



**MagicWave** 4000 / 5000

**TransTig** 4000 / 5000

TIG & MMA welding



PERFECT WELDING



# A threefold technological triumph

## GENERAL REMARKS

### Quiet, tough, stable

TIG welders can raise a heartfelt cheer! Specially for them, Fronius has developed a series of machines that make their every wish come true: MagicWave 4000/5000 for DC and AC, and TransTig 4000/5000 for DC. Active Wave and digitisation are the key technologies underlying this machine concept.

These power sources are up-to-the-minute characters that are a pleasure to work with, in every way: Ever-so discreet, with a super-quiet yet highly stable arc. Extremely straightforward to use – in fact, almost self-explanatory. Tough, powerful and completely digitised – unlike any other TIG machine, by the way.

What is more, every single one of these machines belongs to a complete, totally co-ordinated welding system, each of whose components perfectly complements all the others. All in all, the upshot is the sort of welding results which up to now you could only dream of.

## UTILISATION

### Outdoor enthusiasts

One of the many things that make the new MagicWave and TransTig machines such a pleasure to work with is the fact that they are designed for both field and production use. They can put up with the toughest conditions imaginable, performing superbly all the time.

In terms of materials, these welding systems are very suitable for aluminium and its alloys, but also for low and high-alloy steels and non-ferrous metals, of course. Thanks to their great versatility, the MagicWave 4000/5000 and TransTig 4000/5000 are used right across the entire spectrum of industry - from the construction of chemical plant, tanks and containers to mechanical and plant engineering, pipeline construction, automotive and railway engineering and aerospace, and taking in all site-erection, maintenance and repair firms. Delivering just as perfect results when used for robot welding as in manual welding.





## ECONOMY

### A pleasing side-effect

This series of TIG machines is a fine example of just how efficient modern welding systems can be. Their efficiency begins with the high-grade componentry that is used for all Fronius machines. Special mention should also be made of their high degree of power efficiency, extremely low open-circuit power, automatic cooling-unit cut-out (which has a direct and measurable impact on the current consumption), and of course the automatic cap-shaping function, which reduces the working times needed by the welder. All in all, these features result in outstandingly long operational life, a small number of wearing parts, and lower labour costs. And thus in a welding system that is highly cost-effective in every way.



## FACTS

Active Wave technology boosts profitability:

- Whole system is totally digitised: Power source, welding torches, remote-control units, robot interfaces, PC tools.
- Digital signal processor (DSP) regulates and controls the welding process.
- Available in both “Standard” and “Job” versions. “Job” offers extra functions such as job-mode, and supports cold-wire control and automated applications.
- Exceedingly high arc stability, even on aluminium base metals from which the oxide has been completely removed; no instability (verifiably so)!
- Special program for aluminium: Automatic shaping of the cap on the pointed electrode tip, for perfect root fusion.
- TAC function for faster tacking of materials.
- Series feature: If welding is performed with two power sources, both arcs are synchronised to permit simultaneous welding on both sides.

## UTILISATION

### Materials

- Aluminium and its alloys
- Non-ferrous metals
- Low and high-alloy steels

### Applications

- Manual welding
- Robot welding

### Industrial sectors

- Construction of chemical plant, tanks and vessels, machinery and plant
- Automotive engineering and construction of railway rolling stock
- Aerospace
- Site-erection contractors, maintenance and repair firms
- Pipeline construction
- Shipbuilding



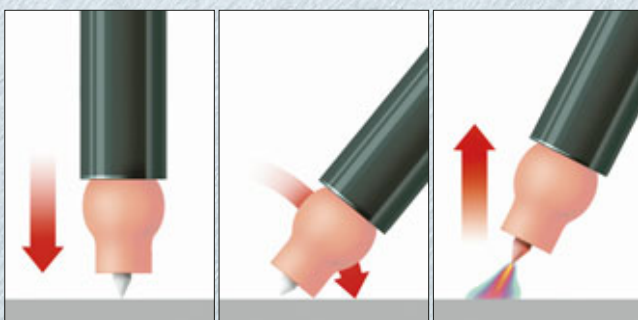
# Welding made easy

## WELDING PROPERTIES

### Simply perfect

The new Fronius welding systems have been thought out right down to the last detail. For every possible application, the goal was nothing less than perfection itself. The result is a system that makes every single operating step as easy and pleasant as possible. From ignition all the way through to the end of the weld, from tack-welding to shaping the electrode cap. But let's take one thing at a time.

We'll start with the ignition, which plays a key rôle in TIG welding. On each of the machines, ignition is possible either with or without touchdown. In non-contact ignition, the arc starts immediately with a high-voltage impulse, ensuring perfect ignition right from the first push of the button - even when using extra-long hosepacks. Touchdown ignition is especially valuable in sensitive areas of application. And the important thing here is to make sure that there are no tungsten inclusions. The digital process control takes good care of this, perfectly controlling the entire sequence.



