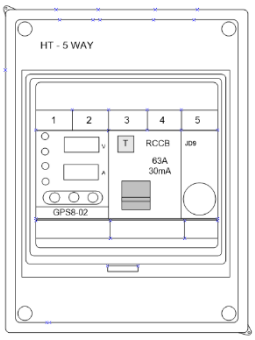
INSTRUCTION MANUAL

SES/16A – Generator and load protection



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Revision	1.05
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Revision	1.06
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Changes	

Please read these instructions carefully and inspect the device to become familiar with it before trying to install, operate, service or maintain it.

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. Applicable electrical regulations and guidance notes should be followed.

No responsibility is assumed by SES for any consequences arising out of the use of this device.

We reserve right to changes without further notice.

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1 GENERAL

The SES/16A is a **16A** maximum resistive capacity load protection device, which is connected inline between the generator and the load using 16A EN60309-1/2 trailing plug and socket (coupler) arrangement.These are each connected with ~600mm of Artic flex cable. The controller has a rated current capacity of 40A.

The protection device comprises of three interconnected components:

1. GPS8-02 Microprocessor controller
2. Earth leakage protection
3. Visual indicator light

The microprocessor controller provides disconnection of a connected generators supply to the load if any of the pre-programmed parameters entered in the configurable controller are not met, this includes:

- Over voltage
- Under voltage
- Over current

Note – When first powered up, there is a programmed delay before the controller switches power to the load on, this is to allow the generator to stabilise its output voltage.

Protection against fire or electrocution caused by earth leakage is provided by a ‘Type A’ 30mA RCCD (Residual Current Circuit Breaker) rated at 63A.

A visual comfort indication illuminates when the supply is healthy and available to the load.

The SES/16A enclosure is constructed of flame-retardant polycarbonate with an IP65 rating, both the 16A maximum capacity plug and coupler are IP44 rated.

Final circuits **MUST** be protected by individual overcurrent protective devices.

1.1 MAXIMUM LOADING ASSUMPTIONS

The assumption is the generator output voltage is 240V AC.

A 5kVA generator for example will deliver a current of 20.88A, assuming continuous running is 80% of maximum capacity, 5000x0.8 = 4000w, ∴ 4000/240 = 16.7A available for a resistive only load.

A fully resistive load may not always be possible or preferable, therefore a 0.8 power factor has been assumed: 4000x0.8 = 3200w, ∴ 3200/240 = 13.3A.

13.3A is well within the loading of the 16A plug and socket, therefore, this value has been configured in the microprocessor controller as the upper current limit cut-off, however, this can be adjusted by the user to suit the particular load characteristics being supplied if required.

For Information: A resistive load is a kettle, immersion heater or element heaters without fans, loads with motors such as fridges, washing machines, air conditioning and pumps require power factor correction being allowed for.

Generator Load Limited Output

Generator Rating (kVA)	Output Amps (Resistive)	Continuous Output (80%)	Running Amps	Power Factor Adjusted	Limited Amps
1000	4.2	800	3.3	640	2.7
1800	7.5	1440	6.0	1152	4.8
2000	8.3	1600	6.7	1280	5.3
2200	9.2	1760	7.3	1408	5.9
2500	10.4	2000	8.3	1600	6.7
3000	12.5	2400	10.0	1920	8.0
3200	13.3	2560	10.7	2048	8.5
3500	14.6	2800	11.7	2240	9.3
4000	16.7	3200	13.3	2560	10.7
4500	18.8	3600	15.0	2880	12.0
5000	20.8	4000	16.7	3200	13.3
6000	25.0	4800	20.0	3840	16.0

2 OPERATION

NOTE - There is a real danger of back feeding voltage into the supply network which could cause injury or death to linesmen working downstream of your installation. Before use, ensure the device is only connected via a sufficiently rated double pole transfer switch which disconnects all external line conductors.

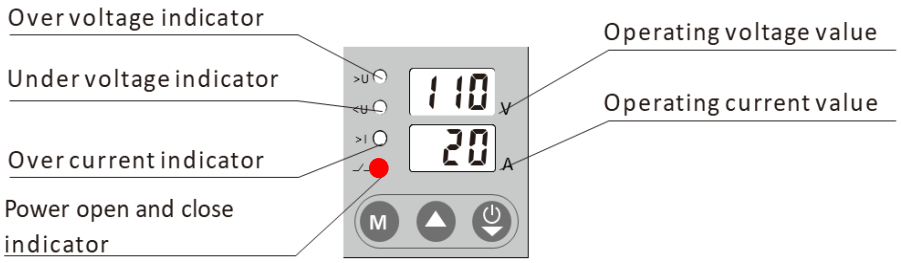
2.1 CONNECTION

The SES/16A has a trailing plug and socket, the plug **MUST** be connected to the generators 16A output socket; whilst the trailing socket **MUST** be connected to the transfer switch supplying the load.

