



FASSI CRANE

eI

F 70.22

use and maintenance

Edition CE 97.01.07

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cI

INTRODUCTION
F70.22

FASSI CRANE

F70.22

use and maintenance

This instruction manual describes the FASSI CRANE F70.22.

The crane, which conforms to the Machines Directive (D.M.) 89/392 and successive amendments, 91/368 and 93/44 must not be put into service within the European Community unless the machine on which it is mounted also conforms with the prescribed Directive.

The fitment must be carried out in accordance with the instructions given by the Manufacturer in the manual for hydraulic crane fitting.

The Manufacturer declines all responsibility and guarantee if the fitting is entrusted to workshops without sufficient technical capability to carry out the work in conformity.

Every change of use, modification or addition of accessories, must be affixed with a new CE mark in accordance with the Machinery Directive.

As well as the principal safety norms, this manual contains a description of the crane and the instructions for use and maintenance.

Equipment other than Fassi must be supplied with its own use manual.

The crane must only be operated by responsible persons, previously instructed and authorized.

THANK YOU FOR SELECTING ONE OF OUR CRANES.





SAFETY NORMS

- (!) This symbol draws your attention on the points concerning safety.
It means: **WARNING! BE CAREFUL!**
IT CONCERNS YOUR SAFETY!

!ATTENTION!

READ THIS MANUAL CAREFULLY prior to use of the crane or any maintenance.

A few minutes spent now could save time and labour later.

Be sure that the unit has been installed, inspected and tested in accordance with the local legal requirements.

To operate the crane it is necessary to fully understand its working, safety and warranty norms.

Warning plates, as well as instruction and operation plates must be replaced when no longer readable or missing. (See chapters A - B)

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

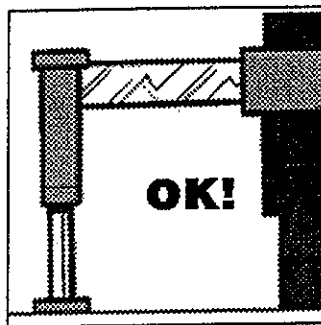
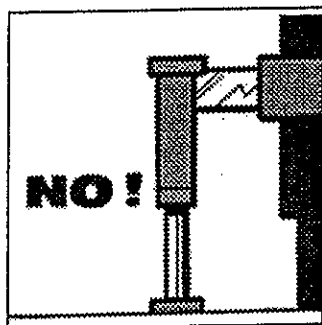
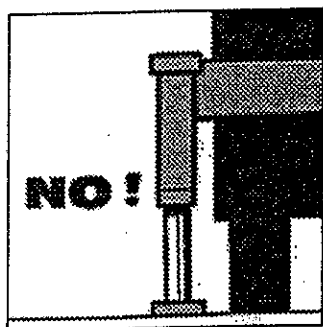
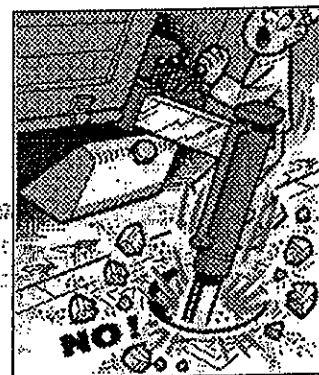
Do not run the engine in a indoor area without first making sure there is adequate ventilation. Fit a suitable extension tube to the vehicle exhaust pipe to take the fumes away from the working area.

Stabilize the vehicle by means of the outrigger rams, checking that they rest on a solid base; if in doubt use special larger outrigger base plates (available on request). (See chapter IX)

Level the crane so as 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 only guaranteed by the maximum lateral extension of the outriggers.



Should visibility be insufficient, make sure that control stations are properly lighted so as to ensure safety while operating control functions and allow reading of the plates.

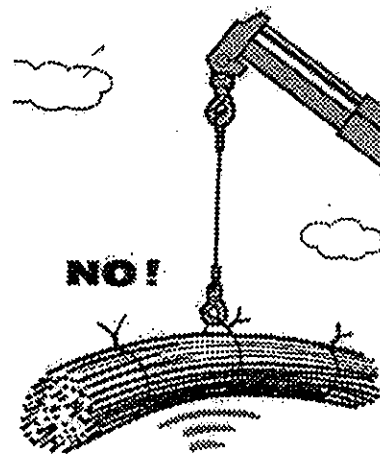
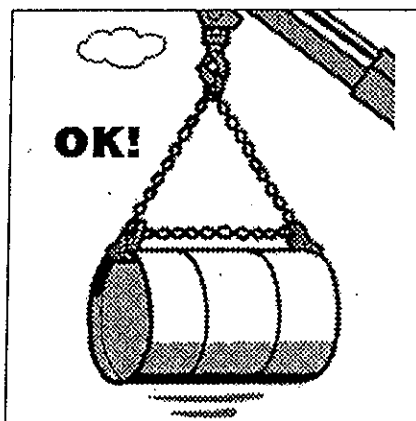
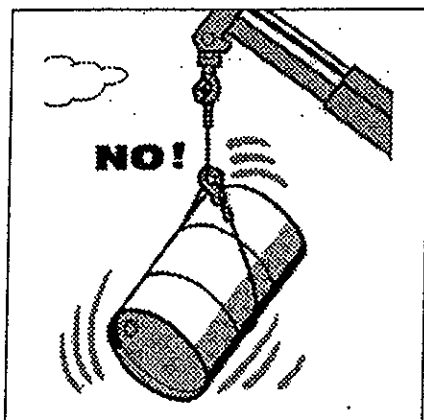
Before manoeuvring a load check that the working area is adequate and properly lighted for your crane.

Make sure that the hook is always free to rotate on its pin and that nothing obstructs its vertical positioning. Check the efficiency of the hook safety catch.



c II SAFETY NORMS
F 70

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

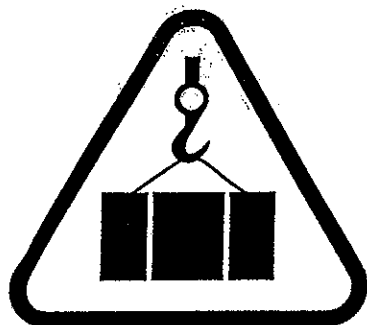
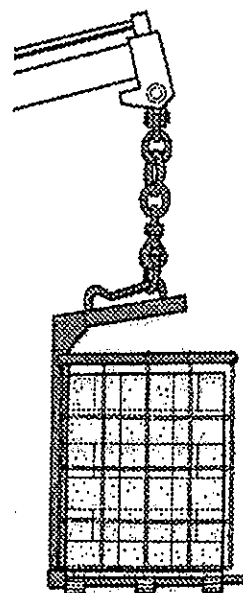


The pallet fork must be connected to the crane hook by means of a chain having at least 3 rings.

Hook up the load, checking that it does not exceed the capacity indicated on the lifting diagram specific to each load configuration.

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

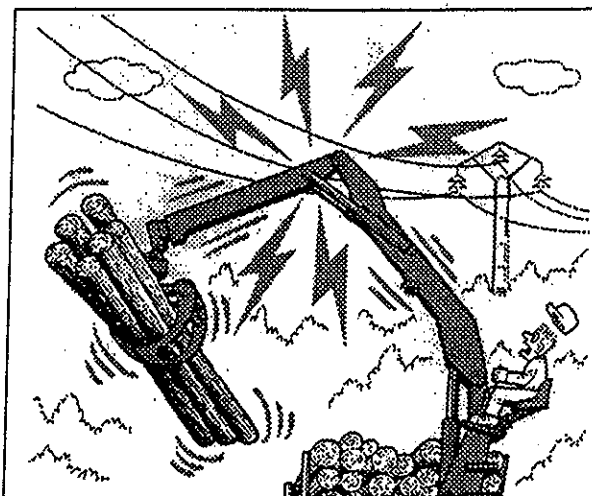
Avoid swinging the load above the control station; in cases where the load is too close, the crane must be operated from the opposite side.

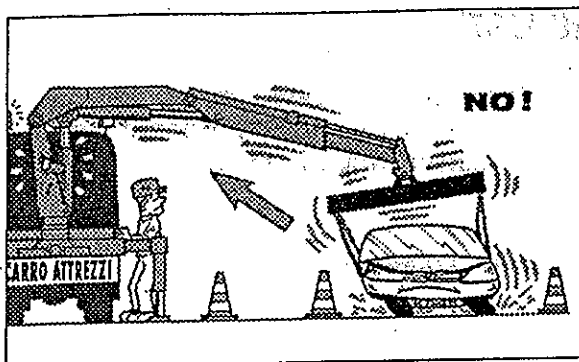


It is absolutely prohibited to load or unload under or in proximity of electric lines.

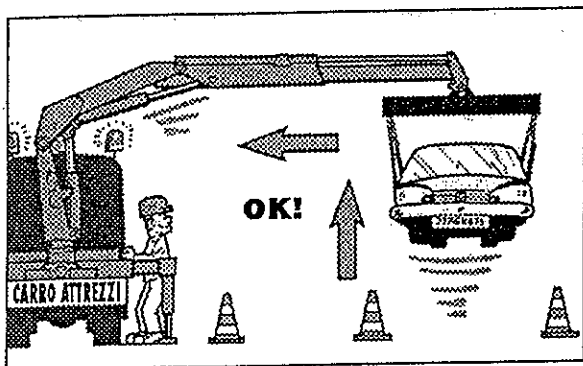
(I) The minimum distance from electric lines is, according to CEN norms, **5 meters**, except for otherwise prescribed by national norms.

For cranes with top seat controls, it is necessary to use a ladder to reach the control station. When operating from the top seat, stay within its side safety guards.





Do not rotate the crane before the load is lifted, do not 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-skidding.



Do not move the vehicle if a load is suspended on the crane.

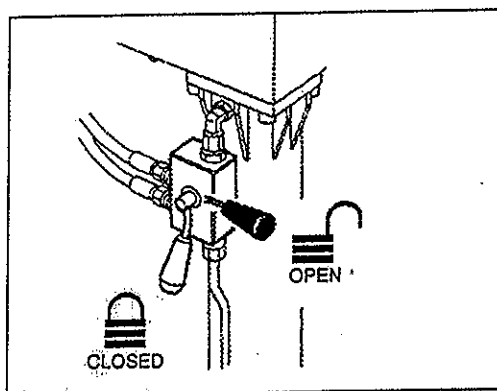
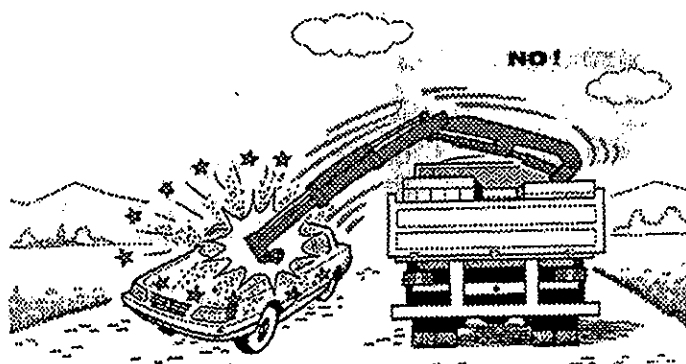
Do not utilize the crane for pushpull, lateral or sideways operations.

Under no circumstances interfere with the safety and protection devices.

The vehicle/crane are not left unless the power take off is disengaged and the load is on the ground.

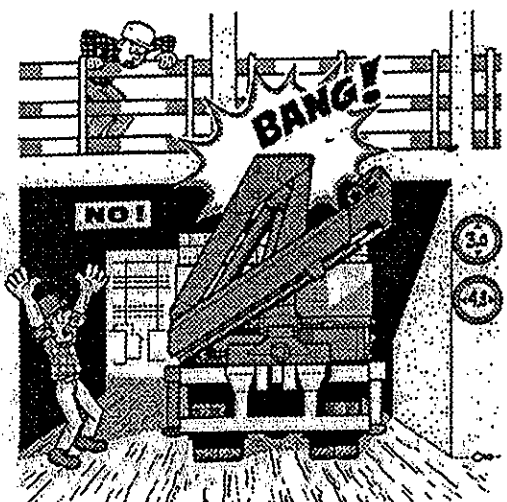
At the end of the job and prior to driving the vehicle the crane must be folded. If the booms are to be laid on the body or on the load, they must be blocked to prevent possible sideways movements. Outrigger rams must be lifted and re-entered within the overall width of the truck and safety devices locked.

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



Disengage the power take off.

To avoid hitting bridges or tunnels check and record the overall height of your crane in the folded position or in laid position in the body or on the load. Always respect and pay proper attention to road signs placed in proximity of such obstacles.





c III

INSTRUCTIONS FOR
CRANE USE
F 70**INSTRUCTIONS FOR CRANE USE**

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

- 1 — Only authorized persons are allowed 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 every 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.
 - the load is correctly slung and hooked.
- 5 — Stabilize the vehicle by the outrigger rams, 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 crane 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 make sure that the outriggers are fully retracted and re-entered, the safety taps closed and the crane is in folded position.

fig. 1



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24021 ALBINO (BG) ITALY - Via dei Carmelitani, 2
Tel. + 39 35 77.64.00 - Fax + 39 35 75.50.20

INSTRUCTIONS FOR SAFE USE OF THE CRANE

DE1771

- 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;
 - the load is correctly slung and hooked.
- 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.

THESE INSTRUCTIONS FOR THE USE OF THE CRANE COINCIDE WITH THOSE OF THE PLATE DE1771 (FIG. 1) PLACED NEXT TO THE CRANE.





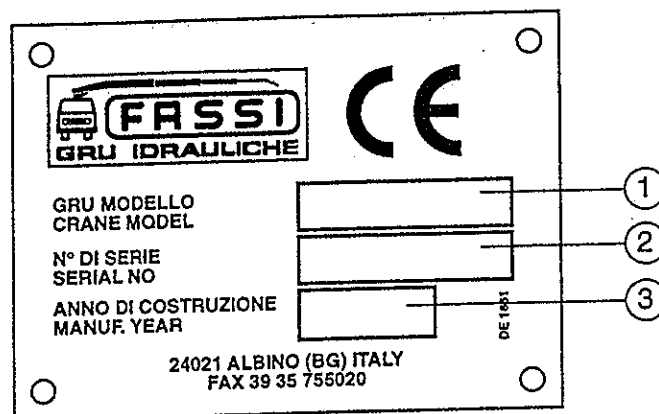
IDENTIFICATION OF THE CRANE MODEL

IDENTIFICATION OF
THE CRANE MODEL **F70 cIV**

Essential data for the identification of the crane are given on the plate DE1661 used for the CE mark and fixed to the base. (Fig. 2)

- 1—Crane model
- 2—Serial Number
- 3—Year of manufacturing

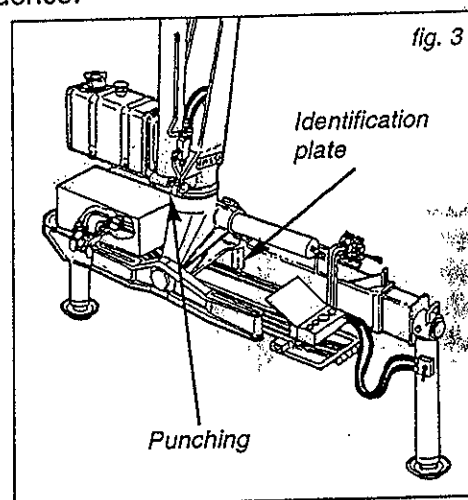
fig. 2



The model, the version of the crane, the year of manufacturing and the serial number are stamped on the base (fig. 3) in the following sequence:

*F70.21*96*1500*

model version 7.22 year of manufacturing serial no.



(!) UNDER NO CIRCUMSTANCES SHOULD THE DATA MARKED ON THE PLATE AND PUNCHED ON THE BASE BE ALTERED.

It is essential to give the correct **crane model** and **serial number**, when you contact the Service and Parts Department.

The exact **crane model**, **serial number** and description of **implements** will enable FASSI Service Department to give a rapid and efficient response.

A further metallic plate (fig. 4) fixed to the crane by the installer, quotes the identifying data of the equipment and the final CE mark.

- 1 Name of the installer who applied the final CE mark
- 2 Crane mark, model and serial number
- 3 Vehicle mark, model and chassis number
- 4 Year of mounting

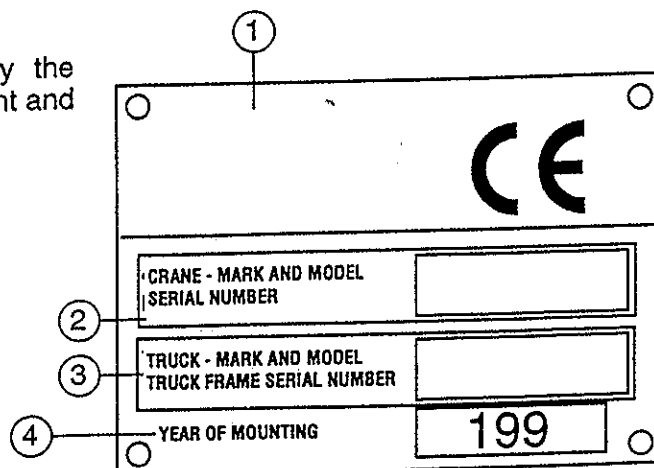


fig. 4





cV

TECHNICAL DATA

F70.22

TECHNICAL DATA

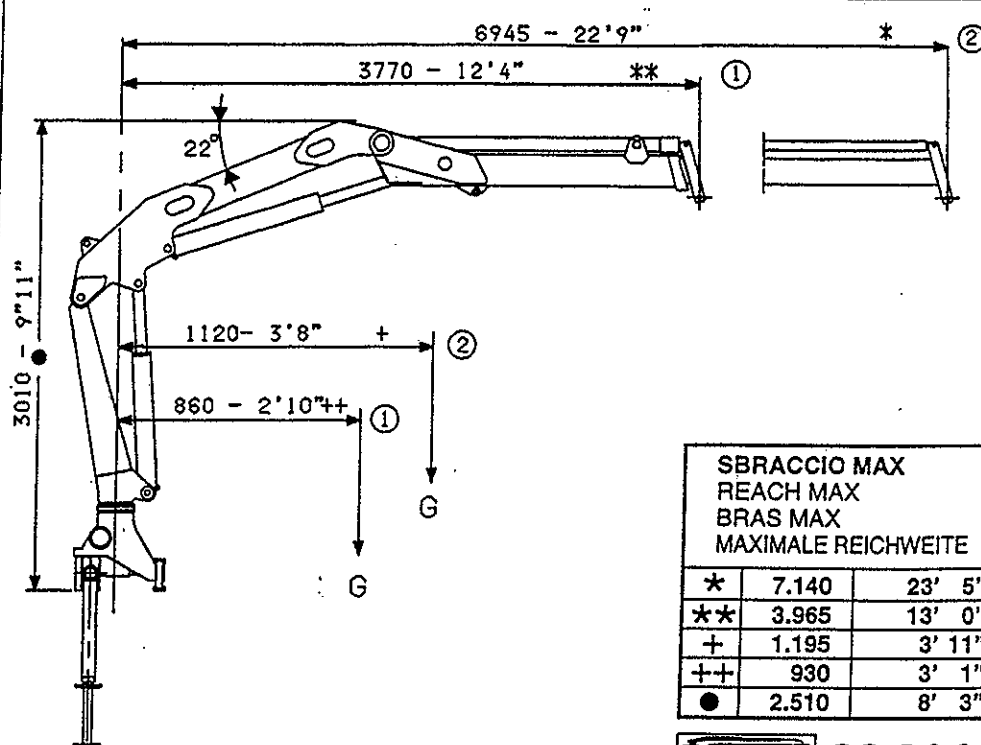
The design of this crane has been carried out in respect of DIN 15018 norms, fatigue test classification **H1B3**.

