3	OFF	0
Sequence 3 Level 11.81 ft		
Relay 1	ON	2
Relay 2	ON	1
Relay 3	OFF	0
Sequence 4 Level 14.11 ft		
Relay 1	ON	3
Relay 2	ON	2
Relay 3	ON	1
Sequence 5 Level 9.19 ft		
Relay 1	OFF	4
Relay 2	ON	3
Relay 3	ON	2

Relay	Status	Time on in hrs
Sequence 6 Level 7.22 ft		
Relay 1	OFF	4
Relay 2	OFF	4
Relay 3	ON	3
Sequence 7 Level 2.63 ft		
Relay 1	OFF	4
Relay 2	OFF	4
Relay 3	OFF	4
Sequence 8 Level 5.91 ft		
Relay 1	ON	5
Relay 2	OFF	4
Relay 3	OFF	4
Sequence 9 Level 2.63 ft		
Relay 1	OFF	6
Relay 2	OFF	4
Relay 3	OFF	4
Sequence 10 Level 5.91 ft		
Relay 1	OFF	6
Relay 2	ON	5
Relay 3	OFF	4

8.11 Rotate Pump Cycling

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/in / 1.00 m/min
SETUP RELAYS	YES
RELAY 1	HI
RELAY 1 SET	4.95 ft / 1.50 m
RELAY 1 RESET	3.28 ft / 1.00 m
PUMP CYCLING	ROTATE
RELAY 2	HI
RELAY 2 SET	11.55 ft / 3.50 m
RELAY 2 RESET	8.2 ft / 2.50 m
PUMP CYCLING	ROTATE
RELAY 3	HI
RELAY 3 SET	13.2 ft / 4.00 m
RELAY 3 RESET	9.84 ft / 3.00 m
PUMP CYCLING	ROTATE



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

The following will occur in the Rotate pump cycling routine:

Relay	Status	Time on in hrs
Sequence 1 Level 4.27 ft		
Relay 1	OFF	0
Relay 2	OFF	0
Relay 3	OFF	0
Sequence 2 Level 7.22 ft		
Relay 1	ON	1
Relay 2	OFF	0
Relay 3	OFF	0
Sequence 3 Level 11.81 ft		
Relay 1	ON	2
Relay 2	ON	1
Relay 3	OFF	0
Sequence 4 Level 14.11 ft		
Relay 1	ON	3
Relay 2	ON	2
Relay 3	ON	1
Sequence 5 Level 9.19 ft		
Relay 1	ON	4
Relay 2	ON	3
Relay 3	OFF	2

Relay	Status	Time on in hrs
Sequence 6 Level 7.22 ft		
Relay 1	ON	5
Relay 2	OFF	4
Relay 3	OFF	2
Sequence 7 Level 2.63 ft		
Relay 1	OFF	6
Relay 2	OFF	4
Relay 3	OFF	2
Sequence 8 Level 5.91 ft		
Relay 1	OFF	6
Relay 2	ON	5
Relay 3	OFF	2
Sequence 9 Level 2.63 ft		
Relay 1	OFF	6
Relay 2	OFF	6
Relay 3	OFF	2
Sequence 8 Level 5.91 ft		
Relay 1	OFF	6
Relay 2	OFF	6
Relay 3	ON	3

9.0 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 and transducer to the workshop. Connect the power and the transducer directly, not using any extension cable. Aim the transducer to a wall about 4.95 ft / 1.5 m away, making sure that it is perpendicular to the wall. Now reset the instrument by the Factory Reset prompt. The Instrument should now read Distance 4.95 ft / 1.50 m. 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. A list of possible problems follow.

If the above works and it still does not work in the field then there are many possible problems, which is listed below.

Loss of echo.

- Check all transducer cable connections and that the joints are soldered together.
- Check that you have used RG62U co-axial for an extension cable.
- Only use RG62U co-axial cable.
- Check the specification of the transducers as agitated surfaces and solids do not reflect as powerful a signal as flat surfaces.
- Aim the transducer straight down if used on liquids and perpendicular if used on solids.
- Check if the transducer face is dirty.

Wrong reading, always reading close to Transducer

- Check to see if the isolation kit has been used correctly and is only hand tight.
- If using a flanged transducer always use a rubber gasket and only use plastic nuts and bolts. Only hand tighten the bolts.
- Do not reduce blanking distance below 1.63 ft / 0.5 m unless consultation has been made with ABB.
- Electrical noise can cause this error. Remove noise.

