

SAFETY & OPERATING INSTRUCTIONS

BIVALVE SORTING GRAPPLES · MG SERIES

REFERENCE MODEL **MG-450**

IN ACCORDANCE WITH THE MACHINERY DIRECTIVE 2006/42/EC · TRANSLATION OF THE ORIGINAL INSTRUCTIONS

HOW TO USE THIS MANUAL

Read this manual in full before installing, operating or maintaining the grapple. Keep it with the carrier throughout the service life of the equipment. This page summarises the document control data and the symbols used.

DOCUMENT CONTROL

DOCUMENT	MG-MAN-EN — Safety & operating manual
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LANGUAGE	English — translation of the original (ES) instructions
PRODUCT	Bivalve sorting grapples — MG series (20 models: MG-75 ... MG-2950)
MANUFACTURER	Changzhou MHA Construction Equipment Co., Ltd. · Changzhou, Jiangsu, P. R. China
CONFORMITY	Machinery Directive 2006/42/EC — see EU Declaration (ch. 12)
CONTACT	info@mhaconstructionequipment.com · mhaconstructionequipment.com

SAFETY SYMBOLS

 DANGER	Imminent hazard: if not avoided, will result in death or serious injury.
 WARNING	Potential hazard: if not avoided, could result in death or serious injury.
 CAUTION	Potential hazard: if not avoided, could result in minor or moderate injury.
 NOTICE	Information about possible property damage or the operation of the equipment.

TEXT SYMBOLS AND MANDATORY PPE

In the text: ▶ indicates an operation step · • indicates a list item · cross-references are given by the chapter number.

 Hard hat	 Eye protection	 Hearing protection	 Gloves	 Safety footwear
 Hi-vis clothing				

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PART 01 · MHA MG SERIES

01

SAFETY

01 · SAFETY

1 INTRODUCTION

2 SAFETY INSTRUCTIONS

1 INTRODUCTION

1.1 ABOUT THIS MANUAL

This manual contains the safety, installation, operating and maintenance instructions for the MHA MG-series bivalve sorting grapples. It is intended for owners, operators and maintenance personnel.

Read and fully understand this manual **before** installing, operating or maintaining the grapple. Keep it accessible with the carrier throughout the service life of the equipment and hand it over to any new owner or user.

Failure to follow the instructions and warnings in this manual can result in serious or fatal injury and property damage. MHA Construction Equipment accepts no liability for damage arising from improper use, unauthorised modifications or failure to follow these instructions.

Illustrations and data may vary depending on the configuration. MHA reserves the right to modify the product and the documentation without prior notice. If in doubt, contact MHA or your authorised dealer.

1.2 SYMBOLS USED IN THIS MANUAL

In addition to the signal words (section 2.1), the symbols ► for operation steps and • for lists are used in the text. References to other sections are given by their chapter number.

1.3 IDENTIFICATION PLATE AND NOMENCLATURE

Each grapple carries an identification plate with the model, serial number, weight and year of manufacture. Do not remove or damage this plate; its data are required to order spare parts and request assistance.

DESIGNATION	MEANING
MG	MHA bivalve grapple (Multi Grapple)
Number (e.g. 450, 1050)	Model size within the series
Category	Mini · Compact · Medium · Heavy (according to carrier tonnage)

1.4 WARRANTY AND ASSISTANCE

Terms of warranty

- The manufacturer grants a warranty of **12 months** from the date of delivery.
- It covers all defective parts proven to have failed due to faults in manufacture, production or material.
- Defective parts replaced under warranty become the property of the manufacturer; they must be kept available and returned immediately, complete and unaltered, upon the manufacturer's first request.
- Any warranty claim requires a **written** notice to the dealer or manufacturer, made immediately after the damage or fault occurs and, at the latest, within **24 hours** of the irregularity arising.
- The claim must contain: type of carrier machine, serial number of the grapple, record of the defective part(s) and a description of the fault, photographs, a copy of the delivery note and invoice, and a copy of the invoice of the

equipment concerned.

