

Remote Control
Console Option...



Panel
Mounted
Control...



Precision Current Regulated Laboratory D.C. Power Supplies

STANDARD FEATURES:

■ CONTROL MODULE

All power supply controls and visual indicators are located in a 19" wide control module which can be mounted in the main power supply cabinet (inset). It is also available for remote rack mounting, or in a separate enclosure for remote bench top mounting.

■ ANALOG INPUT

A 0 – 10V analog voltage is applied to the EXT INPUT providing for remote control of the power supply output current.

■ COARSE, MEDIUM AND FINE CURRENT CONTROL

All three current controls afford an easy and accurate way of setting the load current from one part in 10^3 to one part in 10^6 (-45S).

■ OVERLOAD PROTECTION

Current limiting prevents the power supply from exceeding maximum rated current output by automatically turning the DC power OFF.

■ CURRENT METER

The total output current flowing through the output load is indicated on the 4 1/2 digit meter display.

■ FLOW SWITCH INTERLOCK

Prevents DC power from being applied unless adequate water flow is established.

■ CASTER MOUNTED

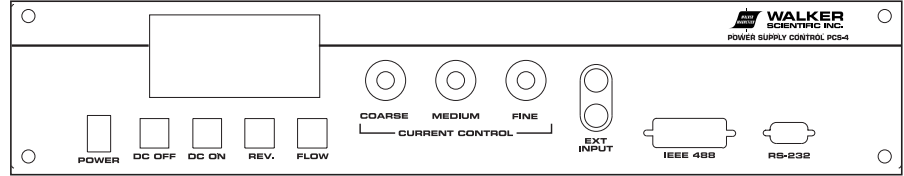
All power supplies above 2.45kW are mounted on casters to facilitate movement from one location to another when required.

General:

Walker Scientific, Inc., manufactures a broad range of high stability, current regulated DC power supplies. The built-in controls are designed to provide an output of continuously regulated DC current to a variety of output loads. The solid state regulator elements are capable of providing current stability of 0.0003% (3ppm) to 0.001% depending upon the regulation option. Current regulation is accomplished by a solid state transistorized series regulator. A wide range of standard and non-standard output configurations are available from 1.25kW to well over 100kW. Numerous standard and optional features afford the versatility required to adapt to almost any current regulated power supply application.

Operation:

The HS series power supply uses a precision closed loop regulator which consists of a phase angle controlled voltage pre-regulator (above 50V), precision voltage reference, precision current shunt, DC amplifier and series regulating transistor bank assembly. The phase angle controlled pre-regulator circuitry provides a constant voltage across the current regulating transistor assembly. This is accomplished by monitoring the collector to emitter voltage of the transistors and maintaining it at a constant level. This serves to keep the power dissipation in the transistors at an optimum level. The current regulator functions by monitoring the voltage drop across the precision current shunt which is in series with the output load, therefore, proportional to the output current. This voltage is then amplified and compared to the precision voltage reference at the level derived from the current control potentiometers. The resultant error signal is then amplified and fed into a series amplifier circuit which in turn drives the series regulating transistor assembly.



POWER SUPPLY CONTROL PANEL

Description:

The basic enclosure of every power supply contains all electrical/electronic components, a control panel, connections for AC input power, DC output terminals and standard hose couplings for water cooling requirements.