Wrong reading, anywhere in weir/channel

- Check to see if there is a reflection from the wall. Please Note! A piece of wire across a tank can cause a big enough echo to be accepted.
- Are the parameters correct? Reset to factory default and check that KSONIK III reads correctly. If the factory settings are OK then your parameters need to be changed. Re-check these parameters with a tape measure.

Wrong reading, erratic.

- Reduce Rate of Change. Not many levels move faster than3.28 foot/minute / 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

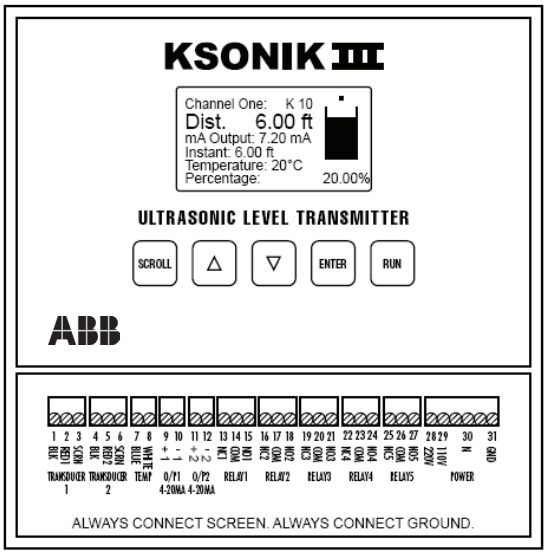
- Increase Rate of Change.

10.0 TERMINAL CONNECTIONS

TERMINAL CONNECTIONS for AC KSONIK III

1. Transducer wire black channel 1
2. Transducer wire red channel 1
3. Transducer screen channel 1
4. Transducer wire black channel 2
5. Trasnducer wire red channel 2
6. Transducer screen channel 2
7. Blue wire temperature transducer
8. White wire temperature transducer
9. Channel 1 + 4-20 mA Output
10. Channel 1 - 4-20 mA Output
11. Channel 2 + 4-20 mA Output
12. Channel 2 - 4-20 mA Output
13. Relay 1 normally closed
14. Relay 1 common
15. Relay 1 normally open
16. Relay 2 normally closed
17. Relay 2 common
18. Relay 2 normally open
19. Relay 3 normally closed
20. Relay 3 common
21. Relay 3 normally open
22. Relay 4 normally closed
23. Relay 4 common
24. Relay 4 normally open
25. Relay 5 normally closed
26. Relay 5 common
27. Relay 5 normally open
28. 220 VAC
29. 110 VAC
30. Neutral
31. Ground

Please see page 36 if extension cable is used.

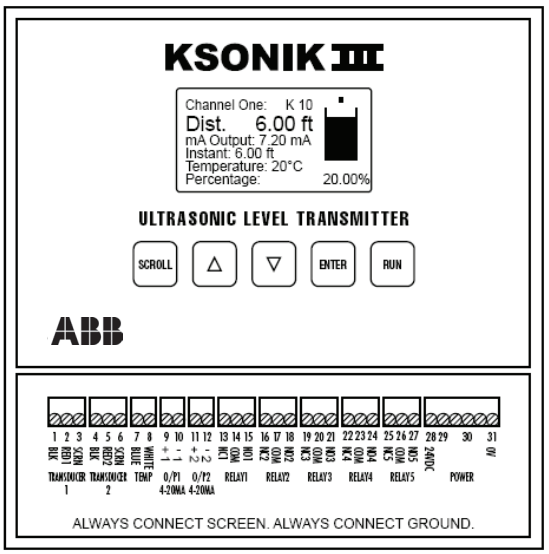


Please see page 39 if extension cable is used.

TERMINAL CONNECTIONS for DC KSONIK III

1. Transducer wire black channel 1
2. Transducer wire red channel 1
3. Transducer screen channel 1
4. Transducer wire black channel 2
5. Transducer wire red channel 2
6. Transducer screen channel 2
7. Blue wire temperature transducer
8. White wire temperature transducer
9. Channel 1 + 4-20 mA Output
10. Channel 1 - 4-20 mA Output
11. Channel 2 + 4-20 mA Output
12. Channel 2 - 4-20 mA Output
13. Relay 1 normally closed
14. Relay 1 common
15. Relay 1 normally open
16. Relay 2 normally closed
17. Relay 2 common
18. Relay 2 normally open
19. Relay 3 normally closed
20. Relay 3 common
21. Relay 3 normally open
22. Relay 4 normally closed
23. Relay 4 common
24. Relay 4 normally open
25. Relay 5 normally closed
26. Relay 5 common
27. Relay 5 normally open
28. 24 VDC
29. No connection
30. No connection
31. 0V

Please see page 36 if extension cable is used.

