

# Syncrowave® 250 DX/350 LX

Issued Feb. 2009 • Index No. AD/4.2

TIG/Stick Welding  
Power Source



## Quick Specs



### Industrial Applications

Precision Metal Fabrication  
Maintenance and Repair  
Light and Heavy Manufacturing  
Aerospace  
Shipbuilding  
Tube and Pipe  
Automotive  
Vocational

### Processes

TIG (GTAW)  
Stick (SMAW)  
Pulsed TIG (GTAW-P)  
(Optional)

**Input Power** Requires 1-Phase Power

**Amperage Range** 250: 3–310 350: 3–400

**Max. Open-Circuit Voltage** 80 VDC

**Rated Output** 250: 250 A at 30 VAC, 40% Duty Cycle  
200 A at 28 VAC, 60% Duty Cycle

350: 350 A at 34 VAC, 40% Duty Cycle  
300 A at 32 VAC, 60% Duty Cycle

**Weight** Standard: 250: 378 lb (172 kg) 350: 496 lb (225 kg)  
TIGRunner®: 250: 478 lb (217 kg) 350: 596 lb (270 kg)

## The Power of Blue.®



See page 2 for  
additional features

Standard Machine

### Syncrowave Complete

#### Package includes:

- Syncrowave®
- Coolmate™ 3X cooler
- No. 37 running gear
- TIG torch kit with accessories
- Foot pedal
- Four gallons of coolant

The **balance control** is adjustable to provide additional oxide removal (more cleaning) or less cleaning based on the condition of the material being welded. See pg 2 for more information on this feature.

**Syncro Start™** allows the choice of Soft, Standard or Hot TIG starts based on the application, lead lengths and tungsten size.

**Dual inline high-frequency** points provide intense high frequency for arc starting and stabilization. Internal machine components are protected from HF interference with additional grounding and filtering for extended product life.

**Digital welding meters** display both amperage and voltage for viewing of the actual and preset values for greater accuracy and repeatability in your welding procedure.

**Last procedure recall** simplifies changing your Syncrowave back and forth from aluminum TIG to stainless TIG to stick welding. One switch makes all the control panel changes.



Power source is warranted for 3 years, parts and labor.  
Original main power rectifier parts are warranted for 5 years.

MADE IN USA  
APPLETON, WI



### Miller Electric Mfg. Co.

An Illinois Tool Works Company  
1635 West Spencer Street  
Appleton, WI 54914 USA

### Equipment Sales US and Canada

Phone: 866-931-9730  
FAX: 800-637-2315  
International Phone: 920-735-4554  
International FAX: 920-735-4125

### Web Site

www.MillerWelds.com



## Additional Features

**Pulsed TIG control** lowers the heat input into the part and reduces warping and distortion (optional on 250 DX models).

**TIGRunner™ system packages with Coolmate™ 3X cooler.** A 3-gallon cooling system equipped with a visual flow indicator ensures that the coolant is flowing. An external coolant filter stops foreign objects from entering the water cooled torch cable for better flow and longer life. Extended cooling capacity ensures maximum productivity. 3-year cooler warranty.

Stick welding features such as **Adaptive Hot Start™** provide good arc strikes without sticking. Once welding, the DIG control makes dynamic adjustments to the welder to ensure smooth E7018 and deep penetration E6010.

**Tilted operator interface and built-in consumable drawer** provide added convenience to your welding experience.

**Arc timer/cycle counter** records actual welding time and number of arc starts. Great for estimating job costs.

**Squarewave technology** developed and patented by Miller Electric in 1976. Squarewave technology was developed to improve your weld quality and make TIG welding easier. Miller Squarewave technology provides arc stability when welding aluminum, prevents arc rectification and eliminates tungsten erosion.

**Welding aluminum?** Oxides that form on aluminum melt at temperatures over 3700° F. The aluminum material that is located under this layer of oxide melts at 1200° F. The Syncrowave's **AC Squarewave welding current** automatically removes the layer of oxide which is necessary for producing high quality welds.