If the above is not adhered to, damage or incorrect operation of the SES/16A will occur and the trailing plug, if exposed, could become a live exposed part with the associated shock risk.

2.2 POWER TO THE TRANSFER SWITCH

With the generator running and the SES/16A plugged in, the GPS-02 controller will be displaying the incoming generator voltage, if nothing is displayed, confirm the generator output is turned on.



If the generators voltage is within the controllers' correct parameters, the '**power closed**' indicator light will illuminate as above after the programmed delay has expired and at the same time the 'power to load' green LED indicator will come on.

If the green LED indicator fails to light, check the RCCD is switched to ON.

It is important to test the operation of the RCCD by pressing the 'Test' button, this should operate the device and turn OFF the green indicator, if this fails, please contact SES.

2.3 TRANSFER SWITCH

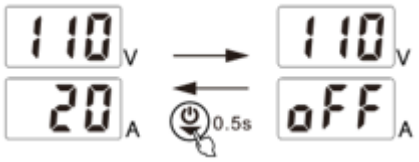
With the circuits supplied by the transfer switch turned OFF, turn ON the transfer switch powered by the SES/16A.

Turn on the individual critical circuits to be supplied by the generator. If the current exceeds the controllers' parameters, the load will disconnect and try to establish connection again at the end of the configured reset time.

2.4 SES/16A MANUAL LOAD SWITCHING

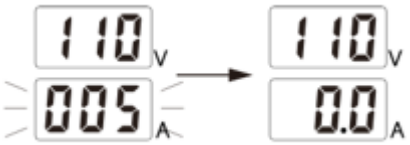
Turning the load OFF manually at the SES/16A can be done in two ways:

- Place the RCCD switch in the OFF position,
- Use the controllers' front button as follows –



Under normal operation, the load can be switched ON or OFF manually by pressing the power key for 0.5 seconds.

2.5 POWER-ON AND RESET-DELAY



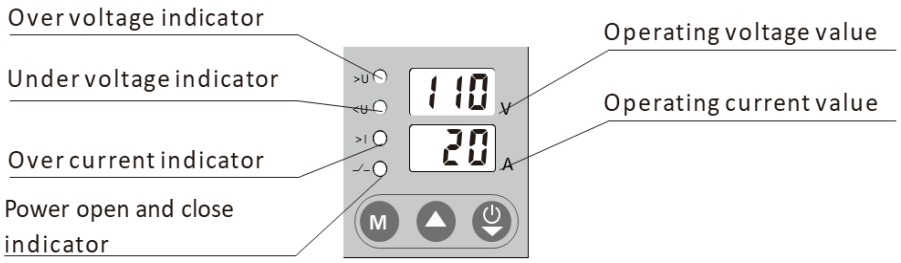
During the 'power-on' and 'fault reset' of the controller, the controller will count down and display this according to the set delay time. At the end of the countdown, power will be switched ON to the RCCD.

3 SOFTWARE SETUP OF THE CONTROLLER

In this chapter, are the protection and control functions of the SES/16A.

Parameter	Range	Step value	Factory settings
Over voltage value	OFF,230v~300v	1v	275v
Over voltage recovery value	225v~295v	1v	265v
Under voltage value	140v~210v, OFF	1v	175v
Under voltage recovery value	145v~215v	1v	180v
Voltage fault action time	0.1s~10s	0.1s	0.5s
Over current value	OFF,1A~40A	0.1A	40A
Over current action delay	2s~600s	1s	5s
Power on delay time	2s~600s	1s	5s
Reset time	2s~900s	1s	30s
Fault reset	ON-OFF		ON
Maximum device current	40A		