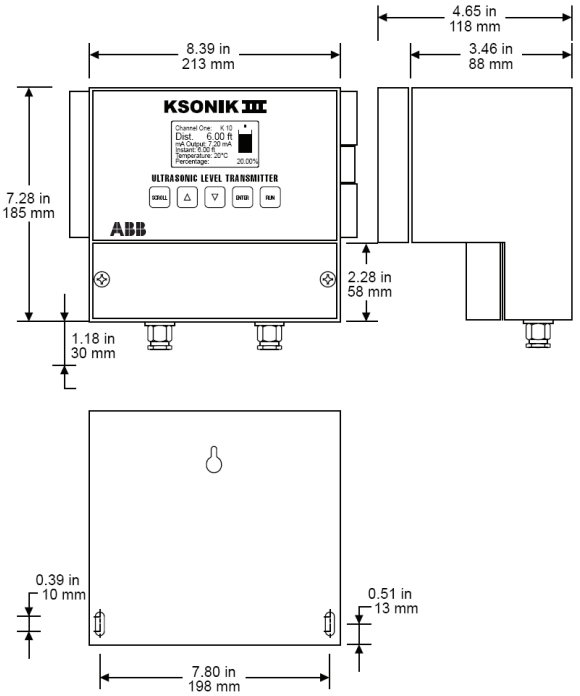


Please see page 39 if extension cable is used.

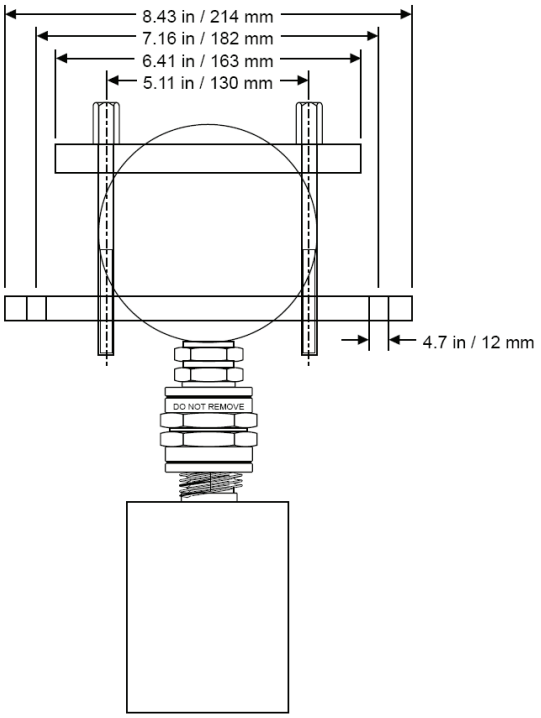
IMPORTANT:
Always use a rubber gasket and only use plastic nuts and bolts. Only hand tighten the bolts.

