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1920300
R09

OPERATING MANUAL

A7 MIG Welder

350, 450

KEMPPI

CONTENTS

1. INTRODUCTION

Congratulations on choosing the A7 MIG Welder system. When used correctly, Kemppi products can significantly increase the productivity of your welding, and provide years of economical service.

This operating manual contains important information on the use, maintenance and safety of your Kemppi product. The technical specifications of the equipment can be found at the end of the manual.

Please read the manual carefully before using the equipment for the first time. For your own safety and that of your working environment, pay particular attention to the safety instructions in the manual.

For more information on Kemppi products, contact Kemppi Oy, consult an authorized Kemppi dealer, or visit the Kemppi web site at www.kemppi.com.

The specifications presented in this manual are subject to change without prior notice.

Important notes

Items in the manual that require particular attention in order to minimize damage and harm are indicated by the symbols below. Read these sections carefully and follow their instructions.

Note: Gives the user a useful piece of information.

Caution: Describes a situation that may result in damage to the equipment or system.

Warning: Describes a potentially dangerous situation. If not avoided, it will result in personal damage or fatal injury.

Disclaimer

While every effort has been made to ensure that the information contained in this guide is accurate and complete, no liability can be accepted for any errors or omissions. Kemppi reserves the right to change the specification of the product described at any time without prior notice. Do not copy, record, reproduce or transmit the contents of this guide without prior permission from Kemppi.

The web user interface server, located in the robot interface unit, is meant to be used only in point-to-point connection with one authorized PC computer. For the sake of confidentiality, it is not recommended to connect the A7 MIG Welder system to any public or internal network. Kemppi is not liable for errors or damages resulting from non-compliance of this recommendation.

2. INSTALLATION

The product is packed in specially designed transport cartons. However, always make sure the products have not been damaged during transportation prior to this.

Product packaging material is recyclable.

When moving the welding machine, never pull it from the welding gun or other cables. For lifting the power source and the robot interface unit, use the recesses at the both ends of the robot interface unit.

Detailed installation instructions and the technical information that is out of the scope of this manual are found in the A7 MIG Welder Integration guide.

Operating environment

The machines included in the system are suitable for both indoor and outdoor use. Always make sure that the air flow to the machine is unrestricted. The recommended operating temperature range is -20…+40°C.

Positioning the machines

Place the machine on a sturdy, level surface that is dry and will not allow dust or other impurities to enter the machine´s cooling air flow. Preferably, situate the machine in a suitable carriage unit so it is above floor level.

- The surface inclination may not exceed 15 degrees.
- Ensure the free circulation of the cooling air. There must be at least 20 cm of free space in front of and behind the machine for cooling-air circulation.
- Protect the machine against heavy rain and direct sunshine.

Do not operate the machine in the rain.

Never aim the spray of sparks from a grinding machine toward the equipment.

3. SYSTEM OVERVIEW

3.1 Power Source

The A7 MIG Welder system

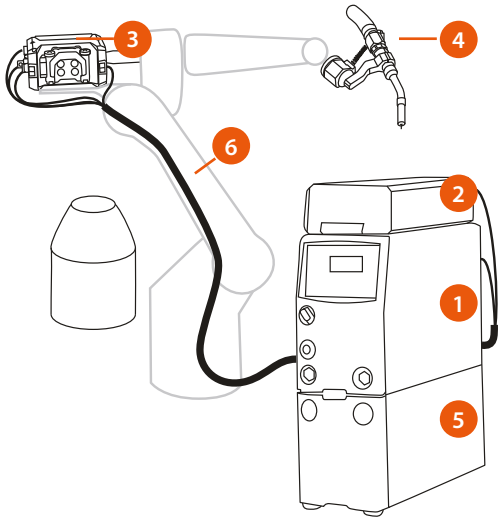


Figure 3.1 A7 MIG Welder system

1. Power Source
2. Robot interface unit
3. Wire feeder
4. MIG torch
5. Cooling unit (optional)
6. Interconnection cable set

A7 MIG Power Source 350/450

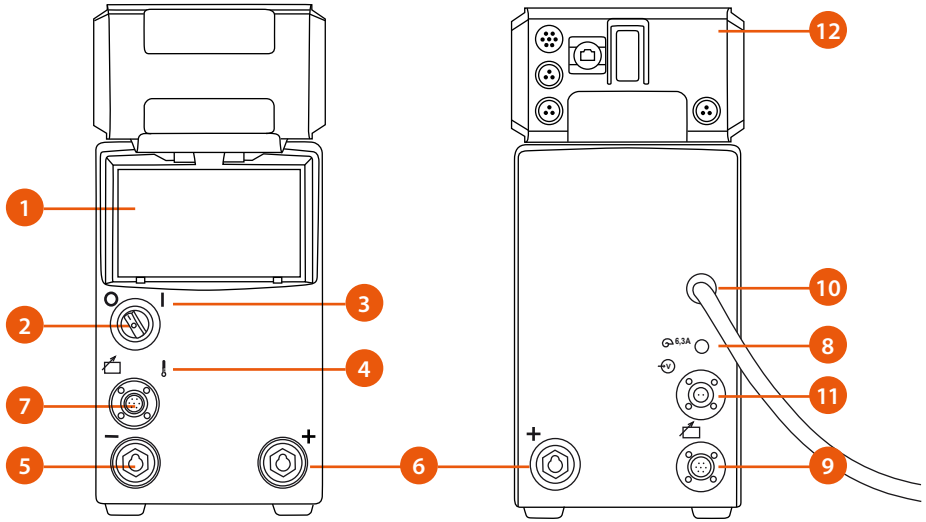


Figure 3.2 Power source, front and rear

1. Setup panel
2. Main switch
3. Main power indicator light (ON/OFF)
4. Overheating indicator
5. Welding cable connection, negative pole (–)
6. Welding cable connection, positive pole (+)
7. Control cable connection
8. Fuse (6.3 A, delayed)
9. Control cable connection
10. Mains power cable
11. Measurement cable connection
12. Robot interface unit

The A7 MIG Power Source 350/450 is designed for demanding professional use. The power source is suitable for pulsed MIG/MAG, 1-MIG, and also for WiseRoot+ and WiseThin+ processes.

3.2 Robot interface unit

A7 MIG Robot interface unit

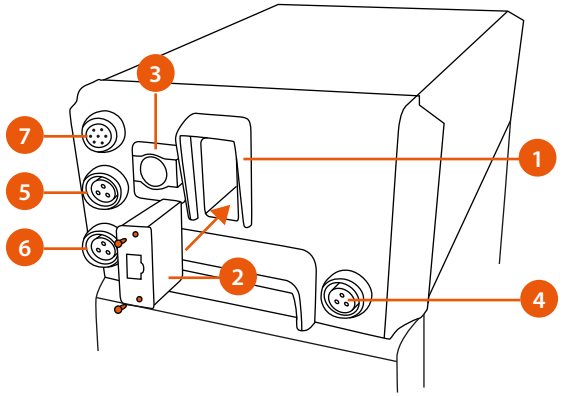


Figure 3.3 Robot interface unit connections

1. Fieldbus module slot
2. Anybus CompactCom M30 module
3. Ethernet connection for the web user interface
4. Touch sensor fast output
5. Stop switch input
6. Gate door switch input
7. Wire feeder control cable connection

The robot interface unit on top of the power source handles the communication with a robot and contains all necessary connections to integrate with a welding cell. The unit has an internal web server that provides a web user interface for easy control of welding and setup parameters via any device equipped with an internet browser including robot teach pendants.

For connecting the cables of the robot interface unit, see the A7 MIG Welder Integration guide.

3.3 User interfaces

The A7 MIG Welder system has two integrated user interfaces with system setup and control capability, a setup panel and a web user interface.

The web user interface is mandatory for configuring the fieldbus. The fieldbus configuration functionality is not available in the setup panel. The fieldbus configuration is described in the A7 MIG Welder Integration guide.

Setup panel

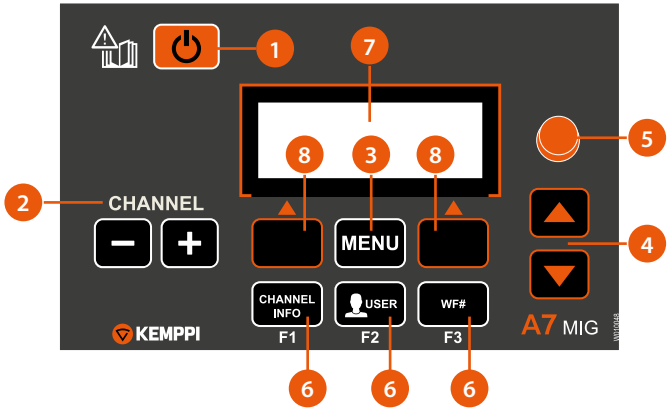


Figure 14 Setup panel layout

1. Power button
2. Memory channel selector (-/+)
3. MENU entry button
4. Up / down arrows
5. Control knob
6. Menu shortcut keys
7. LCD display
8. Soft key buttons

The setup panel has a menu display, soft buttons and a control knob for easy navigation and control. See Section 4.2, "Setup panel" for details.

Web user interface

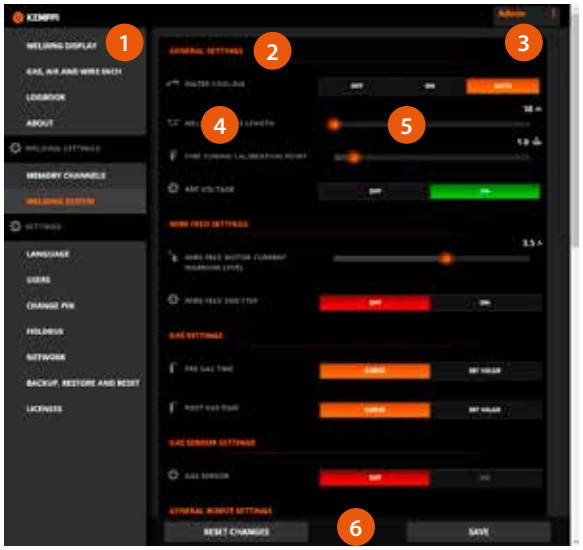


Figure 3.5 Web user interface layout overview

1. Side menu bar
2. Content frame
3. Current user / User logout
4. Setup parameters
5. Setup value controls
6. Pop-up bar (normally hidden)

The web user interface is a website that is located in a network server in the robot interface unit. It can be accessed by any internet browser that is capable of showing dynamic web pages. The web user interface can be used for controlling the welding system and all its setup parameters. See Section 4.3, "Web user interface" for details.

3.4 A7 MIG Wire Feeder 25

A7 MIG Wire Feeder 25

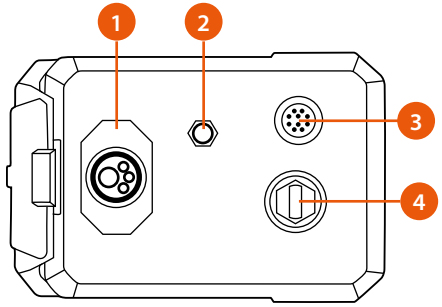


Figure 3.6 Wire feeder – front

1. Euro connector for the welding gun
2. Compressed air outlet
3. Motor gun and peripheral connector
4. Welding current (+) input

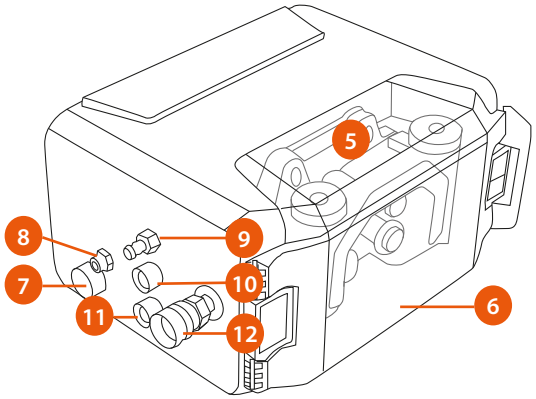


Figure 3.7 Wire feeder – rear side

5. GT04T wire feed mechanism
6. Transparent lid
7. Wire feeder control cable connection
8. Compressed air inlet
9. Shielding gas inlet
10. Arc measurement cable connector for the power source
11. Arc measurement cable connector for the workpiece clamp
12. Wire liner connector

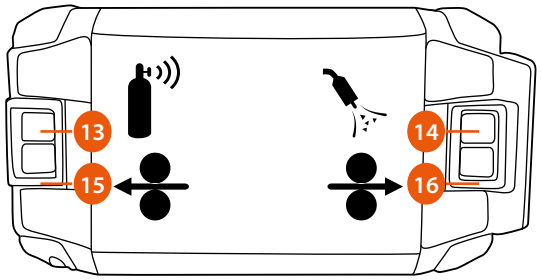


Figure 3.8 Wire feeder – cover

13. Gas test button
14. Air blow button
15. Wire retract button
16. Wire inch button

The A7 MIG Wire Feeder 25 is a durable and powerful wire feeding device for welding automation. For more information on using the wire feeder and its functions, see Section 4.7, "Wire Feeder".

Interconnection cable assembly for wire feeder

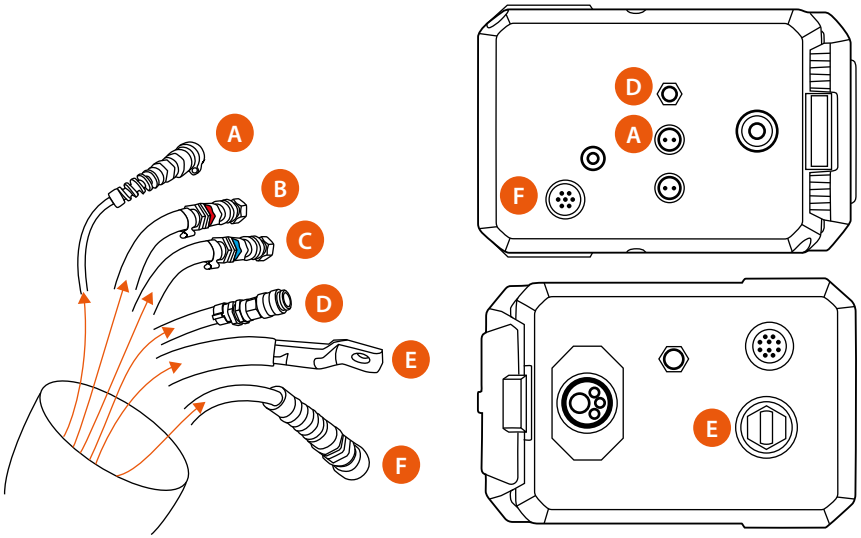


Figure 3.9 Interconnection cable set

A. Measurement cable
B. Cooling hose (red, incoming from gun)
C. Cooling hose (blue, outgoing to gun)
D. Shielding gas hose
E. Welding cable
F. Control cable

The cooling hoses B and C run outside the wire feeder.

See the A7 Welder Integration guide for more detailed information on connecting the wire feeder.

3.5 MIG Guns

A7 MIG Gun 500-g

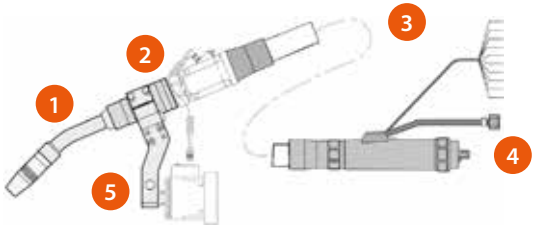


Figure 3.10 A7 MIG Gun 500-g

1. Torch neck
2. Connection module
3. Hose assembly
4. Welding gun connector
5. Robot mount

The A7 MIG Gun 500-g is used in gas welding using inert gases (MIG) or active gases (MAG). This model is gas-cooled and can be used in all welding positions.

A7 MIG Welding Gun 500-w

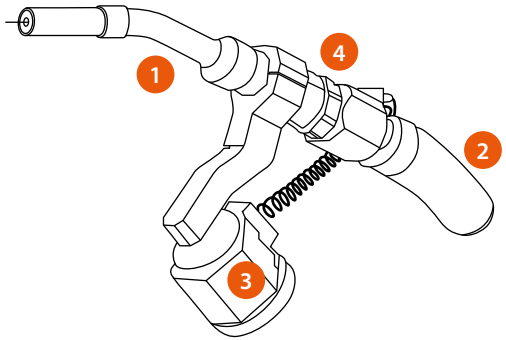


Figure 3.11 A7 MIG Gun 500-w

1. Torch neck
2. Hose assembly
3. Robot mount
4. Fastener

The A7 MIG Gun 500-w is used in gas welding using inert gases (MIG) or active gases (MAG). This model is water-cooled and can be used in all welding positions.

Robot mounts

The A7 MIG Gun 500-w and 500-g are mounted to the welding robot using special robot mounts. There are three types of robot mounts available: robot mount Type 1, Type 2 and Type 3.

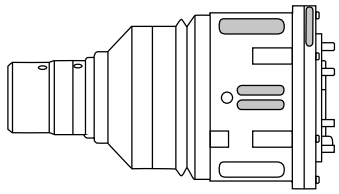


Figure 3.12 Robot mount T1

The robot mount Type 1 serves for accommodating a welding gun in exact position. The mount is fastened to the robot with a cylinder head screws and a robot flange.