3.1 PANEL DIAGRAM



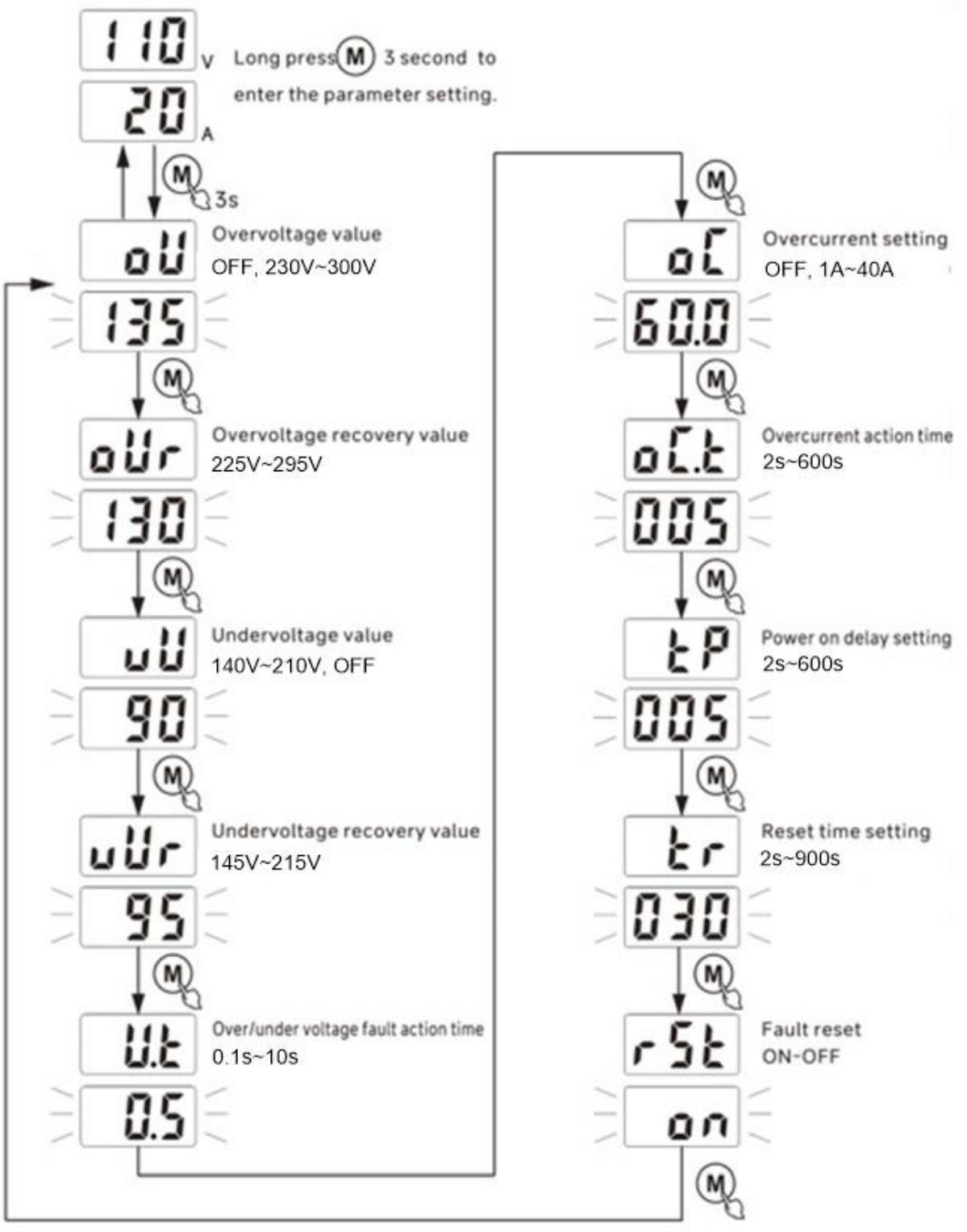
3.1.1 BUTTON FUNCTIONS

M	Press and hold the setting key for 3 seconds to enter the setting. After modifying the setting, press and hold for 3 seconds to save the setting.
▲	Used to increase the value when setting parameters.
⏻▼	1.Used to reduce the value when setting parameters.
	2.After exiting the setting, it can be used to manually turn ON or OFF the load.
	3.If the automatic fault reset function is turned off, this button can be used for manual reset when the fault occurs.

NOTE:

Short press ▲ ⏻▼ to increase or decrease the value, a long press speeds through value options. If no key is pressed in 60 seconds, programming mode will exit automatically. You can press the M for 3 seconds at any time to exit the and save the setting.

3.2 SETTING CONTROLLER PARAMETERS



3.3 GPS8-02 CONFIGURATION 'AS FITTED'

Maximum load 13.3A based on example 5kVA generator.

Parameter	Configured Value
Over voltage value	253v
Over voltage recovery value	248v
Under voltage value	210v
Under voltage recovery value	215v
Voltage fault action time	0.1s
Over current value	13.3A
Over current action delay	005s
Power on delay time	030s
Reset time	20s
Fault reset	ON-OFF
Maximum device current	40A

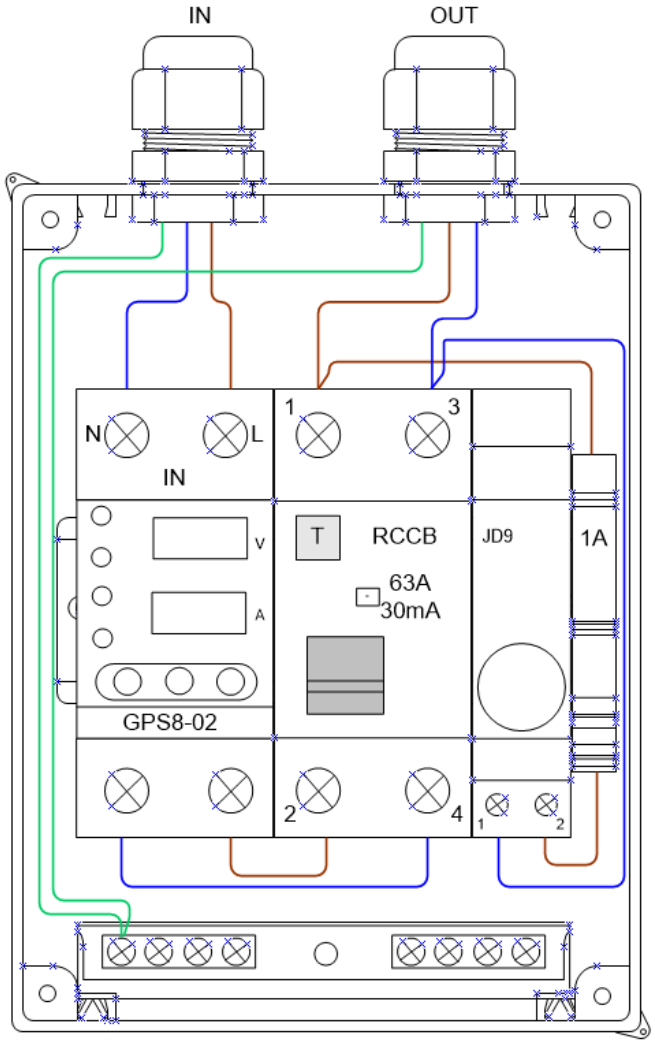
On initial 'Power Up', the output from the controller will be switched to the RCCD after a pre-programmed delay, this is to enable the generators output voltage to stabilise.

The controller displays the countdown time remaining in seconds in the 'A' window.

3.4 GPS8-02 TECHNICAL PARAMETERS

	GPS8-02
Function	Over voltage, under voltage and over current
Rated supply voltage	AC220V(L-N)
Rated supply frequency	45~65Hz
Operation voltage range	80V~400V(L-N)
Rated operational current	32A,40A,50A,63A,80A（AC1）
Burden	AC max.3VA
Over voltage operation value	OFF,230V~300V
Under voltage operation value	140V~210V, OFF
Over/under voltage action delay	0.1s~10s
Over current operation value	1~32A,40A,50A,63A,80A
Over current action delay	2s~600s
Power-up delay	2s~600s
Reset time	2s~900s
Measurement error	≤1%
Electrical life (AC1) Mechanical life	1×10^4 1×10^6
Operating temperature	-20℃~ +60℃
Storage temperature	-35°C ~ +75°C
Mounting/DIN rail	Din rail EN/IEC 60715
Protection degree	IP40 for front panel/IP20 terminals
Operating position	any
Overvoltage category	III.
Pollution degree	2
Dimensions	82×36×68mm
Weight	135g

3.5 SES/16A INTERNAL WIRING



Internal cabling is PVC insulated with copper conductors.

2.5mm^2 cross sectional area (CSA) is used throughout with the exception for the 'Power available' LED indicator, which uses1.5mm^2 CSA due to the LED indication being fused down to 1A.

All terminations use crimped ferrules.