11.0 DIMENSIONS

Transmitter

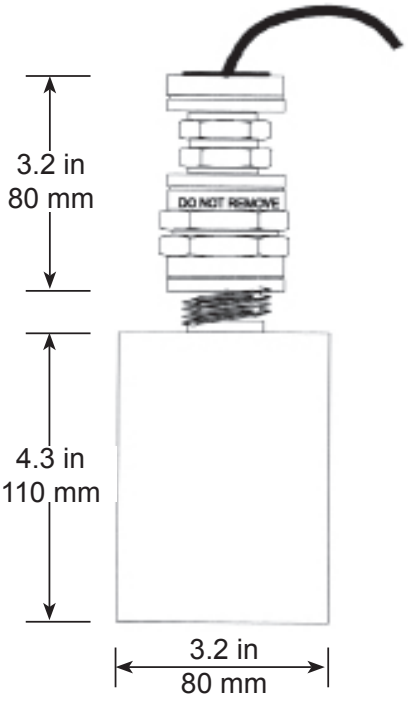


Aiming Kit



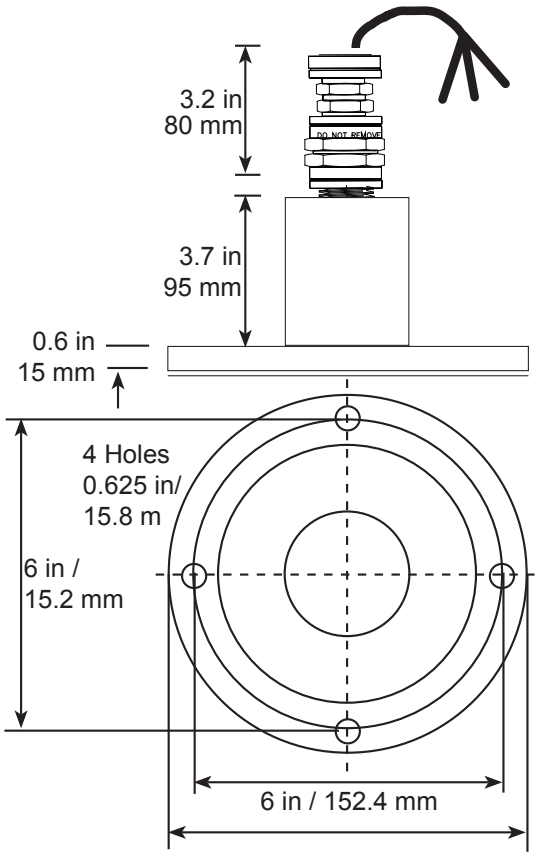
K10C General Purpose

- Maximum Measuring Length (ML) 50 ft. / 15 m
- Application: general use non-corrosive liquid
- K10C has two extra wires: Blue and white for temperature compensation



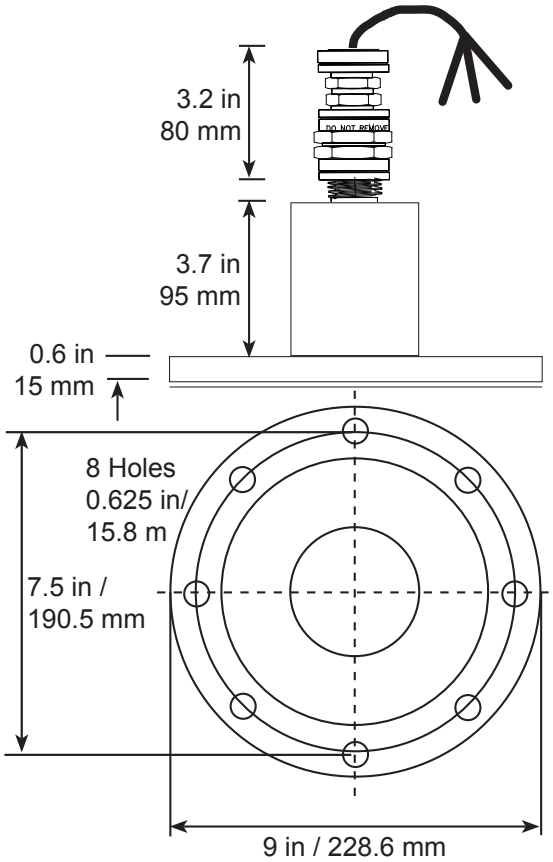
K10T3C PTFE Lined Transducer, 3 inch Flange

- Maximum Measuring Length (ML) 50 ft. / 15 m
- K10S3 Stainless Steel Flanged Transducer
- Application: corrosive liquids



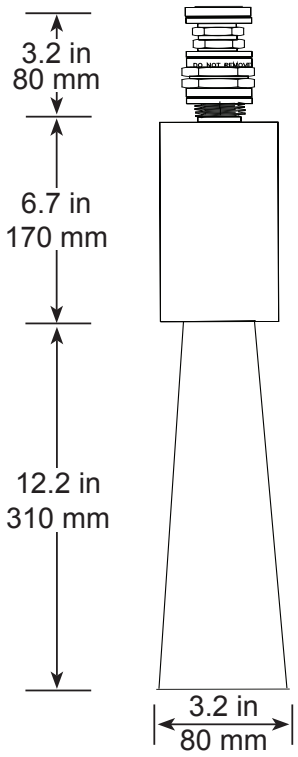
K10T4C PTFE Lined Transducer, 4 inch Flange

- Maximum Measuring Length (ML) 50 ft. / 15 m
- K10S4 Stainless Steel Flanged Transducer
- Applications, corrosive liquids