The crane can operate, intermittently, with lifting devices other than the hook. The dimensions and the capacity of the implements must be proportioned with crane performances.

F70.22

Lifting capacity	Standard reach	Hydraulic extension	Rotation arc	Rotation torque	Working pressure	Pump capacity	Oil tank capacity	Crane weight
tm 7,0 lbs.ft 50.648	m 7,15 ft 23'5"	m 3,15 ft 10'4"	370°	kNm 11,75 lbs.ft 8.666	MPa 25,5 psi 3698	l/min 20 gal/min 5,3	160 gals 15,8	Kg 1100 lbs 2425

F70.22



CO 1448

TECHNICAL DATA

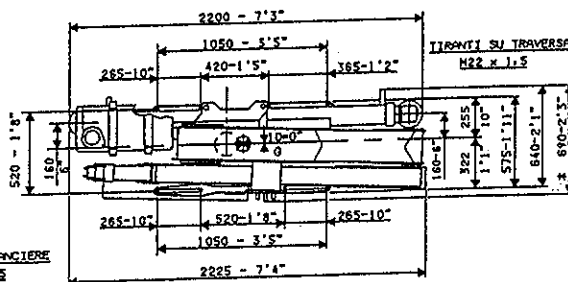
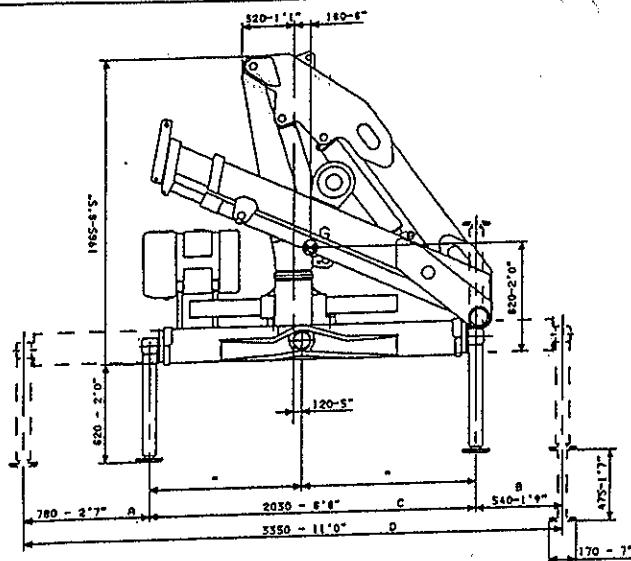
F70.22

cV

F70.22

EXTRA

A	1.192	3'	11"
B	1.192	3'	11"
C	2.116	6'	11"
D	4.500	14'	9"



TIRANTI SU BILANCIERE
M18 x 1.5

— MEZZERIA TIRANTI
— FIXING ROD CENTER DISTANCE
— LIGNE MEDIANE TIRANTS
— ABMESSUNG DER BEFESTIGUNGSBRIDEN
M22 x 1,5

PESO GRU CON SERBATOIO NON RIFORNITO, STABILIZZATORI STANDARD
WEIGHT OF THE CRANE WITH EMPTY TANK, STANDARD STABILIZATION
POIDS DE LA GRUE AVEC RESERVOIR VIDE, STABILISATION STANDARD
KRANGEWICHT MIT LEEREM TANK UND STANDARDABSTUTZUNG

kg 1.100

lbs 2.425

* CON TUBAZIONI SUPPLEMENTARI
* WITH SUPPLEMENTARY HOSES
* AVEC TUYAUTERIE SUPPLEMENTAIRE
* MIT ZUSAETZLICHEN SCHLAEUCHEN

**PESI, DIMENSIONI E POSIZIONE
BARICENTRO.**

POIDS, DIMENSIONS ET POSITION
DU BARYCENTRE.

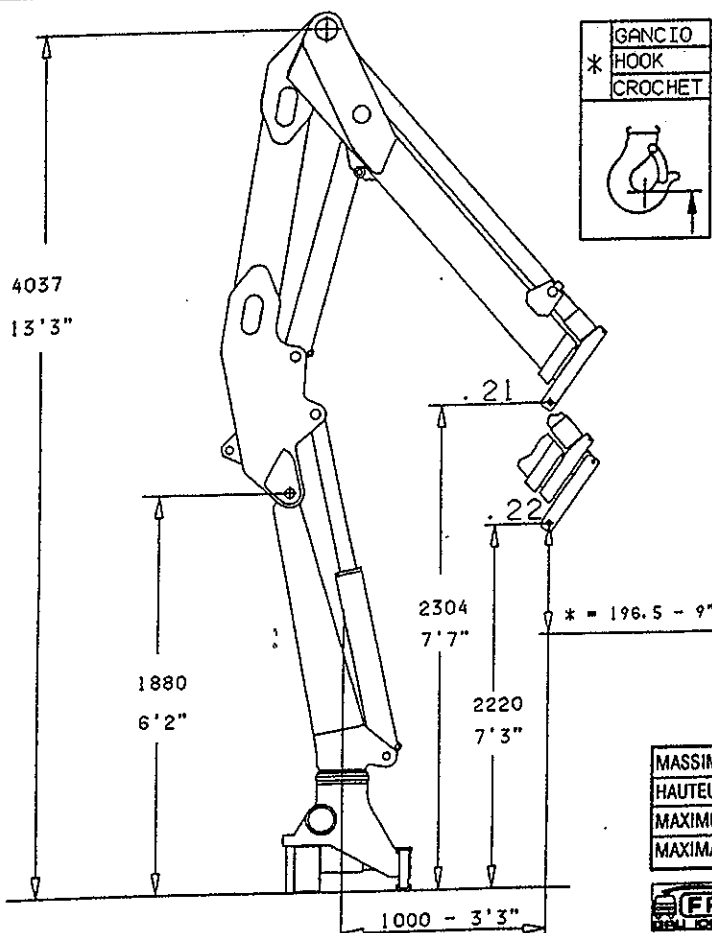
WEIGHT, DIMENSIONS AND
BARYCENTRE POSITION

GEWICHTE, ABMESSUNG UND POSITION
DES KRANSCHWERPUNKTE.

CO 1446



F70.22



GANCIO
HOOK
CROCHET

MASSIMA ALTEZZA SOTTOGANCIO.
HAUTEUR MAXIMUM SOUS CROCHET.
MAXIMUM HOOKING POSITION.
MAXIMAL HOEHE BIS KRANHAKEN.



CO 1449



**c VI**

CRANE NOMENCLATURE

F70

CRANE NOMENCLATURE

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

Pos.	Description
1	— Outrigger rams
2	— Outrigger supports
3	— Base
4	— Rotation cylinders
5	— Outrigger distributor
6	— Outrigger double control
7	— Distributor bank
8	— Double control
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	— Seat (optional)
19	— Hand-cables for crane (optional)
20	— Manual extensions (optional)

- 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	— Outrigger distributor
6	— Outrigger double control
7	— Column
8	— Seat
9	— Distributor bank
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 extensions (optional)

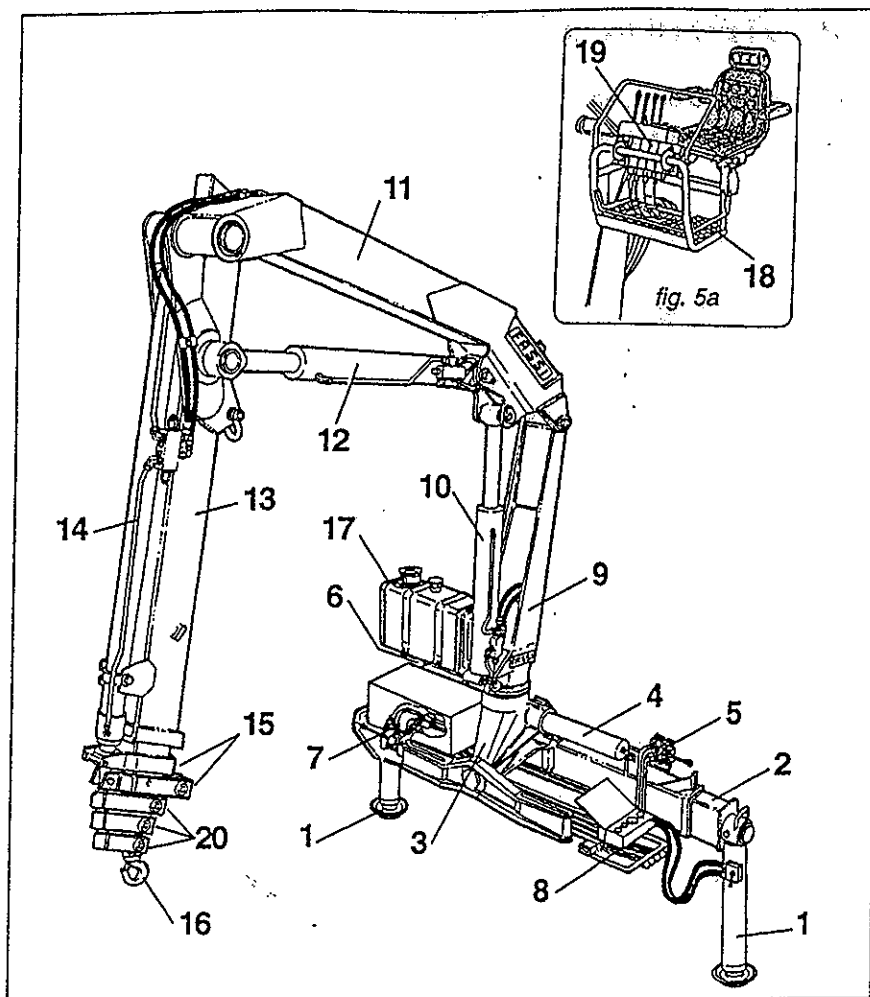


fig. 5

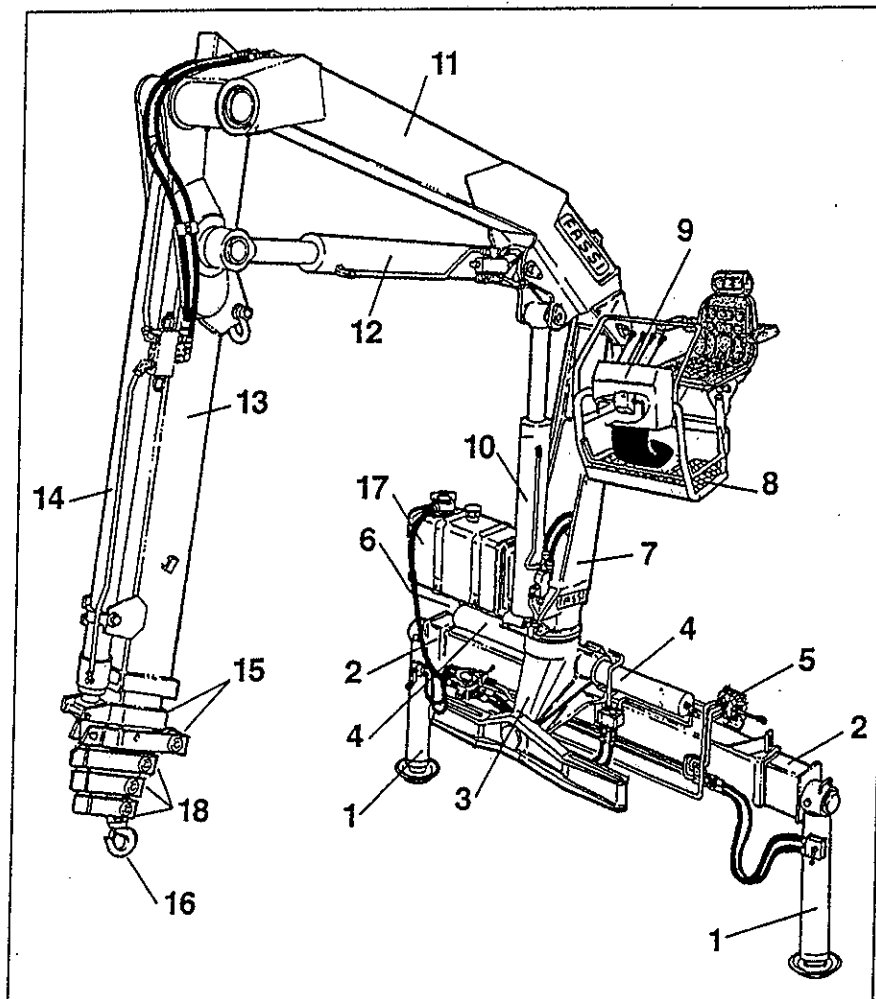


fig. 6



c VII SAFETY AND
PROTECTION DEVICES
F 70

SAFETY AND PROTECTION DEVICES

- Version with ground controls for crane and outriggers
- Top seat controls (fig. 7a) for crane by hand-cables (optional) (fig. 7)

Pos. Description

- 1 — Tap and check valve for outrigger rams
- 2 — Check valves for rotation control (flow regulators)
- 3 — Check valve for inner ram
- 4 — Check valve for outer ram
- 5 — Check valve for booms extension rams
- 6 — Lifting moment limiting device assembly
- 7 — Control panels
- 8 — Parachute valves
- 9 — Rotation limiting device
- 10 — Main pressure valve (outriggers)
- 11 — Main pressure valve (crane)
- 12 — Auxiliary valves (crane)
- 13 — Levers guard
- 14 — Safety device for extensions
- 15 — Safety device for outriggers supports
- 16 — Hook safety device

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

Pos. Description

- 1 — Tap and check valve for outrigger rams
- 2 — Check valve for rotation control
- 3 — Check valve for inner ram
- 4 — Check valve for outer ram
- 5 — Check valve for booms extension rams
- 6 — Lifting moment limiting device assembly
- 7 — Control panels
- 8 — Parachute valves
- 9 — Rotation limiting device
- 10 — Main pressure valve (outriggers)
- 11 — Main pressure valve (crane)
- 12 — Auxiliary valves (crane)
- 13 — Levers guard
- 14 — Safety device for extensions
- 15 — Safety device for outriggers supports
- 16 — Hook safety device

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

(!) Under no circumstances interfere with the safety and protection devices.

(!) Interference with the check valves and removal of the lead seals remove the Manufacturer and invalidate the warranty.

(!) Use the ladder for the access to the top seat.

