



Range of M pneumatic and mechanical machines





MA type

MD type

Glossary:

WCC: Welding Cabinet Controller EL: Effective Length ED: Effective Depth Single Stroke cylinder SS: Double Stroke cylinder

Manual adjustment: Adjustment is performed by a pressure regulator which determines the compressed air supply of the cylinder in order to obtain the best clamping force. Electronic adjustment: The adjustment of the welding force of the cylinder is controlled by a proportional valve.

Pressure program: This device allows the pressure to be varied during the force, for example, to reduce it when welding or to increase it again during the hold







General presentation

ARO, world leader in resistance welding, offers innumerable solutions for spot or projection welding applications, within the 50% of 30 kVA and 50 kVA power ranges.

This new range of M machines, completely updated and redesigned, is structured around a single frame, with a choice of 2 pneumatic cylinders, 2 transformers and a range of 6 welding cabinet controllers (WCC). The user therefore has access to a wide range of possibilities to control better the welding current and the clamping force.

The pneumatic M series is equipped in standard version with a wide diversity of equipment such as:

- Electric pedal,
- Filter, pressure regulator and purge valve assembly for air circuit,
- 740 daN cylinder using non-lubricated air at 6 bars,
- Distributor for pneumatic cylinder control,
- Safety pressure switch,
- Integrated welding controller,
- Program selector,
- With/without current selector,
- Machine stop,
- Mains power supply switch,
- Standard 400 V/50 Hz power supply.

To complete its basic equipment, a wide range of options is proposed:

	MA	MC	MD	MB
■For the frame				
150 mm machine hightener	*	*		*
Column-mounted lower arm	*	*	*	
■For welding cabinet controller				
6 sequence versions (AR.01, 5T2P, 7T8P,10T16P, 10T32P, 10T16PEC)	*	*		*
Welding cabinet controller protective window	*	*	*	*
For controller				
Double-effect pedal (squeeze without welding)	*	*		
Separate welding controller	*	*	*	*
■For pneumatics				
Double stroke cylinder	*	*		*
Opening/closing position control	*	*		*
For controlling force				
Electronic adjustment	*	*		*
Pressure program	*	*		*
Analog pressure sensor	*	*		*
■Choice of electrical power supply:				
230 V/50 Hz	*	*	*	*
230 V/60 Hz	*	*	*	*
400 V/60 Hz	*	*	*	*
440 V/60 Hz	*	*	*	*
480 V/60 Hz	*	*	*	*







