

ROBOTICS

Application manual

Fronius TPS 320i/400i/500i/600i with RI-FB inside/i interface



Trace back information: Workspace Main version a564 Checked in 2024-02-07 Skribenta version 5.5.019

Application manual Fronius TPS 320i/400i/500i/600i with RI-FB inside/i interface

Fronius for OmniCore

Document ID: 3HAC089028-001 Revision: A

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Overview of this manual

About this manual

This manual describes the options Fronius TPS/i interface and Weld editor and contains instructions to configure it.

This manual should be read before installing and commissioning of a Robotic Arc Welding system with a Fronius TPS/i power source.

Who should read this manual?

This manual is intended for:

- Personnel responsible for installations and configurations of fieldbus hardware/software
- Personnel responsible for I/O system configuration
- System integrators

Prerequisites

The reader should have the required knowledge of:

- Mechanical installation work
- · Electrical installation work
- System parameter configuration

References

Reference	Document ID
Operating manual - RobotStudio	3HAC032104-001
Application manual - Product.ProductName	3HAC084370-001
Technical reference manual - RAPID Instructions, Functions and Data types	3HAC065038-001
Technical reference manual - System parameters	3HAC065041-001
Fronius Operating Instructions TPS 320i/400i/500i/600i	42,0426,0114,EN

Revisions

Revision	Description
Α	Released with RobotWare 7.13.

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1 Introduction to Fronius TPS/i interface

About Fronius TPS 320i / 400i / 500i / 600i OmniCore interface

This guide describes the ABB Robotics OmniCore interface for:

Fronius TPS 320i/400i/500i/600i with RI-FB Inside/i interface

The power source must meet the following requirements:

- Firmware 1.7.4 or above
- RI FB Inside/I interface for DeviceNet, PROFINET, or EtherNet/IP
- Firmware 2.3.0 or above is needed for Job mode with correction.

Overview

The MIG/MAG power sources TPS 320i, TPS 400i, TPS 500i and TPS 600i are completely digitized, microprocessor-controlled inverter power sources. The modular design and potential for system add-ons ensure a high degree of flexibility. The devices can be adapted to any specific situation.



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TPSi power sources contain a selection of welding processes, procedures and welding characteristics that enable a wide range of materials to be processed in the most effective way.

Summary of MIG/MAG pulse synergic welding

MIG/MAG pulse synergic welding is a pulsed-arc process with controlled material transfer. In the base current phase, the energy supply is reduced to such an extent that the arc is only just stable, and the surface of the workpiece is preheated. In the pulsing current phase, a precise current pulse ensures the targeted detachment of a droplet of welding material. This principle guarantees a low-spatter weld and precise working across the entire power range, as unwelcome short circuits with simultaneous droplet explosion and uncontrolled welding spatter are virtually eliminated.

Summary of MIG/MAG standard synergic welding

The MIG/MAG standard synergic welding process is a MIG/MAG welding process across the entire power range of the power source with the following arc types:

Arc type	Description
Short circuit arc	Droplet transfer takes place during a short circuit in the lower power range.

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Continued

Arc type	Description
Intermediate arc	The droplet increases in size on the end of the wire electrode and is trans- ferred in the mid power range during the short circuit.
Spray arc	A short circuit-free transfer of material in the high-power range.

Summary of the PMC process

PMC (Pulse Multi Control) is a pulsed arc welding process with high-speed data processing, precise recording of the process status and improved droplet detachment. Faster welding possible with a stable arc and even fusion penetration.

Summary of the LSC / LSC Advanced process

LSC (Low Spatter Control)

LSC (Low Spatter Control) is a new, low-spatter dip transfer arc process. The current is reduced before breaking the short-circuit bridge; re-ignition takes place at significantly lower welding current values.

LSC Advanced

The TPS 400i LSC ADV is required for the LSC Advanced process. The TPS 400i LSC ADV accelerates the reduction in current and improves the LSC properties. The LSC Advanced process is predominantly used when the welding circuit inductivity is higher.

Summary of SynchroPulse welding

SynchroPulse is available for all processes (standard/pulsed/LSC/PMC). Due to the cyclical change of welding power between two operating points, SynchroPulse achieves a flaking seam appearance and non-continuous heat input.

Summary of CMT process

A special CMT (Cold Metal Transfer) drive unit is required for the CMT process. The reversing wire movement in the CMT process results in a droplet detachment with improved dip transfer arc properties. The advantages of the CMT process are as follows:

- Low heat input
- Less spattering
- Reduced emissions
- High process stability

2.1 Prerequisites

Robot controller software

Robot system prerequisites:

- OmniCore robot controller
- RobotWare version 7.13 or higher with the following options:
 - [3416-1] Arc welding Standard
- One of the following Industrial Networks:
 - [3020-1] PROFINET Controller
 - [3024-1] EtherNet/IP Adapter
 - [3029-1] DeviceNet Single Channel

RobotStudio software

RobotStudio version 2023.4 or higher.

Limitations



Currently, only the first Arc System is supported with this interface. If you have more than one welder connected per robot, you must use the Arc Sub-option Standard I/O Welder.



The Fronius TPS/i web browser interface is a licensed option from Fronius.

To be able to connect to the Fronius TPSi Welder via the web browser interface in the RobotStudio Add-in, this option is needed. Contact Fronius for more information regarding this.

Fronius TPS/i Add-In

The Fronius TPS/i Add-In consists of the following software components:

- Ready to weld interface to control a TPS 320i, TPS 400i, TPS 500i and TPS 600i welder
- RobotStudio Add-In to select different weld modes (synergic lines) used with the welder
- Graphical weld data editor
- · Graphical weave data editor

2.2 Hardware setup

2.2 Hardware setup

Overview

The ABB preferred connection to the welder is to connect the LAN port of the welder to the private network on the OmniCore controller. This is not mandatory, but it is a convenient way to set up the system since you have access to the welder and the robot controller from RobotStudio.



This connection is used with the RobotStudio Add-In to download the supported weld modes (also known as Synergic lines) and the Joblist. Furthermore, it is possible to get access to the welders web page from RobotStudio by launching a web browser.



Note

The web app WebJob Editor can currently only used with the welders LAN port connected to the controller's private network.



The I/O based communication to the welder which is needed to control the welder is done via a fieldbus interface and not through the LAN port of the welder.

A switch must be added if the LAN port is connected to a remote system such as the Fronius WeldCube (documentation and data analysis tool).

It is recommended that switches used in the I/O network support Quality of Service (QoS). I/O devices mark their packets with a priority value. The priority value is used in order to get better I/O data throughput and shorter delays on the network. Switches and routers are then able to differentiate the I/O devices critical from the other non-critical traffic. To do this, the switches and routers must support Quality of Service.

2.2 Hardware setup Continued

Connecting to the OmniCore controller

Connect an Ethernet cable between the robot controller X4 port and the TPS/i welder Ethernet port. The following illustration shows an overview of the computer unit.



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2.2 Hardware setup *Continued*

Welder LAN port

The LAN port (Service port) is located on the back of the welder. If you connect the welder to the robot controller, make sure to use a static IP address and turn off DHCP.



IP address on welder

The IP address of the welder can be changed on the front panel with the following steps:

1 Go to Defaults, System and select Network settings.



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2.2 Hardware setup Continued

2 The network setup overview is displayed. If DHCP is enabled, the **IP address**, **Network mask** and **Standard gateway** network parameters are greyed out and cannot be adjusted. In order to change the **IP** address, DHCP must be disabled.



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2.3.1 Fronius EtherNet/IP configuration

2.3 Configure the fieldbus

2.3.1 Fronius EtherNet/IP configuration

Overview

This section describes how to configure the communication between the ABB robot controller and the Fronius E/IP power supply.

2.3.1.1 Installation

2.3.1.1 Installation

Robot controller software

Robot system prerequisites:

- OmniCore robot controller
- RobotWare version 7.13 or higher with the following options:

One of the following Arc options (power-source interface):

- Standard I/O Welder
- Fronius TPS/i Product Add-In

RobotStudio software

RobotStudio version 2023.4 or higher.

Hardware

Required:

• 1 Ethernet cable



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Optional:

• 1 Ethernet switch/hub



2 Ethernet cables

Software installation

The Fronius TPSi RobotStudio Add-In is available for free and can be downloaded from the RobotStudio Add-Ins Tab (Common tags: RobotStudio-Addin) and install it.

2.3.1.2.1 Changing the Fronius power supply network settings

2.3.1.2 Fronius power supply settings

2.3.1.2.1 Changing the Fronius power supply network settings

Change the network settings

Follow these steps to change the Fronius power supply network settings:

1 On the Fronius power supply touch screen, tap Defaults and then select the System tab. Select Network settings:



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2 In the Network settings menu, clear the DHCP check box to enable editing of the menu items.



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3 In field IP address, enter the IP address to be used.



If you access the Fronius webpage through the ABB service port, set the IP address to 192.168.125.65.

4 Tap Store to save the new settings.

2.3.1.2.2 Changing the network settings for OmniCore controller communication

2.3.1.2.2 Changing the network settings for OmniCore controller communication

Change the network settings for OmniCore communication

Follow these steps to change the network settings for OmniCore communication:

1 Connect to the Fronius service port with the Ethernet cable connected to your PC:



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- 2 From a web browser address bar, enter the defined IP address (for example 192.168.125.65).
- 3 In the Fronius TPS/i browser, log on to the system using the default username "admin" and default password "admin".



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4 In the Fronius web browser, select tab RI FB INSIDE/i.

2.3.1.2.2 Changing the network settings for OmniCore controller communication Continued

5 In the Module Configuration, select one of the following options:



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- Change the network settings manually. Select Set configuration and then tap OK to confirm the changes. as needed or use the default "Factory" settings.
- Select Restore factory settings and to use the default factory settings.

2.3.1.3.1 Changing the robot communication settings

2.3.1.3 Robot controller configuration

2.3.1.3.1 Changing the robot communication settings

IRC5 communication settings

Follow these steps to configure the communication between the OmniCore controller and the Fronius power supply:

- 1 In RobotStudio, double-click the system name.
- 2 In the Controller window, expand Configuration and select I/O System.
- 3 In the Configuration I/O System window, select EtherNet/IP Device and select the the Fronius power supply to be configured.

