FASSI CRANE

CE

F 600/700XP.23

use and maintenance

FROM SERIAL NUMBER *0431*

INDEX

FASSI

F 600/700XP.23
use and maintenance

THANK YOU FOR SELECTING ONE OF FASSI CRANES.

This crane is the result of **FASSI** philosophy: ongoing research, rigorous testing, data verification, and analysis of performances.

Many years of experience has allowed us to grant you the maximum safety of operation together with the optimization of machine performances.

All this represents the core of **FASSI quality system**.

FASSI quality system is in conformity with UNI EN ISO 9001 - ISO 9001.

The fitment of the crane on the vehicle must be carried out in accordance with the instructions given by **FASSI** in the manual for hydraulic crane fitting and the relevant chassis manufacturers directives.

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.

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

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

The following instructions refer to mobile cranes in general and must be integrated with the manual for use supplied by the centre responsible for the crane fitting on truck, vehicle or other type of structure.

READ THIS MANUAL CAREFULLY prior to use or any maintenance. A few minutes spent now could save time and labour later.

Always conform to the safety norms and the instructions for use and maintenance contained in the present manual in order to guarantee a long life to the crane.

NOTE
The original version of the present manual is in italian.

B0 SAFETY NORMS

Strictly conform to the norms reported by the plates DE4236 (fig. 1) placed next to the controls, in order to avoid possible accidents while operating the crane.

Only authorized persons are allowed to operate the crane.

The crane must be used on firm, level ground.

Check that the vehicle hand brake is on and that the wheels are chocked.

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.

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.

Use the crane in accordance with the use and maintenance manual, making sure that:
- the load and radius 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.

When using implements protect the crane working area with a barrier.

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

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

FASSI GRU IDRAULICHE

FASSI GRU IDRAULICHE SpA
24021 ALBINO (BG) ITALIA - Via dei Carmelitani, 2
Tel. + 39 35 77.64.00 - Fax + 39 35 75.50.20

INSTRUCTIONS FOR SAFE USE OF THE CRANE

DE4236

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.

6 Use the crane in accordance with the use and maintenance manual, making sure that:
- the load and radius 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.

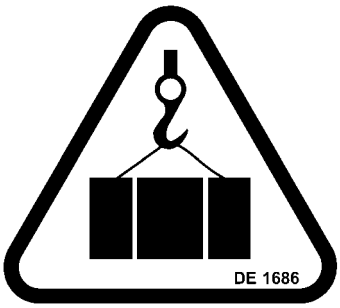
7 When using implements protect the working area with a barrier.

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.

C0 WARNING AND INSTRUCTIONS

The use of the crane is reserved to authorized personnel, instructed in advance, who has to conform to the safety norms and instructions contained in the use manual supplied with the crane. (See norms ISO 9926-1)

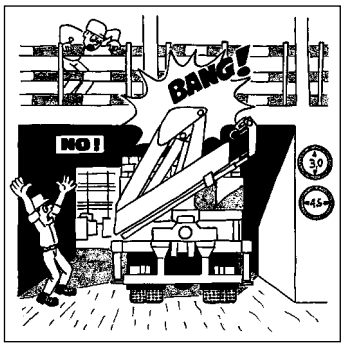


It is absolutely prohibited to walk or stop under a suspended load

It is prohibited for unauthorized persons to be within the working area.

Under no circumstances interfere with the safety and protection devices.

Warning plates, as well as instruction and operation plates must be replaced when no longer readable or missing. See Paragraph R0 Instruction and warning plates.



Do not use the outriggers to raise the vehicle.

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.

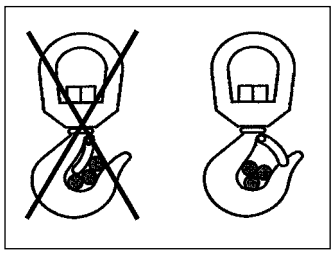
C0.1 Before operating

(!) ATTENTION (!)

Check that protections are in their place and that all safety devices are fitted and active. (See norms ISO 9927-1)

Keep the ladder and the control station on the top seat, clean; the seat can tilt forward.

Make sure that control stations are properly lit so as to ensure safety while operating and allow instruction plates to be visible.

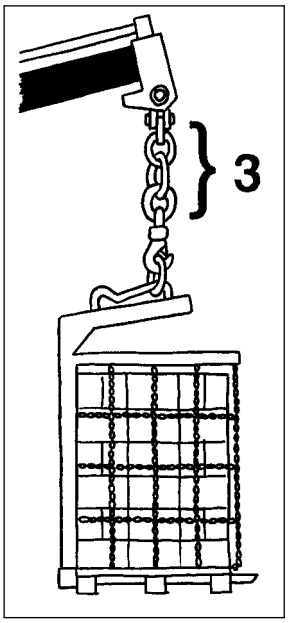


Check that the working area is adequate and properly lighted for your crane.

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.

Carefully inspect the condition of ropes or chains.



Make sure that the pallet fork is connected to the crane hook by means of a chain having at least **three (3)** rings.

C0.2 During operation

Take the vehicle fumes away from the working area by fitting an extension tube of a suitable diameter to the exhaust system.
Do not run the engine in a indoor area without first making sure there is adequate ventilation.

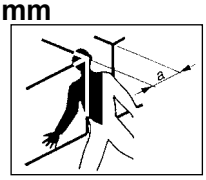
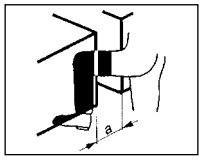
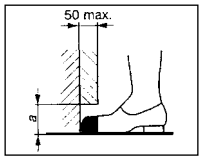
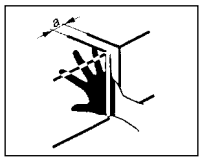
When using the ladder to reach the control station on the top seat, avoid knocking into the controls while going up or down the ladder.
The control station on the top seat is provided with side safety guards; stay within these guards.

