

§ Advanced Module Required

⊙ External HF Starter Required

‡ STT® or Advanced Module Required

Δ Tandem Controller Required

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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 – 23 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 – 1200 ipm (1.27 – 30.48 m/min)
		GMAW Pulse	Pulse	Argon Mix	12	UltimArc®	60 – 1200 ipm (1.52 – 30.48 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)
			Low Fume Pulse(‡)	Argon Mix	550		75 – 1200 ipm (1.91 – 30.48 m/min)
			GMAW STT®	Synergic STT®(‡)	CO ₂		324
				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 – 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		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)
			Low Fume Pulse(‡)	Argon Mix	551		75 – 800 ipm (1.91 – 20.32 m/min)
			GMAW STT®	Synergic STT®(‡)	CO ₂		326
				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 – 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®	50 – 800 ipm (1.27 – 20.32 m/min)
			RapidArc®	Argon Mix	18		75 – 800 ipm (1.91 – 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)
			Low Fume Pulse(‡)	Argon Mix	552		100 – 800 ipm (2.54 – 20.32 m/min)
			GMAW STT®	Synergic STT®(‡)	CO ₂		328
				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 – 750 ipm (1.27 – 19.05 m/min)	
			Argon Mix	25		50 – 700 ipm (1.27 – 17.78 m/min)	
	GMAW Pulse	Pulse	Argon Mix	26	UltimArc®	50 – 700 ipm (1.27 – 17.78 m/min)	
		RapidArc®	Argon Mix	27		60 – 750 ipm (1.52 – 19.05 m/min)	
		Precision Pulse™	Argon Mix	414		75 – 500 ipm (1.91 – 12.7 m/min)	
		Rapid X™(‡)	Argon Mix	275		75 – 600 ipm (1.91 – 15.24 m/min)	
		Low Fume Pulse(‡)	Argon Mix	553		75 – 600 ipm (1.91 – 15.24 m/min)	
		GMAW STT®	Synergic STT®(‡)	CO ₂		330	UltimArc®, Hot Start
			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 – 650 ipm (1.27 – 16.51 m/min)	
		GMAW Pulse	Pulse	Argon Mix		108	UltimArc®

