

# Syncrowave® 250 DX/350 LX

Issued April 2012 • 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 on 250 DX models)  
Air Carbon Arc (CAC-A)  
**250:** 3/16-in. maximum  
**350:** 1/4-in. maximum

**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.®



Standard Machine

See Page 2 for  
Additional Features

### 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 page 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.

**TRUE BLUE®**  
3YR. WARRANTY

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



**Miller Electric Mfg. Co.**  
An Illinois Tool Works Company  
1635 West Spencer Street  
Appleton, WI 54914 USA

**Equipment Sales US and Canada**  
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FAX: 800-637-2315  
International Phone: 920-735-4554  
International FAX: 920-735-4125

**Website**  
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 three-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. Three-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** provides 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 by Miller® 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° Fahrenheit. The aluminum material that is located under this layer of oxide melts at 1200° Fahrenheit. 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?**

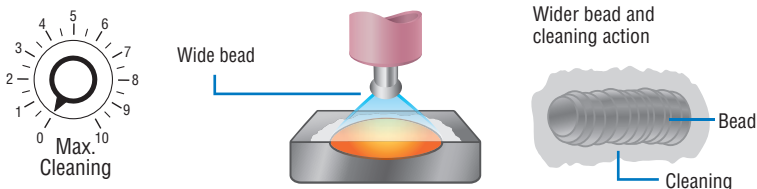
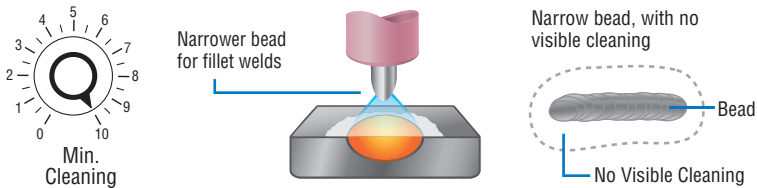
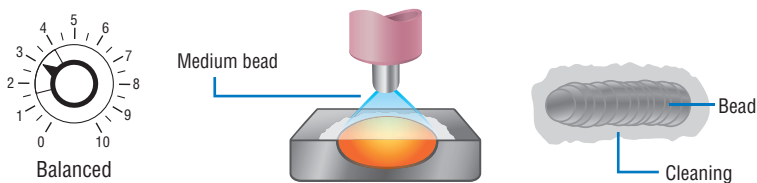
The Syncrowave compensates for power fluctuation without changing your welding parameters. **Line voltage compensation** works on fluctuating power  $\pm 10$  percent.

**Easy Load Dual Cylinder Rack** (see photo at right) minimizes cylinder lifting. Cylinder is not included.

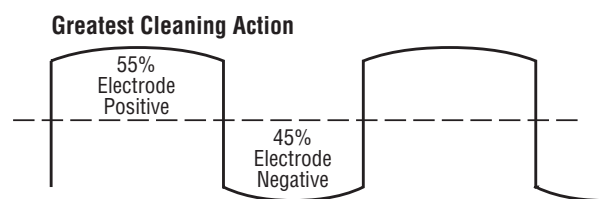
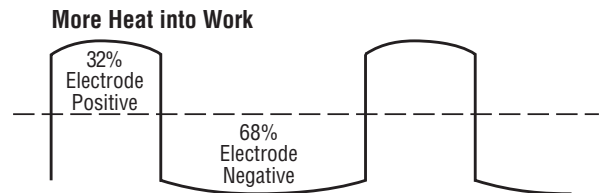
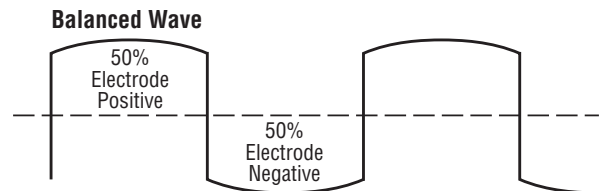


