PureBB Single Phase
User manual

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1. General

1.1 Introduction

The PureBB Single Phase Power Quality Analyzer records and stores voltages and current waveforms data from a working power outlet. Once the analyzer have been plugged-in to the power outlet, the PureBB start to collect waveform data that can be downloaded to a personal computer for complete analysis.

The device comes in 2 versions:

- SPG-5112-A090 – W.O. current measurement
- SPG-5111-A090 – with current measurement

Power quality post recording processing and analysis are available using the free PQSCADA Sapphire Express Edition software via drag and drop of recorded PQZ files for immediate analysis, PQ trending, events occurrences and reports.

Recorded information is saved in a non-volatile memory microSD card which is accessed either via the device USB slot connected to a PC, or by inserting the SD card in a reader connected to a PC.

The advanced design ensures accurate recording of all voltages and current parameters. The Analyzer and PQSCADA Sapphire features include:

- Light weight, hand-held portable PQ Analyzer
- Continuous waveform recording at 256 Sample/Cycle 50/60Hz
- Class A devices IEC61000-4-30
- Configuration FREE Device
- Easy USB connectivity to PC
- SD card slot hot swap

Please refer to the PQSCADA Sapphire Users Manual, located on the PureBB Manual USB drive, for more information. The manual provides instruction for installation and use, as well as general instructions for connecting to Elspec power quality analyzers.

1.2 Limited Warranty & Limitation of Liability

Each Elspec product is under warranty to be free from defects in material and workmanship under normal use and service. The warranty period is for one year and commences on the date of shipment. Parts, product repairs, and services are under warranty for 90 days. This warranty extends only to the original buyer or end-user customer and it does not apply to fuses, disposable batteries, or to any product which, in Elspec's opinion, has been misused, altered, neglected, contaminated, or damaged by accident or abnormal conditions in the operation or handling of the product. Elspec guarantees that the software will operate substantially in accordance with its functional specifications for 90 days and that it has been properly recorded on non-defective media. Elspec does not guarantee that the software will be error free and operate without interruption. Elspec authorized re-sellers shall extend this warranty on new and unused products to end-user customers only, but do not have authority to extend a greater or different warranty on behalf of Elspec. Warranty support is available only if the product is purchased through an Elspec authorized sales outlet or Buyer has paid the applicable international price. Elspec reserves the right to invoice the Buyer for any importation costs for the repair/replacement of parts when the product purchased in one country is submitted for repair in another country. Elspec's warranty obligation is limited, at Elspec's option, to refund of the purchase price, free of charge repair, or replacement of a defective product which is returned to Elspec within the warranty period. For warranty service, contact Elspec directly to obtain a return-authorization. On receipt of the authorization, return the product to Elspec with a description of the problem, including prepaid postage and insurance (FOB destination). Elspec assumes no risk for damage in transit. Following warranty repair, the product will be returned to the Buyer, transportation prepaid (FOB destination). If Elspec determines that the failure was caused by neglect, misuse, contamination, alteration, accident, or abnormal condition of operation of handling, including overvoltage failures caused by use outside the product's specified rating, or normal wear and tear of mechanical components, Elspec will provide an estimate of repair costs and obtain authorization before commencing work. Following repair, the product will be returned to the Buyer, transportation prepaid, and the Buyer will be billed for the repair and return postage transportation charges (FOB Shipping Point). This warranty is the Buyer's sole and exclusive remedy and is in lieu of all other warranties, express or implied, including but not limited to any implied warranty of merchantability or fitness for a particular purpose. Elspec shall not be liable for any special, indirect, incidental, or consequential damages or losses, including loss of data arising from any cause or theory. Since some countries or states do not allow limitation of the term of an implied warranty, or exclusion or limitation

of incidental or consequential damages, the limitations and exclusions of this warranty may not apply to every buyer. If any provision of this Warranty is held invalid or unenforceable by a court or other decision-maker of competent jurisdiction, such holding will not affect the validity or enforceability of any other provision.

1.3 NOTICE REGARDING PROPRIETARY RIGHTS

This publication contains information proprietary to Elspec. By accepting & using this manual, you agree that the information contained herein will be used solely for the purpose of operating equipment developed & manufactured by Elspec.