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Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)	
GMAW	Stainless	GMAW CV	CV	Argon Mix	61	Pinch	100 – 1200 ipm (2.54 – 30.48 m/min)	
				He Ar CO ₂	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)	
				Argon Mix	66		80 – 1200 ipm (2.03 – 30.48 m/min)	
				Argon Mix	420		UltimArc®	100 – 800 ipm (2.54 – 20.32 m/min)
				He Ar CO ₂	430			100 – 800 ipm (2.54 – 20.32 m/min)
	0.035	GMAW CV	CV	Argon Mix	31	Pinch	75 – 1200 ipm (1.91 – 30.48 m/min)	
				He Ar CO ₂	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)	
				Argon Mix	36		60 – 1200 ipm (1.52 – 30.48 m/min)	
				Argon Mix	421		UltimArc®	100 – 600 ipm (2.54 – 15.24 m/min)
				He Ar CO ₂	431			100 – 700 ipm (2.54 – 17.78 m/min)
	GMAW STT®	Synergic STT®(‡)	Argon Mix	364	UltimArc®, Hot Start	100 – 300 ipm (2.54 – 7.62 m/min)		
			He Ar CO ₂	365		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)
	He Ar CO ₂	345	100 – 300 ipm (2.54 – 7.62 m/min)					
	0.040	GMAW STT®	Synergic STT®(‡)	Argon Mix	366	UltimArc®, Hot Start	100 – 300 ipm (2.54 – 7.62 m/min)	
				He Ar CO ₂	367		100 – 250 ipm (2.54 – 6.35 m/min)	
				NonSynergic STT®(‡)	Argon Mix		346	Peak, Background, Tailout, Hot Start
	He Ar CO ₂	347	100 – 300 ipm (2.54 – 7.62 m/min)					
	0.045	GMAW CV	CV	Argon Mix	41	Pinch	75 – 800 ipm (1.91 – 20.32 m/min)	
				He Ar CO ₂	43		75 – 800 ipm (1.91 – 20.32 m/min)	
		GMAW Pulse	Pulse	He Ar CO ₂	44	UltimArc®	75 – 800 ipm (1.91 – 20.32 m/min)	
				Argon Mix	46		50 – 800 ipm (1.27 – 20.32 m/min)	
				Argon Mix	423		UltimArc®	50 – 400 ipm (1.27 – 10.16 m/min)
				He Ar CO ₂	433			60 – 400 ipm (1.52 – 10.16 m/min)
		GMAW STT®	Synergic STT®(‡)	Argon Mix	284	UltimArc®	100 – 800 ipm (2.54 – 20.32 m/min)	
				Argon Mix	368		UltimArc®, Hot Start	90 – 200 ipm (2.29 – 5.08 m/min)
				He Ar CO ₂	369			90 – 200 ipm (2.29 – 5.08 m/min)
				NonSynergic STT®(‡)	Argon Mix		348	Peak, Background, Tailout, Hot Start
He Ar CO ₂	349	90 – 225 ipm (2.29 – 5.72 m/min)						
1/16	GMAW CV	CV	Argon Mix	51	Pinch	50 – 515 ipm (1.27 – 13.08 m/min)		
	GMAW Pulse	Pulse	Argon Mix	56	UltimArc®	50 – 635 ipm (1.27 – 16.13 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)	
	0.045	GMAW CV	CV	Argon Mix	81	Pinch	100 – 700 ipm (2.54 – 17.78 m/min)	
				Argon Mix	82		50 – 700 ipm (1.27 – 17.78 m/min)	
				Argon Mix	87		UltimArc®	75 – 800 ipm (1.91 – 20.32 m/min)
	Argon Mix	294	75 – 800 ipm (1.91 – 20.32 m/min)					
	0.052	GMAW CV	CV	Argon Mix	83	Pinch	50 – 600 ipm (1.27 – 15.24 m/min)	
				Argon Mix	84		50 – 600 ipm (1.27 – 15.24 m/min)	
				Argon Mix	88		UltimArc®	60 – 800 ipm (1.52 – 20.32 m/min)
	Argon Mix	295	60 – 650 ipm (1.52 – 16.51 m/min)					
	1/16	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)	
Argon Mix				89	UltimArc®		60 – 450 ipm (1.52 – 11.43 m/min)	
Argon Mix	296	75 – 450 ipm (1.91 – 11.43 m/min)						
Stainless Metal Core EC4XX	0.045	GMAW Pulse	Rapid X™(‡)	Argon Mix	290	UltimArc®	75 – 800 ipm (1.91 – 20.32 m/min)	

