Machine Sr.No._____

Instruction Manual

XGS28E

Mobile Elevating Work Platform

Original instruction (en) status: 2021–08
XCMG Fire-Fighting Safety Equipment Co., LTD.

Foreword

This Instruction Manual contains information and instructions for safe operation and maintenance of your **XCMG** machine.

In the interest of yours and bystanders' safety as well as to prevent accidents and ensure environmental protection, you shall:

- **Carefully read** the included information **before use of the machine**,
- **Familiarize yourself** with its content and
- **This Instruction Manual is an integral part of the machine! Keep it on the machine at all times for reference!**

In case of damage or loss of this manual it is mandatory to replace it immediately!

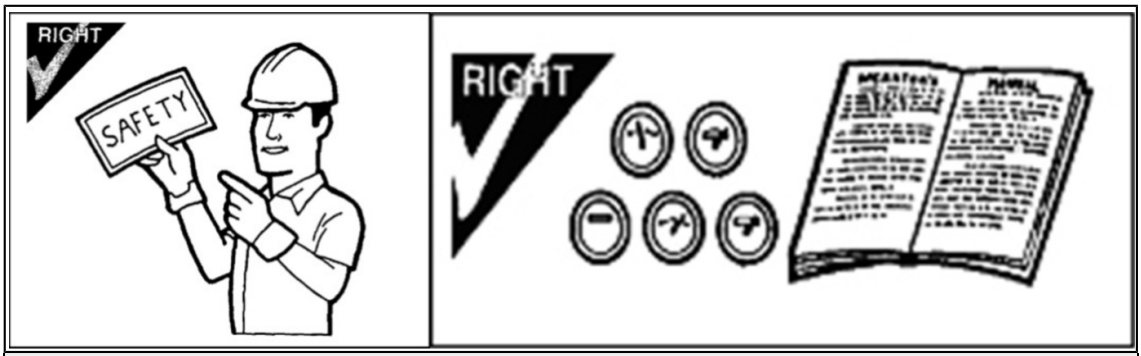

Figure -1 Familiarize yourself with applicable safety regulations in your location and this manual as well as with the machine.

This Instruction Manual is not suitable reference for extensive maintenance and repair work. Such work shall be performed by **XCMG'** service personnel or authorized specialists.

The Operator's safety is **XCMG's** most important point of interest during **XCMG's** efforts in designing, producing and maintaining their products.

- Please note that improper application or maintenance may increase the risk of hazards.

Therefore, always operate and maintain your XCMG machine according to the instructions in this Instruction Manual.

Doing so you will increase the reliability and availability of your machine.

- Repair defective machines immediately to ensure safe operation and environmental protection.
- Please contact your XCMG representative if you have any additional questions concerning the operation or maintenance of your machine.

In case of additional questions concerning operation or maintenance of your machine, do not hesitate to contact your XCMG representative.

Important!

Please fill in the machine's identification information to enable optimum customer support:

XGS28E Mobile Elevating Work Platform

Type:	XGS28E
Year of manufacturing:	2021
Product identification number:	

NOTICE!

Make sure you are familiar with the content of this manual before start to operate the machine!

Your XCMG representative's contact data:

Add：**<Provide FactoryData>**

Manufacturer:	XCMG Fire-Fighting Safety Equipment Co., Ltd.
Address:	No. 17 Zhujiang East Road, Hi-tech Industrial Development Zone, Xuzhou, Jiangsu, China.
National Customer Service Hotline:	400-110-9999

SERVICE

Service and Spare Parts

Tel: +86-516-83461280 87888290

MARKETING

Marketing Department

Tel: 0516－87981118

Imprint

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Update	Data contained in this Instruction Manual meets the current state-of-the-art
XCMG reserves the right to improve or modify the content, information, diagrams and specifications in this Instruction Manual at any time and without any notice.	

Table of contents

Chapter 1 About this document

1.1 Main purpose

This Instruction Manual includes safety, operation and regular maintenance instructions for the machine. Further documents and manuals may be attached if necessary.

This Instruction Manual supports you in

- Getting familiar with your machine
- Reducing probability of risks and hazards
- Preventing incorrect operation, unintended use and foreseeable misuse
- Improving your machine's reliability and availability
- Enhancing machines performance and
- Reducing maintenance costs

Following the instructions of this Instruction Manual is mandatory.

- **This Instruction Manual is intended for persons operating and maintaining the machine.**
- **Additionally to it, you shall adhere rules and regulations applicable at your location.**
- **It is mandatory to keep this Instruction Manual always available to** operators and maintenance personnel, at the machine. **Store it at the designated storage location** Figure 1−1
- For repair and maintenance supplementary documents may apply (i.e. for the engine), please contact your XCMG representative for further information.

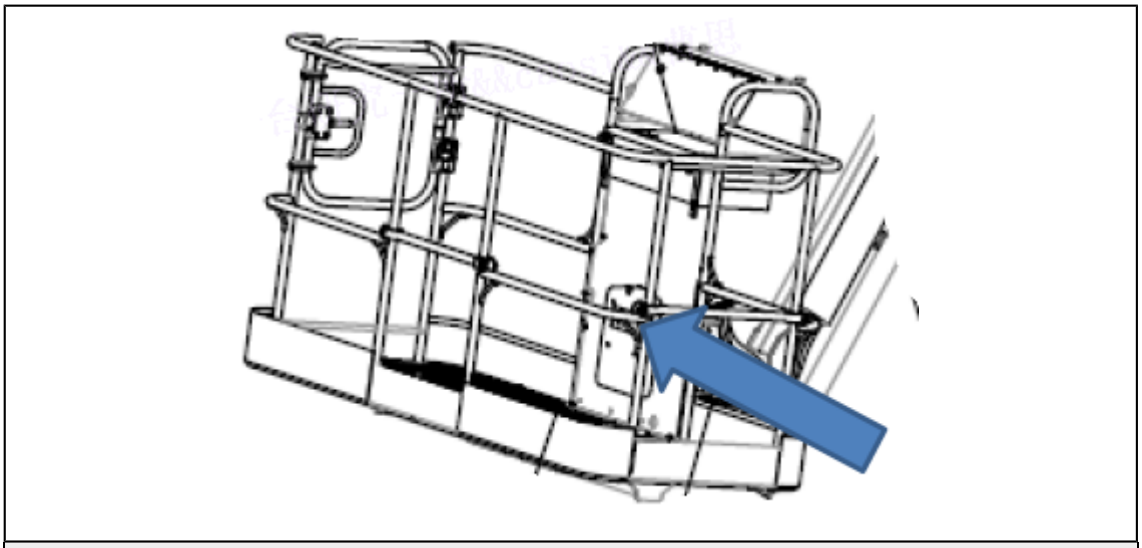


Figure 1-1 Designated storage location of this Instruction Manual on the machine is the box beneath work platform control box

Before operating, maintaining or repairing any machine part:

- **read** carefully and master the content of this Instruction Manual
- **learn** how to correctly operate and maintain the machine

- note the instruction for use's safety information, the safety signs attached to the machine and how both are related
- **understand** the safety requirements and their purpose.

The documentation supplied with the machine shall enable the reader to:

- **operate** the machine safely
- **use it** in all permitted situations
- **maintain/service** the machine within the required schedules

To prevent accidents during operation or maintenance**, always comply with all the precautions measures specified in this Instruction Manual.**

Ensure the documentation is always complete, up to date and available if needed:

- Do not remove individual pages from the Instruction Manual.
- Request any missing or uncomprehensive parts of the Instruction Manual from XCMG after sales service.
- Include new documents supplied as a result of modifications immediately.
- Replace obsolete versions of the Instruction Manual with the amended contents

The delivered documentation is compiled for the indicated **serial number** only.

It cannot be used for the same machine of the same series that has a different serial number.

NOTICE!

The Instruction Manual is considered as a construction part of the machine

Disclaimer:

We are committed to and we do our best to provide you complete and correct information with this instruction manual. However, errors cannot be totally excluded thus this instruction manual as well as the machine may be subject of modifications without prior notice. For resulting downtime, damages or malfunctions **XCMG** assumes no liability.

1.2 Product information

XCMG produces and delivers high quality products. Your machine and its components have passed numerous inspections before delivery, ensuring compliance to **XCMG's** high company standards.

You can ensure reliability and prologue availability by following the instructions of this Instruction Manual, by correct use and careful maintenance. Use only genuine **XCMG** spare and wear parts.

Within warranty period, **XCMG's** specialists as well as our representatives will help you in repairing or even maintaining your machine. Please refer to your warranty conditions attached to your purchase contract.

After warranty period elapsed, we will continue to provide our services to you, helping you maintaining the machine in best condition through its entire lifetime.

Warranty claims cannot be accepted in case of:

- Operation faults and operations not in line with this manual
- Use of wrong consumables
- Deficient maintenance
- Maintenance/repair errors by service personnel not authorized by XCMG
- In case of use of non-genuine XCMG parts
- In case of not XCMG approved modifications of the machine
- Resulting damage/defects due to delayed warranty/repair request+
- Follow-up damage is unexceptionally excluded from warranty.

1.3 Target group(s)

This Instruction Manual is intended for use by:

- manufacturer (i.e. XCMG, the producer of the unit/machine)
- owners,
- **all** operators and maintenance **personnel conducting overhaul or repair**
- Make this Instruction Manual accessible to all persons who operate or work with this machine
- .

1.4 Layout of user's instruction

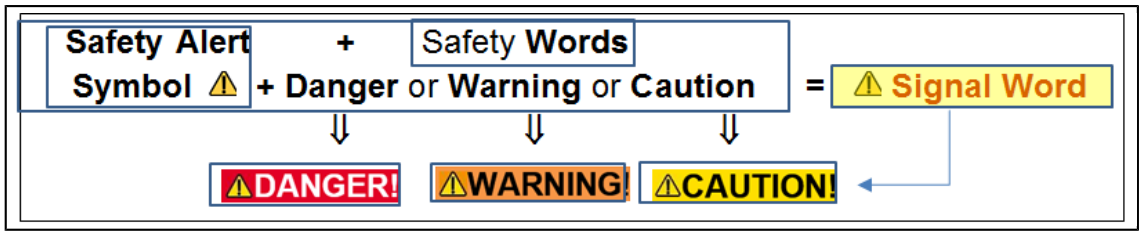
1.4.1 Safety notes

1.4.1.1 Layout of warning notice

Warning notice:

Warning notice is composed from signal word and information on hazard!

Signal Word as **DANGER**, **WARNING**, **CAUTION** requires **Safety Alert Symbol** placed in front of the signal word to emphasise and alert the reader of instructions



Warning notice draw attention and communicate information on hazard :

⚠ Signal Word	1. **Hazard** type of hazard explained 2. **Consequence** of not avoiding the hazard noted 3. **Avoidance** how to prevent the hazard proposed The signal word is selected according to the risk by hazard. The risk is determined according to probability of an accident and probability of worst credible severity occurring

1.4.1.2 Graduation of the warning notices

Warning notices are addressed to hazards affecting only human physical injuries and vary with decreasing hazard gravity as follows:

⚠DANGER!

Signal word used to indicate an imminently hazardous situation which, if not avoided, will result in death or serious irreversible injury.

⚠WARNING!

Signal word used to indicate a hazardous situation which, could result in death or serious injury.

⚠CAUTION!

Signal word used to Indicate a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE!

Notice is used to address situation not related to physical injuries Indicates environmental or property damage if ignored.

1.4.2 Text structure and symbols of the manual

1.4.2.1 Text symbols

- Indicates a single instruction or a regulation to be observed (e.g. for safety reasons)

Indicates useful additional information or further detailed explanations.

May also show a notice of protective measures to prevent minor damages to the machine or environment.

1.4.3 Additional text types

Handling Instructions

- Handling instructions are demanding you to undertake an activity or to perform a work step.
- Always carry out handling instructions stepwise and in pre-defined sequence.
  1st-Step: Indicate the potential Hazard (and if appropriate the cause of it)
  2nd-Step: Describe the consequence of Hazard – if not avoided
  3rd- Step: Describe how to avoid the mentioned Hazard – further Steps
- Handling instructions are structured as follows:
  Lists**:**

  – Not-numbered Lists are structured as follows:
  List-Level 1
  -List-Level 2

  – Not-numbered Lists are structured as follows:
  1. List-Level 1
  2. List-Level 1
  2.1. List-Level 2
  2.1.1. List-Level 3
  2.1.1.1. List-Level 4
  2.2. …
  3. etc**.**

1.4.4 Additional information

1.4.4.1 Figures

Illustrations (Fig.) only serve for additional or more detailed information and may differ from the actual product or scope.

- Figures and associated position numbers are given in bold in the text.
- Position lines in an image end with:


a **dot**, if they denote visible parts,


an **arrow** when pointing towards invisible/indicated direction

1.4.4.2 Dimensions

Dimensions are given in metric, ISO units.

1.4.4.3 Applicable documents

Pay attention to additional documents as repair and maintenance documents of equipment that may apply (*i.e. for the engine or other additional equipment installed*).

1.4.4.4 Accessibility

Make the contents of this Instruction Manual including the applicable documents available to all persons who operate or work with this machine.

Chapter 2 Product description

2.1 General description

2.1.1 Type/ nameplate locations

The straight-arm mobile elevating work platform at the elevation of 26 meters developed by XCMG is self-equipped with a small-sized jib boom, thus having a certain capacity in obstacle crossing, and being stretchable to any inaccessible position; the double-load control system may automatically adjust the operating radius as the loads may be, which will satisfy the different demands of the users on different loads. It is an ideal choice for users engaged in building construction, bridges, steel structures and installation & construction both inside and outside the venue.

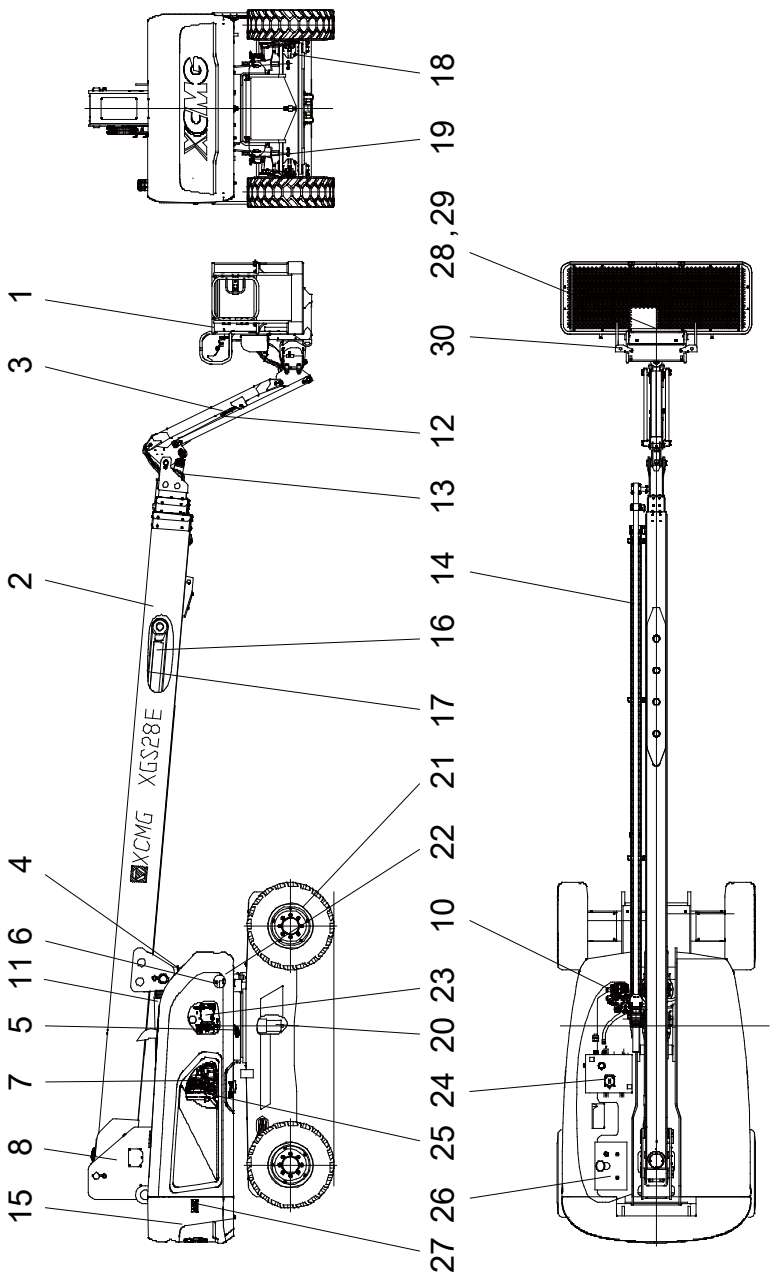


Figure 2-1 Machine overview .

Main Sections – see **Table 2-1**

Table 2-1 Main compoments of machine

No.	Description	No.	Description	No.	Description
1	Work platform	2	Boom assembly	3	Jib boom
4	Turntable assembly	5	Slewing bearing	6	Slewing mechanism
7	Electrical system	8	Luffing mechanism	10	Hydraulic system piping
11	Luffing cylinder	12	Boom cylinder	13	Levelling cylinder
14	Cables and hydraulic piping carrier	15	Counterweight Assembly	16	Telescopic cylinder
17	Telescopic system	18	Steering cylinder	19	Axle balancing system
20	Swing ceter	21	Frame assembly	22	Panel assembly
23	Oil pump	24	Hydraulic tank	25	Engine
26	Fuel tanke	27	Label assembly	28	Supplied tools
29	Supplied spare parts	30	Anti-squeezing detection device V		

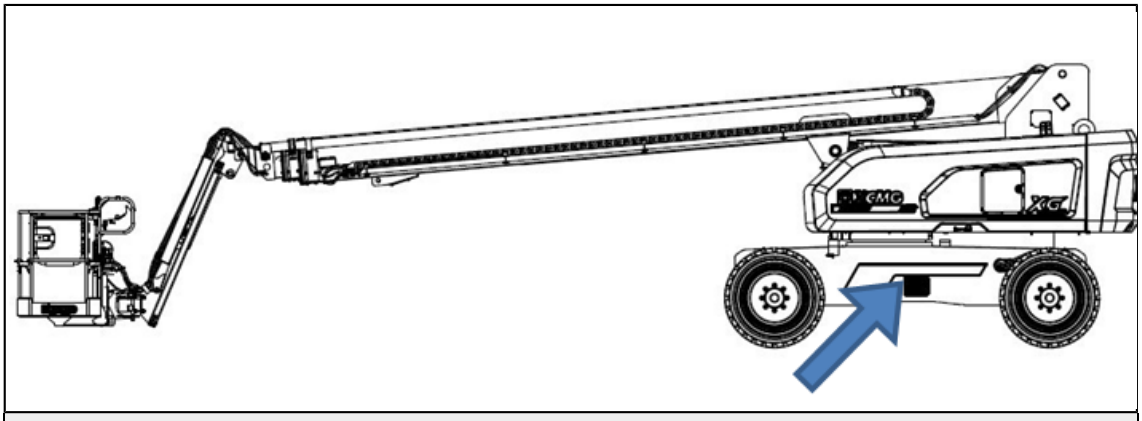


Figure 2-2 Nameplate locations

2.1.2 Declaration of conformity

XCMG

EC Declaration of Conformity

XCMG Fire-fighting Safety Equipment Co.,Ltd.

NO.17 Zhujiang East Road, Hi-tech industrial Development Zone, Xuzhou, Jiangsu ,China, 221100

Hereby declares that the product:

Make:	**Mobile elevating work platforms**
Type:	**XGS28E**
Serial number (PIN):	**XUG0265SVLRL11679**
Date of manufacture	**01/2021**

CE

to which this declaration relates, is in conformity with the Essential Health and Safety requirements of the Council Directives and Regulations and their Amendments related to machinery:

- EC Machinery Directive 2006/42/EC
- Electromagnetic Compatibility Directive 2014/30/EU
- Low Voltage Directive 2014/35/EU

Applied Harmonized Standards, in particular:

- EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction
- EN 280:2013+A1:2015	Mobile elevating work platforms — Design calculations — Stability criteria — Construction — Safety — Examinations and tests
- EN 60204-1:2018	Safety of machinery - Electrical equipment of machines - Part 1: General requirements

Business Name of NB：TÜV SÜD Product Service GmbH Zertifizierstellen

Identification No.：NB0123

Address：Ridlerstraße 65, 80339 MÜNCHEN, Germany

Authorized person, who is in charge for the conformity assessment, machinery safety and technical documentation in respect to Machinery Directive 2006/42/EC is:

Date of the declaration: January 20th,2021

Place of the declaration:

Signature _____

Xu Xiaodong

Director of Technical Center
XCMG Fire-fighting Safety Equipment Co.,Ltd.

Signature _____

Michal Myczkowski

Authorized Representative
Fabryka Maszyn XCMG-Europa Sp. z o.o
Kompina 118,99-416 Nieborów,Poland

Figure 2-3 Declaration of conformity

2.2 Intended use of the machine

2.2.1 Intended use of the machine

Intended use as defined in this Section is a basic requirement for any safe operation!

Your XCMG machine is designed by following recognized standard (BS EN 280-2013+A1-2015) and manufactured according the state of art methods and technologies at the time of placing to the market.

- Intended use of the machine is construction work, and other related and construction areas
- **Intended application of the machine is only for construction and above mentioned purposes**.
- Utilization is limited only to the work areas and conditions of use listed and described in this Instruction Manual.
- Move the machine with care.
  If necessary, ask a co-worker for supervision and marchalling.
  Use and park the machine only over surfaces capable of supporting it.
- The installation and safety requirements specified in the documentation must be observed.
- Any other use or a use beyond this shall be deemed a use not to the intended purpose.
- Intended application of the machine is only for installation and above mentioned purposes.
- Utilization is limited only to the work areas and conditions of use listed and described in this Instruction Manual.
- Use and park the machine only over surfaces capable of supporting it.
- Protect the working areas of use (*i.e. by fences*) to prevent the access of an unauthorized and uninstructed persons (*e.g. children*).

Non-observation of the intended use of machine as defined in 2.5.1 may result in the following consequences:

- Life-threatening or fatal injuries
- Severe damage to the machine, the assets or environmental contamination for which the owner/operator may be held liable.
- Loss of warranty and guarantee claims
- The machine may only be operated in enabled setup condition and modes as provided in this operating and maintenance Instruction Manual.
- Any application, not described in the Instruction Manual must be authorized in writing by the manufacturer beforehand.
- Any divergent use without the manufacturer's written consent is considered as “non-intended use”
- The manufacturer is not liable for injuries resulting from improper use or misuse of the machine.
- The associated risks are the owner's, operator's or user's responsibility.

This also applies to unauthorized changes to the machine

Refer to the information in Section 10, *Technical Specification and Performance Data*. Comply with this information completely.

Intended use requires the following:

- Install all safety devices properly and ensure their correct function
- Provide and perform all maintenance and repair work as stated in this Instruction Manual and according to the given specifications
- Involve only qualified maintenance personnel or authorized personnel
- Take utmost care during use on operational safety as instructed in this Instruction Manual
- Apply all valid local, national and international safety regulations
- Use only the operating materials as listed in this Instruction Manual
- All persons involved with the machine's operation must follow the safety instructions according to this Instruction Manual.
- All persons involved in the machine's operation must comply with their respective responsibilities according to the Instruction Manual.
- Regard and respect the technical information values and their limits
- Follow and respect the operating capacities as listed in this Instruction Manual

Take into account the corresponding machine model and its maximum loads

The machine is not intended to be used:

- as transport vehicle (i.e. for materials and persons),
- use over unstable sites (i.e. the ground is uneven, holes, steep slope),
- on sites with potentially explosive environment and
- on sites with insufficient ventilation (i.e. within closed spaces) is prohibited.
- Do not operate the machine when the wind speed exceeds 12.5 m/s .
- Use other than described here as intended is not authorized by the manufacturer and is outside legal limits of manufacturers' liability.

2.2.2 Not intended use of the machine

The machine is not intended to be used:

- as transport vehicle (i.e. for materials and persons),
- use over unstable sites (i.e. the ground is uneven, holes, steep slope),
- on sites with potentially explosive environment and
- on sites with insufficient ventilation (i.e. within closed spaces) is prohibited.
- Do not operate the machine when the wind speed exceeds 12.5 m/s.
- Use other than described here as intended is not authorized by the manufacturer and is outside legal limits of manufacturers’ liability.

2.3 Reasonably foreseeable misuse

Reasonably foreseeable misuse

- **means also the use of machine in a way not prescribed in the Instruction Manual, but which may result from readily predictable human behavior. This includes any undeclared application or type of misuse listed**
- Basically:

State of art technologies control a number of such "foreseeable misuses" but not all misuse cases can be managed by technological means. Misuse or improper use of the machine may lead to severe injuries or death and consequently to expiration of the warranty!

The machine operator and/or owner will be fully responsible for all damages done due to machine "unintended use".

Any use that is not described in this Instruction Manual is considered as "unintended use".

Reasonably foreseeable misuse is considered-but not limited to:

- Not reading and follow this safety Instruction Manual.
- Operating the machine while the Instruction Manual is missing, is incomplete or is not available in the contractually agreed language at the machine.
- Operating the machine by uninstructed or unqualified personnel.
- Operating the machine ignoring safety requirement applicable at your site.
- Expose the machine to physical quantities that exceed the limits prescribed by the manufacturer. (e.g. ambient temperature, ASL-altitude, carried load, operating restrictions for soil with slope inclination etc.)
- Reflex-operators behavior.
- Transport of materials and/or passengers.
- Towing loads.
-
- Place items on the work guardrail
- When there are people on the work platform, the ground staff operates the equipment.
- Operating the machine without being buckled-up properly.
- Remove of bypass protective equipment
- Perform maintenance/repair tasks with engine running or machine not secured.
- Operating the machine when the machine is not in a proper technical condition.
- Use and/or park the machine in areas exceeding environmental limits specified for this MEWP including (but not limited to):
- Allowable ambient temperature.
- Lateral and transversal surface gradient.
- Surface stability and load-bearing ability.
- Areas that may be flooded (*i.e. in water channels*).
- etc.
- Moving the machine without adequate vision, or without a supervising coworker

- Carrying out any structural modification on the machine or interchangeable equipment which may affect operational safety without the manufacturer's written declaration of approval.
- Not following maintenance instructions and intervals
- Skip and/or delay repairs and activities meant to prevent or to detect damage.
- Improper maintenance and repair work.
- Not use of approved spare parts.
- Unauthorized modifications of the machine.
- Inappropriate use or use high-pressure cleaners and/or use inappropriate cleaning agents and other devices.
- Transport the machine without appropriate lashing on the transport vehicle.
- Parking, storing the machine unsecured or accessible to unauthorized persons (i.e. in inclined areas, open areas, with ignition key at the machine, open covers, etc.).
- Open fire or smoking while handling inflammable materials (i.e. during refueling)

2.4 Limits of application

2.4.1 Limitation factors of intended use

- Range of applications **(For detailed information,See：2-5 Page "2.2.1** Intended use of the machine**".)**
  in accordance to the operator's experience with and knowledge of the machine (industry, commerce, private, public sector)
- **Intended use** **(For detailed information,See：2-5 Page "2.2.1** Intended use of the machine**".)**
  (refer to specifications in the Instruction Manual)
- **Foreseeable misuse****(For detailed information,See：2-6 Page "2.3** Reasonably foreseeable misuse**".)**
- Various steps within product life cycle
  (assembly, commissioning/delivery, set up, regular operation, cleaning, maintenance & servicing, appropriate disposal)
- Operator's skills, experience and knowledge
  Operator, maintenance personnel in terms of training, experience, skills
- **Inexperienced/more vulnerable people**
- Vulnerable groups
  (e.g. apprentices, pregnant women, volunteers, disabled persons with health conditions)
- Collateral damages
  unrelated to the company (e.g. employees from other workplaces, visitors etc.)

2.4.2 Space boundaries

- Safety ranges/distances during movement/deployment
- Safety boundaries for people during installation and maintenance
- Material supply/removal
- Working places/area Interfaces

2.4.3 Time related limits

- Limits of the service period of the whole machine or specific components
- Recommended inspection, maintenance and repair intervals

2.4.4 Environment-related limits

- The following environmental factors define the limits for the safe operation and the performance of the machine:
  - Environmental **factors-related limits**
    e.g. restrictions within specific environmental conditions
    - ♦ weather,
    - ♦ altitude,
    - ♦ slope inclination,
    - ♦ steepness
  - **Energetic limits**
    - ♦ Types of energy
    - ♦ Interfaces supply/discharge
    - ♦ Material limits
    - ♦ Interfaces supply/discharge
    - ♦ Starting materials/auxiliary operating materials, waste products

2.4.5 Permitted environmental conditions

Considerations on environmental conditions shall be taken in order to ensure machine's safe operation, to improve machine's reliability and to prologue machine's service life.

⚠CAUTION!

Operate or park the machine always over ground, stable enough to carry the maximum possible load applied by the machine (see Table 2-3 for ground bearing capacity).

Table 2-2 Type bearing capacity

Maximum tyre load	8500 kg/18739 lb
Ground pressure	7.0 kg/cm²/99.6 psi

Note: Floor loading information is approximate and does not incorporate different option configurations.

It should be used only with adequate safety factors.

Table 2-3 Ground bearing capacity

S/N.	Soil type	Ground bearing capacity kg/ cm²
1	Natural soil:	
	Sludge, peat, and wetland	0
2	Non-compacted soil:	
	Construction debris	0 – 10
3	Non-cohesive soil:	
	Sand, gravel, rock, and mixture	20
4	Clayed soil	
	a. Mixture of clayed silt and topsoil	12
	b. Powdered coal, composed of coarse clay and few clay	13
	c. Pottery clay, composed of plastic clay and filler	
	Hard	9
	Half-solid	14
	Solid	20
	d. Mixed granule ground (mixture of clay, sand, gravel, and rock)	
	Hard	15
	Half-solid	22
	Solid	33
5	Uniform solid rock:	
	a. easily broken or decomposed	150
	b. Non-fragile	300

Table 2-3 Ground bearing capacity(continued)

S/N.	Soil type	Ground bearing capacity kg/ cm²
6	Artificially compacted road:	
	a. Asphalt road	5-15
	b. Concrete:	
	1) General concrete (grade BI concrete)	50 – 250
	2) High strength concrete (grade BII concrete)	350 – 550

⚠CAUTION!

Do not exceed maximum lateral and longitudinal inclinations.

⚠ *Environmental temperatures influence machine's behavior, especially acceleration, deceleration and stopping behavior.*

⚠ *Please check/adjust mainly the used fluids to your environment (fuel, hydraulic oil viscosity, coolant antifreeze, etc.) and avoid changing the battery at temperatures below 0°C.*

⚠WARNING!

Do not operate this machine with the wind speed in excess of 12.5 m/s (28 MPH) (see Table 2-4Beaufort Scale for wind scale).

Table 2-4 Beaufort Scale (For reference only)

Beaufort scale	Wind speed		Description	Ground situation
	(m/s)	Mile/hour		
0	0 – 0.2	0	Calm	Calm. The smoke rises straightly upward.
1	0.3 – 1.5	1 – 3	Light air	The smoke can indicate the wind direction.
2	1.6 – 3.3	4 – 7	Light breeze	A wind can be felt on naked skin. The leaves rustle.
3	3.4 – 5.4	8 – 12	Gentle breeze	The leaves and small branches move.
4	5.5 – 7.9	13 – 18	Moderate breeze	The dusts and papers rise. The small branches start to move.
5	8.0 – 10.7	19 – 24	Breeze	Small trees swing.

Table 2-4 Beaufort Scale (For reference only)(continued)

Beau-fort scale	Wind speed		Description	Ground situation
	(m/s)	Mile/hour		
6	10.8 – 13.8	25 – 31	Fresh gale	The large branches move. The flags swing in nearly horizontal status. It's difficult to hold an umbrella.
7	13.9 – 17.1	32 – 38	Moderate gale	The large trees swing. It's difficult to walk against the wind.
8	17.2 – 20.7	39 – 46	Gale	The large branches break. The vehicles on the roads are blown off the track.
9	20.8 – 24.4	47 – 54	Strong gale	The buildings are slightly damaged.

2.4.6 Environmental protection limitations

Environmental protection shall be a common task.
XCMG implemented several measures to enhance environmentally friendly design, production, operation and maintenance methods on this machine.
Owners, Operators and Maintenance Personnel are responsible to take sustainable precautions to further contribute to environment protection:
Follow environmental protection rules and regulations applying in your area.
Dispose all materials (packaging, exchanged maintenance and wear parts, cleaning agents, residual fluids, etc.) according the local environmental protection rules and make use of the local available recycling systems.
Do not operate the machine unnecessary (keep the engine off as reasonable possible).

2.5 Residual risks

2.5.1 Risks of injury up to death by

XCMG evaluated and designed the machine having safety as main task. Although it is not possible to foresee all events that may occur, existing residual risks are mentioned in this manual as possible at the time this manual has been edited.

- By following instructions provided in this manual and consider the warning signs put on the machine's decals you can avoid risks and operate the machine as safe as possible.

  – As an entrepreneur/operating company, take care that all persons working on and with the machine are aware of the residual risks.

– Follow the instructions to prevent residual risks that may end in accidents or damages.

– Set-up work may require a disassembly of the protective equipment by the customer, resulting in miscellaneous residual risks and potential hazards every operator has to be aware of.

⚠DANGER!

Dangerous injuries during operation of the machine

- **Unintended operation may cause personnel crushed in a life-threatening manner.**
- **Install and approve the function of machine protective devices prior to commissioning**

⚠DANGER!

Danger by electrical shocks

⚠An electrical shock may result in fatal injuries.

- **Use the mains disconnection device to de-energize the machine prior to all repair, set-up and maintenance work.**
- **Secure the machine against inadvertent activation.**
- **Close off the mains disconnection device and put up warning signs.**
- **In addition, press down the emergency-stop button.**

⚠WARNING!

Danger of slipping skidding and falling Danger of burns

- **Weather influences, such as wetness, snow, ice, frost and dirt, change the grip of the treads, walkways and handrails.**
- **Persons may seriously be injured or even killed!**
- **The machine may be damaged.**
- **Step on and treading surfaces taking account of the conditions, e.g. winter slipperiness or soiling.**
- **Only access the platform on approved walking and tread surfaces.**
- **Observe the signs.**
- **Replace damaged safety labels (warning signs) immediately.**
- **If the road is contaminated due to technical defects, unsealed fuel or tank or leaking hydraulic oil, this will represent a serious traffic hazard.**
- **This may result in fatal accidents.**
- **Remove traces of oil immediately and thoroughly**
- **⚠Risk of burns on the surfaces of heated components** 
- **This applies in particular to the exhaust system and the engine of the machine**
- **Allow the components to cool sufficiently before touching them.**
- **Be particularly cautious near heated components.**

Residual risks may occur likely in the following situations:

- not obeying to local guidelines, requirements and directives for **Occupational Health and Safety**.
- misuse or wrong operation, ignoring the content of this manual.
- improper machine transportation, by transporting the machine on unsuitable vehicles or lack in securing measures.
- hesitation of repair/replace of defect parts.
- operation under influence of medication, drugs, alcohol or any other substance, which may impair your ability of safe use.
- operation by persons unable to operate the machine (too young, handicapped in respect *to machine operation, untrained or uninstructed*).
- unclean machine, slippery access systems (*steps, handles, etc.*), unreadable or damaged safety decals and operation elements.
- insufficient secured machine when parked, maintained, serviced or repaired.

- insufficient safety precautions at your site.
- insufficient use of personal protective equipment.
- smoking and/or open fire when dealing with flammable substances (*i.e. when refueling*).
- refueling while engine is running or spilling fuel over hot surfaces.

2.5.2 Risks of damaging the machine and property:

- misuse or wrong operation, ignoring the content of this manual.
- operation of the machine in or on inadequate environment (*i.e. operation on surfaces or on structures with insufficient load-bearing capacity*).
- use of unsuitable ware and spare parts.
- insufficient maintenance and/or repairs.

2.5.3 Environmental risks:

- misuse or wrong operation, ignoring the content of this manual.
- this includes also unnecessary noise and exhaust gas generation by leaving the engine unnecessary running.
- use of unsuitable consumables, ware and spare parts.
- insufficient maintenance and/or repairs.

2.5.4 Performance and service life reduction due to:

- misuse or wrong operation, ignoring the content of this manual.
- use of unsuitable consumables, ware and spare parts.
- Insufficient maintenance and/or repairs.
- Unnecessary operation (*i.e. engine runs when not required*).

Figure 2-4 Get familiar with your local Occupational Health and Safety regulations and rules.

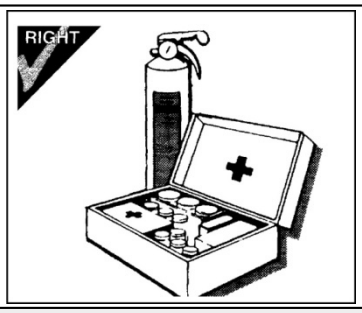


Figure 2-5 Become familiar with safety precautions and devices installed at your site..

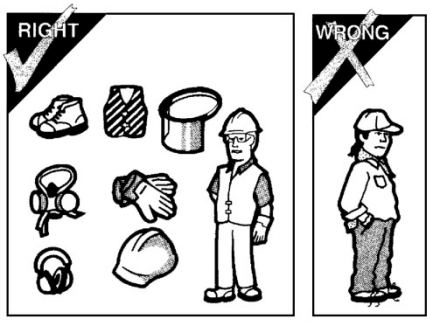


Figure 2-6 Use personal protective equipment according local Occupational Health and Safety regulations..

Chapter 3 General safety information and instructions

3.1 Introduction

To prevent personal injury or property and/or environment damage observe and respect the safety instructions stated in this Section.

The following advice to the users and operators:

Read and respect all safety instructions.

3.2 Responsible parties

For the purpose of communication, this Instruction Manual defines the following participant's groups:

1. Manufacturer−as producer of the unit/machine (XCMG)
2. Dealer
3. The owner
4. User
5. The operator
6. The maintenance personnel
7. Lessor
8. Lessee
9. Agent

The owner:

- as any natural or juristic person/entity who owns permanent or temporary a (set) machine(s), with legal rights duties and responsibilities, and:
  - uses purchased or lent machines to manage a site job (eg. Construction Company) or
  - generates sales merely through the distribution of machines (eg. Reseller or renter).

The operator:

- **a person in charge** for as well as specific job/project and machine, (eg. as natural user, skilled individual for all functions of machine)
- **an operator,** who physical simply driving the machine (but does not necessarily be a skilled operator for all functions of the machine)
- **a company** that operates technical equipment, (as eg. **juristic user, entity)**

Maintenance Personnel/Service Provider:

The natural person responsible for the machine’s flawless functioning and all processes influencing it (maintenance, overhaul, repairs, functional control adjustments etc.)

3.3 Detailed tasks and responsibilities

3.3.1 General requirements for all responsible parties

Any responsible party involved should be committed to:

- **use** and apply the Instruction Manual for operation of machine.
- **notify** involved parties of any safety related defects observed on a machine.
- **check** the machine for damage every day before using it, do not operate in case of safety related defects.
- **wear** PPE as recommended or required in your site/area.
- **operate** any machine correctly, which means according to parameters and intended use prescribed in this Instruction Manual.
- **stop** work with a machine immediately if its safe operation is not guaranteed.
- **repair** the machine prior further operation in case of defects.

⚠ *Only qualified and authorized personnel shall conduct machine operation, transport and* maintenance

⚠ *Qualified persons shall meet the following minimum requirements:*

be at least 18 years of age

- possess the physical and mental abilities to perform the assigned tasks
- be able to read and understand the technical documentation of construction machinery (i.e. this manual)

be knowledgeable in

- accident prevention
- performing first aid,
- applicable occupational safety regulations.
- **be sufficient trained/instructed for the assigned machine tasks**,
- possibly including valid driving license for machines, if legally required.
- introduced at least on basics of machines operation and effects.
- **Marshalling** machines shall be done by instructed personnel with proven skills, meaning of signals between the marshallers and the driver shall be commonly agreed and be unambiguous.

3.3.2 Dealer

3.3.2.1 Maintenance safety precautions

⚠ **Given that the reasonable principles of personnel, safety, training, inspection,** maintenance**, application and operation shall be applied in personnel training, inspection, maintenance, application and operation, these principles shall be consistent with all available data on rational use and external environment parameters.**

- Operation manual and maintenance manual shall be supplied with each lease, rental or sold machine in weatherproof storage box of the MEWP. Manuals are considered as an indispensable part of MEWP, which is an important media to send necessary safety information to owners, users and operators.
- The current responsibilities manual for dealers, owners, users, operators, lessees, leasers and agents of the MEWP shall be provided in a weatherproof storage box.
- The MEWP shall be inspected, maintained and regulated according to manufacturer's requirement before delivery (sale, rental or lease).
- The dealers shall perform preventive maintenance of MEWP on the basis of the operating environment and safety and in accordance with the manufacturer's recommendations.
- The dealers shall perform routine and annual inspections according to the manual and instruction supplied by the manufacturer.
- The repair process to eliminate faults and problems shall be in accordance with the manual and instruction supplied by the manufacturer.
- When parts or components are replaced, they shall be identical or equivalent to original aerial platform parts or components.
- The dealers shall provide appropriate training to assist the owner, users and operators to comply with the requirements for the inspection, maintenance, use, application and operation of MEWP set out in this manual.
- Modification, alteration or remanufacturing of the MEWP shall only be made with prior written permission from the manufacturer.

Before performing adjustment and repair of MEWP, the following precautions should be taken:

1. Power plants stopped and start switches do not work
2. All control mechanisms are in "off" gears to protect all control systems from unintentional action caused by braking, obstruction, or other means
3. Boom and platform shall be lowered to the stowed position as much as possible or shall be secured with block or constraint to prevent falling
4. Release oil pressure from all hydraulic circuit before loosening or removing hydraulic components
5. Safety props and latches shall be installed in proper location according to manufacturer's specification

3.3.2.2 Delivery regulation

For delivery by sale, rental, lease or other means, the dealer and the recipient assigned by receiving unit of MEWP shall share responsibilities:

1. Verify the weatherproof storage box (manual box)
2. Verify the manuals specified by the manufactures is on MEWP
3. Check all control functions
4. Check all safety devices specified during the delivery of MEWP

3.3.2.3 Dealer as a user

Whenever the dealer orders its personnel to operate the MEWP (loading, unloading, inspection, sales demonstration or other forms of use), the dealer shall assume the user's responsibilities specified in Section 3.3.3 of this manual. All authorized operators of MEWP shall:

1. Finish training
2. Be familiar with the MEWP to be operated
3. Define operator responsibilities outlined in section 3.5 of this manual

3.3.2.4 Record preservation and distribution

1. Record preservation

   The dealer shall preserve the following records at least 4 years:

   1) Name and address of each MEWP purchaser by delivery number and date

   2) Pre-delivery preparation record completed before delivery

   3) Complete records of routine inspection and annual inspection for MEWP

   4) Repair record for conducting troubleshooting and troubleshooting

   5) Names of trainee

   6) Names of trainer

   7) Training date

   8) The name of the person receiving the MEWP details for each delivery, unless

   the individual has details on the same model or the product has characteristics consistent with the product delivered within 3 months.

2. Training proof

   The dealer should provide the trained person who has successfully completed the training with documentary evidence to prove they are trained. If the trainee requires, the dealer shall provide evidence. The documentary evidence should include following information:

   1) Name of trainee

   2) Name of entity providing training or retraining

   3) Name of trainer

   4) Clear proof of training covered MEWP

   5) Training date

3. Record distribution

   Upon request, the dealer shall provide the following information:

1) To the owner of MEWP, copy of routine inspection and annual inspection completed

2) To the owner of MEWP, copy of repair completed

3) To user, proof of training for operators (including name of trainer and training date)

4) To user, the name of the person receiving delivery details of MEWP

3.3.2.5 Safety bulletin from manufacturer

The dealer shall observe the bulletins from the manufacturer.

3.3.2.6 Sales responsibilities

When the MEWP is sold, the dealer:
Shall ensure that the operation and maintenance manuals delivered to the owner

1. Shall provide the copy of current responsibilities manual.
2. Shall provide repair and parts manuals within 2 months after sale.
3. Shall notify the manufacturer and its sale successor (if existing), providing full name and address of the purchaser.
4. Shall carry out an annual inspection prior to delivery and provide a copy to the purchaser within 2 months if the MEWP is used.
5. Shall notify the person assigned by the receiving entity when the MEWP was delivered.

3.3.3 User responsibilities

3.3.3.1 Basic principle

The information in this standard must be supplemented by good job management, safety control, and the application of sound principles of safety, training ,inspection, maintenance, application and operation, consistent with all data available regarding the parameters of intended use and expected environment. Since the user has direct control over the application and operation of aerial platforms, conformance with good safety practices in this area is the responsibility of the user and the operating personnel, including the operator. Decisions on the use and operation of the aerial platform must always be made with due consideration for the fact that the aerial platform will be carrying personnel whose safety is dependent on those decisions.

3.3.3.2 Manual storage

The user shall preserved and keep a copy of operation and maintenance manual in weatherproof storage box provided by the manufacturer. Manuals are considered as an indispensable part of MEWP, which is an important media to send necessary safety information to users and operators.

3.3.3.3 Inspection and repair

The user shall inspect and maintain the MEWP as required to ensure normal operation. Routine inspection and maintenance shall be carried out as recommended by the manufacturer and in coordination with the operating conditions and the severity of the operating environment. MEWPs under abnormal operating conditions should be promptly removed from operation until repair is completed. The repair shall comfort to the recommendation of the manufacture and shall be performed by the qualified person.

1. Routine inspection
   The user of MEWP shall perform routine inspection according to the outlines in section 3.3.4.6 of this manual.
2. Annual inspection
   The user of MEWP shall perform routine inspection according to the outlines in section 3.3.4.7 of this manual.
3. Pre-start inspection
   Visual inspection and function testing of MEWP shall be carried out daily or before each shift, including but not limited to:
   1) Operation and emergency control
   2) Safety devices
   3) Leakage of gas, liquid and fuel system
   4) Harness for cable and wire
   5) Loose or missing parts
   6) Tires and wheels
   7) Notices, warnings, control signs and operation manual
   8) Outriggers, stabilizers, stretchable shafts and other structures
   9) Guardrail device
   10)Other items specified by the manufacturer
4. Maintenance safety precautions
   Before performing adjustment and repair of MEWP, the following precautions should be taken:
   1) Power plants stopped and start switches do not work
   2) All control mechanisms are in "off" gears to protect all control systems from unintentional action caused by braking, obstruction, or other means
   3) Boom and platform shall be lowered to the stowed position as much as possible or shall be secured with block or constraint to prevent falling
   4) Release oil pressure from all hydraulic circuit before loosening or removing hydraulic components

5) Safety props and latches shall be installed in proper location according to manufacturer's specification

6) Other items specified by the manufacturer

3.3.3.4 Replacement of components or parts

When parts or components are replaced, they shall be identical or equivalent to original parts or components of MEWP.

3.3.3.5 Repair training

The user shall ensure that the MEWP is inspected and repaired by qualified personnel in accordance with the manufacturer's recommendations and the requirements in this section.

3.3.3.6 Training and retraining of the operator

Whenever the user orders or authorizes an individual to operate MEWP, the user shall ensure that the person has been:

1. Trained prior to being assigned to operate MEWP.
2. Familiar with the MEWP to be operated.
3. Aware of operator responsibilities specified in section 3.3.5 of this manual.
4. Retrained if necessary based on the user's observation and evaluation of the operator.

Trainee record

The user shall preserve the record of trainee of MEWP for at least 4 years.

3.3.3.7 Notice before use

User shall only permit personnel who have completed the training to operate the MEWP. The user shall ensure that the operator is familiar with the model of the MEWP to be operated prior to use, especially:

1. Know where the weatherproof storage box is located.
2. Know that manufacturer's operation and maintenance manuals are stored in weatherproof storage boxes and be familiar with operation safety manuals.
3. Be ware of all control functions, bulletins and warnings.
4. Be ware of and understand all safety devices for the model of MEWP used.

3.3.3.8 Work site inspection

Before and during the use of the MEWP, the user shall check the potential hazards of the work site, including but not limited to:

1. A sharp slope or a pit, including those covered by water, ice, mud, etc.
2. Slop
3. Bumps and obstacles on the ground

4. Debris
5. Obstacles overhead and cables
6. Hazardous places and gas
7. The surface and support are not sufficient to withstand all the loads of the MEWP under various working conditions
8. Wind and weather conditions
9. Presence of unauthorized personnel
10. Other possible hazardous conditions

3.3.3.9 Identification of hazardous sites

The user shall be responsible to identify the hazard classes of intended work sites.
The operation of MEWP in dangerous work site shall be approved and meet the requirement of ANSI/ NFPA 505-1996.

3.3.3.10 Operators warnings and instructions

The users shall direct the operator to operate the MEWP according to clauses specified in this manual. The user shall monitor their performances and work to ensure that the use, application and operation of MEWPs comply with the clauses specified in section 3.3.5: warn personnel of potential hazards, provide means to protect against identified hazards, and explain the potential consequences of not following proper operating guidelines.
Instructions and guidelines for proper operation shall include, but are not limited to the following terms and subjects:

1. Slope and slope grade
   The MEWP shall not be operated in any manner on slopes, side slopes or ramps exceeding rated slope grade specified by the manufacturer.
2. Deployment of stability improvement device
   Outriggers, stabilizers, stretchable shafts, swing axles or other stability enhancement devices shall be deployed and locked in place as required by the manufacturer.
3. Guardrail device
   The guardrail shall be installed and secured, and entrance doors or openings shall be properly closed as directed by the manufacturer.
4. Load distribution
   The load on the platform and its distribution and any the extension of platform shall comply with the rated load requirements specified by the manufacturer for a given condition.
5. Maintain overhead clearance
   The operator shall, as instructed, ensure that adequate clearance is maintained with overhead obstacles and live wires and bodies.
6. Electrocution hazard

The qualified person shall specify and explain to the operator all applicable safety requirements regarding the prevention of electrocution during work practice. Especially, this person shall instruct the operator to maintain a minimum proximity distance (MAD) to the live conductors and equipment according to its own conditions.

7. Personnel protection equipment (PPE)

The user should instruct the operator to ensure that all personnel on the platform wear a personal protection device (PPE) as required.

8. Personnel footing

Personnel working on the platform should maintain a stable foothold on the bottom plate. Personnel are forbidden to climb the mid-rail and top rail of the MEWP. Brackets, ladders or any other equipment used to achieve or reach the target height on a MEWP are prohibited.

9. Precautions for other mobile devices

When other mobile devices and vehicles are present, special precautions should be taken to comply with local laws or established workplace safety standards. Warning signs including, but not limited to, flags, trapped areas, flashing lights and roadblocks shall be used appropriately.

10.Reporting problems and malfunctions

The user shall instruct the operator to report any apparent problems or malfunctions to the manager in time. The user shall make sure that all problems and malfunctions affecting safe operation are solved before continuing use.

11.Report potential hazardous locations

The user shall instruct the operator to report any potential hazardous locations to the manager in time.

12.Working on hazardous location

Unapproved or unmarked MEWP are prohibited from operating in dangerous places.

13. Entanglement

Attentions shall be payedpaid to prevent ropes, wires and hoses from entanglement into the platform.

14.Load limitation

When the load is applied to a platform at any height, it shall not exceed the rated load and the rated capacity.

15. Working area

The user shall instruct the operator to ensure that there are no personnel or equipment around the MEWP before lowering platform.

16.Fueling

The engine shall be turned off (if operating) during fueling the fuel tank. Fueling should be performed in well-ventilated areas away from open flames, sparks or other fire and explosion hazards.

17.Battery Charging

Charging should be performed in well-ventilated areas away from open flames, sparks or other fire and explosion hazards.

18.Incorrect platform stability

The MEWP shall not be placed against other objects to stabilize the platform or increase stability.

19.Misused as a crane

The MEWP shall not be used as a crane.

20.Abnormal operating support condition

The MEWP shall not be used on trucks, trailers, train vehicles, ships, lifting platforms or similar equipment unless it is approved by the manufacturer or by a qualified person in writing.

21.Travel speed

The user shall instruct the operator to limit the travel speed according to the environment, including support surface condition, congestion, visibility, inclination, personnel position, and other risk factors that may cause collisions and result in injuries.

22.Travel requirement

When platform is elevated, the user shall instruct the operator to:

1) Maintain a clear view of the supporting surfaces and driving routes.

2) Make sure that personnel in the working area who may be harmed are aware of the motion of the machine. Inform and relocate MEWP as required to protect personnel from injury.

3) Maintain a safe distance from obstacles, debris, holes, potholes, ramps and other hazards to ensure safe driving.

4) Keep a safety distance from overhead obstacles and charged conductors.

23.Stunt driving

Stunt driving and horseplay are prohibited.

24. MEWP protection

The user shall order the operator to prevent unauthorized use of the tools provided.

25.Modification of safety devices

Interlocks or other safety equipment shall not be altered or removed.

26.Blocked platform

If the platform or elevation assembly is stuck, obstructed or otherwise prevented from performing its normal operation by an adjacent building or other obstacles. Withdrawing control can not free the platform. Before attempting to use the chassis control to free the platform, all personnel on the platform should be removed.

27. Exit (or enter) elevated platform

If approved by the manufacturer, workers shall only leave or enter the elevated platform in accordance with the instructions and guidance provided by the manufacturer, subject to the manufacturer's approval.

28.Alternation

Alteration of an aerial platform or the fabrication and attaching of frameworks, or the mounting of attachments for holding tools or materials onto the platform or the guardrail system shall only be accomplished with the prior written permission of the manufacturer.

29.Assisting the operator

If the operator encounters any suspicious MEWP failures, dangers or potentially unsafe conditions that affect the carrying capacity, normal use or safe operation of the MEWP, the operator should stop the machine operation and consult the user for more information.

30.Problems or malfunctions

Any problem or malfunction affecting safe operation should be repaired prior to use of the MEWP.

31. Carried material (larger than the platform)

The users shall ensure that they carry only safe and reliable tools and materials that are evenly distributed on platform and can be used safely by personnel on platform.

32.Rated horizontal force

The user shall supervise the operator not to exceed the rated horizontal force specified by the manufacturer.

33.Bridge crane

When bridge crane or similar equipment operates within its stroke, measures shall be taken to prevent collisions with MEWP.

34.Appropriate supporting requirement

The user shall ensure that the supporting surface is sufficient to bear MEWP and loads.

35.Stopping unauthorized use

The user shall instruct the operator not to use, rent, lease or supply the MEWP for any benefit without prior permission.

3.3.3.11 User as operator

If the user is also an operator of MEWP, the user shall assume the operational responsibilities specified in section 3.3.5 of this manual and the user responsibilities specified in section 3.3.3 of this manual.

3.3.3.12 Shutdown of MEWP

In case of any suspected MEWP failure or dangerous or potentially unsafe conditions, the user shall approve and instruct the operator to stop the MEWP operation and consult the owner, dealer or manufacturer for more information on safe operation before resuming work.

3.3.3.13 Record preservation and distribution

1. Record preservation

The dealer shall preserve the following records at least 4 years:

1) Name of operator received training and retraining

2) Name of the operator received the details

3) The owner (or an individual designated by the owner) is responsible for

ensuring that routine and annual inspections are carried out and the written records are preserved. Records shall include the date of inspection, defects found, recommended correction, and a certificate from the person who performed the inspection.

The user shall maintain a written record of the completion of repairs to the MEWP by the owner's employees. Records shall include the date of repair, a description of the repair completed and a certificate of the person who performed the repair.

2. Record distribution

   1) When the user instructs the employee to complete the routine inspection or annual inspection, the correct records shall be provided to the owner within 2 months of the completion of the inspection.

   2) When the user instructs the employee to complete the repair, the correct records shall be provided to the owner within 2 months of the completion of the repair.

3. Training proof

   The owner should provide the trained person who has successfully completed the training with documentary evidence to prove they are trained. If the trainee requires, the owner shall provide evidence. The documentary evidence should include following information:

   1) Name of entity supplying training and retraining

   2) Name of trainer

   3) Clear proof of training covered MEWPs

   4) Training date

   5) Names of trainee

3.3.3.14 Modification

Modification, alteration or remanufacturing of MEWPs shall only be made with prior written permission from the manufacturer.

3.3.3.15 Safety bulletin from manufacturer

The user shall comply with the relevant safety bulletins received from the manufacturer, dealer or owner.

3.3.4 Owner responsibilities

3.3.4.1 Basic principle

- specifies and verifies the skills and responsibilities of personnel working with the machine or specific parts of it
- offers the necessary PPE to individuals working with the machine
- is responsible for the safety state (smooth and safe functioning) of the machine and its accessories

- performs inspections on the machine based on local regulations in addition to the inspections defined by manufacturer's Instruction Manual
- informs the manufacturer of any accident involving the machine that may lead to serious injury or major damage to property
- provides unrestricted access to the machine to the manufacturer’s authorized service personnel
- carries out the work planning for the machine carefully and conscientiously
- consults with the manufacturer or their authorized representative before making any modification to the machine

⚠ **Given that the reasonable principles of personnel, safety, training, inspection,** maintenance**, application and operation shall be applied in personnel training, inspection, maintenance, application and operation, these principles shall be consistent with all available data on rational use and external environment parameters.**

3.3.4.2 Purchasing responsibilities

When purchasing MEWP, the purchaser should:

1. Confirm the receiving of operation and maintenance manuals
2. Obtain maintenance and parts catalogue within 2 months of purchase
3. Provide the name and address of the buyer as well as the model and the code number of the MEWP purchased to the manufacturer within 2 months of purchase
4. Make sure the routine inspection and annual inspection are latest if the MEWP is used
5. Be familiar with and follow the owner’s responsibilities as specified in Instruction Manual for MEWPs

3.3.4.3 Manuals

1. Machine manual

   The owner shall provide a copy of the operation and maintenance manuals for each machine by lease, rental or sale and ensure that it is properly stored in the weatherproof box on the MEWP. Manuals are considered as an indispensable part of MEWP, which is an important media to send necessary safety information to owners, users and operators. In addition, each machine sold shall be equipped with a repair and parts manual.
2. Manual of responsibilities

   The current responsibilities manual for distributors, owners, users, operators, lessees, leasers and agents of MEWPs shall be provided in a weatherproof storage box.