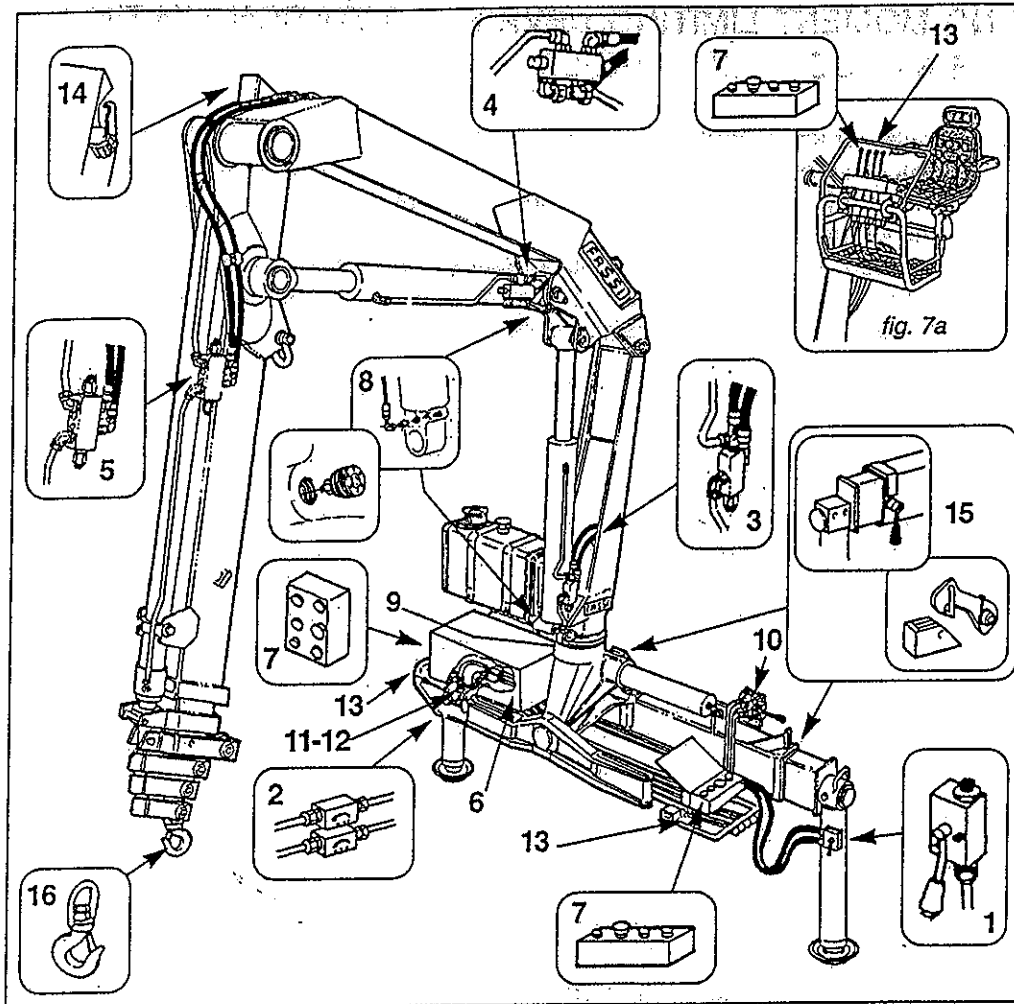
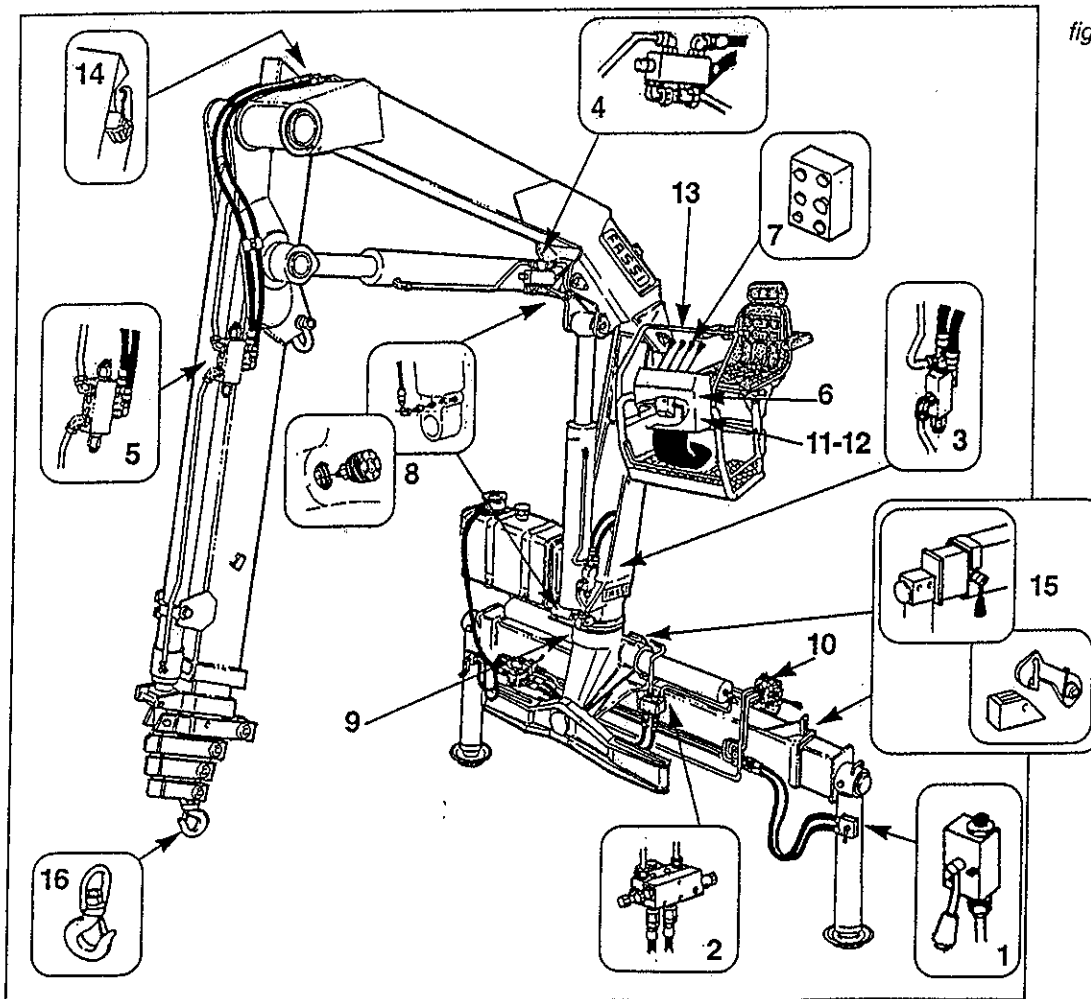


fig. 7

fig. 8





cVIII

LIFTING MOMENT LIMITING DEVICE/ ROTATION LIMITING DEVICE AND CONTROL PANELS F 70

LIFTING MOMENT LIMITING DEVICE - ROTATION LIMITING DEVICE AND CONTROL PANELS

A characteristic which permits the classification of cranes is their lifting capacity or maximum lifting moment. The moment is defined by the value obtained from the product of the load to be lifted (in kg) by its distance (in meters) from the centerline of the crane rotation.

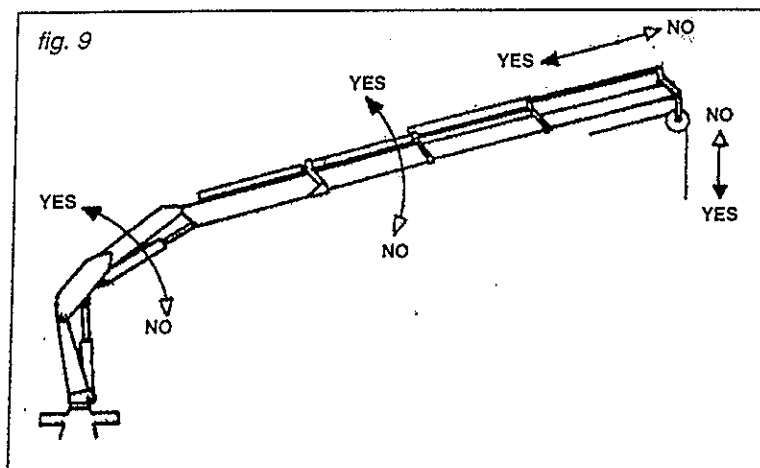
The device called "lifting moment limiting device" preserves the crane structure from overloads, as it prevents any movement which increases the value of the moment up to the maximum established value.

Lifting moment limiting device "INTELLIGENT TYPE"

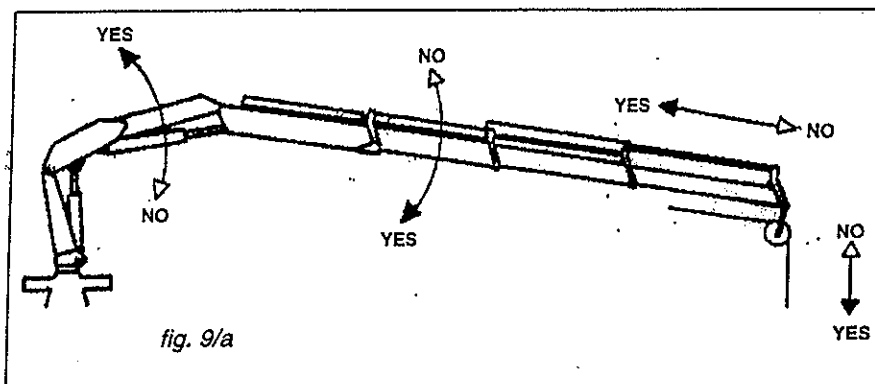
This device is fitted close to the distributor, whose specific functions it uses. It utilises an electrohydraulic technology, preventing any movement which causes an increase in the pressure induced by the load in the inner and outer rams of the crane (and in the outer ram for the hydraulic extension if fitted), up to the "critical values" which have been established in the structural test. These values, which are non-exceedable, determine the intervention levels and provide the data for setting the device.

The lifting moment limiting device concerns the following manoeuvres:

- Inner boom descent; the inner boom lift is controlled by the general main pressure valve of the distributor.
- Outer boom lift.
- Outer boom descent.
- Extension of extension boom sections.
- Winch rope lift (if fitted).
- If hydraulic extension is fitted: extension outer boom lift.
- Extension outer boom descent.
- Extension of the jib extension booms section.



The device is based on hydraulic controls which are activated when the intervention value is reached and block the movements of the relevant distributor levers in one or both directions. Please remember that the device will return the lever of the element being used to neutral position. The condition of intervention is operated by the position of the outer boom (or, if hydraulic extension is fitted, the position of the extension outer boom), on which the electronic signal position (mercury level switch) is read by a special electrovalve. This determines the controls of the locking or unlocking (resetting) of the controls concerned.



The crane configurations (fig. 9-9/a) (and the eventual hydraulic extension) indicate the manoeuvres which are allowed and not allowed by the device, in connection with the horizontal position of the crane and extension outer booms.



Control panels

The electric control panels are placed next to each control station.

Layout of the control panel (fig. 10-12), positioned next to the distributor in the versions with ground and top seat controls.

- pos. 1 — Emergency stop button (STOP)
 2 — Audible alarm push button (danger)
 3 — Orange warning light (90% of the capacity has been reached)
 4 — Red warning light (activation of the limiting device)
 5 — White warning light (power on)
 6 — Fuse

Layout of the control panel (fig. 11) positioned at the double control side in the version with ground controls (and at top seat in case of hand-cable controls)

- pos. 1 — Emergency stop button (STOP)
 2 — Audible alarm push button (danger)
 3 — Orange warning light (90% of the capacity has been reached)
 4 — Red warning light (activation of the limiting device)

If the white warning light 5 comes on, it confirms that the electric circuit is active.

INOTE! In the absence of electric power all crane functions will be desactivated.

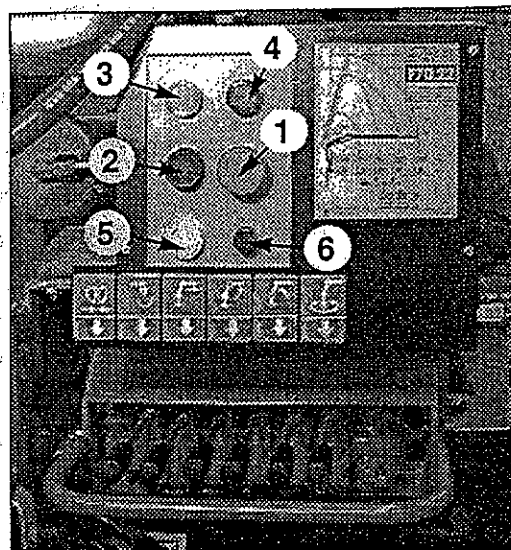
If the orange warning light 3 comes on during load handling, 90% of the capacity (lifting moment) has been reached.

If during operation the red warning light 4 comes on, the activation value of the lifting moment limiting device has been reached.

Any hidden danger situation for persons must be audibly alarmed by pressing the push button 2.

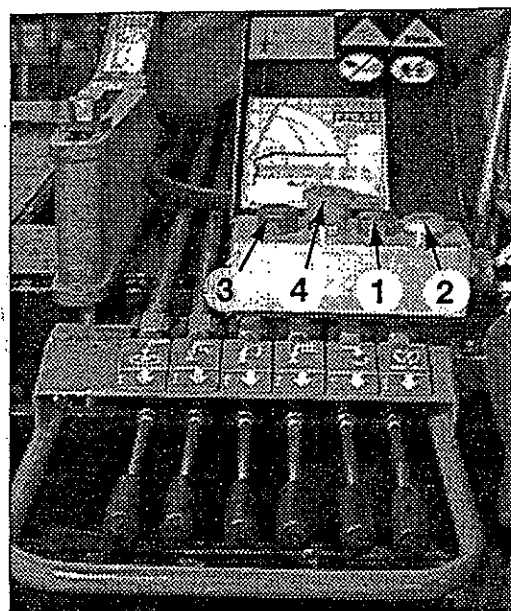
When there are serious, imminent and dangerous conditions for persons and things during load handling, operate on the emergency stop button 1, which isolates all crane functions.

LIFTING MOMENT LIMITING DEVICE/ ROTATION LIMITING DEVICE AND CONTROL PANELS **c VIII** F 70



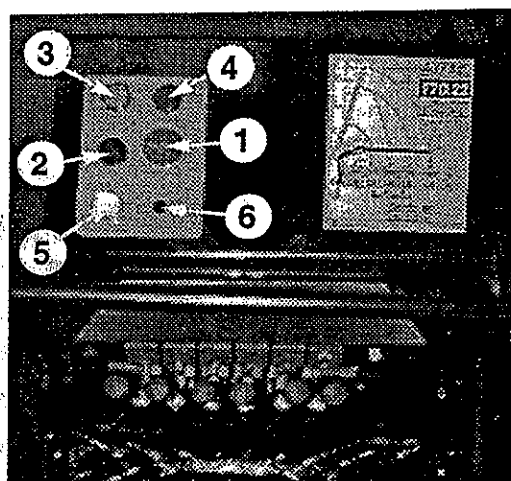
GROUND CONTROLS

fig. 10



DOUBLE CONTROL SIDE

fig. 11



TOP SEAT CONTROLS

fig. 12



c VIII LIFTING MOMENT LIMITING
DEVICE/ ROTATION
LIMITING DEVICE AND
CONTROL PANELS
F 70

- (I) Every device is installed with an exclusion tap, which permits the re-activation of all crane functions in the event of loss of electric power supply.
Only in these situations it is permitted to remove the lead seals which protect the tap lever in the closed position.

Crane with ground controls

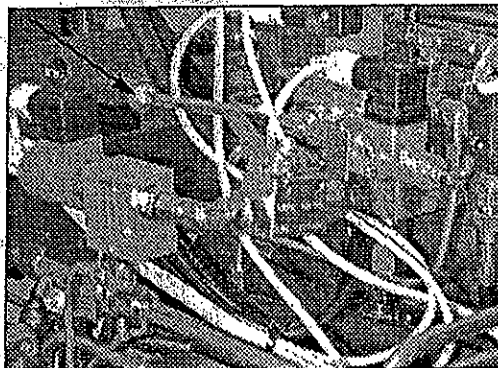


fig. 13

EMERGENCY exclusion tap of the lifting moment limiting device

Every electrovalve is installed with a screwed tap (emergency exclusion tap), which must only be used in case of emergency, testing or other abnormal situations when it is not possible to carry out any of the movements allowed by the device.

Only in these situations it is permitted to remove the lead seals which protect the device. Firstly remove the protection guard. Then unscrew the three base fixing screws and the four seat fixing screws (13 mm hexagonal spanner). Slacken the lock nut of the screwed tap (fig. 15) (14 mm hexagonal spanner), completely screw in the tap (5 mm allen key) and re-tighten the lock nut. After such emergency operations and prior to re-use of the crane, you must immediately go to FASSI authorised Center for testing the structure and re-sealing of the device.

- (I) Interferences with the valves or removal of the lead seals release the Manufacturer from any responsibility and invalidate the warranty.

(I) ATTENTION (I)

The presence of the lifting moment limiting device does not release the user from the obligation to respect what is indicated on capacity plates and lifting curves.

Crane with ground controls

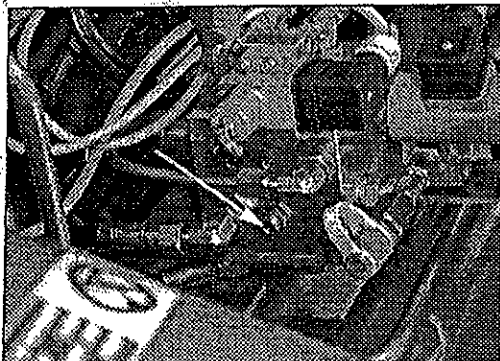


fig. 15



(!) ATTENTION (!)

LIFTING MOMENT LIMITING DEVICE/
ROTATION LIMITING DEVICE AND
CONTROL PANELS
F 70

c IX

Do not walk on the lever guards of the lifting moment limiting device positioned on the distributors or electric control panels.

Do not use water to extinguish fire!



DE 1679



DE 1680

ROTATION LIMITING DEVICE (fig. 17)

When a sector of the working area exists in which the stability is insufficient (for example in the area in front of the cab) the permitted arc of rotation is limited by means of an adjustable electro-hydraulic device which only allows operation within the safe area.

When exceeding the "safe area" the rotation limiting device only allows manoeuvres which reverse the direction of rotation.

If a reduction of capacity is necessary because of insufficient stability of the complete unit, new capacity plates must be fixed giving the derated capacity in accordance with the final stability test.

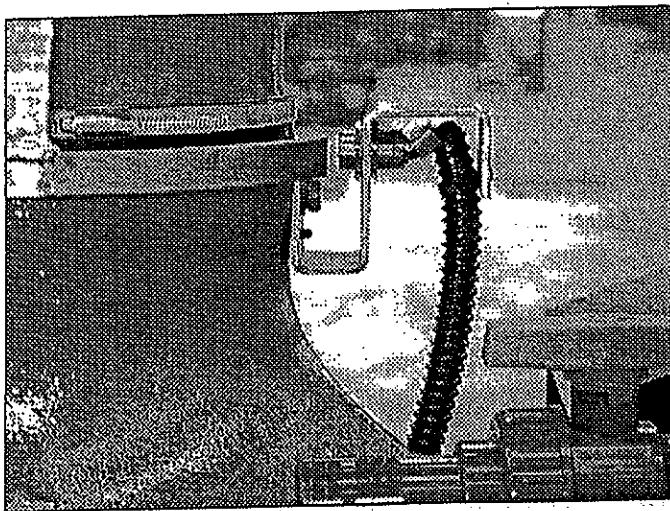


fig. 17

**cIX****CONTROLS TO STABILIZE
THE VEHICLE
F 70****CONTROLS TO STABILIZE THE VEHICLE**

The outriggers rams prevent harmful stresses both to the frame and to the vehicle suspensions on which the crane is mounted and assure the stability of the unit during load handling.

Supplementary beams

Supplementary beams (supplementary outriggers) are used in conjunction with the crane outriggers to ensure the vehicle stability during load handling. They are either fixed or manually extendable.