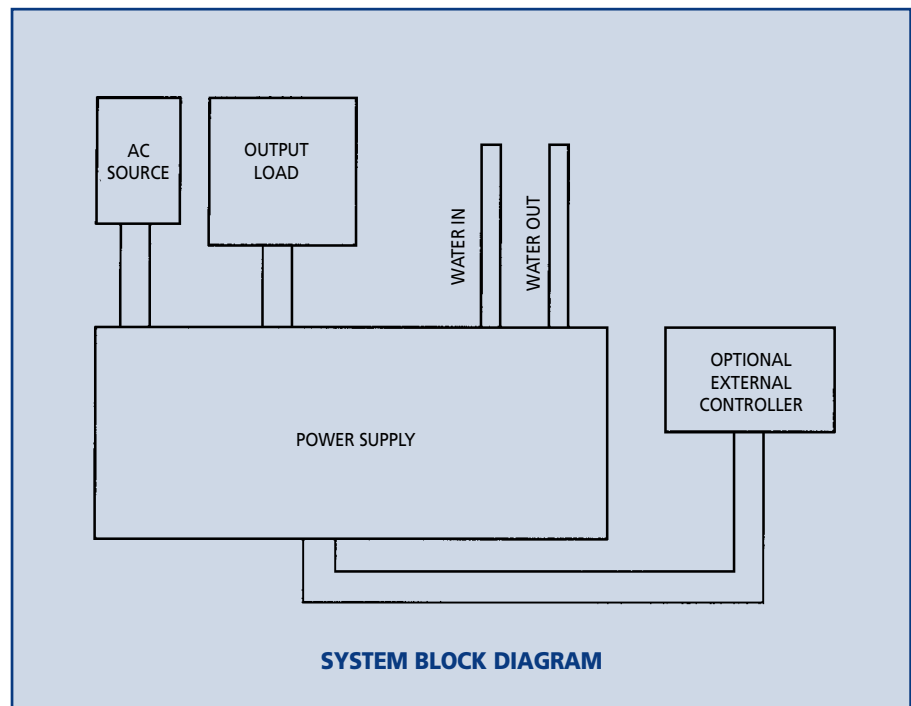
The standard rack mounted control module (see options for remote control console) is located in the top front section of the power supply. The panel includes COARSE, MEDIUM and FINE (-4SS only) CURRENT CONTROLS, a panel meter to display the output current, switches for power ON/OFF,

DC ON, DC OFF with indicator lights for power ON, DC ON and water FLOW. Power supplies equipped with the current REVERSAL option will include a REVERSAL switch and indicator light. An EXT INPUT is provided for connection to an external sweep generator or controller.

Each power supply ordered with computer compatible interfaces will include both RS232 and IEEE 488 ports located on the front panel. Only one port is active at any one time. See options sections for detailed description.

The circuit obtains highly stable operation by temperature controlling the current regulator circuits, using an extremely stable reference voltage and also through the use of a specially constructed, highly stable reference resistor. The combination of these

factors along with precision electronic circuit design allows the HS power supply to operate with such a high degree of current regulation and stability.



SYSTEM BLOCK DIAGRAM

OPTIONAL FEATURES:

■ CURRENT REVERSAL

The current reversal option is incorporated into the main power supply enclosure for the purpose of reversing the current polarity automatically at any setting. The current reversal is initiated by the pushbutton switch located on the front panel of the power supply. Depressing the REVERSAL switch will automatically set the output current to zero, reverse polarity, then ramp back up to the previous setting. The electronic circuitry automatically pauses at zero current to allow for the dissipation of any back EMF that may be generated from an inductive load. The reversal time is dependent upon the power supply, load impedance, and current setting.

■ RELAY CONTROL PACKAGE

This option is used to operate the AC ON, DC ON, DC OFF, and REVERSAL (if so equipped) from a remote source.

■ BACK BIAS

Power supplies equipped with the back bias option have the capability to overcome a typical residual field that would be found when driving an ironcore electromagnet. This is accomplished by a bias current, opposite in polarity to the normal current output of the supply.

■ ANALOG OUTPUT

The power supply can be equipped with a current monitor. This output is a 0 to +10 VDC signal that is proportional to the output current where 10 volts is equal to 100% current. This output can source any device with an input impedance greater than 5 k Ω .

■ REMOTE CONTROL CONSOLE OPTION

A separate, remote control console can be provided in place of the standard panel mounted unit when required. The console measures 3.5" H x 19" W x 18" D. Refer to the power supply control panel description section for details.



■ IEEE/RS-232

COMMUNICATIONS PORTS

Complete control of any Walker Scientific HS power supply is achieved through either an IEEE488 GPIB parallel interface or an RS-232 serial interface. The RS-232 interface allows complete control with a standard PC RS-232 serial port, eliminating the requirement for any additional PC I/O cards for communicating with the power supply. The IEEE488 GPIB interface permits operation of the power supply on the same interface bus as other GPIB compatible equipment (each device on the bus must be set to a different address). The GPIB address can be set via a dipswitch setting to allow the interface to be controlled independently of other equipment on the same bus. Both interface options enable full computer control of all power supply functions, including power on/off, polarity reversal, and the setting of the output current level with up to 20 bits of resolution (1 ppm). The user can also monitor water coolant flow status (go/no go) and actual output current with up to 16 bits of resolution (15 ppm).

