

User manual

TORQUE REACTION ARM

TELESCOPIC CARBON

WITH / WITHOUT POSITION CONTROL

Series: DMF / DMFi / DMF LPC / DMF LAPC



EN

60353-12/20



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REMARKS ABOUT THE MANUAL

Symbols



Information

This warning statement indicates important information (for example: damage), but no hazard.



Caution

This warning statement indicates a low risk that may lead to minor or moderate injuries if not avoided.



Wear personal protection equipment

This symbol indicates the need to wear protective gloves.



Warning

This warning statement indicates a moderate risk that may lead to severe or fatal injuries if not avoided.

Acronyms

DMF: Doga Multi-directional carbon Fiber

LAPC: Length and Angle Posi-Control

LPC: Length Posi-Control

AAPC: 2 x Angle Posi-Control

LS: Long stroke

i: Inverted

1. INFORMATION

1.1 IMPORTANT

The tool supplied with this manual may have been altered to meet specific needs.

If this is the case, when ordering a replacement or spare parts, please indicate the tool item code featured on the delivery document, or contact **DOGAtec at +49 7361 8049950** indicating the approximate delivery date. You will then be sure to get the required tool and/or parts.

1.2 Product reference

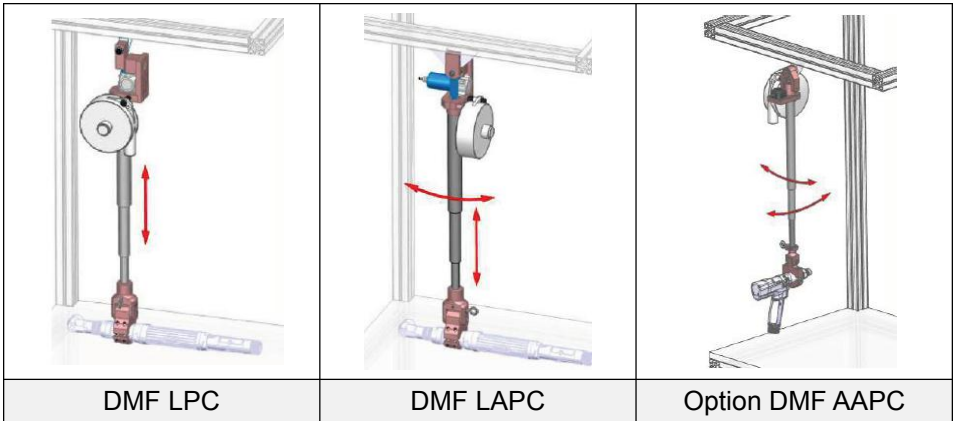
Designation	Telescopic carbon torque reaction arm
Type	DMF DMFi DMF... LPC DMF... LAPC

1.3 General equipment description

DOGA's DMF torque reaction arms are available in several configurations. They are designed to be easily installed on your worktops (vertically or horizontally), and are ideal for multi-directional tightening operations.

The DMF torque reaction arms guarantee a very high flexibility, thanks to the lightness of the carbon, while absorbing the entire reactive torque of the tool. They are used for 3 distinct and complementary functions:

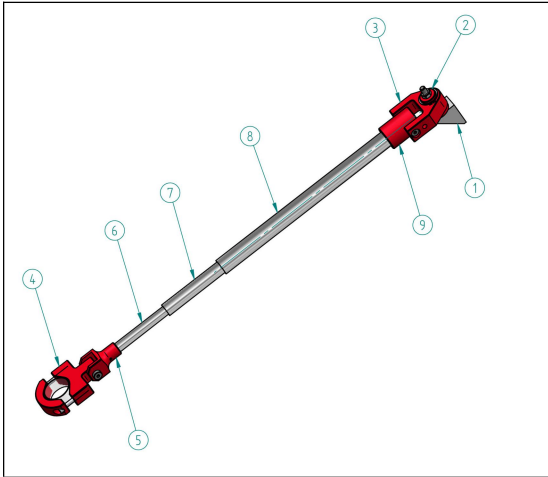
- a) Cancel the torque reaction effect of hand tools with rotary motors such as screwdrivers, drills or tappers. They guarantee the damping of shocks and vibrations delivered by these tools, thus preventing Musculoskeletal Disorders (MSD).
- b) Suspension and balancing of the tools (if vertically mounted).
- c) With encoders mounted (PC version), they are able to maintain position control.



1.4 Standard equipment presentation

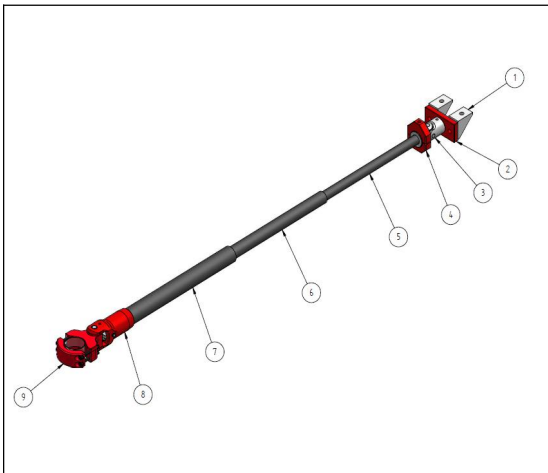
1.4.1 Telescopic torque reaction arm

1.4.1.1 DMF Series



1	Bracket
2	Swivel
3	Back flange
4	Clamp
5	Front flange
6	Carbon rod
7	Intermediate tube
8	Primary tube
9	Mounting sleeve

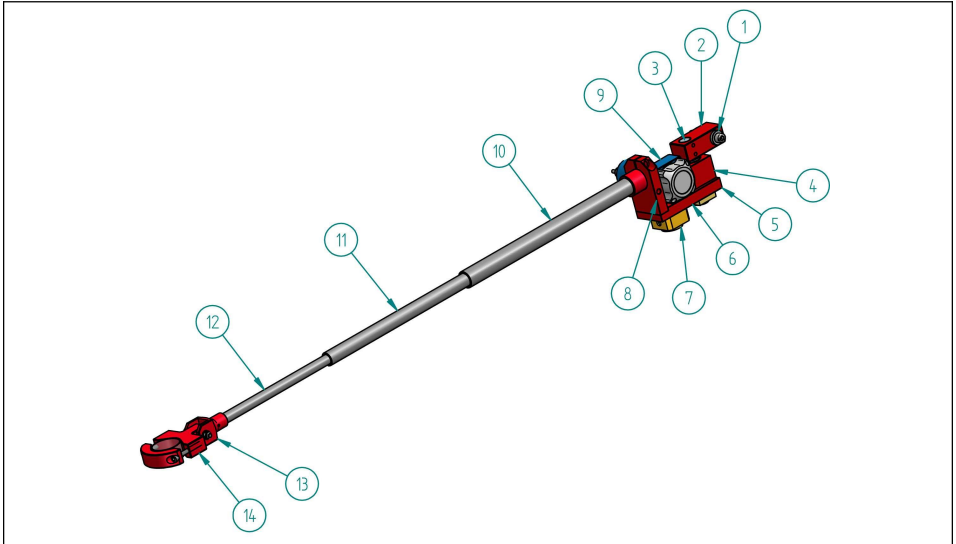
1.4.1.2 DMFi Serie



1	Bracket x 2
2	Mounting plate
3	Cardan
4 *	Balancersupport
5	Rod
6 **	Intermediate tube
7	Front tube
8	Mounting sleeve
9	Clamp