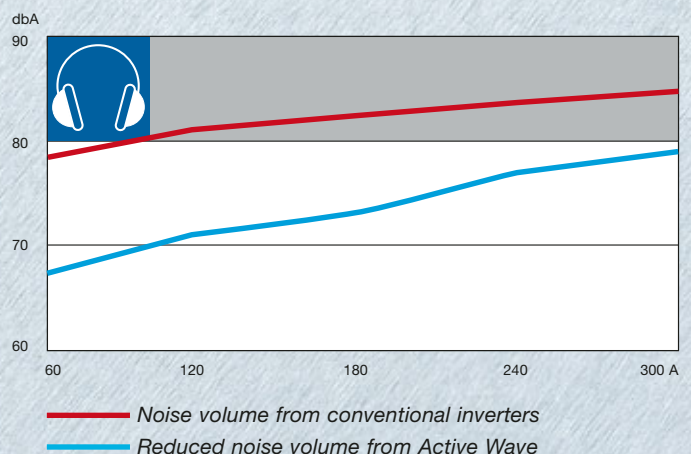
For sensitive areas of application: Touchdown ignition

### TAC: Spot-by-spot tack welding

Before you can weld, you have to tack. The usual way of doing this is to merge the two weld-pools by making a slight movement with the torch. With TAC, one spot is all it takes. And so on. And the one after that. And so on. Because with TAC, the arc during tacking is not continuous, but pulsed. And this prompts the two weld-pools to "jump together", in next to no time, to make one single weld-pool. This works fast, and is a lot easier than the old method. The TAC function is also very useful when light-gauge sheets are being welded without filler metal, as it helps the weld-pools to merge more thoroughly.

### Active Wave ensures peace and quiet

From now on, TIG AC welding will be a much quieter business - with a much quieter arc. All thanks to Active Wave: The integrated digital signal processor always computes - in real time - the waveform that will permit the highest possible arc stability with the lowest possible noise-emission levels. Measurement of these noise levels clearly shows that with Active Wave, even when the machine is delivering 300 A of power, the dbA value is still below 80 dbA. If you're not a welder yourself, and want to know how important this development is, then just ask one!







### All's well that ends well

A perfect start needs to be followed by a perfect finish. At the end of the weld, there are two main things to watch out for: The first of these is the gas post-flow, to make sure that the electrode and the weld-pool do not oxidise. In the past, the gas post-flow had to be set manually. On the digital machines, the ideal post-flow time is computed automatically. The second thing is the end crater. This has to be filled, at a lower amperage. The new power sources take care of this, too, with the crater-fill and downslope function.

### Simultaneous welding on both sides

When joining plates, you normally have to weld a root pass first. This then has to be ground and back-welded – a time-consuming procedure which you can speed up by welding from both sides simultaneously. In “both-sides-simultaneously” TIG-AC welding, both arcs have to be synchronised. And to help you do this, the MagicWave power sources have a “SyncMode” function which harmonises both the arcs.

### Special program for aluminium

Aluminium always needs special treatment. So Fronius have made sure that it gets it. For example, in TIG AC welding, aluminium is normally not welded with a pointed electrode tip, but with a shaped cap at the tip of the electrode. On fillet welds, this leads to inadequate root fusion. The MagicWave machines use a pointed electrode with a much smaller shaped cap, and with perfect root fusion as a result.

The cap is shaped automatically, by the way, which means huge time-savings. All you need to do is clamp the pointed electrode into the electrode holder and pre-select the cap diameter, and the arc then immediately forms the shape and size of cap that you want. Another interesting function enables you to make variable adjustments to the AC waveform, giving the welder reliable weld-pool control even at high amperages.

Cap diameter: 1 mm  
Base metal: AlMg3  
Sheet thickness: 5 mm  
Welding amperage: 185 A  
Welding voltage: 15.6 V  
AC Balance: -5

Cap diameter: 3.2 mm  
Base metal: AlMg3  
Sheet thickness: 5 mm  
Welding amperage: 185 A  
Welding voltage: 15.6 V  
AC Balance: 0





# The more complex they are, the easier it gets

## HANDLING

### Flexible workplaces

Remote control units are really practical. They come in especially handy for welders, because they let you intervene in the welding process and change parameters directly at the scene of the action. No matter where your welding machine happens to be. Special mention should be made here of the JobMaster TIG welding torch, which comes with integral remote control. This lets you call up all your settings, any time and anywhere, regardless of where the machine is standing. The JobMaster TIG welding torch features a digital parameter display, job recall and freely selectable parameters, meaning that you decide for yourself which parameters you want to alter during welding.