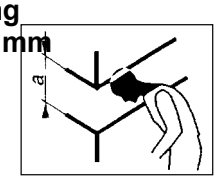
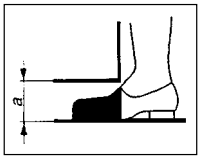
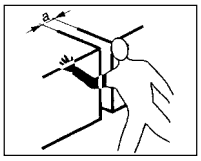
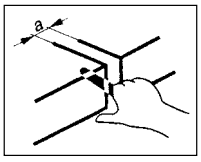
Make sure that no one is within the working area of the crane.

Avoid swinging the load above working and transit areas; any hidden danger situation must be audibly alarmed.

Avoid all those situations which may result in crushing during vehicle stabilization, crane movement and load handling.

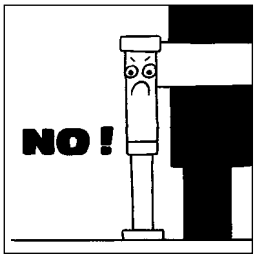
(In conformity with EN 349 standard the minimum safe working distances to avoid crushing parts of the body)

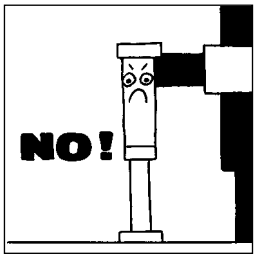
Parts of the Body	Minimum safe working distance mm	Figure
Body	500	
Leg	180	
Toes	50	
Hand Wrist Fist	100	

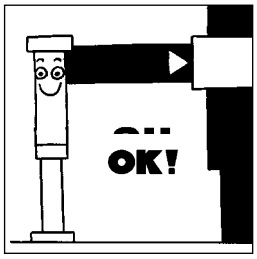
Parts of the Body	Minimum safe working distance mm	Figure
Head	300	
Foot	120	
Arm	120	
Finger	25	

The table indicates the minimum safety working distances concerning the various parts of the body.
The figures illustrate circumstances which may turn out to be dangerous if you fail to respect the minimum safe distances and if it is impossible to introduce larger parts of the body.

(!) ATTENTION (!)
Failure to respect the minimum safe distances may result in a safety hazard and a deadly risk.

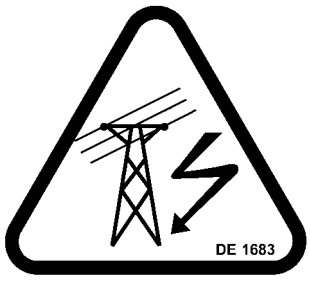






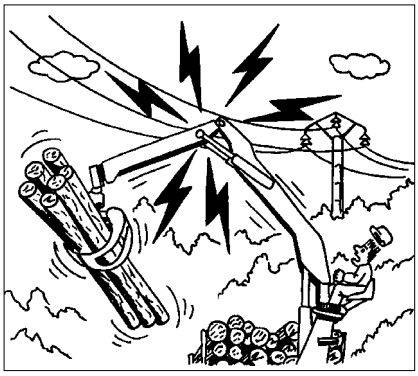
Remember that the stability of the unit (crane-vehicle) is only guaranteed by the complete lateral extension of the outriggers and by the observance of the capacity plates.

Stabilize the vehicle on a horizontal plane with a maximum tolerance of 1,5 degrees. Make sure that the outrigger rams rest on a solid base, if necessary use larger outrigger base plates (available on request) to avoid sinking. If you adopt other means, make sure that they are suitably sized for the load they must bear.



(!) ATTENTION (!)
Respect the distances di sicurezza from electric lines; the minimum distance is, according to CEN norms, five (5) meters, except for otherwise prescribed by national norms.

(!) ATTENTION (!)
Failure to respect the minimum safe distances may result in electrical hazards for the operator and his assistants.



(!) ATTENTION (!)
Do not utilize the crane with wind speed exceeding 12,5 m\s (value 6 of the Beaufort scale).

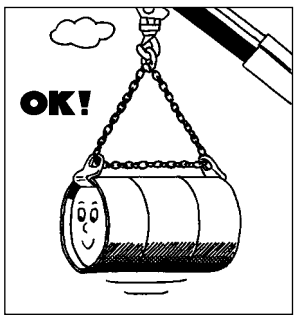
Indications about wind speed

Force of the wind Beaufort scale	Wind speed m/s	Classification	Characteristics
0	0,0 - 0,2	Calm	Calm wind, smoke goes up quite vertically
1 2	0,3 - 1,5 1,6 - 3,3	Light breeze	Smoke reveals the direction of the wind, one can feel the wind blowing, leaves start fluttering.
3 4	3,4 - 5,4 5,5 - 7,9	Moderate breeze	Leaves and branches are in constant motion, small branches start fluttering. Dust and papers dance on the ground.
5	8,0 - 10,7	Fresh breeze	Small green branches bend, the surface of waterways and lakes are wavy.
6	**10,8 - 13,8**	**Near gale**	**Big branches bend, wind whistles through high-tension cables, it's difficult to walk keeping the umbrella open.**
7	13,9 - 17,1	Moderate gale	Trees sway, it's hard to walk.
8	17,2 - 20,7	Storm wind	Branches get broken, it's hard to walk.
9	20,8 - 24,4	Storm	It damages houses (antennas and roof tiles fall down)

(!) ATTENTION (!)
Carefully inspect the load rigging.

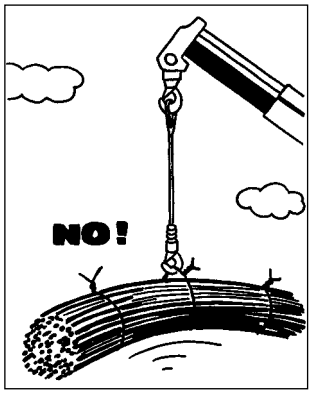
Hook up the load, checking that it does not exceed the capacity indicated on the lifting diagram specific to each load configuration.

Make sure that the lifted load is balanced.



