VANGUARDS POWER

User Manual

Mark 1.1

PropSava® 3 Phase SCRV System

Computer Controlled Automatic Voltage Regulator & Stabiliser

Power Optimisation System

For Manual, Automatic and TDS By-Pass Systems

Input Range – 305V to 440V

Output Range – 364V to 400V

50KVA – 1,200KVA

Customer Support Contact
Channel Partner Name:
Channel Partner Telephone Number:
Email: customersupport@vanguardspower.com
Website: http://www.vanguardspower.com

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December 2011 – Final V1.5

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Thank you:

Thank you for purchasing Vanguards Power (VP) 3 Phase PropSava® SCRV Computer Controlled Automatic Voltage Regulator and Stabiliser. We believe it will provide you with many years of service and a reduction in your electricity costs and early equipment failure.

Please read the following safety instructions and keep this Installation Manual in a safe place so that you can refer back to it at any time. You are permitted to make 3 copies of this User and Installation Manual. If you need any further copies please contact your Channel Partner.

Description:

The PropSava 3 Phase SCRV System is an automated hybrid voltage regulator and stabiliser; using solid state switches, transformers, sensors and control systems; managed by a state-of-the-art computer system with full digital integration. The SCRV System allows the User to manage and change the Output Voltage via the digital keypad on each phase. The Output Voltage can also be changed over a network or Internet subject to installation of the VP Remote Control System. The PropSava is connected after the electric meter and Master Breaker Switch and before the Distribution/Fuse Box. All power to a site/building passes through the PropSava.

Configuration Choices:

The recommended Configuration for the 3 Phase PropSava System consists of a Base Unit, External Protection System - Current Surge Protection) and the automated Product to Site By-Pass - Total Disconnect System (TDS). This configuration provides the customer with the highest level of power optimisation performance and security for most sites.

Alternative configurations are available with options to match the requirements of most sites and budgets.

The 3 Configurations available are:

1. **Base Unit** - Computer controlled automatic voltage regulator and stabiliser with standard Safety Systems including Auto Regulation OFF, Overload, over and under voltage protection and System Temperature.
2. **External Protection System against Current or Voltage Surges** – four choices of Surge and/or Voltage Protection.
3. **Product to Site By-Pass** – three choices of Manual, Automatic and Total Disconnect System

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Configuration Choices Continued…

Base Unit Standard Safety Features:

The Base Unit PropSava SCRV has a number of standard safety features such as:

1. Main overload protection – Master Regulation Protection Switch (MRPS).
2. Over and Under Voltage protection – Factory/User Set with audible and visual warnings.
3. Over Load protection – Factory/User Set with audible and visual warnings.
4. System Temperature control – with audible and visual warnings.
5. Auto Regulation ON and OFF – stated in the Manual as Auto-REG OFF or ON.
6. Temp System Reset

External Protection Systems

The External Protection Systems stop any power surges caused by outside sources, natural or man-made, damaging the PropSava and the site/building electrical equipment.

There are two choices available with two levels of protection for Current and Voltage – although a customer can select both Current and Voltage protection together if they wish:

a) Surge Protection Device 1 – 20,000 Amps
b) Surge Protection Device 2 – 30,000 Amps
c) Voltage Surge Protection Device 3 – 25,000 Volts
d) Voltage Surge Protection Device 4 – 40,000 Volts

Product to Site By-Pass Systems

There are three choices for the Product to Site By-Pass System:

Choice 1. Manual 3 Position Lever Product to Site - Each time the Lever is moved there is an interruption to site power.	
If User/Factory Regulated Output Settings are exceeded and/or Safety System breached such as: Overload, or Under/Over Voltage, or System Temperature:	• Overload – default setting is 95% of MRPS Amps value for 20 seconds then Auto REG OFF is activated. If Overload occurs above MRPS Amps value rating prior to Auto REG OFF being initiated then immediate shutdown of PropSava/LiteSava occurs – Site power is terminated. • Under Voltage – default setting 195V for 5 seconds – Auto-REG OFF • Over Voltage Hardware – 264V instant – Auto – REG OFF • Over Voltage Software – default setting 240V for 5 seconds – Auto-REG OFF • Over Temperature – 90^0C – Auto-REG OFF.
a) PropSava and Site OFF,	• Shut Down - All power to site is terminated. PropSava Input is live.
b) PropSava OFF and Site ON,	• By-Pass – Input PropSava power is diverted to site. PropSava can be shut down
c) PropSava and Site ON.	• Normal – Normal operating position. PropSava is regulating all power to the site.
Choice 2. Automatic Product to Site By-Pass - No interruption to site power - unless safety code requires isolation for maintenance	
a) Automatically Initiated: If any User/Factory Regulated Output Settings are exceeded or Safety System breached the PropSava will automatically activate Automatic Product to Site By-Pass.	• PropSava Input power is diverted to site. • To restore Regulation after new settings entered or problem corrected two Manual By-Pass buttons are provided – By-Pass ON and By-Pass OFF. These two buttons and the Regulation ON/OFF buttons restore Regulation. • No interruption to site power in any of the above events. • If site cabling or PropSava requires maintenance on the Input side then site power will be interrupted. • PropSava can be shut down, but Input is always live.
b) Manual Operated By-Pass using electrically operated push buttons.	• The PropSava can be manually placed in By-Pass using the By-Pass ON and OFF buttons. • This is done to carry out site logging and maintenance after the Input side. • No interruption to site power in any of the above events. • If site cabling or PropSava requires maintenance on the Input side then site power will be interrupted. • PropSava can be shut down, but Input is always live.
3. Total Disconnect System (TDS) - No interruption to site power under any circumstances and full PropSava Isolation	
a) Automatically or Manually selected.	• Automatically diverts PropSava Input power to site seamlessly under any circumstance. • One Key/Button diverts power or starts Regulation & can be operated remotely (option). • PropSava is isolated and can be maintained and/or removed without any interruption to site power. • TDS reduces installation time.

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Purpose and Intended Use:

All 3 Phase PropSava Systems are purpose built to meet the power output and voltage range of a customer site. The purpose of the PropSava is to automatically regulate over or under mains voltage; and stabilise that voltage to any site. The Output Voltage (the supply to the site) is regulated and stabilised at the Output Voltage value entered on the Digital Control pad by the customer – the factory default is 220V but the User may change the Output Voltage by entering any value between 230V and 210V on the Display Panel.

The build specification of the PropSava has been based upon a minimum period of 7 (seven) days of power quality logging at the intended site conducted by your Channel Partner. The power quality logging measures the minimum, maximum and average values of:

- Volts,
- Amps
- Kilowatts
- Power Factor
- Harmonic Distortion.

The sites power usage logged during these 7 days is then checked against 12 months of Electric Bills. This 'check' is to ensure that the 7 days chosen as the logging week is an accurate indication of sites yearly power usage. The values of power quality are then analysed to determine the specification of the PropSava. The maximum power demand of the site, plus 20% is then used to define the power size of the PropSava.

Benefits:

The benefits of voltage regulation and stabilisation are similar on whether there is over or under voltage situations at the relevant site.

Where sites/buildings experience main phase voltage delivery of over 220V, the electrical equipment is over-powered. Power is wasted and equipment suffers premature failure and reduced life expectancy. Sites that have over-voltage supply will:

- Pay more than they need for electricity.
- Increase CO_2 emissions and carbon footprint.
- Increase the organisations liability for Carbon Taxes.
- Experience more electrical equipment breakdowns; higher levels of production loss and higher than normal labour costs for maintenance.
- Replace electrical equipment sooner; increasing the originally projected period for return on investment (ROI) of that equipment, especially in computer systems, lighting and UPS equipment.

PropSava Power Optimisation Systems are used in virtually all forms of industry and commerce: telecoms, factories, offices, petrol stations, department stores, residential apartment blocks, leisure - anywhere that needs to maintain constant Output Voltage, save power, costs & protect equipment from premature failure.

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Benefits, Continued…

Whatever the value of the incoming voltage between phase voltage 254V to 176V (Line Voltage of 440V to 305V) into the site, the PropSava will always tightly control the Output Voltage to +/- 1.3% of the User programmed Output Voltage. It is this powerful and rapid regulation of voltage, coupled with high quality components and build that delivers the significant power and cost savings to our customers in over-voltage supply areas.

PropSava SCRV Range:

This Installation Manual covers the following PropSava Power Sizes:

Product Description:	AMP's at 380V:	MANUAL - Maximum Site Isolator Covered - AMPs at 380V	AUTOMATIC - Maximum Site Isolator Covered - AMPs at 380V	TDS - Maximum Site Isolator Covered - AMPs at 380V
PropSava 3P SCRV 50KVA	75	160	115	115
PropSava 3P SCRV 100KVA	150	250	185	185
PropSava 3P SCR 150KVA	225	250	400	400
PropSava 3P SCRV 200KVA	300	400	400	400
PropSava 3P SCRV 260KVA	400	630	555	555
PropSava 3P SCRV 330KVA	500	630	675	675
PropSava 3P SCRV 400KVA	600	630	1200	1200
PropSava 3P SCRV 460KVA	700	1,000	1200	1200
PropSava 3P SCRV 530KVA	800	1,000	1200	1200
PropSava 3P SCRV 600KVA	900	1,000	1200	1200
PropSava 3P SCRV 700KVA	1000	1,250	1890	1890
PropSava 3P SCRV 800KVA	1200	1,600	1890	1890
PropSava 3P SCRV 900KVA	1370	1,600	1890	1890
PropSava 3P SCRV 1000KVA	1500	1,600	3000	3000
PropSava 3P SCRV 1200KVA	1800	2,000	3000	3000

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Safety Information:

WARNING:

The PropSava **MUST** be installed by a **VP approved qualified Electrician** who holds nationally recognised qualifications for the country of installation in electrical high amperage mains equipment. Failure to use a VP qualified and competent installer can result in fatal injuries and loss of Product Warranty. Be sure to turn off the power before installing or servicing any PropSava. Fire can result from loose electrical connections. Ensure that all connections are secure. Local and National codes of the country of installation and safety **must be adhered to for the installation of the PropSava**. If you do not know or are not familiar with your countries local and/or national codes for the installation of high amperage mains equipment, please contact your local Government/Authority building inspector department for advice and/or guidance.

1. Be sure to turn off the site power before installing or servicing any VP Products to protect you and the PropSava.
2. Please follow all site, health and safety rules at all times. If in doubt contact the site person responsible for health and safety.
3. Place large visible notices on any power supply that you have turned off and lock that lever or mechanism so that no-one can accidently switch it back on. The sign must state that this power supply must not be turned on with a relevant authorised persons contact name and number.
4. Always isolate incoming power to the PropSava **prior** to removing any electrical panels.

Product Package Contents:

- 1 x PropSava 3 Phase SCRV System – Available in various KVA sizes. Please see inside the Operation Panel on the Manufacturers Plate and Max Site Amps Label for that units power, voltage settings and maximum site isolator size.
- If applicable - Transformer nuts, bolts and washers - On the PropSava 330KVA and above copper bars are used instead of cables between the Connection Plate and Transformers. Where copper bars are used they are unbolted from the Transformers to stop damage during transportation. A nylon tie-lock strap is used to hold the copper bar in place. These tie-lock straps must be removed at the time of installation and the packed nuts, bolts and washers used to connect the copper bars to the transformers.
- 1 x User and Installation Manual with Warranty Card. **Warranty is only valid** when the PropSava has been signed by all parties and Commissioned by a VP Company Nominated Commissioning Engineer following installation.
- Special tool for removing electrical installation panel screws.

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Prior to Installation – Product and Site Examination and Conditions:

1. Check the Manufacturers Plate information to ensure that it is designed to meet the sites needs as regards voltage, power output and relationship to the site main Isolator/MCCB. The Manufacturers Plate is located inside the Operation Panel. Specifically check:
    1.1. The installation sites main input voltage range (minimum and maximum) are equal to or below the PropSava voltage range.
    1.2. The maximum Channel Partner recorded installation site power output (measured in KVA) PLUS 20% (twenty percent) is equal to the PropSava maximum power output (also measured in KVA).
    1.3. The maximum power output (measured in Amps) of the PropSava must always be **equal to or less than** the maximum safety limit of the sites Isolator/MCCB.
    1.4. Check the 'Max Site Amps' label below the Manufacturers Plate to identify the Maximum Site Isolator size of the PS By-Pass System. The Amps shown on this label must be **equal to or larger** than the sites Isolator Protection size as measured in Amps.
    1.5. If ANY the above conditions are **NOT** met **do not install the PropSava** as it is not suitable for the installation site and will either fail or not function correctly; and invalidate the Warranty.
    1.6. Examine the intended site of installation of the PropSava and ensure that the site has:
    1.7. No water leakage, steam, oil-based dust and metal particles.
    1.8. No corrosive, flammable, explosive liquid or gas.

