

# WeldTIMES

Newsletter for friends and business partners of Harms & Wende GmbH & Co. KG, Hamburg (Germany)

## Spot welding of aluminum, part I

New information for aluminum welding.

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With this first post of spot welding of aluminum, a small number of articles are to be introduced, – specifically in the field of body-in-white production lines. After the introduction to the specifics of the „technology of the joining process“ are considered,

we will then discuss experiences concerning the „practical implementation“ in detail. Aluminum alloys of different grades and strengths are an indispensable part of the bodies of modern automobiles. The reasons for the increasing use of the materials are to be set aside at this point, since they are used in numerous publications and have adequate assessment. A widespread opinion among experts assumes that the spot welding of aluminum and aluminum alloys is a topic position of our day. This view is derived from the fact that still seemingly insurmountable obstacles impede the wider use of spot welding during the joining of aluminum alloys.

To overcome this, strong efforts have increased just in the past few years. However, current research in no case form the beginning in the effort to spot weld aluminum alloys. To give just one example, described [1] over 50 years ago (December 1965) with the specifics of this same process, Mr. Gronwald, in his thesis, could also support much older technical papers as such. B. [2] in 1954. When the spot welding of aluminum alloys have been so long researched and edited, we must ask, „why has the RSW technology not yet been set up today in large breadth“? Why are the

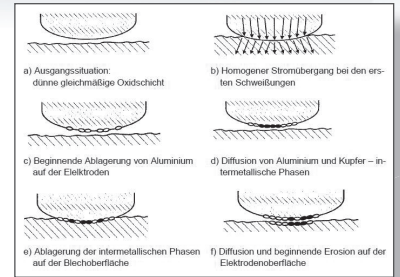


Figure 1

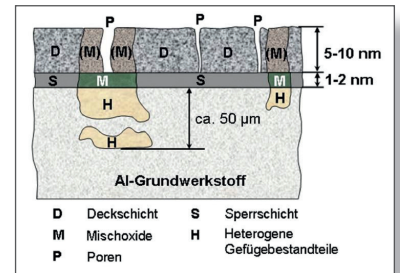


Figure 2

mechanical joining methods such as clinching and SPRs (self-piercing rivets) used? Because these methods are better? *Continued on WeldTIMES 9*

### Editorial

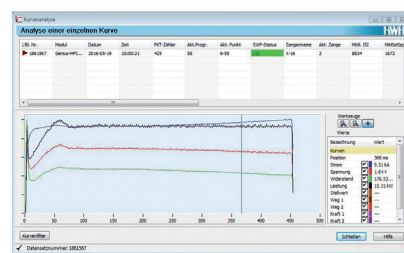
The new Weldtimes is here. It took longer than usual to make this issue ready due to very intensive times this past year. Customer events, trainings, deliveries kept all of us very busy. We have opened our first own subsidiary in China which required special attention to establish this giant market. The sprout is still small so we work very intensely on this. Last year I was in the country six times, the proof lies with the many red stamps in my passport. Also other markets needed attention as well as introduction of new functions and software. Solutions needed to be prepared to secure the future from discontinued timers to our new ones. This is all established now and you will find more in this copy to read. This year the Welding and Cutting Show will take place again in Dusseldorf. Yes, four years have passed. Time just flies away. Please enjoy reading this issue



and we all look forward to see you in Essen!  
Time flies!  
Yours,  
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## Reliable joining of UHSS materials with IQR adaptive feedback regulation



Harms & Wende – the technology partner is at your side. We would not be so if we had not developed suitable tools to meet the needs of our customers.

Our tried and true IQR controller, make many customers a familiar companion. It is important to have the the right tool at hand, IQR gives you this! Hot-formed sheets have a very high material resistance, so that the known course of the resistor is so strongly superimposed that it can no longer be seen. In our toolbox the IQR is located. The power control? With this tool it is possible to apply the welding current according to the material.

The high material resistances lead to a great splashing tendency. The constant power doses the current so that it automatically adapts to the resistance conditions. Different holding times in the oven, which can lead to highly variable material resistances, can thus be reliably detected and adjusted. The splashes are significantly minimized. The handling of this function is very simple. With only one parameter, this function can be adjusted.

# Systems Genius, Filius and Sinius for a retro-fit

Inverter series HWIxxxx EVA, Standard, Profil IQ and analogue are replaced.

Our customers know our company for a long life time of our products. For your confidence, we offer our systems as long as possible but we now come to a break-even point where we have to say farewell to some equipment. But you as our customer know us, we have a replacement for you thereby saving the future.

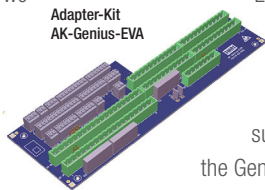
## MFDC

The MFDC series HWI22XX-EVA-IQR, HWI 28XX-EVA-IQR as well as Standard IQ and Profile IQ have been discontinued. The reason is that certain components of the board set are no longer available. Unfortunately, this forced us to take the discontinuation step. However, we kept a reasonable stock for you to serve your units. We will do your repairs as long as the supplies last. For seamless extension

to your existing line we also have ensured that X Pegasus as our HMI for EVA and EVA-IQR systems. It included a driver when you extend your system with new hardware. The successor of the EVA-IQR is the Genius HWI series which runs the same power unit as your EVA-IQR systems, but uses the Genius control part. A conversion (upgrade) from EVA-IQR systems to GeniusHWI is also available. The inverters Standard-IQ and Profile-IQ are replaced with the FiliusMF series. As you see two inverter series melt and make decisions for you easier. There is no longer a choice between two different models. For your convenience, please find below a table of discontinued timers to the left and the successor to the right.

## Mains frequency

Also on the mains frequency side we have to say goodbye to some



models, but the replacement is also here. Our MPS 100 to 300 timer series is replaced with the new FiliusAC models. Filius maintains the functions of the MPS units and extends it with more schedules and a USB plug for backup and data transfer to other Filius modules. You certainly have noticed that Filius

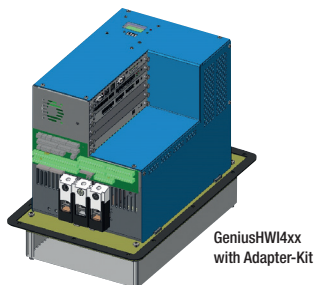
also appears in the MFDC world, yes, this is correct. Filius is available in both worlds to simplify usage for your operators. Your local partner will be pleased to assist you to identify the right model for your purpose.

### MFDC INVERTER

Discontinued type	Model	Replacement
HWI 2424 to HWI 2432	EVA	GeniusHWI424 - 436 BAS
	EVA-IQR	GeniusHWI424 - 436 BAS-IQR
	Standard IQ + Profil-IQ plus HWS 2XXX	FiliusMFS with MFP-Inverter, alternative GeniusHWI424/436 plus XComand
	Analog	SiniusHWI424 to 436 (with PLC only)
HWI2540 to HWI2560	EVA	GeniusHWI3440 BAS to 3460
	EVA-IQR	GeniusHWI3440 IQR to 3460
	Profil-IQ plus HWS 2XXX	GeniusHWI4xxx plus XComand or FiliusMFS plus
	Analog	SiniusHWI440 to 460 (with PLC only)
HWI 2803 to HWI 28326	EVA	GeniusHWI403 BAS - 436 BAS
	EVA-IQR	GeniusHWI403 - 436 BAS-IQR
	Profil-IQ plus HWS 2XXX	FiliusMFS with MFP-Inverter, alternative GeniusHWI4xx plus XComand
	Analog	SiniusHWI403 to 436 (with PLC only)

### AC 50/60 HZ TIMER MODULES

Discontinued type	Model	Replacement
MPS100	Mono	FiliusACS Mono
	Multi	FiliusACS Multi
	R1 Mono	FiliusACS Mono
	R1 Multi	FiliusACS Multi
MPS200	Mono	FiliusACS Mono
	Sonder-Mono	FiliusACS Mono
	Multi	FiliusACS Multi
	R1 Mono	FiliusACS Mono
	R1 Multi	FiliusACS Multi



# HWH solutions to join aluminum

... hot topic in the past and now.

Non-predictable weld conditions between the electrodes with wide spread material properties makes joining this material group quite a challenge.

Due to these circumstances, we treat each spot as individual – steel as well. We learned from IQR how beneficial this is – but we do it in a different

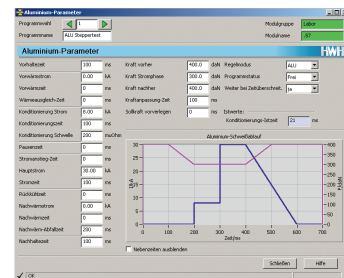
way. In focus are the alloys 5000 and 6000 which are widely used in automotive, tier suppliers and also in many industrial applications.

Both can be joint with resistance welding, but 6000 series alloys are easier to join; because the welding window is bigger.

What needs to be in consideration?

- Oxide layers
- Corn growth
- Expansion
- Particles in the joint

These facts have quite an impact at the joint. Oxide layers grow on the surface of the sheet metal due to



contact to air (oxidation). These layers give a high resistance compared to the base material. Corn growth happens during weld and needs to be treated. Expansion of the aluminum material compared with steel, ...

Continued on page 3...

# HWH solutions to join aluminum

Continued from page 2

... is twice as high. The change from solid to liquid happens instantaneously. Here the gun needs to withstand this matter. The AMC (US name CAM) runs a stabilization phase, then the weld phase. Additionally a

force profile can be run. This profile raises the force and applies additional squeeze to the liquid material. The force profile can be omitted when the gun accommodates the expansion by a spring-back effect of the gun arms. Apart from other joining methods

as clinching just one tool is required to join different stackups, even 3T stacks. Clinching and riveting require different tools, which affects the cost side. When extra material as sealer is used between the sheets, the stabilization

phase is used to remove the material between the tips. In case the conditions cannot be stabilized the user can set a trigger to stop the inverter. This is a setting the user can set individually, by choice of default the inverter may stop for.

## From different markets

Harms & Wende worldwide.

### USA – UL-certified weld enclosures shipped to US customer

„made by HWH in Hamburg“, weld enclosures seamlessly pass UL certification.

For the US market, weld enclosures are delivered in cabinets made in accordance to the US standard „UL“. With regard to the security and compliance of all applicable standards, HWH conforms. Unlike the European CE mark, the UL certification of control cabinets (marked with the UL label) can be done at the customer's site. For the customers, the certification is also an ingredient for its internal audit. So let's get to work and design a UL-enabled welding suitcase. Our design Department has the necessary experience to build a UL certified welding system. All within an IQR USA original welding case made by HWH in Hamburg“ and built according to UL requirements. As the case, cabinets in a large shipment to the United States, even small mistakes could cost a lot. We design and build after these experiences and to the requirements of UL. We sent the drawings prior to shipment to our partners and the UL certification company in the United States. The first review of the paper records showed no complaints – a good sign for the highquality work of our design. After this confirmation of the UL compliance, the equipment while still on site, must then as described above,

be tested and tagged (UL sticker on the enclosure). After delivery, the enclosures are then at the scrutiny of the customer. There were no complaints, and therefore all delivered (over 300 units) with the UL label could be identified! In addition to these deliveries for a large automotive project, other suppliers rely on innovative and proven Harms & Wende technology. For example, we equipped a supplier in the United States „greenfield plant“ (new production) with GeniusHWI inverters. The service structure in the United States, as well as the reliability of the systems over many years let the customer select our equipment. It had begun as a project in 2011 to make manufactured safety components constructed of aluminum. This was a novelty at the time and is now a well run-in standard. The current project involves a complete production line from a supplier from Germany with handling and welding robots. The road includes only about 30 welding robots and is installed in the coming year.

### Extension of green-field plant in the South of the United States – joining steel sub-assemblies for OEM

In March 2017 we received a remarkable order of GeniusHWI inverters for the extension of a customers green-field plant. The weld enclosures are assembled at our partner's site in Michigan and sent further to the US line

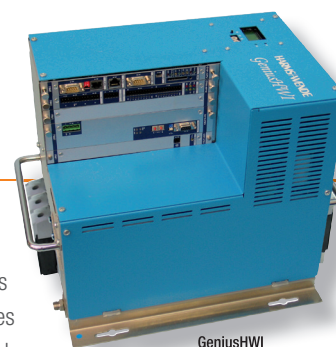
builder. These systems will join sub-assemblies for a German OEM and will go into production later in 2017. This order is a good step into the US market working with a local line builder. Years of presence in the country lets customers recognize our brand as a local brand.

### Mexico – New partnership established in Monterrey.

To accommodate our customers in Mexico as well as to gain for more business we have established a new partnership with company ERC – Electronics, Robotics and Controls. ERC has offices in Monterrey and Saltillo Coah in the North of Mexico. They are an automation company representing Fanuc robots as well and has good knowledge in our business. ERC is in close contact with our US representation, Alliance Engineered Solutions – this ensures quick information flow for your advantage. With 25 employees ERC fits the size of partners we are looking for.

### Public Republic of China – Major order for two projects at FAW in China

Despite hard competition our partner SNG received a major order for our long term customer. The 450 inverters will be shipped to China in



GeniusHWI

early and late summer. The manual enclosures

will be assembled in China since the customer requires a local content as its supplies. SNG has successfully installed thousands of weld timers as well as enclosures from Germany over the years. Our long term relation going back to 2005 is a very trustful relationship which is a great benefit for you as our customers.



#### Let's celebrate it!

Well, in the editorial I stated that time flies away. Yes it does! It's twelve years ago that I came to China the very first time – eleven years ago Nimak China was opened and I had the pleasure to be part of it. Now on April 11th 2017 the company moved into new facilities and I have personally the honor being part of the celebration again. Eleven years here in China (I am writing this Weldtimes in Beijing) is impressive. The entire HWH crew wishes all the best & successful continuation!



# Whats to do?

## Woodward Dream Cruise, Detroit MI (USA)

In August a legendary cruise takes place. All different kind of vehicles, (I am not writing about cars) can be seen during one weekend on Woodward Avenue in Northern Detroit (Birmingham). Enthusiasts show old timers, self-designed vehicles driving or as open-air museums on the road. Take a camping chair, sunscreen, a

bucket with ice-cold drinks, sit down and hang on to what you will see during these days. Vehicles cruising up-and-down the avenue-and you will see them all – but it's a challenge. You will need good patience. People from all over Michigan and other states are there and have a good time. I had the pleasure being part of this.

I've never seen so many classic cars in my life. It's a fun weekend. The event takes place August 19<sup>th</sup> 2017. Don't miss it.



For detailed information please visit [www.woodwarddreamcruise.com](http://www.woodwarddreamcruise.com)

# Technical corner

Filius Compact and Filius Beta

In this technical corner of the Weld times we give you an overview about the successor systems which replace the discontinued units.

Due to limited space we only give key features here. Please contact your

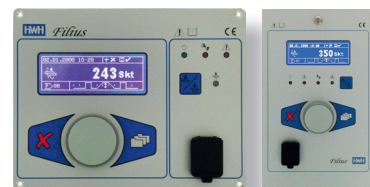
local representative for complete information..

### Filius timer series – versatile series for many purposes

When we decided for the name Filius

as the small brother of our Genius, it gave the impression this is just a small weld timer. But it turned out Filius has many capabilities!

Any Filius system consists always of two components:



- The timer module
  - FiliusAC
  - FiliusMF
- Power module
  - AC SCR
  - FiliusMFP – MFDC power module

From the operator point of view, Filius looks always the same and usage is also almost identical – regardless version or technology. A USB plug in the front allows entering a special service menu, backup data or you can do data transfer from timer to timer. Filius also allows adding a remote timer module, which is very convenient when running one weld station with two workplaces on a turn table machine or similar.

### From HWI22/28 inverters to GeniusHWI

Function	HWI22/28	GeniusHWI
Schedules	up to 512 (IQR 64)	up to 512 (also IQR)
Max. Output current	up to 2400 A	up to 3500 A
Monitoring	Current	Current, Voltage, Displacement,...
Aluminum joining	No	Aluminum modes
Aluminum	Pbs, lbs	Various

### From MPS 100/300 to Filius (also Standard IQ/Profile IQ)

Function	MPS series	FiliusAC series
Schedules	up to 8	up to 128
Backup	No	through USB plug
Data transfer	No	through USB plug
Supervisor mode	No	Yes
Stepper	No	Yes
Remote timer module	No	Yes

## Events & fairs

- Productronica Fair September 2017, Shanghai (PRC)
- Welding and Cutting, September 25<sup>st</sup> to 29<sup>th</sup>, Dusseldorf Germany (The original Essen fairground is currently refurbished)

## Your Harms & Wende partner

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