- Minor repairs: may be carried out in consultation with the dealer; parts covered by the warranty are supplied free of charge. Larger repairs: send the grapple to the dealer or manufacturer; labour and necessary parts are free of charge, but transport and call-out costs to/from the dealer or manufacturer are not covered.
- The manufacturer is not liable for consequential loss caused by a defective grapple (damage to the excavator, machine standstill or interruption of work).

Exclusions from the warranty

- Damage caused by faulty assembly of the machine or hydraulic system, improper maintenance without the necessary expertise, and transport damage.
- Defects resulting from improper repairs or maintenance, including those carried out by an unauthorised third party.
- Defects arising from neglect or improper execution of preventive maintenance (e.g. regular lubrication or greasing).
- Defects in parts subject to normal wear, such as the blades.
- Consequential loss caused by failure to replace normal wearing parts in time.

If defective or worn parts are replaced by **non-original** parts, the entire warranty and liability of the manufacturer cease to apply.

Technical assistance and spare parts: MHA Construction Equipment · info@mhaconstructionequipment.com · mhaconstructionequipment.com

2 SAFETY INSTRUCTIONS

2.1 SIGNAL WORDS

 DANGER	Imminently hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	Hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION	Hazardous situation which, if not avoided, could result in minor or moderate injury.
 NOTICE	Information regarding possible property damage or the operation of the equipment.

2.2 PERSONNEL QUALIFICATION

Installation, operation and maintenance must only be entrusted to qualified, trained personnel. The operator must be legally authorised to operate the carrier and must know the applicable safety regulations. Maintenance of the hydraulic system must be carried out by personnel with specific training.

2.3 INTENDED USE / NON-INTENDED USE

Intended use

The MG grapple is mounted on an excavator or other suitable carrier to **grab, rotate, handle and load materials** in waste and scrap sorting, post-demolition clean-up, C&D recycling, and the loading of bulk materials and logs, within the carrier weight, pressure and flow limits given for each model (chapter 11).

Non-intended use

- lifting, transporting or holding people;
- using the grapple as a hammer, ram or impact tool;
- pulling out or dragging anchored or ground-fixed loads;
- exceeding the model's maximum capacity, pressure or flow;
- working in explosive atmospheres or handling explosive, flammable or radioactive materials;
- using a carrier with a tonnage outside the specified range.

2.4 PERSONAL PROTECTIVE EQUIPMENT (PPE)

All personnel in the work area must use: hard hat, eye protection, hearing protection, gloves, safety footwear and high-visibility clothing. Add further protection according to the risks of the application (e.g. a dust mask in dusty environments).

2.5 RESIDUAL RISKS

Even when the grapple is used correctly, the following risks remain. Stay alert to them:

RISK	SOURCE	PREVENTIVE MEASURE
Crushing / shearing	Closing of the jaws and rotation of the grapple	Keep hands and people clear of the jaw area and the slewing radius
Falling load	Insufficient grip, unstable material or overload	Centre and close firmly; do not pass under suspended loads
Flying objects	Fragments of the handled material	PPE; cab with FOPS/FGPS protection where applicable
High-pressure fluid injection	Leaks in hoses or fittings	Depressurise before working; do not search for leaks with your hands
Carrier tip-over	Off-centre load, slope or unstable ground	Respect carrier stability; work on firm ground
Noise and vibration	Operation and material handling	Hearing protection; breaks and adequate maintenance
Burns	Hot oil and hydraulic components	Allow to cool before working; wear gloves

2.6 DANGER ZONE

WARNING

Keep all persons out of the danger zone during operation.

The danger zone covers the slewing radius of the grapple and the carrier, the area beneath the suspended load and the path of possible material projection. The operator is responsible for checking that no persons are in this zone before operating.

2.7 SAFETY DECALS

The grapple carries safety decals. Keep them clean and legible; replace damaged ones.

