

§ Advanced Module Required

⊙ External HF Starter Required

‡ STT® or Advanced Module Required

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 — 45 V	
		GMAW Power	Power Mode®		40	Pinch	0.1 — 11 kW	
Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)	
GMAW	0.030	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)	
	0.035	GMAW CV	CV		CO ₂	10	Pinch	50 — 1200 ipm (1.27 — 30.48 m/min)
					Argon Mix	11		50 — 1010 ipm (1.27 — 25.65 m/min)
		GMAW Pulse	Pulse		Argon Mix	12	UltimArc®	60 — 1095 ipm (1.52 — 27.81 m/min)
			RapidArc®		Argon Mix	13		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	Peak, Background, Tailout, Hot Start	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)	
	0.040	GMAW CV	CV		CO ₂	138	Pinch	50 — 915 ipm (1.27 — 23.24 m/min)
					Argon Mix	139		50 — 880 ipm (1.27 — 22.35 m/min)
		GMAW Pulse	Pulse		Argon Mix	140	UltimArc®	60 — 835 ipm (1.52 — 21.21 m/min)
			RapidArc®		Argon Mix	141		60 — 1015 ipm (1.52 — 25.78 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	Peak, Background, Tailout, Hot Start	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)
	0.045	GMAW CV	CV		CO ₂	20	Pinch	50 — 530 ipm (1.27 — 13.46 m/min)
					Argon Mix	21		50 — 490 ipm (1.27 — 12.45 m/min)
		GMAW Pulse	Pulse		Argon Mix	22	UltimArc®	50 — 585 ipm (1.27 — 14.86 m/min)
			RapidArc®		Argon Mix	18		75 — 680 ipm (1.91 — 17.27 m/min)
			Precision Pulse™		Argon Mix	413		75 — 600 ipm (1.91 — 15.24 m/min)
			Rapid X™(‡)		Argon Mix	274		100 — 680 ipm (2.54 — 17.27 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	Peak, Background, Tailout, Hot Start	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)		
0.052	GMAW CV	CV		CO ₂	24	Pinch	50 — 435 ipm (1.27 — 11.05 m/min)	
				Argon Mix	25		50 — 375 ipm (1.27 — 9.53 m/min)	
	GMAW Pulse	Pulse		Argon Mix	26	UltimArc®	50 — 435 ipm (1.27 — 11.05 m/min)	
		RapidArc®		Argon Mix	27		60 — 455 ipm (1.52 — 11.56 m/min)	
		Precision Pulse™		Argon Mix	414		75 — 410 ipm (1.91 — 10.41 m/min)	
		Rapid X™(‡)		Argon Mix	275		75 — 405 ipm (1.91 — 10.29 m/min)	
	GMAW STT®	Synergic STT®(‡)		CO ₂	330	UltimArc®, Hot Start	75 — 175 ipm (1.91 — 4.45 m/min)	
				Argon Mix	331		75 — 175 ipm (1.91 — 4.45 m/min)	
NonSynergic STT®(‡)			CO ₂	310	Peak, Background, Tailout, Hot Start	90 — 150 ipm (2.29 — 3.81 m/min)		
		Argon Mix	311		75 — 150 ipm (1.91 — 3.81 m/min)			
1/16	GMAW CV	CV		Argon Mix	107	Pinch	50 — 200 ipm (1.27 — 5.08 m/min)	
	GMAW Pulse	Pulse		Argon Mix	108	UltimArc®	50 — 235 ipm (1.27 — 5.97 m/min)	