4 DATA SHEETS

4.1 RCCD MODULE

LEWDEN

RCCB 63A 30mA 2P TYPE A 6kA

63/30/2A

TECHNICAL DATA	
For cables ø	1-35mm2
Frequency	50/60Hz
Poles	2
Residual Current	30mA
Rated operating voltage	230V
Execution	DIN RAIL MOUNTING
Rated current	63A
RCD Class	A

REGISTRY	
Net weight	0.19KG
Min order quantity	1
EAN Code	5026992048795
Gross Weight	0.21KG
Dimensions	85x36x78mm (HWD)

REFERENCE STANDARDS	STANDARDS
BS EN 61008-1	

Protection against fire or electrocution as a result of earth leakage is provided by a Type ‘A’ residual current circuit breaker. This automatically switches off the supply if a fault develops. Type ‘A’ RCCDs are used for alternating sinusoidal residual current and for electronics which produce residual pulsating direct current up to 6 mA.

It is important to press the ‘Test’ button with the power on, this should operate the device. Afterwards, manually switch on the device.

Type ‘A’ protection symbol: 

If the device does not operate correctly after testing, contact SES.

4.2 INDICATOR MODULE

Item Type: DIN Rail LED Indicator Light

Material: PC

Model: JD9

Current: 20mA

Working Life: ≥30,000h

Connection Wire: 6mm²

Tightening Torsion: 0.8N.m

IP Rating: IP20

The LED indicator is overcurrent protected by a 1A HRC 20mm fuse contained within a DIN mounted fuse carrier.

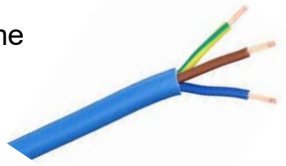
4.3 ENCLOSURE

The HT-5WAY surface-mounted distribution box is made of high-quality, flame-retardant ABS material, overall dimensions. 12cm × 9.5cm × 16 cm.

IP65 protection standard, the surface-mounted distribution box is waterproof, dustproof and rainproof, cable entry penetrations use compression glands with sealing grommets.

The distribution box has a 1-row DIN rail construction that accommodates 3 modules, in addition, the box is equipped with a Gray transparent door to enable switch and controller status to be observed without breaching the enclosures IP rating.

4.4 CONNECTING CABLE



Artic grade, external blue flex cable (3183A) meeting EN 60228 Flame Retardant according to IEC/EN 60332-1-2 standards.

2. 5mm^2 conductor cross sectional area, 3 core cable, 25A current carrying capacity with an external diameter of 10.5mm.

Plug and coupler each have ~600mm of trailing lead from the enclosure.

