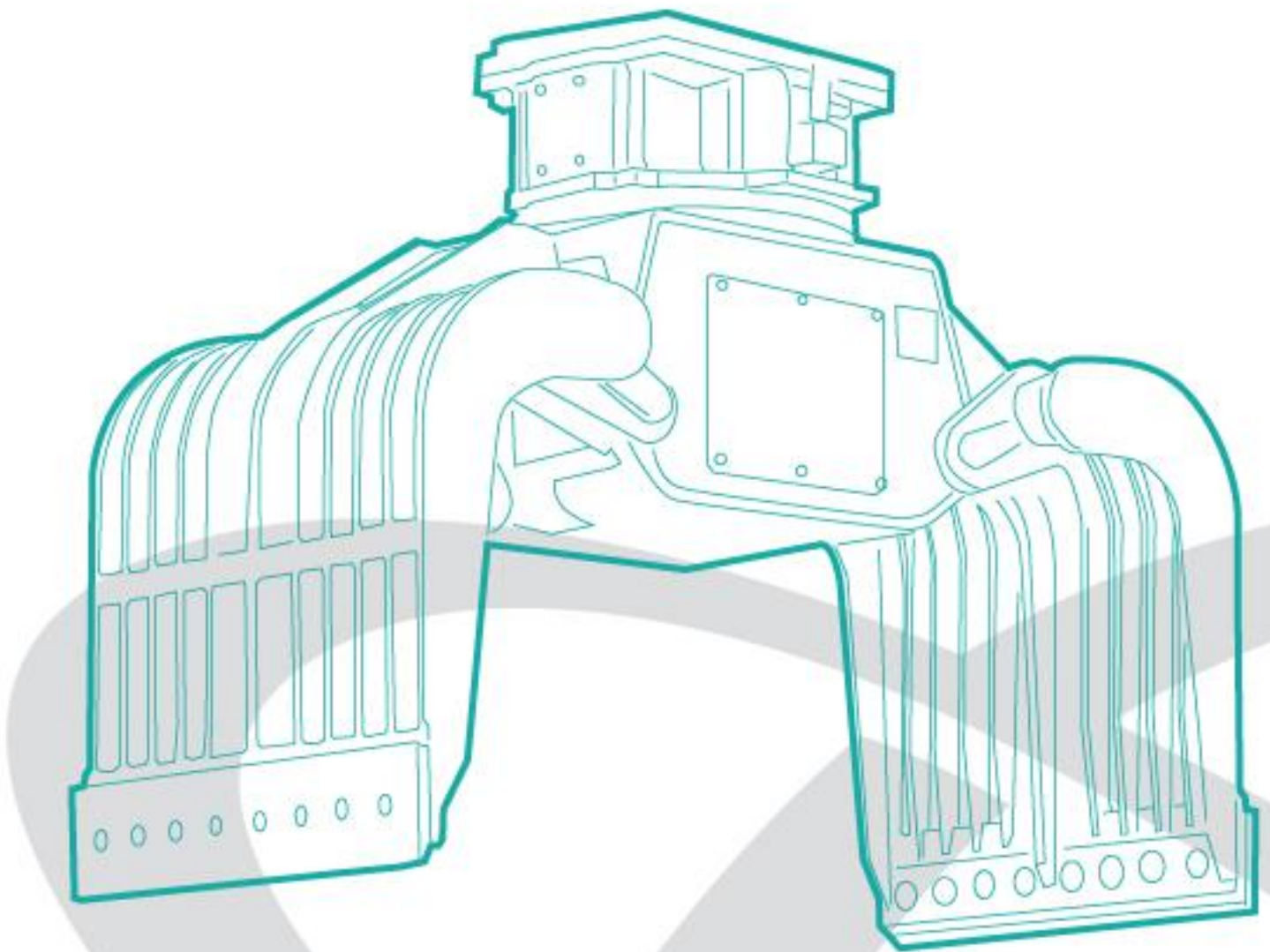


# OPERATION & MAINTENANCE MANUAL

## Multi Purpose Grab



**EVERDIGM**  
**ATTACHMENT**

***EPG05/08***

## FOREWORD

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### WARNING!

It is very important for you to read and understand this manual before operating and to keep the instructions provided herewith. Never fail to follow the instruction related to safety.

This manual contains instructions and information on safe and correct use of EVERDIGM Grabs.

- Please read and understand this manual before operation, inspections and maintenance of the grab
- Keep this manual with your equipment all the time for your quick and easy reference, and read it regularly.
- Do not operate the grab until you have been trained in the use of all operating controls and understand the hydraulic grab operation
- Get a replacement manual from EVERDIGM dealer if you lost it.
- If you transfer the grab to the other, do transfer this manual as well.
- The figures in this manual is for better understanding and may not correspond exactly to the grab. For exact shape, refer to the parts list or ask EVERDIGM.
- For the purpose of constant product improvement, some parts of this manual may be changed. If you found the parts unclear or not corresponding to the grab, call and consult EVERDIGM dealer or service center
- Important information on safety is described in the safety information chapter of this book. Be familiarized with the instructions on the safe operation and observe the instructions before and during operation
- Injury, death or damage caused by unauthorized product modifications and operation under unallowed application will not be responsible by EVERDIGM. Consult EVERDIGM for such modifications and applications.
- Use EVERDIGM genuine parts. EVERDIGM takes no responsibility for damages caused by use of non-EVERDIGM spare parts.
- For warranty, we refer you to the warranty conditions provided separately.

We always exert all our efforts for your satisfaction, and promise you quick and constant service.

We thank you for using EVERDIGM grab and wish you a good luck in every your job,

Sep. 2014

**EVERDIGM.**

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# 1. Safety Information

This manual describes correct use of the product and safety messages. Important or certain instructions in this manual are marked with  symbol. When you see this symbol provided in the manual or on the product, be alert to the possibility of personal injury or death. Be sure to observe the instruction in the safety message.

The safety messages in this manual do not describe all the possibilities of personal injury or death or of damages to the product. This safety manual and the marks with symbols are intended to provide some of basic instructions for safe operation, inspection and maintenance. It is operator's responsibility to observe the safety instructions and regulations though this manual does not include all the possible situations.

***Remember! Safety is up to you***

## Safety Alert Symbol





The Safety Alert Symbol represents that **ATTENTION** is involved.

If you see the mark in this manual or on the products, never fail to read and observe the instructions for safe operation.



## Signal Words

The words "**DANGER**", "**WARNING**", "**CAUTION**" and "**IMPORTANT**" appeared with the above **Safety Alert Symbol** indicate degree of risk of hazards or unsafe practices. All four degrees of risk indicate that safety is involved. Observe precautions indicated whenever you see the **Safety Alert Symbol**, no matter which signal word appears next to the "Exclamation Point" symbol.

- |   |  |
|---|--|
|  <b>DANGER!</b>    | Indicates imminent hazard of a situation that, if not avoided, is very likely to cause death or extremely serious injury. It may also be used to alert against product that may exploded or detonate if handled or treated carelessly. |
|  <b>WARNING!</b>   | Indicates potential of a hazardous situation that, if not avoided, could result in serious injury or death. It may also be used to alert against a highly unsafe practice.   |
|  <b>CAUTION!</b>   | Indicates potential of a hazardous situation that, if not avoided, could result in minor or moderate injury. It may also be used to alert against a general unsafe practice.   |
|  <b>IMPORTANT!</b> | Indicates potential of damages that, if not avoided, could caused to the product or shorten the product life.  |

## 1.1. Basic safety information



### WARNING!

The following instructions are those that should never be fail to observe in operation of construction equipment.

### Know yourself

All the operators and service men must wear safety equipment required, hearing protection, respirator, hard hat, safety shoes, eye protection glass, heavy gloves and other necessary equipment. Wearing loose clothing or any accessories such as flopping cuffs, dangling neckties and scarves, untied shoe-laces, rings, wrist watches and long hair could be the cause of personal injury or death.

Use the proper tools for inspection or maintenance work, which must be carried out after ensuring the equipment stops completely and is placed stably in the safe place



Figure 1

### Know your equipments

Never fail to read and understand the safety messages, operation manual and maintenance manual before installation and operation of the grab. The operator who has been trained and licensed should only operate the carrier and the grab. Familiarize yourself with the operating especially safety related devices such as safety lock, emergency stop and the others.

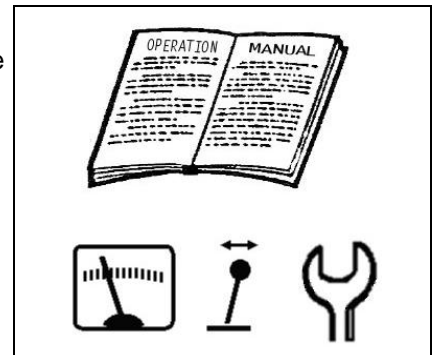


Figure 2

### Know the work site

Before beginning operation, check in and around the work site for any unusual conditions that could be dangerous and prepare the appropriate warnings for safe work.

Be careful, especially when work in the vicinity of electric power line, buried gas lines or oil tank. And pay your careful attention to the people and the cars reside and passing near to the work site. Prepare for every possible injury and damages.

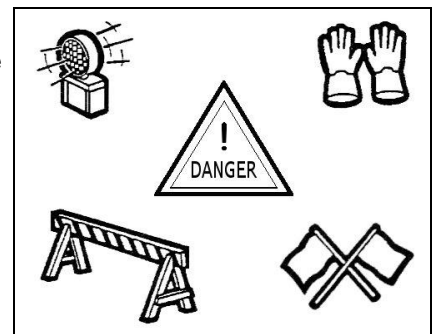


Figure 3

## Know the rules

Every people who operate or maintain the equipment should know the meaning, rules and laws in terms of equipment handling. They should know also the traffic rules, fire service act, emergency measures and where the relief equipment is.

Keep the fire extinguisher and the first-aid case in the operator's cabin for emergency use.

