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Â	This safety alert symbol is used in the manual and on the device to alert of potential risk for serious injury or death.
<u>A</u>	This safety alert symbol identifies risk of electric shock .
	This safety alert symbol identifies risk of fire .
	This safety alert symbol identifies risk of serious injury or death .
A DANGER	Warns of hazards that, if not avoided, will result in serious injury or death.
	Warns of hazards that, if not avoided, could result in serious injury or death.
	Warns of hazards that, if not avoided, could result in minor or moderate injury.
NOTICE	Signals an important instruction related to the system. Failure to follow these instructions could result in pump system failure or property damage.

Failure to read and understand the information provided in this manual may result in death or serious injury or damage to the product or product failure. Please read each section in its entirety and be sure the information provided is understood before attempting any of the procedures or operations.

AWARNING A RISK OF ELECTRIC SHOCK

- This product must be installed in accordance with National Electrical Code, ANSI/NFPA 70 so as to prevent moisture from entering or accumulating within the controller housing.
- Disconnect power prior to servicing.
- More than one disconnect switch may be required to de-energize the equipment before servicing.

- A qualified service person must install and service this product according to applicable codes and electrical schematics.
- Do not connect power to this equipment if it has been damaged or has any missing parts.
- Do not install in areas with: excessive or conductive dust, corrosive or flammable gas, moisture or rain, excessive heat, regular impact shocks, or excessive vibration.

AWARNING A RISK OF FIRE

 Do not use this product with flammable liquids. Do not install in hazardous locations as defined by National Electrical Code, ANSI/NFPA 70.

AWARNING	Read every supplied manual before using this device and the pump system. Follow all the safety instructions in manual(s), on the pump and the device. Failure to do so could result in serious injury or death.		
NOTICE	Installer: manual must remain with owner or system operator/maintainer.		
	Record information below:		
		LEP-Link ID#:	
Keep this manual	handy for future reference.	Pump Model #:	
For replacement i or contact Liberty	nanual, visit LibertyPumps.com/LEP, Pumps at 1-800-543-2550.	Pump Serial #:	
ŗ	'	Control Model #:	
Dealer:		Purchase Date:	
Dealer Ph:		Install Date:	

Introduction

Designed for municipal wastewater lift stations and similar applications, the LEP-Link[™] is a simple and effective RTU (Remote Telemetry Unit) for management of a wastewater collection system via a cellular network. Alarms are monitored and service personnel notified in the event of a failure.

Data logging and trending of critical information enables the User to visually track system performance and recognize impending problems. The station data can be visualized in a simple and intuitive way from a web browser on a PC, tablet, or smartphone.

The LEP-Link remote pump monitoring system is designed to be connected to most simplex or duplex lift station type control panels. The LEP-Link RTU monitors various pump data and relays this data to the cloud, via a cellular network, then to a secure website where it can be accessed and monitored from virtually anywhere in the world.

Product Information

Two LEP-Link versions are available:

- RTU-100 (Digital I/O only)
- RTU-200 (Analog & Digital I/O)

The RTU module can be ordered for direct panel mounting, or pre-assembled in a NEMA 4X enclosure for outdoor mounting near an existing panel, suitable for installation in a fiberglass or thermoplastic enclosure. An antenna is included with each RTU unit.

Note: RTU-100 includes one year of cellular service, antenna, and User Manual; the RTU-200 includes one year of cellular service, antenna, current transducer, and User Manual.

RTU

RTU-100 and 200 are available for installation inside a control panel.

RTU-100



Figure 1. RTU-100

RTU-200

An RTU-200 includes a separate current transducer.



Figure 2. RTU-200



Figure 3. RTU-200 Current Transducer

Antenna

An antenna is supplied with each RTU-100 and RTU-200 unit and is suitable for installation of the unit in a fiberglass or thermoplastic enclosure.

Consult Liberty Pumps for installation in a metal enclosure.



Figure 4. RTU Antenna

RTU Features

The LEP-Link RTU monitors pump run, run time, cycles, amps¹, and flow. It can also monitor system in-flow¹, power failure, level, and level alarms¹. This data is then accessible via a secure website where it can be accessed and monitored from virtually anywhere in the world.

- Li-ion backup battery for power loss detection and notification
- SMS, email, and web portal alarm notifications
- Graphical HMI with simple and clear station status display
- View all pumping stations on an interactive map
- Data logging and historical trending
- First year of service included



Figure 5. RTU Features

LLink

LLINK is available for installation outside a control panel or for retrofit applications. Included in the LLink-100 is an RTU-100, and an LLink-200 with an RTU-200.

LLink Details

- Can monitor lift stations with up to two pumps
- 10 x 8 x 6 NEMA 4X thermoplastic enclosure
- Requires 120/240 VAC supply power
- DC power supply and battery backup (Digital I/O only)
- 100/150/200 A to 4-20 mA current transducer (RTU-200 only)



Figure 6. LLink Exterior



Figure 7. LLink Interior (RTU-200 shown)

^{1.} Available with the RTU-200

LEP-Link Account Setup and Activation Form

Data management for LEP-Link remote cellular devices is hosted by AMI Global, 6280 S. Valley View Blvd. Suite 212, Las Vegas, NV 89118. Both LEP-Link RTUs are provided with one year of pre-paid cellular service. Activation of the device is required for operation. An account needs to be set up if this is the initial RTU device. Fill in the following form for **New** or **Existing** account information. Device ID is located on the lower front left of the device. After completion of the first year, AMI Global will contact the User on the account directly to extend the service (in two additional year increments).

