

Δ Tandem Controller Required

\* Maximum Range is limited by power source rating, module rating, or feeder configuration

Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)
All	All	GMAW CV	STD CV		5	Pinch	10 — 55 V
		GMAW Power	Power Mode®		40	Pinch	0.1 — 40 kW
		GMAW Power	Process HDT™ <sup>1</sup>		635	Pinch	0.1 — 40 kW
Steel	0.8 mm	GMAW CV	CV	CO <sub>2</sub>	93	Pinch	75 — 1200 ipm (1.91 — 30.48 m/min)
				Argon Mix	94		75 — 1200 ipm (1.91 — 30.48 m/min)
		GMAW Pulse	Pulse	Argon Mix	95	UltimArc®	65 — 1200 ipm (1.65 — 30.48 m/min)
			Precision Pulse™	Argon Mix	410		100 — 600 ipm (2.54 — 15.24 m/min)
	0.9 mm	GMAW CV	CV	CO <sub>2</sub>	138	Pinch	50 — 1200 ipm (1.27 — 30.48 m/min)
				Argon Mix	139		50 — 1200 ipm (1.27 — 30.48 m/min)
		GMAW Pulse	Pulse	Argon Mix	140	UltimArc®	60 — 1200 ipm (1.52 — 30.48 m/min)
			RapidArc®	Argon Mix	141		75 — 1200 ipm (1.91 — 30.48 m/min)
		Precision Pulse™	Argon Mix	411	100 — 600 ipm (2.54 — 15.24 m/min)		
	1.0 mm	GMAW CV	CV	CO <sub>2</sub>	10	Pinch	50 — 1200 ipm (1.27 — 30.48 m/min)
				Argon Mix	11		50 — 1200 ipm (1.27 — 30.48 m/min)
		GMAW Pulse	Pulse	Argon Mix	12	UltimArc®	75 — 1200 ipm (1.91 — 30.48 m/min)
			RapidArc®	Argon Mix	13		60 — 1200 ipm (1.52 — 30.48 m/min)
		Precision Pulse™	Argon Mix	412	75 — 600 ipm (1.91 — 15.24 m/min)		
	1.2 mm	GMAW CV	CV	CO <sub>2</sub>	20	Pinch	50 — 800 ipm (1.27 — 20.32 m/min)
				Argon Mix	21		50 — 800 ipm (1.27 — 20.32 m/min)
		GMAW Pulse	Pulse	Argon Mix	22	UltimArc®	60 — 800 ipm (1.52 — 20.32 m/min)
			RapidArc®	Argon Mix	18		60 — 800 ipm (1.52 — 20.32 m/min)
		Precision Pulse™	Argon Mix	413	75 — 600 ipm (1.91 — 15.24 m/min)		
	1.32 mm	GMAW CV	CV	Argon Mix	540	Pinch	50 — 550 ipm (1.27 — 13.97 m/min)
GMAW Pulse		RapidArc®	Argon Mix	541	UltimArc®	60 — 1000 ipm (1.52 — 25.4 m/min)	
1.4 mm	GMAW CV	CV	CO <sub>2</sub>	24	Pinch	50 — 650 ipm (1.27 — 16.51 m/min)	
			Argon Mix	25		50 — 550 ipm (1.27 — 13.97 m/min)	
	GMAW Pulse	Pulse	Argon Mix	26	UltimArc®	50 — 600 ipm (1.27 — 15.24 m/min)	
		RapidArc®	Argon Mix	27		60 — 1000 ipm (1.52 — 25.4 m/min)	