Supplementary beam code	outrigger ram stroke	extension max. interaxis
52185	550 mm	2132 mm fixed
42049	550 mm	3098 mm manually extendable

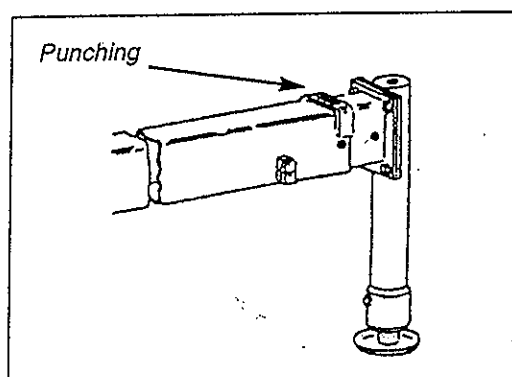


fig. 18

Identification data of the supplementary beam are punched on the beam (fig. 18) in the following sequence:

Example

42049*0001

serial no.

identification code

- (!) The crane stability is only guaranteed by the maximum lateral extension of the outrigger supports of the crane and supplementary outriggers (if fitted).

Be very careful during vehicle stabilization operation; make sure that no one is or transits in close proximity of the working area of the outriggers.

Check that they are applied on a solid base; the plate pressure of the rams is:

26,3 daN/cm² on a plate which diameter is 170 mm

If needed use the special base plates.

When stabilization is complete the wheels of the vehicle must still be in contact with the ground and the suspensions must not be fully unloaded.

Level the crane so as to operate on a horizontal plane.

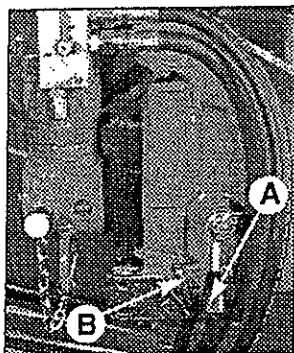


fig. 19

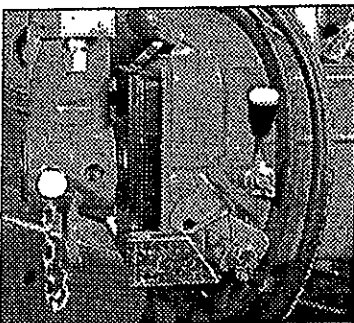


fig. 20

The crane is supplied with outrigger supports having manual side extension. On request manual extra extendable supports, and tiltable outrigger rams (at 180° or 45°). (If needed they can be placed in a vertical or inclined position to avoid obstacle on the truck frame.)

- (!) The outrigger supports are kept in position by safety devices (lock and stop) to prevent accidental movements.

Description of the controls to stabilize the vehicle

Manoeuvres for the manual extension of the outrigger supports (standard) and for the extra-extendable outrigger supports (available on request).

- (!) To manoeuvre the supports hands must only grab the proper handles.

**Manual extension (standard)**

Vehicle side from which the crane is operated

- Release the locking devices and stops of the outrigger support positioning the levers **A** and **B** from the position indicated on the fig. 19 to the one indicated on the fig. 20
- Grasp the handle on top of the outrigger ram, pull out the support until you see the pin location hole in the beam.
- Re-position the lever **A** (fig. 21) downwards; the spring loaded security pin, free to rotate respect of the lever, stays in the released position.
- Carefully extract the outrigger support until the spring loaded security pin locates into its new seat (fig. 22).
- By the same sequence, repeat the operations described to extend the other support.

CONTROLS TO STABILIZE
THE VEHICLE
F 70

c IX

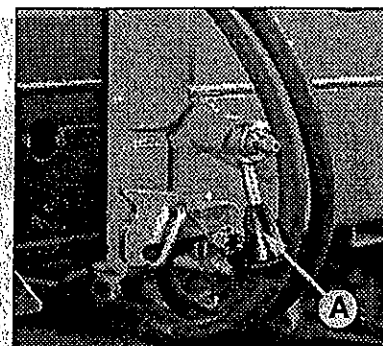


fig. 21

(!) ATTENTION (!)

The complete extension of the outrigger support is visually indicated by the yellow triangle which is found at the end of the beam. (Fig. 29)

Extra manual extension (on request)

Vehicle side from which the crane is operated

- Release the locking devices (of the first and second outrigger support) and stops positioning the levers **A**, **A1** and **B** from the position indicated on the fig. 23 to the one indicated on the fig. 24
- Grasp the handle on top of the outrigger ram, pull out the supports until you see the pin location holes in the beams.

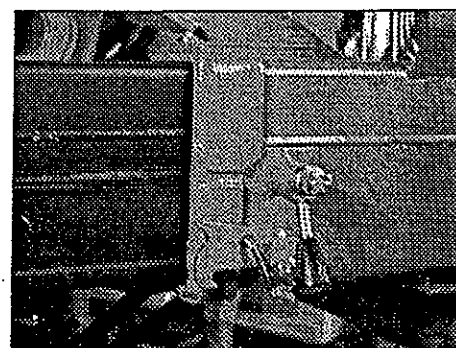


fig. 22

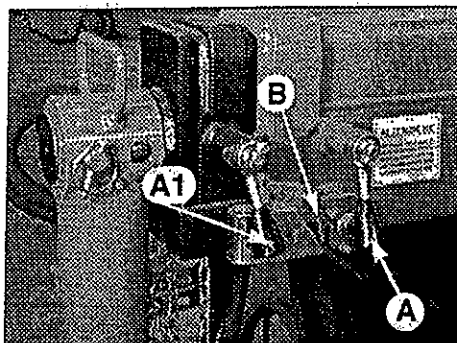


fig. 23

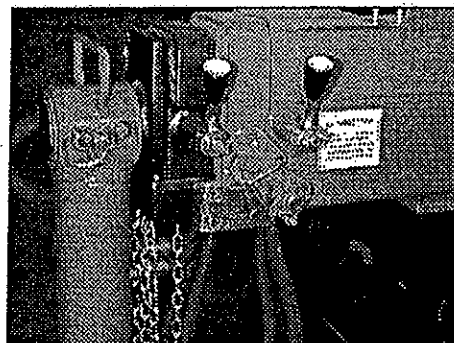


fig. 24



fig. 25

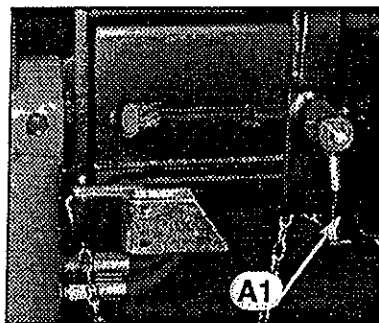


fig. 26

- When the respective seats appear, re-position the levers **A** and **A1** (fig. 25- 26) downwards; the spring loaded security pins, free to rotate respect of the levers, stay in the released position.



IX CONTROLS TO STABILIZE THE VEHICLE F 70

- Carefully extract the outrigger supports until the spring loaded security pins locate into their new seats (fig. 27-28).
- By the same sequence, repeat the operations described to extend the other support.

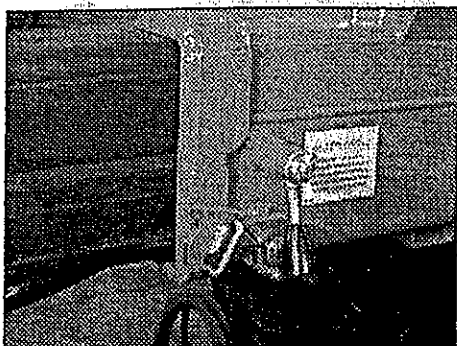


fig. 27

(!) ATTENTION (!)

A system by chain allows to keep the extension stroke of the outrigger supports within the safety limits and prevents the eventual exit of the supports.

- (!) Be sure that the chains are present; your security depends on them.

(!) ATTENTION (!)

The complete extension of the outrigger supports is visually indicated by the yellow triangles which are found at the end of the beam and the first support. (Fig. 29-30)

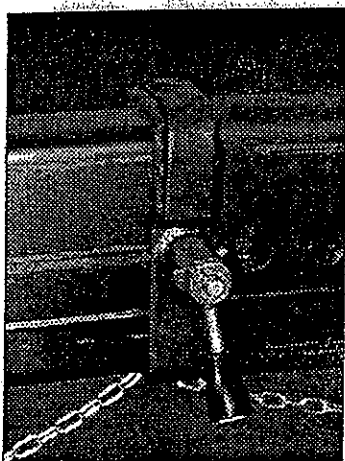


fig. 28

(!) ATTENTION (!)

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

Tiltable outrigger rams

After the extension of the lateral outrigger supports, place the outrigger rams in a working condition as follows:

- Remove the check pin and the locking pin from their position (fig. 31).
- Carefully position the ram, insert the locking pin in its new seat and secure it with the check pin (fig. 32).
- By the same sequence, repeat the operations described to position the other ram.

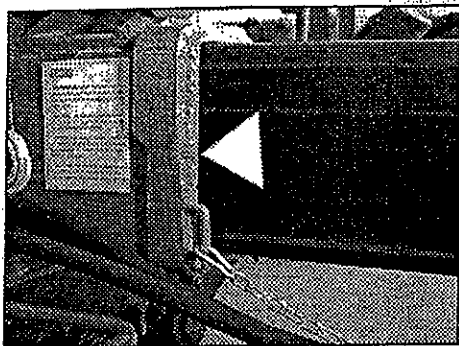


fig. 29

To re-position the rams in folded condition:

- Remove the check pin and the locking pin from their position.
- Carefully rotate the ram in a upward direction, insert the locking pin in its new seat and secure it with the check pin.
- By the same sequence, repeat the operations described to put the other ram in the folded position.

- (!) The locking pin is held to the base structure by a chain in order to prevent its loss.

- (!) The locking pin is constructed from special material
 - do not replace it with a non original part
 - your security depends on it

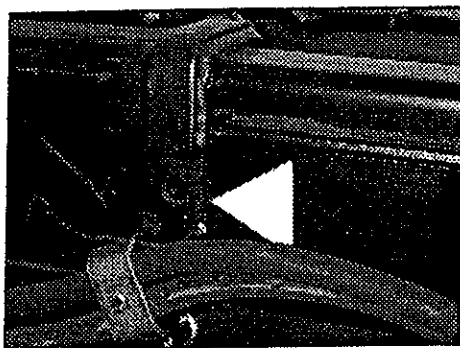


fig. 30

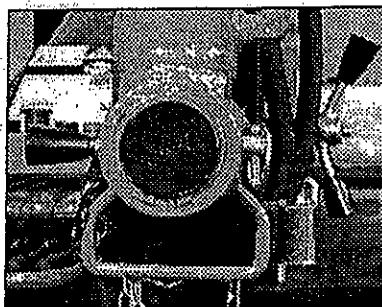


fig. 31

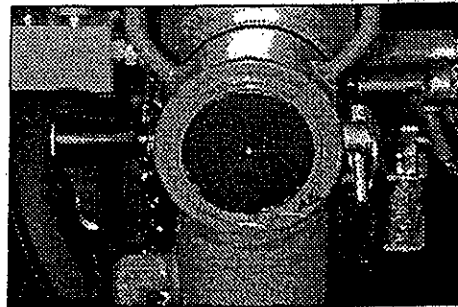


fig. 32



Description of the controls to stabilize the vehicle; crane with manual or extra manual extension

CONTROLS TO STABILIZE
THE VEHICLE **c IX**
F 70

- (I) The controls to stabilize the vehicle are in conformity with the safety directives and enable the operator to actionate the lateral extension of the outriggers (only outrigger rams) only from the side where he can visually check the operation.

Lever function D - C

- Lever **D** Deviator crane - outriggers ($\mathcal{Q}$ - S) fig. 36-38
- Lever **C** Control of crane outrigger rams (and eventual supplementary outriggers) fig 33-35

The symbols placed over the levers **D** and **C** define their function in relation to their movement.

The descent of the outrigger ram indicated on the fig. 34 coincide with what indicated on the plates DE2316 placed in dual side position on the base.

DISTRIBUTOR SIDE

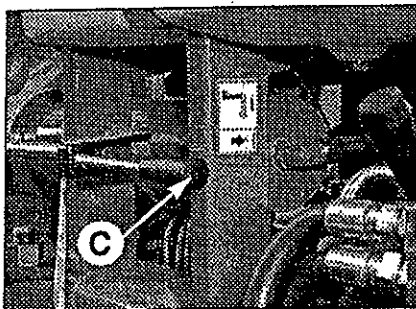


fig. 33

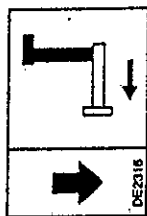


fig. 34

DOUBLE CONTROL SIDE

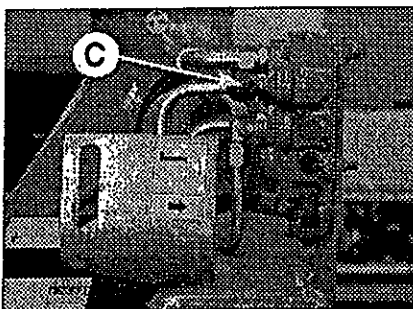


fig. 35

DISTRIBUTOR SIDE

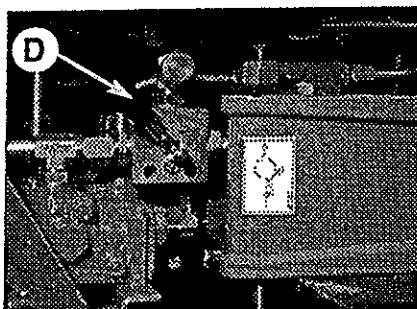


fig. 36

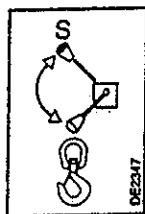


fig. 37

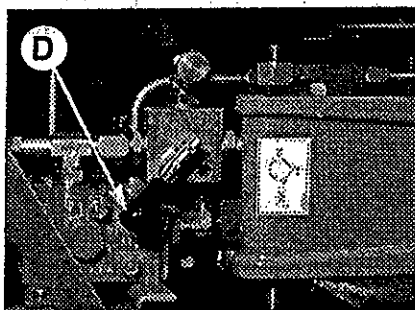


fig. 38

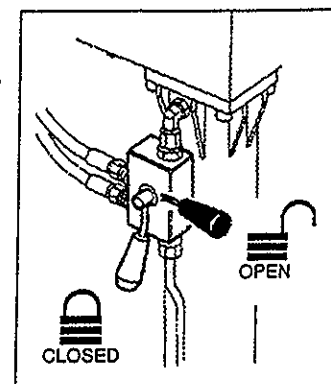
fig. 38a

As previously described:

- Manually extend the crane outrigger supports (and eventual supplementary outriggers).
- Put the crane outrigger rams in working position.
- Place the lever **D** of the deviator crane-outriggers ($\mathcal{Q}$ - S) on the position **S** (fig. 36-37).

Distributor side

- Open the tap of the valve (fig. 38a) placed on the ram on which we intend to operate.
- Operate lever **C** to control the descent of the selected outrigger ram.



Double control side

- By the same sequence, repeat the operations described to position the other ram





c IX

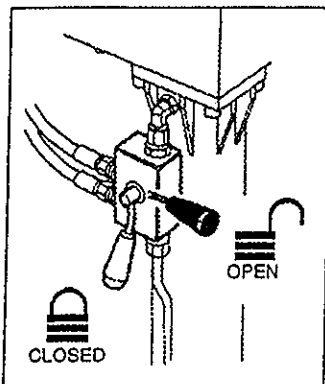
CONTROLS TO STABILIZE
THE VEHICLE
F70**(!) ATTENTION (!)**

During the stabilisation operations, for each outrigger ram, it is recommended to DESCENT the outrigger as last manoeuvre.

(!) ATTENTION (!)

The stabilization has to be carried out with care and gradually keeping the vehicle in horizontal levelled condition to prevent springs overloads and chassis torsions.

fig. 38a



- Close the taps of the valves placed on the outrigger rams before using the crane (fig. 38a)
- Put the crane in working position, by placing the lever D of the deviator crane-outriggers (S - S) on the position S (fig. 38-37)

Manoeuvres for re-entry of the crane outrigger rams (and eventual supplementary outriggers) within the overall vehicle width after crane use

- Position the lever D of the deviator crane-outriggers (S - S) on S.

Distributor side

- Open the tap of the valve (fig. 38a) placed on the ram on which we intend to operate.
- Operate lever C to control the re-entry of the selected outrigger ram.

Double control side

- By the same sequence, repeat operations described to re-enter the other ram.

- (!) To manoeuvre the supports hands must only grab the proper handles.

Crane with manual extension

To stow the outrigger supports, act as follows:

- Position the locking device lever A up, relative to the outrigger support to be stowed.
- By pushing, re-enter the outrigger support by at least 15 cm.
- Re-position the locking device lever A downwards.
- Carefully push the outrigger support until the locking devices and stops are closed.
- As previously described, operate the other outrigger supports (placed on the opposite side) until they are completely re-entered.

Crane with extra manual extension

To stow the outrigger supports, act as follows:

- Position the locking device levers A and A1, relative to the outrigger supports to be stowed.
- By pushing, re-enter the outrigger supports by at least 15 cm and
- Re-position the locking device levers A and A1 downwards.
- Carefully push the outrigger supports until the locking devices and stops are closed.
- As previously described, operate the other outrigger supports (placed on the opposite side) until they are completely re-entered.

(!) ATTENTION(!)

- (!) Always check that the outriggers supports, once in their rest position, are locked in their seat by the safety devices, so as to assure the impossibility of accidental movements. (Fig. 19-23)

- (!) It is compulsory to close the outriggers rams valves taps before moving the truck. (Fig. 38a)



CONTROLS TO OPERATE THE CRANE

CONTROLS TO OPERATE
THE CRANE
F70

cX

(!) WARNING (!)

Before operating the crane it is compulsory to set the outriggers and to shut the safety check valve taps.

This coincides with that indicated on the plate DE319 placed on the outriggers (fig. 39).

- (!) Operate the levers smoothly and gradually.
When carrying out simultaneous movements of two or more functions, also related to pump flow and lever travel, it is possible that on reaching the stroke end of a particular function, an increase in speed of the other functions will occur.

The symbols placed over each lever define their function in relation to their movement.

The crane and hydraulic implements can be operated with:

- manual controls (distributor and double control) placed on the base;
- manual controls (distributor) placed on the top seat;
- manual controls (distributor and double control) placed on the base and manual controls (hand-cable controls) placed on the top seat.
- manual controls (hand-cable controls) placed on third control station.