Account Name:	Example: City of Fargo
First Name:	Example: John
Last Name:	Example: Smith
Email Address:	Example: jsmith@cfargo.gov
Phone:	Example: (123) 456-7890
Billing Address:	Example: 1234 Elm St
Billing City, State Zip:	Example: Fargo, MN 58102
Billing First Last Name:	Example: Judy Miller
Login User Name:	Example: Fargo123
RTU Unit ID:	Example: 68023

Who Should Use this Form?

End Users who wish to create an account for monitoring *LEP-Link* devices. End Users will be responsible for the service fee after the initial period is complete.

Example of End Users: A City, Municipality, Water district, Utility Service Company, etc...

Why Create an Account?

This form provides contact and billing information to AMI (Service Company). This will allow them to contact the End User directly with service renewal options after the initial period is complete.

A login and password will be set up to grant access to the LEP-Link web portal.

Where to Send this Form?

Complete this form and send to your *LEP-Link* contact person:

Peiter Poulton	<peiter.poulton@libertypumps.com></peiter.poulton@libertypumps.com>	800-543-2550
Administrator	<lep@libertypumps.com></lep@libertypumps.com>	800-543-2550

When to Create a New Account?

This form must be submitted at least 24 hours prior to the *LEP-Link* activation.

What Happens Next?

Once the form is submitted, the End User will receive an e-mail (sent to the email address entered in the form) from AMI with a link and instructions for login and account verification. Click on the link or cut and paste it into your browser. Once the account is verified, power up the device for final activation and setup. The device is then ready for use.

For security reasons, this must be done within 48 hours or the link will deactivate.

For Activation of Future LEP-Link RTUs

Once the account is setup, the End User can activate additional *LEP-Link* RTUs in the future by filling in the *Account Name* and the *Device ID* of the *LEP-Link* RTU that needs to be activated.

Mounting the RTU

Unit dimensions are $5.5^{"}$ W x $4.5^{"}$ H x $3.5^{"}$ D (with antenna at 90°). RTU can be DIN rail mounted (Figure 8) or panel mounted (Figure 9) with four screws.



Figure 8. DIN Rail Mounted RTU

Wiring



Figure 9. Panel Mounted RTU



Figure 10. RTU-100 Schematics



Figure 11. RTU-200 Schematics with Transducer

Sensor Wiring

Connect the RTU-200 current transducer as per the schematics on page 8. Open the core of the current transducer by pressing on the lever. Ensure that one incoming power conductor passes through the center of the current transducer.



Figure 12. Current Transducer Wiring

Wire the pump run inputs to a non-powered auxiliary contact in the control panel, which closes when the pump is called to run. These must be wired for each pump.

Motor contactor auxiliary contacts for reference only. Actual contactor configuration may differ.



Figure 13. Aux Contact Example

Mounting the LLINK Panel

Mount the LLINK panel using a solid base such as treated posts with a treated plywood overlay. Mounting on Unistrut® or other metal structure is also common. Use the appropriate hardware for securely anchoring the LLINK panel to the metal structure.



Figure 14. LLINK Mounting Example

LLINK Panel Wiring

When wiring the LLINK panel, be sure to use liquid-tight conduit or strain relief fittings. Refer to Figure 10 / Figure 11 (as applicable) for wiring schematic.



Figure 15. LLINK Panel Interior View

Conduit Options

Use liquid-tight conduit or strain relief fittings to run cables between the LLINK and the lift station control panel. Do not run conduit from the LLINK to the wet well.





Activating the Battery

Battery Connection

The RTU units are equipped with an internal Li-ion battery. This battery will enable operation during power loss (24 Vdc) and send out alert notifications for power loss and any digital input alerts.

Note: The battery is not able to power the current transducer. The battery is shipped disconnected and must be switched on before startup.



Figure 17. Battery Switch

System View



Figure 18. LLINK Installation Example

RTU Troubleshooting

Troubleshooting LEDs

LED Number	LED Color	Function		
Function LEDs at top of RTU		4 3 2 1 12		
4	Yellow	Heartbeat Flash = ONLINE Fast Flash = OFFLINE		
3	Red	Alarm/Fault present		
2	Blue	Connecting to Cellular network (on power up)		
1	Green	Cellular Modem Power		
12	Green	External power (24 Vdc)		
Status LEDs at bottom of RTU Input Status LEDs				
n/a	n/a	I/O Status		

Each input has a corresponding LED indicator above the input terminal. The relay output also has an LED indication.

RTU Communication

The RTU signal strength can be checked on the web portal. Go to **Setup/Ver & Comm** to see the RSSI value.

RSSI Thresholds

RSSI is a measurement of the power present in a received radio signal (Received Signal Strength Indicator). The larger the number, the better the reception.



Below is a guideline to appropriate strength thresholds:

- 1-5 = very poor (no communication)
- 6-8 = poor (inconsistent communication)
- 9-11 = good (little to no communication issues)

>12 = best

Logging In

Click on the following link or type the following URL in a browser to open the login screen: http://www.lep-link.com. Google Chrome or Mozilla Firefox are the recommended web browsers.

Remote Pump Monitoring	
Device ID	
0	a Continue

Figure 19. Login Screens - Register Device



Figure 20. Login Screens

Customer Service Agreement and Terms of Use

This agreement outlines the agreement between AMI and the End User and must be agreed to before access to the cloud interface is allowed.

An automatic email is generated and sent to the email address entered. Follow the link in the email to verify and activate the account.

After activation, the User must agree to the *Terms of Use*. These steps only need to be completed during the initial setup and activation of an initial account.

Note: The End User should activate this product. When the initial one year of cellular service comes to an end, AMI will contact the End User directly to review renewal options. The primary User (Account Admin) will be able to add additional Users for login and alarm notification. The cellular service plan provided with the RTU-100 only covers text (SMS), and additionally data for the RTU-200 unit. It does not cover SMS and data service charges incurred for the use of a personal cell phone or tablet.

