

§ 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 (*)
Steel	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)
			Pulse	Argon Mix	95		UltimArc®
	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	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	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	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)		
1/16	GMAW CV	CV	Argon Mix	107	Pinch	50 – 200 ipm (1.27 – 5.08 m/min)	
		Pulse	Argon Mix	108		UltimArc®	50 – 235 ipm (1.27 – 5.97 m/min)

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	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)		
		Pulse	Argon Mix	82	UltimArc®	50 — 690	ipm (1.27 — 17.53 m/min)		
		GMAW Pulse	RapidArc®	Argon Mix	87	UltimArc®	75 — 795	ipm (1.91 — 20.19 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)		
		GMAW Pulse	RapidArc®	Argon Mix	88	UltimArc®	60 — 440	ipm (1.52 — 11.18 m/min)	
1/16	GMAW CV	CV	Argon Mix	85	Pinch	60 — 495	ipm (1.52 — 12.57 m/min)		
		Pulse	Argon Mix	86	UltimArc®	50 — 310	ipm (1.27 — 7.87 m/min)		
		GMAW Pulse	RapidArc®	Argon Mix	89	UltimArc®	60 — 310	ipm (1.52 — 7.87 m/min)	
			Rapid X™ (‡)	Argon Mix	296	75 — 285	ipm (1.91 — 7.24 m/min)		

GMAW	Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)	
Stainless	0.030	GMAW CV	CV	Pulse	Argon Mix	61	Pinch	100 — 1200	ipm (2.54 — 30.48 m/min)
					He Ar CO <sub>2</sub>	63	UltimArc®	100 — 1200	ipm (2.54 — 30.48 m/min)
					Argon Mix	64	UltimArc®	90 — 1200	ipm (2.29 — 30.48 m/min)
					He Ar CO <sub>2</sub>	66	UltimArc®	80 — 1200	ipm (2.03 — 30.48 m/min)
	0.035	GMAW Pulse	Precision Pulse™	Argon Mix	420	UltimArc®	100 — 800	ipm (2.54 — 20.32 m/min)	
				He Ar CO <sub>2</sub>	430	UltimArc®	100 — 800	ipm (2.54 — 20.32 m/min)	
				Argon Mix	31	Pinch	75 — 1200	ipm (1.91 — 30.48 m/min)	
				He Ar CO <sub>2</sub>	33	Pinch	75 — 1200	ipm (1.91 — 30.48 m/min)	
		GMAW STT®	NonSynergic STT® (‡)	Argon Mix	34	UltimArc®	75 — 1200	ipm (1.91 — 30.48 m/min)	
				He Ar CO <sub>2</sub>	36	UltimArc®	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 <sub>2</sub>	431	UltimArc®	100 — 700	ipm (2.54 — 17.78 m/min)	
	0.040	GMAW STT®	NonSynergic STT® (‡)	Argon Mix	282	UltimArc®	100 — 800	ipm (2.54 — 20.32 m/min)	
				He Ar CO <sub>2</sub>	364	UltimArc®, Hot Start	100 — 300	ipm (2.54 — 7.62 m/min)	
				He Ar CO <sub>2</sub>	365	UltimArc®, Hot Start	100 — 250	ipm (2.54 — 6.35 m/min)	
				He Ar CO <sub>2</sub>	344	Peak, Background, Tailout, Hot Start	100 — 300	ipm (2.54 — 7.62 m/min)	
	0.045	GMAW CV	CV	Argon Mix	345	Peak, Background, Tailout, Hot Start	100 — 300	ipm (2.54 — 7.62 m/min)	
				He Ar CO <sub>2</sub>	366	UltimArc®, Hot Start	100 — 300	ipm (2.54 — 7.62 m/min)	
				He Ar CO <sub>2</sub>	367	UltimArc®, Hot Start	100 — 250	ipm (2.54 — 6.35 m/min)	
				Argon Mix	346	Peak, Background, Tailout, Hot Start	100 — 300	ipm (2.54 — 7.62 m/min)	
				He Ar CO <sub>2</sub>	347	Peak, Background, Tailout, Hot Start	100 — 300	ipm (2.54 — 7.62 m/min)	
				He Ar CO <sub>2</sub>	349	Peak, Background, Tailout, Hot Start	100 — 300	ipm (2.54 — 7.62 m/min)	
		GMAW Pulse	Precision Pulse™	Argon Mix	41	Pinch	75 — 515	ipm (1.91 — 13.08 m/min)	
				He Ar CO <sub>2</sub>	43	Pinch	75 — 555	ipm (1.91 — 14.1 m/min)	
He Ar CO <sub>2</sub>				44	UltimArc®	75 — 610	ipm (1.91 — 15.49 m/min)		
Argon Mix				46	UltimArc®	50 — 515	ipm (1.27 — 13.08 m/min)		
Argon Mix				423	UltimArc®	50 — 400	ipm (1.27 — 10.16 m/min)		
He Ar CO <sub>2</sub>				433	UltimArc®	60 — 400	ipm (1.52 — 10.16 m/min)		
GMAW STT®	NonSynergic STT® (‡)	Argon Mix	284	UltimArc®	100 — 725	ipm (2.54 — 18.42 m/min)			
		He Ar CO <sub>2</sub>	368	UltimArc®, Hot Start	90 — 200	ipm (2.29 — 5.08 m/min)			
		He Ar CO <sub>2</sub>	369	UltimArc®, Hot Start	90 — 200	ipm (2.29 — 5.08 m/min)			
		Argon Mix	348	Peak, Background, Tailout, Hot Start	90 — 225	ipm (2.29 — 5.72 m/min)			
		He Ar CO <sub>2</sub>	349	Peak, Background, Tailout, Hot Start	90 — 225	ipm (2.29 — 5.72 m/min)			
		He Ar CO <sub>2</sub>	349	Peak, Background, Tailout, Hot Start	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)		
	GMAW Pulse	Pulse	Argon Mix	56	UltimArc®	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)	

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	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)	

	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)			

	Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)	
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 <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)		

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

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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
AC GTAW			Touch Start AC TIG(§)		Ar / He	377	AC Balance, DC Offset, Hot Start	10 — 350 A
			HF Start AC TIG (§)		Ar / He	378	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 (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)
		0.040	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)
		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)	