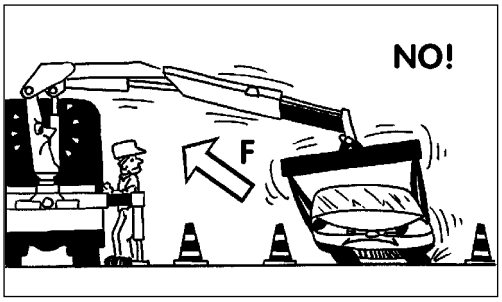
Avoid swinging the load above the control station; in cases where the load is too close, the crane must be operated from the opposite side.

When operating through a winch, lift the load vertically using the cable and not the booms in order to avoid swinging the load.



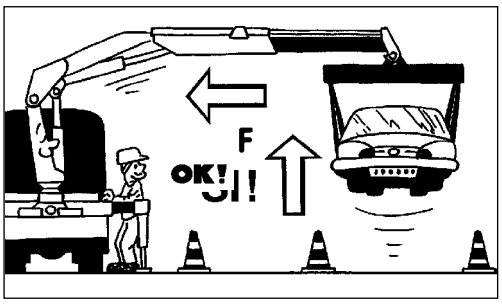
FASSI

Do not rotate the crane before the load is lifted.



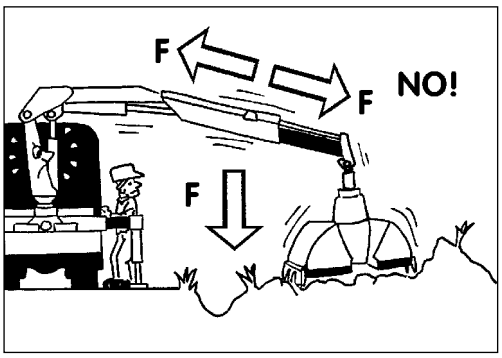
Do not operate with sudden movements, activate the controls with slow and progressive movements; rotate slowly and with care paying attention to the stability of the vehicle.

With vertical lift, on hydraulic and mechanical extension, rotate slowly in order to avoid side-skidding.



(!) ATTENTION (!)
Do not utilize the crane for pushpull (F), lateral (F) or sideways (F) operations.

(!) ATTENTION (!)
Crushing (F) or push (F) manoeuvres are not permitted.



(!) Never operate the outriggers when the crane is loaded.

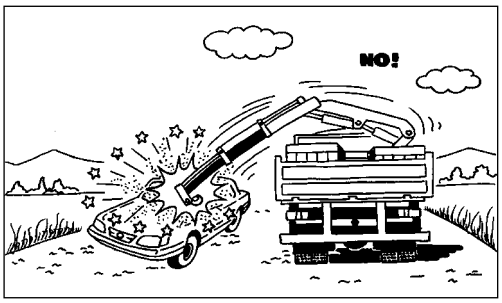
(!) ATTENTION (!)
The vehicle\crane must not be left unless the load is on the ground, the booms of the crane (and of the hydraulic jib), are folded and laid on a solid base and the power take-off is disengaged.

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

C0.3 At the end of the operation (Prior to driving the vehicle)

Fold the crane.

If the booms of the crane of the crane (or of the hydraulic jib) are to be laid on the body or on the load, they must be suitably blocked to prevent possible sideways movements.



Make sure that the indications about the overall dimensions are respected.

NOTE
Implements can be left mounted on the booms of the crane (or of the hydraulic jib) only if the overall dimensions are respected; they must be suitably blocked to prevent possible sideways movements.

Make sure that the outrigger supports and rams are re-entered within the overall width of the truck and locked by the safety devices.

Disengage the power take off.

D0 CLASSIFICATION OF THE CRANE MODEL

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

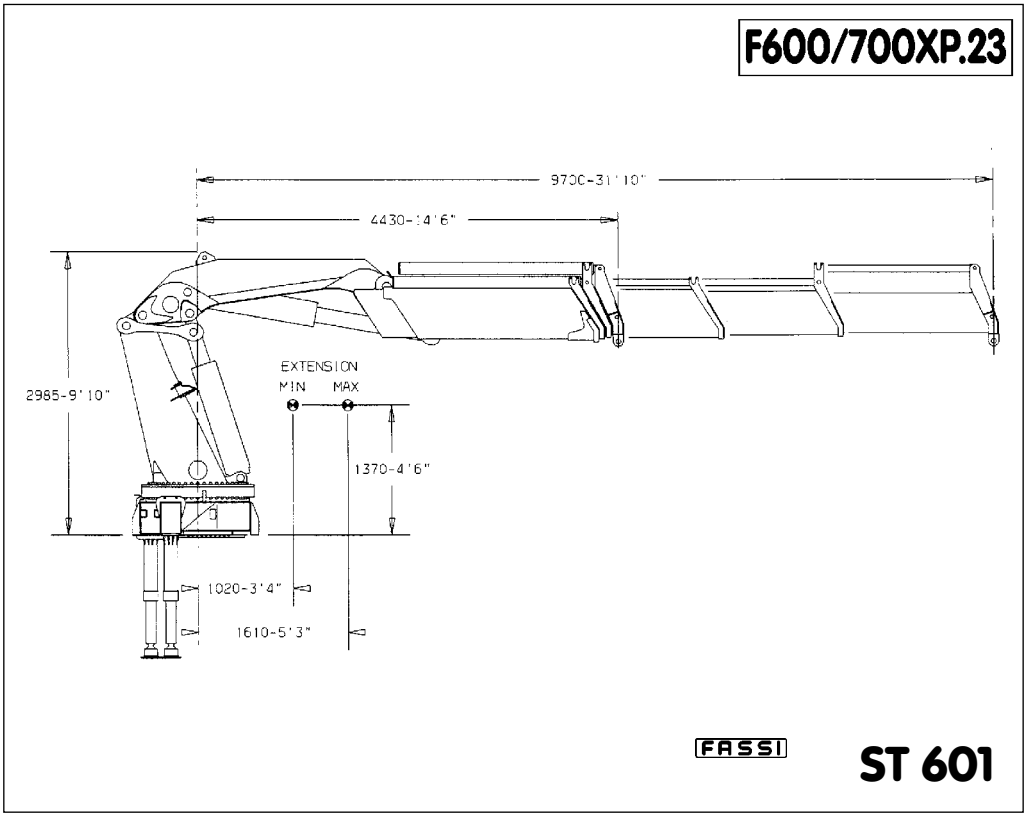
The crane can operate, intermittently, with lifting devices other than the hook.

