

§ Advanced Module Required

⊖ External HF Starter Required

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

‡ STT® or Advanced Module Required

Δ Tandem Controller Required

Type	Size	Procedure		Waveform	Gas Type	Mode #	Arc Control	Range*	
All	All	GMAW CV	STD CV			5	Pinch	10	45 V
		GMAW Power	Power Mode®			40	Pinch	0.1	23 kW
GMAW	0.8 mm	GMAW CV	CV	CO ₂		93	Pinch	75	1200 ipm (1.91 — 30.48 m/min)
			CV	Argon Mix		94	Pinch	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)
			Low Fume Pulse(‡)	Argon Mix		550		75	1200 ipm (1.91 — 30.48 m/min)
			Precision Pulse™	Argon Mix		410		100	600 ipm (2.54 — 15.24 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)
			CV	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		60	1200 ipm (1.52 — 30.48 m/min)
			Precision Pulse™	Argon Mix		411		100	600 ipm (2.54 — 15.24 m/min)
			Rapid X™(‡)	Argon Mix		272		75	1200 ipm (1.91 — 30.48 m/min)
		GMAW STT®	Synergic STT®(‡)	CO ₂		324	UltimArc®, Hot Start	100	225 ipm (2.54 — 5.72 m/min)
				Argon Mix		325		100	225 ipm (2.54 — 5.72 m/min)
			NonSynergic STT®(‡)	CO ₂		304		100	300 ipm (2.54 — 7.62 m/min)
				Argon Mix		305		100	300 ipm (2.54 — 7.62 m/min)
	GMAW AC STT®	Synergic AC STT®(§)	CO ₂		380	Balance, UltimArc®	50	200 ipm (1.27 — 5.08 m/min)	
			Argon Mix		381		50	200 ipm (1.27 — 5.08 m/min)	
	1.0 mm	GMAW CV	CV	CO ₂		10	Pinch	50	1200 ipm (1.27 — 30.48 m/min)
			CV	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)
			Rapid X™(‡)	Argon Mix		273		75	800 ipm (1.91 — 20.32 m/min)
		GMAW STT®	Synergic STT®(‡)	CO ₂		326	UltimArc®, Hot Start	90	225 ipm (2.29 — 5.72 m/min)
				Argon Mix		327		90	225 ipm (2.29 — 5.72 m/min)
			NonSynergic STT®(‡)	CO ₂		306		90	225 ipm (2.29 — 5.72 m/min)
				Argon Mix		307		90	225 ipm (2.29 — 5.72 m/min)
	GMAW AC STT®	Synergic AC STT®(§)	CO ₂		382	Balance, UltimArc®	45	185 ipm (1.14 — 4.7 m/min)	
			Argon Mix		383		45	185 ipm (1.14 — 4.7 m/min)	
	1.2 mm	GMAW CV	CV	CO ₂		20	Pinch	50	800 ipm (1.27 — 20.32 m/min)
			CV	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)
			Rapid X™(‡)	Argon Mix		274		100	800 ipm (2.54 — 20.32 m/min)
GMAW STT®		Synergic STT®(‡)	CO ₂		328	UltimArc®, Hot Start	90	200 ipm (2.29 — 5.08 m/min)	
			Argon Mix		329		90	200 ipm (2.29 — 5.08 m/min)	
		NonSynergic STT®(‡)	CO ₂		308		90	225 ipm (2.29 — 5.72 m/min)	
			Argon Mix		309		90	225 ipm (2.29 — 5.72 m/min)	
GMAW AC STT®	Synergic AC STT®(§)	CO ₂		384	Balance, UltimArc®	40	170 ipm (1.02 — 4.32 m/min)		
		Argon Mix		385		40	170 ipm (1.02 — 4.32 m/min)		
1.32 mm	GMAW CV	CV	Argon Mix		540	Pinch	50	550 ipm (1.27 — 13.97 m/min)	
		CV	Argon Mix		541		60	800 ipm (1.52 — 20.32 m/min)	
1.4 mm	GMAW Pulse	Low Fume Pulse(‡)	Argon Mix		544	UltimArc®	50	600 ipm (1.27 — 15.24 m/min)	
		Low Fume Pulse(‡)	Argon Mix		544		50	600 ipm (1.27 — 15.24 m/min)	
1.4 mm	GMAW CV	CV	CO ₂		24	Pinch	50	640 ipm (1.27 — 16.26 m/min)	
		CV	Argon Mix		25		50	550 ipm (1.27 — 13.97 m/min)	
	GMAW Pulse	Pulse	Argon Mix		26	UltimArc®	50	580 ipm (1.27 — 14.73 m/min)	
		RapidArc®	Argon Mix		27		60	615 ipm (1.52 — 15.62 m/min)	
		Rapid X™(‡)	Argon Mix		275		75	600 ipm (1.91 — 15.24 m/min)	
		Low Fume Pulse(‡)	Argon Mix		553		50	600 ipm (1.27 — 15.24 m/min)	
1.6 mm	GMAW CV	CV	Argon Mix		107	Pinch	50	350 ipm (1.27 — 8.89 m/min)	
		CV	Argon Mix		107		50	350 ipm (1.27 — 8.89 m/min)	
1.6 mm	GMAW Pulse	Pulse	Argon Mix		108	UltimArc®	50	400 ipm (1.27 — 10.16 m/min)	
		Pulse	Argon Mix		108		50	400 ipm (1.27 — 10.16 m/min)	

