



TSi-HAPS VRP

HAPS VRP

Three Phase 3kVA to 50kVA, $\pm 20\%$



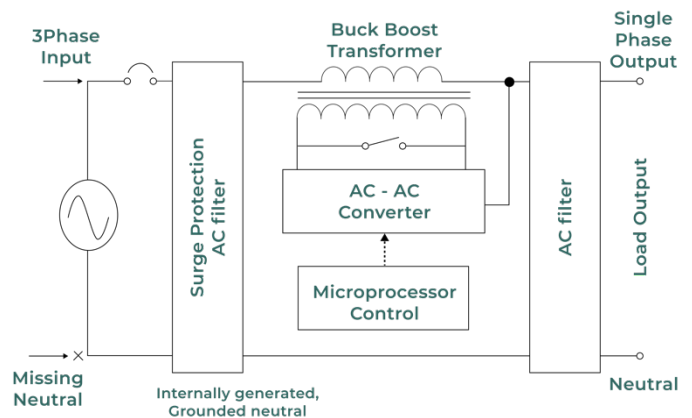
HAPS VRP is a cost-effective three phase precision AC voltage regulator with inbuilt Healthy Automatic Phase Selection (HAPS) system which selects the best incoming voltage phases, ignores incoming neutral and provides a stabilized single-phase output with a fresh grounded neutral. This ensures maintenance-free operation of electronic equipment over a wide range of input voltage range even in situations of phase loss and broken input neutral.

TSi-HAPS VRP is designed to provide high precision power with a typical compensation time of 20 milliseconds to comply with the requirements of the ITIC curve for power supply to electronics.

How the HAPS VRP works:

The high frequency Insulated Gate Bipolar Transistor (IGBT) driven converter takes the incoming AC power, measures it against the nominal voltage reference and then adds or subtracts a compensating voltage to achieve a precisely regulated 230 V output.

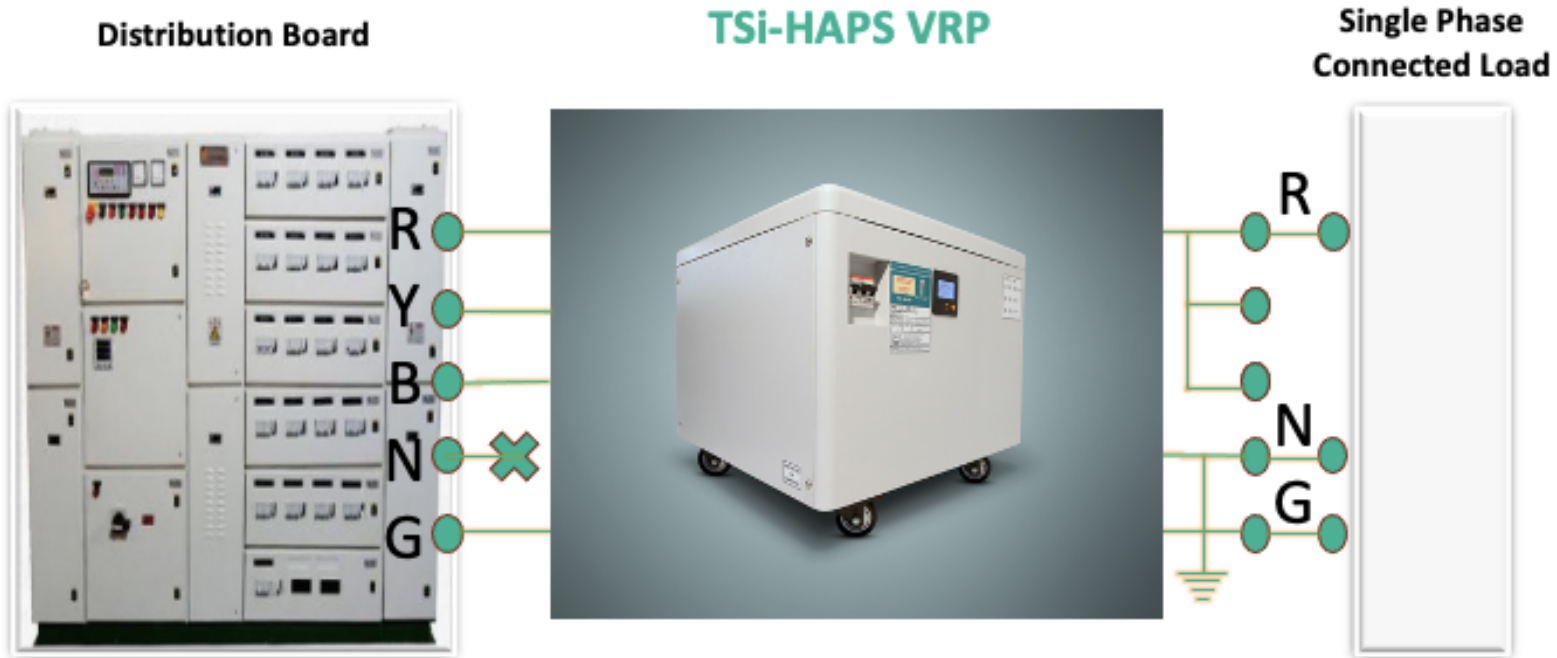
In events of unhealthy/missing incoming phase, HAPS VRP automatically shifts to the next available healthy phase and continues to provide uninterrupted useful output power.