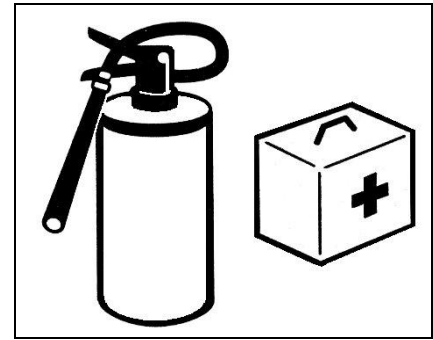


Figure 4

## 1.2. Preparation for safe operation



### WARNING!

Read and observe the following instructions on safety.

### Install the grab on the suitable carrier

The suitable carrier must be selected taking the weight and hydraulic system of the grab into consideration. The carrier may fall over if the grab is installed on the carrier, which does not fit the grab. All hydraulic lines for the grab use must satisfy the specification and quality provided in page 15, "5.2. Requirements on the carrier".

### Protect the operator from the flying splinters

To protect the operator from the heavy concrete elements falling down when the grab is working on the tall columns, supports and brick, the carrier should be equipped with the cab protector strong enough for the falling elements. For more information on the cab protector, please consult carrier manufacturer or EVERDIGM dealer.

### Safety instructions on the grab installation

When insert the mounting pin to install the grab on the carrier, the pin holes in the carrier's arm must be flush with those in the mounting adapter of the grab. For this job, an carrier operator and an assistant should be careful and agree on the hand signals beforehand. Your finger or hand must not used to check whether the holes are flush. Once the mounting pins are inserted, lock the pins so that they are not taken off.

If quick coupler is used, be sure clamping is completed. When you connect the hose, tighten the connectors with prescribed torques.

And make sure of complete connection when you open the stop valve. It may cause personal injury if the incorrectly connected hose is pressurized. When connecting the hose, be careful not to have the o-ring damaged or missed, and keep all the connectors clean.

## Check the grab and carrier

Please check every necessary parts of the grab and the carrier before starting operation. Referring to check points in the manuals of the grab and carrier, check any damages, breakage, crack, wear, deformation, connections, oil leak and the safety related points.

For the grab, check carefully crack in the welded parts of grab body, bolt and nut, pin, oil leak on the cylinder and hose. Do not operate in case any damages or failure is found until it is fixed. In case such trouble is found, put the warning tag in the driver cab. It is good to let the same person remove the tag after trouble shooting. (Figure 5)

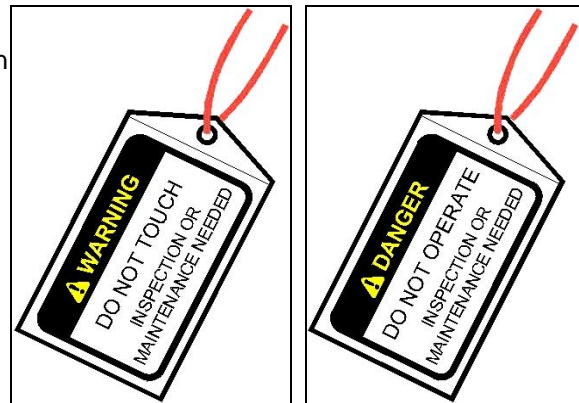


Figure 5

## Check safety in work site

Check if the building has a sufficient load capacity to bear the weight of the carrier in case it is necessary to work on the roof or ceiling of the building.

## 1.3. Safety information for operating the grab



### WARNING!

The following instructions are on safety in operation with grab. Read, understand and observe the instructions. More information is provided in page 23, "6.3. Operation".

### Never operate in unallowed applications

Operation in applications not allowed by the manufacturer must not be carried out. Refer to page 23, "6.3. Operation" for such applications.

### Operate from the top downwards

Heavy broken concrete elements may fall down and damage the hydraulic grab and the carrier, therefore, columns and supports must be broken from the top downwards.

### Never use for hammering or ramming

Hammering or ramming with the grab may cause serious damage to the grab.

### Prepare a escape for the carrier

Never fail to prepare a escape for the carrier for emergency. The direction needs to be opposite to the object of crushing and it should be straight way.

### Stop operation on finding uncertainties

Never fail to stop the operation if an uncertain noise or vibration is detected during the operation and check the condition of the carrier and the grab.

## Pay attention during operation

Do not read, do not listen to music, do not talk over the cell phone during the operation. Do not operate the grab as well as the carrier carelessly.

## 1.4. Safety information for maintenance of the grab

### Follow the manual

Follow the instructions described in the manual when performing maintenance work on the grab. Pay your careful attention to all relevant safety regulations. Do not hurry. Most of accidents occur when the instructions are not observed.

### Use proper tools

The proper tools should be used for the maintenance work. Use of improper tools may cause personal injury or damage to the parts of the grab. Wear the eye protective glasses especially when removing and replacing the cutter blades because the metal chips may fly off and cause injury if they are struck with a hand hammer made of steel.

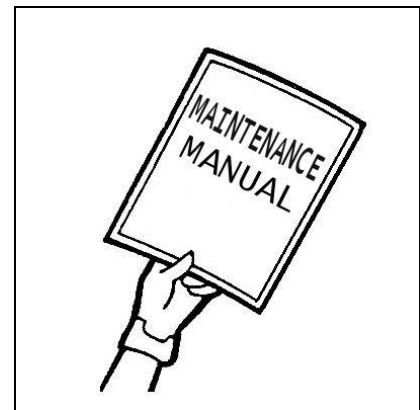


Figure 6

Use only the lug provided and sufficiently powerful lifting equipment when lifting the grab. Lug and ropes must be in good condition.

### Ensure that the grab and carrier stop completely

Maintenance work should be performed with the grab completely closed. Make sure to shut-off the stop valve of the hydraulic line for the grab or to use a support to sustain the opened grab if maintenance work should be carried out with the grab opened.

Place the carrier on the firm and flat ground with all the control levers or switches in a safe position.

### Pay attention to hot oil and high pressure in hydraulic system

Special attention is required when performing maintenance of hydraulic system. Never disassemble the grab as soon as the grab has been stopped because the hydraulic system is still in high pressure. Follow the instructions and release the residual pressure in the system. Pressure may remain in the speed up valve, and it may be burst if it is disassembled with the pressure inside.

Oil running out from the crack or small hole on hydraulic system may cause personal injury. The hydraulic oil becomes very hot. And compressed air in the oil tank may cause oil spouting when disconnecting the line. Bleed off the compressed air by opening slowly the filler cap of the oil tank.

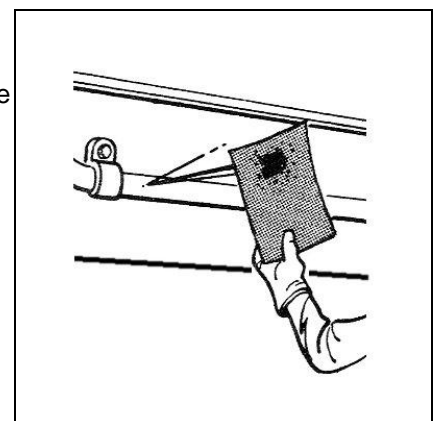


Figure 7



**Wet ground may be slippery**

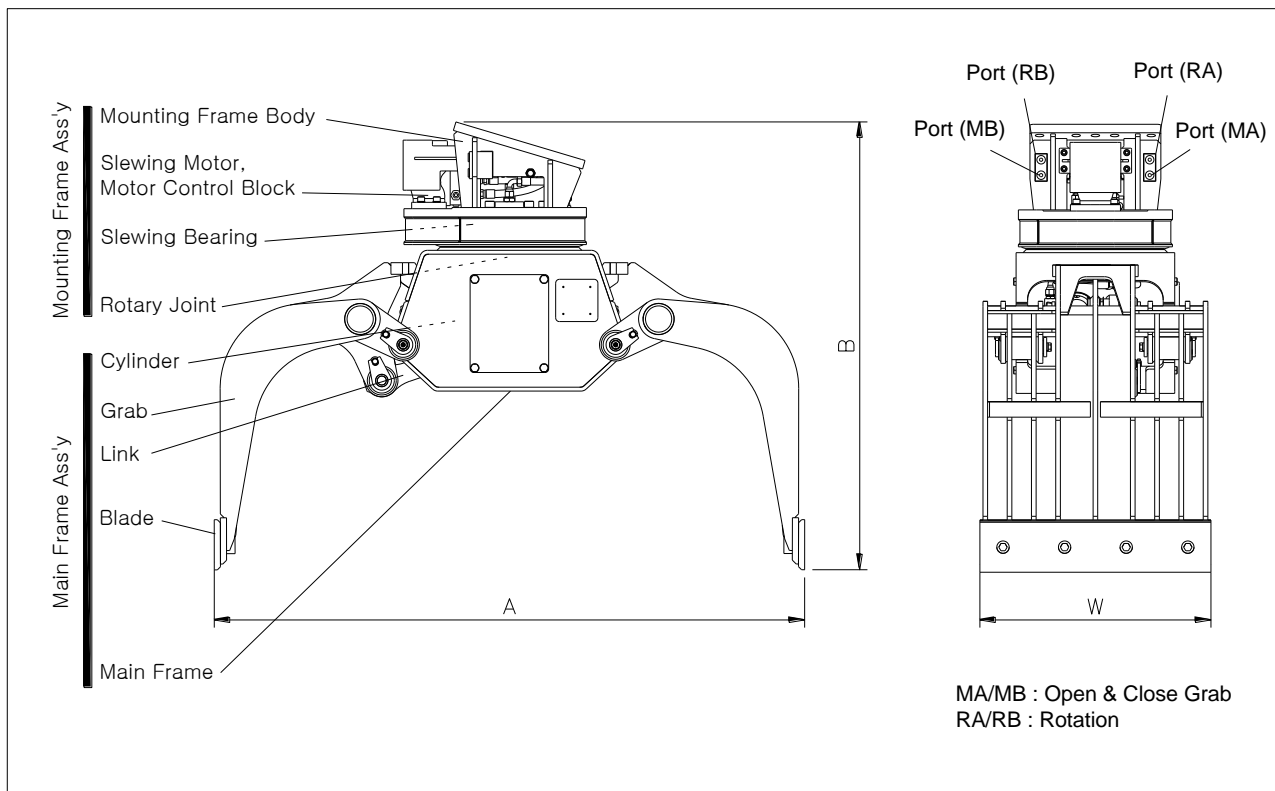
The oil wet on the ground may be very slippery. Collect any oil and dispose it correctly.

