ROBOTICS

Application manual

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

Trace back information:
Workspace Main version a397
Checked in 2021-04-01
Skribenta version 5.4.005

Application manual

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

21A

Document ID: 3HAC065012-001

Revision: C

The information in this manual is subject to change without notice and should not be construed as a commitment by ABB. ABB assumes no responsibility for any errors that may appear in this manual.

Except as may be expressly stated anywhere in this manual, nothing herein shall be construed as any kind of guarantee or warranty by ABB for losses, damage to persons or property, fitness for a specific purpose or the like.

In no event shall ABB be liable for incidental or consequential damages arising from use of this manual and products described herein.

This manual and parts thereof must not be reproduced or copied without ABB's written permission.

Keep for future reference.

Additional copies of this manual may be obtained from ABB.

Original instructions.

Table of contents

This page is intentionally left blank

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
A	First revision.
B	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*.
C	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:

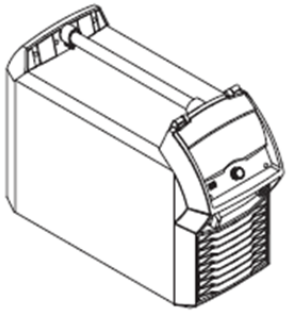
- Fronius TPS 320i/400i/500i/600i with RI-FB Inside/i interface

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.



xx1900002381

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.

Continues on next page

Continued

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:

- 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

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.

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

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

Continues on next page

- 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.

Note

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).

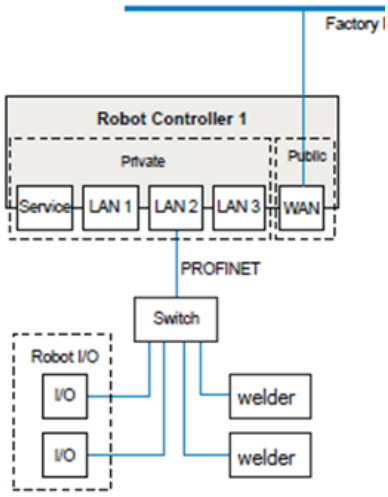
It is recommended that switches used in the I/O network support Quality of Service (QoS). I/O devices mark their packets with a priority value. The priority value is used in order to get better I/O data throughput and shorter delays on the network. Switches and routers are then able to differentiate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

Continues on next page

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.

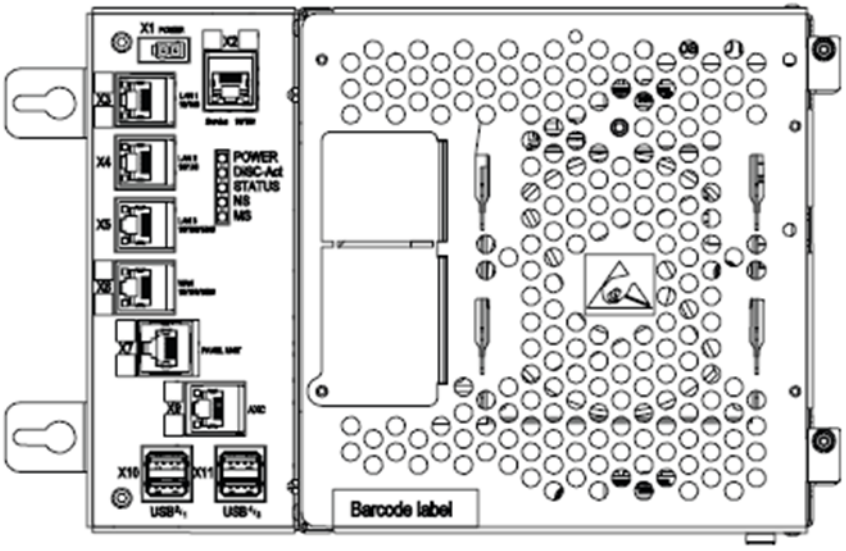
The LAN ports are intended for connecting network based process equipment to the controller, for example industrial networks, cameras, and welding equipment. LAN 2 can only be used as a private network to the IRC5 controller.



xx1900002386

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.



xx1900002385

X4	LAN2

Continues on next page

Welder LAN port

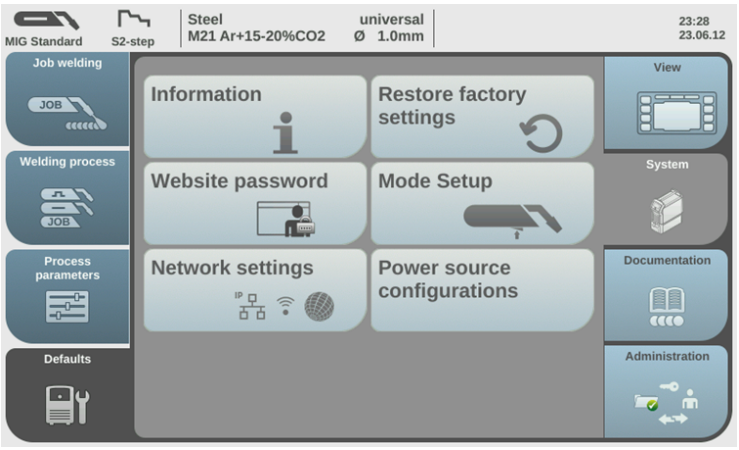
The LAN port (Service port) is located on the back of the welder. If you connect the welder to the IRC5 controller, make sure to use a static IP address and turn off DHCP.

xx1900002382

IP address on welder

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

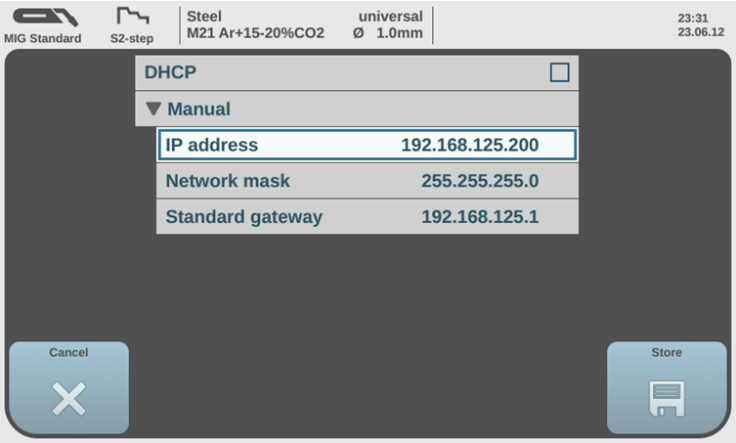
1 Go to **Defaults**, **System** and select **Network settings**.



xx1900002383

Continues on next page

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.



xx1900002384

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.

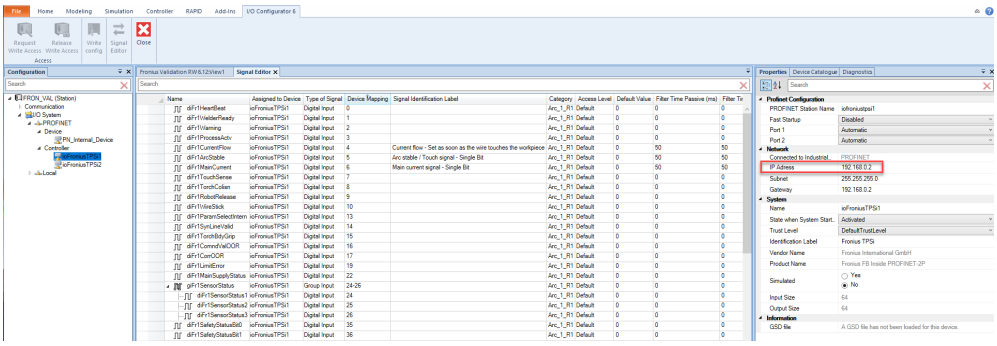
The IPPNIO.xml file is created during the installation the Robot system, and is copied to the HOME folder of the system.

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

The default IP addresses for the welders are:

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



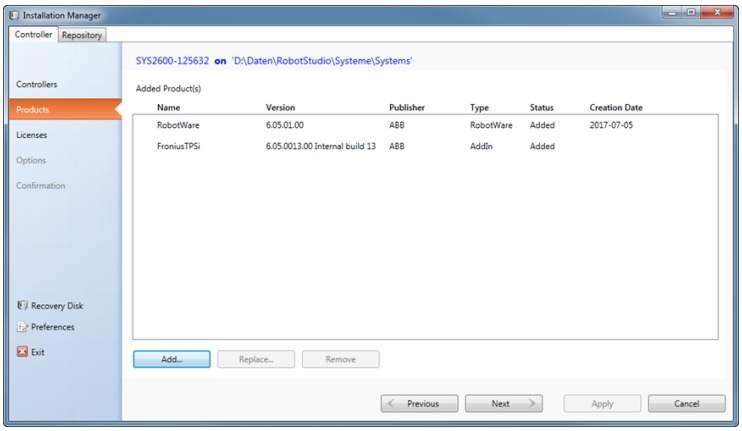
xx2100000509

2.3.2 Fronius TPS/i package

Downloading of Fronius TPS/i package

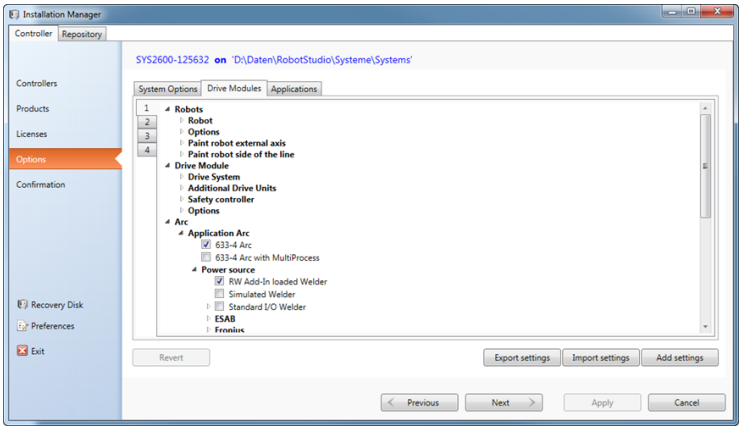
1 Download and install the Fronius TPS/i package from the **Add-Ins** tab in Robotstudio. (Common tags: RobotWare-Addin). Start the Installation Manager and build your robot system.

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



xx1900002395

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.

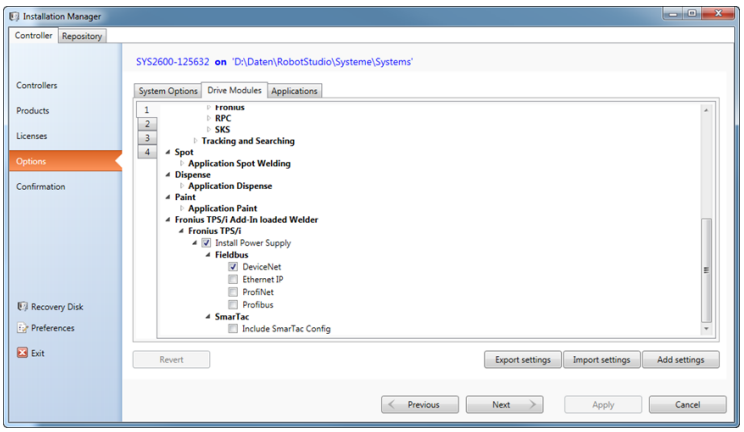


xx1900002396

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**

Continues on next page

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



xx1900002397

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

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

Note

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 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*

Continues on next page

Parameter	Data Type	Description
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*
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*
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

Continues on next page

2.3.3 System parameters
Continued

Parameter	Data Type	Description
Override On	bool	Specifies the visibility of the org value components in welddata. Default value: *TRUE*
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*
Allow tuning in Auto	bool	If this flag is set tuning of welddata is allowed in auto mode. Default value: *FALSE*
Block tuning in Manual	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: *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*
Widget Screen	num	Specifies the startscreen (Widget) for ProductionScreen. (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 protective gas. A high signal means that the protective gas is OK.
Supervision Welder DO	signaldo	Digital output signal that indicates welder supervision.

Continues on next page

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 occurred.
Supervision Water DO	signaldo	Digital output signal for indication of cooling water errors. A high signal means that an error has occurred.
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 occurred.
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.

2.3.4 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)

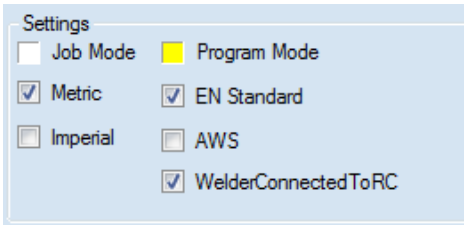
The default setting is *Metric*.