## AC Output: Balance Control

### AC Balance



### Balanced Wave Function



# Specifications (Subject to change without notice.)



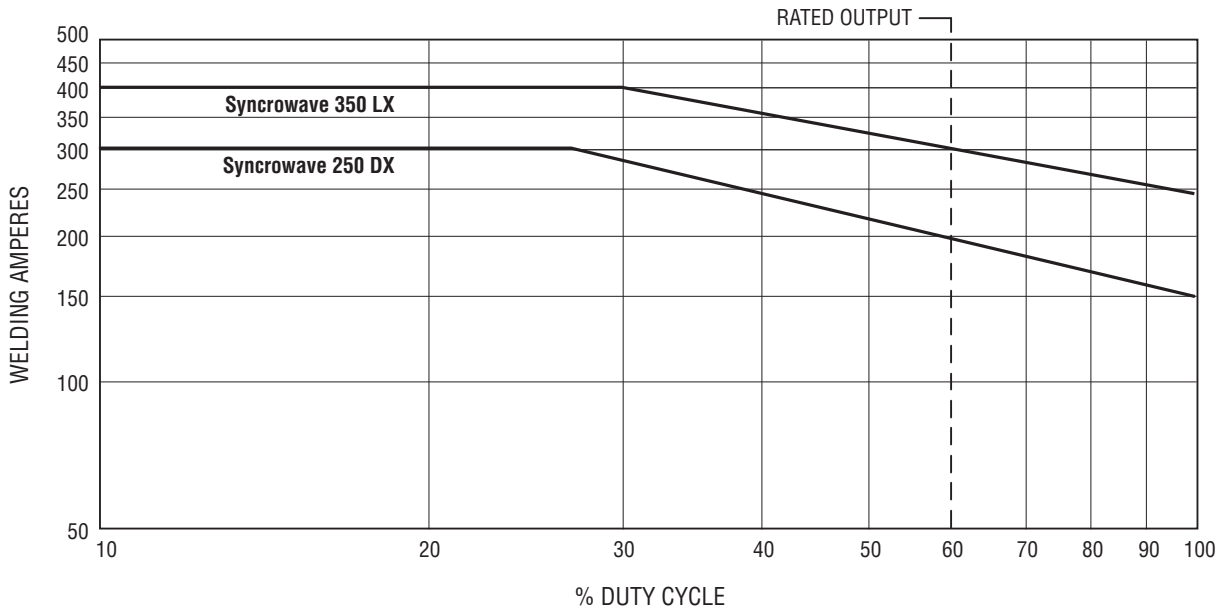
Model	Input Power	Welding Amp Range	Max OCV	Rated Output	Amps Input at AC Balance, Rated Load								Dimensions	Weight		
					200V	220V	230V	400V	440V	460V	520V	575V			KVA	KW
Syncrowave 250	60 Hz, 1-Phase	3-310 A	80 V	250 A at 30 V, 40% Duty Cycle	110	—	96	—	—	48	—	38	22	12	H: 33.25 in. (845 mm)* W: 22.5 in. (572 mm) D: 25 in. (635 mm)** <b>with TIGRunner®</b> H: 46 in. (1168 mm)* W: 28.5 in. (724 mm) D: 40.5 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 IEC 220/400/ 440/520	50 or 60 Hz, 1-Phase			250 A at 30 V, 40% Duty Cycle	—	100	—	55	50	—	42	—	22	12		378 lb. (172 kg)
Syncrowave 350 <i>All Models</i>	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: 33.25 in. (845 mm)* W: 22.5 in. (572 mm) D: 25 in. (635 mm)** <b>with TIGRunner®</b> H: 46 in. (1168 mm)* W: 28.5 in. (724 mm) D: 40.5 in. (1029 mm)**	496 lb. (225 kg) 596 lb. (270 kg)

