

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™ ¹		635	Pinch	0.1 – 40	kW
Steel	0.8 mm	GMAW CV	CV	CO ₂	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 ₂	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 ₂	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 ₂	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)
			Argon Mix	541	60 – 1000		ipm (1.52 – 25.4 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 ₂	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)	
			Argon Mix	108		50 – 400	ipm (1.27 – 10.16 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 ₂	63		100 – 1200	ipm (2.54 – 30.48 m/min)
	GMAW Pulse	Pulse	Argon Mix	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		60 – 1200	ipm (1.52 – 30.48 m/min)
	GMAW Pulse	Pulse	Argon Mix	421	UltimArc®	100 – 600	ipm (2.54 – 15.24 m/min)	
		Precision Pulse™	Argon Mix	421		100 – 600	ipm (2.54 – 15.24 m/min)	
	1.0 mm	GMAW CV	CV	Argon Mix	31	Pinch	75 – 1200	ipm (1.91 – 30.48 m/min)
				Ar He CO ₂	33		75 – 1000	ipm (1.91 – 25.4 m/min)
	GMAW Pulse	Pulse	Argon Mix	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 ₂	43		75 – 700	ipm (1.91 – 17.78 m/min)
	GMAW Pulse	Pulse	Argon Mix	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)
				Argon Mix	56		50 – 700	ipm (1.27 – 17.78 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)
				Argon Mix	82		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 ₂	252	Pinch	100 – 1200	ipm (2.54 – 30.48 m/min)
				Argon Mix	83		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)	
			Argon Mix	86		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)		

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	Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)	
	GMAW	Aluminum (AlSi)	1.0 mm	GMAW CV	CV	Argon	148	Pinch	125 – 800
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)		
Aluminum (AlMg)		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)			
SiBr	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)	
Cu	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)	
NiCr	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)	
FCAW	Flux Core	All	FCAW-S	Self Shield CV	NA	6	Pinch	10 – 45	V
			FCAW-G	Gas Shield CV	NA	7	Pinch	10 – 45	V
	Cored Wire	1.2 mm	FCAW-G	CV	CO ₂	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 ₂	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 ₂	189	Pinch	125 – 400	ipm (3.18 – 10.16 m/min)		
			Argon Mix	190		125 – 400	ipm (3.18 – 10.16 m/min)		
SMAW	NA	NA	DCEP SMAW	SMAW Soft	NA	1	Arc Force, Hot Start	15 – 900	A
				SMAW Crisp	NA	2	Arc Force, Hot Start	15 – 900	A
				SMAW Pipe	NA	4	Arc Force	50 – 250	A
GTAW	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
CAG	NA	NA	CAG	Arc Gouge	Compressed Air	9		60 – 900	A

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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 ¹	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 ²	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	

¹HyperFill® & 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.

²APEX® System Required