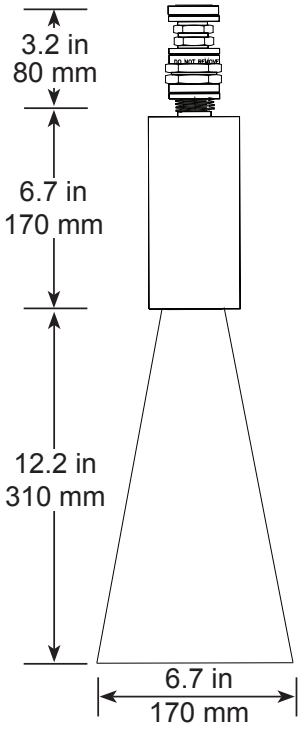
K20C Intermediate Range

- Maximum Measuring Length (ML) 100 ft. / 30 m
- Application: liquids and solids



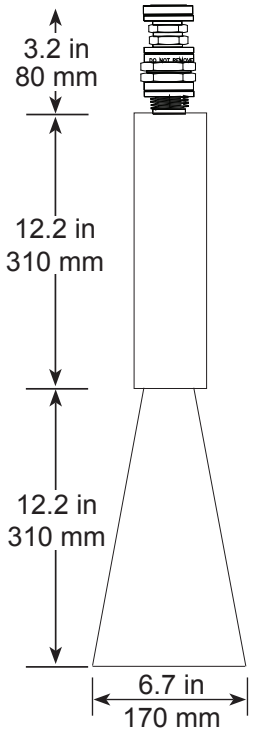
K20HC Intermediate Range with Dust

- Maximum Measuring Length (ML) 100 ft. / 30 m
- Application: solid or dust environments



K60C Long Range

- Maximum Measuring Length (ML) 196 ft. / 60 m
- Application: solid or dusty environments



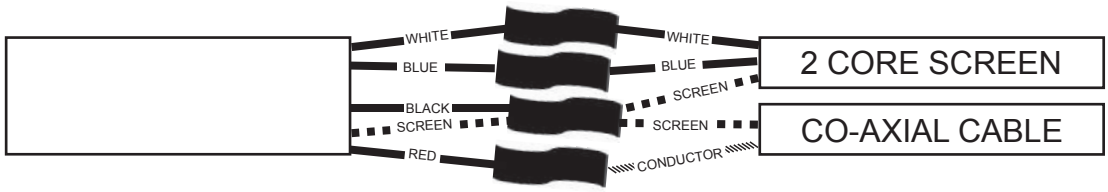
12.0 CABLE EXTENSION

Should it be necessary to extend the cable, ABB only recommends RG62U co-axial cable as an extension cable. The temperature compensation must be a 2 core screened cable. The connections must be SOLDERED and connected as below.

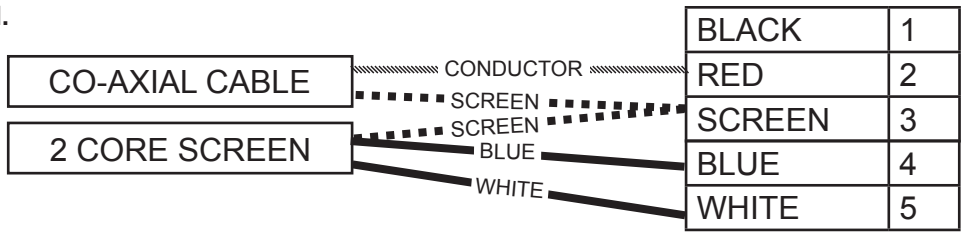
The transducer cable to RG62U cable

The red wire from the transducer is soldered to the single conductor on the RG62U cable and the black and screen from the transducer is soldered to the screen of the RG62U co-axial cable. **RG62U cable connection on the KSONIK III.**

The other end of the RG62U cable should be connected to the transducer connection on the circuit board with the core going to the red marked terminal and the screen going to the SCRN marked terminal. The extra length of cable should not exceed 492 ft / 150 m. This distance could be shorter if the cable is run close to high voltage cables. **The transducer cable to Co-axial and 2 core screened cable for a temperature compensated transducer.**



Solder all wires, the red wire from the transducer is soldered to the single conductor on the RG62U co-axial cable and the black and screen from the transducer is soldered to the screen of the RG62U co-axial cable. The blue wire is soldered to the blue wire and the white wire is soldered to the white wire on the 2 core screen cable. The screen on the 2 core cable must be connected to the screen on the co-axial cable and the screen on the transducer cable. Apply insulation tape or heat shrink to the wires so they do not short. **RG62U cable and 2 core cable connection on the KSONIK III.**