Features and Benefits:

- HAPS VRP can work without incoming neutral. It creates its own perfectly grounded neutral.
- Ability to provide healthy single-phase output even in case of absence of one of the three input phases. Thus, it can work and provide uninterrupted pure power with any of the two incoming phases.
- Provides the output voltage within $\pm 1\%$ of the nominal voltage with real-time optimum voltage compensation, as well as spike & noise control.
- No change in wiring is required. Input will be three phase 4 wire and output will be single phase 3 wire.
- Static technology results in quiet operation, high product up-time & low maintenance.
- Internal surge voltage protection assures trouble-free operation.
- AC input circuit breakers and load over current protection prevents costly equipment damage.
- Tight control over electronic card failures, data corruption and machine breakdowns result in higher productivity, lower operating costs, and greater consumer comfort.
- Lightweight and compact size makes for ease of installation.

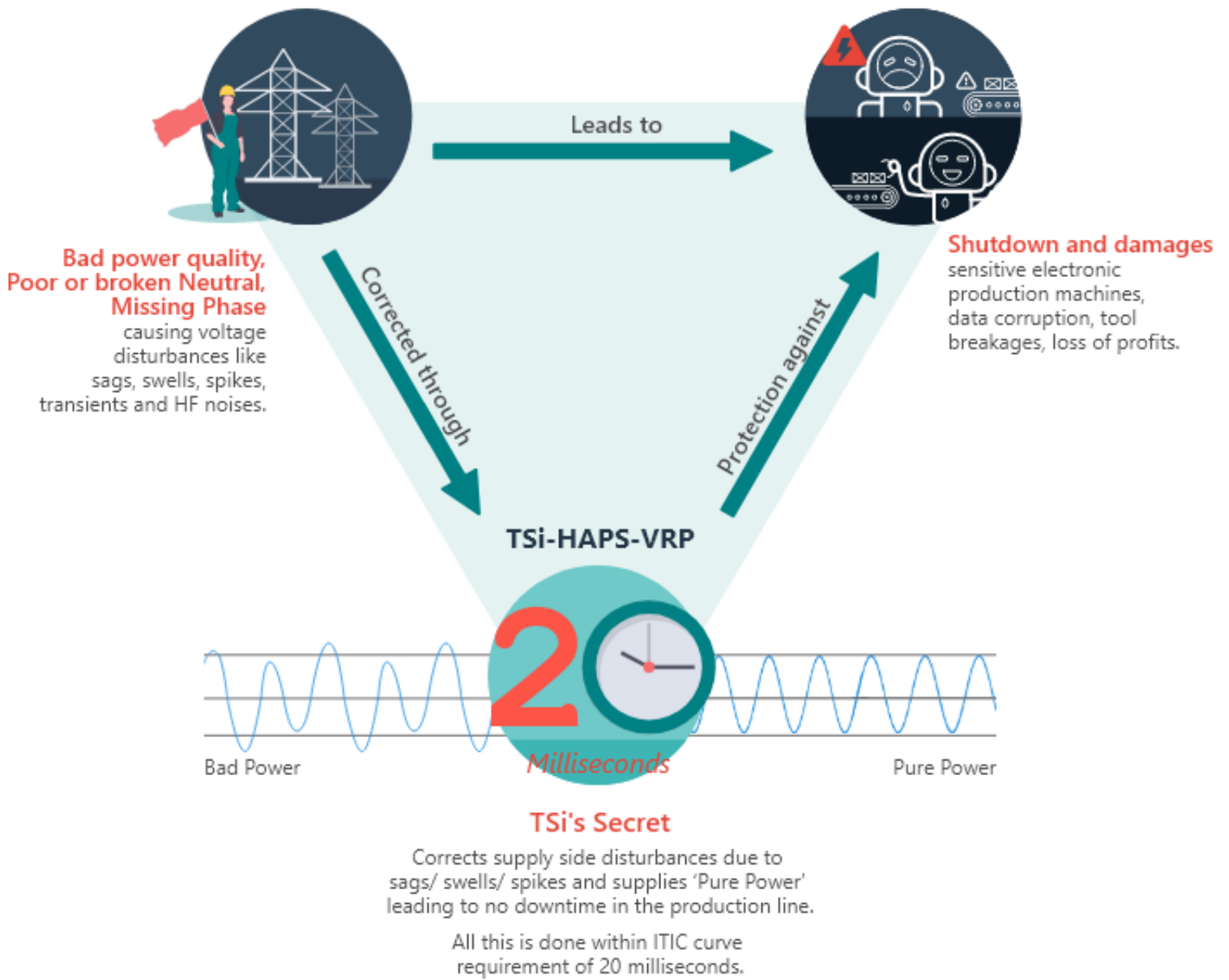
Illustration of TSi-HAPS VRP Technology



Note:

- In HAPS VRP, the output load shall be only single phase.
- No distribution of load is required.

Reliable TSi-HAPS VRP Technology for Next Gen Electronic Machinery



Technical Specifications

Model	HAPS-3000-9319-200M
Electrical	
Capacity (in KVA)	3
Switching Technology	20 kHz IGBT AC chopper/inverter
Voltage Compensation Time	20 ms typical
AC Input	