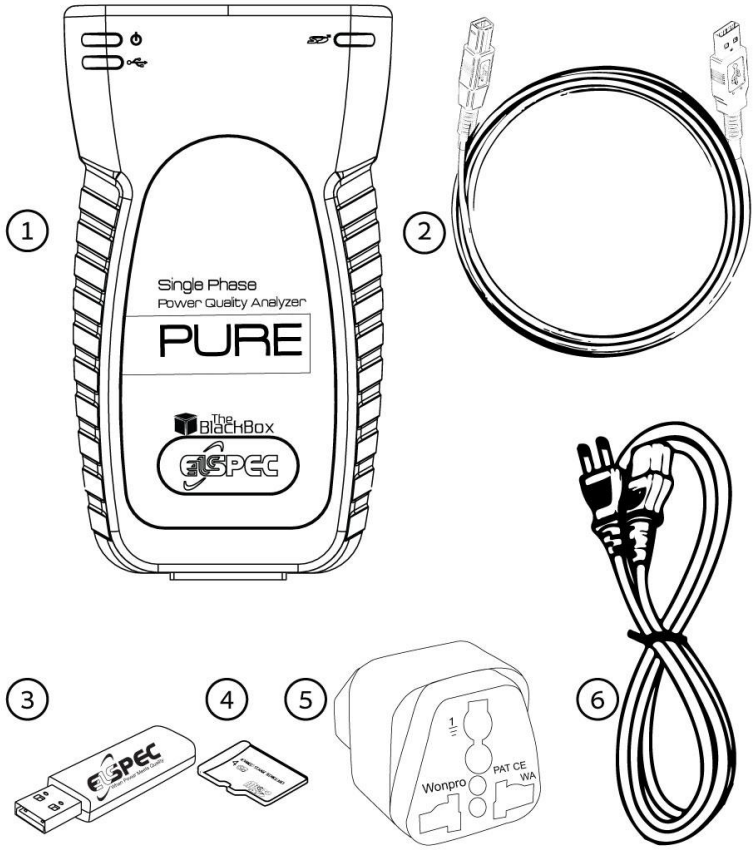
1.4 Safety Precautions

We, Elspec Engineering Ltd. Conduct the following Routine tests as part of the production line: -Dielectric strength test between mains and ground, test voltage 2120Vdc or 1500Vac -Grounding continuity between earth pin of the appliance inlet and earth pin of the appliance outlet

Kindly review & take all the necessary safety precautions prior to proceeding.

⚠WARNINGS⚠
Protection provided by the equipment can be impaired if used in a manner not specified by the manufacturer
Review the entire manual before using the instrument and its accessories
Observe all warnings and cautions
Do not operate the instrument around explosive gas or vapor
Avoid working alone
Before use, inspect the instrument, leads and accessories for mechanical damage, and replace when needed
Pay special attention to the insulation surrounding the connectors and plugs
Remove all accessories that are not in use
Make sure the instrument is properly grounded to a protective earth ground
Do not insert power or any other connectors above the rating of the instrument as shown on the name plate
During installation, ensure that the device is completely disconnected from any live points and\or plugs
Do not insert metal objects into connectors and openings
Never open the instrument's enclosure during operation; Dangerous voltages are present
Do not expose the instrument to extreme moisture and or rain
do not operate the instrument or its accessories when found wet for any reason