3.3.4.4 Maintenance, inspection and repair

1. Maintenance

The owner of the MEWP shall ensure that the maintenance detailed in this standard is implemented on the principle of timeliness. The owner shall establish a preventive maintenance program in accordance with the manufacturer's recommendations and the operation environment and intensity of the MEWP.

2. Inspection

The owner shall arrange routine inspection and annual inspection as recommended by the manufacturer. All faults and problems identified during the inspection should be solved before the MEWP resumes operations.

3. Repair

When the MEWP is damaged or repair is required, all faults and problems identified should be fixed before the MEWP resumes operation.

3.3.4.5 Pre-delivery preparation

The MEWP shall be inspected, maintained and regulated according to manufacturer’s requirement before delivery (by sale, rental or lease).

3.3.4.6 Routine inspection

The owner of the MEWP shall ensure that the routine inspection of the MEWP is performed in accordance with the manufacturer’s instructions:

1. Purchased used machine.The routine and annual inspections shall be conducted unless it is confirmed that the inspections are current.
2. Machine servicing for three months or 250 hours (whichever comes first)
3. No operation for more than 3 months. The inspection shall be carried out by a qualified special MEWP technician or one has similar design characteristics. Inspections shall be carried out in accordance with the manufacturer's requirements for routine inspections, including but not limited to the following:

All functions and controls for speed, stability and motion limits

Chassis control includes provisions for overriding of upper controls

All wire rope devices used for adjustment and worn or damaged parts

All emergency safety equipment

Lubrication of all movable parts, inspection of filter, hydraulic oil, engine oil and refrigerating fluid as specified by manufacturer

Visual inspection of structural parts and other critical components such as fasteners, pins, shafts and latching devices

Bulletins, warnings and control labels

Other items specified by the manufacturer

Emergency descent method

3.3.4.7 Annual inspection

The owner of the MEWP shall ensure that the annual inspection is carried out within 13 months from the date of the last annual inspection. The inspection shall be carried out by a qualified technician on MEWP or one has similar design characteristics. The inspection shall be carried out in accordance with the manufacturer’s annual inspection items. The owner should not arrange MEWP operation until all faults and problems have been solved.

3.3.4.8 Maintenance safety precautions

Before performing adjustment and repair of MEWP, the following precautions should be taken:

1. Power plants stopped and start switches do not work
2. All control mechanisms are in "off" gears to protect all control systems from unintentional action caused by braking, obstruction, or other means
3. Boom and platform shall be lowered to the stowed position as much as possible or shall be secured with block or constraint to prevent falling
4. Release oil pressure from all hydraulic circuit before loosening or removing hydraulic components
5. Other precautions specified by the manufacturer

3.3.4.9 Spare parts

When parts or components are replaced, they shall be identical or equivalent to original parts or components of MEWP.

3.3.4.10 Maintenance training

The owner shall train the maintenance personnel for inspection and maintenance of the MEWP as recommended by the manufacturer and as required in section 3.3.4.

3.3.4.11 Training

1. Operator training

   Whenever the owner orders or authorizes the employee to operate the MEWP (loading, unloading, inspection or other purpose), the owner shall undertake the user's responsibilities specified in Section 3.3.3 of this manual and ensure that the employee has been:

   1) Trained

   2) Familiar with the MEWP to be operated

   3) Aware of operator responsibilities outlined in section 3.3.5 of this manual.

2. Assisting users

When, at the request of the user, the owner sells, rents, leases or supplies the MEWP in any form for benefits, the owner shall provide for training or recommend to the user a relatively reliable place for training.

3.3.4.12 Familiarization on delivery

For delivery by sale, rental, lease or other means, the dealer and the recipient assigned by receiving unit of MEWP shall share responsibilities:

1. Verify the weatherproof storage box (manual box)
2. Verify the manuals specified by the manufactures is on MEWP
3. Check all control functions
4. Check all safety devices specified during the delivery of MEWP

3.3.4.13 Operation

When operating the MEWP, the owner shall be liable for the user's responsibilities under section 3.3.3 of this manual: his operator shall be liable for the operator's responsibilities under section 3.3.5 of this manual.

3.3.4.14 Assisting user and operator

If the owner is unable to answer the user or operator's questions regarding the rated capacity, intended use, maintenance, repair, inspection or operation of the MEWP, the owner shall ask correct information from the manufacturer or a qualified person (if the manufacturer is no longer in business) and provide it to the user or operator.

3.3.4.15 Record preservation and distribution

1. Record preservation

   The owner shall specify the record date and preserve the record at latest 4 years:

   1) Name and address of each MEWP purchaser by delivery number and date

   2) Written record of routine inspection and annual inspection performed. Records include documentation of defects found, modification completed, and certificates of personnel who performed the inspections and repairs.

   3) Written record finished on MEWP. The record shall include a certificate of the person who made the modification and performed the repair.

   4) Pre-delivery preparation record completed before delivery

   5) Names of trainee

   6) Names of trainer

7) The name of the person receiving the MEWP details for each delivery, unless the person has delivery details on the same model or the product has characteristics consistent with the product delivered within 3 months.

8) Name of personnel providing delivery details

2. Training proof

The dealer should provide the trained person who has successfully completed the training with documentary evidence to prove they are trained. If the trainee required, the owner shall provide the evidence. The documentary evidence should includesinclude following information:

1) Name of entity providing training or retraining

2) Name of trainer

3) Clear proof of training covered MEWPs

4) Training date

5) Name of trainee

3. Record distribution

Upon request, the dealer shall provide the following information:

1) To user, proof of training for operators (including name of trainer and training date)

2) To user, the name of the person receiving delivery details of MEWP

3.3.4.16 Modification

Modification, alteration or remanufacturing of MEWPs shall only be made with prior written permission from the manufacturer.

3.3.4.17 Safety bulletin from manufacturer

The dealer shall observe the bulletins from the manufacturer or dealer.

3.3.4.18 Sales responsibilities

When the MEWP are sold, the sales person shall:

1. Delivery operation and maintenance manuals to the owner
2. Provide the copy of current Instruction Manual.
3. Provide the new owner Parts Catalogue
4. Provide training as the new owner requested or recommend a relatively reliable training location.

3.3.5 The operator

3.3.5.1 Basic principle

The operating personnel need:

- training or instructions, according to the local regulations, enable them to operate the machine in a safe manner
- the authorization to operate the machine
- being physical and mental able to operate the machine and is not under the influence or substances affecting operation ability
- be instructed to the safety precautions at the site
- take suitable safety measures for himself and bystanders
- check qualification of persons working next to machine
- manage the activities of persons around the machine
- ensure the machine's safe-mannered operation according to intended use
- immediately take the machine out of operation in case of safety-impairing defects
- perform on-time maintenance and inspections on the machine according to XCMG's Instruction Manual
- report every accident involving the machine, especially:
  - serious injuries
  - major property damage
- use original XCMG spare parts for maintenance
- always consider operating conditions, assesses possible hazards and acts accordingly

⚠ **The information in this manual shall be supplemented according to the principles of good judgment, safety control and warning during elevating and lowering conditions. Due to the operator controls the** MEWP **directly, it is the operator's responsibility to follow good safety** *regulations in the area. Operators shall make decisions about the use and operation of the MEWP with considering their own safety and the safety of others.*

3.3.5.2 Machine manual

The operator shall ensure that operation and maintenance manuals are kept in the weatherproof storage box of MEWP. This manual is an essential part of sending the necessary safety information to the operator of MEWP. The operator shall know and consult the manual as required.

3.3.5.3 Inspection before operation

⚠ *Walk-around visual inspection shall be conducted every day before operation or every change of operation environment, and shall include but not limited to the following functional tests:*

1. Operation and emergency controls
2. Safety devices
3. PPE
4. Leakage of pneumatic pressure, hydraulic pressure and fuel system
5. Harness of cables and wires
6. Loosen or missing parts
7. Tires
8. Labels, warnings, control labels and operation instruction
9. Outriggers, stabilizers, stretchable shafts and other devices like guardrail
10. Items identified by the manufacturer.

3.3.5.4 Problems and malfunctions

Any problems and malfunctions that may affect the safety of the operation shall be fixed before the use of the MEWP.

3.3.5.5 Training, retraining and proficiency

General training

⚠*Only those who have received instructions on the inspection, application and operation of the* MEWP *and who understand and avoid the risks associated with their operation, shall operate the platform. The training shall include, but not limited to the following questions and requirements:*

1. Purpose and use of the guidance
2. Working instructions are an integral part of the MEWP and must be properly stored in the weatherproof storage box when not in use
3. Inspection before operation
4. Responsibilities relating to problems and malfunctions affecting MEWP operation
5. Factors affecting stability
6. Purpose of labels and decals
7. Operating environment checking
8. Safety regulation
9. Operating license
10. Operator warnings and instructions
11. Actual operation of MEWP

12.The trainee shall, under the guidance of qualified personnel, operate the MEWP for a sufficient period of time to achieve proficiency in practical operation.

3.3.5.6 Retraining

When instructed by the user, the operator shall be retrained based on the user's observation and evaluation of the operator.

3.3.5.7 Proficiency

When the operator is instructed to operate a MEWP with which he/she is not familiar, the operator shall be provided with instructions that include the following:

1. The location of the weatherproof storage box (preserving guidance)
2. Purpose and function of all controls
3. Safety devices and operational performance for MEWPs

3.3.5.8 Before working

Before operation, the operator shall:

1. Read and understand the manufacturer's operating instructions and the user's safety regulation, or received related explanation.
2. Understand the meaning of all labels, warning and instructions on MEWP or received related explanation.
3. Ensure that all operators on MEWPs wear appropriate personal protective equipment, including the working environment.

Operating environment checking

Before or during the use of the MEWP, the operator shall check the possible risks in the working area, for example, but not limited to:

1. A drop or pit, including one covered by water, ice, mud, etc.
2. Slop
3. Bumps and obstacles on ground
4. Debris
5. Overhead obstacles and cables
6. Hazardous places and environment (refer to ANSI/NFPA 505-1987)
7. The support surface is insufficient to undertake the loads applied by MEWP under all operating conditions
8. Wind and weather conditions
9. Presence of unauthorized personnel
10. Other possible unsafe conditions

3.3.5.9 Before operation

Before each operation of the MEWP, the operator shall ensure that:

⚠ *Outriggers, stabilizers, stretchable shafts or other equipment to improve stability should be operated according to manufacturer's requirements*

1. The guardrail shall be installed and the hatch closed according to the manufacturer's instructions
2. The load and its distribution on platform and extension structure is accord with the rated required for working conditions specified by manufacturer.
3. All personnel on a MEWP are equipped with appropriate safety devices for the intended work and environment

3.3.5.10 Understanding of hazardous locations

It is the operator's responsibility to understand the hazard classification of the work place according to ANSI/NFPA 505-1996.

3.3.5.11 Operating warning and regulation

⚠ *The operator directs personnel to operate the* MEWP *in accordance with the provisions of this manual. The operator shall supervise the work to ensure that the operation and use of the MEWP comply with the provisions of section 3.3.5 of this manual, warn personnel of potential hazards, provide protective measures for identified hazards, and explain the potential consequences of failure to follow the instructions. Instructions for appropriate operation shall include, but not limited to, the following terms and topics:*

1. Falling protection
   Although the guardrail of MEWP provides basic fall protection, all operators of MEWP should wear fall prevention devices under the guidance of the owner.
2. Inclined surface and slop
   The MEWP shall not be operated in any way on any inclined surface or slop that exceeds the rated slop specified by the manufacturer.
3. Use of equipment to improve stability
   Outriggers, stabilizers, stretchable shafts or other equipment to improve stability shall be stretched and locked in place as manufacturer required.
4. Guardrail device
   The guardrail shall be installed and the hatch closed according to the manufacturer's instructions.
5. Load distribution
   The load and its distribution on platform and extension structure (if equipped) is accord with the rated capacity for that specific configuration.
6. Maintaining overhead clearance

The operator shall ensure that sufficient clearance is maintained with the top barriers and live conductors and parts.

7. Electrocution hazard

Operators should only perform work within their capacity and observe safety regulation related work practices intended to prevent electric shock covered by local regulations and rules. The skill level of the operator can only be determined by the professionals. The minimum approach distance (MAD) from energized power lines shall be maintained according to CFR 1910.333c.

8. PPE

The operator shall ensure that all personnel on the platform wear personal protective equipment as required.

9. Foothold of worker

The worker shall ensure a secure foothold when working on the platform. It is forbidden to climb the to top rail and mid-rail of MEWPs. Do not use boards, ladders or any other equipment on the platform for additional height or distance.

10.Precautions for other mobile equipment

In the presence of other mobile equipment and vehicles, special precautions should be taken to comply with local regulations or safety standards related to the work environment. Warning signs, such as but not limited to flags, rope-fenced zones, flashing lights and barricades, shall be used appropriately.

11.Reporting problems and malfunctions

The operator shall immediately report any problems or risks found during the operation to the manager. The user shall make sure that all problems and hazards affecting safe operation are resolved before resuming use.

12.Reporting potential hazardous environment

The operator shall immediately report any hazardous environment found during the operation to the manager.

13.Operating in hazardous environment

Unlicensed or unmarked MEWPs are prohibited from operating in dangerous environments.

14.Entanglement

Attentions shall be paid to prevent entanglement of ropes, wires and hoses of MEWPs.

15.Load limitation

The load transmitted to the platform at any height shall not exceed the rated load.

16.Working area

The user shall ensure that there are no personnel or equipment around the MEWP before lowering platform.

17.Oiling

Turn off the engine when replenish oil to the oil tank. Replenish oil in a well-ventilated area away from open flames, sparks or other hazards of fire or explosion.

18.Battery charging

Replenish oil in a well-ventilated area away from open flames, sparks or other hazards of fire or explosion.

19.Inappropriate platform stability

The MEWP shall not be placed against another object to improve stability.

20.Misused as a crane

The MEWP shall not be used as a crane.

21.Abnormal operating support condition

The MEWP shall not be used on trucks, trailers, train vehicles, ships, lifting platforms or similar equipment unless it is approved in writing by the manufacturer or by a qualified person.

22.Travel speed

The user shall instruct the operator to limit the travel speed according to the environment, including support surface condition, congestion, visibility, inclination, personnel position, and other risk factors that may cause collisions and result in injuries.

23.Travel requirement

When platform is elevated, the user shall instruct the operator to:

1) Maintain a clear view of the supporting surfaces and driving routes.

2) Make sure that personnel in the working area who can be harmed are aware of the motion of the machine. Inform and relocate MEWP as required to protect personnel from injury.

3) Maintain a safe distance from obstacles, debris, holes, potholes, ramps and other hazards to ensure safe driving.

4) iv. Keep a safety distance from overhead obstacles and charged conductors.

24.Stunt driving

Stunt driving and horseplay are prohibited.

25.MEWP protection

The user shall order the operator to prevent unauthorized use of the tools provided.

26.Modification of safety devices

Interlocks or other safety equipment shall not be altered or removed.

27.Blocked platform

If the platform or elevation assembly is stuck, obstructed or otherwise prevented from performing its normal operation by an adjacent building or other obstacles, withdrawal of the control shall not free the platform. Before attempting to use the chassis control to free the platform, all personnel on the platform should be removed.

28.Exit (or enter) elevated platform

If approved by the manufacturer, workers shall only leave or enter the elevated platform in accordance with the instructions and guidance provided by the manufacturer, subject to the manufacturer's approval.

29.Modification

Modification or alteration of MEWP, structure and accessories of structural frame, brackets of tool box, and equipment and guardrail on platform shall only be accomplished with the prior written permission of the manufacturer.

30.Assisting the operator

If the operator encounters any suspected failure, hazard or potential unsafe situation that affects the carrying capacity, normal use or safe operation of the MEWP, the operator shall stop operation and consult the user for more information.

31.Reporting problems and malfunctions

Any problem or malfunction affecting safe operation should be repaired prior to use of the MEWP.

32.Carried material (larger than the platform)

The users shall ensure that they carry only safe and reliable tools and materials that are evenly distributed and can be used safely by personnel on platform.

33.Rated horizontal force

The user shall supervise the operator not to exceed the rated horizontal force specified by the manufacturer.

34.Bridge crane

When bridge crane or similar equipment operates within its stroke, measures shall be taken to prevent collisions with MEWP.

35.Appropriate supporting requirement

The user shall ensure that the supporting surface is sufficient to bear MEWP.

36.The user shall instruct the operator not to use, rent, lease or supply the MEWP in any way for benefit without prior permission.

3.3.5.12 Training proof

⚠The owner should provide the trained person who has successfully completed the training with documentary evidence to prove they are trained. If the trainee requires, the owner shall provide evidence. The documentary evidence should include following information:

1. Name of entity who supply training and retraining
2. Name of trainer
3. Clear proof of training covered MEWPs
4. Training date
5. Names of trainee

3.3.6 Responsibilities of lessor

3.3.6.1 Basic principle

⚠Given that the reasonable principles of personnel, safety, training, inspection, maintenance*, application and operation shall be applied in personnel training, inspection, maintenance, application and operation, these principles shall be consistent with all available data on rational use and external environment parameters.*

3.3.6.2 Lessor as dealer

When a lessor uses the MEWP as a dealer, the lessor shall assume the dealer's responsibilities specified in section 3.3.2.

3.3.6.3 Lessor as user

When a lessor uses the MEWP as a user, the lessor shall assume the user's responsibilities specified in section 3.3.3.

3.3.6.4 Lessor as owner

When a lessor uses the MEWP as an owner, the lessor shall assume the owner's responsibilities specified in section 3.3.4.

3.3.6.5 Lessor as operator

When a lessor uses the MEWP as an operator, the lessor shall assume the operator's responsibilities specified in section 3.3.5.

3.3.7 Lessee responsibilities

3.3.7.1 Basic principle

⚠*Given that the reasonable principles of personnel, safety, training, inspection, maintenance, application and operation shall be applied in personnel training, inspection, maintenance, application and operation, these principles shall be consistent with all available data on rational use and external environment parameters.*

3.3.7.2 Lessee as dealer

When a lessee uses the MEWP as a dealer, the lessee shall assume the dealer's responsibilities specified in subsection 3.3.2.

3.3.7.3 Lessee as user

When a lessee uses the MEWP as a user, the lessee shall assume the user's responsibilities specified in subsection 3.3.3.

3.3.7.4 Lessee as owner

When a lessee uses the MEWP as an owner, the lessee shall assume the owner's responsibilities specified in subsection 3.3.4.

3.3.7.5 Lessee as operator

When a lessee uses the MEWP as an operator, the lessee shall assume the operator's responsibilities specified in section 3.3.5.

3.3.8 Agent responsibilities

3.3.8.1 Sales responsibilities

The agent shall:
1. Ensure operation and maintenance manuals are provided to new users on delivery
2. Provide new users the cope of current manual of responsibilities
Preserve the sales record for at least 10 years

3.3.8.2 Re-rent, lease or other forms for profit

When compensation is received as a result of a re-rent, lease or any form of beneficial use of a MEWP, the agent shall:
1. Ensure operation and maintenance manuals are provided to new users on delivery
2. Provide new users the cope of current manual of responsibilities
Make sure the operator is familiar with the MEWP before use
Maintain transaction records for at least 10 years

3.3.9 The maintenance personnel (technician/engineer):

- Must have knowledge of the supplied documentation including:
  - operating instructions of the machine and its components
  - operating instructions from other manufacturers (e.g. interchangeable equipment)
  - where required, knowledge of the technical data sheets
- Maintain the machine regularly to ensure safe and reliable operation.
- Perform all prescribed maintenance activities.
- Shall wear PPE where required or recommended.
- Observe safety regulations at the place of use.
- Inform the operator of any safety-related changes/modifications on the machine.

3.3.10 General requirements for all responsible parties

The operating personnel needs to:

- be physically and mentally suitable to operate the machine. This includes:

- Good eyesight and hearing
- Good spatial perception
- Physical capacity
- Good reflexes
- Craftsmanship

- be qualified by appropriate training and instructions for operating the machine.
- be over 18 years old.
- have passed the required health checks.
-
- Persons with the following physical limitations are not, or only partially qualified to operate a machine if they follow a required special medical treatment:
  - epilepsy
  - fainting spells
  - heart attack risk
  - Electrical/electromagnetic implants (e.g. pacemakers)
  - Absents of Limbs (e.g. missing fingers) if expected to impede the capability of operating the machine

3.4 Personal protection equipment (PPE)

Become familiar with safety related precautions at your site

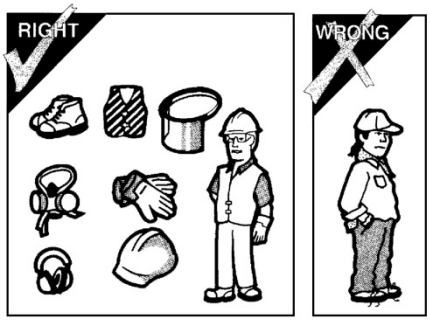


Figure 3-1 Personal protection equipment is recommended and possibly mandatory at your site.

Wear PPE **when working on any machine as required.**

PPE may include:

Safety helmet, if head injuries are possible due to swinging, falling, or flying particles or parts

Safety goggles when in contact with corrosive and pressurized liquids loose parts and dust

Respiratory protection/breathing masks in case of dangerous gases, vapor, smoke or dust in the working environment
Hearing protection when working very close to the machine/on the platforms and roof
must not reduce the operator's attention in communication with the environment
Protective gloves
Safety shoes
Special protective clothing (to prevent burns, chemical burns, or cutting injuries in respected work places)
Boldly-colored or reflective clothing (when working at night or if recognition by other personnel is needed).

3.5 Hazards and risks of injury

3.5.1 General precautions

⚠Before putting the machine into operation, check the following:

- Machine indications and safety are not reporting any fault or warning
- Machine work correctly
- When driving the machine, make sure that nobody is on the working track.

⚠During operation, observe the followings:

- Do not enter dangerous zones with the machine
- Do not reach into areas with moving machine parts (such as engine, fan)
- Keep cover and platform gate closed

3.5.2 Fire and explosion hazards

- Before refueling or filling with hydraulic fluid, shut off the machine and secure against unintentional restart.
- Immediately wipe spilled fuel off the machine with a suitable cloth.
- Immediately bind spilled fuel to substrate with binder.
- Dispose of used binder safely and in an environmentally friendly manner.
- Do not use booster sprays containing ether-solvents to start the engine.
- Do not store or use flammable liquids near the machine.
- Do not use flammable cleaning agents to clean the machine.
- Do not place flammable materials such as rags or clothing near the engine.

Warning!	Fire and Explosion Hazards
	Danger of fire and danger of explosion due to easily flammable operating materials or gas mixtures resulting from these. **No fire, naked flames or electrostatic discharges by handling flammable materials or fluids!** Observe handling-specific and situation-specific safety notes.
	• Dusty environment and improper handling of the machine in dusty environments (e.g. surface dust formation) follows in: • Increased risk of fire. • Increased risk of dust-explosion • Make sure that the operator prevents dust formation through technical or organizational measures. • Shorten cleaning intervals and maintenance intervals.
	**Observe the following safety notes**: • Keep a fire extinguisher ready • Make sure that the fire extinguisher is filled and ready for use • Know how to use the fire extinguisher in case of emergency. • Do not hang any transparent knickknack on the window glass. • Because they are possible to focus the sun and cause a fire. • Ensure that the engine is free from inflammable deposits and soiling (oil buildup, leaves, pine needles, coal dust, waste) • When refueling via a tank supply line, make electrical compensation to avoid electro-static charging between the machine and the refuel unit. • Immediately wipe spilled fuel off the machine with a suitable cloth. • In case that oil is spilled on the ground or floor, use the binder to collect it. • Dispose of any used binder safely and in an environmentally friendly manner. • After refueling, remove the fuel supply line from the machine and close the fuel tank again. • Only commission the machine as described in this Instruction Manual. • Do not use booster sprays containing ether-solvents to start the engine. • Do not store or use flammable liquids in the vicinity of the machine. • Do not use flammable cleaning agents to clean the machine. • Do not place flammable materials such as rags or clothing near the engine/electric motor. • Regularly check all protective covers, cables and wire brackets or completeness and tightness. • Ensure that loose cables or lines are firmly re-installed.

Warning!	Fire and Explosion Hazards
	• Check all hydraulic lines regularly (at least once a year) for damage and leaks. • Replace damaged hydraulic lines immediately. • Do not smoke near the battery. • Close the cover of ashtray to extinguish the match and cigarette butt • Ensure that there are no open flames or sources of . • Check regularly the electrical machine of the machine by qualified personnel. No open fire when handling flammable materials.

3.5.3 Lighting strike

Warning!	Lightning Strike
	**Electric shock from lightning!** • Contact with a direct or indirect current flow caused by a voltage flash-over or step voltage can be fatal. • Fall hazard when working at heights. • It can also cause a total loss of control, damage to the electronics or to local welding spots on supports, especially on the swing ring. Observe handling-specific and situation-specific safety notes.
	**Observe the following safety notes:** • Do not operate the machine during a thunderstorm! • The charge is channeled through the machine and into the ground • Always stay away from large, free-standing metal parts (e.g. machine) during a thunderstorm. • Machines without direct contact between steel structure and ground must be grounded. • Evacuate the machine in the case of fire.
	**Measures after experienced storm strike:** • Inspect the electrical machine of the machine by qualified personnel • Thoroughly inspect the machine by paying attention to any damaged cable, hose or rope. Check machine for leaks of fuels or supplies • Inspect the operational capability of the machine's control systems. • Contact XCMG for after-sales service.

Warning!	Injury from Mechanical Parts
	• Mechanical actions due to moving machinery! • When operating the machine, numerous hazards and situations can arise that can cause life-threatening injuries. Observe handling-specific and situation-specific safety notes.
	Observe the following safety notes: • Switch off the machine and power supply! • Wear suitable PPE. • Only work on non-moving parts. • Do not reach into areas with moving machine parts (e.g. drive shafts, drive belt, fan, etc.). • Examples of mechanical impact: • Standing under a suspended load. • Danger of being drawn in by moving drive units or machine parts. • Danger of falling when working without safety gear. • Danger of crushing due to unsecured components such as doors or sliding elements.

Warning!	Hazards and Injuries from Hydraulic Devices
	**Leaking of hydraulic oil under high pressure**! • Leakages in hydraulic lines can cause injuries to skin, destroy tissue and can cause blood poisoning due to the high pressures involved. Observe handling-specific and situation-specific safety notes.
	**Observe the following safety notes:** Repairs to hydraulic machines may only be carried out by qualified technicians with specialized knowledge and experience of hydraulics. • Make sure that the whole machine is pressure-free before start. • Never attempt to locate the leakage point with your hand or other parts of the body • Damaged hydraulic components must be replaced immediately with original XCMG spares • Check all hydraulic lines regularly (at least once a year) for damage and leaks. • Replace damaged hydraulic lines immediately. **Examples of hydraulic energy:** • Tissue damage from high pressure leaks. • Sepsis from hydraulic oil entering bloodstream.

Warning!	Risk of physical burns
	Contact with hot surfaces and consumables! • High surface and equipment temperatures can lead to burns or scalding. Observe handling-specific and situation-specific safety notes.
	**Observe the following safety notes:** • Always wear suitable protective gloves when working on hot components. • Only carry out work on the machine after it has cooled down and is stopped. **Examples of burns and scalding:** • in contact with the entire drive machine. • on engine exhaust parts. • on hydraulic pumps or motors • on electric components • engine cooling radiator and pipes

Warning!	Chemical burns
	**Contact with corrosive and chemical consumables**! • Acids and bases cause chemical burns to skin and tissue, and blindness if they come in contact with the eyes. • Acids and bases will damage clothing. Observe handling-specific and situation-specific safety notes.
	**Observe the following safety notes:** • Replace damaged battery immediately. • Wear safety goggles and protective gloves when replacing battery. • Wear safety goggles and protective gloves when working on the battery. • Do not smoke near the battery. • Ensure that there are no open flames or sources of ignition (e.g. electrical equipment) near the battery. • Do not short connect the battery terminals. • Do not place conductive materials on the battery. • Replace discharged battery immediately or charge battery in heated area **Examples of chemical burns:** • Chemical burns from handling acidic consumables. • Chemical burns from leaking battery acid.

Warning!	Asbestos dust hazard
	**Contact with the asbestos dust!** • If too much asbestos dust in the air is breathed, it is possible to suffer a lung cancer. Observe handling-specific and situation-specific safety notes.
	Observe the following safety notes: • Use the dust filtering masks, when there is asbestos dust in the air • Follow the rules, regulations and the environment standard at the work place. • Do not allow other personnel to come to close to the machine during operation. • Operate the machine in the upwind position If there is asbestos dust in the air. • Do not use the compressed air to reduce the dust.

Warning!	Poisoning and Suffocation Hazard
	• Inadequate ventilation or fresh air! • Poisonous vapors or other atmospheres hazardous to health can lead to poisoning or suffocation. Observe handling-specific and situation-specific safety notes.
	**Observe the following safety notes:** • Only operate machine in well-ventilated areas • • Use breathing apparatus when working with hazardous materials. • Regularly replace filter of respiratory mask **Examples of intoxication and choking:** • Engine exhaust gases contain carbon monoxide and other hazardous gases. • Machine is used in areas where hazardous substances are present, and contact with hazardous gases is a possibility. • .

Warning!	Environmental Risk
	Risk of damage to the environment caused by pollutants! • If their release is not controlled, fuels, oils, cleaning agents, coolant, etc. can enter the ground or rivers and cause environmental damage. Observe handling-specific and situation-specific safety notes.
	**Observe the following safety notes:** • In the event of leakage of fuel or operating consumables, rectify the causes immediately. • Eliminate leaking fuels or operating materials immediately with binders. • Dispose of used binder safely and in an environmentally friendly manner. • When disposing of fuels or operating materials, observe national disposal regulations. • If necessary, clarify the disposal with the local authorities. • Use a suitable container when draining fuels or fluids. Sump is sufficiently large, dense and chemically resistant to the corresponding fuel or hydraulic oil. • Do not mix fuels or operating consumables when draining. • Store or dispose of fuel or operating consumables separately. **Examples of hydraulic energy:** • Leakages in the operating machines. • Refilling consumables incorrectly.
	First Aid Notify the emergency services/authorities of any large amounts leaks of environment endangering substances!

3.6 Safety distance

3.6.1 Power cables / pipelines

- Start working only after explicit approval or confirmation of the shutoff of the underground power supply lines by the responsible authority.
- Treat the underground power lines as live until shutoff has been confirmed in writing by the responsible authority.
- Pay attention to distances between underground supply lines and working position.
- If necessary, consult a second person for observation.
- Break off in case of doubt.

3.7 How to act in dangerous situations

3.7.1 If the machine contacts with a power supply line

	First response Remain calm. Alert the relevant power supply company. • **If the control machine is still functioning:** • **Move the machine out of the danger area.**
	• Leave the machine • Never touch the machine’s live parts (ropes, load, , etc.) when touching the ground. • Jump in a direction that avoids any contact with live parts. • Jump to a safe distance from the machine and land on both feet at the same time. • Land on both feet at the same time with legs closed (do not straddle). • Never hold on to the machine or any live parts. • Jump away on both feet with both legs pressed together. • While jumping away, keep well clear of any live parts.
	First Aid • Alert Emergency Services • Leave the personnel rescue to the professionals!
	• Assure medical attention after electrical accidents. The person affected may experience symptoms of an irregular heartbeat sometime after the accident.

3.7.2 Machine on fire

In case of Fire

First response

- **Incorrect behavior in case of fire**
- **Danger of backlash!**
- **Even if the fire appears to be extinguished, leaking fuel or oil coming in contact with hot components may reignite**
- **Shut off the engine.**
- **Alert the emergency services.**
- **Move people out of the danger zone,**
- **Perform first aid if required**
- **Only start to fight the fire if there is no risk to your personal safety.**

Fire Fighting

- Regard Fire Classes Requirements:
- Appropriate extinguishers must be used!
- If unsuitable extinguishers are used, they may be ineffective or even lead to additional hazards.

Use extinguishers matching the fire class (see symbols on the left below)

- Fire extinguishers are subject to national regulations!
- Take fire extinguishers on the machine off the holders
- Make it ready for operation.
- Fight the source of the fire with several short bursts.
- While fighting the fire, ask personnel to alert the fire brigade.

Class of Fire

Class of Fire and Reliable Extinguish Agents

The assignment of extinguishing agents to fire classes prevents risks and damage through a wrong extinguishing agent:

A = Solid organic materials

(as wood, paper, cloths etc. ⋯)

i **extinguish by using:**

Water, ABC-Powder

B = Liquids and liquefying materials

(as Gasoline, Wax, White Spirit Solvent etc. ⋯)

i **extinguish by using:**

BC-Powder, ABC-Powder, CO2

	**C = Gases and other vapors** (as Propane, Butan, Natural gas etc. ⋯) i **extinguish by using:** Shut-off Valve, BC-Powder, ABC-Powder, CO_2
	**D = Flammable Metals** (as Aluminum, Magnesium, Lithium⋯) i **extinguish by using:** Metal fire powder, Dry sand
	First Aid • **Alert emergency services** • Only experts rescue the personnel!

3.8 Safety signs and labels

3.8.1 Introduction

Make sure to understand all safety signs contained in this Instruction Manual and the safety symbols related to the machine.

- Keep safety signs clean, undamaged and readable.
- If any safety sign is missing/damaged, contact XCMG Fire-fighting Safety Equipment Co. Ltd. immediately to have them replaced.
- Do not hesitate to contact an XCMG agent for any other ambiguity or issue as well

3.8.2 Mandatory signs

General mandatory action signs

A “**mandatory sign**” is a safety sign enforcing behavior preventing or reducing a risk to health or safety.

Common mandatory signs

Description	Mandatory Signs		Description
Wear ear protection			Wear eye protection
Wear safety footwear			Wear protective gloves
Wear protective clothing			Wear a face shield
Wear head protection			Wear a safety harness
Wear safety belts			Read operating Instruction Manual

3.8.3 Prohibition signs

A “prohibition sign” is a safety sign prohibiting behavior likely to cause a risk to health or safety.

Common prohibition signs

Description	Prohibition Signs		Description
Smoking prohibited			Fire, open ignition sources and smoking are prohibited
Pedestrians prohibited			Forbidden for ground conveyors
Access for persons with pacemakers or implanted defibrillators prohibited			No access for unauthorized personnel

Description	Prohibition Signs		Description
Entering the area prohibited			Switching prohibited
Do not lift load			No climbing for unauthorized personnel
			High-pressure cleaning prohibited

3.8.4 Warning signs

Warning signs indicate potential risks or hazards (ISO 7010)

Common warning signs:

Description	Warning! Sign		Description
Warning of non-ionizing radiation			Warning of obstacles on the ground
Warning of fall hazard			Warning of slipping hazard
Warning of electric voltage			Warning of automatic start
Warning of hot surfaces			Warning of crushing hazard from above
Warning of crushing hazard			Warning of getting rolled over
Warning of hand injuries			Warning of getting drawn into winches

Description	Warning! Sign		Description
Warning against staying the swing range			Warning of hazards through battery charging
Warning of crushing hazard from above			Warning of dangers through hydraulic oil
Warning of getting rolled over			Refer to Instruction Manual

3.8.5 Rescue signs

Rescue signs mark the locations of first aid equipment and emergency exits.

Common signs

Description	Rescue sign	Description
First Aid		Place where to find a first aid kit or similar
Emergency exit (door)		Door useable to exit in case of emergency (alarm may turn on when opened; do not misuse)
Emergency exit (window)		Window to escape in case of emergency. Use the mallet/hammer nearby to smash open

3.8.6 Fire protection signs

Fire protection signs mark the location of fire alarms or fire extinguishing equipment

Common fire protection signs

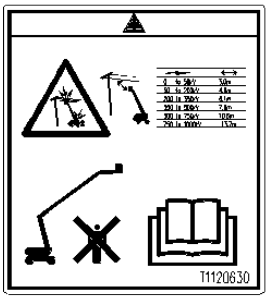
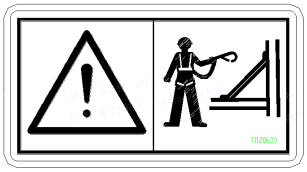
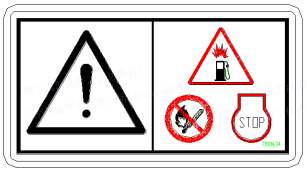
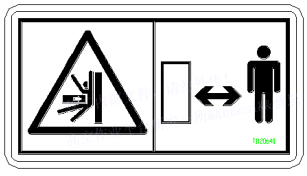
Description	Fire protection Sign		Description
Fire extinguisher			Fire detector

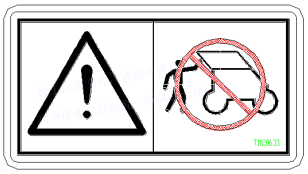
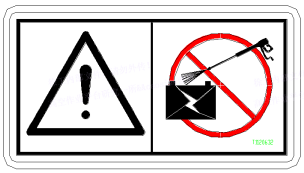
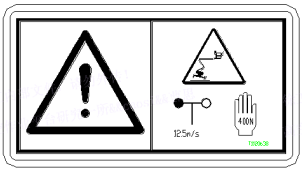
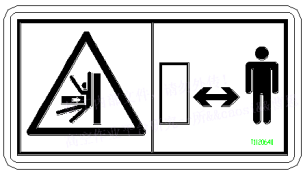
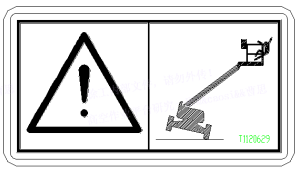
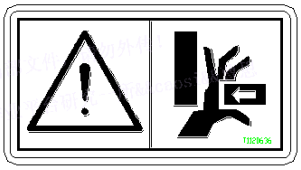
3.9 Machine-specific signs and labels

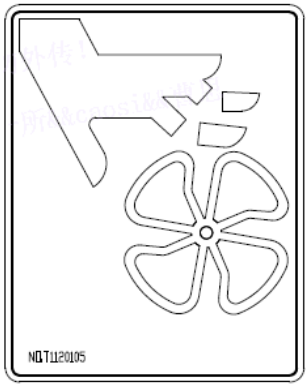
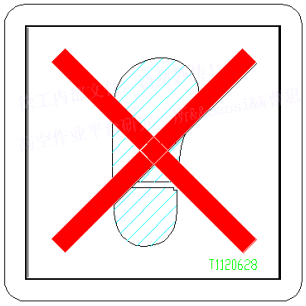
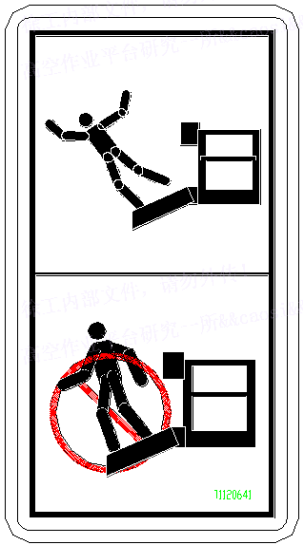
3.9.1 Introduction

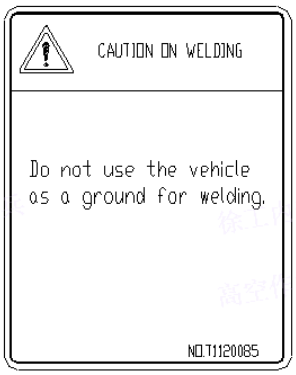
- Be sure to read and memorize all safety instructions in this Instruction Manual and all safety signs and symbols associated with the machine.
- Ensure that the safety signs and symbols remain legible. If one is missing, damaged or unrecognisable, have it replaced immediately.
- If you have any questions, contact an XCMG representative or XCMG Fire-fighting Safety Equipment Co. Ltd.

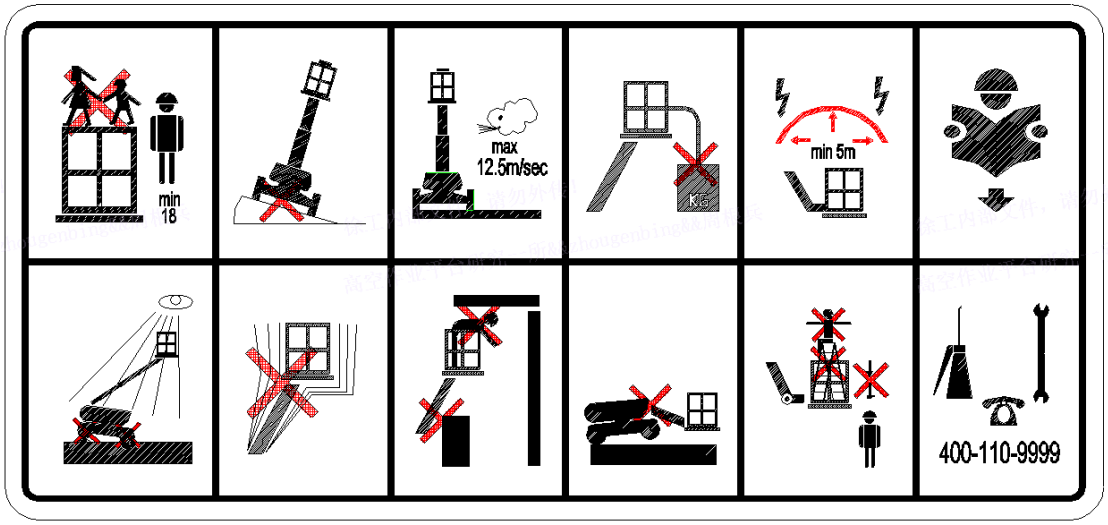
3.9.2 Machine-specific warning signs

Appearance	Meaning and description
	Warning! – Danger from high-voltage lines within the working area! If the machine gets too close to the power lines, electric shock may occur. • Keep a safe distance between the machine and the power lines when operating/driving the machine.
	**Warning! -Anchorage** **Personnel on platform must wear safety belts and attach them to designed anchorage.**
	Warning! – Burn hazards from hot surfaces! Risk of 2nd and 3rd degree burns. • Watch out for hot surfaces of the machine immediately after switching off (e.g.: radiator or hydraulic oil tank), as well as for hot oil or water spots on the surfaces.
	Warning sign stating Crushing Hazard! —Keep away from path of moving parts.

Appearance	Meaning and description
	Warning! Non-professionals are not allowed to alter the internal components of the machine.
	Warning! Electrical equipment inside. Do not point it directly with a hydraulic monitor! •
	Warning! Tip-over Hazard! • Max manual force: 400 N. • Max wind speed: 12.5 m/s.
	Warning! Crushing Hazard. • Keep away from path of moving parts.
	Warning! Tip-over Hazard. No altering limit switches.
	Warning! – Risk of **crushing** • Contact with moving parts may result in death or serious danger. • Keep away from mowing parts.
	Warning! –Improper operation or maintenance can result in serious injury or death. • Read and understand Operator’s Manual, Responsibilities Manual and Safety Manual and all safety signs before using or maintaining machine. • If you do not understand the information in the manuals, consult your supervisor, the owner or the manufacturer.

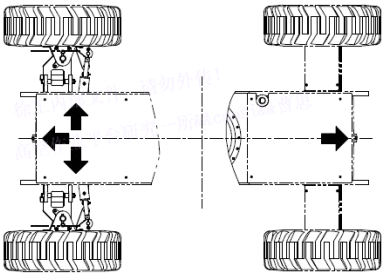
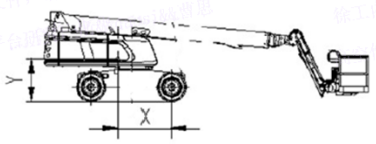
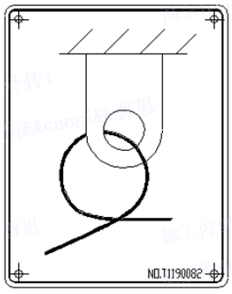
Appearance	Meaning and description
	Warning! Risk of severe crushing or cutting injuries! • Fingers or hands can be crushed or severed by the motor fan. • Do not start any maintenance/repair work before the fan has come to a complete stop.
	Warning! – Unstable/uneven area! • There is a risk of tripping and falling in the marked area. • Standing in this area is prohibited to avoid injury.
	Warning! There is a risk of falling at any time from the boom. • Climbing or riding on the boom may cause death or serious injury.

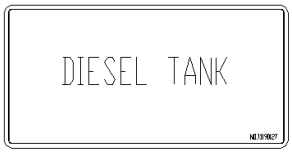
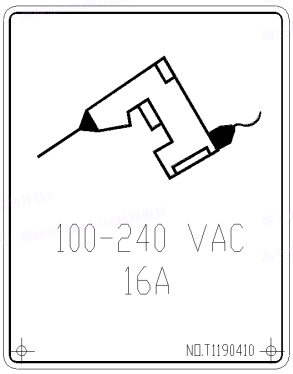
Appearance	Meaning and description
	Warning! Do not use the vehicle as a ground for welding.



1. Minors under age of 18 are prohibited from entering the platform.
2. Do not operate the machine at a tilt angle that exceeds the allowable angle specified by the manufacturer.
3. Do not operate the machine when the wind speed may exceed 12.5 m/s.
4. Do not use the machine as a crane.
5. The distance from the power line is not less than 5 m during operation.
6. Read Instruction Manual before operation.
7. Do not operate on uneven ground at night.
8. Do not shake violently in the platform.
9. Do not hit the obstacles over the platform and under the boom during operation.
10. Do not allow the platform encounter with the obstacles when the boom is lowered.
11. Do not set a ladder within the platform and prevent tools in platform from falling.
12. Service Hotline: 400-110-9999

3.9.3 Information signs - machine-specific functions

	defines which function is triggered by moving the respective operating lever in the corresponding direction.
	Machine's moving direction display Indicates the machine current movement direction.
 重心位置 | X 轴 | Y 轴 XGS28E | 1.43 | 1.48	Position of the machine's center of gravity indicates the usual/actual position of the machine's center of gravity.
	Lifting point symbol Shows the position of spots made for attaching loads to be lifted.
	Hydraulic oil Tank symbol Indicates a hydraulic oil inlet/outlet or the location of the oil tank.

	Diesel Tank symbol Indicates a diesel inlet/outlet or the location of the oil tank.
	Electric equipment Sign Volt：100-240 VAC Current：16A

Chapter 4 Safety guidelines

4.1 Safety rules

- Become familiar with the machine's instruction manual.
- Become familiar with:
- Safety instructions, rules and regulations applicable at your area/site.
- Safety devices installed and available at your site.
- Personal Protection Equipment as required at your area/site.

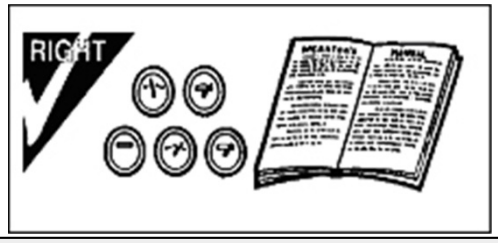


Figure 4-1 Become familiar with this instruction manual and other safety instructions applying at your site

- Comply with additional regulations, standards and laws that may apply in your area or at your jobsite.
- If required wear personal protection items, such as reflective vest, gloves, safety glasses, safety shoes, etc. In dusty environments, dust masks may be required.

Become familiar and adhere rules and regulations Become familiar and comply with the rules and regulations applying at your area

Figure 4-2 Rules and Regulations

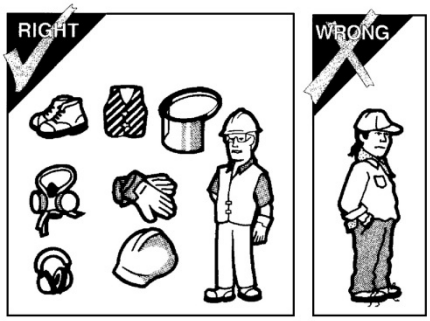


Figure 4-3 Personal protection equipment

- Personal protection equipment is recommended and possibly mandatory at your site.
- Become familiar with safety related precautions at your site.
- This equipment is a non-road vehicle and can not travel on road. In case of transportation, follow local road traffic regulations including driving rules and machine's condition.

- In case additional documents related to machine's safety and its operation, they must be attached to this instruction manual.
- Ensure safety related systems are operational and not damaged:
-
- Same apply to the related bolts and nuts.

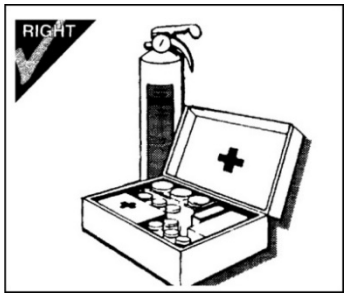


Figure 4-4 Safety equipment

- Be familiar with safety precautions at you site (i.e. emergency phones, fire extinguishers, first aid kits, defibrillators, etc.)
- Bolts and nuts shall be screwed tightly. In case of damage, contact immediately your XCMG service partner.
- Seatbelt and seatbelt lock shall be undamaged and functional

4.2 Access for personnel

The platform is provided with entrances. Personnel enter or leave the platform via entrance doors (see **Figure 4–5**).

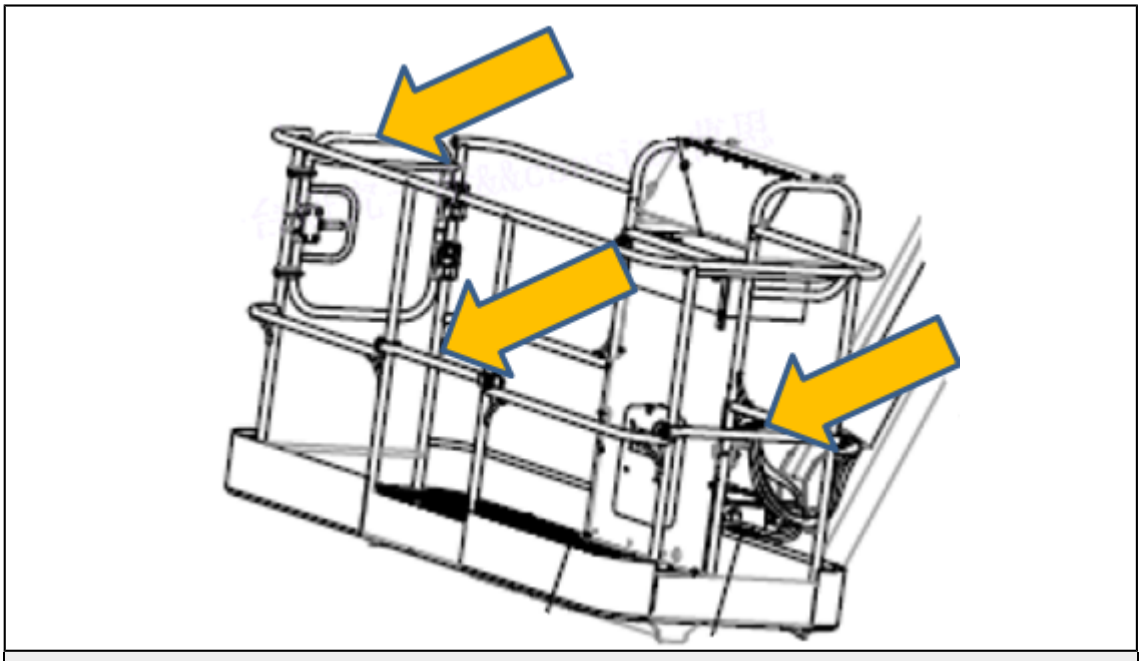


Figure 4-5 Access for personnel

4.3 Installation and assembly

4.3.1 Requirements for the installation and assembly personnel

DANGER!

Beware of risks and hazards during installation and assembly

- **Installation and assembly tests can present the hazards for the life (operator himself, co-workers, bystanders) and/or property!**
- **Be careful! Not respecting the basic safety rules presented hereafter – serious injuries or death casualties and/or significant property damage will result!**

- Only trained personnel of XCMG or its local representative may be involved in installation and assembly tasks of the machine.
- Wear always basic personal protective equipment for your own protection and protection of co-workers

4.3.2 Requirements for the installation site

- Place the machine and components for installation and assembly on flat solid area ground – suitable for the machine size and weight.

- Use lifting appliances of sufficient capacity to carry out installation and mounting of heavy components.
- Note down all important local emergency phone numbers
  - **doctors,**
  - **ambulances,**
  - **hospitals and**
  - **fire departments**

4.3.3 Assembly of the machine

- The scope of the installation depends on the delivered condition of the machine. Smaller units are delivered usually complete
- For bigger units – the delivery is always suited to the shipping – in most cases defined by the customer.

- Depending on the condition of delivered machine
  - delivered complete (ready for immediate operation) or delivered as separate sections
  - boom delivered complete or boom delivered in separate sections
- Refer to the installation documents and procedure supplied with the machine.

4.4 Commissioning

4.4.1 Requirements for commissioning personnel

- Commissioning will be carried out only by trained personnel of XCMG or his local representative
- The commissioning will be carried out according to the commissioning check-list and when completed – will be countersigned from the customer or his representative. For further details read, understand and follow the recommendations of Sections 4.6, 4.7.1, and 4.8.

DANGER!

Beware of risks and hazards of any machine function

- **Any machine's operation can present the hazards for the life (operator himself, co-workers, bystanders) and/or property!**
- **Be careful! Not respecting the basic safety rules presented hereafter – serious injuries or death casualties and/or significant property damage will result!**

- Before start installation – assembly – commissioning and operation of the machine
  - note down all important local emergency phone numbers
    - ♦ doctors,
    - ♦ ambulances,
    - ♦ hospitals and
    - ♦ fire departments
    - ♦ Before doing anything not related to specific machine operation :
- Lower the boom always completely down to the ground prior you park and leave the machine.
- Shut down the engine.
- Keep the safety devices always in good working condition
- Never dismantle safety devices on your own
- Ensure safety before boarding or leaving the machine
- Before entering the work platform always remove the mud/oil remains on the shoes to prevent serious accidents due to slipping when entering or leaving the work platform.
- To prevent accidents due to distraction, do not use cell phones, the radio or earphones when operating machine
- Do not put any flammable or explosive materials in the working platform
- When servicing the machine, do not use any worn-out/damaged tools to prevent injuries or unsatis-factory machine operation.
  - Check the fire extinguisher regularly and replace/refill them if needed.
  - Ensure effective emergency training of all field personnel.
  - Know how to act in case of fire.

4.5 Construction sites safety

⚠DANGER!

Site conditions may have significant impact on safety of the operator, bystanders and property around.

- **The hazards on the site may lead to people injuries or even deaths and significant property damages!**
- **Inspect the site and take necessary safety measures.**
- **Comply to the site local regulations and safety guidelines**

NOTICE!

- **Be aware of soil and surface stability!**
- **A significant machine damage may result**

- Construction site safety shall be guaranteed;
- Limit access of unauthorized persons entering your construction site according your local regulations and best practices, i.e.as per:
- Please inform yourself on the validity and actual status of the regulations at the time you read it.
- In your area and for your specific construction site other, different regulations may apply!, Ask your supervisor, your dealer or inform yourself, further reference is not provided in this instruction manual.
- While the machine is not operational, ensure no by standers are within 1m radius around the machine before staring engine.
- While the machine is operating, ensure that no persons are around, in front or behind the machine on the path of operation.

4.6 Safety for children

DANGER!

- **No children are allowed on the construction site!**
- **Ignoring the following rules may result in serious injuries or even death**

Always observe the following rules of conduct:

- **Never assume that children will remain where you last saw them.**
- **Keep children away from the working area and always under supervision of adults.**
- **Be vigilant and switch the machine off when children enter the working area.**
- **.**
- **Children could fall off the machine and be run over or affect its controls causing unexpected results.**
- **Children must never operate the machine, even under the supervision of an adult.**
- **Never let children play on the machine or attachments.**
- **Always check the machine's vicinity and ensure that there are no children in the area before operating it.**
- **Before leaving the machine, park it so that it cannot move. When leaving the machine (e.g. for breaks or at the end of work), stop the engine, remove the key**

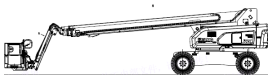
4.7 Operator's safety

DANGER!

Fasten your seat-belt always before start to operate the machine.

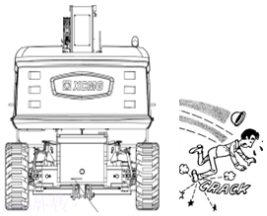
- **Be careful! Not respecting the basic rules presented hereafter – serious injuries or deaths and/or significant property damage may result!**
- **Wear your PPE (see Section 3.4.)**

Safe boarding the machine



- To avoid injury when stepping up and down the machine, use the hand-rails and steps! See the arrows marked in the sketch below.

- Check the handrails and steps for any oil, lubrication grease or mud remains before use.
- Always face the machine while boarding or leaving it.
- Never step on the engine without non-slip mat or cover plate protection
- Never hold onto any control element when boarding.



- Always hold on to **at least three points** at any time while grabbing the handrails and/or stepping on the track shoes (either two feet and one hand or two hands and one foot).
-
- If the machine suddenly moves on its own, do not try to stop the machine by jumping on it.
- Do not jump on and off the machine, especially while it is moving!
-
- Jumping off the machine may cause injuries!

⚠CAUTION!