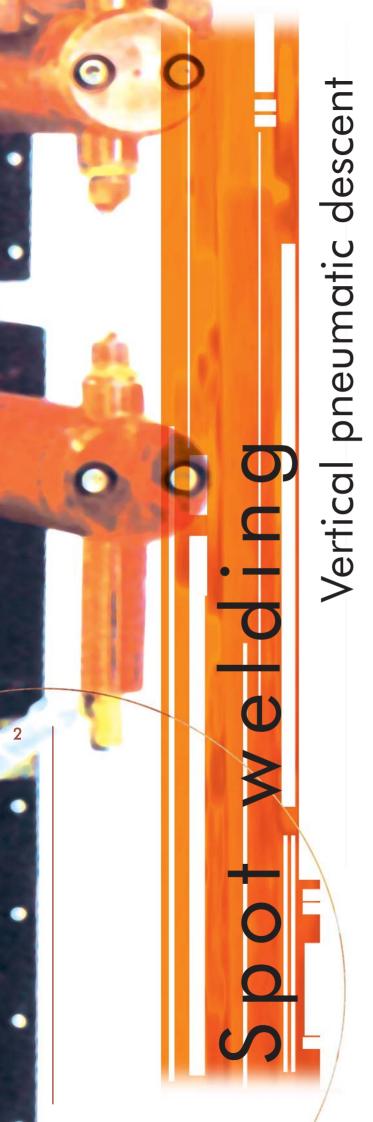


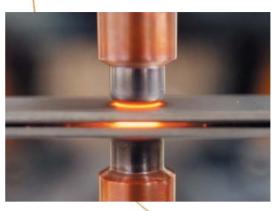






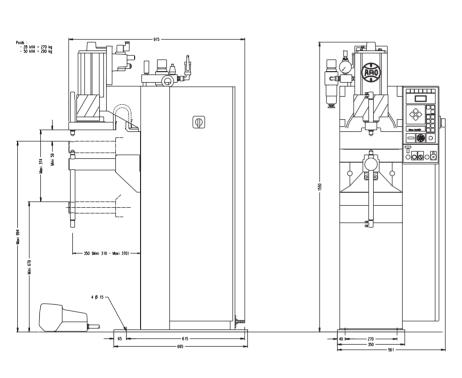




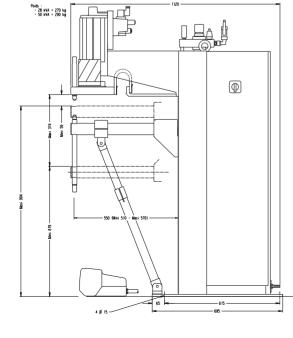


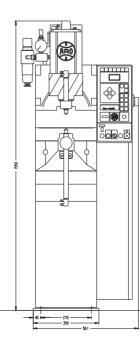
- 2 transformer powers: 30 or 50 kVA at 50%,
- Standard voltage 400 V/50 Hz,
- Cylinder clamping force at electrodes at 6 bars 740 daN,
- Single stroke cylinder 100 mm,
- or Double stroke cylinder 80+20 mm,
- Effective depths at electrode axis, 350 or 550 mm,
- Support stand for 550 mm electrode holder,
- Machine equipped with standard electrode holder and a circuit breaker,
- Effective spacing between arms from 59 to 374 mm (choice of 6 positions),
- Machine completely cooled by water (transformer, secondary junctions, electrode holder and electrodes),
- Welding current adjustment by constant phase shift or by adaptive adjustment according to choice of WCC,
- "Single spot" or "Series spot" machines,
- Electric control pedal.

- Support stand for 350 mm electrode holder,
- Column-mounted lower electrode holder allowing continuous adjustment of its height,
- Manual adjustment pressure program for Single-stroke or Double-stroke* cylinders,
- Electronic adjustment pressure program for Singlestroke or Double-stroke* cylinders,
- Analog pressure sensor*,
- Electronic welding pressure adjustment*,
- Double-function control pedal: Squeeze/Welding.
- * Options valid according to choice of certain WCCs (see table on page 10)



MA type: EL 350 mm













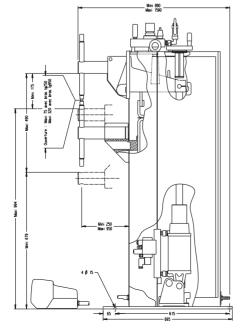


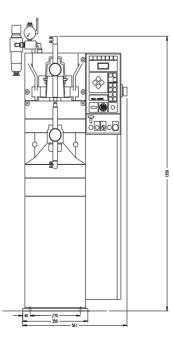




- 2 transformer powers 30 or 50 kVA,
- Standard voltage 400 V/50 Hz,
- Delivered without electrode holders,
- Effective spacing between electrode holders from 174 to 489 mm (choice of 6 positions),
- Effective depths according to choice of electrode holders 250 350 550 - Cylinder clamping force at electrodes at 6 bars 870 590 200 daN
- Single-stroke cylinder 80 mm,
- or Double-stroke cylinder 60+20 mm,
- Opening between electrodes adjustable from: 0 to 75 mm for an ED of 250 mm, 0 to 320 mm for an ED of 950 mm,
- Machine equipped with standard electrode holders and a circuit breaker,
- Machine completely cooled by water (transformer, secondary junctions, electrode holder and electrodes),
- Welding current adjustment by constant phase shift or by adaptive adjustment according to choice of WCC,
- "Single-spot" or "Series spot" machines,
- Electric control pedal.

- Support stand,
- Column-mounted lower electrode holder allowing continuous adjustment of its height,
- Choice: standard electrode holder, straight, inclined standard electrode holders or for butt welding,
- Electrode holder diameter 60 mm for an ED of 250 350 550 750
- Manual adjustment pressure program for Single-stroke or Double-stroke'
- Electronic adjustment pressure program for Single-stroke or Double-stroke* cylinders,
- Analog pressure sensor*,
- Electronic welding pressure adjustment*,
- Double-function control pedal: Squeeze/Welding.
- * Options valid according to choice of certain WCCs (see table on page 10)

