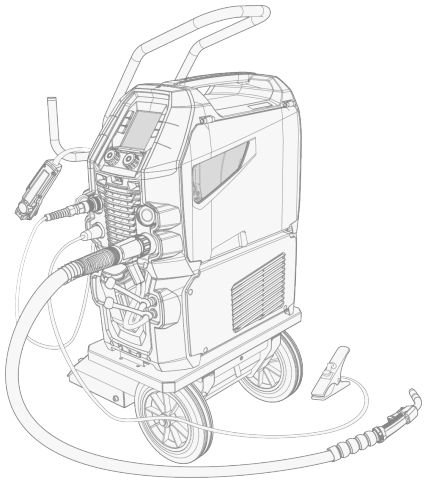
Master M 353, 355
Master M Cooler



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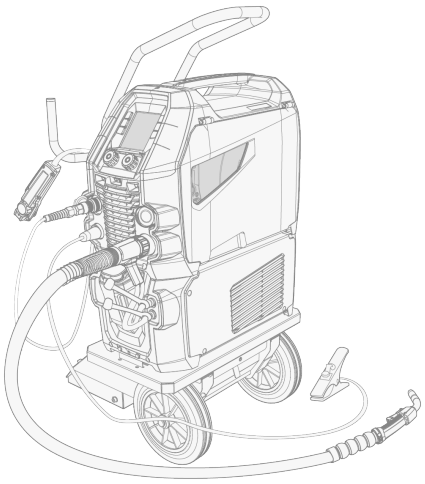
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1. GENERAL

These instructions describe the use of Kemppi's Master M welding equipment designed for light- to medium-duty professional use in MIG/MAG welding.

Master M welding machines include both manual and automatic welding processes. Pulse welding is possible with the Master M 355 series machines.

The equipment consists of a power source (with an integrated wire feeder) and an optional cooling unit.



Master M series:

Master M product series	Master M device model
Master M 353	Master M 353 G
	Master M 353 GM
	Master M Cooler (optional)
Master M 355	Master M 355 G
	Master M 355 GM
	Master M Cooler (optional)

Master M is designed to be used together with Kemppi's Flexlite MIG welding torches.

Master M can be used also for TIG * and MMA ** welding.

** TIG welding requires the use of a dedicated Flexlite TX TIG torch with Euro connector.*

*** MMA welding requires a dedicated DIX-Euro adapter.*

Important notes

Read the instructions through carefully.

Items in the manual that require particular attention in order to minimize damage and harm are indicated with the below symbols. 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.

General notices

https://kemp.cc/ud/notices

EULA (End User License Agreement)

https://kemp.cc/ud/eula

Warranty

https://kemp.cc/ud/warranty

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 source language for this document is English. All other language versions available are either professional human translations or advanced machine translations. Any feedback regarding translation terminology can be sent to userdoc@kemppi.com.

1.1 WELDING SAFETY

Welding is always classified as hot work, and welding equipment typically contains high-voltage circuits. If you are not familiar with welding and welding principles, it is recommended that you acquire welding training or professional guidance before commencing welding. The welding equipment mentioned in this manual is intended for professional use in an industrial environment.

For your own safety, and that of your working environment, pay particular attention to the safety instructions delivered with the equipment.

You can also access and download the safety instructions by using these links:

- Safety

  (https://kemp.cc/safety/general)
- Personal protection

  (https://kemp.cc/safety/ppe)
- Welding guns and torches

  (https://kemp.cc/safety/torches)

1.2 EQUIPMENT DESCRIPTION

Master M device models (350 A)

- Master M 353 G
  >> Generator-compatible
  >> Standard device with automatic 1-MIG process
- Master M 353 GM
  >> Generator-compatible and multi-voltage
  >> Standard device with automatic 1-MIG process
- Master M 355 G
  >> Generator-compatible
  >> Pulse device with automatic 1-MIG and pulse processes. Advanced MAX processes as optional.
- Master M 355 GM
  >> Generator-compatible and multi-voltage
  >> Pulse device with automatic 1-MIG and pulse processes. Advanced MAX processes as optional.

All Master M device models have a 4-roll wire feed mechanism with the maximum wire spool diameter of 300 mm.

For the Master M device part descriptions, refer to "Master M device" on page 9.

Master M control panels

- Color LCD display

Master M cooling units

- Master M Cooler
- Master M Cooler MV (multi-voltage).

For the cooling unit part descriptions, refer to "Master M Cooler cooling unit (optional)" on page 12.

MIG welding torches

- Flexlite GX MIG welding torches.

For more information, refer to Kemppi Userdoc.

Welding programs

- Welding program work pack (factory-installed)
- Additional 1-MIG and pulse programs (on-demand / at the time of purchase)
- Additional MAX processes for Master M 355 (on-demand / at the time of purchase).

For more information on acquiring welding programs and additional welding processes, contact your local Kemppi dealer.

Subfeeders

Subfeeder support can be added with a separate installation kit (contact your Kemppi dealer / service workshop for more information).

- SuperSnake GTX subfeeder.

For more information on the SuperSnake GTX subfeeder, refer to Kemppi Userdoc.

Optional accessories

- 4-wheel carts
- 2-wheel carts
- Remote control HR40 (2-knob control)
- Remote control HR43 (1-knob control)

- Remote control HR55
- Power source air filter
- Wire feed cabinet heater.

For more information on optional accessories, contact your local Kemppi dealer.

EQUIPMENT IDENTIFICATION

Serial number

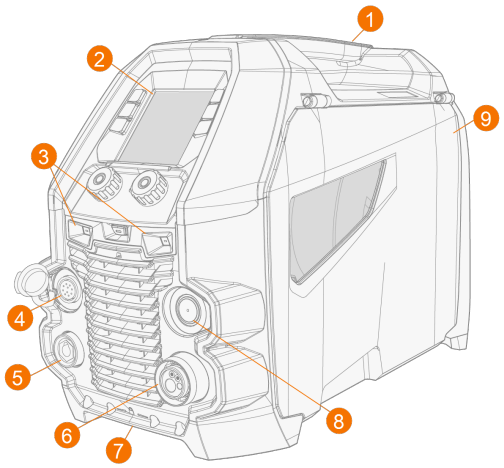
Serial number of the device is marked on the rating plate or in another distinctive location on the device. It is important to make correct reference to the serial number of the product when ordering spare parts or making repairs for example.

Quick Response (QR) code

The serial number and other device-related identification information may also be saved in the form of a QR code (or a barcode) on the device. Such code can be read by a smartphone camera or with a dedicated code reader device providing fast access to the device-specific information.

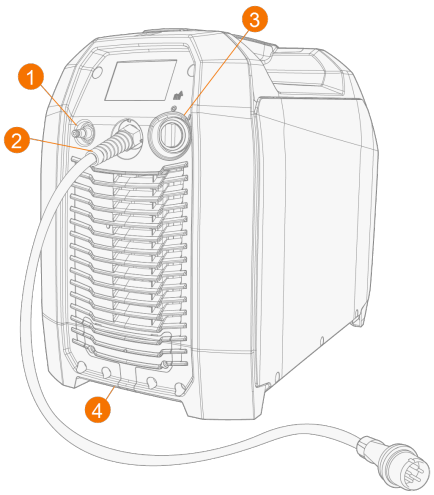
1.3 MASTER M DEVICE

Front



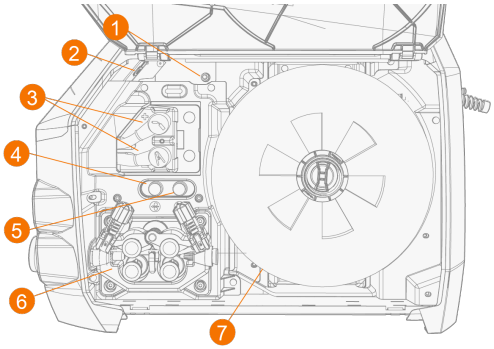
1. Transportation handle (also for mechanical lifting when the device is not installed on a cooling unit or cart)
2. Control panel
3. LED work lights with light switch in the middle
   >> Light switch: First press turns the lights on (full brightness), second press dims the lights (medium brightness), third press turns the lights off
   >> Includes a built-in battery. The battery is charged only when the equipment is connected to the mains and the ambient temperature is between +10...+45 °C.
4. Control cable connector
5. Earth return cable connector
6. Welding cable euro connector
7. Front locking interface
   >> For locking on top of the cooling unit or on the cart
8. Subfeeder synchronization connector
9. Wire feed cabinet hatch.

Rear



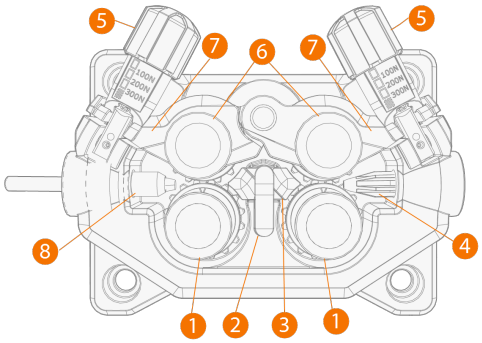
1. Shielding gas hose connector
2. Mains cable
3. Power switch
4. Rear locking interface
   >> For locking on top of the cooling unit or on the cart.

Inside wire feed cabinet



1. Gas regulating valve (Master M 355)
   >> For setting the gas flow rate in the device lower than the gas flow rate from the gas supply
2. USB connector
3. Polarity terminals
4. Wire inch button
   >> Drive the filler wire forward (with arc off)
5. Gas test button
   >> Test the shielding gas flow and flush the gas line
6. Wire feed mechanism (refer to "Wire feed mechanism" on the next page)
7. Wire spool.

1.3.1 WIRE FEED MECHANISM

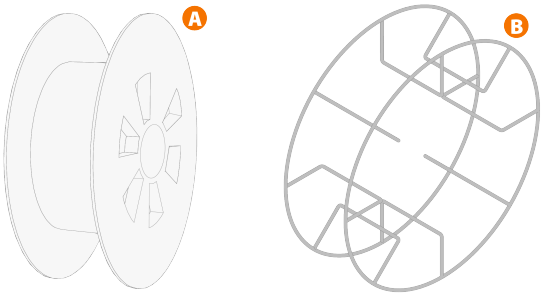


1. Drive rolls and drive roll mounting caps
2. Middle guide tube locking clip
3. Middle guide tube
4. Inlet guide tube
5. Pressure handles
6. Pressure rolls and pressure roll mounting pins
7. Pressure roll locking arms
8. Outlet guide tube.

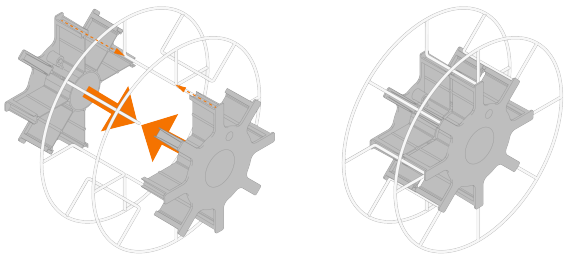
For replacing the feed rolls, refer to "Installing and replacing feed rolls" on page 27.

For replacing the wire guide tubes, refer to "Installing and replacing wire guide tubes" on page 30.

1.3.2 WIRE SPOOLS



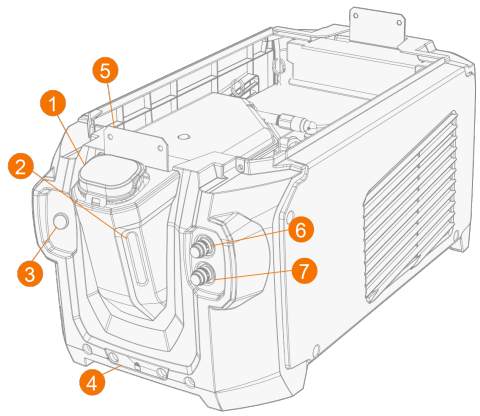
Master M uses the standard wire spools (A) without additional adapters. Wire spools with a large center hole, e.g. a wire basket rim (B), require an additional spool adapter (available as Kemppi accessory):



For more information, refer to "Installing and changing wire" on page 22.

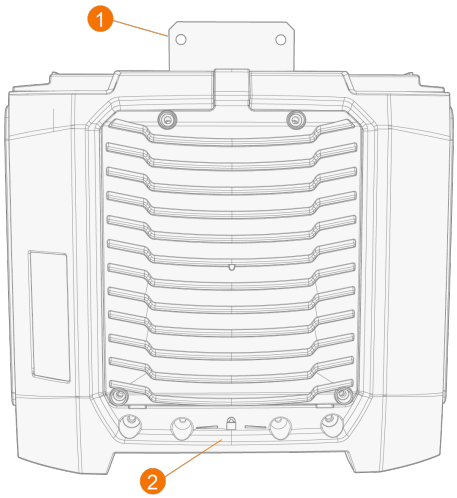
1.4 MASTER M COOLER COOLING UNIT (OPTIONAL)

Front



1. Cooler container cap
2. Cooling liquid level indicator
3. Cooling liquid circulation button
   >> Keeping the button pressed activates the pump and circulates the cooling liquid throughout the system. Once released, the pump stops.
4. Front locking interface
   >> For locking on the cart
5. Front locking interface
   >> For locking to the power source
6. Coolant inlet connector (red)
7. Coolant outlet connector (blue).

Rear



1. Rear locking interface
   >> For locking to the power source
2. Rear locking interface
   >> For locking on the cart.

2. INSTALLATION

Do not connect the equipment to the mains before the installation is complete.

Do not modify the welding equipment in any way, except for the changes and adjustments covered in the manufacturer's instructions.

Place the machine on a horizontal, stable and clean ground. Protect the machine from rain and direct sunshine. Check that there is enough space for cooling air circulation in the machine vicinity.

Before installation

- Make sure to acknowledge and follow the local and national requirements regarding installation and use of high voltage units.
- Check the contents of the packages and make sure the parts are not damaged.
- Before you install the power source on site, see the requirements for the mains cable type and fuse rating.

Distribution network

This Class A equipment is not intended for use in residential locations where the electrical power is provided by the public low-voltage supply system. There can be potential difficulties in ensuring electromagnetic compatibility in those locations, due to conducted as well as radiated radio-frequency disturbances.

Master M power source 350A: Provided that the short circuit power of public low voltage system at the point of common coupling is higher than 2.4 MVA, this equipment is compliant with IEC 61000-3-11:2017 and IEC 61000-3-12:2011 and can be connected to public low voltage systems. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the system impedance complies with the impedance restrictions.

2.1 INSTALLING POWER SOURCE MAINS PLUG

Only an authorized electrician is allowed to install the mains cable and plug.

Do not connect the machine to the mains before the installation is complete.

Install the 3-phase plug according to the Master M device and site requirements.

