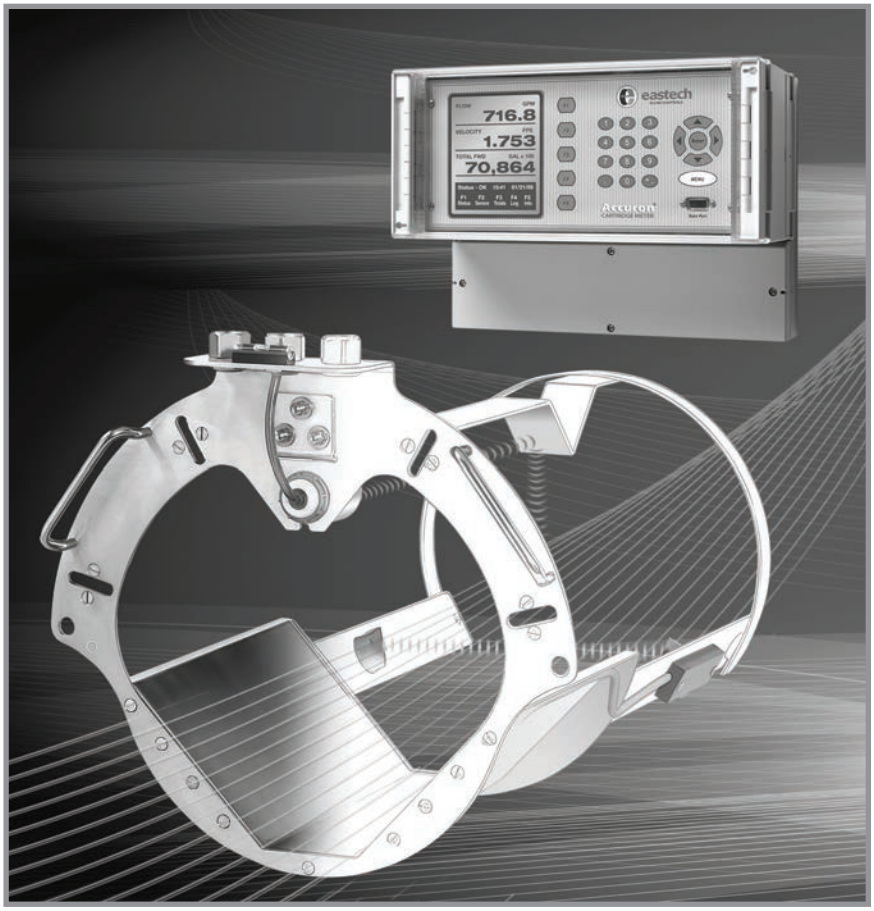
ACCURON 7100 CARTRIDGE METERS

INSTALLATION & OPERATING MANUAL



EASTECH

SCOPE

This manual contains information concerning the installation, operation and maintenance of the Accuron 7100. To ensure proper performance of the unit, the instructions should be thoroughly understood and followed.

UNPACKING & INSPECTION

Retain the container and all packing material for possible use in reshipment or storage.
Visually inspect the product and applicable accessories for any physical damage such as scratches, loose or broken parts, or any other sign of damage that may have occurred during shipment.

Note: If damage is found, request an inspection by the carrier's agent within 48 hours of delivery and file a claim with the carrier. A claim for equipment damaged in transit is the sole responsibility of the customer.

To avoid damage in transit, Eastech Flow Controls products are shipped to the customer in special shipping containers. Upon receipt of the product, perform the following unpacking and inspection procedures:

Note: If damage to the shipping container is evident upon receipt, request the carrier to be present when the product is unpacked.

Carefully open the shipping container adhering to any instructions that may be marked on the box. Remove all cushioning material surrounding the product and carefully lift the product from the container.

