

**DC VOLTAGE UP TO 60KV**

**CHARGING POWER UP TO 40KJ/S**



CCR serie is designed to offer optimal performance in a compact design for Capacitor Chargers. Air or Oil isolated, CCR Power Supply from 1kV to 60kV provides high reliability without any special maintenance.

## APPLICATIONS

- Pulsed applications
- Capacitors
- Research and Development
- Test Equipment
- Accelerators

## MAIN SPECIFICATION

- Output Voltage: up to 60kV
- Charging Power: 750J/s to 40kJ/s
- Polarity: Positive-Negative-Reversible-Floating
- Operating frequency: 10Hz, up to 3kHz
- Reproducibility: 0.1%
- Voltage holding: 0.1% p-p of full voltage
- Remote interface: 0-10V analogue

## TECHNICAL SPECIFICATIONS

|                                  |   |
|----------------------------------|---|
| FORMAT                           | 19" Rack or 19" cabinet   |
| EFFICIENCY                       | > 90% at full load  |
| MAINS INPUT                      | 400 VAC $\pm 10\%$ , 47-63 Hz<br>3 Phases + Earth   |
| INPUT POWER FACTOR               | $\geq 0.90$ at full load  |
| INRUSH CURRENT                   | Limited to operating current at full power  |
| REMOTE CONTROL MODE              | External 0 to 10V analog interface  |
| REGULATION MODES                 | Constant Voltage (CV) and Constant Current (CC) regulations, automatic crossover. Power regulation on demand. |
| STATIC LOAD REGULATION           | $\pm 0.05\%$ of full voltage or current, from no load to full load (lower on demand)                          |
| STATIC LINE REGULATION           | $\pm 0.05\%$ of full voltage or current for $\pm 10\%$ mains voltage (lower on demand)                        |
| STABILITY (AFTER 1-HOUR WARM-UP) | 100 ppm/hour, operating at constant load and temperature  |
| PROTECTIONS                      | Short circuit, Arc quench, External interlock, Over temperature, Overload, Over voltage, Over current         |
| STORED ENERGY                    | 0.2 J/kJ  |
| ACCESSORIES                      | 3m removable coaxial HV cable, interlock terminator, 2 safety keys  |

## CONTROL

|                                    |  |
|------------------------------------|--|
| LOCAL CONTROLS                     | Mains power switch, safety lock, HV on, HV off, Over current mode, Preset, Limitation of voltage setting                       |
| OUTPUT VOLTAGE AND CURRENT SETTING | 10 turn potentiometer (0.05% resolution)<br>Continuously adjustable from 0 to 100%   |
| VOLTAGE AND CURRENT DISPLAY        | 4.5 Digit  |
| DISPLAY INDICATORS                 | HV on, HV off, Line, Fault, Interlock, Remote, Over current limitation/protection, Regulation mode                             |
| REMOTE CONTROL INTERFACE           | Standard: 0-10V Analogue<br>On demand: RS-232, Ethernet, 0-10V Isolated Analogue, 0-10V Analogue with 24V relay, Optical fiber |
| REMOTE CONTROL SOFTWARE            | Labview  |



## OPERATING ENVIRONMENT

|                         |  |
|-------------------------|--|
| AMBIENT TEMPERATURE     | From 0 to 50 °C  |
| AMBIENT HUMIDITY        | 0 to 80% at 25°C, 50% at 40°C (non-condensing)                                 |
| TEMPERATURE COEFFICIENT | 100 ppm/°C   |
| COOLING                 | Air forced<br>Inlet through front panel (dust filters)<br>Outlet at rear panel |

