PIATTAFORME AEREE SEMOVENTI
SELF-PROPELLED WORK-PLATFORMS
PLATES-FORMES DE TRAVAIL AUTOMOTRICES
SELBSTFAHRENDE HUBARBEITSBÜHNEN
PLATAFORMAS ELEVADORAS AUTOPROPULSADAS
ZELFRIJDENDE HOOGWERKERS
SJÄLVGÅENDE ARBETSPLATTFORMAR
SAMOKRETNE RADNE PLATFORME

"A" SERIES
A12 A13 J

USE AND MAINTENANCE MANUAL
- ENGLISH - ORIGINAL INSTRUCTIONS

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2010-01	• Update due to new machine directive 2006/42/EC. • Model names updated.
2010-11	• Biodegradable oil instructions introduced • Temperatures and oil list updated.
2011-05	• Amended information on “Commissioning and first inspection, subsequent inspections and title transfer report”. • Added “Total quantity of battery electrolyte” in Technical Data. • Corrected "Max. power" diesel engine and inserted "Adjusted Power"
2013-10	• Specified instructions for harness anchoring points
2014-09	• Inserted information on maximum limits of manual forces. • Changed Name and Surname of CEO.
2015-01	• CE conformity declaration updated. • Added position of hands instruction
2015-10	• Type of usable hydraulic oil updated. • Added indication for spare parts. They must be original or approved by the manufacturer of the machine in any way. • Added "Leaving at height”. • Updated system/battery charger ignition procedure.
2015-12	• Modified overload controller calibration procedure, removed insulation loss Sensor
2018-07	• Data sheets were added with units of measurement of the international system and US unit of measurement. • Changed Name and Surname of CEO. • Unified First and Second Part.
2019-07	• Updated procedure description of commissioning declaration in Italy.
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2020-02	• Removed A10 AND, A12 EB models • Updated paragraph 5.6 “Manual emergency controls”: procedure for alternative hydraulic block added • Updated wiring diagram for control system unification with A16 J – A18 J. • Updated images and instructions for use and calibration of components of the new control system • Updated information on engine oil, hydraulic oils and lubricating greases • Corrected the technical data converted to the US measuring system • Updated facsimiles of EC declarations of conformity: monolingual text.

Tigieffe thanks you for purchasing a product of its range and invites you to read this manual. Here you can find all the necessary information for a correct use of the purchased machine; therefore, you are advised to follow the instructions carefully and to read the manual thoroughly. The manual should be kept in a suitable place where no damage can occur to it. The content of this manual may be modified without prior notice and further obligations in order to add changes and improvements to the units already delivered. No reproduction or translation may take place without the written permission of the owner.

Contents:

1.	**INTRODUCTION**	**7**
1.1.	Legal aspects	7
1.1.1.	Delivery of the machine	7
1.1.2.	Declaration of commissioning, first check, further periodical checks and transfers of ownership	7
1.1.2.1.	Declaration of commissioning and first check	7
1.1.2.2.	Further periodical checks	8
1.1.2.3.	Transfers of ownership.	8
1.1.3.	Operator training and information	8
1.2.	Tests performed before delivery	8
1.3.	Intended use	8
1.3.1.	Leaving at height	9
1.4.	Description of the machine	9
1.5.	Control panels	10
1.6.	Power supply	10
1.7.	Machine life, demolition and decommissioning	10
1.8.	Identification	11
1.9.	Location of main components	12
2.	**TECHNICAL FEATURES OF STANDARD MACHINES**	**13**
2.1.	Model A12 E	13
2.2.	Model A12 ED	15
2.3.	Model A13 JE	18
2.4.	Model A13 JED	20
2.5.	Vibrations and noise	23
3.	**SAFETY PRECAUTIONS.**	**24**
3.1.	Personal protective equipment (PPE)	24
3.2.	General safety norms	24
3.3.	Use instructions	25
3.3.1.	General	25
3.3.2.	Handling	25
3.3.3.	Operating procedures	27
3.3.4.	Wind speed according to Beaufort scale	28
3.3.5.	Pressure of the machine on ground and load-bearing capacity of ground	29
3.3.6.	High-voltage power lines	30
3.4.	Hazardous situations and/or accidents	30
4.	**INSTALLATION AND PRELIMINARY CHECKS**	**31**
4.1.	Becoming acquainted with the machine	31
4.2.	Preliminary operation checks	31
5.	**USE INSTRUCTIONS**	**32**
5.1.	Platform control panel	32
5.1.1.	Drive and steering	34
5.1.2.	Platform positioning movements	35
5.1.2.1.	Pantograph (lower boom) lifting/lowering	35
5.1.2.2.	Upper boom lifting/lowering	35
5.1.2.3.	Jib lifting/lowering (A13 J only)	35
5.1.2.4.	Telescopic boom extension/retraction	35
5.1.2.5.	Turret orientation (rotation)	35
5.1.2.6.	Platform rotation	36
5.1.2.6.1.	Platform rotation A12 (OPTIONAL)	36

5.1.2.6.2. Platform rotation A13 J 36
5.1.2.7. Platform levelling 36
5.1.3. Other functions of the platform control panel 37
5.1.3.1. Selection of electric/thermic drive power (“ED” models) 37
5.1.3.2. Heat engine start key (“ED” models) 37
5.1.3.3. Manual horn 37
5.1.3.4. Emergency stop 37
5.1.3.5. Fault warning light 37
5.1.3.6. Overload warning light 38
5.1.3.7. Voltmeter 38
5.1.3.8. Fuel level indicator (OPTIONAL for “ED” models) 38
5.2. Ground control panel and electric control unit 39
5.2.1. Ground control panel 39
5.2.1.1. On-off key and control panel selector (A) 40
5.2.1.2. Emergency stop button (B-N) 40
5.2.1.3. Powered-on machine warning light (C) 40
5.2.1.4. Platform control levers (D-E-F-G-H-L) 41
5.2.1.5. Battery charger light (I) 41
5.2.1.6. User interface display (M) 41
5.2.2. Electric control unit on the ground 42
5.3. Platform access 43
5.4. Machine start-up 44
5.4.1. Diesel engine start-up (“ED” models) 44
5.5. Machine stop 45
5.5.1. Normal stop 45
5.5.2. Emergency stop 45
5.5.3. Diesel engine stop (“ED” models) 45
5.6. Emergency manual controls 46
5.6.1. Hydraulic block of type A 46
5.6.2. Hydraulic block of type B 47
5.7. Socket for electric tool connection (Optional) 48
5.8. Fuel level and re-fuelling (“ED” models) 49
5.9. End of work 49
6. HANDLING AND CARRYING 50
6.1. Handling 50
6.2. Transportation 51
6.3. Emergency towing of the machine 52
7. MAINTENANCE 53
7.1. Machine cleaning 53
7.2. General maintenance 54
7.2.1. Various adjustments 55
7.2.2. Greasing 56
7.2.3. Hydraulic circuit oil level check and change 57
7.2.3.1 Biodegradable hydraulic oil (Optional) 58
7.2.3.2 Emptying 58
7.2.3.3 Filters 58
7.2.3.4 Washing 58
7.2.3.5 Filling 58
7.2.3.6 Commissioning / check 58
7.2.3.7 Mix 59
7.2.3.8 Micro-filtration 59
7.2.3.9 Disposal 59
7.2.3.10 Topping up 59
7.2.4. Suction filter replacement 60
7.2.5. Drive reduction gear oil level check and change 61
7.2.5.1 Checks in the use of synthetic biodegradable oil in drive reduction gears (Optional) 61
7.2.6. Telescopic boom sliding blocks clearance adjustment 62
7.2.7. Pressure relief valve adjustment and operation check 63

7.2.8. Operation check and adjustment of the braking valves 64
7.2.9. Inclinometer operation check 65
7.2.10. Operation check and adjustment of platform overload controller (load cells) 67
7.2.11. Overload controller by-pass – ONLY FOR EMERGENCY OPERATIONS 69
7.2.12. Operation check of M1 microswitches 70
7.2.13. Operation check of dead-man pedal safety system 70
7.3. Starter battery for “ED” models 71
7.3.1. Starter battery maintenance 71
7.3.2. Starter battery recharge 71
7.4. “DRIVE” battery for “E” and “ED” models 72
7.4.1. General instructions for DRIVE battery 72
7.4.2. DRIVE battery maintenance 72
7.4.3. Battery charger: DRIVE battery recharge 73
7.4.4. Battery charger: fault report 74
7.4.5. Battery replacement 75
8. MARKS AND CERTIFICATIONS 76
9. PLATES AND STICKERS 77
10. CHECK REGISTER 79
11. WIRING DIAGRAM STANDARD MACHINES A12 E – A13 JE 95
12. HYDRAULIC DIAGRAM STANDARD MACHINES A12 E – A13 JE 104
13. DECLARATION OF CONFORMITY EC FACSIMILE 107

1. INTRODUCTION

This Use and Maintenance Manual provides general instructions concerning the complete range of machines indicated on the cover. Therefore the description of their components, as well as control and safety systems, may include parts not present on Your machine since supplied on request or not available. In order to keep pace with the technical development ***AIRO-Tigieffe s.r.l.*** reserves the right to modify the product and/or the use and maintenance manual at any time without updating the units already delivered.

1.1. Legal aspects

1.1.1. Delivery of the machine

Within EU (European Union) member countries the machine is delivered complete with:
- Use and Maintenance manual in your language
- CE mark applied on the machine
- CE conformity declaration
- Guarantee certificate
- Declaration of internal testing

Only for Italy:
- Instructions on commissioning declaration with INAIL and on the application for the first periodic check on the INAIL portal.

It is to be noted that the Use and Maintenance Manual is an integral part of the machine and a copy of this, together with copies of the documents certifying that the periodical checks have been carried out, must be kept on board in its suitable container. In the event of a transfer of ownership the machine must always be provided with its use and maintenance manual.

1.1.2. Declaration of commissioning, first check, further periodical checks and transfers of ownership

The legal obligations of the owner of the machine vary according to the country of commissioning. It is therefore recommended to inquiry about the procedures in force in your country from the boards responsible for industrial safety. This manual contains a final section called "Check register" for a better filing of documents and recording of any modifications.

1.1.2.1. Declaration of commissioning and first check

In ITALY the owner of the Aerial Platform must notify the use of the machine to the local competent INAIL and submit it to periodical compulsory checks. The first of such checks is performed by the INAIL within sixty days from a request being made. In the event of such time passing without the inspection being made, the employer can call in the ASL (Local Health Unit) or qualified public or private services. Subsequent checks are made by the already-mentioned parties within thirty days from a request being made. In the event of such time passing without these checks being made, the employer can call in qualified public or private services. The checks are on a payment basis and the employer (machine owner) will be charged for them. For these checks, the territorial inspection boards (ASL/USL or ARPA) and INAIL can be supported by qualified public or private services. The qualified private institutes acquire the qualification of responsible for the public service and refer directly to the public structure that controls this function.

For the commissioning declaration in Italy, it is necessary to login to the INAIL portal. Follow the instructions delivered together with other documents during the machine delivery, as well as the information about the portal.

The INAIL will assign a serial number and when the First Check is performed the “technical identification sheet” will be completed indicating only the details obtained from the already-operating machine or from the instruction manual. Such document shall form an integral part of the machine documentation.

1.1.2.2. Further periodical checks

Yearly checks are compulsory. In Italy the Aerial Platform owner must apply for a periodical check - by registered letter - to the local competent inspection board (ASL/USL or other qualified public or private services) at least twenty days before the expiry of the year from the last check.

NB: If a machine without a valid control document should be moved in an area outside the competence of the usual inspection board, the owner of the machine must ask the inspection board, competent for the new territory where the machine is to be used, for the annual check.

1.1.2.3. Transfers of ownership.

In case of transfer of ownership (in Italy) the new owner of the Aerial Platform must notify the ownership of the machine to the local competent inspection board (ASL/USL or ARPA or other qualified public or private services) by enclosing a copy of:

- Declaration of conformity issued by the manufacturer.
- Declaration of commissioning carried out by the first owner.

1.1.3. Operator training and information

The employer must ensure that the workers appointed to use the equipment are adequately and specifically trained so they are able to use the Mobile Elevating Work Platform in a proper and safe way and also avoid the risks caused by other people.

1.2. Tests performed before delivery

Before being placed on the market, each MEWP undergoes the following tests:

- Braking test
- Overload test
- Operating test

1.3. Intended use

The machine described in this use and maintenance manual is a mobile elevating work platform intended for lifting persons and materials (equipment and work materials) in order to carry out maintenance, installation, cleaning, painting, de-painting, sand-blasting, welding operations, etc.
The max. capacity allowed (which varies according to the model – see paragraph “Technical features”) is divided as follows:

- 80 Kg for each person on board.
- 40 Kg for equipment.
- The remaining load is represented by the material being worked.

In any case NEVER exceed the maximum capacity allowed as indicated in paragraph "Technical features”. Persons, tools and work materials can be loaded on the platform only from the access position (platform lowered). It is absolutely forbidden to load persons, tools and work materials on the platform when it is not in access position.
All loads must be positioned inside the cage; do not lift loads (even if complying with the maximum capacity allowed) hanging from the platform or from the lifting structure.
Do not carry large-sized panels since they increase the resistance to wind force thus causing the machine to overturn.
While the machine is being displaced with lifted platform, no horizontal loads can be loaded onto the platform (operators on board are not allowed to pull wires or ropes, etc.).
An overload controller stops the operation of the machine if the load on the platform exceeds by 20% approx. the nominal load (see chapter "General use rules”) and platform is lifted.
The machine cannot be used in areas where road vehicles operate. Always surround the working area by means of suitable signs when the machine is used in public areas.
Do not use the machine to tow trucks or other vehicles.
All types of machine use other than those for which it was designed must be approved in writing by the machine manufacturer following a specific request on the part of the user.

Do not use the machine for purposes other than those for which it was designed, except after making a request and having obtained written permission in this sense from the manufacturer

1.3.1. Leaving at height

The mobile elevating work platforms are not designed by taking into account the risks of the "leaving at height" because the only access position considered is when the platform is completely lowered. **For this reason, this activity is formally forbidden.**
However, there are exceptional conditions in which the operator needs to access or leave the work platform not in the access position. This activity is normally defined as "leaving at height".

The risks connected to the "leaving at height" do not depend exclusively on the MEWP (mobile elevating work platform) characteristics; a specific risk analysis carried out by the employer can authorize this specific use by taking into account:

- The working environment characteristics;
- The absolute prohibition to consider the work platform as a anchoring point for people working outdoors;
- The use of the machine at xx% of its performances to avoid that additional forces created by a specific operation or bending of the structure move away the access zone from the unloading zone. Provide for some tests in order to define these limitations;
- Provide for a specific evacuation procedure in case of emergency (for example: an operator always on the work platform, one at the ground control panel while a third operator leaves the lifted platform);
- Provide for a specific training of the staff both as operator and transported staff;
- Equip the unloading zone with all the devices that are necessary to avoid the risk of fall of the staff that accesses/leaves the platform.

What said above is not a formal authorization of the manufacturer for the "leaving at height", but it wants to supply information to the employer - who is fully responsible for that - which can be useful for the planning of this exceptional activity.

1.4. Description of the machine

The machine described in this use and maintenance manual is a mobile elevating work platform equipped with:

- motorized chassis equipped with wheels;
- hydraulically driven rotating turret;
- Articulated boom operated by hydraulic cylinders (the number of articulations and cylinders varies according to machine model).
- operator platform (the max. capacity varies according to the model - see chapter "Technical features").

The chassis is motorised to allow the machine to move even with lifted platform (see "Use instructions"); the two rear wheels are drive and two front wheels are steering. The drive wheels are equipped with hydraulic parking brakes, positive logic type (when drive controls are released brakes are automatically activated).
The turret rests on a turntable fixed to the chassis and can be oriented (rotated) by 360° non-continuous around the central axle of the machine by means of irreversible endless screw.
The lifting system, with articulated boom, can be divided into three main structures:

- the first, consisting of a "simple parallelogram" for lifting (boom and tie rod);
- the second, consisting of a telescopic extension of the primary boom
- the third, consisting of the terminal boom named "Jib" (for A13 J only).

Such lifting structures are driven by double-acting hydraulic cylinders:

- one cylinder for the "parallelogram" extension.
- one cylinder for the boom extension;
- one cylinder for the extension/retraction of the telescopic boom.
- one cylinder for the "jib" extension (A13 J only).

The hydraulic cylinders which move the articulated structure (except for the boom tilt sensor cylinder) are provided with over-centre valves directly flanged on the same. These devices allow the booms to remain in position even if one of the supply tubes accidentally breaks.

The platform, hinged to the end of the primary boom or of the "jib", is equipped with guard-rails and toe-boards of a prescribed height (the height of the guard-rails is ≥ 1100 mm; the height of the toe-boards is ≥ 150 mm). As an option, the platform can be rotated by a total of 140° (70° to the right and 70° to the left) by means of a rotary actuator, also provided with an over-center valve.
The platform levelling is automatic and is ensured by two cylinders in closed circuit. The manual level compensation is possible by acting on the relevant control only with completely lowered booms (and with "Jib" inclination ranging between +10° and –70° with respect to the horizontal axis).

1.5. Control panels

The machine is equipped with two control panels:

- On the platform for normal use of the machine.
- On the turret (or on the ground) you can find the emergency controls to lower or stop the machine in emergency situations, a key-selector to select the control panel and to start the machine.

1.6. Power supply

The machines can be powered by:

- An electric-hydraulic system composed of rechargeable accumulators and electric pump.
- electric/thermic dual-powered system (electro/diesel dual-powered models are identified by the abbreviation "ED").

In any case both the hydraulic and the electric systems are equipped with all necessary protections (see wiring and hydraulic circuit diagrams attached to this manual).

1.7. Machine life, demolition and decommissioning

The machine has been designed to last for 10 years in normal operating environments, if properly used and serviced. Within this period, the manufacturer must carry out a complete inspection/overhaul.
If disposal of the unit is necessary, comply with current local regulations.
In Italy, the demolition/decommissioning must be notified to the local ASL / USL or ARPA.
The machine consists mainly of metal parts which are easy to be identified (steel for the most parts, and aluminium for the hydraulic blocks); thus, we can state that the machine can be recycled at 90%.

European standards and those transposed by the member countries relating to respect for the environment and the disposal of wastes envisage heavy administrative and penal fines in case of infringement.
In case of demolition/decommissioning, carefully keep to the provisions of applicable regulations, especially as regards materials such as hydraulic oil and batteries.

1.8. Identification

In order to identify the machine, when spare parts and service are required, always mention the information given in the serial number plate. Should this plate (as well as the various stickers applied on the machine) be lost or illegible, it is to be replaced as soon as possible. In order to identify the machine when no plate is available the serial number is also stamped on the chassis. To locate the plate and the stamp of the serial number, see the following picture. It is recommended to copy such data in the following boxes.

MODEL: _____	**CHASSIS:** _____	**YEAR:** _____

Fig.1

1.9. Location of main components

The picture shows the machine and its own components.

Fig. 2

1) Control panel
2) Electric control unit
3) Hydraulic control unit
4) Hydraulic drive motors
5) Turret rotation hydraulic motor
6) 220V socket
7) Spirit level for visual check of machine levelling
8) Lifting cylinders
9) Battery
10) Power assisted steering
11) Inclinometer
12) Heat engine fuel tank
13) Overload controller sensor (load cell)
14) Turntable

2. TECHNICAL FEATURES OF STANDARD MACHINES

THE TECHNICAL FEATURES OF THE PRODUCTS IN THE FOLLOWING PAGES CAN BE MODIFIED WITHOUT PRIOR NOTICE

2.1. Model A12 E

		A12 E			
Dimensions:					
	Maximum working height	12	m	*39' 4"*	*ft*
	Max. platform height	10	m	*32' 10"*	*ft*
	Ground clearance	170	mm	*6.7*	*in*
	Max. outreach from turntable centre	6.3	m	*20' 8"*	*ft*
	Turret rotation (not continuous)	360	°	*360*	°
	Platform rotation (5)	0	°	*0*	°
	Platform height for safety speed activation	< 3	m	*< 9' 10"*	*ft*
	Internal steering radius	0.95	m	*3' 1"*	*ft*
	External steering radius	2.95	m	*9' 8"*	*ft*
	Maximum capacity (m)	200	Kg	*440*	*lbs*
	Max. number of people on the platform (n) – indoors	2		*2*	
	Tool and material weight (me) (2) – indoors	40	Kg	*88*	*lbs*
	Max. number of people on the platform (n) – outdoors	2		*2*	
	Tool and material weight (me) (2) – outdoors	40	Kg	*88*	*lbs*
	Maximum drive height	Max		*Max*	
	Maximum dimensions of platform	0.8 x 1.36	m	*2' 8" x 4' 6"*	*ft*
	Max. hydraulic pressure	210	bar	*3045*	*psi*
	Max. pressure of lifting circuit	210	bar	*3045*	*psi*
	Min. pressure of braking circuit	35 ÷ 40	bar	*508 ÷ 580*	*psi*
	Tyre dimensions (4)	Ø 584 x 324	mm	*23 x 13*	*in*
	Tire type (4)	23 x 10 - 12		*23 x 10 - 12*	
	Transport dimensions	4.15 x 1.5 x 1.97	m	*13' 7" x4' 11" x6' 6"*	*ft*
	Transport dimensions with retracted jib	N.A.	m	*N.A.*	*ft*
	Machine weight (unloaded) (1)	3900	Kg	*8600*	*lbs*
Stability limit:					
	Longitudinal slope	2	°	*2*	°
	Transversal slope	2	°	*2*	°
	Maximum wind speed (3)	12.5	m/s	*27.96*	*mph*
	Maximum manual force:	400	N	*90*	*lbf*
	Max. load per wheel	1740	Kg	*3836*	*lbs*
Performance:					
	Drive wheels	2		*2*	
	Max. drive speed	4	km/h	*2.5*	*mph*
	Safety drive speed	0.6	km/h	*0.4*	*mph*
	Oil tank capacity	40	Lt.	*10.5*	*gal*
	Gradeability	25	%	*25*	*%*
	Max. operating temperature	+50	°C	*+122*	*°F*
	Min. operating temperature	-15	°C	*+5*	*°F*

Battery power:					
	Battery capacity and voltage	2 x 24 / 325	V/Ah	*2 x 24 / 325*	*V/Ah*
	Total electrolyte quantity	2 x 54	Lt.	*2 x 14*	*gal*
	Battery weight	2 x 220	Kg	*2 x 485*	*lbs*
	Single-phase battery charger (HF)	48 / 45	V/A	*48 / 45*	*V/A*
	Max. current absorbed by the battery charger	15	A	*15*	*A*
	Max. installed power	4.5	kW	*6*	*hp*
	Power electric pump 1	4.5	kW	*6*	*hp*
	Max. absorbed current	160	A	*160*	*A*
	Electric pump power 2	NA	kW	*NA*	*hp*
	Max. absorbed current	NA	A	*NA*	*A*
	Electric pump power 3	NA	kW	*NA*	*hp*
	Max. absorbed current	NA	A	*NA*	*A*

(1) In some cases, different limits can be fixed. It is recommended to comply with the data shown on the machine plate.

(2) me = m – (n x 80)

(3) Wind speeds greater than or equal to 12,5 m/s identify machines that can also be used outdoors. Wind speeds equal to 0 m/s identify machines FOR INTERNAL USE ONLY.

(4) Standard: extra flexible black tyres 23x10-12; Optional: extra flexible no-marking tyres 23x10-12.

(5) Standard: fixed platform; Optional: revolving platform 140° (70°+70°).

2.2. Model A12 ED

		A12 ED			
Dimensions:					
	Maximum working height	12	m	*39' 4"*	*ft*
	Max. platform height	10	m	*32' 10"*	*ft*
	Ground clearance	170	mm	*6.7*	*in*
	Max. outreach from turntable centre	6.3	m	*20' 8"*	*ft*
	Turret rotation (not continuous)	360	°	*360*	°
	Platform rotation (5)	0	°	*0*	°
	Platform height for safety speed activation	< 3	m	*< 9' 10"*	*ft*
	Internal steering radius	0.95	m	*3' 1"*	*ft*
	External steering radius	2.95	m	*9' 8"*	*ft*
	Maximum capacity (m)	200	Kg	*440*	*lbs*
	Max. number of people on the platform (n) – indoors	2		*2*	
	Tool and material weight (me) (2) – indoors	40	Kg	*88*	*lbs*
	Max. number of people on the platform (n) – outdoors	2		*2*	
	Tool and material weight (me) (2) – outdoors	40	Kg	*88*	*lbs*
	Maximum drive height	Max		*Max*	
	Maximum dimensions of platform	0.8 x 1.36	m	*2' 8" x 4' 5"*	*ft*
	Max. hydraulic pressure	210	bar	*3045*	*psi*
	Max. pressure of lifting circuit	210	bar	*3045*	*psi*
	Min. pressure of braking circuit	35 ÷ 40	bar	*508 ÷ 580*	*psi*
	Tyre dimensions (4)	Ø 584 x 324	mm	*23 x 13*	*in*
	Tire type (4)	23 x 10 - 12		*23 x 10 - 12*	
	Transport dimensions	4.15 x 1.5 x 1.97	m	*13' 7"x 4' 11"x 6' 6"*	*ft*
	Transport dimensions with retracted jib	N.A.	m	*N.A.*	*ft*
	Machine weight (unloaded) (1)	4140	Kg	*9127*	*lbs*
Stability limit:					
	Longitudinal slope	2	°	*2*	°
	Transversal slope	2	°	*2*	°
	Maximum wind speed (3)	12.5	m/s	*27.96*	*mph*
	Maximum manual force:	400	N	*90*	*lbf*
	Max. load per wheel	1840	Kg	*4056*	*lbs*
Performance:					
	Drive wheels	2		*2*	
	Max. drive speed	4	km/h	*2.5*	*mph*
	Safety drive speed	0.6	km/h	*0.4*	*mph*
	Oil tank capacity	67	Lt.	*17.7*	*gal*
	Gradeability	25	%	*25*	*%*
	Max. operating temperature	+50	°C	*+122*	*°F*
	Min. operating temperature	-15	°C	*+5*	*°F*

Battery power:					
	Battery capacity and voltage	2 x 24 / 325	V/Ah	*2 x 24 / 325*	*V/Ah*
	Total electrolyte quantity	2 x 54	Lt.	*2 x 14*	*gal*
	Battery weight	2 x 220	Kg	*2 x 485*	*lbs*
	Single-phase battery charger (HF)	48 / 45	V/A	*48 / 45*	*V/A*
	Max. current absorbed by the battery charger	15	A	*15*	*A*
	Max. installed power	4.5	kW	*6*	*hp*
	Power electric pump 1	4.5	kW	*6*	*hp*
	Max. absorbed current	160	A	*160*	*A*
	Electric pump power 2	NA	kW	*NA*	*hp*
	Max. absorbed current	NA	A	*NA*	*A*
	Electric pump power 3	NA	kW	*NA*	*hp*
	Max. absorbed current	NA	A	*NA*	*A*

Diesel Power HATZ					
	Diesel engine type (6)	1B40T		*1B40T*	
	Max. motor power	7.3	kW	*10*	*hp*
	Adjusted Power	6.8	kW	*9*	*hp*
	Starter battery	12 / 55	V/Ah	*12 / 55*	*V/Ah*
	Total electrolyte quantity	3	Lt.	*0.8*	*gal*
	Diesel oil tank capacity	5	Lt.	*1.3*	*gal*
	Max. drive speed	4	km/h	*2.5*	*mph*
380V three-phase electrical pump (optional)					
	Motor power	NA	kW	*NA*	*hp*
	Max. absorbed current	NA	A	*NA*	*A*
	Max. drive speed	NA	km/h	*NA*	*mph*
230V single-phase electric pump (optional)					
	Motor power	NA	kW	*NA*	*hp*
	Max. absorbed current	NA	A	*NA*	*A*
	Max. drive speed	NA	km/h	*NA*	*mph*

(1) In some cases, different limits can be fixed. It is recommended to comply with the data shown on the machine plate.

(2) me = m – (n x 80)

(3) Wind speeds greater than or equal to 12,5 m/s identify machines that can also be used outdoors. Wind speeds equal to 0 m/s identify machines FOR INTERNAL USE ONLY.

(4) Standard: extra flexible black tyres 23x10-12; Optional: extra flexible no-marking tyres 23x10-12.

(5) Standard: fixed platform; Optional: revolving platform 140° (70°+70°).

(6) HATZ 1B40T engine standard – 6.6 kW; Optional HATZ 1B50T engine – 7.4 kW.