Nominal Input Voltage (V)	Three phase 400
Designed Input voltage range (V) (voltage regulation accuracy of +/-1%)	320 - 480
Input voltage range (V) (for relaxed output regulation within functional range of 200-250V P-N)	277 - 520
Nominal Operating Frequency	47 – 63 Hz
Maximum rated input current (A)	9
AC Input Connector	L1, L2, L3 & Ground input wires. Input neutral will not be used.
Overload & Short Circuit Protection	Through suitably rated input circuit breaker
AC Output	
Nominal Output Voltage (V)	Single phase 230
Efficiency	Typical 96% (under 20 – 100 % load condition)
Output Voltage Compensation Range	+/- 1 %
Maximum Rated Output Current (A)	13
System Status Indicator	Green LED ON-Normal operation - Amber LED ON-Bypass operation Red LED ON-Fault
Output Connector	L1, Neutral & Ground output wires. Fresh output neutral provided.
Surge Protection	Class II Surge Protection
Physical	
Cabinet Construction	RAL 7035 light grey powder coated CRCA cabinets
Automatic AC-AC Converter Bypass	Standard, will get activated when there is a fault condition
Cabinet Weather Protection Ratings	IP 20 (for use in protected indoor environments)
Display	Digital output voltage display thru selector switch
Mounting	4 High Quality Castor wheels, 2 with brakes
Overall Dimension (approx.)	As per Dimension Diagram of Cubical Type 610x610x640
Unpacked Weight (approx.)	90 kg
Environmental	
Cooling Method	Forced air
Operating Temperature Range	0 to + 45 °C
Operating Humidity Range	10 to 90% relative humidity (non-condensing)

