

ROBOTICS

Application manual

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



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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 - Arc and Arc Sensor	3HAC050988-001
Technical reference manual - RAPID Instructions, Functions and Data types	3HAC050917-001
Technical reference manual - System parameters	3HAC050948-001
Fronius Operating Instructions TPS 320i/400i/500i/600i	42,0426,0114,EN

Revisions

Revision	Description
Α	First revision.
В	 Released with RobotWare 6.11. New information regarding simulated PROFINET device in section Software setup on page 17.
	 Information about TCP Speed Control updated in section System parameters on page 20.
	 Information regarding firmware updated in section Introduction to Fronius TPS/i interface on page 9.
С	 Released with 21A. New section: Fronius EtherNet/IP configuration on page 73 Updated the section Setup of PROFINET devices on page 17.

Safety

Safety regulations

Before beginning mechanical and/or electrical installations, ensure you are familiar with the safety information in the product manuals for the robot.

The integrator of the robot system is responsible for the safety of the robot system.

1 Introduction to Fronius TPS/i interface

About Fronius TPS 320i / 400i / 500i / 600i IRC5 interface

This guide describes the ABB Robotics IRC5 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 D-Net / Profi-Bus / Profi-Net 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.

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 Installation

2.1 Prerequisites

Robot controller software

Robot system prerequisites:

- IRC5 robot controller with main computer DSQC1000 or above
- RobotWare version 6.05 or higher with the following options:
 - [633-4] RobotWare Arc
 - [637-1] Production Screen
- One of the following Industrial Networks:
 - [709-1] DeviceNet Master/Slave
 - [841-1] EtherNet/IP Scanner/Adapter
 - [888-2] PROFINET Controller/Device
 - [969-1] PROFIBUS Controller
- The following option is recommended in order to use the Partdata concept within the welddata editor:
 - [812-1] Production Manager

RobotStudio software

RobotStudio version 6.06 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.

Tuning of weld speed and weld parameters is no longer supported by RobotWare Arc GUI.



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

2 Installation

2.1 Prerequisites *Continued*

- RobotStudio Add-In to select different weld modes (synergic lines) used with the welder
- Graphical weld data editor
- Graphical weave and track data editor
- Graphical application for manual functions such as:
 - Process blocking
 - Wire feed (Forward/Backward)
 - Purge gas

Graphical widget displaying run-time data.

2.2 Hardware setup

Overview

The ABB preferred connection to the welder is to connect the LAN port of the welder either to LAN2 or WAN on the IRC5 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 only 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 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 system is a MultiMove system, or 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 Installation

2.2 Hardware setup *Continued*

Intended use of WAN and LAN ports

The WAN port is a public network interface to the controller, typically connected to the factory network with a public IP address provided by the network administrator.

The LAN ports are intended for connecting network based process equipment to the controller, for example industrial networks, cameras, and welding equipment. LAN 2 can only be used as a private network to the IRC5 controller.



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Connecting to the IRC5 controller

Connect an Ethernet cable between the robot controller LAN2 port and the TPS/i welder Ethernet port. The following illustration shows an overview of the computer unit.



Continues on next page

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 IRC5 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.



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.



2.3 Software setup

2.3.1 Software setup overview

Setup of PROFINET devices

This information is valid if **PROFINET** is selected in the fieldbus selection in Installation Manager.

From version 1.05 of the Fronius TPSi Add-in, the PROFINET setup is pre-configured and ready to use. The only thing that the user needs to do, is to change the IP of the welder if needed.

The IPPNIO.xml file is created during the installation the Robot system, and is copied to the HOME folder of the system.

The latest version of the Fronius TPSi GSDML file is copied to the HOME/GSDML folder on the system.

Welder	IP address
T_ROB1	192.168.0.2
T_ROB2	192.168.0.3
T_ROB3	192.168.0.4
T_ROB4	192.168.0.5

The default IP addresses for the welders are:

The IP address can be changed from the I/O Configurator:

File Home Modeling Simulation Controller RAPI	D Add-Ins UO Configurator 6								a	. 0
Request Release Write Access Write Access corrig										
Configuration T X Fronks Validation RW	6.12/view1 Signal Editor X						¥	Properties Device Catalogue	Diagnostici	÷,
Search X Search							×	Search		×
COmmunication Communication Communication Give System July System July Set Communication July Set Communication	Assigned to Device (HeartBeat inFrontusTPSi1) (WelderReady inFrontusTPSi1)	Type of Signal Device Mapping Digital Input 0 Digital Input 1	Signal Identification Label	Category Access Level Arc_1_R1 Default Arc_1_R1 Default	Default Value 0 0	Filter Time Passive (ms) 0 0	Filter Tir 0 ^ 0	Profinet Configuration PROFINET Station Name Fast Startup	iofroniustpsi1 Disabled	
▲ Device ∬ diFr ↓ PN_Internal_Device ∬ diFr	Warning ioFroniusTPSi1 I ProcessActv ioFroniusTPSi1 I	Digital Input 2 Digital Input 3		Arc_1_R1 Default Arc_1_R1 Default	0	0		Port 1 Port 2	Automatic Automatic	
A Controller JU der Wolfkonust PSit JU der JU der JU der JU der JU der	IArcStable ioFroniusTPSi1 I MainCurrent ioFroniusTPSi1 I MainCurrent ioFroniusTPSi1 I	Digital Input 4 Digital Input 5 Digital Input 6	Current flow - Set as soon as the wire touches the wontprece Arc stable / Touch signal - Single Bit Main current signal - Single Bit	Aro_1_R1 Default Aro_1_R1 Default Aro_1_R1 Default	0	50 50 50	50	Network Connected to Industrial. IP Adress	PROFINET 192.168.0.2	
J/ dir J/ dir J/ dir	ITouchSense xoFroniusTPSi1 ITorchColan ioFroniusTPSi1 IRobotRelease ioFroniusTPSi1	Digital Input 7 Digital Input 8 Digital Input 9		Arc_1_R1 Default Arc_1_R1 Default Arc_1_R1 Default	0	0		Subnet Gateway 4 System	255 255 255 0 192, 168 0.2	
JV dFr JV dFr	WireStick icFroniusTPSi1 1 IParamSelectIntern icFroniusTPSi1 1 ISval ineValid icFroniusTPSi1 1	Digital Input 10 Digital Input 13 Digital Input 14		Aro_1_R1 Default Aro_1_R1 Default Aro_1_R1 Default	0	0		Name State when System Start.	icFroniusTPSi1 Activated	v
ரடன் ரடன்	TorchBdyGrip ioFroniusTPSi1 I IConndValCOR ioFroniusTPSi1 I	Digital Input 15 Digital Input 16		Arc_1_R1 Default Arc_1_R1 Default	0	0		Trust Level Identification Label	DefaultTrustLevel Fronius TPSi	
JJ dFr JJ dFr	IConOOR ioFroniusTPSi1 I ILimitError ioFroniusTPSi1 I	Digital Input 17 Digital Input 19		Arc_1_R1 Default Arc_1_R1 Default	0	0		Product Name	Fronius International Ghon Fronius FB Inside PROFINET-2P	
JU der A IN 9Fr	INternovstatus informus IPSr1 ISensorStatus inFronius TPSr1 4Er1SensorStatus 1 inFronius TPSr1	Group Input 22 Group Input 24-26		Aro_1_R1 Default Aro_1_R1 Default	0	0		Simulated	 Tes No 	
	dFr1SensorStatus2 ioFroniusTPSi1 dFr1SensorStatus3 ioFroniusTPSi1	Digital Input 25 Digital Input 26		Arc_1_R1 Default Arc_1_R1 Default	0	0		Output Size	64	
JJ dër JJ dër	SafetyStatusBit0 ioFroniusTPSi1 I SafetyStatusBit1 ioFroniusTPSi1 I	Digital Input 35 Digital Input 36		Arc_1_R1 Default Arc_1_R1 Default	0	0		GSD file	A GSD file has not been loaded for this device.	

2.3.2 Fronius TPS/i package

2.3.2 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 Installation Manager and build your robot system.



Do not forget to add the Fronius TPS/i product in the **Products** tab. You do not need a license for the package.

Installation Manager							- 0 x
Controller Repository							
	SYS2600-125632 on	D:\Daten\RobotStudio\Systeme\Sj	/stems'				
Controllers	Added Product(s)						
Products	Name	Version	Publisher	Туре	Status	Creation Date	
Licenses	RobotWare	6.05.01.00	ABB	RobotWare	Added	2017-07-05	
Confirme .	FroniusTPSi	6.05.0013.00 Internal build 13	ABB	Addin	Added		
Options							
Confirmation							
Recovery Disk							
De Desferences							
Preferences							
🔛 Exit	Add	Replace Remove					
			< Previous	Next	>	Apply	Cancel

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2 As the TPS/i package is an add-in, RW-Add-In loaded Welder must be selected in the **Drive Module** section (**Option** tab) for each associated welding robot.

Installation Manager		- 0 ×
Controller Repository		
	SYS2600-125632 on 'D:\Daten\RobotStudio\Systeme\Systems'	
Controllers	System Options Drive Modules Applications	
Products	1 # Robots 2 Robot	<u>^</u>
Licenses	3 Options Paint robot external axis Paint robot side of the line	
Confirmation	Drive Module Drive System defined Deer Units	E
	Safety controller	
	633-4 Arc with MultiProcess Power source	
F	RW Add-In loaded Welder	
Preferences	Standard J/O Welder ESAB Fronius	
🔀 Exit	Revert Export settings Import settings A	Add settings
	Previous Next Annu	Cancel
	Previous IVEAL / Apply	CONCEI

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3 Select the **Install Power Supply** option for each welding robot, and select the fieldbus. If the system has the SmarTac option, you can select **Include**

2.3.2 Fronius TPS/i package Continued

SmarTac Config. This will load configuration files to use the Fronius touch sense function.

Controller Repository		
	SYS2600-125632 on 'D\Daten\RobotStudio\Systeme\Systems'	
Controllers	System Options Drive Modules Applications	
Products	1 Pronus PRPC	^
icenses	2 b SKS 3 b Tracking and Searching	
lptions	4 Spot Application Spot Welding	
onfirmation	Dispense Dispense	
	✓ Paint ▷ Application Paint	
	Fronius TPS/i Add-In loaded Welder Fronius TPS/i	Π
	Install Power Supply Fieldbus	
	DeviceNet Ethernet 10	E
-	ProfiNet	
A Recovery Disk	4 SmarTac	
Preferences	Include SmarTac Config	٣
Exit	Revert Export settings Add	settings
	< Previous Next > Apply	Cancel

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

2.3.3 System parameters

2.3.3 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 two welding modes:

- Job mode
- Program mode
- Job mode with correction



TCP Speed Control is currently not supported by Fronius for the TPS/i power source. However, the TCP speed of the robot is available on an analog output (aoFrXSimTcpSpeed) and is logged by Fronius documentation logbook in their web interface.

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>

2.3.3 System parameters Continued

Parameter	Data Type	Description
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 • RowerSource
		<i>Robot</i> 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: <i>Robot</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>
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

2 Installation

2.3.3 System parameters Continued

Parameter	Data Type	Description
Override On	bool	Specifies the visibility of the org value compon- ents in welddata. Default value: <i>TRUE</i>
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>
Allow tuning in Auto	bool	If this flag is set tuning of welddata is allowed in auto mode. Default value: <i>FALSE</i>
Block tuning in Manu- al	Bool	If this flag is set, edit and tuning will be blocked in manual mode from the TPSi editor and from the Weave & Track data editor. 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 "Time to feed 15mm wire" Default value: <i>FALSE</i>
Widget Screen	num	Specifies the startscreen (Widget) for Production- Screen. (Not yet implemented)
Start motion	string	 This is the start signal for the robot to start motion after the arc is stable. The default value is "Robot motion release" 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 Label	string	Label describing the error level of the signal. There are three available levels, MAJOR, MINOR and INFO.
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.
Supervision Welder DO	signaldo	Digital output signal that indicates welder super- vision.

2.3.3 System parameters Continued

Parameter	Data Type	Description
Supervision Arc DO	signaldo	Digital output signal for indication of welding arc errors. A high signal means that an error has oc- curred.
Supervision Water DO	signaldo	Digital output signal for indication of cooling water errors. A high signal means that an error has oc- curred.
Supervision Gas DO	signaldo	Digital output signal for indication of protective gas errors. A high signal means that an error has occurred.
Supervision Wirestick DO	signaldo	Digital output signal for indication of wire feed errors. A high signal means that an error has oc- curred.
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.

2 Installation

2.3.4 Units

2.3.4 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

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In the Process Configuration •



2.3.4 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

2.3.4 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.

HO	ME/Are	/FroniusTPSi/T_ROB1/mFroniusModes.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	<pre>GCONST 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]];</pre>
	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]]];
	11	CONST FroniusWeldModeData weld_mode2764:=[2764,TRUE,1,"AR+15-20%CO2","STEEL","MIG LSC",[1.5,30],[14,37],[34,340],[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	ENDWODILLE

2.4 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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3.1 Overview

Interface modes

Currently the Fronius TPS/i welder interface has support for two 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 or on the FlexPendant.

- 1 In the configuration editor, select the topic **Process**.
- 2 Select the type Fronius TPSi Arc Equipment Properties.
- 3 Select the robot and set the desired interface mode.
- 4 Restart the controller.

3.1 Overview Continued

The configuration editor on the FlexPendant



3.1 Overview Continued

The configuration editor in RobotStudio

🐌 Instance Editor				×
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			
Ignition on	Job mode with correction Program mode			
Heat on	 TRUE FALSE 			
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 Value (string)				~
The changes will not take effect	unul the controller is restarted.			
		OK	C	ancel

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



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

019 JobModeWithCorr_19		0+0
Parameter	Value	
SFI	off	1
SFI Hot start	off	
Wire retract	0.0	
Synchropulse enable	off	
Delta wire feed	2.0 m/min	
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/min	
Gas factor	auto	
Job slope	0.0 s	
Sampling rate	off	
Spot welding time	1.0 s	

Job mode with correction limits via the web interface

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4.1 Introduction

4 Weld editor interface

4.1 Introduction

Overview

The graphical user interface for the FlexPendant is called the Weld editor interface. The information is presented in widgets, which are small applications available when starting the application Production Screen on the FlexPendant. The Weld editor interface consists of tabs where the user can process and modify information such as:

- Ignition parameters
- Heat parameters
- · Weld parameters
- End parameters

Unlike the regular data editor, it combines seam data and weld data for intuitive process setup and allows them to be modified at the same time. The weld data editor 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 Weld data editor, there is more information available than just the Synergic Line number or Job number.

Widget screens

The default Fronius TPS/i installation contains a weld status widget. It is placed on widget page 1. The widget displays the following useful information:

- Program Pointer.
- Seam name.
- Current Arc instruction data.

E.g., (1) p22, sm2, wdWeave11, wv1 (1 = Arc instruction sequence number).

- Current weld speed
- Current weld mode
 - In Job mode the job information is showed.
 - In Program mode the Synergic Line information is showed.
 - In Job mode with correction the job information is showed plus the additional parameters to tune, Wirefeed speed and ArcLength correction.
- Process type (only showed in Job mode).
- Process status, Weld on/off, active weld error, real-time voltage and current.

4.1 Introduction Continued

To switch between robots in a MultiMove setup, use the robot task selector in the upper right corner of the widget.

Job mode



Program mode


4.1 Introduction Continued

Job mode with correction



Starting the weld editor interface

- 1 On the FlexPendant, tap the ABB menu and then tap Production Screen.
- 2 Tap TPSi R1 to start the weld editor widget.



- 3 Tap **Production Screen** to close the window and return to the previous window.
- 4 Tap **Refresh** to refresh and show the updated values.

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.

■ ∨ � ¦	Manual DE-L-7008262	Guard Stop Stopped (Speed 100%	6) X
12 ArcLStart p2 sm1	wd1 \SeamName:="Par	t_1_Pth_1_Weld_1";	
<processdata>TASK</processdata>	PERS sm1:=[0.2,0.05,[25	65,0,0,100,0,0,0,0,0],0,0),0,0,0,[0,0,0,0,0,0,0
Ignition	Heat	Weld	End
Purge Time	0.2 s	Ign Move Delay	0 s
Pre Flow	0.05 s	Scrape Start	
		Use Weld Phas	e Mode
Synergic Line	2565,1,"AR+15-20%	CO2","STEEL","MIG	STANDARD"] 💌
Wire Feed Speed <	6 > <1.6 -	30> [m/min]	
ArcLength Corr. <	0 > <-10 -	10> [steps] Actual <	<15.5 - 35> [V]
Pulse/Dynamic Corr <	0 > <-10 -	10> [steps]	
0	1	8	V
Production Window Screen	tion		

xx1900002406

Button	Description		
Refresh	The blue	The blue refresh button is used to return to the Weld Phase tab.	
Confirm	The green check button is used to confirm any changes made.		
Cancel	The red cancel button is used to cancel any changes made and return to the previous values.		
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.	

Continues on next page

4.2 Weld editor in Program mode Continued

Parameter	Description	
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> .	
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:	
	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 [v]<="" td="" y.y<="" –=""></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

12 ArcLStart p2 sm1	Manual DE-L-7008262 wd1 \SeamName:="Par	Guard Stop Stopped (Speed 100% t_1_Pth_1_Weld_1";	.) X
<processdata>TASK</processdata>	PERS sm1:=[0.2,0.05,[25	65,0,0,100,0,0,0,0,0,0],0,0	,0,0,0,[0,0,0,0,0,0,0
Ignition	Heat	Weld	End
Heat Dist	0 mm		
Heat Speed <	15 > mm/s	Use Weld Phas	e Mode
Synergic Line	2565,1,"AR+15-20%	CO2","STEEL","MIG	STANDARD"]
Wire Feed Speed	6 > <1.6 -	30> [m/min]	
ArcLength Corr.	: 0 > <-10 -	10> [steps] Actual <	:15.5 - 35> [V]
Pulse/Dynamic Corr	: 0 > <-10 -	10> [steps]	
0	1	8	
Production Window Screen	ction		

Button	Description
Refresh	The blue refresh button is used to return to the Weld Phase tab.
Confirm	The green check button is used to confirm any changes made.
Cancel	The red cancel button is used to cancel any changes made and return to the previous values.

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.

4.2 Weld editor in Program mode Continued

Parameter	Description
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)

Weld parameters

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



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

Image: Constraint of the second se			
<processdata>TAS</processdata>	K PERS wd1:=[15,10,[285]	1,0,0,100,0,0,0,0,0,0],[0,0,	0,0,0,0,0,0,0]]
Ignition	Heat	Weld	End
Weld Speed	< 15 > mm/s		
Synergic Line	[2851,1,"AR+15-20%	CO2","STEEL","MIG	PMC"] •
Wire Feed Speed	< 6 > <2 - 3	0> [m/min]	
ArcLength Corr.	< 0 > <-10 -	10> [steps] Actual <	<18.6 - 33.5> [V]
Pulse/Dynamic Corr	< 0 > <-10 -	10> [steps]	
ArcLength stab.	< 0.0 > <0.0 -	5> [V]	
\odot			
Production Window	duction een		

Button	Description		
Refresh	The blue	The blue refresh button is used to return to the Weld Phase tab.	
Confirm	The gree	The green check button is used to confirm any changes made.	
Cancel	The red cancel button is used to cancel any changes made and return to the previous values.		
Parameter		Description	
Weld speed		The speed of the TCP of the welding torch during the weld in- struction.	

4.2 Weld editor in Program mode Continued

Parameter	Description
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.
	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)
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.

Tip

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*

Manual Guard Stop DE-L-7008262 Stopped (Speed 100%) 12 ArcLStart p2 sm1 wd1 \SeamName:="Part_1_Pth_1_Weld_1"; <processdata>TASK PERS sm1:=[0.2,0.05,[2565,0,0,100,0,0,0,0],0,0,0,0,0,[2565,0,0,0</processdata>			
Ignition	Heat	Weld	End
Cool Time	0 5	Post Flow	0.05 s
Fill Time	0 s	Burn Back	0.1 s
		Use Weld Pha	se Mode
Synergic Line	503,1,"AR+15-20%	CO2","STEEL","MIC	S STANDARD"] 💌
Wire Feed Speed <	6 > <1.5 -	30> [m/min]	
ArcLength Corr. <	0 > <-10 -	10> [steps] Actual	<14.5 - 36> [V]
Pulse/Dynamic Corr <	0 > <-10 -	10> [steps]	
0		8	
Production Window Screen	tion		

Button	Description
Refresh	The blue refresh button is used to return to the Weld Phase tab.
Confirm	The green check button is used to confirm any changes made.
Cancel	The red cancel button is used to cancel any changes made and return to the previous values.

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.	
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:	
	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.	

4.2 Weld editor in Program mode *Continued*

Parameter	Description
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)
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, $+5$ V Max Arc Length stabilizer)

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.



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

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

Imanual Guard Stop SE-L-7004661 Stopped (Speed 100%) 11 ArcLStart p6 sm1 wdWeave10 \Weave:=wv1 \SeamName:="Part_2_Pth_1_Weld_1"; <processdata>TASK PERS sm1:=[0.2,0.05,[5,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,</processdata>						
Ignition	Ignition Heat Weld End					
Purge Time	0.2 s	Ign Move Delay	0 s			
Pre Flow	0.05 s	Scrape Start				
		Use Weld Phas	se Mode			
Job number 5,	CrossmemberSeam	1-10				
ProcessType MIC	G/MAG pulse synergic					
0						
Production Production Screen						

Button	Description
Refresh	The blue refresh button is used to return to the Weld Phase tab.
Confirm	The green check button is used to confirm any changes made.
Cancel	The red cancel button is used to cancel any changes made and return to the previous values.

4.3 Weld editor in Job mode Continued

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> .	
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.

Note

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

Tip

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

Image: Manual SE-L-7004661 11 ArcLStart p6 sm1 wdWeave10 \Weave:=w <processdata>TASK PERS sm1:=[0.2,0.05,[5,0,</processdata>		Guard Stop Stopped (Speed 100% vv1 \SeamName:="Par 0,0,0,0,0,0,0,0,0],0,0,0,0,0	₀) t_2_Pth_1_Weld_1"; [5,0,0,0,0,0,0,0,0]		
Ignition	Heat Weld End				
Heat Dist Heat Speed < Job number 5, ProcessType MIC	0 mm 0 > mm/s CrossmemberSeam	Use Weld Phas 1-10	e Mode		
 Image: Image: Ima					
Production Window Screen	ion				

Button	Description
Refresh	The blue refresh button is used to return to the Weld Phase tab.
Confirm	The green check button is used to confirm any changes made.
Cancel	The red cancel button is used to cancel any changes made and return to the previous values.

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

4.3 Weld editor in Job mode Continued

Weld parameters	Tan the Wold to						
	Tap the weld ta	b to view or mod	iny neat phase p	barameters	5.		
	Note						
	The weld phas	e parameters ca	n only be modifi	ed in man	ual mod	e.	
		1anual E-L-7004661	Guard Stop Stopped (Speed 100%))			
	11 ArcLStart p6 sm1	wdWeave10 \Weave:=w	vv1 \SeamName:="Part [50000000001[100	t_2_Pth_1_Weld	d_1";		
	Ignition	Heat	Weld	Fnd			
	Weld Speed	5 > mm/s					
	Job number 5,	CrossmemberSeam 1	1-10				
	ProcessType MIC	G/MAG pulse synergic					
	\odot						
	Production Window Screen	tion		1			
	xx1900002411						
	Button	Description					
	Refresh	The blue refresh I	button is used to r	return to the	Weld P	hase tab.	
	Confirm	The green check	button is used to	confirm any	change	s made.	

Cancel	The red cancel button is used to cancel any changes made and return to the previous values.		
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 	

4.3 Weld editor in Job mode *Continued*

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.

Image: Manual SE-L-7004661 Motors On SE-L-7004661 12 ArcL p7 sm1 wdWeave10 \Weave:=wv1					
<processdata>TASK</processdata>	PERS sm1:=[0.2,0.05,[0,	0,0,0,0,0,0,0,0],0,0,0,0	,[0,0,0,0,0,0,0,0,0,0]		
Ignition	Heat Weld End				
Cool Time	0 s	Post Flow	0.05 s		
Fill Time	0 s	Burn Back	0.1 s		
		Use Weld Pha	se Mode		
Job number 5	,CrossmemberSeam	1-10			
ProcessType M	IG/MAG pulse synergic				
0					
Production Window Screen					

Button	Description		
Refresh	The blue	refresh button is used to return to the Weld Phase tab.	
Confirm	The gree	en check button is used to confirm any changes made.	
Cancel	The red cancel button is used to cancel any changes made and retur to the previous values.		
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.	

4.3 Weld editor in Job mode *Continued*

Parameter	Description	
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	

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.



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.

21 ArcL p22 sm2 wdW	1anual 195i_608_VC (SE-L-7009549) eave11 \Weave:=wv1 \	Guard Stop Stopped (2 of 2) (Spe Track:=track1;	ed 100%)		
<processdata>TASK P</processdata>	PERS sm2:=[0.2,0.05,[5,	0,0.1,1,0,0,0,0,0],0,0,0,0	,0,[5,0,0.1,1,0,0,0,		
Ignition	Heat	Weld	End		
Purge Time	0.2 s	Ign Move Delay	0 s		
Pre Flow	0.05 s				
		Use Weld Pha	se Mode		
Job number 5,	CrossmemberSeam	1-10			
Wire Feed Speed < ArcLength Corr.	1 → <-20 - 0.1 → <-10 -	20> [%] 10> [steps]			
Production Window Creen					

Button	Description		
Refresh	The blue	The blue refresh button is used to return to the Weld Phase tab.	
Confirm	The gree	The green check button is used to confirm any changes made.	
Cancel	The red cancel button is used to cancel any changes made and return to the previous values.		
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.	

4.4 Weld editor in Job mode with correction *Continued*

Parameter	Description
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> .
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.

4.4 Weld editor in Job mode with correction *Continued*

Image: Manual TPSi_608_VC (SE-L-7009549) Motors On Stopped (2 of 2) (Speed 100%) 21 ArcL p22 sm2 wdWeave11 \Weave:=wv1 \Track:=track1;					
T	EK3 SIIIZ[0.1,0.3,[3,0,		,[3,0,0.1,1,0,0,0,0,0		
Ignition	неас	Weld	End		
Heat Dist Heat Speed < Job number 5,0 Wire Feed Speed <	0 mm 0 > mm/s CrossmemberSeam 1 > <-20 -	Use Weld Phas 1-10 20> [%] 100 [110]	e Mode		
ArcLength Corr.	0.1 > <-10 -	10> [steps]	ROB_1		

Button	Description
Refresh	The blue refresh button is used to return to the Weld Phase tab.
Confirm	The green check button is used to confirm any changes made.
Cancel	The red cancel button is used to cancel any changes made and return to the previous values.

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.
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 \pm 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.

4.4 Weld editor in Job mode with correction Continued

Weld parameters	-				
	l ap the Weld ta	b to view or mod	lify heat phase p	barameters.	
	Note				
	The weld phase	e parameters ca	n only be modifi	ed in manual mode	
		lanual PSi_608_VC (SE-L-7009549)	Guard Stop Stopped (2 of 2) (Spee	ed 100%)	
	21 ArcL p22 sm2 wdWe	eave11 \Weave:=wv1 \	Frack:=track1;	0 0 0 0 0 0 0 0 1 1	
	<pre><pre>cessData>TASK P</pre></pre>	EKS wdweavell:=[6,5,	[5,0,0.1,1,0,0,0,0,0,0],[1,0,	,0,0,0,0,0,0,0]]	
	Ignition	Heat	weid	End	
	Weld Speed <	6 > mm/s			
	Job number 5,0	CrossmemberSeam :	1-10	_	
	WireFeed Speed	1 > <-20 -	20> [%]		
	ArcLength Corr.	0.1 > <-10 -	10> [steps]		
	ProcessType MI	G/MAG pulse synerg	ic		
	\bigcirc				
	Production Window Screen	ion			
	xx1900002415				

Button	Description
Refresh	The blue refresh button is used to return to the Weld Phase tab.
Confirm	The green check button is used to confirm any changes made.
Cancel	The red cancel button is used to cancel any changes made and return to the previous values.

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.

4.4 Weld editor in Job mode with correction *Continued*

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.

	Manual TPSi_608_VC (SE-L-7009549)	Guard Stop Stopped (2 of 2) (Spec	ed 100%)		
21 ArcL p22 sm2 wdV	Veave11 \Weave:=wv1 \	Track:=track1;			
<processdata>TASK</processdata>	PERS sm2:=[0.2,0.05,[5,0	0,0.1,1,0,0,0,0,0],0,0,0,0,	0,[5,0,0.1,1,0,0,0,		
Ignition	Heat	Weld	End		
Cool	0 5	Post Flow	0.05 s		
Fill Time	0 s	Burn Back	0.1 S		
Use Weld Phase Mode					
Job number 5	,CrossmemberSeam	1-10			
Wire Feed Speed	1 > <-20 -	20> [%]			
ArcLength Corr.	. 0.1 > <-10 -	10> [steps]			
Q					
Production Window Screen	n				

Descript	ion				
The blue	refresh button is used to return to the Weld Phase tab.				
The gree	en check button is used to confirm any changes made.				
The red to the pro	cancel button is used to cancel any changes made and return evious values.				
	Description				
	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.				
	The crater-filling time (in seconds) at the end phase of the well				
Retract	The values apply to the MIG/MAG standard synergic, MIG/M pulse synergic, MIG/MAG PMC and MIG/MAG LSC welding processes.				
	The value can be applied between 0 – 10 mm.				
	The time (in seconds) for purging with protective gas after the end of the process.				
	Descript The blue The gree to the pr				

4.4 Weld editor in Job mode with correction *Continued*

Parameter	Description
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

4.5 Weld parameters

Tuning of weld parameters

Weld parameters marked with the arrows \leq or \geq in the weld editor can be tuned, either off-line (when not welding) or on-line (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)

4.6 How to edit welddata using the PartData concept

4.6 How to edit welddata using the PartData concept

Part data concept

The option [812-1] Production Manager is needed to be able to use the part data concept. Even though Production Manager is not configured to control the robot cell, its part data concept can be used to edit welddata.



Additional information on how to use Production Manager and its partdata can be found in *Application manual - Production Manager 3HAC052855-001*.



The optional argument \seamName must be used on <code>ArcLStart</code> to be able to show the seam in the editor.

Example

Here is an example how the welddata can be changed without the RAPID data editor or moving the program pointer around. The example consists of 3 parts which are configured in Production Manager.

■ ∨ 	Manual DE-L-7008262	Guard Stop Stopped (Speed 100%)	
	T_ROB	1	
Station 1			
Select part f	rom list or create nev	v part	and the
Part 🛆	Description		
<empty></empty>	None		
Part_1	Discription of Part_1	1	
Part_2	Discription of Part_2		
Part_3	Discription of Part_3		
Test Part	New Edit	ОК	Cancel
Production Window Scre	luction		

4.6 How to edit welddata using the PartData concept Continued

RAPID example



xx1900002417

The welddata can now selected from the TPS/i Screenmaker application by selecting the partdata. Start the TPS/i application and press the start button.

Manual	Guard Stop	
= V SQ DE-L-7008	262 Stopped (Sp	eed 100%)
Seam: sm3, Weld: wd3, Name:	Part_3_Pth_1_Weld_1	
<processdata>TASK PERS wd</processdata>	3:=[12,10,[3,0,0,0,0,0,0,0,0],[0,0	0,0,0,0,0,0,0,0]]
Ignition	Weld	End
Weld Speed < 1	2 > mm/s	
Job number 3,Towing	l eye	
	Press to start part da	ta
	selection	
2		
Production Window Screen		
xx1900002418		

4.6 How to edit welddata using the PartData concept Continued



This will start the following screen and present all partdata found in the system.

xx1900002419

Click on the partdata you want to edit. In this example it's Part_2_Pth_1_Weld_1. The used seamdata/welddata is shown in the header. Here it is sm2/wd2.

Manual Guard Stop DE-L-7008262 Stopped (Speed 100%) Weld Parameters sm2 wd2 Programmed targets pd_Part_1 pd_Part_2 Part_2_Pth_1_Weld_1 + pd_Part_3 Ok Close Production Production Production Production Production Production Production Production				
Weld Parameters sm2 wd2 Programmed targets <p< td=""><td></td><td>Manual DE-L-7008262</td><td>Guard Stop Stopped (Speed 100%)</td><td>X ×</td></p<>		Manual DE-L-7008262	Guard Stop Stopped (Speed 100%)	X ×
sm2 wd2 Programmed targets pd_Part_1 pd_Part_2 Part_2_Pth_1_Weld_1 pd_Part_3 Ok Close Production Screen Production Screen Production Screen Production Screen Production Screen Production Screen Production Screen Production Screen Production Screen Production Screen Production Screen Production Screen Production Screen Production Production Screen Production Pr	Weld Parameters			
Programmed targets pd_Part_1 pd_Part_2 Part_2_Pth_1_Weld_1 pd_Part_3 Ok Close Production Screen Window Production Screen	sm2 wd2			
 pd_Part_1 pd_Part_2 Part_2_Pth_1_Weld_1 pd_Part_3 Ok Close Production Screen 	Programmed targe	ts —		
 pd_Part_2 Part_2_Pth_1_Weld_1 pd_Part_3 Ok Close Production	🔁 pd_Part_1			
● Part_2_Pth_1_Weld_1	pd_Part_2			
Production	O Part_2_Pth	_1_Weld_1		
Ok Close Image: Production Image: Window Image: Window	🕂 pd_Part_3			
Ok Close				
Production Screen			Ok	Close
	Production Window Scree	luction		

4.6 How to edit welddata using the PartData concept Continued

Press **OK** to go back to the welddata editor. The editor automatically selects the used seam/welddata from your part. The header is now updated with sm2/wd2.

Seam: sm2, Weld: wd2, Name:	Guard Stop 262 Stopped (Sp : Part_2_Pth_1_Weld_1	eed 100%)
<processdata>TASK PERS wd</processdata>	2:=[15,10,[2,0,0,0,0,0,0,0,0],[0,0	0,0,0,0,0,0,0,0]]
Ignition	Weld	End
Weld Speed < 1 Job number 2,Crossm	5 > mm/s nember Seam 11-20	
9		
Production Window Screen		

xx1900002421



To update the editor with the value from the seam/welddata, you may have to press the blue **Refresh** button.

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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 from the RobotApps View in RobotStudio. The add-in will be available in the **Add-Ins** tab.

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.

۵ 🖌	5-6-	<- ₹							
File	Home	Modeling 9	Simulation	Controll	er RAPID	Add-Ins			
			\geq			21 -	Enabled		
RobotAp	ps Install	Migrate	ArcWelding	Cutting	Fronius	Gearbox		Setup	
	Package	e RobotWare 🔻	6.05	6.04	TPS/i 🔻	Heat		Editor	
Commun	ity Ro	botWare	PowerP	acs	Arc Utilities	Gearbox Heat	Prediction	Production Screen	

xx1900002428



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 U	tility v1.00 ∓ ×
Controller	vcTPSi_Single (Station VC)
Task	T_ROB1
- Status	
Auto	Motors On 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 20.

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

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

Welder		
IP Adress	192.168.1/8.100	
User	admin	
Password	•••••	\bigcirc
	Show Browser	
	Get Synergic Lines	
	Get Joblist	
	Search Weld Modes	

xx1900002434

Button	Description
Show Browser	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.

reid mod	le Searci	n Criteria											
MIG S	tandard	Gas Type	Ar+15-20%CO2		Possible Correction	s:							
MIGP	ulse	Wire Size	1	-	ArcLength								
MIGL	SC	Wire Type	Steel		Wire Retract								
MIG P	мс	Chanadaniatia	Nees	-									
MIGC	мт	unaracteristic	NUTE										
] Is Lice	nced												
arch Hes renced	ult(15)	Process	Gae	Size	Type	Workspirit		Updated List	Auto Upda	te Controller 🔄 Show	/ line	Numbe	r of weld modes :
2	2565	MIG Standard	Are 15:20%CO2	1	Seel	48.400 (A)	ń.	Licenced	ID Process	Gas	0126	туре	workpoin
2	2569	MIG Standard	Are15-20%CO2	1	Steel	43-200 (A)							
	2000	ning otoriogra	11.10201002	1		10 200 00	=						
>	2629	MIG Standard	Act 15,20%CO2	1	Chaol	45,400 (4)							
>	2629	MIG Standard	Ar+15-20%CO2	1	Steel	45-400 (A)							
> >	2629 2764	MIG Standard MIG LSC	Ar+15-20%CO2 Ar+15-20%CO2	1	Steel Steel	45-400 (A) 34-430 (A)	>						
> > >	2629 2764 2766	MIG Standard MIG LSC MIG LSC	Ar+15-20%CO2 Ar+15-20%CO2 Ar+15-20%CO2	1	Steel Steel Steel	45-400 (A) 34-430 (A) 34-430 (A)	>						
> > >	2629 2764 2766 2784	MIG Standard MIG LSC MIG LSC MIG Pulse	Ar+15-20%CO2 Ar+15-20%CO2 Ar+15-20%CO2 Ar+15-20%CO2 Ar+15-20%CO2	1 1 1 1	Steel Steel Steel Steel	45-400 (A) 34-430 (A) 34-430 (A) 21-340 (A)	>						
	2629 2764 2766 2784 2851	MIG Standard MIG LSC MIG LSC MIG Pulse MIG PMC	Ar+15-20%CO2 Ar+15-20%CO2 Ar+15-20%CO2 Ar+15-20%CO2 Ar+15-20%CO2	1 1 1 1	Steel Steel Steel Steel Steel	45-400 (A) 34-430 (A) 34-430 (A) 21-340 (A) 43-375 (A)	>						
P P P P	2629 2764 2766 2784 2851 2868	MIG Standard MIG LSC MIG LSC MIG Pulee MIG PMC MIG PMC	Ar+15-20%CO2 Ar+15-20%CO2 Ar+15-20%CO2 Ar+15-20%CO2 Ar+15-20%CO2 Ar+15-20%CO2	1 1 1 1 1 1	Steel Steel Steel Steel Steel	45-400 (A) 34-430 (A) 34-430 (A) 21-340 (A) 43-375 (A) 43-420 (A)	>						
	2629 2764 2766 2784 2851 2868 2000	MIG Standard MIG LSC MIG LSC MIG Pulse MIG PMC MIG PMC	Ar+15-20%CO2 Ar+15-20%CO2 Ar+15-20%CO2 Ar+15-20%CO2 Ar+15-20%CO2 Ar+15-20%CO2 Ar+15-20%CO2	1 1 1 1 1 1	Steel Steel Steel Steel Steel Steel	45-400 (A) 34-430 (A) 34-430 (A) 21-340 (A) 43-375 (A) 43-420 (A)							

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.

vireid Mo	de Search	n Criteria							Synergic I	Line					
V MIG S	tandard	Gas Type	Ar+15-20%CO2		Possible Correction	18:			2	50					
MIG F	ulse	Wire Size	1	•	ArcLength Plus (Durantic				8 2	00				_	-
V MIG L	SC.	Wire Type	See		Wire Retract				j j	00					
MIG F	MC	Characteristic	None							50					
MIG C	:MT	Characteristic	None							-1	0 1	2 3	4 5	6	7 8 9
🗸 is Lice	enced											Synergic	line Points	5	
Licenced	ID	Process	Gas	Size	Type	Workpoint			Updated L	я 🖂	Process	Gas	Gine	Tune	Workpoint
1	2569	MIG Standard	Ar+15-20%CO2	1	Steel	43-200 (A)				2565	MIG Standard	Are15,20%CO2	1	Steel	48,400 (A)
1	2629	MIG Standard	Ar+15-20%CO2	1	Steel	45-400 (A)			2	2569	MIG Standard	Ar+15-20%CO2	1	Steel	43,200 (4)
1	2764	MIG LSC	Ar+15-20%CO2	1	Steel	34-430 (A)				2020	MIG Standard	Arr 15 20%CO2		Steel	45 400 (0)
1	2766	MIG LSC	Ar+15-20%CO2	1	Steel	34-430 (A)		_		2023	MIG LCC	Art 15 20%CO2		Gool	24 420 (A)
1	2784	MIG Pulse	Ar+15-20%CO2	1	Steel	21-340 (A)		>		2704	MICLCC	A+15-204002	1	Occil	24,420 (A)
1	2851	MIG PMC	Ar+15-20%CO2	1	Steel	43-375 (A)			1	2700	MIG LOC	Ar+15-204002		Occil	34-430 (A)
<u></u>	2868	MIG PMC	Are15-201/CO2	1	Steel	43-420 (A)			X	2/04	Mila Pulse	Ar+15-20/4002	1	Steel	21-340 (A)
1	2060	MIGLISC	Are 15-201/CO2	4	Quad	24,420 (4)			×.	2851	MIG PMC	Ar+15-20%CO2	1	Steel	43-375 (A)
× .	3000	MIG 230	AFT0-204002	1	0.000	34-430 (VV	-		V	2868	MIG PMC	Ar+15-20%CO2	1	Steel	43-420 (A)

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.

Controller

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

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)	
/	2629	MIG Standard	Ar+15-20%CO2	1	Steel	45-400 (A)	
/	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)	
/	2766	MIG LSC	Ar+15-20%CO2	1	Steel	34-430 (A)	
/	2851	MIG PMC	Ar+15-20%CO2	1	Steel	43-375 (A)	
/	2868	MIG PMC	Ar+15-20%CO2	1	Steel	43-420 (A)	
	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.

Show local files	

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).

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\XXXXXX\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.

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6 Customize widget screen

Production Screen widgets

The TPS/i package provides a set of widgets that can be used. The configuration is done with the template files which are copied to the HOME folder at (\HOME\Arc\FroniusTPSi\WidgetConfig) on the system.

Simply copy the template to the folder HOME\ProdScr\config in the systems HOME directory and restart Production Screen.



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The customizable widgets are placed on widget Page 2 and 3.



Additional information on how to use and set up Production Screen can be found in *Application manual - Production Screen 3HAC050964-001*.

Continued

Teach mode widget

The Teach Mode widget can be used in manual mode. It activates the Fronius function Teach Mode. When the TPS/i is in teach mode, the wire will not be bent if it touches the work piece.



Continued

Simulate process widget

The **Simulate Process** can be used in manual and auto mode. It can be used to test the welding program. The power source simulates a real welding process by using the welding simulation signal.

- A programmed welding path can therefore be travelled without any welding taking place.
- All signals are set, just like the real thing (with no timing interdependencies or actual values).
 - Arc stable
 - Process active
 - Main current signal
 - No arcs are ignited
 - No wire electrode is fed
 - The gas solenoid valve is not activated

ArcStatus widget

The **ArcStatus** widget has a status LED to indicate active welding process. Also, the current seam name and segment is shown in the widget.

	Manual DE-L-700826	52	Guard Stop Stopped (Spe	ed 100%))	X	X
- 3 -					0	0 0	<u></u>
T_ROB1 : ArcSt	atus : Segme	nt : SeamNan	ie	T_R	0 B1 —		
• ArcOn [-1] ""				0	Stop	Proces	s
P	F	hu-	P				
Arc	TPSi R1	WvTr R1	ManOp R1				
Production Window Scr	duction een						0B_1
xx1900002437							

Stop Process Widget

The **Stop Process** widget can be used to stop the current welding process. This is mainly used for testing and should not be used in real production.

The widget area on the FlexPendant

The widget area is a 10×4 grid of cells. Each cell is 60×60 pixels. The smallest space a widget can occupy is one cell.

Continued

Widget area navigation on the FlexPendant

Tap the widget page indicators or the widget page navigation arrows to change widget page.

To access the widget location view, first enable widget move state then tap and hold the widget. The widget can now be moved by tapping any cell in the widget area.

The widget can also be moved to a different page. Tap and hold a widget to access the widget location view. Tap the desired page in the widget page indicator. Finally, tap any cell in the widget area.



	Manual		Guard Stop			X	\mathbf{X}
	DE-L-700820	52	Stopped (Spee	d 100%) -		\square
- 3 -					0	0 0	_
T_ROB1 : ArcS	tatus : Segme	nt : SeamNam	e	T_R	OB1 —		<u> </u>
O ArcOn [-1	L] ""			0	Stop	Proces	5
					/		
			Tap to e	nable wi	iget navig	ation	
	F	n,					
Arc	TPSi R1	WvTr R1	ManOp R1				
Production Window	oduction						B_1
xx1900002436							
Overview

This section describes how to configure the communication between the ABB IRC5 controller and the Fronius E/IP power supply.

7.1 Installation

7.1 Installation

Robot controller software

Robot system prerequisites:

- IRC5 robot controller with main computer DSQC1000 or above
- RobotWare version 6.07 or higher with the following options:

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

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

RobotStudio software

RobotStudio version 6.07 or higher.

Hardware

Required:

• 1 Ethernet cable



xx2100000466

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.

7.2 Fronius power supply settings

7.2.1 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**:



xx2100000469

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



xx2100000470

7.2.1 Changing the Fronius power supply network settings *Continued*

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.

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7.2.2 Changing the network settings for IRC5 controller communication

7.2.2 Changing the network settings for IRC5 controller communication

Change the network settings for IRC5 communication

Follow these steps to change the network settings for IRC5 communication:

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



xx2100000473

- 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".

Fronius TPS 320i PULSE IMVinc	~
admin admin togat passes	

xx2100000471

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

7.2.2 Changing the network settings for IRC5 controller communication Continued



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

xx2100000472

- Change the network settings manually. Select Set configuration and then tap OK to confirm the changes. as needed or use the default "Factory" settings in Fig 5.2.
- Select Restore factory settings and to use the default factory settings.

7.3 IRC5 controller configuration

7.3.1 Changing the IRC5 communication settings

IRC5 communication settings

Follow these steps to configure the communication between the IRC5 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.



7.3.1 Changing the IRC5 communication settings Continued

🐌 Instance Editor	— E	ı x
Name	Value	Informa
Vendor Name	Fronius International GmbH	1
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 $^{\vee}$	
Input Connection Type	Point to point v	
Connection Priority	Schedule v	
Configuration Size (bytes)	0	
Output RPI (us)	20000	
Input RPI (us)	20000	
Connection Timeout Multiplier	4 ~	
4		>
		1
	ОК	Cancel

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

xx2100000475

7.3.1 Changing the IRC5 communication settings Continued

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

				~
Name	Value	Information		
Heat defined as time	 TRUE FALSE 			1
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	2		
Service Port IP	192.168.125.165			
		OK	Ca	incel

6 Restart the controller system.

7.3.2 Accessing the Fronius service port from ABB controller

7.3.2 Accessing the Fronius service port from ABB controller

Accessing the Fronius service port

Follow these steps to access the Fronius web page from the IRC5 service port:



xx2100000478

- 1 Define the Fronius network settings (192.168.125.165), see *Change the network settings on page 75*. This will set the service port of the power supply to the IRC5 private network.
- 2 Connect the X4 Lan 2 to an Ethernet switch, see *Hardware on page 74*.
- 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 83*.

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7.3.3 Adding or removing synergic lines from RobotStudio

7.3.3 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:

7.3.3 Adding or removing synergic lines from RobotStudio *Continued*

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.
- 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	e Search	Criteria													
MIG S	andard	Gas Type	Ar+8-10%CO2	~	Possible Correction	s:									
MIGP	.lse	Wire Size	0.9	~	ArcLength Plus/Departic										
] MIG L	SC	Wire Type	Steel	~	Wire Retract										
MIG PI	MC	Characteristic	None	~											
] MIG C	МТ														
Is Lice	nced														
archRes	uit(4)							Updated Li	st 🗆	Auto Update Cori	troller 🗌 Show Ir	ne	Numbe	r of wek	d modes :
icenced	ID	Process	Gas	Size	Туре	Workpoint		Licenced	ID	Process	Gas	Size	Туре	1	Workpoint
/	2679	MIG Standard	Ar+8-10%CO2	0.9	Steel	52-305 (A)		\checkmark	2683	MIG Standard	Ar+15-20%CO2	0.9	Steel	4	3-300 (A)
1	2682	MIG Standard	Ar+8-10%CO2	0.9	Steel	40-310 (A)		\checkmark	2686	MIG Standard	Ar+15-20%CO2	0.9	Steel	3	8-148 (A)
/	2685	MIG Standard	Ar+8-10%CO2	0.9	Steel	38-148 (A)		V	2710	MIG Standard	Ar+15-20%CO2	0.9	Steel	4	8-300 (A)
1	3356	MIG Pulse	Ar+8-10%CO2	0.9	Steel	30-300 (A)		1	2783	MIG Pulse	Ar+15-20%002	0.9	Steel	4	0-330 (A)
							-								

xx2100000479

- 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.

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