### Do you have power fluctuations?

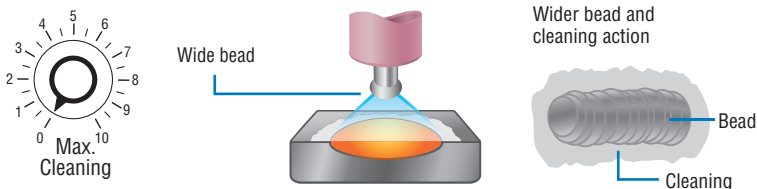
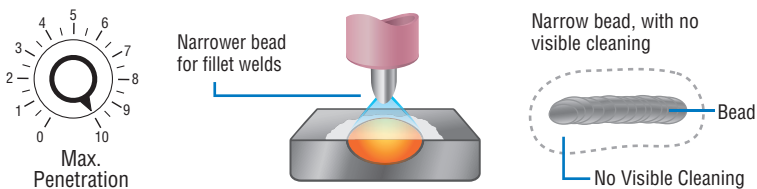
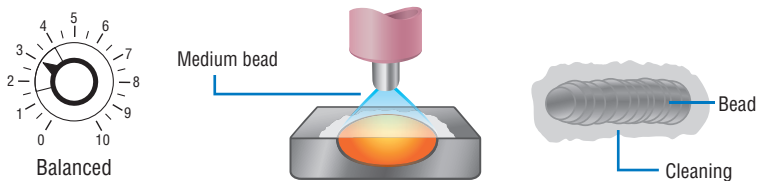
The Syncrowave compensates for power fluctuation without changing your welding parameters. **Line voltage compensation** works on fluctuating power  $\pm 10\%$ .

**NEW! Easy Load Dual Cylinder Rack** ➔ minimizes cylinder lifting. (Cylinder not included.)

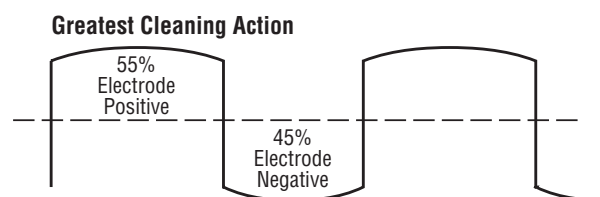
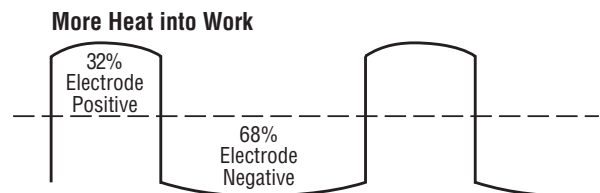
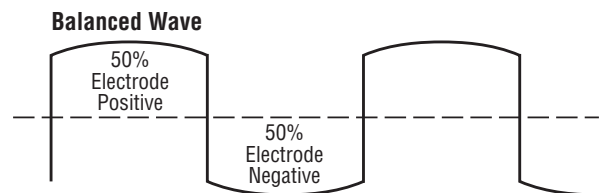