**HAPS VRP works with broken input neutral & one missing phase.*

Technical Specifications

Model	HAPS-6000-9319-200M
Electrical	
Capacity (in KVA)	6
Switching Technology	20 kHz IGBT AC chopper/inverter
Voltage Compensation Time	20 ms typical
AC Input	
Nominal Input Voltage (V)	Three phase 400
Designed Input voltage range (V) (voltage regulation accuracy of +/-1%)	320 - 480
Input voltage range (V) (for relaxed output regulation within functional range of 200-250V P-N)	277 - 520
Nominal Operating Frequency	47 – 63 Hz
Maximum rated input current (A)	19
AC Input Connector	L1, L2, L3 & Ground input wires. Input neutral will not be used.
Overload & Short Circuit Protection	Through suitably rated input circuit breaker
AC Output	
Nominal Output Voltage (V)	Single phase 230
Efficiency	Typical 96% (under 20 – 100 % load condition)
Output Voltage Compensation Range	+/- 1 %
Maximum Rated Output Current (A)	25
System Status Indicator	Green LED ON-Normal operation - Amber LED ON-Bypass operation Red LED ON-Fault
Output Connector	L1, Neutral & Ground output wires. Fresh output neutral provided.
Surge Protection	Class II Surge Protection
Physical	
Cabinet Construction	RAL 7035 light grey powder coated CRCA cabinets
Automatic AC-AC Converter Bypass	Standard, will get activated when there is a fault condition
Cabinet Weather Protection Ratings	IP 20 (for use in protected indoor environments)
Display	Digital output voltage display thru selector switch
Mounting	4 High Quality Castor wheels, 2 with brakes
Overall Dimension (approx.)	As per Dimension Diagram of Cubical Type 660x660x720
Unpacked Weight (approx.)	90 kg
Environmental	
Cooling Method	Forced air
Operating Temperature Range	0 to + 45 °C
Operating Humidity Range	10 to 90% relative humidity (non-condensing)

**HAPS VRP works with broken input neutral & one missing phase.*

Technical Specifications

Model	HAPS-10000-9319-200M
Electrical	
Capacity (in KVA)	10
Switching Technology	20 kHz IGBT AC chopper/inverter
Voltage Compensation Time	20 ms typical
AC Input	
Nominal Input Voltage (V)	Three phase 400
Designed Input voltage range (V) (voltage regulation accuracy of +/-1%)	320 - 480
Input voltage range (V) (for relaxed output regulation within functional range of 200-250V P-N)	277 - 520
Nominal Operating Frequency	47 – 63 Hz
Maximum rated input current (A)	31
AC Input Connector	L1, L2, L3 & Ground input wires. Input neutral will not be used.
Overload & Short Circuit Protection	Through suitably rated input circuit breaker
AC Output	
Nominal Output Voltage (V)	Single phase 230
Efficiency	Typical 96% (under 20 – 100 % load condition)
Output Voltage Compensation Range	+/- 1 %
Maximum Rated Output Current (A)	44
System Status Indicator	Green LED ON-Normal operation - Amber LED ON-Bypass operation Red LED ON-Fault
Output Connector	L1, Neutral & Ground output wires. Fresh output neutral provided.
Surge Protection	Class II Surge Protection
Physical	
Cabinet Construction	RAL 7035 light grey powder coated CRCA cabinets
Automatic AC-AC Converter Bypass	Standard, will get activated when there is a fault condition
Cabinet Weather Protection Ratings	IP 20 (for use in protected indoor environments)
Display	Digital output voltage display thru selector switch
Mounting	4 High Quality Castor wheels, 2 with brakes
Overall Dimension (approx.)	As per Dimension Diagram of Cubical Type 660x660x720
Unpacked Weight (approx.)	100 kg
Environmental	
Cooling Method	Forced air
Operating Temperature Range	0 to + 45 °C
Operating Humidity Range	10 to 90% relative humidity (non-condensing)