The mains cable includes the following wires:

1. Brown: L1
2. Black: L2
3. Grey: L3
4. Yellow-green: Protective earth

Cable type and fuse rating requirements:

Unit amperage	Cable type	Fuse rating
350 A (380-460 V)	4 mm^2	16 A
350 A (380-460 / 220-230 V)	4 mm^2	16 / 32 A

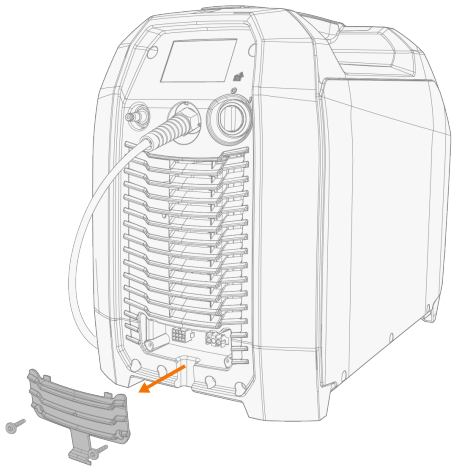
2.2 INSTALLING COOLING UNIT (OPTIONAL)

⚠ *The Master M cooling unit must be installed by authorized service personnel.*

Tools needed:

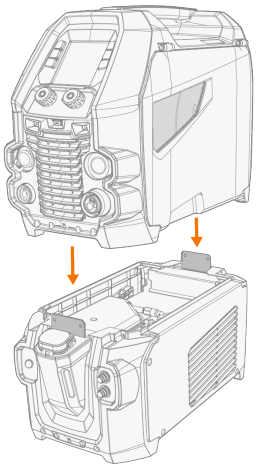


1. Remove the small connector cover in the rear of the power source.

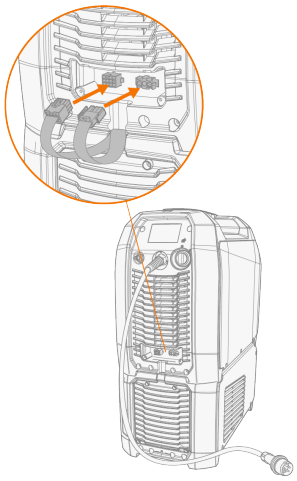


2. Route the cooling unit's connection cables so that they remain accessible through the next steps.
3. Lift the Master M device on top of the cooling unit so that the fixing plates align and go into their slots.

⚠ *Ensure that the cooling unit's connection cables are not caught and/or damaged between the edges.*



4. Fix the units together with two screws (M5x12) in the front and two screws (M5x12) in the rear.
5. Connect the cooling unit cables.



6. Replace the small connector cover.

2.3 INSTALLING EQUIPMENT ON CART (OPTIONAL)

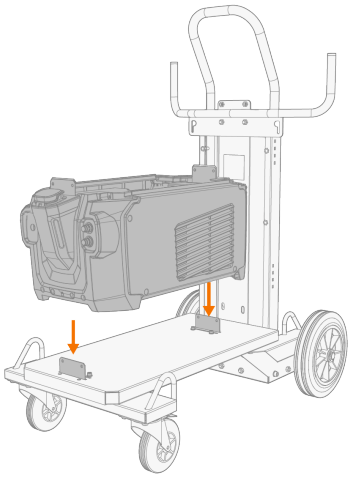
Master M has four transport unit options: a 4-wheel cart with a gas bottle rack (P45MT), a 4-wheel cart without a gas bottle rack (P43MT), a 2-wheel cart with a gas bottle rack (T25MT) and a 2-wheel cart without a gas bottle rack (T35A).

The equipment installation principle and the bottom securing interface is the same with all carts.

Tools needed:

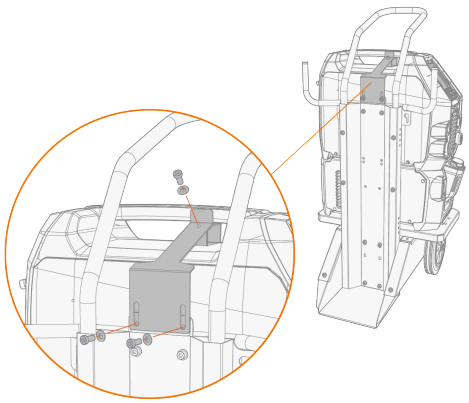


1. Install the cooling unit on the cart.

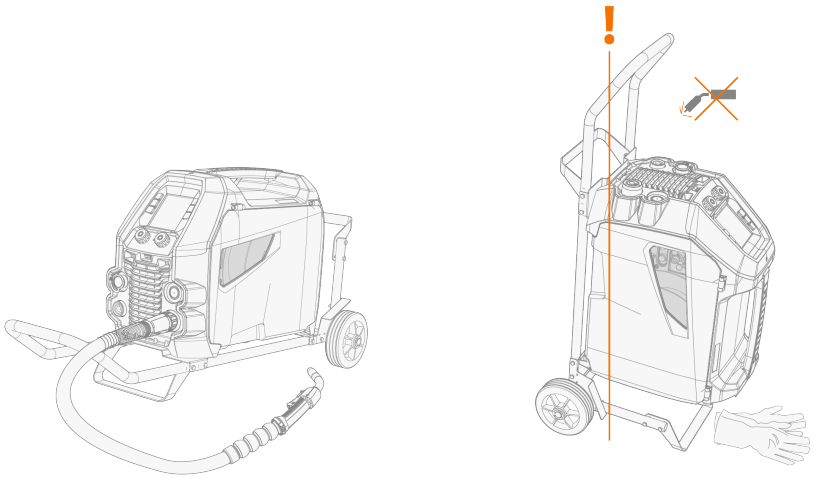


2. Fix the cooling unit to the cart with two screws (M5x12) in the front and two screws (M5x12) in the rear.
3. Install the Master M device on top of the cooling unit. Refer to "Installing cooling unit (optional)" on page 15 for installation details.
4. T25MT 2-wheel cart: Secure the equipment to the cart with the two side connection brackets.

With the T25MT cart, an additional securing bracket is attached to the device handle. Secure the bracket to the cart with the screws provided (M8x16) .



⚠ *T35A 2-wheel cart: The cart must be in horizontal position during welding.*



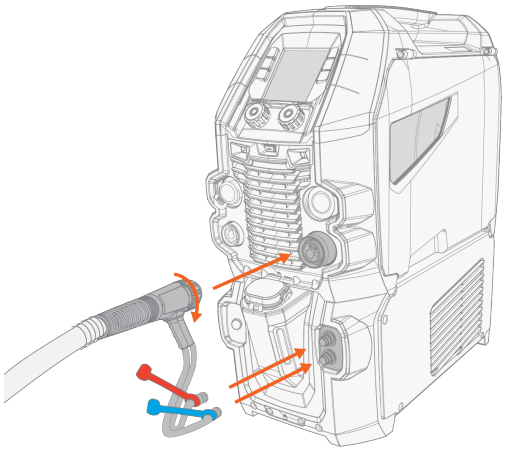
For lifting the Master M equipment, refer to "Lifting Master M equipment" on page 60.

2.4 CONNECTING WELDING TORCH

Master M is designed to be used with the Kemppi Flexlite GX MIG welding torches. For more information, refer to Userdoc.

Always check that the wire liner, contact tip and gas nozzle are suitable for the job.

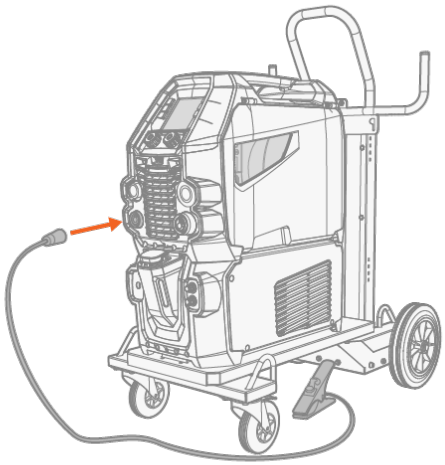
1. Push the welding torch connector into the Euro connector and hand-tighten the collar.
2. If your setup includes a power source with cooling unit and a water-cooled torch, connect also the cooling liquid hoses. The hoses are color-coded.



3. Install and load the filler wire as described in "Installing and changing wire" on page 22.
4. Check the gas flow. Refer to "Installing gas bottle and testing gas flow" on page 31 for more information.

2.5 CONNECTING EARTH RETURN CABLE

Connect the earth return cable to the welding machine.

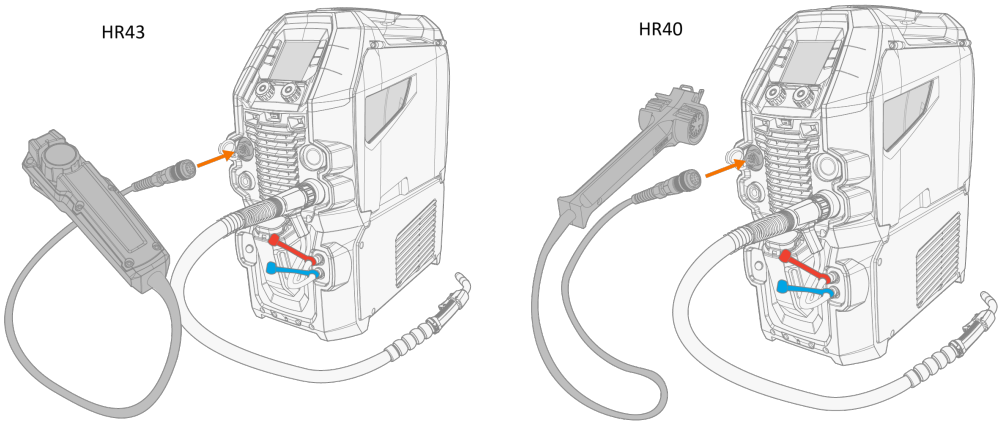


2.6 INSTALLING REMOTE CONTROL (OPTIONAL)

Remote controls are optional. To enable remote operation, connect the remote control device to the Master M welding equipment.

Remote control HR43/HR40

1. Connect the remote control cable to the power source's control cable connector.

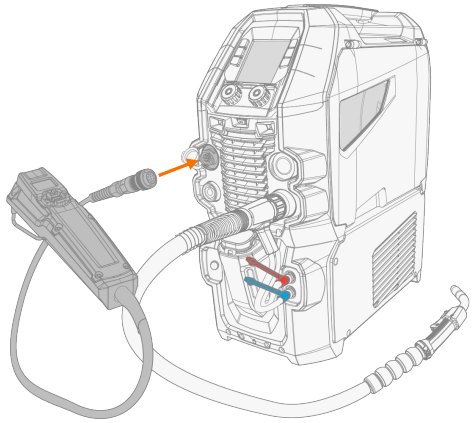


2. To adjust the remote control parameters, refer to the control panel settings ("Control panel: System settings" on page 47).

The remote control mode can be set and adjusted in the control panel settings.

Remote control HR55

1. Connect the remote control cable to the power source's control cable connector.



The remote control selections in the control panel settings are not required with HR55 remote control. When connected, the HR55 remote control is automatically in use.

2.7 INSTALLING AND CHANGING WIRE

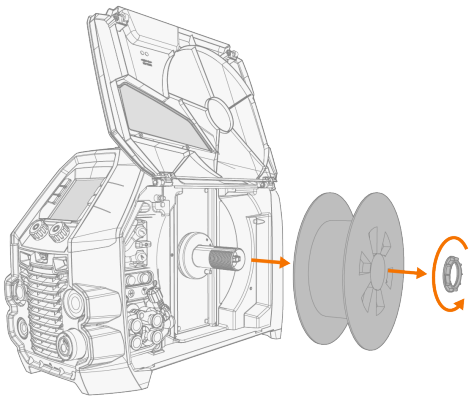
Always ensure that the feed rolls are suitable for the filler wire (diameter and material) in question. For more information, refer to "Wire feeder consumables" on page 83.

Install the welding torch to the Master M device before installing the wire spool.

When changing the wire spool, remove the remaining filler wire from the welding torch and wire feed mechanism before removing the wire spool.

To remove the wire spool:

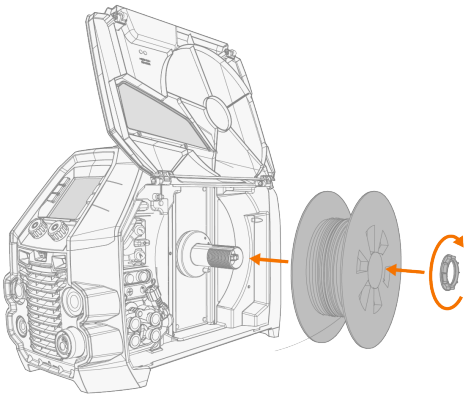
1. Open the wire feed cabinet hatch.
2. Loosen and remove the spool fastener and remove the wire spool.



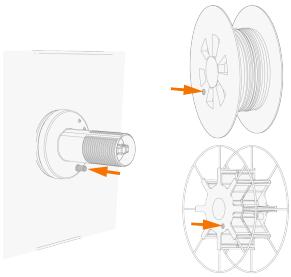
To install a new wire spool:

1. Insert the wire spool onto the spool hub. Secure the wire spool in place by inserting and tightening the spool fastener.

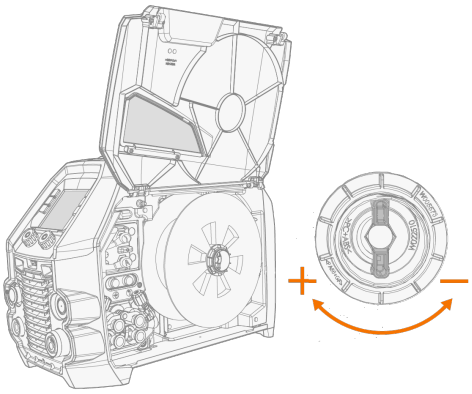
Ensure that the wire spool is facing the right direction, the filler wire running from the bottom of the spool to the feed rolls.



When installed, the pin next to the wire spool hub in the wire feeder must align and go into the hole in the spool or spool adapter.



2. If needed, adjust the spool brake by turning the spool brake tightening knob in the center of the spool hub.

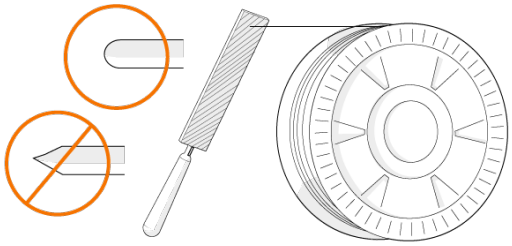


To install the filler wire:

1. Release the filler wire end from the spool and cut off any deformed section so that the end is straight.

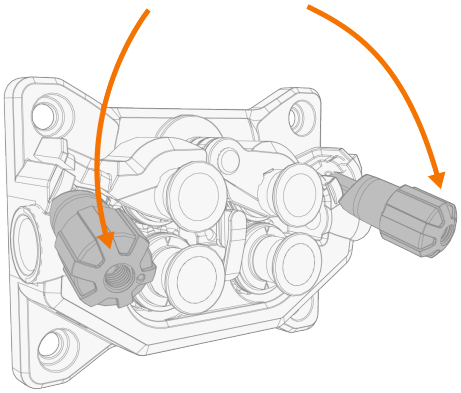
Ensure that the filler wire does not spill from the spool when it is released.

2. File the tip of the filler wire smooth.

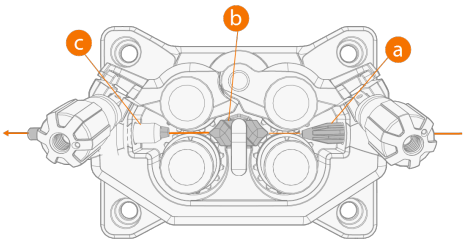


Sharp edges on the filler wire tip may damage the wire liner.

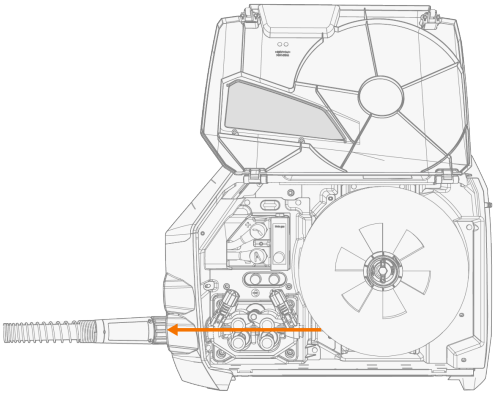
3. Release the pressure arms to move the feed rolls apart.