## AC Output: Balance Control

### AC Balance



### Balanced Wave Function



# Specifications (Subject to change without notice.)



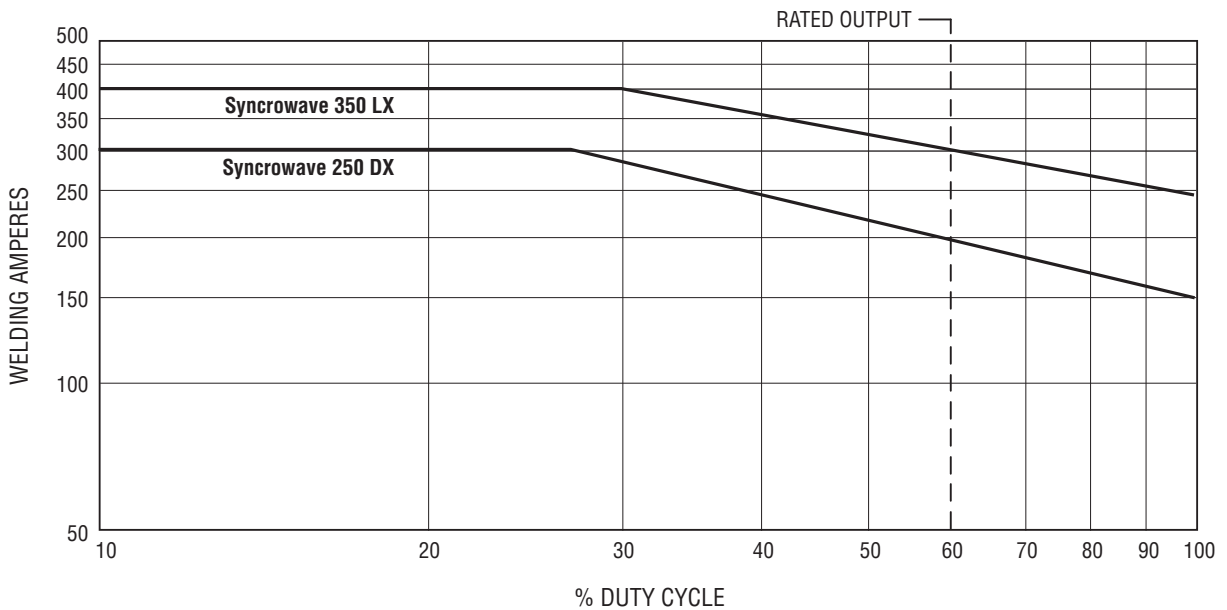
Model	Input Power	Welding Amp Range	Max OCV	Rated Output	Amps Input at AC Balance, Rated Load								Dimensions	Weight		
					200V	220V	230V	400V	440V	460V	520V	575V			KVA	KW
Syncrowave 250	60 Hz, 1-Phase	3-310 A	80 V	250 A at 30 V, 40% Duty Cycle	110	—	96	—	—	48	—	38	22	12	H: 33-1/4 in (845 mm)* W: 22-1/2 in (572 mm) D: 25 in (635 mm)** <b>with TIGRunner®</b> H: 46 in (1168 mm)* W: 28-1/2 in (724 mm) D: 40-1/2 in (1029 mm)**	378 lb (172 kg)
	50 Hz, 1-Phase			225 A at 29 V, 40% Duty Cycle	101	—	88	—	—	44	—	35	20	10		
Syncrowave 250 CE 220/400/ 440/520	50 or 60 Hz, 1-Phase			250 A at 30 V, 40% Duty Cycle	—	100	—	55	50	—	42	—	22	12	H: 33-1/4 in (845 mm)* W: 22-1/2 in (572 mm) D: 25 in (635 mm)**	378 lb (172 kg)
Syncrowave 350 All Models	50 or 60 Hz, 1-Phase	3-400 A	80 V	350 A at 34 V, 40% Duty Cycle	146	120	128	66	60	65	51	50	30	14	H: 33-1/4 in (845 mm)* W: 22-1/2 in (572 mm) D: 25 in (635 mm)** <b>with TIGRunner®</b> H: 46 in (1168 mm)* W: 28-1/2 in (724 mm) D: 40-1/2 in (1029 mm)**	496 lb (225 kg)
																596 lb (270 kg)

Note: See pg 6 for power factor correction kit. \*Add 3 in (76 mm) for lift eye. \*\*Add 1-1/2 in (38 mm) for handle.