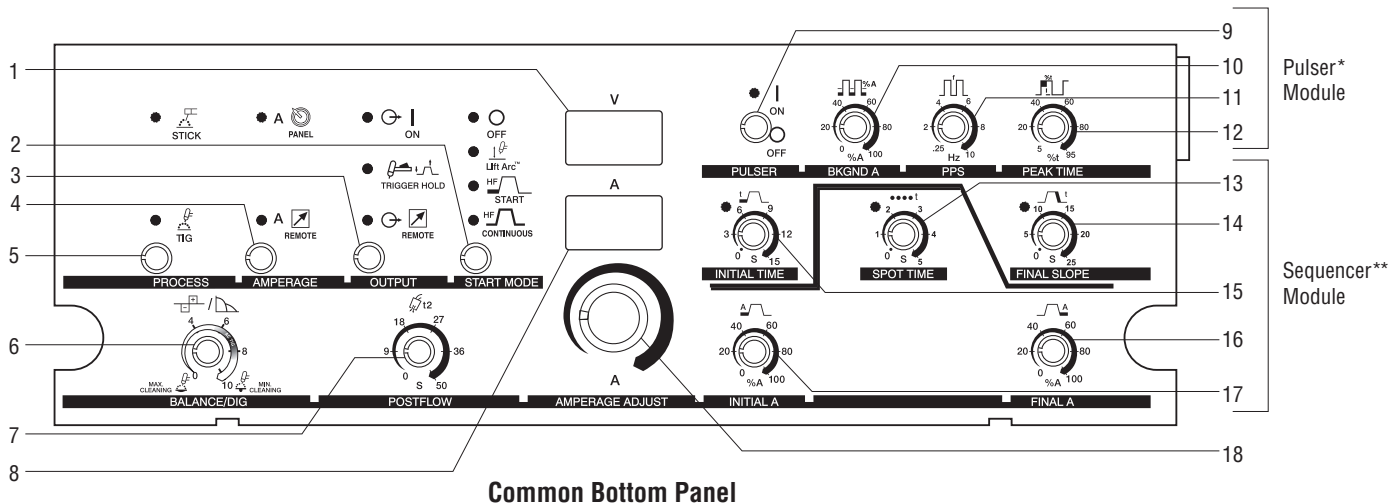
Notes: See page 6 for power factor correction kit. \*Add 3 inches (76 mm) for lift eye. \*\*Add 1.5 inches (38 mm) for handle.  
IEC models conform to the following standards: IEC 60974-1: 2005, IEC 60974-10: 2004, and EN 50445

Certified by Canadian Standards Association to both the Canadian and U.S. Standards.