A12 E
A12 ED

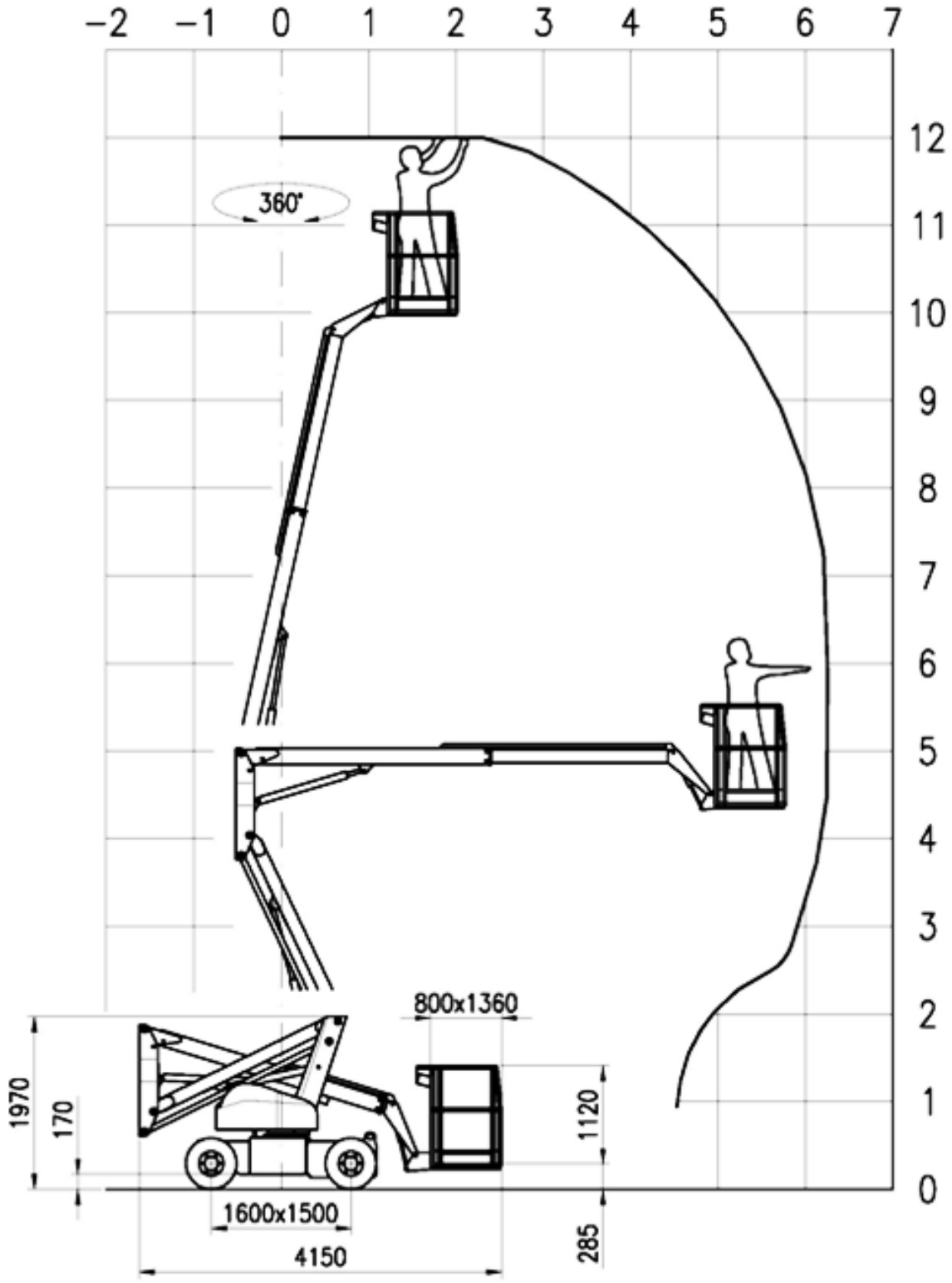


Fig. 3

2.3. Model A13 JE

	A13 JE			
Dimensions:				
Maximum working height	13.1	m	*42' 11"*	*ft*
Max. platform height	11.1	m	*36' 5"*	*ft*
Ground clearance	170	mm	*6.7*	*in*
Max. outreach from turntable centre	8.1	m	*26' 7"*	*ft*
Turret rotation (not continuous)	360	°	*360*	°
Platform rotation (5)	140	°	*140*	°
Platform height for safety speed activation	< 3	m	*< 9' 10"*	*ft*
Internal steering radius	0.95	m	*3' 1"*	*ft*
External steering radius	2.95	m	*9' 8"*	*ft*
Maximum capacity (m)	200	Kg	*440*	*lbs*
Max. number of people on the platform (n) – indoors	2		*2*	
Tool and material weight (me) (2) – indoors	40	Kg	*88*	*lbs*
Max. number of people on the platform (n) – outdoors	2		*2*	
Tool and material weight (me) (2) – outdoors	40	Kg	*88*	*lbs*
Maximum drive height	Max		*Max*	
Maximum dimensions of platform	0.8 x 1.36	m	*2' 8" x 4' 5"*	*ft*
Max. hydraulic pressure	220	bar	*3191*	*psi*
Max. pressure of lifting circuit	220	bar	*3191*	*psi*
Min. pressure of braking circuit	35 ÷ 40	bar	*508 ÷ 580*	*psi*
Tyre dimensions (4)	Ø 584 x 324	mm	*23 x 13*	*in*
Tire type (4)	23 x 10 - 12		*23 x 10 - 12*	
Transport dimensions	5.06 x 1.5 x 1.97	m	*16' 7"x 4' 11"x 6' 6"*	*ft*
Transport dimensions with retracted jib	N.A.	m	*N.A.*	*ft*
Machine weight (unloaded) (1)	5400	Kg	*11905*	*lbs*
Stability limit:				
Longitudinal slope	4	°	*4*	°
Transversal slope	4	°	*4*	°
Maximum wind speed (3)	12.5	m/s	*27.96*	*mph*
Maximum manual force:	400	N	*90*	*lbf*
Max. load per wheel	2380	Kg	*5247*	*lbs*
Performance:				
Drive wheels	2		*2*	
Max. drive speed	4	km/h	*2.5*	*mph*
Safety drive speed	0.6	km/h	*0.4*	*mph*
Oil tank capacity	40	Lt.	*10.5*	*gal*
Gradeability	25	%	*25*	*%*
Max. operating temperature	+50	°C	*+122*	*°F*
Min. operating temperature	-15	°C	*+5*	*°F*

Battery power:					
	Battery capacity and voltage	2 x 24 / 325	V/Ah	*2 x 24 / 325*	*V/Ah*
	Total electrolyte quantity	2 x 54	Lt.	*2 x 14*	*gal*
	Battery weight	2 x 220	Kg	*2 x 485*	*lbs*
	Single-phase battery charger (HF)	48 / 45	V/A	*48 / 45*	*V/A*
	Max. current absorbed by the battery charger	15	A	*15*	*A*
	Max. installed power	4.5	kW	*6*	*hp*
	Power electric pump 1	4.5	kW	*6*	*hp*
	Max. absorbed current	160	A	*160*	*A*
	Electric pump power 2	NA	kW	*NA*	*hp*
	Max. absorbed current	NA	A	*NA*	*A*
	Electric pump power 3	NA	kW	*NA*	*hp*
	Max. absorbed current	NA	A	*NA*	*A*

Diesel drive power					
	Diesel engine type	NA		*NA*	
	Motor power	NA	kW	*NA*	*hp*
	Starter battery	NA	V/Ah	*NA*	*V/Ah*
	Diesel oil tank capacity	NA	Lt.	*NA*	*gal*
	Max. drive speed	NA	km/h	*NA*	*mph*
380V three-phase electrical pump (optional)					
	Motor power	NA	kW	*NA*	*hp*
	Max. absorbed current	NA	A	*NA*	*A*
	Max. drive speed	NA	km/h	*NA*	*mph*
230V single-phase electric pump (optional)					
	Motor power	NA	kW	*NA*	*hp*
	Max. absorbed current	NA	A	*NA*	*A*
	Max. drive speed	NA	km/h	*NA*	*mph*

(1) In some cases, different limits can be fixed. It is recommended to comply with the data shown on the machine plate.

(2) me = m – (n x 80)

(3) Wind speeds greater than or equal to 12,5 m/s identify machines that can also be used outdoors. Wind speeds equal to 0 m/s identify machines FOR INTERNAL USE ONLY.

(4) Standard: extra flexible black tyres 23x10-12; Optional: extra flexible no-marking tyres 23x10-12.

(5) Revolving platform standard 140° (70°+70°).

2.4. Model A13 JED

	A13 JED			
Dimensions:				
Maximum working height	13.1	m	*42' 11"*	*ft*
Max. platform height	11.1	m	*36' 5"*	*ft*
Ground clearance	170	mm	*6.7*	*in*
Max. outreach from turntable centre	8.1	m	*26' 7"*	*ft*
Turret rotation (not continuous)	360	°	*360*	°
Platform rotation (5)	140	°	*140*	°
Platform height for safety speed activation	< 3	m	*9' 10"*	*ft*
Internal steering radius	0.95	m	*3' 1"*	*ft*
External steering radius	2.95	m	*9' 8"*	*ft*
Maximum capacity (m)	200	Kg	*440*	*lbs*
Max. number of people on the platform (n) – indoors	2		*2*	
Tool and material weight (me) (2) – indoors	40	Kg	*88*	*lbs*
Max. number of people on the platform (n) – outdoors	2		*2*	
Tool and material weight (me) (2) – outdoors	40	Kg	*88*	*lbs*
Maximum drive height	Max		*Max*	
Maximum dimensions of platform	0.8 x 1.36	m	*2' 8" x 4' 5"*	*ft*
Max. hydraulic pressure	220	bar	*3191*	*psi*
Max. pressure of lifting circuit	220	bar	*3191*	*psi*
Min. pressure of braking circuit	35 ÷ 40	bar	*508 ÷ 580*	*psi*
Tyre dimensions (4)	Ø 584 x 324	mm	*23 x 13*	*in*
Tire type (4)	23 x 10 - 12		*23 x 10 - 12*	
Transport dimensions	5.06 x 1.5 x 1.97	m	*16' 7"x 4' 11"x 6' 6"*	*ft*
Transport dimensions with retracted jib	N.A.	m	*N.A.*	*ft*
Machine weight (unloaded) (1)	5640	Kg	*12434*	*lbs*
Stability limit:				
Longitudinal slope	4	°	*4*	°
Transversal slope	4	°	*4*	°
Maximum wind speed (3)	12.5	m/s	*27.96*	*mph*
Maximum manual force:	400	N	*90*	*lbf*
Max. load per wheel	2480	Kg	*5467*	*lbs*
Performance:				
Drive wheels	2		*2*	
Max. drive speed	4	km/h	*2.5*	*mph*
Safety drive speed	0.6	km/h	*0.4*	*mph*
Oil tank capacity	67	Lt.	*17.7*	*gal*
Gradeability	25	%	*25*	*%*
Max. operating temperature	+50	°C	*+122*	*°F*
Min. operating temperature	-15	°C	*+5*	*°F*

Battery power:					
	Battery capacity and voltage	2 x 24 / 325	V/Ah	*2 x 24 / 325*	*V/Ah*
	Total electrolyte quantity	2 x 54	Lt.	*2 x 14*	*gal*
	Battery weight	2 x 220	Kg	*2 x 485*	*lbs*
	Single-phase battery charger (HF)	48 / 45	V/A	*48 / 45*	*V/A*
	Max. current absorbed by the battery charger	15	A	*15*	*A*
	Max. installed power	4.5	kW	*6*	*hp*
	Power electric pump 1	4.5	kW	*6*	*hp*
	Max. absorbed current	160	A	*160*	*A*
	Electric pump power 2	NA	kW	*NA*	*hp*
	Max. absorbed current	NA	A	*NA*	*A*
	Electric pump power 3	NA	kW	*NA*	*hp*
	Max. absorbed current	NA	A	*NA*	*A*

Diesel Power HATZ					
	Diesel engine type (6)	1B40T		*1B40T*	
	Max. motor power	7.3	kW	*10*	*hp*
	Adjusted Power	6.8	kW	*9*	*hp*
	Starter battery	12 / 55	V/Ah	*12 / 55*	*V/Ah*
	Total electrolyte quantity	3	Lt.	*0.8*	*gal*
	Diesel oil tank capacity	5	Lt.	*1.3*	*gal*
	Max. drive speed	4	km/h	*2.5*	*mph*
380V three-phase electrical pump (optional)					
	Motor power	NA	kW	*NA*	*hp*
	Max. absorbed current	NA	A	*NA*	*A*
	Max. drive speed	NA	km/h	*NA*	*mph*
230V single-phase electric pump (optional)					
	Motor power	NA	kW	*NA*	*hp*
	Max. absorbed current	NA	A	*NA*	*A*
	Max. drive speed	NA	km/h	*NA*	*mph*

(1) In some cases, different limits can be fixed. It is recommended to comply with the data shown on the machine plate.

(2) me = m – (n x 80)

(3) Wind speeds greater than or equal to 12,5 m/s identify machines that can also be used outdoors. Wind speeds equal to 0 m/s identify machines FOR INTERNAL USE ONLY.

(4) Standard: extra flexible black tyres 23x10-12; Optional: extra flexible no-marking tyres 23x10-12.

(5) Revolving platform standard 140° (70°+70°).

(6) HATZ 1B40T engine standard – 6.6 kW; Optional HATZ 1B50T engine – 7.4 kW.

A13 JE
A13 JED

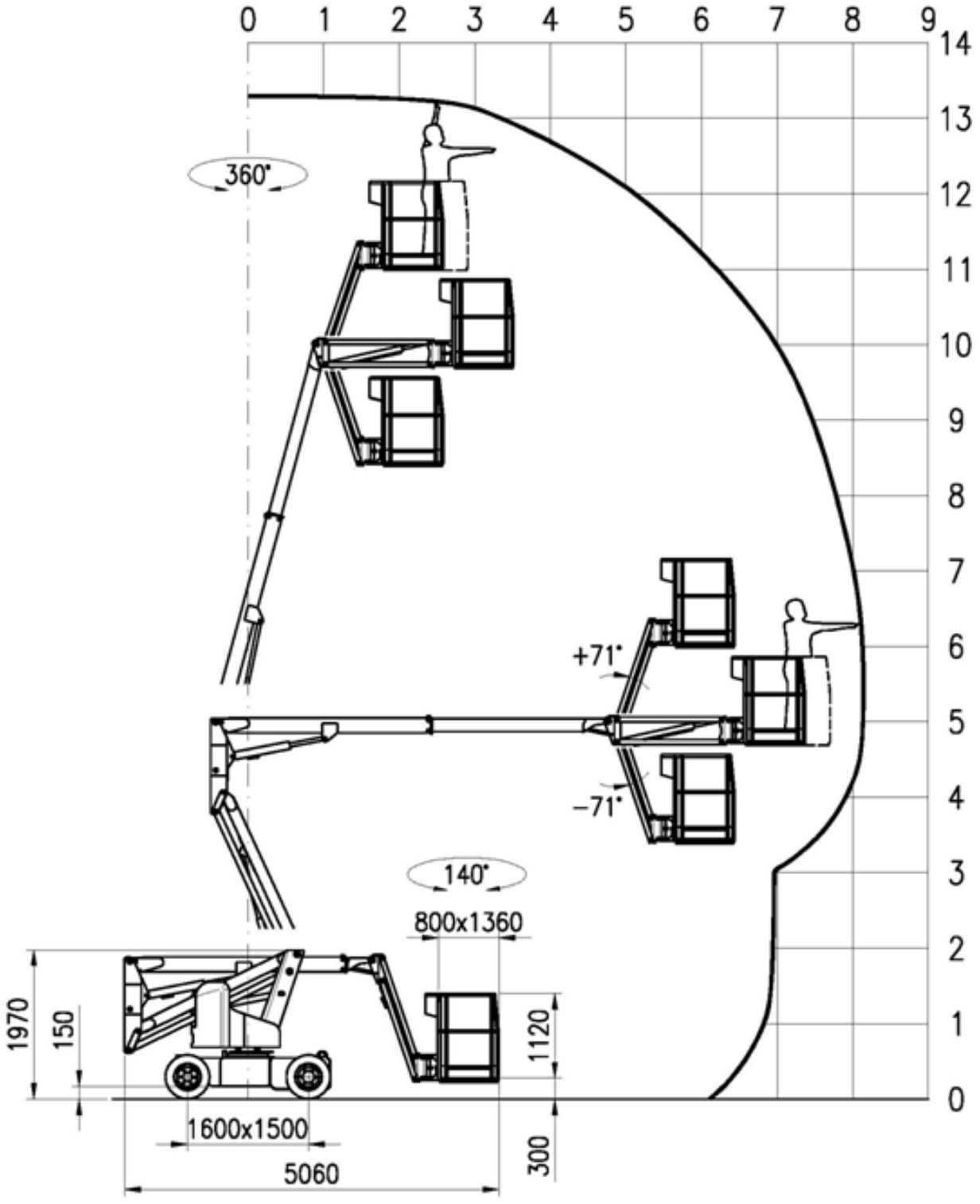


Fig. 4

2.5. Vibrations and noise

Noise tests have been carried out under the most unfavourable conditions to study the effects on the operator. The level of acoustic pressure weighed (A) at work places does not exceed 70dB(A) for each electrical model.

For the Diesel engine models, the level of acoustic pressure weighed (A) at work places does not exceed 106dB(A), the level of acoustic pressure at ground control panel does not exceed 85dB(A), the level of acoustic pressure at platform control panel does not exceed 78bD(A).

As to vibrations in ordinary working conditions:

- The average weighted quadratic value in frequency of the acceleration which the upper members have to withstand is below **2.5 m/sec²** for each of the models to which this Use and Maintenance manual refers.
- The average weighted quadratic value in frequency of the acceleration which the body has to withstand is below **0.5 m/sec²** for each of the models to which this Use and Maintenance manual refers.

3. SAFETY PRECAUTIONS.

3.1. Personal protective equipment (PPE)

Always wear personal protective equipment according to current regulations concerning industrial health and safety (in particular, hard hat and safety shoes are **COMPULSORY)**.
It is the operator or safety manager's responsibility to choose the personal protective equipment (PPE) depending on the activity to be carried out. For their correct use and maintenance, refer to the equipment manuals themselves.
The use of safety harness is not compulsory except in certain countries with specific regulations. In Italy, the consolidation act on safety, **Law Decree 81/08,** has made the use of a safety harness mandatory.
The harness is attached to one of the anchorages reported by labels, as in the following picture.

Fig.5

3.2. General safety norms

- Only adults (18 years old), after carefully reading this manual, are allowed to use the machine. The employer is responsible for training.
- The platform is intended for people carriage; therefore, it is necessary to comply with the current local regulations relevant to this class of machines (see paragraphs 1).
- At least two users must operate the machine, one of them on the ground, able to carry out the emergency operations described in this handbook.
- Always keep the machine at a safety distance from power lines as indicated in the next chapters.
- Use the machine according to the capacity values indicated in the technical features section. The identification plate shows the maximum number of people allowed on the platform at any one time, the maximum capacity and the tool and material weight. Never exceed the indicated figures.
- Do NOT use the framework of the platform or any of its elements for grounding connections while welding on the platform.
- It is absolutely forbidden to load and/or unload persons and/or material with platform not in the access position.
- It is the machine owner and/or safety manager's responsibility to check that the maintenance and repair operations are carried out by skilled personnel.

3.3. Use instructions

3.3.1. General

The electric and hydraulic circuits are provided with safety devices, calibrated and sealed by the manufacturer:

DO NOT TAMPER WITH AND MODIFY THE CALIBRATION OF ANY COMPONENT OF THE ELECTRIC AND HYDRAULIC SYSTEMS.

- The machine must be used only in areas well lit up, checking that the ground is flat and firm. The machine may not be used if the lighting conditions are not sufficient. The machine is not equipped with any lightening system.
- Before using the machine check its integrity and conservation state.
- During maintenance operations do not dispose of any waste materials in the environment, but comply with current regulations.
- Do not carry out any service or maintenance operations when the machine is connected to the mains supply. Follow the instructions given in the following paragraphs.
- Do not approach the electric and hydraulic system components with sources of heat or flames.
- Do not increase the max. allowed height by means of scaffolds, ladders or other.
- With the machine lifted, do not fasten the platform to any structure (beams, pillars or wall).
- Do not use the machine as a crane, hoist or lift.
- Protect the machine (in particular the platform control panel by means of the specially provided cover- if any - or a waterproof tarpaulin) and the operator when working in adverse environmental conditions (painting, de-painting, sand-blasting, washing, etc.).
- Using the machine in bad weather conditions is forbidden; in particular, wind speeds must not exceed the limits indicated in the technical specifications (to measure speeds, see following chapters).
- Machines with a wind speed limit of 0 m/s are to be used indoors only.
- In the event of rain or in parking condition always protect the platform control panel (with the specially provided cap - if any - or a waterproof tarpaulin).
- Do not use the machine in areas where risks of fire or explosion exist.
- Do not use pressurized water jets (high-pressure cleaners) to wash the machine.
- Overloading the work platform is forbidden.
- Avoid knocks and/or contacts with other vehicles and fixed structures.
- Leaving or accessing the work platform is forbidden unless this is in the position required for access or leaving (see the “Accessing the platform” chapter).

3.3.2. Handling

- Before handling the machine check that the connection plugs are disconnected from the power supply source. Always check the cable position during handling if the machine is powered with a 230V electrical pump.
- In order to avoid any instability, use the machine on regular and firm grounds. To prevent the machine from overturning, comply with the max. gradeability values indicated in the Technical data section under paragraph "Stability limits". However, movements on inclined grounds are to be carried out with the utmost caution.
- As soon as the platform is lifted (the tolerance varies from model to model) the safety drive speed is automatically activated (all models of this handbook have passed the stability Tests in compliance with standard EN280).
- Drive the machine with lifted platform only on flat grounds, verifying the absence of holes or steps on the floor and bearing in mind the overall dimensions of the machine.
- While driving the machine with lifted platform the operators are not allowed to place horizontal loads onto the platform (operators on board must not pull ropes, wires, etc.).
- The machine must not be used directly for road transport. Do not use it for material transport (see paragraph “Intended use”).
- Check that in the operating area there are not obstacles or other dangerous elements.

- Pay particular attention to the area above the machine during lifting to avoid any crushing and collisions.
- During operation keep your hands in safety position, the driver has to place them as shown in picture A or B while the transported operator has to keep them as shown in picture C.

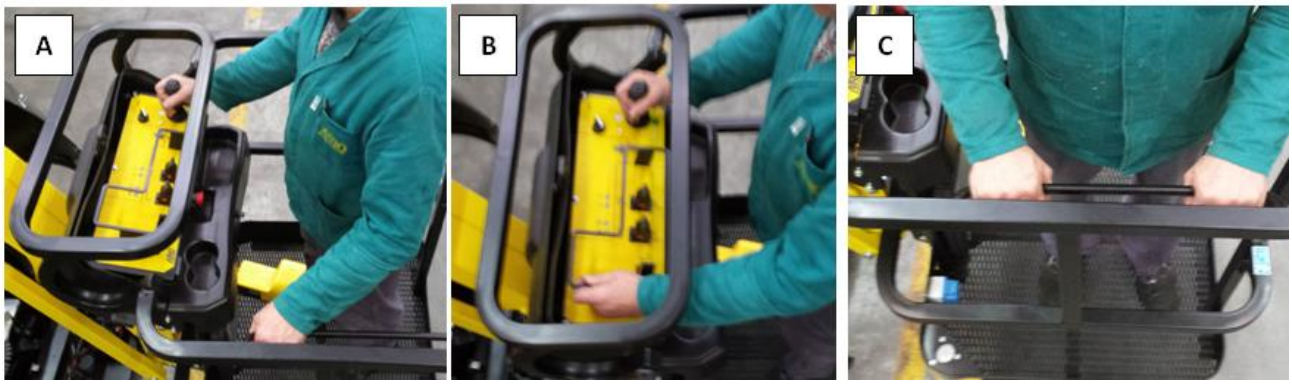


Fig. 6

3.3.3. Operating procedures

When choosing the positioning point of the chassis, to prevent unexpected possible contacts with obstacles, always observe the figures carefully as these make it possible to identify the range of action of the platform (chap. 2).

- The machine is equipped with a chassis inclination control system disabling lifting operations in case of unstable positioning. Working operations can be resumed only after placing the machine in a steady position. If the audible alarm and the red light on the platform control panel turn on, the machine is not correctly positioned (see paragraphs relevant to “Use instructions”). It is necessary to bring it to safety rest position before starting operations again. If the tilt alarm trips with the platform elevated, the only possible operations are those that allow lowering the platform.
- The machine is equipped with an overload controller stopping the platform in case of overloading. In case of platform overloading when lifted, also drive is disabled. Platform operation can be resumed only after removing the exceeding load. Should the audible alarm and the red light located on the platform control panel turn on, then the platform is overloaded (see chapter "Red warning light overload"). Remove the exceeding load before starting operations again.
- Electric-powered machines feature a device for checking the state of battery charge (battery protection): when battery charge is at 20% the operator on the platform is informed of this condition through a flashing red light. In this condition lifting is disabled, battery should be immediately charged.
- Do not lean over the platform guard rails.
- Make sure that no people, apart from the operator, are in the area where the machine is operating. While moving the platform, the operator on board should pay particular attention to avoid any contact with the personnel on the ground.
- During operations in public areas, in order to prevent people other than the personnel from approaching the machine and being endangered, surround the working area by means of barriers or other suitable signs.
- Avoid severe weather conditions and, in particular, windy days.
- Lift the platform only if the machine is resting on cohesive and horizontal soil (following chapters).
- Drive the machine with lifted platform only if the soil is cohesive and horizontal.
- Do not use the thermic drive power (diesel engine) indoors or in insufficiently ventilated areas.
- After each work session, always take the keys out of the control panels and keep them in a safe place to prevent unauthorized people from using the machine.
- Always place working tools in a steady position to prevent them from falling and hurting the operators on the ground.

3.3.4. Wind speed according to Beaufort scale

You can use the table below for a simple assessment of the wind speed. We remember that the max. limit for each machine model is indicated in the table TECHNICAL FEATURES OF STANDARD MACHINES.

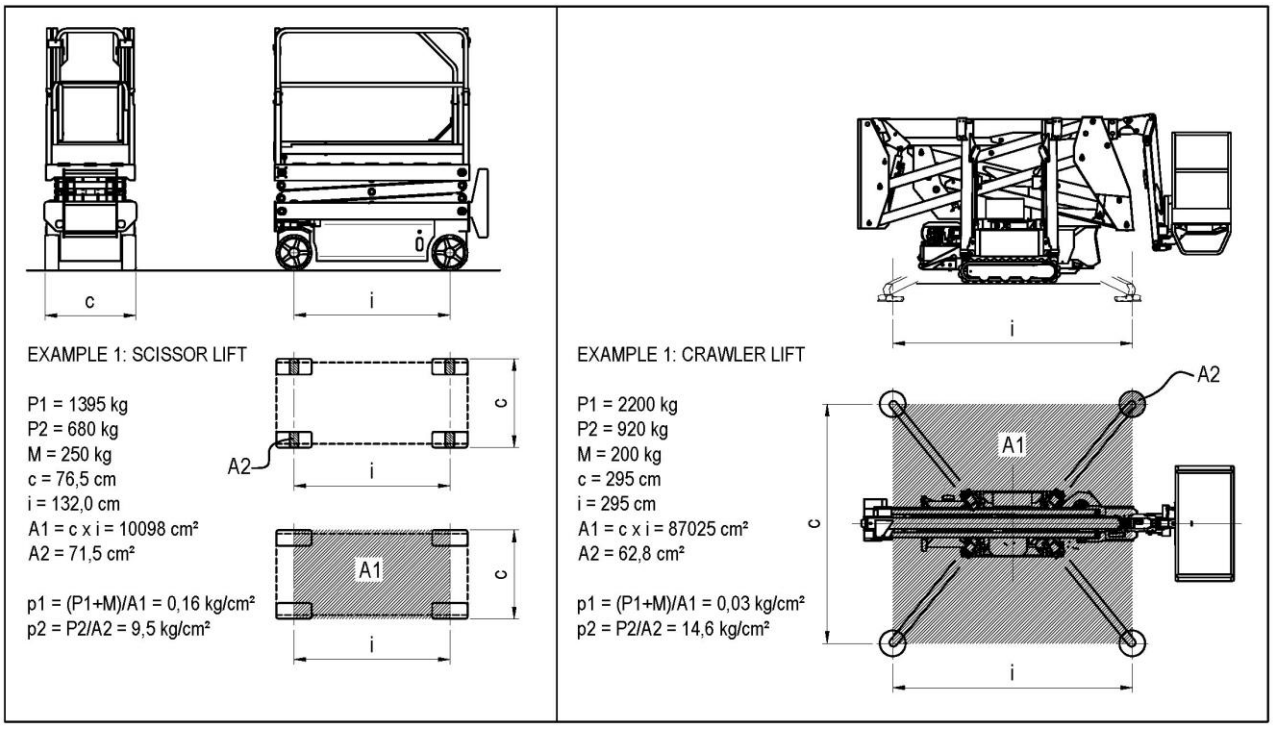
The machines for which the max. wind limit is 0 m/s must be used indoors only. These machines cannot be used outdoors even with no wind.

Beaufort Number	Wind speed (km/h)	Wind speed (m/s)	Description	Sea conditions	Land conditions
0	0	<0.28	Calm	Flat	Calm. Smoke rises vertically.
1	1-6	0.28–1.7	Light air	Ripples without crests.	Wind motion visible in smoke.
2	7-11	1.7–3	Light Breeze	Small wavelets. Crests of glassy appearance, not breaking.	Wind felt on exposed skin. Leaves rustle.
3	12-19	3–5.3	Gentle breeze	Large wavelets. Crests begin to break; scattered whitecaps.	Leaves and smaller twigs in constant motion.
4	20-29	5.3–8	Moderate breeze	Small waves.	Dust and loose paper raised. Small branches begin to move.
5	30-39	8.3-10.8	Fresh breeze	Moderate (1.2 m) longer waves. Some foam and spray.	Smaller trees sway.
6	40-50	10.8-13.9	Strong breeze	Large waves with foam crests and some spray.	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult.
7	51-62	13.9-17.2	Near gale / moderate gale	Sea heaps up and foam begins to streak.	Whole trees in motion. Effort needed to walk against the wind.
8	63-75	17.2-20.9	Fresh gale	Moderately high waves with breaking crests forming spindrift. Streaks of foam.	Twigs broken from trees. Cars veer on road.
9	76-87	20.9-24.2	Strong gale	High waves (6-7 m) with dense foam. Wave crests start to roll over. Considerable spray.	Larger branches break off trees, construction/temporary signs and barricades blown over, damage to circus tents and canopies.
10	88-102	24.2-28.4	Whole gale / Storm	Very high waves. The sea surface is white and there is considerable tumbling. Visibility is reduced.	Trees broken off or uprooted, saplings bent and/or deformed, poorly attached asphalt shingles and shingles in poor condition peel off roofs.
11	103-117	28.4-32.5	Violent storm	Exceptionally high waves.	Widespread vegetation damage, minor damage to most roof shingles/surfaces, gravel may be blown from flat roofs.
12	>117	>32.5	Hurricane	Huge waves. Air filled with foam and spray. Sea completely white with driving spray. Visibility greatly reduced.	Considerable and widespread damage to vegetation, a few windows broken, structural damage to mobile homes and poorly constructed sheds and barns.

