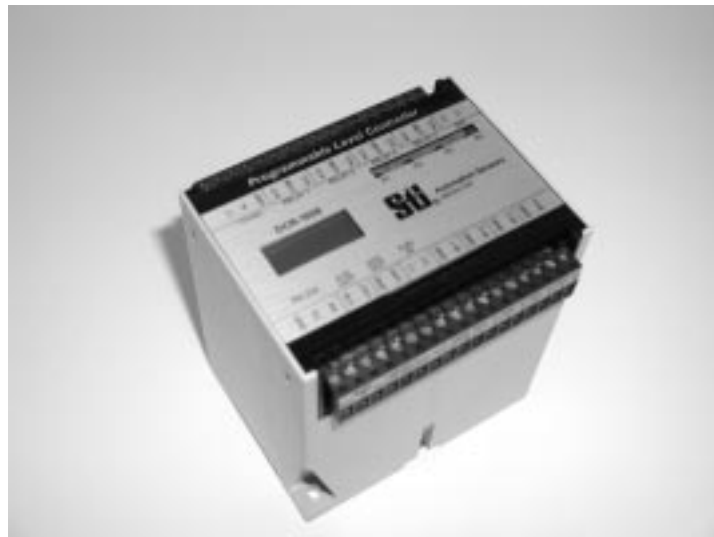# DCR-1008 QUICK START PROCEDURES

DCR-1008 PROGRAMMABLE LEVEL CONTROLLER

DCR-1008 QUICK SETUP PROCEDURES

1   Terminal Strip Connections

Connect the terminal strips to the DCR-1008.   The labels on the terminals will match the labels on the top of the unit. The terminal strips are pre-wired with a 110 Vac cable and an RS-232 cable. Refer to the Operators Manual Section 4 for wiring additional devices to the terminals.

2   DCR-1008 Hookup

The pin out for the RS-232 cable is shown below.

Female 9 Pin D Connection to PC	Wire Color	Connection to DCR-1008
Pin 2	White	TX
Pin 3	Red	RX
Pin 5	Black	GND

a.   Connect the RS-232 cable to the PC communication port 1.
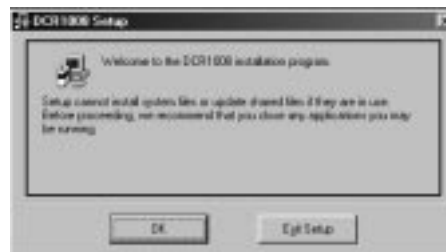b.   Connect Power to the DCR-1008.

3   Power Up Information

When the unit is powered on it is programmed to come up in the run mode. Four red LEDs indicate the status of relays 1 through 4. If the light is on, the N.O. relay contact is closed. The LCD powers on displaying a distance, level or volume. If no ultrasonic sensor is connected to the DCR-1008 it will display a communications error.

4   Software Installation

The software works on PC's running the Windows 95, 98 or 2000 operating system. Install the DCR-1008 software using the following steps.

a.   Insert the DCR-1008 software CD into the PC's CD-ROM drive.
b.   Double click the Setup.exe file to launch the DCR-1008 installation software.   The following screen is displayed.

STI Automation Sensors Division   1025 West 1700 North, Logan Utah 84321   Phone (435) 753-7300

c.   Click on the "OK" button to continue. The following screen will be displayed.

d.   To begin the installation click on the button with the computer. The files will be put in the
     c:\Program Files\DCR1008 directory. To put them in a different directory specify the path name by
     clicking on the "Browse" button. When the setup is complete the following screen will be displayed.

e.   Click "OK" to exit the installation program.

5   PC Communications Test

Test the PC to DCR-1008 communications using the following steps.

1.   Bring up the DCR-1008 software by clicking on the Windows Start button, selecting Programs and
     then selecting DCR1008.
2.   The following menu will come up.

3. If the DCR-1008 and PC are connected correctly you will see "Communication: 0 0 0 0 0 …" in the communication window.
4. If you see "Error No Communication" in the communication window then check the following items.

    a. Select the DCR-1008 Software Utilities Menu. Verify the COM port is set correctly to match the PC port connected to the DCR.
    b. Make sure the PC com port parameters are set as follows:

Baud Rate=	9600
Bits=	8
Stop Bit=	1
Parity=	No

5. If you are still having troubles contact STI Technical Support. (435) 753-7300

6   DCR-1008 Operators Manual

With the DCR-1008 powered on and connected to the PC you will be able to look at the different software menu's and get a good idea of the capability of the DCR-1008. Additionally you may want to refer to the Operators Manual , located on the CD in the Manuals Directory, for detailed information on the controller's capabilities and for application examples. The following table gives a quick overview of the Operator's Manual sections and page numbers.

Operator's Manual Overview

SECTION	DESCRIPTION	PAGE
1	INTRODUCTION	4
2	SPECIFICATIONS	5
3	INSTALLATION	6
4	WIRING	7
5	PROGRAMMING	12
6	SOFTWARE INSTALLATION	17
7	STARTUP	19
8	SOFTWARE TABS	21
9	OPERATION MODES TABLE	34
10	OPERATION MODES DESCRIPTION	38
11	APPLICATION EXAMPLES	56
APPENDIX A	DCR-1008 SETUP WORKSHEET	65
APPENDIX B	DST SPECIFICATIONS	66

7   DCR-1008 Operation Modes

The DCR-1008 can be easily programmed using the software or from the onboard keypad and LCD. The following page shows a table of the DCR-1008 modes, their ranges, and their factory settings. Typically only a few modes require changing to setup the DCR-1008 for your application. Use the change column of this table to show differences from the default settings for your application.