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	GMAW										
	Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)			
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)			
	3/64		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)			
			GMAW Pulse on Pulse®	Pulse on Pulse®	Argon	99	Frequency	85 – 500 ipm (2.16 – 12.7 m/min)			
	1/16		GMAW AC Pulse	AC Pulse (§)	Argon	391	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)			
				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)		
		3/64		GMAW AC Pulse	AC Pulse (§)	Argon	396	UltimArc®	125 – 800 ipm (3.18 – 20.32 m/min)		
				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)				
		1/16		GMAW AC Pulse	AC Pulse (§)	Argon	398	UltimArc®	85 – 600 ipm (2.16 – 15.24 m/min)		
				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 – 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)					
SiBr		0.035		GMAW Pulse	Pulse	Argon	192	UltimArc®	80 – 1200 ipm (2.03 – 30.48 m/min)		
	GMAW STT®			Synergic STT®(‡)	Argon	335	UltimArc®	140 – 450 ipm (3.56 – 11.43 m/min)			
	0.040		GMAW STT®	Synergic STT®(‡)	Argon	336	UltimArc®	120 – 350 ipm (3.05 – 8.89 m/min)			
			GMAW Pulse	Pulse	Argon	191	UltimArc®	50 – 600 ipm (1.27 – 15.24 m/min)			
0.045		GMAW STT®	Synergic STT®(‡)	Argon	337	UltimArc®	90 – 300 ipm (2.29 – 7.62 m/min)				
		GMAW Pulse	Pulse	Argon Helium	198	UltimArc®	100 – 700 ipm (2.54 – 17.78 m/min)				
Cu			GMAW Pulse	Pulse	Argon Helium	196	UltimArc®	75 – 500 ipm (1.91 – 12.7 m/min)			
			GMAW Pulse	Pulse	Argon Helium	198	UltimArc®	100 – 700 ipm (2.54 – 17.78 m/min)			
NiCr			GMAW Pulse	Pulse	Ar/ Ar He	501	UltimArc®	75 – 800 ipm (1.91 – 20.32 m/min)			
			GMAW Pulse	Pulse	Ar/ Ar He	503	UltimArc®	75 – 600 ipm (1.91 – 15.24 m/min)			
			GMAW Pulse	Pulse	Ar/ Ar He	505	UltimArc®	75 – 350 ipm (1.91 – 8.89 m/min)			
NiCu			GMAW Pulse	Pulse	Ar/ Ar He	507	UltimArc®	75 – 800 ipm (1.91 – 20.32 m/min)			
			GMAW Pulse	Pulse	Ar/ Ar He	509	UltimArc®	75 – 600 ipm (1.91 – 15.24 m/min)			
			GMAW Pulse	Pulse	Ar/ Ar He	511	UltimArc®	50 – 350 ipm (1.27 – 8.89 m/min)			
NiFe-CI			GMAW Pulse	Pulse	Ar/ Ar He	513	UltimArc®	75 – 800 ipm (1.91 – 20.32 m/min)			
			GMAW Pulse	Pulse	Ar/ Ar He	515	UltimArc®	75 – 600 ipm (1.91 – 15.24 m/min)			
Ni-1			GMAW Pulse	Pulse	Ar/ Ar He	519	UltimArc®	75 – 800 ipm (1.91 – 20.32 m/min)			
			GMAW Pulse	Pulse	Ar/ Ar He	521	UltimArc®	75 – 600 ipm (1.91 – 15.24 m/min)			
			GMAW Pulse	Pulse	Ar/ Ar He	523	UltimArc®	50 – 300 ipm (1.27 – 7.62 m/min)			
Ni-CI			GMAW Pulse	Pulse	Ar/ Ar He	525	UltimArc®	75 – 800 ipm (1.91 – 20.32 m/min)			
			GMAW Pulse	Pulse	Ar/ Ar He	527	UltimArc®	75 – 500 ipm (1.91 – 12.7 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	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)				
				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 – 400 ipm (3.18 – 10.16 m/min)		

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SMAW	Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)
	NA	NA	NA	DCEP SMAW	Soft	NA	1	Arc Force, Hot Start
Crisp					NA	2	Arc Force, Hot Start	15 – 555 A
Pipe					NA	4	Arc Force	50 – 250 A
DCEN SMAW				SMAW DC- (S)	NA	379	Arc Force, Hot Start	15 – 350 A
AC SMAW				AC SMAW (S)	NA	374	Arc Force, Hot Start, Frequency	15 – 350 A

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 – 555 A
HF TIG (⊖)					Ar / He	375	Hot Start	5 – 450 A
HF TIG Pulse (⊖)					Ar / He	376	Frequency, Background, Hot Start	5 – 450 A
AC GTAW				Touch Start AC TIG(S)	Ar / He	377	AC Frequency, AC Balance, DC Offset, Hot Start	10 – 350 A
				HF Start AC TIG (S)	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	

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
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)
0.040		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)
0.045		GMAW Tandem (Δ)	Sync Pulse Lead	Argon Mix	406	UltimArc®, Phase Angle	100 – 800 ipm	(2.54 – 20.32 m/min)
			Sync Pulse Trail	Argon Mix	407	UltimArc®	100 – 800 ipm	(2.54 – 20.32 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	0.035	GMAW	HyperFill		Argon Mix	601	
0.040		GMAW	HyperFill		Argon Mix	602		100 – 480 ipm (2.54 – 12.19 m/min)