1.6 mm	GMAW CV	CV	Argon Mix	107	Pinch	50 — 350 ipm (1.27 — 8.89 m/min)	
	GMAW Pulse	Pulse	Argon Mix	108	UltimArc®	50 — 400 ipm (1.27 — 10.16 m/min)	
Stainless	0.8 mm	GMAW CV	CV	Argon Mix	61	Pinch	100 — 1200 ipm (2.54 — 30.48 m/min)
				Ar He CO <sub>2</sub>	63		100 — 1200 ipm (2.54 — 30.48 m/min)
		GMAW Pulse	Pulse	Ar He CO <sub>2</sub>	64	UltimArc®	100 — 1200 ipm (2.54 — 30.48 m/min)
				Argon Mix	66		100 — 1200 ipm (2.54 — 30.48 m/min)
	0.9 mm	GMAW CV	CV	Argon Mix	29	Pinch	75 — 1200 ipm (1.91 — 30.48 m/min)
				Argon Mix	30	UltimArc®	60 — 1200 ipm (1.52 — 30.48 m/min)
		GMAW Pulse	Pulse	Argon Mix	421		100 — 600 ipm (2.54 — 15.24 m/min)
			Precision Pulse™	Argon Mix			
	1.0 mm	GMAW CV	CV	Argon Mix	31	Pinch	75 — 1200 ipm (1.91 — 30.48 m/min)
				Ar He CO <sub>2</sub>	33		75 — 1000 ipm (1.91 — 25.4 m/min)
		GMAW Pulse	Pulse	Ar He CO <sub>2</sub>	34	UltimArc®	60 — 1200 ipm (1.52 — 30.48 m/min)
				Argon Mix	36		60 — 1200 ipm (1.52 — 30.48 m/min)
			Precision Pulse™	Argon Mix	422	UltimArc®	60 — 600 ipm (1.52 — 15.24 m/min)
	1.2 mm	GMAW CV	CV	Argon Mix	41	Pinch	75 — 700 ipm (1.91 — 17.78 m/min)
				Ar He CO <sub>2</sub>	43		75 — 700 ipm (1.91 — 17.78 m/min)
		GMAW Pulse	Pulse	Ar He CO <sub>2</sub>	44	UltimArc®	50 — 700 ipm (1.27 — 17.78 m/min)
				Argon Mix	46		50 — 800 ipm (1.27 — 20.32 m/min)
			Precision Pulse™	Argon Mix	423	UltimArc®	50 — 400 ipm (1.27 — 10.16 m/min)
	1.6 mm	GMAW CV	CV	Argon Mix	51	Pinch	50 — 600 ipm (1.27 — 15.24 m/min)
		GMAW Pulse	Pulse	Argon Mix	56	UltimArc®	50 — 700 ipm (1.27 — 17.78 m/min)
Metal Core	1.2 mm	GMAW CV	CV	Argon Mix	81	Pinch	50 — 700 ipm (1.27 — 17.78 m/min)
		GMAW Pulse	Pulse	Argon Mix	82	UltimArc®	50 — 700 ipm (1.27 — 17.78 m/min)
	1.4 mm	GMAW CV	CV	CO <sub>2</sub>	252	Pinch	100 — 1200 ipm (2.54 — 30.48 m/min)
				Argon Mix	83	Pinch	50 — 1200 ipm (1.27 — 30.48 m/min)
	GMAW Pulse	Pulse	Argon Mix	84	UltimArc®	50 — 600 ipm (1.27 — 15.24 m/min)	
		RapidArc®	Argon Mix	88		60 — 1000 ipm (1.52 — 25.4 m/min)	
	1.6 mm	GMAW CV	CV	Argon Mix	85	Pinch	50 — 450 ipm (1.27 — 11.43 m/min)
		GMAW Pulse	Pulse	Argon Mix	86	UltimArc®	50 — 450 ipm (1.27 — 11.43 m/min)

