



FASSI CRANE



F 230SE.22

use and maintenance

Edition 95 - 01 - 02

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FASSI CRANE

F 230SE.22

use and maintenance

This instructions manual describes the FASSI CRANE F 230SE.22.

It contains, further to the principal safety norms, a description of the crane and the maintenance and use instructions.

To assure a long life of the crane it is necessary to meticulously follow the instructions.

General lubrication and small repairs can be carried out by the user; repairs of more consistency have to be carried out by authorized service personnel.

Original Fassi replacement parts must be used.

FASSI GRU IDRAULICHE reserves the right to modify without notice the characteristics and options of the crane.

THANK YOU FOR SELECTING ONE OF OUR CRANES





SAFETY NORMS

SAFETY NORMS
F 230SE

(!) This symbol recalls your attention on the points concerning safety.

It means: **WARNING!** **BE CAREFUL!**
***IT CONCERNS YOUR SAFETY !**

! ATTENTION !

READ CAREFULLY THIS BOOK before carrying out the start, use and maintenance or other operations of the crane. Few minutes dedicated to reading will save you, later on, time and work.

Be sure that the unit that You are going to utilize has been presented, in the countries where this is required by law, to the tests of the responsible organizations.

To manoeuvre the crane it is necessary to know its working and safety and warranty norms.

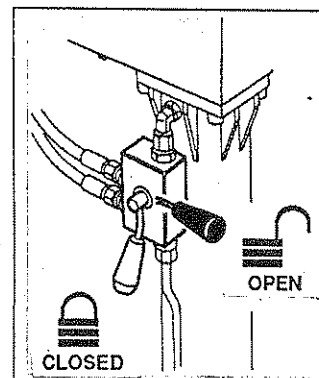
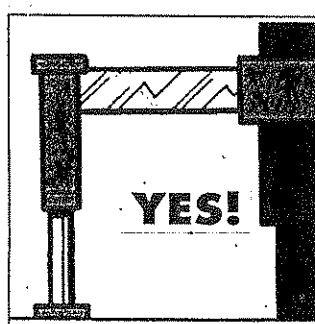
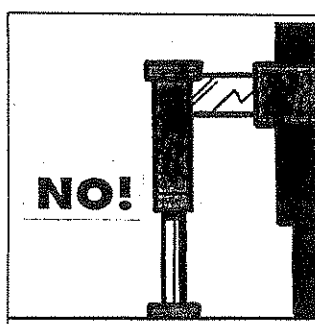
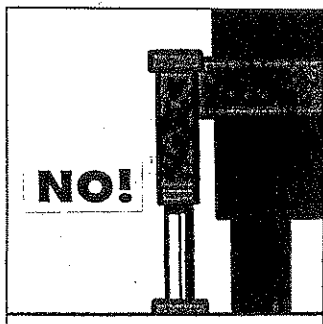
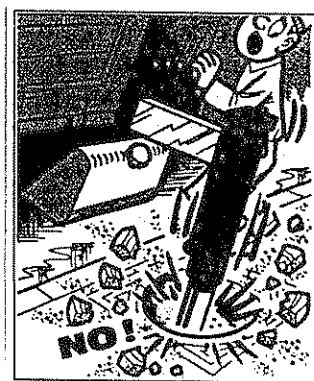
The crane has to be operated by responsible persons, instructed in advance and authorized to operate the crane.

Check that protections are in their place and that all safety devices are fitted and active.

Don't activate the engine in an indoor area without making sure that the place is adequately ventilated.

Stabilize the vehicle by means of the outriggers rams checking that they lay on a solid base; the pressure of inner rams foundation plate is 650 psi. Use in the case special outrigger plates (deliverable on request). Level the crane so that it is always operated on a horizontal plane.

Check that the taps of the outrigger rams safety check valves are closed. Never operate the outriggers when the crane is out of its boom rest.



Remember that the stability of the unit crane-vehicle is guaranteed only by the maximum lateral extension of the outriggers.

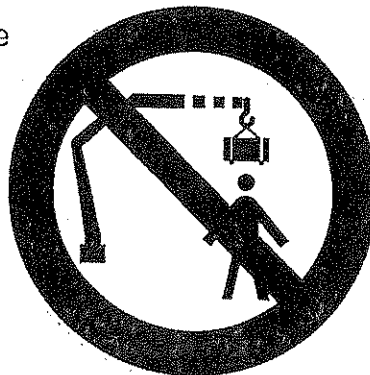
Before manoeuvring a load check that the working area is adequate for Your crane.

Make sure that the lifted load is balanced.

Hook up the load checking that it doesn't exceed the capacity indicated on the lifting diagram specific to each load configuration.

It's absolutely prohibited to walk or stop under a suspended load and for foreign persons to be within the working area.

Avoid to travel with the load above the control station.



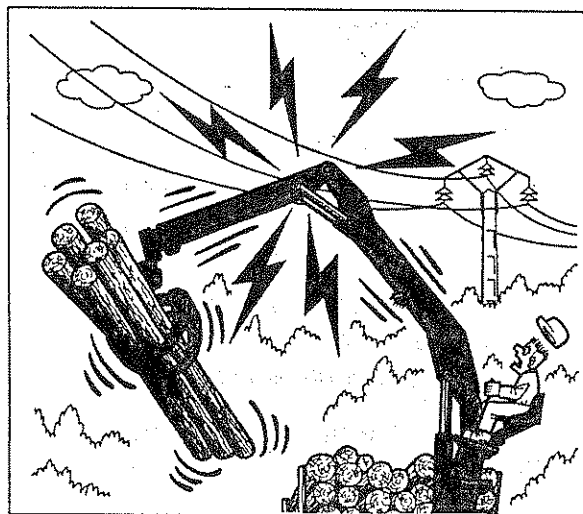


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SAFETY NORMS F 230SE

Maintain safe clearances from electrical lines and apparatus. You must allow for boom sway, rock or sag and electrical line and loadline swaying. This lifting device does not provide protection from contact with or proximity to an electrically charged conductor.

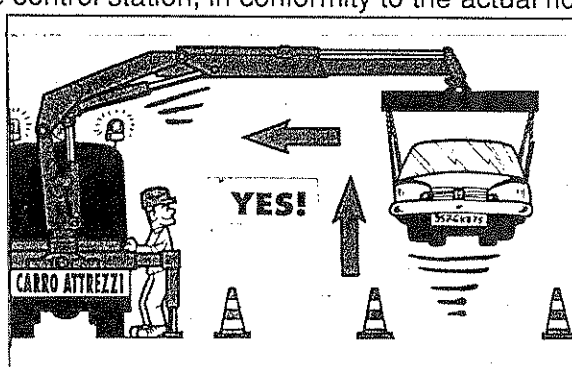
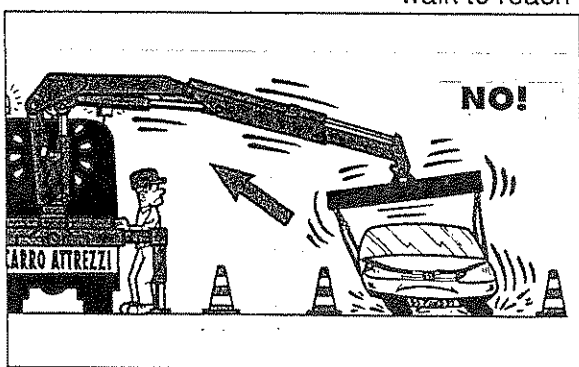
You must maintain a clearance of at least 10 feet between any part of the crane, loadline or load and any electrical line or apparatus carrying up to 50,000 volts. One foot additional clearance is required for every additional 30,000 volts or less.



In case of crane with top seat controls, it's necessary to use a ladder and a cat walk to reach the control station, in conformity to the actual norms, which

guarantee access security. The seat is suitable to fasten the seat belts.

Don't rotate the crane before the load is lifted: don't operate

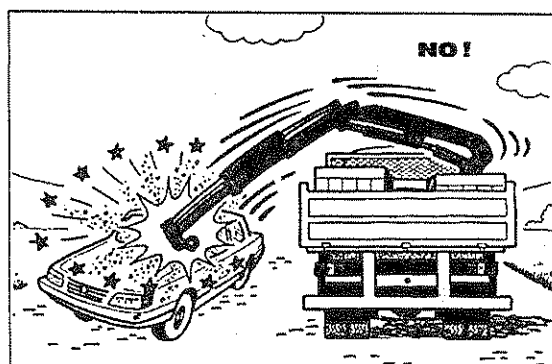


with sudden movements, activate the controls with slow and progressive movements. Rotate slowly and with care paying attention to the stability of the vehicle. With vertical lift rotate very slowly in order to avoid side-skidings.

Don't move the vehicle if a load is suspended on the crane.

Don't utilize the crane for pull or push operations.

Don't manipulate, in any case, the safety and protection devices.



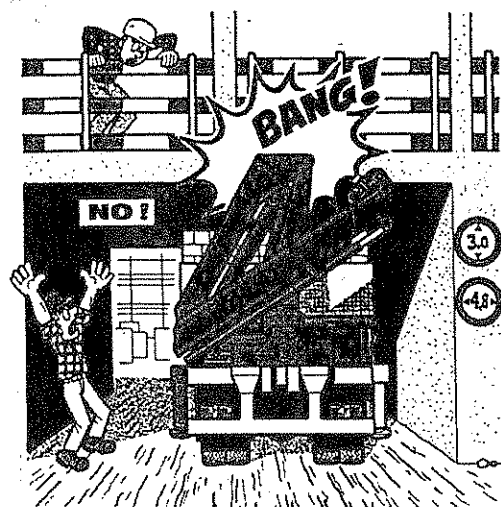
At the end of the work and before the transfer, the crane must put in boom stand. If booms lay on the body or on the load they will have to be blocked to prevent possible side movements.

