TESMEC

Installation, operation and maintenance

Handbook

Puller-Tensioner Model: PT2450

ATTENZIONE

Per motivi di sicurezza durante il trasporto la macchina è fornita senza olio idraulico e senza carburante. Nel presente fascicolo troverete informazioni sulle caratteristiche e le quantità richieste. In caso di dubbio consultare la TESMEC.

WARNING

The machine is supplied without hydraulic oil and fuel during transport for precautionary measures. Please refer to this manual for all information regarding the characteristics and quantities required. Should you have any doubt, please get in touch with TESMEC.

ATTENTION

Pour mesures de sécurité, pendant le transport la machine est livrée sans huile hydraulique et sans carburant.
Référez-vous à ce manuel pour renseignements nécessaires sur les caractéristiques et quantités. En cas de doute veuillez contacter TESMEC.

ATENCION

Por motivos de seguridad la máquina se transporta sin aceite hidráulico y sin combustible. En el presente fascículo encontrarán informaciones acerca de las características y de las cantidades requeridas. En caso de dudas, consultar a TESMEC.

ATENÇÃO

Por razões de segurança durante o transporte, a máquina é fornecida sem óleo hidráulico e combustível. No presente folheto poderão encontrar as informações sobre as características a as quantidades requeridas.
Caso tenham alguma dúvida, rogamos-lhes pôr-se em contacto com a TESMEC.

ACHTUNG

Aus Sicherheitsgründen während des Transportes, wird die Maschine ohne Öl und Kraftstoff geliefert. Im vorliegenden Gebrauchsanweisungsheft werden Sie Informationen über die Eigenschaften und Mengen des Öls finden.
Wenn Sie im Zweifel sind, fragen Sie TESMEC um Rat.

ПРЕДУПРЕЖДЕНИЕ

Из соображений безопасности, при поставке машина транспортируется без рабочей жидкости в гидравлической системе и топлива.
Пожалуйста, пользуйтесь настоящим руководством для получения любых сведений, касающихся характеристик и заправочных емкостей.
В случае каких-либо сомнений, пожалуйста, свяжитесь с компанией ТЕСМЕК.

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PULLER-TENSIONER

Modell: PT2450

Serial number

.....

Manufacturing year

.....

Working order

.....

USE AND MAINTENANCE INSTRUCTIONS

CE

1. GENERAL INDEX

Page

2. INTRODUCTION

2.1 MANUFACTURER

TESMEC S.p.A.

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tel. (+39)-035-825024
fax (+39)-035-826375
e-mail: service-stringing@tesmec.com
parts-stringing@tesmec.com
info@tesmec.com

2.2 COMMUNICATIONS WITH THE MANUFACTURER

For any information related to the machine (use, maintenance, spare parts) always state Model, Serial Number, Manufacturing Year and Order.
These data can be found in the machine-identifying table.

2.3 PURPOSE OF THE MANUAL

This instruction manual and all publications attached are an integral part of the machine and provides guidance for conducting, conducting, operation and maintenance.

Reading the instruction manual is essential and necessary for the training and information of staff likely to operate on the stretching machine; given the specific use of the instructions were produced for professionals, thereby taking into account the level of general education and acumen that can reasonably be expected from such operators.

Although the book provides information to operate correctly and also shows the residual risks of the operations, this document does not replace the experience of the " experienced " , believed formed and informed their duties and knowledge of operational procedures and safety related to them .

For their own safety and the safety of persons exposed to the risks present during the lifecycle of the vehicle and its equipment, it is compulsory to refer to the instructions and always contact the distributor **Tesmec S.p.A.** in the case of any doubt arising from the lack or difficult interpretation of the instructions themselves .

Read and understand this manual carefully in all its parts before starting operation.
Do not do anything which is difficult to interpret the instructions, should always contact the distributor **Tesmec S.p.A.**

Do not do that no information has been provided by the distributor.
Do not do anything differently than described in this manual.
Do not perform operation expressly prohibited in this manual.

If you experience operating conditions not covered or not described in the instruction manual, contact your distributor immediately **Tesmec S.p.A.**

The distributor **Tesmec S.p.A.** disclaims any liability related to non-compliance of the instructions in this manual.

Using this manual should be kept in mind that each chapter has a specific function and information is distributed to provide the user with a gradual and progressive knowledge of the equipment.

It is mandatory to preserve all of the instructions (instruction manual and documentation) in a safe, accessible and known to all users for future references. This documentation should always accompany the vehicle even in the event of sale to third parties of the same.

2.4 SYMBOLS USED IN THE MANUAL

The following symbols are used in the manual to make available information on:

DANGER
The information marked by side and this style refers to situations of danger to the person exposed.

GENERIC PROHIBITION
The information characterized by the symbol next to the present style and refer to actions or operations prohibited operator, which can lead to dangerous situations for the exposed person.

ATTENTION
The information characterized by the symbol next to the present style and relate to situations that may cause damage to the vehicle and / or its equipment.

INFORMATION
The indications marked by side and this style is for advice, hints and advices.

ENVIRONMENTAL INFORMATION
The indications marked with the symbol by side and this style is for environmental information and ecology, such as the treatment of hazardous substances to the environment, waste or recycling of materials.

WARNING
The information characterized by the symbol next to the present style and relate to situations that may cause damage to property or persons.

PERSONAL PROTECTION
The information marked by the symbols alongside and this style refers to situations in which the operator is obliged to use personal protective equipment .

Safety shoes
Protective helmet
Hearing protection
Gloves
Anti-fall harness

SIREN ACTIVATION

The information characterized by the symbol to the left and the present style refer to possible situations or alarms can be activated in which an acoustic signal to the siren.

PROHIBITION OF PASSAGE

The information characterized by the symbol to the left and the present style refer to zones or parts of the means in which is prohibited the passage or transit of the operators.

WARNING

The information characterized by the symbol next to the present style and relate to situations that may cause harm to people.

WARNING & DANGER FOR THE OPERATOR

The information characterized by the symbol next to the present style and relate to situations that may cause harm to people.

- ***Electrocution.***
- ***Moving parts***
- ***Risk or Burn Hot surfaces***
- ***Crushing ARTS***
- ***Crushing by moving parts***
- ***Suspended loads***

MANUAL READING

Information marked with the symbol by side and this style refers to the obligation for the operator to read this manual or the manuals supplied with it .

2.5 ILLUSTRATIONS

All illustrations in this manual refer to the stretching machine in question and are representative for other models to which this manual has been prepared.

Illustrations are used with a general nature and may for this vary slightly from the machine in your possession (ex. Location tool box, panels with ventilation grid, etc.). But do not invalidate the instructions.

It contains always attached technical drawings specific to the machine model to which this manual has been prepared that should always be used to supplement the instructions provided in the following chapters.

DANGER

For the sake of clarity, some illustrations may show the machine safety guards and / or protective measures removed. Please note that you DO NOT use the machine safety guards and / or protective measures removed and / or disabled.

3. KNOWING THE MACHINE

3.1 TYPOLOGY AND USING FIELD

The puller tensioner mod. PT2450 It is suitable for the traction of 1 or 2 conductors with a diameter of max 42 mm and for the recovery of 1 or 2 rope with max diameter 21.

The machine is governed by a hydraulic system which allows it to automatically configure itself as TENSIONER, but also like a PULLER if necessary.

The power transmission to the wheels of adhesion is achieved through a closed hydraulic circuit with variable displacement pump and a fixed displacement engine, with the possibility to vary continuously the speed in both directions of rotation.

A hydraulic drive brake allows to automatically lock the wheels of grip when the work stops and in case of failure in the hydraulic circuit.

The tensioner has a reel winder with hydraulic command with automatic lever winder, rear stabilizer, front hydraulic control jack and attacks and for the anchorage to the ground; The case comes in a rigid axle for towing at 30 km / h and of a handbrake hand wheel. The machine can be equipped with special equipment approved for road transport at max. speed of 80 Km/h.

3.2 PERFORMANCES

Performance puller:

Max. Pull	100 kN	2 x 50 kN
Max. speed.	5 km/h	5 km/h
Max. speed. at max pull	2 km/h	2 km/h
Performance tensioner:	*1 conductor*	*2 conductor*
Max. Pull	100 kN	2 x 50 kN
Max. speed.	2 km/h	2 km/h

Performances are referred to the machine without optional, at sea level and at 20°C.

DANGER

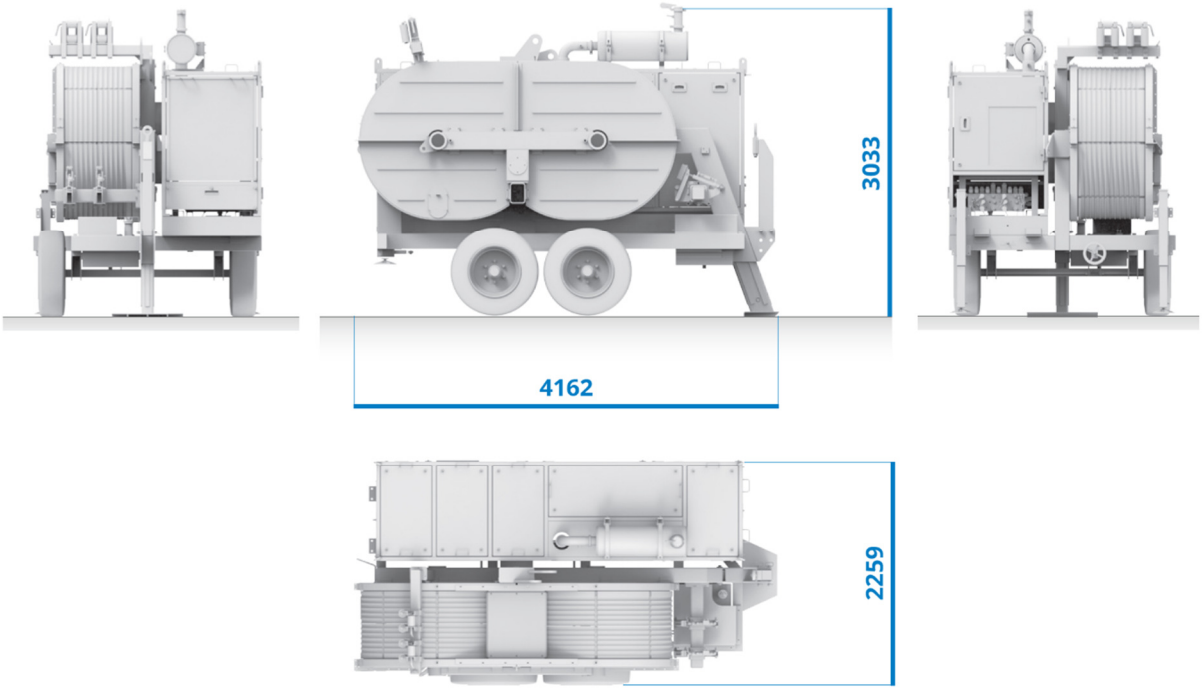
use with ropes or conductors of smaller diameter than the maximum allowed involves the reduction of the max pull. applicable in relation to the workload guaranteed minimum of rope or conductor.

3.3 TECHNICAL CHARACTERISTICS

Bull-wheels nominal diameter:	1500 mm
Max. rope conductor:	42 mm
Max. rope diameter:	21 mm
Transmission:	hydraulic circuit of the closed type with hydraulic oil cooling
Safety brake:	negative and self-acting type
Axle:	rigid type with mechanical parking brake for max. towing speed of 30 km/h

Dimensions: length - 4162 mm
width - 2259 mm
high - 3033 mm

Dry mass: 8150 kg



The machine was equipped with engine VOLVO of the latest generation stage4 conforms to the latest anti-pollution standards in force in Europe and in the rest of the world.
The main features of the engine are:

- Diesel engine model: Volvo TAD570VE TIER 4F Stage 4 (USA / EURO regulation) or TIER 3 STAGE 3A (extra USA / EURO regulation)
- Displacement: 5 liters
- Aspiration: Turbocharged and Charge Air Cooled
- Control: Electronic
- Power: 105 kW @ 2300 rpm (143 hp)
- Cooling system: Water
- Electric System: 24 V
- Panels with sound absorbing material for acoustic insulation.

MANUAL READING

For further analysis of DIESEL ENGINE VOLVO TAD570 installed on the PT2450, read carefully the reference manual.

3.4 GENERAL INFORMATION FOR THE MACHINE USE

a. Only employed and qualified operators must use the machine.
   Qualified operators is intended to be the person who has received a qualified training from the using Company or, as alternative, from the manufacturer.
b. Machine must be used **only** for the work it was designed for.
c. Machine cannot be used with non-authorized personnel on the working site.
d. For safety reasons, during transport machine comes without hydraulic oil and fuel.
   Characteristics and required quantities are listed in the present manual.
e. For any doubt concerning use, functioning, maintenance or everything else, contact the After-sales Service of the manufacturer.

3.5 GENERAL PRESCRIPTIONS FOR THE OPERATOR CHARGED OF THE MACHINE USE

a. Operator **has** to know safety directives for accident prevention in force in the machine using country, for a correct use of the same.
b. The operator in charge with the installation and maintenance of the machine must use **suitable clothes** to the working site and to the situation where he finds himself; in particular, he must avoid the use of very large clothes, chains, bracelets, rings or whatever can get entangled with moving parts.
c. The operator has to use the necessary protecting devices (i.e. gloves, boots, helmet, etc.).
   It is compulsory the use of personal protecting devices for hearing.
d. The operator must not carry out on his own initiative operations or interventions that are not up to him.
e. The operator must carefully follow danger and/or prohibition prescriptions contained in the instruction manual or indicated on the machine.
f. The working area of the operator has to be cleaned from possible oil or liquids wastes and free of materials or equipment that may be considered as on obstacle for the operator work.
g. The operator **must absolutely avoid** the direct inhalation of the exhaust gas of the endothermic engine.

3.6 GENERAL PRESCRIPTIONS FOR THE OPERATOR CHARGED OF THE MACHINE MAINTENANCE

a. It is absolutely forbidden to carry out any work of maintenance, adjustment or setting on units while stringing (except for the operations indicated in the present manual).
b. Before carrying out any maintenance operations, stop the energy feeding (except for the cases indicated in the present manual) and wait till the cooling of the elements subjected to heating.
c. All the maintenance operations of the machine must be carried out with machine on a level surface and not under load.
d. Authorized and trained personnel must do all the maintenance operations, ordinary and not ordinary. Trained personnel are intended to be the person who has received a qualified training from the using Company or, as alternative, from the manufacturer.
e. The operator in charge with the machine maintenance must use suitable clothes to the working site and to the situation where he finds himself; in particular, he must avoid the use of very large clothes, chains, bracelets, rings or whatever can get entangled with moving parts.
f. The operator has to use the necessary protecting devices (i.e. gloves, boots, helmet, etc.).
g. All the maintenance operations, ordinary and not ordinary, must be effectuated respecting the prescriptions included in the present manual or following technical indications written by the manufacturer.

The non-respect of the prescribed restrains relieves the manufacturer from any responsibility causing also the loss of warranty.

3.7 KNOWLEDGE AND CARE OF THE INSTRUCTION MANUAL

a. The information contained in the instruction manual applies to all the operators charged with the use and/or the maintenance of the machine.
b. The instruction manual is not a training manual.
c. Before using the machine, the chief of the job site and the operator must read the instruction manual.
d. The chief of the job site is obliged to inform all the operators about the instructions contained in the manual.
e. The user must carefully follow the instructions listed in the present manual.
f. Before using the machine, the operator must be able to use it and has to exactly know the positions and the operations of all the controls.
g. The chief of the job site must verify that the instructions contained in the manual are applied.
h. The instruction manual must be kept, in order to be consulted, for all the life of the machine and also when it is given to another user.
i. The instruction manual must be kept in a sheltered and dry place.

ATTENTION

Present manual belongs exclusively to the manufacturer. The reproduction, event partial, of the text is forbidden.

3.8 CONDITION OF USE

a. Temperature: from -10°C to +40°C.
b. Relevant moisture: from 30% to 90% ± 5%.
c. Weather conditions: any (in line with working conditions).
a. Natural and/or artificial lighting of the working site.

3.9 ACOUSTIC EMISSION

Level of continuous sound pressure to the operator seat (UNI 9432) Lep = 85 dB(A)

3.10 TEMPERATURE LIMITS FOR HYDRAULIC OIL

When using the machine, always remember to respect the following temperature limits that can be reached with hydraulic oil as function of the working condition.

TEMPERATURE LIMITS FOR HYDRAULIC OIL (°C)				
Working condition	**Hydraulic oil viscosity**			
	VG 22	**VG 32**	**VG 46**	**VG 68**
Minimum temperature running in neutral position	-21	-14	-7	-1
Minimum temperature running in full load	8	16	24	32
Maximum temperature running in full load	48	57	67	76
Maximum temperature running in neutral position	63	73	83	93

For additional information concerning the hydraulic oil, see chapter "Maintenance" and the attached comparative table of the oils used on the machine.

3.11 USE NOT ALLOWED

The machine **must not be used**:

a. for lifting persons and/or goods
b. in closed/unventilated sites or, however, not sufficiently airy (tunnel or similar)
c. in sites with presence of gas that can be easily set on fire or explosives
d. in sites with presence of explosive materials
e. on aircraft, crafts, floating platforms and similar
f. for structure demolition, shafts felling or similar
g. for pulling flexible elements that can be highly lengthening, which allow elastic power accumulation
h. with ropes or joints having a bigger diameter than the one specified in present manual
i. when engine is off and bull-wheels are moving
j. with inhibited and broken safety devices installed on the machine
k. when winding on the bull-wheels ropes and/or conductors having a smaller diameter as a succession of ropes and/or conductors having a bigger diameter for handling trucks or other moving equipment.

ATTENTION
is not allowed to install on board radio equipment. These could create electronic equipment malfunctions, putting the personnel at serious risk.

3.12 RESPONSIBILITY

The use of the machine for scopes different from those foreseen, even if not well described in this manual, has to be considered extremely **dangerous** and then **forbidden**.

ATTENTION
The non-respect of the prescribed restrains causes a situation of improper use for technical and persons safety purposes and relieve the manufacturer from any responsibility, civil or penal, in case of accidents to persons or damages to things, causing the loss of warranty.

The manufacturer responsibility declines even when one of the following situations happens:

a. for the consequences caused by tampering and/or modifications carried out without the manufacturer's written acceptance (in this case the operator becomes the manufacturer with relevant obligations and responsibilities, both civil and penal)
b. for the use of not original spare parts
c. or bad maintenance
d. for the use with disconnected safety devices
e. for the connection to machine and/or plans not produced and not directly authorized by the manufacturer in a written acceptance.

3.13 APPLIED NORMS

If the machine is commercialized in C.E. responds to the following regulatory framework:

2006/42/CE Norm referring to the laws of the machines.

2014/30/UE Norm referring to the laws of the electromagnetic compatibility.

If the machine is commercialized outside the C.E. was made reference to the following regulatory framework:

2006/42/CE Norm referring to the laws of the machines.

2014/30/UE Norm referring to the laws of the electromagnetic compatibility.

4. TRANSPORT AND POSITIONING INSTRUCTIONS

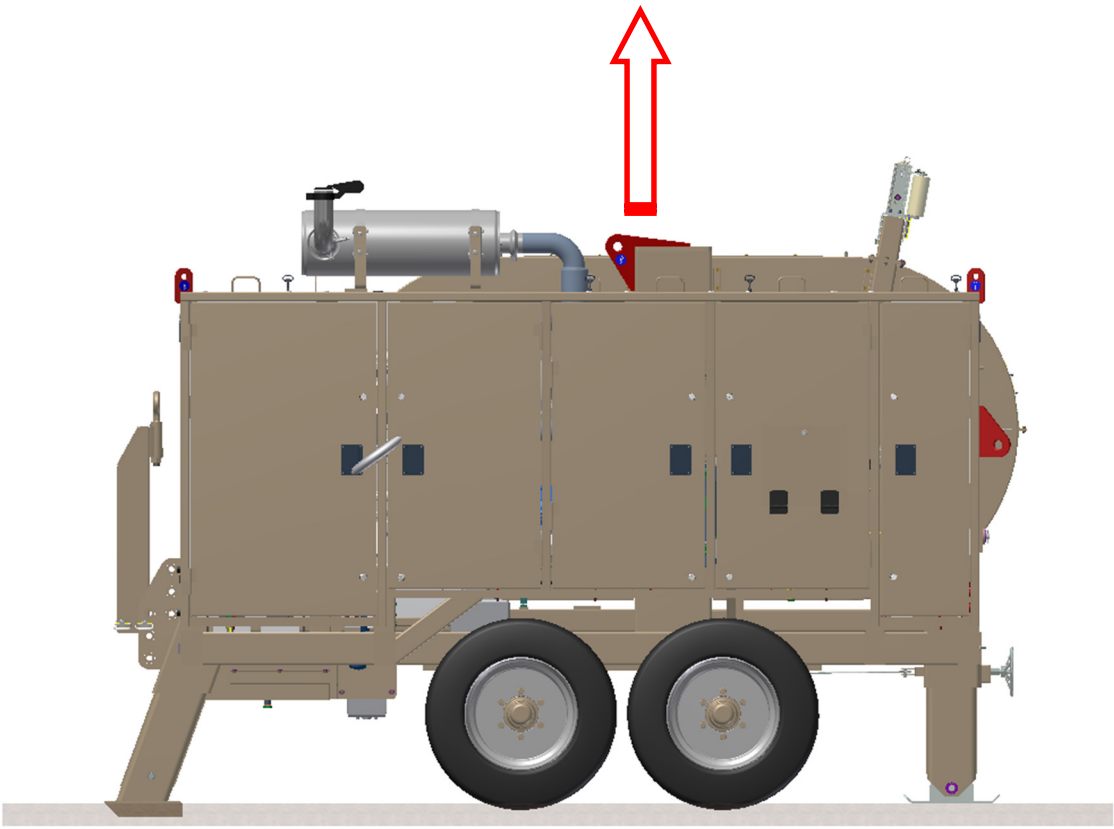
4.1 MACHINE LIFTING

For the machine lifting use only devices as overhead travelling cranes or lift trucks, with a capacity equal to the mass to be lifted.

The instruments used for the machine lifting (ropes, cables, hooks, etc.) have to be exactly dimensioned as compared to the mass to be lifted and have to be connected to the proper elements foreseen on the machine.

For lifting of individual units refer to the corresponding table.

During machine lifting operations, the presence of persons on board the machine is strictly forbidden.



The total no dry mass relative to the lifting points and at the center of gravity is shown in the figure below:
8350 kg

PERSONAL PROTECTION

During lifting operations, it is necessary for the operator to use all the safety equipment and personal protection equipment required.

Safety shoes
Protective helmet
Hearing protection
Gloves

DANGER

the non-respect of the above mentioned conditions may cause dangerous situations as well as damages to the machine with the consequent decline of any warranty condition.

4.2 TRANSPORT TYPOLOGIES AND PACKAGE

Transport by land by truck

The machine comes without all the liquids that can be set on fire and protected in the most exposed and delicate parts by means of cardboard and/or plywood and/or polyethylene extensible film.
To fix the machine on the platform of the transporting unit, use nailed wedges and/or metal brackets and/or tie rods.

Transport by sea in wooden cases or container

The machine comes without all the liquids that can be set on fire; metal parts are protected with waterproof wax.

To fix the machine on the package, use nailed wedges and/or metal brackets and/or tie rods.
At the inside, the wooden case foreseen a protection with tarpaper.

Materials usually used for the package are:
⇒ wooden
⇒ nails and/or steel screws
⇒ cardboard and/or paper
⇒ polyethylene extensible film
⇒ adhesive tape.

4.3 UNPACKING

When receiving the machine verify the integrity of the package; advise immediately the manufacturer and the person in charge of the transport (even with photos) when possible damages due to transport or tampering with removal, even partial, of the content happen.

Verify if the supplied material corresponds to the ordered one; immediately advise the manufacturer if there are some discrepancies.

In case of transportation on wooden case, take away, in sequence, the upper cover and lateral panels, before removing the machine.

During unpacking operations, avoid any shock to the structure or to the machine units, in order to avoid any damage to the machine itself.

ENVIRONMENTAL INFORMATION

the elimination of packaging materials must be effectuated in conformity with the norms in force in the relevant country.

4.4 TOWING TRANSPORTATION

The machine is not arranged to be towed on the road.

Possible displacements on trailer in the working site must be carried out by a connection to the towing unit by means of the towing eye on the drawbar (tab. 1) and in the respect of the speed limits of the axle. The used towing unit must be homologated for towing trailers with mass and dimensions as per the described machine.

Before transporting lift the rear stabilizers and the front plough (tab. 2, pos.1,5) through the dedicated screen on the computer of the machine control (tab. 8, pos.1 and par.5.5.2.2 *Machine Optional* )

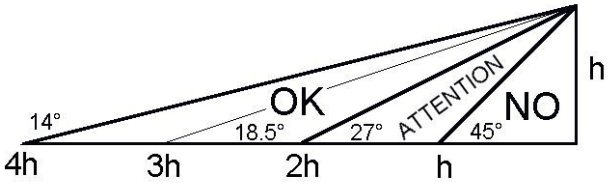
(NOTE: This must be done with the engine running).

Check the inflation pressure of tires (7 bars).
During machine transport operations, nobody must stay on the machine itself.

4.5 POSITIONING AND ANCHORING

Positioning and anchoring of the machine have to be carried out only by trained personnel, verifying if the ground grants the foreseen stability, support and anchoring.

The machine has to be placed in a distance from the first pylon or trestle for the rope passage (or conductor) included between 2 and 4 times the height h of the pylon itself (see diagram here below)



It is possible to use the machine at a distance from the pole included between 1 and 2 times the height of the pole itself. In this case, the anchorage described thereafter must be over dimensioned of 125% compared to the reported data and some moorings must be provided on the front side of the machine.

PROHIBITION
when the distance between the machine and the pole is lower than the height of the pole itself, the machine use is not possible.

Machine anchoring sequence is the following:

a. keep the wheel brakes of the machine disengaged.

b. place the rear stabilizers as close to the ground through the dedicated screen on the computer of the machine control (tab. 2, pos.5 and par.5.5.2.2 *Machine Optional* )

c. set the front plow through the dedicated screen on the computer of the machine control (tab. 2, pos.1 and par.5.5.2.2 *Machine Optional* ) in order to support the rear stabilizers to the ground, thereby relieving the tires.

d. anchor the machine to the ground using 2 ropes each having a load of use guaranteed minimum of 3 time the maximum force allow of the machine. linking the connections provided (tab. 2 pos.8 and tav.3 pos.10), in the rear of the machine, with anchoring pegs. The attacks used to be an anchor shackle with a breaking load of 3 time the maximum force capacity tons and the safety factor of 5. It is necessary that the ropes make an angle with the direction of pull as shown on the table 1, to allow the machine to withstand even any transverse loads.

IMPORTANT
before starting stringing operations, we suggest to test the pull, reaching the max. value expected for the operations, in order to check the carried out anchoring and the machine settling. It is better to have the rear anchoring slightly released so that the machine can freely settle.

f. put the anchoring ropes under tension using the suitable turnbuckles (if necessary, anchor the machine also in the front).

g. block the machine brakes acting on the handle brake wheel.

ATTENTION
the non-respect of the foreseen anchoring operations may cause dangerous situations during machine use.

Around the machine must be a free space of at least 2-m to make easier the operations of use, adjustment, maintenance, etc.

Be sure that around the radiators (endothermic motor, hydraulic oil) cooling air can freely circulate. Otherwise overheating situations with damage for the installed components may happen.

DANGER
machine has not a proper grounding device; for the system machine-rope-conductor in the job site must foresee a grounding device on the towing rope or on the conductors.

5. INSTRUCTION FOR USE

5.1 INTRODUCTION, RULES AND PROHIBITIONS

All the rules of use and maintenance contained in this manual are mandatory and therefore it is recommended a careful and constant application of its contents.

Tesmec S.p.A. is not liable for damage to the vehicle, to persons and property, also against third parties in the event of failed or incorrect observance of even one of the instructions given in this manual, or in general, the lack of enforcement of existing legislation.

The safety systems are electrical and mechanical work, although they are designed for maximum ease of use and effectiveness can still be used improperly. So avoid behaviors that reduce the concentration and attention in using them. Excessive confidence in them may impair the effect and usefulness.

The operator is the only person responsible for his own safety and those around him. Must act professionally meticulously following all safety regulations and instructions in this manual, even those indicated also on plaques located in the machine.

Daily, before starting the work, check:

- The absence of warning and alarm on the display;
- The correct operation of the emergency buttons and of the safety devices.
- The close examination of these provisions, the instructions in the user 's manual and take perfectly aware of the safety devices and emergency;

5.2 PRESCRIPTIONS FOR THE OPERATOR

PROHIBITION

it is forbidden to walk or stop in front or backward the machine and/or under the towing rope due to a constant residual risk of crushing in case of a possible giving in of the rope or of the anchoring.

Daily, before starting the work, check:

a. if the protection and safety devices are activated and functioning
b. if the machine liquids levels are in conformity with the indications in maintenance chapter
c. if the anchoring conditions are in conformity with the indications of present manual.

5.3 PRELIMINARY OPERATIONS

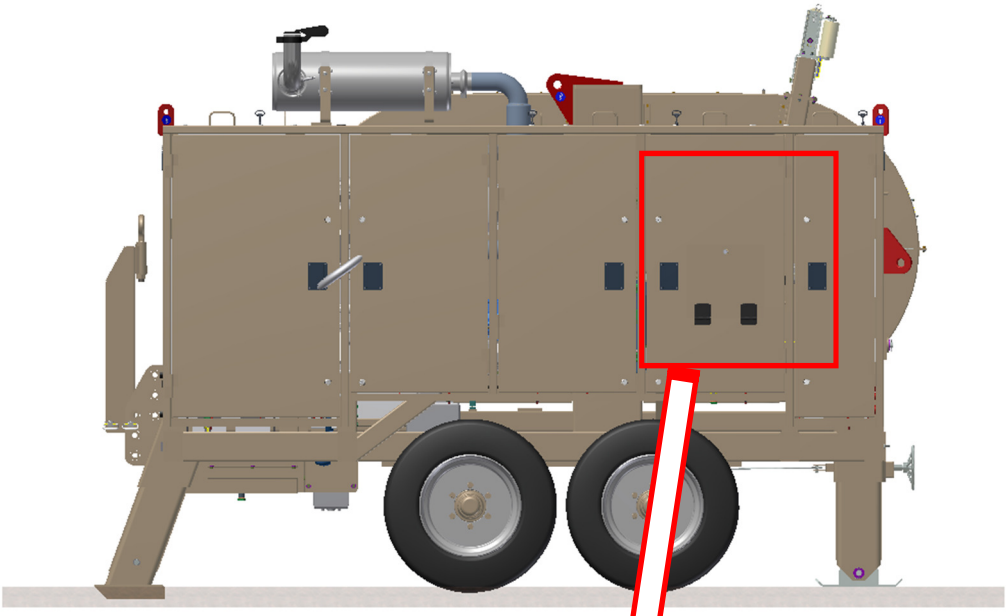
a. Wind the rope as indicated on table 1 making sure that it is well placed on the grooves.
   The free end must be inserted in the suitable roller ways and connected to the reel.
   To hang the rope on the reel is necessary to lower the pressure of the reel stands branch on te radio remote control.
   This ensures that the reel does not get in rotation during coupling operations.
b. After attaching the rope to raise the pressure so the reel putting to rotate put in tension the section of the cable between itself and the bull-wheels.

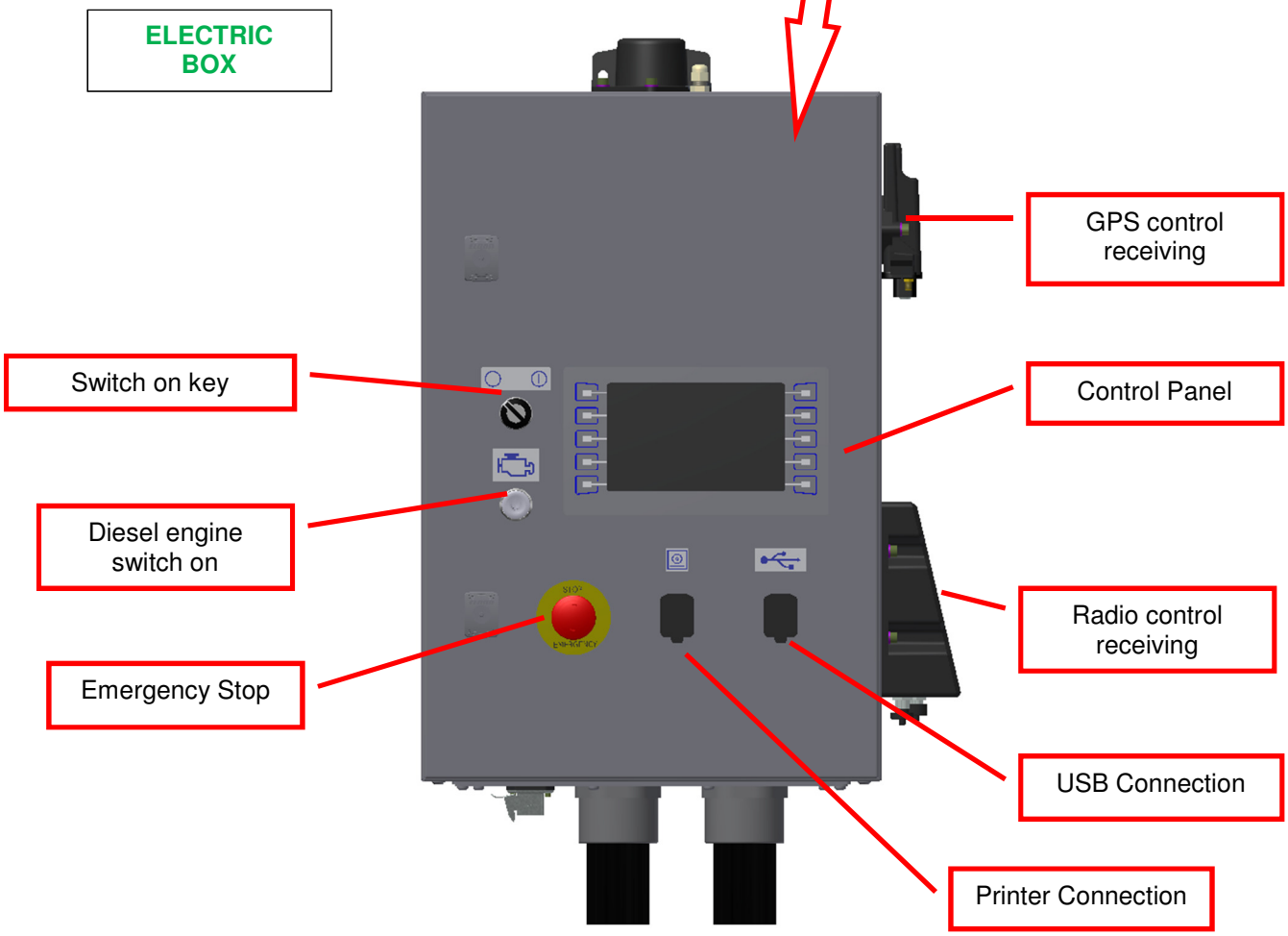
DANGER

please pay attention to the risk to be squeezed during the operations above described.

5.4 CONTROL PANEL and RADIO CONTROL

The machine is equipped with a control panel on the electric box and a radio remote control to handle the stringing operation.





The location and meaning of the elements placed on the control panel are described in the enclosed table

RADIO REMOTE CONTROL

Rope clamp switch

Elettronic Connection switch (if allow)

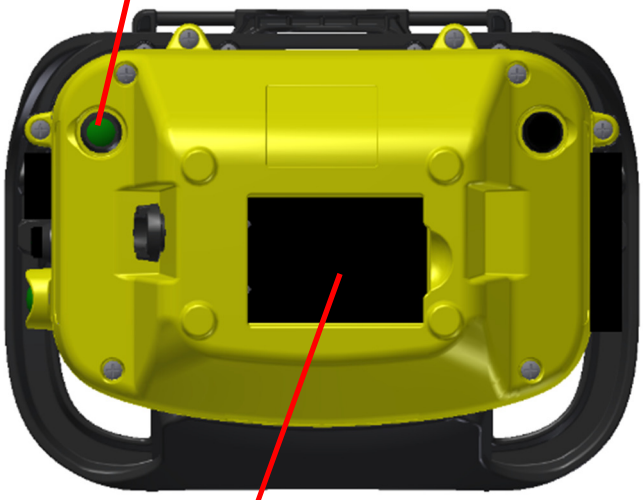
Machine Control Joystick

Pull-Force Control

Reel Winder Control

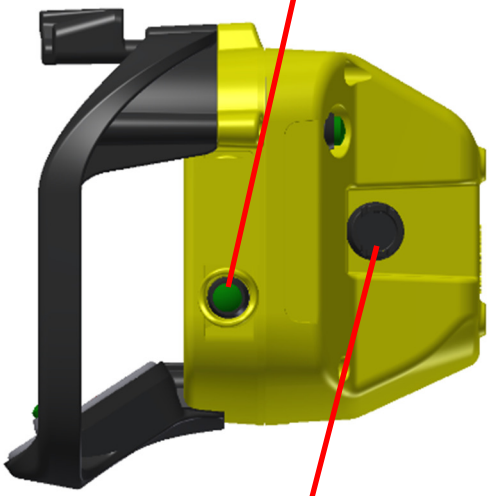
Syncronizer device switch (if allow)

Emergency Push-Button



Connection Remote control

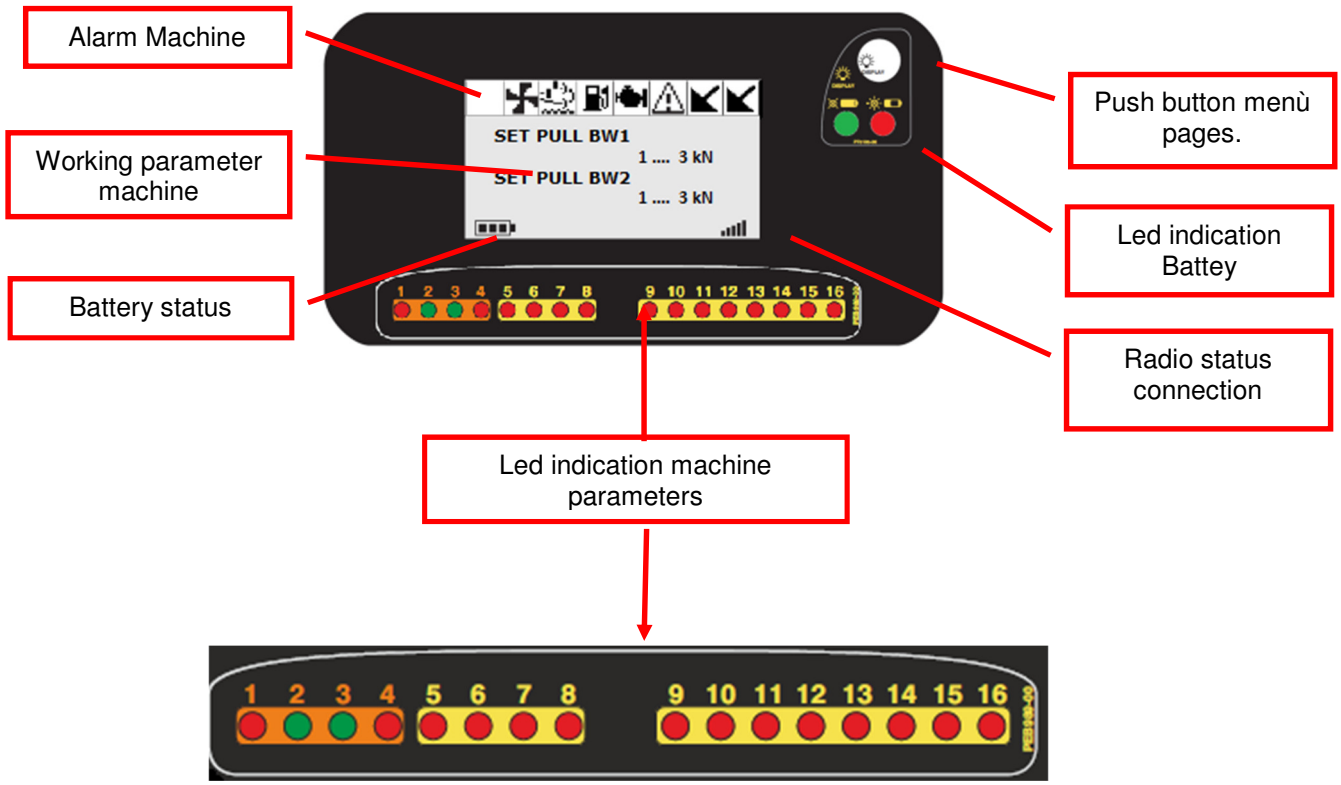
Remote control Battery



Reel Winder Control (for manual use)

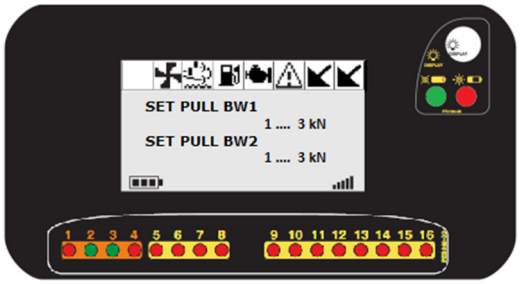
Start Remote control

The radio control display is equipped with 4 control pages of the main parameters of the machine, and the operator cannot remain near the machine during the stringing operation.



- Led 1: ROPE CLAMP CIRCUITE 1 CLOSED
- Led 2: NEGATIVE BRAKE BULL-WHEEL CIRCUITE 1 OPEN
- Led 3: NEGATIVE BRAKE REEL ELEVATOR CIRCUITE 1 OPEN
- Led 4: OPERATING MODE PULLER TENSIONER, REVERSE FROM THAT SET CIRCUITE 1
- Led 5: ROPE CLAMP CIRCUITE 2 CLOSE
- Led 6: NEGATIVE BRAKE BULL-WHEEL CIRCUITE 2 OPEN
- Led 7: NEGATIVE BRAKE REEL ELEVATOR CIRCUITE 2 OPEN
- Led 8: OPERATING MODE PULLER TENSIONER, REVERSE FROM THAT SET CIRCUITE 2
- Led 9: NO ATTIVE
- Led 10: OIL TOO HOT
- Led 11: BULL-WHEEL SELECTION+REEL ELEVATOR DISABLED CIRCUITE 1
- Led 12: BULL-WHEEL SELECTION+REEL ELEVATOR DISABLED CIRCUITE 2
- Led 13: ELETTRONIC CONNECTION ATTIVE
- Led 14: SYNCHRONIZER DEVICE ATTIVE
- Led 15: MECCANICAL CONNECTION ATTIVE
- Led 16: ELETTRONIC CONNECTION WITH ANOTHER MACHINE ATTIVE

You can switch from page to page, by using the “control pages button” placed on the radio control.



Page to set the pull force value

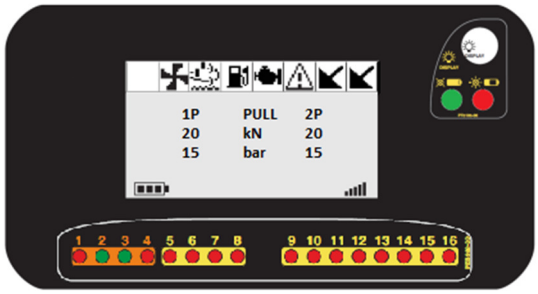
This page allows the operator to set the pull value on the machine.

SET PULL BW1 – XX …. XX KN

Pull force value set on circuit 1

SET PULL BW2 – XX …. XX KN

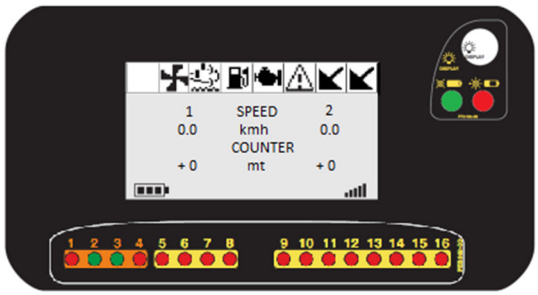
Pull force value set on circuit 2



Pull real control and machine reel elevator pressure

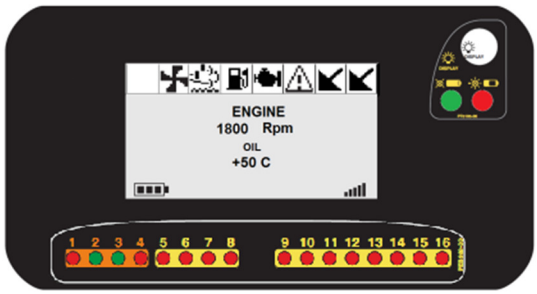
This page allows the operator to check the real pull value on the machine and set the desired pull back pressure on the reel winder circuit.

Note: The transition between PULLER and TENSIONER is displayed automatically.



Working machine parameters

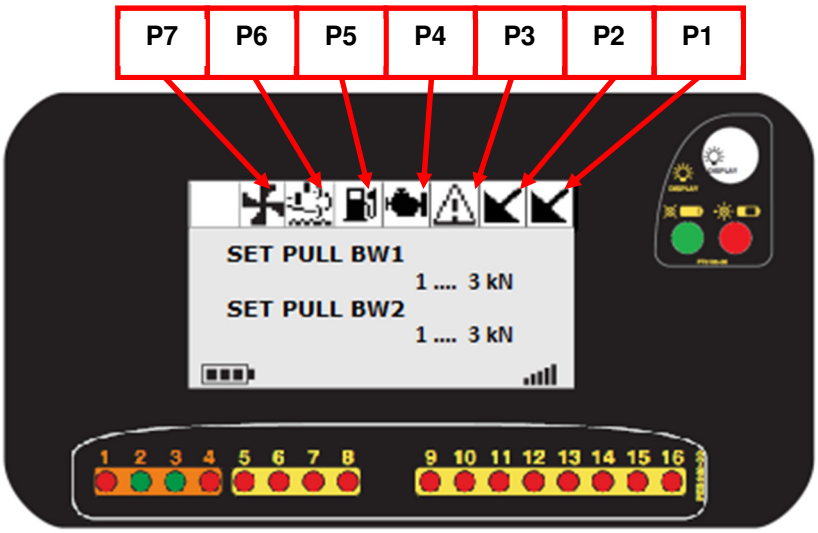
This page lets you control the speed of stringing of conductor and the strung meters of rope or wire from the first and second circuit.



Diesel engine control parameters

This page allows you to control the speed and the oil temperature of the diesel engine.

The radio control display is equipped with a bar for signaling an alarm or various machine functions:

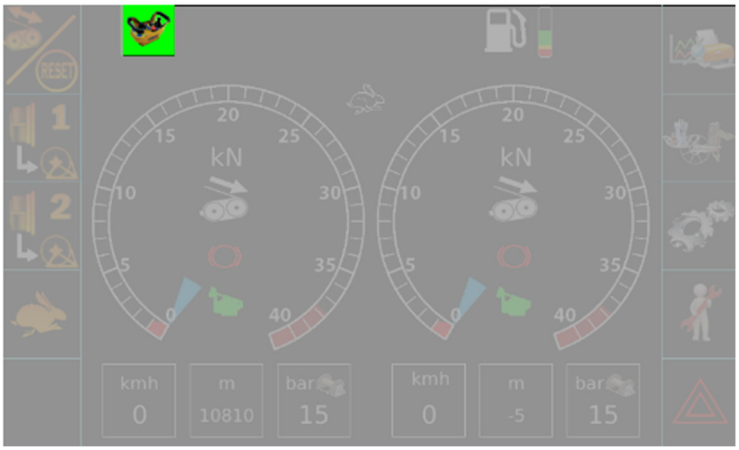


P1		WORKING MACHINE CONFIGURATION (PULLER OR TENSIONER) CIRCUIT 1
P2		WORKING MACHINE CONFIGURATION (PULLER OR TENSIONER) CIRCUIT 2
P3		MACHINE ALARM
P4		ALLARMS FROM DIESEL ENGINE
P5		FUEL RESERVE
P6		UREA RESERVE (If present)
P7		COOLING OIL FAN SWITCHED ON

Connection the remote control

The main control of the machine is on the remote control. The machine is always set to connect the remote control.

It will be possible to see the status of the connection, between the state of the icons in the main control panel and on the display control panel.



Remote control CONNECTED

Remote control DICONNECTED

Remote control OFF

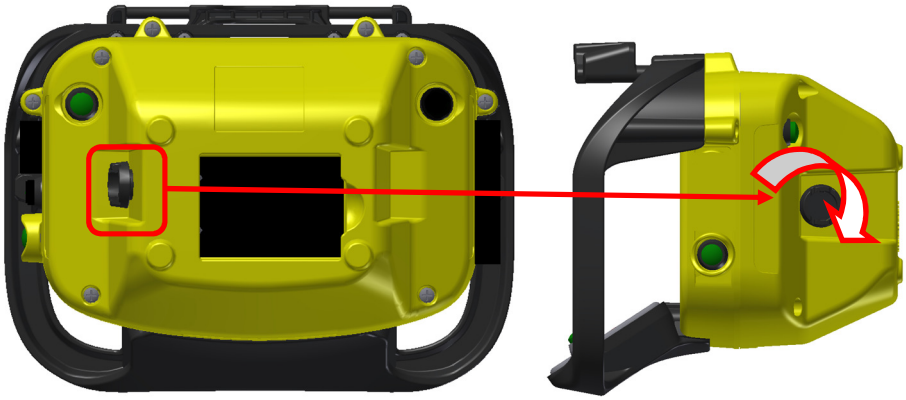
In the follow step, it is described the procedure to connect the radio remote control on the machine:

WARNING
Remember to connect or disconnect the radio remote control only when the bull-wheel machine are stationary.

1. Check the status of the joystick position of the remote control. It'll be on neutral position (close negative brake of bull-wheel)

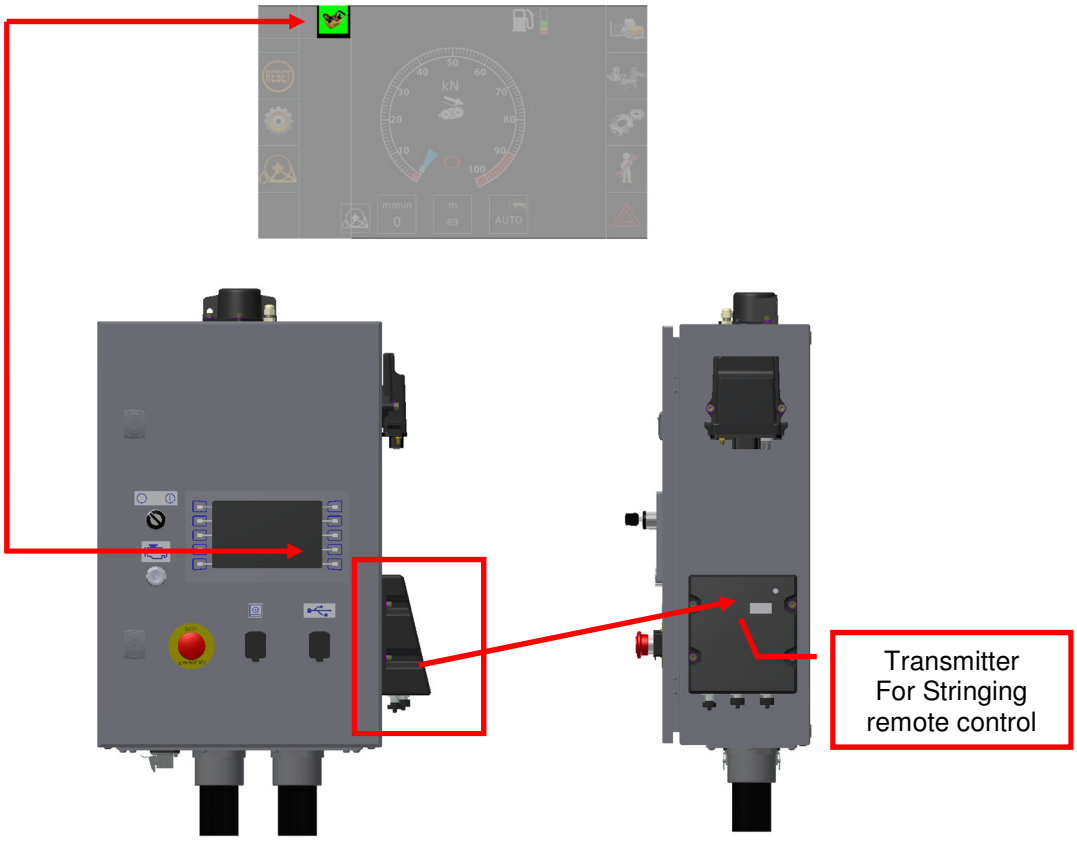
INFORMATION
It will impossible to connect the remote control still the joysticks are on neutral position

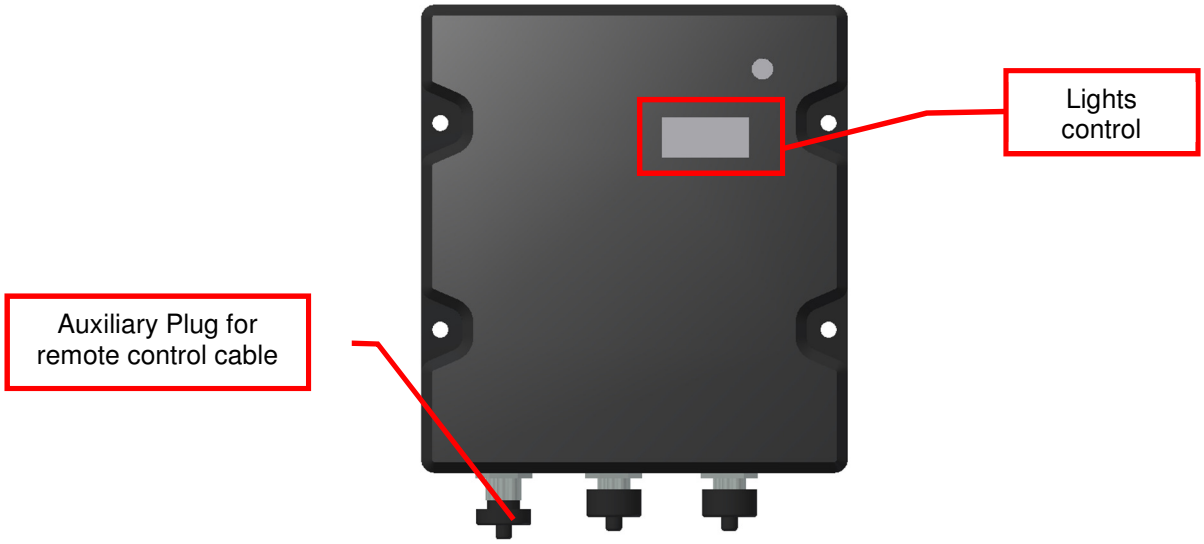
2. Turn On the radio remote control. Rotate the switch to ON position.



3. Push the green button on the radio remote control.

4. Check the status of the remote control connection on the display machine and on the transmitter.





ATTENTION

If the remote control have any problem, it is possible to use the remote control with auxiliary cable, connect to the transmitter unit.

MANUAL READING

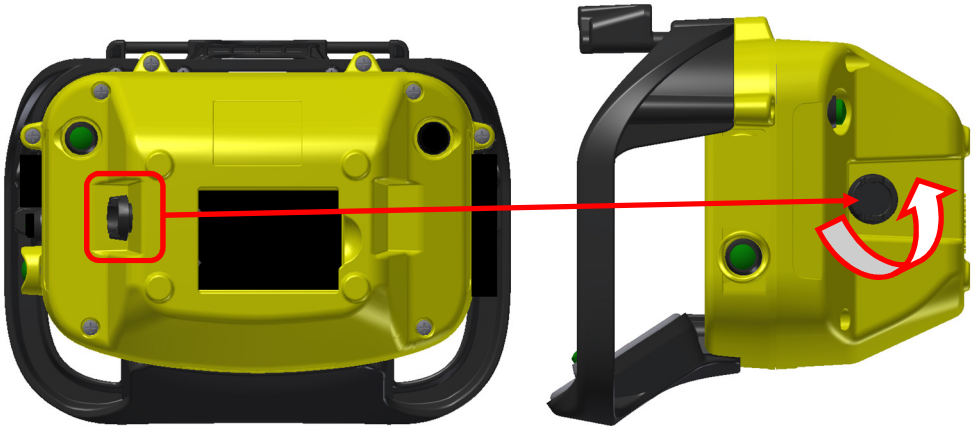
For further analysis about AUTEC remote control allow on the PT2450, read carefully the reference manual.

The operator also can check the status of connection between the blink of light.

"Green light blink fast" = Remote control NOT connect

"Green Light blink slowly" = Remote control connected

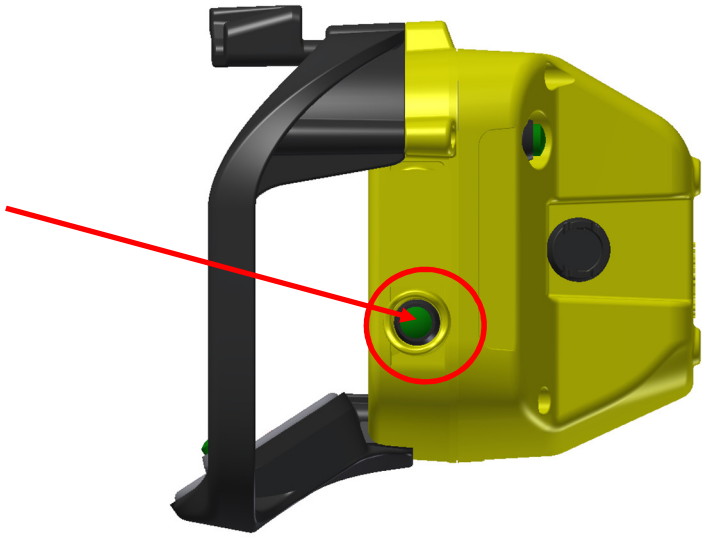
5. If the operator need to disconnect the remote control, rotate the switch to OFF position.