1.5 Unpacking Components & Accessories



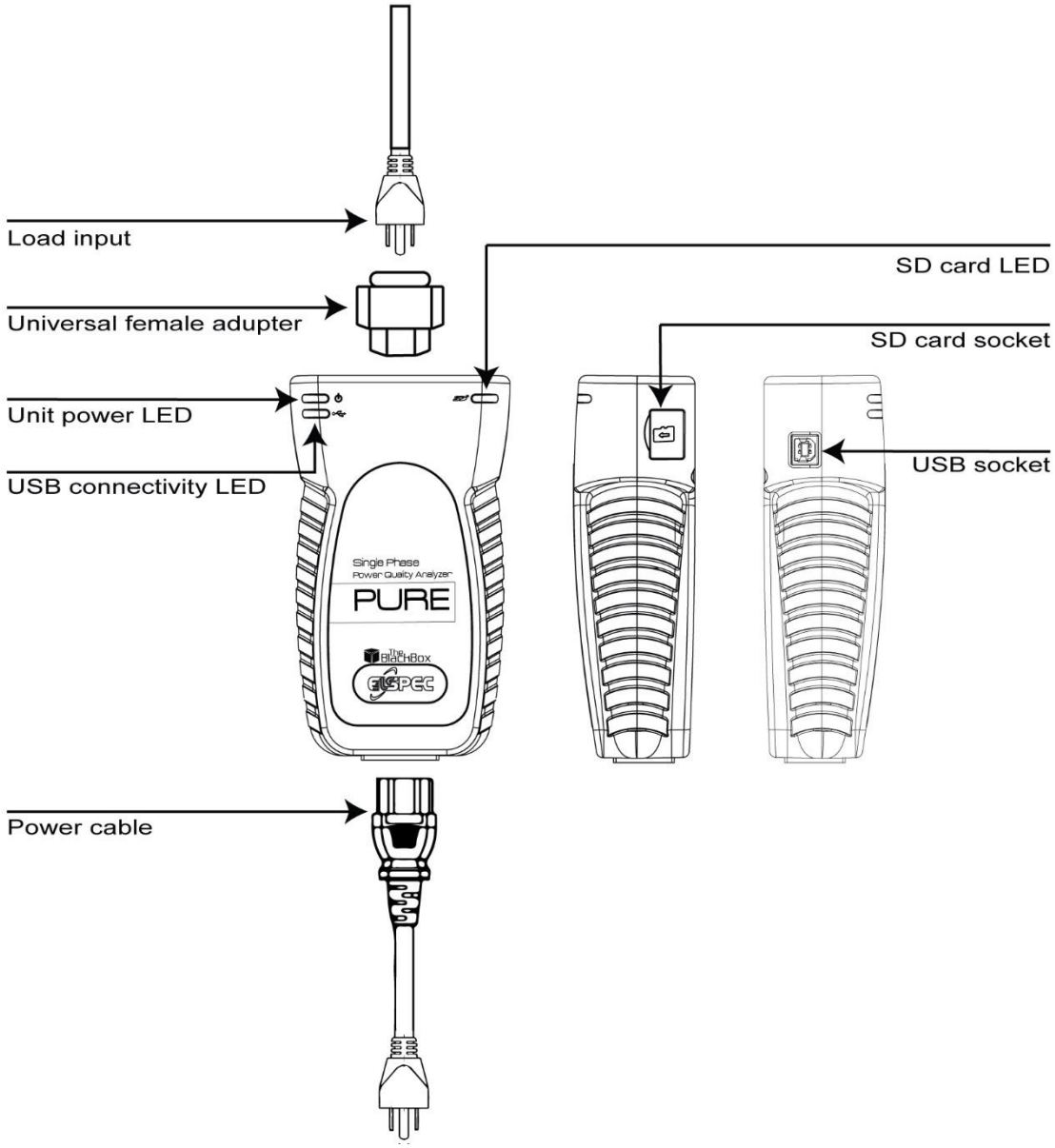
The following items are included in your Analyzer Kit:

#	Description	Cat. number
1	Pure Single Phase BlackBox Power Quality Analyzer	SPG-531A-0090
2	USB Cable type A male to type B male 1.5m black	EHA-0159-9100
3	Elspec BlackBox Installation USB drive	SMX-0408-0103
4	4GB Micro SD card	EBO-4096-9094
5	Universal Female Adapter	EHA-9001-2100
6	Power Cable for Europe 10A/230V, straight, 1.8M, Black / Power Cable for America 10A/125V, straight, 1.8M, Black	EPC-2012-2190 / EPC-7012-2190

2. Using the PureBB Analyzer

2.1 Connections & Plugs

The PureBB single phase power quality analyzer has the following connections & Plugs:



2.2 Connecting the PureBB

Plug the female end of the Power Cable to the Main Power Supply inlet socket of the analyzer.

Connect the male plug end of the Power Cable to the electrical supply outlet.

Wait for approx. 1min for the analyzer to be initialized. At the end of the initializing process the unit power led should be solid green and the SD card led should be blinking green.

To measure current, plug your load into the Universal Female Adapter (Supplied).

Leave the Analyzer plugged in for a few hours or days depending on your application and the micro SD card size.

When you are ready, disconnect it from the power outlet and connect it to a PC running PQSCADA Sapphire.

Electric utility specialists can also send the Recorder to a utility consumer who can connect it to their own electric outlet for a specified period. When finished taking data, the consumer can then send the Recorder back to the electric utility specialist. The specialist can analyze the collected data with PQSCADA Sapphire. Collected data, and real-time clock data stay intact in transit via the Recorder's non-volatile memory.

2.3 LEDs Indications

The PureBB have 3 operational bi-color (green/red) LEDs – Unit Power, USB connectivity and SD card. These LEDs provide the following information:

Power LED:

Led Status	Description
Solid Green	The analyzer in powered-up and working well
Blinking Green	N/A
Solid Red	• Carnell is initializing (during analyzer initializing process). • DSP Error**.**
Blinking Red	• System is initializing (during analyzer initializing process). • FW Upgrade is in process (SD LED will be blinking as well)

USB LED:

Led Status	Description
Solid Green	USB connection detected
Blinking Green	N/A
Solid Red	N/A
Blinking Red	N/A

SD LED:

Led Status	Description
Solid Green	N/A
Blinking Green	Recording is O.K
Solid Red	• No micro SD card • Corrupted micro SD card
Blinking Red	Not recording, USB connected

3. PQZ Recording

The PureBB is able to continuously record & store all the electrical waveforms at 256 sample/cycle, on board for more than a year, with no gaps in the data. The innovation behind this capability is the PQZIP compression technology. The patented PQZIP enables you to store up to a 1000 times more information than typical formats, allowing for storage of complete & precise data over extended periods of time.

The PQZ recording is enabled by default. The analyzer start recording once the initializing process has finished and the SD LED is blinking green.

PQZ files are stored on the PureBB's micro SD card based on the FIFO (First In First Out) concept. As such, when the on-board memory becomes full, the oldest files are deleted automatically to free required space for the newest data.

4. Using the USB cable

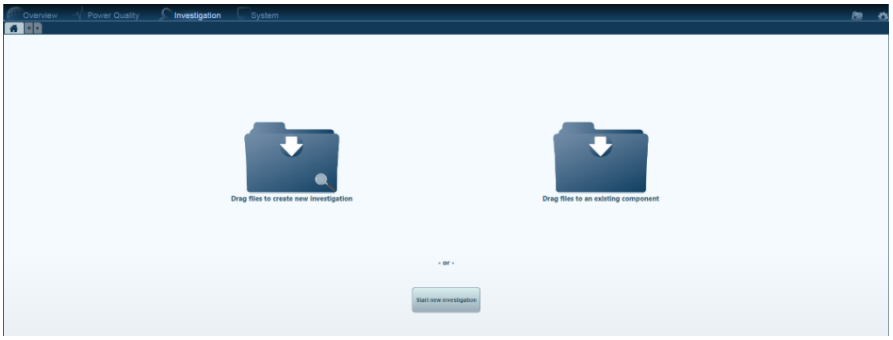
This section describes how to connect the analyzer to a computer when importing PQZ files to the computer or to PQSCADA Sapphire.

1. Plug in the supplied USB cable into the USB socket on the computer.
2. Connect the other end of the USB cable to the analyzer's USB socket.
3. Wait for the analyzer to complete initialization.
4. The message that appears on the screen differs depending on the computer's operating system or software installed in the computer. If a window to select a program or application appears, select Open Device to view files.
5. If the AutoPlay window does not pop-up automatically, click the Start button, go to “My Computer,” and select the PureBlackBox driver.
6. Click on the PQZ_ folder. Folder are sorted by year/month/day.
7. Drag and drop the files/folder into PQSCADA Sapphire Investigation module.

5. Using the PQSCADA Sapphire

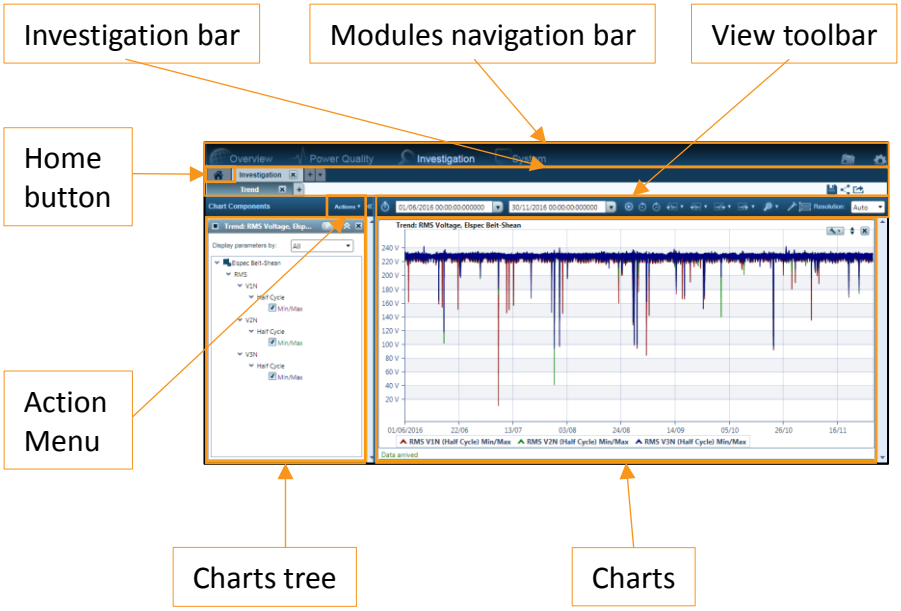
When PQSCADA Sapphire starts at the first time, the Investigation module is opened on the home screen.

To start new Investigation, Drag and drop supported files into the *Drag file to create new investigation* folder.



- Multiple files can be opened if you hold down the SHIFT or CTRL keys and click on another filename(s).
- New Investigation is opened based on predefined templates

The following window displays with the PQSCADA Sapphire menus and buttons for accessing frequently used features.



The *Investigation module* screen is divided into two main sections: the left section displays the *Charts tree*, and the right section displays charts - in the selected view. These sections are divided by the splitter control (a vertical line between the sections).

The position of the splitter control can be changed by clicking and

dragging the splitter control to the left or right with a pointing device. The *Charts tree* section can be hide by clicking *Hide parameters tree* on the upper right corner of the *Charts tree* section.

Investigations and Views are displayed as Tabs in the *Investigation bar*.

6. PQSCADA Sapphire Installation

Download

Download PQSCADA Sapphire set-up file from Elspec *website*.

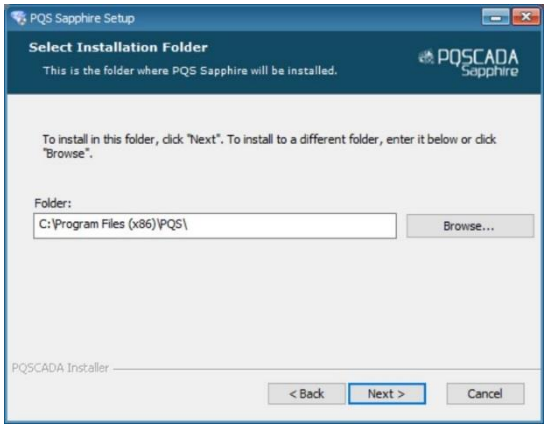
Double click on *Elspec Sapphire Setup v1.x.x.xx* file to run the setup wizard.

Welcome page

Click *Next* to start the installation.

Installation folder

Select the installation folder and click *Next*.

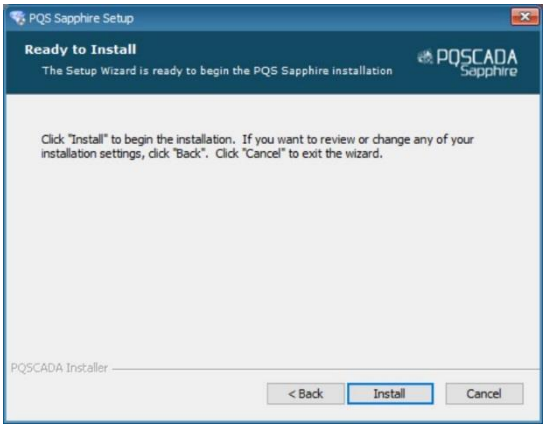


License agreement

Once the license agreement is read and approved, select *I accept the terms in the license agreement* option and click *Next*.

Install

Click *Install* to start the installation process.



Wait while the program is installing

Finish

Check the *Launch sapphire* box and click *Finish* to start working.

6.1 License Activation

6.1.1 On-line activation

To run *On-line* activation, Make sure that your computer is connected to the internet.

Launch *Upgrade License* wizard by clicking the *Setup menu* and selecting *Install/Upgrade* license.

Activation for enterprise edition must run on the server machine.

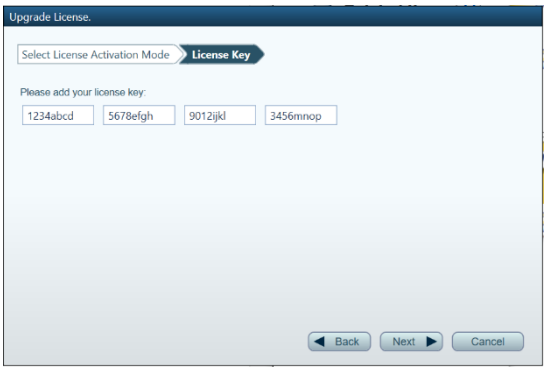
Step 1: Select License Activation Mode

On the *License Activation Mode*, select On-line by downloading the license.

Click *Next* to go to the *License Key* page.

Step 2: License Key

On the *License Key* page, enter your license ID in the field provided. It is recommended to copy and paste the ID to avoid problems distinguishing letters and numbers.



Click *Next* to run the activation.

On a successful license activation, click *Close*.

Step 3 (enterprise edition only): service installation

With Enterprise edition license ID, PQSCADA Sapphire service installation wizard will open automatically. On the PQSCADA Sapphire service installation wizard, do the following:

1. On the welcome page Click *Next*
2. Read and agree to the End-User license agreement
3. Select the installation folder and click *Next*.
4. Click *Install* to start the installation process. Wait while the program installs.
5. Click *Finish* to close the installation wizard.

Step 4 (enterprise edition only: create Instance DB)

1. Open PQSCADA Sapphire
2. On the System module, right click the server Instance and select create server.
3. On the Database page, configure the following options:

   DB Type – SELECT the database type in which PQSCADA Sapphire will store the data. PQSCADA Sapphire supports two DB types:

   - SQLite.
   - MS SQL server (MSSQL).

   If MSSQL was selected, configure the following options:

   - DB URL – enter the DB URL, or click *Browse*, to search for SQL service in your network.
   - DB user name: enter you DB user name.
   - Password: enter your DB password.
   - Check the *save as default* to keep these settings as default. You can use *set default*, to fill in the default settings in the future.
   - Click *Test*, to verify the connection with the DB.

4. Click *add* to close the wizard.

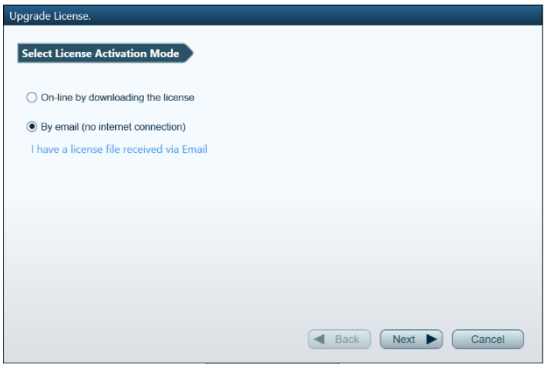
6.1.2 Off-line activation

Launch *Upgrade License* wizard by clicking *on the Setup menu then select Install/Upgrade* license.

Activation for enterprise edition must run on the server machine.

Step 1: Select License Activation Mode

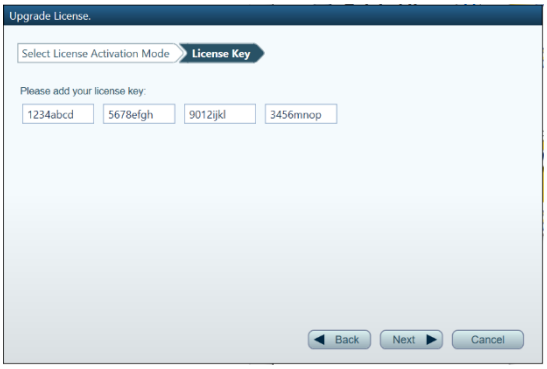
On the *License Activation Mode*, select *by email (No internet connection)*.



Click *Next* to go to the *License Key* page.

Step 2: License Key

On the *License Key*, enter your license ID in the field provided. It is recommended that you copy and paste your ID to avoid problems distinguishing letters and numbers.

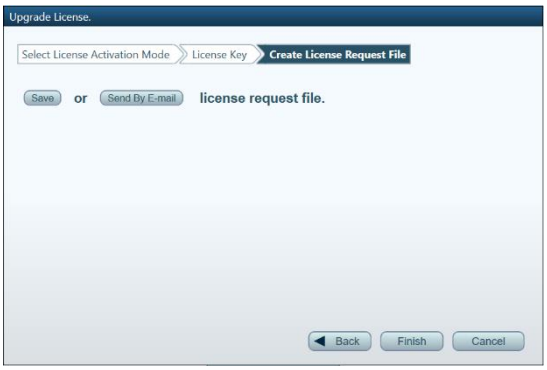


Click *Next* to go to *Create License Request File*.

Step 3: Create License Request File

On the *Create License Request Files* page, select one of the following:

- *Save* – To open Windows explorer to select a place to store the *license request file*.
- *Send By Email* – To open your default email client to send the *license request file*.



Click *Finish* to close the wizard.

Step 4: create license file

1. Copy the license request file to computer with internet connection.
2. Browse to Elspec *licensing website*.
3. On Elspec licensing website, click *ACTIVATE LICENSE* on the top right corner of the screen.
4. Drop the license request file into the designated window.
5. Download the license file to your local computer.

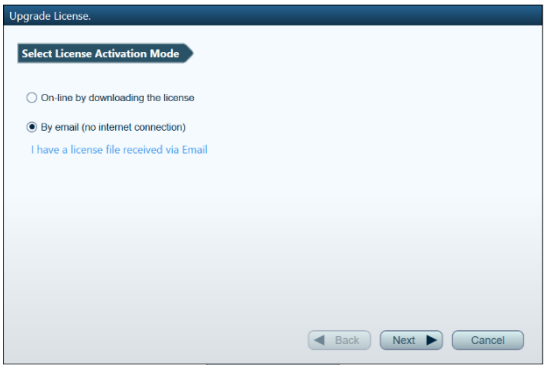
Step 5: activate the license file

Copy the license file into the PQSCADA Sapphire computer.

Launch *Upgrade License* wizard by clicking the *Setup menu* and select *Install/Upgrade* license.

On the *License Activation Mode*, do the following:

1. Select *By email (No internet connection)*.
2. Click *I have a license file* to open Windows explorer and select the license file.



Click *Close*.

Step 6 (enterprise edition only): service installation

With Enterprise edition license, PQSCADA Sapphire service installation wizard will open automatically. On the PQSCADA Sapphire service installation wizard, do the following:

1. Click *Next* on the welcome page
2. Select the installation folder and then click *Next*.
3. Click *Install* to start the installation process. Wait while the program is installing.
4. Click *Finish* to close the installation wizard.

Step 7 (enterprise edition only): create Instance DB

1. Open PQSCADA Sapphire
2. On the System module, right click the server Instance and select create DB.
3. On the Database page, configure the following options:

   DB Type – SELECT the database type in which PQSCADA Sapphire will store your data. PQSCADA Sapphire supports two DB types:

   - SQLite.
   - MS SQL server (MSSQL).

   If MSSQL was selected, configure the following options:

   - DB URL – enter the DB URL, or click the *Browse button*, to search for SQL service in your network.
   - DB user name: enter you DB user name.
   - Password: enter your DB password.
   - Check the *save as default checkbox* to keep these settings as default. You can use the *set default button*, next time to fill in the default settings.
   - Click the *Test button*, to verify the connection with the DB.
4. Click *add* to close the wizard.

7. Specifications

SPECIFICATIONS	
Voltage Inputs	2 channels, phase and neutral through power socket 110/240VAC Nominal-Measurement Category II
Current Channel (optional)	1 channel, between source and load up to 9.9A Peak
Waveform Sampling	256 Sample/Cycle at 50/60Hz
Measurements	Continuous PQZ file
Accuracy	IEC 61000-4-30 Class A
LED Indicators	3 Bi-colors LED
COMMUNICATION	
USB	PQZ file download, FW upgrade & clock setting
POWER	
Power Supply	100-240VAC 50/60Hz 10W 5VDC over USB
Ride through	30sec
MECHANICAL	
Operating Temperature	-20 to + 60 °C
Humidity	5% to 95% non-condensing
Maximum Operation Altitude	2,000m (1.24Mi)
IP protection	IP 40 (*)
Weight	0.25kg
Dimensions	146 x 82 x 48
STORAGE	
Nonvolatile memory	SD card supporting hot swap
SYNCHRONIZATION	
Internal clock	10 ppm

(*) The product is intended for indoor use