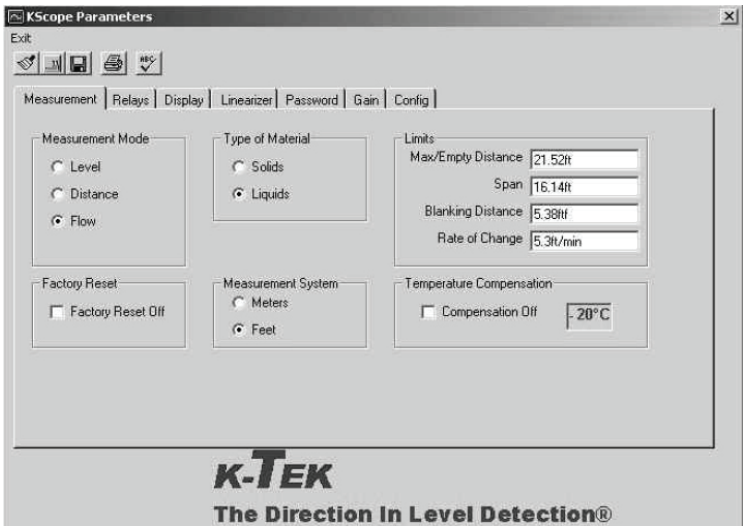


All wires should be connected as above, Co-Axial core to red, Co-Axial screen to screen. Blue and white from the temperature probe should be connected to blue and white on the board. The Black does not need a connection as it is already connected to the screen on the circuit board.

The extra length of cable should not exceed 492 ft / 150 m. This distance could be shorter if the cable is run close to high voltage cables.

Programming in KScope

1. Click on the ▼ icon or Press F3 or Go to the menu Parameters and then select KSONIK III parameters
2. Enter the security code, 5159 is the default code. The screen shown to the right will appear.
3. All values that are saved on the KSONIK III will appear on the KScope programming page.
4. After all settings have been changed click on the save icon to save data to the KSONIK III.



13.0 Declaration of Conformity

KSONIK III complies with conformity in accordance with the following tests.

Electromagnetic Compatibility

Susceptibility:	EN50082-1	EN801-2,3,4,	ENV50204
	EN50082-2	ENV50140	ENV50141
		EN61000-4-2	EN61000-4-5
		EN61000-4-4	EN61000-4-11
Emission:	EN50081-2	EN55011	
	EN50081-1	EN55022	EN60555-2, 3
Safety:	BSEN61010-1		

CE Conformity Declaration
KSONIK III is in accordance with EN50081-2 1993 and EN50082-2 1995.
Prairieville, Louisiana, December 20, 2002.

Eric Fauveau

Eric Fauveau V.P. R&D, ABB

14.0 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.

THE FOREGOING WARRANTY IS ABB'S SOLE WARRANTY AND ALL OTHER WARRANTIES EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OF FITNESS FOR A PARTICULAR PURPOSE, ARE EXCLUDED AND NEGATED TO THE MAXIMUM EXTENT PERMITTED BY LAW. NO PERSON OR REPRESENTATIVE IS AUTHORIZED TO EXTEND ANY OTHER WARRANTY OR CREATE FOR ABB ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF ABB'S PRODUCTS. THE REMEDIES SET FORTH IN THIS WARRANTY ARE EXCLUSIVE OF ALL OTHER REMEDIES AGAINST ABB. ABB SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, OR SPECIAL DAMAGES OF ANY KIND. ABB'S SOLE OBLIGATION SHALL BE TO REPAIR OR REPLACE PARTS (FOUND TO BE DEFECTIVE IN MATERIALS OR WORKMANSHIP) WHICH ARE RETURNED BY THE PURCHASER TO ABB.

15.0 Customer Support

ABB
18321 Swamp Road
Prairieville, LA 70769 USA
Tel: +(1) 225.673.6100
Fax: +(1) 225.673.2525
Email: service@ktekcorp.com
Website: abb.com/level

15.1 ABB RMA Form

ABB
18321 Swamp Road
Prairieville, LA 70769
Phone: +1 (225) 673-6100
Fax: +1 (225) 673-2525
Email: service@ktekcorp.com
Toll Free: (800) 735-5835

***** 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:

Contact us

ABB Inc.
18321 Swamp Road
Prairieville, LA 70769 USA
Phone: +1 225 673 6100
Service: +1 225 677 5836
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