



# Submerged Arc Welding Equipment

# Miller® Submerged Arc Solutions



## **Built for you ... to build with you.**

Miller develops high-quality, reliable welding solutions that deliver exceptional performance for our customers. We back the products we build with the most responsive support and service. And together, with the skilled, dedicated welders who use our products, we build lasting work that benefits the world.

With the advanced line of Miller® SubArc Digital Series equipment, you'll experience solutions developed for nearly every Submerged Arc welding application. Easy to install, easy to integrate and easy to operate with new or existing systems, Miller Submerged Arc solutions provide robust performance and exceptional reliability, giving you the power to get jobs done. It's what you expect when you build with Miller.



If you need skilled technical assistance to equip your business, your Miller Submerged Arc welding professionals can evaluate your existing processes, recommend options for improvements and help put your plans into action for real benefits.



Miller SubArc Digital Series equipment is tested with precisely formulated Hobart® filler metal and flux solutions, and we recommend their use. As ITW Welding companies, both Hobart and Miller share a commitment to your complete satisfaction.

**Contact your Miller Submerged Arc professional today and optimize your processes to their full potential.**



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# Technology Increases SAW Deposition Rates

## SubArc AC/DC Digital Submerged Arc Welding Power Source

Variable balance AC/DC squarewave Submerged Arc welding (SAW) technology from Miller overcomes the traditional problems or limitations of SAW with all other processes including DC electrode positive (DCEP), DC electrode negative (DCEN) and traditional AC.

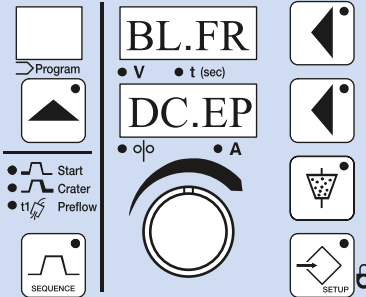


### The SubArc AC/DC Digital gives full control over AC wave balance and frequency

- Maximized deposition rate. 30% higher or more is feasible, using the same parameters
- Smaller angles and lower filler metal consumption
- Reduced heat input, minimized distortion and increased mechanical properties
- Penetration control to minimize the risk of lack of fusion
- Minimized magnetic arc blow
- Reduced arc interactions in multi-wire processes
- Control of bead shape
- Excellent arc start
- Improved arc stability compared to traditional AC
- Substantially lower power consumption
- Reduced weld over thickness

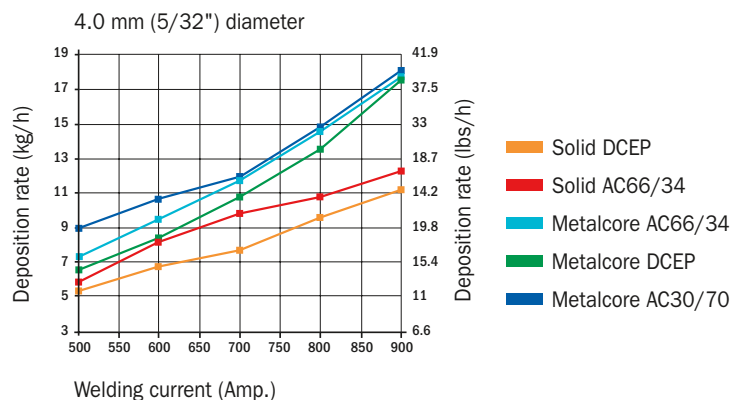
The SubArc AC/DC Digital has a choice of 14 most commonly used balance/frequency combinations and user-friendly setting.

Balance selection, indicated by BL.FR in the upper display, adjusts the AC balance and frequency, shown on the lower display. The first two digits indicate the positive balance value followed by a decimal point. The two digits after the decimal point indicate frequency. Balance and frequency are dependent on one another, and cannot be individually adjusted.