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Type	Size	Procedure		Waveform	Gas Type	Mode #	Arc Control	Range*	
Metal Core	0.9mm	GMAW Rapid Z™	Rapid Z™(§)		Argon Mix	472	UltimArc®	75 — 900 ipm	(1.91 — 22.86 m/min)
	1.0mm	GMAW Rapid Z™	Rapid Z™(§)		Argon Mix	473	UltimArc®	70 — 700 ipm	(1.78 — 17.78 m/min)
	1.2 mm	GMAW CV	CV		Argon Mix	81	Pinch	50 — 700 ipm	(1.27 — 17.78 m/min)
		GMAW Pulse	Pulse	Rapid X™(‡)	Argon Mix	82	UltimArc®	50 — 700 ipm	(1.27 — 17.78 m/min)
	1.4 mm	GMAW Pulse	Pulse	Rapid X™(‡)	Argon Mix	294	UltimArc®	75 — 700 ipm	(1.91 — 17.78 m/min)
		GMAW Pulse	Pulse	Rapid X™(‡)	Argon Mix	84	UltimArc®	50 — 600 ipm	(1.27 — 15.24 m/min)
	1.6 mm	GMAW Pulse	Pulse	Rapid X™(‡)	Argon Mix	295	UltimArc®	60 — 650 ipm	(1.52 — 16.51 m/min)
		GMAW CV	CV		Argon Mix	85	Pinch	50 — 450 ipm	(1.27 — 11.43 m/min)
1.6 mm	GMAW Pulse	Pulse	Rapid X™(‡)	Argon Mix	86	UltimArc®	50 — 450 ipm	(1.27 — 11.43 m/min)	
	GMAW Pulse	Pulse	Rapid X™(‡)	Argon Mix	296	UltimArc®	75 — 450 ipm	(1.91 — 11.43 m/min)	
Stainless	0.8 mm	GMAW CV	CV		Argon Mix	61	Pinch	100 — 1200 ipm	(2.54 — 30.48 m/min)
		GMAW CV	CV		Ar He CO ₂	63	Pinch	100 — 1200 ipm	(2.54 — 30.48 m/min)
		GMAW Pulse	Pulse		Ar He CO ₂	64	UltimArc®	100 — 1200 ipm	(2.54 — 30.48 m/min)
		GMAW Pulse	Pulse		Argon Mix	66	UltimArc®	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)
		GMAW Pulse	Pulse		Argon Mix	30	UltimArc®	60 — 1200 ipm	(1.52 — 30.48 m/min)
		GMAW Pulse	Pulse	Precision Pulse™	Argon Mix	421	UltimArc®	100 — 600 ipm	(2.54 — 15.24 m/min)
		GMAW STT®	Synergic STT®(‡)		Argon Mix	364	UltimArc®, Hot Start	100 — 300 ipm	(2.54 — 7.62 m/min)
			Synergic STT®(‡)		Ar He CO ₂	365	UltimArc®, Hot Start	100 — 250 ipm	(2.54 — 6.35 m/min)
			NonSynergic STT®(‡)		Argon Mix	344	Peak, Background, Tailout, Hot Start	100 — 300 ipm	(2.54 — 7.62 m/min)
	NonSynergic STT®(‡)		Ar He CO ₂	345	Peak, Background, Tailout, Hot Start	100 — 300 ipm	(2.54 — 7.62 m/min)		