* Delivered with the balancing kit
 ** Except on DMFi 200/300

1.4.2 Telescopic torque reaction arm with position control



		LPC	LAPC
1	Pivot	x 1	x 1
2	Mounting plate n°1	x 1	x 1
3	Encoder axis	x 1	x 1
4	Plate n°2	x 1	x 1
5	Plate n°3	x 1	x 1
6	Angular encoder		x 1
7	Cable junction box		x 1
8	Plate n°4	x 1	x 1
9	Encoder cable	x 1	x 1
10	Primary tube	x 1	x 1
11	Intermediate tube	x 1	x 1
12	Rod	x 1	x 1
13	Flange	x 1	x 1
14	Clamp	x 1	x 1

1.5 Packing list

x 1 - Torque reaction arm

All hardware and wiring are pre-installed.

Designation	Packing dimension L x l x H		Weight with packing	
	(cm)	(in)	(kg)	(lbs)
DMF 05	60 x 12 x 10	2,36 x 0,47 x 0,39	0,80	0.03
DMF 12	59,5 x 11,50 x 10	2.34 x 0.45 x 0.39	0,82	0.03
DMF 12/1500	85,5 x 13,5 x 13,5	3.37 x 0.53 x 0.53	1,28	0.05
DMF 12/2000	95,5 x 13,5 x 13,5	3.76 x 0.53 x 0.53	1,40	0.06
DMF 30	59,5 x 11,50 x 10	2.34 x 0.45 x 0.39	1,18	0.05
DMF 30/1500	85,5 x 13,5 x 13,5	3.37 x 0.53 x 0.53	1,56	0.06
DMF 30/1500 LAPC	106 x 18 x 16,5	4.17 x 0.71 x 0.65	2,84	0.11
DMF 30/2000	96 x 13,5 x 13,5	3.78 x 0.53 x 0.53	1,72	0.07
DMF 30/2500	106 x 18 x 16,5	4.17 x 0.71 x 0.65	2,44	0.10
DMFi 70/1500	85,5 x 13,5 x 13,5	3.37 x 0.53 x 0.53	2,16	0.09
DMFi 70/2000	95,5 x 13,5 x 13	3.76 x 0.53 x 0.51	2,38	0.09
DMFi 70/2500	106,5 x 18 x 17	4.19 x 0.71 x 0.67	2,98	0.12
DMFi 120/1500	85,5 x 13,5 x 13,5	3.37 x 0.53 x 0.53	2,72	0.11
DMFi 120/2000	96 x 13,5 x 13,5	3.78 x 0.53 x 0.53	2,92	0.11
DMFi 120/2500	106,5 x 18 x 17	4.19 x 0.71 x 0.67	3,92	0.15
DMFi 120/3000	154 x 14 x 15	6.06 x 0.55 x 0.59	4,2	0.17
DMFi 200/1500	95,5 x 13 x 14	3.76 x 0.51 x 0.55	3,16	0.12
DMFi 200/3000	200 x 16 x 16	7.87 x 0.63 x 0.63	4,5	0.18
DMFi 300/2000	154 x 14 x 15	6.06 x 0.55 x 0.59	5,5	0.22
DMFi 300/2500			6,5	0.26



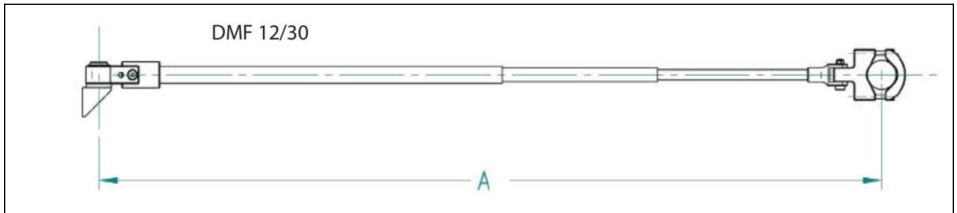
Information

Other models/options, contact us.

1.6 Technical specifications

1.6.1 Telescopic reaction arm specifications

1.6.1.1 Technical characteristics & dimensions of DMF series



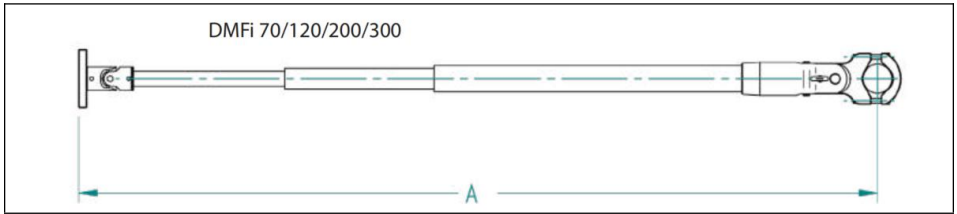
Designation	Torque max (Nm) (lbf.in)		Ø Tools min-max (mm) (in)		Length A min-max (mm) (in)	
	DMF 5/950	5	44	25 - 42 (P1)	0.98 - 1.65	460 - 950
DMF 12/950	12	106	27 - 50 (P1)	1.06-1.97	460 - 950	18.11-37.40
DMF 12/1500					650 - 1500	25.59-59.06
DMF 12/2000					820 - 2000	32.28-78.74
DMF 30/960	30	265	28 - 52 (P1)	1.10-2.05	475 - 960	18.70-37.80
DMF 30/1500					656 - 1500	25.83-59.06
DMF 30/1500 LS					555 - 1500	21.85-59.06
DMF 30/2000					823 - 2000	32.40-78.74
DMF 30/2000 LS					680 - 2000	26.77-78.74
DMF 30/2500					993 - 2500	39.09-98.43
DMF 30/2500 LS					805 - 2500	31.69-98.43



Warning

Never use torque arms beyond listed torque ratings.

