PUMP TECHNICAL SERVICES LIMITED
THE SUBMERSIBLE PUMP SPECIALISTS
JUNG PUMPEN
MANUFACTURING, SALES, PROJECT DESIGN, INSTALLATION, MAINTENANCE AND REPAIRS

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SMS Alarm Reporting System

Technical Manual

Product Information

Full information about other PTS/Jung products are available by contacting our offices or visiting our Website at: www.pts-jung.co.uk

Disclaimer

The information in this manual has been carefully checked and is believed to be accurate.
Pump Technical Services Ltd assumes no responsibility for any infringements of patents or other rights of third parties which may result from its use.

Pump Technical Services Ltd assumes no responsibility for any inaccuracies that may be contained in this document. Pump Technical Services Ltd reserves the right to make improvements to this document and *l or* product at any time and without notice.

Anti-Static Handling

The alarm unit contains CMOS devices that could be damaged in the event of static electricity discharged through them. There are no user serviceable parts within the main enclosure of the alarm unit. However if the front panel is removed then please observe anti-static precautions when handling the internal board. This includes storing the board in appropriate anti-static packaging and wearing an earthed wrist strap when handling the board.

Battery

The unit contains a Lead Acid rechargeable battery. Do not short circuit the battery or place on a metal surface where the battery terminals could be shorted. During shipment the battery is isolated from the board circuitry and must be connected before using the unit, please refer to the installation section of this manual for details. Do not incinerate, crush or otherwise damage the battery.

End of Life

At the end of the products useful life it should be recycled as follows:
Remove lid and disconnect battery. Recycle battery at licensed facility.
Disconnect panel switches from circuit board and remove metal front panel. Recycle as Aluminum.
Remove circuit board and recycle at licensed facility. Recycle plastic enclosure as ASS.

Packaging

Please ensure that should an alarm unit need to be returned to Pump Technical Services Ltd, make sure it is adequately packed, preferably in the original packing material.

Electromagnetic Compatibility (EMC) and other EC Standards

The Alarm Unit is classified as a component with regard to the European Community EMC regulations and it is the users responsibility to ensure that complete systems using the unit are compliant with the appropriate EMC and other standards.

Technical Support

Pump Technical Services Ltd will be able to provide assistance if you have any problems with this product. Please refer to the fault finding guide on page 8, before contacting us.

Introduction

This manual describes the operation and use of the Pump Technical Services Ltd SMS Alarm Reporting System. Please read this manual carefully before installing the alarm unit and retain it for future reference.

Features

The alarm unit sends an SMS message to up to five mobile or fixed phones in the event of:

- Any alarm connected via a volt free contact to one of the four inputs
- Power failure to the alarm unit itself

If the receiving phone is a mobile or SMS enabled fixed phone the message will be displayed as text, otherwise BT will convert the text to a spoken message.
Alarms are repeated every 10 minutes (adjustable) for a maximum of 5 times, unless acknowledged by a call back or reset message. Alarms messages are sent to each programmed phone number in turn. If a number is not programmed it will be skipped and next number used instead.
All alarms are delayed for 10 minutes (adjustable) before a message is triggered, except for the first hour of operation when the delay is only two minutes. An alarm returning to normal will also result in a message. If the alarm condition clears within the delay period then no message is sent.
The unit will also send a message and make a dummy voice call (to the first telephone number only) every 28 days (adjustable) at midday to confirm correct operation. The unit runs from a 240v ac mains power supply and has a built in back up battery to provide full functionality for 48 hours with no mains power. When the battery voltage reaches a low threshold the unit will send a 'Low Battery' alarm and then shut down. When power is restored it will wait 30 minutes for the battery to partially recharge and then restart.
All configuration for the unit is held in internal, non-volatile, memory and not in the SIM. Hence the SIM can be changed without affecting the unit setup.

