

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 – 55 V	
		GMAW Power	Power Mode®		40	Pinch	0.1 – 40 kW	
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)	
		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 – 1200 ipm (1.27 – 30.48 m/min)	
		GMAW Pulse	Pulse	Argon Mix	12		60 – 1200 ipm (1.52 – 30.48 m/min)	
		GMAW Pulse	RapidArc®	Argon Mix	13	UltimArc®	60 – 1200 ipm (1.52 – 30.48 m/min)	
	0.040			Argon Mix	411		100 – 600 ipm (2.54 – 15.24 m/min)	
		GMAW CV	CV	CO <sub>2</sub>	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)	
	0.045			Argon Mix	141	UltimArc®	60 – 1200 ipm (1.52 – 30.48 m/min)	
				Argon Mix	412		75 – 600 ipm (1.91 – 15.24 m/min)	
		GMAW CV	CV	CO <sub>2</sub>	20	Pinch	50 – 800 ipm (1.27 – 20.32 m/min)	
				Argon Mix	21		50 – 800 ipm (1.27 – 20.32 m/min)	
	0.052			Argon Mix	22		50 – 800 ipm (1.27 – 20.32 m/min)	
		GMAW Pulse	Pulse	Argon Mix	18	UltimArc®	75 – 800 ipm (1.91 – 20.32 m/min)	
				Argon Mix	413		75 – 600 ipm (1.91 – 15.24 m/min)	
		GMAW CV	CV	CO <sub>2</sub>	24	Pinch	50 – 750 ipm (1.27 – 19.05 m/min)	
	1/16			Argon Mix	25		50 – 700 ipm (1.27 – 17.78 m/min)	
				Argon Mix	26		50 – 700 ipm (1.27 – 17.78 m/min)	
		GMAW Pulse	Pulse	Argon Mix	27	UltimArc®	60 – 750 ipm (1.52 – 19.05 m/min)	
				Argon Mix	414		75 – 500 ipm (1.91 – 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 <sub>2</sub>	63		100 – 1200 ipm (2.54 – 30.48 m/min)	
GMAW Pulse			Pulse	He Ar CO <sub>2</sub>	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)	
0.035				He Ar CO <sub>2</sub>	430		100 – 800 ipm (2.54 – 20.32 m/min)	
		GMAW CV	CV	Argon Mix	31	Pinch	75 – 1200 ipm (1.91 – 30.48 m/min)	
				He Ar CO <sub>2</sub>	33		75 – 1200 ipm (1.91 – 30.48 m/min)	
		GMAW Pulse	Pulse	He Ar CO <sub>2</sub>	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)		
0.045				He Ar CO <sub>2</sub>	431		100 – 700 ipm (2.54 – 17.78 m/min)	
		GMAW CV	CV	Argon Mix	41	Pinch	75 – 800 ipm (1.91 – 20.32 m/min)	
				He Ar CO <sub>2</sub>	43		75 – 800 ipm (1.91 – 20.32 m/min)	
		GMAW Pulse	Pulse	He Ar CO <sub>2</sub>	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)		
1/16				He Ar CO <sub>2</sub>	433		60 – 400 ipm (1.52 – 10.16 m/min)	
		GMAW CV	CV	Argon Mix	51	Pinch	50 – 600 ipm (1.27 – 15.24 m/min)	
Metal Core		0.045			Argon Mix	56	UltimArc®	50 – 700 ipm (1.27 – 17.78 m/min)
			GMAW CV	CV	Argon Mix	81	Pinch	100 – 700 ipm (2.54 – 17.78 m/min)
					Argon Mix	82	UltimArc®	50 – 700 ipm (1.27 – 17.78 m/min)
		0.052	GMAW Pulse	Pulse	Argon Mix	87	UltimArc®	75 – 800 ipm (1.91 – 20.32 m/min)
					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	UltimArc®	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)	
				Argon Mix	86		50 – 450 ipm (1.27 – 11.43 m/min)	
		GMAW Pulse	Pulse	Argon Mix	89	UltimArc®	60 – 450 ipm (1.52 – 11.43 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)		
3/64			GMAW Pulse on Pulse®	Pulse on Pulse®	Argon	98	Frequency	125 – 800 ipm (3.18 – 20.32 m/min)		
			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)					
1/16			GMAW Pulse on Pulse®	Pulse on Pulse®	Argon	99	Frequency	85 – 500 ipm (2.16 – 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)		
	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)			
3/64		GMAW Pulse on Pulse®	Pulse on Pulse®	Argon	101	Frequency	140 – 800 ipm (3.56 – 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)						
1/16		GMAW Pulse on Pulse®	Pulse on Pulse®	Argon	102	Frequency	100 – 600 ipm (2.54 – 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)			
		SiBr	0.035		GMAW Pulse	Pulse	Argon	192	UltimArc®	80 – 1200 ipm (2.03 – 30.48 m/min)
					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)		
			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)		
			GMAW Pulse	Pulse	Ar/ Ar He	503	UltimArc®	75 – 600 ipm (1.91 – 15.24 m/min)		
NiCu	0.045		GMAW Pulse	Pulse	Ar/ Ar He	505	UltimArc®	75 – 350 ipm (1.91 – 8.89 m/min)		
			GMAW Pulse	Pulse	Ar/ Ar He	507	UltimArc®	75 – 800 ipm (1.91 – 20.32 m/min)		
						509	UltimArc®	75 – 600 ipm (1.91 – 15.24 m/min)		
NiFe-CI	1/16		GMAW Pulse	Pulse	Ar/ Ar He	511	UltimArc®	50 – 350 ipm (1.27 – 8.89 m/min)		
			GMAW Pulse	Pulse	Ar/ Ar He	513	UltimArc®	75 – 800 ipm (1.91 – 20.32 m/min)		
						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)		
			GMAW Pulse	Pulse	Ar/ Ar He	521	UltimArc®	75 – 600 ipm (1.91 – 15.24 m/min)		
						523	UltimArc®	50 – 300 ipm (1.27 – 7.62 m/min)		
Ni-CI	0.045		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	Type	Size	Procedure	Waveform	Gas Type	Mode #	Arc Control	Max. Range (*)
	Flux Core	All		FCAW-S	Self Shield CV	NA	6	Pinch
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)
			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)	
					CO <sub>2</sub>	189	Pinch	125 – 400 ipm (3.18 – 10.16 m/min)
	1/16		FCAW-G	CV	Argon Mix	190	Pinch	125 – 400 ipm (3.18 – 10.16 m/min)

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

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

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 – 700 ipm (2.54 – 17.78 m/min)