DCR-1008 Operation Mode Table

Software Tab	Keypad	Description	Range	Default	Changes
Basic Setup	Units	Units	Inches, Feet, Meters	Feet	
	InputSel	Sensor Type	35' DST, 50'DST, 4-20mA	35' DST	
	DecPoint	Decimal Point	00000, 0000.0, 0000.00, 00.000	000.00	
4-20 mA Setup	4mA In	4mA Input Point	0-65535 (Limited by Decimal Point)	3.00	
	20ma In	20 mA Input Point	0-65535 (Limited by Decimal Point)	10.00	
Relay Setup / Relay 1	Lead Trip	Trip Point (T1)	0-65535 (Limited by Decimal Point)	2.50	
	Lead Win	Trip Window (TW)	0-65535 (Limited by Decimal Point)	0.50	
	LeadCtrl	Control Logic	OnOffOff, OnOff,On, OnHysOff, OffOnOn, OffOnOff, OffHysOn, Off, FailSafe	Off	
	Lead Asn	Input Assignment	Sensor, D1, Sensr/D1, D2, Sensr/D2, D3, Sensr/D3, D4, Sensr/D4, D1D2PmUp, D3D4PmDn	Sensr/D1	
	LeadTime	Hold / Delay Time	+/- 0-1000 Seconds	+0	
Relay Setup / Relay 2	Lag Trip	Trip Point (T1)	0-65535 (Limited by Decimal Point)	3.00	
	Lag Win	Trip Window (TW)	0-65535 (Limited by Decimal Point)	0.50	
	Lag Ctrl	Control Logic	OnOffOff, OnOff,On, OnHysOff, OffOnOn, OffOnOff, OffHysOn, Off, FailSafe	Off	
	Lag Asn	Input Assignment	Sensor, D1, Sensr/D1, D2, Sensr/D2, D3, Sensr/D3, D4, Sensr/D4, D1D2PmUp, D3D4PmDn	Sensr/D2	
	Lag Time	Hold / Delay Time	+/- 0-1000 Seconds	+0	
Relay Setup / Relay 3	R3 Trip	Trip Point (T1)	0-65535 (Limited by Decimal Point)	3.50	
	R3 Win	Trip Window (TW)	0-65535 (Limited by Decimal Point)	0.50	
	R3 Ctrl	Control Logic	OnOffOff, OnOff,On, OnHysOff, OffOnOn, OffOnOff, OffHysOn, Off, FailSafe	Off	
	R3 Asn	Input Assignment	Sensor, D1, Sensr/D1, D2, Sensr/D2, D3, Sensr/D3, D4, Sensr/D4, D1D2PmUp, D3D4PmDn	Sensr/D3	
	R3 Time	Hold / Delay Time	+/- 0-1000 Seconds	+0	
Relay Setup / Relay 4	R4 Trip	Trip Point (T1)	0-65535 (Limited by Decimal Point)	4.00	
	R4 Win	Trip Window (TW)	0-65535 (Limited by Decimal Point)	0.50	
	R4 Ctrl	Control Logic	OnOffOff, OnOff,On, OnHysOff, OffOnOn, OffOnOff, OffHysOn, Off, FailSafe	Off	
	R4 Asn	Input Assignment	Sensor, D1, Sensr/D1, D2, Sensr/D2, D3, Sensr/D3, D4, Sensr/D4, D1D2PmUp, D3D4PmDn	Sensr/D4	
	R4 Time	Hold / Delay Time	+/- 0-1000 Seconds	+0	
Relay Setup	Alt Pump	Alternate Pumps	0-25 Cycles	0	
4-20 mA Output Setup	4mA Out	4mA Output Point	0-65535 (Limited by Decimal Point)	3.00	
	20mA Out	20 mA Output Point	0-65535 (Limited by Decimal Point)	10.00	
Measurement Setup	Tank Type	Measurement and Tank Types	Distance, Level, RecTank, SphrTank, VertFlat, VertCone, HoriFlat, HoriSphr	Distance	
	ConvMult	ConversionMultiplier	0-65.535	1.000	
	TankSpan	Sensor face to bottom	0-669 Inches, 0-58.25 feet, 0-17.75 meters	12.00	
	Tank Len	Tank Length	0-669 Inches, 0-58.25 feet, 0-17.75 meters	10.00	
	SpherLen	Sphere Length	0-669 Inches, 0-58.25 feet, 0-17.75 meters	2.0	
	Rad/Wid	Radius / Width	0-669 Inches, 0-58.25 feet, 0-17.75 meters	5.00	
Ultrasonic Setup	UltSensit	Sensitivity	0-100	75	
	UltBlank	Blanking	0-669 Inches, 0-58.25 feet, 0-17.75 meters	2.00	
	UltPulse	Pulses	1-20	13	
	SampRate	Sample Rate	0-9999 msec	120	
	SampAve	Sample Average	1-50	20	
	SampOOR	SamplesOutOf Range	1-50	10	
	SampWin	Sample Window	0-669 Inches, 0-58.25 feet, 0-17.75 meters	2.00	
	LossEcho	Loss of Echo Delay	0-1000 sec	5	
	Max Dist	Maximum Distance	35' DST = 5-35 feet, 50' DST = 5-100 feet	35	
	AutSense	Auto Sense	Off, On	Off	
	TempComp	Temperature Comp	Off, On	Off	
	OffstDis	Offset Distance	0-669 Inches, 0-58.25 feet, 0-17.75 meters	0	
	OffstPol	Offset Polarity	Positive, Negative	Positive	
	Calibrat	Calibration Factor	0-1.999	1.000	
4-20mA Setup	4ma Cal	4ma Calibration	0-9999 (Units Selected)	5000	
	20ma Cal	20ma Calibration	0-9999 (Units Selected)	5000	
Utilities	Reset	Set Factory Settings	No, Yes	No	

8   APPLICATION EXAMPLES

The examples in this document can be programmed using the PC Software Menus or using the onboard keypad and LCD display.