How to change the unit settings

Metric units are the default setting.

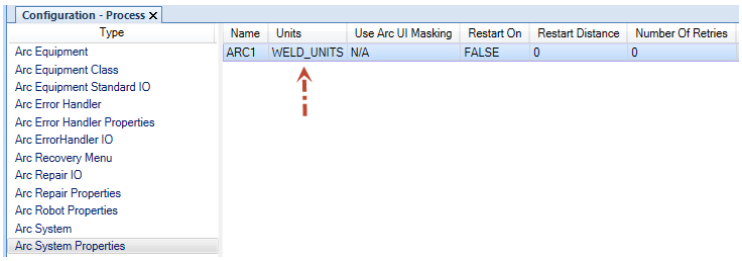
Unit settings are displayed at three different places:

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



xx1900002387

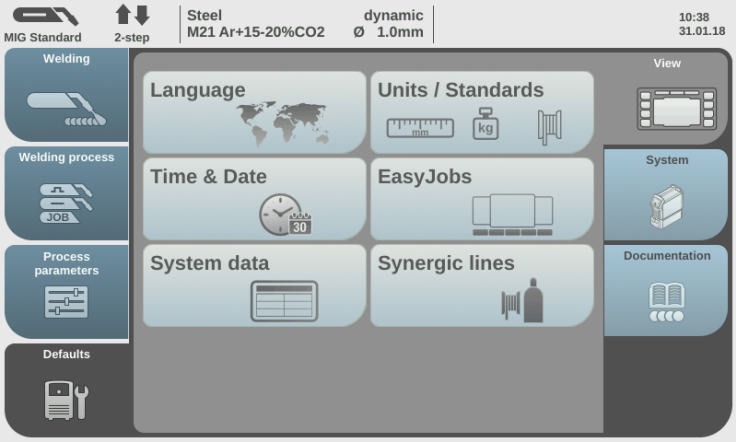
- In the Process Configuration



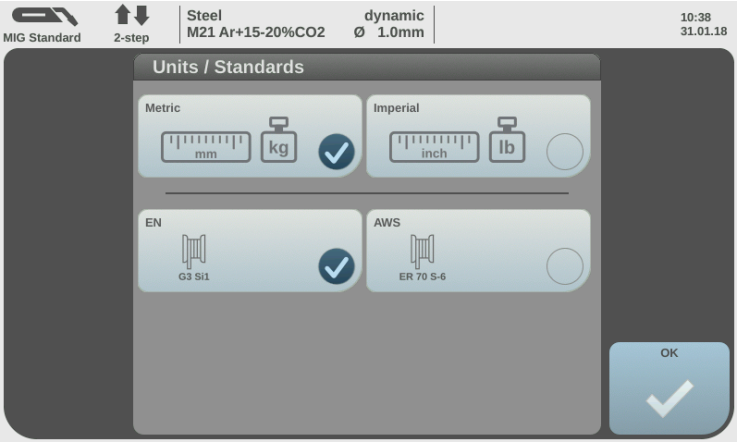
xx1900002388

Continues on next page

- On the TPS/i welder front panel



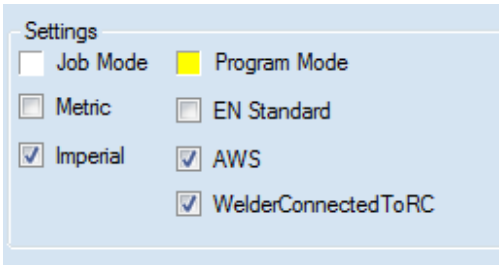
xx1900002389



xx1900002390

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

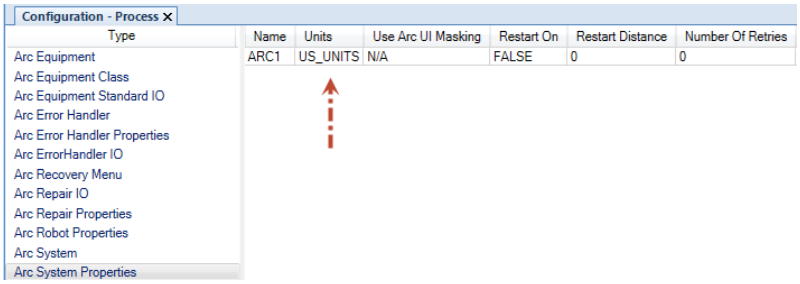
Example: Change from *Metric* to *Imperial* units.



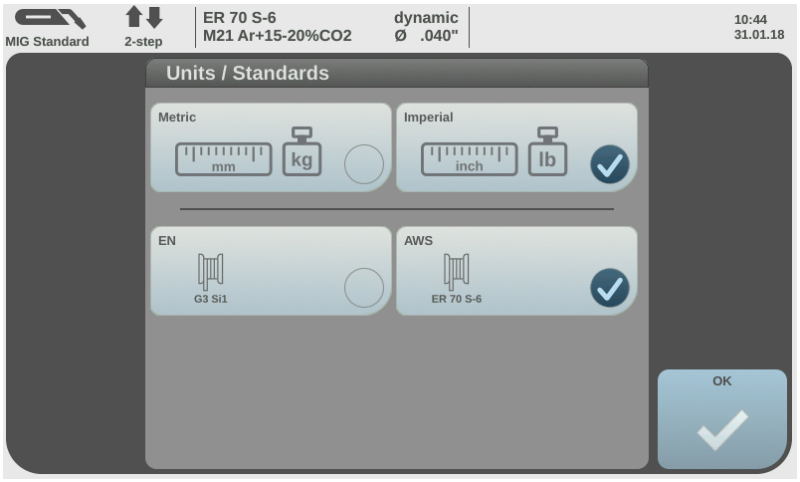
xx1900002391

Continues on next page

2.3.4 Units
Continued



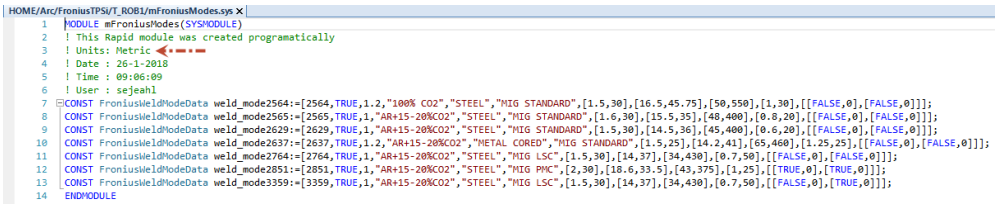
xx1900002392



xx1900002393

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.



xx1900002394

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.

This page is intentionally left blank

3 Fronius interface modes

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.

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.

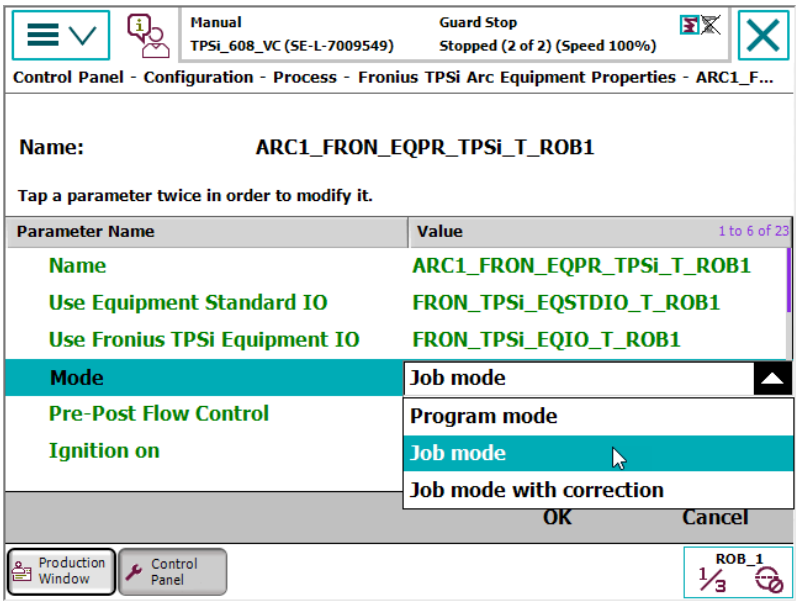
Setting the interface mode

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

Continues on next page

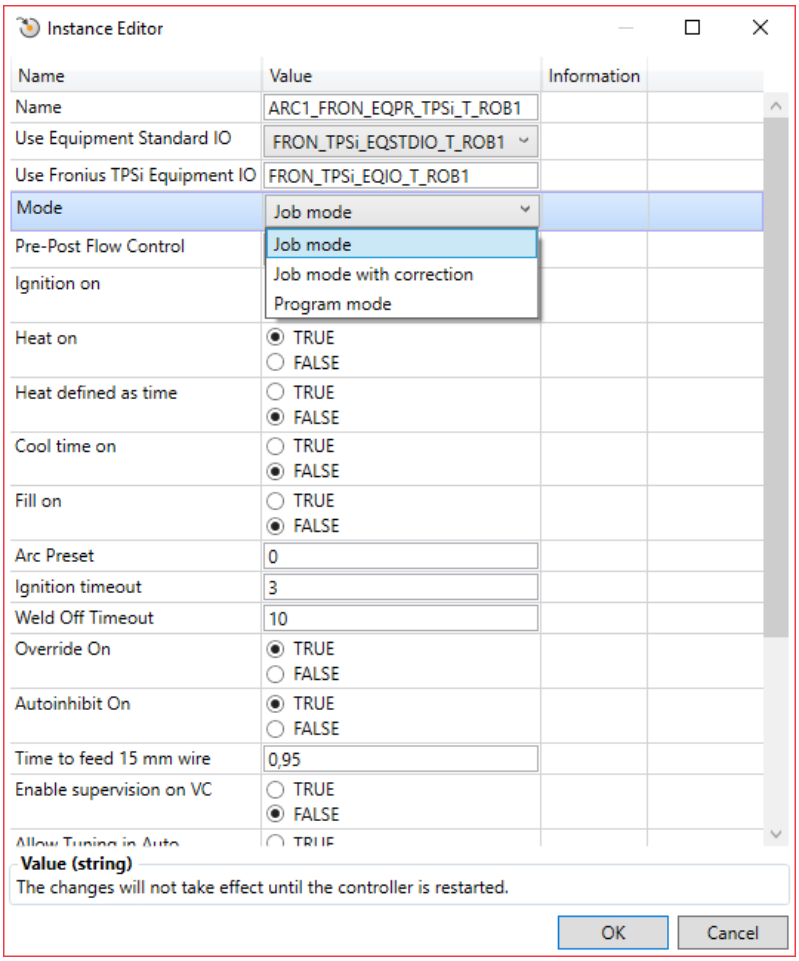
The configuration editor on the FlexPendant