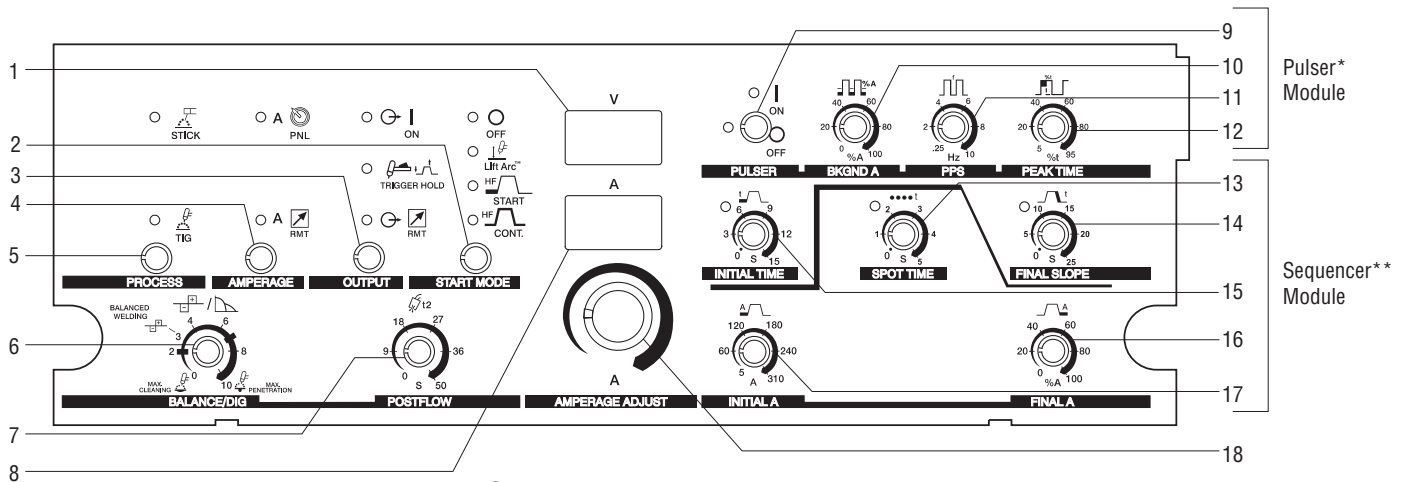
Certified to both the Canadian and U.S. Standards for welding equipment. All CE models conform to the applicable parts of the IEC 60974 series of standards.