It is assumed that the DCR-1008 has been set to the factory settings before the parameters for the examples are entered. This minimizes the amount of data that needs to be entered.   The factory settings can be loaded into the DCR-1008 by going to the Utilities Tab and selecting the Reset to Defaults button. They can also be loaded from the keypad by going to the Reset Mode selecting the Yes option.

For each example a mode table has been provided that shows all the DCR-1008 modes, the options for each mode and the default settings. If any changes are made from the default value it is put it the Change column. All modes not grayed out are applicable to the example being shown.

The example files can be loaded into the DCR-1008 by using the following steps.

1.   Go to the Software Utilities Tab
2.   Select the example that you want to load. I.E. Example1.txt
3.   Press the Read File button. The data will be loaded into the DCR-1008 software tabs.
4.   To load the DCR-1008 with the selected file press the Send to DCR button. The data will be loaded into the DCR-1008.
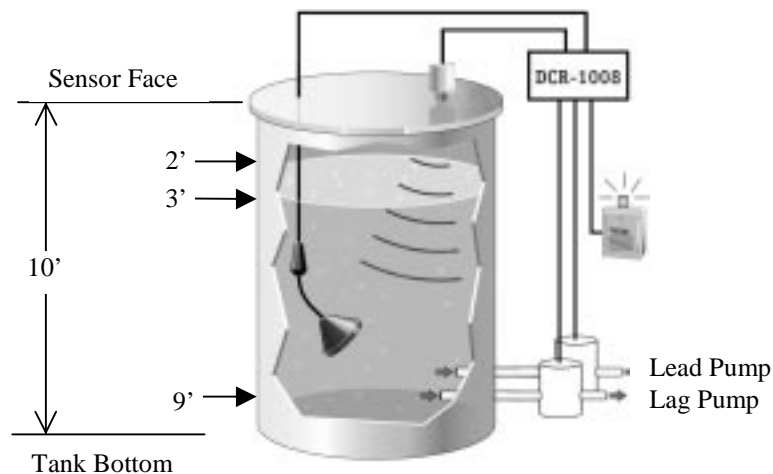
8.1   Example 1 - Distance Measurement with Lead/Lag Alternation

Variables
a.   Tank: 10' Vertical Cylinder
b.   Inputs: 35' DST Sensor, N.O. High-level float
c.   Outputs: Lead and Lag Pumps, Safety Alarm

Requirements
1.   The lead pump must turn on when the level gets 3 ft from the DST.
2.   The lead pump must stay on until the level drops below 9 ft from the DST.
3.   The lag pump must turn on if the water is rising faster then the lead pump can handle and gets closer than 2 ft from the DST.
4.   If the lag pump turns on it must stay on until the level drops to 3 ft from the DST.
5.   Each time the lead pump cycles, the lead and lag pumps must alternate to allow for equal run time on both pumps (lead becomes lag, and lag becomes lead).
6.   A high-level float switch is to be used as a safety alarm. The float is wired to discrete input 1 and is set to control relay 3.

DCR-1008 Settings

- **Basic Setup:** Input = <=35'Dst   Units = Feet   Decimal = 000.00
- **Measurement Setup:** Measurement Type = Distance from Sensor Face
  Tank Parameters: Not required for distance measurements
- **Relay Setup**

Relay	Wired	Device Name	Input Assignment	Sensor Control Logic	Trip 1 (T1)	Trip 2 (T2)	TW= T2-T1	Discrete Time
1	N.O.	Lead Pump	Sensor	OnHysOff	3'	9'	6'	N/A
2	N.O	Lag Pump	Sensor	OnHysOff	1'	2'	1'	N/A
3	N.O.	Alarm	Discrete 1	N/A	N/A	N/A	N/A	0

Alternate Lead and Lag Pumps = 1 (change every cycle)

- **Ultrasonic Setup:** Blanking =1.5, Use defaults for other parameters
- **4-20mA Setup:** Not Required for this example

Programming the DCR-1008 for Example 1

All fields not colored out are required to be set. Use default settings unless changes are shown.

