

Institiúid Teicneolaíochta Cheatharlach



At the Heart of South Leinster

# Utility Watch

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## Installation Manual

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**Abstract**

*The purpose of this document is to detail the process involved in installing the Utility Watch system into a premises. It will contain step by step instructions and also have illustrative diagrams and pictures to guide an individual to a successful installation.*

## Table of Contents

1. Introduction .....	4
2. Installing the transmitter and receivers.....	4
2.1. What’s what? .....	4
2.2. Step by Step – Energy Monitor System.....	5
3. Installing the Utility Watch System.....	6
3.1. What’s what? .....	6
3.2. Step by Step – Utility Watch installation .....	6
4. LAN Router Configuration.....	7
4.1. Step by Step – Port Forwarding .....	7
4.2. Step By Step – Dynamic Domain Name Server .....	8
5. Conclusion.....	9

## 1. Introduction

The Utility Watch system is relatively easy to install. The system has three components to it that will need configuring; the transmitter and receivers, the Galileo Board and the local area network. This guide will be divided up into those three sections and taken individually. Also, it is taken that the Galileo ip address has been preconfigured prior to shipping.

## 2. Installing the transmitter and receivers

### 2.1. What's what?

Energy Gateway



1: Energy Gateway – Transmitter



2: Clamp



3: RF Sockets – Receiver



4: RF Switch – Receiver

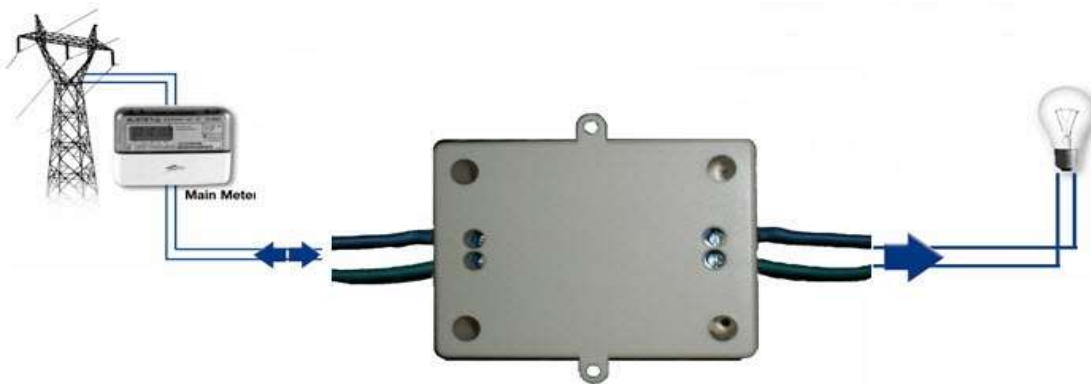
## 2.2. Step by Step – Energy Monitor System

**Step 1.** Connect the energy gateway (item 1) to the LAN router using the yellow ethernet cable supplied. Power up the energy gateway using the 12v dc adapter supplied.

**Step 2.** Carefully install the clamp (item 2) around the mains live cable in your fuse board. This may require a qualified electrician.



**Step 3.** The RF switch (item 4) needs to be installed on the power supply line of the target lighting; this will require an electrician to do the installation.



**Step 4.** Insert the RF sockets (item 3) into the mains and plug in the appliance you wish to control.

**Step 5.** Pairing the devices:

- a) Press the link button on the side of the energy gateway. A blue light will flash to signal that the gateway is listening. This will continue for approximately 1 minute.
- b) On each of the receivers, press and hold the pairing button for 5 seconds to pair the device with the listening gateway. A light on the receivers will blink when it is activated.
- c) To confirm connection of devices, open a web browser and log onto the gateway's homepage at the address <http://smarthome001>. This will display a list of connected devices.

### 3. Installing the Utility Watch System

#### 3.1. What's what?



5: Utility Watch



6: Ethernet Cable

#### 3.2. Step by Step – Utility Watch installation

**Step 1:** Connect the Utility Watch (5) to the local area network using an ethernet cable (6) provided.

**Step 2:** Power the Utility Watch using the 12v dc power supply.

**Step 3:** Visit the local application homepage by opening a web browser and entering the following ip address – 192.168.1.199:5000



The screenshot shows the 'Web Server Configuration' interface. At the top, it displays 'MAC: 0004A3CC739E' and 'version: 1.1.0'. Below this are four tabs: 'Basic Setting', 'Sensors Manager', 'Change Password', and 'Update'. The 'Basic Setting' tab is active, showing the following configuration fields:

- Device Name: SMARTHOME001
- Server URL (IP): 192.168.1.199 | Ports: 5000
- DHCP:  Enable  Disable
- IP Address: 192.168.1.100
- Subnet mask: 255.255.255.0
- Gateway: 192.168.1.1
- Primary DNS server: 192.168.1.1
- Secondary DNS server: 0.0.0.0
- Period of data transmission: 15 Second

At the bottom of the configuration section, there is a 'Save' button. Below the configuration section, there are additional settings:

- Allow NTP Server:  Yes  No
- NTP Servers: pool.ntp.org
- Device Time: 2014-11-09 17:02:22
- System Time: 2014-11-09 17:02:20

A 'Sync to Device' button is located at the bottom right of the system time section.