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GENERAL SPECIFICATIONS

Span Range	Full Range of Cartridge.
Outputs	4-20 mA DC isolated; 800 ohms max. Up to Five programmable relays, SPDT .25 amp @ 120 VAC, .5 amp @ 24 VDC. RS-232 Serial Port, 9600 – 38500 Baud, Modbus™ Protocol
Display	4 line, 20 characters per line backlit LCD display.
Programming	Front panel mounted 16 button keypad.
Power	90/240 VAC, 50/60 Hz, or 12 VDC @ 150 mA continuous.
Accuracy	± 0.02" or ± 0.05% of target distance
Sensor	CMH: Temperature Range: -20° to 160° F (-30° to 70° C) Operating Frequency: 50 KHz Beam Angle: 6° included at -3dB Boundary Housing: Tefzel Cable: 2 twisted pair, foil shielded, standard lengths of 30 feet
Electronic Enclosure	IP66/NEMA 4X standard, temperature range: -4° to 158° F (-20° to 70° C) Optional with heater, temperatures to -40° F (-40°C)
Optional Modem	14400 BBS data speed

GENERAL DESCRIPTION

FIELD READY INSTALLATION
The Cartridge Meter is a single factory integrated unit, designed for 30 minute field installation and validation.

PRE-SIZED
Each field ready Cartridge is pre-sized for its intended application. Gasketed and manufactured of 304 stainless steel, Cartridges are installed within minutes.

PRE-ALIGNED
Installed accuracy is guaranteed through precision factory alignment and calibration of each component encased within the Cartridge.

PRE-PROGRAMMED
Every Cartridge Meter is factory programmed in strict accordance to customer supplied operating specifications.

Installation Procedure

Enclosure Mounting

The enclosure is rated IP 66 (NEMA 4X). **A sunshade is recommended for outdoor installation**. There are two stainless steel mounting brackets factory assembled to the enclosure. The mounting feet have slots for ¼" bolts (4 places). The electronics should be mounted with the display at eye level or lower. There are three ½ inch holes in the bottom of the enclosure for conduit fittings. These holes have rubber plugs installed at the factory. The holes used for wiring must be properly prepared and sealed to maintain rating. If you do not use all three holes for conduit, leave the rubber plugs in the holes to protect the enclosure ratings.

Opening the Enclosure:

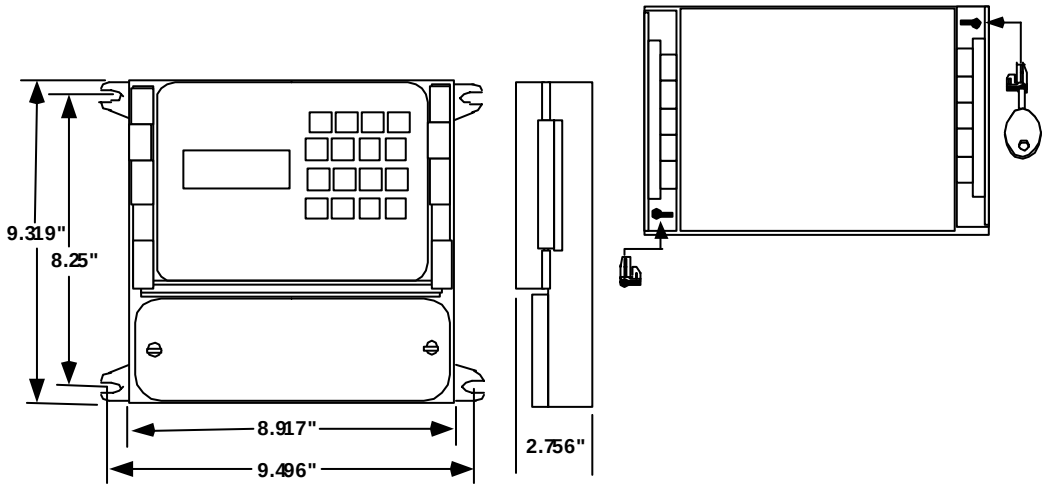
There are two hinged door clasps on the front cover of the enclosure. To open, put thumb on one of the hinges, pull toward the outside of the enclosure. Once the hinge pops to the outside it will lower allowing the clasp at the bottom of the hinge to release. Swing the cover towards the front to open. The opposite side will act as a hinge to swing the door freely. To close, clasp the bottom side of the hinge and push the top of the hinge toward the enclosure until it locks.