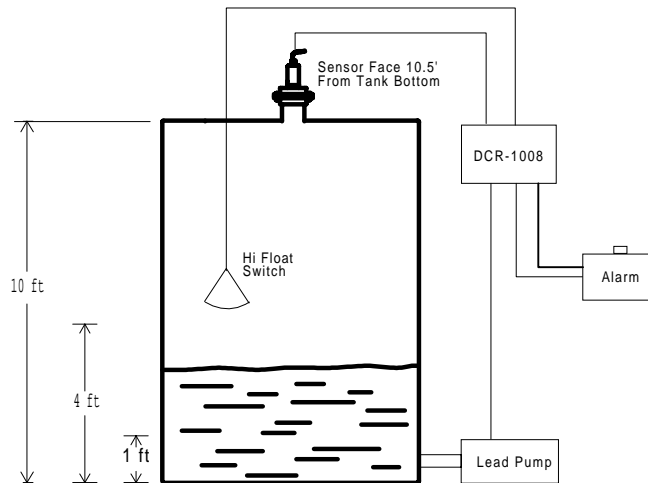| Software Menu	Keypad	Description	Range	Default	Changes
Basic Setup	Units	Units	Inches, Feet, Meters	Feet	
	InputSel	Sensor Type	35' DST, 50'DST, 4-20mA	35' DST	
	DecPoint	Decimal Point	00000, 0000.0, 0000.00, 00.000	000.00	
4-20 mA Setup	4mA In	4mA Input Point	0-9999 (Units Selected)	3.00	
	20ma In	20 mA Input Point	0-9999 (Units Selected)	10.00	
Relay Setup / Relay 1	Lead Trip	Trip Point (T1)	0-9999 (Units Selected)	2.50	3.00
	Lead Win	Trip Window (TW)	0-9999 (Units Selected)	0.50	6.00
	LeadCtrl	Control Logic	OnOffOff, OnOff,On, OnHysOff, OffOnOn, OffOnOff, OffHysOn, Off, FailSafe	Off	OnHysOff
	Lead Asn	Input Assignment	Sensor, D1, Sensr/D1, D2, Sensr/D2, D3, Sensr/D3, D4, Sensr/D4, D1D2PmUp, D3D4PmDn	Sensr/D1	Sensor
	LeadTime	Hold / Delay Time	+/- 0-1000 Seconds	+0	
Relay Setup / Relay 2	Lag Trip	Trip Point (T1)	0-9999 (Units Selected)	3.00	2.00
	Lag Win	Trip Window (TW)	0-9999 (Units Selected)	0.50	1.00
	Lag Ctrl	Control Logic	OnOffOff, OnOff,On, OnHysOff, OffOnOn, OffOnOff, OffHysOn, Off, FailSafe	Off	OnHysOff
	Lag Asn	Input Assignment	Sensor, D1, Sensr/D1, D2, Sensr/D2, D3, Sensr/D3, D4, Sensr/D4, D1D2PmUp, D3D4PmDn	Sensr/D2	Sensor
	Lag Time	Hold / Delay Time	+/- 0-1000 Seconds	+0	
Relay Setup / Relay 3	R3 Trip	Trip Point (T1)	0-9999 (Units Selected)	3.50	
	R3 Win	Trip Window (TW)	0-9999 (Units Selected)	0.50	
	R3 Ctrl	Control Logic	OnOffOff, OnOff,On, OnHysOff, OffOnOn, OffOnOff, OffHysOn, Off, FailSafe	Off	
	R3 Asn	Input Assignment	Sensor, D1, Sensr/D1, D2, Sensr/D2, D3, Sensr/D3, D4, Sensr/D4, D1D2PmUp, D3D4PmDn	Sensr/D3	D1
	R3 Time	Hold / Delay Time	+/- 0-1000 Seconds	+0	
Relay Setup / Relay 4	R4 Trip	Trip Point (T1)	0-9999 (Units Selected)	4.00	
	R4 Win	Trip Window (TW)	0-9999 (Units Selected)	0.50	
	R4 Ctrl	Control Logic	OnOffOff, OnOff,On, OnHysOff, OffOnOn, OffOnOff, OffHysOn, Off, FailSafe	Off	
	R4 Asn	Input Assignment	Sensor, D1, Sensr/D1, D2, Sensr/D2, D3, Sensr/D3, D4, Sensr/D4, D1D2PmUp, D3D4PmDn	Sensr/D4	
	R4 Time	Hold / Delay Time	+/- 0-1000 Seconds	+0	
Relay Setup	Alt Pump	Alternate Pumps	0-25 Cycles	0	1
4-20 mA Output Setup	4mA Out	4mA Output Point	0-9999 (Units Selected)	3.00	
	20mA Out	20 mA Output Point	0-9999 (Units Selected)	10.00	
Measurement Setup	Tank Type	Measurement and Tank Types	Distance, Level, RecTank, SphrTank, VertFlat, VertCone, HoriFlat, HoriSphr	Distance	
	ConvMult	ConversionMultiplier	0-65.535	1.000	
	TankSpan	Sensor face to bottom	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	12.00	
	Tank Len	Tank Length	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	10.00	
	SpherLen	Sphere Length	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	2.0	
	Rad/Wid	Radius / Width	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	5.00	
Ultrasonic Setup	UltSensit	Sensitivity	0-100	75	
	UltBlank	Blanking	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	2.00	1.5
	UltPulse	Pulses	1-20	13	
	SampRate	Sample Rate	0-9999 msec	120	
	SampAve	Sample Average	1-50	20	
	SampOOR	SamplesOutOf Range	1-50	10	
	SampWin	Sample Window	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	2.00	
	LossEcho	Loss of Echo Delay	0-1000 sec	5	
	Max Dist	Maximum Distance	5-100 feet	35	
	AutSense	Auto Sense	Off, On	Off	
	TempComp	Temperature Comp	Off, On, View	Off	
	OffstDis	Offset Distance	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	0	
	OffstPol	Offset Polarity	Positive, Negative	Positive	
	Calibrat	Calibration Factor	0-1.999	1.000	
4-20mA Setup	4ma Cal	4ma Calibration	0-9999 (Units Selected)	5000	
	20ma Cal	20ma Calibration	0-9999 (Units Selected)	5000	
Utilities	Reset	Set Factory Settings	No, Yes	No	

8.2   Example 2 - Level Measurement with Alarms

Variables
a.   Tank: 10' Vertical Cylinder
b.   Inputs: 35' DST sensor mounted 10.5 from the bottom of the tank, N.C. Float Switch
c.   Outputs: Lead Pump, Dual Input Alarm

Requirements
1.   The pump will turn on when the level reaches a depth of 1 ft from the tank bottom and stay on until the level rises to a depth of 4 ft.
2.   A fail safe alarm relay will be energized under normal operation and should open for power failures, sensor problems.
3.   A float switch will be used as a high level alarm. The float switch will be wired to Discrete Input 1

DCR-1008 Settings

- **Basic Setup:** Input = <=35'Dst   Units = Feet   Decimal = 000.00
- **Measurement Setup:** Measurement Type = Tank Bottom to Level
  Tank Parameters: Tank Span=10.5, Other parameters not required
- **Relay Setup**

Relay	Wired	Device Name	Input Assignment	Sensor Control Logic	Trip 1 (T1)	Trip 2 (T2)	TW= T2-T1	Discrete Time
1	N.O.	Lead Pump	Sensor	OnHysOff	1'	4'	3'	N/A
2	N.O.	Alarm 1	Sensor	FailSafe	N/A	N/A	N/A	N/A
3	N.O	Alarm 2	Discrete 1	N/A	N/A	N/A	N/A	N/A

Alternate Lead and Lag Pumps = 0 (Disabled)

- **Ultrasonic Setup:** Blanking =1.5, Use defaults for other parameters
- **4-20mA Setup:** Not Required for this example

Programming the DCR-1008 for Example 2
All fields not colored out are required to be set. Use default settings unless changes are shown.

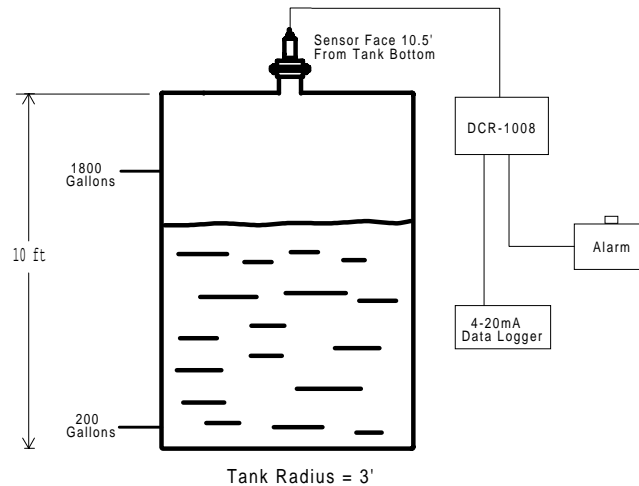| Software Menu	Keypad	Description	Range	Default	Changes
Basic Setup	Units	Units	Inches, Feet, Meters	Feet	
	InputSel	Sensor Type	35' DST, 50'DST, 4-20mA	35' DST	
	DecPoint	Decimal Point	00000, 0000.0, 0000.00, 00.000	000.00	
4-20 mA Setup	4mA In	4mA Input Point	0-9999 (Units Selected)	3.00	
	20ma In	20 mA Input Point	0-9999 (Units Selected)	10.00	
Relay Setup / Relay 1	Lead Trip	Trip Point (T1)	0-9999 (Units Selected)	2.50	1.00
	Lead Win	Trip Window (TW)	0-9999 (Units Selected)	0.50	3.00
	LeadCtrl	Control Logic	OnOffOff, OnOff,On, OnHysOff, OffOnOn, OffOnOff, OffHysOn, Off, FailSafe	Off	OnHysOff
	Lead Asn	Input Assignment	Sensor, D1, Sensr/D1, D2, Sensr/D2, D3, Sensr/D3, D4, Sensr/D4, D1D2PmUp, D3D4PmDn	Sensr/D1	Sensor
	LeadTime	Hold / Delay Time	+/- 0-1000 Seconds	+0	
Relay Setup / Relay 2	Lag Trip	Trip Point (T1)	0-9999 (Units Selected)	3.00	
	Lag Win	Trip Window (TW)	0-9999 (Units Selected)	0.50	
	Lag Ctrl	Control Logic	OnOffOff, OnOff,On, OnHysOff, OffOnOn, OffOnOff, OffHysOn, Off, FailSafe	Off	FailSafe
	Lag Asn	Input Assignment	Sensor, D1, Sensr/D1, D2, Sensr/D2, D3, Sensr/D3, D4, Sensr/D4, D1D2PmUp, D3D4PmDn	Sensr/D2	Sensor
	Lag Time	Hold / Delay Time	+/- 0-1000 Seconds	+0	
Relay Setup / Relay 3	R3 Trip	Trip Point (T1)	0-9999 (Units Selected)	3.50	
	R3 Win	Trip Window (TW)	0-9999 (Units Selected)	0.50	
	R3 Ctrl	Control Logic	OnOffOff, OnOff,On, OnHysOff, OffOnOn, OffOnOff, OffHysOn, Off, FailSafe	Off	
	R3 Asn	Input Assignment	Sensor, D1, Sensr/D1, D2, Sensr/D2, D3, Sensr/D3, D4, Sensr/D4, D1D2PmUp, D3D4PmDn	Sensr/D3	D1
	R3 Time	Hold / Delay Time	+/- 0-1000 Seconds	+0	
Relay Setup / Relay 4	R4 Trip	Trip Point (T1)	0-9999 (Units Selected)	4.00	
	R4 Win	Trip Window (TW)	0-9999 (Units Selected)	0.50	
	R4 Ctrl	Control Logic	OnOffOff, OnOff,On, OnHysOff, OffOnOn, OffOnOff, OffHysOn, Off, FailSafe	Off	
	R4 Asn	Input Assignment	Sensor, D1, Sensr/D1, D2, Sensr/D2, D3, Sensr/D3, D4, Sensr/D4, D1D2PmUp, D3D4PmDn	Sensr/D4	
	R4 Time	Hold / Delay Time	+/- 0-1000 Seconds	+0	
Relay Setup	Alt Pump	Alternate Pumps	0-25 Cycles	0	
4-20 mA Output Setup	4mA Out	4mA Output Point	0-9999 (Units Selected)	3.00	
	20mA Out	20 mA Output Point	0-9999 (Units Selected)	10.00	
Measurement Setup	Tank Type	Measurement and Tank Types	Distance, Level, RecTank, SphrTank, VertFlat, VertCone, HoriFlat, HoriSphr	Distance	Level
	ConvMult	ConversionMultiplier	0-65.535	1.000	
	TankSpan	Sensor face to bottom	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	12.00	10.5
	Tank Len	Tank Length	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	10.00	
	SpherLen	Sphere Length	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	2.0	
	Rad/Wid	Radius / Width	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	5.00	
Ultrasonic Setup	UltSensit	Sensitivity	0-100	75	
	UltBlank	Blanking	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	2.00	1.5
	UltPulse	Pulses	1-20	13	
	SampRate	Sample Rate	0-9999 msec	120	
	SampAve	Sample Average	1-50	20	
	SampOOR	SamplesOutOf Range	1-50	10	
	SampWin	Sample Window	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	2.00	
	LossEcho	Loss of Echo Delay	0-1000 sec	5	
	Max Dist	Maximum Distance	5-100 feet	35	
	AutSense	Auto Sense	Off, On	Off	
	TempComp	Temperature Comp	Off, On, View	Off	
	OffstDis	Offset Distance	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	0	
	OffstPol	Offset Polarity	Positive, Negative	Positive	
	Calibrat	Calibration Factor	0-1.999	1.000	
4-20mA Setup	4ma Cal	4ma Calibration	0-9999 (Units Selected)	5000	
	20ma Cal	20ma Calibration	0-9999 (Units Selected)	5000	
Utilities	Reset	Set Factory Settings	No, Yes	No	

8.3   Example 3 - Volume in a Vertical Cylinder Tank with 4-20mA Output

Variables
a.   Tank: 2000 Gallon Vertical Tank With Flat Bottom, 3' Radius
b.   Inputs: 35' DST sensor mounted 10.5' from bottom of the tank
c.   Outputs: 4-20mA Data Logger, High/Low Alarm

Requirements
1.   Water will be measured in a 2000 gallon cylindrical flat bottom tank.
2.   We want to chart the volume in gallons using a 4-20mA input data logger. A 20mA corresponds to a volume of 1750 gallons, and 4mA corresponds to 250 gallons.
3.   A normally closed contact should open (setting off an alarm) for levels above and below 1800 gallons and 200 gallons respectively.

Tank Radius = 3'

DCR-1008 Settings

- **Basic Setup:** Input = <=35'Dst   Units = Feet   Decimal = 0000.0
- **Measurement Setup:** Measurement Type = Vertical Cylinder with Flat Bottom
  Tank Parameters: Tank Span=10.5, Tank Radius =3, Conversion multiplier = 7.4805 (Cubic feet to gallons), Other parameters not required
- **Relay Setup**

Relay	Wired	Device Name	Input Assignment	Sensor Control Logic	Trip 1 (T1)	Trip 2 (T2)	TW= T2-T1	Discrete Time
1	N.C.	Alarm	Sensor	OffOnOff **	200'	1800'	1600'	N/A

Alternate Lead and Lag Pumps = 0 (Disabled)
** Settings for N.O. Circuit. (N.C. output will be OnOffOn)

- **Ultrasonic Setup:** Blanking =1.5, Use defaults for other parameters
- **4-20mA Setup:** 4ma Output Set Point = 250 Gallons, 20ma Output Set Point = 1750 Gallons

Programming the DCR-1008 for Example 3

All fields not colored out are required to be set. Use default settings unless changes are shown.

