



**FRACTURE
TECHNOLOGY**

SV-5V20

DCPD Power Supply

User Manual



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Technical Support

This manual is written and supplied by Fracture Technology. For any questions or comments please contact Fracture Technology via e-mail at FTAsupport@labtesting.com. Additional information may also be obtained via the Fracture Technology website at www.fracturetech.com.

Be Vigilant About Safety

Before you use your Fracture Technology product please read and understand the safety information provided with your system. Improper installation, operation or maintenance can result in damaging the system, cause severe personal injury or death and/or damage your equipment or test specimen(s). Before applying power, verify that the power input is in the range 110 - 240V and all safety precautions are taken. It is very important that you understand the safety hazards of your system, especially when dealing with live electrical current.

The power cable shall be inserted only in a power outlet socket that is provided with a protective earth contact. Any interruptions or disconnection from the protective earth terminal may cause a potential shock hazard that could result in personal injury or death. Ensure that the power is turned off before connecting cables to the system; connecting cables with the power applied can cause damage to the system.

Warranty

The SV-5V20 DCPD Power Supply is provided with a 1-year warranty. Please contact FTAsupport@labtesting.com for any warranty claims. When contacting Fracture Technology, please provide the serial number of the hardware, and the specific issue. Any return shipping is the responsibility of the customer.

User Serviceable Parts

There are no user serviceable parts within this equipment and opening the system will void the warranty. Only qualified service personnel from Fracture Technology can replace components or perform any internal testing or adjustments. Operating personnel are not allowed to remove or modify parts of the instrument. Do not attempt internal service or adjustment. Never attempt to modify or replace components with the power cable connected. In case of a malfunction please contact Fracture Technology for service and repair. For cleaning the system, use a dry cloth on the outside of the power supply unit. Any use of chemicals or alcohols can damage the surface or the system finish. Should there be any dust inside the system, use only low air pressure for removing the dust.

