

CITOWAVE

Manual MIG/MAG digital welding equipment for use in advanced technological processes

Aim for digital precision!



Awarded by French Institute for Design



**JANUS 2006
DE L'INDUSTRIE**

CITOWAVE, welding expertise available to large market segments

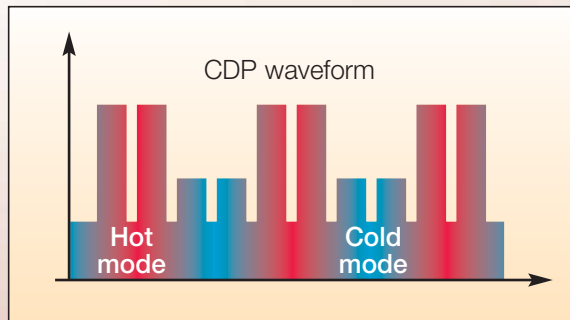


2006-021

The CITOWAVE range represents leading edge MIG equipment technology from OERLIKON. High precision digital welding technology is combined with the ability to auto regulate the welding parameters to produce high quality welds for the widest range of industrial applications.

Products designed to satisfy the demanding environment of today's modern enterprise

Reduction of noise and pollution and ease of use and operation for improved welding conditions, increase in the power available for difficult applications and the assurance of having available the latest technological developments by downloading the software directly from a workstation.



Digital technology for welding

A complete range of unique products to meet your requirements both now and in the future.

- New processes giving total versatility: Smooth current [Short arc, Speed Short Arc (SSA™), Spray arc], Pulsed current [Standard pulsed, Low noise pulsed (SSP™)], Modulated current (Spray-Modal™)
- Total control of aluminium welding: Processes and options adapted for facilitating striking and significantly reducing porosity.
- More synergic curves stored: 135 synergic curves as standard that optimize parameter settings depending on the material to be welded, the gas and the wire (solid or flux-cored).
- Process control and PC connection: Control and monitoring of parameters, malfunction indication, parameter locking at several levels, parameter printing, parameter calibration, PC connection.



2221-005



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2006-006

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Developed in conjunction with European industrial fabricators for the precision joining of a wide range of materials and joint configurations, from very thin sections of aluminium through to thick steel sections, from manual to robotic applications. Designed to ensure that innovative technology is translated into the ability to reliably make the correct joint the first.



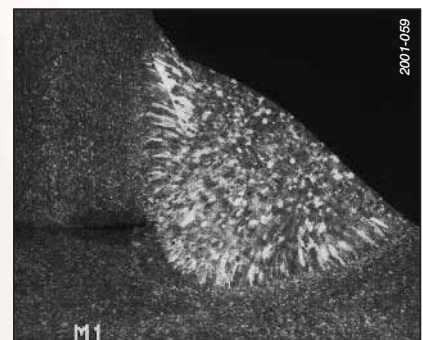
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Decisive advantages for greater efficiency

- A wide choice for optimising operational conditions and efficiency however demanding the application.
- A large graphic screen to allow all the performance of the power source to be utilised easily and to give access to the 100 programs stored in CITOWAVE.
- A range of 3 welding currents: 280, 400, or 500 amps.
- A large choice of wire feeding solutions whatever your manual or automatic applications with our wire feeders which have been especially designed for the most exacting robotic applications.
- And the possibility of using our CITORCH range of torches whether conventional, with integrated setting and control or push-pull.



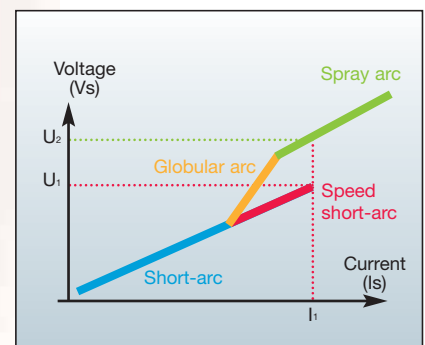
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CITOWAVE, for full and complete assembly



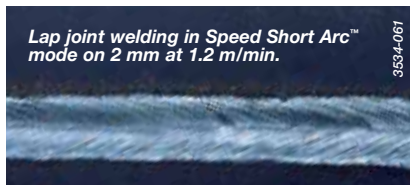
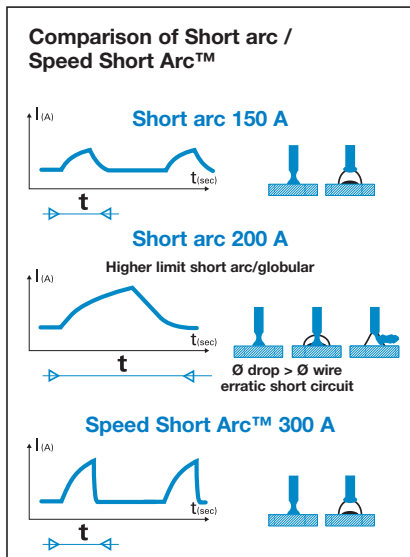
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Welding processes must be fully compatible with the technological changes taking place in the large industrial sectors and in particular the transport sector. These applications require very high performance welded joints in order to cope with the higher and higher stress and load levels now demanded for

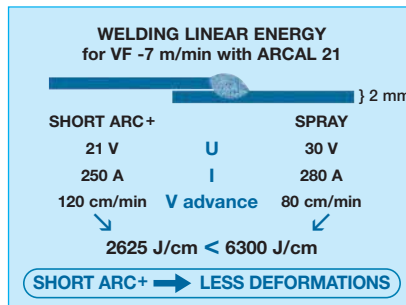
Speed Short Arc™ (SSA™)

The Speed Short Arc™ provides a transfer mode using short circuits in a wire speed domain usually governed by globular conditions.

The current values used in this mode are clearly very different from those used in conventional "short arc" operation.



3534-061



Faster wire speeds require a medium current together with a large peak current in order to form and detach the droplet quicker.

This is done by programming a digitally-regulated inverter where the current is controlled and where, for wire speeds governed by globular conditions, a current profile of the form described in the diagram opposite is required (particularly as regards the rise and fall gradients of the current as well as the maximum peak current).

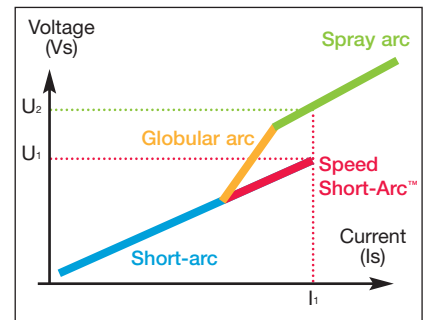
This means the appearance of short-circuits is "forced" in a mode where, under natural conditions, they appear only erratically.

SSA™ advantages

- Large increase in travel speed
- Reduction in distortion
- Reduction of adhering spatter
- Reduction of fume

As can be seen in the diagram below, in applying Speed Short Arc™ to the welding of medium-thickness sheet (2mm), the large increase in travel speed induces a much lower linear energy than that of the conventional mode.

The potential applications of Speed Short Arc™ are mainly in the welding of fine thickness sheet over great lengths where distortion problems are generally observed with conventional arc modes.



Main applications

Parts and products in alloy steels; Containers, steel trailers, infrastructure, agricultural trailers, public work plants.

Soft Silence Pulse™ (SSP™)

With the CITOWAVE, the power source delivers an optimized current wave required by the transfer mode associated with the process.

The SSP uses a special current wave form which enables a soft pulsed arc to be produced, i.e. one that is able to melt the hardest wires more gently.

This produces a pulsed arc which is much quieter than a normal one while at the same time increasing the wetting of the weld bead.

Great stability of the arc is also observed leading to a large reduction in spatter and an impeccable weld appearance.

The SSP is mainly intended for stainless steel applications.

SSP™ advantages

- Large reduction in noise
- Increased wetting of the weld bead
- Large reduction in spatter
- Gives a fine appearance to the weld



2006-033

Main applications

Parts and products in stainless steel; containers, road tankers, food industry equipment, boilermaking.



1279-005

automobile, rail and road transport vehicles and even in the field of naval construction. The CITOWAVE offer a range of products which respond individually to the different quality and productivity levels required by these new applications.

MIG Brazing

MIG brazing appeared in the late 1990's as a better replacement for flame brazing. Since this time, it has gone from strength to strength and has become an essential process in automobile construction.

The use of digital technology further increases the performance of this process both from the point of view of the quality

of the joint produced, the productivity obtained and also the preservation of coatings applied to steel sheets for corrosion protection.

MIG Brazing advantages

- Effective on fine coated sheets
- Reduces distortion
- Large joint tolerance
- Good mechanical characteristics

Main applications

Parts and products in aluminium; automobile construction and repair, metal furniture, ventilation ducting.



2221-007

Spray-Modal™ (SM™)

This is a special transfer mode which uses a modulated current at frequencies of 30 to 50 Hz that produce vibrations in the liquid weld pool that have the effect of removing most of the hydrogen bubbles before the metal solidifies.

These modulations strengthen the rigidity of the welding arc making it possible to use this process in all positions. The use of low-frequency modulation also gives a TIG-like appearance to the weld bead.



This process is particularly useful for aluminium applications using sheet thicknesses of > 2mm.

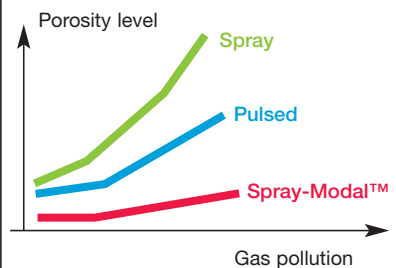
Spray-Modal™ advantages

- Large reduction in porosity
- Increases penetration
- Increase in travel speeds
- All-position welding

Main applications

Parts and products in aluminium; automobile construction and repair, metal furniture, ventilation ducting.

Comparison between different arc transfer methods on the effectiveness in reducing porosity



Cold Double Pulse™ (CDP™)

The main purpose of Cold Double Pulse™ is to reduce the HEAT INPUT to the weld bead. This transfer mode uses two voltage/current levels in different transfer modes, one corresponding to the so-called "HOT" parameters to carry out penetration and the second to the so-called "COLD" parameters to reduce the temperature of the weld pool.



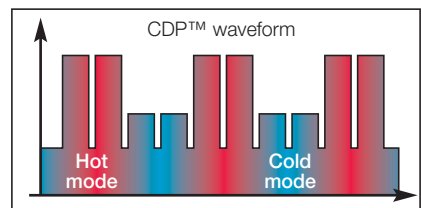
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CDP™ advantages

- Weld pool temperature reduced
- Reduces distortion
- Enables very fine thicknesses to be welded
- Gives a TIG-like appearance to the weld bead

Main applications

Parts and products in aluminium; automobile construction and repair, metal furniture, tanks, etc. And also for horizontal welding.



Alternating these hot and cold modes produces perfect weld beads on thin thicknesses with much better operational control than that of normal pulsed mode. This process thus gives a TIG-like appearance to the weld bead. CDP™ is particularly useful for aluminium applications where sheet thicknesses of < 2mm are used.

CITOWAVE, a wide range of EXPERT

The CITOWAVE has been designed for all applications requiring very high quality welding for all thicknesses and all materials used in the main industry sectors. A wide graphic screen allows the operator to navigate easily around a menu bar for adjusting the various parameters of the unit. User-friendliness and high level performance make the CITOWAVE the ideal partner for your manual, automatic and robotic welding.

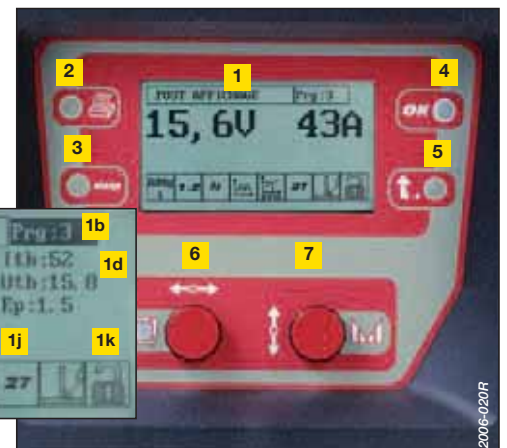
CITOWAVE installation

- A** Welding power source
- B** Wire feeder
- C** Connection harness 2/5/10 & 15 m
- D** Welding torch
- E** Workshop trolley
- F** Wire feed trolley
- G** Main power on/off switch
- H** Torch connector
- I** Slings rings

Main characteristics	CITOWAVE		
	280 A Compact air	400 A Separate water	500 A Separate water
Standard interface	Expert (graphic screen, extended setup)		
Main applications	Automobile construction and repair. Rail, road and naval construction. Metalwork, infrastructures, energy. Food industry.		
Uses	Manual/Automatic and Robotic at A1, A2, A3 levels		
Processes	Electrodes, Short arc regimes smooth current MIG/MAG, Speed Short arc™ and Spray arc, Pulsed and Low Noise Pulsed™, MODULE in Spray-Modal™ regime		
Synergic curves available (wire/gas combinations)	115	152	153
Number of welding and storable programs	100		



CITOWAVE interface



DMX 5000



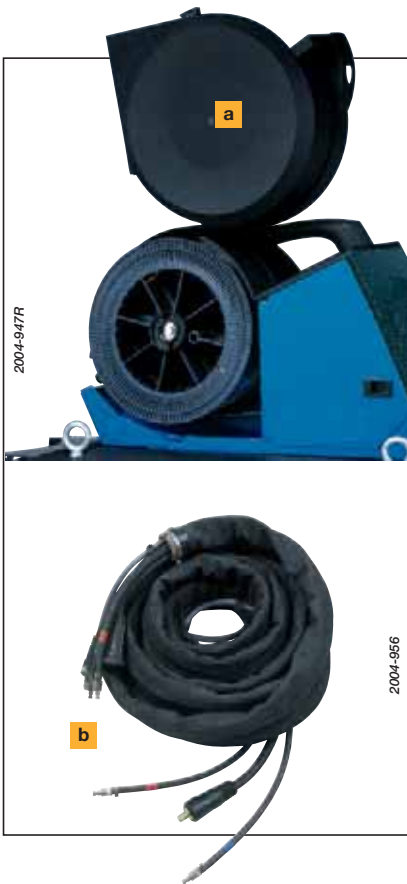
- a** Wire speed regulation
- b** Display
- c** Torch connector
- d** Coolant connections
- e** Setting and selection keys
- f** Arc length setting
- g** CAD connector

- 1** Graphic screen, parameter pre-selection
 - a - Menu
 - b - Programme no.
 - c - Presets
 - d - Pre-display
 - e - Wire grade
 - f - Wire diameter
 - g - Gas
 - h - Transfer mode
 - i - Setting mode
 - j - Welding mode
 - k - Locking
- 2** Parameter print button
- 3** Help button
- 4** Selection validation button
- 5** Return to previous menu button
- 6** Screen navigation button
- 7** Setting button

Wire feeders with digital regulation

The CITOWAVE wire feeders are provided with regulation using an optic encoder which guarantees precision and consistency of feeding even at very slow speeds. The double-disconnectable ducted harnesses with quick connectors are instantly interchangeable. The reel cover with half-shell opening gives easy access to the reel which is in a semi-inclined position to obtain improved wire feeding.

Wire feeding precision



CITOWAVE DMX 5000 wire feeder

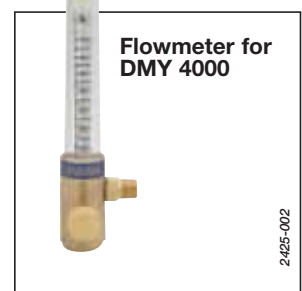
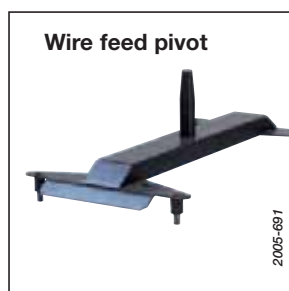
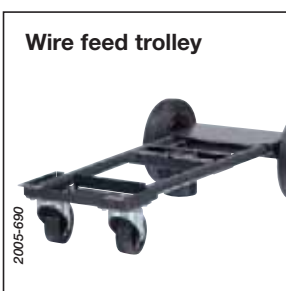


- a** Reel cover
- b** Double-disconnectable harness
- c** Display
- d** Parameter settings
- e** Torch connector
- f** Coolant connections
- g** CAD connector

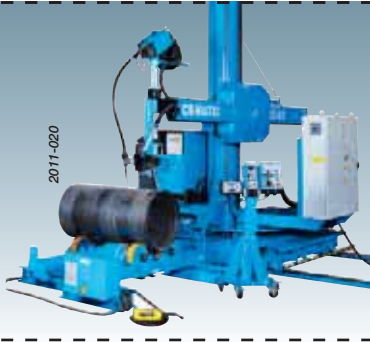
Harnesses	Length
Steel air	2 m - 5 m - 10 m
Steel water	2 m - 5 m - 10 m - 15 m
Alu water	2 m - 10 m - 15 m - 25 m

Wire feed	Diameter
Wire speed	1 - 25 m/min.
Steel	0.6 - 0.8 - 1.0 - 1.2 - 1.4 - 1.2 - 1.6 mm
Stainless steel	0.8 - 1.0 - 1.2 - 1.4 - 1.2 - 1.6 mm
Alum.	1.0 - 1.2 - 1.4 - 1.2 - 1.6 - 2.4 mm

Wire feeder options

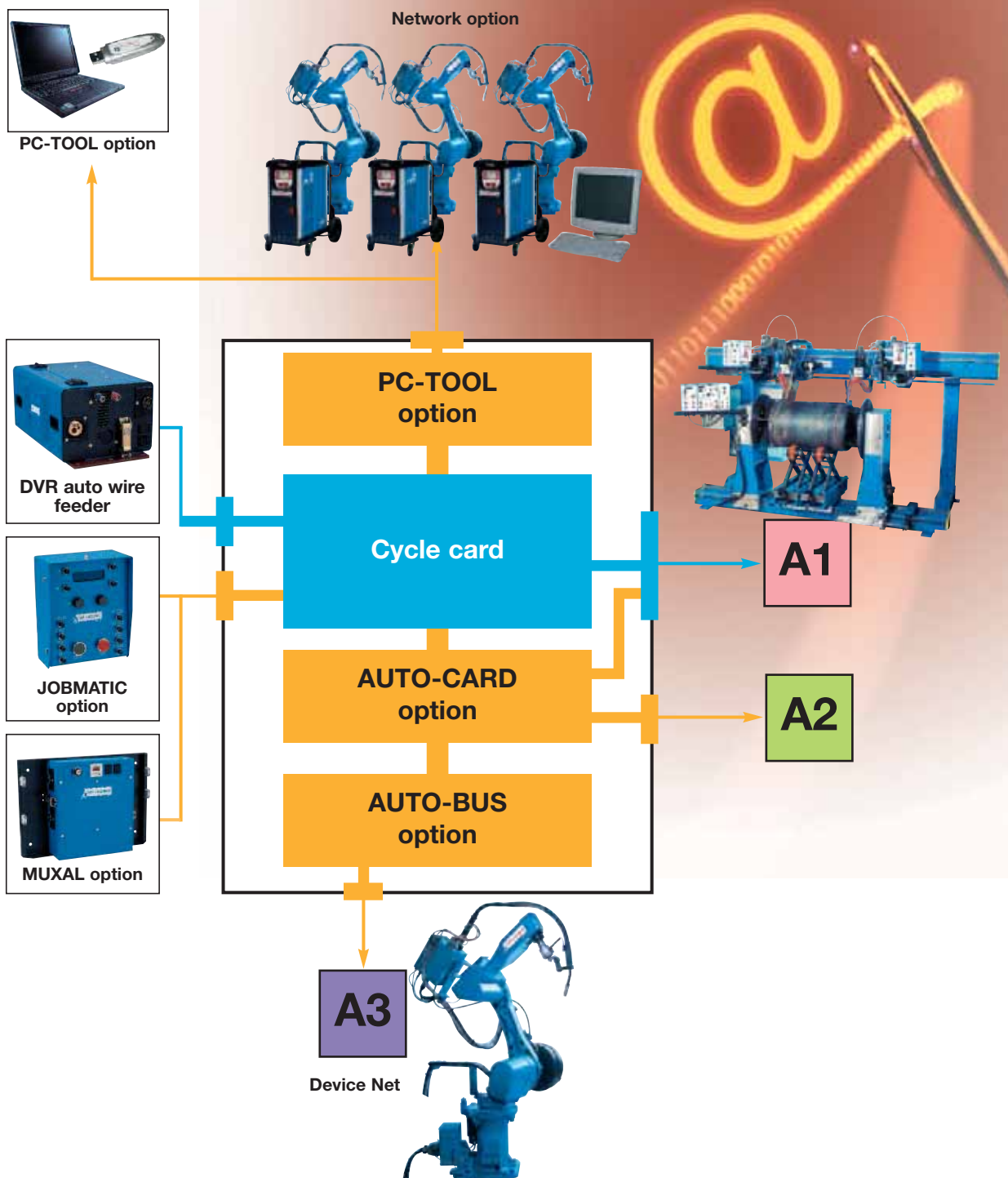


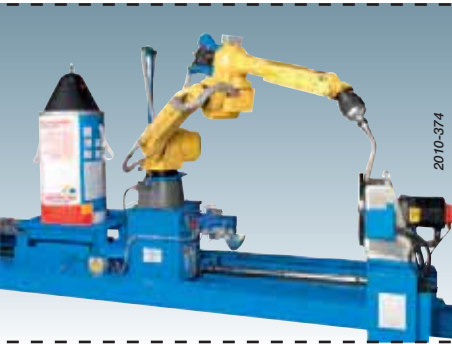
CITOWAVE, welding expertise for all automatic and robotic applications



CITOWAVE, covers the vast majority of automatic and robotic applications used in the market sectors. The basic unit is designed to receive the option(s) specific to the application depending on the desired integration level.

Architecture of automatic options





CITOWAVE is perfectly flexible. It adapts to all situations found in industry and by adding modules can become the most complete product on the market meeting the most sophisticated requirements.

Automation levels

	CITOWAVE													
	280		400 W						500 W					
Automation level	A1	A2	A1	A1	A2	A2	A3	A3	A1	A1	A2	A2	A3	A3
DMY 4000 manual wire feeder														
DMX 5000 manual wire feeder				●						●				
DV-R 500 robot wire feeder			●		●		●		●			●		●
DV-R 500 HA hollow arm robot wire feeder						●		●			●		●	
DV-R 600 robot wire feeder						●		●			●		●	
CITOJOB remote control	■	■	■	■	■	■	■	■	■	■	■	■	■	■
AUTO-CARD auto card	A2	●			●	●	●	●			●	●	●	●
AUTO-BUS auto card Device Net	A3						●	●					●	●
PC-TOOL option Ethernet / USB		■			■	■	■	■			■	■	■	■

Recommended configuration
 ● Required equipment
■ Optional equipment

A1 Automation

The A1 automation level allows direct connection of a CITOWAVE to an automatic welding machine as standard. A DV-R 400 robot wire feeder is recommended, but these installations can also operate with a manual wire feeder. This level of synchronization does not require an additional card.

A2 Automation kits

The A2 automation level with the PC-Card option allows a CITOWAVE to be interfaced with a robot or automatic welding machine. This controlled process works by program selection or by instructions for adjusting the parameters. These installations require a DV-R 500 or DV-R 600 HD robot wire feeder for applications with a very high duty cycle. The PC-TOOL option enables download and backup on a USB key.

A3 Automation kits.

The A3 automation level with the AUTO-CARD and AUTO-BUS options allows a CITOWAVE to be interfaced to a robot with a field bus link. This controlled process works with an advanced protocol. These installations require a DV-R 500 or DV-R 600 HD robot wire feeder for applications with a very high duty cycle. The PC-TOOL option enables download and backup on USB key.



Torches



Although it is true that welding performance is linked to the technology of the current source and the correct regulation of the wire speed, the welding torch makes an equally important contribution. The parameters sent by the power source must be very accurately transferred by the torch in the arc.

Conventional torches

OERLIKON propose a complete range of manual MIG-MAG torches **CITORCH M NG** which are innovative, powerful and suited to quality applications in the various market sectors. Torches comply with the EN 60974-7 standard and use the European standard connector.

Torches with digital display

The **CITORCH ME** range meets the challenge of making the torch as small and easy to handle as a conventional torch with the inclusion of remote control facilities and digital display.

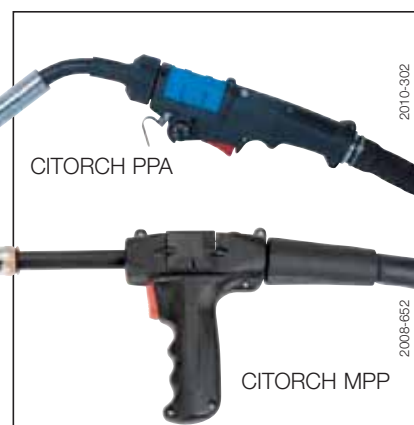
Designation	Duty Cycle Ar+CO ₂	Cooling	Ordering information		
			3 m long	4 m long	5 m long
Conventional torches					
CITORCH M 341 NG	320A @ 60%	Air	W000345091	W000345092	W000345093
CITORCH M 441 NG	380A @ 60%	Air	W000345097	W000345098	W000345099
CITORCH M 341W NG	320A @ 100%	Water	W000345094	W000345095	W000345096
CITORCH M 441W NG	380A @ 100%	Water	W000345100	W000345101	W000345102
CITORCH M 450W NG	450A @ 100%	Water	W000274868	W000274869	W000274870
Torches with digital display					
CITORCH ME 241	250A @ 60%	Air	-	W000345110	-
CITORCH ME 341	320A @ 60%	Air	-	W000345112	-
CITORCH ME 341W	320A @ 100%	Water	-	W000345114	-
CITORCH ME 441W	380A @ 100%	Water	-	W000345116	-
CITORCH ME 450W	450A @ 100%	Water	-	W000278704	-



Push-pull torches and guns

Several push-pull systems are available for use with **CITOWAVE**. The **CITORCH PPA (torches)** and **CITORCH MPP (guns)** ranges have excellent operation due to the miniaturization of the wire drive system in line with the push-pull wire feeding axis. These torches and guns give an excellent wire feeding quality, and therefore an excellent weld quality and are particularly recommended for aluminium applications or use with small diameter wires. They can be easily adapted with a push-pull kit.

Designation	Duty Cycle Ar+CO ₂	Cooling	Ordering information		
			8 m long curved 45°	8 m long straight	10 m long curved
Push-Pull Torches					
CITORCH PPA 342	300 A @ 40%	Air	-	-	W000265068
CITORCH PPA 441W	450 A @ 60%	Water	-	-	W000265069
Push-Pull Guns					
CITORCH MPP 352	270 A @ 60%	Air	W000267609	-	-
CITORCH MPP 451W	450 A @ 60%	Water	W000267608	W000271007	-



Automatic torch

The **TR600** is the most popular torch in the OERLIKON range for applications application. The torch is available with a 0° neck and in standard lengths of 3 or 4 m.

Designation	Duty Cycle Ar+CO ₂	Cooling	Ordering information		
			0° neck	3 m long harness	4 m long harness
TR600	400 A @ 100%	Water	W000370103	W000370111	W000370112



Technical data

2221-001



		CITOWAVE™		
		280	400	500
Primary				
Three-phase power supply		400 V - 50/60 Hz		
Consumption	60 %	-	34.5 A	44,5 A
	100 %	31.4 A	29.8 A	39 A
Secondary				
Open circuit voltage		106 V		
Welding current		20 A - 280 A	20 A - 400 A	20 A - 500 A
Duty cycle at 100 %	MIG	280 A/28 V	350 A/31.5 V	440 A/36 V
	EE	280 A/31.2 V	350 A/34 V	440 A/36.6 V
Duty cycle at 60 %	MIG	-	400 A/34 V	500 A/39 V
	EE	-	400 A/36 V	480 A / 39.2 V
Measurements				
Dimensions (L x l x h)		845 x 380 x 855 mm	1 150 x 750 x 1 150 mm (with trolley and feeder)	
Net weight		76 kg	107 kg	
Standards		EN 60974-1 / EN 60974-10		
Protection class		IP 23 S		
Cooling				
Fan		-	230 V single-phase	
Pump		-	400 V single-phase	
Maximum pressure		-	4 bar	
Maximum flow rate		-	4.5 l/min.	

To order		Cat. nr
Current sources:		
CITOWAVE MX 280	Compact air cooled	W000055013
CITOWAVE MXW 400	Separate water cooled	W000257777
CITOWAVE MXW 500	Separate water cooled	W000055022
Wire feeder:		
DMX 5000	CITOWAVE manual	W000257782
DV-R 500	CITOWAVE Robotic	W000055087
DV-R 500 HA	Hollow arm	W000274336
DV-R 600 HD	HD CITOWAVE Robotic	W000055068
Harnesses (for use with steel):		
Water cooling	2 m	W000055091
Water cooling	5 m	W000055092
Water cooling	10 m	W000055093
Water cooling	15 m	W000055094
Harnesses (for use with aluminium):		
Water cooling	2 m	W000055095
Water cooling	10 m	W000055096
Water cooling	15 m	W000055097
Water cooling	25 m	W000055098

To order		Cat. nr
Harness & cable DV-R 500 HA and 600HD only		
Harness DVR 600HD	10 m	W000274394
Cable CITOWAVE - DVR 600HD	1.5 m	W000274395
	5 m	W000274396
Cable DVR 600HD card-feeder	5 m	W000274397
	10 m	W000274398

To order	Cat. nr
Add-ons:	
Workshop trolley for power source	W000055046
Wire feed pivot (requires wire feeder trolley)	W000055048
Workshop trolley for wire feeder for DMY 4000 and DMX 5000	W000055050
Wire feed suspension support	W000055101
Options :	
Manual push-pull card (PP-card)	W000055061
Remote control (CITOJOB)	W000273134
Remote control on power source (CAD-plug)	W000055040
Automatic/robotic interface card (auto-card A2)	W000266590
Retrofit automatic/robotic multiplexer box (MUXAL)	W000055037
Communication card (PC-TOOL) Rear panel	W000055081
Flowmeter kit	W000267596
A ₃ Device Net Option	W000055029
PC Tool Front panel	W000272383



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