**Do not alter or modify**

Unauthorized alteration or modification of the grab shall not be guaranteed by EVERDIGM.

## 2. Configuration and ordering information

### 2.1. Main components



**Figure 8**

The followings are to be supplied as standard parts :

- Grab ass'y
- Standard tool kit
- Operation manual
- Parts list
- Standard accessories (fittings, hoses, etc)

### 2.2. Option components

The following parts are to be supplied as option only

- Standard mounting adapter <sup>1)</sup> (can be installed on most popular carriers)
- Mounting pin & bush set <sup>1)</sup>
- Special tools for cylinder maintenance
- Piping kit <sup>2)</sup> (including the hydraulic rotation circuit)
- Bolt and nut set for assembly of blades
- Bolt and nut set for assembly of cover plates

Notes : 1) Installation must be confirmed whether it is possible in accordance with the carrier dimension. Consult it with EVERDIGM dealer.

2) Refer to page 17, "5.3. Installation of hydraulic piping on the carrier" for more information

### 2.3. Mounting dimension for the adapter plate

EPG05

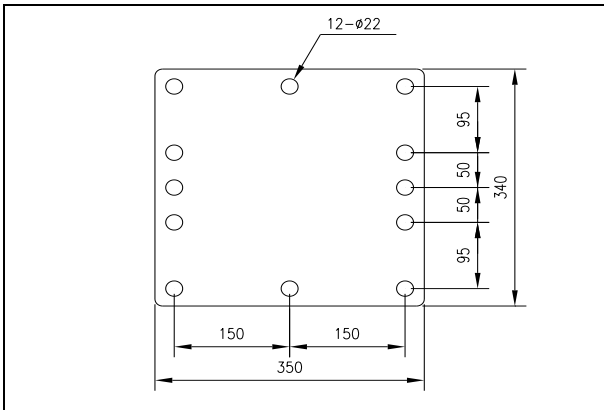


Figure 9

EPG08

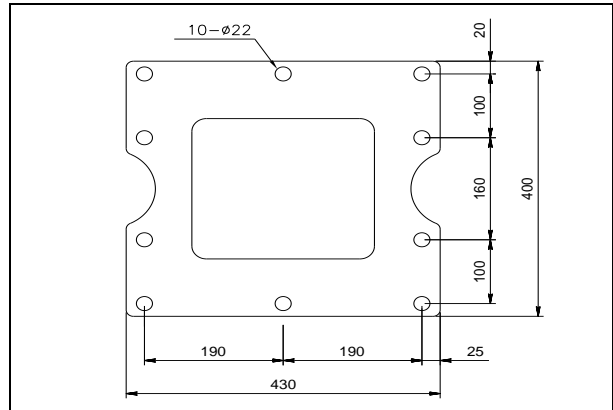


Figure 10

### 3. Technical specifications

| Model                                       | EPG05    |  | EPG08    |                 |       |
|---|----------|--|----------|-----------------|-------|
|   | Rib Type | Perforated Type  | Rib Type | Perforated Type |       |
| Weight <sup>1)</sup>                        | kg       | 432  | 419      | 568             | 548   |
| Height of opened grab(B)                    | mm       | 1,162  | 1,162    | 1,303           | 1,303 |
| Width of grab shells(W)                     | mm       | 600  | 600      | 700             | 700   |
| Width of opened grab(A)                     | mm       | 1,533  | 1,533    | 1,736           | 1,736 |
| Oil flow                                    | lpm      | 20 ~ 60  |          |                 |       |
| Max. Operating Pressure                     | bar      | 300  |          |                 |       |
| Max. Oil Flow for Rotation                  | lpm      | 20   |          |                 |       |
| Max. Pressure for Rotation                  | bar      | 140  |          |                 |       |
| Max. Rotation Speed                         | rpm      | 15   |          |                 |       |
| Rotating Angle                              |          | > 360° (Continuous)  |          |                 |       |
| Operating Oil Temperature                   | °C       | -20 ~ +90  |          |                 |       |
| Recommended Carrier Weight <sup>2)</sup>    | tonne    | 4 ~ 8  |          | 7 ~ 10          |       |
| Hose Connections                            |          |  |          |                 |       |
| Main  |          | Pressurizing Port 'MA' : Grab Closing<br>Pressurizing Port 'MB' : Grab Opening   |          |                 |       |
| Rotation<br>(at the view from carrier)      |          | Pressurizing Port 'RA' : Counter-clockwise<br>Pressurizing Port 'RB' : Clockwise |          |                 |       |
| Type of Hose Connection Ports <sup>3)</sup> |          |  |          |                 |       |
| Main (Port 'MA' and 'MB')                   |          | BSP 3/8  |          | BSP 1/2         |       |
| Rotation (Port 'RA' and 'RB')               |          | BSP 3/8  |          | BSP 1/2         |       |

Notes : 1) Total weight excluding mounting adaptor, hydraulic hoses, fittings and mounting pins.

2) The carrier weight must be heavier in case long boom and/or long arm are equipped. For more details, consult the manufacturer of the carrier.

3) JIS B2351 type 'O' O-ring boss ports.

## 4. Markings and labels

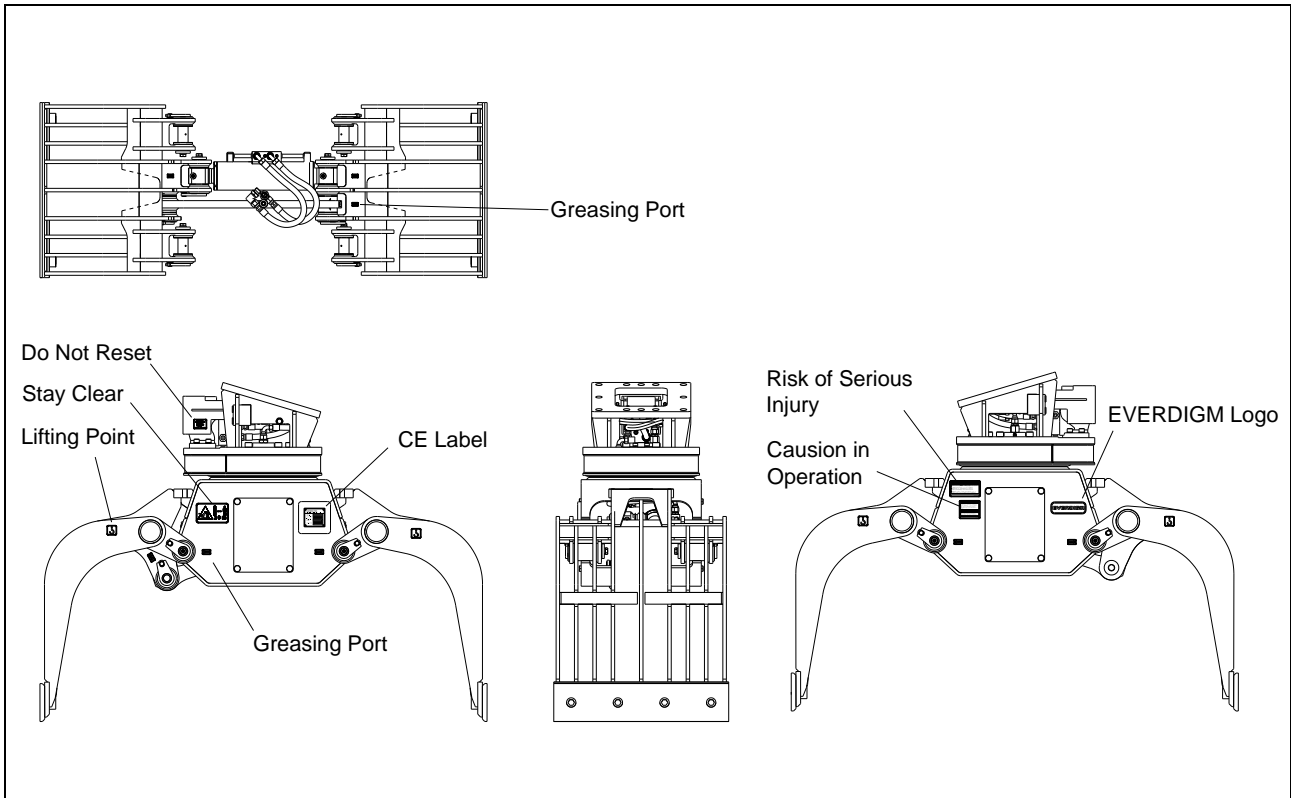




Figure 11

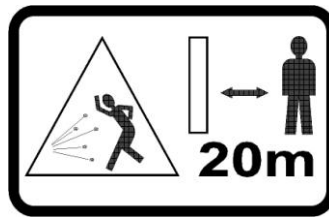
Pay attention to the marks and labels related to safety.