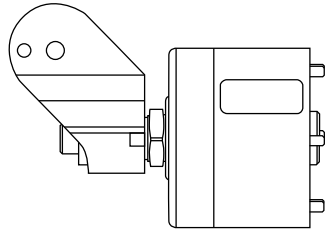


Figure 3.13 Robot mount T2

The robot mount Type 2 is used for connecting the robot and the welding gun. The device acts three-dimensionally and is adaptable to all types of robots and for handling machines via a robot flange.

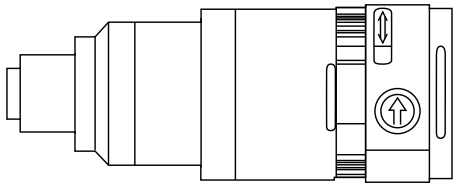


Figure 3.14 Robot mount T3

The robot mount Type 3 is a gun seat without integrated collision protection. The collision protection or the switch-off of the robot is only possible via the robot control.

For assembly and installation of the A7 MIG guns, see A7 MIG Gun 500-g Operation manual, A7 MIG Gun 500-w Operation manual and A7 MIG Welder Integration guide.

For compatibility and selection table, see the separate A7 MIG Gun 500-g Operation manual and A7 MIG Gun 500-w Operation manual.

3.6 Cooling unit

A7 Cooler

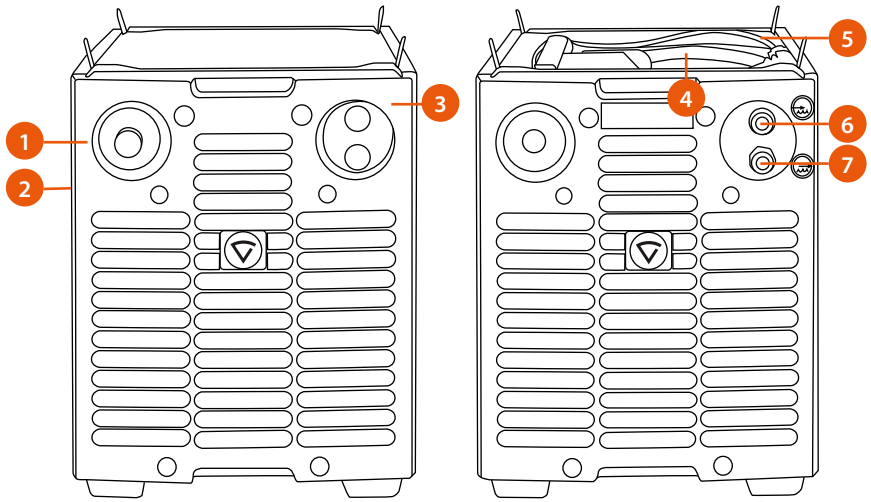


Figure 3.15 Cooling unit

1. Test switch
2. Filling hole (in the side plate)
3. Overheat control indicator
4. Power supply cable
5. Control cable
6. Coolant return connector
7. Coolant output connector

The cooling unit is designed for automatic and manual welding equipment and to be used for cooling of the liquid-cooled welding gun. See the A7 Cooler Operating manual for more information on the installation.

This unit is equipped with a filter and a flow switch in the return channel to ensure uninterrupted cooling operation. The operation is controlled by software. See the A7 MIG Welder Integration guide for system configuration options.

4. USING THE WELDER

4.1 Basic controls

Main switch

When you turn the on/off switch into position 1, the main power indicator is illuminated and the welder system starts a power-up sequence. The system is ready for use when the setup panel is ready. Always turn the machine on and off with the power source mains switch. Never use the mains plug as a switch.

Indicator lights

The indicator lights of the machine report its operational state: When the green main power indicator is on, it indicates that the machine is switched on. When the orange warning indicator light is on, the machine is overheated. This is due to a higher than regular working load exceeding the rated duty cycle. The cooling fan continues to cool the machine down. When the light goes off the machine is ready to weld again.

Cooling fans

The A7 MIG Power Source incorporates two simultaneously operating cooling fans. The fans will start during welding as the machine reaches operational temperature, and they will run for 1 to 10 minutes after welding, depending on the heat effect of the completed cycle.

4.2 Setup panel

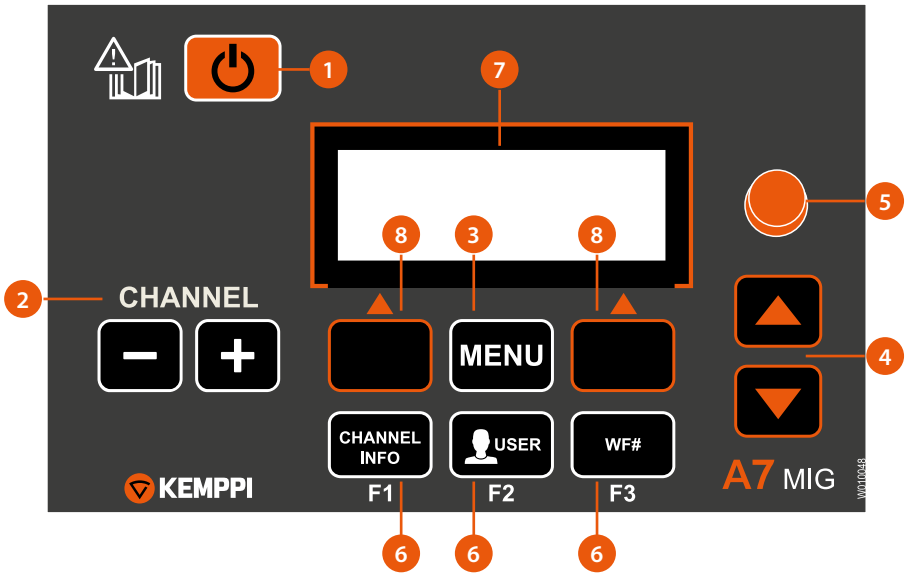


Figure 4.1 Setup panel layout

1. Power button
2. Memory channel selector (-/+)
3. MENU entry button
4. Up / down arrows
5. Control knob
6. Menu shortcut keys
7. LCD display
8. Soft key buttons

4.2.1 Button functions

Power button

You can log OFF the current user by pressing on the power button for approximately 5 seconds. The user identification system has to be on and a user logged in for this function. If the user identification system is off, the long press has no effect.

Pressing this button anywhere in the menu returns to the memory channel information display. Possible unsaved changes are lost.

Memory channel selector

There are up to 200 memory channels available in the system starting from number 0 and ending to number 199. The plus and minus buttons can be used to navigate between the memory channels in the information display. If the selected channel is empty, a soft button with text NEW is shown allowing direct entering to a channel editor.

MENU entry button

Enter the main menu by pressing this button.

Up/down arrows

Navigate in the menus up and down by pressing these buttons.

Control knob

Adjust values and settings of menu parameters by turning the control knob.

Menu shortcut keys

Press the F1 to view additional information on the current memory channel. Multiple presses show more information pages. Pressing this button in the menu returns to the channel information display.

Press the F2 to log a user in when the user identification system is turned on and all users are logged off. Pressing this button when a user has logged in redirects you to the user settings menu. If the Key Lock feature is in use, a long press (over 4 seconds) locks and unlocks the Setup panel.

Press the F3 to select another wire feeder. The selection is allowed if there are multiple wire feeders connected into the welding system.

Soft key buttons

The function of the soft key buttons depends on the current menu location and the operation being performed in that location. The function is indicated by a text in the LCD display just above the buttons, for example BACK, EXIT, SELECT, OK, SAVE or NEW.

4.2.2 Main menu

Main menu list		
	Menu item	Description
1/8	Edit channel	Open a memory channel wizard and create, modify and delete memory channels.
2/8	User settings	Select, add, edit and delete users (requires login). See Section 4.4 "User identification" for more information.
3/8	Weld data	Check the values of the last weld.
4/8	System config menu	Configure the welding system and view device information.
5/8	Language	Select the menu language.
6/8	Select feeder (WF#)	Select another parallel wire feeder for setup.
7/8	Test menu	Test system devices.
8/8	Robot menu	Configure the robot interface and devices for automated welding.

4.2.3 Memory channel wizard

For further information about the available welding programs, modified processes, Match™ functions and the special enhanced arc performance solution, see the wire feeder's operating manual or the Kemppi website at www.kemppi.com.

Edit channel (Main menu 1/8)		
Menu item	Value range	Description
Select channel		
Edit channel	0 - 199	Select which memory channel to edit, create or delete. The text below the selection shows whether the channel is empty or not.

New channel (displayed when the selected channel is empty)			
	Menu item	Value range	Description
1/2	Create new		Create a new memory channel by selecting the welding curve and specifying welding functions and welding parameters. After saving the curve selection, the welding parameter setup is opened automatically.
	1. Choose process	MIG, 1-MIG, Pulse MIG, Double pulse MIG, WiseRoot+, WiseThin+, Curve number list	Select one of the processes for step-by-step curve selection, or go to the curve number list to select the welding curve directly by its number. In the step-by-step selection the curve list is filtered by each selection to make the curve selection easier.
	2. Choose group *		Select the group of the base material.
	3. Choose material *		Select the base material.
	4. Choose diameter *		Select the filler wire diameter.
	5. Choose gas *		Select the shielding gas type.
	Choose curve *		Choose the curve from the list filtered by the process, material, wire diameter and shielding gas selections.
2/2	Copy from CH…		Create a new memory channel by making a copy from an existing one.
	Copy from CH	0 - 199	Select the channel where to make the copy from.

* The content of the list depends on the available curves and the selections in the previous steps.

Edit channel (displayed when the selected channel is not empty)			
	Menu item	Value range	Description
1/6	Select weld curve		Change the weld curve. The curve selection follows the same method as when creating a new channel.
2/6	Welding parameters *		Select welding parameters, like wire feed speed and fine tuning. The list of the available welding parameters depends on the selected welding process.
3/6	Welding functions *		Select welding functions, like hot start, creep start and crater fill.
4/6	Advanced functions *		Select advanced welding functions, like WiseFusion and WisePenetration.
5/6	Copy channel to…		Make a copy from this memory channel to another channel.
	Copy channel to	0 - 199	Select the channel number where to make the copy. Note that making the copy to a non-empty channel overwrites the channel data without confirmation.
6/6	Erase channel		Make this channel empty by erasing all data from the channel.

* See the tables Welding parameters and Welding functions for more information.

Welding parameters

Welding parameters for MIG process (Edit channel 2/6)				
	Menu item	Value range	Default value	Description
1/7	WFSpeed	WFS min - WFS max	From curve	Set the wire feed speed in 0.05 m/min steps from 0.5 to 5.0 m/min and in 0.1 m/min steps above 5.0 m/min.
2/7	WFS max	0.7 - 25.0 m/min *	From curve	Set the upper limit for the WFSpeed value.
3/7	WFS min	0.7 - 25.0 m/min *	From curve	Set the lower limit for the WFSpeed value.
4/7	Voltage	Voltage min - Voltage max	From curve	Set the welding voltage (arc length).
5/7	Voltage max	8.0 - 50.0 V *	From curve	Set the upper limit for the Voltage value.
6/7	Voltage min	8.0 - 50.0 V *	From curve	Set the lower limit for the Voltage value.
7/7	Dynamics	-9 … +9	0	Control the arc behavior in short circuit. Lower value results to softer and higher value to rougher arc.

* These are system limits. Actual limits come from the selected welding curve.

Welding parameters for 1-MIG process (Edit channel 2/6)				
	Menu item	Value range	Default value	Description
1/7	WFSpeed	WFS min - WFS max	From curve	Set the wire feed speed in 0.05 m/min steps from 0.5 to 5.0 m/min and in 0.1 m/min steps above 5.0 m/min.
2/7	WFS max	0.7 - 25.0 m/min *	From curve	Set the upper limit for the WFSpeed value.
3/7	WFS min	0.7 - 25.0 m/min *	From curve	Set the lower limit for the WFSpeed value.
4/7	FineTuning	FineTuningMin - FineTuningMax	0	Adjust the welding voltage (arc length) of the welding curve up and down (0 = no adjustment).
5/7	FineTuningMax	-9.0 … +9.0	+9.0	Set the upper limit for the FineTuning value.
6/7	FineTuningMin	-9.0 … +9.0	-9.0	Set the lower limit for the FineTuning value.
7/7	Dynamics	-9 … +9	0	Control the arc behavior in short circuit. A lower value results in a softer arc and a higher value results in a rougher arc.

* These are system limits. Actual limits come from the selected welding curve.

Welding parameters for Pulse MIG process (Edit channel 2/6)				
	Menu item	Value range	Default value	Description
1/8	WFSpeed	WFS min - WFS max	From curve	Set the wire feed speed in 0.05 m/min steps from 0.5 to 5.0 m/min and in 0.1 m/min steps above 5.0 m/min.
2/8	WFS max	0.7 - 25.0 m/min *	From curve	Set the upper limit for the WFSpeed value.
3/8	WFS min	0.7 - 25.0 m/min *	From curve	Set the lower limit for the WFSpeed value.
4/8	FineTuning	FineTuningMin FineTuningMax-	0	Adjust the welding voltage (arc length) of the welding curve up and down (0 = no adjustment).
5/8	FineTuningMax	-9.0 … +9.0	+9.0	Set the upper limit for the FineTuning value.
6/8	FineTuningMin	-9.0 … +9.0	-9.0	Set the lower limit for the FineTuning value.
7/8	Dynamics	-9 … +9	0	Control the arc behavior in short circuit. A lower value results in a softer arc and a higher value results in a rougher arc.
8/8	Pulse current	-10 … +15 %	0 %	Adjust the pulse current up and down.

* These are system limits. Actual limits come from the selected welding curve.

Welding parameters for Double Pulse MIG process (Edit channel 2/6)				
	Menu item	Value range	Default value	Description
1/10	WFSpeed	WFS min - WFS max	From curve	Set the wire feed speed in 0.05 m/min steps from 0.5 to 5.0 m/min and in 0.1 m/min steps above 5.0 m/min.
2/10	WFS max	0.7 - 25.0 m/min *	From curve	Set the upper limit for the WFSpeed value.
3/10	WFS min	0.7 - 25.0 m/min *	From curve	Set the lower limit for the WFSpeed value.
4/10	FineTuning	FineTuningMin - FineTuningMax	0	Adjust the welding voltage (arc length) of the welding curve up and down (0 = no adjustment).
5/10	FineTuningMax	-9.0 … +9.0	+9.0	Set the upper limit for the FineTuning value.
6/10	FineTuningMin	-9.0 … +9.0	-9.0	Set the lower limit for the FineTuning value.
7/10	Dynamics	-9 … +9	0	Control the arc behavior in short circuit. Lower value results to softer and higher value to rougher arc.
8/10	Pulse current	-10 … +15 %	0 %	Adjust the pulse current up and down.
9/10	DPulseAmp	0.1 - 3.0, CURVE	CURVE	Adjust the amplitude of the wire feed speed, or use the value from the welding curve.
10/10	DPulseFreq	0.4 - 8.0 Hz, CURVE	CURVE	Adjust the frequency of the double pulse, or use the value from the welding curve.

* These are system limits. Actual limits come from the selected welding curve.

Welding parameters for WiseRoot+ process (Edit channel 2/6)				
	Menu item	Value range	Default value	Description
1/6	WFSpeed	WFS min - WFS max	From curve	Set the wire feed speed in 0.05 m/min steps from 0.5 to 5.0 m/min and in 0.1 m/min steps above 5.0 m/min.
2/6	WFS max	1.2 - 11.0 m/min *	From curve	Set the upper limit for the WFSpeed value.
3/6	WFS min	1.2 - 11.0 m/min *	From curve	Set the lower limit for the WFSpeed value.
4/6	FineTuning	FineTuningMin - FineTuningMax	0	Adjust the base current (arc heat) of the curve up and down (0 = no adjustment).
5/6	FineTuningMax	-9.0 … +9.0	+9.0	Set the upper limit for the FineTuning value.
6/6	FineTuningMin	-9.0 … +9.0	-9.0	Set the lower limit for the FineTuning value.

* These are system limits. Actual limits come from the selected welding curve.

Welding parameters for WiseThin+ process (Edit channel 2/6)				
	Menu item	Value range	Default value	Description
1/7	WFSpeed	WFS min - WFS max	From curve	Set the wire feed speed in 0.05 m/min steps from 0.5 to 5.0 m/min and in 0.1 m/min steps above 5.0 m/min.
2/7	WFS max	0.7 - 25.0 m/min *	From curve	Set the upper limit for the WFSpeed value.
3/7	WFS min	0.7 - 25.0 m/min *	From curve	Set the lower limit for the WFSpeed value.
4/7	FineTuning	FineTuningMin - FineTuningMax	0	Adjust the base current (arc heat) of the curve up and down (0 = no adjustment).
5/7	FineTuningMax	-9.0 … +9.0	+9.0	Set the upper limit for the FineTuning value.
6/7	FineTuningMin	-9.0 … +9.0	-9.0	Set the lower limit for the FineTuning value.
7/7	Dynamics	-9 … +9	0	Control the arc behavior in short circuit. A lower value results in a softer arc and a higher value results in a rougher arc.

* These are system limits. Actual limits come from the selected welding curve.