**HAPS VRP works with broken input neutral & one missing phase.*

Technical Specifications

Model	HAPS-15000-9319-200M
Electrical	
Capacity (in KVA)	15
Switching Technology	20 kHz IGBT AC chopper/inverter
Voltage Compensation Time	20 ms typical
AC Input	
Nominal Input Voltage (V)	Three phase 400
Designed Input voltage range (V) (voltage regulation accuracy of +/-1%)	320 - 480
Input voltage range (V) (for relaxed output regulation within functional range of 200-250V P-N)	277 - 520
Nominal Operating Frequency	47 – 63 Hz
Maximum rated input current (A)	47
AC Input Connector	L1, L2, L3 & Ground input wires. Input neutral will not be used.
Overload & Short Circuit Protection	Through suitably rated input circuit breaker
AC Output	
Nominal Output Voltage (V)	Single phase 230
Efficiency	Typical 96% (under 20 – 100 % load condition)
Output Voltage Compensation Range	+/- 1 %
Maximum Rated Output Current (A)	65
System Status Indicator	Green LED ON-Normal operation - Amber LED ON-Bypass operation Red LED ON-Fault
Output Connector	L1, Neutral & Ground output wires. Fresh output neutral provided.
Surge Protection	Class II Surge Protection
Physical	
Cabinet Construction	RAL 7035 light grey powder coated CRCA cabinets
Automatic AC-AC Converter Bypass	Standard, will get activated when there is a fault condition
Cabinet Weather Protection Ratings	IP 20 (for use in protected indoor environments)
Display	Digital output voltage display thru selector switch
Mounting	4 High Quality Castor wheels, 2 with brakes
Overall Dimension (approx.)	As per Dimension Diagram of Cubical Type 660x660x720
Unpacked Weight (approx.)	130 kg
Environmental	
Cooling Method	Forced air
Operating Temperature Range	0 to + 45 °C
Operating Humidity Range	10 to 90% relative humidity (non-condensing)

**HAPS VRP works with broken input neutral & one missing phase.*

Technical Specifications

Model	HAPS-20000-9319-200M
Electrical	
Capacity (in KVA)	20
Switching Technology	20 kHz IGBT AC chopper/inverter
Voltage Compensation Time	20 ms typical
AC Input	
Nominal Input Voltage (V)	Three phase 400
Designed Input voltage range (V) (voltage regulation accuracy of +/-1%)	320 - 480
Input voltage range (V) (for relaxed output regulation within functional range of 200-250V P-N)	277 - 520
Nominal Operating Frequency	47 – 63 Hz
Maximum rated input current (A)	63
AC Input Connector	L1, L2, L3 & Ground input wires. Input neutral will not be used.
Overload & Short Circuit Protection	Through suitably rated input circuit breaker
AC Output	
Nominal Output Voltage (V)	Single phase 230
Efficiency	Typical 96% (under 20 – 100 % load condition)
Output Voltage Compensation Range	+/- 1 %
Maximum Rated Output Current (A)	87
System Status Indicator	Green LED ON-Normal operation - Amber LED ON-Bypass operation Red LED ON-Fault
Output Connector	L1, Neutral & Ground output wires. Fresh output neutral provided.
Surge Protection	Class II Surge Protection
Physical	
Cabinet Construction	RAL 7035 light grey powder coated CRCA cabinets
Automatic AC-AC Converter Bypass	Standard, will get activated when there is a fault condition
Cabinet Weather Protection Ratings	IP 20 (for use in protected indoor environments)
Display	Digital output voltage display thru selector switch
Mounting	4 High Quality Castor wheels, 2 with brakes
Overall Dimension (approx.)	As per Dimension Diagram of Cubical Type 888x888x838
Unpacked Weight (approx.)	140 kg
Environmental	
Cooling Method	Forced air
Operating Temperature Range	0 to + 45 °C
Operating Humidity Range	10 to 90% relative humidity (non-condensing)

