

P series machines



*Company of
the ARO Group*

General presentation

ARO, worldwide leader in the area of resistance welding has designed this range of medium-power machines to cover the 4 families of resistance welding: projection, spot, seam and butt welding.

With the benefit of the experience gained with the M and MOS ranges, the P series integrates the latest technologies designed for resistance welding including Medium Frequency technology for the most demanding users.

Using a single machine frame, 8 "High Performance" transformers (AC or MF), 8 different programmable welding commands, a choice of 5 cylinders and 4 distinct pneumatic regulators, and through its know-how ARO optimizes the modularity of its offer with these 4 families thanks to a choice of standard and optional items of equipment.

Each "P" series machine is fitted with a very complete basic set of equipment, such as:

- 400 V/50 Hz power supply as standard,
- electric pedal on PA, PE or
- bimanual control desk on PB and PF,
- Filter, regulator pressure gauge and purge valve assembly for the air circuit,
- Solenoid valve for controlling the pneumatic cylinder,
- 740 daN cylinder with unlubricated air at 6 bar, or
- 1380 daN two-stage cylinder with unlubricated air at 6 bar,
- Safety pressure switch,
- Thyristor variator and welding control
- Program selector,
- With/without current selector,
- Mains power supply switch,
- 1/4 turn valves for the water supply.



Projection welding
PB type stationary machine



Spot welding
PA type stationary machine



Butt welding
PF type stationary machine



Seam welding
PE type stationary machine

General presentation (cont'd)

Presentation of the medium frequency technology

A wide range of optional items of equipment is proposed to complete the basic system:

■ **For the frame:**

- 150 mm riser,
- Stay for machines with an effective length of more than 600 mm.

■ **For the resistance welding programmable control:**

- 8 versions of sequences (AR 01, 5T2P, 7T8P, 10T16P, 10T32P, 10T32PEC, 10T16PMF, 10T16PMO).

■ **For the pneumatics:**

- Opening/Closing position monitoring (by induction magnetic detector attached to the cylinder profile).

■ **For the force monitoring system*:**

- Manual pressure regulation program for Single-stroke or Double-stroke cylinders,
- Electronic regulation pressure program for Single-stroke or Double-stroke cylinders,
- Analog pressure sensor,
- Welding pressure electronics regulation.

* Options valid depending on the choice of certain CPSs, see table on page 12. Electronic regulation by proportional valve.

■ **For the electrical power supply*:**

- 230 V/50 Hz - 230 V/60 Hz - 400 V/60 Hz - 440 V/60 Hz - 480 V/60 Hz.

* Options valid depending on machine power rating adopted

WHAT IS THE MEDIUM FREQUENCY TECHNOLOGY?

Unlike the conventional 50 Hz solution, medium frequency technology makes it possible to produce a DC current with the advantages specific to that solution. This DC current is delivered by a whole range of rectified 1000 Hz transformers powered by different types of converters operating in three-phase mode.

In order to optimize the performances of this technique, a current regulation and monitoring module is integrated in the system. Given the operating frequency of 1000 Hz, this regulation enables a very fast reaction with respect to any variation in the process and precise monitoring of the power used for welding.

The advantages of Medium Frequency:

■ **at the welding level:**

- production of a DC current which makes it possible to lower the weldability range by decreasing:
- the value of the nominal current (hence fewer amperes required for the power supply),
- and/or the length of the welding time (improved productivity),
- longer electrode service life,
- limited projections of matter at fusion.

■ **at the machine level:**

- relative independence of the machine's current performances with respect to the electrode-holder length and gap.

■ **at the network level:**

- better balancing of the network load thanks to the 3-phase power supply,
- smaller dimension of the cables and protection systems (contactors, circuit-breakers, etc.),
- low current/voltage phase shift enabling a lower reactive power consumption (improved $\cos \varphi$).

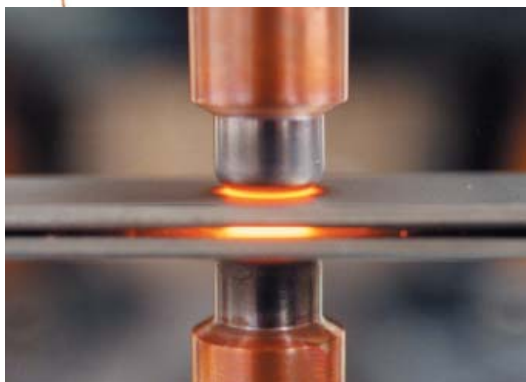
A technology that contributes to a "Total Quality" approach

Today, the Medium Frequency technology is extremely advantageous for applications up to 50,000 A, since it enables the production of high-quality assembly spots for a very low cost (most applications can be found in multi-projection welding (PB machines) and spot welding (PA machines) in particular safety spots and appearance spots).



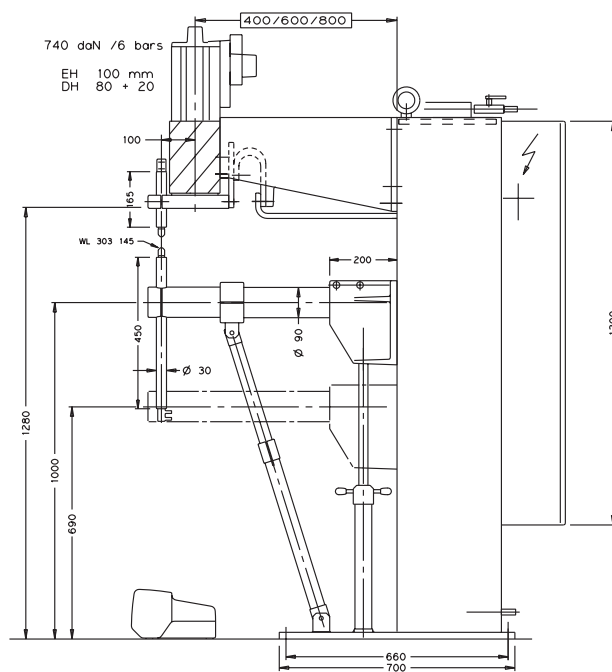
Spot welding

PA type



General characteristics:

- Tightening force on the electrodes: 740 daN at 6 bar,
- Single-stroke cylinder travel range: 100 mm, or double-stroke cylinder travel range: 80+20 mm,
- Air throttling,
- Parachute and anti-fall system (rapid purge),
- Machine equipped with standard shank-holders,
- Electrical power supply circuit-breaker,
- Electric pedal welding cycle command,
- Stay for 800 mm arm,
- Effective spacing between arm of 235 to 545 mm by continuous adjustment of the lower table
- "A" version of arm and electrode-holder installation as standard,
- Electrode-holder upper assembly,
- Effective length of the lower arm: 400 600 800 mm at the cylinder center line,
- Program selector,
- Machine entirely water cooled (transformer, secondary junctions, electrode-holder and electrodes),
- Operates "blow by blow" or "on the fly",
- Welding current intensity setting by constant phase-shifting or adaptive regulation according to the choice of CPS.



Technical dimensions for PA machine with A type 800 mm electrode-holder (upper electrode-holder offset with respect to the cylinder center-line)

PA type:

- 50 Hz AC single-phase technology
- 1000 Hz medium frequency technology

Specific options:

400 V/ 50 Hz AC transformers:

- Effective depths at the cylinder center line: 400/600 mm
- Effective depths at the electrode center line: 500/700 mm

90 kVA AC

125 kVA AC

- 400/600/800 mm
- 500/700/900 mm

160 kVA AC

- 600/800 mm
- 700/900 mm

400 V/50 Hz MF transformers:

- Effective depths at the cylinder center line:
- Effective depths at the electrode center line:

90 kVA MF

- 400/600/800 mm
- 500/700/900 mm

180 kVA MF

- 600/800 mm
- 700/900 mm

Arm and Electrode-holder installation:

"B" version optional:

- Upper arm assembly,
- Lower arm with electrode-holder assembly with an effective length of 500 /700 /900 mm.

"C" version optional:

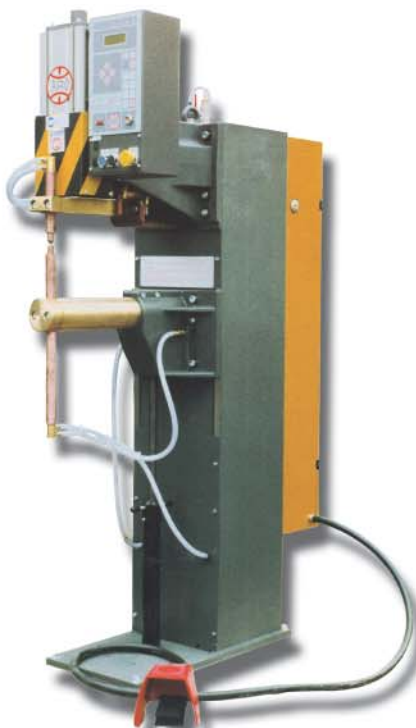
- Upper arm assembly installed in the cylinder center line,
- Lower arm assembly with effective length of 400 /600 /800 mm.

- **Stay** for effective length shorter than 800 mm.

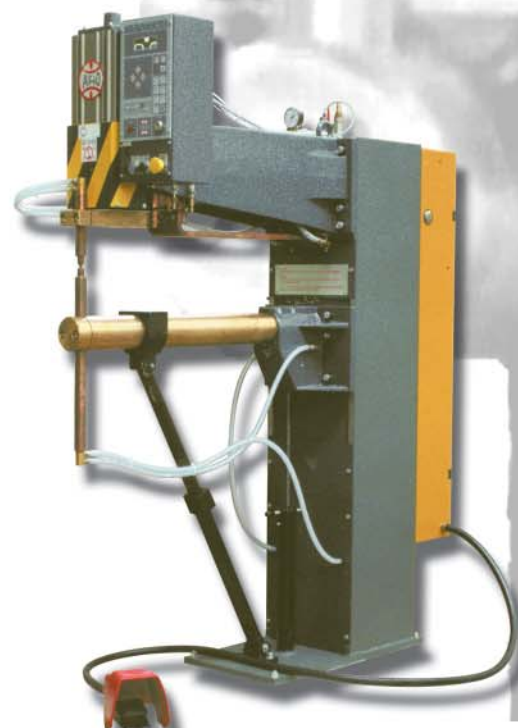
For the force monitoring:

- Pressure program with **manual regulation** for the Single-stroke or Double-stroke cylinders*,
- Pressure program with **electronic regulation** for the Single-stroke or Double-stroke cylinders*,
- Electronic regulation of the welding pressure*,
- Analog pressure sensor*,
- Double-function control pedal: Squeeze/Welding,
- Working Stroke Open/Gun Fully Open position monitor.

* Options valid according to choice of certain CPSs, see table page 12.

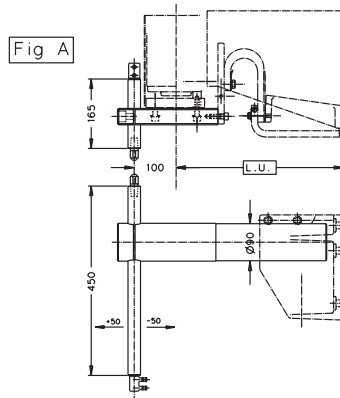
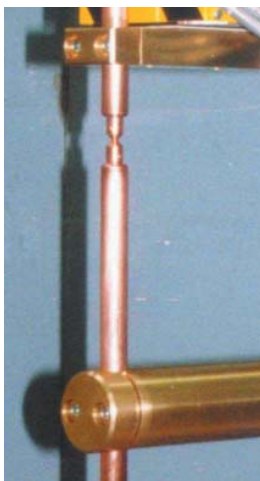


PA machine with type A 400 mm lower electrode-holder (upper electrode-holder offset with respect to the cylinder center-line)

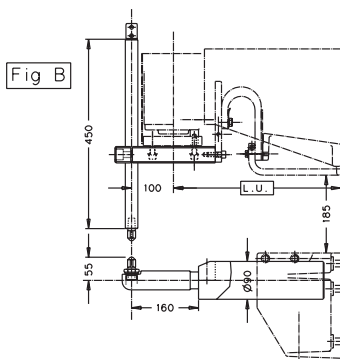


PA machine with type A 800 mm lower electrode-holder (lower electrode-holder reinforced by adjustable stay)

OFFSET INSTALLATION

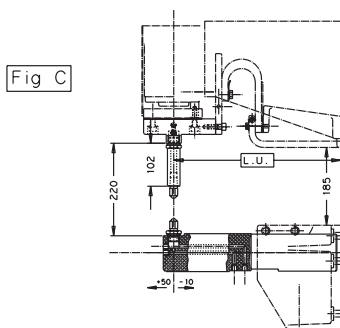


Installation offset with respect to cylinder center line		
Figure A	Eff. depth (mm)	P/N:
Lower arm assembly	500	00 290 606
Lower arm assembly	700	00 290 607
Lower arm assembly	900	00 290 608
Upper electrode-holder assembly		00 290 605



Installation offset with respect to cylinder center line with axial lower electrode-holder		
Figure B	Eff. depth (mm)	P/N:
Lower arm assembly	500	00 290 716
Lower arm assembly	700	00 290 717
Lower arm assembly	900	00 290 718
Upper electrode-holder assembly		00 291 381

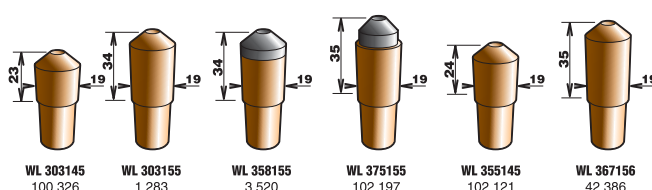
INSTALLATION IN THE CENTER LINE



Installation in the cylinder center line		
Figure C	Eff. depth (mm)	P/N:
Lower arm assembly	400	00 290 713
Lower arm assembly	600	00 290 714
Lower arm assembly	800	00 290 715
Upper electrode-holder assembly		00 290 720

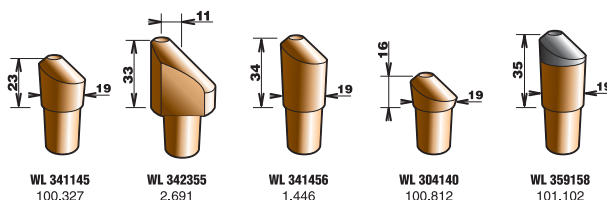
For PA Machines
Cone n°3, Ø 17.8 mm

STRAIGHT CENTERED ELECTRODES



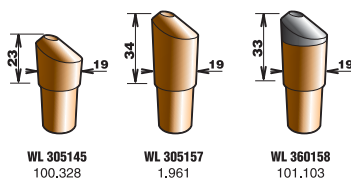
WL 303145 standard 23 mm
WL 303156 long 34 mm
WL 358156 with molybdenum tip
WL 375155 with cutene tip
WL 355145 made of electrolytic copper for light alloys (24 mm)
WL 367156 long made of electrolytic copper for light alloys (35 mm)

STRAIGHT OFFSET ELECTRODES



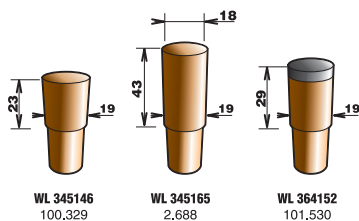
WL 341145 standard 23 mm
WL 342355 double off-centering
WL 341156 long 34 mm
WL 304140 short 16 mm for two-pin electrode
WL 359158 with molybdenum tip
WL 381145 with cutene tip (23 mm)

OFFSET INCLINED ELECTRODES



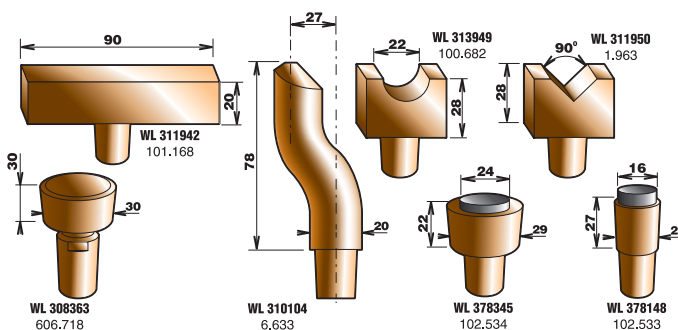
WL 305145 standard 23 mm
WL 305157 long 34 mm
WL 360158 with molybdenum tip

FLAT ELECTRODES



WL 345146 standard 23 mm
WL 345165 long 43 mm
WL 364152 with molybdenum tip
WL 376145 with cutene tip

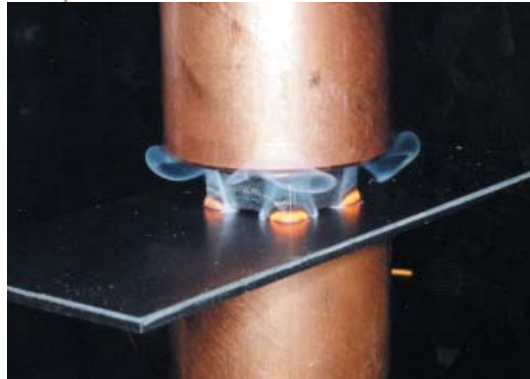
SPECIAL ELECTRODES



WL 308363 with welding swivel joint without mark
WL 310104 long elbowed 78 mm highly off-centered
WL 313950 V-shaped
WL 311942 with platen width 90 mm with imprint for tubes
WL 313949 Ø 22 mm (exists in other Ø)
WL 378148 Ø 16 mm graphite end for braze welding
WL 378345 Ø 24 mm graphite end for braze welding

Projection welding

PB type



General characteristics:

- Single-stage cylinder 740 daN or 1380 daN in double-stage cylinder at 6 bar,
- Single-stroke cylinder travel range: 100 mm,
- Air throttling,
- Platen dimensions 200 mm x 200 mm,
- 3 grooves, center distance 63 mm,
- Effective spacing between platens: 205 to 515 mm by continuous adjustment of the lower platen,
- Effective depth at the cylinder center line: 250 mm,
- Program selector,
- Machine entirely water-cooled (transformer, secondary junctions, connections for tools),
- Welding current intensity adjustment by constant phase-shift or by adaptive regulation according to the choice of CPS,
- Bimanual control desk



Projection welding
PB type stationary machine - 250x250 mm platen option

PB type:

- 50 Hz AC single-phase technology
- 1000 Hz medium frequency technology

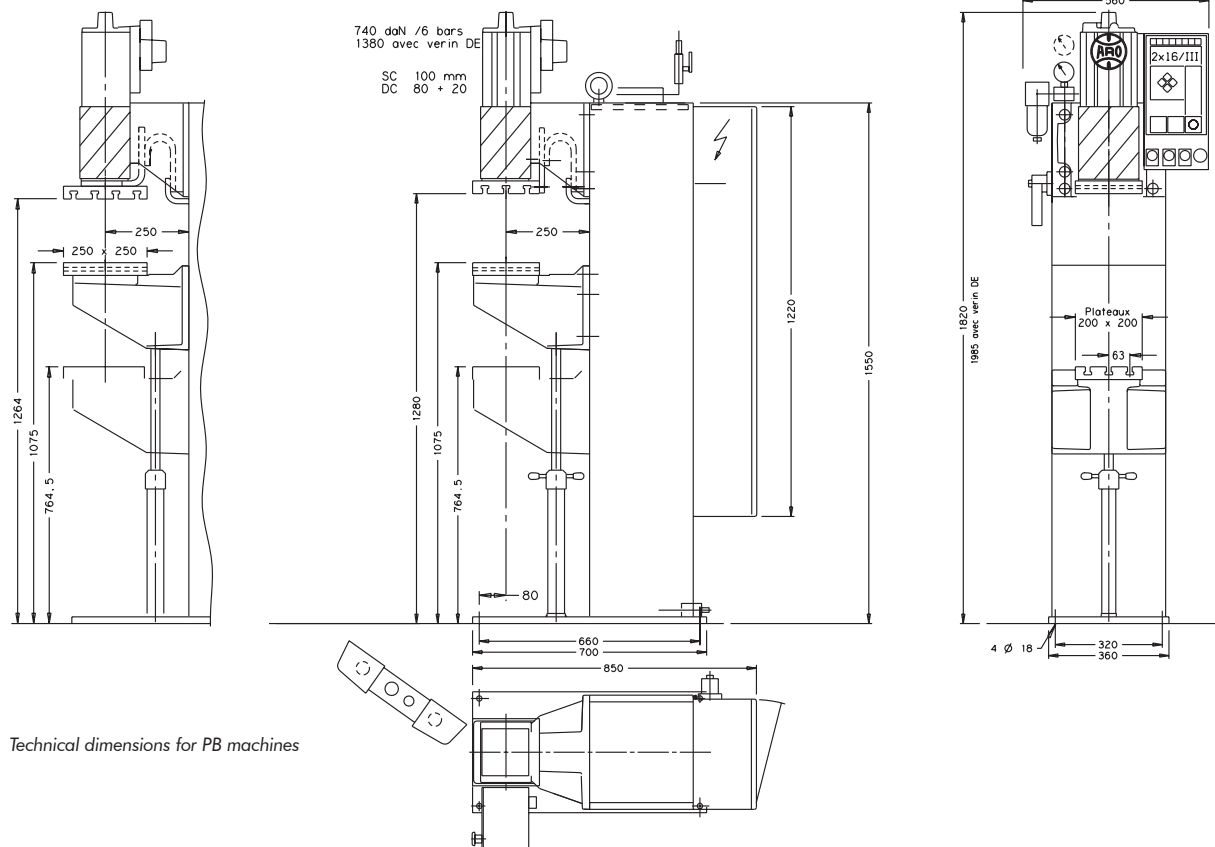
Specific options:

- | | | | |
|--------------------------------|-----------|------------|------------|
| - 400 V/50 Hz AC transformers: | 90 kVA AC | 125 kVA AC | 160 kVA AC |
| - 400 V/50 Hz MF transformers: | 90 kVA MF | | 180 kVA MF |

Options :

- PO-GO position monitor,
- Pressure program with manual regulation for Single-Stroke or Double-Stroke cylinders*,
- Pressure program with electronic regulation for Single-Stroke or Double-Stroke cylinders*,
- Analog pressure sensor*,
- Electronic regulation of the welding pressure*,
- 250 mm x 250 mm platen, 4 grooves, center distance 63 mm.

* Options valid according to choice of certain CPSs, see table page 12.



Seam welding

PE type



Seam welding machines:

Given the wide range of applications involving seal or "Roll spot" welding, it is difficult to define a range of seam welding machines. However, our Design Office, working in close cooperation with the users, can design and define tools that are the best suited to characteristics of the application.

We can nevertheless define a standard machine profile with the following characteristics:

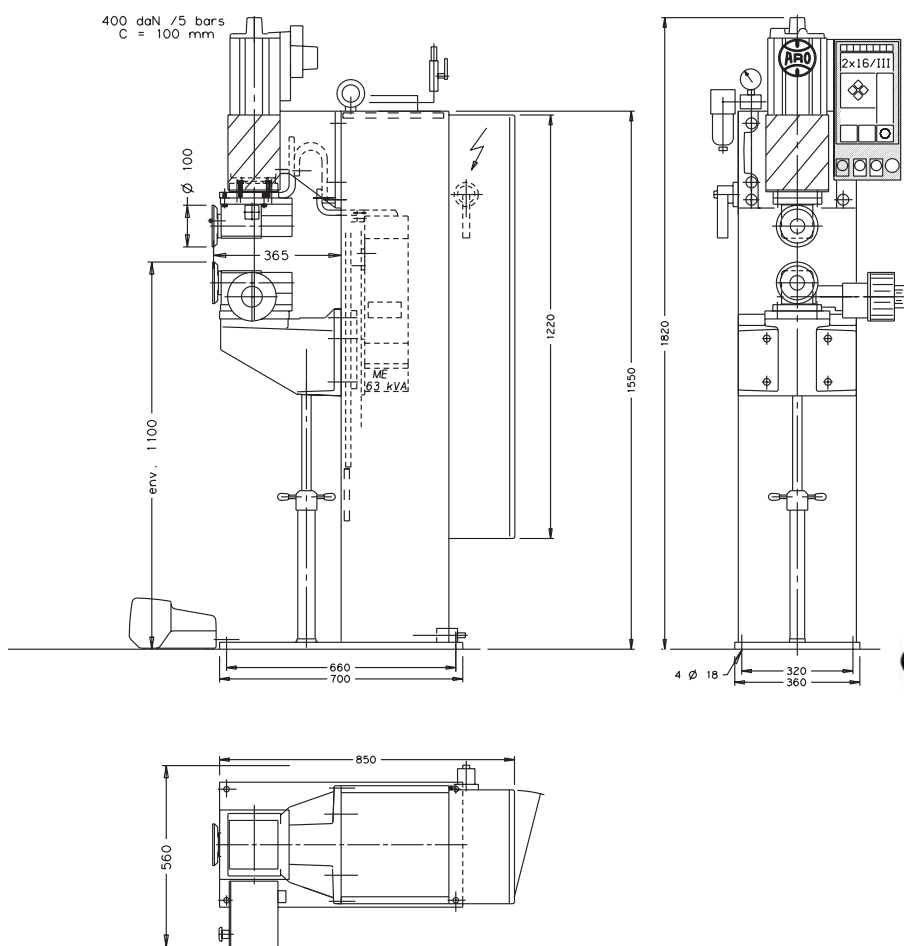
General characteristics:

- High thermal power and low magnetic saturation
63 kVA transformer,
- Duty cycle that can vary between 40 and 100%,
- Clamping force at seam wheels: 480 daN at 6 bar,
- Single-stage, single-stroke cylinder travel range: 100 mm,
- Air throttling,
- Parachute and anti-fall system (rapid purge),
- Electrical power supply circuit-breaker,
- Electric pedal welding cycle command,
- Seam wheel gap by continuous adjustment of the lower table,
- Machine entirely water cooled (transformer, junction of the secondaries, seam wheel units and seam wheels),
- Functions for seal and "Roll spot" welding,
- Welding current intensity adjustment by constant phase shift or by adaptive regulation according to the choice of CPS,
- Specific command sequence for ARO 10T16P Mo seam welding, also controlling welding speed management.

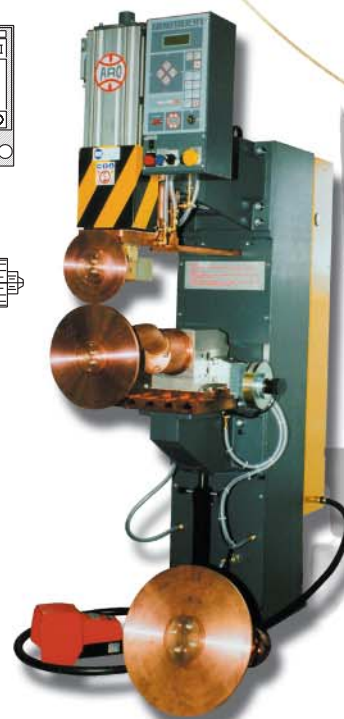
Specific options:

- Min/max diameter of the seam wheels (lower/upper) to be defined as a function of the work program to be carried out,
- Double-function control pedal
Squeeze/Weld.

PE type machines: - 50 Hz AC single-phase technology



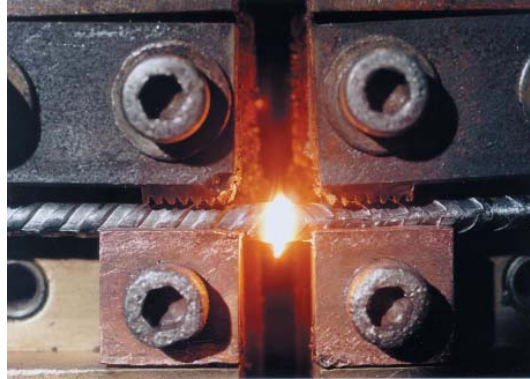
Technical dimensions for PE machines



Seam welding
PE type stationary machine

Butt welding

PF type



General characteristics:

- Machine with 3 cylinders:
 - 2 single-stroke, double-stage cylinders for clamping 900 daN at 6 bar,
 - 1 single-stroke, single-stage cylinder for thrusting 300 daN at 6 bar,
- Standard jaw for round 4 to 20 mm diameter,
- Bimanual control desk,
- Machine entirely water cooled (transformer, junction of the secondaries, jaw-holder),
- Adjustment of the welding current intensity by constant phase-shift or by adaptive regulation according to the choice of CPS.

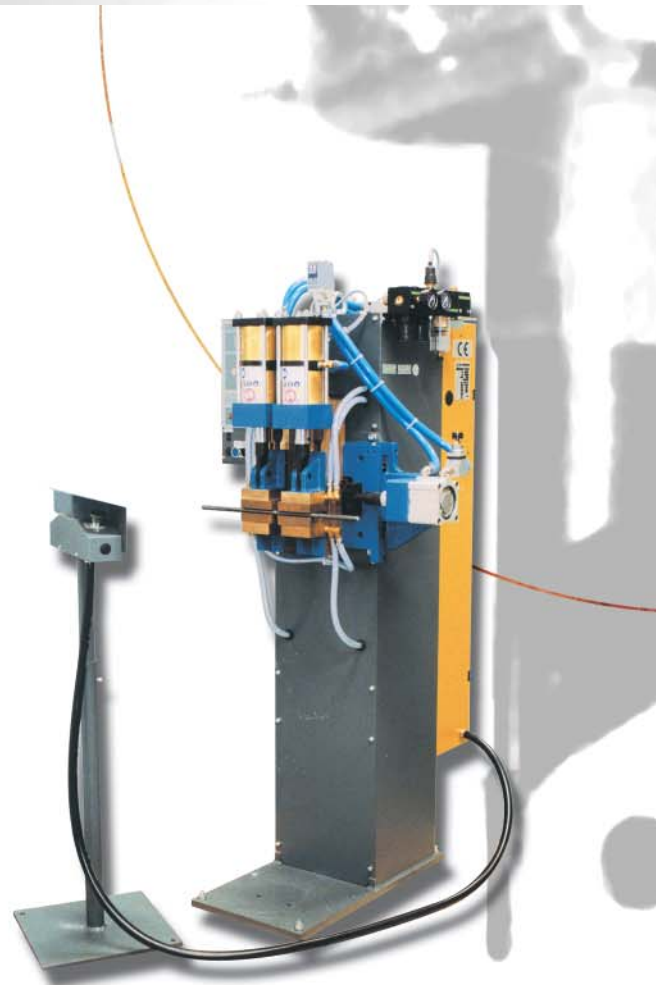
Specific options:

- Command for 10T16P, 10T16PEC or 10T32P type welding,
- Analog force sensor (only with machines equipped with the 10T16PEC sequence),
- 400 V/50 Hz AC transformers: 36 kVA AC, 60 kVA AC.

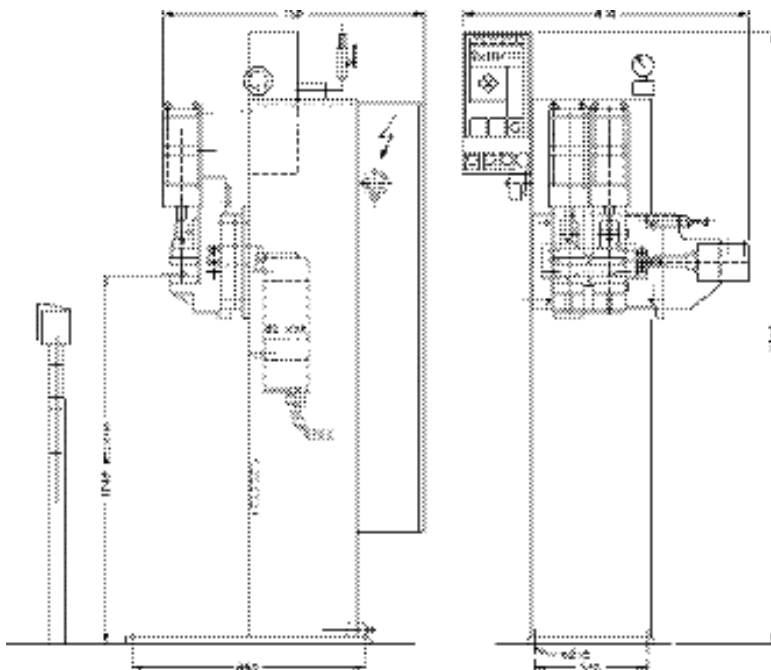
PF type machines: - 50 Hz AC single-phase technology



Cooled copper jaws and clamping and upsetting cylinders



PF type 36 kVA stationary machine, seen from the upsetting cylinder



Technical dimensions for PF machines



PF type 60 kVA stationary machine with 2X16 III type CPS

AR.01 AND 2X16III FUNCTIONS

FUNCTIONS		INDUSTRIAL VERSIONS							
		AR.01	5T2P	7T8P	10T16P	10T32P	10T16PEC	10T32PMF	10T16PMO
Software version			6A	6B	7A	7B	7E	7D	7C
Number of programs		2	2	8	16	32	16	32	16
1 st squeeze	0 to 200 periods	-	●	●	●	●	●	●	●
Squeeze	0 to 200 periods	0 to 99	●	●	●	●	●	●	●
Welding	0 - 0.5 - 1 to 200 periods	0 to 99	●	●	●	●	●	0 to 30	●
Hold	0 to 200 periods	0 to 99	●	●	●	●	●	●	●
Interval	1 to 200 periods	0 to 99	●	●	●	●	●	●	●
Upslope	0 to 20 periods	0 to 40		●	●	●	●		●
Downslope	0 to 30 periods			●	●	●	●		●
Pulses	1 to 20	●		●	●	●	●	●	●
Pulse interval	1 to 200 periods	0 to 99		●	●	●	●	●	●
Pre-heating	0 to 200 periods			●	●	●	●	●	●
Cooling	0 to 200 periods			●	●	●	●	●	●
Annealing	0 to 200 periods			●	●	●	●	●	●
Current control in % without intensity monitoring		●	●	●	●	●	●	●	●
Current control in % with intensity monitoring				●	●	●	●	●	●
Current regulation in kA with intensity monitoring				●	●	●	●	●	●
Current regulation in kA with phase-shift monitoring				●	●	●	●	●	●
Current control in % with mains voltage compensation				●	●	●	●	●	●
Duty cycle monitoring				●	●	●	●	●	●
Weld spot counter with reset			●	●	●	●	●	●	●
Electrode worn alarm			●	●	●	●	●	●	●
Wear compensation in steps or segments				●	●	●	●	●	●
Link between electrodes and programs				●	●	○	○	●	●
Electrode dressing management (alarm and end-of-life)						○	○		
Spot-by-spot welding		●	●	●	●	●	●	●	●
On-the-fly welding		●	●	●	●	●	●	●	●
Servovalve monitoring	1	2	2	2	2	2	2	2	2
Programmable outputs					2	2	2	2	2
Pressure program					●	●	●	●	●
Proportional valve control					●	●	●	●	●
Clamping without welding (SSS)	●	●	●	●	●	●	●	●	●
With/without welding current (CSC)		●	●	●	●	●	●	●	●
16 programs with management of 6 cascade steps with 6 "on-off" outputs							●	●	●
0 to 10 volt force monitoring							●	●	●
Off-line programming/loading/saving on PC ARONET network					●	●	○	○	○
					○	○	○	○	○
Servovalve power supply	standard	24 VAC	24 VAC	24 VAC	24 VAC	24 VAC	24 VAC	24 VAC	24 VAC
	on request	24 VDC	24 VDC	24 VDC	24 VDC	24 VDC	24 VDC	24 VDC	24 VDC
Servovalve internal power supply	as standard	24 VAC	110 VAC	110 VAC	110 VAC	110 VAC	24 VAC	24 VAC	24 VAC
	on request	24 VDC	24 VAC	24 VAC	24 VAC	24 VAC	24 VDC	24 VDC	24 VDC
CPS power supply on power network	as standard (1)		●	●	●	●			●
Languages (2) number of languages			7	7	7	7	4	4	2
Measuring coil rating (10 to 2600 mV/kA)					●	●	●	●	●
Parity bit/Choice of program					●	●	●	●	●
Link - START - SV control					●	●	●	●	●
Electrode wear compensation configuration					●	●	●	●	●
Date/Time					●	●	●	●	●

● Standard function in the corresponding version. ○ Optional function in the corresponding version.

Consult us for the other panels. (1) On request, power supply delivered by separate network that can be backed up in case of power cut-out.

(2) F: French, E: English, S: Spanish, I: Italian, Swedish, Finnish, Dutch/German

The language is selected by programming. Other languages: consult us.



Single-Stroke, Double-Stage cylinder 1380 daN:

Thanks to the addition of a second housing on the upper part of the cylinder, this option makes it possible to increase the clamping force. The travel height can be adjusted by adding bushes inside the cylinder.



Stay assembly for 400/600/800 mm machine: this option ensures the required stiffness for the assembly and makes it possible to carry out precision welding. Equipment strongly recommended for welding operations carried out in accordance with a Quality Charter.



Analog pressure sensor:

This piece of equipment makes it possible to trigger the welding cycle as soon as the required force has been reached.



Electronic pressure regulation by means of a proportional valve:

This option makes it possible to store in memory the force during the welding cycle from the CPS, whatever the program used.

Glycerin bath precision pressure gauge:

this option makes it possible to monitor very precisely the initial pressure when generating the welding pressure.



500 daN elastomer head:

Double-spot welding head mounted on an elastomer assembly making it possible to balance the pressure force on each weld spot.



MACHINES		PA Spot welding						
TECHNOLOGY		50 Hz AC single-phase						
Type of transformer	kVA	90		125			160	
Effective depth at the electrode center line (<i>type A</i>)/seam wheel	mm	500	700	500	700	900	700	900
Convent. power at 50%	kVA	90		127			159	
Permanent power 100%	kVA	64		90			112	
Max short-circuit power	kVA	195	164	395	316	255	495	410
Max welding power	kVA	156	131	316	252	204	396	327
Nominal primary voltage (three-phase*)	kVA	230/400					400	
Network frequency	Hz	50						
Consumed power	kVA	117	98	237	190	153		246
Fuses (1)	230 V	A	320	250	500	400	320	-
	400 V	A	160	125	320	250	200	400
Copper cable cross-section (for 20m)	230 V	mm ²	70		120			-
	400 V	mm ²	35		50			70
No load secondary voltage	V	7.1		10			12.5	
Permanent current	kA	9		9			9	
Max. short-circuit current (2)	kA	27.5	23.1	39.5	31.6	25.5	39.6	32.8
Max. welding current (2)	kA	22	18.5	31.6	25.3	20.4	31.7	26.2
...for a duty cycle of	%	16.7	23.6	8.1	12.7	19.4	8	11.8
Sheet steel welding capacity	mm	5+5	4+4	6+6	5+5	4+4	6+6	5+5
Force on the electrodes/seam wheels (6 bar max, 1 bar min)	daN	740/120						
Effective spacing	min	mm	235					
	max	mm	545					
Diameter of the arm/seam wheels* - Platen dimensions	mm	90						
Reinforcement stay on the lower arm		Read: 800 mm standard/600 mm option						
Arm lower setting (extended-retracted)	mm	+/- 50 mm						
Diameter of the electrode-holder	mm	30 mm copper						
Electrodes/seam wheels max travel	mm	100						
Fluid connection (air and water)		1/2" L int. Ø 13 mm hose						
Air service pressure	bar	3.5 to 6						
Air consumption for 1000 blows at 6 bar	Nm³	3.4						
Water	bar	2 to 6						
Water consumption (average) ΔP 2 bar	l/h	800						
Dimensions	Width W	mm	560					
	Depth D	mm	1040	1240	905	1240	1440	1240
	Height H	mm	1820					
Weight	kg	545	565	545	582	602	622	652

(1) Calculations performed per NFA 82.002 standard
(2) with PE Config A std
* three-phase power

Machines types PA - PB - PE - PF

PA spot welding (cont'd)				PB Projection					PE Seam		PF Butt	
1000 Hz medium frequency				50 Hz AC single-phase			1000 Hz med. freq.		50 Hz AC single-phase			
91		180		90	125	160	91	180	63		36	60
700	900	700	900	250					365		-	
90		180		90	127	159	90	180	63		36	60
63		126		64	90	112	63	1126	44		26	43
360		570		337	635	962	360	570	126		118	212
288		456		270	508	770	283	456	100		94	170
400*				230/400		400	400*		400		400	
50				50					50		50	
150		300		202	381	577	150	300	63		71	127
-		-		400	800	-	-	-	-		-	-
160		250		250	400	630	160	250	125		100	160
-		-		95	185	-	-	-	-		-	-
3x25 + PE 25		3x50 + PE 35		35	70	95	3x25 + PE 25	3x50 + PE 35	35		35	
10		10		7.1	10	12.5	10	10	6.3		6.3	8
6.3		12.6		9	9	9	6.3	12.6	7		4	5.4
36		57		47.5	63.5	77	36	57	20		18.7	26.5
28.8		45.6		38	50.8	61.6	28.8	45.6	16		15	21.2
see diode graph (MF Transfo. doc)				5.6	3.1	2.1	(MF Transfo. doc)		19		7.1	6.4
-	-	-	-	-	-	-	-	-	1,2+1,2		-	-
740/120				740/120 single-stage cylinder - 1360/225 with double-stage cylinder					480/80		effective depth 80 mm	
279				205					-		jaw opening: 4 to 34 mm	
589				515					-		clamping force (6 bar) 900 daN	
90				200x200 3 grooves - 250x250 4 grooves (options)					120*		recruitment force (6 bar) 300 daN	
Read: 800 mm standard/600 mm option				-					-		-	
+/- 50 mm				-					-		-	
30 mm copper				-					-		-	
100				100					100		-	
1/2" L int. Ø 13 mm hose				1/2" L int. Ø 13 mm hose					1/2" L int. Ø 13 mm hose		1/2" L int. Ø 13 mm hose	
3.5 to 6				3.5 to 6					3.5 to 6		3.5 to 6	
3.4				3.4 (6.6 with double-stage cylinder)					1/2.5		1/2.5	
2 to 6				2 to 6					2 to 6		2 to 6	
800				800					800		800	
620				560			620		560		810	
1430	1630	1430	1630	905			1040		880		750	
1820				1820 (1985 with double-stage cylinder)					2030/1820		1740	
580	600	620	640	545	582	602	600	640	570		550	560