The dimensions and the capacity of the implements must be proportioned with crane performances.

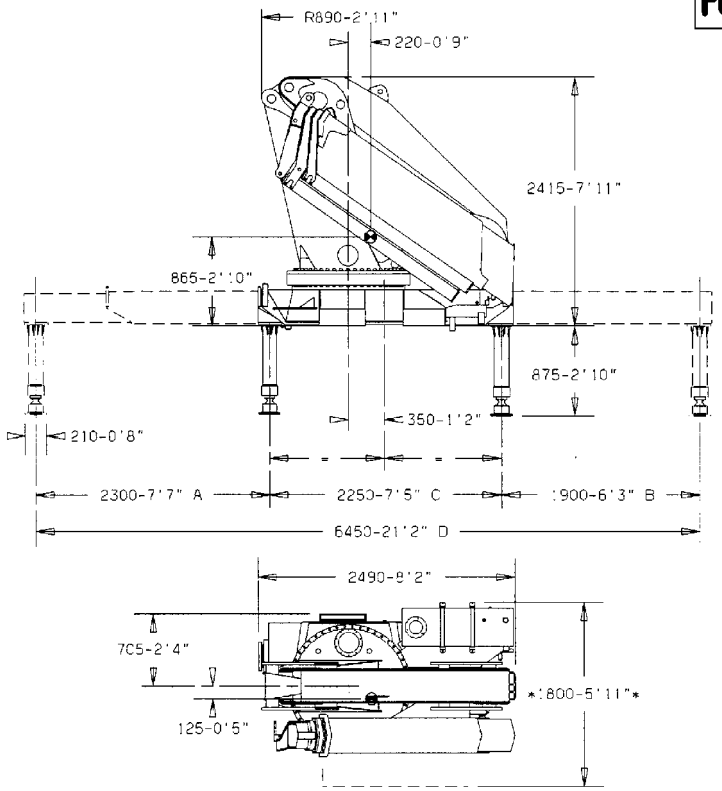
D0.1 Technical data

F 600/700XP.23

Lifting capacity	Standard reach	Hydraulic extension	Rotation arc	Rotation torque	Working pressure	Pump capacity	Oil tank capacity	Crane weight	Max. working pressure on the outrigger (Φ 200)
61,1 tm 599 kNm	**9,70 m**	**5,30 m**	**360°**	**4,89 tm 48 kNm**	**32,5 MPa**	**12/70 l/min**	**250 l**	**5700 kg**	**56 daN\cm²**



F600/700XP.23

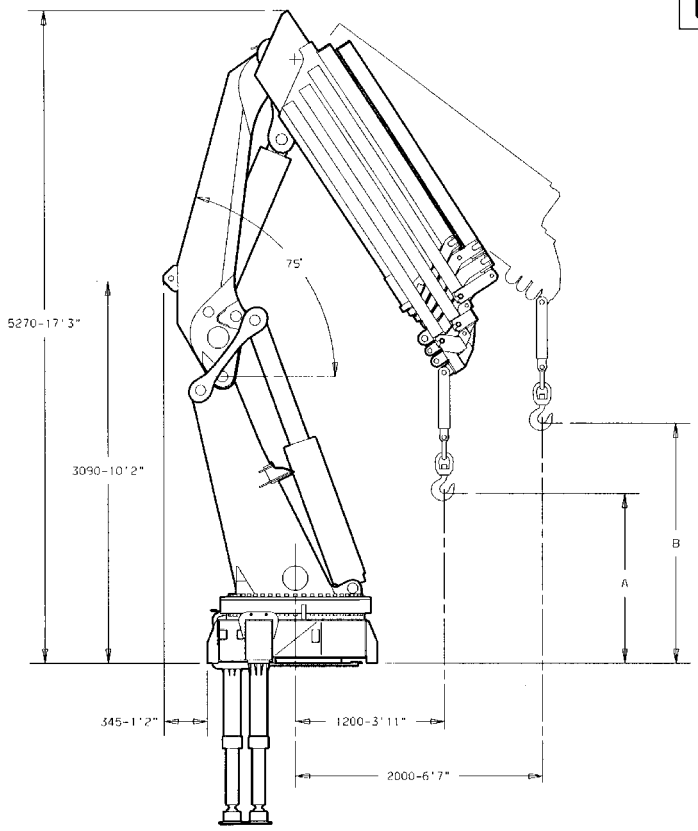


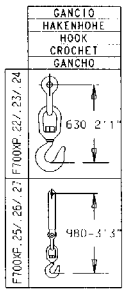
EXTRA		
A	2950	9' 8"
B	2600	8' 6"
C	2250	7' 5"
D	7800	25' 7"

— MEZZERIA TIRANTI
— FIXING ROD CENTER DISTANCE
— LIGNE MEDIANE TIRANTS
— ABMESSUNG DER BEFESTIGUNGSBRIDEN
M39 x 3

FASSI **ST 601**

F600/700XP





	A		B	
F600/700XP.22	2225	7'4"	3005	9'10"
F600/700XP.23	2150	7'1"	2885	9'6"
F600/700XP.24	2075	6'10"	2770	9'1"
F600/700XP.25	1600	5'3"	2250	7'5"
F600/700XP.26	1490	4'11"	2095	6'10"
F600/700XP.27	1370	4'6"	1940	6'4"

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

FASSI **ST 601**

D1 IDENTIFICATION OF THE CRANE MODEL

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

D1.1 Crane mark

The CE indicates that the crane complies with the Machines Directive (D.M.) 98/37; it can be considered effective only with a written declaration of conformity enclosed. The crane affixed with the CE mark is supplied with a lifting moment limiting device to preserve the crane structure from over-loads.