1.1. Good ventilation. The normal operation of the PropSava will produce heat. It is important that the air of a room be exchanged at least twice an hour by natural ventilation. The room should be a minimum size of 3 (three) times the cubic volume of the PropSava Cabinet. You must have at least 2 (two) vents fitted to an outside wall – one low (for cold air incoming) and one higher up (for venting of the warm air). There should be at least 1.5 meter horizontal distance between each vent. If not consider installing forced air fans and vent to an outside wall. The room temperature should not be allowed to exceed 40^0C.
    1.2. Altitude: ≤2000 meters
    1.3. Humidity：0~95%
    1.4. Ambient temperature: -10^0C to 40^0C

2. A MINIMUM clearance of 100mm above, 500mm on rear, left and right vertical sides, and for the front, a space equal or greater of the width of the Outer Door from any surface/equipment. This clearance is needed for good ventilation, inspection and maintenance. If a Header Box is needed, please allow additional head room clearance.
3. There is sufficient space to carry out a safe installation and maintenance.

If any of the above conditions cannot be met Do Not Install the PropSava. Contact the Channel Partner and ask for clarification and guidance.

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Prior to Installation – Product and Site Examination and Conditions Continued…

Site Isolator/MCCB Size to PropSava Output Size:

The PropSava should never be used in any site where the site Isolator/MCCB safety rating is **less than** the power output size of the PropSava as measured in Amps. If you do fit a PropSava to a site where the output power of the PropSava is larger than the site Isolator/MCCB safety limit, the PropSava will not be Commissioned and all Warranties are invalidated. Please check the Amp safety limit of your site Isolator/MCCB **BEFORE** you install the PropSava.

Site Isolator/MCCB Size to PropSava PS By-Pass System Size:

The PropSava Product to Site By-Pass System will have an Amp rating. This is stated on the 'Max Site Amps' label situated below the Manufacturers Plate in the Operation Panel. The value of Amps shown on this label is the maximum Amps the PropSava By-Pass System can carry in the event of a PS By-Pass (Manual or Automatic). Please ensure that the 'Max Site Amps' Amp value is **equal to or larger** than the site Isolator/MCCB capacity/fuse setting. If you do fit a PropSava to a site where the PS By-Pass System is smaller than the site Isolator/MCCB safety limit, the PropSava will not be Commissioned and all Warranties are invalidated. Please check the PropSava Max Site Amps against the safety limit of your site Isolator/MCCB **BEFORE** you install the PropSava.

Transportation and Storage:

ALWAYS transport/store PropSava in the **VERTICAL** position. Damage can occur if transported/stored horizontally which would invalidate any Warranty Claim. The SCRV packing box has fork lift position indicators. Please ensure that you lift/move the PropSava packing box with your lifting device/forks between these indicators or there is a **possibility of tipping the load** and causing damage to the PropSava which will also invalidate the Warranty.

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Preparing for Installation:

1. It is important for the safe and problem free operation of the PropSava that the ground for siting the PropSava is level in all directions; and preferably with concrete foundations of at least 100mm (up to 300KVA) and 150MM (from 301KVA to 600KVA) and 175MM (from 601KVA to 1,200KVA) in depth. Please ensure that concrete platforms have no protruding aggregate. **It is not advisable** to use wooden blocks or other natural fibres as blocks/chocks for seating/raising the PropSava.
2. **ONLY LIFT THE PROPSAVA FROM THE BASE.** Lifting the PropSava from the top can severely damage the casing and internal components of the PropSava and invalidate the Warranty.
3. The PropSava Cabinet frame is **always bolted to the pallet** on which it is delivered.
4. All PropSava are fitted with a minimum of 4 or 6 adjustable feet. These feet provide two benefits: easy removal of the pallet and adjusting the Cabinet and PropSava a level position when in-situ.
5. Only remove the pallet when the PropSava has been moved to near the final siting place. This will ensure that the Cabinet and its contents are not unduly stressed or damaged.

Standard Torque Settings for PropSava Systems:

Tolerance on all settings ± 2%		
Stud Size:	**Torque Setting (Newton/Metres):**	**Torque Setting (Pounds/Feet):**
M6	5	3.7
M8	13	9.6
M10	25	18.4
M12	40	29.5
M16	100	73.8
M20	195	143.8
M22	265	195.5

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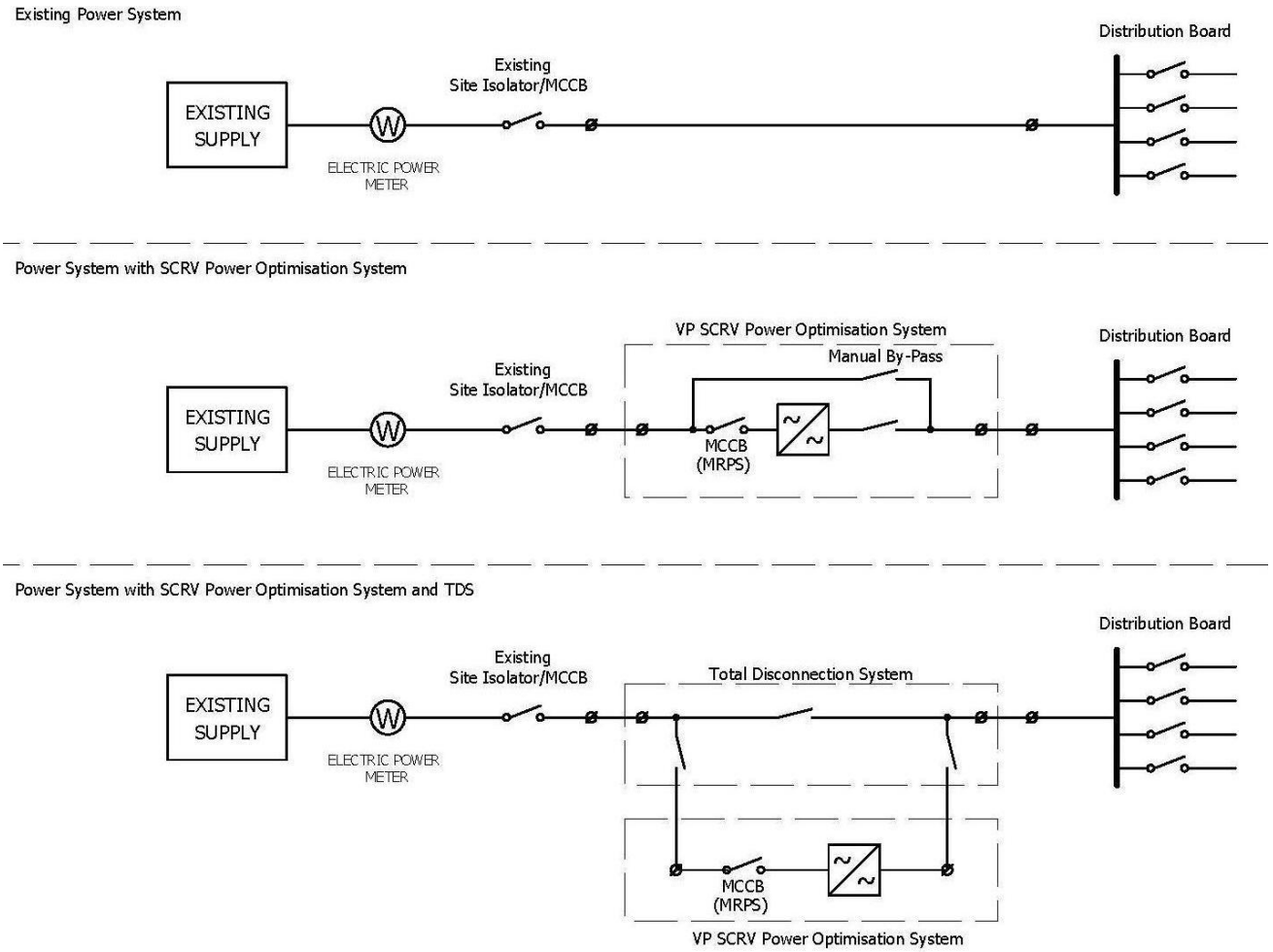
Site Wiring Diagram:



Service and Maintenance:

The PropSava SCRV Power Optimisation System has no parts that need regular servicing. However we recommend that a weekly visual inspection is carried out by a nominated staff member to see that no dirt, debris or items have blocked the external cabinet(s) ventilation ports; and that no warning lights are illuminated. We also recommend the fitting of a Remote Alarm Monitoring Panel (RAMP) if the PropSava is infrequently visited so that in the event of an alarm information will be provided to the responsible person(s).

Annual checks for safety and performance should be carried out by a qualified electrician. We also recommend that the System Control Board be tested for performance and replaced every 10 (ten) years.

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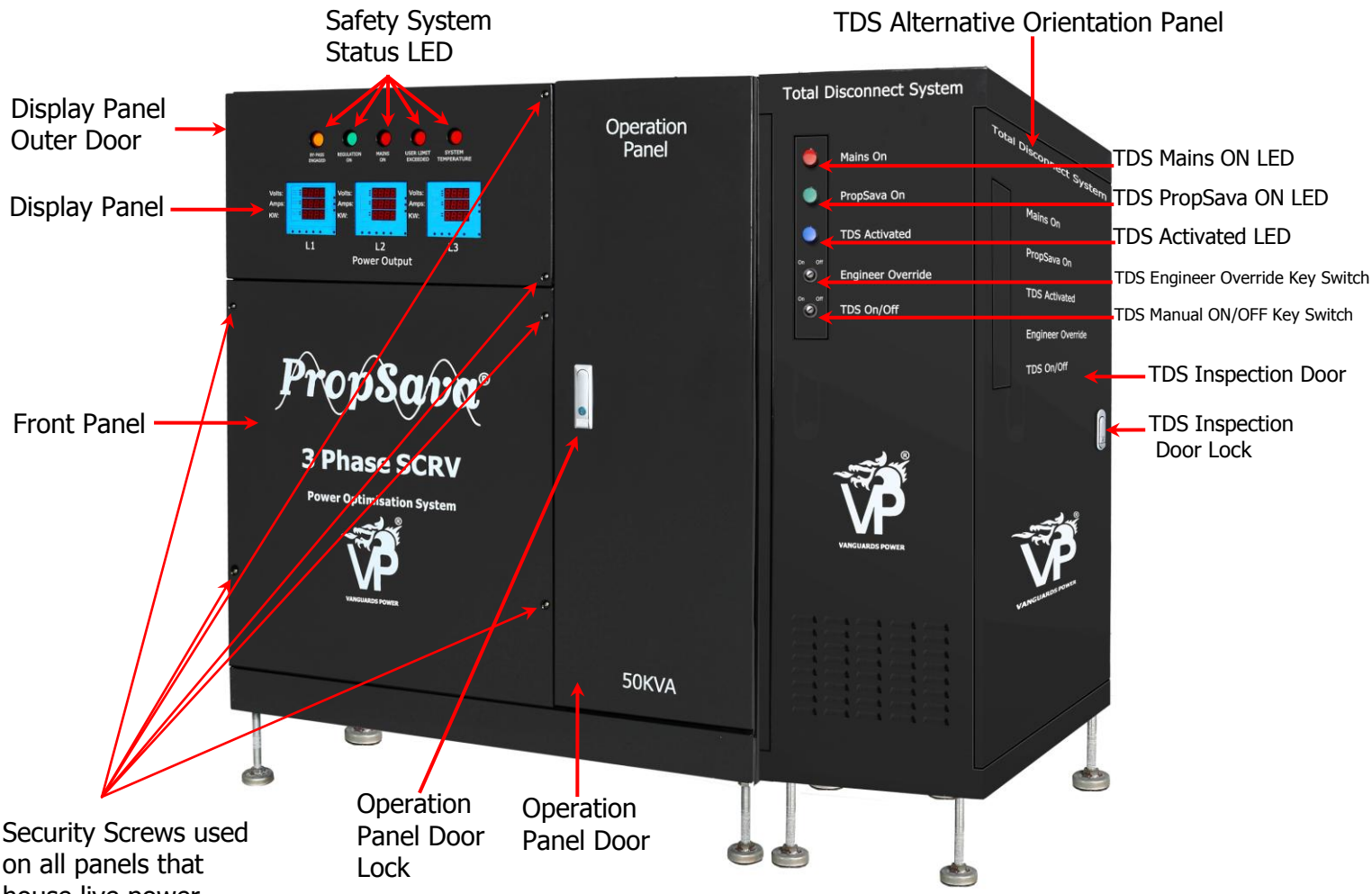
PropSava Layout and Identification:

Recommended Layout and configuration - Base Unit plus External Protection System- 20KA Surge Protection; and Product to Site Total Disconnect System.