Signals and gestures of the signalman

- **If there is poor sight, ask for a co-worker to act as a signalman.**
- **The operator shall pay close attention to the signs and follow the signalman's commands diligently.**
- **Only one signalman shall send the signals.**
- **Before operating, make sure all of the workers understand all of the signals and gestures.**
- **Place the required warning signs when working on the roadside or other unstable ground.**

4.8 Pre-Inspections before machine operation

4.8.1 Pre-operation safety rules

1. Become familiar with the machine's instruction manual.
   - Become familiar with:
   - Safety instructions, rules and regulations applicable at your area/site.

- Safety devices installed and available at your site.
- Place PPE (Personal Protection Equipment) as required at your area/site.

Figure 4-6 Become familiar with this instruction manual and other safety instructions applying at your site

- Comply with additional regulations, standards and laws that may apply in your area or at your jobsite.
- If required wear personal protection items, such as reflective vest, gloves, safety glasses, safety shoes, etc. In dusty environments, dust masks may be required.

Refer also to the Sections: 3.4 and 4.1

2. **Become familiar and adhere rules and regulations**

Figure 4-7 Rules and Regulations

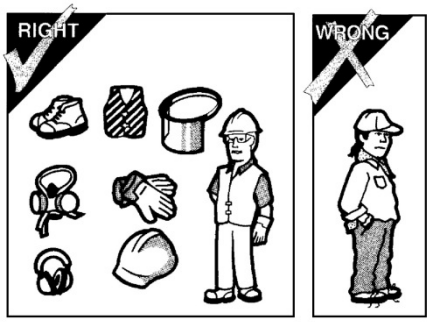


Figure 4-8 Personal protection equipment

Become familiar and comply with the rules and regulations applying at your area

- Personal protection equipment is recommended and possibly mandatory at your site.
- Become familiar with safety related precautions at your site. .
- In case additional documents related to machine's safety and its operation, they must be attached to this instruction manual.
- Ensure safety related systems are operational and not damaged: Same apply to the related bolts and nuts.

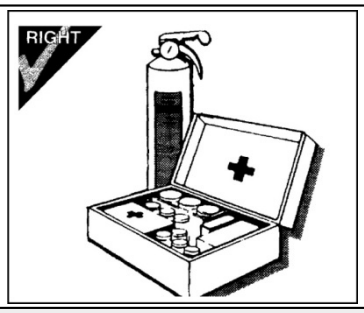


Figure 4-9 Safety Equipment

- Be familiar with safety precautions at you site (i.e. emergency phones, fire extinguishers, first aid kits, defibrillators, etc.)
- Bolts and nuts shall be screwed tightly. In case of damage, contact immediately your XCMG service partner.
- Seatbelt and seatbelt lock shall be undamaged and functional.

⚠DANGER!

Beware of risks and hazards during any machine operation
Take always outmost care!

- **Be careful!**
  Not respecting the basic rules presented hereafter and Section 4.8.1 and 4.8.4.
  serious injuries or death and/or significant property damage may result!

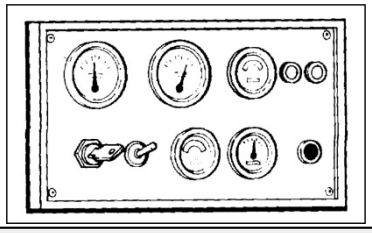


Figure 4-10 Ensure all operation elements are operational.

⚠ *Approve all indicators are operational and display indicated no error code.*

- Same applies to all illumination devices as well as to audible and visual warning devices (i.e. horn, beacon light, set occupation light or seat belt-indicator if installed, etc.).
- Keep machine clean, avoiding slippery steps and surfaces.
- Perform regularly recommended maintenance check according this manual.

4.8.2 Location of safety signs on the machine

The overview list below shows all stickers attached on your machine.

Please replace damaged or lost decals immediately, the exact part numbers you can find in the attached spare parts list, in case you need support please contact your XCMG service partner.

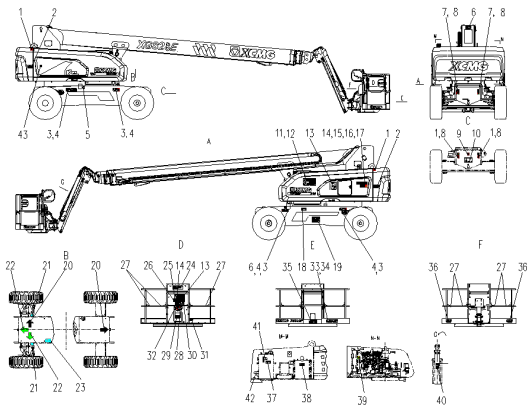


Figure 4-11 Location of Safety Signs and Labels

1. Lifting indication sign
2. Anti-collision warning sign (counterweight)
3. Tire load sign
4. “Read Instructions” warning sign
5. Slewing locking pin indicating sign
6. Tip-over warning sign
7. Non-lashing indication sign
8. Lashing position indication sign
9. Transporting notice sign
10. Lifting sign
11. Comprehensive warning sign (boom)
12. Operation curve chart
13. Repair & maintenance instruction sign
14. Washing warning sign
15. Panel warning sign
16. Anti-explosion warning sign
17. Fuel tank indication sign
18. Towing operation notice sign
19. Engine nameplate (Diesel, English, CE)
20. Machine travel arrow (yellow)
21. No stepping warning sign
22. Machine travel arrow (front axle)
23. Anti-extrusion warning sign
24. Driving operation notice sign
25. Tip-over warning sign (straight boom)
26. User’s notice sign
27. Safety belt anchorage point sign
28. Welding notice sign
29. “Read Instructions” warning sign
30. Voltage and current indication sign
31. Foot pedal warning sign
32. Combined indication sign
33. Tip-over hazard warning sign
34. Safety belt anchoring warning sign
35. Platform load warning sign
36. Anti-collision warning sign (platform)
37. Hydraulic tank indication sign
38. Diesel tank indication sign
39. Anti-cutting warning sign
40. Anti-fall warning sign
41. Limit hydraulic indication
42. Ball valve switch indication sign English
43. Noise warning sign

Table 4-1 Labels description

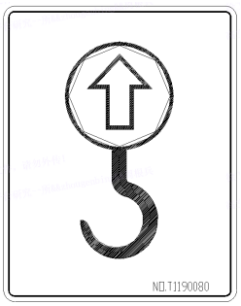
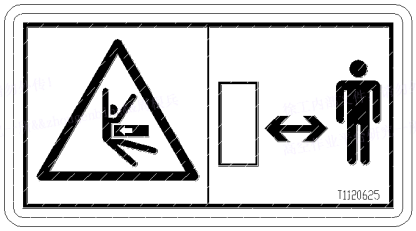
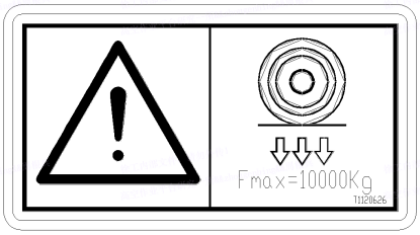
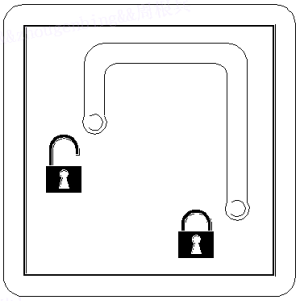
Item	Labels	Description
1		1. Lifting indication sign T1190080 Indicate it is the lifting position.
2		Anti-collision warning sign (counterweight) T1120625 Warning! Crush Hazard! Stay away from the moving zone of movable parts.
3		Tyre load sign T1120626 The max. Carrying capacity is 1,000 kg.
4		“Read Instructions” warning sign T1120627 Read files Before using or maintaining, please read and understand operation and maintenance manual, as well as all safety signs. If you don’t understand the content of this manual, please consult with your leader, employer or manufacturer.
5		Slewing locking pin indication sign T1120628 During transport, rotate the locking pin to “🔒” position. During operation, rotate the locking pin to “🔓” position.

Table 4-1 Labels description(continued)

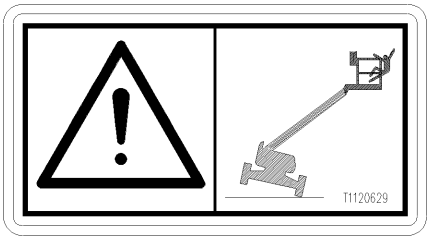
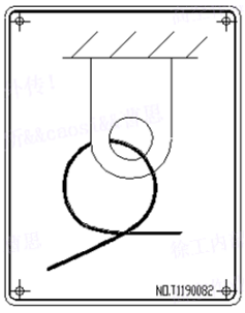
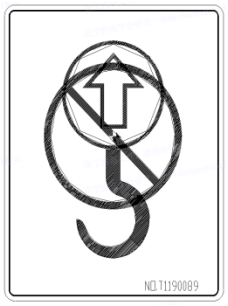
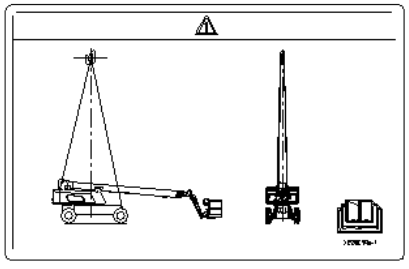
Item	Labels	Description
6		Tip-over warning sign T1120628 Tipping Hazard! Do not alter limit switch
7		Lashing position T1190082 It indicates the lifting lug used for loading and unloading operation.
8		Non-lashing position It indicates it is a fixing point for transport but not a lashing position.
9		Transporting notice sign T1120523 Do inert slewing lock pin during machine transportation!
10		Lifting sign XGS28E.97III-1 Select a high-quality sling according to machine weight. Anchoring wire ropes to 4 lashing points to prevent machine tilting. Use wire ropes with cut-off load over 35,000 kg.

Table 4-1 Labels description(continued)

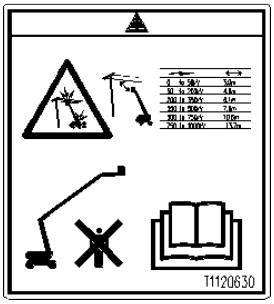
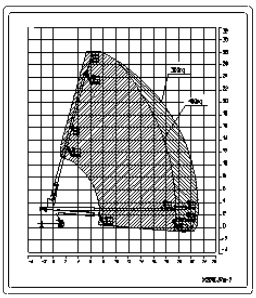
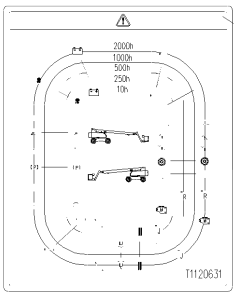
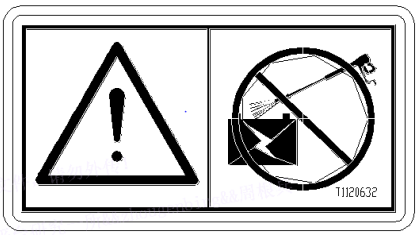
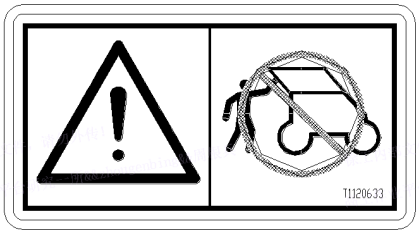
Item	Labels	Description
11		Electric shock hazard warning sign T1120630 Electric shock hazard! Keep away from high-voltage lines.
12		Operation curve chart XGS28E.97III-2
13		Repair & maintenance instruction sign T1120631 Maintain the machine according to the time intervals shown in the sign
14		Washing warning sign T1120632 Electrical devices are inside and do not directly spray pressurized water for washing!
15		Panel warning sign T1120633 Non-professional is not allowed to changer internal elements!

Table 4-1 Labels description(continued)

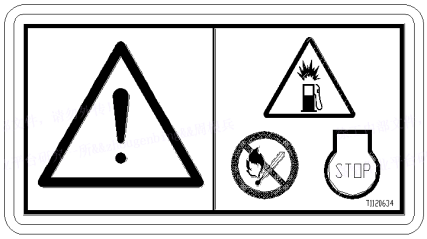
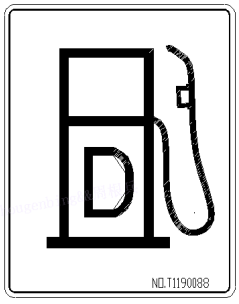
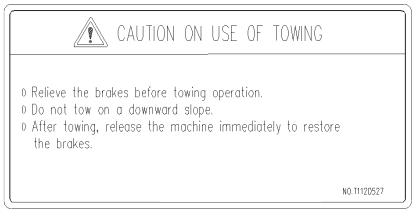
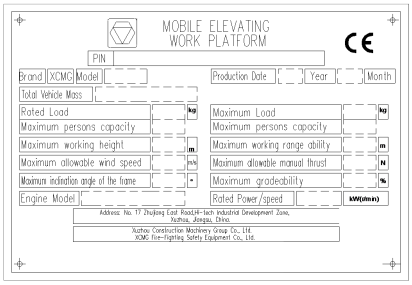
Item	Labels	Description
16		Anti-explosion warning sign T1120634 Explosion hazard! Do not smoke or star the engine during refueling.
17		Fuel tank indicating sign T1190088
18		Towing operation notice sign T1120527 Release the brake prior to towing operation. Do not tow when traveling downhill. Immediately release the towing state and resume brake after towing operation.
19		Machine nameplate (English, Dutch, German) T1180684

Table 4-1 Labels description(continued)

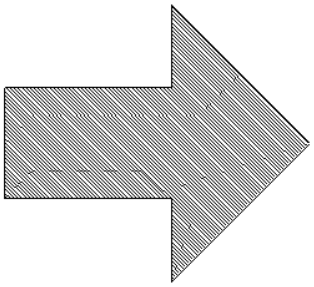
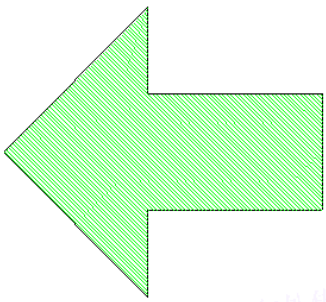
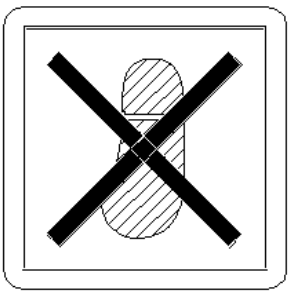
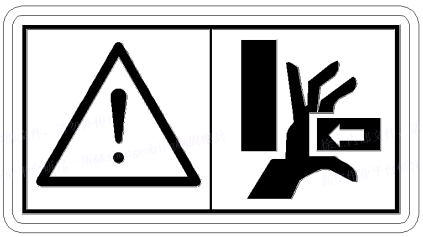
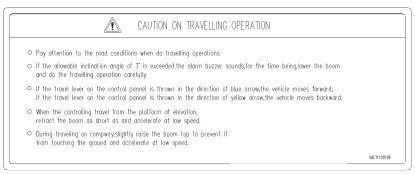
Item	Labels	Description
20		Vehicle travel arrow (yellow) T1190085 Indicate the right-turn and (or) travel backward.
21		Vehicle travel arrow (front axle) T1190086 Indicate the left-turn and (or) travel forward.
22		No stepping warning sign T1120635
23		Anti-extrusion warning sign T1120636 Warning! Crush Hazard! Stay away from the moving zone of movable parts.
24		Driving operation notice sign T1120519 Pay attention to the road conditions when perform driving operation. If the machine body tilts more than 3%%d, the alarm sounds; lower the boom and drive slowly. Push the joystick to the blue arrow direction on control panel, the machine moves forward.

Table 4-1 Labels description(continued)

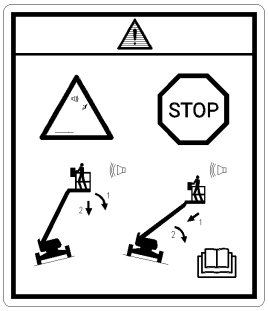
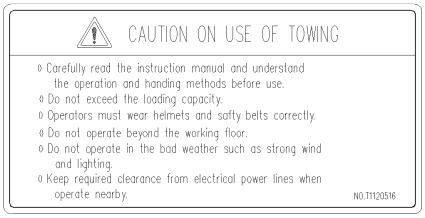
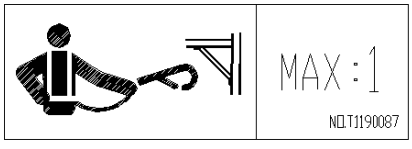
Item	Labels	Description
		Push the joystick to the yellow arrow direction on control panel, the machine moves backward. When the travel limit warning light turns on, pull the travel confirmation switch and push the traveling/ steering joystick slowly, the machine shall moves/ turns to the opposite direction. When operation on high altitude, try to retract the boom and drive with low speed. When traveling on a slope, raise the front part of boom to avoid touching the ground and drive with low speed.
25		Tip-over warning sign (straight boom) T1120081 Platform uphill: 1. Lower the boom. 2. Retract the boom. Platform downhill: 1. Retract the boom. 2. Lower the boom.
26		Towing operation notice sign T1120088 Read instructions carefully and fully understand the content before operation. Operating personnel must properly wear safety helmets and safety belts. Strictly observe the rated loading capacity and do not overload. Do not operate out of the safe operation range. Do not operate in the harsh weather conditions, like strong wind and thundering. Keep a safe distance from electrical power lines when operate nearby.
27		Safety belt anchoring position sign T1190087 Each anchorage only allows one person.

Table 4-1 Labels description(continued)

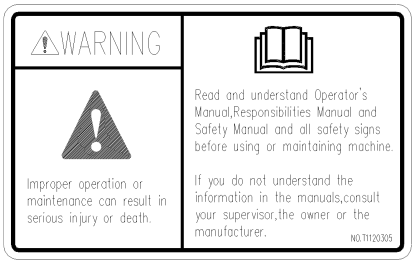
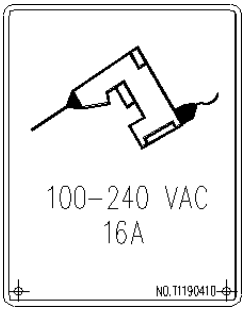
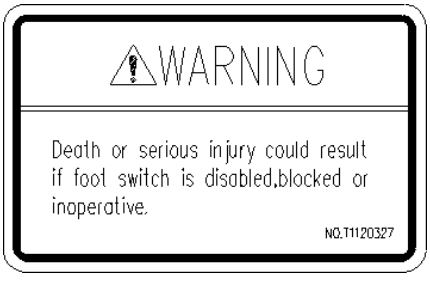
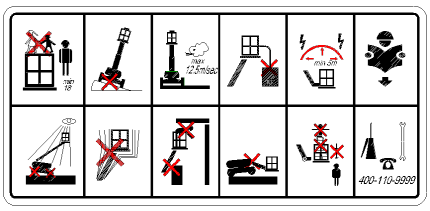
Item	Labels	Description
28		Welding notice sign T1120082 Do not use the machine as a round for welding.
29		“Read Instructions” warning sign T1120470 Improper operation may cause serious injury or death. You must read and under the operation manual, responsibility manual and safety manual as well as all the safety signs. For any content that you don’t understand, please consult your leader, machine owner or the manufacturer.
30		Voltage and current indication sign T1190410 Voltage: 100-240 VAC Current: 16A
31		Foot pedal warning sign T1120469 Death or serious injury may result from foot pedal failure, short-circuit, or improper operation.
32		Combined indication sign T1190411 Refer to 3.9.2 Device special warning signs.

Table 4-1 Labels description(continued)

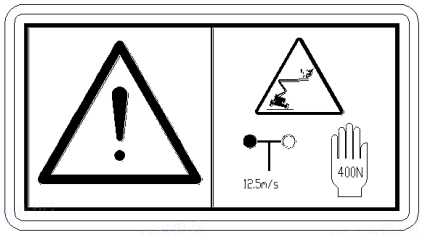
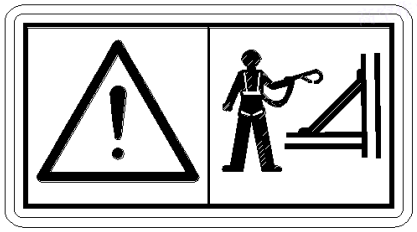
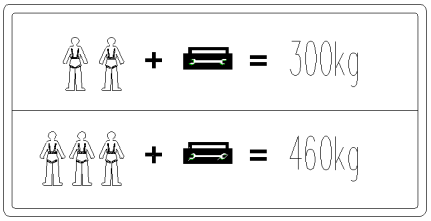
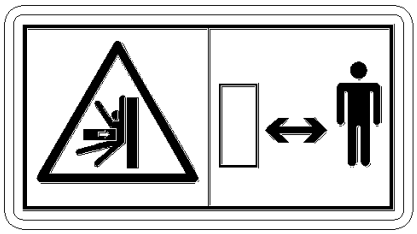
Item	Labels	Description
33		Tip-over hazard warning sign T1120638 Tip-over hazard! Max. operating force: 400 N. The max. working wind speed is 12.5 m/s.
34		Safety belt anchoring point warning sign T1120639 Occupants accessing to the platform must wear a safety belt. Attach the lanyard to the anchorage point provided in the platform.
35		Platform load warning sign XGS28E.97III-3 Unlimited load: 300 kg Limited load: 460 kg
36		Anti-collision warning sign (platform) T1120640 Warning! Crush Hazard! Stay away from the moving zone of movable parts.
37		Hydraulic tank indication sign T1190407 It indicates hydraulic oil inlet/outlet/tank position.
38		Diesel tank indication sign T1190406 It indicates diesel inlet/outlet/tank position.

Table 4-1 Labels description(continued)

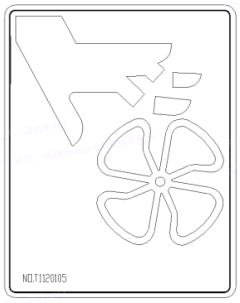
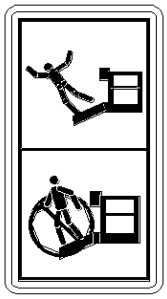
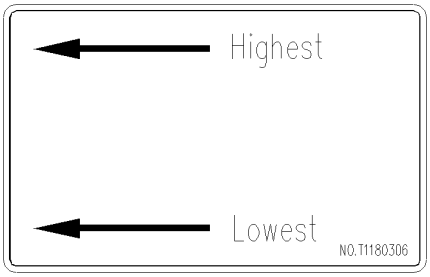
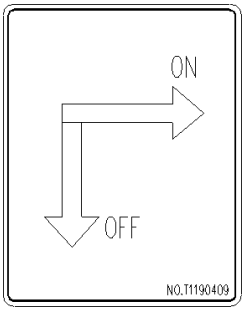
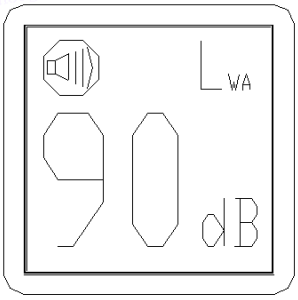
Item	Labels	Description
39		Anti-cutting warning sign T1120105 Cutting hazard: Stay away from the moving zone of rotary parts.
40		Anti-falling warning sign T1120641 Fall hazard! Please stay away from this surface.
41		Limit hydraulic indication T1180306 Highest liquid level Lowest liquid level
42		Ball valve switch indication sign English T1190409 ON OFF

Table 4-1 Labels description(continued)

Item	Labels	Description
43		Noise warning sign T1120642 Max. engine noise value is 90 dB.

4.8.3 Daily inspection and visual checks before operation

⚠The scope of inspections depends on the operator knowledge about condition of the machine:

1. The operator solely use this particular machine frequently and **takes it into operation after a short interruption (i.e. daily).**
   He knows the condition of the machine he left and the scope can be reduced on standard visual safety checks
2. **In all cases not included into the above point, operator who intends to operate the machine shall** provide extended detailed inspection of the machine condition, safety devices and functions prior machine start and operation.
3. **In case the machine has just been under** maintenance **or repair**
   operator need inform himself on the status of maintenance/repair progress and result. Machine shall be released for safe operation prior taken into service.

Do the following:

- **Confirm your Personal Protective Equipment**
  Helmet, Gloves, Goggles, Shoes are in good condition
- **Check machine for damage!**
- **Inspect mechanical connections**
  safety locks and
  any other interchangeable equipment connected.
  ⚠ *Do not start to operate if any safety split-pin is missing!*
  Insert spare split-pin!
- **Lubricate** lightly connections according to manufacturer's specification if required
- **Check** switches, controls, joysticks and function pedals to ensure these are in sound condition.
- **Inspect all available levels of operating fluids**

  – engine luboil level

– engine coolant level

– engine exhaust fluid

♦ hydraulic oil level
Fill-up if necessary. Take care to use approved fluid quality!
Refer to the Section 9 – Qualities of service fluids

- **Insert the start-key and initiate the power supply to control system**!
  ⚠ *Do not start the engine!*
  Pay attention to strange noise or signals from control system!
- **Start to check control functions**
  for any failure-or error message
  Check any failure or error massage and rectify it!
- **Check** engine compartment**.**
- **Ensure** driving belts on engine, alternator and water pump are properly tight and in good condition before use.
- **Check** the water separator – and empty existing water
- **Clean** air filter. Replace if damaged.
- **Ensure** that no person can be endangered before starting the engine.
- **Prior to engine start refer to Sections 4.8.4 to 4.8.6!**
- **Start the engine!**
- **Check** for any leaks on hydraulic components
- **Notify any defects** on checks carried out at the roadside,
- **Inform site manager** or service to enable service department to schedule workflow and more importantly, order parts required
- **Ensure** that no person or animal can be endangered before operating

4.8.4 Inspection before engine-start

- There is a blind spot in the machine's rear: a signalman may be needed to supervise your movements.
- Pay close attention not to bump into other machines, persons or structures while driving.
- Be aware of your surroundings at any time during work

4.8.5 Engine start check-list

- Keep people away from the machine during the inspection.
- Remove all obstacles in the area before starting the inspection.
- Check around the vehicle for oil leaks, looseness, improperly adjusted safety devices and possible damage on any components -

- Check the level of:
  - cooling liquid
  - fuel and engine oil
  - Check the air filter and for any damage in the circuit.
  - Check fuel water separator and drain collected water
- ⚠ *In case the boom is facing towards the machine's rear, the control joysticks for travel and slewing need to be operated in reverse direction.*
- Check if all lights are functioning properly, and if they have the correct angles
- Check if the safety belt and/or the attaching clamp is damaged or worn out.
- Check if the main control joysticks lie in the central position.
-
- In case of any abnormality, solve it right away to prevent accidental injury or machine failure later on.
- Ensure that the horn, motion alarm (if installed) and other warning/safety devices are set up/working properly.
- If there is noticed any damage or wear out/tear, replace the parts before using the machine again.
- Don't forget to fasten your seat belt!
  NOTE: abnormalities of the machine may not be found out right away after engine starts, so that personal injury or machine breakdown may occur.
- Maintenance and engine warm-up are required before start of operation if:
  - the machine has not been used recently or
  - ambient temperature is very low

4.8.6 Starting the engine

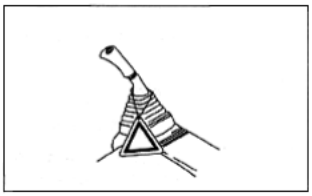
4.8.6.1 Engine cold-start

⚠WARNING!

Check all safety guards prior engine start

Approve prior to engine starting!
Be careful!

- **Any not approved start may lead to injuries and/or additional property damage!**



Do not start ever the engine or touch any part of the machine

- **during maintenance/service/repair by other personnel or**
- **when a warning sign is hung on the joystick control**
- **in the above last case, wait for the warning sign to be removed by the placer before operating the machine again.**

- Warm up the engine and/or hydraulic oil before operation.
- Do not start the engine by short-circuiting the starting motor. This will increase the risk of damage to the machine.
- Right after start-up, check the meters and monitor instruments for abnormal values or warning sounds.
- Make sure that all safety devices are in place to prevent accidents

NOTICE!

Preheat the engine and hydraulic system

- **Preheating prevent a logy response of the joystick control or other machine parts**
- **Not practicing preheating increases the risk of accident and/or damage to the machine's components**
- **If the battery's electrolyte is frozen, do not charge it or start the engine with external power. Both may cause the battery to catch fire.**
- **Make sure that the battery's electrolyte is dissolved before charging it or starting the engine with external power.**

4.8.6.2 Cold weather precautions

NOTICE!

Hazards on frozen and slippery ground, Move machine slowly and extra carefully!

- The iced ground surface becomes soft when the temperature rises up, and the machine will tip over.
- If the machine enters into deep snow areas, it may tilt or become buried in the snow.

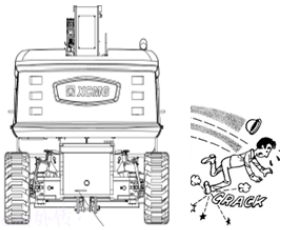
4.8.7 Inspection after starting the engine

- Make sure again that there is no person or obstacle in the surrounding area.
- Check if the instruments on the dashboard show unusual values after start-up
- Always monitor on your surroundings for potential hazards during operation.
- Check for unusual sounds, vibrations, abnormal heat emissions or peculiar smells
- Check if all components respond without delay or difficulties, including:
  - The mobility of the machine's rod
  - The boom's mobility
  - The function of upper structure's rotation axis
  - The machine's flawless moving and steering.
  - Any oil or fuel leaks
- Fix any abnormality at once to prevent serious injuries and/or damage to the machine during work
- Chose the mode suitable for your task.
- **Before start to operate, sound the warning horn to alert people in the area**

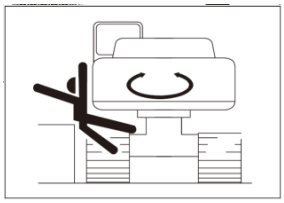
4.8.8 Inspection before starting to operate machine

⚠WARNING!

Ensure that no person or animal can be endangered before operating



- **Before moving, check always that there is no person or obstacle in the action radius.**
- **Sound the horn to alert other people working in the nearby area.**



- **Take always above precaution measures.**
- **When the machine turns or swings, there should be a signalman at the rear of the machine.**
- **Take the most care not to touch people or other machines or property.**

4.9 Safe machine operation

4.9.1 Recommended use of machine

⚠DANGER!

Beware of risks and hazards when operating machine

- **Not respecting the rules presented hereafter – accidents with serious injuries or even death may result!**

To avoid possible injuries or mechanical damages during operation caused by unexpected shock movements of the machine or extensive vibrations:

- Select the appropriate machine, required equipment and ancillary devices for a function/purpose/task of the machine.
- Use the machine according to their intended use only (see also Section 2.2)!
- Always read – understand – and apply the recommendations as described in this Instruction manual.
- In case of recent faults, make sure maintenance and repairs on the machine was done thoroughly.
- Pay special attention to the tyre pressure and the function of brakes, steering gear, crawler tracks and related components after provided maintenance or repair on those components!

- Always operate the machine with care to avoid extensive wear process of the parts and to keep the frequency of repairs to a minimum (e.g. when steering, braking, accelerating, changing gears, moving the boom and jib boom)
- Do not drive through the obstacles and rough terrain – bypass it whenever possible to reduce unexpected shock movements of the machine.
- If compelled to drive through/over it, slow down the speed and act with great care.
- Include the ground maintenance into your project's schedule
- Keep moderate speed when traveling longer distances (e.g.: on the road)
- Adjust the gear to the road surface and traffic situation to avoid sudden acceleration.

⚠*Keep the machine's working area in good shape by:*

- removing the large rocks and other obstacles in the way.
- plugging the ditches and potholes

4.9.2 General risks in operation

⚠DANGER!

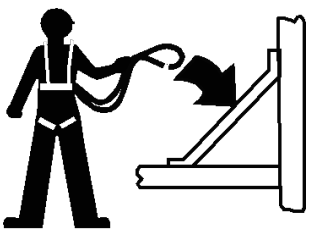
- **Beware of risks and hazards for life and property! Take outmost care!**
- **Any hereafter presented machine operation represent always the possible hazards for the life, to the driver himself, co-workers, bystanders and/or to property.**

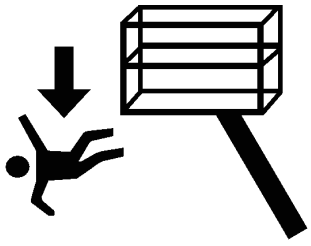
- Check the machine prior to start operation – especially if you were not present during installation of interchangeable or other equipment!
  Refer to safety instructions in Sect. 3.5, i.e. 3.5.3.
- Any sudden uncontrolled movement may result in hazard for life for driver itself and/or bystanders and/or any property
- Install only interchangeable equipment authorized by the manufacturer!
- Check properly installation of the interchangeable equipment!
- Avoid lifting the equipment while driving a slope downhill.
- Do not drive across slopes or protective walls
- Take extra care when swinging the upper structure while on a slope.
- Make sure enough space is available to stop the swing process.
- The swing of a long and heavy equipment will increase danger of slippage of the equipment additionally.
- Be careful! Not respecting the basic rules presented hereafter – serious injuries or deaths and/or significant property damage may result!

- Machine operation requires full attention of the operator. Bring the machine to a full stop before using any device like cell phones, wireless walkie-talkies, etc., which will distract operators' attention from safe operation.
- Do not use the machine for any purpose other than lifting personnel with their tools and materials.
- Do not operate a malfunctioning machine. If any failure occurs, shut down the machine. Remove the machine from service and inform the proper authorities.
- Do not dismount, modify, or disable any safety devices.
- Do not hard pull any control switch or lever through neutral to an opposite direction. Ensure to return switch to neutral and stop before moving to the next function. Operate controls with slow and uniform force.
- Unless it is an emergency, staff are not allowed to adjust or operate machine from the ground when there is a person on the platform.
- If there are two or more workers on the platform, the operator must be responsible for all machine operations.
- Ensure that power tools are properly stored and never hang its wires in the working area of the platform.
- During the moving process of the machine, the elevation boom should always be placed above the rear shaft along the moving direction. Note: if the boom is above the front axle, the direction of steering and driving functions will be reversed.
- Be careful! Not respecting the basic rules presented hereafter – serious injuries or deaths and/or significant property damage may result!
-
- Do not assist a stuck or disabled machine by pushing or pulling without chassis traction device.
- Fully lower the work platform and shut off the power before leaving the machine.
- Remove all rings, watches, and jewelry when operating machine. Do not wear any loose fitting clothing or keep long hair unrestrained which may be caught or entangled in machine.

Tripping and falling hazards

- During the operation, the workers on the platform must wear the whole-body safety belt and fix the safety belt to an approved anchorage by a hook. Each anchorage can only be attached by one hook.
-



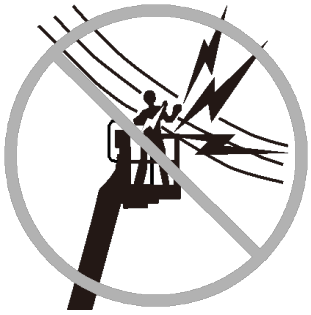


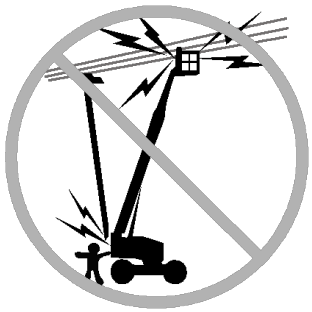
- Only enter and exit through the door. Pay extreme attention when entering or leaving the platform. Ensure that the work platform assembly is fully lowered. Face the machine when entering or leaving the platform. Ensure to maintain "three-point contact" with the machine, using two hands and one foot or two feet and one hand at all times during entry and exit.
- Ensure that all doors are closed and secured in the correct position before operating the machine.
- Keep both feet firmly positioned on the platform floor at all times. Do not place ladders, boxes, steps, planks, or similar items in the platform to add additional stretch areas.
- Keep any oil, mud, and slippery substances away from the working shoes and the platform floor.

Electrical hazard

=> (see also Section 3.6.8 Safety Distance)

- This machine is not electrically insulated and will not provide protection from contact with or proximity to electrical current.





- Maintain safety distance from electrical power lines, apparatus, or any electrified (exposed or insulated electrical) parts according to the Minimum Approach Distance (MAD) as shown in**Table 4-2**.
- The factors of machine movement and electrical line swaying shall be taken into consideration.
- Minimum approach distance (M.A.D.)

Table 4-2 Minimum approach distance (M.A.D.

Voltage range (phase to phase)	Minimum approach distance M (ft)
0 – 50 KV	3 (10)
＞50 KV – 200 KW	5 (15)
＞200 KV – 350 KW	6 (20)
＞350 KV – 500 KW	8 (25)
＞500 KV – 750 KW	11 (35)
＞750 KV – 1000 KW	14 (45)
Notice: This rule must be followed unless there are more stringent laws and regulations from the employer, the local authorities or government.	

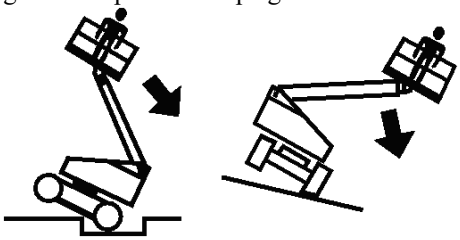
- Any part of the machine, operators, tools and devices must keep at a distance of 3 m (10 ft) at least from any electrical line or apparatus with a maximum voltage of 50,000 V. 1 ft additional clearance is required for every additional 30,000 volts or less.
- If a rated insulating partition that meets the power line voltage is installed, the minimum approach distance can be reduced. These barriers shall not be part of (or attached to) the machine. The minimum approach distance shall be reduced to a distance within the designed working dimensions of the insulating barrier. This decision must be made by qualified personnel in accordance with the regulations of the employer, the local authority or the government regarding working near electric equipment.

⚠Do not operate the machine or transport any personnel within minimum approach distance (MAD).

Assume that all electrical parts and wires are live unless known otherwise!

Tip-over hazard

- The user must be familiar with road condition before driving. Do not exceed the allowable side slope grade and positive slope grade while driving.



- Do not elevate the platform or drive with platform elevated on or near a slope or an uneven, soft surface. Ensure the machine is on a firm, level and smooth surface before elevating the platform or driving with the platform elevated.
- Before driving onto grounds, bridges, trucks, and other surfaces, check the allowable capacity of the surfaces.
- Do not exceed the maximum working load as specified for the platform. Keep all loads within the loading capacity of the platform unless authorized by XCMG.
- Ensure that the chassis of the machine is at least 0.6 m (2 ft) away from holes, bumps, depressions, obstructions, debris, hidden holes and other potentially hazardous objects on the floor/road.
- Do not use the boom push or pull any objects.
- Do not use the machine as a crane. Do not attach this machine to any adjacent structure. Do not contact any wire, cable, or any similar items to the platform.
- Do not operate the machine at wind speed greater than 12.5 m/s(28 MPH). See table 1-2 for Beaufort scale (for reference only).
- Do not increase the area or load of the work platform. Increasing the windward area will results in stability reduction.

⚠It's prohibited to enlarge the dimension of work platform by extending platform floor or adding accessory without permission.

- If the boom assembly or platform is in a position that cause one or more wheels are suspended off the ground, remove personnel before attempting to stabilize the machine. Use cranes, forklift or other appropriate equipment to stabilize the machine.

Crushing **and** collision **hazards**

- Approved safety helmet must be worn by all operators and ground personnel.
- Clearances above and around the working area and clearance under the work platform must be checked when raising or lowering the work platform and when traveling.

- Keep all body parts inside the platform guardrail during operation.
- Make the work platform approach to obstacles by elevating function but not driving function.
- Assign a lookout when driving in areas where vision is blocked.
- Keep non-stuffs at least 1.8 m (6 ft) away from the machine during driving and steering.
- In all driving conditions, the operator must limit the driving speed based on the ground conditions, congestion, visibility, slope, location of persons, and other conditions that may cause collisions or injuries.
- Know braking distances in all driving speeds. When driving at high speed, switch to low speed before stopping. Only use low speed while driving the machine on a slope.
- Do not use high speed while driving the machine in confined space or enclosed areas or reversing.
- Pay extreme attention at all times to prevent obstacles from hitting or interfering with operating controls and personnel in the platform.
- Ensure that the operators from the equipment overhead or on floors are aware of the MEWP's presence. Disconnect the power to overhead cranes.
- The workers shall be warned not to work, stand, or walk under the elevated platform. Place roadblocks on the ground if necessary.
- Be careful! Not respecting the basic rules presented hereafter – serious injuries or deaths and/or significant property damage may result!

⚠ *Follow the safety instructions:*

- The graphical symbols on controls indicate theirs function and purpose
- Learn the position and function of each control element before operation
- When released, most control elements will automatically return to their centered neutral position and stop the executed function or command immediately
- Check your surroundings before slewing and operate the lever carefully.

- Accidental movement of the machine can cause physical injuries. Avoid it!
- The boom can move and hurt bystanders if you accidentally hit the boom joystick lever or joggle it by any other reason

4.9.3 Safety rules for towing

DANGER!

The towing ropes can brake! Be outmost careful!

- **Any movement – and especially towing the machine represents unexpected risks and hazards for the operator himself, bystanders and/or environment!**
- **Do not allow anybody to stand between towing machine and towed machine during the towing process!**
- **Wear leather gloves when handling wire ropes.**
- **Be careful! Not respecting the basic rules presented hereafter – serious injuries or deaths and/or significant property damage may result!**

- If a towing winch is required for towing the MEWP, disengage the brake

4.9.4 Risk in special working conditions

4.9.4.1 Operating in harsh environmental conditions

NOTICE!

Be aware of special working conditions!

- **Special working conditions may have impact to the lifetime of machine, machine functions and finally safety of machine operation!**
- **Not respecting the safety steps and notices presented hereafter – can reduce the machine lifetime, may lead to machine damage and loss of the product warranty**

NOTICE!

Be aware of operations at low temperatures:

- **Not respecting the safety steps for special working conditions may have impact to the lifetime of machine, machine functions and finally safety of machine operation!**
- **Loss of the product warranty may also result!**

  Protective measures must be taken to ensure normal operation in freezing days

  The following inspection can ensure flawless operation of the machine at extremely low temperature.

- Check if the correct antifreeze is added in the cooling system.
  Also Check the cooling system itself carefully and record any leakage.
- Keep the battery fully charged to prevent it from freezing.
  If water has been added into the battery, run the engine for at least 1 hour to enable it to mix with the electrolytes.
- Maintain the engine at its optimum to enable an easy start and operation, even in adverse weather conditions.
- Use the engine oil of proper specifications according to the ambient temperature. Refer to “Lubrication and Specifications” in the engine instruction manual for further information.
- Ensure that the fuel tank is full at any time. Always drain any condensate built-up in the fuel tank before resuming operation.
- Remove and service the fuel filter element regularly.
  Drain any concretions (e.g. wax), and ensure that the used fuel's solidification point is below the lowest ambient temperature.
- Lubricate the machine completely according to either the “Lubricants and Maintenance Schedule” or the lubrication diagram on the machine.
- Start the engine to warm it up to the usual operation temperature before load-on operation.
- While in idle state, if there are any dirt or ice deposits on the running gears, heat the machine up to thaw the frozen impurities before attempting machine operation.
- Operate the hydraulic units with care until the temperature required for normal operation is reached.
- Check all control units and their function status to ensure flawless operation.
- If assisted start becomes compulsory refer to the “start in cold days”-section located in the chapter “Engine Start” in this instruction manual.
- Clean up all dirt, snow and water on the machine's surface to prevent ice coating. If possible, cover the machine with canvas and prevent its edges from getting frozen on the ground.

4.9.4.2 Operations in very hot areas

NOTICE!

- *Continuous operation in a very hot environment will cause overheat.*
- **Not respecting the safety steps for special working conditions may have impact to the lifetime of machine, machine functions and finally safety of machine operation!**

- Make sure to monitor the engine’s temperature and stop the machine regularly to enable a cool down when needed.
- The dirt inside the cooling system will accumulate faster under high temperature. Change the antifreeze at least once a year to maintain the corrosion resistance property.
- Flush the cooling system regularly to keep its pipes clean. Do not use highly alkaline water limit the deposit of dirt and rust inside the pipes
- Check the electrolyte level every day. Use less concentrated electrolytes in a high-temperature environment.
- If a wrench is required for towing the MEWP, disengage the brake.
- Recharge the battery whenever the reading of specific gravity reaches 1.160 (missing unit). If stored for a longer time under high temperature, the battery will quickly discharge itself.
- Do not store acidic batteries close to a large number of tires as the acidic gases will damage the rubber.
- Lubricate according to “Lubricants and Maintenance Schedule” or the lubrication label attached on the machine.
- When leaving the machine for a longer period, park it in a shelter to prevent exposure to sunlight, dirt and dust.
- If there is no appropriate covering available, use a canvas to prevent the dust from entering the engine or hydraulic system.

  The machine components will corrode faster in a hot and humid climate; especially during the rainy season.
  Rust and paint bubbles will build up on the metal surfaces and spots may appear on other components’ surfaces, too.
- Apply corrosion resistant lubricant on the machine’s unpainted or exposed areas.
- Protect conductors and terminals with an insulating mixture.
- Apply paint or appropriate antirust materials on damaged surfaces to prevent the rust from spreading.

4.9.4.3 Operations in dusty or sandy areas

NOTICE!

- **Take special care in dusty or sandy *environments***
- **Not respecting the safety steps for special working conditions may have impact to the lifetime of machine, machine functions and finally safety of machine operation!**

- Take extra protective measures when working in dusty or sandy environments.
- Clean the machine with compressed air frequently to keep the cooling system dustfree.
- Wear safety goggles when using compressed air for cleaning.
- When servicing the fuel machine, take extra care to prevent dust or sand from entering the oil circuit.
- Always keep the air cleaner in good shape. Check its clogging indicator everyday.
- Prevent dust and sand from entering engine parts and/or components as well as possible.
- Lubricate and service according to “maintenance schedule” or the lubrication diagram attached on the machine.
- Clean all the lubrication connections before lubricating the machine.
  Sand mixing in with the lubricant will cause the machine parts to wear faster. Keep the machine as sand- and dust-free as possible.
- Park the machine under a shelter or cover it with a tarpaulin to prevent potential damage caused by sandstorms.

4.9.4.4 Working in rainy and humid environment

NOTICE!

Be aware when working in rainy, humid environment!

- Not respecting the safety steps for special working conditions may have impact to the lifetime of machine, machine functions and finally safety of machine operation!
- The measures are similar to those for working in hot areas.
- Coat all exposed surfaces with lubricant
- Pay extra attention to damaged or unpainted areas.
- Apply lubricant where paint starts to crack as soon as possible to prevent corrosion.

4.9.5 Optional components/equipment

The standard package include/Not include optional equipment

- Contact an authorized special parts dealer or XCMG Co, Ltd.
- Listen carefully to the installation instructions to manage the task by yourself in the future

- Only use optional equipment according to their intended range of application.
- Make sure to install optional equipment properly by observing the instruction manual.
- Do not attach optional equipment on your own.
- Never remove safety devices without prior approval.

Without proper working safety devices, the machine will lose its conformity according to the machine directive (2006/42/EG) and other applicable directives and regulations.

⚠WARNING!

- **Installation of optional equipment may be hazardous for life and property!**
- **Installation of the optional equipment may bring possible hazards and risks for the service stuff and environment.**
- **Be careful! Not respecting the basic rules presented hereafter–serious injuries or deaths and/or significant property damage may result!**

- Foam tyres or solid tyres are optional for the equipment. It is required that four wheels shall be replaced with tyres of the same specification.
- Refer to section 4.2 for installation requirement when replacing the optional equipment.

4.9.6 Hazards related to the battery:

4.9.6.1 Battery switch

⚠DANGER!

Be aware of highly flammable, explosive hydrogen gas!

- **Use protective gloves and goggles when handling battery**
- **When charging the battery, beware of the highly flammable and explosive hydrogen gas generated in the process!**
- **The battery's electrolytes contain corrosive sulfuric acid!**

⚠Hazards related to the battery

- Never smoke or use open fire at any time when close to the battery
- Wash out clothes or skin thoroughly with water if sulfuric acid splashes on any.
- In case sulfuric acid has entered your eyes, wash them out abundantly with water and contact the closest hospital for immediate treatment.
- Beware of sparks the battery may generate during operation/handling and
- make sure that the machine's engine is turned off before starting the maintenance process.

⚠ *Carry out the* maintenance *by keeping the following in mind:*

- When disassembling the battery, start by disconnecting the negative terminals (grounding side).
- Do not let tools or other metal objects get into contact with the battery's terminals or drop them on/close to the battery.
- Before charging, disconnect the battery from the machine and carry it to a well-ventilated place.
- Finally, solidly reinstall the battery in its original position after maintenance
- When installing the battery connect the positive terminals, first, then the negative terminals (grounding side)

The battery's main switch

⚠ *Switch the battery OFF when:*

- Not operating the machine for more than one month.
- Maintaining the electrical system.
- Disposing of the battery.
- Replacing the fuse and/or fuse link.
- Connecting the auxiliary cables.

⚠ *To avoid damaging the electrical system, do not turn off the battery while the engine is still running.*

NOTE:

Switch off the accumulator's jar switch at least one minute after the engine has been turned off

After disconnecting the accumulator jar switch, the whole electrical system will be cut off.

This may delete the radio's stored data set. Reset the data in case that happens, if necessary.

- Cut off the power supply between the storage battery and the machine's electrical system.

The switch is located either on the battery container frame or in the machine's engine compartment close to the battery's location.

(O) (=" OFF"-position): Cuts off the electric current.

Keep the switch at a free sagging state while in this position.

(I): (=ON"-position):

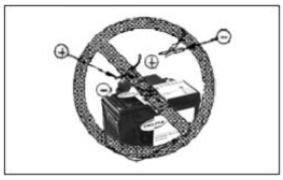
Electric current is flowing through the circuit.

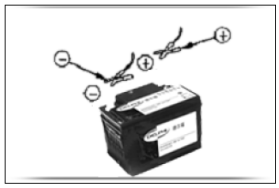
- Make sure the switch is turned on before starting the engine.

4.9.6.2 Engine start using auxiliary battery cables

⚠WARNING!

- **Battery may explode!**
- **Check the starting cables connection!**
- **Always wear goggles and rubber gloves when handling the batteries and cables**
- **Wrong connected cables will damage the battery and may even explode**





⚠ *Observe the following instructions:*

- **Starting the engine using auxiliary start-cables requires 2 people:**
- **When using another machine's battery to start your own, do not connect the two machines together.**
- **Turn all engines off before connecting the cables to prevent unexpected movements when supplying power.**
- **When installing the auxiliary cables, first connect the positive (+) pole.**
- **When removing the cables, start by disconnecting negative (-) pole (grounding side).**
- **After removing the auxiliary cables, do not let the clamps contact with any metallic substance.**
-

4.10 Safety related parts

NOTICE!

- **Replacement of critical safety-related parts Follow regulations of the operating area**
- **Periodically replacement of safety related parts for enhanced security (eg. hydr. hoses in European community)is the requirement of safety regulations (Machinery Directive 2006/42/EC/ EN-ISO 13849-1).**
- **Exceeding the assigned time (10 years), due to different kind of wear (mechanical/chemical)the material of parts and part itself will naturally change. Re-used – such parts may cause earlier failure of the system.**
- **Safety parts can fail and by any defects in safety-critical parts, repair or replace it! Depending on kind of the part and its function, serious damage or even physical injury can follow.**
- **In operation, as it is difficult to judge how long these parts can keep working, and if an external inspection could not give the reliable judgment, replace the safety related part regularly – even if it has not reached the assigned time.**

Table 4-3 Safety related parts

No.	Part Code	Part Name	Q'ty
1	803083464	F381C91C202010-1100	1
2	803103922	F481CACF121206-750	1
3	803165272	F781C9C9202012-950	1
4	803171641	F481CACF101004-650	1
5	803173015	F381CACF121206-1550-PG	1
6	803176877	F381CACF080804-850	1
7	803180783	F381CACF151508-3700	1
8	803180785	F381CACF151508-3800	1
9	803181586	F381CACA151508-800	1
10	803182587	F481CACF101005-900	1
11	803191739	F381CACA121206-800	1
12	803268212	F381CACF151508-1500-PG	1
13	803277658	F381CACE121206-3400	4
14	803302008	F381CACA101005-840	1
15	803303325	F381CACF181810-1350	1
16	803303397	F381CACA080804-400	1
17	803309114	F481CACF101005-1050	1
18	803309571	F481CACF121206-350	2
19	803373601	F381CACA080804-1500	1

Table 4-3 Safety related parts(continued)

No.	Part Code	Part Name	Q'ty
20	803391918	F381CACF080804-920	1
21	803398895	F481CACA101005-500-PG(J)	1
22	803406737	F481CACF101005-1150-PG(J)	2
23	803416505	F481CACF101004-730	1
24	803423703	F481CACA101005-600-PG(J)	1
25	803429274	F481CACF080804-950-PG(J)	1
26	803433902	F481CACF100804-1600(J)	1
27	803444626	F431CACA121206-8900(J)	1
28	803445075	F481CACF080804-1200-PG(J)	1
29	813400125	F431CACF121206-3700	2
30	813400127	F431CACF121206-3800	1
31	813400174	F781C91C202012-1050	1
32	813400199	F481CACF100804-1655(J)	1
33	813400200	F481CACF100804-1250(J)	1
34	813400201	F481CACF100804-1200(J)	1
35	813400236	F481CACF121005-1400(J)	1
36	813403011	F431CACE121206-15600(J)	1
37	803602405	SZL-WL-A	1
38	803668767	JQ102S-FLO	1
39	803688244	ETA 1626-3 20A	1
40	803688247	ETA 1626-3 25A	1
41	803688261	ETA 1626-3 5A	1
42	803689785	ETA 1626-3 30A	1
43	803747799	IMCT4050S	2
44	803751003	ICA3601-043H (with cable)	1
45	803697603	684-1221-212-17	1
46	803803802	THH1-200	1
47	803589618	DST P92S	1
48	803594188	RG2266-L570	1
49	803612892	STW05-060.101 (G1/2)	1
50	803693448	SZL-VL-S-I	1
51	803695557	NBB8-18GM60-E2-V1	1
52	803802309	VTS2021-GNC-0006	1

Table 4-3 Safety related parts(continued)

No.	Part Code	Part Name	Q'ty
53	803695184	J1798-JC4000-0021	1
54	803800586	P261S-S1BF3CB5K	1
55	803690868	NGCPB10AX01C	1
56	803697043	INX360D-F99-I2E2-V15	1
57	803697601	ADS-200MKII-D-2.0-MC3-0-44-N-PC-B-NOT	1

Chapter 5 Operation

5.1 General overview of machine:

5.1.1 Machine overview

- This equipment is a mobile self-propelled mobile elevating work platform with work platform attached at the end of boom structure.
- It is widely used in municipal construction ,bridge construction, shipyard and petrochemical industries and general supporting construction work at other related construction areas.

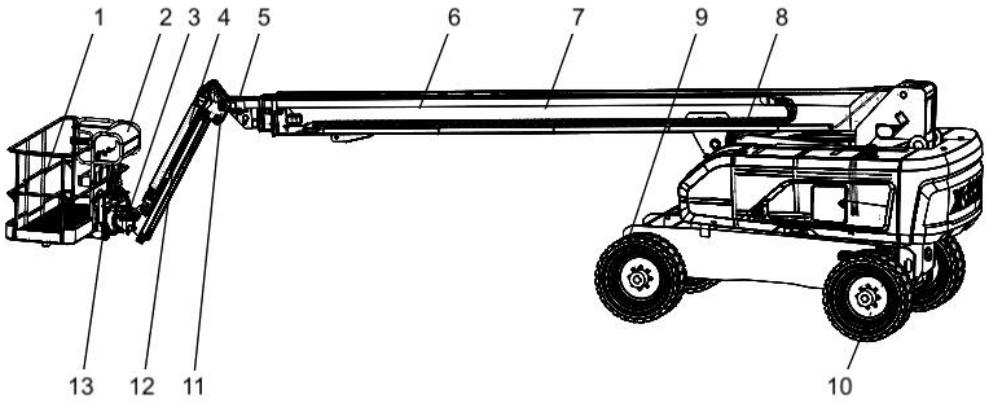


Figure 5-1 Basic moving parts

Table 5-1

1	Work Platform	8	Luffing Cylinder
2	Control Box in Work Platform	9	Front Drive/Steer Wheel
3	Swing Cylinder	10	Rear Driving Wheel
4	Jib Boom Cylinder	11	Levelling Cylinder

Table 5-1 (continued)

5	3rd Section Boom	12	Jib Boom Cylinder
6	1st Section Boom	13	Foot Pedal
7	Luffing Mechanism		

5.1.2 Basic functional description

⚠ XGS28E straight-arm mobile elevating work platform,

- the maximum height of the whole machine is 28.2 m,
- the maximum load is 460 kg, and
- the maximum climbing rating is 40%;

The vehicle is equipped with a three-section telescopic boom + tower boom mechanism and a small jib boom, with an ability to overcome obstacles, large working radius. The dual-load control system can automatically adjust the working radius according to the load to meet the different safe load requirements of users.

Table 5-2 Functional overview of the machine

Driving system	The built-in travel reducer integrated with motor and reducer is selected, and it is equipped with two speeds, fast and slow, to meet machine travelling requirement in different environments.
Brake	While running on a slope, the travel mechanism has the function of self-braking and the clutch device is provided for easy traction in case of machine malfunctions.
Engine	The power system adopts an electronic control engine. The sensors of oil pressure, water temperature and speed are integrated with the engine and controlled by ECU, which is safe and reliable. At the same time, the system is provided with a fault diagnosis interface to facilitate fault diagnosis and maintenance.
Levelling system	The levelling system adopts electro-hydraulic proportional levelling.
Steering	2-wheel steering
Electrical system	PLC control technology - one controller on turntable and one on platform. Turntable and platform separately are equipped with control box to realize the control of chassis, turntable, boom, jib boom and platform.
Control lever	The one control handle controls the machine traveling and steering, the other one controls boom elevating and turntable rotating

Table 5-2 Functional overview of the machine(continued)

Control monitor	It adopts diagnostic controller to monitor the real-time condition of the machine.
Axle balance:	The machine is equipped with an axle balance system, which enables four wheels to land simultaneously by means of axle floating when traveling on an uneven ground, to ensure the driving force and improve the passing ability.

