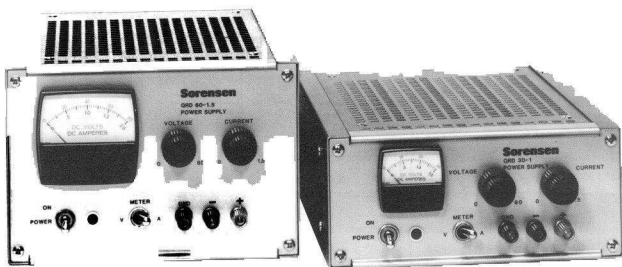


30 to 90 Watt Linear High Speed Power Supplies QRD Series

QRD Series incorporates a linear pass design for high performance with low noise for bench, lab, test and system applications. Six models have unusually quick response to programming instructions, and options and accessories to accommodate a wide range of user situations. Five output voltage ranges—0-15 Vdc to 0-60 Vdc with current levels from 0.75 to 4 A.

- 6 models in five voltage ranges from 0-15 Vdc to 0-60 Vdc with current levels from 0.75 to 4 A
- 115 Vac single phase input standard; 220/230 Vac optional
- Standard and high speed programming modes
- Remotely programmable
- 50/440 Hz operation without derating
- High speed programming by voltage or resistance in voltage or current modes
- Voltage regulation to $\pm 0.005\%$
- Excellent voltage or current regulation with automatic recovery
- Coarse and fine voltage and current output controls standard
- No overshoot at turn-on, turn-off or power failure
- 0.01% line & load regulation (typical)
- 200 μV rms ripple (typical)
- 50 μs transient response—100% change (typical)



DC OUTPUT**CONSTANT VOLTAGE MODE****Voltage Regulation:**

Line and load combined 0.01% or 1.5 mV, whichever is greater.

Temperature Coefficient:

$\pm 0.015\% + 200 \mu\text{V}/^\circ\text{C}$.

Resistance Programming:

100 ohms per volt.

Voltage Programming:

1 volt/volt, 10 mA drive.

Stability:

0.025% + 1 mV for 8 hours after 30 minute warm-up.

Ripple: 200 μV rms.

Remote Sensing:

1 V maximum drop per load lead.

Transient Response:

50 μs (70 μs in high speed mode) to return to a bandwidth of ± 10 mV for a 0-100% or 100-0% step load change (typical).

CONSTANT CURRENT MODE**Current Regulation:**

.02% + 125 μA or 250 μA .

Temperature Coefficient:

0.015% + 100 $\mu\text{A}/^\circ\text{C}$.

Ripple: 150 μV to 400 μA rms.

Current Programming:

Current programmable. See specification chart.

Stability:

0.1% + 0.5 mA for 8 hours after 30 minute warm-up.

HIGH SPEED PROGRAMMING MODE**Programming time (typical):**

0-100% $\Delta E = 25 \mu\text{s}$.

100-0% $\Delta E = 10 \mu\text{s}$.

0-100% $\Delta I = 80 \mu\text{s}$.

100-0% $\Delta I = 200 \mu\text{s}$.

Ripple:

High speed specifications are twice those listed in model specs.

Maximum Capacitive Load:

0.02 μF .

INPUT**Voltage:**

105-125 Vac single phase standard.

Voltage Options:

(see "Options" on this page)

Option M2: 200-240 Vac, selectable.

Option M3: 210-250 Vac, selectable.

Frequency:

47-440 Hz operation.

OPERATING DATA**Ambient Operating****Temperature Range:**

0 to + 70°C.

Storage Temperature Range:

- 40°C to + 85°C.

Resolution:

0.01% of E_o max. and 0.015% of I_o max. with standard controls.

Series Operation:

200 Vdc maximum.

Parallel Operation:

Master-slave up to three units maximum. Straight paralleling any number.

Overshoot:

No overshoot at turn-on, turn-off or power failure.

Overload/Short-Circuit Protection:

Adjustable automatic current limiting (ACL) with automatic recovery.