File Home Modeling Simulation	Con	troller	RAPID	Add	-Ins	
	2	0	U	7	e	
Add Request Release Autho	enticate	Restart	Backup	Inputs/	Events	File
Arress				Output	5	nansiei C
Access	_		_	_	_	
Controller 🗧 🌫	vc2600	-801065	(Local)	×		
Virtual Controllers	Conf	iguration	- I/O Sys	stem ×		
Vc2600-801065		Туре		Na	me 👘	
D 🛅 HOME	Access	Level		B_H	IOME_JO	INT E
A Y Configuration	Cross Connection B_OP_21 Device Trust Level B_OP_SIM			E		
				E		
	EtherN	et/IP Con	nmand	B_F	OS_SIM	E
	EtherN	et/IP Dev	ice	GA	TE_EIP_E	xclusive E
I/O System	EthorN	ot/ID Into	mal David	ioFi	roniusTPS	i1 E
Man-Machine Communication		Eurenveure internal De	inal Devic	ioFronius7		i2 E
Motion	Industr	ial Netwo	rĸ	ioFr	onSmt	E
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2.3.1.3.1 Changing the robot communication settings Continued

4 In the Instance Editor, enter the Address (192.168.125.160) for the Fronius EtherNet/IP device and select OK.

🐌 Instance Editor	— C	ı ×
Name	Value	Informa
Vendor Name	Fronius International GmbH	~
Product Name	Fronius-FB-Inside-EtherNetIP(TM)	
Recovery Time (ms)	5000	
Identification Label	Fronius-FB-Inside-EtherNet/IP(TM) - Standard Image	
Address	192.168.125.160	
Vendor ID	1332	
Device Type	12	
Product Code	769	
Quick Connect	Not Used 🗸	
Output Assembly	150	
Input Assembly	100	
Output Size (bytes)	40	
Input Size (bytes)	40	
Configuration Assembly	5	
Ownership	Exclusive	
Input Connection Type	Point to point V	
Connection Priority	Schedule ×	
Configuration Size (bytes)	0	
Output RPI (us)	20000	
Input RPI (us)	20000	
Connection Timeout Multiplier	4 ~	
<		>
	OK	Cancel
		cancer

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2.3.1.3.1 Changing the robot communication settings *Continued*

🐌 Instance Editor				×
Name	Value	Information		
Heat defined as time	TRUE FALSE			^
Cool time on	TRUE FALSE			
Fill on	TRUE FALSE			
Arc Preset	0			
Ignition timeout	3			
Weld Off Timeout	10			
Override On	 TRUE FALSE 			
Autoinhibit On	TRUE FALSE			
Time to feed 15 mm wire	0.95			
Enable supervision on VC	TRUE FALSE			
Allow Tuning in Auto	TRUE FALSE			
Block Tuning in Manual	TRUE FALSE			
Enable Wire Retract	TRUE FALSE			
WidgetScreen	1			
Start Motion	Robot Motion Release	ç		
Service Port IP	192.168.125.165			
				~
		OK	Ca	incel

5 In the Instance Editor, set the Service Port IP to 192.168.125.165 and select OK.

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6 Restart the controller.

2.3.1.3.2 Accessing the Fronius service port from ABB controller

Accessing the Fronius service port

Follow these steps to access the Fronius web page from the OmniCore X4 port:



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- 1 Define the Fronius network settings (192.168.125.165), see *Change the network settings on page 18*. This will set the service port of the power supply to the OmniCore private network.
- 2 Connect the X4 Lan to an Ethernet switch, see Hardware on page 17.
- 3 Connect the Fronius Ethernet IP and service port to the Ethernet switch/hub.
- 4 Open the Fronius add-in from RobotStudio.
- 5 From the add-in, you can access the web browser and update the synergic lines, see *Adding or removing synergic lines from RobotStudio on page 71*.

For more information about the network settings, see *Operating manual* - *Integrator's guide OmniCore*.

2.3.2 Fronius PROFINET configuration

2.3.2 Fronius PROFINET configuration

Setup of PROFINET devices

This information is valid if PROFINET is selected in the fieldbus selection in the Modify Installation dialog.

The Fronius TPS/I Add-in *Fronius TPS/I for OmniCore* will provide a pre-defined ProfiNet configuration. The welder should be connected to the I/O Network (LAN port, X4).

The ProfiNet Master will use the following IP address: 192.168.0.1. The I/O Network IP is configured in RobotStudio.

1 Right-click on the controller name, select **Properties** -> **Network Settings** -> **I/O Network**.



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2.3.2 Fronius PROFINET configuration *Continued*

Specify the IP Address						
<mark>ම</mark> 1/0	Network	: PROT	_	. [×
Cor opt	Configure the I/O network interface using options available					
IP	Address					
19	2 _ 168	0.	1			
Su	bnet Mas	k				
25	5 <u>255</u>	255	0			
De	Address 2 . 168 . 0 . 1 bnet Mask 5 . 255 . 255 . 0 efault Gateway 2 . 168 . 178 . 1 ort Speed (Mbps) uto v					
19	2 _ 168	. 178 .	1			
Po	rt Speed ((Mbps)				
Au	to		~			
Ac	tual Port S	Speed: 10	00			
		ОК		(Cancel	

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3 The HMS Module configuration can be verified or updated by scanning the ProfiNet network. This is done in the IO Engineering tool. Open IO Engineering and right-click on PROFINET.



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2.3.2 Fronius PROFINET configuration *Continued*

4 Scan the network and update the IP address and station name, if needed. Change the station name and IP address and click **Send Changes** to update the HMS module.



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Default settings

The Add-In will install an IO Engineering project file during start-up with the following default settings.

Properties	Device Catalogue		₹ ×
● ● ■ Z↓	Search		×
 System 			
Station Name Identification Label Interface Port		profinet	
		ProfiNet for TPS/i	
		I/O-Network (LAN)	~
Simulat	ed	○ Yes● No	

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Welder	IP address	Station name	System name
1	192.168.0.2	iofroniustpsi1	ioFroniusTPSi1
2	192.168.0.3	iofroniustpsi2	ioFroniusTPSi4
3	192.168.0.4	iofroniustpsi3	ioFroniusTPSi3

2.3.2 Fronius PROFINET configuration *Continued*

Pr	operties Device Catalogue					
0	t Search	×				
4	Profinet Configuration					
	Station Name	iofroniustpsi1				
	Reduction Ratio	8 ~				
	Faulty Telegrams	24				
4	Network					
	IP Adress	192 . 168 . 0 . 2				
	Subnet	255 . 255 . 255 . 0				
	Gateway					
1	System	I-Freeho-TDCH				
	Name	IOF FONIUS I PSI I				
	State when System Start	Activated ~				
	Trust Level	DefaultTrustLevel v				
	Simulated	⊖ Yes ● No				
	Identification Label					
	Media Redundancy Protoc	bl				
	Media Redundancy	Disabled v				
4	Information					
	Input Size	40				
	Output Size	40				
	Startup Mode	Advanced				
	Vendor Name	Fronius International GmbH				
	Device Family	Fronius FB Inside PROFINET-2P				
	Device Type	General				
	Product Name	DAP				
	Order Number	4.044.014				
	Hardware Version					
	Software Version	V1.41.06				
	Description	Fronius welding controller for the series TPS/i with PRO				
	Vendor Id	432				
	Device Id	769				
	GSD file	GSDML-V2.34-FRONIUS-FB-INSIDE-PN-2P-20190509				
	Module ID	0x00000011				

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2.4 Fronius TPS/i package

2.4 Fronius TPS/i package

Downloading of Fronius TPS/i package

1 Download and install the Fronius TPS/i package from the Add-Ins tab in Robotstudio. (Common tags: RobotWare-Addin). Start the Modify Installation dialog and modify your robot system.



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2 Apply your settings and download the system to the controller.

2.5 System parameters

Overview

The Fronius Equipment Class and settings are automatically activated after the controller is booted with the TPS/i Add-in.

This option has advanced support for the Fronius TPS 320i/400i/500i/600i power source that includes support for the following welding modes:

- Job mode
- Program mode
- Job mode with correction

Fronius Equipment Properties

The Fronius Equipment Properties can be defined in RobotWare Arc.

Parameter	Data Type	Description
Name	string	The name of the Fronius Equipment Properties.
Use Equipment Standard IO	string	The name of the Equipment Standard IO to use.
Use Fronius Equip- ment IO	string	The name of the Equipment Standard IO to use.
Mode	string	 The mode of the welder. The following modes are available: Job mode Program mode Job mode with correction Default value: Job mode
Ignition on	bool	Specifies if ignition data specified in seamdata is to be used at the start of the weld phase. At the start it is often beneficial to define higher weld data values for a better ignition. If the ignition data parameter is changed, the contents of seamdata will also change. Default value: <i>FALSE</i>
Pre-Post Flow Control	string	This parameter is only used in JobMode. It spe- cifies if the robot controller or the power source job controls preflow and postflow of shielding gas. The following values are available: • Robot
		PowerSource Robot means that the robot controller is in charge of the gas flow control. The configurations in the power source job are discarded.
		<i>PowerSource</i> means that the values in the power source job control preflow and postflow of the shielding gas.
		If <i>PowerSource</i> is selected, the value for "Ignition timeout" has to be set to a bigger value than the preflow time in the job, and the "Weld Off Timeout" must be bigger than the post flow time.
		Default value: Robot

2.5 System parameters *Continued*

Parameter	Data Type	Description
TWIN System	bool	This parameter specifies if the system is a TWIN Wire system (TRUE) or single wire system (FALSE). The parameter cannot be modified, as it is defined by what is configured in the Installa- tion Editor.
		If TWIN Wire is selected, the seam/welddata will also use job2 to send the job to the second power source. Default value: <i>FALSE</i>
Heat on	bool	When the arc is ignited, the seam will generally not have reached the correct temperature. Pre- heating can thus be used at the start of the weld to define higher weld data values. The values to be used are. If the preheating parameter is changed, the contents of seamdata will also change Default value: <i>FALSE</i>
Heat defined as time	bool	Specifies if the heat phase should use the seam- data parameters heat_time or heat_distance. TRUE means that heat_time is used and visible in the seamdata. FALSE means that heat_distance and heat_speed is used and visible in the seam- data. Default value: <i>FALSE</i>
Cool time on	bool	Enables masking of cool_time component in seamdata. Default value: <i>FALSE</i>
Fill on	bool	Specifies whether a crater fill is to be used in the final phase. This means that the end crater that can form in the completed weld will be filled in with extra filler material. If the Crater fill parameter is changed, the contents of seamdata will also change. Default value: <i>FALSE</i>
Collision Switch Su- pervision On	bool	Specifies if the collision switch (if present) is supervised. If a collision is detected the program execution stop and motors are switched off. It is still possible to jog the robot after a collision. Default value: <i>FALSE</i>
Arc Preset	num	Delays the power control signal with this time (seconds). This gives the analog reference signals and group output signals enough time to stabilize before the weld is started. Default value: 0
Ignition Timeout	num	The maximum time (in seconds) permitted for ig- niting the welding arc. Default value: 3
Weld off timeout	num	The maximum time (in seconds) permitted for shutting off the welding arc. Default value: 10
Override On	bool	Specifies the visibility of the org value compon- ents in welddata. Default value: <i>TRUE</i>

2.5 System parameters Continued

Parameter	Data Type	Description
Auto inhibition on	bool	If this flag is set, weld inhibition will be allowed in AUTO mode, otherwise not allowed. Default value: <i>FALSE</i>
Time to feed 15 mm wire	num	The time in seconds to feed 15 mm of wire. Default value: 0.95
Enable supervision in VC	bool	Enables signal supervision in the virtual controller. Default value: <i>FALSE</i>
Enable Wire Retract	bool	If this flag is set Wire will be retracted at the end and of weld and feed at start (the specified time in <i>Time to feed 15mm wire</i>) Default value: <i>FALSE</i>
Start motion	string	 This is the start signal for the robot to start motion after the arc is stable. The default value is <i>Robot motion release</i> signal. This signal is high after the start current is executed until gas post flow. Possible selections are: Robot motion release Arc stable Current flow Main current flow
Service port IP	num	The IP address of the welder's service port. This is used in conjunction with the RobotStudio Add-In.

