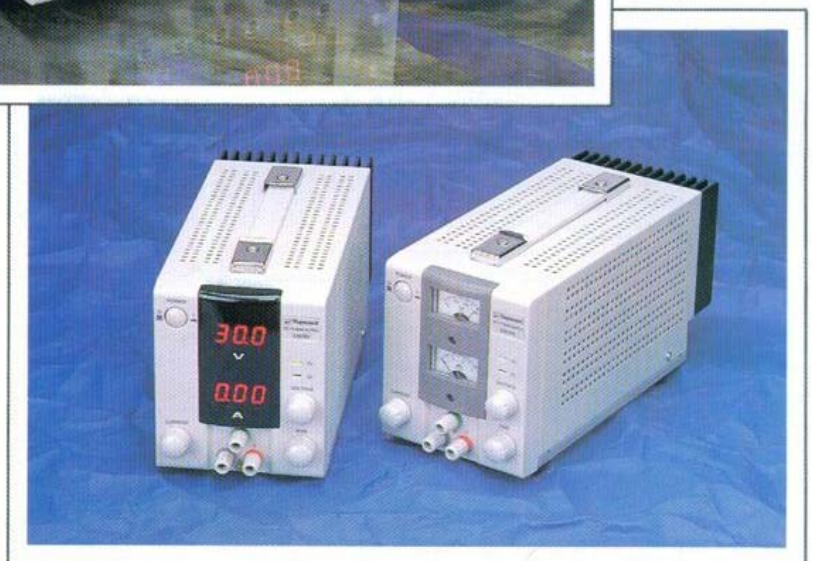
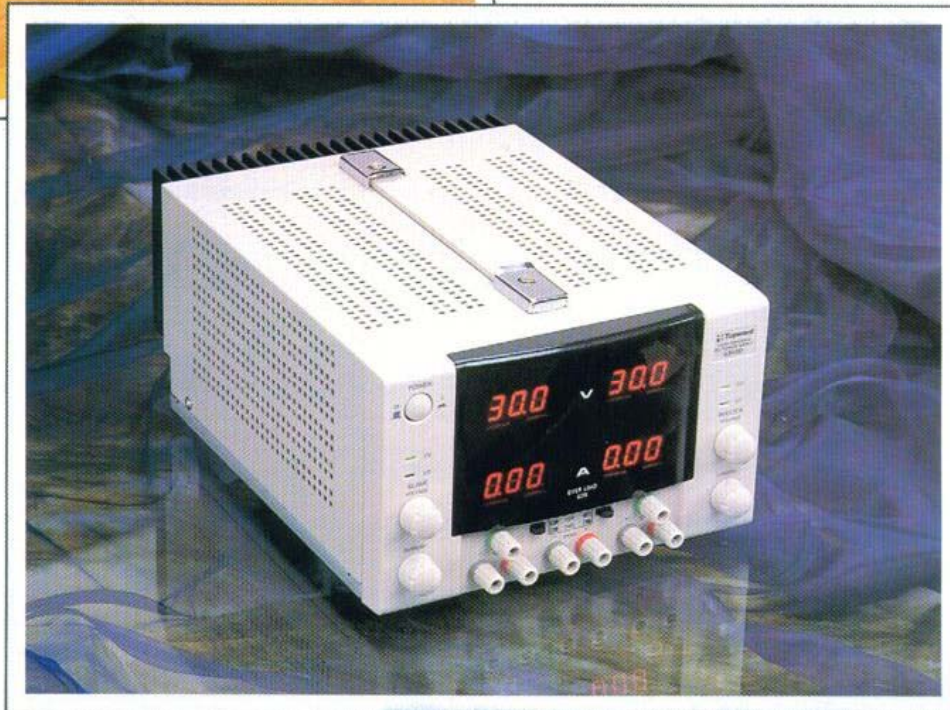
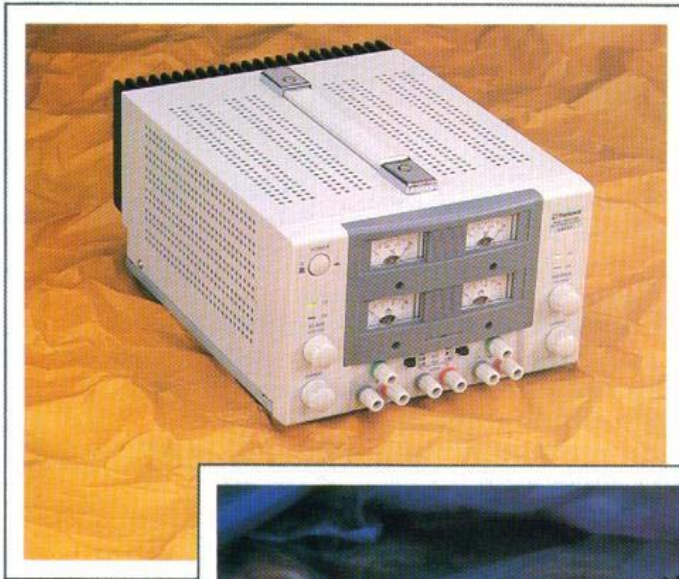