3.3.5. Pressure of the machine on ground and load-bearing capacity of ground

Before using the machine, the operator must make sure the floor is suitable for withstanding the specific loads and pressures on the ground with a certain safety margin.
The following chart provides the parameters in play and two examples of calculation of the average pressure on the ground below the machine and max pressure underneath the wheels or stabilizers (p1 and p2).

SYMBOL	U.M.	DESCRIPTION	EXPLANATION	FORMULA
P1	Kg	Total machine weight	It represents the machine weight, nominal load excluded. Note: always refer to the details indicated on the plates affixed to the machine.	-
M	Kg	Nominal load	The max. load allowed for the work platform.	-
A1	cm²	Area occupied on the ground	Machine supporting area on the ground determined by the result of TRACK x WHEEL BASE.	A1 = c × i
c	cm	Track	Cross width of machine measured outside the wheels. or: Cross width of machine measured between levelling outrigger centres.	-
i	cm	Wheel base	Longitudinal length of machine measured between wheel centres. or: Longitudinal length of machine measured between levelling outrigger centres.	-
A2	cm²	Wheel or levelling stabilizer area	Wheel or levelling stabilizer ground support area. The wheel support area on the ground must be verified empirically by the operator; the levelling stabilizer support area depends on the shape of the support foot.	-
P2	Kg	Max. load on wheel or levelling stabilizer	This represents the max. load that can be discharged onto the ground by a wheel or by a levelling stabilizer when the machine is in the worst position and load conditions. Note: always refer to the details indicated on the plates affixed to the machine.	-
p1	Kg/cm²	Pressure on ground	Average pressure placed on the ground in idle conditions and supporting the nominal load.	p1 = (P1 + M) / A1
p2	Kg/cm²	Max specific pressure	Max. pressure which a wheel or a levelling stabilizer can place on the ground when the machine is in the worst position and load conditions.	p2 = P2 / A2



The table below shows the load-bearing capacity of the ground split up by ground type.
Refer to the data contained in the specific tables of each model (chapter 2, TECHNICAL FEATURES OF STANDARD MACHINES) to obtain the figure relating to the max pressure on the ground caused by the single wheel.

Using the machine is forbidden if the max ground pressure per wheel is higher than the bearing capacity of the specific type of ground on which the machine is to be used.

TYPE OF GROUND	BEARING CAPACITY IN Kg/ cm²
Non compact filling earth	0 – 1
Mud, peat, etc.	0
Sand	1.5
Gravel	2
Friable earth	0
Soft earth	0.4
Rigid earth	1
Semi-solid earth	2
Solid earth	4
Rock	15 – 30

Should you have any doubts, verify the load-bearing capacity with specific tests.
In case of constructed surfaces (concrete floors, bridges, etc.) the load-bearing capacity must be provided by the builder.

3.3.6. High-voltage power lines

The machine is not electrically insulated and is not protected in case of contact with or vicinity to power lines.
According to the applicable laws and the following table a minimum distance from the power lines must be kept

Type of power lines	Voltage (KV)	Minimum distance (m)
Light poles	<1	3
	1 -10	3.5
	10 - 15	3.5
	15 - 132	5
	132 - 220	7
	220 - 380	7
High-voltage pylons	>380	15

3.4. Hazardous situations and/or accidents

- If, during Preliminary Operation Checks or when using the machine, the operator discovers a defect that could produce a hazardous situation, the machine must be placed in **safety condition** (isolate it and affix a notice) and the employer must be notified about the fault.
- If, during use, an accident occurs, with injury to the operators, caused by operating errors (e.g., collisions) or any structural yielding, the machine must be placed in **safety condition** (isolate it and affix a notice) and the employer must be notified about the fault.
- In case of an accident with injuries to one or more operators, the operator on the ground (or on a platform not involved in the accident) must:
    - **Seek help immediately**
    - Perform the operation to return the platform to the ground **only if he is certain this will not make the situation worse.**
    - Place the machine in **safety condition** and notify the fault to the employer.

4. INSTALLATION AND PRELIMINARY CHECKS

The machine is supplied completely assembled, therefore it can perform all functions in full safety as provided for by the manufacturer. No preliminary operation is required. To unload the machine, follow the instructions in chapter “Handling and carrying”.
Place the machine on a sturdy enough surface (see paragraph **3.3.5**) and with a gradient below max. allowed gradient (see technical features “**Stability limits**”).

4.1. Becoming acquainted with the machine

Anyone wishing to use a machine with weight, height, width and length characteristics or which generally differs significantly from the training received must be updated in order to cover the differences.
The employer shall be responsible for ensuring all the operators who use work equipment are adequately trained and in compliance with applicable health and safety legislation.

4.2. Preliminary operation checks

Before using the machine read the instructions given in this manual and the concise instructions indicated on the platform plate.
Check the perfect integrity of the machine (by sight check) and read the plates showing machine operating limits.
Before using the machine, the operator must always check visually that:

- Make sure the battery is fully charged and the fuel tank is full.
- The oil level lies between the min. and max. value (with lowered platform).
- The ground is sufficiently horizontal and solid.
- The machine carries out all operations in safety
- The wheels and drive motors are properly fixed.
- The wheels are in good conditions.
- Make sure the rails are fastened to the platform and the gate/s are in automatic reclosing mode.
- The structure does not show clear faults (visually check welding of lifting structure).
- The instructions plates are perfectly readable.
- The platform control panel and the ground emergency control panel, dead-man system included, are perfectly efficient.
- The anchoring points for the harness are in perfect state of conservation

Do not use the machine for purposes different from those it was intended for.

5. USE INSTRUCTIONS

Before using the machine read this chapter thoroughly.

WARNING !

Follow exclusively the instructions given in the next paragraphs and the safety rules described both hereafter and in the previous paragraphs. Read the next paragraphs carefully in order to properly understand the on/off procedures as well as all operations and their correct use.

5.1. Platform control panel

The control panel is located on the platform. The control panel is fixed to the front guard rail and is used to:

- Turn the machine ON/OFF.
- Move the platform during ordinary working procedures.
- Display some working parameters (alarms).

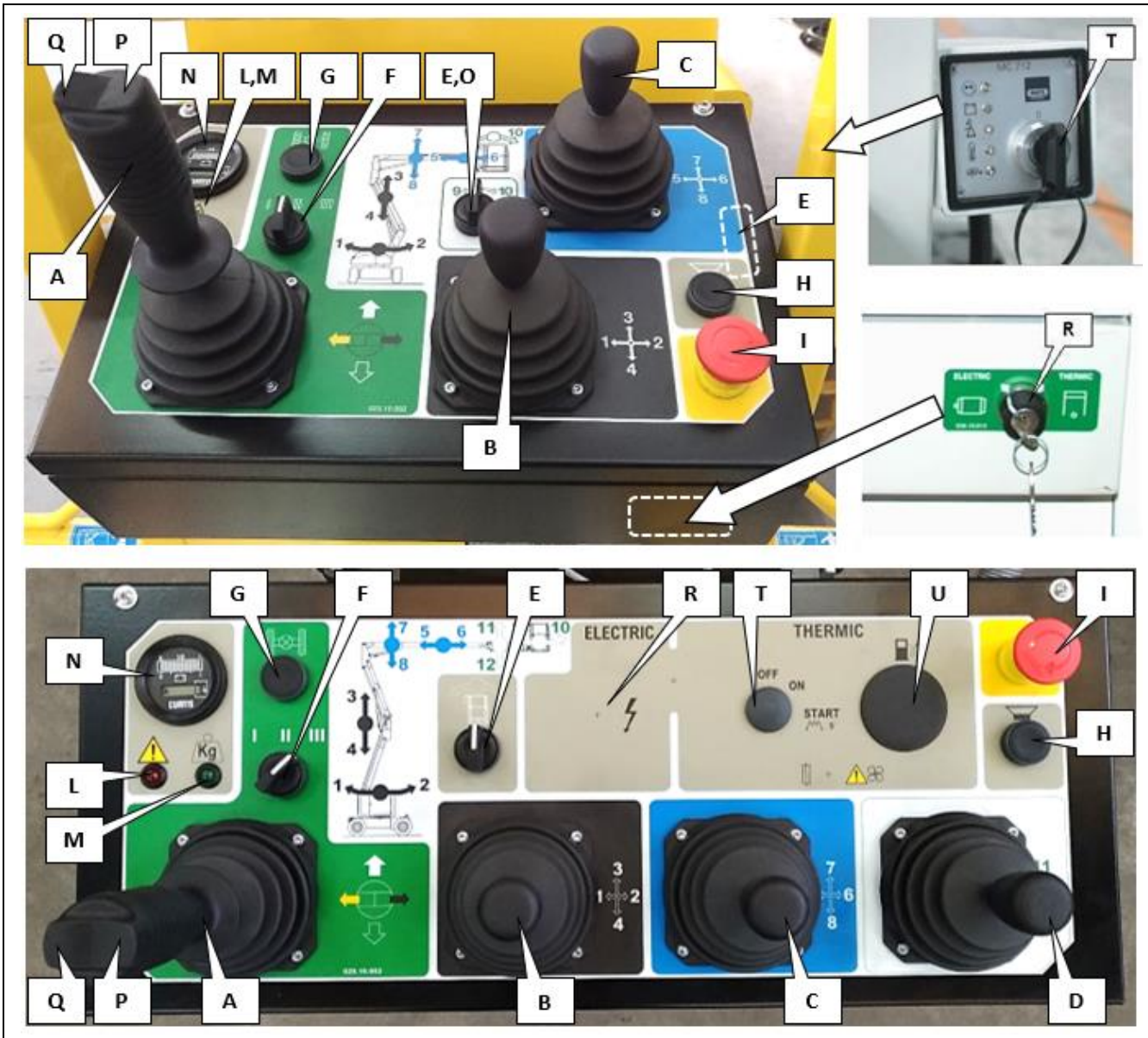


Fig. 7

A) Drive proportional joystick control
B) Proportional joystick control: lower boom (pantograph) and turret rotation
C) Proportional joystick control: upper boom and telescopic boom
D) Proportional joystick control: jib and platform rotation (A13 J only)
E) Platform level switch
F) Drive speed selector
G) “Differential locking" button
H) Manual horn
I) Emergency STOP button
L) Fault warning light
M) Overload warning light
N) Voltmeter
O) Platform rotation switch (optional for A12)
P) Right steering button
Q) Left steering button
R) Electric/Thermic drive power key selector
T) Heat engine starting key
U) Fuel level gauge
Z) Dead-man pedal

All movements (except for platform rotation and platform level compensation) are controlled by proportional joystick /levers; it is therefore possible to adjust movement speed by means of the relative controls. To avoid sudden shakes during movements, it is advisable to operate the proportional joystick controls gradually.

For safety reasons, to operate the machine, it is necessary to press the dead-man pedal **ZF** on the platform. If the dead-man pedal is accidentally released while the machine is operating, the movement is immediately stopped.

WARNING !

Holding down the dead-man pedal for over 10 seconds without carrying out any operation will disable the control panel.
To operate the machine again it is necessary to release the dead-man pedal and press it again; for the next 10 seconds all controls will be enabled.

5.1.1. Drive and steering

Before carrying out any displacement operation, verify that no people are in proximity of the machine and in any case proceed with the utmost caution.

IT IS FORBIDDEN to drive the machine when the platform is lifted unless the chassis is flat and steady with no holes and steps.

To drive the machine, carry out the following operations in sequence:
a) press the dead-man pedal **Z** on the platform;
b) within 10 seconds, set the proportional joystick control **A** forward for forward drive or backward for reverse drive.

WARNING!!
Drive and steering controls can take place at the same time but they are interlocked with the platform movement controls (lifting/lowering/rotation).

With platform lowered (booms down, telescopic boom in, jib at a height between +10° and –70°) it is possible to select different drive speeds by means of the speed selector **F**.

NOTE: To achieve maximum drive speed, set speed selector (**F**) to position (**III**), hold down the differential locking button (**G**) and press down the proportional joystick (**A**).
To operate on high ascending or descending slopes (e.g. while loading/unloading the machine onto/from a truck) and get the minimum speed, set the speed selector (**F**) to position (**I**).

With lifted platform, safety drive speed is automatically enabled, therefore neither speed selector **F** nor differential locking button **G** are active.

WARNING!! The differential locking press-button (G) is to be used by the operator to drive the unit on uneven grounds; when one of the driving wheels is lifted and absorbs the whole drive power. It is absolutely forbidden to hold down the press-button while steering and when drive is started.

To steer, press the buttons **P, Q** located on the drive proportional joystick control (press the right button for right steering and vice versa). Also the steering control is enabled by the dead-man pedal.

5.1.2. Platform positioning movements

To carry out all movements other than drive, use proportional joysticks **B**, **C**, **D** and switches **E** and **O.**
To achieve the movement, it is necessary to carry out the following operations in sequence:

a) press the dead-man pedal on the platform;
b) within 10 seconds, operate the proportional joystick control or the desired switch by moving it in the direction shown by the serigraphy on the control panel

NOTE: before activating the proportional joystick control or the desired switch the dead-man pedal must be pressed.
Release the dead-man pedal and the manoeuvre will be immediately stopped.

All platform position controls can be executed only individually and are interlocked with drive and steering controls.

5.1.2.1. Pantograph (lower boom) lifting/lowering

To lift/lower the pantograph (secondary boom), use the proportional joystick **B**.
Set the proportional joystick **B** to position **3** to lift the scissors, or to position **4** to lower the scissors.

5.1.2.2. Upper boom lifting/lowering

To lift / lower the primary boom, use the proportional joystick **C**.
Set the proportional joystick **C** to position **7** to lift, or to position **8** to lower the primary boom.

5.1.2.3. Jib lifting/lowering (A13 J only)

To lift/lower the JIB, use the proportional joystick **D**.
Set the proportional joystick **D** to position **11** to lift the jib, or to position **12** to lower the jib.

5.1.2.4. Telescopic boom extension/retraction

To extend / retract the telescopic boom, use the proportional joystick **C**.
Set the proportional joystick **C** to position **6** for extraction or to position **5** for retraction.

5.1.2.5. Turret orientation (rotation)

To carry out the turret orientation (rotation), use the proportional joystick **B.**
Set the proportional joystick **B** to position **2** to rotate the turret to the right, or to position **1** to rotate it to the left.

Before carrying out this manoeuvre make sure that the mechanical lock device of the turret - if any - be deactivated (see chapter 6 "handling and carrying").

5.1.2.6. Platform rotation

5.1.2.6.1. Platform rotation A12 (OPTIONAL)

To rotate the platform, use the switch **O**. Set the switch **O** on the right for right rotation, or on the left for left rotation. The operation occurs at fixed speed (ON-OFF control).

5.1.2.6.2. Platform rotation A13 J

To rotate the platform, use the proportional joystick **D.** Set the proportional joystick **D** to position **10** for right rotation, or to position **9** for left rotation. The operation occurs at fixed speed (ON-OFF control).

5.1.2.7. Platform levelling

The platform is automatically levelled. Should it be necessary to reset the correct level, use switch **E**. Act on switch E as indicated on the serigraphy.

Warning!! This operation can be carried out only when booms are completely lowered. No result is achieved if these operations are carried out when the platform is lifted.

5.1.3. Other functions of the platform control panel

5.1.3.1. Selection of electric/thermic drive power ("ED" models)

On dual drive power models (electric/thermic) the type of power can be selected using the key selector **R**. Set it to position **Electric** to use the electric (battery) drive power; set it to position **Thermic** to use the thermic drive power (Diesel).

5.1.3.2. Heat engine start key ("ED" models)

Selector **T** is used to start the heat engine (Diesel) in dual-powered models ("ED").

- **START** or **1** position enables starting;
- **STOP** or **0** position stops the heat engine.

5.1.3.3. Manual horn

The horn warns that the machine is moving; it is operated by means of button **H.**

5.1.3.4. Emergency stop

By pressing the red emergency STOP **I** button all control functions of the machine are stopped. Normal functions are enabled by rotating the button of 1/4 turn clockwise.

5.1.3.5. Fault warning light

This warning light (**L**) warns that:

- **a fault is present**
  It flashes quickly for 4 seconds together with the audible alarm at the machine start-up in case of fault during safety test on controls (pedal, joystick control, switches, etc).
- **the machine is not perfectly levelled.**
  It is lit up steady together with the audible alarm when the chassis inclination exceeds the allowed value. All lifting operations and telescopic extension are disabled (except JIB lifting). If the machine is lifted, drive is also disabled. It is necessary to lower the booms completely and then place the machine onto a flat surface.
- **the battery is discharged**.
  Flashing when battery is charged at 20% only. In this condition lifting and telescopic boom extension are disabled. Batteries should be immediately recharged.

WARNING! The activation of this indicator warns of a dangerous situation since the machine has reached a dangerous inclination level for the machine stability.
When the chassis inclination exceeds the allowed value, to prevent increasing the overturn risk, the operator on the platform is recommended to retract the telescopic boom first and to lower it as the last operation.

5.1.3.6. Overload warning light

Lit up flashing slowly with activation of audible alarm with a platform overload exceeding 20% the nominal load. If platform is lifted, the machine is completely locked. If the platform is lowered all drive/steering operations are still possible but lifting/rotation are disabled. Remove the overload before using the machine again.
Fast flashing in case of fault in the platform overload controller. With lifted platform the machine is completely locked. After reading the manual instructions, trained staff can carry out an emergency operation for platform lowering.

WARNING! The activation of this indicator is a synonym of danger since the load at platform is exceeding or no overload controller is active upon signalling.
For adjustment or activation in emergency situations read the MAINTENANCE chapter.

5.1.3.7. Voltmeter

The voltmeter **N** is available on electric-powered models and dual-powered models “ED”.

It indicates the charge level of the battery.
When the battery is fully charged, all leds in panel **(A)** are lit. As the charge drops, they turn off from right to left.
When the battery is low (approximately 20% charge remaining), the last two red leds flash alternately and you must immediately recharge the battery. In this condition platform lifting is automatically disabled.

However, battery should be recharged daily, either at night or during long work intervals.
For more information, see chapter “drive battery”.

Display **(B)** shows working hours. The last digit is in tenths of an hour.

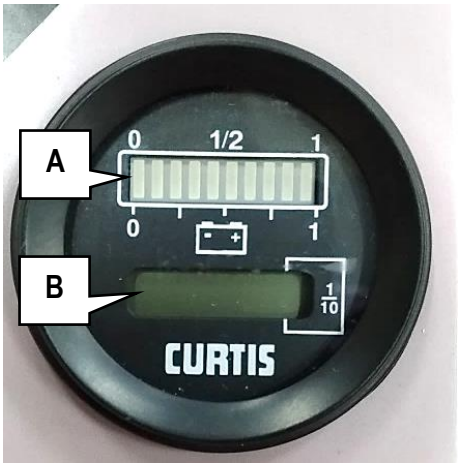


Fig. 8

5.1.3.8. Fuel level indicator (OPTIONAL for “ED” models)

The fuel level indicator (**U**) is available on request for Diesel-powered models (“D”), and dual-powered models (“ED” and "EB"). It indicates the level of fuel inside the tank. It is normally not equipped with a low fuel warning light, therefore it is recommended to top-up fuel in the tank as soon as the indicator is close to zero. For topping up, see the instructions given in this manual.

5.2. Ground control panel and electric control unit

The ground control panel is located on the rotating turret (see paragraph "Location of main components") and is used to:

- Turn the machine ON/OFF.
- Select the control panel (ground or platform).
- Operate the platform in emergency cases.
- Display some working parameters of the battery charger.

The electric control unit on the ground is located on the chassis (see paragraph “Location of main components”) and contains the main electronic boards necessary to operate the machine and to carry out safety checks.

5.2.1. Ground control panel

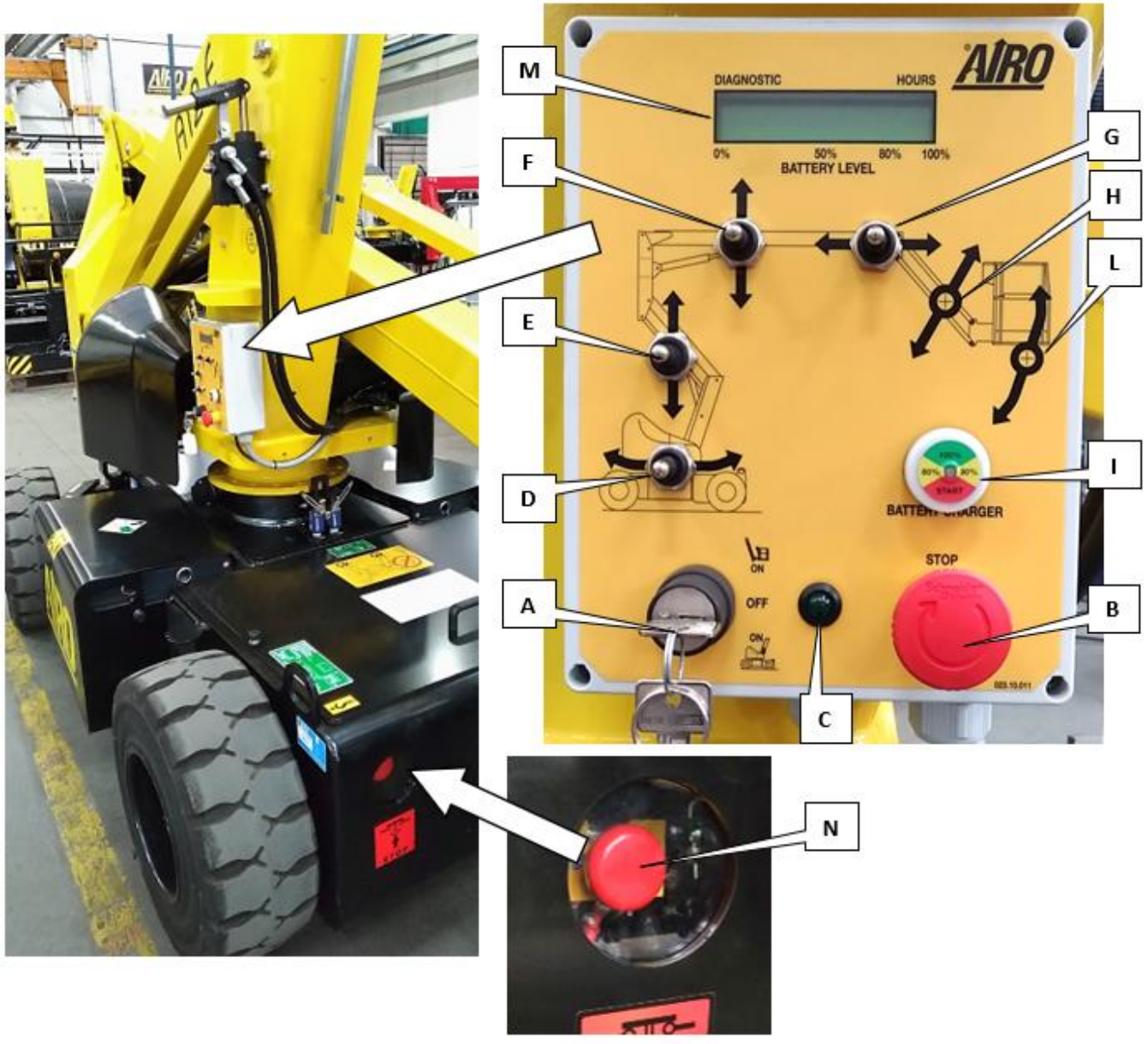


Fig. 9

A) ON-OFF key and ground/platform control panel selector
B) Emergency STOP button
C) Powered-on machine warning light
D) TURRET ROTATION lever
E) PANTOGRAPH LIFTING/LOWERING lever
F) BOOM LIFTING/LOWERING lever
G) TELESCOPIC BOOM OUT/IN lever
H) JIB LIFTING/LOWERING lever (A13 J only)
I) Battery charger warning light
L) PLATFORM ROTATION lever (OPTIONAL for A12, STANDARD for A13 J)
M) User interface display
N) Power STOP button

IT IS FORBIDDEN
to use the ground control panel as a workstation when personnel is on the platform.

Use the ground controls only to start/stop the machine, to select the control panel or in emergency situations to allow the platform to be recovered.

Give the key to authorized persons and keep a duplicate in a safe place.
Always remove the on/off key at the end of work shifts.

Access to the electric control unit is allowed to specialized personnel only for maintenance and/or repair purposes. Access the electric control unit only after the machine has been disconnected from any 230V or 380V power sources.

5.2.1.1. On-off key and control panel selector (A)

The on-off key located on the ground control panel is used to:
- turn ON the machine by selecting one of the two control panels:
  - Platform controls enabled with locking key switch set to “platform” symbol. Stable key position with possibility to extract the key.
  - Ground controls enabled (for emergency operations) with locking key switch set to "turret" symbol. Position with action to be kept. When the key is released the machine is turned off.
- Turn OFF the control circuits by turning it to OFF.

5.2.1.2. Emergency stop button (B-N)

Button B on the control panel: By pressing this button the machine (as well as the heat engine on “ED” models) is completely stopped; by rotating it of 1/4 turn (clockwise) the machine can be turned ON by means of the ON-OFF key (see previous paragraph).
N button on the chassis: By pressing this button the machine (as well as the heat engine on “ED” models) is completely stopped due to battery disconnection (opening of electric power circuit); by pulling the same button to the outside, the machine can be turned ON by means of the ON-OFF key (see previous paragraph).

5.2.1.3. Powered-on machine warning light (C)

The green light is on with machine on (key to ON).

5.2.1.4. Platform control levers (D-E-F-G-H-L)

The various levers shown in the figure allow the platform to be operated. According to the various signs the corresponding movements are activated. These controls can be operated only if the on-off key is set to ON down (ground control panel selected). We shall also remind you that the ground controls are to be used to operate the platform only in emergency situations and must not be used for any other purposes.

5.2.1.5. Battery charger light (I)

Electric and dual-powered models (“E”, “ED”), equipped with a built-in high frequency battery charger, are provided with this warning light indicating the operation of the battery charger (for more detailed information read the paragraph "Battery charge”).

5.2.1.6. User interface display (M)

The multifunction display for machine/user interface is used to display:

- The operation parameters of the machine during normal functioning or in the event of a fault.
- working hours of the electric pump (when electric power is selected the working hours are displayed in the format HOURS:MINUTES and final letter E);
- working hours of Diesel engine (when Diesel power is selected the working hours are displayed in the format HOURS: MINUTES and final letter D);
- Battery charge level

The user interface display is also used during any interventions by specialized personnel to calibrate/adjust the working parameters of the machine. This function is not available to the user.

5.2.2. Electric control unit on the ground

The electric control unit on the ground is placed on the chassis (see paragraph “Location of main components”).

Access to the electric control unit is allowed to specialized personnel only for maintenance and/or repair purposes. Access the electric control unit only after the machine has been disconnected from any power sources (battery, 220V or 380V).

Fig. 10

The main electronic control board (**A**) and the complementary control logic units (**B**) are located inside the electric control unit.

5.3. Platform access

The “access position” is the only one from which loading or unloading of persons and materials is allowed. The “access position” to the work platform is the **completely lowered configuration.**

To get on the platform:
- Get on the platform hanging on to the entry side rails.
- Raise the bar and get on board.

Check that, once you are on the platform, the bar falls down closing the access. Fasten the safety harness to the provided hooks.

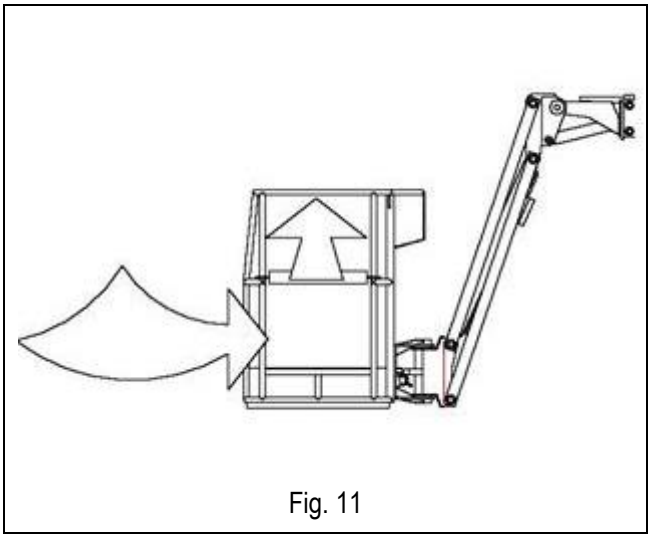


Fig. 11

To get on the platform use only the access equipment the platform is provided with.
When moving up or down, always keep your eyes on the machine and hold onto the entry stringers.

IT IS FORBIDDEN
to lock the closing bar so as to keep the platform access door open.

IT IS FORBIDDEN
to leave or access the work platform if it is not in the position required for accessing or leaving.

With the ground controls (see paragraph “Ground control panel”) it is possible, operating the boom, to lower the height of access to the platform for a better access to the platform itself.

5.4. Machine start-up

To start the machine the operator shall:
- release the emergency stop button on the ground control panel by rotating it of 1/4 turn clockwise;
- turn the on-off key on the ground control panel to "platform" position;
- remove the starting key and hand it over to a person in charge on ground, properly informed of the use of the emergency controls
- get onto the platform
- release the emergency stop button on the platform control panel (see previous paragraphs) by rotating it by 1/4 clockwise.

For electric-powered machines ("E" models), at this point the various functions can be performed by thoroughly following the instructions given in the previous paragraphs. To turn on the machine, the battery charger must be disconnected from the mains. If the battery charger is working, the machine is off and cannot be turned on.