5.1.3 Operating environmental machine limits

NOTICE!

Respect Environmental Machine Limits

Altitude:	**below 1000 m above sea level**
Ambient Temperature:	**-20℃ to +40℃**

- **All machines must be inspected, prepared and adjusted before delivery by the manufacturer or his authorised representative.**
- **The steps in Section 5.1 must be followed during initial start-up process and/or the running-in period.**
- **Ignoring them may damage the machines or produce other negative impacts on their performance.**

5.1.4 Machine start-up and operating hours

5.1.4.1 Recommendations for a safe running-in period

NOTICE!

Regard a safe running-in period of the machine!

- **Avoid working at full load within the running-in period (first 50 h of service)**
- **It will affect the lifetime and safe operation of the machine, eventually leading to accidents!**
- **When changing the lubricant or grease, refer to the "Maintenance" section of this instruction manual**

- Check the coolant, fuel, engine oil and hydraulic oil every day for leakage.
- Check the lubricating liquids every day and refill them if needed.
- Always observe info and indications on display and various intruments during operation.
- Avoid engine overload.

- Keep below 80% of the maximum load until the engine and other components have reached the standard working temperature.
  During operation, pay attention to proper function of the machine.
- Check for looseness, wear or damage caused during delivery
- Check the wires and terminals for looseness, the meters for abnormal values, and the battery’s electrolytes for concentration.
- Check the lubricating liquids and filter elements for contamination, dirt or damages.
- After the **first 50 h** of service, change the engine oil and oil filter elements.
- After the **first 250 h** working hours:
  - Replace the oil and return the original filter elements in the hydraulic oil circuit.
  - Change the gear oil in the swing reducer.
- After the first 1000 working hours, change the gear oil in the travel reducer.

5.2 Platform control cabinet

5.2.1 Control panel

Figure 5-2 Control Panel Overview(See Table 5−3)

Most of the control functions need to be implemented on the control panel**. See the following table for details:**

Table 5-3 Switches on Control Panel

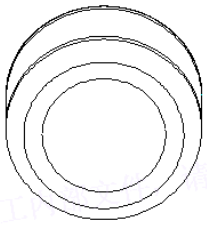
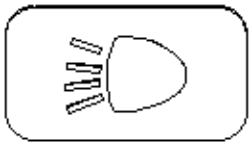
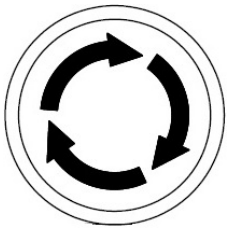
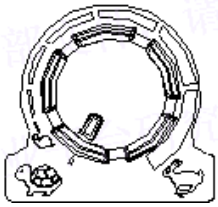
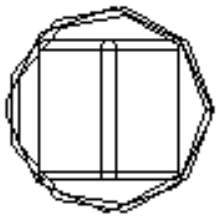
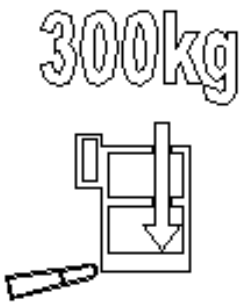
Code	Switch	Symbol	Function
S214			Platform searchlight switch
S203			E-stop Button: In the case of emergency, press this button to stop current movement and turn off the engine; Reset this button manually after troubleshooting.
S225			Superstructure speed adjustment Adjust the speed of boom motion.
S229			Load selector switch-Left The maximum load is 300 kg
			Load selector switch-Right The maximum load is 460 kg

Table 5-3 Switches on Control Panel(continued)

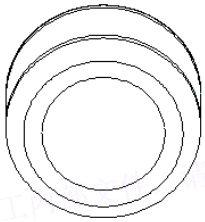
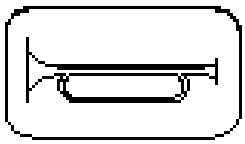
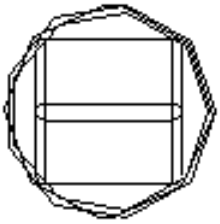
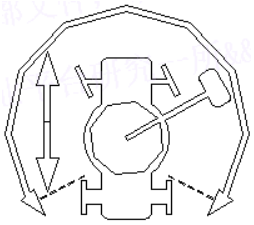
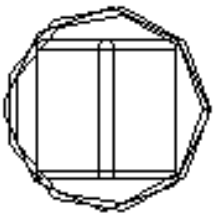
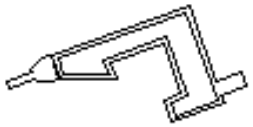
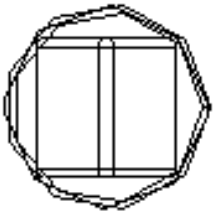
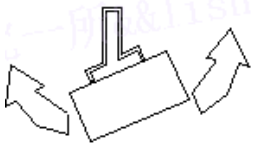
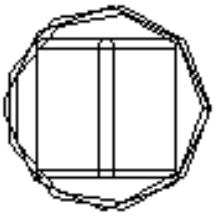
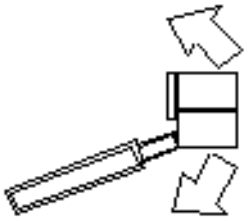
Code	Switch	Symbol	Function
S216			Horn: Horn alarm switch
S223			Drive orientation unlocking switch When choosing drive function, the drive orientation indicator light will turn on if the boom turns left or right beyond the rear wheel in either direction. Press and release this switch, and enable drive or steer function by moving drive/steer control joystick in 3 s.
S230			Generator switch (optional) Pull this switch to either side to start generator and turn it back to neutral to stop the generator operation.
S210			Platform rotation switch Pull the switch to the left, the platform will rotate clockwise; Pull the switch to the right, the platform will rotate anticlockwise.
S211			Platform level switch Pull up the switch, the level of platform will raise; Pull down the switch, the level of platform will lower.

Table 5-3 Switches on Control Panel(continued)

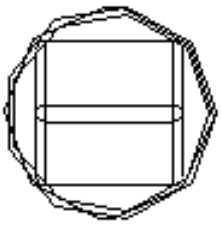
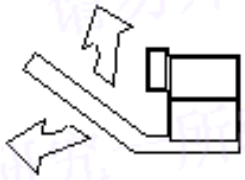
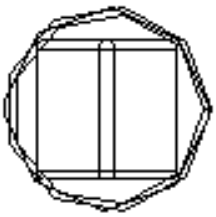
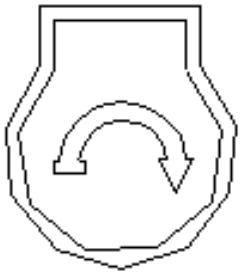
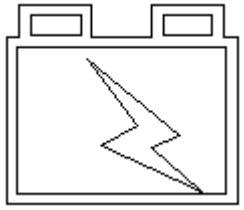
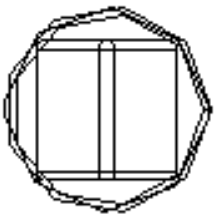
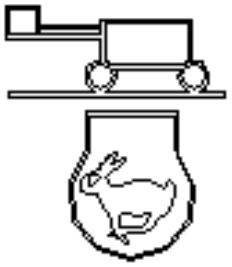
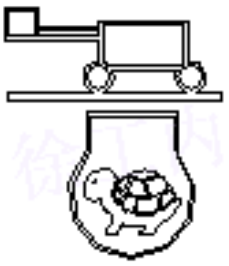
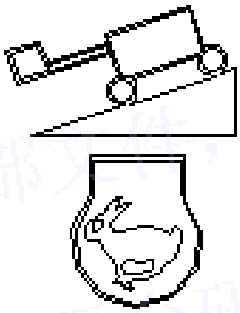
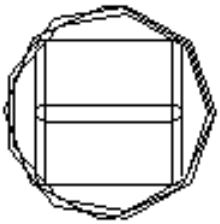
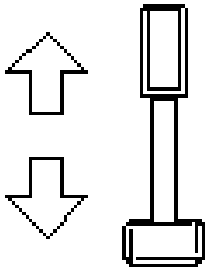
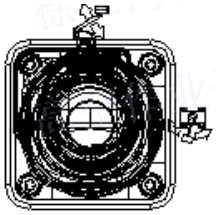
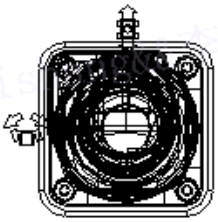
Code	Switch	Symbol	Function
S208			Jib boom raising/loweringswitch Pull up to raise and pull down to lower.
S201			Engine start switch Push the switch to the far left to choose ground high speed gear.
			Battery pump start switch Push the switch to the right to start auxiliary battery pump and shut off the engine at the same time.
S226			Travel mode select switch Push the switch to the left to choose ground high speed gear.
			Travel mode select switch Push the switch in the middle to choose ground low speed gear.

Table 5-3 Switches on Control Panel(continued)

Code	Switch	Symbol	Function
			Travel mode select switch Push the switch to the far right to choose climbing gear.
S205			Boom telescopic switch: Pull up to retract the boom; pull down to extend the boom.
S204			Boom motion joystick Control boom luffing and slewing
S213			Travel joystick Control machine traveling and steering

5.2.2 Indicator lights panel

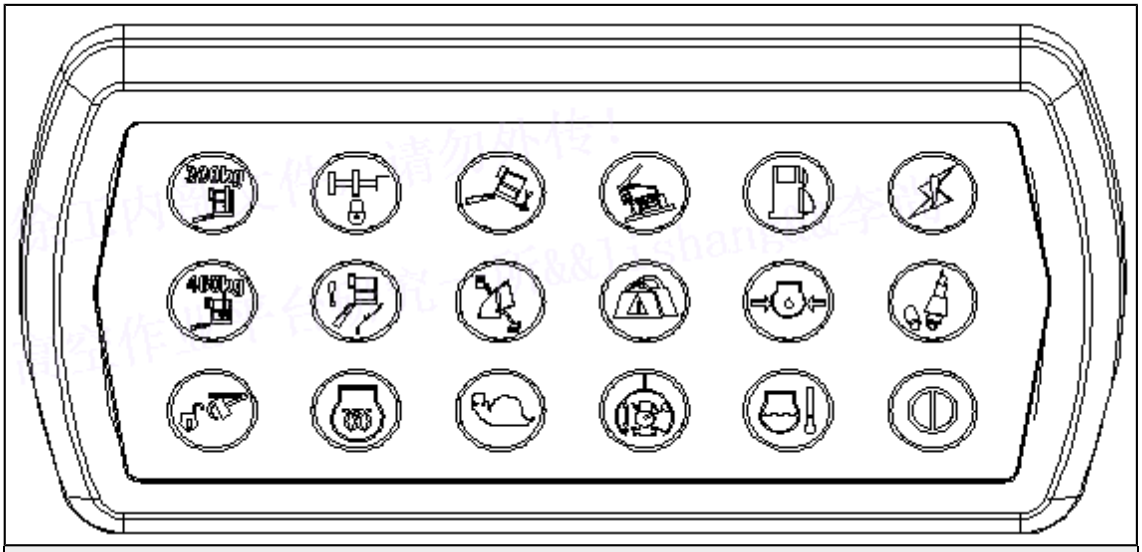


Figure 5-3 indicator lights panel

Table 5-4 Indicator lights introduction

S/N.	Symbol	Function description
1		300 Kg load indicator When load mode switch is in 300 kg position, the indicator light will be on.
2		460 Kg load indicator When load mode switch is in 460 kg position, the indicator light will be on.
3		Glow plug indicator light Indicate the glow plug is operating. Turn the key, wait unit the indicator light turns off before starting engine.
4		Wire rope repair indicator light When the wire rope of telescopic boom is loosen or damaged, the indicator light turns on; The wire rope must be repair or adjustment immediately.

Table 5-4 Indicator lights introduction(continued)

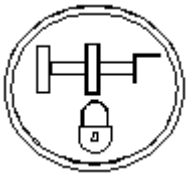
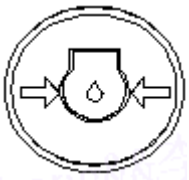
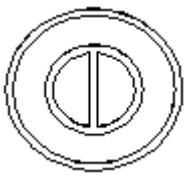
S/N.	Symbol	Function description
5		Axle extension indicator light Pull the axle extension button and the indicator light will turns on when the axle stretches in place.
6		Low speed indicator light When the control system switch the machine to slow speed, the indicator light will flash; When the operator choose slow speed, the indicator light will be on.
7		Over range warning light When the platform is beyond the rated range of operation, the warning light turns on.
8		Platform tilt warning light The warning light turns on when the platform tilts more than 10° and the platform can be levelled by manual level system.
9		Travel drive limit warning light When the boom is slewing beyond the front edge of the rear wheel in either direction, the warning light turns on and the driving function is restrained.
10		Platform overload warning light When the platform load is greater than rated load, the warning light turns on and all movements are prohibited. Unload loads until the warning light turns off before continuing operating the machine.
11		Chassis tilt warning light When the chassis tilts more than 3°, the warning light turns on.

Table 5-4 Indicator lights introduction(continued)

S/N.	Symbol	Function description
12		Fuel level warning light The warning light flashes when the fuel level is lower than default value.
13		Engine oil pressure warning light When the engine oil pressure is abnormal, the warning light turns on to alert the operator to abnormal low of the engine oil pressure.
14		Water temperature warning light The warning light turns on when the engine water temperature is abnormal high.
15		System malfunction indicator light The indicator light turns on when the machine control system malfunctions.
16		Food pedal/function enable indicator light The indicator light will turns on when the food pedal is stepped and turns off if no movement in 15 seconds.
17		Work platform power indicator light When the platform controller is powered on, the indicator light turns on.

5.2.3 Control joystick

Figure 5-4 Dual-axle proportional joystick-L

The joystick on the left side of control box adopts dual-axle proportional to control boom luffing and rotating.

Operation of joystick: pull up to raise boom; pull down to lower boom. Move right to rotate platform anti-clockwise; move left to rotate platform clockwise. The faster the joystick moves, the faster the platform rotates.

Figure 5-5 Proportional control joystick-R

The joystick on the right side of control box adopts proportional joystick with thumb rocker on the top.

Operation of joystick: Move the joystick to the direction of blue arrow on control panel to drive the machine forward; Move the joystick to the direction of yellow arrow on control panel to drive the machine backward. Press the left of thumb rocker to turn left; press the right of thumb rocker to turn right.

5.3 Control box on turntable

5.3.1 Display on platform

Figure 5-6 Ground control box

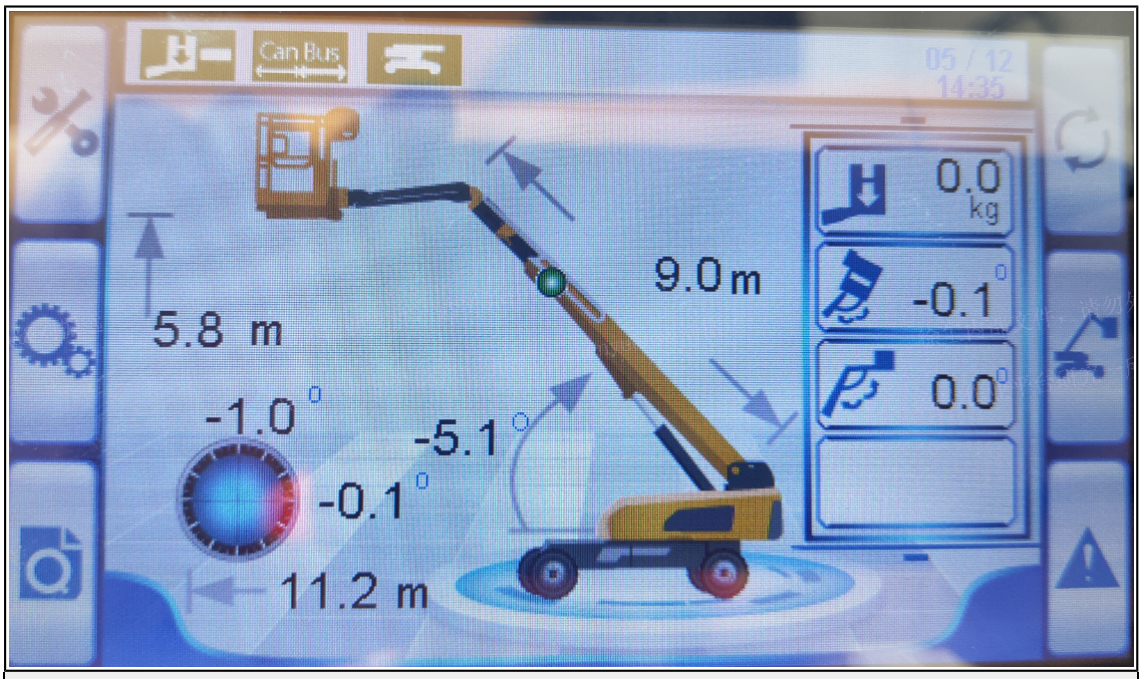


Figure 5-7 Display interface

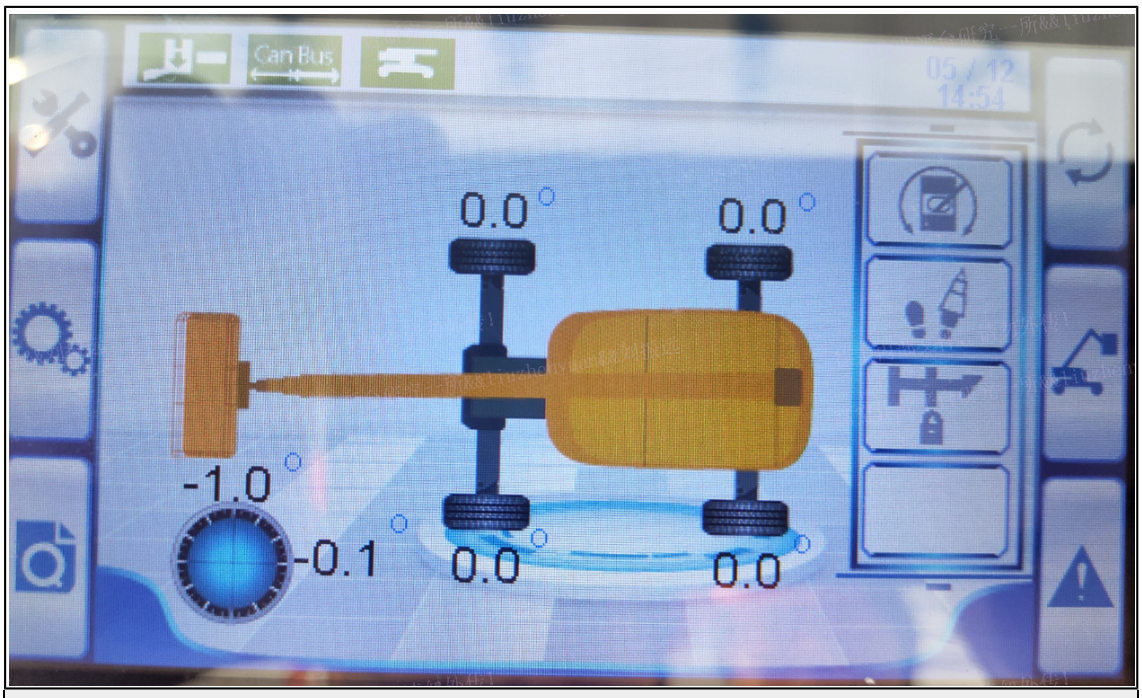


Figure 5-8 Display interface

Table 5-5 Display function introduction

Icon	Content
	Basic setting option: It can realize basic setting, such as language selection, inch or metric, time, and brightness.
	Debug setting option: It can perform sensor calibration, movement speed debug, function option configuration, controller parameter backup, and other debug setting.
	Background data query: I/O port query, CAN-bus information, GPS information and other background data query.
	Main pages switching option: It can switch main pages to show machine dynamic information, fuel volume, temperature, engine rotation speed, pressure and other data.
	Machine status option: It can reflect boom movement, chassis movement, platform and jib boom status in real time.
	Faults query: It can show the real-time faults and query history faults.
	Machine body balance angle display: It shows the horizontal angle of axle.
	Platform load display: It shows the current platform load, unit: kg.
	Platform levelling angle display: It shows current horizontal angle of the platform for easy levelling operation and hazard warning.
	CAN-bus status display
	Turntable slewing angle display: It displays current turntable slewing angle and range to remind the operator of the position of boom and front/rear position of the machine.
	Food pedal switch display: It displays current connection status of food pedal switch.

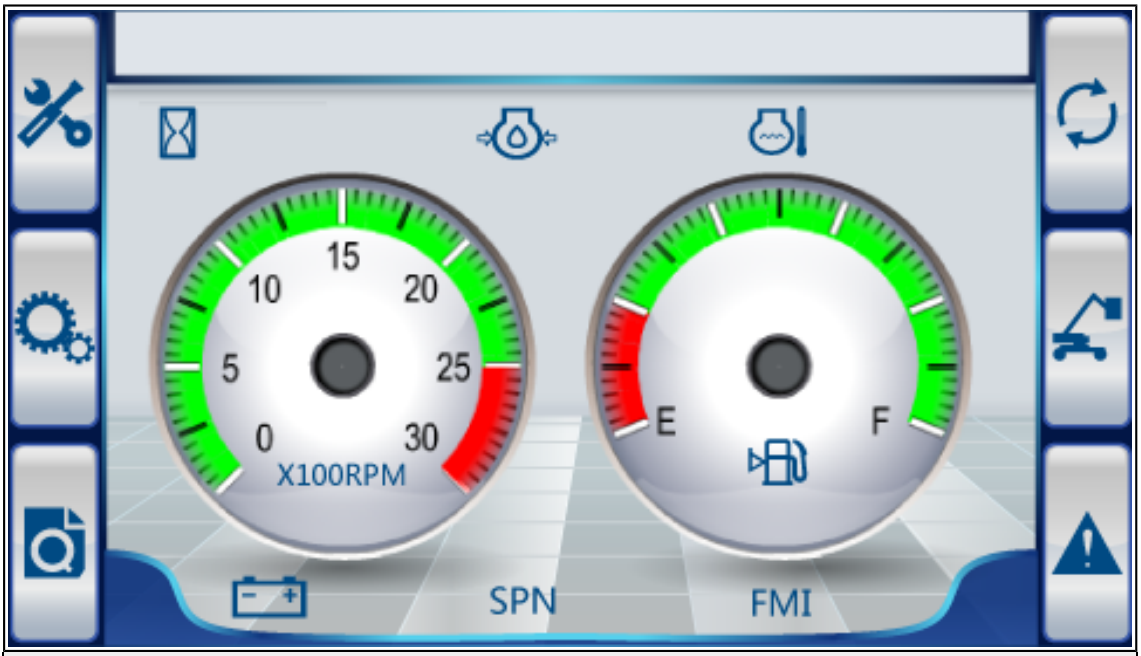


Figure 5-9 Display interface

Table 5-6 Display function introduction

	Working time display: Display the current total working time of the machine, unit: hour.
	Engine oil pressure display: Show current engine oil pressure, unit: bar.
	Engine oil pressure display: Show current engine oil temperature, unit: ℃.
	Battery pressure display: Display current battery pressure, unit: V.
	Fault code: Display current fault code.

5.3.2 Key function description

1. Ground/platform selection key switch: When the key switch turns to OFF position, the machine will be shut down. Turn the key switch to GROUND position, the ground controller will operate. Turn the key switch to PLATFORM position, the platform controller will operate.
2. Engine start/auxiliary power switch: pull up and hold until engine starts; If the main power (engine) malfunctions, please use auxiliary power switch; Pull down and hold, the auxiliary power starts and enable required function.

3. Engine speed selection/function enable switch: turn the switch to rabbit position, the engine operates at high speed. Turn the switch to turtle position, the engine operates at middle speed. This switch is also used as enable switch, pull the switch to either side to enable functions on ground control panel for operation.
4. Jib boom raising/lowering switch: Pull up to raise jib boom; pull down to lower jib boom.
5. Platform levelling switch: Pull up to raise the platform level; Pull down to lower the platform level;
6. Platform rotation switch: Pull up to rotate the platform clockwise. Pull down to rotate the platform anticlockwise.
7. Buzzer: When the machine malfunctions, the buzzer will send out an acousto-optic alarm to warn the operator.
8. Charging indicator light: When the engine is working normally, the engine will charge the battery and the indicator light will be on to indicate the generator is working normally If the indicator light is not on after engine starting, immediately inspect generator and indicator light for malfunction.
9. Display: The screen will display machine operating status parameters, engine status parameters, as well as service information such as fault code and fault query.
10. Red E-stop button: push in the red E-stop button to “OFF” position to stop all functions and shut down the engine. Rotate clockwise and release the rotating button switch, the button will return back to “ON” position and can operate the machine.
11. Boom extension/retraction switch: Pull up to extend the boom; pull down to retract the boom.
12. Turntable rotation switch: Pull left to rotate the turntable leftward. Pull right to rotate the turntable rightward.
13. Boom raising/lowering switch: Pull up to extend boom; pull down to retract boom.

5.3.3 Components in control box

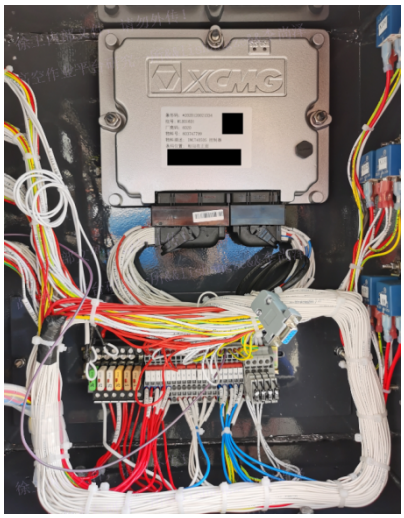


Figure 5-10 Components in control box

Table 5-7 Functions of control components

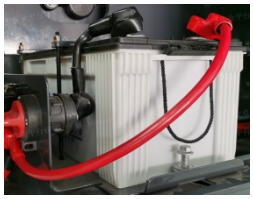
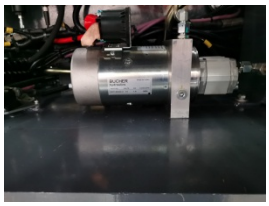
Component	Function
1. Controller	The controller is the core of the machine operation, which directs and coordinates the orderly work of various components of machine. It supplies logic operation and date storage for machine.
2. Relay	The internal relay of the control box is composed of program control route to realize switch control, safety protection, self-regulation and other functions.
3. Diode	Rectification: transfer the alternating current into direct current which small components required. Voltage limiting: limit voltage output amplitude to protect components.
4. Mini breaker	As the infrequent operation of the circuit conversion, it can also be automatically cut off when the circuit overload, short circuit and other faults occur to protect the circuit.
5. Terminal strip	It is used as the base holding components to fix components and calibrate each socket position.

5.4 Compartment electrical devices

5.4.1 Warning light

	• The warning light is mounted above the right side of housing and on the right side of the boom. • OFF: In this state, the warning light turns off. • ON: In this state, the warning light turns on. • Note: • This warning light will turns on when the machine starts; It will turn off when the machine is shut down. • When the machine is on different states or performs different motions, the warning light flashes to alert.

5.4.2 Electrical components

	Battery: • Battery is mounted on the left side of turntable and behindthe engine. • The battery, the power input of which is provided by the engine, is taken as the auxiliary power output for the electrical system of the machine.
	Breaker • The breaker is mounted on the left side of the turntable and is fixed on the rear panel of the battery device. • The breaker is connected between the power supply and the main harness. In case of abnormal circuit load, the breaker disconnects the power supply to protect the circuit.
	Battery pump: • The battery pump is mounted on the right side of turntable and in front of the control box. • The battery pump stores electric energy and is taken as emergency energy to complete the action such as falling and retraction when the master energy is exhausted, so as to ensure the safety of machine and personnel.
	Acoustic: • The acoustic ismountedon the right side of the turntable and under the control box.

	• The acoustic gives an alarm when the machine performs motions to remind the operator and surrounding personnel for safety of the machine and personnel.
	Data logger • The data logger is mounted on the right side of the turntable and on the left side of the controller. • The data logger turns on and off along with the machine to record each machine motion, data parameters, faults information, etc. and it can be used for vehicle data consultation, fault information inquiry and other operations.
	Foot pedal: • The foot pedal is located in the work platform and under the control box. • The foot pedal as an enable switch should be pressed while the operator controls motion of the machine to ensure the safety position of the operator for personnel safety.

⚠CAUTION!

- **Replacing fuses may cause hazards**
- **When replacing a fuse, make sure to use one that has the same electric current magnitude.**
- **Otherwise, a fire accident may ignite in the wiring or other circuit elements due to overheat.**
- **Use the manufacturer’s original spare parts!**

5.4.3 Sensor device

	Inclination sensor • The inclination sensor can monitor the inclination of chassis and display the inclination in real time. The sensor will give an alarm when the inclination of the chassis is greater than 3°;
	Platform levelling sensor: • The platform levelling sensor is used to test the inclination of the platform. The sensor will give an alarm when the platform tilts, to guarantee the stability of automatic levelling.

	Length and angle sensor : • The length and angle sensor can be used to detect extension length and raising angle of the boom; The sensor will give an alarm when the length or angle reaches the limit, to ensure the safety of the machine operation.
	Weighting sensor: • The weighing sensor can detect the total mass of the work platform and set a maximum load to ensure the normal operation of the work platform.

5.5 Machine startup and shutdown

5.5.1 Starting the engine

5.5.1.1 Starting operation

⚠WARNING!

- **Beware of risks and hazards by engine startup!**
- **Become familiar with the manual and engine manual before operating the machine.**
- **Wear safety belt during machine operation.**
- **Engine start may be dangerous for the maintenance stuff, co-workers and bystanders.**
- **Require all bystanders to leave the area close to the machine!**
- **Approve the engine compartment before start and close the compartment door!**
- **Be aware of all moving parts, drive belts and fan in engine compartment!**
- **Be aware of any leakage of fuel, lubricant or hydraulic oil. Combustible materials may start a fire.**
- **Remove tree leaves, paper, etc. away from the high-temperature components such as the muffler/ turbocharger to prevent fire.**
- **Do not use any aerosol or chemical fluids as a startup aid**
- **Be careful – not following the instructions hereafter may cause damage and/or serious injuries.**

NOTICE!

Check the engine compartment!

- **Engine start may result in damage of the equipment or drive system components**
- **Always make checks/inspections if you come to the machine for the fist time**
- **Inform you always by the service stuff if the engine start is allowed when performing maintenance/repair.**

Figure 5-11 Control box on turntable

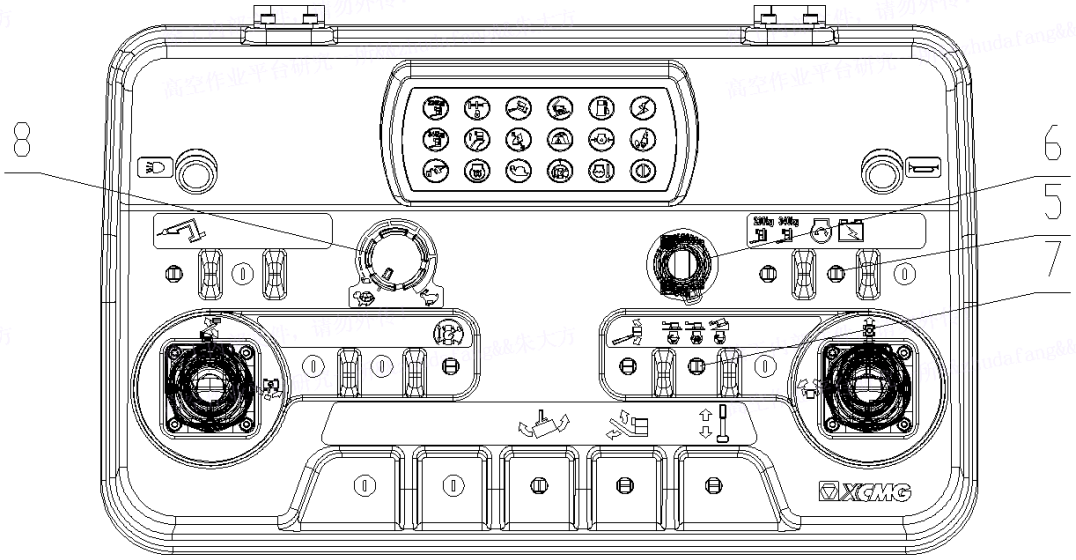


Figure 5-12 Control box on Platform

1. Ground/platform selector switch
2. Engine start/auxiliary power switch (turntable)
3. Engine speed selection/function enable switch (turntable)
4. Emergency stop button (turntable)
5. Engine start/auxiliary power switch (platform)
6. Emergency stop button (platform)
7. Travel speed/torque selection switch
8. Speed selection rotary knob

5.5.1.2 Inspection before engine startup

1. Machine inspection

1) Ensure that the Operation Manual, Maintenance Manual, and Parts Atlas are intact and are preserved with the machine.

2) Ensure all labels are legible and in the appropriate places. Refer to manuals for inspection. Refer to Instruction Manual for inspection.

3) Check engine oil for leakage and level. Replenish if necessary. Please refer to section oil lubrication and maintenance in Maintenance Manual for details.

4) Check hydraulic oil for leakage and level. Replenish if necessary. Please refer to section oil lubrication and maintenance in Maintenance Manual for details.

5) Check engine antifreeze for leakage and level. Please add antifreeze as required. Please refer to section oil lubrication and maintenance in Maintenance Manual for details.

6) Ensure that all accesses and work platform are clean and oil-free.

7) Check the following parts or areas for damage, improper installation, missing part, and unauthorized modification:

①Electrical components, wirings and cables;

②Hydraulic hoses, connectors, hydraulic cylinders, and manifolds;

③Fuel oil and hydraulic tank;

④Drive motor, turntable motor and drive hubs;

⑤Boom wear pads;

⑥Tires and wheels;

⑦Engine and related components;

⑧Limit switch and horn;

⑨Alarms and indication lights (if equipped);

⑩Nuts, bolts, and other fasteners

⑪Entrance or rail of work platform.

8) Check machine components for:

①Cracks on welds or structural parts;

②Indentation or damage to the machine;

③Excessive rust, corrosion, or oxidation;

a. Any other dangerous deterioration (rupture, wear, etc.).

9) Ensure that all structural and other critical components are in place and all relevant fasteners and pins are properly screwed.

10)Check device related safety. Check the items of safety device, warning device, e-stop device, etc. to ensure normal operation before using the machine.

11)After checking and verifying, ensure that all components are covered properly and securely.

2. Work site inspection

Before or during the use of the MEWP, the work site shall be inspected for possible hazards, including but not limited to:

1) Slopes, edges and potholes;

2) Protrusions and obstacles on ground;

3) Overhead obstacles and high-voltage lines;

4) Hazardous locations;

5) Surface supports in the working area that cannot bear all the load applied by the MEWP;

6) Wind, rain, thunder, lightening and other weather conditions;

7) Presence of unauthorized personnel;

5.5.1.3 Starting procedure

1. Turn platform/ground selection switch to "ground" position;
2. Pull the e-stop button out to "ON" position;
3. Push the engine start switch for 3 seconds until the engine is started;
4. After sufficient engine pre-heating time, push the power/e-stop switch into to turn off the engine;
5. Turn platform/ground selection switch to "platform" position;
6. Pull the e-stop button out to "ON" position on platform;
7. Push the engine start switch until the engine is started;

NOTICE!

The initial boot must always be done from the ground console.
If the engine does not start immediately, do not start for a long time. If the engine fails to start again, the starting motor should be cooled for 2~3 min. If the engine fails to start after several attempts, refer to the engine maintenance manual.
Let the engine run at a low speed for a few minutes to warm up before loading any load.
When start the engine on platform, the foot pedal must be released first and the engine cannot be started when the foot pedal is stepped.
If an unexpected shutdown is caused by an engine failure, the problem must be solved before the engine can be started up again.
The following actions may damage the starter:

- **Each starting time is more than 10 seconds**
- **Start continuously without cooling**
- **Start again while the engine is running!**

Do not start engine by dragging to prevent engine damage.
Retrying immediately after a startup failure will cause the battery to run out quickly or even damage the starter.
If the battery power is not enough to start the engine, refer to section jumpstarting, connect the battery at normal voltage.

5.5.1.4 Shutdown of engine and parking

Shutdown of Engine

Press the emergency stop button or turn the ground/platform key selector switch to the "O" position to shut down.

Parking of Machine

1. Drive the machine to a secured place.
2. Endure the boom is fully retracted and lowered over the (drive) rear axle; All maintenance panels and doors are closed and latched.
3. Remove all loads and let the engine run at low speed for 3-5 minutes to further reduce the engine temperature.
4. In the ground control box, turn the key selector switch to the "O" position, press the emergency stop button and remove the key.
5. Cover the platform console to protect indication nameplates, warning signs, and operating controls from severe environment damage.

5.5.1.5 Inspection after shutdown

⚠Inspection

- Check the machine for abnormal phenomenon or malfunction.
- Refuel if the fuel is short.
- Remove combustible material, such as leaves, sticks, or paper, which has accumulated near the engine.

5.5.2 Engine jumpstarting

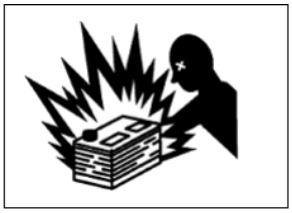
5.5.2.1 Connecting boosting battery

⚠WARNING!

Beware of explosive gas leakage while charging or use the battery

- **Wrong jump-start procedure may result in an explosion and cause severe injuries**
- **When starting jump-start, wear safety goggles and gloves.**
- **Charge the battery at a well-ventilated place**
- **Keep the area around it free of sparks or static electricity**

⚠ *Follow further safety instructions*



– Start on a dry and solid ground but avoid ungrounded metallic roads or surfaces.
– When starting with other equipment connected, make sure that the facilities do not contact.
– When charging, connect the positive pole of the subsidiary battery to that of the feeding battery and the negative pole of the former to bracket of the latter.
When installing the battery, connect the positive connection poles first, when dismounting it, start by removing the negative pole.
Important: The voltage of the electrical machine is 12 V (negative ground).
During assisted start, **be sure to use a 12 V boosting battery of the same capacity.**

NOTICE!

– Connect correct the boost battery!
Wrong connecting may damage battery or cause fire

1. **Shut off the engine on the equipment connected with the boosting battery**
2. **Connect one end of the red wire (a) to the positive pole of the battery on the machine and the other end to that of the boosting battery (c).**
3. **Connect one end of the black wire (b) to the negative pole of the boosting battery and the other end to the upper bracket (e) on the machine for grounding.**
4. **When connecting the upper bracket, keep connections away from the battery as far as possible and do not connect it to the negative pole of the battery directly.**
5. **Start the engine.**

First the ignition is switched off

- To start the engine there are two ways: – from the additional battery or from another vehicle
- **In case the supply system is another vehicle, check the battery voltage of supporting vehicle.**

Switch ignition off on supporting vehicle as well

NOTICE!

Take care of the cross-section of the cables

- **Connecting cables for provide jump start support to the machine should have a cross-section above 25 mm² (complying to DIN 72553 or ISO 6722).**
- **Batteries may be already frozen if kept discharged at temperatures below freezing point (0°C / 32°F)..**
- **Ensure battery is defrosted prior charging of jumpstarting.**
- **Avoid unnecessary engine operation as often as possible to ensure environmental protection**
- **The battery may explode if the auxiliary cables are connected the wrong way.**

Connect the cables in the following order to minimize hazards:

1. Connect **1st** the **red cable** with the **(+)-pole** of the **"empty" battery**
2. **Then connect the other end** of the **red cable** with **the (+) pole of the "full" battery**.
3. Connec**t the black cable** with **a GND pole** close to **the battery on the receiving machine**
4. Then connect the other end of the **black cable** to the **(−) pole of the "full" battery**.

In case battery of the machine is empty connect it with an external power supply (i.e. as shown in figure). Ensure GND pole (-) is connected to machine's frame!

5.5.2.2 Connection scheme

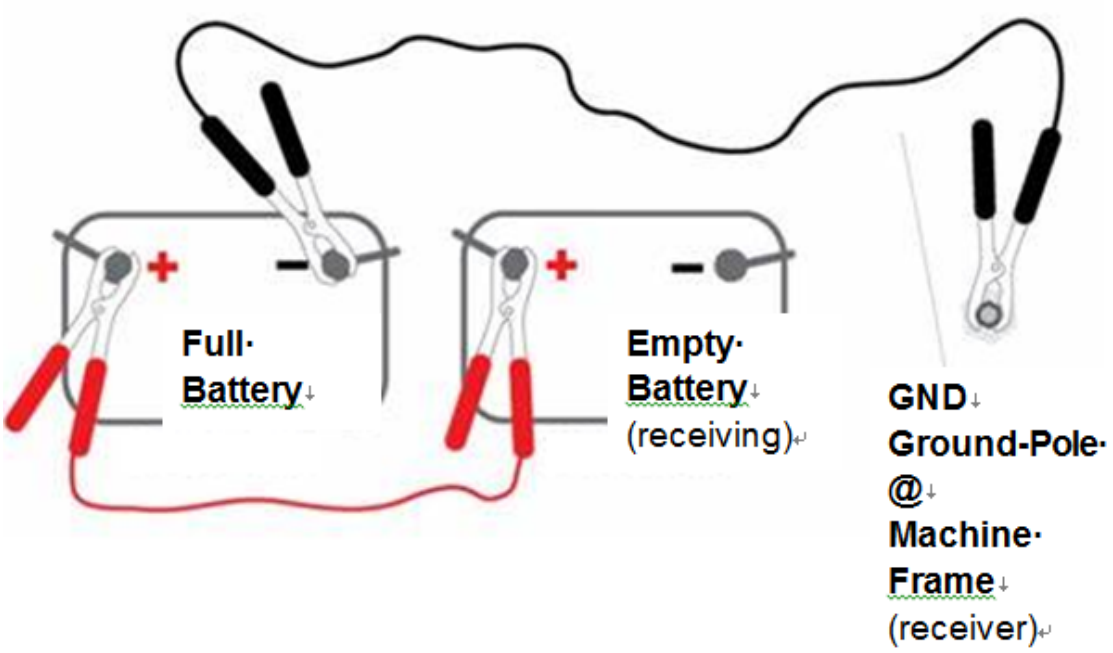


Figure 5-13 Jumpstarting of loading battery

Note: On the left side is the donating battery

DANGER!

Make sure that life cables' ends do not contact.

- Charge battery for at least 5 minutes before any starting attempt.
- If engine start was successful, keep the cables connected for another 3 minutes before disconnecting them.
- In case the supply system is another vehicle, keep its engine running during the entire charging process.

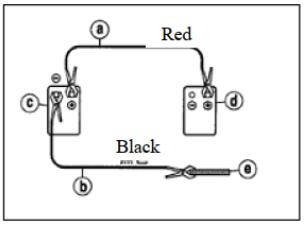
5.5.2.3 Removing boosting battery

Disconnecting the auxiliary battery

1. Before disconnecting, open the lights on receiving machine to avoid overload.
2. Disconnect the cables in exactly the opposite order as described below in Notice
3. **Let engine run to charge battery**.

NOTICE!

– **Remove correctly the boost-battery:**



1.First, remove the black negative connection (b) from the main frame of the equipment.

2.Remove the other end of the black negative connection from the boosting battery

3.Remove the red positive connection (a) from the boosting battery.

4.Then, remove the other end of the red positive connection (a) from the battery on the machine.

5.6 Driving the machine

5.6.1 Travel

⚠DANGER!

- **Ensure no bystanders are in the zone of danger while machine is operated.**
- **Ensure driving path is stable and secured**
- **Unexpected moving parts may cause burns or injury**

⚠CAUTION!

- **Driving over notches may cause the machine tip over.**
- **Consider that application and release and of parking brake may be delayed at low hydraulic oil temperature.**

NOTICE!

Please refer to the operation parameters table for the allowable range of positive and lateral slopes. All allowable ranges of positive and lateral slopes are based on the fact that the boom is in stowed position and completely lowered and retracted.

Traveling will be restricted by the following two factors:

1. Slope grade, the percentage of slope gradient that the device can climb.

2. Side inclination, the side slope grade of the road that the machine can pass through.

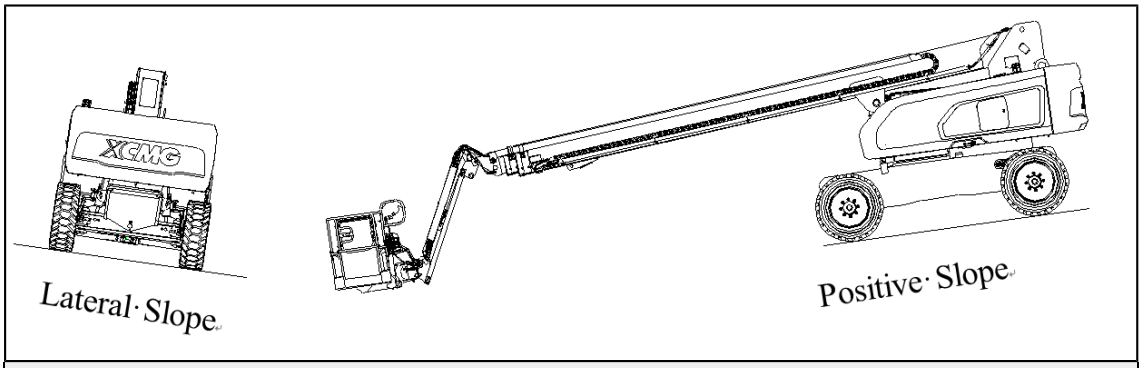


Figure 5-14 Diagram of driving slope

⚠WARNING!

Do not allow the machine travel with the boom above the horizontal position unless it is on a flat, solid, and horizontal surface. To avoid losing control or overturning, do not drive the machine on a slope with a slope grade exceeding the grade marked on the nameplate.

Make sure the turntable lock is engaged before moving on.

Do not drive on roads with a side slope more than 8 degrees.

Extra care must be taken when driving in reverse or with the platform raised.

Before driving, ensure the boom is placed over the rear drive axle. If the boom is over the front axle, the direction of steering and driving functions will be reversed.

Driving forward and backward

1. Pull the emergency stop switch out on the platform control box and then press the foot pedal.
2. Move the drive joystick to “forward” or “backward” position according to requirement.

The machine is equipped with driving direction indicator light. The yellow indicator light on the platform control box indicates that the swing of the boom has exceeded the rear-drive wheel and the machine may be run/turn against the direction of the joystick movement. If the indicator light is on, the driving function should be operated as follows:

1. Match the blue arrow on the platform control panel and yellow directional arrow on chassis to determine the driving direction of the machine.
2. Press and release the drive orientation unlocking switch. Move the driving joystick slowly toward the arrow in the same direction as the machine is intended to travel in 10 seconds. Do operate driving joystick in 10 seconds of indicator light flashing.

5.6.2 Steering

Move the thumb switch on the drive/steering joystick to the right position to turn right or the left position to turn left.

5.6.3 Platform

WARNING!

Only levelling override function can be used to level the platform slightly. Improper use may cause the displacement or falling of loads/occupants. Failure to follow above instructions may result in serious injury or death.

Platform leveling

To adjust the level up and down—Move the platform/level control switch to "up" or "down" position and hold it until the platform is level.

Platform rotation

To rotate the platform left and right—Operate the platform rotation control switch to select the direction, then press and hold the switch until the desired position is reached.

5.6.4 Swing of boom

WARNING!

Do not swing or raise the boom beyond the horizontal position when the machine tilts.

Do not use the tilt alarm as a levelness indicator for the chassis.

To avoid overturning, the platform should be lowered to ground level. Then drive the machine to a level surface before raising the boom.

To avoid death and serious injury, do not operate the machine if any control lever or toggle switch controlling the movement of platform does not turns back to off position or neutral position when released.

If the platform does not stop after releasing the control switch or joystick, remove the foot from the foot pedal or use the emergency stop switch to stop the machine.

Swing of boom

To swing the boom, you can select “left” or “right” with the joystick.

Attention!

When swinging the boom, make sure it is sufficiently far away from the surrounding walls, partitions, and equipment.

Elevation of boom

To raise or lower the boom, move the boom lift switch up or down until the desired height is reached.

Extension of boom

To extend or retract the boom, select "extension" or "retraction" with boom extension switch.

5.7 Braking and stopping the machine

5.7.1 E-stop switch

⚠WARNING!

- **An emergency stop switch must be used to stop the machine in case of emergency**
- **Triggering the anti-squeeze device can also stop the machine in an emergency**

Figure 5-15 Devices for stopping the machine

The emergency stop operation can be fulfilled from either turntable or platform. The operations are same as follows:

1. E-stop operation

   When E-stop switch is pressed, the engine turns off. After the shutdown of engine, all operation of MEWP can not be carried out.

   — E-stop switch is used for following conditions:

   1) When the machine can not be controlled by a joystick or switch, or an immediate stop is required in case of hazards.

   2) To prevent personnel in platform from misoperation or unintended touching on any switch or joystick to cause hazards.

2. Reset of E-stop Switch

   Rotate the E-stop switch again to reset the e-stop switch. After the reset of E-stop switch, the engine can be restarted and all operation of MEWP can be carried out.

   If you operate the joystick or switch after completing above reset, the machine may still not be able to move. In this case, pull the joystick or switch back to the neutral and ask a professional to perform maintenance before use.

5.7.2 Parking of machine and shutdown of engine

5.7.2.1 Parking of machine

NOTICE!

- **Park the machine in monitored area to prevent possible accidents or the entrance of unauthorized personnel.**
- **Remove the ignition key and cover the machine with engine hood to avoid misuse.**
- **Park the machine on stable and flat ground to prevent hazards or damage to the machine.**
- **Obey local traffic regulations and rules when parking in public area.**

5.8 Operation of battery pump

As an auxiliary power source, the battery pump will be used for machine retraction in case of emergency. Keep pressing the battery pump button on turntable or platform for battery pump operation and the service time should not exceed 30 minutes.

Operation steps:

1. Ensure the breaker switch next to battery bracket is on “ON” (see Figure 5-8)
2. Turn turntable/platform selector switch to platform or turntable;
3. Pull and hold the battery pump switch on turntable or platform.
4. If operated on platform, press the foot pedal.
5. Carry out the retraction operation normally to retract the machine.

⚠WARNING!

- **Only use this switch when engine fails.**
- **The battery pump is used for emergency retraction only. Do not use for other purpose.**

5.9 Work functions

5.9.1 The engine’s DPF-regeneration

5.9.1.1 Precaution for regeneration

NOTICE!

- **Consult the engine’s manual to prevent unwanted damage or possible injuries.**
- **The exhaust gas’s temperature may rise significantly during the regeneration process. In case regeneration is not performed on time, engine and/or DPF may suffer severe damage!**
- **Check engine oil regularly!**
  Replace it if the (fuel) oil level is higher than the max. value or the frequency of regeneration is more than once every 5 hours.

- The Engine’s Diesel Particle Filter (DPF for short) needs periodical regeneration.
- During this process, carbon particles filtered in the DPF are burned, ensuring DPF remains functional.
- To ensure engines performance, DPFs service life and legal exhaust gas emission limits it is strongly recommended to enable automatic regeneration.
- Regeneration can start only while exhaust gas temperature is above 250°C, coolant temperature shall be above 50°C (122°F).
- During regeneration exhaust gas temperature may exceed 550°C (1022°F).
- During regeneration, fuel may be mixed with engines oil; if engines oil level rises above upper limit
  - Replace engine oil immediately to ensure engines lubrication and avoid engines damage.
  - Replace engine oil also when interval between regenerations becomes less than 5 hours.

5.9.1.2 Regeneration modes

NOTICE!

- **Postponing regeneration increase the risk of irreversible damage to the DPF.**
- **Delayed regeneration causes the exhaust gas temperature to increase**
- **Proceed with caution when initiating/resuming regeneration after postponing it**

1. RegenerationRegeneration switch description

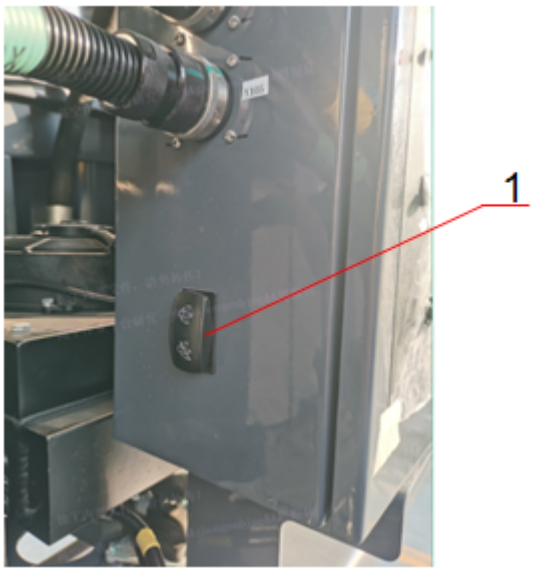


Figure 5-16 DPF regeneration switch

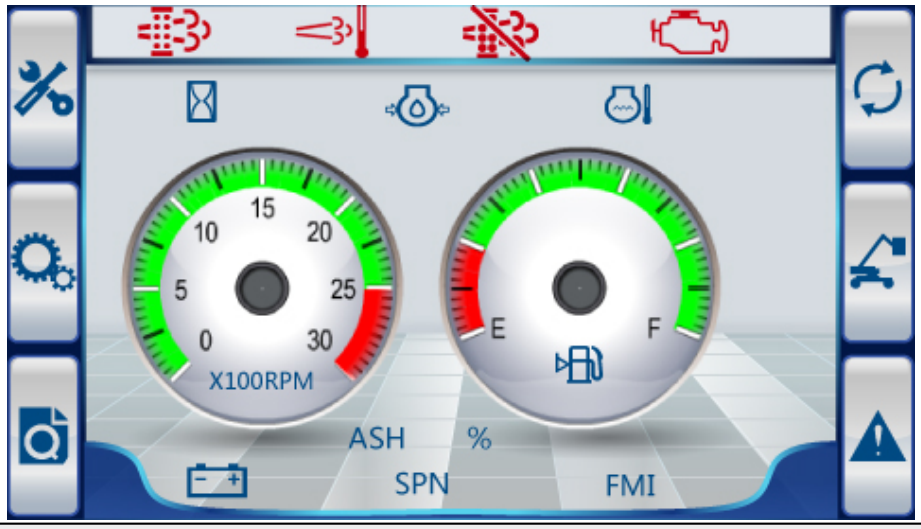


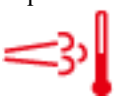
Figure 5-17 Regeneration status display

2. RegenerationRegeneration mode selection

1) Automatic regenerationRegeneration

Turn the regeneration switch to the auto regeneration position (the middle position of the switch). As shown in **Figure 5-18**.

Figure 5-18 Automatic regeneration position

When the switch is in this position, once the DPF exhaust gas pressure in front of the DPF gets high, the system will assume that the DPF is clogged and regeneration is required. Now DPF regeneration will start automatically, the regeneration-in-progress indicator light  will light up indicating that exhaust gas is hot.

After regeneration, the regeneration-in-progress indicator light  will turn off and the display will show corresponding indication, as shown in **Figure 5-17**.

2) Inhibit/Interrupt regeneration

Turn the regeneration switch to inhibit/interrupt regeneration position (press the switch down). As shown in **Figure 5-19**.

Figure 5-19 Stop regeneration position

The exhaust temperature may be over 550°C during regeneration. Therefore, press the regeneration switch down to the inhibit regeneration position to stop or interrupt regeneration at specific times or places (such as gas stations, refueling stations, petrochemical and other construction sites). In this case, the regeneration request indicator light  will light up but the regeneration will not (re) start automatically.

After leaving the place where the high temperature is prohibited, turn the regeneration switch to auto regeneration position to enable auto regeneration function.

3) Manual regeneration

When the switch is in the bottom non-auto regeneration, the regeneration delay will cause high exhaust temperature and the system will show warning message SPN：3701, FMI：15. Press the switch up to the manual regeneration position and then release to make the system regeneration, as shown in **Figure 5-20**.

Figure 5-20 Manual regeneration position

When the switch is in the bottom non-auto regeneration position, the regeneration delay will cause high exhaust temperature and the system will show warning message SPN：3701, FMI: 15. The machine will restrict the boom raising and extending. Stop the machine and perform manual regeneration, as shown in **Figure 5-20**. The regeneration-in-process indicator light will turns on during regeneration.

After regeneration, confirm the switch in the middle auto-regeneration position.

