

§ 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 <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)
	0.035	GMAW CV	CV	CO <sub>2</sub>	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 <sub>2</sub>	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 <sub>2</sub>	304		Peak, Background, Tailout, Hot Start
			Argon Mix	305		100 – 300 ipm (2.54 – 7.62 m/min)	
	GMAW AC STT®	Synergic AC STT®(§)	CO <sub>2</sub>	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 <sub>2</sub>	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 <sub>2</sub>	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 <sub>2</sub>	306		Peak, Background, Tailout, Hot Start
				Argon Mix	307		90 – 225 ipm (2.29 – 5.72 m/min)
	GMAW AC STT®	Synergic AC STT®(§)	CO <sub>2</sub>	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 <sub>2</sub>	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 <sub>2</sub>	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 <sub>2</sub>	308		Peak, Background, Tailout, Hot Start
		Argon Mix	309		90 – 225 ipm (2.29 – 5.72 m/min)		
GMAW AC STT®	Synergic AC STT®(§)	CO <sub>2</sub>	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 <sub>2</sub>	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 <sub>2</sub>	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 <sub>2</sub>	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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	GMAW		Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)								
	Stainless	0.030	GMAW CV	CV	Argon Mix			He Ar CO <sub>2</sub>	61	Pinch	100 — 1200 ipm (2.54 — 30.48 m/min)							
63									100 — 1200 ipm (2.54 — 30.48 m/min)									
GMAW Pulse			Pulse	Argon Mix				He Ar CO <sub>2</sub>	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				He Ar CO <sub>2</sub>	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			He Ar CO <sub>2</sub>	31	Pinch	75 — 1200 ipm (1.91 — 30.48 m/min)							
									33		75 — 1200 ipm (1.91 — 30.48 m/min)							
									GMAW Pulse		Pulse	Argon Mix			He Ar CO <sub>2</sub>	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				He Ar CO <sub>2</sub>	421	UltimArc®	100 — 600 ipm (2.54 — 15.24 m/min)							
									431		100 — 700 ipm (2.54 — 17.78 m/min)							
									Rapid X™(‡)		Argon Mix				He Ar CO <sub>2</sub>	282	UltimArc®	100 — 800 ipm (2.54 — 20.32 m/min)
																364		100 — 300 ipm (2.54 — 7.62 m/min)
GMAW STT®		Synergic STT®(‡)	Argon Mix				He Ar CO <sub>2</sub>	365	UltimArc®, Hot Start	100 — 250 ipm (2.54 — 6.35 m/min)								
								344		100 — 300 ipm (2.54 — 7.62 m/min)								
GMAW STT®		NonSynergic STT®(‡)	Argon Mix				He Ar CO <sub>2</sub>	345	Peak, Background, Tailout, Hot Start	100 — 300 ipm (2.54 — 7.62 m/min)								
								345		100 — 300 ipm (2.54 — 7.62 m/min)								
0.040		GMAW STT®	Synergic STT®(‡)	Argon Mix			He Ar CO <sub>2</sub>	366	UltimArc®, Hot Start	100 — 300 ipm (2.54 — 7.62 m/min)								
								367		100 — 250 ipm (2.54 — 6.35 m/min)								
								GMAW STT®		NonSynergic STT®(‡)	Argon Mix			He Ar CO <sub>2</sub>	346	Peak, Background, Tailout, Hot Start	100 — 300 ipm (2.54 — 7.62 m/min)	
															347		100 — 300 ipm (2.54 — 7.62 m/min)	
0.045		GMAW CV	CV	Argon Mix			He Ar CO <sub>2</sub>	41	Pinch	75 — 515 ipm (1.91 — 13.08 m/min)								
								43		75 — 555 ipm (1.91 — 14.1 m/min)								
								GMAW Pulse		Pulse	Argon Mix			He Ar CO <sub>2</sub>	44	UltimArc®	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				He Ar CO <sub>2</sub>	423	UltimArc®	50 — 400 ipm (1.27 — 10.16 m/min)							
									433		60 — 400 ipm (1.52 — 10.16 m/min)							
	GMAW STT®								Synergic STT®(‡)		Argon Mix			He Ar CO <sub>2</sub>	368	UltimArc®, Hot Start	90 — 200 ipm (2.29 — 5.08 m/min)	
															369		90 — 200 ipm (2.29 — 5.08 m/min)	
	GMAW STT®	NonSynergic STT®(‡)	Argon Mix				He Ar CO <sub>2</sub>	348	Peak, Background, Tailout, Hot Start	90 — 225 ipm (2.29 — 5.72 m/min)								
								349		90 — 225 ipm (2.29 — 5.72 m/min)								
1/16	GMAW CV	CV	Argon Mix				51	Pinch	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 (*)
<b>GMAW</b>	<b>Aluminum 4XXX</b>	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)			
	<b>Aluminum 5XXX</b>	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)		
<b>Metal Core</b>		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)	
			GMAW Pulse	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)	
	Rapid X™ (§)	Argon Mix	295	60 — 495 ipm (1.52 — 12.57 m/min)					
	1/16		GMAW CV	CV	Argon Mix	85	Pinch	50 — 310 ipm (1.27 — 7.87 m/min)	
			GMAW Pulse	Pulse	Argon Mix	86	UltimArc®	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)						
<b>FCAW</b>	<b>Flux Core</b>	All	FCAW-S	Self Shield CV	NA	6	Pinch	10 — 45 V	
			FCAW-G	Gas Shield CV		7	Pinch	10 — 45 V	
	<b>Cored Wire</b>	0.045		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)
		0.052		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)
1/16		FCAW-G	CV	CO <sub>2</sub>	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		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		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
Automatic TIG					Ar / He	490	Hot Start	5 — 500 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)
Sync Pulse Trail				Argon Mix	401	UltimArc®	100 — 800 ipm (2.54 — 20.32 m/min)	
HotWire Pulse Trail				Argon Mix	460		80 — 900 ipm (2.03 — 22.86 m/min)	
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)	
0.045		GMAW Tandem (Δ)	Sync Pulse Lead	Argon Mix	404	UltimArc®, Phase Angle	100 — 655 ipm (2.54 — 16.64 m/min)	
			Sync Pulse Trail	Argon Mix	405	UltimArc®	100 — 655 ipm (2.54 — 16.64 m/min)	
			HotWire Pulse Trail	Argon Mix	462		75 — 610 ipm (1.91 — 15.49 m/min)	
0.052		GMAW Tandem (Δ)	Sync Pulse Lead	Argon Mix	406	UltimArc®, Phase Angle	100 — 435 ipm (2.54 — 11.05 m/min)	
			Sync Pulse Trail	Argon Mix	407	UltimArc®	100 — 435 ipm (2.54 — 11.05 m/min)	
			HotWire Pulse Trail	Argon Mix	463		50 — 445 ipm (1.27 — 11.3 m/min)	