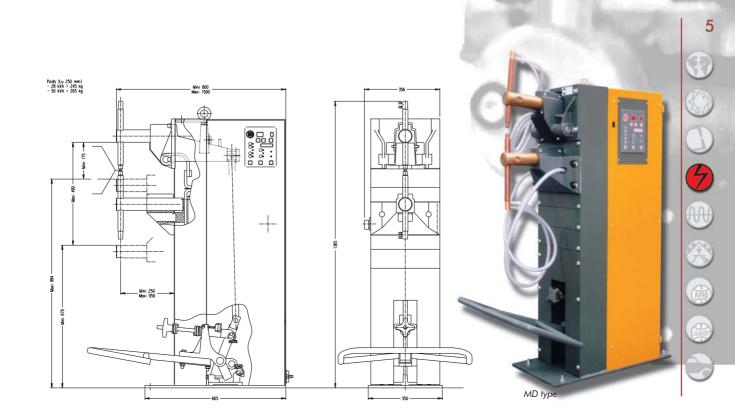




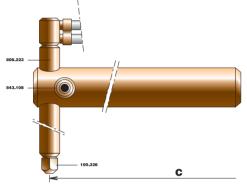


- 2 transformer powers 30 or 50 kVA,
- Standard voltage 400 V/50 Hz,
- Delivered without electrode holders,
- Effective spacing between electrode holders from 174 to 489 mm (choice of 6 positions),
 Effective depths according to choice of electrode holders 250 350 550 750 950 mm
- Clamping force between 150 and 400 daN for 250 mm standard electrode holders,
- Automatic triggering of welding cycle when preset force is reached,
- Machine completely cooled by water (transformer, secondary junctions, electrode holder and electrodes),
- AR.01-type WCC,
- Welding current adjustment by constant phase shift.

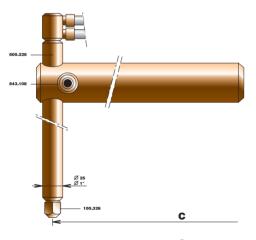
- Column-mounted lower electrode holder allowing continuous adjustment of its height,
- Choice: standard electrode holders, straight, inclined standard electrode holders or for butt welding,
- Electrode holder diameters, 60 mm for an ED of: 250 350 550 750 950 mm.

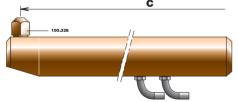


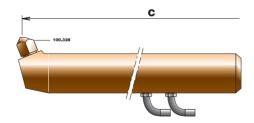
SYMMETRICAL SETUP

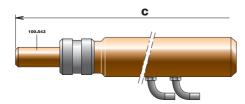


SETUP WITH ELECTRODE HOLDERS









UPPER AND LOWER ELECTRODE HOLDERS

Effective	length (C)	References	Type of
mm	in		machine
250	9.84	WK 110.300	١
350	13.78	WK 120.306	
550	21.65	WK 140.303	MC, MD
750	29.53	WK 160.300	
950	37.40	WK 180.300	J
Electrodes can be in position. For inclina- the effective inter-c			
	iriii spaciiig io 413 i		
Lower shank		WU 251.000	
350	13.78	WK 120.305	MA
550	21.65	WK 140.302	

UPPER ELECTRODE HOLDERS

Effective length (C)									
mm	in		machine						
250	9.84	WK 110.301	٦						
350	13.78	WK 120.307							
550	21.65	WK 140.304	MC, MD						
750	29.53	WK 160.301							
950	37.40	WK 180.301	J						

STRAIGHT ELECTRODE HOLDERS

Effective	length (C)	References	Type of
mm	in		machine
350	13.78	WK 120.104)
550	21.65	WK 140.103	
750	29.53	WK 160.100	MC, MD
950	37.40	WK 180.101	J

INCLINED ELECTRODE HOLDERS

Effective	ffective length (C) References						
mm	in		machine				
350	13.78	WK 120.203	1				
550	21.65	WK 140.201					
750	29.53	WK 160.201	> MC, MD				
950	37.40	WK 180.202	IJ				

SPADE-TYPE ELECTRODE HOLDERS

Type of	ffective length (C) References						
machine		in	mm				
١	WK 120.503	13.78	350				
	WK 140.500	21.65	550				
MC, MD	WK 160.500	29.53	750				
IJ	WK 180.500	37.40	950				

