Application manual
Miller Ethernet I/P Interface and Weld Editor

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Application manual

Miller Ethernet I/P Interface and Weld Editor

RobotWare 6.02

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Revision: -

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The original language for this publication is English. Any other languages that are supplied have been translated from English.

Table of contents

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Overview of this manual

About this manual

This manual describes the options *Miller Auto-Axcess E Ethernet/IP Interface* and *Weld Editor* and contains instructions to configure it.

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

References	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 - RAPID overview	*3HAC050947-001*
Miller Axcess E Network Setup Guide	263 431A (www.miller-welds.com)
Miller Auto-Axcess E Analog Welding Power Sources CE	OM-251440A (www.miller-welds.com)

Revisions

Revision	Description
-	New manual. Released with RobotWare 6.02.

Product documentation, IRC5

Categories for user documentation from ABB Robotics

The user documentation from ABB Robotics is divided into a number of categories. This listing is based on the type of information in the documents, regardless of whether the products are standard or optional.

All documents listed can be ordered from ABB on a DVD. The documents listed are valid for IRC5 robot systems.

Product manuals

Manipulators, controllers, DressPack/SpotPack, and most other hardware is delivered with a **Product manual** that generally contains:

- Safety information.
- Installation and commissioning (descriptions of mechanical installation or electrical connections).
- Maintenance (descriptions of all required preventive maintenance procedures including intervals and expected life time of parts).
- Repair (descriptions of all recommended repair procedures including spare parts).
- Calibration.
- Decommissioning.
- Reference information (safety standards, unit conversions, screw joints, lists of tools).
- Spare parts list with exploded views (or references to separate spare parts lists).
- Circuit diagrams (or references to circuit diagrams).

Technical reference manuals

The technical reference manuals describe reference information for robotics products.

- *Technical reference manual - Lubrication in gearboxes*: Description of types and volumes of lubrication for the manipulator gearboxes.
- *Technical reference manual - RAPID overview*: An overview of the RAPID programming language.
- *Technical reference manual - RAPID Instructions, Functions and Data types*: Description and syntax for all RAPID instructions, functions, and data types.
- *Technical reference manual - RAPID kernel*: A formal description of the RAPID programming language.
- *Technical reference manual - System parameters*: Description of system parameters and configuration workflows.

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Application manuals

Specific applications (for example software or hardware options) are described in **Application manuals**. An application manual can describe one or several applications.

An application manual generally contains information about:

- The purpose of the application (what it does and when it is useful).
- What is included (for example cables, I/O boards, RAPID instructions, system parameters, DVD with PC software).
- How to install included or required hardware.
- How to use the application.
- Examples of how to use the application.

Operating manuals

The operating manuals describe hands-on handling of the products. The manuals are aimed at those having first-hand operational contact with the product, that is production cell operators, programmers, and trouble shooters.

The group of manuals includes (among others):

- *Operating manual - Emergency safety information*
- *Operating manual - General safety information*
- *Operating manual - Getting started, IRC5 and RobotStudio*
- *Operating manual - Introduction to RAPID*
- *Operating manual - IRC5 with FlexPendant*
- *Operating manual - RobotStudio*
- *Operating manual - Trouble shooting IRC5*, for the controller and manipulator.

Safety

Safety of personnel

When working inside the robot controller it is necessary to be aware of voltage-related risks.

A danger of high voltage is associated with the following parts:

- Devices inside the controller, for example I/O devices, can be supplied with power from an external source.
- The mains supply/mains switch.
- The power unit.
- The power supply unit for the computer system (230 VAC).
- The rectifier unit (400-480 VAC and 700 VDC). Capacitors!
- The drive unit (700 VDC).
- The service outlets (115/230 VAC).
- The power supply unit for tools, or special power supply units for the machining process.
- The external voltage connected to the controller remains live even when the robot is disconnected from the mains.
- Additional connections.

Therefore, it is important that all safety regulations are followed when doing mechanical and electrical installation work.

Safety regulations

Before beginning mechanical and/or electrical installations, ensure you are familiar with the safety regulations described in *Operating manual - General safety information*[1].

---

[1] This manual contains all safety instructions from the product manuals for the manipulators and the controllers.

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1 Overview of Auto-Axcess

1.1 Hardware

Hardware features

Overview

Miller Auto-Axcess E welding systems are precise, digitally controlled and software-driven. They are provided with Ethernet/IP communication for quick and easy connection to the ABB IRC5 robot controller.

Miller Auto-Line

Miller® Auto-Line technology allows for **any** input voltage hook-up (190 – 630 V, 50 or 60 Hz) with no manual jumpers which assures rock-solid, consistent output on fluctuating primary lines.

Fan-On-Demand

The Fan-On-Demand™ cooling system operates only when needed which reduces the amount of airborne contaminants pulled through the machine.

Wind Tunnel Technology

The Wind Tunnel Technology™ feature circulates air over components that require cooling, not over electronic circuitry, which reduces contaminants and improves reliability in harsh welding environments.

1/4-turn steel connectors

1/4-turn steel connectors allow for faster installation of system and eliminates thread stripping.

115 VAC duplex receptacle

The 115 VAC duplex receptacle provides 10-amp circuit-breaker-protected auxiliary power regardless of primary power.

Dual removable lifting eyes

The dual removable lifting eyes are used for moving with overhead lifts. Removability allows for flat-top feeder or storage on top.

Forklift slots

Forklift slots are slots cut into the frame for forklift transportation.

Small footprint

Miller Auto-Axcess models feature a small footprint, designed to minimize floor space requirements.

Interface options

Several different wire feeding and operator interface options are available and configurable to the desired application.

Connections for Ethernet

Two connections for Ethernet are provided to interface with any Auto-Axcess™ E either directly or via the factory Ethernet network.

---

1 Overview of Auto-Axcess

1.1 Hardware
Continued

USB connections

USB connections allow USB flash drives can be used for loading code updates.

1.2 Software

Software features

Multi-MIG capability

Multi-MIG® capability includes common carbon steel, aluminum and stainless welding programs, including Accu-Pulse®, Accu-Curve™, standard or adaptive pulse, conventional MIG, Metal-Cored, and RMD® (Regulated Metal Deposition) programs using the most popular wire diameters and gas combinations.

SureStart

SureStart™ provides consistent arc starts by electronically assuring a ball is not left on the wire when welding is stopped. This provides a predictable condition for the next arc start and combines this with precisely tuned arc starting routines.

Arc Control

Arc Control offers a simple way to tailor factory pulse weld programs by adjusting the arc plasma cone to accommodate a variety of welding applications without the need for any reprogramming or changing any hardware.

Arc Adjust

Arc Adjust allows a simple method that controls arc length for pulse processes and wetting action for RMD.

Remote/trigger program select

Remote/trigger program select allows changing weld programs to take advantage of up to eight programs of Multi-MIG welding process capabilities.

Software updates

> **ℹ Note**
>
> As new and improved software features are developed, they can be added to the existing Auto-Axcess E systems for free. Code transfer is accomplished via a USB memory stick plugged directly into USB connection on the Auto-Axcess E.