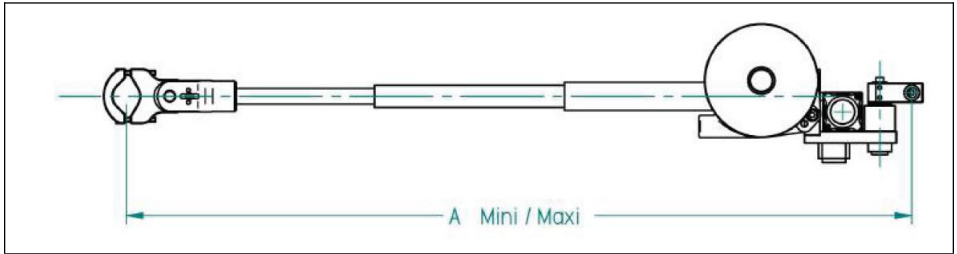
1.6.1.2 Technical characteristics & dimensions of DMFi series



Designation	Torque maxi		Ø Tools min-max		Length A min-max					
	(Nm)	(lbf.in)	(mm)	(in)	(mm)	(in)				
DMFi 70/1500	70	620	35 - 52 (P2)	1.38-2.05	667 - 1500	26.26-59.06				
DMFi 70/2000					833 - 2000	32.80-78.74				
DMFi 70/2500					1000 - 2500	39.37-98.43				
DMFi 70/3000					1330 - 3000	52.36-118.11				
DMFi 100/1500 LS	100	885			35 - 52 (P2)	1.38-2.05	592 - 1500	23.31-59.06		
DMFi 100/2000 LS							717 - 2000	28.23-78.74		
DMFi 100/2500 LS							842 - 2500	33.15-98.43		
DMFi 120/1500	120	1062					35 - 52 (P2)	1.38-2.05	691 - 1500	27.20-59.06
DMFi 120/2000									857 - 2000	33.74-78.74
DMFi 120/2500									1023 - 2500	40.28-98.43
DMFi 120/3000									1347 - 3000	53.03-118.11
DMFi 200/1500	200	1770							Maxi 63 (P2)	2.48
DMFi 200/1500 LS			728 - 1500	28.66-59.06						
DMFi 200/2000			1170 - 2000	46.06-78.74						
DMFi 200/2000 LS			894 - 2000	35.20-78.74						
DMFi 200/2500			1420 - 2500	55.91-98.43						
DMFi 200/2500 LS			1060 - 2500	41.73-98.43						
DMFi 200/3000			1720 - 3000	67.72-118.11						
DMFi 300/1500	300	2655	Maxi 73 (P2)	2.87	970 - 1500	38.19-59.06				
DMFi 300/2000					1220 - 2000	48.03-78.74				
DMFi 300/2500					1470 - 2500	57.87-98.43				
DMFi 300/3000					1720 - 3000	67.72-118.11				

1.6.2 Telescopic reaction arm specifications with encoders

1.6.2.1 Technical characteristics & dimensions



Designation	Torque maxi		Ø Tools min-max		Length A min -max	
	(Nm)	(lbf.in)	(mm)	(in)	(mm)	(in)
DMF 30 LPC/LAPC/960	30	266	28-52 (P1)	1.10-2.05	560 - 960	22.05-37.80
DMF 30 LPC/LAPC/1500					727 - 1500	28.62-59.06
DMF 30 LPC/LAPC/2000					894 - 2000	35.20-78.74
DMF 80 LPC/LAPC/1500	80	708	35-52 (P2)	1.38-2.05	780 - 1500	30.71-59.06
DMF 80 LPC/LAPC/2000					947 - 2000	37.28-78.74
DMF 140 LPC/LAPC/1500	140	1239	35-52 (P2)	1.38-2.05	991 - 1500	39.02-59.06
DMF 140 LPC/LAPC/2000					1241 - 2000	48.86-78.74
DMF 300 LPC/LAPC/1500	300	2655	Maxi 73 (P2)	2.87	1055 - 1500	41.54-59.06
DMF 300 LPC/LAPC/2000					1305 - 2000	51.38-78.74


1.6.3 Balancing kits specifications (for vertical mounting)

1.6.3.1 Technical characteristics of balancing kit

Designation	Capacity		Item code
	(kg)	(lbs)	
Balancer DMF 12	1 to 2	2.20-4.40	4-5200303
Balancer DMF 30	1 to 2,5	2.20-5.50	4-5200304
	2 to 4	4.40-8.80	4-5200305
Balancer DMFi 70/120/2000	2 to 4	4.40-8.80	4-5200701
	4 to 6	8.80-13.20	4-5200702
	6 to 8	13.20-17.60	4-5200703
Balancer DMFi 300	4 to 8	8.80-17.60	4-5344064
	6 to 10	13.20-22.00	4-5344065

1.6.3.1 Technical characteristics of balancing kit for PC arm

Designation	Capacity		Item code
	(kg)	(lbs)	
Balancer DMF 30	1 to 2,5	2.20-5.50	4-5200304
Balancer DMF 30/80	2 to 4	4.40-8.80	4-5200305
Balancer DMF 80/140	4 to 6	8.80-13.20	4-5200306
Balancer DMF 300	4 to 8	8.80-17.60	4-5200704
	6 to 10	13.20-22.00	4-5200705

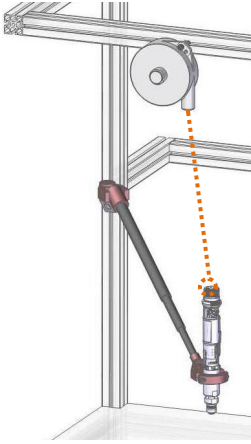
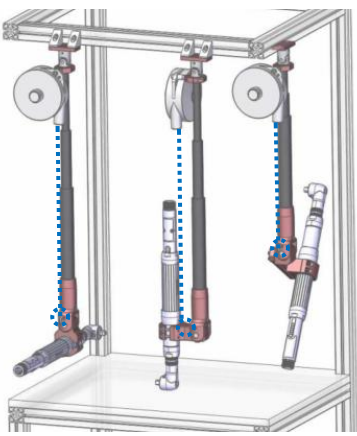


Warning When horizontally mounted the balancer is not attached to the telescoping arm. As a result, the balancer mounting hardware is not used. Please refer to DOGA balancer catalogue in this case.

2. STARTING UP

2.1 Workstation description

Torque reaction arm is fixed on a stable workstation equipped with a tightening tool. Mounting can be horizontal or vertical:

Horizontal mounting	Vertical mounting
	
<p>Maximum angle of the arm is determined by the maximum tool torque (refer to paragraph 2.4.1). The balancer is attached to the tool.</p>	<p>Balancing kit is mounted on the arm.</p>



Information

The global stroke must be considered before workstation layout.



Warning

The last 100mm of arm stroke should not be routinely used to avoid premature ring wear.

2.2 Unpacking

Remove the arm from its packaging.



Information

Before first use, check all the packaging for damage.
Do not use the product if damage is present.



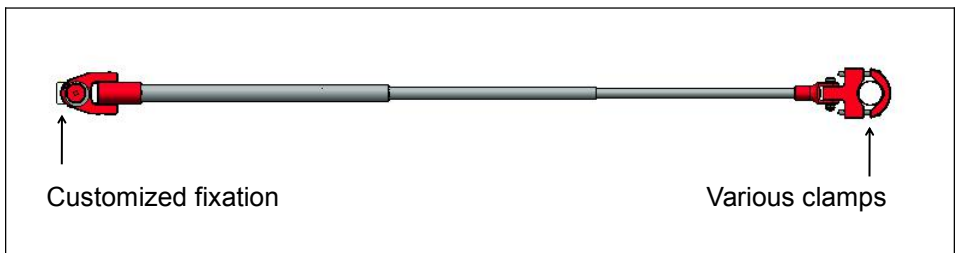
Warning

Danger of suffocation!
Be careful not to leave empty packages lying around.

Dispose of the packaging in accordance with applicable local laws.

2.3 Configuration

The arm is customizable thanks to a wide choice of options and accessories.



Please refer to our commercial documentation to choose the right accessories.

2.4 Installation



Warning

Protective gloves are recommended while installing torque reaction arms to avoid pinching and cutting hazards.

2.4.1 Maximal work angle for torque absorption

It is imperative to respect the angles indicated below in the working position while installing the DMF arm.

Angle α	Torque
From 0 to 45°	< 30 Nm 266 (lbf.in)
From 0 to 30°	30 to 100 Nm 266-885 (lbf.in)
From 0 to 20°	100 to 200 Nm 885-1770 (lbf.in)
From 0 to 10°	> 200 Nm 1770 (lbf.in)



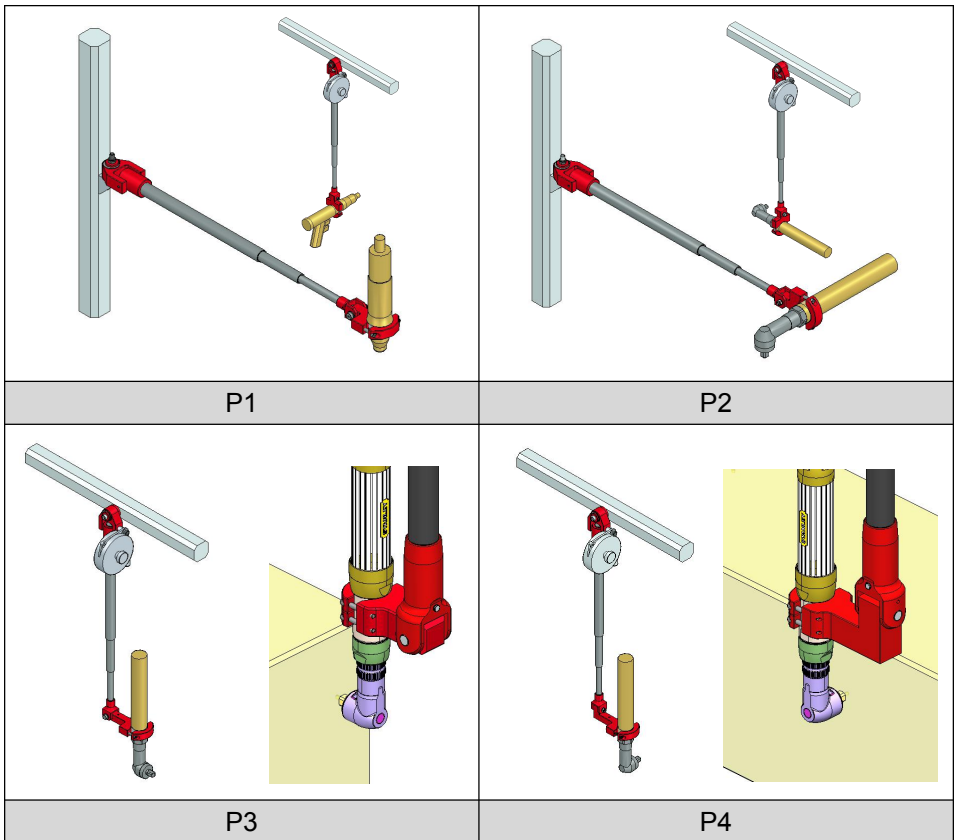
Warning

It is not recommended to use horizontally mounted DMF/DMFI arms (angle α to 0°) longer than 1500 mm.

This causes premature wear of the tubes guide rings.

2.4.2 Orientation / clamp models

The choice of the clamp is related to the type of tool, the tightening orientation and the arm positioning. Clamp styles P1/P2/P3/P4 are shown below:



It is also possible to install special clamps (tilting or rotating), please refer to our sales documentation.

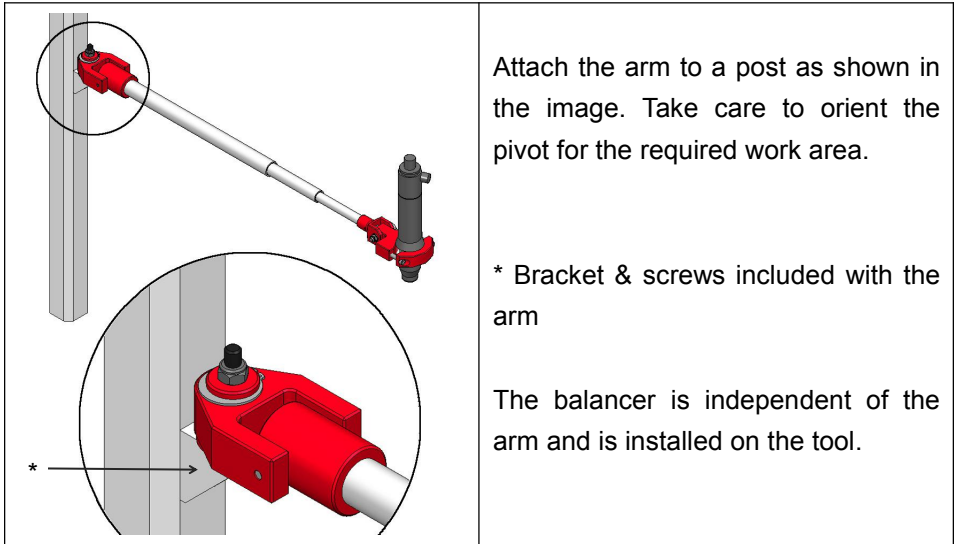


Warning

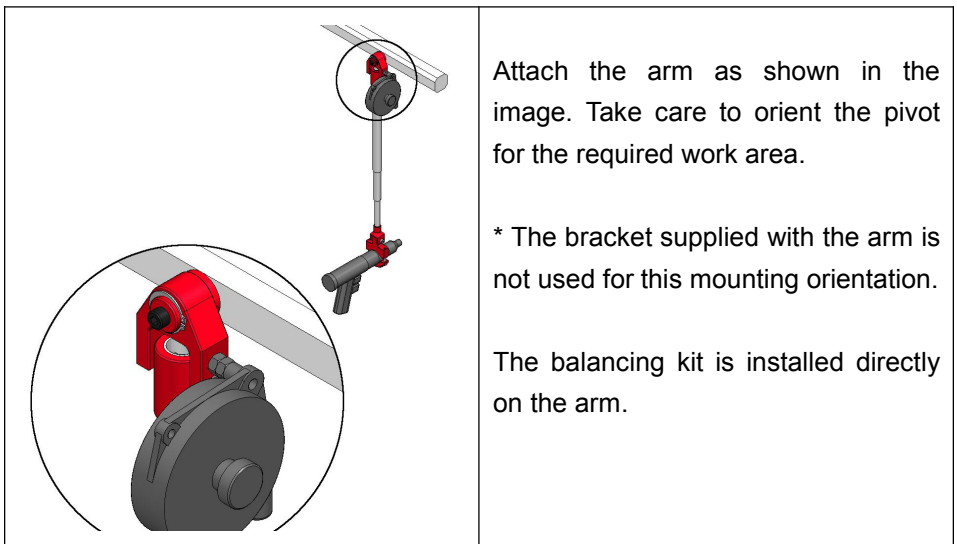
Screw and arm axis must not be parallel.

2.4.3 Mounting

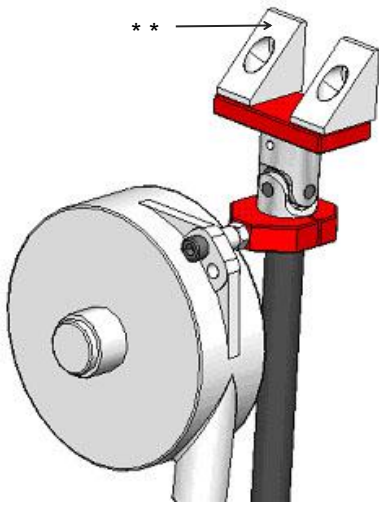
2.4.3.1 Horizontal mounting of DMF 5/12/30



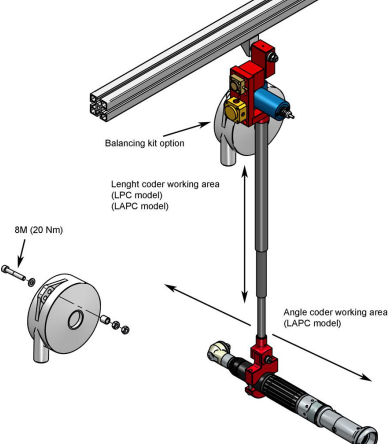
2.4.3.2 Vertical mounting of DMF 5/12/30



2.4.3.3 Vertical mounting of DMFi 70/120/200/300

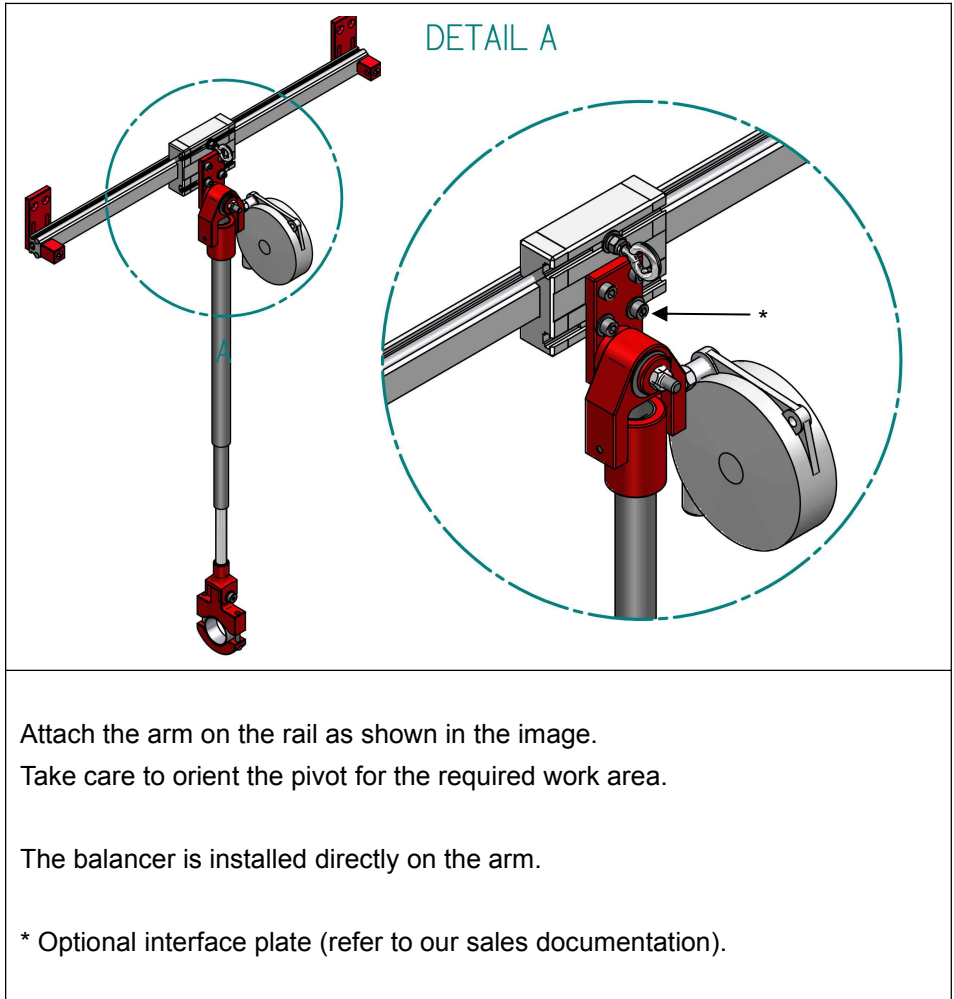
	<p>Attach the arm as shown in the image. Take care to orient the cardan for the required work area.</p> <p>The balancer is installed directly on the arm.</p> <p>** Use of the brackets is optional and based on site requirements.</p>
---	---