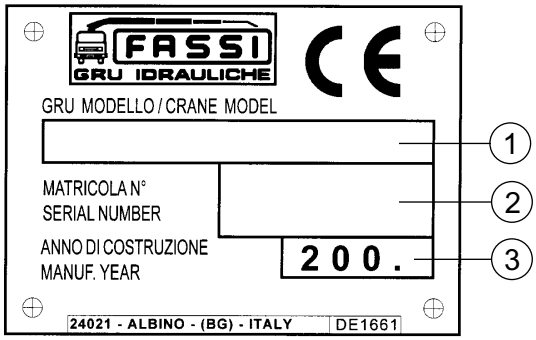


fig. 2

Identification data are marked on the plate DE1661 used for the CE mark (fig. 2) and fixed on the base

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

The crane must not be put into service within the European Community unless the machine on which it is mounted also conforms with the prescribed Directive. Ever change of use, modification or addition of accessories, not specified by this manual must be affixed with a new CE mark in accordance with the Machinery Directive.

A further metallic plate (fig. 3) 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

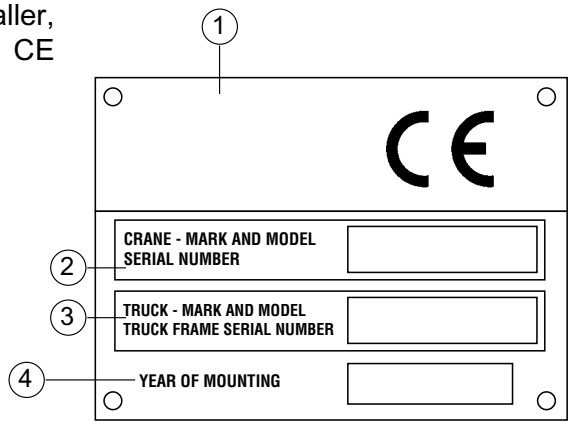


fig. 3

(!) UNDER NO CIRCUMSTANCES SHOULD THE DATA MARKED ON THE PLATES BE ALTERED.

E0 CRANE NOMENCLATURE

E0.1 Controls for crane and outriggers through push-button panel of the radio remote control. (fig. 4).

Pos.	Description
1.	Outrigger rams
2.	Outrigger supports
3.	Base
4.	Slew ring
5.	Rotation motoreducer
6.	Deviator crane - outriggers
7.	Dual control for deviator crane - outriggers
8.	Integrated group for outrigger controls
9.	Electric hydraulic distributor for crane
10.	Column
11.	Inner ram
12.	Inner boom
13.	Outer ram
14.	Outer boom
15.	Booms extension rams
16.	Extension boom sections
17.	Lifting hook
18.	Oil tank
19.	Manual extensions (optional)
20.	Heat exchanger
21.	Receive radio remote control
22.	Push-button panel (transmitting-console of the radio remote control)