## STANDARDS AND REGULATIONS

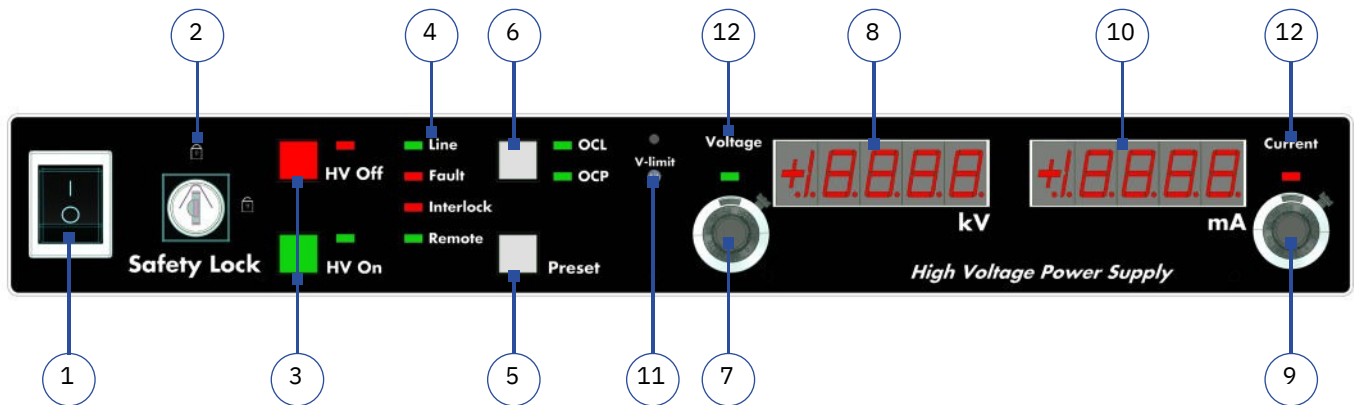
|                            |   |
|----------------------------|---|
| CE CERTIFIED AND ACCORDING | <p>Low voltage directive: 2014/35/EU</p> <p>EMC directive: 2014/30/EU</p> <p>RoHS directive: 2011/65/EU</p> <p>EN 61000-6-2: 2005 + AC (2005)</p> <p>EN 61000-6-4: 2007 + A1 (2011)</p> <p>EN 61326-1:2013</p> <p>EN 61000-3-2: 2014</p> <p>EN 61000-3-3: 2013</p> <p>EN 61010-1: 2010</p> <p>EUROLAB EMC decision n°11: issue 1 of 18 of December 2007</p> |
|----------------------------|---|

## DOCUMENTATION AND SERVICES

|                |   |
|----------------|---|
| DOCUMENTATIONS | <p>User manual</p> <p>Device test report</p> <p>EU declaration of conformity </p> <p>RoHS2 declaration of conformity </p> |
| WARRANTY       | <p>2 years</p> <p>Extension on demand</p>   |
| ON DEMAND      | <p>Factory Acceptance Test (FAT)</p> <p>Detailed design report</p> <p>Custom tests</p> <p>Manufacturing process certification</p> <p>Special engineering</p>  |

## INTERFACES

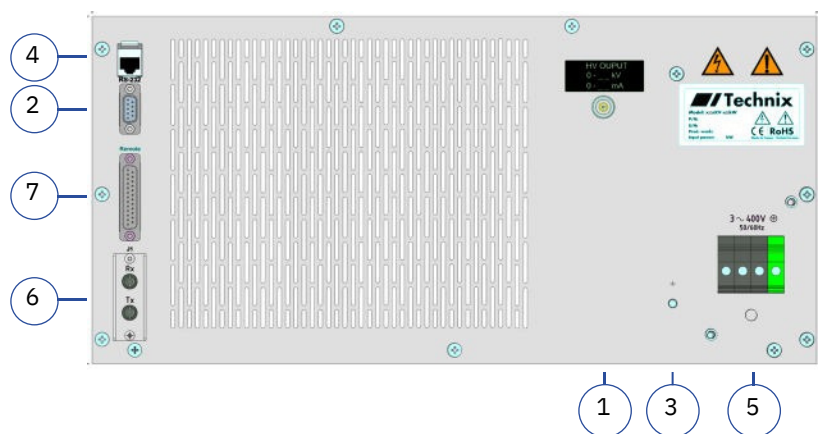
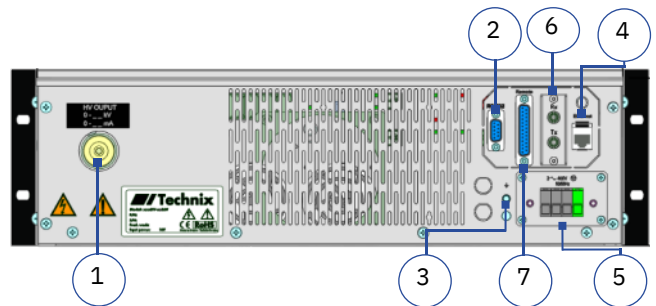
### FRONT PANEL



- |                          |   |                                      |
|--------------------------|---|--------------------------------------|
| 1. ON/OFF switch         | 4. Statuses (Line, Fault, Interlock, Remote)                      | 8. Voltage display                   |
| 2. Safety lock (key)     | 5. Preset push button   | 9. Current setting                   |
| 3. HV ON/OFF push button | 6. Over Current Limitation (OCL)<br>Over Current Protection (OCP) | 10. Current display                  |
|                          | 7. Voltage setting  | 11. Local voltage setting limitation |
|                          | 11. Local voltage setting limitation                              | 12. Regulation mode (Current)        |
|                          | 12. Regulation mode (Voltage)                                     |                                      |