## 4. LAN Router Configuration

### 4.1. Step by Step – Port Forwarding

The Utility Watch server operates on port 5000 and the server address is 192.168.1.199. The router will need port 5000 opened and any request on those ports will need to be directed to the Utility Watch server. PortForwarding.com is a good guide to opening ports specifically for whatever make and model router you have. The following steps are specific to the TP-Link WD 8960 model but there will be a lot of similarities amongst most routers.

**Step 1:** Log into the LAN router homepage by typing 192.168.1.1 into a web browser and pressing enter (note – your ip address may be 192.168.1.254).

**Step 2:** Enter a valid username and password. Default is admin and password.

**Step 3:** Click on the ‘advanced setup’ tab. This will open up further options.

**TP-LINK** 300M Wireless N ADSL2+ Modem Router  
Model No. TD-W8960

### NAT -- Virtual Servers Setup

Virtual Server allows you to direct incoming traffic from WAN side (identified by Protocol and External port) to the Internal server with private IP address on the LAN side. The Internal port is required only if the external port needs to be converted to a different port number used by the server on the LAN side. A maximum 32 entries can be configured.

Server Name	External Port Start	External Port End	Protocol	Internal Port Start	Internal Port End	Server IP Address	WAN Interface	Status	Enable/Disable
UtilityWatch	5000	5000	TCP/UDP	5000	5000	192.168.1.199	ppp0.2	Enabled	Disable
Secure Shell Server (SSH)	22	22	TCP/UDP	22	22	192.168.1.199	ppp0.2	Enabled	Disable
Tinet Server	23	23	TCP/UDP	23	23	192.168.1.199	ppp0.2	Enabled	Disable
WordGame	10000	10000	TCP/UDP	10000	10000	192.168.1.199	ppp0.2	Disabled	Enable
heating	5005	5005	TCP/UDP	5005	5005	192.168.1.199	ppp0.2	Disabled	Enable
gateway	5050	5050	TCP/UDP	5050	5050	192.168.1.112	ppp0.2	Disabled	Enable

Add Enable All Select All Remove

**Step 4:** Click the ‘NAT’ option. This will open a new page.

**Step 5:** An ‘Add’ and ‘Remove’ button will be displayed. Click ‘Add’ and this will allow you to enter the new service details.

**TP-LINK** 300M Wireless N ADSL2+ Modem Router Model No. TD-W891

**NAT -- Virtual Servers**

Select the service name, and enter the server IP address and click "Save/Apply" to forward IP packets for this service to the specified server.  
 NOTE: The "Internal Port End" cannot be modified directly. Normally, it is set to the same value as "External Port End". However, if you modify "Internal Port Start", then "Internal Port End" will be set to the same value as "Internal Port Start".  
 Remaining number of entries that can be configured: 26

Use Interface: pppoe\_0\_8\_35/ppp0 2

Service Name:  
 Select a Service: Select One  
 Custom Service: Utility Watch  
 Server IP Address: 192.168.1.199

External Port Start	External Port End	Protocol	Internal Port Start	Internal Port End
5000	5000	TCP/UDP	5000	5000
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		

Save/Apply

**Step 6:** Click the 'Custom Service' radio button and enter 'Utility Watch' in the service name textbox.

**Step 7:** In the 'Server IP' address textbox, enter 192.168.1.199.

**Step 8:** In the 'port address' textbox, enter 5000 and select TCP/UDP from the protocol dropdown menu.

**Step 9:** Click 'Save/Apply' to confirm changes.

## 4.2. Step By Step – Dynamic Domain Name Server

In order to access the Utility Watch server remotely, we need to know the public IP address. This is provided by your Internet Service Provider (ISP) but is not static. Unfortunately, we do not know if or when it may change so we need to assign a dynamic dns which will keep track of it for us. All we will need to do then is remember the ddns address. The router has a list of ddns providers and we



need to register with one of them. This is an online registration process on the provider's website. Some providers offer a free service, others charge for it.

The following steps are specific to the provider no-ip.

**Step 1:** In the address bar of your web browser enter the following address - <http://freedns.no-ip.com/> and click the 'Sign Up Now' Button

**Step 2:** Enter your details into the 'Create No-IP Account Details' form and click 'free sign up' button. You will be sent a confirmation email and you will need to click on the verification link.

**Step 3:** The provider asks you to download a client program – click it.

**Step 4:** The provider asks you to verify hostname settings – click it. This will bring you to a dashboard with your domain name and IP address. To confirm the domain is working, open up a command prompt and ping your domain name. If setup is complete, you will get a reply from your public IP address.

## 5. Conclusion

After a successful installation of the transmitter and receivers, the installation of the Utility Watch and the configuration of the LAN router, you now should be able to access your Utility Watch home page. The URL is <http://your-domain-name.ddns.net:5000>. The username and password are defaulted to admin and password. We hope you enjoy our application!