Fronius TPSi Equipment IO

Parameter	Data Type	Description
ArcEst DI	signaldi	This signal is set as soon as the wire electrode touches the workpiece and the current flows, thus reporting to the robot controller that the arc is burning.
ArcEst Label	string	Label describing the error level of the signal. There are three available levels, MAJOR, MINOR and INFO.
MainCurrent DI	signaldi	If welding is carried out with a defined starting current and a defined end current, the Main cur- rent signal is set high between the end of the starting current and the start of the end current phases.
CurrentFlow DI	signaldi	This signal is set to high as soon as the wire electrode touches the workpiece and the current flows.
RobotMotionRelease DI	signaldi	The signal is active from the end of the starting current to the end of the gas post-flow.
WelderReady DI	signaldi	The signal is high when the power source is ready to weld.
WelderHeartBeat DI	signaldi	Power source alive indication. The value changes its activity with a frequency of 1 Hz.
Process Active DI	signaldi	The signal is high from the beginning of gas pre- flow to the end of gas post-flow to inform the robot that welding is still taking place.

2.5 System parameters Continued

Parameter	Data Type	Description
CmdValueOutO- fRange DI	signaldi	This signal indicates that the <i>Wire feed speed command value</i> input is outside of the possible range
CorrValueOutO- fRange DI	signaldi	This signal indicates that at least one of the selec- ted corrections (for example, arc length correction) is outside of the specified range.
CollisionSwitch	signaldi	If a collision occurs (with the workpiece, clamping device, etc.) while using the CrashBox, the contact of the CrashBox is opened and the CollisionSwitch active signal is set to low.
WaterOK DI	signaldi	Digital input signal for supervision of the water. A high signal means that the water is OK.
GasOK DI	signaldi	Digital input signal for supervision of the protect- ive gas. A high signal means that the protective gas is OK.
GasOn DO	signaldo	This signal opens the gas solenoid valve and thus activates the gas flow.
WeldOn DO	signaldo	The rising edge of the welding start signal starts the welding process.
FeedOn DO	signaldo	The signal activates the start of the wirefeeder.
FeedOnBwd DO	signaldo	The signal activates the retraction of the wire electrode.
RobotReady DO	signaldo	The robot sets this signal as soon as it is ready to weld.
WelderErrReset DO	signaldo	If an error message is output on the power source, the error is reset using this error reset signal. To reset the signal successfully, the signal must re- main set for at least 10 ms.
WelderSimulation DO	signaldo	The power source uses the welding simulation signal to simulate an actual welding process.
TouchSense DO	signaldo	When Touch sensing is activated, a voltage of approximately 70 V (up to 3 A) is applied to the wire electrode/gas nozzle.
Supervision Welder DO	signaldo	Digital output signal that indicates welder supervision.
Supervision Arc DO	signaldo	Digital output signal for indication of welding arc errors. A high signal means that an error has oc- curred.
SupervWater DO	signaldo	Digital output signal for indication of cooling water errors. A high signal means that an error has oc- curred.
SupervGas DO	signaldo	Digital output signal for indication of protective gas errors. A high signal means that an error has occurred.
SupervWirestick DO	signaldo	Digital output signal for indication of wire feed errors. A high signal means that an error has oc- curred.

2.5 System parameters Continued

Parameter	Data Type	Description
HeartBeatLost DO	signaldo	Digital output signal for indication of HeartBeat lost from the Welder. A high signal means that the communication between the Robot and Welder is lost. It can be used to inform an external PLC that welder communication is lost.
ArcLength correction	signalao	Arc length correction in the range of -10% to +10%.
FeedReference AO	signalao	Wirefeed speed in the range of -327.68 m/min to 327.68 m/min (depending on the wirefeeder).
Dynamic correction AO	signalao	Pulse/dynamic correction in the range of -10% to +10%.
BurnBackCorrection	signalao	Wire retraction correction.
TCP Speed AO	signalao	This value is used to transmit the robot TCP speed.
Process specific cor- rection AO	signalao	Arc Length Stabilizer (PMC) from 0 to 5 V.
JobPort GO	signalgo	Job number to be used in <i>Job Mode</i> and <i>Job Mode</i> with Correction.
ModePort GO	signalgo	Work mode selection.
Error Code GI	signalgi	Error code indication.

2.6 Units

2.6 Units

Overview

The Fronius TPS/i can handle different units; metric or imperial.

Unit	Description
Metric	Length (mm), robot travel speed (mm/s), wirefeed speed (m/min)
Imperial	Length (inch), robot travel speed (ipm), wirefeed speed (ipm)

The default setting is Metric.

How to change the unit settings

Metric units are the default setting.

Unit settings are displayed at three different places:

· At the bottom of the Fronius TPSi RS Add-in

Settings	
Job Mode	Program Mode
Metric	V EN Standard
Imperial	AWS
	VelderConnectedToRC

xx1900002387

In the Process Configuration •


2.6 Units Continued

On the TPS/i welder front panel



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If the unit type should be changed, change it on all these places. Example: Change from *Metric* to *Imperial* units.



2 Installation

2.6 Units *Continued*



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Note

If the units are changed from metric to imperial units, or the other way around, it is very important that new WeldModes are searched and transferred to the controller from the RobotStudio Add-in. The reason for that is that the RAPID file which is created during the WeldMode search, is stored with unit information.

	President PORT PORT PRESERVATION AND AND AND A
nome/A	(vrionus) rsiv i_kost/micionusmodes.sys X
1	MODULE mFroniusModes(SYSMODULE)
2	! This Rapid module was created programatically
3	! Units: Metric ┥ = = = =
4	! Date : 26-1-2018
5	! Time : 09:06:09
6	! User : sejeahl
7	CONST FroniusWeldModeData weld_mode2564:=[2564,TRUE,1.2,"100% CO2","STEEL","MIG STANDARD",[1.5,30],[16.5,45.75],[50,550],[1,30],[[FALSE,0],[FALSE,0]]];
8	CONST FroniusWeldModeData weld_mode2565:=[2565,TRUE,1,"AR+15-20%CO2","STEEL","MIG STANDARD",[1.6,30],[15.5,35],[48,400],[0.8,20],[[FALSE,0],[FALSE,0]]];
9	CONST FroniusWeldModeData weld_mode2629:=[2629,TRUE,1,"AR+15-20%CO2","STEEL","MIG STANDARD",[1.5,30],[14.5,36],[45,400],[0.6,20],[[FALSE,0],[FALSE,0]]];
10	CONST FroniusWeldModeData weld_mode2637:=[2637,TRUE,1.2,"AR+15-20%CO2","METAL CORED","MIG STANDARD",[1.5,25],[14.2,41],[65,460],[1.25,25],[[FALSE,0],[FALSE,0]]];
11	CONST FroniusWeldModeData weld_mode2764:=[2764,TRUE,1,"AR+15-20%CO2","STEEL","MIG LSC",[1.5,30],[14,37],[34,430],[0.7,50],[[FALSE,0],[FALSE,0]]];
12	CONST FroniusWeldModeData weld_mode2851:=[2851,TRUE,1,"AR+15-20%CO2","STEEL","MIG PMC",[2,30],[18.6,33.5],[43,375],[1,25],[[TRUE,0],[TRUE,0]]];
13	CONST FroniusWeldModeData weld_mode3359:=[3359,TRUE,1,"AR+15-20%CO2","STEEL","MIG LSC",[1.5,30],[14,37],[34,430],[0.7,50],[[FALSE,0],[TRUE,0]]];
14	ENDIODULE

2.7 Best practice

Installation and setup workflow

1 Install a system with the add-in.

- 2 Start the RS add-in and connect to the welder.
- 3 Edit and manage data in the welder via the browser.
- 4 Edit what should be transferred to the controller.
- 5 Transfer the data to the controller.
- 6 Create a weld program.
- 7 Step through the program and use the Fronius weld editor to edit/tune the data.
- 8 Run the program and watch the run-time data in the weld info widget.

Data editor workflow

The **Use weld phase mode** checkbox is global. If it is checked in one tab, it will be checked on the other tabs as well.

It should be used if the weld tab jobs/synergic lines are wanted for the other tabs.

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3 Fronius interface modes

3.1 Overview

Interface modes

Currently the Fronius TPS/i welder interface has support for the following modes, that will be customized by selecting the mode in system parameters.



A warm-start is mandatory if the modes are changed.

Interface modes	Description
Job mode	The welding parameters (except for pre flow, post flow, and purge time) are stored and set in the power supply using jobs. The job number is set in the Weld Data editor. In addition, the Job Name is displayed on the FlexPendant.
Program mode	All the welding parameters are set and stored in the robot controller. The program (also known as a synergic line or a wave form) is stored in the power supply. The program is selected in the Weld Data editor and all the welding parameters are with the graphical editor. This interface allows the operator to make all weld settings from the FlexPendant rather than the power supply.
Job mode with correction	The welding parameters (except for pre flow, post flow, and purge time) are stored and set in the power supply using jobs. The job number is set in the Weld Data editor. In addition, the Job Name is displayed on the FlexPendant.
	 In this mode it is also possible to adjust the following parameters; Power (Wirefeed speed) can be adjusted between +/- 20 % in 1% increments.
	 Voltage (ArcLength correction) can be adjusted between +/- 10 steps in 0.1 increments.