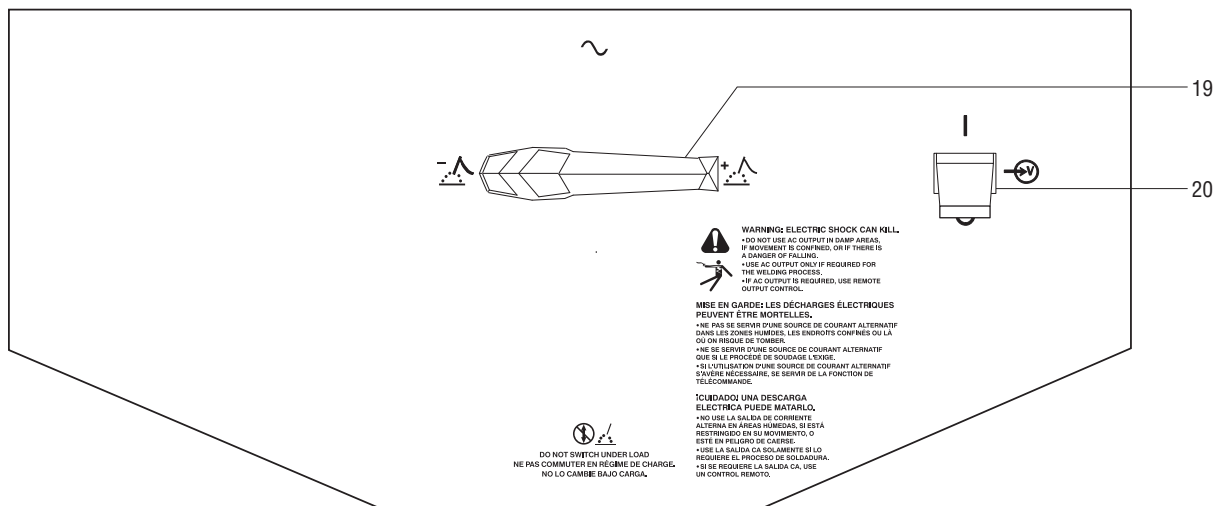
## Performance Data

DUTY CYCLE CHART





Common Bottom Panel



1. Voltmeter Display
2. Start Mode Control  
(Lift-Arc™, HF Start, HF Continuous)
3. Output Control
4. Amperage Control (Panel/Remote)
5. Process Control (Stick/TIG)
6. Balance/Dig Control (0–10)
7. Postflow Time Control (0–50 seconds)
8. Ammeter Display
9. Pulser Control\*
10. Background Amps Control (0–100%)\*
11. Pulse-Per-Second Control (0.25–10 Hz)\*
12. Peak Time Control (5–95%)\*
13. Spot Time Control (0–5 seconds)\*\*
14. Final Slope Control (0–25 seconds)\*\*
15. Initial Time Control (0–15 seconds)\*\*
16. Final Amperage Control (0–100%)\*\*
17. Initial Amperage Control (0–100%)\*\*
18. Amperage Adjustment Control (3–310/400 A)
19. Output Selector Switch (AC/DC-/DC+)
20. Power Switch (On/Off)

\*Optional Pulser for 250 DX

\*\*Optional Sequencer



Standard Model



## Syncrowave® Power Sources

### Syncrowave® 250 DX

#907 194 (200/230/460 VAC)

#907 195 (230/460/575 VAC)

#907 516 (220/400/440/520 VAC) IEC

### Syncrowave® 350 LX

#907 198 (200/230/460 VAC)

#907 199 (230/460/575 VAC)

#907 517 (220/400/440/520 VAC) IEC

Primary cord and TIG torch adapter sold separately.

Syncrowave TIGRunner



## 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, and RFCS-14 HD remote foot control.

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

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

## 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, and RFCS-14 HD remote foot control), 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.



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



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

## Genuine Miller® Options

### Field Options

#### Sequencer Module

**#300 547** Field Kit for Syncrowave 250/350  
*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 percent 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-inch (254 mm) wheels, two 5-inch (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.



#### RCCS-14 Remote Contactor and Current Control #043 688

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-foot (8 m) cord and 14-pin plug.



#### 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-foot (6 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-foot (8 m) cord and 14-pin plug.

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

**#242 208 025** 25 ft. (7.6 m)

**#242 208 050** 50 ft. (15.2 m)

**#242 208 080** 80 ft. (24.4 m)

### Educational Materials

Please visit [MillerWelds.com/resources/tools](http://MillerWelds.com/resources/tools) to order the following.

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

A comprehensive text on all aspects of the TIG process. Filled with figures and tables to illustrate process technique and equipment setup. Glossary of TIG terms also provided. 86 pages—8.5 x 11 inches.

#### 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

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. 13:00 minutes.

### Remote Controls and Switches



#### Wireless Remote Foot Control #300 429

For remote current and contactor control. Receiver plugs directly into the 14-pin receptacle of Miller machine. 90-foot (27.4 m) operating range.



#### RHC-14 Hand Control #242 211 020

Miniature hand control for remote current and contactor control. Dimensions: 4 x 4 x 3.25 inches (102 x 102 x 83 mm). Includes 20-foot (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-foot (8 m) cord and 14-pin plug.



#### Wireless Remote Hand Control #300 430

For remote current and contactor control. Receiver plugs directly into the 14-pin receptacle of Miller machine. 300-foot (91.4 m) operating range.



**TIG Gloves**

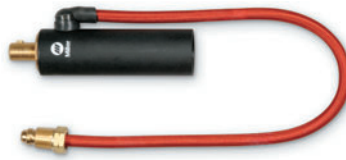
#249 178 Medium

#249 179 Large

#249 180 X-Large

Durable goatskin back and palm for extended wear and ultimate dexterity. Flame-resistant cotton fleece back and padded palm provide excellent protection.

