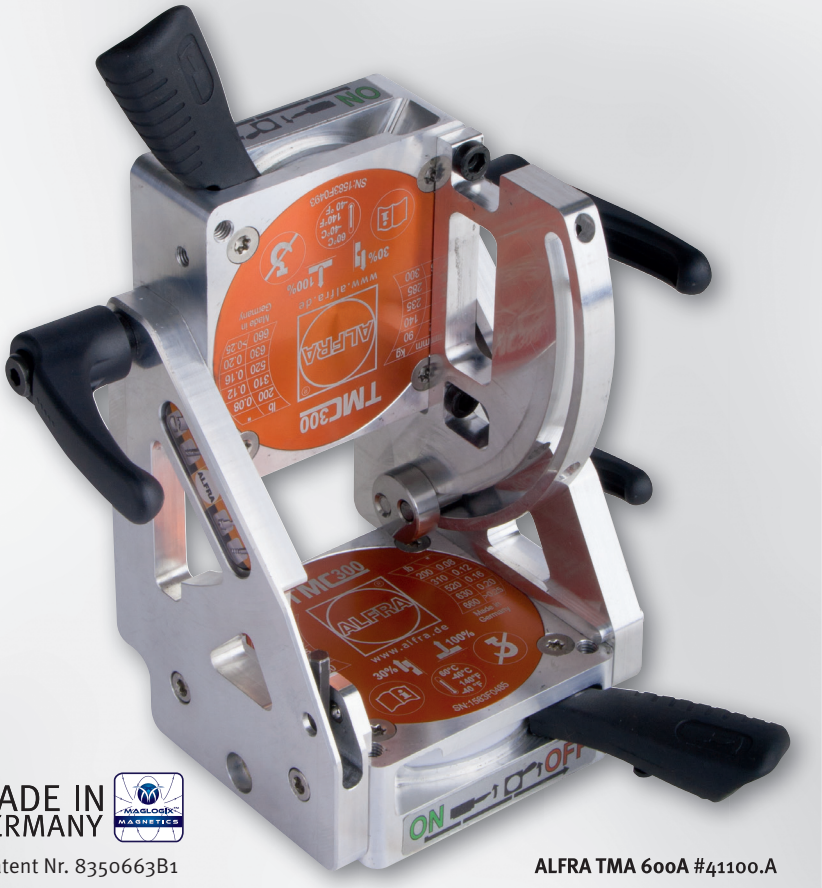
ALFRA TMA 600A

Passion for Tools

DE VARIABLER SCHWEIßWINKEL
EN ADJUSTABLE WELDING ANGLE
FR ANGLE AJUSTABLE DE SOUDAGE
ES ÁNGULO DE SOLDADURA VARIABLE
NO JUSTERBAR SVEISEVINKEL



MADE IN GERMANY

US Patent Nr. 8350663B1

ALFRA TMA 600A #41100.A

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OPERATION MANUAL | MODE D'EMPLOI | MANUAL DE INSTRUCCIONES | BRUKSANVISNING

EN

Dear customer,
Thank you for purchasing an ALFRA product. Please read these operation instructions closely before using your device for the first time and keep them along with the enclosed Product Control Card for later reference.

SAFETY INSTRUCTIONS

Danger can occur when using extremely strong magnetic clamps due to improper handling and/or poor maintenance, which may cause serious accidents with fatal physical injuries. Please observe all safety instructions of this operation manual and contact the manufacturer if you have any questions.

Important:

- stability and safe hold do not occur on round or arched surfaces
- use the magnetic clamp preferably on plane surfaces
- full performance is only reached when using the entire magnetic surface
- cavities or drilled holes underneath the surface reduce the magnetic holding force
- fixing several work pieces on top of each other decreases the holding force significantly
- ensure that the lever springs back strongly during work on thin materials

Always...

- activatethemagnetic clamp completely
- activate the magnetic clamp on metallic, ferromagnetic materials
- clean the magnetic surface and keep it clear of dirt, chips and welding spatter
- set the magnet clamp down gently to prevent damage to the magnetic surface
- respect the stated maximum breakaway force
- inspect the magnetic surface and the entire magnetic clamp for damage
- follow the instructions in this operating manual
- instruct new operators in the safe use of switchable magnetic clamps
- respect local and country-specificguidelines on handling magnetic tools
- keep and use in a dry environment

Never...

- exceed the stated maximum load
- use the magnet to position objects above people or walking paths without using additional safeguards
- use the magnetic clamp to lift or transport loads
- use the magnetic clamp to support, lift or transport persons
- switch the magnetic clamp off before setting down all work pieces in a safe end position
- modify the magnetic clamp or remove operating labels
- use the magnetic clamp if damaged or missing parts
- strain the underside of the magnet through heavy impact or blows
- use the magnetic clamp without having been properly instructed
- use if you have not read and understood these operating instructions completely
- place fingers or any other body part between the magnetic surface and the work piece because there is a risk of injury
- operate in temperatures higher than 60°C (140°F)
- expose to corrosive substances

People using pacemakers or other medical devices should not use this magnetic clamp until they have consulted with their physician.

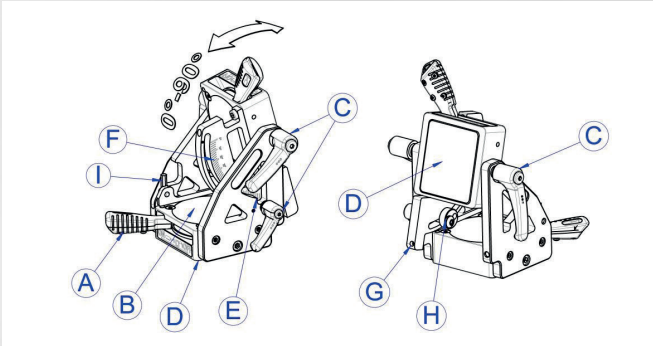
PROPER USE

The adjustable welding angle with TMC 300 magnetic clamp is a unit equipped with two switchable magnetic clamps, which is designed to position and to align different ferromagnetic, metallic work pieces to each other. It may only be used according to its technical data and determination. Proper use includes adherence to the start-up, operating, environment and maintenance conditions specified by the manufacturer. The user bears sole responsibility for understanding the operating manual as well as for proper use and maintenance of the adjustable welding angle with magnetic clamp TMC 300.

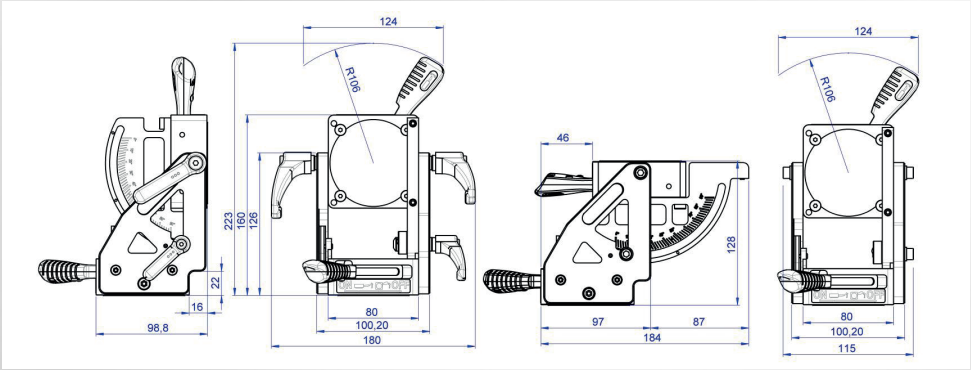
DEVICE DESCRIPTION

The adjustable welding angle consists of two TMC 300 magnetic clamps (B), whose angle to each other can be modified according to desire and application. Any angle between 0° and 90° can be adjusted exactly at the read- out point (E) and fixed by means of the angle scale (F). All 3 clamping levers (C) must be opened and/or tightened to adjust and fix the angle. For use in small, cramped installation spaces the clamping levers can be replaced by the enclosed mild steel screws and fixed with the insertable Allen key (I).

The TMC (Thin Material Clamper) is a switchable magnetic clamp with manual actuation for attachment to ferromagnetic materials. The magnet can be activated by pushing the activation lever (A) into the ON position until it audibly latches into place. The installed permanent magnet generates a magnetic field in the lower magnetic plate area (D). Owing to the special design of the TMC 300, this magnetic field is very compact and develops excellent adhesive force especially on thin materials of less than 10 mm. The activation lever must be lifted slightly at its end and returned by 60° into the OFF position in order to deactivate the magnet.Care must be taken that the lever springs backstrongly when working on thin materials.



A) Activationleverformagnet
B) TMC 300 Magneticclamp
C) Clampingleverforrotation
D) Magneticsurface
E) Read-out point for angle scale
F) Angle scale
G) 90° end stop
H) Clampingwasher
I) Allen key 5mm

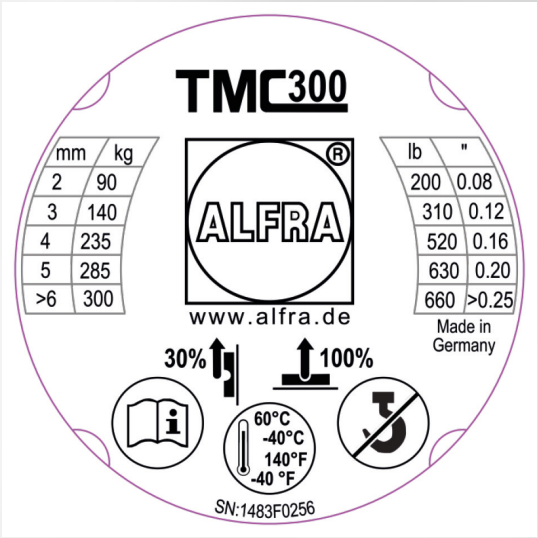


TECHNICAL DATA

Prod.-No.	**41100.A**	
Designation	Adjustable welding angle	
Breakaway force: (at 0° inclination to the load)	per TMC ›300 kg on 6 mm S235	›660 lbs on 0.25" AISI CRS 1020
Max. load-bearing capacity: (at 90° inclination of the load)	30% of the breakaway force	30% of the breakaway force
Max. load-bearing capacity: (at 90° inclination of the load)	per TMC 100 kg on 6 mm S235	220 lbs on 0.25“ AISI CRS 1020
Dead weight of the unit	2.75 kg	6.1 lbs
Storage temperature	-30°C to +60°C	-22°F to +140°F
Operating temperature	-30°C to +60°C	-22°F to +140°F

MARKINGS ON THE MAGNETIC CLAMP

Detailed descriptions for handling and operating conditions of the TMC 300 can be found on the upper side of the magnetic clamp. This labeling must not be modified, damaged or removed. New labels must be ordered from the manufacturer if necessary.



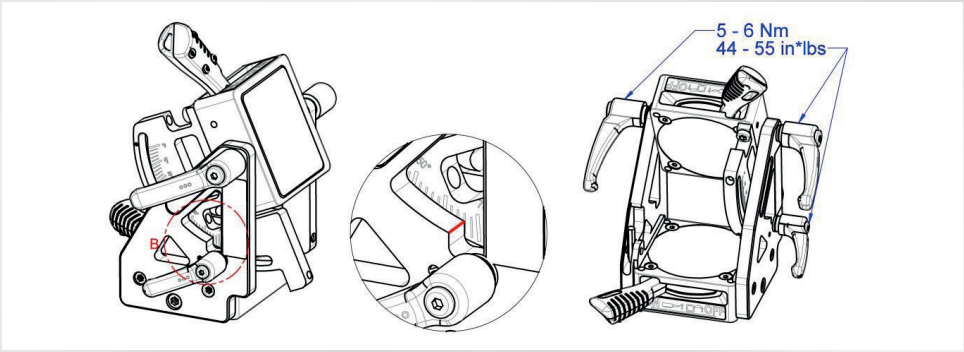
Laser marking incl. serial number on the upper side of the cap

Prod.-No.: 189414246
Sticker “Safety instructions”

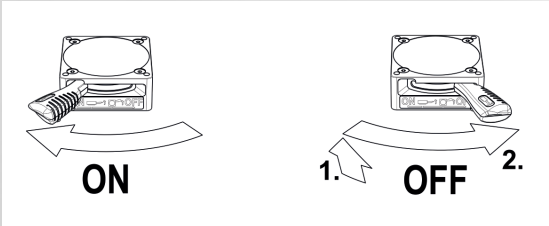
START-UP

You have received a pre-assembled adjustable welding angle and a detailed operating manual.
Please check the condition of the goods upon receipt for any damage incurred during transport, and make sure the delivery is complete. If you have any problems, please contactthemanufacturerimmediately.

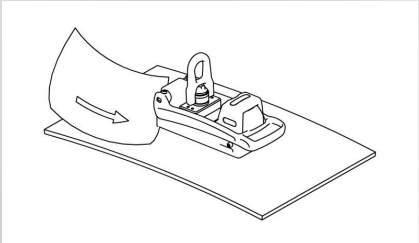
1. Follow the safety instructions. Clean the workpiece and the lower magnetic plate of the switchable magnetic clamp.
2. Release all three clamping levers. Adjust the angle of the magnets to each other according to the desired application. Now tighten the three levers again with ca. 5-6 Nm to fix the assemblies in place.



3. Place the magnetic clamp into the desired position or put the work piece onto the magnetic surface. The magnetic clamp is slightly magnetized in order toassist positioning the magnet and the work piece.
4. Align the work piece and the magnet according to the desired application.
5. Turn the activation lever by 60° into the ON position until it audibly latches into place (with a slight tilting).
6. Check the secure and strong hold of the magnet and the work piece depending on application.
7. After the load has been set down completely and safely, you can deactivate the magnetic clamp. To do this, push the activation lever at its far end upwards (1.) and move it into the OFF position (2.).



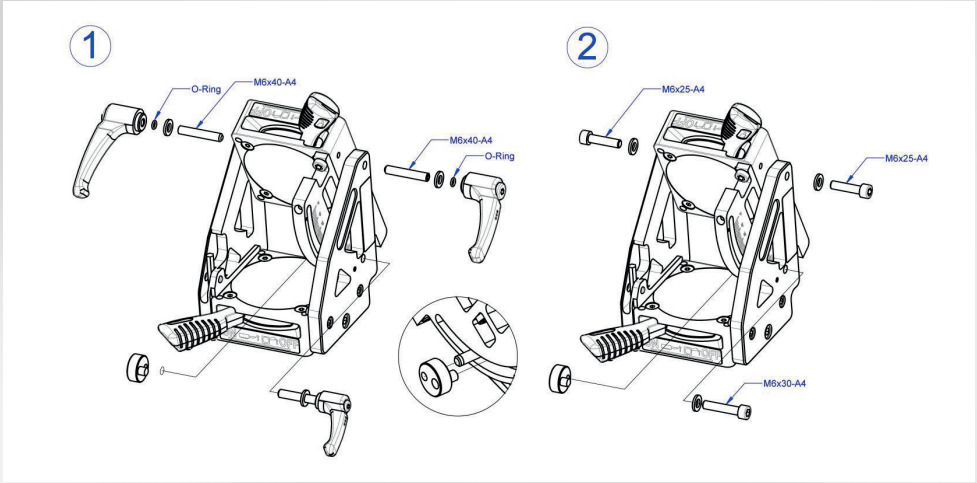
During each application, watch for any deformation of the work piece that might occur. If a small distance (air gap) forms between the magnetic surface and the work piece, the magnetic clamp will not reach the stated holding force and could detach itself. Please check for any air gap developing at the edges of the TiN-coated magnetic surface if necessary (e.g. with a sheet of paper; 80g/m²).



Immediately stop the application if there is any excessive deformation of the work piece or if an air gap occurs.

Never exceed the dimensions and/or the load-bearing capacity of the values given in table 2 (page 16).

MOUNTING OPTIONS (1) WITH CLAMPING LEVERS AND (2) WITH CLAMPING SCREWS



MAINTENANCE AND INSPECTION OF THE MAGNETIC CLAMP

Regular maintenance and inspections are necessary to ensure the safe use of the switchable magnetic clamp. Furthermore, country-specific standards and regulations must be observed depending on application.

The maintenance intervals are classified according to the recommended schedule.

Before every use...
- visually inspect the magnet for damage
- clean the surface of the workpiece and the underside of the magnet
- free the underside of the magnet of rust, chips or unevenness

Weekly...
- inspect the magnetic clamp for deformation, cracks or other defects
- make sure the activation lever is working properly and latches correctly into place
- inspect the bottom of the magnet for scratches, pressure points or cracks and have the magnet repaired by the manufacturer if necessary

Monthly...
- check the markings and labelling on the magnet for legibility and damage and replace them if necessary

Annually...
- have the load-bearing capacity of the magnet checked by the supplier or an authorized workshop, should the application so require

Unauthorized repairs or modification to the magnetic clamp are not permitted.
If you have any questions, contact the manufacturer.

BASIC INFORMATION CONCERNING THE HANDLING OF MAGNETIC LIFTING GEAR – IN PARTICULAR TML / TMH / TMC

The magnetic surface is located on the underside of the magnet incorporating multiple magnetic poles which generate the magnetic holding force when activated. The maximum holding force that can be achieved depends on different factors which are explained below:

Material thickness

The magnetic flux of the permanent magnet requires a minimum material thickness to flow completely into the load. Below this minimum thickness of material, the maximum holding force is reduced depending on material thickness. Conventional switchable permanent magnets have a deep penetrating magnetic field similar to the tap root of a tree, and require a large material thickness to achieve maximum holding force. The compact magnetic field of TML, TMH and TMC magnets is similar to a shallow root and achieves maximum holding force even when used on thin materials (see performance data in table 2, page 16).

Material

Every material reacts in a different way to penetration of the magnetic field lines. The breakaway force of the magnet is determined using a low carbon material. Steels with high carbon content or whose structure has been changed by heat treatment have a lower holding force. Foamed or porous cast components also have a lower holding force, so that the given load-bearing capacity of the magnet can be downgraded on the basis of the following table 1.

Table 1

Material	Magneticforce in %
Non-alloyed steel (0.1-0.3% C content)	100
Non-alloyed steel (0.3-0.5% C content)	90-95
Cast steel	90
Grey castiron	45
Nickel	11
Most stainless steels, aluminium, brass	0

Surface quality

The maximum holding force of a permanent magnet can be achieved in case of a closed magnetic circuit in which the magnetic field lines can connect up freely between the poles, thus creating a high magnetic flux. In contrast to iron, for example, air has very high resistance to magnetic flux. If an air gap is formed between the work piece and the magnet, the holding force will be reduced. In the same way, paint, rust, scale, surface coatings, grease or similar substances all constitute a space (i.e. an air gap), between work piece and magnet. Furthermore, an increase in surface roughness or unevenness has an adverse effect on the magnetic holding force. Reference values for your TMC 300 can be found in table 2 (page 16).

Load dimensions

When working with large workpieces such as girders or plates, the load can deform during the application. A large steel plate would bend downwards at the outer edges and create a curved surface which no longer has full contact with the bottom of the magnet. The resulting air gap reduces the maximum load-bearing capacity of the magnetic clamp. Hollow objects or those smaller than the magnetic surface will also result in less holding power being available.

Load alignment

During lateral load ('shear' mode), the holding force of the magnetic clamp decreases dependent upon the coefficient of friction between the two materials.

Temperature

The high-power permanent magnets installed in the magnetic clampwill begin to lose their magnetic properties irreversibly from a temperature of more than 80°C (180°F), so that the full load-bearing capacity is never reached again even after the magnet has cooled down. Please note the specifications on your product and in the operating manual.

DETAILED PERFORMANCE DATA FOR THE SWITCHABLE MAGNETIC CLAMP TMC 300

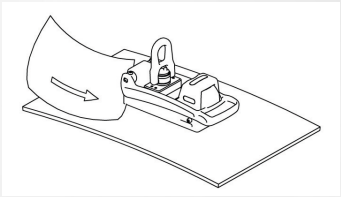
Values shown for the performance of the TMC 300 are based on measurements made on material S235 JR, comparable to AISI 1020 Cold Rolled Steel, for the maximum, vertical breakaway force at 0° deviation from the load axis and additionally under a 90° inclined load. These values do not include any safety factor. The magnetic clamp will detach itself abruptly when the load exceeds values given in table 2.

Table 2

Breakaway force in kg						
Thickness of material	Clean, flat, ground surface		Rusty, slightly scratched surface		Irregular, rusty or rough surface	
	Air gap <0.1 mm		Air gap = 0.25 mm		Air gap = 0.5 mm	
mm	**0°**	**90°**	**0°**	**90°**	**0°**	**90°**
2	90	30	75	25	66	22
3	150	50	120	40	105	35
4	240	80	180	60	135	45
5	285	95	210	70	150	50
>6	300	100	210	70	150	50

Breakaway force in lbs						
Thickness of material	Clean, flat, ground surface		Rusty, slightly scratched surface		Irregular, rusty or rough surface	
	Air gap <0.004 inches		Air gap = 0.01 inches		Air gap = 0.02 inches	
Inches	**0°**	**90°**	**0°**	**90°**	**0°**	**90°**
0,08	198	66	165	55	150	50
0,12	330	110	270	90	225	75
0,16	540	180	390	130	300	100
0,20	630	210	465	155	330	110
>0,25	660	220	465	155	330	110

During each application, watch for any deformation of the work piece that might occur. If an air gap forms between the magnetic surface and the work piece, the magnetic clamp will not reach the stated holding force and could detach itself. Please check for any air gap developing at the edges of the TiN-coated magnetic surface if necessary (e.g. with a sheet of paper; 80g/m²).



Immediately stop the operation if there is any excessive deformation of the work piece or if an air gap occurs.

Never exceed the dimensions and/or the load-bearing capacity of the material thickness given In table 2.