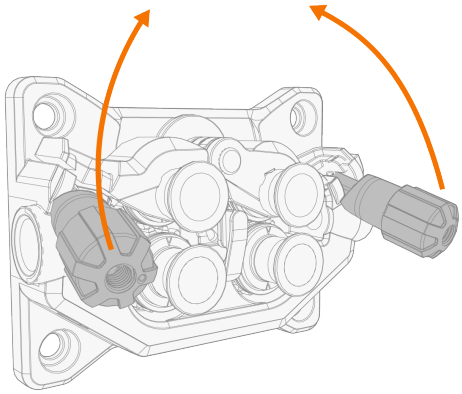
4. Guide the filler wire through the inlet guide tube (a), middle guide tube (b) and into the outlet guide tube (c), which feeds the filler wire to the MIG welding torch.



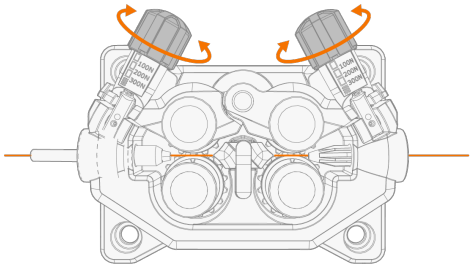
5. Push the filler wire by hand into the torch so that the wire reaches the wire liner.



6. Close the pressure arms so that the filler wire is locked between the feed rolls.



7. Adjust the pressure of the feed rolls with the pressure adjustment wheels. The pressure is the same for both feed roll pairs.

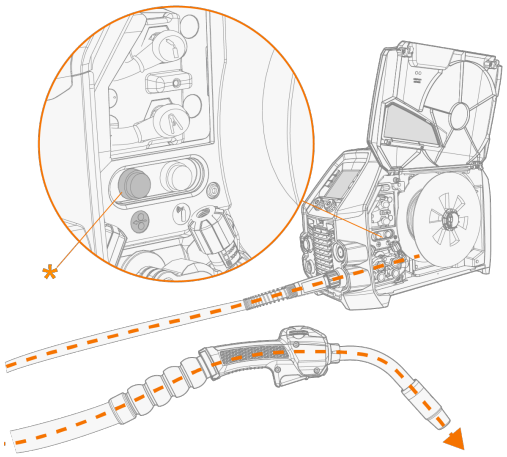


The graduated scales on the pressure handle indicate the pressure applied to the feed rolls. Adjust the pressure of the feed rolls according to the table below.

Filler wire material	Feed roll profile*	Filler wire diameter (mm)	Adjustment (x100N)
Fe/Ss solid	V-groove	0.8-1.0	1.5-2.0
		≥ 1.2	2.0–2.5
MC/FC	V-groove, knurled	≥ 1.2	1.0–2.0
Al	U-groove	1.0	0.5–1.0
		1.2	1.0–1.5

⚠ *Excessive pressure flattens the filler wire and may damage coated or cored filler wires. Excessive pressure also unnecessarily wears the feed rolls and increases gearbox load.*

8. Drive the filler wire into the MIG welding torch by pressing the wire inch button (*), by using the wire inch function in the system settings or by long pressing the left control knob button. Stop when the wire reaches the welding torch's contact tip.



Watch out for the wire when it reaches the contact tip and exits the welding torch.

9. Before welding, ensure that the welding parameters and settings conform to your welding setup.

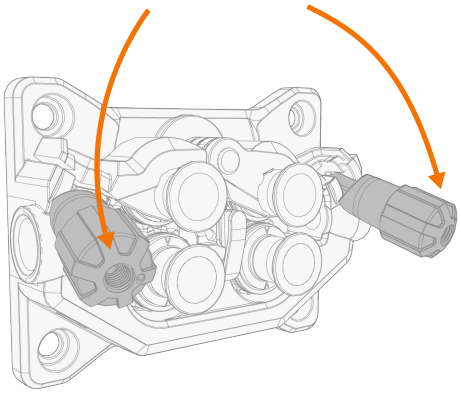
** Feed roll profiles and corresponding symbols*

Feed roll profile	Symbol
V-groove	V
V-groove, knurled	V≡
U-groove	U

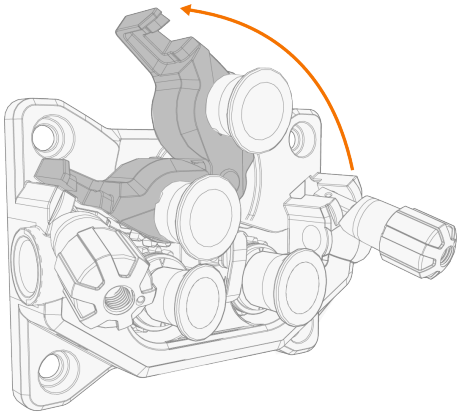
2.8 INSTALLING AND REPLACING FEED ROLLS

Replace the feed rolls when the filler wire diameter or material changes. Select the feed rolls according to the tables in "Wire feeder consumables" on page 83.

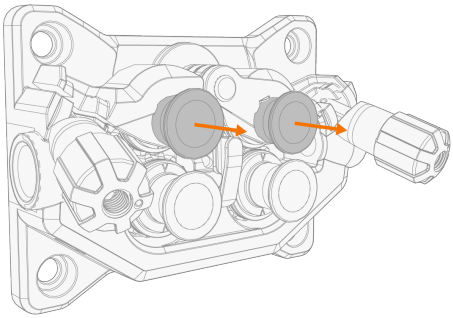
1. Open the wire feed cabinet hatch.
2. Release the pressure handles on the wire feed mechanism.



3. Open the locking arms to release the feed rolls.

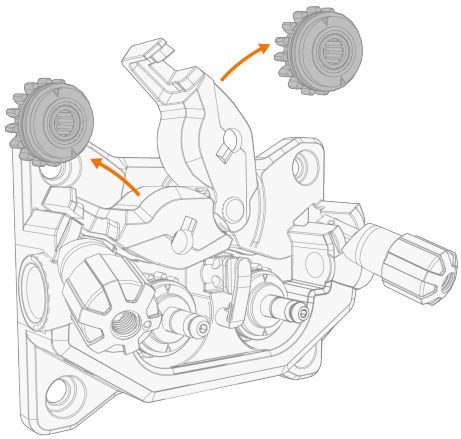


4. Remove the pressure feed roll mounting pins by pulling them.

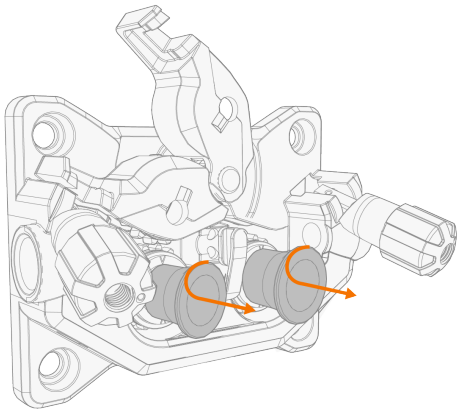


The pressure rolls' mounting pins have central axles attached to them, whereas the drive rolls' central axles act as drive shafts attached directly to the wire feed mechanism/motor.

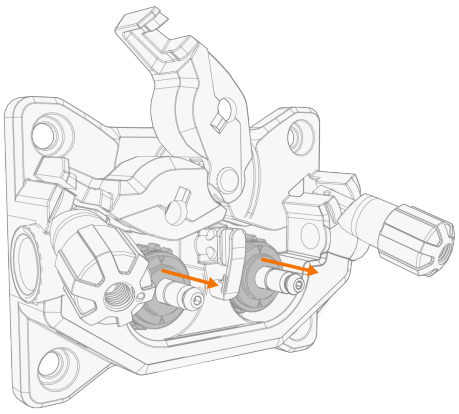
5. Remove the pressure rolls.



6. Remove the drive feed roll mounting caps by turning and pulling them.



7. Remove the drive feed rolls.

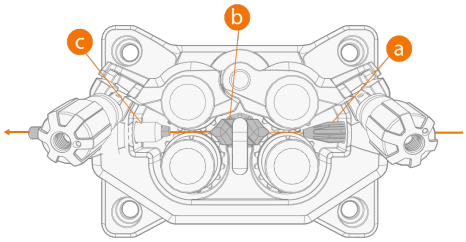


8. Follow the previous steps in reverse to install the wire feed rolls. Align the cut on the drive rolls' bottom with the pin on the drive shaft.
9. Reattach the mounting caps and mounting pins to lock the drive and pressure rolls into their places.
10. Close the locking arms and lower the pressure handles on the feed rolls. Refer to "Installing and changing wire" on page 22 for more information on the wire installation.
11. Close the wire feed cabinet hatch.

2.9 INSTALLING AND REPLACING WIRE GUIDE TUBES

The wire feed mechanism includes three wire guide tubes. Replace them when the filler wire diameter or material changes. Select the wire guide tubes according to the tables in "Wire feeder consumables" on page 83.

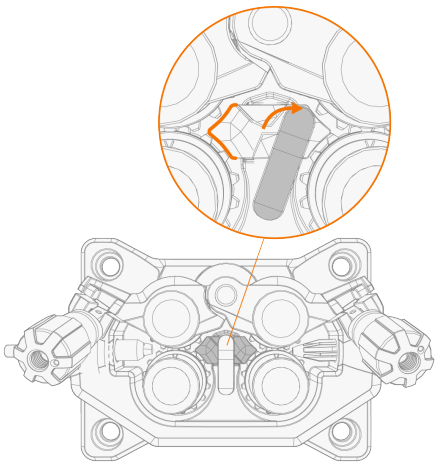
When replacing the outlet guide tube, the welding torch must be detached.



a. Inlet guide tube
b. Middle guide tube
c. Outlet guide tube

To replace the wire guide tubes:

1. Release the pressure arms and remove the filler wire from the system.
2. Pull out the inlet guide tube (a) and insert a new one in its place.
3. Turn the locking clip aside to free the middle guide tube (b) for replacement.
4. Insert a new middle guide tube in its slot and push it properly in place. Ensure that the mark arrow points to the wire running direction.



5. Turn the locking clip back to lock down the new middle tube.
6. Replace the outlet guide tube (c) by pushing the old outlet tube out from either direction.

2.10 INSTALLING GAS BOTTLE AND TESTING GAS FLOW

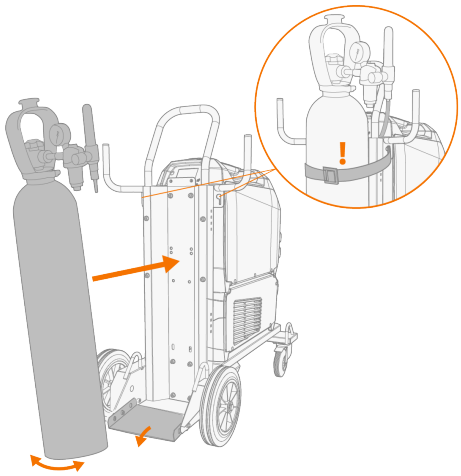
Handle gas bottles with care. There is a risk of injury if the gas bottle or the bottle valve is damaged!

Always secure the gas bottle properly in an upright position to a special holder on the wall or on the welding equipment cart. Always keep the gas bottle valve closed when not welding.

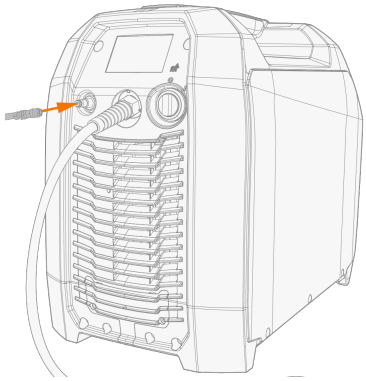
- If a transport unit with a gas bottle rack is used, install the gas bottle on the transport unit first, then make the connections.
- Install the welding torch to the welding device before installing and testing the gas bottle.

Contact your local Kemppi dealer for choosing the gas and the equipment.

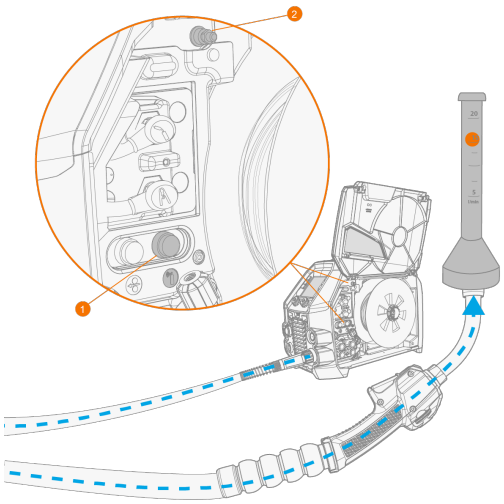
1. Without gas bottle cart: Place the gas bottle in a suitable, secure location.
2. With gas bottle cart: Move the gas bottle on the transport unit's gas bottle rack and secure it in place with the straps and fixing points provided.



3. If not already, connect the welding torch to the welding device (refer to "Connecting welding torch" on page 19).
4. Connect the gas hose to the welding device.



5. Open the gas bottle valve.
6. Start gas flow by pressing the gas test button (1), by using the gas test function in the system settings or by pressing the welding torch trigger. Use the gas regulating valve (2) (not available in Master M 353) or an external flow meter and regulator.



The gas test time is 20 seconds by default. The gas test time can be changed in the control panel.

Recommended gas flow rates (for general guidance only):

	TIG*	MIG**
Argon	5...15 l/min	10...25 l/min
Helium	15...30 l/min	-
Argon + 18-25% CO2	-	10...25 l/min
CO2	-	10...25 l/min

** Depending on the gas nozzle size.*

*** Depending on the gas nozzle size and welding current.*

3. OPERATION

Before using the equipment, ensure that all the necessary installation actions have been completed according to your equipment setup and instructions.

Welding is forbidden in places where there is an immediate fire or explosion hazard!

The wire feed cabinet hatch must be kept closed when welding.

Check that there is enough space for cooling air circulation in the machine vicinity.

If the welding equipment is left unused for a longer period, disconnect the mains plug from the mains.

Always check before use that shielding gas hose, earth return cable and clamp and mains cable are in serviceable condition. Ensure that the connectors are correctly fastened. Loose connectors can impair welding performance and damage connectors.

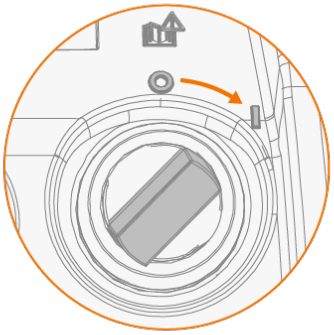
3.1 PREPARING WELDING SYSTEM FOR USE

Before starting the use of the welding equipment:

- Ensure the installation has been completed
- Switch the welding equipment on
- Prepare the cooler
- Connect the earth return cable
- Calibrate the welding cable (in MIG operation mode only)
  >> Refer to "Calibrating welding cable" on page 36 for instructions.

Turning on welding system

To turn on the welding equipment, turn the power source main switch to ON (I).



Turn the main switch to start and shut down the welding equipment. Do not use the mains plug as a switch.

If the welder is left unused for a longer period, detach the mains plug to disconnect it from the mains.

Preparing cooler

Fill the coolant container inside the cooler with Kemppi cooling liquid. For instructions on filling the cooler, refer to "Filling cooler and circulating coolant" on the next page. To weld, you must pump the coolant through the system by pressing the coolant circulation button in the front panel of the cooling unit.

Connecting earth return cable

Keep the work piece connected to earth to reduce the risk of injury to users or damage to electrical equipment.

Attach the earth return cable clamp on the work piece.

Ensure that the contact surface is clean of metal oxide and paint and that the clamp is firmly secured.

Selecting operation mode and process

To select the operation mode (MIG/TIG/MMA), refer to "Using control panel" on page 37.

For TIG welding, the polarity (+/-) must be switched. For information, refer to "Changing welding polarity" on page 59.

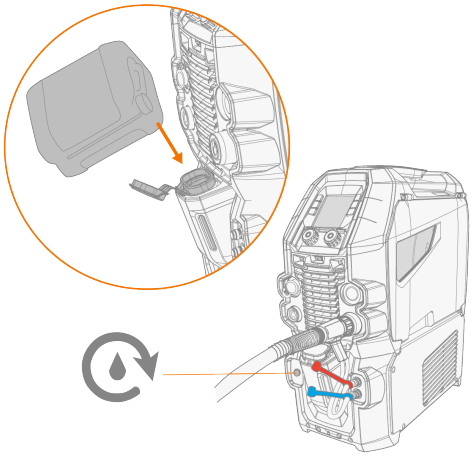
In MMA welding, the VRD (Voltage Reduction Device) limits the open-circuit voltage to 24 V.

3.1.1 FILLING COOLER AND CIRCULATING COOLANT

Fill the cooler with pre-mixed coolant solution. The mixing ratio should be 20...50% as standard. Use only ethylene or propylene glycol mixture intended for welding cooling systems, for example Kemppi cooling liquid.

⚠ *Do not add water to the pre-mixed coolant solution. Do not use automotive cooling solutions or ethanol-based mixtures.*

1. Open the cooler cap.
2. Fill the cooler with coolant. Do not fill over the max. marking.



3. Close the cooler cap.

To circulate the coolant:

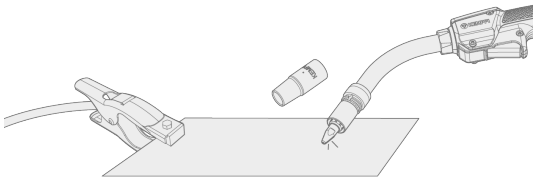
Press the coolant circulation button in the cooler front panel. It activates the motor, which pumps the coolant to the hoses and to the welding torch.

Complete the coolant circulation operation after each time you change the welding torch.

3.2 CALIBRATING WELDING CABLE

The welding cable resistance can be measured using the built-in cable calibration function without an additional measurement cable. This calibration function is available only in MIG operation mode.

1. Connect the earth return cable between the welding device and work piece.
2. Remove the welding torch gas nozzle.
3. Connect the welding torch to the welding device.
4. Turn the welding device on.
5. On the control panel, go to settings and enable cable calibration.
6. Touch the cleaned work piece briefly with the welding torch contact tip.

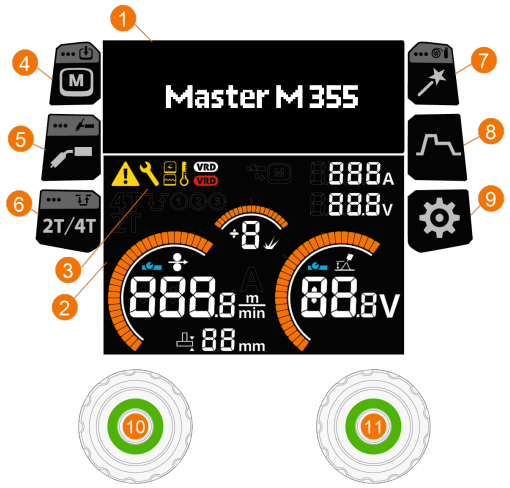


There is no need to press the trigger. Trigger function is disabled at this stage.

7. Using the control panel, confirm the measured values.

3.3 USING CONTROL PANEL

The Master M control panel includes features and functions for MIG welding with the options to use Master M also for TIG and MMA welding.



General

1. Settings display
2. Welding display
3. Indicators (for descriptions of the symbols, refer to the Indicators table below)
4. Memory channels button (MIG only)
   >> Shortcut to the memory channel selection
   >> Long-press (> 1 second) opens a dialog for saving changed welding parameters to a memory channel
   >> Memory channel selection is not available with TIG and MMA welding processes as there is one memory channel for each process
5. Welding process / operation mode button
   >> Shortcut to welding process selection
   >> Long-press (> 1 second) opens a dialog for switching between MIG / TIG / MMA modes
6. Trigger logic button
   >> Switches between 2T and 4T trigger logic
   >> Long-press (> 1 second) opens the Powerlog settings (4T only). Powerlog trigger logic is not available with manual MIG, DPulse or MAX processes.
7. Weld Assist button
   >> Shortcut to Weld Assist
   >> Long-press (> 1 second) opens the filler wire and shielding gas settings adjustment
8. Welding parameters button
   >> Shortcut to the welding parameters view
9. Settings button
   >> Shortcut to the system settings view
10. Left control knob
    >> Adjustment and selection
    >> Long press of the control knob button activates the wire inch function. The wire feed speed can be adjusted by turning the control knob. The wire inch function is automatically switched off when the function is not used for a while or when welding is started.
11. Right control knob
    >> Adjustment and selection.

Indicators

Symbol	Description
	General notification There is a problem that requires attention.
	Service / repair
	Power source
	Cooling unit
	High temperature indicator (overheating)
	VRD (Voltage Reduction Device): White VRD symbol is on = VRD is on Red VRD symbol is blinking = There is a fault with VRD that prevents welding.
	Remote mode (ON/OFF)

Views

A. Main view
B. Memory channels
C. Welding processes
D. Welding parameters
E. Trigger logic
F. Weld Assist
G. Weld data
H. System settings

3.3.1 CONTROL PANEL: SETTING FILLER WIRE AND SHIELDING GAS

When you start the welding device for the first time or after a factory reset, the control panel will ask you to specify filler wire and shielding gas settings.

If you do not specify the filler wire and shielding gas settings, then only manual MIG process is available.

The selections are made with the two control knobs.

1. Start by pressing the right control knob.



2. Select:
   >> Filler wire material (the selection is made at two levels)
   >> Filler wire diameter
   >> Shielding gas type.
3. Save the settings to a memory channel.

The same procedure applies when you try to select a welding process that does not support the set filler wire and shielding gas combination. In that case, start specifying wire and gas by long-pressing the Weld Assist button.

3.3.2 CONTROL PANEL: MAIN VIEW

The Master M control panel's main view consists of the settings display and welding display. The content displayed depends on the welding process and features and functions used.



1. Memory channel (and filler wire and shielding gas settings, if set)
2. Active welding process
3. Applied welding functions*
4. Applied trigger logic function
5. Wire feed speed
   >> The value range is defined by the active welding program, step 0.1, default = 5.0 m/min
6. Current and voltage
7. Dynamics
   >> Controls the short circuit behavior of the arc. The lower the value the softer the arc, the higher the value the rougher the arc. Value range: -9 ... +9, default = 0
   >> With MAX process a corresponding MAX parameter adjustment is displayed
8. Welding voltage
   >> With 1-MIG process voltage fine tuning is displayed
   >> With MAX process a corresponding MAX parameter adjustment is displayed.

Control knob functions

Left control knob:

- Manual MIG: Wire feed speed adjustment
- 1-MIG: Wire feed speed adjustment
- Pulse MIG: Wire feed speed adjustment
- DPulse MIG: Wire feed speed adjustment and switching between pulse levels with the control knob button
- TIG/MMA: Welding current adjustment.

Right control knob:

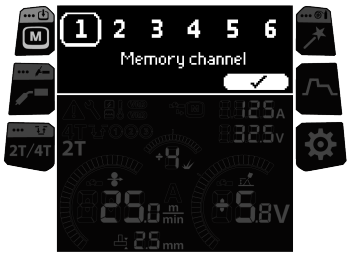
- Manual MIG: Welding voltage and dynamics adjustment
- 1-MIG: Dynamics adjustment and fine tuning of welding voltage and switching between the adjustments with the control knob button
- Pulse MIG: Fine tuning of welding voltage
- DPulse MIG: Fine tuning of welding voltage
- MMA: Dynamics adjustment.

** Applied welding functions*

Graph	Description
⌜‾⌝	Hot start, Powerlog and crater fill OFF.
/^—\	Hot start and crater fill ON.
/^-·-\	Hot start, Powerlog (power levels) and crater fill ON.

3.3.3 CONTROL PANEL: MEMORY CHANNELS

There are 6 memory channels available in MIG welding.



Selecting memory channel

1. Turn the right control knob to highlight the desired memory channel.
2. Press the right control knob to select the memory channel.

Saving changes to memory channel

1. Adjust welding parameters.
2. Long-press the memory channel button.
3. The channel number framed by a dashed line indicates that the set welding parameters are different from the ones currently saved on the active memory channel:

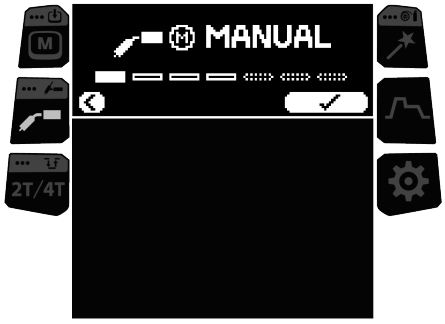


4. Save the changes to the active memory channel by pressing the right control knob or select another channel by turning the right control knob.

3.3.4 CONTROL PANEL: WELDING PROCESS

Welding process is selected in the Welding process view. For more information on welding processes, refer to "Additional guidance to functions and features" on page 50.

The use of pulse and MAX processes is possible in Master M 355.



Selecting welding process

1. Turn the right control knob to highlight the desired welding process.

Only a welding process that supports the set filler wire and shielding gas combination can be selected. If the filler wire and shielding gas settings have not been made, then only manual MIG process is available. The filler wire and shielding gas settings can be changed at any time by long-pressing the Weld Assist button.

2. Press the right control knob to confirm selection.

3.3.5 CONTROL PANEL: TRIGGER LOGIC

Welding torches can have several alternative trigger operation modes (trigger logics). Most common are 2T and 4T. In 2T mode you hold the trigger down while welding. In 4T mode you press and release the trigger to start or to stop welding. For more information on trigger logic, refer to "Trigger logic functions" on page 53.

Switching between 2T and 4T trigger logic

1. Press the trigger logic button.

Selecting Powerlog (4T only)

Powerlog is not available with manual MIG, DPulse or MAX processes.

1. Long-press the trigger logic button.
2. Choose whether 2 or 3 power levels are used by turning and pressing the right control knob.
3. In the main view, set up the wire feed speed, fine tuning of welding voltage and dynamics for each level.
   >> To switch between the voltage fine tuning and dynamics adjustments, press the right control knob.
   >> To switch between power levels, press the left control knob.

Tip: To turn off Powerlog and activate the 2T trigger logic, press the trigger logic button.

3.3.6 CONTROL PANEL: WELD ASSIST

Weld Assist is a wizard-like utility for easy selection of welding parameters. The utility walks the user step-by-step through the selection of required parameters, presenting the selections in an easily understandable way. In Weld Assist, the selections are made with the two control knobs.

Weld Assist is available for MIG welding.

The currently selected filler wire and shielding gas information is shown and used as a basis in Weld Assist. If necessary, the filler wire and shielding gas settings can be changed by long-pressing the Weld Assist button.

1. Press first the Weld Assist button to open the view and then press the right control knob to continue to the selections.



2. Select:

   >> Material thickness (1...10 mm). (With PG position, the maximum material thickness is 3 mm.)



   >> Joint type: butt joint / corner joint / edge joint / lap joint / T-joint / tube joint / tube+plate joint.



   >> Position: PA / PB / PC / PD / PE / PF / PG.



3. Weld Assist gives you a recommendation for these welding parameters:

   >> Wire feed speed
   >> Current
   >> Voltage

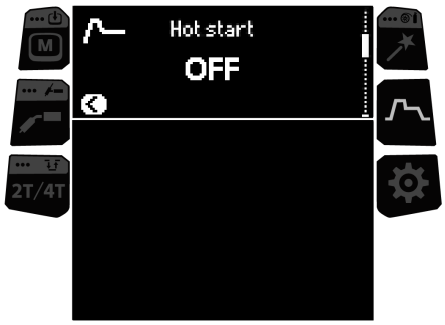
4. Confirm the Weld Assist's recommendation for welding parameters by saving the parameter values to a memory channel.

Tip: You can go back step by step in Weld Assist by pressing the left control knob.

Once the recommended values are saved, they are automatically applied. The welding parameters created with Weld Assist are still adjustable as per normal.

3.3.7 CONTROL PANEL: WELDING PARAMETERS

Welding parameters are welding process specific and are visible and available for adjustment accordingly. The welding process selection is based on the active memory channel and its settings.



Adjusting welding parameters

1. Turn the right control knob to highlight the desired welding parameter.
2. Press the right control knob to select the welding parameter for adjustment.
3. Turn the right control knob to adjust the welding parameter value.
   >> Depending on the parameter to be adjusted, refer also to the Welding parameters table below for more details.
4. Confirm the new value / selection by pressing the right control knob.

Welding parameters

MIG and 1-MIG welding parameters

The parameters listed here are available for adjustment with the manual MIG and 1-MIG processes.

Parameter	Parameter value	Description
Post current	-30 ... +30 Default = 0	Post current setting affects the wire length at the weld end, for example to prevent the wire from stopping too close to the weld pool. This also enables the optimum wire length for the start of the next weld. Decreasing the value increases the wire length, and increasing the value decreases it.
Creep start level	10...90 % / AUTO, step 1	The Creep start function defines the wire feed speed before the welding arc ignites, that is, before the filler wire comes in contact with the workpiece. When the arc ignites, the wire feed speed is automatically switched to the normal user-set speed. The Creep start function is always on.
Pre gas	0.0 ... 9.9 s / AUTO, step 0.1 0.0 = OFF	Welding function that starts the shielding gas flow before the arc ignites. This ensures that the metal does not come into contact with air at the start of the weld. Time value is preset by the user. Used for all metals, but especially for stainless steel, aluminum and titanium.
Post gas	0.0 ... 9.9 s / AUTO, step 0.1 0.0 = OFF	Welding function that continues the shielding gas flow after the arc has extinguished. This ensures that the hot weld does not come into contact with air after the arc is extinguished, protecting the weld and also the electrode. Used for all metals. Especially stainless steel and titanium require longer post gas times.

1-MIG welding parameters

The parameters listed here are available for adjustment with the 1-MIG process.

Parameter	Parameter value	Description

Hot start	ON/OFF Default = OFF	Welding function that uses higher or lower wire feed speed and welding current at the start of the weld. After the Hot start period the current changes to normal welding current level. This facilitates the start of the weld especially with aluminum materials. The Hot start level and time are adjustable in 2T trigger logic only.
- Hot start level	-40 ... +100 %, step 1 Default = +40 %	
- Hot start time	0.1 ... 10.0 s, step 0.1 Default = 1.2 s	
Crater fill	ON/OFF Default = OFF	When welding with high power, a crater is usually formed at the end of the weld. The Crater fill function decreases the welding power / wire feed speed at the end of the welding job so that the crater can be filled using a lower power level. Crater fill duration, wire feed speed and voltage are preset by the user. The crater fill start level cannot be smaller than the crater fill end level. When the 4T timer is set to ON, releasing the trigger during crater fill does not end welding.
- Crater fill start level	10 ... 150 %, step 1 Default = 100 %	
- Crater fill time	0.1 ... 10.0 s, step 0.1 Default = 1.0 s	
- Crater fill end level	10 ... 150 %, step 1 Default = 10 %	
- Crater fill 4T timer	ON/OFF	
Touch Sense Ignition	OFF/ON Default = OFF	Touch Sense Ignition (TSI) delivers minimum spatter and stabilizes the arc immediately after ignition. For more information, refer to "Touch Sense Ignition" on page 54.
WiseFusion	OFF/ON Default = OFF	The WiseFusion feature enables adaptive arc length control, which keeps the arc optimally short and focused. For more information, refer to "WiseFusion feature" on page 54. (Not available with MAX Cool, MAX Speed and MAX Position.)

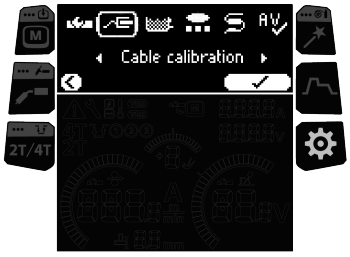
Pulse / DPulse / MAX Position welding parameters (not available in Master M 353)

The parameters listed here are available for adjustment with the pulse and MAX Position welding processes in addition to the MIG and 1-MIG welding parameters. For more information on the processes, refer to "Additional guidance to functions and features" on page 50.

Parameter	Parameter value	Description
Pulse current %	-10 ... 15 % Default = 0 %	The pulse current relative to the base current in pulse and double pulse welding.
DPulse frequency	0.4 ... 8.0 Hz Default = 2 Hz	These adjust the double pulse frequency and time percentage. The pulse ratio adjusts the first pulse level. When the pulse ratio is set at 35 %, the ratio of the second pulse level is 65 %. **Note**: The wire feed speed and voltage fine tuning are adjusted in the main view.
DPulse ratio	10 ... 90 % Default = 35 %	

MAX Position frequency	-0.5 ... 0.5 Hz Default = 0 Hz	This adjusts the MAX Position frequency.

3.3.8 CONTROL PANEL: SYSTEM SETTINGS



Changing settings

1. Turn the right control knob to highlight the desired settings parameter.
2. Press the right control knob to select the settings parameter for adjustment.
3. Turn the right control knob to select the settings value.
   >> Depending on the settings parameter to be adjusted, refer also to the Settings table below for more details.
4. Confirm the new value / selection by pressing the right control knob.

Settings

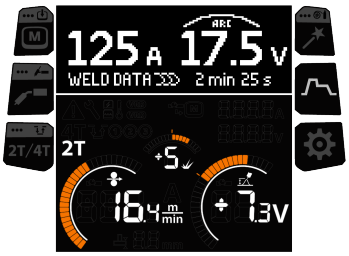
Parameter	Parameter value	Description
Remote	ON/OFF Default = OFF	Select whether remote is used. Note: This setting does not affect and is not affected by the HR55 remote control.
Remote selection	Hand remote / Torch remote Default = Torch remote	Note: This setting does not affect and is not affected by the HR55 remote control.
Remote mode	Wire feed speed / Channel Default = Wire feed speed	This determines what is changed with the remote, wire feed speed or memory channel (available channels: 1...5). Note: If the HR55 remote control is also connected, the parameter that is selected here cannot be adjusted with the HR55 remote control.
Remote min.	Defined by the active welding program	Minimum and maximum limits for the remote wire feed speed adjustment.
Remote max.	Defined by the active welding program	
Cable calibration (MIG only)	Start/Cancel	Calibration information on the previous calibration is also shown. Refer to "Calibrating welding cable" on page 36 for cable calibration.

Water cooler	OFF/Auto/ON Default = Auto	When ON is selected, the coolant is circulated continually, and when Auto is selected, the coolant is circulated only during welding.
Cycle timer	ON/OFF Default = OFF	Cycle timer is a welding function that automatically produces a weld or welds of predefined duration. For more information, refer to "Cycle timer" on page 50.
- Cycle arc time	0.0 ... 60.0 s Default = 2.0 s	
- Cycle pause	ON/OFF Default = OFF	
- Cycle pause time	0.1 ... 3.0 s, step 0.1 s Default = 0.1 s	
WF end step	OFF/ON Default = OFF	Wire feed end step feature prevents the filler wire from sticking to the contact tip when the welding ends.
Subfeeder	*Subfeeder model* / OFF Default = OFF	If a compatible subfeeder is connected, select the subfeeder from the list. Compatible subfeeders: *SuperSnake GTX 10 m, 15 m, 20 m, 25 m, Binzel PP401D, Binzel PP36D.* Note: For the best possible welding result when using the pulse and MAX welding processes with a subfeeder device, we recommend a maximum subfeeder cable length of 10 meters (SuperSnake GTX 10 m). This recommendation assumes that you are using a 5-meter welding torch cable and a 15-meter earth return cable together with the subfeeder. In some cases, it is possible to weld with pulse and MAX welding processes with a 15-meter subfeeder device, but a test weld is advised.
Arc verification	OFF, 1 ... 365 Default = OFF	This defines the number of days until the next device verification reminder.
Weld data duration	0...10 s, step 1 Default = 5 s	This defines how long the weld data summary is shown after each weld.
Safe wire inch (MIG only)	OFF/ON Default = ON	When ON, and the arc doesn't ignite, the filler wire is fed 5 cm. When OFF, 5 m of filler wire is fed.
Gas guard (not available in Master M 353)	ON/OFF Default = OFF	Gas guard prevents welding without shielding gas.
Voltage display	Arc voltage / Terminal voltage Default = Arc voltage	This defines which is shown on the control panel display, arc or terminal voltage.

Wire inch	0.5 ... 18.0 m/min Default = 5.0 m/min	Drive the filler wire forward (with arc off).
Gas test	0 ... 60 s Default = 20 s	Test the shielding gas flow and flush the gas line.
Language	Available languages	
PIN code	ON/OFF	4-digit PIN code for locking parameters and settings. PIN lock does not prevent welding, browsing Powerlog levels or selecting memory channel.
Demo time (not available in Master M 353)	OFF/ON	The demo time feature allows you to try out optional welding features and functions without a license for a limited time. The total available demo time is 3 hours. The demo time passes only when welding using a welding feature you don't have a license for. When the demo time is set to ON, the remaining time is shown on the display.
Device info		Shows information on the device and its usage.
Factory reset	Reset/Cancel Default = Cancel	Restores factory settings. Note that the arc verification parameter value is also reset.

3.3.9 CONTROL PANEL: WELD DATA

After each weld, a weld summary is displayed briefly. To change the weld data view duration, refer to "Control panel: System settings" on page 47.



3.4 ADDITIONAL GUIDANCE TO FUNCTIONS AND FEATURES

This section summarizes some of the Master M functions and features and how to use them.

3.4.1 1-MIG

1-MIG is a MIG/MAG welding process where the voltage is defined automatically when you adjust the wire feed speed. The voltage is calculated based on the welding program in use. The process is suitable for all materials, shielding gases and welding positions.

3.4.2 DEMO TIME

Not available in Master M 353.

The demo time feature allows a free test evaluation of MAX welding software.

The total available demo time is 3 hours. The demo time passes only when welding using a welding feature you don't have a license for. When the demo time is set to ON, the remaining time is shown on the display.

Available for test evaluation are:

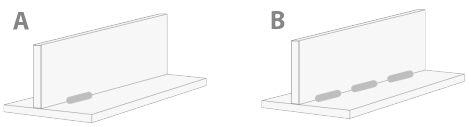
- MAX Cool
  >> For more information, refer to "MAX Cool process" on the next page.
- MAX Speed
  >> For more information, refer to "MAX Speed process" on page 52.
- MAX Position
  >> For more information, refer to "MAX Position process" on page 52.

The demo time feature can be turned on and off in "Control panel: System settings" on page 47. By default, the demo time is set to OFF.

When the demo time expires, the features without a license cannot be used anymore. To continue using the optional features, you must buy licenses for them.

3.4.3 CYCLE TIMER

Cycle timer is a welding function that automatically produces a single weld or multiple welds of predefined duration with a press of the MIG welding torch trigger. For example, this can be used to maintain weld consistency when creating a single weld (A) or an intermittent weld (B), or to easily create clean tack welds with low heat input.



>> To take Cycle timer in use, go to **System settings** and set Cycle timer to ON.
>> Once Cycle timer is turned on, the Cycle arc time (the duration of the weld) can be adjusted.

When only the Cycle arc time is set, only one single weld is created. The intermittent weld feature is enabled by setting also the Cycle pause time.

>> To turn the Cycle timer's intermittent weld feature on, go to **System settings** and set Cycle timer to ON, set also Cycle pause to ON and adjust the Cycle pause time (the pause duration before the next weld).

With Cycle timer, the weld start and stop features such as pre gas, post gas, upslope, hot start, creep start and crater fill, are available for adjustment according to the selected welding process. Note that using these features with Cycle timer also has an effect on the actual weld duration and that the Cycle arc time setting does not include these.

3.4.4 PULSE WELDING

Not available in Master M 353.

Pulse



Pulse is an automatic MIG/MAG welding process where the current is pulsed between the base current and the pulse current. The advantages of Pulse are a higher welding speed and deposition rate compared to short-arc welding, lower heat input compared to spray-arc welding, a spatter-free globular arc and smooth appearance of the weld. Pulse is suitable for all position welding. It is excellent for welding aluminum and stainless steel, especially when the material thickness is small.

>> To take Pulse into use, press the welding process button and select Pulse.
>> The corresponding pulse welding parameters become available for adjustment. For more information, refer to 'Pulse welding parameters' in Control panel: Welding parameters.

DPulse



DPulse is a double-pulse MIG/MAG welding process with two separate power levels. The welding power varies between these two levels. The parameters of each level are controlled independently.

>> To take DPulse into use, press the welding process button and select DPulse.
>> Adjust wire feed speed and fine tuning in the Main view.
>> Adjust double pulse frequency and pulse ratio in the Welding parameters view.

3.4.5 MAX COOL PROCESS

Available as an option in Master M 355.

MAX Cool is a short arc MIG/MAG welding process that is designed for root pass welds and sheet metal (thin sheet) applications. It's fully current-controlled welding process. MAX Cool does not require the use of a separate voltage sensing cable.

MAX Cool is suitable for all welding positions and provides a smooth arc, reducing spatter.

>> To take MAX Cool into use, press the control panel's welding process button and select MAX Cool.
>> To adjust the wire feed speed, in the Main view, turn the left control knob. The adjustment's effect on the plate thickness is also shown.
>> To fine-tune the heat output, in the Main view, turn the right control knob.

MAX Cool supports these filler wire and shielding gas combinations:

- Fe solid & Ar + 8...25 % CO_2 (1.0 mm, 1.2 mm)
- Fe solid & CO_2 (1.0 mm, 1.2 mm)
- Ss solid & Ar + 2 % CO_2 (1.0 mm, 1.2 mm)
- CuSi3 & Ar (1.0 mm)
- CuAl8 & Ar (1.0 mm).

3.4.6 MAX POSITION PROCESS

Available as an option in Master M 355.

MAX Position is a MIG/MAG welding process optimized for vertical fillet welds (position: PF). MAX Position automatically switches between two separate power levels. The two power levels can use the same welding process or two different welding processes.

>> To take MAX Position into use, press the control panel's welding process button and select MAX Position. The MAX Position frequency becomes available for adjustment in the Welding parameters view. The ratio of the two power levels is preset.
>> To adjust the average wire feed speed, in the control panel's Main view, turn the left control knob. The adjustment's effect on the base material thickness is also shown.
>> To fine-tune the welding voltage, in the control panel's Main view, turn the right control knob.

MAX Position supports these filler wire and shielding gas combinations:

- Fe solid & Ar + 18% CO_2 (1.0 mm, 1.2 mm)
- Fe solid & Ar + 8% CO_2 (1.0 mm, 1.2 mm)
- Fe MC & Ar + 18% CO_2 (1.2 mm)
- Ss solid & Ar + 2% CO_2 (1.0 mm, 1.2 mm)
- AlMg & Ar (1.0 mm, 1.2 mm)

MAX Position supports these base material thicknesses:

- 3...12 mm.

MAX Position utilizes also other welding processes (depending on material):

- Fe & Fe MC: 1-MIG (with low power) and Pulse MIG (with high power)
- Ss & Al: Pulse MIG (throughout the power range).

3.4.7 MAX SPEED PROCESS

Available as an option in Master M 355.

MAX Speed is a pulsed MIG/MAG welding process. It is designed to maximize the welding speed and to minimize the heat input by modifying the conventional MIG/MAG arcs.

MAX Speed is designed for steel and stainless steel welding applications mainly in the PA and PB positions. It is suitable for plate thicknesses above 2.5 mm, the ideal maximum plate thickness being approximately 6 mm.

MAX Speed operates within the spray arc range. Welding current is pulsed with constant frequency and amplitude. Arc length is controlled with the normal voltage control. MAX Speed's low-amplitude pulsing enables an effective transfer mode with lower wire feed speed than with conventional MIG/MAG arc. The pulsing is not noticeable to the welder.

>> To take MAX Speed into use, press the control panel's welding process button and select MAX Speed. The MAX Speed frequency becomes available for adjustment in the Main view. The MAX Speed frequency value range is 100 ... 800 Hz, step 10 Hz, default 300 Hz.
>> To adjust the wire feed speed, in the Main view, turn the left control knob. The adjustment's effect on the material thickness is also shown.
>> To fine-tune the welding voltage, in the Main view, turn the right control knob.

MAX Speed supports these filler wire and shielding gas combinations:

- Fe solid & Ar + 18% CO_2 (1.0 mm, 1.2 mm)
- Fe solid & Ar + 8% CO_2 (1.0 mm, 1.2 mm)
- Fe MC & Ar + 18% CO_2 (1.2 mm)
- Ss solid & Ar + 2% CO_2 (1.0 mm, 1.2 mm).

3.4.8 TRIGGER LOGIC FUNCTIONS

Switch between the 2T and 4T trigger logic by pressing the control panel's trigger logic button.

2T

In 2T, pressing the trigger ignites the arc. Releasing the trigger switches the arc off.



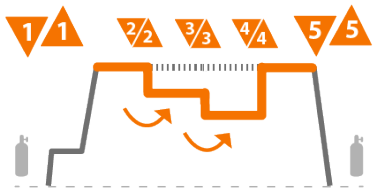
4T

In 4T, pressing the trigger starts the pre gas, and releasing the trigger ignites the arc. Pressing the trigger again switches the arc off. Releasing the trigger ends the post gas.



Powerlog

Powerlog trigger logic function allows the user to switch between two or three different power levels. In Powerlog, pressing the trigger starts the pre gas, and releasing the trigger ignites the arc. A quick press of the trigger during welding switches between levels (after the last defined power level the first level is selected). Long-pressing the trigger at any of the levels during welding switches the arc off.



To take Powerlog into use, long-press the trigger logic button and choose whether 2 or 3 power levels are used. Set up the power levels for this function. The parameters available for adjustment for each level are:

- Wire feed speed
- Voltage / Fine tuning
- Dynamics.

Powerlog trigger logic is not available with manual MIG, DPulse or MAX processes.

Powerlog trigger logic cannot be used together with a remote control. If a Powerlog memory channel is selected when a remote control is in use, the trigger logic is automatically switched to 4T.