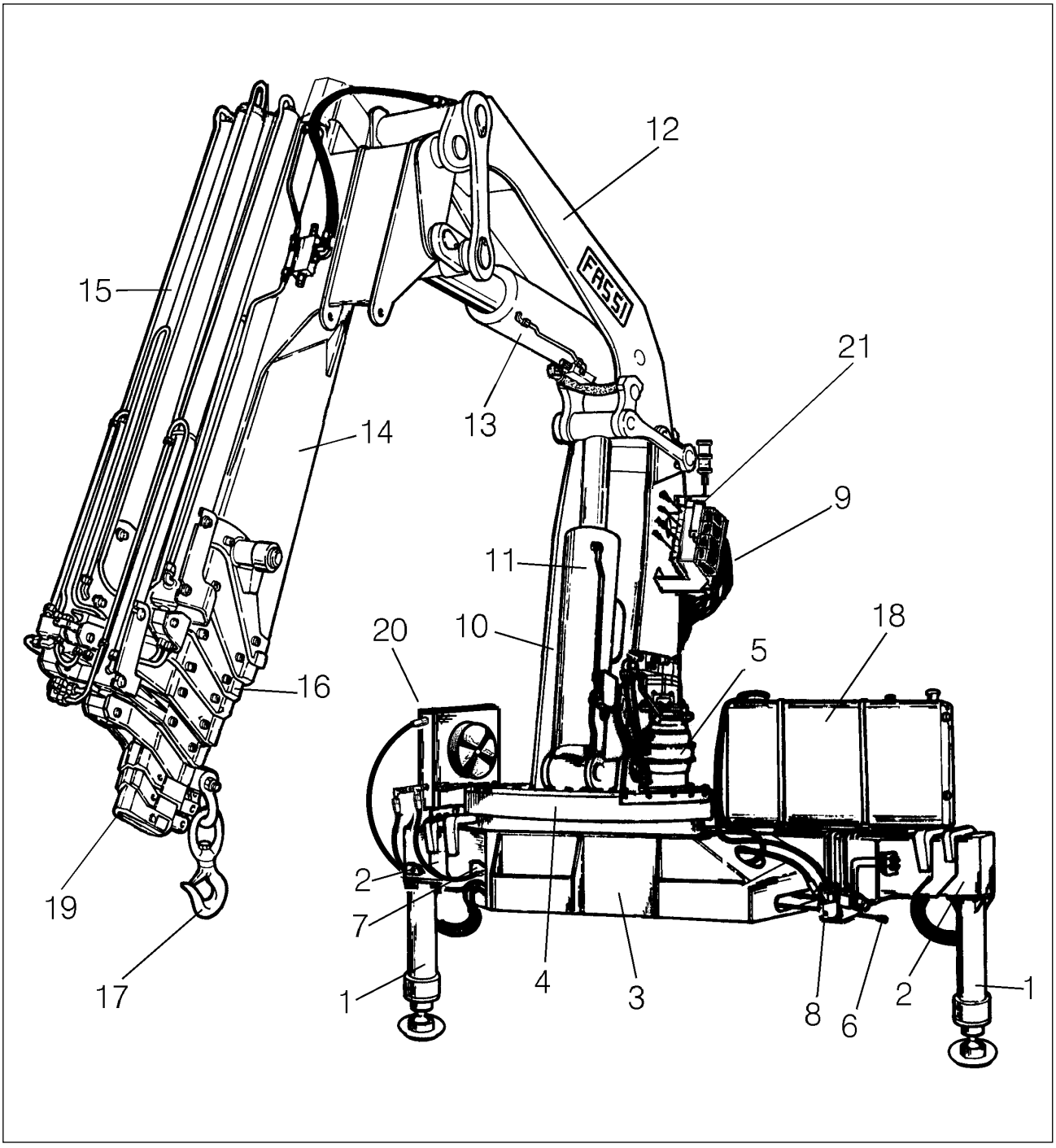


fig. 4

F0 NOMENCLATURE OF THE SAFETY AND PROTECTION DEVICES

F0.1 Controls for crane and outriggers through push-button panel of the radio remote control. (fig. 4).

Pos.	Description
1.	Check valves 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 panel
8.	Rotation limiting device
9.	Main pressure valve (outriggers)
10.	Main pressure valve (crane)
11.	Auxiliary valves (crane)
12.	Safety device for outrigger supports
13.	Hook safety device
14.	Exclusion tap lever
15.	Visual indicator yellow/red light

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 seal remove the Manufacturer and invalidate the warranty.

Use the ladder for the access to the top seat.

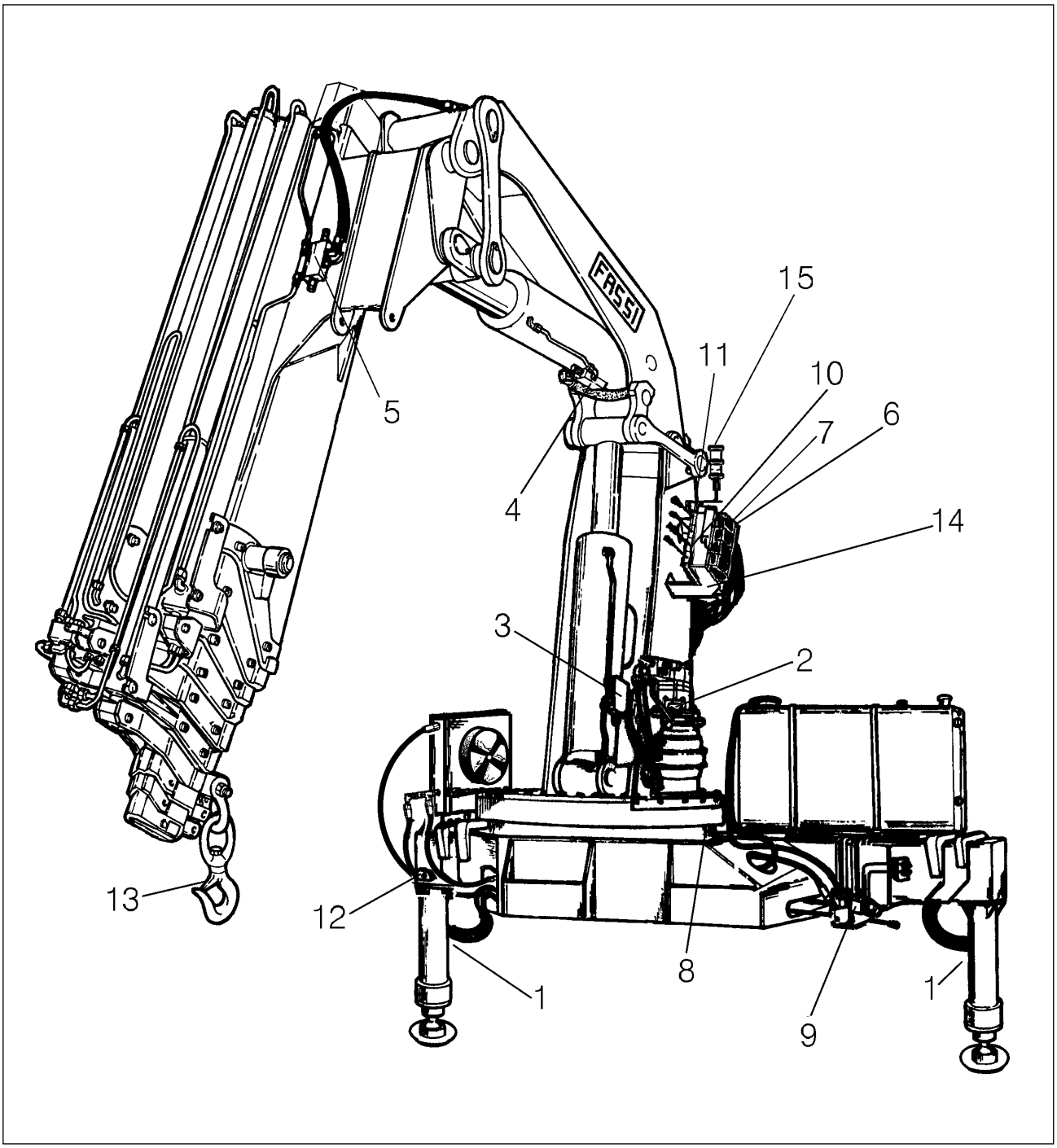


fig. 5

G0 SUPPLEMENTARY BEAMS

Supplementary beams are used in conjunction with the crane outriggers to ensure the vehicle stability during load handling.

