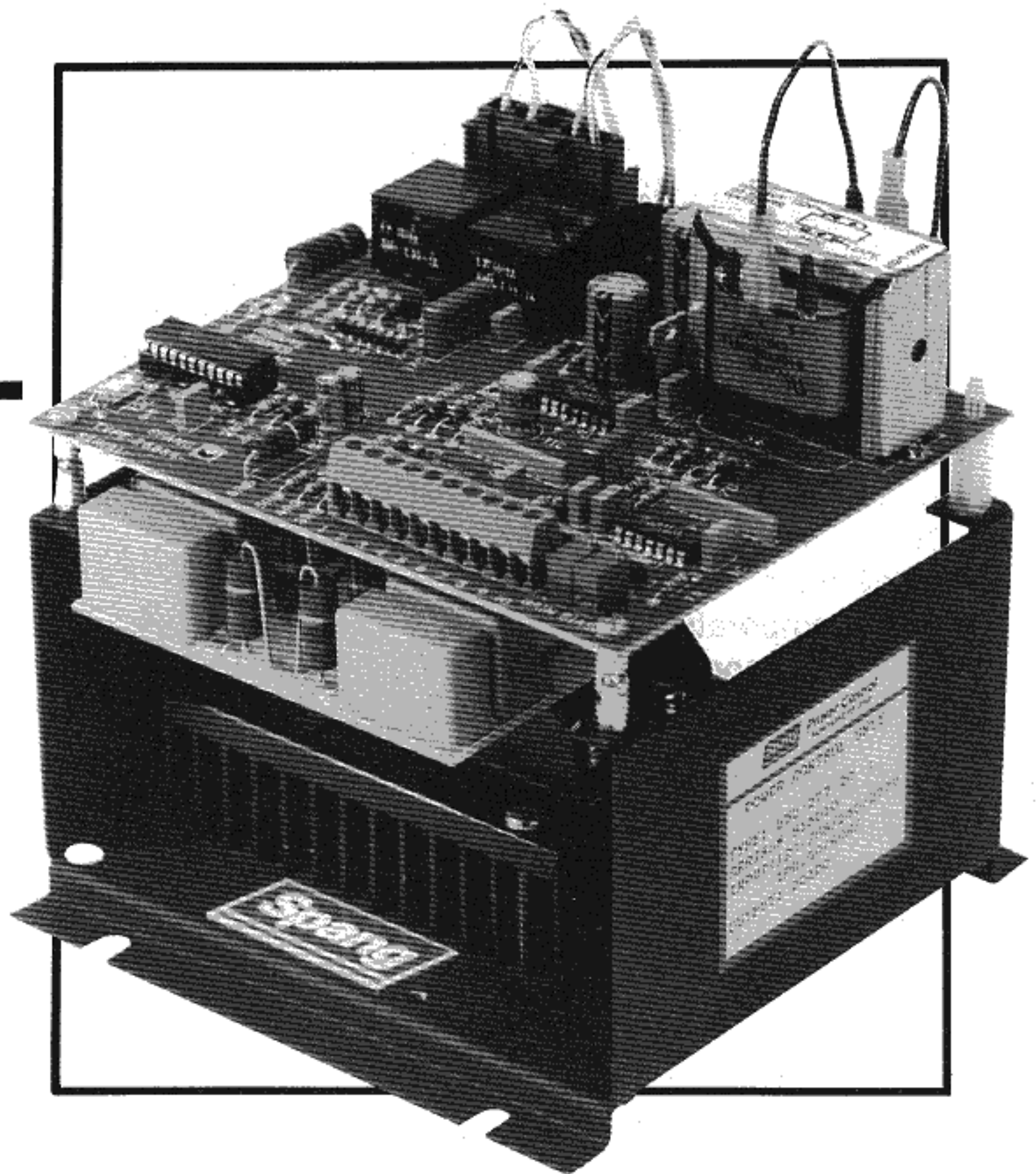


Phase Angle Control  
DEFINITE PURPOSE  
SINGLE PHASE SCR  
**DC POWER CONTROL  
UNITS - 653 SERIES**



## **Compact, Economical Proportional Control of Single Phase DC Power**

For control of static resistive or inductive loads:

- **Saturable Reactor Driver**
- **Generator Field Control**
- **Eddy Current Brakes**
- **Eddy Current Clutches**
- **Small Electromagnets**

## **STANDARD FEATURES**

- Electronic design utilizing Large Scale Integration
- Phase lock loop for firing pulse synchronization
- Stepless control for proportional electric power
- Immunity to line distortions and fluctuations
- Electrically isolated heatsinks
- Pulse transformer gate isolation
- Accepts all standard control signals

## Specifications

**Output Rating:** 20 amperes DC average at full output voltage.

**Input Voltage:** All units are shipped connected for 240VAC input. 120VAC, 208VAC, or 277VAC may be selected by moving a plug-in jumper.

**Input Frequency:** All units are shipped connected for 60 Hertz operation. Conversion to 50 Hertz is achieved by simply removing a jumper.

**Connections:** UL listed compression terminals are provided for both power and control connections.

**Ambient:** All ratings are designed for 50°C maximum operating temperature. For operation at higher temperatures (to 65°C maximum), some derating is necessary; please consult factory.