SYSTEM DC POWER SUPPLY

3000 / 6000 SERIES



 **Topward**

The 3000/6000 series is designed as a versatile system power supply series. The 3000 series supplies variable single output with 2 analog or digital displays. The 6000 series supplies variable dual outputs with 4 analog or digital displays plus a fixed 5V/5A output. All the variable outputs can be connected in parallel or series to get multiple output currents or voltages. The output current and voltage of the remote series which can be controlled by external voltage and resistance can also be proportionally read back. In addition to this, the remote 3000 series is equipped with an output on/off switch, remote sensing, and master/slave functions. The remote on/off is controllable both in 3000 and 6000 series. The safety series is designed and manufactured according to IEC-1010-1 requirements with CE/GS mark, 10-Turn voltage control is available for 6000 D/DS-10 series.

3000 SERIES SYSTEM POWER SUPPLY



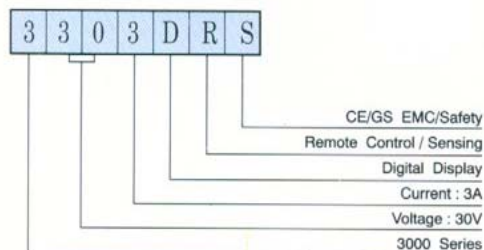
- 2 Built-In Analog/Digital Displays.
- Constant Voltage/Current.
- Series/Parallel Available.
- Short Circuit/External Input Protection.
- Coarse and Fine Voltage Control.
- Compact Size.

- Master/Slave Selectable.
- Remote Sensing Available.
- Output ON/OFF Controllable.
- Output Voltage Controllable by External Variable Voltage or Resistance.
- Output Current Controllable by External Variable Voltage or Resistance.
- Voltage/Current Readback Available.