Hinge Lock and Optional Door Lock

There are two plastic gray plugs supplied with the Accuron series 7100. These plugs may be used to permanently disable one side of the hinged handles. If an optional door lock was supplied with the unit then one side of the hinge handle should be plugged. Either side hinge handle may be disabled. Insert the gray plug into the keyhole.

Warning: This will permanently disable the hinge handle.

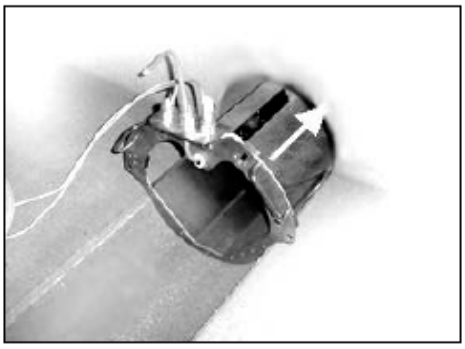
Note: The key will need to be left in the hinge handle if the door is to remain unlocked. The only way the key can be removed is if the hinge handle is locked.



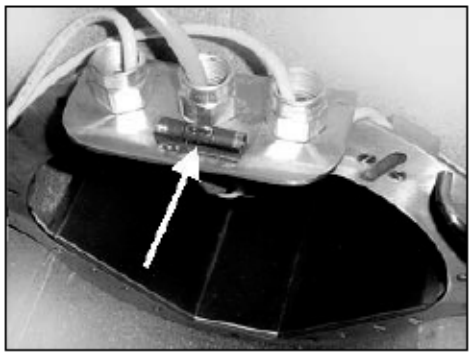
Note: When supplied with optional, the enclosure height is 12.875” instead of 9.319”.

Cartridge installation

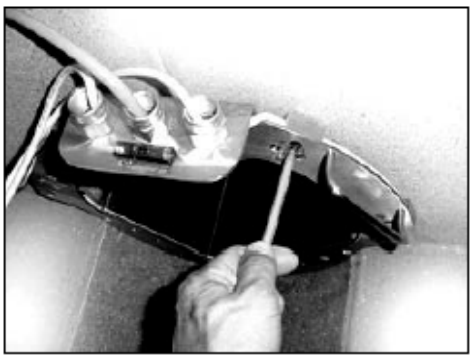
STEP 1
The Cartridge should be installed in the incoming pipe of the manhole.



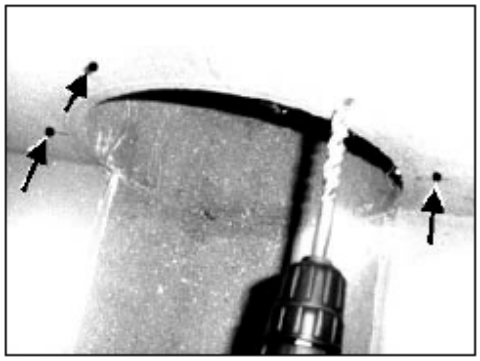
STEP 2
Install the cartridge until the flange is flush with the wall.



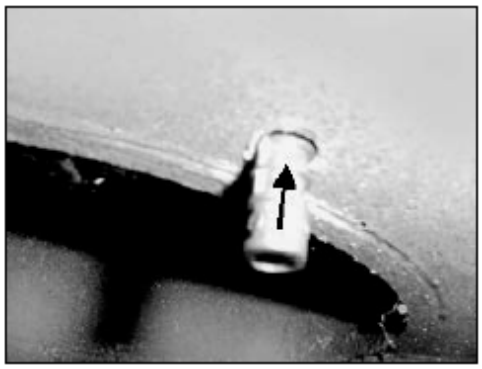
STEP 3
Rotate the Cartridge to center the level.