Installation

The alarm unit should be mounted inside the pump control kiosk or adjacent to it. The unit must be sheltered from the direct sun and rain and extremes of temperature. If the unit is to be mounted inside a metal enclosure then it may need to have an external antenna fitted. To mount the unit: first fix one pan head screw in a suitable position, using appropriate fixings for the base material, and hang the unit from it. Isolate power and remove the lower cover. Level unit using spirit level and mark position of lower two mounting screws (120mm below top screw). Remove unit, drill and insert fixing plugs, then replace unit and screw to wall. Alternatively the box can be clipped to standard DIN rail.
Connect the unit to a 240v ac supply via a 2A fused spur or via a 3 pin plug fitted with a 2A fuse.
The supply must be on the same circuit as the pumps.

Important: The unit must be earthed. Connection to the mains supply must only be done by a competent person, e.g. an NICEIC approved electrician.

Isolate the mains supply and remove the terminal compartment cover. Connect up the alarm inputs from the pump control panel as follows:

Com	Common 0v for all inputs
I/P 1:	Pump 1 Fail
I/P 2:	Pump 2 Fail
I/P 3:	Sump High
I/P 4:	Spare

All inputs are Normally Open - close for alarm. The above are example inputs from a typical pump control panel. Any other inputs can be used and the alarm messages changed to suit.

Do not connect any wiring to any terminals other than those above. I/P 5 and I/P 6 are reserved for special functions such as pulse counting.

The unit inputs are not opto-isolated and hence all signals must be derived from Volt Free Contacts (see drawing Ref: PTS/SMSARS/WD/0113).

Important Note: The Remote Alarm Unit incorporates protective devices to ensure that (as far as is reasonably practicable) voltages sufficient to generate a spark cannot be present at the alarm terminals. However the unit is not A TEX certified and the user is responsible for ensuring the pumping station sump is correctly zoned and any additional protective devices required (e.g. zener barrier) are fitted between the float switch and the alarm unit.

Commissioning

Isolate the mains supply and remove the terminal compartment cover. Connect up the battery lead to the PCB PL I, the plug and socket are polarised so ensure they are connected the right way round. Insert a SIM card in to the holder, Push the top back until it springs open, Cut corner on the SIM needs to be at the bottom right hand corner when the holder has been shut. The units have been tested with Orange, Vodaphone, 02, Tesco and Virgin SIMS only. Other network Pay As You Go SIMs should work providing they are not locked to a particular type of phone. It is recommended that you register the SIM via the network providers website so that you can track the calls the unit has made and top up its credit as required. Do not add more than £20 of credit at a time in case the unit (or its SIM) is stolen or a sensor problem results in alarm messages being sent continuously. Alternatively use a Pay Monthly SIM.

Refit cover. Switch on mains power.
Switch on the unit by pressing the Blue button on the front panel. The unit will sound morse 'A' (dit dah) and the Blue lamp should start to flash quickly within a few seconds. A few seconds later the unit should sound morse 'B' (dah dit dit dit) and a short while later the flash rate of the lamp should slow to once per second and the unit sounds morse 'c' (dah dit dah dit). This indicates that the GSM radio is receiving a good signal and has connected to the network. The full start up sequence of the unit is as follows:

Switch ON via blue button
Short delay then morse A (• –) = micro computer system is healthy
Blue front panel lamp starts to flash quickly (GSM modem searching for signal)
Short delay then morse B (– • • •) = GSM modem is healthy
Blue front panel lamp starts to flash more slowly (radio registered with network)
Short delay then morse C (– • – •) = radio and signal all OK. System is ready for use.

Set up the phone number(s) and then the title and location part of the message as described in the next section. The unit will reply to you each time. Morse MR (– – • – •) indicates a valid message has been received. Morse ME (– – •) indicates an invalid message has been received (this is possible with a new SIM as the network provider will be sending special offer messages etc). Make sure each set up message is acknowledged **before** sending another.

> **NB** The built in clock will synchronise automatically to network time whenever you send the unit a message. The clock settings are lost if the unit is switched off for more than a couple of seconds.
> ***The clock must be running for the alarm delay timer to operate. If the clock is not operating then switch the unit off and back on again and send another message (e.g. XXX!) to set the clock***.