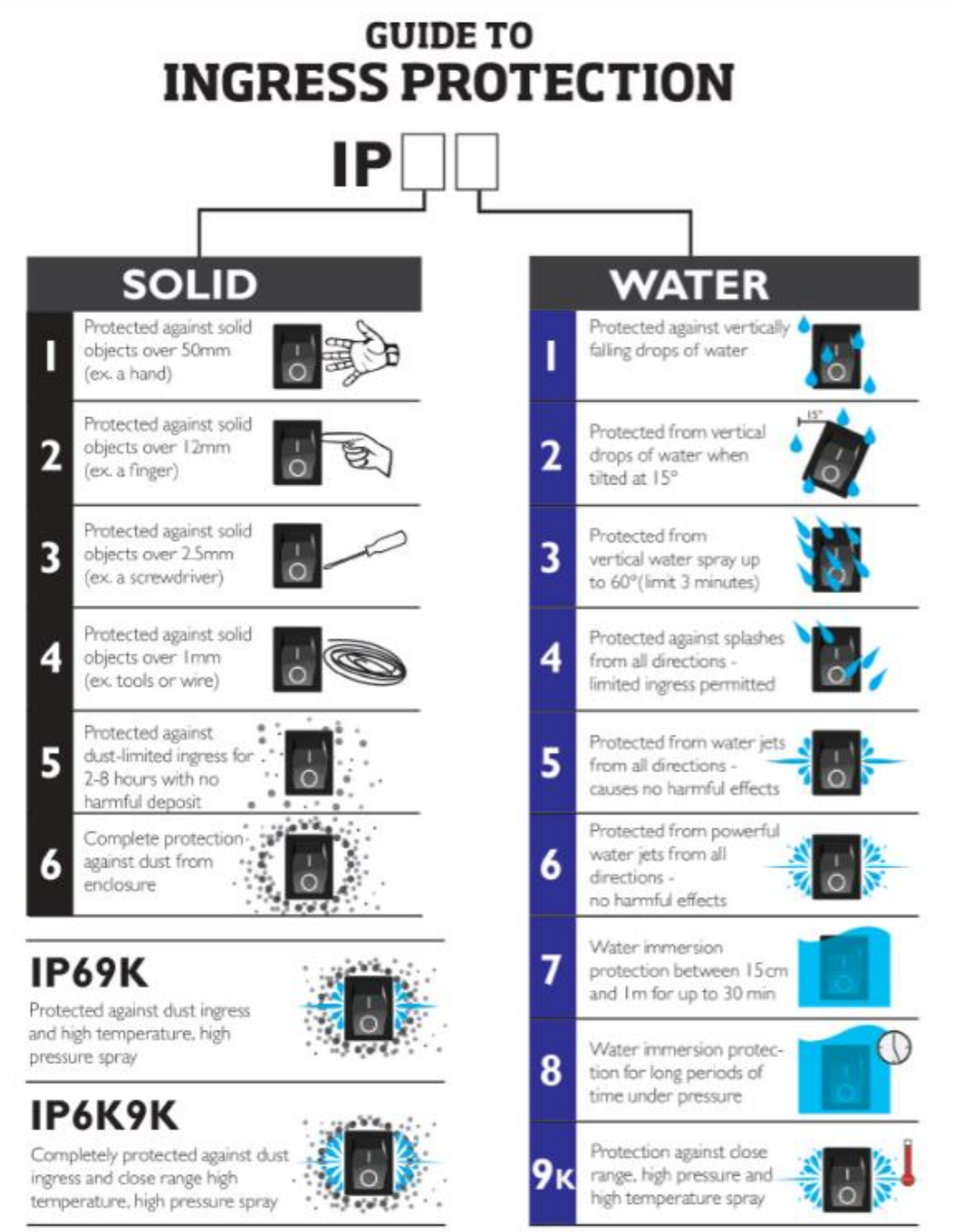
4.5 TRAILING PLUG

Voltage Rating	**240V**
Current Rating	**16A**
IP Rating	**IP44**
Frequency	**50Hz**
Weight	**0.111kg**
Number of Poles	**2P+E**
Terminal size (Range)	**1 - 2.5mm²**
Torque	**0.8Nm**
Mounting	**Trailing**
Cable Entry	**Compression Gland**
Clamping range (min - max)	**7 - 15.5mm**
Colour	**Blue**
Material	**Thermoplastic**
Compliance	**UKCA, CE**
Guarantee	**1 Year**
Standards	**IEC/EN 60309-1/2**
Diameter Ø	**51mm**
Height	**58mm**
Length	**124mm**

4.6 TRAILING SOCKET (COUPLER)

Voltage Rating	**240V**
Current Rating	**16A**
IP Rating	**IP44**
Weight	**0.135kg**
Frequency	**50Hz**
Number of Poles	**2P+E**
Terminal size (Range)	**1 - 2.5mm²**
Torque	**0.8Nm**
Mounting	**Trailing**
Cable Entry	**Compression Gland**
Clamping range (min - max)	**7 - 15.5mm**
Colour	**Blue**
Material	**Thermoplastic**
Compliance	**UKCA, CE**
Guarantee	**1 Year**
Standards	**IEC/EN 60309-1/2**
Diameter Ø	**51mm**
Height	**77mm**
Length	**135mm**

5 INGRESS PROTECTION RATINGS



6 MATERIALS LIST

Description	Model	Quantity	Size
DIN Enclosure	HT-5WAY	1	120mm x 90mm x 160mm
Axiom trailing lead plug	IP1623QF	1	16A - 2P+E Blue 6h
Axiom trailing lead coupler	IC1623QF	1	16A - 2P+E Blue 6h
Heat shrink label		2	23.6mm Diameter
Geya Microprocessor Controller	GPS8-02	1	2 Module - 40A
Lewden RCCB	2P Type A	1	2 Module - 63A
LED Indicator	JD9	1	1 Module – 240v
DIN fuse carrier		1	1A HRC Fuse
Artic cable	3183A	2m	2.5mm^2 3 core
Brown & Blue conduit cable	6491X	20cm x 2	1.5mm^2 singles
Double bootlace crimp		2	4mm^2
Bootlace crimp - Plain		6	2.5mm^2
Bootlace crimp - Insulated		6	2.5mm^2
Bootlace crimp - Insulated		4	1.5mm^2
Cable tie		4	120mm x 4.8mm
Cable tie		3	100mm x 2.5mm
Instruction Guide		1	

7 REFERENCE INFORMATION

Manufacturer information:
Secure Electrical Solutions

email sales or technical support: secureelectricalsolutions@gmail.com

Instruction Manual QR Code