	1.0 mm	GMAW CV	CV		Argon Mix	31	Pinch	75 — 1200 ipm	(1.91 — 30.48 m/min)
		GMAW CV	CV		Ar He CO ₂	33	Pinch	75 — 1000 ipm	(1.91 — 25.4 m/min)
		GMAW Pulse	Pulse		Ar He CO ₂	34	UltimArc®	60 — 1200 ipm	(1.52 — 30.48 m/min)
			Pulse	Precision Pulse™	Argon Mix	36	UltimArc®	60 — 1200 ipm	(1.52 — 30.48 m/min)
			Pulse	Precision Pulse™	Argon Mix	422	UltimArc®	60 — 600 ipm	(1.52 — 15.24 m/min)
		GMAW STT®	Rapid X™(‡)		Argon Mix	283	UltimArc®	100 — 800 ipm	(2.54 — 20.32 m/min)
			Synergic STT®(‡)		Argon Mix	366	UltimArc®, Hot Start	100 — 300 ipm	(2.54 — 7.62 m/min)
			Synergic STT®(‡)		Ar He CO ₂	367	UltimArc®, Hot Start	100 — 250 ipm	(2.54 — 6.35 m/min)
	1.2 mm	GMAW CV	CV		Argon Mix	41	Pinch	75 — 700 ipm	(1.91 — 17.78 m/min)
			CV		Ar He CO ₂	43	Pinch	75 — 700 ipm	(1.91 — 17.78 m/min)
		GMAW Pulse	Pulse		Ar He CO ₂	44	UltimArc®	50 — 700 ipm	(1.27 — 17.78 m/min)
			Pulse	Precision Pulse™	Argon Mix	46	UltimArc®	50 — 800 ipm	(1.27 — 20.32 m/min)
			Pulse	Precision Pulse™	Argon Mix	423	UltimArc®	50 — 400 ipm	(1.27 — 10.16 m/min)
GMAW STT®		Rapid X™(‡)		Argon Mix	284	UltimArc®	100 — 800 ipm	(2.54 — 20.32 m/min)	
		Synergic STT®(‡)		Argon Mix	368	UltimArc®, Hot Start	90 — 200 ipm	(2.29 — 5.08 m/min)	
		Synergic STT®(‡)		Ar He CO ₂	369	UltimArc®, Hot Start	90 — 200 ipm	(2.29 — 5.08 m/min)	
GMAW STT®	NonSynergic STT®(‡)		Argon Mix	348	Peak, Background, Tailout, Hot Start	90 — 225 ipm	(2.29 — 5.72 m/min)		
	NonSynergic STT®(‡)		Ar He CO ₂	349	Peak, Background, Tailout, Hot Start	90 — 225 ipm	(2.29 — 5.72 m/min)		
1.6 mm	GMAW CV	CV		Argon Mix	51	Pinch	50 — 480 ipm	(1.27 — 12.19 m/min)	
	GMAW Pulse	Pulse		Argon Mix	56	UltimArc®	50 — 505 ipm	(1.27 — 12.83 m/min)	
Stainless Metal Core EC4XX	1.2 mm	GMAW Pulse	Rapid X™(‡)		Argon Mix	290	UltimArc®	75 — 800 ipm	(1.91 — 20.32 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 He	502	UltimArc®	75 — 800 ipm	(1.91 — 20.32 m/min)
	1.2mm	GMAW Pulse	Pulse		Ar He	504	UltimArc®	75 — 600 ipm	(1.91 — 15.24 m/min)