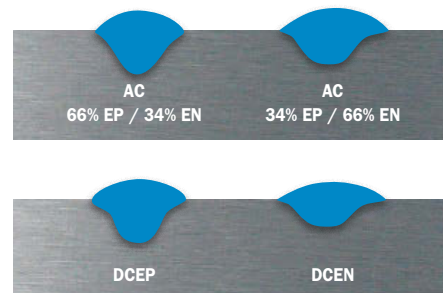


Balance/frequency combinations

Balance	Frequency	
	60Hz line	50Hz line
Electrode positive	—	—
80/20	18	15
75/25	23	19
70/30	18	15
67/33	30	25
60/40	18	15
50/50	30	25
50/50	18	15
40/60	18	15
33/67	30	25
30/70	18	15
25/75	23	19
20/80	18	15
Electrode negative	—	—



### Penetration profiles



# Submerged Arc System

## SubArc DC 650/800 and DC 1000/1250 Digital Submerged Arc Welding Power Source

Three-phase, CC/CV DC power sources are designed to provide a superior arc for the Submerged Arc (SAW) and Electroslag (ESW) welding processes, as well as Air Carbon Arc gouging, plus the endurance to handle demanding industrial applications.



### PROCESSES

- Submerged Arc (SAW)
- Electroslag (ESW)
- Air Carbon Arc Cutting and Gouging (CAC-A)

### CHARACTERISTICS

- CC/CV
- DC
- Requires three-phase power
- 24 VAC low-voltage control power
- Easy to integrate, Modbus® digital interface

### SubArc DC 650 / 800 Digital

- Amperage 50–815 A
- Voltage 20–44 V
- Rated output 650 A at 44 V (100% duty cycle)

### SubArc DC 1000 / 1250 Digital

- Amperage 100–1250 A
- Voltage 20–44 V
- Rated output 1000 A at 44 V (100% duty cycle)

## SubArc AC/DC Digital Submerged Arc Welding Power Source

Three-phase squarewave AC/DC machine with phase-shifting capability with steps to refine arc. AC/DC squarewave provides excellent quality of penetration/bead profile and high performance in deposition rate with low heat input (increased mechanical properties and reduced distortion).



### PROCESSES

- Submerged Arc (SAW)
- Electroslag (ESW)

### CHARACTERISTICS

- CC/CV
- AC/DC variable squarewave
- Requires three-phase power
- Easy to integrate, Modbus® digital interface
- 24 VAC low-voltage control power
- Frequencies 10–90 Hz
- Amperage 300–1250 A
- Voltage 20–44 V
- Rated output 1000 A at 44 V (100% duty cycle)

## SubArc Interface Digital Automatic Weld Control

Automatic digital weld controllers offer reliability, flexibility and performance with their ability to interface with SubArc Digital power sources.



### PROCESSES

- Submerged Arc (SAW)
- Electroslag (ESW)

### CHARACTERISTICS

- Supply 24 VAC
- Adjustable start and crater parameters
- Amperage/voltage/WFS range look
- Memory for up to 15 programs
- Arc time and arc cycles
- Ability to change programs during welding operation
- Terminal block for easy integration of hard automation or remote control
- CV+C mode allows operator to preset voltage and amperage rather than wire feed speed

# SAW Accessories

## Wire Drive Assemblies

Miller offers heavy-duty, low-voltage (38 VDC) wire drive assemblies.



### CHARACTERISTICS

- SubArc Strip Drive 100 Digital Low Voltage (ESW)
  - Low-speed, for strip cladding, 0.3–3.2 m/min (10–125 IPM)
- SubArc Wire Drive 400 Digital Low Voltage
  - Standard-speed, 0.8–10.2 m/min (30–400 IPM)
- SubArc Wire Drive 780 Digital Low Voltage
  - High-speed, 1.3–19.8 m/min (50–780 IPM)



## SubArc Flux Hopper Digital Low Voltage

Automatic flux valve will carry 11.3 kg (25 lbs) of flux. The opening is sized to allow hook-up of any flux-hopper-mounted recovery system. A slag screen is also provided.



### DESCRIPTION

- 11.3 kg (25 lbs) capacity
- Power supply 24 V
- 12 VDC solenoid valve



## Compressed Air Flux Feeder

The automatic air compressed flux feeding system is electronically controlled to enable preheated flux to be kept at a constant temperature.



### CHARACTERISTICS

- Storage capacity from 120–205 l (32–205 gal)
- Working temperature 100°C (212°F)
- Voltage supply 220 V
- Max input power 2800 W
- Max air pressure 6 bar (87 psi)



## Single-Wire Straightener

For use with SubArc Wire Drive 400 Digital Low Voltage or 780 Digital Low Voltage.