# Performance Data

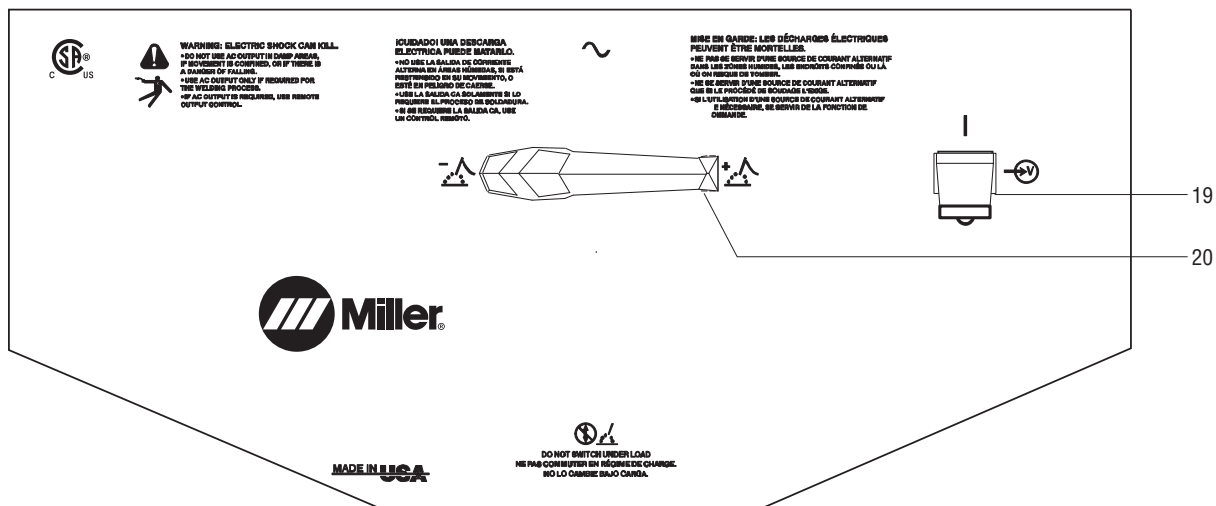
DUTY CYCLE CHART



# Control Panels



Common Bottom Panel



- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. Voltmeter Display</li> <li>2. Start Mode Control<br/>(Lift-Arc, HF Start, HF Continuous)</li> <li>3. Output Control</li> <li>4. Amperage Control (Panel/Remote)</li> <li>5. Process Control (Stick/TIG)</li> <li>6. Balance/Dig Control (0–10)</li> <li>7. Postflow Time Control (0–50 sec)</li> <li>8. Ammeter Display</li> <li>9. Pulsar Control*</li> <li>10. Background Amps Control (0–100%)*</li> <li>11. Pulse-Per-Second Control (0.25–10 Hz)*</li> </ol> | <ol style="list-style-type: none"> <li>12. Peak Time Control (5–95%)*</li> <li>13. Spot Time Control (0–5 sec)*</li> <li>14. Final Slope Control (0–25 sec)*</li> <li>15. Initial Time Control (0–15 sec)*</li> <li>16. Final Amperage Control (0–100%)*</li> <li>17. Initial Amperage Control (3–310/400 A)*</li> <li>18. Amperage Adjustment Control (3–310/400 A)</li> <li>19. Power Switch (On/Off)</li> <li>20. Output Selector Switch (AC/DC-/DC+)</li> </ol> <p>*Optional Pulsar for 250 DX<br/>**Optional Sequencer</p> |
|---|---|

# Packages

Standard Model



Syncrowave TIGRunner



Syncrowave Complete  
(Syncrowave TIGRunner,  
TIG Coolant and Torch Kit)



250 A Water-Cooled Torch Kit  
for Syncrowave 250 DX TIGRunner



300 A Water-Cooled Torch Kit  
for Syncrowave 350 LX TIGRunner

## Syncrowave® Power Sources

### Syncrowave® 250 DX

#907 194 (200/230/460 VAC)

#907 195 (230/460/575 VAC)

#907 408 (220/400/440/520 VAC) CE

### Syncrowave® 350 LX

#907 198 (200/230/460 VAC)

#907 199 (230/460/575 VAC)

#907 409 (220/400/440/520 VAC) CE

Primary cord and TIG torch adapter  
sold separately.

## TIGRunner® Packages

### Syncrowave® 250 DX TIGRunner® 3X

#907 194-03-2 (200/230/460 VAC)

#907 195-03-2 (230/460/575 VAC)

### Syncrowave® 350 LX TIGRunner® 3X

#907 198-03-2 (200/230/460 VAC)

#907 199-03-2 (230/460/575 VAC)

Completely assembled. TIGRunner includes Syncrowave, Coolmate™ 3X cooler, No. 37 running gear, RFCS-14 HD remote foot control, and international-style connectors.

Primary cord, TIG torch adapter and TIG coolant sold separately.

## Syncrowave® Complete Packages

### Syncrowave® 250 DX Complete

#951 117 (200/230/460 VAC)

#951 118 (230/460/575 VAC)

### Syncrowave® 350 LX Complete

#951 119 (200/230/460 VAC)

#951 120 (230/460/575 VAC)

Completely assembled. Includes TIGRunner above (Syncrowave, Coolmate™ 3X cooler, No. 37 running gear, RFCS-14 HD remote foot control, and international-style connectors), plus four gallons of TIG coolant and a water-cooled torch kit (see kits to left) consisting of torch, cable cover, accessory kit, regulator/flowmeter, gas hose, torch adapter, and weld lead with clamp and Dinse connector.

Primary cord sold separately.

## Genuine Miller Options

### Field Options

#### Sequencer Module 250/350

#300 547 Field Kit

Effective with serial number LE282983.

Provides a starting current higher or lower than the welding current. Provides final slope and final current for trailing the weld. Provides a spot timer for TIG spot application.

#### Pulser Module

#300 548 Field Kit for Syncrowave 250 DX  
Effective with serial number LE282983.

For welding of thin materials. Provides a heating and cooling effect of the weld puddle to reduce heat input and control distortion of the material. Provides 0.25 to 10 pulses per second.