xx1900002399

Continues on next page

The configuration editor in RobotStudio



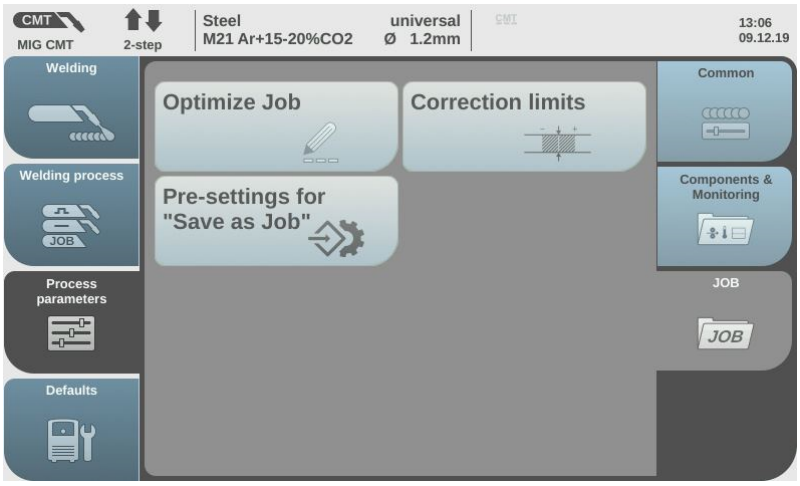
xx1900002398

3.2 Setting up limits in job mode with correction

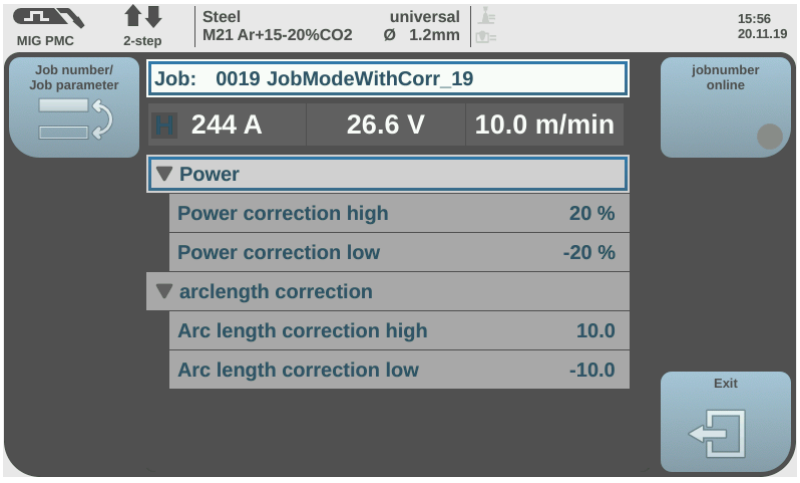
Overview

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



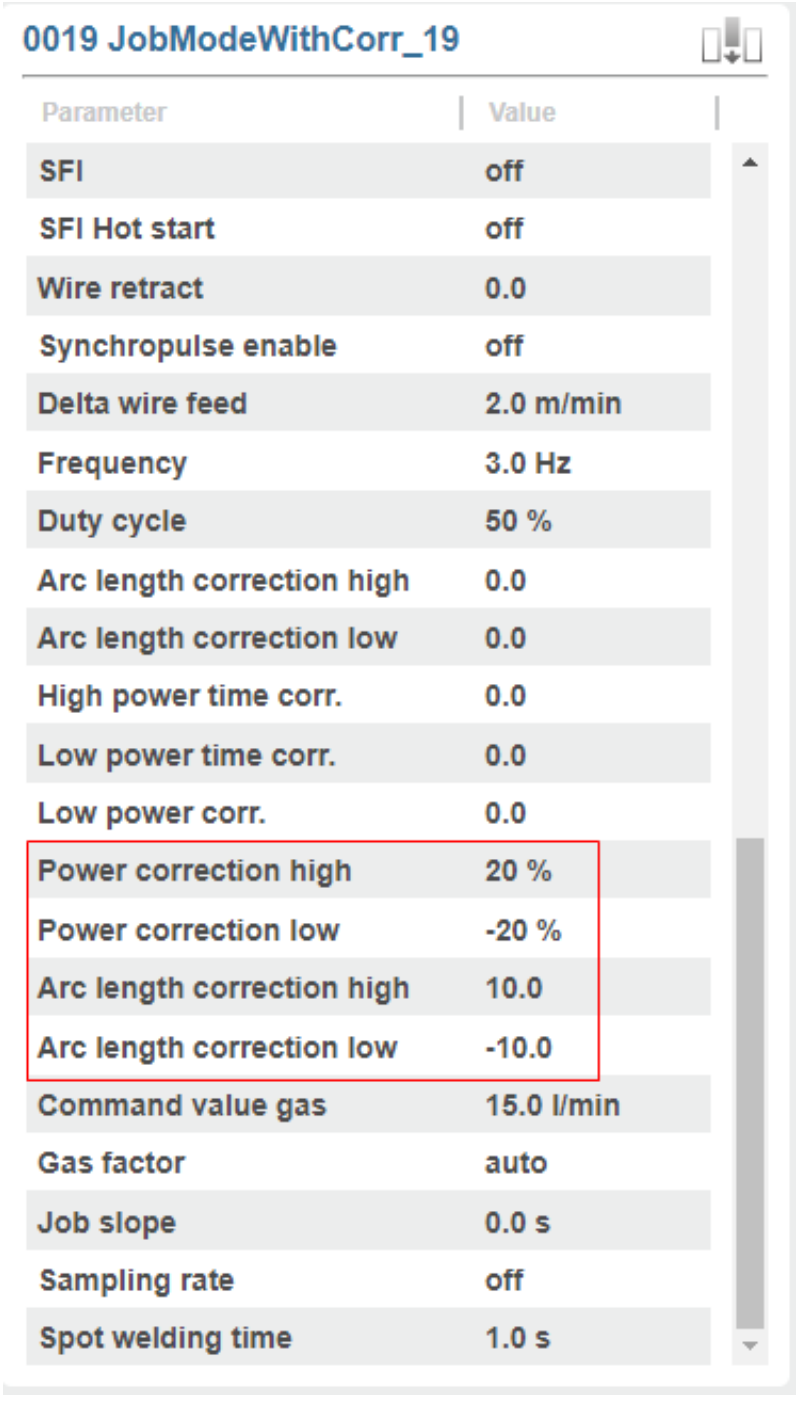
xx1900002402



xx1900002403

Continues on next page

Job mode with correction limits via the web interface



xx1900002400

This page is intentionally left blank

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.

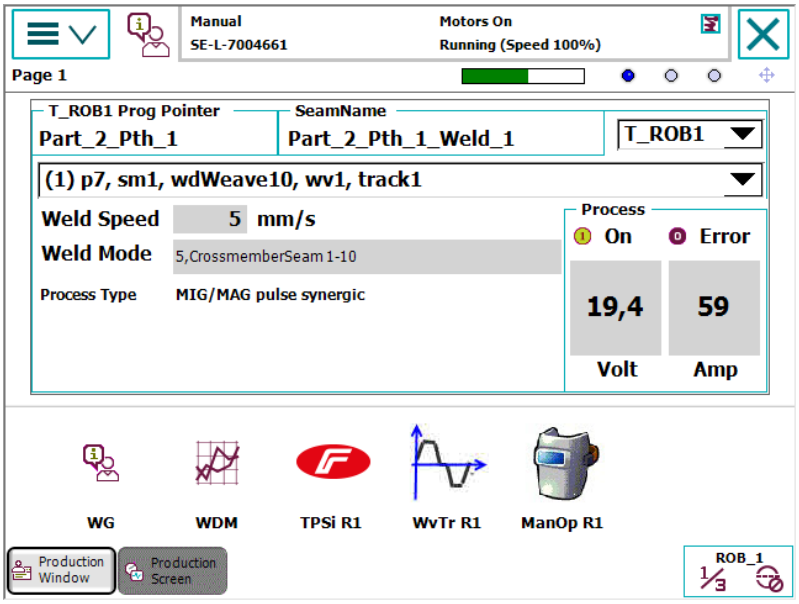
Continues on next page

4.1 Introduction

Continued

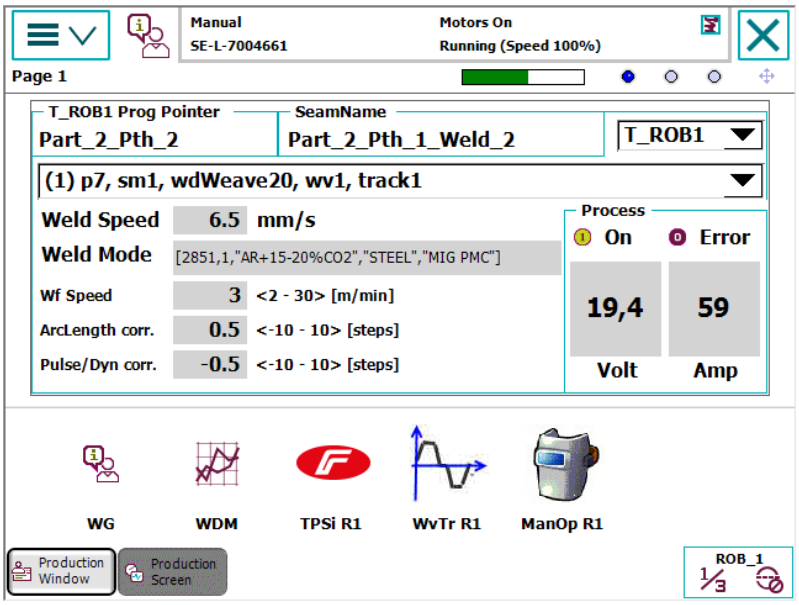
To switch between robots in a MultiMove setup, use the robot task selector in the upper right corner of the widget.

Job mode



xx1900002423

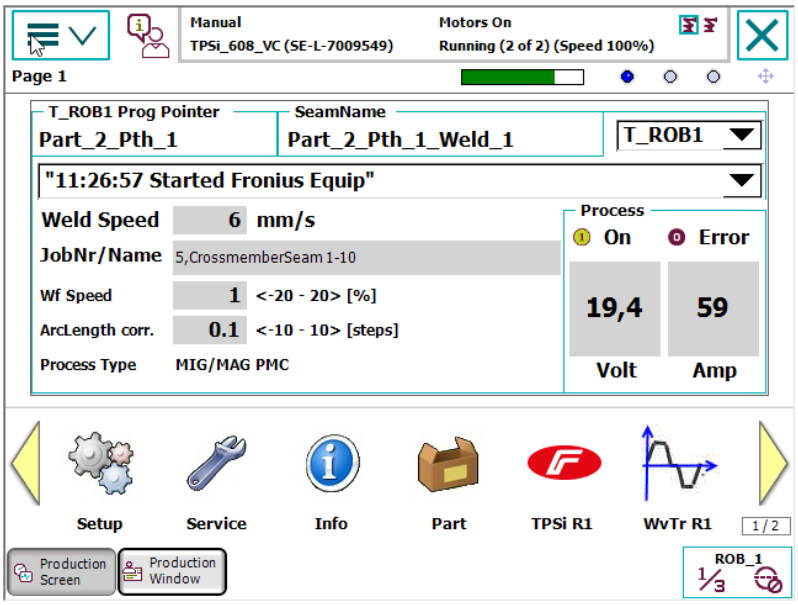
Program mode



xx1900002424

Continues on next page

Job mode with correction

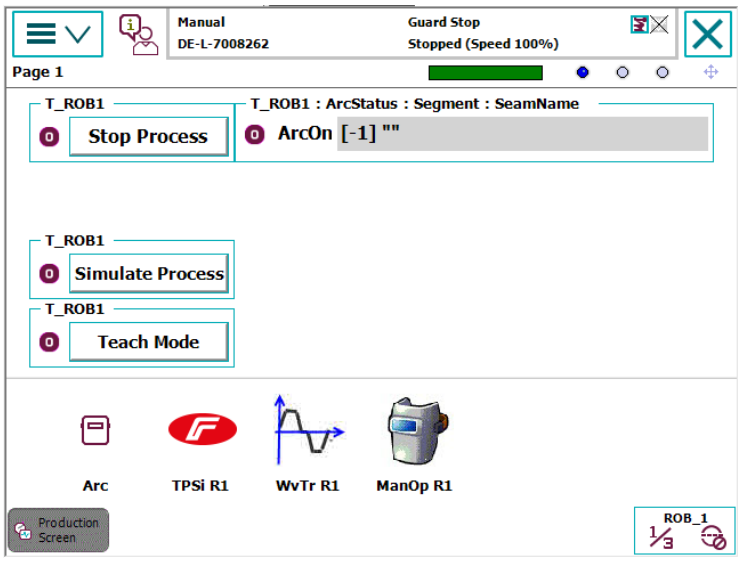


xx1900002422

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.



xx1900002425

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

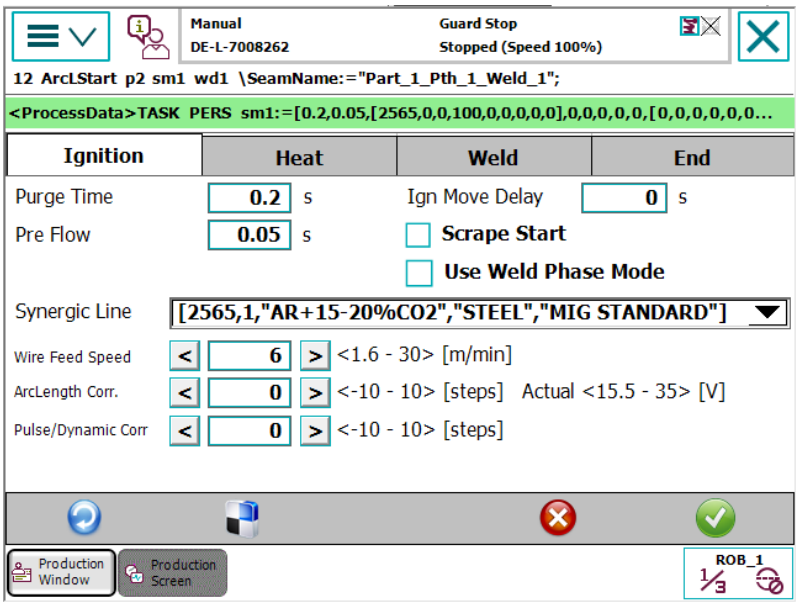
Ignition parameters

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.



xx1900002406

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
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

Parameter	Description
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*.
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.