Test out the alarm inputs as follows:

If the Red button is lit then press and hold it to cancel any current alarms.
Simulate each alarm in turn. The red light should come on in each case after a few seconds. Check a message is sent after a delay.
Messages will be repeated to the programmed numbers in turn, every 10 minutes (default), up to a maximum of five times unless the alarm is acknowledged by either calling the unit using any phone (the unit will answer the call and then hang up - caller **must** wait for this) or by sending the reset

text command **XXXR** or by pressing and holding the red button until the light goes out and morse R heard. In each case the Red lamp on the unit should light within a few seconds and the unit will send a message two minutes later. Morse MS (– – • • •) indicates a message has been sent successfully. When all the messages have been sent or the alarm has been acknowledged the Red lamp will go out. Check that the messages are received correctly.

Important Note:
None of the mobile service providers offer any guarantee of delivery for SMS messages. At peak times there can be delays of several minutes before a message is received and it is possible for messages to be lost completely. Also note that the alarm unit has no way of knowing how much credit it has left on a Pay-As-You-Go SIM. It is the user's responsibility to ensure the SIM is topped up as required. If the unit is protecting critical plant then a contract SIM is recommended.

Pump Technical Services Ltd accepts no liability of any kind for any injury or loss as the result of any transmission failure of an SMS message.

Changing the phone numbers

To get the unit to send messages to a new primary phone then send it a text message exactly as follows:
XXX07887123456

Where 07887123456 is the full number of the phone to receive the messages and IS entered immediately after three upper case Xs.

To get the unit to send messages to a second number (if the alarm is not acknowledged within 10 minutes) send: **XXXB07887123456**. The third, fourth and fifth numbers can be programmed in the same way by prefixing the number with **XXXC, XXXD** and **XXXE**.

To delete a number just send the same message but put anything other than 0 (zero) as the first character. For example to delete the 4 number send **XXXDno number.**

NB The telephone numbers must begin with a zero. International numbers will be accepted in the form 00447887123456. Routine monthly messages are only sent to the first number. Any number that is not programmed (or has an invalid number) will be skipped and the first number used instead.

Messages can be sent from a mobile phone, SMS enabled fixed phone, or via an ISP on the internet.

IMPORTANT: Wait for each set up message to be acknowledged before sending another or it will be ignored

Changing the message text

The unit comes pre-programmed with standard text messages but these can be customised as follows:

To change the text for the 1^{5t} input alarm message send a text message exactly as follows:
XXX1ALARM TEXT

To change the text for the 2nd input alarm message send:
XXX2ALARM TEXT

Prefix text with XXX3 or XXX4 for 3rd and 4th input alarm messages.
NB Alarm Messages must not exceed 15 characters.

To change the 1^{5t} title line of the text message send:
XXX5EXAMPLE TEXT (**max 30 characters**)

To change 2nd title line of the text message send:
XXX6EXAMPLE TEXT (**max 30 characters**)

Message format

The alarm message from the unit is in the following format:
Pump Technical Services Ltd (or Text Line 1)
Unit ID (or Text Line 2)
dd/mm/yy hh:mm
ALARM
Mnn
Where dd/mm/yy hh:mm is the current date and time.
ALARM = current alarm(s) or ALL OK and Mnn is the message sequence number (l to 5).

Test Message

The unit can be forced to send a message to the primary number only by pressing the Red button until it illuminates and then releasing it immediately.

Remote Reset

The Reset Relay on the unit can be pulsed by sending XXXP.

Alarm Cancel

Pending alarms can be cancelled by holding in the red button until the light comes on and then goes out, or by sending a text message **XXXR**, or by calling the unit from any phone and waiting for it to answer and then hang up. Caller must wait for unit to hang up or alarms will not be cancelled.
Note that the Red button used as described above will also reset the elapsed days counter that controls when the next routine' ALL OK' message is sent.

