

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 - 40 kW
Steel	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		60 - 1200 ipm (1.52 - 30.48 m/min)
			RapidArc®	Argon Mix	13	UltimArc®	60 - 1200 ipm (1.52 - 30.48 m/min)
			Precision Pulse™	Argon Mix	411		100 - 600 ipm (2.54 - 15.24 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		60 - 1200 ipm (1.52 - 30.48 m/min)
			RapidArc®	Argon Mix	141	UltimArc®	60 - 1200 ipm (1.52 - 30.48 m/min)
			Precision Pulse™	Argon Mix	412		75 - 600 ipm (1.91 - 15.24 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		50 - 800 ipm (1.27 - 20.32 m/min)
			RapidArc®	Argon Mix	18	UltimArc®	75 - 800 ipm (1.91 - 20.32 m/min)
			Precision Pulse™	Argon Mix	413		75 - 600 ipm (1.91 - 15.24 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		50 - 700 ipm (1.27 - 17.78 m/min)
			RapidArc®	Argon Mix	27	UltimArc®	60 - 750 ipm (1.52 - 19.05 m/min)
			Precision Pulse™	Argon Mix	414		75 - 500 ipm (1.91 - 12.7 m/min)
	1/16	GMAW CV	CV	Argon Mix	107	Pinch	50 - 450 ipm (1.27 - 11.43 m/min)
GMAW Pulse		Pulse	Argon Mix	108	UltimArc®	50 - 500 ipm (1.27 - 12.7 m/min)	
Stainless	0.030	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)
			Precision Pulse™	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)
			Precision Pulse™	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)	
	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)
		Precision Pulse™	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)		
1/16	GMAW CV	CV	Argon Mix	51	Pinch	50 - 600 ipm (1.27 - 15.24 m/min)	
	GMAW Pulse	Pulse	Argon Mix	56	UltimArc®	50 - 700 ipm (1.27 - 17.78 m/min)	
Metal Core	0.045	GMAW CV	CV	Argon Mix	81	Pinch	100 - 700 ipm (2.54 - 17.78 m/min)
		GMAW Pulse	Pulse	Argon Mix	82	UltimArc®	50 - 700 ipm (1.27 - 17.78 m/min)
			RapidArc®	Argon Mix	87		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)
		GMAW Pulse	Pulse	Argon Mix	84	UltimArc®	50 - 600 ipm (1.27 - 15.24 m/min)
			RapidArc®	Argon Mix	88		60 - 800 ipm (1.52 - 20.32 m/min)
	1/16	GMAW CV	CV	Argon Mix	85	Pinch	50 - 450 ipm (1.27 - 11.43 m/min)
		GMAW Pulse	Pulse	Argon Mix	86	UltimArc®	50 - 450 ipm (1.27 - 11.43 m/min)
		RapidArc®	Argon Mix	89		60 - 450 ipm (1.52 - 11.43 m/min)	

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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 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)		
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 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 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)		
SiBr	0.035	GMAW Pulse	Pulse	Argon	192	UltimArc®	80 - 1200	ipm (2.03 - 30.48 m/min)	
	0.045	GMAW Pulse	Pulse	Argon	191	UltimArc®	50 - 600	ipm (1.27 - 15.24 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)	
	1/16	GMAW Pulse	Pulse	Ar/ Ar He	505	UltimArc®	75 - 350	ipm (1.91 - 8.89 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 - 600	ipm (1.91 - 15.24 m/min)	
NiFe-CI	0.035	GMAW Pulse	Pulse	Ar/ Ar He	511	UltimArc®	50 - 350	ipm (1.27 - 8.89 m/min)	
	0.045	GMAW Pulse	Pulse	Ar/ Ar He	513	UltimArc®	75 - 800	ipm (1.91 - 20.32 m/min)	
Ni-1	0.035	GMAW Pulse	Pulse	Ar/ Ar He	515	UltimArc®	75 - 600	ipm (1.91 - 15.24 m/min)	
	0.045	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 - 600	ipm (1.91 - 15.24 m/min)	
Ni-CI	0.035	GMAW Pulse	Pulse	Ar/ Ar He	523	UltimArc®	50 - 300	ipm (1.27 - 7.62 m/min)	
	0.045	GMAW Pulse	Pulse	Ar/ Ar He	525	UltimArc®	75 - 800	ipm (1.91 - 20.32 m/min)	
Ni-CI	0.035	GMAW Pulse	Pulse	Ar/ Ar He	527	UltimArc®	75 - 500	ipm (1.91 - 12.7 m/min)	
	0.045	GMAW Pulse	Pulse	Ar/ Ar He	527	UltimArc®	75 - 500	ipm (1.91 - 12.7 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	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)
		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 - 400	ipm (3.18 - 10.16 m/min)

Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)
SMAW	NA	DCEP SMAW	SMAW Soft	NA	1	Arc Force, Hot Start	15 - 900 A
			SMAW Crisp	NA	2	Arc Force, Hot Start	15 - 900 A
			SMAW Pipe	NA	4	Arc Force	50 - 250 A

Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)
GTAW	NA	DCEN GTAW	Touch Start TIG	Ar / He	3	Hot Start	5 - 900 A
			Touch Start TIG Pulse	Ar / He	8	Frequency, Background, Hot Start	5 - 800 A

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CAG	Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)
	NA	NA	CAG	Arc Gouge	Compressed Air	9		60 - 900 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
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 - 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)
0.052		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)
1/16		GMAW Tandem (Δ)	Sync Pulse Lead	Argon Mix	408	UltimArc®, Phase Angle	100 - 500 ipm	(2.54 - 12.7 m/min)
			Sync Pulse Trail	Argon Mix	409	UltimArc®	100 - 500 ipm	(2.54 - 12.7 m/min)
			HotWire Pulse Trail	Argon Mix	464		50 - 500 ipm	(1.27 - 12.7 m/min)