Specification

	3000 Series	3000 Series (Remote Series)
CONSTANT VOLTAGE Load Regulation Line Regulation Ripple & Noise ($\leq 100W$) Ripple & Noise ($\geq 100W$)	$\pm 0.01\% + 2mV$ $\pm 0.01\% + 2mV$ $\leq 0.5mVrms$ $\leq 1mVrms$	$\pm 0.01\% + 2mV$ $\pm 0.01\% + 2mV$ $\leq 1mVrms$ $\leq 2mVrms$
CONSTANT CURRENT Load Regulation ($\leq 100W$) Load Regulation ($\geq 100W$) Line Regulation Ripple & Noise ($\leq 100W$) Ripple & Noise ($\geq 100W$)	$\leq 10mA$ $\leq 15mA$ $\pm 0.01\% + 2mA$ $\leq 2mA_{rms}$ $\leq 3mA_{rms}$	$\leq 10mA$ $\leq 15mA$ $\pm 0.01\% + 2mA$ $\leq 2mA_{rms}$ $\leq 3mA_{rms}$
DISPLAY ACCURACY Analog Display (A) Digital Display (D)	Full Scale 3% $\pm 0.1\% + 2d$	
PROGRAMMING SPEED Rise Time (No Load) (Load) Fall Time (No Load) (Load)	$\leq 100mS$ $200mS (<6A), \leq 500mS (<10A), \leq 1S (\geq 10A)$ $2.5 S$ $250mS$	
OUTPUT IMPEDANCE	$< 2m\Omega + 2\mu H$	
RECOVERY TIME	$\leq 100\mu s$ to Within 0.1% of Set Voltage (50% TO 100% Load Change)	
FUNCTIONS Series Connection Parallel Connection Master - Slave	Different Models Can Be Connected In Series ($\leq 240V$) Same Model Can Be Connected In Parallel ($\leq 24A$) N/A	Different Models Can Be Connected In Series ($\leq 240V$) Same Model Can Be Connected In Parallel ($\leq 24A$) YES (For Multi-Set Connection)
REMOTE CONTROL Voltage Programmable By External DC Voltage By External Resistance Current Programmable By External DC Voltage By External Resistance	N/A	0 to 10V Control 0 to Voltage-Setting 0 to 10K Ω Control 0 to Maximum-Voltage 0 to 10V Control 0 to Current-Setting 0 to 10K Ω Control 0 to Maximum-Current
VOLTAGE/CURRENT READBACK AVAILABLE Voltage/Current Readback Voltage: Voltage Readback Current Readback	N/A	0 to 10V Proportional to Output Voltage 0 to 0.3V Proportional to Output Current
OUTPUT ON/OFF CONTROL	N/A	YES (Manual And Remote)
REMOTE SENSING	N/A	Compensate Voltage Drop Up to 2VDC
POWER SOURCE	ACV 100/120/220/240 $\pm 10\%$, 50/60Hz (*ACV 230V, 50Hz)	
ACCESSORIES	ACS-002 X1, (ACS-016 x1 for CE/GS Models), Operation Manual x1	

Ordering Information :



Dimension S SIZE : 120 (W) X 160 (H) X 295 (D)
Dimension L SIZE : 230 (W) X 160 (H) X 366 (D)
* Models with CE/GS Mark

Model No.	Dimension	Model Type						Voltage/Current
3203	S	A	D	AR	DR	AS*	DS*	20V/3A
3302	S	A	D	AR	DR	AS*	DS*	30V/2A
3303	S	A	D	AR	DR	AS*	DS*	30V/3A
3601	S	A	D	AR	DR	AS*	DS*	60V/1A
3306	L		D		DR			30V/6A
3603	L		D		DR			60V/3A
33010	L		D		DR			30V/10A

6000 SERIES SYSTEM POWER SUPPLY



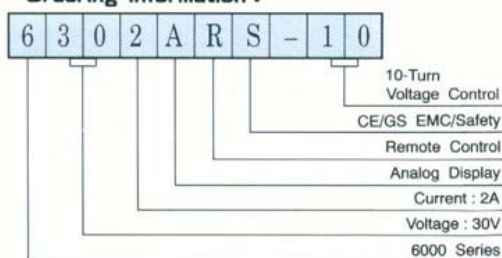
- 4 Built-In Analog/Digital Displays.
- Constant Voltage/Current.
- Series/Parallel Available with Other Sets.
- Short Circuit/External Input Protection.
- Auto Series/Parallel Selectable.
- Additional 5V/5A Fixed Output.

- Master/Slave Selectable.
- Output Voltage Controllable by External Variable Voltage or Resistance.
- Output Current Controllable by External Variable Voltage or Resistance.
- Voltage/Current Readback Available.
- 10-Turn Voltage Control Optional (6000D/DS-10 Only).