Remote Checks

The unit can be forced to reply to **you** with current alarm status by sending it a text message exactly as follows:
XXX!
This can also be used to set the internal clock in the unit. This works from any mobile or text enabled fixed phone and the unit will respond to the caller's number (providing they have not withheld it). This does not change the normal numbers messages are sent to.

To check programmed phone numbers send **XXX#** and the unit will respond with a message containing diagnostic information and the numbers in its memory.

The unit can be forced to send a message to the Primary number with current alarm status by sending it a text message exactly as follows:
XXX?

Alarm Delays

The delay before an alarm is sent (and delay between messages) and the period between routine messages can be changed by sending the following message:
XXXMaabb (the default is 2810)
Where aa is a 2 digit number representing the delay time in days between routine messages (from 01 to 99) and bb is the alarm delay in minutes (from 01 to 99).

The routine message is only sent to the first number. Approximately 60 seconds after sending the routine message the unit will make a voice call to the same number. Answer the call and you will hear the unit beeping; then hang up. Do not set the delay time to longer than 28 days (unless you are using a Pay Monthly SIM) to ensure that the unit makes at least one chargeable call per month and keeps the SIM registered.

FAULT FINDING GUIDE

Problem	Action
Blue button pushed in but button does not flash at all. No morse A heard	Check power is on and battery is connected. Isolate from mains power and check mains and battery fuses are OK (mains: 250mA, battery: 2A
Morse A heard at start up but no B or C	Battery may, be discharged or not connected or fuse blown. Check battery voltage (6v) and leave to charge for 4 hours if low. Check fuse. If all OK then probable hardware fault. Return for repair
Morse A and B heard but no C	No service or SIM card not fitted. Remove SIM and fit in a phone to check signal level. If no signal then change to alternative SIM
Blue button flashes quickly. No messages sent. Repeated morse 'E' heard, followed by Morse 'SR'.	Service may be poor and the unit may need to be fitted with an external antenna or alternative SIM. Check by fitting SIM to a mobile phone and testing signal strength.
Blue button flashes slowly but no messages sent.	Check Red button lights when new alarm occurs (NB lamp may not be easily visible in bright sunlight). Check Morse messages at start up. Check SIM has adequate credit.
Red button does not come on when alarm is activated	Check wiring to unit terminals. Voltage across terminals should be 3.6 DC when alarm is open circuit
Red button comes on when alarm activated but no message sent.	If unit has been on for >1 hour then message will not be sent for 10 mins after alarm. Switch unit off and back onto reset delay to 2 minutes. Check clock is running correctly, if not switch off and back on again.
Repeated messages sent with no new alarm.	Switch unit off and back on again or press Red reset button until illuminated and hold until it goes out.
Message sent OK but time is wrong	Send any valid message to the unit and it will automatically set its clock
Message sent OK but the message is MAINS FAIL.	Check supply to socket is OK. Isolate power and check mains fuse.
Morse ME heard after sending the unit a set up message	Check that the message is preceded by at least three upper case X's

Morse Code Messages		
A	• –	System start up OK
B	– • • •	GSM modem is OK
C	– • – •	GSM Signal and Network OK
MR	– – • – •	**M**essage **R**eceived (valid message received)
MS	– – • • •	**M**essage **S**ent
ME	– – •	**M**essage **E**rror (invalid message received)
MF	– – • • – •	**M**essage **F**ailed (message send failed)
E	•	Radio response **E**rror (no signal or network error)
SR	• • • • – •	No signal or network, **S**ystem **R**eset – try to reconnect
RM	• – • – –	**R**eset **M**odem (critical error)

