


## 6.4. Routine maintenance

We recommend the following ordinary routine maintenance operations

	WHERE	WHAT	MACHINE STATUS	HOW	TYPE OF LUBRICANT
Daily		Check locking latch movement	Make sure latch operates freely.	By clicking of the lock	
		Check for oil leakage		Visually	
		Check forks and carriage for damage		Visually	
Monthly		Tank filling	Lower lift check oil level in oil tanks on each column:	Open Power Unit Cover.	If necessary, add ISOAW46 or ISOAW32 hydraulic oil, until it reaches the full mark on the tank
		Examine Cords	Check the condition of the charging cord and the communication cords on each column.	Replace worn or broken cords as required.	
		Inspect battery terminal connections	Make sure they are clean and residue free	Visually	
		Check that the down stop catch pawl rotates forward and backward freely		Manually	
		Inspect structure for damage to contact surfaces, excessive wear, damaged or cracked welds and/or any abnormal conditions that could affect performance		Visually	
		Review all cables and cable connections for damage		Visually	
		All warning and capacity labels should be readable and complete.	Wash external surfaces of lift, labels, and decals with a mild soap solution.	Visually	
2 years		Change Fluid		See procedure 6.4.1.	

**Periodically check the electrical safety devices and report any faults to the Service Centre.**

#### 6.4.1. Oil change procedure

- Columns must be completely lowered.
- Remove cover panel from power unit.
- Clean around the surface of the oil fill plug
- Remove oil from power unit tank.
- Refill with approximately 12 liters of hydraulic oil meeting ISOAW46 or ISOAW32, into the tank.
- Check oil level in oil tanks on each column, add if necessary.
- Allow at least 1" of air gap at the top for fluid expansion and to prevent spilling when moving the lift unit.
- Install the oil fill plug and clean up any spilled oil and operation.
- Install the cover
- Dispose of waste oil according to legal regulations

To restart the column, perform some cycling in order to bleed the air from the hydraulic circuits.

#### Note:

- Do not use brake or transmission fluid
- Use of the wrong fluid can deteriorate the seals and corrosion problems will occur.
- If the lift carriage does not rise to full height before the pump cavitates, or jumps check for air in the system.
- See for instructions on how to bleed air from the hydraulic system.

#### 6.4.2. Bleeding air from hydraulic

By filling the tank and the cylinder by oil the first time, a certain amount of air remains trapped inside and the lift carriage can jump.

To remove the trapped air perform some cycling, avoiding to reach the end of the stroke of the cylinder

There are two procedure that can be used :

- a) By using the column as an operator, connect two columns on a group and move one single column at a time
- b) By entering at level 3 , move a single column alone

## 6.5. BATTERY

### 6.5.1. Battery Charging

Battery chargers have to be plugged when needed.

Life of the battery depends from the regular charging (for example, after every use), and not allowed to be fully discharged.

The charging level is indicated by a symbol on the operator display

The supplied battery charger is intended for use with any type of batteries.

The front panel shows the status of the battery charging level; a yellow light indicates that the battery is partly discharged and should be recharged. A red light indicates that you are near the end of the battery capacity and may not have enough energy left to complete a fully loaded lift cycle; the batteries must be recharged.

A green light indicates a full charge instead.

As a reference, a fully discharged battery will need to be recharged overnight to be fully restored.

If a single lift is required, a short charge time (such as 30 minutes) should restore the batteries enough for a fully loaded lift cycle.

Battery performance will depend on

- the brand of battery selected,
- the battery specifications,
- the battery maintenance
- the number of charging operations of the batteries.

**CAUTION: The area should be well ventilated when charging batteries**

The battery charger provided on each lift unit is a “smart” charger. The battery charger automatically goes through several different stages of charging to properly charge the batteries.

The lights on the battery charger indicate the current stage of charging.

A flashing or solid yellow light indicates the charger is in the bulk

charging mode.

A flashing or solid green light indicates the battery is fully charged and the charger has switched to its maintenance charge mode.

The battery charger can be left plugged in indefinitely without harming the batteries.

#### **NOTICE:**

*Only use the supplied battery charger to charge the batteries.*

*The supplied battery charger is designed for the type of the lift batteries.*

*Do not use a different charger in order to avoid under or overcharging and reduce the life and capacity of the batteries.*

### 6.5.2. Battery Information

#### 6.5.2.1. Battery Type

Each lift unit is equipped at the factory with two wet cell, deep cycle batteries.

These batteries have been selected to match the usage conditions found on the lift unit.

If replacement batteries are needed, it is recommended to use only the same brand and model of batteries originally supplied with the lift unit.

Do NOT mix old and new batteries or use different types/brands of batteries on the same lift unit.

#### 6.5.2.2. Battery Maintenance

### REFER TO THE MAINTENANCE INSTRUCTIONS OF THE BATTERIES SUPPLIED WITH THE COLUMN

According to the main international standards a battery is considered at the end of its service life whenever delivering less than 80% of its nominal capacity.

All Lead Acid Batteries emits gases during the charge process. FIAMM VRLA batteries have a high recombination efficiency (>98%) and for cells operated at 20°C under normal operating conditions venting is virtually negligible.