### DESCRIPTION

- For 1.6–5.6 mm (1/16–7/32") wires.



## Twin-Wire Straightener

For use with twin-wire torches only. Single or double/separate adjustment models available.



### DESCRIPTION

- For 1.2–2.4 mm (.045–3/32") wires.



# Submerged Arc Torches System

## OBT 600

600-amp, 100% duty cycle torch with concentric flux flow nozzle.



### PROCESS

- Submerged Arc (SAW)
- Wire diameter 1.6–5.6 mm (1/16–7/32")



## OBT 1200

1200-amp, 100% duty cycle torch with concentric flux flow nozzle.



### PROCESS

- Submerged Arc (SAW)
- Wire diameter 1.6–5.6 mm (1/16–7/32")



## Single-Wire Narrow Gap Torch

1200-amp, 100% duty cycle torch for narrow gap.



### PROCESS

- Submerged Arc (SAW)
- Wire diameter 2.4–4.0 mm (3/32–5/32")
- For depth 50–350 mm (2–14")
- PTFE insulation up to 200°C (390°F)
- Ceramic insulation up to 350°C (660°F)



## 1200-Amp Single-Wire Torch — Short

1200-amp, 100% duty cycle torch.



### PROCESS

- Submerged Arc (SAW)
- Wire diameter 1.6–4.0 mm (1/16–5/32")

**Short model:** single-wire welding nozzle with an effective length of 220 mm (5.6").



## Tandem-Wire Narrow Gap Torch

800-amp, 100% duty cycle torch for narrow gap.



### PROCESS

- Submerged Arc (SAW)
- Wire diameter 2.4–4.0 mm (3/32–5/32")
- For depth 50–350 mm (2–14")
- PTFE insulation up to 200°C (390°F)
- Ceramic insulation up to 350°C (660°F)



## 1200-Amp Twin-Wire Torch — Short / Long

1200-amp, 100% duty cycle twin-wire torches with concentric flux flow nozzle.

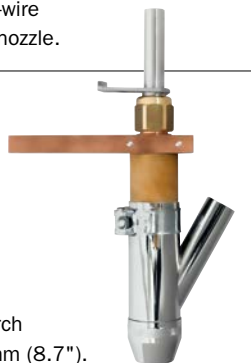


### PROCESS

- Submerged Arc (SAW twin)
- Wire diameter 1.2–2.4 mm (.045–3/32")

**Short model:** twin-arc welding torch with an effective length of 220 mm (8.7").

**Long model:** twin-arc welding torch with an effective length of 360 mm (14.2").



## Single-Wire Narrow Gap Flat Torch

800-amp, 100% duty cycle torch for narrow gap.



### PROCESS

- Submerged Arc (SAW)
- Wire diameter 2.4–4.0 mm (3/32–5/32")
- For depth 100–250 mm (4–10")
- Ceramic insulation up to 350°C (660°F)



# Cladding Heads

## For Standard Application

It is recommended that all cladding SAW/ESW heads are used in conjunction with the SubArc Strip Drive 100 Digital Low Voltage.

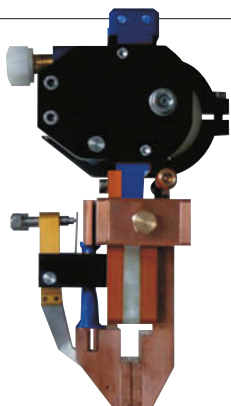
## For Nozzle and Pipe Application

The following head is designed for SAW/ESW, both circumferential and longitudinal cladding.