#### Power Factor Correction Kit

#194 692 Field Kit for Syncrowave 250 DX

#043 757 Field Kit for Syncrowave 350 LX  
Reduces primary amperage draw by approximately 25% allowing the use of smaller breakers/fuses and smaller primary cord. Power Factor *does not* reduce the power consumption/electrical bill.

## Genuine Miller Accessories



#### No. 37 Running Gear #195 282

Includes two 10 in (254 mm) wheels, two 5 in (127 mm) casters, two-compartment rack (for gas cylinder(s) or Coolmate V3 coolant system), and handles. Provides excellent mobility and easy to install.

#### Protective Cover #195 320

Heavy-duty, water- and mildew-resistant. Protects and maintains the finish of the welder.



#### RFCS-14 HD Foot Control #194 744

Maximum flexibility is accomplished with a reconfigurable cord that can exit the front, back or either side of the pedal. Foot pedal provides remote current and contactor control. Includes 20 ft (6 m) cord and 14-pin plug.



#### RHC-14 Hand Control #129 340

Miniature hand control for remote current and contactor control.

Dimensions:

4 x 4 x 3-1/4 in

(102 x 102 x 83 mm). Includes 20 ft (6 m) cord and 14-pin plug.



#### RMLS-14 Switch #129 337

Momentary- and maintained-contact rocker switch for contactor control. Push forward for maintained contact and backward for momentary contact. Includes 26.5 ft (8 m) cord and 14-pin plug.



#### RMS-14 On/Off Control #187 208

Momentary-contact switch for contactor control. Rubber-covered pushbutton dome switch ideal for repetitive on-off applications. Includes 26.5 ft (8 m) cord and 14-pin plug.

#### Extension Cords for 14-Pin Remote Controls

#122 973 25 ft (7.6 m)

#122 974 50 ft (15.2 m)

#122 975 75 ft (23 m)

#### Gas Tungsten Arc (TIG) Welding Book #170 555

To order this item, distributors can call the Miller Literature Distribution Center at 1-920-735-4356, or FAX 1-920-735-4011. 86 pages — 8-1/2 x 11 in. A comprehensive text on all aspects of the GTAW process. Filled with figures and tables to illustrate process technique and equipment setup. Glossary of TIG terms also provided.

#### TIG Training CD #196 567

Designed for anyone who's looking to better understand the TIG process. Easy to understand instruction, proven teaching steps, and expert advice help to create a more effective academic approach to training. Subject areas covered include system components, process fundamentals, electrical theory, safety, power source operation.

#### Video – GTAW Setup Procedures #108 241

To order this item, distributors can call the Miller Literature Distribution Center at 1-920-735-4356, or FAX 1-920-735-4011. 13:00 minutes. A detailed demonstration on preparing your equipment for TIG welding. Uses a Syncrowave 250 power source, but topics fit any TIG setup including air- or water-cooled systems. In-depth discussion of tungstens and gases.

### Remote Controls and Switches



#### RCCS-14 Remote Contactor and

Current Control #043 688 14-pin plug  
North/south rotary-motion fingertip control fastens to TIG torch using two Velcro® straps. Great for applications that require a finer amperage control. Includes 26.5 ft (8 m) control cord.



## TIG Welding Gloves

- #227 813 Small
  - #227 814 Medium
  - #227 815 Large
  - #227 816 X-Large
- Designed to meet the specific requirements high-quality TIG welding demands.

Made from soft grain goatskin. Sewn with Kevlar® thread.

## TIG (GTAW) Torch Adapters



### Water-Cooled Dinse #195 377

Used to adapt a 250 or 350 A water-cooled torch (WP20, WP18, CS310) to an International-style connector.



### Air-Cooled Dinse #195 379

Used to adapt a 1-piece 200 amp air-cooled torch (WP26) to an International-style connector.

## Tungsten

Items below are available in packages of 10 and are 7-in lengths.

