

DO CERAM

ADVANCED CERAMIC SOLUTIONS

ModulMaster



User Manual | EN
incl. Declaration of Incorporation | EN

Translation of Original Montageanleitung ModulMaster, Rev. 01, 09.2019, Art. No. 1910300144

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DISCLAIMER

The general regulations on occupational safety and safety technology as well as the guidelines in this user manual must be followed when working on/with the product.

Please read and take notice of the guidelines in this user manual before the installation of the product. DOCERAM GmbH assumes no liability for direct damage or consequential damage resulting from improper use of the product and failure to comply the following regulations and guidelines.

The illustrations/drawings used in this manual are simplified and shown as an example and may therefore vary from the purchased product. The user must check the information and – if necessary – consider deviations.

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Technical changes are possible at any time due to product and model changes as well as further developments. Information, illustrations, descriptions and dimensions in this user manual are subject to technical changes.

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Translations are completed to the best of our knowledge and with the utmost care and accuracy. DOCERAM GmbH assumes no liability or responsibility for translation errors even if the translation is made by DOCERAM GmbH itself or on our behalf. The original version of the user manual in German is binding. In case of any inconsistencies, the German version shall prevail.

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1 SCOPE OF SUPPLY

The following tables show the standard scope of supply of every ModulMaster variant. Depending on the customer request, contents may differ.

1.1 MODULMASTER N100

Designation	Article No.	Quantity	Notes
ModulMaster	<i>various</i>	1	custom
Hook wrench	1703301457	1	
8 mm open-end wrench	1703301458	1	
Insertion aid	1703301643	1	
Elbow push connector	1116300003	2	
Original Montageanleitung (DE)	1910300144	1	
User Manual (EN)	1910300145	1	

1.2 MODULMASTER N200

Designation	Article No.	Quantity	Notes
ModulMaster	<i>various</i>	1	custom
Hook wrench	1703301457	1	
8 mm open-end wrench	1703301458	1	
Insertion aid	1703301643	1	
Elbow push connector	1116300003	2	
Sensor 200	1119Z71259	1	incl. user manual
Original Montageanleitung (DE)	1910300144	1	
User Manual (EN)	1910300145	1	

1.3 MODULMASTER N300 AND S300

Designation	Article No.	Quantity	Notes
ModulMaster	<i>various</i>	1	custom
Hook wrench	1703301457	1	
8 mm open-end wrench	1703301458	1	
Insertion aid	1703301643	1	
Elbow push connector	1116300003	2	
Sensor 300	1115300003	1	incl. user manual
Original Montageanleitung (DE)	1910300144	1	
User Manual (EN)	1910300145	1	

2 PREFACE

2.1 GENERAL

Please take your time to read this user manual to guarantee a safe and proper handling of the product.

2.2 INFORMATION ON THIS USER MANUAL

This user manual is part of the ModulMaster welding device and gives you important advice and information regarding installation, safety and intended purpose as well as maintenance and care. The user manual must always be available near the welding device and must be read and applied by every person who is in charge of installation, operation, troubleshooting and/or maintenance of the ModulMaster. Carefully store this user manual.

We hope you enjoy using our ModulMaster.

2.3 WARNINGS AND PRECAUTIONS

The present user manual uses the following warnings and symbols:

**Danger for person!**

High risk level of danger:

Failure to comply can lead to serious injuries or death.

**Danger for person!**

Low to medium risk level of danger:

Failure to comply can lead from moderate to minor injuries.

**Damage!**

Denotes information for preventing damage.



Additional information.

3 SAFETY INFORMATION

Read and note this information before installing the device. Non-compliance with the user manual can make the device a safety hazard.

3.1 SAFETY NOTES

The ModulMaster welding device is an incomplete machine (Machinery Directive 2006/42/EG) and cannot fulfill its purpose by itself. Due to this reason, there is no danger by itself. The safety information given in this user manual are an addition to the safety information of the resistance-welding machine combined with the ModulMaster welding device. The entirety of the safety information of all available components of the resistance-welding machine – incomplete or complete machine – must be followed carefully.

⚠ DANGER**Disconnect the device from all sources of energy!**

Before installation, maintenance or repair ensure the disconnection of the welding device from all sources of energy including current, compressed air and cooling water.

Ensure safe supply lines!

Compressed air and cooling water lines are a potential safety hazard. Operate properly.

Only operate the welding device in its original state!

Do not operate the welding device with modifications, changes or adaptations that the DOCERAM GmbH did not approve.

⚠ CAUTION**Use original spare parts exclusively!**

Chapter 7 and section 4.4 lists valid components for the welding device.

Wear your personal protective equipment!

Working on and with the welding device, the following personal protective equipment is recommended: safety glasses, protective shoes, gloves (protection against hot surfaces) and proper work wear.

Check the delivery state!

Before installation and commissioning, check the welding device for possible damage. Do not use the device if damaged.

ATTENTION**Keep the device dry and clean!**

Excessive contamination and corrosion can reduce performance and lifetime of the welding device.

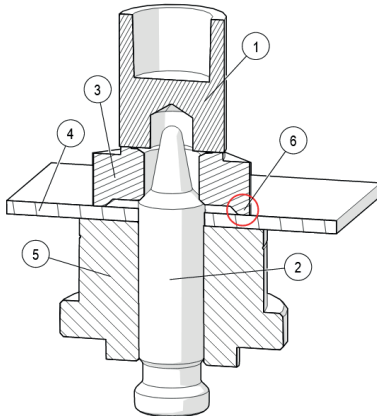
Carefully carry the welding device!

During transportation keep the ModulMaster dry and clean and protect the device from thermal or mechanical damage.

3.2 INTENDED PURPOSE

The ModulMaster is a modular welding-device used for the so-called resistance-welding, which results in a substance-to-substance bond of the joining components through heat and force.

The device is part of a resistance-welding machine and is used to weld sheet metal parts with additional parts like nuts and screws or studs. Usually for this purpose unalloyed or low-alloy sheet metals with a thickness of 5 mm and M4 and M12 nuts and screws or studs of equivalent materials, respectively, are used.



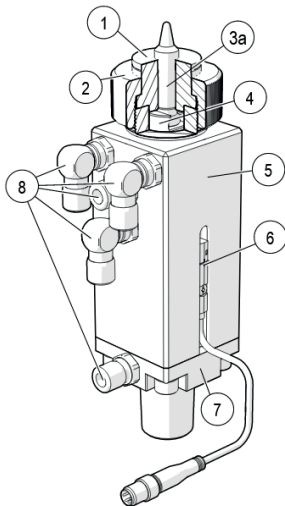
Item	Designation
(1)	Backup electrode
(2)	Centering pin
(3)	Weld nut
(4)	Sheet metal plate (blank)
(5)	Change electrode
(6)	Welding zone

The schematic diagram shows the resistance-welding of a square weld nut, held in position by a centering pin

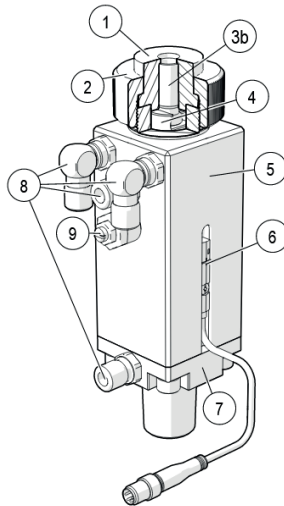
The heating of the joining components is accomplished through the resistance heating of the welding zone by an electric current flow. The force is transmitted to the welding zone by pressing the backup and bottom (change) electrodes together on the joining components. The centering pin or sleeve centers the parts on the device. The sole purpose of the ModulMaster therefore is to combine it with other machines, incomplete machines or interchangeable equipment and cannot fulfill its function on its own.

4 PRODUCT DESCRIPTION

4.1 OPERATING ELEMENTS



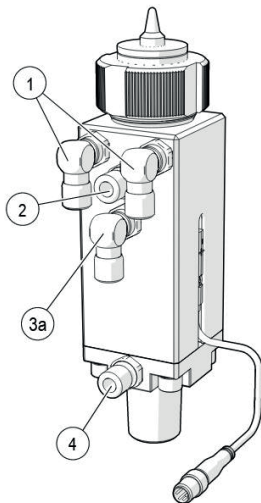
Example ModulMaster N300



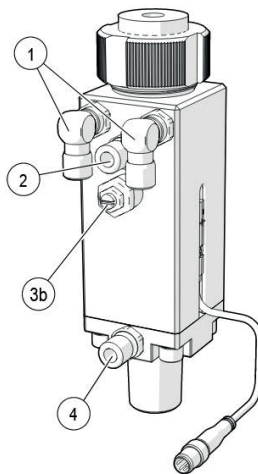
Example ModulMaster S300

Item	Designation
(1)	Change electrode
(2)	Union nut
(3a)	Centering pin
(3b)	Centering sleeve
(4)	Piston rod attachment
(5)	Cylinder housing
(6)	Sensor
(7)	Connection plate
(8)	Push connector
(9)	Valve/Filter

4.2 CONNECTIONS



Example ModulMaster N300

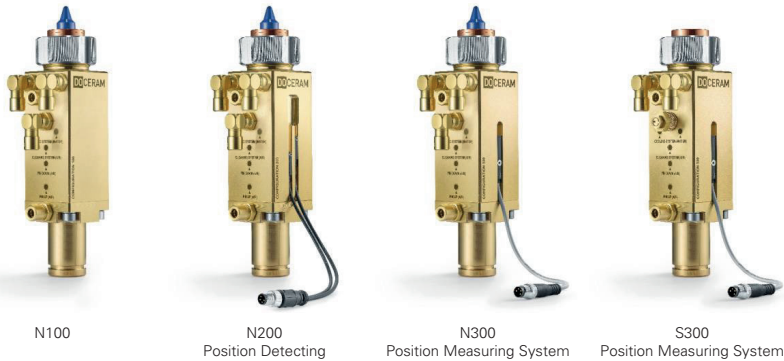


Example ModulMaster S300

Item	Designation
(1)	Cooling system Medium: Water
(2)	Cleaning system Medium: Air
(3a)	Downward movement Medium: Air
(3b)	Valve/Filter Medium: Air
(4)	Upward movement Medium: Air

4.3 CONFIGURATIONS

DOCERAM ModulMaster is available in the configuration N and S, where N stands for nut welding and S for stud welding. Three different variants are available in the N-Line – N100, N200 and N300.

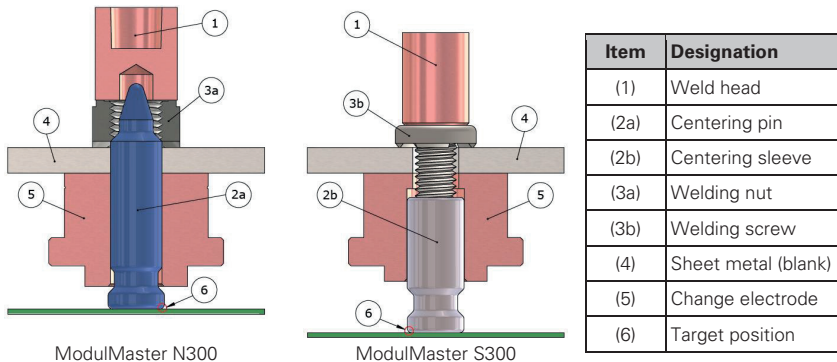


4.3.1 FEATURE OF THE POSITION DETECTING (MODULMASTER N200)

ModulMaster N200 is provided with a sensor that detects the starting and end position of the centering pin. As soon as the centering pin reaches the correct position, the machine receives an enabling signal, the nut is supplied and the welding process starts. When the pin reaches the lower position after welding, the sensor gives the signal to withdraw the component.

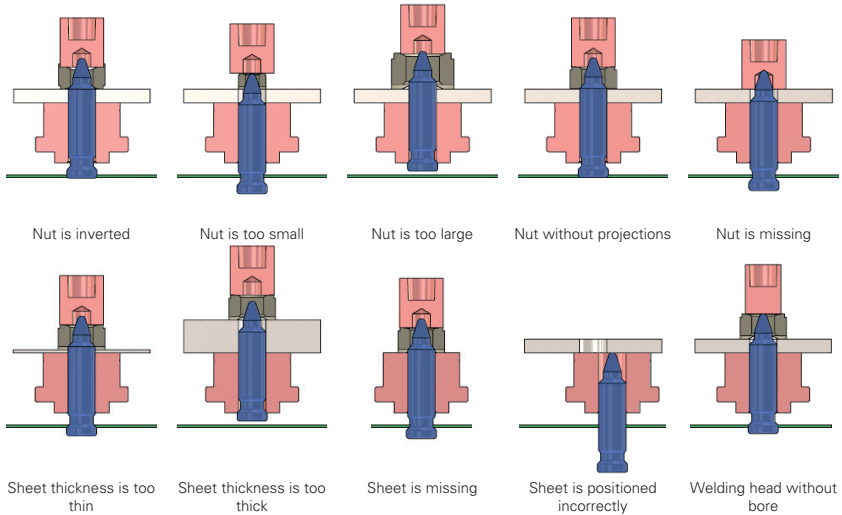
4.3.2 FEATURE OF THE POSITION MEASURING SYSTEM (MODULMASTER N300 AND S300)

The sensor integrated in the ModulMasters N300 and S300 provides advanced functionality through a precise position measuring system, which is able to detect a large number of possible production errors. For this purpose, the unit connects with the available PLC of the welding machine. After correct integration of the sensor into the PLC, the welding process will only start if the pre-defined parameters are correct.



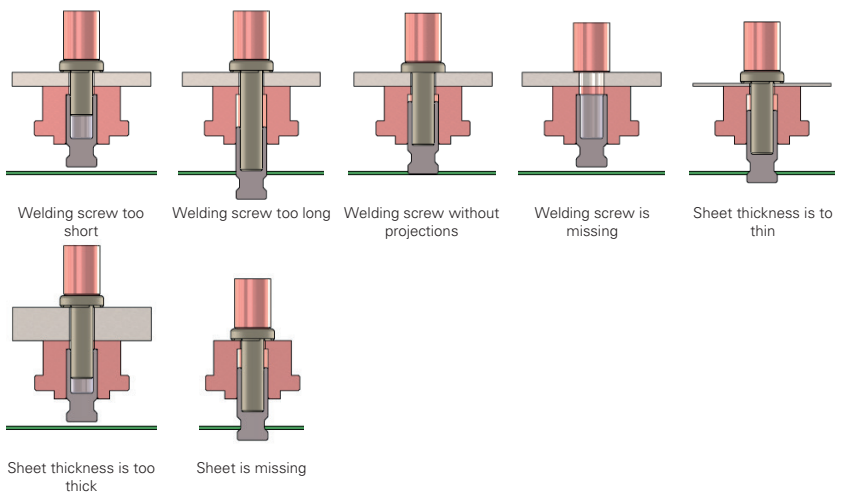
4.3.2.1 DETECTABLE PROCESS DEVIATIONS N300

The following process errors, amongst others, are avoidable with the ModulMaster N300 sensor technology:

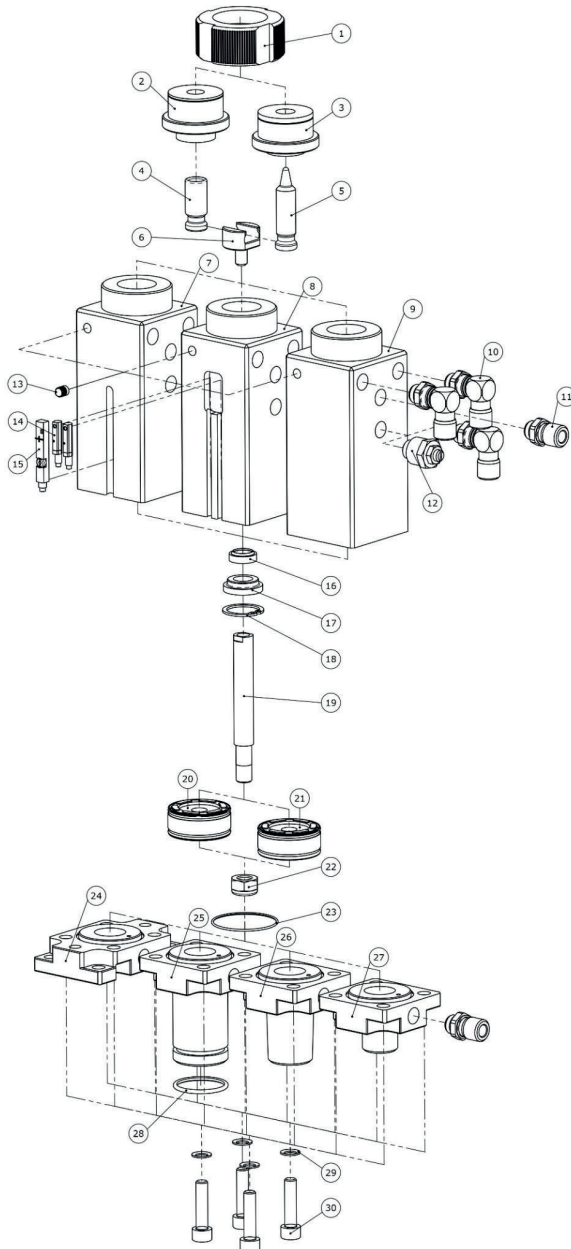


4.3.2.2 DETECTABLE PROCESS DEVIATIONS S300

The following process errors, amongst others, are avoidable with the ModulMaster S300 sensor technology:



4.4 PARTS



Item	Designation	Article No.	Notes
(1)	Union nut	1703301456	
(2)	Change electrode S	<i>various</i>	Custom parts
(3)	Change electrode N	<i>various</i>	
(4)	Centering sleeve	<i>various</i>	
(5)	Centering pin	<i>various</i>	
(6)	Piston rod attachment	1703301213	
(7)	Cylinder housing 300	1705300037	Clean the surface of the electric current and use contact grease compound
(8)	Cylinder housing 200	1705300040	
(9)	Cylinder housing 100	1705300039	
(10)	Elbow push connector	1116300003	
(11)	Straight push connector	1116300002	
(12)	Valve	1705300041	
(13)	Sealing plug	1703Y62987	
(14)	Sensor 200	1119Z71259	Note user manual from manufacturer
(15)	Sensor 300	1115300003	
(16)	Cylinder seal	1123300003	Pay attention to the installation position
(17)	Slide bearing	1123300007	
(18)	Circlip Ø 20 x 1 mm	1703301427	
(19)	Piston rod	1703301425	Use an insertion aid and piston grease
(20)	Piston 100	1703301561	Use piston grease
(21)	Piston 200 + 300	1703301066	
(22)	Lock nut M8	1703301426	Note maximum tightening torque
(23)	O-ring Ø 32 x 1 mm	1123300006	Grease O-ring
(24)	Connection plate with four bores for M6 screws	1705300042	Use contact grease compound
(25)	Connection plate Ø 28 mm, shaft length 40 mm	1705300043	
(26)	Connection plate MK3, shaft length 30 mm	1705300044	
(27)	Connection plate M18 x 1.5 thread, length 14 mm	1705300036	
(28)	O-ring Ø 24 x 2 mm	1123ZK16436	Grease O-ring
(29)	Lock washer	1703301459	
(30)	Cylinder screw M6 x 25 mm	1703Y71558	Note maximum tightening torque

5 INSTALLATION

This chapter revolves around the commissioning of the ModulMaster. Please pay attention to the instructions to prevent any dangers and damages.

ATTENTION

Keep the device dry and clean!

Excessive contamination and corrosion can reduce performance and lifetime of the welding device.

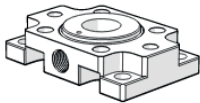
5.1 PREPARATION OF THE ELECTRIC CURRENT CONTACT SURFACE

Before assembly, the electric current contact surface needs cleaning. The surfaces must be clean and free from oil, dirt and any other contaminations or the resistance will increase during electric current transmission. Oil residue on the hands is about enough to increase the resistivity and consequentially the temperature on the electric current transmission.

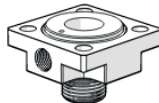
Furthermore, we advise you to roughen the contact surfaces slightly with a fine cleaning fleece and to clean afterwards with a suitable solvent or compressed air. In addition, you should use contact grease compound between all the units of the contact plates. We listed some product recommendations in section 6.1.4.

5.2 ASSEMBLY OF THE MODULMASTER

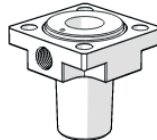
Depending on the customer's request, the welding device comes with different connection plates. See the standard product range below.



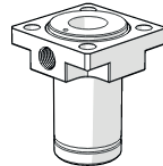
Connection plate with four bores for M6 screws
(Art. No. 1705300042)



Connection plate M18 x 1.5 thread, length 14 mm
(Art. No. 1705300036)



Connection plate MK3, shaft length 30 mm
(Art. No. 1705300044)



Connection plate Ø 28 mm, shaft length 40 mm
(Art. No. 1705300043)

ATTENTION

Clean the contact surfaces and use contact grease compound!

To protect the device from heat damage, clean the contact surfaces thoroughly and assemble quickly.



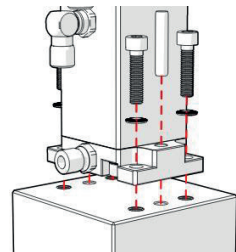
In case of special solutions, the user must provide a transfer service and thus possible risks must be taken into account.

5.2.1 ASSEMBLY OF THE CONNECTION PLATE (ART. NO. 1705300042)

- Use four M6 screws with suitable lock washers (each stainless steel) to place the device into the welding machine.
- If desired, you can center the welding device with two cylindrical pins (stainless steel) on the installation surface.

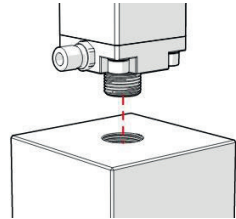


Screws, lock washers, centering pins and cleaning supplies are not included in the scope of delivery.



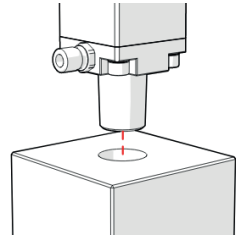
5.2.2 ASSEMBLY OF THE CONNECTION PLATE (ART. NO. 1705300036)

- Screw the welding device into the welding machine.



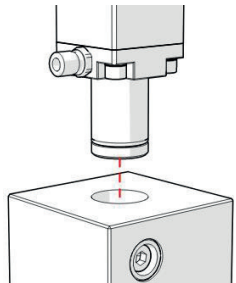
5.2.3 ASSEMBLY OF THE CONNECTION PLATE (ART. NO. 1705300044)

- Integrate the welding device into the welding machine with the morse taper.



5.2.4 ASSEMBLY OF THE CONNECTION PLATE (ART. NO. 1705300043)

- Integrate the welding device into the welding machine with the fitting cylinder.
- Lock the device with the compression fitting.



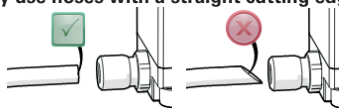
5.3 SUPPLY LINES

On every welding device you will find a schematic connection diagram inscribed. The connections are described in section 4.2.

Protect the supply lines from weld spatter and heat!

Only use hoses with a straight cutting edge!

CAUTION



Prevent bending of the supply lines!

ATTENTION

Check the correct position of the hoses!

To ensure that the hose snaps securely into the hose connection, pull the hose back slightly after installation and check the tightness.

5.3.1 COOLING SYSTEM

Medium: Cooling water

Water temperature: +15 to +35 °C

Flow rate: 80 to 120 L/h

Hose: Suitable for cooling water with an outer diameter of 6 mm

Do not exceed the maximum water temperature!

In order to ensure sufficient cooling of the welding device, do not exceed the maximum water temperature of 35 °C.



CAUTION

Do not fall below the minimum flow rate!

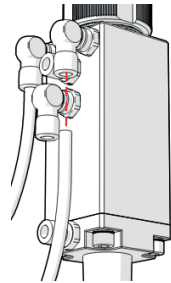
In order to ensure sufficient cooling of the welding device, do not fall below the minimum flow rate of 80 L/h.

5.3.1.1 ASSEMBLY OF THE COOLING WATER PIPING

- Insert the hoses into the push connectors of the cooling system as deep as possible.



You can choose which of the two connections forms the inlet or outlet.



5.3.2 CLEANING SYSTEM

Medium: Compressed air

Operating pressure: Process-dependent (recommendation: 2 to 6 bar)

Compressed air quality: Clean, dry and free of contaminations (ISO 8573-1:2010 [7:4:4])

Hose: Compressed air line with an outer diameter of 6 mm



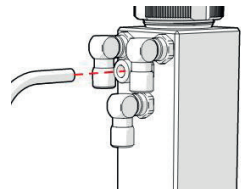
Always use properly prepared compressed air!



The amount of compressed air for the cleaning system is highly process-dependent, regulate individually. The intention of the cleaning air is to prevent the ingress of dirt particles and the adhesion of welding spatters and can act as another cooling system.

5.3.2.1 ASSEMBLY OF THE CLEANING AIR LINES

- Insert the hoses into the push connectors of the cleaning system as deep as possible.



5.3.3 PNEUMATIC SUPPLY

Operating pressure: 2 to 4 bar

Compressed air quality: Clean, dry and free of contaminations (ISO 8573-1:2010 [7:4:4])

Hose: Compressed air line with an outer diameter of 6 mm

CAUTION

Do not exceed the operating pressure!

If the operating pressure is too high, the abrasion of the installed components increases, which leads to a premature failure of the welding device and can be a danger to the person operating.

ATTENTION

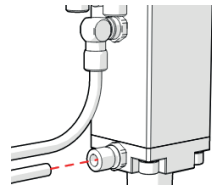
Always use properly prepared compressed air!



Depending on the design and application of the ModulMaster, the operating pressure may vary within the specified range.

5.3.3.1 ASSEMBLY OF THE COMPRESSED AIR LINE

- Insert the hoses into the push connectors of the pneumatic system as deep as possible.



5.3.4 SENSORS (ONLY N200, N300 AND S300)

Each ModulMaster, which is equipped with a sensor, is supplied with the original product-accompanying information of the sensor manufacturer – the user manual of the ModulMaster does not replace these. In these documents, you can find important information about installing the sensors.

ATTENTION

Please note the product-accompanying information for your sensor!

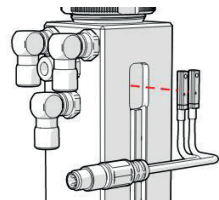
Protect the sensor, cable including, from weld spatter and heat!



In some applications, it makes sense to install the sensors upside down (the other way around than shown in the pictures).

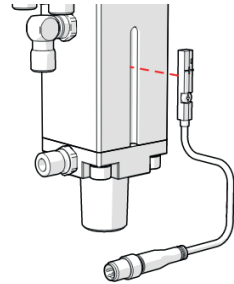
5.3.4.1 ASSEMBLY OF THE SENSOR 200 (N200 WITH POSITION DETECTION)

- Push both sensors into the C-slots of the cylinder housing via the cutout.
- Roughly, fix the sensors over the clamping screws.
- Connect the cable.
- Align the sensors with your measuring range.
- Secure the sensors against slipping with the clamping screw.



5.3.4.2 ASSEMBLY OF THE SENSOR 300 (N300 AND S300 WITH MEASURING SYSTEM)

- Slide the sensor into the T-slot of the cylinder housing.
- Roughly fix the sensor over the clamping screw.
- Connect the cable.
- Align the sensor with your measuring range.
- Secure the sensor with the clamping screw to prevent slipping.



5.4 FUNCTION TEST

After integration of the welding device into the welding machine run a function test. Chapter 8 lists common errors and suggested solutions.

6 MAINTENANCE

6.1 GENERAL

6.1.1 MAINTENANCE INTERVALS

The maintenance of the device should happen no later than after 500,000 movement cycles or after three months. This includes inspection of the installed components, as well as cleaning and greasing. If you notice any damages, replace the corresponding components with original spare parts (see section 4.4). Furthermore, if you notice any performance loss, an increasing air consumption or increasing noise emission you should assemble a new wearing parts kit (see chapter 7).

Also, check the welding device regularly on any outer damage and the supply lines on leakage.

ATTENTION Continuously monitor the operating cycle and wearing parts!

6.1.2 CLEANING

Keep the device always clean during operating. Do not use any cleaning agents that corrodes the materials, especially copper and brass.

For external cleaning, we recommend blasting the device with dry ice.

6.1.3 TOOLS

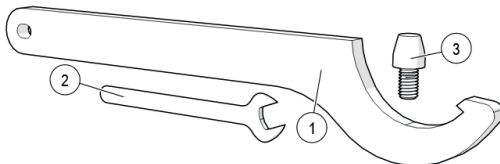
- 13 mm open-end wrench
- 15 mm open-end wrench
- 5 mm allen wrench
- Circlip pliers
- Screwdriver
- Pin punch
- Soft-faced hammer

6.1.4 INSTALLATION AIDS

- Threadlocking adhesive, high strength | Recommendation: LOCTITE 278
- Contact grease compound | Recommendation: PFISTERER P1 001531531
- Piston grease | Recommendation: FESTO Lub-KB 1
- Silicone grease | Recommendation: LOCTITE LB 8104
- Cleaning fleece | Recommendation: 3M Scotch-Brite™ CF ultrafine

6.1.5 SPECIAL TOOLS

Upon working with the ModulMaster, you need the following special tools, which are included in the scope of supply:



Item	Designation
(1)	Hook wrench
(2)	8 mm open-end wrench
(3)	Insertion aid

6.2 MAINTENANCE AND CARE



Disconnect the device from all sources of energy!

Before installation, maintenance or repair ensure the disconnection of the welding device from all sources of energy including electric current, compressed air and cooling water.



Protect yourself from burns!

It is possible, depending on the requirements and cycle time, that the upper part, especially the change electrode, may reach temperatures way over 100°C. Wear heat-protective gloves.

Use original spare parts exclusively!

Chapter 7 and section 4.4 lists valid components for the welding device.

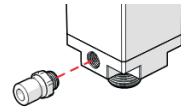
6.2.1 HOSE CONNECTION/VALVE

Disassembly

- Unscrew the hose-connection/valve with a 13 mm open-end wrench from the cylinder housing.

Assembly

- Screw the hose-connection/valve into the cylinder housing with a 13 mm open-end wrench.



Remove the supply lines!

Remove the supply lines before starting. To do so, push the release sleeve in direction of the ModulMaster and pull the supply lines.



Note maximum tightening torque!

The maximum tightening torque for the hose-connections and valve is 7 Nm.

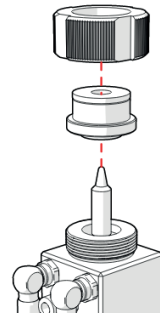
6.2.2 CHANGE ELECTRODE

Disassembly

- Unscrew the union nut with the hook wrench (see section 6.1.5).
- Lift the change electrode from the housing.

Assembly

- Clean the current contact surfaces (see section 5.1)
- Put the change electrode onto the housing.
- Put the union nut over the change electrode and tighten it by hand.



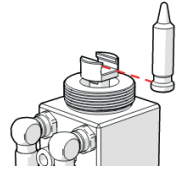
6.2.3 CENTERING PIN/CENTERING SLEEVE

Disassembly

- Bring the piston unit to the maximum extend position.
- Pull the centering pin/centering sleeve sideways out of the piston rod attachment.

Assembly

- Bring the piston unit to the maximum extend position.
- Push the centering pin/centering sleeve sideways into the piston rod attachment.
- Push the piston unit downwards so that the pin remains fixed by the cylinder housing.



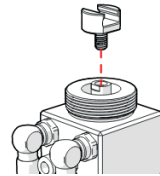
6.2.4 PISTON ROD ATTACHEMENT

Disassembly

- Secure the piston rod with the 8 mm open-end wrench (see section 6.1.5) against rotation and unscrew the piston rod attachment with a 15 mm open-end wrench.

Assembly

- Remove any threadlocking adhesive residuals.
- Apply threadlocking adhesive onto the thread (see section 6.1.4).
- Secure the piston rod with the 8 mm open-end wrench (see section 6.1.5) against rotation and screw the piston rod attachment onto the piston rod with a 15 mm open-end wrench.



ATTENTION

Note maximum tightening torque!

The maximum tightening torque for the piston rod attachment is 3 Nm.

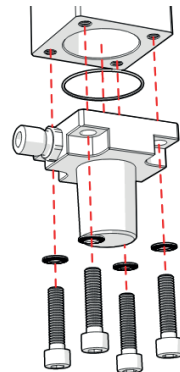
6.2.5 CONNECTION PLATE

Disassembly

- Unscrew the screws with a 5 mm allen wrench.
- Remove the lock washers.
- Lift the connection plate from the housing.
- Remove the O-ring from the connection plate.

Assembly

- Grease the O-ring with silicone grease (see section 6.1.4) and put it over the nozzle of the connection plate.
- Clean the current contact surfaces (see section 5.1).
- Screw the connection plate onto the housing with the screws and lock washers by using the 5 mm allen wrench.



ATTENTION

Note maximum tightening torque!

The maximum tightening torque for the screws is 6 Nm.

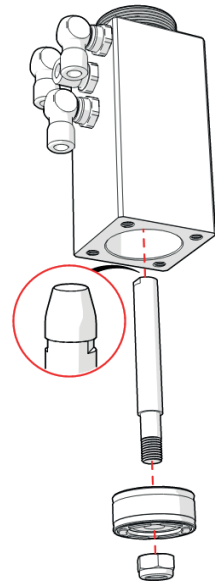
6.2.6 PISTON UNIT

Disassembly

- Push the piston unit downwards out of the housing.
- Secure the piston rod with the 8 mm open-end wrench (see section 6.1.5) against rotation and remove the locknut from the piston rod with a 13 mm open-end wrench.
- Remove the piston from the piston rod.

Assembly

- Put the piston onto the piston rod.
- Secure the piston rod with the 8 mm open-end wrench (see section 6.1.5) against rotation and screw the locknut onto the piston rod with a 13 mm open-end wrench.
- Screw the insertion aid (see section 6.1.5) into the piston rod.
- Clean the cylinder housing and, if needed, the piston unit.
- Grease the cylinder housing and the piston unit with piston grease (see section 6.1.4).
- Put the piston unit into the cylinder housing and keep in mind not to fold down the sealing lips.
- Place the piston unit in the maximum extend position and remove the insertion aid.



Note maximum tightening torque!

The maximum tightening torque for the locknut is 15 Nm.

ATTENTION

Use the insertion aid!

Use the insertion aid so you do not damage the cylinder sealing.

Do not use any sharp objects!

Make sure not to damage the cylinder sealing and sealing lips.

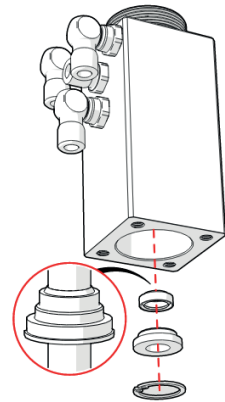
6.2.7 SEALING PACKAGES

Disassembly

- Remove the circlip with the circlip pliers.
- Push the plain bearing down with a pin punch or a soft-end hammer from the housing.
- Remove the cylinder sealing from the cylinder housing.

Assembly

- Clean the internal surfaces of the cylinder housing with a cloth or compressed air.
- Insert the cylinder sealing into the cylinder housing. Make sure that the seal sits correctly.
- Press the bearing into the hole as deep as possible.
- Insert the lock washer into the cylinder housing.



Replace the bearing and the cylinder sealing after disassembly!

Once used, replace the bearing and cylinder sealing (see chapter 7).

Make sure that the cylinder sealing sits correctly!

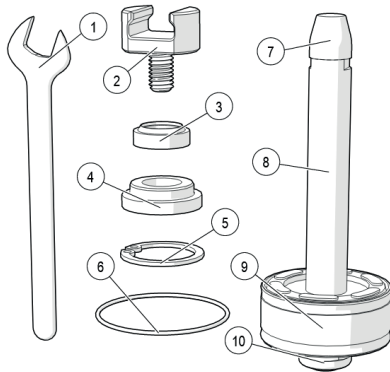
The grease reservoir of the cylinder sealing (gap) must point downwards in direction of the piston.

ATTENTION

Do not use any sharp objects!

Make sure not to damage the cylinder sealing and bearing during assembly.

7 SPARE PARTS



7.1 SPARE PART KIT MODULMASTER N100 (ART. NO. 7910300000)

Item	Designation	Article No.	Quantity	Notes
(1)	8 mm open-end wrench	1703301458	1	
(2)	Piston rod attachment	1703301213	1	
(3)	Cylinder sealing	1123300003	1	
(4)	Bearing	1123300007	1	
(5)	Lock washer	1703301427	1	Ø 20 mm x 1 mm
(6)	O-ring	1123300006	1	Ø 32 mm x 1 mm
(7)	Insertion aid	1703301643	1	
(8)	Piston rod	1703301425	1	
(9)	Piston 100	1703301561	1	Piston without magnet
(10)	Lock nut	1703301426	1	M8

7.2 SPARE PART KIT MODULMASTER N200, N300, S300 (ART. NO. 7930300000)

Item	Designation	Article No.	Quantity	Notes
(1)	8 mm open-end wrench	1703301458	1	
(2)	Piston rod attachment	1703301213	1	
(3)	Cylinder sealing	1123300003	1	
(4)	Bearing	1123300007	1	
(5)	Lock washer	1703301427	1	Ø 20 mm x 1 mm
(6)	O-ring	1123300006	1	Ø 32 mm x 1 mm
(7)	Insertion aid	1703301643	1	
(8)	Piston rod	1703301425	1	
(9)	Piston 200 + 300	1703301066	1	Piston with magnet
(10)	Lock nut	1703301426	1	M8

8 TROUBLESHOOTING

Error	Possible cause	Solution
Irregular movement of the piston unit (Centering pin/sleeve is jerking)	Missing grease	Grease the cylinder pipe and the piston unit with piston grease (see section 6.2.6)
	Contaminated piston rod	Clean and grease the piston rod (see section 6.2.6)
	Compressed air flow too low	Increase the operating pressure (see section 5.3.3)
	Defect cylinder sealing	Exchange the sealing package (see section 6.2.7)
	Supply lines are bent	Use bend-free supply lines (see section 5.3)
Loud bang while extending the piston unit	Too much compressed air in the pneumatic supply	Reduce the operating pressure (see section 5.3.3)
Increased noise emission through the compressed air supply	Improper cutting edge of the supply line	Use supply lines with straight cutting edge (see section 5.3)
	Supply line not locked into place	Pull the supply line to lock it in (see section 5.3)
	O-ring of the connection plate defect	Replace O-ring of the connection plate (see section 6.2.5)
	Cylinder sealing defect	Replace the sealing package (see section 6.2.7)
	Too much compressed air in the pneumatic supply	Reduce the operating pressure (see section 5.3.3)
	Compressed air of cleaning system too high	Reduce the operating pressure (see section 5.3.2)
Water leakage	Improper cutting edge of the supply line	Use supply lines with straight cutting edge (see section 5.3)
	Supply line not locked into place	Pull the supply line to lock it in (see section 5.3)

Error	Possible cause	Solution
Rapid heating of the ModulMaster	Water cooling turned off, defect or leaky	Turn on the water cooling and check the supply lines (see section 5.3)
	Cooling water flow rate too low	Increase flow rate (see section 5.3.1)
	Cooling water temperature too high	Reduce cooling water temperature (see section 5.3.1) or cycle time while welding
	Current contact surface contaminated	Clean the current contact surface (see section 5.1)
Heating of the connection plate	Current contact surface contaminated	Clean the current contact surface (see section 5.1)
Discoloration of the ModulMaster	Corrosion	Keep the ModulMaster dry and clean (see section 6.1.2 and 10)
Discoloration of the connection plate	Current contact surface contaminated	Clean the current contact surface (see section 5.1)

9 DECOMMISSIONING

Before removing the welding device make sure it has cooled down to room temperature. Disconnect all supply lines from the ModulMaster and disassembly the welding device from your resistance-welding machine.

⚠ DANGER**Disconnect the device from all sources of energy!**

Before installation, maintenance or repair ensure the disconnection of the welding device from all sources of energy including current, compressed air and cooling water.

⚠ CAUTION**Protect yourself from burns!**

It is possible, depending on the requirements and cycle time, that the upper part, especially the backup electrode, may reach temperatures way over 100 °C. Wear heat-protective gloves.

ATTENTION**Keep the device dry and clean!**

Excessive contamination and corrosion can reduce performance and lifetime of the welding device.

Carefully transport the welding device!

During transportation keep the ModulMaster dry and clean and protect the device from thermal or mechanical damage.

9.1 STORAGE

Keep the ModulMaster in a clean and dry place and protect it from thermal and mechanical damage.

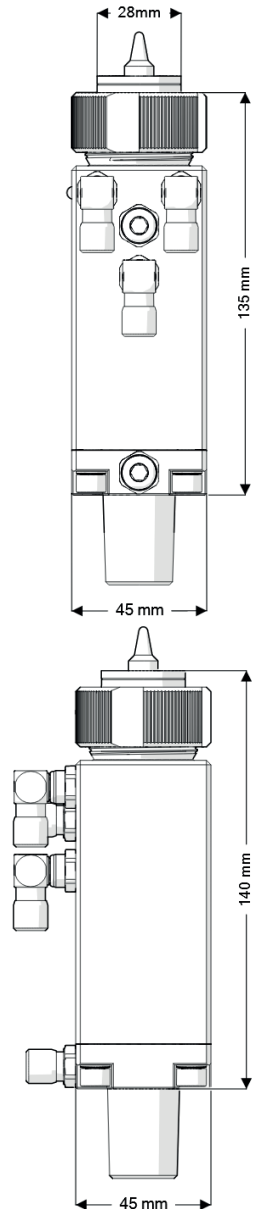
For further information on the environmental conditions, see chapter 10.

9.2 DISPOSAL

Disassembly the ModulMaster (see section 6.2) and dispose the components accordingly.

10 TECHNICAL DATA

Product name :	ModulMaster
Product variants:	N100, N200, N300 and S300
Serial number:	SN XXXXXX-X (see inscription on housing)
Year of construction:	Since 2019
Product type:	Welding device for resistance-welding machines
Machine type:	Incomplete machine (Directive 2006-42-EG)
Manufacturer:	DOCERAM GmbH Hesslingsweg 65-67 44309 Dortmund (Germany)
Height:	about 140 to 180 mm (Centering pin excluded)
Width:	about 45 to 69 mm
Depth:	about 61 to 66 mm
Weight:	about 1,800 to 2,200 g
Noise emission:	≤ 75 dB
Operating temperature:	+5 °C to +40 °C (ambient temperature)
Operating humidity:	≤ 90 % (relative humidity)
Transportation temperature:	-25 °C to +55 °C (ambient temperature)
Storage humidity:	≤ 75 % (relative humidity)
Storage period:	≤ 1 Year
Storage temperature:	0 °C to +40 °C
Lifespan:	about 7 Years (strongly process- and maintenance-dependent)



DECLARATION OF INCORPORATION**ACCORDING TO ANNEX II PART 1 SECTION B FOR INCOMPLETE MACHINES PURSUANT TO DIRECTIVE 2006/42/EG**The manufacturer,

DOCERAM GmbH
Hesslingsweg 65-67
44309 Dortmund (Germany)

hereby declares, that the applicable basic health and safety requirements according to Annex I of Directive 2006/42/EC for the following incomplete machine

Product name: ModulMaster
Product variants: N100, N200, N300 and S300
Serial number: SN XXXXXXX-X (see inscription on housing)
Year of construction: since 2019
Product type: Welding device for resistance-welding machines

are adhered to.

We furthermore declare that the special technical documents were prepared in accordance with Annex VII B of Directive 2006/42/EG and that this documentation will be transmitted electronically in response to a reasoned request by the national authorities.

The above-mentioned incomplete machine may only be put into operation when the machine, in which the incomplete machine is installed, complies with the provisions of the Directive 2006/42/EG, if the directive applies to this machine.

Document authorization:

Tobias Lars Stuba
DOCERAM GmbH
Hesslingsweg 65-67
44309 Dortmund (Germany)

Dortmund, 27.09.2019

Place, Date



Signature

Dr. Tobias Fürderer
Head of Development



Further technical information about the DOCERAM ModulMaster can be requested at technik@doceram.com or by telephone on +49 231 92 50 25-0.

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