Welding functions

Welding Functions (In Edit Channel menu 3/6)				
	Menu item	Value range	Default value	Description
1/10	HotStart	ON, OFF, USER	USER	Set the hot start on and off, or let the user select it from a welding panel.
2/10	HotStartLevel	-50 … +100 %	40 %	Set the hot start level related to the welding current level.
3/10	Hot 2T time	0.0 - 9.9 s	1.2 s	Set the duration of the hot start.
4/10	Crater fill	ON, OFF, USER	USER	Set the crater fill on and off, or let the user select it from a welding panel.
5/10	CraterStart	10 - 250 %	100 %	Set the level of the curve where the crater fill starts from.
6/10	CraterFillEnd	10 - 250 %, not higher than CraterStart value	30 %	Set the level of the curve at the end of the crater fill.
7/10	CraterTime	0.0 - 10.0 s	1.0 s	Set the crater fill slope time.
8/10	Creep start	10 - 99 %, OFF, CURVE	CURVE	Set the creep start off, adjust the creep start level or select the value of the welding curve being used.
9/10	Start power	-9 … 9	0	Adjust the arc ignition power.
10/10	TSI	ON, OFF	OFF	Set the touch sense ignition on and off.

Advanced functions (Edit channel 4/6)*				
	Menu item	Value range	Default value	Description
1/4	WisePenetration	ON, OFF	OFF	Set the Wise penetration on and off.
2/4	Penet%(123A)	-30 … 30 %	0 %	Set the level of the Wise penetration.
3/4	WiseFusion	ON, OFF	OFF	Set the Wise fusion on and off.
4/4	WiseFusion%	20 - 60 %, CURVE	CURVE	The Wise fusion functionality controls the amount of short circuits in the arc. Lower fusion value reduces the amount of the short circuits and higher value increases the amount.

* If the function is not allowed by the selected process or there is no license for the function, the text 'NA' (not allowed) is displayed.

4.2.4 User settings

*User settings menu (Main menu 2/8) (login required)**				
	Menu item	Value range	Factory value	Description
1/5	Change PIN code			Change your PIN code.
	New PIN code	0000 - 9999	0000	Specify a new PIN code.
2/5	User mode	ON, OFF	OFF	Set the user identification mode on and off.
3/5	Set the user rights			Change the role for a user.
	Select user	USER1 - USER10		Select the user whose role you want to change. Note! You cannot change your own role.
	Level	Welder, Supervisor, Administrator		Select the role for the user.
4/5	User activation			Create and delete users.
	User activation	USER1 - USER10		Select the user account that you want to create /delete.
	User	Enabled, Disabled		Create an account by setting the user Enabled, or delete the account by selecting Disabled.
5/5	Reset user PIN code			Reset the PIN code of a user.
	Select user	USER1 - USER10		Select the user whose PIN code to reset. The reset value is 0000. Confirm the reset by pressing OK soft button.

* See section 4.4 User identification for more information.

4.2.5 Welding system settings

System config menu (Main menu 4/8)				
	Menu item	Value range	Factory value	Description
1/22	Water cooling	OFF, ON, AUTO	AUTO	Set the water cooler on and off, or let the system control the cooler (AUTO). In auto mode the water pump starts when welding starts and stops after a delay when welding stops.
2/22	Cable length	10 - 100 m	10 m	Set the welding circuit length for optimal arc control.
3/22	FineCalib	0 V - 10 V / 100 A	10 V / 100 A	Set the compensation for cable resistance variation.
4/22	System clock			View and modify the system time and date.
5/22	Device information			Review the following device information for each device in the system: DevSW: Unit software version. SysSW: System base software version. BootSW: Boot software version. SW Item: Software item number. Serial: Device serial number. Prog: Programmer name. Date: Programming date.
6/22	Restore settings			
	ROBOT All settings			All memory channels (0-199) are restored from backup. Setup settings remain as they are.
	Restore to factory			All memory channels and their backups are removed. All settings are set to default factory values.

7/22	License menu			
	License code			Enter a license code manually: • Up and down arrows are used to select the code number index. • Control knob is used to select the code number (0-255). • ENTER soft button is used to activate the license code after all numbers have been entered.
	License timers			Check the remaining license time of the time-based Wise features.
8/22	Weld data delay	1 - 60 s	20 s	Specify how long the Weld Data is displayed after welding stops. Weld Data display can be closed by turning the control knob or pressing any button.
9/22	Display delay	1 - 20	10	Specify how long any textual information (like ”Settings saved”) is displayed on the screen. This is an approximate time value and the actual delay may vary depending on the system load.
10/22	Pre gas time	0.0 - 9.9 s, CURVE	CURVE	Override the pre gas time of the welding curve, or let the system use the curve value.
11/22	Post gas time	0.0 - 9.9 s, CURVE	CURVE	Override the post gas time of the welding curve, or let the system use the curve value.
12/22	Control *	USER, PANEL, REMOTE, GUN	USER	Select which remote control is used, or let the user choose the remote control freely.
13/22	RemoteAutoRecog *	ON, OFF	ON	Set the automatic recognition of the remote control unit on and off.
14/22	MIG CurrentDisp	ON, OFF	OFF	Set the MIG current display on and off. When the MIG current display is off, the wire feed speed is displayed instead.
15/22	WFMotorWarnLev	1.5 - 5.0 A	3.5 A	Set the warning level of the wire feeding motor current. The setting affects how sensitively the system detects issues in the wire feeding system.
16/22	WF end step	ON, OFF	OFF	Set the wire feeding end step on and off. When the setting is on, the filler wire steps forward at the end of the welding cycle. Otherwise the filler wire remains in the position where it was driven during the welding cycle.
17/22	AutoWireInch *	ON, OFF	ON	Set the automatic SuperSnake wire inch feature on and off. When the setting is on, the filler wire is driven automatically to the SuperSnake by pressing the wire inch button.

18/22	Gas guard *	ON, OFF	OFF	Set the gas guard on and off. Using this feature requires the gas guard to be installed into the wire feeder. This setting does not affect the gas sensor in the A7 MIG Wire Feeder.
19/22	ArcVoltage	ON, OFF	OFF	Set the arc voltage measurement and calculation function on and off. When on, the arc voltage, current and power are displayed on the setup panel and web user interface during welding. This setting also affects the welding voltage indicated in the fieldbus interface tables.
20/22	SubFeederLength *	10 - 25 m	10 m	Set the length of the subfeeder for arc voltage calculation.

21/22	Gas sensor menu			Configure the gas sensor in the the A7 MIG Wire Feeder (bus-controlled version).
	Enabled	ON, OFF	OFF	Set gas sensor unit on and off.
	Level	5.0 – 20.0 l/min	10.0 l/min	Set gas flow detection level.
	Gas mixture menu			
	Ar	(0 – 100 %)	(100 %)	Amount of Argon (Ar) in the mixture. This value cannot be adjusted manually. The value is automatically decreased when the amount of other gases is increased, and vice versa.
	CO2	0 – 100 %	0 %	Set the amount of Carbon Dioxide (CO2) in the mixture.
	N2	0 – 100 %	0 %	Set the amount of Nitrogen (N2) in the mixture.
	O2	0 – 100 %	0 %	Set the amount of Oxygen (O2) in the mixture.
	H2	0 – 100 %	0 %	Set the amount of Hydrogen (H2) in the mixture.
	He	0 – 100 %	0 %	Set the amount of Helium (He) in the mixture.
22/22	Keylock	ON, OFF	OFF	Enable or disable the Key Lock feature in Setup Panel. When enabled, this feature prevents unintentional key presses. To lock or unlock the keys, press F2 for 4 seconds. The keys are locked automatically after 2 minutes, if the Setup Panel is not used.

* This setting applies only to manual welding.

4.2.6 System tests

Test menu (Main menu 7/8)				
	Menu item	Value range	Factory value	Description
1/4	Wire inch			Run the wire inch test by pressing the START soft button and keeping it pressed. The filler wire is driven forward by accelerating to the selected speed. The test stops when the button is released.
	Speed	0.5 - 25.0 m/min	5.0 m/min	Select the wire feed speed in 0.05 m/min steps from 0.5 to 5.0 m/min and in 0.1 m/min steps above 5.0 m/min.
	WF motor			Displays the motor current during the test.
2/4	Wire retract			Run the wire retract test by pressing the START soft button and keeping it pressed. The filler wire is driven backwards by accelerating to the selected speed. The test is stopped when the button is released.
	Speed	0.5 - 25.0 m/min	5.0 m/min	Set the wire feed speed in 0.05 m/min steps from 0.5 to 5.0 m/min and in 0.1 m/min steps above 5.0 m/min.
	WF motor			Displays the motor current during the test.
3/4	Gas test			Run the gas test by pressing the START soft button once. The test is run until the test time goes off or until the STOP soft button is pressed (appears in the place of the START button).
	Test time	1 - 60 s	20 s	Set how long the gas test is run for.
4/4	Air blow			Run the compressed air blow test by pressing the START soft button once. The test is run until the test time goes off or until the STOP soft button is pressed (appears in the place of the START button).
	Test time	1 - 60 s	20 s	Set how long the air blow test is run for.

4.2.7 Robot settings

Robot menu (Menu 8/8)				
	Menu item	Value range	Factory setting	Description
1/15	Interface mode *	1 - 99	15	Select the robot I/O table for the fieldbus communication (digital robot interface).
2/15	Voltage scaling *	0 - 9999	0 (no scaling)	Select the maximum value for welding voltage / fine tuning in scaled mode (1-9999), or switch scaled mode off (0).
3/15	WFS scaling *	0 - 9999	0 (no scaling)	Select the maximum value for wire feed speed in scaled mode (1-9999), or switch scaled mode off (0).
4/15	Current scaling *	0 - 9999	0 (no scaling)	Select the maximum value for welding current in scaled mode (1-9999), or switch scaled mode off (0).
5/15	Simulation	ON, OFF, USER	OFF	Select welding simulation on and off, or let the user of the robot to manage the simulation (USER).
6/15	Wire Feeder *	WF1, WF2, USER	WF1	Select the wire feeder in dual wire feeder systems.
7/15	Stop switch menu *			Configure Stop functionality. The Stop circuitry is connected to the robot interface unit of the A7 MIG Welder.
	Selection	ON, OFF	OFF	Set the stop input on and off.
	Line level	0 V, 24 V	0 V	Select the voltage level of the input line.
	Switch type	Opening, Closing	Opening	Select the type of the electrical switch used in the signal line. The opening type switch opens the electrical circuit of the signal line and the closing type switch closes the circuit.
8/15	Door switch menu *			Configure gate door functionality. The gate door circuitry is connected to the robot interface unit of the A7 MIG Welder.
	Selection	ON, OFF	OFF	Set the gate door input on and off.
	Line level	0 V, 24 V	0 V	Select the voltage level of the input line.
	Switch type	Opening, Closing	Opening	Select the type of the electrical switch used in the signal line. The opening type switch opens the electrical circuit of the signal line and the closing type switch closes the circuit.
9/15	Touch sensor menu *			Configure touch sensor.
	Voltage	50 V, 80 V, 110 V, 160 V, 170 V, 180 V, 200 V	50 V	Select the output voltage level for the touch sensor.
	Tool	USER, Welding wire, Gas nozzle	USER	Select the tool used for touch sensing (welding wire or gas nozzle), or let the user of the robot to manage the tool selection (USER).
	FastOutput	Low-act, High-act	Low-act	Select the signal polarity of the fast hardware output. The low-active signal pulls the output to 0 V on logical '1' state and the high-active signal releases the output on logical '1'. The signal is pulled up to 24 V by a resistor when released.

10/15	Coll. sensor menu *			Configure collision sensor. The collision sensor is an optional external device connected to the A7 MIG Wire Feeder.
	Selection	ON, OFF	OFF	Set the collision sensor on and off.
	Switch type	Opening, Closing	Closing	Select the type of the electrical switch used in the signal line. The opening type switch opens the electrical circuit of the signal line and the closing type switch closes the circuit.
	Output	Low-act, High-act	High-act	Select the polarity of the output signal in the robot interface. The low-active signal is logically '1' when the signal level is 0 V and the high-active signal is '1' when the signal level is 24 V.
11/15	Gun menu *			Configure the welding torch connected to the A7 MIG Wire Feeder.
	Gun type	0 Regular, 2 WHPP E 42V 17.1:1, 3 WHPPi E 32V 13.7:1, 4 Dinse MEP(Z) 200, 5 Dinse MEP(Z) 200E 6 Dinse MEP(Z) 200T 7 TBI PP2R 8	0 Regular	Select the type of the welding torch. Some torches have a push-pull motor, with or without a tachometer or an encoder. This selection enables use of certain push-pull torches.
12/15	Watchdog settings			Configure the watchdog functionality.
	Selection	ON, OFF	OFF	Enable or disable the watchdog functionality. When enabled, the robot must refresh the watchdog by changing the status of the corresponding signal in the I/O table periodically within the watchdog timeout time. The timeout timer restarts on every transaction. If the robot stops refreshing, an error is raised and the system stops operation immediately.
	Timeout	0.1 s – 5.0 s	0.1 s	Set the watchdog timeout time.

13/15	Network settings *			Configure web user interface server's network settings. The server is located in the robot interface unit of the A7 MIG Welder.
	DHCP enabled	ON, OFF	ON	Switch the DHCP (dynamic host configuration protocol) client on for automatic IP settings or off for manual (fixed) settings.
	IP address	0.0.0.0 - 255.255.255.254	0.0.0.0	View the current IP address when teh DHCP is on, or specify the IP address manually when the DHCP is off.
	Subnet mask	0.0.0.0 - 255.255.255.254	0.0.0.0	View the current subnet mask when the DHCP is on, or specify the subnet mask manually when the DHCP is off.
	Gateway	0.0.0.0 - 255.255.255.254	0.0.0.0	View the current gateway when the DHCP is on. The web user interface does not use the gateway address, so it is not necessary to set up this value when the DHCP is off.
14/15	Gas sensor menu *			Configure gas sensor located in the A7 MIG Wire Feeder (integrated version).
	Enabled	ON, OFF	OFF	Set the gas flow sensor on and off.
	Level	5.0 - 20.0 l/min	5.0 l/min	Set the gas flow detection level.
	Gas type	Unknown, CO2, Argon, AR18CO2	Unknown	Select the shielding gas type used for welding. This selection affects the correctness of the gas flow measurement.
15/15	System name			View the system name. The system can be named in the web user interface for identification purposes.

* For more information, see the A7 MIG Welder Integration guide.

4.3 Web user interface

To access the web user interface, make sure that the network settings of the web user interface server are correct and the network cable has been plugged in. The cable connection and the network configuration are described in the A7 MIG Welder Integration guide.

Open the web user interface with a web browser to by typing a proper IP address to the browser's address field. The IP address can be verified from the setup panel, Robot Menu > Network settings > IP address.

The web user interface is used only for configuring robotic welding settings. If manual welding is used with the A7 MIG Welder, the configuration of the hand welding wire feeder is done using the setup panel.

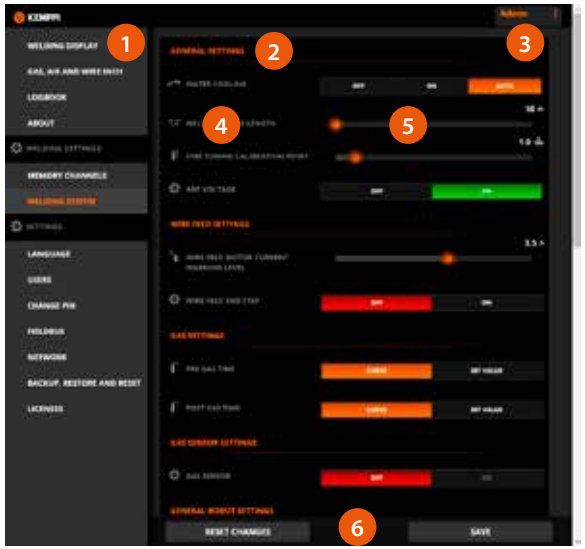


Figure 4.2 Web user interface layout overview

1. Side menu bar
2. Content frame
3. Current user / User logout
4. Setup parameters
5. Setup value controls
6. Pop-up bar (normally hidden)

Side menu bar
The side bar will be hidden if the width of the window is narrowed down. A side bar button appears in the top left corner of the window and can be used to show and hide the side bar.

The menu items are shown according to the access level of the current user. See Section 4.4 "User identification" for more information.

Current user / User logout
Clicking the current username opens a drop-down list with logout text. Clicking the text logs out the current user and redirects automatically to the login window.

Setup parameters and controls
Many of the menu items contain user configurable parameters. The setup parameters and their related controls are listed from top to bottom. They are ordered in functional groups to make system configuration easier.

Setup value controls
The controls allow you to change parameter values. Different types of parameter values have controls of types according to the parameter value range. The controls can be button bars, edit boxes, drop-down lists, sliders, and sliders with adjustable min and max limits. The slider value can be provided as a direct value input by clicking the current value and typing a new value.

Pop-up bar
The multi-function pop-up bar on the bottom of the window is normally hidden and appears when needed. The bar appears for error and warning notifications and for save changes requests. It allows the user to take actions related to the notification and disappears after one of the buttons has been clicked.

4.3.1 Welding display

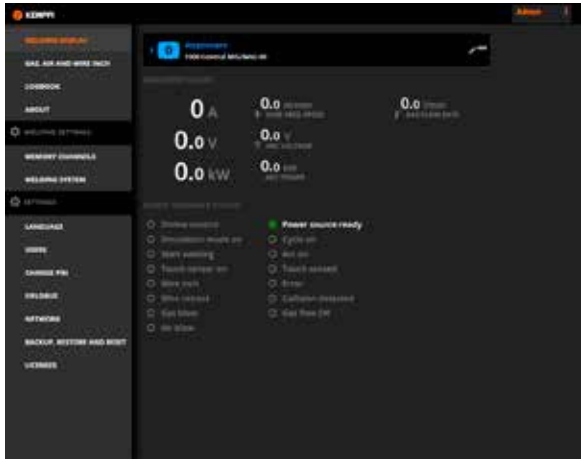


Figure 4.3 Welding display, main view

The Welding display view monitors the selected memory channel, the welding process data and the robot control state in real time. The display shows welding current, voltage, power, wire feed speed and gas flow rate. If arc measurement is set on, the measured arc voltage and arc power are also displayed.