Table 5-8 DPF automatic regeneration permission

Automatic regeneration permission	**AC heat exchange light**	**Inhibit Regeneration Light**	**Regenerating Light**	**Warning Light**	**DPF state**	**Machine performance**
						
Level 0 (No regeneration required)	OFF	OFF	OFF	OFF	No regeneration is needed	
Level 1 (Automatic regeneration)	ON	OFF	ON	OFF	Automatic regeneration	Set idle speed to 1400 rpm
Level 2 (Request for parking	ON	OFF	ON	OFF	Parking regeneration is available	Set idle speed to 1400 rpm

Table 5-8 DPF automatic regeneration permission(continued)

Automatic regenera-tion permission	AC heat ex-change light	Inhibit Re-generation Light	Regenerat-ing Light	Warning Light	DPF state	Machine perform-ance
						
regenera tion)						
Level 3 (Parking regenera tion)	ON	OFF	ON	ON	Automatic regeneration is forbidden Parking regeneration is available	Alarm Set idle speed to 1400 rpm The travel speed is reduced and the boom raise and extension is restricted

Table 5-8 DPF automatic regeneration permission(continued)

Automatic regenera-tion permission	AC heat ex-change light	Inhibit Re-generation Light	Regenerat-ing Light	Warning Light	DPF state	Machine perform-ance
						
Level 4 (Regenera tion with maintenance tools)	ON	OFF	ON	ON	Automatic regeneration is not available Parking regeneration is not available	Alarm Set idle speed to 1400 rpm The travel speed is reduced and the boom raise and extension is restricted
Level 5 (DPF out of repair)	Flash	OFF	OFF	ON	DPF out of repair	Alarm Set idle speed to 1400 rpm The travel speed is reduced and the boom raise and extension is restricted

Table 5-9 DFP Automatic regeneration prohibition

Automatic regeneration permission	AC heat exchange light	Inhibit Regeneration Light	Regenerating Light	Warning Light	DPF state	Machine performance
						
Level 0 (No regeneration needed)	OFF	ON	OFF	OFF	No regeneration is needed	
Level 1 (automatic regeneration)	ON	ON	OFF	OFF	Automatic regeneration forbidden	Set idle speed to 1400 rpm
Level 2 (Parking regeneration is required)	Flash	ON	OFF	OFF	Automatic regeneration forbidden Parking regeneration is available	Set idle speed to 1400 rpm
Level 3 (Parking regeneration)	Flash	ON	OFF	ON	Automatic regeneration is forbidden Parking regeneration is available	Alarm Set idle speed to 1400 rpm Slow down

Table 5-9 DFP Automatic regeneration prohibition(continued)

Automatic regeneration permission	AC heat exchange light 	Inhibit Regeneration Light 	Regenerating Light 	Warning Light 	DPF state	Machine performance
Level 4 (regeneration with maintenance tools)	Flash	ON	OFF	ON	Automatic regeneration forbidden Parking regeneration is not available	Alarm Set idle speed to 1400 rpm The travel speed is reduced and the boom raise and extension is restricted
Level 5 (DPF out of repair)	Flash	ON	OFF	ON	DPF out of repair	Alarm Set idle speed to 1400 rpm The travel speed is reduced and the boom raise and extension is restricted

NOTICE!

- **Perform parking regeneration while machine is stands still**
- **Forced regeneration is mandatory in case DPF’s contamination is far too high.**
- **Contact your XCMG representative if that happens.**

In case of high contamination of the DPF (i.e. because regeneration was not accomplished previously), warning code SPN: 3701, FMI:15 will appear on the display and the regeneration light will flash.

- In this case, perform a “parking active regeneration” as soon as possible.

- Park the machine in a secured area and turn the regeneration switch (position 10.2 in the table) to the left position (3) (“parking active regeneration”).

Engine controls will adjust its setup to correctly perform the regeneration.

During this process, **do not stop** the engine except in case of emergency.

In case of warning message SPN: 3701, FMI:15, forced regeneration is mandatory; consult engines manual and contact your XCMG representative.

If the regeneration may not be possible in the next time, perform regeneration in advance reasonably. For doing this turn regeneration switch to the “parking regeneration” position.

While regenerating the engine regeneration light  will light up.

5.9.1.3 Regeneration temperature

During DPF regeneration, exhaust gas temperature increases.

In case the temperature exceeds 450°C (840°F) the temperature indicator light will light up.

Ensure neither bystanders nor potential inflammable materials are close to the machine.

5.9.2 Refueling

⚠CAUTION!

- **Clean up any spilled fuel immediately**
- **Let the engine cool down prior fueling.**
- **Always use sulfur free fuel specified in the operation instructions.**
- **Engine and EGR may suffer severe damage.**
- **Dirt or soiling will damage the engine.**
- **Keep all fuel related components and systems thoroughly clean.**

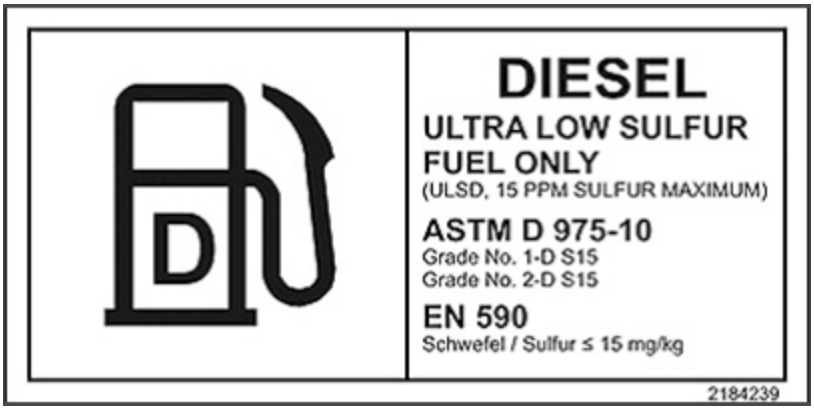


Figure 5-21 Use only approved fuel!

NOTICE!

- **Use of fuel supplements is prohibited**
- **Always Refuel the machine with sulfur free fuel according EN 590 or ASTM 0975-10 grade No. 1 or 2 -S15, containing less than 15 mg/Kg sulfur.**

Warranty is void in case non-compliant fuel is used.

Non-approved fuels cannot guarantee compliance to European or US emission regulations.

Fill up with clean fuel only!

Refuel with caution and avoid spilling.

Ensure the tank cap is properly closed after refueling.

Keep an eye on the fuel level: never let the engine completely run out of fuel!

- Observe the fuel level and refuel the machine timely before the tank gets empty.
  - Otherwise, deaeration of the fuel system may become necessary prior to next engine’s start.
  - To avoid condensation of water within the fuel tank, make sure to park the machine while fuel is remaining in the tank.

  Do not fill up fuel tank above the lower edge of the filler neck.
- Use winter fuel as soon temperatures may approach the freezing point (0 °C / 32 °F).
  - In case temperature falls far below freezing point (i.e. arctic regions), use fuels approved for arctic regions.

Chapter 6 Maintenance

6.1 General hints and overall safety

6.1.1 Safety during maintenance

DANGER!

- **Beware of maintenance risks and hazards!**
  - **Maintenance of the machine may lead to potential hazards for operator himself, co-workers and bystanders, to possible death casualties and/or damage to property.**
  - **For every maintenance step noticed in this Section 6−obey the rules and recommendations to prevent serious injuries and accidents!**
  - **Be careful! Not respecting the basic rules presented hereafter-serious injuries or deaths and/or significant property damage may result!**

WARNING!

Respect the rules and recommendations!
Maintenance may cause risk and hazards!

- **Take all precautions in order to prevent hazards for operator and bystanders, which may lead to serious injuries and even to death casualties.**
- **Be careful! Not respecting the basic rules noted hereafter in this Section 6 serious injuries or deaths and/or significant property damage may result!**

- To avoid any accident:
- Be sure to remember the maintenance regulations before you start working.
- Keep your workplace clean and dry.
- Do not lubricate or maintain the machine while moving.
- Avoid body limbs contact, or clothes getting sucked in, rotating parts.

Before starting maintenance:

- Park the machine on flat ground.
- Run the engine for 5 minutes at low speed and empty load.
- Stop the engine, turn off electric power and remove the key from the switch

  – Set a warning sign of “No Operate” on control lever.

- Let the engine cool down.

If the inspection or maintenance *is to be carried out while the engine is running, at least 2 persons should be appointed to carry it out. One person should stand in front of the turntable or platform control panel to stop the engine if necessary and to ensure that others can inspect or maintain the machine. Maintenance persons should maintain close communication to ensure the mission is completed safely.*

- Be aware of moving or falling parts and objects
- Check the parts at regular intervals and repair or replace them according to the needs.
- Keep all the parts in good working state and install them correctly.
- Replace the worn or damaged parts in time, and remove any accumulated grease, oil or scrap.
- Use non-flammable cleaning oil and do not use fuel, gasoline or other highly flammable substances to clean the parts or surface.
- If spilled on any machine parts, or surfaces, clean them instantly.
- Disconnect the grounding cable (-pole) of the battery before regulating the electric system or performing any welding on the machine.
- Ensure adequate lighting at the workplace. If working below or inside the machine, always use guarded work lights. Otherwise, the bulb may ignite any of the flammable liquids (fuel, engine oil, anti-freezing or washing fluid) it contact or in case it breaks.

Protection against flying debris, particles or parts

⚠ *Avoid flying parts:*

- Flying debris, particles or parts can cause severe injuries!
- Use the safety goggles or safety glasses to avoid injuries due to flying particles, fragments or debris of any material.
- Prevent others from entering the working place in case of hazard of flying objects.
-

⚠ *During the* maintenance *process:*

- Warn the others that any unexpected machine movement may cause severe injuries and hang up the warning plate “No Operate” on the control joystick before maintaining the machine.

⚠ *Support machine parts in a safe manner:*

- Always secure the affected machine parts safely before starting maintenance or repairs on them.
- Always lower the equipment to the ground before maintaining and repairing the machine.
- Do not use slag bricks, cord tires or racks to secure the machine parts that need maintenance or repairs. Those may topple or even break under the parts’ steady load.
- Do not work below machine parts secured with a single jack.

-

⚠ *Keep away from rotating parts:*

- The entrapment of limbs within rotating parts causes severe injuries.
- In case of working next to rotating parts, do not let your limbs, clothes or hair get sucked-in by the rotation.
-

⚠ *Pressure hazards with the reducer:*

- The gear oil is hot. Avoid contact to prevent burns or scalds.
- After cooling the gear oil, loosen the air bleed plug gradually to release the pressure.

⚠ *Pay attention to hot fluids*

- Avoid burns caused by sprayed high-temperature fluid. After the operation, the engine's cooling water is hot and pressurised. There is hot water or steam inside the engine or the radiator, too. If the skin contacts the spilled hot water or steam, the severe skin burns will be caused.
- **Prevent burns from hot water**. Do not open the cover of radiator before the engine has cooled down. When opening the cover, turn the cover to bottom slowly, and remove the cover after the pressure is completely released.
- High-temperature fluid and surface. During the operation, engine oil, gear oil and hydraulic oil may become hot; engine, hose, pipe and other parts will also become hot.
- After the oil and parts cooled, start to check or maintain them.

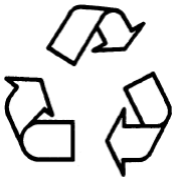
⚠ *Periodic replacement of rubber hose*

- Machinery directive and local regulations require regular exchange of rubber hoses! Refer to Section 6.4.
- Due to ageing, fatigue and wear, the rubber hose containing flammable fluid may be broken under the pressure. It's difficult to judge the poorness of rubber hose due to its ageing and wear and replace the rubber hose at regular intervals.
- Irregular replacement of rubber hose may cause the fire, the injection of fluid into skin or the knock of working device to persons around it will cause severe heat injury, dermal gangrene, other injuries or death.

⚠ *Pay attention to high-pressure fluid*

- If the fuel, hydraulic oil or other fluids injected under high pressure can penetrate the skin or rip into the eyes, it will cause severe injury, blindness or death.
- Release the pressure before removing the hydraulic or other pipes to avoid this risk.
- Fasten all connections before repressurizing.
- Use cardboard to find leaks, and protect your hands and body from high-pressure liquids. Wear the face mask or safety goggles to protect your eyes.
- In case of any accident, let the doctor who’s familiar with this type of wound cure immediately.
- Any fluid injected into skin must be removed through surgery within several hours, otherwise the dermal gangrene will be caused.

Correct treatment of discards



- Any improper treatment of discards will harm the environment and ecology, and the potential harmful discards include hydraulic oil, fuel, engine oil, coolant, filter and battery, etc.
  - When discharging the fluid, use the leak-proof container.
  - Do not use the food or drink vessel, because it may cause the wrong drinking.
  - Do not pour the waste liquid on the ground, into sewerage or any water source.
  - Inquire the correct recovering or treatment methods of discards from local environmental protection or recovery center or your assigned dealer.

NOTICE!

Keep your machine functioning and safe! Perform regular maintenance

- **Regular maintenance is the essential for the expected machine function and safety!**
- **Use recommended oil products, greases and anti-freeze fluid only. Any use of incorrect oil in the grease may lead to machine damage!**
- **Use original service parts only when required!**
- **Not respecting the maintenance, schedules and steps presented hereafter can reduce the machine lifetime, may lead to machine damage and loss of the product warranty!**

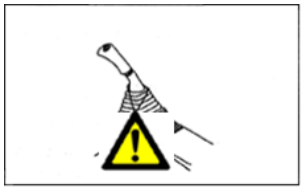
6.1.2 Inspection checks before starting

⚠WARNING!

Beware of risks and hazards at start!

- **The start of machine may lead to hazards for operator and bystanders, and finally to death casualties and/or damage to property.**
- **Always place "No Operation" warning label clearly visible on the one of the working joysticks to warn that someone is maintaining theAerial Work Plstform.**
- **Start of the engine touches or operates joysticks during maintenance may cause serious personal injury or damage to the machine.**
- **Be careful! Not respecting the basic rules presented hereafter , serious injuries or deaths and/or significant property damage may result!**

⚠ *Warning label for Maintenance*



- When the warning sign is not in use, put it in the tool box.
-

⚠ *Keeping the work area clean and tidy*

- Do not scatter the hammer or other tools in the work area.
- Wipe off all slippery grease, oil or other substances. Keep the work area clean and tidy, so as to secure the working process.
- If the work area is not kept clean and tidy, persons may stumble, slip or drop, and cause injury.
- There are several special safety labels on the machine,
- Please get familiar with all these safety labels.
- Ensure that you can see and understand all the safety labels clearly.
- If the words of a safety label are unclear, clean the label or replace it.
- If the illustrations of a safety label are unclear, replace them.
- Clean the safety labels with soft cloth, water and soap.
- Do not clean safety labels with solvents, gasoline or caustic chemical agents. Labels could be not readable or destroyed.
- If any safety label is damaged or lost, it must be replaced immediately.
- If the part to be replaced wear a safety label, ensure that the part to be replaced with also has the safety labe on itself.

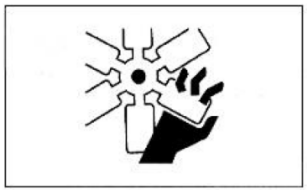
⚠ *When working with others, appoint a conductor!*

- When repairing the machine or when disassembling or installing components, a conductor should be appointed and follow his command during the operation.
- When working together, persons that not familiar may cause serious accidents.

⚠ *Shut off the engine before* maintenance

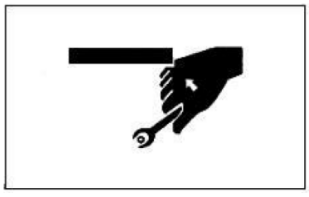
- The machine should be stopped on solid and flat ground.
- The place without fallen stones, collapses or is of no danger of being submerged should be chosen.
- Lower the working device completely to the ground and shut off the engine
- Put stopper blocks under the wheels in order to prevent the machine moving.

⚠ *When the engine is running, two persons carry out the* maintenance



- To prevent injury, do not carry out the maintenance when the engine is running. If the maintenance must be carried out when the engine is running, operate it with at least two people, and follow the rules below:
- One staff shall stand in front of the turntable or platform control panel, so as to stop the engine at any time if necessary. All people must keep in communication with each other.
- When operating near the fan, the fan belt or other rotating parts, the operator must pay special attention to prevent being coiled.
- – Prohibit touching any operating lever. If necessary, the operator needs to send signals to other people to warn them to move to a safe place.
- It is forbidden to drop or insert tools or other objects into the fan or fan belt, otherwise the parts may break or fly out.

Suitable tools



- Proper use of suitable tools, such as the use of damaged, inferior, defective, temporary tools or unsuitable tools may cause serious personal injury.

⚠CAUTION!

- **Beware of risk and hazards from maintenance.**
- **Only trained personnel is allowed to maintain or to repair the MEWP**
- **Appoint an observer if necessary**
- **Be careful! Not respecting the basic rules presented hereafter–serious injuries or even deaths and/or significant property damage may result!**

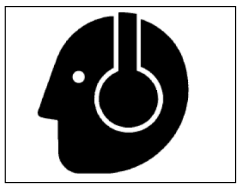
⚠ *Follow the safety instructions:*

⚠ *Accessories:*

- Before removing or installing the accessories, a conductor will be appointed.
- The accessories which are removed from the MEWP*m* should be put in a stable place where the accessories do not fall. Measures should be taken to prevent unauthorized persons from entering storage area.

⚠*Working under the platform of* MEWP

- If you need to carry out maintenance under the machine or working equipment, firmly support the working equipment and machine with pads and brackets strong enough to support the weight of the working equipment and machine.
- If the wheel leaves the ground, the machine is only supported by the working equipment; if the control levers or hydraulic pipes are accidentally touched, the equipment or the machine may suddenly fall. If the pads or the frames are not used to support the machines, working under the machine is prohibited.



⚠ *Noise:*

- If the noise of the machine is too loud, temporary or permanent hearing problems can be caused.
- When persons maintain the engine and suffer the noise for a long time, ear covers or earplugs should be worn.

⚠ *Relevant safety rules for high-pressure hydraulic system:*

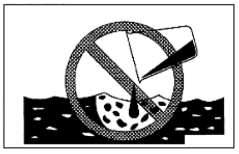
The internal part of the hydraulic system always has pressure; when checking or replacing pipes or hoses, the pressure in the hydraulic oil pipe must be checked whether it has been released or not. If oil pipe still has the pressure, serious injury or damage can be caused, so the following rules need to be obeyed:

- When the hydraulic system has the pressure, before releasing the pressure, do not carry out check or replace.
- If the surrounding area of the pipes or the hoses is wet, the pipes or the hoses should be checked for break, and the hoses for inflation.
- When checking, goggles and leather gloves should be worn.
- The high-pressure oil which leaks from small orifices can penetrate skin and may cause blindness if contact eyes directly. If skin or eyes contacted with the high-pressure oil were injured, skin or eyes should be flushed by clean water and go to hospital for treatment immediately.

⚠

Safe operation of high-pressure hose

- If the hose leaks, it may cause fire or faulty operation, resulting in serious injury or damage.
- If the bolt looseness is found, stop operations and fasten the bolts to the specified tightening torque. If there is any damage to the hose, stop the operation immediately, and contact with the dealer of XCMG.
- If there is any of the following problems, replace the hose:
  - Damage or leakage of hydraulic pipe connection.
  - Cladding frayed or disconnected, and or strengthening layer wire exposed.
  - Cladding expands in some places.
  - Movable parts distorted or crushed.
  - Impurities inside cladding.



⚠ *Waste*

To prevent pollution, attention should be paid to the treatment of waste:

- Discharge the oil from the machine into the container; do not discharge it directly to the ground, or into the sewers, rivers, oceans or lakes. When dealing with hazardous materials, such as engine oil, fuel oil, cooling fluid, solvents, filter and batteries, it is necessary to comply with the laws and regulations.
- According to the requirements of laws and regulations, the whole machine, parts and accessories that need to be disposed of must be properly handled in accordance with laws and regulations.

⚠

Compressed air

- When cleaning with compressed air, it may be caused by flying particles causing personal injury or machine damage.
- When using compressed air to clean the filter element or radiator, wear goggles, dust masks, gloves and other protective equipment.

6.1.3 Installation of accessories and other safety instructions

⚠DANGER!

- **Beware of risk and hazards when installing accessories**
- **Installation of different accessories and optional parts are related to different hazards for operator himself, co-workers and bystanders that may end with accidents, injuries or death**
- **Be careful! Not respecting the basic rules presented hereafter for this Section 5 serious injuries or death casualties and/or significant property damage may result!**

NOTICE!

Always use approved accessory or equipment
Contact XCMG distributor in advance

- **When installing and using the accessories, combine the operating accessories according to the instruction manual of the accessories and the general instruction about the accessories in this instruction manual**

⚠ *Installation for the accessories and other safety instructions*

– When installing the optional parts or accessories, please contact the **XCMG** distributor in advance. Any injury, accident or product fault caused by using the accessories or parts without approval from **XCMG** will be unrelated with our company.

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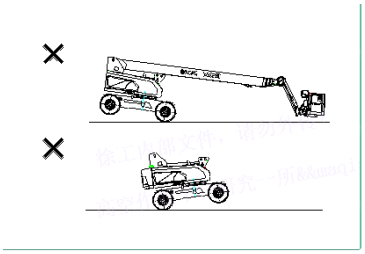
⚠*Removal of boom and counterweights*



⚠*Removal of counterweights or boom or any other component from the machine will affect its stability and this will result in its sudden move causing serious injury and death.*

– You can remove counterweights or boom only when the top structure and the bottom structure are disposed of in the same direction. Once counterweights or front-end equipment is removed, do not rotate the top structure

⚠ *Safety in the workplace*

Before operating, check the work area thoroughly for dangers.

- When operating near the flammable materials (cottage roof, dry leaves or grasses) stored, it is possible to cause a fire, so it is necessary to be careful during operating.
- Check the ground situation in the workplace and finalize the safest operation method. It is forbidden to operate in the place with collapses or falling stones.
- If there are water pipes, gas pipes or high voltage electrical wires buried under the workplace, please contact the related companies and mark their positions, note: do not break or damage any pipe and wire.
- It is forbidden for any unauthorized person to enter the working area, some necessary warning measures should be taken.
- Before moving or operating in the shallow water or on the soft ground, check the types and situation of the sill and the depth and the flow rate of the water.

6.2 Lubrication of machine

6.2.1 General precautions

⚠WARNING!

Beware of risks and hazards of machine maintenance

- **Prior and during maintenance, respect the rules and take all precautions in order to prevent hazards for operator himself, co-workers and bystanders that may lead to serious injuries and even to death casualties.**
- **Before any maintenance, read carefully the related content in this instruction manual.**
- **The operator of the MEWP need to carry out the maintenance according to the area or local regulations!**
- **For extensive maintenance or/and repair involve trained and qualified service personnel!**
- **Ensure good ventilation condition if diesel engines is operated indoors**
- **Be careful! Not respecting the basic rules presented hereafter for this Section 5−serious injuries or deaths and/or significant property damage may result!**

NOTICE!

Provide regular lubrication!

- **Regular maintenance is the essential for the expected machine safety!**
- **Regular maintenance keeps your machine functioning and safe!**
- **Use recommended quality lubricants.**
- **Do not mix oil quality from different manufacturers. Select only the oil suppliers which oil qualities always meet or exceed the required standards**
- **Excessive lubricant or grease may lead to overheating and even speed up the abrasion.**
- **Use special lubricant when working in specially high/low temperature regions. Use good judgment in selecting lubricant types that are appropriate for climate conditions. Contact MEWP dealer, agent or XCMG after-sales department.**
- **Not respecting the maintenance schedules and steps presented hereafter−can reduce the machine lifetime and may lead to machine damage!**

⚠ *Correct procedures of* maintenance *and check*

- **In order to maintain and repair the machine correctly, follow the correct** maintenance **and check procedures described in this instruction manual.** .

- For diesel engine refer to **instruction manual instruction manual of diesel engine** included in the documents along with the MEWP (besides this instruction manual).

⚠ **Make and save the record of the** maintenance **or repair of this machine!**

- Maintain and ensure Aerial Work Platform normal function.
- Keep the machine clean in order tspot failure such as leakage, looseness of screw or connection.
- Pay attention tthe environmental protection!
- Dnot spill the oil and other fluids tpollute the environment.
- Dispose the waste according tthe local laws and regulations.

⚠ *The content of this chapter includes items related regular check,* maintenance *and repair*

⚠ **Extensive** maintenance **or repair is subject of separate instruction for maintenance or repair**

⚠ *Regular daily checks*

- Check the levels of coolant, fuel and hydraulic oil.
- Check the hoses and pipes for leaks, twists, wears or damages.
- Check the controller and instruments.
- Make a patrol inspection of common conditions, noises or heat around the machine.
- Check the part for looseness or missing.
- If anything is wrong with the machine, repair it before the operation, or contact with your assigned XCMG dealer.

⚠ *Check the hour meter frequently*

- Determine the time of machine check and maintenance according to the operating hours shown by the engine working hour meter.
- The intervals shown in List of Maintenance Periods are determined as per the normal operation and maintain the machine in shorter interval in case of running the machine under the bad conditions.
- Make a periodic check and adjustment of lubrication or maintenance as per the readings of periodic maintenance meter on the inner side of tool-box cover.
- When the hours of hourmeter reach the replacement time of recommended lubricant and filter element, or during the periodic check every day or every month, replace the lubricant and filter element.

Important:

- Always use oil products, grease and anti-freeze fluid recommended in this instruction manual! Otherwise the machine can be damaged and the warranty of this machine will be lost.
- Ask your XCMG dealer or manufacturer for approval if some products are not available.

6.2.2 New machine

Table 6-1 New machine used and refilled with the following lubricants.

Item	Specification
Engine oil (API CJ4/CK4)	SAE 15W/40
Hydraulic oil	ISO AE 46
Fuel	ASTM D975 No.2
Grease	NLGI No.2
Coolant	FD-28 (distilled water)
Gear oil	L-CKD220

Legend:

SAE: Society of Automotive Engineers
API: American Petroleum Institute
ISO: International Organization for Standardization
NLGI: National Lubricating Grease Institute
ASTM: American Society of Testing and Material

* Engine oil must meet **API CH4/CI4**
*** Hydraulic oil change interval is 2,000 hours, only when XCMG Genuine Oil is used. If other brand of oil is used, guaranteed change interval is 1,000 hours.
**** Diesel fuel must be ultra low sulphur diesel. Sulfur content ≤15 ppm.

6.2.3 Recommended oils

Table 6-2 Use listed below or equivalent only. Do not mix different brand oils.

Service point	Kind of fluid	Capacity /(imperial gal)	Ambient temperature ℃ / ℉
			-50 -30 -20 -10 0 10 20 30 40 -58 -22 -4 14 32 50 68 86 104
Engine oil	* Engine oil	7 (1.6)	SAE 5W-40 NLGI 10W-30 SAE 15W-40
Travel reducer	Gear oil	2. 5×2 (0. 6×2)	SAE 90 L-CKD220
Hydrauli c oil tank	*** Hydraulic oil	Tank: 129 (34) System: 80/(21)	ISO VG 32 ISO VG 46 ISO VG 68
Fuel tank	**** Diesel fuel	40 (180/(47)	-10# 0#
Grease fitting	Greas e	As required	NLGI No.1 NLGI No.2
Cooling system	Coola nt	15 (3.5)	Add antifreeze (50% antifreeze-50% distilled water)

6.2.4 Oil and grease qualities

Table 6-3 Oil and grease-qualities and quantities

Lubricant varieties	Brand/name	Used for	Capacity (Lit.)	Remark
Grease	Mobilux grease EP2 NLGI 2	Pin shaft of equipment	0.3	-20～ 40℃
		Slewing bearing raceway	11	

Table 6-3 Oil and grease-qualities and quantities(continued)

		Slewing bearing gear	2×0.11	
Engine oil	CF 15W/40 oil	Diesel engine	7	-10℃
	CF 10W/30 oil	Diesel engine	7	-20~-10℃
	CF 5W/40 oil	Diesel engine	7	-30～-20℃
	L-CKD220	Travel reducer	2×2.5	
		Slewing reducer	1	

6.2.5 Critical lubrication points

Table 6-4 Lubrication points

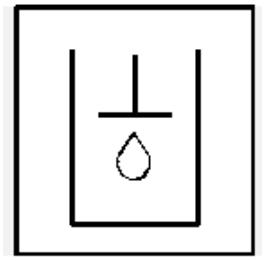
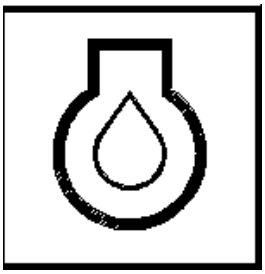
Symbol	Description	Specification	Purpose
	Lubricating grease	Mobilux grease EP2 NLGI 2	For slewing bearing raceway and slewing bearing
	Hydraulic oil	Comply with DIN51524 as min. requirement	Typical ambient operation temperature -10℃～+40℃
	Engine oil	In summer: 15 W/40 In winter: 15 W/30 or APICH4/CI4 (Lubrication oil for heavy duty Water-cooled diesel engine)	Typical ambient operation temperature 30℃～+40℃

Table 6-4 Lubrication points(continued)

Symbol	Description	Specification	Purpose
	Fuel	Sulfur free diesel according to EN 590	
		0 # diesel oil	＞0℃
		-10 # diesel oil	＜0℃
	Coolant antifreeze	FD-2B	Ambient temperature ＞ -36℃

6.2.6 Overview of the periods for regular maintenance

Overview of the minimum required maintenances shown in hereafter

1. Daily maintenance: Maintenance of MEWP before and after work everyday.
2. First 50-hour maintenance: Maintenance of MEWP after initial operation for 50 hours.
3. Maintenance every 50 hours: Maintenance of MEWP after 50 hours operation.
4. Maintenance every 250 hours: Maintenance of MEWP after 250 hours operation.
5. Maintenance every 500 hours: Maintenance of MEWP after 500 hours operation.
6. Maintenance every 1000 hours: Maintenance of MEWP after 1000 hours operation.

Overview:

Check frame, boom and slewing bearing connection every 1000 hours and at least once a year. The checking works shall be fulfilled by our trained professionals. Check content: Check conditions of all welds and hinge points of frame and boom; Check slewing bearing connection for looseness and derricking cylinder for oil leakage.

Table 6-5 Scheduled service intervals

Maintenance Items	Regular Service Interval					
	Daily	First week	Weekly	Monthly	Semi-annual	Annual
	8h	First 50 h	50 h	250 h	500 h	1000 h
Visual Inspection	●					

Table 6-5 Scheduled service intervals(continued)

Maintenance Items	Regular Service Interval					
	Daily	First week	Weekly	Monthly	Semi-annual	Annual
	8h	First 50 h	50 h	250 h	500 h	1000 h
Check and drain water separator	●					
Check coolant level	●					
Check engine oil level	●					
Check fuel level	●					
Check/clean engines air filter	●					
Check auxiliary platform locking mechanism (if equipped)	●					
Check platform swing mechanism	●					
Check steel wire rope	●					
Check battery charger	●					
Replace engine oil		●				
Replace engine lubrication oil filter		●				
Replace fuel filter		●				
Replace the fuel prefilter		●				
Replace hydraulic oil filter		●				

Table 6-5 Scheduled service intervals(continued)

Maintenance Items	Regular Service Interval					
	Daily	First week	Weekly	Monthly	Semi-annual	Annual
	8h	First 50 h	50 h	250 h	500 h	1000 h
Check the bolt pre-tightening force of slewing bearing, tighten if necessary		●				
Clean the inside of the reducer and brake, and replace the oil		●				
Perform E-stop test on platform			●			
Check for loose parts, bolts, etc. tighten if necessary			●			
Check the safety belt anchoring point			●			
Lubrication of the slewing bearing			●			
Parking brake test				●		
Check battery				●		
Replace engine oil				●		
Replace engine oil filter				●		
Check engine V-belts				●		
Check engine air-inlet pipes				●		

Table 6-5 Scheduled service intervals(continued)

Maintenance Items	Regular Service Interval					
	Daily	First week	Weekly	Monthly	Semi-annual	Annual
	8h	First 50 h	50 h	250 h	500 h	1000 h
Check and clean radiator				●		
Check and replace damping elements as required					●	
Replace fuel filter cartridge					●	
Check fuel tank, clean if required					●	
Replace V-belt					●	
Replace hydraulic filter cartridges					●	
Check the bolt pre-tightening force of slewing bearing, tighten if necessary					●	
Check engine valves clearance						●
Check engine installation						●
Change hydraulic oil filter						●

6.3 Maintenance schedules

6.3.1 Lubrication schedule and lubrication progress label

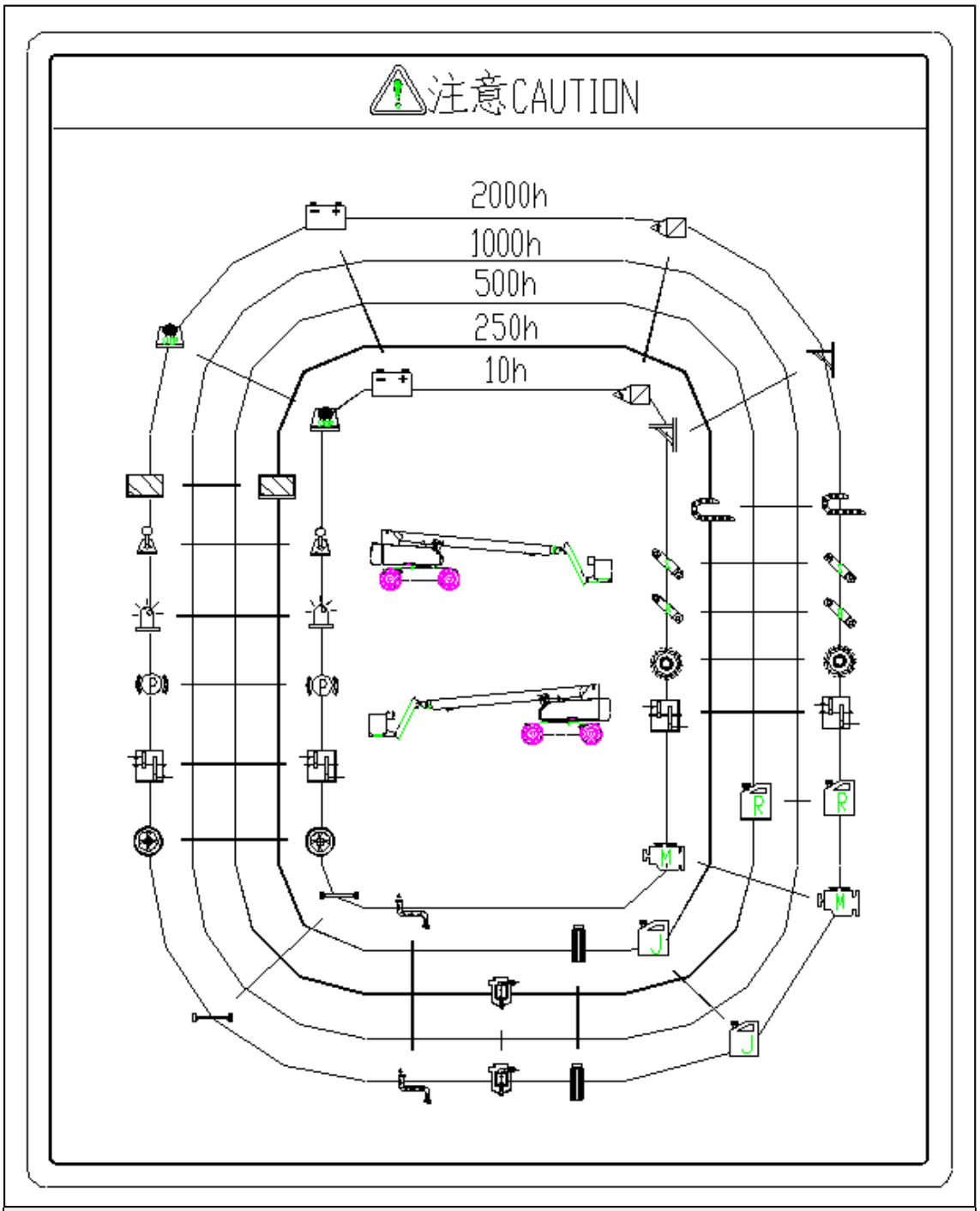


Figure 6-1 Maintenance chart decal on the machine

NOTICE!

Regular maintenance intervals or engine lubrication oil shall be performed/renewed every 12 months, even in case operating hours interval have not been achieved.

6.3.2 Operator maintenance checklist

Table 6-6 Check items

⚠Check items		Service	Maintenance intervals
Walk-around inspection		check	Daily
Hydraulic oil level		check, add	Daily
Control panel and indicator lights		check, add	Daily
Hydraulic hoses and pipes	Leak or crack	check, clean and tighten	Daily
	Crack or bend, etc.	Check, replace	250 h
Fuel level		check, refill	Daily
Engine oil level		check, add	Daily
Water separator		check, clean	Daily
Fuel tank		drain	Daily
Fuel hoses and air intake hoses	Leak or crack	check, clean, and tighten	Daily
	Crack or bend, etc.	Check, replace	250 h
Coolant level		Check, add	Daily
Coolant radiator and oil cooler core or intercooler		Check, clean	200 h
Front mesh enclosure of oil cooler(if equipped)		check, add	500 h
		check, clean	500 h
Fan belt tension and damage		check, adjust	Daily
Air cleaner(outer, inter)		check, clean	250 h
Cylinder head bolt		check, tighten	Daily
Electrical equipment		check	Daily
Battery		check	50 h
Lubricate the front-end attachments	Slewing bearing raceway	Check, grease	100 h
	Slewing bearing	grease	250 h

Table 6-6 Check items(continued)

⚠Check items		Service	Maintenance intervals
	Running mechanism and slewing mechanism	Check, grease	500 h
steel wire rope		Check, setting	Daily

6.4 Specific maintenance instructions

6.4.1 Hydraulic system

6.4.1.1 Checking hydraulic oil level and temperature in tank

Figure 6-2 Indicator for hydraulic level and temperature inside the *hydraulic tank*

6.4.1.2 Hydraulic oil filling requirement

The machine is ex-works filled with AE46 mineral oil.

Always comply with maintenance requirements on hydraulic oil accurately to avoid machine damages.

- Only use clean oil for refill to avoid contamination of the hydraulic tank.

⚠CAUTION!

- **Low viscosity of hydraulic oil is not revommended!**
- **Use of hydraulic oil with too high viscosity may delay application or release of parking brake.**

NOTICE!

- **Use of other than recommended mineral oils is prohibited.**
- **Use of biological hydraulic oils is prohibited.**

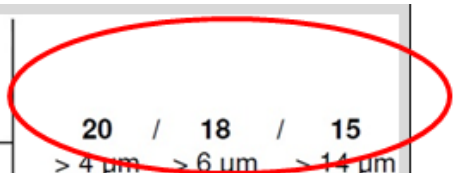
NOTICE!

- **Use of other than recommended mineral oils is prohibited.**
- **Use of biological hydraulic oils is prohibited.**
- **Contamination of hydraulic oil voids warranty.**
- **Using hydraulic oil with too low viscosity may cause overheating due to increased leakage or cavitation. This will reduce viscosity further and lead to extreme losses and finally will lead to the loss of oils lubrication properties.**
- **The hydraulic oil grade is 20/18/15 when leaving the factory. Filter or replace the hydraulic oil if it is subpar. Refer to table 6-7 for hydraulic oil cleanliness classes.**

Table 6-7 Hydraulic-Oil *Cleanliness Classes*

Hydraulic-Oil *Cleanliness Classes (ISO 4406)*

Particles per 100ml		Scale
Greater than	Less than or equal to	
8,000,000	16,000,000	24
4,000,000	8,000,000	23
2,000,000	4,000,000	22
1,000,000	2,000,000	21
500,000	1,000,000	20
250,000	500,000	19
130,000	250,000	18
64000	130,000	17
32000	64000	16
16000	32000	15
8000	16000	14
4000	8000	13
2000	4000	12
1000	2000	11
500	1000	10
250	500	9
130	250	8
64	130	7
32	64	6



Hydraulic-oil viscosity vs temperature charts

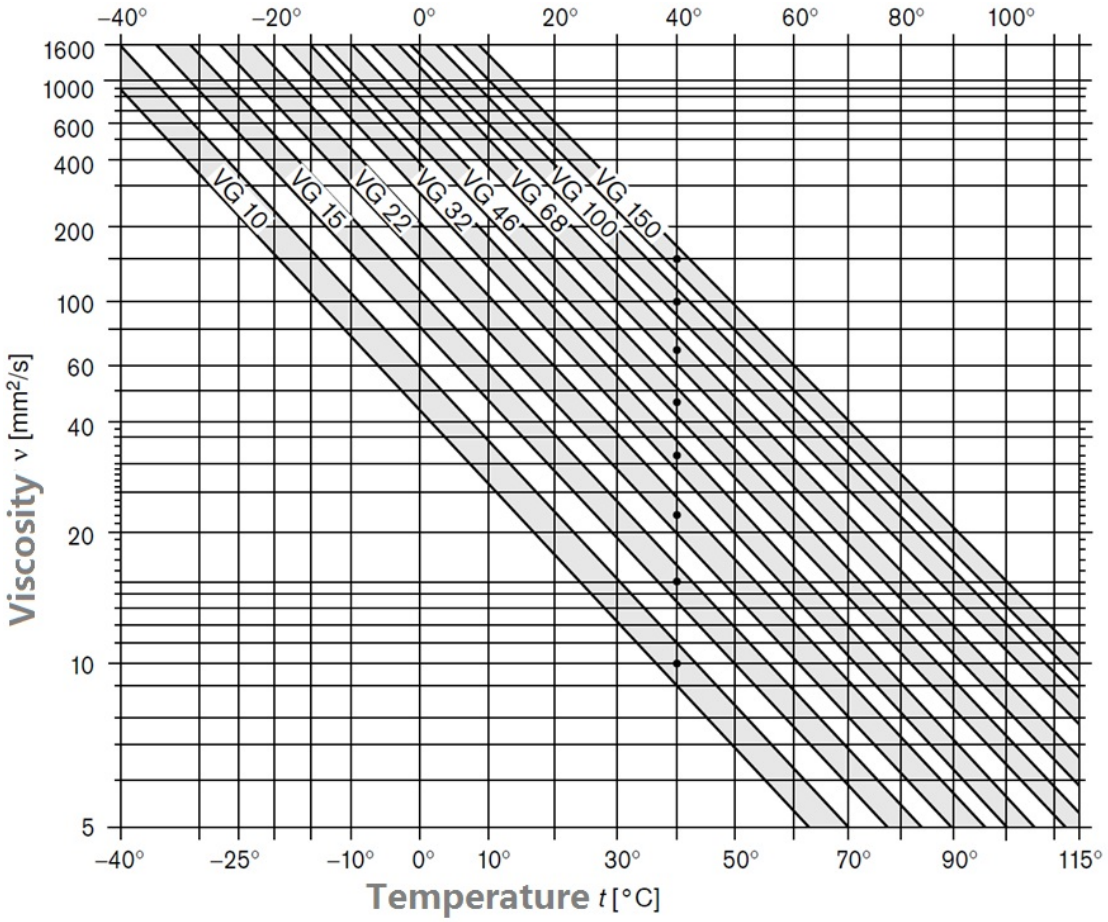


Figure 6-3 Hydraulic-oil viscosity vs temperature charts

6.4.1.3 Refilling the hydraulic oil tank

Figure 6-4 Hydraulic oil filler

Refilling the hydraulic oil tank

1. Switch off engine and remove ignition key.
2. Enable hydraulic oil to cool down if necessary.
3. Open the air filter cover on the upper plane of oil tank.
4. Remove the gasket of oil filter.
5. Replace the oil filter element.
6. Fill the hydraulic of the same grade through the air filter strainer.
7. Reinstall the oil filter component.

The hydraulic tank is located at the machine’s front left side, below the guard board.

- Do not fill above the maximum indication line.
- Use only approved hydraulic oils .
- Make sure the draining port does not leak.

NOTICE!

- **Fill hydraulic oil through a special filter. Do not fill the new oil into hydraulic tank directly.**
- **When replacing hydraulic oil, it is recommanded to replace hydraulic oil filter and air filter at the same time.**
- **When exchanging the hydraulic oil, drain the old hydraulic oil in tank and system totally and then fill the new hydraulic oil.**

- After a few minutes of deaeration, run the engine at low idle speed for a few minutes and confirm that the oil level in the tank is within limits.

6.4.1.4 Draining the hydraulic oil tank

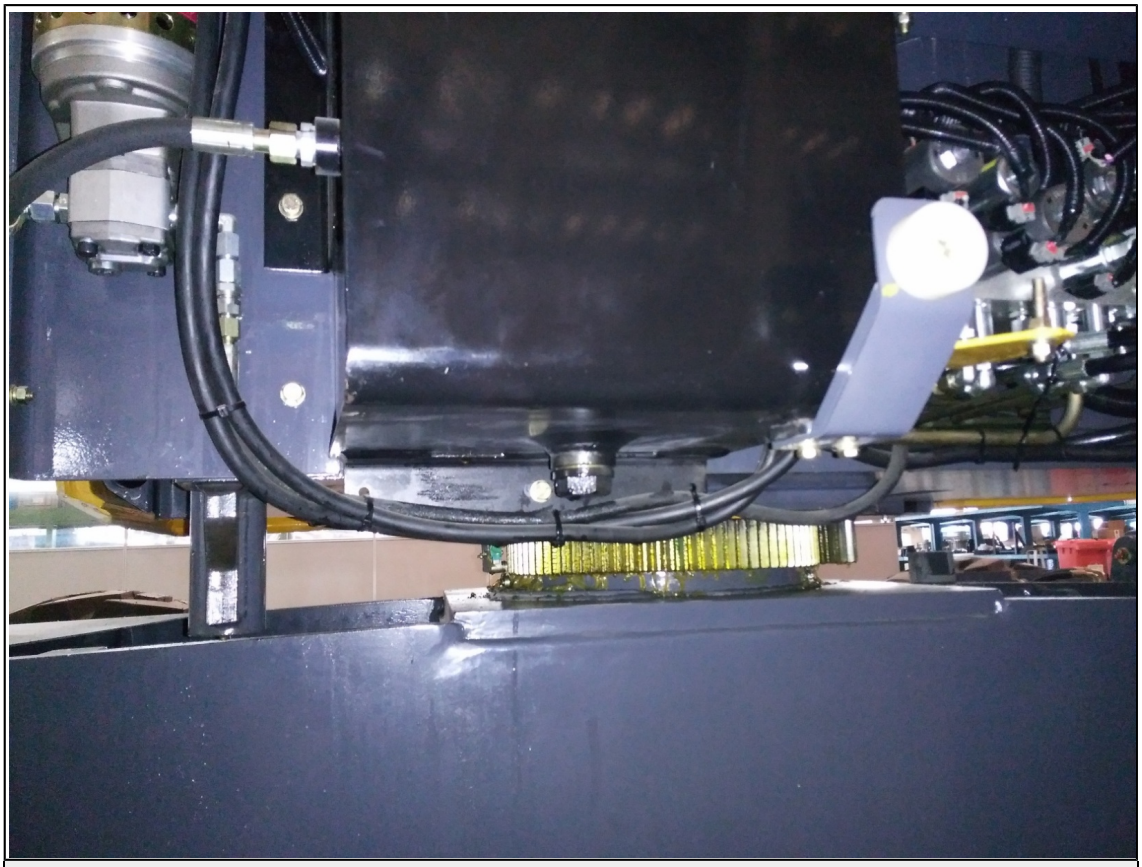


Figure 6-5 Drain valve of hydraulic tank

For draining the hydraulic oil tank proceed as follows:

1. Lift the boom to the maximum working height and switch the engine
2. Open the engine hood and let the engine cool down completely.
3. Disassemble all hoses from the oil tank and drain the hydraulic oil in hoses as soon as possible.
4. Put a container under the drain valve
5. Open the drain valve and drain the hydraulic oil
6. Cut off the return oil way into the oil tank and connect to a container.
7. Start engine and operate boom and outrigger (if equipped) to travelling state.
8. Clean and replace the oil return pipe of oil tank.
9. Connect the oil return pipe and check oil level and replenish as required. Restart engine and operate boom and outrigger to travelling state.

NOTICE!

- **Let hydraulic oil cool down before maintenance Recuperate and dispose of all the drained hydraulic oil according to local recycling regulations in your area.**
- **Mark all hoses and joints for reinstallation.**
- **Clean all opening with clean cloth as deep as possible. Remember to clean hidden holes.**
- **Fill oil into oil tank through oil filter.**

6.4.1.5 Hydraulic hoses

⚠CAUTION!

- **Maintenance of hydraulic lines shall only be carried out by qualified personnel..**
- **Always follow your local rules and regulations regarding permitted hose service life.**

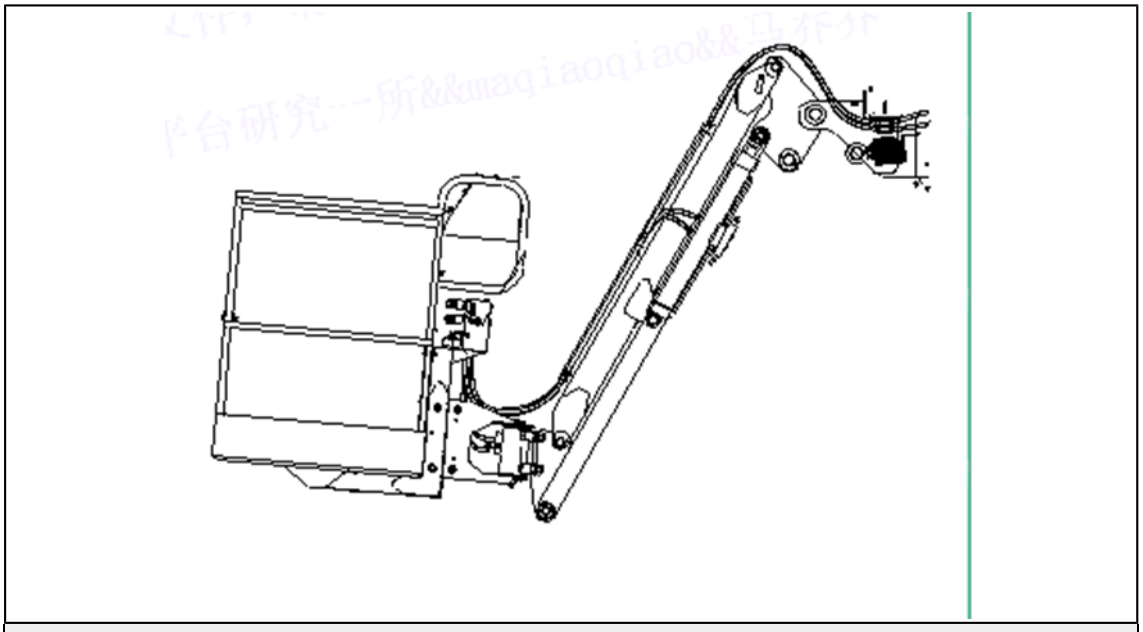


Figure 6-6 Hydraulic hoses at the platform

DANGER!

- **Severe gangrene or death due to high pressured oil!**
- **Damaged hydraulic lines will cause high-pressurized oil squirt, penetrating the skin up to the inner tissue layer.**
- **In case of occurrence, call an ambulance immediately.**
- **Risk of fire!**
- **Make sure to prevent all leakage of high-pressured oil into the atmosphere..**

- Inspect all lines, pipes, hoses and connections regularly on leakage and any visible damage.
  - Damaged parts must be replaced immediately.
  - Operating machine with potentially damaged hydraulic lines is prohibited.

Figure 6-7 Hose Identification

Production date of hose assemblies is stamped on the Hose – DD/MM/YY.

1. Regardless of the wear extent, the hose should be replaced in 6 years after production (i.e. DIN 20066:2018-03, DGUV rule 113-020).
2. Production date of the hoses are stamped on the hose.
3. Use of hoses stored longer than 2 years may be prohibited in your area.

6.4.1.6 Replacing the hydraulic oil filter

Figure 6-8 Hydraulic oil filters

For replacing the hydraulic oil filters proceed as follows:

1. Switch off engine, open engine hood and enable engine and hydraulic oil to cool down if necessary.
2. Clean the exposed section of oil filter housing with diesel or other cleaning agents.
3. Place a container under the oil filter to recycle the oil from oil filter housing.
4. Unscrew hydraulic filter end cap and self-close valve of filter will close automatically to cut off the oil-way of oil tank and the oil will not flow out from oil tank, which is easy for cleaning.
5. When unscrew or screw the end cap of oil filter, only insert a wrench into the slot in the middle of the oil filter end cover and pull, as shown in **Figure 6-9**.

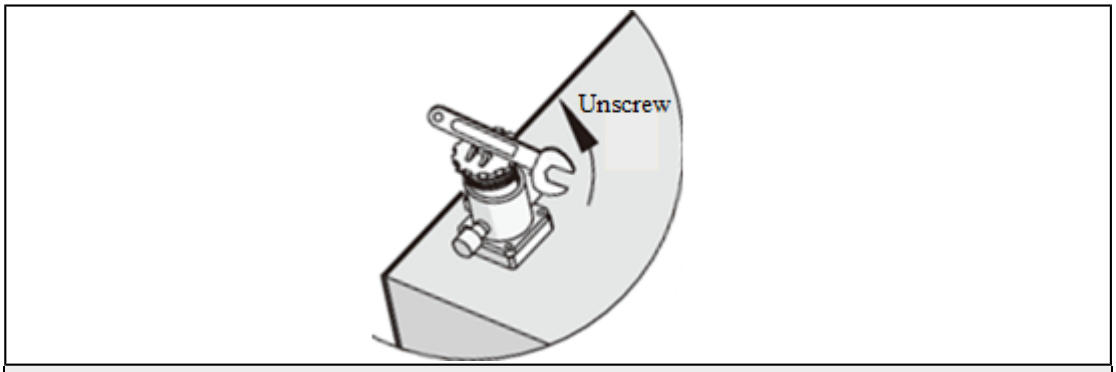


Figure 6-9 Unscrew the hydraulic filter end cap

6. Pull the filter element out and dispose properly.

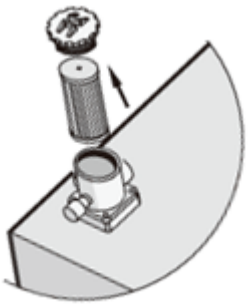


Figure 6-10 Pull out the filter element

7. The filter element of the oil suction filter of this product is a paper structure and cannot be cleaned or repaired. If the filter element is broken or clogged by dirt (the reading of vacuum guage is higher than 0.018 MPa), only replace with new filter. The filter element shall be only replaced with the spare parts supplied by our company.
8. Install the new filter element into the filter housing and then the filter end cap and tighten it.

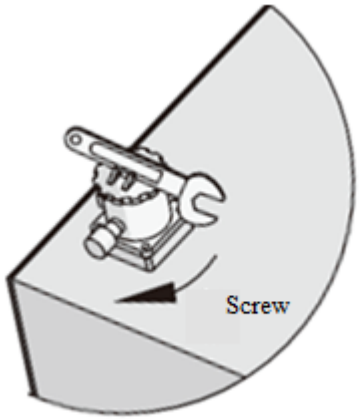


Figure 6-11 Screw hydraulic filter end cap

The steps to replace the oil filter elements are same as above. After removal, replace the whole filter.

6.4.2 Wire rope inspection

6.4.2.1 Inspection of wire rope

The steel wire rope shall not be reused in case of any following situation:

1. Deformation or corrosion
2. Twisting
3. More than 10% of metal wires are broken on any layer of rope
4. The diameter of any part is reduced by 7% or more in comparison with the rated diameter
5. Heat damage

6.4.2.2 Adjustment of **wire rope**

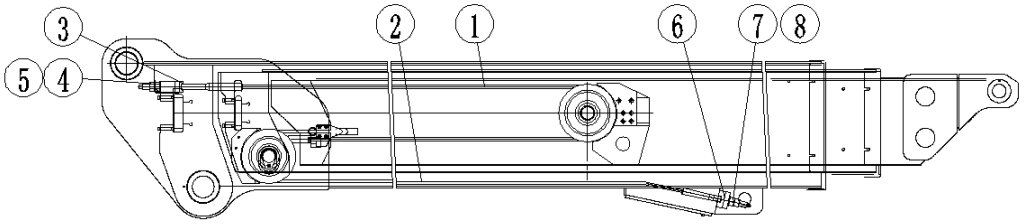


Figure 6-12 Assembly diagram of telescopic system

No.	Name	No.	Name
1	Extension rope	5	Locknut
2	Retraction rope	6	Retraction rope counter counterbalance

No.	Name	No.	Name
3	Extension rope counterbalance	7	Adjustable nut
4	Adjustable nut	8	Locknut

Inspection method:

1. Luff the telescope arm to horizontal, extend and retract the boom, check if 2nd and 3rd section boom simultaneously start moving accordingly. Adjust the tightness degree of wire rope if the movement of 3rd section boom lags behind 2nd section boom.
2. Luff the telescope boom to horizontal, extend and retract the boom, check the boom during the extension and retraction, if 3rd section boom shakes or the wire rope beats the boom (with “creak, creak, creak” sound at the beginning of movement), adjust the tightness degree of wire rope;
3. Check No. 3 and 6 counterbalances in above figure, if the counterbalance inclines to one side, adjust the tightness degree of wire rope.

The detailed adjustment steps are as follows:

1. Luff the boom to horizontal, loosen No. 5 and 8 locknuts.
2. Extend the boom outward, respectively adjust No. 7 adjustable nut at both left and right sides, tension the retraction rope. Pay attention that No. 6 counterbalance shall be parallel to the end surface of boom during the process.
3. Retract the boom inward, respectively adjust No. 4 adjustable nuts at both left and right sides, tension the extension rope. Pay attention that No. 3 counterbalance shall be parallel to the end surface of boom during the process.
4. According to the demand, repeat Step 2 and 3, check the boom movement according to the above-mentioned inspection methods, confirm that the rope is properly adjusted, tighten and lock No. 5 and 8 locknuts. The adjustment of wire rope is completed.