EVERDIGM Logo

|   |                                   |
|---|-----------------------------------|
|   |                                   |
| <small>332-3, Janggwan-ri, Jincheon-eub, Jincheon-gun, Chungcheongbuk-do, Korea</small>   |                                   |
| <small>Made in Korea</small>  |                                   |
| MODEL NAME  | <input type="text"/>              |
| SERIAL NO.  | <input type="text"/>              |
| MANUFACTURING YEAR  | <input type="text"/>              |
| INSPECTION DATE   | <input type="text"/>              |
| WORKING WEIGHT  | <input type="text"/> kg           |
| FLOW RATE   | <input type="text"/> lpm          |
| OPERATING PRESSURE  | Rotation <input type="text"/> lpm |
|   | <input type="text"/> bar          |
|   | Rotation <input type="text"/> bar |
| <small>WWW.EVERDIGM.COM</small>   |                                   |

CE Label



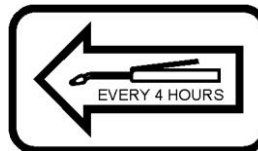
**Stay Clear**

Indicates that the distance must be kept to be safe from the flying rock splinter



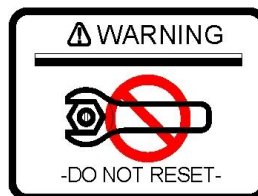
**Lifting Point**

Indicates the hooking points when lifting the grab



**Greasing Port**

Indicates grease apply point. Apply grease at the interval prescribed



**Do not reset**

Indicate "do not reset the slewing motor control valve".

### Caution in Operation

#### **DANGER**

- The operator must be adequately protected within the cab using the necessary window guarding.
- Do not operate when bystanders are in working area.
- Keep out from the attachment when it's moving parts opened. Risk of accident!
- Be sure to secure the attachment prior to maintenance.

#### **IMPORTANT**

- Lubricate every greasing point at the specified interval.
- Never use for unallowed applications.
- Follow all maintenance schedules.

Read the manuals prior to initial use and follow the safety instructions.

A095-0132

### Risk of Serious Injury

#### **DANGER**

- Never disassemble the hydraulic parts before closing the moving parts completely. Danger of injury or death!
- High pressure may remain in the cylinder. Danger of explosion! Follow the instructions.
- Oil can be very hot after operating. Risk of burns! Wait for machine cooling before any maintenance work.

A095-0134

## 5. Installation

### 5.1. Lifting the grab



#### **DANGER!**

Be sure of observing the instructions below because they are related to safety

- Move the grab with the grabs completely closed and hydraulic lines plugged.
- When lifting the grab, use only the lug provided and sufficiently powerful lifting equipment.
- Ropes and rugs must be in good condition.

### 5.2. Requirements on the carrier



#### **WARNING!**

Be sure of observing the instructions because they are related safety and the life of the grab

EVERDIGM hydraulic grab, EPG series is designed to be used with an hydraulic excavator. Refer to the following points when deciding an excavator for the grab.

#### ● **Carrier weight :**

- The excavator may fall over if the capacity is not good enough to use the grab or if it is equipped with a long boom and/or a long reach arm. Proper excavator should be decided for use with the grab or such long boom and arm.

#### ● **Hydraulic system :**

- The hydraulic system of the carrier must be suitable for the grab. Low flow rate and pressure results in slow working speed and low crushing force respectively. Check the specification of the carrier.
- For the hydraulic grab, the inner diameter of the hydraulic line must be correspond to page 12 “3. Technical specifications” or bigger. If the inner diameter is small inadequately, back-pressure increase and the hydraulic oil in the lines may be overheated.
- Have the bigger line for the grab closing than the line for the grab opening.
- The seamless steel tube with thickness of more than 4.5mm (schedule 80 or higher) must be used. And the hose must satisfy SAE R11~14.
- Generally speaking the hydraulic oil originally recommended for the carrier can be used for the EVERDIGM hydraulic grab. However, since working with the hydraulic grab will heat the oil much more than the usual excavation work, the viscosity of the oil must be checked. When the grab is used continuously, the viscosity of the hydraulic oil should be 15~100 cSt at the whole operating temperature range. For more details about hydraulic oil, refer to page 32, Chapter “7.4. Hydraulic oil”
- When installing the grab with no pre-filled oil in it, the grab’s cylinders need a lot of oil. So you must fill the oil by the proper level in oil tank after operating the grab two or three times.

- Hydraulic system must have a proper cooling system in order the temperature of the hydraulic oil not to exceed 90 °C (194 °F) which may cause damage to the grab as well as the carrier. If the carrier's oil cooler is too small either the original cooler must be replaced with a larger one or an auxiliary cooler must be installed.

- **Retrofitting from breaker piping to grab piping :**

- When retrofitting the breaker piping lines to grab piping lines, take the return line of the existing breaker piping lines for the grab closing lines of the grab. If the return line of the existing breaker lines is also installed for low pressure only, we recommend you to replace all the piping lines with the adequate piping lines as required above and make the lines both supply and return lines to high pressure lines. If the breaker supply line is taken for the grab opening line, relief valve on the breaker supply line does not need to be reset. (But the setting pressure must be more than 230 bar)
- For more detailed information, refer to EVERDIGM service center.