WARNING
When the radio remote control lost the signal, the machine will stop immediately if the machine working like a PULLER.
When the machine work like a TENSIONER, the bull wheel will continue to move, but there will be an audible alarm indicating that the machine is not connected.
To re-connect the remote control, follow the instructions in previous points.

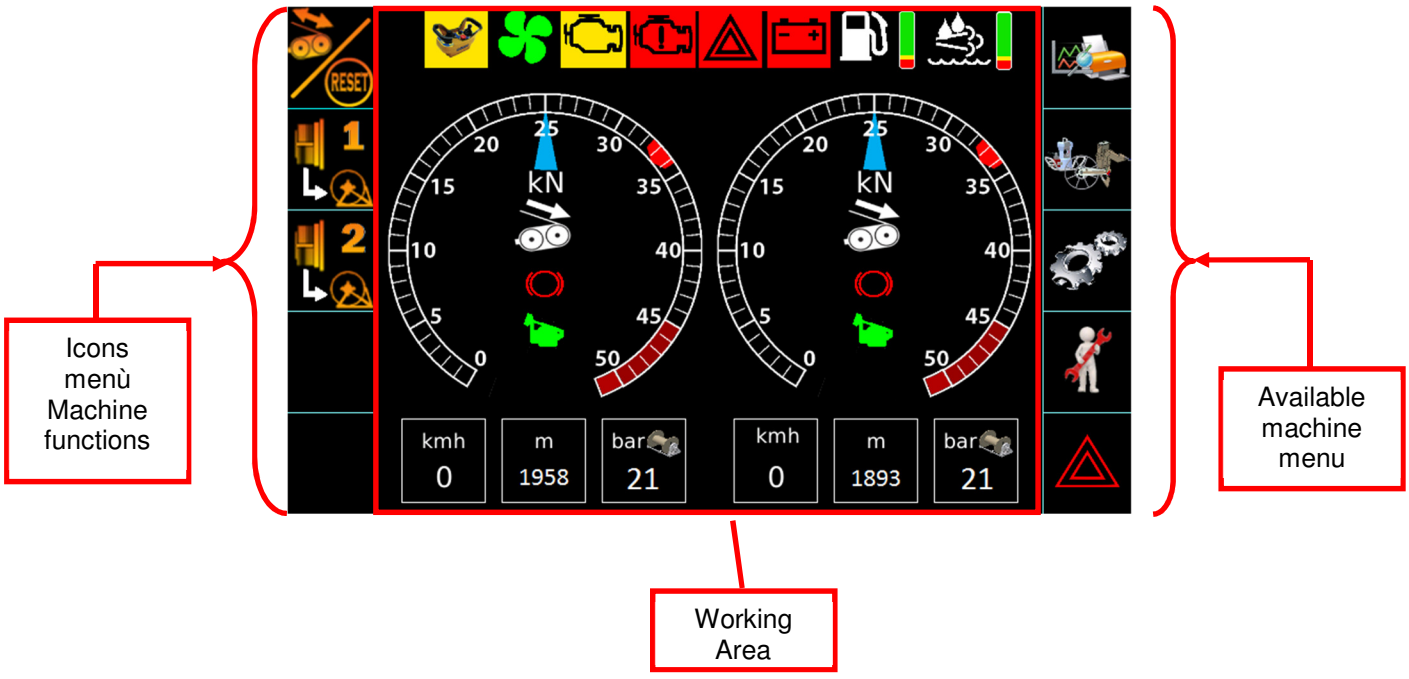
On the radio control there is a lateral button: This button allows the operator to rotate the gantry holding closed the negative brake circuit of the bull-wheel.
This command can be useful when loading or unloading the reel from the stands or during the rope loading operations on the machine.

Button for the management of the reel elevator, separately from the bull-wheels circuit.

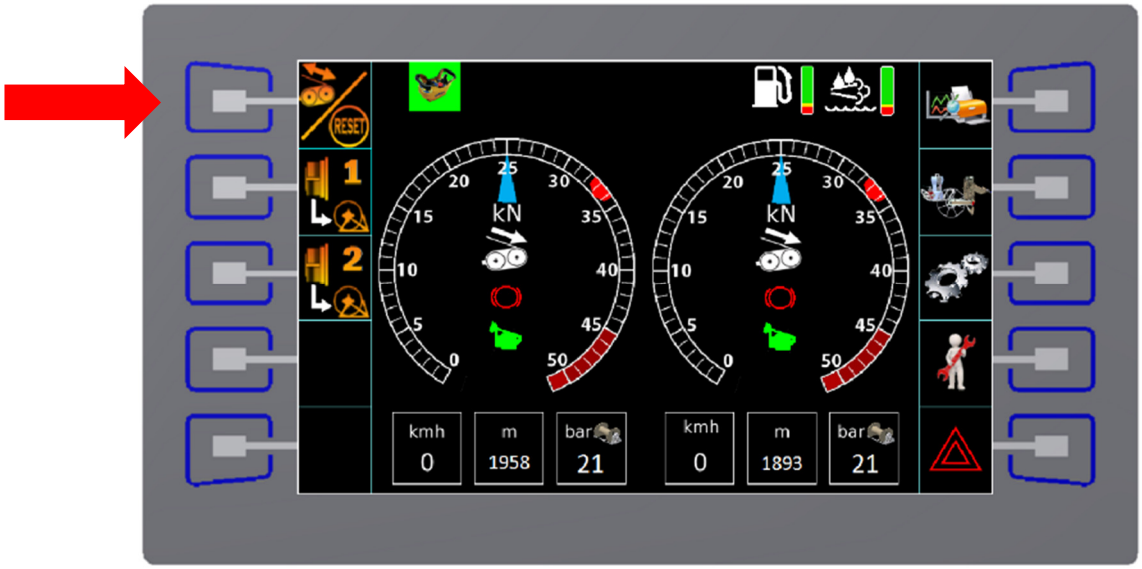


5.5 MULTIFUNCTION DISPLAY AND MACHINE PARAMETERS

The machine control panel is equipped with a 7 "multifunction touch display. When the power is turned on, the following main working screen opens, which contains all the elements for controlling the machine and monitoring it in real time.



To access the machine functions / menus, simply press the button corresponding to the icon.

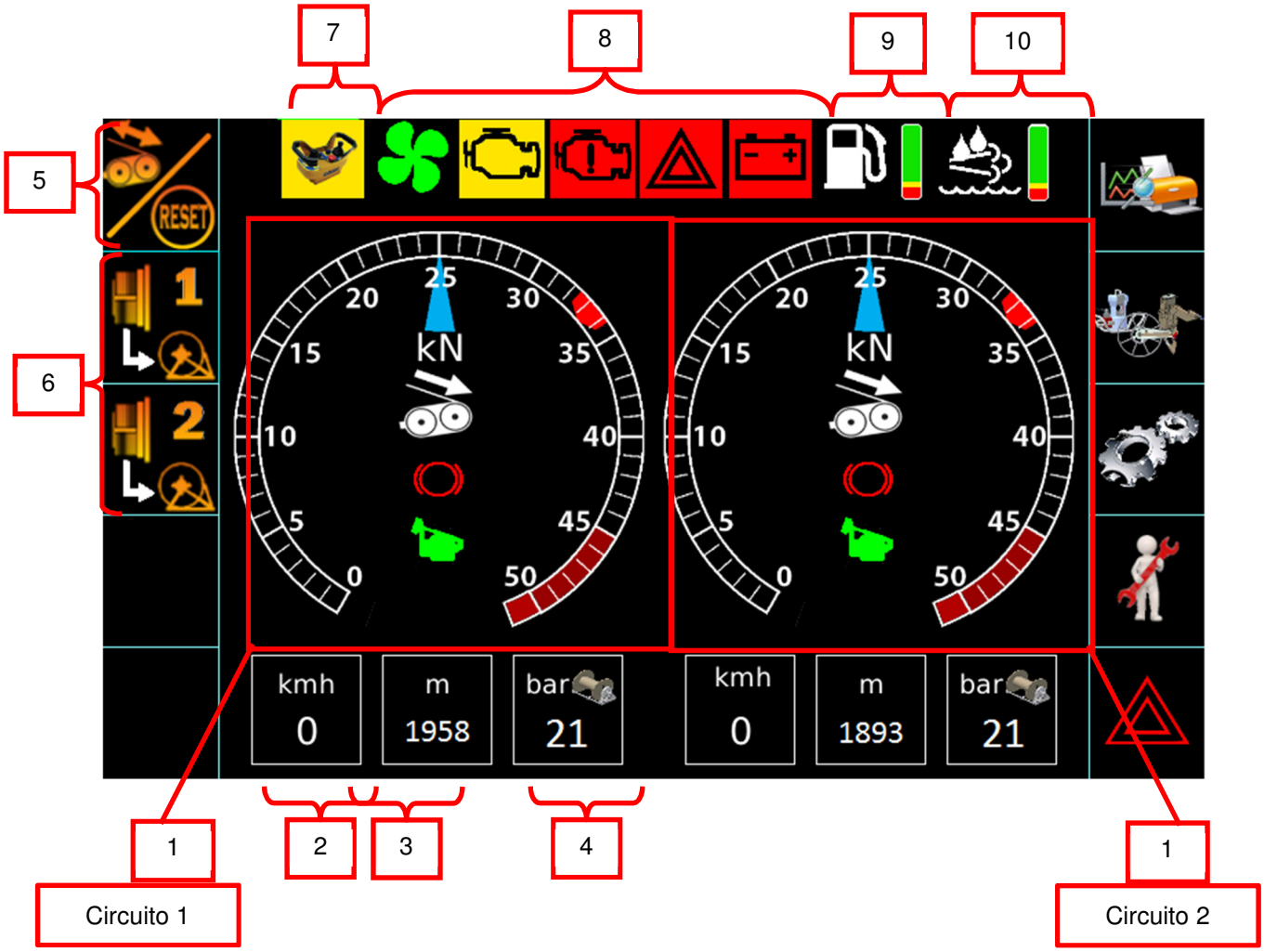


When the button is activated, the relative screen will open.

Between the follow icon  it's possible to return in the main working area.

5.5.1 WORKING AREA MACHINE

In this chapter it will be described the command and graphic representation in the main control panel.



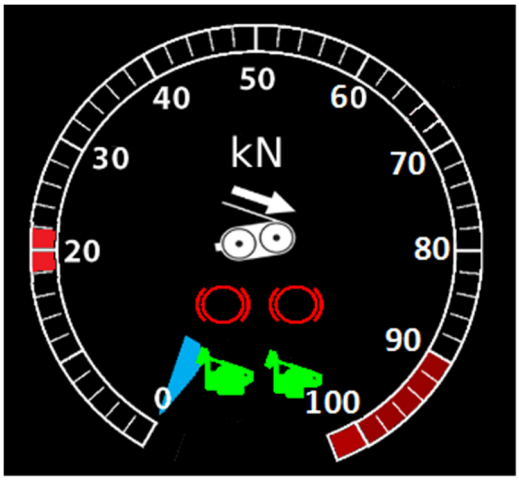
1- **Virtual Dynamometer (circuit 1 and 2)**: Displays the pull set and the actual shooting on the machine, depending on the choice of configuration work by the operator (between the button n°5).

The machine can work in the following configurations:

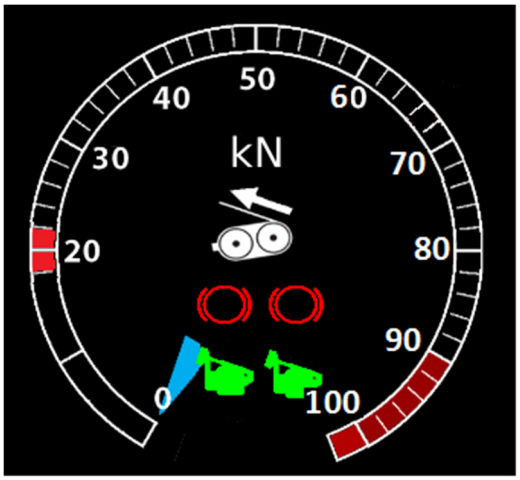
- Puller – scale from 0 to 50 kN (Circuit 1 o Circuit 2) and scale from 0 to 100 KN (Circuit connected)
- Tensioner – scale from 0 to 50 kN (Circuit 1 o Circuit 2) and scale from 0 to 100 KN (Circuit connected)
- Puller fine brake scale – scale from 0 to 17 kN (Only Circuit 1)
- Tensioner fine brake scale – scale from 0 to 17 kN (Only Circuit 1)

The dynamometer scale will change automatically as a function of the bull-wheels rotation, if the speed is greater than 0, will be displayed while the set (through the pos.5 button) if the machine is stopped.

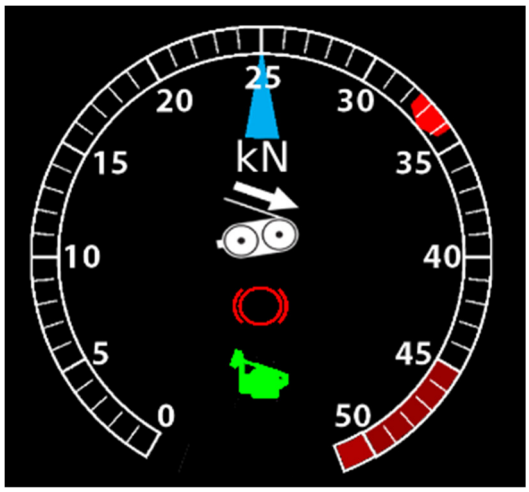
On the following page, shows four configurations of the crane scale can take.



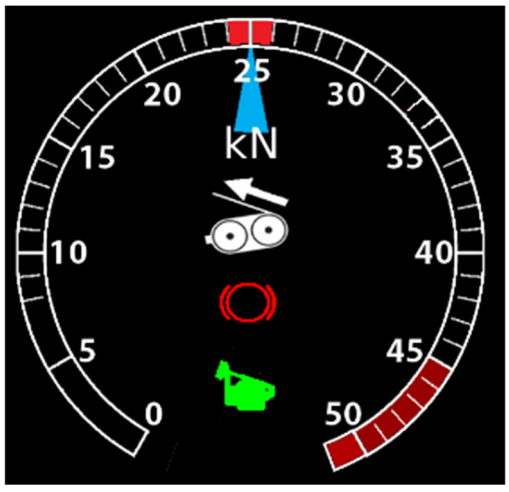
Machine in PULLER configuration
"CIRCUIT 1 + CIRCUIT 2"



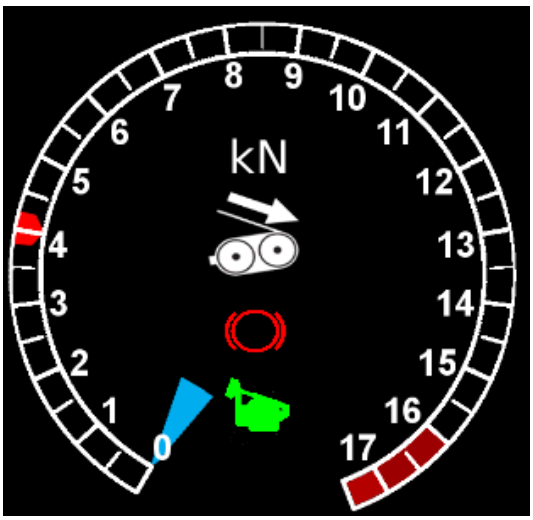
Machine in TENSIONER configuration
"CIRCUIT 1 + CIRCUIT 2"



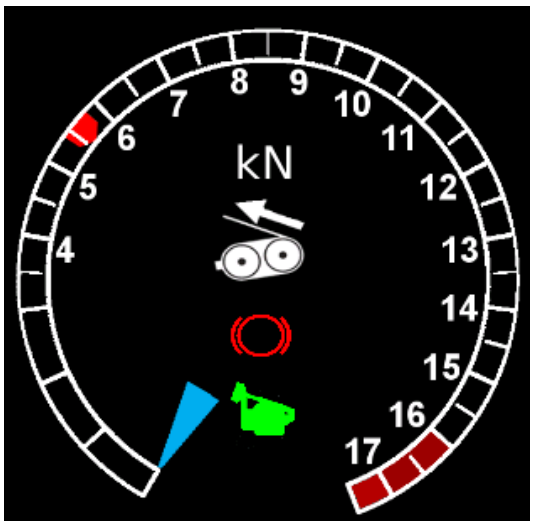
Machine in PULLER configuration
"CIRCUIT 1" or "CIRCUIT 2"



Machine in TENSIONER configuration
"CIRCUIT 1" or "CIRCUIT 2"



Machine in PULLER configuration
"CIRCUIT 1" in FINE BRAKE



Machine in TENSIONER configuration
"CIRCUIT 1" in FINE BRAKE

BLUE ARROW: indicates the CURRENT pull value in KN on the reference scale.

RED ARROW:
TENSIONER machine: Indicates the pull value SET in KN.
PULLER machine: Indicates the LIMIT pull value in KN.

At the center of the virtual dynamometer, they show the following symbols, which can have different configurations:

MACHINE IN PULLER CONFIGURATION.

MACHINE SET AS PULLER BUT IR WORKS AS A TENSIONER (only with bull-wheels rotation speed > 0).

MACHINE IN TENSIONER CONFIGURATION.

MACHINE SET AS TENSIONER BUT IR WORKS AS A PULLER (only with bull-wheels rotation speed > 0).

ROPE CLAMP OPENED.

ROPE CLAMP CLOSED

NEGATIVE BRAKE BULL-WHEELS CIRCUIT OPEN

NEGATIVE BRAKE BULL-WHEELS CIRCUIT CLOSED

2- **Stringing speed**: it is displays the speed in KM / H (or miles / h) which is string or recovered the rope or wire.

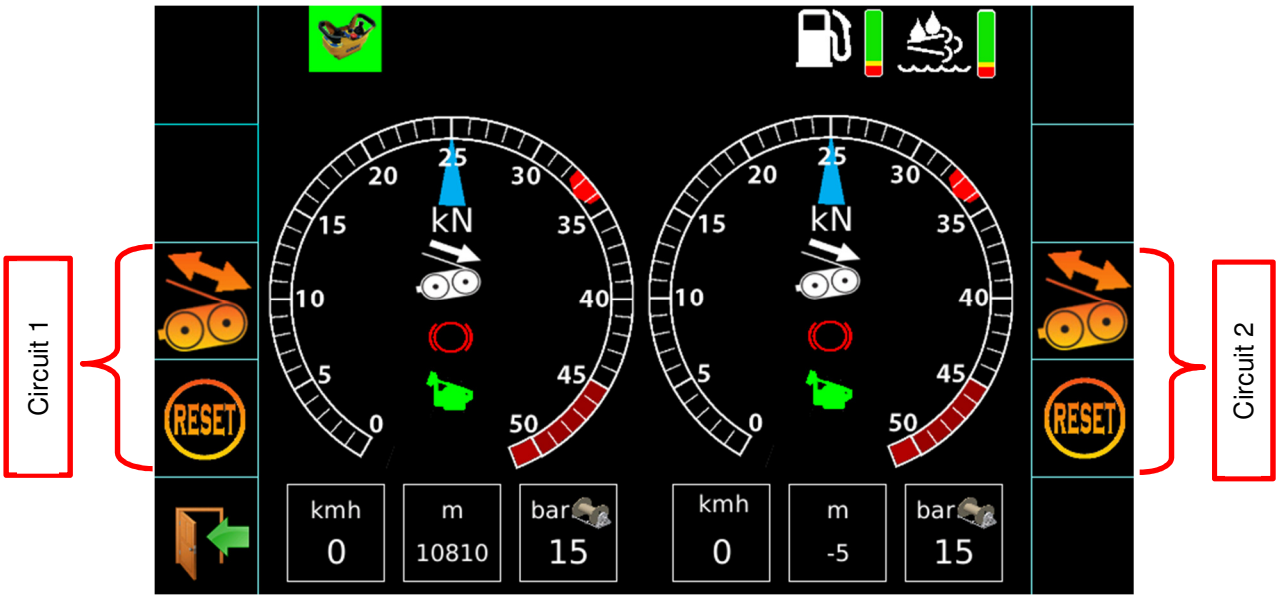
3- **Strung meters**: it is displays how many meters (or feed) of conductor or rope have been strung

4- **Reel Elevator Pressure**: it is displays the set pressure on de reel winder circuit or hydraulic heads mounted on the reel elevators.

5- **Button to choose "Machine Operating Mode" and "Meter counter reset":** through this button, it will show the menu between the operator can select the scale of the pull to be displayed (MACHINE TENSIONER or MACHINE PULLER). push the button  to change the type of scale.

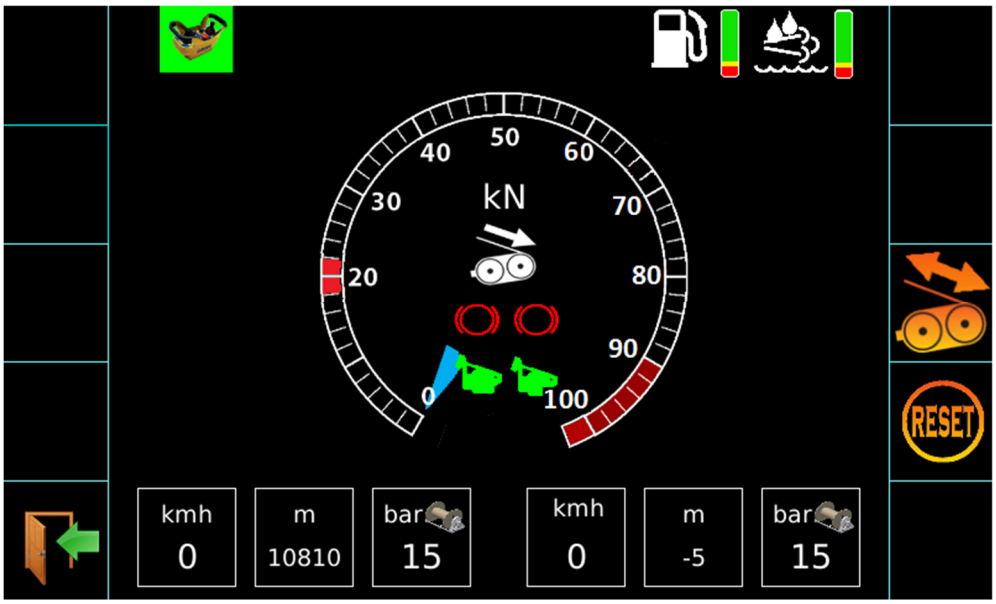
Depending on the chosen configuration, the virtual dynamometer will automatically scale the pull consistently to the direction of rotation of the bull-wheels if v> 0.

The push button Meter counter reset  It allows you to reset the counter of the strung meters.



Machine configuration

"CIRCUIT 1" or "CIRCUIT 2"



Machine configuration

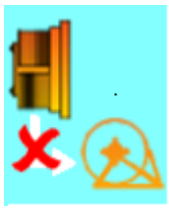
"CIRCUIT 1 + CIRCUIT 2"

6- **Circuit Management Button Reel elevator/Reel winder circuit 1 and 2 :** through this button, the operator has the option to choose how to use the reel elevators circuit or reel winder.
It is possible to choose from:

Reel elevator circuit STRINGING mode

In this configuration, the reel elevators circuit is pressurized automatically. Moving the bull-wheels joystick, the reel elevator circuit is under pressure and is ready for operation, allowing you to keep pull the conductor between bull-wheels and reel elevator.

When the operator push this button, the icon will change.



If the button is active, it will start to be blinking and it will active the configuration "Reel **elevator circuit MANUAL mode"**

Reel elevator circuit MANUAL mode

In this configuration, you can move the bull-wheels excluding the reel elevators circuit. This operation can be useful in the process of loading of the conductor on the machine and allows the operator to lock the rotation of the reels on the reel elevators.

DANGER

The operator should always turn off this feature before starting the stringing operations, in order not to drag the stand without having the appropriate back-pull on the conductor.

7- **Radio control connection**: It displays the status of the radio connection to the machine control.

Radio control CONNECTED

Radio control DISCONNECTED

Radio control OFF

8- Alarms and warning lights:

 Radiator Status [Black: Turned off – Red: Problem – Green: Switched on]

 Engine alarm [Black: Turned off – Yellow: Alarm to engine → see dedicated page]

 Engine alarm [Black: Turned off – Yellow: Alarm to engine → see dedicated page]

 Machine and/or Engine alarm

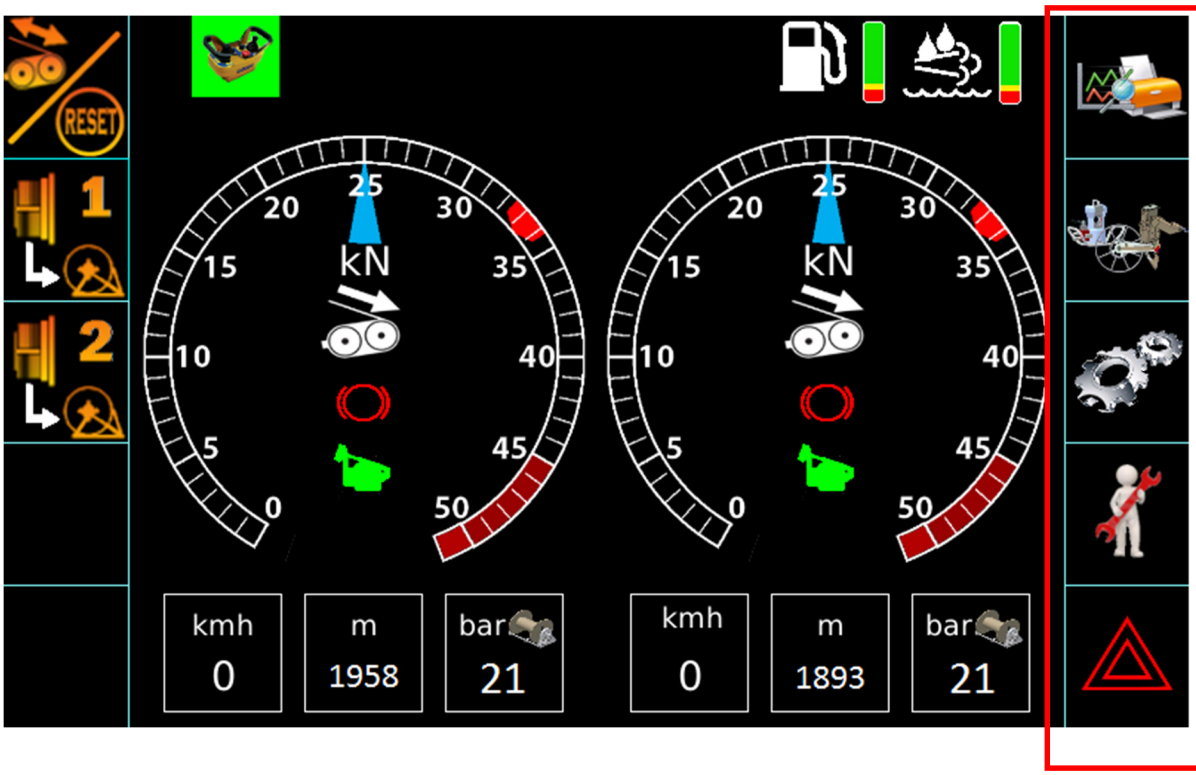
 Alternator alarm

9- Fuel Level (GREEN – NO RESERVE **– RED –** RESERVE**)**

10- Urea Level (only for machine with diesel engine Volvo TAD872VE TIER 4F Stage 4 “USA / EURO”).

5.5.2 Machine menu

On the right side of the main work screen, lists the available machine menu.

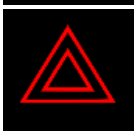


PULL RECORDER Menu identified with the symbol 

MACHINE SERVICES Menu identified with the symbol 

MACHINE SETTING Menu identified with the symbol 

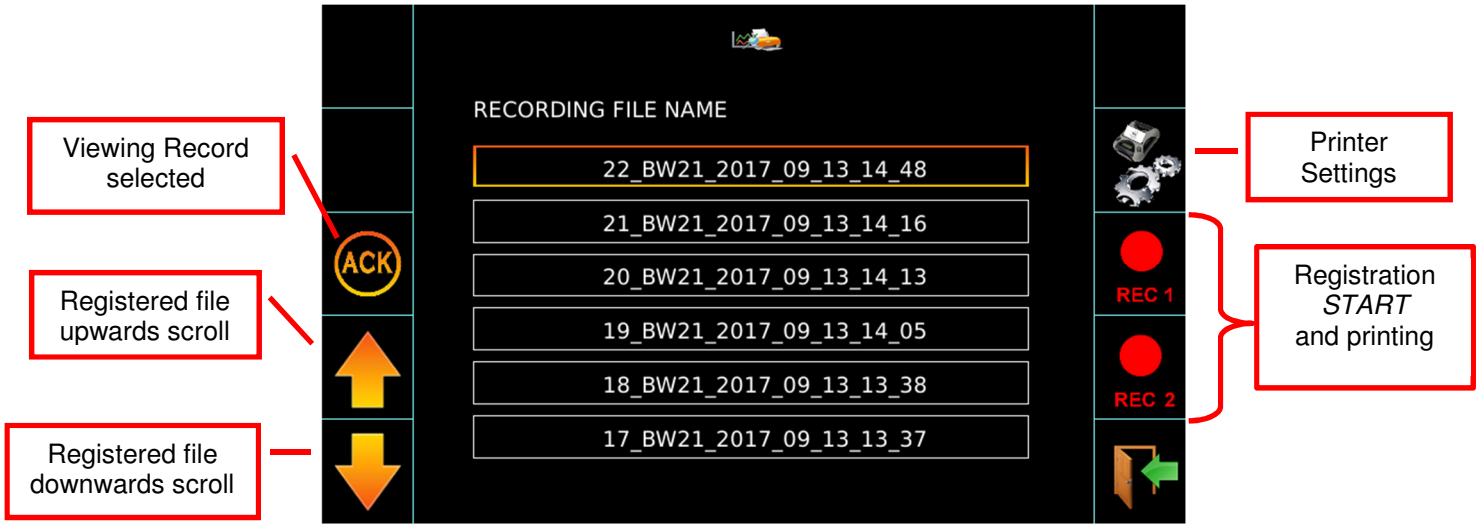
MACHINE MAINTENANCE Menu identified with the symbol 

ALARMS Menu identified with the symbol 

5.5.2.1 Pull Recording Menu 

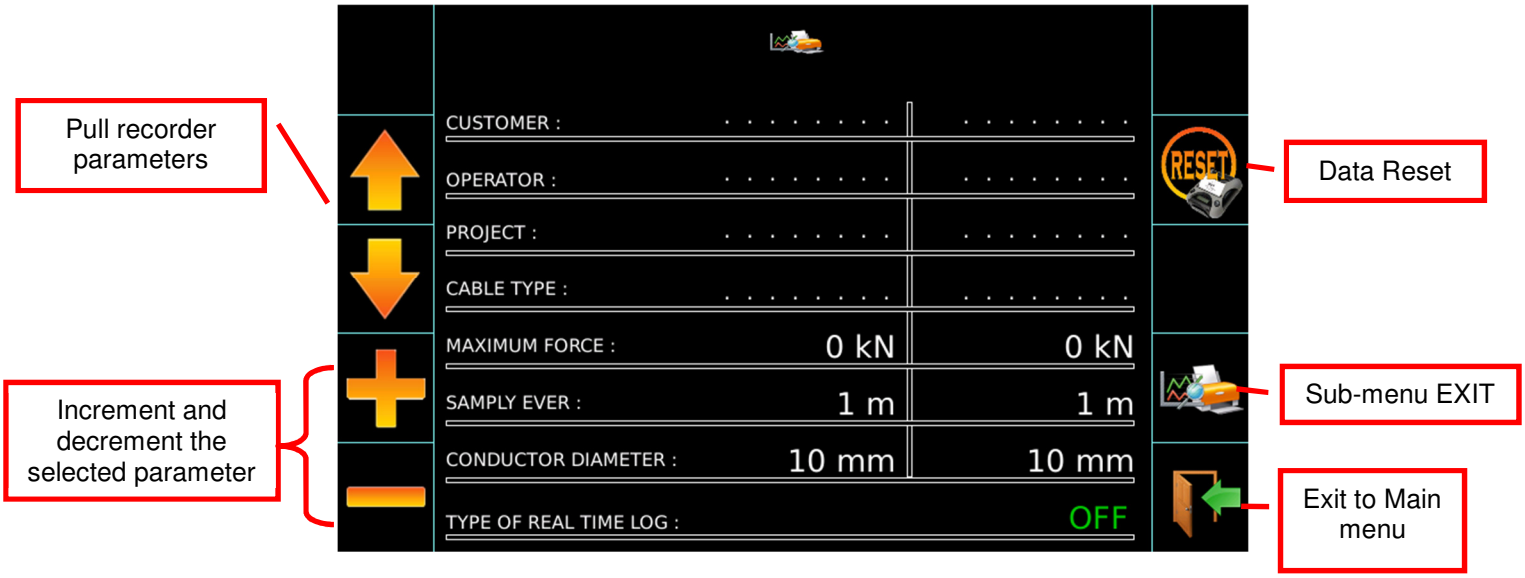
Between the menù “Pull recording menù” it’s possible to :

- Betwwen the “REC” button of the relative circuite, it’s possible record the key parameters of the machine during the stringing operations. It’s possible to print the record simultanelly during the stringing opearation or in a second time with the external printer;
- The “ACK” button allow to see the recording data;
- Save the recording in PDF format;
- Setting the parameter between the menù “Printer setting”;

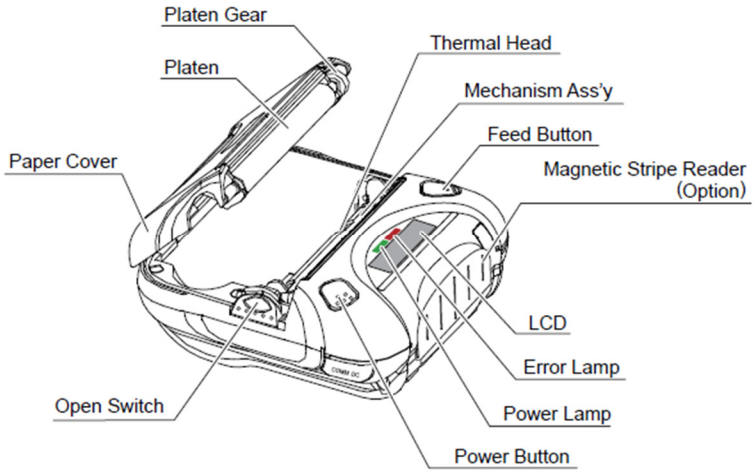


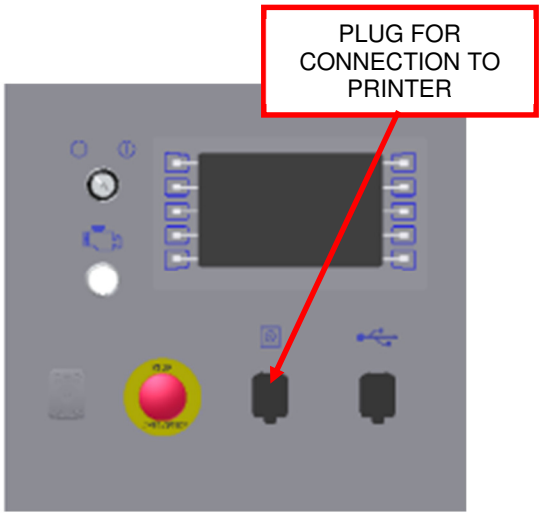
“Printer setting” button:

Pressing the "Printer Setting" button you can set the parameters that will be displayed in the recordings during the stringing operations:



Customer	Name constructor or other information.
Operator	Name operator or other information.
Project	Name Project or other information.
Cable type	Type cable or other information.
Maximun Force	Maximum shooting value beyond which an alarm is displayed during printing
Sample Ever	Recording interval expressed in meters.
Conductor Diameter	Diameter or rope conductor.
Type of real time Log	By setting the following values, it's possible to have different functions: - **OFF:** Record only and no snapshot Performs only the recording of the main stringing parameters by pressing the REC button (without instant printing); - **BW1**: If the printer is connected to the machine and the REC button is pressed, it is possible to have an instantaneous recording of the recording about circuit 1; - **BW2**: If the printer is connected to the machine and the REC button is pressed, it is possible to have an instantaneous recording of the recording about circuit 2.; - **BW1 > BW2:** If the printer is connected to the machine and the REC button is pressed, it is possible to have an instantaneous recording of the recording made regarding the connection of the 1 >+ 2 circuits (circuite in electronic connections); - **BW1 + BW2:** If the printer is connected to the machine and the REC button is pressed, it is possible to have an instantaneous recording of the recording made regarding the connection of the 1 + 2 circuits (circuite in mechanical connections);



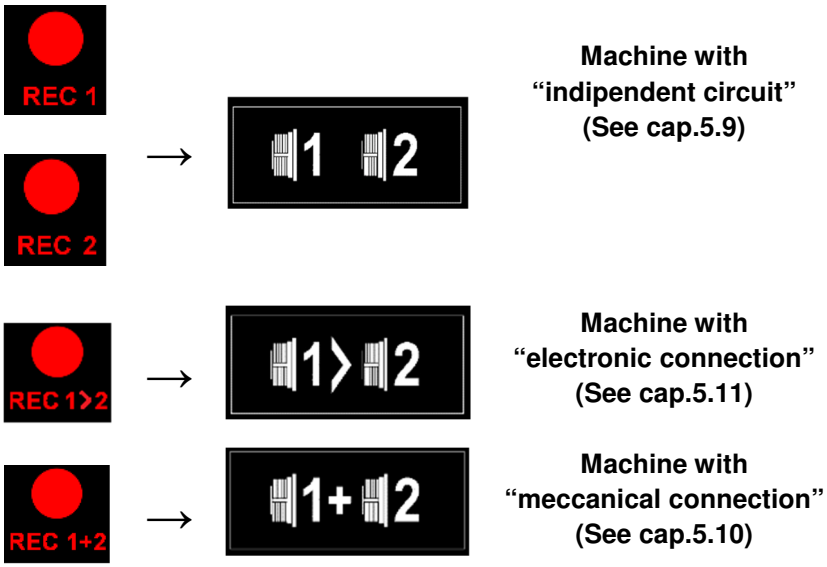


READING MANUAL

For a deeper analysis of the usable printer on the puller-tensioner PT250, please read carefully the reference manual.

"REC" button:

The icon of the REC button is displayed in different ways, depending on the machine's working configuration set in the relevant "Machine settings" menu → see menu 



In function of the option choose in the menù "***Printer setting***" on the point "***Type of real time Log***", the "REC" button will have different function:

With Type of real time Log "OFF":

Pressing the "REC" button to start the recording of the main parameters of stringing: registration status is indicated by the symbol "REC" flashes, the symbol dedicated to the shooting recorder on the main screen of the working menu.

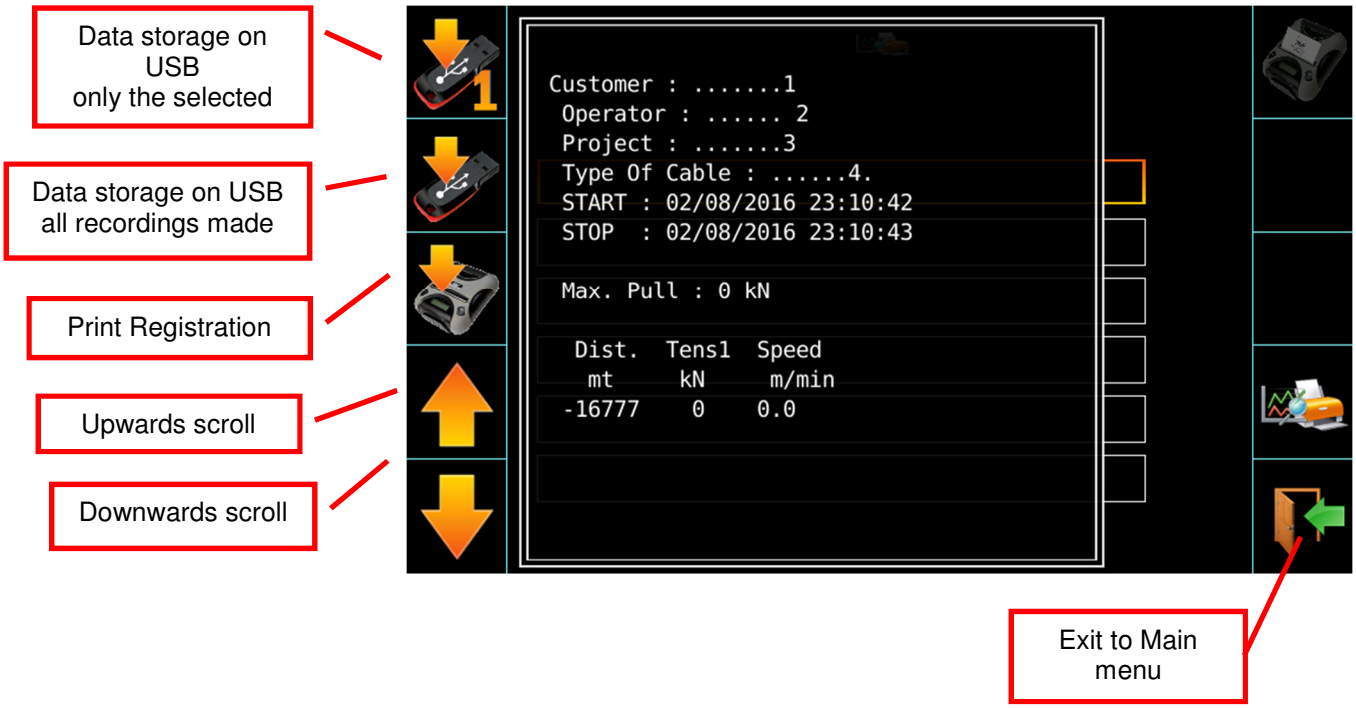
By pressing the "REC" meal you can stop the recording: at this point, the name of the recording will be displayed at the center of the screen.

With Type of real time Log "BW1" / "BW2" / "BW1+BW2":

Pressing the "REC" button to start the recording of the main parameters of stringing about "Circuit 1" o "Circuit 2" , "Circuit 1 > Circuit 2" and "Circuit 1 + Circuit 2".

"ACK" button:

Pressing the button "ACK" it's possible to see the recorded data during the stringing operations:



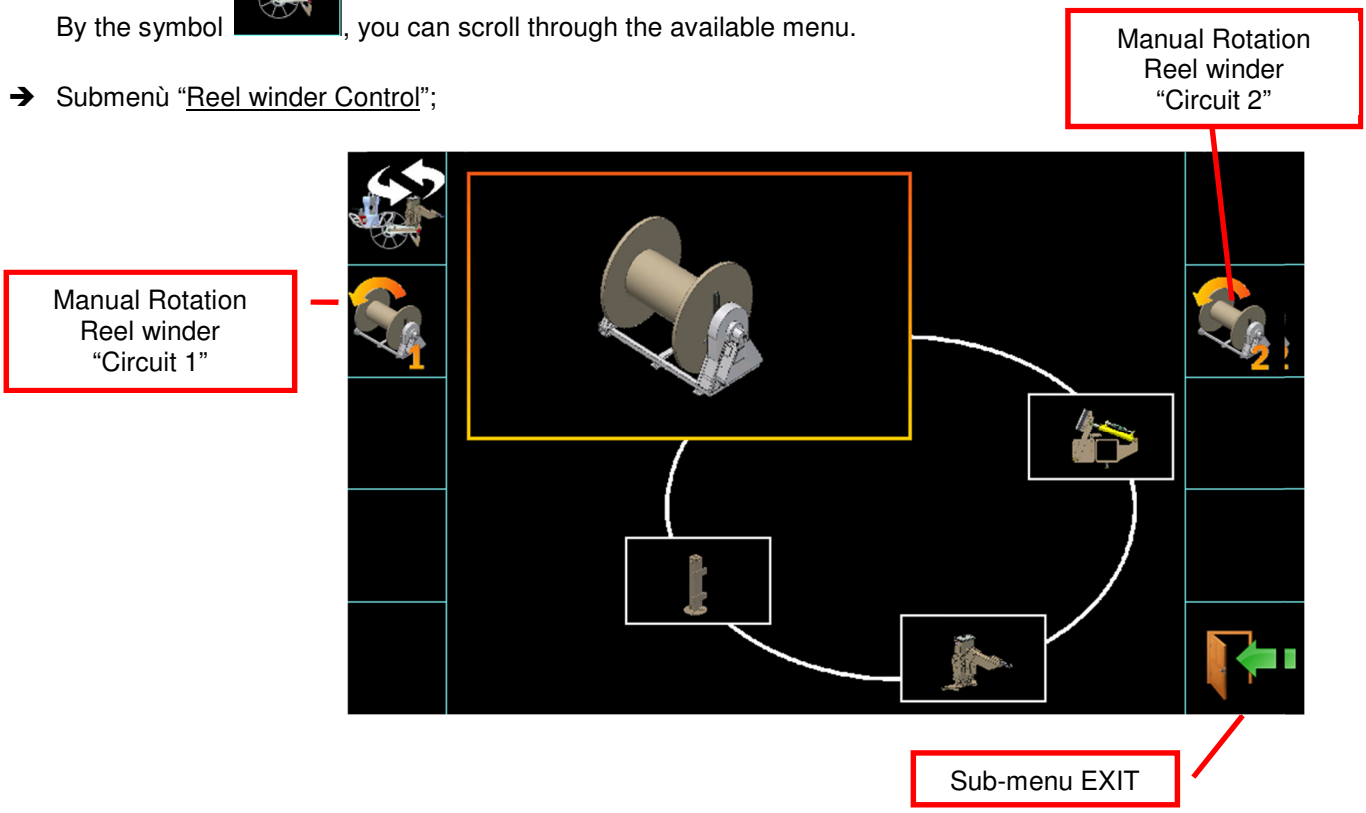
In the recorded files are displayed the strung meters, the efective pull, and the conductor stringing speed. The operator can also view recording date, operator name, project name, conductor type and date of registration term.

5.5.2.2 Machine Services Menu 

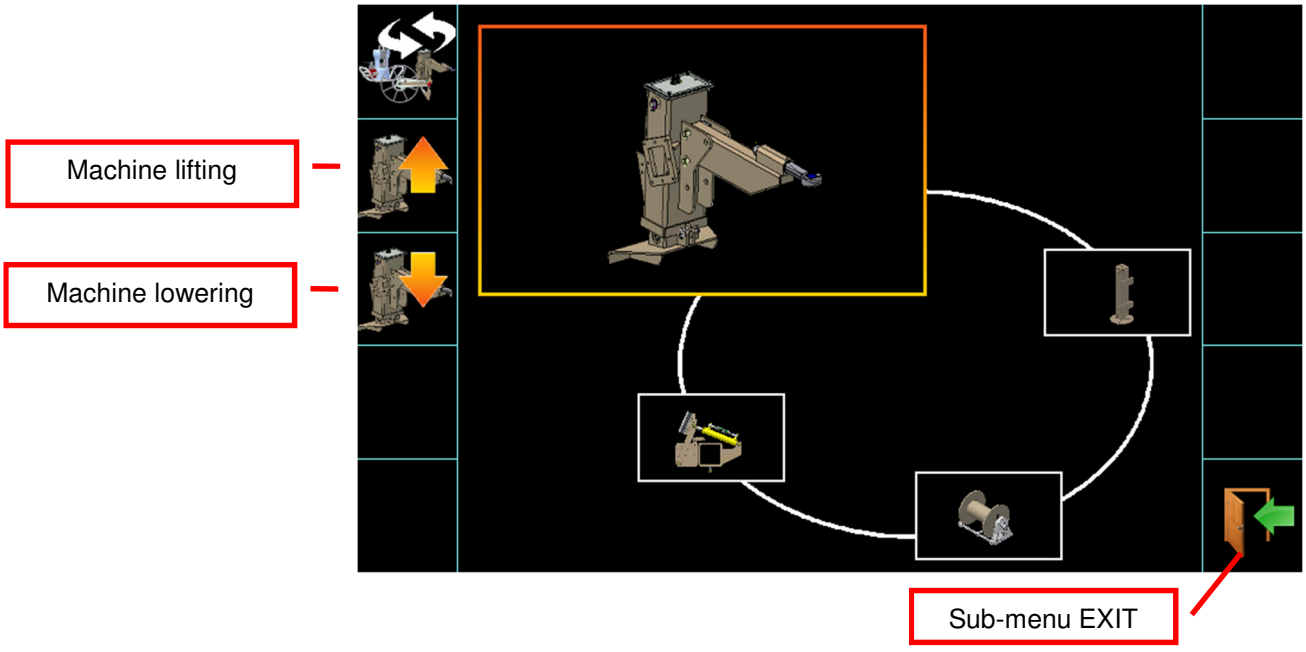
The screen, allows you to scroll through the options available to the machine and allows control through the functions shown in the left column.

By the symbol  , you can scroll through the available menu.

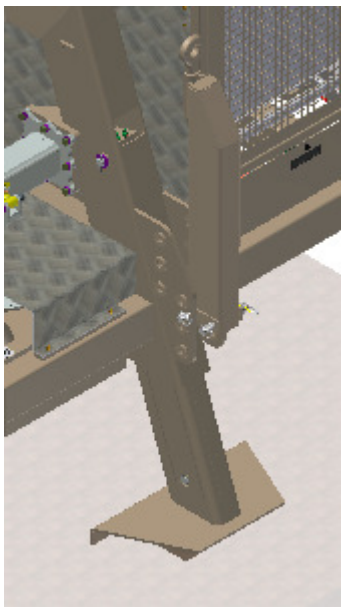
➔ Submenù "Reel winder Control";

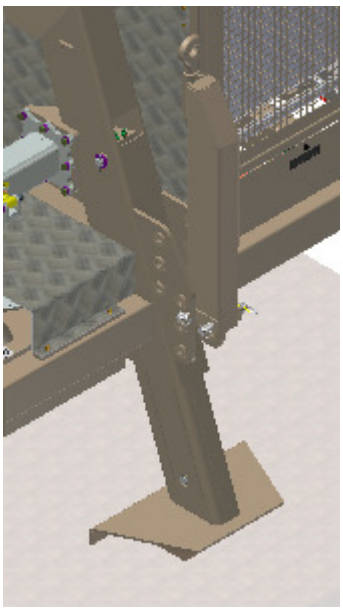


➔ Submenù "Front plough control";

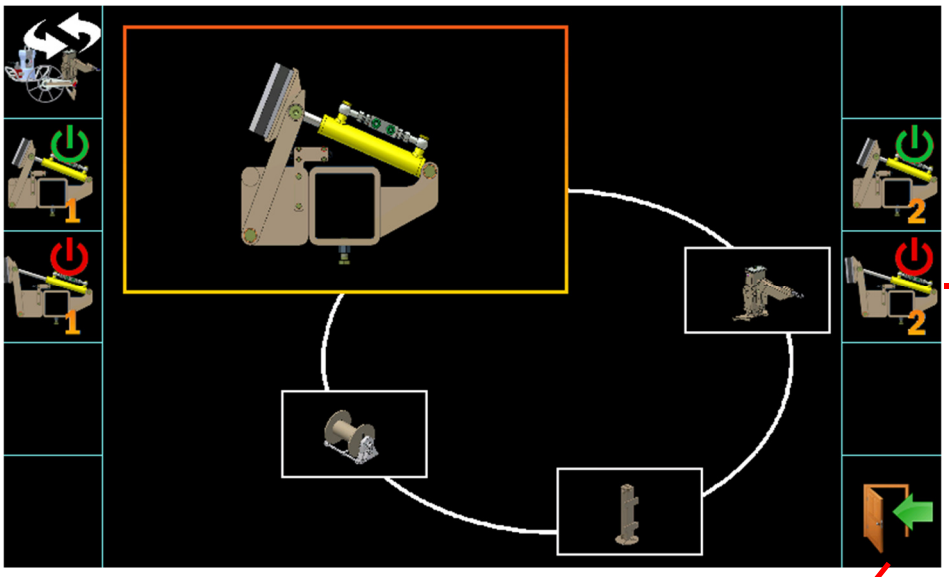


CONTROL FRONT PLUG

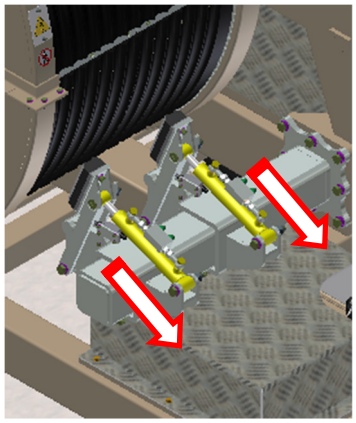


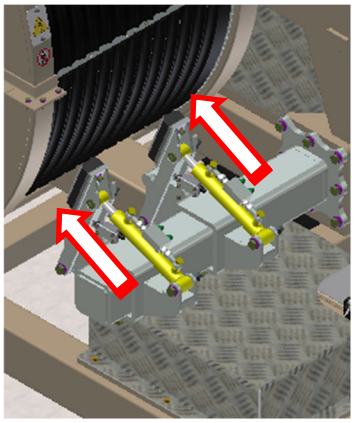


➔ Submenù <u>"Rope clamp Control";</u>

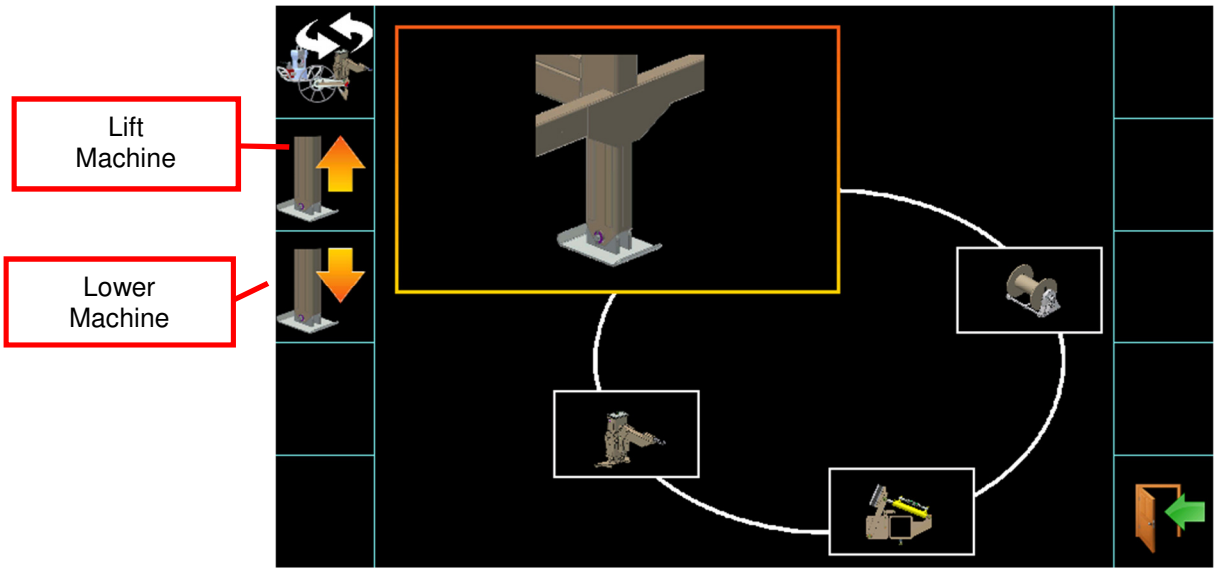


CONTROL ROPE CLAMP

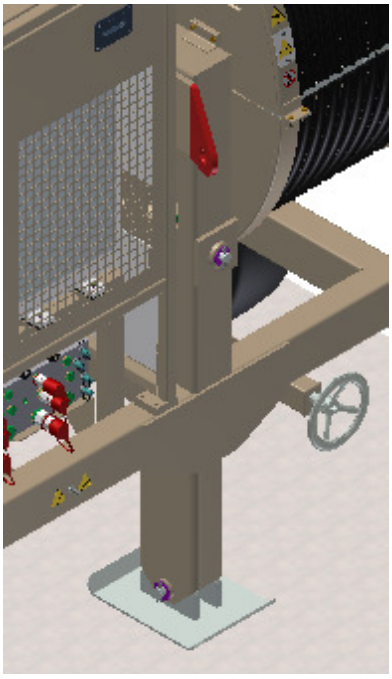


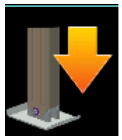


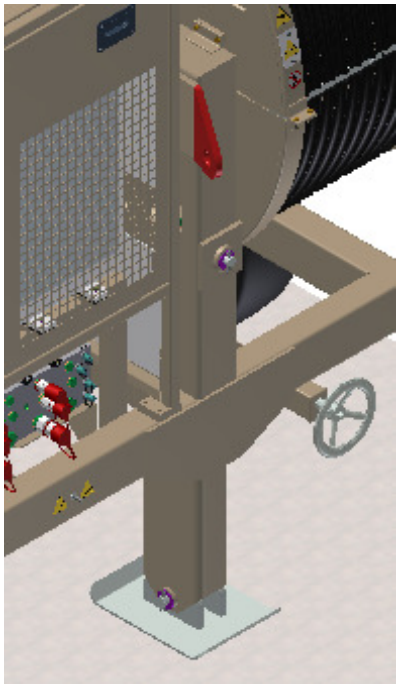
➔ Submenù “Control Rear plug”;



CONTROL REAR PLUG







5.5.2.3 *Menù "SETTING MACHINE"* 

From the "Machine settings" menu it is possible to access the following sub-menus by pressing the relative button:

- "Type of oil and circuit pressure control";
- "General settings of the machine control panel";
- "Machine work configuration";

- ***Submenù "Type of oil and circuit pressure control"***

1- Choosing the Oil Type (from AVG22 to AVG100);

2- Hydraulic oil temperature;

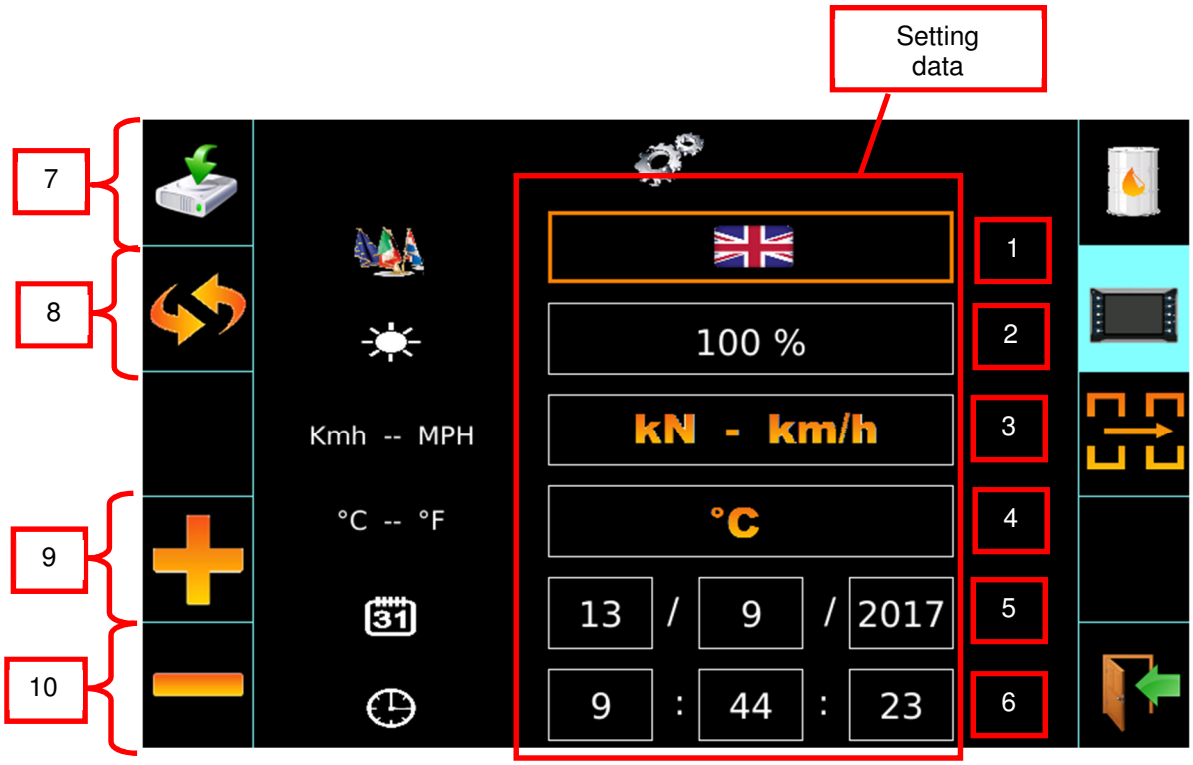
3- Pressure at the entrance of the hydraulic engine;

4- Pressure at the exit of the hydraulic engine;

5- Reel elevators circuit pressure;

6- Feeding circuit pressure about main hydraulic pump;

- ***Submenù "General settings of the machine control panel"***



1- Setting Screen language;

2- Setting Display brightness;

3- Setting the speed of stringing and pull set units of measure;

4- Setting temperature units of measure;

5- Data settings;

6- Hour settings;

7- Saving time and date set;

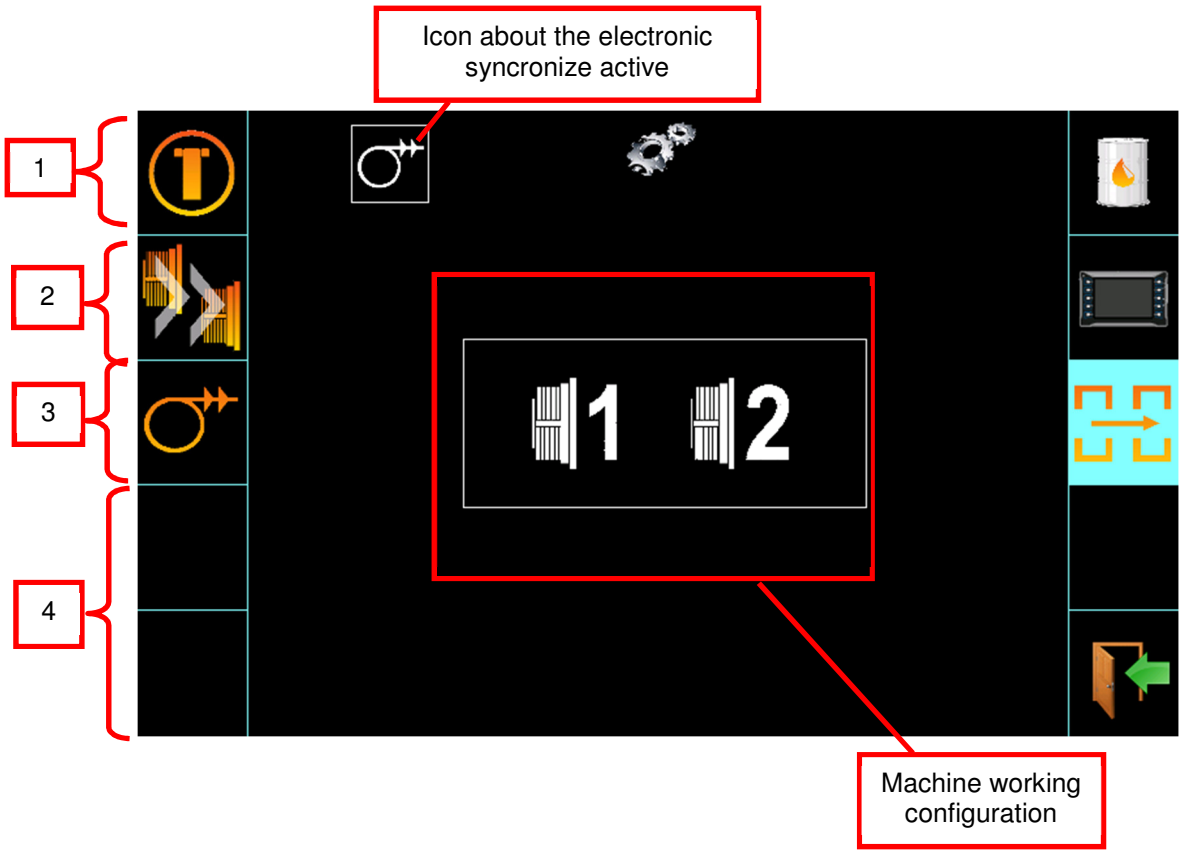
8- Button to scroll through the different menus (the selected date it will be underline);

9- Button to increase the selected menu;

10- Button to decrease the selected menu;

ATTENTION: In order to take effect any changes to the date and / or time, you must save the settings by pressing the dedicated button "save pos.7 settings".