6.4.3 Work platform

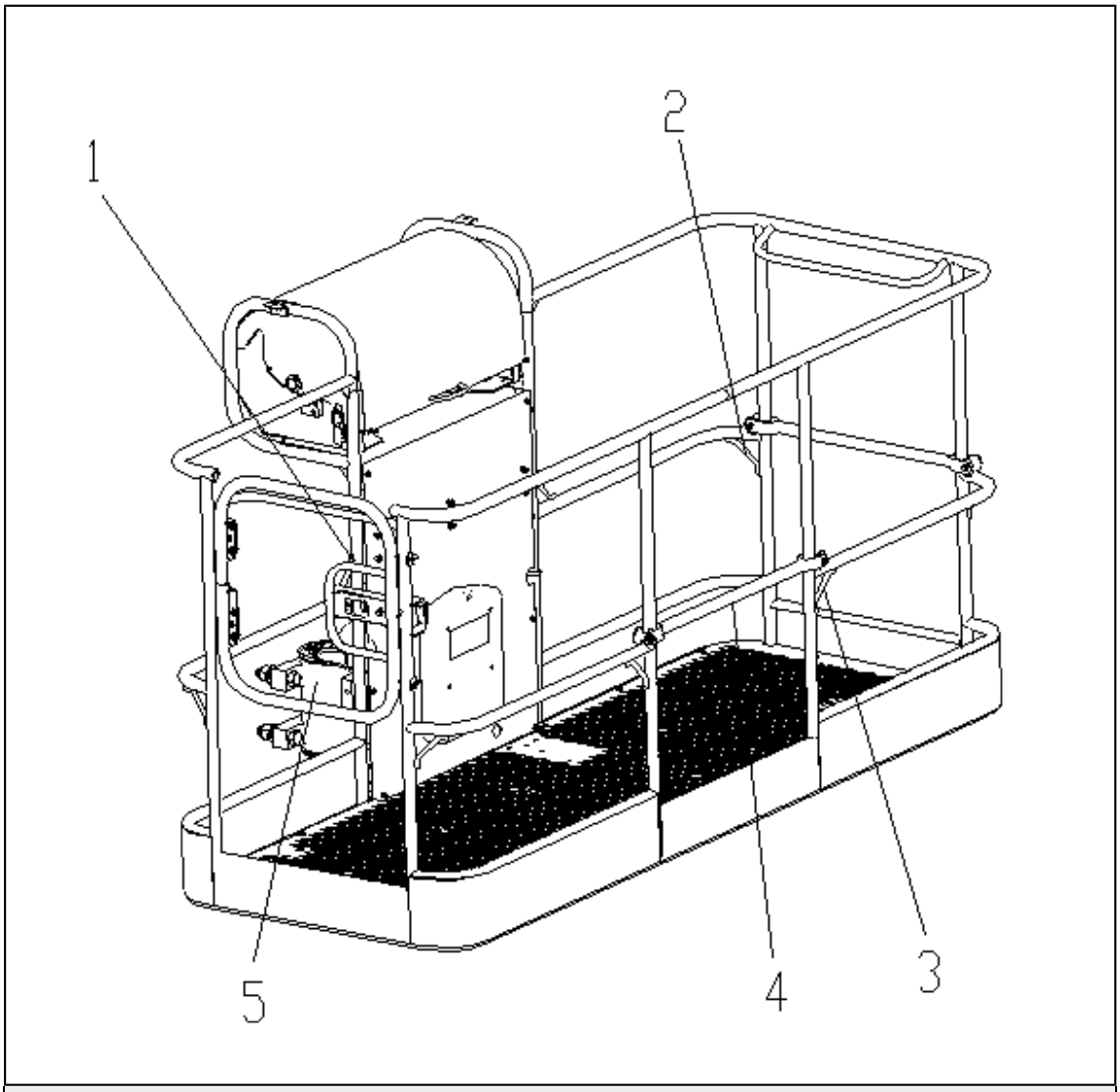


Figure 6-13 Work Platform

No.	Name	No.	Name
1	Safety belt fixing point 1	4	Movable fence
2	Safety belt fixing point 2	5	Work platform swing cylinder
3	Safety belt fixing point 3		

During the vehicle use, the work platform shall be regularly checked and maintained:

- Check whether the slewing cylinder of work platform has oil leakage, and whether the rotation action is flexible and stable.
- Check whether the fixation point of the safety belt is damaged.
- Check whether the moveable guardrail is damaged and check wear conditions of the pulley.

- Check whether the installation state, detection function and precision of the weighing sensor are normal.

6.4.4 Slewing mechanism

6.4.4.1 Slewing motor

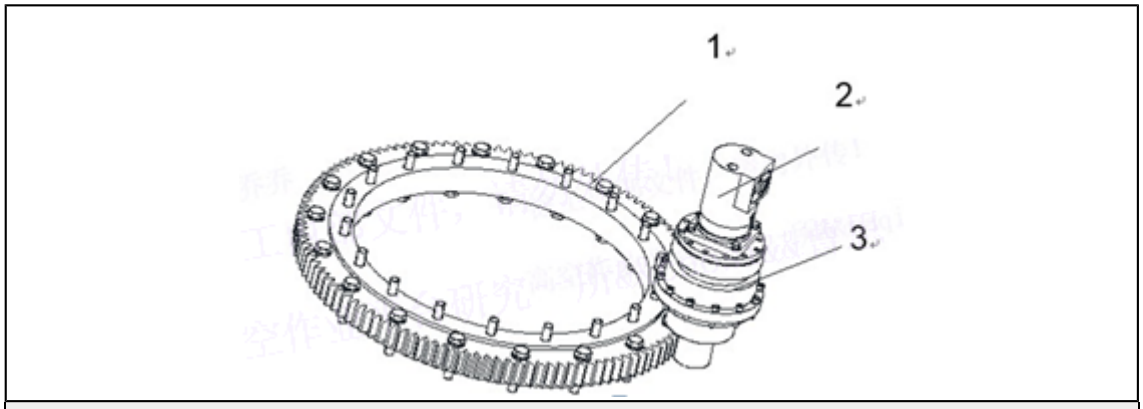


Figure 6-14 Compositions of slewing mechanism

No.	Name	No.	Name
1	Slewing bearing	3	Slewing reducer
2	Slewing motor		

The slewing motor is a kind of gerotor motor, which is the actuator component of the system.

1. Replacement

Repair and removal method of the slewing motor:

1) Remove the connecting hydraulic hose of the motor; Make marks and properly seal it, and block the motor oil port.

⚠CAUTION!

When removing the oil pipe, the connector shall be removed and loosened slowly to prevent personal injury by high pressure hydraulic oil squirt.

2) Remove the connecting bolt between the motor and reducer, and remove the motor.

⚠CAUTION!

- **The user is not recommended to remove the hydraulic motor without permission. If the hydraulic motor has problems, please directly contact the nearest XCMG agency.**
- **Please be sure to remember the position of the interfaces and spare parts during removal.**
- **It is forbidden to remove the hydraulic motor with hard tools (hammer, etc.) or by forcible knocking.**
- **The spare parts to be installed in the motor shall be cleaned before installation, and no impurities can be brought into the motor.**
- **When removing the oil pipe, the connector shall be removed and loosened slowly to prevent personal injury by high pressure hydraulic oil squirt.**

6.4.4.2 Slewing reducer

1. Inspection and maintenance

1) After initial 50 h operation time (including the intermittent operation), please clean the inside of the reducer and brake with the cleaning solution, and change the oil. Subsequently, after every (2000 ~ 2500) h operation time, please change the oil, or change the oil once every year at least.

⚠CAUTION!

- **Check whether there are metal chips in the reducer and brake.**
- **It is recommended to change the oil when the oil has not been cooled down, so as to facilitate oil drainage.**
- **Don’t use mixed oil. When removing the oil pipe, the connector shall be removed and loosened slowly to prevent personal injury by high pressure hydraulic oil injection.**

2) The slewing reducer is equipped with the multi-disc wet brake, and the brake is in a normally closed state. When pressure oil enters the brake, the brake will be started and the mechanism can freely slip. When the parts of the brake have one of the following conditions, the parts shall be replaced or the brake shall be rejected:

①When the input end has oil leakage and oil seal is damaged, the brake oil seal shall be replaced.

②Insufficient brake torque: When the brake torque is reduced or the friction plate has deformation due to serious friction, the friction plate shall be replaced.

2. Gear oil change

Determine the correct position of the oil ports on the reducer and brake.

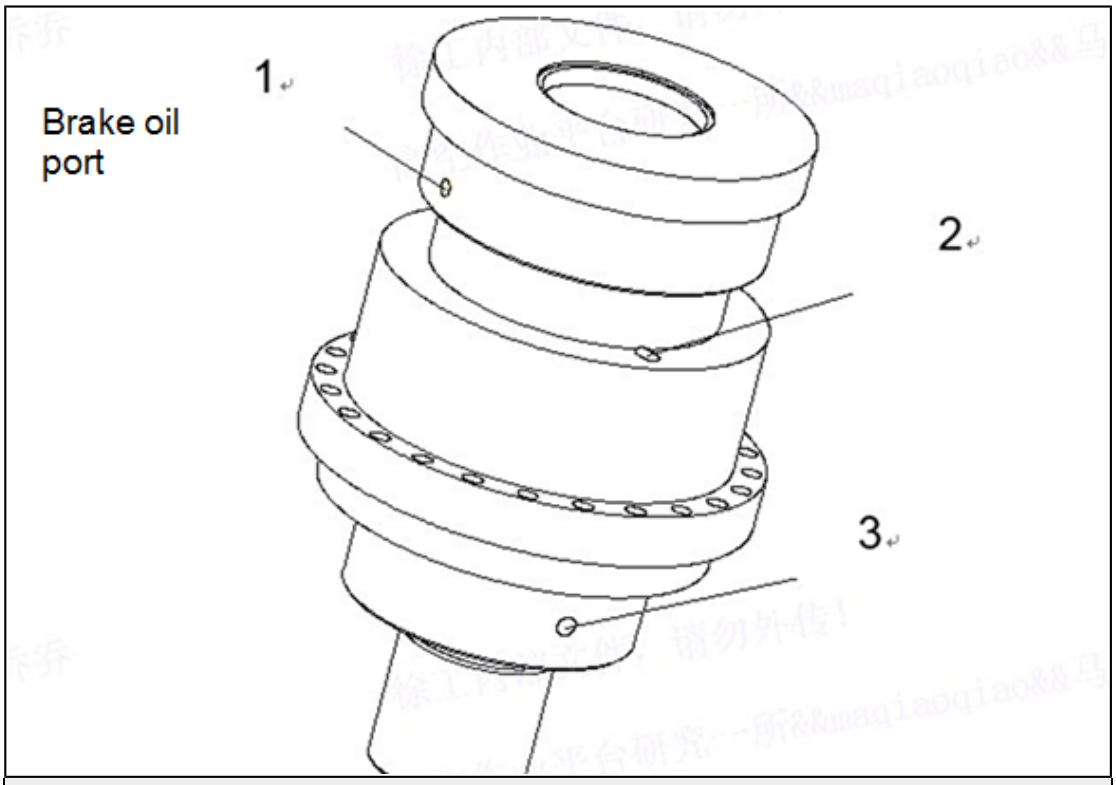


Figure 6-15 Schematic diagram of the position of the oil ports of the reducer

No.	Name	No.	Name
1	Brake oil port	3	Oil discharge port
2	Oil filling port		

Remove the oil discharge plug and oil filling plug, and drain out oil in the reducer and brake completely.

⚠CAUTION!

- **Before filling new oil, clean the inside of the slewing reducer and brake with the cleaning solution.**
- **Inject the cleaning solution into the slewing reducer and brake, and install the oil filling plug. After several minutes of high sped operation, completely drain out the cleaning solution.**

⚠WARNING!

Use of corrosive cleaning agent or improper lubrication product will change the ester characteristics and damage the slewing trajectory and relevant parts.

6.4.4.3 Slewing bearing

1. Lubrication of the slewing bearing:
   Proper lubrication is a must for the durability of track and gear. The lubrication cycle is determined according to the service condition and the environment, and one lubrication is recommended every 50 h in general case.

⚠CAUTION!

When the equipment is not used for a long time, the slewing bearing shall be lubricated. The lubrication times shall be increased in the irregular tropical climate affected by temperature as well as sandy or wet areas.

   1) Use the grease gun to fill Mobilux grease EP2 NLGI 2 to the slewing bearing raceway from the grease nozzle of the extended lubrication pipe (see the drawing volume of spare parts) of the slewing bearing, until the lubricating grease overflows from the seal and the raceway is full of grease. Lubricate the slewing bearing, and fill the lubricating grease once every 50 h work time generally.

   2) Gear lubrication. In principle, the impurities on the gear surface shall be removed once every 80 h work time, and the surface shall be coated with graphite calcium base lubricating grease. No matter whether oil spraying or brushing is applied, the lubricating grease shall completely cover the pinion and the gear surface with gear ring.

2. Inspection and maintenance

   1) After 100 h operation time of the slewing bearing, the bolt pre-tightening force shall be checked. If there is any abnormality, timely fasten the bolt. The bolt tightening torque is as shown in Table 5-2. The bolt shall be checked once after every 500 h operation time and it shall keep enough pre-tightening force. The bolt shall be replaced every 7 years or after 14000 h generally.

   2) During use, the slewing bearing shall be avoided from direct sun exposure, and it shall not be washed with water directly. No water can enter the raceway, and no harder impurities can get close to or enter the meshing area.

   3) Check the seal soundness of the slewing bearing, and the damaged one shall be timely repaired and replaced.

   4) Check the meshing work condition of the slewing gear. In order to reduce the wear of the pinion and large gear, the meshing clearance between the pinion and large gear shall be adjusted within (0.25 ~ 0.4) mm.

6.4.4.4 Gear backlash adjustment of the slewing mechanism

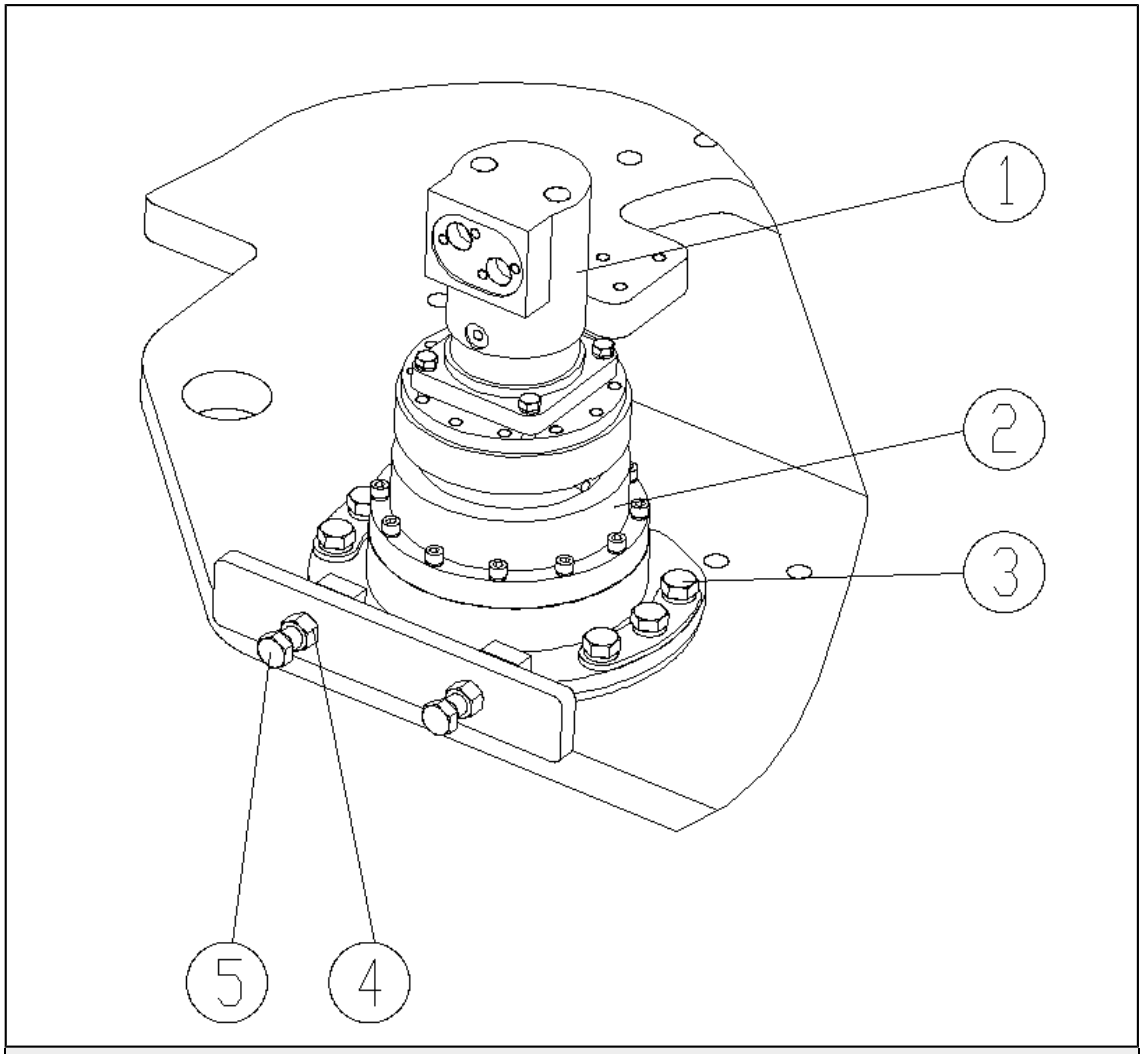


Figure 6-16 Clearance adjustment of the slewing gear

No.	Name	No.	Name	No.	Name
1	Motor	2	Reducer	3	Mounting bolt
4	Locknut	5	Adjustable bolt		

The adjustment steps are as follows:

1. Loosen the locknut (No. 4), and it is unnecessary to completely screw out the locknut;
2. Loosen the mounting bolt (No. 3), and it is unnecessary to completely screw out the mounting bolt;
3. Adjust the adjustable bolt (No. 5), and measure the backlash between the slewing gear and slewing bearing with the feeler gauge. Make adjustment and measurement repeatedly until the clearance is between (0.2 ~ 0.40) mm;
4. Screw down the mounting bolt (No. 3), with the tightening torque of (250 ~ 280) N·m;

5. Press down the adjustable bolt (No. 5), and screw down the locknut (No. 4), with the tightening torque of (250 ~ 280) N·m.

6.4.5 Running system

6.4.5.1 Wheel

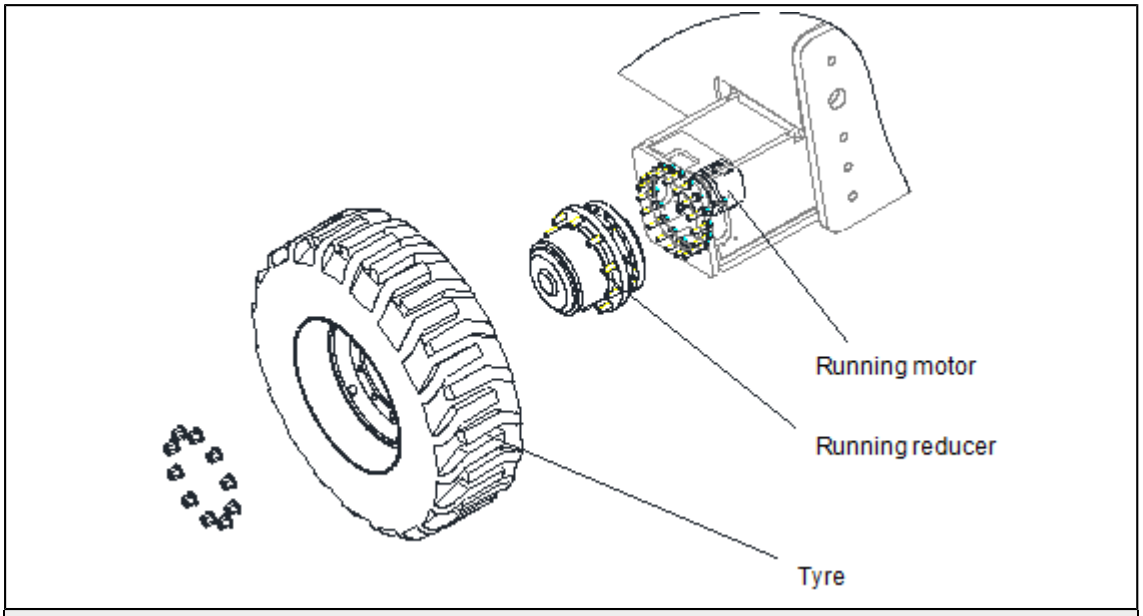


Figure 6-17 Compositions of running system

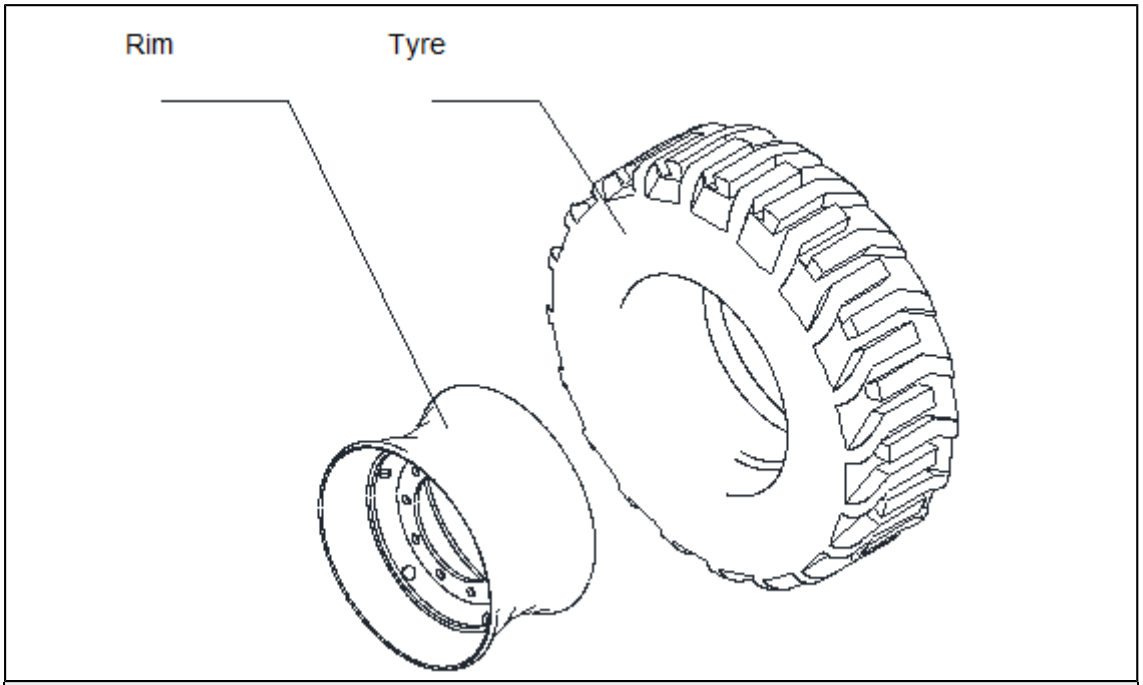


Figure 6-18 Compositions of the wheel

1. Rim checking

1) Rust conditions of the rim;

2) Rim bending and deformation conditions;

3) Whether the rim parts have cracks;

4) Conditions of the rim spigot, mounting hole, and wheel and rim bolt and nut.

5) If discovering that the rim has damaged and deformed parts by inspection, they shall be repaired or replaced immediately. In case of paint peeling off, the parts can be repainted after dust removal.

⚠CAUTION!

It is forbidden to weld and repair deformed tyre bolts at the bolt connection. If above problems occur, the old parts shall be replaced by new ones.

2. The following content of the tyre shall be regularly checked::

1) Whether the model and specification of tyres on both coaxial sides are unified.

2) The tyre crown tread depth shall not be less than 3.2 mm.

3) The tyre texture shall not be exposed due to local wear of the tyre tread.

4) The tyre tread and wall shall not have the fracture and cutting longer than 25 mm or deep enough to expose the tyre texture and other defect, abnormal wear and deformation affecting the use.

5) Whether the bolts of the tyre and half shaft are completed and tightened.

3. Tyre replacement

Pay attention to followings during the wheel replacement

1) Don’ t damage the tread on the tyre bolt.

2) The tyre nut pressure surface shall be kept clean.

3) Apply a little lubricating grease or engine oil onto the thread of the tyre bolt and nut, rim spigot and its matching surface.

4) The thread of the nuts of all the tyres is right hand thread. After the tyre is installed, screw down the nuts according to the symmetry, cross, alternate, succession sequence with suspended wheels.

5) After each tyre reinstallation, the tyre nut shall be retightened as specified once after the vehicle has been driven for 50 km.

⚠CAUTION!

- **Pay attention to followings during the tyre installation:**
- **The tyre on the same shaft shall have the same model and pattern.**
- **The retreaded tyre can’t be used.**
- **It is forbidden to weld and repair deformed tyre bolts at the bolt connection. If above problems occur, the old parts shall be replaced by new ones.**

6.4.5.2 Running reducer

1. Oil filling

The oil change of the reducer drive wheel is vital to its normal operation and service life. If the drive wheel oil is not changed as specified (the first oil change shall be made after 50 h operation time, and then the oil shall be changed every 2500 h or every 12 months subsequently), the equipment working condition will become poor, and even the parts will be damaged.

The oil filling position is as shown in the following figure. The operation steps are as follows:

1) Rotate the reducer till the “Oil level” horizontal plug is in a horizontal state, as A shown in Figure 6-16.

2) The “Oil drain” oil filling plug shall be above the “Oil level” horizontal plug.

3) Remove two plugs.

4) Fill oil to the reducer from the “Oil drain” oil filling plug till the oil quantity reaches the “Oil level” horizontal plug.

5) Reinstall the plug in the hole.

6) After several minutes’ operation, check the oil quantity. If necessary, continue filling oil.

2. Oil drain

The oil drain position is as shown in Figure 6-16. The operation steps are as follows:

1) Rotate the reducer till the “Oil level” horizontal plug is in a horizontal state, as B shown in Figure 6-16.

2) The “Oil drain” drain plug is located at the bottom.

3) For convenient oil drain, it is recommended to remove the horizontal oil plug.

4) Remove the oil drain plug for oil discharge.

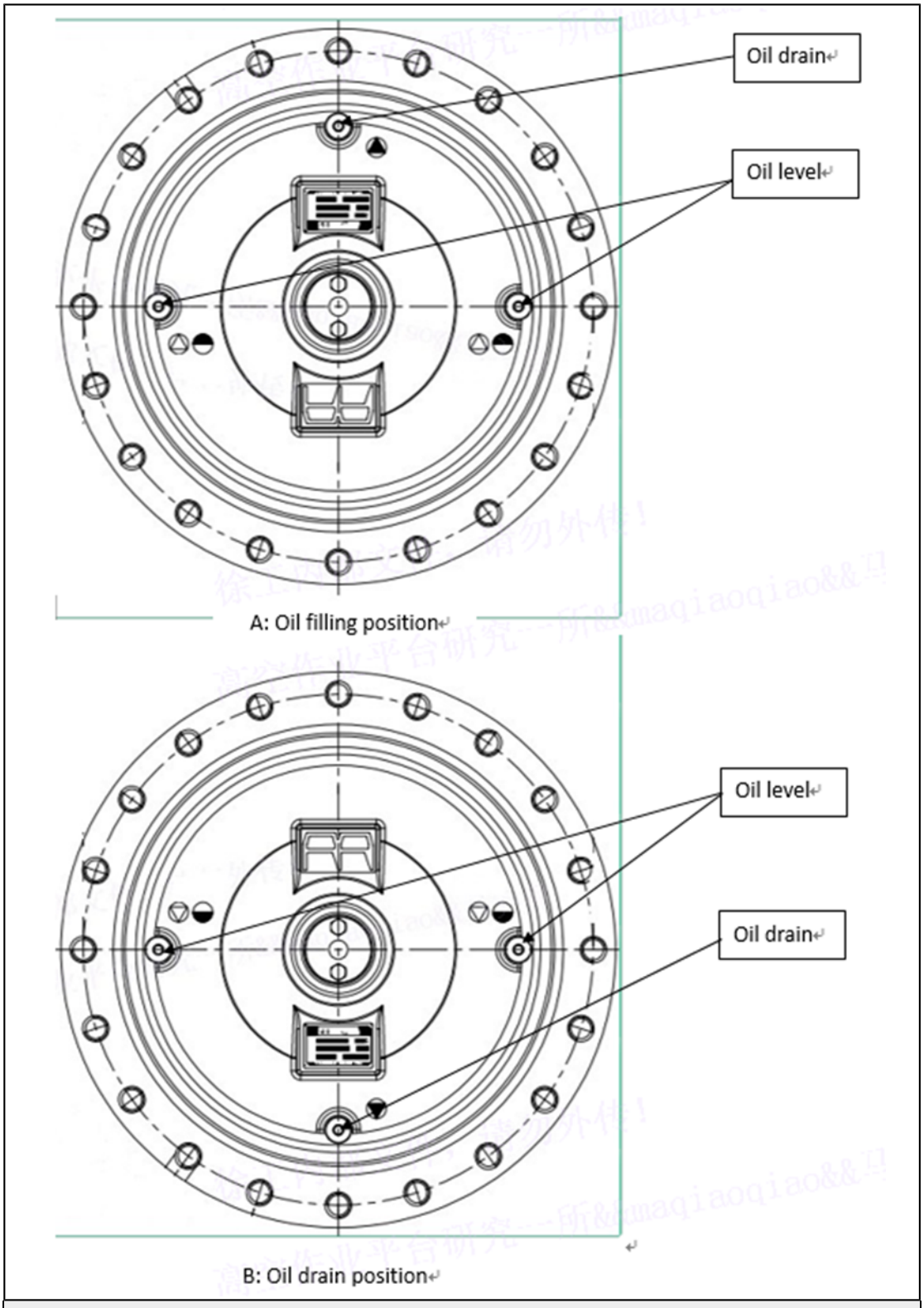


Figure 6-19 Schematic diagram of oil filling and draining of the running reducer

3. Separation

The separator of the running reducer is as shown in the schematic diagram. The separation steps are as follows:

1) When the running reducer is in “ON” state, remove the bolts with a wrench.

2) Remove the plug.

3) Flip the plug and install it to the original position.

4) Tighten bolts and now the running reducer is in “OFF” state.

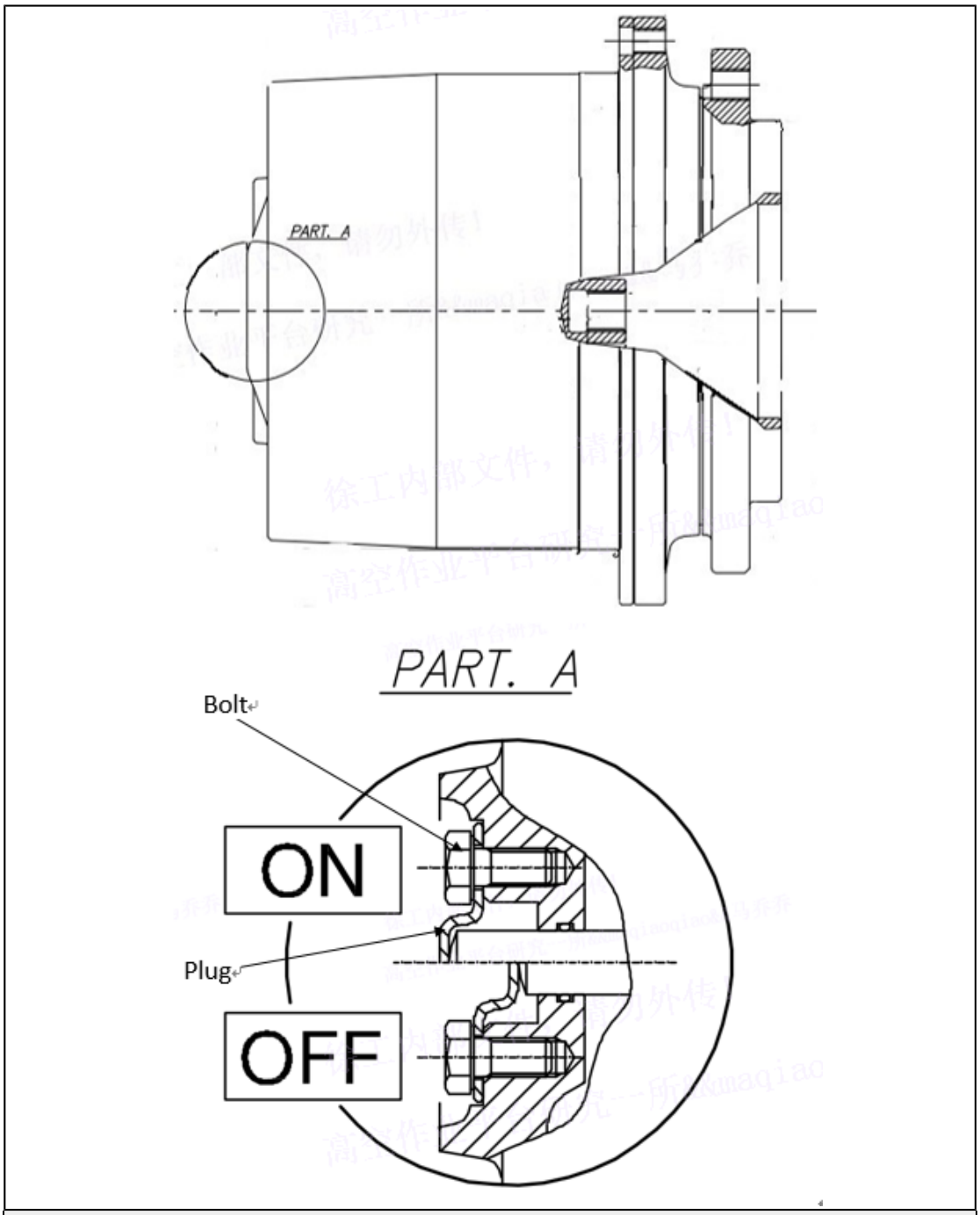


Figure 6-20 Schematic diagram of the separator of the running reducer

6.4.5.3 Travel motor

1. Remove the hydraulic hose connecting to the travel motor; make marks and properly seal it, and then block the motor oil port.
2. Loosen the connecting bolt between the travel motor and the frame, and carefully remove the travel motor.

⚠CAUTION!

During the removal of the oil pipeline, the joint shall be loosened slowly to prevent the high-pressure hydraulic oil from splash damage.

6.4.6 Checking the electric system and controls functions

6.4.6.1 Starter battery and main fuse

NOTICE!

- **The installation of improper radio communicators and accessories may corrupt the machine's electronic elements and cause it to move in an unexpected matter.**
- **The installation of improper electric devices may also cause faults or an accidental fire.**
- **During the installation of radio communicators or additional electric components or replacement of these components, be sure to consult with the assigned dealer.**
- **Don't attempt to disassemble or modify any electric or electronic component.**
- **If it's necessary to replace or modify these components, contact with the assigned dealer.**

⚠CAUTION!

- **The battery can start the fire or burst out.**
- **The gas of battery during loading can cause the explosion!**
- **Prevent the spark and flame from approaching the battery.**
- **During loading keep the battery in well ventilated room!**

NOTICE!

- **This machine adopts the maintenance-free battery, so it's unnecessary to add in the water frequently.**
- **Inspect the capacity of battery frequently to lengthen its lifetime**
  - **Keep the terminal of battery clean always to avoid the discharge of battery. Inspect the terminals for loosening or rusting, and apply the grease or vaseline to avoid the corrosion**

NOTICE!

- **Replacement of the battery**
- **If battery system malfunctions, replace the maintenance free battery with new one.**
- **Different types of batteries may charge at different speeds, which may cause one of the batteries is overloaded and malfuctions.**

6.5 Diesel engine maintenance

6.5.1 Engine lubrication

6.5.1.1 Engine lubrication oil

⚠DANGER!

- **Serious injury hazards due to rotating machine parts!**
- **Always keep a safe distance to running machine parts.**
- **Serious injury hazards due to hot surfaces (engine – hydraulic – components of the cooling system)!**
- **Serious injury hazards due to high pressures (fuel lines and cooling system)**

Engine is filled with engine oil with grade CJ-4 or CK-4 before leaving factory, which should cover most realistic climatic conditions.

NOTICE!

- **For the prescribed amount of lubrication oil, see section 6.3.2. The Engine’s lubrication oil shall be replaced every 12 months, whether a maintenance schedule date is due or not.**

6.5.1.2 Checking the engine’s lubrication oil level

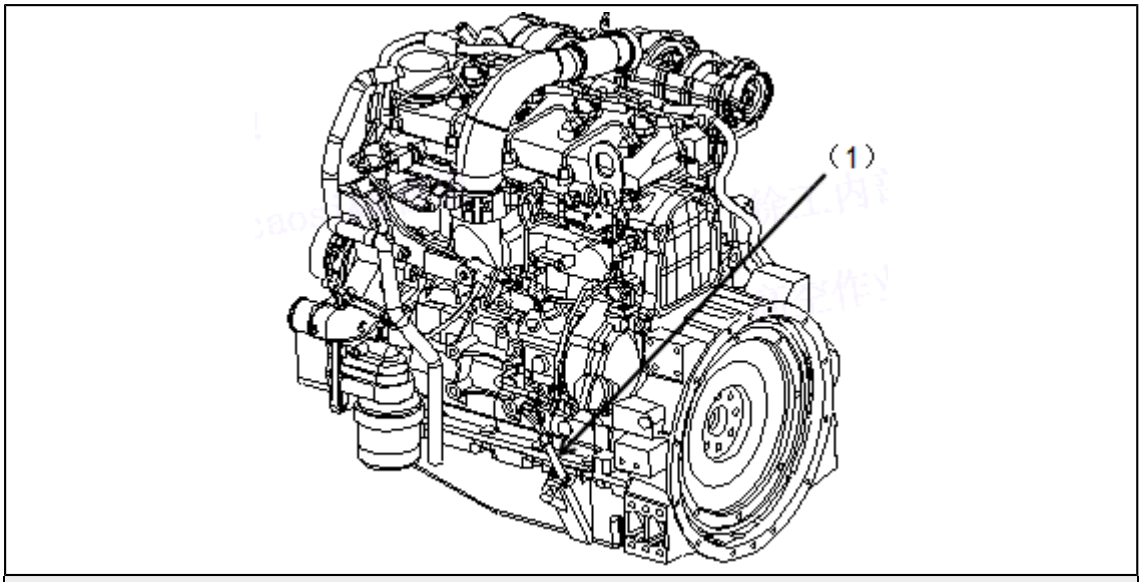


Figure 6-21 Oil dipstick location

To check engines lubrication oil level:

1. Park the machine on flat ground.
2. Shut down the engine, remove ignition key and open engine side panel.
3. When the engine lubrication oil’s cool down is completed, check lubrication oil level with the dipstick.
4. Replenish engine oil if necessary.

   1) Pull out oil scale (1) and clean up. Insert the oil scale again and then pull out.

   2) Make sure oil level is between the upper scale (a) and the lower scale (b).
   If the oil level is below (b), please add engine oil to keep the engine oil level is between the upper scale (a) and the lower scale (b).

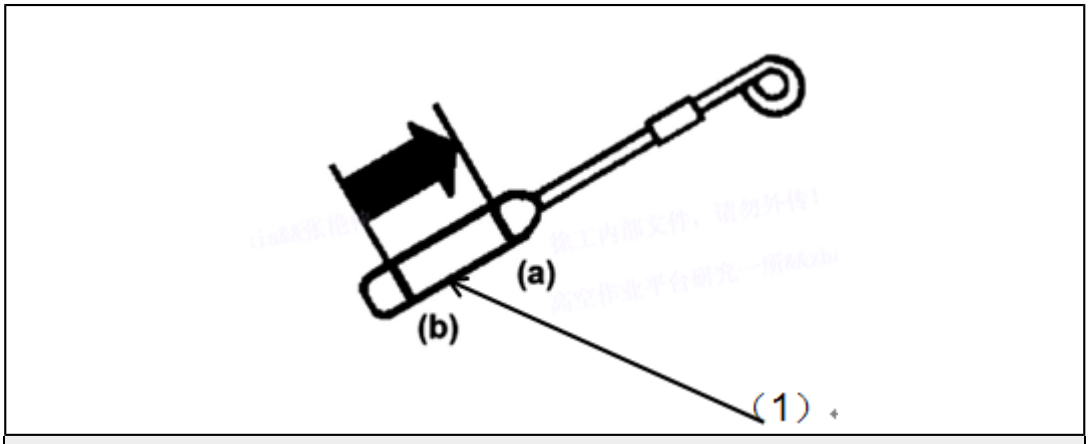


Figure 6-22 Engine oil level

6.5.1.3 Refilling the engine’s lubrication oil

NOTICE!

- **Shut down the engine before replacing engine lubrication oil or oil filter.**
- **Only use lubrication oil specified either in the engine’s manual or this manual.**
- **On engine equipped with diesel particulate filter (DPF), some of the fuel may be mixed with oil during regeneration. This may dilute the oil and increase the volume of oil.**
- **If the oil level exceeds the upper limit of the oil scale, it means that the oil has been over diluted and will cause a failure. In this case, replace with new oil immediately.**
- **Before draining the engine lubricating oil, let the engine run for 5 minutes to increase the oil temperature.**
- **Replace the oil filter immediately when the oil is discharged completed.**

⚠ **If you want to use an oil of a different brand or viscosity from the previous one, please drain residual oil. Do not mix 2 different types of engine oil**

- Refill the lubrication oil into the engine through the oil-fill inlet (2)
- Close it right after filling.
- Avoid spilling of oil on the engine.

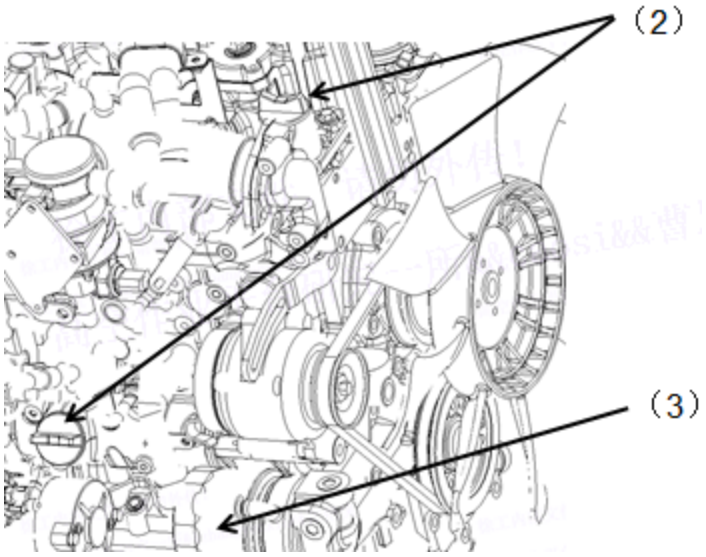


Figure 6-23

（2） Oil filling port

（3）Engine lubrication oil filter

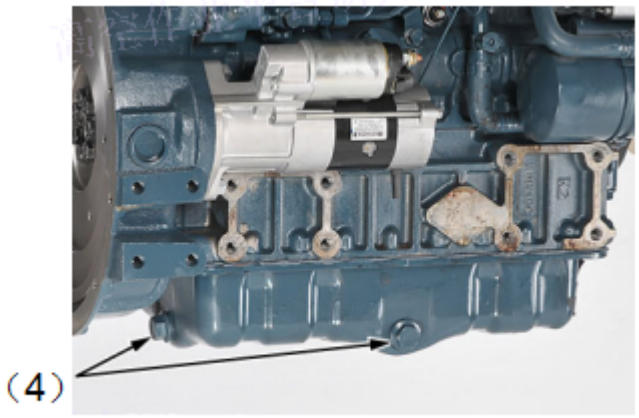


Figure 6-24

（4）Engine lubrication oil drain

1. Replacement of engine lubrication oil

   1) Start the engine and warm up for about 5 minutes.

   2) Place a 15 L container for engine oil under the engine.

   3) Remove the drain plug (4) to drain the oil completely.

   4) After draining, tighten the drain plug.

   5) Fill engine oil to the upper mark of the oil scale (1).

2. Replacing the engine’s lubrication oil filter

   1) Shut down the engine and place an appropriate container under the engine.

   2) Open oil filling port (2) and oil drain (4).

   3) Drain the hot lubrication oil and replace engine lubrication oil filter (3). Unscrew the oil filter out by hand or a wrench (90-95 mm).

   4) Wipe the sealing surface of base of filter and remove residues on the seal ring of engine oil filter.

   5) Pour clean lubrication oil into filter before filter installation.

   6) Paint a layer of oil film for the new seal ring.

   7) Screw in the new filter element by hand.

   8) Screw one more half a turn after it matches with the seal ring.

   9) Check engine oil level and fill hydraulic oil to the specified oil level.

Figure 6-25 Engine oil filter

6.5.1.4 Checking the engine’s crankcase ventilation valve

⚠CAUTION!

Risk of burns in contact with hot surfaces!

For details, see engine operation and maintenance instructions or contact your XCMG-partner.

6.5.1.5 The engine’s lubrication hose

⚠CAUTION!

- **Risk of burns in contact with hot surfaces!**

NOTICE!

- **Shut down the engine and wait for complete cool down before maintenance**

Replace engines lubricating oil filter hose in case they are worn out or broken.

For details, refer to the engine’s operation and maintenance handbook.

6.5.1.6 Checking the engine’s crankcase ventilation valve

⚠CAUTION!

- **Risk of burns in contact with hot surfaces!**

For details, see engine operation and maintenance instructions or contact your XCMG-partner.

6.5.1.7 The Engine’s lubrication hose

⚠CAUTION!

- **Risk of burns in contact with hot surfaces!.**

NOTICE!

- **Shut down the engine and wait for complete cool down before maintenance**

- Replace engines lubricating oil filter hose in case they are worn out or broken.
  - For details, refer to the engine’s operation and maintenance handbook.

6.5.2 Engine fuel system

6.5.2.1 Fuel tank

⚠CAUTION!

- **Let the engine cool down after turning it off and before performing maintenance**
- **Inflammable Fluid!**
- **Do not smoke or use open fire**
- **Do not breath in the fuel vapors**
- **Avoid environmental pollution by engine fluids or coolant dispose of the drained oil as environmentally friendly as possible; follow disposal regulations valid in your area**

6.5.2.2 Deaerating the fuel line

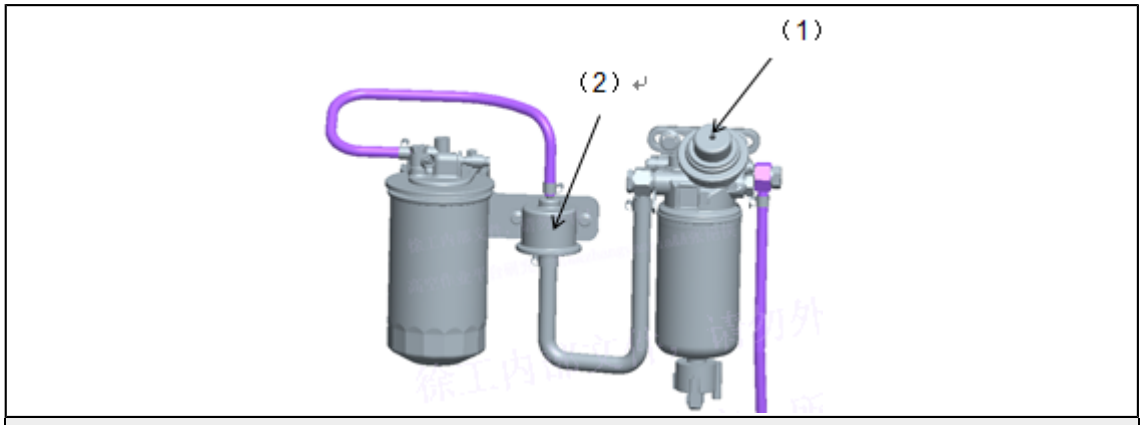


Figure 6-26 Fuel pumps

1. Hand pump on the fuel-water separator
2. Pumping pump in the fuel line

- To deareate the fuel line, operate the hand-pump on the fuel-water separator.

6.5.2.3 Fuel-water separator

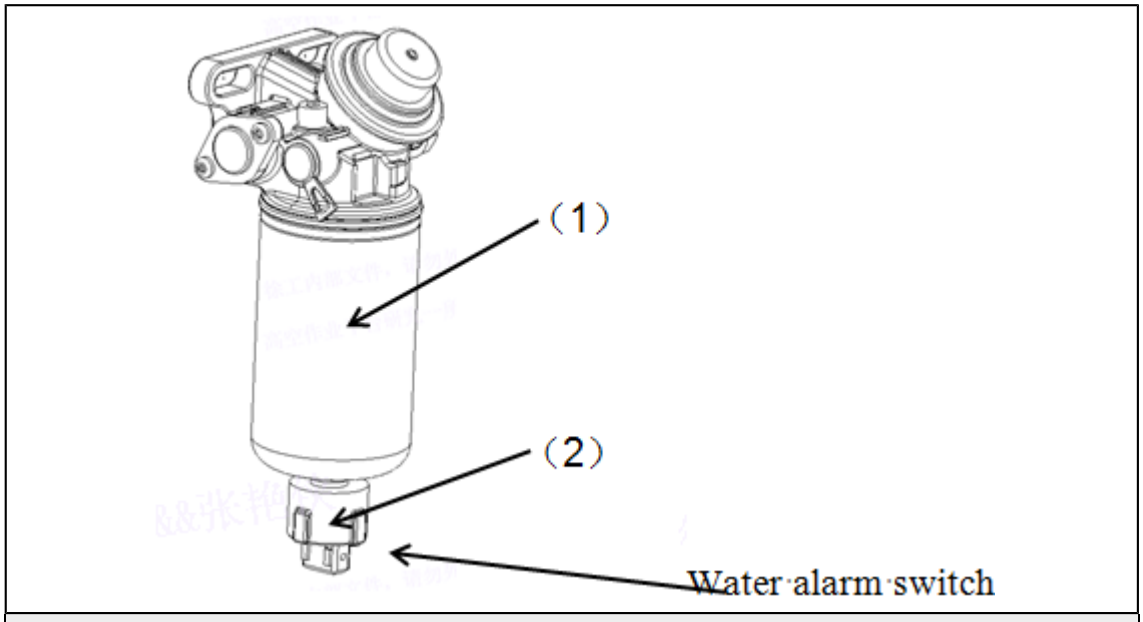


Figure 6-27 Fuel-water separator

1. Oil-water separator cartridge
2. Blocking sensor

The fuel-water separator is equipped with a blocking sensor (2). Its status will be shown on the Dashboard's display screen in a manner similar to

Error code: XXXXXX explanations…

- Replace the separator filter’s cartridge when the message appears pops up.

6.5.2.4 Cleaning the water separator

1. Unplug the electrical connector at the bottom of the separator, unscrew the sensor (2), and unscrew the cartridge (1).
2. Clean the sealing surface of the cartridge cover; Wet the sealing ring of the new oil-water separator cartridge (1) with clean diesel.
3. Fill the clean diesel into the new cartridge and screw it hand-tight on the separators housing.
4. At the end, turn it another half-circle with a suitable tool to ensure leak-proof tightness.
5. De-aerate fuel system and start diesel engine for fuel leakage inspection.

6.5.2.5 Replacing the fuel pre-filter

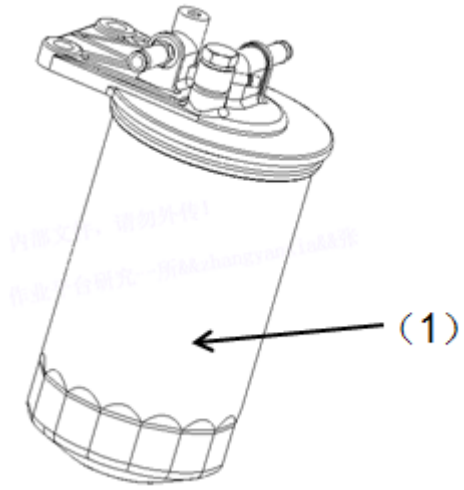


Figure 6-28 Fuel filter (1)

NOTICE!

- **Let the engine cool down after turning it off and before performing maintenance**
- **Avoid spilling fuel on the ground to prevent risk of fire or environmental pollution.**
- **Dispose of the drained oil as environmentally friendly as possible; follow disposal regulations valid in your area.**

- Before carrying out maintenance
  1. Switch the engine off and remove ignition key, enable engine to cool down.
  2. Screw out the fuel filter cartridge (1).
- Replacing the fuel pre-filter

1. Clean the sealing surface of the cartridge cover; Wet the sealing ring of the new filter (1) with clean diesel.
2. Fill clean diesel into the new filter and screw it hand-tight on the pre-filter housing..
3. Before installation, pour clean diesel into filter. Screw on new filter element by hand or belt spanner. Screw another half a circle after is matched with seal ring;
4. At the end, turn it another half turn with a suitable tool to ensure leak-tightness.
5. De-aerate fuel system and start diesel engine for fuel leakage inspection.

– Replace filter element isolating filter when the info pops up.

6.5.2.6 Inspecting the fuel lines

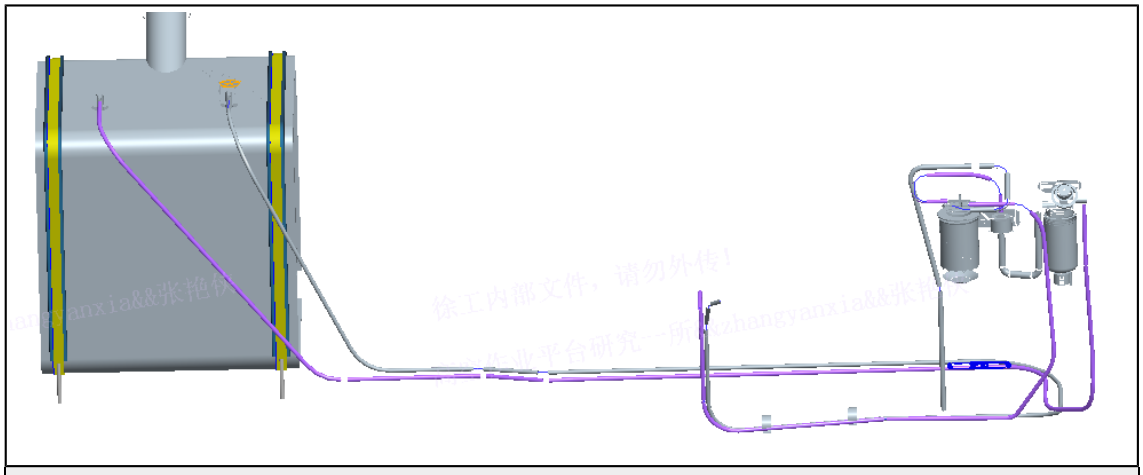


Figure 6-29 Fuel lines

- Inspect the fuel supply lines regularly.
- In case of any signs of damage, replace them immediately.
- After replacement, de-aerate the fuel supply and start engine. Ensure leakage free operation.

Replace filter element isolating filter when the info pops up.

6.5.2.7 Draining the fuel tank

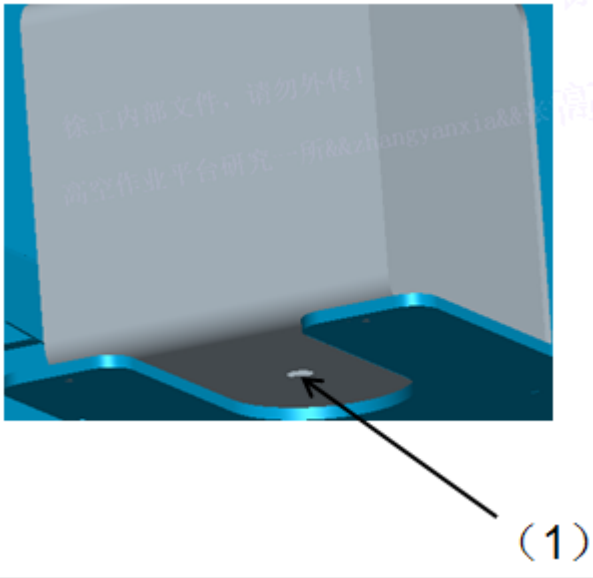


Figure 6-30 Fuel tanks drainage plug

(1) is located on the lower left-hand side of the front frame

(1) Oil drain plug

⚠CAUTION!

- **Inflammable fuel or vapours!**
- **No smoking or open fire while handling the fuel**

NOTICE!