You can view and change the welding parameters of the current memory channel by clicking on the memory channel info bar.

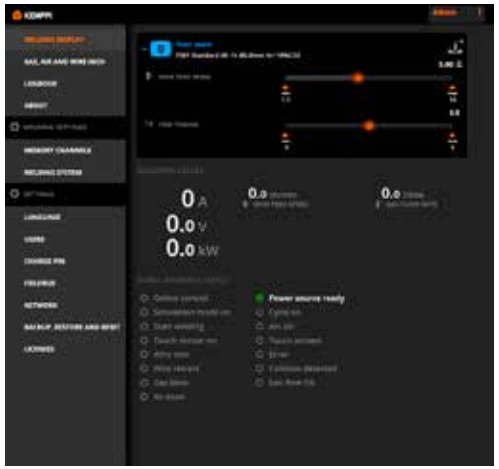


Figure 4.4 Welding display – editing welding parameters

Clicking on the memory channel info bar opens a sub view where you can change wire feed speed and, depending on the process, the fine tuning, voltage, dynamics, pulse current, double pulse amplitude and double pulse frequency values during welding. Saving the changes will affect the arc behavior immediately.

4.3.2 Gas, air and wire inch

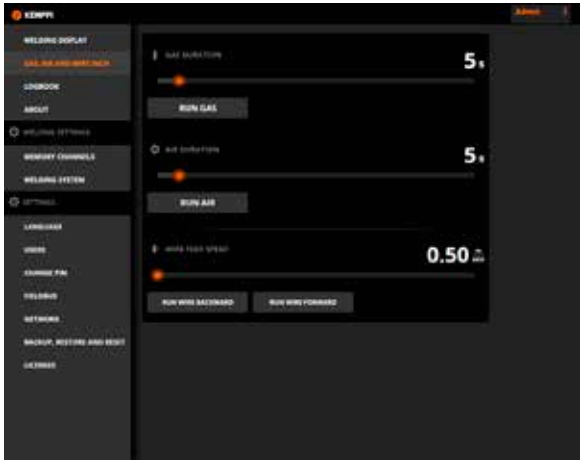


Figure 4.5 Gas, air and wire inch view

In the Gas, air and wire inch view you can test shielding gas valve, compressed air valve, wire inch and wire retract.

To adjust the duration of the gas and air test, use the slider bars. Then click on the Run gas or Run air button. The test stops automatically after the specified time. Clicking the test button again during the test stops the test immediately.

To adjust the wire feed speed for wire inch and wire retract use the slider bar. Then click either on Run wire backward or Run wire forward button to start the test. The button has to be kept pressed down throughout the whole test. Releasing the button stops the test.

4.3.3 Logbook

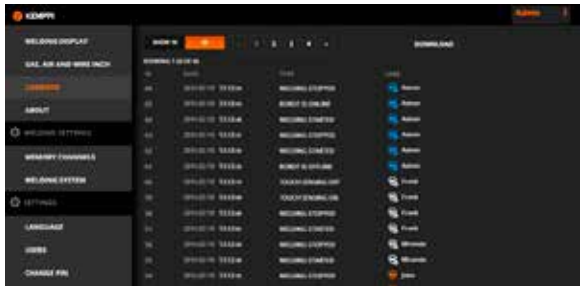


Figure 4.6 Logbook view

In the Logbook view, you can scroll to see status messages, warnings, errors and other event information stored into the logbook. Clicking an item opens a dialog box showing more information about the event in a pop-up window.

You can also download the logbook information as a JSON (JavaScript Object Notation) file and store it on your hard disk by clicking the Download button. The JSON file contains the logbook entries that are shown in the current view.

4.3.4 About

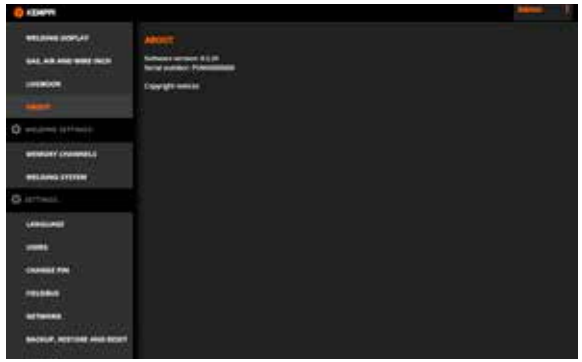


Figure 4.7 About view

The About view shows the software version of the web user interface, the internal serial number of the power source and copyright notices.

4.3.5 Welding settings – Memory channels

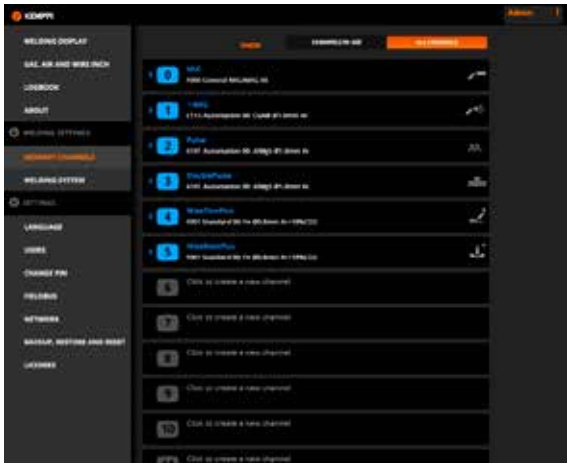


Figure 4.8 Memory channels view

In the Memory channels view you can edit, save and clear welding memory channels. A memory channel contains configuration of the welding process, program, parameters and functions. There are up to 200 memory channels available in the system.

To create a new memory channel, click on the name field of an empty memory channel and enter a name for the channel. A sub-view with a welding program selector, welding parameters and welding functions will open. Provide all required parameters and hit the Save button in the pop-up bar below.

To view the settings of a memory channel, click on the channel in the list.

To delete a channel, click on the channel name. A delete button will appear on the right side of the name box. Click on the button and confirm delete in a pop-up window.

Welding program selection

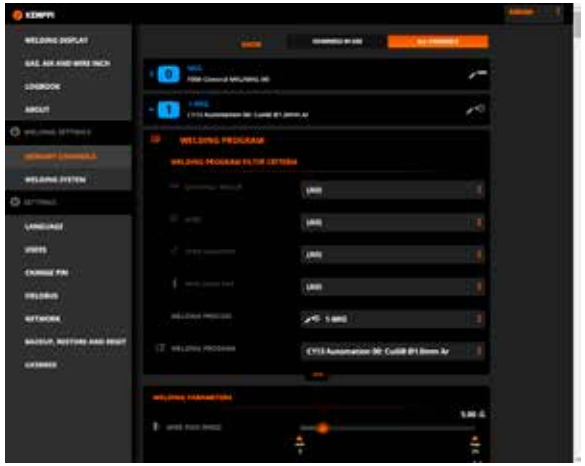


Figure 4.9 Memory channel editing – Welding program view

In the Welding program view you can select the desired welding process and welding program. For some processes there are several available welding programs. The drop-down list of the welding programs can be filtered to make the selection easier by using material group, wire, wire diameter and shielding gas.

Table 4.17: Welding process symbols

Icon	*Description*
	MIG welding process
	WiseThin+ welding process
	WiseRoot+ welding process
	1-MIG welding process
	Pulse welding process
	Double pulse welding process

Welding parameters and functions

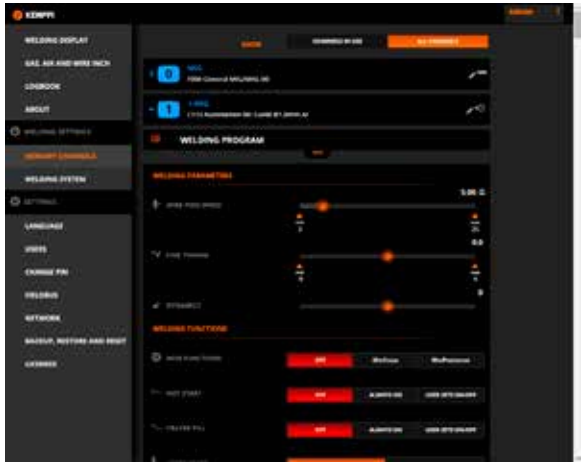


Figure 4.10 Memory channel editing – Welding parameters and functions view

In the Welding parameters view you can, depending on the selected welding process,

- set the min, max and initial values for Wire feed speed.
- set the min, max and initial values for Fine tuning or Voltage.
- set the value for the Dynamics and Pulse current.
- set the value manually or from the curve for Double pulse amplitude and Double pulse frequency.

In the Welding functions menu you can, depending on the selected welding process,

- select Wise functions on and off and set up their effectiveness.
- select Hot start option OFF, ALWAYS ON or USER SETS ON/OFF and set Hot start level and Hot start time by using the sliders.
- select Crater fill option OFF, ALWAYS ON or USER SETS ON/OFF and set Crater fill step level, Crater fill end level and Crater fill time by using the sliders.
- select Creep start option CURVE or SET VALUE and set Creep start level by using the sliders.
- select Start power by using the slider.
- select Touch sense ignition option OFF or ON

Welding settings – Welding system

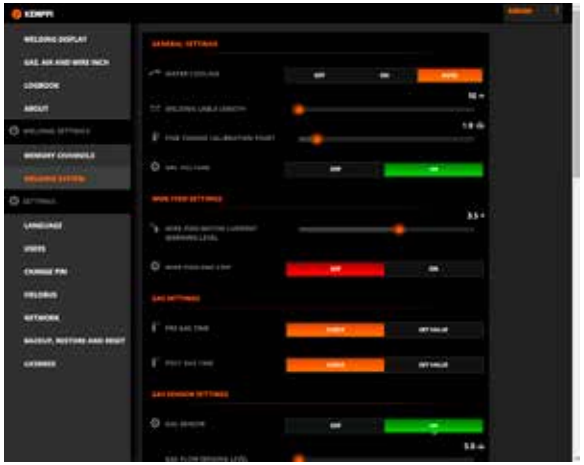


Figure 4.11 Welding system settings view

In the Welding system view you can modify all settings related to the behavior and function of the welding system.

In the General settings menu you can

- turn Water cooling ON, OFF and AUTO by clicking on the buttons.
- adjust Welding cable length by using the slider bar.
- select Fine tuning calibration point by using the slider bar.
- select Arc voltage measurement ON and OFF by clicking on the button.

In the Wire feed settings menu you can

- select wire feeder option: WIRE FEEDER 1, WIRE FEEDER 2 or SELECT AT ROBOT.
- adjust Wire feed motor current warning level by using the slider bar.
- select Wire feed end step ON and OFF by using the buttons.

In the Gas settings menu you can

- select Pre gas time and Post gas time as a preset value from welding program (CURVE) or a value selected with a slider (SET VALUE).

In the Gas sensor settings menu you can

- select Gas sensor ON and OFF.
- adjust Gas flow sensing level by using the slider bar.
- select Gas type from the drop-down menu (for an integrated gas sensor). OR
- select Argon, Carbon Dioxide, Nitrogen, Oxygen, Hydrogen and Helium concentration in a Gas mixture (for a bus-controlled gas sensor).

In the General robot settings menu you can

- select Interface mode for the digital robot interface in the selection box.
- adjust Voltage scaling by using the slider bar.
- adjust Wire feed speed scaling by using the slider bar.
- adjust Current scaling by using the slider bar.
- select Simulation mode by OFF, ON or SELECT AT ROBOT by clicking on the buttons.
- select Gun type from the drop-down menu.

In the Touch sensor settings menu you can

- select Output voltage from the drop-down menu.
- select Touch tool WELDING WIRE, GAS NOZZLE or SELECT AT ROBOT by clicking on the buttons.
- select Fast output polarity LOW-ACTIVE or HIGH-ACTIVE by clicking on the buttons.

In the Collision sensor settings menu you can

- select Collision sensor ON and OFF by clicking on the buttons.
- select Switch type OPENING or CLOSING by clicking on the buttons.
- select Output polarity LOW-ACTIVE or HIGH-ACTIVE by clicking on the buttons.

In the Stop switch settings menu you can

- select Stop switch ON and OFF by clicking on the buttons.
- select Gate door switch ON and OFF by clicking on the buttons.
- select Switch type for Stop switch and the gate door switch by clicking on the buttons.
- select Line level for Stop switch and the gate door switch by clicking on the buttons.

In the Watchdog settings menu you can

- select Watchdog ON and OFF by clicking on the buttons.
- adjust Timeout by using the slider bar.

In the Welding system time menu you can

- select date by clicking on the date and selecting year, month and day from a pop-up calendar.
- set time by clicking on the time and typing new time in to the field.
- synchronize with the current system time by clicking the NOW button.

4.3.6 Settings – Language

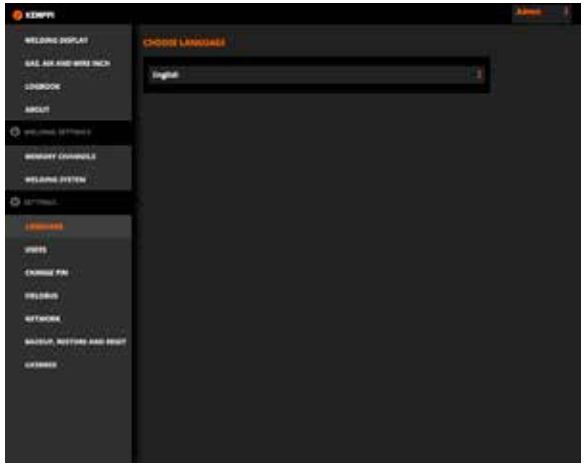


Figure 4.12 Settings – Language view

In the Language view you can select the desired language for the web user interface by clicking on the drop-down menu. If available, the same language is used in the setup panel. If the setup panel is not capable of showing the selected language (for example Chinese) it uses English as the default.

4.3.7 Settings – Users

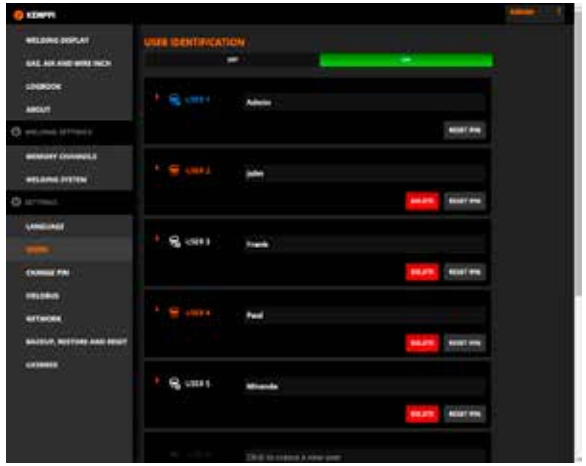


Figure 4.13 Settings – Users view

Accessing this view requires administrator or service supervisor rights.

In the Users view you can

- select User identification ON and OFF by clicking on the buttons.
- change Role for a user by clicking the orange arrow and clicking on the WELDER, SUPERVISOR or ADMINISTRATOR button.
- create a new user by typing a name for an unused user account and selecting Role for the user.
- delete a user by clicking on the user's DELETE button and confirming the delete in the pop-up dialog.
- reset PIN code to 0000 by clicking on the user's RESET PIN button.

See Section 4.4 "User identification" for more information.

4.3.8 Settings – Change PIN

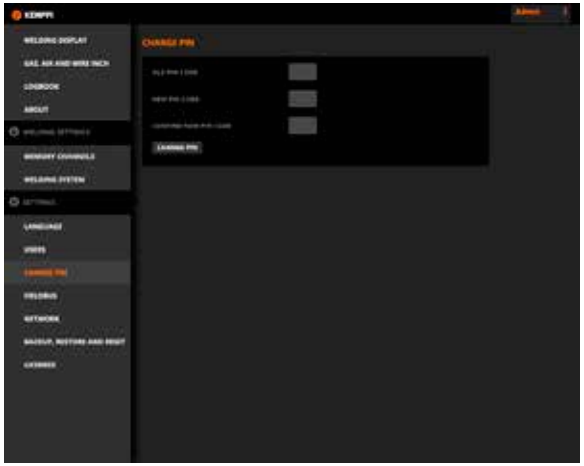


Figure 4.14 Settings – Change PIN view

In the Change PIN view the current user can change the PIN code by typing the required information in the fields and clicking on the CHANGE PIN button.

See Section 4.4 "User identification" for more information.

4.3.9 Settings – Fieldbus

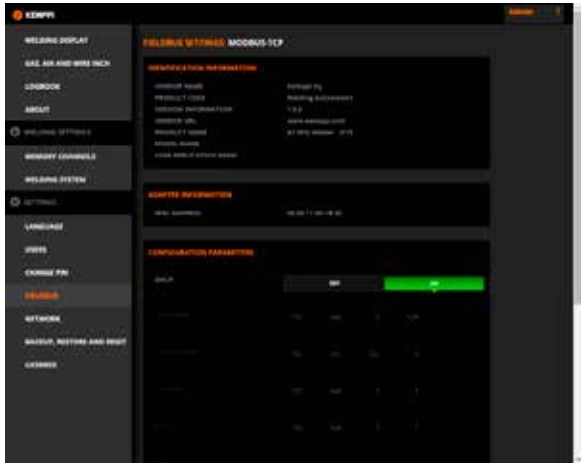


Figure 4.15 Settings – Fieldbus view

In the Fieldbus view you can identify the fieldbus, view the fieldbus specific information and set the configuration values. The available information and configuration parameters depend on the fieldbus type. See the A7 MIG Welder Integration guide for more information.

Accessing this view requires administrator or service supervisor rights.

Changing the fieldbus settings affects the communication between the welder system and the robot.

4.3.10 Settings – Network

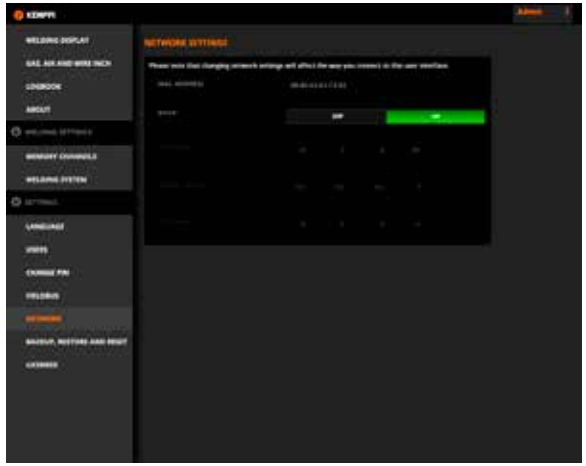


Figure 4.16 Settings – Network view

In the Network menu you can configure the network settings of the web user interface server. See the A7 MIG Welder Integration guide for more information about the network configuration.

Accessing this view requires administrator or service supervisor rights.

Changing the network settings affects your access to the web user interface.

4.3.11 Settings – Backup, restore and reset

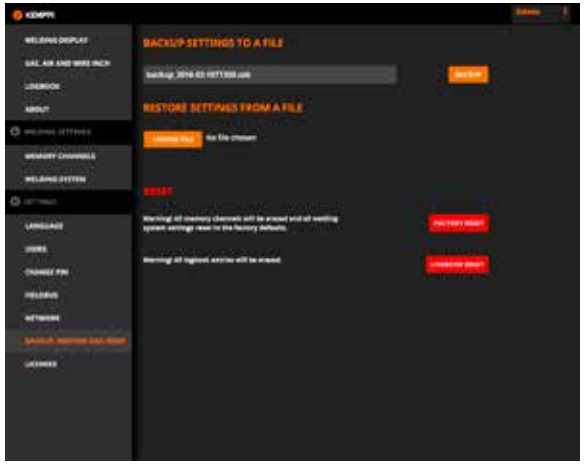


Figure 4.17 Settings – Backup, restore and reset view

In the Backup, restore and reset menu you can

- create a backup file from memory channels and welding system settings by clicking on the Backup button.
- restore settings from a backup file by clicking on the Choose file button, browsing for the file, selecting from the Memory channels, Welding system, Users and Network options the desired items to restore and then press the Restore button.
- reset all welding system settings and memory channels by clicking on the Factory reset button.
- clear the logbook by clicking on the Logbook reset button and confirming the operation in the pop-up dialog.

4.3.12 Settings – Licenses

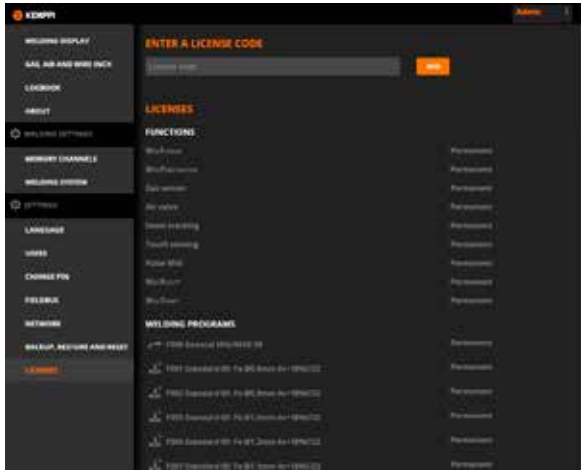


Figure 4.18 Settings – Licenses view

In the Licenses menu you can view the current software licenses.

As an administrator or a supervisor you can add new software licenses. See further information about the available welding programs, modified processes, Match™ functions and special enhanced arc performance solutions on Kemppi's web site at www.kemppi.com.

4.4 User identification

4.4.1 Overview

The user identification system enables access control of individual users. The feature is optional and can be turned on when needed. Initially, the user identification system is turned off. The welding system is in the initial state when it is taken into use for the first time or after a factory reset.

System configuration, control and monitoring functions are divided into three access levels. The lowest level (level 0) covers the smallest subset of functions. The middle level (level 1) covers a larger subset and the highest level (level 2) covers all the available functions. The access level is associated with a user account by specifying a role for the user. See Table 4.18 "User roles in the A7 MIG Welder system" for descriptions of different user roles and the associated access levels.

User accounts are protected from unauthorized use by a PIN code. The PIN code is a 4-digit numeric code that can have any value between 0000 and 9999. Each user can change their PIN code. Administrator level users can reset the PIN codes of other users. The user identification system requires at least one existing administrator level user account in order to work correctly. The system prevents deleting or changing an administrator user account when no other administrator account exists.

In the initial state, there is only one user account called “Admin” in the system. The PIN code of the Admin user is ‘0000’ (four zeroes) by default.

Table 4.18 User roles in the A7 MIG Welder system

Role	*Access level*	*Description*
Welder	Level 0	A welder works on a robot cell changing workpieces and welding. The welder can adjust welding values within the limits set by the supervisor. The welder cannot change system settings or memory channels.
Supervisor	Level 1	A supervisor teaches the robot new works and prepares the system for welding. The supervisor specifies welding value limits to be used by welders. The supervisor creates memory channels and deletes and modifies them. The supervisor cannot change the system settings related to the cell configuration.
Administrator	Level 2	An administrator builds and maintains the robot cell. The administrator specifies all system settings related to the fixed environment, for example, stop switch settings or welding cable length. The administrator can create, modify and delete other users and set user identification system off if needed.

4.4.2 Turning user identification system on

The user identification system can be turned on from either the web user interface or the setup panel.

Setup panel

Turning the user identification system on requires **administrator privileges** in the setup panel. Go to the Main menu > User settings and select a user with administrator privileges. Provide a valid PIN code to log in. In the User settings menu look for the User mode parameter and select the desired value (ON). Press the Save button to save the settings.

Web user interface

In the web user interface the user identification system can be turned on **without user login**. Note that you still need to have a valid administrator PIN code available. The system requires user login immediately after the user identification system has been turned on and the user identification system cannot be turned off without administrator privileges.

Go to the Settings > Users page and switch the User identification parameter on. A pop-up dialog with Save and Reset changes buttons will appear at the bottom. Press the Save button in the dialog to save the settings. The user interface will go to a login page automatically. Select an appropriate username and provide a PIN code to log in.

4.4.3 Creating new users

Creating a new user requires **administrator privileges**. Welders and supervisors cannot create users. There are up to ten user accounts available in the system. If all ten user accounts are in use, a new user cannot be created.

Setup panel

Go to the Main menu > User settings and provide your PIN code to access the User settings menu. Go to the User activation and select a user number from the USER1 - USER10 until the text (Disabled) appears under the username. This means that the particular user account is not in use. Click the Select button and switch the user to Enabled. Press the Set button. The new user is now created with welder privileges. In order to change the user privileges, see Subsection 4.4.5 "Changing user role".

You cannot configure usernames in the setup panel. In that case users are displayed by their system name (USER1, USER2...). Use the web user interface to configure the usernames.

TThe default PIN code for the new user account is 0000. To change the PIN code, the newly created user needs to be logged in. See Subsection 4.4.7 "Changing pin code" for more information.

Web user interface

Go to the Settings > Users page. In the web user interface the user identification system must be turned on to access user settings. Available unused user accounts are displayed in gray font. Click the text Click to create a new user on the account you want to create and type a name for the user. The user interface will make other options automatically available and a pop-up dialog with Save and Reset changes buttons appear at the bottom. Select the role for the user by clicking the Welder, Supervisor or Administrator buttons. Click the Save button to save the settings. The new user has been created with the default PIN code 0000. To change the PIN code, the newly created user needs to be logged in. See the Subsection 4.4.7 "Changing PIN code" for more information.

The Settings > Users selection in the side menu is not visible to welders and supervisors. If you cannot see the selection, you do not have the privileges to change user settings. Log out and log in using another account with administrator privileges.

4.4.4 Deleting a user

Deleting a user requires **administrator privileges**. Welders and supervisors cannot delete users. At least one administrator account is required in the system. You cannot delete your own account.

Setup panel

Go to the Main menu > User settings and provide your PIN code to access the User settings menu. Go to the User activation and select the user you want to delete. Switch the user to Disabled and press the Set button. The user is now deleted and the account released for further use.

Web user interface

Go to the Settings > Users page. The user identification system must be turned on to access user settings. Users have a Delete button in their user account. Press the button to delete a user. A confirmation dialog with Delete and Cancel buttons appears. Press the Delete button on the dialog. The user is now deleted and the account released for new user.

4.4.5 Changing user role

When a new user is created in the web user interface, the user role is specified for the user in the same view. When a new user is created in the setup panel, the default role is Welder. The role can be changed afterwards. Changing a user role requires **administrator privileges**.

Setup panel

Go to the Main menu >User settings and provide your PIN code to access the User settings menu. Go to the Set user rights and select the user whose role you want to change.

You cannot change your own role.

Select the role and press the Set button to save the settings.

Web user interface

Go to the Settings > Users page. The user identification system must be turned on to access user settings. Press the orange arrow > to left of the user icon to see the user options. Select the role for the user by clicking on the Welder, Supervisor or Administrator buttons. A pop-up dialog with Save and Reset changes buttons will appear at the bottom. Click the Save button to save the settings.

4.4.6 Changing username

Usernames can be configured in the web user interface. The setup panel does not have this functionality. Changing a username requires **administrator privileges**. The user identification system must be turned on to access user settings.

Go to the Settings > Users page. Click on the username you want to change and retype the name. A pop-up dialog with Save and Reset changes buttons will appear at the bottom. Click the Save button to save the settings.

4.4.7 Changing PIN code

By default, the PIN code for each user is 0000 (four zeroes). Users can protect their user accounts by personalizing this code. In order to change the PIN code, the user identification system must be turned on.

Setup panel

Go to Main menu > User settings and provide your PIN code to access the User settings menu. Go to Change PIN code and specify the new PIN code digit by digit. Go to the next digit by pressing the Next button. After the fourth digit press the OK button to save the settings. The PIN code is now changed.

Web user interface

Go to the Settings > Change PIN page. On the page, enter the old PIN code in the first box and the new PIN code twice in the boxes below. Press the Change PIN button. The PIN code is now changed.

4.4.8 Resetting PIN code

The administrator can reset a PIN code to let the user redefine it and access the system again. Resetting the PIN code requires **administrator privileges**.

Setup panel

Go to the Main menu > User settings and provide your PIN code to access the menu. Go to the Reset user PIN code and select the user whose PIN code you want to reset. Confirm reset by pressing the OK button.

Web user interface

Go to the Settings > Users page. The user identification system must be turned on to access users. Press the Reset PIN button on the right side of the user whose PIN code you want to reset. Please note that the reset operation is not confirmed – pressing the Reset PIN button will reset the PIN code immediately. A dialog with an OK button will appear indicating a successful operation.

4.4.9 Logging in and out, changing active user

Setup panel

The setup panel displays User logged off text when no user is logged in. To log in press the F2 button, select a user, provide a valid PIN code and press OK. You are now logged in.

To log out, press F2, select Log off and press Select. Alternatively, press the power button on the setup panel for five seconds to log out.

When a user has already logged in, you can log in as an active user without logging out. To change you as the active user, press the F2 button, select your user account, provide a valid PIN code and press OK. You are now the active user and the other user account is logged out automatically.

Web user interface

The web user interface shows the login page when no user is logged in. To log in, select a user from the drop-down box, provide a valid PIN code and press the Login button.

To log out, locate your username in the right top right corner of the view. Press your name to open a drop-down list and select logout. The web user interface will redirect you to the login page.

When a user has already logged in, follow the logout and login instructions to change yourself as the active user.

4.5 Touch sensor (seam search)

The touch sensor is a specific functional system used in automated welding for finding workpiece's accurate location and position. The touch sensor hardware and I/O are located in the robot interface unit. A welding robot finds the particular edges of the workpiece by touching them either with a welding wire or a gas nozzle. Touches are detected by the touch sensor and the information is passed on to the robot controller.

The touch sensor generates a sensing voltage separately from the welding power source. Touch is detected when there is a short-circuit between the workpiece and the sensing tool resulting in a voltage drop. The negative pole of touch sensor's voltage source is connected to a welding minus. The positive pole of the sensor is connected either to a welding plus or a gas nozzle. The target for the positive pole can be changed by a user. A relay in the touch sensor device enables the configuration by software.

The touch sensor system consists of hardware and software. The hardware consists of a touch sensor device, a fast status output connector and wiring in the wire feeder's control cable for the gas nozzle use (see Figure 4.20 "Touch sensing system"). The software enables configuration and control. Configuration is available in the setup panel and in the web user interface. The touch sensor is controlled by the welding robot using the digital robot interface.

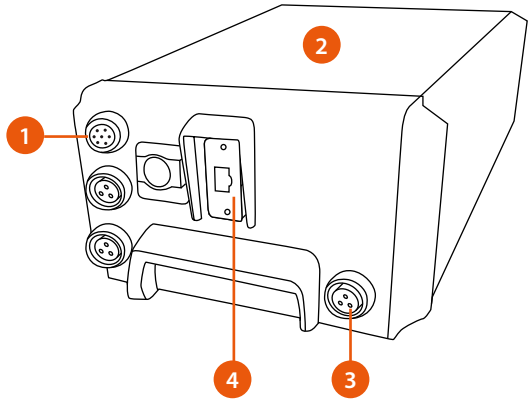


Figure 4.19 Touch sensor in the robot interface unit

1. Wire feeder control cable connector (wiring for the gas nozzle)
2. Touch sensor device inside the robot interface unit
3. Fast status output (direct hardware output)
4. Fieldbus / Digital robot interface

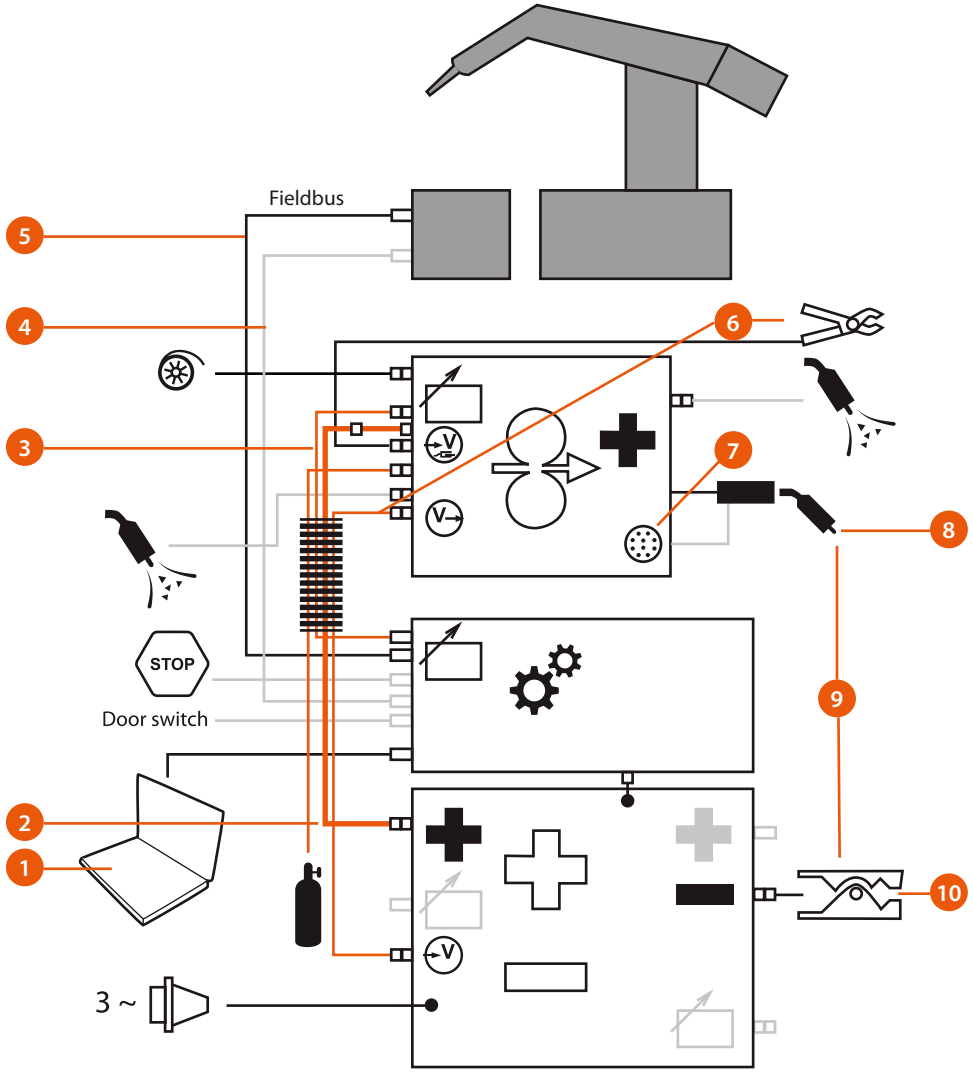


Figure 4.20 Touch sensing system

1. Configuration (web user interface or setup panel)
2. Welding plus (welding wire touch sensing)
3. Wire feeder control cable (gas nozzle touch sensing)
4. Fast status (direct hardware connection, optional)
5. Fieldbus / Digital robot interface
6. Arc measurement cables
7. Peripheral connector
8. Touch tool (welding wire or gas nozzle)
9. Touch detection
10. Welding minus (touch sensor ground)

On/Off control

The touch sensor device behaves as a software controllable power source. The power source can be switched on and off from the robot controller by using the digital robot interface. The touch sensor cannot be put on or turned off from the setup panel or the web user interface.

The touch sensor cannot be used when the welding cycle is on.

4.5.1 Voltage source, levels and safety

The touch sensor provides eight software selectable DC voltage levels (see Table 4.19, "Voltage levels"). The voltage level can be configured in the web user interface or the setup panel. See Subsection 4.5.5, "Selecting output voltage" for more information on the voltage level setup.

⚠ *All levels have limited continuous power supply to ensure human safety. The 200 V supply drops down under the 113 V level when loaded by a 5.6 kΩ resistor which is the nominal DC resistance of the human body. In some cases, voltage levels above 113 V can still cause minor harm, such as pain, to a person. Use the gate door safety switch with touch sensor levels above 110 V.*

The welder system features an arc measurement function which is performed between the welding plus and minus poles near the welding arc using specific cabling and a measurement circuitry. The measurement system influences touch sensing when the welding wire is used as a touch tool and when the arc measurement cables are connected. The measurement system does not influence touch sensing when the gas nozzle is used as the touch tool.

ⓘ *The touch sensing is influenced when*

- the arc measurement cable between the power source and the wire feeder (included in the cable set) is connected, but the arc measurement clamp from the wire feeder to the workpiece is disconnected.
- the clamp is also connected. This situation is more harmful because it causes false touch detection at certain voltage levels.

The Table 4.19, "Voltage levels" describes all setups and their relative voltage levels. The accuracy of all values in the table except the nominal voltage is ±5 %.

Table 4.19 Voltage levels

Nominal voltage	*Voltage (gas nozzle)*	*Voltage (welding wire)*	*Voltage (welding wire + arc cable on)*	*Voltage (welding wire + arc clamp on)*
50 V	55 V	54 V	54 V	50 V
80 V	80 V	80 V	77 V	74 V
110 V	110 V	110 V	105 V	87 V
150 V	150 V	150 V	130 V	89 V*
160 V	160 V	160 V	130 V	89 V*
170 V	170 V	170 V	130 V	89 V*
180 V	180 V	180 V	130 V	89 V*
200 V	200 V	200 V	130 V	89 V*

*Values cause false detection on touch sensor.

The power source and the touch sensing circuitry are galvanically isolated from the other systems in the robot interface unit.

4.5.2 Touch tool

Two alternative touch tools can be used for touch sensing (see Figure 4.21, "Welding wire used as touch tool" and Figure 4.22, "Gas nozzle used as touch tool"). The regular tool is the welding wire (welding plus). Sometimes the welding wire is not accurate enough. The tip of the welding wire can bend resulting in incorrect position information. In that case the gas nozzle can be used instead. Using the gas nozzle requires extra wiring from wire feeder's 10-pole peripheral connector (pin F) to the gas nozzle.

The touch tool can be forced by the configuration in both the web user interface and the setup panel, or the selection can be allowed to be managed by the robot controller by using the digital robot interface. See Subsection 4.5.6, "Configuring touch tool" for more information on these alternatives.

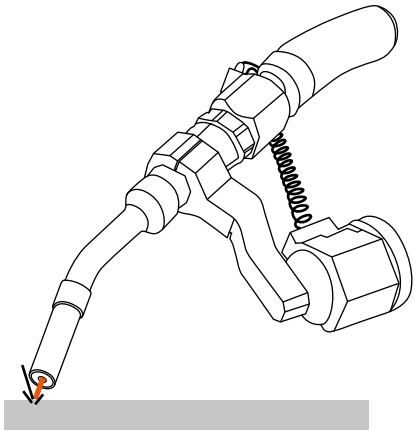


Figure 4.21 Welding wire used as touching tool

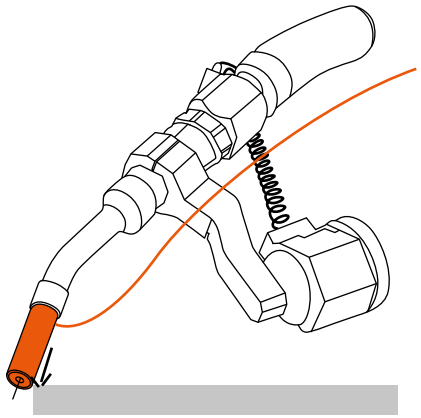


Figure 4.22 Gas nozzle used as touching tool

4.5.3 Fast status output

The fast status output is a direct hardware output for systems where the latency between the sensing and the detection status reception is an issue. The normal latency is around 10 milliseconds through the fieldbus. The response time of the fast output is about 1.5 milliseconds.

See the A7 Welder Integration guide for connecting and configuring the fast output.

4.5.4 Selecting output voltage

The output voltage of the touch sensor power source can be selected by using either the web user interface or the setup panel. Setting the voltage requires **administrator privileges**.

Setup panel

Go to the Main menu > Robot menu > Touch sensor menu and specify the desired output voltage value to the Voltage parameter by turning the control knob. Press the Save button to save the settings.

Web user interface

Go to the Welding settings > System settings > Touch sensor settings and select the desired output voltage from the Output voltage drop-down list. A pop-up bar with Save and Reset changes buttons will appear at the bottom. Press the Save button in the dialog to save the settings.

4.5.5 Configuring touch tool

The touch tool can be configured from the web user interface or from the setup panel. The configuration requires **administrator privileges**. The touch tool can be forced either to the gas nozzle or the welding wire, or left to be controlled by the robot via the digital robot interface.

Setup panel

Go to the Main menu > Robot menu > Touch sensor menu and turn the control knob on the Tool parameter to configure the touch tool. Select the Welding wire or Gas nozzle to force the tool, or USER to let the tool selection control to the robot. Press the Save button to save the settings.

Web user interface

Go to the Welding settings > System settings > Touch sensor settings and select the touch tool by clicking one of the Touch tool buttons. Select the Welding wire or Gas nozzle to force the tool, or Select at robot to let the tool selection control to the robot. A pop-up bar with Save and Reset changes buttons will appear at the bottom. Press the Save button in the dialog to save the settings.

4.6 Through Arc Seam Tracking (TAST)

Through-Arc Seam Tracking (TAST) is used in arc welding for following a welding groove automatically by weaving the welding head (see Figure 4.23, "Weaving the welding head during TAST") and measuring the arc length. The seam tracking provides precise welds in setups where the workpiece position within repetitive tasks varies, or when the route of the groove is complicated.

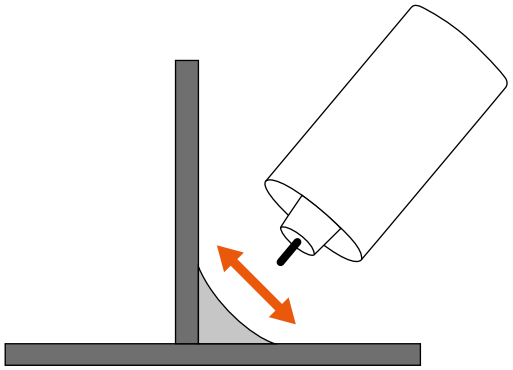


Figure 4.23 Weaving the welding head during TAST

The arc length depends on the wire tip distance from the middle of the groove. Weaving the welding head between the edges of the groove generates a signal that is directly proportional to the arc length (see Figure 4.24, "TAST signal waveform"). The generated signal is equivalent to the welding current.

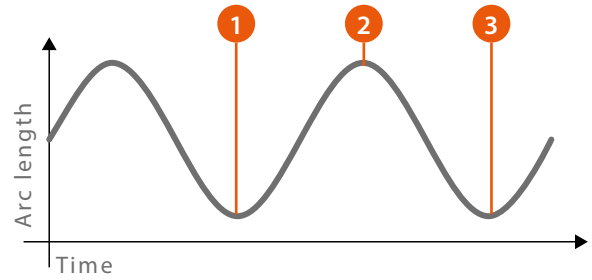


Figure 4.24 TAST signal waveform

1. Short arc (edge)
2. Long arc (middle)
3. Short arc (opposite edge)

The welding power source measures welding current as a contiguous value during welding. It filters the raw current value to generate a stable signal for the TAST. The TAST signal is valid for all MIG/MAG processes including Pulse MIG and Double Pulse MIG.

The TAST signal is passed to a welding robot as a numeric value using the digital robot interface. Using the TAST requires use of certain I/O tables containing a field for the TAST value and the control signal. See the A7 MIG Welder Integration guide for more information.

The TAST function is always available in the digital robot interface and therefor it does not have any configuration parameters in the web user interface or in the setup panel.

4.7 Collision sensor

For information on connecting and configuring the collision sensor, see the A7 MIG Welder Integration guide.

The collision sensor is a module mounted between a robot arm and a welding torch. It protects the torch neck from bending and breaking on collision to an obstacle. The collision detection is usually based on micro switches or optical switches which act on the collision. The information about the detection is passed to the robot that uses it to stop motion immediately to prevent any damage.

In the A7 MIG Welder the collision sensor signal is read by the wire feeder and the information is passed to the robot by the welding system. In addition, a collision causes always the Error 53 Collision detected in the welding system. When the error occurs, the power source stops welding immediately.

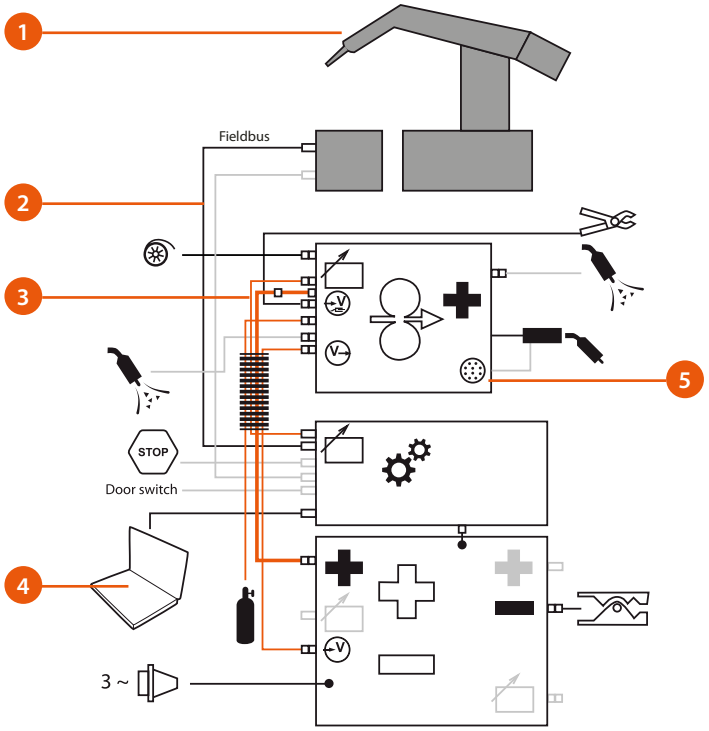


Figure 4.25 Collision sensing system

1. Collision sensor
2. Fieldbus / Digital robot interface
3. Wire feeder control cable
4. Configuration using web user interface or setup panel
5. Peripheral connector

The collision sensor is mounted to the robot arm, and it is a mounting point for the welding torch (see Figure 4.26, "Collision sensor mounting").

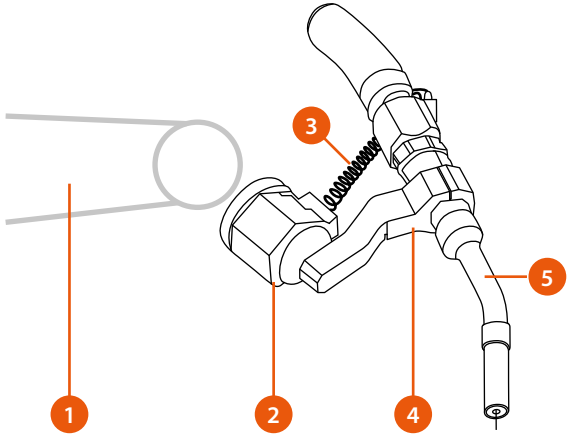


Figure 4.26: Collision sensor mounting

1. Robot arm
2. Collision sensor
3. Collision signal cable
4. Torch suspension
5. Torch neck

The collision sensor input hardware is located in the wire feeder. There is a 10-pin peripheral connector in the front panel of the wire feeder. The collision sensor signal is available in the pin E, and the ground for the signal is in the pin H. See the A7 MIG Welder Integration guide for more information about connecting the collision sensor.

4.7.1 Setting collision sensor on and off

The collision sensor can be turned on and off by using either the web user interface or the setup panel. Setting sensor on and off requires administrator privileges.

The collision sensor should be turned off by software when there is no collision sensor installed in the system.

Setup panel

Go to the Main menu > Robot menu > Coll. sensor menu and turn the control knob on the Selection to set the sensor ON or OFF. Press the Save button to save the settings.

Web user interface

Go to the Welding settings >Welding system > Collision sensor settings and select the collision sensor on or off by clicking the ON or OFF button. A pop-up bar with Save and Reset changes buttons will appear at the bottom. Press the Save button in the dialog to save the settings. When turned on, additional settings appear.

4.7.2 Selecting sensor type

The sensor type can be selected by using either the web user interface or the setup panel. Setting the sensor type requires administrator privileges.

Setup panel

Go to the Main menu -> Robot menu -> Coll. sensor menu and select the switch type by turning the control knob on the Switch type parameter. Press the Save button to save the settings.

Web user interface

Go to the Welding settings > Welding system > Collision sensor settings and select the switch type by clicking Opening or Closing button. The collision sensor must be on in order to change the other settings. A pop-up bar with Save and Reset changes buttons will appear at the bottom. Press the Save button in the dialog to save the settings. When turned on, additional settings appear.

4.7.3 Selecting output polarity

The output polarity of the sensor affects to the polarity of the signal in the digital robot interface. If the polarity is low-active, the signal is 0 on collision and 1 otherwise. If the polarity is high-active, the signal is 1 on collision and 0 otherwise. Setting the output polarity requires administrator privileges.

Setup panel

Go to the Main menu > Robot menu > Coll. sensor menu, navigate to the Output parameter and turn the control knob on it to change the output polarity. Press the Save button to save the changes.

Web user interface

Go to the Welding settings > Welding system > Collision sensor settings and select the output polarity by clicking the Low-active or High-active button. A pop-up bar with Save and Reset changes buttons will appear at the bottom. Press the Save button in the dialog to save the settings.

4.8 Wire feeder

The A7 MIG Wire Feeder can be manually operated in several alternative ways:

- By operating the wire feeder from the web user interface
- By operating the wire feeder from the setup panel
- By operating the wire feeder from the robot teach pendant through the digital robot interface
- By using the illuminated buttons on the wire feeder

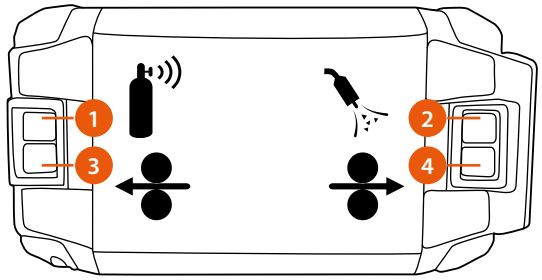


Figure 4.27 Wire feeder buttons

1. Gas test button
2. Air blow button
3. Wire retract button
4. Wire inch button

The buttons on the wire feeder are illuminated.

All lights are off when:

- main power is off or
- user has not logged into the system (when log in is required) or
- during welding.

One of the lights is off:

- Function is not allowed at the moment (for example, no license for the function in question).
- If the button is pressed the light flashes three times to indicate a prohibited function. The indicated function is not carried out.

A light is on:

- The indicated function is available.

All lights are blinking:

- There is an error in the system that needs to be acknowledged in the setup panel, in the web user interface or from the robot teach pendant.
- Connection to the robot interface has been lost.

The system error cannot be acknowledged from the wire feeder buttons.

4.8.1 Loading the filler wire

The filler liner is a consumable part which needs to be changed if it has been worn. To load a new filler liner, follow the following instructions.

Select the correct feed rolls and wire feed guide (wire guide tube and middle wire guide tube) according to the type of the filler wire. See Table 4.20, "Wire guide tubes with Euro connector", Table 4.21, "Wire guide tubes with Panasonic connector", Table 4.22, "Plastic wire feed rolls" and Table 4.23, "Metal wire feed rolls" for details.

Mounting wire guide tubes and wire feed rolls to the wire feeder:

1. Open the pressure handle of the wire feed mechanism.
2. Remove the orange-colored fasteners from the motor shafts (lower shafts).
3. Remove the shafts of the auxiliary feed rolls by pulling from the orange-colored knobs.
4. Mount the outlet wire guide tube.
5. Mount the middle wire guide tube, ensuring that the mounting direction is correct (the arrow on the bottom of the middle wire guide tube indicates wire's direction of travel -> towards the torch).
6. Mount the lower feed rolls, ensuring that the pin on the shaft fits in the cut on the feed rolls.
7. Mount the auxiliary feed rolls inside the pressure handle. While mounting the retainer shafts ensure that the niches of the orange knobs fit into the tabs on the pressure handle.
8. Adjust the pressure of the feed rolls by using the adjustment screws.

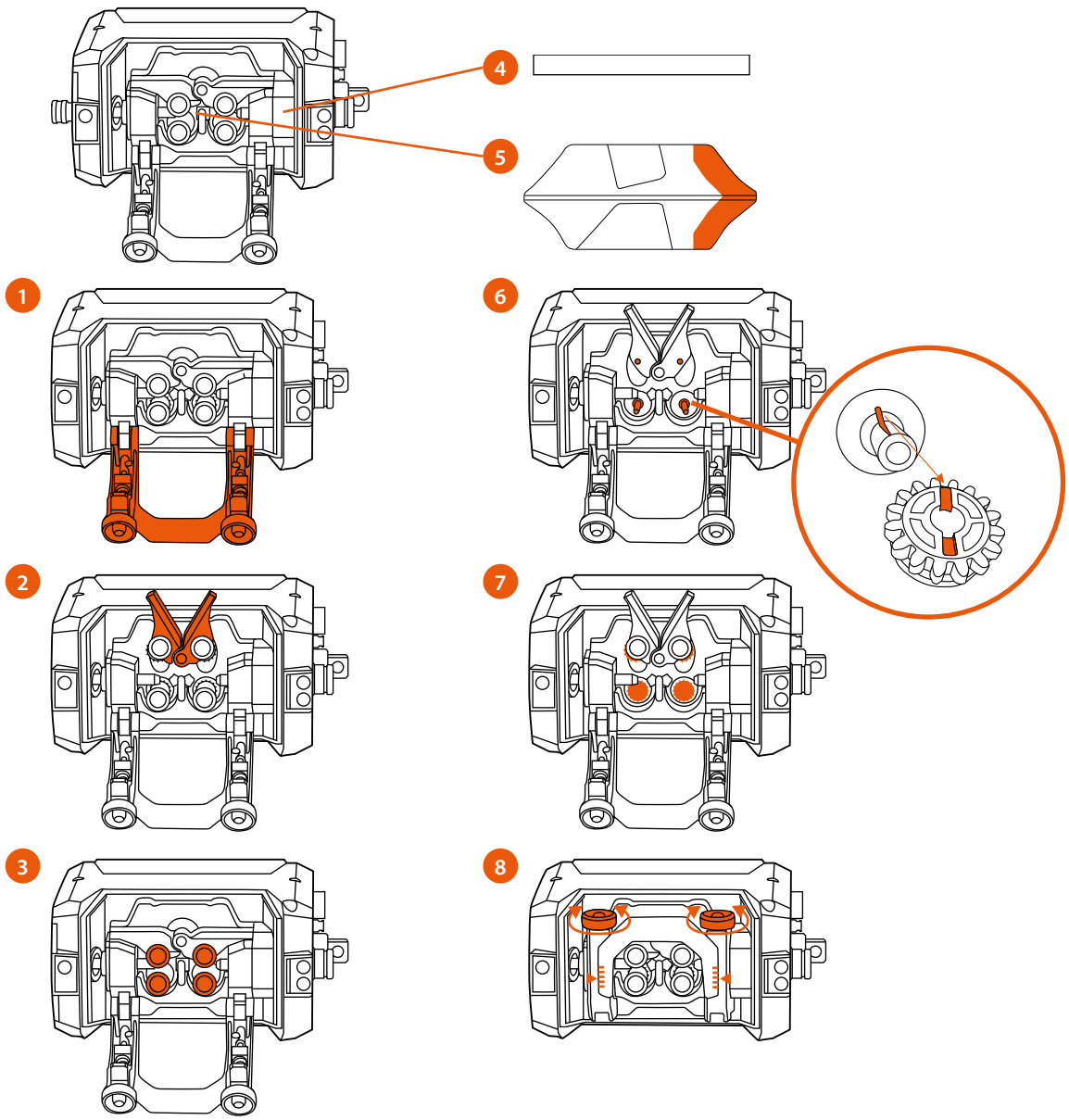


Figure 4.28 Mounting wire guide tubes and wire feed rolls

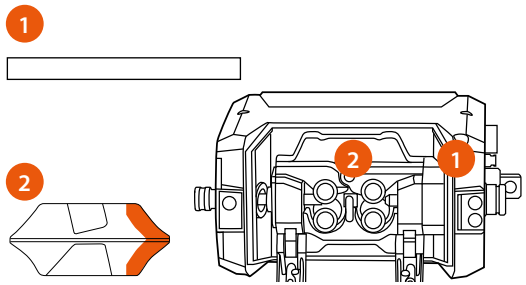
Figure 4.29 Wire guide tubes with Euro connector

Wire guide tubes with Euro connector			1		2	
	ø mm		outlet tube	mm	middle tube	mm
GT04 T Binzel metal Fe, Mc, Fc	0.8 – 0.9		SP011460	108	SP007279	33
	1.0		SP011461	108	SP007278	33
	1.2		SP011462	108	SP007277	33
	1.4		SP011768	108	SP007276	33
	1.4 – 1.6		SP011463	108	SP007275	33
GT04 T Binzel plastic Al, Ss (Fe, Mc, Fc)	0.8 – 0.9		SP011446	108	SP007279	33
	1.0		SP011447	108	SP007278	33
	1.2		SP011448	108	SP007277	33
	1.4		SP011451	108	SP007276	33
	1.6		SP011452	108	SP007275	33
	2.0		SP011453	108	SP007274	33
	2.4		SP011454	108	SP007273	33
GT04 T Dinse plastic Al, Ss (Fe, Mc, Fc)	0.8 – 0.9		SP011443	112	SP007279	33
	1.0		SP011445	112	SP007278	33
	1.2		SP011769	112	SP007277	33

Table 4.20 Wire guide tubes with Panasonic connector

Wire guide tubes with Panasonic connector			1		2	
	ø mm		outlet tube	mm	middle tube	mm
GT04 T Binzel plastic Al, Ss (Fe, Mc, Fc)	0.8 – 0.9		SP011770	117	SP007279	33
	1.0		SP011771	117	SP007278	33
	1.2		SP011772	117	SP007277	33
GT04 T Dinse plastic Al, Ss (Fe, Mc, Fc)	0.8 – 0.9		SP011773	120	SP007279	33
	1.0		SP011774	120	SP007278	33
	1.2		SP011775	120	SP007277	33

Figure 4.29 Wire guide tubes



1. Outlet tube
2. Middle tube

Table 4.22 Plastic wire feed rolls

Wire feed rolls, plastic				
	ø mm		lower	upper
Fe, Ss, (Al, Mc, Fc) V-groove V	0.6		W001045	W001046
	0.8 – 0.9		W001047	W001048
	1.0		W000675	W000676
	1.2		W000960	W000961
	1.4		W001049	W001050
	1.6		W001051	W001052
	2.0		W001053	W001054
	2.4		W001055	W001056
Fc, Mc, (Fe) V-groove, knurled V≡	1.0		W001057	W001058
	1.2		W001059	W001060
	1.4 – 1.6		W001061	W001062
	2.0		W001063	W001064
	2.4		W001065	W001066
Al, (Fc, Mc, Ss, Fe) U-groove U	1.0		W001067	W001068
	1.2		W001069	W001070
	1.6		W001071	W001072

Table 4.23 Metal wire feed rolls

Wire feed rolls, metal			
	ø mm	lower	upper
Fe, Ss, (Al, Mc, Fc) V-groove V	0.8 – 0.9	W006074	W006075
	1.0	W006076	W006077
	1.2	W004754	W004753
	1.4	W006078	W006079
Fc, Mc, (Fe) V-groove, knurled V≡	1.0	W006080	W006081
	1.2	W006082	W006083
	1.4 – 1.6	W006084	W006085
	2.0	W006086	W006087
Al, (Fc, Mc, Ss, Fe) U-groove U	1.0	W006088	W006089
	1.2	W006090	W006091
	1.6	W006092	W006093

4.9 Arc measurement

The welding system supports precise arc voltage, current, and power measurement for specific processes. Using this feature makes it unnecessary to concern about voltage losses in the welding cables. Measurement requires dedicated cables from the power source to the wire feeder (included in the interconnection cable set) and from the wire feeder to the workpiece (a separate cable with a clamp, included in the delivery). See Figure 4.30, "Arc measurement system" for details.

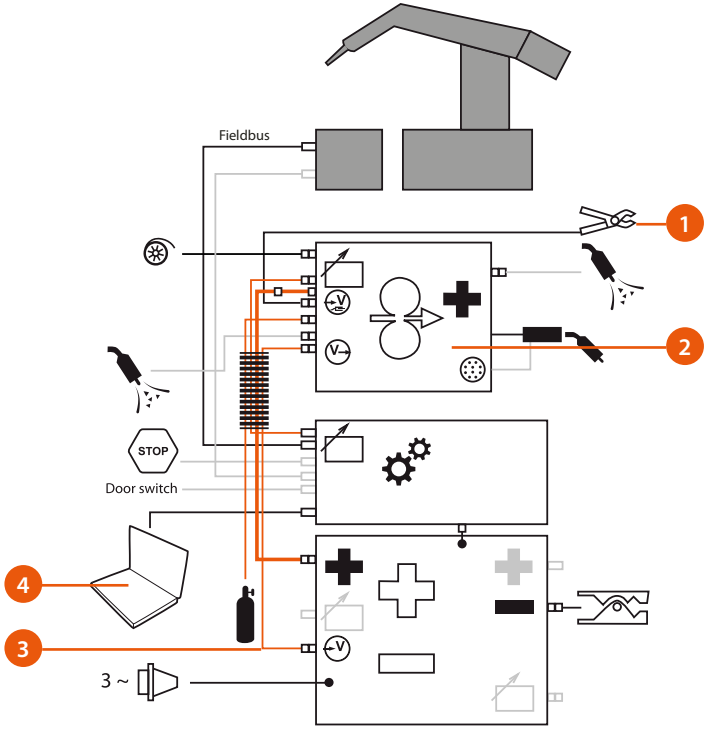


Figure 4.30: Arc measurement system

1. Earth cable: Cable and clamp for workpiece
2. Positive pole: Connection inside wire feeder
3. Arc measurement cable in the interconnection cable set
4. Setup and monitoring in setup panel and web user interface

4.9.1 Setup and calibration

For the arc measurement setup and calibration, refer to the A7 MIG Welder Integration guide.

4.9.2 Display

The arc voltage, current, and power can be displayed in the setup panel and in the web user interface. The setup panel displays a dot after the voltage value to indicate that the value is measured directly from the arc. In the weld data the text "AVol" is displayed for the same determination. In the web user interface, the arc values are displayed on the Welding display page.

The welding voltage indicated in the fieldbus interface tables is either terminal voltage or arc voltage, depending on which voltage is selected to be displayed in the user interfaces.

In order to display the values, the arc measurement has to be switched on by the means of the following instructions.

Setup panel

Go to the Main menu > System config menu, navigate to the ArcVoltage parameter and turn the control knob on it to change the feature on. Press the Save button to save the changes.

Web user interface

Go to the Welding settings > Welding system > General settings and select the Arc voltage on by clicking the corresponding button. A pop-up bar with Save and Reset changes buttons will appear at the bottom. Press the Save button in the dialog to save the settings.

4.10 Gas flow sensor

The welding system is equipped with a gas flow sensor that is located inside the wire feeder. The sensor is capable of sensing gas flow for any mixture of six base gases containing Argon (Ar), Carbon dioxide (CO_2), Nitrogen (N_2), Hydrogen (H_2), Oxygen (O_2) and Helium (He). The gas flow sensor provides both flow indication and flow rate outputs. The outputs can be monitored in the web user interface and in a robot pendant through the digital robot interface.

These instructions and specifications apply to a gas flow sensor unit that is a bus-controlled standalone device inside the wire feeder. They do not apply to an integrated gas flow sensor that uses wire feeder hardware. To check the type of the gas sensor in use, go to setup panel's Main menu > System config menu > Device information and navigate through the list. The standalone gas flow sensor device appears in the list as "Gas sensor unit". If that entry does not exist, the system uses the integrated gas flow sensor.

They do not apply to an integrated gas flow sensor that uses wire feeder hardware. To check the type of the gas sensor in use, go to setup panel's Main menu > System config menu > Device information and navigate through the list. The standalone gas flow sensor device appears in the list as "Gas sensor unit". If that entry does not exist, the system uses the integrated gas flow sensor.

4.10.1 On/Off control

The gas flow sensor can be turned on and off. By default, it is off. When turned on, flow rate and status are monitored in web user interface's welding display.

Setup panel

Go to the Main menu > System config menu > Gas sensor menu, navigate to the Enabled parameter and turn the control knob on it to change the gas flow sensor on or off. Press the Save button to save the changes.

Web user interface

Go to the Welding settings > Welding system > Gas sensor settings and select the Gas sensor on or off by clicking the corresponding button. A pop-up bar with Save and Reset changes buttons will appear at the bottom. Press the Save button in the dialog to save the settings.

4.10.2 Gas flow sensing level

The welding system can indicate flow rate below sensing level. This feature is enabled when the gas flow sensor has been turned on, the gas flow sensing level has been set to greater than zero, and gas is flowing by the means of manual control, or during welding. The indication is reported 3 seconds after the gas valve has been opened. The status is monitored in the welding display of the web user interface, and is passed to the robot via the digital robot interface as the GasFlowOk signal.

Setup panel

Go to the Main menu > System config menu > Gas sensor menu, navigate to the Level parameter and turn the control knob on it to change the gas flow sensing level. Press the Save button to save the changes.

Web user interface

Go to the Welding settings > Welding system > Gas sensor settings and adjust the Gas flow sensing level parameter by using the slider, or by clicking on the value and typing a new value. A pop-up bar with Save and Reset changes buttons will appear at the bottom. Press the Save button in the dialog to save the settings.

4.10.3 Gas mixture setup

Knowing the exact mixture of the shielding gas is necessary for precise gas flow measurement. The gas flow sensor unit supports flow measurement for any mixture of the six base gases, including pure base gases. The mixtures are set up by specifying the percentage of each gas in the mixture.

Reconfigure the mixture every time when the type of the shielding gas is changed.

The percentage of Argon is changed automatically when adjusting other gases, the total percentage being always 100 %. For example, if Carbon dioxide is increased from 0 to 18 %, Argon is changed automatically from 100 to 82 %. This applies for Ar+18CO_2 gas. If Carbon dioxide is increased to 100 %, Argon is decreased to 0 %. This applies for pure CO_2 gas, etc.

Setup panel

Go to the Main menu > System config menu > Gas sensor menu > Gas mixture menu. Navigate through the gas parameters and adjust their percentage in the mixture by turning the control knob, according to the shielding gas in use. Press the Save button to save the changes.

Web user interface

Go to the Welding settings > Welding system > Gas sensor settings and adjust the gases by using sliders, or by clicking on the value and typing a new value. A pop-up bar with Save and Reset changes buttons will appear at the bottom. Press the Save button in the dialog to save the settings.

5. TROUBLESHOOTING

5.1 Typical problems

The problems listed and the possible causes are not definitive, but serve to suggest some standard and typical situations that may present during normal environmental use when using the MIG/MAG process with the A7 MIG Welder.

Problem	*Check the following*
Machine won't work	• Check mains plug is connected correctly • Check mains power distribution is switched on • Check the mains fuse and/or circuit breaker • Check power source 0/1 switch is ON (1) • Check interconnection cable set and connectors between the power source and wire feed unit are correctly fastened. See the manual schematic • Check earth return cable is connected • Check control panels are switched on.
Dirty, poor quality weld	• Check shielding gas supply • Check and set gas flow rate • Check gas type for application • Check gun/electrode polarity • Check correct welding program selected • Check correct channel number selected on wire feeder control panel • Check power supply – Phase down?
Variable welding performance	• Check wire feed mechanism is correctly adjusted • Check correct drive rolls are fitted • Check wire spool overrun tension is correctly adjusted • Check gun liner is not blocked, replace if necessary • Check correct gun liner is fitted for the filler wire size and type • Check contact tip for size, type and wear • Check gun is not over heating in application • Check cable connections and earth return clamp • Check welding parameter settings.
Filler wire won't feed	• Check that pressure arms are closed and adjusted in wire feed mechanism • Check welding gun switch function • Check Euro gun collar is correctly fastened • Check gun liner is not blocked • Check contact tip, size, type, wear • Check and try alternative gun.

5.2 Error codes

Every incident is recorded in the logbook and displayed to a user.

Severity	*Priority*	*Description*
Warning	1	Does not stop or prevent welding.
Minor error	2	Any welding operations are interrupted in a controlled manner (involving downslope and crater filling, for instance).
Error	3	Any welding operations are immediately interrupted. Requires user acknowledgement from the user interface.
Serious error	4	Any welding operations are immediately interrupted. To acknowledge the error, the device has to be restarted.
Critical error	5	Any welding operations are immediately interrupted. Turn the machine off, disconnect the power supply and contact the maintenance service.

5.2.1 Power source errors

Code	*Description*	*Severity*	*Measures*
2	UNDERVOLTAGE Undervoltage in the mains supply (phase missing).	Error	Check the fuses.
3	OVERVOLTAGE Lengthy overvoltage in the mains supply.	Error	
4	OVERHEAT The overheat detector of the power source has gone off during welding. Welding has continued for too long without interruption or the ambient temperature is too high.	Minor error	Do not switch off the power source. Let the fans cool down the device.
5	LOW AUXILIARY VOLTAGE Undervoltage in power source control card's auxiliary voltage. The control card is defective.	Critical error	Switch off and restart the power source. Contact the maintenance service if the error is not resolved.
6	GENERAL FAILURE A defective control card/connection, or set limit exceeded. Unable to measure auxiliary voltage or current/the set limit exceeded for overcurrent/auxiliary voltage.	Serious error	Switch off and restart the power source. Contact the maintenance service if the error is not resolved.
9	MEASUREMENT CABLE Failed to measure welding voltage using a measurement cable. The earth return cable on the measurement cable is disconnected or defective.	Error	Connect the earth return cable on the measurement cable to the welding piece, check the connection of the intermediate cable, and if necessary, replace the intermediate cable.

10	UNSUPPORTED PROCESS The power source does not support the requested process. The welding process is unknown or from a different product range.	Error	Replace the weld curve on the memory channel to one with a welding process supported by the power source.
11	CUT-OFF CARD CONTROL ERROR An error has occurred in the cur-off card control. The cut-off card connector is loose, or the card is defective.	Critical error	Switch off the power source. Check that the cut-off card connector is correctly connected. Restart the power source. If the problem is not resolved, switch off the power source and contact maintenance.
12	CHECK WELDING CABLE The welding circuit is short-circuited. Incorrect cabling, or a defective cable, or an in-line arc-fed MMA/TIG power source, whose (+) pole is connected to the weld piece, is connected to the MIG/MAG power source outputs at the same time as MIG/MAG is used, or the arc-fed power source is defective.	Serious error	Switch off the MIG/MAG power source. Check that the welding cables are correctly connected. Disconnect the (+) cable of the arc-fed power source or the entire arc-fed power source from the welding piece. Restart the MIG/MAG power source. Contact the maintenance service if the error is not resolved.

5.2.2 Cooling unit errors

Code	*Description*	*Severity*	*Measures*
27	COOLING UNIT ERROR The cooling unit does not function properly, or coolant circulation is prevented, or the cooling unit is not connected but has been configured ON in the system.	Serious error	Switch the cooling unit OFF from the system setup when there is no cooling unit in the system. Check coolant circulation. Switch off and restart the power source. Contact the maintenance service if the error is not resolved.

5.2.3 Wire feeder errors

Code	Description	Severity	Measures
42	WIRE FEED MOTOR HIGH CURRENT The wire feed motor current is close to the current limit when the motor is running. The wire feeder rolls are too tight, the wire spool brake is too tight, or the wire liner is dirty.	Warning	Check and replace the consumables in the wire feed unit and the torch.
43	WIRE FEED MOTOR OVERCURRENT Current limit is exceeded while the wire feed motor is running, and the motor is stopped. The wire feeder rolls are too tight, the wire spool is too tight, or the wire is stuck.	Error	Check and replace the consumables in the wire feeder unit and the torch.
44	NO WIRE FEED SPEED SIGNAL Wire feed motor tachometer signal missing. The tachometer is damaged or the wiring is broken.	Critical error	Contact the maintenance service.
50	LICENSE ERROR An attempt was made to use an optional accessory, welding program, or a specific setting for welding that has not been activated using a license code.	Error	Acquire a license for the optional function you want from the device provider.
51	THE REAR FEED WHEELS ARE LOOSE The rear feed rolls are loose. The wire feed speed is slowed down or varies.	Warning	Tighten the rear feed rolls.
52	THE FRONT FEED WHEELS ARE LOOSE The front feed rolls are loose. The wire feed speed is slowed down or varies.	Warning	Tighten the front feed rolls.
53	COLLISION DETECTED The collision sensor has been activated. The welding torch mounted on the arm of a welding robot has collided with the welding piece or another obstacle.	Error	Reverse the robot arm until the torch no longer touches the obstacle. Check the torch in case of damages.

5.2.4 Welding curve errors

Code	Description	Severity	Measures
81	CURVE FILE NOT FOUND Internal program error. The selected synergic welding curve was not found in the memory. The system memory card is detached or defective.	Error	Switch off and restart the power source. Contact the maintenance service if the error is not resolved.

5.2.5 Robot interface errors

Code	*Description*	*Severity*	*Measures*
131	FIELDBUS ERROR Failed to initialize the fieldbus card during start-up. The fieldbus module is missing, has been incorrectly connected, or is damaged.	Serious error	Check that the Anybus CompactCom M30 fieldbus module is correctly connected. Replace if necessary. Contact the maintenance service if the error is not resolved.
132	COMMUNICATION ERROR No connection to the robot. Fieldbus cable is broken or detached, or there is a robot failure or shutdown. Welding is interrupted when connection is lost.	Error	Check the fieldbus cable. Turn on the robot if it was shut down. Switch off and restart the power source.
133	STOP A user has pressed the stop button. Welding is immediately interrupted.	Error	Identify the reason for stop. Do not release the stop button before the cause has been identified and resolved.
134	GATE DOOR OPEN The door of the welding cell is open, or the light field of the photo-electric device has been broken by passing through it. Welding is immediately interrupted.	Error	Close the gate door of the welding cell and acknowledge the signal.
135	LOGBOOK MEDIA CARD MISSING The system cannot find the logbook memory card. The microSD memory card has not been installed in robot interface unit's card slot, or the contact is defective. The system can be used normally, but log entries cannot be recorded.	Warning	Check that the microSD memory chip is correctly connected.
136	LOGBOOK MEDIA CARD BROKEN Failed to write to the logbook microSD memory card. The memory card or the contact is defective. The system can be used normally, but log entries cannot be recorded.	Warning	Check the microSD memory card connection and replace the card, if necessary.
137	LOGBOOK MEDIA CARD UNFORMATTED Failed to read from the microSD memory card. The memory card has not been formatted. The system can be used normally, but log entries cannot be recorded.	Warning	Format the logbook memory card by using the web user interface. Go to the Settings > Backup restore and reset and click on the Reset logbook button.
138	LICENSE ERROR An attempt was made to use an optional accessory, welding program, or a specific setting for welding that has not been activated using a license code.	Error	Acquire a license for the optional function you want from the device provider.
139	WIRE FEEDER LOST No connection to the wire feeder. There is no wire feeder connected to the system, or the connection is defective.	Error	Check the connection and condition of the wire feeder interconnection cable.
140	THE LOGBOOK MEMORY CARD IS INVALID The microSD memory card is the wrong type. The system can be used normally, but log entries cannot be recorded.	Warning	Replace the microSD memory card with the right type of card. Kingston® microSDHC Class-10 10MB/s, min. 4 GB is recommended. This error may appear also if the microSD card is broken.

6. OPERATION DISTURBANCES

Should you experience a malfunction from your machine, please consult the basic troubleshooting text above first, and complete some basic checks.

If the machine malfunction cannot be corrected with these measures, contact your Kemppi maintenance service workshop.

Operation of the overload protection

Yellow thermal protection lamp is lit when the thermostat is operating, due to loading beyond the stated duty cycle.

The thermostat will operate, if machine is continuously loaded over rated values or cooling air circulation is blocked.

Internal fans will cool the machine, and when the pilot lamp is not lit the machine is automatically ready for welding.

Control fuses

Fuse, 6.3 A delayed, on the rear wall of the machine provides protection for auxiliary devices.

Use the same type and rating of fuse as marked beside the fuse adapter. Damage caused by incorrect fuse selection is not covered by the guarantee.

Under- and overvoltages in the mains supply

Primary circuits of the machine are protected against sudden, transient overvoltage. The machine is designed to withstand 3 x 440 V voltage continuously. Ensure that voltage is kept within this permissible limit, especially when the mains supply is provided by a combustion engine generator. If the mains have undervoltage (under approx. 300 V) or overvoltage (over approx. 480 V) machine control stops operation automatically.

Loss of a phase in the mains supply

Loss of a mains power phase causes noticeably poor welding properties. In some cases, the machine won't start at all. Loss of a phase can be due to following:

- Blowing of mains supply fuse
- Defective mains cable
- Bad connection of mains power cable on machine terminal block or plug of machine.

7. MAINTENANCE

When considering and planning routine maintenance, please consider the frequency of machine use and the working environment.

Correct operation of the machine and regular maintenance will help you avoid unnecessary downtime and equipment failure.

Disconnect the machine from the mains before handling the electrical cables.

7.1 Daily maintenance

Check the overall condition of the welding gun. Remove welding spatter from the contact tip and clean the gas nozzle. Replace worn or damaged parts. Only use original Kemppi spare parts.

Check the condition and connection of the welding circuit components: welding gun, earth return cable and clamp, sockets and connectors.

Check the condition of the feed rolls, needle bearings and shafts. Clean and lubricate bearings and shafts with a small quantity of light machine oil if necessary. Assemble, adjust and test function.

Check that the feed rolls are suitable for the filler wire you are using, and that their pressure adjustment is correct.

7.2 Periodic maintenance

Periodic maintenance should only be carried out by a suitably qualified person. Disconnect the plug of the machine from the mains socket and wait about 2 minutes (capacitor charge) before removing the cover plate.

Check at least every half year the electric connectors of the machine – clean any oxidized parts and tighten loose connections.

You must know the correct tension torques values before starting the reparation of the loose joints.

Clean the inner parts of the machine from dust and dirt e.g. with a soft brush and vacuum cleaner. Also clean the ventilation net behind the front grill.

Do not use compressed air, there is a risk that the dirt will compact even more tightly into gaps of cooling profiles.

Do not use pressure washing devices.

Only an authorized trained electrician should carry out repairs to Kemppi machines.

7.3 Service shop maintenance

Kemppi Service Workshops complete maintenance according to their Kemppi service agreement.

The major points in the maintenance procedure are listed as follows:

- Cleaning of the machine
- Checking and maintenance of the welding tools
- Checking of connectors, switches and potentiometers
- Checking of electric connections
- Checking of mains cable and plug
- Damaged parts or parts in bad condition are replaced by new ones
- Maintenance testing.
- Operation and performance values of the machine are checked, and when necessary adjusted by means of software and test equipment.

Software loading

Kemppi Service Workshops can also test and load firmware and welding software.

8. DISPOSAL

Do not dispose of electrical equipment with normal waste!

In observance of European Directive 2002/96/EC on waste electrical and electronic equipment, and its implementation in accordance with national law, electrical equipment that has reached the end of its life must be collected separately and taken to an appropriate environmentally-responsible recycling facility.

The owner of the equipment is obliged to deliver a decommissioned unit to a regional collection center, as per the instructions of local authorities or a Kemppi representative. By applying this European Directive you will improve the environment and human health.

9. ORDERING NUMBERS

Code	*Product*	
6203510	A7 MIG WIRE FEEDER 25-LH-EUR	Wire feeder, left handed, euro -connector
6203501	A7 MIG WIRE FEEDER 25-LH-PP	Wire feeder, left handed, power pin -connector
6201450	A7 MIG POWER SOURCE 450	Welding power source, 450 A
6201350	A7 MIG POWER SOURCE 350	Welding power source, 350 A
SP013699	MOUNTING KIT A7 DUAL FEEDER	Mounting kit, A7 dual feeder set up
6260458	ROBOT 70-5-GH CABLE SHOE	Interconnection cable set with zipper bag sleeve, 5 meters, gas cooled
6260459	ROBOT 70-5-WH CABLE SHOE	Interconnection cable set with zipper bag sleeve, 5 meters, water cooled
6260449	ROBOT 70-10-GH CABLE SHOE	Interconnection cable set with zipper bag sleeve, 10 meters, gas cooled
6260460	ROBOT 70-10-WH CABLE SHOE	Interconnection cable set with zipper bag sleeve, 10 meters, water cooled
6260480	ROBOT 70-20-GH CABLE SHOE	Interconnection cable set with zipper bag sleeve, 20 meters, gas cooled
6260481	ROBOT 70-20-WH CABLE SHOE	Interconnection cable set with zipper bag sleeve, 20 meters, water cooled
6203521	A7 LITE ANALOG PLC	See the A7 Analog PLC Operating manual, to be used with 977412ETC
6203522	A7 FULL ANALOG PLC	See the A7 Analog PLC Operating manual, to be used with 977412ETC
6260482	A7 ROBOT 70-5-WH	Interconnection cable set with corrugated sleeve, 5 meters, water cooled
6260483	A7 ROBOT 70-5-GH	Interconnection cable set with corrugated sleeve, 5 meters, gas cooled
9774121DEV	ANYBUS-CC M30 DEVICENET	DeviceNet fieldbus adapter
9774121DEV12	ANYBUS-CC M30 DEVICENET M12	DeviceNet fieldbus adapter, M12 connectors
9774121ETH	ANYBUS-CC M30 ETHERNET/IP	EtherNet/IP fieldbus adapter, 1-port version
9774121ETH2	ANYBUS-CC M30 ETHERNET/IP 2-PORT	EtherNet/IP fieldbus adapter, 2-port version
9774121ETC	ANYBUS-CC M30 ETHERCAT	EtherCAT fieldbus adapter
9774121PRF	ANYBUS-CC M30 PROFIBUS	PROFIBUS fieldbus adapter
9774121PRN	ANYBUS-CC M30 PROFINET IO	PROFINET IO fieldbus adapter, 1-port version
9774121PRN2	ANYBUS-CC M30 PROFINET IO 2-PORT	PROFINET IO fieldbus adapter, 2-port version
9774121MBR	ANYBUS-CC M30 MODBUS-RTU	Modbus-RTU fieldbus adapter
9774121MBT	ANYBUS-CC M30 MODBUS-TCP	Modbus-TCP fieldbus adapter, 1-port version
9774121MBT2	ANYBUS-CC M30 MODBUS-TCP 2-PORT	Modbus-TCP fieldbus adapter, 2-port version

10. TECHNICAL DATA

A7 MIG Power Source 350, 450

A7 MIG Power source	*350*	*450*
Supply voltage 3~ 50/60 Hz	400 V, -15 % … +20 %	400 V, -15 % … +20 %
Mains connection cable	H07RN-F 4G6 (5 m)	H07RN-F 4G6 (5 m)
Maximum supply current	23 A	32 A
Effective supply current	21 A	25 A
Fuse	25 A delayed	35 A delayed
No-load voltage (peak)	U0 = 85 V – 95 V	U0 = 85 V – 95 V
Open circuit voltage (average)	85 V – 103 V	85 V – 103 V
Operating temperature range	-20 °C … +40 °C	-20 °C … +40 °C
Minimum generator power	35 kVA	35 kVA
External dimensions LxWxH	610 x 240 x 520 mm	610 x 240 x 520 mm
Weight (no mains connection cable)	40.2 kg	40.2 kg
Weight (with mains connection cable)	42.6 kg	42.6 kg
Degree of protection	IP23S	IP23S
Efficiency (100 % duty cycle)	87 %	87 %
Power factor (at max. current)	0.85	0.88
Storage temperature range	-40 °C … +60 °C	-40 °C … +60 °C
Temperature class (main transformer)	155 (F)	155 (F)
EMC class	A	A
Minimum short circuit power Ssc of supply network	5.5 MVA	5.5 MVA
Welding range	20 A / 12 V - 350 A / 46 V	20 A / 12 V - 450 A / 46 V
Output (at 60 % duty cycle)	350 A	450 A
Output (at 100 % duty cycle)	330 A	350 A
Power supply for auxiliary devices	50 V DC / 100 W	50 V DC / 100 W
Max. apparent power	22 kVA	22 kVA
Idle power	25 W	25 W
Power supply for cooling unit	24 V DC / 50 VA	24 V DC / 50 VA

A7 Cooler

A7 Cooler	
Operating temperature range	-20 °C … +40 °C
External dimensions LxWxH	570 x 230 x 280 mm
Weight (no accessories)	11 kg
Degree of protection	IP23S
Storage temperature range	-40 °C … +60 °C
EMC class	A
Operating voltage (safety voltage)	400 V -15 % … +20 %
Cooling power	1 kW
Maximum pressure	0.4 MPa
Tank volume	Approx. 3 l

A7 MIG Wire Feeder 25

A7 MIG Wire Feeder	*25*
Operating temperature range	-20 °C ... +40 °C
External dimensions LxWxH	380 x 250 x 170 mm
Weight (no accessories)	7.8 kg
Degree of protection	IP21S
Storage temperature range	-40 °C ... +60 °C
EMC class	A
Gun connection	Euro
Wire feed mechanism	4-roll, two motors
Filler wire sizes (Fe solid)	0.8 mm - 1.6 mm
Filler wire sizes (Fe cored)	1.0 mm - 1.6 mm
Filler wire sizes (Ss)	0.8 mm - 1.6 mm
Filler wire sizes (Al)	1.0 mm - 2.4 mm
Filler wire sizes (CuSi)	0.8 mm - 1.2 mm
Wire feed speed adjustment	0.5 m/min - 25 m/min
Operating voltage (safety voltage)	50 V DC

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Declarations of Conformity – Overensstemmelseserklæringer – Konformitätserklärungen – Declaraciones de conformidad – Vaatimustenmukaisuusvakuutuksia – Déclarations de conformité – Dichiarazioni di conformità – Verklaringen van overeenstemming – Samsvarserklæringer – Deklaracje zgodności – Declarações de conformidade – Заявления о соответствии – Försäkran om överensstämmelse – 符合性声明

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