**HAPS VRP works with broken input neutral & one missing phase.*

Technical Specifications

Model	HAPS-25000-9319-200M
Electrical	
Capacity (in KVA)	25
Switching Technology	20 kHz IGBT AC chopper/inverter
Voltage Compensation Time	20 ms typical
AC Input	
Nominal Input Voltage (V)	Three phase 400
Designed Input voltage range (V) (voltage regulation accuracy of +/-1%)	320 - 480
Input voltage range (V) (for relaxed output regulation within functional range of 200-250V P-N)	277 - 520
Nominal Operating Frequency	47 – 63 Hz
Maximum rated input current (A)	78
AC Input Connector	L1, L2, L3 & Ground input wires. Input neutral will not be used.
Overload & Short Circuit Protection	Through suitably rated input circuit breaker
AC Output	
Nominal Output Voltage (V)	Single phase 230
Efficiency	Typical 96% (under 20 – 100 % load condition)
Output Voltage Compensation Range	+/- 1 %
Maximum Rated Output Current (A)	109
System Status Indicator	Green LED ON-Normal operation - Amber LED ON-Bypass operation Red LED ON-Fault
Output Connector	L1, Neutral & Ground output wires. Fresh output neutral provided.
Surge Protection	Class II Surge Protection
Physical	
Cabinet Construction	RAL 7035 light grey powder coated CRCA cabinets
Automatic AC-AC Converter Bypass	Standard, will get activated when there is a fault condition
Cabinet Weather Protection Ratings	IP 20 (for use in protected indoor environments)
Display	Digital output voltage display thru selector switch
Mounting	4 High Quality Castor wheels, 2 with brakes
Overall Dimension (approx.)	As per Dimension Diagram of Cubical Type 888x888x838
Unpacked Weight (approx.)	140 kg
Environmental	
Cooling Method	Forced air
Operating Temperature Range	0 to + 45 °C
Operating Humidity Range	10 to 90% relative humidity (non-condensing)

**HAPS VRP works with broken input neutral & one missing phase.*

Technical Specifications

Model	HAPS-30000-9319-200M
Electrical	
Capacity (in KVA)	30
Switching Technology	20 kHz IGBT AC chopper/inverter
Voltage Compensation Time	20 ms typical
AC Input	
Nominal Input Voltage (V)	Three phase 400
Designed Input voltage range (V) (voltage regulation accuracy of +/-1%)	320 - 480
Input voltage range (V) (for relaxed output regulation within functional range of 200-250V P-N)	277 - 520
Nominal Operating Frequency	47 – 63 Hz
Maximum rated input current (A)	94
AC Input Connector	L1, L2, L3 & Ground input wires. Input neutral will not be used.
Overload & Short Circuit Protection	Through suitably rated input circuit breaker
AC Output	
Nominal Output Voltage (V)	Single phase 230
Efficiency	Typical 96% (under 20 – 100 % load condition)
Output Voltage Compensation Range	+/- 1 %
Maximum Rated Output Current (A)	130
System Status Indicator	Green LED ON-Normal operation - Amber LED ON-Bypass operation Red LED ON-Fault
Output Connector	L1, Neutral & Ground output wires. Fresh output neutral provided.
Surge Protection	Class II Surge Protection
Physical	
Cabinet Construction	RAL 7035 light grey powder coated CRCA cabinets
Automatic AC-AC Converter Bypass	Standard, will get activated when there is a fault condition
Cabinet Weather Protection Ratings	IP 20 (for use in protected indoor environments)
Display	Digital output voltage display thru selector switch
Mounting	4 High Quality Castor wheels, 2 with brakes
Overall Dimension (approx.)	As per Dimension Diagram of Cubical Type 888x888x838
Unpacked Weight (approx.)	150 kg
Environmental	
Cooling Method	Forced air
Operating Temperature Range	0 to + 45 °C
Operating Humidity Range	10 to 90% relative humidity (non-condensing)