On Electric/Diesel dual-powered models ("ED" models), it is necessary to select the power supply type by means of the selector. To use the electric drive power once this option has been selected the operator can start performing the various functions by following the instructions given in the previous paragraphs. To use the thermic drive power read the next paragraphs to start the heat engine.

Before using the thermic drive power (diesel engine), check the fuel level in the tank.
For those machines that are not equipped with a level gauge on the platform control panel, this operation should be carried out by visually checking the fuel level after unscrewing the filler cap; for the other machines it is possible to check the level directly through the level gauge on the platform control panel.

- Before starting the working session, when the motor is off and sufficiently cool, visually check the fuel level.
- Keep the fuel tank and the motor clean.

5.4.1. Diesel engine start-up ("ED" models)

By turning the starter key on the platform control panel:
- In **STOP** or **0** or **OFF** position the Diesel engine stops (model "D" and "ED").
- In **START** or **1** or **ON** position the engine starts.

Do not insist on the starting position for longer than 3 seconds. In the event of failed start, check the fuel level by means of the relevant indicator and read the Use and maintenance manual of the Engine.

Do not try to start the motor if it is already running. This operation may cause the pinion of the starter to break (under normal conditions the control system blocks this operation).
In the event of operational faults, check the motor warning lights and read the Use and Maintenance manual of the motor.

NOTE: The heat engine can be started only if the dead-man pedal is neither pressed nor enabled.

5.5. Machine stop

5.5.1. Normal stop

In normal operating conditions:
- By releasing the controls the operation is stopped. Stop occurs within a time limit set in the factory, which guarantees smooth braking.
- By releasing the dead-man pedal located on the platform, the operation is immediately stopped. In the event of an immediate stop, braking is sudden.

5.5.2. Emergency stop

Should it be necessary, the operator may immediately stop all machine functions on both platform and ground control panel.

On the platform control panel:
- Press the emergency stop button on the control panel and the machine is turned off.
- By releasing the dead-man pedal, the operation is immediately stopped. In the event of an immediate stop, braking is sudden.

On the ground control panel:
- Press the emergency stop button and the machine (all models) and the heat engine ("ED" models) are stopped.
- Press the power emergency stop button (if available), and the machine power (power circuit cut-out) is cut-out.

To resume the operations is necessary:

On the platform control panel:
- Turn the emergency stop button of 1/4 turn clockwise;

On the ground control panel:
- Turn the emergency stop button of 1/4 turn clockwise;
- Pull the power circuit emergency stop button (if available) to the outside until it locks in position to power the machine again.

5.5.3. Diesel engine stop ("ED" models)

In order to stop the Diesel engine:

On the platform control panel:
- Turn the starter key to **STOP** or **"0"** position.
- Otherwise, press the emergency stop button.

On the ground control panel:
- turn the starter key anticlockwise to **OFF** o "**0**" position.
- Otherwise, press the emergency stop button.

Do not stop the motor when the r.p.m. is high. Before stopping the motor wait until the r.p.m. is at the lowest.

5.6. Emergency manual controls

This function is to be used only in emergency situations, when no motive power is available.

There are two types of hydraulic control blocks. Follow the emergency procedure corresponding to the type installed on the machine.
For either cases, these solenoid valves refer to the following the movements:

- EV4 = Pantograph lifting (lower boom)
- EV5 = Pantograph lowering (lower boom)
- EV6 = Telescopic boom out
- EV7 = Telescopic boom in
- EV12 = Turret right rotation
- EV13 = Turret left rotation
- EV14 = Lifting upper boom
- EV15 = Lowering upper boom
- EV18 = Jib up
- EV19 = Jib down
- EV21 = Platform right rotation
- EV22 = Platform left rotation.

5.6.1. Hydraulic block of type A

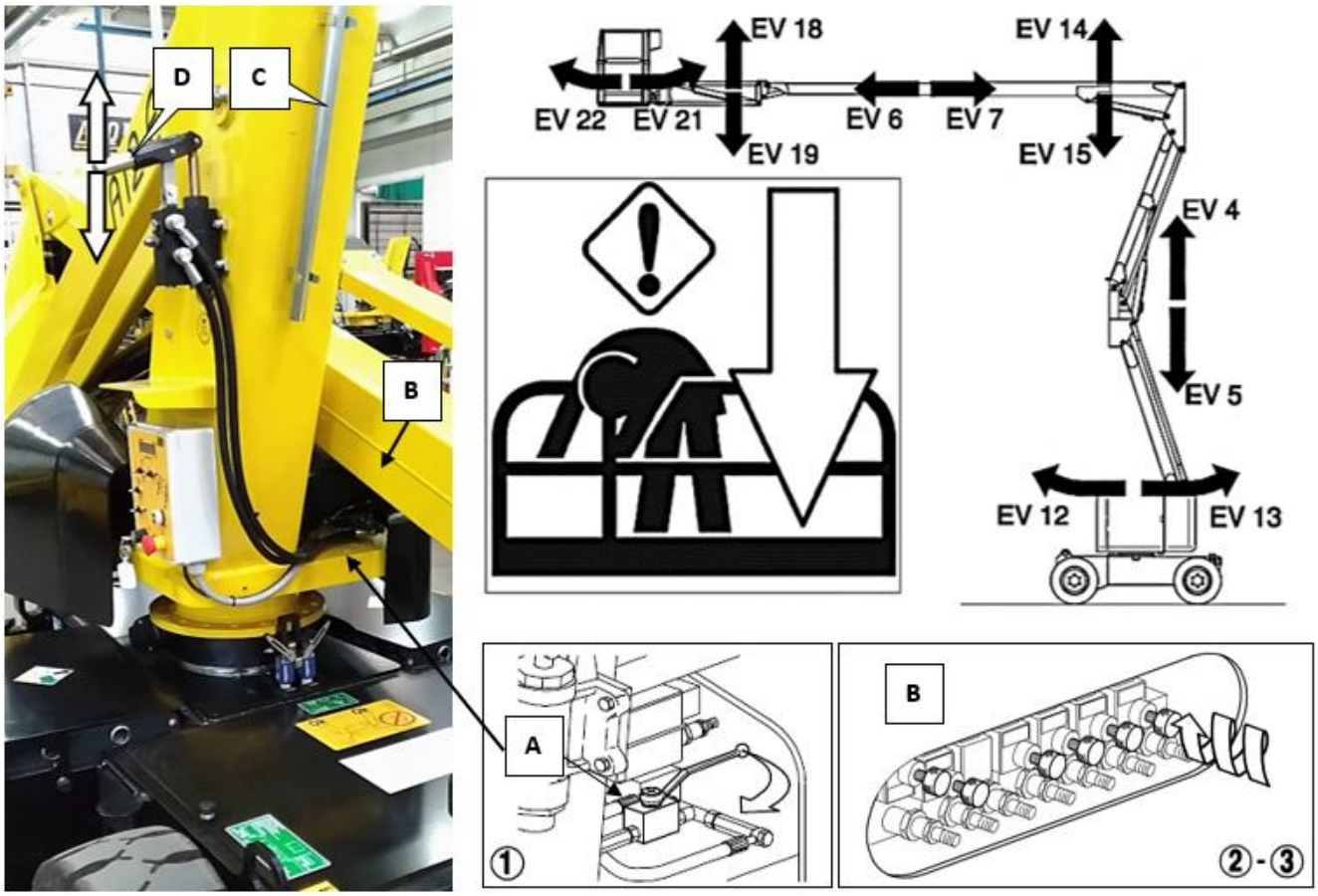


Fig.12-A

In case of fault in the electric or hydraulic system, carry out the following emergency procedures:

1) Turn the tap **A** completely.

2) Insert and screw the emergency actuator on the solenoid valve corresponding to the desired movement (see paragraph 5.6 for the correspondence between solenoid valves names and obtained movements).
3) Completely screw the knurled knob of the previously chosen actuator.
4) Insert the specially provided lever (**C**) on the manual pump handle (**D**).
5) Activate the emergency pump **D**.
6) Check the correct execution of this procedure.

WARNING: The emergency control can be stopped at any moment by releasing the knob or by stopping the pump.

Once this emergency manoeuvre has been carried out, the knurled knobs and the tap must be set to their initial position again in order to resume the operations (in normal position the knobs are completely unscrewed).

5.6.2. Hydraulic block of type B

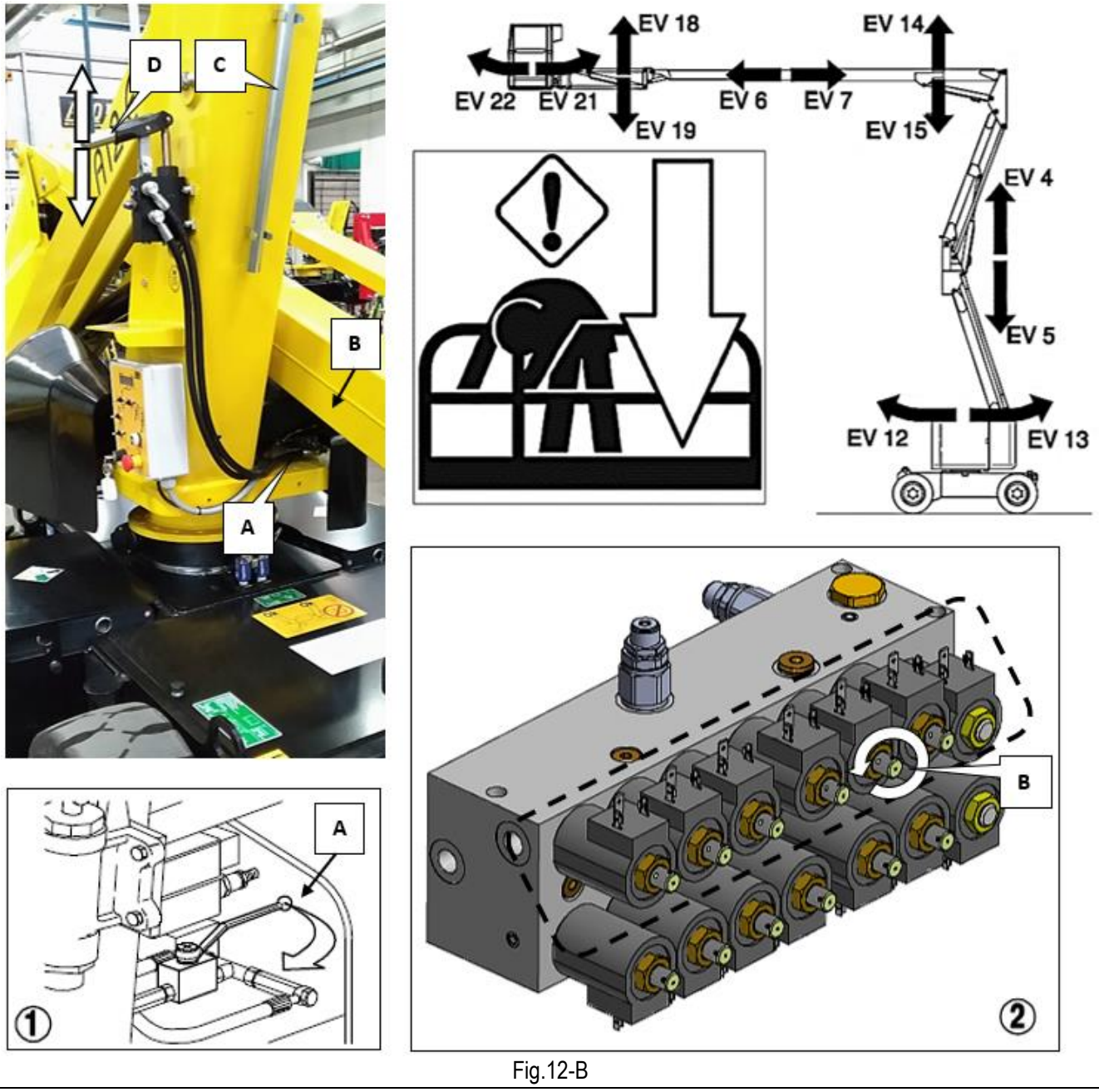


Fig.12-B

In case of fault in the electric or hydraulic system, carry out the following emergency procedures:

1) Turn the tap **A** completely.
2) Completely unscrew knurled knob of the solenoid valve (example **B**) relevant to the movement you wish to achieve (see paragraph 5.6 for the correspondence between name of solenoid valves and achieved movements).
3) Insert the specially provided lever (**C**) on the manual pump handle (**D**).
4) Activate the emergency pump **D**.
5) Check the correct execution of this procedure.

WARNING: The emergency control can be stopped at any moment by releasing the knob or by stopping the pump.

Once this emergency manoeuvre has been carried out, the knurled knobs and the tap must be set to their initial position again in order to resume the operations (in normal position the knobs are completely unscrewed).

5.7. Socket for electric tool connection (Optional)

The work platform can be equipped with a socket (230V Ac) enabling the operator to connect the electric tools necessary to carry out his operations.

To activate the electric line (see pictures above) introduce a cable into the plug connected to the 230V AC 50 Hz mains, with all protections according to the current standards in force. If there is the circuit breaker switch (optional), to activate the electric line set the switch to ON position. It is advisable to check the earth-leakage circuit breaker by means of the specially provided TEST button.

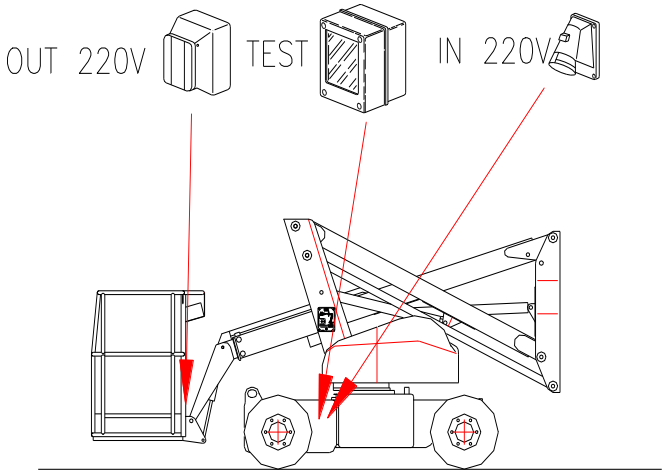


Fig.13

The plugs and sockets equipped on standard machines comply with EEC standards and can therefore be used in EU member countries.
On request the machine can be equipped with plugs and sockets in compliance with local standards or with particular needs.

Connect to the power mains having the following features:
- **Power voltage 230V ± 10%**
- **Frequency 50÷60 Hz**
- **Activated grounding line.**
- **Personal protective equipment according to current standards in force.**
- **Do not use extension leads exceeding 5 metres to connect to the mains.**
- **Use a cable of suitable section (min 3x2.5 mm²).**
- **Do not use rolled-up cables.**

5.8. Fuel level and re-fuelling (“ED” models)

Before using the Diesel drive power check the fuel level in the tank.

This operation is to be carried out by visually checking the fuel level after unscrewing the filler cap.

- Visually check the fuel level before starting to work.
- Keep the fuel tank and the motor clean.

5.9. End of work

After stopping the machine according to the instructions given in the previous paragraphs:

- Always set the machine to rest position (platform completely lowered).
- Press the emergency Stop button on the ground control panel.
- Remove the keys from the control panel to prevent unauthorized people from using the machine.
- Recharge the battery according to the instructions given in section "Maintenance".
- Fill the tank (if it applies).

6. HANDLING AND CARRYING

6.1. Handling

Before using the machine, make sure that the mechanical lock device of the turret is disabled (see figures below).

Fig. 14

To handle the machine in normal operating conditions, follow the instructions given in chapter "USE INSTRUCTIONS" under paragraph "Drive and steering".

When platform is completely lowered (or within a given height according to specific needs and further to checks) the machine can be handled (i.e. drive can be performed) at different speeds to be freely selected by the user.

With platform at a given height, the drive speed is automatically limited, and cannot be changed.
The section TECHNICAL FEATURES indicates the limits concerning drive for each model.

WARNING !
Drive with lifted platform may be subject to different restrictions according to the country where the machine is used. Find out about the legislative limits concerning this operation from the bodies of Health and Safety at work.

It is absolutely forbidden to drive the machine when platform is lifted unless the ground is horizontal, flat and steady.

Before carrying out any displacement operation, verify that no people are in proximity of the machine and in any case proceed with the utmost caution.

Before handling the machine check that the connection plugs are disconnected from the power supply source.

Check that there are no holes or steps on the floor and bear in mind machine overall dimensions.

Do not use the machine to tow other vehicles.

Before steering and driving the machine, check the actual position of the rotating turret through the relevant stickers on the chassis to achieve the correct movement direction.

While the machine is being displaced with lifted platform, no horizontal loads can be loaded onto the platform (operators on board are not allowed to pull wires or ropes, etc.).

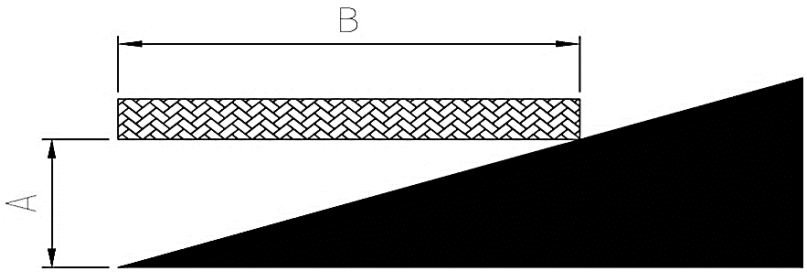
6.2. Transportation

In order to carry the machine to the various working sites, follow the instructions given below. Considering the large dimensions of some models, before carrying, it is recommended to inquire about the overall dimension limits for road transport in force in your country.

Before carrying the machine, turn it off and remove the keys from the control panels. No people are allowed in proximity to or on the machine to avoid any risks deriving from sudden movements.
For safety reasons never lift or tow the machine by means of its booms or platform.
Loading operations are to be carried out on a flat surface with a suitable capacity, after setting the platform to rest position.

To carry the machine the operator shall load it onto a vehicle either:

- **By means of loading ramps and translation controls** located on the platform to load it directly onto the machine (if ramp slope is within the gradeability described in paragraph "TECHNICAL FEATURES" and ramp capacity is adequate to weight) according to the instructions given in paragraph "USE INSTRUCTION" under paragraph "Drive and steering" for correct operation of drive controls. During the loading operation following this system, it is advisable to lift the jib (if present- see picture aside) to prevent the machine from hitting the ground. Pay attention not to load other booms during this operation to prevent the emergency microswitches from being activated, which in case of inclined machine disable all the operations except the lowering ones. If the slope exceeds the gradeability, the machine is to be towed by means of a windlass only if the operator on the platform simultaneously activates the drive control to release the parking brakes. Position a spirit level on the wood board and lift the downstream extremity of the latter until it is level;
    - position a wood board of known length on the gradient to be measured.
    - Position a spirit level on the wood board and lift the downstream extremity of the latter until it is level;
    - Now measure the distance between the board and the ground (**A**), divide this by the length of the board (**B**) and multiply by 100. The following image sums up the method.



- **by means of hooks and steel ropes** (with safety factor = 5, see machine weight in Technical features) connected to the provided holes as indicated in the picture aside;

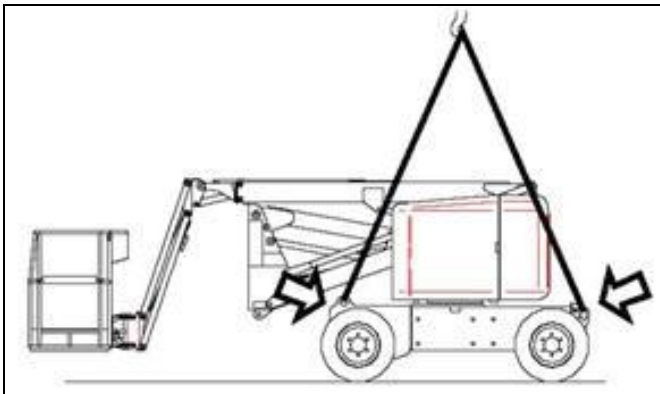


Fig.15

- **through a lift truck** of a suitable capacity (see machine weight in table "Technical features" at the beginning of this manual) equipped with forks having at least the same length as the machine width. Insert the forks as indicated by the stickers on the machine. Should these stickers be not available, DO NOT lift the machine by means of a lift truck. Lifting the machine by means of a lift truck is a dangerous operation, which must be carried out by qualified operators only.

After placing the machine onto the carrying vehicle, fasten it by means of the same holes used for lifting. To avoid breaking the platform overload controller, thus causing the machine to stop, DO NOT fix the machine to the vehicle base by tying the platform (any model) or the last lifting boom.

Lock the turret by means of the mechanical safety lock device as specified in the previous chapters.

Before carrying the machine check the stability grade. The platform must be fully lowered and the platform extension must be in retracted position to ensure adequate stability during the entire operation.

6.3. Emergency towing of the machine

In the event of a fault, carry out the following operations to tow the machine:

- Hook the machine to the provided holes.
- Completely screw the threaded dowels at the centre of the drive reduction gears by means of a 6 mm hexagonal wrench;
- Tow at a very slow speed (remember that when the machine is being towed, brakes are out of order).

To resume the normal operation, set back the machine to initial conditions.

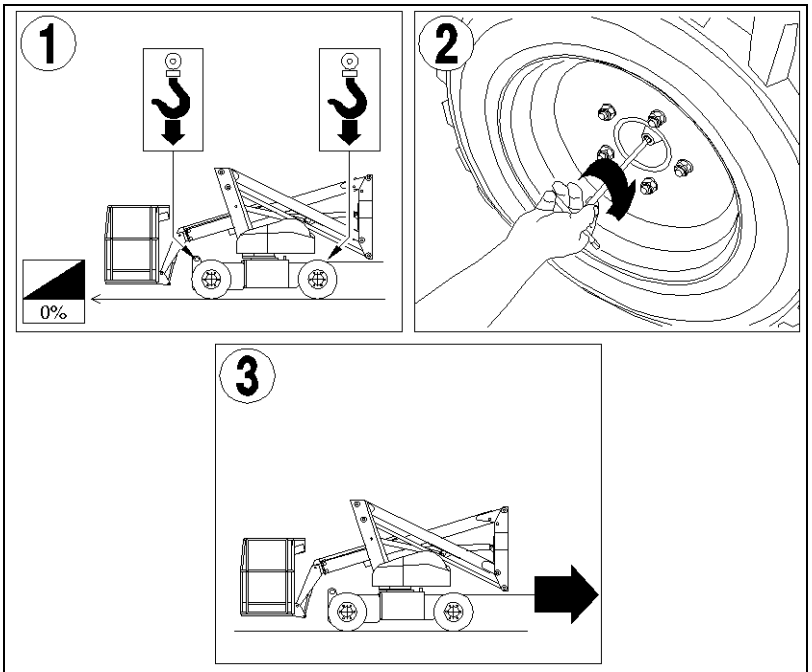


Fig.16

Tow at a very slow speed (remember that when the machine is being towed, brakes are out of order).

Tow only on a flat ground.

Do not park the machine without brakes on. Should the brakes be completely out of order put wedges under the wheels to prevent the machine from moving accidentally

7. MAINTENANCE

- **Always carry out maintenance operations with machine at a standstill position and after having removed the key from the control panel with the platform in rest position.**
- **The maintenance operations described below refer to a machine with ordinary working use. In case of difficult conditions of use (extreme temperatures, corrosive environments, etc.) or following long machine inactivity, it will be necessary to contact the AIRO assistance service to change the intervention schedule.**
- **Repairs and maintenance operations are to be carried out by trained and authorised personnel only. All maintenance operations should be carried out in compliance with the current work safety regulations (work places, personal protection equipment, etc...).**
- **Carry out only the maintenance and adjustment operations described in this user manual. In emergency situations (e.g. breakdown, wheels replacement) contact Our Technical Support.**
- **During interventions, check that the machine is completely locked. Before carrying out maintenance operations inside the lifting structure, check that this is off-line in order to avoid accidental lowering of the booms.**

- **Remove the battery cables and provide batteries with a suitable protection during welding operations.**
- **Carry out maintenance operations on the heat engine only when it is not running and sufficiently cool (except for those operations, such as oil change, which must be performed when the motor is hot). Risk of burns in contact with hot parts.**
- **Do not use petrol or other flammable materials to clean the heat engine.**
- **For maintenance operations on the heat engine, read the manufacturer's manual of the motor supplied on machine purchase.**
- **In case of replacement, use original spare parts only or spare parts approved by the manufacturer.**
- **Disconnect the 230V AC and/or 380V AC sockets, if any.**
- **The lubricants, hydraulic oils, electrolytes and all detergent products should be handled with care and disposed of in safety according to the current regulations. A prolonged contact with the skin may cause irritations and dermatosis; wash with water and soap and rinse thoroughly. Contact with eyes, especially with electrolytes, is also dangerous; rinse with water thoroughly and call the doctor.**

WARNING!
NEVER MODIFY OR TAMPER WITH MACHINE PARTS TO IMPROVE THE MACHINE PERFORMANCE AS THIS MAY AFFECT ITS SAFE OPERATION.

7.1. Machine cleaning

To clean the machine, use non-pressurized water jets after properly protecting the following parts:
- The control panel (both platform and ground).
- The electric ground control unit and all electric boxes in general.
- The electric motors.

Do not use pressurized water jets (high-pressure cleaners) to clean the machine.

After washing the machine, always:
- Dry the machine.
- Check integrity of plates and stickers.
- Lubricate the articulated joints equipped with greaser.

7.2. General maintenance

Below are listed the main maintenance jobs to be done and the relevant schedule (the machine features an hour meter).

Operation	Frequency
Screw tightening (see paragraph "Various adjustments")	After the first 10 working hours
Oil level check in hydraulic tank	After the first 10 working hours
Check of the battery state (charge and liquid level)	Every day
Check of deformation of tubes and cables	Every week
Check of stickers and code plates	Every month
Articulated joints and sliding blocks greasing	Every month
Oil level check in hydraulic tank	Every month
Check of heat engine fixing on elastic supports	Every month
Emergency devices efficiency check	Every year
Electric connections check	Every year
Hydraulic connections check	Every year
Periodic operation check and structure visual check	Every year
Screw tightening (see paragraph "Various adjustments")	Every year
Check of drive reduction gear oil change	Every year
Pressure relief valve operation check	Every year
Operation check and adjustment of the braking system	Every year
Inclinometer operation check	Every year
Operation check of platform overload controller	Every year
Operation check of M1 microswitches	Every year
Operation check of dead-man pedal safety system	Every year
Telescopic boom sliding blocks clearance adjustment	Every year
Hydraulic filter replacement	Every two years
Drive reduction gear oil change	Every two years
Total oil change in hydraulic tank	Every two years

ELECTRIC-DIESEL MODELS (ED): As it is possible to install different types of Diesel engines, refer to the instructions manual of the engine manufacturer for all maintenance operations.

ENGINE OIL - STANDARD: SAE 15W40
BIODEGRADABLE OIL KIT: PANOLIN BIOMOT 10W40

TO SEND THE MACHINE TO THE MANUFACTURER WITHIN 10 YEARS OF WORK FOR A COMPLETE CHECK

7.2.1. Various adjustments

Check the conditions of the following components and, if necessary, tighten after the first 10 working hours and, afterwards, at least once a year:

1) wheel screws;
2) drive motors fixing screws;
3) steering cylinder fixing screws + fixing screws of steering hub pins;
4) cage fixing screws;
5) hydraulic fittings;
6) fixing screws of boom pins;
7) rotation turntable fixing screws;
8) elastic supports of heat engine.

For torque wrench setting refer to the table below.

Fig. 17

TORQUE WRENCH SETTING (S.I. thread, normal pitch)						
Class	**8.8 (8G)**		**10.9 (10K)**		**12.9 (12K)**	
Diameter	**kgm**	**Nm**	**kgm**	**Nm**	**kgm**	**Nm**
M4	0.28	2.8	0.39	3.9	0.49	4.9
M5	0.55	5.5	0.78	7.8	0.93	9.3
M6	0.96	9.6	1.30	13.0	1.60	16.0
M8	2.30	23.0	3.30	33.0	3.90	39.0
M10	4.60	46.0	6.50	65.0	7.80	78.0
M12	8.0	80.0	11.0	110	14.0	140
M14	13.0	130	18.0	180	22.0	220
M16	19.0	190	27.0	270	33.0	330
M18	27.0	270	38.0	380	45.0	450
M20	38.0	380	53.0	530	64.0	640
M22	51.0	510	72.0	720	86.0	860
M24	65.0	650	92.0	920	110	1100

7.2.2. Greasing

Grease all articulated joints equipped with greaser (or predisposition for greaser) at least every month.

At least once a month, using a spatula or a brush, lubricate the telescopic extension.

Moreover, remember to grease the articulated joints in the following cases:

- After washing the machine.
- Before using the machine again after a long time-interval.
- After using the machine in adverse environmental conditions (high humidity levels; presence of dust; coastal areas, etc).