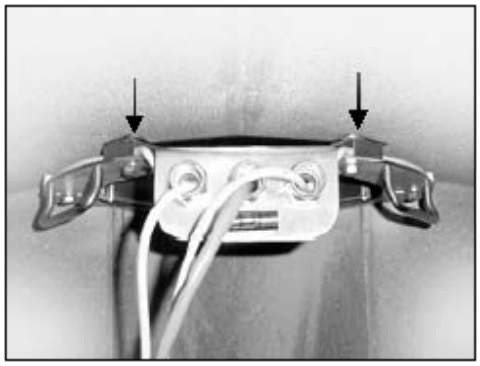
STEP 4
Mark the wall with the position of the four slotted holes in the flange of the Cartridge. Remove the Cartridge from the pipe.



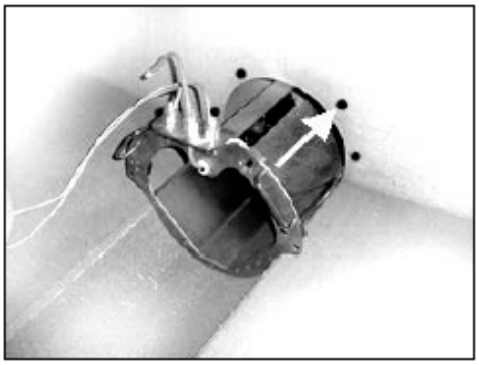
STEP 5
Using the drill and the masonry drill bit provided to drill all four holes for the lag shields.



STEP 6
Insert lag shields flush to the wall.



STEP 7
If installing the Cartridge in a round manhole, it may be necessary to user flat washers as spacers between the Cartridge flange and the wall.

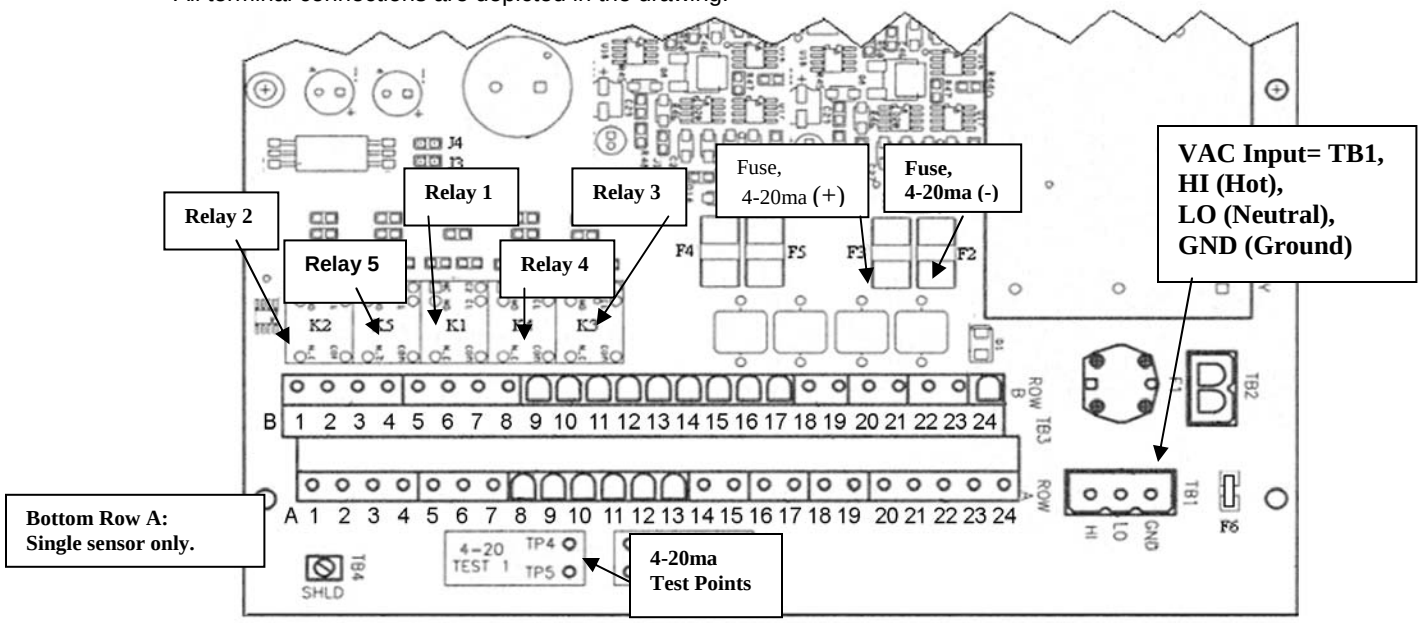


STEP 8
Re-insert the Cartridge. Line up the slots with the lag shield holes and screw the lag bolts with the flat washers into the wall.