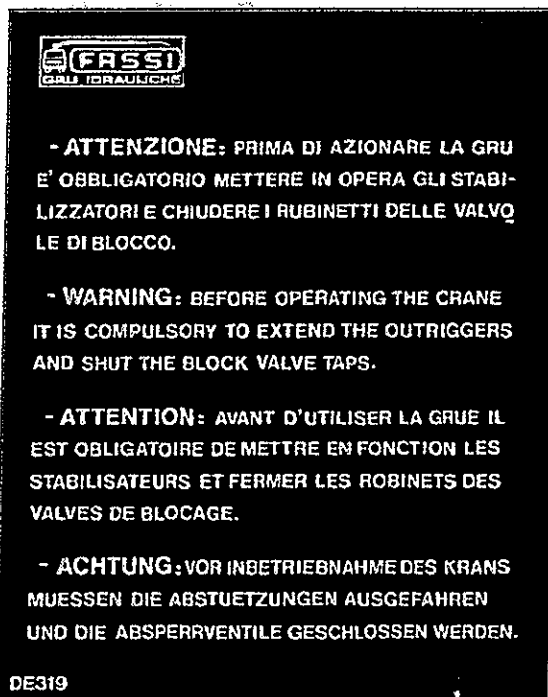


fig. 39

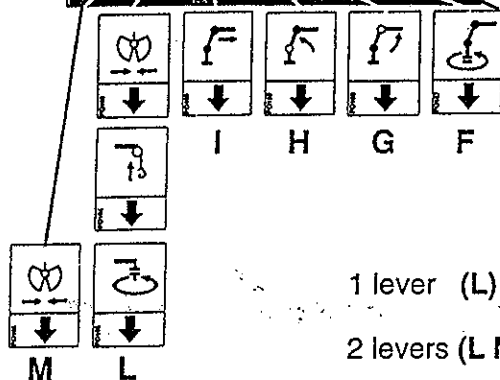
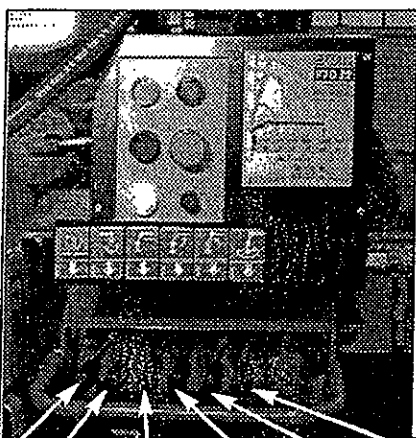


cX CONTROLS TO OPERATE
THE CRANE
F70

Crane controls - Lever function F-G-H-I (fig. 40-41-42)

- F - Rotation control
- G - Inner ram control
- H - Outer ram control
- I - Outer booms section rams control

Distributor side *fig. 40*



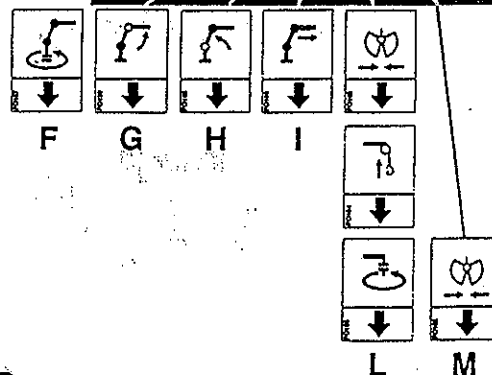
Hydraulic implements controls - Lever function L-M
fig. 40-41-42

- L — First hydraulic implement control or winch control
- M — Second hydraulic implement control

Always remember that the number of levers for hydraulic implements controls changes upon the type of fittings, as follows:

- 1 lever (L) hydraulic implement control or winch control
- 2 levers (L M) hydraulic implement control

Double control side *fig. 41*



From top seat *fig. 42*

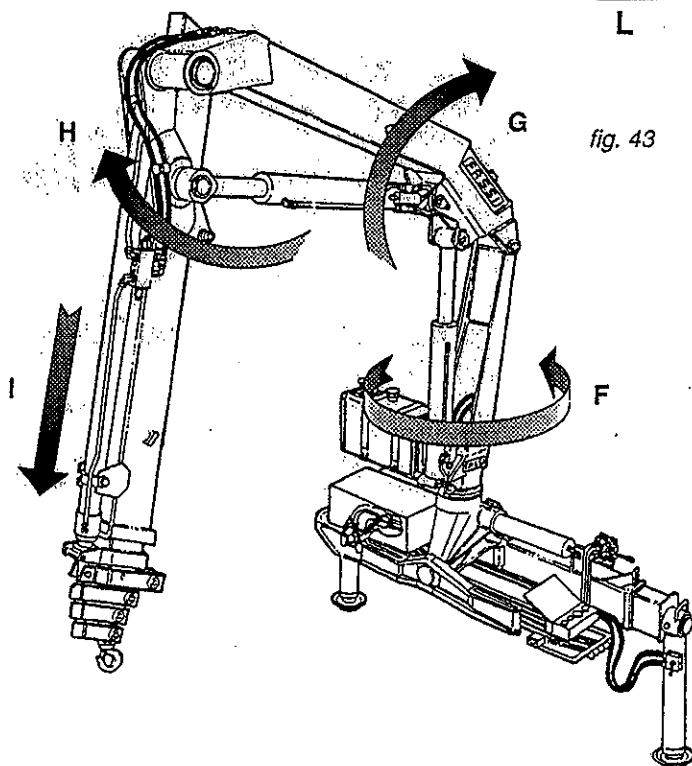
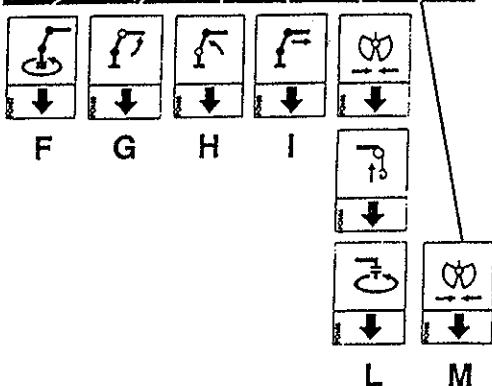
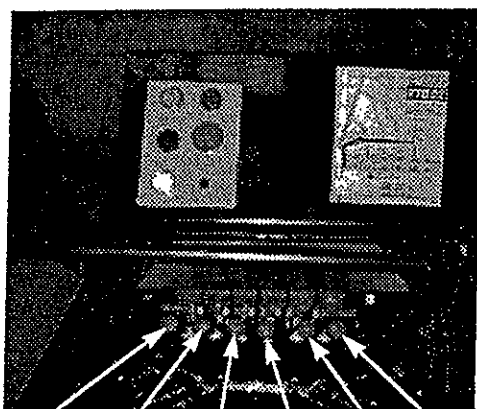


fig. 43

**Manoeuvres to unfold the crane into a working condition (fig. 43)**

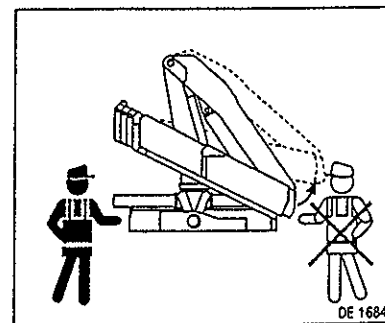
CONTROLS TO OPERATE
THE CRANE **cX**
F 70

- Engage the power take off.
- Stabilize the vehicle as described on page 18.

(!) Operate from ground control distributor side (!)

- Lift the inner boom over the horizontal line, by operating lever G whilst paying attention to the position of the boom (fig. 44-44a) (in case of operation from the double control side).
- Open the outer boom to the "horizontal" position by operating lever H.
- Extend the booms of the crane by operating lever I, until the locking device hook is free.
- Position the hook on the vertical line above the load, operating (if required) lever F (rotation).

fig. 44

**Manoeuvres to fold the crane into the rest condition****(!) Operate from ground control distributor side (!)**

- Lift the inner boom to its stroke end (lever G)
- Fold the outer boom to its stroke end (lever H)
- Lower with the inner boom (lever G) until the hook of the safety device lays on the extension boom sections
- Extend the extensions (lever I) (the device concerns the first boom) until the hook is free
- Re-enter the extension boom sections (lever I) so as the hook can keep them in position
- Do not insist on the control!
- Operate the rotation control (lever F) until the arrows placed on the base and on the column (dust cover) coincide.
- Fold the inner boom (lever G) to its stroke end, paying attention that the rest locating pin lines up with its seat and to the boom movements (in case of operation from the double control side). (Fig. 44-44a)
- Lift and re-enter the outriggers to within the overall vehicle width as described on page. .
- When all manoeuvres are completed, check that the taps of the outrigger ram valves are closed. (Fig. 38a)

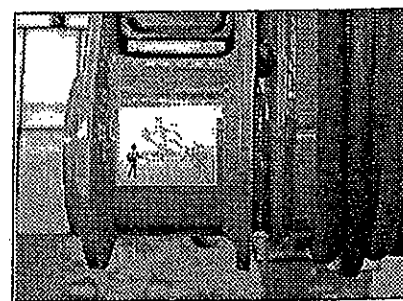
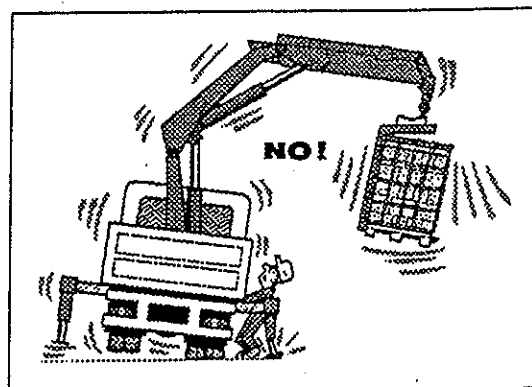
**Load manoeuvres**

fig. 45

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

When a sector of the working area exists in which the stability is insufficient (for example in the area in front of the cab) the permitted arc of rotation is limited by means of an adjustable electro-hydraulic device which only allows operation within the safe area. When exceeding the "safe area" the rotation limiting device only allows manoeuvres which reverse the direction of rotation. The lifting curves of the capacity plate indicate the maximum load that the crane can lift at a certain radius and at a certain height.

To utilize the maximum capacity of the crane, it is necessary to position the inner boom as indicated on the capacity plate; the coloured symbols on the inner boom and column must coincide.



During load handling, do not exceed the reach limits given, or the load indicated on the above mentioned charts.

If the limits are exceeded, the load limiting device, allowing all manoeuvres, which reduce the lifted load within the permitted reach limits and forbid all other manoeuvres, will be immediately activated.

- (!) The presence of the lifting moment limiting device does not release the user from the observance of the capacity plates and lifting curves.





cXI

USE OF IMPLEMENTS

F 70

USE OF IMPLEMENTS

The crane can be provided with implements such as:

- Manual extensions
- Winches
- Personnel baskets.

- (!) When using an implement it is always necessary to check that its weight, dimension and capacity is matched to the crane performances.

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

- (!) Before using a personnel basket it is necessary to provide the crane with the safety devices requested by the local norms in force. Prior to use of the crane it has to be tested and inspected in accordance with the local legal requirements.

Manual extensions

Manual extensions are additional boom sections, which are placed in the crane outer booms and secured by pins and check pins; they have a maximum capacity, indicated on the plate, independent from the crane configuration.

(!) WARNING (!)

Manual extensions are not protected by the lifting moment limiting device.

Before lifting the load make sure that its weight does not exceed the capacity indicated on the plate.

Manual extensions can be extracted from the rest position and be operative, once the security pins have been removed, with the outer boom in sliding position.

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

Do not permit the extension to slide out at speed as this will damage the stroke end stops.

Do not try to align the holes (slots) for the locking pins with your fingers; always use a suitable tool.

Always remember that when operating with implements, their tare weight must be deducted from the capacity of the crane.

When manual extensions are in place, fit the locking pins and secure them with the check pins to prevent accidental escape.





Winch

USE OF IMPLEMENTS
F 70 **c XI**

The winch is made of a drum (pos. 1) that can rotate by means of a hydraulic engine (pos. 2), on a structure (pos. 3) fixed on the crane (i.e. under the outer boom). The rotation of the drum on which the cable winds is achieved by a hydraulic motor (pos. 2) connected to the circuit by means of hoses; in case of fittings or hoses brake the stop of the rotation is guaranteed by a safety check valve (pos. 4). A parking brake integrated to the motoreducer group prevents the rotation on the drum (held of the winch load in position), when the control function is not activated (lever N in neutral position).

The winch is identified by a plate (fig. 46a) indicating the essential data and fixed by the manufacturer:

Manufacturer mark ...
Winch type ...
Serial number ...
Maximum line in N at the 4th layer...
Maximum speed in m/min ...

(I) See operator winch manual supplied by the winches' manufacturer.

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.

The couple limiter, installed on the winch structure, prevents that on the cable, can be created a load major to the value of maximum line at the 4th layer, quiescing all the crane controls.

(I) Under no circumstances interfere with the limiter device adjustment.

Do not rotate the crane before the load is lifted, rotate slowly and with care the suspended load checking the stability of the vehicle.

The presser-cable always keeps the cable in tension easing the regular rewinding and without overlappings on the drum.

(I) On winches not equipped with pressafune, check the rewinding of the cable on winch drum proceeds regularly and without overlapping: it is suggested not to rewind the cable if it is not sufficiently taut.

According to the actual norms the winches must be provided with safety device. That adopted one uses an electrohydraulic technology, where a signal, given by a microswitch, controls the quiescing and the reactivation of crane controls through an electrovalve.

The adopted device prevents that:

- in the lifting with the winch or in the booms extension rams exit (crane or hydraulic extension) the cable hook (or the block) takes contact with the pulley structure;
- in the unwinding the cable is completely wound from the winch drum (three turns must be wound at least), causing the controls quiescing.

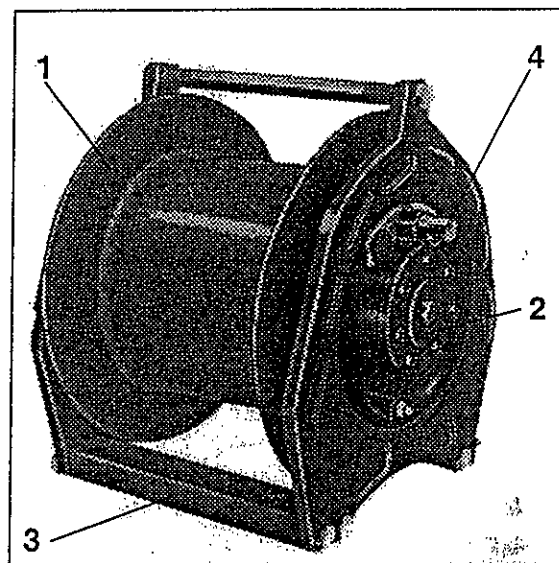


fig. 46

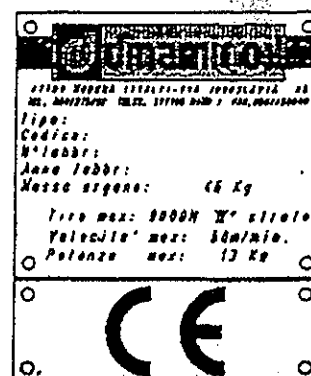


fig. 46a

**cXI****USE OF IMPLEMENTS****F70**

To reactivate the controls the lever L (fig. 40), winch control must be activated controlling:

- the descent of the cable if the device operation is happened in the lifting with the winch or in exit with the booms extension rams;
- the lifting of the cable if the operation is happened in the unwinding of the same one.

In the phase of lifting or exit of booms extension rams, the control of the position about the cable hook (or about the block), as regards the pulley structure, is obtained through a microswitch, which lever is kept in position by a chain balance weight, assembled free on the cable.

In the quiescing of the crane the keeping in position of the microswitch lever becomes impossible with the consequent quiescing of controls.

To put the crane in rest position it is necessary to operate in this way:

- withdraw the flying drive (it is assembled on the cable of the cable winder) from the pin placed near the microswitch, placed on the pulley, assembled on the booms extension rams.
- In case it is a crane with hydraulic extension it is necessary to detach the cable of the cable winder, placed on the crane from the pin of the second cable winder, assembled on the extension.
- Release the cable from all support rings placed on the booms letting that it winds free in the cable winder.
- Insert the flying drive in the pin placed in the cable winder. (Fig. 47).

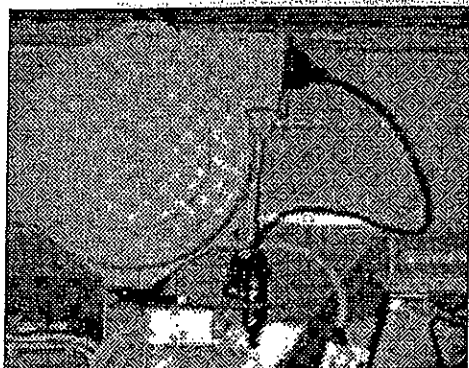


fig. 47

This operation gets active all crane controls to complete the rest position operations..

- (I) Please remember that after stabilizing the vehicle and placing the crane in working position it is compulsory to reset the functionality of end stroke device, otherwise the cable could be damaged.

Hydraulic connections between implements and hoses fitted on extension booms section.

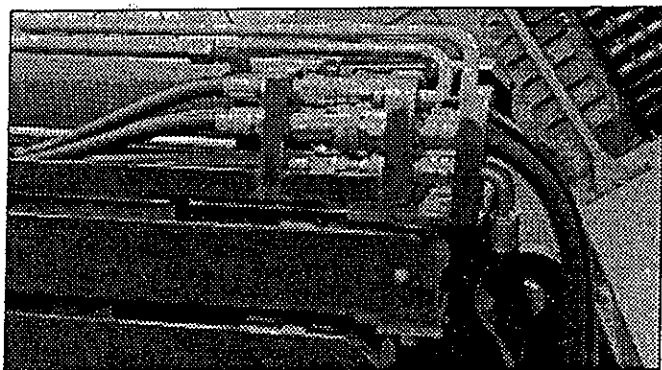


fig. 48

- (I) In case of hoses connection to implements through coupling unions it is necessary to verify that there is no trace of soil, dirt etc. on the unions and inside the seats so as to avoid the oil contamination and consequently wear the tightening " surface of unions.

(I) WARNING (I)

To ensure that the control corresponds to the implement movement, hydraulic connections are symmetrically fitted with coupling unions. Never invert such positions: movements inversion as well as operating difficulties could occur.