Grease all points indicated in the picture aside (and all articulated joints equipped with greaser) with grease type **NLGI 2 for use at high pressures (EP).**

Examples:
Esso BEACON EP2
Petronas JOTA SYNTH 2
Persian POLYGREASE EP2

(OPTIONAL BIODEGRADABLE OIL KIT)
PANOLIN BIOGREASE 2

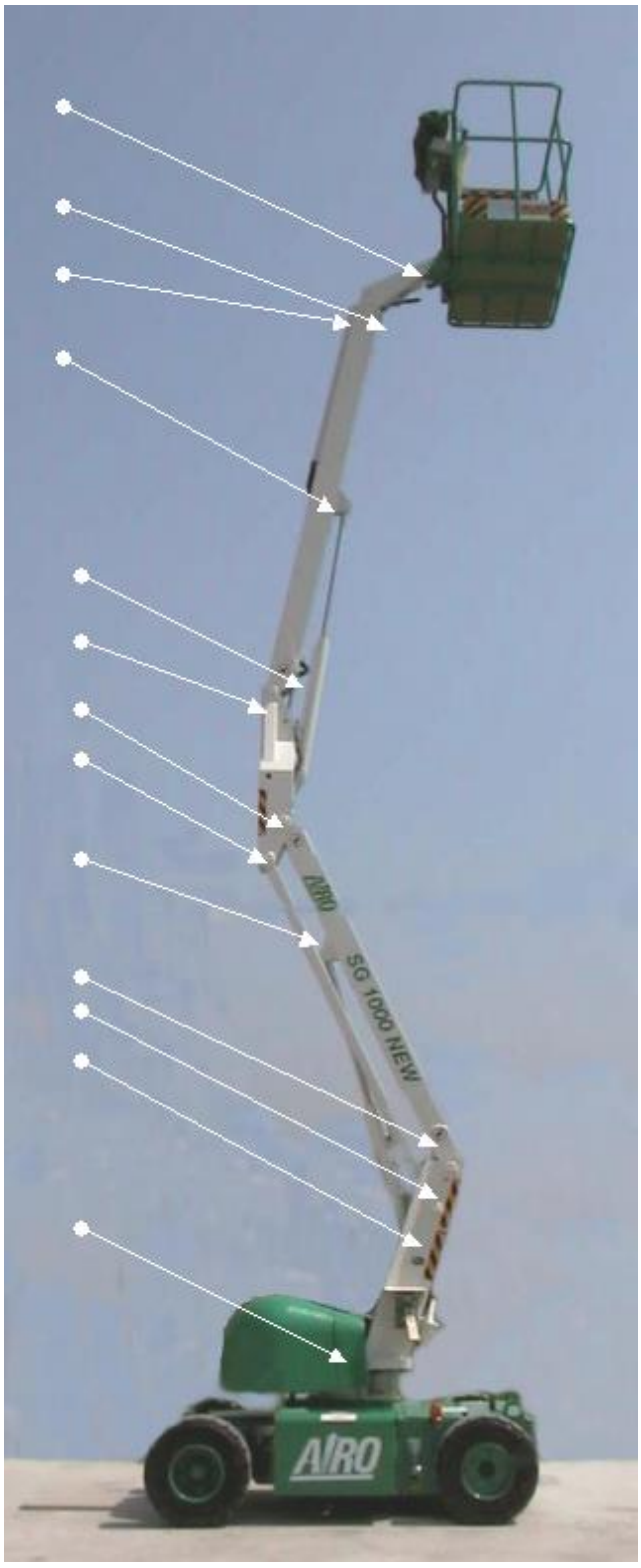


Fig. 18

7.2.3. Hydraulic circuit oil level check and change

Check after the first 10 working hours and, afterwards, at least once a month the level in the tank by means of the provided cap (detail **A** in the picture aside) equipped with a dipstick, and make sure that it always lies between the max. and min. values. If necessary, top up until the max. level is reached. The oil check should be carried out when platform is completely lowered and telescopic boom in.

Completely change the hydraulic oil at least every two years.

To empty the tank:

- Lower the platform completely and retract the telescopic boom extension.
- stop the machine by pressing the emergency stop button of the ground control panel.
- Place a container under cap (**B**), under the tank, and unscrew it.

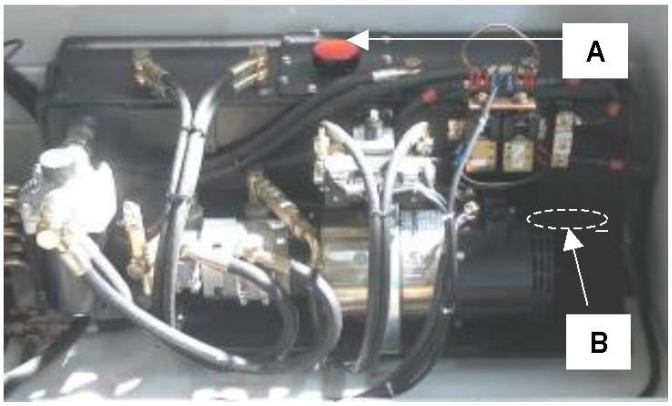


Fig. 19

Only use the oil types and quantities listed in the following summary table, depending on the ambient temperature range in which you expect to operate.

HYDRAULIC SYSTEM OIL			
BRAND	**ISO VG 46** 0°C +50°C	**ISO VG 22** -20°C +25°C	**REQUIRED QUANTITY**
SYNTHETIC OILS			40 litres (“E” models) 67 litres (“ED” models)
ESSO	Invarol EP46	Invarol EP22	
AGIP	Arnica 46	Arnica 22	
ELF	Hydrelf DS46	Hydrelf DS22	
SHELL	Tellus SX46	Tellus SX22	
BP	Energol SHF46	Energol SHF22	
TEXACO	Rando NDZ46	Rando NDZ22	
Q8	LI HVI 46	LI HVI 22	
PETRONAS	HIDROBAK 46 HV	HIDROBAK 22 HV	
BIODEGRADABLE OILS - OPTIONAL			
PANOLIN	HLP SINTH E46	HLP SINTH E22	

To use the platform with an ambient temperature ranging from -20°C to +50°C, it is recommended using a hydraulic oil with a very high viscosity index. Example: **Mobil UNIVIS HVI 26.**

Do not dispose of used oil in the environment. Comply with the current local standards.

The lubricants, hydraulic oils, electrolytes and all detergent products should be handled with care and disposed of in safety according to the current regulations. A prolonged contact with the skin may cause irritations and dermatosis; wash with water and soap and rinse thoroughly. Contact with eyes, especially with electrolytes, is also dangerous; rinse with water thoroughly and call the doctor.

7.2.3.1 Biodegradable hydraulic oil (Optional)

At the request of the customer, the machines can be supplied with biodegradable hydraulic oil compatible with the environment. Biodegradable hydraulic oil is completely synthetic, without zinc, non-polluting and highly efficient with saturated ester base, combined with special additives. The machines with biodegradable oil use the same component parts as standard machines, but the use of such type of oil is best taken into account from machine construction.
In case of wanting to change from mineral-oil based hydraulic oil to "bio" oil, the following procedure must be followed.

7.2.3.2 Emptying

Empty the hot hydraulic oil for entire system operation (oil tank, cylinders, large-volume pipes).

7.2.3.3 Filters

Change the filtering inserts. Use standard filters as indicated by the manufacturer.

7.2.3.4 Washing

After completely emptying the machine, fill the recommended type and quantity of "bio" oil.
Start the machine and perform all work movements at low revs for at least 30 minutes.
Drain the liquid from the system as indicated at 7.2.3.2.
Warning: During the entire washing procedure, avoid air entering the system.

7.2.3.5 Filling

After washing, fill the hydraulic circuit, bleed and check the level.
Bear in mind that contact of fluid with the hydraulic pipes can cause swelling.
Also remember that contact of fluid with the skin can cause reddening or irritation.
Also use suitable PPE during these operations (e.g., protective eyewear and gloves).

7.2.3.6 Commissioning / check

"Bio" oil behaves regularly, but it must be checked by taking a sample at set intervals according to the indications provided below:

CHECK FREQUENCY	NORMAL DUTY	HEAVY DUTY
1st CHECK AFTER	50 OPERATION HOURS	50 OPERATION HOURS
2nd CHECK AFTER	500 OPERATION HOURS	250 OPERATION HOURS
3rd CHECK AFTER	1000 OPERATION HOURS	500 OPERATION HOURS
FOLLOWING CHECKS	1000 HOURS OR 1 OPERATION YEAR	500 HOURS OR 1 OPERATION YEAR

The fluid state is therefore constantly monitored, thus allowing its use until its features decay. Normally, in the absence of contaminating agents, the oil is never completely changed, but only occasionally topped-up.

The oil samples (at least 500ml) must be taken with the system at operating temperature.
It is recommended to use new and clean containers.

The samples must be sent to the "bio" oil supplier.
For more dispatch details, contact Your nearest distributor.

Copies of the analysis report must be kept in the check register. This is mandatory.

7.2.3.7 Mix

Mixtures with other biodegradable oils are not allowed.
The remaining amount of mineral oil must not exceed 5% of total filling quantity as long as the mineral oil is suitable for the same use.

7.2.3.8 Micro-filtration

When making the conversion on second-hand machines, always take into account the high dirt dissolution power of biodegradable oil.
After conversion, the dissolution of fault-causing deposits in the hydraulic system could occur. In extreme cases, washing the seal housings can cause greater leaks.
To prevent faults as well as avoid any negative effect on oil quality, after the conversion, it is best to filter the hydraulic system using a micro-filtration system.

7.2.3.9 Disposal

The biodegradable oil, inasmuch as saturated ester, is suitable for both thermal and material re-use.
It therefore provides the same disposal / re-use options as mineral based old oil.
Such oil can be incinerated whenever local laws allow.
Recycling the oil is preferable to disposal on dumps or incineration.

7.2.3.10 Topping up

The oil must **ONLY EVER** be topped up with the same product.

Note: Max water contamination is 0.1%.

During oil change or topping up, do not discard the hydraulic oil in the environment.

7.2.4. Suction filter replacement

The suction filter is fixed to the tank and is equipped with a clogging indicator to indicate when the filtering cartridge is to be replaced. During normal operation, the visual indicator is in the green zone. When the indicator is in the red zone, the filtering cartridge is to be replaced. The filtering cartridge should be replaced at least every two years.

To replace the filtering cartridge:

- Stop the machine by pressing the emergency stop button on the ground control panel.
- Remove the cover (**A**) of the filter unscrewing the four hexagonal nuts (**B**) (13mm wrench) keeping one hand under the bowl (**C**) of the filter to prevent it from detaching.
- Extract the bowl with the cartridge (**D**).
- Remove the cartridge **D** and check its condition.
- If necessary, clean the filter by means of compressed air paying attention not to alter the filtering surface. Otherwise replace the cartridge.
- fit the new cartridge paying attention to the correct positioning of the retaining spring (**F**) and place the bowl containing a small amount of oil.

It is to be noted that the bowl containing the filtering cartridge is full of oil. Therefore during these operations a quantity of oil may leak out. In this case remove the oil by means of cloths and by pouring it into a specific container.

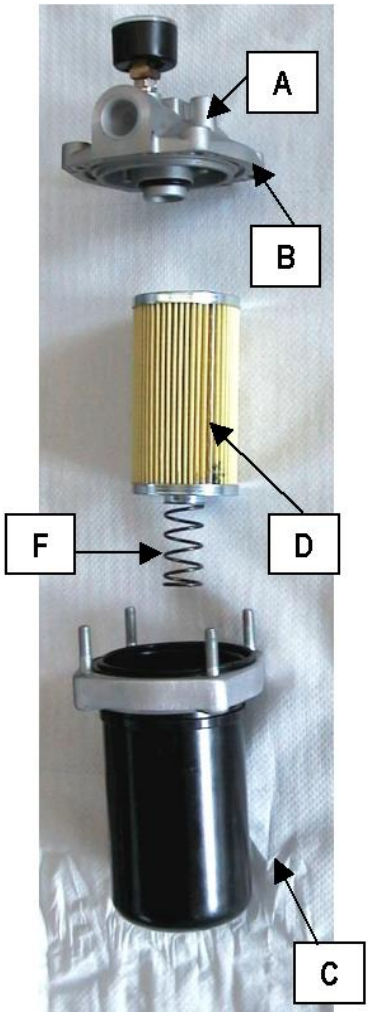


Fig. 20

IT IS FORBIDDEN to start the machine when the filter cover is missing or not properly tightened.

Replace the filters using only original accessories available at our Technical Support.
Do not re-use used oil and do not leave it in the environment, but dispose of in compliance with local standards in force.
Once the filters have been replaced (or cleaned), check the hydraulic oil level in the tank.

7.2.5. Drive reduction gear oil level check and change

The oil level should be checked at least once a year. Place the machine so as to have the two caps (**A** and **B**) in the position shown in the picture aside (in a few cases it is necessary to remove the drive wheels to access the a.m. caps). Check the level by means of cap (**A**). Oil check must be carried out when the oil is hot. The level is correct when the reduction gear body is full of oil up to the cap limit (**A**). Should a lubricant volume higher than 10% be topped up, check that there is no oil leakage in the system. Do not mix different types of oil, of the same or of different brands. Do not mix mineral oils and synthetic oils.

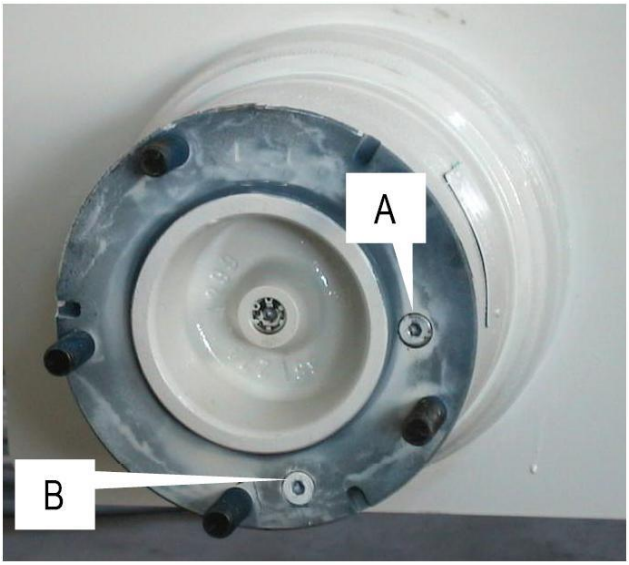


Fig. 21

The oil must be changed the first time after 50-100 working hours, and afterwards after every two years. Depending on the actual operating conditions, these intervals may be varied for each single case.
While changing the oil it is advisable to wash the internal part of the cover with a fluid recommended by the lubricant producer. To avoid sludge deposits, the oil must be changed when the reduction gear is hot. To change the oil unscrew cap **B**, and place a container of a 2-litre capacity under it. Drain the reduction gear completely, clean it as described above and then fill it up to the limit level of plug **A** through the same hole (for max. capacity see following table).

HYDRAULIC SYSTEM OIL		
BRAND	**SAE 80W90 / ISO VG 150**	**REQUIRED QUANTITY**
		Drive
SYNTHETIC OILS		1 litre
ESSO	Compressor Oil LG 150	
AGIP	Blasia S 220	
CASTROL	Alpha SN 6	
IP	Telesia Oil 150	
BIODEGRADABLE OILS - OPTIONAL		
PANOLIN	Biogear 80W90	

7.2.5.1 Checks in the use of synthetic biodegradable oil in drive reduction gears (Optional)

Quarterly or every 500 hours check the oil level. If needed, top it up. If you notice that more than 10% of oil lacks in the reduction gear, check if there are any leaks.
Change the oil in the rotation reduction gear after the first 100 hours of operation and then every 6000 hours or every 3 years. Depending on the actual operating conditions, these intervals may change.
When changing the oil, it is recommended that you run a wash cycle inside the cover.
Change the oil when the reduction gear is hot. Mixtures of different oils (either biodegradable or mineral) even of the same brand are not allowed.

During oil change or topping up, do not discard the hydraulic oil in the environment.

7.2.6. Telescopic boom sliding blocks clearance adjustment

Check the wear of the telescopic boom sliding blocks every year.
The correct clearance between the blocks of the boom is 0,5-1 mm; in case of higher clearance tighten the sliding blocks as follows:

- Unscrew dowel **A**.
- Screw the sliding block **B** using a a seeger wrench until the above mentioned clearance is reached.
- Screw dowel **A** again.

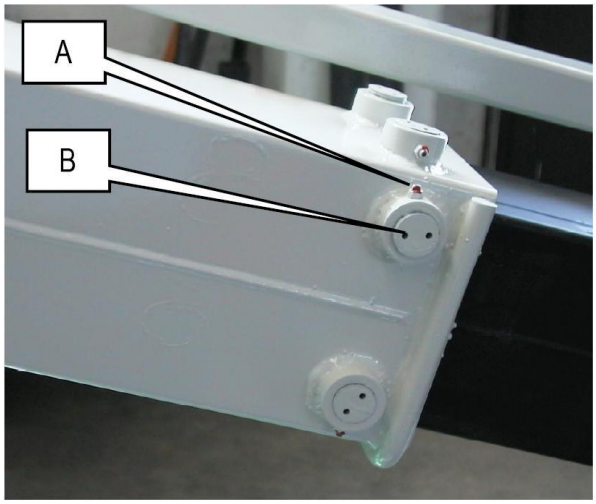


Fig.22

WARNING !
AS THIS OPERATION IS VERY IMPORTANT IT IS TO BE CARRIED OUT BY SKILLED TECHNICIANS ONLY.

7.2.7. Pressure relief valve adjustment and operation check

The pressure relief valve described controls the maximum pressure. Normally, this valve does not require any adjustment, since it is calibrated at the factory before the machine is delivered.

Calibration is required:

- In case of replacement of the hydraulic block.
- In case of replacement of the pressure relief valve only.

Check operation at least once a year.

To check the operation of the pressure relief valve:

- Introduce a pressure gauge with full scale of at least 250 bar in the special quick coupling (1/4" BSP) **D.**
- Using the ground control panel, lift the machine up to the end stop.
- Check the detected pressure value. The correct value is indicated in the chapter "Technical features"**.**

To calibrate the pressure relief valve:

- Introduce a pressure gauge with full scale of at least 250 bar in the special quick coupling (1/4" BSP) **D.**
- Locate the main pressure relief valve **B**.
- Unscrew the adjusting dowel lock-nut.
- Using the ground control panel, lift the machine up to the end stop.
- Adjust the pressure relief valve by means of the adjusting dowel so as to reach the pressure value indicated in chapter **"Technical Features"**.
- Once calibration has been carried out, lock the adjusting dowel by means of the lock-nut.

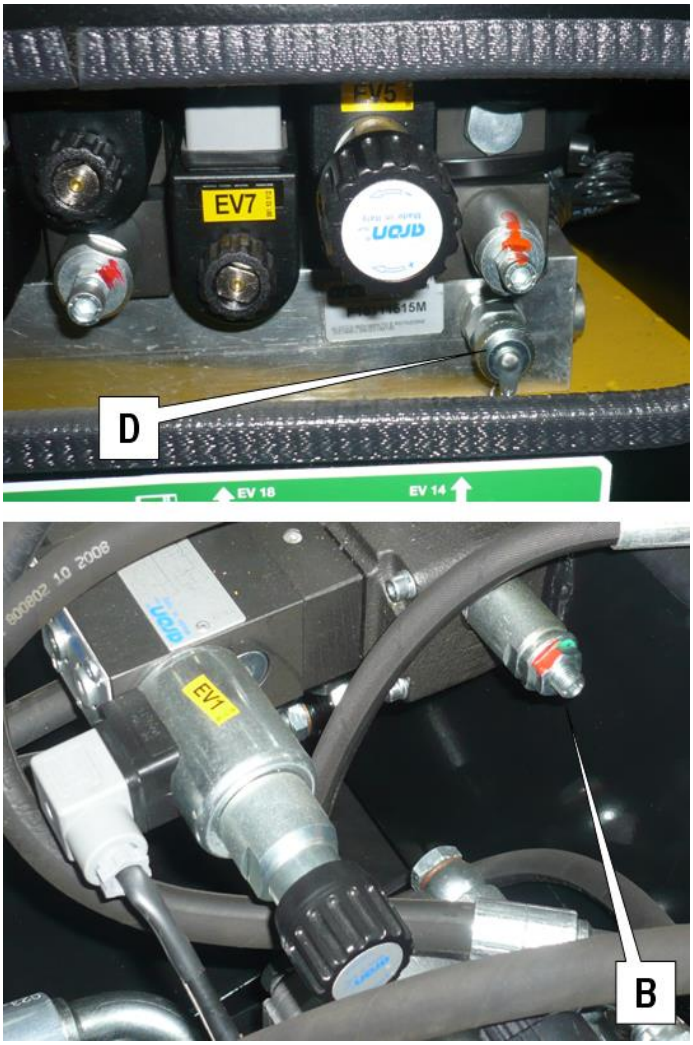


Fig. 23

WARNING !
AS THIS OPERATION IS VERY IMPORTANT IT IS TO BE CARRIED OUT BY SKILLED TECHNICIANS ONLY.

7.2.8. Operation check and adjustment of the braking valves

These valves check the minimum operating pressure during drive (in both running directions) and affect the dynamic braking and the drive speed. Normally, these valves do not require any adjustment, since they are calibrated at the factory before the machine is delivered.
The braking valves stop the machine when the drive controls are released. Once the machine has stopped, the parking brakes automatically come on, thus keeping the machine in position.

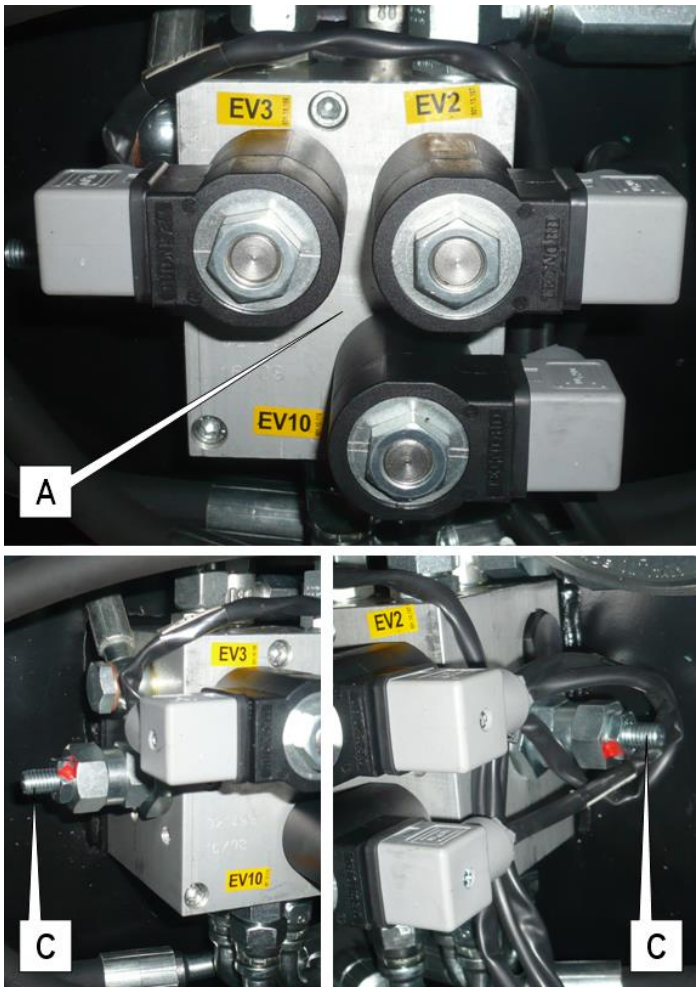


Fig.24

Check operation at least once a year.

To check the operation of the braking system:

- With platform completely lowered place the machine on a flat ground, free of obstacles, operate the drive control and when the max. speed is reached, release the control immediately;
- The correct operation of the braking system allows the machine to stop within a distance lower than 70 cm.
- In any case the braking system can stop and keep the machine on slopes as indicated in **"Technical features"** (the braking distance on descents is longer; drive downwards at the min. drive speed).

Calibration of both braking valves is required:

- In case of replacement of the hydraulic unit **A**.
- In case of replacement of one or both braking valves **C** (in a few cases only one valve is fitted).

To calibrate the braking valves:

- Locate braking valves **C** (one for each running direction).
- Introduce a pressure gauge with full scale of at least 250 bar in the special quick coupling of hydraulic control unit (1/4" BSP) **D.**
- On the platform control panel select the minimum drive speed.
- Unscrew the lock-nuts of the adjusting dowels.
- Using the platform control panel drive the machine (in the direction controlled by the valve) on a flat ground in straightforward direction and adjust the braking valve (relevant to that running direction) by means of adjusting dowel so as to achieve the required pressure value (call the nearest Service Centre to ask for the exact value).
- Once the required pressure value has been achieved, check that the valve controlling the braking in the opposite direction has maintained its adjustment (if present – in a few cases only one valve is fitted).
- Once adjustments are complete (pressure values in the two directions must not vary by more than ±5 bar), lock the adjusting dowel by means of the lock-nut.

WARNING !
AS THIS OPERATION IS VERY IMPORTANT IT IS TO BE CARRIED OUT BY SKILLED TECHNICIANS ONLY.

7.2.9. Inclinometer operation check

WARNING!

Usually the inclinometer does not need to be adjusted unless the electronic control unit is replaced. The equipment necessary for the replacement and adjustment of this component is such that these operations should be carried out by skilled personnel.

AS THIS OPERATION IS VERY IMPORTANT IT IS TO BE CARRIED OUT BY SKILLED TECHNICIANS ONLY.

The inclinometer does not require any adjustment since it is calibrated in the factory before the machine is delivered. This device controls the chassis slope and when inclined over the allowed value:

- It disables lifting.
- It disables drive when platform exceeds a given height (varying according to model).
- It warns of the instability condition by means of an audible alarm and a warning light located on the platform (see chapter "General use instructions").

The inclinometer checks the inclination with respect to the two axes (X; Y). On machine models that have the same transversal and longitudinal inclination limits, the control is carried out with reference to one axis only (X-axis).

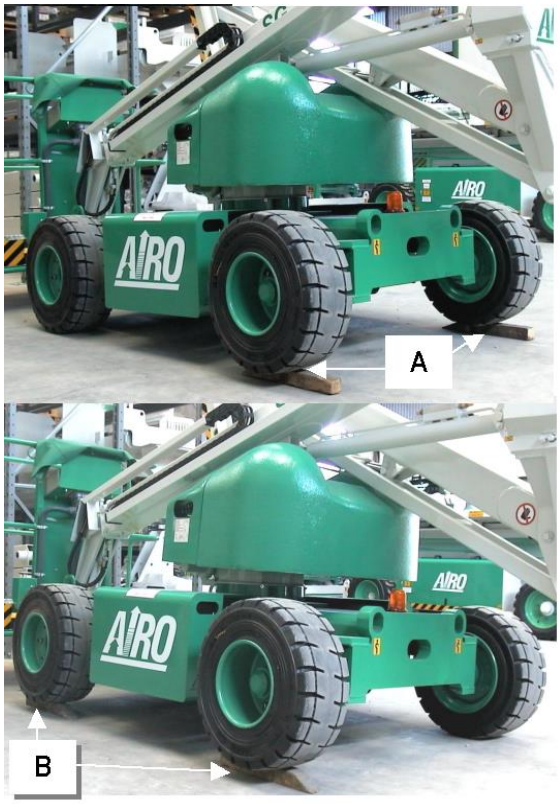


Fig. 25

Check operation at least once a year.

To check the inclinometer operation according to the **longitudinal axis** (generally **X-axis**):

- Using the platform controls set the machine so as to place a shim of dimension (**A+10 mm**) under the two rear or front wheels (see following table).
- Wait three seconds (operation delay set at factory) until the danger red light turns on. With platform lowered (booms down, and jib at a height between +10° and –70°) all manoeuvres are still possible. By lifting one of the booms (excepting the Jib) and/or extending the telescopic boom with respect to the horizontal, the control system of the machine disables the lifting and drive controls and activates the audible alarm.
- If the alarm does not go off CALL THE TECHNICAL ASSISTANCE.

To check the inclinometer according to the **transversal axis** (normally **Y-Axis**):

- Using the platform controls set the machine so as to place a shim of dimension (**B+10 mm**) under the two side right or left wheels (see following table).
- Wait three seconds (operation delay set at factory) until the danger red light turns on. With platform lowered (booms down, and jib at a height between +10° and –70°) all manoeuvres are still possible. By lifting one of the booms (excepting the Jib) and/or extending the telescopic boom with respect to the horizontal, the control system of the machine disables the lifting and drive controls and activates the audible alarm.
- If the alarm does not go off CALL THE TECHNICAL ASSISTANCE.

MODELS		
SHIMS	**A12 E**	**A13 J**
A [mm]	55	110
B [mm]	45	90

WARNING! The dimensions of shims A and B refer to max. allowed inclination as indicated in table "TECHNICAL FEATURES". To be used during the inclinometer calibration.

7.2.10. Operation check and adjustment of platform overload controller (load cells)

The AIRO self-propelled articulated boom aerial platforms are equipped with a sophisticated overload controller.

Normally the overload controller does not require any adjustments, since it is calibrated in the factory before the machine is delivered.

This device checks the load on the platform and:
- disables all movements if platform is overloaded by 20% compared to the nominal load (drive and steering disabled with platform lifted);
- with platform in transport position and overloaded by 20% compared to the nominal load, it disables telescopic boom lifting and extension;
- it warns the user of the overload condition by means of the platform audible alarm and warning light;
- by removing the overload, the machine can be operated again.

<u>Check operation at least once a year</u>

The overload controller consists of:
- Deformation transducer (**A**) (load cell).
- Electronic board (**B**) for the system calibration located inside a tight case (**C**) in platform.

Operation check of the overload controller:
- When platform is completely lowered and with extension deck retracted, load a charge evenly distributed equal to the max. nominal load allowed by the platform (paragraph “Technical features”). In this condition all operations should be possible both from platform and ground control panel.
- When platform is completely lowered add to the rated load an overload of 20% of the nominal load. In this condition the red alarm light and the audible alarm turn on.
- If the platform is at a height from the ground higher than that indicated in chapter “Technical features”, the alarm condition blocks the machine completely (for A13 J, remember that the jib activates its microswitch after exceeding a height of 10° according to the horizontal axis). To operate the machine again, remove the overload.

The system needs calibration:
- In case of replacement of one of the items composing the system.
- When, following an excessive overload or a collision, without the excessive load the danger condition is signalled anyway.