1.3 Welding Processes

Accu-Pulse

Accu-Pulse® is standard on all Auto-Axcess™ E models.

The Accu-Pulse process allows for precise control of the pulse arc. Accu-Pulse provides optimum molten puddle control and has power to increase wire feed speeds and deposition 20 to 25 percent in many applications. In most cases, slightly different ratios of gas mixtures will perform well using a similar program and adjusting arc length or the appropriate arc control for the selected process. Contact Miller for more information on less common materials and gas combinations.

Benefits (compared to conventional pulse):

- Shorter arc lengths possible
- Better puddle control
- More tolerant of contact tip to work variation
- Less audible noise
- No arc wandering in tight corners
- Narrow arc plasma column
- Allows weld to fill in at toes increasing travel
- speed and deposition
- More tolerant of poor fit up and gaps
- (compared to standard pulse)
- Ideal for robot seam tracking applications
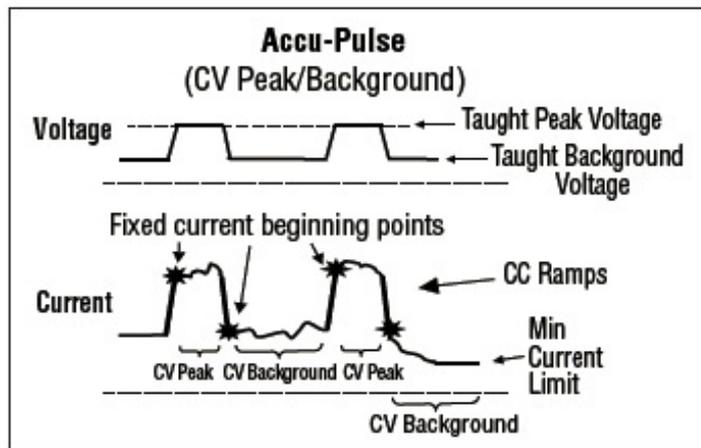
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Accu-Curve

Accu-Curve™ is standard on all Auto-Axcess™ E models.

Accu-Curve is a variation of the Accu-Pulse process. The transitions from peaks to background voltage are "curved". The curved transitions provide a "softer" feel

Continues on next page

without sacrificing the tight arc lengths that allow for better puddle control and have become the hallmark of the Accu-Pulse process.

Benefits:

- "Softer" arc feel than Accu-Pulse
- Maintains tight arc lengths
- Maintains better puddle control

RMD

RMD® (Regulated Metal Deposition) is standard on all Auto-Axcess™ E models.

The RMD process is a precisely controlled short-circuit transfer. It is a method of detecting when the short is going to clear and then rapidly reacting to this data changing the current levels. Features proactive dynamic puddle control.

Benefits:

- Well suited to thin materials
- Can replace TIG process in some applications
- Gap filling
- Spatter reduction
- Provides less heat into work piece
- Excellent performance on stainless steel
- Can be combined with other Axcess®-related programs
- Minimize distortion
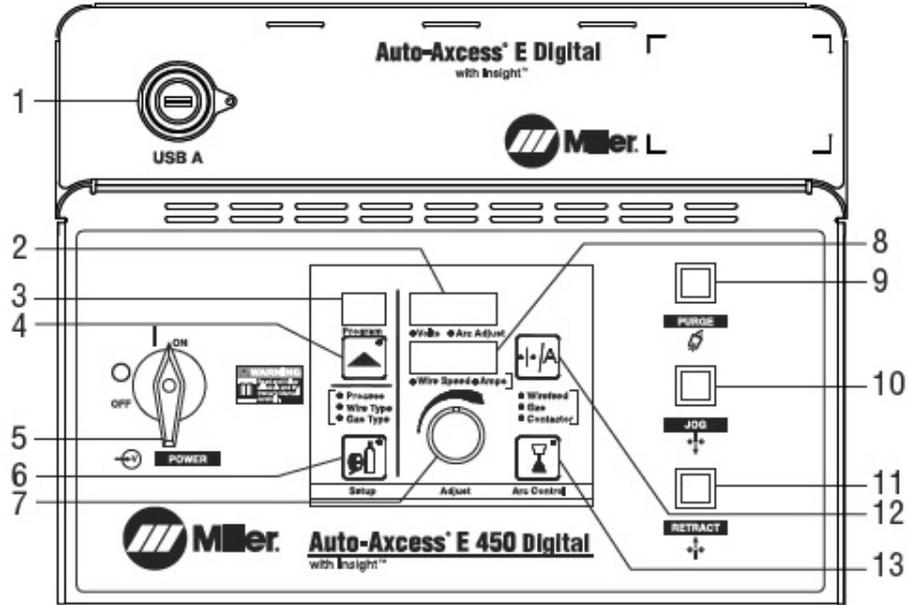- Use larger diameter wire on thin materials
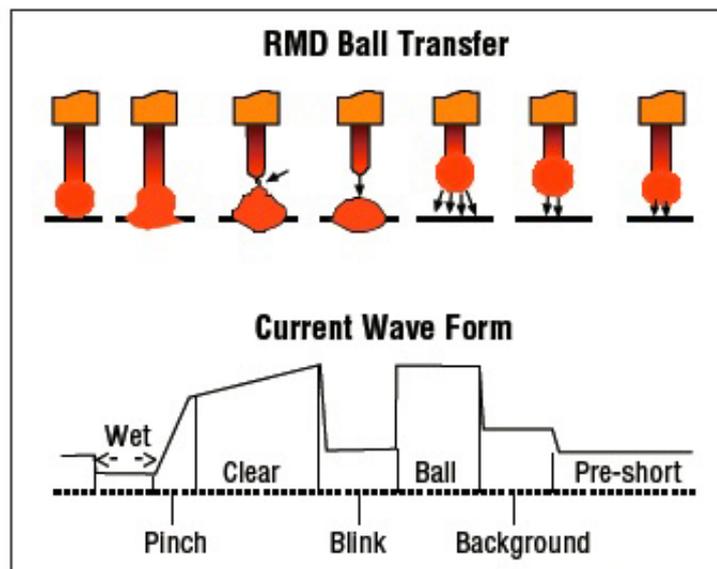
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1 Overview of Auto-Axcess