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	Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)					
								ipm	(m/min)				
GMAW	Stainless	0.030	GMAW CV	CV	Argon Mix	61	Pinch	100 — 1200	ipm (2.54 — 30.48 m/min)				
						63		100 — 1200	ipm (2.54 — 30.48 m/min)				
			GMAW Pulse	Pulse	He Ar CO ₂	64	UltimArc®	90 — 1200	ipm (2.29 — 30.48 m/min)				
						66		80 — 1200	ipm (2.03 — 30.48 m/min)				
						Precision Pulse™		Argon Mix	420	UltimArc®	100 — 800	ipm (2.54 — 20.32 m/min)	
									430		100 — 800	ipm (2.54 — 20.32 m/min)	
		0.035	GMAW CV	CV	Argon Mix	Pinch	31	75 — 1200	ipm (1.91 — 30.48 m/min)				
							33	75 — 1200	ipm (1.91 — 30.48 m/min)				
							GMAW Pulse	Pulse	He Ar CO ₂	34	UltimArc®	75 — 1200	ipm (1.91 — 30.48 m/min)
										36		60 — 1200	ipm (1.52 — 30.48 m/min)
	GMAW STT®		Precision Pulse™	Argon Mix	UltimArc®	421	100 — 600	ipm (2.54 — 15.24 m/min)					
						431	100 — 700	ipm (2.54 — 17.78 m/min)					
						Rapid X™(‡)	Argon Mix	282	UltimArc®	100 — 800	ipm (2.54 — 20.32 m/min)		
								364		100 — 300	ipm (2.54 — 7.62 m/min)		
	0.040	GMAW STT®	Synergic STT®(‡)	He Ar CO ₂	UltimArc®, Hot Start	365	100 — 250	ipm (2.54 — 6.35 m/min)					
						NonSynergic STT®(‡)	Argon Mix	Peak, Background, Tailout, Hot Start	344	100 — 300	ipm (2.54 — 7.62 m/min)		
									345	100 — 300	ipm (2.54 — 7.62 m/min)		
						0.045	GMAW CV	CV	Argon Mix	Pinch	41	75 — 515	ipm (1.91 — 13.08 m/min)
	43	75 — 555	ipm (1.91 — 14.1 m/min)										
	GMAW Pulse	Pulse	He Ar CO ₂	UltimArc®	44						75 — 610	ipm (1.91 — 15.49 m/min)	
					46		50 — 515	ipm (1.27 — 13.08 m/min)					
					GMAW STT®		Precision Pulse™	Argon Mix	UltimArc®	423	50 — 400	ipm (1.27 — 10.16 m/min)	
	433	60 — 400	ipm (1.52 — 10.16 m/min)										
	GMAW STT®	Rapid X™(‡)	Argon Mix	UltimArc®		284				100 — 725	ipm (2.54 — 18.42 m/min)		
					NonSynergic STT®(‡)	Argon Mix	Peak, Background, Tailout, Hot Start	368	90 — 200	ipm (2.29 — 5.08 m/min)			
								369	90 — 200	ipm (2.29 — 5.08 m/min)			
	1/16	GMAW CV	CV	Argon Mix	Pinch	51	50 — 230	ipm (1.27 — 5.84 m/min)					
						56	50 — 270	ipm (1.27 — 6.86 m/min)					
	Stainless Metal Core EC4XX	0.045	GMAW Pulse	Rapid X™(‡)	Argon Mix	290	UltimArc®	75 — 665	ipm (1.91 — 16.89 m/min)				
	SiBr	0.035	GMAW Pulse	Pulse	Argon	192	UltimArc®	80 — 1110	ipm (2.03 — 28.19 m/min)				
0.045		GMAW Pulse	Pulse	Argon	191	UltimArc®	50 — 555	ipm (1.27 — 14.1 m/min)					
	Cu	0.035	GMAW Pulse	Pulse	Argon Helium	198	UltimArc®	100 — 700	ipm (2.54 — 17.78 m/min)				
0.045		GMAW Pulse	Pulse	Argon Helium	196	UltimArc®	75 — 500	ipm (1.91 — 12.7 m/min)					
	NiCr	0.035	GMAW Pulse	Pulse	Ar/ Ar He	501	UltimArc®	75 — 800	ipm (1.91 — 20.32 m/min)				
0.045		GMAW Pulse	Pulse	Ar/ Ar He	503	UltimArc®	75 — 600	ipm (1.91 — 15.24 m/min)					
	NiCu	0.035	GMAW Pulse	Pulse	Ar/ Ar He	507	UltimArc®	75 — 800	ipm (1.91 — 20.32 m/min)				
0.045		GMAW Pulse	Pulse	Ar/ Ar He	509	UltimArc®	75 — 575	ipm (1.91 — 14.61 m/min)					
	NiFe-CI	0.035	GMAW Pulse	Pulse	Ar/ Ar He	513	UltimArc®	75 — 800	ipm (1.91 — 20.32 m/min)				
0.045		GMAW Pulse	Pulse	Ar/ Ar He	515	UltimArc®	75 — 600	ipm (1.91 — 15.24 m/min)					
	Ni-1	0.035	GMAW Pulse	Pulse	Ar/ Ar He	519	UltimArc®	75 — 800	ipm (1.91 — 20.32 m/min)				
0.045		GMAW Pulse	Pulse	Ar/ Ar He	521	UltimArc®	75 — 555	ipm (1.91 — 14.1 m/min)					
	Ni-CI	0.035	GMAW Pulse	Pulse	Ar/ Ar He	525	UltimArc®	75 — 800	ipm (1.91 — 20.32 m/min)				
0.045		GMAW Pulse	Pulse	Ar/ Ar He	527	UltimArc®	75 — 400	ipm (1.91 — 10.16 m/min)					