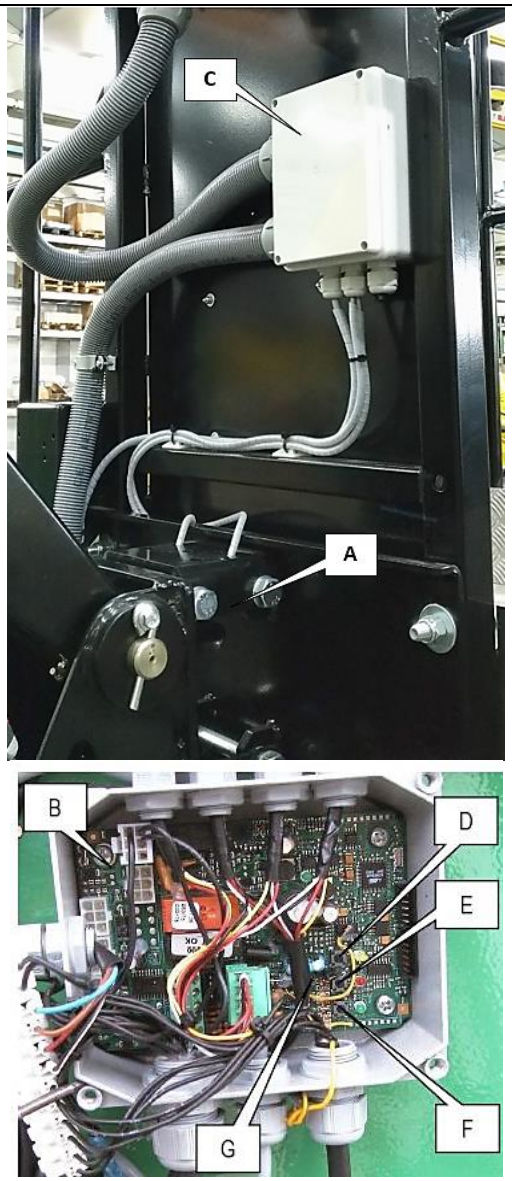


Fig.26a

Fig.26b

Calibration depends on the type of fitted device.
If the board is the one shown in **fig.26a**:

- switch off the machine;
- open the box **C** which contains electronic board**;**
- without any load on the platform, fit the bridge between the two pins of the connector **G**;
- switch on the machine;
- press button **D** (the yellow light and red light turn on);
- press button **E** (the luminosity of the red light increases a few seconds), and the overload controller will be reset;
- position a distributed load on the platform equal to nominal capacity plus 20%;
- press button **F** (the green light turns on a few seconds) to store the overload condition;
- press button **D** again to exit the calibration procedure (the yellow light turns off and if the procedure has been carried out correctly, the red light stays on signalling the overload);
- switch off the machine;
- open the jumper on connector **G**;
- switch on the machine;
- check that after removing the 20% overload (only the rated load remains on the platform) the alarm condition does not occur in any of the platform positions (platform down, up, driving, rotated);
- once the adjustment has been completed, close the box which contains the board.

If the board is the one shown in **fig.26b**:

- switch off the machine;
- Open the box which contains electronic board.
- switch on the machine;
- With no load on the platform, press and hold buttons **1** and **4** until the word **CONS** appears;
- press **4** to enter the **CAP** and **4** again to display the parameter value;
- Enter the correct value = **1000** via the button **1**, **2** and **3**. Press button **4** to save and exit.
- Press **2** and **2** again to switch to **J01J**, press **4** to display the parameter value;
- Enter the correct value = **1** via the button **1**, and **2**. Press button **4** to save and exit.
- Press **3** and **2** again to switch to **CALB**. Press **4** to switch to **CAL**;
- after checking that there are no loads on platform, press **1** to perform the zero calibration;
- load the weight equal to the nominal load and check out the value shown on the display. If it is correct, press **4** to save and exit, otherwise press **2** and then, via buttons **1**, **2** and **3** manually enter the correct value. Press **4** and **4** again to go back to **CALB**.
- press **2** and **2** again to switch to **ALAR**, then press **4** and **2** again to switch to **BLOC**;
- press **4** to enter and then, via buttons **1**, **2** and **3**, enter the alarm value equal to the nominal load + the overload of 20%. Press **4** to save;
- press **2** to go to **DIFF** and **4** again to enter. Set the value = **0045**, via buttons **1**, **2** and **3**, then 4 again to store;
- press **2** to switch to **TEST** and **4** again to do the test. When **PASS** appears, press **3** three times to exit calibration;
- check out if the display shows the value of the current load on the platform;
- check out if with a load >= the rated load + 20% overload, the system goes into overload alarm and that, by removing the 20% overload, the alarm condition disappears;
- once the adjustment has been completed, close the box which contains the board.

AS THIS OPERATION IS VERY IMPORTANT IT IS TO BE CARRIED OUT BY SKILLED TECHNICIANS ONLY

7.2.11. Overload controller by-pass – ONLY FOR EMERGENCY OPERATIONS

In case of fault and impossibility to calibrate the device, a by-pass of the system is possible by means of locking key switch (**A**) under the control panel. Keep the locking key switch active for 5 seconds and release to get the BY-PASS condition.

WARNING!! IN THIS CONDITION THE MACHINE CAN CARRY OUT ANY OPERATION, THOUGH THE RED STEADY LED AND THE AUDIBLE ALARM SIGNAL THE DANGER CONDITION. TURNING OFF THE MACHINE WILL RESET THE SYSTEM, AND UPON STARTING, THE OVERLOAD CONTROLLER OPERATES AGAIN SIGNALLING THE PREVIOUS OVERLOAD CONDITION.
THIS OPERATION IS ALLOWED ONLY FOR EMERGENCY HANDLING OF THE MACHINE. DO NOT USE THE MACHINE IF THE OVERLOAD CONTROLLER IS NOT EFFICIENT.

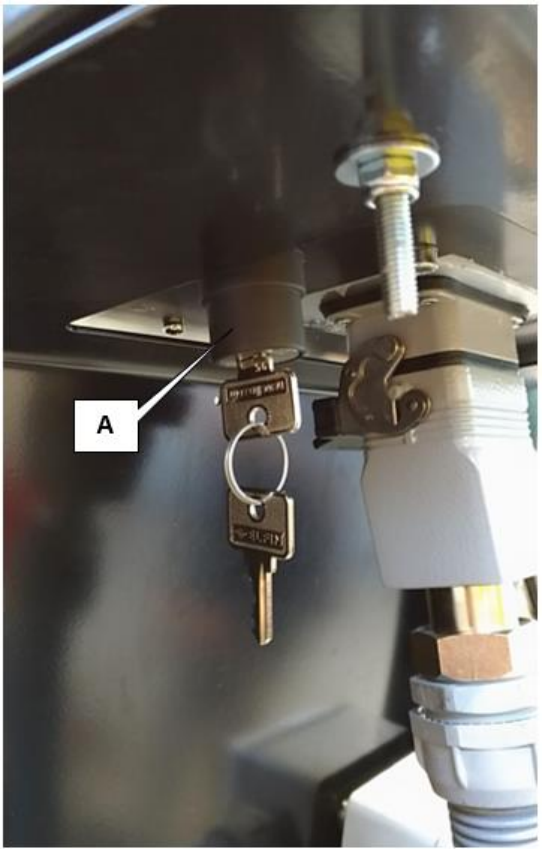


Fig. 27

WARNING!
THIS OPERATION IS ALLOWED ONLY FOR EMERGENCY HANDLING OF THE MACHINE OR IN THE EVENT OF A FAULT OR IMPOSSIBILITY TO CALIBRATE THE SYSTEM.
DO NOT USE THE MACHINE IF THE OVERLOAD CONTROLLER IS NOT EFFICIENT.

7.2.12. Operation check of M1 microswitches

The lifting booms are controlled by microswitches:
- M1A on pantograph (lower boom)
- M1B on the upper boom.
- M1C on the Jib

Once a year check the working conditions of the microswitches M1.

The microswitch functions M1A-M1B-M1C are as follows: with platform outside the rest position (at least one of the microswitches M1A-M1B-M1C is driven):
- The safety drive speed is automatically activated.
- If the chassis is inclined over the max. allowed inclination, lifting, extension and drive controls are disabled.
- The compensation control for platform levelling is disabled.
- When the platform is overloaded ALL operations until removal of overload are disabled.

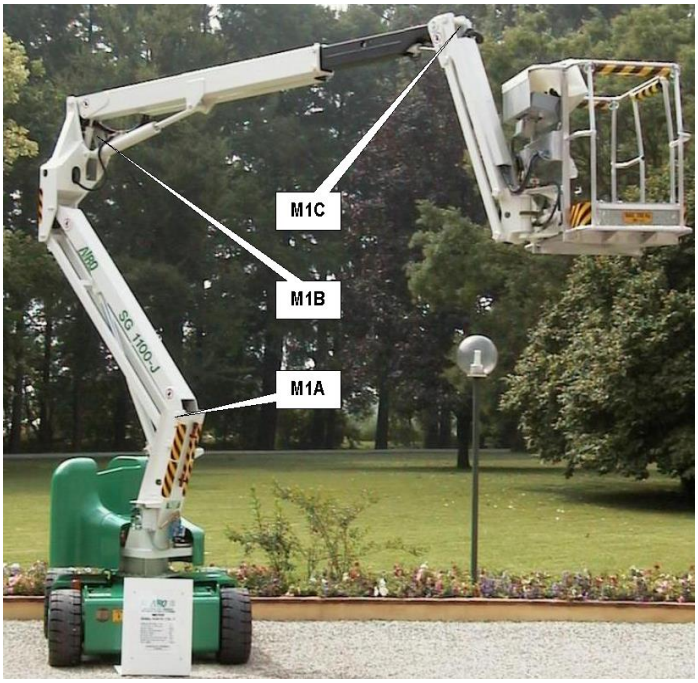


Fig. 28

The functions of the microswitch M1C on the Jib have been designed to favour loading/unloading operations from the ramps of a vehicle. With booms in rest position (microswitches M1A-M1B not activated), and Jib with inclination higher than +10° according to the horizontal axis (M1C activated):
- The first drive speed is automatically activated.
- if the chassis is inclined over the max. allowed inclination, Jib lifting and drive controls remain allowed.

7.2.13. Operation check of dead-man pedal safety system

The platform dead-man pedal is for enabling the operation controls of the machine on the platform control panel. Pressing the dead-man pedal the operation controls of the machine are activated.

Check operation at least once a year

To check the dead-man PEDAL:

- Move the drive joystick forward and backward in sequence, WITHOUT PRESSING THE DEAD-MAN PEDAL
- Check that the machine does not perform any movement.

- Hold down the dead-man pedal for more than 10 seconds.
- With the pedal pressed, move the joystick forward and backward in sequence.
- Check that the machine does not perform any movement

If the device works properly, no machine movement is possible on the platform control panel unless you press the dead-man pedal beforehand. If this is pressed for more than 10 seconds and no operation is performed, all movements are disabled; to operate the machine again, release the dead-man pedal and press it again.

On “ED” models the heat engine start-up is prevented if the pedal is pressed.

7.3. Starter battery for “ED” models

The battery is one of the most important elements of the machine. It is recommended to keep it in an efficient condition to increase its useful life, to avoid faults and to reduce the management costs of the machine.

On machines with heat engine, the starter battery is only for starting the heat engine; the control circuits are powered by the drive batteries.

7.3.1. Starter battery maintenance

The starter battery does not require any special maintenance:

- Keep terminals clean by removing any oxidation residues.
- Check correct terminal tightening.

7.3.2. Starter battery recharge

Starter batteries do not require any recharge.
During normal operation of the Diesel engine an alternator recharges the battery.

7.4. “DRIVE” battery for “E” and “ED” models

The battery is one of the most important elements of the machine. It is recommended to keep it in an efficient condition to increase its useful life, to avoid faults and to reduce the management costs of the machine.

7.4.1. General instructions for DRIVE battery

- In case of new batteries do not wait for the flat battery warning before recharging; recharge batteries after 3 or 4 working hours for the first 4/5 times.
- In case of new batteries full performance is achieved after approx. ten cycles of discharge and charge.
- Charge the battery in airy rooms and open the caps to allow the outflow of gas.
- Do not use extension leads exceeding 5 metres to connect the battery charger to the mains.
- Use a cable of suitable section (min 3x2.5 mm^2).
- Do not use rolled-up cables.
- Do not approach the battery with flames. Risk of deflagration due to the formation of explosive gases.
- Do not carry out temporary or irregular electric connections.
- The terminals must be tightened and without deposits. The cables must be provided with a good insulation.
- Keep the battery cleaned, dry and free of oxidation products by using antistatic cloths.
- Do not place tools or any other metal object on the battery.
- Check that the electrolyte level is 5-7 mm higher than the splash guard level.
- During charging operations check that the electrolyte temperature is not higher than 45°C max.
- If the machine is equipped with an automatic topping up device, follow the instructions described in the battery user manual carefully.

7.4.2. DRIVE battery maintenance

- For normal water operating conditions, water topping up is to be carried out every week.
- Top up using distilled or demineralized water.
- Top up after battery charging. The electrolyte level must be 5-7 mm higher than the splash guard level.
- For machines equipped with automatic topping up device, follow the instructions given in the battery user manual.
- Battery discharge must be stopped when 80% of the battery rated capacity has been used. An excessive and prolonged discharge irreversibly damages the battery. The machine is equipped with a device that, when the battery is discharged by 80%, lifting operations are disabled. The battery needs to be recharged. This condition is signalled by a flashing light of the relevant led on the platform control panel.
- Battery charge is to be carried out according to the instructions given in the next paragraphs.
- Keep caps and connections covered and dry. A careful cleaning allows electric insulation protection, good operation and useful life of the battery.
- In case of faulty operations due to the battery, avoid any direct intervention and call the Customer Service.
- When the machine is not being used the batteries will run down automatically (automatic discharge). To avoid the battery operation from being compromised, charge it at least once a month. This has to be done even if the density values of the electrolyte are high.
- To limit the discharge of the battery during periods of inactivity, store the machine in environments where the temperature is below 30°C and press all the emergency buttons, including the main power button.

7.4.3. Battery charger: DRIVE battery recharge

WARNING !
EXPLOSIVE gas is originated during battery charging process. Therefore, charging must take place in airy rooms where no risks of fire and explosion exist and in the presence of fire extinguishers.

Connect the battery charger to the power mains having all protections according to the current standards in force and with the following features:

- Power voltage 230V ± 10%.
- Frequency 50÷60 Hz.
- Activated grounding line.
- Magneto-thermic switch and residual current device ("circuit breaker").

Moreover:

- Do not use extension leads exceeding 5 metres to connect the battery charger to the mains.
- Use a cable of suitable section (min 3x2.5 mm^2).
- Do not use rolled-up cables.

IT IS FORBIDDEN
Connection to mains that do not comply with the above mentioned features.
Failure to comply with the a.m. instructions may cause incorrect functioning of the battery charger with consequent damages not covered by the warranty.

WARNING !
After charging, when the battery charger is still connected, the electrolyte density values should range from 1.260 g/l to 1.270 g/l (at 25thC).

To use the battery charger, follow these procedures:

- connect the battery charger by means of plug **A** to a current socket with the a.m. features
- Check the connection state of the battery charger through led **B.** If it is on, connection has taken place and charging has started. The colour and enable mode of the led indicate the charging phase (refer to table below).

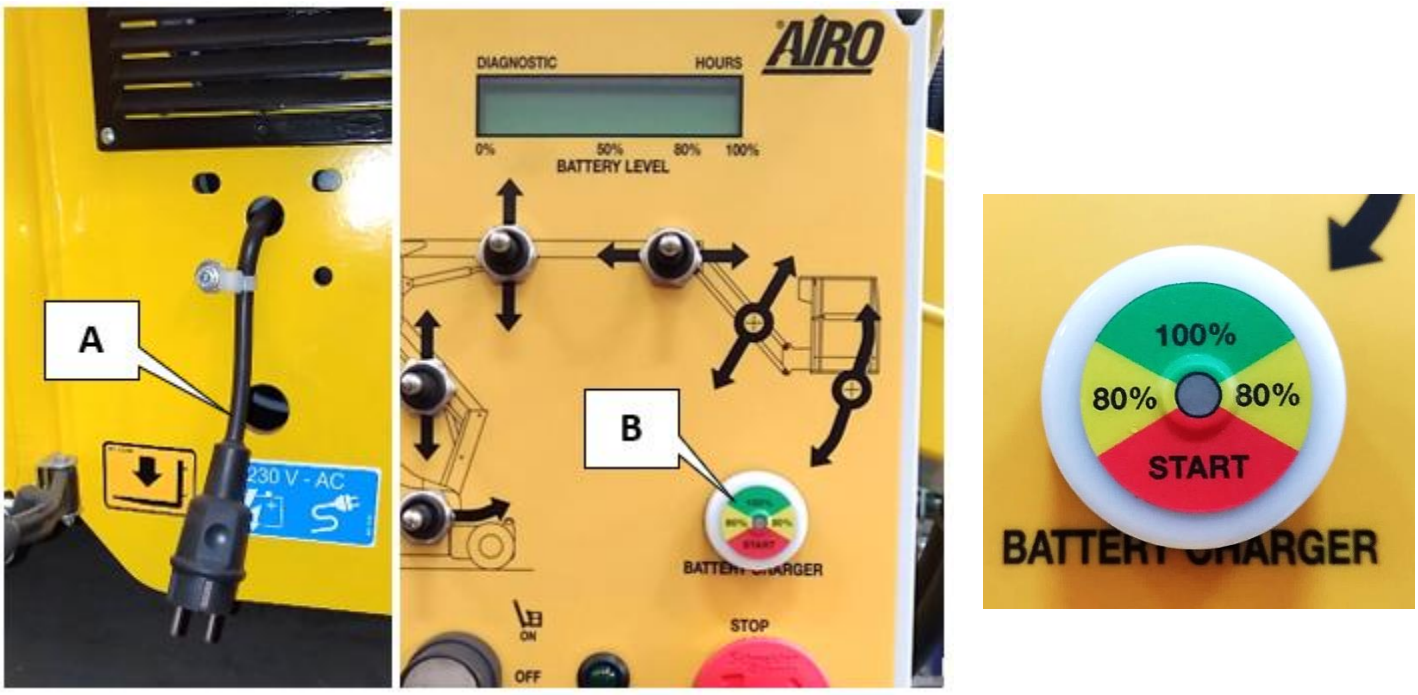


Fig.29

WARNING	DESCRIPTION
RED led flashing for a few seconds	Battery charger self-diagnostic phase
RED led on	Indicates the first and second charging phase
YELLOW led on	Indicates the equalization of the charging phase
GREEN led on	Indicates that charging is over; buffer charge active

With the battery charger ON, the machine is automatically off.

To disconnect the battery charger from the power source, disconnect the machine from the electric line.

WARNING !

Before using the machine check that the power cord of the battery charger is disconnected.

7.4.4. Battery charger: fault report

An intermittent audible alarm and the flashing LED on the battery charger indicator described in the previous paragraph indicate that a warning situation has occurred:

Signalling	Alarm type	Problem description and troubleshooting
Alarm + flashing **RED**	Battery presence	Battery is disconnected or faulty (check connection and the rated voltage of the battery).
Alarm + flashing **YELLOW**	Thermal probe	Thermal probe is disconnected during charging or outside working range (check probe connection and measure battery temperature).
Alarm + flashing **GREEN**	Time-out	Phase 1 and/or Phase 2 of duration higher than the max. allowed value (check battery capacity).
Alarm + flashing **RED-YELLOW**	Battery Current	Loss of output current control (fault in control logic).
Alarm + flashing **RED-GREEN**	Battery Voltage	Loss of output voltage control (battery disconnected or fault in the control logic).
Alarm + flashing **RED-YELLOW-GREEN**	Thermal	Over temperature of semiconductors (check the fan operation).

WARNING !

In presence of alarm the battery charger stops the current delivery.

7.4.5. Battery replacement

Replace the old batteries only with models of the same voltage, capacity, dimensions and mass. Batteries must be approved by the manufacturer.

Do not dispose of batteries in the environment after replacement. Comply with the current local standards.

AS THIS OPERATION IS VERY IMPORTANT IT IS TO BE CARRIED OUT BY SKILLED TECHNICIANS ONLY.

CALL THE TECHNICAL SUPPORT

8. MARKS AND CERTIFICATIONS

The models of self-propelled aerial platform described in this manual were subject to the CE type test according to the Directive 2006/42/EC. The certification was issued by:

Eurofins Product Testing Italy Srl - 0477 **Via Cuorgné, 21** **10156 – Torino – TO (Italy)**	CE

Test carrying out is shown by the above plate with CE mark applied on the machine and by the declaration of conformity enclosed in this user manual.

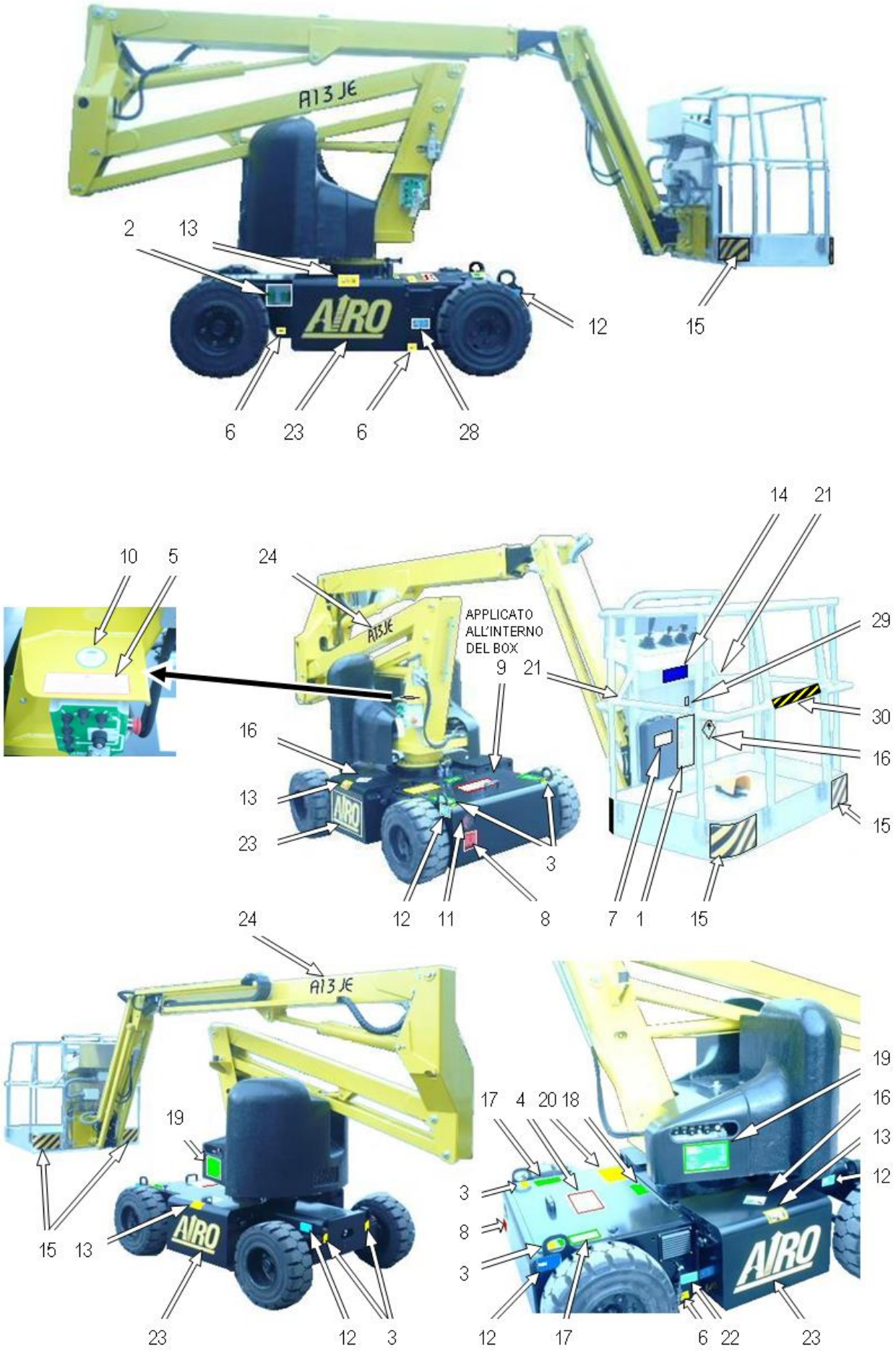
9. PLATES AND STICKERS

STANDARD STICKER CODES

	CODE	DESCRIPTION	QUANTITY
1	001.10.001	AIRO warnings plate	1
2	001.10.011	AIRO serial number plate	1
3	001.10.031	Towing hook sticker	4
4	001.10.057	General warnings sticker	1
5	001.10.059	Wheels tightening sticker	1
6	001.10.060	Lifting point sticker	4
7	001.10.088	Document holder sticker	1
8	001.10.098	STOP sticker I-D-F-NL-B-GB	1
9	001.10.150	Oil type adhesive "46" I-D-F-NL-B-G-PL – under the cowling	1
10	001.10.180	First check sticker	1
11	001.10.242	Emergency stop button yellow sticker	1
12	001.10.243	“Max. Load per wheel” sticker	4
13	001.10.260	Symbol articulated no stopping sticker	2
14	008.10.003	200 KG capacity sticker	1
15	010.10.010	Yellow-black line sticker <150x300>	4
16	023.10.003	Directions sticker	3
17	023.10.006	Emergency towing sticker (CWD)	2
18	023.10.010	Turret lock device sticker	1
19	029.10.030	Manual lowering sticker	1
20	029.10.011	No fasten cage sticker	1
21	035.10.007	Safety belts coupling sticker	2
22	045.10.011	Battery charger plug sticker	1
23	001.10.175	AIRO pre-spaced yellow sticker <530x265>	2
24	024.10.009	Pre-spaced sticker A12 E black	2
	033.10.011	Pre-spaced sticker A13 J E black	2
	024.10.012	Pre-spaced sticker A12 E D black	2
	033.10.012	Pre-spaced sticker A13 J E D black	2
25*	008.10.020	Triangle hot parts sticker	1
26*	029.10.005	Fuel tank sticker	1
27*	029.10.016	Sound power level sticker 103 dB	1
28**	045.10.010	(Optional) electric line plug sticker	1
29**	001.10.021	(Optional) ground symbol sticker	1
30**	001.10.244	(Optional) entrance bar black-yellow line sticker	1

* only diesel engine models

** optional features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10. CHECK REGISTER

The check register is released to the user of the platform in conformance with Attachment 1 of Directive 2006/42/EC.
This register is to be considered an integral part of the equipment and must accompany the machine for its entire life until its final disposal.

The register is provided for the notation, according to the proposed format, of the following events that regard the life of the machine:

- Periodic obligatory inspections under the care of the agency responsible for checking it (in Italy, ASL or ARPA).
- Obligatory periodic inspections to verify the structure, proper machine functioning and the protection and safety systems. Such inspections are the responsibility of the safety manager of the company that owns the machine and must occur with **frequency indicated.**
- Transfers of ownership. In Italy, the purchaser must notify the INAIL department responsible that the installation of the machine has occurred.
- Extraordinary maintenance work and replacement of important elements of the machine.

REQUIRED PERIODIC INSPECTIONS BY THE REGULATORY AGENCY		
Date	**Observations**	**Signature + Stamp**

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

STRUCTURAL CHECK	DESCRIPTION OF OPERATIONS TO BE PERFORMED
VISUAL CHECK	Check the integrity of the rails; the harness anchoring points; state of the lifting structure; any access ladders; rust; state of the tyres; oil leaks; locking pins on the structure.

	DATE	REMARKS	SIGNATURE + STAMP
1st YEAR			
2nd YEAR			
3rd YEAR			
4th YEAR			
5th YEAR			
6th YEAR			
7th YEAR			
8th YEAR			
9th YEAR			
10th YEAR			

DEFORMATION OF TUBES AND CABLES	Most of all, check at junction points that tubes and cables do not show any evident defects. Monthly operation. It is not necessary to indicate its execution every month, but at least every year when the other operations are carried out.

	DATE	REMARKS	SIGNATURE + STAMP
1st YEAR			
2nd YEAR			
3rd YEAR			
4th YEAR			
5th YEAR			
6th YEAR			
7th YEAR			
8th YEAR			
9th YEAR			
10th YEAR			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

STRUCTURAL CHECK	DESCRIPTION OF OPERATIONS TO BE PERFORMED
VARIOUS ADJUSTMENTS	See chapter 7.2.1

	DATE	REMARKS	SIGNATURE + STAMP
1st YEAR			
2nd YEAR			
3rd YEAR			
4th YEAR			
5th YEAR			
6th YEAR			
7th YEAR			
8th YEAR			
9th YEAR			
10th YEAR			

GREASING	See chapter 7.2.2 Monthly operation. It is not necessary to indicate its execution every month, but at least every year when the other operations are carried out.

	DATE	REMARKS	SIGNATURE + STAMP
1st YEAR			
2nd YEAR			
3rd YEAR			
4th YEAR			
5th YEAR			
6th YEAR			
7th YEAR			
8th YEAR			
9th YEAR			
10th YEAR			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

FUNCTIONAL CHECK	DESCRIPTION OF OPERATIONS TO BE PERFORMED
HYDRAULIC TANK OIL LEVEL CHECK	See chapter 7.2.3. Monthly operation. It is not necessary to indicate its execution every month, but at least every year when the other operations are carried out.

	DATE	REMARKS	SIGNATURE + STAMP
1st YEAR			
2nd YEAR			
3rd YEAR			
4th YEAR			
5th YEAR			
6th YEAR			
7th YEAR			
8th YEAR			
9th YEAR			
10th YEAR			

DRIVE REDUCTION GEARS OIL LEVEL CHECK	See chapter 7.2.5.

	DATE	REMARKS	SIGNATURE + STAMP
1st YEAR			
2nd YEAR			
3rd YEAR			
4th YEAR			
5th YEAR			
6th YEAR			
7th YEAR			
8th YEAR			
9th YEAR			
10th YEAR			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

FUNCTIONAL CHECK	DESCRIPTION OF OPERATIONS TO BE PERFORMED
CALIBRATION CHECK OF PRESSURE RELIEF VALVE	See chapter 7.2.7.