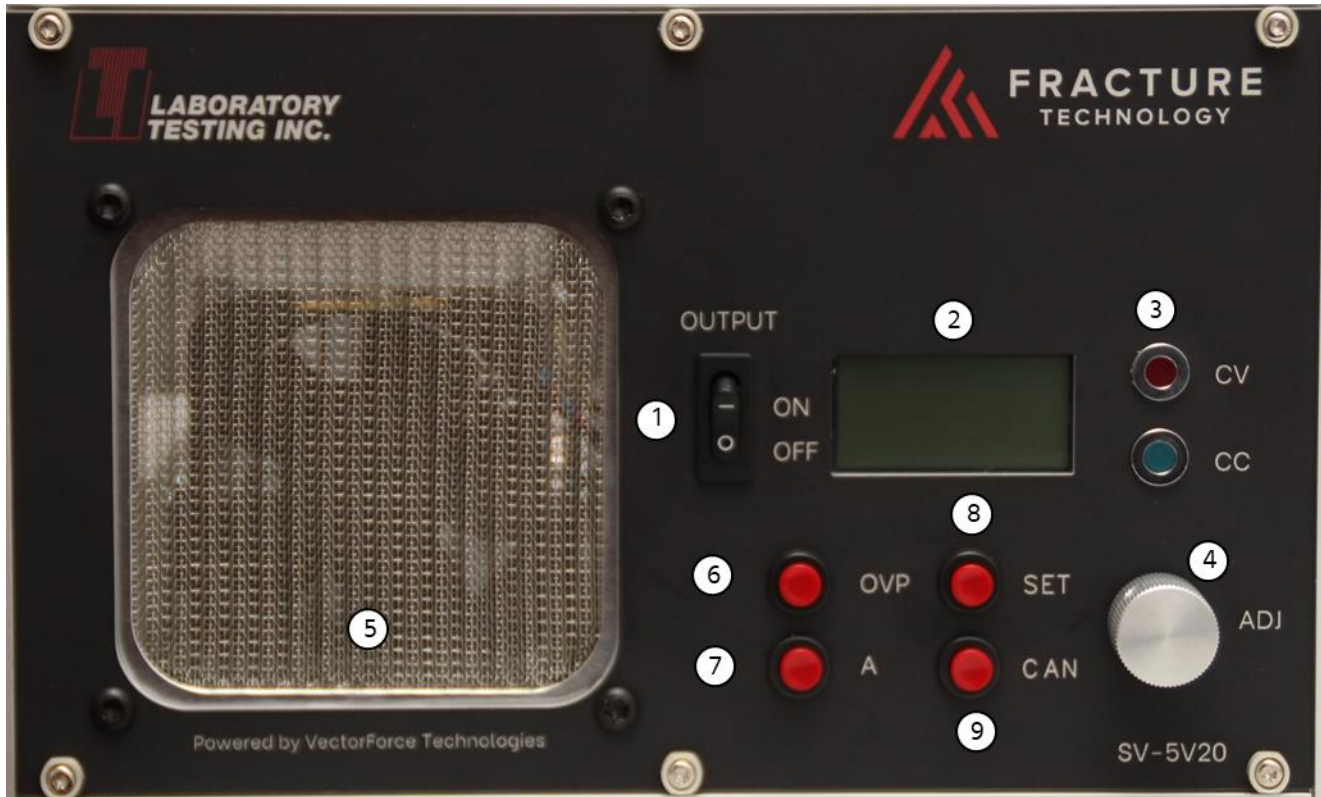
Airflow

It is very important that the system has adequate ventilation in order to maintain the system in the operating temperature range. Do not block the ventilation inlets on the front or rear of the system in order to allow cooling air to reach the system. Allow unrestricted air space at the back of the unit for fan exhaust. For proper ventilation, allow 2 inches of clear space on all sides of the chassis.

Introduction

The SV-5V20 was specifically designed as an extremely stable fully reversing constant current power supply for direct current potential difference (DCPD) to be used in measuring crack length in metallic test specimens tested for fatigue crack growth or fracture toughness tests. The system has a maximum power output of 100W with current and voltage ratings of 0 - 20A and 0 - 5V, respectively. The system has fully integrated solid-state relays that allow for current reversal within 250ms via digital inputs. The SV-5V20 has a simplicity of design and use that makes it ideal for DCPD testing. The system was designed by testers, for testers, to be the state-of-the-art DCPD power supply used for fatigue and fracture testing. As stability of the output current is the most critical specification, the system was extensively designed to be the most stable power supply in the industry for DCPD testing. Current stability is rated at within 2mA p-p at 5A. The system is compact at only 8.9 inches wide by 9.5

inches deep and can be mounted into a standard half-rack. The layout of the system is simple and intuitive, as shown in the following component identification diagrams.



SV-5V20 Component identification (Front View)

Item	Label	Description
1	Output	Switch for activating current
2	Main Display	Main graphical display
3	Current Mode Indicators	Indicates constant voltage (CV) or constant current (CC)
4	Adjust Knob	Adjust knob for setting current, OVP, etc.

Item	Label	Description
5	Fan Input and Filter	Fan grille
6	OVP	Over voltage protection (OVP) set button
7	A	Current set button
8	SET	Used for setting the current value
9	CAN	Cancel button. Used for cancelling out of menu.



SV-5V20 Component identification (Rear View)

Item	Label	Description
10	Power Switch	Primary power switch, 110 - 240 VAC
11	Main Display	Current output, banana plugs.
12	Chassis ground	Chassis ground
13	Direction	Switch for switching current polarity
14	CTRL	TTL input from ADwin Gold for current reversal
15	SRV	Service port for upgrading firmware; factory use only
16	Fan Exhaust	Exhaust fan outlet. Do not block.

Basic Setup Procedure

To avoid any ground loops, the chassis ground on the rear of the system should be connected to the DCPD amplifier chassis ground and ADwin chassis ground (if utilized in the system). The power supply can be turned on by switching on the main power switch at the back of the instrument. The fan inside of the power supply will be active when the power is on. Two additional system fans inside the enclosure will turn on once the power is turned on, one small fan at the rear panel and one larger primary system fan in the front of the enclosure. The rear fan will always be on when the power is on, however the larger primary fan will only be on when the current output is on, unless the temperature inside the system exceeds 149 °F. During system power-on a boot screen will be displayed with the firmware version. After bootup, the boot screen will disappear, and the start screen will be displayed. The settings of the voltage and current will be displayed from the last set point. During the boot cycle the system automatically performs thorough hardware and system checks. If an error occurs during system bootup, an error code will be displayed on the main display, and the user should contact Fracture Technology.

When turning off the main system power or when making any changes to current output or any other settings, the output should be turned to the off position. There is no current outputted out at the back of the power supply (output off) when the system is initially switched on. This is an intentional safeguard so that current output is only activated when desired. Switching on the output using the front output switch will activate the current.