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PropSava Layout and Identification Continued…

Base Unit Front – Doors Closed – No External Protection Systems, No Product to Site By-Pass Systems

Display Panel
Outer Door Open

Operation Panel Door Open

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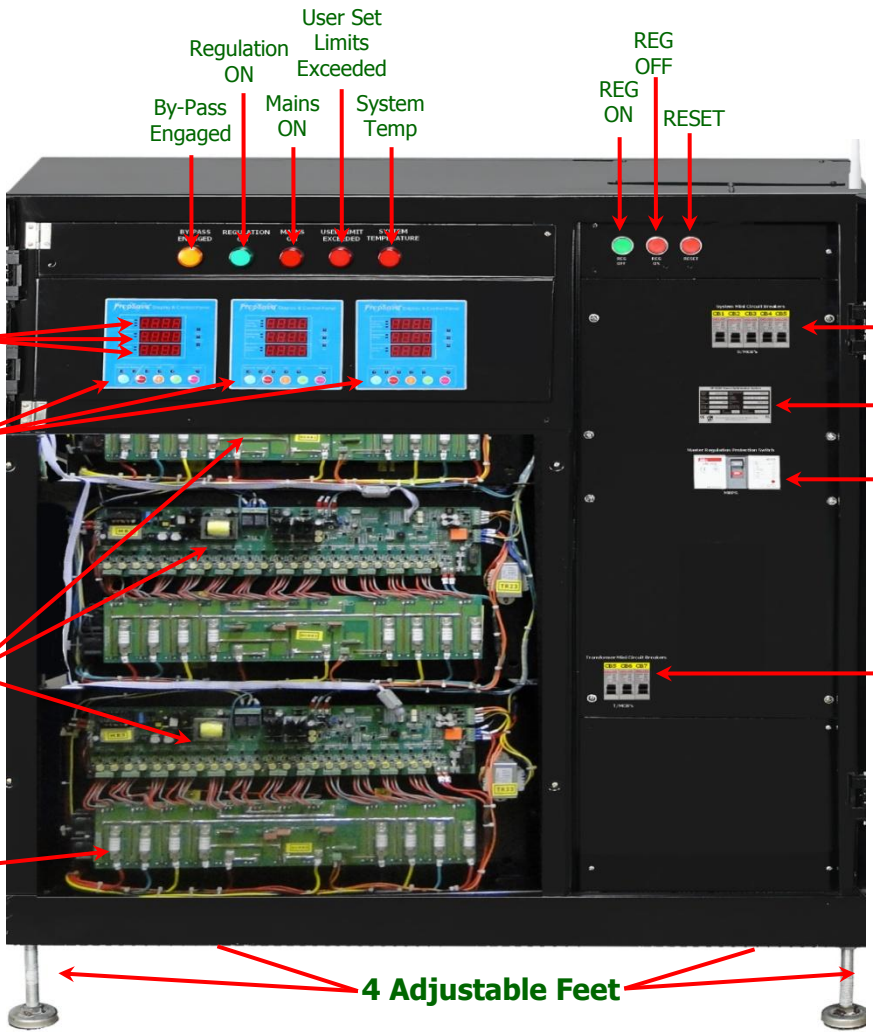
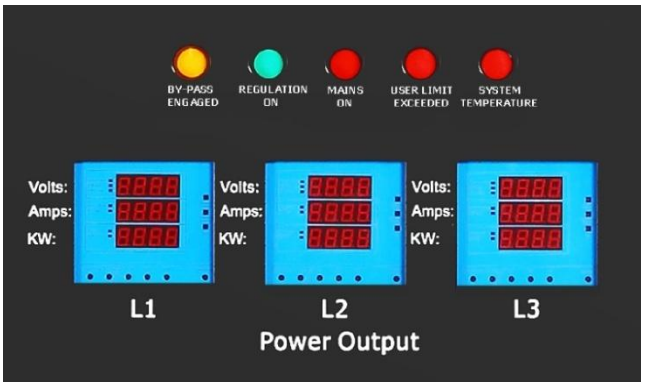
PropSava Layout and Identification Continued…

Base Unit Front – Control Panel and Operation Doors Open, Front Panel Removed





Display Panel Door Closed

Display Panel Door Open

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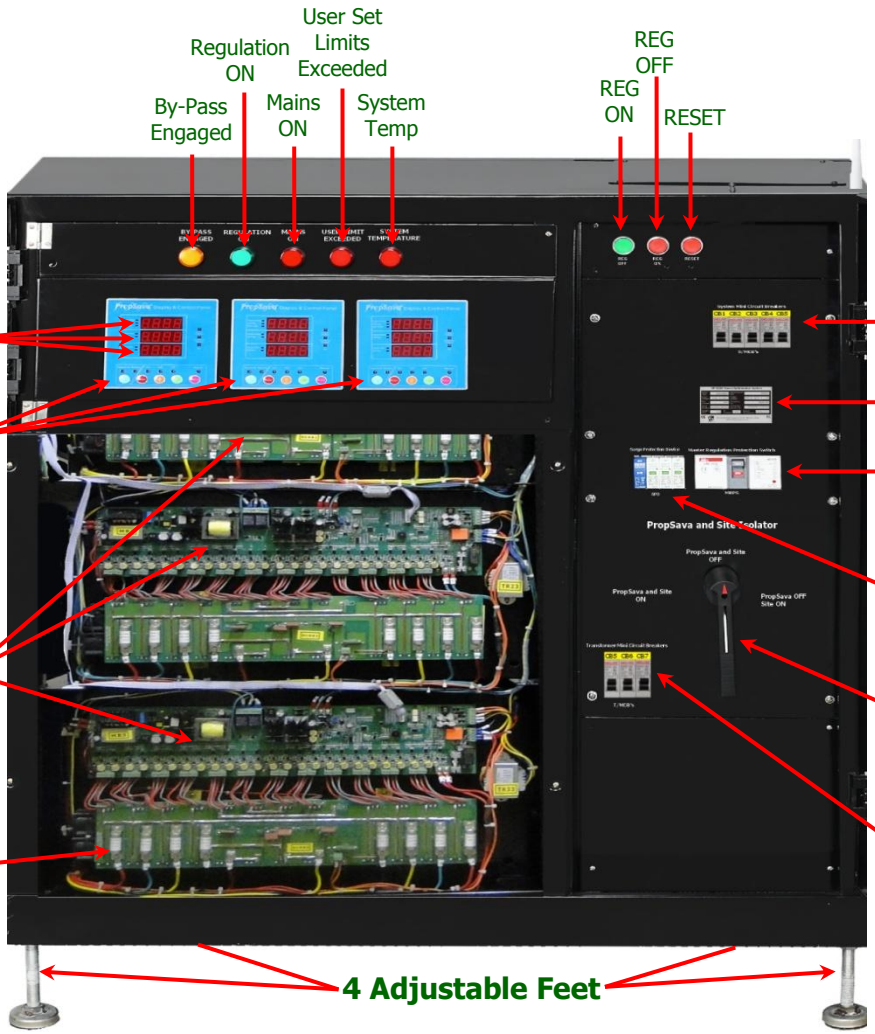
PropSava Layout and Identification Continued…

Base Unit Front PLUS External Protection System and Manual By-Pass



Output measurements of Volts, Amps and Kilowatts

Digital Display Panels, one for each Phase to set User Output Voltage and User Limit Settings

Modular Design for safety and security of supply – 3 single Phase Systems controlled by 3 separate computer systems

Each SCR fused separately for maximum system protection

System protection Mini Circuit Breakers

Manufacturers Plate

Master Regulation Protection Switch (MRPS)

Surge Protection System 20KA Current

Manual By-Pass System Lever

Transformer protection Mini Circuit Breakers

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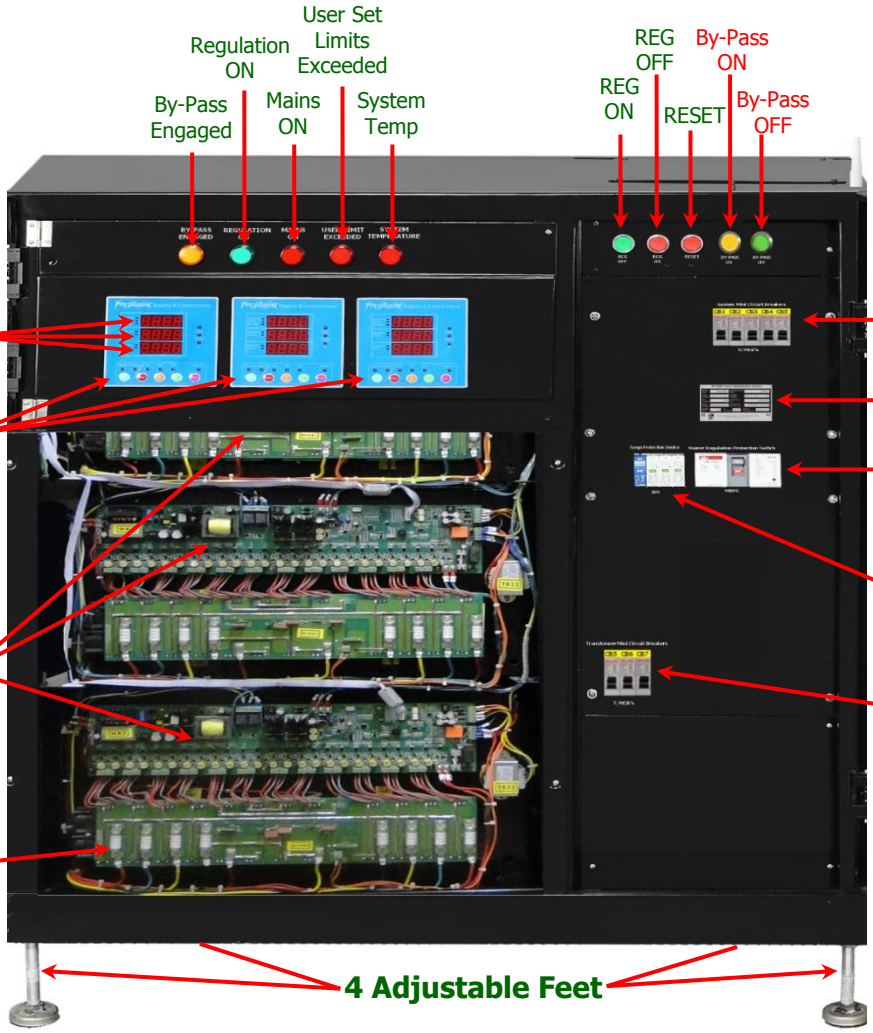
PropSava Layout and Identification Continued…

Base Unit Front PLUS External Protection System and Automatic By-Pass



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Manufacturers Plate

Master Regulation Protection Switch (MRPS)