Setting the interface mode

The interface mode can be set in the configuration editor in RobotStudio.

- 1 Connect to the controller and select Process in the Configuration Editor.
- 2 Select the type **Fronius TPSi Arc Equipment Properties** and change the mode.

3 Fronius interface modes

3.1 Overview Continued

The configuration editor in RobotStudio

🙆 Instance Editor		31		×
Name	Value	Information		
Name	ARC1_FRON_EQPR_TPSi_T_ROB1			~
Use Equipment Standard IO	FRON_TPSi_EQSTDIO_T_ROB1 ~			
Use Fronius TPSi Equipment IO	FRON_TPSi_EQIO_T_ROB1			
Mode	Job mode 🗸 🗸			
Pre-Post Flow Control	Job mode			
TWIN System	Job mode with correction Program mode			
Ignition on	○ TRUE● FALSE			
Heat on	○ TRUE ● FALSE			
Heat defined as time	○ TRUE● FALSE			
Cool time on	 TRUE FALSE 			
Fill on	 TRUE FALSE 			
Collision Switch Supervision On	 TRUE FALSE 			
Arc Preset	0			
Ignition timeout	3			
Weld Off Timeout	10			
Override On	TRUE FALSE			
Autoinhibit On	TRUE FALSE			~
Value (string) The changes will not take effect	until the controller is restarted.			
		ОК	Ca	ncel

3.2 Setting up limits in job mode with correction

3.2 Setting up limits in job mode with correction

Overview

When the welder is running in JobMode with Correction mode, the limits of Power (Wire feed speed) and Voltage (Arc Length Correction) must be setup in the Job. This can be done either via the Welder display or via the Web interface.

Job mode with correction limits via the welder display



3 Fronius interface modes

3.2 Setting up limits in job mode with correction *Continued*

Job mode with correction limits via the web interface

0019 JobModeWithCorr_19		
Parameter	Value	
SFI	off	*
SFI Hot start	off	
Wire retract	0.0	
Synchropulse enable	off	
Delta wire feed	2.0 m/mi	n
Frequency	3.0 Hz	
Duty cycle	50 %	
Arc length correction high	0.0	
Arc length correction low	0.0	
High power time corr.	0.0	
Low power time corr.	0.0	
Low power corr.	0.0	
Power correction high	20 %	
Power correction low	-20 %	
Arc length correction high	10.0	
Arc length correction low	-10.0	
Command value gas	15.0 l/mi	n
Gas factor	auto	
Job slope	0.0 s	
Sampling rate	off	
Spot welding time	1.0 s	*

4.1 Introduction

Overview The graphical user interface (web app) for the FlexPendant is called the WeldEditor. The interface consists of tabs where the user can process and modify information, such as: Ignition parameters • Heat parameters • · Weld parameters · End parameters Weave parameters • Unlike the regular data editor, the WeldEditor combines seam data and weld data for intuitive process setup and allows them to be modified at the same time. The WeldEditor also validates the data based on information from the welder. The data to edit can be selected either by moving the program pointer to a weld instruction or by using the last weld and seam data.

When selecting a synergic line or a job in the WeldEditor, there is more information available than just the Synergic Line number or Job number.

Starting the WeldEditor

The WeldEditor can be started from the home tab on the FlexPendant.

4.2 Weld editor in Program mode

4.2 Weld editor in Program mode

Ignition parameters

Tap the **Ignition** tab to view or modify the ignition phase parameters.



Do not manipulate seam/welddata using the RAPID data type editor. This can result in unwanted behavior and wrong welding parameters which in worst case can damage your welding equipment. Use the Weld mode editor instead.



Note

The ignition phase parameters can only be modified in manual mode.



To copy the current weld phase mode settings, toggle Use Weld Phase Mode off, on, and then off again.

였 Messages 🗄 Event I	og	€	۵ 🛞 🏵 ۱۵۵%	S Axis 1-3
IGNITION	HEAT	WELD	END	WEAVE
pp: 200 ArctStart p1/000 Welder Mode: Progr Active Seamdata: Active Welddata: Synergic Line	Qum, wdt/Weavenawy, fine, t/WeldGuimMode Purge Time Pre Flow 0.5 S 0.05 Use Weld Phase Mode 2565.1.Ar+15-20%CO2.Stere	Ignition Move Delay 0 s eLMIG Standard V	Scrape Start	Аррђу
	Wirefeed Speed 10.0 [m/r 1.5 Arc Length Corr 0 [steps] -10 Actual <15.5-2:	nin] 30 5> (v]	Pulse/Dyn Corr 0 [steps] 	Cancel 10
🛕 Home 🥏 WeldEdito	or			07:53

xx2300001970

Parameter	Description
Ign Move Delay	The delay (in seconds) from the time the arc is considered stable at ignition until the heat phase is started.
Purge Time	The time (in seconds) it takes to fill the gas lines and the welding gun with protective gas, also called <i>gas purging</i> .
Pre Flow Time	The time (in seconds) it takes to pre-flow the weld object with protective gas, also called <i>gas pre-flow</i> .

4.2 Weld editor in Program mode *Continued*

Parameter	Description
Scrape Start	 The type of scrape used at the weld start. Scrape type at restart will not be affected. It will always be weaving scrape. Not selected – No scrape at weld start Selected – weaving scrape
Use Weld Phase Mode	Not selected – Select weld parameters during ignition phase manually. Selected – Use the parameters from the Weld tab. This is the default mode.
Synergic Line	Mode defines the shape and characteristics of the weld. The characteristics of a mode generally implement the process: Standard, Pulse, LSC, PMC and CMT. The information displayed in the Synergic Line is: <i>SynergicLine number, Wiresize, GasType, Material, Pro- cessType</i> .
Wire Feed Speed	This is the wire feed speed. The values apply to the MIG/MAG standard synergic, MIG/ MAG pulse synergic, MIG/MAG PMC and MIG/MAG LSC welding processes.
Arc Length Correction	This parameter represents the arc length when welding in synergic mode the range is -10 to +10. The values apply to the MIG/MAG standard synergic, MIG/MAG pulse synergic, MIG/MAG PMC and MIG/MAG LSC welding processes. (-10% = shorter arc, 0% = value from line, +10% longer arc) The actual value range in Volts is also shown as, Actual <x.x y.y="" –=""> [V]</x.x>
Pulse/Dynamic Corr.	Arc-force dynamic correction or pulse correction (pulsed arc). The range is -10 to +10.The values apply to the MIG/MAG standard synergic, MIG/MAG pulse synergic, MIG/MAG PMC and MIG/MAG LSC welding processes. (-10% = pulse-/dynamic correction, 0% = value from line, +10% = pulse-/dynamic correction)

Heat parameters

Tap the Heat tab to view or modify heat phase parameters.



The heat phase parameters can only be modified in manual mode.



To copy the current weld phase mode settings, toggle **Use Weld Phase Mode** off, on, and then off again.

4.2 Weld editor in Program mode *Continued*



Parameter	Description
Heat Dist / Heat as time	The distance during which the heat data is active at the start of the weld.
	If the parameter "Heat as time" is active the distance will be replaced by time (in seconds).
Heat Speed	The welding speed during the heat phase at the start of the weld phase.
Use Weld Phase Mode	Not selected – Select weld parameters during ignition phase manually.
	Selected – Use the parameters from the Weld tab. This is the default mode.
Synergic Line	Mode defines the shape and characteristics of the weld. The characteristics of a mode generally implement the process: Standard, Pulse, LSC, PMC and CMT.
	The information displayed in the Synergic Line is:
	SynergicLine number, Wiresize, GasType, Material, Pro- cessType.
Wire Feed Speed	This is the wire feed speed. The values apply to the MIG/MAG standard synergic, MIG/ MAG pulse synergic, MIG/MAG PMC and MIG/MAG LSC welding processes.
Arc Length Correction	This parameter represents the arc length when welding in syn- ergic mode the range is -10 to +10. The values apply to the MIG/MAG standard synergic, MIG/MAG pulse synergic, MIG/MAG PMC and MIG/MAG LSC welding processes.
	(-10% = shorter arc, 0% = value from line, +10% longer arc)
	The actual value range in Volts is also shown as, Actual <x.x y.y="" –=""> [V]</x.x>
Pulse/Dynamic Corr.	Arc-force dynamic correction or pulse correction (pulsed arc). The range is -10 to +10.The values apply to the MIG/MAG standard synergic, MIG/MAG pulse synergic, MIG/MAG PMC and MIG/MAG LSC welding processes
	(-10% = pulse-/dynamic correction, 0% = value from line, +10% = pulse-/dynamic correction)

4.2 Weld editor in Program mode *Continued*

Weld parameters

Tap the Weld tab to view or modify weld phase parameters.



The weld phase parameters can only be modified in manual mode.

← ABB Robotics FlexPendant				
😡 Messages 🗄 Event I	og	-	@ 🕢 🏹 10	0% S Axis 1-3
IGNITION	HEAT	WELD	END	WEAVE
pp: B+2 ArcLEnd p4/100 Welder Mode: Progra Active Seamdata: sm Active Welddata: vd Synergic Line	mwdWeavenwy,fine,1WeldGun mMode Weld Speed 8 [mm/s] 0 2565.1.Ar+15-20%C02.5tee	30 I.MIG Standard ❤		Apply
	Wirefeed Speed 1.6 (m/mi 1.6 Arc Length Corr 3 [steps] -10 Actual < 15.5-25	in] 30 0 i> (v) 10	Pulse/Dyn Corr 0 [steps 	Cancel 10 WebJob Editor Launch
🛕 Home 🏼 🌮 WeldEdito	r.			13:30

xx2300001972

Parameter	Description
Weld speed	The speed of the TCP of the welding torch during the weld in- struction.
Synergic Line	Mode defines the shape and characteristics of the weld. The characteristics of a mode generally implement the process: Standard, Pulse, LSC, PMC and CMT.
	The information displayed in the Synergic Line is:
	SynergicLine number, Wiresize, GasType, Material, Pro- cessType
Wire Feed Speed	This is the wire feed speed. The values apply to the MIG/MAG standard synergic, MIG/ MAG pulse synergic, MIG/MAG PMC and MIG/MAG LSC welding processes.
Arc Length Correction	This parameter represents the arc length when welding in syn- ergic mode the range is -10 to +10. The values apply to the MIG/MAG standard synergic, MIG/MAG pulse synergic, MIG/MAG PMC and MIG/MAG LSC welding processes.
	(-10% = shorter arc, 0% = value from line, +10% longer arc)
	The actual value range in Volts is also shown as, Actual $\langle x.x - y.y \rangle$ [V]
Pulse/Dynamic Corr.	Arc-force dynamic correction or pulse correction (pulsed arc). The range is -10 to +10.The values apply to the MIG/MAG standard synergic, MIG/MAG pulse synergic, MIG/MAG PMC and MIG/MAG LSC welding processes.
	(-10% = pulse-/dynamic correction, 0% = value from line, +10% = pulse-/dynamic correction)

Continues on next page

4.2 Weld editor in Program mode *Continued*

Parameter	Description
Arc Length Stabilizer	Synergic lines support different kind of corrections depending on the selected process. As for the PMC process the Arc Length Stabilizer can be set if supported by the synergic line. The Arc Length Stabilizer will be dynamically shown within the editor. The range is 0 to +5 V.
	(0 V = value from the line, +5V Max Arc Length stabilizer)

End parameters

Tap the **End** tab to view or modify the end phase parameters.



