FASSI CRANE

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F 140.23
use and maintenance

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INTRODUCTION

This instructions manual describes the FASSI CRANE F 140.23

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 au thorized service personnel.

Spare parts must be original.

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

THANKS TO HAVE SELECTED ONE OF OUR CRANES

FASSI CRANE

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use and maintenance

INDEX

SAFETY NORMS

(!) 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 the read 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 with the unit.

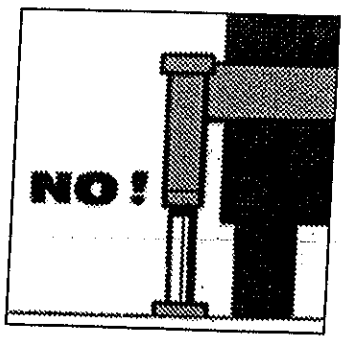
Check that protections are in their place and that all safety devices are fitted and active.

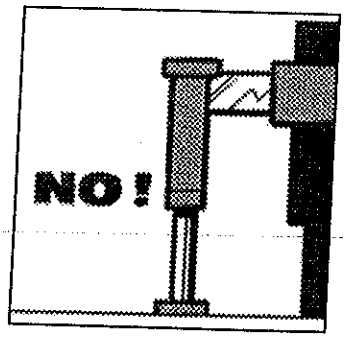
Don't activate the engine in an indoor area without making sure that the place is adequately ventilated.

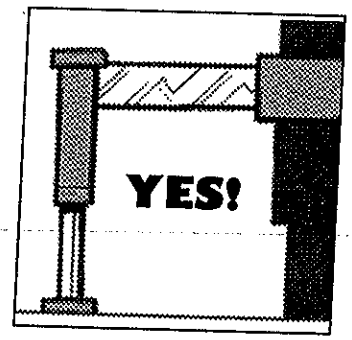
Stabilize the vehicle by means of the outriggers rams checking that they lay on a solid base; use in the case special outrigger plates (deliverable on request).

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 loaded.

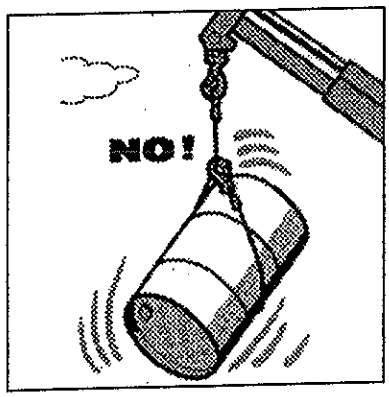


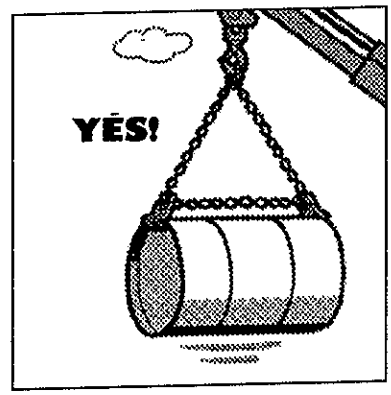


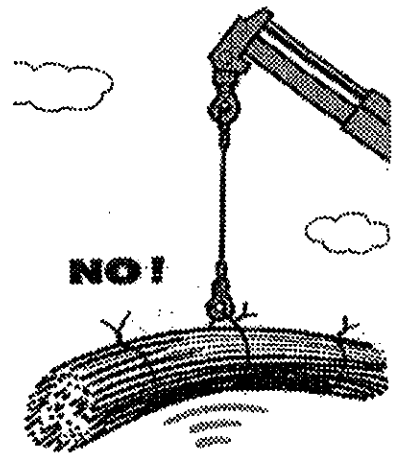


Remember that the stability of the unit crane-vehicle is guaranteed only by the maximum lateral extension of the outriggers.
Before manoeuvering a load check that the working area is adequate for Your crane.
Make sure that the hook is always free to rotate on the pin and that there are no obstacles for its vertical positioning.
Check the efficiency of the hook safety.

Carefully inspect the load rigging and the conditions of cables or chains.
Make sure that the lifted load is balanced.

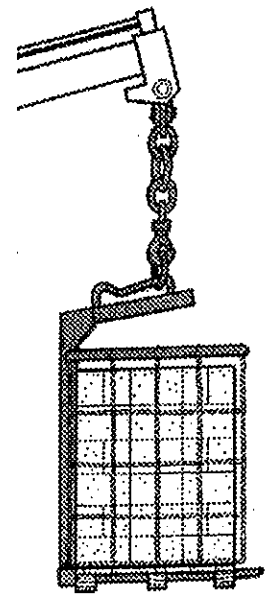






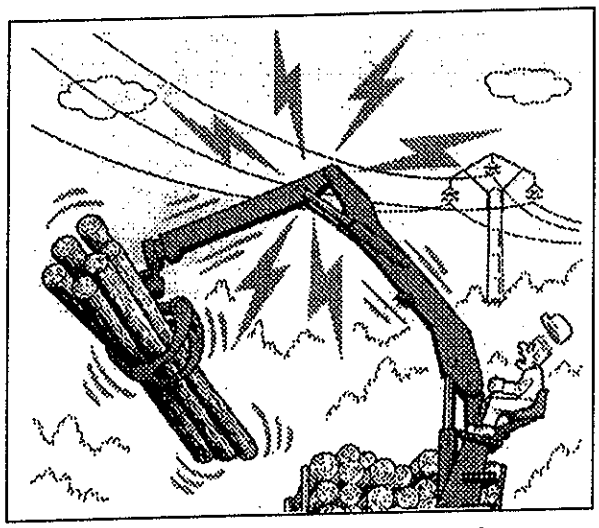
The pallet fork must be connected to the crane hook by means of a chain having at least 3 rings.

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.



It's absolutely prohibited to load or unload under or in proximity of electric lines. The minimum distance from electric lines is, according to the Italian norms actually in force, 5 meters.

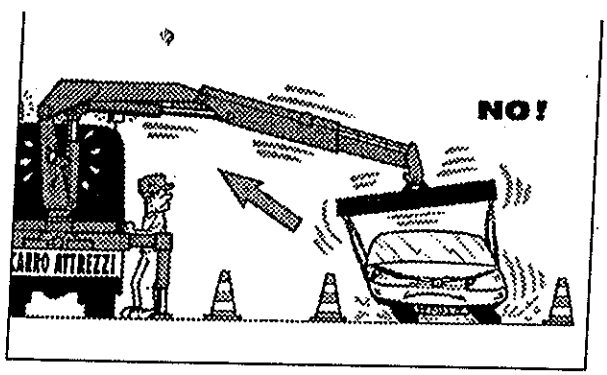
In other countries the minimum distance from electric lines is:

up to 500 V	**2 meters = 6' 7"**
from 500 to 50000 V	**4 meters = 13'**
above 50000 V	**6 meters = 19' 9"**

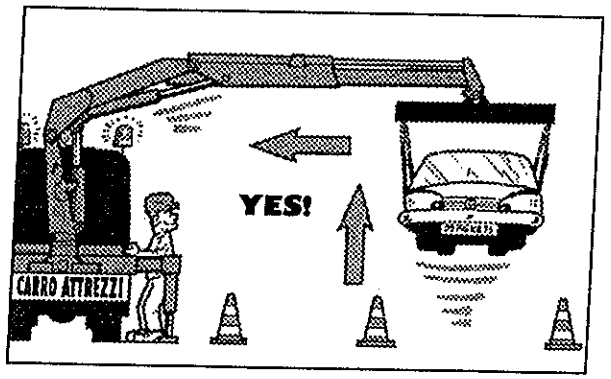
For France the minimum distance from electric lines are:

up to 57000 V	**3 meters**
above 57000 V	**5 meters**

In case of crane with top seat controls, it's necessary to use a ladder and a car 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, on hydraulic and mechanical extension, rotate slowly in order to avoid side-skiding.



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

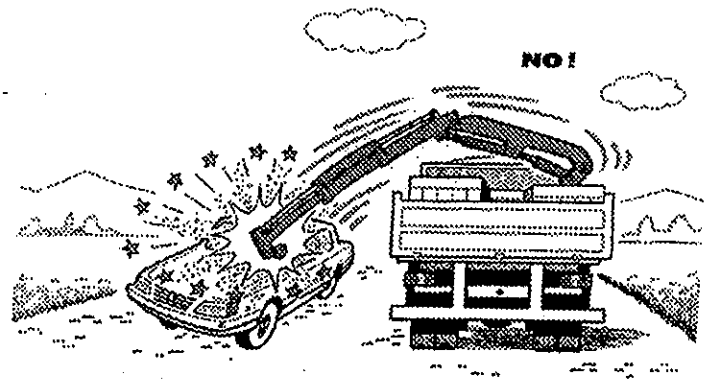
Don't utilize the crane for pull or push operations.

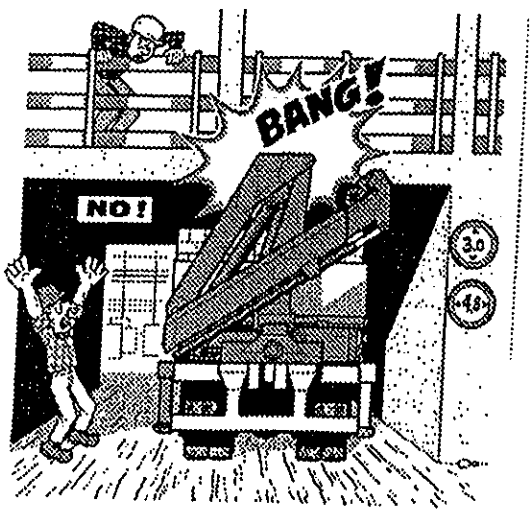
Don't manipulate, in no case, the safety and protection devices.

At the end of the work and before the transfer the crane has to be folded in the rest position. If booms will be laid on the body or on the load they must be blocked to prevent possible movements.

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

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





INSTRUCTIONS FOR CRANE USE

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.

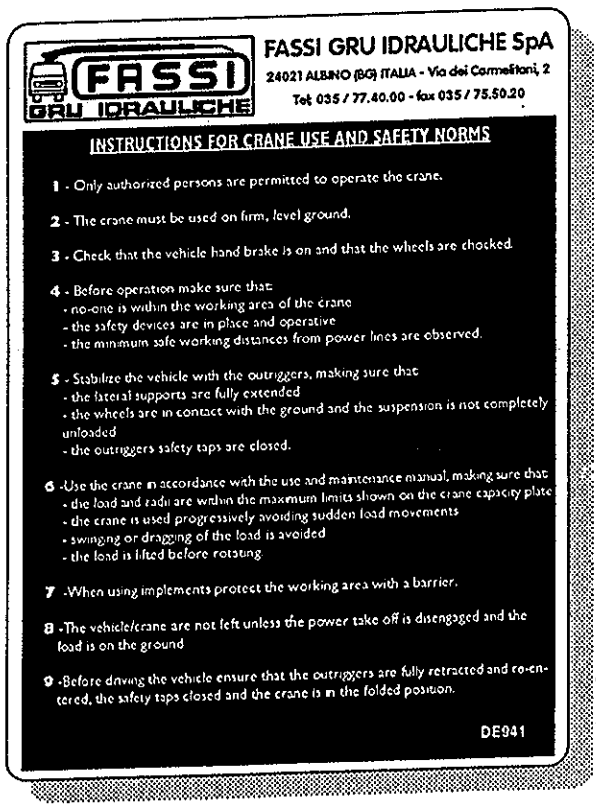
2 - The crane must be used on firm, level ground.

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.


FASSI GRU IDRAULICHE SpA
24021 ALBINO (BG) ITALIA - Via dei Carmelitani, 2
Tel. 035 / 77.40.00 - fax 035 / 75.50.20

INSTRUCTIONS FOR CRANE USE AND SAFETY NORMS

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
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- 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.

DE941

fig. 1

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.

THESE INSTRUCTIONS FOR THE USE OF THE CRANE COINCIDE WITH THOSE OF THE PLATE DE 941 (fig. 1) PLACED NEXT TO THE CRANE CONTROLS.

Essential data for the identification of the crane are reported on the plate fixed on the base.