NOTE: If the sewer pipe is not flush with the sewer wall, utilize the two turnbuckles provided. Insert the hook end into the hole below the handle of the Cartridge and attach other end to the sewer wall with the lag bolt. **Pipe slope must be less than 1 degree**.

Sensor Wiring

All terminal connections are depicted in the drawing.



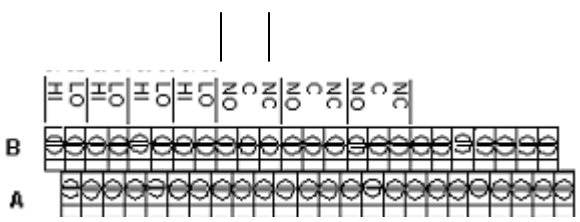
HEIGHT SENSOR WITH ORANGE CABLE, BELDEN 3124A

TERMINALS A: BOTTOM ROW	**TERMINALS B: TOP ROW**
1=Hi, Red, Single sensor wire, transmit	1= N/A
2= Lo, Black, Single sensor wire, receive and Shield wire	2= N/A
3= White, Hi, Single sensor wire, temperature	3= N/A
4= Green, Lo Single sensor wire, ground	4= N/A
5= #1 Compensator	5= N/A
6= N/A	6= N/A
7= GND Compensator	7= N/A
8= NO, Relay 2	8= N/A
9= C, Relay 2	9= NO, Relay 5
10= NC, Relay 2	10= C, Relay 5
11= NO, Relay 1	11= NC, Relay 5
12= C, Relay 1	12= NO, Relay 4
13= NC, Relay 1	13= C, Relay 4
14= N/A	14= NC, Relay 4
15= N/A	15= NO, Relay 3
16= + (Positive), Powered 4-20madc Output #1	16= C, Relay 3
17= - (Negative), Powered 4-20 mADC Output #1	17= NC, Relay 3
18= Hi, DC Battery Input	18= + (positive) 12VDC Output
19= Lo, DC Battery Input	19= Gnd (negative) 12VDC Output
20= TX, Rs232, Computer's RX	20= + (Positive), Powered 4-20mADC Output #2, 7100 only
21= RX, Rs232, Computer's TX	21= - (Negative), Powered 4-20 mADC Output#2, 7100 only
22= RTS, Rs232	22= N/A
23= CTS; Rs232	23= N/A
24= N/A	24= N/A

Note: All relays are optional and can be added in the field. PN 544718-0001.

If the unit is supplied with a modem option, the telephone connection is made through Relay #5 NO (TIP) and NC (RING) terminals as shown below.

Telephone connections for modem



QuikCal Menu Functions

The screen on the right represents the Main Screen. To program, recalibrate or change any function in the Accuron series 7100, press the "**MENU**" key. This will display the main menu selections for all of the functions of the Accuron series 7100 QuikCal firmware. Below is a quick reference for the main menu and a brief description of each to allow the user to navigate each required location.