A few more words on the torch: Particularly advantageously for TIG welding, this comes with a leather hose, whose much greater flexibility means that the welder only

has a smaller proportion of the total weight of the torch to carry with him while he works. The torch also has an ergonomically shaped handle and a swivel-mounted hosepack. Another great feature is the torch central connector F++, with a separate water connector so that there is absolutely no way that any coolant can get into the gas channel and cause porosity in the weld metal.

Different types of job call for different types of welding torch. Which is why there is a special one for robot applications, with an integrated cold-wire feeder unit. Or a special cold-wire torch for manual welding with an integrated wirefeed – used mainly for series applications with good accessibility. By the way, the cold-wire control system, complete with all parameters, is already integrated in the power source.



*JobMaster TIG welding torch with integrated remote-control and display*



*MagicWave 5000 and Robacta TTW 4500 robot welding torch with Robacta KD-Drive cold-wire feeder unit*



For cold-wire applications: TTW 4000 KD welding torch with integrated remote-control, display and wirefeed unit

TR 2200 F remote-control pedal unit: For precision control of the welding amperage at all times



## A complete system, from the robot interface all the way through to the TIG welding torch

Fronius is a system supplier. Each member of the system is designed to “fit in” optimally with all the others, in perfect harmony. It takes in everything from modularly designed power sources (available for both gas and water-cooled torches, incidentally), to remote-control units, cooling units, trolleys and a wide range of different robot interfaces, as well as complete welding-data documentation and visualisation.

## Quality at the push of a button

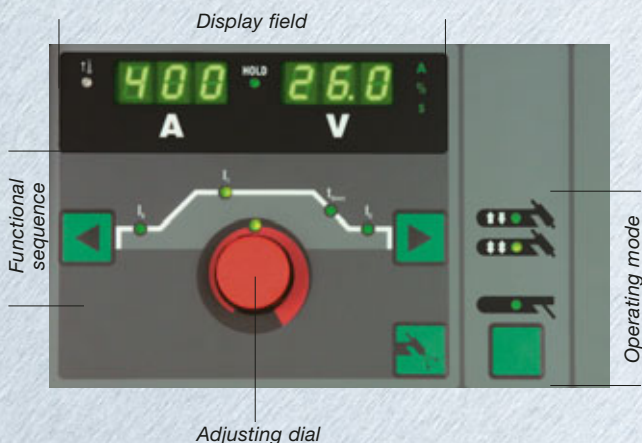
Even welding systems with very wide-ranging functionality ought to be easy to operate. And it is just this which is yet another big strength of the Fronius systems. The extensive know-how stored in the systems can be intuitively retrieved, and the control panels are self-explanatory and straightforward. What is more, there is a choice of two different control panels for this series of machines: Standard or Job. The “Job” control panel offers additional functions such as job mode, and enables cold-wire control and automated applications.

## SAFETY

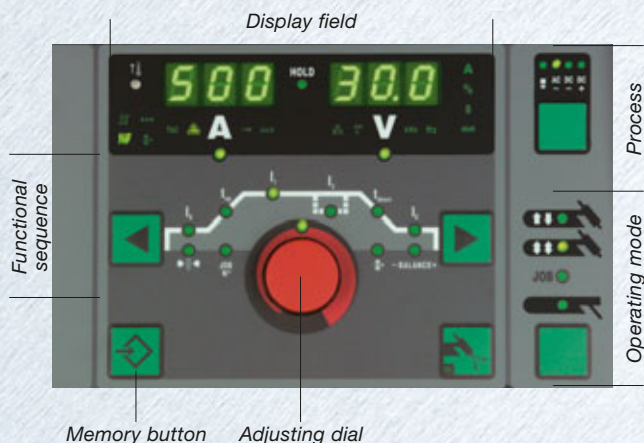
### Green lights all round

As anybody at all familiar with Fronius machines will know, their safety features are second to none. Every power source comes with the CE mark and with the S mark - permitting welding in confined spaces in conditions of enhanced electrical hazard, also when AC welding, of course. What is more, each of the power sources amply fulfils the requirements of IEC “degree of protection IP 23”, meaning that it is safely protected from dirt and water, for use in the field. The integral fan is thermostat-controlled and so only runs when it is needed. This reduces dirt collection and prolongs the service life of the power source. At Fronius, though, safety starts even sooner: in the development stage. The MagicWave and TransTig machines were designed from the ground up to be so robust and compact that they can take just about anything in their stride.