- ***Submenù "Machine work configuration";***

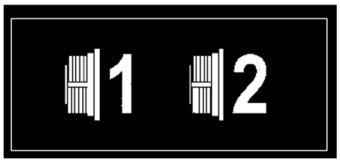


The puller-tensioner PT2450 have the possibility to work in this configuration:

a. **Machine with independent bull-wheel;**
b. **Machine mechanical and hydraulic connected;**
c. **Machine electronic connected;**

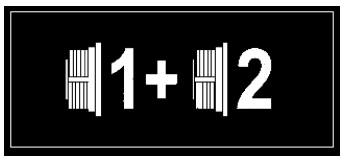
1- Button for machine configuration in mode "a" and "b"

This button allows to activate / deactivate the following working configurations of the machine with the visualization, in the central part of the menu, of the active configuration



Machine with independent Bull-wheel.

Circuit 1 independent and completely separate from circuit 2.
Each single circuit be able to pull or tension until 50 KN.



Machine with mechanical and hydraulic connection

Circuit 1 is connected with circuit 2.
The machine can pull or tension until 100 KN.

2- Button for machine configuration in mode “c”

This button allows to activate / deactivate the following working configurations of the machine with the visualization, in the central part of the menu, of the active configuration

Machine with Electronic connection.

Each single circuit can pull or tension until 50KN, but it’s possible to control both circuit from the control of circuit 2 (see cap.5.11).

The icon of this button is only displayed with disconnected or emergency radio control.

3- Button to active electronic syncronize between “Circuit 1” and “Circuit 2”

The icon of this button is only displayed with disconnected or emergency radio control (see cap. 6.1.3). It allowed to active or de-active the electronic syncronize between “circuit 1” and “circuit 2” and appear and disappear the relative icon in case of use.

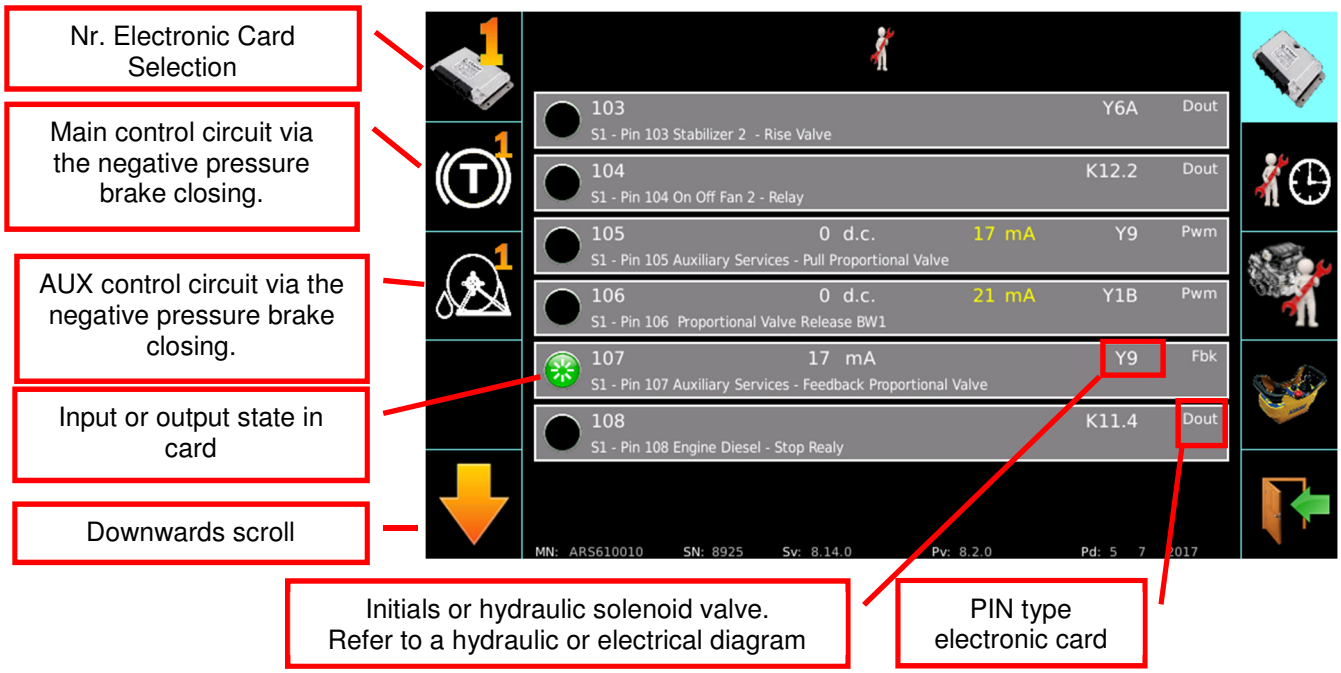
4- Button about electronic connection of multiple machine.

If the machine is configurate with the optional about the electronic connection between machine (see Cap 6) it will appear the relative icons.

INFORMATION
To deepen the knowledge and use of the machine in electronic connection configuration (see chapter 6).

5.5.2.4 Menù "Maintenance Parameters Machine" 

- *Sub-menu Electronic Cards inputs status - Virtual Radio Control*



This menu allows you to view the list and status of PIN inputs or outputs of the electronic cards that is attached to the machine. In case of emergency, reported errors or faults, the operator has the possibility to monitor the electronic state of the machine with an immediate reference to the hydraulic and electrical diagrams.

Electronic card input and output PIN status

 PIN output or input enabled and working properly

 PIN output or input in card NOT managed

 PIN output or input enabled and not working. Hardware problem detected.

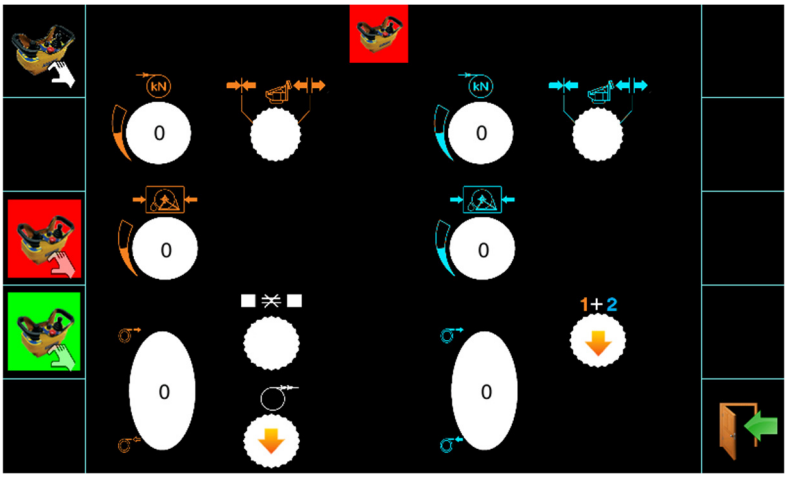
 PIN output or input NOT enables. Hardware problem detected.

 PIN output or input NOT enabled. No Hardware Error detected.

ATTENTION
In case of electronic or hydraulic system malfunction, please contact your service agency Tesmec.
The screen described here, can be used by customer service Tesmec, to monitor the status of the inputs and outputs as a result of electronic malfunctions detected.

➔ Submenù “Test radio remote control functioning”:

Only the *submenu inputs electronic cards*, you can access the menu to monitor the operation of the main commands available on the car radio control.



Turning the potentiometer for adjustment of the pull or the reel elevator system pressure, or move the joystick to the bull-wheels control, the values are displayed that may give the operator an indication on the proper functioning of the controls on the radio control.

Reel elevator command circuit potentiometer

If the operator rotates the potentiometer it’s possible to have:

- displays values between 128 and 256 = *Regular Operation;*
- displays values different from 128 and 256 = *Malfunction;*

Machine pull setting potentiometer

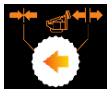
If the operator rotates the potentiometer it’s possible to have:

- displays values between 128 and 256 = *Regular Operation;*
- displays values different from 128 and 256 = *Malfunction;*

Rope clamp switch

If the operator moves the switch in open position, it’s possible to have:

- displays right arrow = *Regular Operation;*
- arrow is not displayed = *Malfunction;*



If the operator moves the switch in close position, it’s possible to have:

- displays left arrow = *Regular Operation;*
- *arrow is not displayed = Malfunction*;

Command joystick bull-wheel rotation

If the operator moves the joystick control of the bull-wheel, it’s possible to have:

- displays values between 128 and 256 = *Regular Operation*;
- displays values different from 128 and 256 = *Malfunction;*

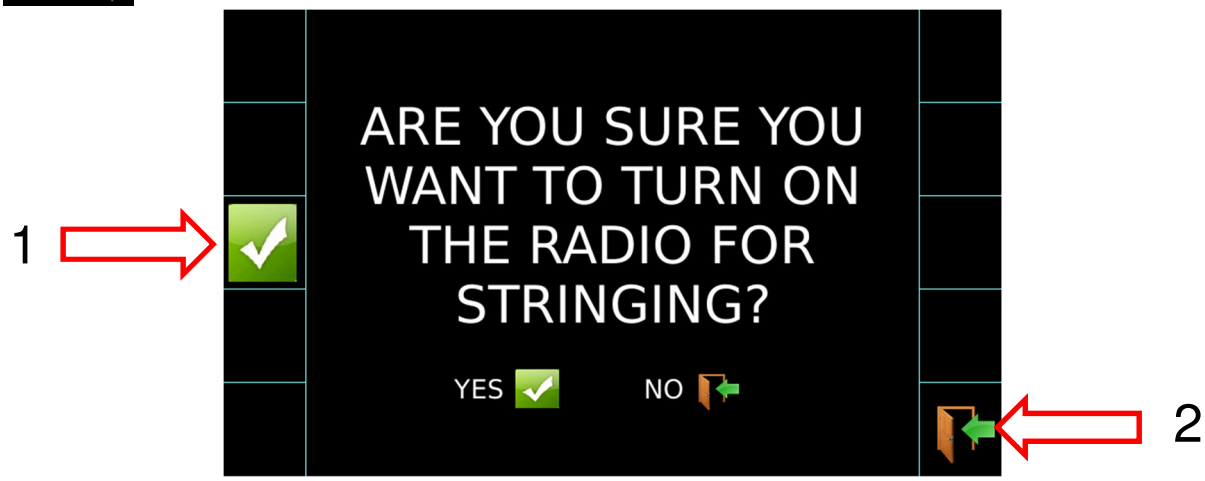
In radio operation monitoring screen control, there is another button that lets you access a menu by password.

This menu can be used only and exclusively under Tesmec assistance authorization.

If it detects a malfunction of the controls on the radio control, it is possible to completely exclude the radio control and control the machine from the main screen machine.
In the radio control management screen, you can enable or disable the radio control and / or on-screen controls.

Radio remote control connection:

With this button, you can connect your radio controlled exclude commands activated screen 7 ".



1- Push the button to connect the radio remote control;
2- Push the button to exit from this menu;

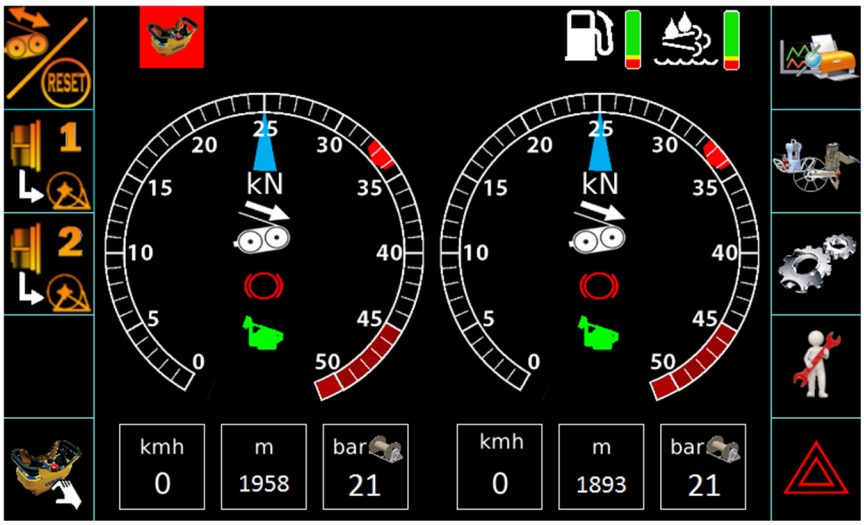
Radio remote control disconnection:

With this button, you can disconnect the radio control to control the machine through the 7 " screen.

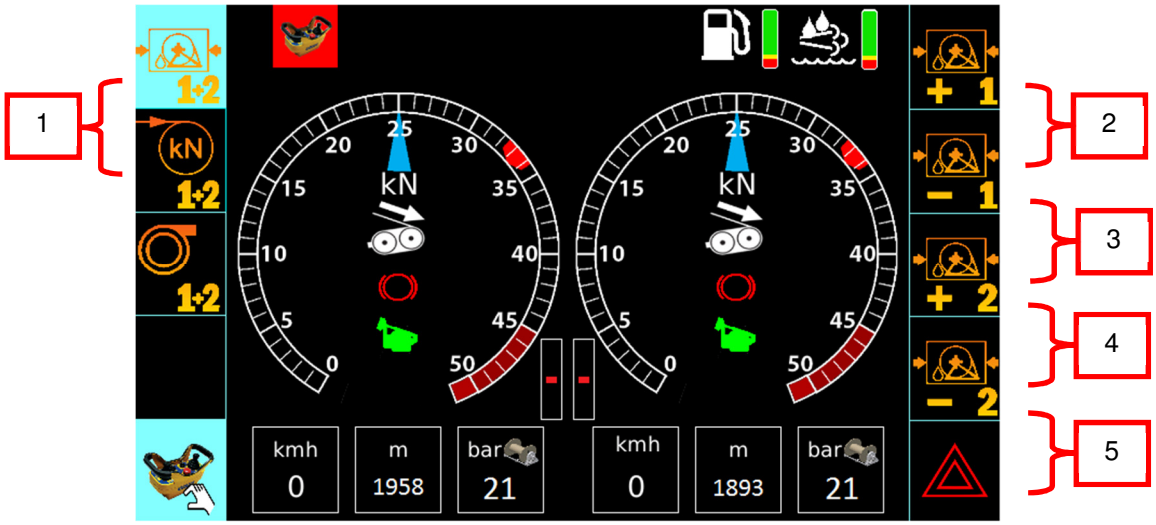
1- Push the button to connect the radio remote control;
2- Push the button to exit from this menu;

ATTENTION
Disconnect the radio control to anything bull-wheels rotation speed (stopped machine).

ATTENTION
Taking command from the screen to the radio control, the stringing parameters are not transferred. The machine is reset by taking the parameters set on the radio control.

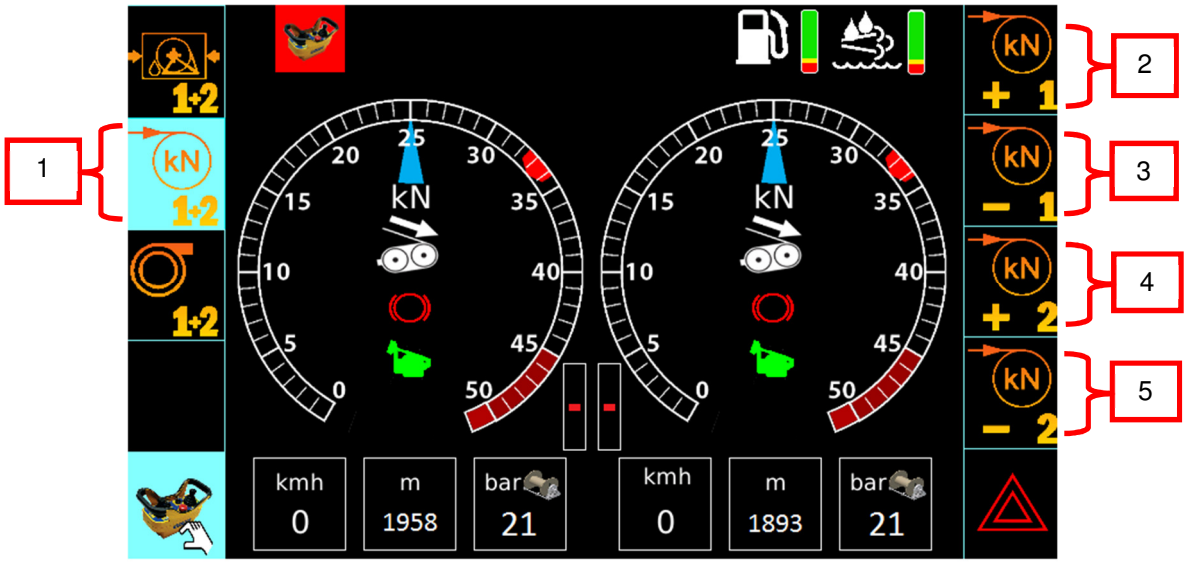


Disconnecting the radio remote control from the machine, in the main working screen, a dedicated button  will appear, press to access the following menus:



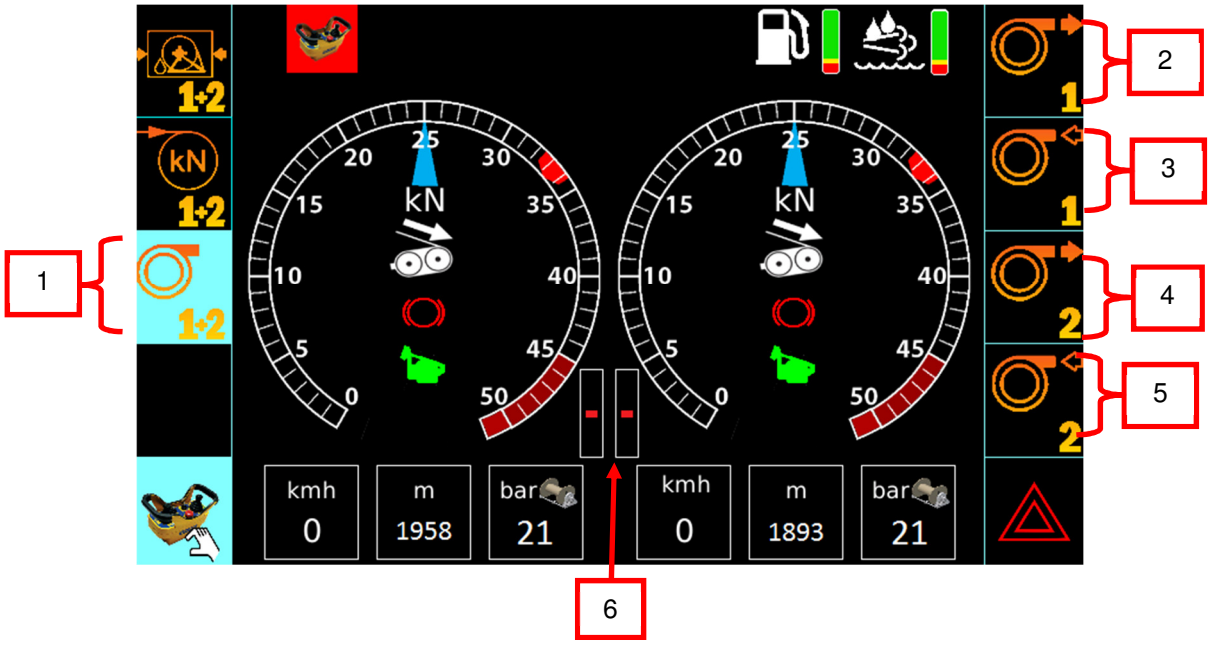
This will make it possible:

1- Control the pressure in the circuit reel elevators;
2- Increase the pressure in the circuit reel elevators circuit 1;
3- Decrease the pressure in the circuit reel elevators circuit 1;
4- Increase the pressure in the circuit reel elevators circuit 2;
5- Decrease the pressure in the circuit reel elevators circuit 2;



This will make it possible:

1- Control of the force value on the different circuits;
2- Increase the value of the pull force on circuit 1;
3- Decrease the value of the pull on circuit1;
4- Increase the value of the pull force on circuit 2;
5- Decrease the value of the pull on circuit 2;

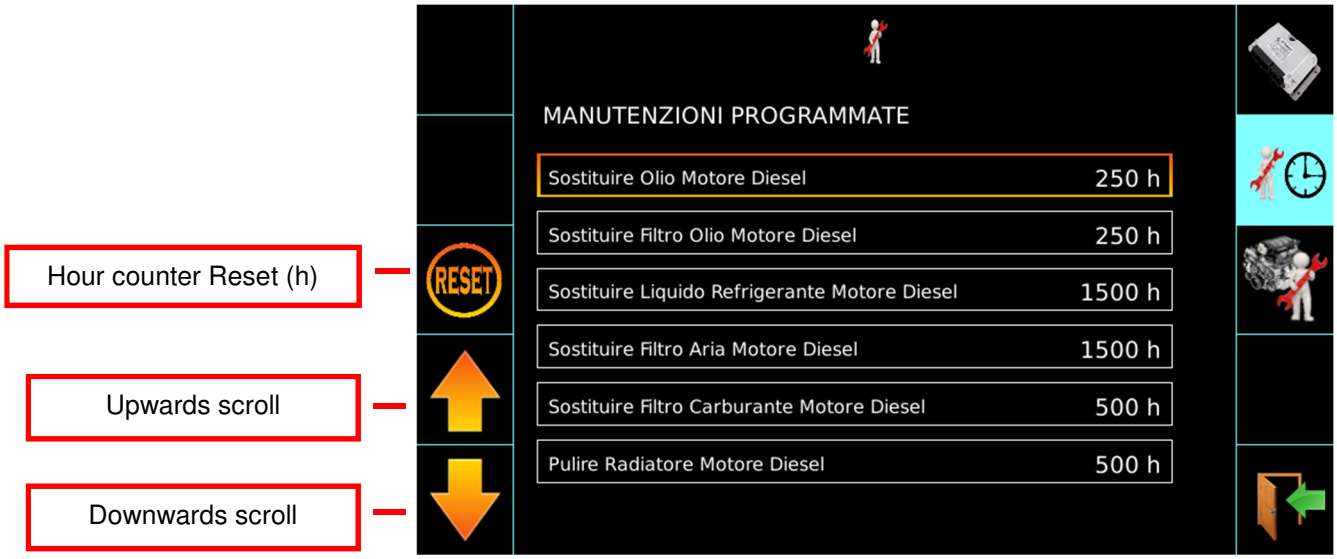


This will make it possible:

1- Control of the recovery/release single circuits (bull-wheels virtual joystick);
2- Release circuit with bull-wheels circuit 1 (bull-wheels virtual joystick);
3- Recover circuit with bull-wheels circuit 1 (bull-wheels virtual joystick);
4- Release circuit with bull-wheels circuit 2 (bull-wheels virtual joystick);
5- Recover circuit with bull-wheels circuit 2 (bull-wheels virtual joystick);
6- Display the Virtual bull-wheels joystick position;

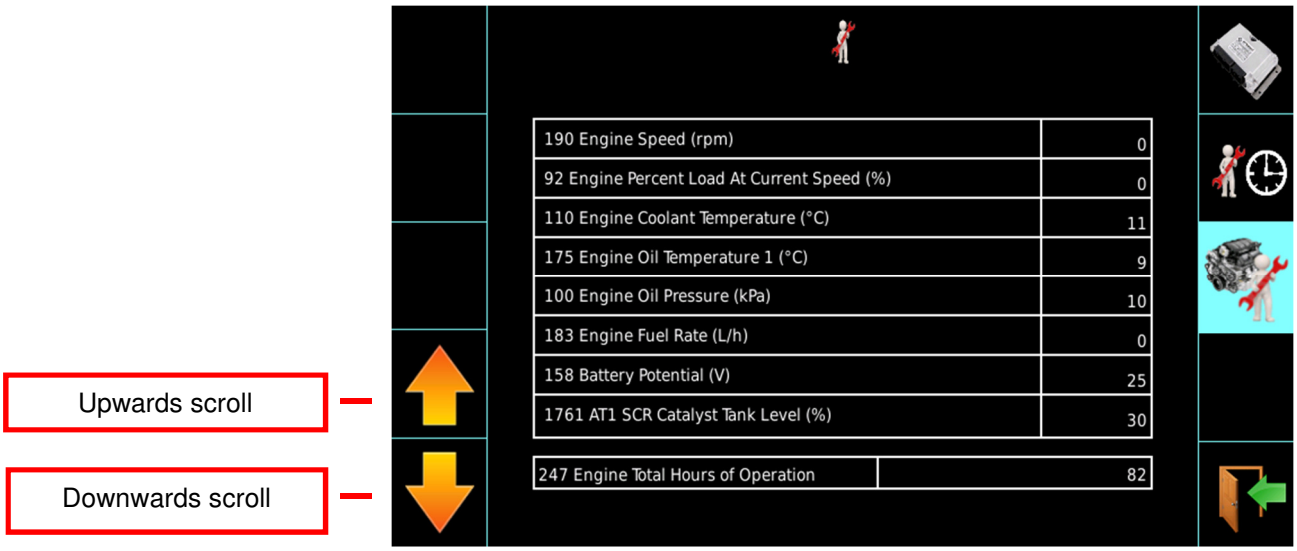
Depending on the machine configuration of the selected machine (see "Machine Configuration Screen Machine", cap.5.5.2.3), the above screens will be modified and only the running commands will be displayed.

- *Extraordinary machine maintenance settings*



In this menu it is possible to set the time (in hours) of the alarms of the programmed maintenance alarms of the machine: when the set time is reset, when the control panel is switched on, the maintenance warning will be displayed.

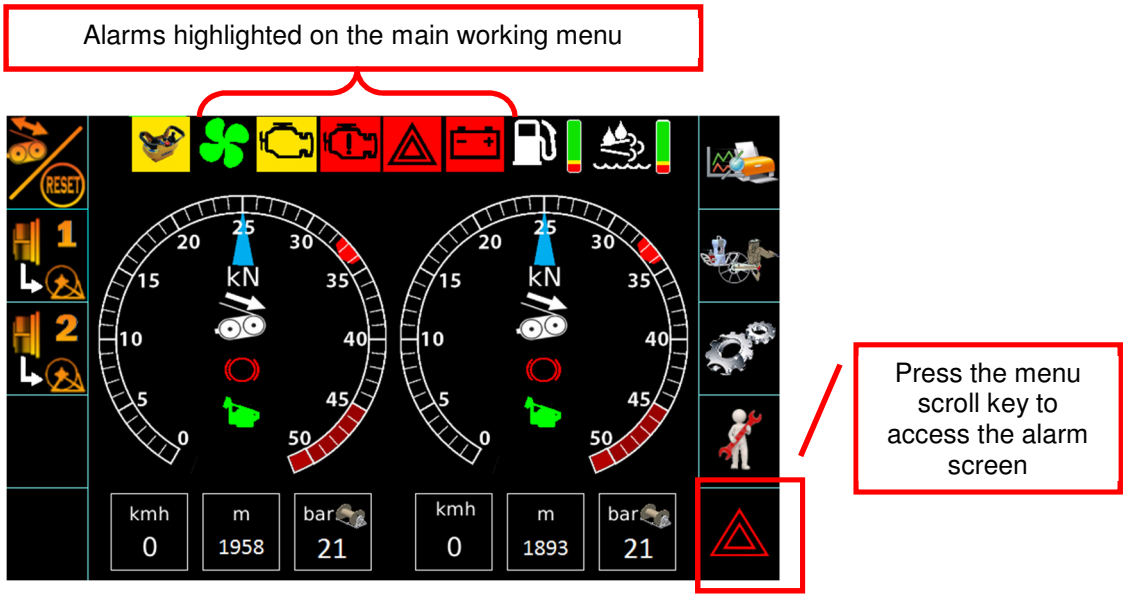
- *SPN engine available list*



It allows you to view the complete list of the diesel engine parameters of the machine. With this menu, the operator has the ability to control all the major parameters returned by the sensors which is fitted to the engine.

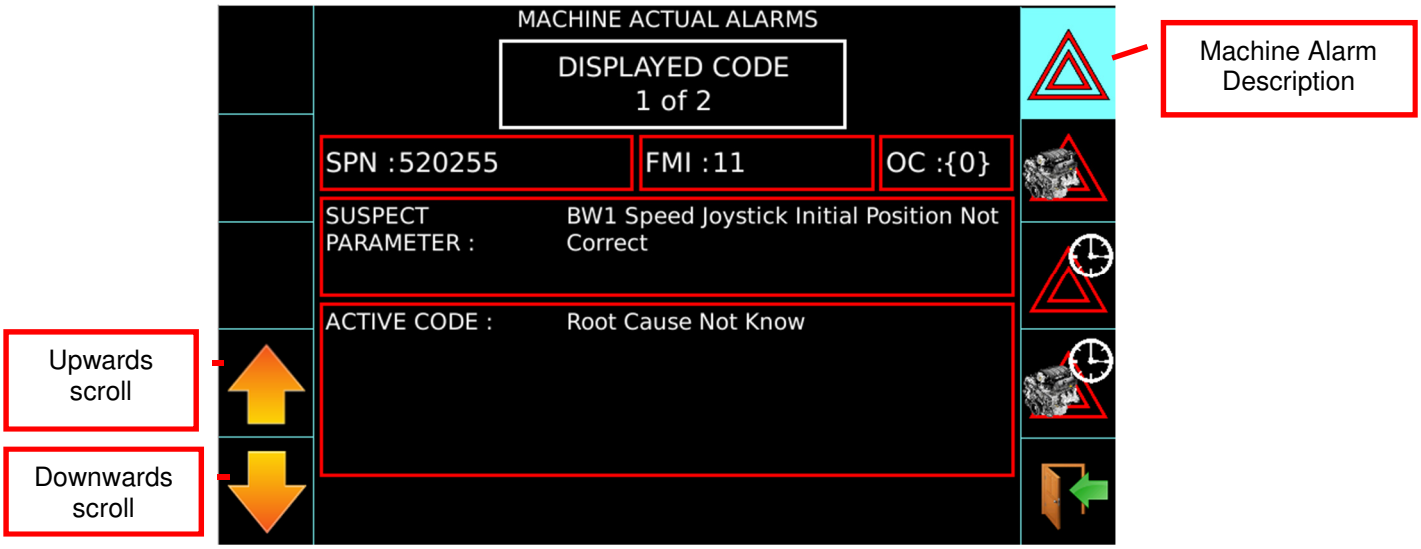
5.5.2.5 ALARMS MENU and ALARMS SUB-MENU.

If during operations stretching, you display a warning and / or error, you can be able to analyze the status or the cause through the four dedicated screens, which can be accessed through the menu scroll key shown at the bottom right of the screen main work.



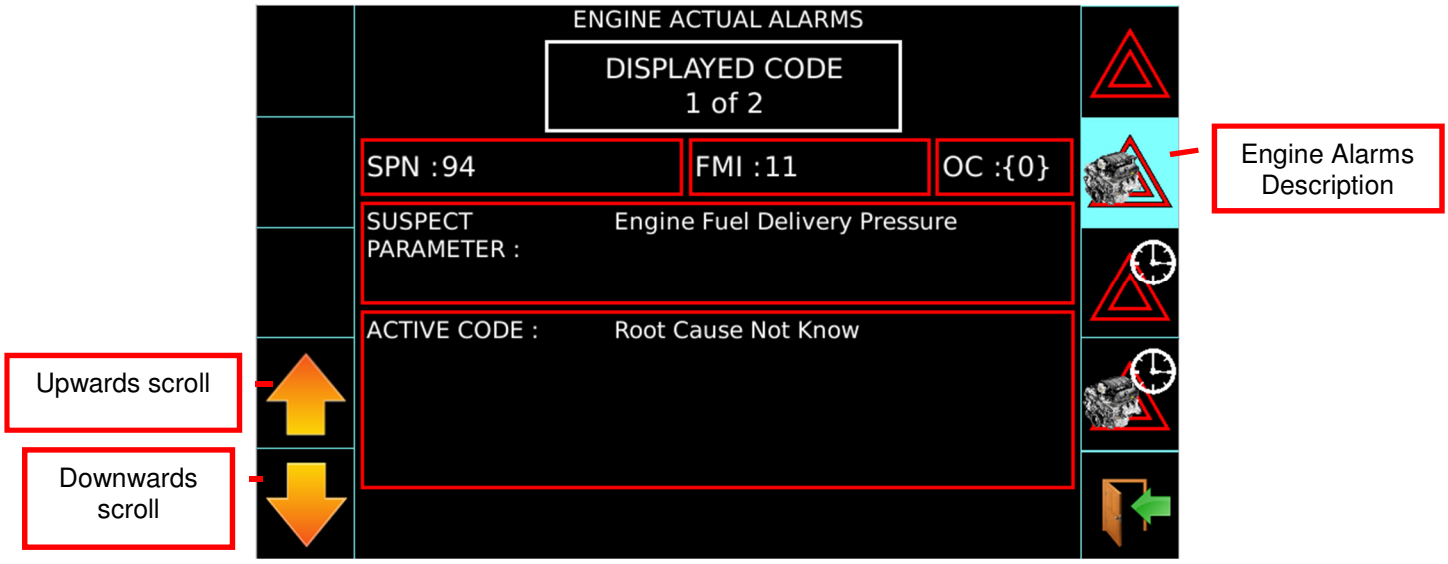
The ALARMS menu consists of four sub-menus, each of which is indicated by the symbol shown on the screen right column.
you can select each of the sub-menu via the corresponding keys on the 7 "screen of the remote control.

- *Machine error description.*



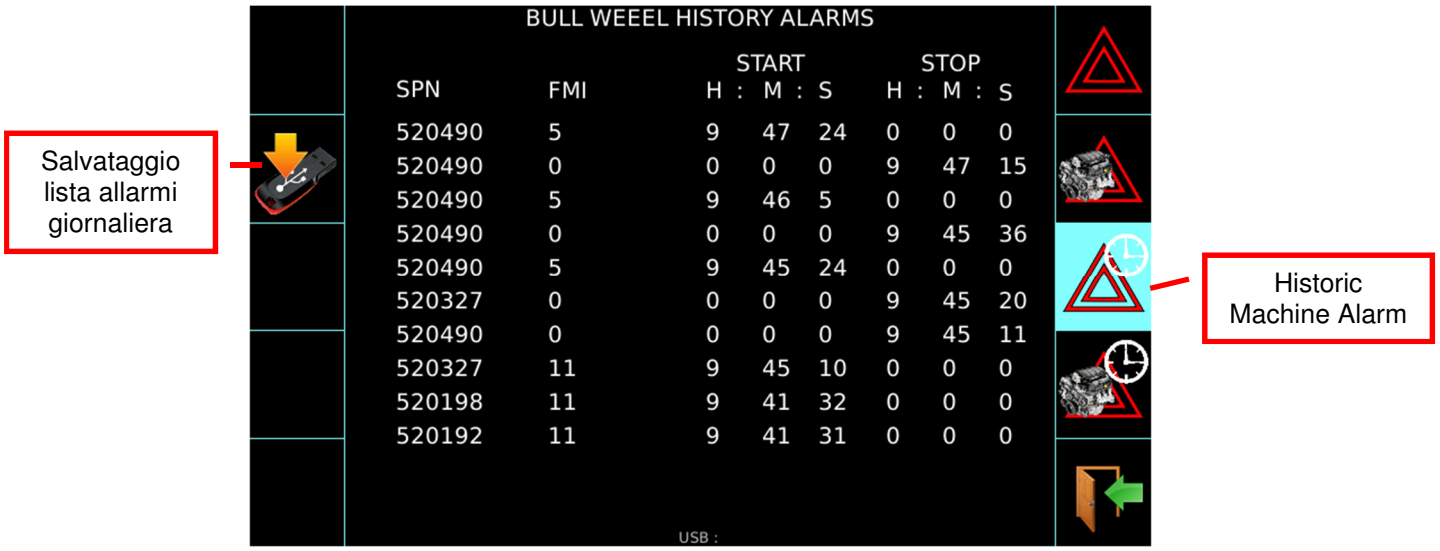
This screen allows you to view the description of the active faults on the machine at that time

- *Engine error description*



This screen allows you to view the description of the active faults on the engine at that time.

- *Historic Machine Alarm*



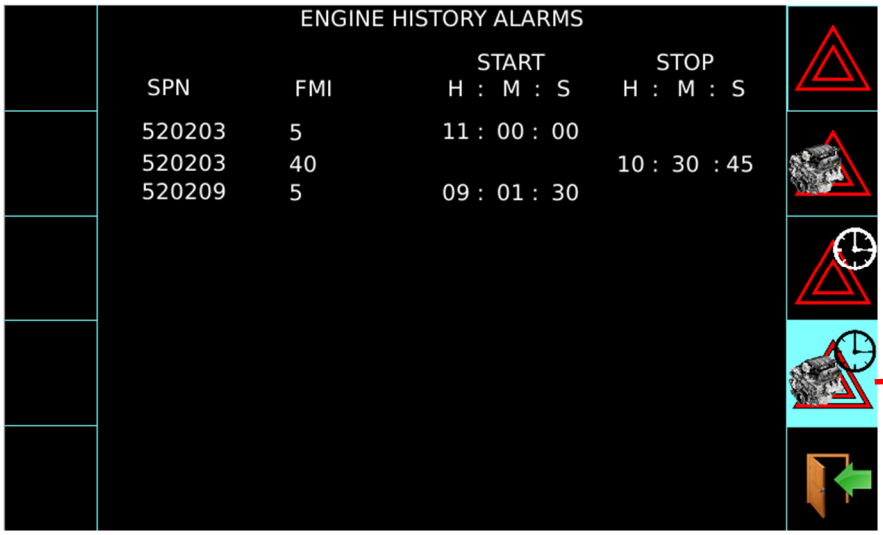
Displays a list of errors reported by the machine.

Even in this case, each of the errors is highlighted by a code SPN and the IMF description of the same while, in the right column of the list, is given the start time and end error signaling.

ATTENTION
The machine alarm history will be erased every time you turn off the machine.
Historical alarms relate to a single power-on/off phase of the machine.

INFORMATION
An attachment to this manual is a list of all the SPN and FMI codes of the machine (see manual attachment).

- *Historic Engine Alarm*



Displays a list of errors reported by the diesel engine of the machine.

Each error is highlighted by the IMF SPN code and description of the same and, in the right of the column shows the start and end of an error message.

INFORMATION

The manual of the diesel engine is attached to this manual, where you can consult the list of all its SPN and FMI codes.

5.6 MACHINE STARTING

ATTENTION: Before starting the work and turn on the diesel engine, check that the key off the battery is inserted and turned to the ON position (Tav.4 pos.1).

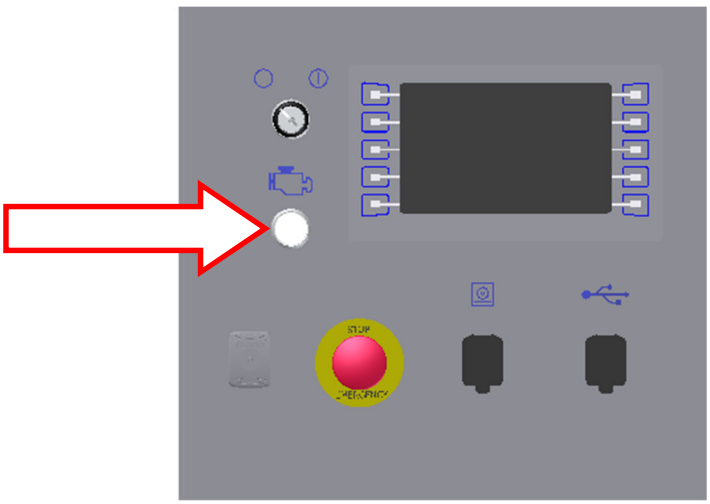
a. Turn the key consensus starter machine positioned on the panel of the power unit. (tab.8 pos.2)
b. Operate from the remote control of the machine (tab. 3).

In the 7 " screen of the remote control, you see the loading and setting of the list of controlled parameters for the maintenance of the machine.

The screen shown here to the side, alerts the operator of the need to perform performing maintenance and control.

In the screen “extraordinary settings“, it is possible to see which control will be needed

c. Connect the machine radio control as described in chapter 5.4.
d. Position centrally the control lever of the variable displacement pump located on the remote control (tab. 9, pos.2 e 8).
e. Via the switch on the panel, turn on the diesel engine.

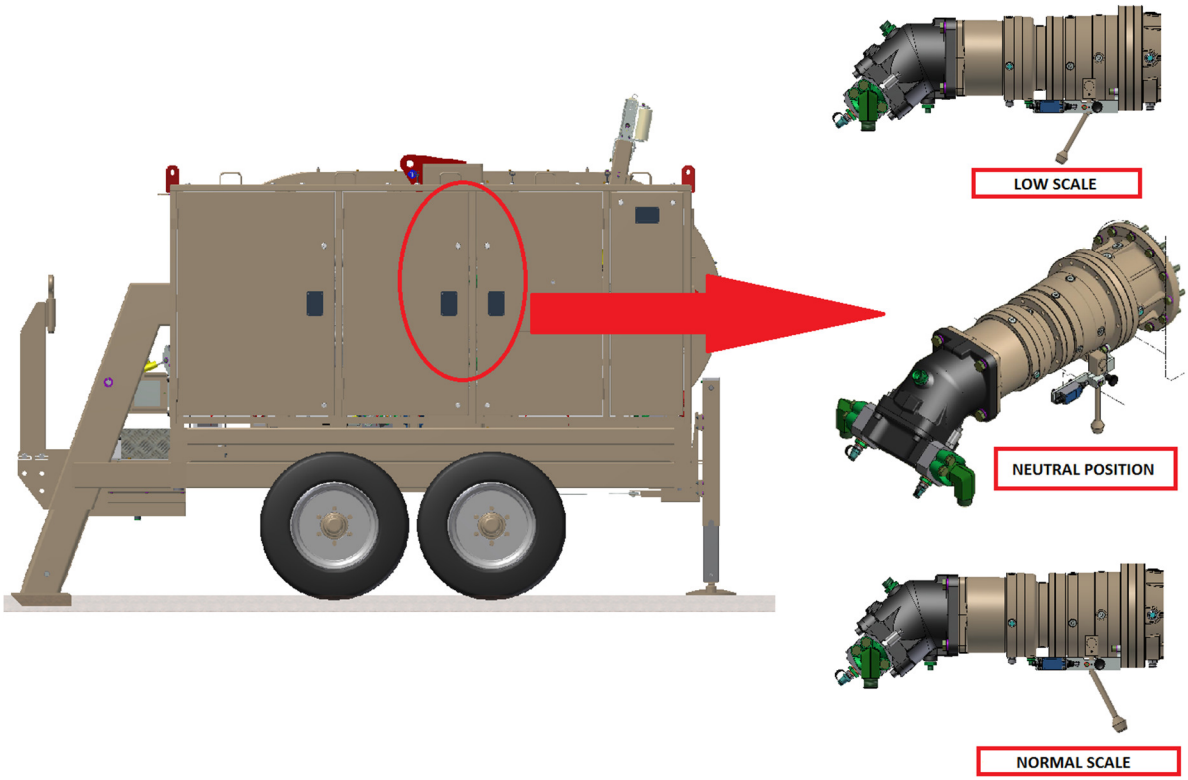


f. Through the dedicated button, select the operating mode in which you want to use the machine (PULLER or TENSIONER).

This button displays the appropriate scale on the virtual dynamometer, depending on the chosen configuration.

Refer to the symbolist specified in chapter 5.5.1.

g. Only for the first circuit, if necessary set the gear lever on the machine gear box, depending on whether you want to work with the normal scaling dynamometer (0 a 50 KN) or if you want to use a FINE scaling (0 to 17 KN).



ATTENTION: Never change the position of the shift lever without first discharging the line pull, in order to avoid the loss of the rope / conductor.

h. Choose machine usage configuration: Fully independent circuits, electronically connected circuits or coupled circuits. (see chapter 5.5.2.3).

i. Check the machine parameters through the main work screen (see Working Menu par.5.5.2)

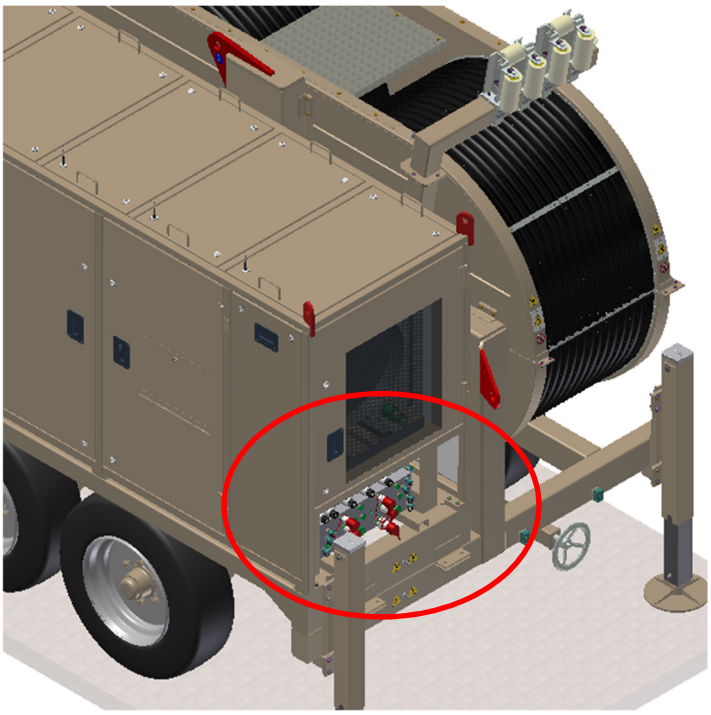
ATTENTION: During the sequence of cold start leave turn the vacuum machine for about 10 minutes.

ATTENTION: In case of cold starts, after having pre-heated the hydraulic oil as described above, the start of stringing operations for limiting at least the first 15 minutes the maximum performance of work (not exceed 30% of the maximum speed of recovery).

5.1 CONNECTION MACHINE - HYDRAULIC HEAD OR REEL WINDER

Machine can feed 2 reel elevators with hydraulic head or 2 reel winders made by Tesmec, both functioning as tensioner and puller.
Each hydraulic head (or each reel winder) has a connecting kit consisting of two pipes.
Each of these pipes has to be connected to the proper rapid coupler making care to connect them properly (otherwise the installation will not work).

Connect the hoses of the reel elevators to the rapid couplers (tav. 7).



ATTENZION: it is important that, before connecting the rapid couplers, the operator has checked their cleanliness as the introduction of dirt into the hydraulic circuit can create very serious damages.

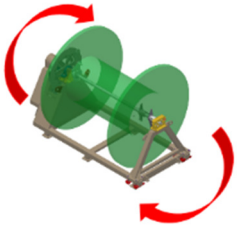
ATTENZION: The rapid couplers must be connected before putting the circuit under pressure.

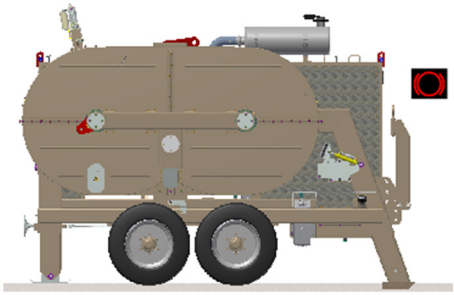
5.2 ROPE OR CONDUCTOR MACHINE CHARGING

In the wire and conductor charging phases on the machine, they can be used two special commands, which I allow the operator to separately manage the movement of the bull-wheels or connected to the machine reel elevators.

➔ **on radio control button to move the reel elevator.**

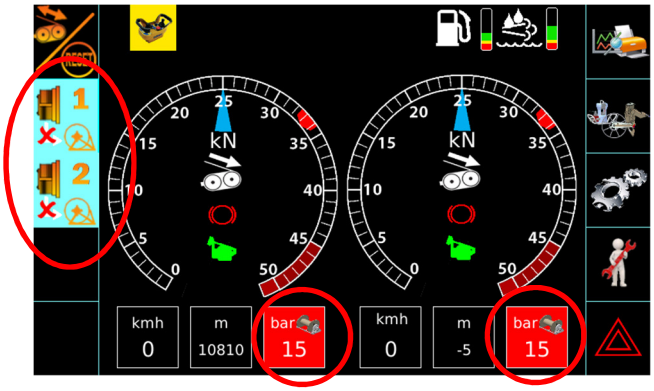
This button allows the operator to rotate the gantry holding closed the negative brake circuit of the bull-wheels.

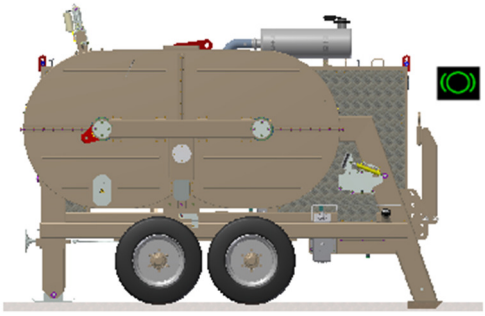




➔ **on-screen button to move only the bull-wheels circuit.**

In this configuration, you can move the bull-wheels excluding the reel elevators circuit.



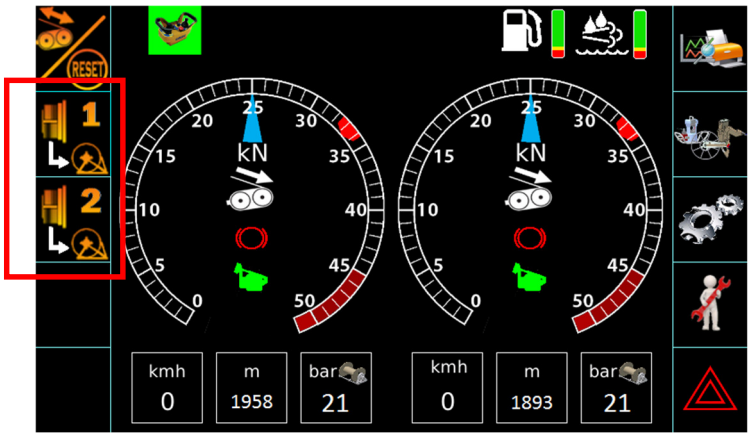


ATTENTION: This function should only be used during loading or separate stand management.
During the operations of tensioning and whenever the conductor and the cable is located on both the bull-wheels that on the stand, it is necessary to set the STRINGING mode.

5.3 MACHINE USE – INDIPENDENT BULL-WHEEL

The machine is fully automatic and is able to independently manage variations of load or speed of stringing, self-adjusting the number of revolutions of the engine, turning on and off of the radiator, the rotation speed of the reel elevators.

a. Select or control the reel elevator circuit management button. For stringing operations, it must be set to STRINGING.



b. Set the desired pull using the dedicated potentiometer, placed on the remote control. By turning the potentiometer, the red notch on virtual dynamometer, will move to the desired value. Simultaneously, it will display the same value on the remote control screen.

c. Adjust the pull on the branch of wire and / or wire rope to the reel elevator by adjusting the dedicated commands to and read the pressure on the main work screen.

The pressure value is approximately 50 bar when the reel has few turns of rope and wrapped
with the increase of the number of the windings of the rope on the reel, the pressure must increase up to a maximum value of 80-100 bar. For the maneuver release the pressure should be 40 bar

d. Between the dedicate switch, release the conductor on the bull-wheel opening the rope clamp.

e. Gently move the lever (tab. 9, pos.2 and pos.8) to the position  (down), the negative brake will open automatically.

The machine is ready for working and automatically start to recover if the pull in the rope is less than that of the puller or will begin to release braking if the kinks in the rope is greater than that of the puller. After setting the pull with dedicated potentiometer, the engine stops or starts independently following the movements of the machine antagonist.