The end phase parameters can only be modified in manual mode.



To copy the current weld phase mode settings, toggle **Use Weld Phase Mode** off, on, and then off again.

← ABB Robotics FlexPendant								
🖗 Messages 🔚 Event lo	g		ି କ	\otimes		San and a second secon	Axis 1-3	••••
IGNITION	HEAT	WELD		END		WE	AVE	
pp: 5-39 ArctStart p1v1000 Welder Mode: Program Active Seamdata: Active Welddata: Synergic Line	Stm.vdtWeave==wv,finetWeldGun nMode Cool Time Fill Time 0 s 5 Use Weld Phase Mode 2565;1.Ar+15-20%CO2.Steel	SeamName:="Seam_1" Flow Burn Back 5 s 0 s						Apply
	Wirefeed Speed 10.0 [m/m 1.6 Arc Length Corr 0 [steps] -10 Actual < 15.5-25	in] 30 10 > [/]	Puls	e/Dyn Corr	0 [steps] →→O	1		Cancel

	<u>^</u>	Home	WeldEditor	15:41
--	----------	------	------------	-------

Parameter	Description	
Cool Time	The time (in seconds) during which the process is stopped, al- lowing the weld to cool before other end activities such as crater fill and burn back take place.	
Fill Time	The crater-filling time (in seconds) at the end phase of the weld.	
Burn Back (Wire Retract correction)	The values apply to the MIG/MAG standard synergic, MIG/MA pulse synergic, MIG/MAG PMC and MIG/MAG LSC welding processes.	
	The value can be applied between 0 – 10 mm.	

4.2 Weld editor in Program mode *Continued*

Parameter	Description
Post Flow	The time (in seconds) for purging with protective gas after the end of the process.
Use Weld Phase	Not selected – Select weld parameters during ignition phase manually. Selected – Use the parameters from the Weld tab. This is the default mode.
Synergic Line	Mode defines the shape and characteristics of the weld. The characteristics of a mode generally implement the process: Standard, Pulse, LSC, PMC and CMT. The information displayed in the Synergic Line is: <i>SynergicLine number, Wiresize, GasType, Material, Pro- cessType.</i>
Wire Feed Speed	This is the wire feed speed. The values apply to the MIG/MAG standard synergic, MIG/ MAG pulse synergic, MIG/MAG PMC and MIG/MAG LSC welding processes.
Arc Length Correction	This parameter represents the arc length when welding in synergic mode the range is -10 to +10. The values apply to the MIG/MAG standard synergic, MIG/MAG pulse synergic, MIG/MAG PMC and MIG/MAG LSC welding processes. (-10% = shorter arc, 0% = value from line, +10% longer arc) The actual value range in Volts is also shown as, Actual <x.x y.y="" –=""> [V]</x.x>
Pulse/Dynamic Corr.	Arc-force dynamic correction or pulse correction (pulsed arc). The range is -10 to +10.The values apply to the MIG/MAG standard synergic, MIG/MAG pulse synergic, MIG/MAG PMC and MIG/MAG LSC welding processes. (-10% = pulse-/dynamic correction, 0% = value from line, +10% = pulse-/dynamic correction)
Arc Length Stabilizer	Synergic lines support different kind of corrections depending on the selected process. As for the PMC process the Arc Length Stabilizer can be set if supported by the synergic line. The Arc Length Stabilizer will be dynamically shown within the editor. The range is 0 to +5 V. (0 V = value from the line, +5V Max Arc Length stabilizer)

Weave parameters

Tap the Weave tab to view or modify the weave parameters.



The weave parameters can only be modified in manual mode. The optional argument $\forall weave$ must be used with the arc instructions to weave. For more information, see *Application manual - ArcWare for OmniCore*.

4.2 Weld editor in Program mode *Continued*

← ABB Robotics FlexPendant				
🗘 Messages 🗄 Event log		• @ 🕢	∽ 100% S ROB_1 ⊕, Axis	1-3
IGNITION HEAT	WELD	END	WEAVE	
pp: 2+42 ArtcEnd p4v100sm.wd/Weaverawy.fine tWebG Webler Mode ProgramMode Active Webldata: wd Active Weavedata: wv	a.			
Shape 2-V-Shaped V	Dwell Left	0.00 [mm]	Weave Frequency 2.00 [Hz]	
Type 0-Geometric 🗸	Dwell Center	0.00 [mm]		
Length 4.0 [mm]	Direction	0.00 [mm]		Apply
0 10 Width 3.0 [mm]	Tilt	0 [deg]		Cancel
	Orientation	0 [deg]		
Height 0.0 [mm]	V-shaped wea	aving		
0 10 Bias 0.0 [mm]	×	T'x X		
0 10		→ × _W × _W		
🛕 Home 🥝 WeldEditor				13:26

xx2300001974

Parameter	Description		
Shape	 The used weave shape. The following shapes can be selected: ZigZag V-Shaped Triangular Circular 		
Туре	 The used weave type. The following types can be selected: Geometric weaving. All axes are used during weaving. Wrist weaving. Rapid weaving. Axes 1, 2, and 3 used. Rapid weaving. Axes 4, 5, and 6 used. 		
Length	Weave length in mm.		
Width	Total amplitude of the weaving pattern.		
Height	The height (H) of the weaving pattern during V-shaped and tri- angular weaving.		
Bias	The bias horizontal to the weaving pattern.		
Dwell Left	The length of the dwell used to force the TCP to move only in the direction of the seam at the left turning point of the weave.		
Dwell Center	The length of the dwell (DC) used to force the TCP to move only in the direction of the seam at the center point of the weave.		
Dwell Right	The length of the dwell used to force the TCP to move only in the direction of the seam at the right turning point of the weave.		
Direction	The weave direction angle horizontal to the seam. An angle of zero degrees results in a weave vertical to the seam.		
Tilt	The weave tilt angle, vertical to the seam. An angle of zero de- grees results in a weave which is vertical to the seam.		
Orientation	The weave orientation angle, horizontal-vertical to the seam. An angle of zero degrees results in symmetrical weaving.		

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4.3 Weld editor in Job mode

4.3 Weld editor in Job mode

Ignition parameters

Tap the **Ignition** tab to view or modify the ignition phase parameters.



Do not manipulate seam/welddata using the RAPID data type editor. This can result in unwanted behavior and wrong welding parameters which can in worst case damage your welding equipment. Use the Weld mode editor instead.



Note

The ignition phase parameters can only be modified in manual mode.



To copy the current weld phase mode settings, toggle **Use Weld Phase Mode** off, on, and then off again.

ABB Robotics FlexPenda	nt					
Ø Messages 🗄 Eve	nt log		∎ ற	8 7	100% SOB_1	Axis 1-3 •••
IGNITION	HEAT	WELD		END	WEAV	Ē
p: 133 Artistant pi). Welder Mode: Jo Active Seamdata: Active Welddata: Jobs	ADD Im well Weaker swy fine two loc Purge Time Pre Flow 0.5 s 0.05 s Use Weld Phase Mode 1.Job #1	Ignition Move Delay	Scrap Process	ie Start Type MIG/MAG	pulse synergic	Apply Cancel
🛕 Home 🥟 Weld	ditor					15:30

xx2300001975

Parameter	Description
Ign Move Delay	The delay (in seconds) from the time the arc is considered stable at ignition until the heat phase is started.
Purge Time	The time (in seconds) it takes to fill the gas lines and the welding gun with protective gas, also called <i>gas purging</i> .
Pre Flow Time	The time (in seconds) it takes to pre-flow the weld object with protective gas, also called <i>gas pre-flow</i> .

Continues on next page

4.3 Weld editor in Job mode Continued

Parameter	Description
Scrape Start	 The type of scrape used at the weld start. Scrape type at restart will not be affected. It will always be Weaving scrape. Not selected – No scrape at weld start Selected – Weaving scrape
Use Weld Phase Mode	Not selected – Select weld parameters during ignition phase manually Selected – Use the parameters from the Weld tab. This is the default mode.
Job number	The job (schedule) that should be selected within the welder. The information displayed in the Job number is: Job number, Job name.
ProcessType	 The process type that is active for the selected job. Available process types are: MIG/MAG Pulse Synergic MIG/MAG Standard Synergic MIG/MAG PMC MIG/MAG LSC MIG/MAG Standard Manual Electrode TIG

Heat parameters

Tap the Heat tab to view or modify heat phase parameters.



The heat phase parameters can only be modified in manual mode.



To copy the current weld phase mode settings, toggle Use Weld Phase Mode off, on, and then off again.

4.3 Weld editor in Job mode Continued

ABB Robotics FlexPendant				
	og HEAT	WELD	END	WEAVE
pp: >39 Arct Start p1 v100 Welder Mode: JobMo Active Seamdata: N/A Active Welddata: N/A Jobs	Osm wdWeaterswy, fine tWeldGur dde Heat dist Heat Speed 0.00 [mm] 0.00 [m Use Weld Phase Mode 1.Job #1	nSeamManer="56am 1" nm/s] ↓	Process Type MiG/MAG	pulse synergic Apply Cancel
🛕 Home 🥟 WeldEdito	or			15:23

xx2300001976

Parameter	Description
Heat Dist / Heat as time	The distance during which the heat data is active at the start of the weld. If the parameter Heat as time is active, the distance will be re- placed by time (in seconds).
Heat Speed	The welding speed during the heat phase at the start of the weld phase.
Use Weld Phase	Not selected – Select weld parameters during ignition phase manually. Selected – Use the parameters from the Weld tab. This is the default mode.
Job number	The job (schedule) that should be selected within the welder. The information displayed in the Job number is: Job number, Job name.
ProcessType	 The process type that is active for the selected job. Available process types are: MIG/MAG Pulse Synergic MIG/MAG Standard Synergic MIG/MAG PMC MIG/MAG LSC MIG/MAG Standard Manual Electrode TIG

Weld parameters

Tap the Weld tab to view or modify heat phase parameters.