1 - Year of construction
2 - Serial number
3 - Crane model
4 - Lifting model
5 - Maximum capacity
6 - Technical norm and class
7 - ISPESL Homologation (only for Italy)

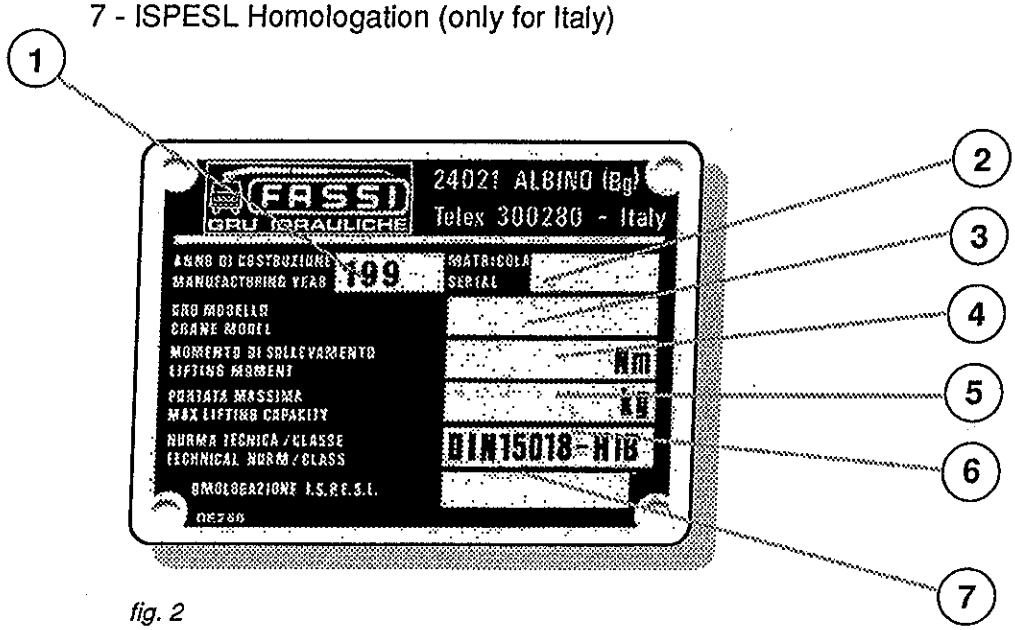


fig. 2

The model, the version of the crane, the year of construction and the serial number are stamped on the base in the following sequence:

Punching on the base

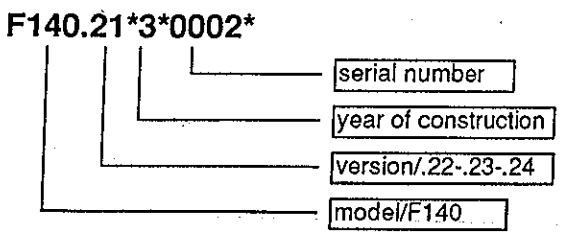
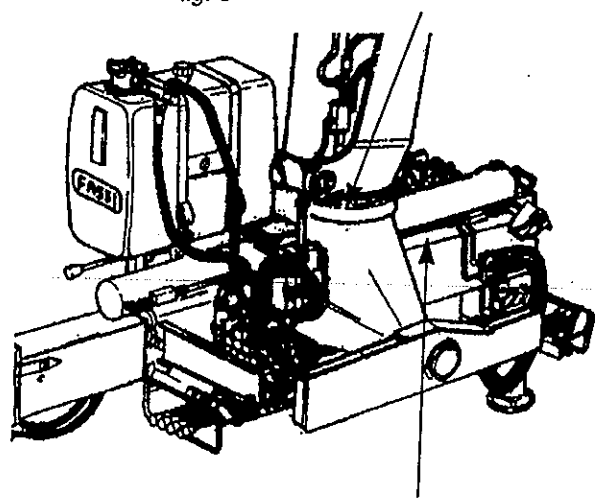


fig. 3 *Punching on the base*



Identification Plate

(!) FOR NO REASONS THE DATA MARKED ON THE PLATE AND PUNCHED ON THE BASE CAN BE ALTERED.

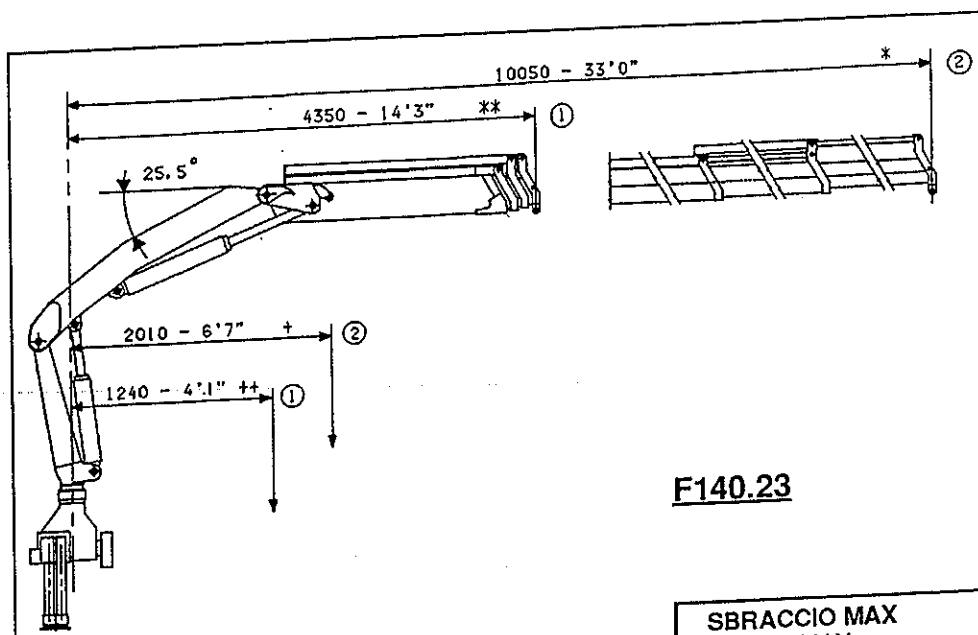
It is suggested to always report with precision the **model of the crane** and its **serial number** when You have to contact the Service or Parts Department.

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

TECHNICAL DATA :

The design of this crane has been carried out in the respect of **DIN 15018** norms, class of utilisation **H1B3.**
The crane can operate, in intermittent operation, with lifting devices different from the hook.
The dimensions and the capacity of the implements must be proportioned with crane performances.

F 140.23								
Lifting capacity	Standard reach	Hydraulic estension	Rotation arc	Rotation Torque	Working pressure	Pump Capacity	Oil Tank Capacity	Crane Weight
tm 12,2 lbs.ft 88.400	m 10,40 ft 34'.1"	m 5,70 ft 18'.8"	390°	KNm 21,5 lbs.ft 15.800	Mpa 29 psi 4200	l/min 35 gal/min 9	l 70 gals 18	Kg 1960 lbs 4310



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SBRACCIO MAX REACH MAX BRAS MAX MAXIMALE REICHWEITE			
*	10.385	34'	1"
**	4.695	15'	5"
+	2.160	7'	1"
++	1.390	4'	7"

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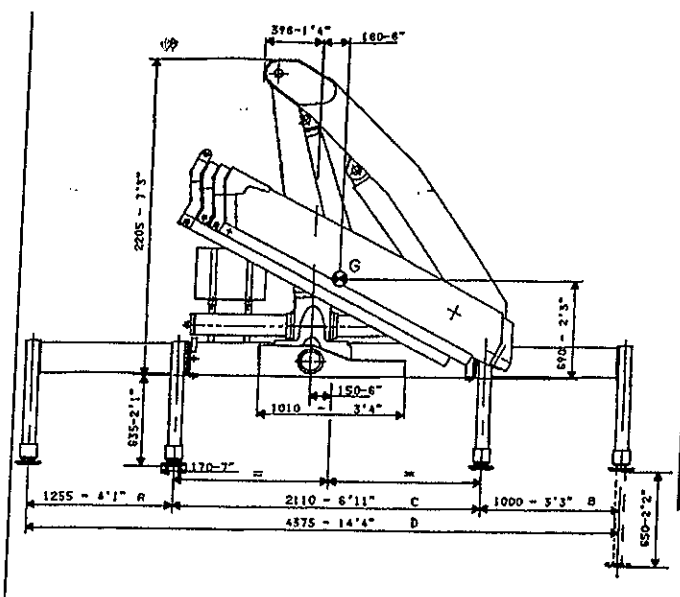
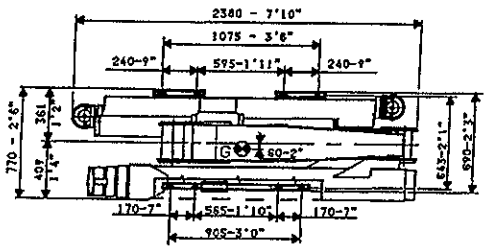


EXTRA		
A	1.809	5' 11"
B	1.809	5' 11"
C	2.212	7' 3"
D	5.830	19' 2"



— MEZZERIA TIRANTI
— FIXING ROD CENTER DISTANCE
— LIGNE MEDIANE TIRANTS
— ABMESSUNG DER BEFESTIGUNGSBRIDEN M24 x 2

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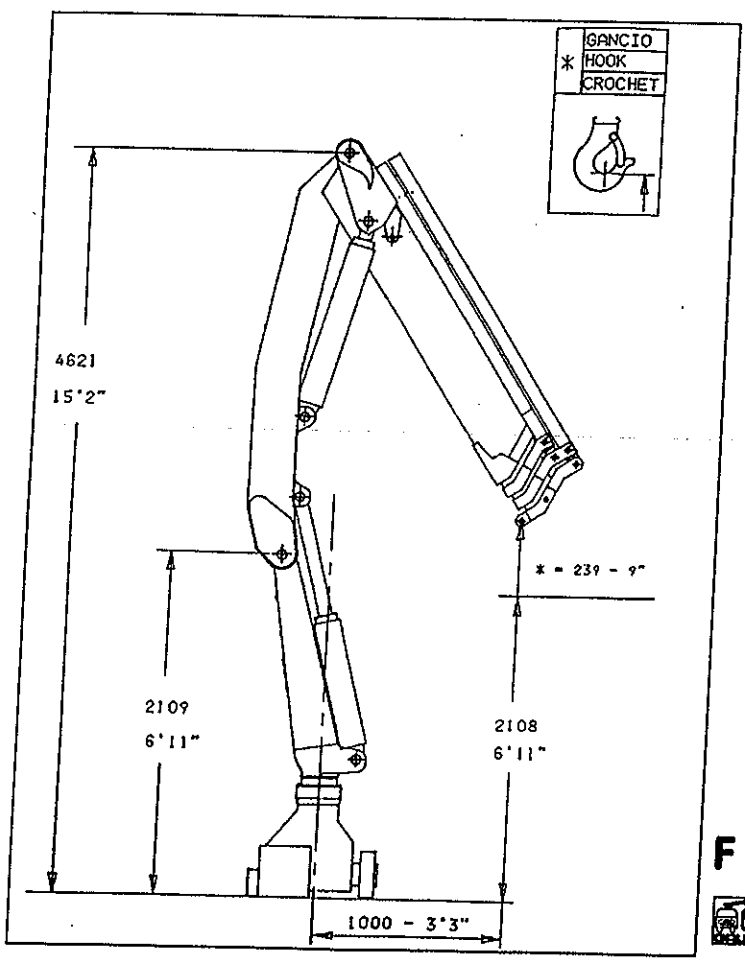
FASSI GRU IDRAULICHE



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CRANE NOMENCLATURE

Version with ground controls for crane and outriggers (fig. 5) and top seat controls for crane by hand-cables (fig 4)

Pos.	*Description*
1	Outrigger rams
2	Outrigger supports
3	Base
4	Rotation cylinders
5	Distributor bank outriggers
6	Double control outriggers crane
7	Distributor bank for crane
8	Double control crane
9	Column
10	Inner ram
11	Inner boom
12	Outer ram
13	Outer boom
14	Booms extension ram
15	Extension boom section
16	Lifting hook
17	Oil tank
18	Manual extensions
19	Seat
20	Hand-cables for crane

Version with ground controls for outriggers and top seat controls for crane. (fig. 6)

Pos.	*Description*
1	Outrigger rams
2	Outrigger supports
3	Base
4	Rotation cylinders
5	Distributor bank for outriggers
6	Double control for outriggers
7	Seat
8	Distributor bank for crane
9	Column
10	Inner ram
11	Inner boom
12	Outer ram
13	Outer boom
14	Booms extension rams
15	Extension boom sections
16	Lifting hook
17	Oil Tank
18	Manual extension