ATTENTION: if the blue arrow reaches the red mark, if the machine working like a PULLER, the machine stops automatically.

f. To stop the rotation of the bull-wheels, gently bring the lever (table 9, pos. 5) in the center position. This operation has the negative brakes that cause the arrest of the bull-wheels.

NOTE: when situate the lever (tab. 9, pos.2 and pos.8) to center the negative brakes engage automatically.

ATTENTION: quickly move the lever (tab. 9, pos.2 and pos.8) from the working position to the central position of the neutral it is harmful to the risks of negative brakes that have to endure at the time of their intervention to heavy load.

g. For the release of the rope lead position  (up) the command lever (tab. 9, pos.2 and pos.8).

5.4 MACHINE USE – ELECTRONIC CONNECTION WITH INDIPENDENT BULL-WHEEL

The electronic connection allow to connect electronically circuit 1 and circuit 2 and the operator have the possibility to control both circuit with the one series of controls.
It's possible active the electronic connection between the switch [1<2] on the radio remote control. In this configuration, it's possible active the electronic synchronize: this system allows you to automatically align the speeds of both circuits so that you can have the conductor or ropes at the same height during the stringing operations.

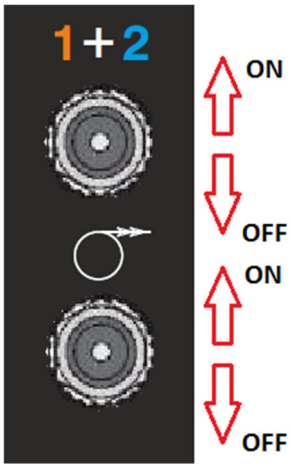
To active the electronic connection and use the machine in this configuration, follow the step below:

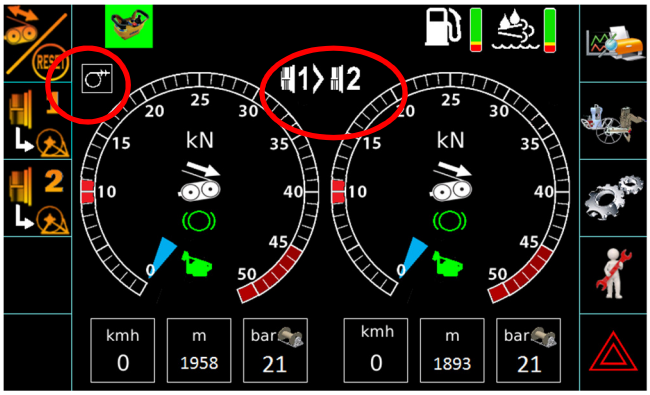
1- To use the electronic connection, it's necessary to have the bull-wheel circuit in independent configuration:

2- To active the electronic connection, switch ON the switch on the radio remote control.

Electronic Connection

Synchronize





On the main work screen, the corresponding symbol will be displayed if it activates the electronic connection and electronic synchronization.

NOTE: Electronic synchronization can only be activated when the electronic connection is active.

3- When the electronic connection is active, the remote commands will be distributed as follows (with reference to Table 9):

RADIO REMOTE CONTROL USE IN ELECTRONIC CONNECTION

	Circuits control 1	***Circuits control 2***
Pos.1 e 8 – Recovery / Release	Inactive	Active Move Circuits 1+2
Pos.3 e 10 – Pulling setting potentiometer	Inactive	Active Move Circuits 1+2
Pos.4 e 9 –Pressure control on reel winder	Active Only for circuit 1	Active Only for circuit 2
Pos.5 e 12 – Rope clamp control	Inactive	Active Move Circuits 1+2

4- To use the machine in electronic connection, follow the same steps as in chapter 5.9.

Manual Synchronization: When the electronic connection is active but no synchronization is inactive, the operator can make a manual adjustment of the pull value set on circuit 1.

Through the circuit potentiometer 2 (pos.9 p.9) it is possible to set the pull force value on both circuits, while with the circuit potentiometer 1 (pos.3 p.9) you can make a small adjustment on the force value of the same circuit.

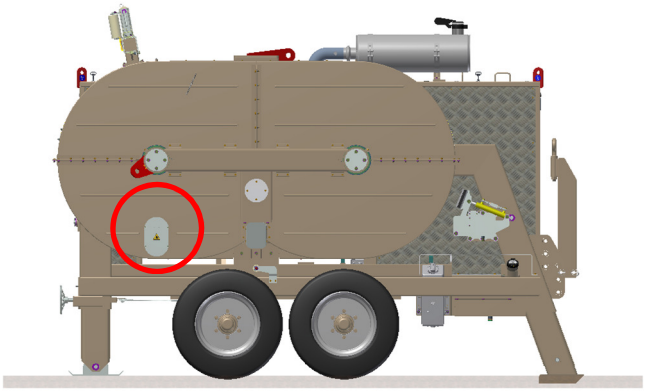
In this way, the operator can manually adjust the height of the conductors or rope, according to the line and the various stretching operations that are being carried out.

If you are operating through the controls placed on the panel, then without the radio remote control connected to the machine (see chapter 5.5.2.4), the buttons for activating the electronic connection and synchronization will be displayed on the "machine work configuration choice" screen (see chapter 5.5.2.3).

5.5 MACHINE USE – MECHANICAL CONNECTION BULL-WHEEL

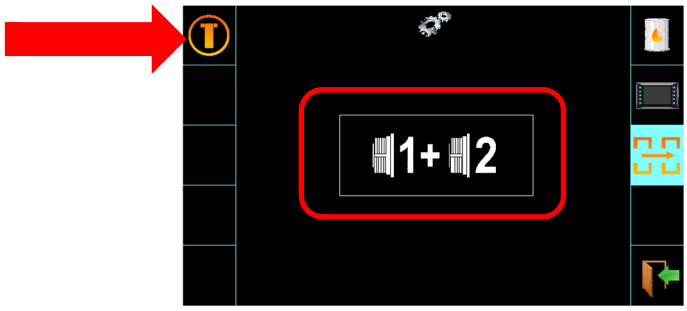
In this configuration, the machine hydraulically connects Circuit 1 to Circuit 2 so that the performance of the individual circuits can be combined to reach a maximum tensioning force of 100 KN (50 kN + 50 kN).

ATTENZION:
To use the machine in hydraulic connection it is mandatory to insert the mechanical connection pin into the bull wheel to mechanically connect the two independent circuits.

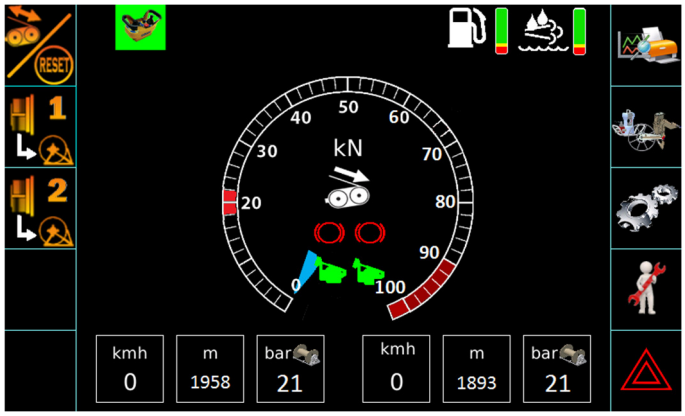


To active the hydraulic and mechanical connection and use the machine in this configuration, follow these steps:

1- To activate the connection, press the dedicated button on the "Machine Work Configuration Selection" screen (cap.5.5.2.3)



2- The main work screen will be changed automatically and a single maximum force scale of 100 kN will appear automatically.
It will be visualized two value pressure of the reel winder, in case if necessary use the reel winder circuit 1 or 2.



3- When the hydraulic and mechanical connection is active, the radio control commands will be distributed as follows (with reference to Table 9):

RADIO REMOTE CONTROL USE IN MECHANICAL CONNECTION

	Comandi circuito 1	*Comandi Circuito 2*
Pos.1 e 8 – Recovery / Release	Inactive	Active Move Circuits 1+2
Pos.3 e 10 – Pulling setting potentiometer	Inactive	Active Move Circuits 1+2
Pos.4 e 9 – Pressure control on reel winder	Active Only for circuit 1	Active Only for circuit 2
Pos.5 e 12 – Rope clamp control	Inactive	Active Move Circuits 1+2
Pos.14 – Electronic Connection switch	Inactive	Inactive
Pos.15 – Synchronization switch	Inactive	Inactive

5.6 POINTS TO REMEMBER

a. The pressure of the feeding circuit (see par.5.5.2.3) must be higher than 25 bar: otherwise, the stationary brakes will be damaged.
b. Adjust the pull of the reel elevators with hydraulic head at minimum indispensable value: otherwise, the hydraulic oil will be uselessly heated and dangerous counter pulls may arise.
c. Before beginning the works, check the levels.
d. Respect the temperature limits for the hydraulic oil as indicated at paragraph 3.10
e. After an emergency intervention of the negative safety brake, verify the condition of the brake discs (see paragraph 5.5.2.4).
f. It is strictly forbidden to wind on the bull-wheels ropes and/or conductors with a lower diameter in succession of ropes and conductors with a larger diameter.

5.7 END OPERATIONS

At the end of the operations to download the tension of the cables / conductors using the control lever (tab. 9, pos.2 and pos.8). Afterwards turn off the engine by turning the ignition key.

Using the dedicated button (Table 9, pos.5 and pos.12), actuate the rope lock to prevent the slider from the bull wheel when leaving the unused machine with a charged conductor.

Drain the tension on the rope section between the machine and the reel winder, using the dedicated button on the remote control (Table 9, pos.7 and pos.13).

Then switch off the engine by pressing the ignition button.

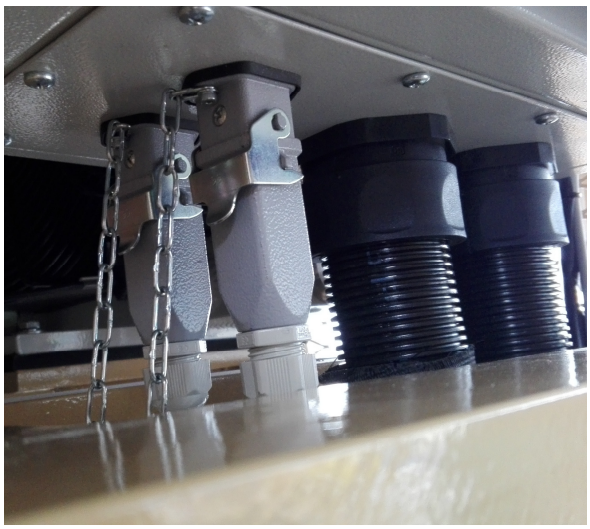
6. AVAILABLE DEVICES

The machine can be equipped with the following additional device:

6.1 MACHINE ELECTRONIC CONNECTION (ALL.089)

This device allows a single operator to control multiple "twin" machines (up to a maximum of 4 machines) simultaneously, synchronizing the stringing operations (as regards the main operating parameters).
Each machine must be equipped with this device with the possibility of working in different work configurations depending on the number of connected machines.

The machines must be connected through a special connecting cable; the un-used plugs on the first and on the last machine (right and left) must **always** be closed with the related caps.
To grant the continuous connection of the machines, a special protection device must be provided for the connection cables, to avoid accidental disconnection of the communication between the machines.



WARNING
Connect the connection cables before switching on and using connected machines. The cables must be connected when the machine have DIESEL OFF.

WARNING
If the operator disconnect the machine connection cables, during operation, you will have the immediate emergency stop of all connected machines.

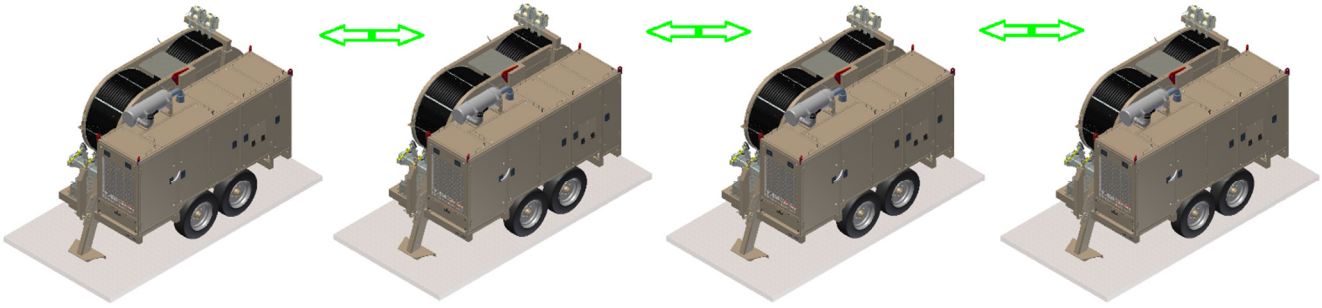
WARNING
Before using the machines connected to each other, make sure that the fine braking gear configuration is HIGH-PULL in each machine.

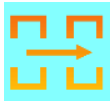
6.1.1 MACHINES SET-UP

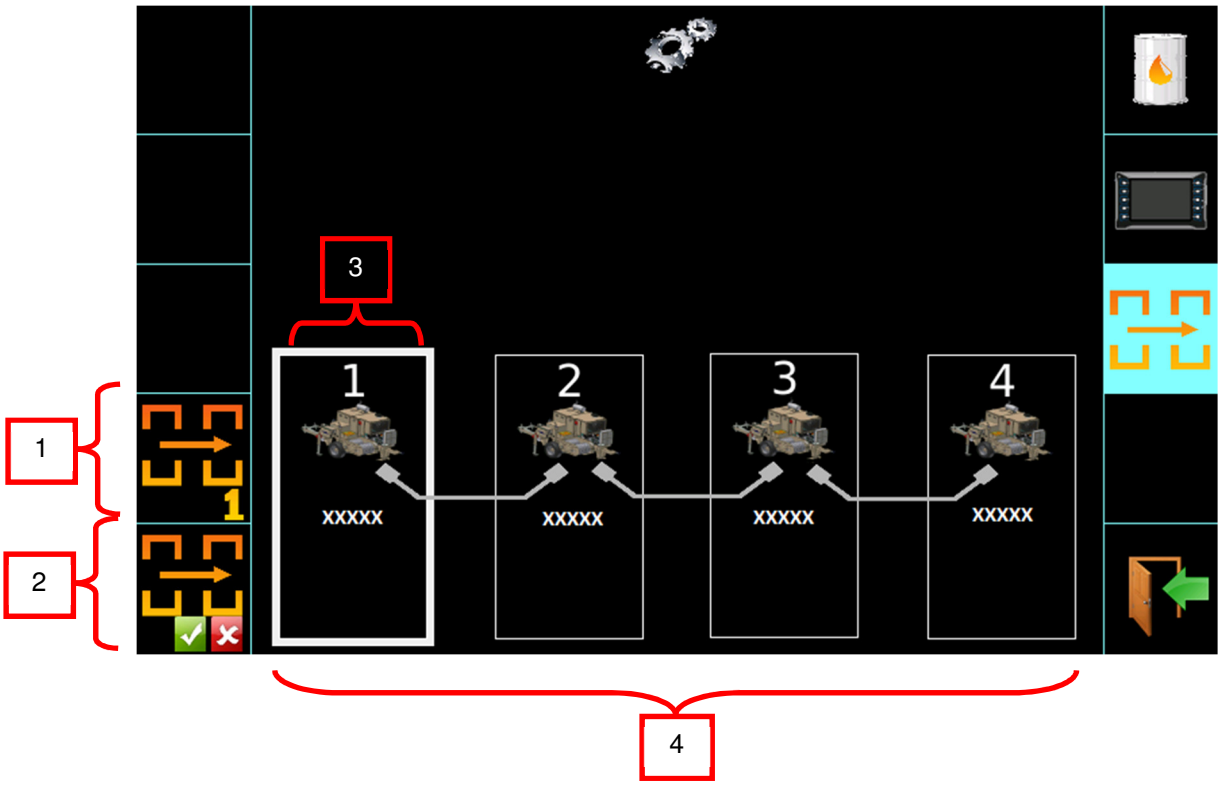
Before use, the machines must be set up to be used in connection by assigning the correct identification numbers.

When machines are connected, the machine with the highest reference number is the MASTER machine, while the lower number machines are all SLAVE machines.

Through the MASTER machine it is possible to move and control all other machines.



The setting of the single machine is carried out on the relevant control panel in the "Machine settings" menu  in the "Machine work configuration" sub-menu  , by default the "machine 1" number is highlighted



1- Button to choose the number machine;

2- Button to activate the connection (it allowed to pass the commands between machine SLAVE with lower N° to the machine MASTER with higher number);

3- Display of the status check of the single machine (the box of the machine on which it is working is highlighted);

4- Allow to check the status of the single machine:
GREY connection cable = machine NOT connected
GREEM connection cable = machine CONNECTED
xxxxx = machine serial number

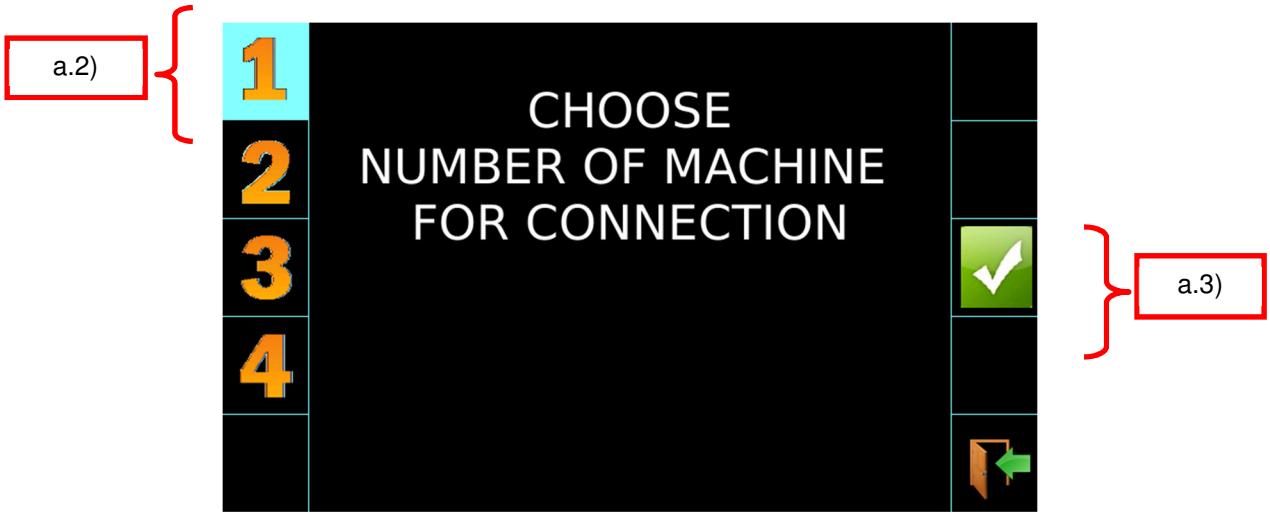
Carry out the following procedure, on the panel of each machine, in the order indicated starting from the machine with the lowest number "N ° 1 - SLAVE" up to the machine with the highest number "N ° 4 - MASTER" (depending on the number of machines to be connected):

a) MACHINE NUBER setting

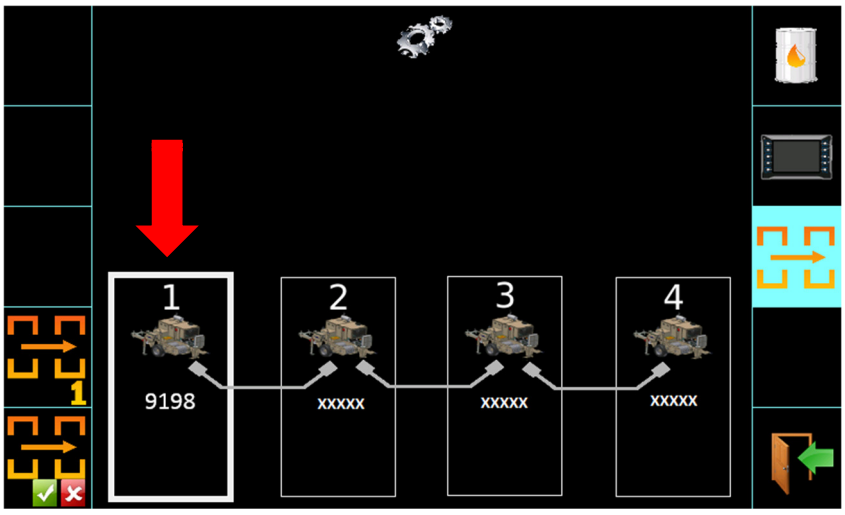
a.1) Push button "**1**", and will open the follow screen;

a.2) set the machine number by the relative button;

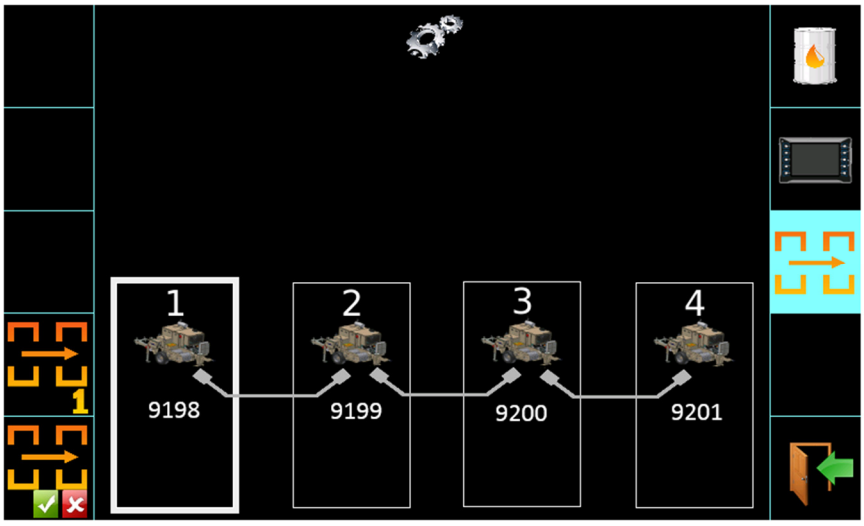
a.3) Confirm with the relative button;



a.4) In the following screen, the box of the machine in question is highlighted display of the serial number;



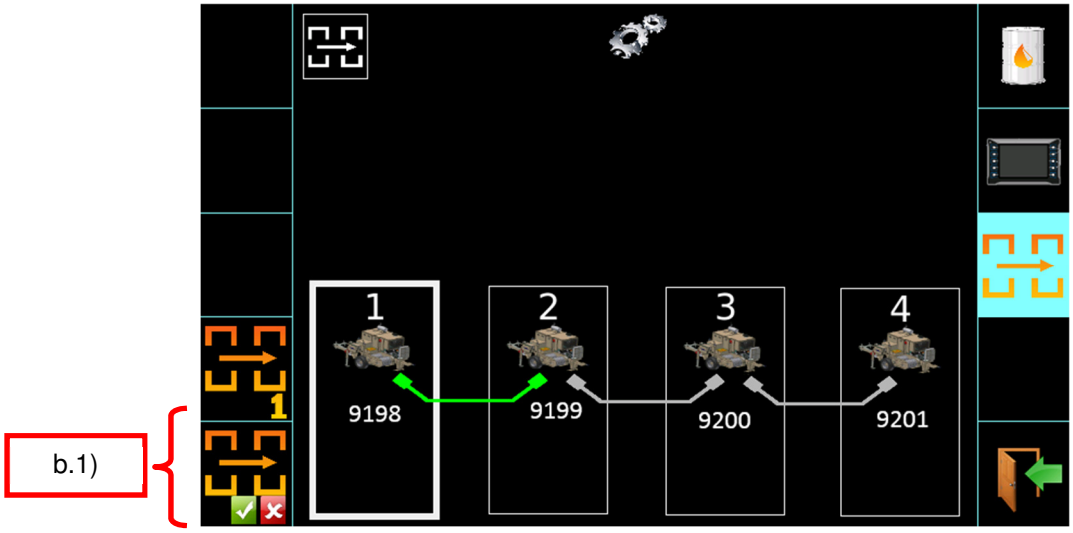
a.5) Repeat the procedure described above on the panel of each machine supplied, you will have the following screen configuration;



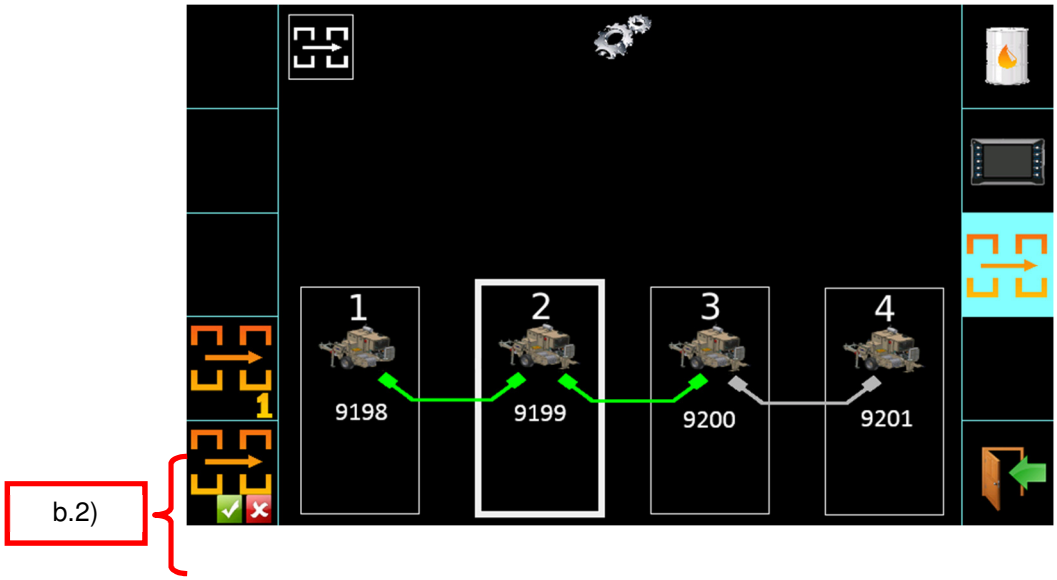
b) MACHINE electronic connection

Once the machine number has been defined on the control panel of each machine it is necessary to connect the machines to each other, following the procedure for a maximum of four machines:

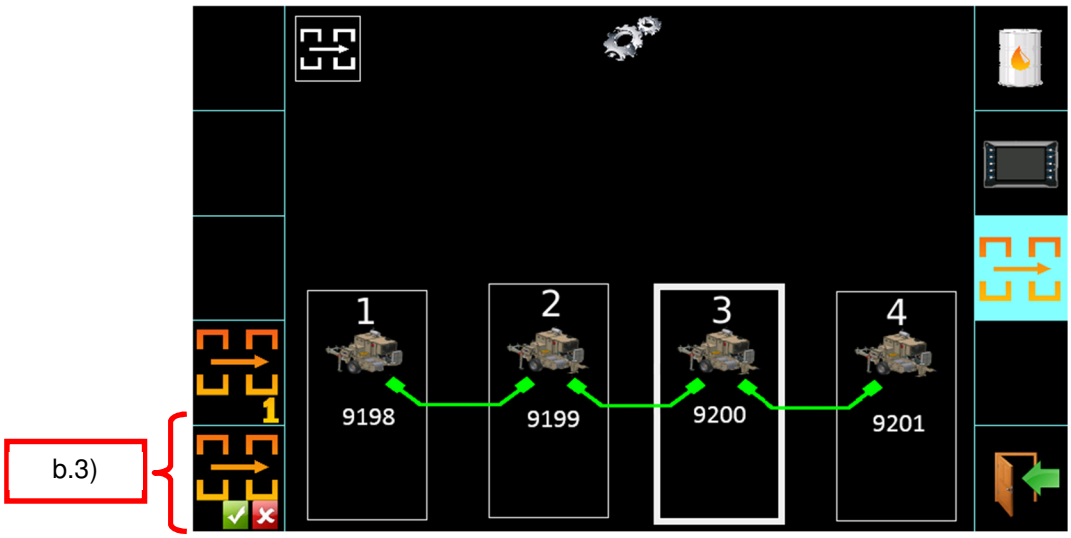
b.1) On the panel of the machine N°1 – SLAVE, push the relative button, to connect the nearby in machine N°2 – SLAVE



b.2) On the panel of the machine N°2 – SLAVE, push the relative button, to connect the nearby in machine N°3 – SLAVE



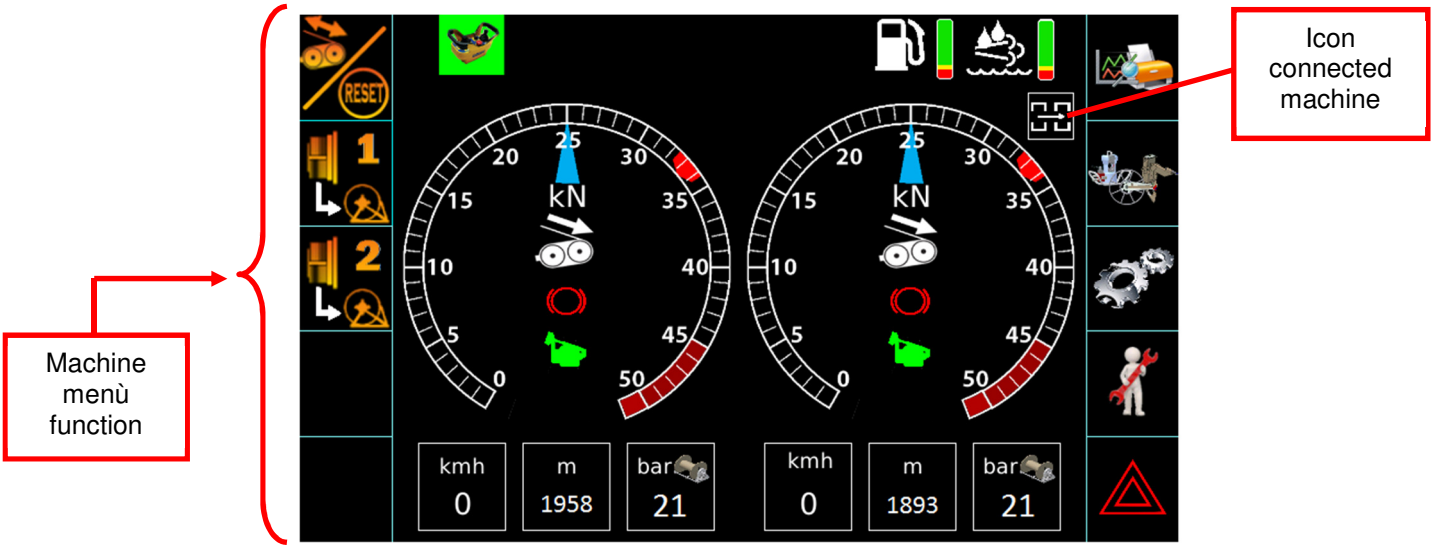
b.3) On the panel of the machine N°3 – SLAVE, push the relative button, to connect the nearby in machine N°4 – SLAVE;



Is not necessary to make the above procedure for the MASTER machine.

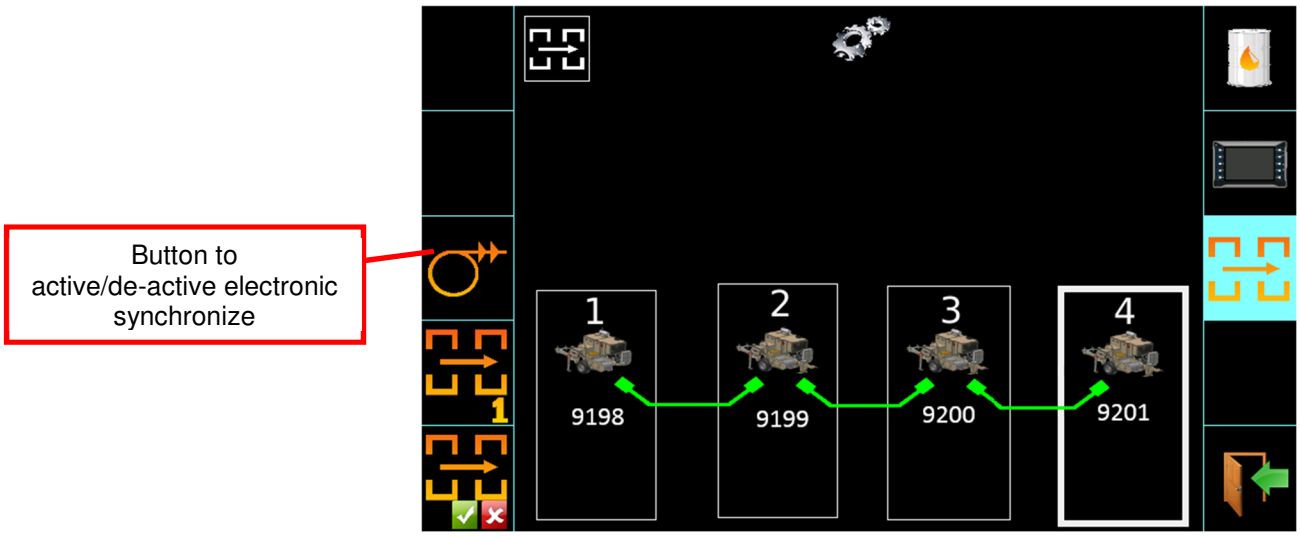
At every connection, the icon of successful connection will appear on the control panel  of the single machine and the connection cable will turn green.

The connection icon also appears in all "machine function menus" of SLAVE machines:



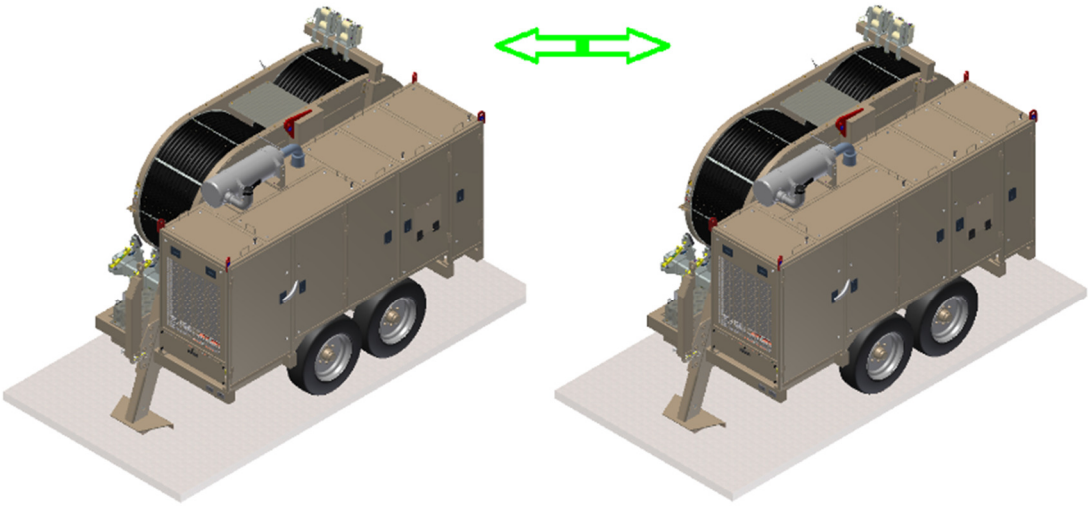
With the machines connected to each other, the controls of the SLAVE machines pass to the MASTER machine and can be moved simultaneously, using the radio control of the MASTER machine or, in the case of disconnected or emergency radio control, they can be moved from the control panel, again of the MASTER machine.

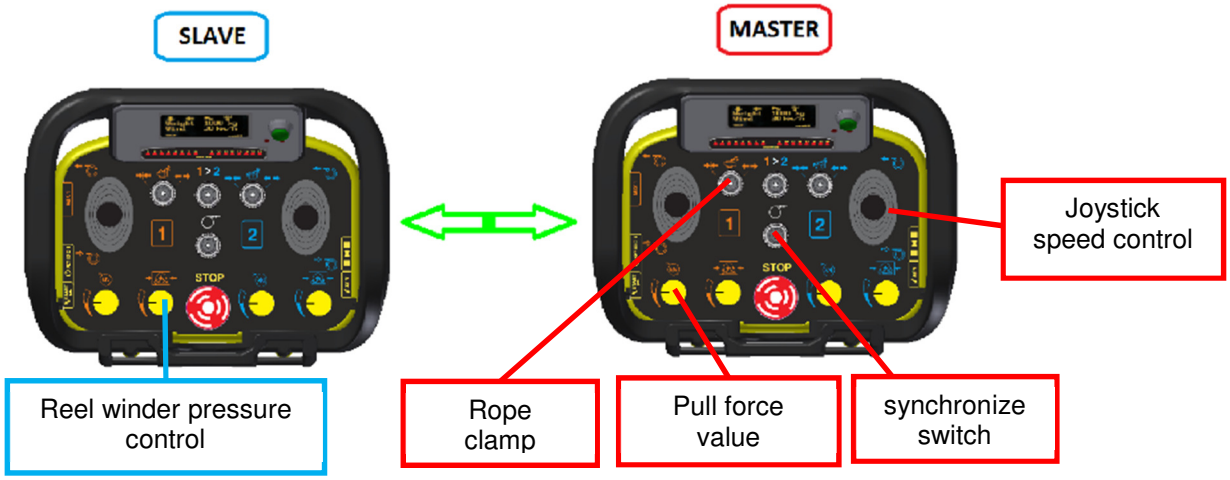
In the case of a disconnected or emergency radio remote control, the electronic synchronization activation button will be displayed in the "Machine work configuration" sub-menu screen (see cap. 6.1.3).



6.1.2 COMMAND "CONNECTED MACHINE"

In the following pages there are the possible commands that can be made with the machines in electronic connection:





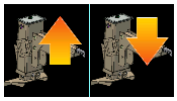
When using connected machines, the following controls effect on all machines when operated from the **MASTER machine**:

- Speed control (with relative Joystick);
- Pull-adjusting control (with relative potentiometer);
- Rope-clamp selector (with relative switch);
- Active / de-active electronic synchronize (with relative switch) - (see Cap.6.1.3).

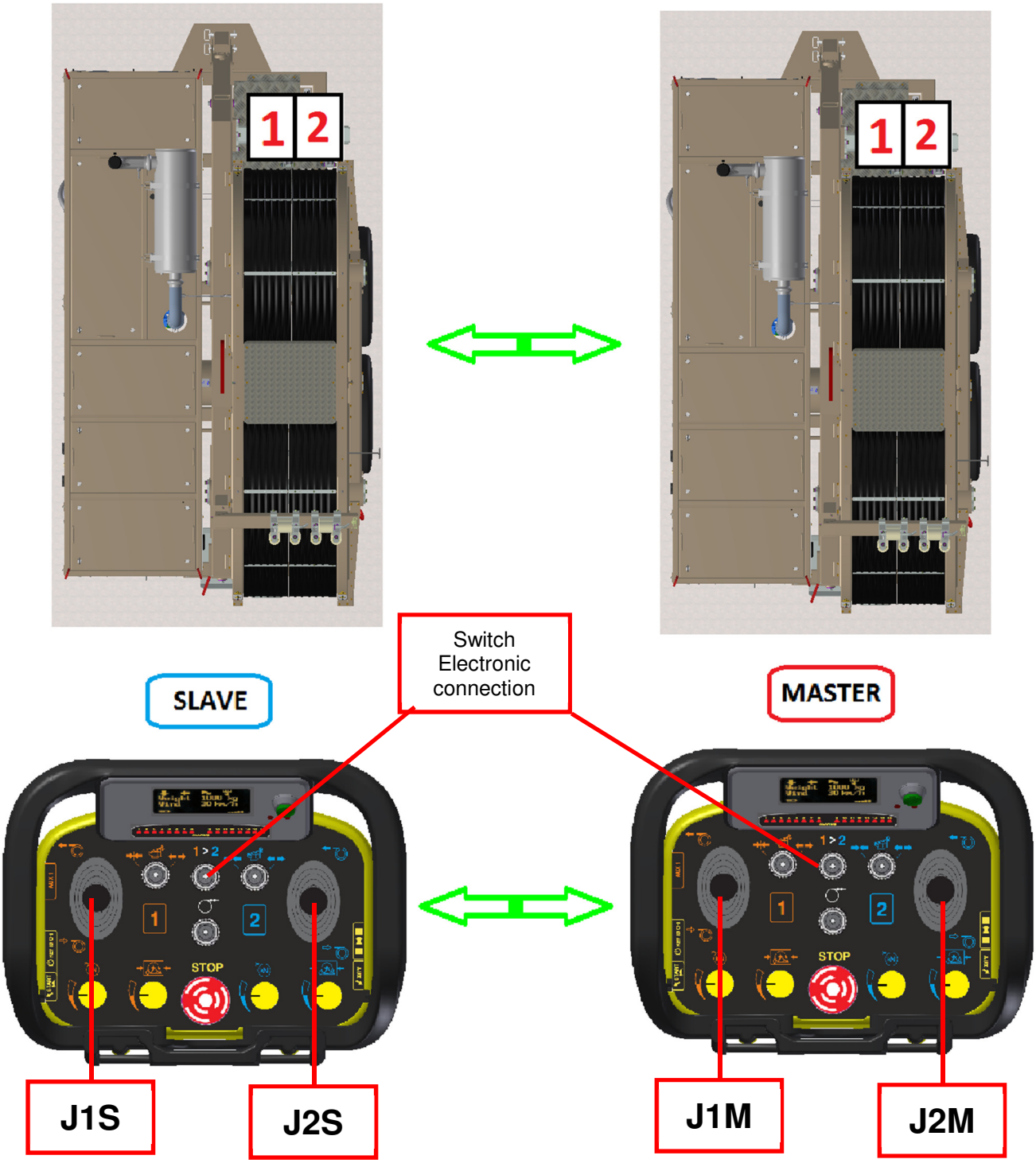
While the following commands / settings must be performed on each individual **SLAVE machine:**

- Reel-winder working pressure (with relative potentiometer);
- Reset of meter counter (with relative button on control panel - see cap. 5.5.1); 

- Positioning the rear and back plug (with relative button on control panel - see cap. 5.5.2.2.);



Depending on the working configuration of the individual machines (see chapter 5.5.2.3), the following commands can be executed:



LEGENDA:

J = Joystick
1 = Circuit 1
2 = Circuit 2
S = machine SLAVE
M = machine MASTER
= command activated
= command de-activated

* = with machine in TENSIONER configuration it's possible to control the "force value"
with the machine in PULLER configuration it's possible to control the "speed recover"

MACHINE IN INDIPENDENT CIRCUIT CONFIGURATION					
STATUS SWITCH ON SLAVE (S) MACHINE		STATUS SWITCH ON MASTER (M) MACHINE		COMAND	CIRCUIT MOVEMENT
	+		+	J2M	2M
				J1M	1M + 2S
				J2S*	/
				J1S	1S
	+		+	J2M	2M+1M+2S
				J1M*	/
				J2S*	/
				J1S	1S
	+		+	J2M	2M+1M+2S+1S
				J1M*	/
				J2S*	/
				J1S*	/
	+		+	J2M	2M
				J1M	1M+2S+1S
				J2S*	/
				J1S*	/

MACHINE IN MECHANICAL CONNECTION BULL-WHEEL					
STATUS SWITCH ON SLAVE (S) MACHINE		STATUS SWITCH ON MASTER (M) MACHINE		COMAND	CIRCUIT MOVEMENT
	+		+	J2M	2M+1M+2S+1S
				J1M*	/
				J2S*	/
				J1S*	/

In the machine work configuration with "independent circuits" and "dependent circuits" the following commands can be use:

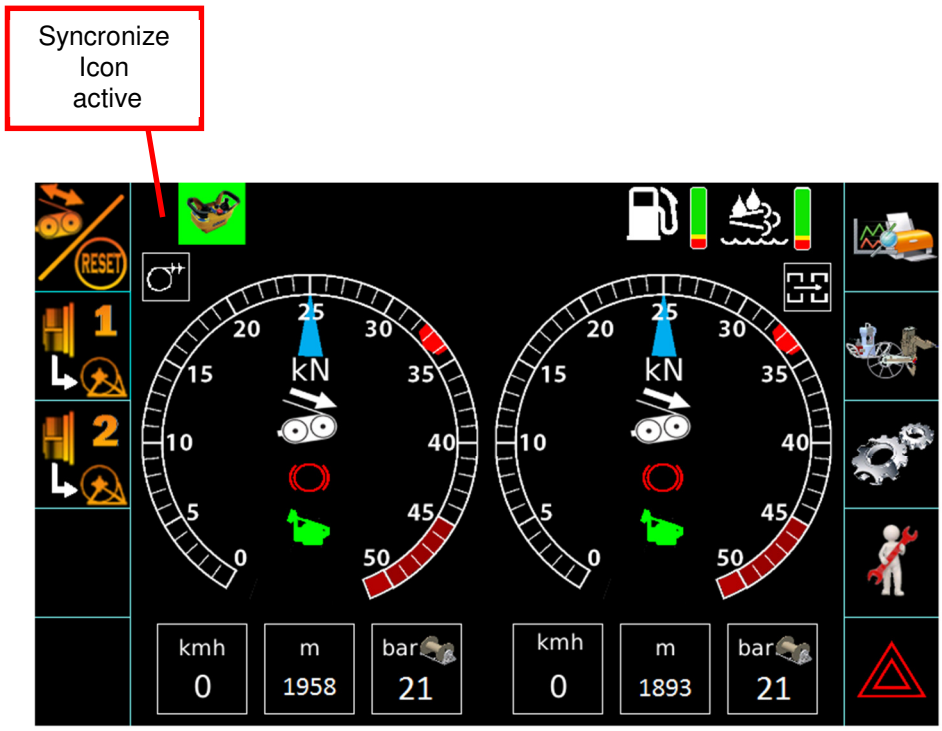
- Active the synchronizer with the relative switch on the radio remote control on the MASTER machine;
- temporarily interrupt the radio control of the SLAVE or MASTER machine (see cap. 6.1.3)

6.1.3 ELECTRONIC SYNCRONIZE

The activation of the **electronic synchronism** allows to automatically equalize the speeds of all the circuits connected to each other with machines in working configuration "PULLER" or "TENSIONER", in order to have the conductors or ropes at the same height, during operations of stringing.

The electronic synchronize operation can be activated only after the electronic connection of the machines (see chapter 6.1.1).

When the electronic synchronize operation is activated (by means of the relative switch on the radio control of the MASTER machine - see chapter 6.1.2), the relative icon will appear in all the "machine functions menu" of the connected machines:



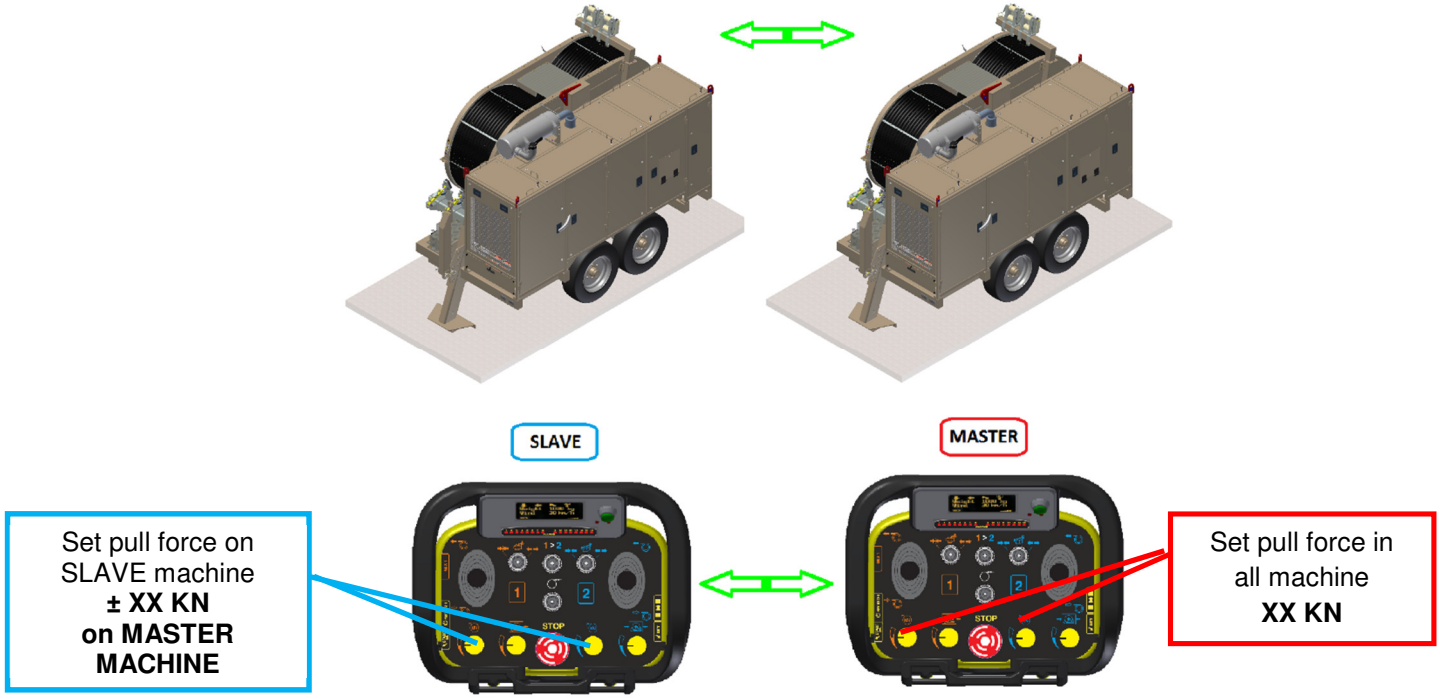
When electronic connection is active but automatic electronic synchronization (OFF switch sync) is disabled, manual adjustment can be made on the pull-force value or the recovery speed of the individual SLAVE machines, depending on the settings set on the MASTER machine.

This system can be used in two different situations

- **Machine in "TENSIONER" configuration:**

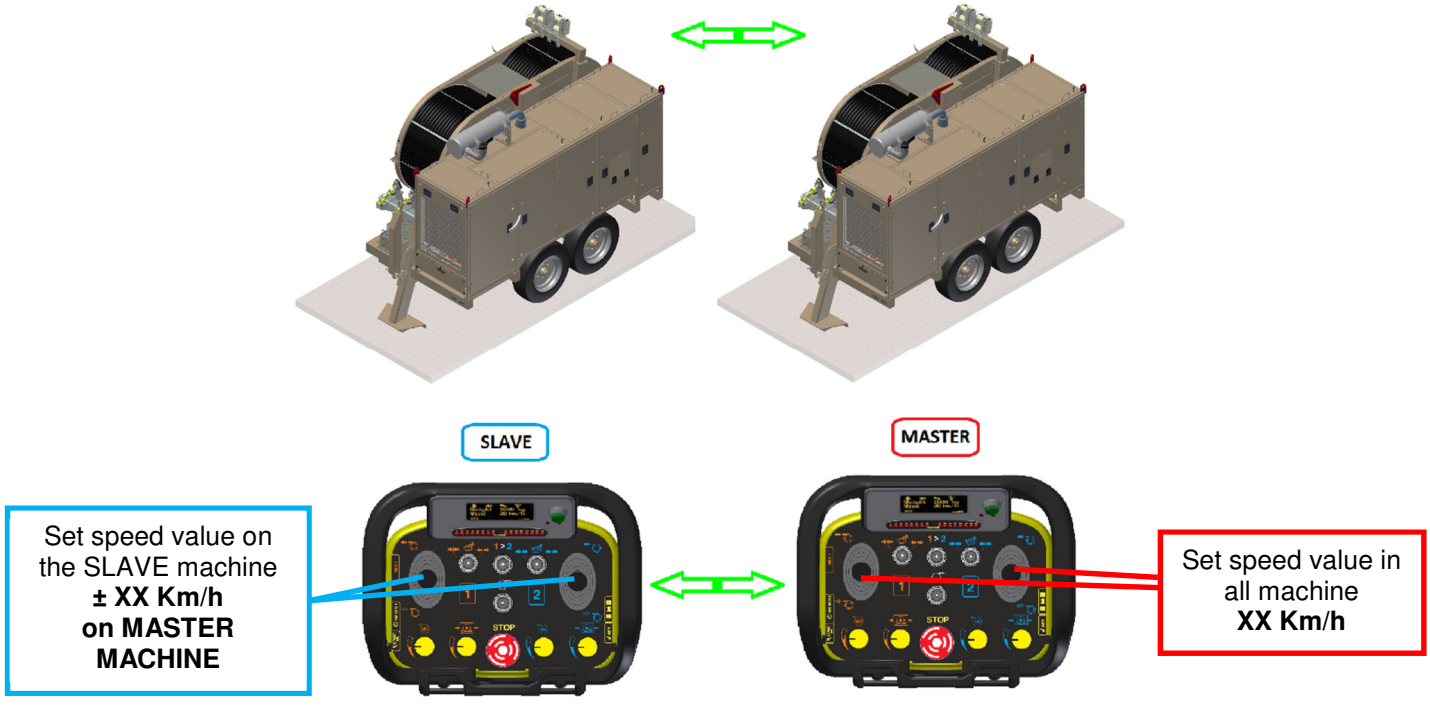
Between the MASTER machine pull potentiometer, it's possible to set the pull-force value on all machines, while through the SLAVE drive remote control potentiometer, it's possible to make a small adjustment on the value of the single circuit, depending on the value set on the master.

In this way, the operator can manually adjust the height of the wire or wire according to the line and the various stretching operations that are being carried out



- **Machine in "PULLER" configuration:**

With the joystick of the MASTER machine it is possible to set the recovery speed on all machines, while via the joystick of the SLAVE machines, it's possible to make a small adjustment on the recovery speed of the single circuit, depending on the value set on the master.
In this way, the operator can manually adjust the height of the wire or wire according to the line and the various stretching operations that are being carried out.

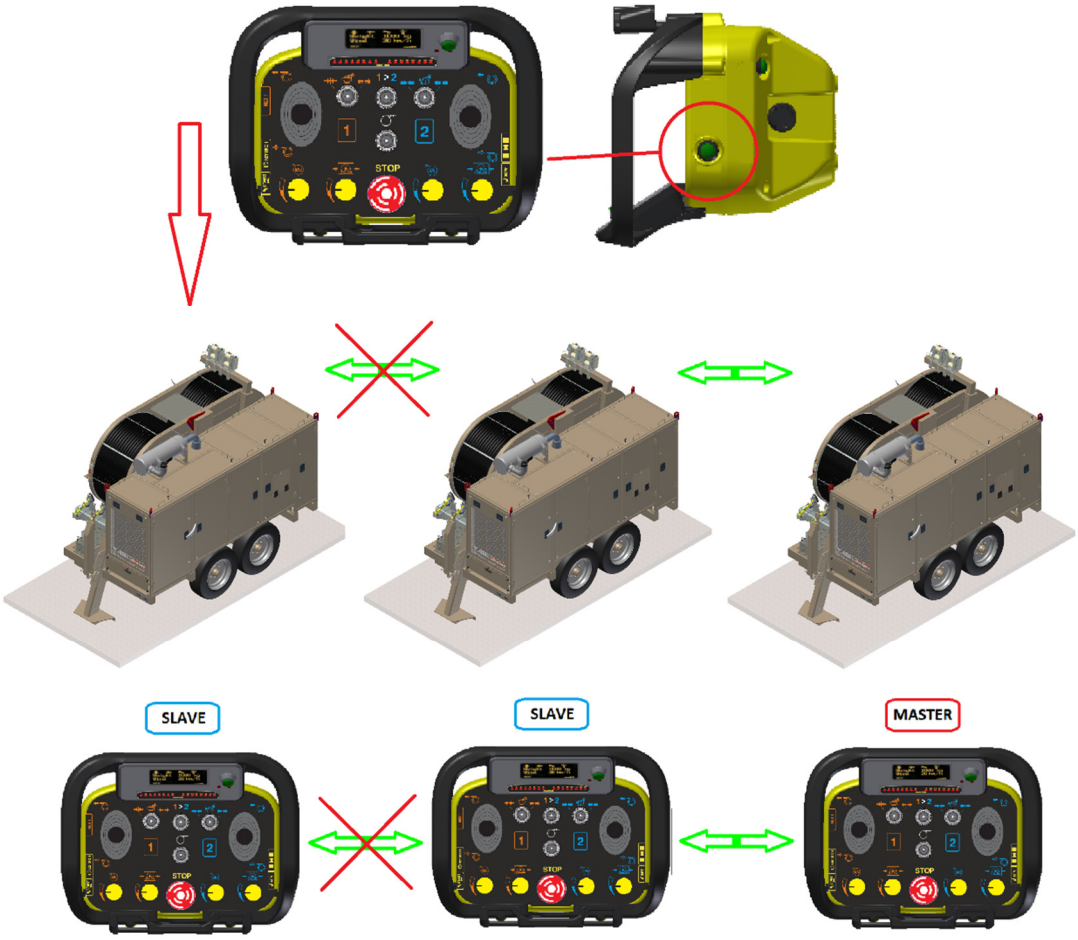


6.1.4 TEMPORARY DISCONNECTION WITH ELECTRONIC CONNECTION

When the machines are electronically connected, the operator can temporarily disconnect one or more machines from the other.

This feature is only available when all connected machines are stop and not working (the MASTER machine joystick in the center).

This function is activated by the button located on the side of each radio control: Holding this button, the operator can disconnect the single radio control, temporarily resuming all the controls on the single machine.



WARNING
Press and hold the button to activate the temporary machine disconnection function. As soon as the button is released, the single machine will reconnect to the other.

WARNING
Fino a quando sarà premuto il tasto di disconnessione sulla singola macchina, non sarà possibile riprendere le normali operazioni di tesatura.
Until the button is hold engage on the single machine, it will be impossible to re-start normaly stringing operation on the other machines.