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	Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)		
	GMAW	Aluminum 4XXX	0.035	GMAW CV	CV	Argon	148	Pinch	150 — 750	ipm (3.81 — 19.05 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)	
GMAW Pulse on Pulse®				Pulse on Pulse®	Argon	98	Frequency	125 — 800	ipm (3.18 — 20.32 m/min)	
GMAW AC Pulse			AC Pulse (§)	Argon	391	UltimArc®	125 — 700	ipm (3.18 — 17.78 m/min)		
3/64			GMAW CV	CV	Argon	71	Pinch	125 — 590	ipm (3.18 — 14.99 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)	
			GMAW Pulse on Pulse®	Pulse on Pulse®	Argon	99	Frequency	85 — 500	ipm (2.16 — 12.7 m/min)	
GMAW AC Pulse			AC Pulse (§)	Argon	393	UltimArc®	100 — 500	ipm (2.54 — 12.7 m/min)		
1/16			GMAW CV	CV	Argon	73	Pinch	75 — 340	ipm (1.91 — 8.64 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)		
		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)			
Aluminum 5XXX		0.035	GMAW CV	CV	Argon	151	Pinch	175 — 750	ipm (4.45 — 19.05 m/min)	
			GMAW Pulse	Pulse	Argon	152	UltimArc®	150 — 800	ipm (3.81 — 20.32 m/min)	
				CC Pulse	Argon	153		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)	
		GMAW AC Pulse	AC Pulse (§)	Argon	396	UltimArc®	125 — 800	ipm (3.18 — 20.32 m/min)		
	3/64	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)		
		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)			
	1/16	GMAW CV	CV	Argon	77	Pinch	125 — 470	ipm (3.18 — 11.94 m/min)		
		GMAW Pulse	Pulse	Argon	78	UltimArc®	100 — 460	ipm (2.54 — 11.68 m/min)		
			CC Pulse	Argon	80		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)			
	Metal Core	0.035	GMAW AC Pulse	Rapid Z™ (§)	Argon Mix	472	UltimArc®	75 — 900	ipm (1.91 — 22.86 m/min)	
		0.040	GMAW AC Pulse	Rapid Z™ (§)	Argon Mix	473	UltimArc®	70 — 700	ipm (1.78 — 17.78 m/min)	
				GMAW CV	CV	Argon Mix	81	Pinch	100 — 700	ipm (2.54 — 17.78 m/min)
0.045		GMAW Pulse	Pulse	Argon Mix	82	UltimArc®	50 — 690	ipm (1.27 — 17.53 m/min)		
			RapidArc®	Argon Mix	87		75 — 795	ipm (1.91 — 20.19 m/min)		
			Rapid X™ (§)	Argon Mix	294		75 — 800	ipm (1.91 — 20.32 m/min)		
0.052		GMAW CV	CV	Argon Mix	83	Pinch	50 — 460	ipm (1.27 — 11.68 m/min)		
			Pulse	Argon Mix	84	UltimArc®	50 — 445	ipm (1.27 — 11.3 m/min)		
			RapidArc®	Argon Mix	88		60 — 440	ipm (1.52 — 11.18 m/min)		
1/16		GMAW Pulse	Rapid X™ (§)	Argon Mix	295	UltimArc®	60 — 495	ipm (1.52 — 12.57 m/min)		
			GMAW CV	CV	Argon Mix		85	Pinch	50 — 310	ipm (1.27 — 7.87 m/min)
			Pulse	Argon Mix	86		50 — 290	ipm (1.27 — 7.37 m/min)		
	RapidArc®		Argon Mix	89	60 — 310		ipm (1.52 — 7.87 m/min)			
Rapid X™ (§)	Argon Mix	296	75 — 285	ipm (1.91 — 7.24 m/min)						
FCAW	Flux Core	All	FCAW-S	Self Shield CV	NA	6	Pinch	10 — 45	V	
			FCAW-G	Gas Shield CV		7	Pinch	10 — 45	V	
	Cored Wire	0.045	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)	
		0.052	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)	
		1/16	FCAW-G	CV	CO ₂	189	Pinch	125 — 400	ipm (3.18 — 10.16 m/min)	
Argon Mix	190				125 — 375	ipm (3.18 — 9.53 m/min)				