### REAR PANEL

1. HV output
2. RS-232 (option)
3. Earth bolt
4. Ethernet (option)
5. Mains input
6. Optical fiber (option)
7. Analog interface



## 0-10V ANALOG INTERFACE

| PIN      | SIGNAL   | SIGNAL DESCRIPTION  | I/O    | IMPEDANCE    |
|----------|--|---|--------|--------------|
| 1        | HV-Off control   | Produced by a fleeting opening from pin 16  | Input  | 20Ω          |
| 2        | Fault status   | Internal Fault: 0V = Detected; +15V = No  | Output | 100Ω         |
| 3        | Interlock status                                       | fault External interlock: 0V = Open; +15V =   | Output | 475Ω         |
| 4        | HV-On control  | Closed Produced by a fleeting closing to  | Input  | 20Ω          |
| 5        | Output voltage measurement                             | pin 16  | Output | 475Ω         |
|          | Output current measurement                             | 0V to 10V = 0% to 100%  |        | 475Ω         |
| 6        | Inhibit control  | 0V to 10V = 0% to 100%  | Output |              |
| 7        | Remote   | Activated by digital signal between +5V to +24V   | Input  |              |
| 8        | control  | Open contact = Local control mode; Closed contact = Remote control mode   | Input  | 20Ω          |
| 9        |  | Not connected   |        |              |
| 10       | Arc monitor (Mains Monitor for older models)           | Generates a signal when an arc is detected: +15V = No arc; 0V = Arc detected<br>Older models (shipped before January 2023): Generates a fault if the mains input is failing: 0V = Mains is fine ; +15V = Mains is failing | Output | 100Ω         |
| 11       | Output power measurement (option)                      | 0V to 10V = 0% to 100% (option)   | Output | 475Ω         |
| 12       | Local output voltage setting                           | Copy of the setting on the front panel potentiometer. 0V to 10V = 0% to 100%  | Output | 10Ω          |
| 13       | Local output current setting                           | Copy of the setting on the front panel potentiometer. 0V to   | Output | 10Ω          |
| 14       | Remote output current setting                          | 10V = 0% to 100%  | Input  | 115Ω         |
| 15       | +10V reference   | 0V to 10V = 0% to 100%  | Output | 2.7Ω         |
| 16       | 0V reference (digital signals)                         | +10V reference for analog signals, max current : 5mA  | Output |              |
| 17       | Remote output voltage setting                          | 0V ground reference for digital signals   | Output |              |
| 18       | Regulation mode status or End of Charge status         | 0V to 10V = 0% to 100% of max output voltage  | Input  | 115Ω         |
| 19       | HV-On status   | DC power supply:<br>Open contact = Current Regulation; +24V = Voltage Regulation<br>CC power supply:<br>Open contact = Capacitor charging; +24V = End of charge   | Output | 100Ω         |
| 20       | 0V reference (analogue signals)                        | 0V = HV output disabled (HV Off)<br>+15V = HV output enabled (HV On)  | Output |              |
| 21-22-23 |  | 0V ground reference for analogue signals  | Output |              |
| 24       | External Interlock                                     | Not connected   |        |              |
| 25       | +10V Reference or Remote output power setting (option) | Connect to pin 16 to close the interlock.   | Input  | 500Ω         |
|          |  | Standard: +10V reference for analog signals, max current : 5mA Option: 0V to 10V = 0% to 100% of max output power   | Output | 2.7Ω or 115Ω |

## OPTIONS

- Reversibility
- Floating Outputs
- Auto inhibition after discharge
- Parallel operation
- Custom remote interface
- Emergency stop switch
- Special mains input
- Non Instrumented front panel
- Industrial dust filters
- Transportable case
- Remote Front panel
- Tropicalization
- Custom design