Δ Tandem Controller Required

\* Maximum Range is limited by power source rating, module rating, or feeder configuration

	Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)
<b>GMAW</b>	<b>Aluminum (AlSi)</b>	1.0 mm	GMAW CV	CV	Argon	148	Pinch	125 — 800 ipm (3.18 — 20.32 m/min)
			GMAW Pulse	Pulse	Argon	149	UltimArc®	125 — 800 ipm (3.18 — 20.32 m/min)
				CC Pulse	Argon	150		125 — 800 ipm (3.18 — 20.32 m/min)
				Precision Pulse™	Argon	566		125 — 800 ipm (3.18 — 20.32 m/min)
		GMAW Pulse-on-Pulse®	Pulse-on-Pulse®	Argon	98	Frequency	100 — 500 ipm (2.54 — 12.7 m/min)	
		1.2 mm	GMAW CV	CV	Argon	71	Pinch	125 — 700 ipm (3.18 — 17.78 m/min)
			GMAW Pulse	Pulse	Argon	72	UltimArc®	85 — 600 ipm (2.16 — 15.24 m/min)
				CC Pulse	Argon	69		85 — 600 ipm (2.16 — 15.24 m/min)
				Precision Pulse™	Argon	567		85 — 600 ipm (2.16 — 15.24 m/min)
		GMAW Pulse-on-Pulse®	Pulse-on-Pulse®	Argon	99	Frequency	85 — 500 ipm (2.16 — 12.7 m/min)	
		1.6 mm	GMAW CV	CV	Argon	73	Pinch	75 — 375 ipm (1.91 — 9.53 m/min)
			GMAW Pulse	Pulse	Argon	74	UltimArc®	75 — 350 ipm (1.91 — 8.89 m/min)
	CC Pulse			Argon	79	75 — 350 ipm (1.91 — 8.89 m/min)		
	Precision Pulse™			Argon	568	75 — 350 ipm (1.91 — 8.89 m/min)		
	GMAW Pulse-on-Pulse®	Pulse-on-Pulse®	Argon	100	Frequency	80 — 400 ipm (2.03 — 10.16 m/min)		
	<b>Aluminum (AlMg)</b>	1.0 mm	GMAW CV	CV	Argon	151	Pinch	175 — 750 ipm (4.45 — 19.05 m/min)
			GMAW Pulse	Pulse	Argon	152	UltimArc®	125 — 700 ipm (3.18 — 17.78 m/min)
				CC Pulse	Argon	153		150 — 800 ipm (3.81 — 20.32 m/min)
				Precision Pulse™	Argon	571		150 — 800 ipm (3.81 — 20.32 m/min)
		GMAW Pulse-on-Pulse®	Pulse-on-Pulse®	Argon	101	Frequency	140 — 800 ipm (3.56 — 20.32 m/min)	
		1.2 mm	GMAW CV	CV	Argon	75	Pinch	125 — 750 ipm (3.18 — 19.05 m/min)
			GMAW Pulse	Pulse	Argon	76	UltimArc®	85 — 700 ipm (2.16 — 17.78 m/min)
				CC Pulse	Argon	70		85 — 700 ipm (2.16 — 17.78 m/min)
				Precision Pulse™	Argon	572		85 — 700 ipm (2.16 — 17.78 m/min)
		GMAW Pulse-on-Pulse®	Pulse-on-Pulse®	Argon	102	Frequency	100 — 600 ipm (2.54 — 15.24 m/min)	
		1.6 mm	GMAW CV	CV	Argon	77	Pinch	125 — 500 ipm (3.18 — 12.7 m/min)
			GMAW Pulse	Pulse	Argon	78	UltimArc®	100 — 500 ipm (2.54 — 12.7 m/min)
	CC Pulse			Argon	80	100 — 350 ipm (2.54 — 8.89 m/min)		
Precision Pulse™	Argon			573	100 — 500 ipm (2.54 — 12.7 m/min)			
GMAW Pulse-on-Pulse®	Pulse-on-Pulse®	Argon	103	Frequency	75 — 350 ipm (1.91 — 8.89 m/min)			
<b>SiBr</b>	1.0mm	GMAW Pulse	Pulse	Argon	192	UltimArc®	80 — 1000 ipm (2.03 — 25.4 m/min)	
	1.2mm	GMAW Pulse	Pulse	Argon	191	UltimArc®	50 — 600 ipm (1.27 — 15.24 m/min)	
<b>Cu</b>	1.0mm	GMAW Pulse	Pulse	Argon Helium	198	UltimArc®	75 — 500 ipm (1.91 — 12.7 m/min)	
	1.2mm	GMAW Pulse	Pulse	Argon Helium	196	UltimArc®	75 — 500 ipm (1.91 — 12.7 m/min)	
<b>NiCr</b>	1.0mm	GMAW Pulse	Pulse	Ar/ Ar He	502	UltimArc®	75 — 800 ipm (1.91 — 20.32 m/min)	
	1.2mm	GMAW Pulse	Pulse	Ar/ Ar He	504	UltimArc®	75 — 600 ipm (1.91 — 15.24 m/min)	
<b>FCAW</b>	<b>Flux Core</b>	All	FCAW-S	Self Shield CV	NA	6	Pinch	10 — 45 V
			FCAW-G	Gas Shield CV	NA	7	Pinch	10 — 45 V
	<b>Cored Wire</b>	1.2 mm	FCAW-G	CV	CO <sub>2</sub>	90	Pinch	175 — 600 ipm (4.45 — 15.24 m/min)
			Argon Mix	91	175 — 600 ipm (4.45 — 15.24 m/min)			
		1.4 mm	FCAW-G	CV	CO <sub>2</sub>	187	Pinch	150 — 500 ipm (3.81 — 12.7 m/min)
			Argon Mix	188	150 — 500 ipm (3.81 — 12.7 m/min)			
		1.6 mm	FCAW-G	CV	CO <sub>2</sub>	189	Pinch	125 — 400 ipm (3.18 — 10.16 m/min)
Argon Mix	190		125 — 400 ipm (3.18 — 10.16 m/min)					
<b>SMAW</b>	NA	NA	SMAW Soft	NA	1	Arc Force, Hot Start	15 — 900 A	
			DCEP SMAW	SMAW Crisp	NA	2	Arc Force, Hot Start	15 — 900 A
			SMAW Pipe	NA	4	Arc Force	50 — 250 A	
<b>GTAW</b>	NA	NA	DCEN GTAW	Touch Start TIG	Ar / He	3	Hot Start	5 — 900 A
				Touch Start TIG Pulse	Ar / He	8	Frequency, Background, Hot Start	5 — 800 A
<b>CAG</b>	NA	NA	CAG	Arc Gouge	Compressed Air	9		60 — 900 A