Access Levels

The portal has three access levels:

- Liberty Pumps
- Account Admin
- User

Note: There may be multiple Account Admins and Users per account, but each Account Admin or User can only be assigned to one account.



Figure 21. Access Level Example

Table 2. User Privileges	
--------------------------	--

	Create Accounts	Create Account Admins	Create Users	Run Reports
Dealer (LP)	Х	Х	Х	Х
Account Admin ¹			Х	Х
User				Х

¹ Account Admin and User can work within assigned account only

Viewing/Searching For Your Device

After completing the registration procedure, access is provided to all of the RTUs contained within. There are multiple ways to search for/find/select a controller:

- From Map (Satellite or road view available)
- From List
- From Tree View
- Search by RTU Name or ID
- Sort by RTU Name or ID

From Map

Once logged in, the interactive map appears on the main screen. If RTUs have already been located on the map, they will appear here. The next section explains how to place the RTU on the map.

Right-click on a controller to see the device ID and other pertinent information. To select an RTU, click on the *RTU* icon.



Figure 22. Search for Device from Map

From List

Select an RTU by Device ID.

oard								
							(Q Search Device
	oc roculte							
evice	es results							
evice	es results							= -
w 10	entries						Search:	8
w 10	entries PeviceID	Device Name	Oem Name 🗢	Dealer Name 🗢	Account Name	Rssi ©	Search:	Active
w 10	entries PeviceID	Device Name = LS 35	Oem Name ORTU-100	Dealer Name	Account Name City of Lake Jackson	Rssi © 19	Search:	Active Active
	entries entries	Device Name = LS 35 LS 20	Oem Name C RTU-100 RTU-100	Dealer Name Cliberty Pumps	Account Name City of Lake Jackson	Rssi © 19 16	Search: Last Comm 11/02/2017 09:04:48 AM 11/02/2017 09:00:47 AM	Active Active Active



From Tree View

On the left side of the window, all RTUs in the account are permanently displayed and can be clicked at any time to move from one RTU to another.

To select an RTU from the Tree View, click on the **RTU** icon.

lcon	Status	Color
0	RTU-100 (offline)	gray
Ø	RTU-100 (online)	green
Ø	RTU-200 (offline)	gray
Q	RTU-200 (online)	green

Ø	60013 LEP-L 3G
Q	60014 LEP-L 3G
Q	60016 LEP-L 3G
Q	60018 LEP-L 3G
Q	60019 LEP-L 3G
Ø	60025 LEP-L 3G
$\mathbf{\Omega}$	63064 LEP-L 3G
\bigcirc	63225 LEP-L 3G

∭ Map ≣ List

æ

Dashboard

Searching and Sorting by RTU ID or Name

Select the "List" view from the Dashboard to search devices based on any of the top row items: Device ID, Device Name, Account Name, etc.

All board	d							
							Q Search	
Dev	lces resi	ults -			Enter ID # or Devi	ce na	ame	
Show 10 y ensues Search 65								
	DeviceID®	Device Name 🔹	Oem Name 🕈	Dealer Name 🗢	Account Name 🗢	Rssi ¢	Last Comm 🗢	Active
0	65000	65000 Liftstation #2	RTU-200	Liberty Pumps	City of Gibbon	9	11/02/2017 09:24:39 AM	Active
0	65001	4"rental pump	RTU-200	Liberty Pumps	Sander	20	11/02/2017 10:24:27 AM	Active
	65002	Oceanview P.S.	RTU-200	Liberty Pumps	Stantec - GSP	14	11/02/2017 10:25:11 AM	Active
ଥ								
ର ପ୍ର	65003	lift station 01	RTU-200	Liberty Pumps	City of Poteau	16	11/02/2017 09:24:16 AM	Active

Figure 24. Search for Device by ID or Name

Placing an RTU on the Map

Account Admins can place individual controllers on the map interface powered by Google Imagery.

Q Search Device	Summary 🗙
→ 🔳	OPending downloads
	💢 0 Disconnected controllers
	🚯 1Unallocated Controllers
	Q Homestead P.S.

Figure 25. Placing an RTU

Placing a Controller on the Map (Dashboard - Map View)

Click and release the unallocated device, then click on the map to drop. Drag and drop to the desired location, then save.

Dashboard	Save position
мар Select Edit	when done Д
T All T Edit Oni	ractive 💾 🗲 💼 Q 📤 Q. Locate Address Q
Map Satellite	147 (544) (554) (5

Figure 26. Placing a Controller

User Setup

Account Admins have the ability to create/edit/delete Users, but not other Account Admins. To set up additional Account Admins, contact Liberty Pumps.

New User Setup

Click **WELCOME** at the top right of the page, then select Users.

ø	Welcome, T
🛓 Down	load
🛃 Deale	rs
曫 Accou	nts
A <u>Users</u>	
😭 Manag	ge Inventory
🔍 Regist	er Device
ப் Logout	

Figure 27. Add New User

a lisers		
Users		
🕼 Edit 🛛 🛱 Save 📋 Dele	te 🕈 New 🕈 Impersonate	
Dealers	Accounts	
Liberty Pumps	West Lab	r
Users List	User Details	
۹	User Name*	ABC_123
greust	First Name*	John
Joshua	Last Name*	Smith
Wayne123	Primary Email*	John.Smith@coolcompany.com
	Secondary Email	
	Mobile Phone	12223334444
	Fax	
	Comments	Example
	Approve Date	11/16/2017
	Language	English
	Access Level	User 🔻

Figure 28. New User Setup

Set up new account as desired.