## RANGES

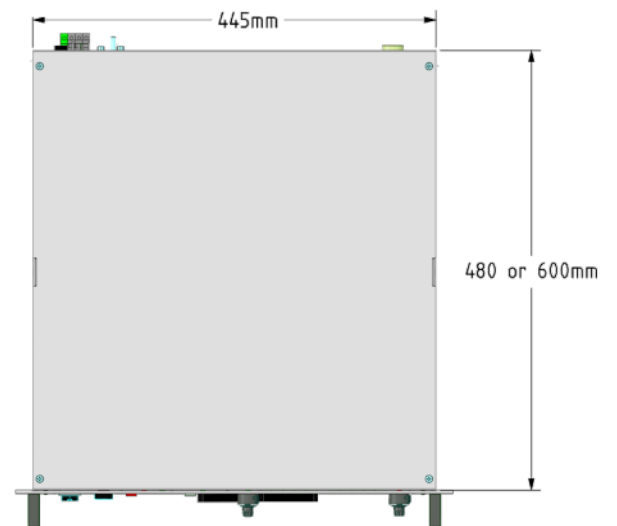
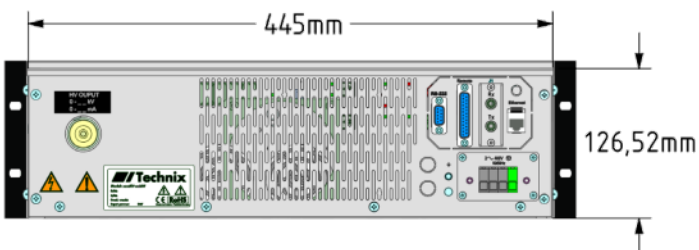
model reference: CCR 1 kV to 60 kV - 0.75 kJ/s to 24 kJ/s

VOLTAGE                      CHARGING POWER

| OUTPUT VOLTAGE | 0.75 kJ/s   | 1.5 kJ/s | 2.5 kJ/s | 3 kJ/s/4 kJ/s/5 kJ/s/6 kJ/s/7.5 kJ/s |        |        |        | 8 kJ/s | 10 kJ/s | 12 kJ/s | 15 kJ/s | 20 kJ/s | 24 kJ/s |        |
|----------------|-------------|----------|----------|--------------------------------------|--------|--------|--------|--------|---------|---------|---------|---------|---------|--------|
|                | Max Current |          |          |                                      |        |        |        |        |         |         |         |         |         |        |
| 1 kV           | 1.50 A      | 3 A      | 5 A      | 6 A                                  | 8 A    | 10 A   | 12 A   | 14 A   | 16 A    | 20 A    | 24 A    | 30 A    | 40 A    | 48 A   |
| 2.5 kV         | 600 mA      | 1.20 A   | 2 A      | 2.40 A                               | 3.20 A | 4 A    | 4.80 A | 5.6 A  | 6.40 A  | 8 A     | 9.60 A  | 12 A    | 16 A    | 19.2 A |
| 5 kV           | 300 mA      | 600 mA   | 1 A      | 1.2 A                                | 1.60 A | 2 A    | 2.40 A | 2.8 A  | 3.20 A  | 4 A     | 4.80 A  | 6 A     | 8 A     | 9.60 A |
| 10kV           | 150 mA      | 300 mA   | 300 mA   | 600 mA                               | 800 mA | 1 A    | 1.20 A | 1.4 A  | 1.60 A  | 2 A     | 2.40 A  | 3 A     | 4 A     | 4.80 A |
| 15 kV          | 100 mA      | 200 mA   | 330 mA   | 400 mA                               | 530 mA | 670 mA | 800 mA | 933 mA | 1.06 A  | 1.33 A  | 1.60 A  | 2 A     | 2.67 A  | 3.20 A |
| 20 kV          | 75 mA       | 150 mA   | 250 mA   | 300 mA                               | 400 mA | 500 mA | 600 mA | 700 mA | 800 mA  | 1.120 A | 1.20 A  | 1.50 A  | 2 A     | 2.40 A |
| 25 kV          | 60 mA       | 120 mA   | 200 mA   | 240 mA                               | 320 mA | 400 mA | 480 mA | 560 mA | 640 mA  | 800 mA  | 960 mA  | 1.20 A  | 1.60 A  | 1.92 A |
| 30 kV          | 50 mA       | 100 mA   | 167 mA   | 200 mA                               | 270 mA | 330 mA | 400 mA | 467 mA | 533 mA  | 667 mA  | 800 mA  | 1 A     | 1.33 A  | 1.60 A |
| 40 kV          | 37.5 mA     | 75 mA    | 125 mA   | 150 mA                               | 200 mA | 250 mA | 300 mA | 350 mA | 400 mA  | 500 mA  | 600 mA  | 750 mA  | 1 A     | 1.20 A |
| 50 kV          | 30 mA       | 60 mA    | 100 mA   | 120 mA                               | 160 mA | 200 mA | 240 mA | 280 mA | 320 mA  | 400 mA  | 480 mA  | 600 mA  | 800 mA  | 960 mA |
| 60 kV          | 25 mA       | 50 mA    | 83 mA    | 100 mA                               | 130 mA | 170 mA | 200 mA | 233 mA | 266 mA  | 330 mA  | 400 mA  | 500 mA  | 667 mA  | 800 mA |