Surge Protection System 20KA Current

Transformer protection Mini Circuit Breakers

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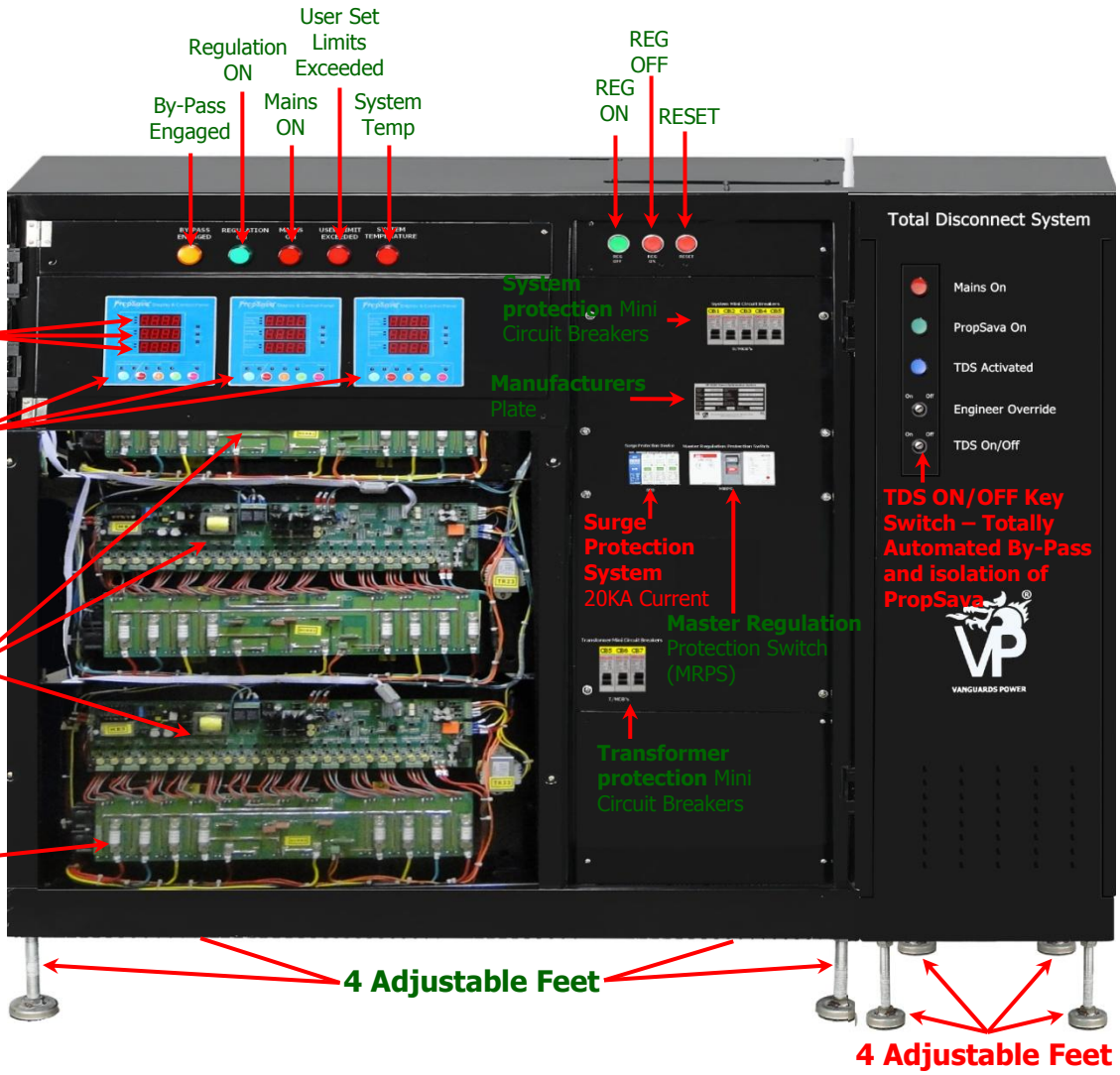
PropSava Layout and Identification Continued…

Base Unit Front PLUS External Protection System and Total Disconnect System



Output measurements of Volts, Amps and Kilowatts

Digital Display Panels, one for each Phase to set User Output Voltage and User Limit Settings

Modular Design for safety and security of supply – 3 single Phase Systems controlled by 3 separate computer systems

Each SCR fused separately for maximum system protection

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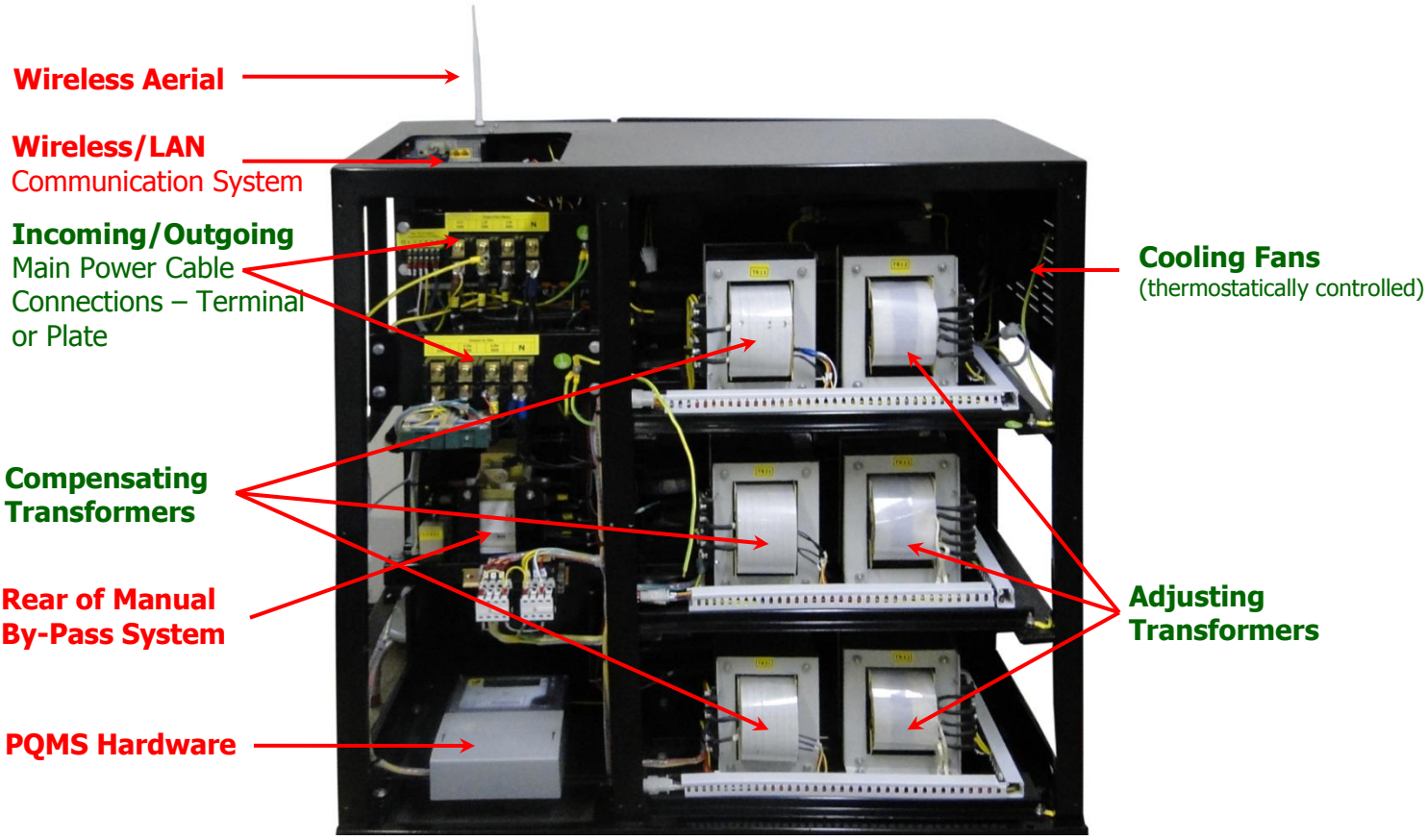
PropSava Layout and Identification Continued…

Base Unit Rear PLUS External Protection System, Manual By-Pass & PQMS



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Safety System Status Indicators:

1. **By-Pass Engaged Indicator:**

   a) This LED illuminates and alarm sounds to provide a warning that a By-Pass System has been engaged when Auto Regulation OFF (**Auto-REG OFF**) is activated caused by either Overload Protection System (OLP), or Under Voltage Protection (UVP), or Over Voltage Protection (OVP), or when a SCR fuse has been damaged. There are 3 forms of Product to Site By-Pass fitted to the PropSava - Manual By-Pass, Automatic By-Pass and Total Disconnect System.

   b) **Auto Regulation OFF** (**Auto-REG OFF**)**:** In the event of an internal or external fault or User Settings Limits being exceeded the PropSava computer systems will initiate and implement an **'Auto-REG OFF'.** This causes the PropSava regulation to stop. If Automatic By-Pass or Total Disconnect System is fitted these Product to Site By-Pass systems will also be activated. In this **'Auto-REG OFF'** state the **'By-Pass Engaged'** LED Indicator will illuminate and an alarm will sound. There will be no interruption of site power supply when **'Auto-REG OFF'** is activated by the computer system.

2. **Regulation On Indicator:**

   a) When the PropSava is in Regulation Mode the **'Regulation ON'** LED Indicator is illuminated. In the event of **'Auto-REG OFF'**, **'User Set Limits Exceeded'**, or **'Systems Temperature'** alarm being activated then the '**Regulation ON'** LED Indicator light is extinguished.

3. **Mains ON:**

   a) The **'Mains ON'** LED illuminates at all times when incoming power is connected to the PropSava. When this LED is extinguished all power **AFTER** the MRPS has been terminated.

   WARNING: There are still live connections into the MRPS **UNLESS** a TDS has been installed. If a TDS is installed then after the TDS has been automatically activated or the User has turned the TDS Key Switch to **'ON'**, then the PropSava will be totally isolated from incoming and outgoing main power.

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Safety System Status Indicators Continued…

User Set Limit Exceeded Continued…

4. **User Set Limit Exceeded:**

a) This LED illuminates and alarm sounds to provide a warning that one of a number of User Settings has been exceeded.

i. **Regulated Over Voltage Protection (OVP)** – In the event of the User Set Limits of OVP being exceeded the **'Auto-REG OFF'** is engaged. The factory default setting for OVP is 240V phase voltage. In OVP the PropSava will initiate **'Auto Regulation OFF'** and then:

1. If **'Manual By-Pass'** System is installed the PropSava will remain in **'Auto-REG OFF'** state until the problem is resolved and Regulation is restored. Site power is not interrupted.
2. If **'Automatic By-Pass'** System is installed then the PropSava Computer System will initiate an Automatic By-Pass sequence of connecting the incoming power to the site Distribution system and remain in this state until the problem is resolved and Regulation is restored. Site power is not interrupted.
3. If **'TDS'** System is installed then the PropSava Computer System will initiate an Automatic By-Pass sequence of connecting the incoming power to the site Distribution system and remain in this state until the problem is resolved and Regulation is restored. Site power is not interrupted.

b) **Regulated Under Voltage Protection (UVP)** - In the event of the User Set Limits of UVP being exceeded the **'Auto-REG OFF'** is engaged. The factory default setting for UVP is 195V phase voltage. In UVP the PropSava will initiate **'Auto-REG OFF'** and then:

1. If **'Manual By-Pass'** System is installed the PropSava will remain in **'Auto-REG OFF'** state until the problem is resolved and Regulation is restored. Site power is not interrupted.
2. If **'Automatic By-Pass'** System is installed then the PropSava Computer System will initiate an Automatic By-Pass sequence of connecting the incoming power to the site Distribution system and remain in this state until the problem is resolved and Regulation is restored. Site power is not interrupted.
3. If **'TDS'** System is installed then the PropSava Computer System will initiate an Automatic By-Pass sequence of connecting the incoming power to the site Distribution system and remain in this state until the problem is resolved and Regulation is restored. Site power is not interrupted.

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Safety System Status Indicators Continued…

User Set Limit Exceeded Continued…

iii. **Regulated Overload Protection (OLP)** - In the event of the User Set Limits of OLP being exceeded, **'Auto-REG OFF'** is engaged and Regulation is stopped. The factory default setting for OLP is -5% (minus five percent) of the PropSava MRPS Rating. In OLP the PropSava will initiate **'Auto-REG OFF'** and then:

1. If **'Manual By-Pass'** System is installed and the current does not drop to the Default Setting the MRPS will be shutdown - **All site power is terminated.**
2. If **'Automatic By-Pass'** System is installed then the PropSava Computer System will initiate an Automatic By-Pass sequence of connecting the incoming power to the site Distribution system and remain in this state until the problem is resolved and Regulation is restored. Site power is not interrupted.
3. If **'TDS'** System is installed then the PropSava Computer System will initiate an Automatic By-Pass sequence of connecting the incoming power to the site Distribution system and remain in this state until the problem is resolved and Regulation is restored. Site power is not interrupted.

5. **System Temperature Indicator:**

i. In the event of either a Cabinet or transformer temperature rise to 90^0C the alarm will sound and the System Temperature LED Indicator will illuminate. **'Auto-REG OFF'** is engaged and Regulation is stopped and then:

1. If **'Manual By-Pass'** System is installed - **All site power is terminated.**
2. If **'Automatic By-Pass'** System is installed then the PropSava Computer System will initiate an Automatic By-Pass sequence of connecting the incoming power to the site Distribution system and remain in this state until the problem is resolved and Regulation is restored. Site power is not interrupted.
3. If **'TDS'** System is installed then the PropSava Computer System will initiate an automatic By-Pass sequence of connecting the incoming power to the site Distribution system and remain in this state until the problem is resolved and Regulation is restored. Site power is not interrupted.

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REG OFF, REG ON and Reset Button:

1. In the event of an internal or external fault or User Settings Limits being exceeded the PropSava computer systems will initiate and implement an **'Auto-REG OFF'.** This causes the PropSava regulation to stop.
2. If the User wants to stop regulation of the PropSava manually then the User would use the Regulation OFF (REG OFF) and Regulation ON (REG ON) buttons located in the top section of the Operation Panel. Pressing the **'REG OFF'** button immediately stops PropSava Regulation and site power is uninterrupted. In this state you will be able to see the value of the incoming Mains voltage.
3. To re-start regulation, press the **'REG ON'** button. After a few seconds the PropSava will start regulation again. Site power is uninterrupted.
4. The **'RESET'** button is used to reset 'System Temperature' LED light that remains illuminated when activated. When the PropSava returns to the correct temperature pressing the **'RESET'** button will extinguish the LED Light.