### 5.3. Installation of hydraulic piping on the carrier

- Basic circuit for grab piping

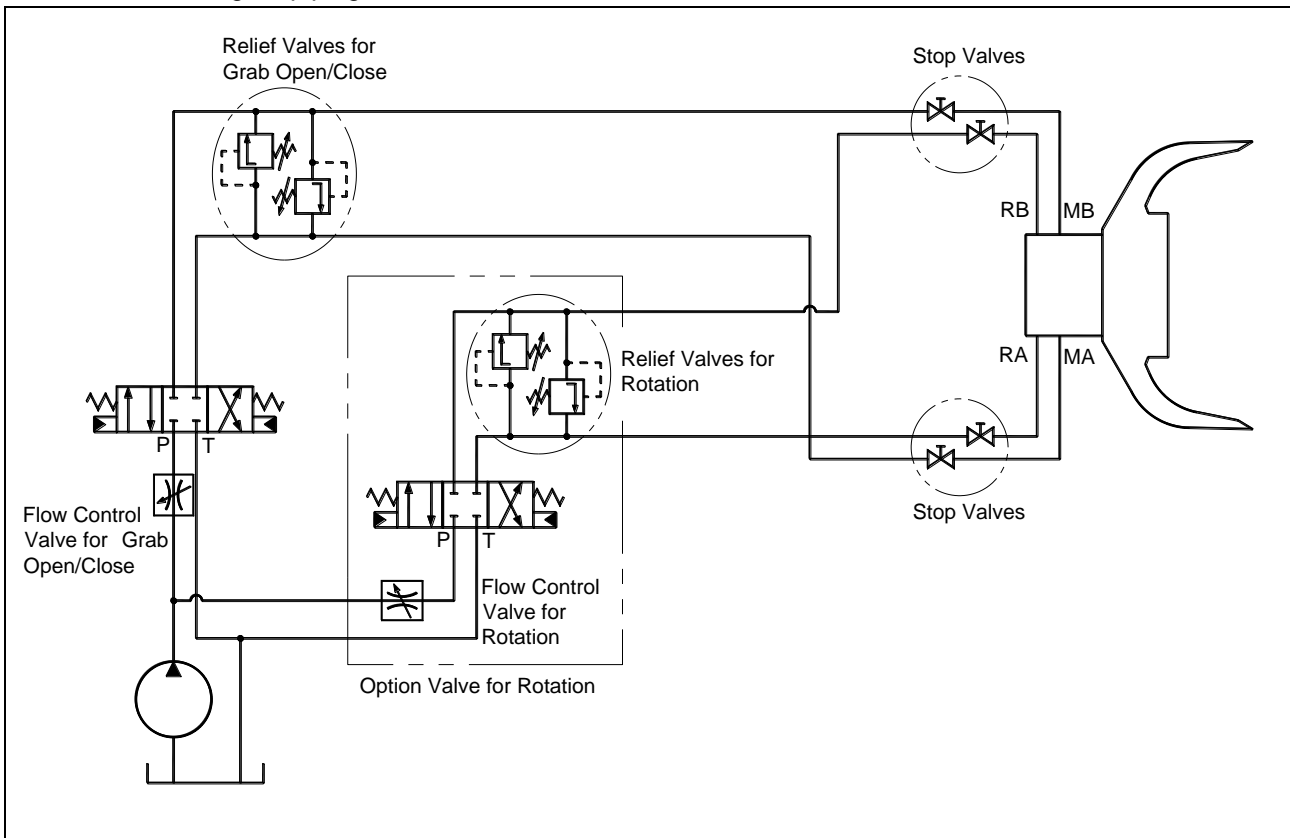


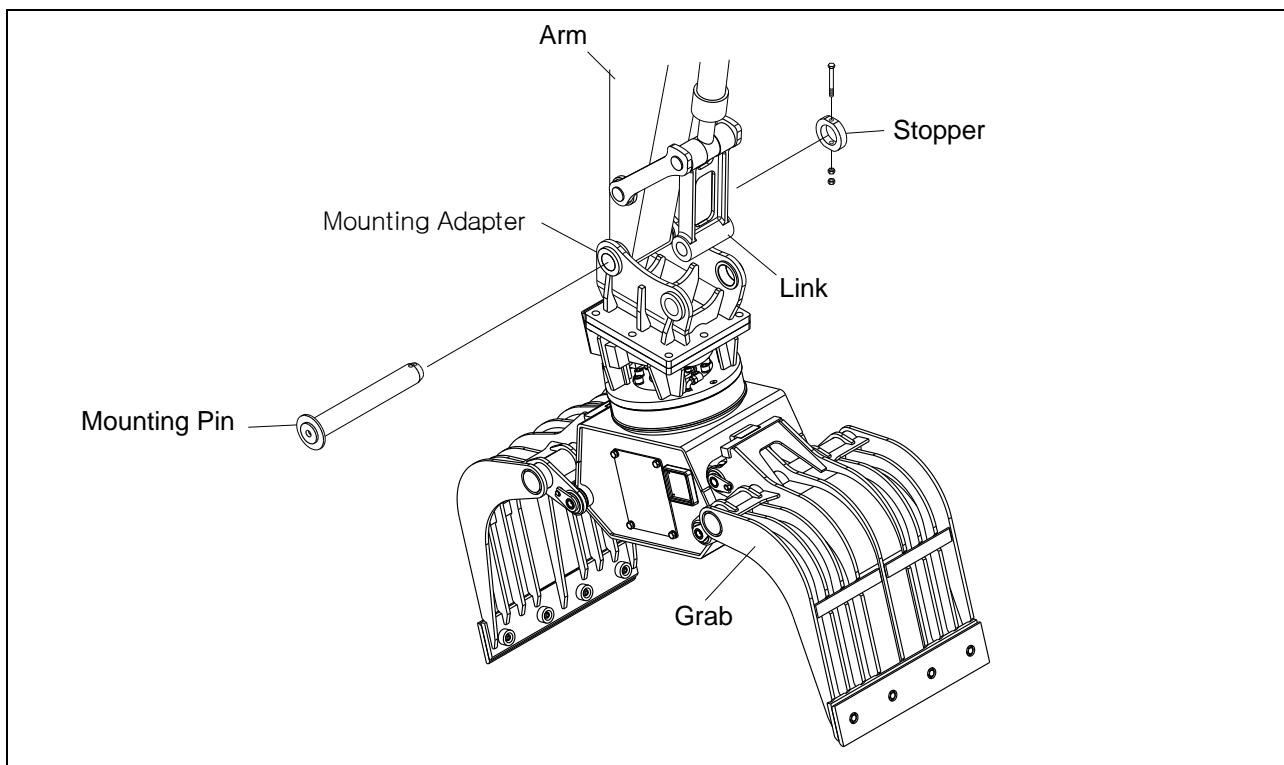
Figure 12

The following functions are required in the hydraulic circuit for the grab :

- Relief valves to set the maximum pressure in grab opening and closing operation
  - Flow control valves to adjust working speed and rotation speed  
(but, it is necessary not to exceed recommended speeds otherwise hydraulic motor and seals in it will be damaged. Refer to page 12, “3. Technical specifications“)
  - Relief valves in hydraulic motor to set maximum pressure.
  - Stop-valves in the connection with the hose from the grab.
- Standard piping kit for EVERDIGM EPG-series grab  
By this kit, all of Grab opening, closing and rotating of the grab can be carried out with one spare valve of the carrier. For more information, ask EVERDIGM dealer.

## 5.4. Mounting the hydraulic grab

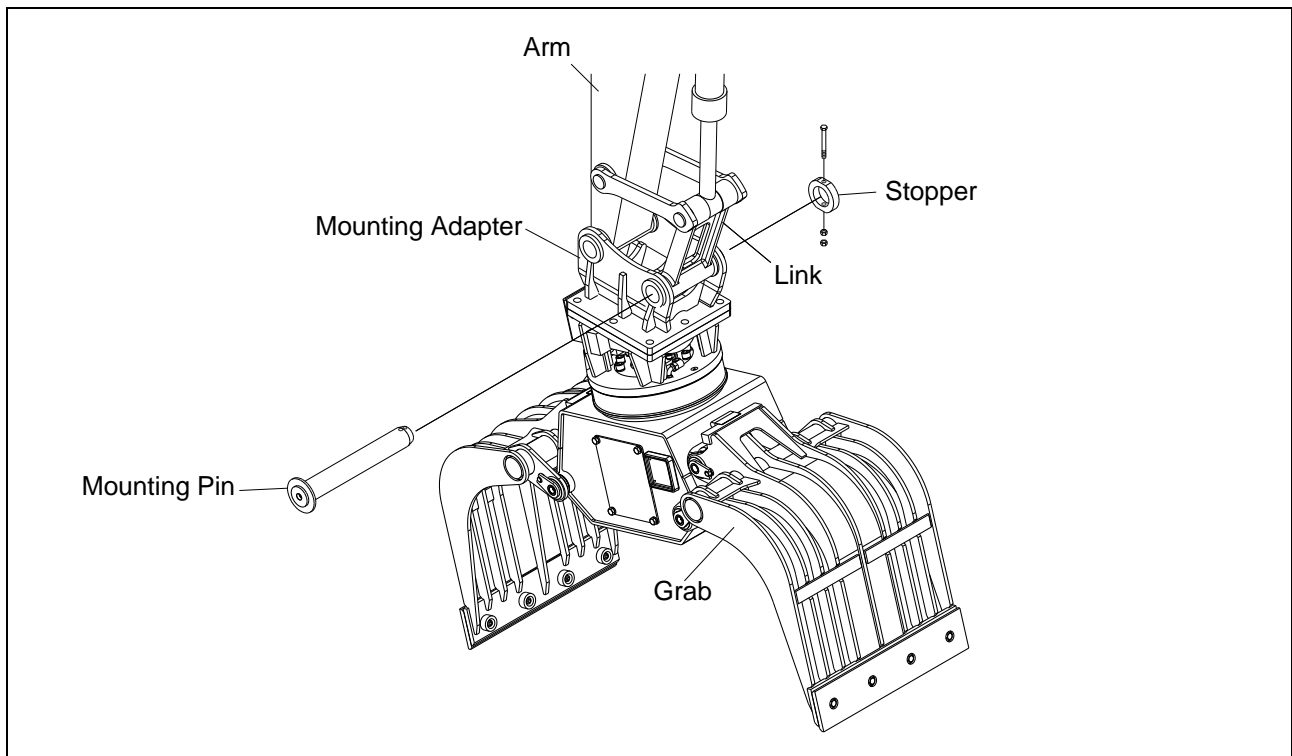
- Step 1 :



**Figure 13**

- Before mounting the grab, please put it on the flat place to take care of the direction of the mounting adapter as the drawing.
- Set the carrier's engine speed to low idle, and move the stick of carrier slowly until its hole is aligned with that in the mounting adapter. Insert the mounting pin and assemble the stopper and its fasteners. According to mounting adapter, the stopper and fasteners may not correspond exactly to Figure 13.

● **Step 2 :**



**Figure 14**

- Move the shovel cylinder and align the hole of carrier link with that in the mounting adapter in the same way as the Step 1.



**DANGER!**

When aligning the pin holes, never insert fingers into the pin holes or the inner space of the linkages. Unexpected movement of carrier may cause a server injury.

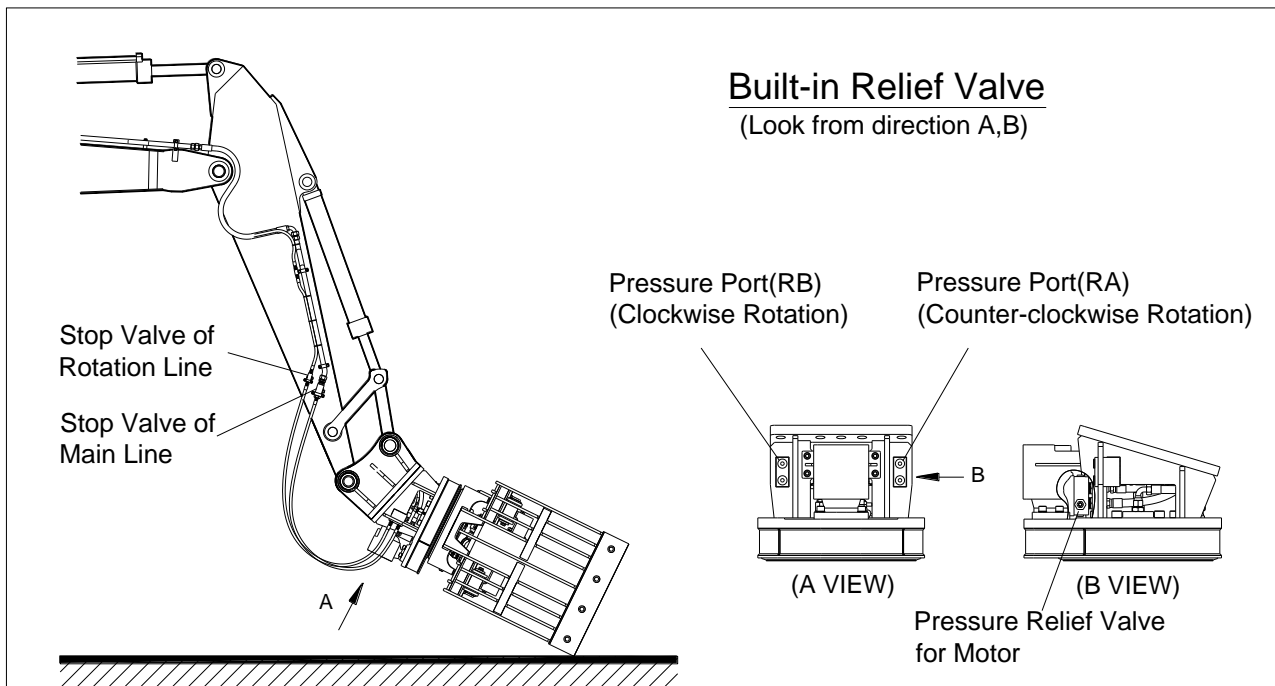
Match the holes by only visual lining up. While moving the carrier, make sure that there is no person in the vicinity of the carrier.

Personal injury can result also from dropping the mounting pins during the installation work. Wear safety shoes to protect feet.

● **Step 3 :**

- Remove the end caps from the connection ports on the grab and the stop valves on piping line, then connect the main port and rotation port each other with proper hydraulic hoses.
- The connecting threads must be undamaged and clean from sands, water, etc.
- Open the stop valves on piping line.

## 5.5. Adjustment of the rotation device



**Figure 15**

A built-in relief valve, in which a relief valve to protect rotation motor is built in EVERDIGM hydraulic grab EPG-series. Do not reset this relief valve because it is set in the factory when delivery. If reset is required, follow the instructions below.

A built-in relief valve will be seen as Figure 15.