Specification

	6000 Series	6000 Series (Remote Series)
CONSTANT VOLTAGE Load Regulation Line Regulation Ripple & Noise ($\leq 200W$) Ripple & Noise ($\geq 200W$)	$\pm 0.01\% + 2mV$ $\pm 0.01\% + 2mV$ $0.5mVrms$ $1mVrms$	$\pm 0.01\% + 2mV$ $\pm 0.01\% + 2mV$ $1mVrms$ $1mVrms$
CONSTANT CURRENT Load Regulation ($\leq 200W$) Load Regulation ($\geq 200W$) Line Regulation Ripple & Noise ($\leq 200W$) Ripple & Noise ($\geq 200W$)	$10mA$ $15mA$ $\pm 0.01\% + 2mA$ $2mArms$ $3mArms$	$10mA$ $15mA$ $\pm 0.01\% + 2mA$ $2mArms$ $3mArms$
DISPLAY ACCURACY Analog Display (A) Digital Display (D)	Full Scale 3% $\pm 0.1\% + 2d$	
PROGRAMMING SPEED Rise Time (No Load) (Load) Fall Time (No Load) (Load)	$100ms$ $200ms$ ($<6A$), $\leq 500ms$ ($<10A$), $\leq 1S$ ($\geq 10A$) $2.5 S$ $250ms$	
OUTPUT IMPEDANCE	$< 2m\Omega + 2uH$	
RECOVERY TIME	$\leq 100uS$ To Within 0.1% of Set Voltage (50% TO 100% Load Change)	
FUNCTIONS Series Connection Parallel Connection Master - Slave	Different Models Can Be Connected In Series ($\leq 240V$) Same Model Can Be Connected In Parallel ($\leq 24A$) YES (For Single-Set Operation) N/A (For Multi-Set Connection)	Different Models Can Be Connected In Series ($\leq 240V$) Same Model Can Be Connected In Parallel ($\leq 24A$) YES (For Single-Set Operation) YES (For Multi-Set Connection)
REMOTE CONTROL Voltage Programmable By External DC Voltage By External Resistance Current Programmable By External DC Voltage By External Resistance	N/A	0 to 10V Control 0 to Voltage-Setting 0 to 10K Ω Control 0 to Maximum-Voltage 0 to 10V Control 0 to Current-Setting 0 to 10K Ω Control 0 to Maximum-Voltage
TRACKING OPERATION TRACKING ERROR SERIES REGULATION	$\pm 0.2\% + 10mV$ $\pm 0.3\% + 10mV$	
5V FIX OUTPUT Load Regulation Line Regulation Ripple & Noise Voltage Accuracy Output Current	$10mV$ $5mV$ $2mVrms$ $5V \pm 0.25V$ $5A$	
VOLTAGE/CURRENT READBACK AVAILABLE Voltage/Current Readback Voltage: Voltage Readback Current Readback	N/A	0 to 10V Proportional to Output Voltage 0 to 0.3V Proportional to Output Current
OPERATION MODE Independent Series Parallel	Two Independent Outputs and 5V Fixed Output Output From 0 to Rating Volts and 0 to Rating Amperes Output From 0 to $\pm$ Rating Volts at Rating Amperes Output From 0 to Double Rating Volts at Rating Amperes Output From 0 to Double Rating Ampere at Rating Volts	
POWER SOURCE	ACV 100/120/220/240V $\pm 10\%$, 50/60Hz (* ACV 230V, 50Hz)	
ACCESSORIES	ACS-002 X2, (ACS-016 x2 for CE/GS Models), Operation Manual x1	

Ordering Information :



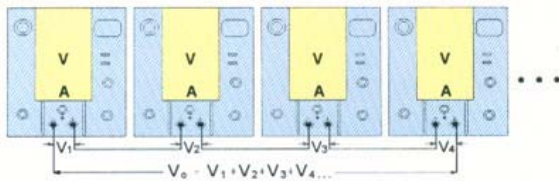
Dimension L SIZE : 230 (W) X 160 (H) X 366 (D)

* Models with CE/GS Mark

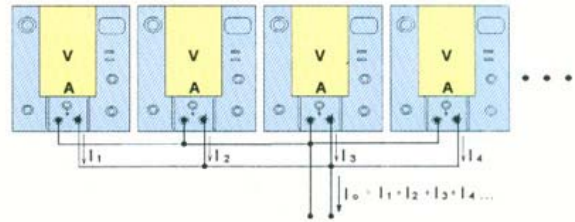
Model No.	Dimension	Model Type								Voltage/Current
6302	L	A	D	D-10	AR	DR	AS*	DS*	DS*-10	$\pm 30V/2A$, 5V/5A
6303	L	A	D	D-10	AR	DR	AS*	DS*	DS*-10	$\pm 30V/3A$, 5V/5A
6306	L	A	D	D-10	AR	DR				$\pm 30V/6A$, 5V/5A
6603	L	A	D	D-10	AR	DR				$\pm 60V/3A$, 5V/5A