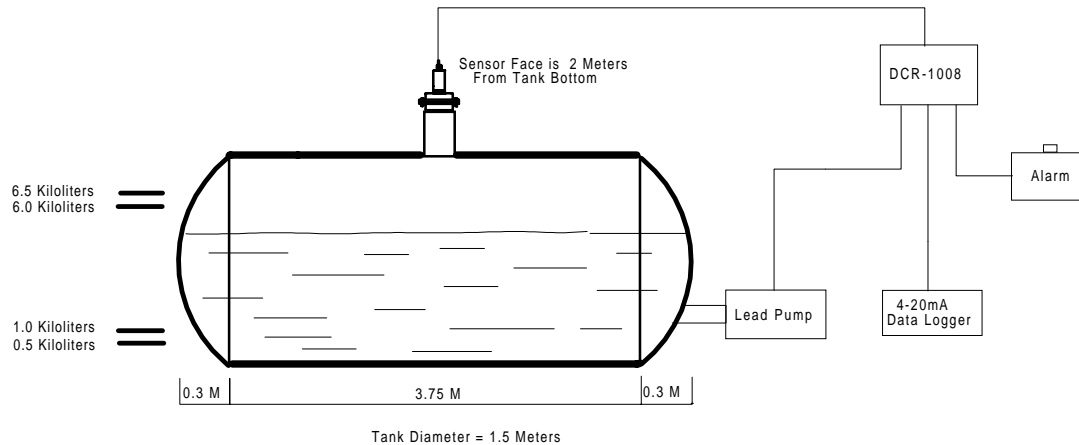| Software Menu	Keypad	Description	Range	Default	Changes
Basic Setup	Units	Units	Inches, Feet, Meters	Feet	
	InputSel	Sensor Type	35' DST, 50'DST, 4-20mA	35' DST	
	DecPoint	Decimal Point	00000, 0000.0, 0000.00, 00.000	000.00	0000.0
4-20 mA Setup	4mA In	4mA Input Point	0-9999 (Units Selected)	3.00	
	20ma In	20 mA Input Point	0-9999 (Units Selected)	10.00	
Relay Setup / Relay 1	Lead Trip	Trip Point (T1)	0-9999 (Units Selected)	2.50	200
	Lead Win	Trip Window (TW)	0-9999 (Units Selected)	0.50	1600
	LeadCtrl	Control Logic	OnOffOff, OnOff,On, OnHysOff, OffOnOn, OffOnOff, OffHysOn, Off, FailSafe	Off	OffOnOff
	Lead Asn	Input Assignment	Sensor, D1, Sensr/D1, D2, Sensr/D2, D3, Sensr/D3, D4, Sensr/D4, D1D2PmUp, D3D4PmDn	Sensr/D1	Sensor
	LeadTime	Hold / Delay Time	+/- 0-1000 Seconds	+0	
Relay Setup / Relay 2	Lag Trip	Trip Point (T1)	0-9999 (Units Selected)	3.00	
	Lag Win	Trip Window (TW)	0-9999 (Units Selected)	0.50	
	Lag Ctrl	Control Logic	OnOffOff, OnOff,On, OnHysOff, OffOnOn, OffOnOff, OffHysOn, Off, FailSafe	Off	
	Lag Asn	Input Assignment	Sensor, D1, Sensr/D1, D2, Sensr/D2, D3, Sensr/D3, D4, Sensr/D4, D1D2PmUp, D3D4PmDn	Sensr/D2	
	Lag Time	Hold / Delay Time	+/- 0-1000 Seconds	+0	
Relay Setup / Relay 3	R3 Trip	Trip Point (T1)	0-9999 (Units Selected)	3.50	
	R3 Win	Trip Window (TW)	0-9999 (Units Selected)	0.50	
	R3 Ctrl	Control Logic	OnOffOff, OnOff,On, OnHysOff, OffOnOn, OffOnOff, OffHysOn, Off, FailSafe	Off	
	R3 Asn	Input Assignment	Sensor, D1, Sensr/D1, D2, Sensr/D2, D3, Sensr/D3, D4, Sensr/D4, D1D2PmUp, D3D4PmDn	Sensr/D3	
	R3 Time	Hold / Delay Time	+/- 0-1000 Seconds	+0	
Relay Setup / Relay 4	R4 Trip	Trip Point (T1)	0-9999 (Units Selected)	4.00	
	R4 Win	Trip Window (TW)	0-9999 (Units Selected)	0.50	
	R4 Ctrl	Control Logic	OnOffOff, OnOff,On, OnHysOff, OffOnOn, OffOnOff, OffHysOn, Off, FailSafe	Off	
	R4 Asn	Input Assignment	Sensor, D1, Sensr/D1, D2, Sensr/D2, D3, Sensr/D3, D4, Sensr/D4, D1D2PmUp, D3D4PmDn	Sensr/D4	
	R4 Time	Hold / Delay Time	+/- 0-1000 Seconds	+0	
Relay Setup	Alt Pump	Alternate Pumps	0-25 Cycles	0	
4-20 mA Output Setup	4mA Out	4mA Output Point	0-9999 (Units Selected)	3.00	250
	20mA Out	20 mA Output Point	0-9999 (Units Selected)	10.00	1750
Measurement Setup	Tank Type	Measurement and Tank Types	Distance, Level, RecTank, SphrTank, VertFlat, VertCone, HoriFlat, HoriSphr	Distance	VertFlat
	ConvMult	ConversionMultiplier	0-65.535	1.000	7.4805
	TankSpan	Sensor face to bottom	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	12.00	10.5
	Tank Len	Tank Length	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	10.00	
	SpherLen	Sphere Length	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	2.0	
	Rad/Wid	Radius / Width	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	5.00	3.00
Ultrasonic Setup	UltSensit	Sensitivity	0-100	75	
	UltBlank	Blanking	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	2.00	1.5
	UltPulse	Pulses	1-20	13	
	SampRate	Sample Rate	0-9999 msec	120	
	SampAve	Sample Average	1-50	20	
	SampOOR	SamplesOutOf Range	1-50	10	
	SampWin	Sample Window	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	2.00	
	LossEcho	Loss of Echo Delay	0-1000 sec	5	
	Max Dist	Maximum Distance	5-100 feet	35	
	AutSense	Auto Sense	Off, On	Off	
	TempComp	Temperature Comp	Off, On, View	Off	
	OffstDis	Offset Distance	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	0	
	OffstPol	Offset Polarity	Positive, Negative	Positive	
	Calibrat	Calibration Factor	0-1.999	1.000	
4-20mA Setup	4ma Cal	4ma Calibration	0-9999 (Units Selected)	5000	
	20ma Cal	20ma Calibration	0-9999 (Units Selected)	5000	
Utilities	Reset	Set Factory Settings	No, Yes	No	

8.4   Example 4 - Volume in a Horizontal Tank with Spherical Ends

Variables
a.   Tank: 9 kiloliter horizontal tank with spherical ends.
     Diameter = 1.5m, Length = 3.75m, Spherical End Length = 0.3m
b.   Inputs: 35' DST sensor mounted 2 meters from bottom of the tank
c.   Outputs: 20mA Data Logger, Lead Pump, High/Low Alarm

Requirements
1.   Kiloliters of oil are to be displayed and controlled in a 9 kiloliter horizontal tank with spherical ends.
2.   A 4-20mA data logger is used to display the volume. 4ma = 1kiloliter, 20mA=6 kiloliters
3.   If the volume drops below 1 kiloliter a pump must activate until the volume reaches 6 kiloliters.
4.   If the volume drops below .5 kiloliters or reaches more that 6.5 kiloliters, a normally closed contact
     should open (setting off an alarm)

DCR-1008 Settings

- **Basic Setup:** Input = <=35'Dst   Units = Meters   Decimal = 000.00
- **Measurement Setup:** Measurement Type = Horizontal Cylinder with Spherical Ends
- **Tank Parameters:** Tank Span=2, Tank Length = 3.75, Sphere Length = .3, Tank Radius =.75,
  Conversion multiplier = 1 (Cubic meters to Cubic Kilo-Liters)
- **Relay Setup**

Relay	Wired	Device Name	Input Assignment	Sensor Control Logic	Trip 1 (T1)	Trip 2 (T2)	TW= T2-T1	Discrete Time
1	N.O.	Lead Pump	Sensor	OnHysOff	1	6	5	N/A
2	N.C.	Alarm	Sensor	OffOnOff **	.5	6.5	6	N/A

Alternate Lead and Lag Pumps = 0 (Disabled)
** Settings for N.O. Circuit. (N.C. output will be OnOffOn)

- **Ultrasonic Setup:** Blanking =1.5, Use defaults for other parameters
- **4-20mA Setup:** 4ma Output Set Point = 1 kiloliter, 20ma Output Set Point = 6 kiloliters

Programming the DCR-1008 for Example 4

All fields not colored out are required to be set. Only variances from the default settings are shown. .