How to Change PropSava Output Voltage and User Limit Settings:

1. You can change all the PropSava settings with mains power on and in a normal regulation state. You do not need to power down, nor activate any form of By-Pass to change the Output Voltage or the User Limit Settings.
2. You will need to read and understand the Control Panel functions set-out in the following chapter.
3. To access the Control Panel to carry out changes to Output Voltage and all other User Settings you will need to unfasten two security screws located to the right side of the Display Panel. You must use the security screwdriver provided with the PropSava to unfasten these screws.
4. When you have removed the security screws, hinge the Display Panel to the left to access the Control Panel buttons.
5. Press the **Display** button to change the display to **Power**, **Protection** or **Set** screens.
6. On the selected screen, press the **Enter** button. The first character on the top set of LED will now flash.
7. Use the **Up-Arrow** to change the character up. Keep pressing until you have arrived at the number you want. If you pass the character you wanted, keep pressing the **Up-Arrow** until you arrive at the number required.
8. If this is the only change you wish to make then press the **Enter** button to save the entry. If you wish to change further settings, use the **Right-Arrow** to move to the next character or next row of LED's.
9. When you have completed all your setting changes, please make sure to press the **Enter** button to save your new settings. If the **Display** screen changes to the Default screen (Power) and you have not pressed the **Enter** button your changes will not have been saved. You will then need to start again.

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How to Re-Start PropSava Regulation When Automatic By-Pass has been engaged:

1. **Prior** to resetting the PropSava and returning to Regulation State after **'Auto Regulation OFF' and 'Automatic By-Pass'** has been engaged please carry out the following:
   a. First identify the reason for the **'Auto Regulation OFF'** state. Look for Safety System LED's that are illuminated – **'User Set Limits Exceeded'**, **'System Temperature',** Display Panel Event/Alarm warning LED's.
   b. **Check and correct the problem** that forced the **'Auto Regulation OFF'** state.
2. To return the PropSava to Regulation State from **ONE** of the **RELEVANT** states titled below, follow that procedure:

a) Overload/Over Voltage/Under Voltage Protection System

Possible Reason - Regulated Overload Protection Exceeded – **'Auto Regulation OFF'** and **'Automatic By-Pass'** has been activated.

Action:	Alarm/Safety Status Lights Illuminated:	Display Panel:
Identify why the output load has exceeded either the Factory Default or User Set limits and rectify.	a) Mains ON b) By-Pass Engaged c) User Limits Exceeded d) By-Pass ON e) Alarm activated **NOTE:** By-Pass ON/OFF buttons are de-activated	Input Volts value ONLY.
Press **'REG ON'** button	a) Mains ON b) Regulation ON c) By-Pass ON	Regulated output volts ONLY.
Press **'REG OFF'** button	a) Mains ON b) By-Pass Engaged c) By-Pass ON d) Alarm activated	Input Volts value ONLY.
Press & **HOLD 'By-Pass OFF'** button for 5 seconds	a) Mains ON b) By-Pass Engaged c) By-Pass OFF d) Alarm activated	Input Volts, Amps and Kilowatts.
Press **'REG ON'** button	a) Mains ON b) Regulation ON c) By-Pass OFF	Output Volts, Amps and Kilowatts.

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How to Re-Start PropSava Regulation When Automatic By-Pass has been engaged Continued…

b) System Temperature

Possible Reason – Extreme climate and/or room temperature; lack of correct room ventilation; dirt/dust build-up inside Cabinet and/or components; failure of one or more cooling fans.

Action:	Alarm/Safety Status Lights Illuminated:	Display Panel:
Identify why the System Temperature has exceeded the normal operating temperature of the PropSava and rectify.	a) Mains ON b) By-Pass Engaged c) System Temperature d) By-Pass ON e) Alarm activated **NOTE:** By-Pass ON/OFF buttons are de-activated	Input Volts value ONLY.
Please wait until the PropSava has returned to normal operating temperature. Press **'RESET'** button. If System temperature has returned to normal the System Temperature LED will extinguish – if not it will remain illuminated.	a) Mains ON b) By-Pass Engaged c) By-Pass ON d) Alarm activated	Input Volts value ONLY.
Press **'REG ON'** button	a) Mains ON b) Regulation ON c) By-Pass ON	Regulated output volts ONLY.
Press **'REG OFF'** button	a) Mains ON b) By-Pass Engaged c) By-Pass ON d) Alarm activated	Input Volts value ONLY.
Press & **HOLD 'By-Pass OFF'** button for 5 seconds	a) Mains ON b) By-Pass Engaged c) By-Pass OFF c) Alarm activated	Input Volts, Amps and Kilowatts.
Press **'REG ON'** button	a) Mains ON b) Regulation ON c) By-Pass OFF	Output Volts, Amps and Kilowatts.

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How to Manually Engage By-Pass ON and OFF

c) Setting 'By-Pass ON'

Possible Reason – To permit site power quality surveys; repair or servicing of the PropSava

Action:	Alarm/Safety Status Lights Illuminated:	Display Panel:
None	a) Mains ON b) Regulation ON c) By-Pass OFF	Output Volts, Amps and Kilowatts.
Press **'REG OFF'** button	a) Mains ON b) By-Pass Engaged c) By-Pass OFF d) Alarm activated	Input Volts value ONLY.
Press & **HOLD 'By-Pass ON'** button for 5 seconds	a) Mains ON b) By-Pass Engaged c) By-Pass ON d) Alarm activated	Input Volts value ONLY.
To silence Alarm, switch MRPS to **'OFF'.**	a) Mains ON b) By-Pass ON	NONE

d) Setting 'By-Pass OFF'

Possible Reason – To return PropSava to Regulation after completion of site power quality surveys; repair or servicing of the PropSava

Action:	Alarm/Safety Status Lights Illuminated:	Display Panel:
NONE	a) Mains ON b) By-Pass ON	NONE
Switch MRPS **'ON'.**	a) Mains ON b) Regulation ON c) By-Pass ON	Regulated Output Volts.
Press **'REG OFF'** button	a) Mains ON b) By-Pass Engaged d) By-Pass OFF e) Alarm activated	Input Volts.
Press & **HOLD 'By-Pass OFF'** button for 5 seconds	a) Mains ON b) By-Pass Engaged c) By-Pass OFF c) Alarm activated	Input Volts, Amps and Kilowatts.
Press **'REG ON'** button	a) Mains ON b) Regulation ON c) By-Pass OFF	Regulated output volts, Amps and Kilowatts.

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Output Voltage Table and Calculating Out of Range Output Voltage:

The Output Voltage setting depends on the value of incoming mains voltage. The PropSava Adjusting Transformer ratio is 215V ±18%. At 215V Output Voltage Setting the PropSava can maintain and stabilise 215V ± 1.3% with an incoming main phase voltage of a 253.7V to 176.3V. The Table below shows the approximate Output Voltage Setting corresponding to the Maximum and Minimum incoming mains phase voltage.

If the incoming main voltage exceeds the Maximum or Minimum values below, then calculate: the difference between the two (the incoming voltage and the Table Maximum or Minimum Voltage at that Output Voltage Setting) divided by 1.387 + Output Voltage Setting = New Output Voltage

Output and Input Voltage Tables For 215V ± 18% Transformers - PropSava					
All Voltage Tolerances ± 1.3%					
PropSava SCRV Regulation USOV Range:					
264V Soft/Hardware By-Pass Safety Limit:					
User Setting for Regulated OUTPUT VOLTAGE (USOV) SP:	**3 Phase Voltage:**	**MAX Incoming SP Voltage to Maintain USOV:**	**3 Phase Voltage:**	**MIN Incoming SP Voltage to Maintain USOV:**	**3 Phase Voltage:**
240	416	283	491	197	341
239	414	282	488	196	339
238	412	281	486	195	338
237	410	280	484	194	337
236	409	278	482	194	335
235	407	277	480	193	334
234	405	276	478	192	332
233	404	275	476	191	331
232	402	274	474	190	329
231	400	273	472	189	328
230	398	**271**	470	**189**	327
229	397	**270**	468	**188**	325
228	395	**269**	466	**187**	324
227	393	**268**	464	**186**	322
226	391	**267**	462	**185**	321
225	390	**266**	460	**185**	320
224	388	**264**	458	**184**	318
223	386	**263**	456	**183**	317
222	385	**262**	454	**182**	315
221	383	**261**	452	**181**	314
220	381	**260**	450	**180**	312
219	379	**258**	448	**180**	311
218	378	**257**	446	**179**	310
217	376	**256**	443	**178**	308
216	374	**255**	441	**177**	307
215	372	**254**	439	**176**	305
214	371	**253**	437	**175**	304
213	369	**251**	435	**175**	303
212	367	**250**	433	**174**	301
211	365	**249**	431	**173**	300
210	364	**248**	429	**172**	298
209	362	247	427	171	297
208	360	245	425	171	295
207	359	244	423	170	294
206	357	243	421	169	293
205	355	242	419	168	291
204	353	241	417	167	290
203	352	240	415	166	288
202	350	238	413	166	287
201	348	237	411	165	285
200	346	236	409	164	284

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Hardware and Software Over-Voltage Safety Control Systems:

NOTES:

a) All values below are given as phase voltage with a tolerance of ± 1.3%.
b) Transformer Specification of 215V ± 18% input voltage range providing Output Voltage regulated and stabilised at 215V ± 1.3%

1. There are two additional safety systems employed by the PropSava SCRV to control the damaging effects of incoming over-voltage into a site if the PropSava is not regulating:

   a. **Software Control:** User input via the digital key pad to set the maximum **regulated** Output Voltage Protection (OVP) level.
      i. The OVP can be any value up to a maximum of 260V (Factory default 240V).
      ii. **EXAMPLE:** OVP User Setting of 240V would mean that the incoming voltage would be 283V: 240+ (240/215X38.7) = 283V
      iii. If the incoming voltage increases to 285V, Output Regulated Voltage will be 242V. This exceeds the OVP Factory default setting of 240V. In this event the PropSava will stop regulation, initiate **'Auto-REG OFF'** then one of the following:
         1. If **'Manual By-Pass'** System is installed the PropSava will remain in **'Auto-REG OFF'** state until the problem is resolved and Regulation is restored. Site power is not interrupted.
         2. If **'Automatic By-Pass'** System is installed then the PropSava Computer System will initiate an Automatic By-Pass sequence of connecting the incoming power to the site Distribution system and remain in this state until the problem is resolved and Regulation is restored. Site power is not interrupted.
         3. If **'TDS'** System is installed then the PropSava Computer System will initiate an Automatic By-Pass sequence of connecting the incoming power to the site Distribution system and remain in this state until the problem is resolved and Regulation is restored. Site power is not interrupted.