Δ Tandem Controller Required

\* Maximum Range is limited by power source rating, module rating, or feeder configuration

GMAW-Tandem	Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)	
	Steel	1.0 mm	GMAW Tandem (Δ)	Sync Pulse Lead	Argon Mix	402	UltimArc®, Phase Angle	150 — 800 ipm	(3.81 — 20.32 m/min)
Sync Pulse Trail				Argon Mix	403	UltimArc®	150 — 800 ipm	(3.81 — 20.32 m/min)	
HotWire Pulse Trail				Argon Mix	461		80 — 800 ipm	(2.03 — 20.32 m/min)	
1.2 mm		GMAW Tandem (Δ)	Sync Pulse Lead	Argon Mix	404	UltimArc®, Phase Angle	100 — 700 ipm	(2.54 — 17.78 m/min)	
			Sync Pulse Trail	Argon Mix	405	UltimArc®	100 — 700 ipm	(2.54 — 17.78 m/min)	
			HotWire Pulse Trail	Argon Mix	462		75 — 800 ipm	(1.91 — 20.32 m/min)	
1.4 mm		GMAW Tandem (Δ)	Sync Pulse Lead	Argon Mix	406	UltimArc®, Phase Angle	100 — 600 ipm	(2.54 — 15.24 m/min)	
			Sync Pulse Trail	Argon Mix	407	UltimArc®	100 — 600 ipm	(2.54 — 15.24 m/min)	
			HotWire Pulse Trail	Argon Mix	463		50 — 800 ipm	(1.27 — 20.32 m/min)	
1.6 mm		GMAW Tandem (Δ)	Sync Pulse Lead	Argon Mix	408	UltimArc®, Phase Angle	100 — 500 ipm	(2.54 — 12.7 m/min)	
			Sync Pulse Trail	Argon Mix	409	UltimArc®	100 — 500 ipm	(2.54 — 12.7 m/min)	
			HotWire Pulse Trail	Argon Mix	464		50 — 500 ipm	(1.27 — 12.7 m/min)	

HyperFill® <sup>1</sup>	Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)	
	Steel	0.9mm	GMAW	HyperFill®	Argon Mix	601	UltimArc®	150 — 800 ipm	(3.81 — 20.32 m/min)
		1.0mm	GMAW	HyperFill®	Argon Mix	602	UltimArc®	100 — 600 ipm	(2.54 — 15.24 m/min)
		1.2mm	GMAW	HyperFill®	Argon Mix	603	UltimArc®	100 — 465 ipm	(2.54 — 11.81 m/min)
	Metal Core	1.2mm	GMAW	HyperFill®	Argon Mix	608	UltimArc®	150 — 515 ipm	(3.81 — 13.08 m/min)
	Cored Wire	1.2mm	FCAW-G	HyperFill®	Argon Mix	618	Pinch	100 — 630 ipm	(2.54 — 16 m/min)

GTAW - APEX® <sup>2</sup>	Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)	
	NA	NA	DCEN GTAW	Touch Start TIG	NA	490	Transition Speed	5 — 500 A	

<sup>1</sup>HyperFill® & Process HDT™ Waveform Activation Capability with Power Wave® and PIPEFAB™ Systems

Your purchase of a Lincoln Power Wave or PIPEFAB Welding System comes with (i) a license to use Lincoln Electric standard Power Wave / PIPEFAB waveforms, and (ii) HyperFill & Process HDT waveform capability, which requires a separate license. Without the separate license, the HyperFill and Process HDT waveforms are not available for use on these machines, and only the standard Power Wave / PIPEFAB waveforms are usable.

<sup>2</sup>APEX® System Required