Once a new User account is created, an email will be sent to the new User's email address. The User will have 48 hours to use the link on the email to verify the information listed above. This verification process is in place to ensure that new Users are aware and willing to receive future alarm notifications. If the User account is not verified, the account is not activated.

Dashboard

Ensure that the RTU has been properly configured. The functionality of this system is dependent on the setup of the RTU(s).

The data on the screen may not display the latest RTU values. Use the *GET STATUS* button to update to the most current values.



Figure 29. Dashboard Use

RTU Setup

Click on the **SETUP** button on the top row of the Main Screen to enter the RTU edit screen.



Figure 30. RTU Setup

Click **SAVE** to store changes. It may take a few seconds to take effect.

Online/Offline Trigger Alert Setup

The RTU has the ability to alert a User when the RTU transitions from online to offline and vice versa.

Click on the **Ver&COMM** tab on the setup screen to set up the online and offline triggers.

Ver & Comm Setup

a in	E Reports	≡ Setup	G Back To Dashboard
tup	Ver&Comm	LS 35(630	4) 🗟 🖸
Ge	t Status		
Vei	rsions		
Ve	rsions		
VA	POR version		18.14
На	rdware versi	on	2.1
Mo	odem versior		12.24
RS	RSSI		19
Ce	II ID		2812
SI	M		8934071179003596960
IM	EI		351579054557184
La	st Comm		11/6/2017 4:35:11 PM
De	veloper Cod	2	0
Ser	ver Alert	2	
JCI	Ver Alere	,	
8	Save		
1	Active Nar	ne	Text Email
	 Off 	ineTrigger	d OfflineTriggered

Figure 31. Notification Setup

See *Alarm Notification Setup* on page 18 for more information.

The Online Triggered notification will alert the selected User when the RTU is connected to the cellular network and transmitting to the server.

The Offline Triggered notification will alert the selected User if the RTU is no longer online (not connected to the server). This can be as a result of power loss for a prolonged time, or a drop in cellular service. It can take the server up to 20 minutes to detect this condition.

Several templates are available to visualize your remote controller. There is a unique template for the RTU-100 and RTU-200. The template shown below is for the **RTU-200**.



Figure 32. RTU Visualization

Alarms

RTU-100 and RTU-200:

Alarm 1-4: These alarms become active upon a contact closure (see *Wiring* on page 7). The label "Alarm 1" can be changed to describe the actual alarm condition. Example: "P1 Fail". See *Main Screen Configuration* on page 16 for instructions on how to edit text on the Main Screen.

LED Indication: The LED indication on the screen will turn red when the alarm is active. Configure the alert notification by clicking on the indicator.

Power: If 24 Vdc power is lost for more than the set time (see Configuration screen). The 3.7 Vdc battery must be connected.

P1-2 Runtime Alarm: The pump ran continuously for longer than the set time (see Configuration screen). This condition may indicate a pump clog, a high in-flow event, or sensor fault.

RTU-200 Additional Alarms:

Xdcr High: Level transducer High Level alarm. This alarm set point and timer value are set in the configuration screen. The tank level value will change to zero if 24 Vdc power is lost and the RTU is running on the 3.7 V Li-ion battery. The High Level alarm will no longer be active during this condition.

It is recommended to have a 24 Vdc battery backup system to ensure alarm notification during power loss. Alternately, a high level float switch may be connected to any of the four digital alarms and activate during power loss. **Xdcr Low:** Level transducer Low Level alarm. This alarm set point and timer value are set in the configuration screen. This alarm will not be active on power loss (24 Vdc), and running on the 3.7 V Li-ion battery.

P1-2 High Amps: The pump running amps are higher than set point for longer than the set timer (see Configuration screen).

P1-2 Dry Run Alarm: The pump running amps are lower than set point for longer than the set timer (see Configuration screen).

Relay Button

AWARNING 🛕 RISK OF SERIOUS INJURY OR DEATH

- Machine may start unexpectedly and cause serious injury or death. User must have confirmation that all personnel are free and clear from moving parts and the electrical panel before activating the relay remotely.
- Only allow qualified operators to remotely activate the relay. The relay remote operation must be part of a fail safe electrical circuit that would shutdown the equipment before failing or cause damage/injury.
- Local and National safety codes must be followed.

Pressing the *ReLAY* icon on the screen will remotely energize the relay in the RTU. The relay will only stay ON for two seconds, then it will turn OFF automatically.

The label text below the relay button can be edited to describe the function of the relay. Example: "Silence Horn".

Ack Fault Button and Indication

The **Ack FAULT** button must be pressed after an alarm within the set time (See Setup screen). If an alarm becomes active, the timer starts and the operator must acknowledge the alarm on the screen before the timer times out (default value is 20 min). If not acknowledged, the OK indicator turns red and can be used to notify other Users of the failure to acknowledge. This function is useful if only one User is on standby, and may not be able to respond in a timely manner.

Click on **OK** to set the Alert notification. Leave it blank if not using this function.

Station Data (trending available - see Reports and Trending section)

Wet Well Level: Level of the wet well as measured by the transducer.

P1-2 Amps: Pump Current snapshot captured 30 sec after motor start by the current transducer.

P1-2 Cycles: The number of start cycles occurred since midnight.

P1-2 Runtime Minutes: Accumulated motor run since midnight. View reports (accumulation for full run analysis day/week/month).

Station In-Flow (GPM): The measurements are calculated using the wet well level, the tank diameter, and the fill time. It is a very useful data point to track peak flow hours and to detect storm water infiltration issues.

P1-2 GPM: The measurements are calculated using the wet well level, the tank diameter, the fill time, and discharge time. It is a very useful data point in tracing the performance on each pump, and to understand the effect of changing head conditions.

Pump Data: These values are not measured. They are used as reference and for recordkeeping. It is valuable to compare the pump FLA to the actual Amps on the screen for setting High Amp and Dry Run Alarms. It is also a quick way to check the pump data before making a service call to the station.

Main Screen Configuration

Main Screen - Editing Text Labels



Figure 33. Text Labels

The Edit Text function enables the User to change the text on the screen to match the function of the alarm assigned in the field.



Figure 34. Edit Text Labels

Edit text labels as desired.

To save changes, press 💾 . To cancel edits, press 🗙 .

Station Parameter Configuration



Figure 35. Station Parameter Setup

Click on **SETUP** to navigate to the parameter Setup screen. Edit values are required. Press **SAVE** after edits to store values to the RTU.

			Save
Parameter		Value	Unit
Alarm 1 delay		60	Sec
Alarm 2 delay		60	Sec
Alarm 3 delay		2	Sec
Alarm 4 delay		0	Sec
Power loss Alarm delay		0	Sec
High Tank Level Alarm d	elay	0	Sec
Low Tank Level Alarm delay		0	Sec
Acknowledge Alarm Dela	ау	0	Min
10 01			-
evel Sensor Setup			Save
Parameter	V	alue	Unit
Range (20mA)	34.7		Ft
Offset	1.0		Ft
Current Sensor Setup			Save
Parameter	V	alue	Unit
Range (20mA)	100.0		Δ

Get Daramete

Alarm Setup	Save	
Parameter	Value	Unit
High Tank Level	11.0	Ft
Low Tank Level	2.5	Ft
P1 Max Runtime	0	Min
P2 Max Runtime	0	Min
P1 High Amp	60.0	A
P2 High Amp	60.0	A
P1 Dry Run	37.0	А
P2 Dry Run	37.0	A
P1 Dry Run Delay	10	Sec
P2 Dry Run Delay	10	Sec

Parameter	Value	Uni
Tank Diameter	10.4	Ft
Flow Calc. Start Level	5	Ft
Flow Calc. Stop Level	4	Ft

Pump Data		Save
Parameter	Value	Unit
Pump HP	25.0	HP
Pump Voltage	230	V
Pump FLA	60.0	A

Figure 36. Edit Station Parameters

Table 3. Station Parameter Details

Parameter Purpose		Default Value
Alarm 1-4 delay	Delay timer used to confirm the presence of a closed contact.	2 sec
Power loss Alarm delay	Delay timer used to confirm the loss of the 24 Vdc power supply.	30 sec
High Tank Level Alarm delay	Delay timer used to confirm the presence of a high level measurement from the transducer. This alarm is triggered by the High Tank Level value.	5 sec
Low Tank Level Alarm delay	Delay timer used to confirm the presence of a low level measurement from the transducer. This alarm is triggered by the Low Tank Level value.	5 sec
Acknowledge Alarm delay	If an alarm becomes active, the timer starts, and the operator must click the Ack FAULT button on the screen before the timer times out. If not acknowledged, the OK indicator turns red and can be used to notify other Users of the failure to acknowledge. This function is useful if only one User is on standby, and may not be able to respond in a timely manner.	20 min

Level Sensor Setup (sold separately for RTU-200)

Table 4. Level Sensor Details						
Parameter	Definition	Default Value				
Range (20 mA)	Level transducer measurement range. Value in ft for 20 mA output.	15 ft				
Offset	Level transducer distance above the bottom of the tank. This value is added to the measurement.	1 ft				

Current Sensor Setup (supplied with RTU-200)

Table 5. Current Sensor Details

Parameter	Definition	Default Value	
Range (20 mA)	Current transducer measurement range. Value in A for 20 mA output	100 A	

Alarm Setup

Set values to "0" in the alarm setup to disable the alarm function.

Parameter	Definition	Default Value
High Tank Level	High level set point for transducer high level alarm	12 ft
Low Tank Level	Low level set point for transducer low level alarm	0 ft
P1-P2 Max Runtime	Max timer value for pump runtime during a single cycle. The RTU is equipped with a maximum run time indicator. The unit can be configured to activate a message if a pre-determined maximum run time, per pump cycle, has been exceeded. This alarm requires the User to click on ACK FAULT to clear.	30 min
P1-P2 High Amp	Max timer value for pump runtime during a single cycle. The RTU is equipped with a high amp indicator. The unit can be configured to activate a message if a pre-determined maximum value has been exceeded. This alarm requires the User to click on ACK FAULT to clear.	80 A
P1-P2 Dry Run	Dry Run indication uses the motor current measurement to determine whether a pump is running dry (no load). For a submersible pump, the current draw will typically drop 30% from normal when running dry. Consult the Liberty Pumps for this value and test this fault, if possible. The amp set value corresponds to the minimum amp value that the pump should draw during normal operation. If the current drops below this value for longer than the Dry Run Delay, the RTU will display a "Dry Run" fault. The "Trip Delay" time is used to avoid nuisance tripping. This alarm requires the User to click on ACK FAULT to clear.	0 A

Flow Monitoring Setup (RTU-200)

Volumetric flow measurement is available when a level transducer is used in a cylindrical tank. The RTU-200 unit calculates the volume of liquid based on the level. The flow is calculated by using the volume and the fill/discharge times. The in-flow and the discharge flow is measured. The Flow Calc. Level set points are not used for controlling the pump. They are used for volumetric flow calculation. The flow calculation is based on the diameter of the tank, the Start Flow Calc. and Stop Flow Calc. level set points, and the fill and discharge times. Both In-Flow and Discharge flow are calculated during every cycle.

Tank Diameter: Enter the tank diameter in ft

- Flow Calc. Start Level: See below (in ft)
- Flow Calc. Stop Level: See below (in ft)

Important notes on flow setup:

Set Flow Calc. Start Level at least 4" below the pump start level. Set Flow Calc. Stop Level at least 4" above the pump stop level.

The flow accuracy is better with longer cycle times (2 min or more).

Note: When using a rectangular tank, the equivalent diameter would be: d = $2\sqrt{L\times W/\pi}$.

Example: A 10 x 10 tank would equate to a diameter of 11.28. Enter this value and get the flow calculations as if it was a cylindrical tank.



Figure 37. Flow Monitoring Example

Pump Data

The Pump Data screen is for information only. It is a record of the pump HP, Volts, and FLA.

Pump HP: Enter pump horsepower.

Pump Voltage: Enter pump rated voltage.

Pump FLA: Enter pump FLA as shown on the nameplate.

Alarm Notification Setup

There are three options to receive alerts:

- Email
- Email to text
- SMS

The User phone number needs to be setup on the Users tab (see *User Setup* on page 13). Under Mobile Phone, make sure to put a "1" (US/CANADA) before the phone number.

sers			
🕼 Edit 🖺 Save 🗎 De	lete 🖶 New 🖶 Impersonate		
Liberty Pumps	* LEP :	v	
Users List	User Details		
Q pw	User Nam	ne pweami	
amipumpwatch	First Nam	e* PWE	
pumpworks	Last Nam	AMI	
pwatch	Primary Ema	ail* pweami@gmail.com	
	Secondary Ema	all	
	Mobile Phor	13335551212	
	Fa	X	
	Commen	ts	
	Approva Da	7/7/2015	
	Approve Da	Nene	
	Access Lev	el Account-Admin	*
		- Account-Admin	



Connecting Alerts to User

Email/SMS Alarm Notifications

Click on the alarm indicator to launch the "Bit Alerts" dialog box.



Figure 39. Alarm Notification

Click on **Select Users** to select which User will be notified when the alarm goes ON (Condition set alert), and when the alarm goes OFF (Condition reset alert). Multiple Users may be selected for notification. See **New User Setup** on page 13 to create additional

Type in the Alert text message that will be delivered. The name of the station is not necessary in the text as it is always sent as part of the notification.

Users.

User	@1 @2 SMS			Escalation	1	Escalation 2		
amichase	~		~	ColinChen	۳	joez	Ŧ	
carrollholmes				None	Ŧ	None	Ŧ	
ColinChen				None	٣	None	Ŧ	
ddemo				None	٣	None	٣	
eremyd				None	v	None	Ŧ	
oez				None	Ŧ	None	Ŧ	
loshua				None	Ŧ	None	Ŧ	

Figure 40. Alarm Escalation Setup

Escalation

In addition to the original SMS message, you can assign escalated Users. The escalation can happen two ways: forced or timed. The forced way is initiated by the User(s) that receive the initial SMS when they text a code that will escalate to the assigned User.

SMS Notification

The timed escalation will happen when the initial User does not acknowledge the message. The escalation time is fixed at 30 min.

Example of SMS sent:

```
Device Name → Device RTU-200
Device ID → (63012) sent alert:
Generator fault If
Fault Description → you will handle this
alert please reply
1851 if you want to
Escalation Instructions → escalate please
reply E1851
```



Email Notification Example

Alert Controller # [60003] PWE Modbus

Figure 42. Email Example

Email to Text

It is possible to convert an email into an SMS (text). This function is made available by some cellular carriers. Check with the specific carrier for more information. Below are some examples:

AT&T - cellnumber@txt.att.net

Verizon - cellnumber@vtext.com

T-Mobile - cellnumber@tmomail.net

Sprint PCS - cellnumber@messaging.sprintpcs.com

Virgin Mobile - cellnumber@vmobl.com

US Cellular - cellnumber@email.uscc.net

Nextel - cellnumber@messaging.nextel.com

Boost - cellnumber@myboostmobile.com

Alltel - cellnumber@message.alltel.com

Example: Phone number is 444-333-2222 with Verizon, the email address for notification is 4443332222@vtext.com.

The SMS report can be found in the Reports tab.

		A Main	Reports	≡ Setup	G Back To Dashboard
Generate Start Date 1	0/06/2017 End Date 10/13/2017	Reports	Graph Graph Tabula Messa Email SMS Re	r ge Report Report eport	9) S 1
Sent Time	Ack Time	¢ Me	ssage		
0/12/2017 02:30 PM		Ger	nerator ok		
0/12/2017 02:29 PM		Gen	nerator fau	lt	
0/12/2017 02:26 PM		Ger	nerator ok		
0/12/2017 01:54 PM		Gen	nerator ok		
0/12/2017 01:43 PM		Gen	nerator ok		
0/12/2017 12:40 PM		Gen	nerator fau	lt	
0/12/2017 12:40 PM		Ger	ierator ok		
0/11/2017 03:36 PM		Gen	nerator ok		
0/11/2017 08:33 AM		Ger	ierator ok		
0/10/2017 10:19 AM		Ger	nerator fau	lit	
/0/10/2017 10:19 AM		Ger	ierator ok		

Figure 43. Escalation Report Example

All notifications sent are logged and can be viewed in a tabular format. The table can be exported to an Excel spreadsheet (example shown).