Model	Output Power				Constant Voltage Mode				Transient Response Time ¹		Temp. Coeff. Voltage (Typ.) mV/°C	Voltage Drift ² (Typ.) % E_o Max. 0.025% \pm mV	Programming Constants Voltage Mode			
	Voltage (Vdc)	Current (Ade)			Regulation ³ .01% or \pm mV	Ripple (PARD) (10 Hz to 7 MHz), μV		Resolution % E_o (Max.)	Normal	High Speed			Normal	High Speed	OV	VV
		40°C	55°C	70°C		Normal	High Speed									
QRD 15-2	0-15	2.2	2.0	1.2	1.5	200	300	0.01	50	70	4.7	1	100	1		
QRD 20-4	0-20	4.4	4.0	2.4	1.5	200	300	0.01	50	70	6.2	1	100	1		
QRD 30-1	0-30	1.1	1.0	0.6	1.5	200	300	0.01	50	70	9.2	1	100	1		
QRD 40-.75	0-40	0.825	0.750	0.450	1.5	200	300	0.01	50	70	12.2	1	100	1		
QRD 48-2	0-40	2.2	2.0	1.2	1.5	200	300	0.01	50	70	12.2	1	100	1		
QRD 60-1.5	0-60	1.65	1.50	0.90	1.5	200	300	0.01	50	70	18.2	1	100	1		

NOTES: 1. With load change (NL to FL or FL to NL) and line voltage change ($\pm 10\%$) combined. 2. To return to a bandwidth of ± 10 mV for a 0-100% or 100-0% change. 3. For 8 hours (after 30 min. warmup) with constant line, load and ambient temperature. 4. Optional. 5. 2% accuracy.

NOTE ON HIGH SPEED MODE: Programming Time (Typ.): 25 μs from zero to E_{max} ; 10 μs from E_{max} to zero; 80 μs from zero to I_{max} ; 200 μs from I_{max} to zero. All measured at 10% and 90% points.

QRD Series Specifications

Automatic Crossover Time:
From I to V mode—160 μ s.

Automatic Crossover Time:
From V to I mode—208 μ s.

QRD ACCESSORIES

Overvoltage protection, front panel handles, rack adapters, IEEE-488 digital programmer. See page 6:

OPTIONS

M1: 105-125 Vac input (Std.)

M2: 200-240 Vac input

M3: 210-250 Vac input

CC-1: 10-turn I control

D-1: Dial for CC-1

VC-2:

VC-3: 10-turn

VC-4: Voltage

VC-5: control

VC-6:

D-2: Dial for VC-2 thru VC-6

VP1, VP3: OVP

See
Page 29
for
details

- Option CC-1: 10-turn current control
- Option VC-2 through VC-6: 10-turn voltage control
- Option D-1: calibrated dial for CC-1
- Option D-2: calibrated dial for VC-2 through VC-6
- Option OVP: overvoltage protection-Crowbar

INPUT VOLTAGES

Model	Option	Input Power	
		Vac	Aac
QRD 15-2	M2	200-240	Note 1
	M3	210-250	
QRD 20-4	M2	200-240	Note 1
	M3	210-250	
QRD 20-1	M2	200-240	Note 1
	M3	210-250	
QRD 40-75	M2	200-240	Note 1
	M3	210-250	
QRD 40-2	M2	200-240	Note 1
	M3	210-250	
QRD 60-1.5	M2	200-240	Note 1
	M3	210-250	

1. Contact factory.

Model	Constant Current Mode			Temp. Coeff., Current (Typ.) mA/°C	Current Drift, ¹ (Typ.) % I ₀ (Max.) 0.1% \pm mA	Programming Constants Current Mode		Standard Input Power (single phase 47-60Hz)		Power Factor (Typ.)	OVP ²	Meters ³		Case Size
	Regulation .02% + μ A	Ripple (PAR) (1 st Hz to 7 MHz), μ A	Resolution % I ₀ (Max.)			mA	mV/A	Vac \pm 10%	Aac (Max.)			Vdc	Adc	
QRD 15-2	125	150	0.015	0.7	0.5	500	500	115	0.95	0.86	VP1	0-15	0-3	I
QRD 20-4	250	400	0.015	0.7	0.5	250	250	115	2.3	0.78	VP1	0-25	0-5	II
QRD 30-1	125	150	0.015	0.25	0.5	1000	1000	115	0.95	0.86	VP1	0-30	0-1.5	I
QRD 40-75	125	150	0.015	0.212	0.5	1300	1300	115	0.95	0.86	VP1	0-50	0-1	I
QRD 40-2	250	300	0.015	0.4	0.5	500	500	115	2.3	0.78	VP1	0-50	0-2.5	II
QRD 60-1.5	250	300	0.015	0.325	0.5	667	667	115	2.3	0.78	VP3	0-80	0-2	II