MAINTENANCE INSTRUCTIONS

MAINTENANCE
INSTRUCTIONS **c XII**
F 70

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

General lubrication and small repairs can be carried out by the user; repairs of a more complicated nature must be carried out by authorized service personnel.

Spare parts must be original.

Good maintenance and proper use are imperative to maintain efficient use and guarantee the safety of the crane.

- (I) Before disconnecting any hydraulic hoses, ensure that there is no pressure in the hydraulic circuit. After removing hoses always mark them and their respective ports on the crane. Faulty replacement can cause damage to the rams and to the hydraulic circuit.



fig. 49

Respect the information supplied for maintenance and technical assistance.

Any maintenance operation must be carried out with the crane power source turned off.

Do not place limbs, fingers or any other parts of anatomy into areas of the crane, which present possibilities of shearing, without having blocked such parts of the crane.

Do not weld, drill or grind any part of the crane without the Manufacturer's authorisation.

Do not weld the column support and the pendulum beam (see plate DE815 fig. 49).

Do not weld the fixing rods of the crane (see plate DE1574 fig. 50).

When repairs to, or checks of, the hydraulic circuit and of the rams are carried out, it is very important not to use, or be in the proximity of, materials which can damage the circuit or contaminate the hydraulic oil eg. metal shavings, sand or dust.

Never use detergents, petrolsol or inflammable liquids, always use non flammable or non toxic liquids.

To avoid down time, it is recommended to periodically carry out the following checks.

At the end of every working day

Check that all safety devices are efficient.

Check the level of the hydraulic oil in the tank.

Check the hoses fittings and all the components of the hydraulic circuit for possible leaks.

Check that the oil diverter levers can easily be positioned and that the control levers of the crane (distributors/double-controls and hand-cables) operate freely and return to neutral position.

Check the condition of shackles, hooks, wire ropes and any other lifting equipment.



DE 815

GHISA: NON SALDARE!
CAST IRON: DO NOT WELD!
FONTE: NE PAS SOUDER!
GUSSEISEN: NICHT SCHWEISSEN!

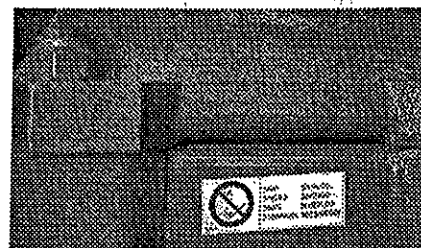
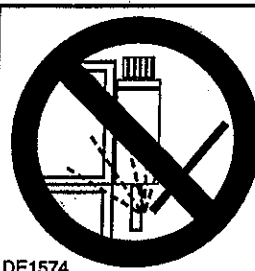


fig. 50



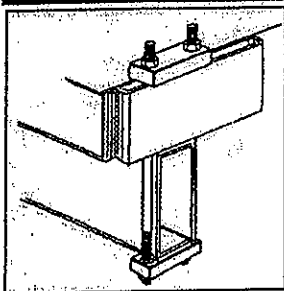
DE1574

TIRANTI: NON SALDARE!
FIXING ROD: DO NOT WELD!
TIRANTS: NE PAS SOUDER!
ZUGSCHRAUBEN: NICHT SCHWEISSEN



c XII MAINTENANCE INSTRUCTIONS F 70

After the first 40 hours use



Check the tightening torque of the fixing rods of the crane.

Tightening torque for the rods M18x1,5 pendulum beam side = 150 Nm
(fig. 51).
Tightening torque for the rods M22x1,5 cross bar side = 300 Nm

fig. 51

After every working week

Clean the oil filter placed in the oil tank of the crane and if any, on the pump section and pressure hoses.

If the hydraulic circuit of the crane is connected to a tipper a remote oil tank may be fitted, in this case the filter will be found in this tank.

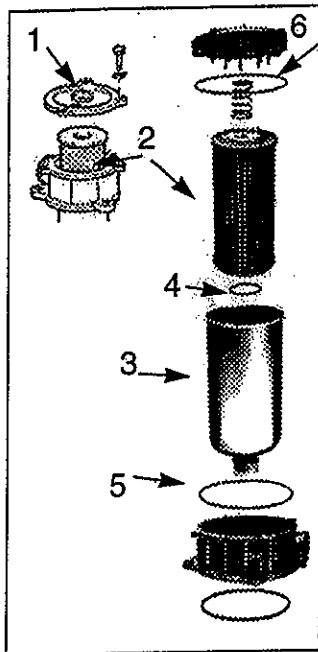


fig. 52

Cleaning of the filter on the tank (oil return from the distributor) fig. 52

- Remove the filter cover, pos. 1, by unscrewing the three security bolts. Remove the spring and extract the filter cartridge pos. 2: during this operation take care that no contaminated material passes into the tank.
- Clean the cartridge by flushing with a non flammable and non toxic solvent. Thoroughly dry the filter inside and out with compressed air.
- Remove the filter holder from the filter body pos. 3 (a hose is attached to its base); clean and reassemble checking the sealing 'O' rings pos. 4-5 (internal seal between cartridge and holder and external seal between holder and body).
- Re-assemble the filter cartridge into its holder, re-assemble the spring and the filter cover pos. 6 (check the sealing of the 'O' ring under the filter cover).
- Re-fit the three security bolts.
- Check for leaks when the pump is activated.

Check the oil level in the tank with the crane in the folded position and with the outriggers (crane and supplementary) fully re-entered. The oil level must not exceed the maximum or be lower than the minimum (fig. 53).

Top up using hydraulic oil with the same characteristics as those indicated in the table on page 39.

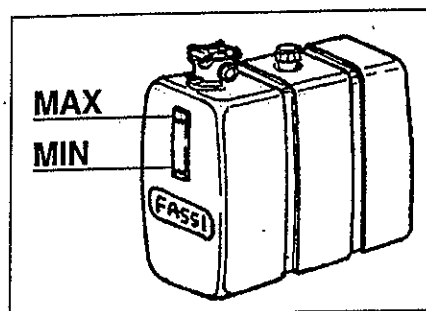


fig. 53

Periodically grease the points indicated in the following pictures, paying particular attention to the points not easily detected.

- The fig. 54b shows the lubricators of the outrigger rams and the locking devices of the outrigger supports.
- The fig. 54c shows the lubricators of the column symmetrically positioned on the column support.
- The fig. 54d shows the lubricator of the pin articulation column-inner boom.
- The fig. 54e shows the lubricators of the inner ram.
- The fig. 54f shows the lubricator of the pin articulation inner boom-outer boom.
- The fig. 54g shows the lubricators of the outer ram.



fig. 54/b

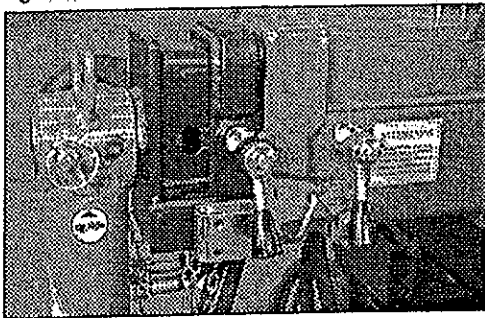


fig. 54/c



fig. 54/d

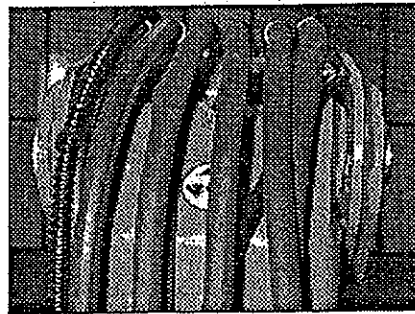


fig. 54/e

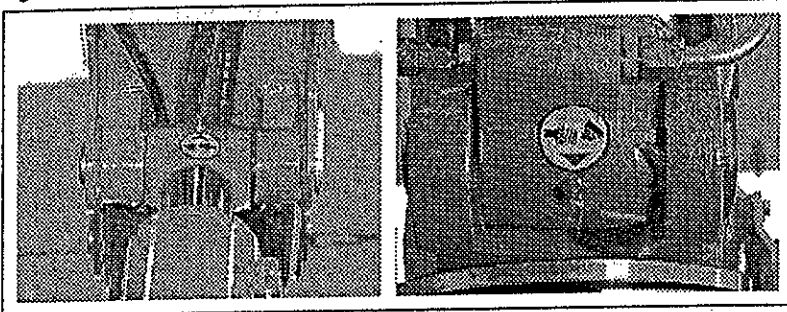


fig. 54/f

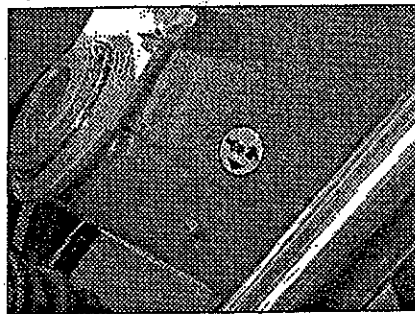


fig. 54/g

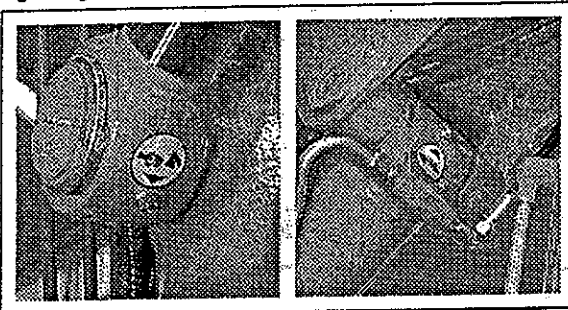
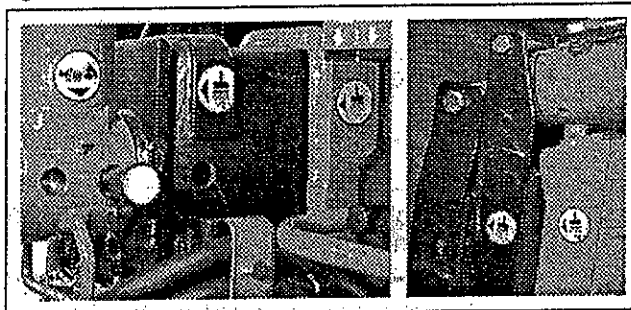


fig. 54/h



For the sliding sections of the outrigger supports and of the extension booms guide shoes made from a special material have been fitted: to ease their movement it is recommended to smear a light film of grease on them, taking care that the surfaces of the outrigger supports and extension booms are free from impurities such as sand etc. (fig. 54/h).

Use a grease with the same characteristics indicated in the table on page 39.

After every 500 working hours

Check the tightening torque of the tie rods fixing the crane to the vehicle frame.

Check the tightening torque of the securing bolts for the ram pins.

Check the guide shoe wear as it affects the sliding section tolerances; if the clearances are considerable, damage to the rams and the structure may occur.

Replace the oil filter cartridges.

Clean the air filter placed in the top of the oil tank filter cap.

Completely replace the hydraulic oil.

(*) The waste oil must be disposed of by authorized persons.

**POSSIBLE FAULTS**
F 70**POSSIBLE FAULTS**

Many years experience of our product has allowed us to identify and classify the most common faults which occur. In most cases it requires accurate hydraulic and electric troubleshooting and simple rectification. In the following table we report the most frequent inconveniences and our suggested remedies.

- (1) Checking and adjustment of oil pressures of valve settings must be carried out by an authorized service agent, under penalty of warranty forfeiture.

Operations which can be carried out by the user.

Faults	Cause	Remedies
The crane does not rotate properly	<i>Vehicle non in level position</i>	Stabilize the vehicle
	<i>Lack of lubrication</i>	Grease the pushes
The extension booms do not completely extend or work jerkily	<i>Lack of lubrication of the guide shoes</i>	Grease the guide shoes
Crane controls are not active	<i>Lack of electric energy</i>	Check the fuse, the battery and electric circuit
	<i>Winch end stroke active</i>	See Chapter XII
	<i>The rotation limiting device is activated</i>	See Chapter IX
Vibrations in crane operations	<i>Shortage of oil</i>	Check the level and top up if necessary
	<i>Obstructed filters</i>	Clean or replace the filter cartridge
Noteable decrease in movement speed	<i>Obstructed filters</i>	Clean or replace the filter cartridge

Operations to be carried out by a service center.

Faults	Cause	Remedies
The crane does not lift the loads indicated on the capacity plate	<i>Non 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
	<i>Ram seals are not properly fitted</i>	Replace the seals
A boom of the crane does not hold up the load and visually lowers	<i>The safety check valve of the ram is open</i>	Replace the valve
	<i>Oil leaks inside the ram</i>	Defective seals, replace them
The crane does not rotate properly	<i>Valves controlling the rotation not adjusted</i>	Adjust the valves
	<i>Relief valves of the distributor not adjusted</i>	Adjust the valves
	<i>Wear of the seals of the rotation cylinder</i>	Replace the seals
The extension booms do not completely extend or work jerkily	<i>Wear of guide shoes</i>	Check the guide shoes wear, replace if necessary
Vibrations in crane operations	<i>Non efficient pump</i>	Check the pump
Noteable decrease in movement speed	<i>Non efficient pump</i>	Check the pump

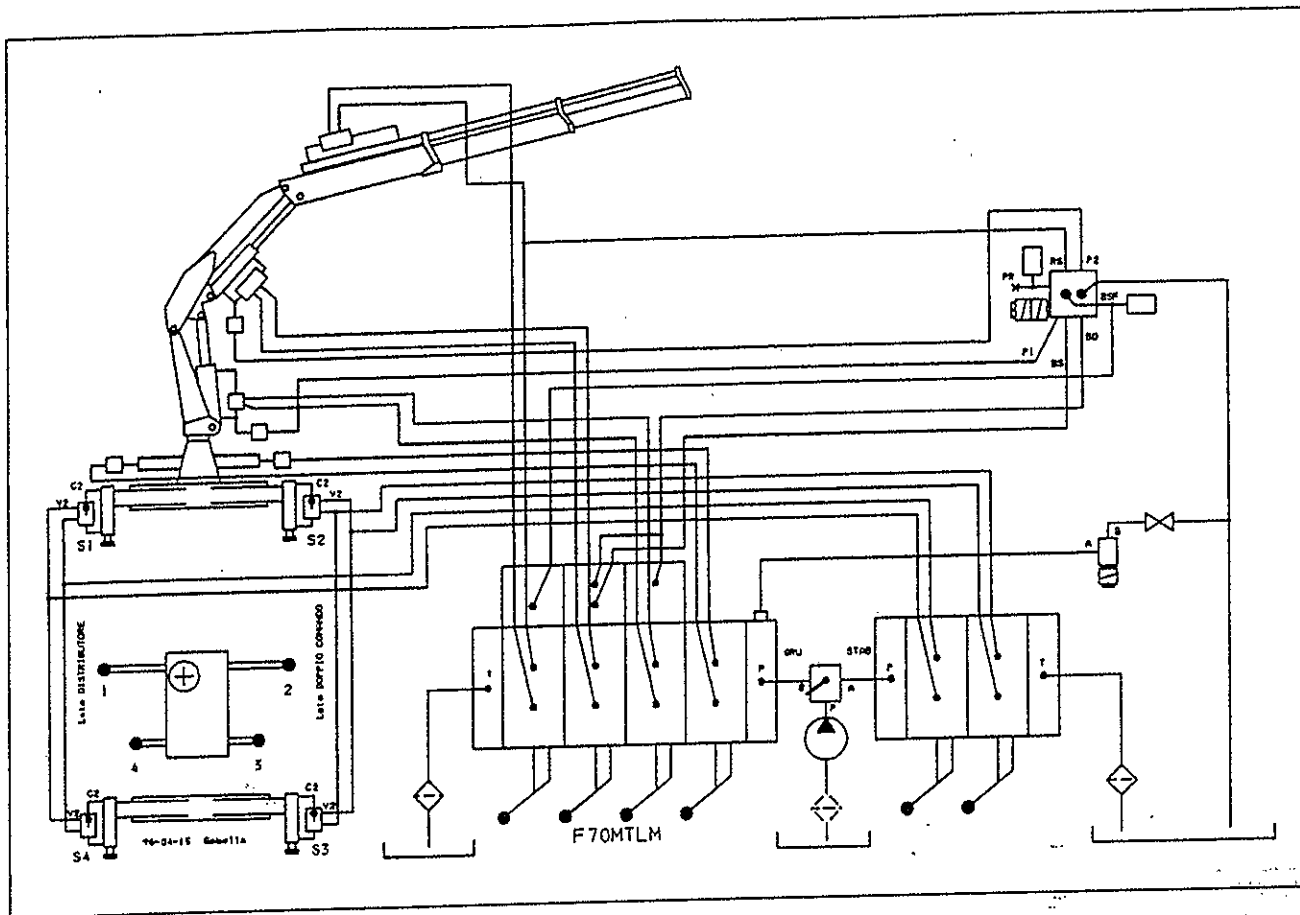




HYDRAULIC AND ELECTRIC SCHEMATICS

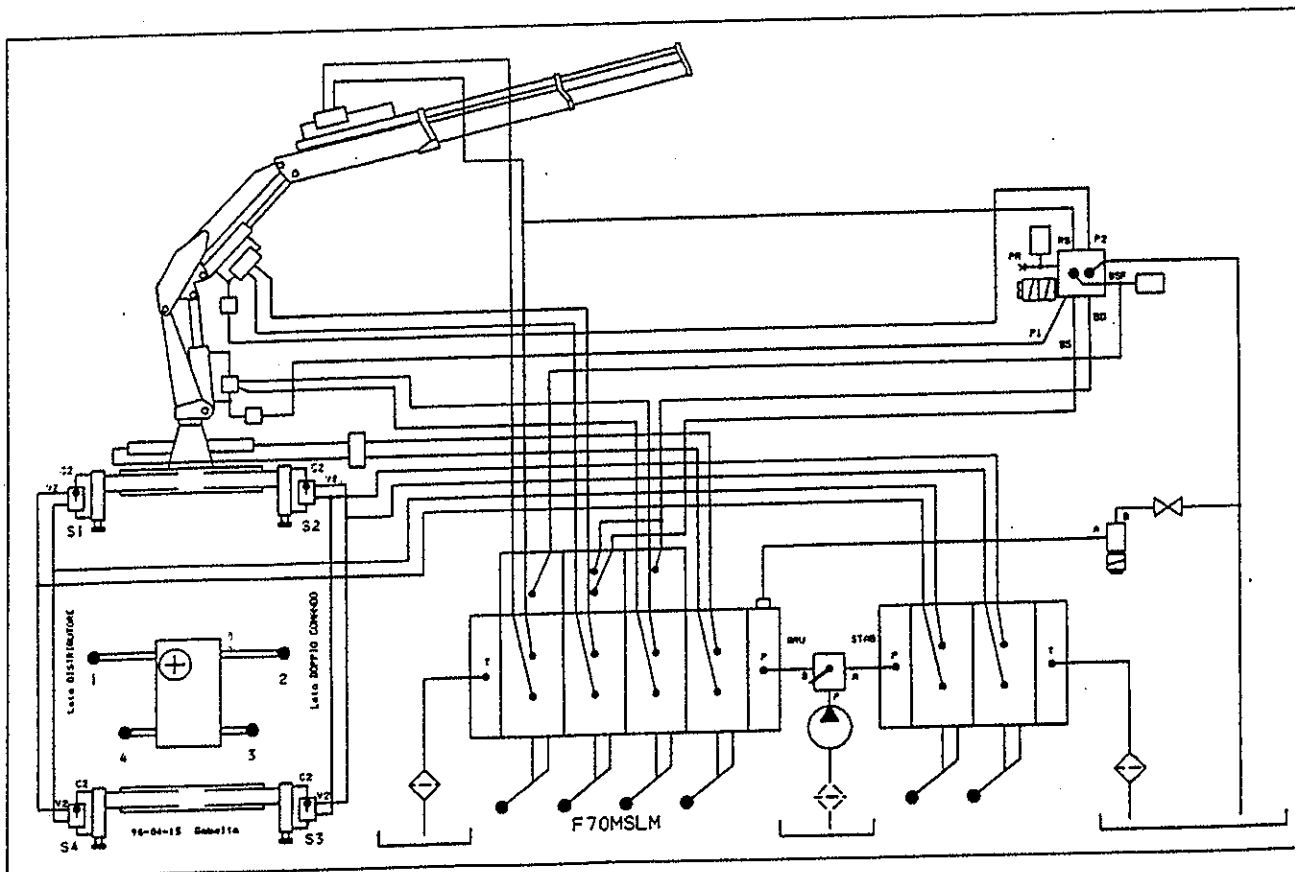
HYDRAULIC AND
ELECTRIC SCHEMATICS
F 70

c XIV



Ground control schematics - Crane with lifting moment limiting device

fig. 58



Top seat control schematics - Crane with lifting moment limiting device

fig. 59





XIV HYDRAULIC AND ELECTRIC SCHEMATICS F70

Electric schematics for crane with lifting moment limiting device, rotation limiting device and winch

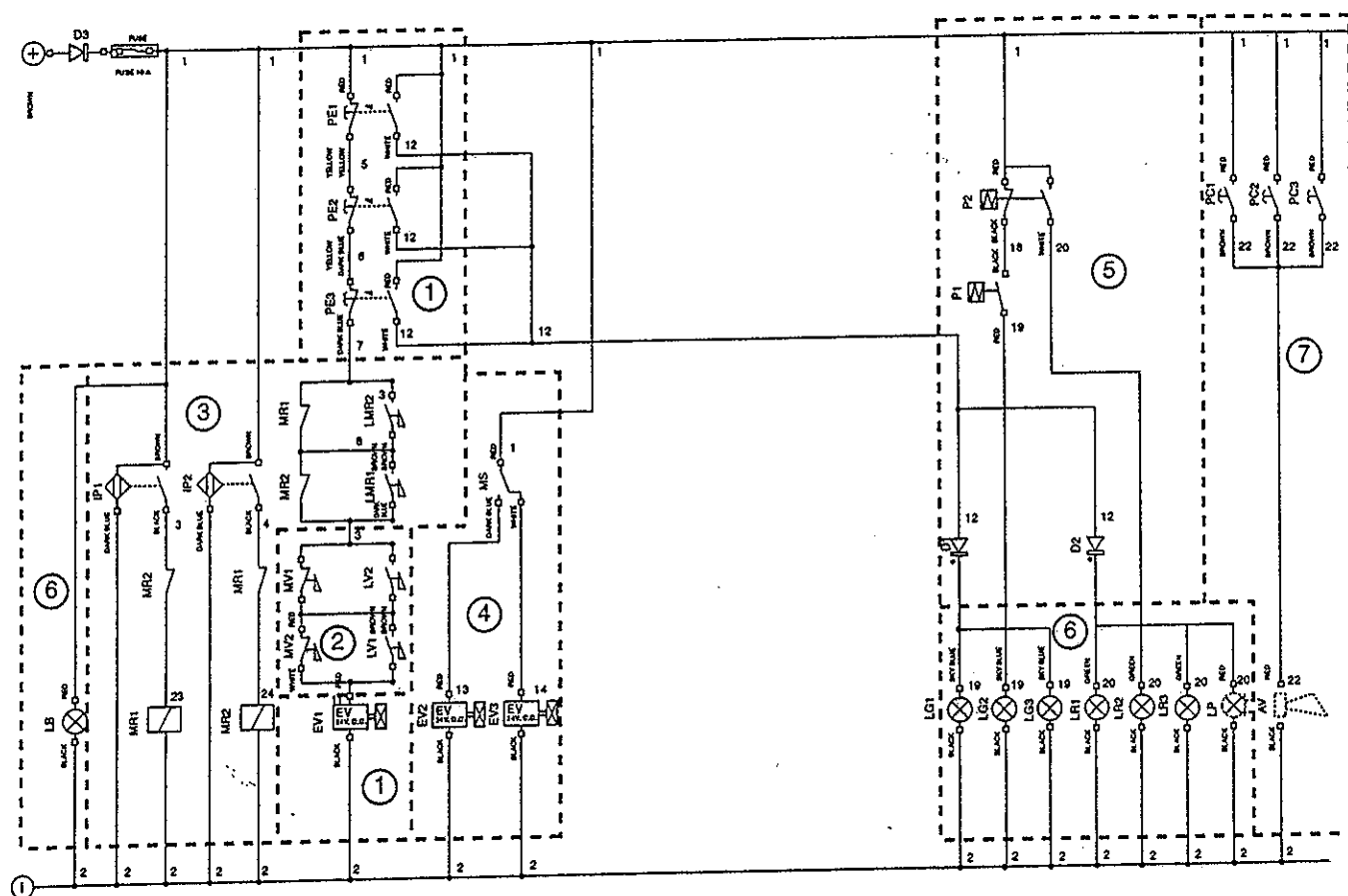


fig. 65

- 1) Emergency Group Activation
- 2) Winch Group Activation
- 3) Group Activation for blocked rotation
- 4) Lifting Moment Limiting Device Group Activation
- 5) Visual Alarms Group Activation
- 6) Visual Alarm Group
- 7) Acoustic Alarm Group Activation

CODE DESCRIPTION

AV	ACOUSTIC ALARM FOR ENERGY MAX. 0.5 A.	LV1	MICRO LEVER FOR CABLE WINDING REACTIVATION
D1-D2	LAMPS TEST DIODES	LV2	MICRO LEVER FOR CABLE UNWINDING REACTIVATION
D3	POLARITY PROTECTION DIODE	MR1	CLOCKWISE ROTATION RELAY
EV1	ELECTROVALVE FOR EMERGENCY CONTROL	MR2	ANTICLOCKWISE ROTATION RELAY
EV2	ELECTROVALVE FOR LIFTING BLOCK LIMITING DEVICE	MS	SLOPE SENSORS ON OUTER BOOM
EV3	ELECTROVALVE FOR DESCENTS BLOCK LIMITING DEVICE	MV1	PULLEY MICRO WINCH
FUSE	PROTECTION FUSE MAX 10 A.	MV2	DRUM MICRO WINCH
LB	WHITE WARNING LIGHT	P1	90% LOAD PRESSURE DETECTOR
LG 1	YELLOW WARNING LIGHT FOR CONTROL PANEL 90% LOAD REACHING	P2	BLOCK PRESSURE DETECTOR
LG2	YELLOW WARNING LIGHT FOR DOUBLE CONTROL SATELLITE 90% LOAD REACHING	PC1	ACOUSTIC WARNING BUTTON FOR CONTROL PANEL
LG 3	YELLOW WARNING LIGHT FOR TOP SEAT SATELLITE 90% LOAD REACHING	PC2	ACOUSTIC WARNING BUTTON FOR DOUBLE CONTROL SATELLITE
LP	ENERGY WINKING LIGHT MAX. 0.5 A.	PC3	ACOUSTIC WARNING BUTTON FOR TOP SEAT SATELLITE
LR1	RED WARNING LIGHT FOR CONTROL PANEL BLOCK	PE1	CONTROL PANEL EMERGENCY BUTTON
LR2	RED WARNING LIGHT FOR DOUBLE CONTROL SATELLITE BLOCK	PE2	DOUBLE CONTROL SATELLITE EMERGENCY BUTTON
LR3	RED WARNING LIGHT FOR TOP SEAT SATELLITE BLOCK	PE3	TOP SEAT SATELLITE EMERGENCY BUTTON
		SAT1	DOUBLE CONTROL SATELLITE
		SAT2	TOP SEAT SATELLITE



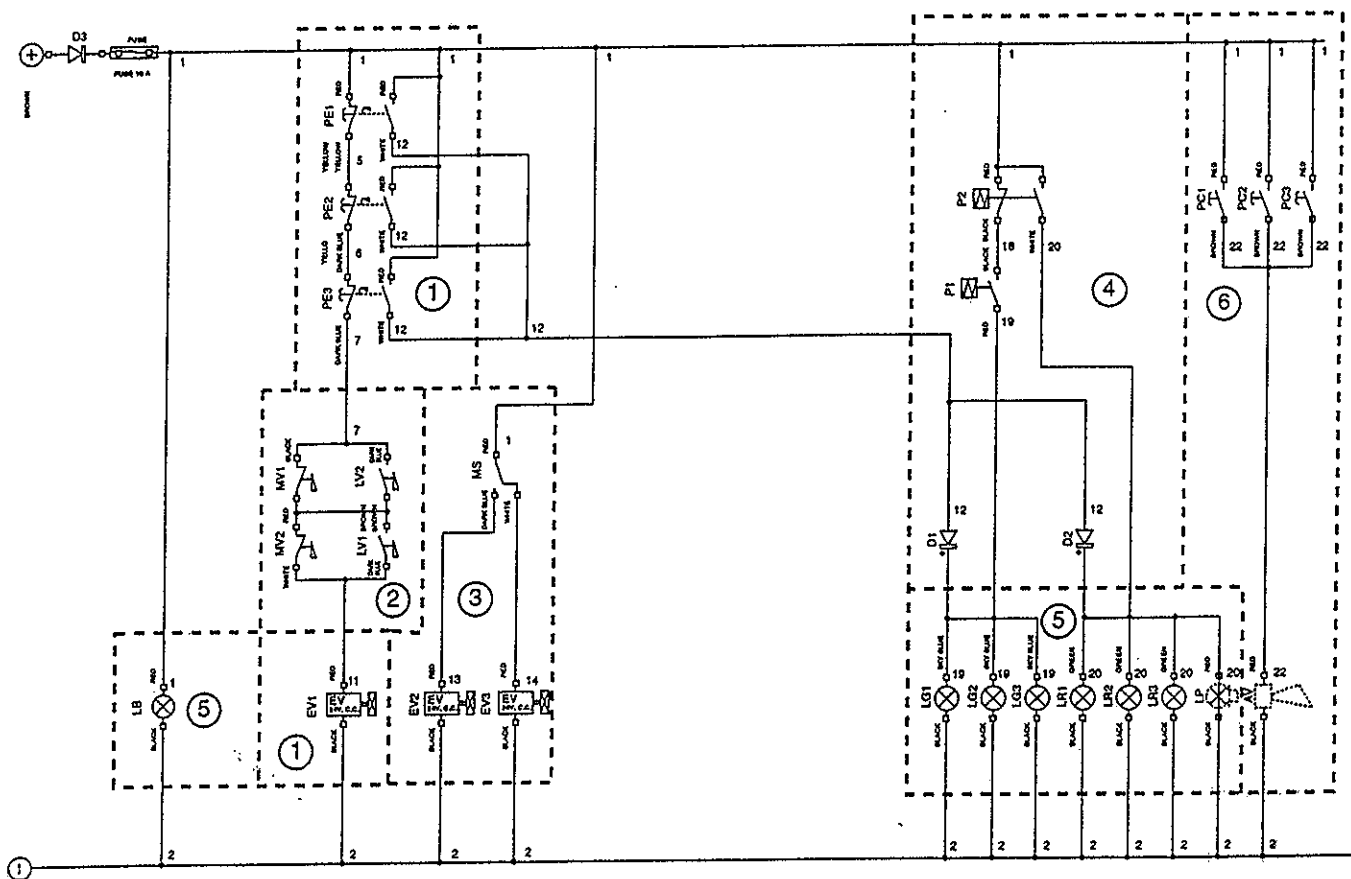
XIV

HYDRAULIC AND
ELECTRIC SCHEMATICS

F70



Electric schematics for crane with lifting moment limiting device and winch



- | | |
|--|------------------------------------|
| 1) Emergency Group Activation | 4) Visual Alarms Group Activation |
| 2) Winch Group Activation | 5) Visual Alarm Group |
| 3) Lifting Moment Limiting Device Group Activation | 6) Acoustic Alarm Group Activation |

fig. 64

CODE DESCRIPTION

AV	ACOUSTIC ALARM FOR ENERGY MAX. 0.5 A.	LR3	RED WARNING LIGHT FOR TOP SEAT SATELLITE BLOCK
D1-D2	LAMPS TEST DIODES	LV1	MICRO LEVER FOR CABLE WINDING REACTIVATION
D3	POLARITY PROTECTION DIODE	LV2	MICRO LEVER FOR CABLE UNWINDING REACTIVATION
EV1	ELECTROVALVE FOR EMERGENCY CONTROL	MS	SLOPE SENSORS ON OUTER BOOM
EV2	ELECTROVALVE FOR LIFTING BLOCK LIMITING DEVICE	MV1	PULLEY MICRO WINCH
EV3	ELECTROVALVE FOR DESCENTS BLOCK LIMITING DEVICE	MV2	DRUM MICRO WINCH
FUSE	PROTECTION FUSE MAX 10 A.	P1	30% LOAD PRESSURE DETECTOR
LB	WHITE WARNING LIGHT	P2	BLOCK PRESSURE DETECTOR
LG1	YELLOW WARNING LIGHT FOR CONTROL PANEL 90% LOAD REACHING	PC1	ACOUSTIC WARNING BUTTON FOR CONTROL PANEL
LG2	YELLOW WARNING LIGHT FOR DOUBLE CONTROL SATELLITE 90% LOAD REACHING	PC2	ACOUSTIC WARNING BUTTON FOR DOUBLE CONTROL SATELLITE
LG3	YELLOW WARNING LIGHT FOR TOP SEAT SATELLITE 90% LOAD REACHING	PC3	ACOUSTIC WARNING BUTTON FOR TOP SEAT SATELLITE
LP	ENERGY WINKING LIGHT MAX. 0.5 A.	PE1	CONTROL PANEL EMERGENCY BUTTON
LR1	RED WARNING LIGHT FOR CONTROL PANEL BLOCK	PE2	DOUBLE CONTROL SATELLITE EMERGENCY BUTTON
LR2	RED WARNING LIGHT FOR DOUBLE CONTROL SATELLITE BLOCK	PE3	TOP SEAT SATELLITE EMERGENCY BUTTON
		SAT1	DOUBLE CONTROL SATELLITE
		SAT2	TOP SEAT SATELLITE





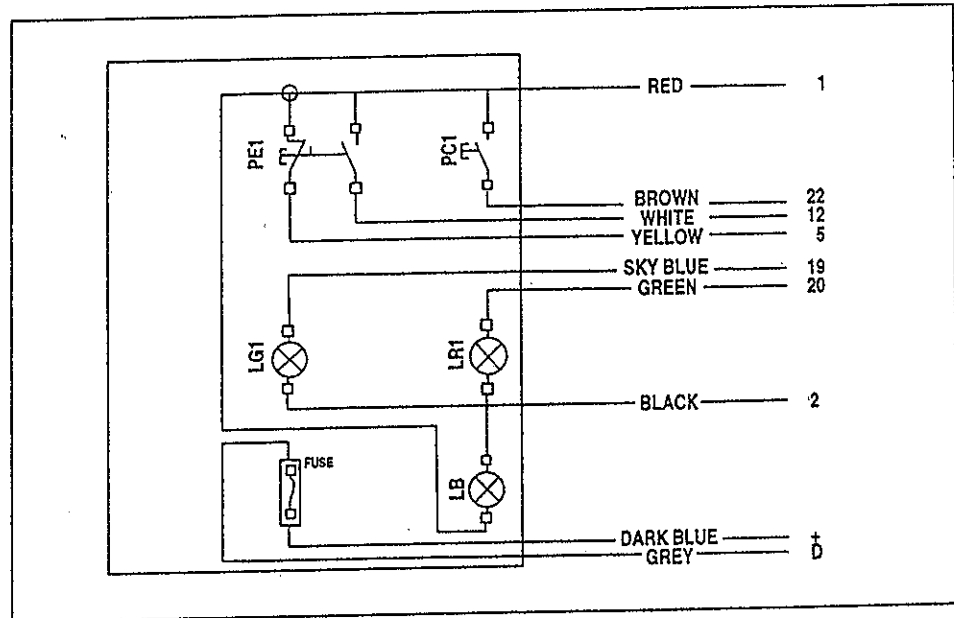
cXIV

HYDRAULIC AND
ELECTRIC SCHEMATICS
F 70

CONTROL PANELS

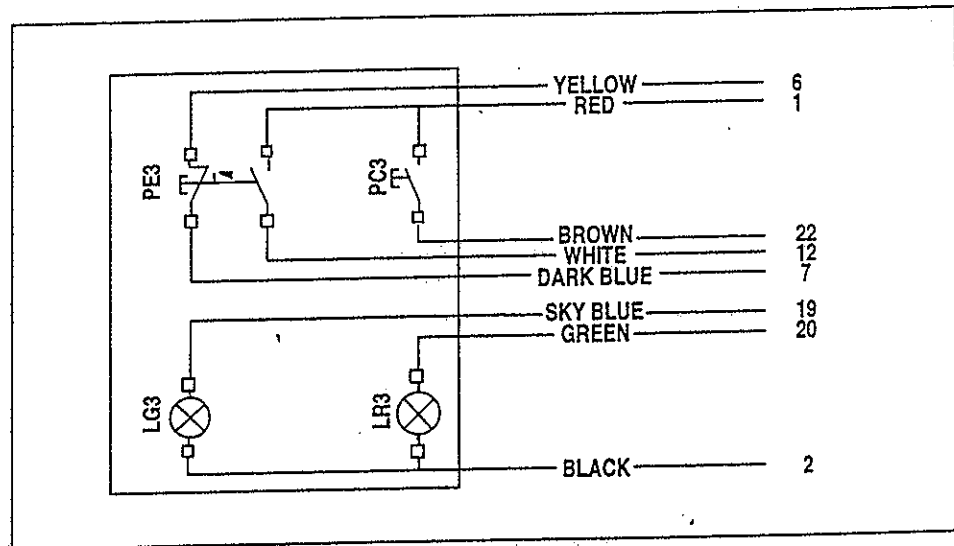
control panel cover

fig. 67



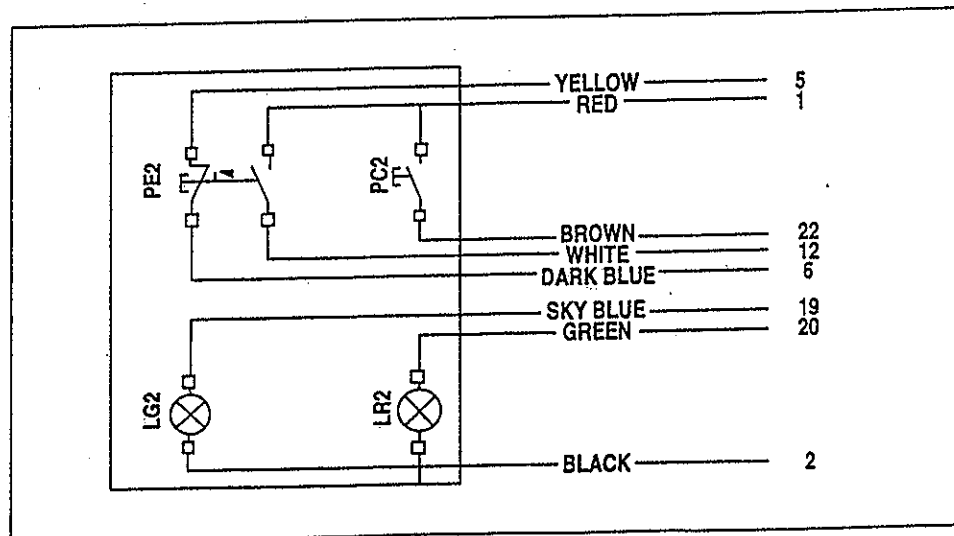
top seat satellite

fig. 68



double control satellite

fig. 69





Electric schematics for crane with lifting moment limiting device with two working zones

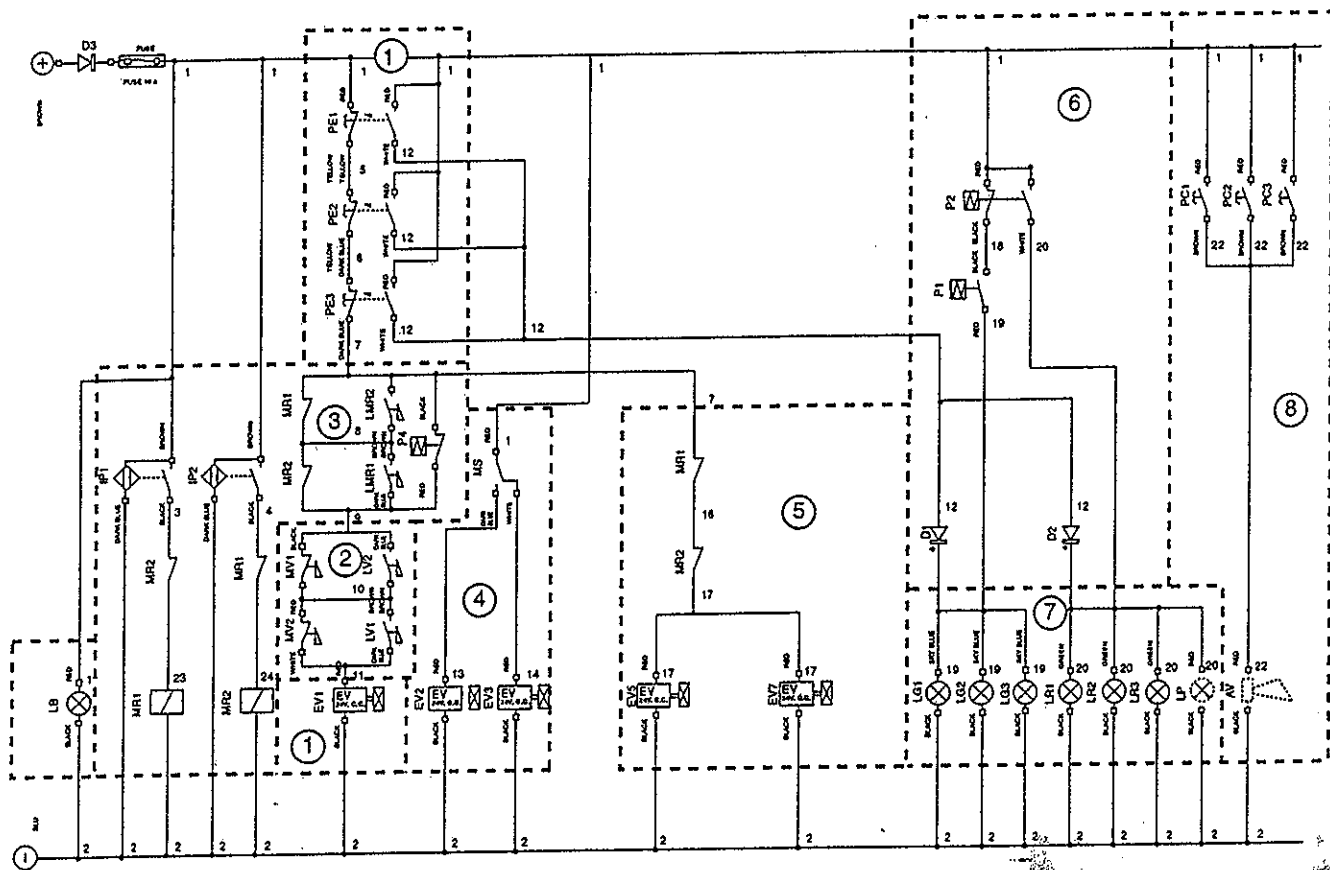


fig. 66

- | | | |
|--|--|------------------------------------|
| 1) Emergency Group Activation | 4) Lifting Moment Limiting Device Group Activation | 6) Visual Alarms Group Activation |
| 2) Winch Group Activation | 5) Limiting electrovalves Group | 7) Visual Alarm Group |
| 3) Group Activation for blocked rotation | | 8) Acoustic Alarm Group Activation |

CODE DESCRIPTION

AV	ACOUSTIC ALARM FOR ENERGY MAX. 0.5 A.	LR2	RED WARNING LIGHT FOR DOUBLE CONTROL SATELLITE BLOCK
D1-D2	LAMPS TEST DIODES	LR3	RED WARNING LIGHT FOR TOP SEAT SATELLITE BLOCK
D3	POLARITY PROTECTION DIODE	LV1	MICRO LEVER FOR CABLE WINDING REACTIVATION
EV1	ELECTROVALVE FOR EMERGENCY CONTROL	LV2	MICRO LEVER FOR CABLE UNWINDING REACTIVATION
EV2	ELECTROVALVE FOR LIFTING BLOCK LIMITING DEVICE	MR1	CLOCKWISE ROTATION RELAY
EV3	ELECTROVALVE FOR DESCENTS BLOCK LIMITING DEVICE	MR2	ANTICLOCKWISE ROTATION RELAY
EV5	ELECTROVALVE FOR LIFTING MOMENT LIMITING DEVICE ON CRANE	MS	SLOPE SENSORS ON OUTER BOOM
EV7	ELECTROVALVE FOR LIMITING OF PRESSION OF THE ANTERIOR SIDE	MV1	PULLEY MICRO WINCH
FUSE	PROTECTION FUSE MAX 10 A.	MV2	DRUM MICRO WINCH
IP1	TIME ROTATION PROXIMITY DEVICE	P1	90% LOAD PRESSURE DETECTOR
IP2	ANTICLOCKWISE ROTATION PROXIMITY DEVICE	P2	BLOCK PRESSURE DETECTOR
LB	WHITE WARNING LIGHT	P4	PRESSURE DETECTOR ROTATION CONSENT WITH DOUBLE LIFTING MOMENT LIMITING DEVICE
LG1	YELLOW WARNING LIGHT FOR CONTROL PANEL 90% LOAD REACHING	PC1	ACOUSTIC WARNING BUTTON FOR CONTROL PANEL
LG2	YELLOW WARNING LIGHT FOR DOUBLE CONTROL SATELLITE 90% LOAD REACHING	PC2	ACOUSTIC WARNING BUTTON FOR DOUBLE CONTROL SATELLITE
LG3	YELLOW WARNING LIGHT FOR TOP SEAT SATELLITE 90% LOAD REACHING	PC3	ACOUSTIC WARNING BUTTON FOR TOP SEAT SATELLITE
LMR1	TIME ROTATION MICRO RE-SETTING	PE1	CONTROL PANEL EMERGENCY BUTTON
LMR2	ANTICLOCKWISE ROTATION MICRO RE-SETTING	PE2	DOUBLE CONTROL SATELLITE EMERGENCY BUTTON
LP	ENERGY WINKING LIGHT MAX. 0.5 A	PE3	TOP SEAT SATELLITE EMERGENCY BUTTON
LR1	RED WARNING LIGHT FOR CONTROL PANEL BLOCK	SAT1	DOUBLE CONTROL SATELLITE
		SAT2	TOP SEAT SATELLITE



A

INSTRUCTION AND
WARNING PLATES
F 70

INSTRUCTION AND WARNING PLATES



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INSTRUCTIONS FOR SAFE USE OF THE CRANE

DE1771

- 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;
 - the load is correctly slung and hooked.
- 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.

DE 1685

Instruction plate and safety norms



- **ATTENZIONE:** PRIMA DI AZIONARE LA GRU E' OBBLIGATORIO METTERE IN OPERA GLI STABILIZZATORI E CHIUDERE I RUBINETTI DELLE VALVOLE DI BLOCCO.

- **WARNING:** BEFORE OPERATING THE CRANE IT IS COMPULSORY TO EXTEND THE OUTRIGGERS AND SHUT THE BLOCK VALVE TAPS.

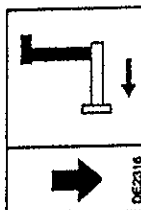
- **ATTENTION:** AVANT D'UTILISER LA GRUE IL EST OBLIGATOIRE DE METTRE EN FONCTION LES STABILISATEURS ET FERMER LES ROBINETS DES VALVES DE BLOCAGE.

- **ACHTUNG:** VOR INBETRIEBNAHME DES KRANS MUESSEN DIE ABSTUETZUNGEN AUSGEFAHREN UND DIE ABSPERRVENTILE GESCHLOSSEN WERDEN.

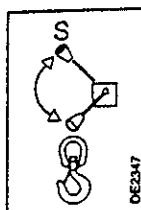
DE319

DE 319

Warning plate to stabilize the vehicle before using the crane



DE 2316



DE 2347

Instruction plates to stabilize
the vehicle





TABLE OF THE HYDRAULIC AND LUBRICANT CHARACTERISTICS

OIL AND LUBRICANT
CHARACTERISTICS **c XV**
F 70

HYDRAULIC OIL

External temperature:

$-30^{\circ}\text{C} \leq -10^{\circ}\text{C}$ $\leq -5^{\circ}\text{C}$ $> +35^{\circ}\text{C}$	up to $+35^{\circ}\text{C}$	Classification	ISO-L-HM
		Grade	ISO VG 46
		"	ISO VG 68
		"	ISO VG 100

GREASE

Consistency: NLGI EP 2 - EP 3

(!) WARNING (!)

Do not use greases with solid particles as "Bisulphide of Molybdenum".



A

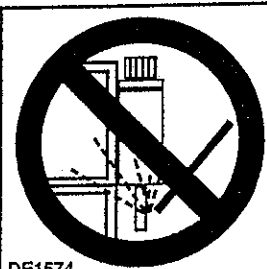
INSTRUCTION AND
WARNING PLATES
F 70



DE 1679
Do not walk on...



DE 1680
Do not use water to extinguish fire



DE1574

TIRANTI: NON SALDARE!
FIXING ROD: DO NOT WELD!
TIRANTS: NE PAS SOUDER!
ZUGSCHRAUBEN: NICHT SCHWEISSEN

DE 1574

Do not weld the fixing rods

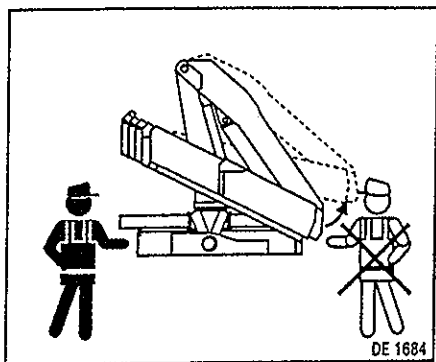


DE 815

GHISA: NON SALDARE!
CAST IRON: DO NOT WELD!
FONTE: NE PAS SOUDER!
GUSSEISEN: NICHT SCHWEISSEN!

DE 815

Do not weld the support column and the beam



DE 1684

Do not operate from the double control side to unfold or fold the crane



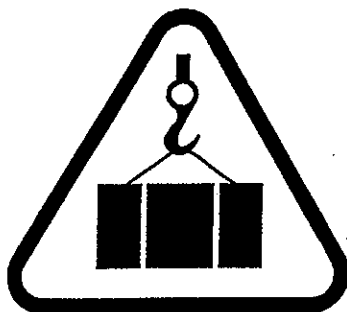
DE 1681

Greasing points with brush



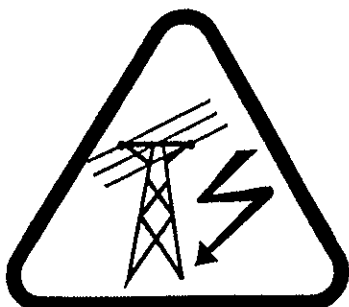
DE 1682

Greasing points at pressure



DE 1686

Do not walk or stop under a suspended load



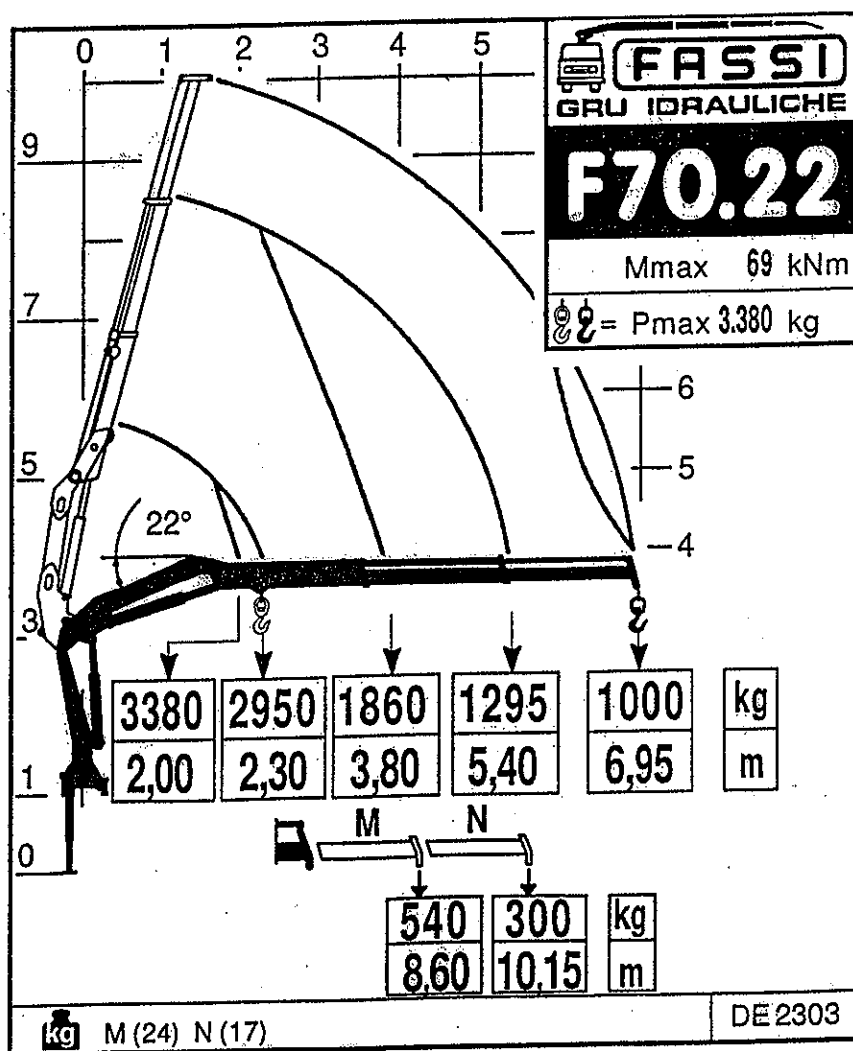
DE 1683

Do not operate in proximity of electric high-tension lines



B

CAPACITY PLATES
F 70.22



**CAPACITY PLATES**CAPACITY PLATES
F 70.22**B**

For cranes and manual extensions.

The represented plates refer to the nominal design capacities.

! WARNING !

If the capacities are downgraded or partially reduced (e.g. sector in front of vehicle cab) capacity plates must be applied in line with the final test figures.