Outrigger rams must be lifted and re-entered within the truck side shape.

Check that the taps of the outrigger rams safety check valves are closed.

Disengage the power takeoff.

Check and record the overall height of Your crane in folded and laid position on the body or on the load, to avoid to low bridges or other encumbrments; be consequently very careful to respect the proper road signs placed in proximity of such obstacles.





INSTRUCTIONS FOR CRANE USE

INSTRUCTIONS
FOR CRANE USE
F 230SE



The use of the crane is reserved to authorized personnel, instructed in advance, which has to strictly conform to the safety norms and instructions contained in the instruction manual supplied with the crane.

- 1 - Only authorized persons are permitted to operate the crane.
- 2 - The crane must be used on firm, level ground.
- 3 - Check that the vehicle hand brake is on and that the wheels are chocked.
- 4 - Before operation make sure that:
 - no-one is within the working area of the crane
 - the safety devices are in place and operative
 - the minimum safe working distances from power lines are observed.
- 5 - Stabilize the vehicle with the outriggers, making sure that :
 - the lateral supports are fully extended
 - the wheels are in contact with the ground and the **suspension is not completely unloaded**
 - the outriggers safety taps are closed.
- 6 - Use the crane in accordance with the use and maintenance manual, making sure that:
 - the load and radii are within the maximum limits shown on the crane capacity plate
 - the crane is used progressively avoiding sudden load movements
 - swinging or dragging of the load is avoided
 - the load is lifted before rotating.
- 7 - When using implements protect the working area with a barrier.
- 8 - The vehicle/crane are not left unless the power take off is disengaged and the load is on the ground.
- 9 - Before driving the vehicle ensure that the outriggers are fully retracted and re-entered, the safety taps closed and the crane is in the folded position.

 FASSI GRU IDRAULICHE	FASSI GRU IDRAULICHE SpA 24021 ALBINO (BG) ITALY - Via dei Carmelitani, 2 Tel. + 39 35 77.40.00 - Fax + 39 35 75.50.20
INSTRUCTIONS FOR SAFE USE OF THE CRANE 1 ONLY AUTHORIZED PERSONS ARE PERMITTED TO OPERATE THE CRANE. 2 THE CRANE MUST BE USED ON FIRM, LEVEL GROUND. 3 CHECK THAT THE VEHICLE HAND BRAKE IS ON AND THAT THE WHEELS ARE CHOCKED 4 BEFORE OPERATION MAKE SURE THAT. - NO-ONE IS WITHIN THE WORKING AREA OF THE CRANE; - THE SAFETY DEVICES ARE IN PLACE AND OPERATIVE; - THE MINIMUM SAFE WORKING DISTANCES FROM POWER LINES ARE OBSERVED. 5 STABILIZE THE VEHICLE WITH THE OUTRIGGERS, MAKING SURE THAT. - THE LATERAL SUPPORTS ARE FULLY EXTENDED. - THE WHEELS ARE IN CONTACT WITH THE GROUND AND THE SUSPENSION IS NOT COMPLETELY UNLOADED; - THE OUTRIGGER SAFETY TAPS ARE CLOSED 6 USE THE CRANE IN ACCORDANCE WITH THE USE AND MAINTENANCE MANUAL MAKING SURE THAT: - THE LOAD AND THE EXTENSIONS ARE WITHIN THE MAXIMUM LIMITS SHOWN ON THE CRANE CAPACITY CHART; - THE CRANE IS USED PROGRESSIVELY AVOIDING SUDDEN LOAD MOVEMENTS; - SWINGING OR DRAGGING THE LOAD IS AVOIDED; - THE LOAD IS LIFTED BEFORE ROTATING. 7 WHEN USING IMPLEMENTS PROTECT THE WORKING AREA WITH A BARRIER. 8 THE VEHICLE/CRANE ARE NOT LEFT UNATTENDED UNLESS THE POWER TAKE OFF IS DISENGAGED AND THE LOAD IS ON THE GROUND. 9 BEFORE DRIVING THE VEHICLE ENSURE THAT THE OUTRIGGERS ARE FULLY RETRACTED AND RE-ENTERED, THE SAFETY TAPS CLOSED AND THE CRANE IS IN THE FOLDED POSITION. DE942	

THESE INSTRUCTIONS FOR THE USE OF THE CRANE COINCIDE WITH THOSE OF THE PLATE DE942 (FIG. 1) PLACED NEXT TO THE CRANE CONTROLS.

fig. 1



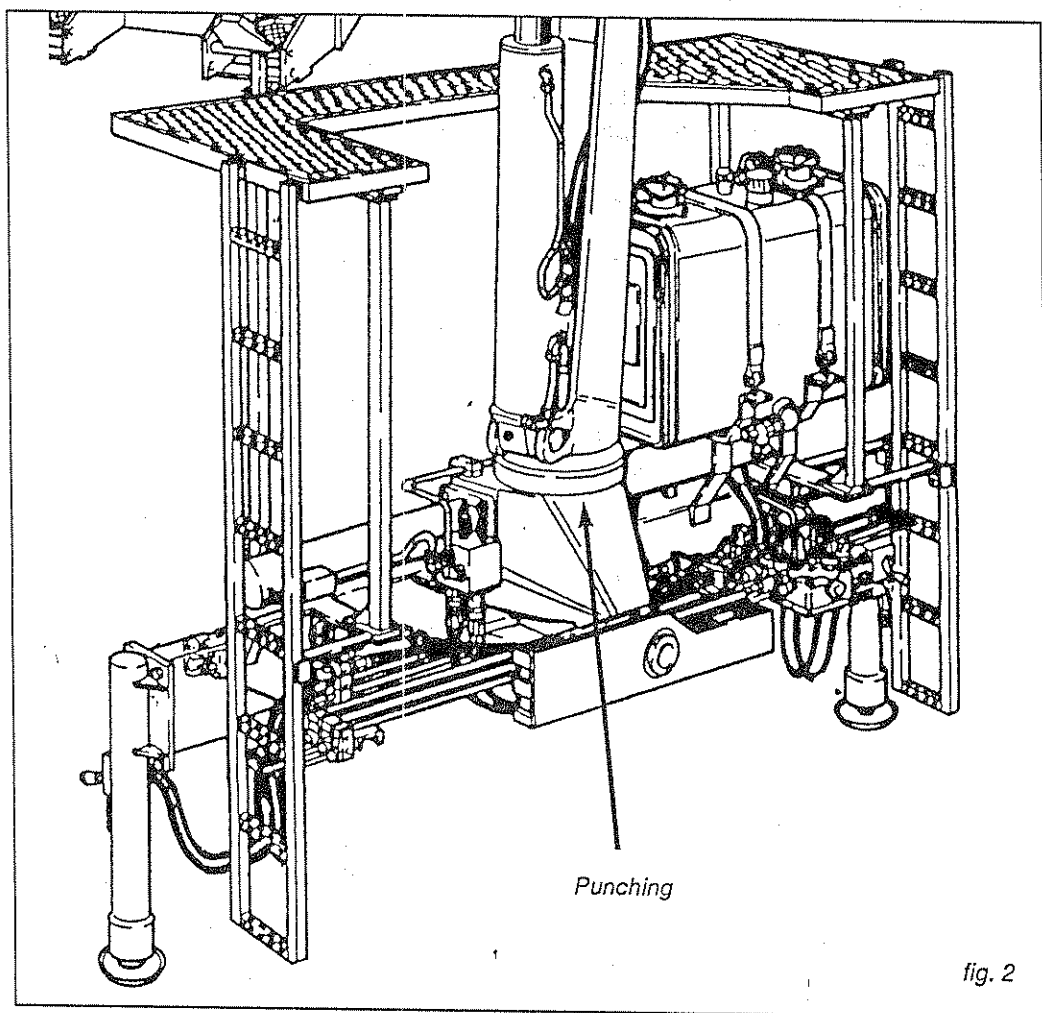
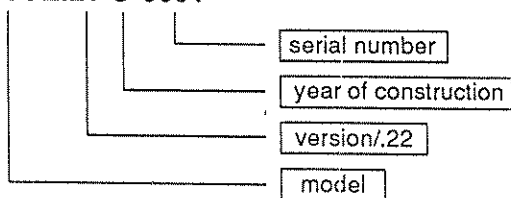


IDENTIFICATION OF THE CRANE MODEL F 230SE

IDENTIFICATION OF THE CRANE MODEL

Essential data for the identification of the crane (model, version of crane, year of construction and serial number) are punched on the base with this draft:

*F230SE.21*3*0001*



- (!) FOR NO REASONS THE DATA PUNCHED ON THE BASE CAN BE ALTERED.

It is required to report always with precision the **model of the crane** and its **serial number** when You have to contact the Service or Parts Department.