Software Menu	Keypad	Description	Range	Default	Changes
Basic Setup	Units	Units	Inches, Feet, Meters	Feet	Meters
	InputSel	Sensor Type	35' DST, 50'DST, 4-20mA	35' DST	
	DecPoint	Decimal Point	00000, 0000.0, 0000.00, 00.000	000.00	
4-20 mA Setup	4mA In	4mA Input Point	0-9999 (Units Selected)	3.00	
	20ma In	20 mA Input Point	0-9999 (Units Selected)	10.00	
Relay Setup / Relay 1	Lead Trip	Trip Point (T1)	0-9999 (Units Selected)	2.50	1.00
	Lead Win	Trip Window (TW)	0-9999 (Units Selected)	0.50	5.00
	LeadCtrl	Control Logic	OnOffOff, OnOff,On, OnHysOff, OffOnOn, OffOnOff, OffHysOn, Off, FailSafe	Off	OnHysOff
	Lead Asn	Input Assignment	Sensor, D1, Sensr/D1, D2, Sensr/D2, D3, Sensr/D3, D4, Sensr/D4, D1D2PmUp, D3D4PmDn	Sensr/D1	Sensor
	LeadTime	Hold / Delay Time	+/- 0-1000 Seconds	+0	
Relay Setup / Relay 2	Lag Trip	Trip Point (T1)	0-9999 (Units Selected)	3.00	0.5
	Lag Win	Trip Window (TW)	0-9999 (Units Selected)	0.50	6.00
	Lag Ctrl	Control Logic	OnOffOff, OnOff,On, OnHysOff, OffOnOn, OffOnOff, OffHysOn, Off, FailSafe	Off	OffOnOff
	Lag Asn	Input Assignment	Sensor, D1, Sensr/D1, D2, Sensr/D2, D3, Sensr/D3, D4, Sensr/D4, D1D2PmUp, D3D4PmDn	Sensr/D2	
	Lag Time	Hold / Delay Time	+/- 0-1000 Seconds	+0	
Relay Setup / Relay 3	R3 Trip	Trip Point (T1)	0-9999 (Units Selected)	3.50	
	R3 Win	Trip Window (TW)	0-9999 (Units Selected)	0.50	
	R3 Ctrl	Control Logic	OnOffOff, OnOff,On, OnHysOff, OffOnOn, OffOnOff, OffHysOn, Off, FailSafe	Off	
	R3 Asn	Input Assignment	Sensor, D1, Sensr/D1, D2, Sensr/D2, D3, Sensr/D3, D4, Sensr/D4, D1D2PmUp, D3D4PmDn	Sensr/D3	
	R3 Time	Hold / Delay Time	+/- 0-1000 Seconds	+0	
Relay Setup / Relay 4	R4 Trip	Trip Point (T1)	0-9999 (Units Selected)	4.00	
	R4 Win	Trip Window (TW)	0-9999 (Units Selected)	0.50	
	R4 Ctrl	Control Logic	OnOffOff, OnOff,On, OnHysOff, OffOnOn, OffOnOff, OffHysOn, Off, FailSafe	Off	
	R4 Asn	Input Assignment	Sensor, D1, Sensr/D1, D2, Sensr/D2, D3, Sensr/D3, D4, Sensr/D4, D1D2PmUp, D3D4PmDn	Sensr/D4	
	R4 Time	Hold / Delay Time	+/- 0-1000 Seconds	+0	
Relay Setup	Alt Pump	Alternate Pumps	0-25 Cycles	0	
4-20 mA Output Setup	4mA Out	4mA Output Point	0-9999 (Units Selected)	3.00	1.00
	20mA Out	20 mA Output Point	0-9999 (Units Selected)	10.00	6.00
Measurement Setup	Tank Type	Measurement and Tank Types	Distance, Level, RecTank, SphrTank, VertFlat, VertCone, HoriFlat, HoriSphr	Distance	HoriSphr
	ConvMult	ConversionMultiplier	0-65.535	1.000	
	TankSpan	Sensor face to bottom	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	12.00	2
	Tank Len	Tank Length	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	10.00	3.75
	SpherLen	Sphere Length	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	2.0	0.3
	Rad/Wid	Radius / Width	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	5.00	0.75
Ultrasonic Setup	UltSensit	Sensitivity	0-100	75	
	UltBlank	Blanking	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	2.00	.457
	UltPulse	Pulses	1-20	13	
	SampRate	Sample Rate	0-9999 msec	120	
	SampAve	Sample Average	1-50	20	
	SampOOR	SamplesOutOf Range	1-50	10	
	SampWin	Sample Window	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	2.00	
	LossEcho	Loss of Echo Delay	0-1000 sec	5	
	Max Dist	Maximum Distance	5-100 feet	35	
	AutSense	Auto Sense	Off, On	Off	
	TempComp	Temperature Comp	Off, On, View	Off	
	OffstDis	Offset Distance	0-1398 Inches, 0-116.5 feet, 0-35.509 meters	0	
	OffstPol	Offset Polarity	Positive, Negative	Positive	
	Calibrat	Calibration Factor	0-1.999	1.000	
4-20mA Setup	4ma Cal	4ma Calibration	0-9999 (Units Selected)	5000	
	20ma Cal	20ma Calibration	0-9999 (Units Selected)	5000	
Utilities	Reset	Set Factory Settings	No, Yes	No	

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