Code	outrigger ram stroke mm	outrigger interaxis mm	extension type	Weight Kg
330B054	520	4984	Hydraulic-“H” variable	520
750B055	520	5770	Hydraulic-“H” variable	840
750B053	520	6870	Hydraulic-“H” variable	930
330B055	340	4984	Hydraulic-“H” variable	490
750B054	340	5770	Hydraulic-“H” variable	810
750B043	340	6870	Hydraulic-“H” variable	900

G0.1 Identification of the supplementary beams

Identification data of the supplementary beam is punched on the beam (fig. 6) in the following sequence:

Ex. ***330B054*0001**
- serial no.
- identification code

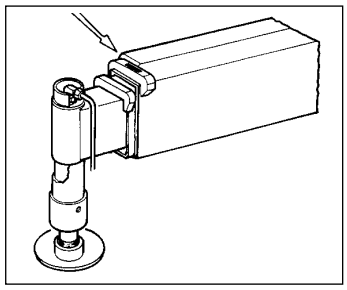


fig. 6

G1 TILTABLE OUTRIGGER RAMS

Outrigger rams are allowed to be stored in an inclined position, when obstructions on the vehicle chassis prevent their vertical stowability. These hinged supports are placed between the outrigger supports and the rams; the fixed part is screwed to the supports while the mobile part is screwed to the rams. (fig. 7-7a)

fig. 7

To place the rams in a working condition.
- Supporting the ram, remove the check pin and the locking pin from their positions.
- Position, carefully, the ram in working condition, insert the locking pin in its new position and secure it with the check pin.

To re-position the rams to the folded position.
- Remove the check pin and the locking pin.
- Position, the ram in a upward direction and supporting the ram, insert
- the locking pin in its new position and secure it with the check pin

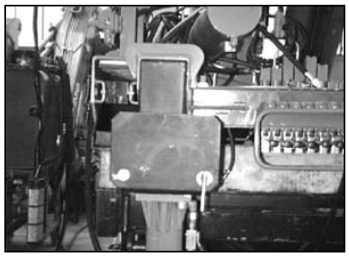


fig. 7a

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

G2 MANOEUVRES AND CONTROLS TO STABILIZE THE VEHICLE

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

(!) ATTENTION (!)

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

(!) ATTENTION (!)

The crane stability is maintained by the maximum extension of the outrigger supports, by the solidity of the base underneath the plates of the outrigger rams and by the observance of the capacity plates. To check the maximum working pressure see Paragraph D0.1 Technical data

Check that the outrigger rams are applied on a solid base; if necessary use larger outrigger base plates (available on request) to avoid sinking.

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.

Stabilize the crane so as to operate on a horizontal plane with a maximum tolerance of 1,5 degrees.

While loading, it may be necessary to vertically adjust the outrigger rams to prevent an overload on the outriggers, then stabilize again.

While unloading, the outrigger rams may not be perfectly in contact with the ground because of a rise in the suspension; it is therefore recommended to stabilize the vehicle during operation to avoid an overturn.

G2.1 Functions of control levers for stabilization

The controls to stabilize the vehicle are activated only from the push-button panel of the transmitting-console with the exception of the crane to outrigger diverter valve which is manual operated.

NOTE

The graphic symbols illustrated hereunder are marked on the plates affixed next to the control station.

See Paragraph R0 Instruction and warning plates.

Lever function D (fig. 8)

Lever **D** Control for deviator and deviator transmission crane-outriggers (- **E/S**).

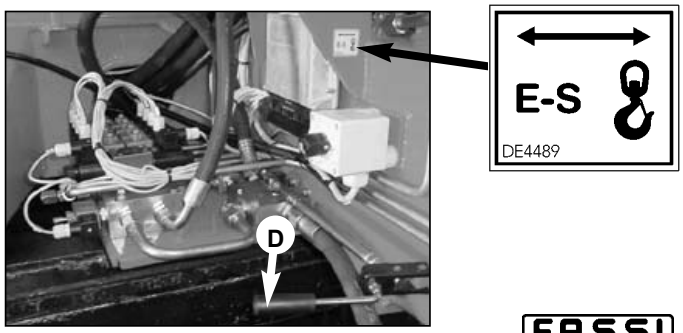


fig. 8

Functions of the controls on the push-button panel of the transmitting-console

LINEAR PUSH-BUTTON PANEL SCANRECO

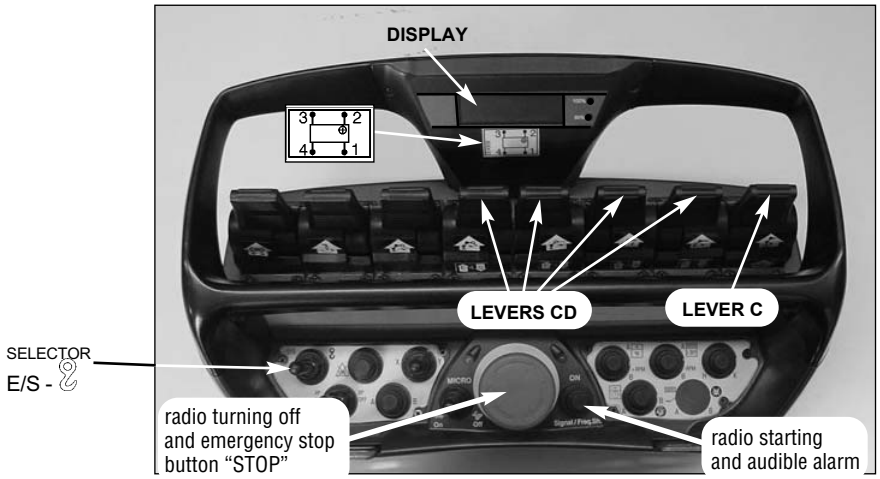


fig. 8a

The first 5 control levers on the push-button panel (beginning on the right) have two plates because they can control, through the selector (**E/S** -) 5 functions of the crane or the functions for stabilization. Hereunder are reported the plates which correspond to the stabilization functions.