- **Setting of the relief valve :**

- Port for pressure check is positioned in both ports 'RA' and 'RB'. Place a pressure gauge into either port, and set the minimum pressure unscrewing the pressure relief valve to the end. The pressure gauge must be for 400 bar or more.
- Place the grab to the ground or the other strong structure so that the grab can not rotate.
- Increase pressure by screwing the screw adjuster until the pointer of the pressure gauge reaches the recommended pressure with the rotation actuator of the carrier switched on. Recommended pressure is less than 100 bar.
- Pay attention to the max pressure since motor life will be reduced if it is used over maximum pressure.



### **DANGER!**

Pay attention to the safety in case a worker is vicinity of working area. Never operate the grab with workers in close proximity to the grab.



### **IMPORTANT!**

Do not reset the relief valve if possible. The rotation motor life will reduce if the pressure is set exceeding the allowed pressure.

- **Setting of the throttle valves :**

- Position the grab for rotation, and rotate it.
- Set the rotation speed by adjusting the flow control valve in the carrier's rotation pipe.
- The proper rotation speed is 7~12 rpm and it must not exceed 15 rpm.



**IMPORTANT!**

It will cause personal injury, damage to the grab, or inconvenience operation if the rotation speed of the grab is too high. The service life of the rotation bearing will reduce if it exceeds 15 rpm.

## 6. Operating the grab

### 6.1. Preparation for safe and correct operation

After whole installing procedure as described in the previous chapter, the grab is ready to operate. However, before starting up the grab, please make sure the followings :

- mechanical connection between the grab and the carrier
- locking status of the mounting pins
- hydraulic connections between the grab and the carrier
- exact setting of the relief pressure
- no oil leaks from the hydraulic connections and any parts of the grab
- no defective or loosened parts of the grab
- cracks, wear, loss, etc.

Check the followings moving the grab :

- corresponding the grab movements and the rotating direction with the appropriate actuating switches in the carrier's cab
- smooth opening and closing of the grabs
- smooth rotating of the grab
- no abnormal sound and no vibration during the operation



#### **WARNING!**

Read carefully and follow all safety regulations concerned with the preparation for safe operation. Refer to page 6, "1.2. Preparation for safe operation".

### 6.2. Greasing

Apply grease to every grease nipple – marked with the “Greasing Port” label – at the joint pins and slewing bearing of the grab using recommended greases.

- Recommended greasing Interval : Every 2 hours
- 4 ~ 5 strokes from a grease gun to each greasing nipples are sufficient in each case
- Adapt greasing interval and amount of grease to working conditions
- Insufficient greasing may cause abnormal wear of the joint pin or slewing bearing
- Grease with the following properties are recommended:
  - No dropping point (or very high, over 250 °C / 480 °F)
  - Max. working temperature over 150 °C / 300 °F
  - Min. working temperature under lowest ambient temperature
  - Additives : molybdenum disulphide (MoS<sub>2</sub>), graphite or equivalent
  - Grade (thickness) NLGI 0~2
  - Water resistant

- Recommended grease

| Manufacturer | Grease         |
|--------------|----------------|
| SHELL        | Extrema MDS    |
| ESSO         | EOL 232        |
| WYNNS        | GS80           |
| KRUBBER      | Unimoly GB2    |
| TEBO         | Geargrease MDS |

### 6.3. Operation



#### WARNING!

Read carefully and follow all safety regulations concerned with safe operation. Refer to page 7, "1.3. Safety information for operating the grab".

- **Operating temperature :**

The operating temperature of the grab is  $-20 \sim +90^{\circ}\text{C}$  ( $-4 \sim +194^{\circ}\text{F}$ ).

If the ambient temperature is lower than  $-20^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$ ), the grab have to be warmed up before starting operation in the way described at the carrier's manual. During operation, they will remain warm.

If the oil temperature exceeds  $+90^{\circ}\text{C}$  ( $+194^{\circ}\text{F}$ ), please stop the carrier and wait until the oil has cooled to operating temperature range. For continuous operation with high duty, maximum oil temperature is recommended not to exceed  $+80^{\circ}\text{C}$  ( $+175^{\circ}\text{F}$ ). An auxiliary oil cooler must be fitted if needed.

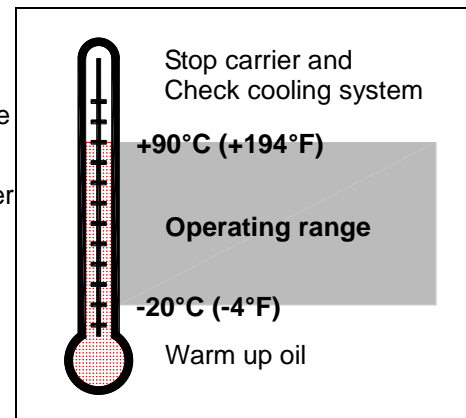


Figure 16

The oil temperature during operating the grab depends on ambient temperature condition, on cooling capacity of carrier's hydraulic system and on working duty for the grab. Use the hydraulic oils of high viscosity in high oil temperature.



#### IMPORTANT!

If the oil temperature exceeds  $+90^{\circ}\text{C}$  ( $+194^{\circ}\text{F}$ ), please stop the carrier and wait until the oil has cooled to operating temperature range. Extreme oil temperature may cause serious damage on the seals in the carrier and grab.

● **Correct working method :**



**WARNING!**

Stop operating immediately if anyone moves into the danger area, i.e. within a radius of at least 20 meters around the grab. Must be observant of other workers, bystanders and other equipments in the danger area.



**WARNING!**

Please do install the proper protection shield on the carrier's cab to prevent possible injury from flying pieces of broken rock or the cut steel pieces.



**DANGER!**

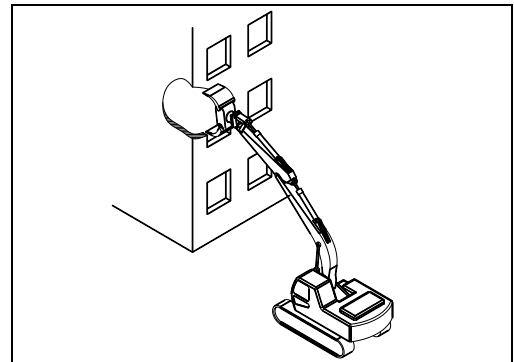
Improper operation of the grab could result in serious injury or death. Never operate the grab unless you are properly trained.



**DANGER!**

***DO CRUSHING FROM THE TOP DOWNWARDS.***

Always be careful of falling down of broken elements. When crushing columns, chimneys and brick wall, the crushing operation has been done from the top to the bottom. In case of the large construction of heavy concrete, the supporting elements must always be broken later. If not, there is a danger they may collapse.



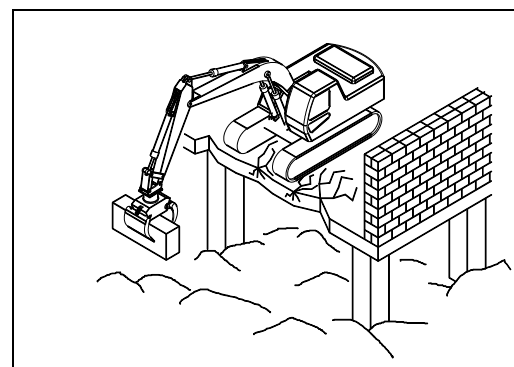
**Figure 17**



**DANGER!**

***MAKE SURE THE STRENGTH OF STRUCTURE WHICH SUPPORT THE CARRIER.***

Check the strength of roofs or ceilings in advance is sufficient to maintain the weight of the carrier. If any doubt exist about the strength, do not operate on it.



**Figure 18**





**ENSURE POSITION OF THE CARRIER.**

Do place the carrier on the even flat ground during the operation. If not, there is a danger the carrier may fall down and turn upside.

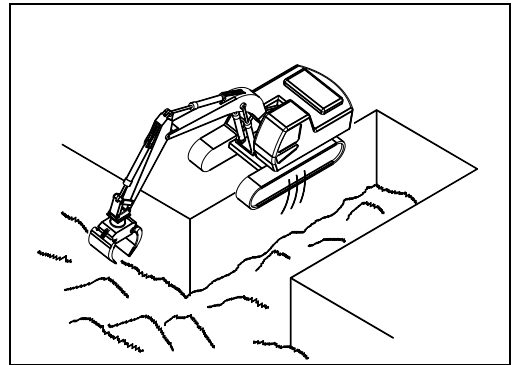


Figure 19



**CHECK UNDERGROUND PIPING.**

Check demolition job is being done over the area where high-pressure piping or similar gas piping was laid out. High-pressure gas piping can be explosive at damage.

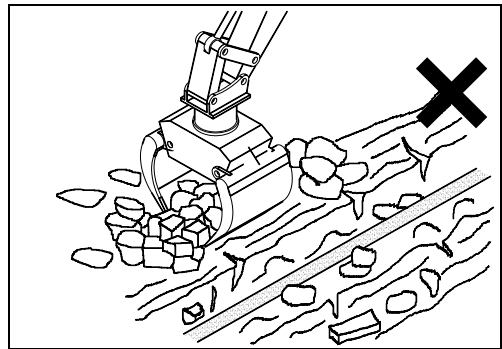


Figure 20



**DO NOT USE FOR TRANSPORT PURPOSES.**

The hydraulic grab is not intended to hoist or tow any object. To do so can bring out the risk of unexpected turning upside-down and the damage in the grab.

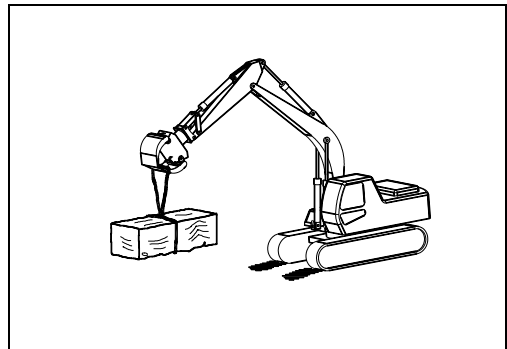
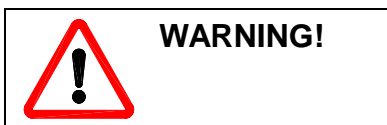


Figure 21



**DO NOT OPERATE TO EITHER SIDE OF THE CARRIER WITH THE BOOM AND ARM EXTENDED.**

This can make a danger of the carrier fall over.