ILLUSTRATION

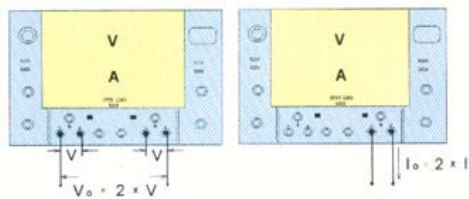
01 3000 series connected in series(up to 240V)



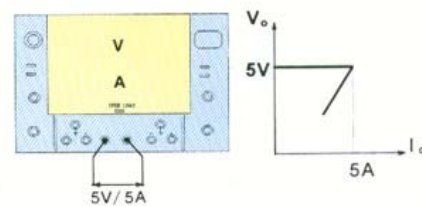
02 3000 series connected in parallel(up to 24A)



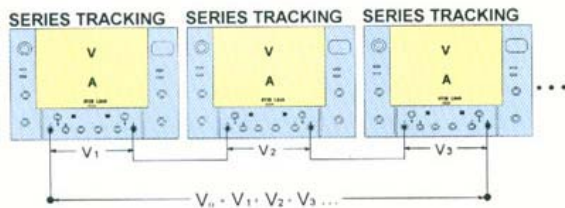
03 6000 series used in series/parallel tracking mode to supply double output voltage/current



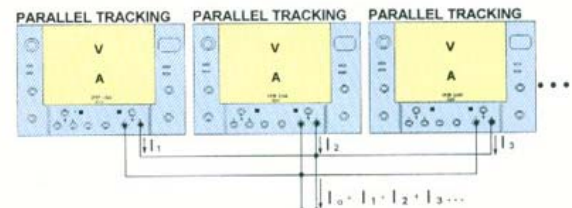
04 5V/5A fixed output



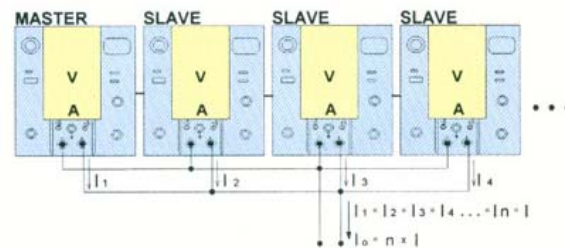
05 6000 series connected in series(up to 240V)



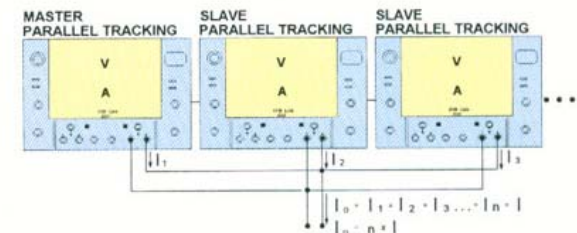
06 6000 series connected in parallel(up to 24A)



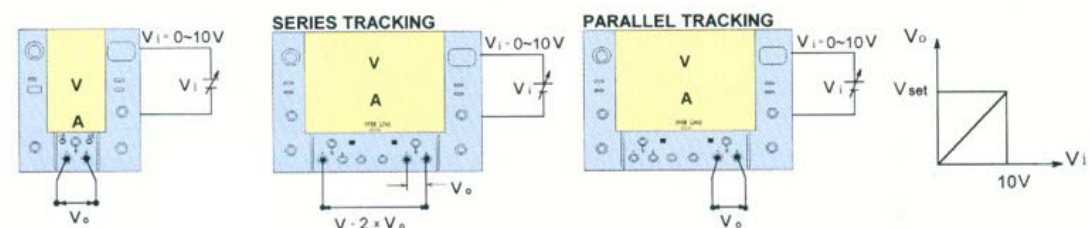
07 3000 remote series connected in parallel with master/slave control(up to 24A)



08 6000 remote series connected in parallel with master/slave control(up to 24A)