Flw1	00	GPM
1T	00x10	GAL
Lvl1	00	In
Alm Sig	4-20	

MENU

>01) Review Meter	Displays meter parameters presently programmed. (e.g. Max level, Offset, VMt, Totalizer, Logger, etc>)	
>02) Program Use the UP or DOWN key to scroll through the selections. Press number to make a selection.	01) Measurement Units 02) Totalizer 03) 4-20 Out 04) Setpoints 05) Sensor Cal 06) Damping 07) Lost Echo 08) Simulation 09) Integrator 10) Relays	Change units of flow or level. Select totalizer engineering units and multiplier. Adjust 4-20ma output. Assign setpoints. (e.g. Hi or Lo alarms) Calibrate distance from target to face of sensor. Adjust damping times. Adjust Lost echo time and Fail to zero or span. Simulate flow or level outputs. Set relay contract integrator time. Assign relays.
>03) Status	01) Sensor 02) Level 03) Alarms/Relays 04) Logger 05) History 06) Daily Sum	Review signal strength, temperature and gain. Review level distance. Review alarms and 4-20 loop. Review storage times, amount and amount left. Review logged channel history. Review daily totals.
>04) Data logger	01) Set Time/date 02) Storage Rate 03) Secondary 04) Log channels 05) Clear data	Sets time and date Sets logger storage intervals. Sets secondary logging interval based on a set point. Sets channels for logger and values. Clears all stored logger data.
>05) System Setup	01) Language 02) Display 03) Communications 04) N/A 05) N/A 06) Rly Pulse Wdt 07) Totals Reset 08) New Password 09) Summary Reset 10) Meter reset 11) New Firmware	Sets language. Sets display contrast and backlighting. Sets communication parameters and enables modem. Sets relay contact closure time. Resets totalizer. Changes password. Clears daily summary. Resets factory defaults. Uploads new firmware.
>06) Calibration	01) Flow Simulation 02) 4-20 Adjustment 03) Sensor Cal.	Checks flow simulation of H vs Q. Adjusts 4-20ma output signal. Same as sensor cal. under program menu.

Note: The Cartridge Meter has been pre-programmed at the factory to specifications requested by the Customer.

Programming Menus

To change any function within the Program Mode, press "MENU" and "ENTER". Enter a password if prompted and press the numbers *including any leading 0* corresponding to the selection.

>01) Review Meter

This menu lists the chosen programming option for a quick review of the meters current settings.

>02) Programming

01) Measurement Units

Level Units
01) Inches
02) Feet
03) Meters

Flow Units
01) GPM
02) GPD
03) MGD

Measurement Units

01 key changes engineering units for flow or level.

Number on keypad corresponds to the engineering units. Use UP or DOWN button to scroll.

Select flow engineering unit desired:

01) GPM	06) CFD	11) MS3
02) GPD	07) LPS	12) M3H
03) MGD	08) LPM	13) M3D
04) CFS	09) LPD	14) IGM
05) CFM	10) MLD	15) BPH

The FLOW DISPLAY FORMAT screen allows selection of decimal digits:
01) #. 02) #.# 03) #.## 04) #.###

Example: GPM, #., will show a direct flow reading (e.g. 100 GPM)

Press selection then MENU and ENTER to save any changes.

02) Totalizer

Total Units
01) GAL
02) MET3
03) LTRS

Totalizer Setup

02 key programs the totalizer. The following screen is Engineering Unit Selection. Available options are:

01) GAL, Gallons	05) BARR, Barrels
02) MET3, Cubic Meters	06) CUFT, Cubic Feet
03) LTRS, Liters	07) ACFT, Acre feet
04) IGAL, Imperial Gallons	

Press corresponding number for engineering units desired.

Next screen is Totalizer Multiplier. There are eight selections for Totalizer Multiplier. Use the UP or DOWN key to display all multipliers available. Press the number key that corresponds to the multiplier required.

Press selection desired. Press MENU then ENTER to save changes.

03) 4-20 Out

4-20 Output Adjustment

Selection 03 is the 4-20mA output adjustment. Press the 03 key to adjust the 4-20mA DC output.

```
>1) Up          2) Down
. . . . . . . . . . . . . . . .
>3) Coarse      4) Fine
>5) 4 mA        6) 20 mA
```

To adjust Zero: Press the 5 key. The cursor arrow will appear before the 5) 4 mA line. Press the 3 key for coarse adjustment or the 4 key for fine adjustment. Now press the 1 key to adjust the mA upwards or the 2 key to adjust downwards.