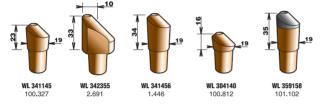
For MA - MC - MD machines Cone No.3





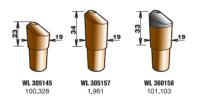
WL 303145 standard 23 mm WL 303156 long 34 mm with molybdenum insert WL 375155 with Cu-W insert electrolytic copper for light alloys (24 mm) long electrolytic copper for light alloys (35 mm) WL 355145 WL 367156

STRAIGHT EXCENTERED ELECTRODES



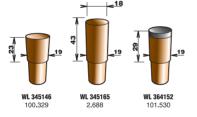
WL 341145 standard 23 mm double excentered WI 342355 WL 341156 long 34 mm short 16 mm WL 304140 for two-pin electrode WL 359158 with molybdenum insert WL 381145 with Cu-W insert

INCLINED EXCENTERED ELECTRODES



WL 305145 standard 23 mm WL 305157 long 34 mm WL 360158 with molybdenum insert

FLAT TIP ELECTRODES



WL 345146 WL 345165 WL 364152 standard 23 mm long 43 mm with molybdenum insert WL 376145 with Cu-W insert

WL 308363

WL 310104

WL 313950 WL 311942

WL 313949

WL 378148

WL 378345

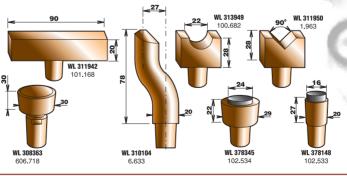
WL 403500

WL 425500

WL 420500

WI 199901

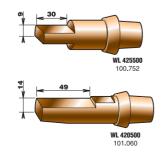
SPECIAL ELECTRODES

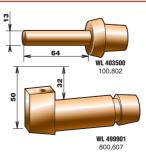


swivel for welding without marks long elbow 78 mm highly excentered with large flat 90 mm with profile tip for tubes Ø 22 mm (exists in other Ø) 16 mm Ø graphite end for braze welding 24 mm Ø graphite end

for braze welding

SPADE-TYPE ELECTRODE HOLDERS





13 mm Ø cylindrical flat end single flat electrodes straight electrode holder height with electrode 50 mm (its attachment requires 2 half-rings ref. 100.604)









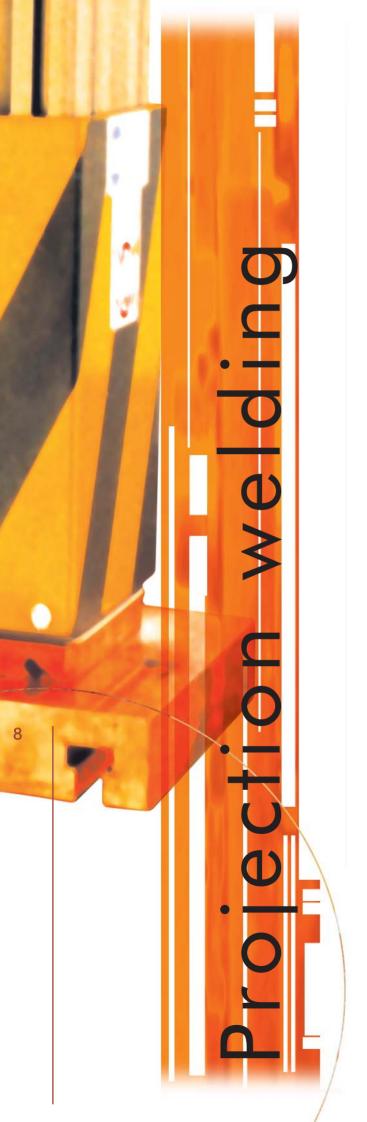


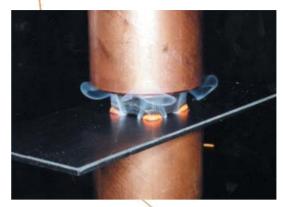






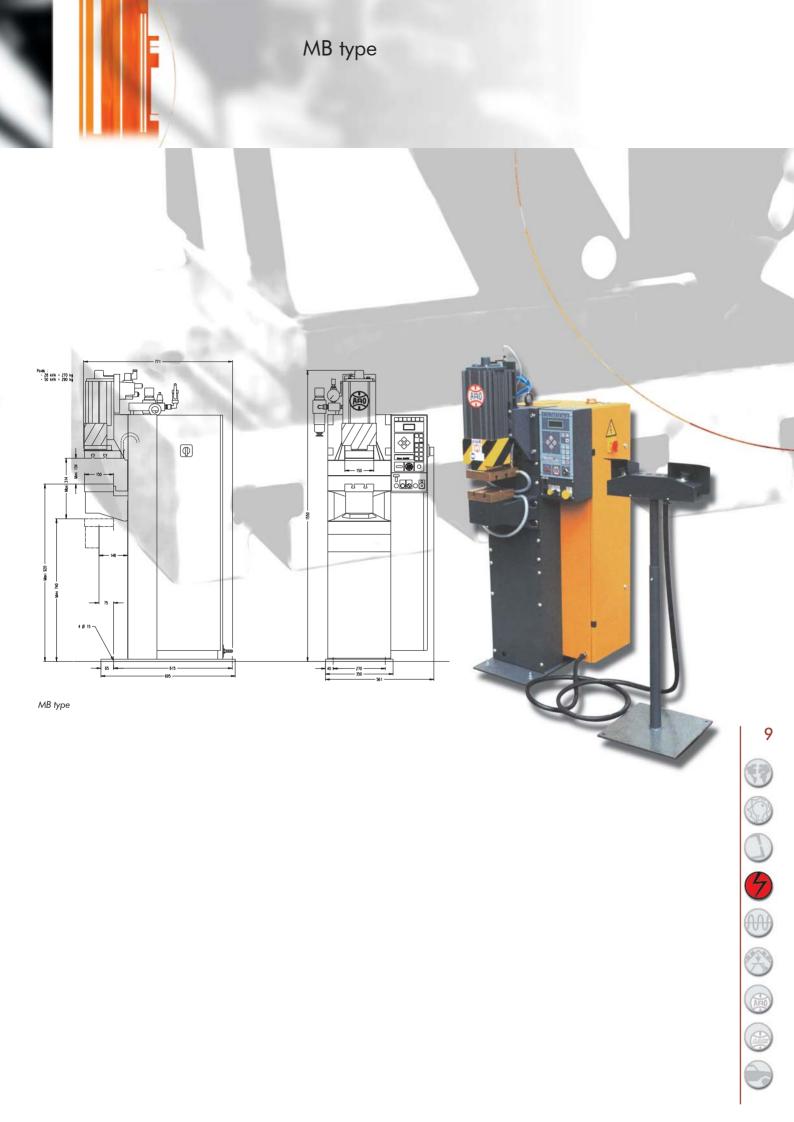






- 2 transformer powers 30 or 50 kVA,
- Standard voltage 400 V/50 Hz,
- Cylinder clamping force 740 daN at 6 bars,
- Single-stroke cylinder 100 mm,
- or Double-stroke cylinder 80 + 20 mm,
- Platen dimensions 150 x 150 mm,
- 2 slots center distance 63 mm,
- Effective spacing of platens 133/223/313 mm,
- Effective depth at cylinder axis 150 mm,
- Machine completely cooled by water (transformer, secondary junctions, platens),
- Welding current adjustment by constant phase shift or by adaptive adjustment according to choice of WCC,
- Bi-manual control desk for SC or DC cylinder option.

- Attachment kit to adapt special electrode holders for spot welding (X2),
- Manual adjustment pressure program for Singlestroke or Double-stroke* cylinders,
- Electronic adjustment pressure program for Single-stroke or Double-stroke* cylinders,
- Analog pressure sensor*,
- Electronic welding pressure adjustment*.
- * Options valid according to choice of certain WCCs (see table on page 10)



AR.01 AND 2X16III FUNCTIONS

Many ARO WCC options and variants guarantee high-performance operations in all types of applications. Secondary current adjustment, force control, program cascade are but some examples of the many functionalities proposed.

AR.01

This approach enables the complete series of M machines to accept a range of 6 different welding cabinet controllers.

5T2P

7T8P

10T16P 10T32P 10T16PEC

Software versions		6A	6B	7A	7B	7E
Number of programs	2	2	8	16	32	16 + 16
FUNCTIONS						
1st squeeze 0 to 200 periods Squeeze 0 to 200 periods Welding 0 - 0.5 - 1 to 200 periods Hold 0 to 200 periods Interval 1 to 200 periods	0 to 99 0 to 99 0 to 99 0 to 99	•	•	•	•	•
Upslope 0 to 20 periods Downslope 0 to 30 periods Pulses 1 to 20 Pulse interval 1 to 200 periods Preheating 0 to 200 periods Cooling 0 to 200 periods Annealing 0 to 200 periods	0 to 40 • 0 to 99		•	•	•	•
Current control in % without secondary current control Current control in % with secondary current control Current adjustment in kA with secondary current control Current adjustment in kA with monitoring of phase shift Current control in % with network voltage compensation Duty cycle monitoring	•	•	•	•	•	•
Welding spot counter with reset Electrode wear warning Wear compensation by steps or by segments Link between electrodes and programs		•	•	•	•	•
Single spot welding Series spot welding Servovalve control Programmable outputs Pressure program Control of a proportional valve Clamping without welding (SSS) With/without welding current (CSC) 16 programs with management of 6 cascade steps with 6 "On/Off" outputs Force control 0 to 10 volts.	1	2	2	2 2	2 2	2 2
Programming/load/save off line on PC (ARODMS) ARONET network				•	•	0
Servovalve power supply standard on request Servovalve internal power supply standard on request WCC power supply on power network standard (1)	24 VAC 24 VDC 24 VAC 24 VDC	24 VAC 24 VDC 110 VAC 24 VAC	24 VAC 24 VDC 24 VAC 24 VDC			
Languages (2) number of languages Measuring coil (10 to 2600 mV/kA) Parity bit / Program choice Link - START - SV control Day / Time		7	7	7	7 • •	4

● Standard function with corresponding version. ○ Optional function with corresponding version. Please contact us for other panels. (1) By request, supply from a separate network in case of power disjunction. (2) F: French, A: English, E: Spanish, I: Italian, Swedish, Finnish, Dutch/German The language is selected by programming. Other languages, please contact us.

Industrial versions

MACHINES		Spot welding									Projection welding					
		Vertic	MA type Vertical pneumatic descent				type matic descent		type anical descent	MB type						
Conventional power at 50%	kVA	3	80	5	50	30	30 50		50	30	50					
Effective depth	mm	350	550	350	550	250 /350 /5	550 /750/950	250 /3	50 /550	150						
Permanent power 100% Max short circuit power Max welding power	kVA kVA kVA	21 117 93	21 102 81	35 195 156	35 170 136	21 122 97	35 202 161	21 122 97	35 202 161	21 178 142	35 283 226					
Primary voltage rating Network frequency	V Hz	23		/415/4 50	140)/415/440 50)/415/440 50		/415/440 50					
Consumed power Fuses 230 V 400 V Cable section 230 V (for 20 m) 400 V	kVa A mm²	70 100 63 35 16	61 100 63 35 16	117 160 100 70 35	102 160 100 70 35	73 121 100 160 63 100 35 70 16 35		73 121 100 160 63 100 35 70 16 35		100 160 63 100		107 100 63 50 25	169 160 100 70 35			
Secondary no-load voltage Permanent current Max short circuit current Max welding currentfor a duty cycle of Steel sheet welding capacity	V kA kA kA % mm	5.1 4.2 23 18.4 5.2 4+4	5.1 4.2 20 16 6.9 4+4	6.3 5.6 31 24.8 5.1 5+5	6.3 5.6 27 21.6 6.7 4+4	5.1 4.2 24* 19.2 4.8 4+4	6.3 5.6 32* 25.6 4.8 5+5	5.1 4.2 24* 19.2 4.8 4+4	6.3 5.6 32* 25.6 4.8 5+5	5.1 4.2 35 28 2.3 4 projections 1.5+1.5	6.3 5.6 45 36 2.4 8 projections 1.5+1.5					
Force at electrodes Max electrode travel Effective spacing Arm diameter Platen dimensions Am adjustment (extended-retraded)	E.L. daN mm mm		7 1 59/14 239/2 6	/550 30 00 9/194, 89/374 60 +20/-4	4	870/590/3 75/110/18 174/20 354/3 Upper H	50/750/950 58/257/200 80/250/320 64/309/ 99/489 60	400/2 20/3 174/20 354/3 0 Upper -	50/550 50/150 30/50 64/309/ 99/489 60	7 1 min: 133	50 40 00 max: 313					
Electrode holder diameter Air connection Service pressure Air consumption for 1000 cycles at 6 bars	mm mm bar Nm³	3/8"	25 3/8" NPT I.D. 12 mm hose 1 to 6 2.7			3/8" NPT I.D 1 ·	+20/-40 25 1. 12 mm hose to 6 6		+20/-40 25	1 1	. 12 mm hose to 6 .7					
Cooling Input/output connecting Ø Min/max service pressurei Water consumption (Average)	bar I/h	1/4"	2 1	. 10 mn to 4 00	n hose	2	1. 10 mm hose to 4 00		0. 10 mm hose	1/4" NPT I.D. 10 mm hose 2 to 4 300						
Dimensions L x D x H		(540x77	75x155	0	640x86	0x1550*	370x10	10x1330*	640x930	0x1550**					
Weight	kg	270) (**)	290) (**)	250 *	270 *	245*	265 *	270	290					