Message Time	Delivered Time	ToAddress	Subject	TextPart	
8/10/ 2018 8:57	8/10/2018 8:57	youremail@server.com	Alert Controller # [7160] LS #10 St Pete Beach	#8 High Level Float - Reset	
8/10/ 2018 8:52	8/10/2018 8:50	youremail@server.com	Alert Controller # [7160] LS #10 St Pete Beach	#4 Power Fail - Rest	
8/10/ 2018 8:50	8/10/2018 8:50	youremail@server.com	Alert Controller # [7160] LS #10 St Pete Beach	#8 High Level Float	
8/10/ 2018 8:36	8/10/2018 8:26	youremail@server.com	Alert Controller # [7160] LS #10 St Pete Beach	#1 Fault Acknowledged	
8/10/ 2018 8:29	8/10/2018 8:29	youremail@server.com	Alert Controller # [7160] LS #10 St Pete Beach	#3 Power Fail	

Reports and Trending

Five types of reports are available:

- **1. Graph**: provides the ability to view historical trends of various data point.
- 2. Tabular: ability to view and export data in a .cvs or Excel file.
- 3. Message: reports (notifications) generated from the server.
- 4. Email: list all notifications sent to a valid email address.
- 5. SMS: lists all notifications sent via SMS to a smart device.

Reports are very useful for evaluating the health of the pumping station and for detecting abnormal operation.

Example: High inflow from water infiltration from a storm or other event. This data can be downloaded in various formats and shared.

- 1. Click on the **REPORT** icon on top of the screen
- 2. Click on GRAPH
- 3. Select In-FLOW GPM to view chart



Figure 44. Reports Example



Figure 45. Reports Results

Click on Start Date and End Date to select a data time range. Large ranges will take longer to download.

10/0	3/201	17	End D	ate	10/10	/2017
+		Oct	tober	2017		•
Su	Мо	Tu	We	Th	Fr	Sa
1	2		4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				
	10/0 • Su 1 8 15 22 29	10/03/201 Su Mo 1 2 8 9 15 16 22 23 29 30	10/03/2017 Su Mo Tu 1 2 3 8 9 10 15 16 17 22 23 24 29 30 31	10/03/2017 End D Cottober: Su Mo Tu We 1 2 3 4 8 9 10 11 15 16 17 18 22 23 24 25 29 30 31	10/03/2017 End Date Ctober 2017 October 2017 Su Mo Tu We Th 1 2 3 4 5 8 9 10 11 12 15 16 17 18 19 22 23 24 25 26 29 30 31 12	10/03/2017 End Date 10/10 € October 2017 Fr Su Mo Tu We Th Fr 1 2 3 4 5 6 8 9 10 11 12 13 15 16 17 18 19 20 22 23 24 25 26 27 29 30 31

Figure 46. Set Report Dates

Click on GENERATE to create the graph.

Zoom by clicking and dragging the mouse on a particular area on the graph. Click on *Reset zoom* to go back to the previous view.



Figure 47. Zoom Reports

All graphs can be viewed at the same time. Click on the data labels below the graph to turn OFF the pens to not display. This enables comparison data. Click on a label to turn OFF pens.



Figure 48. Example P1 and P2 Amps





Figure 49. Accumulation Data

When finished with the session, logout of the system.



Customer Service Agreement and Terms of Use

After you verify and activate your account and login for the first time you will need to agree to the Terms of Use. This step only needs to be completed during the initial setup and activation of your account. You can review this document at any time thereafter on the web portal after successful login.

This document (outlined below) is the agreement between AMI and the End User and must be agreed to before access to the cloud interface is allowed.

Only the End User should activate this product. When the initial 1 year of cellular service comes to an end, AMI will contact you directly and review renewal options. The primary User (Account Admin) is able to add additional Users for login and alarm notification. The cellular service plan provided only covers text (SMS), and data for the LEP-Link unit. It does not cover SMS and Data service charges incurred for the use of your personal cell phone or tablet.

By pressing the **O***k* button, you declare that you have read and agree to these Terms of Use.

This agreement (hereinafter referred to as the "Agreement") is entered between AMI Global, (hereinafter referred to as "AMI") and the entity or individuals utilizing AMI's products and services, including its web site and database information (hereinafter collectively referred to as the "Customer") and is effective upon activation and use by Customer of AMI's products and services.

The Parties:

AMI is engaged in the business of providing wireless communications and database systems for managing and monitoring remote equipment in a supervisory manner, including such industrial applications as agriculture, oil, gas water and wastewater systems. The Customer desires to use and benefit from AMI's communications and database system, which is to be installed by the Customer on-site at the Customer's premises.

Customer acknowledges and understands that by activating and utilizing AMI's products, services, web site and/or data- based information, Customer is agreeing to be bound by the following terms contained in this legal agreement.

The Terms:

In consideration of the above recitals, the mutual promises contained herein, and other good and valuable consideration, including Customers use of AMI's products and services, the parties hereby agree as follows:

 Customer agrees to pay AMI for hardware and monthly monitoring fees as defined in AMI invoices, and AMI agrees to provide Customer with monitoring and notification services by utilizing automated texting, e-mailing and/or TCP/ IP transfer of data to Customer's designated destinations as set forth in the AMI web site database on a best efforts basis. For additional operational and functional details, Customer should refer to the AMI product instructions.