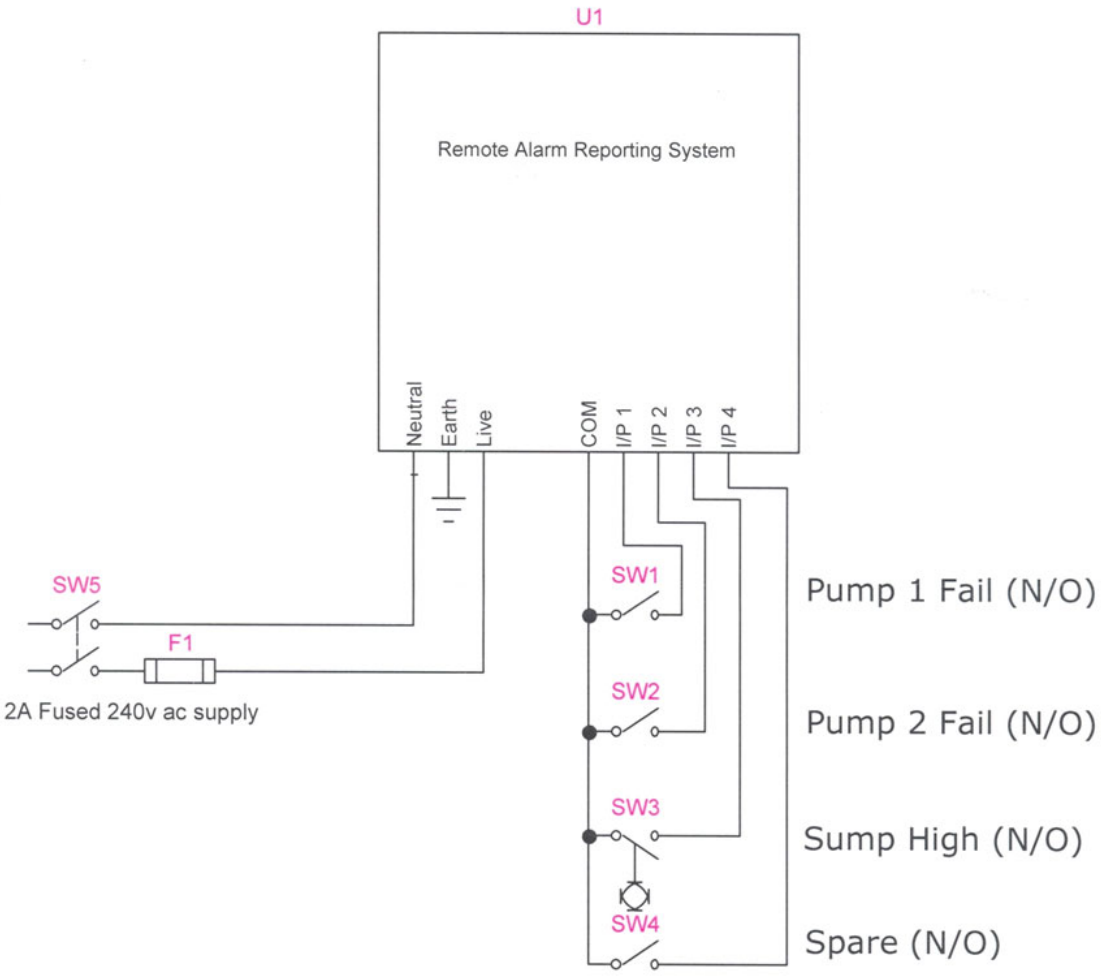
Technical Specifications

Environmental Protection:	IP65
Temperature range:	-10°C - + 40°C
Power Consumption:	100w max
GSM Interface:	Quad Band 850/900/1800/1900 MHz 2W Peak RF Power

Declaration of Conformity

Pump Technical Services Ltd hereby declares that this alarm unit is in compliance with the essential requirements and other relevant provisions of the Radio and Telecommunications Terminal Equipment (R & TTE) directive 1999/5/EC, the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC.

Wiring Diagram



Notes:

Inputs must be from isolated volt free contacts

Alarm Unit must be Earthed

Zener barrier must be fitted between float and alarm unit if sump is Zone 0.

Reset Relay max 1a at 24v DC

Ref: PTS/SMSARM/WD/0113