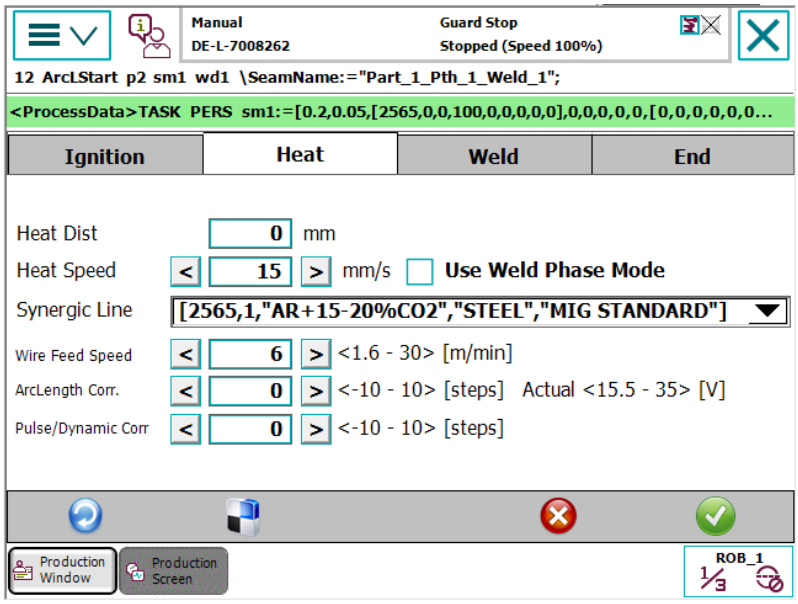
Tip

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

Continues on next page

4.2 Weld editor in Program mode

Continued



xx1900002405

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, 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.

Continues on next page

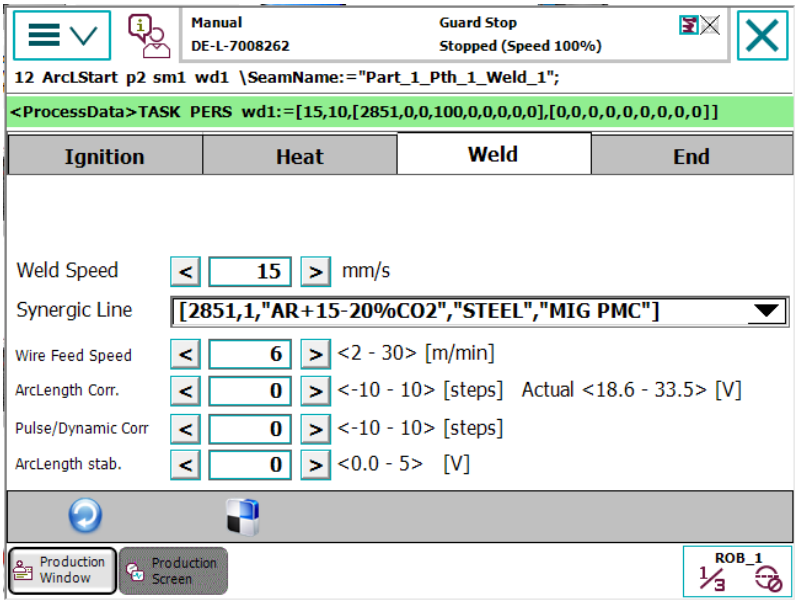
Parameter	Description
Arc Length Correction	This parameter represents the arc length when welding in synergic mode the range is -10 to +10. The values apply to the MIG/MAG standard synergic, MIG/MAG pulse synergic, MIG/MAG PMC and MIG/MAG LSC welding processes. (-10% = shorter arc, 0% = value from line, +10% longer arc) The actual value range in Volts is also shown as, Actual <x.x – y.y> [V]
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.

Note

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



xx1900002407

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 instruction.

Continues on next page

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, 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)

End parameters

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

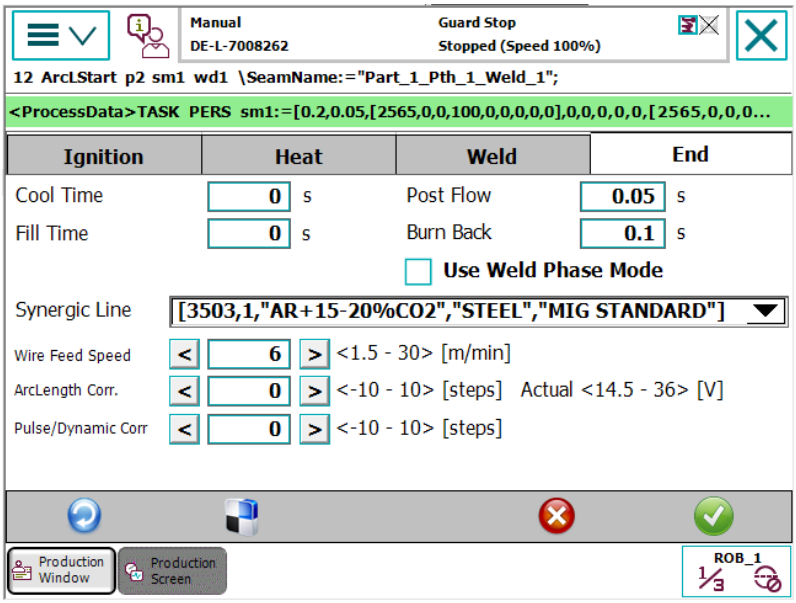
Note

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.

Continues on next page



xx1900002404

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, 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.
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.

Continues on next page

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]
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)

4.3 Weld editor in Job mode

Ignition parameters

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

Note

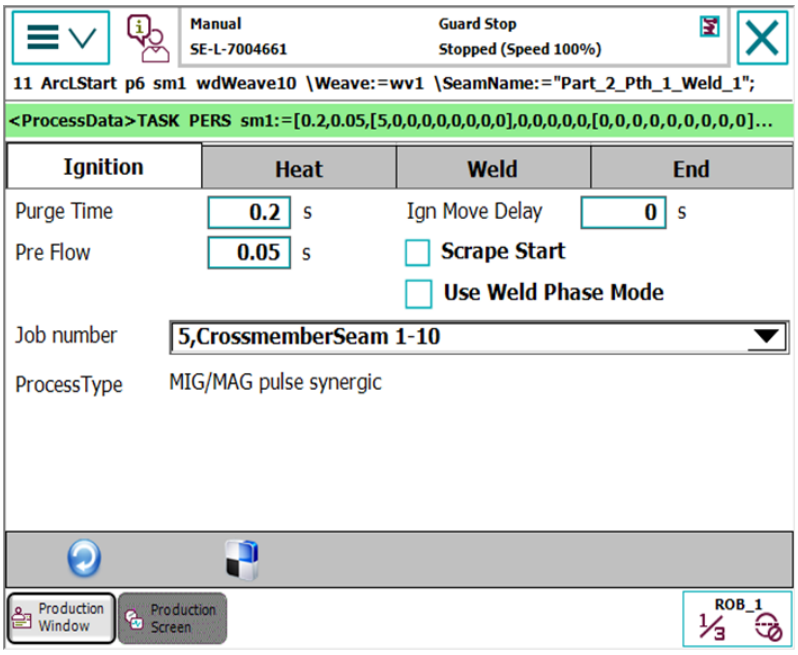
Do not manipulate seam/welddata using the RAPID data type editor. This can result in unwanted behavior and wrong welding parameters which can in worst case damage your welding equipment. Use the Weld mode editor instead.

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.



xx1900002410

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.

Continues on next page

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*.
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.

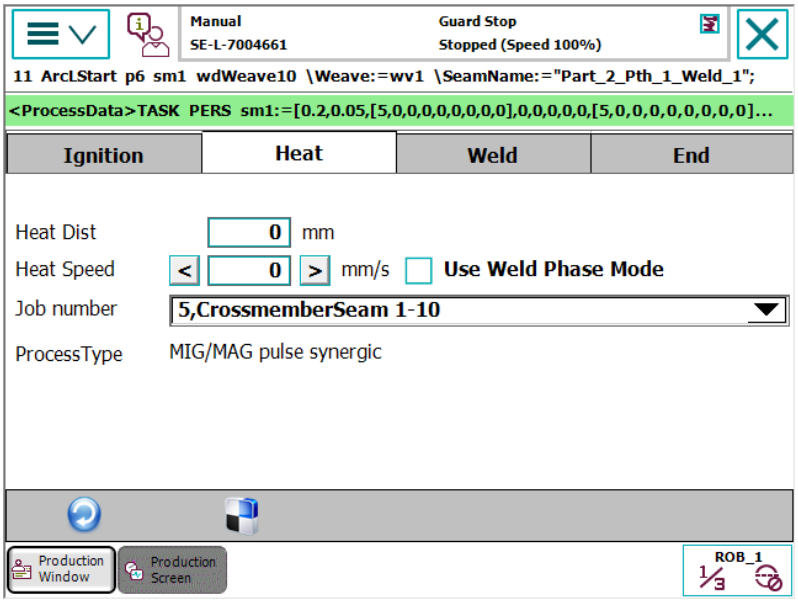
Note

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.

Continues on next page



xx1900002409

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.

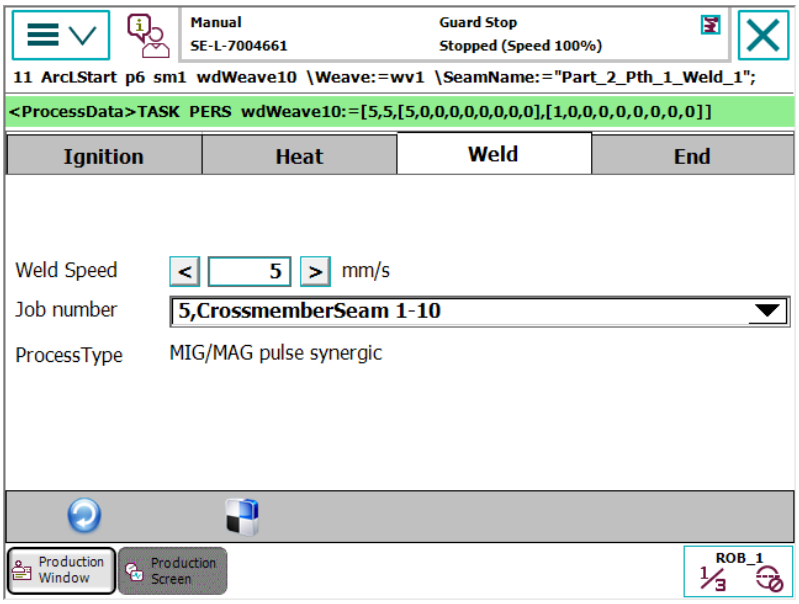
Parameter	Description
Heat Dist / Heat as time	The distance during which the heat data is active at the start of the weld. If the parameter **Heat as time** is active, the distance will be replaced by time (in seconds).
Heat Speed	The welding speed during the heat phase at the start of the weld phase.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

Continues on next page

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.



xx1900002411

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 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

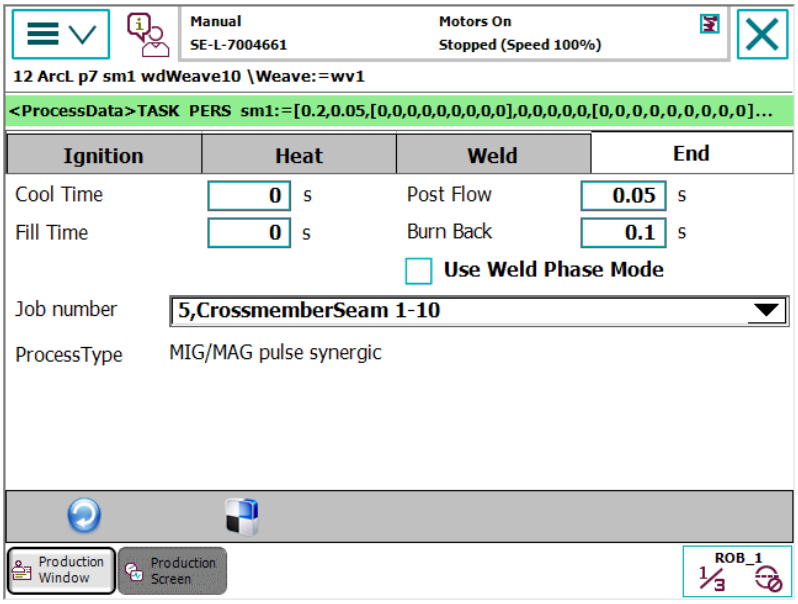
Continues on next page

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.



xx1900002408

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, 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.

Continues on next page

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

Ignition parameters

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

Note

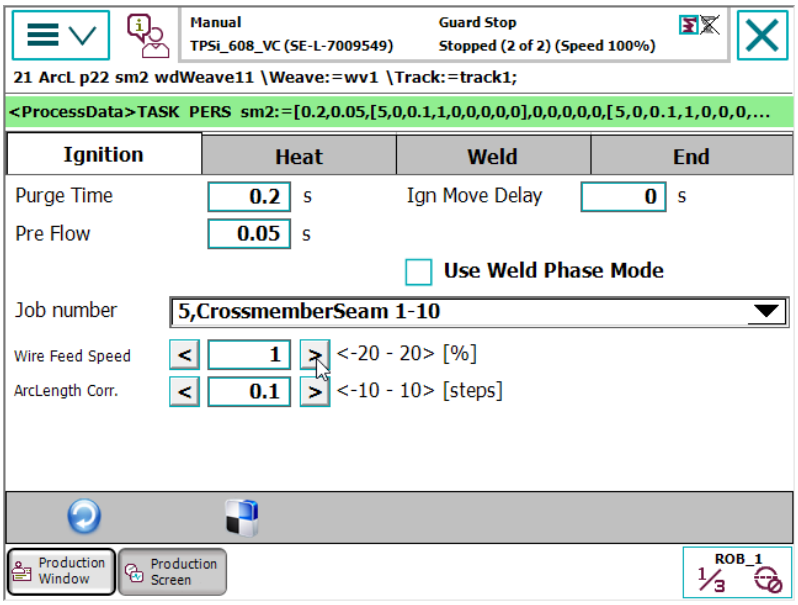
Do not manipulate seam/welddata using the RAPID data type editor. This can result in unwanted behavior and wrong welding parameters which can in worst case damage your welding equipment. Use the Weld mode editor instead.

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.



xx1900002414

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
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

Parameter	Description
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*.
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.

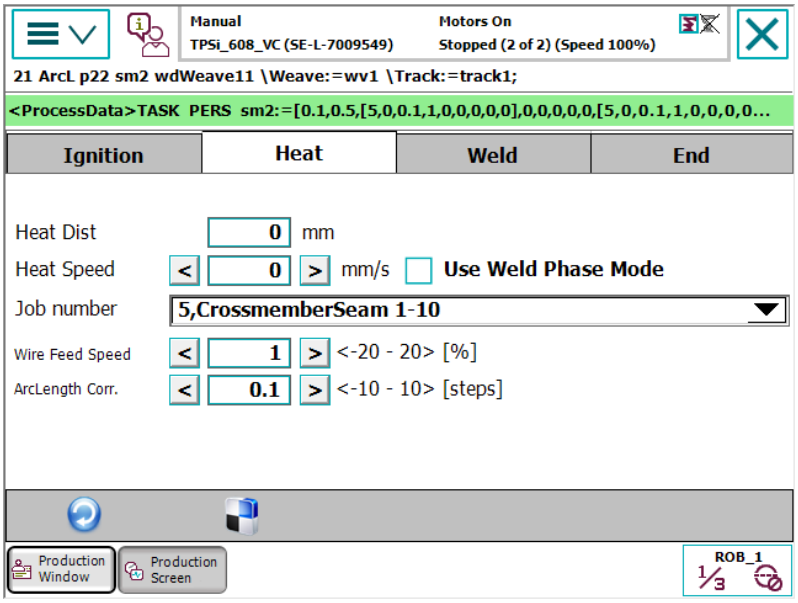
Note

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.

Continues on next page



xx1900002413

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.

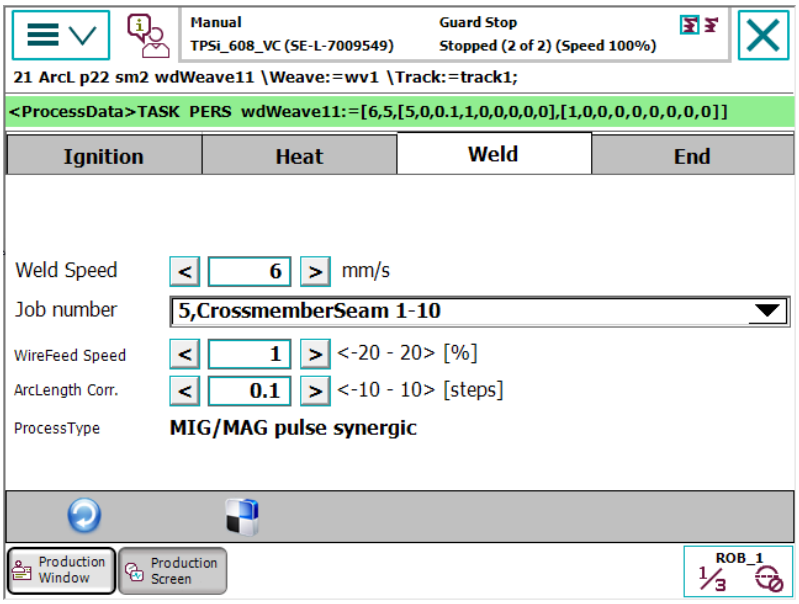
Parameter	Description
Heat Dist / Heat as time	The distance during which the heat data is active at the start of the weld. If the parameter **Heat as time** is active the distance will be replaced by time (in seconds).
Heat Speed	The welding speed during the heat phase at the start of the weld phase.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

Continues on next page

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.



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 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.

Continues on next page

End parameters

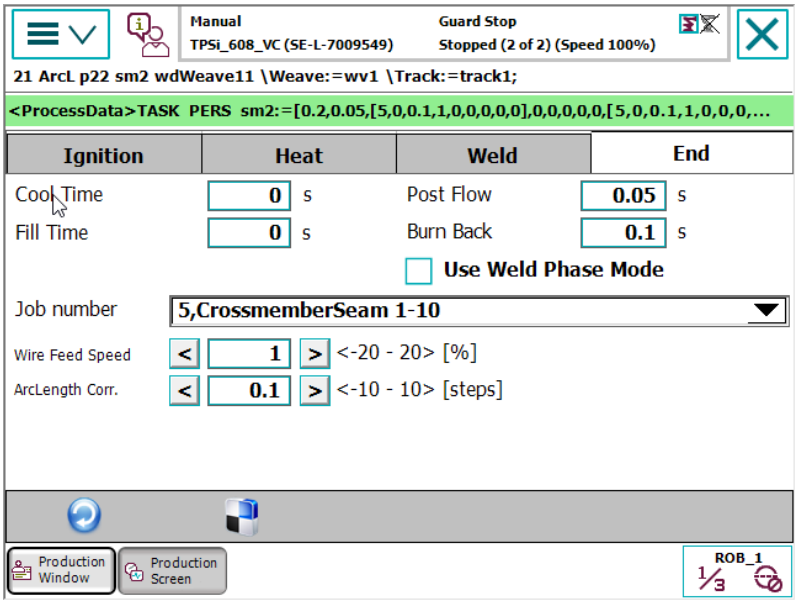
Tap the **End** tab to view or modify the end phase parameters.

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.



xx1900002412

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, 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.

Continues on next page

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

Tuning of weld parameters

Weld parameters marked with the arrows < or > 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

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.

Note

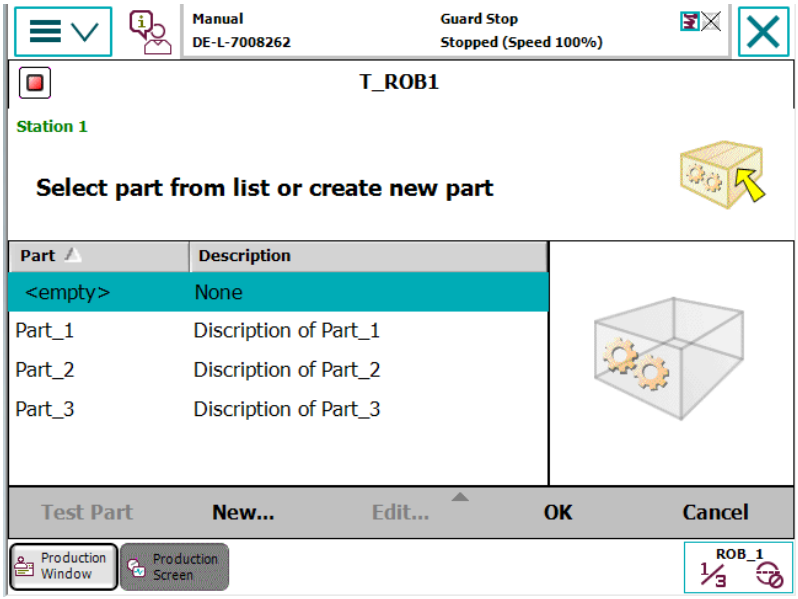
Additional information on how to use Production Manager and its partdata can be found in *Application manual - Production Manager 3HAC052855-001*.

Note

The optional argument `\SeamName` must be used on `ArcLStart` 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.



xx1900002416

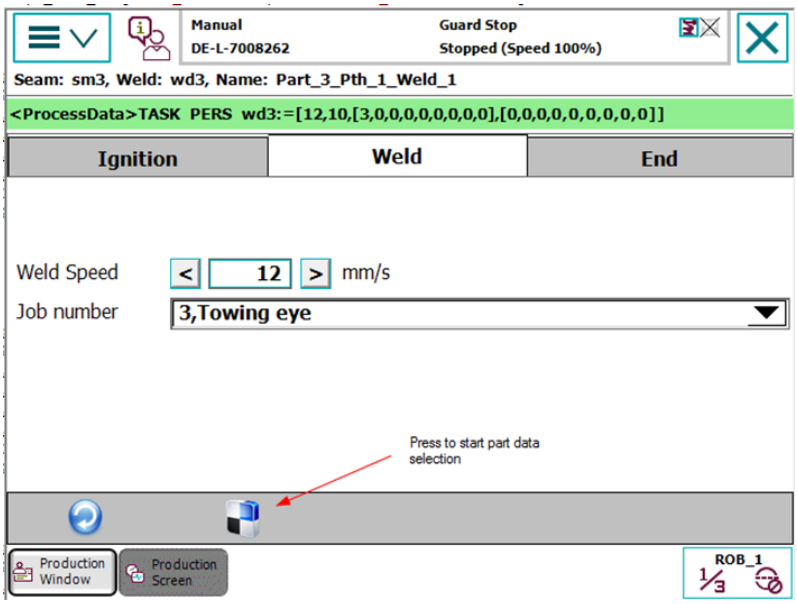
Continues on next page

RAPID example

```
TASK PERS partdata pd_Part_1:=["Part_1","Discription of Part_1","",1,0,"",""];
TASK PERS partdata pd_Part_2:=["Part_2","Discription of Part_2","",1,0,"",""];
TASK PERS partdata pd_Part_3:=["Part_3","Discription of Part_3","",1,0,"",""];


PROC Part_1()
    ActUnit STN1;
    MoveJ p1,v1000,z10,tWeldGun\WObj:=wobjStn1;
    ArcLStart p2,v1000,sm1,wd1,fine,tWeldGun\WObj:=wobjStn1\SeamName:="Part_1_Pth_1_Weld_1";
    ArcL p3,v100,sm1,wd1,z1,tWeldGun\WObj:=wobjStn1;
    ArcL p4,v100,sm1,wd1,z1,tWeldGun\WObj:=wobjStn1;
    ArcL p5,v100,sm1,wd1,z1,tWeldGun\WObj:=wobjStn1;
    ArcLEnd p6,v100,sm1,wd1,fine,tWeldGun\WObj:=wobjStn1;
    MoveL p7,v1000,z10,tWeldGun\WObj:=wobjStn1;
ENDPROC


PROC Part_2()
    ActUnit STN1;
    MoveJ p1,v1000,z10,tWeldGun\WObj:=wobjStn1;
    ArcLStart p2,v1000,sm2,wd2,fine,tWeldGun\WObj:=wobjStn1\SeamName:="Part_2_Pth_1_Weld_1";
    ArcL p3,v100,sm2,wd2,z1,tWeldGun\WObj:=wobjStn1;
    ArcL p4,v100,sm2,wd2,z1,tWeldGun\WObj:=wobjStn1;
    ArcL p5,v100,sm2,wd2,z1,tWeldGun\WObj:=wobjStn1;
    ArcLEnd p6,v100,sm2,wd2,fine,tWeldGun\WObj:=wobjStn1;
    MoveL p7,v1000,z10,tWeldGun\WObj:=wobjStn1;
ENDPROC

PROC Part_3()
    ActUnit STN1;
    MoveJ p1,v1000,z10,tWeldGun\WObj:=wobjStn1;
    ArcLStart p2,v1000,sm3,wd3,fine,tWeldGun\WObj:=wobjStn1\SeamName:="Part_3_Pth_1_Weld_1";
    ArcL p3,v100,sm3,wd3,z1,tWeldGun\WObj:=wobjStn1;
    ArcL p4,v100,sm3,wd3,z1,tWeldGun\WObj:=wobjStn1;
    ArcL p5,v100,sm3,wd3,z1,tWeldGun\WObj:=wobjStn1;
    ArcLEnd p6,v100,sm3,wd3,fine,tWeldGun\WObj:=wobjStn1;
    MoveL p7,v1000,z10,tWeldGun\WObj:=wobjStn1;
ENDPROC
```

xx1900002417

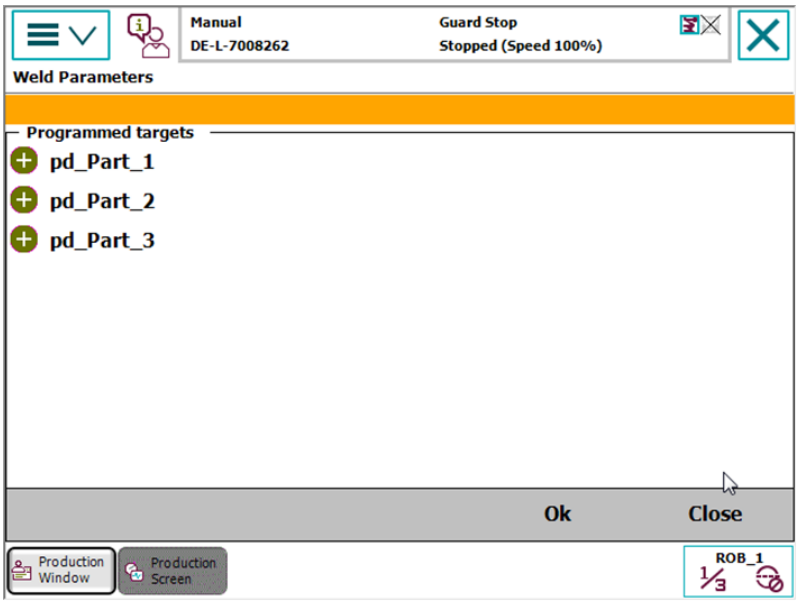
The welddata can now selected from the TPS/i Screenmaker application by selecting the partdata. Start the TPS/i application and press the start button.



xx1900002418

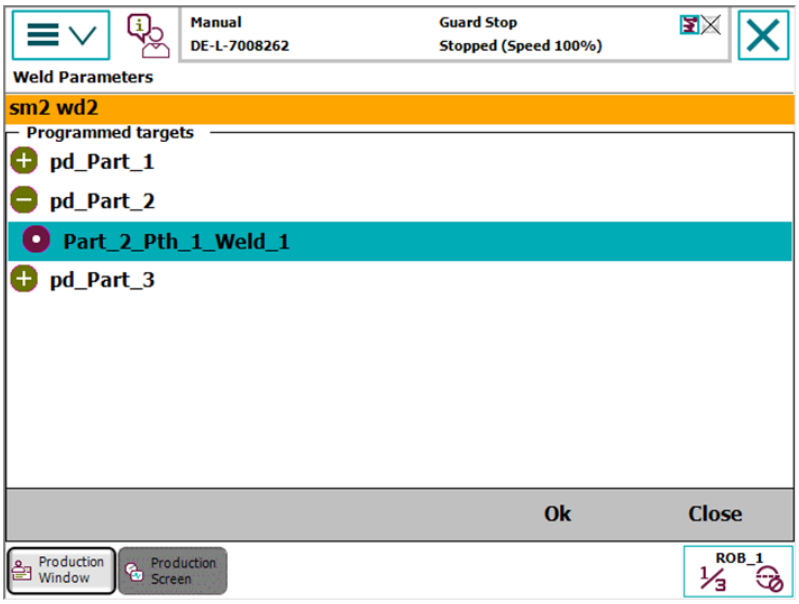
Continues on next page

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



xx1900002419

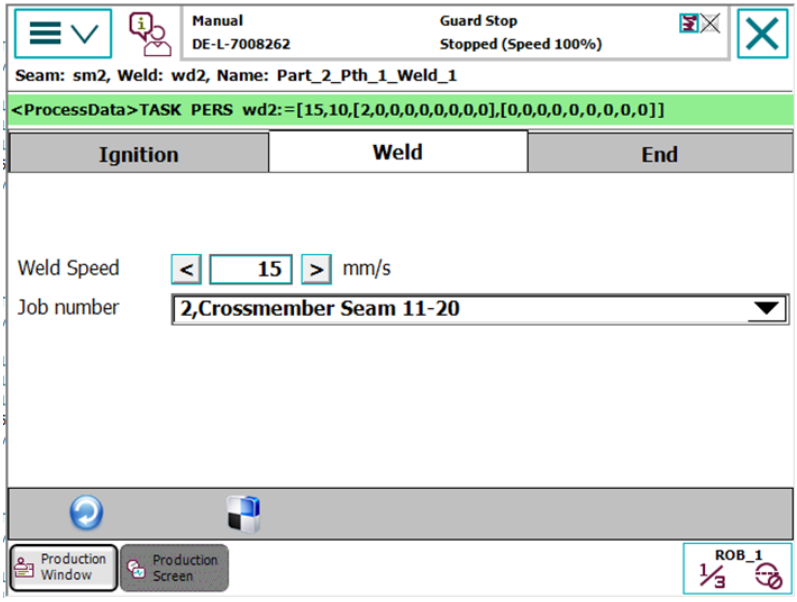
Click on the partdata you want to edit. In this example it's Part_2_Pth_1_Weld_1. The used seamdata/welddata is shown in the header. Here it is sm2/wd2.



xx1900002420

Continues on next page

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.



xx1900002421

Note

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

This page is intentionally left blank

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*.

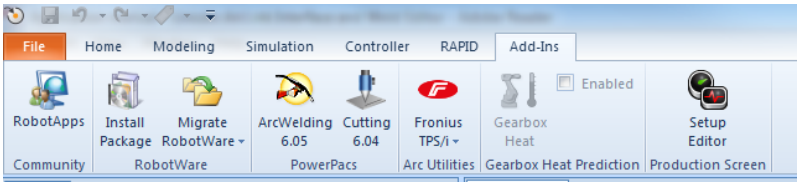
Installing the Fronius TPS/i Add-In

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.

5.2 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**.

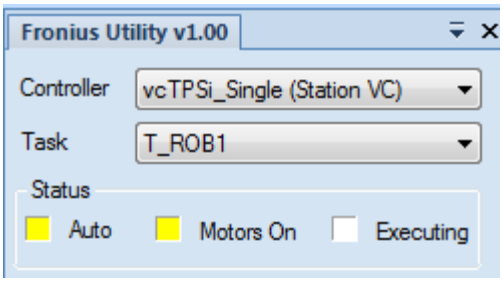


xx1900002428

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.



xx1900002429

Welder section

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

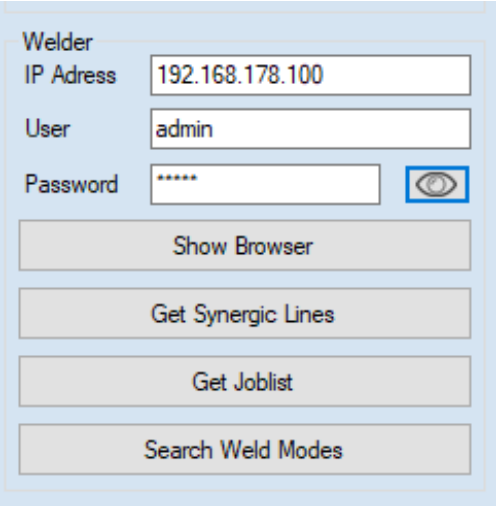
Note

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 20*.

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

Continues on next page

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

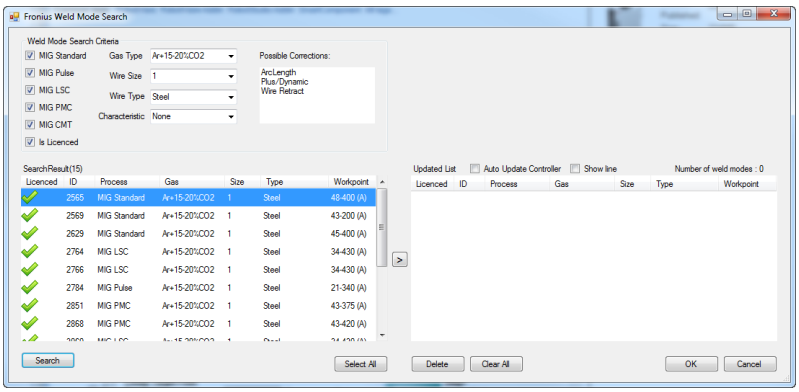


xx1900002434

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.

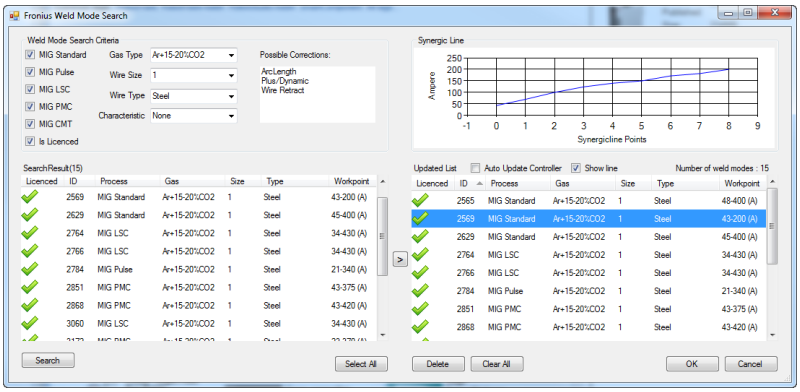


xx1900002431

Continues on next page

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.



xx1900002432

Once the weld modes are selected, click on **OK**.

Note

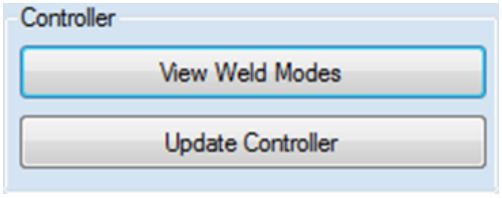
The selection needs to be downloaded to the controller before they are active. This is done by clicking **Update Controller**.

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

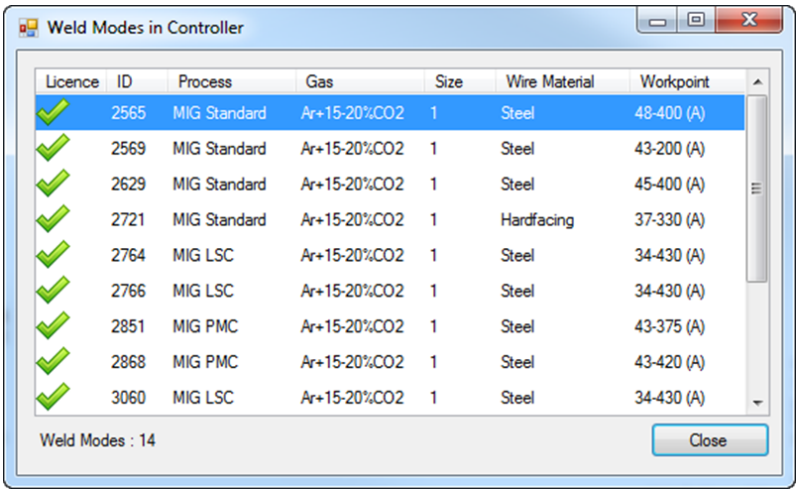
Continues on next page

Controller

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



xx1900002426

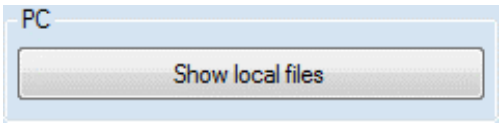


xx1900002427

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.



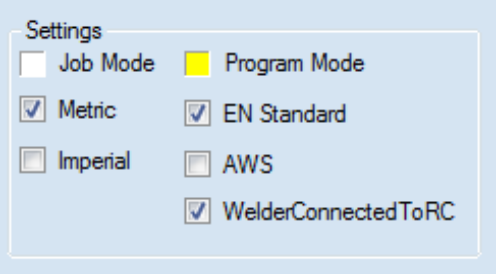
xx1900002430

Continues on next page

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

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

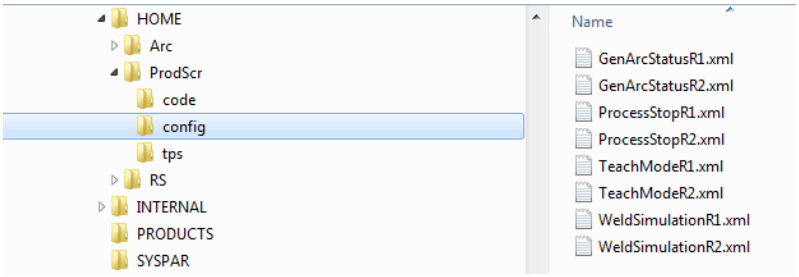
If the files are copied, you can start selecting the weld modes and download them to the controller.

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.



xx1900002438

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

Note

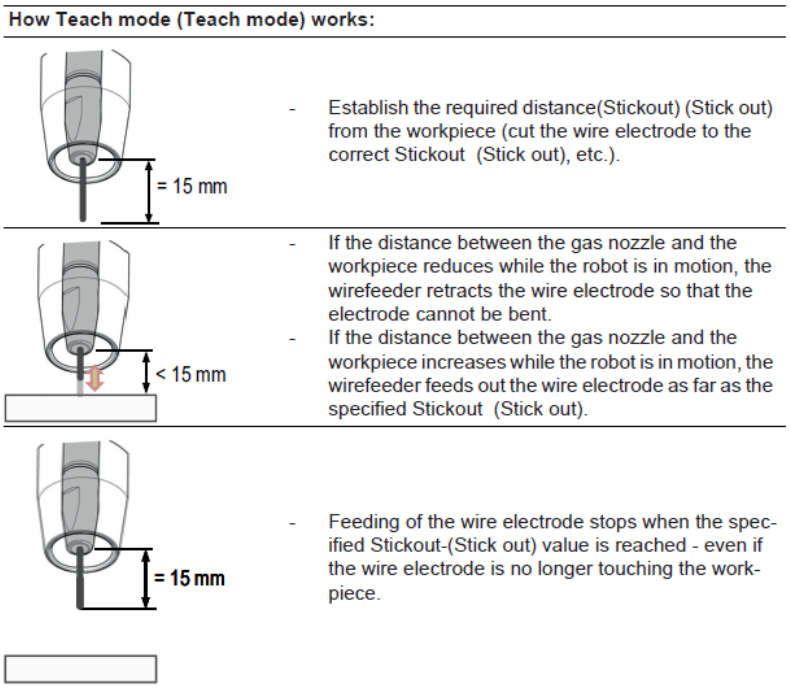
Additional information on how to use and set up Production Screen can be found in *Application manual - Production Screen 3HAC050964-001*.

Continues on next page

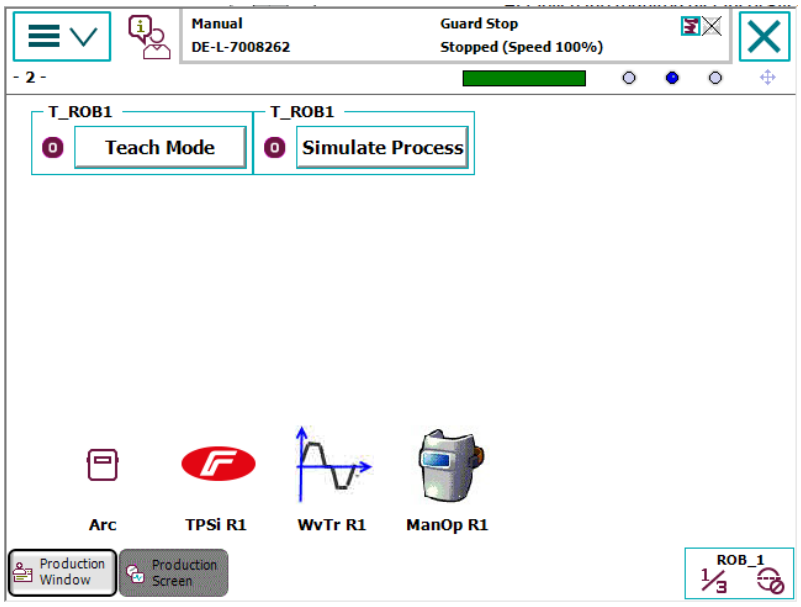
Continued

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.



xx1900002439



xx1900002440

Continues on next page

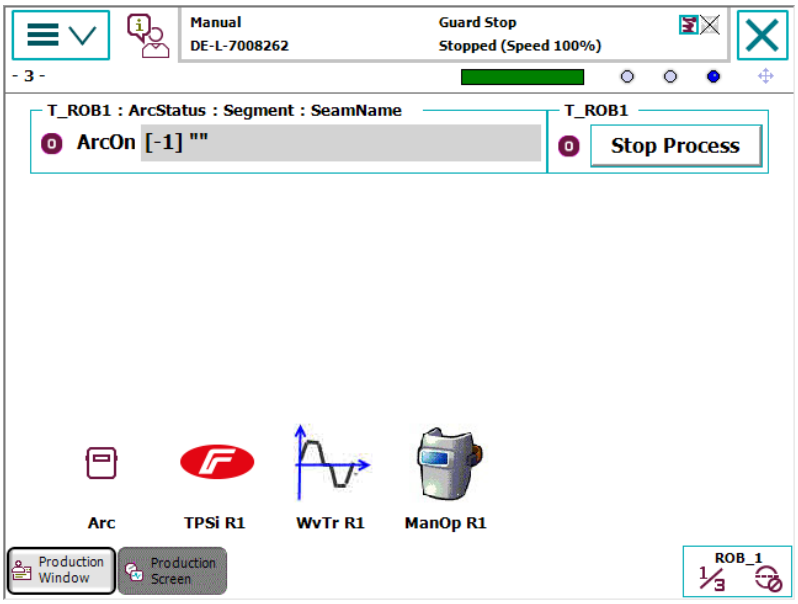
Simulate process widget

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.



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

Continues on next page

Continued

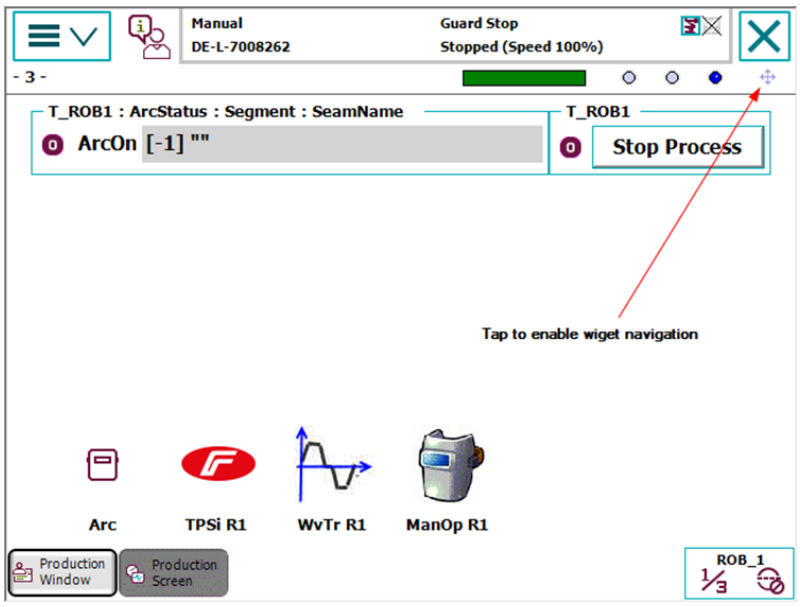
Widget area navigation on the FlexPendant

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.

xx1900002435



xx1900002436

7 Fronius EtherNet/IP configuration

Overview

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

Continues on next page

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

xx2100000468

- 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.

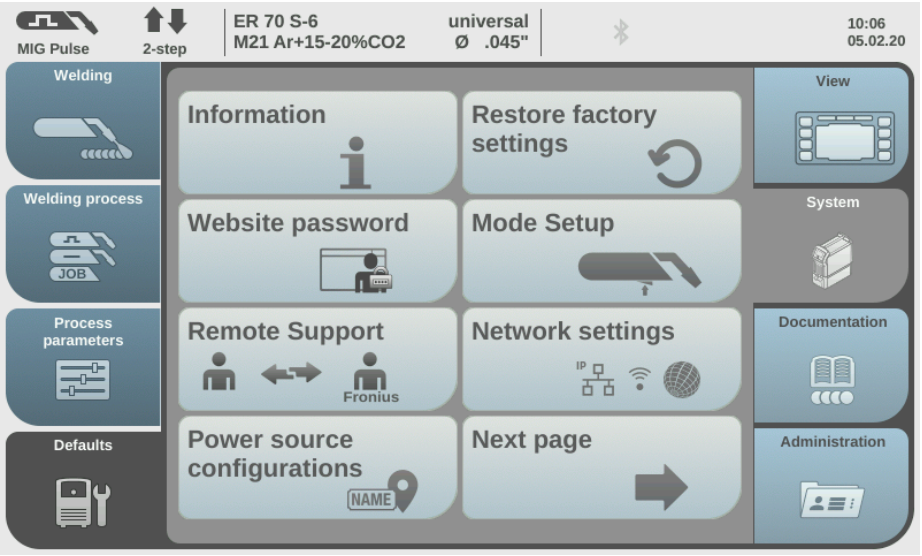
7.2 Fronius power supply settings

7.2.1 Changing the Fronius power supply network settings

Change the network settings

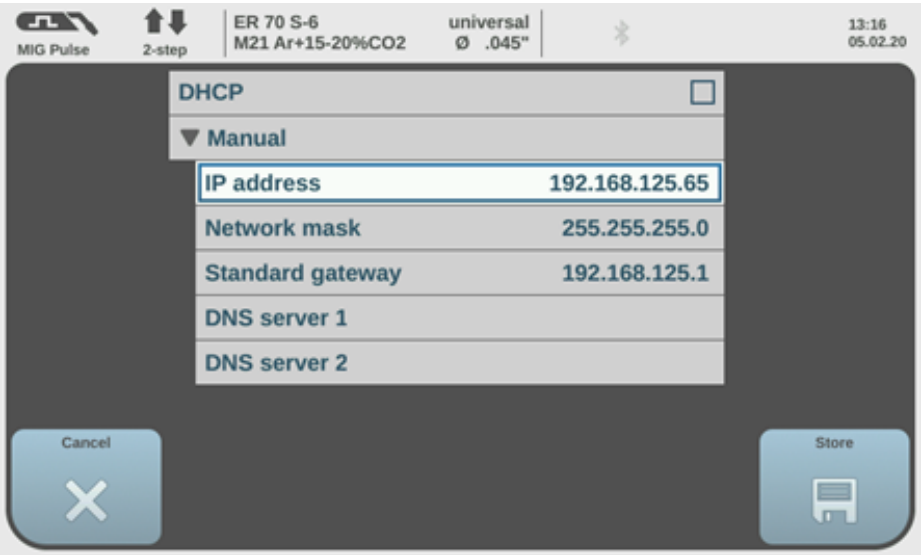
Follow these steps to change the Fronius power supply network settings:

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

Continues on next page

7.2.1 Changing the Fronius power supply network settings
Continued

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.

7.2.2 Changing the network settings for IRC5 controller communication

Change the network settings for IRC5 communication

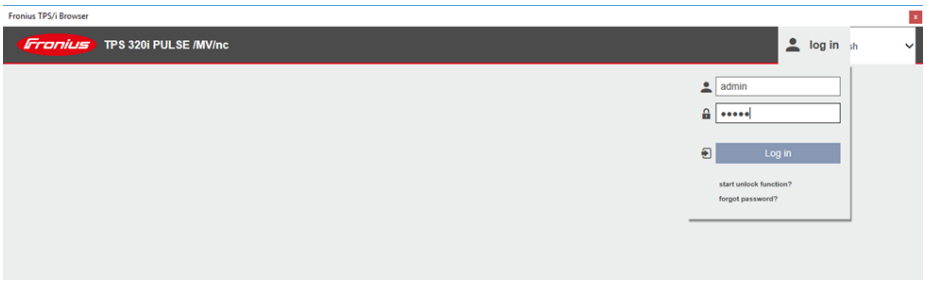
Follow these steps to change the network settings for IRC5 communication:

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".



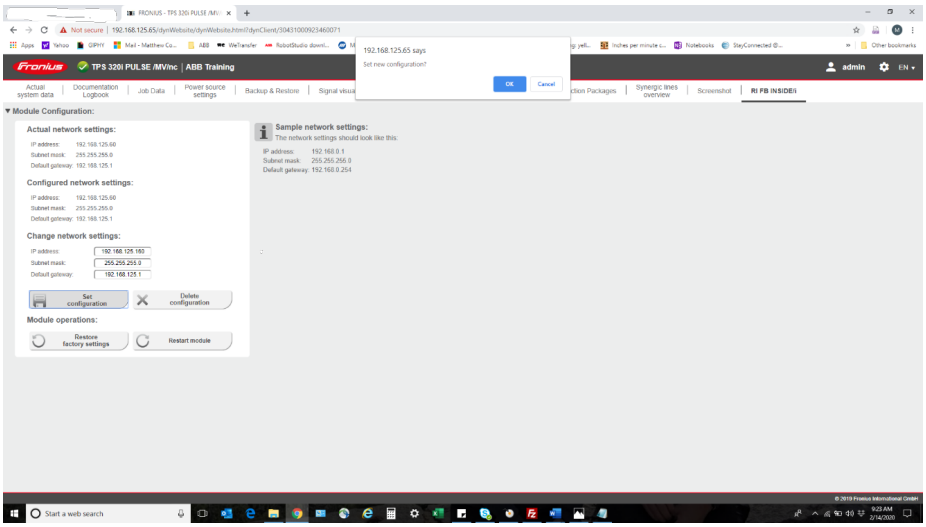
xx2100000471

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

Continues on next page

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.

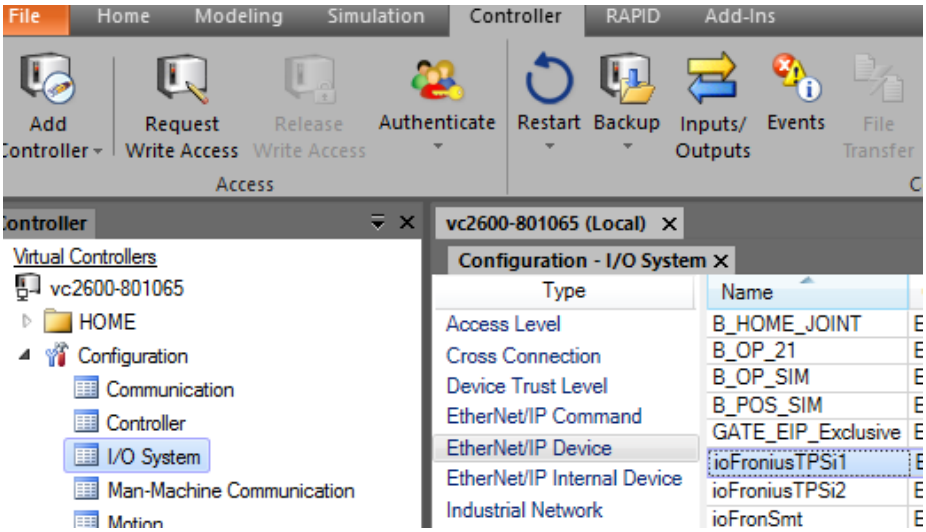
7.3 IRC5 controller configuration

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.

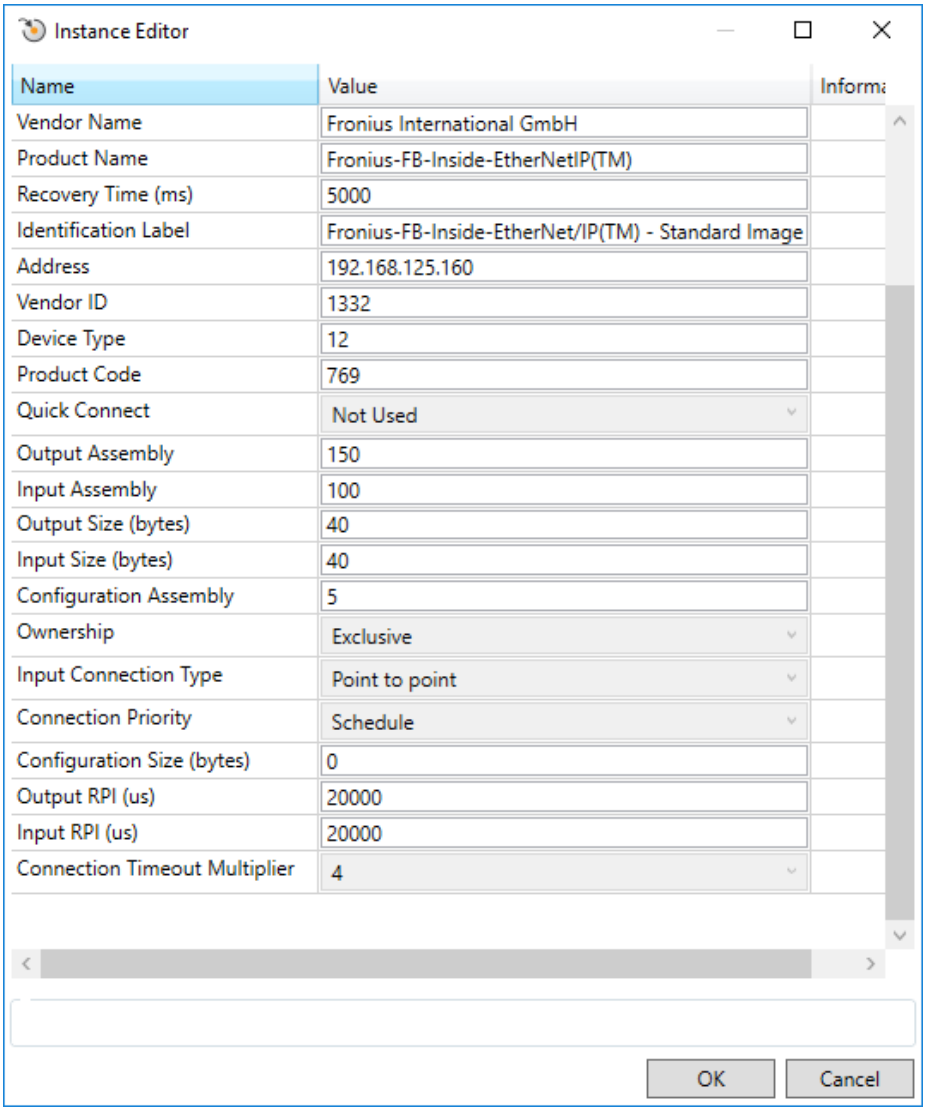


xx2100000474

Continues on next page

7.3.1 Changing the IRC5 communication settings
Continued

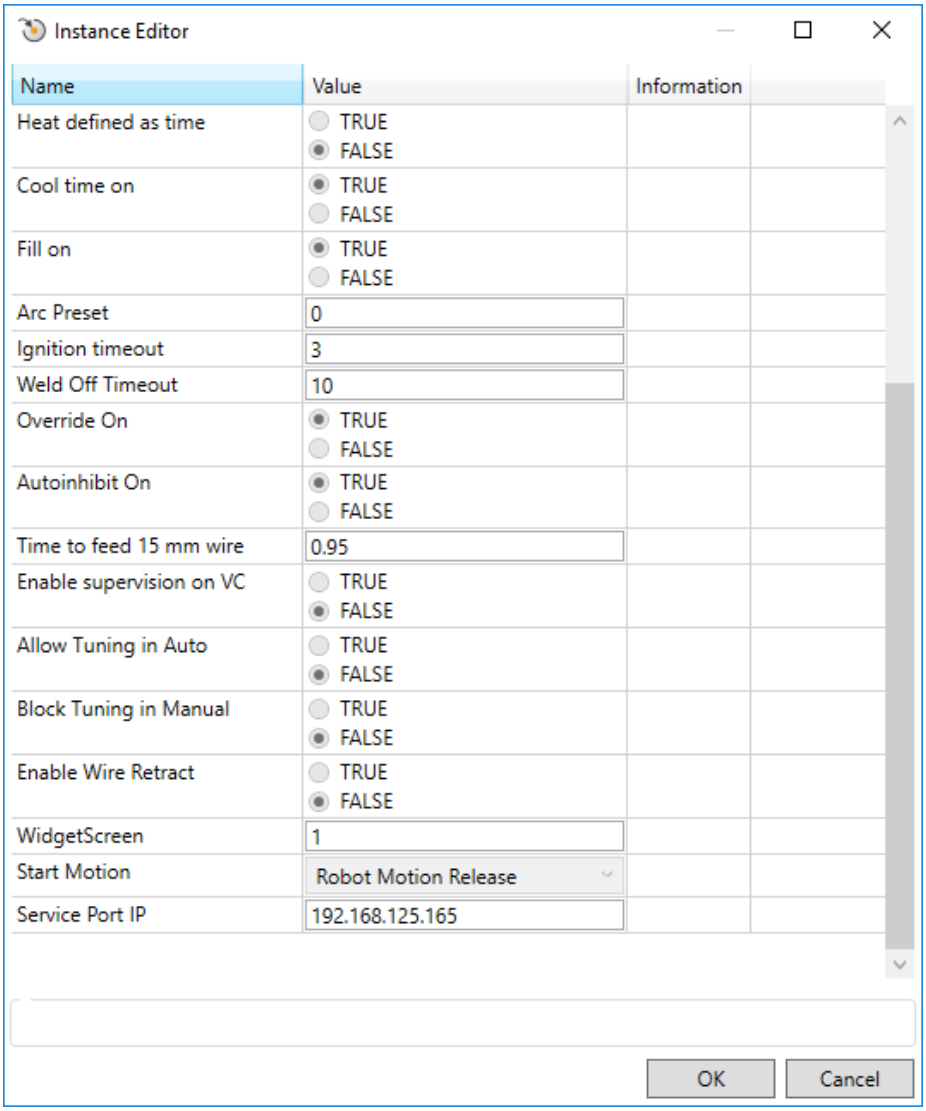
4 In the **Instance Editor**, enter the **Address** (192.168.125.160) for the Fronius EtherNet/IP device and select **OK**.



xx2100000475

Continues on next page

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



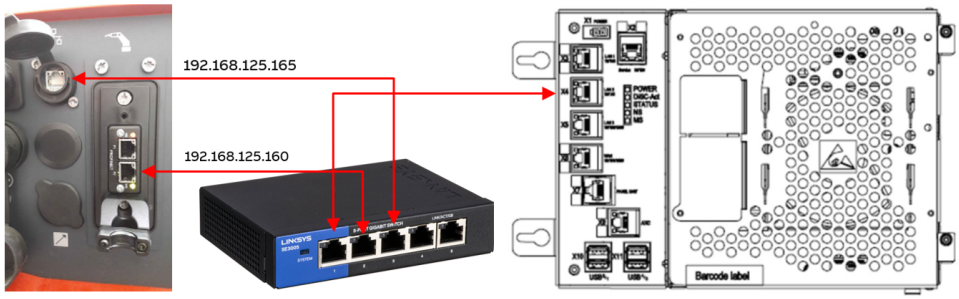
xx2100000476

6 Restart the controller system.

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*.

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:

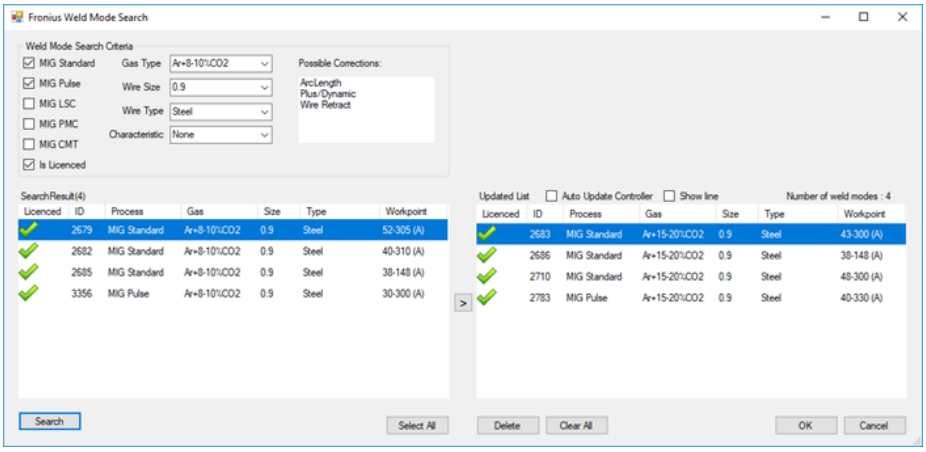
Continues on next page

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:



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.

Index

ABB AB
Robotics & Discrete Automation
S-721 68 VÄSTERÅS, Sweden
Telephone +46 (0) 21 344 400

ABB AS
Robotics & Discrete Automation
Nordlysvegen 7, N-4340 BRYNE, Norway
Box 265, N-4349 BRYNE, Norway
Telephone: +47 22 87 2000

ABB Engineering (Shanghai) Ltd.
Robotics & Discrete Automation
No. 4528 Kangxin Highway
PuDong District
SHANGHAI 201319, China
Telephone: +86 21 6105 6666

ABB Inc.
Robotics & Discrete Automation
1250 Brown Road
Auburn Hills, MI 48326
USA
Telephone: +1 248 391 9000

abb.com/robotics

3HAC065012-001, Rev C, en