Setting Output Current

The current is set on the system by pressing the A button on the front panel. Each digit is set independently by the ADJ by rotating the ADJ knob and pressing the multi-function ADJ knob at the desired value. To accept the current setting press SET at any time. If the user wishes to cancel out of the setting procedure, CAN should be pressed during this procedure.

When the output is activated, the user will see OUTPUT ON on the system display and conversely OUTPUT OFF when the output is deactivated. The constant current (CC) indicator light should light up in blue during normal operation. If there is a fault or if the overvoltage protection (OVP) limit is tripped, then the system will revert to constant voltage (CV) mode, which is indicated by a flashing red LED. Operating this system in CV mode for DCPD testing is considered a fault condition. The system cannot be operated in CV mode intentionally at a user specified value; it is only available as the fault condition.

CC versus CV Modes

DCPD testing must be performed in constant current (CC) mode for standard DCPD calibrations so that the change in voltage is directly associated with changes in crack length. When the power OUTPUT is set to ON and the system is in constant current mode the blue CC LED will be constantly on. When the system is running in a constant voltage mode the CV LED will be flashing red. This can be the case when no connection is made at the output, there is an open circuit, if the cable gauge is too small for the output current, or the OVP limit is reached.

Setting OVP Limit Voltage

The OVP protection limit can be set by pressing OVP once and then using the ADJ knob one digit at a time to set the desired OVP limit. The ADJ knob is a multi-function knob as it can be rotated and also pressed. The ADJ knob is pressed in once to set each digit one at a time. To accept the OVP setting, press the SET button. If at any time the user wishes to cancel out of a setting operation, the user may press the CAN button and cancel out of the operation. In this case, the system will use the previously set value.

An OVP setting of 5V is recommended in most situations in order to take full advantage of the power capabilities of the power supply and to avoid accidentally switching to CV in the middle of an actual test which would negate the remainder of the test. The system will revert to CV above the OVP limit.

Setting DCPD-CRTL or Manual Mode

The power supply can operate in the DCPD control mode or in a Manual Mode. This setting can be changed within the system Options Menu. The Options Menu is accessible by pressing in and holding the ADJ button for 4 seconds. Within the Options Menu, the user can select between operating the system using the CTRL port or Manual Control Mode. In order to select the preferred option, the user simply rotates to the desired selection with the ADJ knob and then presses the ADJ knob. In Manual Mode, the system will operate as a non-reversing DCPD power supply. Without the DCPD control the current flow will be RED (+) and BLACK (-). The Main Display will indicate FOR when the current is in the forward direction and REV for the reverse direction. The power supply provides a convenient switch on the rear of the system for reversing the polarity of the solid state relay outputs. This is a useful feature in the case that the inputted PD signal into the test software from the amplifier is negative, so that the wires do not have to be physically reversed at the test specimen.

System Overheating

In the event of system overheating above 149 °F, an OVERHEAT message will be displayed on the main system display, and the main display will turn red. Overheating can occur if the fans are not working properly or if adequate airflow is not provided to the system. In the event that the overheat limit is tripped, the power supply system will be shut down until the temperature is below 149 °F. Any testing that was ongoing during the overheat limit being tripped would need to be reinitiated.

System Locking

A system lock mode is available by pressing and holding the CAN button on the front panel for three seconds. When this is done, all of the buttons on the front panel will be locked. Only the OUTPUT switch for the current is still active. This will prevent accidentally changing values during a test. When the system is locked, the user will see LOCKED on the main display. To deactivate the lock, press and hold the “CAN” button again.

DCPD CTRL Connection

The CTRL port on the system is configured to be compatible with ADwin systems that are sold separately by Fracture Technology.

Pin connections of the DCPD-CRTL control

Pin 1 – GND for Pins 2 & 3 (DCPD control)

Pin 2 – DCPD control input 0V or 5V Current flow out put Red (+) Black (-)

Pin 3 – DCPD control input 0V or 5V Current flow out put Red (-) Black (+)

Pin 4 – GND for Pin 5 (TTL)

Pin 5 – TTL out (0V – Constant Current / 5V – Constant Voltage)

Manufacturing and IP

The SV-5V20 system utilizes technology from VectorForce Technologies (VFT) on behalf of Fracture Technology. All equipment is manufactured in Germany by VFT.

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