### 2% Ceriated (orange) for AC/DC applications

- #WC040X7 .040 in, 10–80 A
- #WC116X7 1/16 in, 70–150 A
- #WC332X7 3/32 in, 140–250 A
- #WC018X7 1/8 in, 225–400 A
- #WC532X7 5/32 in, 300–500 A

### 1.5% Lanthanum (gold) for AC/DC applications

- #WL040X7 .040 in, 10–80 A
- #WL116X7 1/16 in, 70–150 A
- #WL332X7 3/32 in, 140–250 A
- #WL018X7 1/8 in, 225–400 A
- #WL532X7 5/32 in, 300–500 A

### Pure (green) for AC applications only

- #WP040X7 .040 in, 10–80 A
- #WP116X7 1/16 in, 70–150 A
- #WP332X7 3/32 in, 140–250 A
- #WP018X7 1/8 in, 225–400 A
- #WP532X7 5/32 in, 300–500 A

### 2% Thoriated (red) for DC applications only

- #WT040X7 .040 in, 10–80 A
- #WT116X7 1/16 in, 70–150 A
- #WT332X7 3/32 in, 140–250 A
- #WT018X7 1/8 in, 225–400 A
- #WT532X7 5/32 in, 300–500 A

## Water Coolant Systems

For more information, see the Miller Coolant Systems literature sheet, Index No. AY/7.2.



### Coolmate™ V3

- #043 009 115 VAC
  - #043 009-01-2 115 VAC, CE
- For use with water-cooled torches rated up to 500 amps. Vertical design conveniently mounts to Miller cylinder rack in place of one cylinder. 3-gallon capacity.



### Coolmate™ 3X with Cart and Dual Cylinder Rack #300 419

Includes: Easy Load Dual Cylinder Rack, running gear, and 3X industrial water cooler — a perfect solution for water-cooled TIG torches.



### TIG Coolant

- #043 810
- Sold in multiples of 4. Pre-mixed low-conductivity Miller coolant contains

ethylene glycol and deionized water to protect from freezing and boiling -37° to 227°F (-38° to 108°C). Coolant contains 2.4% algae growth inhibitor. 1-gallon plastic recyclable bottles.

## Torch Kits



### 250 A Water-Cooled Torch Kit #300 185

Recommended for Syncrowave 250 DX

- 25 ft (7.6 m) Weldcraft® WP20 torch
- Torch cable cover
- AK4C torch accessory kit includes shielding cups, collets, collet bodies and 2% cerium tungsten electrodes (1/16, 3/32 and 1/8 in)
- Smith® regulator/flowmeter HM2051A-580
- 12 ft (3.7 m) rubber gas hose (regulator to machine)
- Water-cooled Dinse torch adapter
- 15 ft (4.6 m) 1/0 weld lead with clamp (work or ground lead) and Dinse connector



### 300 A Water-Cooled Torch Kit #300 183

Recommended for Syncrowave 350 LX

- 25 ft (7.6 m) Weldcraft® CS310 torch
- Torch cable cover
- CS310AKC torch accessory kit includes shielding cups, collets, collet bodies and 2% cerium tungsten electrodes (1/16, 3/32 and 1/8 in)
- Smith® regulator/flowmeter HM2051A-580
- 12 ft (3.7 m) rubber gas hose (regulator to machine)
- Water-cooled Dinse torch adapter
- 15 ft (4.6 m) 1/0 weld lead with clamp (work or ground lead) and Dinse connector



### 400 A Water-Cooled Torch Kit #300 186

- 25 ft (7.6 m) Weldcraft® WP18SC torch
- Torch cable cover
- AK18C torch accessory kit includes shielding cups, collets, collet bodies and 2% cerium tungsten electrodes (3/32, 1/8 and 5/32 in)
- Smith® regulator/flowmeter H1954D-580
- 12 ft (3.7 m) rubber gas hose (regulator to machine)
- Water-cooled thread lock torch adapters
- 12 ft (3.7 m) 4/0 weld lead with clamp (work or ground lead)