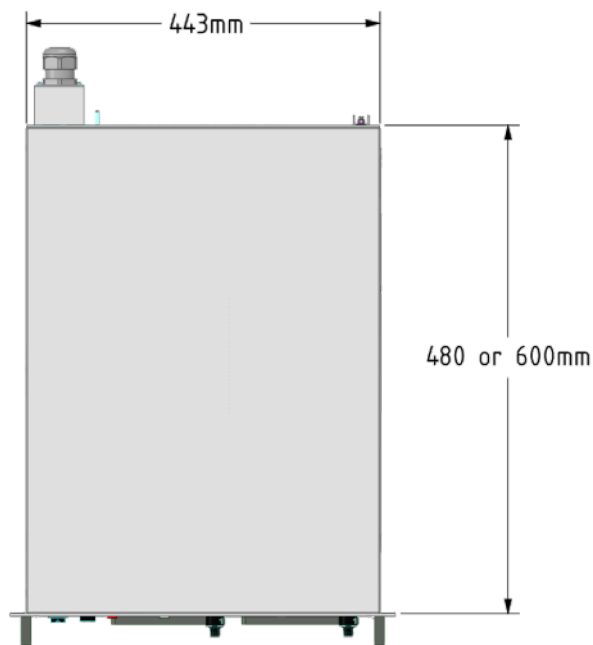
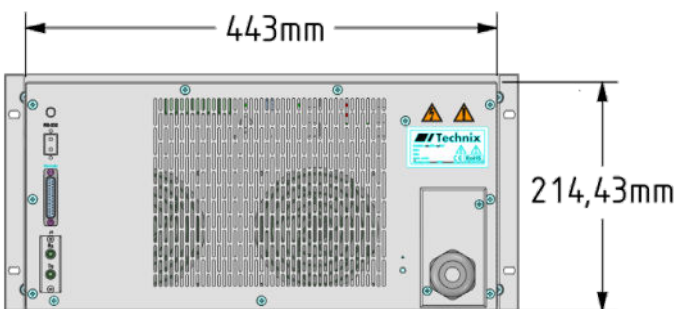
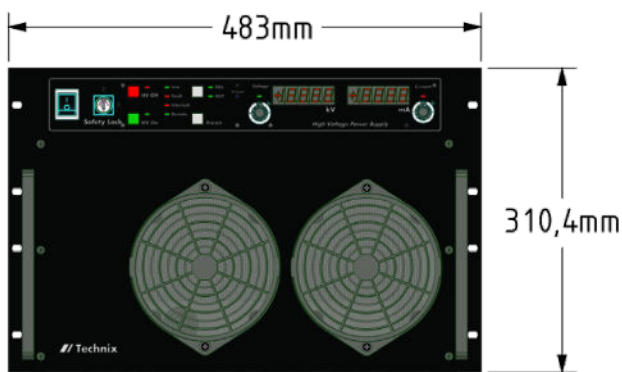
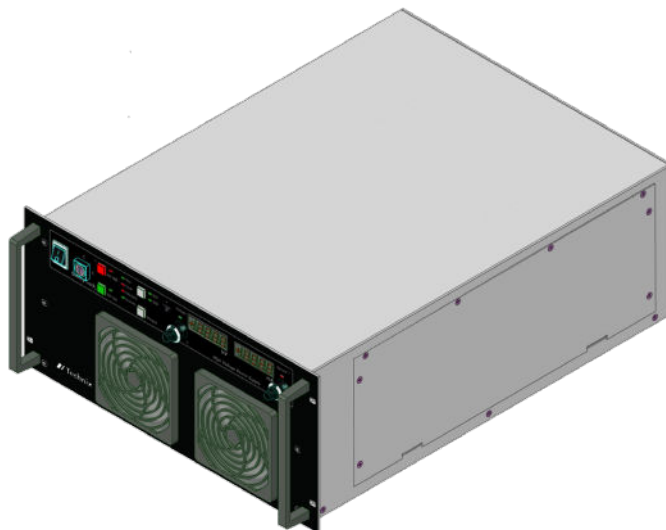
## DIMENSION