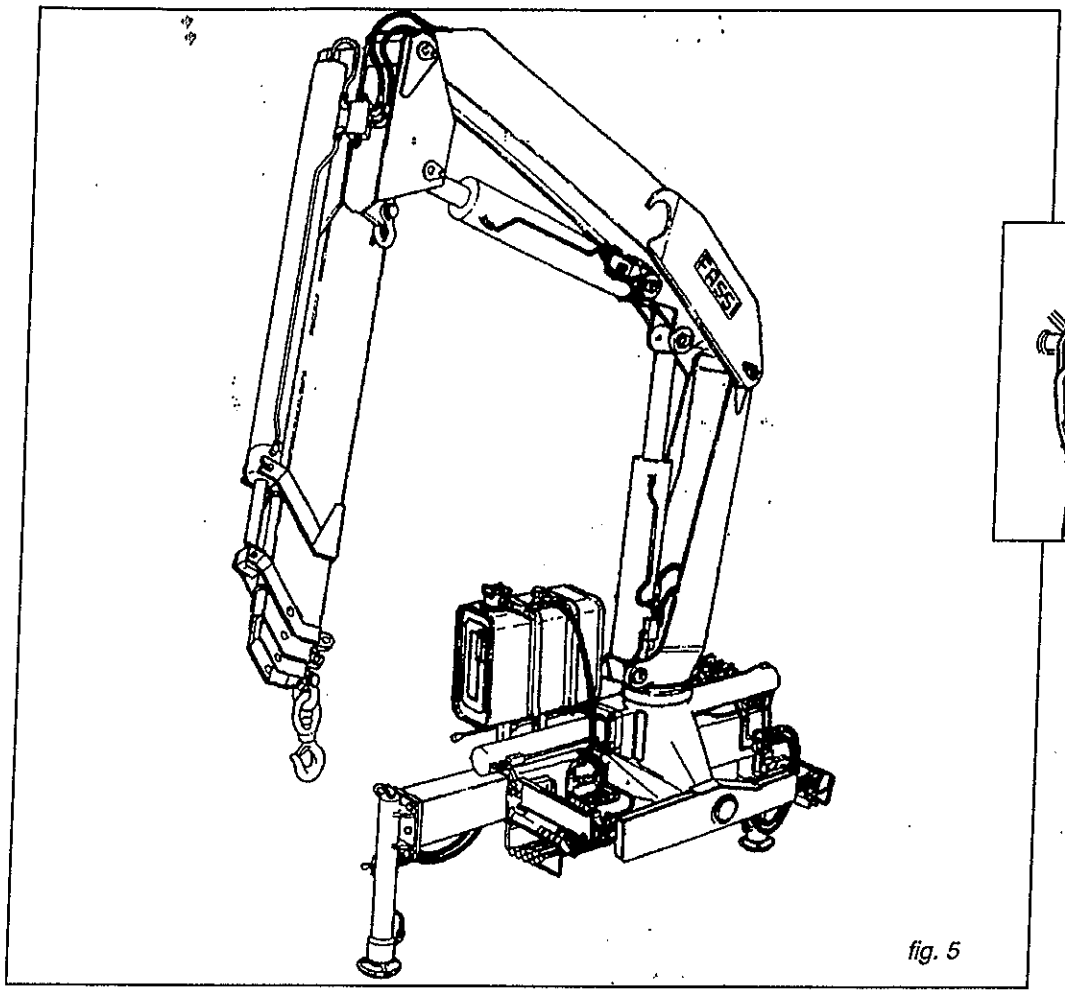


fig. 5

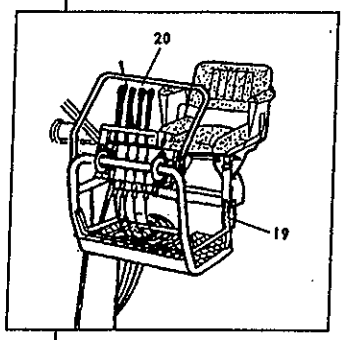


fig. 4

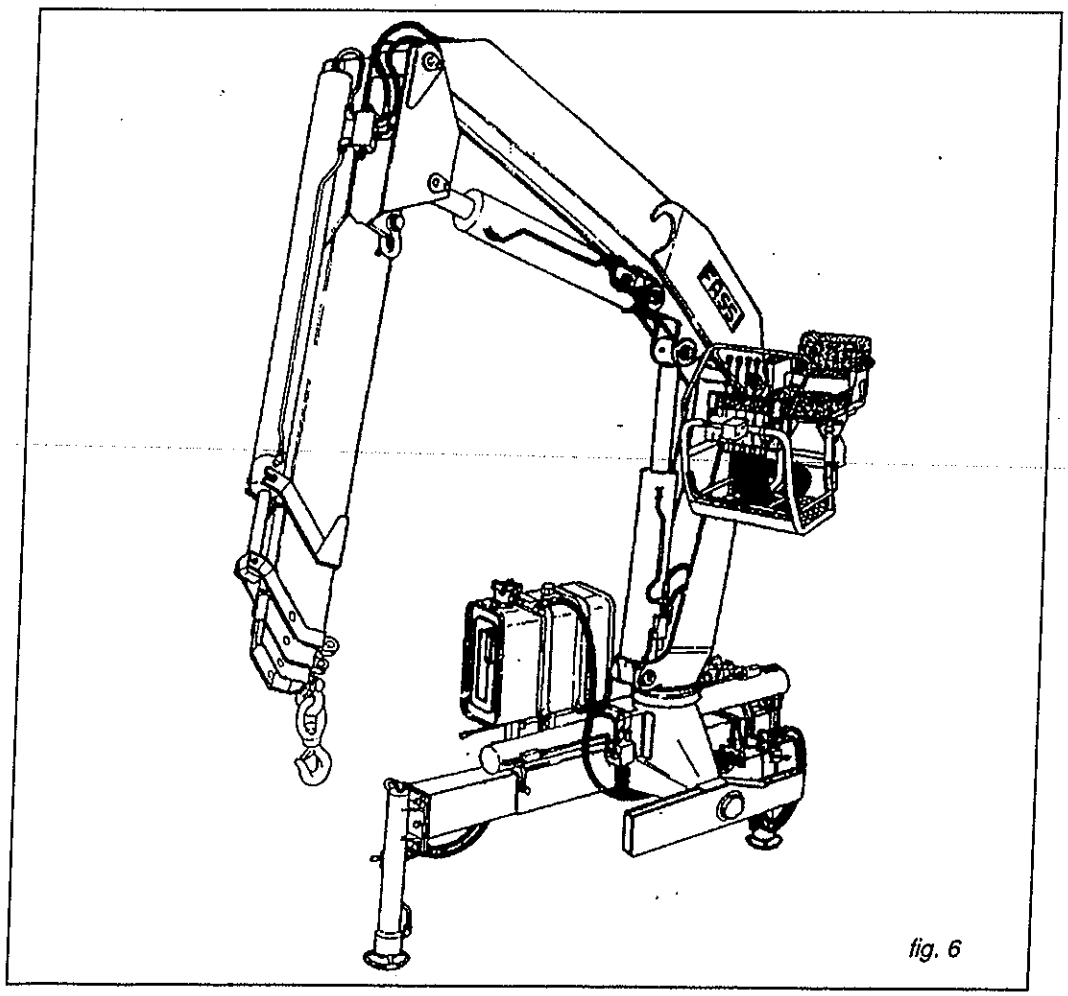


fig. 6

SAFETY AND PROTECTION DEVICES

Version with ground controls for crane and outriggers
Version with ground controls for crane and outriggers (fig. 8) and top seat controls by hand-cables (fig. 7)

Pos.	Description
1	Check valve for booms extension rams
2	Check valve for inner ram
3	Check valve for outer ram
4	Tap and check valve for outrigger rams
5	Check valve for rotation control (flow regulators)
6	Lifting moment limiting device assembly (on request)
7	Parachute valves (if control limiting device is present)
8	Main pressure valve (outriggers)
9	Main pressure valve (crane)
10	Auxiliary valves (crane)
11	Levers guard
12	Safety device outrigger supports
13	Hook safety device

Version with ground controls for outriggers and top seat controls for crane (fig. 9)

Pos.	Description
1	Check valve for booms extension rams
2	Check valve for inner ram
3	Check valve for outer ram
4	Tap and check valve for outrigger rams
5	Check valve for rotation control (flow regulators)
6	Check valve for rotation control
7	Lifting moment limiting device assembly (on request)
8	Parachute valves (if the lifting moment is present)
9	Main pressure valves (outriggers)
10	Main pressure valve (crane)
11	Auxiliary valves (crane)
12	Levers guard (crane)
13	Safety device outrigger supports
14	Hook safety device

(!) Before crane use check that safety and protection devices are fitted and active.

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

(!) Manipulation of the check valves and removal of seals remove the Producer from any responsibility and warranty.

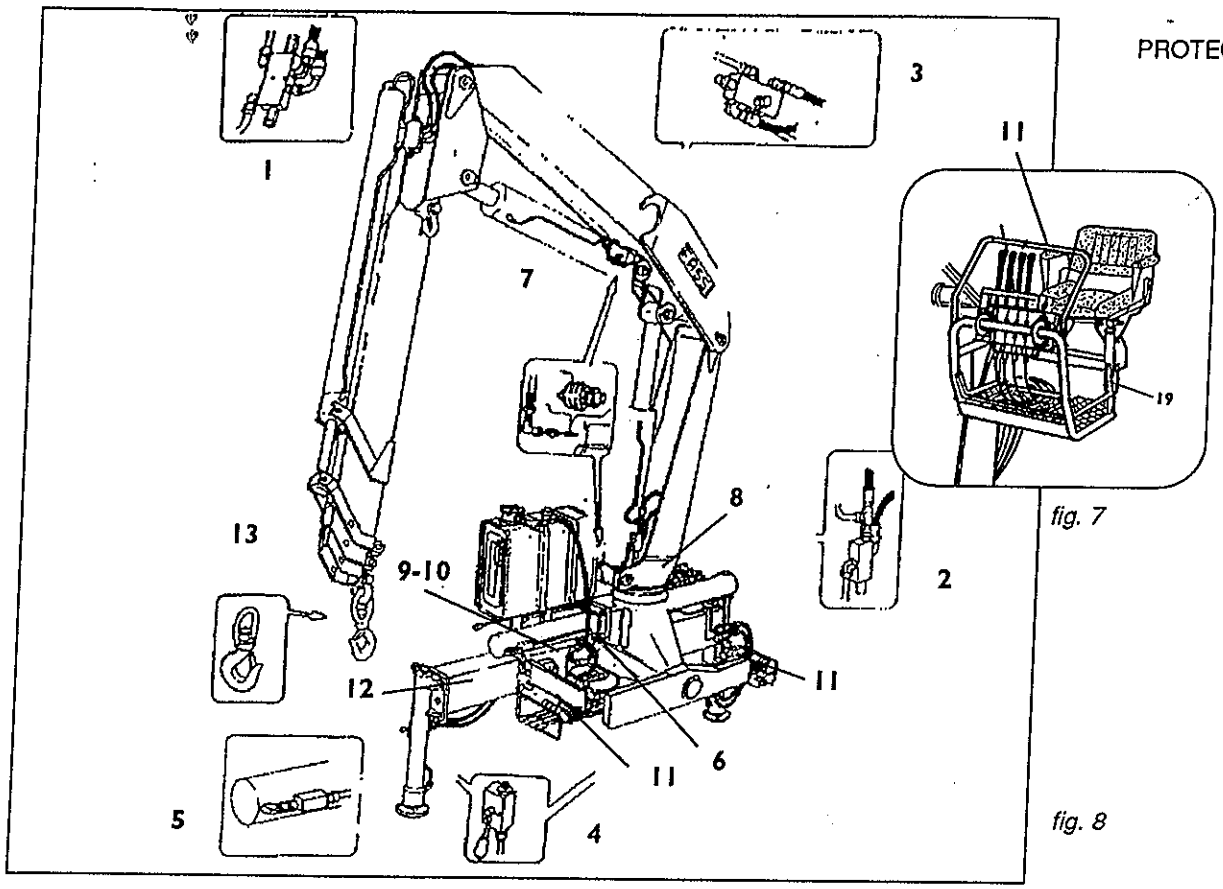


fig. 7

fig. 8

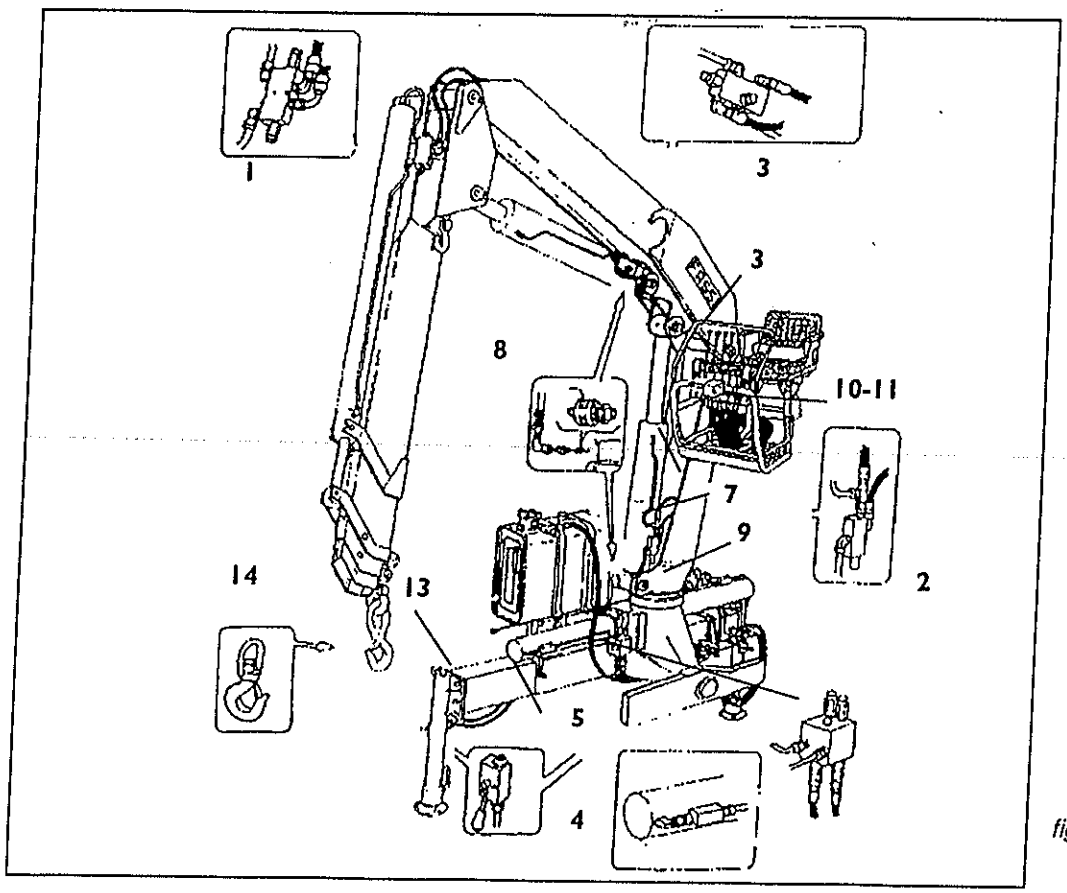


fig. 9

LOAD LIMITING DEVICE - LIFTING MOMENT LIMITING DEVICE

A characteristic which allows the classification of cranes is their lifting capacity or maximum lifting moment. It's defined moment the value obtained by the product of the load to be lifted (in Kg) for its distance (in meters) from the centerline of the crane rotation.

Load limiting device

The safety device called "load limiting device" is fitted from the origin and serves to prevent the utilisation of the crane in overloaded condition, 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 approach the load to the column, operating the control lever to re-enter the boom extension rams, or with an alternative manoeuvre which can reduce 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.

Lifting moment limiting device (supplied on request)

The device called "lifting moment limiting device" serves to preserve the crane structure from overloads, as it prevents any movement tending to increase the value of the moment.

Lifting moment limiting device "Standard Version"

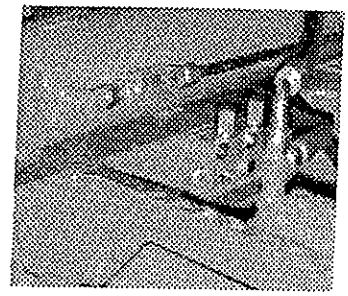
It utilises a completly hydraulic technology whic prevents any movements wich cause the increasing of the pressure, induced by the load in the inner and outer rams of the crane, further up to the "critical values" wich have been established in the structure tests. These values, wich have been imposed as non -exceedable, determine the intervention levels and are the setting data of the device.

When the intervention values of the device are reached, all movements of the crane are obstructed, except the re-entering of the extension rams. In order to re-activate the crane (re-activation function) it is necessary to act on the extension ram control lever, by re-entering the booms of at least 30-50 cm; in this way, the moment is brought to a lower value than the one of intervention (the maximum admitted) and the crane can work again.

The device can be activated also further to load swingings or in lifting stroke end of the inner and outer rams; it is suggested to act on the levers gently and not to insist on the control when the lifting are at lifting stroke end. The eventual re-activation function can be made by acting on the extension ram control lever by re-entering.

Emergency exclusion tap

On every device it has been installed an emergency exclusion tap wich must be used when, during the movement of a load in anomel situations, it is not possible to do anyone of the manouvres which are allowed by the device.



Only in these conditions it is allowed to remove the seals which protect the tap lever and put it in closed position.
At the end of the emergency manoeuvres and before doing other operations with the crane you must immediately go to a FASSI authorized center for testing of the structure and for re-sealing of the device.

Lifting moment limiting device "Intelligent type"

This electro-hydraulic device, fitted close to the distributor, is based on an electric signal, activated by a level mercury switch placed on the outer boom, wich is "read" by a special multicoils electrovalve determining the activation of the hydraulic lock devices placed on the distributor.
This limiting device operates in function of the outer boom position and only concerns the following manoevres:

- inner boom descent
- outer boom descent
- outer boom lift
- extension of the outer boom section
- winch lift (if it's present)

The inner boom lift is limited by the main pressure valve of the distributor.

If the activation of the device happens with the outer boom placed over the horizontal line

it prevents
- inner boom descent
- outer boom descent
- extension of the outer boom sections
- the winch lift (if it's fitted)

and it allows - all the other manoeuvres

If the activation of the device happens with the outer boom placed under the horizontal line

it prevents
- outer boom lift
- extension of the outer boom sections
- the winch lift (if it's fitted)

and it allows - all the other manoeuvres

Remark that in case of lack of electric power to the coils of the electro-valve, the only allowed manoeuvre is the re-enter of the outer boom sections (if the winch is fitted the winch descent is also allowed).

!!! Valves manipulation and seals removal release the Producer from any responsibility.

(!) WARNING (!)

The lifting moment limiting device doesn't release the user from the obligation to respect what indicated on capacity plate and lifting curves.

CONTROLS TO STABILIZE THE VEHICLE

The outriggers rams serve to prevent hurtful 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 crane stability is assured only by the maximum extension of the outrigger supports of the crane and supplementary outrigger beam. (if any).
Be very careful during vehicle stabilization operation. Make sure that during the extension operation of the crane outrigger supports and of the supplementary beam nobody is or transit in proximity of the working area of the 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.

fig. 10

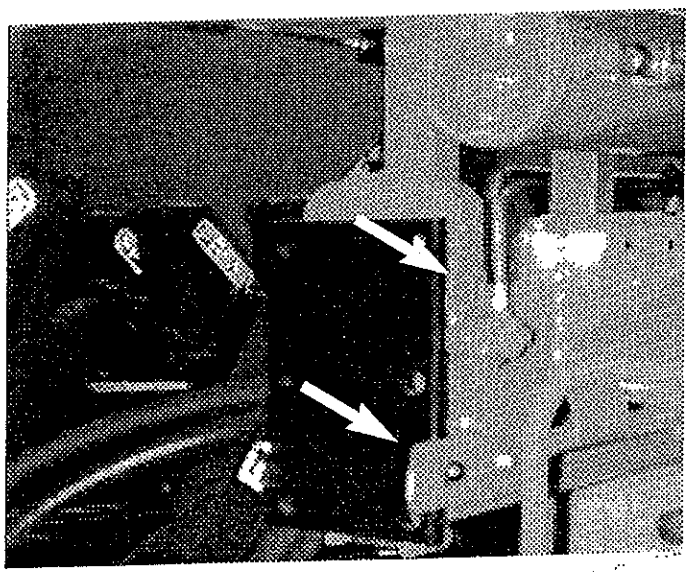
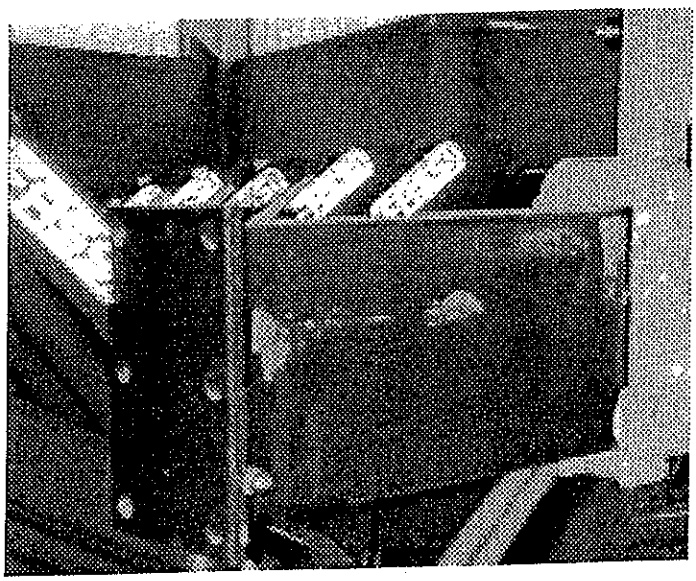


fig. 11



The controls to stabilize the vehicle are in conformity with the EEC directivities which make compulsory the execution of the stabilisation from the side where the operator can visually check the operation. To better explain, if the operator is operating from the left side of the vehicle, he will have the permission to activate the lateral hydraulic extensions and the outrigger rams only of the left side; he will have to go to the right side to operate the controls related to the stabilisation of the right side.

Cranes are supplied with outrigger supports having manual lateral extension as standard version and, on request , having extra manual lateral extension or hydraulic lateral extension.
Outriggers rams are supplied, on request, in orientable version.

Manual extension of the outrigger supports (standard)

- Position the lever (fig. 10) up; in this way the security spring pin releases from the seat in the outrigger support.
- Pull the spring stop (fig. 10) in order to free it from the checking pin and simultaneously:
- extract from the base, for a length of almost 60 cm, the outrigger support.
- Re-position the lever down: the security spring pin, free to rotate in respect of the lever, stays in release position.
- Extract the outrigger support till the released spring pin, after having slided on the outrigger support, locks into its seat.

the security spring pin; this will give the certainty of the complete extension of the outrigger support (essential for the stability of the unit crane-vehicle) and the impossibility of accidental movements.

Manual extension of the extra-extendable outriggers supports (deliverable on request)

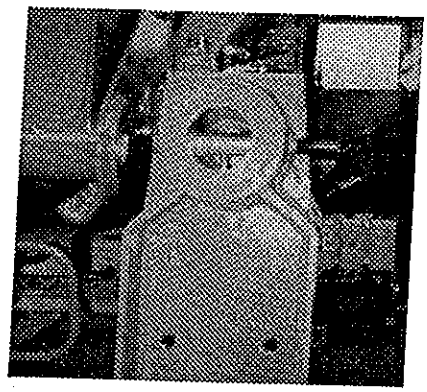
- Position the lever (fig.10) up; in this way the security spring pin releases from the seat in the first outrigger support.
- Pull the spring stop (fig 10) in order to free it from the checking pin and simultaneously.
- Extract from the base, for a length of almost 60 cm, the outrigger supports group.

- Re-position the lever (fig.10) down: the security spring pin, free to rotate in respect of the lever, stays in released position.

- Extract the second outrigger support till the released spring pin, after having slided on the first outrigger support, locks into its seat.

(!) Always check that the outrigger supports are locked in their position by the security spring pin; this will give the certainty of the complete extension of the outrigger support (essential for the stability of the unit crane-vehicle) and the impossibility of accidental movements.

fig. 12



The operations of manual extension of the outrigger supports are eased by suitable sliding rollers fitted on the outrigger beam and on the outriggers supports.

Tiltable outrigger rams

Outrigger rams which allow to be rested in an inclined position, when obstructions on the vehicle chassis prevent their vertical stowability.
After the extension of the outrigger supports, place the outrigger ram in working condition as follows:
- remove the security pin and then the locking pin (fig. 12) from its seat
- rotate the outrigger ram in down direction, re-insert the locking pin in the new seat (fig.13) and lock it with the security pin.

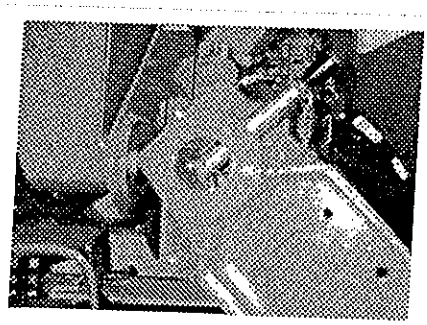


fig. 13

(!) **The locking pin is connected to the base structure through a chain in order to prevent its loss.**

(!!) **It's built in special material**
- **don't replace it with other pins**
- **it depends on Your security.**

Description of the controls to stabilize the vehicle

(!) The extension and re-enter of the outrigger supports and rams indicated on fig. (from 14 to 23) coincide with what indicated on plates DE 1328 and DE 1327, DE 1330 and DE 1329, DE 1332 and DE 1331, DE 1333 and DE 1334, DE 1335 and 1336 placed, according to the executions, on the crane rotation cylinders.

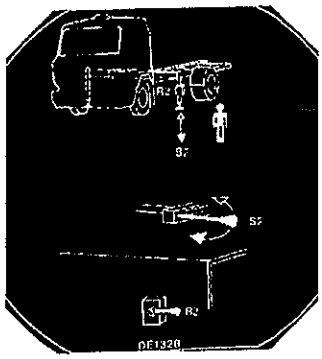


fig. 14

The upper part of the plates indicates, according to the installations, 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 control possibilities and the levers operating direction; the position of the hoses taps (-open or close - placed on the side of the beam of the base) and the position (open or close) for the outrigger rams safety check valves taps.

Crane with outriggers manual extension and without supplementary outrigger beam. Re. fig. 14-15

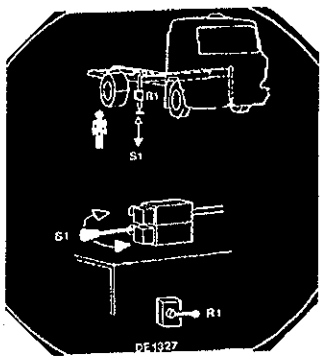


fig. 15

Left side of the vehicle
- Manually extend the outrigger support (as previously indicated).
- Position the outrigger ram valve tap as indicated in figure R2 (open).
- Operate the lever of the outrigger ram control S2 for the descent.
- Close the outrigger ram valve tap R2.

Right side of the vehicle
- Manually extend the outrigger support (as previously indicated).
- Position the outrigger ram valve tap as indicated in figure R1 (open).
- Operate the lever of the outrigger ram control S1 for the descent.
- Close the outrigger ram valve tap R1.

Crane and supplementary outrigger beam with outriggers manual extension Re. fig. 16-17

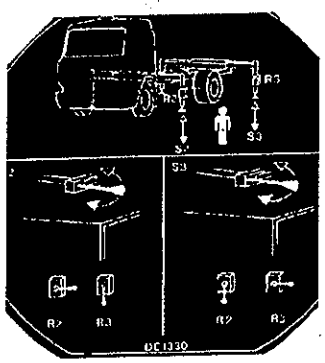


fig. 16

Left side of the vehicle
- Manually extend the outriggers supports.
- Position the outrigger rams valves taps R2 and R3 as reported on the lower square S2 (R2 open and R3 close).
- Operate the lever S2 for the outrigger ram control of the crane.
- Position the outrigger rams valves taps R2 and R3 as reported on the lower square S3 (R2 close and R3 open).
- Operate the lever S3 for the outrigger ram control of the supplementary outrigger beam and close the tap R3.

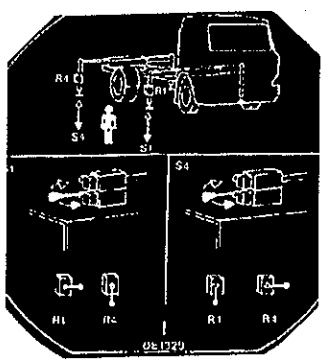


fig. 17

Right side of the vehicle
- Manually extend the outrigger supports.
- Position the outrigger rams valves taps R1 and R4 as reported on the lower square S1 (R1 open and R4 close).
- Operate the lever S1 for the outrigger ram control of the crane.
- Position the outrigger rams valves taps R1 and R4 as reported on the lower square S4 (R1 close and R4 open).
- Operate the lever S4 for the outrigger ram control of the supplementary outrigger beam and close the tap R4.

Crane with outriggers hydraulic extension and without supplementary outrigger beam. Re. fig. 18-19

Left side of the vehicle

- Position the taps as reported on the lower square E2 (hose-tap open and outrigger rams valve taps R2 close).
- Operate the lever for the ram extension support control E2.
- Position the taps as reported on square S2 (hose-tap close and outrigger ram valve tap R2 open).
- Operate the lever for the outrigger ram S2 control.
- Close the tap valve R2.

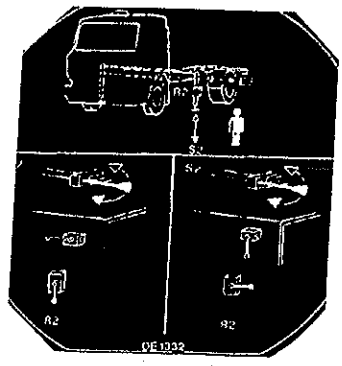


fig. 18

Right side of the vehicle

- Position the taps as reported on the lower square E1 (hose-tap open and outrigger ram valve tap R1 close).
- Operate the lever for the ram extension support E 1.
- Position the taps as reported on square S1 (hose-tap close and outrigger ram valve tap R1 open).
- Operate the lever for the outrigger ram control S1.
- Close the tap valve R1.

Crane with outriggers hydraulic extension and manual extension of supplementary outriggers beam. Re. fig. 20-21

Left side of the vehicle

- Manually extend the outrigger support of the supplementary outrigger beam.
- Position the taps as reported on square E2 (hose-tap open and outrigger rams valves taps R2 and R3 close).
- Operate the lever for the outriggers extension control E2 of the crane.
- Position the taps as reported on square S2 (hose-tap close and outrigger rams valves taps R2 open and R3 close).
- Operate the lever for the outrigger ram control S2 of the crane.
- Position the taps as reported on square S3 (hose-tap close and outriggers rams valves taps R2 close and R3 open).
- Operate the lever for the outrigger ram control S3 of the supplementary outrigger beam and close the tap valve R3.

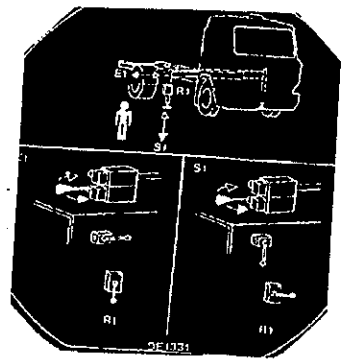


fig. 19

Right side of the vehicle

- Manually extend the outrigger support of the supplementary outrigger beam.
- Position the taps as reported on square E1 (hose-tap open and outrigger rams valves taps R1 and R4 close).
- Operate the lever for the outriggers extension control E1 of the crane.
- Position the taps as reported on square S1 (hose-tap close and outriggers rams valves taps R1 open and R4 close).
- Operate the lever for the outrigger ram control S1 of the crane.
- Position the taps as reported on square S4 (hose-tap closeand outriggers rams valves taps R1 close and R4 open).
- Operate the lever for the outrigger ram control S4 of the supplementary outrigger beam and close the tap valve R4.

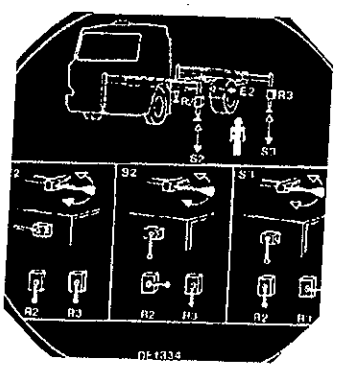


fig. 20

Crane and supplementary outrigger beam with outriggers hydraulic extension. Re. fig. 22-23

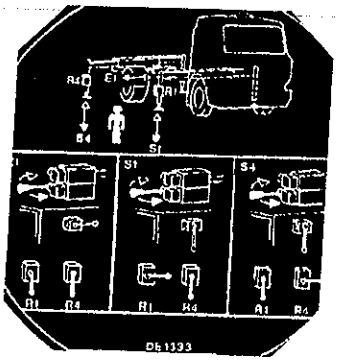


fig. 21

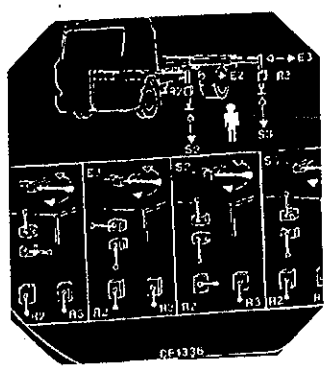


fig. 22

Left side of the vehicle

- Position the taps as reported on square E2 (hoses-taps, down from above, one close and one open, and outriggers rams valves taps R2 and R3 close).
- Operate the lever for the ram extension control E2 of the crane.
- Position the taps as reported on square E3 (hoses-taps, down from above, one open and one close and outriggers rams valves taps R2 and R3 close).
- Operate the lever for the ram extension control E3 of the supplementary beam.
- Position the taps as reported on square S2 (hose-tap close and outriggers rams valves taps R2 open and R3 close).
- Operate the lever for the outrigger ram control S2 of the crane.
- Position the taps as reported on square S3 (hoses-taps close and outriggers rams valves taps R2 close and R3 open).
- Operate the lever for the outrigger ram control S3 of the supplementary outrigger beam and close the tap valve R3.

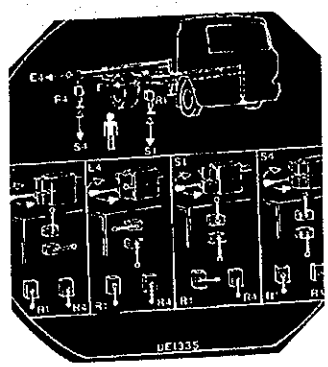


fig. 23

Right side of the vehicle

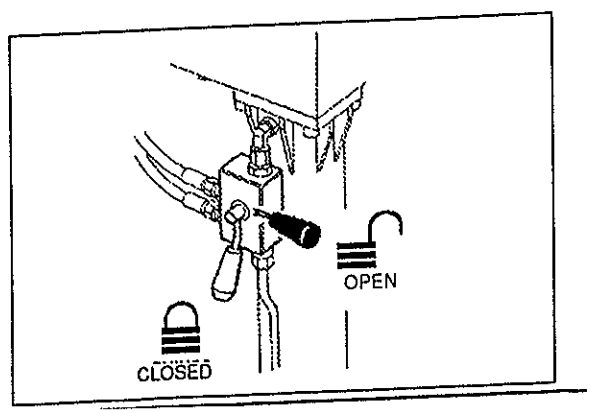
- Position the taps as reported on square E1 (hoses-taps, down from above, one close and one open and outriggers rams valves taps R1 and R4 close).
- Operate the lever for the ram extension control E1 of the crane.
- Position the taps as reported on square E4 (hoses-taps, down from above, one open and one close and outriggers rams valve taps R1 and R4 close).
- Operate the lever for the ram extension control E4 of the supplementary outrigger beam.
- Operate the lever for the ram extension control E4 of the supplementary outrigger beam.
- Position the taps as reported on square S1 (hoses-taps close and outriggers rams valves taps R1 open and R4 close).
- Operate the lever for the outrigger ram control S1 of the crane.
- Position the taps as reported on square S4 (hoses-taps close and outriggers rams valve taps R1 close and R4 open).
- Operate the lever for the outrigger ram control S4 of the supplementary outrigger beam and close the tap valve R4.

Controls to re-enter the outriggers of the crane and supplementary outrigger beam (if any) within crane truck shape at the end of crane use.

- Operate, according to the installations, positioning the hoses-taps and the valve taps according to what reported on the lower squares of the plates fixed on the crane rotation cylinders.
- Operate, then, on the levers to activate the re-enter of the outriggers rams and the outriggers supports with hydraulic extension(if it's fixed)

(!) Both of the crane and of the eventual supplementary beam.

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



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.

This warning coincides with what indicated
on the plate DE 319 placed on the outriggers (fig. 24)

(!) Operate the levers smoothly and gradually. In case of simultaneous manoeuvres of two or more functions with particular values of pump flow and of levers travel, in correspondence of the stroke end reach of a manoeuvre, it's possible to remark an increase of speed of the other functions.

The symbols reported on side of each lever, define the lever operating direction in relation to the movement to be activated.

The crane and the hydraulic implements can be operated with:
1) manual controls (distributor and double control) fixed on the base
2) manual controls (distributor) placed on the seat
3) manual controls (hand-cables controls) placed on the seat and manual controls (distributor and double control) placed on the base.

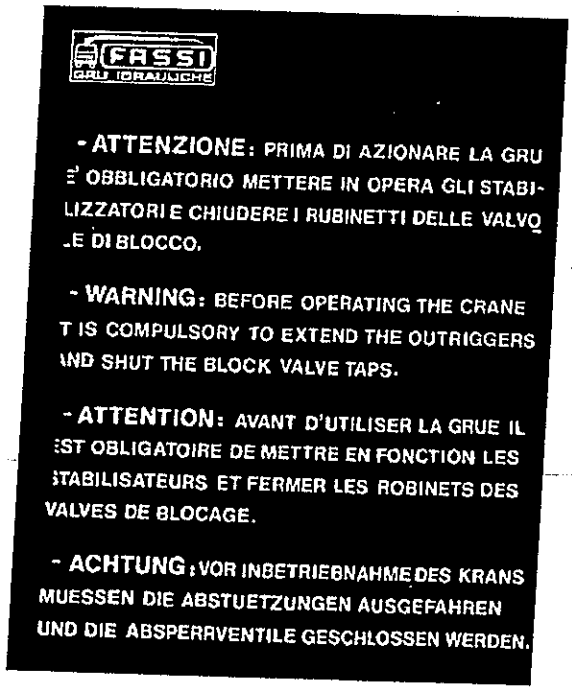


fig. 24

Crane controls - Levers functions F-G-H-I

F - ROTATION CONTROL
G - INNER RAM CONTROL
H - OUTER RAM CONTROL
I - OUTER BOOM EXTENSION RAMS CONTROL

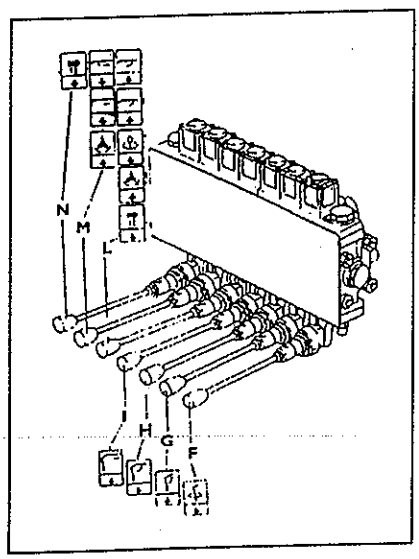
Hydraulic implements controls -Levers functions L-M-N

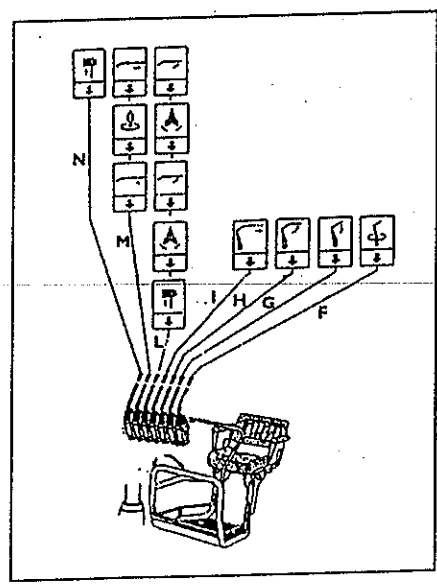
L - First hydraulic implement control or jib outer ram control.
M - Second hydraulic implement or jib outer booms extension ram control.
N -Third hydraulic implement or winch control.

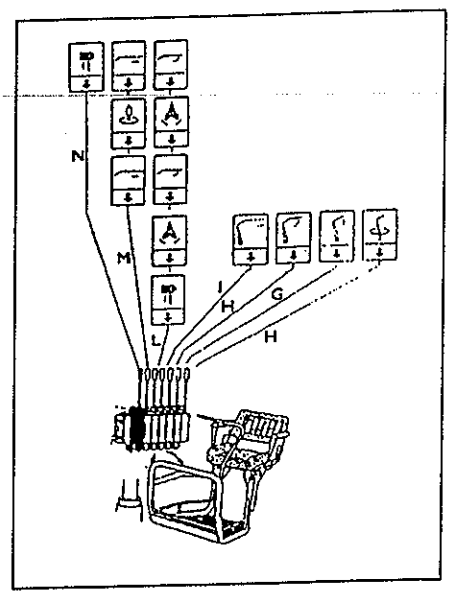
Please remember that the levers quantity to control the implements changes according to the executions and follows this diagram:

1 Lever **(N)**	winch control
2 Levers **(LM)**	jib control
3 Levers **(L M N)**	jib control and winch control

Crane unfolding and folding manoeuvres:







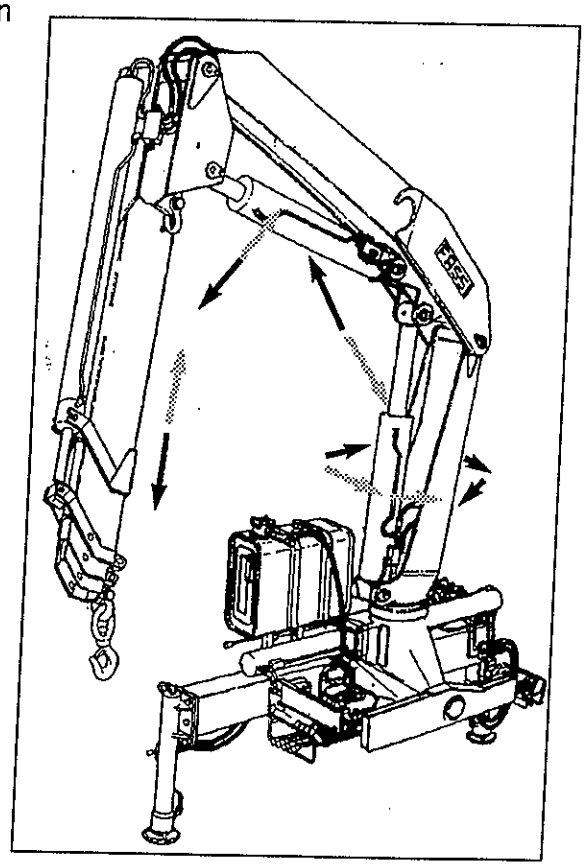
Manoeuvres to unfold the crane in working condition:

- Engage the power take off.
- Stabilize the vehicle as described at page 16.
- Operate the lever 1 (re-enter) to assure the outer booms sections are completely re-entered.
- Before lifting the inner boom assure that the outer ram is fully closed (operate the lever H on re-enter function).
- Lift the inner boom over the horizontal line operating onlever G; if operation is from ground control, distributor side, be careful to the booms encumberements.
- Open the outer boom in "horizontal" position operating the lever H.
- Extend (in case) the booms of the crane operating on lever I.
- Operate on lever F, rotation control, to position the hook on the vertical side of the load.

Manoeuvres to fold the crane in rest condition

- Completely re-enter the outer booms.
- Lift the inner boom to stroke end.
- Fold the outer booms at stroke end.
- Operate the rotation control till the the arrows placed on the column support and on the column (dust cover) coincide.
- Fold the inner boom to stroke end, paying attention that the rest pin matches its rest seat.
- Lift and re-enter the outriggers within the crane truck shape as described at chapter IX.
- When completed all manoeuvres, assure that the taps of the outrigger rams valves are closed. (fig. 25)

(!) 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.



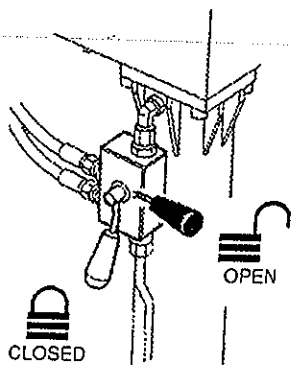


fig. 25

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. To utilize at maximum the load capacity of the crane, it's necessary to position the inner boom with the angle shot indicated on the capacity plate.

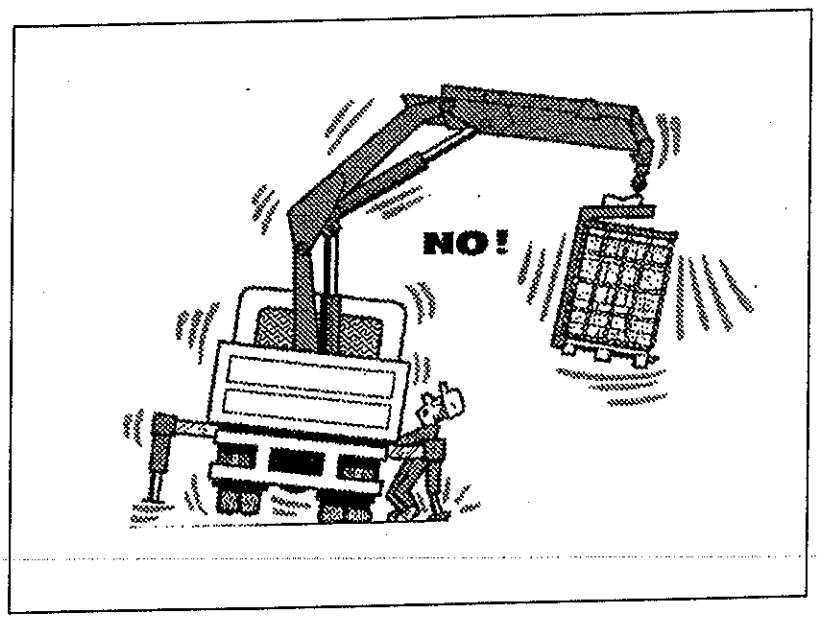
During the load handling, don't exceed the reach limits concerning the load indicated on the above mentioned charts. If the limits are overcome, the load limiting device allowing the slow descent of one of the two, or both, lifting rams (inner and outer ram), will be immediately activated. (see chapter VIII)
In case of crane with lifting moment limiting device (deliverable on request) the device, allowing all the manoeuvres to carry the load within the permitted reaches limits and forbidding all other manoeuvres, will be immediately activated.

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.

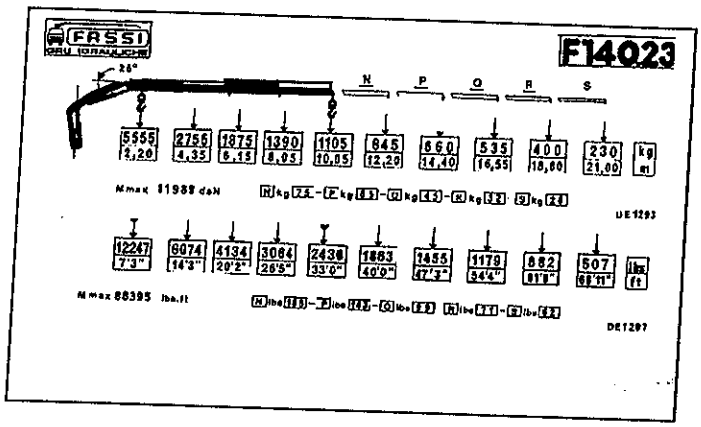
(!) WARNING

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.

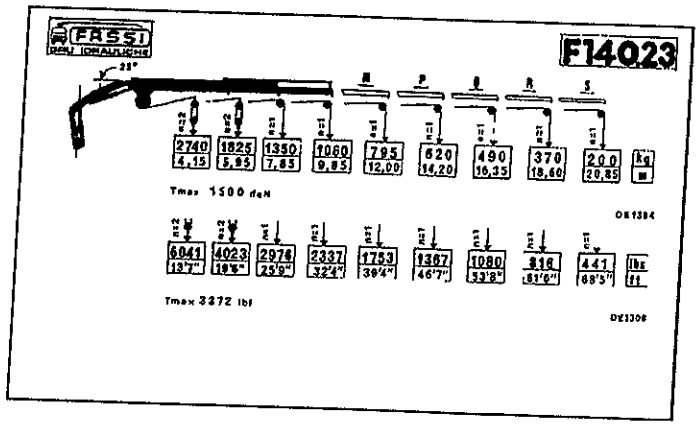
IMPLEMENTS USE

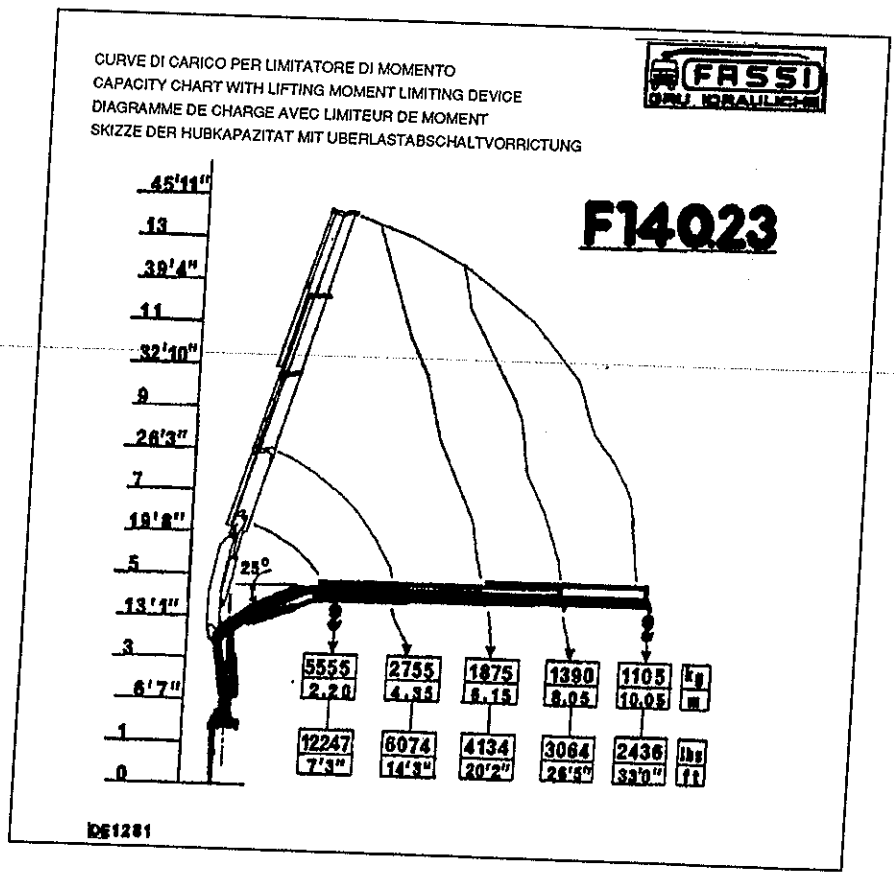


For crane and manual estension



With Winch





The crane can be provided with some implements such as:
- manual extensions
- hydraulic jibs
- winches
- buckets
- rotators
- man baskets etc.

(!) To utilize the man basket it's compulsory to equip the crane with safety systems as requested by the current safety regulations in force.

(!) When using an implement, it's always necessary to check that its weight, dimensions and capacities are adeguated to crane performances.

Warning and norms for crane utilisation apply also for hydraulic implement use.

Manual extensions.

Manual extensions are additional boom sections, which are placed in the crane booms and locked through locking pins. Manual extensions can be extended from the folding position (rest condition) and put into the operation position (working condition), after removal of the locking pins and positioning the outer boom in a light slope position.

(!) Verify that the area is suitable for this operation and there are no unauthorized people in the working area.

Pay attention to avoid a fast slide-off of the extensions, which could damage the stroke end stops.
Don't try to align the holes (slots) of the locking pins by using fingers: use always a suitable tool.
Always remember that when operating with accessory implements, its tare weights have to be deducted from the capacity of the crane.

When manual extensions are extended, fit the locking pins and block them with check pins to avoid an accidental sliding off.

Hydraulic connections between the implements and the supplementary function hoses mounted on outer booms sliding sections of the crane.

In case hoses are to be connected with the implements through quick couplings, it's necessary to check there is no presence of ground, dirty etc. in the pins and in the seats of the quick couplings to avoid immission of contaminated material in the hydraulic oil and the wear of the sealing surfaces of quick couplings.

(!) Warning (!)

To make sure that, the hydraulic connection by means of quick couplings, has the maximum functional accuracy (correspondence between control and implement movement) the components of the quick coupling have been mounted in a symmetrial position. Never reverse these positions, because beside this movement, the pressure relief valves (inside the distributor) could cause difficulties to the implement working.

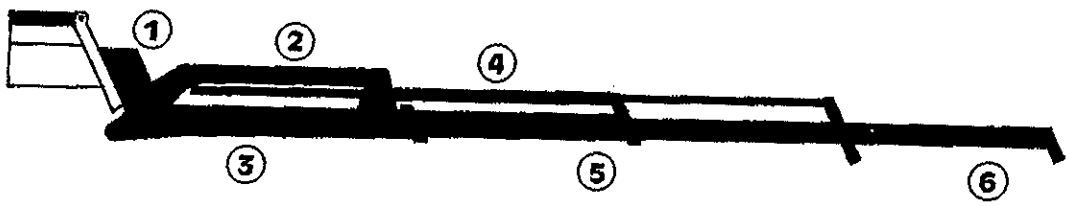
Hydraulic jib.

The hydraulic jib L2, foldable behind the cab, is an additional boom with articulation and hydraulic outer booms sliding sections (with possible manual extension) to be fitted to the outer boom of the crane. The position is obtained through locking-pins: the hydraulic connection to the two supplementary functions of the crane, is through quick couplings.

(!) Warnings and norms for crane utilisation apply also for hydraulic jibs use.

NOMENCLATURE OF THE HYDRAULIC JIB

pos.		*Description*
1	-	Connecting boom
2	-	Jib outer ram
3	-	Jib outer boom
4	-	Outer boom extension rams
5	-	Outer boom sliding sections
6	-	Manual extension



Manoeuvres to unfold the jib in working condition

-Operate as described to put the crane in working condition(page 11) and after opening the outer boom of the crane.
-Operate lever L to open the outer boom of the jib.
-Operate (in case) lever M to extend the jib outer boom sliding sections.
-Position the hook on the centerline of the load.

Manoeuvres to fold the jib in rest condition

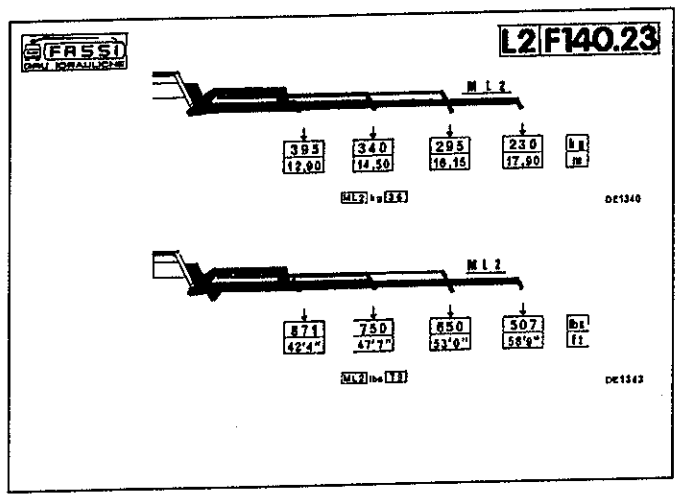
- Re-enter the hydraulic sections of the jib (lever M) and of the crane (lever I).
- Lift the inner boom at stroke end reach.
- Completely re-enter, to stroke end position, the outer boom of the jib.
- Completely re-enter, to stroke end position, the outer boom of the crane.
- Operate, as described, to fold the crane in rest position.

Operations to remove the hydraulic jib from the crane

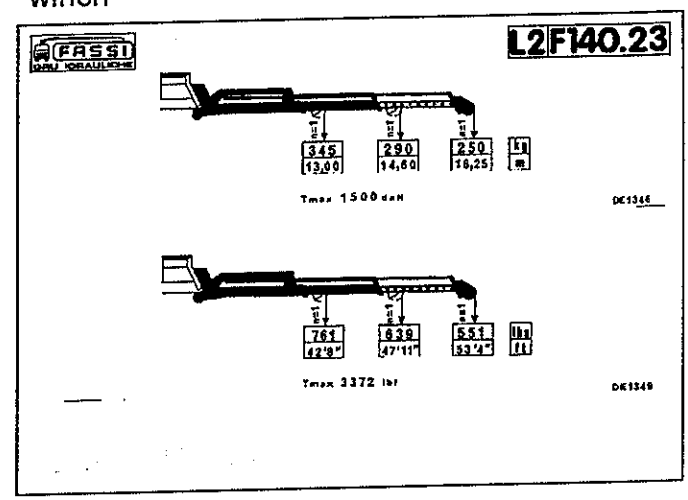
- Re-enter at stroke end reach the jib outer booms sliding sections.
- Extend, at stroke end reach, the crane outer ram.
- Extend, of at least 1 m the crane outer booms sliding sections.
- Re-enter the outer ram of the jib and the inner ram of the crane to obtain the two rest brackets of the jib, either lay on the ground, or on the truck body or, if possible, on a specific rest trestle.
- Remove the security pin and the locking pin
- Disconnect the jib from the hydraulic circuit of the crane operating on the quick couplings
- Re-enter the outer booms sliding sections of the crane to free the first boom of the crane jib.

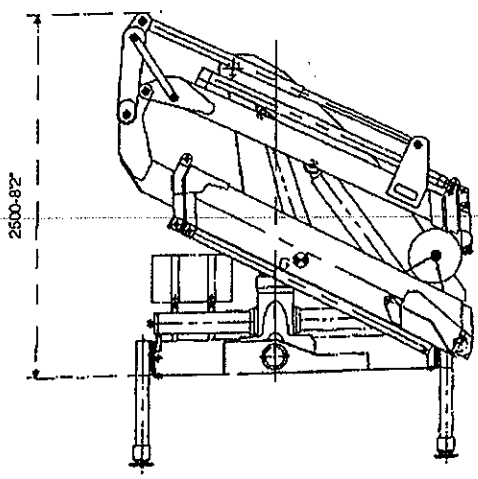
(!) Assure that the hydraulic jib is adequately stripped to avoid side turnover.

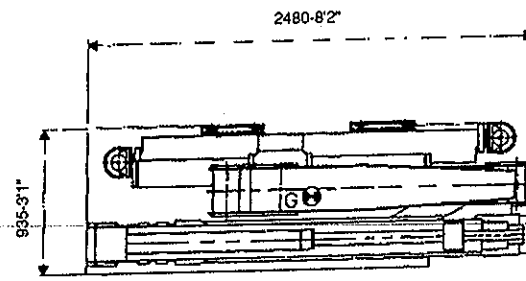
L extension



winch







	Kg	lbs
Peso prolunga L2 L2 Extension weight Poids de la rallonge L2 Gewicht der L2 Verlängerüg Peso de la prolonga L2	490	1080

Winch

The winch has a maximum capacity, indicated by a plate, not related to the crane capacities which can also be lower.

Consequently avoid to lift, with the winch, heavier loads than those allowed by the crane capacity plate.

Don't rotate the crane before the load is lifted, rotate slowly and with care the suspended load checking the stability of the vehicle.

Check the rewinding of the cable on winch drum proceeds regulary and without overlapping: it's suggested not to rewind the cable if it's not sufficiently taut.

According to the actual norms, the winches controls must be protected by stroke ends switches to prevent that:
- when lifting with the winch or extending the booms sections, the hook of the cable crashes the bracket of the pulley;
- the cable can be fully unwinded from the winch drum (a specific amount of turns must always be winded on the drum).

(!) Warning! In case of winch is not fitted with stroke end switches, don't carry out the following manoeuvres:
- Lifting or boom sections extension with the hook of the winch near the fixed pulley.
- Complete unwinding of the cable from the winch drum so that it can rewind in the opposite direction.

MAINTENANCE INSTRUCTIONS

A good maintenance and a correct use are useful to maintain a perfect efficiency and to guarantee the safety of the crane.

(!) Before disconnecting any hydraulic hose assure that there is no pressure in the circuit. Always remark the removed hoses and the respective ports on the crane; a fault 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 (in case of static installation with switched off power pack).

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 producer's authorisation.

When repairs or ckecks 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 efficient.

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.

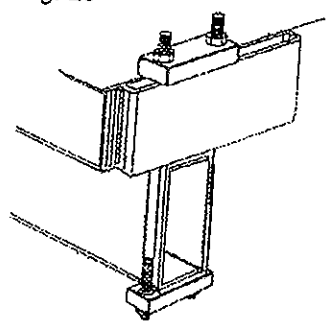
Check that the controls lever of the crane (distributor and double and hand-cables controls) can easily operate and can freely return in neutral position.

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 (thightening torque 400 Nm).

fig. 26



After every working week use:

Clean the oil filters placed on the tank of the crane and, if any, on the pump suction and pressure lines. In case of the hydraulic circuit of the crane is connected to a tipper, an additional tank, excluding the one of the crane, can exist;in this case the filter is placed on this tank.

Cleaning of the filter on the tank (oil-return from the distributor) (fig. 27)

- Take the filter plug off, pos. 1 unscrewing the three locking screws.
- Remouve 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 having checked the sealing function of the seal OR pos. 3 (internal sealing function between cartridge and holder and external sealing function between holder and body of the filter).
- Re-assemble the filter cartridge into its holder, remove the spring and the filter plug after having checked the sealing function of the seal OR placed on the plug.

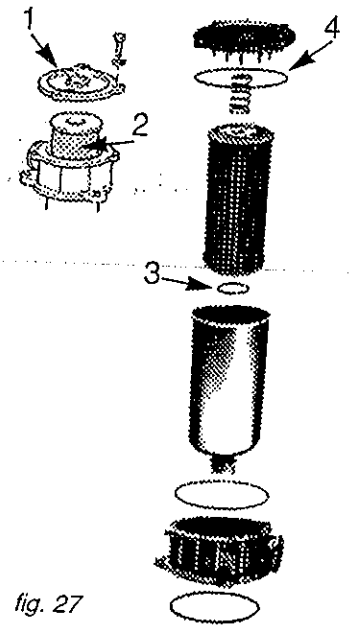


fig. 27

Check the oil level into the tank, and assure that when the crane is in folded position (rest), the oil level is between the minimum and maximum (fig. 28).
Top up using hydraulic oil with the same characteristics of the one indicated in the table at page 36.

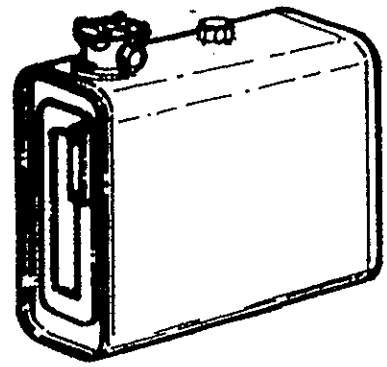


fig. 28

Periodically grease the points indicated on fig. 29, 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 the surfaces of the booms are perfectly free from any impurity (sand, ground).
For the sliding of the outrigger supports, guide-shoes and sliding rollers have been fitted. Use a grease with the same characteristics indicated on the table at page 36.

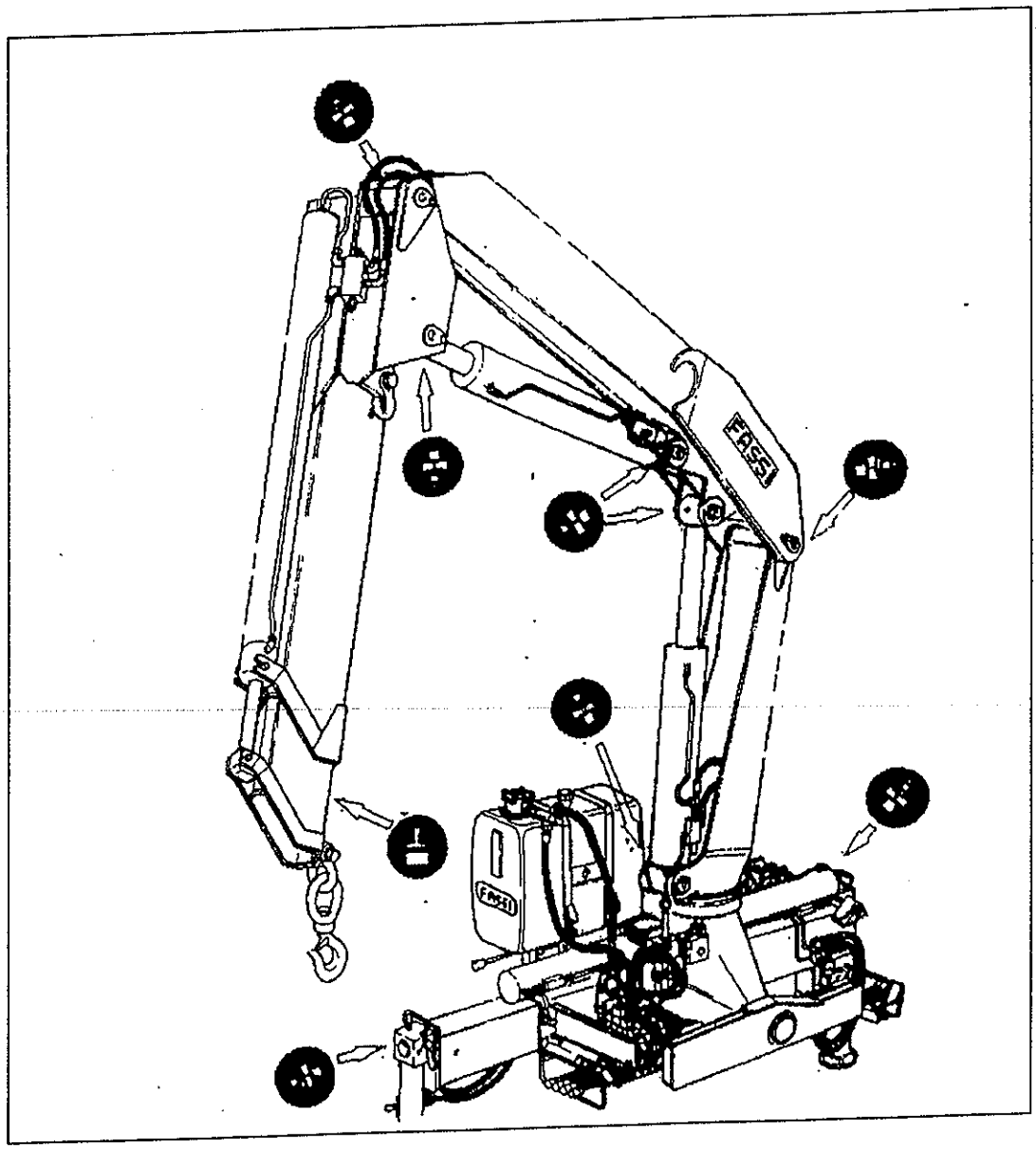


fig. 29

After 500 working hours use

Check the thightening torque of the tie rods fixing the crane on the truck frame.

Check the thightening torque of the screws locking the pins at each pin joint area.

Check the guide shoes wear, because it alters the outer booms sections and outriggers supports couplings, by creating considerable clereances among the parts with damage to the rams and to the crane.

Replace the oil filter cartridges.

Clean the air filter placed in the top up oil plug of the oil tank.

Completely replace the hydraulic oil.

POSSIBLE PROBLEMS

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

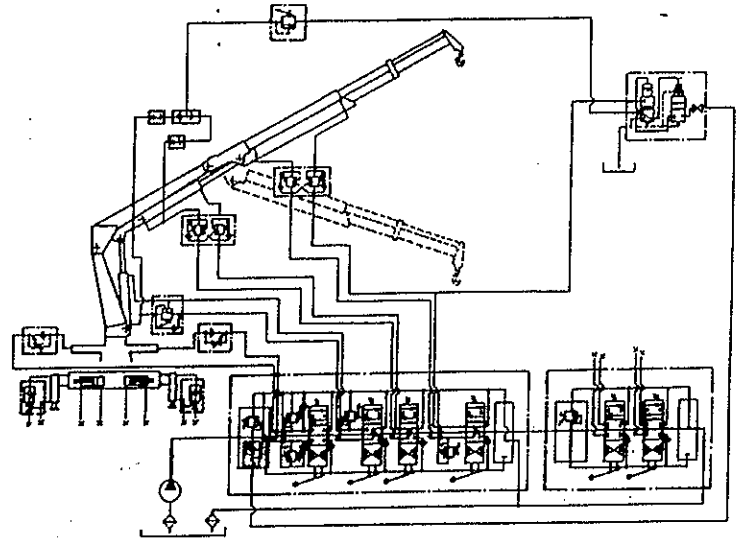
(!) The check and oil pressure regulation must be effected in an authorized service center, under penalty of warranty forfeiture.

N.B. Operations which can be carried out by the user are underlined: [ ]

Problems	Cause	Remedies
The crane doesn't lift the loads of the capacity plate	*No efficiency of the pump*	Replace the pump
	Main pressure valve not properly adjusted blocked or out of service	Check the pressure adjust the valve
	Seals of the rams are not properly adjusted	Replace the seals
A boom of the crane doesn't hold up the	*The safety check valve of the ram is open!*	Replace the safety check valve
	Oil leaks inside the ram	Defective seals Replace them
The crane doesn't rotate properly	*Vehicle not in level position*	Stabilize the vehicle
	Valves controlling the rotation not adjusted	Adjust the valves
	Lack of lubrication	Grease the bushes
	Relief valves of the distributor not adjusted	Adjust the valves
	Rotation cylinders seals are not properly adjusted	Replace the seals
	Excessive clearance of the rack	Adjust the clearance
The outer booms sliding sections don't completely extend or work jerkily	*Lack of lubrication of the guide-shoes*	Grease the guide-shoes
	Wear of guide-shoes	Check the guide-shoes wear and replace them if necessary

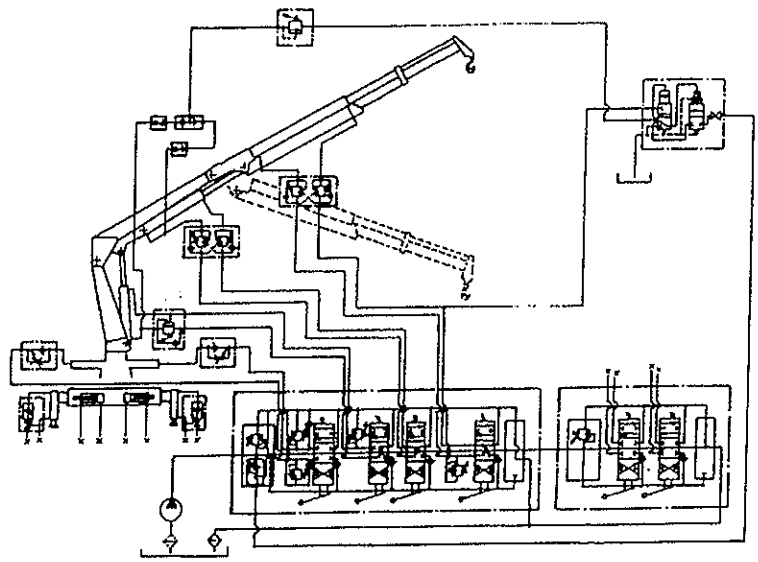
are not active	*Electro valve of the winch stroke end switches not exiceted*	Check the fuse, the battery and electric circuit
Vibrations in crane operations	*Shortage of oil*	Check the level and top us if necessary
	Obstructed filters	Clean or replace the filter cartridge
	Not efficient pump	Check the pump
Remarkable decreases in movement speed	*Obstructed filters*	Clean or replace the filter cartridge
	Not efficient pump	Check the pump

fig. 30



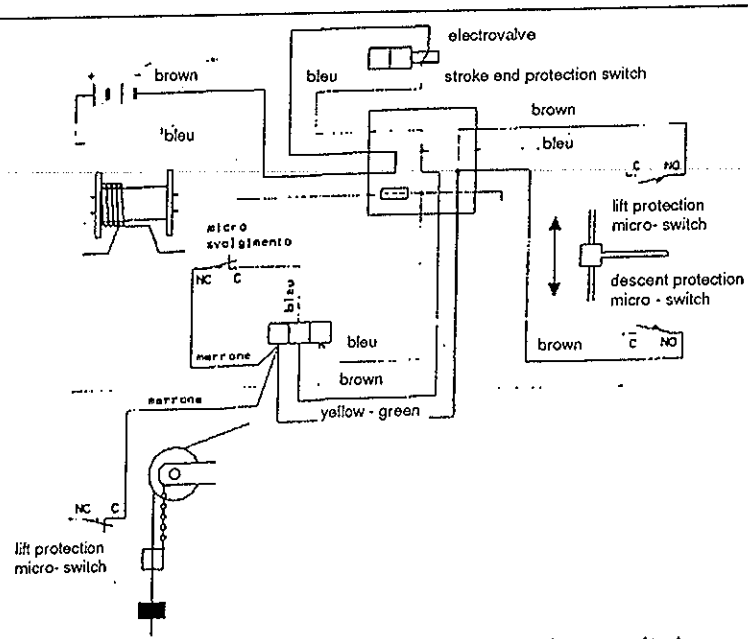
Crane with lifting moment limiting device "standard type"

fig. 31



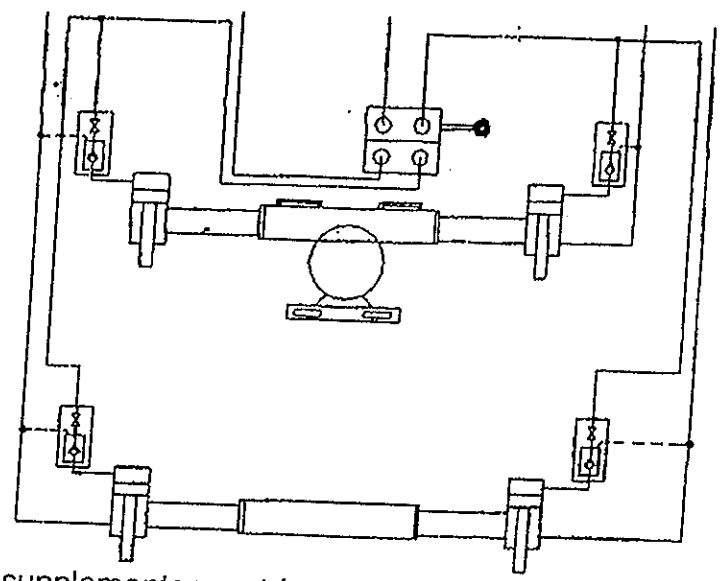
Crane with lifting moment limiting device ""intelligent type"

fig. 32



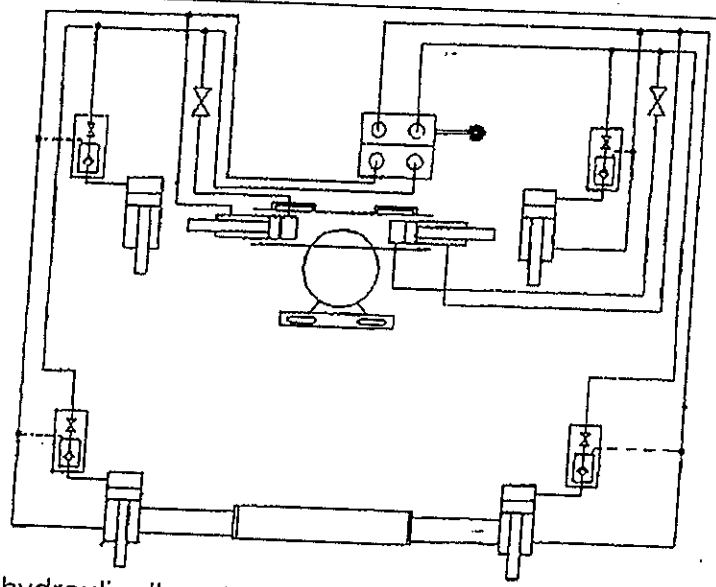
Electric schematic for winch stroke end protection switch

fig. 33



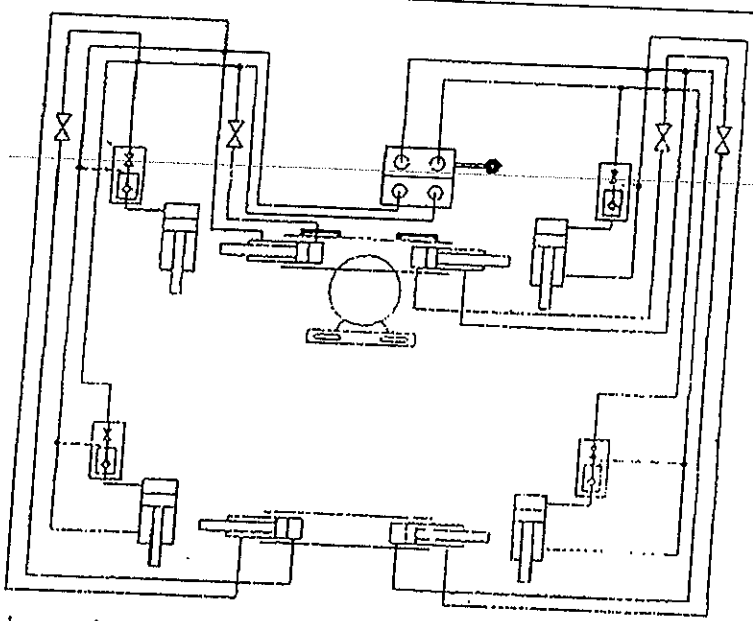
Crane and supplementary outriggers manually extendable

fig. 34



Crane with hydraulically extendable outriggers and manually extendable supplementary outriggers

fig. 35



Crane and supplementary outriggers hydraulically extendable

TABLE OF HYDRAULIC OIL AND LUBRICANTS CHARACTERISTICS

Hydraulic oil

External temperature	<= -30° C	Gradation	ISO 32
	<= -10° C	"	ISO 46
	<= -5° C up to + 35° C	"	ISO 68
	<= + 35° C	"	ISO 100
GREASE		RATING	EP 85 ISO 140

(!) WARNING(!)

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