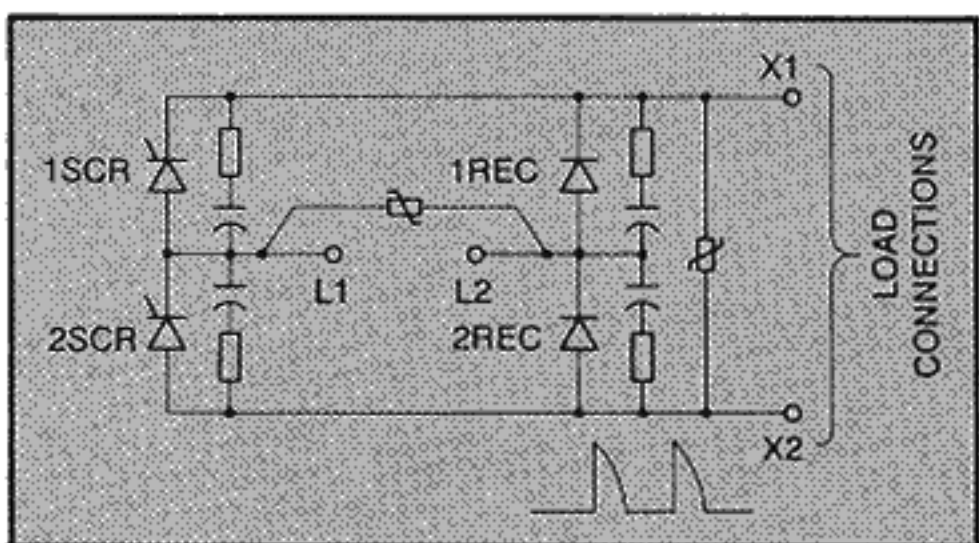
**Input Signals:** 0-5, 1-5, 2-12, 4-20, 10-50ma inputs or a manual potentiometer (see chart).

**Adjustments:** High resolution, 20 turn potentiometers are provided for all adjustments.

a. Gain adjustments provide full output for 50% to 200% standard control signal.

b. Bias adjustment for manual control to 100% output.

**Voltage Protection:** Transient voltage suppression is provided by an R-C snubber network and a metal oxide varistor (MOV) which clamps high voltage spikes to within the standard 1200 volt PRV rating of the semiconductors.



**Reference Supply:** A 12 volt DC regulated reference supply is available from the firing circuit for connection to a remote potentiometer from which the unit can be controlled manually. This supply is regulated to within  $\pm 1/2\%$  for line voltage variations. Maximum current rating from this reference source is 10 milliamperes.

**Cooling:** All units are convection cooled with electrically isolated heatsinks. Optional fan kit is available.

**Soft Start:** An integral soft start ramp is provided on all units. Upon initial energization, gate firing is inhibited for a short dead time to allow for circuit stabilization. After this time the SCR output is ramped in response to the input control signal.

## Special Applications and Options

**I<sup>2</sup>t Fusing:** Fuse kit 650-FA1-40-277 connected in series with either L1 or L2 protects the SCRs and diodes from current surges.

**Forced Air Cooling:** Fan kit 11596-0006 mounted below the power control unit to provide forced air cooling increases the unit's output to 30 amperes DC.

**Voltage Regulation and Current Limit:** RMS voltage regulation of load voltage controlled by a saturable reactor and rms current limit of the load current requires the following:

CONTROL CONNECTIONS		
DC CONTROL SIGNAL	INPUT CONTROL TERMINAL POINTS	INPUT IMPEDANCE
0-5 ma	1 (+) 5 (-)	1000 ohms
2-12 ma	2 (+) 5 (-)	400 ohms
4-20 ma	3 (+) 5 (-)	250 ohms
10-50 ma	4 (+) 5 (-)	100 ohms
0-10 v	7 (+) 5 (-)	200K ohms
Contact Closure	6 and 7	Close Contact to turn PCU ON
Manual Control:		
Ends of Pot	6 and 8	Connect to a 10K ohm
Slider of Pot	7	2 Watt Potentiometer
Lockout (External shutdown contact)	8 and 10	Close Contact to turn PCU OFF

a. 11719-0106 accessory card mounted to the unit's control amplifier.

b. E7036 voltage feedback transformer connected to the voltage being regulated and plugged into the accessory card.

c. 650-CT-15 current limiting CT plugged into the accessory card.

d. Three turns of feedback from the 5 ampere secondary of a CT measuring load current placed through the 650-CT-15 current limiting CT.

**Current Limit:** RMS current limiting of the actual load current of the saturable reactor in a driver application requires the following:

a. 11719-0101 accessory card mounted on the unit's control amplifier.

b. 650-CT-15 current limiting CT plugged into the accessory card.

c. Three turns of feedback from the 5 ampere secondary of a CT measuring load current placed through the 650-CT-15 current limiting CT.

d. To provide RMS current limit of the actual driver output current, place the line current to either L1 or L2 through the window of the 650-CT-15 current limiting CT one time.

## Ordering Information

Model No.: 653-277-20  
Current Rating: 20 Amps  
Input Voltage: 120-277 VAC