3.4.9 TOUCH SENSE IGNITION

The Touch Sense Ignition (TSI) function minimizes spatter and stabilizes the arc immediately after ignition.

In standard ignition the filler wire touches the workpiece and creates a short circuit.

The following describes how TSI operates in ON, Auto and OFF modes.

TSI ON

1. The filler wire is fed forward until it touches the workpiece.
2. The filler wire is retracted until the short circuit is broken and the arc is ignited immediately.

TSI Auto

1. The filler wire is already in contact with the workpiece upon ignition (this is a prerequisite for TSI to work).

If the filler wire is not in contact with the workpiece, standard ignition is performed.

2. The filler wire is retracted until the short circuit is broken and the arc is ignited immediately.

TSI OFF

1. Standard ignition is performed.

3.4.10 WISEFUSION FEATURE



Not available in Master M 353.

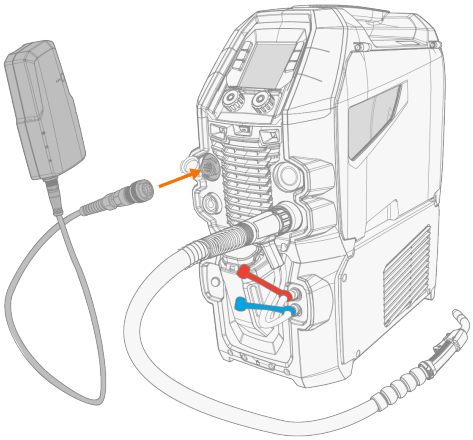
The WiseFusion feature enables adaptive arc length control, which keeps the arc optimally short and focused. WiseFusion increases the welding speed and penetration and decreases heat input. WiseFusion can be used throughout the power range (short arc, globular arc and spray arc). WiseFusion is compatible with 1-MIG and pulsed MIG welding processes. (Not available with MAX Cool, MAX Speed and MAX Position.)

>> To take WiseFusion into use, go to the control panel's Welding parameters view and apply the WiseFusion feature.
>> To adjust the wire feed speed, in the control panel's Main view, turn the left control knob.
>> To fine tune the heat output while welding, in the control panel's Main view, turn the right control knob.

For more information on Wise products, visit www.kemppi.com.

3.4.11 WELDEYE WITH DCM (OPTIONAL)

Kemppi's WeldEye welding management software is also available for use with Master M. For this, an additional Digital Connectivity Module (DCM) device is required. DCM is connected directly to the Master M's control connection with the cables and adapters delivered with the DCM device.



For more information on installing and using the DCM device, refer to userdoc.kemppi.com (DCM/WeldEye).

Discover WeldEye – universal welding management software

WeldEye is your primary tool and storage space for keeping your welding-related documents in order. WeldEye is a universal solution for managing welding production.

WeldEye's modular structure is based on various useful functions that serve the needs of wide-ranging industries and welding-related tasks:

- Welding procedures
  >> Includes the digital library and management of dWPS, WPQR and WPS templates according to the most important welding standards.
- Personnel and qualifications
  >> Includes the management and renewal processes of all personnel - welders and inspectors - qualification certificates.
- Quality management
  >> Includes quality verification functionalities with digital WPS and qualification compliance control against automatically collected digital welding data.
- Welding management
  >> Includes document register functionalities and features for comprehensive welding project documentation and management.

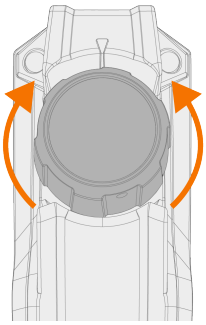
For more information on WeldEye, refer to www.weldeye.com.

3.5 USING REMOTE CONTROL HR43/HR40

The HR40 or HR43 remote controls are taken into use in the control panel settings ("Control panel: System settings" on page 47).

The minimum and maximum values for the remote wire feed speed adjustment affect also the resolution of the remote control adjustment.

Remote control HR43

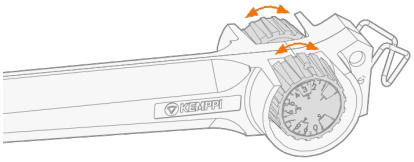


The HR43 control knob function is defined by the selected welding process and reflects the adjustment of the control panel's left control knob.

To adjust the welding parameter, turn the knob on the remote control.

In MIG/MAG: The adjusted parameter can be selected between wire feed speed and memory channel in the control panel settings.

Remote control HR40



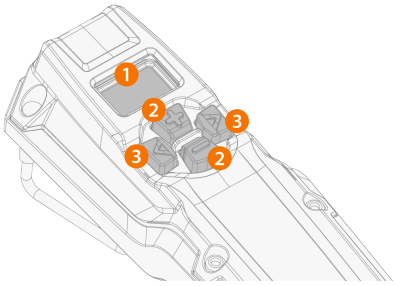
The HR40 control knob functions are defined by the selected welding process and reflect the adjustments of the control panel's two control knobs.

In MIG/MAG: The adjusted parameter can be selected between wire feed speed and memory channel in the control panel settings. When the remote mode is set to 'channel', only the left remote control knob is in use.

3.6 USING REMOTE CONTROL HR55

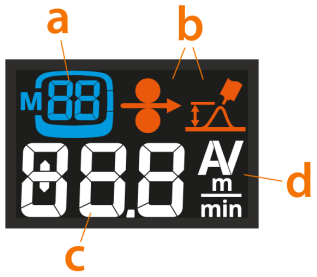
When connected, the HR55 remote control is automatically in use.

With the optional HR55 remote control, you can select memory channels and adjust wire feed speed, welding current, welding voltage or voltage fine tuning depending on the welding process and the features supported by the connected Master M equipment.



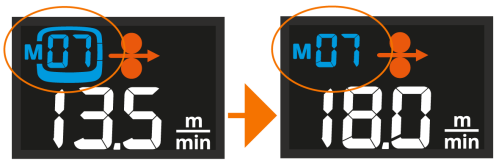
1. LCD display
   >> Displays the adjusted parameter and notifies if there is an error ("Err") in the welding system.
2. Plus/minus (+/-) buttons
   >> Changes the parameter value.
3. Left/right arrow buttons
   >> Changes between adjustable parameters/views.

Remote control display items



a. Process and/or selected memory channel information (process is indicated with a single letter: M = MIG/MAG, t = TIG, S = MMA)
b. MIG/MAG: Wire feed speed and fine tuning symbols
c. Adjusted parameter value (or error indicator)
d. Adjusted parameter unit

When the parameter is adjusted with the remote and the parameter value doesn't reflect the one saved on the selected memory channel anymore, this is indicated on the display by showing only the memory channel number without the channel box around it (MIG/MAG only):



Remote control views and operation

Change between the views by pressing the left/right arrow buttons.

- **Memory channel view (MIG/MAG only):** The memory channel is changed by pressing the +/- buttons. Long press of a +/- button scrolls the parameter values faster.
- **Process selection view:** This allows selecting between MIG/MAG, TIG and MMA welding.
- **Welding power view:** Depending on the used welding process, wire feed speed or current is adjusted by pressing the +/- buttons. Long press of a +/- button scrolls the parameter values faster.
- **Voltage/Fine tuning view:** Depending on the welding process used, voltage or welding process specific parameter is adjusted by pressing the +/- buttons. Long press of the +/- button scrolls the parameter values faster. Long press of the right arrow button switches between different parameter sets, as applicable.
- **Safety lock:** By pressing the left/right arrow buttons simultaneously for 2 seconds, the equipment safety lock can be enabled and disabled.

Long press of the left arrow button saves the adjusted parameters on the currently selected channel.

When a MIG welding torch remote control is used to select a memory channel or adjust the wire feed speed, the corresponding function is disabled in the HR55 remote control.

3.7 CHANGING WELDING POLARITY

Welding polarity needs to changed for TIG welding. Also, some filler wires require changing the welding polarity. Check the recommended welding polarity on the filler wire package.

Before handling electrical parts, ensure the welding device is disconnected from the mains.

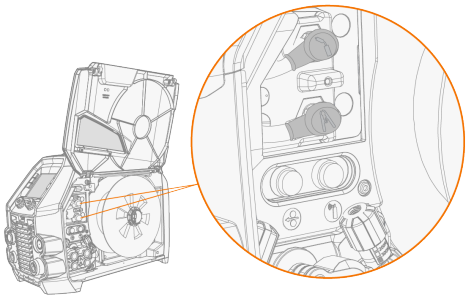
Tools needed:



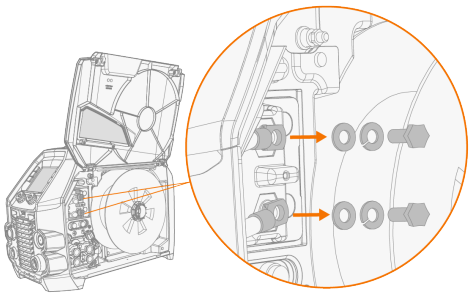
17 mm

1. Turn off the welding device and disconnect it from the mains.
2. Open the wire feed cabinet hatch.
3. Remove the protective rubber covers from the polarity terminals.

Use caution when handling electrical parts.



4. Remove the terminal tightening bolts and washers.



5. Connect the cables to the polarity terminals according to the polarity recommendation.
6. Replace the washers and bolts. Tighten to 17 Nm torque.
7. Replace the protective rubber covers.

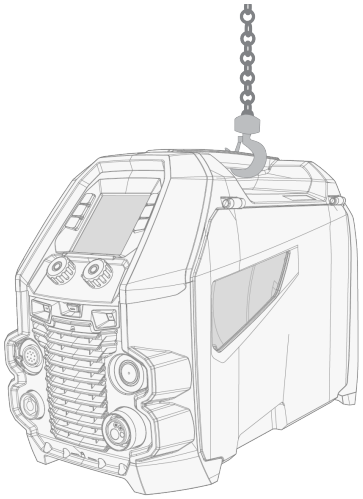
3.8 LIFTING MASTER M EQUIPMENT

If a gas bottle is installed on cart, DO NOT attempt to lift the cart with the gas bottle in place.

Transportation handle:

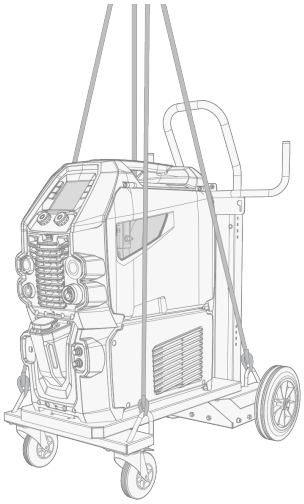
The transportation handle can be used for mechanical lifting (for moving only, not for hanging) when the device is not mounted on a cooling unit or cart.

Connect the hoist hook to the transportation handle.



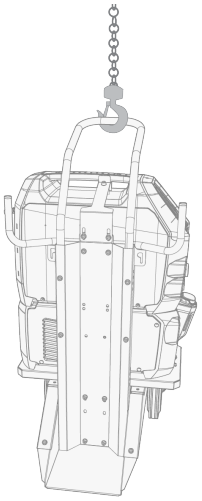
4-wheel cart:

1. Ensure that the welding equipment is properly secured to the cart.
2. Connect the 4-legged chain or straps from the hoist hook to the four lifting points on the cart on both sides of the welding equipment.



2-wheel cart (T25MT only):

1. Ensure that the welding equipment is properly secured to the cart.
2. Connect the hoist hook to the lifting handle on the cart.



⚠ *Do not lift the equipment when it is installed on the T35A cart.*

4. MAINTENANCE

4.1 DAILY, PERIODIC AND ANNUAL MAINTENANCE

When considering and planning routine maintenance, consider the operating frequency of the welding system and the working environment.

Correct operation of the welding machine, regular maintenance, and the use of original Kemppi spare parts and consumables help you avoid unnecessary downtime and equipment failure, while also maximizing the equipment's service life.

Use pre-mixed coolant solution in the cooling unit. The mixing ratio should be 20...50% as standard. Use only ethylene or propylene glycol mixture intended for welding cooling systems, for example Kemppi cooling liquid. Do not add water to the pre-mixed coolant solution. Do not use automotive cooling solutions or ethanol-based mixtures.

For repairs, find your closest Kemppi service workshop at www.kemppi.com or contact your dealer.

Only an authorized electrician is allowed to carry out electrical work.

Only qualified service personnel is allowed to carry out periodic and annual maintenance.

Disconnect the power source from the mains before handling electrical cables and connectors.

Do not use pressure washing devices.

Where applicable, use the correct tension torque when fastening loose parts.

Daily maintenance

Welding equipment's daily maintenance:

- Check that all covers and components are intact.
- Check all the cables, hoses and connectors. Do not use them if they are damaged.
- Ensure that the connectors are correctly fastened. Loose connectors can impair welding performance and damage connectors.
- Check the wire feeder's feed rolls and the pressure handle mechanism. Clean and lubricate with a small quantity of light machine oil if needed.

Cooling unit's daily maintenance (in addition):

- Check the cooling liquid level. Add cooling liquid if needed. Note: Use the correct coolant solution (see above).
- Check the cooling unit surroundings for cooling liquid leakages. If there are signs of significant leakage, contact Kemppi service.
- Check and test the cooling liquid pump operation by circulating the cooling liquid.

Weekly maintenance

Welding equipment's weekly maintenance:

- Clean the outside parts of the units from dust and dirt, for example, with a soft brush and vacuum cleaner.
- Clean the ventilation grills. Do not use compressed air, there is a risk that the dirt will compact even more tightly into the gaps of the cooling profiles.
- If air filters are used, remove them and clean them by blowing with compressed air.

Periodic maintenance

Welding equipment's periodic maintenance, every 1–6 months:

- Check the electrical connectors of the equipment at least every 6 months. Clean oxidized parts and tighten loose connectors.
- Update the welding system to the latest firmware and software versions, as applicable.

Cooling unit's periodic maintenance, every 1–6 months (in addition):

- Check the cooling liquid quality at least once a month. Ensure that the liquid is clear and free of any visible impurities.
- Replace the cooling liquid every 6 months. Note: Use the correct coolant solution (see above).

Annual maintenance

The annual maintenance must be carried out by an authorized Kemppi service workshop. Kemppi service workshops complete the welding system maintenance according to your Kemppi service agreement. Find your closest service workshop at www.kemppi.com.

Welding equipment's annual maintenance program includes:

- Cleaning the equipment.
- Maintenance of the welding tools.
- Checking the connectors and switches.
- Checking all electrical connections.
- Checking the power source mains cable and plug.
- Repairing defective parts and replacing defective components.
- Maintenance test.
- Testing the operation and calibrating the performance values when needed.
- Updating the welding system to the latest firmware and software versions, and installing new welding software.
- If a cooling unit is used: Checking and cleaning the cooling liquid pump. The pump is dismantled and cleaned thoroughly, and if there has been any leakage in the pump's axle seal point, the axle seal is replaced. The axle seal is subject to wear and may need replacement periodically to maintain proper sealing.

For Kemppi welding torch maintenance, refer to your welding torch's instructions (available also at user-doc.kemppi.com).

4.2 INSTALLING AND CLEANING POWER SOURCE AIR FILTER (OPTIONAL)

An optional power source air filter can be purchased separately. The air filter comes with a fixed casing designed to be mounted directly onto the power source air intake.

Using the optional air filter decreases the rated power levels of the power source as follows (output 40 °C): 60% >>> 45% and 100% >>> 100%-20A. This is due to the slightly reduced cooling air intake.

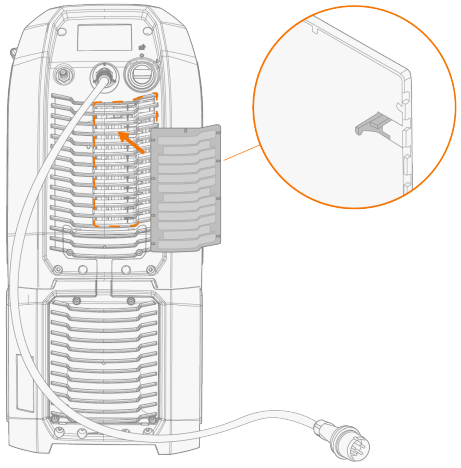
Tools needed:





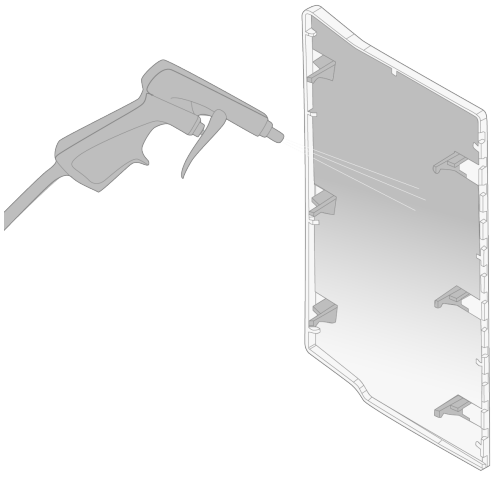
Installation and replacement

1. Place the air filter assembly onto the power source air intake, and lock it in place with the clips on the edge of the casing.



Cleansing

1. Remove the air filter from the power source by releasing the clips on the edge of the air filter casing.
2. Blow the air filter clean with compressed air.



4.3 TROUBLESHOOTING

The problems listed and the possible causes are not definitive, but suggest some typical situations that may turn up during normal use of the welding system.

Welding device:

Problem	Recommended actions
The welding device does not power up	Check that the mains cable is plugged in properly.
	Check that the mains switch of the power source is at the ON position.
	Check that the mains power distribution is on.
	Check the mains fuse and/or the circuit breaker.
	Check that the interconnection cable between the power source and the wire feeder is intact and properly attached.
	Check that the earth return cable is connected.
The welding device stops working	Gas-cooled torch may have overheated. Wait for it to cool down.
	Check that none of the cables is loose.
	The wire feeder may have overheated. Wait for it to cool down and see that the welding current cable is properly attached.
	The power source may have overheated. Wait for it to cool down and see that the cooling fans work properly and the air flow is unobstructed.
Welding does not start when the trigger is pressed	If text "Welding not allowed" is shown on the Settings display and subfeeder is in use, make sure that the welding ON/OFF switch on the subfeeder is set to ON.

Wire feeding:

Problem	Recommended actions
The filler wire on the spool unravels	Check that the spool locking cover is closed.
The wire feed mechanism does not feed the filler wire	Check that the filler wire has not run out.
	Check that the filler wire is properly routed through the feed rolls to the wire liner.
	Check that the pressure handle is properly closed.
	Check that the feed roll pressure is adjusted correctly for the filler wire.
	Check that the welding cable is properly connected to the wire feeder.
	Blow compressed air through the wire liner to check that it is not blocked.

Weld quality:

Problem	Recommended actions
Dirty and/or poor quality weld	Check that the shielding gas has not run out.
	Check that the shielding gas flow is unobstructed.
	Check that the gas type is correct for the application.
	Check the polarity of the torch/electrode.
	Check that the welding procedure is correct for the application.
Varying welding performance	Check that the wire feed mechanism is adjusted properly.
	Blow compressed air through the wire liner to check that it is not blocked.
	Check that the wire liner is correct for the selected wire size and type.
	Check the welding torch contact tip's size, type and wear.
	Check that the welding torch is not overheating.
	Check that the earth return clamp is properly attached to a clean surface of the workpiece.
High spatter volume	Check the welding parameter values and welding procedure.
	Check the gas type and flow.
	Check the polarity of the torch/electrode.
	Check that the filler wire is correct for the current application.

"Error codes" below

4.3.1 ERROR CODES

In error situations, the control panel displays the number, title and possible cause of the error, and a proposed action to fix the issue.

Error			
Code	Title	Possible cause	Proposed action
1	Power source not calibrated	Power source calibration has been lost.	Restart the power source. If problem persists, contact Kemppi service.
2	Too low mains voltage	Voltage in mains network is too low.	Restart the power source. If problem persists, contact Kemppi service.
3	Too high mains voltage	Voltage in mains network is too high.	Restart the power source. If problem persists, contact Kemppi service.
4	Power source is overheated	Too long welding session with high power.	Do not shut down, let the fans cool the machine. If fans are not running, contact Kemppi service

5	Internal 24V voltage is too low	Power source contains an inoperative 24V power supply unit.	Restart the power source. If problem persists, contact Kemppi service.
10	Unsupported welding process	There is an unsupported welding process in the memory channel.	Check that all memory channel definitions are supported.
12	Welding cable failure	Plus and minus cables are connected together.	Check the connections of welding cable and earth return cable.
13	IGBT overcurrent	Inoperative mains transformer in power source.	Restart the power source. If problem persists, contact Kemppi service.
14	IGBT overheated	Too long welding session with high power or high ambient temperature.	Do not shut down, let the fans cool the machine. If fans are not running, contact Kemppi service.
16	Main transformer is overheated	Too long welding session with high power or high ambient temperature.	Do not shut down, let the fans cool the machine. If fans are not running, contact Kemppi service
17	Phase is missing from mains supply	One or more phases are missing from the mains supply.	Check the mains cable and its connectors. Check the voltage of mains supply.
20	Power source cooling failure	Cooling capacity is reduced in the power source.	Clean the filters and clear any dirt from the cooling channel. Check that the cooling fans are running. If not, contact Kemppi service.
24	Cooling liquid overheated	Too long welding session with high power or high ambient temperature.	Do not turn off the cooler. Let the liquid circulate until the fans cool it down. If fans are not running, contact Kemppi service.
26	Cooling liquid not circulating	No cooling liquid or circulation is blocked.	Check the liquid level in the cooler. Check hoses and connectors for blockage.
27	Cooler not found	Cooling is turned on in the settings menu, but cooler is not connected to power source or cabling is faulty.	Check the cooler connections. Ensure that the cooling is turned off in the settings menu, if the cooler is not in use.
33	Welding cable calibration failure	Welding cable calibration failed.	Check the welding system cables and their connections.
35	Too high mains current	Current drawn from the mains is too high.	Reduce welding power.
40	VRD error	Open circuit voltage exceeds the VRD limit.	Restart the power source. If problem persists, contact Kemppi service.
42	High current in wire feeder motor	There may be too much pressure in the wire feed rolls or dirt in the wire line.	Adjust the feed roll pressure. Clean the wire line. Change worn parts in the welding gun.
43	Overcurrent in wire feeder motor	There may be too much pressure in the wire feed rolls or dirt in the wire line.	Adjust the feed roll pressure. Clean the wire line. Change worn parts in the welding gun.
44	Wire speed measurement is missing	Faulty sensor or wiring in wire feeder.	Restart the welding system. If problem persists, contact Kemppi service.
45	Low gas pressure	Shielding gas pressure is too low.	Check and adjust the shielding gas flow.

50	License error	License for the selected feature is missing.	To continue using the feature, please install the license.
61	Operation is not allowed	Subfeeder is connected, but it has not been selected in the system settings.	Go to the system settings menu on the control panel and select your subfeeder model and type.
64	Robot control device lost	Wire feeder lost connection to the robot control device.	Check the robot control device and interconnection cables. If problem persists, contact Kemppi service.
65	Subfeeder not allowed	Use of subfeeder is not allowed with selected welding process.	Remove the subfeeder or change the welding process.
103	Empty memory channel	Robot tried to start welding using a nonexistent memory channel.	Check the memory channel selected by the robot.
132	Robot not responding	There is a communication problem between robot and the RCM.	Check fieldbus cabling, connectors and the fieldbus module.
244	Internal memory failure	Initialization failed (%sub:%device).	Restart welding system. If problem persists, contact Kemppi service.
245	Demo time left: %min min	When the demo time expires, the features without a license cannot be used anymore.	To continue using the optional features, you must buy licenses for them.
246	Demo time has expired	Features without a license cannot be used anymore.	To continue using the optional features, you must buy licenses for them.
250	Internal memory failure	Memory communication failed (%sub:%device).	Restart welding system. If problem persists, contact Kemppi service.

4.4 DISPOSAL



Do not dispose of any electrical equipment with normal waste!

In observance of WEEE Directive 2012/19/EU on waste of electrical and electronic equipment and European Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment, and their 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 these European Directives you improve the environment and human health.

For more information:

5. TECHNICAL DATA

Technical data:

- For Master M device technical data, refer to "Master M devices" on the next page.
- For Master M Cooler cooling unit technical data, refer to "Master M cooling unit" on page 80.

Additional information:

- For wire feeder consumable information, refer to "Wire feeder consumables" on page 83.
- For ordering information, refer to "Master M ordering info" on page 82.

5.1 MASTER M DEVICES

Master M 353 G

Master M 353 G		
Feature		Value
Mains connection voltage		380...460 V ±10 %
Mains connection phases		3~50/60 Hz
Mains connection cable type		H07RN-F
Mains connection cable size		2.5 mm²
Rated maximum input power [S_{1max}]		14 kVA
Mains fuse		16 A
Idle state power consumption [P_{1idle}]		18 W
No-load state power consumption (MMA), power save		18 W
No-load state power consumption (MMA), fans ON		119 W
No-load voltage [U_0]		55...69 V
Open circuit voltage [U_{av}]		53...64 V
Effective supply current [I_{1eff}]		13.5...10.8 A
Maximum supply current [I_{1max}]		21.3...17.1 A
Output, duty cycle % at rated max current, MIG		40 %
Output at +40 °C, rated max current, MIG		350 A
Output at +40 °C, 60% MIG		280 A
Output at +40 °C, 100% MIG		220 A
Output range, MIG welding current/voltage		15 A / 10 V ... 350 A / 45 V
Output range, TIG welding current/voltage		15 A / 1 V ... 350 A / 45 V
Output range, MMA welding current/voltage		15 A / 10 V ... 330 A / 45 V
Voltage adjustment range (MIG)		10...40 V
VRD voltage		24 V
Power factor at rated maximum current	λ	0.91
Efficiency at rated maximum current	η	87 %
Minimum short-circuit power of supply network [S_{SC}]		2.4 MVA
Voltage supply for auxiliary devices		12 V
Voltage supply for cooling unit		24 V, 380...460 V
Welding connection type		Euro
Wire feed mechanism		4-roll, Single-motor
Diameter of feed rolls		32 mm
Filler wire diameter, Fe		0.8...1.2 mm

Filler wire diameter, Ss		0.8...1.2 mm
Filler wire diameter, MC/FC		0.8...1.2 mm
Filler wire diameter, Al		0.8...1.2 mm
Wire feed speed		0.5...25 m/min
Maximum wire spool weight		20 kg
Maximum wire spool diameter		300 mm
Maximum shielding gas pressure		0.5 MPa
Control panel, model		Custom LCD
Control panel, display		Color LCD
Control panel, controls		2 control knobs, Push buttons
Control panel, type of installation		Built-in
Control panel, input voltage (DC)		12 V
Wired communication type		CAN bus
LED battery type and voltage		SAMSUNG SDI (INR18650-26J; 3,6 V; 2600 mAh); LG CHEM (ICR18650HE4; 3,6 V; 2500 mAh)
Operating temperature range		-20...40 °C
Storage temperature range		-40...60 °C
Recommended minimum generator power [S_{gen}]		20 kVA
EMC class		A
Degree of protection		IP23S
External dimensions	*L* x *W* x *H*	602 x 298 x 447 mm
Weight without accessories		27 kg
Standards		IEC 60974-1, -10

Master M 353 GM

Master M 353 GM		
Feature		Value
Mains connection voltage		380...460 V ±10 %
Mains connection voltage	MV low range	220...230 V ±10 %
Mains connection phases		3~50/60 Hz
Mains connection cable type		H07RN-F
Mains connection cable size		2.5 mm²
Rated maximum input power [S_{1max}]		14 kVA
Mains fuse		16 A
Mains fuse	@MV low range	32 A
Idle state power consumption [P_{1idle}]		20 W
No-load state power consumption (MMA), power save		20 W

No-load state power consumption (MMA), fans ON		120 W
No-load voltage [U_0]		55...69 V
No-load voltage [U_0]	@MV low range	54...56 V
Open circuit voltage [U_{av}]		53...64 V
Effective supply current [I_{1eff}]		13.3...10.8 A
Effective supply current [I_{1eff}]	@MV low range	18 A
Maximum supply current [I_{1max}]		21.1...17.1 A
Maximum supply current [I_{1max}]	@MV low range	28.4 A
Output, duty cycle % at rated max current, MIG		40 %
Output at +40 °C, rated max current, MIG		350 A
Output at +40 °C, 60% MIG		280 A
Output at +40 °C, 100% MIG		220 A
Output at +40 °C, rated max current, MIG	@MV low range	300 A
Output at +40 °C, 60% MIG	@MV low range	240 A
Output at +40 °C, 100% MIG	@MV low range	190 A
Output range, MIG welding current/voltage		15 A / 10 V ... 350 A / 45 V
Output range, TIG welding current/voltage		15 A / 1 V ... 350 A / 45 V
Output range, MMA welding current/voltage		15 A / 10 V ... 330 A / 45 V
Output range, MIG welding current/voltage	@MV low range	15 A / 10 V ... 300 A / 40 V
Output range, TIG welding current/voltage	@MV low range	15 A / 1 V ... 300 A / 40 V
Output range, MMA welding current/voltage	@MV low range	15 A / 10 V ... 280 A / 40 V
Voltage adjustment range (MIG)		10...40 V
VRD voltage		24 V
Power factor at rated maximum current	λ	0.91
Efficiency at rated maximum current	η	87 %
Minimum short-circuit power of supply network [S_{SC}]		2.4 MVA
Voltage supply for auxiliary devices		12 V
Voltage supply for cooling unit		24 V, 380...460 V
Voltage supply for cooling unit	@MV low range	220...230 V, 24 V
Welding connection type		Euro
Wire feed mechanism		4-roll, Single-motor
Diameter of feed rolls		32 mm
Filler wire diameter, Fe		0.8...1.2 mm
Filler wire diameter, Ss		0.8...1.2 mm
Filler wire diameter, MC/FC		0.8...1.2 mm
Filler wire diameter, Al		0.8...1.2 mm
Wire feed speed		0.5...25 m/min

Maximum wire spool weight		20 kg
Maximum wire spool diameter		300 mm
Maximum shielding gas pressure		0.5 MPa
Control panel, model		Custom LCD
Control panel, display		Color LCD
Control panel, controls		2 control knobs, Push buttons
Control panel, type of installation		Built-in
Control panel, input voltage (DC)		12 V
Wired communication type		CAN bus
LED battery type and voltage		SAMSUNG SDI (INR18650-26J; 3,6 V; 2600 mAh); LG CHEM (ICR18650HE4; 3,6 V; 2500 mAh)
Operating temperature range		-20...40 °C
Storage temperature range		-40...60 °C
Recommended minimum generator power [S_{gen}]		20 kVA
EMC class		A
Degree of protection		IP23S
External dimensions	*L* x *W* x *H*	602 x 298 x 447 mm
Weight without accessories		27 kg
Standards		IEC 60974-1, -10

Master M 355 G

Master M 355 G	
Feature	Value
Mains connection voltage	380...460 V ±10 %
Mains connection phases	3~50/60 Hz
Mains connection cable type	H07RN-F
Mains connection cable size	2.5 mm²
Rated maximum input power [S_{1max}]	14 kVA
Mains fuse	16 A
Idle state power consumption [P_{1idle}]	18 W
No-load state power consumption (MMA), power save	18 W
No-load state power consumption (MMA), fans ON	119 W
No-load voltage [U_0]	55...69 V
Open circuit voltage [U_{av}]	53...64 V
Effective supply current [I_{1eff}]	13.5...10.8 A
Maximum supply current [I_{1max}]	21.3...17.1 A
Output, duty cycle % at rated max current, MIG	40 %

Output at +40 °C, rated max current, MIG		350 A
Output at +40 °C, 60% MIG		280 A
Output at +40 °C, 100% MIG		220 A
Output range, MIG welding current/voltage		15 A / 10 V ... 350 A / 45 V
Output range, TIG welding current/voltage		15 A / 1 V ... 350 A / 45 V
Output range, MMA welding current/voltage		15 A / 10 V ... 330 A / 45 V
Voltage adjustment range (MIG)		10...40 V
VRD voltage		24 V
Power factor at rated maximum current	λ	0.91
Efficiency at rated maximum current	η	87 %
Minimum short-circuit power of supply network [S_{SC}]		2.4 MVA
Voltage supply for auxiliary devices		12 V
Voltage supply for cooling unit		24 V, 380...460 V
Welding connection type		Euro
Wire feed mechanism		4-roll, Single-motor
Diameter of feed rolls		32 mm
Filler wire diameter, Fe		0.8...1.2 mm
Filler wire diameter, Ss		0.8...1.2 mm
Filler wire diameter, MC/FC		0.8...1.2 mm
Filler wire diameter, Al		0.8...1.2 mm
Wire feed speed		0.5...25 m/min
Maximum wire spool weight		20 kg
Maximum wire spool diameter		300 mm
Maximum shielding gas pressure		0.5 MPa
Control panel, model		Custom LCD
Control panel, display		Color LCD
Control panel, controls		2 control knobs, Push buttons
Control panel, type of installation		Built-in
Control panel, input voltage (DC)		12 V
Wired communication type		CAN bus
LED battery type and voltage		SAMSUNG SDI (INR18650-26J; 3,6 V; 2600 mAh); LG CHEM (ICR18650HE4; 3,6 V; 2500 mAh)
Operating temperature range		-20...40 °C
Storage temperature range		-40...60 °C
Recommended minimum generator power [S_{gen}]		20 kVA
EMC class		A
Degree of protection		IP23S

External dimensions	*L* x *W* x *H*	602 x 298 x 447 mm
Weight without accessories		27 kg
Standards		IEC 60974-1, -10

Master M 355 GM

Master M 355 GM		
Feature		**Value**
Mains connection voltage		380...460 V ±10 %
Mains connection voltage	MV low range	220...230 V ±10 %
Mains connection phases		3~50/60 Hz
Mains connection cable type		H07RN-F
Mains connection cable size		2.5 mm²
Rated maximum input power [S_{1max}]		14 kVA
Mains fuse		16 A
Mains fuse	@MV low range	32 A
Idle state power consumption [P_{1idle}]		20 W
No-load state power consumption (MMA), power save		20 W
No-load state power consumption (MMA), fans ON		120 W
No-load voltage [U_0]		55...69 V
No-load voltage [U_0]	@MV low range	54...56 V
Open circuit voltage [U_{av}]		53...64 V
Effective supply current [I_{1eff}]		13.3...10.8 A
Effective supply current [I_{1eff}]	@MV low range	18 A
Maximum supply current [I_{1max}]		21.1...17.1 A
Maximum supply current [I_{1max}]	@MV low range	28.4 A
Output, duty cycle % at rated max current, MIG		40 %
Output at +40 °C, rated max current, MIG		350 A
Output at +40 °C, 60% MIG		280 A
Output at +40 °C, 100% MIG		220 A
Output at +40 °C, 40% MIG	@MV low range	300 A
Output at +40 °C, 60% MIG	@MV low range	240 A
Output at +40 °C, 100% MIG	@MV low range	190 A
Output range, MIG welding current/voltage		15 A / 10 V ... 350 A / 45 V
Output range, TIG welding current/voltage		15 A / 1 V ... 350 A / 45 V
Output range, MMA welding current/voltage		15 A / 10 V ... 330 A / 45 V
Output range, MIG welding current/voltage	@MV low range	15 A / 10 V ... 300 A / 40 V
Output range, TIG welding current/voltage	@MV low range	15 A / 1 V ... 300 A / 40 V

Output range, MMA welding current/voltage	@MV low range	15 A / 10 V ... 280 A / 40 V
Voltage adjustment range (MIG)		10...40 V
VRD voltage		24 V
Power factor at rated maximum current	λ	0.91
Efficiency at rated maximum current	η	87 %
Minimum short-circuit power of supply network [S_{SC}]		2.4 MVA
Voltage supply for auxiliary devices		12 V
Voltage supply for cooling unit		24 V, 380...460 V
Voltage supply for cooling unit	@MV low range	220...230 V, 24 V
Welding connection type		Euro
Wire feed mechanism		4-roll, Single-motor
Diameter of feed rolls		32 mm
Filler wire diameter, Fe		0.8...1.2 mm
Filler wire diameter, Ss		0.8...1.2 mm
Filler wire diameter, MC/FC		0.8...1.2 mm
Filler wire diameter, Al		0.8...1.2 mm
Wire feed speed		0.5...25 m/min
Maximum wire spool weight		20 kg
Maximum wire spool diameter		300 mm
Maximum shielding gas pressure		0.5 MPa
Control panel, model		Custom LCD
Control panel, display		Color LCD
Control panel, controls		2 control knobs, Push buttons
Control panel, type of installation		Built-in
Control panel, input voltage (DC)		12 V
Wired communication type		CAN bus
LED battery type and voltage		SAMSUNG SDI (INR18650-26J; 3,6 V; 2600 mAh); LG CHEM (ICR18650HE4; 3,6 V; 2500 mAh)
Operating temperature range		-20...40 °C
Storage temperature range		-40...60 °C
Recommended minimum generator power [S_{gen}]		20 kVA
EMC class		A
Degree of protection		IP23S
External dimensions	*L* x *W* x *H*	602 x 298 x 447 mm
Weight without accessories		27 kg
Standards		IEC 60974-1, -10

5.2 MASTER M COOLING UNIT

Master M Cooler

Master M Cooler			
Feature			Value
Supply voltage		U_1	380...460 V +/- 10 %
Maximum supply current	@ 380...460 V	I_{1max}	0.7 A
Cooling power	@ 1 l/min		1.0 kW
Recommended coolant			MGP 4456 (Kemppi mixture)
Maximum coolant pressure			0.4 MPa
Tank volume			3 l
Operating temperature range	With recommended coolant		-20...+40 °C
Storage temperature range			-40...+60 °C
EMC class			A
Degree of protection	When mounted		IP23S
Package external dimensions	*L* x *W* x *H*		635 x 305 x 292 mm
Weight	Without accessories		14.9 kg
Standards			IEC 60974-2, -10

Master M Cooler MV

Master M Cooler MV			
Feature			Value
Supply voltage		U_1	220...240 V +/- 10 % 380...460 V +/- 10 %
Maximum supply current	@ 220...230 V	I_{1max}	1.0 A
	@ 380...460 V	I_{1max}	0.7 A
Cooling power	@ 1 l/min		1.0 kW
Recommended coolant			MGP 4456 (Kemppi mixture)
Maximum coolant pressure			0.4 MPa
Tank volume			3 l
Operating temperature range	With recommended coolant		-20...+40 °C
Storage temperature range			-40...+60 °C
EMC class			A

Degree of protection	When mounted	IP23S
Package external dimensions	*L* x *W* x *H*	635 x 305 x 292 mm
Weight	Without accessories	14.9 kg
Standards		IEC 60974-2, -10

5.3 MASTER M ORDERING INFO

For Master M ordering information and optional accessories, refer to Kemppi.com.

5.4 WIRE FEEDER CONSUMABLES

This section lists the feed rolls and wire guide tubes available both separately and in consumable kits. The consumable kits contain recommended feed roll and wire guide tube combinations for selected filler wire materials and diameters. The wire feeder consumables can be ordered in Configurator.kemppi.com.

In the tables, *standard* refers to plastic feed rolls and *heavy-duty* refers to metal feed rolls. The materials mentioned first refer to primary suitability and the materials mentioned inside brackets refer to secondary suitability.

Wire feeder consumable kits

The table below lists the recommended consumable kits for selected filler wire materials and diameters.

Wire feeder consumable kits				
Filler wire material	Feed roll profile*	Filler wire diameter (mm)	Consumable kit code, standard	Consumable kit code, heavy-duty
Fe (MC/FC)	V-groove	0.8–0.9	F000488	F000492
		1.0	F000489	F000493
		1.2	F000490	F000494
Ss (Fe, Cu)	V-groove	0.8–0.9	F000455	-
		1.0	F000456	-
		1.2	F000457	-
Ss (Fe)	V-groove	0.8–0.9	-	F000458
		1.0	-	F000459
		1.2	-	F000460
MC/FC	V-groove, knurled	1.0	F000499	F000502
		1.2	F000500	F000503
Al	U-groove	1.0	F000461	-
		1.2	F000462	-

Wire guide tubes

The table below lists the wire guide tubes available.

Wire guide tubes				
Filler wire material	Filler wire diameter (mm)	Inlet guide tube	Middle guide tube	Outlet guide tube
Al, Ss (Fe, MC/FC)	0.6	SP007293	SP007273	SP016608
	0.8–0.9	SP007294	SP007274	SP011440
	1.0	SP007295	SP007275	SP011441
	1.2	SP007296	SP007276	SP011442
Fe, MC/FC	0.6	(SP007293)	(SP007273)	SP016613
	0.8–0.9	SP007536	(SP007274)	SP016614
	1.0	SP007537	(SP007275)	SP016615
	1.2	SP007538	(SP007276)	SP016616

Feed rolls

The table below lists the standard feed rolls available.

Feed rolls, standard				
Filler wire material	Feed roll profile*	Filler wire diameter (mm)	Drive roll code	Pressure roll code
Fe, Ss, Cu (Al, MC/FC)	V-groove	0.6	W001045	W001046
		0.8–0.9	W001047	W001048
		1.0	W000675	W000676
		1.2	W000960	W000961
MC/FC (Fe)	V-groove, knurled	1.0	W001057	W001058
		1.2	W001059	W001060
Al (MC/FC, Ss, Fe, Cu)	U-groove	1.0	W001067	W001068
		1.2	W001069	W001070

The table below lists the heavy-duty feed rolls available.

Feed rolls, heavy-duty				
Filler wire material	Feed roll profile*	Filler wire diameter (mm)	Drive roll code	Pressure roll code
Fe, Ss (MC/FC)	V-groove	0.8–0.9	W006074	W006075
		1.0	W006076	W006077
		1.2	W004754	W004753
MC/FC (Fe)	V-groove, knurled	1.0	W006080	W006081
		1.2	W006082	W006083
(MC/FC, Ss, Fe)	U-groove	1.0	W006088	W006089
		1.2	W006090	W006091

** Feed roll profiles and corresponding symbols:*

Feed roll profile	Symbol
V-groove	
V-groove, knurled	
U-groove	

5.5 WELDING PROGRAM WORK PACKS

Welding program work packs include a set of standard welding programs to allow welding with e.g. automatic 1-MIG and pulse processes. For more information, contact your local Kemppi dealer or go to Kemppi.com.

1-MIG work pack:

Welding program	Process	Wire material	Wire diameter	Shielding gas	Description
A01	1-MIG	AlMg5	1.0	Ar	Standard
A02	1-MIG	AlMg5	1.2	Ar	Standard
A11	1-MIG	AlSi5	1.0	Ar	Standard
A12	1-MIG	AlSi5	1.2	Ar	Standard
C01	1-MIG	CuSi3	0.8	Ar	Standard: Brazing
C03	1-MIG	CuSi3	1.0	Ar	Standard: Brazing
C11	1-MIG	CuAl8	0.8	Ar	Standard: Brazing
C13	1-MIG	CuAl8	1.0	Ar	Standard: Brazing
F01	1-MIG	Fe	0.8	Ar+18%CO2	Standard
F02	1-MIG	Fe	0.9	Ar+18%CO2	Standard
F03	1-MIG	Fe	1.0	Ar+18%CO2	Standard
F04	1-MIG	Fe	1.2	Ar+18%CO2	Standard
F11	1-MIG	Fe	0.8	Ar+8%CO2	Standard
F12	1-MIG	Fe	0.9	Ar+8%CO2	Standard
F13	1-MIG	Fe	1.0	Ar+8%CO2	Standard
F14	1-MIG	Fe	1.2	Ar+8%CO2	Standard
F21	1-MIG	Fe	0.8	CO2	Standard
F22	1-MIG	Fe	0.9	CO2	Standard
F23	1-MIG	Fe	1	CO2	Standard
F24	1-MIG	Fe	1.2	CO2	Standard
M04	1-MIG	Fe Metal	1.2	Ar+18%CO2	Standard
R04	1-MIG	Fe Rutil	1.2	Ar+18%CO2	Standard
S01	1-MIG	Ss	0.8	Ar+2%CO2	Standard
S02	1-MIG	Ss	0.9	Ar+2%CO2	Standard
S03	1-MIG	Ss	1.0	Ar+2%CO2	Standard
S04	1-MIG	Ss	1.2	Ar+2%CO2	Standard
S82	1-MIG	FC-CrNiMo	0.9	Ar+18%CO2	Standard
S84	1-MIG	FC-CrNiMo	1.2	Ar+18%CO2	Standard

Pulse work pack (Master M 355 only):

The Pulse work pack includes also all 1-MIG work pack welding programs.

Welding program	Process	Wire material	Wire diameter	Shielding gas	Description
A01	Pulse	AlMg5	1.0	Ar	Standard
A02	Pulse	AlMg5	1.2	Ar	Standard
A11	Pulse	AlSi5	1.0	Ar	Standard
A12	Pulse	AlSi5	1.2	Ar	Standard
C01	Pulse	CuSi3	0.8	Ar	Standard: Brazing
C03	Pulse	CuSi3	1.0	Ar	Standard: Brazing
C11	Pulse	CuAl8	0.8	Ar	Standard: Brazing
C13	Pulse	CuAl8	1.0	Ar	Standard: Brazing
F01	Pulse	Fe	0.8	Ar+18%CO2	Standard
F02	Pulse	Fe	0.9	Ar+18%CO2	Standard
F03	Pulse	Fe	1.0	Ar+18%CO2	Standard
F04	Pulse	Fe	1.2	Ar+18%CO2	Standard
F11	Pulse	Fe	0.8	Ar+8%CO2	Standard
F12	Pulse	Fe	0.9	Ar+8%CO2	Standard
F13	Pulse	Fe	1.0	Ar+8%CO2	Standard
F14	Pulse	Fe	1.2	Ar+8%CO2	Standard
M04	Pulse	Fe Metal	1.2	Ar+18%CO2	Standard
S01	Pulse	Ss	0.8	Ar+2%CO2	Standard
S02	Pulse	Ss	0.9	Ar+2%CO2	Standard
S03	Pulse	Ss	1.0	Ar+2%CO2	Standard
S04	Pulse	Ss	1.2	Ar+2%CO2	Standard

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