6.1.5 CONDITIONS OF ALARM WITH CONNECTED MACHINES

The following conditions may occur, on one or more connected machines, which generate an alarm with consequent stoppage of the stringing operations and the stop of the diesel engine of all the machines

- Pressing the emergency stop on the panel in one of the connected machines;
- Disconnected cables between machines (ex. loose plugs, accidental cutting of a cable, ...);

To restore the operation of the machines, proceed as follows depending on the cause that generated the alarm:

STOP IN EMERGENCY

1) Resolve the cause of the emergency;
2) Position the joystick of the radio control of the MASTER machine in the central position;
3) Restore the emergency button of the machine in alarm;
4) Re-ignite the diesel engines of the individual machines;

CAN-BUS DISCONNECTION BETWEEN MACHINES

1) Restore the connection;
2) Position the joystick of the radio control of the MASTER machine in the central position;

WARNING
Disconnecting the connection cable is equal to pressing the emergency button. When disconnecting the cable, all diesel engines of the connected machines will immediately turn off.

7. SAFETY CONDITIONS

7.1 SAFETY DEVICES

Machine has been equipped with the following safety devices:

1. load-limiting device with automatically stop of the engine once the max. pre-set load value has been exceeded
2. mechanical negative safety brake for movement stop in case of lack of hydraulic pressure
3. timing case and protections on moving parts, where technologically possible.

DANGER: it is absolutely forbidden the use of the machine without protecting timing cases or with damaged/disconnected safety devices.

ATTENTION: after a serious emergency use of the negative safety brake, check the wear condition of the discs and the efficiency of the brake itself; if necessary, replace the brake discs before re-using the machine.

7.2 EMERGENCY STOP DEVICE

The machine is equipped with an emergency stop device (table 8, pos.4 and tav.9 pos.1) that directly acts on the Diesel engine, on the electrical box on the machine or on the radio remote control.

The power generator locking causes the intervention of the negative safety brakes and, consequently, the complete machine stop.

Each situation of danger or alarm is signaled on the main display screen. In case of alarm situations, also it triggers an emergency acoustic signaling.

In case this indication appears, see the alarm list in the dedicated menu

THE MACHINE NOT TURNS OFF

In case this indication appears, see the alarm list in the dedicated menu

THE MACHINE TURNS OFF

ATTENTION: In the event of Warning and Alarm, see alarm list attached to the book itself.

ATTENTION: use the emergency stop ONLY in dangerous situations for the safety of the operators.

NOTE: to re-enable the machine to the operation, you must unlock the emergency command with an intentional operation (rotate a quarter turn, in a clockwise direction, the button).

IT IS FORBIDDEN to use this device for the arrest of the normal work of the machine activities.

7.3 PERIODIC OPERATIONS

Daily, before starting the work, the operator **has** to verify the functionality of the machine safety devices.

ATTENTION: do not modify for any reason safety devices of the machine because the manufacturer declines any responsibility as consequence of the non-functioning of the same.

7.4 RESIDUAL RISKS

In the machine there are still the following residual risks:

1. **Sudden break of the rope.** The break of the rope causes sudden movements of the machine and of the rope or conductor connected to the machine.
   To reduce to min., the risks the operator has to:

⇒ check the rope and replace it as soon as appear some defects or wear signs
⇒ respect the working positions indicated in the manual.

2. **Sudden break of the anchoring stakes.** The sudden break of the anchoring stakes causes the machine instability and sudden movements of the same.
   To reduce to min., the risks the operator has to:

⇒ periodically check the anchoring stakes and replace them as soon as appear some defects or wear signs
⇒ follow the anchoring indications described in the present manual
⇒ respect the working positions indicated in the manual.

3. **Entangling or dragging of the accessible rotating units.** It is not technologically possible to foreseen covering in correspondence of some rotating units (i.e. winding of the rope or of the conductor on the bull-wheels or on the driving gears), due to an excessive restriction of the machine functionality and operative functions.
   To reduce to min., the risks the operator has to:

⇒ avoid any possible contact with the machine rotating units except for the control devices
⇒ follow the anchoring indications described in the present manual
⇒ respect the prescriptions indicated in the present manual concerning wearing and the necessary safety devices.

4. **Limbs crushing during loading or removal of the reel and during rope loading.**
   These operations have a large risk margin due to the use of mechanical parts to be moved.
   To reduce to min., the risks the operator has to:

⇒ know the directives for accident prevention and apply them.

5. **Electrostatic discharges.** The machine has not a proper grounding device for this reason during stringing operation it is possible to have dangerous electrostatics discharges on ropes and conductors.
   To reduce to min., the risks the operator has to:

⇒ know the directives for accident prevention and apply them
⇒ check if the job site has a suitable grounding device for the machine-rope-conductor's system.

6. **Inhalation of the endothermic engine exhausting gas.** The machine discharge exhausting gas of the endothermic engine combustion.
   To reduce to min., the risks the operator has to:

⇒ respect the working positions indicated in the manual
⇒ respect the indications of attention and prohibition indicated in the present manual
⇒ if necessary, use safety devices for the respiratory tracts.

7. **Lockable control lever in working position**. For functional reasons and convenience of use the control lever does not provide for the return to zero in the case of returning; The computer of the remote control is equipped with a setting screen control in case of an emergency situation. (see par.5.4.3.2) that allows you to assign some screen buttons, the functions usually assigned to the control lever).

8. MAINTENANCE

8.1 GENERAL PRESCRIPTIONS

ATTENTION: possible repairs not carried out by the manufacturer and not allowed by a written authorization relieve the manufacturer for any responsibility in case of accidents to persons or damages to things and/or to the machine, causing also the loss of warranty.

8.2 LEVELS CONTROL

For safety reasons, during the transport machine comes without hydraulic oil and fuel.
Fill the levels as per the following table:

	Quantity
Hydraulic oil level (table 5, pos. 6)	*220 l*
Engine oil level (see enclosed engine booklet)	
Reduction gear oil level (table 6, pos. 5)	*7.4 l*
Fuel level	*100 l*
Coupler level	*3.7 l*

ATTENTION: the non-respect of the correct levels causes serious damages to the installed components

DANGER: do not ingest hydraulic liquids, fuels and cooling liquids because injurious to health and potentially lethal.

8.3 TYRES INFLATION PRESSURE

Tires inflation pressure has to be 7 bars.

ATTENTION: the non-respect of tyres inflation pressure causes dangerous situations during transport operations.

8.4 SUGGESTED LUBRICANTS

The manufacturer tests the machine with the following oils and lubricants:

a. hydraulic circuit: AGIP OSO 46 (ISO HM 46)
b. mechanical reduction gear: AGIP BLASIA 220 (ISO CKC 220)
c. stationary brake reel winder: AGIP OSO 46 (ISO HM 46).

Possible different trademarks must be chosen based on the enclosed table "SUGGESTED LUBRICANTS".
It is possible to use different trademarks but with same characteristics and ISO specifications.
When using oil with characteristics and ISO specifications different from the ones declared during test, completely empty out the hydraulic circuit.

ATTENTION: the use of lubricants not in conformity with the technical specifications indicated in the present manual seriously damages the machine components and, consequently, the warranty conditions are not valid.

8.5 ENDOTHERMIC ENGINE MAINTENANCE

For the specific maintenance of the engine, see the enclosed use and maintenance booklet.
For filling the fuel, use the filling cap on the tank.
For filling the radiator liquid, use the filling cap on the radiator.

DANGER: to fill the fuel and the radiator liquid, turn off the engine; before carrying out any operation let the engine be cooled.

8.6 HYDRAULIC CIRCUIT MAINTENANCE

a. Change the hydraulic oil after 500 working hours and, thereafter, every 1500 hours (or in any case every year).
b. To discharge the exhaust hydraulic oil, use the suitable tap in the tank (tab.5, pos. 3).

DANGER: let the hydraulic oil be completely cooled before removing it and always use the suitable safety wears (gloves, etc.).

ATTENTION: the discharge of the exhaust oils has to be effectuated in conformity with the laws in force in the relevant country.

c. Fill the oil in the tank by means of the suitable filler (tab. 5, pos. 3).

ATTENTION: make maximum care when filling to make sure no foreign matter, which could cause irreparable damages to the circuit's components, enters along with the oil; if possible filter the oil with a 10 µm filter.

d. Replace the filter cartridge (table 5, pos. 2) after 500 working hours and, thereafter, every 1500 hours (or every year at least).
e. Daily check the clogging of the oil filters.
   If necessary, replace the cartridges taking care of the following filtering grade:

⇒ intake filters for overfeeding pump: 10 µ (nominal values)
⇒ intake services filter (plunged in the hydraulic oil tank): 90 µ (nominal values)

For further maintenance operations of installed hydraulic components (pumps and motors), refer to the enclosed documentation.

8.7 REDUCTION GEAR – STATIONARY BRAKES MAINTENANCE

a. Change the oil of the reduction gear, of the stationary brake of the reel winder and of the coupler after 50 working hours and, thereafter, every 500 hours (or every year at least).
b. To discharge the exhaust oil of the reduction gear and of the stationary brake, use the suitable caps on the lower part of the casing.

DANGER: let the hydraulic oil be completely cooled before removing it and always use the suitable safety wears (gloves, etc.).

ATTENTION: the discharge of the exhaust oils has to be effectuated in conformity with the laws in force in the relevant country.

c. Fill the oil of the reduction gear and of the stationary brake by means of the suitable caps on the upper part of the casing.

ATTENTION: make maximum care when filling to make sure no foreign matter, which could cause irreparable damages to the circuit's components, enters along with the oil.

For further maintenance operations of installed mechanic components (reduction gear, negative brakes), refer to the enclosed documentation.

8.8 RADIATORS' MAINTENANCE

At least once a year, or more in case of use in dusty places, is foreseen a blowhole with compressed air of the radiant mass of the radiators.

ATTENTION: in order to make this operation the one in charge of maintenance, besides wearing all the protection devices already shown in this manual, must also wear a device for protecting respiratory organs.

8.9 GREASING

Grease 2-3 times per day the crown gear of the bull-wheels using the suitable greaser .

Weekly grease all the other parts subjected to rotation or translation and that not foreseen a forced lubrication or an automatic greasing.

Use IP ATHESIA GR2 (ISO XBCEA 2) grease or equivalent of another trademark based on the enclosed "SUGGESTED LUBRICANTS" table.

8.10 OTHER PERIODIC OPERATIONS

When cleaning the machine, avoid direct jets of water or steam on the components of the electric system of the machine and on the control panel.

For the other periodic operations, refer to the summary table for the ordinary maintenance (see next paragraph).

8.11 SUMMARY TABLE FOR ORDINARY MAINTENANCE

In this card are listed main operation of periodic maintenance and relevant intervals.

Part	Object	Interval				
		Daily	50 h	250 h	500 h	1500 h
Diesel engine (***)	Engine oil	**CL**		**ST**		
	Oil filter			**ST**		
	Cooling liquid	**CL**				**ST**
	Air filter			**VF**		**ST**
	Fuel	**CL**				
	Fuel filter				**ST**	
	Radiator				**CN(*)**	
Hydraulic circuit	Hydraulic oil	**CL**			**ST1**	**ST(*)**
	Filter	**VF**			**ST1**	**ST(*)**
Reduction gear	Oil	**CL**		**ST1**	**ST(*)**	
Negative brake	Disc	**(**)**				
Bull-wheels greasing circuit	Gears	**GR**				
Front plow	Cylinder		**GR**			
Reel winder	Chain transmission		**GR**			
	Level winder screw	**GR**				
	Pawl		**VF**			
	Cylinder		**GR**			
Reel winder negative brake	Oil	**CL**	**ST1**		**ST(*)**	
	Disc	**(**)**				
Axle	Tires pressure		**VF**			
	Stationary brake		**GR**			

Legend:

CL Check the level (and possible filling up)

GR Grease

ST Replace

ST1 Replace (only for the first time)

VF Check

CN Clean

(*) Or in any case every year

(**) Check the discs wear condition after an emergency stop

(***) For further information see the engine booklet

9. HOW TO DISABLE THE MACHINE

9.1 TRANSPORT

Before transporting the machine, empty any liquid that can be set on fire contained in the machine (oils and fuels).

Transport must be effectuated as per the specifications described in chapter 3 (Transport and positioning instructions).

9.2 EXTENDED SERVICE STOP

When foreseeing an extended service stop (two months at least) protect the external parts with waterproof wax and empty the fuel tank.

During service stop, start the machine at least once every two months and let the machine idle for one hour at least, so that the oil enters in the hydraulic system and to prevent the gaskets drying.

We recommend stocking the machine under a roof; do not cover the machine with pieces of cloth and/or plastic materials that cause an excessive increase of the temperature and humidity.

If the machine does not work for a year or more, before re-starting the machine it is necessary to replace the hydraulic oil and filters of the hydraulic circuit.

9.3 DISMANTLING

Machine dismantling has to be carried out by the manufacturer or by a specialized factory.

All the dismantling operations have to be effectuated in conformity with the norms in force for accidents prevention.

Waste materials have to be divided for typology (i.e. iron scrap, aluminum, plastic, rub, etc.) and disposed of by means of authorized structures in conformity with the laws in force.

Exhausted oils and polluting substances have to be disposed of by means of authorized structures in conformity with the laws in force.

10. ENCLOSED DOCUMENTS

10.1 TABLES

10.2 SYTEMS

10.3 OTHER DOCUMENTS

Manual for engine use and maintenance

PULLER-TENSIONER MOD. PT2450

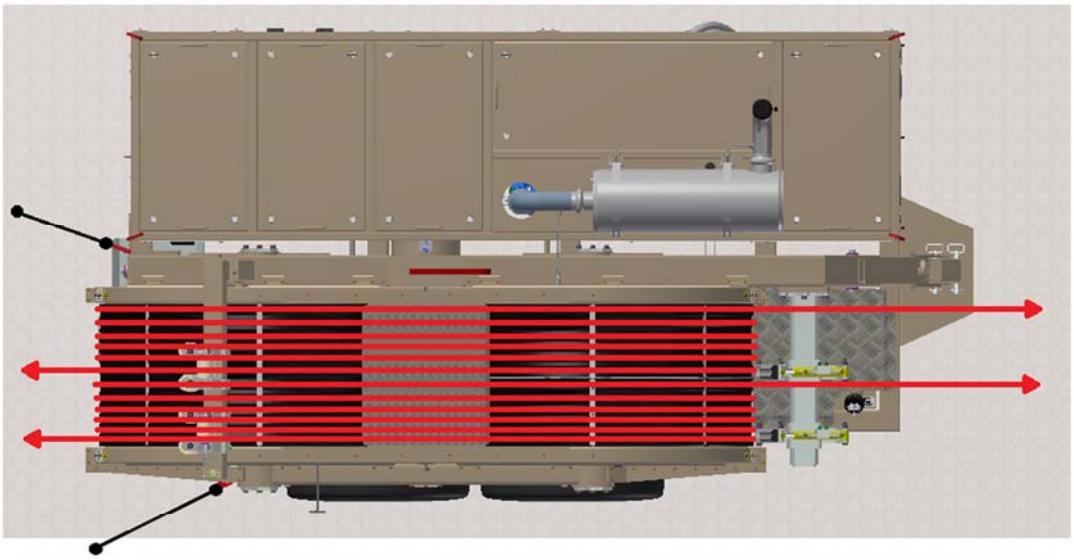
TABLES

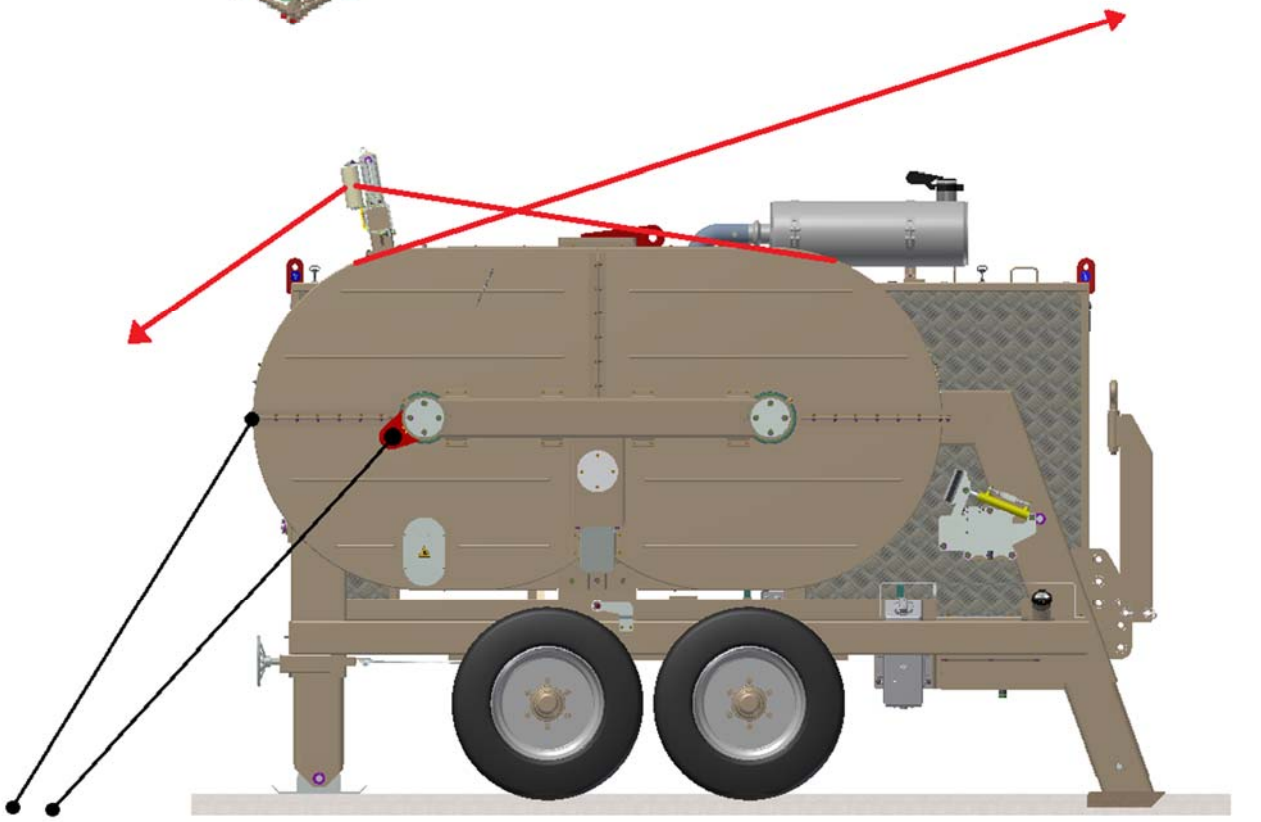
- 24050 Grassobbio (Bg) via Zanica, 17/O
Tel. 0039 / 035 / 4232911
Fax 0039 / 035 / 4522445
E-mail: info@tesmec.it

- 24060 Endine Gaiano (Bg) via Pertegalli
Tel. 0039 / 035 / 825024
Fax 0039 / 035 / 826375
E-mail: info@tesmec.it

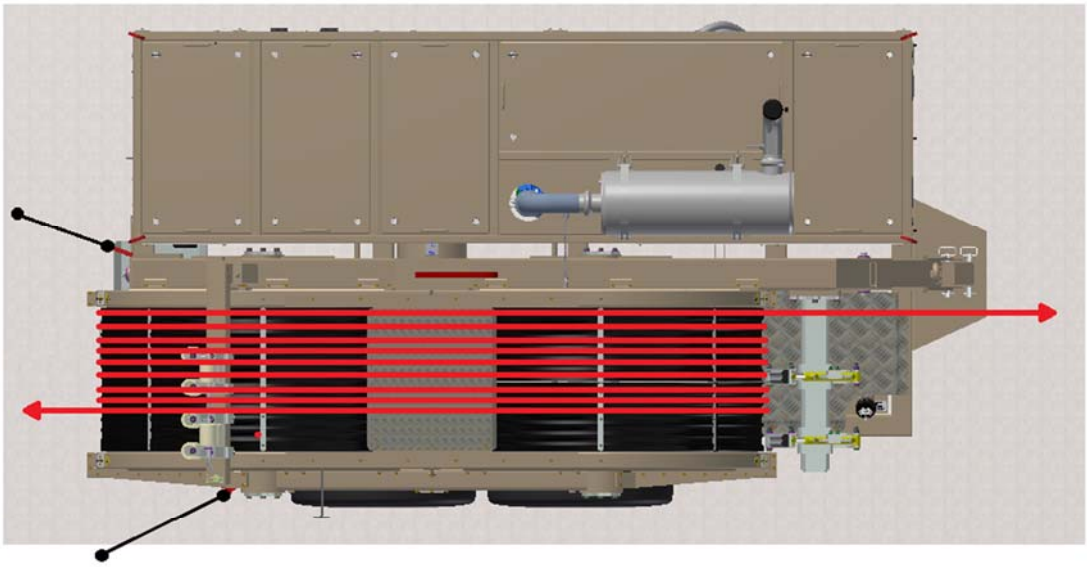
Table 1 – Rope charging

- ***Machine with indipendent Bull-wheel (50 KN and 50 KN).***





- ***Machine with mechanical and hydraulic connection (100 kN).***



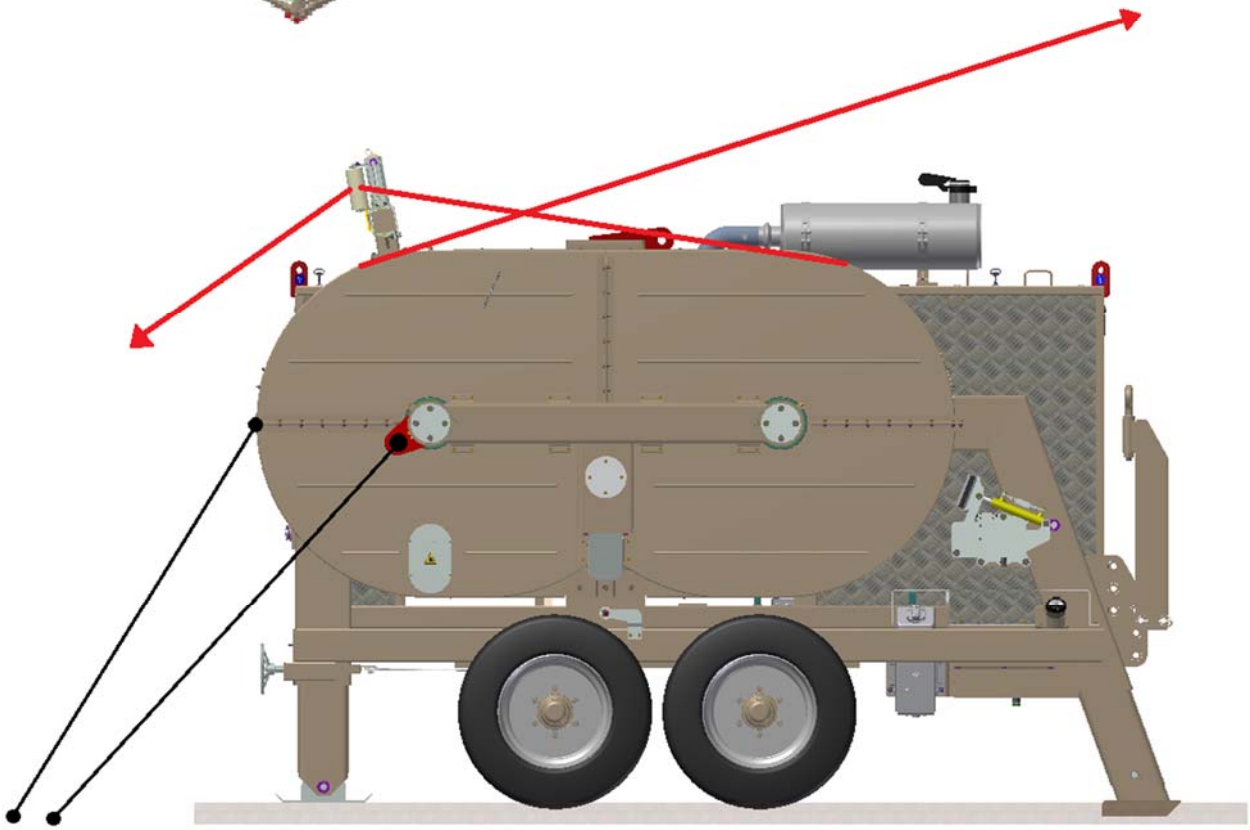
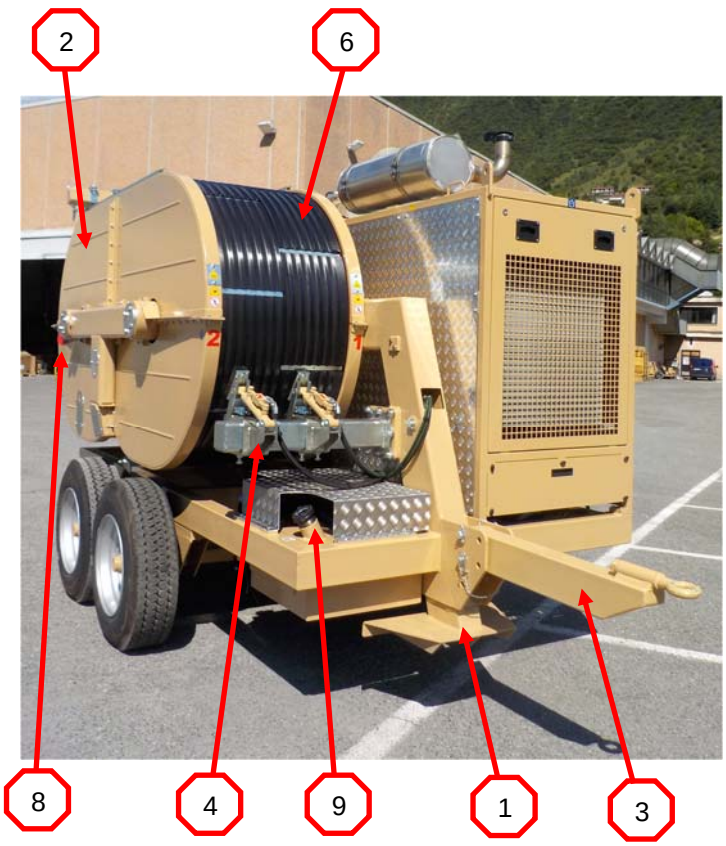
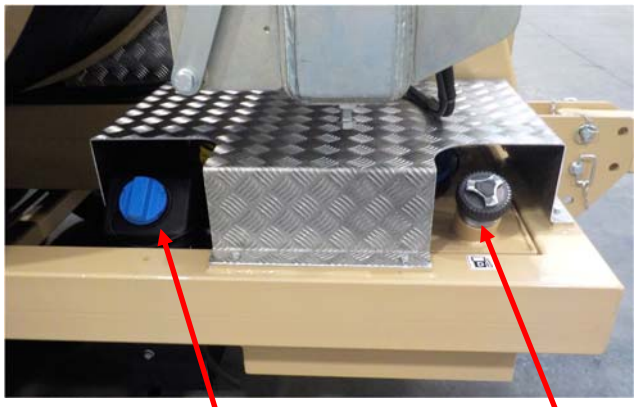


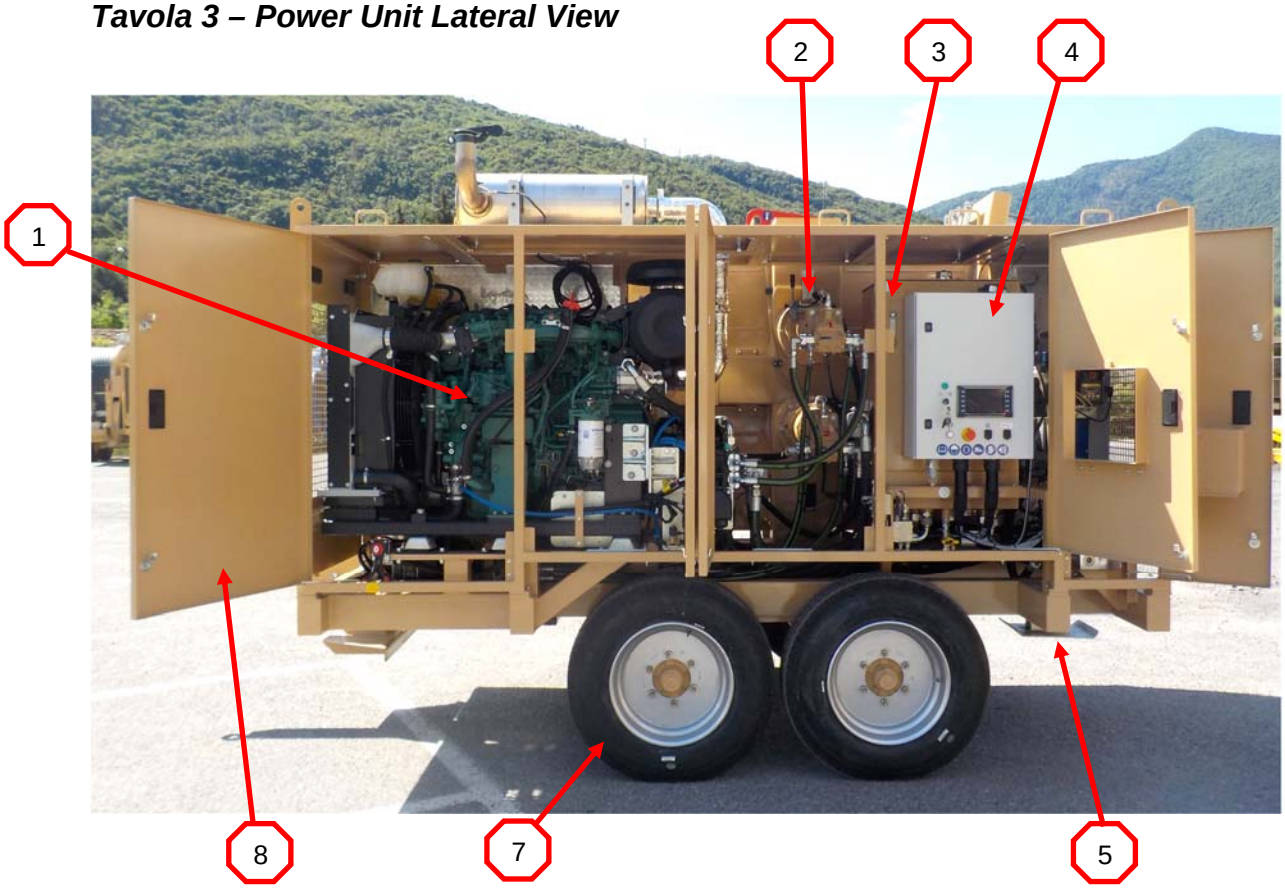
Table 2 – Bull-wheels Lateral View





1. Front plough;
2. Roller for reel elevator rope passing;
3. Front wheel;
4. Hydraulic rope clamp;
5. Rear stabilizers;
6. Bull-wheels;
7. Machine lifting point;
8. Anchor machine point;
9. Gasoline tank;
10. UREA tank.

Tavola 3 – Power Unit Lateral View



1. Diesel engine
2. Bull-wheels gearbox;
3. Hydraulic oil tank;
4. Control panel;
5. Rear stabilizers;
6. Manual parking brake;
7. Tires;
8. Sound-absorbing cover panel;
9. Anchor machine point;
10. Window for mechanical connection pin of the bull wheel;

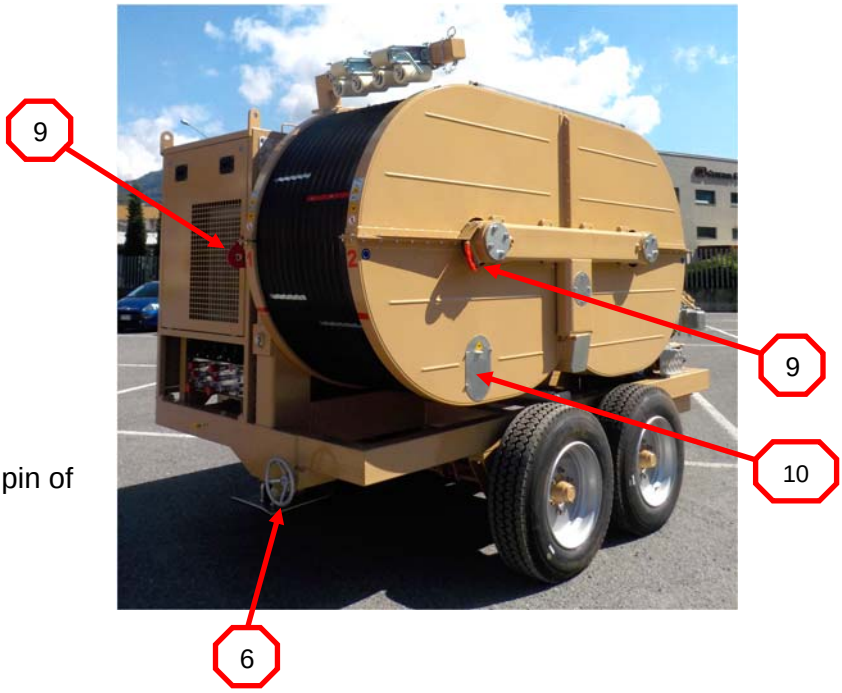
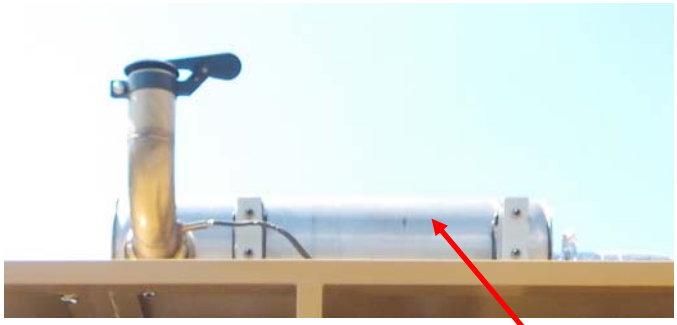
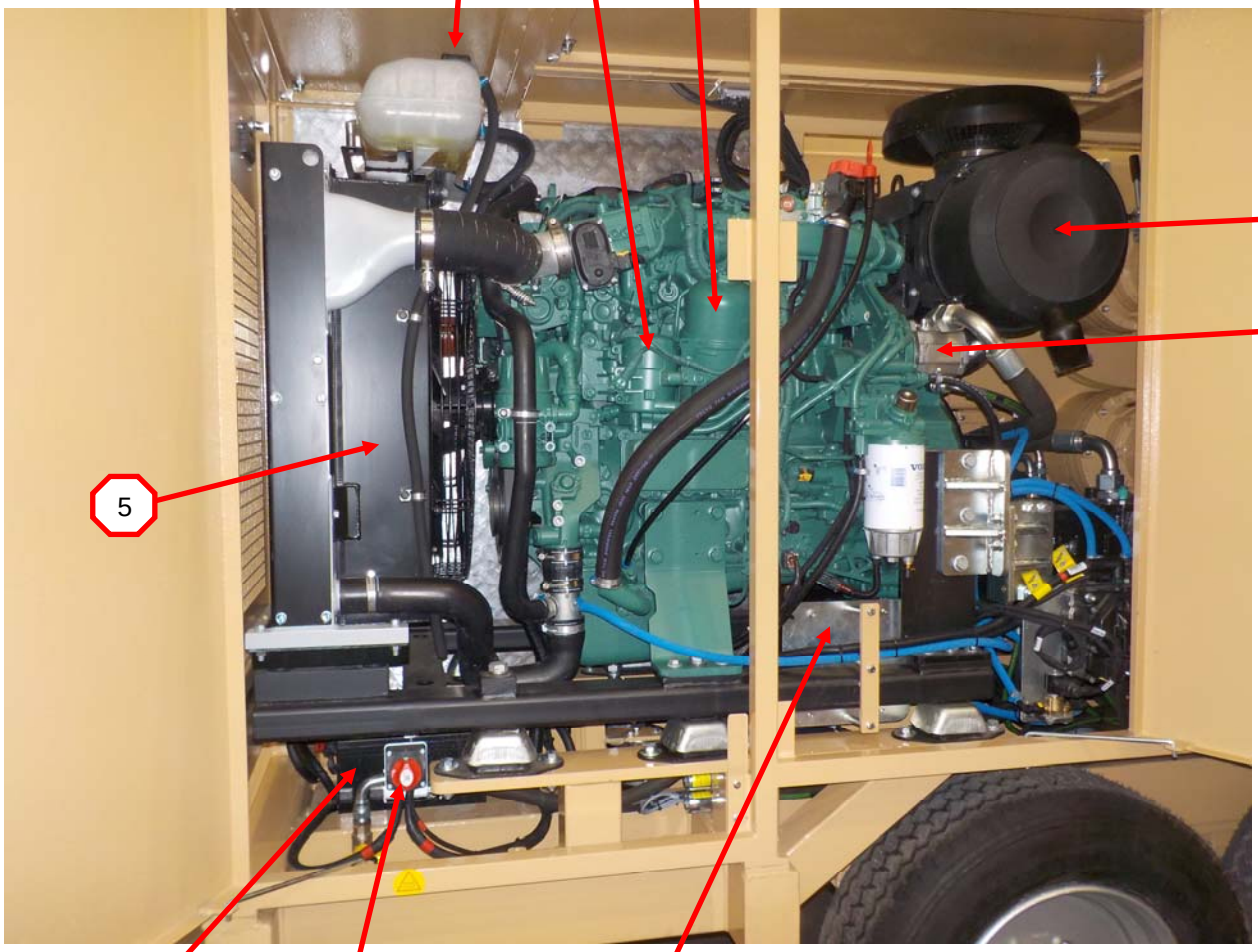
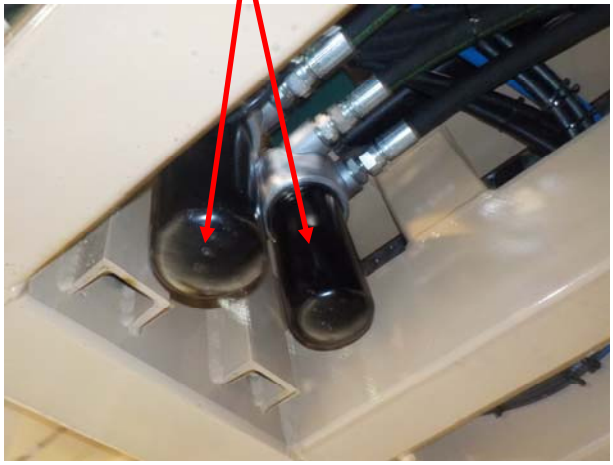
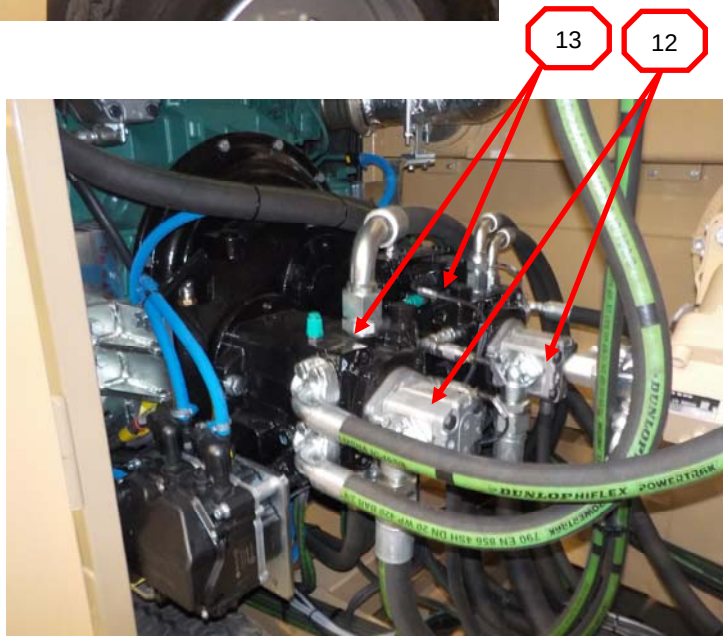


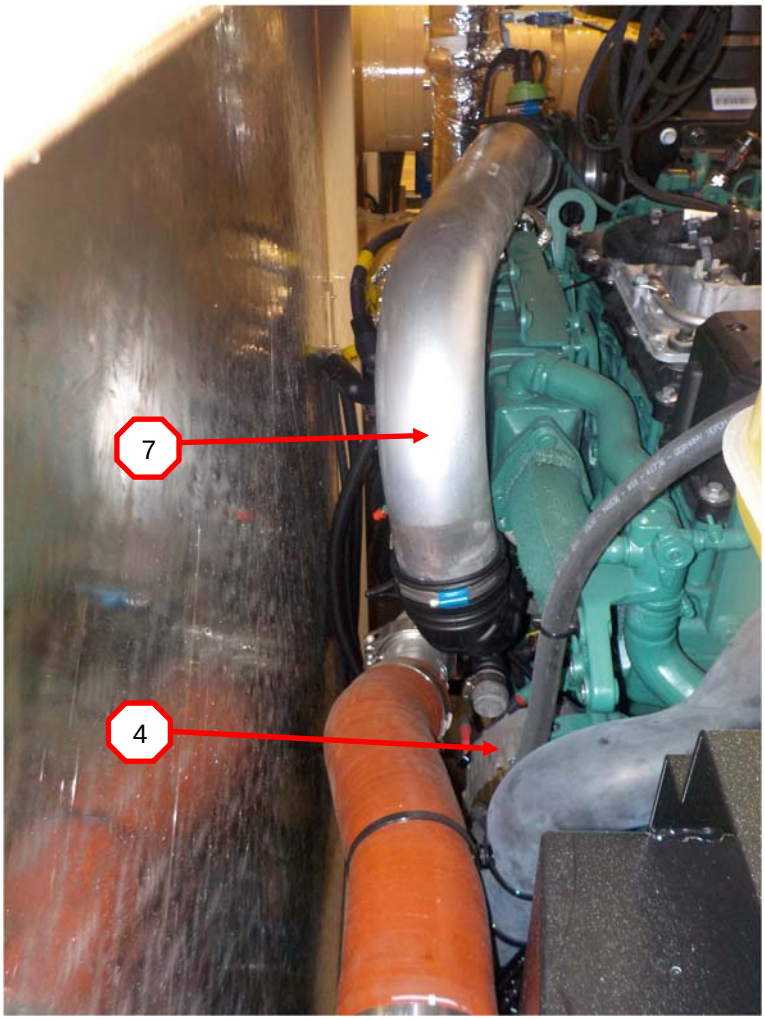
Table 4 – Diesel engine area





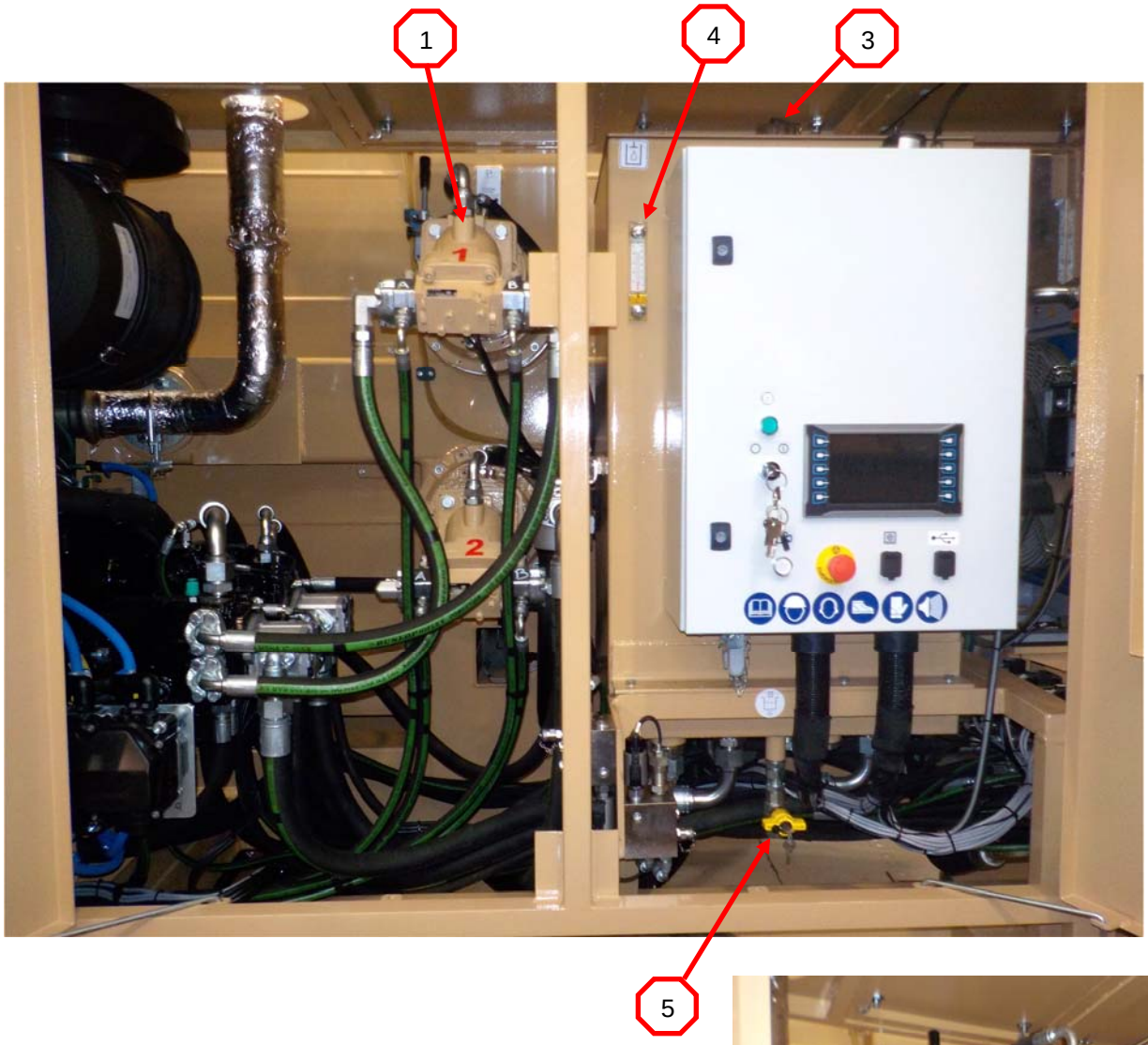






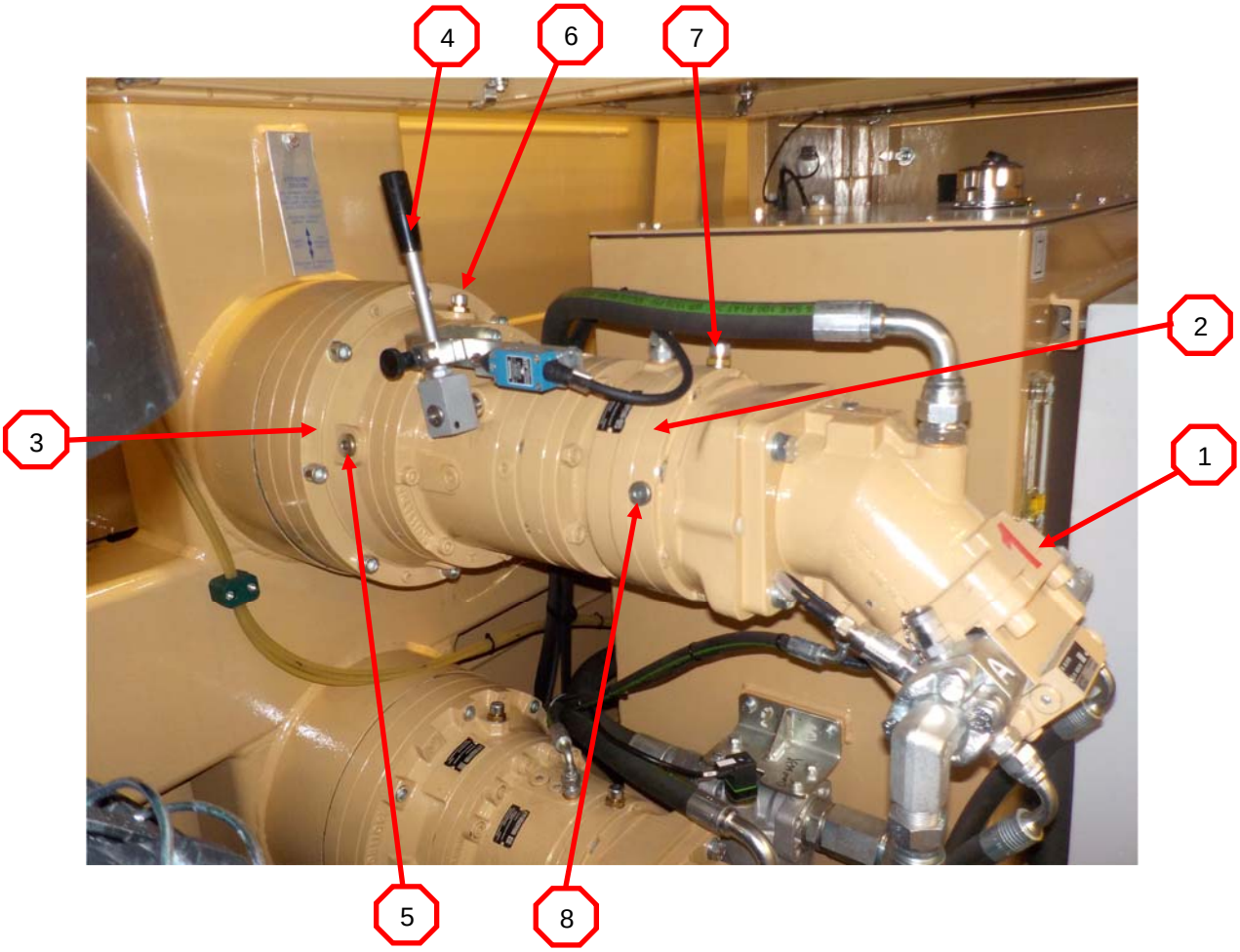
1. Machine battery-removal;
2. 12V Battery;
3. SCR exhaust muffler;
4. Alternator;
5. Air radiator /diesel engine water;
6. Coolant filling cap;
7. Suction pipe;
8. Air filter;
9. Filter;
10. Gasoil filter;
11. Oil filter;
12. Gear pump services;
13. Bull-wheels circuit main pump plus;
14. Unit UREA.

Table 5 – Hydraulic System Area



1. Hydraulic engine – Negative brake – Main circuit gearbox;
2. Hydraulic oil filter;
3. Hydraulic oil load cap;
4. Hydraulic oil level;
5. Hydraulic oil drain faucet.

Table 6 – Hydraulic Gearbox

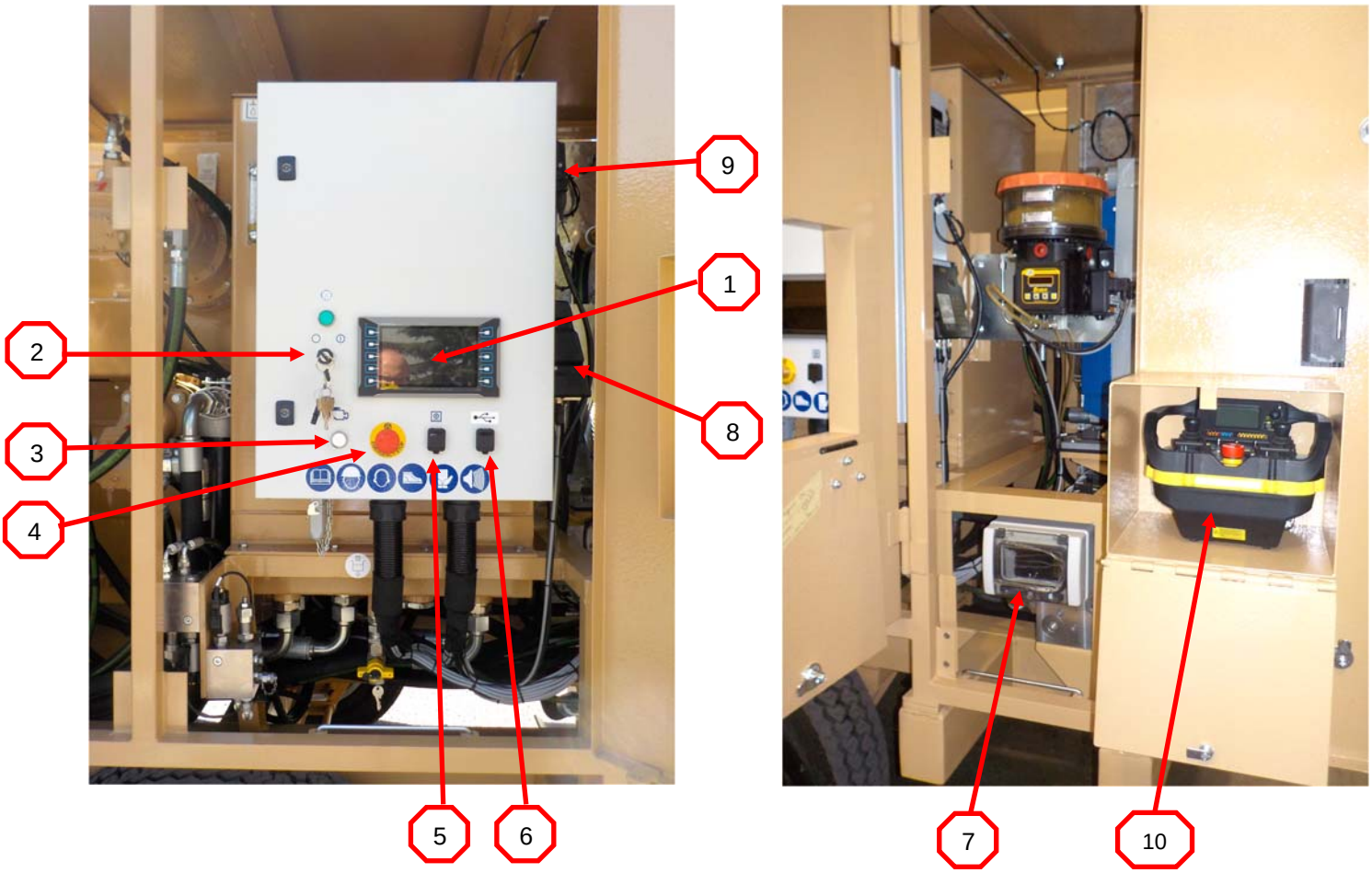


1. Hydraulic engine;
2. Negative brake;
3. Reduction gear;
4. Shift lever fine stringing;
5. Gearbox oil level;
6. Gearbox oil filling cap;
7. Negative brake oil filling cap;
8. Negative brake oil level.

Table 7 – External Drum Elevator Connections

1. Hydraulic oil to hydraulic head delivery – circuit 1;
2. Drainage – circuit 1;
3. Hydraulic oil to hydraulic head return – circuit 1;
4. Hydraulic oil to hydraulic head delivery – circuit 2;
5. Drainage – circuit 2;
6. Hydraulic oil to hydraulic head return – circuit 2;

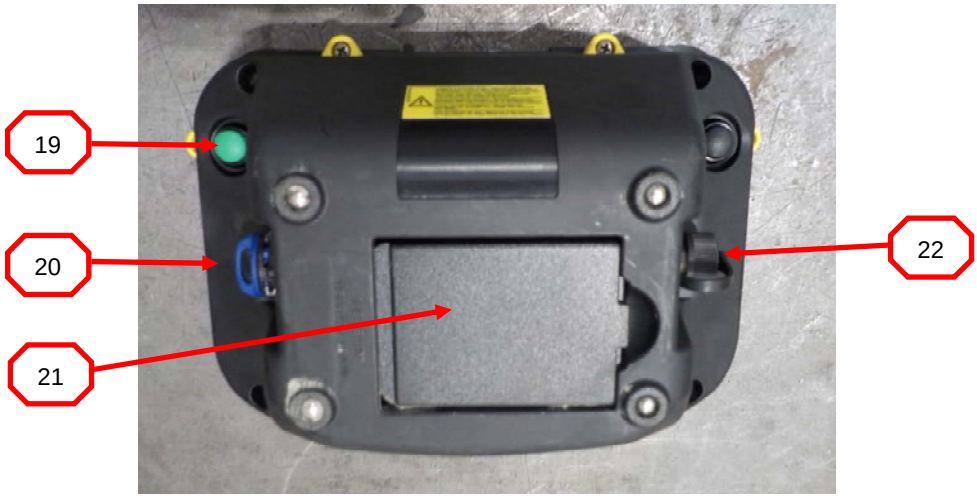
Table 8 – Machine Control Panel



1. Control panel with 7” touch multifunction display;
2. Machine Ignition key;
3. Power button diesel engine;
4. Emergency button;
5. External printer connection;
6. USB input;
7. Radio control battery charger;
8. Radio control receiving
9. Receiver satellite system;
10. Radio control.

Table 9 – Machine Radio control

1. Operational stop button;
2. Joystick release/recovery circuit 1;
3. Pull force control circuit 1;
4. Reel winder control pressure circuit 1;
5. Rope clamp switch circuit 1;
6. -
7. Reel elevator rotation button circuit 1;
8. Joystick release/recovery circuit 2;
9. Pull force control circuit 2;
10. Reel winder control pressure circuit 2;
11. -
12. Rope clamp switch circuit 2;
13. Reel elevator rotation button circuit 2;
14. Active/inactive electronic connection;
15. Active/inactive syncronizer;
16. Alarm Led/or several reports;
17. Display data;
18. Page management display button e radio control battery charge indicator;
19. Radio control connection button;
20. Switch on/off radio control;
21. Radio control battery;
22. Socket for remote connection cable.



PULLER-TENSIONER MOD. PT2450

ENCLOSED DOCUMENTS

- 24050 Grassobbio (Bg) via Zanica, 17/O
Tel. 0039 / 035 / 4232911
Fax 0039 / 035 / 4522445
E-mail: info@tesmec.it

- 24060 Endine Gaiano (Bg) via Pertegalli
Tel. 0039 / 035 / 825024
Fax 0039 / 035 / 826375
E-mail: info@tesmec.it

IMPORTANTE

Per qualsiasi informazione riguardante questa macchina/attrezzatura (utilizzo, manutenzione, ricambi) citare sempre Modello, Numero di matricola, Commessa, Anno di fabbricazione rilevabile nella targa d'identificazione della macchina.
Questo manuale non descrive le procedure di tesatura, né si è cercato di dare istruzioni all'utilizzatore sui metodi di tesatura.
Il contenuto di questo manuale prevede unicamente un testo di base per l'uso, manutenzione e l'elenco dei pezzi di ricambio della macchina stessa e come s'intende e si suggerisce di utilizzarla.
Saranno graditi suggerimenti da parte degli Utilizzatori per migliorare questa pubblicazione. Scriveteci all'indirizzo sottoindicato.