**HAPS VRP works with broken input neutral & one missing phase.*

Technical Specifications

Model	HAPS-40000-9319-200MP
Electrical	
Capacity (in KVA)	40
Switching Technology	20 kHz IGBT AC chopper/inverter
Voltage Compensation Time	20 ms typical
AC Input	
Nominal Input Voltage (V)	Three phase 400
Designed Input voltage range (V) (voltage regulation accuracy of +/-1%)	320 - 480
Input voltage range (V) (for relaxed output regulation within functional range of 200-250V P-N)	277 - 520
Nominal Operating Frequency	47 – 63 Hz
Maximum rated input current (A)	125
AC Input Connector	L1, L2, L3 & Ground input BUS BAR. Input neutral will not be used.
Overload & Short Circuit Protection	Through suitably rated input circuit breaker
AC Output	
Nominal Output Voltage (V)	Single phase 230
Efficiency	Typical 96% (under 20 – 100 % load condition)
Output Voltage Compensation Range	+/- 1 %
Maximum Rated Output Current (A)	174
System Status Indicator	Green LED ON-Normal operation - Amber LED ON-Bypass operation Red LED ON-Fault
Output Connector	L1, Neutral & Ground output BUS BAR. Fresh output neutral provided.
Surge Protection	Class II Surge Protection
Physical	
Cabinet Construction	RAL 7035 light grey powder coated CRCA cabinets
Automatic AC-AC Converter Bypass	Standard, will get activated when there is a fault condition
Cabinet Weather Protection Ratings	IP 20 (for use in protected indoor environments)
Display	Digital output voltage display thru selector switch
Mounting	Pad mounted
Overall Dimension (approx.)	As per Dimension Diagram of Cubical Type 650x1020x2150
Unpacked Weight (approx.)	400 kg
Environmental	
Cooling Method	Forced air
Operating Temperature Range	0 to + 45 °C
Operating Humidity Range	10 to 90% relative humidity (non-condensing)

**HAPS VRP works with broken input neutral & one missing phase.*

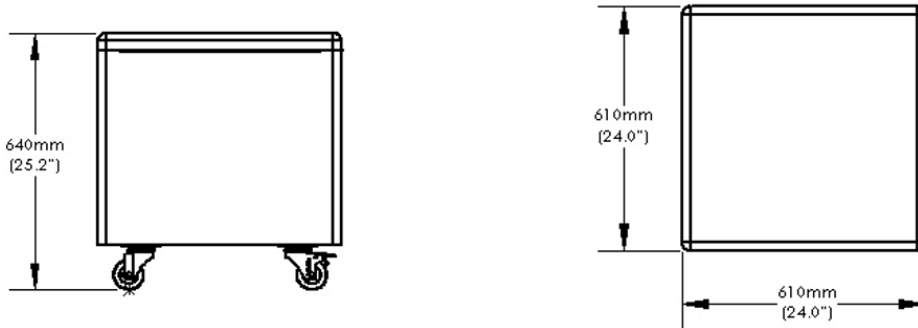
Technical Specifications

Model	HAPS-50000-9319-200MP
Electrical	
Capacity (in KVA)	50
Switching Technology	20 kHz IGBT AC chopper/inverter
Voltage Compensation Time	20 ms typical
AC Input	
Nominal Input Voltage (V)	Three phase 400
Designed Input voltage range (V) (voltage regulation accuracy of +/-1%)	320 - 480
Input voltage range (V) (for relaxed output regulation within functional range of 200-250V P-N)	277 - 520
Nominal Operating Frequency	47 – 63 Hz
Maximum rated input current (A)	156
AC Input Connector	L1, L2, L3 & Ground input BUS BAR. Input neutral will not be used.
Overload & Short Circuit Protection	Through suitably rated input circuit breaker
AC Output	
Nominal Output Voltage (V)	Single phase 230
Efficiency	Typical 96% (under 20 – 100 % load condition)
Output Voltage Compensation Range	+/- 1 %
Maximum Rated Output Current (A)	217
System Status Indicator	Green LED ON-Normal operation - Amber LED ON-Bypass operation Red LED ON-Fault
Output Connector	L1, Neutral & Ground output BUS BAR. Fresh output neutral provided.
Surge Protection	Class II Surge Protection
Physical	
Cabinet Construction	RAL 7035 light grey powder coated CRCA cabinets
Automatic AC-AC Converter Bypass	Standard, will get activated when there is a fault condition
Cabinet Weather Protection Ratings	IP 20 (for use in protected indoor environments)
Display	Digital output voltage display thru selector switch
Mounting	Pad mounted
Overall Dimension (approx.)	As per Dimension Diagram of Cubical Type 650x1020x2150
Unpacked Weight (approx.)	430 kg
Environmental	
Cooling Method	Forced air
Operating Temperature Range	0 to + 45 °C
Operating Humidity Range	10 to 90% relative humidity (non-condensing)