The exact information of the **model of the crane**, the **serial number** and the description of eventual **accessories**, will allow our Service to assist You with rapidity and efficiency



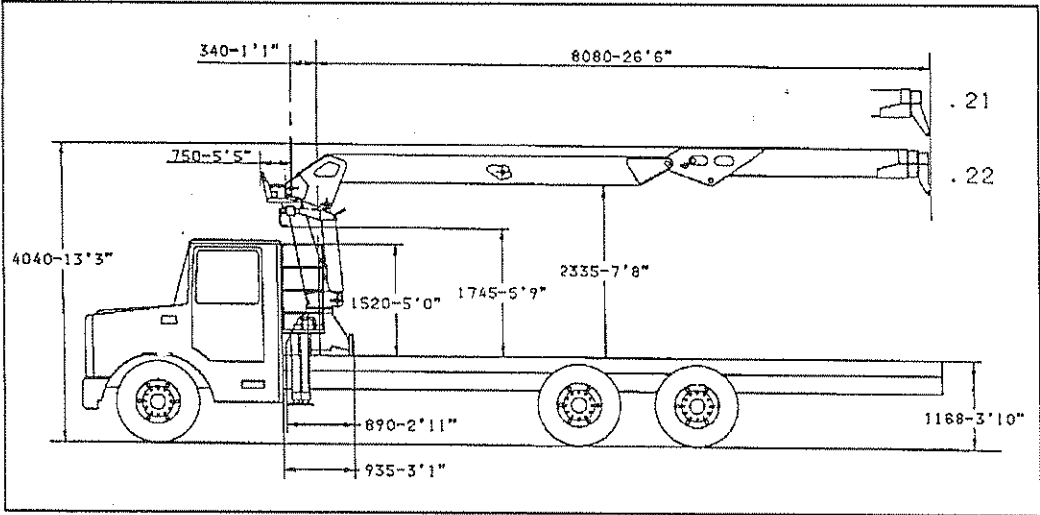
TECHNICAL DATA

TECHNICAL
DATA
F 230SE

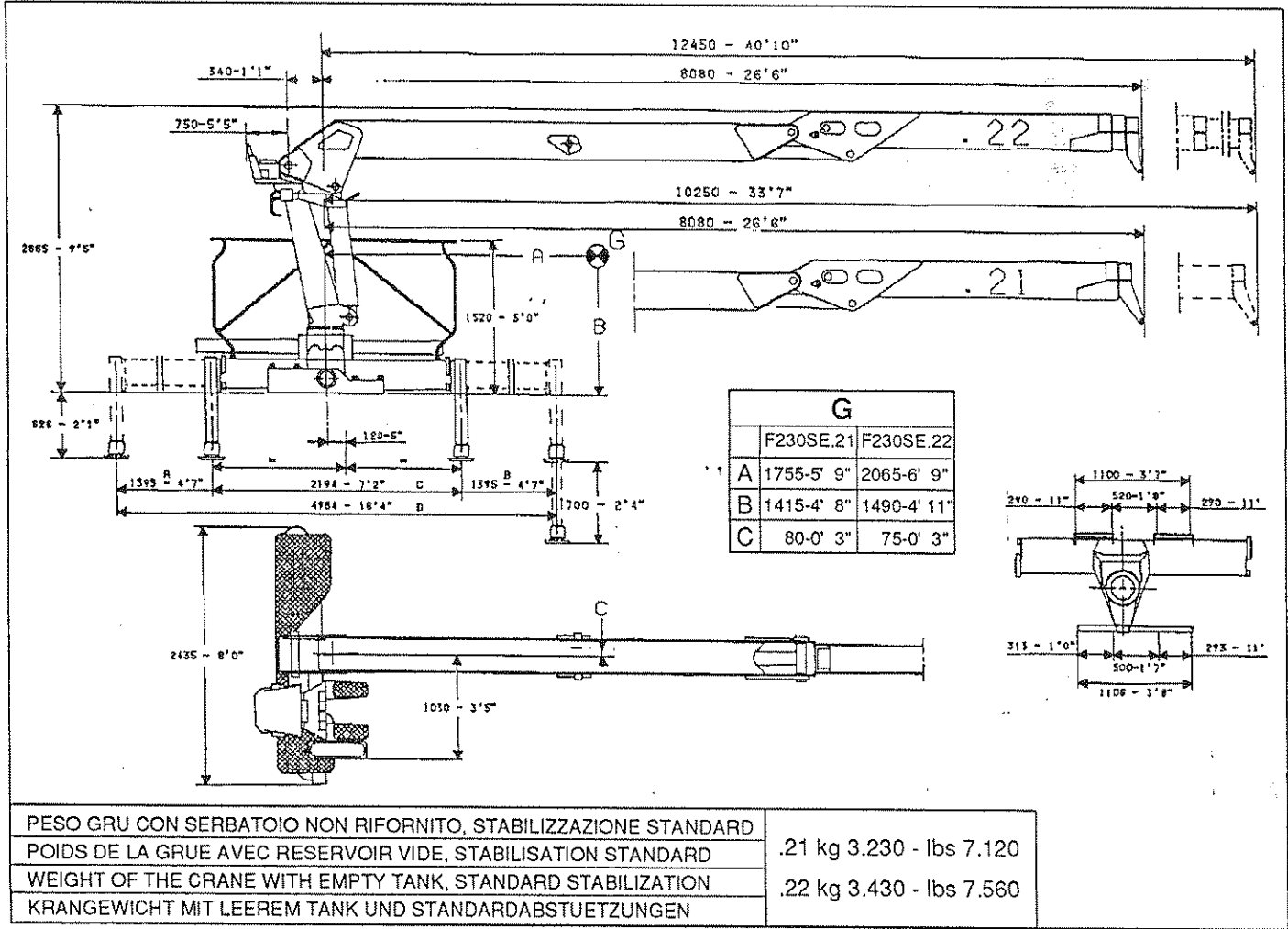


The design of this crane has been carried out in the respect of DIN 15018 norms, class of utilisation H1B3.

- (1) The crane can operate, in intermittent operation, with lifting devices different from the hook. The dimension and the capacity of the implements must be proportioned with crane performances.

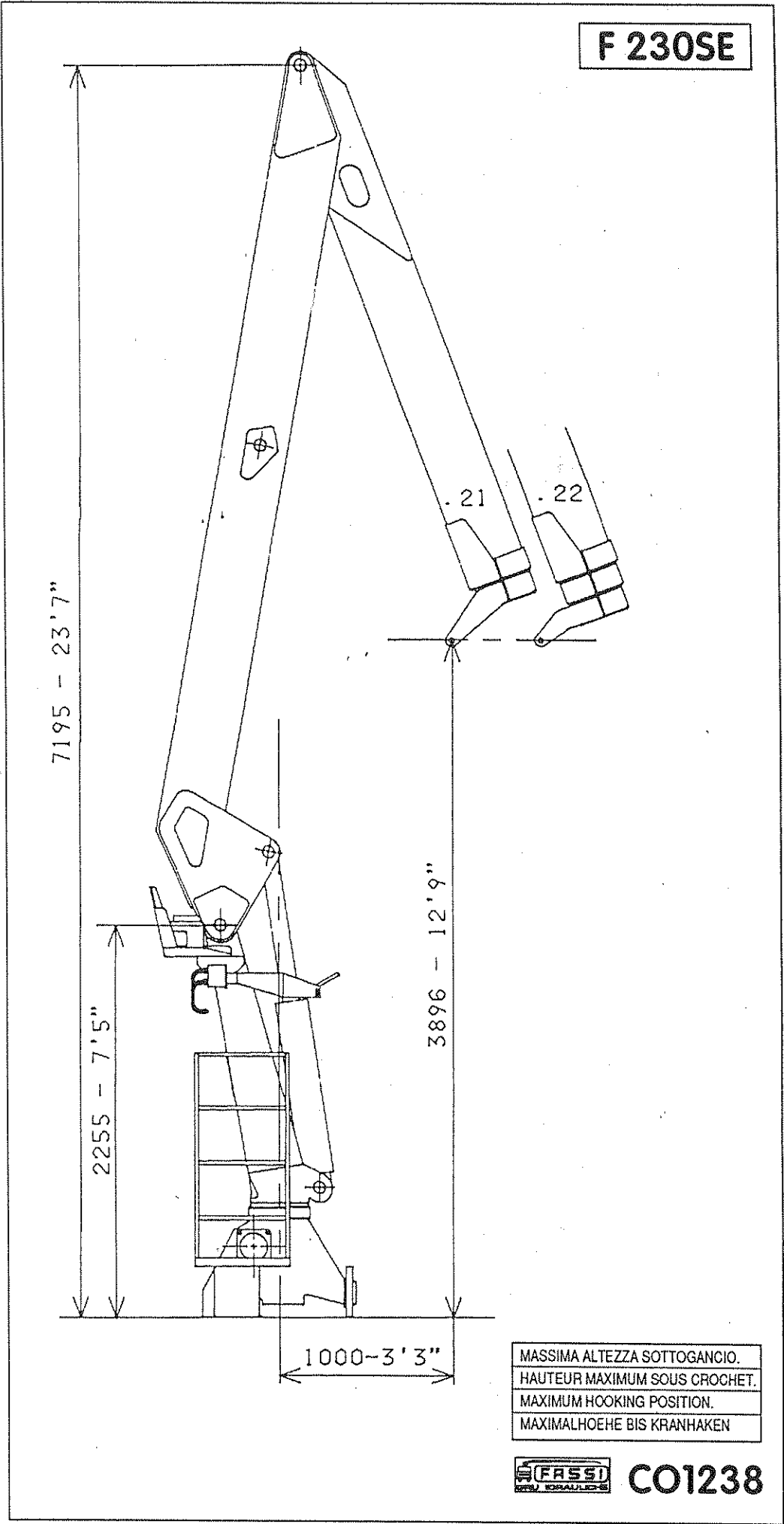


F 230SE
FRSSI CO1239



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FRSSI CO1238







CRANE NOMENCLATURE

Version with ground controls for outrigger and top seat controls for crane

Pos.	Description
1	- Outriggers rams
2	- Outrigger supports with lateral hydraulic extension
3	- Base
4	- Rotation cylinders
5	- Column
6	- Inner ram
7	- Inner boom
8	- Outer ram
9	- Outer boom
10	- Booms extension rams
11	- Extension boom sections
12	- Ladder and cat walk
13	- Seat and control station
14	- Diverter oil delivery outriggers - crane
15	- Outriggers control distributor
16	- Double control outriggers
17	- Crane control valve banks
18	- Joy-stick crane controls
19	- Pedal crane controls
20	- "Cat trac" for two extra functions
21	- Oil tank

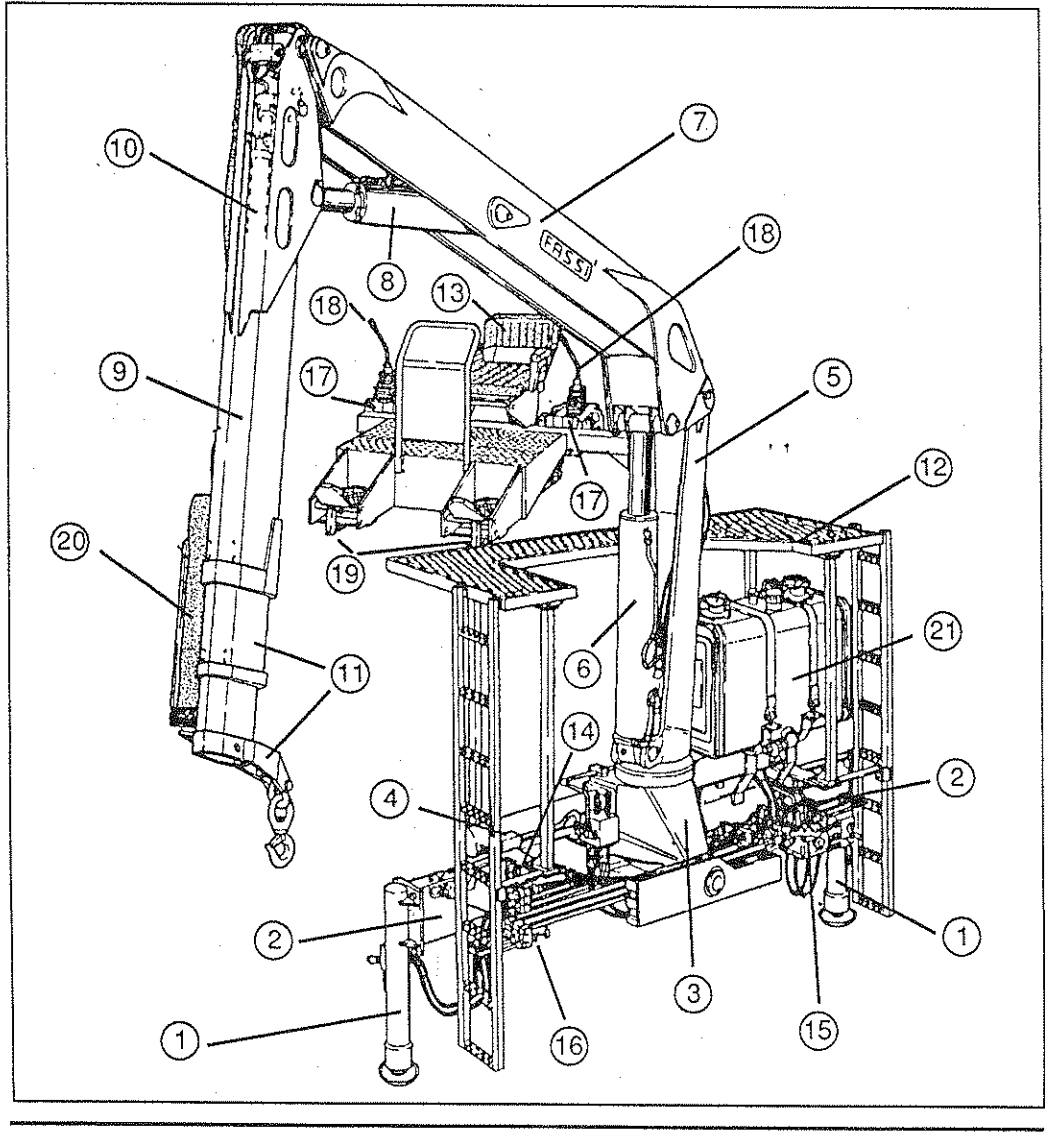


fig. 3





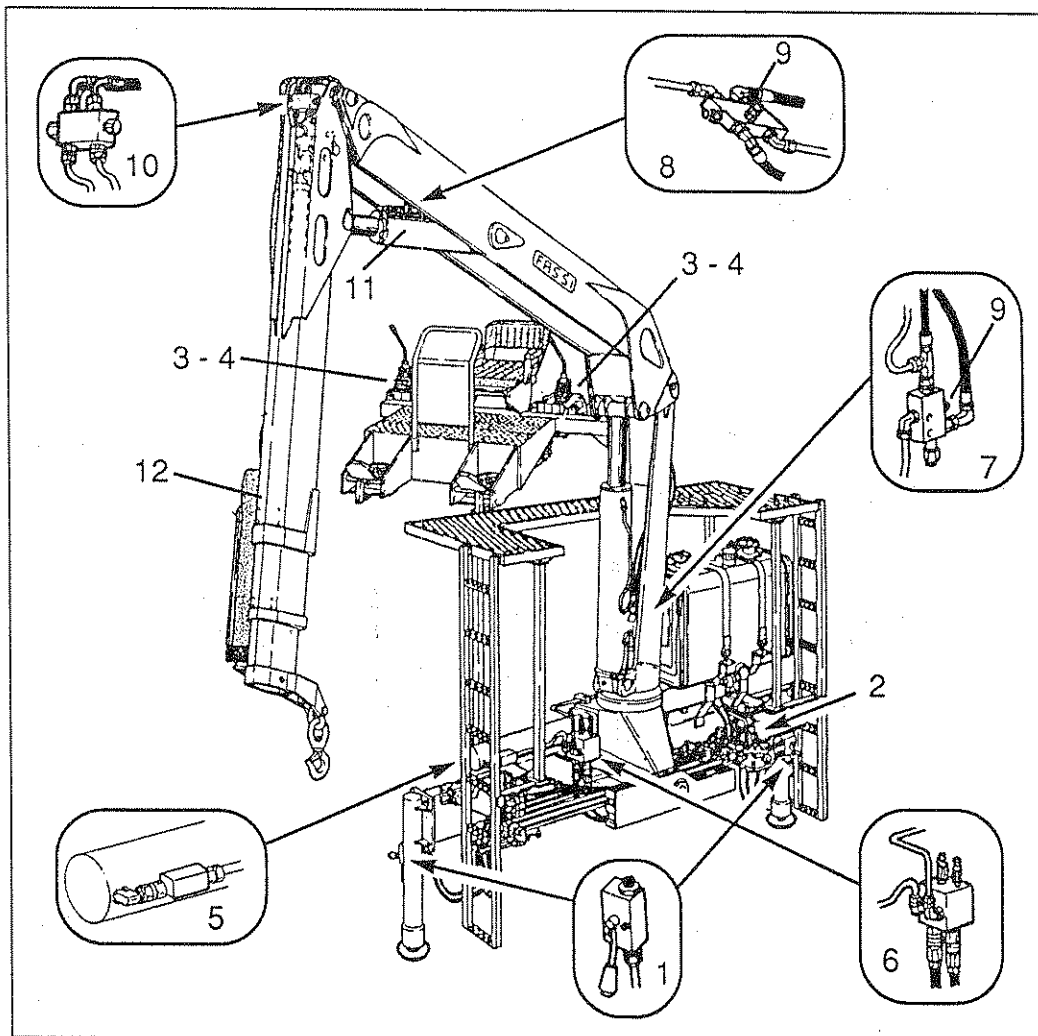
SAFETY AND PROTECTION DEVICES

Version with ground controls for outriggers and top seat controls for crane

Pos.	Description
1	- Tap and check valve for outrigger rams
2	- Main pressure valve (outriggers distributor)
3	- Main pressure valves (crane valve banks)
4	- Auxiliary valves (crane valve banks)
5	- Rotation speed control valves
6	- Check valve for rotation control
7	- Check valve for inner ram
8	- Check valve for outer ram
9	- Load limiting device valves
10	- Check valve for boom extension rams
11	- Outer ram rod protection shield
12	- "Cat trac"

- (!) Before crane use check that safety and protection devices are fitted and active.
- (!) Don't manipulate, in no case, the safety and protection devices.
- (!) Manipulation of the check valves and removal of seals remove the Producer from any responsibility and warranty.

fig. 4





LOAD LIMITING DEVICE

LOAD LIMITING
DEVICE
F 230SE



A characteristic, which allows the classification of the crane is their lifting capacity or maximum lifting moment. It's defined by the product of the load to be lifted (lbs) for its distance (ft) from the centerline of the crane rotation (column axis).