### TransTig control panel



### MagicWave “Job” control panel





## TECHNICAL DATA

Power source		MW 4000 TT 4000	MW 5000 TT 5000
Mains voltage		3 x 400 V	3 x 400 V
Mains voltage tolerance		± 15 %	± 15 %
Mains fuse protection (slow-blow)		35 A	35 A
Primary continuous current (100 % d.c.)		15.5 kVA <sup>1</sup>	17.9 kVA <sup>2</sup>
Cos phi		0.99	0.99
Welding current range	TIG	3 - 400 A	3 - 500 A
	MMA	10 - 400 A	10 - 500 A
Welding current at:			
10 min/40 °C (104 °F)	40 % d.c.	—	500 A
10 min/40 °C (104 °F)	45 % d.c.	400 A	—
10 min/40 °C (104 °F)	60 % d.c.	365 A	440 A <sup>7</sup>
10 min/40 °C (104 °F)	100 % d.c.	310 A	350 A
Open-circuit voltage		86 V	86 V
Working voltage	TIG	10.1 - 26.0 V	10.1 - 30.0 V
	MMA	20.4 - 36.0 V	20.4 - 40.0 V
Ignition voltage (U <sub>p</sub> )*		9.5 kV	9.5 kV
Degree of protection		IP 23	IP 23
Type of cooling		AF	AF
Insulation class		F	F
Dimensions LxWxH (with handle) mm		625x290x705 <sup>3</sup>	625x290x705 <sup>3</sup>
	Inches	24.6x11.4x27.8 <sup>4</sup>	24.6x11.4x27.8 <sup>4</sup>
Gewicht		58.2 kg <sup>5</sup>	58.2 kg <sup>5</sup>
		128 lb <sup>6</sup>	128 lb <sup>6</sup>



\*The arc ignition feature is suitable for manual operation.

<sup>1</sup> On the TT 4000: 11.8 kVA

<sup>5</sup> On the TT 4000/5000: 39.8 kg

<sup>2</sup> On the TT 5000: 15.1 kVA

<sup>6</sup> On the TT 4000/5000: 87.7 lb

<sup>3</sup> On the TT 4000/5000: 625x290x475 mm

<sup>7</sup> On the TT 5000: 450 A

<sup>4</sup> On the TT 4000/5000: 24.6x11.4x18.7 in

Welding torch		TTW 4000 A	TTW 5000 A
Welding current:	AC	350 A	400 A
	DC	400 A	500 A
Duty cycle		60 %	60 %
Electrode diameters		1.0 - 4.0 mm	1.6 - 6.4 mm
Weight		0.96 kg / 2.1 lb	0.985 kg / 2.2 lb

Cooling unit		FK 4000 R
Cooling capacity at Q = 1 l/min.		+40 °C / 1000 W
Max. delivery rate		3.5 l/min
Coolant volume		5.5 l
Degree of protection		IP 23
Dimensions LxWxH	mm	700 x 280 x 250
	Inches	27.6 x 11.0 x 9.8
Weight (without coolant)		16.3 kg / 35.9 lb

## CHECKLIST

	MW	MW Job	TT	TT Job
Digital weld-process control	●	●	●	●
Microprocessor control	●	●	●	●
Energy-saving inverter technology	●	●	●	●
Generator-compatible	●	●	●	●
Thermostat-controlled fan / overtemperature protection	●	●	●	●
Earth leakage monitoring	●	●	●	●
Continuous welding-current adjustment from torch	●	●	●	●
Remote-controllable	●	●	●	●
Switchover facility between touchdown and HF ignition	●	●	●	●
Automatic gas post-flow (dep. on welding current)	●	●	●	●
Gas-test function	●	●	●	●
Automatic cooling-unit cut-out	●	●	●	●
Anti-stick function	●	●	●	●
Freely selectable parameters on the welding torch		●		●
Job mode		●		●
Automatic cap-shaping function	●	●		
Polarity reversal	●	●		
RPI ignition	●	●		
Keylock switch	○	○	○	○
Rate-of-flow watchdog for torch cooling system	○	○	○	○
External current-flow signal	○	○	○	○
Robot interface, analogue/digital		○		○
Cold-wire control		○		○

### Operating modes

2-step mode / 4-step mode	●	●	●	●
TAC (programmed tack-welding)	●	●	●	●
AC / DC	●	●		
Special 4-step mode		●		●
TIG-Puls		●		●
Spot welding		●		●

### Digital indication of

Run-status	●	●	●	●
Operating mode	●	●	●	●
Welding voltage, welding amperage (actual value)	●	●	●	●
"Hold" function	●	●	●	●
Overtemperature	●	●	●	●
Service code	●	●	●	●
Mains voltage monitoring	●	●	●	●
Job number		●		●

### Adjustable parameters

Welding power (continuously adjustable)	●	●	●	●
Electrode diameters	●	●	●	●
Gas pre-flow time / gas post-flow time	●	●	●	●
Crater-fill current / start-arc	●	●	●	●
UpSlope / DownSlope	●	●	●	●
Hot-Start / arc-force dynamic	●	●	●	●
AC balance / AC frequency / AC waveform	●	●		

● as standard ○ optional



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