2.8 PHASE-SPECIFIC PRECAUTIONS

Carrier machine

- Check that the weight of the grapple and load is compatible with the capacity and stability of the carrier.
- Use a coupler/adaptor approved for the weight of the assembly.

Transport

- Lift only by the intended lifting points, with accessories of sufficient capacity.
- Secure the load during transport so that it cannot move or fall.

Hydraulic installation

DANGER

Pressurised oil can penetrate the skin and cause serious injury. Depressurise the circuit before any intervention.

- Working pressure: 220–350 bar depending on model; do not exceed it (chapter 11).
- Flow: 15–200 L/min depending on model; respect it to avoid damaging the rotation motor.
- Switch off the engine and depressurise before connecting/disconnecting hoses.
- Check the type and diameter of the hoses. The rotation motor does not require a separate drain line.

Operation and maintenance

- Do not use the grapple with cracks, deformation, leaks or damaged parts.
- Before maintenance: set the grapple down, stop the engine, depressurise and lock out the carrier start.
- Use only original MHA spare parts. Do not weld or modify the structure without MHA authorisation.

2.9 NOISE AND VIBRATION

The grapple has no power source of its own: noise and vibration emissions depend on the carrier, the material and the application, so no specific values are declared for the attachment. Refer to the noise and vibration values in the carrier documentation and use hearing protection.

2.10 HAZARDOUS SUBSTANCES

Hydraulic oil and grease can be harmful to health and the environment. Avoid prolonged skin contact, collect spills and dispose of waste in accordance with local regulations. Consult the safety data sheets of the products used.

PART 02 · MHA MG SERIES

02

PRODUCT & INSTALLATION

02 · PRODUCT

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3 PRODUCT DESCRIPTION

3.1 FUNCTION AND PRINCIPLE

The MG grapple is a hydraulic attachment mounted on the arm of an excavator. Two hydraulically actuated jaws grab the material and, depending on the model, a continuous 360° hydraulic rotation system allows the load to be oriented without repositioning the carrier.



Views and dimensions of the MG grapple

Front view (opening A / width B / heights C-D) and side view (jaw width W). See dimensions per model in chapter 11.

3.2 MAIN COMPONENTS

COMPONENT	FUNCTION
Coupling head	Connects the grapple to the carrier's coupler/adaptor.
Rotation motor(s)	Rotate the grapple 360° continuously. The Heavy series has a dual motor.
Hydraulic cylinder(s)	Open and close the jaws. MG-1050 and above are dual-cylinder.
Jaws / shells	Hold the material; slotted design that lets fines fall through.
Bolt-on blades / tips	Interchangeable wear parts that restore the grip.
Internal hoses	Route the oil inside the body, protected from snagging and impact.
Pins and bushes	Articulate the jaws; require periodic greasing.

3.3 VARIANTS AND HYDRAULIC CONFIGURATION

The MG series covers four categories according to carrier tonnage: **Mini** (0.7–2 t), **Compact** (1.2–9 t), **Medium** (6–28 t) and **Heavy** (20–50 t). The cylinder and motor configuration varies by model (see chapter 11): MG-1050 and above are dual-cylinder; the Heavy series has a dual rotation motor.

4 TRANSPORT AND STORAGE

WARNING

Do not stand or pass under suspended loads. Use lifting accessories of sufficient capacity for the weight of the grapple (chapter 11).

Receipt

- Check that the model received matches the order and shows no transport damage.
- Verify that this manual and the equipment documentation are included.

Lifting

- Lift the grapple only by the intended lifting points.
- Use suitable slings/shackles and keep the assembly balanced.

Storage

- Store the grapple resting stably, in a dry and protected place.
- Protect the cylinder rods and plug the hydraulic connections against corrosion and dirt.
- Before prolonged storage, clean and grease the grapple.

5 INSTALLATION AND COMMISSIONING

5.1 CARRIER REQUIREMENTS

- Carrier tonnage within the model range (chapter 11).
- Auxiliary hydraulic circuit with pressure and flow within the model range.
- Coupler/adaptor approved for the weight of the assembly.

5.2 MECHANICAL MOUNTING

1. Set the grapple down stably.
2. Couple the head to the coupler following the coupler manufacturer's instructions.
3. Tighten the fixing bolts to the torque given in the table in section 7.3 and lock them.
4. Check that the coupler lock is fully engaged.

5.3 HYDRAULIC CONNECTION

1. With the engine off and the circuit depressurised, connect the open/close and rotation hoses.
2. Respect the oil flow direction.
3. Check that there are no leaks and that the hoses do not rub or become taut over the whole travel.

5.4 PRE-START CHECKLIST

CHECK	OK
Model compatible with the carrier tonnage	
Pressure and flow within the model range	
Coupling bolts tightened and locked	
Coupler lock engaged	
Hoses connected, no leaks or rubbing	
No-load test cycles correct (open/close and rotation)	
Re-torque of bolts after the first 8 hours of work	

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OPERATION & MAINTENANCE

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 - 9 DECOMMISSIONING AND RECYCLING
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6 OPERATION

6.1 BEFORE EACH SHIFT

- Visual inspection: leaks, cracks, deformation, condition of hoses and bolts.
- Check the condition of the blades/tips.
- Check rotation and open/close without load.

6.2 HANDLING AND GOOD PRACTICE

- Centre the load in the jaws and close firmly before lifting.
- Rotate and move loads smoothly; avoid abrupt movements and swinging.
- Use the 360° rotation to place the load without repositioning the carrier.
- Work within the operator's field of view and with the carrier stable.

6.3 TECHNIQUES BY APPLICATION

APPLICATION	RECOMMENDATION
Waste and scrap sorting	Partial, precise grips; use the slotted jaw to release fines.
Post-demolition / C&D clean-up	Compact loads; avoid prying against fixed structures.
Bulk loading	Fill the jaw without overloading; close firmly before rotating.
Logs	Orient the jaws to the axis of the log; centred grip to prevent slipping.

6.4 LIMITS OF USE

- Do not exceed the load capacity or the pressure/flow of the model.
- Do not use the closing force to break, strike or pry on fixed objects.
- Do not drag the grapple along the ground or use it as a digging bucket.

7 MAINTENANCE AND INSPECTION

⚠ WARNING

Before working: set the grapple down, stop the engine, depressurise the circuit and lock out the carrier start.

7.1 MAINTENANCE SCHEDULE

INTERVAL	OPERATION
Daily / each shift	Visual inspection of leaks, cracks, deformation, hoses and bolts.
Every 8–10 h	Grease the pins, bushes and slewing ring (see 7.2).
50 h / weekly	Check the torque of the main bolts; condition of blades/tips.
250 h	Inspect the rotation motor, cylinders and hoses; condition of the slewing ring/reducer.
500–1000 h / annual	Full structural inspection; inspection of the slewing ring/reducer by qualified personnel.
As wear requires	Replacement of bolt-on blades/tips and of pins/bushes.

⚠ CAUTION

The intervals are indicative; adapt them to the intensity of use and the working conditions, and validate them against the MHA maintenance sheet.

7.2 LUBRICATION

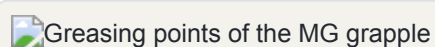
Grease all the intended points until the grease slightly overflows. Recommended grease: EP lithium grease NLGI 2 (general purpose).

Greasing procedure

1. Set the grapple on the ground and stop the carrier engine.
2. Fully open the jaws.
3. Clean the grease nipples and apply grease with a grease gun.
4. Grease until fresh grease comes out at the pins, edges and seals: this indicates a sufficient fill.
5. Wipe off any excess grease with a cloth.

⚠ CAUTION

During greasing, open and rotate the grapple several times to distribute the grease. Grease with special care after cleaning the equipment or if it has got wet.



Greasing points ①–⑤ of the product (front and side view). Grease every 8 hours of operation.

POINT	LOCATION	INTERVAL
①	Jaw pivots (claw articulation)	Every 8 h

②	Upper articulation (head–body joint)	Every 8 h
③	Rotator / slewing head	Every 8 h
④	Side articulation	Every 8 h
⑤	Central pivot	Every 8 h

7.3 TIGHTENING TORQUES

Tighten the bolts and hydraulic fittings to the torques given in the following tables. Tighten progressively and crosswise where applicable, and do not exceed the maximum torque. For a specific joint, apply the specific MHA value if it differs from the table.

Metric bolts (dry thread)

THREAD	PITCH (MM)	WRENCH (MM)	8.8 MIN (N · M)	8.8 MAX (N · M)	10.9 MIN (N · M)	10.9 MAX (N · M)	12.9 MIN (N · M)	12.9 MAX (N · M)
M6	1	10	9.5	11	14	16	16	19
M8	1.25	13	23	27	33	39	40	47
M10	1.5	16	45	53	65	75	75	90
M12	1.75	18	80	93	115	135	135	160
M14	2	21	125	145	180	210	215	250
M16	2	24	195	225	280	330	330	390
M18	2.5	27	270	310	390	450	460	540
M20	2.5	30	380	440	550	640	650	750
M22	2.5	32	520	600	750	870	880	1,000
M24	3	36	660	760	950	1,100	1,100	1,300
M27	3	41	980	1,100	1,400	1,650	1,650	1,950
M30	3.5	46	1,350	1,550	1,900	2,250	2,250	2,650

Hydraulic fittings (BSPP · G thread)

THREAD	DESIGNATION (BSPP)	THREADS/IN (TPI)	RECOMMENDED TORQUE (N · M)	MAX. TORQUE (N · M)	METRIC O.D. REF. (MM)
G 1/4"	G 1/4 - 19	19	20	25	13.1
G 3/8"	G 3/8 - 19	19	35	40	16.6
G 1/2"	G 1/2 - 14	14	60	70	20.9
G 5/8"	G 5/8 - 14	14	70	80	22.9
G 3/4"	G 3/4 - 14	14	115	130	26.4
G 1"	G 1 - 11	11	140	165	33.2
G 1-1/4"	G 1-1/4 - 11	11	190	220	41.9
G 1-1/2"	G 1-1/2 - 11	11	240	280	47.8

7.4 WEAR AND STRUCTURAL INSPECTION

- Replace the blades/tips before the wear reaches the jaw body.
- Inspect the structure for cracks, especially at welded areas and articulations.

- Check the clearance of pins and bushes; replace them if it exceeds the permissible limit.

** DANGER**

Do not use the grapple if you detect structural cracks. Weld repairs may only be authorised and specified by MHA.

7.5 HYDRAULIC SYSTEM

- Periodically inspect hoses, fittings, cylinders and rotation motor(s).
- Replace damaged hoses immediately. As a preventive measure, it is recommended to replace the hydraulic hoses every 3 months, and sooner if they show cracks, leaks or signs of ageing.
- Keep the circuit clean; oil contamination is the main cause of hydraulic failure.

8 REPAIR AND SPARE PARTS

- Use exclusively original MHA spare parts; state the model and serial number when ordering.
- Structural and weld repairs must be carried out to MHA specifications and by qualified personnel.
- Do not modify the equipment without express MHA authorisation; any unauthorised modification voids the warranty and the declaration of conformity.

See the spare-part references and the exploded views in **Annex A** (Exploded views and spare parts).

9 DECOMMISSIONING AND RECYCLING

- Depressurise the circuit and drain the hydraulic oil before scrapping.
- Manage the oil, grease and waste in accordance with local environmental regulations.
- Separate the materials (steel, elastomers, hydraulic components) for recycling.

10 TROUBLESHOOTING

Guide to fault diagnosis and resolution for the grapple. In the event of any anomaly, first make the equipment safe; if the problem persists or affects safety, stop work and consult the dealer or MHA.

DANGER

Stop the equipment immediately and do not use it if you detect structural cracks or deformation, pressurised oil leaks, loud noises or knocks, or loss of control of the movements. Before working, set the grapple down, stop the engine and depressurise the circuit.

SYMPTOM	POSSIBLE CAUSE	SOLUTION
The grapple does not open/close or does so slowly	Insufficient flow or pressure; air in the circuit; internal leak	Check the auxiliary circuit; bleed the air; inspect cylinders and hoses
Rotation does not work or is irregular	Incorrect or reversed connections; damaged rotation motor	Check the rotation connections; inspect the motor (qualified personnel)
Oil leaks	Loose fittings; deteriorated hoses or seals	Tighten or replace fittings; replace hoses/seals
Poor grip	Worn blades/tips	Replace the bolt-on wear parts
Abnormal noise or play	Clearance in pins/bushes; lack of greasing	Grease; inspect and replace pins/bushes
Rotation with play or vibration	Wear of the slewing ring/reducer	Inspect the rotation reducer (qualified personnel)

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TECHNICAL DATA, SPARE PARTS & CONFORMITY

11 TECHNICAL DATA

A EXPLODED VIEWS & SPARE PARTS

12 EU DECLARATION OF CONFORMITY

11 TECHNICAL DATA

Nominal values of the MG series. Working pressure and flow depending on model. Specifications subject to change without notice.

MODEL	CARRIER (T)	WEIGHT (KG)	WORK. PRESSURE (BAR)	FLOW (L/MIN)	CLOSING FORCE (kN)	JAW WIDTH (MM)	OPENING (MM)	VOLUME (L)	CYL.	MOT.	CATEGORY
MG-75	0.7–1.2	85	220	15	6	300	600	30	1	1	Mini
MG-100	1–2	95	220	20	7	350	770	40	1	1	Mini
MG-150	1.2–3	155	220	25	15	450	800	70	1	1	Compact
MG-250	2.5–4	245	220	35	20	500	1,150	100	1	1	Compact
MG-300	2.5–5	280	220	35	20	500	1,150	100	1	1	Compact
MG-400	4–7	400	220	40	24	600	1,400	150	1	1	Compact
MG-450	5–9	440	220	50	24	700	1,500	200	1	1	Compact
MG-500	6–11	500	220	60	24	700	1,550	200	1	1	Medium
MG-600	9–12	630	220	70	30	700	1,750	300	1	1	Medium
MG-850	10–16	850	350	80	38	800	1,750	400	1	1	Medium
MG-1050	12–20	1,060	350	120	46	800	1,950	500	2	1	Medium
MG-1100	13–20	1,100	350	120	46	900	1,950	600	2	1	Medium
MG-1150	15–20	1,150	350	170	46	1,000	1,950	700	2	1	Medium
MG-1350	16–25	1,380	350	170	68	900	2,100	750	2	1	Medium
MG-1400	17–28	1,420	350	170	68	1,000	2,100	800	2	1	Medium
MG-1500	20–28	1,520	350	170	68	1,200	2,100	850	2	2	Heavy
MG-1900	24–35	1,920	350	200	80	1,200	2,250	900	2	2	Heavy
MG-2550	28–40	2,560	350	200	90	1,200	2,250	1,000	2	2	Heavy
MG-2700	30–50	2,710	350	200	90	1,360	2,250	1,100	2	2	Heavy
MG-2950	35–50	2,950	350	200	90	1,500	2,450	1,300	2	2	Heavy

Cyl. = number of cylinders · Mot. = number of rotation motors · Rotation: 360° continuous.

Fluid recommendations (indicative)

ITEM	RECOMMENDATION
Hydraulic oil	Mineral oil HLP/HVLP ISO VG 46 (general purpose)
Greasing grease	EP lithium grease NLGI 2