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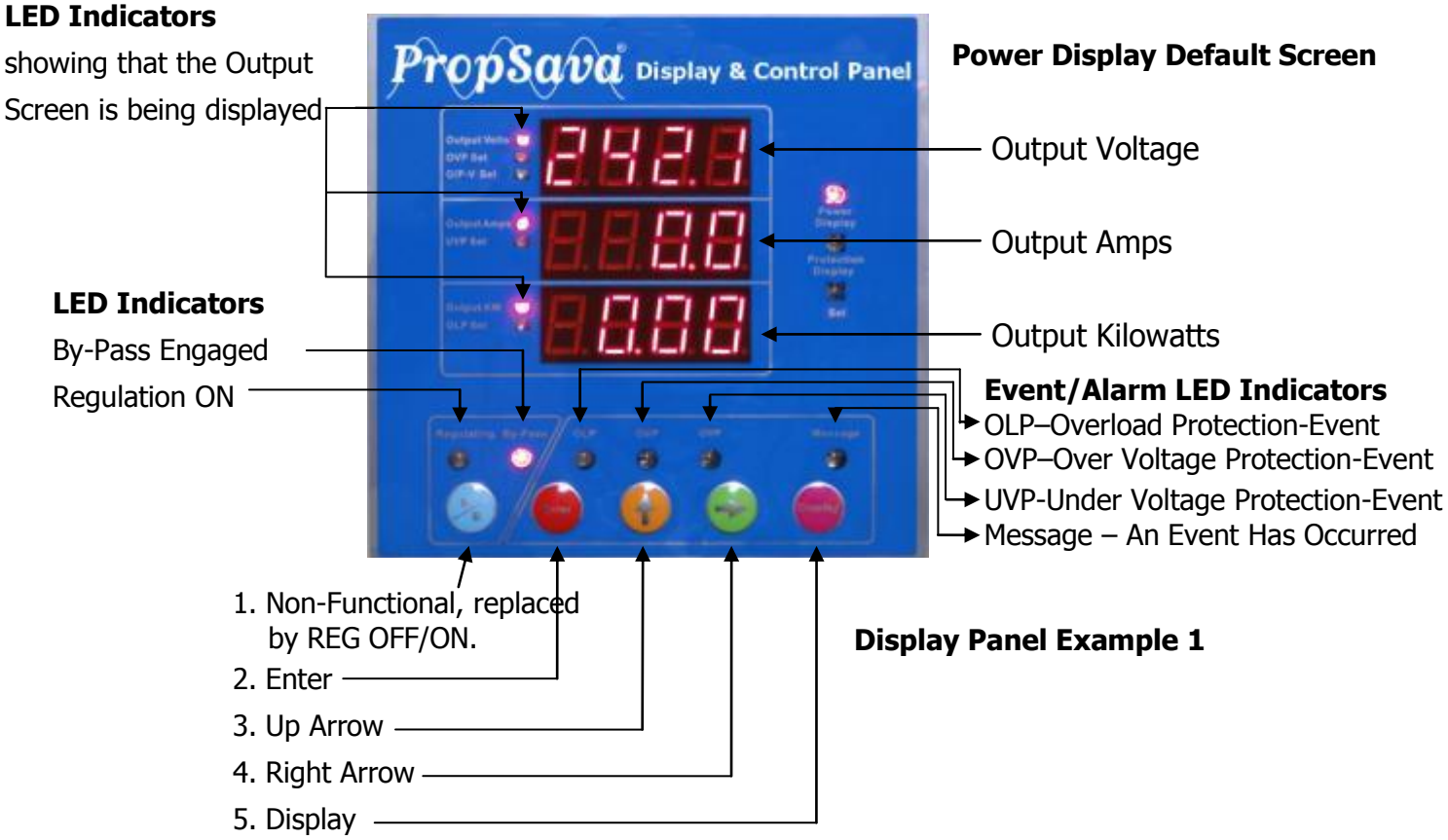
Display & Control Panel – Description of Function and Controls:

NOTE: To access the Display Control Panel to carry out changes to Output Voltage and all other User Settings you will need to unfasten two security screws located to the right side of Display Panel Outer Door. You must use the security screwdriver provided with the PropSava to unfasten these screws.



Display Panel Example 1

Description of Function and Controls:

1. The **"R/B"** button has been de-activated and replaced with the 'REG ON/OFF' Buttons located in the Operation Panel.

2. The **"Enter"** button has three functions:
   a. By holding the **'Enter'** button for 3 seconds on the **'Power Display'** screen this is a shortcut to change Output Voltage. The first digit of the Output Voltage will flash – meaning it can now be changed up or down using the **'Up'** arrow. By pressing the **'Right Arrow'** the changed digit will stop flashing and move to the next Output Voltage digit. When you have changed the Output Voltage to the setting you require, press the **'Enter'** button to save the changes into memory.
   b. At any Display Screen holding the **'Enter'** button for 3 seconds starts the change of programming system. You will see that the programming system starts when the first digit of the screen starts to flash.
   c. At any Display Screen pressing the **'Enter'** button immediately saves the program changes made to memory.

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Description of Function and Controls Continued….

3. The **'Up Arrow'** button is used to scroll the number or value to your newly selected value on each of the LED screens. Repeated pressing of the '**Up-Arrow'** button will increase the value displayed in increments of 1. Stop pressing when you reach the value you require and then press '**Enter'** to store the new value.
4. The '**Right Arrow'** button is used to move the cursor to the next LED character to the right. Repeated pressing of the '**Right Arrow'** will move the cursor through each of the LED characters of each row of the LED screens. When you have moved the cursor to the desired character to change, use the '**Up Arrow'** to change the value and press '**Enter'** to memorise the changes.
5. The **'Display'** button changes the display panel. By changing the '**Display'** panel you can access the LED screens and make changes to the settings of the PropSava. There are 3 display screens. Each press of the '**Display'** button will change to a different screen. After 60 seconds of non activity on that screen, the display will default to the '**Power Display'** screen.

Display Screens:

Power Display Screen – Default Screen: Shows the Output Voltage, Output Amps and Output Kilowatts. You cannot change the values of the Power Display as these are the measured output values of your electrical system.

Output Voltage – In this example the PropSava is in **'REG OFF'** mode. The value shown in Output Voltage Display Panel is of incoming mains voltage. When in **'REG ON'** Mode, this value will show the regulated Output Voltage set by the User +/- 1.3%.

Output Amps – The site load measured in AMPs.

Output Kilowatts – The site power measured in Kilowatts.

Display Panel Example 2

Display Screens continued…..

Protection Display Screen – Shows the Output User Setting Limits of Over-Voltage, Under-Voltage and Overload.

1. **Output Over-Voltage Protection – OVP:** Here you can change the Maximum Output Voltage value. Maximum Output Voltage value is 260V. Factory default is 240V. Should the Output Voltage exceed this setting, the PropSava Computer Systems will stop regulation and initiate **'Auto-REG OFF'** then one of the following:
   a. If **'Manual By-Pass'** System is installed the PropSava will remain in **'Auto-REG OFF'** state until the problem is resolved and Regulation is restored. Site power is not interrupted.
   b. If **'Automatic By-Pass'** System is installed then the PropSava Computer System will initiate an Automatic By-Pass sequence of connecting the incoming power to the site Distribution system and remain in this state until the problem is resolved and Regulation is restored. Site power is not interrupted.
   c. If **'TDS'** System is installed then the PropSava Computer System will initiate an Automatic By-Pass sequence of connecting the incoming power to the site Distribution system and remain in this state until the problem is resolved and Regulation is restored. Site power is not interrupted.
2. **Output Under-Voltage Protection – UVP**: Here you can change the Minimum Output Voltage value for Outgoing Voltage. Minimum voltage value is 180V. Factory default is 195V. Should the Output voltage fall below this setting, the PropSava Computer Systems will stop regulation and initiate **'Auto Regulation OFF'** then one of the following:
   a. If **'Manual By-Pass'** System is installed the PropSava will remain in **'Auto-REG OFF'** state until the problem is resolved and Regulation is restored. Site power is not interrupted.
   b. If **'Automatic By-Pass'** System is installed then the PropSava Computer System will initiate an Automatic By-Pass sequence of connecting the incoming power to the site Distribution system and remain in this state until the problem is resolved and Regulation is restored. Site power is not interrupted.
   c. If **'TDS'** System is installed then the PropSava Computer System will initiate an Automatic By-Pass sequence of connecting the incoming power to the site Distribution system and remain in this state until the problem is resolved and Regulation is restored. Site power is not interrupted.

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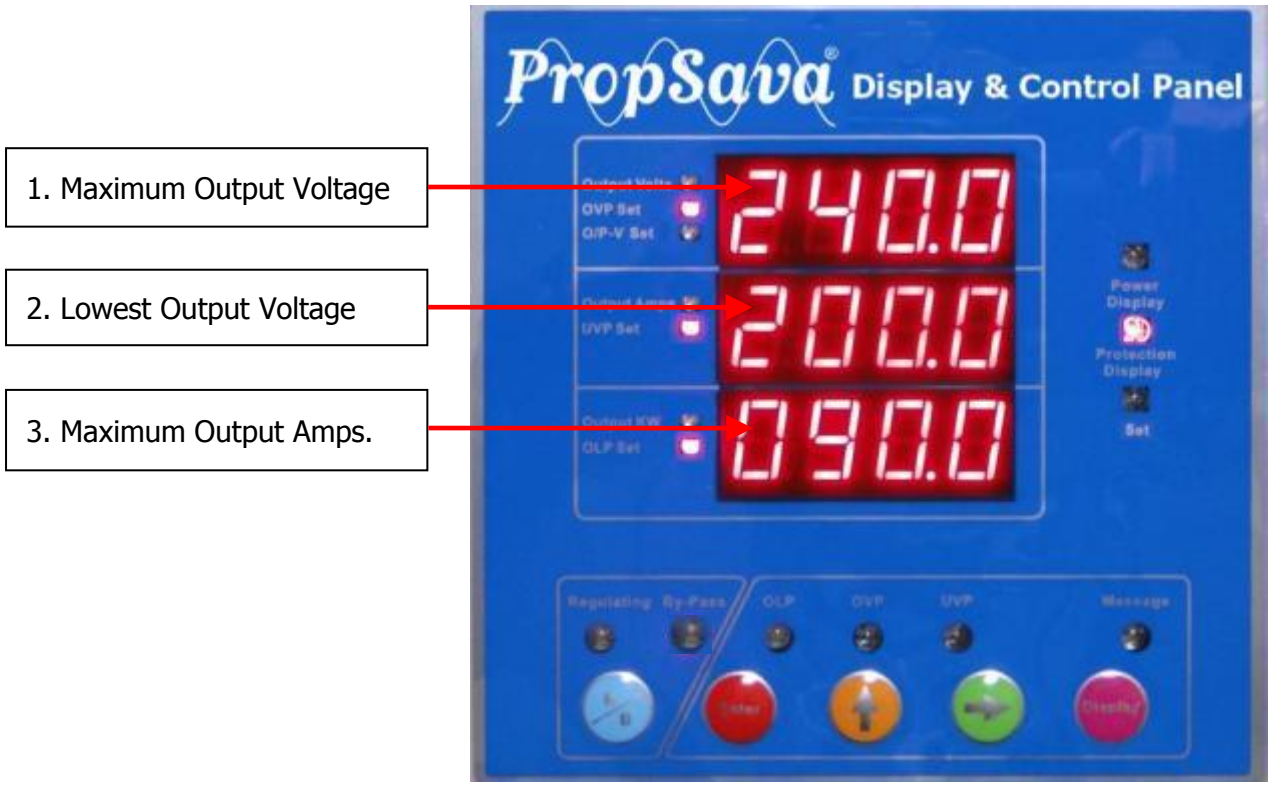
Display Screens continued…..

3. **Output Overload Production – OLP: <u>We do not recommend you change this setting.</u>** Should you do so you may inhibit or stop the By-Pass mechanisms and thereby cause a direct shutdown of the PropSava and site power. If you **<u>have to change</u>** this setting ensure that the setting is equal to the PropSava rated output Amps. The Factory default is -5% (minus five percent) of the rated output Amps of the PropSava. Should the site electrical load be greater than the PropSava power output and/or MRPS safety limit the PropSava Computer Systems will stop regulation and initiate **'Auto-REG OFF'** then one of the following:
   a. If **'Manual By-Pass'** System is installed and the current does not drop to the Default Setting the MRPS will be shutdown - **All site power is terminated.**
   a) If **'Automatic By-Pass'** System is installed then the PropSava Computer System will initiate an Automatic By-Pass sequence of connecting the incoming power to the site Distribution system and remain in this state until the problem is resolved and Regulation is restored. Site power is not interrupted.
   b) If **'TDS'** System is installed then the PropSava Computer System will initiate an Automatic By-Pass sequence of connecting the incoming power to the site Distribution system and remain in this state until the problem is resolved and Regulation is restored. Site power is not interrupted.



Display Panel Example 3

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Display Screens continued…..

Set Display – Shows the Output Voltage, Output Voltage Stabilisation Percentage (cannot be changed, reference only) and SCR speed in milliseconds which also cannot be changed.

1. **Output Voltage Setting – O/P-V Set:** Here you can change the Output Voltage value that the PropSava will regulate all Output Voltage. Maximum voltage value recommended is 230V and Minimum voltage value recommended* is 210V. Factory default value is 220V. *Subject to the value of incoming mains voltage the Output Voltage Setting can be further reduced below the Minimum voltage vale recommended. Please review the incoming main voltage values shown in the "Output Voltage Table and Calculating Out of Range Output Voltage" chapter.

1. Output Voltage Setting.

2. Voltage stabilising rate as percentage and **cannot be changed**.

3. Speed of regulation in milliseconds and **cannot be changed**.

Display Panel Example 4

Events and Alarm Buzzer:

1. In the event of any of the Protection setting being breached, the **'Auto-REG OFF'** will automatically engage and an audible Alarm will activate. There is no interruption to the site power.
2. The breached setting will be identified by one of the Event/Alarm LED being illuminated.
3. If any internal fault occurs in the PropSava including main control board failure, SCR, Transformer etc., the **'Auto-REG OFF'** will automatically engage and audible Alarm will activate. There is no interruption to the site power.
4. **NOTE:** The Alarm Buzzer will also activate if any type of By-Pass has been activated. There is no interruption to the site power.