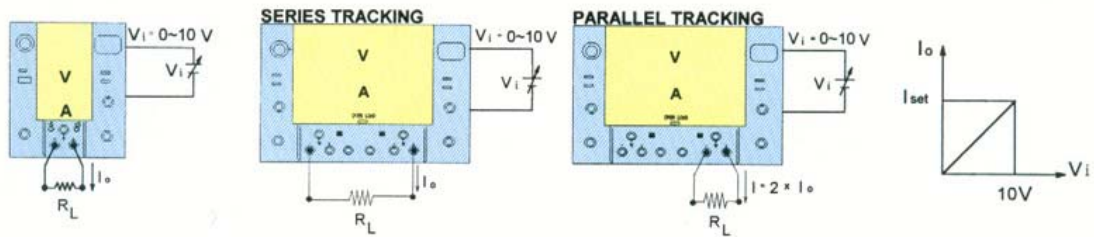


09 Output voltage controlled by external voltage(Remote series)

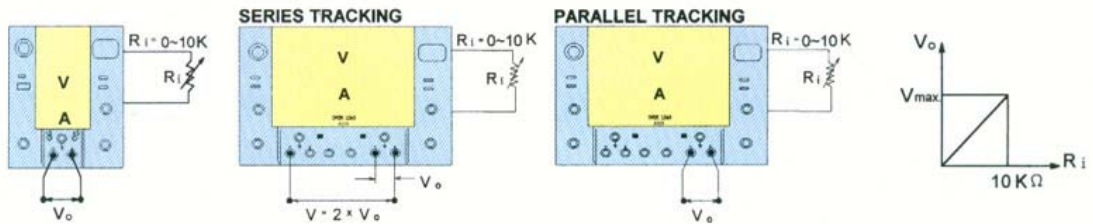


ILLUSTRATION

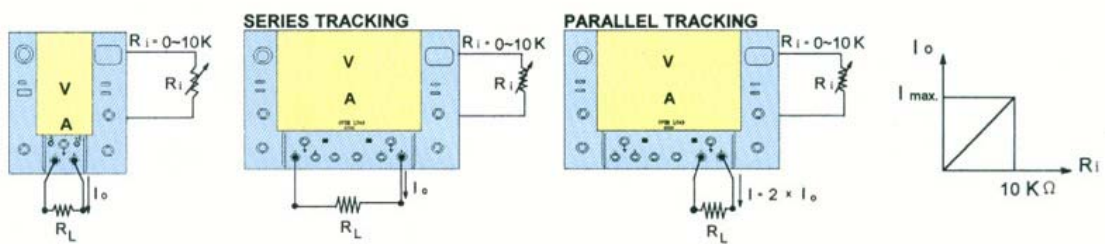
10 Output current controlled by external voltage(Remote series)



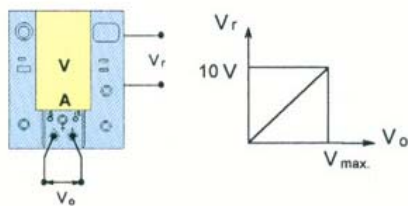
11 Output voltage controlled by external resistance(Remote series)



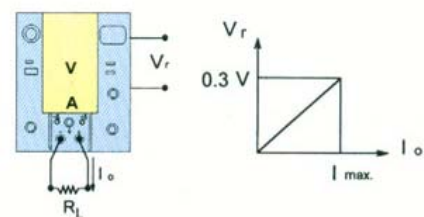
12 Output current controlled by external resistance(Remote series)



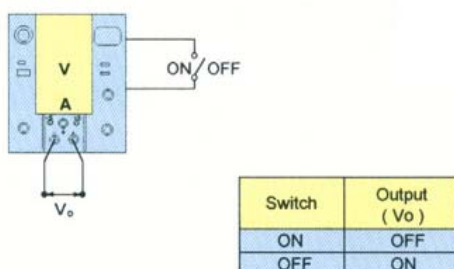
13 The output voltage can be proportionally read back



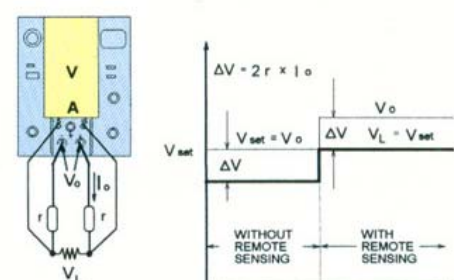
14 The output current can be proportionally read back