- **Let fuel level fall as low as possible before draining**
- **Refill tank only with clean fuel**
- **Dispose of the drained oil as environmentally friendly as possible; follow disposal regulations valid in your area.**

6.5.3 Engine air intake system

6.5.3.1 Checking/cleaning the engine’s air intake filter

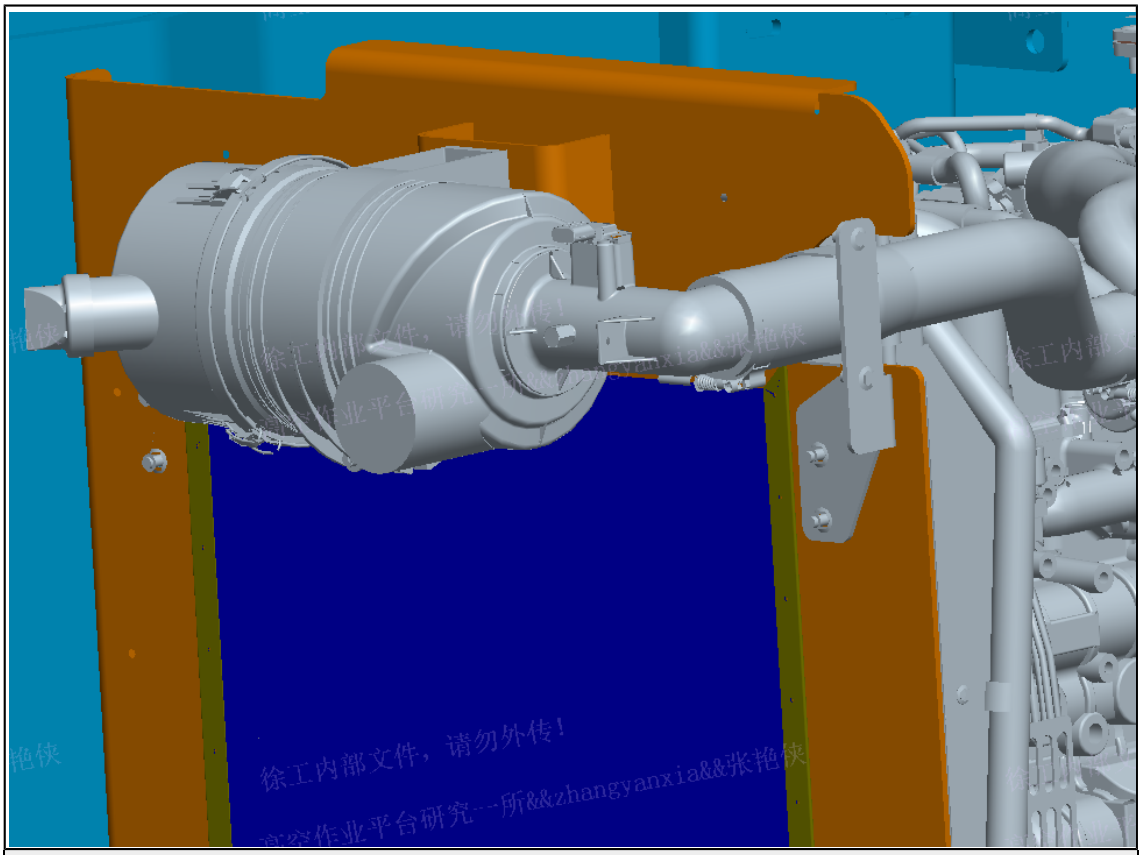


Figure 6-31 Engines air intake filter (1) location

NOTICE!

- **Any engine damage due to inappropriate maintenance of the intake filter voids the warranty.**

- Check whether the dust discharge valve is clean or clogged (e.g. by wet deposits).
- If so, squeeze it, to enable the deposits to fall out.
- In case this is not sufficient, remove the filter’s cover (1) by opening the clips and clean it from the inside.
- Ensure the cover is fixed correctly prior starting the engine.

6.5.3.2 Replacing the engine’s air intake filter

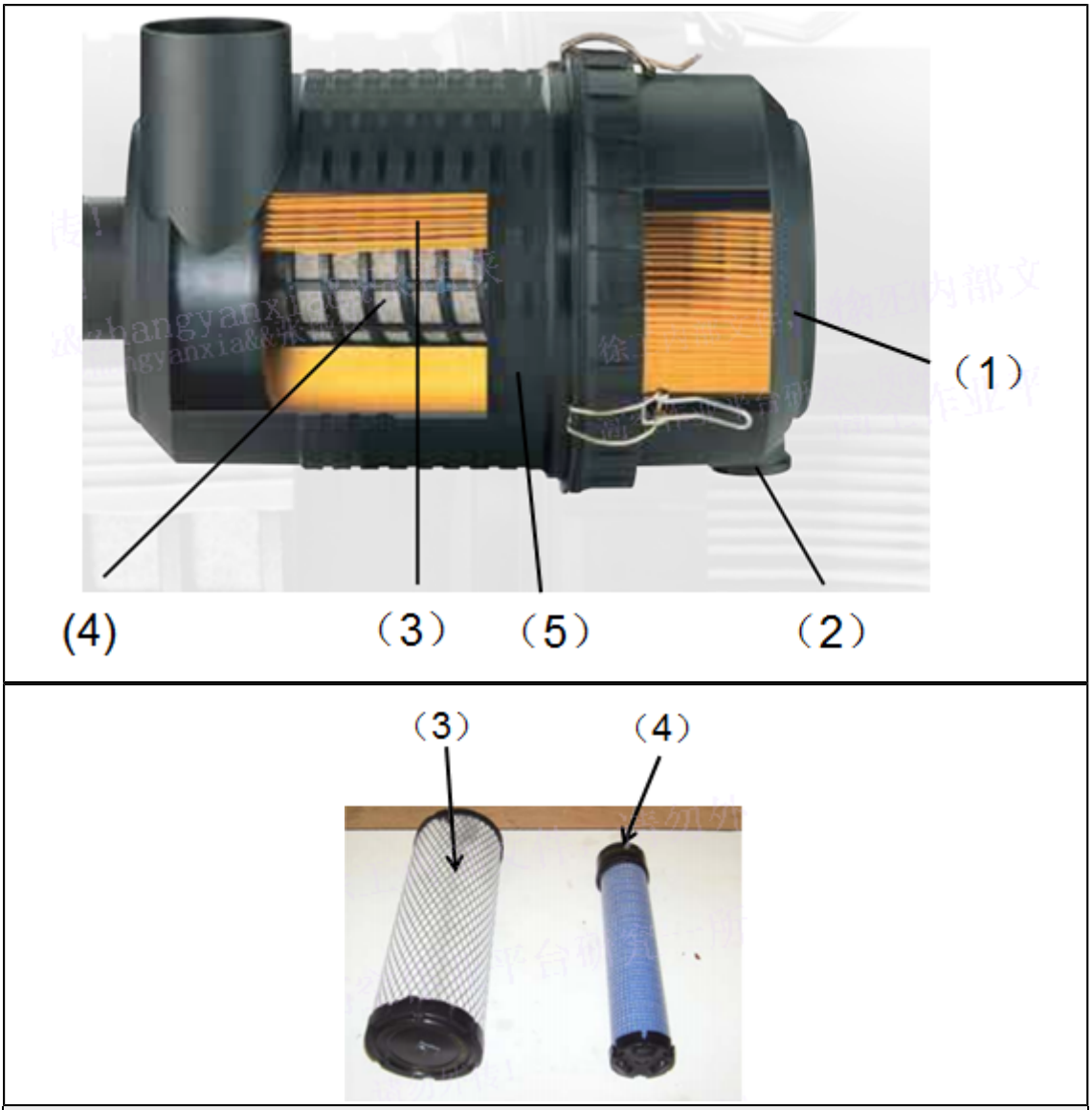


Figure 6-32 Engines air intake filter

(1) Air filter cover

(2) Dust discharge valve

(3) Main filter element

(4) Safety filter element

(5) Housing

Replacing the air intake filter

1. Switch off engine, remove the ignition key.

2. Let the engine cool down if necessary.

3. Remove the filter´s cover (1) by opening the clips

4. Remove the main filter element (3)
5. Clean the dust discharge valve (2)and the filter housing (5) if necessary.
6. Insert the new main filter element, then close and lock the cover.
7. If required, (after 2000 operating hours at the latest) replace the safety filter element (4) as well.

6.5.3.3 Replacing the air intake pipe

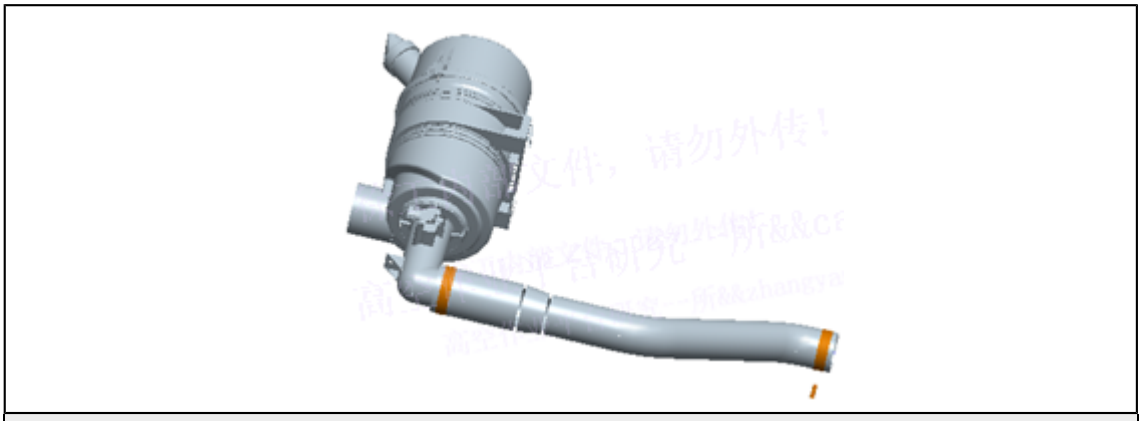


Figure 6-33 Air inlet system;

(1). Air intake filter pipes

NOTICE!

- **Shut down engine and await complete cool down before maintenance**
- **Do not operate the engine while the air intake system is not correctly assembled**
- **Replace the filter element instead of cleaning it every 6th time**

Replacing the air intake pipe

1. Open the engine hood and enable engine system to cool down if necessary.
2. Loosen the clamps at both ends of the intake pipes (1), remove and replace the new ones.
3. If clamps are corroded or damaged, replacement is also required.
4. Tightened the clamps properly and close and secure engine hood.

6.5.4 Engine cooling system

6.5.4.1 Coolant requirements

⚠DANGER!

- **Protect your eyes and wear gloves for handling the cooler**
- **Serious injury hazards due to rotating machine parts! (Ventilator and V-belts)**
- **Risk of burns due to hot surfaces!**
- **Risk of burns due to hot cooling fluids!**
- **Risk of high vapour pressure through hot steam!**
- **Do not open the coolers filling tap until complete cool down**
- **Filling tap has two stage opening release (to prevent that pressure lift the tap)**
- **Open filling tap always covered with large cloth!**
- **Open with caution to the first stage!**
- **Wait until the steam pressure is released/reduced!**

NOTICE!

- **Always use the minimum concentration of protective agent, even if temperatures never fall below freezing point.**
- **Do not exceed maximum recommended protection agent concentration.**
- **Refer to the recommendation of the engine manufacturer in engine instruction manual**

Liquid-cooled engines rise have specific requirements on the used coolant to avoid overheating or freezing, corrosion of engine or radiator as well as cavitation.

To avoid damage of the engine or the cooling system observe the coolant regularly in respect to coolant level and protection agent concentration.

Follow instructions on engine manual as well as those provided by the coolant agent manufacturer.

Ensure protection agent concentration is at least **50%** of what do we recommend.

The cooler is filled ex works with **50%** protective agent enabling operation up to **－109 °C/ 228** °F.

6.5.4.2 Inspecting the radiator

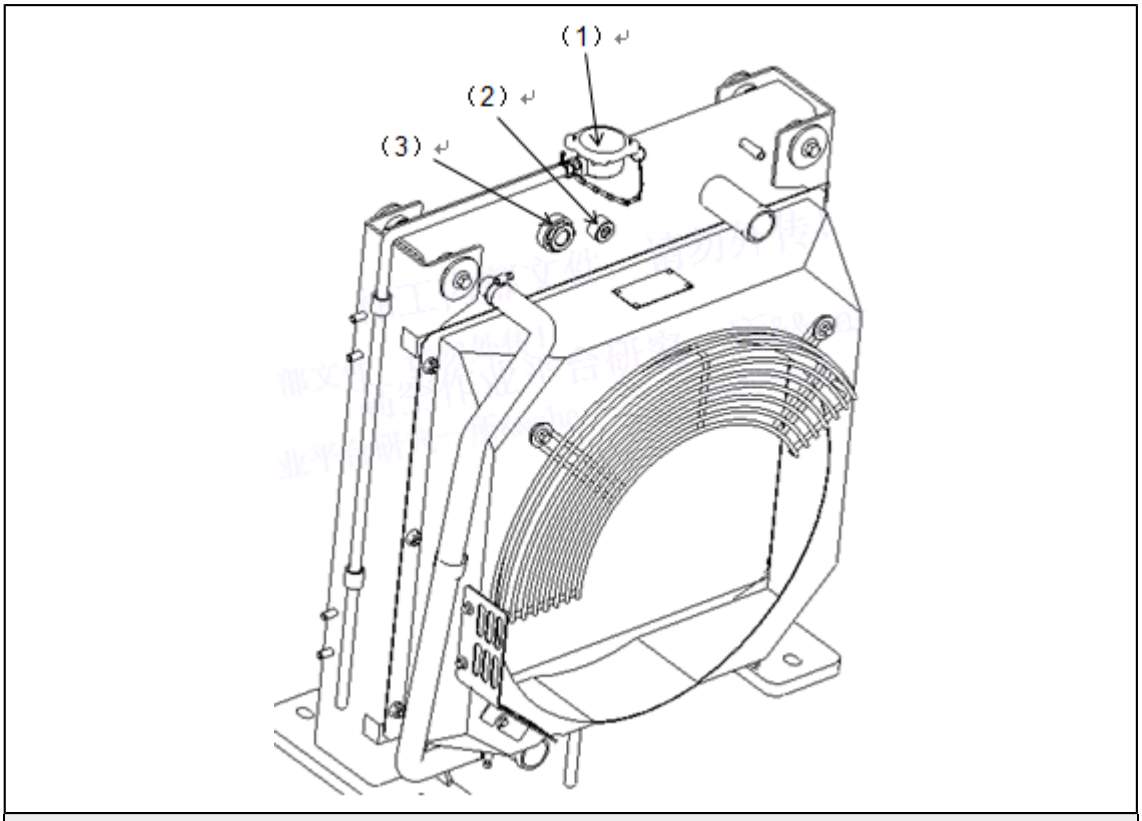


Figure 6-34 Radiator

(1) Cooling liquid filling port

(2) Liquid level sensor

(3) Liquid level observation window

- Switch off engine, remove the ignition key and open engine hood; let engine and radiator to cool down if necessary.
- Inspect the radiator and clean it if it is dirty.

Only use pressurized air or water and clean it from inside to outside.

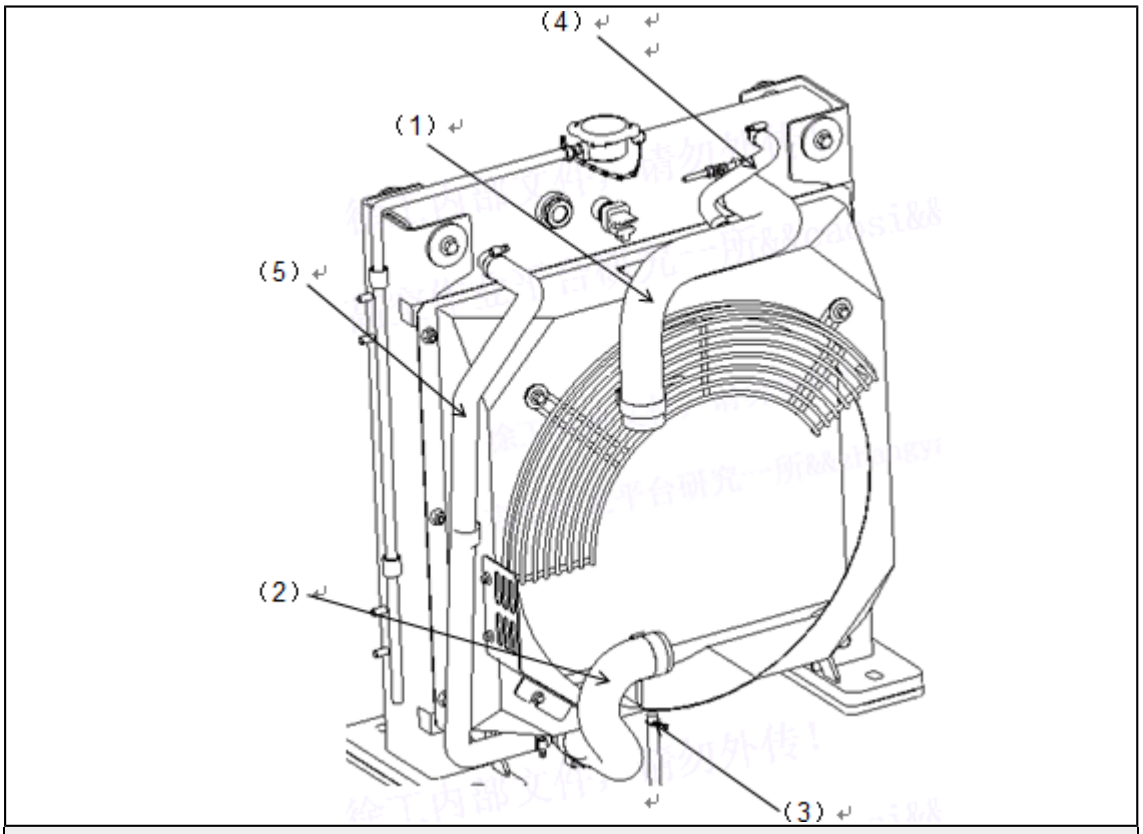


Figure 6-35 Cooling systems piping(1)

（1） Radiator inlet pipe
（2） Radiator outlet pipe
（3） Water drain switch
（4） Vent pipe
（5） Water supply pipe

- Inspect the radiator’s piping regularly on fractures and leaks
- Replace any damaged pipes and tighten all loosened connections.
- Check whether the intake hose (1) is aging or fracturing,
- Check whether the hose clamp at the pipe joint is tight.
- The inlet pipe (1) shall be tightened or replaced when it is loose, aging, fracturing or damaged.

6.5.4.3 Replacement radiator refrigerant (persistent effect refrigerant)

Attention: When the engine temperature is high, please do not dismantle the radiator cap. After should wait till the engine cooling, loosens the radiator cap relief pressure slightly, then completely dismantles again the cover.

1. Stops the engine, causes refrigerant temperature drop.
2. Dismantles the radiator cap (1), turns on the row of fluid valve (2), discharges completely the refrigerant.

3. After discharges all refrigerants, closure row of fluid valve (2).
4. Pours into the refrigerant to fill to the radiator up to.
5. The starting engine and transports the rotation minute.
6. Stops the engine, causes refrigerant temperature drop, inspects the radiator the refrigerant fluid position, like the need, please supplement the refrigerant.

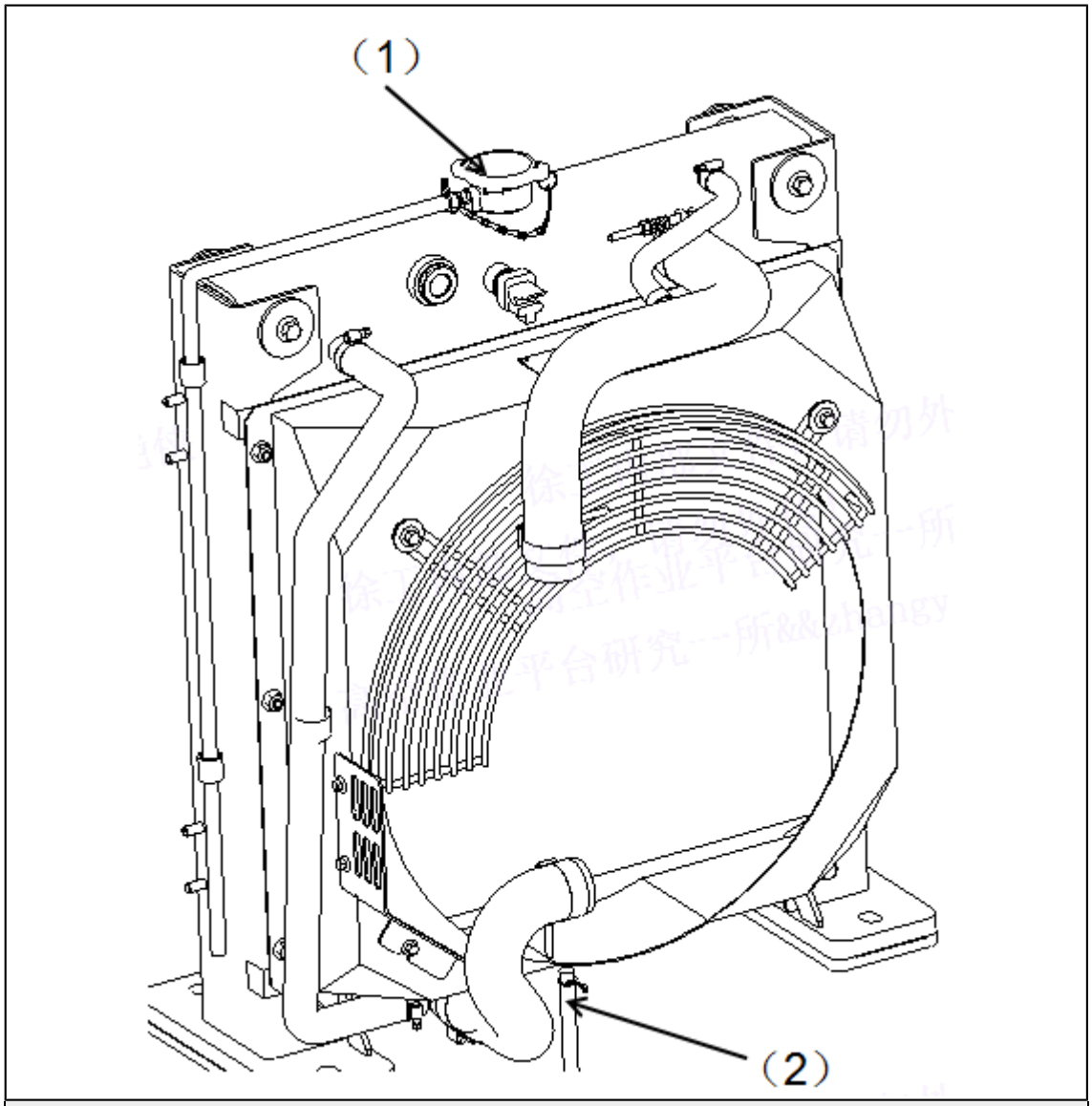


Figure 6-36 Coolant drainage port

（1）Filler cap

（2） Drain valve

Start the engine for a short time and check the coolant level.

Refill if necessary.

6.5.5 Inspection of the EGR system

NOTICE!

- **Shut down engine and await complete cool down before maintenance.**
- **Do not operate the machine while EGR is not fully operational.**
- **Ignoring this equals to violating the exhaust emission regulations.**

➔ Inspect EGR system.

➲ For details, see engine operation and maintenance instructions or call your assigned XCMG partner.

➔ Replacing the EGR cooling hose

NOTICE!

Do not operate engine while engine’s EGR system is not correctly assembled!

➔ For details, see engine operation and maintenance instructions

6.5.6 Engine’s V-belt

⚠DANGER!

- **Danger due to rotating parts: -V-belt-Alternator-Cooler Ventilator**
- **Risk of limb cutting or squeezing by rotating parts.**
- **Keep the engine’s hood closed while it is running.**
- **Refer to the engine's instruction manual**

Preliminary actions:

1. Switch the engine off, remove the ignition key and disconnect battery insulation switch.
2. Open the engine hood, and if necessary, enable the engine cool down.

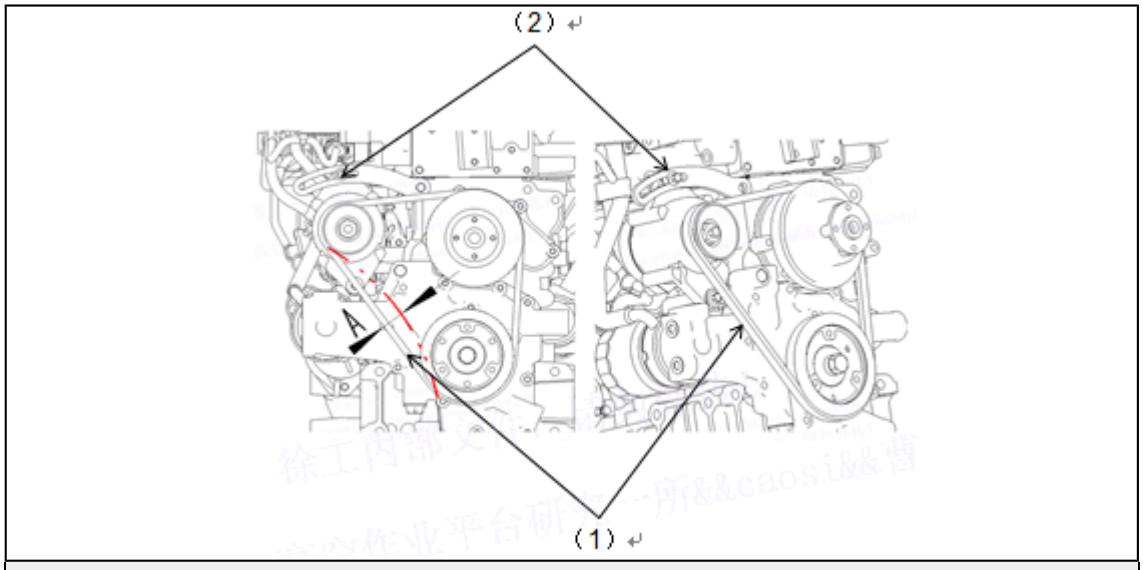


Figure 6-37 V- Belt installation

1 V- belt

2 Engine’s V- Belt tensioning bolt

- **Tensioning the V- Belt**

  – Push the V-Belt in the middle between the shaft wheel and the alternator (see **Figure 6-37**)

  – V- Belts tension is sufficient as long as maximum deflection stays below 8 mm.

- **Replacing the V- Belt**

1. Screw off the alternator’s tensioning bolt (2).
2. Swing the generator to the engine’s side.
3. Loosen and remove the V- Belt.
4. Mount the new V- Belt, press the generator to the outside of the engine with lever until the tension is within the required limits.

6.6 Bolt tightening torques

NOTICE!

- **Inspect the tightening torques of bolt and nut every 500 hours.**
- **Inspect the tightness of bolts and nuts after the breaking-in period of the machine. (usually first 50 hours of operation)**
- **Perform the next periodic checks every 250 hours of operation.**
- **If loose, tighten the bolt up to the torque shown in Tightening of bolt.**
- **In case of replacement, replace it with the same or higher-class bolt and nut.**
- **For bolts and nuts not listed in the "Tightening of bolts" - section , refer to "Tightening Torques"- section.**
- **Use a torque wrench when checking or tightening bolts and nuts.**

Table 6-8 Bolt tightening torque table(1/3)

The following values apply to galvanized/zinc chrome fasteners.							
8.8 metric bolts /8 metric nuts							
Dimen-sion	Pitch	Tensile stress area	Applied load	Torque (Dry or Loctite 263)	Torque (Lubrica-tion)	Torque (Loctite 262 glue)	Torque (Loctite 242 or 271)
		Square millime-ters	kilonew-ton	Newton meter	Newton meter	Newton meter	Newton meter
3	0.5	5.0	2.2	1.3	1.0	1.2	1.4
3.5	0.6	6.8	2.95	2.1	1.6	1.9	2.3
4	0.7	8.8	3.82	3.1	2.3	2.8	3.4
5	0.8	14.0	6.2	6.2	4.6	5.6	6.8
6	1	20.1	8.74	11	7.9	9.4	12
7	1	28.9	12.6	18	13	16	19
8	1.25	36.6	15.9	25	19	23	28
10	1.5	58.0	25.2	50	38	45	55
12	1.75	84.3	36.7	88	66	79	97
14	2	115	50.0	140	105	126	154
16	2	157	68.3	219	164	197	241
18	2.5	192	82.5	301	226	271	331
20	2.5	245	106	426	320	383	469
22	2.5	303	132	581	436	523	639

Table 6-8 Bolt tightening torque table(1/3)(continued)

The following values apply to galvanized/zinc chrome fasteners.							
8.8 metric bolts /8 metric nuts							
Dimen-sion	Pitch	Tensile stress area	Applied load	Torque (Dry or Loctite 263)	Torque (Lubrica-tion)	Torque (Loctite 262 glue)	Torque (Loctite 242 or 271)
		Square millime-ters	kilonew-ton	Newton meter	Newton meter	Newton meter	Newton meter
24	3	353	153	737	553	663	811
27	3	459	199	1080	810	970	1130
30	3.5	561	255	1460	1100	1320	1530
33	3.5	694	302	1990	1490	1790	2090
36	4	817	355	2560	1920	2300	2690
42	4.5	1120	487	4090	3070	3680	4290

Table 6-9 Bolt tightening torque table (2/3)

The following values apply to galvanized/zinc chrome fasteners.							
8.8 metric bolts /8 metric nuts							
Dimen-sion	Pitch	Tensile stress area	Applied load	Torque (Dry or Loctite 263)	Torque (Lubrica-tion)	Torque (Loctite 262 glue)	Torque (Loctite 242 or 271)
		Square millime-ters	kilonew-ton	Newton meter	Newton meter	Newton meter	Newton meter
3	0.5	5.0	3.13	1.9	1.4	1.5	2.1
3.5	0.6	6.8	4.22	3.0	2.2	2.4	3.3
4	0.7	8.8	4.47	4.4	3.3	3.5	4.8
5	0.8	14.0	8.85	8.9	6.6	7.1	9.7
6	1	20.1	12.5	15	11	12	17
7	1	28.9	18.0	25	19	20	28
8	1.25	36.6	22.8	37	27	29	40
10	1.5	58.0	36.1	72	54	58	79
12	1.75	84.3	52.5	126	95	101	139
14	2	115	71.6	200	150	160	220
16	2	157	97.8	313	235	250	344

Table 6-9 Bolt tightening torque table (2/3) (continued)

The following values apply to galvanized/zinc chrome fasteners.							
8.8 metric bolts /8 metric nuts							
Dimen-sion	Pitch	Tensile stress area	Applied load	Torque (Dry or Loctite 263)	Torque (Lubrica-tion)	Torque (Loctite 262 glue)	Torque (Loctite 242 or 271)
		Square millime-ters	kilonew-ton	Newton meter	Newton meter	Newton meter	Newton meter
18	2.5	192	119.5	430	323	344	473
20	2.5	245	152.5	610	458	488	671
22	2.5	303	189	832	624	665	915
24	3	353	220	1060	792	845	1170
27	3	459	286	1540	1160	1240	1690
30	3.5	561	349	2100	1570	1680	2310
33	3.5	694	432	2600	2140	2280	2860
36	4	817	509	3660	2750	2930	4020
42	4.5	1120	598	5860	4400	4690	6440

Table 6-10 Bolt tightening torque table(3/3)

The following values apply to galvanized/zinc chrome fasteners.							
8.8 metric bolts /8 metric nuts							
Dimen-sion	Pitch	Tensile stress area	Applied load	Torque (Dry or Loctite 263)	Torque (Lubrica-tion)	Torque (Loctite 262 glue)	Torque (Loctite 242 or 271)
		Square millime-ters	kilonew-ton	Newton meter	Newton meter	Newton meter	Newton meter
3	0.5	5.0				1.5	2.1
3.5	0.6	6.8				2.4	3.3
4	0.7	8.8				6.5	4.8
5	0.8	14.0				7.1	9.7
6	1	20.1	12.5		11	12	17
7	1	28.9	18		19	20	28
8	1.25	36.6	22.8		27	29	40

Table 6-10 Bolt tightening torque table(3/3)(continued)

The following values apply to galvanized/zinc chrome fasteners.							
8.8 metric bolts /8 metric nuts							
Dimen-sion	Pitch	Tensile stress area	Applied load	Torque (Dry or Loctite 263)	Torque (Lubrica-tion)	Torque (Loctite 262 glue)	Torque (Loctite 242 or 271)
		Square millime-ters	kilonew-ton	Newton meter	Newton meter	Newton meter	Newton meter
10	1.5	58.0	36.1		54	58	79
12	1.75	84.3	52.5		95	101	139
14	2	115	71.6		150	160	220
16	2	157	97.8		235	250	344
18	2.5	192	119.5		323	344	473
20	2.5	245	152.5		458	488	671
22	2.5	303	189.0		624	665	915
24	3	353	220.0		792	845	1170
27	3	459	286.0		1160	1240	1690
30	3.5	561	349.5		1570	1680	2310
33	3.5	694	432.5		2140	2280	2860
36	4	817	509.0		2750	2930	4020
42	4.5	1120	697.0		4400	4690	6440

Table 6-11 Bolt/*wrench size and required tightening torques*

S/N	Item	Bolt Size mm	QTY	Wrench Size mm	Torque Nm
1	Engine support fixing bolts	M12	16	18	110-130
2	Engine shock absorber fixing bolts	M8	4	13	30-36
		M10	4	16	65-78
3	Hydraulic tank fixing bolts	M10	6	16	50
4	Hydraulic pump fixing bolts	M10	8	16	120
5	Main valve fixing bolts	M16	2	24	210-240
6	Running motor mounting bolts	M16	24	24	210-240
7	Tyre mounting nuts	M20	32	30	396-401
8	Slewing bearing mounting bolts	M16	48	24	250-280
9	Fuel tank fixing nuts	M10	8	16	50

Chapter 7 Faults and troubleshooting

7.1 Engine

Table 7-1 Engine faults and solutions

Trouble	Cause	Solution
Abnormal operation of engine	Blockage of air filter	Replace
	Blockage of fuel oil pipe	Repair or replace
	Fuel oil contaminated	Drain the fuel tank and clean the filter screen
	Blockage of fuel filter	Replace
	Blockage of tank cover vent	Clean or replace
	Fuel oil error	Use the correct fuel oil
	Engine oil error	Use the coorect engine oil
	Blockage of exhaust port	Contact your assigned XCMG-dealer.
	Injection pump faults	
	Failure of preheating circuit or igniter plug	
	Low compression ratio	
	dirty nozzle or improper operation	
	Nozzle inoperation	
Engine overheat	Low coolant level	Replenish coolant
	Engine overloaded	Check hydraulic safety valve
	Radiator cover wearout	Replace
	Blockage of radiator core and oil cooler core	Clean radiator and oil cooler
	Blockage of radiator mesh cover	Clean the mesh cover
	Fan damaged	Replace
	Blockage of air filter	Replace the filter element
	Loose belts of alternator and fan	Tighten or replace the belts
	Belts wearout	Replace
	Cooling system pipeline contaminated	Wash cooling system
	Thermometer fault	Contact your assigned XCMG-dealer

Table 7-1 Engine faults and solutions(continued)

Trouble	Cause	Solution
Over low coolant temperature	Thermostat fault	Contact your assigned XCMG-dealer
	Thermometer or transfer device fault	
Engine oil mixed with diesel in combustion chamber and burn.	Engine oil type error	Drain and replace with correct engine oil
	Engine oil leakage	Check engine drain plug
	Engine internal components wearout	Contact your assigned XCMG-dealer
High fuel consumption	Wrong fuel oil type	Clean air intake system
	Dirty fuel oil nozzle	Use correct fuel oil
	Injection pump inoperation	Contact your assigned XCMG-dealer
Too dark or grey exhaust gas	Wrong fuel	Empty fuel tank and refueling
	Blockage or dirt of air suction or discharge system	Clean air intake or exhaust system
	Off-time of injection pump	Contact your assigned XCMG-dealer
	Dirty fuel nozzle or its incorrect operation	
	Trouble of engine body	
Insufficient capacity of battery	Loose or corroded wiring	Wash, tighten or replace the battery
	Loose generator belt	Tighten generator belt or replace
	Fuse damaged	Replace
	Generator failure	Contact your assigned XCMG-dealer
Starting motor can’ t rotate.	Insufficient capacity of battery or damaged	Recharge or replace
	Poor connection of battery circuit	Check connection of circuit
	Broken fuse	Replace fuse
	The starting motor pinion is clamped in the flywheel gear.	Repair or replace
	Trouble of engine body	Repair or replace start motor
	Trouble of key switch	Contact XCMG dealer
	Trouble of starting relay	
	Trouble of starting motor magnetic coil	
	Insufficient capacity of battery or damaged	

Table 7-1 Engine faults and solutions(continued)

Trouble	Cause	Solution
Magnetic vibration of starting motor	Poor connection of battery or start motor short-circuit	Clean the connection section
	Low capacity of battery	Charge or replace the battery
	Open magnetic holding coil of start motor	Contact XCMG dealer
The starting motor rotates but it can’ t be started.	Disengagement of starting motor pinion with the flywheel gear	Contact XCMG dealer
	Seizure or trouble of pinion shift mechanism	
	Fracture of pinion teeth	
	Fracture of flywheel gear teeth	
Slow starting of engine	Inner damages or fracture of battery leads	Check and replace the leads.
	Loosening of battery or starting motor connection or corrosion	Clean and tighten the connection.
Engine takes white smoke.	Wrong fuel.	Empty the oil tank, and adopt the correct fuel.
	Low temperature of engine	Run the engine until it becomes hot.
	Trouble or overcooling of thermostat	Contact your assigned XCMG-dealer.
	Off-time of injection pump	
	Leak of cooling water into the cylinder of engine	
Large noise or vibration of turbo charger	Bearing is not lubricated.	Insufficient oil pressure, check the blocked oil pipe of turbo charger
	Worn bearing	Contact with your assigned dealer.
	Air leaks of engine, suction or drain pipe	Check or repair.
	Improper gap between the turbine and turbine case	Contact your assigned XCMG-dealer.
	Breakage of turbine blade	Remove the exhaust elbow and air inlet hose, and check them.
Oil dripping of turbo charger joint	Damage or wear of bearing and/or worn seal	check and clean the air filter,

Table 7-1 Engine faults and solutions(continued)

Trouble	Cause	Solution
	Overhigh pressure of crankcase	check if the service interval of engine is due or if dirt is inside the engine.
	Blockage of turbo charger return pipe at the exhaust pipe	Contact your assigned XCMG-dealer
Too large resistance of turbo charger rotating member	The combustion deposits cause the blockage of coal behind the turbine.	check or clean
	Leaks of air suction pipe cause the blockage of dirt behind the compressor wheel.	check or clean

7.2 Electric system

Table 7-2 Electric System−Faults and Troubleshooting

S/N	Trouble	Cause	Solution
1	Entire vehicle is with no power	Battery is damaged or with no power, connecting line is peeled or fuse is burnt out	Replace or recharge the battery, connect line or replace fuse
2	Starter does not work	Fuse is burnt out	Replace fuse
		Starting button works abnormally	Repair or replace
		Conductors between elements are disconnected or plug-ins and connecting parts are peeled	Re-lay and re-fix
		Bond strap is badly connected or the strap is damaged	Re-bond or replace the strap
		Starting relay is damaged	Repair or replace
3	Generator does not produce power	Battery has insufficient power	Repair or replace
		The connector of generator peels	Re-fix
		Generator is damaged	Replace generator
		Machine is with fault or generator is damaged	Check the belt for whether being loose
		Fuse is burnt out	Replace fuse

Table 7-2 Electric System−Faults and Troubleshooting(continued)

S/N	Trouble	Cause	Solution
4	Generator does not strike spark	Emergency stop switch is damaged	Replace
		Shutdown electromagnetic valve is damaged	Replace
		Shutdown control circuit is with fault	Check faults in circuit
		Fuel oil filter element is blocked	Replace
		Oil-water separator is damaged	Replace
		Fuel line damaged and other oil line fault	Troubleshoot
5	Engine alarms faultily	Water temperature sensor (or switch) is damaged	Replace
		Sensor plug-ins and connecting parts are peeled or the pin is badly connected or line is disconnected	Find out loose point, closely insert plug-ins and connecting parts and eliminate line fault
		Water temperature sensor (or switch) is damaged	Replace
		Sensor plug-ins and connecting parts are peeled or the pin is badly connected or line is disconnected	Find out loose point, closely insert plug-ins and connecting parts and eliminate line fault
6	Fuel meter displays abnormally	Meter sensor is damaged	Replace meter sensor
		Meter is damaged	Replace meter
		Meter sensor does not match meter	Replace with a meter sensor that matches meter parameters
		Line is damaged	Check faults in circuit
7	Superstructure is with no power	Fuse is burnt out	Replace
		Power relay is burnt	Replace
		Conductor is in open circuit	Re-connect or re-lay
8	Turntable does not work	Fuse is burnt out	Replace
		Electromagnetic valve failure	Repair or replace
		Conductor is in open circuit	Re-connect or re-lay

Table 7-2 Electric System−Faults and Troubleshooting(continued)

S/N	Trouble	Cause	Solution
		The switch to shifting upper and lower vehicle is damaged	Replace
9	Platform does not work	Fuse is burnt out	Replace
		Pedal switch failure	Replace
		Conductor is in open circuit	Re-connect or re-lay
		The switch to shifting upper and lower vehicle is damaged	Replace
		System bus is with fault	Check faults in circuit
		Electromagnetic valve failure	Repair or replace
		Handle or button and switch is damaged	Replace

7.3 Hydraulic system

Table 7-3 Hydraulic System − Faults and Troubleshooting

S/N	Trouble	Cause	Solution
1	The pressure of superstructure hydraulic system is too low or too high	Under-low setting of pressure cutoff value for open variable displacement pump	Regulate pressure to 19 Mpa
		Under-low pressure setting of main relief valve in turntable control valve	Regulate pressure to 21 Mpa
2	Low chassis hydraulic system pressure	Under-low setting of pressure cutoff valve for closed traveling variable displacement pump	Regulate pressure to 30 MPa
		Under-low pressure setting of main relief valve in closed traveling variable displacement pump	Regulate pressure to 32 Mpa
3	All superstructure actuators are inoperative	No pressure in system or pressure is too low	Refer to Item 1 for checking
		Malfunction of electronic proportional pilot joystick	Check and repair electronic proportional pilot joystick

Table 7-3 Hydraulic System – Faults and Troubleshooting(continued)

S/N	Trouble	Cause	Solution
4	Individual superstructure actuator is inoperative	Under-low pressure setting of motion control circuit for turntable control valve and platform control valve	Increase the pressure with reference to 2.2-the pressure adjustment method of main hydraulic parts
5	Luffing cylinder could not be locked and automatically descends	The locking performance of balance valve is bad and inner leaking is serious	Check balance valve
		Inner leaking of the cylinder is serious	Check cylinder
		The lock pressure of balance valve is set too low	Increase the lock pressure
6	Electro proportion pilot handle stops operation and actuator stops or is irresponsive	Relevant balance valve closes too slow	Check relevant balance valve
7	Rotary table shakes or is unstable when up vehicle rotates	The gap in gear engagement of rotary mechanism is too large	Regulate gear engagement gap
		The set pressure of rotary cushion valve is too high, causing the impact when opening	Regulate the set pressure of cushion valve
		The opening pressure of slewing reducer brake is too high, or is with fault	Check the brake
8	Emergency power installation can retrieve the vehicle after starting	Malfunction of electro-hydraulic proportional valve	Check and repair electro-hydraulic proportional valve.
		Internal leakage of power unit	Check and repair power unit.
9	Vehicle cannot move	System pressure is too low	Measure system pressure and regulate it to corresponding value
		Travel selector valve is with fault, causing travelling reducer brake cannot be opened	Check travel selector valve

Table 7-3 Hydraulic System – Faults and Troubleshooting(continued)

S/N	Trouble	Cause	Solution
10	Only one side can move	The motor or reducer at the side that cannot move is damaged	Check the motor or reducer
11	Chassis cannotturn	Steering pressure is too low	Measure system pressure and regulate it to corresponding value
		Malfunction of axle control valve	Check and repair axle control valve.
		Steering mechanism is with fault	Check steering mechanism
12	The state of high-speed and low-speed in traveling cannot be shifted	Shifting electromagnetic valve is with fault	Check shifting electromagnetic valve and controlling electrical signal
		Control pressure is insufficient	Check control pressure
13	Platform cannot level in operation	The hydraulic oil in levelling system is insufficient	Supply hydraulic oil to levelling system
		The set pressure of levelling overload valve is too low	Increase to set pressure
14	Platform cannot swing	System pressure is too low	Increase system pressure

7.4 Parts that need periodic replacement

Table 7-4 Parts for periodic replacement

Parts replaced at regular intervals			Replacement interval
Engine		Fuel hose (from fuel tank to filter)	Every 2 years
		Fuel hose (from fuel tank to injection pump)	
		Oil filter hose (from engine to oil filter)	
Hydraulic system	Basic body	Oil pump inlet hose	
		Oil pump outlet hose	
		Hydraulic hose of rotation gear	
	Accessories of equipment	Hose of boom hydraulic cylinder pipeline	
		Hose of pilot pipeline	

Chapter 8 Transport storage and protection

8.1 Transport safety requirements

8.1.1 Transport on public roads

8.1.1.1 General requirements

NOTICE!

- **Secure the machine properly while transporting!**
- **Do not engage untrained or insufficient qualified personnel in loading, transport and unloading the machine.**
- **Additional/deviating requirements may apply in your region!**

Most common transportation occurs via lorries, trailers or semitrailers.
Regardless the transportation vehicle, proper securing of the machine is mandatory.
Personnel executing loading, transport and unloading shall be sufficient

Vehicles, rams and securing items shall be qualified for the transport of the machine

Fasten and lash the machine on the transport vehicle in a transport-safe way.

The machine must remain safe fastened in its position on the vehicle also during typical common traffic unexpected invents as:

- **emergency stopping,**
- **sudden maneuvers**
- **road unevenness!**

If the safe transport is not provided due to

- **improper or damaged fixation equipment,**
- **insufficient fixation,**
- **unsuitable** or **damaged transport vehicle,**
- **involved untrained, unqualified personnel**,

transport of the machine is prohibited!

NOTICE!

- **Do not overload the transport vehicle**
- **Company/person executing the transport is always responsible for the safe transport.**

8.1.1.2 Loading & unloading instructions

⚠DANGER!

- **Risk of serious injuries or death.**
- **Consider the load distribution on transport vehicle!**
- **Machine may slip uncontrollable on blank, slippery ramps!**
- **Ensure ramps are wide enough to enable safe loading/ unloading.**

Indicates an imminent and inescapable danger that causes certain death if not prevented.

Prior driving the machine on the lorry, trailer or semi-truck ensure not exceeding overall permitted weight and dimensions of loaded vehicle. Ramps and planks must be equipped with a7n antiskid surface
Do not attempt to climb a blank metal ramp.

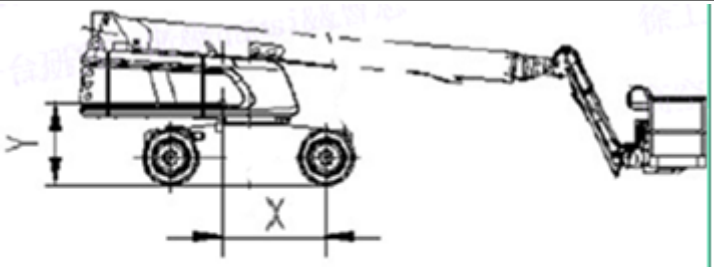
- Ramps, planks, loading areas as well as the machines drums must be clean and free potential slippery elements such as grease, dirt, ice, etc.
- In case surfaces are slippery (friction factor below 0.6), use of anti-slip mats is highly recommended.

Proceed as follows to load the machine:

1. Drive the machine carefully to the edge of the ramp, keep it in direction of the slope.
2. Lose machine parts shall be secured or disassembled and stored separately. Secure the lose parts of the machine or disassemble and store them separately
3. Drive the machine slowly and carefully the ramp up on the loading surface.
4. Park the machine under consideration of machine’s center of gravity indicated also on the machine.
5. Apply articulation lock and apply lashing for machine safely during transport

Transport requirements

- **Center of gravity**



Center of gravity	X-axis	Y-axis
XGS28E	1.43	1.48

Figure 8-1 Machines center of gravity

- **Transport lashing**

Before transportation, securely fix the chassis on the transportation vehicle and take corresponding safety protection measures. The chain cable with sufficient load-bearing capacity is required and the number is at least 5. The rigging should be adjusted appropriately to avoid damage to the chain cable. As shown in the following figure.

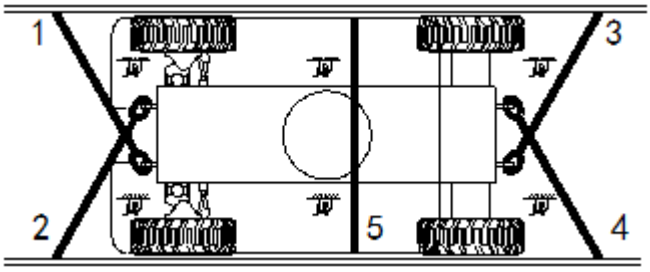


Figure 8-2 Schematic diagram of chassis fixing during transportation

Before transportation, securely fix the working platform on the transportation vehicle and take corresponding safety protection measures.

1. Place a block under the rotating part of the work platform to prevent it from rotating. However, it is necessary to avoid contact between the block and the platform cylinder.
2. Use Nylon ropes to pass through the plane near the support point at the lower part of the platform and fix it on the transport machine to protect the platform, but do not apply extra downward force to avoid damage to the boom.

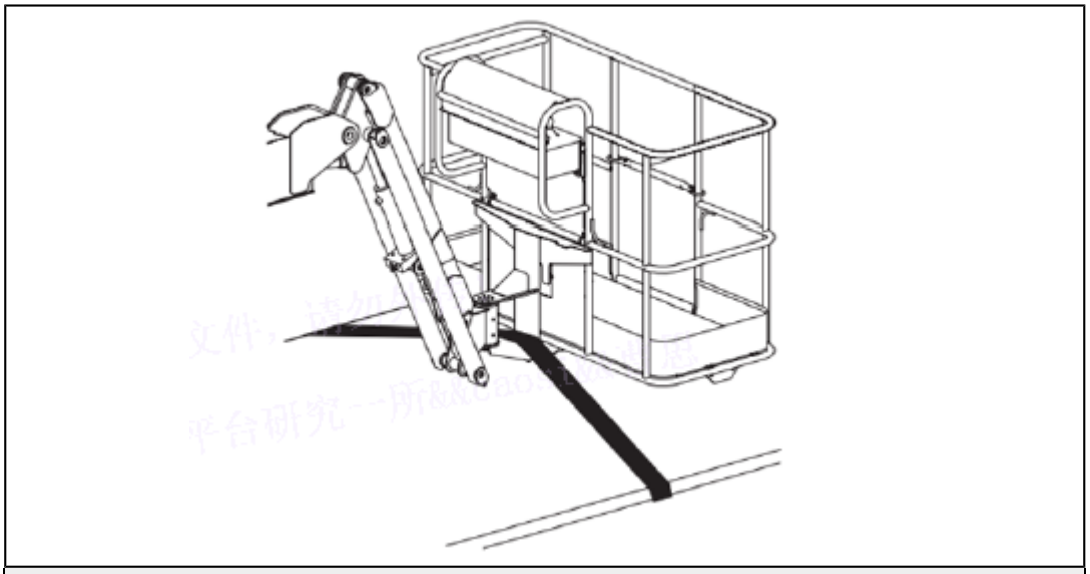


Figure 8-3 Schematic diagram of work platform fixing during transportation

Note: Please use chains or ropes with sufficient bearing capacity to fix the chassis and the work platform.

⚠CAUTION!

- **Disengage articulation lock prior driving the machine.**

8.1.2 Hoisting the machine

⚠DANGER!

- **Risk of serious injuries or death.**
- **Consider the load distribution!**
- **Follow the loading crane's instructions for use precisely!**
- **Do not overload the crane!**
- **Consider and follow the limitations given by the machine's load chart!**
- **Do not stand beneath the load or the crane's boom!**
- **Loading/ unloading presentsan imminent and inescapable danger that causes certain death if not prevented.**
- **Handle with caution and care!**
- **Protect and secure the loading/unloading environment**
- **Hoisting machine is prohibited if not all safety requirements are fulfilled**

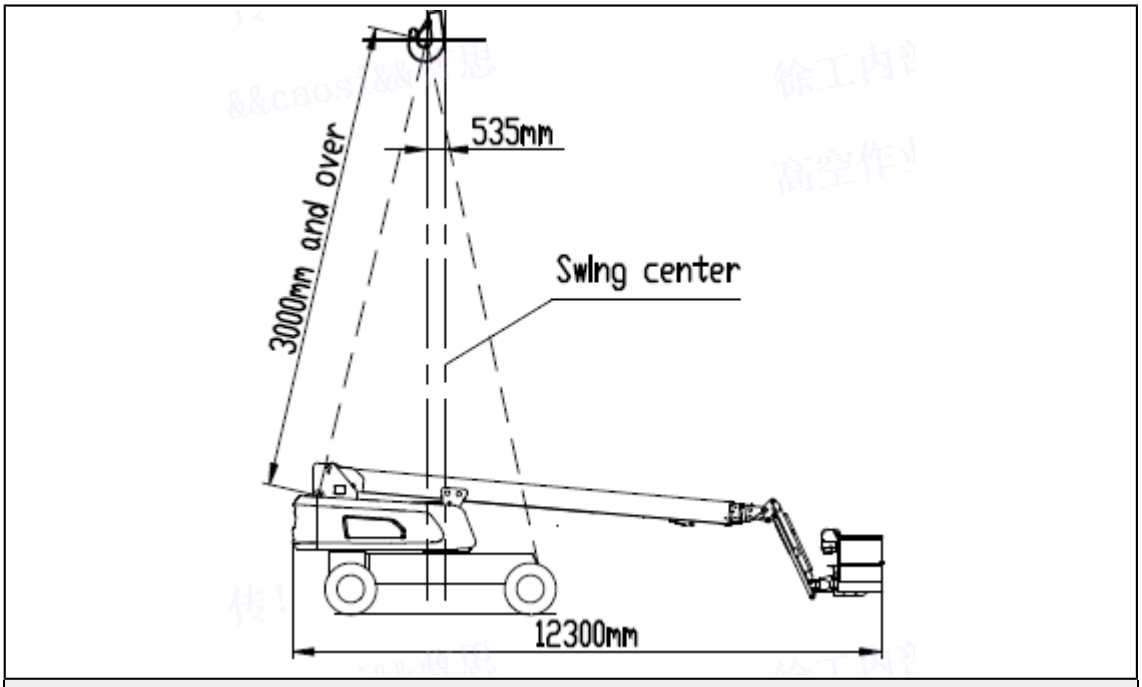


Figure 8-4 : Lifting the machine with a crane

Residual activities of positioning, securing and towing down the machine on the transport vehicle remain identical as described in section 7.1.4 that follows below.

- **Drive the machine in the required position.**
- Prior hoisting machine ensure all precautions mentioned in machines safety and operation manual are met, including securing the potential danger zone.
- Use only permitted tools, lugs, ropes, etc. and ensure grounds stability as required for the machine.
- The machine’s load table must correspond to the machine to be lifted.

8.1.3 Towing the machine

8.1.3.1 Towing preparations

⚠DANGER!

- **Risk of serious injuries or death!**
  - **The machine’s brakes are disabled during towing process.**
  - **That means the machine can roll unintentionally at any time.**
  - **Secure machine with wedges to prevent damage or injuries**
- **When towing the machine on a slope**
  - **Secure the machine with wedges.**
  - **Only tow the machine uphill**

NOTICE!

- **Towing and related tasks shall be executed only by experienced personnel with knowledge on hydrostatic propel systems and spring-loaded brakes**
- **Always keep these safety rules in mind while towing machines:**
- **The maximum towing speed is 6 km/h.**
- **The maximum towing slope rating is 25%.**

To tow the machine properly and safely, follow the steps below:

1. Retract and lower the boom, and place it above the rear drive wheels in same direction with the driving direction, and lock the turntable
2. Switch off the engine – if operational.
3. Secure the machine with wedges.
4. Bring the towing vehicle in position.
5. Put the lever in park position;
6. Switch off the engine – if operational.
7. Secure the machine with wedges,
8. Open the engine hood and bring the towing vehicle in position.

- **Prepare the towing rope, chains or bar,**
- **Do not attach to machine yet and get the tool kit.**

8.1.3.2 Disengage the drive hub

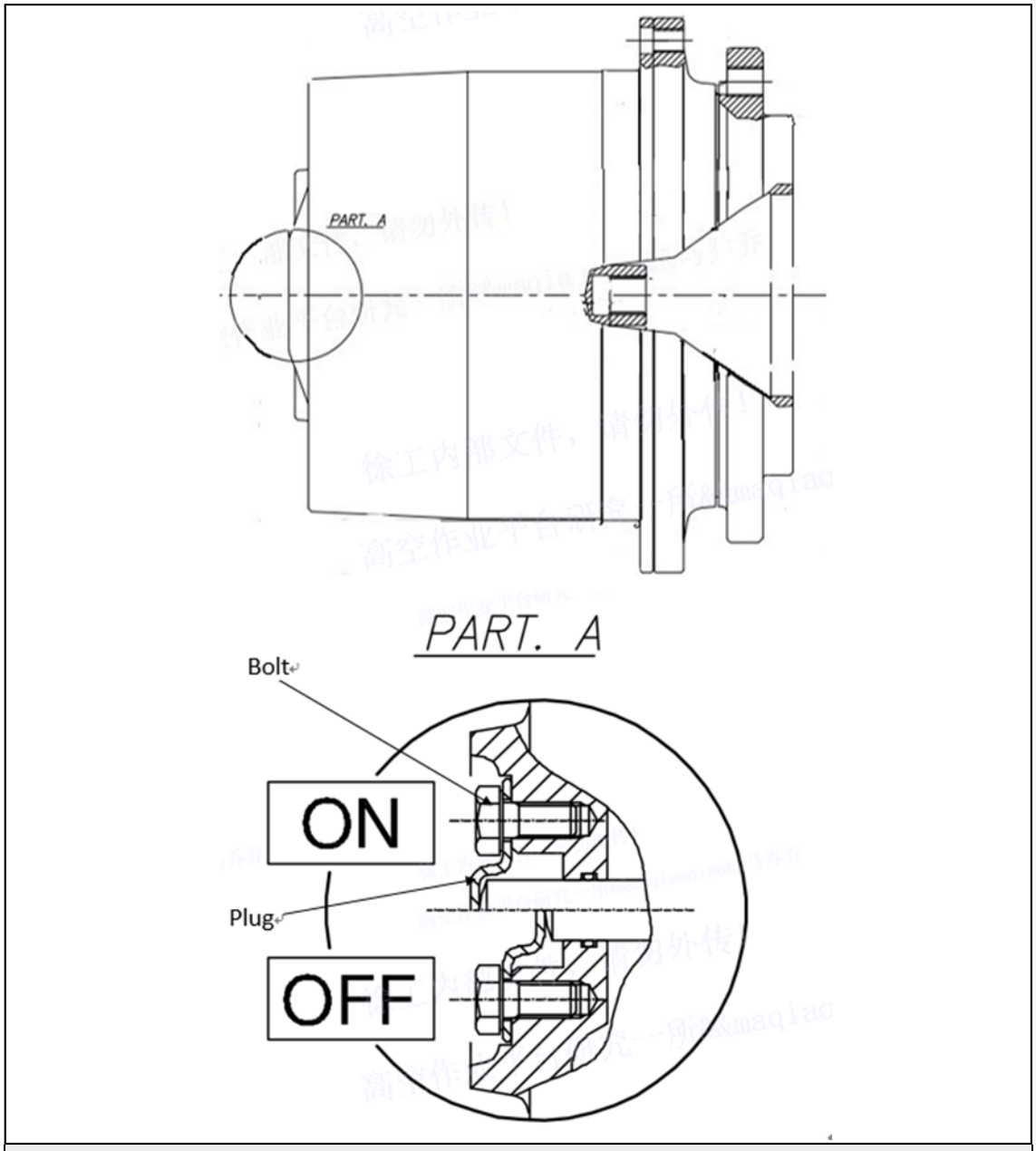


Figure 8-5 :Disengagement of Drive Hub

T0 disengagement of Drive Hub:

- When the running reducer is in “ON” state, remove the bolts with a wrench.b. Remove the plug.
- Remove the plug.
- Flip the plug and install it to the original position.
- Tighten bolts and now the running reducer is in “OFF” state

8.1.3.3 Towing process

⚠DANGER!