**TIG (GTAW) Torch Adapters**



**Water-Cooled Dinse #195 377**

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



**Air-Cooled Dinse #195 379**

Used to adapt a one-piece 200-amp air-cooled torch (WP26) to a Dinse-style connector.

**Coolant Systems**

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



Includes Wheels

3X industrial water cooler — a perfect solution for water-cooled TIG torches.

**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.



**Low-Conductivity TIG Coolant #043 810**

Sold in multiples of four one-gallon recyclable plastic bottles. Miller coolants

contain a base of ethylene glycol and deionized water to protect against freezing to -37° Fahrenheit (-38° C) or boiling to 227° Fahrenheit (108° C).

**Torch Kits**



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

Recommended for Syncrowave 250 DX

- 25-foot (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-inch)
- Smith® regulator/flowmeter HM2051A-580
- Gas hose (regulator to machine)
- Water-cooled Dinse torch adapter
- 15-foot (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-foot (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-inch)
- Smith® regulator/flowmeter HM2051A-580
- Gas hose (regulator to machine)
- Water-cooled Dinse torch adapter
- 15-foot (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-foot (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-inch)
- Smith® regulator/flowmeter H1954D-580
- Gas hose (regulator to machine)
- Water-cooled thread lock torch adapters
- 12-foot (3.7 m) 4/0 weld lead with clamp (work or ground lead)

**Tungsten**

Tungsten	Amp Range	2% Ceriated (AC/DC)	2% Lanthanated (AC/DC)	2% Thoriated (DC)	Zirconiated (AC)
1/16 in. (1.6 mm)	70–150 A	WC116X7	WL2116X7	WT116X7	WZ116X7
3/32 in. (2.4 mm)	140–250 A	WC332X7	WL2332X7	WT332X7	WZ332X7
1/8 in. (3.2 mm)	225–400 A	WC018X7	WL2018X7	WT018X7	WZ018X7
5/32 in. (4.0 mm)	300–500 A	WC532X7	WL2532X7	WT532X7	WZ532X7



# 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		
	#907 516	220/400/440/520 V, 50/60 Hz, <b>IEC</b>		
	#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		
<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		
	#907 517	220/400/440/520 V, 50/60 Hz, <b>IEC</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		
Sequencer Module	#300 547	Field. For Syncrowave 250 DX and 350 LX		
	#300 548	Field. For Syncrowave 250 DX		
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>				
Wireless Remote Foot Control	#300 429	Foot control with wireless 90-ft. (27.4 m) operating range		
Wireless Remote Hand Control	#300 430	Hand control with wireless 300-ft. (91.4 m) operating range		
RCCS-14	#043 688	North/south fingertip control		
RFCS-14 HD	#194 744	Heavy-duty foot control		
RHC-14	#242 211 020	Hand control		
RMLS-14	#129 337	Momentary/maintained rocker switch		
RMS-14	#187 208	Momentary rubber dome switch		
Extension Cables	#242 208 025	25 ft. (7.6 m)		
	#242 208 050	50 ft. (15.2 m)		
	#242 208 080	80 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	<i>Order at <a href="http://MillerWelds.com/resources/tools">MillerWelds.com/resources/tools</a></i>		
TIG Training CD	#196 567	<i>Order at <a href="http://MillerWelds.com/resources/tools">MillerWelds.com/resources/tools</a></i>		
Video – GTAW Setup Procedures	#108 241	<i>Order at <a href="http://MillerWelds.com/resources/tools">MillerWelds.com/resources/tools</a></i>		
Torch Adapters	#195 377	Adapts 250 or 350 A water-cooled torch to Dinse-style connector		
<i>Supplied with power source and torch kits</i>	#195 379	Adapts 1-piece 200 A air-cooled torch to Dinse-style connector		
Cable Connectors		<i>Supplied with power source and torch kits</i>		
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		
Coolmate™ 3X w/Cart and Dual Cylinder Rack	#300 419			
TIG Coolant	#043 810	Sold in multiples of four one-gallon plastic bottles.		

Date:

Total Quoted Price:

Distributed by:

