ROBOTICS

Application manual

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

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Application manual

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

Fronius for OmniCore

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Original instructions.

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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
A	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:

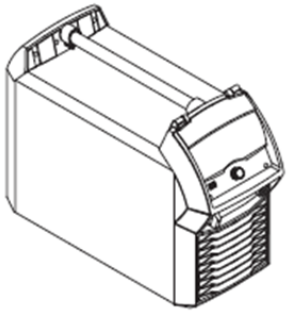
- Fronius TPS 320i/400i/500i/600i with RI-FB Inside/i interface

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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Arc type	Description
Intermediate arc	The droplet increases in size on the end of the wire electrode and is transferred 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:

- 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

Note

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.

Note

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

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.

Note

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.

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 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.

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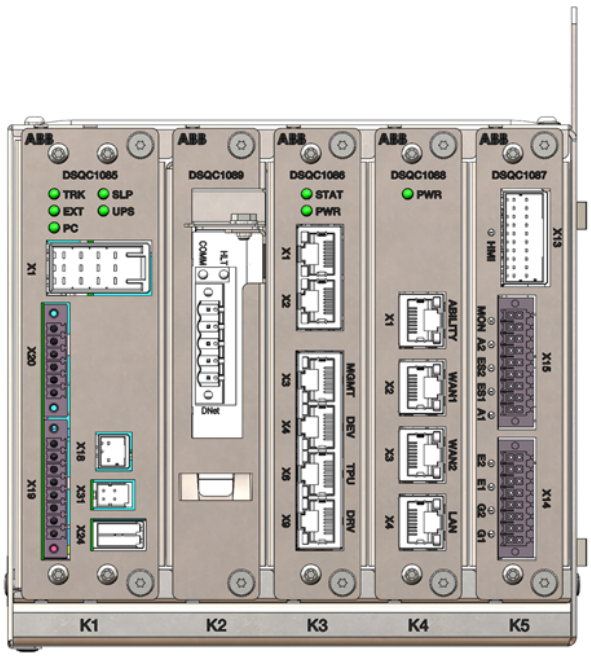
Connecting to the OmniCore controller

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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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.

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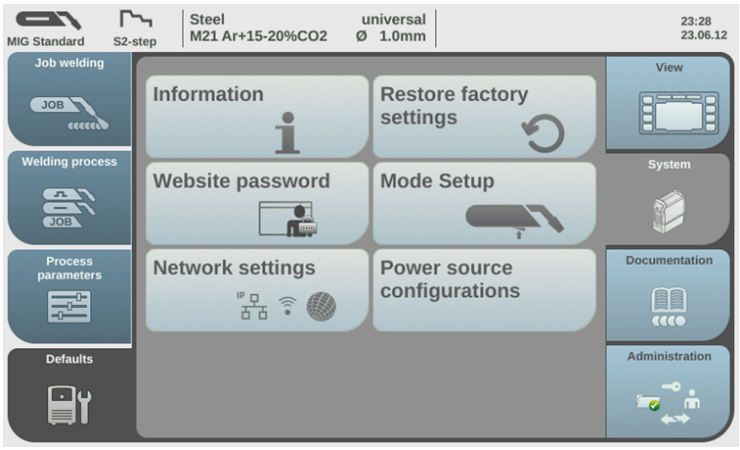
IP address on welder

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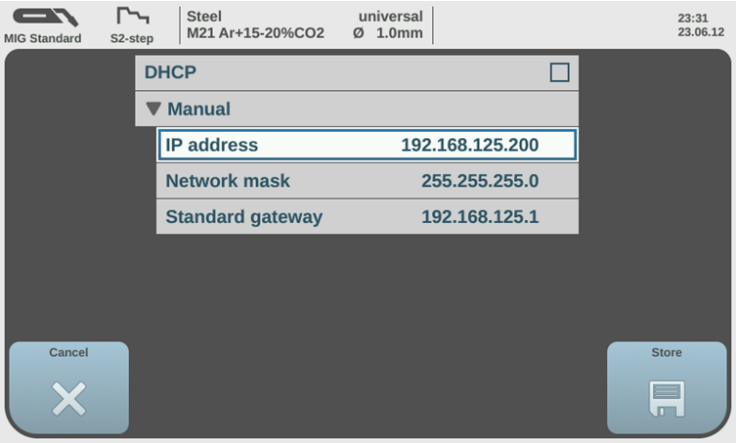
2 The network setup overview is displayed. If DHCP is enabled, the **IP address**, **Network mask** and **Standard gateway** network parameters are greyed out and cannot be adjusted. In order to change the IP address, DHCP must be disabled.



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2.3 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.

Continues on next page

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

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- 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

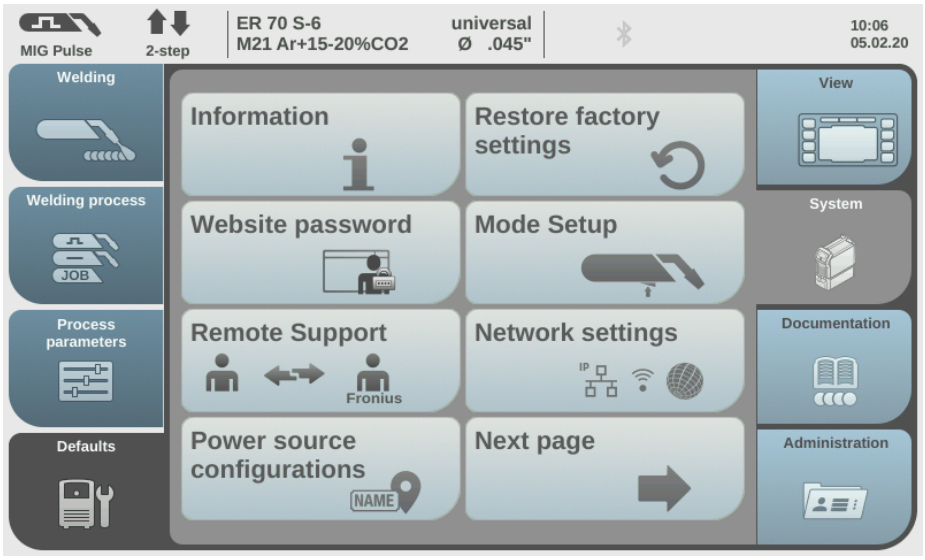
2.3.1.2 Fronius power supply settings

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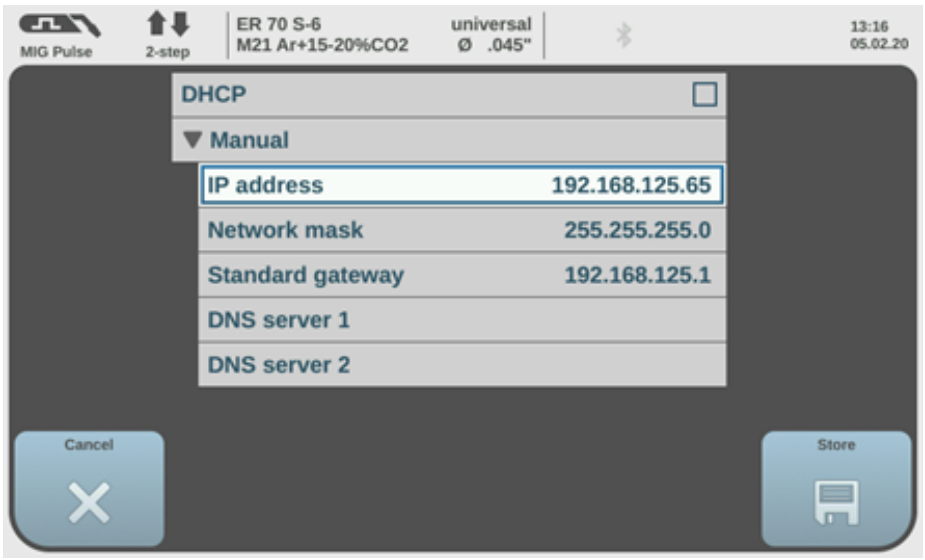
2 In the **Network settings** menu, clear the **DHCP** check box to enable editing of the menu items.



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

> **Note**
>
> 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

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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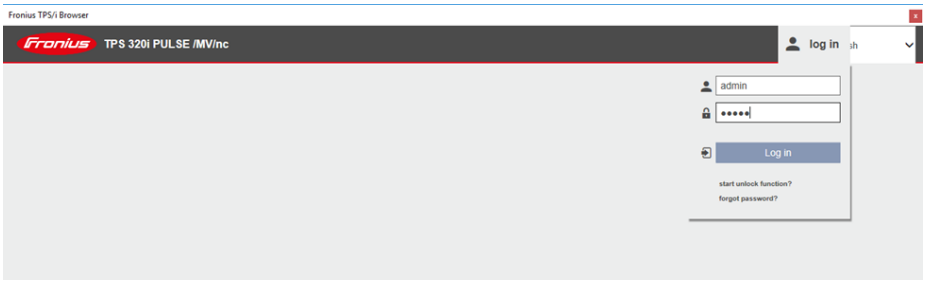
2 From a web browser address bar, enter the defined IP address (for example 192.168.125.65).

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**.

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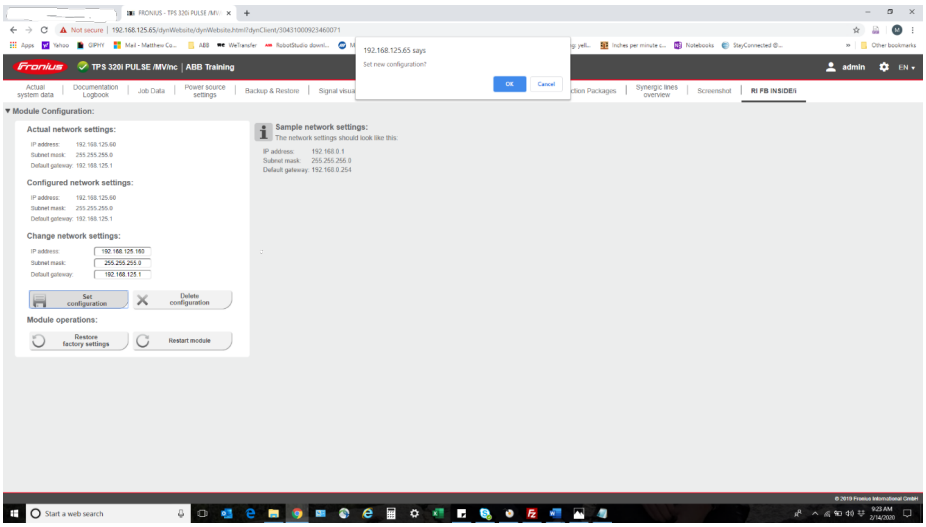
5 In the **Module Configuration**, select one of the following options:



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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.

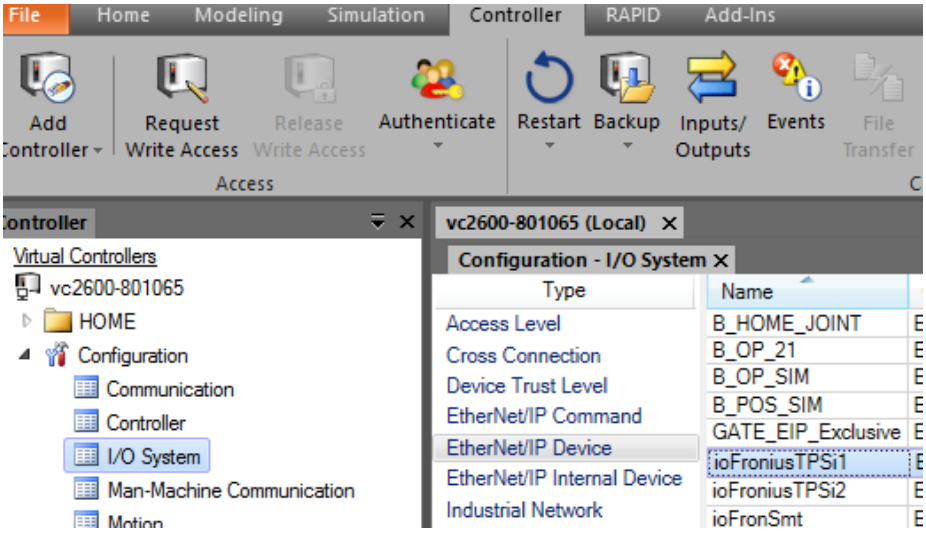
2.3.1.3 Robot controller configuration

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.



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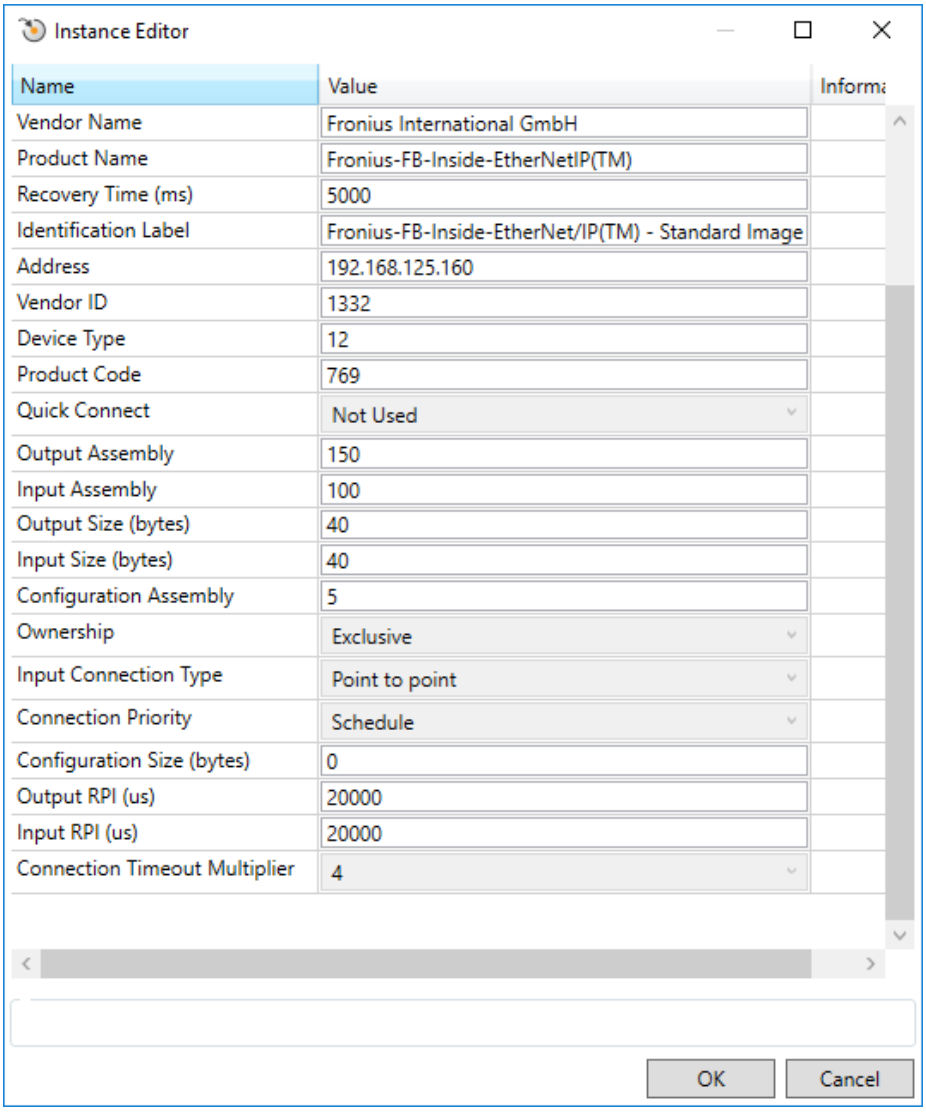
4 In the **Instance Editor**, enter the **Address** (192.168.125.160) for the Fronius EtherNet/IP device and select **OK**.



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2.3.1.3.1 Changing the robot communication settings

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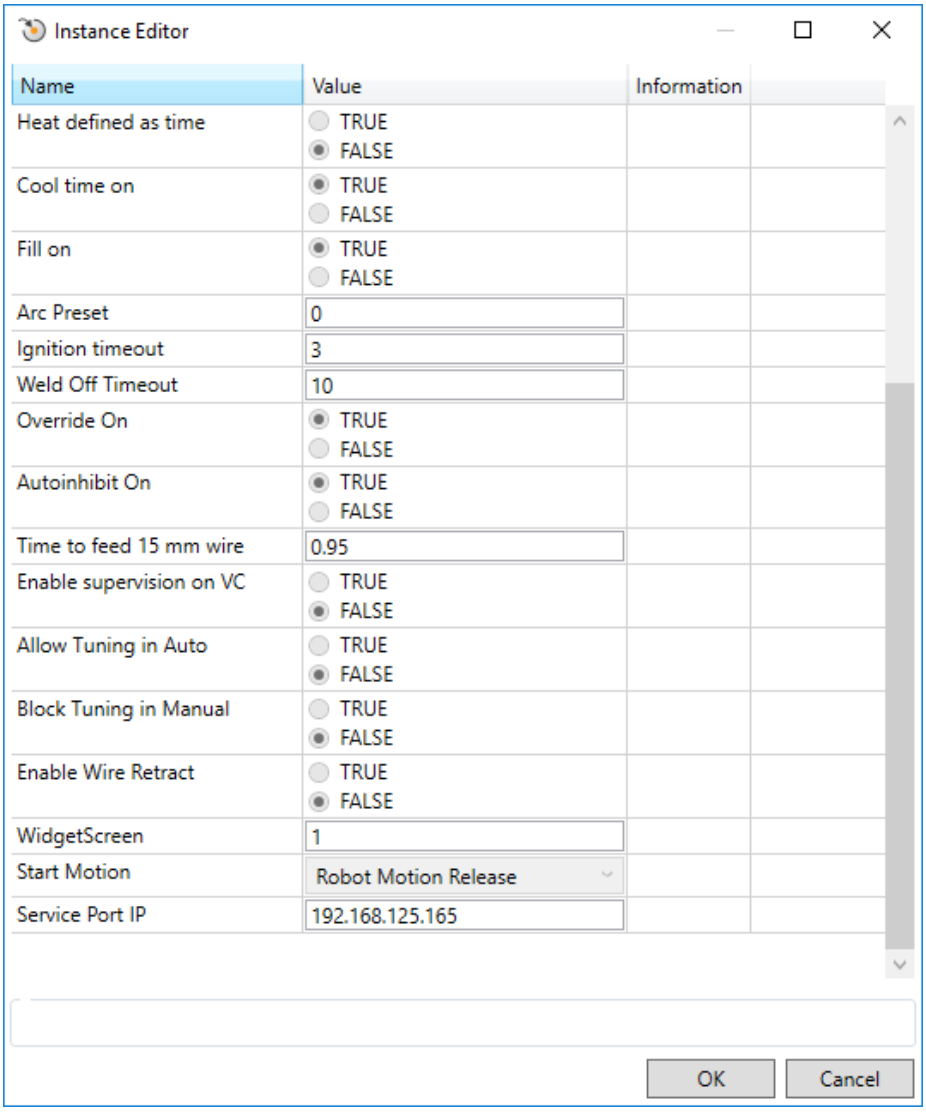
5 In the **Instance Editor**, set the **Service Port IP** to 192.168.125.165 and select **OK**.



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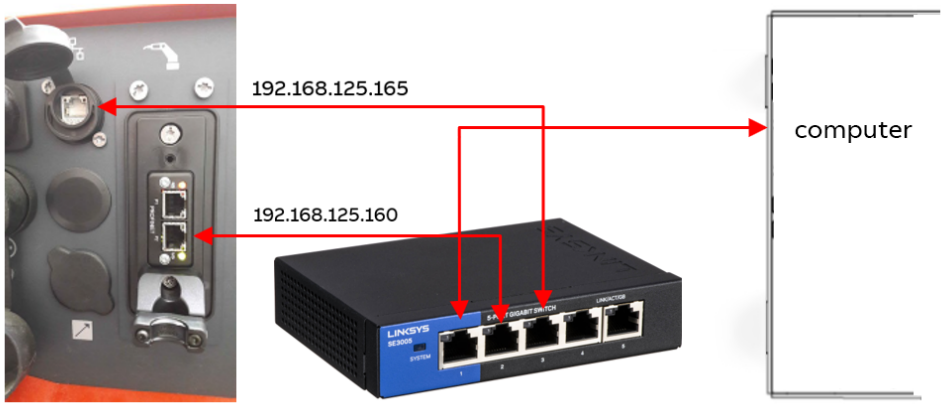
6 Restart the controller.

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

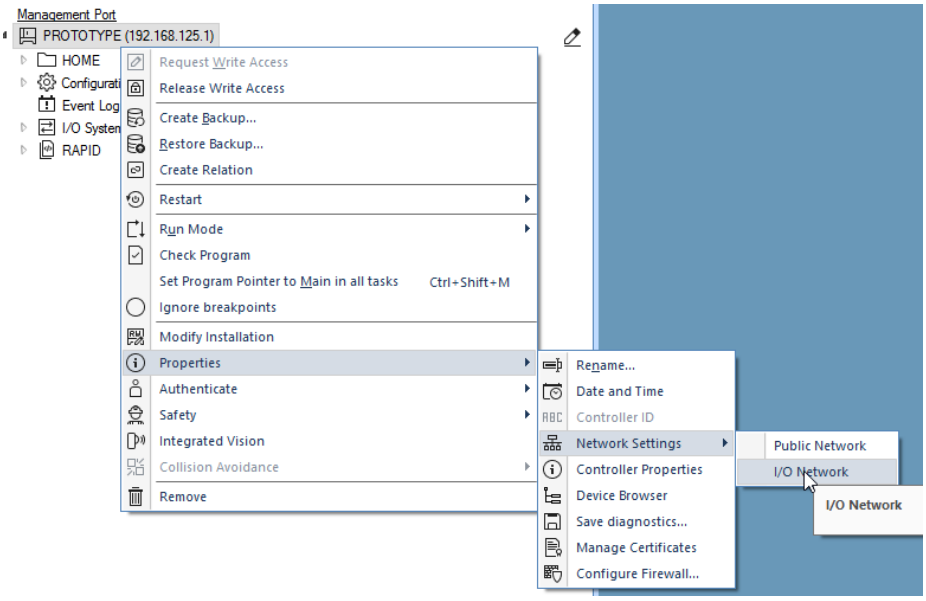
Setup of PROFINET devices

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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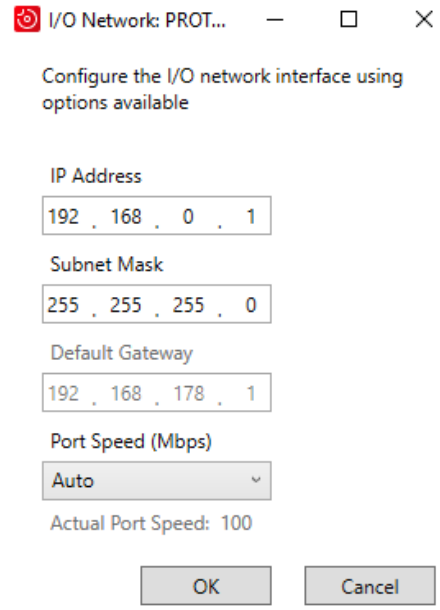
2 Specify the IP Address



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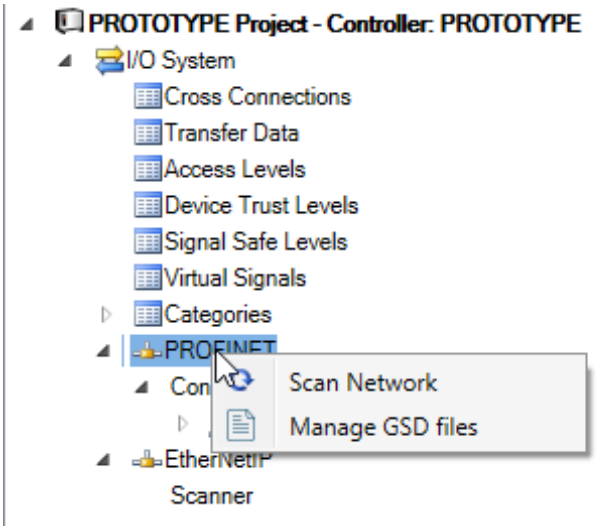
3 The HMS Module configuration can be verified or updated by scanning the ProfiNet network. This is done in the **IO Engineering** tool. Open **IO Engineering** and right-click on **PROFINET**.



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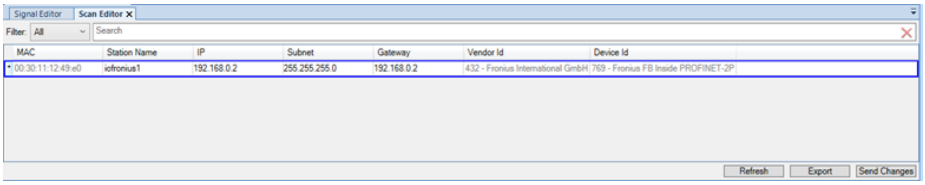
4 Scan the network and update the IP address and station name, if needed. Change the station name and IP address and click **Send Changes** to update the HMS module.



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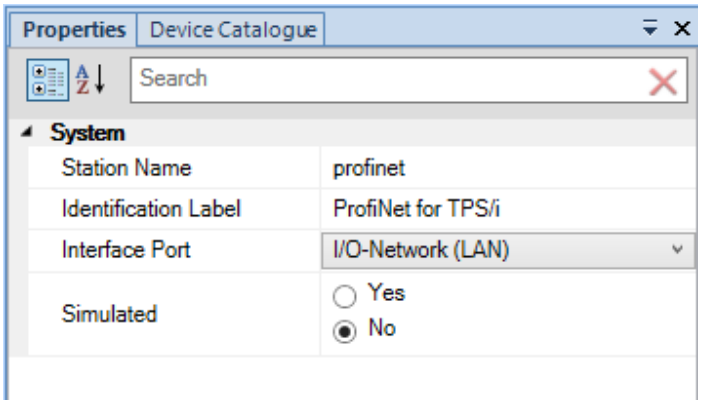
Default settings

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



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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

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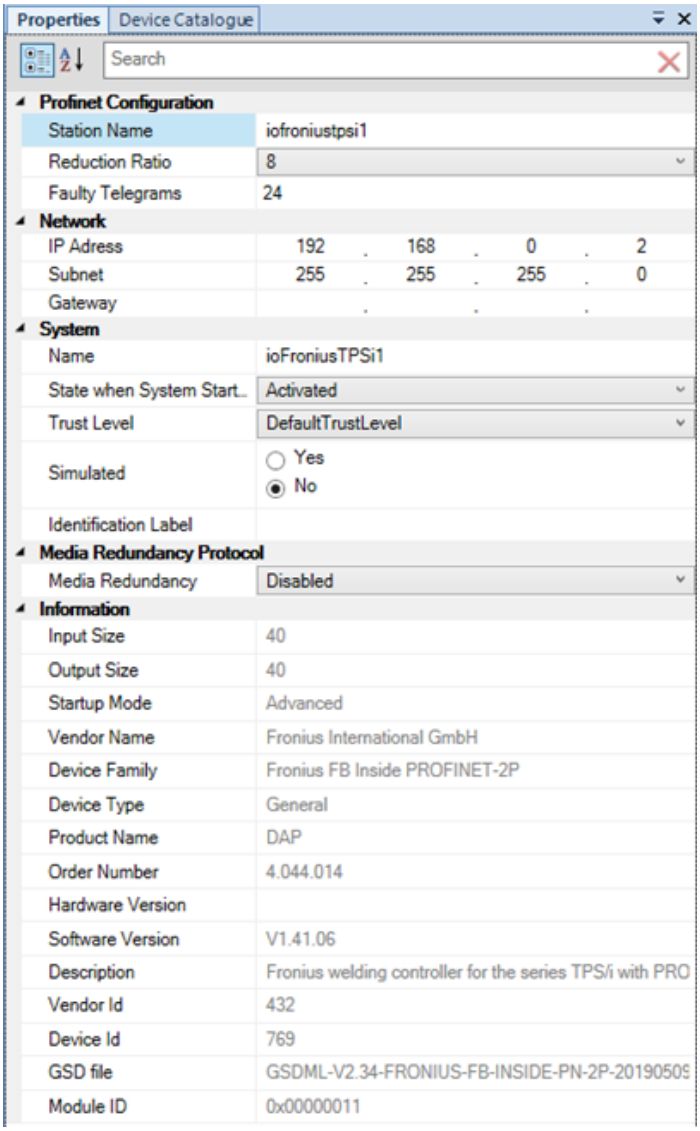

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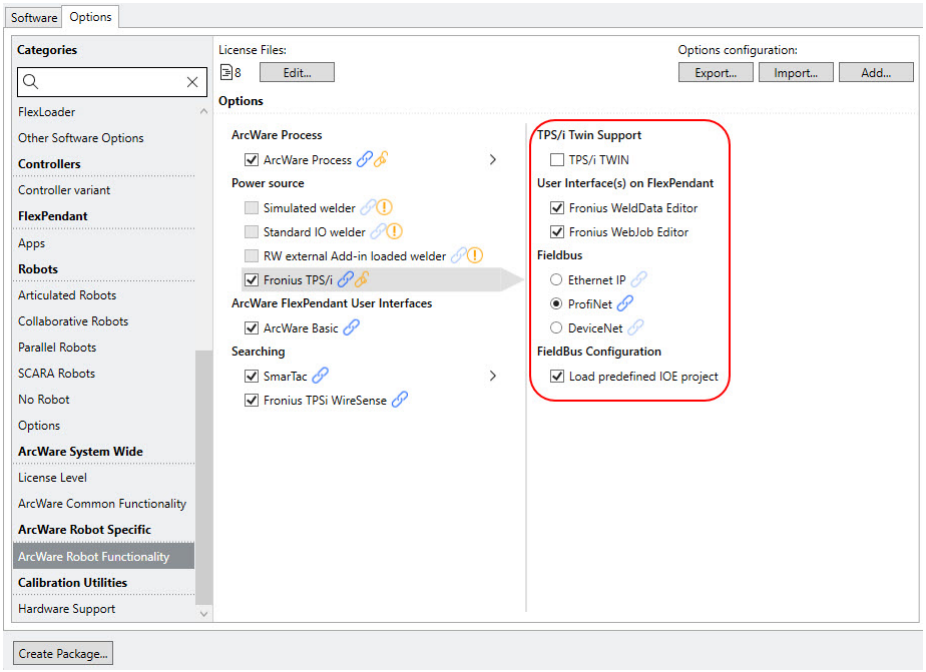
2.4 Fronius TPS/i package

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 Equipment 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: *FALSE*
Pre-Post Flow Control	string	This parameter is only used in JobMode. It specifies 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. *PowerSource* means that the values in the power source job control preflow and postflow of the shielding gas. If *PowerSource* 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*

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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 Installation Editor. If TWIN Wire is selected, the seam/welddata will also use `job2` to send the job to the second power source. Default value: *FALSE*
Heat on	bool	When the arc is ignited, the seam will generally not have reached the correct temperature. Preheating 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: *FALSE*
Heat defined as time	bool	Specifies if the heat phase should use the seamdata 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 seamdata. Default value: *FALSE*
Cool time on	bool	Enables masking of cool_time component in seamdata. Default value: *FALSE*
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: *FALSE*
Collision Switch Supervision 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: *FALSE*
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 igniting 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 components in welddata. Default value: *TRUE*

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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: *FALSE*
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: *FALSE*
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: *FALSE*
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 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 current 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.

Continues on next page

Parameter	Data Type	Description
CmdValueOutOfRange DI	signaldi	This signal indicates that the *Wire feed speed command value* input is outside of the possible range
CorrValueOutOfRange DI	signaldi	This signal indicates that at least one of the selected 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 protective 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 remain 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 occurred.
SupervWater DO	signaldo	Digital output signal for indication of cooling water errors. A high signal means that an error has occurred.
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 occurred.

Continues on next page

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 AO	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 AO	signalao	Wire retraction correction.
TCP Speed AO	signalao	This value is used to transmit the robot TCP speed.
Process specific correction AO	signalao	Arc Length Stabilizer (PMC) from 0 to 5 V.
JobPort GO	signalgo	Job number to be used in *Job Mode* and *Job Mode with Correction*.
ModePort GO	signalgo	Work mode selection.
Error Code GI	signalgi	Error code indication.

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)

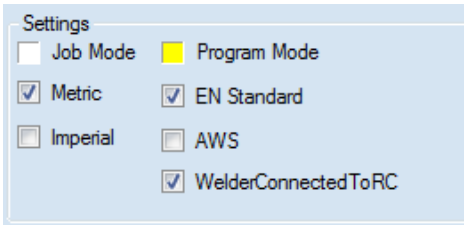
The default setting is *Metric*.

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



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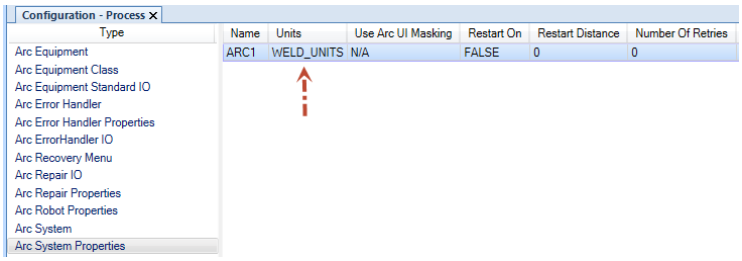
- In the Process Configuration



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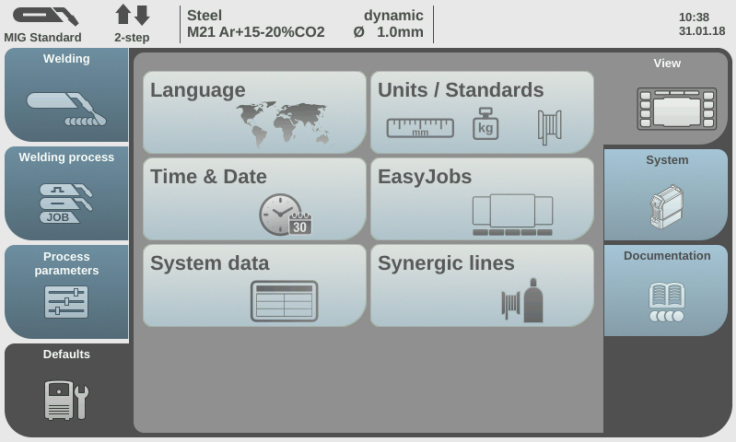
- On the TPS/i welder front panel



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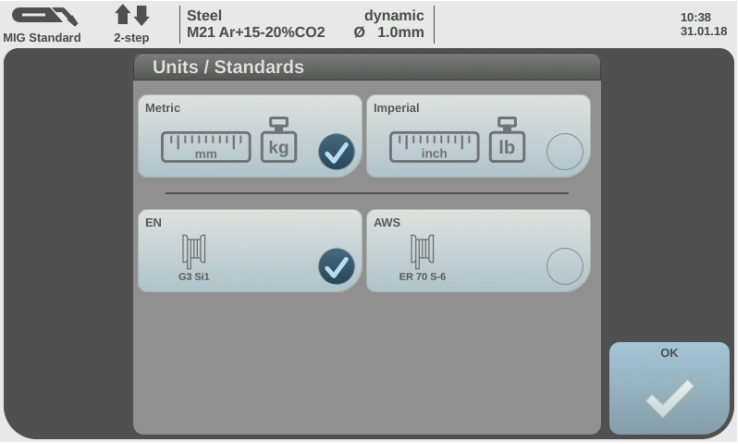

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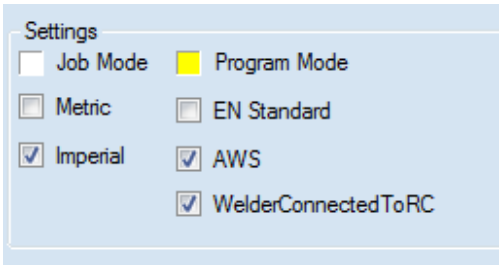
If the unit type should be changed, change it on all these places.

Example: Change from *Metric* to *Imperial* units.



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2.6 Units
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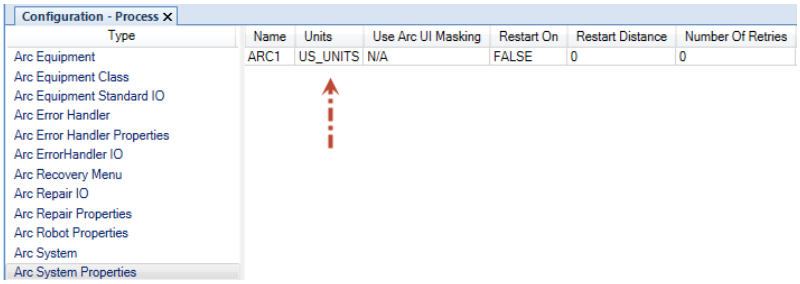

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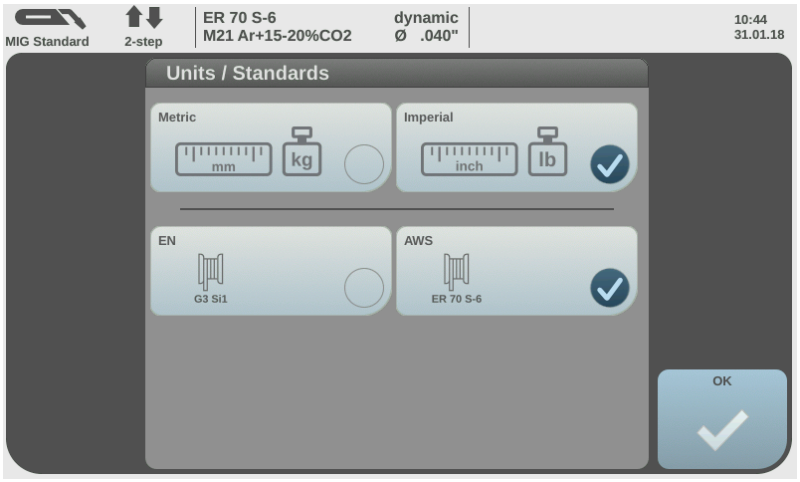

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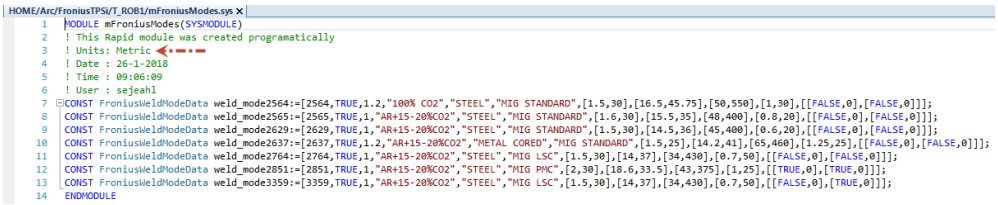
Note

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.



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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.

Note

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.

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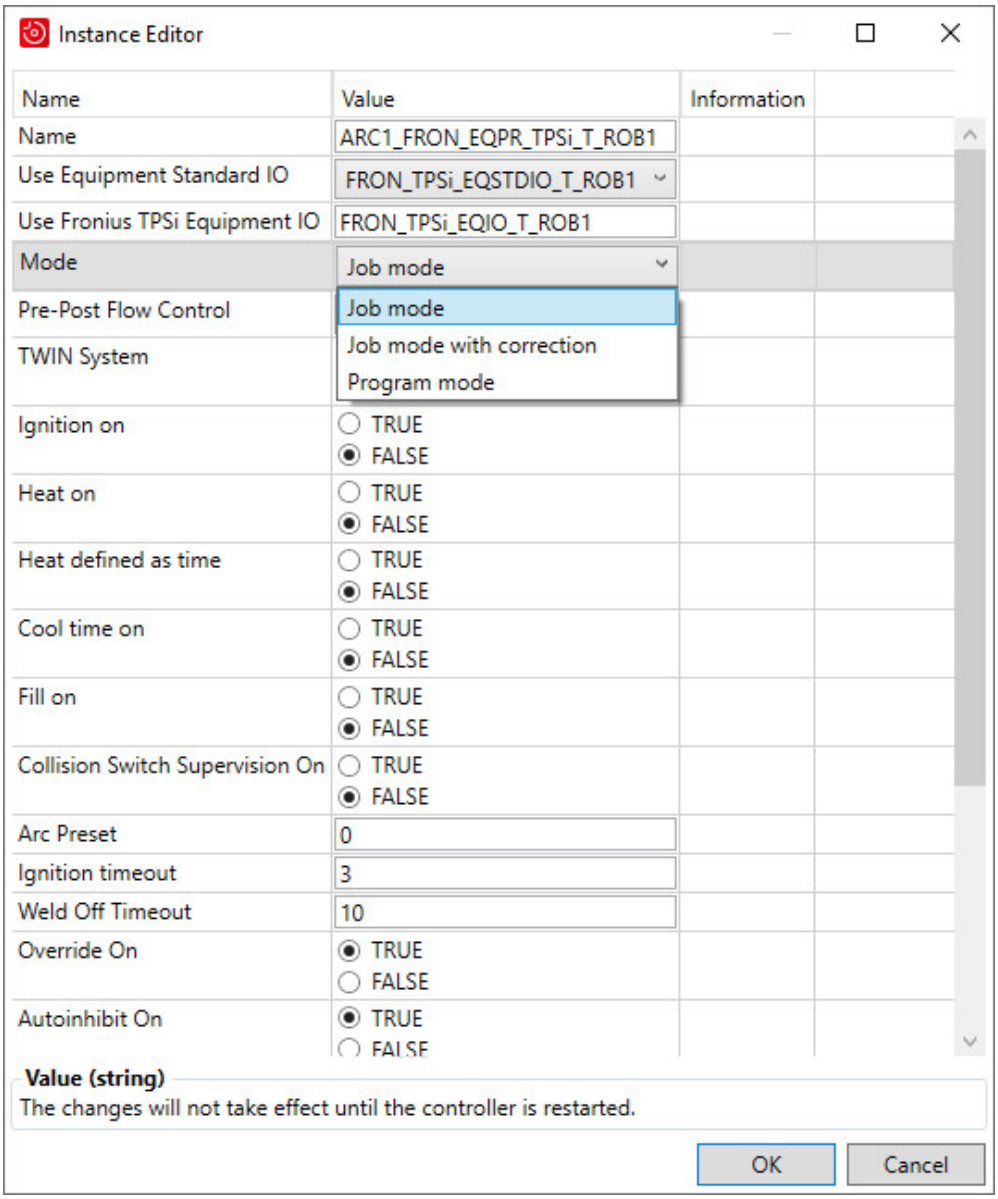
The configuration editor in RobotStudio



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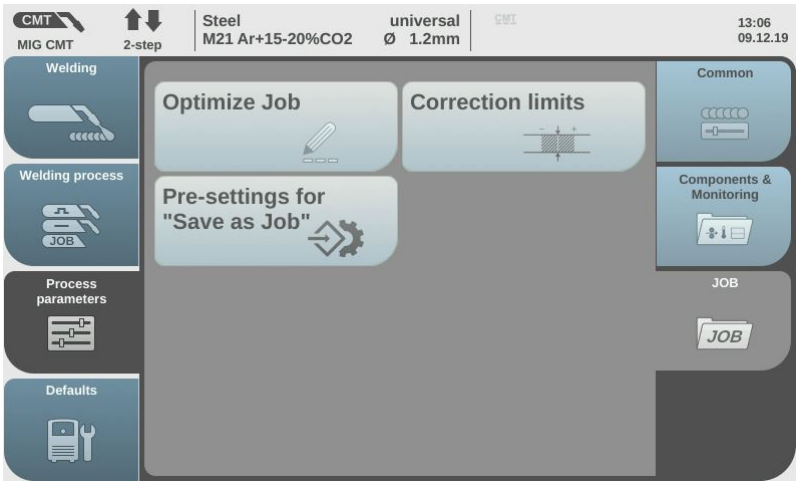
3.2 Setting up limits in job mode with correction

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



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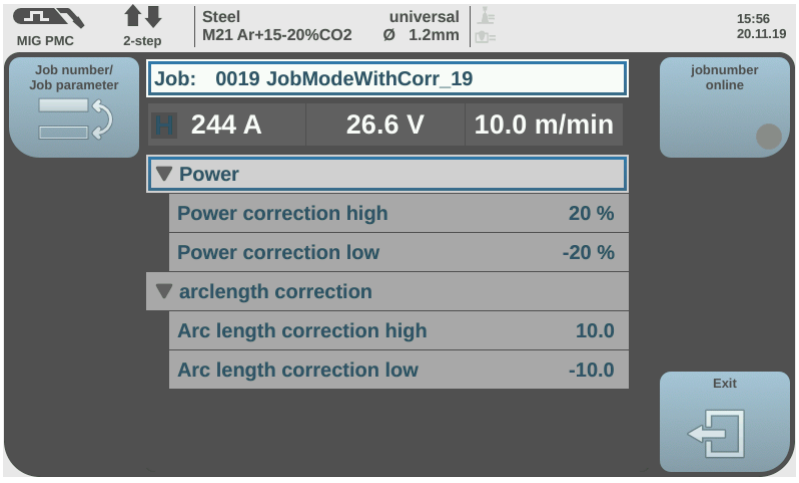

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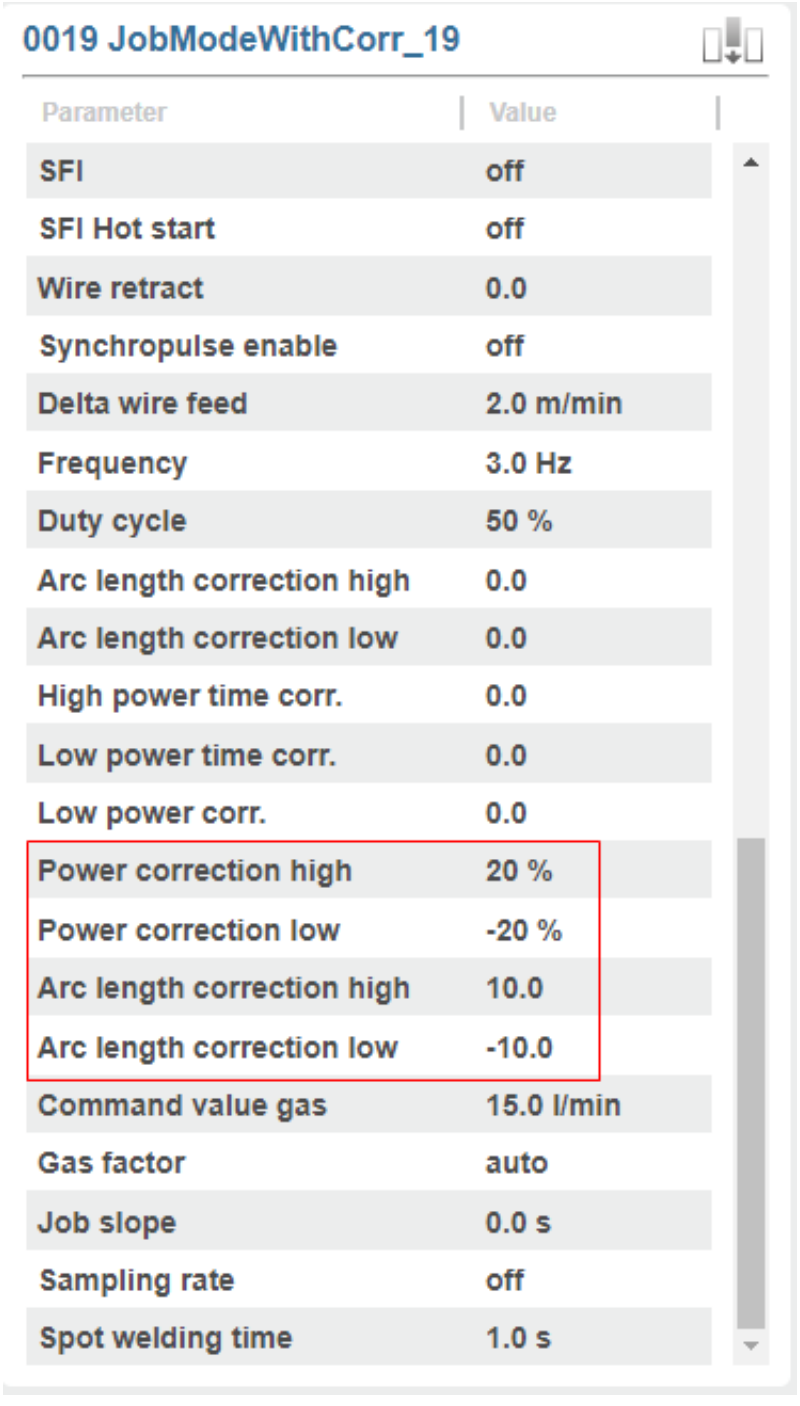
Job mode with correction limits via the web interface



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4 WeldEditor

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

Ignition parameters

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

Note

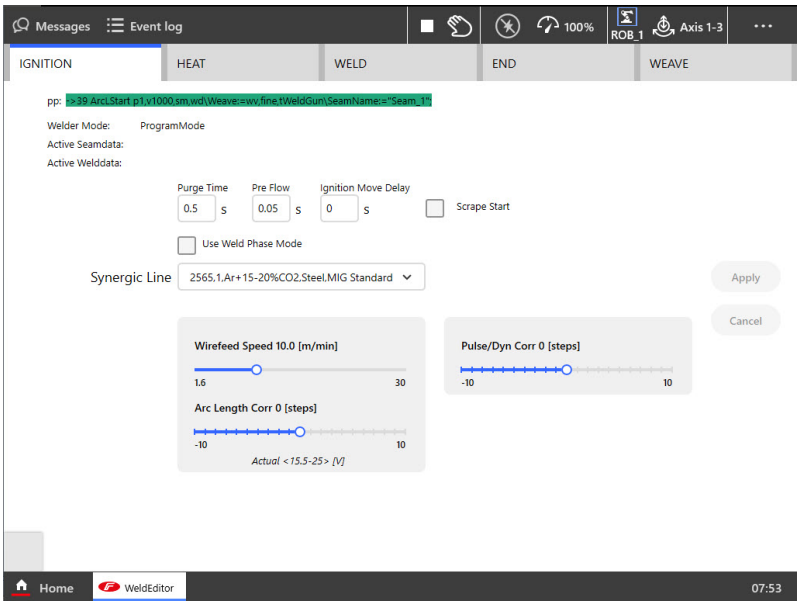
Do not manipulate seam/welddata using the RAPID data type editor. This can result in unwanted behavior and wrong welding parameters which in worst case can damage your welding equipment. Use the Weld mode editor instead.

Note

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

Tip

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



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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 *gas purging*.
Pre Flow Time	The time (in seconds) it takes to pre-flow the weld object with protective gas, also called *gas pre-flow*.

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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: *SynergicLine number, Wiresize, GasType, Material, ProcessType*.
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]
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.

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.

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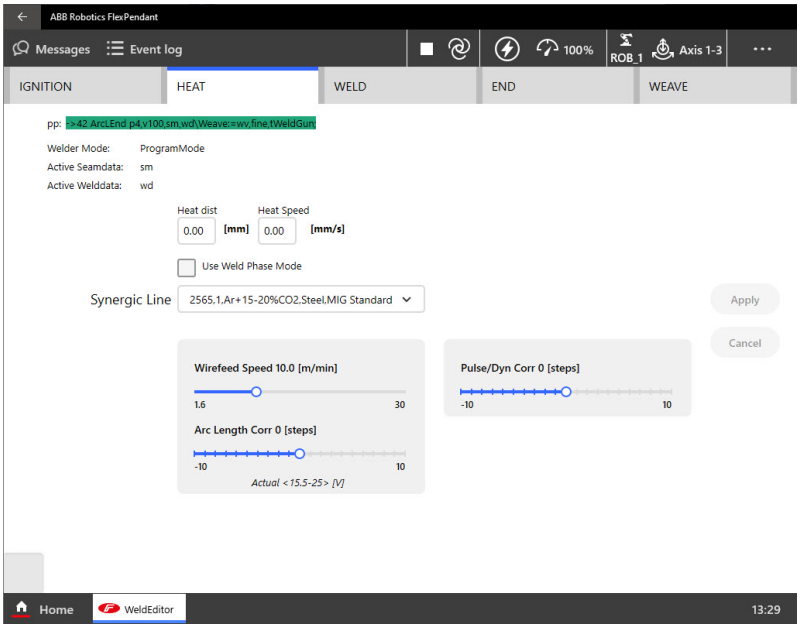
4.2 Weld editor in Program mode

Continued



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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, ProcessType*.
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]
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)

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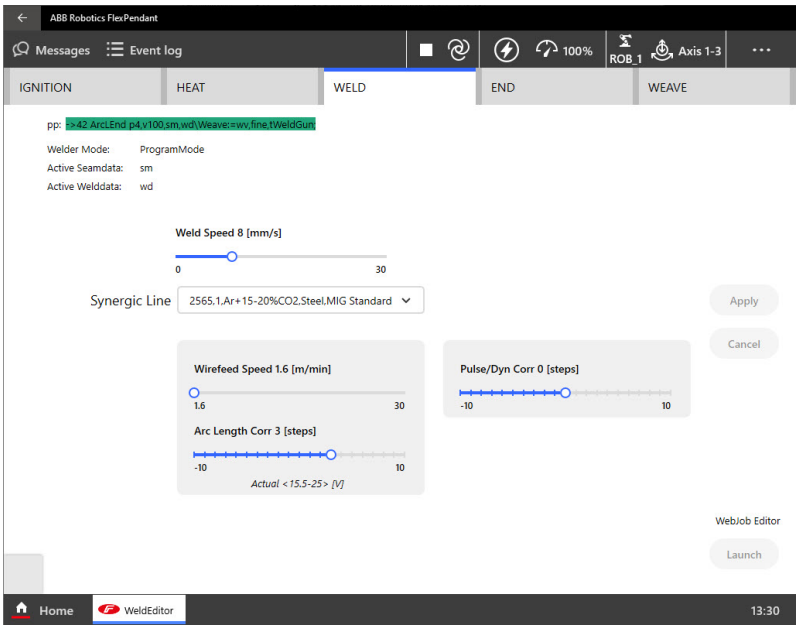
Weld parameters

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

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



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Parameter	Description
Weld speed	The speed of the TCP of the welding torch during the weld instruction.
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, ProcessType*
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]
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)

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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

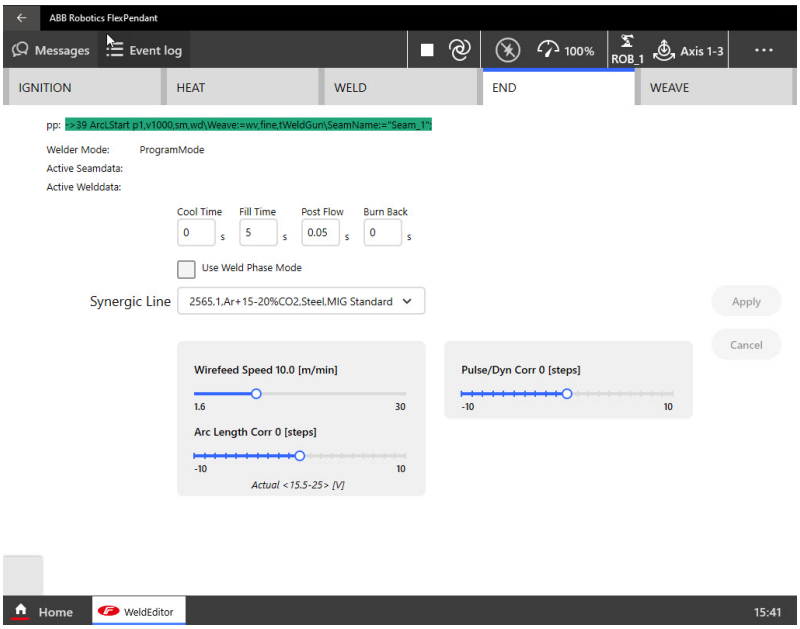
Tap the **End** tab to view or modify the end phase parameters.