MODEL 3U - 19" : 133 x 483 x 480 or 600 mm (H x W x D)



## DIMENSION

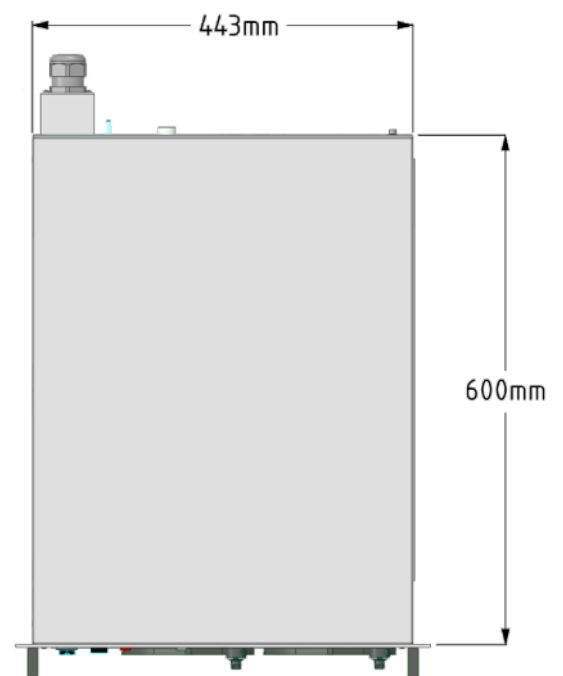
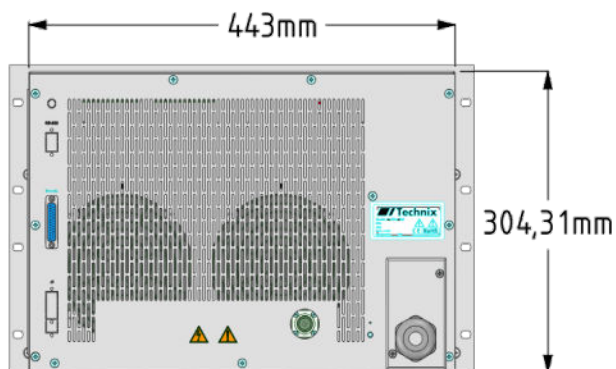
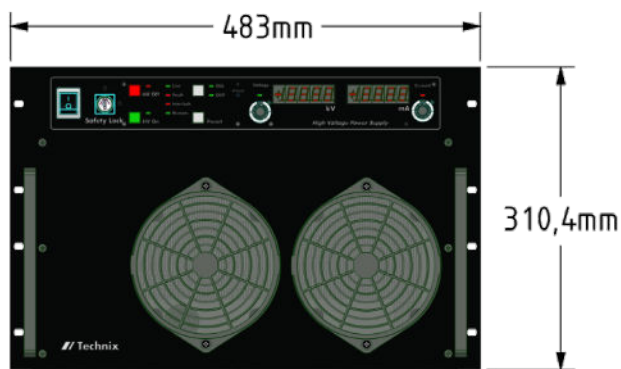
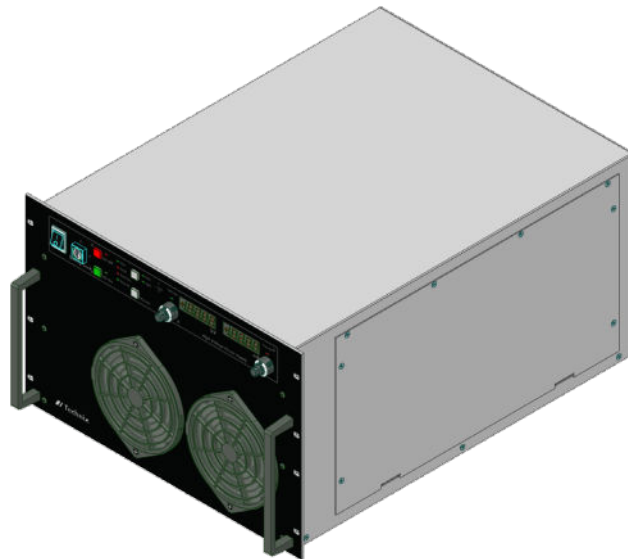
MODEL 5U - 19" : 222 x 483 x 480 or 600 mm (H x W x D)





## DIMENSION

MODEL 7U - 19" : 311 x 483 x 600 mm (H x W x D)



## DIMENSION

MODEL 10U - 19" : 444 x 483 x 600mm (H x W x D)