The crane has from the origin, a safety device called "load limiting device". This device serves to prevent the utilisation of the crane in overloaded conditions, allowing the slow descent of one of the two, or both, lifting rams (inner and outer ram).

To stop the load descent, it's compulsory to retract the load to the column (see page 14 Controls to operate the crane), operating on the right pedal to re-enter the boom extension rams, or in an alternative, operating on the (joy-stick) inner or outer ram control lever, and carrying out a manoeuvre finalised to the reduction of the moment on the column axis.

- (!) This operation must be carried out within and not over 5 seconds from the beginning of the load descent.



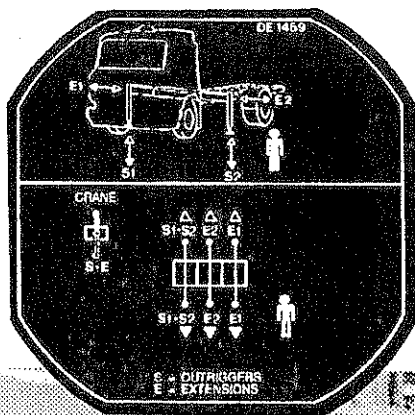
CONTROLS TO STABILIZE THE VEHICLE F 230SE

CONTROLS TO STABILIZE THE VEHICLE

The outrigger rams serve to prevent damaging stresses both to the frame and to the vehicle suspensions on which the crane is mounted and to assure the stability of it during the load handling.

- (!) The vehicle-crane stability is assured only by the maximum extension of the outrigger supports of the crane.
- Be careful during vehicle stabilization operation.
- Make sure that during the extension operation of the crane outrigger supports nobody is or transit in proximity of the working area of outriggers.
- When stabilization is completed the wheels of the vehicle are to be in contact with the ground and **suspensions not fully unloaded**.
- Level the crane so as to operate on a horizontal level.

The controls to stabilize the vehicle can be operated only from the ground and they are placed in bilateral position on the base of the crane.



Description of the controls to stabilize the vehicle

- (!) The extension and the re-enter of the outrigger supports and rams indicated on fig.5 and 6 coincide with what indicated on plates DE1469 and DE1470 placed on the crane rotation cylinders.

The upper part of the plates indicates the side of the vehicle from which the operation is carried out with the possibilities of outrigger supports extension and outrigger rams descent.

The lower part of the plates indicates the controls position and the levers operating direction.

On the plate DE1469 is also reported the oil diverter (placed on the side of the base beam fig. 5, on the left side of the vehicle) with the position of the lever for CRANE S-E control (S=outriggers, E=extensions).

Levers function E1 - E2 - S1/S2 of fig. 5

- E1 - E1 outrigger supports extension control
- E2 - E2 outrigger supports extension control
- S1/S2 - S1/S2 outrigger rams control

Control for outrigger supports extension for crane

- move the lever of the S-E CRANE oil diverter fig. 5, (placed on the beam of the crane base, on the left side of the vehicle), on the S-E position (outriggers - extensions).

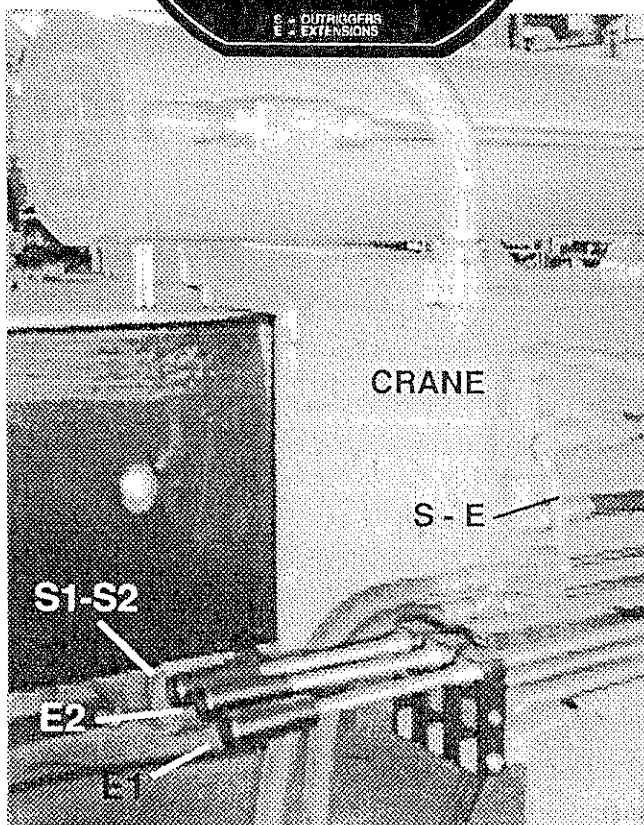


fig. 5

- operate the lever E1 to exit the outrigger support E1
- operate the lever E2 to exit the outrigger support E2



Crane outrigger rams descent control

CONTROLS TO STABILIZE THE VEHICLE
F 230SE

This are the two possibilities to control the outrigger rams descent:

"Dual" descent of the outrigger ram S1 and S2:

- open the taps of the valves fig. 7 placed on the outrigger rams S1 and S2
- operate the lever S1/S2 to control the dual descent of rams
- close the taps of the outrigger rams valves fig. 7 after carrying out the manoeuvre of the descent and the stabilization.

"Single" descent of one outrigger ram S1 or S2:

- open the tap of the valves fig. 7 placed on the outrigger ram, which must be activated
- operate the lever S1/S2 to control the ram descent
- close the tap of the outrigger ram valve fig. 7 after carrying out the manoeuvre of the descent and the stabilization
- repeat, as above indicated for the other outrigger ram, completing the stabilization of the vehicle.

To have the crane in working condition, the CRANE-S E oil diverter lever fig. 5, placed on the base beam, must be positioned on the CRANE position.

Controls to re-enter the outriggers of the crane at the end of crane use.

Make sure that during the extension operation of the crane outrigger supports nobody is or transit in proximity of the working area of outriggers.

- Position the lever of the CRANE-SE oil diverter in the position S E (outriggers-extensions).
- Open the taps of the outrigger rams valves.
- Operate the lever S1/S2 to control the lift of outrigger rams S1 and S2.
- Operate the lever E1 to re-enter the outrigger support E1.
- Operate the lever E2 to re-enter the outrigger support E2.
- Close the taps of the outrigger rams valves.

(!) It's compulsory to close the outrigger rams valves taps before moving the truck.

(!) WARNING (!)

For the particular characteristic of the hydraulic circuits, also with the oil diverter in the position S-E, the right side distributor on the seat remains active (outer boom pallet fork and extension boom control.)

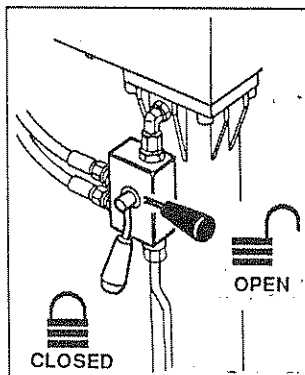


fig. 8

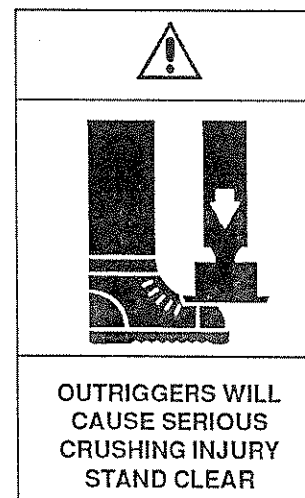


fig. 6

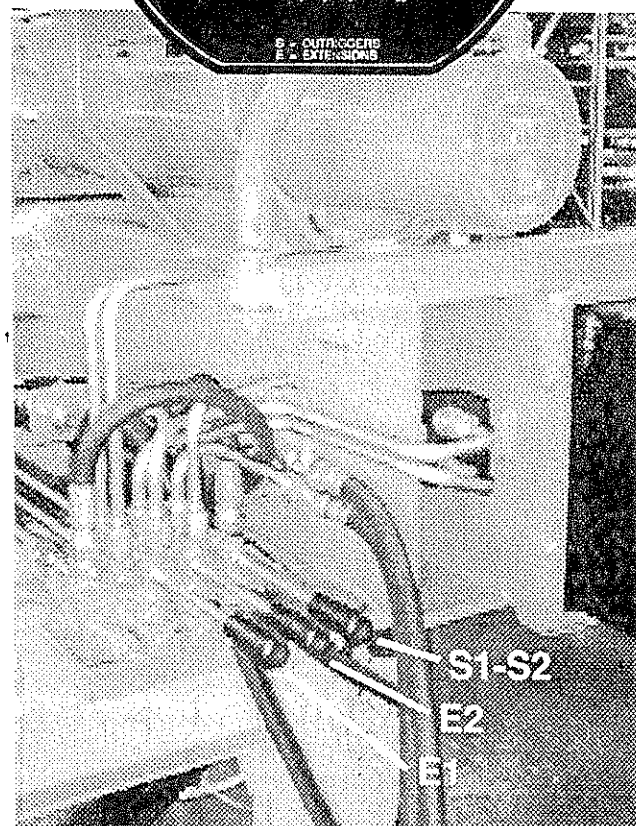
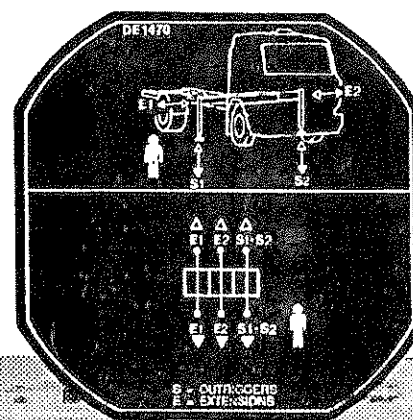


fig. 7





CONTROLS TO OPERATE THE CRANE F 230SE

CONTROLS TO OPERATE THE CRANE

(!) WARNING (!)

Before operating the crane it's compulsory to set the outriggers and to shut the safety check valves taps.

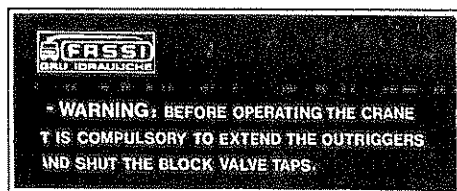


fig. 9

This warning coincides with what indicated on the plate DE319 placed on the outriggers (fig. 9).

- (!) Operate the levers smoothly and gradually; in the simultaneous manoeuvre of two or more functions in correspondance of the stroke end reach of a manoeuvre, it's possible to remark an increase of speed of the other functions.

The control station is in the top seat, the hydraulic accessories and crane controls are positioned on left and on right of the operator and they are joy-stick manual (double function) and by pedals.

The ideograms reported on the plate DE1458, positioned on the support handle in front of the operator identify the left and right side of the control station, and define the joy-stick and pedals operating direction according to which crane function to be carried out (fig.10).

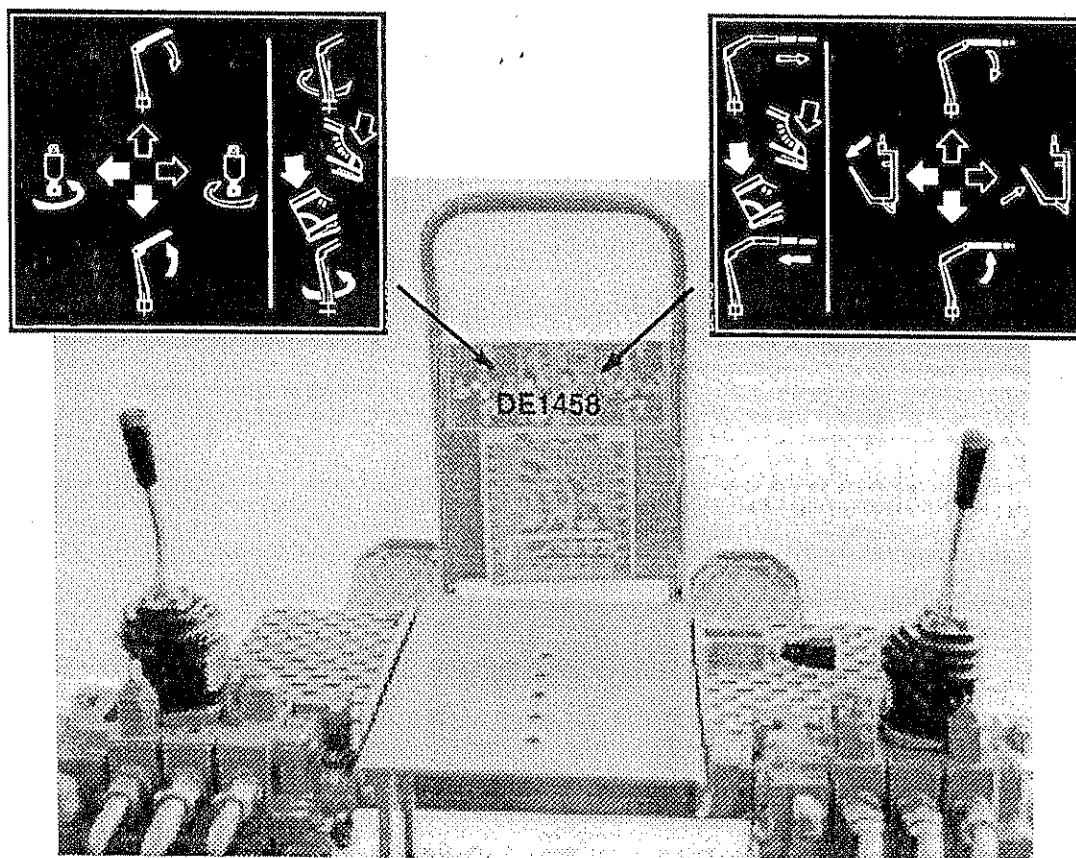


fig. 10

Left side of the control station.

The left joy-stick controls two functions:

- in the operating direction FORWARDS-BACK we have the inner boom movement;
 - in the position FORWARDS we control the descent
 - in the position BACK we control the ascent.
- in the operating direction RIGHT-LEFT we have the rotator movement;
 - towards RIGHT we control the clockwise rotation
 - towards LEFT we control the counter-clockwise rotation





- (!) Varying opportunely the angle of the joy-stick operating direction it's possible to control simultaneously the two functions.

The left pedal controls the crane rotation direction;
PUSHING with the foot point we control the clockwise rotation
PRESSING with the heel we control the counter-clockwise rotation

Right side of the control station.

The right joy-stick controls two functions:

- in the operating direction FORWARDS-BACK we have the outer boom movement;
 - in the position FORWARDS we control the descent
 - in the position BACK we control the lifting.
- in the operating direction RIGHT-LEFT we have the pallet fork operation;
 - towards RIGHT we control the closing
 - towards LEFT we control the opening

- (!) Varying opportunely the angle of the joy-stick operating direction it's possible to control simultaneously the two functions.

The right pedal controls the movement of the crane extension boom;
PUSHING with the foot point we control the extension boom exit
PRESSING with the heel we control the extension boom re-enter.

Manoeuvres to set the crane in working condition:

- Engage the power take off.
- Stabilize the vehicle as described at page 12 and 13.
- Before lifting the inner boom make sure that the outer ram is fully open, and disengage fork stowage pin.
- Lift the inner boom over the horizontal line, close the outer boom and withdraw, in the case, the crane booms.
- Operate the crane rotation to set the fork on the vertical of the load, operate the pallet fork rotation control to have the exact positioning of the fork.

Manoeuvres to set the crane in rest condition:

- Lift the outer boom to stroke end.
- Re-enter the outer extension booms.
- Operate the crane rotation control and fold the inner boom paying attention to the crane booms positioning in rest seat obtained on the body. It's necessary to position exactly the pallet fork to avoid the interferences when the crane is put in the rest condition on the truck body or on the load.
- Lift and re-enter the outriggers within the crane truck shape as described previously.
- When completed all manoeuvres, assure that the taps of the outrigger rams valves are closed.
- Disengage the power take off.

- (!) In case of implements folded position on the load or in the truck body it's necessary to assure that they are blocked in order to avoid lateral movements.



LOADS MANOEUVRES

- (!) Before manoeuvring the load, verify that the working area is suitable for Your crane.

The lifting curves of the capacity plate indicate the maximum load that the crane can move at a certain radius and at a certain height.

- (!) When you operate with wallboard forks it's necessary to deduct the fork and rotator weight from the crane capacity.

During the load handling, don't exceed the reach limits concerning the load indicated on the above mentioned charts. If the limits are overcome, the load limiting device allowing the slow descent of one of the two, or both, lifting rams (inner and outer ram), will be immediately activated.

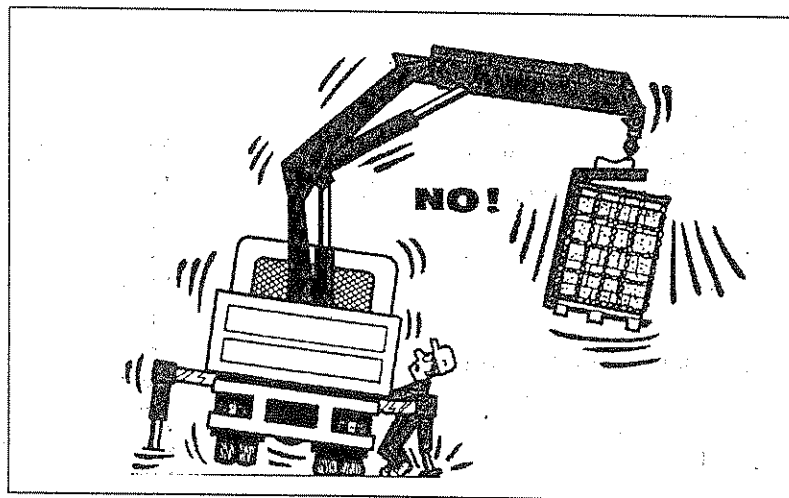
To stop the load descent it's necessary to re-approach the load to the column operating, in the re-enter, the right pedal (booms extension rams control) or, in alternative, operating the (joy-stick) inner or outer ram control and carrying out a manoeuvre, which reduces the moment on the column axis.

- (!) The operation must be carried out within and not over 5 seconds from the load descent beginning.

The presence of the load or the lifting moment limiting device doesn't release the user from the observance of the capacity plate and lifting curves.

(!) WARNING (!)

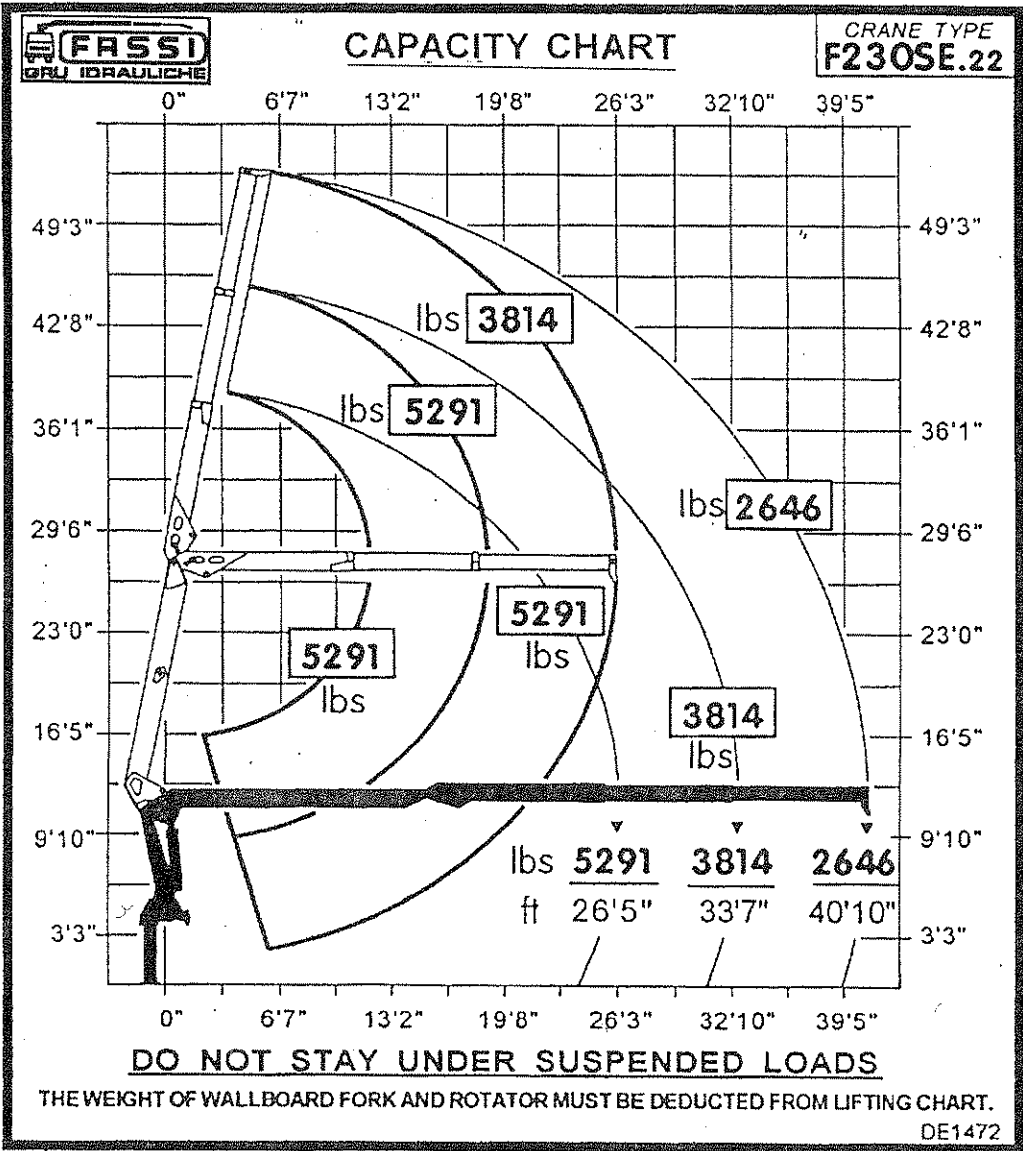
Verify with caution the stability of the vehicle within the entire working area and pay particular attention to the truck cab area, where normally the stability is limited or reduced.





CAPACITY PLATES AND LIFTING CURVES

CAPACITY PLATES
F 230SE.22





cXII

MAINTENANCE
INSTRUCTION
F 230SE

MAINTENANCE INSTRUCTIONS

Good maintenance and correct use are necessary to maintain a perfect efficiency and to guarantee the safety of the crane.

- (!) Before disconnecting any hydraulic hose be sure that there is no pressure in the circuit. Always remark the removed hoses and the respective ports on the crane; an error in deconnection can cause damage to the rams and to the hydraulic circuit.

Respect the information supplied for maintenance and technical assistance.

Any maintenance operation must be carried out with non activated engine.

Don't insert the body, limbs, or fingers in holes, in openings or between joints which present possibilities of shearing without having securely locked all parts.

Don't carry out any procedure of weld, boring, or grinding without the manufacturer's written authorisation.

When repairs or checks of the hydraulic circuit and of the rams are carried out, it's very important not to use or not to be in the vicinity of materials, which can damage the circuit or contaminate the hydraulic oil (hemp filaments, tow, metallic shavings, sand or dust materials).

Never use detergents, petrol, solvents or inflammable liquids: adopt and use not inflammable and not toxic liquids.

To avoid down time for repairs, it's suggested to periodically carry out the following checks.

**At the end of every working day**

Check that all safety devices are sealed with manufacturer's seal.

Check the level hydraulic oil in the tank.

Check the hoses, the fittings and all the components of the hydraulic circuit to point out possible oil leaks.

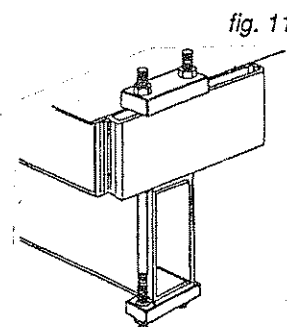
Check that the crane controls (joy-stick and pedals) and the outriggers (levers) can easily operated and can freely return in neutral position.

Check that the cables, hooks and all eventual implements used accessories aren't worn out.

After the first 40 hours use

Check the thightening torque of the fixing rods of the crane to the frame of the truck.

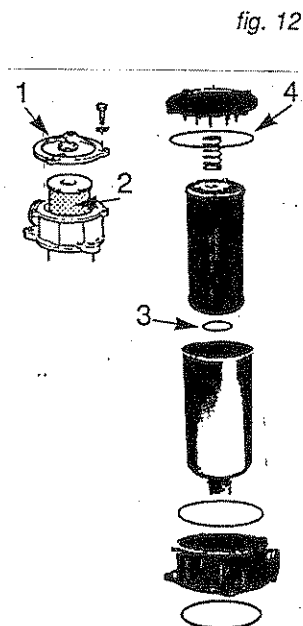
Torque wrench setting tie rod side equalizer 1200 Nm
Torque wrench setting tie rod side beam guide 1800 Nm

**After every working week use**

Carry out the filters cleanings placed on the crane tank.

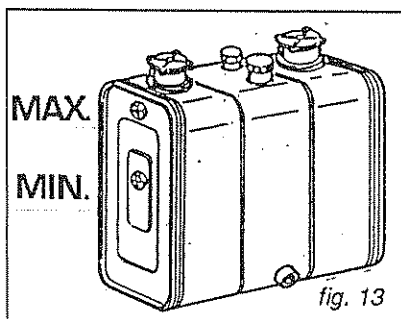
Cleaning of the filter on the tank (oil-return from the distributors)

- Take the filter plug off, pos. 1 unscrewing the three locking screws. Remove the spring, and extract the filter cartridge pos. 2, during this operation avoid that some contaminated material passes through the tank.
- Clean the cartridge and plunge it into a non infammable and non-toxic solvent. Dry it with compressed air through the inside to the outside of the same.
- Remove the filter holder from the filter body (it carries on the external connector a hose clamped with a metal band) clean it and re-assemble it after checking the sealing function of the seal OR pos. 4-5 (internal sealing function between cartridge and holder and external sealing function between holder and filter body).
- Re-assemble the filter cartridge into its holder, remove the spring and the filter plug after checking the sealing function of the seal OR placed on the plug.
- Re-screw the three locking screws.
- Verify the sealing function of the seal when the pump is activated.





After every working week use



Check the oil level into the tank, and assure that when the crane is in travel position (rest), the oil level is between the minimum and maximum.

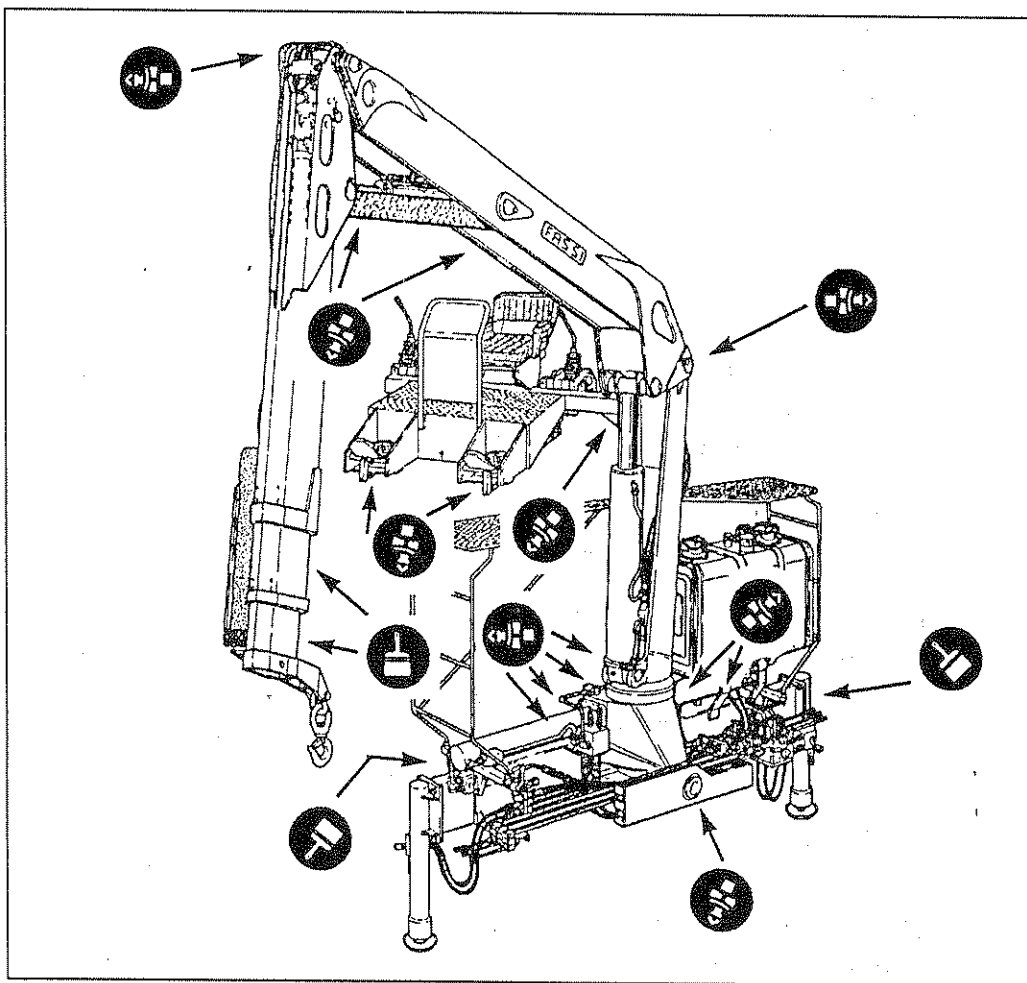
Top up using hydraulic oil with the same characteristics of the one indicated in the table at page 24.

After every working week, grease the points indicated on fig. 14, using particular attention to the points not easily detectable.

For the sliding of the outer booms sections, guide-shoes in special material have been fitted; to ease their sliding, it's necessary to spread a grease film outside and inside of them, taking care that all surfaces of the booms are perfectly free from any impurity (sand, ground).

For the sliding of the outrigger supports, guide-shoes have been fitted. Use a grease with the same characteristics indicated on the table at page 24 .

fig. 14



(!) WARNING (!)

Don't use greases with solid particles as "Bisulphide of Molybdenum"



POSSIBLE PROBLEMS

The experience gained in many years work, allows us to identify and to classify the most common problems which can happen. In the most of the cases it's concerning the hydraulic troubleshooting of simple repair.
In the following table we report the most frequent problems and we suggest the possible remedies.

(!) The check of oil pressure and flow must be done at an authorized service center, under penalty of warranty forfeiture.

Operations which can be carried out by the user are underlined:

problems	cause	remedies
The crane doesn't lift the loads of the capacity plates	<i>No efficiency of the pump</i>	Replace the pump
	<i>Main pressure valve not properly adjusted, blocked or out of service</i>	Check the pressure adjust the valve or replace it
	<i>Seals of the rams are worn</i>	Replace the seals
A boom of the crane doesn't hold up the load and visually lowers	<i>The safety check valve of the ram isn't set or in breakdown</i>	Replace the safety check valve load and
	<i>Oil leaks inside the ram for seals are worn</i>	Replace the seals
The crane doesn't rotate properly	<i>Vehicle not in level position</i>	STABILIZE THE VEHICLE
	<i>Lack of lubrication</i>	GREASE THE BUSHES
	<i>Valves controlling the rotation not adjusted</i>	Adjust the valves
	<i>Rotation cylinders seals are worn</i>	Replace the seals
The outer booms sliding sections don't completely extend or work jerkily	<i>Wear of guide-shoes</i>	Check them and replace them if necessary
	<i>Lack of lubrication</i>	GREASE THE GUIDE-SHOES





POSSIBLE
PROBLEMS
F 230SE

Vibrations in
crane operations

Shortage of oil

CHECK THE LEVEL
AND TOP UP TO
PROPER LEVEL

Obstructed filters

CLEAN OR REPLACE
THE FILTER CARTRIDGES

Not efficient pump

Check it and replace
if necessary

Noticeable
decrease in speed
of operation

Obstructed filters

CLEAN OR REPLACE
THE FILTER CARTRIDGES

Not efficient pump

Check it and replace
if necessary

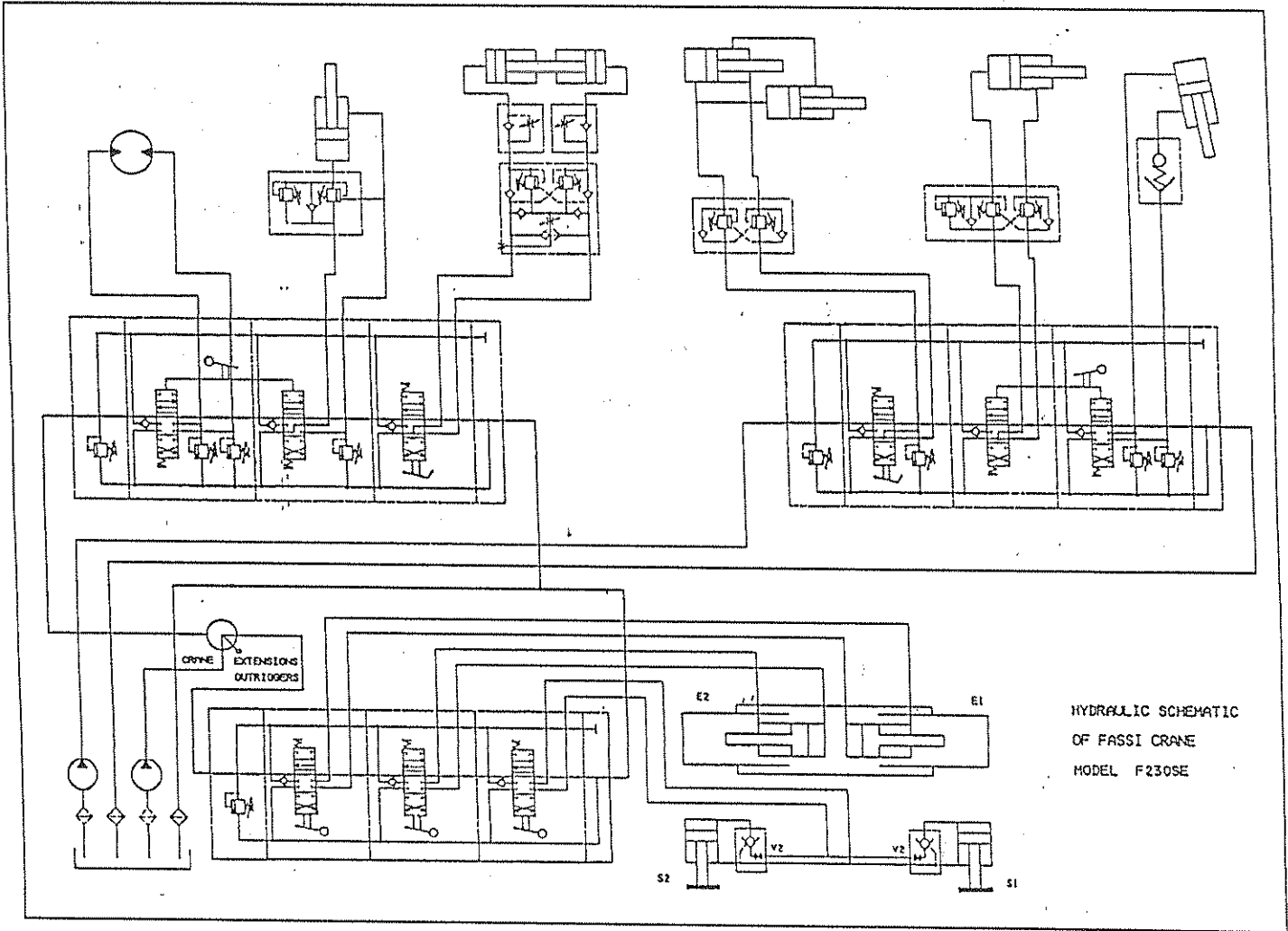


fig. 15



TABLE OF HYDRAULIC OIL AND LUBRICANTS CHARACTERISTICS

HYDRAULIC OIL

External temperature	- 30°C <= - 10°C	Gradation	ISO 46
	<= - 5°C up to +35°C	"	ISO 68
	> + 35°C	"	ISO 100

GREASE

Rating	EP 85	ISO 140
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(!) WARNING (!)

Don't use greases with solid particles as "Bisulphide of Molybdenum".