	DATE	REMARKS	SIGNATURE + STAMP
1st YEAR			
2nd YEAR			
3rd YEAR			
4th YEAR			
5th YEAR			
6th YEAR			
7th YEAR			
8th YEAR			
9th YEAR			
10th YEAR			

BATTERY STATE	See chapter 7.3 and 7.4. Daily operation. It is not necessary to indicate its execution every day, but at least every year when the other operations are carried out.

	DATE	REMARKS	SIGNATURE + STAMP
1st YEAR			
2nd YEAR			
3rd YEAR			
4th YEAR			
5th YEAR			
6th YEAR			
7th YEAR			
8th YEAR			
9th YEAR			
10th YEAR			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

FUNCTIONAL CHECK	DESCRIPTION OF OPERATIONS TO BE PERFORMED
TELESCOPIC BOOM SLIDING BLOCKS CLEARANCE ADJUSTMENT	See chapter 7.2.6.

	DATE	REMARKS	SIGNATURE + STAMP
1st YEAR			
2nd YEAR			
3rd YEAR			
4th YEAR			
5th YEAR			
6th YEAR			
7th YEAR			
8th YEAR			
9th YEAR			
10th YEAR			

TOTAL OIL CHANGE IN HYDRAULIC TANK AND DRIVE REDUCTION GEARS (EVERY TWO YEARS)	See chapter 7.2.3 and 7.2.5

	DATE	REMARKS	SIGNATURE + STAMP
2nd YEAR			
4th YEAR			
6th YEAR			
8th YEAR			
10th YEAR			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER			
FUNCTIONAL CHECK		**DESCRIPTION OF OPERATIONS TO BE PERFORMED**	
HYDRAULIC FILTER REPLACING (EVERY TWO YEARS)		**See chapter 7.2.4.**	
	DATE	**REMARKS**	**SIGNATURE + STAMP**
2nd YEAR			
4th YEAR			
6th YEAR			
8th YEAR			
10th YEAR			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

SAFETY SYSTEM CHECK	DESCRIPTION OF OPERATIONS TO BE PERFORMED
INCLINOMETER OPERATION CHECK	See chapter 7.2.9.

	DATE	REMARKS	SIGNATURE + STAMP
1st YEAR			
2nd YEAR			
3rd YEAR			
4th YEAR			
5th YEAR			
6th YEAR			
7th YEAR			
8th YEAR			
9th YEAR			
10th YEAR			

EFFICIENCY CHECK OF PLATFORM OVERLOAD CONTROLLER	See chapter 7.2.10.

	DATE	REMARKS	SIGNATURE + STAMP
1st YEAR			
2nd YEAR			
3rd YEAR			
4th YEAR			
5th YEAR			
6th YEAR			
7th YEAR			
8th YEAR			
9th YEAR			
10th YEAR			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

SAFETY SYSTEM CHECK	DESCRIPTION OF OPERATIONS TO BE PERFORMED
BRAKING SYSTEM EFFICIENCY CHECK	See chapter 7.2.8.

	DATE	REMARKS	SIGNATURE + STAMP
1st YEAR			
2nd YEAR			
3rd YEAR			
4th YEAR			
5th YEAR			
6th YEAR			
7th YEAR			
8th YEAR			
9th YEAR			
10th YEAR			

M1 MICROSWITCH OPERATION CHECK	See chapter 7.2.12.

	DATE	REMARKS	SIGNATURE + STAMP
1st YEAR			
2nd YEAR			
3rd YEAR			
4th YEAR			
5th YEAR			
6th YEAR			
7th YEAR			
8th YEAR			
9th YEAR			
10th YEAR			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

SAFETY SYSTEM CHECK	DESCRIPTION OF OPERATIONS TO BE PERFORMED
STICKERS AND PLATES CHECK	See Chapter 9. Check the legibility of the aluminium plate on the platform where the main instructions are summarised; that the capacity stickers are on the platform and that they are legible; that the stickers on the ground and platform controls are legible.

	DATE	REMARKS	SIGNATURE + STAMP
1st YEAR			
2nd YEAR			
3rd YEAR			
4th YEAR			
5th YEAR			
6th YEAR			
7th YEAR			
8th YEAR			
9th YEAR			
10th YEAR			

SAFETY SYSTEM CHECK	DESCRIPTION OF OPERATIONS TO BE PERFORMED
DEAD-MAN SYSTEM CHECK	See chapter 7.2.13.

	DATE	REMARKS	SIGNATURE + STAMP
1st YEAR			
2nd YEAR			
3rd YEAR			
4th YEAR			
5th YEAR			
6th YEAR			
7th YEAR			
8th YEAR			
9th YEAR			
10th YEAR			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER			
CHECK OF EMERGENCY DEVICES		**DESCRIPTION OF OPERATIONS TO BE PERFORMED**	
MANUAL EMERGENCY LOWERING CHECK		**See chapter 5.6**	
	DATE	**REMARKS**	**SIGNATURE + STAMP**
1st YEAR			
2nd YEAR			
3rd YEAR			
4th YEAR			
5th YEAR			
6th YEAR			
7th YEAR			
8th YEAR			
9th YEAR			
10th YEAR			

TRANSFERS OF OWNERSHIP

FIRST OWNER

COMPANY	DATE	MODEL	SERIAL NUMBER	DELIVERY DATE

AIRO / Tigieffe S.r.l.

SUBSEQUENT TRANSFERS OF OWNERSHIP

COMPANY	DATE

We affirm that, as of the date quoted above, the technical, dimensional and functional features of this machine were in conformance with what was originally required and that any changes have been recorded in this Register.

THE SELLER **THE PURCHASER**

SUBSEQUENT TRANSFERS OF OWNERSHIP

COMPANY	DATE

We affirm that, as of the date quoted above, the technical, dimensional and functional features of this machine were in conformance with what was originally required and that any changes have been recorded in this Register.

THE SELLER **THE PURCHASER**

SUBSEQUENT TRANSFERS OF OWNERSHIP

COMPANY	DATE

We affirm that, as of the date quoted above, the technical, dimensional and functional features of this machine were in conformance with what was originally required and that any changes have been recorded in this Register.

THE SELLER **THE PURCHASER**

SUBSEQUENT TRANSFERS OF OWNERSHIP

COMPANY	DATE

We affirm that, as of the date quoted above, the technical, dimensional and functional features of this machine were in conformance with what was originally required and that any changes have been recorded in this Register.

THE SELLER **THE PURCHASER**

SUBSEQUENT TRANSFERS OF OWNERSHIP

COMPANY	DATE

We affirm that, as of the date quoted above, the technical, dimensional and functional features of this machine were in conformance with what was originally required and that any changes have been recorded in this Register.

THE SELLER **THE PURCHASER**

IMPORTANT BREAKDOWNS

DATE	DESCRIPTION OF BREAKDOWN	SOLUTION

SPARE PARTS USED		DESCRIPTION
CODE	QUANTITY	

SERVICE **SAFETY MANAGER**

DATE	DESCRIPTION OF BREAKDOWN	SOLUTION

SPARE PARTS USED		DESCRIPTION
CODE	QUANTITY	

SERVICE **SAFETY MANAGER**

IMPORTANT BREAKDOWNS

DATE	DESCRIPTION OF BREAKDOWN	SOLUTION

SPARE PARTS USED		DESCRIPTION
CODE	QUANTITY	

SERVICE **SAFETY MANAGER**

DATE	DESCRIPTION OF BREAKDOWN	SOLUTION

SPARE PARTS USED		DESCRIPTION
CODE	QUANTITY	

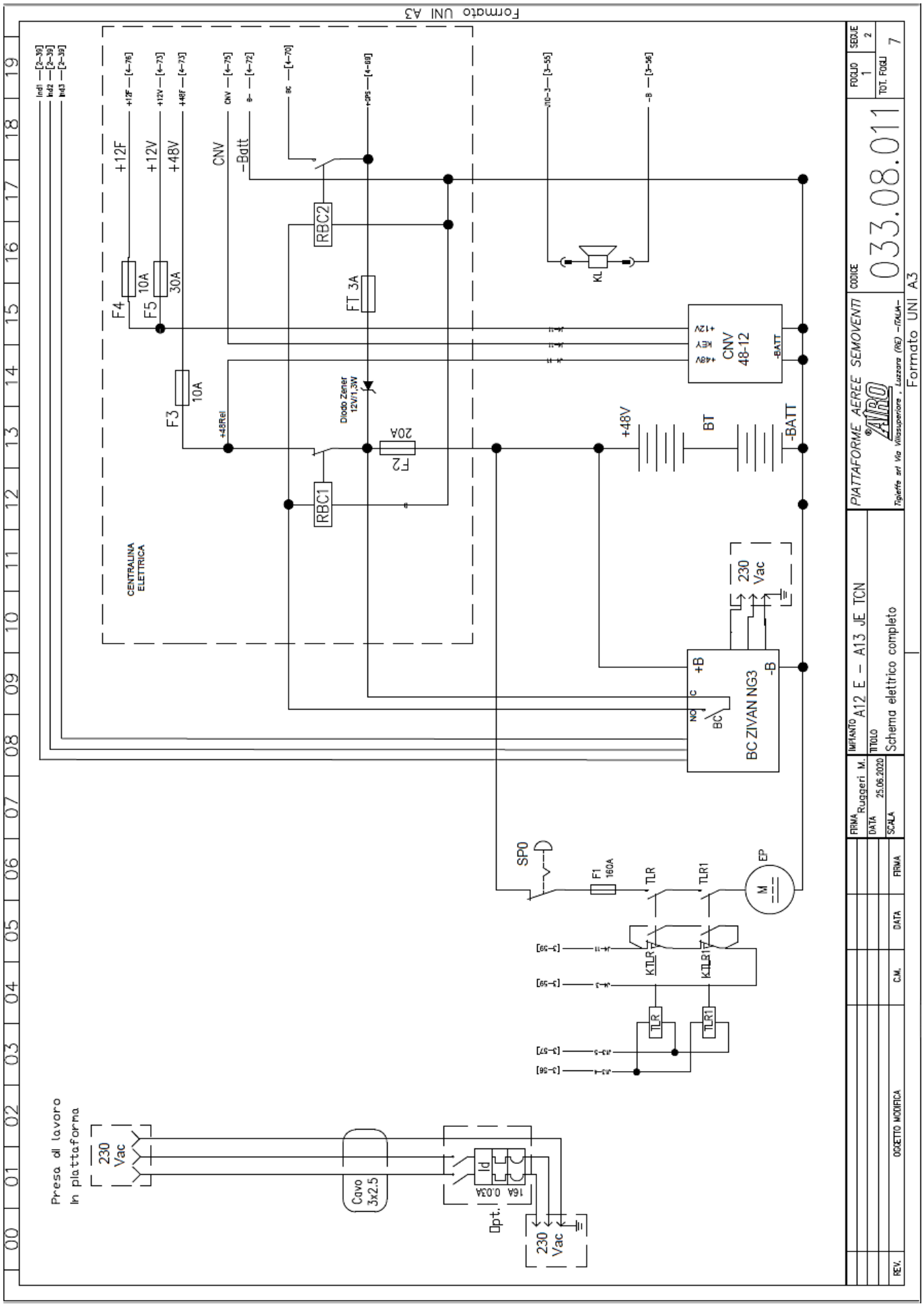
SERVICE **SAFETY MANAGER**

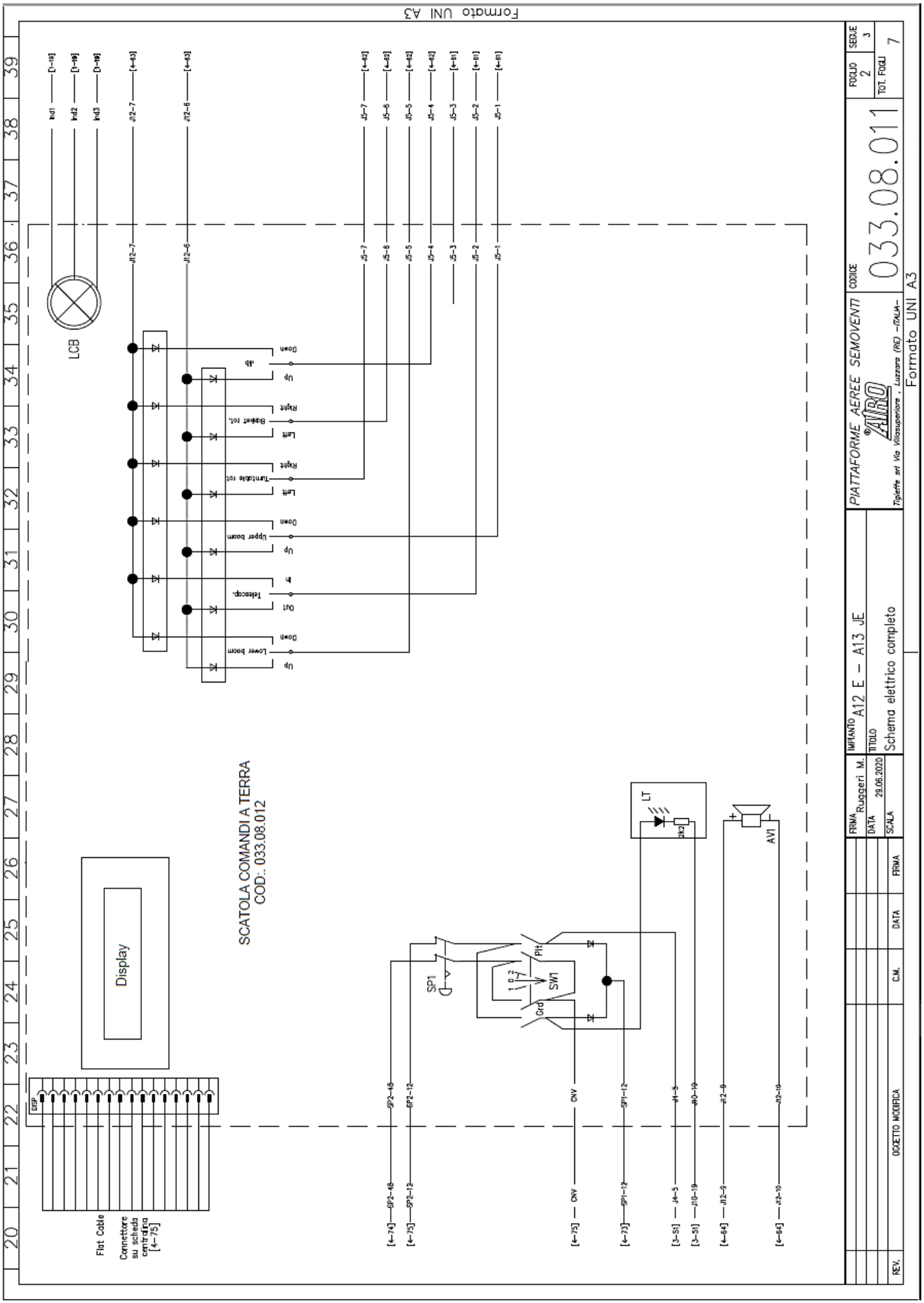
11. WIRING DIAGRAM STANDARD MACHINES A12 E – A13 JE

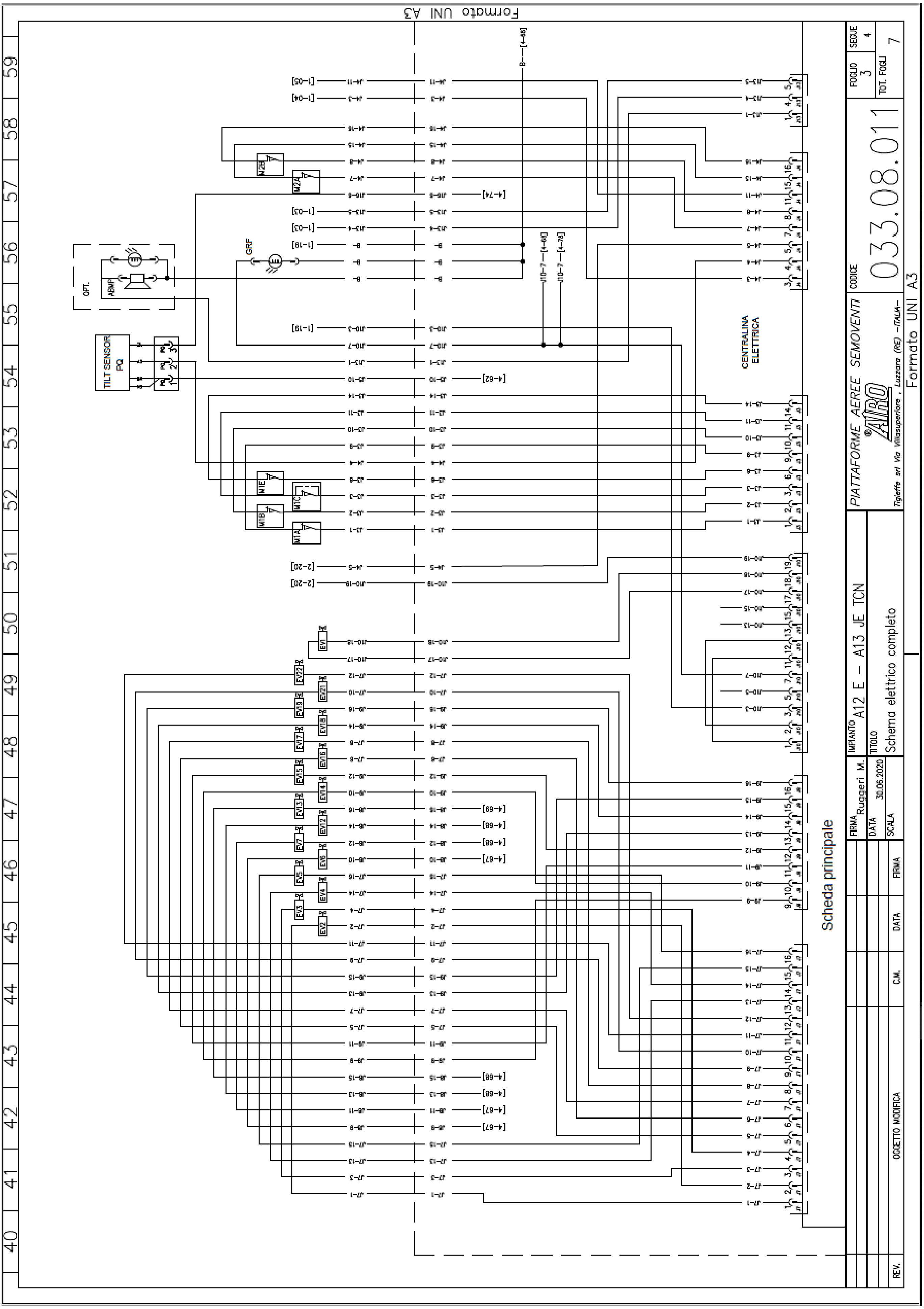
033.08.011

SYMB.	DESCRIPTION	Pag.-Col.
ABMP	AUDIBLE ALARM AND WARNING LIGHT "SENTINEL" (OPTIONAL)	3-55/56
AV1	MOVEMENT ALARM	2-27
AV2	ALARM	5-97
BC	BATTERY CHARGER	1-08/10
BMP	AIRO BUMPER "SENTINEL" (OPTIONAL)	5-85
BT	BATTERY	1-13/14
BY	OVERLOAD CONTROLLER BY-PASS SELECTOR	6-110
CNV	CONVERTER 48V-12V	1-11/12
EV1	PROPORTIONAL JOYSTICK CONTROL	3-50
EV2	FORWARD DRIVE SOLENOID VALVE	3-45
EV3	BACKWARD DRIVE SOLENOID VALVE	3-45
EV4	SECONDARY BOOM LIFTING SOLENOID VALVE	3-46
EV5	SECONDARY BOOM LOWERING SOLENOID VALVE	3-46
EV6	BOOM EXTENSION SOLENOID VALVE	3-46
EV7	BOOM RETRACTION SOLENOID VALVE	3-46/47
EV8	RIGHT STEERING SOLENOID VALVE	4-66
EV9	LEFT STEERING SOLENOID VALVE	4-66
EV10A-B	SOLENOID VALVES SERIES-PARALLEL TRACTION (DIFFERENTIAL LOCK)	4-66/67
EV12	CLOCKWISE TURRET ROTATION SOLENOID VALVE	3-47
EV13	ANTICLOCKWISE TURRET ROTATION SOLENOID VALVE	3-47
EV14	PRIMARY BOOM LIFTING SOLENOID VALVE	3-47
EV15	PRIMARY BOOM LOWERING SOLENOID VALVE	3-47/48
EV16	FORWARD CAGE LEVELLING SOLENOID VALVE	3-48
EV17	REVERSE CAGE LEVELLING SOLENOID VALVE	3-48
EV18	JIB LIFTING SOLENOID VALVE (A13 J ONLY)	3-48
EV19	JIB LOWERING SOLENOID VALVE (A13 J ONLY)	3-49
EV20A	SOLENOID VALVE, DRIVE MOTOR PISTON DISPLACEMENT EXCHANGE	4-67
EV21	SOLENOID VALVE, CAGE RIGHT ROTATION (OPTIONAL)	3-49
EV22	SOLENOID VALVE, CAGE LEFT ROTATION (OPTIONAL)	3-49
F1	POWER CIRCUIT FUSE	1-06
F2	CONTROL CIRCUIT FUSE 48V	1-13
F3	PROTECTION CIRCUIT FUSE 48V	1-13/14
F4	PROTECTION CIRCUIT FUSE 12V	1-15/16
F5	CONTROL CIRCUIT FUSE 12V	1-15/16
FT	TRACKUNIT DEVICE FUSE (OPTIONAL)	1-15/16
GRF	ROTATING BEACONS	3-56
KL	HORN	1-16
LA	ALARM LEDS	6-112
LC	LOAD ALARM LED	6-111
LCB	BATTERY CHARGER LED	2-33/34
LT	GROUND CONTROL LED	2-27
M	ELECTRIC PUMP – DC ELECTRIC MOTOR	1-05/06
M1A	LOWER BOOM MICROSWITCH	3-52
M1B	UPPER BOOM MICROSWITCH	3-52
M1C	JIB MICROSWITCH (A13 J only)	3-52
M1E	TELESCOPIC EXTENSION MICROSWITCH	3-52
M1S	DRIVE STOP MICROSWITCH (OPTIONAL)	
M2A	LIMIT SWITCH, TURRET RIGHT ROTATION	3-57
M2B	LIMIT SWITCH, TURRET LEFT ROTATION	3-57
R48	BATTERY STATUS RELAY 48V	4-75

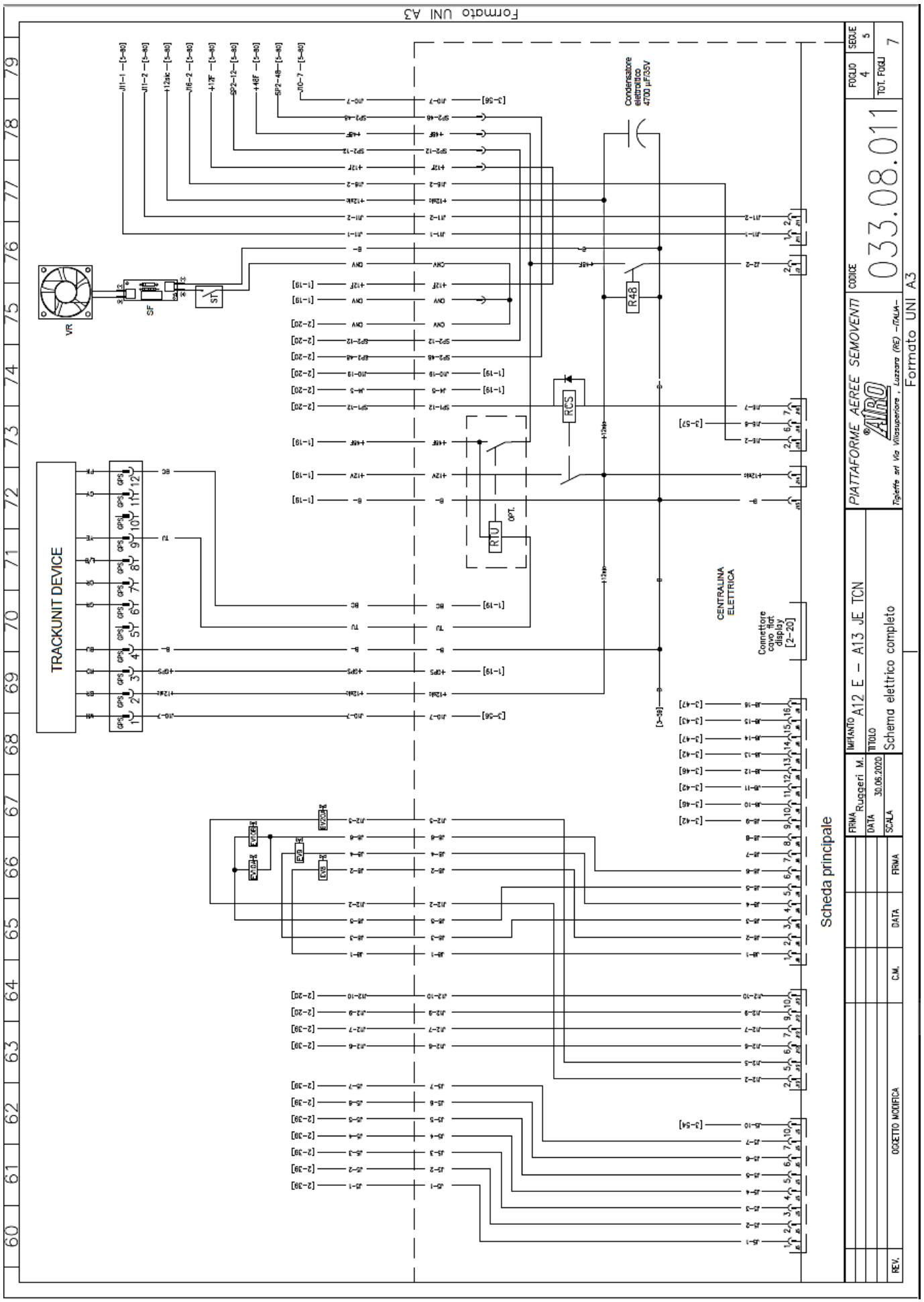
RBC1	BATTERY CHARGER RELAY 1	1-12/13
RBC2	BATTERY CHARGER RELAY 2	1-16/18
RCS	SYSTEM ENABLE RELAY	4-73/74
RTU	TRACKUNIT ENABLE RELAY (OPTIONAL)	4-71/72
SF	FAN FILTER BOARD	4-75/76
SP0	POWER CIRCUIT EMERGENCY SWITCH	1-06/07
SP1	EMERGENCY STOP BUTTON	2-24/25
SP2	EMERGENCY STOP BUTTON	5-94
SP3	HORN BUTTON	6-113
ST	THERMIC SENSOR	4-75/76
SW1	MACHINE START KEY-SELECTOR / CONTROL PANEL SELECTION	2-23/25
SW…	CONTROL SWITCHES.	
TLR	ELECTRIC MOTOR REMOTE CONTROL SWITCH	1-03/06
TLR1	SAFETY REMOTE CONTROL SWITCH	1-03/06
UM	DEAD-MAN PEDAL CONTACT	5-85
VR	COOLING FAN	4-75/76

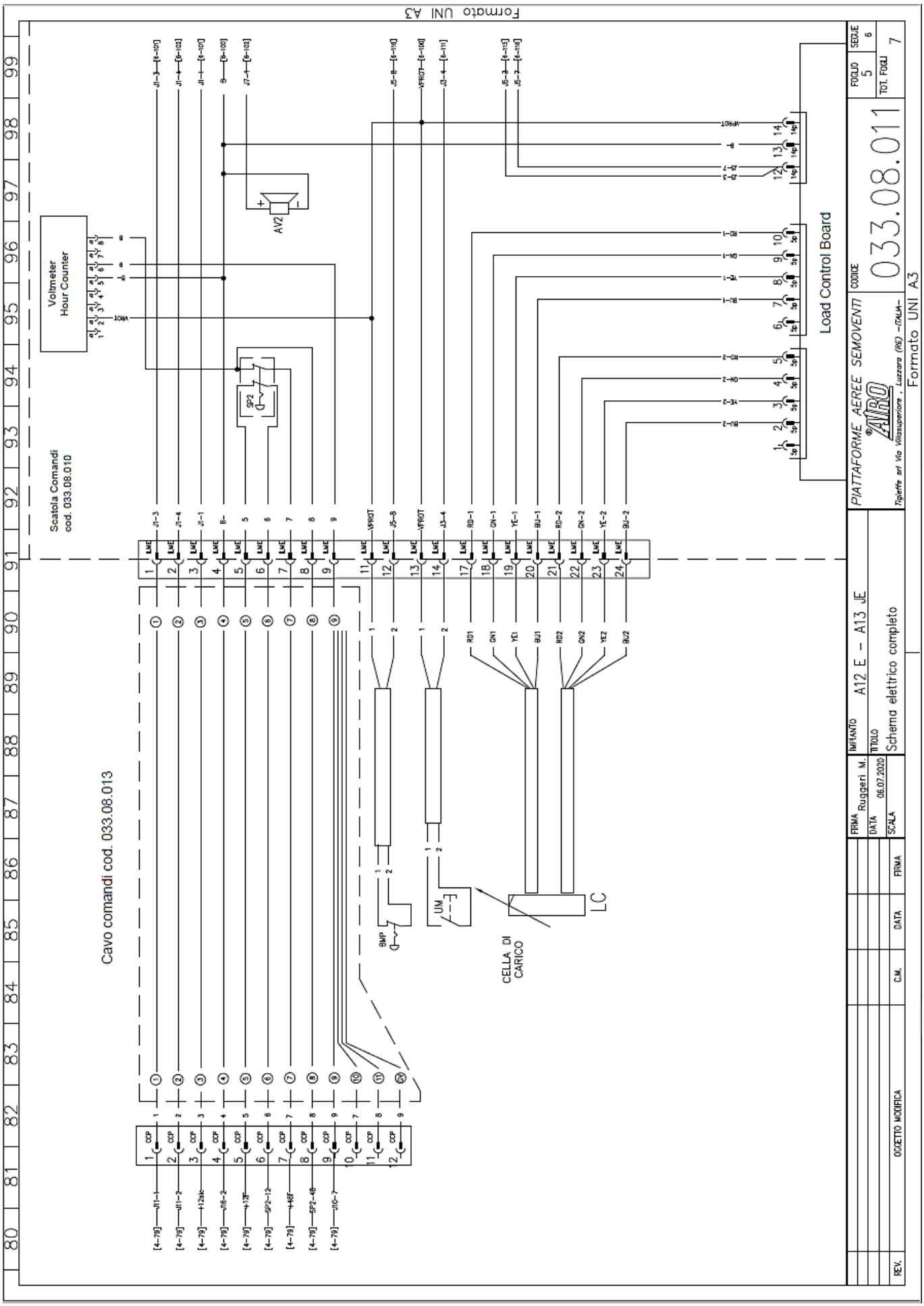

Formato UNI A3
CENTRALINA ELETTRICA
+12F
+12V
+48V
CNV
-Batt
F4 10A
F5 30A
F3 10A
FT 3A
F2 20A
RBC1
RBC2
Diodo Zener 12V/1,3W
CNV 48-12
BC ZIVAN NG3
KL
SP0
F1 160A
TLR
TLR1
EP
230 Vac
Presa di lavoro in piattaforma
Cavo 3x2.5
Id
16A 0.03A
Dpt.
PIATTAFORME AEREE SEMOVENTI
CODICE
033.08.011
FOGLIO 1
SEGUE 2
TOT. FOGLI 7
IMPIANTO A12 E – A13 JE TCN
TITOLO Schema elettrico completo
FIRMA Ruggeri M.
DATA 25.06.2020
SCALA
Formato UNI A3