General characteristics
and special options

■ MACHINE:

PA	<input type="checkbox"/>	
PB	<input type="checkbox"/>	
PE	<input type="checkbox"/>	
PF	<input type="checkbox"/>	

■ SPECIAL FEATURES:

EFFECTIVE DEPTH at the cylinder center line + 100 mm at the center line of the "A" version electrodes:		
400 mm + 100 mm	} PA	<input type="checkbox"/>
600 mm + 100 mm		<input type="checkbox"/>
800 mm + 100 mm		<input type="checkbox"/>
250 mm	PB	<input type="checkbox"/>
390 mm as standard for PE		<input type="checkbox"/>
other depth to be defined according to tool required		
Electrode-holder kit for machines		<input type="checkbox"/>

■ PNEUMATIC:

Cylinders (PA, PB)	
Sgl Stroke/Sgl Stage: 100 mm 740 daN (PA, PB)	<input type="checkbox"/>
Sgl Stroke/Sgl Stage: 163 mm 740 daN (PA, PB)	<input type="checkbox"/>
Dbl Stroke/Sgl Stage: 80+20 mm 740 daN (PA)	<input type="checkbox"/>
Sgl Stroke/Dbl Stage: 100 mm 1380 daN (PB)	<input type="checkbox"/>
Sgl Stroke/Dbl Stage: 163 mm 1380 daN (PB)	<input type="checkbox"/>
Analog pressure sensor*	<input type="checkbox"/>
Adjustable single-stroke cylinder	<input type="checkbox"/>

Without pressure program:

Sgl Stroke/Dbl Stroke electronic regulation*	<input type="checkbox"/>
----------------------------------------------	--------------------------

With pressure program:

Manual pressure regulation*	<input type="checkbox"/>
Electronic pressure regulation*	<input type="checkbox"/>

* Options valid according to choice of certain CPSs or to the type of machine, see table page 12

ELECTRICITY:

AC transformer:

36 kVA	PF	<input type="checkbox"/>
60 kVA	PF	<input type="checkbox"/>
63 kVA	PE	<input type="checkbox"/>
90 kVA	} PA, PB	<input type="checkbox"/>
125 kVA		<input type="checkbox"/>
160 kVA		<input type="checkbox"/>

MF transformer:

90 kVA	} PA, PB	<input type="checkbox"/>
180 kVA		<input type="checkbox"/>

Voltage/Frequency*:

230 V/50 Hz	<input type="checkbox"/>
400 V/50 Hz	<input type="checkbox"/> standard
400 V/60 Hz	<input type="checkbox"/>
440 V/60 Hz	<input type="checkbox"/>
480 V/60 Hz	<input type="checkbox"/>

* options valid according to choice of power rating

Programmable Welding Control

for PA, PB, PF:

AR. 01	} PF	} PA, PB	<input type="checkbox"/>
5T2P			<input type="checkbox"/>
7T8P			<input type="checkbox"/>
10T16P			<input type="checkbox"/>
10T32P			<input type="checkbox"/>
10T32PEC			<input type="checkbox"/>
10T32PEMF			<input type="checkbox"/>

OPTION(S)*:

Installation offset with respect to cylinder center line	<input type="checkbox"/>
"B" version electrode holder	<input type="checkbox"/>
Installation in the cylinder center line	<input type="checkbox"/>
"C" version electrode holder	<input type="checkbox"/>
Protection window	<input type="checkbox"/>
150 mm riser	<input type="checkbox"/>
250 x 250 mm platen	<input type="checkbox"/>
Support stay	<input type="checkbox"/>
A/S double-stroke pedal	<input type="checkbox"/>
PO/GO position monitor	<input type="checkbox"/>
* options valid according to the type of machine	

The Essentials:

Standard electrodes	<input type="checkbox"/>
Special electrodes	<input type="checkbox"/>
Electrode removal wrench	<input type="checkbox"/>
Cooling unit (NCREG)	<input type="checkbox"/>
Force monitor (dynamometer)	<input type="checkbox"/>
Welding monitor	<input type="checkbox"/>

Machine definition:

Specifics:

.....

Some specific developments



Machine with upper and lower cylinders



Machine P with multi-spot heads



Machine P per customer expression of requirements
(adapted for the automobile industry)

Warning:

The various P machines presented in this catalogue meet most standard requirements for the greatest satisfaction of our customers.

However, for specific applications, we can place the expertise of our teams at your disposal. Our sales staff and technicians will be able to help you define your requirements, and validate them by means of laboratory tests. This approach enables us to design and develop the product that is best suited to your needs



Inverted machine with pressure head protection

Glossary:

CPS: Programmable Welding Control

PE: Electrode-holder

SC: Single-Stroke cylinder

DC: Double-Stroke cylinder

Manual regulation: the adjustment is made by means of a pressure regulator which determines the compressed air supply to be delivered to the cylinder with a view to obtaining the best force when clamping.

Electronic regulation: the cylinder's welding force is adjusted by a proportional valve.

Pressure program: this system makes it possible, for example, to vary the pressure when applying the force, lower it when welding and raise it again for the holding phase.



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