To adjust Span: Press the 6 key. The cursor arrow will appear before the 6) 20 mA line. Press the 3 key for coarse adjustment or the 4 key for fine adjustment. Now press the 1 key to adjust the mA upwards or the 2 key to adjust downwards.

04) Setpoints

Programming Setpoints

This selection will allow the user to assign up to three setpoints for High or Low alarm conditions. Press the 04 key to enter the setpoint selections. Press the 01 key for Setpoint #1. Press the 02 key for Setpoint #2. Press the 03 key for Setpoint #3. The next screen allows the user to assign the setpoint selected to level or flow. Press the 01 key for Level and the 02 key for Flow. The level selection will be in the identical engineering units selected for level. The flow selection will be in the engineering units selected for flow. The next screen will allow the user to input ON and OFF points for the setpoint selected. For Low alarm, the ON value will be less than the OFF value. For High alarm the ON value will be greater than the OFF value. To program; use the DOWN/LEFT arrow keys to move the cursor to the far left digit. Enter the number desired by using the keypad. The cursor will advance to the right after the selection is entered. Press the ENTER key. The Setpoints must be assigned to a Relay. (14 key under Program.).

>05) Sensor Cal.

Sensor Calibration

To adjust sensor calibration, press the 05 key. The dimension physically measured from the bottom the sensor to any target or liquid level is the distance that will be displayed in the next screen. If the dimensions displayed vary from the distance measured, use the 1 or 3 key to adjust the displayed length to the measured length.

>02) Program Continued

06) Damping

Output Damping Adjustment

To adjust the 4-20mA output damping, press 06. This will allow the user to adjust the damping time. The damping times available are:

01) None
02) 5 Seconds
03) 15 Seconds
04) 30 Seconds
05) 60 Seconds
06) 2 Minutes
07) 4 Minutes
08) 8 Minutes

07) Lost Echo

Lost Echo Setting

To adjust the Lost Echo time: (The time the meter will hold the last value after losing the signal until failing to the Lost Echo 4-20 mA DC assignment).

To set the Lost Echo time, press the 07 key. The lost echo times available are:

01) 5 Seconds
02) 15 Seconds
03) 30 Seconds
04) 60 Seconds
05) 2 Minutes
06) 4 Minutes
07) 8 Minutes
08) 16 Minutes

After pressing the desired number, or ENTER key, the next screen to appear is the Lost Echo 4-20mA assignment. The user can select the default for the 4-20mA DC output during a lost echo. The selections are:

01) Fail to Zero
02) Fail to Span
03) Hold last value

Press the number desired, this will return you to the Main Program screen.

08) Simulation.

Simulation

The simulation screen allows for entry of a level in order to simulate volume or flow. Enter the level in the engineering units displayed. The Flow or Level/Volume line will display the flow or level/volume for that simulation. Pressing the UP key will allow the user to test the totalizer function. Press MENU to return to the main program screen.

09) Integrator

Integrator Setup

The next option is the Integrator screen. To select press 09. This screen allows for assignment of contact closure time for a contact integrator. The cursor will appear on the most significant digit. Use the number keys to enter the totalized flow value desired. Press ENTER to return to the Main Program screen.

>02) Program Continued

10) Relays

Relay Assignment
The next option is the Relay screen. To select press 10. This option assigns each of the five relays to the following selections:

01) None	05) Lost Signal	09) Contact Integrator
02) Setpoint #1	06)4-20 Loop	10) Tot1
03) Setpoint #2	07) Over range 1	11) N/A
04) Setpoint #3	08) N/A	

Press selection desired. Presses MENU then ENTER to save any changes.

>03) Status

The status selection allows the user to view the status on the following options:

>01) Sensor

Sensor Status
View signal strength, temperature and the signal gain.

>02) Level

Level Status
This screen indicates the distance from sensor to the target and the level.

>03) Alarm/Relays

Alarms/Relays Status
View the Alarms Set and the Relays Energized.

>04) Data Logger

The next selection is the Data Logger selection. There are five selections in the data logger menu.

>01) Set Time/Date

Set Time and Date
Press the UP key to move the arrow to the date or time. Press the number value on the key pad that is desired. Note: Time is entered and viewed as military time.