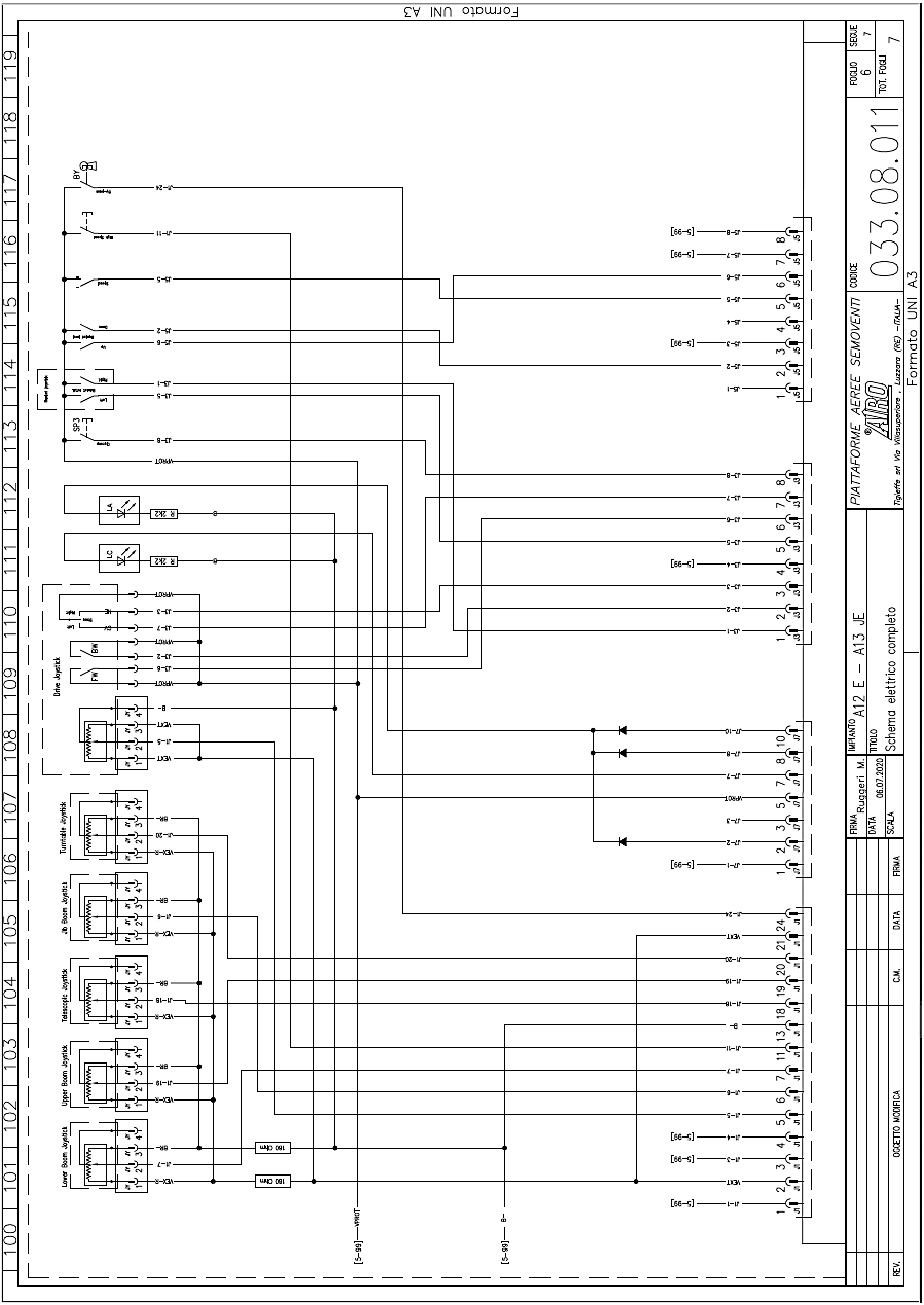

Formato UNI A3
PIATTAFORME AEREE SEMOVENTI
AIRO
033.08.011
FOGLIO 2
TOT. FOGLI 7
SEDILE 3
IMPIANTO A12 E – A13 JE
TITOLO Schema elettrico completo
FIRMA Ruggeri M.
DATA 29.06.2020
SCALA
Formato UNI A3
LCB
Display
SCATOLA COMANDI A TERRA
COD:: 033.08.012
Flat Cable
Connettore su scheda centralina [4–75]
SP1
SW1
LT
AV1
Up
Down
Left
Right
Basket rot.
Turntable rot.
Lower boom
Upper boom
Telescop.
Jib
In
Out
Pit
Grd
CNV



Formato UNI A3
OPT.
TILT SENSOR PQ
GRF
CENTRALINA ELETTRICA
Scheda principale
PIATTAFORME AEREE SEMOVENTI
AIRO
Tigieffe srl Via Villasuperiore, Luzzara (RE) –ITALIA–
CODICE
033.08.011
FOGLIO 3
SEGUE 4
TOT. FOGLI 7
IMPIANTO
A12 E – A13 JE TCN
TITOLO
Schema elettrico completo
FIRMA Ruggeri M.
DATA 30.06.2020
SCALA
REV.
OGGETTO MODIFICA
C.M.
DATA
FIRMA


Formato UNI A3
TRACKUNIT DEVICE
Scheda principale
CENTRALINA ELETTRICA
Condensatore elettrolitico 4700 µF/50V
R48
RCS
R1U
OPT.
VR
SF
ST
Connettore cavo flat display [2-20]
PIATTAFORME AEREE SEMOVENTI
AIRO
Tiglieto srl Via Villasuperiore - Luzzara (RE) -ITALIA-
CODICE
033.08.011
FOGLIO 4
TOT. FOGLI 7
SEGUE 5
IMPIANTO A12 E – A13 JE TCN
TITOLO Schema elettrico completo
FIRMA Ruggeri M.
DATA 30.06.2020
SCALA
FIRMA
DATA
C.M.
OGGETTO MODIFICA
REV.
Formato UNI A3


Formato UNI A3
Voltmeter
Hour Counter
Scatola Comandi
cod. 033.08.010
Load Control Board
Cavo comandi cod. 033.08.013
AV2
SP2
BMP
UM
LC
CELLA DI
CARICO
PIATTAFORME AEREE SEMOVENTI
CODICE
033.08.011
FOGLIO 5
SEDUTE 6
TOT. FOGLI 7
IMPIANTO A12 E – A13 JE
TITOLO Schema elettrico completo
FIRMA Ruggeri M.
DATA 08.07.2020
SCALA
REV.
OGGETTO MODIFICA
DATA
FIRMA
Formato UNI A3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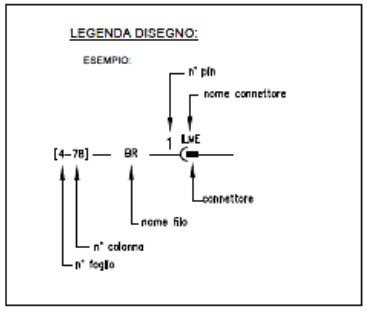
PIATTAFORME AEREE SEMOVENTI
AIRO
Tigieffe srl Via Villasuperiore, Luzzara (RE) -ITALIA-
CODICE
033.08.011
FOGLIO 6
SEGUE 7
TOT. FOGLI 7
IMPIANTO A12 E - A13 JE
TITOLO Schema elettrico completo
FIRMA Ruggeri M.
DATA 06.07.2020
SCALA
REV.
OGGETTO MODIFICA
C.M.
DATA
FIRMA
Drive Joystick
Turntable Joystick
Jib Boom Joystick
Telescopic Joystick
Upper Boom Joystick
Lower Boom Joystick

SIMB.	DESCRIZIONE	Pag.–Col.
ABMP	Avvisatore acustico e luminoso Sentinel (opt.)	3–55/56
AV1	Avvisatore acustico a terra	2–27
AV2	Avvisatore acustico in piattaforma	5–97
BC	CaricaBatteria	1–08/10
BMP	Bumper per AIRO SENTINEL	5–85
BT	Batteria	1–13/14
BY	Selettore di By–pass controllo del carico	6–110
CNV	Convertitore 48V–12V	1–11/12
EV1	Elettrovalvola Proporzionale comandi	3–50
EV2	Elettrovalvola trazione Avanti	3–45
EV3	Elettrovalvola trazione indietro	3–45
EV4	Elettrovalvola di sollevamento braccio inferiore	3–46
EV5	Elettrovalvola di discesa braccio inferiore	3–46
EV6	Elettrovalvola di sfilo braccio telescopico	3–46
EV7	Elettrovalvola di rientro braccio telescopico	3–46/47
EV8	Elettrovalvola di sterzo a destra	4–66
EV9	Elettrovalvola di sterzo a sinistra	4–66
EV10A	Elettrovalvola di comando blocco differenziale	4–66
EV10B	Elettrovalvola di comando blocco differenziale	4–66/67
EV12	Elettrovalvola di rotazione torretta a destra	3–47
EV13	Elettrovalvola di rotazione torretta a sinistra	3–47
EV14	Elettrovalvola di sollevamento II Braccio	3–47
EV15	Elettrovalvola di discesa II braccio	3–47/48
EV16	Elettrovalvola di livellamento cesto ALTO	3–48
EV17	Elettrovalvola di livellamento cesto BASSO	3–48
EV18	Elettrovalvola di sollevamento JIB	3–48
EV19	Elettrovalvola di discesa JIB	3–49
EV20A	Elettrovalvola di cambio cilindrata	4–67
EV21	Elettrovalvola di rotazione cesto a destra	3–49
EV22	Elettrovalvola di rotazione cesto a sinistra	3–49
F1	Fusibile circuito di potenza	1–06
F2	Fusibile circuito di controllo a 48Vdc	1–13
F3	Fusibile protezione circuito 48Vdc	1–13/14
F4	Fusibile protezione circuito a 12Vdc	1–15/16
F5	Fusibile circuito di controllo 12Vdc	1–15/16
FT	Fusibile dispositivo Trackunit	1–15/16
GRF	Girofaro	3–56
KL	Clacson	1–16
LA	Led Allarmi piattaforma	6–112
LC	Led Allarme Carico	6–111
LCB	Led Carica Batteria	2–33/34
LT	Led Comandi a terra	2–27

SIMB.	DESCRIZIONE	Pag.–Col.
M	Elettropompa – Motore elettrico DC	1–05/06
M1A	Finecorsa posizione I braccio	3–52
M1B	Finecorsa posizione II braccio	3–52
M1C	Finecorsa posizione JIB	3–52
M1E	Finecorsa posizione braccio telescopico	3–52
M2A	Finecorsa stop rotazione destra torretta	3–57
M2B	Finecorsa stop rotazione sinistra torretta	3–57
R48	Relè stato batteria 48V	4–75
RBC1	Relè Carica Batteria 1	1–12/13
RBC2	Relè Carica Batteria 2	1–16/18
RCS	Relè Consenso sistema	4–73/74
RTU	Relè Abilitazione Trackunit (opt.)	4–71/72
SF	Scheda filtro ventola	4–75/76
SP0	Interrttore di emergenza circuito di potenza	1–06/07
SP1	Interrutore di emergenza a fungo	2–24/25
SP2	Interruttore di emergenza a fungo	5–94
SP3	Pulsante clacson	6–113
ST	Sensore Termico	4–75/76
SW1	Selettori comandi	2–23/25
TLR	Teleruttore di potenza	1–03/06
TLR1	Teleruttore di potenza	1–03/06
UM	Contatto pedale "Uomo presente"	5–85
VR	Ventola di Raffreddamento	4–75/76



REV.	OGGETTO MODIFICA	C.M.	DATA	FIRMA

FIRMA Ruggeri M.
DATA 30.09.2020
SCALA

IMPIANTO A12 E – A13 JE TCN
TITOLO Schema elettrico completo

PIATTAFORME AEREE SEMOVENTI
AIRO
Tigieffe srl Via Villasuperiore , Luzzara (RE) –ITALIA–

CODICE 033.08.011

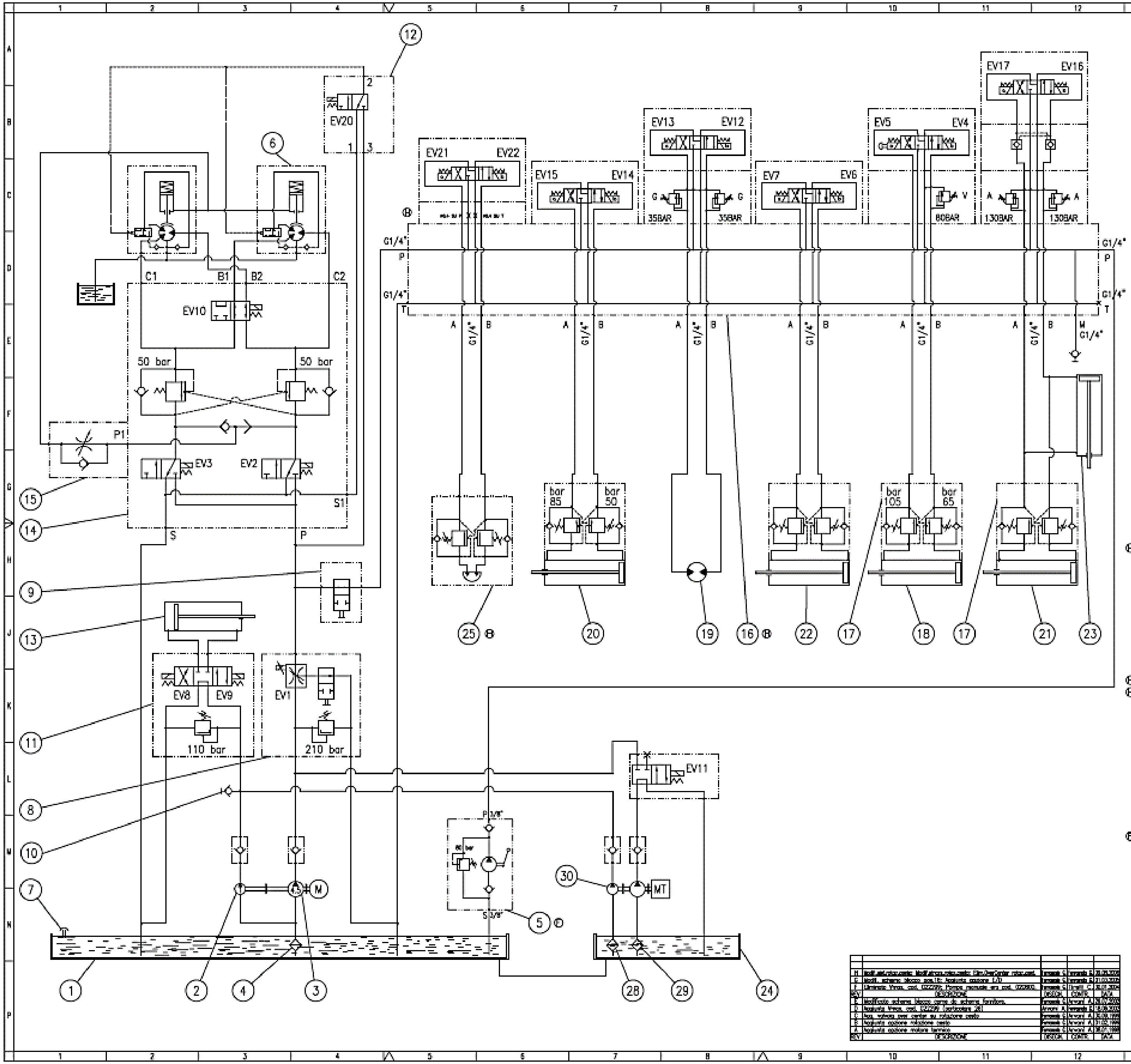
FOGLIO 7 | SEGUE -
TOT. FOGLI 7

Formato UNI A3

Formato UNI A3

12. HYDRAULIC DIAGRAM STANDARD MACHINES A12 E – A13 JE

EV1 PROPORTIONAL JOYSTICK CONTROL
EV2 FORWARD DRIVE SOLENOID VALVE
EV3 BACKWARD DRIVE SOLENOID VALVE
EV4 PANTOGRAPH LIFTING SOLENOID VALVE
EV5 PANTOGRAPH LOWERING SOLENOID VALVE
EV6 BOOM EXTENSION SOLENOID VALVE
EV7 BOOM RETRACTION SOLENOID VALVE
EV8 RIGHT STEERING SOLENOID VALVE
EV9 LEFT STEERING SOLENOID VALVE
EV10 SOLENOID VALVE, SERIES-PARALLEL TRACTION
EV11 SOLENOID BYPASS VALVE (E/B ONLY)
EV12 CLOCKWISE TURRET ROTATION SOLENOID VALVE
EV13 ANTICLOCKWISE TURRET ROTATION SOLENOID VALVE
EV14 BOOM LIFTING SOLENOID VALVE
EV15 BOOM LOWERING SOLENOID VALVE
EV16 FORWARD CAGE LEVELLING SOLENOID VALVE
EV17 REVERSE CAGE LEVELLING SOLENOID VALVE
EV18 JIB LIFTING SOLENOID VALVE (A13 J ONLY)
EV19 JIB LOWERING SOLENOID VALVE (A13 J ONLY)
EV20 SOLENOID VALVE, DRIVE MOTOR PISTON DISPLACEMENT EXCHANGE
EV21 PLATFORM RIGHT ROTATION SOLENOID VALVE
EV22 PLATFORM LEFT ROTATION SOLENOID VALVE
M ELECTRIC MOTOR
MT HEAT ENGINE ("ED" MODELS ONLY)
1 HYDRAULIC TANK
2 STEERING PUMP
3 MAIN PUMP
4 SUCTION FILTER
5 EMERGENCY MANUAL PUMP
6 DRIVE HYDRAULIC MOTOR
7 FILLER AND RELIEF CAP
8 PROPORTIONAL JOYSTICK CONTROL HYDRAULIC BLOCK
9 EMERGENCY TAP
10 PRESSURE GAUGE CONNECTION
11 STEERING HYDRAULIC BLOCK
12 HYDRAULIC BLOCK DISPLACEMENT EXCHANGE
13 STEERING CYLINDER
14 DRIVE PLATE
15 UNIDIRECTIONAL FLOW RESTRICTOR
16 ELECTRIC DISTRIBUTOR ASSEMBLY
17 OVER-CENTER VALVE
18 SECONDARY BOOM LIFTING CYLINDER
19 TURRET ROTATION MOTOR
20 PRIMARY BOOM LIFTING CYLINDER
21 PLATFORM LEVELLING CYLINDER
22 TELESCOPIC BOOM EXTENSION CYLINDER
23 SENSOR CYLINDER
24 ADDITIONAL TANK ("ED" MODELS ONLY)
25 CAGE ROTATION CYLINDER
26 JIB CYLINDER (A13 J ONLY)
27 UNIDIRECTIONAL AND PRESSURE RELIEF VALVE



Pos.	Q.tà	Descrizione	Materiale	Codice
MT		Motore Diesel HATZ 1B40	SG1000 NEW E/D	021886
MT		Motore Benzina Kohler 11.2 kW	SG1000 NEW E/B	020675
M		Motore elettrico 48V 4500W		020590
EV22		Elettrovalvola rotaz. cest. DX	SG1000 NEW/R	
EV21		Elettrovalvola rotaz. cest. SX	SG1000 NEW/R	
EV20		Elettrovalvola scambio cilindrata		
EV17		Elettrovalvola livell. cest. indietro		
EV16		Elettrovalvola livell. cest. avanti		
EV15		Elettrovalvola discesa II° braccio		
EV14		Elettrovalvola sollevan. II° braccio		
EV13		Elettrovalvola rotaz. torretta DX		
EV12		Elettrovalvola rotaz. torretta SX		
EV11		Elettrovalvola by-pass	SG1000 NEW E/B	
EV10		Elettrovalvola serie/parallelo		
EV9		Elettrovalvola sterzo DX		
EV8		Elettrovalvola sterzo SX		
EV7		Elettrovalvola rientro telescopico		
EV6		Elettrovalvola sfilo telescopico		
EV5		Elettrovalvola discesa I° braccio		
EV4		Elettrovalvola sollevan. I° braccio		
EV3		Elettrovalvola trazione indietro		
EV2		Elettrovalvola trazione avanti		
EV1		Regolatore di flusso proporzionale		
30	1	Pompa	SG1000 NEW E/D	021892
30	1	Pompa	SG1000 NEW E/B	020681
29	1	Filtro in aspirazione	SG1000 NEW E/B E/D	020550
28	1	Filtro in aspirazione	SG1000 NEW E/D E/D	020846
Ⓗ 25	1	Attuatore rotazione cestello	SG1000 NEW/R E/D-R	024.04.058
24	1	Serbatoio supplementare 27 l	SG1000 NEW E/B E/D	023.09.012
23	1	Cilindro sensore		008.09.006
22	1	Cilindro sfilo telescopico		010.09.003
21	1	Cilindro livellamento piattaforma		008.09.007
20	1	Cilindro sollevam. secondo braccio	SG1000 NEW E/B E/D	023.09.016
20	1	Cilindro sollevam. secondo braccio	SG1000 NEW	023.09.001
19	1	Riduttore rotazione torretta		021001
19	1	Motore rotazione torretta		020595
18	1	Cilindro sollevamento primo braccio		023.09.001
17	4	Valvola over-center		020865
Ⓗ 16	1	Gruppo idraulico movimenti	SG1000 NEW/R - E/D-R	021860
Ⓗ 16	1	Gruppo idraulico movimenti	SG1000 NEW - E/D	021858
15	1	Regolatore di flusso unidirezionale		020163
14	1	Piastra trazione		021499
13	1	Cilindro sterzo		014.09.001
12	1	Gruppo idraulico scambio cilindrata		020863
11	1	Gruppo idraulico di sterzo		020581
10	1	Attacco manometro 1/4" BSP		020300
9	1	Rubinetto manovre di emergenza		020330
8	1	Gruppo idr. regol. proporzionale		020829
7	1	Tappo di carico e sfiato		020199
6	2	Riduttore trazione		020458
6	2	Motore idraulico trazione		020302/3
Ⓕ 5	1	Pompa manuale		021735
4	1	Filtro in aspirazione		020592
3	1	Pompa		020827
2	1	Pompa sterzo (incorporata)		
1	1	Serbatoio olio idraulico		023.09.002

Descrizione: Schema idraulico — Class. merc.: --

Gruppo: Impianto idraulico

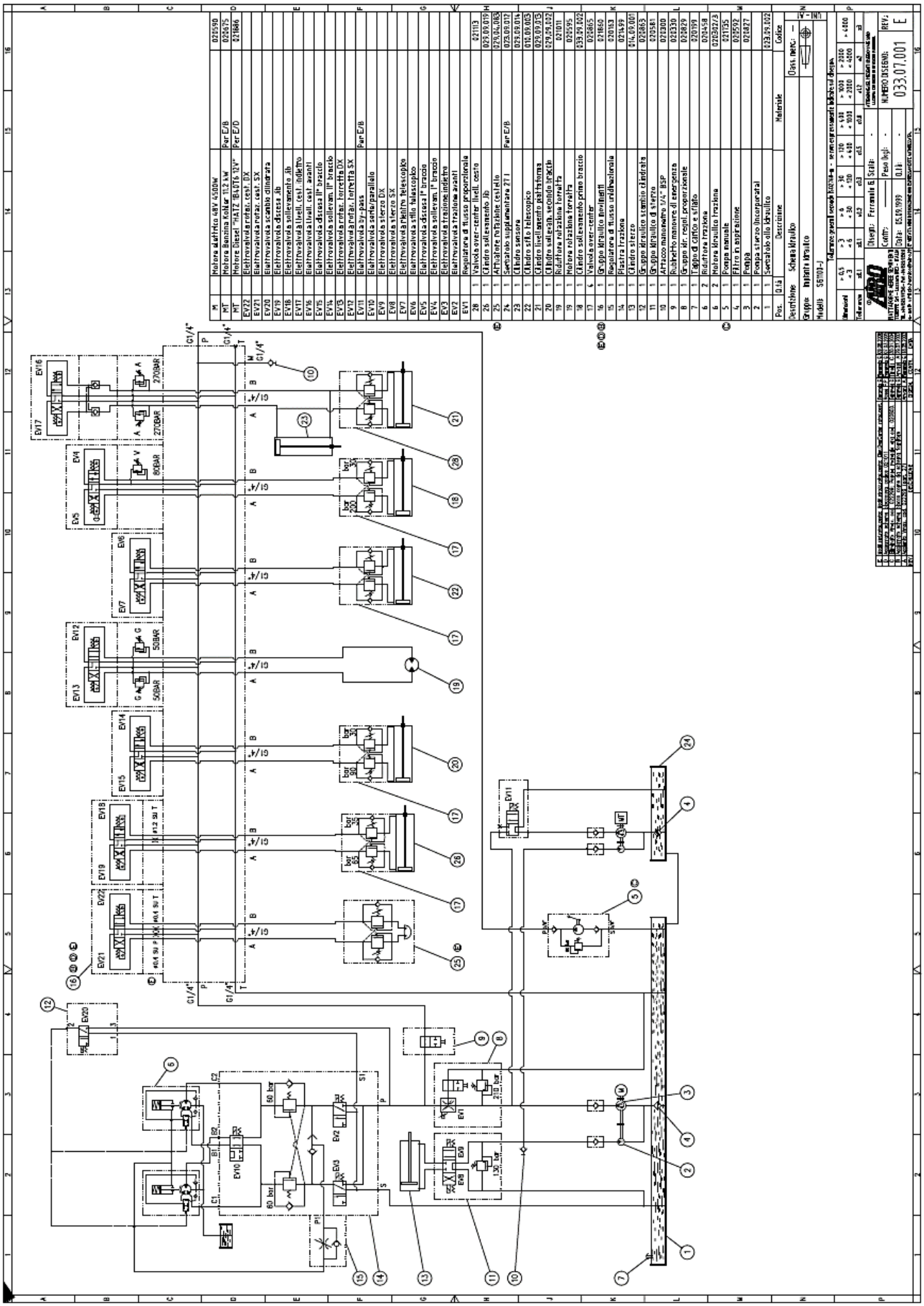
Modelli: SG1000 NEW SG1000 NEW/R SG1000 NEW E/B SG1000 NEW E/D

Tolleranze generali secondo ISO2768-m - se non espressamente indicate sul disegno.

Disegn.: Ferranola G. Scala: -

Data: 05.09.1997

NUMERO DISEGNO: 024.07.005 REV.: H



13. DECLARATION OF CONFORMITY EC FACSIMILE

AIRO È UNA DIVISIONE TIGIEFFE SRL - VIA VILLA SUPERIORE, 82 - 42045 LUZZARA (RE) - ITALIA
TEL. +39 0522 977365 FAX +39 0522 977015

ORIGINAL EC DECLARATION OF CONFORMITY
2006/42/CE

We

Tigieffe s.r.l. - Via Villa Superiore N.° 82 - Luzzara (Reggio Emilia) - ITALIA

declare under our sole responsibility that the product:

Mobile Elevating work platform

Model	Chassis No.	Year
A12 E	***XXXXXXXXXX***	***XXXXXXXXXX***

To which this declaration refers is in conformity with directives 2006/42/CE, 2014/30/CE, 2005/88/CE and the model certified by:

Eurofins Product Testing Italy Srl - Via Cuorgné, 21 10156 – Torino – TO (Italia)
Identification No. 0477

With the following certification number:

Certificate No.
XYZ

Moreover, it is compliant with the following standards:

EN 280:2013+A1:2015 EN ISO 12100:2010 EN ISO 60204-1:2018

The signatory of this declaration of conformity is authorised to compile the Technical Dossier.

Luzzara (RE), date

.....
Pignatti Simone
(General Manager)
C/O TIGIEFFE SRL - VIA VILLA SUPERIORE,82 - 42045 LUZZARA (RE) - ITALY

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