- **Risk of serious injuries or death!**
- **Use only approved towing devices.**

Carry out the towing steps in the following order:

1. Connect the towing bar to the front of framework by accessory pin and tow the machine by traction bar.
2. Proceed with towing under respect or the limit conditions (maximum towing speed is 13 km/h, maximum towing slope rating is 25%).
3. After reaching destination secure machine immediately against unintended motion, i.e. with wedges.
4. Rotate the drive hub cover to engage the drive hub
5. Disengage the towing bar from the steering hook and the traction vehicle. Now the machine is in driving mode.

8.2 Parking, storage and protection

8.2.1 Mid-term storage (up to 4 weeks)

NOTICE!

- **Starter batteries suffer self discharge.**
- **Starting may not be possible depending on storage duration, batteries condition and temperatures.**

- Park the machine on even ground.
- If parking on a ramp is inevitable, park it facing to the inclination slope
- Alternatively, you can use stoppers to secure the machine.

- Ensure propulsion joystick is in park position and engine switched off.
- Empty the water tank and ensure all spray water lines are empty

NOTICE!

- **Starter batteries suffer self discharge.**
- **Starting may not be possible depending on storage duration, batteries condition and temperatures.**
- **While temperatures may fall below freezing point, insert antifreeze agent into the spray system..**

In case the machine needs to be stored for a period of up to 2 months, carry out the following tasks additional to the previous:

- Inspect and fill up all lubricants and fluids but spray water, in particular:
  - engine oil,
  - hydraulic oil
  - Coolant including required protective fluids
  - Fuel
- Grease all lubrication points.
- Secure greasing points with the respective caps.
- Grease all plain metal surfaces (i.e. cylinder rods)
- Clean the machine with appropriate cleaning agent dry it with soft rags.

8.2.2 Long-term storage (longer than 1 month)

In case long term storage is required following shall be carried out additional to the previous points.

- Park the machine in a protected, dry and ventilated place on even, load-bearing ground.
- If the parking place is open, it is recommended to cover the machine appropriately.

If storage period significantly extends 4 weeks, you should remove starter battery and store it separately

Regular Maintenance during storage period:

Carry out maintenances according to the instructions

Every month:

Charge the battery

Connect battery and let engine run for 30 minutes

Grease all lubrication points

Grease all plain metal surfaces

Inspect machine for leakage and take measures if necessary

Every 3 months (additionally to the previous):

Visual inspection of appearance for signs of corrosion;

Drain fuel water separator if necessary;

Grease all hinges

8.2.3 Use preparation after storage

1. Remove the covers.
2. Clear the protection materials that have been applied on exposed parts.
3. Charge, install and connect the battery.

4. Ensure lubricants, fuel and coolant levels are sufficient
5. Run the engine idle for about 30 minutes and propel slowly for another 30 minutes to enable hydraulic oil to heat up.

Chapter 9 Cleaning

9.1 Cleaning the machine

Cleaning the Machine. When using high-pressure water to clean the machine, it is forbidden to directly aim at the electrical control box and line connector, otherwise it will cause electrical short circuit.

Never aim water or steam jet at electrical components! Otherwise, there is a rise of electric shock!

⚠WARNING!

Personal physical injury

- **Risk of slipping and falling**

  Do not climb onto the machine when cleaning with water or water containing cleaning agents and/or cleaning by a high-pressure cleaner!

  Use a working platform - do not climb onto the machine!

- **Injury hazard due to rotating parts!**

  Rotating parts can cause serious injuries or death.

  Open the engine cover only at engine standstill.

  Switch-of the engine,

  Pull the start-key out of key-slotted to avoid any unintentional engine start

  Keep all guards and covers securely fastened to the equipment.

  Wear suitable protective clothing and personal protective equipment!

  Do not wear loose clothing or jewelry that can get caught on rotating equipment and could result in death injuries.

⚠CAUTION!

Personal physical injury

- **Burn hazard due to hot engine parts!**
  Can cause severe physical burns.
  Stop the engine and let it cool down.
  Wear protective equipment.
  Clean machine, the engine and the combi cooler only when the engine is switched off and cooled down
  Keep all guards and covers securely fastened to the equipment.
- **Injury hazards when using compressed air**
  Wear suitable protective clothing.
- **Hazard due to missing safety warning labels**
  Cleaning with high pressure may remove safety warning labels on the machine.
  All safety warning labels on the machine must be available and clearly legible.
  All safety labels must not be damaged
  Damaged or missing safety labels must be replaced. Refer to the Section xxx: List of safety warning labels Ordering safety labels according to the List of labels, Section xxx.
  If necessary, specify the language.
  Use mild cleaning agents and water to clean the safety labels.
  Do not to use cleaning agents containing solvents.

NOTICE!

Property damage

- **Damage to machine due to cleaning work.**
  Do not clean the engine compartment with high-pressure cleaners, steam jets or high-pressure water.
  High pressure water can penetrate seals get into the electrical system cause short circuits and disable the controls.
- **Environmental damage**
  Clean the machine only in wash bays and places provided to this tasks in order to avoid damage to the environment
  cleaning without an oil separator may cause environmental damage.
  clean the machine, the engine and the combi cooler if an oil separator is available.
- **Property damage**
  Damage may occur when cleaning with a high-pressure cleaner.
  The first cleaning with a high-pressure cleaner may only be carried out six weeks after the MEWP has been put into operation.
  Do not spray into the openings of the air filter and exhaust.

Keep the machine clean. Remove dirt, oil, tools and other objects from the platform, walkways and steps.

Depending on the degree of contamination, different cleaning methods can be used.

Follow the information below:

The wrong choice of cleaning equipment and agents may have impact on the operating safety of the machine and to the health of the persons cleaning the machine.

When unsuitable cleaning agent is used – the surface will be damaged

When insufficient or incorrect preservation agents are applied the machine will be damaged!

Do not use any aggressive cleaning agents.

Do not use any abrasive cleaning agents.

Do not use any phosphate cleaners.

Do not use and solvents or solvent-containing cleaning agents.

Only use cleaning agents with a pH value of ⩽ 12.

Ensure that the cleaning agent to water ratio does not exceed 3%.

Rinse with clear water (not salt water).

Involve authorized qualified personnel for preservation of the machine.

Take care that inspection and re-application intervals are strictly followed.

Dry cleaning with compressed air

For cleaning minor dry-dust contamination use oil-free compressed air!

Compressed air and/or a high-pressure cleaner can be used to blow out dirt and/or hot water. Set the maximum air pressure for cleaning below 205 kPa (~ 2 bar) when nozzle is removed.

Wear protective clothing, safety shoes, goggles and protective mask for cleaning work with compressed air and/or a high-pressure cleaner.

With PPE use an effective deflector shield for particles

Work carefully.

Do not direct the compressed air at the skin or at other persons.

Do not use compressed air for cleaning your clothing

When cleaning with air, allow the machine to cool down to minimize the possibility that blowed fine dirt deposits will ignite in contact with hot surfaces.

Cleaning with water and detergents

In case of minor dust contamination in combination with oil and fuel:

Use only neutral or alkaline cleaning agents.

Apply cleaning agent with a brush,

Allow cleaning agent time to act and spray off with water.

Lubricate the MEWP after cleaning, see section 6.2.

The maximum water pressure for cleaning must be less than 275 kPa (~2,5 bar)

Never spray water directly on electrical connections, connections and components. When cleaning with air, allow the machine to cool so that the likelihood that fine dirt deposits will not be ignited if they are deposited again on hot surfaces.

Cleaning with washing solvents

Ensure adequate room ventilation.

Wear suitable protective clothing.

Do not use flammable liquids, such as gas or diesel.

Cleaning with a high-pressure cleaner or steam jet

In case of heavy dirt contamination with durst mixed with oil and fuel

Cover electric parts.

Do not directly expose electrical components and damping material to the jet.

Cover the vent filter on the hydraulic oil reservoir and the filler caps for fuel, hydraulic oil etc.

Protect the following components from moisture:

- Electrical components such as the alternator etc.
- Control devices and seals.
- Air intake filters etc.

Cleaning with a high-pressure cleaner:

Keep the distance of at least 300 - 400 mm from the nozzle of the high-pressure cleaner to the cleaning surface!

Spray pressure must not exceed 100 bars.

Apply spray temperature of 80-90 °C.

Use only neutral or alkaline cleaning agents.

Use a brush or similar to assist cleaning of firmly adhering dirt.

Lubricate the MEWP after cleaning (refer to maintenance section)

Use of solvents

Cleaning with volatile and easily flammable anticorrosion agents/ /inhibitors/sprays:

⚠WARNING!

Fire, explosion and inhalation hazards

Volatile, easy flammable cleaning solvents, agents inhibitors and sprays in closed compartments or rooms always present danger of fire or even explosion.

Provide fully ventilation with fresh air in rooms or compartments prior to further work when cleaning with solvents was necessary.

Do not use unprotected lights or open flames.

Do not smoke or and avoid any cause of sparks (electrostatic discharge or possible short circuit caused by open live wires).

When cleaning do not use objects containing metal! There is an increased risk of explosion due to possible sparks

Only use brushes without metal parts.

NOTICE!

Property damage

Damage to rubber and electrical parts when cleaning with solvents.

Do not use solvents, gasoline or other aggressive chemicals.

9.2 Exterior parts cleaning

To clean the exterior of machine use of the following aids is recommended:

High-pressure cleaner

Steam jet

Excessive pressure during power washing can damage the safety warning labels and design film foils on machine surfaces by forcing water underneath the labels/films.

These problems are also critical for the perforated film foils on windows.

To avoid lifting of the edge or other damage to the labels and films foils, follow these important steps:

Use a wide-spray pattern spray nozzle

Adjust maximum pressure below 100 bars

Use water with maximum temperature of 50°C

Keep the nozzle always perpendicular to the label/film foils at a minimum distance between 300-400 mm

Do not direct a stream of water at a sharp angle to the edge of the label or film foils. **Clean the interior of engine side panel.**

Clean the engine panel as follows:

1. Park the machine in a wash bay or place.
2. Stop the engine.
3. Open the engine panel to clean the panel interior.

Screw connections

Check once a day the screw connections of the protective structures for tightness.

Loose screw connections must be immediately retightened

Chapter 10 Technical specifications/performance data

10.1 Operating limits

1. Carry out the comprehensive checking to the vehicle functions before the operation.
2. If the vehicle can't work normally or hasn't been correctly maintained, the corresponding operation shall be forbidden.
3. The vehicle can’ t be used as the Aerial Work Platform.
4. It is forbidden to contact the fixed object (building, etc.) or the moveable object (vehicle, Aerial Work Platform, etc.).
5. Don’ t carry out illegal operation which will cause the stability of machine:
   1) It is forbidden to use the boom to push the machine or other object.
   2) It is forbidden to use the boom to touch the adjacent building.
   3) It is forbidden to tie the boom or platform onto the adjacent building.
   4) It is forbidden to place the load on the platform edge.
   5) It is forbidden to change or disable the machine components which may affect safety and stability.
   6) It is forbidden to use components with different weight or specifications to replace the components affecting the machine stability.
   7) It is forbidden to use tyres or air tyres with different specifications to replace the original tyres. The wheel weight is critical to the stability.
   8) The original high-flotation tyre shall be used. It is forbidden to use other high-flotation tyres to replace the original standard tyres.
6. It is forbidden to use the additional equipment to increase the extension length and work height (such as the ladder) of the MEWP..
7. It is forbidden to place the additional object which may increase the load in the platform, such as advertising board, etc.
8. Prohibition of any addition that would increase the wind loading on the MEWP, e.g. notice boards.
9. Without prior approval of the manufacturer, it is forbidden to modify or change the MEWP.

10.2 Overall dimensions

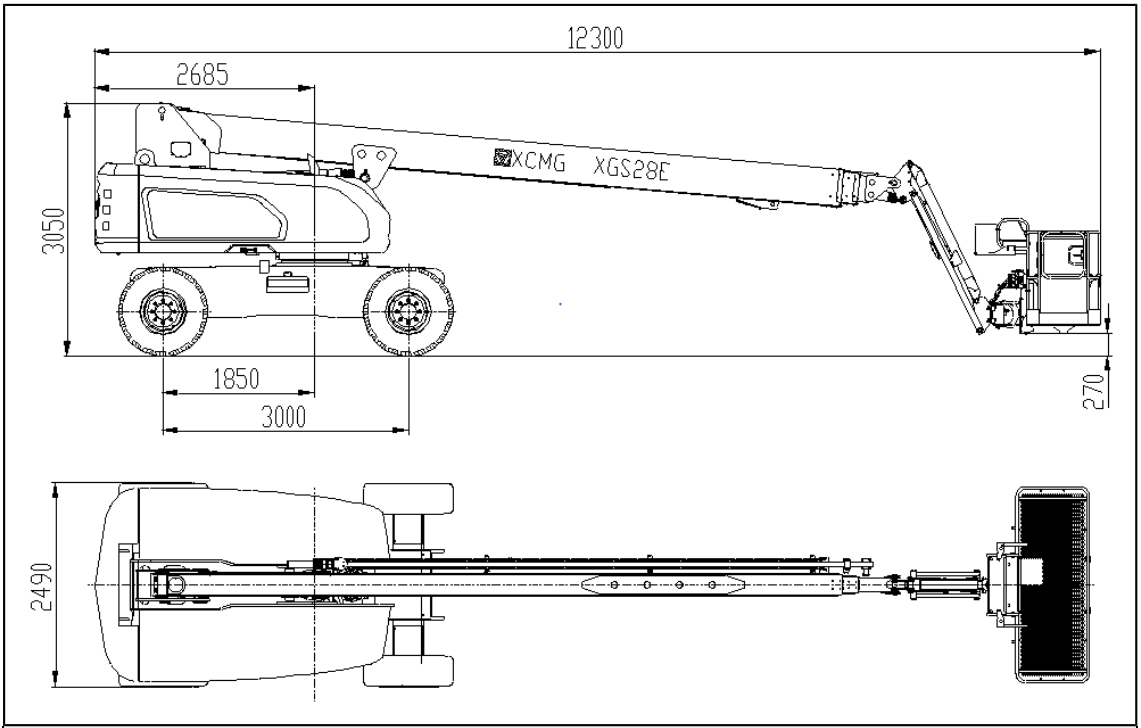


Figure 10-1 Overview of dimensions

10.3 Main parameters

Table 10-1 Main Parameters

Equipment height	3.05 m
Equipment length	12.3 m
Equipment width	2.49 m
Wheelbase	3.00 m
Platform height	26.2 m
Tail rotation	1.60 m
Maximum workload Unlimited Limited	 300 kg 460 kg
Maximum driving slope	40%
Maximum driving side slope	8°
Ground bearing pressure	8.5 kg/cm²
Maximum driving speed Collection status	 6.1 km/h 1.1 km/h

Table 10-1 Main Parameters(continued)

Elevated status	
Maximum hydraulic system pressure	4500 psi
Maximum wind speed	12.5 m/s
Maximum hand thrust	400 N
Turning radius	6.7 m
Total weight of equipment	18300 kg
Turntable rotation	360°
Fuel tank	180 L
Hydraulic oil tank	129 L
Engine oil capacity Cooling system Crankcase	 151 L 9-10 L
Electrical system voltage	12 V

10.4 Emissions

10.4.1 Noise emissions

The sound emissions of the machine have been measured following the EC Sound Emission Directive (For Outdoor Machinery) 2000/14/EC.

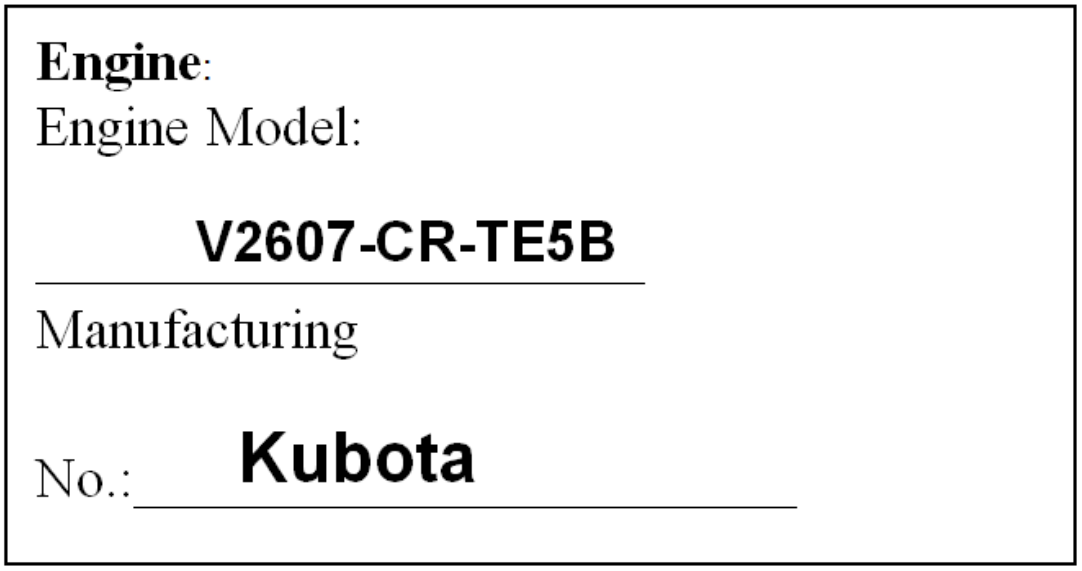
Sound pressure at operators' ear as well as vibration values are in line with the requirements of the EC Machinery Directive 2006/42/EC.

⚠CAUTION!

- **Working in close the machine noise levels may exceed 85 dB(A).**
- **Wear personal noise protection**

10.4.2 Engine’s nameplate

Table 10-2 Nameplate engine



10.5 Vibration information

The vibration in the ambient environment will cause resonance and impact problems of MEWP. Ensure that all vibrations in the ambient environment will not impair the working of MEWP and the safety of the personnel; otherwise it is necessary to avoid operating in a vibration environment.

The vibration total value to which the hand-arm system is subjected does not exceed 2.5 m/s². The highest root mean square value of weighted acceleration to which the whole body is subjected does not exceed 0.5 m/s².

10.6 Hydraulic schematics

Hydraulic schematic: main components list

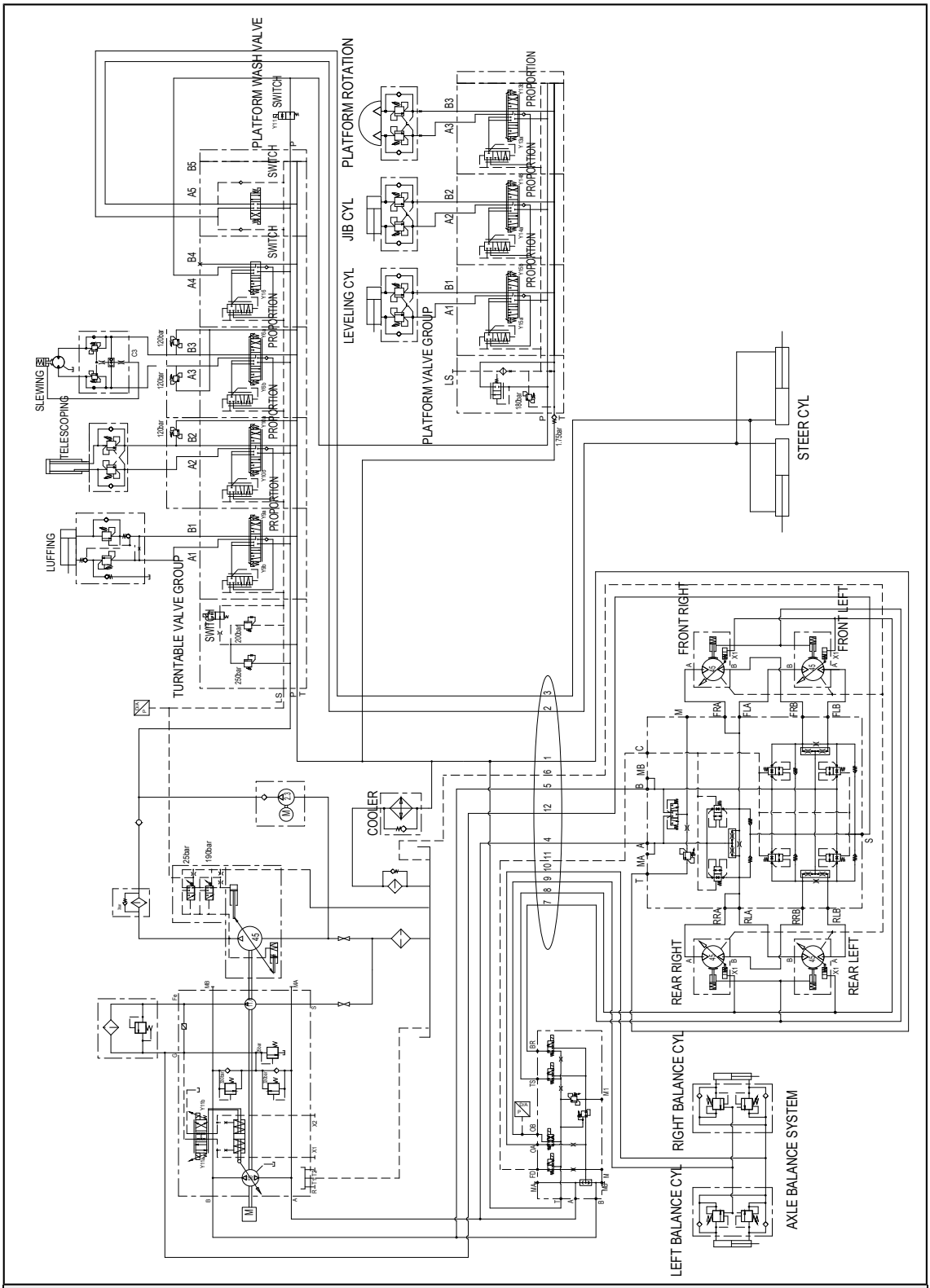


Figure 10-2 Hydraulic Schematic 1: *Overview*

10.7 Electric schematics

Table 10-3 Electric schematic 1: components list

S100	Power switch
S103	Turntable E-stop switch
S113	PlatformPlatform/turntable mode switch
H101	Charging warning light
K101	Engine starter relay
K104	Power supply relay
K110	Heating relay
K111	Battery pump relay
F100	Breaker

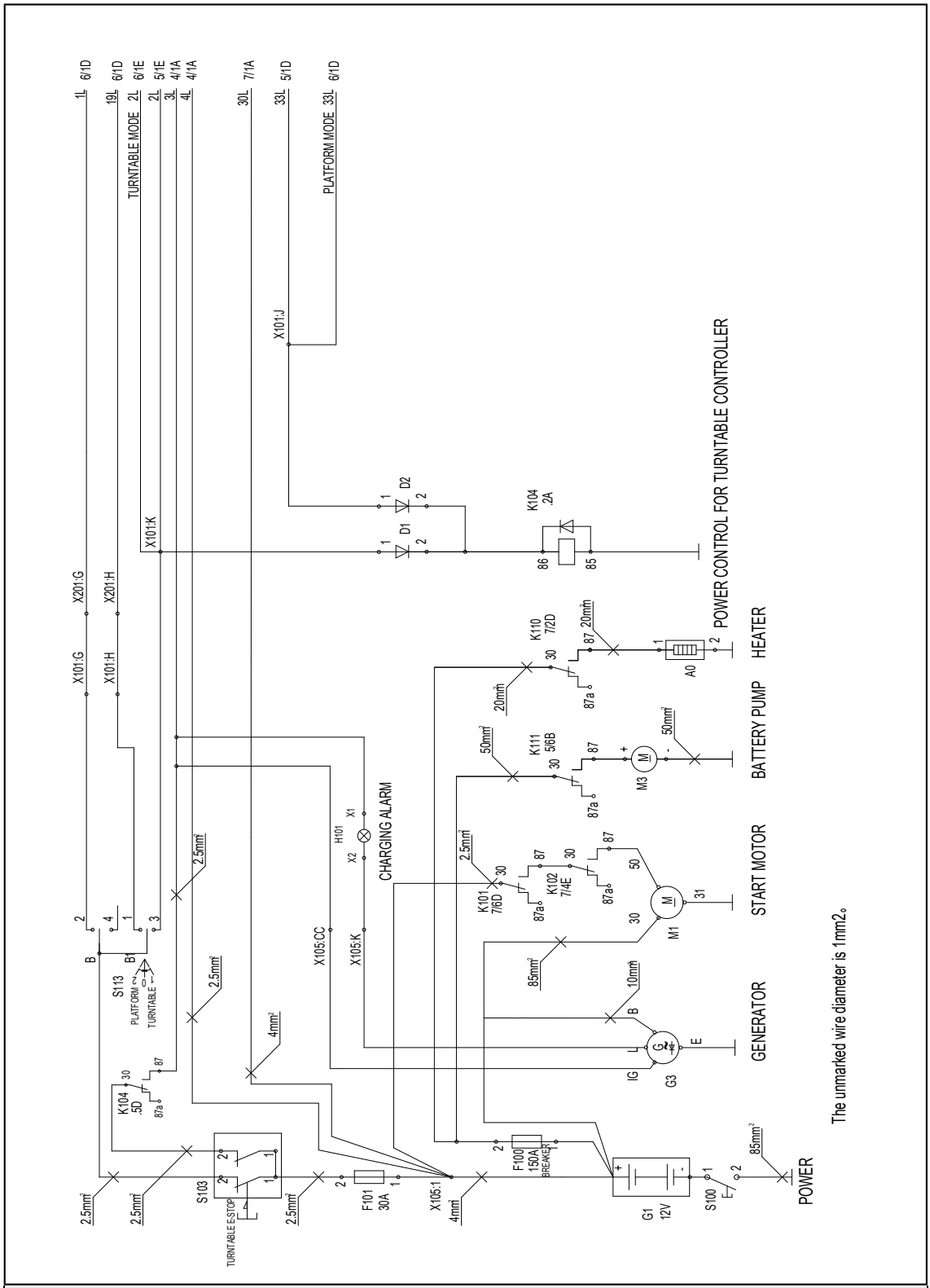


Figure 10-3 Electric Schematic 1

Table 10-4 Electric schematic 2: components list

K116	Lighting relay
K112	Cooling fan relay
D1-TS	Hydraulic oil temperature control switch

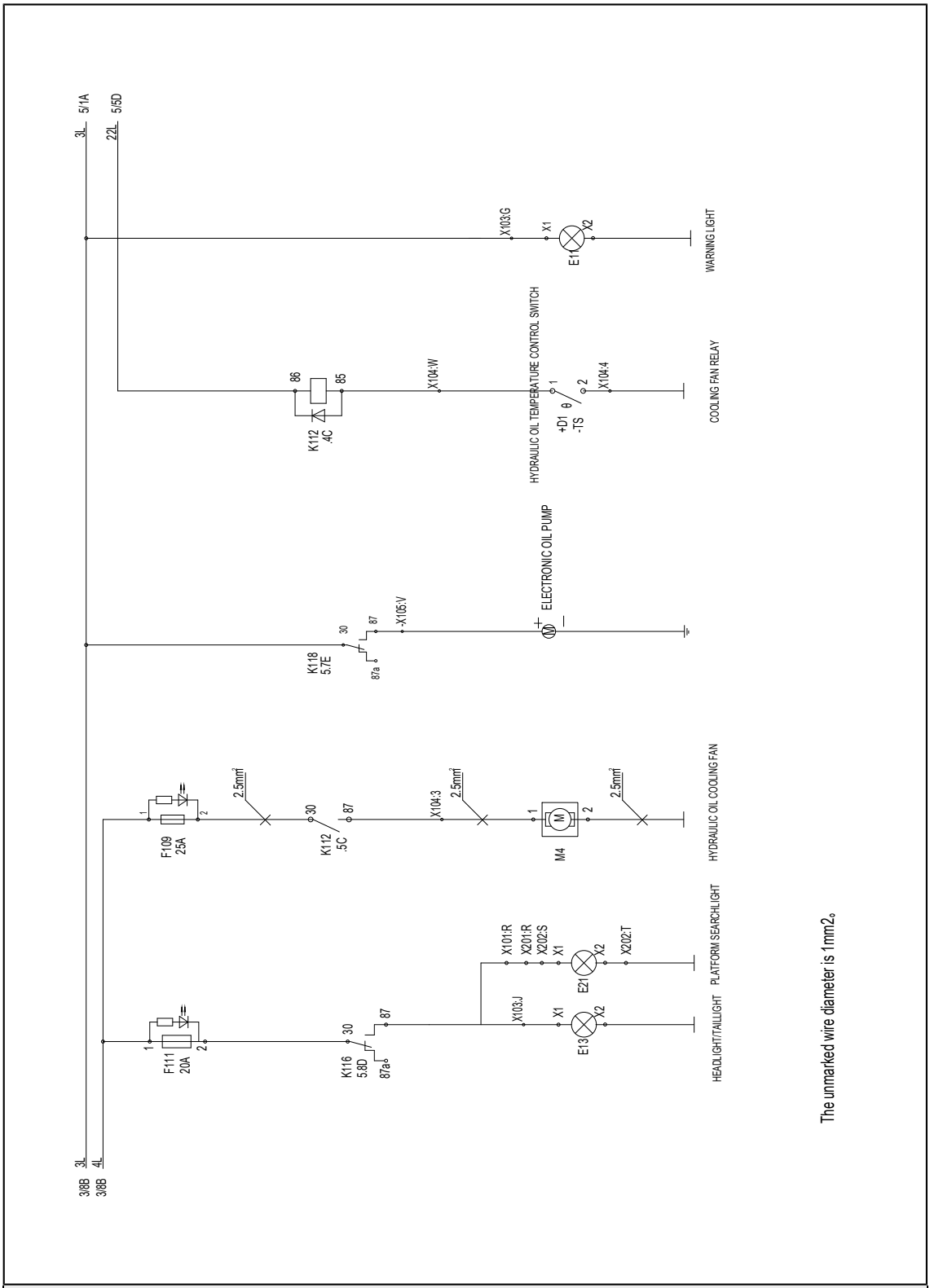


Figure 10-4 Electric Schematic 2

Table 10-5 Electric schematic 3: components list

S112	Acceleration switch
S12	Boom retraction in place detection switch
S19 S20	Wire rope detection switch
S101	Start/battery pump switch
S29	Boom 10° detection switch
S14	Front area detection switch
H11	Acoustic
H109	Buzzer
P101	Turntable display
DAL	Data logger
R101	Turntable inclination sensor
R102	Length and angle sensor

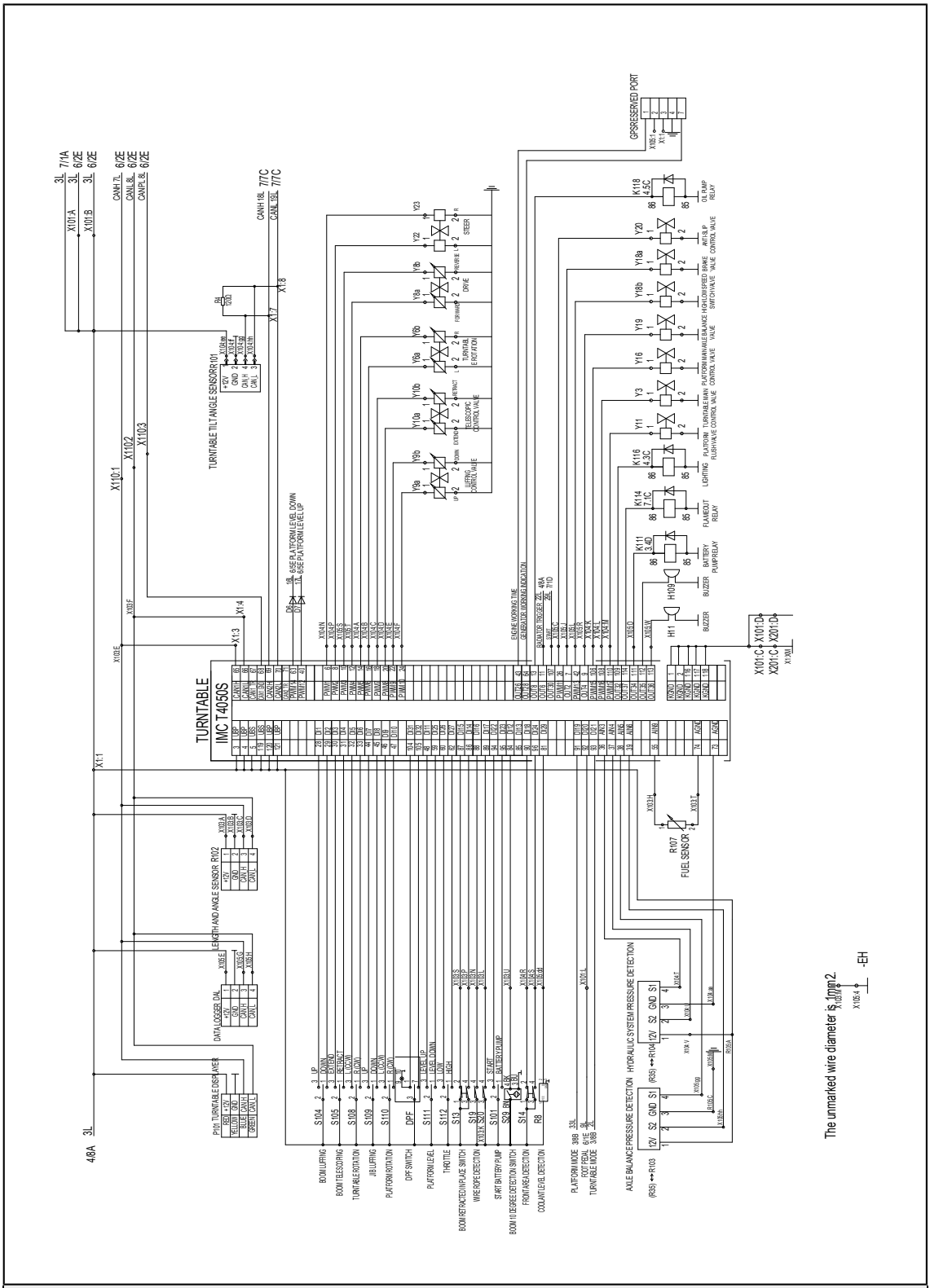


Figure 10-5 Electric schematic 3

Table 10-6 Electric schematic 4: Component List

R201	Weighting sensor
R205	Platform title sensor
S21	PlatformPlatform active defense switch
S25	Jib boom detection switch
P201	PlatformPlatform display
H202	PlatformPlatform illuminating light
H208	Buzzer
S203	Platform E-stop switch
S216	Horn

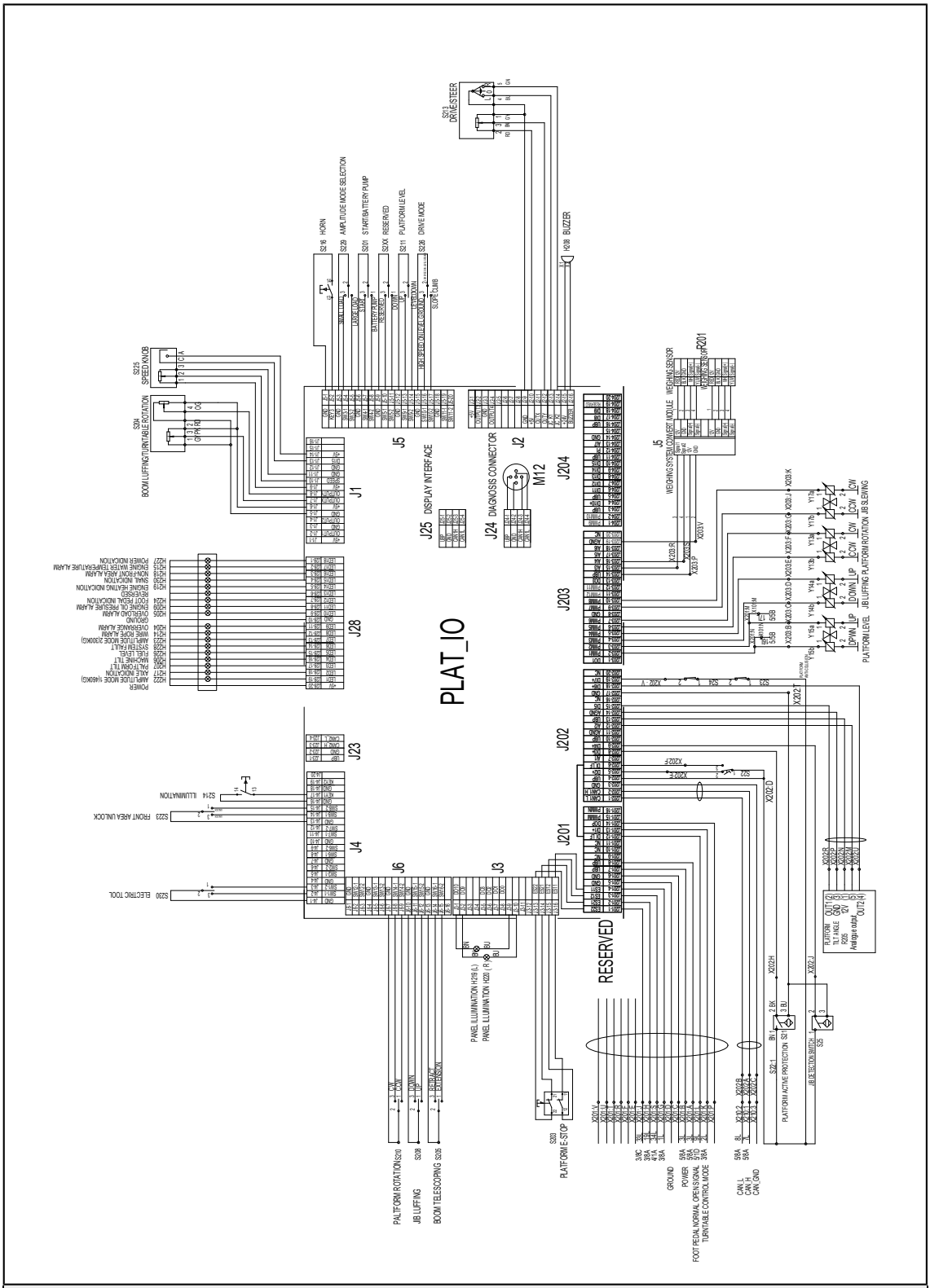


Figure 10-6 Electric schematic 4

Table 10-7 Electric schematic 5: component list

K101	Starting relay
K110	Heating relay
K114	Start/stop control relay
KMain	Master contactor

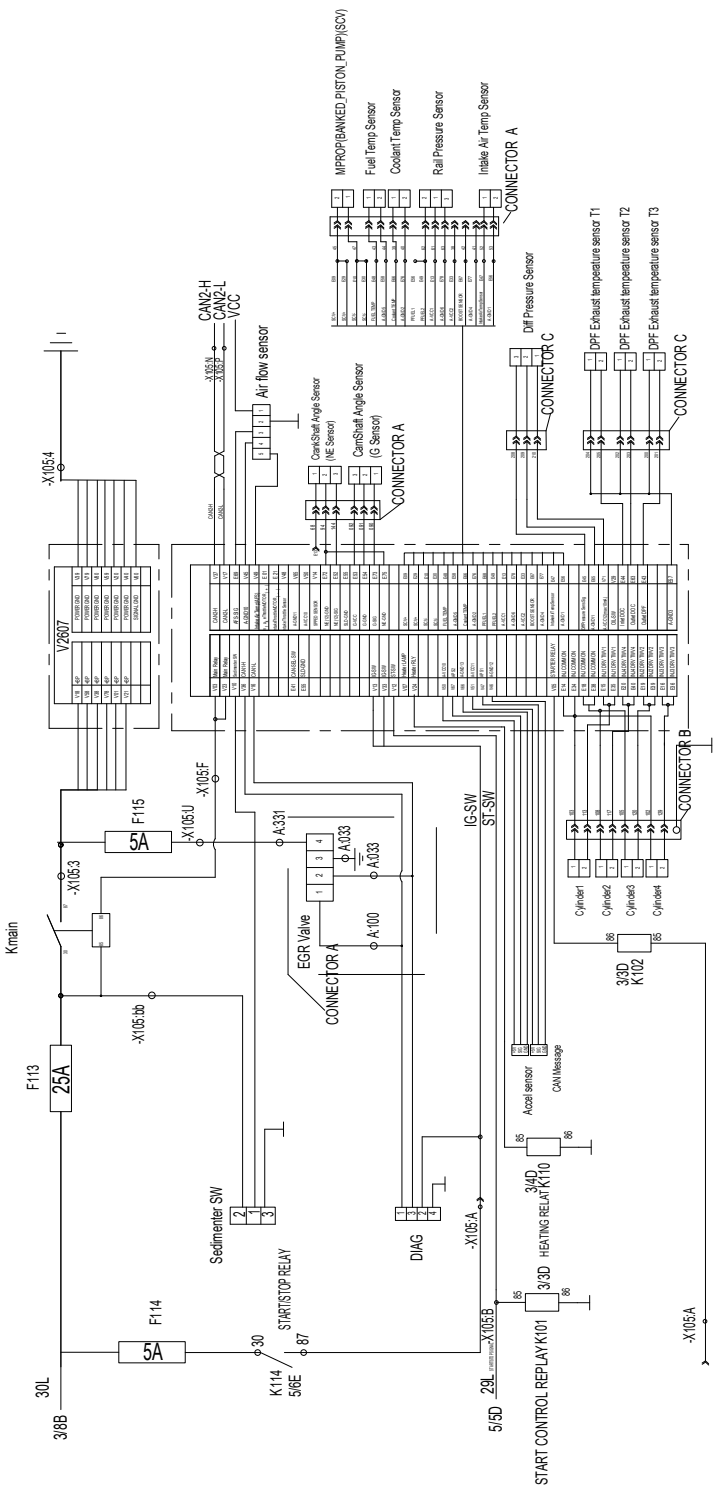


Figure 10-7 Electric schematic 5

Chapter 11 Decommissioning and disposal

11.1 Properly disassemble the unit

⚠CAUTION!

Hazards during disposal

- **Improper disassembly increases the risk of accidents!**
- **Contact your XCMG partner for proper disassembly of the machine.**
- **Disassemble the machine into its individual parts according to the instructions of your XCMG partner**

NOTICE!

Property and environmental hazards

- **Safety and environmental protection should be in focus**
- **Please ensure negative impacts are avoid during disposal of packing materials, cleaning agents, consumables, components and after end of life, the entire machine.**

If the product needs to be taken out of service, different regional regulations apply for decommissioning/ disposal the product.

The product must be disposed of in accordance with the respective regional regulations. Contact your local XCMG dealer for more information.

Follow all local regulations for the disposal of materials liquids.

Improper waste disposal endangers the environment.

Potentially harmful liquids must be disposed of in accordance with the applicable regulations.

Always use leak-proof containers when draining fluids. Do not pour used fluids onto the floor, down a drain, or into a water source.

XCMG equipment do not contain asbestos.

⚠CAUTION!

Hazards from asbest dust

Avoid inhaling dust generated dust that may be generated when handling asbestos fiber can be generated. Inhalation of this dust is harmful to health.

When handling parts containing asbestos fibers or asbestos debris, during disposal follow these guidelines:

Components that may contain asbestos fibers include
Brake pads, brake bands, brake linings, clutch plates and some gaskets. The asbestos contained in these parts is bound or sealed with resin. bound or sealed. Normal handling is not dangerous as long as no asbestos dust is generated is produced that can become airborne.

If asbestos dust is present, the following guidelines must be followed:
Never use compressed air for cleaning.
Do not brush on asbestos-containing material.
Do not grind on asbestos-containing material.
Clean asbestos-containing material wet.
You can also use a vacuum cleaner with a HEPA, High Efficiency Particulate Air filter

Use an air-suction system for machining during disposal work.
If the dust cannot be kept away in any other way, use an approved dust mask.
Avoid places where asbestos particles may be in the air.
When disposing of asbestos, follow the relevant environmental regulations when disposing of asbestos.
European Directive 98/391/EWG for Occupational Safety and Health (OSH) by the European Agency for Safety and Health at Work.
The rules and regulations are applicable to the workplace. In the USA, the Occupational Safety and Health Administration (OSHA) Administration (OSHA) regulations must be followed. These OSHA regulations can be found in “29 CFR 1910.1001”.
In Japan, in addition to the requirements of the Industrial Safety and Health Act, the requirements in “Ordinance on Prevention of Health Impairment due to Asbestos” must be observed.

11.2 Disposal

Follow regulations that apply to your region and dispose the materials in a professional safe and environmentally friendly way.

NOTE recycling may become easier in case when materials meant for disposal are properly sorted.

Chapter 12 Warranty

12.1 Warranty regulation

1. Application Area

   This clause is applied to all regions in Mainland of China.

2. Application Product

   This clause is applied to boom-type MEWPs manufactured by XCMG FIRE-FIGHTING SAFETY EQUIPMENT CO., LTD (hereinafter referred to as XCMG Fire-Fighting).

3. Warranty Period and Coverage:

   The warranty time of boom-type MEWPs manufactured by XCMG Fire-Fighting is: calculated from the delivery date (date of filling in customer pick-up registration form), the warranty coverage is as follows:

   1) The following items enjoy a 60-month warranty period:

   2) The following items enjoy a 24-month warranty period:

      ①Main hydraulic system components (under normal use and maintenance): hydraulic cylinder, hydraulic pump, hydraulic control valve lock, slewing bearing, slewing motor, slewing reducer, travel motor, and travel reducer.

      ②Main electrical system components (under normal use and maintenance): tilt sensor, length and angle sensor, weighting sensor, angle sensor, controller and solenoid valve.

   3) The following items enjoy a 12-month warranty period:

      ①Electrical control system components: detection switch, display, and joystick.

      ②Other main components: radiator, slewing center, shaft, pin, bearing, fuel tank, hydraulic tank, etc.

   4) For replacement service of above damaged parts/components provided by XCMG Fire-Fighting, the replaced parts/components shall be owned by XCMG Fire-Fighting.

   5) The warranty period of replaced parts within warranty coverage during the warranty period of machine will automatically terminate with the machine’s warranty period.

   6) For products with special requirements, the warranty regulation shall be executed according to the contract signed by both parties.

   Due to quality problems, XCMG Fire-Fighting shall offer repair service for free or replace service for free if the parts cannot be repaired or cannot meet the performance requirements after repair.

4. Parts/Components not Covered by Warranty:

   1) Fading, damage, peeling, etc. of paint on the appearance of the machine and its components.

2) The parts that are easy to damage, wear, age and break, such as rubber (plastic) parts, tires, transmission belts, exhaust cylinders, signs, sealing elements, standard fasteners, slides, copper sleeves, brake friction pads for walking and slewing mechanisms, etc.

3) Electrical components: batteries, bulbs, fuses, wires, cables, connectors, etc.

4) Various oils, greases, antifreeze, various filters, external decorative sheet parts, etc.

5. Limited Warranty Coverage for Other Special Parts:

1) For the warranty of the engine, please refer to “Operation and Maintenance Manual” or “Warranty Manual” from the engine supplier. Please refer to the specific regulation from the manufacturer of the engine configured on the MEWP you purchased for the first maintenance.

2) Various high-pressure and low-pressure hoses: Within 12 months from the purchase date (subject to the effective repair feedback record), under normal use and maintenance, the hoses shall be repaired or replaced for free if there is any oil leakage at hose head, fracture or hose wall bubble burst.

3) Electrical instruments and switches: Within 12 months from the date of purchase (subject to the effective repair feedback record), under normal use and maintenance, the parts shall be repaired or replaced for free.

4) Sound and light alarm devices, door lock hinges and air springs and other hardware: Within 12 months from the date of purchase (subject to the effective repair feedback record), under normal use and maintenance, the parts shall be repaired or replaced for free due to the following problems: Burnout or malfunction of sound and light alarm devices caused by water intake such as horns, buzzers, strobe lights, etc.; serious rust and fracture of hardware such as door lock hinges.

5) For products with special requirements, the warranty regulation shall be executed according to the contract signed by both parties.

6) A 12-month warranty is provided for imported parts and components of the machine, and the warranty period of more than 12 months is limited to domestic parts.

6. Malfunctions or Damages Caused by the Following Reasons is Excluded from the Warranty

1) Machine malfunctions caused by use, maintenance and adjustments that fail to comply with the “Operation Manual” from XCMG Fire-Fighting and related component instructions.

2) Machine damages or malfunctions caused by failure to comply with the “Operation Manual” from XCMG Fire-Fighting and other relevant safety operation regulations and failure to operate and use correctly.

3) Machine damages caused by continued use after malfunction without the authorization of XCMG Fire-Fighting.

4) The machine is disassembled or modified without authorization.

5) Parts or components of other manufacturers is used to replace original parts/components or approved replacement parts or accessories without the authorization of XCMG Fire-Fighting.

6) Machine or parts/components is damaged or malfunctioned by failure to fill and replace engine oils, gear oils and fuels in accordance with the grades specified in the “Operation Manual” of XCMG Fire-Fighting.

7) Customers need to check and tighten the bolts in all parts of the machine regularly according to service condition. XCMG Fire-Fighting shall not be liable for product damage and other responsibilities caused by bolts not tightened in place.

8) The follow-up machine damages or malfunctions caused by maintenance work in a repair shop which is not authorized by XCMG Fire-fighting.

9) If the actual product is not consistent with the nameplate, certificate or serial number of the machine of XCMG Fire-Fighting and valid proof cannot be provided, the warranty will not be provided.

10)If there is no complete maintenance record of the machine, the warranty will not be provided.

7. XCMG Fire-Fighting’s MEWPs are special products, so personnel must operate and regularly maintain according to the operation and maintenance manuals; Otherwise, XCMG Fire-Fighting will not accept product damage and operation accidents caused thereby.

12.2 Machine return and exchange agreement

12.2.1 Machine change agreement

1. The customer must submit an replacement application (subject to valid application record) within 1 month after sale and the main function of the product has a serious failure that cannot be repaired (due to manufacturing or design reasons).
2. If the customer does not meet the requirements of term 1, he/she is willing to bear the traffic fees and transportation costs paid for the replacement formalities, and pay the vehicle depreciation fee (depreciation fee is calculated at 3‰ per day), and bear the cost of the damage to the product or its parts/components caused by his/her own responsibility.

If the above terms are met and approved by XCMG Fire-Fighting in accordance with the prescribed procedures, the customer can change machine after signing a machine replacement agreement with XCMG Fire-Fighting. The replacement of machine of same model, specification, configuration and engine is not affected by the replacement of sales price. The replacement of machine with different models, specifications, configurations and engines shall be carried out after filling price difference based on the sales price.

12.2.2 Machine return agreement:

1. The customer must submit a return application (subject to valid application records) within 15 days after sale and the main function of the product has a serious malfunction that cannot be repaired (due to manufacturing or design reasons).
2. If the customer does not meet the requirements of term 1, he/she is willing to bear the traffic fees and transportation costs of return formalities, and pay the vehicle depreciation fee (depreciation fee is calculated at 3‰ per day), and is willing to bear the cost of the damage to the product or its parts/components caused by his/her own responsibility.

If the above terms are met and approved by XCMG Fire-Fighting in accordance with the prescribed procedures, the customer can return machine after signing a machine return agreement with XCMG Fire-Fighting. After the agreement is fulfilled, the rights and obligations between XCMG Fire-Fighting and the customer shall terminate immediately.

12.3 Agreement on handling major accidents:

In the process of using the machine, boom fracture, operating tipover, traveling tipover, or accidents involving heavy personal casualties and property losses are classified as serious accidents. If a major accident has happened, the customer shall preserve the accident site and notify local representative office of XCMG Fire-Fighting as soon as possible.

After the accident handling personnel of XCMG Fire-Fighting arrive at the site, the customer shall cooperate to collect relevant data actively, describe the process of the accident truly and completely, assist to question the person concerned and collect evidence, and cooperate to make relevant record, so that XCMG Fire-Fighting can quickly and effectively handle the accident and related aftermath matters for customers.

If a major accident occurs due to product quality, XCMG Fire-Fighting shall take corresponding compensation liability. If a major accident is not caused by product quality (such as a customer or a third party's illegal operation, illegal driving, etc.), XCMG Fire-Fighting will not accept any consequences and assume relevant responsibility.

12.4 Limited liability

Regardless of whether the customer's claim against manufacturer and dealers can be found in the warranty clauses, whether the claim complies with the provisions of the contract, or weather the claim involves civil torts caused by negligence or dereliction of duty, XCMG Fire-Fighting or authorized dealers only assume limited liability for the losses, damages or expenses incurred by problems in the design, production, and sales process. Unless it is contrary to the contract or Chinese national law, in any case, the cost of XCMG Fire-Fighting or its authorized dealers for fulfilling the liability shall not exceed the value of the machine or accessory itself that caused such liability.

12.5 Exemption clauses

In addition to fulfilling the obligations stipulated in the warranty clauses, XCMG Fire-Fighting or authorized dealers shall not be liable for any loss, damage or expense caused by the following reasons:

1. XCMG Fire-Fighting shall be take the warranty responsibility for the parts and components within the warranty period, not including any liability for personal and property damage caused by any illegal operation.
2. Only the loss of function caused by material quality and manufacturing process within the warranty period is covered by the warranty and no other related loss liability (such as construction period delay, etc.) is assumed.
3. XCMG Fire-Fighting is not responsible for compensation for contracts, agreements and other civil, commercial, and maritime related-disputes (such as profit and loss, breach of contract or lease losses) caused by machines or parts.
4. XCMG Fire-Fighting shall not be liable for losses caused by the theft of machine or its accessories or any damage not caused by the machine itself.
5. Any other economic or commercial losses and special or serious damages (unless the compensation for a certain serious loss is the obligation of manufacturers and dealers expressly given by local law).
6. The machine that the customer refuses to let XCMG Fire-Fighting inspect and maintain.
7. The customer shall not occupy, discard or detain the defective parts replaced for any reason or excuse. If the customer does not return the defective parts in their entirety to the service personnel of XCMG Fire-Fighting, XCMG Fire-Fighting has the right to refuse or terminate after-sales service.
8. The third party, customers or dealers should be liable for the faults.
9. Due to accidents or force majeure which can not be controlled or overcome.
10. Circumstances under which government (national) laws and regulations provide for exemption from liability or where the parties agree to exempt from liability.

12.6 Risk and advantage

The customer accepts the above warranty and exemption clauses as part of the agreed price at the time of product purchase. The customer and XCMG Fire-Fighting can also reach a supplementary agreement on the warranty and exemption clauses, but the corresponding product price should be renegotiated and determined in writing. If the customer does not agree to change the price in accordance with this term, it shall be deemed to have agreed to deal with it in accordance with item 4 of this agreement and agree that XCMG Fire-Fighting shall take limited liability.

XCMG Fire-Fighting Safety Equipment Co., Ltd reserves the right to interpret this warranty manual.

This warranty manual is an integral part of the product sales contract and has the same legal effect as the sales contract. XCMG Fire-Fighting has clearly informed customers about the warranty coverage, return and exchange agreement, exemption clauses, limited liability clauses, risk and advantage, etc.; The customer has understand their rights and obligations; Both parties agree that this warranty manual is binding on both parties.

★In order to maintain your machine in normal operation, please pay attention to regular maintenance according to the technical requirements of this manual.

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XCMG**Fire-Fighting** Safety Equipment., LTD. keeps abreast of the latest technical developments and constantly improves their products.
For this reason, we may from time to time need to make changes to figures and descriptions in this documentation which do not reflect products that have already been delivered and that will not be attached on these machines.
Technical data, dimensions and weights are only given as an indication. Responsibility for errors or omissions is not accepted. Non-metric weights and measurements are approximate. Translation of original Operation and Maintenance Manual.
The cover features the machine with possible optional equipment.
Photographs and graphics are symbolic representations and may differ from the actual products.
The Operation and Maintenance Manual and any amendments to it must be constantly available at the place of use of the vehicle. Possible amendments are included at the end of the Operation and Maintenance Manual.

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