(*) : for a 250 mm throat (**) : for a 350 mm throat

M type machines



Column-mounted lower electrode holder for MA/MC/MD: This option allows continuous adjustment of lower electrode holder height.



Support stand for 350 mm electrode holder: Ensures rigidity of the assembly and allows precision welding. This option is strongly recommended when welding to quality charter.



Manual pressure adjustment: In standard version on MA, MC and MB machines.

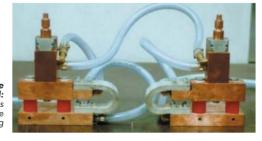


Electronic pressure adjustment by proportional valve:
This option allows the force to be stored in memory during the welding cycle from the WCC irrespective of the program used.



Analog pressure sensor: This assembly only allows welding cycle to be triggered when requested force is reached.

Elastomer pressure head 500/1000 daN: This device balances the force in each zone for multiple welding





General characteristics and specific options

MACHINE MA MC MD MB	
■ SPECIFICITIES	
EFFECTIVE DEPTH: 250 mm (MC, MD) 350 mm (MA, MC, MD) 550 mm (MA, MC, MD) 750 mm (MC, MD) 950 mm (MC, MD)	
Standard electrode holders (MA, MC, MD) Straight electrode holders (MA, MC, MD) Inclined electrode holders (MA, MC, MD) Spade-type electrode holders (MA, MC, MD	
Electrode holder kit for MB	_
PNEUMATIC: Cylinder (MA, MB, MC) SS: 100 mm DS: 80+20 mm Analog pressure sensor	8
Without pressure program Electronic adjustment SS/DS*	<u> </u>
With pressure program Manual pressure adjustment* Electrical pressure adjustment* * Options valid according to choice of certain WCCs (see to	ble on page 10)
ELECTRICITY: Transformer: 30 kVA 50 kVA	8===
Voltage/Frequency: 230 V/50 Hz 400 V/ 50 Hz 400 V/60 Hz 440 V/60 Hz 480 V/60 Hz	standard
Programmable Welding Controller: AR.01 (MA, MC, MD, MB) 5T2P (MA, MC, MB) 7T8P (MA, MC, MB) 10T16P (MA, MC, MB) 10T32P (MA, MC, MB) 10T32PEC (MA, MC, MB)	

OPTION(S):
Protective window
150 mm heightener
Column-mounted lower arm Support stand Double-effect pedal Squeeze/Welding Separate welding controller

MUSTS:

Standard electrodes Special electrodes Electrode removal key Cooling unit (NCREG) Force controller (dynamometer) Welding controller

Machine	definition:	٠.	•	 ٠.	٠	 •	 ٠	•	 •	٠	٠	٠	•	•	•	•
Details: .				 												
				 	•	 •	 •		 •	•	•	•	•	•	٠	•
				 ٠.	•	 ٠	 •	•	 •	•	•	•	•	•	٠	٠
	• • • • • • • • •		•	 ٠.	•	 ٠	 •	•	 •	•	٠	•	•	٠	٠	٠

Warning:

The various M machines in this catalog meet most standard uses for the greatest satisfaction of our customers.

However, for specific applications, we place the expertise of our teams at your disposal. Our sales people and technicians will help you to define your requirements and validate your expectations thanks to laboratory tests. This allows us to design and develop the product the best suited to your requirements.





















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