A simple command structure is used to execute each power supply function. The user can write software routines for controlling the power supply or use a commercially available software package such as National Instruments LabVIEW™, or we can provide the software support required for your application.

■ FIELD REGULATION

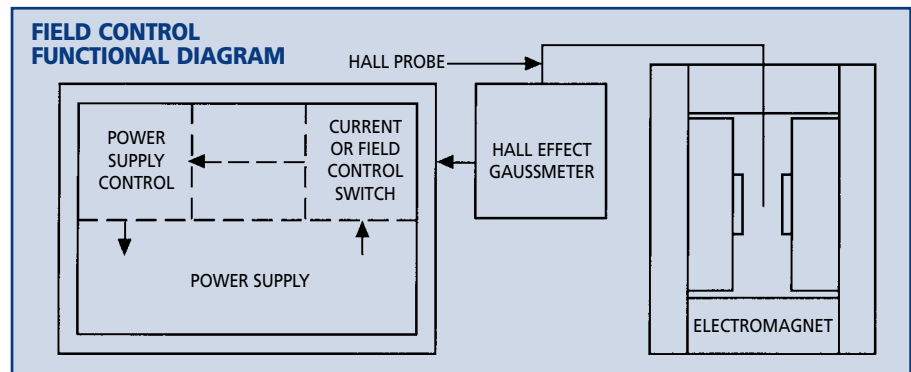
A universal field control package consisting of a precision gaussmeter, probe and power supply interface provides a system designed to allow full user control of the electromagnet through either current or field regulation.

When operating in the current control mode, the current to the electromagnet is sensed and fed back to the power supply control to maintain a constant current. Current to the electromagnet will remain constant with changing load impedance and over specified line voltage variations of $\pm 10\%$.

When the system is operated in the field control mode, the magnetic field in the electromagnet gap is sensed by a Hall effect sensor and gaussmeter. The signal from the gaussmeter is then fed to the power supply control to maintain a constant field in the electromagnet air gap. The field in the electromagnet will remain constant for variations in gap size or with the introduction of other objects into the air gap.

■ FIELD CONTROL

Field set accuracy:
 MG-3D Gaussmeter
 $\pm 0.2\%$ of range with HP-93 probe (10X) (Ranges: 0-10KG or 0-100KG)
 $\pm 0.35\%$ of range with HP-33 probe (1X) (Ranges: 0-1KG or 0-10KG)
 Field set resolution:
 0.1% of range (0-1KG or 0-100KG)
 Field Regulation:
 $\pm 0.02\%$ or 25 milligauss, whichever is greater.
 Max. line voltage variation $\pm 10\%$.



A full range of Precision DC Current Regulated Power Supplies is available with output power in the range of 1.25kW to 100kW with either -3SS or -4SS regulation and input power to match any facility requirement. When requesting a quotation, please specify input and output requirements.

DC Output Range

POWER	CURRENT	VOLTAGE
1.25kW – 100kW	0-10A to 0-500A	0-10V to 0-500V

Regulation Selection

SUFFIX	SHORT TERM (30 MIN.)		LONG TERM (8 HRS.)		CURRENT CONTROL RESOLUTION		
	10-100%	1-10%	10-100%	1-10%	COARSE	MEDIUM	FINE
-3SS	0.001%	0.01%	0.01%	0.1%	1 PART IN 10 ³	5 PARTS IN 10 ⁵	N/A
-4SS	0.0003%	0.001%	0.001%	0.01%	1 PART IN 10 ³	5 PARTS IN 10 ⁵	1 PART IN 10 ⁶

Typical Precision DC Current Regulated Power Supplies between 1.25kW and 22kW.