2.4.3.4 Vertical mounting of DMF LPC/LAPC

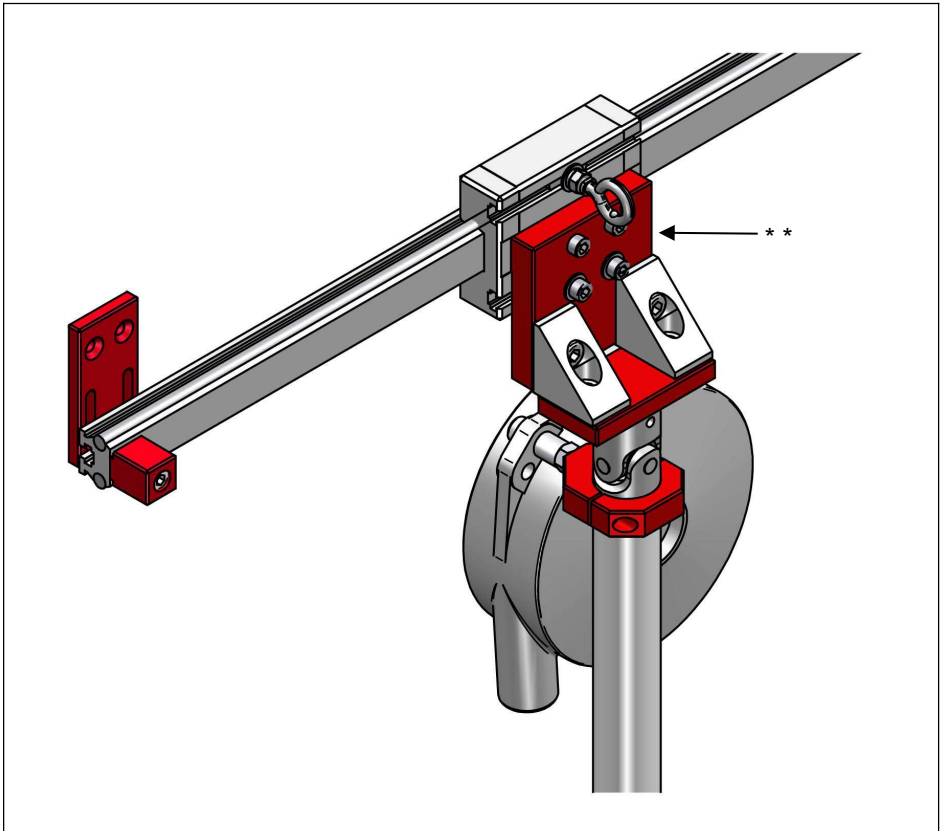
	<p>Attach the arm as shown in the image. Take care to orient the pivot for the required work area.</p> <p>The balancing kit is installed directly on the arm.</p>
--	---

2.4.4 Mounting on a rail

2.4.4.1 Mounting of DMF arm on a rail



2.4.4.2 Mounting of DMFi arm on a rail



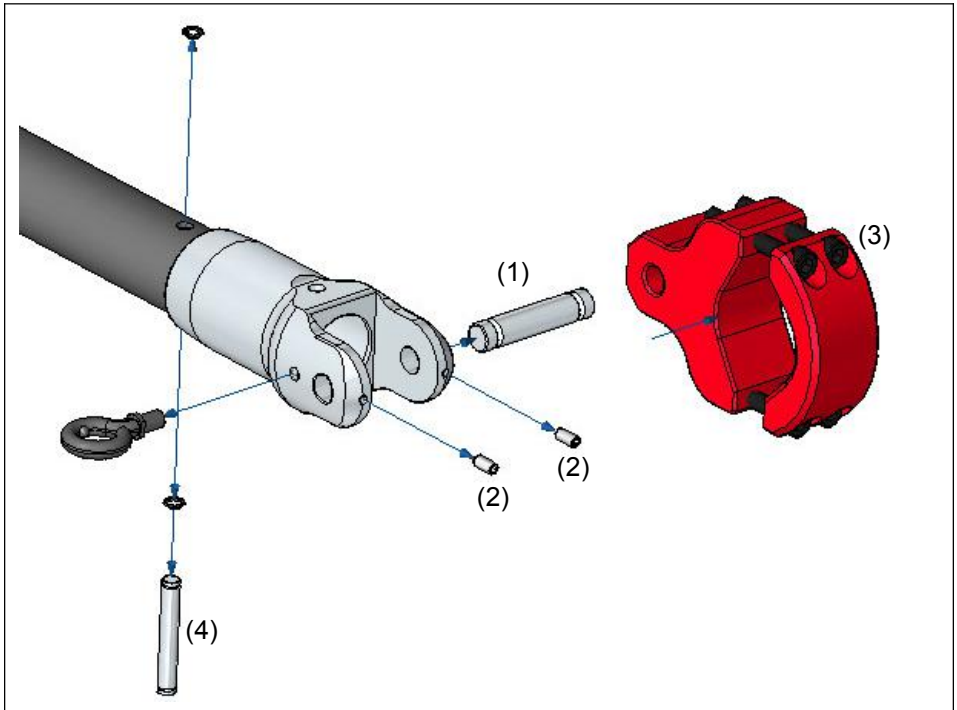
Attach the arm on the rail as shown in the image.
Take care to orient the cardan for the required work area.

The balancer is installed directly on the arm.

* Optional interface plate (refer to our sales documentation).

2.4.5 Clamp mounting for DMFi 70/120/200/300

Mounting a clamp requires the removal of the axis (1). To do so, unscrew the two locking screws (2). Remove the axis (1) from its housing to mount the clamp (3). Then replace the axis. Retighten the locking screws (2) using medium threadlocker.



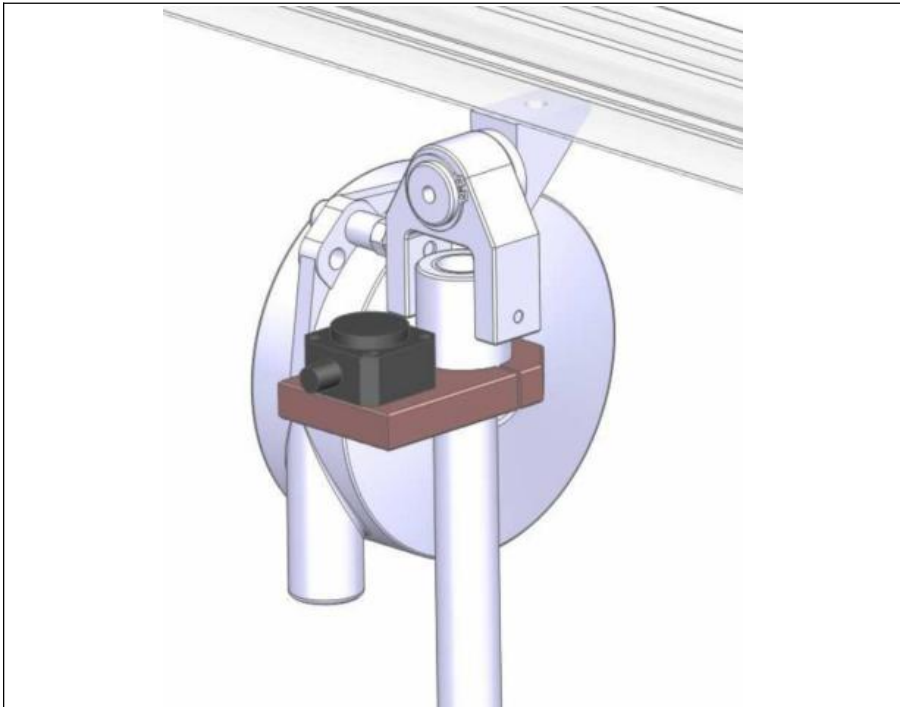
Warning

Ensure the tightening of the clamp axis to prevent accidental tool disengagement and possible operator injury.

2.4.6 Mounting AAPC option

The AAPC option can be installed on standard DMF series arms (DMF30 & DMFi 70/120/200).

The AAPC monitors angular position using inclinometers.



Attach the AAPC as shown in the image.

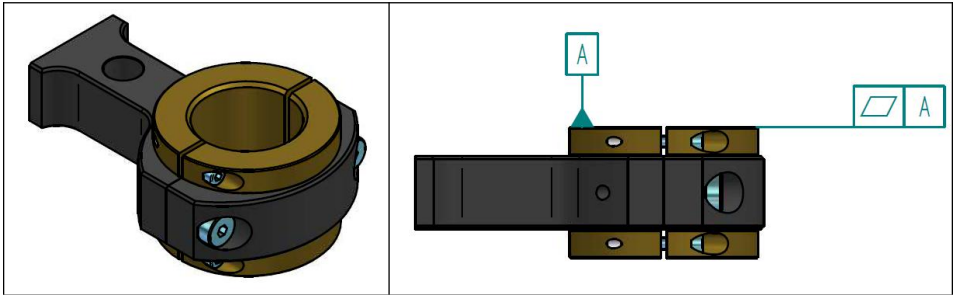
Take care to place the plate far enough away from the joint to not interfere with its movement.

The encoder cable connects directly to the DOGA positioning control (DPC Touch V2).

2.4.7 Rotating clamp mounting

Mount the bronze ring on the screwdriver ensuring that the two half-shells are flat (A on the plane).

Mount the screwdriver/bronze ring assembly into the clamp, tightened to the maximum. Then slowly tighten the screws of the bronze ring until it starts to turn.



2.4.8 Standard clamp tool installation

Clamp tool with the clamp as follows:

- Loosen the screws with an appropriate wrench.
- Position the tool in the clamp at a location where the tool is cylindrical and allows for mounting.
- Tighten screws moderately until the tool is firmly clamped.



Information

Excessive clamping may affect the operation of the tool mounted on the arm.

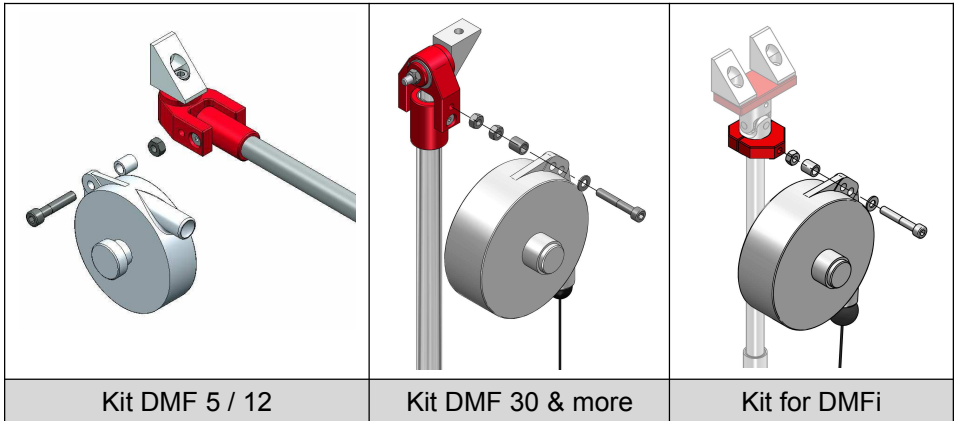


Warning

Insufficient clamping will not guarantee the cancellation of the torque reaction effect.

2.4.9 Balancing kit installation

Install the balancer by firmly tightening the mounting bolt. Use the spacer provided to properly align the balancer. Use of the lock nut allows the balancer to rotation. Make sure the balancer cable is parallel with the arm.



Warning



Between the balancer and the frame, install the included safety cable to avoid falling. Refer to the dedicated user manual of your balancing model.


2.4.10 Encoders verification (LPC, LAPC series)

For LAPC models, connect the encoder cable to the encoder junction box. Then connect the DB9 cable from the junction box to the DOGA position control system (DPC Touch V2).

For LPC models, directly connect the DB9 encoder cable to the DOGA position control system (DPC Touch V2).

3. SETTINGS

3.1 Balancer setting

	<p>It is the effective load at the end of the arm which give the balancer tension. The load is well balanced when the operator can handle the tool easily.</p> <ul style="list-style-type: none"> ● Decrease the tension by turning the adjuster in clockwise direction. ● Increase the tension by turning the adjuster in the counterclockwise direction.
---	--



Warning

The cable length must be adjusted appropriately using the rubber ball.



Important

Refer to the information on the body of the balancer.

4. USE



Warning

Protective gloves are recommended while installing torque reaction arms to avoid pinching and cutting hazards.

4.1 Standard use

The arm is fully mechanical and is manually oriented according to the operator's needs.



Warning

DMF arms should not be used routinely at maximum and minimum strokes. This may damage the arms.

4.2 Position control use

The arm is fully mechanical and is manually oriented according to the operator's needs.

The position encoders allow for position control.



Information

Refer to the instruction manual of the DPC Touch V2.

5. MAINTENANCE

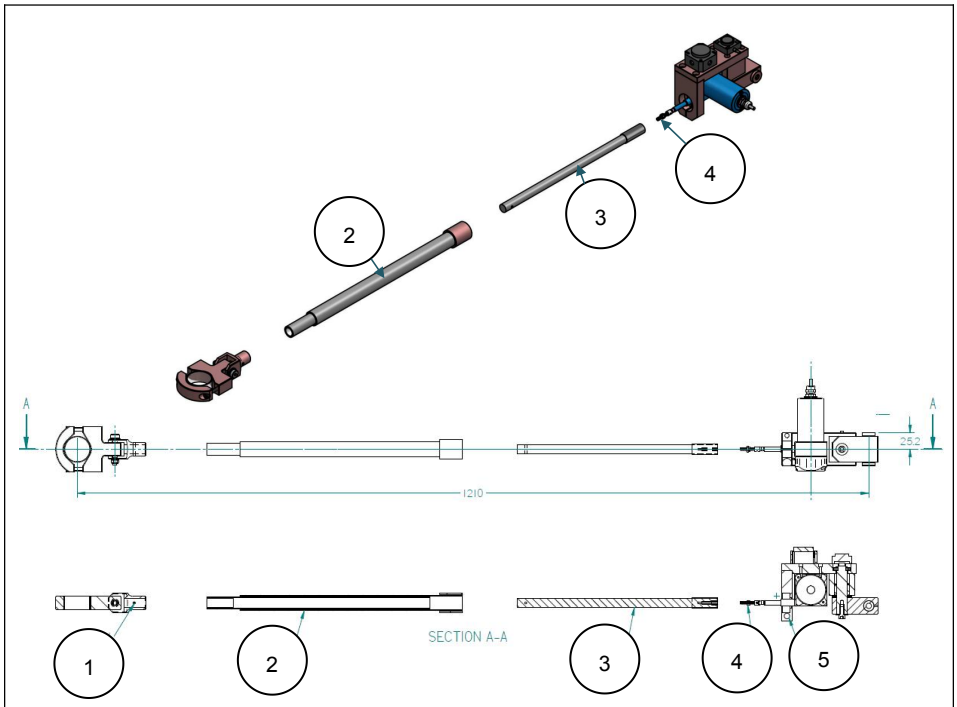
5.1 Maintenance

5.1.1 General maintenance

The telescopic motion can deteriorate and harden over time due to dust or dirt. Periodic cleaning should be carried out following the instructions below:

- a) Use a compressed air gun to clean the rings.
- b) Wipe down the tubes with a dry cloth.

5.1.2 Encoder cable replacement (LPC, LAPC series)



To disassembly the internal encoder cable:

- 1) Disassemble the pin at position 1.
- 2) Loosen the screw at position 5.
- 3) Remove the carbon fiber tube from the back plate at position 2.
- 4) Remove the rod at position 3 from the carbon fiber tube at position 2 (without releasing the rod to not damage the encoder).
- 5) Loosen the nut at position 4 and the threaded tip of the carbon rod.

For reassembly, follow these steps in reverse.

**Warning**

The cable of the encoder must never be released. It must always be secured. Releasing without care can cause damage.

5.2 Troubleshooting

As part of the production, the proper functioning of the arm has been checked several times. However, if the torque arm malfunctions, check it according to the following list.

Malfunction	Action to take
The arm doesn't reach the required position	Check the stroke and the distance with respect to the mounting point of the base plate. Dismantle and mount the arm closer if necessary.
Encoder signal is not received (PC series)	Check the connection of the encoders to the junction box as well as the DPC Touch V2. Check if the encoder has been damaged. (If so, replace it.)
The encoder values do not change when extending the arm (PC series)	The encoder cable is broken. Replace per instructions in paragraph 5.1.2.
The tool position is not maintained and constantly descends	Check that the weight of the tool is less than the capacity of the arm. Refer to paragraph 3.1 for the balancer setting.
The tool constantly ascends	Refer to paragraph 3.1 for the balancer setting.

If you can't solve an issue after reading this manual, please contact the DOGA After-Sales Service.

**Support: www.dogatec.de
+49 7361 8049950**

5.3 Spare parts

For any spare part order, contact your DOGA technical sales representative. Indicate your torque arm part number as well as the specific part to be replaced (refer paragraph 1.4).

**Support: www.dogatec.de
+49 7361 8049950**

5.4 Phone support

5.4.1 For any questions about using the device

**Support: www.dogatec.de
+49 7361 8049950**

5.4.2 For any questions about repairs

**Support: www.dogatec.de
+49 7361 8049950**

If our technician can remotely determine the origin of the fault, he will tell you what to do to allow you to repair it by yourself as far as possible.

5.5 Warranty

DOGA guarantees all our products against any defect in parts or fabrication for a period of **12 months**.

To benefit from the parts and labor warranty, the following conditions must be respected:

- The torque reaction arm must have been used in a professional manner and in accordance with the normal conditions of use described in the instruction manual.
- The torque reaction arm must not have suffered any damage from storage, maintenance or improper handling.
- The torque reaction arm must not have been modified or repaired by unqualified persons.

6. SAFETY

6.1 General provisions



The user manual must be carefully stored in a known place and easily accessible to the potential users of the product.



Caution

Read this manual and have each operator read it carefully before installing, using or repairing.

Make absolutely sure that the operator fully understands the rules of use and the meaning of any symbols affixed to the product.

Most accidents could be avoided by following the instruction manual.

These rules have been drafted with reference to the European Directives and their various amendments as well as standard rules product.

In each case, respect and comply the National Safety Standards.

Do not remove or damage the labels and annotations affixed to the product, especially those imposed by the law.

6.2 Residuals risks

6.2.1 Pinching or Cutting Risks

Moving components can cause injuries. Protective gloves are recommended while installing torque reaction arms to avoid pinching and cutting hazards.

6.2.2. Injury Risk

A person hitting the arm with a part of his body (unprotected by safety equipments) exposes himself to the risk of injury.

6.3 Contra-indications

Do not immerse.

Do not expose to liquid splashes.

Do not expose to dusty atmospheres.

Do not oil the arms.

Do not use near to a heat source.

7. STANDARDS

7.1 Manufacturer details

Manufacturer: DOGA


Address: ZA Pariwest

8 avenue Gutenberg CS 50510

78317 MAUREPAS CEDEX

FRANCE

7.2 Markings

DMF/DMFi	Equipment designation
Torque(Nm)	Max admissible torque
 <p>8 avenue Gutenberg - CS 50510 78317 Maurepas Cedex - FRANCE</p>	Name and address of the equipment manufacturer
CE	Equipment designed and manufactured in accordance with the requirements of European Directives 2006/42/CE

7.3 Transport and storage



Information

Your equipment can be damaged if you store it or transport it improperly. Observe the transport and storage information for your equipment.

7.3.1 Transport

Use a suitable container to transport the equipment to protect it from damage.

7.3.2 Storage

Respect the following guidelines before each storage:

- Disconnect the encoder cable (PC only).
- Clean the arm according to the Maintenance chapter.
- Store it in a suitable container to protect it from dust and direct sunlight.
- Store it in a dry place at an ambient temperature, below 40°C.

7.4 Recycling and end of service life

At the end of service life, torque reaction arms must be sent to suitable recycling programs for ferrous (steel and iron) and non-ferrous (other metal such as aluminium).

DOGA**TEC**

Mit Sicherheit montiert

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+49 7361 8049950