>02) Storage Rate

Storage Rate

01) 1 minute	03) 10 minute	05) 30 minute
02) 5 minute	04) 15 minute	06) 60 minute

>03) Secondary

Secondary Storage Rate
This will allow the user to select a secondary log rate to store logging at a different interval than the main interval. This may be used to store at faster intervals during storms or flow events. The selections available are:

01) Not active 02) Setpoint #1 03) Setpoint #2 04) Setpoint #3

If setpoints are selected, this screen will be followed by storage rate times.

>04) Log Channels

Log Channels

There are up to 8 channels available for logging.

01) Not Used	04) Flow 1	07) N/A	10) N/A
02) Level 1	05) N/A	08) Setpoints	11) N/A
03) N/A	06) Total 1	09) Sensor 1 Temp	

>05) Clear Data

Clear Data Stored Data

Press (5) to clear all stored data. It is recommended that this be done whenever there is a change to the logger settings.

7100 Data Logger Download Program

Refer to Data Download Software Manual for instructions.

>05 System Setup

The system setup option will allow the user to set up the Accuron series 7100 for the following options.

>01) Language

Language
The options are 01) English, 02) German, 03) Spanish.

>02) Display

Display
Allows user to select the contrast of the display from 01) Highest to 08) Lowest. This feature also allows for a "timed off" of the display light if the key pad is not touched in a selected time interval.

>03) Communications

Communications
This option allows for the setting of baud rates, flow controls and slave I.Ds for the RS-232 and RS-485 communications.

01) Baud Rate - Select the baud rate desired..
02) Flow Control - Hardware should be selected unless a device requires no flow control.
03) Slave ID - Select desired Slave Identification number.
04) Modem Init - If a modem is used, select "02) Enable", otherwise select "01) Disabled".

>04) N/A
>05) N/A

Selections 04 and 05 are not available on this meter.

>06) Rly Pulse Wdt

Relay pulse Width
Sets relay contact times . The selections are 50, 100, 150, 200, 250, or 300 milliseconds.

>07) Totals Reset

Totals Reset
This option will reset the totalizer to zero. Press 5 to begin.

>08) New Password

New Password
This option allows changing the password for entry into the QuikCal program.

>09) Summary Reset

Summary Reset
Clears the Daily Summary memory.

>10) Meter Reset

Meter Reset
Resets all parameters to factory defaults.

>11) New Firmware

New Firmware Upload

This option will allow the user to upload all new firmware revisions. This will require connection to the RS232 Data Port with a computer.

Do not enter into this screen unless you are prepared to upload new firmware.

>6 Calibration

The next option is Calibration. Options available are:

>01) Flow Simulation

Flow Simulation

The flow simulation screen will allow the user to check the flow curve programmed into the unit. Enter the flow level in the engineering units displayed. The Flow line will display the flow at the entered interval. Pressing the UP key will allow the user to test the totalizer function.

>02) 4-20 Adjustment

4-20 Adjustment

To adjust or calibrate the 4-20mA DC output, Press the 1 key. The screen shown on the left will appear.

>1) Up 2) Down
. . . . . .
>3) Coarse 4) Fine
>5) 4 mA 6) 20 mA

To adjust Zero: Press the 5 key. The cursor arrow will appear before the 5) 4 mA line. Press the 3 key for coarse adjustment or the 4 key for fine adjustment. Now press the 1 key to adjust the mA upwards or the 2 key to adjust downwards.

To adjust Span: Press the 6 key. The cursor arrow will appear before the 6) 20 mA line. Press the 3 key for coarse adjustment or the 4 key for fine adjustment. Now press the 1 key to adjust the mA upwards or the 2 key to adjust downwards.

>03) Sensor Cal

Sensor Cal

This option allows for calibration of the system by measuring the distance between the face of the sensor and the target (or water). Adjust the displayed distance value up or down with the 1 or 3 key in order to re-calibrate the unit to the corrected distance.

Factory Assistance

Call 1 800 226 3569

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