### 60 mm Cladding Head

#### CHARACTERISTICS

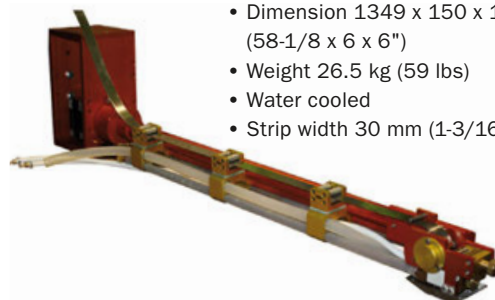
- Max current 2000 A (100% duty cycle)
- Dimension 200 x 230 x 360 mm (8 x 9 x 14")
- Weight 13.5 kg (29.7 lbs)
- Water cooled
- Strip width 30–60 mm (1-3/16–2-3/8")



### 8" Diameter Head

#### CHARACTERISTICS

- Minimum inside diameter pipe clad 203 mm (8")
- Max current 750 A (100% duty cycle)
- Dimension 1349 x 150 x 150 mm (58-1/8 x 6 x 6")
- Weight 26.5 kg (59 lbs)
- Water cooled
- Strip width 30 mm (1-3/16")



### 90 mm Cladding Head

#### CHARACTERISTICS

- Max current 3000 A (100% duty cycle)
- Dimension 220 x 230 x 400 mm (8 x 9 x 16")
- Weight 19 kg (41.8 lbs)
- Water cooled
- Strip width 30 – 60 – 90 mm (1-3/16 – 2-3/8 – 3-1/2")



### 10" Diameter Head

#### CHARACTERISTICS

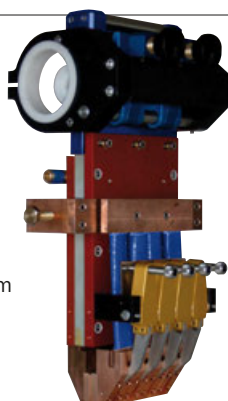
- Minimum inside diameter pipe clad 260 mm (10")
- Max current 850 A (100% duty cycle)
- Dimension 1349 x 200 x 200 mm (58-1/8 x 8 x 8")
- Weight 27 kg (60 lbs)
- Water cooled
- Strip width 30 mm (1-3/16")



### 120 mm Cladding Head

#### CHARACTERISTICS

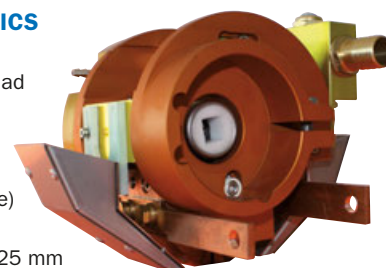
- Max current 3600 A (100% duty cycle)
- Dimension 230 x 230 x 470 mm (8 x 9 x 19")
- Weight 25 kg (55 lbs)
- Water cooled
- Strip width 60 – 90 – 120 mm (2-3/8 – 3-1/2 – 4-3/4")



### 12" Diameter Head

#### CHARACTERISTICS

- Minimum inside diameter pipe clad 310 mm (12")
- Max current 1000 A (100% duty cycle)
- Dimension 1349 x 240 x 225 mm (58-1/8 x 9-1/2 x 9")
- Weight 27.5 kg (61 lbs)
- Water cooled
- Strip width 30 mm (1-3/16")





# Accessories

## Magnetic Steering Device

The magnetic steering device is intended for use with the ESW process. When used with stainless steel and nickel-base strip and fluxes, it ensures that the cladding process achieves uniformity, in terms of level and uniform weld bead edge formation. Additionally it controls the weld bead ripple formation which maintains the consistency of both bond integrity and appearance.



### CHARACTERISTICS

- Weight 15 kg (33 lbs)
- Dimension 530 x 280 x 400 mm (21 x 11 x 16")
- Power 220 V/ 110 V, 50–60 Hz
- Solenoid 10 A, 24 VDC (red)/ strip 90–120 mm (3.5–4.7")



## Strip De-Reeler



Strip spool holder from 150–1000 kg (330–2200 lbs) with adjustable inner diameter.



## SubArc Tractor

A motorized, highly flexible welding tractor designed to produce, high-quality Submerged Arc welds.



### PROCESS

- Submerged Arc (SAW)
- For use with Miller
  - SubArc DC 650/800 Digital
  - SubArc DC 1000/1250 Digital
  - SubArc AC/DC Digital

### PACKAGE INCLUDES

- Tractor with remote start/stop control and guide rolls
- SubArc Interface
- SubArc Wire Drive 400 for Tractor
- SubArc Flux Hopper Digital Low Voltage
- 27 kg (60 lb) wire reel
- OBT 600
- Wire straightener