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Total Disconnect System (TDS)

The Total Disconnect System (TDS) is a fail-safe system that protects the Users site from interruption of power if power quality logging needs to be carried out or if the PropSava or LiteSava upgrading or maintenance. The PropSava/LiteSava 'cutting-edge' safety systems, coupled with the TDS seamless power control adds greater security for continuity of power supply and protection of the site. Fitting the TDS provides for a totally isolated supply to the PropSava/LiteSava

This revolutionary system designed and developed by VP ensures that site will not suffer any loss of power at anytime should the PropSava/LiteSava be shut down, removed or reconnected.

VP recommends that the TDS be installed at any critical site - a site that cannot be disconnected from mains power for any reason such as hospitals, medical centres, schools, universities, data centres, hotels, airports, any public area or facility.

The TDS is fitted between the site MCCB and the site distribution board. The PropSava or LiteSava is then connected to the TDS. In the event that the PropSava or LiteSava needs to be completely isolated from the site power the TDS key switch is simply turned OFF - without any interruption to site power or electrical equipment.

The TDS when turned ON automatically initiates a program to:

1. Switch-off regulation of the PropSava or LiteSava.
2. Connect power from the site MCCB directly to the Site Distribution board.
3. Activation of a flashing LED and alarm that signifies that TDS is activated.
4. Isolation of power to the PropSava/LiteSava so that it can be maintained/repaired/removed safely.

The TDS when turned OFF automatically initiates a program to:

5. Reconnect the PropSava or LiteSava and start regulation of the site power.
6. Disconnect direct site power to the Distribution Board.
7. An 'Engineers' switch to allow for the testing of the PropSava or LiteSava before it is connected to the site.

Another major benefit of the TDS is the shorter time the sites power is shut-down for first time installation of 3 Phase PropSava or LiteSava. Connection and installation of the TDS is faster than installing 3 Phase PropSava and/or LiteSava. Once the TDS power cables are installed the site power can be instantly turned back on. The PropSava or LiteSava can then be connected at a later time or date without any further power shutdown at the site.

Any maintenance of the PropSava or LiteSava can proceed safely without any power interruption to the site. The TDS is simple to activate at source or remotely by any non-technical staff; and can be retrofitted to existing installations easily.

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3 Phase PropSava SCRV Example Specifications:

PropSava Type:		SCRV
Regulation:		Digital control contactless (SCR) compensation regulation
Phases:		Three Phase
Mains Power System:		Three Phase five wires. L1, L2, L3, Neutral + Earth
Input Mains switch:		MCCB or Air - break switch for input control and short circuit protection.
Output Voltage Stabilisation Range:		≤±1.3%
Efficiency:		≥99%
Power Output:		50KVA-1200KVA
Input voltage for all models:		305V to 440V, 50/60Hz Phase Voltage
Output Voltage PropSava:		364V to 400V (210V - 230V Line Voltage) User set at Display Panel. One Regulation Output Voltage value per phase.
Output Voltage LiteSava:		346V to 400V (200V – 230V Line Voltage) User set at Display Panel. Two Regulation Output Voltage (V1 & V2) value per phase, with timer V1 to V2.
Response time:		≤20ms
Output wave:		Additional Waveform deformation less than 0.4%.
Insulation Resistance:		≥2MΩ
Voltage Strength Standard Test:		No damage at 2000V for 1 Minute
Protection:	**Over voltage:**	If output voltage is above setting (default 250V) for 5 seconds the system will activate Auto Regulation OFF with audible alarm (buzzer).
	Under voltage:	If output voltage is under setting (default 200V) for 5 seconds the system will activate Auto Regulation OFF with audible alarm (buzzer).
	Over load:	If output current exceeds 95% of maximum rated current for 20 seconds, then system will activate Auto Regulation OFF with audible alarm (buzzer).
	Surge Protection:	Customer Choice, Current or Voltage 20KA, 30KA, 25KV or 40KV.
	Auto Regulation OFF:	In the event of any internal fault with SCR, Protection fuse, or external fault such as over/under voltage, over load etc. the system will activate Auto Regulation OFF with audible alarm (buzzer).
LED Indicators:		1. Mains ON (Red): When Mains Power is connected, the LED indicator will illuminate regardless of the MRPS state. 2. Regulation OFF/By-Pass Engaged (Amber): This LED will illuminate when PropSava enters any type of Regulation OFF mode. 3. Regulation ON (Green): When PropSava is in Regulation mode, this LED is illuminated. 4. User Limit Set Exceeded (Red): When PropSava senses any values outside the User Set Limits, over/under voltage, or overload the PropSava initiates Auto Regulation OFF and this LED illuminates. 5. System Temperature (Red): When PropSava System temperature reaches 95^0C, PropSava activates Auto Regulation OFF and illuminates this LED. The LED remains on until reset.
Regulation ON/OFF:		Manual Regulation ON and Regulation OFF press buttons to start and stop Regulation. In Regulation OFF, Display shows Input Voltage values, output Amps and Kilowatts; there is no power interruption to site. In Regulation ON Display shows normal regulated output voltage, Amps and Kilowatts.
RESET:		Reset Button to clear System Temperature Safety LED light after the System temperature returns to normal.

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External Protection Systems:

Overview:

Surges are short-duration peak voltages – i.e. transient voltages – existing for only milliseconds; but can measure thousands of volts.

These surges are caused by:

1. Direct lightning strikes
2. Indirect lightning strikes within a distance of some kilometres
3. Switching operations in the power supply system
4. Faults due to switching operations within the installation

In the commercial sector, lightning or power surges cause 45% of electrical equipment damage. Overall, 28 out of 100 cases of damage to electronic equipment are caused by surges. Surges are by far the most frequent cause of damage.

Various manufactured Surge Protection Systems can be fitted to the PropSava and LiteSava 3 Phase Systems. Changes are made on the basis of supply and performance characteristics. The selection of a manufactured type is also based on the installation site weather and power supply characteristics. These manufacturer types may be OBO, DEHN, THOR or Phoenix.

Maintenance of Current Surge Protection – OBO Type:

Surge Protection Device

Operational Status Windows:
Green - Functional and Protection available.
Red – Activated/Used and must be replaced. No further protection is available**.**

The Surge Protection Devices are consumable items similar in operation to a fuse. They are designed to operate **once** and then **must be** replaced.

To provide continued Surge Protection of the PropSava and all other electrical equipment connected to the PropSava the Operational Status Windows must show a 'Green' colour label. In the event that the Surge Protector has been activated the Operational Status Window label turns "Red"; and then **must** be replaced with the equivalent rated device to continue the protection.

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Power Quality Management System (PQMS):

Overview:

PQMS is an optional system available on all VPHK Products (single and 3 Phase PropSava and LiteSava). PQMS consists of a smart metering system (hardware) installed into VPHK Power Optimisation Systems. Windows based management software reads the data collected by the hardware via USB (for direct connection to a PC or Laptop) or RJ45 sockets to LAN or via a wireless system to LAN. The PQMS software allows management to read real-time and historic site power quality readings.

The PQMS readings can help to identify:

a) Areas/sites that can benefit from additional energy saving effort;
b) areas/sites of high energy use;
c) real-time and historic increased energy use;
d) potential equipment failure;
e) areas/sites for reduction of CO_2 emissions.

There are 4 PQMS Options Available:

1. **PQMS Direct:** Single USB socket on Product with USB lead connection to PC or Laptop.
2. **PQMS LAN Wired**: RJ45 socket connection on Product for wired connection to LAN.
3. **PQMS LAN Wireless:** RJ45 socket connection on Product for wired or wireless connection to LAN.
4. **PQMS Multi-Drive:** Multi-Site/Area, multi-product system with LAN (wired & wireless) and Internet connectivity.

Contents of PQMS:

PQMS Direct:

a. Meter and all wiring fitted to Product with USB socket. 2Mb on-board memory for all readings.
b. Hardware warranted for 5 years parts and labour based upon 'return-to-base'.
c. 3 meter USB cable for computer connections.
d. 1, 2 or 3 User Windows Software License without Database. Full on-line tutorial for software installation and set-up of PQMS.
e. 1st year upgrade and bug fixes (Software Maintenance) for Windows Software FOC. Additional years available upon request.
f. Free email Technical support for 1 month after installation. Additional email Technical support available upon request.
g. Installation of software and connection to PQMS available upon request.
h. Software and PQMS Training available upon request.

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Power Quality Management System (PQMS) – Continued…

PQMS LAN Wired:

i. Meter and all wiring fitted to Product with BJ45 socket. 2Mb on-board memory for all readings.
j. Hardware warranted for 5 years parts and labour based upon 'return-to-base'.
k. 1, 3, 5 and 10 User Windows Software License with database. Full on-line tutorial for software installation and set-up of PQMS.
l. 1st year upgrade and bug fixes (Software Maintenance) for Windows Software FOC. Additional years available upon request.
m. Free email Technical support for 1 month after installation. Additional email Technical support available upon request.
n. Installation of software and connection to PQMS available upon request.
o. Software and PQMS Training available upon request.

PQMS LAN Wireless:

p. Meter and all wiring fitted to Product with BJ45 socket. 2Mb on-board memory for all readings.
q. Hardware warranted for 5 years parts and labour based upon 'return-to-base'.
r. 1, 3, 5 and 10 User Windows Software License with database. Full on-line tutorial for software installation and set-up of PQMS.
s. 1st year upgrade and bug fixes (Software Maintenance) for Windows Software FOC. Additional years available upon request.
t. Free email Technical support for 1 month after installation. Additional email Technical support available upon request.
u. Installation of software and connection to PQMS available upon request.
v. Software and PQMS Training available upon request.

PQMS Multi-Drive: Prices subject to quotation and customer needs.

Benefits for Users:

- Instant access to Site Energy usage.
- Comparison of Energy usage to equate savings.
- Equipment Failure Alarms- Instant knowledge of problems.
- Time of Use – Identify where extra energy is being used.
- Multi Metered Sites- To compare which/why/where perform better on energy savings.
- Construct a full energy saving plan to cut costs.
- Accurately show savings for Carbon tax credits.
- Future application to allow full control of energy Output.

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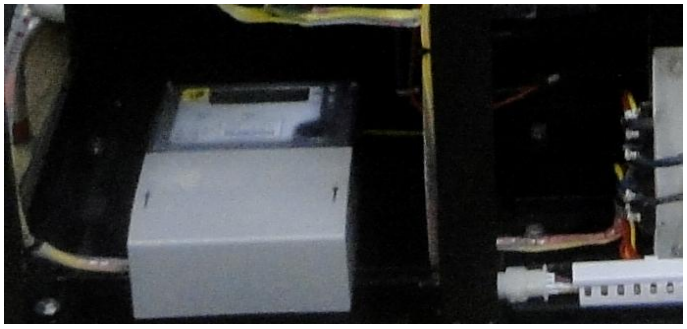
Power Quality Management System (PQMS) – Continued…

Meter Positioning:

The meter is positioned/mounted in various positions in the single and 3 Phase PropSava and LiteSava. Below we show the position in a 3 Phase PropSava SCRV series, mounted in the lower part of the case.



PQMS meter mounted inside 3 Phase SCRV PropSava

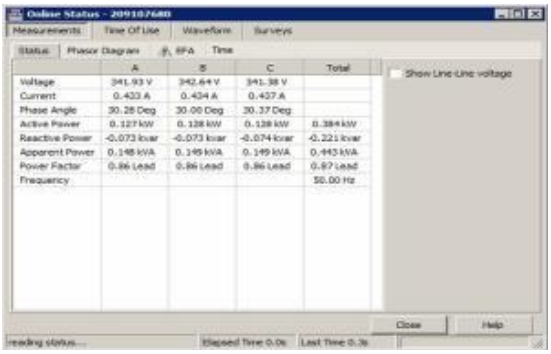
PQMS Communication Socket – For Direct and LAN connections – Fitted on Right Side of Cabinet when there is NO TDS fitted. Fitted to the rear of Right Side when used with TDS.

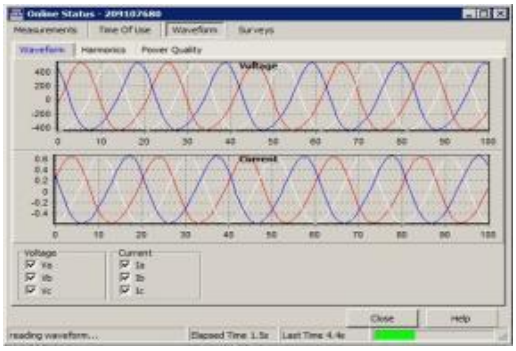
Connectivity:

Connectivity comes in the form of either a USB (for Direct to PC or Laptop) or BJ45 connection to a LAN or wireless network. Alternatively a USB connection can be fitted for use with a PC or Laptop.

Software Application:

PQMS software is a 32 bit Windows-based application primarily used to configure and retrieve data in a user-friendly manner from the metering system. It can keep track of single or multiple meters spread across multiple sites. This software allows Users to see current and past power quality readings with customisable displays, presented as tables, waveforms or as graphs.





Example Screens, showing on line readings in a table and waveform format.

The PQMS software is provided with a Tutorial section enabling the user to familiarise themselves with all applications; from setting up the meter to customising the relevant data required for live applications and historical records.

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Security:

Security is controlled by PQMS using usernames and passwords on a meter by meter basis. When PQMS loads it prompts for a username and password.

The meter allows for up to six (6) users, before any operations can be performed a user must log on. Each user has a user name and password, each up to 7 and 15 characters long respectively. The user remains logged on until logged out.

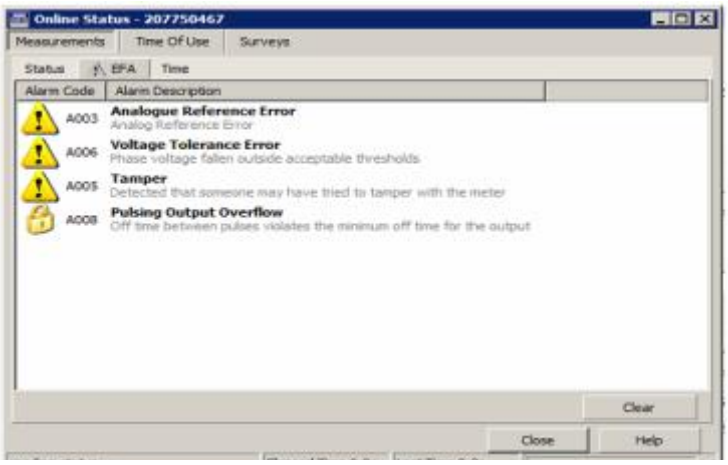
Each user has a user level security access to the system subject to Administrator given rights. There are 7 user levels of security numbered 0-6 as outlined below with 6 being the highest level of acce

Number	Access	Description
0	Read only	Only allows values to be read
1	Read All/ Limited Timeset	Also allows the time to be set by a limited amount, as per the shift limit setting.
2	Read All/Billing Reset	Also allows a billing reset to be performed.
3	Read All/Clear	Clear EFA alarms, surveys and other systems. Control user programmable pulsing outputs. Unlimited timeset ability.
4	Read All/+Setup/ Write User	Allows the setup to be read, and allows limited setup change. Added in firmware version 1.27
5	Read All/+Setup	Allows the setup to be read, but not written.
6	Read/Write All	Allows the setup of the meter to be changed.

The seven levels of User Security Rights which are set by the Administrator

PQMS Alarms:

During operation the metering system monitors a variety of external and internal conditions. If a problem is detected an alarm is raised called an 'Equipment Failure Alarm' or EFA. These tests are designed to detect measurement failure, tampering attempts and hardware failure.



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Power Quality Management System (PQMS) – Continued…

There are 17 alarms each representing a different fault. Each alarm has a corresponding flag letter that represents it.

Flag Letter	Alarm Name	Alarms Page Code
E	Analog Reference Failure	A003
S	Asymmetric Power on Mk10 Neutral current Mismatch on Mk7	A000
V	Voltage Tolerance Error.	A006
F	VT Failure.	A007
R	Incorrect Phase Rotation. (not on Mk7)	A002
T	Lid Tamper	A005
C	Clock Failure.	A017
M	Reverse Power.	A004
L	Calibration Data Lost.	A001
H	Modem Failure.	A012
X	RAM Failure or LCD Failure.	A015
Y	Program Flash Failure.	A015
Z	Data Flash Failure.	A015
N	Pulsing Output Overflow.	A008
D	Battery Failure	A016
U	Tamper	A005
O	Overcurrent (Extra EFAs group)	

Alarm names and Flag letters

An Alarm Flag can have one of 3 states. The Active state means that the alarm has been detected and is still occurring. The latched state means the alarm was active but is not active now. The inactive state means the alarm is not active and has not been in the past.

PQMS Event Logs:

The PQMS keeps a record of a variety of events that occurs to the Meter. The size of these logs may be configured.

Log Name	Description
System Log	Used for system events like power on and off.
Access Log	Used to track user accesses to the meter.
Tamper Log	Records when tamper events occur. (Also used as LCD Alarm LOG for UPS meters, and previously was used as a billing reset log)
Sag/Swell Log	Records Sag and Swell events.
Debug Log	Only used for diagnostics. Also used as the Push Alarm log for UPS meters and meters with Push alarming enabled.

Event Log Types

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Power Quality Management System (PQMS) – Continued…

Event logs can be downloaded as a text file. Each file has a unique number starting from when the meter was started, which is only reset if a survey is cleared. Each Log can be cleared individually.

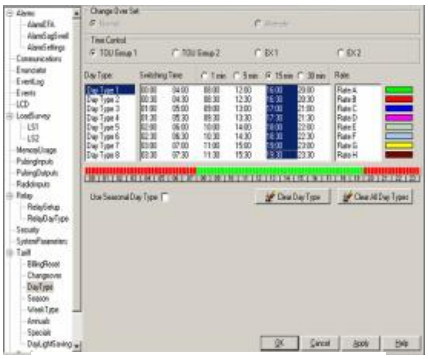
[LoadSurvey]
LastRecord=0000000061
StartTime=01/01/1996 00:20:50

Record No	DateTime (0x0000F03D)	Event (0x0000FFFF)
34	01/01/1996 21:39:50	User: 1 changed database stage: Misc=>2041
35	01/01/1996 21:39:55	User: 2 changed database stage: Pulse=>2042
36	01/01/1996 21:39:57	Log off port: Optical=>2081
37	03/01/1996 07:56:58	User: 0 logged in on port: Optical=>2000
38	03/01/1996 07:56:58	Bad password on port: Optical=>2080
39	03/01/1996 07:56:58	User: 0 logged in on port: Optical=>2000
40	03/01/1996 07:57:28	Inactivity timeout on port: Optical=>2082

Downloaded Event Log

Time of Use (TOU) Channels:

An energy quantity such as KW/h is recorded in a TOU channel. Each TOU channel records both accumulated energy; the maximum demand; and the time maximum demand occurred. It can record these quantities separately for different times of the day, week, seasons, special periods, and year. Hence the term 'Time of Use'. The calendar allows different rate structures for different days of the week and for different special days during the year. It can take account of seasons or complete customised rate conditions.

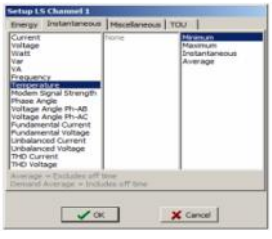


Day type TOU set up

Week type TOU set up

PQMS Load Survey:

A load survey is designed to give a detailed record of energy usage. PQMS has two load surveys available each independently programmable and each can record up to 32 channels. The load surveys in PQMS also have the ability to record instantaneous figures such as voltage and current. Load Surveys can be downloaded as text files, similar to Event Logs.
The Load Survey on line status screen allows periods of time to be downloaded or entire surveys.
WARNING: Please do NOT change Load Surveys **until you have saved** all accumulated data held in the PQMS Memory. Failure to do so will delete the content of the PQMS Memory.



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Declaration of Conformity:

The Manufacturer of the Products covered by this Declaration is:

Vanguards Power (Hong Kong) Limited
1508 Eastern Tower, Yihai Square,
Commercial Building
North Chuang Ye Road, Nanshan, Shenzhen.518054, China
Telephone: 0086 755 2664 7764
http://www.vanguardspower.com
customersupport@vanguardspower.com
Company Registered in Hong Kong Number: 1125122

The Directives covered by this Declaration:
LVD 2006/95/EC & EMC 2004/108/EC Annex II:

The Product Covered by this Declaration is the PropSava® 3PSCRV Series

The Basis on which Conformity is being declared:

EMC Test Standards: EN61000-6-4:2007, EN61000-6-2:2005, EN61558-2-12:2011
LVD Test Standards: EN60364-4-42:2005.

The manufacturer hereby declares under his sole responsibility that the products identified above comply with the protection requirements of the EMC directive and with the principal elements of the safety objectives and that the standards have been applied.

The technical documentation required to demonstrate that the products meet the above requirements has been compiled and is available for inspection by the relevant enforcement authorities. The CE mark was first applied in November 2011.

IEC Test Standards Independently Certified:

EMC Test Standards: IEC61000-6-1:2007, IEC61000-6-2:2005, IEC 61588-2-12:2011,
LVD Test Standards: IEC60364-4-42:2005.

The technical documentation required to demonstrate that the products meet the above IEC requirements has been compiled and is available for inspection from Vanguards Power. The IEC Report was first completed 4th November 2011

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Warranty Terms & Conditions

1. Please check the PropSava package and contents as soon as possible. If the PropSava or any other item included in the package is damaged or faulty, you must inform your Channel Partner/Channel Partner immediately or at the latest within 14 (fourteen) days of the date of delivery. If you and/or your Channel Partner/Channel Partner do not inform us within 14 (fourteen) days of arrival of the PropSava of any missing items, damage or fault we shall have no further liability for items missing, damaged or faulty.

2. Vanguards Power (Hong Kong) Limited, hereafter referred to as "VPHK", warranty that the PropSava will be free from component defects for 10 (ten) years from the date of purchase and free from labour charges to rectify any faulty workmanship or component for 5 (five) years from the date of purchase. This Warranty is subject to commissioning of the PropSava by a VPHK authorised engineer; and the signatures of the installation engineer, End User and Channel Partner; completion and filing with VPHK of the Warranty Card attached.

3. This Warranty is **only** valid when signed and stamped by the authorised VPHK Commissioning Engineer. Please ask your Channel Partner to arrange for the authorised VPHK Commissioning Engineer to attend at the completion of installation by your engineers.

4. Any repairs or parts supplied or other work carried out which are found to be outside the Terms of this Warranty will be charged to the End User and will be payable at the point of service. If no fault is found or the fault is outside the scope of the Warranty then a possible charge for travel, labour, parts and/or transportation may also be made.

5. The purchaser must ensure the environmental and power supply conditions are suitable for the PropSava and that the PropSava is cared for and maintained in accordance with the recommendations stated in this User manual.

Exclusions to the Warranty:

1. Breakdowns or failures arising from any external influences such as misuse, neglect, accidental damage, inadequate ventilation/temperature control of the area of installation, harmonic wave distortion, power factor below 0.8, transients of any kind, power surges above the rated protection, short circuits, loading to the PropSava above the original specification of build, any unauthorised tampering with the system and/or its software, and other external influences such as, but not limited to poor environmental conditions.

2. Purchaser's consequential loss or liability of any kind.

3. We do not accept liability for returns damaged in transit or not received by us.

4. Every care has been taken in the preparation of all and any details or statement made in this User Manual and the PropSava packaging. However, as far as is permitted by applicable law, we disclaim all warranties, express or implied as to the accuracy of information contained herein.

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Warranty Card:

Please complete all sections, detach and mail to Vanguards Power (Hong Kong) Limited

KVA Size: _____ Voltage Range: _____ Serial Number: _____

Date of Installation: _____ Installer/Engineer Name: _____ Tel: _____

Installer/Engineer Company Name: _____

Installer/Engineer address:_____

_____ Country:_____

Installer/Engineer Statement: I confirm that the above stated PropSava has been installed in accordance with current building and electrical code(s) of safety and conditions specified in the User Manual for such products. Signed:_____ Dated:_____

Name of Customer /Company:_____

Name of Contact: _____ Telephone (Incl.Country code):_____

Address of installation: _____

_____ Country: _____

Signed by Customer confirming receipt of User Manual, Warranty Card and Demonstration of use:

Signed: _____ Date: _____

Channel Partner Name/Company: _____

Signed on behalf of authorised Channel Partner: _____ Dated: _____

VP Commissioning Engineer Name: _____ Date of Inspection: _____

VP Commissioning Engineer Number: _____ Passed Date: _____

Refused Date: _____ Reason: _____

_____

Signed by VP Commissioning Engineer (CE): _____

VP Commissioning Engineer Stamp

PLEASE NOTE:

Unless this Warranty Card is signed by all parties stated above and carries the Vanguards Power Authorised Commissioning Engineer Stamp, the Warranty for this Product is invalid.

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