1.4 Auto-Axcess E Digital Control Panels
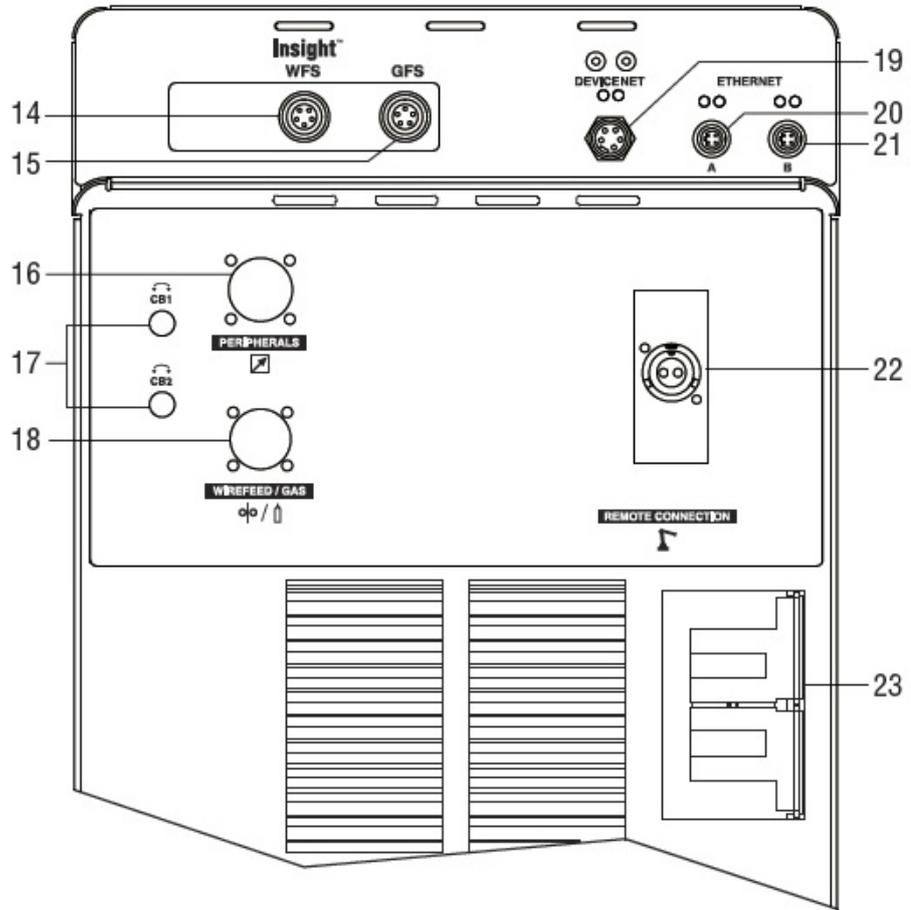
1.4 Auto-Axcess E Digital Control Panels

Front Panel

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1	USB Connection A (Host)
2	Voltage/Arc Adjust Display Meter
3	Program Display
4	Program # Select
5	Power Switch
6	Process Setup Button
7	Control Knob
8	Wire Speed/Amperage Display Meter
9	Purge Pushbutton
10	Jog Forward Pushbutton
11	Jog Retract Pushbutton
12	Wire Feed/Amperage Select
13	Arc Control

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Rear Panel

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14	Wire Feed Speed Sensor Connection (Optional)
15	Gas Flow Sensor Connection (Optional)
16	Peripheral Connector
17	Circuit Breakers
18	Motor Connector
19	DeviceNet Connector
20	Ethernet Connector A
21	Ethernet Connector B
22	E-Stop
23	115 VAC, 10 A Duplex Receptacle

Capabilities

Remote Program Select

Remote Program Select allows changing weld programs from the robot controller to take advantage of up to eight programs or Multi-MIG® welding process capabilities.

1 Overview of Auto-Axcess

1.4 Auto-Axcess E Digital Control Panels
Continued

Integrated 80 V Touch Sensor

Integrated 80 V Touch Sensor is used with external circuitry or peripheral equipment when touch sensing.

Front Panel Features

- Weld Process Selection
- Wire Size and Type
- Gas Type
- Wire Jog Forward Button
- Wire Jog Reverse Button
- Purge Button
- Digital Display Meters:
    - Voltage / Arc Adjust (Trim)
    - Wire Feed Speed /Amperage
- Program Number
- Arc Control (SharpArc® and Inductance)

Digital Outputs

- Voltage
- Current

Digital Inputs

- Voltage/Arc Adjust (Trim)
- Wire Feed Speed

Auto Setup

- Robot Specific

Sequence

- Preflow: 0 – 9.9 seconds
- Start Power: 0 – 2.5 seconds
- Start Ramp
- Voltage: 10 – 44
- IPM: 50 –1400
- Crater: 0 – 2.5 seconds
- Crater Ramp
- Retract
- Postflow: 0 – 9.9 seconds

2 Installation and setup

2.1 Hardware

2.1.1 Auto-Axcess E Welding Systems

Description

Miller Auto-Axcess E welding systems are extensively used in robotic arc welding applications.

Auto-Axcess E uses Ethernet/IP, a well established industrial Ethernet communication system with good real-time capabilities.

Compatible equipment

The Miller Auto-Axcess E Ethernet/IP Interface may be used with any Auto-Axcess E weld power supply manufactured by Miller Electric. This list includes, but is not limited to, the following units:

- Auto-Axcess E 675 Digital
- Auto-Axcess E 450 Digital
- Auto-Axcess E 300 Digital

2 Installation and setup

2.1.1 Auto-Axcess E Welding Systems
Continued

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2.1.2 Ethernet/IP

Description

Ethernet/IP is an Ethernet digital communications system used in Miller Electric's Auto-Axcess E welding systems. It is used to connect the robot and the weld power source.There are two 10/100 Ethernet NIC's (Network Interface Connections) on the rear panel of the Axcess E. These NIC's require an industrial Ethernet cable and do not provide a connection for standard RJ-45 Ethernet cables.

Miller Electric Mfg. Co. offers Industrial Ethernet cables available for use with the Axcess E. These are available in 3, 5 and 10 meter lengths (part numbers 300734, 300735 and 300736). They have a shielded RJ-45 connection to connect to a PC or network drop. Shielded CAT-5 cable is strongly recommended in the welding environment, and proper termination of the shield is important for noise-free operation.

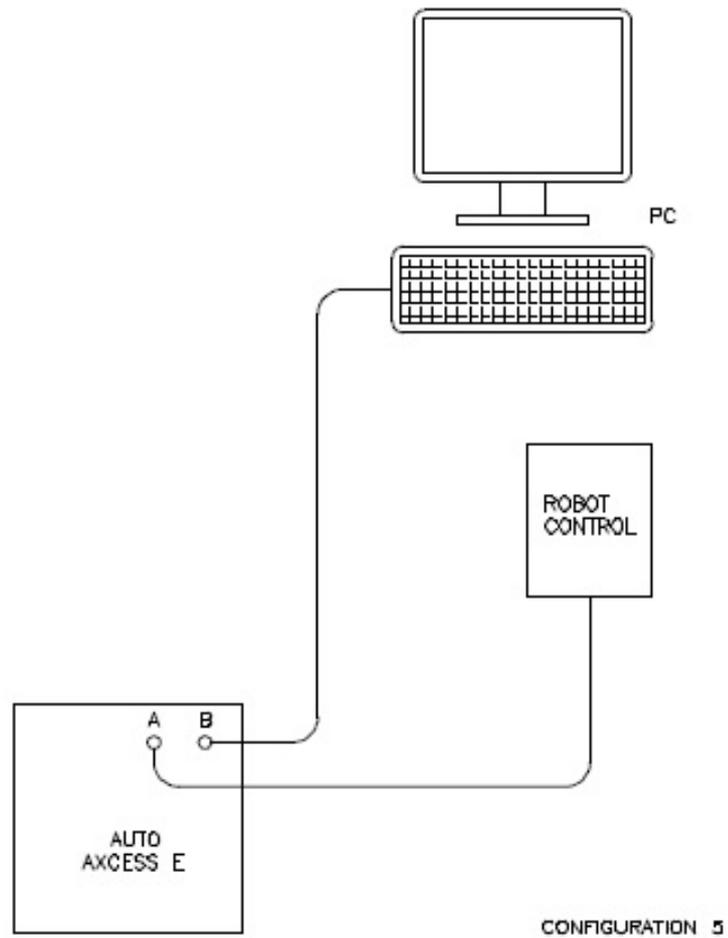The following figure shows the rear panel Ethernet connector on a Miller Axcess E welding system.
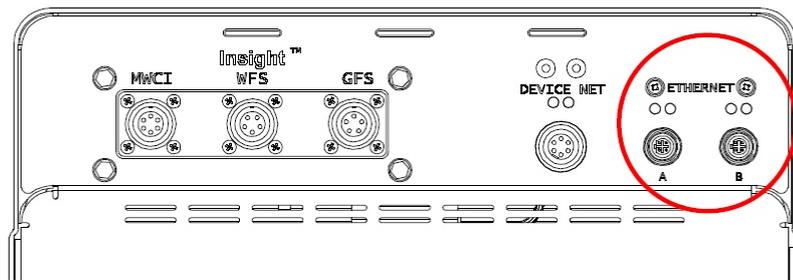
Ethernet Port A is factory set with a static IP address:
Ethernet Port A IP address is: 169.254.0.2
Ethernet Port A Subnet Mask is: 255.255.0.0