The weld phase parameters can only be modified in manual mode.

4.3 Weld editor in Job mode Continued

← ABB Robotics FlexPendant						
🗘 Messages 🗄 Event	log		5	🕅 🏠 100%	1 💩 Axis 1-3	
IGNITION	HEAT	WELD	EN	D	WEAVE	
pp: 5-35 AvcIstarf p1 v10 Welder Mode: JobM Active Geamdata: sm Active Welddata: wd Jobs	00.sm wdtWeave swyfine tWeldGur Iode Weld Speed 10 [mm/s] 0 1.Job #1	a(SeamName:="Seam, 1" 30 ✓	Process Type	MIG/MAG pulse synergic		Apply Cancel
					w	ebJob Editor
🔒 Home 🥟 WeldEdi	or					15.24
						15.24

xx2300001977

Parameter	Description	
Weld speed	The speed of the TCP of the welding torch during the weld in- struction.	
Job number	The job (schedule) that should be selected within the welder. The information displayed in the Job number is: Job number, Job name.	
ProcessType	 The process type that is active for the selected job. Available process types are: MIG/MAG Pulse Synergic MIG/MAG Standard Synergic MIG/MAG PMC MIG/MAG LSC MIG/MAG Standard Manual Electrode TIG 	

End parameters

Tap the End tab to view or modify the end phase parameters.



Note

The end phase parameters can only be modified in manual mode.



To copy the current weld phase mode settings, toggle Use Weld Phase Mode off, on, and then off again.

56

4.3 Weld editor in Job mode Continued

← ABB Robotics FlexPendant				
Ø Messages 🗄 Event	log		۵۵% 🛞 🛞	SAxis 1-3
IGNITION	HEAT	WELD	END	WEAVE
pp: 39 ArcLStart p1 v10 Welder Mode: JobM Active Seamdata: N/A Active Welddata: N/A	Cool Time Fill Time Post	rlow Burn Back		
Jobs	Use Weld Phase Mode	~	Process Type MIG/MAG pulse s	ynergic Apply Cancel
Home WeldEdit	or			15:25

xx2300001978

Parameter	Description
Cool Time	The time (in seconds) during which the process is stopped, al- lowing the weld to cool before other end activities such as crater fill and burn back take place.
Fill Time	The crater-filling time (in seconds) at the end phase of the weld.
Burn Back (Wire Retract correction)	The values apply to the MIG/MAG standard synergic, MIG/MAG pulse synergic, MIG/MAG PMC and MIG/MAG LSC welding processes The value can be applied between 0 – 10 mm.
Post Flow	The time (in seconds) for purging with protective gas after the end of the process.
Use Weld Phase	Not selected – Select weld parameters during ignition phase manually. Selected – Use the parameters from the Weld tab. This is the default mode.
Job number	The job (schedule) that should be selected within the welder. The information displayed in the Job number is: Job number, Job name.
ProcessType	 The process type that is active for the selected job. Available process types are: MIG/MAG Pulse Synergic MIG/MAG Standard Synergic MIG/MAG PMC MIG/MAG LSC MIG/MAG Standard Manual Electrode TIG

Weave parameters

See Weave parameters on page 51.

4.4 Weld editor in Job mode with correction

4.4 Weld editor in Job mode with correction

Ignition parameters

Tap the **Ignition** tab to view or modify the ignition phase parameters.



Do not manipulate seam/welddata using the RAPID data type editor. This can result in unwanted behavior and wrong welding parameters which can in worst case damage your welding equipment. Use the Weld mode editor instead.



The ignition phase parameters can only be modified in manual mode.



To copy the current weld phase mode settings, toggle Use Weld Phase Mode off, on, and then off again.

ABB Robotics FlexPendan	t			-
A Messages 🗄 Even	nt log		<u>କ</u> 🛞	∑ ⊕ Axis 1-3 ····
GNITION	HEAT	WELD	END	WEAVE
pp: ->39 ArcLStart p1 v1 Welder Mode: Job Active Seamdata: Active Welddata:	1000 sm,wd\Weave:=wy.fine.tWeldGi ModeWithCorr	un\SeamName:="Seam_1		
Jobs	0.5 S 0.05 S Use Weld Phase Mode 1,Job #1	0 s	Scrape Start	Apply
	Wirefeed Speed 0 [%]	20		Cancel
	Arc Length Corr 0 [steps -10] 10		
Home 🥟 WeldEd	ditor			15:49

Parameter	Description
Ign Move Delay	The delay (in seconds) from the time the arc is considered stable at ignition until the heat phase is started.
Purge Time	The time (in seconds) it takes to fill the gas lines and the welding gun with protective gas, also called <i>gas purging</i> .
Pre Flow Time	The time (in seconds) it takes to pre-flow the weld object with protective gas, also called <i>gas pre-flow</i> .

4.4 Weld editor in Job mode with correction Continued

Parameter	Description
Scrape Start	 The type of scrape used at the weld start. Scrape type at restart will not be affected. It will always be Weaving scrape. Not selected – No scrape at weld start Selected – Weaving scrape
Use Weld Phase Mode	Not selected – Select weld parameters during ignition phase manually. Selected – Use the parameters from the Weld tab. This is the default mode.
Job number	The job (schedule) that should be selected within the welder The information displayed in the Job number is: Job number, Job name.
Wire Feed Speed	This is the wire feed speed (Power). In this mode, the wire feed speed can be adjusted in the range of +/- 20 % in 1% increments.
Arc Length Correction	This parameter represents the arc length (Voltage).
	In this mode, the Arc Length Correction can be adjusted in the range of +/- 10 steps in 0.1 increments.

Heat parameters

Tap the Heat tab to view or modify heat phase parameters.



The heat phase parameters can only be modified in manual mode.



To copy the current weld phase mode settings, toggle **Use Weld Phase Mode** off, on, and then off again.

⟨♀ Messages 🗄 Event	log	∎ @	🛞 🆓 100% 🌋 ROB	_1 💩 Axis 1-3 ····
IGNITION	HEAT	WELD	END	WEAVE
pp: 239 Arc Start p1v101 Welder Mode: JobM Active Seamdata: Active Welddata:	0 sm wdWeve swy fine tWeldGur odeWithCorr Heat dist Heat Speed 0.00 [mm] 0.00 [m Use Weld Phase Mode	15aamNume="Saam_11" 15aamNume="Saam_11" 1m/s]		
Jobs	1,Job #1 Wirefeed Speed 0 [%] -20 Arc Length Corr 0 [steps] -10	20		Apply Cancel
▲ Home	or			15:52

4.4 Weld editor in Job mode with correction Continued

Parameter	Description
Heat Dist / Heat as time	The distance during which the heat data is active at the start of the weld.
	If the parameter Heat as time is active the distance will be re- placed by time (in seconds).
Heat Speed	The welding speed during the heat phase at the start of the weld phase.
Use Weld Phase Mode	Not selected – Select weld parameters during ignition phase manually.
	Selected – Use the parameters from the Weld tab. This is the default mode.
Job number	The job (schedule) that should be selected within the welder. The information displayed in the Job number is: Job number, Job name.
Wire Feed Speed	This is the wire feed speed (Power). In this mode, the wire feed speed can be adjusted in the range of +/- 20 $\%$ in 1% increments.
Arc Length Correction	This parameter represents the arc length (Voltage).
	In this mode, the Arc Length Correction can be adjusted in the range of +/- 10 steps in 0.1 increments.

Weld parameters

Tap the Weld tab to view or modify heat phase parameters.



The weld phase parameters can only be modified in manual mode.

← ABB Robotics Flex	Pendant				
Ø Messages ∷Ξ	Event log		ଡ 🛞	√ 100% ST ROB	1 💩 Axis 1-3
IGNITION	HEAT	WELD	END		WEAVE
pp: ->39 ArcLSta Welder Mode: Active Seamdata: Active Welddata:	t p1,v1000.sm,wcl\Weave:=wv,fine.tWeldGur JobModeWithCorr sm wd	\\SeamName:="Seam_1";			
Jobs	Weld Speed 10 [mm/s]	30			Apply
	Wirefeed Speed 0 [%] -20 Arc Length Corr 0 [steps] -10	20 10			Cancel
					WebJob Editor
🛕 Home 🏉	WeldEditor				15:54
xx2300001981					

60

4.4 Weld editor in Job mode with correction Continued

Parameter	Description
Weld speed	The speed of the TCP of the welding torch during the weld in- struction.
Job number	The job (schedule) that should be selected within the welder. The information displayed in the Job number is: Job number, Job name.
Wire Feed Speed	This is the wire feed speed (Power). In this mode, the wire feed speed can be adjusted in the range of $+/-20$ % in 1% increments.
Arc Length Correction	This parameter represents the arc length (Voltage). In this mode, the Arc Length Correction can be adjusted in the range of +/- 10 steps in 0.1 increments.

End parameters

Tap the End tab to view or modify the end phase parameters.



The end phase parameters can only be modified in manual mode.



To copy the current weld phase mode settings, toggle **Use Weld Phase Mode** off, on, and then off again.

← ABB Robotics FlexPendant								
Ω Messages 🗄 Event log 🔹 🎯			@	(\mathfrak{K})	介 100%	SΣ ROB_	Axis 1-3	
IGNITION	HEAT	WELD		END			WEAVE	
pp: 1930 ArctStart p1/vft Welder Mode: John Active Seandata: Active Welddata: Jobs	XOOLTM, WALWARK Wine Will Corr Cool Time Fill Time Pr 0 s 5 s Use Weld Phase Mode 1. Job #1 Virefeed Speed 0 [%] -20 Arc Length Corr 0 [step -10 -10 -10	sost Flow Burn Back 0.05 s 0 s 20 s]						Apply Cancel
Home Weddad xx2300001982 Parameter	itor	Descriptio						15:55
Parameter Description								
Cool Time	-	Tho timo (i	in coo	onde	a) durir		hich the	nrood

Cool Time The time (in seconds) during which the process is stopped, allowing the weld to cool before other end activities such as crater fill and burn back take place.

4.4 Weld editor in Job mode with correction *Continued*

Parameter	Description
Fill Time	The crater-filling time (in seconds) at the end phase of the weld.
Burn Back (Wire Retract correction)	The values apply to the MIG/MAG standard synergic, MIG/MAG pulse synergic, MIG/MAG PMC and MIG/MAG LSC welding processes. The value can be applied between 0 – 10 mm.
Post Flow	The time (in seconds) for purging with protective gas after the end of the process.
Use Weld Phase	Not selected – Select weld parameters during ignition phase manually. Selected – Use the parameters from the Weld tab. This is the default mode.
Job number	The job (schedule) that should be selected within the welder. The information displayed in the Job number is: Job number, Job name.
Wire Feed Speed	This is the wire feed speed (Power). In this mode, the wire feed speed can be adjusted in the range of +/- 20 % in 1% increments.
Arc Length Correction	This parameter represents the arc length (Voltage). In this mode, the Arc Length Correction can be adjusted in the range of +/- 10 steps in 0.1 increments.

4.5 Weld parameters

Tuning of weld parameters

Weld parameters that can be adjusted with a slider can be tuned either offline (when not welding), or online (when welding).

When welding, these parameters can be tuned within the range with immediate response. Parameters in the Weld tab are easiest to tune.

Parameters that can be tuned in Program mode:

- Weld Speed
- · Wirefeed speed
- ArcLength Correction
- Pulse/Dynamic Correction
- ArcLength Stabilizer

Parameters that can be tuned in Job mode:

Weld Speed

Parameters that can be tuned in Job mode with correction:

- Weld Speed
- Wirefeed speed (+- 20%)
- ArcLength Correction (+-10 steps)

Weave parameters that can be tuned in all modes:

- Length
- Width
- Height
- Bias

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5.1 Introduction

5 The Fronius TPS/i RobotStudio Add-In

5.1 Introduction

About RobotStudio RobotStudio is a PC application for modeling, offline programming, and simulation of robot cells. For information on how to install and operate RobotStudio, see Operating manual - RobotStudio. Installing the Fronius TPS/i Add-In

The FroniusTPS/i RobotStudio Add-In does not require a RobotStudio license. The add-in will be automatically installed with the TPS/i package which can be downloaded in the add-in section in RobotStudio.

5 The Fronius TPS/i RobotStudio Add-In

5.2 Overview of the Fronius TPS/i Add-In

5.2 Overview of the Fronius TPS/i Add-In

General

This section describes the available configuration options for the Fronius TPS/i Add-In used in the setup. The add-in can be launched by clicking **Fronius TPS**/i.



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The Fronius TPS/i add-in is used to select the weld modes to be used in the robot from among the many weld modes available in the welder. This simplifies choosing weld modes for the user and allows engineering staff to select only the weld modes they want the user to use.

The Fronius TPS/i add-in consists of a list of controllers and its tasks in drop-down menus. The status of the controller is displayed in the status section. The list can hold virtual controllers as well as real controllers.

Fronius v1	.0.0	∓ x
Controller	PROTOTYPE (192.16	8.125.1) 🗸
Task	T_ROB1	\sim
Status Auto RC5	Motors On OmniCore	Executing
- xx1900002429		

Welder section

In the Welder section you can specify the IP Address of the welder service port.



The IP address can be stored in the system parameters for later use. If the add-in started, the IP address is read from the parameter settings. See *System parameters on page 31*.

Credentials are mandatory to be able to download the weld modes (Synergic lines) and the Joblist.

5.2 Overview of the Fronius TPS/i Add-In Continued

The default password is *admin*. You need the correct password in case the default password has changed.

TPS/i										
ServicePort IP	192.168.125.114									
User	admin									
Password	·····									
Smart Manager										
Ge	t Synergic Lines									
	Get Joblist									
Sea	arch Weld Modes									

xx1900002434

Button	Description
Smart Manager	This will launch a web browser to access the welder webpage.
Get Synergic Lines	This will create a local copy of the synergic line information as XML.
Get JobList	This will create a local copy of the Joblist. This can be displayed on the FlexPendant if the welder is used in job mode.
Search Weld Modes	This will present a list of all weld modes in the welder.
	Show/Hide password

Search weld modes

Before the weld modes can be selected, they need to be downloaded to a local folder. Once they are downloaded, different filters can be applied such as the different process types (Standard, Pulse, LSC, PMC and CMT). In addition, filters for **Gas Type**, **Wire Size**, **Wire Type** and **Characteristic** can be applied.

111	ue searcr	i Cikelia													
MIG S	tandard	Gas Type	Ar+15-20%CO2	•	Possible Correction	18:									
MIG F	ulse	Wire Size	1	•	ArcLength Plus/Dynamic										
MIG L	SC.	Wire Type	Steel	•	Wire Retract										
MIG F	MC	Characteristic	None												
MIG 0	:MT	0100001000													
🗸 is Lice	enced														
earchRe	sult(15)								Updated Li	ist 🖂	Auto Update Co	ntroller 📄 Sho	wline	Numbe	of weld modes
icenced	ID	Process	Gas	Size	Type	Workpoint			Licenced	ID	Process	Gas	Size	Туре	Workpoi
							П.								
1	2569	MIG Standard	Ar+15-20%CO2	1	Steel	43-200 (A)	11								
1	2629	MIG Standard	Ar+15-20%CO2	1	Steel	45-400 (A)	=								
	2764	MIG LSC	Ar+15-20%CO2	1	Steel	34-430 (A)		_							
/		MIG LSC	Ar+15-20%CO2	1	Steel	34-430 (A)	ш.	2							
	2766														
	2766 2784	MIG Pulse	Ar+15-20%CO2	1	Steel	21-340 (A)									
 	2766 2784 2851	MIG Pulse MIG PMC	Ar+15-20%CO2 Ar+15-20%CO2	1	Steel Steel	21-340 (A) 43-375 (A)									
	2766 2784 2851 2868	MIG Pulse MIG PMC MIG PMC	Ar+15-20%CO2 Ar+15-20%CO2 Ar+15-20%CO2	1 1 1	Steel Steel Steel	21-340 (A) 43-375 (A) 43-420 (A)									

5.2 Overview of the Fronius TPS/i Add-In *Continued*

The selection on the left side represents all available weld modes in the welder. You can simply apply the filters and then copy the selection (you can apply multiselect) to the left right side. This represents the modes currently available in the welder. If there are already some modes installed, they will be presented, and you can update the list.

The checkbox **Show line** will present a graph of the selected weld mode on controller side.

11010 1100	de Searci	h Criteria						Synergic	Line					
V MIG S	tandard	Gas Type	Ar+15-20%CO2	•	Possible Correction	18:			250					
MIG P	ulse	Wire Size	1	•	ArcLength Plus /Durperio			2	200				_	-
MIG LSC Wire Typ MIG PMC Characteristi		Wire Type	Steel		Wire Retract			- V	100-					
		Characteristic	None						50					
MIG C	MT								-1	0 1	2 3	4 5	6	789
🗸 is Lice	nced										Synergic	line Points		
-	- 4/15)							1		Auto Dadata Can	unles 📝 Chaudi		Numb	and used and and
Licenced	ID	Process	Gas	Size	Type	Workpoint		Licenced		Process	Gas	Size	Type	Workpoint
1	2569	MIG Standard	Ar+15-20%CO2	1	Steel	43-200 (A)			2565	MIG Standard	Ar+15-20%CO2	1	Steel	48-400 (A)
1	2629	MIG Standard	Ar+15-20%CO2	1	Steel	45-400 (A)			2569	MIG Standard	Ar+15-20%CO2	1	Steel	43-200 (A)
1	2764	MIG LSC	Ar+15-20%CO2	1	Steel	34-430 (A)			2629	MIG Standard	Ar+15-20%CO2	1	Steel	45-400 (A)
1	2766	MIG LSC	Ar+15-20%CO2	1	Steel	34-430 (A)	1	. 🧹	2764	MIG LSC	Ar+15-20%CO2	1	Steel	34-430 (A)
1	2784	MIG Pulse	Ar+15-20%CO2	1	Steel	21-340 (A)		2 🌽	2766	MIG LSC	Ar+15-20%CO2	1	Steel	34-430 (A)
1	2851	MIG PMC	Ar+15-20%CO2	1	Steel	43-375 (A)		<u> </u>	2784	MIG Pulse	Ar+15-20%CO2	1	Steel	21-340 (A)
1	2868	MIG PMC	Ar+15-20%CO2	1	Steel	43-420 (A)		<u> </u>	2851	MIG PMC	Ar+15-20%CO2	1	Steel	43-375 (A)
7	3060	MIG LSC	Ar+15-20%CO2	1	Steel	34-430 (A)		<u> </u>	2868	MIG PMC	Ar+15-20%CO2	1	Steel	43-420 (A)
1							-	•						

xx1900002432

Once the weld modes are selected, click on OK.

Note

The selection needs to be downloaded to the controller before they are active. This is done by clicking **Update Controller**.

Button	Description
Search	This will start the search the weld modes based on the filters.
Select All	This will select all weld modes that have been found.
Clear all	This will delete all weld modes in the selection, but the controller will not be updated if Auto Update Controller is not checked. (Update must be done by clicking Update Controller).
Delete	This will delete the selected weld modes on controller side, but the controller will not be updated if Auto Update Controller is not checked. (Update must be done by clicking Update Controller).
ок	Apply the settings.
Cancel	Cancel the settings.

5.2 Overview of the Fronius TPS/i Add-In *Continued*

Controller

In the **Controller** section, the weld modes that were previously selected and saved locally can be viewed by selecting **View Weld Modes**.

Robot controller								
	View Weld Modes							
	Update Controller							

xx1900002426

Licence	ID	Process	Gas	Size	Wire Material	Workpoint	
\checkmark	2565	MIG Standard	Ar+15-20%CO2		Steel	48-400 (A)	
\checkmark	2569	MIG Standard	Ar+15-20%CO2	1	Steel	43-200 (A)	
\checkmark	2629	MIG Standard	Ar+15-20%CO2	1	Steel	45-400 (A)	
\checkmark	2721	MIG Standard	Ar+15-20%CO2	1	Hardfacing	37-330 (A)	
\checkmark	2764	MIG LSC	Ar+15-20%CO2	1	Steel	34-430 (A)	
\checkmark	2766	MIG LSC	Ar+15-20%CO2	1	Steel	34-430 (A)	
\checkmark	2851	MIG PMC	Ar+15-20%CO2	1	Steel	43-375 (A)	
\checkmark	2868	MIG PMC	Ar+15-20%CO2	1	Steel	43-420 (A)	
\checkmark	3060	MIG LSC	Ar+15-20%CO2	1	Steel	34-430 (A)	

xx1900002427

The **Update Controller** button will transfer the locally stored files to the controller. The progress of the transfer will be shown in the RobotStudio output window.

PC

In the PC section, the **Show local files** button will show the locally stored files transferred to the PC. These are the files that will be transferred to the controller.