- 2. Customer understands that AMI will not, with its own personnel, respond to or take action related to those events about which AMI provides monitoring and notification. Customer further understands that he/she is solely responsible for the final entries and schedules set forth in the AMI database, notwithstanding the fact that AMI may have entered the monitoring and notification information in that database on the Customers behalf.
- **3.** Customer also understands that the data entries and schedules, residing in AMI's database, can be changed by the Customer. Customer furthers understands and agrees to bear the risk of loss or damage that may result from changes to the AMI database made by, or on behalf of the Customer, and that such changes may impair or prevent the AMI notification system from providing timely and successful notifications.
- 4. Customer further understands that AMI makes no representations, promises, warranties, or guarantees that there will be no interruptions in service, delays in performing service, or as to the quality, usefulness, completeness and reliability of such service. Furthermore, that AMI provides no assurances that such service will be free of errors. Customer acknowledges that AMI utilizes wireless data services that may be provided by cellular and various participating carriers, and that such providers disclaim any and all liability arising from the Customer's use of AMI's products and services. Customer further understands that AMI has no control of, or responsibility for, the texting, cellular, radio, telephone, Internet, or other communication medium which the customer may rely upon for delivery of alarm or other messages sent by AMI.
- 5. Customer also understands that in further consideration of being granted the right to utilize AMI's monitoring and notification service, the Customer, on behalf of himself/ herself, and any employees, agents, personal representatives, assigns, heirs, next of kin and any third party, agrees:
 - **A.** To indemnify, defend and hold harmless AMI, its owners, directors, officers, employees, agents, suppliers or affiliated companies, against any and all claims, demands or actions based upon any losses, liabilities, damages or costs, whether direct or indirect, special or consequential, including attorney's fees, that may result from the operation of AMI's products and services, or from the failure of the AMI system to report a given event or condition
 - **B.** To release, waive, discharge and covenant not to sue AMI, its owners, directors, officers, employees, agents, suppliers or affiliated companies, for any and all liabilities potentially arising from any claim, demand or action based upon any losses, liabilities, damages or costs, whether direct or indirect, special or consequential, including attorney's fees, that may result from operation of AMI's products and services, or from the failure of the AMI system to report a given event or condition.
 - **C.** That in the event AMI is found to be liable for any loss or damage arising out of mistakes, AMI's, interruptions, delays, errors or defects in AMI's products or services, such liability shall not exceed the total amount paid by the Customer to AMI for the services or \$250.00, whichever is greater.

- D. That the AMI hardware includes a limited warranty that the product is free from defects in materials and workmanship for a period of one year from the date of delivery. AMI's obligation under this limited warranty is limited to repairing or replacing the product, at AMI's option, unless the product has been misused or improperly repaired or serviced by any party other than authorized AMI personnel, in which case the limited warranty is voided. Other than this limited warranty, AMI's products and services are provided with no other guarantees or warranties, express or implied, including any warranties of merchantability or fitness for a particular purpose.
- E. That neither AMI nor its owners, directors, officers, employees, or agents are an insurer and that the Customer is to maintain their own insurance coverage sufficient to provide compensation for any loss, damage, or expense that may arise in connection with the use of AMI's products or services.
- 6. Customer further understands and agrees that AMI's products and services are intend to monitor and notify Customer of events only relating to Customers non-critical mechanical and electrical equipment and are not intend to be use for a primary life-safety, burglary, fire-detection and reporting system.
- 7. Customer is responsible for the ongoing, periodic testing of the AMI system, and shall notify AMI immediately if any failures are found. AMI shall use all reasonable efforts to identify and resolve the perceived failures, but in no case will be obligated to travel to the Customer's premises to perform diagnostic or corrective actions.
- Should the Customer choose to utilize AMI equipment and 8 services to perform manual or automatic control for external equipment such as pumps, wells, or valves, Customer acknowledges that AMI performs this service on a best efforts basis. AMI recommends that Customer not rely on AMI solely for the control of remote relay activated devices and that customer should make provisions for alternate means of remotely or locally operating said controls. AMI strongly recommends that Customer make electrical or mechanical provisions at the remotely controlled site equipment that will alleviate, or reduce the risks associated with the failure by AMI to properly control said remote relay control functions. Customer understands and acknowledges that there are other providers of such remote or local control technologies.

- 9 Customer agrees to pay AMI for a monthly per unit monitoring fee, which is to be prepaid on an annual basis, as indicated in Customer's invoice. The first annual service fee and hardware cost are to be paid within 30 days from the date of shipment of the AMI hardware. Although the hardware cost and monitoring fees are due and payable within 30 days of shipment from AMI's factory, Customer may receive up to 90 days of service credit on the first term service, per monitored unit, for units not installed up to 90 days after shipment. Units not installed within 90 days from shipment will be billed as active, whether installed or not. Service credit will be applied to the second-year service period. After the expiration of the initial one-year term, this Agreement shall automatically renew for additional one-year periods, unless canceled by written notice to AMI at least sixty days prior to expiration date of the then current term. Once a field RTU is in service, AMI shall not increase that device's annual monitoring fees by an amount greater than the percentage increase in the United States Bureau of Labor Statistics "Consumer Price Index."
- **10.** The Customer understands the intended uses of AMI's products and services and will ensure that they are used in an intended and safe manner. AMI reserves the right to remotely take out of service any field unit that generates more than twenty-five (25) alarm messages in any one day period. AMI may keep the offending field unit out of service until AMI and the Customer have agreed how to prevent the unit from transmitting further excess messages or made alternative arrangements. In addition, it is agreed that AMI personnel will be contacted if the Customer does not know how to install or operate AMI's products and services.
- **11.** The Customer acknowledges that he/she has read and understands this Customer Service Agreement, and that he/ she agrees to its terms and intends to be bound by them. The Customer further understands that this Agreement is intended to be as broad and inclusive as is permitted by law and that if any portion thereof is held invalid. It is agreed that the balance of the agreement shall, notwithstanding, continue in full legal force and effect.
- **12.** Regardless of the place of contracting or performance, this Agreement and all questions relating to its validity, interpretation, performance and enforcement shall be governed by and construed in accordance with the laws of the State of Nevada, and that any suit, action or other legal proceeding involving this Agreement shall be brought exclusively within the State or Federal Courts of Las Vegas, Nevada.
- **13.** The parties hereto acknowledge and agree that this Agreement contains the entire agreement between AMI and the Customer, and that there are no other representations, inducements, promises, or agreements, oral or otherwise, which are not embodied herein.