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2.1.3 Auto-Axcess E Ethernet cable connection

Description

Auto-Axcess E welders use a single cable Ethernet/IP interface between the Auto-Axcess E welder and the IRC5 controller. The Ethernet port A connector port on the rear panel of the Auto-Axcess is connected using an industrial Ethernet cable that connects directly, or via a switch, to the LAN2 port on the IRC5 controller.

Overview

The following figures illustrate an overview of a typical Auto-Axcess E installation with Auto-Axcess E connected to a robot with a PC or PC-HMI in the cell.

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2.1.4 IRC5 Controller Ethernet cable connection

Connecting to the IRC5 controller

Connect an Ethernet cable between the robot controller LAN3 port and the Auto-Axcess welder Ethernet port.

The following illustration shows an overview of the computer unit.
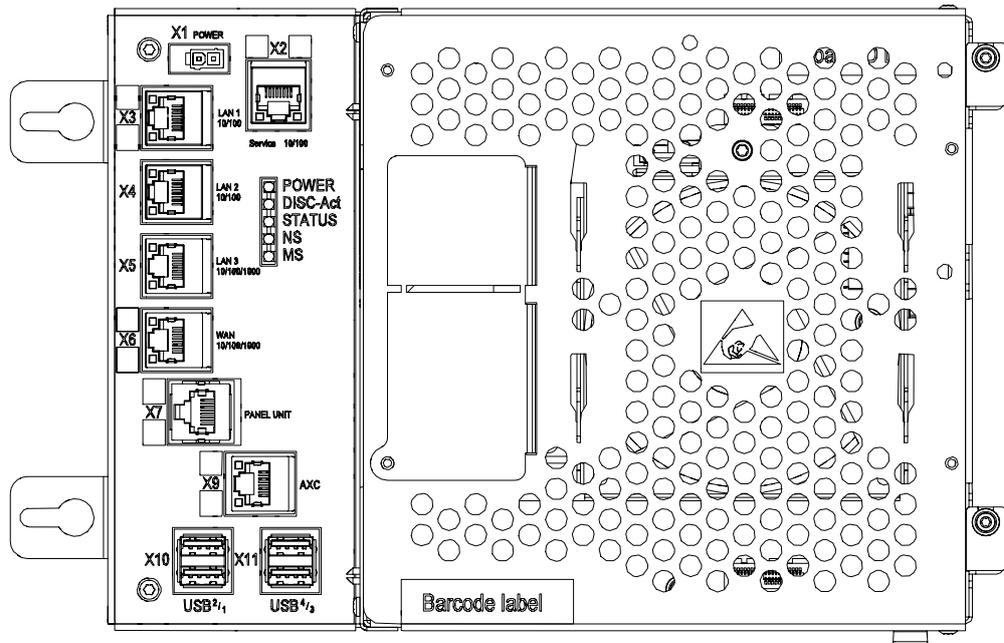
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X5	LAN3

2.2 Robot Controller Software

Robot system prerequisites

- IRC5 robot controller with main computer DSQC1000 or DSQC1018
- RobotWare 6.01 or higher with the following options:
    - *[633-4] RobotWare Arc*
    - *[624-1] CAP*
    - *[637-1] Production Screen*
    - *[617-1] FlexPendant Interface*
    - *[841-1] Ethernet/IP Scanner/Adapter*
    - *Miller Auto-Axcess E Addin* (can be downloaded from the ABB RobotApps^{TM} web site under the Add-In tab in RobotStudio)

2.3 Establishing a connection

2.3.1 Overview

Ethernet port and IP address

By default, Miller Axcess E power sources ship from the factory with Ethernet Port A set to a static or fixed IP address of 169.254.0.2 and a subnet mask of 255.255.0.0. The recommended method to connect to the IRC5 controller is using fixed IP addresses.

The robot LAN3 Ethernet port must be used to connect to the Miller welder.

ℹ **Note**

If the Ethernet/IP bus is used to connect to other devices, in addition to the Miller welder, such as a PLC or other Ethernet/IP devices, then an Ethernet switch must be used.

ℹ **Note**

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 device's critical from the other non-critical traffic. To do this, the switches and routers must support Quality of Service.

ℹ **Note**

If the Ethernet/IP bus is used to connect to other devices, in addition to the Miller welder, such as PLC or other Ethernet/IP devices, then a unique IP address must be assigned to each device. Otherwise duplicate IP address errors will occur.

ℹ **Note**

The IP addresses selected for the robot controller and the Miller Axcess E power source must be in the same IP address range. For example if the subnet mask is 255.255.255.0 then 169.254.0.1 for the robot controller and 169.254.0.2 for the Miller welder would be fine.

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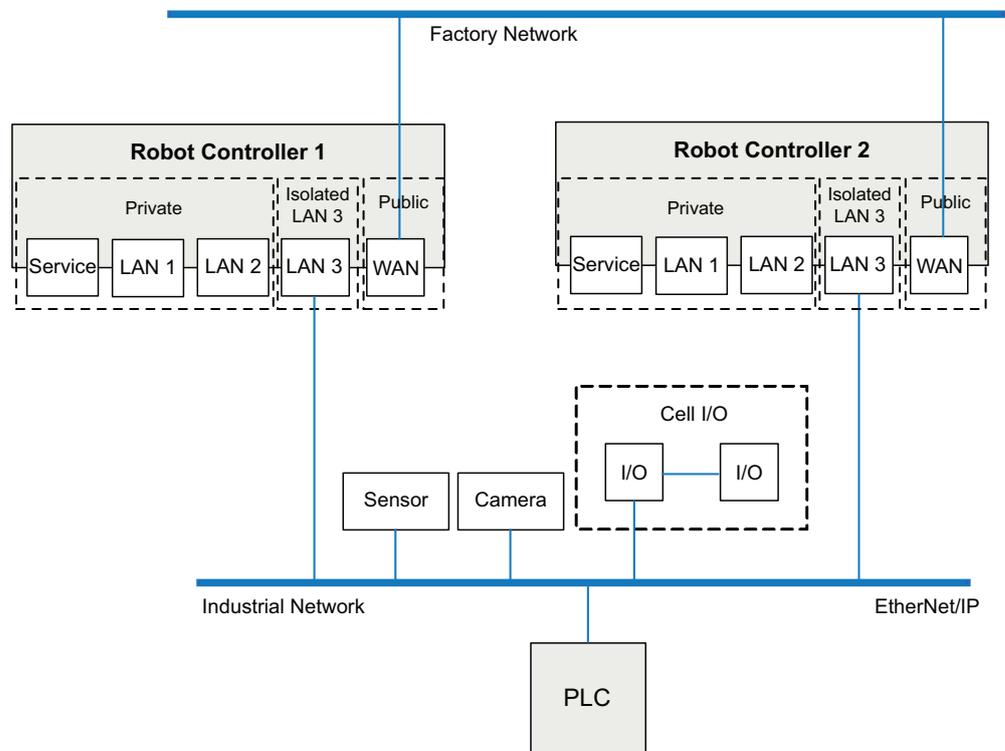3HAC054885-001 Revision: -

Isolated LAN 3 network

The default configuration is that LAN 3 is configured as an isolated network. This allows several robot controllers to be connected to the same network.
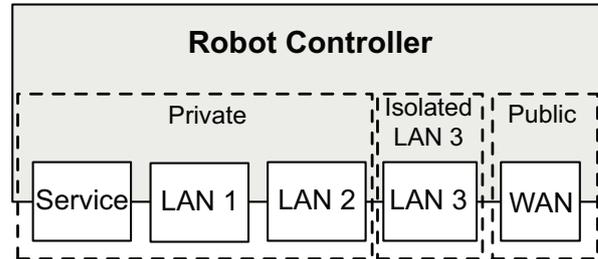
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By connecting to the isolated LAN 3 port it is possible to connect several robot controllers to a dedicated industrial network.

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I/O signals setup

All necessary I/O signals are setup by the *Miller Auto-Axcess E Addin*.

Ethernet/IP communication setup

The steps to setup the Ethernet/IP communication are as follows.

1   Choose the robot controller Ethernet/IP IP address.

2   Choose the Miller Ethernet/IP IP address in a compatible range.

3   Setup the Miller Ethernet/IP IP address in the Miller Auto-Axcess. See section *Setup Miller Ethernet/IP address in Miller Auto-Axcess on page 29*.

4 Setup the robot controller Ethernet/IP IP address. See section *Setup the robot controller Ethernet/IP address on page 32*.

5 Setup the Miller Ethernet/IP IP address in the robot controller. See section *Setup the Miller Ethernet/IP address in the robot controller on page 34*.

2.3.2 Setup Miller Ethernet/IP address in Miller Auto-Axcess

Prerequisites

Use one of the following web browsers:

- Internet Explorer version 7 and higher
- Mozilla FireFox version 3 and higher
- Google Chrome version 15 and higher
- Safari version 5.1 and higher
- Opera version 11.5 and higher

Procedure

1   Connect an Ethernet cable between your PC and the Ethernet Port A on the Miller Axcess E welder.

> **ℹ️ Note**
>
> It may take up to 1 minute for the PC to acquire an IP address. If the PC is set up with a static IP address it must either be changed to DHCP or assigned an address in the range of Port A.

2   Open a web browser, enter 169.254.0.2 in the address bar and press the Enter key on the keyboard.

3   Click the **Login** button on the Miller web page.

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Continues on next page

2 Installation and setup

2.3.2 Setup Miller Ethernet/IP address in Miller Auto-Axcess
Continued

> **ℹ Note**
>
> If you are using Microsoft Internet Explorer and the Miller Login page does not come up or you get an error, your IT department may have configured Microsoft Internet Explorer to use a proxy server. This will prevent the browser from connecting to the Axcess E. Contact your IT department or install and use a different browser to interface with the Axcess E.

4   Click the **System Settings** button on the **Home** page.

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5   Click the **Ethernet Settings** button on the **System Settings** page.
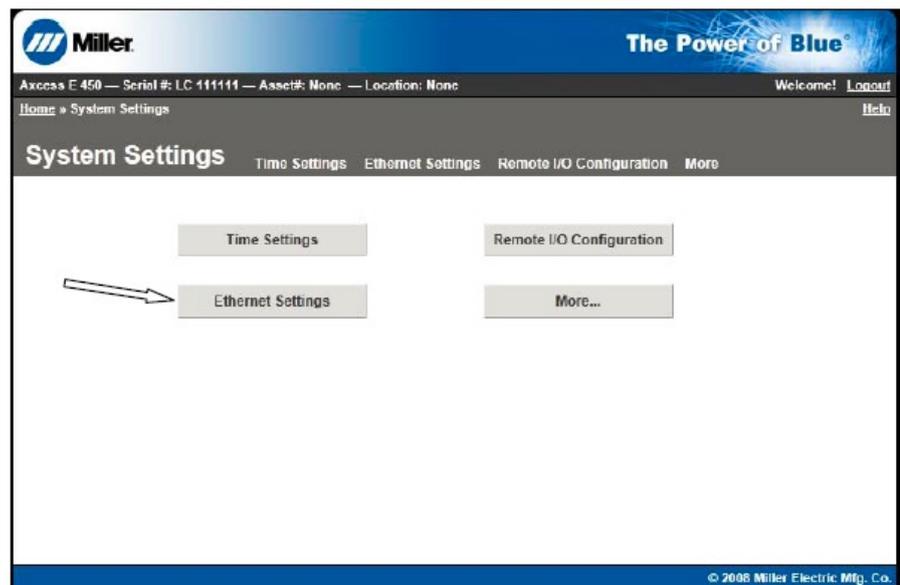
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6   Change the settings for either Ethernet A and click **Update A** or update
Ethernet B and click **Update B**.

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2.3.3 Setup the robot controller Ethernet/IP address

Procedure

> 💡 **Tip**
>
> You may want to backup the robot controller before the next steps. That way, if you make a mistake you have a starting point to go back to.

Setup the robot controller Ethernet/IP address on the FlexPendant with the following steps.

1 On the **ABB** menu, tap **Control Panel** and then tap **Configuration**.

2 Select the **Communication** topic and double tap **IP Setting** to open it.

3 Tap **Add** to add an IP setting.

4 Set the following system parameters:

- **IP**: desired IP address.
- **Subnet**: usually 255.255.255.0.
- **Interface**: LAN3
- **Label**: for example "Miller"

Tap **OK**. Do not restart the controller yet as there are more settings to configure.

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5 To assign the IP address to the Industrial Network, select the topic **I/O** and then double tap **Industrial Network** to open it.

6 Double tap the **EtherNetIP** network to modify it.

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7 In **Connection**, select the connection you have just created, for example "Miller".

Tap **OK**. Do not restart the controller yet as there are more settings to configure.
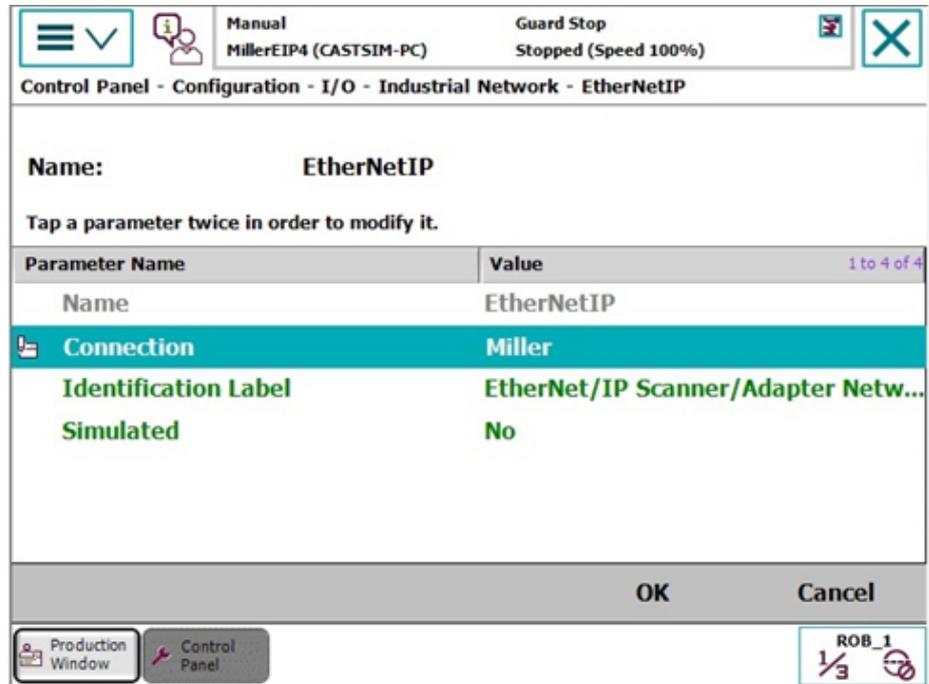
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2.3.4 Setup the Miller Ethernet/IP address in the robot controller

Procedure

1 Select the topic **I/O** and then double tap **EtherNet/IP Device** to open it.

2 Double tap the **ioMillerWld1** network to modify it.

3 Make sure **Simulated** is set to 0 (Not simulated).
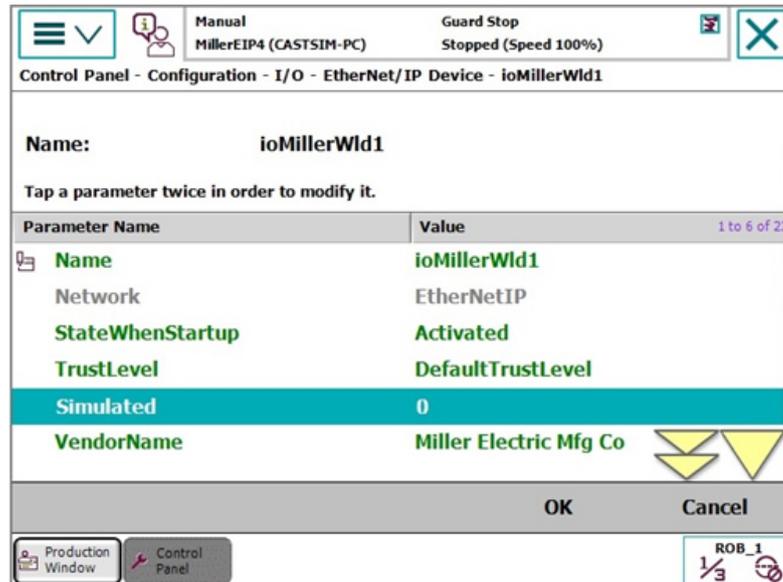
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4 Set the desired **EtherNet/IP Address** for the Miller Auto-Axcess.
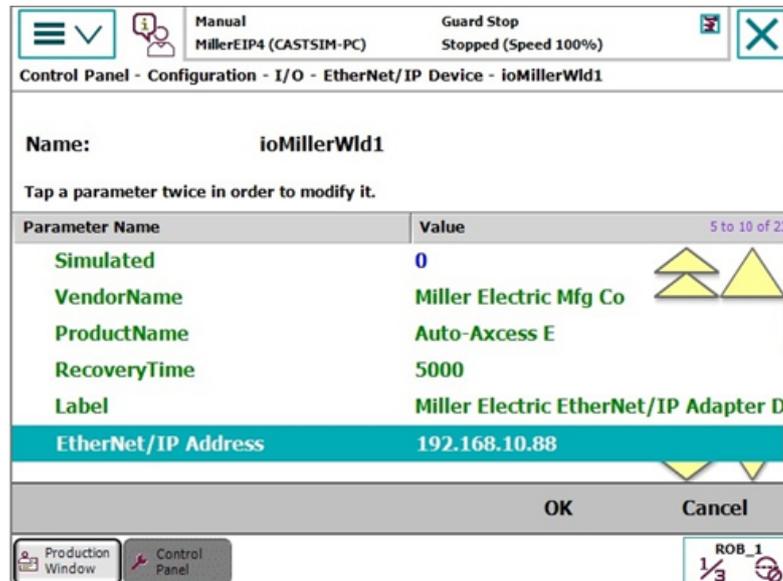
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5 Restart the controller to activate the changes.

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You now have Ethernet/IP communication between the IRC5 controller and the Auto-Axcess welder.

> 💡 **Tip**
>
> Make a new backup to save your changes.

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3 Weld Editor Interface

3.1 About the Weld Editor Interface

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 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.

3.2 Widget screens

Overview

The widget screens provide live weld process information during welding. They provide information from both welder and robot program execution.

Use the back/forward arrow buttons or the dots in the upper right corner to move between widgets.

Interface
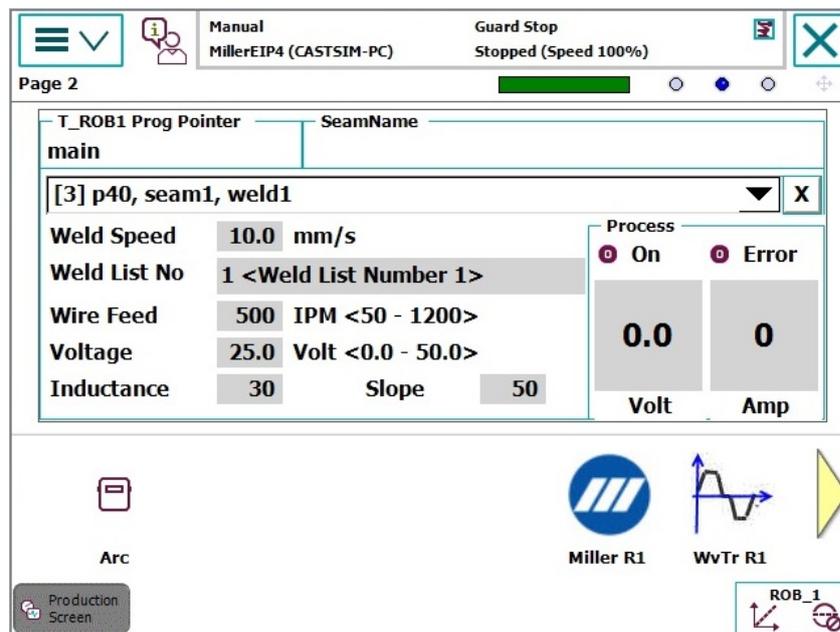
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Process information

The widgets show the following live weld process information:

- Weld speed
- Weld List No
- Wire Feed
- Voltage setting
- Inductance
- Slope
- Voltage
- Current
- Welding status
- Error status

3.3 The Weld Editor Interface

Starting the Weld Editor Interface

1 On the FlexPendant, tap the **ABB** menu and then tap **Production Screen**.

2 Tap **Miller R1** to start the Weld Editor widget.
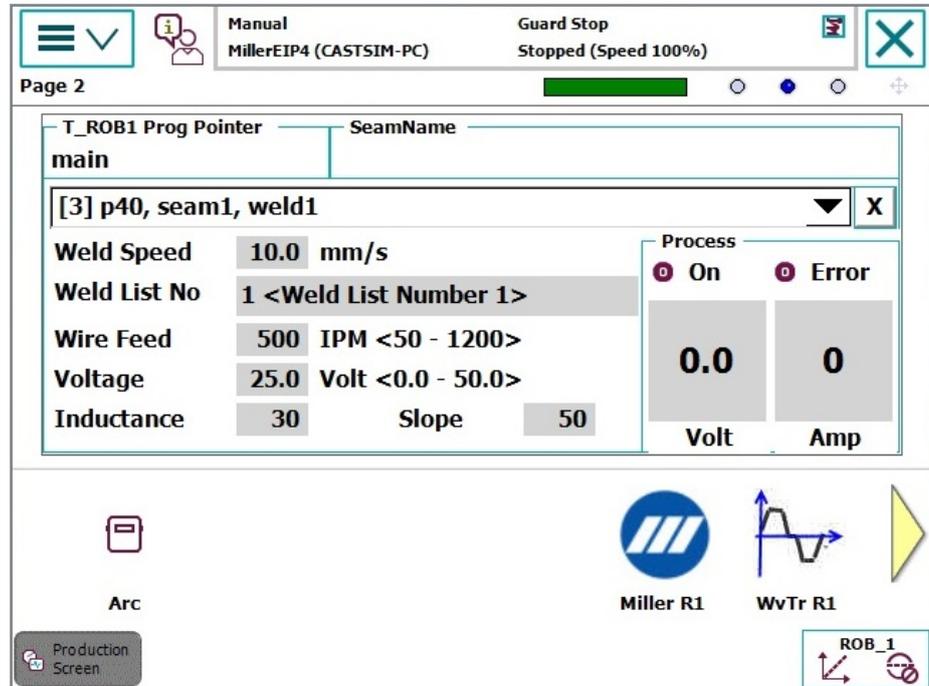
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Handling the Weld Editor Interface

Tap **Production Screen** to close the window and return to the previous window.

Tap **Refresh** to refresh and show the updated values.

3.4 Ignition

Overview

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

> **ℹ 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.

Activation/deactivation of Ignition

The Ignition tab is only shown if Ignition is active. It is active if the system parameter *Ignition on* (topic *PROC*, type *Miller Arc Equipment Properties*) is set to True.

Interface

xx1500000851

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.

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Ignition parameters

> ### ℹ Note
>
> The parameters are defined dynamically, so not all parameters will be present for every Weld List No.

Parameter	Description
seamdata	`seamdata` is used to control the start and end of the weld. `seamdata` is also used if the process is restarted after a welding operation has been interrupted.
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".
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.
Weld List No	Weld list number defines the shape and characteristics of the weld using eight active slots for selection of various processes, wire type, and parameters. The characteristics of a weld list number generally implement the process: GMAW, SMAW, SAW, GTAW, FCAW, etc. Also known as a schedule. For more details about the particulars of each weld list number, see the front panel of the welder.
Wire Feed	Term used to represent wire feed speed. In MIG mode, wire feed setting is independent of voltage setting. In pulse and Accu-pulse, adjusting wire feed also increases power level of wire electrode (one knob control).
Voltage	`Voltage` sets the voltage reference for the weld.
Inductance	In short circuit GMAW welding, an increase in inductance will decrease the number of short circuit transfers per second (provided no other changes are made) and increase arc-on time. The increased arc-on time makes the welding puddle more fluid.
Slope	Refers to the shape of the volt-amp curve. Varying the amount of slope in the welding circuit will change the amount of short-circuit current and rate of response from the power source.
Arc Length	Distance from end of wire electrode to weld pool.
Arc Adjust	Term used to represent arc length adjustments in pulse programs. Increasing `Arc Adjust` increases the actual arc length. Likewise, decreasing `Arc Adjust` shortens arc length. `Arc Adjust` is replaced by volts in MIG programs.
Sharp Arc (Arc Control)	Allows setting of inductance and slope in MIG mode. In pulse and Accu-pulse modes, this adjustment changes the arc characteristics by adjusting the preprogrammed factory pulse settings.

3.5 Heat

Overview

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.

Activation/deactivation of Heat

The Heat tab is only shown if Heat is active. It is active if the system parameter *Heat on* (topic *PROC*, type *Miller Arc Equipment Properties*) is set to True.

Interface

xx1500000852

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

Heat parameters

> ℹ️ **Note**
>
> The parameters are defined dynamically, so not all parameters will be present for every Weld List No.

| Parameter	Description
seamdata	`seamdata` is used to control the start and end of the weld. `seamdata` is also used if the process is restarted after a welding operation has been interrupted.
Heat Dist	The distance during which the heat data is active at the start of the weld.
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 the heat phase manually. • Selected – Use the parameters from the **Weld** tab. This is the default mode.
Weld List No	Weld list number defines the shape and characteristics of the weld using eight active slots for selection of various processes, wire type, and parameters. The characteristics of a weld list number generally implement the process: GMAW, SMAW, SAW, GTAW, FCAW, etc. Also known as a schedule. For more details about the particulars of each weld list number, see the front panel of the welder.
Wire Feed	Term used to represent wire feed speed. In MIG mode, wire feed setting is independent of voltage setting. In pulse and Accu-pulse, adjusting wire feed also increases power level of wire electrode (one knob control).
Voltage	`Voltage` sets the voltage reference for the weld.
Inductance	In short circuit GMAW welding, an increase in inductance will decrease the number of short circuit transfers per second (provided no other changes are made) and increase arc-on time. The increased arc-on time makes the welding puddle more fluid.
Slope	Refers to the shape of the volt-amp curve. Varying the amount of slope in the welding circuit will change the amount of short-circuit current and rate of response from the power source.
Arc Length	Distance from end of wire electrode to weld pool.
Arc Adjust	Term used to represent arc length adjustments in pulse programs. Increasing `Arc Adjust` increases the actual arc length. Likewise, decreasing `Arc Adjust` shortens arc length. `Arc Adjust` is replaced by volts in MIG programs.
Sharp Arc (Arc Control)	Allows setting of inductance and slope in MIG mode. In pulse and Accu-pulse modes, this adjustment changes the arc characteristics by adjusting the preprogrammed factory pulse settings.

3.6 Weld

Overview

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

> **Note**
>
> The weld parameters can only be modified in manual or tune mode while the arc is established.

Interface
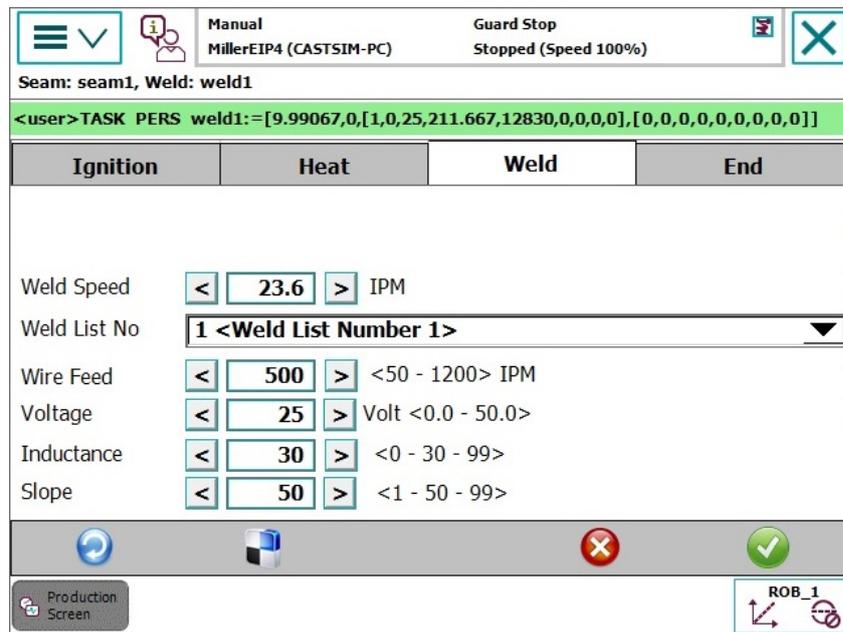
xx1500000853

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.

Weld parameters

> **Note**
>
> The parameters are defined dynamically, so not all parameters will be present for every Weld List No.

Parameter	Description
welddata	The `welddata` parameters control the weld during the weld phase, which is as long as the arc is established.

Continues on next page

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Parameter	Description
Weld Speed	The speed of the TCP of the welding torch during the weld instruction.
Weld List No	Weld list number defines the shape and characteristics of the weld using eight active slots for selection of various processes, wire type, and parameters. The characteristics of a weld list number generally implement the process: GMAW, SMAW, SAW, GTAW, FCAW, etc. Also known as a schedule. For more details about the particulars of each weld list number, see the front panel of the welder.
Wire Feed	Term used to represent wire feed speed. In MIG mode, wire feed setting is independent of voltage setting. In pulse and Accu-pulse, adjusting wire feed also increases power level of wire electrode (one knob control).
Voltage	`Voltage` sets the voltage reference for the weld.
Inductance	In short circuit GMAW welding, an increase in inductance will decrease the number of short circuit transfers per second (provided no other changes are made) and increase arc-on time. The increased arc-on time makes the welding puddle more fluid.
Slope	Refers to the shape of the volt-amp curve. Varying the amount of slope in the welding circuit will change the amount of short-circuit current and rate of response from the power source.
Arc Length	Distance from end of wire electrode to weld pool.
Arc Adjust	Term used to represent arc length adjustments in pulse programs. Increasing `Arc Adjust` increases the actual arc length. Likewise, decreasing `Arc Adjust` shortens arc length. `Arc Adjust` is replaced by volts in MIG programs.
Sharp Arc (Arc Control)	Allows setting of inductance and slope in MIG mode. In pulse and Accu-pulse modes, this adjustment changes the arc characteristics by adjusting the preprogrammed factory pulse settings.

3.7 End

Overview

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

> ℹ️ **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.

Interface

xx1500000854

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.

End parameters

> ℹ️ **Note**
>
> The parameters are defined dynamically, so not all parameters will be present for every Weld List No.

Continues on next page

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Parameter	Description	Masking rules
seamdata	`seamdata` is used to control the start and end of the weld. `seamdata` is also used if the process is restarted after a welding operation has been interrupted.	
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.	Visible if parameter *cool_time_on* and *fill_on* is activated in *PROC*.
Fill Time	The crater-filling time (in seconds) at the end phase of the weld.	Visible if parameter *fill_on* is activated in *PROC*.
Post Flow	The time (in seconds) for purging with protective gas after the end of the process.	Always visible.
Roll Back	The time (in seconds) during which the weld electrode is rolled back when electrode feeding has stopped.	Visible if parameter *rollback_on* is activated in *PROC*.
Use Weld Phase Mode	• Not selected – Select weld parameters during the end phase manually. • Selected – Use the parameters from the **Weld** tab. This is the default mode.	
Weld List No	Weld list number defines the shape and characteristics of the weld using eight active slots for selection of various processes, wire type, and parameters. The characteristics of a weld list number generally implement the process: GMAW, SMAW, SAW, GTAW, FCAW, etc. Also known as a schedule. For more details about the particulars of each weld list number, see the front panel of the welder.	
Wire Feed	Term used to represent wire feed speed. In MIG mode, wire feed setting is independent of voltage setting. In pulse and Accu-pulse, adjusting wire feed also increases power level of wire electrode (one knob control).	Visible if *AO FeedReference* is defined in *PROC*.
Voltage	`Voltage` sets the voltage reference for the weld.	Visible if *AO VoltReference* is defined in *PROC*.
Inductance	In short circuit GMAW welding, an increase in inductance will decrease the number of short circuit transfers per second (provided no other changes are made) and increase arc-on time. The increased arc-on time makes the welding puddle more fluid.	
Slope	Refers to the shape of the volt-amp curve. Varying the amount of slope in the welding circuit will change the amount of short-circuit current and rate of response from the power source.	
Arc Length	Distance from end of wire electrode to weld pool.	
Arc Adjust	Term used to represent arc length adjustments in pulse programs. Increasing `Arc Adjust` increases the actual arc length. Likewise, decreasing `Arc Adjust` shortens arc length. `Arc Adjust` is replaced by volts in MIG programs.	

3.7 End
Continued

Parameter	Description	Masking rules
Sharp Arc (Arc Control)	Allows setting of inductance and slope in MIG mode. In pulse and Accu-pulse modes, this adjustment changes the arc characteristics by adjusting the preprogrammed factory pulse settings.	

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