IMPORTANT NOTE

State always "Model, Serial Number and Manufacturing Year" of the machine/equipment in case you need information on use, maintenance and spare parts. The a/m data can be found on the identification plate of the machine itself.
This is not a stringing procedures manual, and no attempt is made or implied herein to instruct the user in stringing methods.
The contents of this manual are intended as base line for operation, maintenance and part list of the unit as it stands alone and as it is intended and anticipated to be used. Recommendation by the individual user for improving this publication is encouraged and should be forwarded to the address on this page.

IMPORTANT

Indiquer toujours le modèle, le numéro de série et l'année de fabrication de la machine/équipement même, en demandant à TESMEC renseignements sur l'utilisation, l'entretien et les pièces de rechange.
Ces informations se trouvent sur la plaque d'identification de la machine.
Ce manuel ne décrit pas les procédures de déroulage, ni on a tache de donner instructions à l'Utilisateur sur les méthodes de déroulage. Le contenu de ce manuel prévoit seulement un texte pour l'utilisation, l'entretien et la liste de pièces de rechange et comme TESMEC conseille d'utiliser la machine même. Pour chaque suggestion pour améliorer cette machine, écrire à l'adresse au-dessous.

IMPORTANTE

Para cualquier información relativa a esta máquina/equipo (utilización, mantenimiento, repuestos) citar siempre Modelo, Número de serie, Orden de compra, Año de fabricación que se hallan en la tarjeta de identificación de la máquina.
Este manual no describe los procedimientos de tensado y tampoco se ha tratado de dar instrucciones al utilizador acerca de los métodos de tensado. El contenido de este manual prevé únicamente un texto básico para el uso, mantenimiento y el listado de repuestos de la misma máquina y cómo se pretende y se sugiere utilizarla.
Se apreciarán sugerencias por parte de los utilizadores para mejorar esta publicación.
Nos pueden escribir a la dirección indicada abajo.

IMPORTANTE

Para qualquer informação a respeito desta máquina/equipamento (utilização, manutenção, peças sobresselentes) citar sempre o Modelo, o Número de Série, a Encomenda, o Ano de fabrico, dados que podem ser encontrados na placa de identificação da máquina. Este manual não descreve os procedimentos de entesadura, tão pouco foi nossa intenção dar instruções ao utilizador sobre os métodos de entesadura. O conteúdo deste manual de instruções prevê unicamente um texto básico para o uso, a manutenção e a lista das peças sobresselentes da mesma máquina e como se entende e se sugere utilizá-la.
Serão muito bem aceitas sugestões por parte dos Utilizadores, no intento de melhorar esta publicação.
Escrevam-nos no endereço abaixo indicado.

WICHTIG

Geben Sie für alle Informationen über diese Maschine/Ausrüstung (Verwendung, Wartung, Ersatzteile) immer Modell, Artikelnummer, Bestellung und Baujahr an, welche Sie dem Identifizierungsschild der Maschine entnehmen können.
Dieses Handbuch beschreibt nicht die Verfahren des Seilzug, und es wurde auch nicht versucht, dem Verwender Anleitungen über die Methoden des Seilzugs zu geben. Der Inhalt dieses Handbuchs enthält allein einen Basistext für den Gebrauch und die Wartung, die Ersatzteilliste der Maschine und außerdem, welche Verwendung für sie bezweckt und empfohlen wird. Wir freuen uns über Tipps von Seiten der Verwender, um diese Veröffentlichung zu verbessern.
Schreiben Sie uns an unten angegebene Adresse.

ВАЖНОЕ ПРИМЕЧАНИЕ

Всегда следует указывать модель, серийный номер и год выпуска машины/оборудования в случае, если Вам необходима информация по эксплуатации, техническому обслуживанию и запасным частям.
Вышеупомянутые данные можно найти на паспортной табличке на самой машине.
Это — не руководство по методикам натяжения, и здесь не делается никаких попыток инструктирования пользователя способам натяжения, и они не подразумеваются. Цель настоящего руководства состоит только в том, чтобы дать описание эксплуатации и технического обслуживания, а также список запасных частей машины, и указать ее назначение и рекомендуемое использование. Рекомендации отдельных пользователей по улучшению данной публикации приветствуются, и их следует направлять по адресу, указанному в руководстве.

- 24050 Grassobbio (Bg) via Zanica, 17/O
Tel. 0039 / 035 / 4232911
Telefax 0039 / 035 / 4522445
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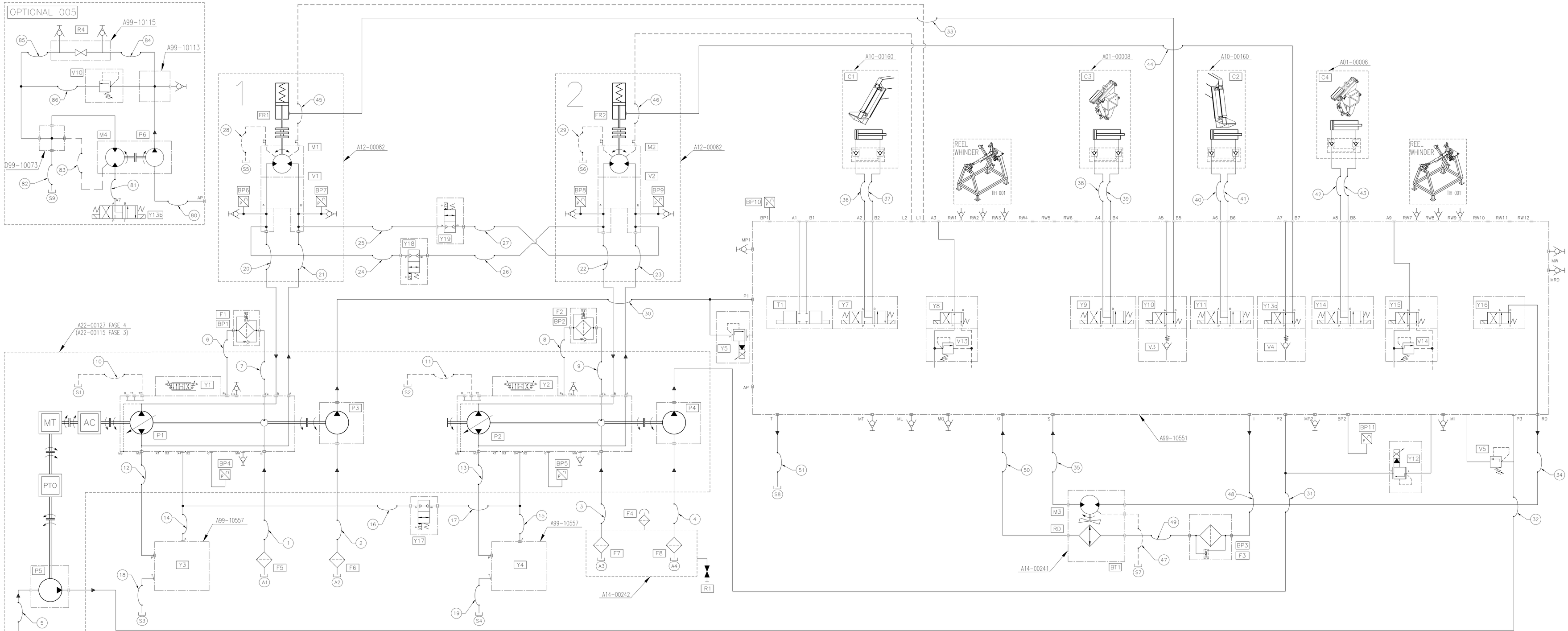
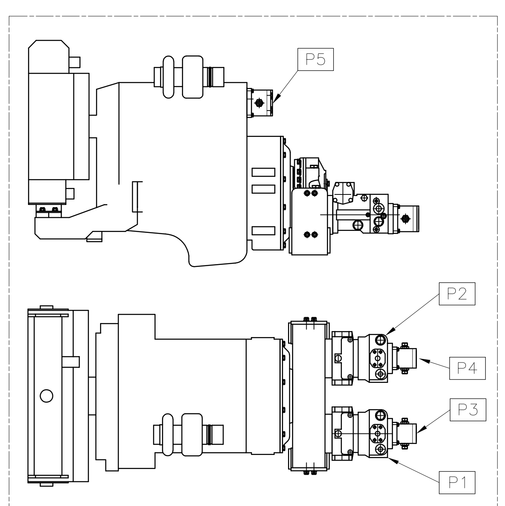
Comparative table of suggested oils and greases

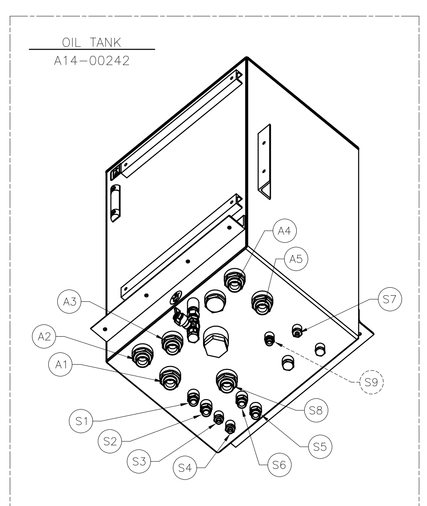
TYPE	HYDRAULIC CIRCUIT OIL FOR ENVIROMENTAL CONDITION:				REDUCTION UNIT - COUPLERS REDUCTION UNIT OIL FOR ENVIROMENTAL CONDITION:				GREASING GREASE FOR EACH AMBIENT
	ARTIC	WINTER	SUMMER	TROPICAL	ARTIC	WINTER	SUMMER	TROPICAL	
VISCOSITY (ISO 3448)	VG 22	VG 32	VG 46	VG 68	VG 100	VG 150	VG 220	VG 320	NLGI 2
AGIP	OSO 22	OSO 32	OSO 46	OSO 68	BLASIA 100	BLASIA 150	BLASIA 220	BLASIA 320	GR MU EP 2
API	APILUBE CIS 22	APILUBE CIS 32	APILUBE CIS 46	APILUBE CIS 68	DT 100	DT 150	DT 220	DT 320	PGX 2
ARAL	ARAL VITAM GF 22	ARAL VITAM GF 32	ARAL VITAM GF 46	ARAL VITAM GF 68	DEGOL BG 100	DEGOL BG 150	DEGOL BG 220	DEGOL BG 320	ARALUB HL 2
AVIA	AVILUB RSL 22	AVILUB RSL 32	AVILUB RSL 46	AVILUB RSL 68	AVILUB RSX 100	AVILUB RSX 150	AVILUB RSX 220	AVILUB RSX 320	-
BP	ENERGOL HLP 22	ENERGOL HLP 32	ENERGOL HLP 46	ENERGOL HLP 68	ENERGOL GR-XP 100	ENERGOL GR-XP 150	ENERGOL GR-XP 220	ENERGOL GR-XP 320	GREASE LTX 2
CASTROL	HYSPIN AWS 22	HYSPIN AWS 32	HYSPIN AWS 46	HYSPIN AWS 68	ALPHA SP 100	ALPHA SP 150	ALPHA SP 220	ALPHA SP 320	SUPERGREASE 2
CHEVRON	EP HYDRAULIC 22	EP HYDRAULIC 32	EP HYDRAULIC 46	EP HYDRAULIC 68	COMPOUND GEAR 100	COMPOUND GEAR 150	COMPOUND GEAR 220	COMPOUND GEAR 320	DURALITH EP 2
ELF	ELFOLNA DS 22	ELFOLNA DS 32	ELFOLNA DS 46	ELFOLNA DS 68	REDUCTELF SP 100	REDUCTELF SP 150	REDUCTELF SP 220	REDUCTELF SP 320	ROLEXA 2
ESSO	NUTO H 22	NUTO H 32	NUTO H 46	NUTO H 68	SPARTAN EP 100	SPARTAN EP 150	SPARTAN EP 220	SPARTAN EP 320	BEACON 2
FINA	HYDRAN 22	HYDRAN 32	HYDRAN 46	HYDRAN 68	GIRAN 100	GIRAN 150	GIRAN 220	GIRAN 320	MARSON EP L2
FUCHS	RENOLIN MR 5	RENOLIN MR 10	RENOLIN MR 15	RENOLIN MR 20	-	RENEP COMPOUND 104	-	RENEP COMPOUND 108	-
GULF	HARMONY 22 AW	HARMONY 32 AW	HARMONY 46 AW	HARMONY 68 AW	-	EP LUBRICANT HD 150	EP LUBRICANT HD 220	EP LUBRICANT HD 320	CROWN EP 2
IP	HYDRUS OIL 22	HYDRUS OIL 32	HYDRUS OIL 46	HYDRUS OIL 68	MELLANA 100	MELLANA 150	MELLANA 220	MELLANA 320	ATHESIA EP GR 2
KLUBER	LAMORA 22	LAMORA 32	LAMORA 46	LAMORA 68	LAMORA 100	LAMORA 150	LAMORA 220	LAMORA 320	CENTOPLEX 2 EP
MOBIL	DTE 22	DTE 24	DTE 25	DTE 26	-	MOBILGEAR 629	MOBILGEAR 630	MOBILGEAR 632	MOBILUX EP 2
Q8	HAYDIN 22	HAYDIN 32	HAYDIN 46	HAYDIN 68	GOYA 100	GOYA 150	GOYA 220	GOYA 320	REMBRANDT EP 2
ROLOIL	LI 22	LI 32	LI 46	LI 68	EP 100	EP 150	EP 220	EP 320	LITEX EP 2
SHELL	TELLUS 22	TELLUS 32	TELLUS 46	TELLUS 68	OMALA 100	OMALA 150	OMALA 220	OMALA 320	SUPERGREASE EP2
SYNECO	-	PACEMAKER 32	PACEMAKER 46	PACEMAKER 68	-	PACEMAKER RODI 12	-	PACEMAKER RODI 24	SINT GREASE EP 2
TAMOIL	HYDRAULIC OIL 22	HYDRAULIC OIL 32	HYDRAULIC OIL 46	HYDRAULIC OIL 68	CARTER EP 100	CARTER EP 150	CARTER EP 220	CARTER EP 320	TAMLITH GREASE EP2
TEXACO	RANDO HD 22	RANDO HD 32	RANDO HD 46	RANDO HD 68	MEROPA 100	MEROPA 150	MEROPA 220	MEROPA 320	MULTIFAK EP 2
TOTAL	AZOLLA ZS 22	AZOLLA ZS 32	AZOLLA ZS 46	AZOLLA ZS 68	CARTER EP 100	CARTE EP 150	CARTER EP 220	CARTER EP 320	MULTIS EP 2
VALVOLINE	ELIOS HVI 22	ELIOS HVI 32	ELIOS HVI 46	ELIOS HVI 58	ELIOS EP 100	ELIOS EP 150	ELIOS EP 220	ELIOS EP 320	LITHIUM BASE EP 2



POS	CODE	QTY
51	L01-0020-198	1
50	L01-0020-209	1
49	L01-0020-032	1
48	L01-0020-200	1
47	L01-0004-055	1
46	L01-0004-105	1
45	L01-0004-018	1
44	L02-0004-091	1
43	L02-0004-436	1
42	L02-0004-436	1
41	L02-0004-435	1
40	L02-0004-435	1
39	L02-0004-434	1
38	L02-0004-434	1
37	L02-0004-254	1
36	L02-0004-254	1
35	L01-0008-270	1
34	L02-0008-047	1
33	L02-0004-033	1
32	L02-0008-056	1
31	L02-0008-188	1
30	L02-0008-188	1
29	L01-0012-200	1
28	L01-0012-034	1
27	L04-0006-010	1
26	L04-0006-009	1
25	L04-0006-008	1
24	L04-0006-007	1
23	L03-0012-032	1
22	L03-0012-034	1
21	L03-0012-033	1
20	L03-0012-033	1
19	L01-0006-233	1
18	L01-0006-232	1
17	L01-0004-033	1
16	L01-0004-088	1
15	L01-0004-141	1
14	L01-0004-424	1
13	L04-0004-013	1
12	L04-0004-014	1
11	L01-0012-010	1
10	L01-0012-010	1
9	L01-0012-368	1
8	L01-0012-368	1
7	L01-0012-346	1
6	L01-0012-346	1
5	L01-0020-208	1
4	L01-0020-018	1
3	L01-0020-021	1
2	L01-0020-152	1
1	L01-0020-207	1

POS	CODE	QTY
OPTIONAL 005		
86	L01-0004-	1
85	L01-0004-	1
84	L08-0004-	1
83	L01-0004-	1
82	L01-0008-	1
81	L02-0008-	1
80	L01-0008-	1





POS	CODE	DESCRIPTION
OPTIONAL 005		
Y13b	V00-6100-172 (replace V00-6100-110)	COMPRESSOR SOLENOID VALVE CONTROL
V12	V00-6203-016	COMPRESSOR RELIEF VALVE
R4	V00-6130-017	COMPRESSOR BY-PASS VALVE
P6	V00-6007-001	COMPRESSOR FEED PUMP
M4	V00-6052-006	COMPRESSOR HYDRAULIC MOTOR

POS	CODE	DESCRIPTION
Y19	V00-6100-034	HYDRAULIC DIFFERENTIAL CONTROL SOLENOID VALVE
Y18	V00-6100-034	HYDRAULIC DIFFERENTIAL CONTROL SOLENOID VALVE
Y17	V00-6100-034	HYDRAULIC DIFFERENTIAL CONTROL SOLENOID VALVE
Y16	V00-6100-110	FAN RADIATOR CONTROL SOLENOID VALVE
Y15	V00-6100-110	REEL WINDER 2 CONTROL SOLENOID VALVE
Y14	V00-6100-172	ROPE LOCKING 2 CYLINDER CONTROL SOLENOID VALVE
Y13a	V00-6100-110	VACUUM-BRAKE BULL 2 WHEEL OPENING SOLENOID VALVE CONTROL
Y12	V00-6209-037	REEL WINDER 2 / AUXILIARY EQUIPMENT PROPORTIONAL RELIEF VALVE
Y11	V00-6100-172	REAR RIGHT STABILIZER CYLINDER CONTROL SOLENOID VALVE
Y10	V00-6100-110	VACUUM-BRAKE BULL 1 WHEEL OPENING SOLENOID VALVE CONTROL
Y9	V00-6100-172	ROPE LOCKING 1 CYLINDER CONTROL SOLENOID VALVE
Y8	V00-6100-110	REEL WINDER 1 CONTROL SOLENOID VALVE
Y7	V00-6100-172	FRONT STABILIZER CYLINDER CONTROL SOLENOID VALVE
Y5	V00-6209-037	REEL WINDER 1 / AUXILIARY EQUIPMENT PROPORTIONAL RELIEF VALVE
Y4	V00-6209-045	BULL WHEEL 2 PULL REGULATION PROPORTIONAL VALVE CONTROL
Y3	V00-6209-045	BULL WHEEL 1 PULL REGULATION PROPORTIONAL VALVE CONTROL
Y2	V00-6001-186	PUMP 2 PROPORTIONAL VALVE CONTROL
Y1	V00-6001-186	PUMP 1 PROPORTIONAL VALVE CONTROL
V14	V00-6203-070	RELIEF VALVE
V13	V00-6203-070	RELIEF VALVE
V5	V00-6203-054	RELIEF VALVE
V4	V00-6204-055	CHECK VALVE
V3	V00-6204-055	CHECK VALVE
V2	V00-6200-056	FLUSHING VALVE
V1	V00-6200-056	FLUSHING VALVE
T1	V00-7200-004	BLIND PLATE
RD	V00-6610-049	RADIATOR
R1	V00-6130-006	EMPTY TANK HYDRAULIC OIL
P5	V00-6004-015	RADIATOR FEED PUMP
P4	V00-6004-040	REEL WINDER 2 / AUXILIARY EQUIPMENT FEED PUMP

POS	CODE	DESCRIPTION
P3	V00-6004-040	REEL WINDER 1 / AUXILIARY EQUIPMENT FEED PUMP
P2	V00-6001-186	PULLER/TENSIONER 2 FEED PUMP
P1	V00-6001-186	PULLER/TENSIONER 1 FEED PUMP
MT	V00-4500-129 (V00-4500-154)	DIESEL ENGINE FASE 4 (FASE 3)
M3	V00-6052-022	RADIATOR MOTOR
M2	V00-6050-049	BULL WHEEL 2 MOTOR
M1	V00-6050-049	BULL WHEEL 1 MOTOR
FR2	V00-5702-112	BULL WHEEL 2 VACUUM BRAKE
FR1	V00-5702-113	BULL WHEEL 1 VACUUM BRAKE
F9	V00-6600-140	STRAINER
F8	V00-6600-140	STRAINER
F7	V00-6600-140	STRAINER
F6	V00-6600-140	STRAINER
F5	V00-6600-140	STRAINER
F4	V00-4801-008	OIL TANK AIR BREATHER
F3	V00-6600-081	RETURN FILTER
F2	V00-6600-082	P2 BOOST FILTER
F1	V00-6600-082	P1 BOOST FILTER
C4	D99-19901	ROPE LOCKING 2 CYLINDER
C3	D99-19901	ROPE LOCKING 1 CYLINDER
C2	D99-19904	REAR STABILIZER CYLINDER
C1	D99-19904	FRONT STABILIZER CYLINDER
BT1	V00-8510-145	TEMPERATURE TRANSMITTER
BP11	V00-8510-239	REEL WINDER 2/AUXILIARY EQUIPMENT PRESSURE TRANSDUCER
BP10	V00-8510-239	REEL WINDER 1/AUXILIARY EQUIPMENT PRESSURE TRANSDUCER
BP9	V00-8510-224	BULL WHEEL 2 IN MOTOR PRESSURE TRANSDUCER
BP8	V00-8510-224	BULL WHEEL 2 OUT MOTOR PRESSURE TRANSDUCER
BP7	V00-8510-224	BULL WHEEL 1 IN MOTOR PRESSURE TRANSDUCER
BP6	V00-8510-224	BULL WHEEL 1 OUT MOTOR PRESSURE TRANSDUCER
BP5	V00-8510-239	P2 PUMP BOOST-FEEDING PRESSURE TRANSDUCER
BP4	V00-8510-239	P1 PUMP BOOST-FEEDING PRESSURE TRANSDUCER
BP3	V00-8510-179	CLOGGING FILTER F3
BP2	V00-8510-179	CLOGGING FILTER F2
BP1	V00-8510-179	CLOGGING FILTER F1
AC	V00-4600-122	DRIVE PUMP

POS	CODE	DESCRIPTION

TESMEC
GRASSOBBIO (BG) Tel.035/4232911 – Fax 035/4522445
ENDINE G. (BG) Tel.035/825024 – Fax 035/826375
TUTTE LE NORME RICHIAMATE SI INTENDONO NELLA LORO ULTIMA EDIZIONE
SALDATURE IN ACCORDO CON – WPS 1 – 9
GRADO DI PRECISIONE PER QUOTE LINEARI, ANGOLARI, GEOMETRICHE NON TOLLERATE
LAV.MECCANICHE UNI EN 22768-f H
CARPENTERIA UNI EN 22768-c K

A.T.
21-08-2018
Kg

MACCHINA ARGANO-FRENO 2.0
MODELLO AFB 621 050
GRUPPO IMPIANTO OLEODINAMICO
OGGETTO SCHEMA IDRAULICO
NUMERO DISEGNO S02-00139 S

A0 – 1189x841

Notes:

RILEVATO 22/06/2018

REV	REVIEW	DATE	SIGN

SERIES :

WORKING ORDER : S01-00167

CUSTOMER : AFB 621 0050

	DATE	SIGNATURE
DRAFTSMAN	01/03/2018	Locatelli
VERIFIED		
APPROVED		
LOG. PROD.		

TESMEC

AFB 621 050

PRESETTINGS :

EQUIPMENT :

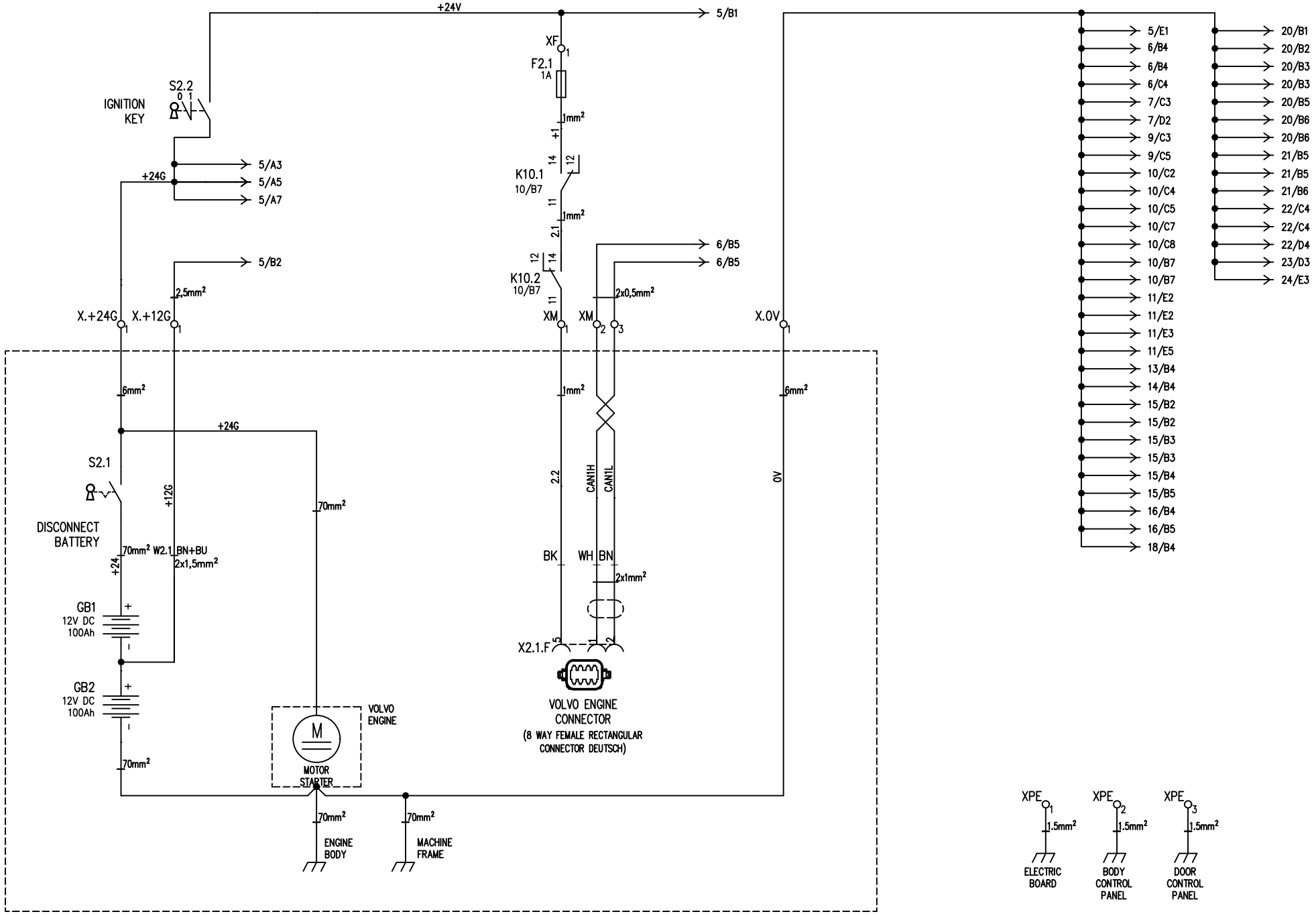
ARCHIVES FILES:

\\ TESMEC \ UT \ EGPSchemiElettrici \
\\ TESMEC \ PLOT \ TESATURA \S01 \

S01-00167

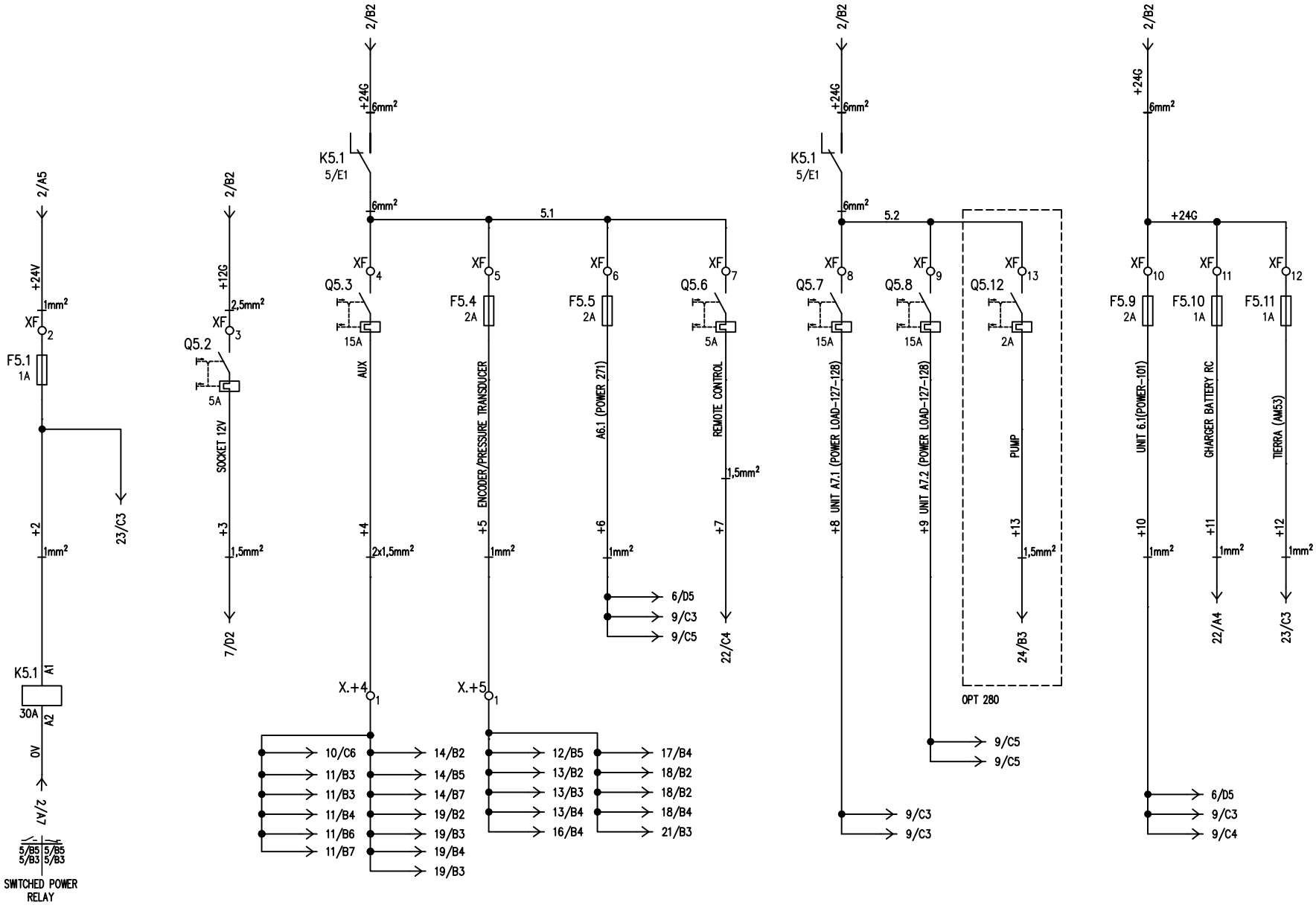
SHEET 1

TOTAL SHEET 39



TESMEC
Grassobbio BG via Zanica, 17/o –Italy – Email: info@tesmec.it tel: +39 035 4232911 fax: +39 035 4522445
Sede di Endine Gaiano BG via Pertegalli – Italy – tel: +39 035 825024 fax: +39 035 826375

Electric scheme	POWER SUPPLY	Drawn: Locatelli	Drawing Nr:S01–00167 Archive Nr: S01	Sheet 2 of 39
	Design: AFB 621 050	Checked:	Date: 01/03/2017	Following 5



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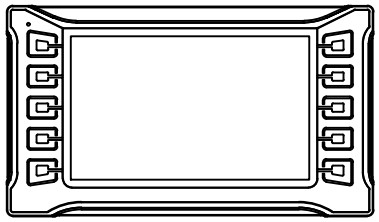
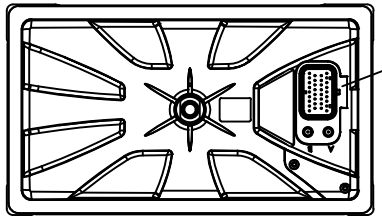
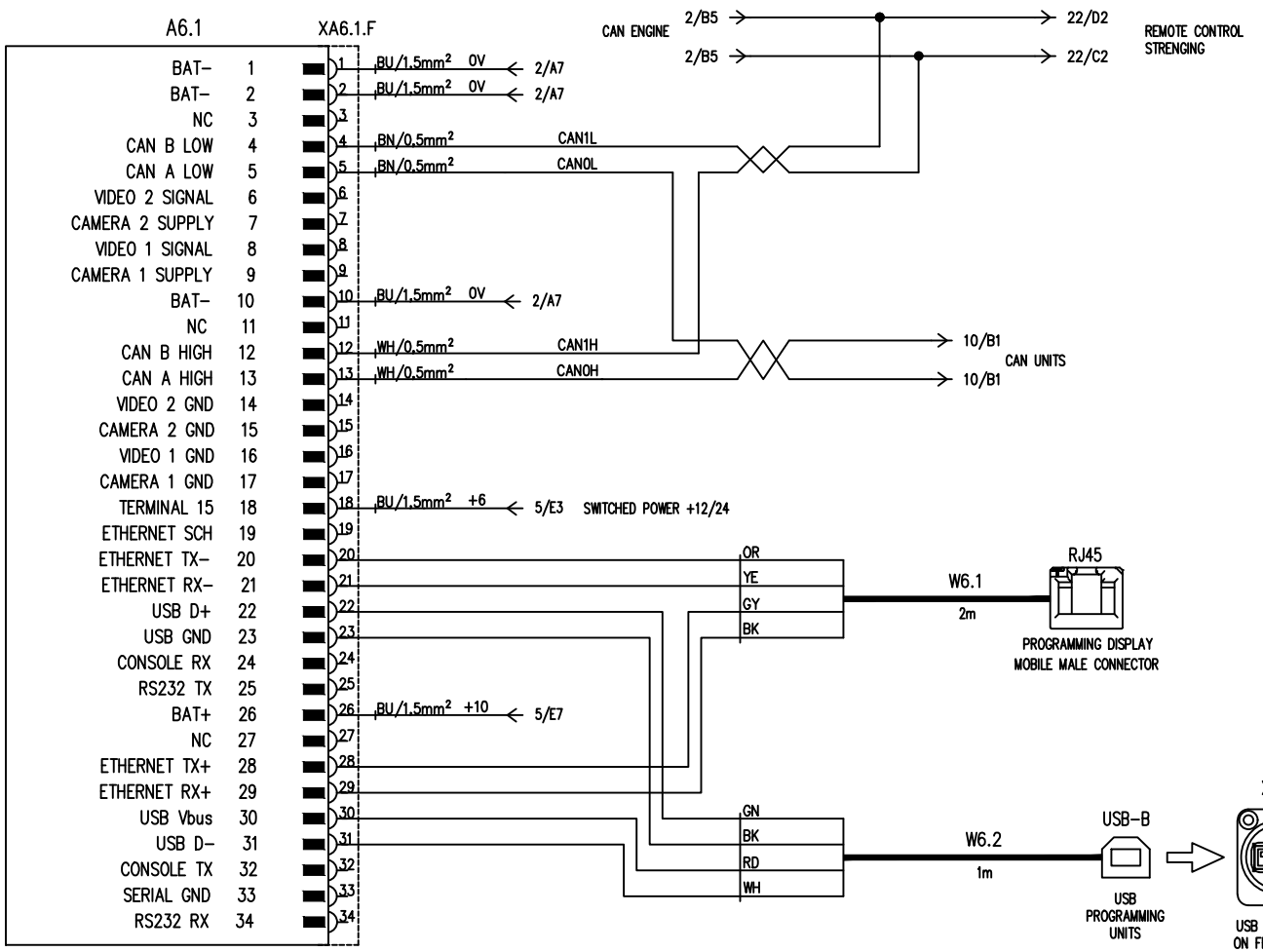
Electric scheme	PROTECTIONS	Drawn: Locatelli	Drawing Nr:S01–00167 Archive Nr: S01	Sheet 5 of 39
	Design: AFB 621 050	Checked:	Date: 01/03/2017	Following 6

A6.1
E-VISION 7"







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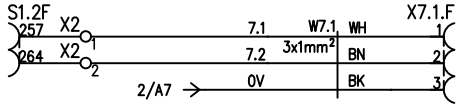
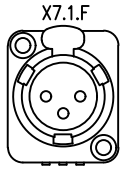
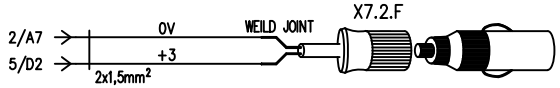
Electric scheme	E–VISION DISPLAY	Drawn: Locatelli	Drawing Nr:S01–00167 Archive Nr: S01	Sheet 6 of 39
	Design: AFB 621 050	Checked:	Date: 01/03/2017	Following 7





PROGRAMMING PRINTER
ON FRONT PANEL



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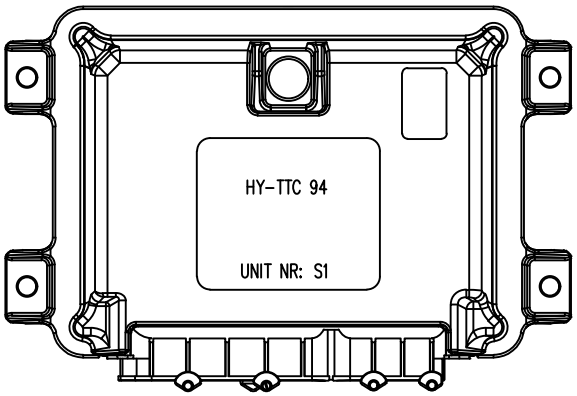
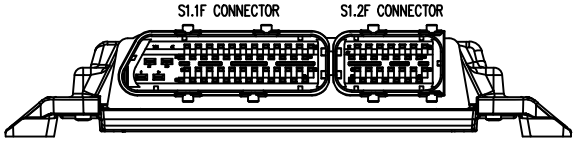
Electric scheme	PRINTER	Drawn: Locatelli	Drawing Nr:S01–00167 Archive Nr: S01	Sheet 7 of 39
	Design: AFB 621 050	Checked:	Date: 01/03/2017	Following 8

A8.1





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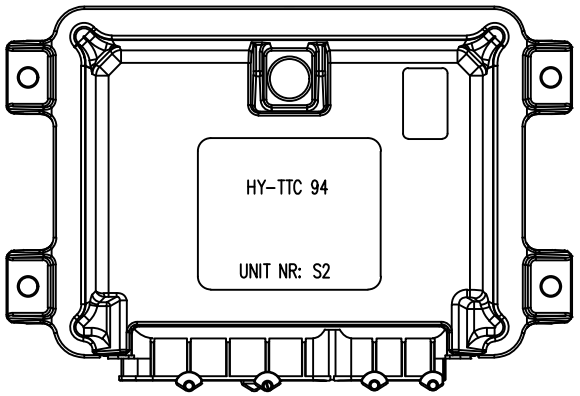

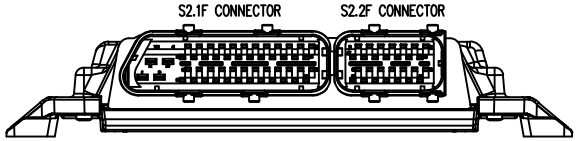

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Electric scheme

ELECTRONIC CARD

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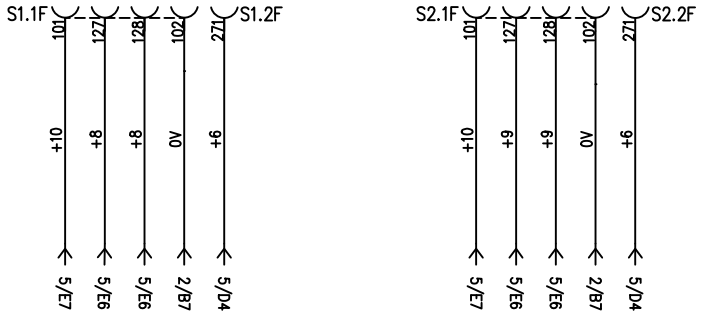
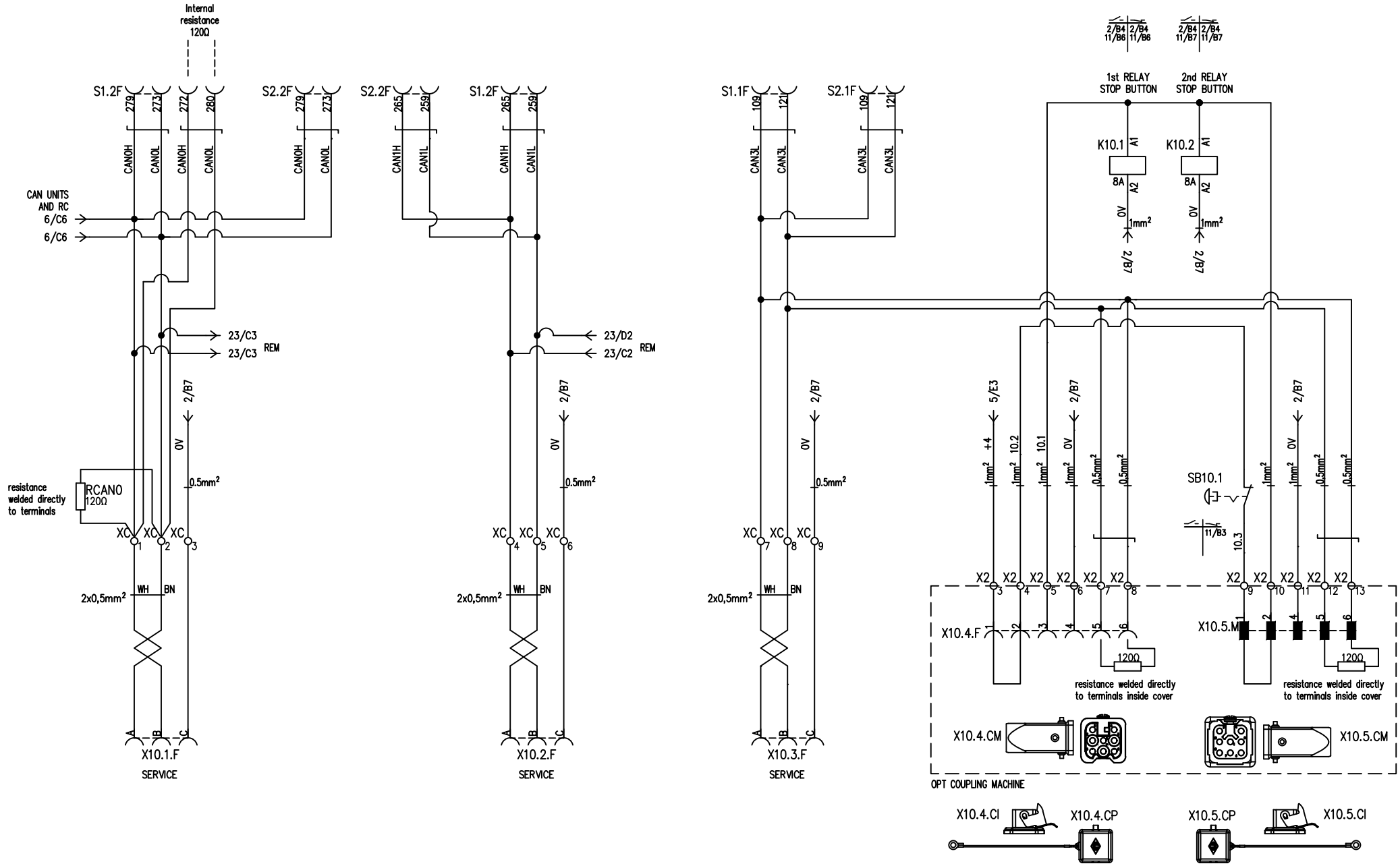
Drawing Nr:S01–00167
Archive Nr: S01

Date: 01/03/2017

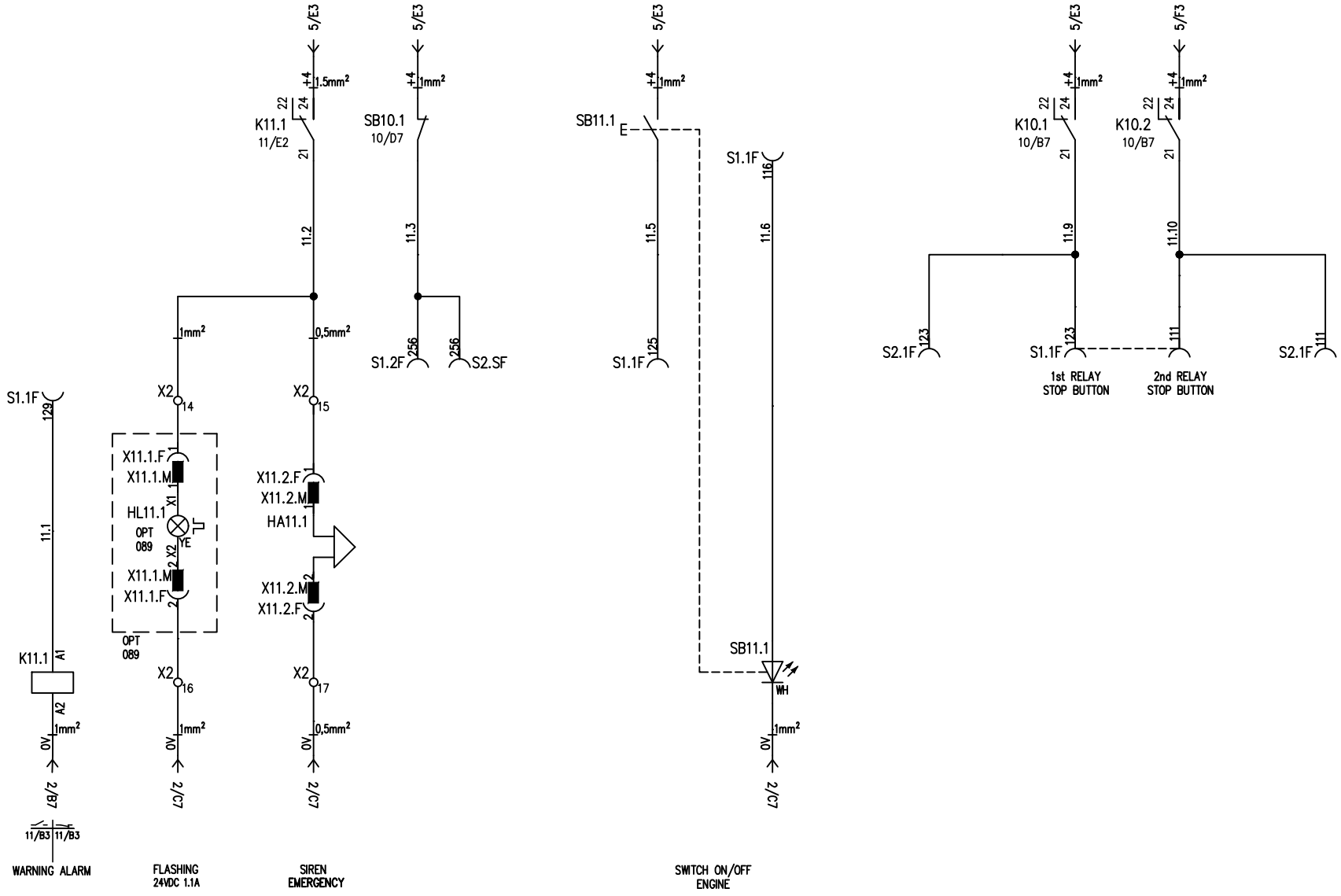


Grassobbio BG via Zanica, 17/o –Italy – Email: info@tesmec.it tel: +39 035 4232911 fax: +39 035 4522445
Sede di Endine Gaiano BG via Pertegalli – Italy – tel: +39 035 825024 fax: +39 035 826375

Electric scheme	ELECTRONIC CARD: SUPPLY	Drawn: Locatelli	Drawing Nr:S01–00167 Archive Nr: S01	Sheet 9 of 39
	Design: AFB 621 050	Checked:	Date: 01/03/2017	Following 10

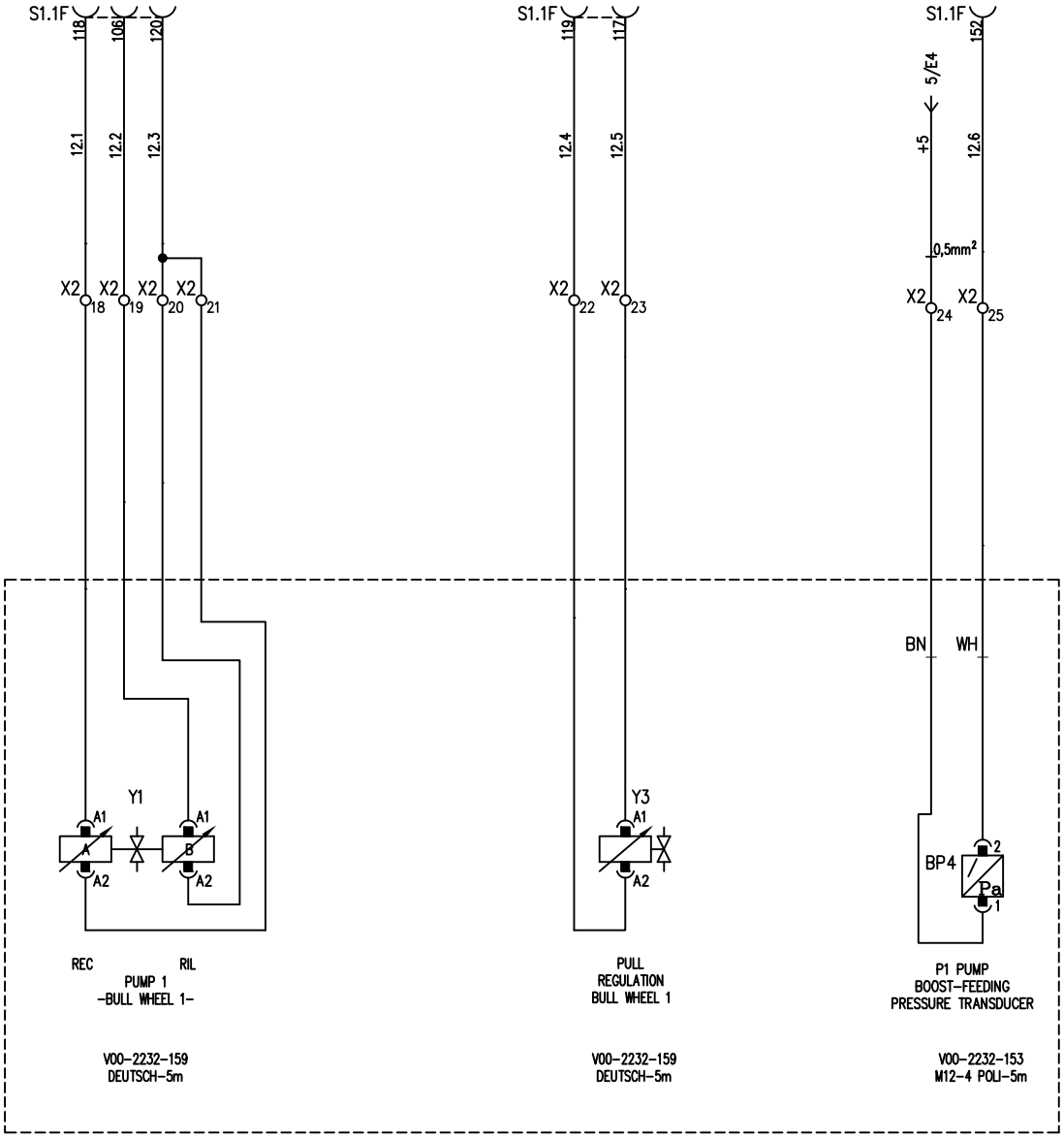


Electric scheme	ELECTRONIC CARD: CANBUS	Drawn: Locatelli	Drawing Nr:S01–00167 Archive Nr: S01	Sheet 10 of 39
	Design: AFB 621 050	Checked:	Date: 01/03/2017	Following 11



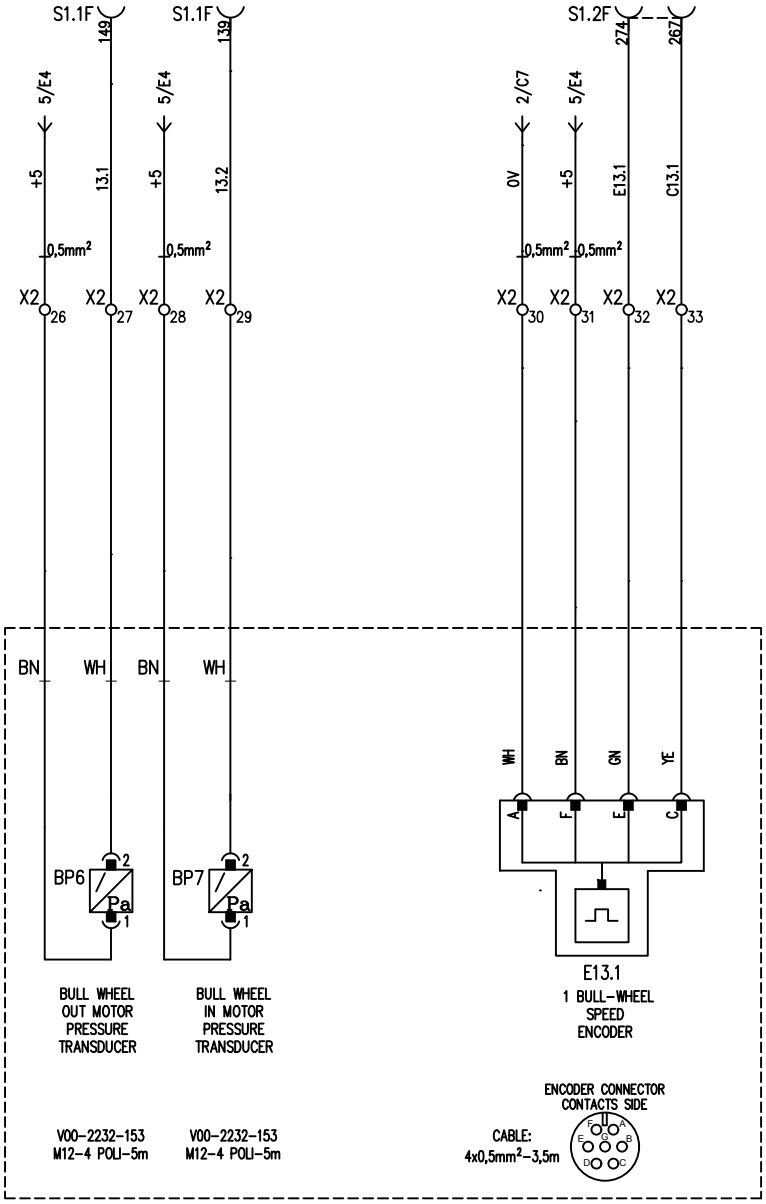
Grassobbio BG via Zanica, 17/o –Italy – Email: info@tesmec.it tel: +39 035 4232911 fax: +39 035 4522445
Sede di Endine Gaiano BG via Pertegalli – Italy – tel: +39 035 825024 fax: +39 035 826375

Electric scheme	ALARM AND SWITCH ON/OFF ENGINE	Drawn: Locatelli	Drawing Nr:S01–00167 Archive Nr: S01	Sheet 11 of 39
	Design: AFB 621 050	Checked:	Date: 01/03/2017	Following 12



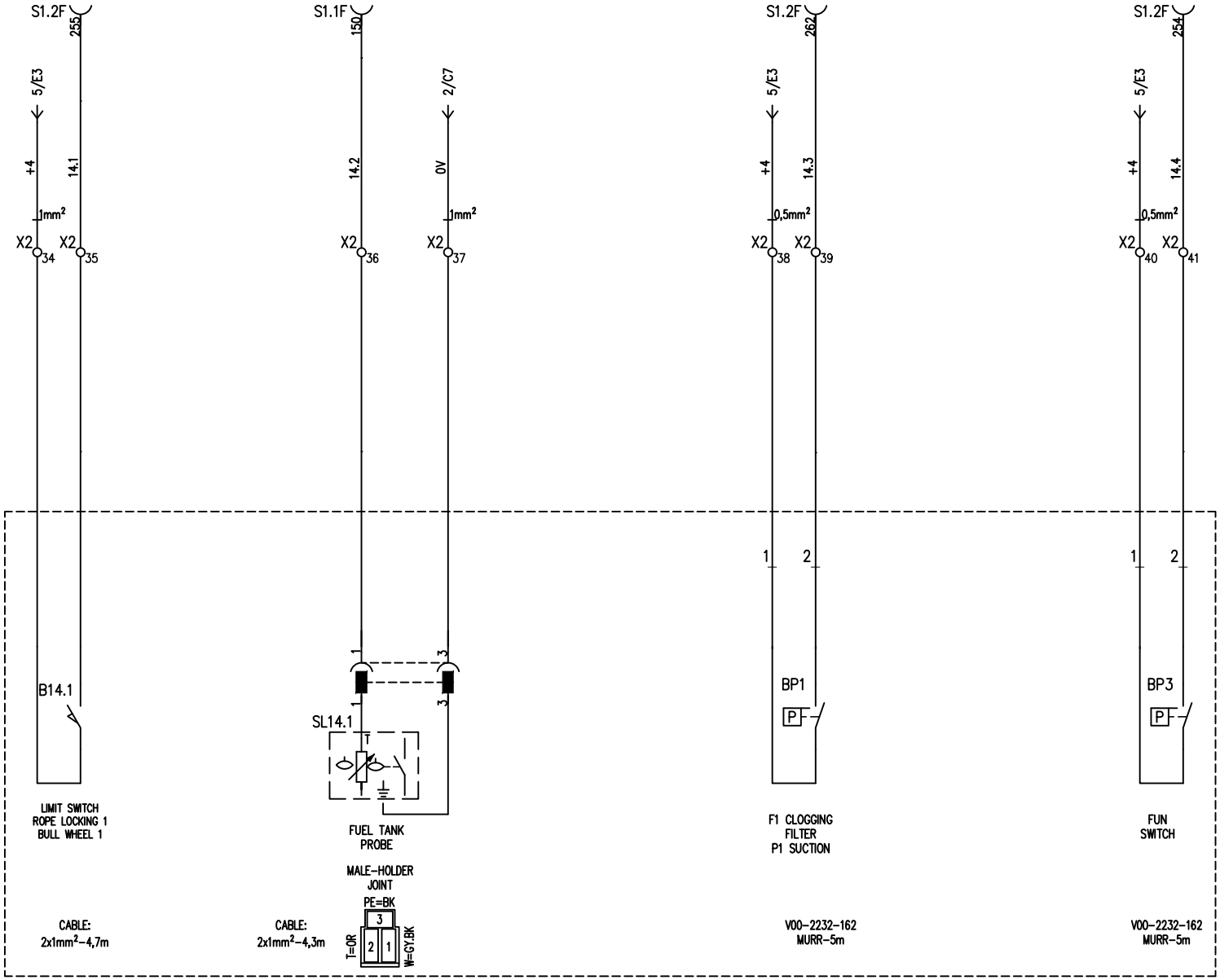
Grassobbio BG via Zanica, 17/o -Italy - Email: info@tesmec.it tel: +39 035 4232911 fax: +39 035 4522445
Sede di Endine Gaiano BG via Pertegalli - Italy - tel: +39 035 825024 fax: +39 035 826375