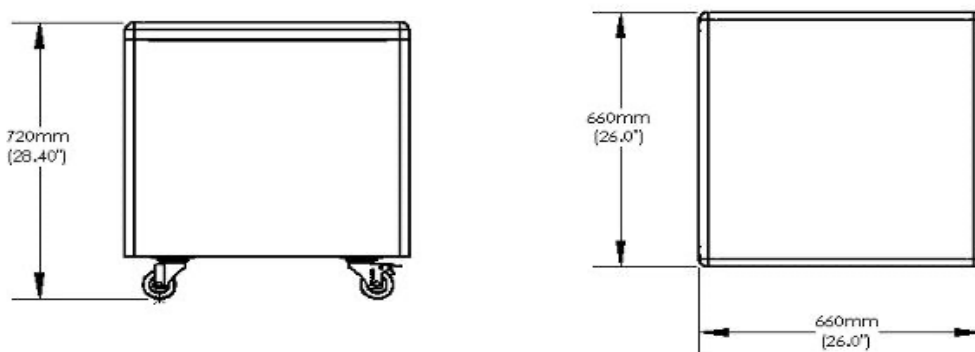
**HAPS VRP works with broken input neutral & one missing phase.*

Dimension Diagrams

CUBICAL TYPE 610x610x640



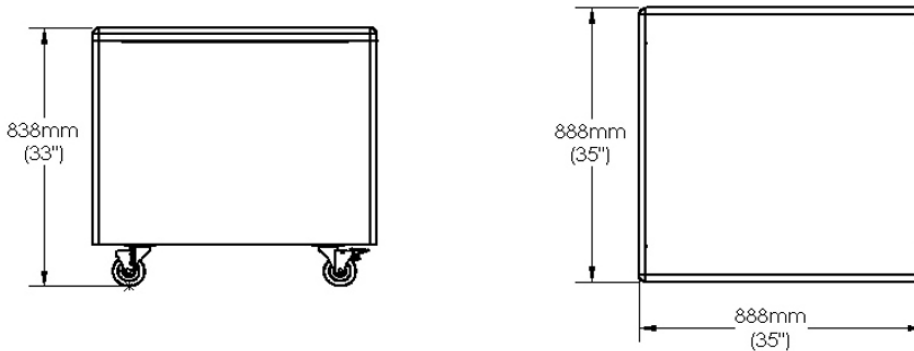
CUBICAL TYPE 660x660x720



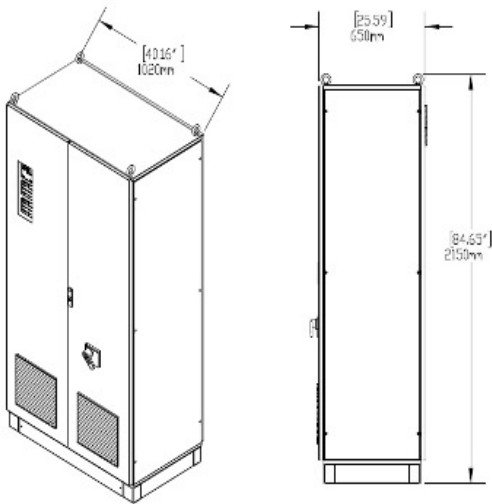
Technical Specifications

Dimension Diagrams

CUBICAL TYPE 888x888x838



PANEL TYPE 650x1020x2150



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