# Ordering Information

Equipment and Options	Stock No.	Description	Qty.	Price
<b>Syncrowave® 250 DX</b>	#907 194	200/230/460 V, 50/60 Hz, Standard Model		
	#907 195	230/460/575 V, 50/60 Hz, Standard Model		
	#907 408	220/400/440/520 V, 50/60 Hz, <b>CE</b> , Standard Model		
	#907 194-03-2	200/230/460 V, 50/60 Hz, Syncrowave 250 DX TIGRunner® 3X		
	#951 117	200/230/460 V, 50/60 Hz, Syncrowave 250 DX Complete		
	#907 195-03-2	230/460/575 V, 50/60 Hz, Syncrowave 250 DX TIGRunner® 3X		
	#951 118	230/460/575 V, 50/60 Hz, Syncrowave 250 DX Complete		
<b>Syncrowave® 350 LX</b>	#907 198	200/230/460 V, 50/60 Hz, Standard Model		
	#907 199	230/460/575 V, 50/60 Hz, Standard Model		
	#907 409	220/400/440/520 V, 50/60 Hz, <b>CE</b>		
	#907 198-03-2	200/230/460 V, 50/60 Hz, Syncrowave 350 LX TIGRunner® 3X		
	#951 119	200/230/460 V, 50/60 Hz, Syncrowave 350 LX Complete		
	#907 199-03-2	230/460/575 V, 50/60 Hz, Syncrowave 350 LX TIGRunner® 3X		
	#951 120	230/460/575 V, 50/60 Hz, Syncrowave 350 LX Complete		
Sequencer Module	#300 547	Field		
Pulser Module	#300 548	Field. For Syncrowave 250 DX		
Power Factor Correction Kit	#194 692	Field. For Syncrowave 250 DX		
	#043 757	Field. For Syncrowave 350 LX		
<b>TIG Torch Kits</b>				
Weldcraft® 250 A Water-Cooled Torch Kit	#300 185	See page 7. Recommended for Syncrowave 250 DX TIGRunner 3X		
Weldcraft® 300 A Water-Cooled Torch Kit	#300 183	See page 7. Recommended for Syncrowave 350 LX TIGRunner 3X		
Weldcraft® 400 A Water-Cooled Torch Kit	#300 186	See page 7		
Consumables and Tungsten		See page 7		
Gas Cylinder, Hose and Fittings				
<b>Remote Controls</b>				
RCCS-14	#043 688	North/south fingertip control		
RFCS-14 HD	#194 744	Heavy-duty foot control		
RHC-14	#129 340	Hand control		
RMLS-14	#129 337	Momentary/maintained rocker switch		
RMS-14	#187 208	Momentary rubber dome switch		
Extension Cords	#122 973	25 ft (7.6 m)		
	#122 974	50 ft (15.2 m)		
	#122 975	75 ft (22.9 m)		
<b>Accessories</b>				
No. 37 Running Gear	#195 282			
Protective Cover	#195 320			
Gas Tungsten Arc (TIG) Welding Book	#170 555	Contact your distributor		
TIG Training CD	#196 567			
Video – GTAW Setup Procedures	#108 241	Contact your distributor		
Torch Adapters	#195 377	Adapts 250 or 350 A water-cooled torch to international-style connector		
Supplied with power source and torch kits	#195 379	Adapts 1-pc 200 A air-cooled torch to international-style connector		
Cable Connectors		Supplied with power source and torch kits		
Dinse Connector 50 mm (1 male)	#042 418	Used to connect weld lead to Dinse terminal machine		
Dinse Connector 50 mm (1 male, 1 female)	#042 419	Used to extend weld cables		
Tweco Terminal Adapter	#042 465	Male Dinse to female Tweco		
Cam-Lok Terminal Adapter	#042 466	Male Dinse to female Cam-Lok		
TIG Coolant	#043 810	Sold in multiples of 4. 1-gallon plastic bottles.		
Water Coolant Systems		See page 7		
<b>Miscellaneous</b>				
Stick Electrodes				
Welding and Work Cables				
Helmets				
TIG Welding Gloves		See page 7		

Date:

Total Quoted Price:

Distributed by:

