Application manual
Miller Ethernet I/P Interface and Weld Editor
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

<table>
<thead>
<tr>
<th>References</th>
<th>Document ID</th>
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<tbody>
<tr>
<td>Operating manual - RobotStudio</td>
<td>3HAC032104-001</td>
</tr>
<tr>
<td>Application manual - Arc and Arc Sensor</td>
<td>3HAC050988-001</td>
</tr>
<tr>
<td>Technical reference manual - RAPID Instructions, Functions and Data types</td>
<td>3HAC050917-001</td>
</tr>
<tr>
<td>Technical reference manual - RAPID Overview</td>
<td>3HAC050947-001</td>
</tr>
<tr>
<td>Miller Axcess E Network Setup Guide</td>
<td>263 431A (<a href="http://www.miller-welds.com">www.miller-welds.com</a>)</td>
</tr>
<tr>
<td>Miller Auto-Axcess E Analog Welding Power Sources CE</td>
<td>OM-251440A (<a href="http://www.miller-welds.com">www.miller-welds.com</a>)</td>
</tr>
</tbody>
</table>

Revisions

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<tr>
<th>Revision</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>Published with RobotWare 6.09.</td>
</tr>
<tr>
<td></td>
<td>• Clarification regarding options, see Robot controller software on page 25.</td>
</tr>
<tr>
<td>-</td>
<td>New manual. Released with RobotWare 6.02.</td>
</tr>
</tbody>
</table>
Product documentation

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.


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 corresponding figures (or references to separate spare parts lists).
- References to circuit diagrams.

Technical reference manuals

The technical reference manuals describe reference information for robotics products, for example lubrication, the RAPID language, and system parameters.

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, 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 troubleshooters.
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.
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.

Continues on next page
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

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 Overview of Auto-Axcess

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

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...
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
1 Overview of Auto-Axcess

1.4 Auto-Axcess E Digital Control Panels

1.4 Auto-Axcess E Digital Control Panels

Front Panel

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

Continues on next page
Rear Panel

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Wire Feed Speed Sensor Connection (Optional)</td>
</tr>
<tr>
<td>15</td>
<td>Gas Flow Sensor Connection (Optional)</td>
</tr>
<tr>
<td>16</td>
<td>Peripheral Connector</td>
</tr>
<tr>
<td>17</td>
<td>Circuit Breakers</td>
</tr>
<tr>
<td>18</td>
<td>Motor Connector</td>
</tr>
<tr>
<td>19</td>
<td>DeviceNet Connector</td>
</tr>
<tr>
<td>20</td>
<td>Ethernet Connector A</td>
</tr>
<tr>
<td>21</td>
<td>Ethernet Connector B</td>
</tr>
<tr>
<td>22</td>
<td>E-Stop</td>
</tr>
<tr>
<td>23</td>
<td>115 VAC, 10 A Duplex Receptacle</td>
</tr>
</tbody>
</table>

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.

Continues on next page
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

Continues on next page
2 Installation and setup

2.1.1 Auto-Axcess E Welding Systems

Continued
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 NICs (Network Interface Connections) on the rear panel of the Axcess E. These NICs 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.
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.

xx1500000812
2 Installation and setup

2.1.3 Auto-Axcess E Ethernet cable connection

Continued
2 Installation and setup

2.1.4 IRC5 controller Ethernet cable connection

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.

![Overview of the computer unit](xx1300000608)

| X5 | LAN3 |
2.2 Robot controller software

Robot controller software prerequisites

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

[637-1] Production Screen is included in RobotWare Arc.
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.

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.

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.

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.

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.
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.

By connecting to the isolated LAN 3 port it is possible to connect several robot controllers to a dedicated industrial network.

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.

Continues on next page
2 Installation and setup

2.3.1 Overview

Continued

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.

   **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.

Continues on next page
2 Installation and setup

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

Continued

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.

5 Click the Ethernet Settings button on the System Settings page.

Continues on next page
6 Change the settings for either Ethernet A and click Update A or update Ethernet B and click Update B.
2 Installation and setup

2.3.3 Setup the robot controller Ethernet/IP address

2.3.3 Setup the robot controller Ethernet/IP address

Procedure

Tip

We recommend to create a 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.

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 EtherNet/IP network to modify it.

Continues on next page
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.
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).

4. Set the desired EtherNet/IP Address for the Miller Auto-Access.

5. Restart the controller to activate the changes.

Continues on next page
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

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.

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.

**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

![Image of Ignition interface with buttons and settings]

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refresh</td>
<td>The blue refresh button is used to return to the Weld Phase tab.</td>
</tr>
<tr>
<td>Confirm</td>
<td>The green check button is used to confirm any changes made.</td>
</tr>
<tr>
<td>Cancel</td>
<td>The red cancel button is used to cancel any changes made and return to the previous values.</td>
</tr>
</tbody>
</table>
Ignition parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>seamdata</td>
<td>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.</td>
</tr>
<tr>
<td>Purge Time</td>
<td>The time (in seconds) it takes to fill the gas lines and the welding gun with protective gas, also called &quot;gas purging&quot;.</td>
</tr>
<tr>
<td>Pre Flow Time</td>
<td>The time (in seconds) it takes to pre-flow the weld object with protective gas, also called &quot;gas pre-flow&quot;.</td>
</tr>
</tbody>
</table>
| 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     | 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. |

**Note**

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

![Heat Interface](image)

### Button Description

<table>
<thead>
<tr>
<th>Button</th>
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</tr>
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<td>Confirm</td>
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<td>Cancel</td>
<td>The red cancel button is used to cancel any changes made and return to the previous values.</td>
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Continues on next page
### Heat parameters

**Note**

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>seamdata</td>
<td><em>seamdata</em> is used to control the start and end of the weld. <em>seamdata</em> is also used if the process is restarted after a welding operation has been interrupted.</td>
</tr>
<tr>
<td>Heat Dist</td>
<td>The distance during which the heat data is active at the start of the weld.</td>
</tr>
<tr>
<td>Heat Speed</td>
<td>The welding speed during the heat phase at the start of the weld phase.</td>
</tr>
</tbody>
</table>
| 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

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refresh</td>
<td>The blue refresh button is used to return to the Weld Phase tab.</td>
</tr>
<tr>
<td>Confirm</td>
<td>The green check button is used to confirm any changes made.</td>
</tr>
<tr>
<td>Cancel</td>
<td>The red cancel button is used to cancel any changes made and return to the previous values.</td>
</tr>
</tbody>
</table>

Weld parameters

Note

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>welddata</td>
<td>The welddata parameters control the weld during the weld phase, which is as long as the arc is established.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Weld Speed</td>
<td>The speed of the TCP of the welding torch during the weld instruction.</td>
</tr>
<tr>
<td>Weld List No</td>
<td>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.</td>
</tr>
<tr>
<td>Wire Feed</td>
<td>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).</td>
</tr>
<tr>
<td>Voltage</td>
<td>Voltage sets the voltage reference for the weld.</td>
</tr>
<tr>
<td>Inductance</td>
<td>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.</td>
</tr>
<tr>
<td>Slope</td>
<td>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.</td>
</tr>
<tr>
<td>Arc Length</td>
<td>Distance from end of wire electrode to weld pool.</td>
</tr>
<tr>
<td>Arc Adjust</td>
<td>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.</td>
</tr>
<tr>
<td>Sharp Arc (Arc Control)</td>
<td>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.</td>
</tr>
</tbody>
</table>
3 Weld Editor Interface

3.7 End

Overview

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.

Interface

![Interface Image]

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refresh</td>
<td>The blue refresh button is used to return to the Weld Phase tab.</td>
</tr>
<tr>
<td>Confirm</td>
<td>The green check button is used to confirm any changes made.</td>
</tr>
<tr>
<td>Cancel</td>
<td>The red cancel button is used to cancel any changes made and return to the previous values.</td>
</tr>
</tbody>
</table>

End parameters

Note

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

Continues on next page
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Masking rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>seamdata</td>
<td>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.</td>
<td>Visible if parameter cool_time_on and fill_on is activated in PROC.</td>
</tr>
<tr>
<td>Cool Time</td>
<td>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.</td>
<td>Visible if parameter fill_on is activated in PROC.</td>
</tr>
<tr>
<td>Fill Time</td>
<td>The crater-filling time (in seconds) at the end phase of the weld.</td>
<td>Visible if parameter roll-back_on is activated in PROC.</td>
</tr>
<tr>
<td>Post Flow</td>
<td>The time (in seconds) for purging with protective gas after the end of the process.</td>
<td>Always visible.</td>
</tr>
<tr>
<td>Roll Back</td>
<td>The time (in seconds) during which the weld electrode is rolled back when electrode feeding has stopped.</td>
<td>Visible if parameter roll-back_on is activated in PROC.</td>
</tr>
</tbody>
</table>
| 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. |                                                   |

Continues on next page
<table>
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<th>Parameter</th>
<th>Description</th>
<th>Masking rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharp Arc (Arc Control)</td>
<td>Allows setting of inductance and slope in MIG mode. In pulse and Accu-pulse</td>
<td>mode, this adjustment changes the arc characteristics by adjusting the</td>
</tr>
<tr>
<td></td>
<td>mode, this adjustment changes the arc characteristics by adjusting the</td>
<td>preprogrammed factory pulse settings.</td>
</tr>
<tr>
<td></td>
<td>preprogrammed factory pulse settings.</td>
<td></td>
</tr>
</tbody>
</table>
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