Electric scheme	MACHINE CONNECTIONS	Drawn: Locatelli	Drawing Nr:S01-00167 Archive Nr: S01	Sheet 12 of 39	
	Design: AFB 621 050	Checked:	Date: 01/03/2017	Following 13	



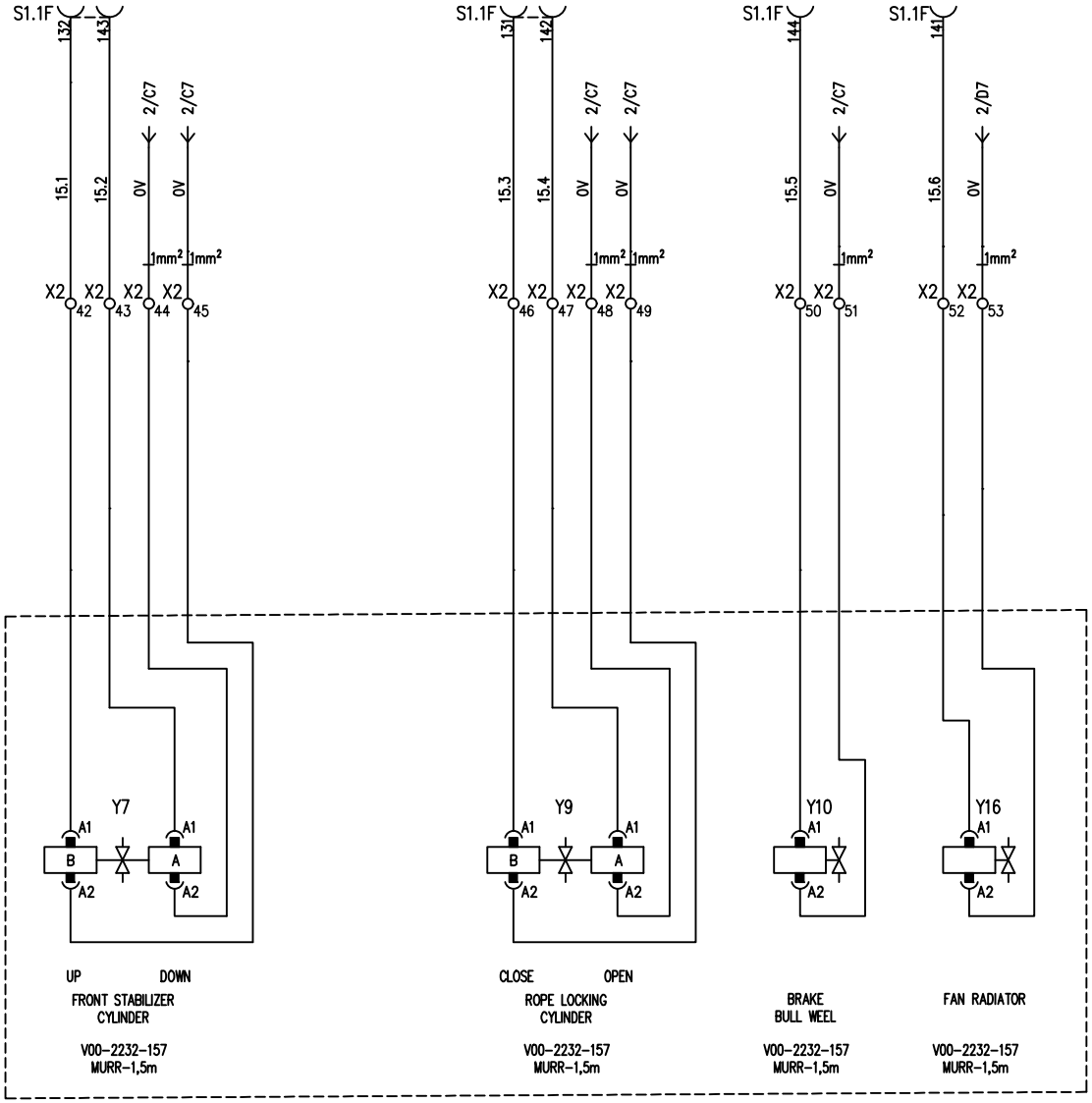
Grassobbio BG via Zanica, 17/o -Italy - Email: info@tesmec.it tel: +39 035 4232911 fax: +39 035 4522445
Sede di Endine Gaiano BG via Pertegalli - Italy - tel: +39 035 825024 fax: +39 035 826375

Electric scheme	MACHINE CONNECTIONS	Drawn: Locatelli	Drawing Nr:S01-00167 Archive Nr: S01	Sheet 13 of 39
	Design: AFB 621 050	Checked:	Date: 01/03/2017	Following 14



Grassobbio BG via Zanica, 17/o -Italy - Email: info@tesmec.it tel: +39 035 4232911 fax: +39 035 4522445
Sede di Endine Gaiano BG via Pertegalli - Italy - tel: +39 035 825024 fax: +39 035 826375

Electric scheme	MACHINE CONNECTIONS	Drawn: Locatelli	Drawing Nr:S01-00167 Archive Nr: S01	Sheet 14 of 39	
	Design: AFB 621 050	Checked:	Date: 01/03/2017	Following 15	



TESMEC
Grassobbio BG via Zanica, 17/o –Italy – Email: info@tesmec.it tel: +39 035 4232911 fax: +39 035 4522445
Sede di Endine Gaiano BG via Pertegalli – Italy – tel: +39 035 825024 fax: +39 035 826375

Electric scheme

MACHINE CONNECTIONS

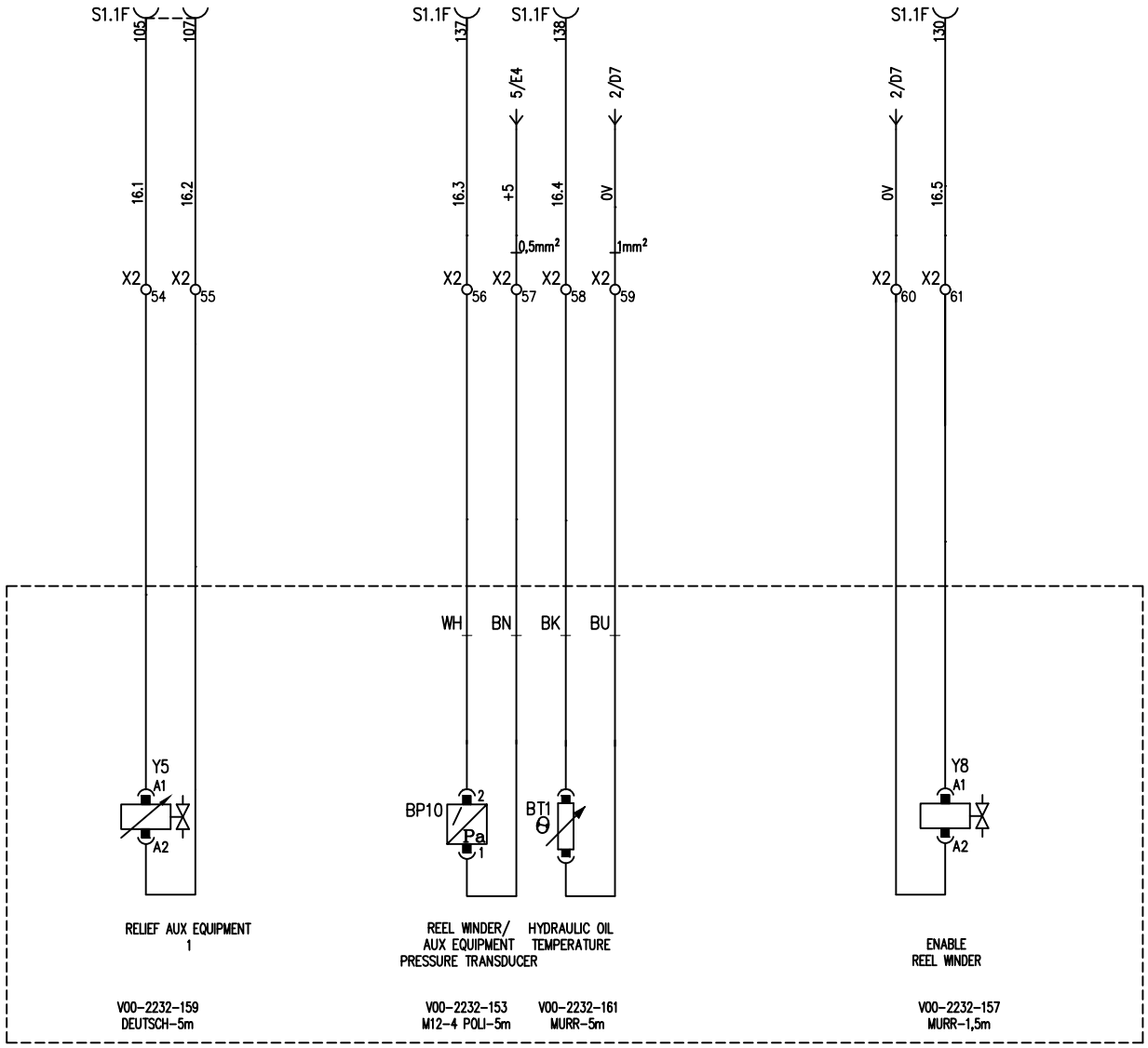
Design: AFB 621 050

Drawn: Locatelli

Checked:

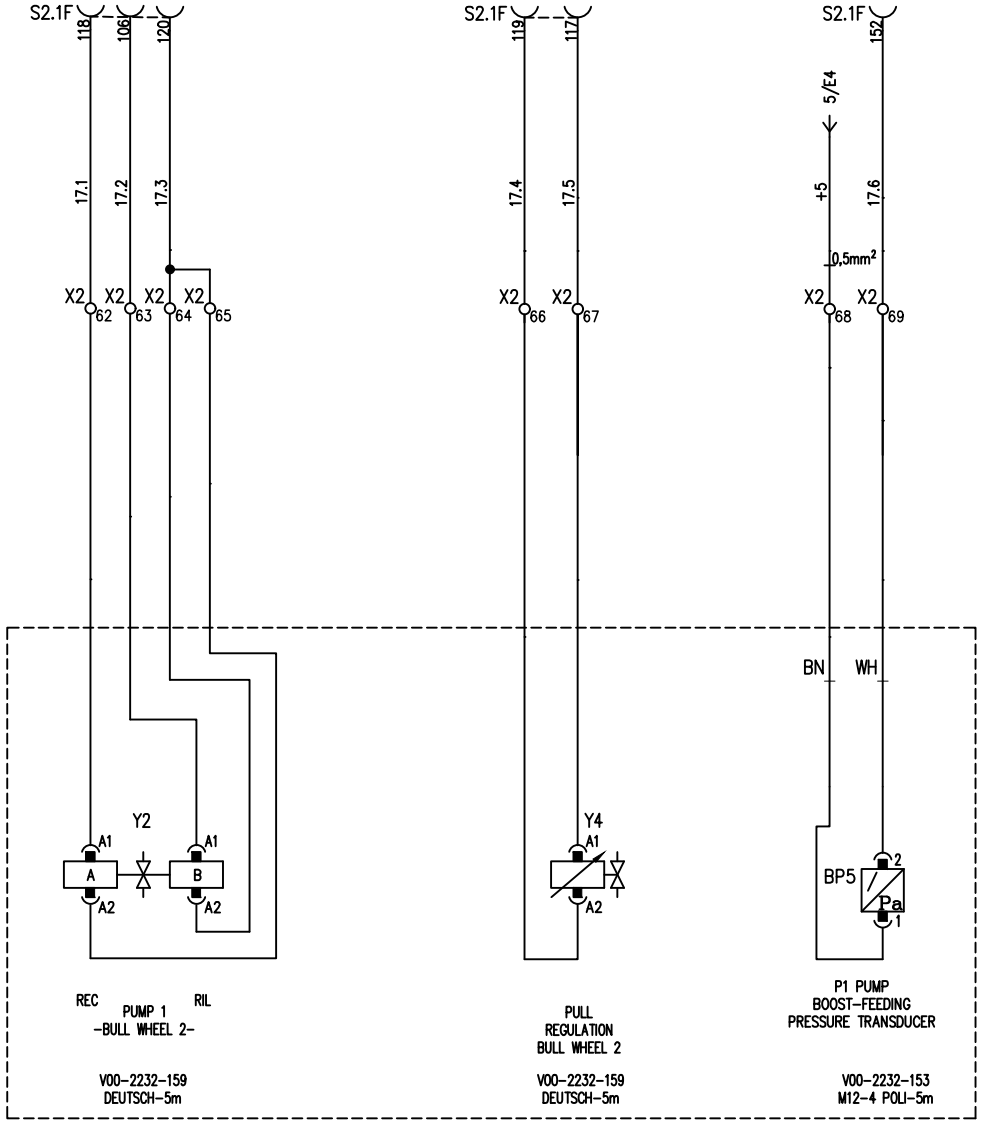
Drawing Nr:S01–00167
Archive Nr: S01

Date: 01/03/2017



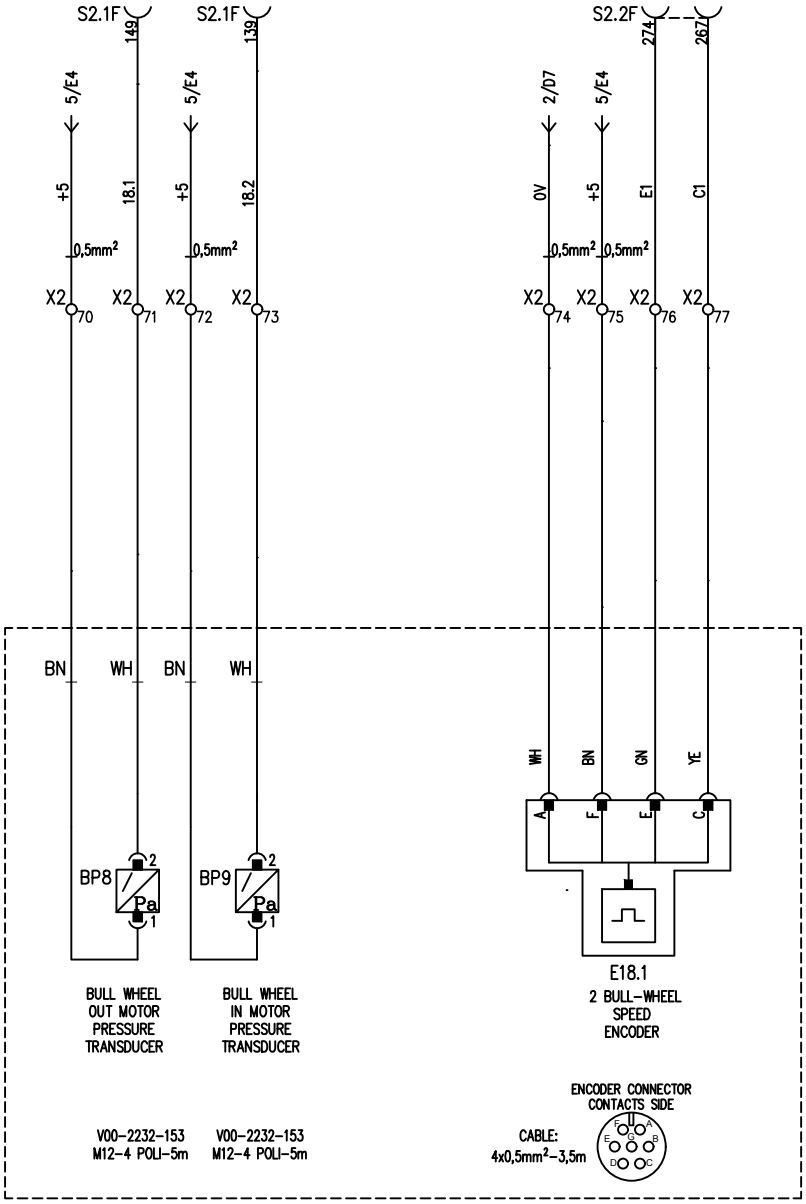
Grassobbio BG via Zanica, 17/o –Italy – Email: info@tesmec.it tel: +39 035 4232911 fax: +39 035 4522445
Sede di Endine Gaiano BG via Pertegalli – Italy – tel: +39 035 825024 fax: +39 035 826375

Electric scheme	MACHINE CONNECTIONS	Drawn: Locatelli	Drawing Nr:S01–00167 Archive Nr: S01	Sheet 16 of 39
	Design: AFB 621 050	Checked:	Date: 01/03/2017	Following 17



TESMEC
Grassobbio BG via Zanica, 17/o -Italy - Email: info@tesmec.it tel: +39 035 4232911 fax: +39 035 4522445
Sede di Endine Gaiano BG via Pertegalli - Italy - tel: +39 035 825024 fax: +39 035 826375

Electric scheme	MACHINE CONNECTIONS	Drawn: Locatelli	Drawing Nr:S01-00167 Archive Nr: S01	Sheet 17 of 39
	Design: AFB 621 050	Checked:	Date: 01/03/2017	Following 18



TESMEC
Grassobbio BG via Zanica, 17/o -Italy - Email: info@tesmec.it tel: +39 035 4232911 fax: +39 035 4522445
Sede di Endine Gaiano BG via Pertegalli - Italy - tel: +39 035 825024 fax: +39 035 826375

Electric scheme

MACHINE CONNECTIONS

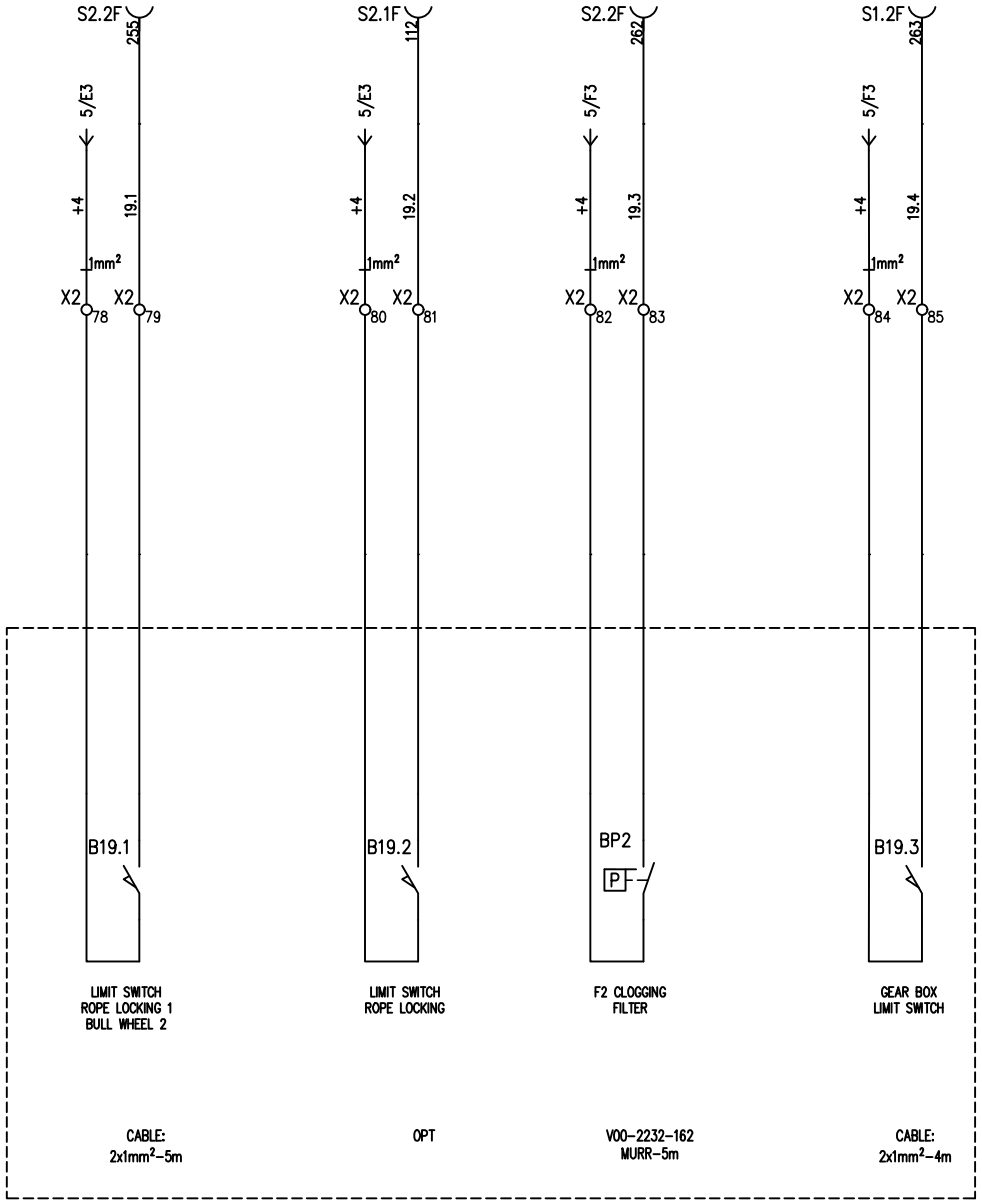
Design: AFB 621 050

Drawn: Locatelli

Checked:

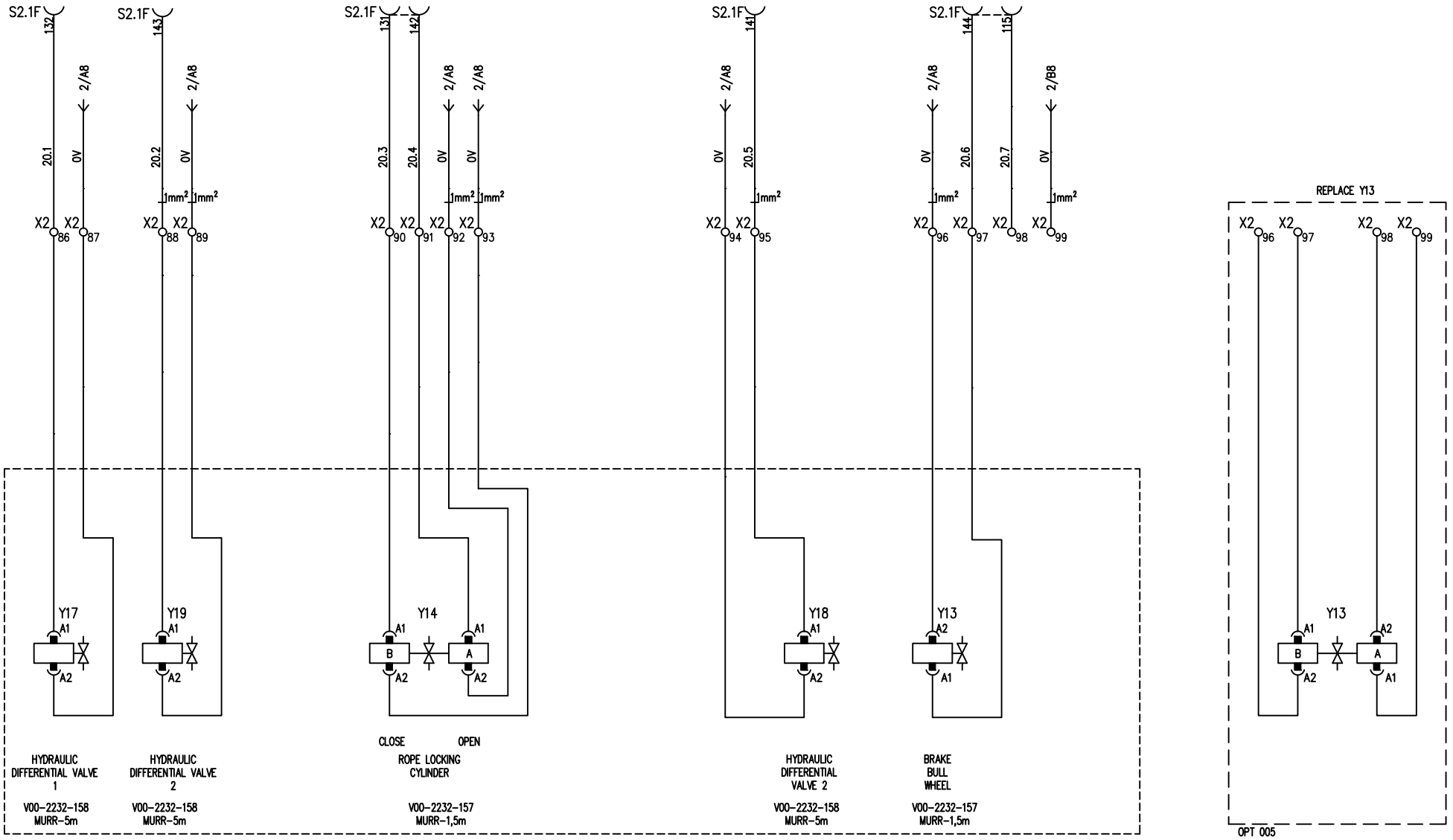
Drawing Nr:S01-00167
Archive Nr: S01

Date: 01/03/2017



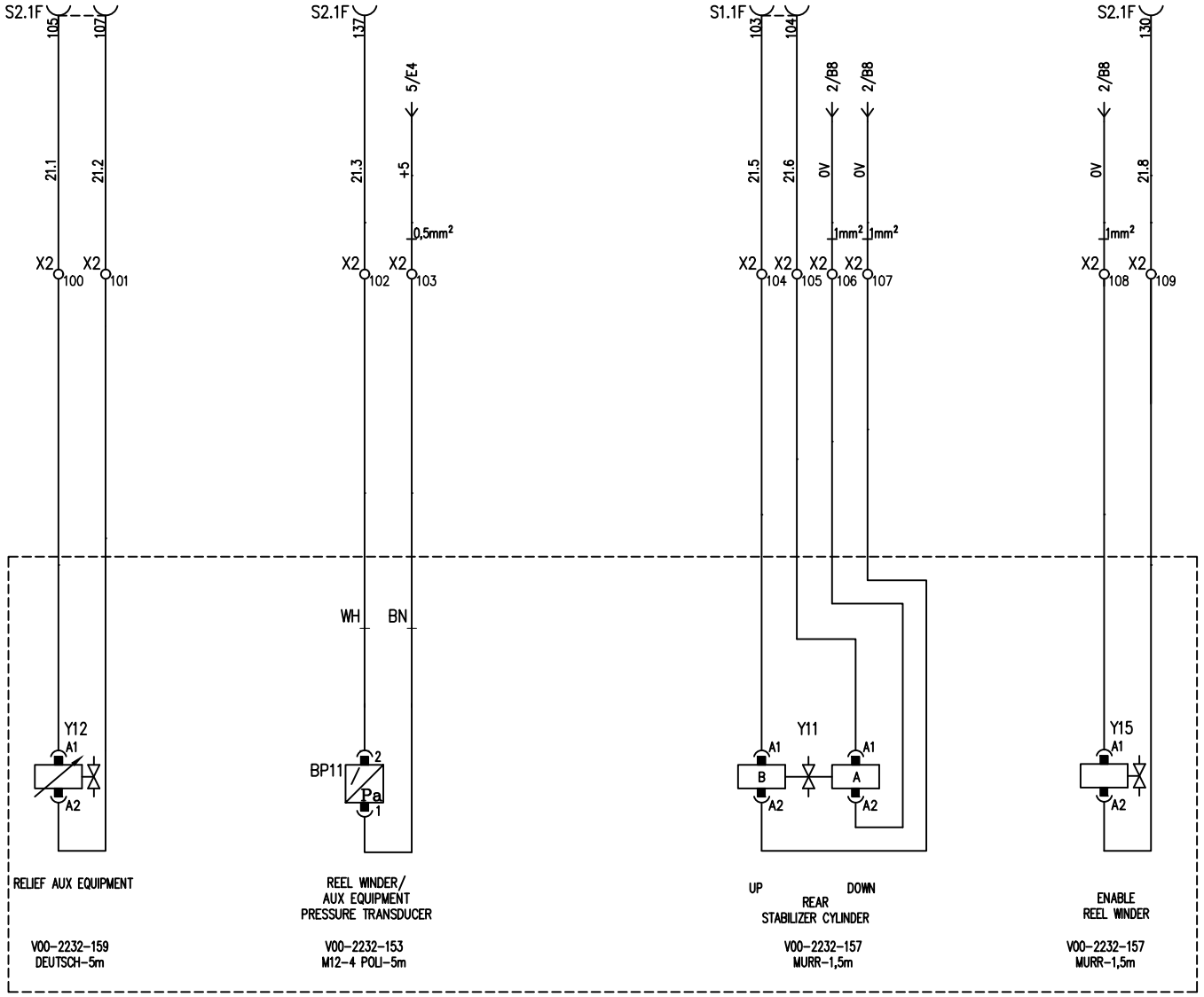
Grassobbio BG via Zanica, 17/o -Italy - Email: info@tesmec.it tel: +39 035 4232911 fax: +39 035 4522445
Sede di Endine Gaiano BG via Pertegalli - Italy - tel: +39 035 825024 fax: +39 035 826375

Electric scheme	MACHINE CONNECTIONS	Drawn: Locatelli	Drawing Nr:S01-00167 Archive Nr: S01	Sheet 19 of 39
	Design: AFB 621 050	Checked:	Date: 01/03/2017	Following 20



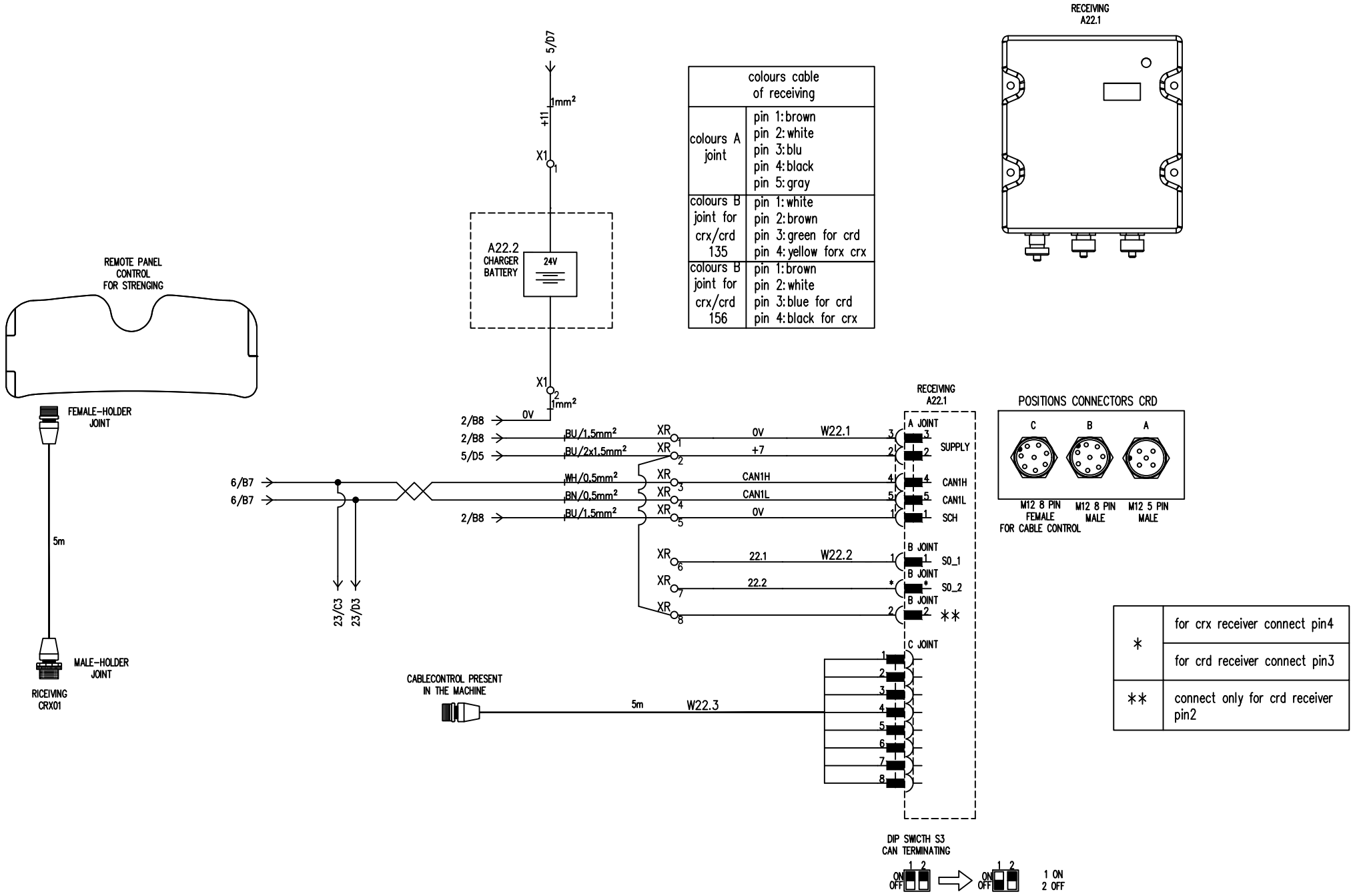
TESMEC
Grassobbio BG via Zanica, 17/o –Italy – Email: info@tesmec.it tel: +39 035 4232911 fax: +39 035 4522445
Sede di Endine Gaiano BG via Pertegalli – Italy – tel: +39 035 825024 fax: +39 035 826375

Electric scheme	MACHINE CONNECTIONS	Drawn: Locatelli	Drawing Nr:S01–00167 Archive Nr: S01
	Design: AFB 621 050	Checked:	Date: 01/03/2017



TESMEC
Grassobbio BG via Zanica, 17/o –Italy – Email: info@tesmec.it tel: +39 035 4232911 fax: +39 035 4522445
Sede di Endine Gaiano BG via Pertegalli – Italy – tel: +39 035 825024 fax: +39 035 826375

Electric scheme	MACHINE CONNECTIONS	Drawn: Locatelli	Drawing Nr:S01–00167 Archive Nr: S01	Sheet 21 of 39	
	Design: AFB 621 050	Checked:	Date: 01/03/2018	Following 22	



colours cable of receiving	
colours A joint	pin 1: brown pin 2: white pin 3: blu pin 4: black pin 5: gray
colours B joint for crx/crd 135	pin 1: white pin 2: brown pin 3: green for crd pin 4: yellow forx crx
colours B joint for crx/crd 156	pin 1: brown pin 2: white pin 3: blue for crd pin 4: black for crx

*	for crx receiver connect pin4
	for crd receiver connect pin3
**	connect only for crd receiver pin2

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Sede di Endine Gaiano BG via Pertegalli – Italy – tel: +39 035 825024 fax: +39 035 826375

Electric scheme

REMOTE CONTROL STRENGING

Design: AFB 621 050

Drawn: Locatelli

Checked:

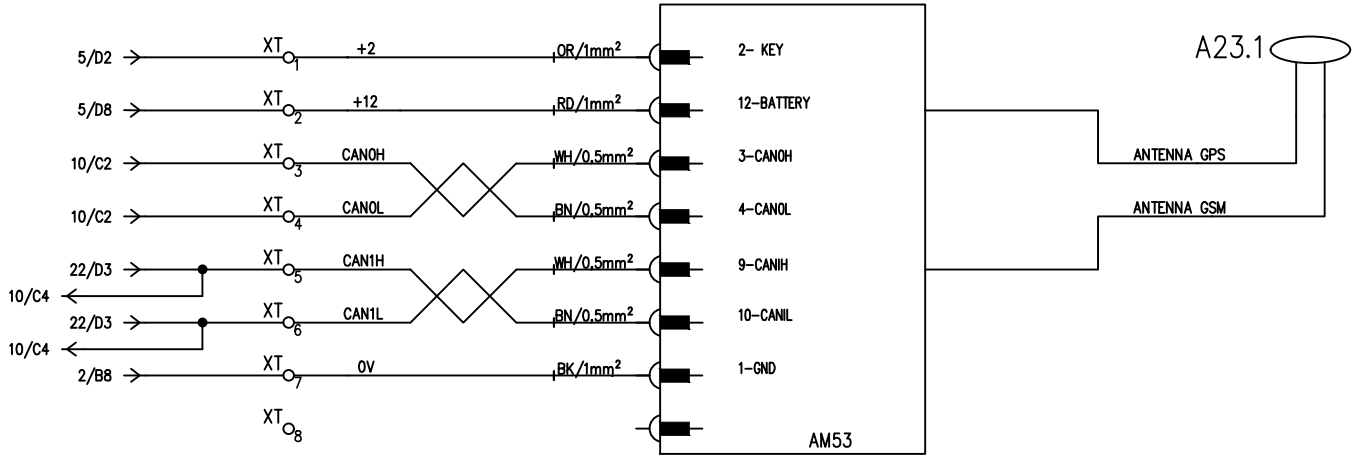
Drawing Nr:S01–00167 S01

Archive Nr:

Date: 01/03/2018

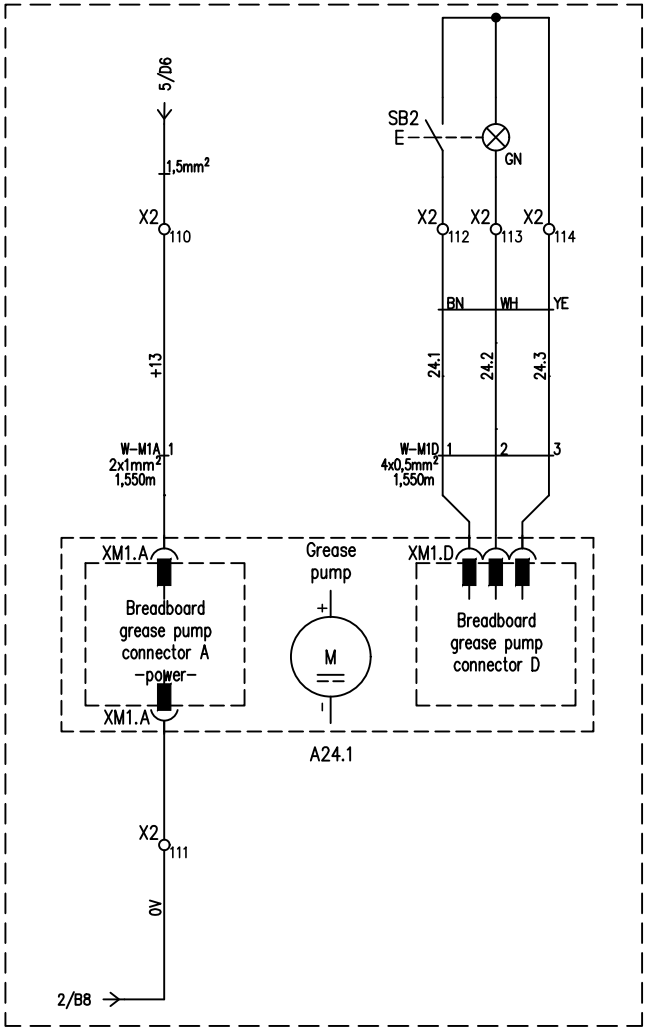
Sheet 22 of 39

Following 23



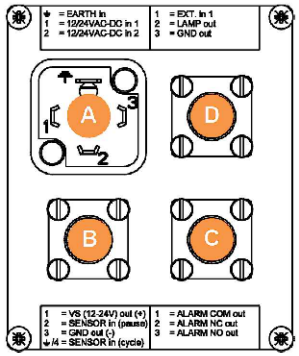
Grassobbio BG via Zanica, 17/o –Italy – Email: info@tesmec.it tel: +39 035 4232911 fax: +39 035 4522445
Sede di Endine Gaiano BG via Pertegalli – Italy – tel: +39 035 825024 fax: +39 035 826375

Electric scheme	REM	Drawn: Locatelli	Drawing Nr:S01–00122 Archive Nr: S01	Sheet 23 of 39
	Design: AFB 621 001	Checked:	Date: 31/07/2017	Following 24



A24.1

GREASE PUMP CONNECTIONS



Setting for DROPSA
BRAVO grease pump:

MODE	–	CYCLE
P.Hou	–	2
P.Cou	–	1
C.min	–	10
C.cou	–	0
Pr.El	–	OFF
duty	–	100
NCYC	–	1
P.toa	–	OFF
Lev.	–	ON

TESMEC
Grassobbio BG via Zanica, 17/o –Italy – Email: info@tesmec.it tel: +39 035 4232911 fax: +39 035 4522445
Sede di Endine Gaiano BG via Pertegalli – Italy – tel: +39 035 825024 fax: +39 035 826375

Electric scheme

PUMP

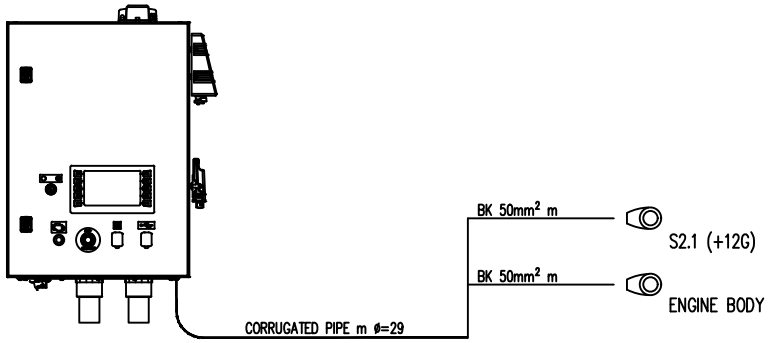
Design: AFB 621 050

Drawn: Locatelli

Checked:

Drawing Nr:S01–00167
Archive Nr: S01

Date: 01/03/2018



TESMEC
Grassobbio BG via Zanica, 17/o –Italy – Email: info@tesmec.it tel: +39 035 4232911 fax: +39 035 4522445
Sede di Endine Gaiano BG via Pertegalli – Italy – tel: +39 035 825024 fax: +39 035 826375

Electric scheme

SUPPLY TO PANEL AND ENGINE SIGNALS WIRING

Design: AFB 621 050

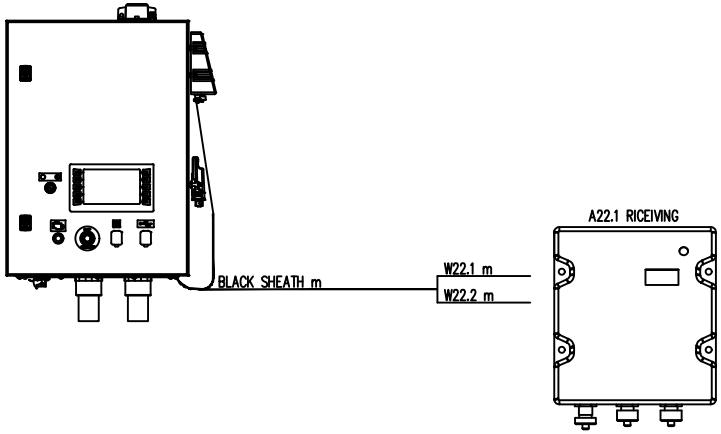
Drawn: Locatelli

Checked:

Drawing Nr:S01–00167
Archive Nr: S01

Date: 01/03/2018

REMOTE CONTROL STRENGING



X22.2.F
CONNETTORE A RICEVENTE
M12 FEMALE 5 PIN

PIN	WIRE	POSITION	COLOUR
1	SCH	22/D6	SCH
2	+7	22/C6	RD
3	0V	22/C6	BK
4	CAN1H	22/C6	BU
5	CAN1L	22/D6	WH

X22.2.F
CONNETTORE A RICEVENTE
M12 FEMALE 8 PIN

1	22.1	22/D6	WH
2	+7	22/D6	BR
3*	22.2	22/D6	GN
4*	22.2	22/D6	YE
5	/	/	GY
6	/	/	PK
7	/	/	BU
8	/	/	RD

*	for crx receiver connect pin4
	for crd receiver connect pin3

TESMEC
Grassobbio BG via Zanica, 17/o –Italy – Email: info@tesmec.it tel: +39 035 4232911 fax: +39 035 4522445
Sede di Endine Gaiano BG via Pertegalli – Italy – tel: +39 035 825024 fax: +39 035 826375

Electric scheme

REMOTE CONTROLS

Design: AFB 621 050

Drawn: Locatelli

Checked:

Drawing Nr:S01–00167
Archive Nr: S01

Date: 01/03/2018

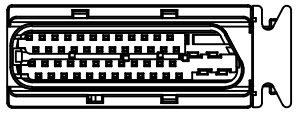
S1.1F
CONNETTORE 52 PIN SCHEDA TTC94
FEMALES-HOLDER JOINT 52-WAYS

PIN	WIRE	POSITION	CABLE	DESIGNATION
101	+10	9/B3	1.5mm²	BATT. +
102	0V	9/B3	1.5mm²	BATT. -
103	21.4	21/A5	0.5mm²	X2
104	21.5	21/A5	0.5mm²	X2
105	16.1	16/A2	0.5mm²	X2
106	12.2	12/A2	0.5mm²	X2
107	16.2	16/A2	0.5mm²	X2
108				
109	CAN3H	10/A5	0.5mm²	CAN COUPLING
110				
111	11.10	11/C7	0.5mm²	K10.2
112				
113				
114				
115				
116	11.6	11/B5	0.5mm²	SB11.1
117	12.5	12/A4	0.5mm²	X2
118	12.1	12/A2	0.5mm²	X2
119	12.4	12/A4	0.5mm²	X2
120	12.3	12/A2	0.5mm²	X2
121	CAN3L	10/A5	0.5mm²	CAN
122				
123	11.9	11/C6	0.5mm²	K10.1
124				
125	11.5	11/C4	0.5mm²	SB11.1
126				
127	+8	9/B3	1.5mm²	POWER (LOAD)
128	+8	9/B3	1.5mm²	POWER (LOAD)
129	11.1	11/D2	0.5mm²	K11.1
130	16.5	16/A6	0.5mm²	X2
131	15.3	15/A3	0.5mm²	X2
132	15.1	15/A1	0.5mm²	X2
133				
134				
135				
136				
137	16.3	16/A4	0.5mm²	X2
138	16.4	16/A4	0.5mm²	X2
139	13.2	13/A3	0.5mm²	X2
140				
141	15.6	15/A5	0.5mm²	X2
142	15.4	15/A3	0.5mm²	X2
143	15.2	15/A1	0.5mm²	X2
144	15.5	15/A4	0.5mm²	X2

S1.1F
CONNETTORE 52 PIN SCHEDA TTC94
FEMALES-HOLDER JOINT 52-WAYS

PIN	WIRE	POSITION	CABLE	DESIGNATION
145				
146				
147				
148				
149	13.1	13/A2	0.5mm²	X2
150	14.2	14/A3	0.5mm²	X2
151				
152	12.6	12/A5	0.5mm²	X2

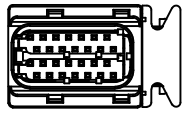
S1.1F



S1.2F
CONNETTORE 28 PIN SCHEDA TTC94
FEMALES-HOLDER JOINT 28-WAYS

PIN	WIRE	POSITION	CABLE	DESIGNATION
253				
254	14.4	14/A7	0.5mm²	X2
255	14.1	14/A2	0.5mm²	X2
256	11.3	11/C3	0.5mm²	SB1.3
257	7.1	7/B2	0.5mm²	X2
258				
259	CAN1L	10/A3	0.5mm²	CAN REMOTE
260				
261				
262	14.3	14/A5	0.5mm²	X2
263	19.4	19/A5	0.5mm²	X2
264	7.2	7/C2	0.5mm²	X2
265	CAN1H	10/A4	0.5mm²	CAN REMOTE
266				
267	C13.1	13/A5	0.5mm²	X2
268				
269				
270				
271	+6	9/B3	1.5mm²	SWITCHED POWER
272	CAN0H	10/A2	0.5mm²	CAN UNIT TTC
273	CAN0L	10/A1	0.5mm²	CAN UNIT TTC
274	E13.1	13.A4	0.5mm²	X2
275				
276				
277				
278				
279	CAN0H	10/A1	0.5mm²	CAN UNIT TTC
280	CAN0L	10/A2	0.5mm²	CAN UNIT TTC

S1.2F



TESMEC
Grassobbio BG via Zanica, 17/o -Italy - Email: info@tesmec.it tel: +39 035 4232911 fax: +39 035 4522445
Sede di Endine Gaiano BG via Pertegalli - Italy - tel: +39 035 825024 fax: +39 035 826375

Electric scheme

A8.1 WIRING

Design: AFB 621 050

Drawn: Locatelli

Checked:

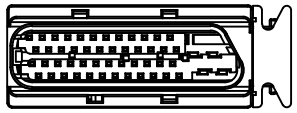
Drawing Nr:S01-00167 S01
Archive Nr:

Date: 01/03/2018

S2.1F CONNETTORE 52 PIN SCHEDA TTC94 FEMALES-HOLDER JOINT 52-WAYS				
PIN	WIRE	POSITION	CABLE	DESIGNATION
101	+10	9/B4	1.5mm²	BATT. +
102	0V	9/B5	1.5mm²	BATT. -
103				
104				
105	21.1	21/A2	0.5mm²	X2
106	17.2	17/A2	0.5mm²	X2
107	21.2	21/A2	0.5mm²	X2
108				
109	CAN3H	10/A5	0.5mm²	CAN COUPLING
110				
111	11.10	11/C8	0.5mm²	K10.2
112	19.2	19/A3	0.5mm²	X2
113				
114				
115	20.7	20/A6	0.5mm²	X2
116				
117	17.5	17/A3	0.5mm²	X2
118	17.1	17/A1	0.5mm²	X2
119	17.4	17/A3	0.5mm²	X2
120	17.3	17/A2	0.5mm²	X2
121	CAN3L	10/A6	0.5mm²	CAN
122				
123	11.9	11/C6	0.5mm²	K10.1
124				
125				
126				
127	+9	9/B5	1.5mm²	POWER (LOAD)
128	+9	9/B5	1.5mm²	POWER (LOAD)
129				
130	21.6	21/A6	0.5mm²	X2
131	20.3	20/A3	0.5mm²	X2
132	20.1	20/A1	0.5mm²	X2
133				
134				
135				
136				
137	21.3	21/A3	0.5mm²	X2
138				
139	18.2	18/A2	0.5mm²	X2
140				
141	20.5	20/A5	0.5mm²	X2
142	21.4	21/A3	0.5mm²	X2
143	20.2	20/A2	0.5mm²	X2
144	20.6	20/A6	0.5mm²	X2

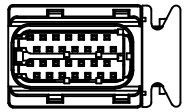
S2.1F CONNETTORE 52 PIN SCHEDA TTC94 FEMALES-HOLDER JOINT 52-WAYS				
PIN	WIRE	POSITION	CABLE	DESIGNATION
145				
146				
147				
148				
149	18.1	18/A2	0.5mm²	X2
150				
151				
152	17.6	17/A4	0.5mm²	X2

S2.1F



S2.2F CONNETTORE 28 PIN SCHEDA TTC94 FEMALES-HOLDER JOINT 28-WAYS				
PIN	WIRE	POSITION	CABLE	DESIGNATION
253				
254				
255	19.1	19/A2	0.5mm²	X2
256				
257				
258				
259	CAN1L	10/A3	0.5mm²	CAN REMOTE
260				
261				
262	19.3	19/A4	0.5mm²	X2
263				
264				
265	CAN1H	10/A3	0.5mm²	CAN REMOTE
266				
267	C1	18/A4	0.5mm²	X2
268				
269				
270				
271	+6	9/B5	1.5mm²	SWITCHED POWER
272				
273	CAN0L	10/A2	0.5mm²	CAN UNIT TTC
274	E1	18/A4	0.5mm²	X2
275				
276				
277				
278				
279	CAN0H	10/A2	0.5mm²	CAN UNIT TTC
280				

S2.2F



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Electric scheme

A8.2 WIRING

Design: AFB 621 050

Drawn: Locatelli

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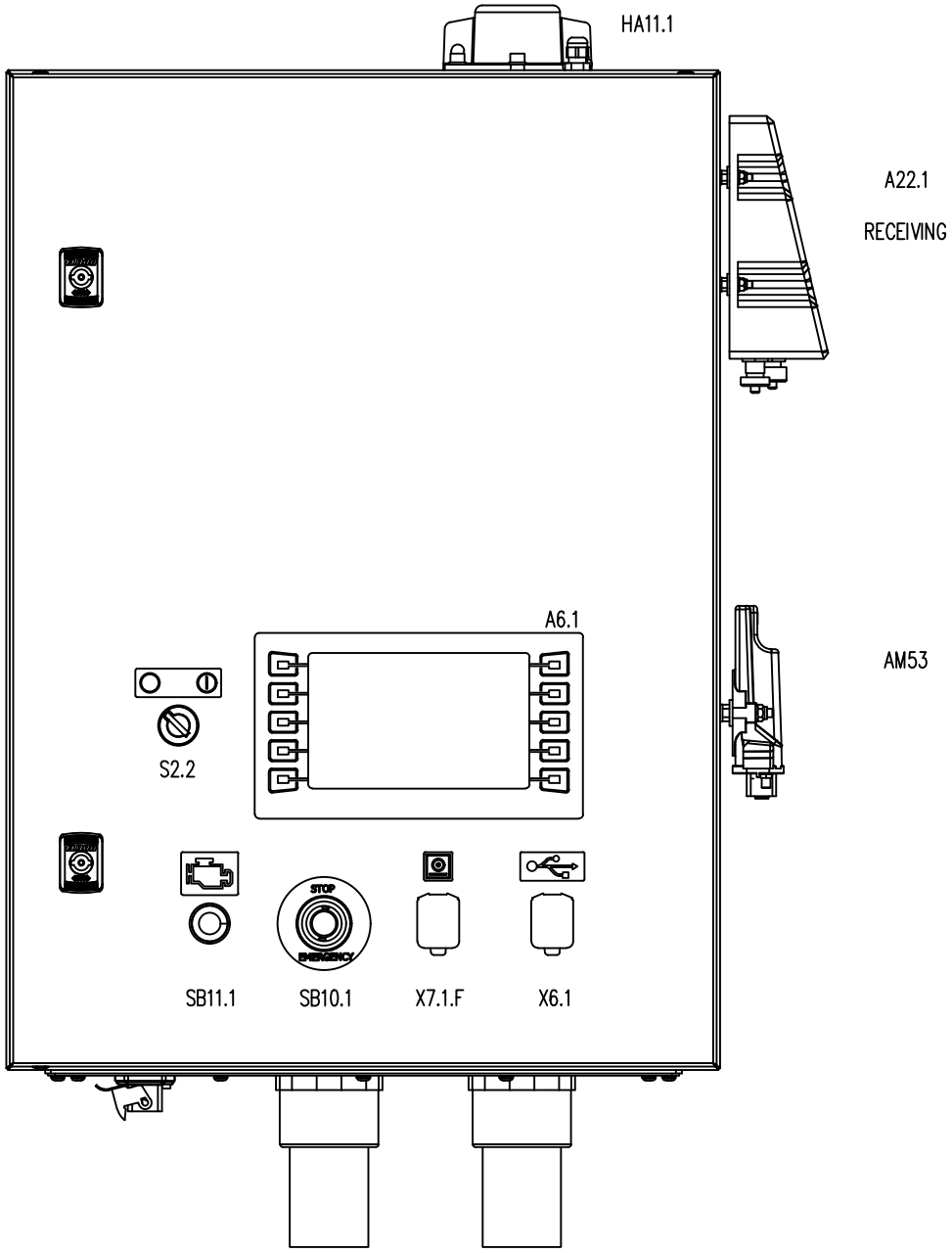
Drawing Nr:S01-00167 S01
Archive Nr:

Date: 01/03/2018



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Electric scheme

EXTERNAL PANEL

Design: AFB 621 0050

Drawn: Locatelli

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Drawing Nr:S01–00167 S01
Archive Nr:

Date: 01/03/2018

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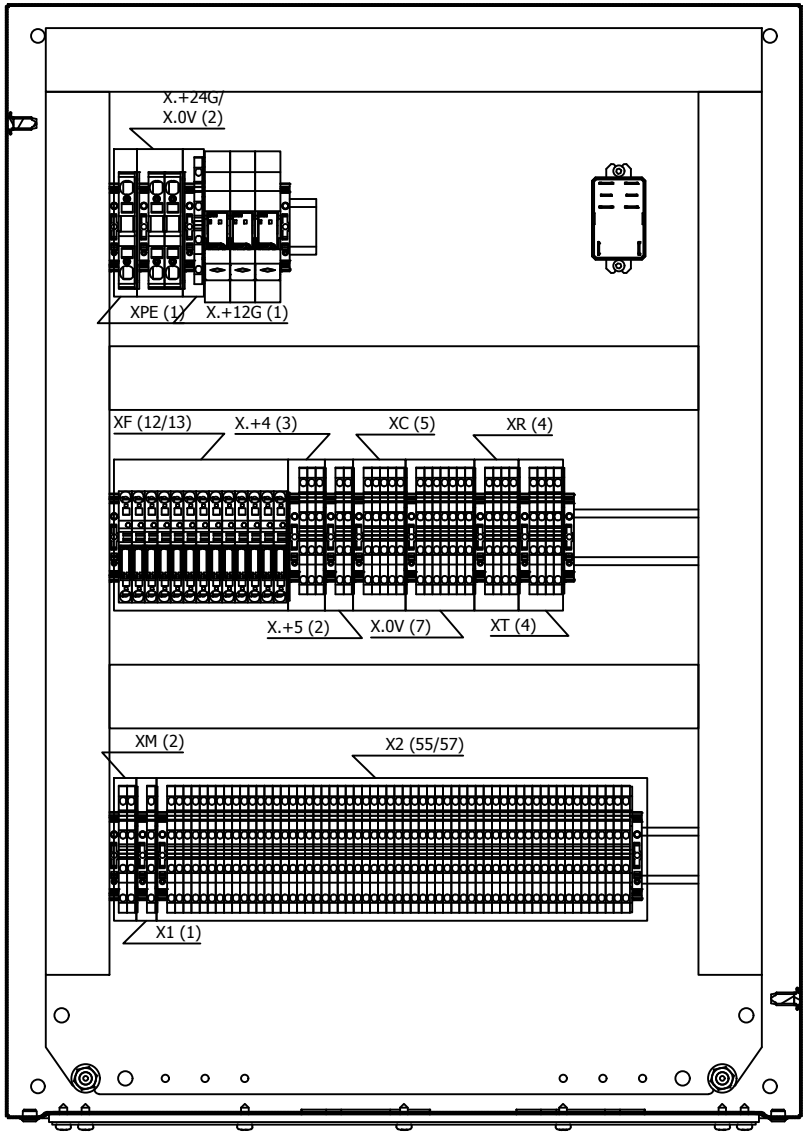
Following 30



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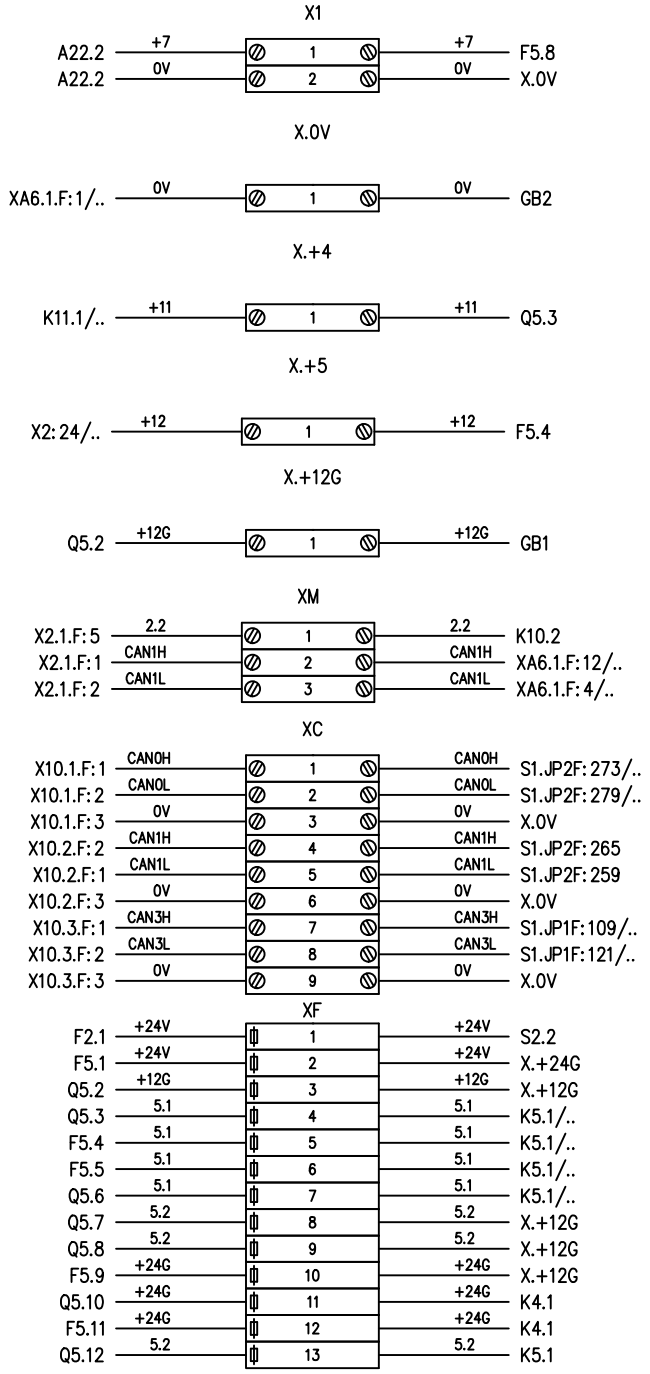
Electric scheme	INTERNAL PANEL	Drawn: Locatelli	Drawing Nr:S01–00167 Archive Nr: S01	Sheet 30 of 39
	Design: AFB 621 050	Checked:	Date: 01/03/2018	Following 31



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Electric scheme

TERMINALS BOARD

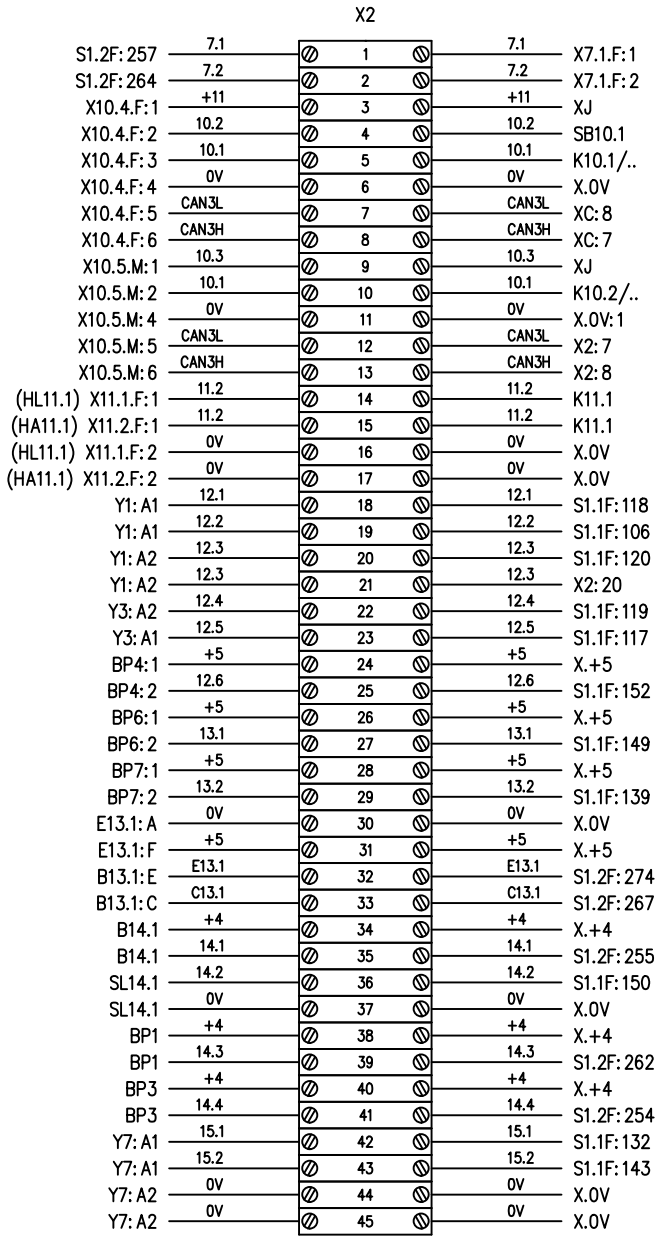
Design: AFB 621 050

Drawn: Locatelli

Checked:

Drawing Nr:S01–00167 S01
Archive Nr:

Date: 01/03/2018



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Electric scheme

TERMINALS BOARD

Design: AFB 621 050

Drawn: Locatelli

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Drawing Nr:S01–00167 Archive Nr: S01

Date: 01/03/2018

X2

Y9: A1	15.3	46	15.3	S1.1F: 131
Y9: A1	15.4	47	15.4	S1.1F: 142
Y9: A2	0V	48	0V	X.0V
Y9: A2	0V	49	0V	X.0V
Y10: A1	15.5	50	15.5	S1.1F: 144
Y10: A2	0V	51	0V	X.0V
Y16: A1	15.6	52	15.6	S1.1F: 141
Y16: A2	0V	53	0V	X.0V
Y5: A1	16.1	54	16.1	S1.1F: 105
Y5: A2	16.2	55	16.2	S1.1F: 107
BP10: 2	16.3	56	16.3	S1.1F: 137
BP10: 1	+5	57	+5	X.+5
BT1	16.4	58	16.4	S1.1F: 138
BT1	0V	59	0V	X.0V
Y8: A2	0V	60	0V	X.0V
Y8: A1	16.8	61	16.8	S1.1F: 130
Y2: A1	17.1	62	17.1	S2.1F: 118
Y2: A1	17.2	63	17.2	S2.1F: 106
Y2: A2	17.3	64	173	S2.1F: 120
Y2: A2	17.3	65	173	S2.1F: 120
Y4: A2	17.4	66	17.4	S2.1F: 119
Y4: AA	17.5	67	17.5	S2.1F: 117
BP5: 1	+5	68	+5	X.+5
BP5: 2	17.6	69	17.6	S2.1F: 152
BP8: 1	+5	70	+5	X.+5
BP8: 2	18.1	71	18.1	S2.1F: 149
BP9: 1	+5	72	+5	X.+5
BP9: 2	18.2	73	18.2	S2.1F: 139
E18.1: A	0V	74	0V	X.0V
E18.1: F	+5	75	+5	X.+5
E18.1: E	E1	76	E1	S2.2F: 274
E18.1: C	C1	77	C1	S2.2F: 267
B19.1	+4	78	+4	X.+4
B19.1	19.1	79	19.1	S2.2F: 255
B19.2	+4	80	+4	X.+4
B19.2	19.2	81	19.2	S2.1F: 112
BP2	+4	82	+4	X.+4
BP2	19.3	83	19.3	S2.2F: 262
B19.3	+4	84	+4	X.+4
B19.3	19.4	85	19.4	S1.2F: 263
Y17: A1	20.1	86	20.1	S2.1F: 132
Y17: A2	0V	87	0V	X.0V

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Electric scheme

TERMINALS BOARD

Design: AFB 621 050

Drawn: Locatelli

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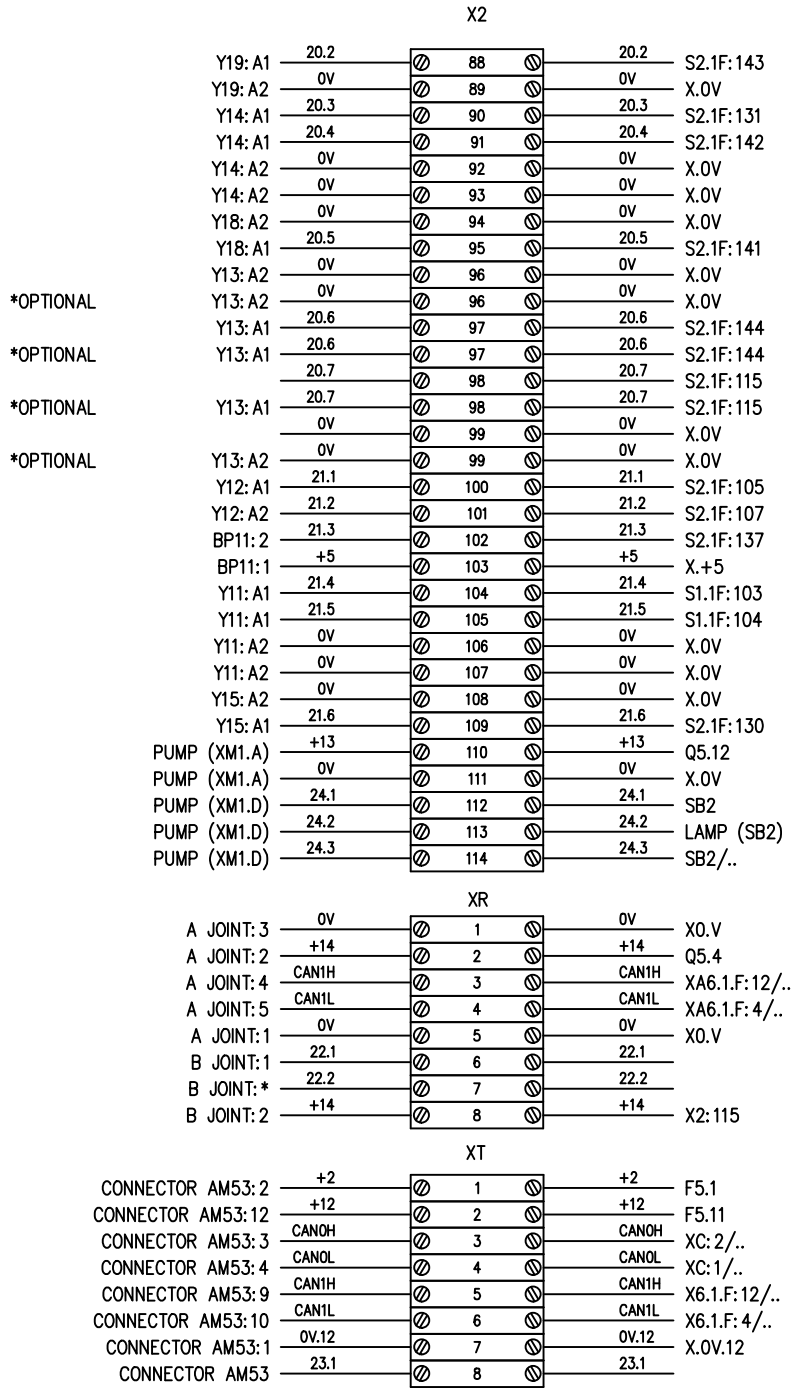
Drawing Nr:S01–00167 S01
Archive Nr:

Date: 01/03/2018



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Electric scheme

TERMINALS BOARD

Design: AFB 621 050

Drawn: Locatelli

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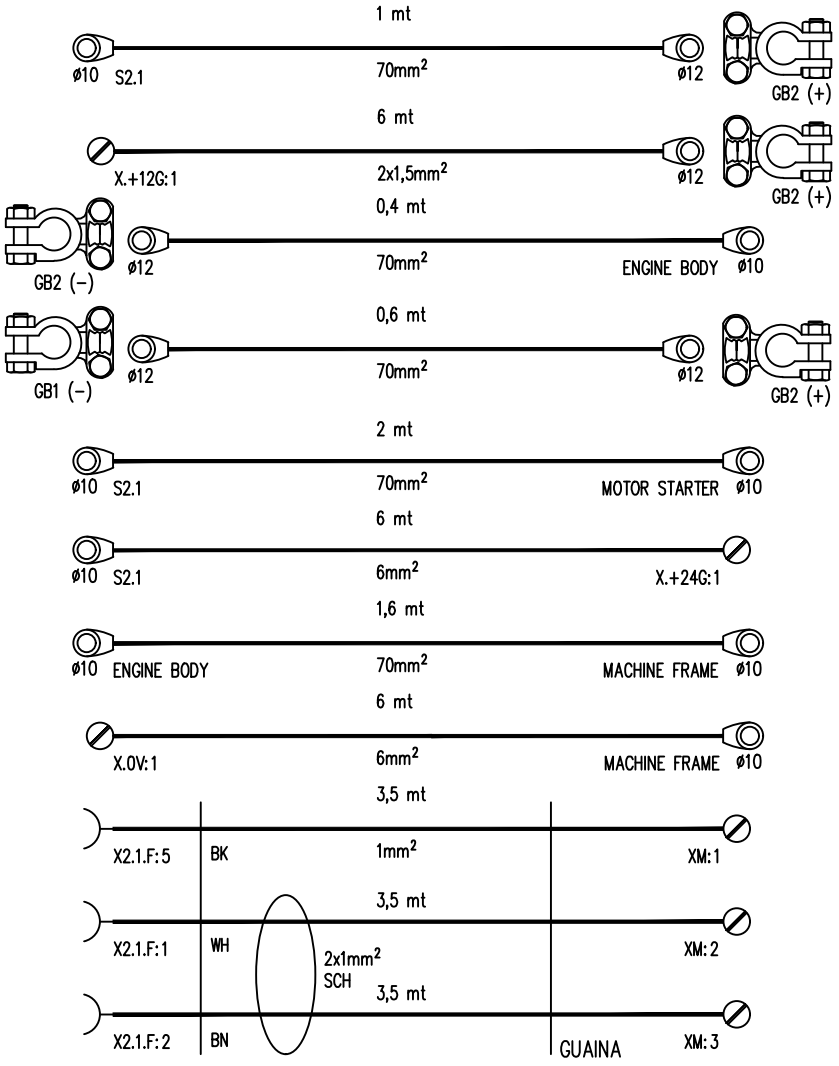
Drawing Nr:S01–00167 Archive Nr: S01

Date: 01/03/2018



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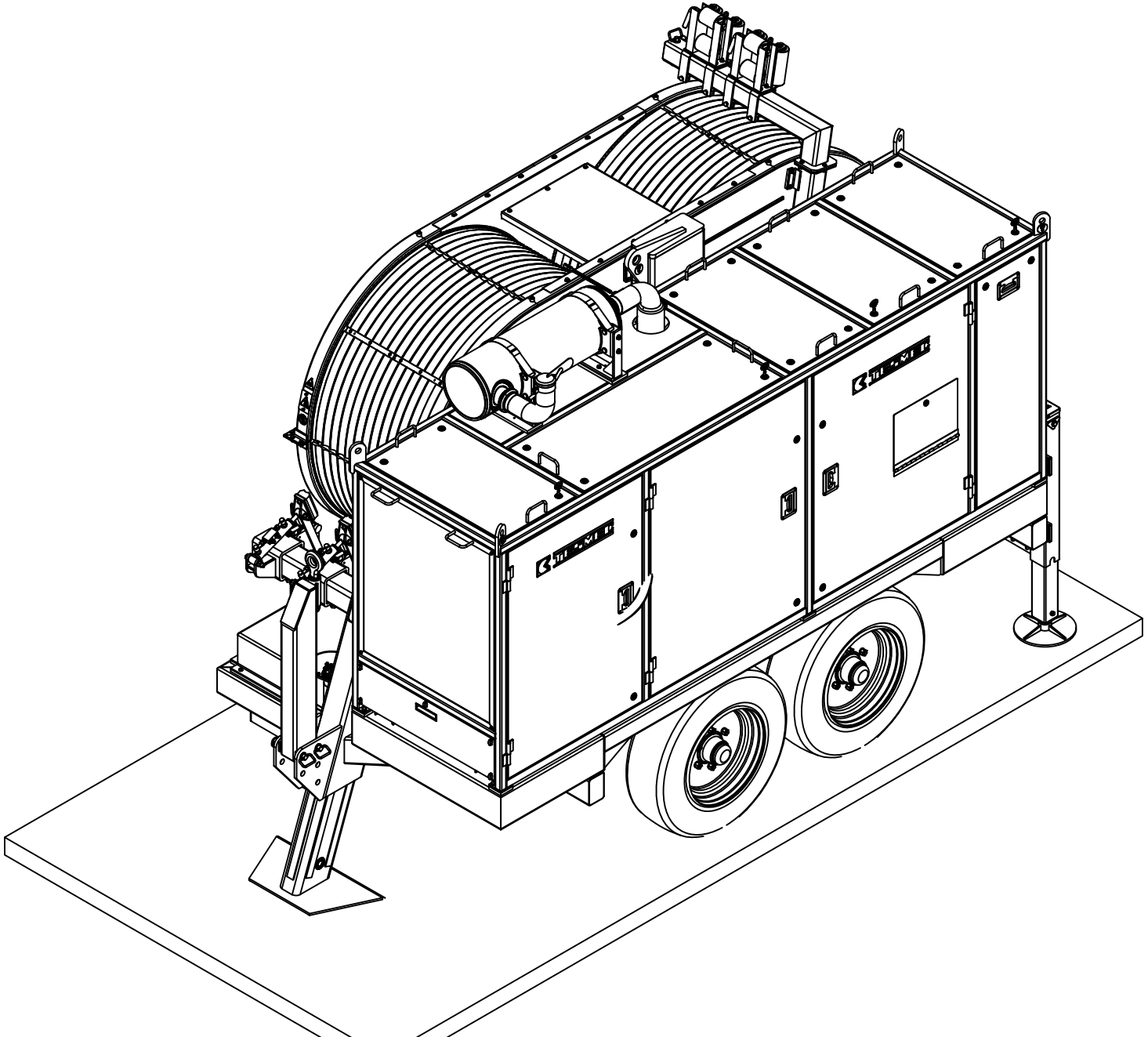
Electric scheme	POWER CABLES	Drawn: Locatelli	Drawing Nr:S01–00167 Archive Nr: S01	Sheet 35 of 39
	Design: AFB 621 050	Checked:	Date: 01/03/2018	Following 36



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Electric scheme

ASS'Y MACHINE		Drawn: Locatelli	Drawing Nr:S01–00167 Archive Nr: S01	Sheet 36 of 39
Design:	AFB 621 050	Checked:	Date: 01/03/2018	Following 37

Sigla	Codice	N°	Descrizione da Archivio Materiali	Funzione Componente	Function Component
A6.1	V00-8600-074	1	DISPLAY . 800X450 EVISION2 7.0" - TTCONT	DISPLAY eVision 7"	
A8.1	V00-8600-085	1	UNITA' - ECU HY-TTC 94 DI CONTROLLO - TT	TT CONTROL	
A8.2	V00-8600-085	1	UNITA' - ECU HY-TTC 94 DI CONTROLLO - TT	TT CONTROL (OPT)	
F3.2	V00-8401-036	1	FUSIBILE A LAME 5A BEIGE - INTERASSE LAM	FUSIBILE ALIMENTAZIONE ELETTRICA	
F3.3	V00-8401-027	1	FUSIBILE A LAME 20 A GIALLO - INTERASSE	FUSIBILE COMANDO RELE	
F3.4	V00-8401-036	1	FUSIBILE A LAME 5A BEIGE - INTERASSE LAM	FUSIBILE	
F3.5	V00-8401-026	1	FUSIBILE A LAME 15 A BLU - INTERASSE LAM	FUSIBILE G2	
F3.6	V00-8401-011	1	FUSIBILE A LAME 3A VIOLETTO - INTERASSE	FUSIBILE DI SERVIZIO	
F2.1	V00-8401-054	1	FUSIBILE A LAME 1A NERO - INTERASSE LAME		
F5.1	V00-8401-054	1	FUSIBILE A LAME 1A NERO - INTERASSE LAME	FUSIBILE RELE PROTEZIONI	
F5.4	V00-8401-073	1	FUSIBILE A LAME 2A GRIGIO - INTERASSE LA	FUSIBILE ECODER/ TRASDUTTORI	
F5.5	V00-8401-073	1	FUSIBILE A LAME 2A GRIGIO - INTERASSE LA	FUSIBILE A6.1	
F5.9	V00-8401-073	1	FUSIBILE A LAME 2A GRIGIO - INTERASSE LA	FUSIBILE UNIT 6.1	
F5.10	V00-8401-054	1	FUSIBILE A LAME 1A NERO - INTERASSE LAME	CHARGER BATTERY	
F5.11	V00-8401-054	1	FUSIBILE A LAME 1A NERO - INTERASSE LAME	FUSIBILE ALIM. TIERRA	
GB1	V00-1500-003	1	BATTERIA 100AH -12V - EN750A - LUNGH.32	BATTERIA	
GB1	V00-2229-091	1	MORSETTO BATTERIA POLO POSITIVO FISSAGGI		
GB1	V00-2229-092	1	MORSETTO BATTERIA POLO NEGATIVO FISSAGGI		
GB1	V00-2229-093	1	COPRIMORSETTO POLO POSITIVO BATTERIA -AD		
GB1	V00-2229-094	1	COPRIMORSETTO POLO NEGATIVO BATTERIA -AD		
GB2	V00-1500-003	1	BATTERIA 100AH -12V - EN750A - LUNGH.32	BATTERIA	
GB2	V00-2229-091	1	MORSETTO BATTERIA POLO POSITIVO FISSAGGI		
GB2	V00-2229-092	1	MORSETTO BATTERIA POLO NEGATIVO FISSAGGI		
GB2	V00-2229-093	1	COPRIMORSETTO POLO POSITIVO BATTERIA -AD		
GB2	V00-2229-094	1	COPRIMORSETTO POLO NEGATIVO BATTERIA -AD		
HA11.1	V00-8401-010	1	AVVISATORE ACUSTICO -9-32V 95DB -COBO :3	AVVISATORE ACUSTICO EMERGENZA (OPT)	
HL11.1	V00-2210-029	1	LAMPADA ROTANTE -9/32V -XENON REVOLUX :3	LAMPEGGIANTE (OPT)	
K5.1	V00-8402-022	1	RELE - -24V 2 SC -30A -FINDER	RELE PROTEZIONI	

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Electric scheme

COMPONENTS LIST

Design: AFB 621 050

Drawn: Locatelli

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Drawing Nr:S01-00167 S01

Archive Nr:

Date: 01/03/2018

Sigla	Codice	N°	Descrizione da Archivio Materiali	Funzione Componente	Function Component
K10.1	V00-8402-028	1	RELE -24V 2 SC -8A -FINDER :46.52.9.024	PRIMO RELE PULSANTE DI STOP	
K10.1	V00-8402-020	1	MODULO DIODO + LED -6-24V DC/AC -FINDER		
K10.1	V00-8402-039	1	ZOCCOLO RELE 2SC MORSETTOA MOLLA MONTAGG		
K10.2	V00-8402-028	1	RELE -24V 2 SC -8A -FINDER :46.52.9.024	SECONDO RELE PULSANTE DI STOP	
K10.2	V00-8402-020	1	MODULO DIODO + LED -6-24V DC/AC -FINDER		
K10.2	V00-8402-039	1	ZOCCOLO RELE 2SC MORSETTOA MOLLA MONTAGG		
K11.1	V00-8402-028	1	RELE -24V 2 SC -8A -FINDER :46.52.9.024	RELE SEGNALE ALLARME	
K11.1	V00-8402-020	1	MODULO DIODO + LED -6-24V DC/AC -FINDER		
K11.1	V00-8402-039	1	ZOCCOLO RELE 2SC MORSETTOA MOLLA MONTAGG		
Q5.2	V00-8401-085	1	PROTEZIONE TERMICA - 5 A - 32 VDC - INTE	PROTEZIONE 12V	
Q5.3	V00-8401-089	1	PROTEZIONE TERMICA - 15 A - 32 VDC - INT	PROTEZIONE AUX	
Q5.6	V00-8401-085	1	PROTEZIONE TERMICA - 5 A - 32 VDC - INTE	PROTEZIONE CONTROLLO REMOTO	
Q5.7	V00-8401-089	1	PROTEZIONE TERMICA - 15 A - 32 VDC - INT	PROTEZIONE SCHEDA TTC (CARICO)	
Q5.8	V00-8401-089	1	PROTEZIONE TERMICA - 15 A - 32 VDC - INT	PROTEZIONE SCHEDA 2 TTC (CARICO)	
Q5.12	V00-8401-131	1	PROTEZIONE TERMICA - 2 A - 32 VDC - INTE	PROTEZIONE POMPA GRASSO	
RCANO	V00-8400-034	1	RESISTENZA 120 OHM 1/4 W - RS : 135-780	RESISTENZA CANO	
S1.1F	V00-8600-087	1	CAVO - 3 M - TTCONTROL : 10373 PRECABLAT	CONNETTORE 52 PIN SCHEDA TTC94	
S1.2F	V00-8600-087	1	CAVO - 3 M - TTCONTROL : 10373 PRECABLAT	CONNETTORE 28 PIN TTC94	
S2.1F	V00-8600-087	1	CAVO - 3 M - TTCONTROL : 10373 PRECABLAT	CONNETTORE 52 PIN SCHEDA TTC94	
S2.2F	V00-8600-087	1	CAVO - 3 M - TTCONTROL : 10373 PRECABLAT	CONNETTORE 28 PIN TTC94	
S2.1	V00-8401-038	1	INTERRUTTORE STACCABATTERIA -12-24V -250	ALIMENTAZIONE INTERROTTA	
S2.1	V00-8401-039	1	CHIAVE PER INTERRUTTORE STACCABATTERIA -		
S2.2	V00-8410-104	1	SELETTORE A CHIAVE - ESTRAZIONE A SX - N	CHIAVE AVVIAMENTO	
SB10.1	V00-8420-001	1	PULSANTE EMERGENZA - D. PULSANTE:22 MM -	PULSANTE ARRESTO MACCHINA	
SB11.1	V00-8410-103	1	PULSANTE LUMINOSO D.22 BIANCO - IP69K -T	PULSANTE LUMINIOSO	
W6.1	V00-2232-110	1	CAVO ETHERNET DI PROLUNGA RJ45 FEMM - RJ	CAVO PRESA RJ45 PER PROGRAMMAZIONE DISPLAY	
W6.2	V00-2232-037	1	CAVO USB A-B - L. 1M	CAVO PRESA USB-B PER PROGRAMMAZIONE SCHEDE	
X10.1.F	V00-2225-022	1	BLOCCACONTATTI - FEMMINA ARANCIONE - Nø3		

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Electric scheme

COMPONENTS LIST

Design: AFB 621 050

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Drawing Nr:S01-00167 S01
Archive Nr:

Date: 01/03/2018

Sigla	Codice	N°	Descrizione da Archivio Materiali	Funzione Componente	Function Component
X10.2.F	V00-2225-022	1	BLOCCACONTATTI - FEMMINA ARANCIONE - Nø3		
X10.3.F	V00-2225-022	1	BLOCCACONTATTI - FEMMINA ARANCIONE - Nø3		
X3.1.M	V00-2227-205	1	CONNETTORE PORTAMASCHI - Nø 60+6 POLI -		
X3.2.M	V00-2225-055	1	CONNETTORE - - Nø9POLI -MASCHIO -NERO -D		
X1	V00-2229-044	2	MORSETTO PASSANTE A MOLLA ZDK 2.5 SEZION	MORSETTO	
X2	V00-2229-044	121	MORSETTO PASSANTE A MOLLA ZDK 2.5 SEZION	MORSETTO	
X6.1	V00-2232-147	1	CONNETTORE DA PANNELLO -USB 2.0 - TIPO A	CONNETTORE USB A PANNELLO PER PROGRAMMAZIONE SCHEDE	
X7.1.F	V00-2232-148	1	CONNETTORE DA PANNELLO -XLR - IEC 61076-	CONNETTORE SERIALE DB9 PER STAMPANTE	
X7.2.F	V00-8401-075	1	CAPPUCCIO PER CHIAVE AVVIAMENTO - PVC MO	CONNETTORE ACCENDISIGARI	
X.0V	V00-2229-044	8	MORSETTO PASSANTE A MOLLA ZDK 2.5 SEZION	MORSETTO	
X.0V	V00-2229-041	1	MORSETTO PASSANTE A MOLLA ZDU 10 SEZION	MORSETTO	
X.+4	V00-2229-044	1	MORSETTO PASSANTE A MOLLA ZDK 2.5 SEZION	MORSETTO	
X.+5	V00-2229-044	1	MORSETTO PASSANTE A MOLLA ZDK 2.5 SEZION	MORSETTO	
X+24G	V00-2229-041	1	MORSETTO PASSANTE A MOLLA ZDU 10 SEZION	MORSETTO	
X.+12G	V00-2229-044	1	MORSETTO PASSANTE A MOLLA ZDK 2.5 SEZION	MORSETTO 12G	
XA6.1.F	V00-2227-188	1	CONNETTORE VOLANTE - Nø 34 POLI - PORTAF	CONNETTORE PER E-VISION 7"	
XC	V00-2229-044	9	MORSETTO PASSANTE A MOLLA ZDK 2.5 SEZION	MORSETTO	
XF	V00-2229-038	12	MORSETTO PORTAFUSIBILE A LAME ZSI 6-2/FC LD LED 10-36V	MORSETTO PORTAFUSIBILI	
XM	V00-2229-044	3	MORSETTO PASSANTE A MOLLA ZDK 2.5 SEZION	MORSETTO	
XPE	V00-2229-064	1	MORSETTO DI TERRA PASSANTE A MOLLA ZPE 1	MORSETTO TERRA	
XT	V00-2229-090	8	MORSETTO DOPPIO PASSANTE CON DIODO ZDK 2.5 SEZION	MORSETTO	
AM53	V00-8700-131	1	SCHEDA ACQ. E TRASM. DATI AM53-TOPCONT	TIERRA	
A24.1	V00-4550-001	1	POMPA GRASSO -2Kg -12/24V BRAVO -DROPSA	POMPA GRASSO (OPT)	

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COMPONENTS LIST

Design: AFB 621 050

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Drawing Nr:S01-00167 S01
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Date: 01/03/2018

ID MACHINE	DESCRIPTION ALARM OR WARNING
ID520192	Monitor - Engine Motor - Can Comunication Fault
ID520193	Monitor - Card S1 - Can Comunication Fault
ID520194	Monitor - Card S2 - Can Comunication Fault
ID520195	Monitor - Card S3 - Can Comunication Fault
ID520196	Monitor - Card S4 - Can Comunication Fault
ID520197	Monitor - Card S5 - Can Comunication Fault
ID520198	Monitor - Radio Stringing - CanComunicationFault
ID520224	Radio Stringing Receiver - CanComunicationFault
ID520225	Radio Stringing - CanComunicationFault
ID520226	Radio Stringing - Radio Switch Or Joystick Not In Middle Position
ID520227	Radio Stringing - Stop Push Button Pressed
ID520228	Emergency Push Button Pressed
ID520229	Oil - Temperature Too High
ID520230	Return Oil Filter Obstructed
ID520231	Remote Emergency Push Button Pressed
ID520232	Error on remote emergency relay
ID520233	Oil - Pressure Too High
ID520234	Over Max Rpm
ID520235	Engine Oil Pressure Too High
ID520236	Engine Water Temperature Too High
ID520237	Connected Machinery Are Not The Same Model
ID520238	Alarm From Machine Connected
ID520239	Connection With Machine ID 1 Fault
ID520240	Connection With Machine ID 2 Fault
ID520241	Connection With Machine ID 3 Fault
ID520242	Connection With Machine ID 4 Fault
ID520243	FreeWhell - One Output Pin Card Fault
ID520244	FreeWhell - Check mA On Auxiliary Valve Fault
ID520245	FreeWhell - Deactive Procedure Fault During Auxiliary Valve Check
ID520246	FreeWhell - Deactive Procedure Fault During BW Rotation Valve Check
ID520247	FreeWhell - Speed Over 5 Kmh (3.1 mph)
ID520248	FreeWhell - Auxiliary Pull Value Not Correct
ID520249	Engine - Error Air Cleaner
ID520250	Engine - Battery Not In Charge
ID520251	Engine - Temperature Too Cold
ID520252	Alarm From Machine Connected - ID 1
ID520253	Alarm From Machine Connected - ID 2
ID520254	Alarm From Machine Connected - ID 3
ID520255	Alarm From Machine Connected - ID 4
ID520256	Warning From Machine Connected - ID 1
ID520257	Warning From Machine Connected - ID 2
ID520258	Warning From Machine Connected - ID 3
ID520259	Warning From Machine Connected - ID 4
ID520260	Stringing Not Permitted Because Bypass Is Active On Othe Connected Machine
ID520261	Wait For The Pre-heating Procedure To Complete
ID520262	Engine Off

ID520263	Speed synchronism mode can not be activated
ID520288	S1 - Eeprom Error
ID520289	S1 - Internal Temperature
ID520290	S1 - Battery Value
ID520291	S1 - Monitor - Can Comunication Fault
ID520292	S1 - Engine Motor - Can Comunication Fault
ID520293	S1 - Engine Motor - Battery Not In Charge
ID520294	S1 - Card S2 - Can Comunication Fault
ID520295	S1 - Card S3 - Can Comunication Fault
ID520296	S1 - Card S4 - Can Comunication Fault
ID520297	S1 - Card S5 - Can Comunication Fault
ID520298	BW1 Speed Joystick Fault
ID520299	BW1 Pull Set Potentiometer Fault
ID520300	RW1 Pull Set Potentiometer Fault
ID520301	BW1 Boost Pump Pressure - TooLow
ID520302	BW1 Boost Pump Oil Filter Obstructed
ID520303	BW1 Speed Joystick Initial Position Not Correct
ID520304	BW1 Pull Max
ID520305	BW1 Stringing Mode - One Output Pin Card Fault
ID520306	BW1 Stringing Mode - Initial Rpm Value Incorrect
ID520307	BW1 Stringing Mode - Pull Valve Set Error
ID520308	BW1 Stringing Mode - Auxiliary Pull Value Not Correct
ID520309	BW1 Stringing Mode - Minimum Pressute To Unlock Brake Incorrect
ID520310	BW1 Stringing Mode - Connected Bull Wheel Not Ready
ID520311	BW1 Stringing Mode - Rotation Valve Regulation Fault To Unlock Brake
ID520312	BW1 Stringing Mode - One Proportional Valve Not Zero Value
ID520313	BW1 Auxliary Valve Already Used to Other Functions
ID520314	BW1 Rope Locker Close
ID520315	BW1 StringingMode - Rpm Not Reached For Tensioner
ID520316	BW1 Gear Box Switch Inconsistent
ID520317	BW1 Lock/Unlock Negative Brake Switch Not In Correct Position
ID520318	BW1 Auxiliary Pull Value Low
ID520319	BW1 Pull Pressure Too High For Release
ID520321	BW1 Release Function Not Permitted
ID520322	BW1 Low Tensioner Active: Function Not Permitted
ID520323	BW1 Negative Brake Closure Requested
ID520325	BW1 StringingMode - Switch Low Tensioner Not Correct
ID520326	BW1 Rotation Not Concorde With That Of BW Reference
ID520327	BW1 Low Tensioner Set Different From Other Bull Wheel
ID520328	BW1 ReelWinder Encoder Error
ID520329	BW1 Fast Speed Selection Already In Use
ID520330	BW1 Release Function Not Permitted
ID520331	BW1 Electrical Coupling Setting Non Available
ID520332	BW1 Recovery/Release Selector On Radio Not In Correct Position
ID520333	BW1 Rope Locker Selector Not Enable
ID520334	BW1 Connection Error - Non-Concording Rotation Sensor
ID520335	BW1 Stringing Mode - Secondary Stand ReelWinder Pull Value Not Correct

ID520336	Secondary Stand ReelWinder Pull Set Potentiometer Fault
ID520337	BW1 Mechanical Coupling On The Machinery Is Not Concordant
ID520338	BW1 StringingMode - StandAloneCV In Use
ID520339	BW1 Stringing Mode - ReelWinder Pressure Value Not Correct
ID520340	BW1 ReelWinder Pull Value Too Low
ID520341	BW1 Stringing Mode - ReelWinder Pull Value Not Correct
ID520342	BW1 ReelWinder Speed Joystick Fault
ID520343	BW1 Auxliary Valve Used By Stringing
ID520344	BW1 Auxliary Valve Used By Reel Winder
ID520345	BW1 Auxliary Valve Used By Stabilizer
ID520346	BW1 Auxliary Valve Used By Compressor
ID520347	BW1 Auxliary Valve Used By RW Cylinder
ID520348	BW1 Auxliary Valve Used By Translation
ID520349	BW1 Auxliary Valve Used By Free-Wheel
ID520350	BW1 Auxliary Valve Used By RopeLocker
ID520351	BW1 Auxliary Valve Used By Test Function
ID520352	BW1 Electrical Coupling Setting Not Deactivable
ID520480	S2 - Eeprom Error
ID520481	S2 - Internal Temperature
ID520482	S2 - Battery Value
ID520483	S2 - Monitor - Can Comunication Fault
ID520484	S2 - Engine Motor - Can Comunication Fault
ID520485	S2 - Engine Motor - Battery Not In Charge
ID520486	S2 - Card S2 - Can Comunication Fault
ID520487	S2 - Card S3 - Can Comunication Fault
ID520488	S2 - Card S4 - Can Comunication Fault
ID520489	S2 - Card S5 - Can Comunication Fault
ID520490	BW2 Speed Joystick Fault
ID520491	BW2 Pull Set Potentiometer Fault
ID520492	RW2 Pull Set Potentiometer Fault
ID520493	BW2 Boost Pump Pressure - TooLow
ID520494	BW2 Boost Pump Oil Filter Obstructed
ID520495	BW2 Speed Joystick Initial Position Not Correct
ID520496	BW2 Pull Max
ID520497	BW2 Stringing Mode - One Output Pin Card Fault
ID520498	BW2 Stringing Mode - Initial Rpm Value Incorrect
ID520499	BW2 Stringing Mode - Pull Valve Set Error
ID520500	BW2 Stringing Mode - Auxiliary Pull Value Not Correct
ID520501	BW2 Stringing Mode - Minimum Pressute To Unlock Brake Incorrect
ID520502	BW2 Stringing Mode - Connected Bull Wheel Not Ready
ID520503	BW2 Stringing Mode - Rotation Valve Regulation Fault To Unlock Brake
ID520504	BW2 Stringing Mode - One Proportional Valve Not Zero Value
ID520505	BW2 Auxliary Valve Already Used to Other Functions
ID520506	BW2 Rope Locker Close
ID520507	BW2 StringingMode - Rpm Not Reached For Tensioner
ID520508	BW2 Gear Box Switch Inconsistent
ID520509	BW2 Lock/Unlock Negative Brake Switch Not In Correct Position

ID520510	BW2 Auxiliary Pull Value Low
ID520511	BW2 Pull Pressure Too High For Release
ID520512	BW2 Pull Pressure No Reached
ID520513	BW2 Release Function Not Permitted
ID520514	BW2 Low Tensioner Active: Function Not Permitted
ID520515	BW2 Negative Brake Closure Requested
ID520516	BW2 Stringing Mode - Auxiliary Pull Value Already In Use
ID520517	BW2 StringingMode - Switch Low Tensioner Not Correct
ID520518	BW2 Rotation Not Concorde With That Of BW Reference
ID520519	BW2 Low Tensioner Set Different From Other Machine
ID520520	BW2 ReelWinder Encoder Error
ID520521	BW2 Fast Speed Selection Already In Use
ID520522	BW2 Release Function Not Permitted
ID520523	BW2 Electrical Coupling Setting Non Available
ID520524	BW2 Recovery/Release Selector On Radio Not In Correct Position
ID520525	BW2 Rope Locker Selector Not Enable
ID520526	BW2 Connection Error - Non-Concording Rotation Sensor
ID520527	BW2 Stringing Mode - Secondary Stand ReelWinder Pull Value Not Correct
ID520528	Secondary Stand ReelWinder Pull Set Potentiometer Fault
ID520529	BW2 Mechanical Coupling On The Machinery Is Not Concordant
ID520530	BW2 StringingMode - StandAloneCV In Use
ID520531	BW2 Stringing Mode - ReelWinder Pressure Value Not Correct
ID520532	BW2 ReelWinder Pull Value Too Low
ID520533	BW2 Stringing Mode - ReelWinder Pull Value Not Correct
ID520534	BW2 ReelWinder Speed Joystick Fault
ID520535	BW2 Auxliary Valve Used By Stringing
ID520536	BW2 Auxliary Valve Used By Reel Winder
ID520537	BW2 Auxliary Valve Used By Stabilizer
ID520538	BW2 Auxliary Valve Used By Compressor
ID520539	BW2 Auxliary Valve Used By RW Cylinder
ID520540	BW2 Auxliary Valve Used By Translation
ID520541	BW2 Auxliary Valve Used By Free-Wheel
ID520542	BW2 Auxliary Valve Used By RopeLocker
ID520543	BW2 Auxliary Valve Used By Test Function
ID520544	BW2 Electrical Coupling Setting Not Deactivable
ID520608	S1 - Pin 103 ReelWinder - Rise Valve (BW1)
ID520609	S1 - Pin 104 Engine Diesel - Stop Relay
ID520610	S1 - Pin 105 BW1 Auxiliary Services - Pull Proportional Valve
ID520611	S1 - Pin 106 BW1 Rotation - Valve Release
ID520612	S1 - Pin 107 BW1 Auxiliary Services - Feedback Proportional Valve
ID520613	S1 - Pin 108 ReelWinder - LockUnlock Brake Valve (BW1)
ID520614	S1 - Pin 111 Emergency Realy 02
ID520615	S1 - Pin 112 Engine - Grid Heater
ID520616	S1 - Pin 113 Engine - Oil Pressure
ID520617	S1 - Pin 114 Signal From Stringing RadioControl Receiver
ID520618	S1 - Pin 115 ReelWinder - Down Valve (BW1)
ID520619	S1 - Pin 116 Engine Diesel - Start Relay

ID520620	S1 - Pin 117 BWRotation - Proportional Pull Valve (BW1)
ID520621	S1 - Pin 118 BWRotation - Valve Recovery (BW1)
ID520622	S1 - Pin 119 BWRotation - Feedback Proportional Pull Valve (BW1)
ID520623	S1 - Pin 120 BWRotation - Feedback Proportional Release- Recovery Valve (BW1)
ID520624	S1 - Pin 123 Emergency Relay 01
ID520625	S1 - Pin 124 Engine - Battery In Charge
ID520626	S1 - Pin 125 Engine - Start Stop Push Button
ID520627	S1 - Pin 126 Engine - Air Cleaner
ID520628	S1 - Pin 129 Warning Lamp Relay
ID520629	S1 - Pin 130 RW - Lock Unlock Brake Valve (BW1)
ID520630	S1 - Pin 131 Rope Locker - Lock Valve (BW1)
ID520631	S1 - Pin 132 Front Stabilizer Valve - Machine Rise
ID520632	S1 - Pin 137 Auxiliary Services - Pull Trasducer (BW1)
ID520633	S1 - Pin 138 Oil - Temperature Trasducer
ID520634	S1 - Pin 139 BWRotation - Pull Trasducer (Input Motor) (BW1)
ID520635	S1 - Pin 140
ID520636	S1 - Pin 141 Oil Cooler - Fan Valve
ID520637	S1 - Pin 142 BW Rope Locker - UnLock Valve (BW1)
ID520638	S1 - Pin 143 Front Stabilizer Valve - Machine Down
ID520639	S1 - Pin 144 BWRotation - Lock Unlock Brake Valve (BW1)
ID520640	S1 - Pin 149 BWRotation - Pull Trasducer (Output Motor) (BW1)
ID520641	S1 - Pin 150 Fuel Level - Sensor
ID520642	S1 - Pin 151
ID520643	S1 - Pin 152 Boost Pump Pressure - Pull Trasducer (BW1)
ID520644	S1 - Pin 253 Oil Radiator Pressure Switch
ID520645	S1 - Pin 254 Return Filter Clogged
ID520646	S1 - Pin 255 Rope Locker - Mechanical Switch (Opened) (BW1)
ID520647	S1 - Pin 256 Emergency Push Button Pressed
ID520648	S1 - Pin 260 Engine Diesel - Actuator Limit Switch (Decrease rpm)
ID520649	S1 - Pin 261 Engine Diesel - Actuator Limit Switch (Increase rpm)
ID520650	S1 - Pin 262 BW Boost Pump Filter Clogged (BW1)
ID520651	S1 - Pin 263 BW Gearbox Switch (BW1)
ID520652	S1 - Pin 267 BW Speed Encoder (BW1)
ID520653	S1 - Pin 268 RW - Speed Sensor (RW1)
ID520654	S1 - Pin 274 BW Speed Encoder (BW1)
ID520655	S1 - Pin 275 RW - Speed Sensor (RW1)
ID520656	S1 - Pin 103 Engine Diesel - Start Relay For Lombardini Interface
ID520657	S1 - Pin 103 Back BW1 Side Stabilizer - Down Valve
ID520658	S1 - Pin 103 Engine Diesel - PreHeating Relay
ID520659	S1 - Pin 104 Engine Diesel - Decrease Rpm Relay
ID520660	S1 - Pin 104 Back BW1 Side Stabilizer - Rise Valve
ID520661	S1 - Pin 108 Alarm Relay
ID520662	S1 - Pin 112 Rope Locker 2 - Mechanical Switch (Opened) (BW1)
ID520663	S1 - Pin 113 Engine - Grid Heater
ID520664	S1 - Pin 115 Differential Valve
ID520665	S1 - Pin 115 Engine - Starter Relay
ID520666	S1 - Pin 115 Oil Cooler - Fan Valve

ID520667	S1 - Pin 116 Engine Diesel - Increase Rpm Relay
ID520668	S1 - Pin 116 Engine Diesel - Motor On Segnaling Light
ID520669	S1 - Pin 124 Engine - Water Temperature
ID520670	S1 - Pin 262 Oil Fan Max Pressure Sensor
ID520671	S1 - Pin 268 Engine - Speed Sensor
ID520672	S1 - Pin 130 ReelWinder - Rotation Valve (BW1)
ID520673	S1 - Pin 108 Engine Diesel - Stop Relay
ID520674	S1 - Pin 104 Oil Cooler 2 - Fan Valve
ID520675	S1 - Pin 268 RW - Rotation Speed Encoder (RW1)
ID520676	S1 - Pin 275 RW - Rotation Speed Encoder (RW1)
ID520677	S1 - Pin 113 Engine - Battery In Charge
ID520678	S1 - Pin 114 Engine - Low Fuel
ID520679	S1 - Pin 150 Engine - Temperature Sensor
ID520680	S1 - Pin 253 Engine - Oil Pressure Switch
ID520681	S1 - Pin 129 ReelWinder - Rotation Valve (BW1)
ID520682	S1 - Pin 108 Oil Cooler - Feedback Fan Valve
ID520683	S1 - Pin 124 Rope Locker 3 - Mechanical Switch (Opened) (BW1)
ID520684	S1 - Pin 126 Rope Locker 4 - Mechanical Switch (Opened) (BW1)
ID520685	S1 - Pin 260 Rope Locker 5 - Mechanical Switch (Opened) (BW1)
ID520686	S1 - Pin 261 Rope Locker 6 - Mechanical Switch (Opened) (BW1)
ID520687	S1 - Pin 103 Radiator Oil Drain Valve
ID520688	S1 - Pin 103 Back Side Stabilizer - Machine Rise Valve
ID520689	S1 - Pin 104 Back Side Stabilizer - Machine Down Valve
ID520710	S2 - Pin 103 Back BW2 Side Stabilizer Valve - Machine Down
ID520711	S2 - Pin 104 Back BW2 Side Stabilizer Valve - Machine Rise
ID520712	S2 - Pin 105 BW2 Auxiliary Services - Pull Proportional Valve
ID520713	S2 - Pin 106 BW2 Rotation - Valve Release
ID520714	S2 - Pin 107 BW2 Auxiliary Services - Feedback Proportional Valve
ID520715	S2 - Pin 108
ID520716	S2 - Pin 111 Emergency Realy 02
ID520717	S2 - Pin 112 Rope Locker 2 - Mechanical Switch (Opened) (BW2)
ID520718	S2 - Pin 113
ID520719	S2 - Pin 114
ID520720	S2 - Pin 115 Press - Valve On/Off
ID520721	S2 - Pin 116 Oil Cooler - Proportional Fan Valve
ID520722	S2 - Pin 117 BWRotation - Proportional Pull Valve (BW2)
ID520723	S2 - Pin 118 BWRotation - Valve Recovery (BW2)
ID520724	S2 - Pin 119 BWRotation - Feedback Proportional Pull Valve (BW2)
ID520725	S2 - Pin 120 BWRotation - Feedback Proportional Release- Recovery Valve (BW2)
ID520726	S2 - Pin 123 Emergency Realy 01
ID520727	S2 - Pin 124
ID520728	S2 - Pin 125
ID520729	S2 - Pin 126
ID520730	S2 - Pin 129 Fast Speed Rotation - Valve (BW2)
ID520731	S2 - Pin 130 ReelWinder - Rotation Valve (BW2)
ID520732	S2 - Pin 131 Rope Locker - Lock Valve (BW2)
ID520733	S2 - Pin 132 Fast Speed Rotation - Valve (BW1)

ID520734	S2 - Pin 137 Auxiliary Services - Pull Trasducer (BW2)
ID520735	S2 - Pin 138
ID520736	S2 - Pin 139 BWRotation - Pull Trasducer (Input Motor) (BW2)
ID520737	S2 - Pin 140
ID520738	S2 - Pin 141 Slow Speed Rotation - Valve (BW2)
ID520739	S2 - Pin 142 BW Rope Locker - UnLock Valve (BW2)
ID520740	S2 - Pin 143 Slow Speed Rotation - Valve (BW2)
ID520741	S2 - Pin 144 BWRotation - Lock Unlock Brake Valve (BW2)
ID520742	S2 - Pin 149 BWRotation - Pull Trasducer (Output Motor) (BW2)
ID520743	S2 - Pin 150
ID520744	S2 - Pin 151
ID520745	S2 - Pin 152 Boost Pump Pressure - Pull Trasducer (BW2)
ID520746	S2 - Pin 253
ID520747	S2 - Pin 254
ID520748	S2 - Pin 255 Rope Locker - Mechanical Switch (Opened) (BW2)
ID520749	S2 - Pin 256 Emergency Push Button Pressed
ID520750	S2 - Pin 260
ID520751	S2 - Pin 261
ID520752	S2 - Pin 262 BW Boost Pump Filter Clogged (BW2)
ID520753	S2 - Pin 263
ID520754	S2 - Pin 267 BW Speed Encoder (BW2)
ID520755	S2 - Pin 268 RW - Speed Sensor (BW2)
ID520756	S2 - Pin 274 BW Speed Encoder (BW2)
ID520757	S2 - Pin 275 RW - Speed Sensor (BW2)
ID520758	S2 - Pin 132 Hydraulic differential n°1
ID520759	S2 - Pin 141 Hydraulic differential n°2
ID520760	S2 - Pin 143 Hydraulic differential n°3
ID520761	S2 - Pin 132 ReelWinder Seconday - Rotation Valve
ID520762	S2 - Pin 105 ReelWinder Seconday - Pull Proportional Valve
ID520763	S2 - Pin 106 ReelWinder Seconday - Release Direction Valve
ID520764	S2 - Pin 118 ReelWinder Seconday - Recovery Direction Valve
ID520765	S2 - Pin 120 ReelWinder Seconday - Feedback Direction Valve
ID520766	S2 - Pin 152 ReelWinder Seconday - Pull Trasducer
ID520804	S1 - Pin 103 Stabilizer 2 Vave - Machine Rise
ID520805	S1 - Pin 104 On Off Fan 2 - Relay
ID520806	S1 - Pin 105 Auxiliary Services - Pull Proportional Valve
ID520807	S1 - Pin 106 Proportional Valve Release BW1
ID520808	S1 - Pin 107 Auxiliary Services - Feedback Proportional Valve
ID520809	S1 - Pin 108 Engine Diesel - Stop Realy
ID520810	S1 - Pin 111
ID520811	S1 - Pin 112
ID520812	S1 - Pin 113
ID520813	S1 - Pin 114 Signal From Stringing RadioControl Receiver
ID520814	S1 - Pin 115 Stabilizer 2 Valve - Machine Down
ID520815	S1 - Pin 116 On Off Fan 1 - Relay
ID520816	S1 - Pin 117 Proportional Valve Pull BW1
ID520817	S1 - Pin 118 Proportional Valve Recovery BW1

ID520818	S1 - Pin 119 Feedback Proportional Valve Pull BW1
ID520819	S1 - Pin 120 Feedback Proportional Release- Recovery BW1
ID520820	S1 - Pin 123
ID520821	S1 - Pin 124 Engine - Grid Heater
ID520822	S1 - Pin 125 Engine Diesel - Start-Stop PushButton
ID520823	S1 - Pin 126 Engine - Battery In Charge
ID520824	S1 - Pin 129 Warning Lamp Relay
ID520825	S1 - Pin 130 ReelWinder - LockUnlock Brake Valve
ID520826	S1 - Pin 131 ReelWinder - Rotation Valve
ID520827	S1 - Pin 132 Stabilizer 1 - Rise Valve
ID520828	S1 - Pin 137 Auxiliary Services - Pull Trasducer
ID520829	S1 - Pin 138 Oil - Temperature Trasducer
ID520830	S1 - Pin 139 BW1 Pull Trasducer
ID520831	S1 - Pin 140 Boost Pump Pressure BW1 - Pull Trasducer
ID520832	S1 - Pin 141 Engine Diesel - Start Realy
ID520833	S1 - Pin 142 FreeWheel - Engage Disengage Valve
ID520834	S1 - Pin 143 Stabilizer 1 - Down Valve
ID520835	S1 - Pin 144 BW1 Brake - Lock Unlock Valve
ID520836	S1 - Pin 149 Load Cell TO Detect BW1 Pull
ID520837	S1 - Pin 150 Fuel Level - Sensor
ID520838	S1 - Pin 151
ID520839	S1 - Pin 152
ID520840	S1 - Pin 253 Stabilizer 1 - Rise Position Sensor Detector
ID520841	S1 - Pin 254 Stabilizer 2 - Rise Position Sensor Detector
ID520842	S1 - Pin 255
ID520843	S1 - Pin 256 Emergency Push Button Pressed
ID520844	S1 - Pin 260
ID520845	S1 - Pin 261
ID520846	S1 - Pin 262 BW Boost Pump Filter Clogged (BW1)
ID520847	S1 - Pin 263
ID520848	S1 - Pin 267 BW1 Speed Encoder
ID520849	S1 - Pin 268 ReelWinder - Rotation Speed Encoder
ID520850	S1 - Pin 274 BW1 Speed Encoder
ID520851	S1 - Pin 275 ReelWinder - Rotation Speed Encoder