The quantity of gas given off in the air (it basically consists of 80-90% hydrogen) is very low and thus it is clear that FIAMM VRLA batteries can be installed in rooms containing electric equipment with no explosion danger or corrosion problems under normal conditions. In any case these rooms or cabinets must have a natural or forced ventilation and not be fully sealed.

#### 6.5.2.2.1. SAFETY

is recommended that full precautions be taken at all times when working on batteries.

The safety standards of the country of installation must be risk, explosives gasses, heavy components,

#### Protective Equipment

Make sure that the following equipment is available to personnel working with batteries:

- Instructions manual.
- Tools with insulated handles.
- Fire extinguisher.
- PPE (Personal Protective Equipment) must be worn (glasses,

gloves, aprons etc ... ).

To avoid static electricity when handling batteries, material of clothing, safety boots and gloves are required to have a surface resistance  $0 \leq 108 \Omega$ , and an insulation resistance  $\geq 105 \Omega$

- First aid equipment must be available.

#### Safety Precautions

Observe the following precautions at all times:

- Batteries are no more dangerous than any other equipment when handled correctly
- Do not allow metal objects to rest on the battery or fall across the terminals (even when disconnected, a battery remain charged!).
- Never wear rings or metal wrist bands when working on batteries.
- Do not smoke or permit open flames near batteries or do anything to cause sparks.
- Do not try to remove the battery cap to add water or acid into the cell(s).
- Never lift or pull up the battery at the terminals.
- Air exchange must be provided to prevent the formation of explosive hydrogen concentration.
- For further information please refer to EN 50272-2
- Safety requirements for secondary batteries and battery installations Part 2: Stationary batteries.

#### Battery Disposal

Lead acid batteries must be disposed according to the country law. It is strongly recommended to send batteries for recycling to a lead smelter. Please refer to the local Standards for any further information, these batteries need to be collected separately for waste disposal. As of the 31st of December 1994, all Valve Regulated Lead Acid (VRLA) battery has to have the following symbols present in conformance to EG-guideline 93/86/EWG Pb

### **6.5.2.2.2. MAINTENANCE**

#### **Battery care**

GASES GIVEN OFF BY BATTERIES ON CHARGE ARE EXPLOSIVE!  
DO NOT SMOKE OR PERMIT OPEN FLAMES OR DO ANYTHING TO  
CAUSE SPARKS NEAR BATTERIES.

1. Keep the battery and surroundings clean and dry.
2. Make sure that bolted connections are properly tightened (see table in INSTALLATION paragraph).
3. Usually it is not necessary to apply grease on the bolts and connectors, in any case "No-oxide" grease increase the protection against corrosion.
4. Should any corrosion of the connections occur because of spilled acid, etc., carefully remove corrosion materials, thoroughly clean and neutralize with diluted ammonia or baking soda.
5. Keep the battery at the recommended charge voltage (see CHARGING section).
6. The room in which the battery is installed should be well ventilated and its temperature as close as possible to 20°C.
7. Do not try to open the cover valve.

#### **Cleaning**

When necessary, batteries could be cleaned using a soft dry antistatic cloth or water-moistened soft antistatic cloth paying attention not to cause any ground faults.

No detergent nor solvent-based cleaning agents nor abrasive cleaners should be used as they may cause a permanent damage to the battery plastic container and lid.

#### **Voltage checks**

All voltage measurements should be made when the whole battery has stabilized on floating, at least 7 days after battery installation or after a discharge/ charge cycle.

To facilitate voltage reading in the correspondence of each block terminal

protection covers are designed with a safe and proper hole. Measure and record individual block voltages on float once a year. It is normal to have a spread of block voltages at 20°C up to 2.27 +0.2/-0.1 V (13.62 +0.54/-0.29 for a 12 volt battery) particularly in the first year of operation. No corrective action is required in this case. Maintaining a correct battery charging voltage is extremely important for the reliability and life of the battery. So it is advisable to carry out a periodical checking of the overall float voltage to verify any possible defect of charger or connections.

#### **Cell Appearance**


Any cells showing corrosion, container bulging, high temperature than the other cells, should be regarded as suspect. Such cells should be carefully examined and, expert advice should be obtained immediately from FIAMM.

#### **Pilot Cell**

For regular monitoring of the battery condition, select one or more cells of the battery as a "pilot" cell(s); for batteries comprising more than 60 cells, select one pilot cell for every 60 cells.

## Periodic Inspections

Written records must be kept of battery maintenance, so that long-term changes in battery condition may be monitored. The following inspection procedures are recommended:

	WHAT	HOW
EVERY SIX MONTHS	Visual inspection on cells/racks	appearance, cracks or corrosion signs, electrolyte leakage.
	check and record the overall float voltage at the battery terminals	not at the charger!
	measure and record the pilot cell(s) voltage	
	measure and record the pilot cell(s) electrolyte specific gravity	
	measure and record the pilot cell(s) electrolyte temperature	
	electrolyte level	
	room ventilation	
YEARLY	check and record the voltage of all cells	
	measure and record electrolyte specific gravity of all cells	
	measure and record the pilot cell(s) electrolyte temperature	
	make sure all connection are torqued according to connection torque table; in case of frequent high discharge current please consider to check	
	visual inspection on cells/rack	electrolyte level, corrosion signs
	clean cells	