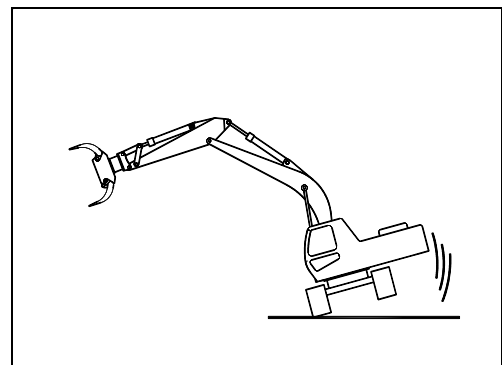


Figure 22



**DO NOT OPERATE WITH THE CARRIER'S HYDRAULIC CYLINDERS FULLY EXTENDED OR RETRACTED.**

Make sure that the piston of the hydraulic cylinders of the carrier are at least 100 mm away from the stroke end before operating grab. Failure to do so will cause damage to the carrier's hydraulic cylinders.

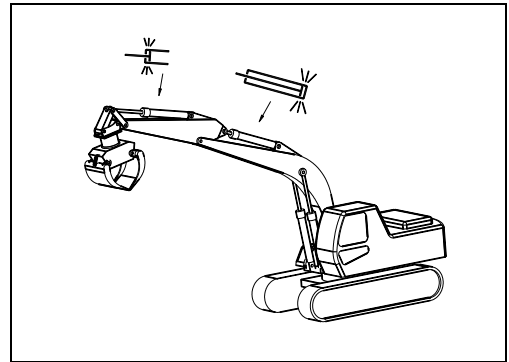


Figure 23



**DO NOT SUPPORT THE CARRIER WITH THE GRAB.**

Never support the carrier's weight with the grab -i.e. jack-up with grab- to rotate the carrier's undercarriage. This will cause serious damage to the grab.

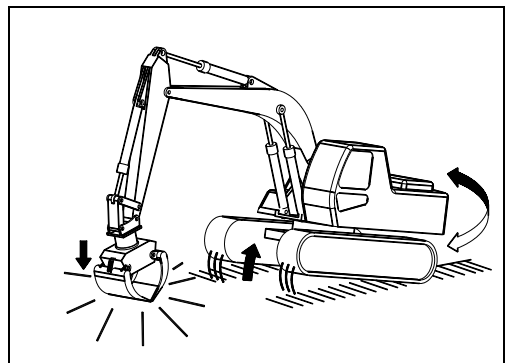


Figure 24



**NEVER USE AS A HAMMER.**

Never attempt to use the grab as a hammer or ramming tool. This will lead to the serious damage to the grab.

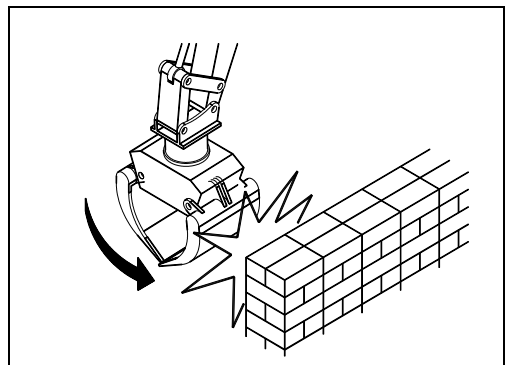


Figure 25



**START WORK AFTER REMOVING STEEL REBARS.**

Steel rebar can severely damage cylinder and hoses. Thus, remove steel rebar first before work.

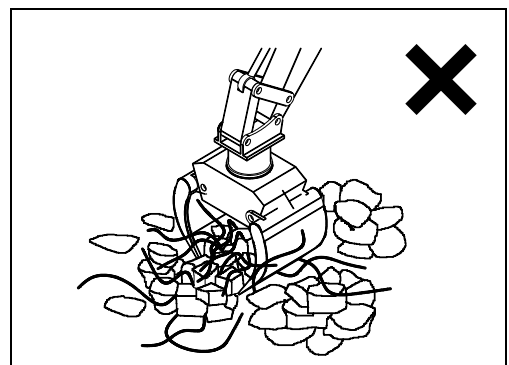


Figure 26



**NEVER PULL AT HEAVY ELEMENTS**

Do not pull at heavy columns, girders or foundation with the grab. This will cause serious damage both the grab and the mounting adapter.

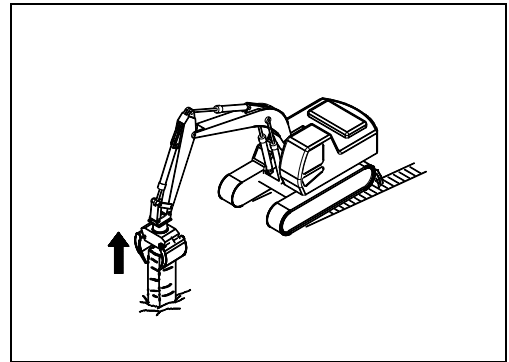


Figure 27



**DO NOT ROTATE THE GRAB WHILE CRUSHING IS IN PROGRESS**

This will cause damage to the grab and carrier's arm.

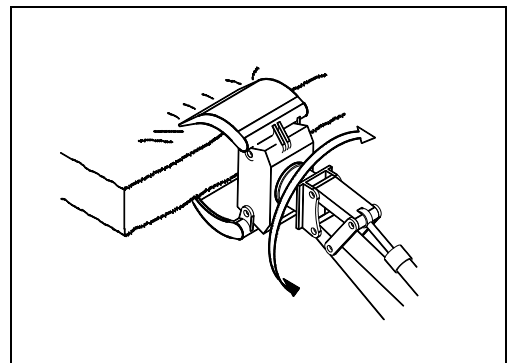


Figure 28



**NEVER ATTEMPT TO DO UNALLOWED JOB.**

Do not attempt to do job other than open and close motion of grab by hydraulic forces. If this is not applicable, realign the position of grab and start work.

Do not attempt to move grab back and forth or ramming, crushing, compacting.

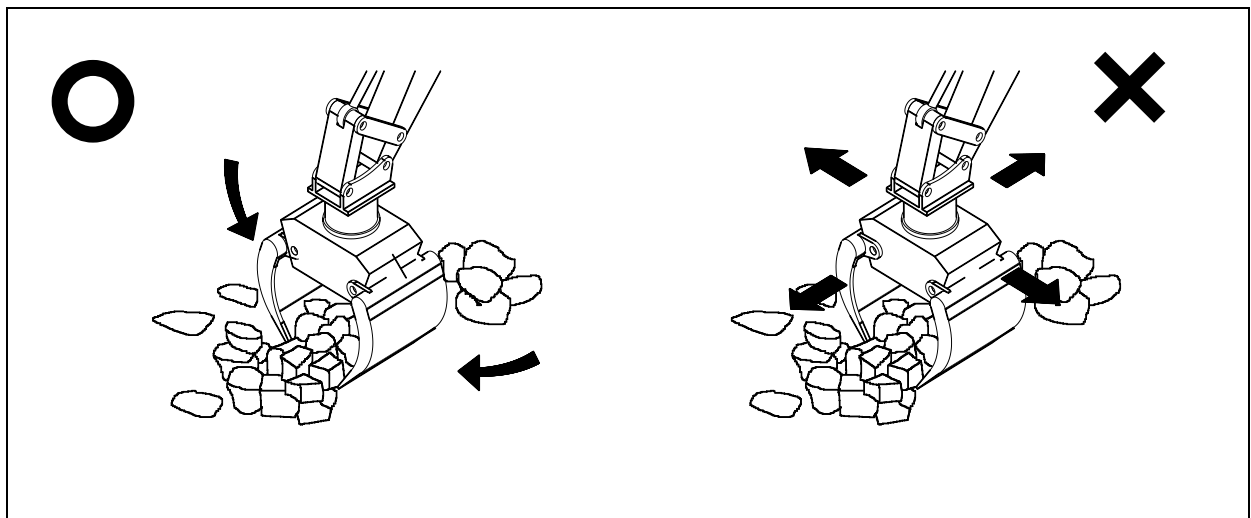


Figure 29

*\* Please consult EVERDIGM dealer for the operation in special applications such as :*

- underwater use
- cutting high temperature object
- bitting off ladle slag in iron works

## 7. Inspection and Maintenance

### 7.1. General information

Routine inspections and maintenance work must be carried out to keep the hydraulic grab in the best operating condition. The following sections list the inspection and maintenance intervals, check points over the grab and carrier.



#### **WARNING!**

Read carefully and follow all safety regulations concerned with maintenance of the grab. Refer to page 8, "1.4. Safety information for maintenance of the grab".

Whenever maintenance work is carried out, keep always following instructions.

1. Park the carrier on a firm and flat ground.
2. Close the grabs of the grab completely.
3. Lower the grab to ground and put the grab on a rigid and clean support.
4. Lower the engine speed to the lowest idle position.
5. Wait for at least 10 minutes to allow the residual pressure in the grab be released.
6. Turn the stop valves to "OFF" position



#### **DANGER!**

Never put your body into the open grabs. ***Risk of death or serious injury!***

Followings are the basic inspections to be checked always :

- ✓ Check, whenever inspecting, if there is a crack at the welded part of the grab (visual inspection).
- ✓ Check, whenever inspecting, if there are oil leaks at the hydraulic components or the hydraulic connections of the grab.
- ✓ Check, whenever inspecting, if all fasteners such as bolts, nuts and snap-rings come loose, and retighten them to the prescribed tightening torque, if necessary. Broken parts must be replaced immediately. Refer to page 31, "7.3. Tightening torques" for detail instructions.