PC		
	Show local files	
xx1900002430		

5 The Fronius TPS/i RobotStudio Add-In

5.2 Overview of the Fronius TPS/i Add-In *Continued*

Settings

In the **Settings** section you can change the units from **Metric** to **Imperial**, and the standard from **EN Standard** (European) to the **AWS** (American Welding Society). This only applies to the values shown in the add-in (Wiresize, Material).

It also shows the current interface mode (Job Mode or Program Mode).

Settings	
Job Mode	Program Mode
Metric	EN Standard
Imperial	AWS
	WelderConnectedToRC

xx1900002433



If the welder is not connected to the welder but in the same network as the robot controller, then **WelderConnecteToRC** is active.

If the welder service port for some reason is not connected to the robot controller, the checkbox **WelderConnecteToRC** must be unchecked. In that case, the user has to specify the local path where the weld modes and JobList should be downloaded. The default path is the following:

C:\Users\XXXXXXX\Documents\RobotStudio\FroniusTPSiUtility\SynergicLines

It is not recommended to change this path, however, it is possible to do so.

If the files are downloaded, you must connect to a real controller and copy the with the **Copy Files** button. This button will appear if the checkbox **WelderConnecteToRC** is unchecked.

Your files will then be copied to the following location:

C:\Users\XXXXXXX\Documents\RobotStudio\FroniusTPSiUtility\Systemname\ SynergicLines\T_ROB1

If the files are copied, you can start selecting the weld modes and download them to the controller.

5.3 Adding or removing synergic lines from RobotStudio

5.3 Adding or removing synergic lines from RobotStudio

Add or remove synergic lines

Synergic lines can be edited from the Add-Ins window in RobotStudio.

1 In the Add-Ins window, open the Fronius Add-in window:

Fronius v1.0.	0 ∓ ×
Controller F	PROTOTYPE (192.168.125.1) V
Task 1	r_ROB1 ~
Status	
Auto	Motors On Executing
IRC5	OmniCore
TPS/i	
ServicePort I	P 192.168.125.114
User	admin
Password	·····
	Smart Manager
	Get Synergic Lines
	Get Joblist
	Search Weld Modes
Robot contro	oller
	View Weld Modes
	Update Controller
PC	
	Show local files
Settings Job Mode Metric Imperial	 Program Mode EN Standard AWS WelderConnectedToRC

xx2100000480

2 In the Fronius Add-in window, select the Settings to be used, such as Metric, Imperial, EN standard (European standards) or AWS standard. 5.3 Adding or removing synergic lines from RobotStudio *Continued*

3 In the Fronius Add-in window, click Search weld modes. The Fronius Weld Mode Search window is displayed:

Fronius	Weld Mo	ode Search												-		
Weld Mod	le Search	Criteria														
MIG S	andard	Gas Type	Ar+8-10%CO2	~	Possible Correction	E										
MIG P	dse	Wre Size	0.9	~	ArcLength											
MIG L	SC	Wre Type	Steel	~	Wire Retract											
MIG P	MC	Characteristic	None	-												
] MIG C	мт	Characteriate		-												
🛛 ls Lice	nced															
earchRes	et(4)							Undated In		Auto Lindate Cont	tenter 🗆 Show k		Numb	er of web	ld modes -	ļ
licenced	ID	Process	Gas	Size	Type	Workpoint		Licenced	ID	Process	Gas	Sze	Type	or or me	Workpoint	
/	2679	MIG Standard	Ar+8-10%CO2	0.9	Steel	52-305 (A)		\checkmark	2683	MIG Standard	A+15-20%CO2	0.9	Steel		43-300 (A)	l
/	2682	MIG Standard	Ar+8-10%CO2	0.9	Steel	40-310 (A)		 Image: A set of the set of the	2686	MIG Standard	A+15-20%CO2	0.9	Steel	:	38-148 (A)	1
1	2685	MIG Standard	Ar+8-10%CO2	0.9	Steel	38-148 (A)		i	2710	MIG Standard	A+15-20%CO2	0.9	Steel		48-300 (A)	
1	3356	MIG Pulse	Ar+8-10%CO2	0.9	Steel	30-300 (A)		2	2783	MIG Pulse	Ar+15-20%CO2	0.9	Steel		40-330 (A)	
							-	· .								
Search						Colored All		Delete		Charac 84			01		Contra	1

- 4 In section **Weld Mode Search Criteria**, define the welding parameters (wire size, gas, wire type) and process (CV, Pulse, PMC) upon which the search should be based.
- 5 Select **Search**. The search results are displayed in the window. The synergic lines can be cleared (**Clear All**) on the right-hand window or kept as they are.
- 6 Transfer desired Synergic lines from the left-hand window over to the right-hand window as needed, and then click **OK**.
- 7 In the Fronius Add-in window, select Update Controller and then select View Weld Modes to make sure changes were applied.
6 Torch Collision

General

The Fronius TPS/i Add-In provides a feature for torch collision supervision by using a collision switch. A digital input (high active if no collision) is monitored and in case of a torch collision the program execution is stopped, and motors are turned off.

It is possible to turn on motors in manual mode and jog the robot to release the collision switch.

A momentary collision is also detected, for example, if a collision is triggered but the collision switch snaps back into its origin position within 1.5 seconds.



Torch collision supervision is disabled as default. To activate it, change the parameter *Collision Switch Supervision On*, in the *Process* configuration, type *Fronius TPS/i Arc Equipment Properties*.

Parameter Collision Switch Supervision On

🙆 Instance Editor			×			
Name	lame Value					
Name	ARC1_FRON_EQPR_TPSi_T_ROB			^		
Use Equipment Standard IO	FRON_TPSi_EQSTDIO_T_ROB1					
Use Fronius TPSi Equipment IO	FRON_TPSi_EQIO_T_ROB1					
Mode	Job mode with correction					
Pre-Post Flow Control	Robot	~				
TWIN System	TRUE FALSE					
Ignition on	 TRUE FALSE 					
Heat on	 TRUE FALSE 					
Heat defined as time	 ○ TRUE ● FALSE 					
Cool time on	TRUE FALSE					
Fill on	TRUE FALSE					
Collision Switch Supervision On	TRUE FALSE					
Arc Preset	0					
Ignition timeout	3					
Weld Off Timeout	10					
Override On	TRUE FALSE					
Autoinhibit On				~		
Value (string) The changes will not take effect	until the controller is restarted.					
			<u>O</u> K	<u>C</u> a	ncel	

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Application manual - Fronius TPS 320i/400i/500i/600i with RI-FB inside/i interface 3HAC089028-001 Revision: A

Continues on next page

6 Torch Collision

Continued

Collision switch error codes

Error code	Description	Туре
110528	A torch collision is detected in manual mode	Error
110529	A torch collision is detected in auto mode	Error
110530	The collision switch got activated momentarily in manual mode but is no longer active	Warning
110351	The collision switch got activated momentarily in auto mode but is no longer active	Warning

7 RAPID reference

7.1 Instructions

7.1.1 FroniusDataChannel - send data to the power source

Usage

The Fronius Add-In provides the RAPID instruction FroniusDataChannel to send an article number, serial number, and seam number to the TPS/i. This is used for part-based documentation inside the welder.

The RAPID instruction communicates through the power source management port (service port) and therefore an Ethernet connection from the robot controller to the power source is needed.



Note

The Fronius option OPT/I Documentation (4,067,003) is needed to use the instruction for Data Channel.



Communication to the power source is done via TCP on port number 4714. To establish a connection the firewall manager must allow RapidSockets on the network.

IP Setting

The IP address can be changed in the Process configuration type Fronius TPS/i Arc Equipment Properties.

Instance Editor				X
Name	Value	Information		
Ignition on	TRUE FALSE			1
Heat on	TRUE FALSE			
Heat defined as time	TRUE FALSE			
Cool time on	TRUE FALSE			
Fill on	TRUE FALSE			
Collision Switch Supervision On	TRUE FALSE			
Arc Preset	0			
Ignition timeout	3			
Weld Off Timeout	10			
Override On	TRUE FALSE			
Autoinhibit On	TRUE FALSE			
Time to feed 15 mm wire	0,949999988			
Enable supervision on VC	TRUE FALSE			
Enable Wire Retract	TRUE FALSE			
Start Motion	Robot Motion Release	3		
Service Port IP	192.168.178.100			
Value (string) The changes will not take effect	until the controller is restarted.			_
		OK	Car	ncel

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7 RAPID reference

7.1.1 FroniusDataChannel - send data to the power source Continued

Arguments	
	FroniusDataChannel [\ArticleNumber] [\SerialNumber] [\SeamNumber]
[\ArticleNumber]	
	Data type: string
	Sends the article number from the controller to the power source. This parameter identifies the series of the part being welded, for example, the model number. Supported characters are ASCII text A-Z, a-z, and 0-9.
[\SerialNumber]	
	Data type: string
	Sends the serial number from the controller to the power source. This parameter identifies individual pieces being welded. Supported characters are ASCII text A-Z, a-z, 0-9.
[\SeamNumber]	
	Data type: num
	Sends the seam number from the controller to the power source. This parameter identifies the seam being welded (weld location). Supported characters are ASCII text 0-9.
	Minimum value: 0
	Maximum value: 65535
Example	

PROC WeldTest_1() MoveL Location8, v500, fine, tWeldGun; MoveL Location9,v500,fine,tWeldGun; FroniusDataChannel \ArticleNumber:="123" \SerialNumber:="12345" \SeamNumber:=1; ArcLStart Location10,v200,sml1,wd_1 \Weave:=wv111,fine,tWeldGun \SeamName:="Seam_1"; ArcL Location11,v100,sm11,wd_2 \Weave:=wv111,z5,tWeldGun; ArcL Location12,v100,sml1,wd_3 \Weave:=wv111,z5,tWeldGun; ArcL Location13,v100,sm11,wd_4 \Weave:=wv111,z5,tWeldGun; ArcL Location14,v100,sm11,wd_5 \Weave:=wv111,z5,tWeldGun; ArcL Location15,v100,sm11,wd_6 \Weave:=wv111,z5,tWeldGun; ArcLEnd Location20,v100, sml1, wd_3, fine, tWeldGun; MoveL Location10, v500, fine, tWeldGun; ENDPROC

7.1.1 FroniusDataChannel - send data to the power source Continued

Fronius Smart Manager example

Fronius TPS/i Browser										×
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V	plant ästerås		all		cell					
Pulse		MyPerfe	ectWeld1		Job	b: 0003	P			
		AC					— Part ID (next weld	(r		
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