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SMAW	Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)
	NA	NA	NA	DCEP SMAW	SMAW Soft	NA	1	Arc Force, Hot Start
SMAW Crisp					NA	2	Arc Force, Hot Start	15 — 350 A
SMAW 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

GTAW	Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)
	NA	NA	NA	DCEN GTAW	Touch Start TIG	Ar / He	3	Hot Start
Touch Start TIG Pulse					Ar / He	8	Frequency, Background, Hot Start	5 — 350 A
HF TIG(⊖)					Ar / He	375	Hot Start	5 — 350 A
HF TIG Pulse (⊖)					Ar / He	376	Frequency, Background, Hot Start	5 — 350 A
AC GTAW				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	Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)
	NA	NA	CAG	Arc Gouge	Compressed Air	9		60 - 350 A

GMAW-Tandem	Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)
	Steel	0.035	GMAW Tandem (Δ)	Sync Pulse Lead	Argon Mix	400	UltimArc®, Phase Angle	100 — 1000 ipm (2.54 — 25.4 m/min)
Argon Mix					401	UltimArc®	100 — 800 ipm (2.54 — 20.32 m/min)	
Argon Mix					460		80 — 900 ipm (2.03 — 22.86 m/min)	
Sync Pulse Trail				Argon Mix	402	UltimArc®, Phase Angle	150 — 800 ipm (3.81 — 20.32 m/min)	
				Argon Mix	403	UltimArc®	150 — 800 ipm (3.81 — 20.32 m/min)	
				Argon Mix	461		80 — 800 ipm (2.03 — 20.32 m/min)	
0.040		GMAW Tandem (Δ)	Sync Pulse Lead	Argon Mix	404	UltimArc®, Phase Angle	100 — 655 ipm (2.54 — 16.64 m/min)	
				Argon Mix	405	UltimArc®	100 — 655 ipm (2.54 — 16.64 m/min)	
				Argon Mix	462		75 — 610 ipm (1.91 — 15.49 m/min)	
			Sync Pulse Trail	Argon Mix	406	UltimArc®, Phase Angle	100 — 435 ipm (2.54 — 11.05 m/min)	
				Argon Mix	407	UltimArc®	100 — 435 ipm (2.54 — 11.05 m/min)	
				Argon Mix	463		50 — 445 ipm (1.27 — 11.3 m/min)	