In order to prevent possible damages to the grab from unallowed maintenance work, please keep following instructions :

- The hydraulic components of the grab - such as hydraulic cylinders, speed-up valve, rotation motor, etc. - are precision made hydraulic elements. These parts are strongly recommended to maintain by authorized EVERDIGM service.
- Absolute cleanliness and great care are basic and essential matters in handling of any hydraulic components. Dirt is the worst enemy in hydraulic system.
- Sealing components such as packings, O-rings and plugs in the hydraulic system should be oiled with very clean oil before assembly.



#### **DANGER!**

High pressure can be maintained in hydraulic cylinders and hoses long after the system has been shut down. This residual pressure can cause hydraulic oil or parts such as plugs to shoot out at high speed if the pressure is not released completely.

## 7.2. Maintenance intervals

- **Every 2 hours**

- Grease the joint pins and adjust screw

- **Daily**

- Retighten loose components. Especially :
  - Bolts at the rotation bearing
  - Bolts in the blades
- Check the wear or breakage of the blades.
- Check if the hydraulic connection become loose.

- **Weekly**

- Check the wear of the grabs and grab body.
- Check carefully if there is a crack in the welded part of the grab.
- Check the hydraulic components of the carrier.
- Check abnormal sound or vibration during the grab movements and rotation of the grab.

- **Every 1000 hours, or yearly**

Contact EVERDIGM service or dealer for yearly maintenance. Yearly service is recommended to be done by authorized EVERDIGM service after 1000 operating hours.



**IMPORTANT!**

Neglecting the yearly service can cause severe damage to the grab.

The maintenance intervals may need to be shortened depending on the operating conditions.

### 7.3. Tightening torques

| Thread Spec. | Head Size     | Tightening Torque [kgf•m] | Comments          |
|--------------|---------------|---------------------------|-------------------|
| 0.875"-14    | 25 Hex head   | 6.6 ~ 7.3                 | Pilot check valve |
| M8 x1.25     | 13 Hex head   | 3.5 ~ 4                   |                   |
| M8 x1.25     | 6 Hex socket  | 3.5 ~ 4                   |                   |
| M10 x 1.5    | 17 Hex head   | 7 ~ 8                     |                   |
| M10 x 1.5    | 8 Hex socket  | 7 ~ 8                     |                   |
| M12 x 1.75   | 19 Hex head   | 12 ~ 14                   |                   |
| M12 x 1.75   | 10 Hex socket | 12 ~ 14                   |                   |
| M14 x 2      | 22 Hex head   | 19 ~ 21                   |                   |
| M14 x 2      | 12 Hex socket | 19 ~ 21                   |                   |
| M16 x 2      | 24 Hex head   | 30 ~ 33                   |                   |
| M16 x 2      | 14 Hex socket | 30 ~ 33                   |                   |
| G1/4         | 19 Hex head   | 4 ~ 4.5                   | Adapter           |
| G1/4         | 19 Hex head   | 3.6 ~ 4                   | Hoses             |
| G3/8         | 22 Hex head   | 5 ~ 5.5                   | Adapter           |
| G3/8         | 22 Hex head   | 4.5 ~ 5                   | Hoses             |
| G1/2         | 27 Hex head   | 9.5 ~ 10.5                | Adapter           |
| G1/2         | 27 Hex head   | 8.5 ~ 9.5                 | Hoses             |

## 7.4. Hydraulic oil

Generally speaking the hydraulic oil originally intended for the carrier can be also used in the hydraulic grab. However, since working with the hydraulic grab will heat the oil much more than the usual excavation work, the viscosity of the oil should be selected properly.

When the grab is used continuously, the temperature of the hydraulic oil normalizes at a certain level depending on working conditions and on the carrier's hydraulic system. At this temperature, the viscosity of the hydraulic oil should be 15 ~ 100 cSt.

The hydraulic grab should not be started if the viscosity of the hydraulic oil is above 1000 cSt or operated when the viscosity of hydraulic oil is below 15 cSt.

Following table shows hydraulic oils recommended for grab use.

| Manufacturer | Hydraulic Oil         |
|--------------|-----------------------|
| TOTAL        | Total Equivis ZS46    |
| SHELL        | Tellus Oil T32, T46   |
| MOBIL        | Mobil DTE 13M, 16, 24 |
| CALTEX       | Caltex HD Z46         |
| ESSO         | Univis N32, N46       |
| TEXACO       | Rando Oil 32S, 46     |

In summer and hotter climates, oils of viscosity class HLP 68 (68 cSt at 40°C) or higher should be used.

Using the oil with higher viscosity (too thick) may cause :

- Generating shock while cylinder is in operation
- Risk of failure in the pumps and rotation motor
- Life time of hydraulic oil filter shortened

Using the oil with lower viscosity (too thin) may cause :

- Efficiency losses (internal leaks)
- Damage to seals and oil leaks
- Accelerated wear in moving parts due to insufficient lubrication

### ● Hydraulic oil purity

No separate filter is required when the hydraulic grab is installed in the carrier. The hydraulic oil filter of the carrier will clean the oil flowing through the grab. The purpose of oil filter is to remove impurities from the hydraulic oil since they cause accelerated component wear, blockages and even seizure. Impurities also cause the oil to heat and deteriorate. Air and water are also impurities in oil. Not all impurities can be seen with the naked eye.

### ● Oil filter

In hydraulic grab work, the carrier's oil filter must fulfill the following specifications:

- The oil filter must allow maximum particle size of 25microns (0.025mm).
- The oil filter material must be fiber cloth or very fine metallic mesh to withstand pressure fluctuations.
- The oil filter must have a volume flow capacity of at least twice the grab's maximum flow



In general, oil companies guarantee new oil to have a particle count of 40 microns maximum. When adding oil to existing tank the oil must be filtered.

The impurities in the hydraulic oil can cause damages to the grab and carrier as follows :

- The working life of the hydraulic elements is significantly shortened
- Valves do not function properly due to spool stick
- Wear of cylinder rod and seals
- Shortened working life and reduced efficiency of hydraulic oil (overheats of oil, deteriorates of oil quality, electro-chemical changes in hydraulic oil)

We recommend to replace the hydraulic oil and oil filters at the intervals shown in the following table, which is based on the grab operating time.

|               |                 |
|---------------|-----------------|
| Hydraulic Oil | Every 600 hours |
| Oil filters   | Every 100 hours |

### ● Oil cooling

The maximum permitted hydraulic oil temperature in continuous grab operation is 90 °C (194 °F). Therefore, a reliable hydraulic oil thermometer is necessary. If there is no thermometer on the carrier one must be installed. The temperature of hydraulic oil depends on ambient conditions, the cooling capacity of the carrier and on the oil flow through the grab.

When the hydraulic grab is used continuously it is necessary to have cooling system with extra cooling capacity compared with normal excavation work. The oil cooler of the carrier must have a oil flow capacity of at least twice the grab's maximum oil flow. The cooler must stand the dynamic pressure of 20 bar (290 psi).

If the carrier's oil cooler is too small either the original cooler must be replaced with a larger one or an auxiliary cooler must be installed. For this, please contact your carrier's dealer or EVERDIGM dealer.

## **8. Dismounting and Storing the grab**

Dismount and store the grab according to following instructions :

- When dismounting the hydraulic grab from the carrier, put the grab on the firm and flat ground after check if there is no obstacle within the swing area of the carrier.
- Also the grab of the grab must be kept completely open.
- Take care of the safety against the grab after dismounting so that it can't fall over.
- After turn stop valves to "OFF" position, disconnect hydraulic hoses from the stop valves.
- Apply end caps and plugs to hoses and stop valves to prevent contamination.
- The hydraulic grab recommended to be deposited for storage on a wooden support of sufficient size and strength.
- Also the grab of the grab must be kept completely open.
- Collect any oil which runs out when the hydraulic hoses are disconnected and dispose of it correctly.

## 9. Trouble shooting

| Trouble  |  | Cause  | Remedy   |
|--|--|--|--|
| Grab does not work                                     | Pressure is not applied to piping                    | Electric system fault (if voltage is not detected)       | Check the electric fuse or wiring for operating switch and solenoid valve.   |
|  |  | Solenoid valve fault                                     | Check spool stuck of the solenoid valve. Clean the valve spool and reassemble it.<br>Replace the solenoid assembly of the valve. |
|  | Pressure is applied to piping but grab does not work | The stop valves in pipe line locked                      | Open the stop valves   |
|  |  | Defective cylinder, check valve                          | Contact EVERDIGM service   |
| The operation of grab is irregular or run slowly.      |  | The hydraulic oil in oil tank is too small               | Check the oil level in oil tank and fill the oil properly  |
| The crushing power is weak                             |  | Relief pressure of grab is too low                       | Correct operating pressure or contact EVERDIGM service   |
|  |  | Defective relief valve                                   | Contact EVERDIGM service   |
| Grab can not rotated or abnormal noise during rotation |  | Hydraulic motor, pinion or slewing bearing are defective | Contact EVERDIGM service   |
| Operating temperature is too high                      |  | Pressure relief valve is defective                       | Replace the pressure relief valve  |
|  |  | Insufficient oil level                                   | Refill oil tank  |
|  |  | Defective in oil cooler or cooler piping                 | Contact manufacturer of carrier  |
| The operation of grab is irregular or run slowly.      |  | The hydraulic oil in oil tank is too small               | Check the oil level in oil tank and fill the oil properly  |
| Oil leaks  | Oil leaks from the hydraulic connections             | O-ring damaged   | Replace the damaged O-rings.   |
|  | Oil leaks from main body                             | Defective hydraulic parts or connection area             | Contact EVERDIGM service   |
| Abnormal noise at joint pin                            |  | Insufficient greasing                                    | Apply grease   |

- Consult the other troubles and more details with EVERDIGM dealers or EVERDIGM service center.

**Notes**

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## Notes

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