15 Output on/off control(3000 Remote series)

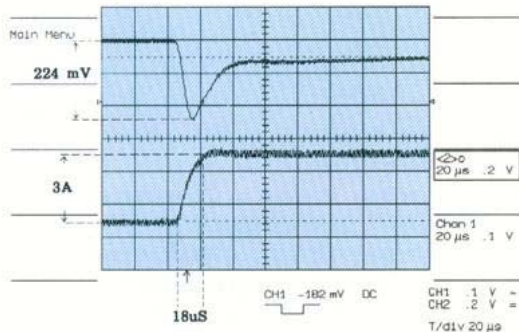


16 Remote sensing(3000 Remote series)



17 Output impedance

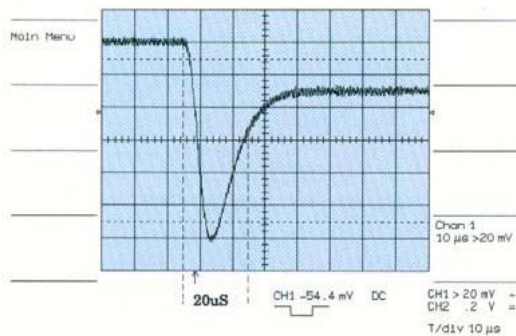
The very low output inductance 2uH produces very little overshoot of the output voltage during fast changes of load.



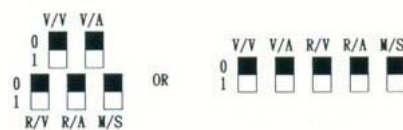
$$L = \frac{\Delta V \times \Delta T}{\Delta I} = \frac{224\text{mV} \times 18\text{uS}}{3\text{A}} = 1.34\text{uH}$$

18 Recovery time

The series takes less than 100uS to settle within 0.1% of the set voltage when the load current changes from 50% to 100%

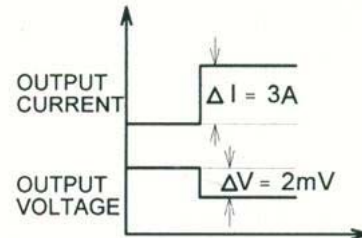


20 Remote switch and remote connector



V/V: Switch for external voltage controlling output voltage.
V/A: Switch for external voltage controlling output current
R/V: Switch for external resistance controlling output voltage
R/A: Switch for external resistance controlling output current
M/S: Switch for Master/Slave selection

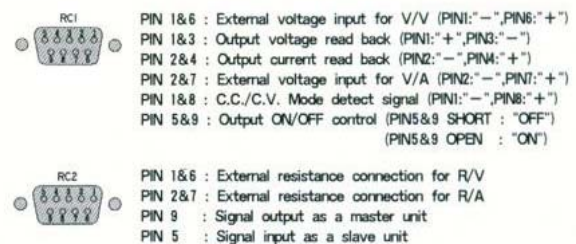
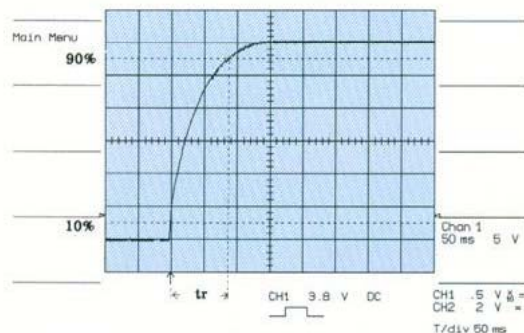
The very low output resistance of 2mΩ produces minimal output voltage variation with large changes in load.



$$R_o = \frac{\Delta V}{\Delta I} = \frac{2\text{mV}}{3\text{A}} = 0.67\text{m}\Omega$$

19 Programming speed

Programming speed is the time needed for the output voltage to rise from 10% to 90% of the setting voltage (rise time) or fall from 90% to 10% of the setting voltage (fall time) under full load or no load condition.



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