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	Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Range*		
	GMAW	Aluminum (AlSi)	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)	
GMAW Pulse				CC Pulse	Argon	150	UltimArc®	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)	
GMAW AC Pulse			AC Pulse (§)	Argon	392	UltimArc®	125 — 700 ipm	(3.18 — 17.78 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)	
			GMAW Pulse	CC Pulse	Argon	69	UltimArc®	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 AC Pulse	AC Pulse (§)	Argon	393	UltimArc®	100 — 500 ipm	(2.54 — 12.7 m/min)	
			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)	
		GMAW Pulse	CC Pulse	Argon	79	UltimArc®	75 — 350 ipm	(1.91 — 8.89 m/min)		
Aluminum (AlMg)		1.0 mm	GMAW Pulse on Pulse*	Pulse on Pulse*	Argon	100	Frequency	80 — 400 ipm	(2.03 — 10.16 m/min)	
			GMAW AC Pulse	AC Pulse (§)	Argon	394	UltimArc®	100 — 400 ipm	(2.54 — 10.16 m/min)	
			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)	
		1.2 mm	GMAW Pulse	CC Pulse	Argon	153	UltimArc®	125 — 700 ipm	(3.18 — 17.78 m/min)	
			GMAW Pulse on Pulse*	Pulse on Pulse*	Argon	101	Frequency	140 — 800 ipm	(3.56 — 20.32 m/min)	
			GMAW AC Pulse	AC Pulse (§)	Argon	397	UltimArc®	100 — 800 ipm	(2.54 — 20.32 m/min)	
			GMAW CV	CV	Argon	75	Pinch	125 — 750 ipm	(3.18 — 19.05 m/min)	
		1.6 mm	GMAW Pulse	Pulse	Argon	76	UltimArc®	85 — 700 ipm	(2.16 — 17.78 m/min)	
			GMAW Pulse	CC Pulse	Argon	70	UltimArc®	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)	
			GMAW AC Pulse	AC Pulse (§)	Argon	398	UltimArc®	85 — 600 ipm	(2.16 — 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)		
		GMAW Pulse	CC Pulse	Argon	80	UltimArc®	100 — 450 ipm	(2.54 — 11.43 m/min)		
	GMAW Pulse on Pulse*	Pulse on Pulse*	Argon	103	Frequency	75 — 350 ipm	(1.91 — 8.89 m/min)			
GMAW AC Pulse	AC Pulse (§)	Argon	399	UltimArc®	100 — 400 ipm	(2.54 — 10.16 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)	
			FCAW-G	CV	Argon Mix	91	Pinch	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)
				FCAW-G	CV	Argon Mix	188	Pinch	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)			
	FCAW-G	CV	Argon Mix	190	Pinch	125 — 400 ipm	(3.18 — 10.16 m/min)			
SMAW	NA	NA	DCEP SMAW	Soft	NA	1	Arc Force, Hot Start	15 — 555 A		
				Crisp	NA	2	Arc Force, Hot Start	15 — 555 A		
				Pipe	NA	4	Arc Force	50 — 250 A		
			DCEN SMAW	SMAW DC- (§)	NA	379	Arc Force, Hot Start	15 — 350 A		
			AC SMAW	AC SMAW (§)	NA	374	Arc Force, Hot Start, Frequency	15 — 350 A		
GTAW	NA	NA	DCEN GTAW	Touch Start GTAW	Ar / He	3	Hot Start	5 — 555 A		
				Touch Start TIG Pulse	Ar / He	8	Frequency, Background Hot Start	5 — 555 A		
				HF TIG (⊖)	Ar / He	375	Hot Start	5 — 450 A		
			AC GTAW	HF TIG Pulse (⊖)	Ar / He	376	Frequency, Background Hot Start	5 — 450 A		
				Touch Start AC TIG (§)	Ar / He	377	AC Frequency, AC Balance, DC Offset, Hot Start	10 — 350 A		
				HF Start AC TIG (§)	Ar / He	378	AC Frequency, AC Balance, DC Offset, Hot Start	10 — 350 A		
CAG	NA	NA	CAG	Arc Gouge	Compressed Air	9		60 — 555 A		

Weld Set Reference: Z194536
Power Wave® R450/S500 (SI units)



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Δ Tandem Controller Required

GMAW-Tandem	Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Range*
	Steel	1.0 mm	GMAW Tandem (Δ)	Sync Pulse Lead	Argon Mix	402	UltimArc®, Phase Angle	150 — 800 ipm
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)

GMAW-HyperFill	Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)
	Steel	0.9mm	GMAW	Hyperfill		Argon Mix	601	
1.0mm		GMAW	Hyperfill		Argon Mix	602		100 — 480 ipm (2.54 — 12.19 m/min)