Typical Power Supplies			COOLING REQUIREMENTS							PHYSICAL		
POWER SUPPLY MODEL NUMBER	USE WITH MAGNET SIZE	STANDARD INPUT POWER	OUTPUT			BTU / MIN MAX INLET TEMP		FLOW RATE		APPROX. WEIGHTS		CABINET DIMENSIONS
			AMPS	VDC	kW	POWER SUPPLY ONLY	POWER SUPPLY AND MAGNET	POWER SUPPLY ONLY	POWER SUPPLY AND MAGNET	APPROX. NET WGT.	APPROX. SHIP. WGT.	
HS-525-4SS	4"	120V / 50 OR 60Hz Single Phase	0-25	0-50	1.25	15 BTU 80°F (27°C)	93 BTU 80°F (27°C)	1 GPM (4 LPM) 30-100 PSI	1 GPM (4 LPM) 30-100 PSI	175 lbs. (79 kg)	225 lbs. (79 kg)	22"W x 24"D x 31"H (56 x 61 x 79cm)
HS-735-4SS	4", 5"	208, 220, 230, 240V 50 or 60Hz Single Phase	0-35	0-70	2.45	20 BTU 80°F (27°C)	170 BTU 80°F (27°C)	1 GPM (4 LPM) 30-100 PSI	1 GPM (4 LPM) 30-100 PSI	200 lbs. (90 kg)	250 lbs. (113 kg)	22"W x 24"D x 31"H (56 x 61 x 79cm)
HS-1050-3SS HS-1050-4SS HS-50100-3SS HS-50100-4SS	5", 7" 5", 7" 5", 7" 5", 7"	120/208V 60Hz, 3 Phase, 4 Wire	0-50 0-50 0-100 0-100	0-100 0-100 0-50 0-50	5.0 5.0 5.0 5.0	30 BTU 80°F (27°C)	350 BTU 80°F (27°C)	2 GPM (8 LPM) 30-100 PSI	2-3 GPM (8-11 LPM) 30-100 PSI	390 lbs. (176 kg)	475 lbs. (215 kg)	22"W x 31"D x 38"H (56 x 79 x 97cm)
HS-1365-3SS HS-1365-4SS HS-65130-3SS HS-65130-4SS	7", 9.5", 12" 7", 9.5", 12" 7", 9.5", 12" 7", 9.5", 12"	120/208V 60Hz, 3 Phase, 4 Wire	0-65 0-65 0-130 0-130	0-130 0-130 0-65 0-65	8.5 8.5 8.5 8.5	42 BTU 80°F (27°C)	590 BTU 80°F (27°C)	2 GPM (8 LPM) 30-100 PSI	3 GPM (11 LPM) 30-100 PSI	390 lbs. (176 kg)	475 lbs. (215 kg)	22"W x 31"D x 38"H (56 x 79 x 97cm)
HS-1575-3SS HS-1575-4SS HS-75150-3SS HS-75150-4SS	9.5", 10" 9.5", 10" 9.5", 10" 9.5", 10"	120/208V 60Hz, 3 Phase, 4 Wire	0-75 0-75 0-150 0-150	0-150 0-150 0-75 0-75	11.5 11.5 11.5 11.5	50 BTU 80°F (27°C)	750 BTU 80°F (27°C)	2 GPM (8 LPM) 30-100 PSI	4-5 GPM (15-19 LPM) 30-100 PSI	580 lbs. (263 kg)	700 lbs. (317 kg)	22"W x 31"D x 47"H (56 x 79 x 119.5cm)
HS-1785-3SS HS-1785-4SS HS-85170-3SS HS-85170-4SS	12" 12" 12" 12"	120/208V 60Hz, 3 Phase, 4 Wire	0-85 0-85 0-170 0-170	0-170 0-170 0-85 0-85	14.5 14.5 14.5 14.5	60 BTU 80°F (27°C)	960 BTU 80°F (27°C)	2 GPM (8 LPM) 30-100 PSI	5 GPM (19 LPM) 30-100 PSI	780 lbs. (353 kg)	930 lbs. (421 kg)	22"W x 31"D x 47"H (56 x 79 x 119.5cm)
HS-20100-3SS HS-20100-4SS HS-10200-3SS HS-10200-4SS	15" 15" 15" 15"	120/208V 60Hz, 3 Phase, 4 Wire	0-105 0-105 0-210 0-210	0-210 0-210 0-105 0-105	22.0 22.0 22.0 22.0	74 BTU 80°F (27°C)	1430 BTU 80°F (27°C)	2 GPM (8 LPM) 30-100 PSI	8 GPM (30 LPM) 30-100 PSI	975 lbs. (442 kg)	1150 lbs. (4521 kg)	22"W x 31"D x 47"H (56 x 79 x 119.5cm)

Accessories:

Hall Effect Gaussmeters

Model UFC-5 Hall Field Controller

Model WS-8-10D Digital Electronic Sweep



Rockdale Street • Worcester, MA 01606 USA

Tel: (508) 852-3674 • (508) 853-3232 • (800) 962-4638 • (508) 856-9931 Fax

Email: info@walkerldjscientific.com • Website: www.walkerldjscientific.com