Note

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.



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Parameter	Description
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.
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.

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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: *SynergicLine number, Wiresize, GasType, Material, ProcessType.*
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]
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.

Note

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

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4.2 Weld editor in Program mode
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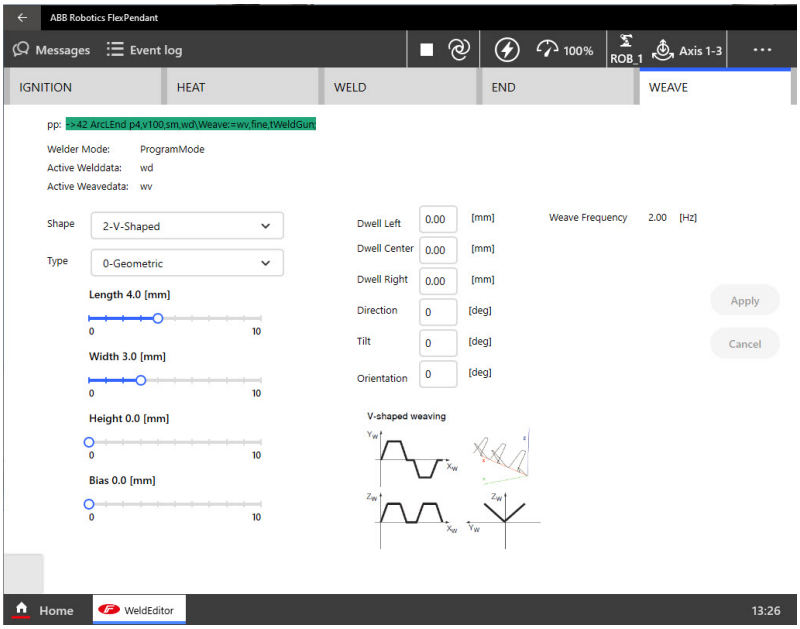

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Parameter	Description
Shape	The used weave shape. The following shapes can be selected: • ZigZag • V-Shaped • Triangular • Circular
Type	The used weave type. The following types can be selected: • Geometric weaving. All axes are used during weaving. • 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 triangular 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 degrees 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.

4.3 Weld editor in Job mode

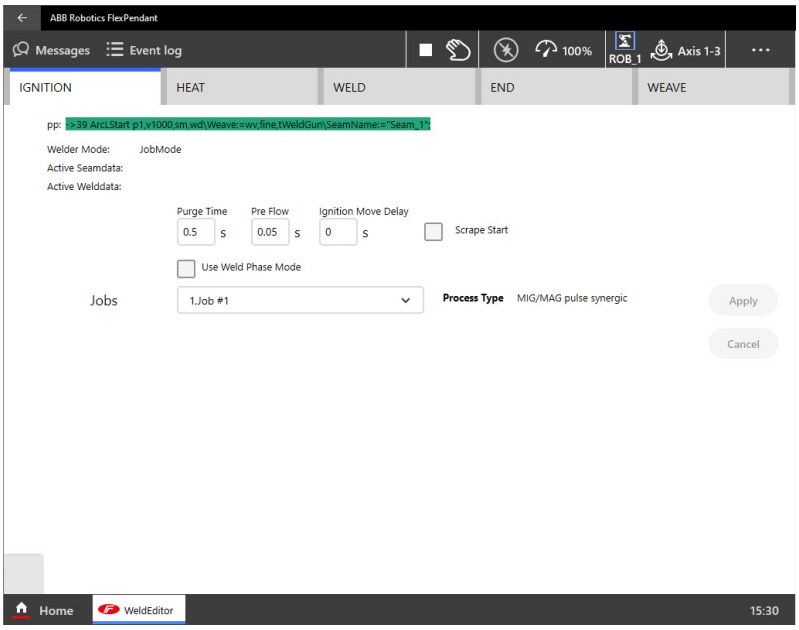
Ignition parameters

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

> **Note**
>
> 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.

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



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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 *gas purging*.
Pre Flow Time	The time (in seconds) it takes to pre-flow the weld object with protective gas, also called *gas pre-flow*.

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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.

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.

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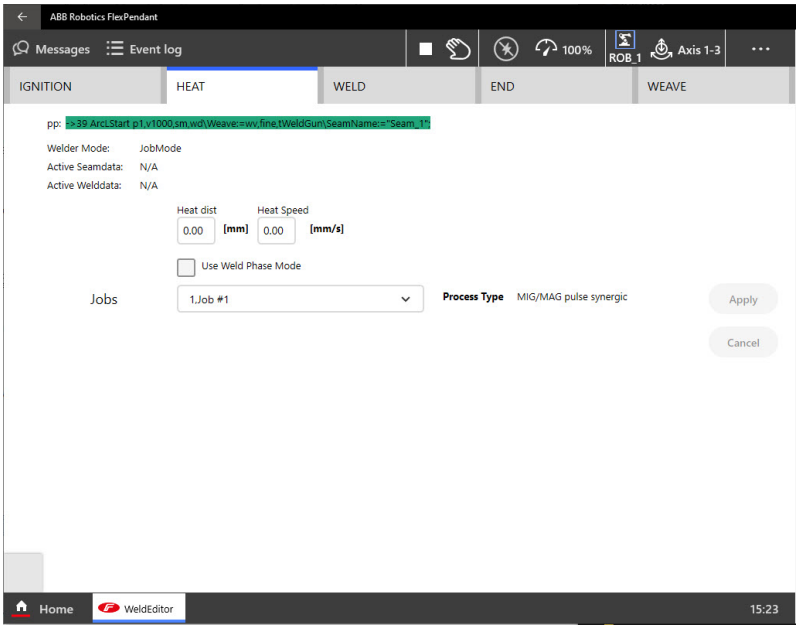

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Parameter	Description
Heat Dist / Heat as time	The distance during which the heat data is active at the start of the weld. If the parameter **Heat as time** is active, the distance will be replaced by time (in seconds).
Heat Speed	The welding speed during the heat phase at the start of the weld phase.
Use Weld Phase	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.

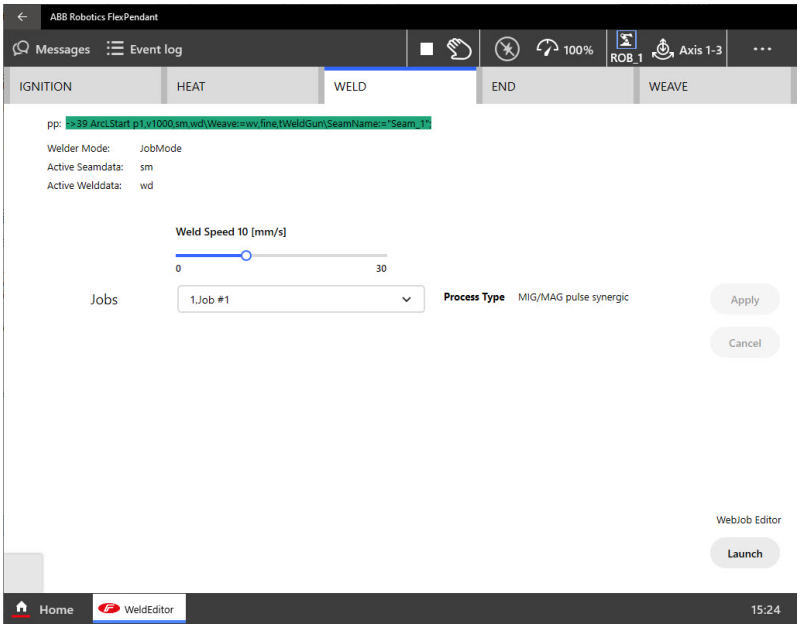
Note

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

Continues on next page

4.3 Weld editor in Job mode

Continued



xx2300001977

Parameter	Description
Weld speed	The speed of the TCP of the welding torch during the weld instruction.
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.

Tip

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

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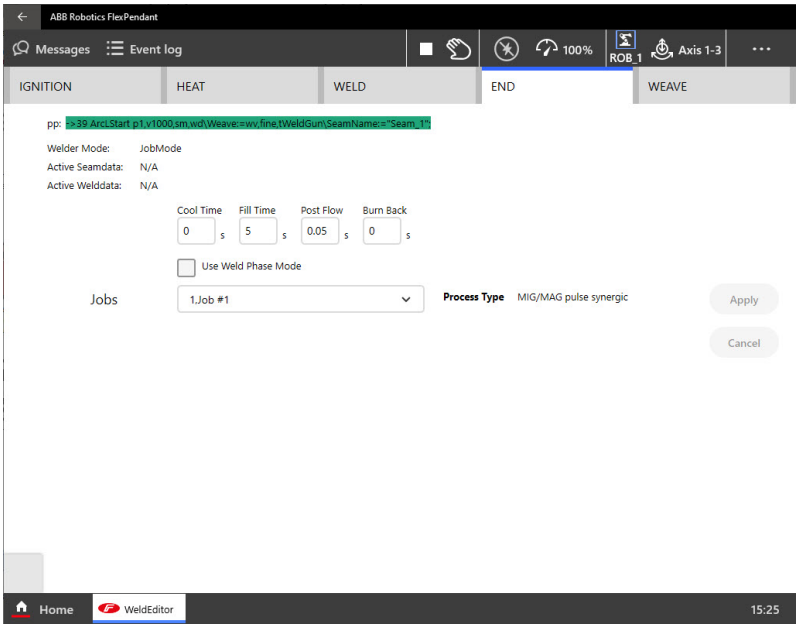


xx2300001978

Parameter	Description
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.
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

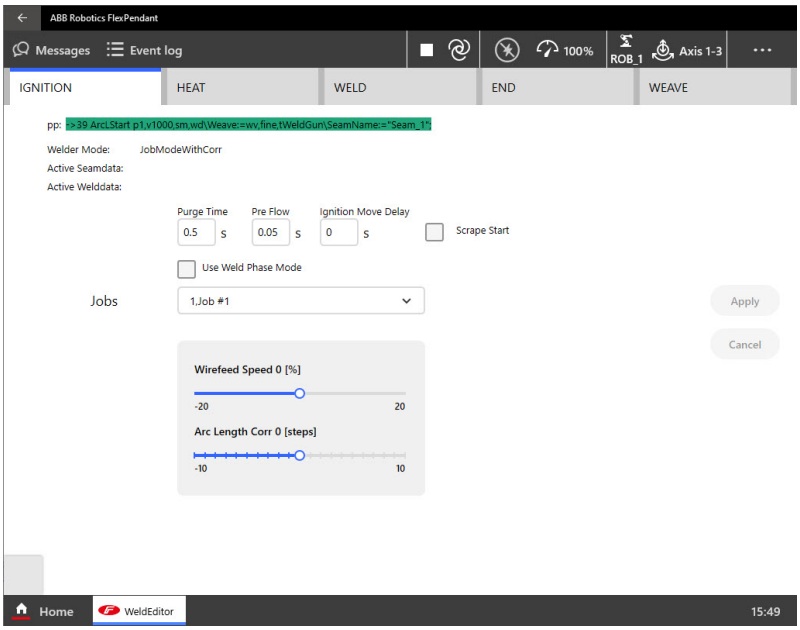
Ignition parameters

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

> **Note**
>
> 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.

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



xx2300001979

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 *gas purging*.
Pre Flow Time	The time (in seconds) it takes to pre-flow the weld object with protective gas, also called *gas pre-flow*.

Continues on next page

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

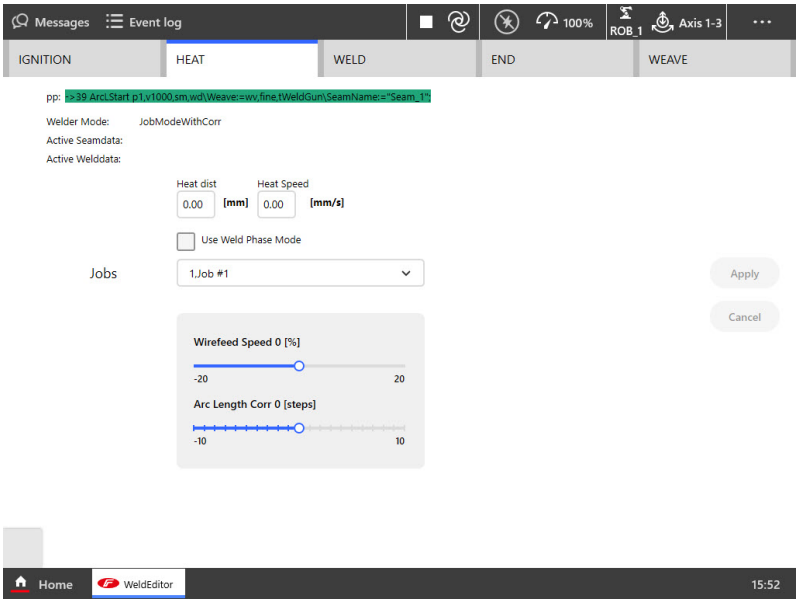
Tap the **Heat** tab to view or modify heat phase parameters.

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.



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4.4 Weld editor in Job mode with correction

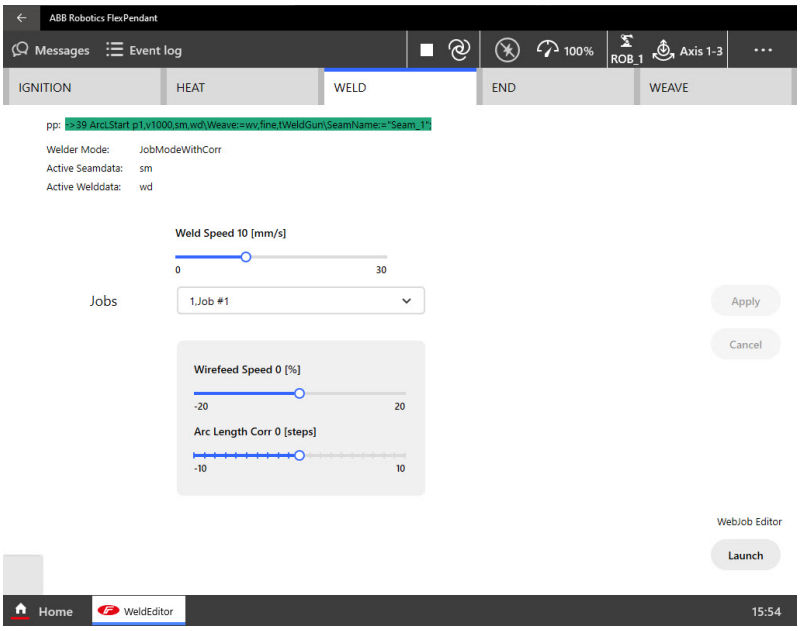
Continued

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 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 +/- 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.

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



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Continues on next page

Parameter	Description
Weld speed	The speed of the TCP of the welding torch during the weld instruction.
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

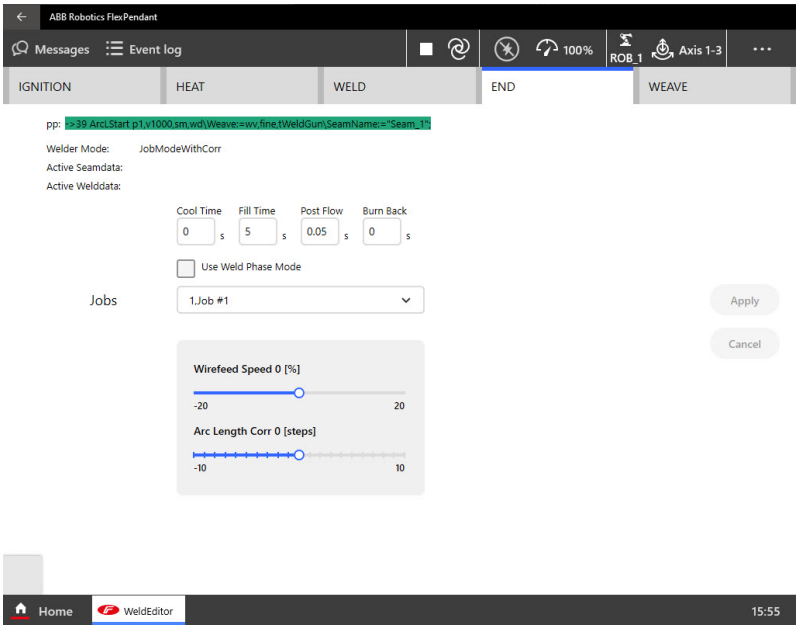
Tap the **End** tab to view or modify the end phase parameters.

Note

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.



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Parameter	Description
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.

Continues on next page

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 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*.

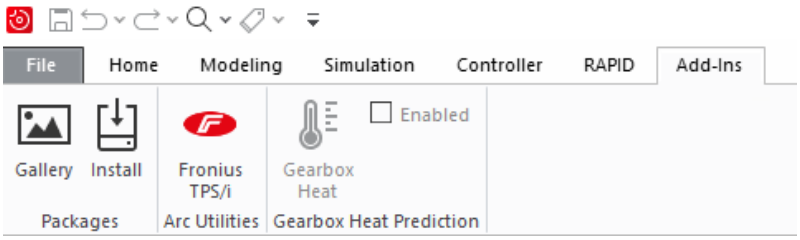
Installing the Fronius TPS/i Add-In

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.

5.2 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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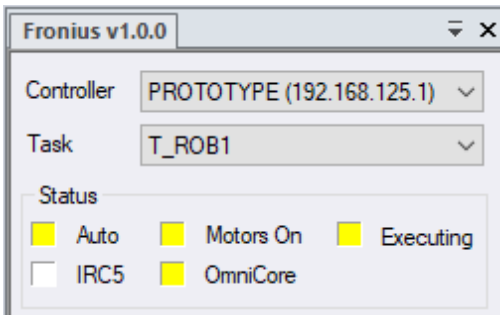
Note

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.



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Welder section

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

Note

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.

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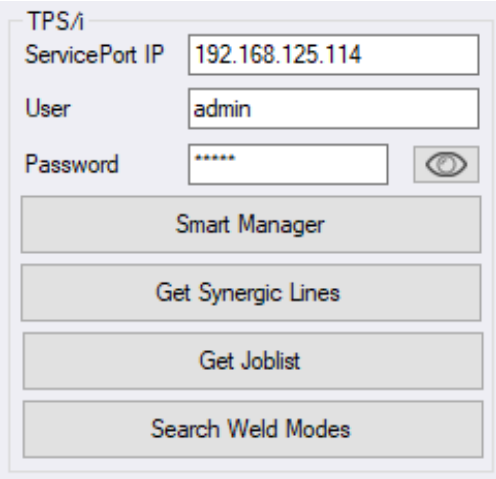
The default password is *admin*. You need the correct password in case the default password has changed.



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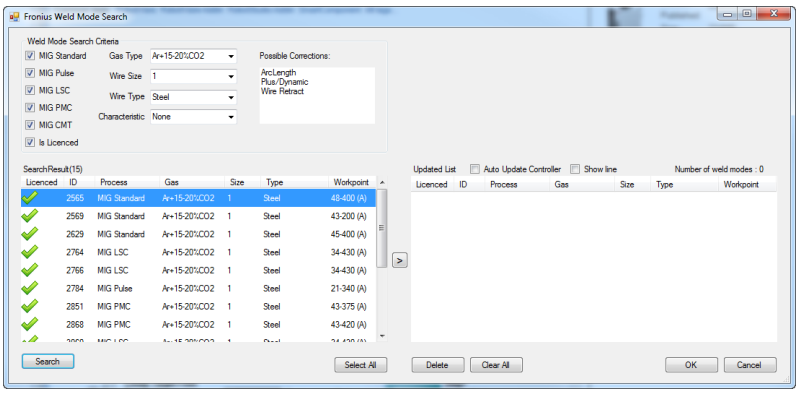
Button	Description
Smart Manager	This will launch a web browser to access the welder webpage.
Get Synergic Lines	This will create a local copy of the synergic line information as XML.
Get JobList	This will create a local copy of the Joblist. This can be displayed on the FlexPendant if the welder is used 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.



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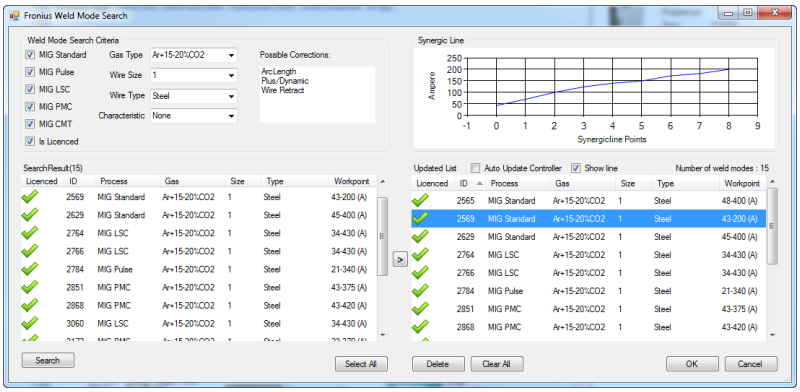
The selection on the left side represents all available weld modes in the welder. You can simply apply the filters and then copy the selection (you can apply multiselect) to the left right side. This represents the modes currently available in the welder. If there are already some modes installed, they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



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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**).
OK	Apply the settings.
Cancel	Cancel the settings.

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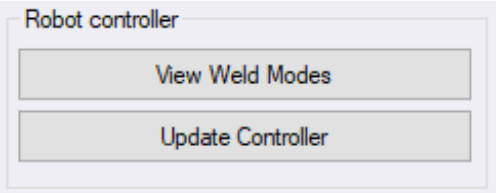
Controller

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



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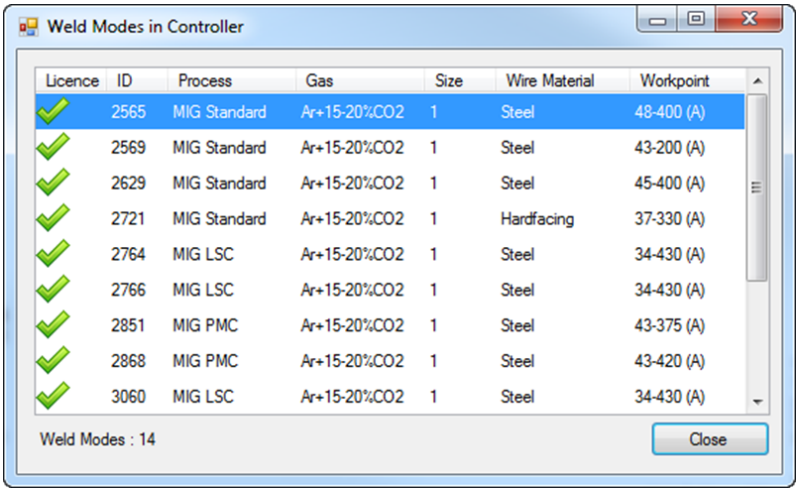

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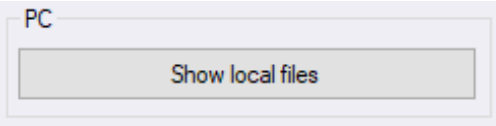
The **Update Controller** button will transfer the locally stored files to the controller. The progress of the transfer will be shown in the RobotStudio output window.

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.



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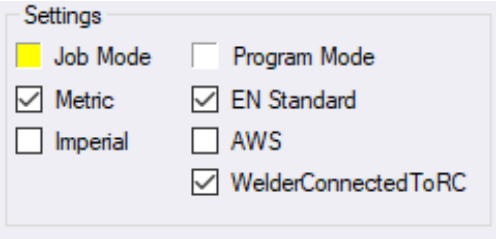
Settings

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**).



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Note

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\XXXXXXXX\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\XXXXXXXX\Documents\RobotStudio\FroniusTPSiUtility\Systemname\SynergicLines\T_ROB1

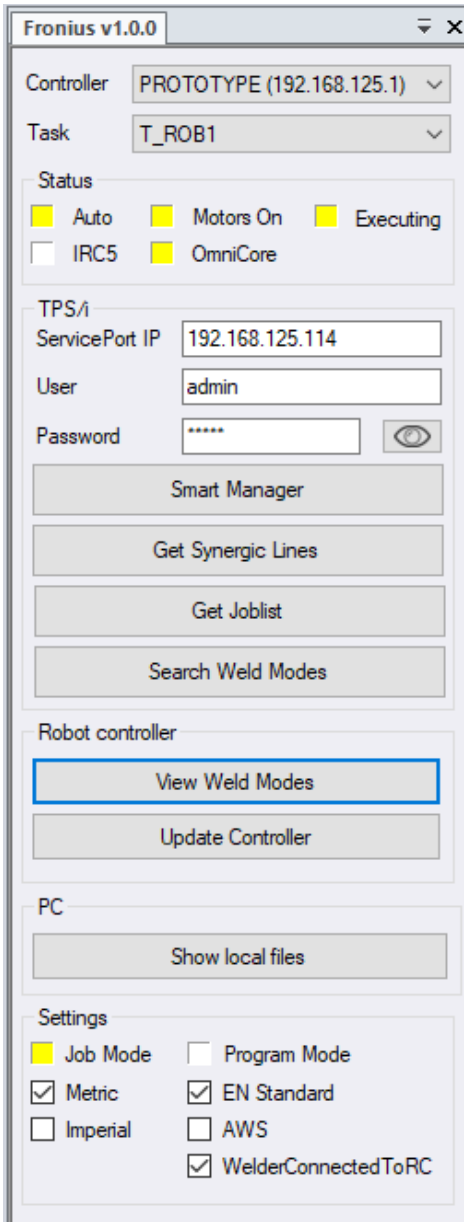
If the files are copied, you can start selecting the weld modes and download them to the controller.

5.3 Adding or removing synergic lines from RobotStudio

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:



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.

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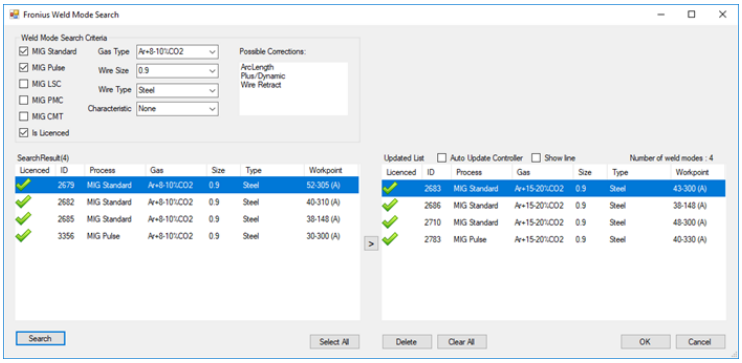
3 In the **Fronius Add-in** window, click **Search weld modes**. The **Fronius Weld Mode Search** window is displayed:



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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.

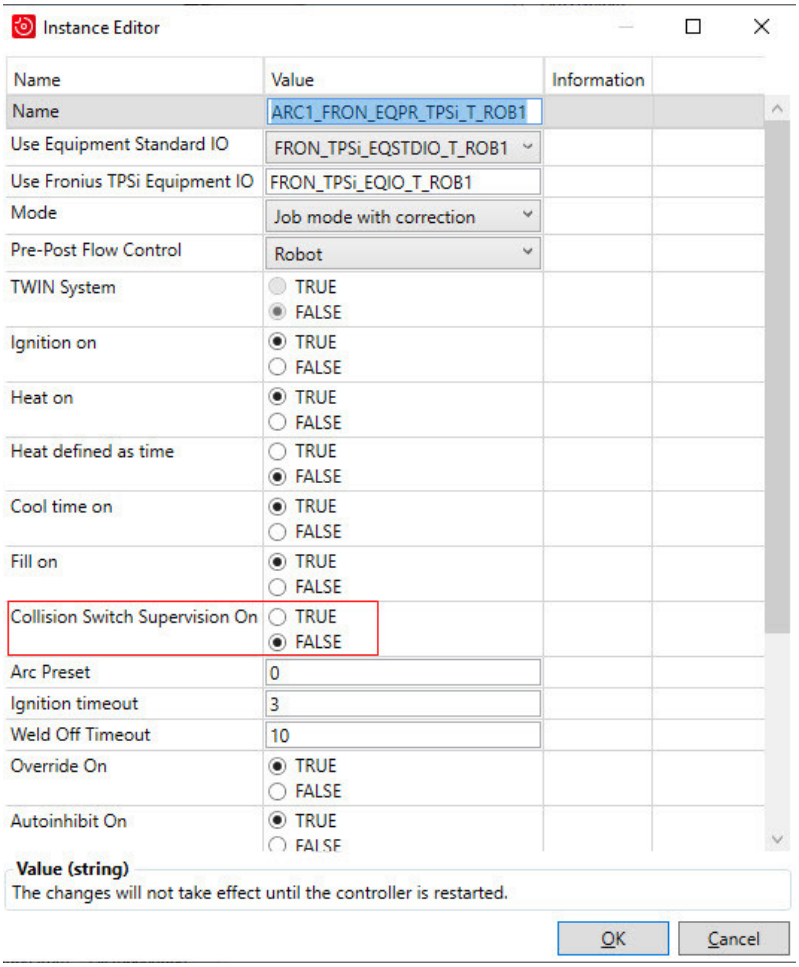
It is possible to turn on motors in manual mode and jog the robot to release the collision switch.

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.

Note

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*



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Collision switch error codes

Error code	Description	Type
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

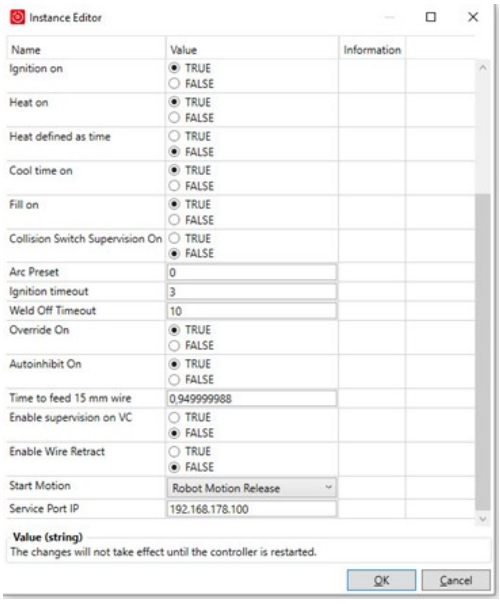
The Fronius option *OPT/I Documentation* (4,067,003) is needed to use the instruction for Data Channel.

Note

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*.



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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,sm11,wd_1 \Weave:=wv111,fine,tWeldGun
       \SeamName:="Seam_1";
  ArcL Location11,v100,sm11,wd_2 \Weave:=wv111,z5,tWeldGun;
  ArcL Location12,v100,sm11,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, sm11, wd_3, fine, tWeldGun;
  MoveL Location10, v500,fine,tWeldGun;
ENDPROC
```

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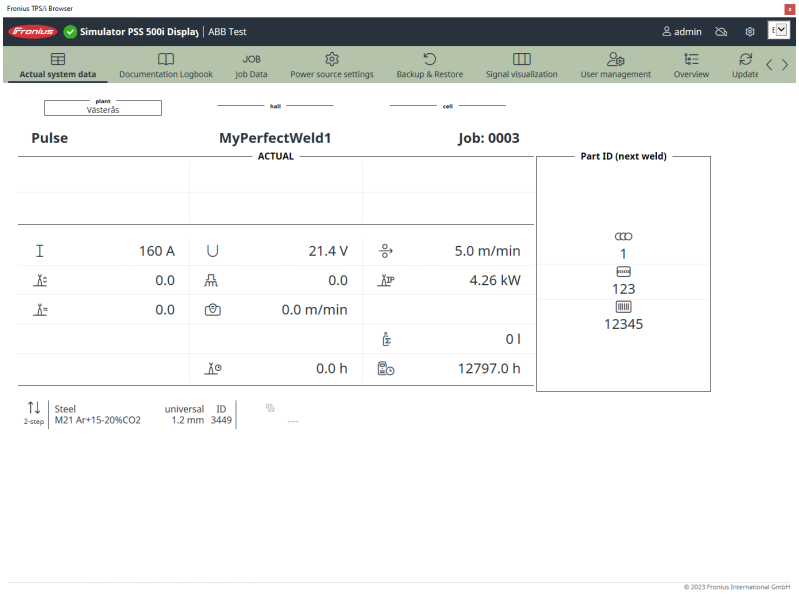
Fronius Smart Manager example



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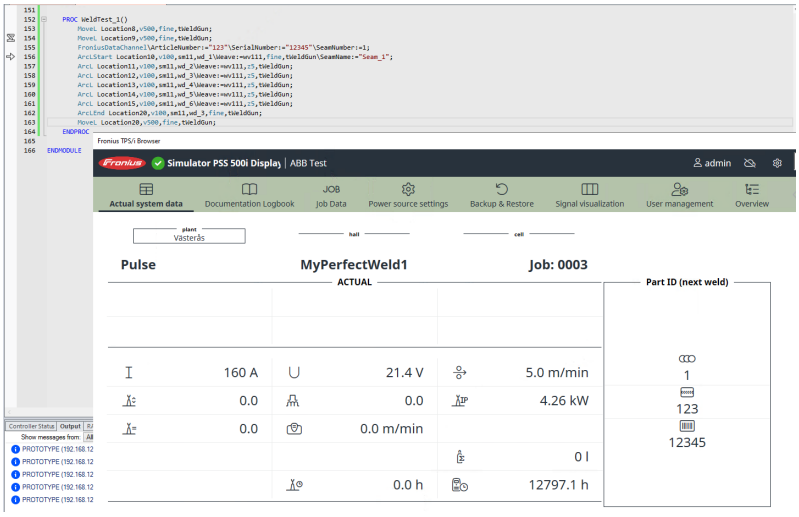

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