LEVERS CD **LEVER C**

PUSH-BUTTON PANEL SCANRECO WITH JOY-STICK

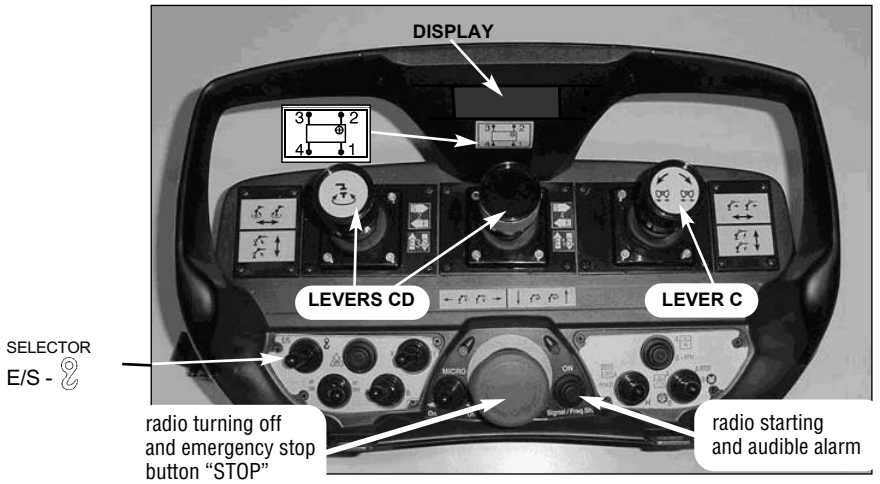
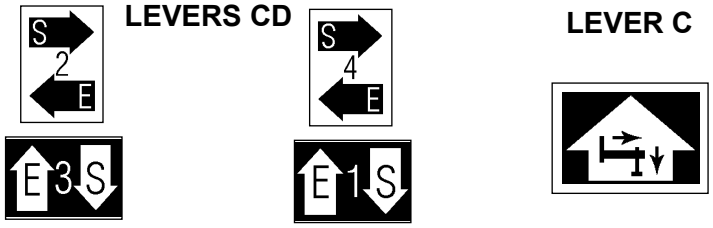


fig. 8b

The three control joy-sticks on the push-button panel have two plates because they can control, through the selector (**E/S** -) the functions of the crane or the functions for stabilization. Hereunder are reported the plates which correspond to the stabilization functions.

LEVERS CD **LEVER C**



Selector (**E/S** -)	Selector for the use of the crane or the outriggers.
Levers **CD**	Controls to select the outrigger supports and rams.
Levers **C**	Control of the selected outrigger support or ram.

MANOEUVRES OF THE OUTRIGGER RAMS IN CASE OF AN ELECTRICAL FAILURE

In case of an electrical failure, electrical or hydraulic malfunctions, you cannot use the selectors on the push-button panel and so it is necessary to operate directly the integrated group of the outrigger control (fig. 9) after removing the protection.

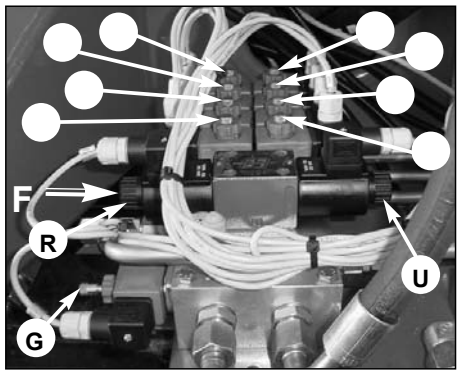


fig. 9

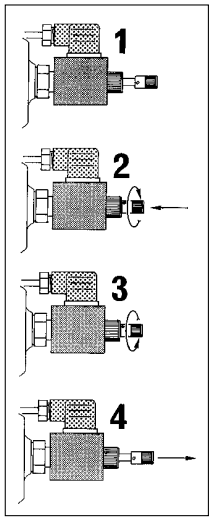


Abb. 9b

PICTURE LIST (fig. 9):
G electrovalve for main bypass
U electrovalve for the ram descent and extension of the outrigger supports
R electrovalve for the ram re-entry and retraction of the outrigger supports
E1 E2 E3 E4 electrovalve of the extension rams
S1 S2 S3 S4 electrovalve of the outrigger rams

Example: re-entry of the outrigger ram **S1**
- remove the lead seal placed on the electrovalve **G**, push the button and then turn it clockwise (fig. 9b pos. 1-2); the button stays in the closed position.
- Unscrew the knurled screw of the electrovalve **S1** of the outrigger.
- Push with an appropriate metal tip and in the direction of the arrow **F** the slider of the spool **R** to re-enter the ram.
- **Re-screw the knurled screw of the electrovalve S1 of the outrigger.**
- **Put the button of the electrovalve G back to its original position, by turning it anti-clockwise (fig. 9b pos. 3-4)**

After such emergency operations and prior to re-use of the crane, you must immediately go to a FASSI authorised Center for the repair of the fault and re-sealing of the device.

(!) Interferences with the valves or removal of the lead seal release the FASSI GRU IDRAULICHE from any responsibility and invalidate the warranty.

G2.2 Controls to stabilize the vehicle

G2.2.1 Crane with fixed or manually tiltable supports for outrigger rams

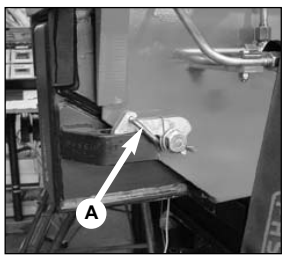


fig. 10

- Disengage the locking devices of the outrigger supports by putting the levers **A** from the position of the fig. 10 to the one of the fig. 10a.

- Position lever **D** of oil diverter (-**E/S**) on **E/S**.

- Position selector (-**E/S**) of the push-button panel on **E/S**. (you read “outriggers” on the display)
- By using the levers **CD** and the lever **C** extend the outrigger supports and lower the outrigger rams till the complete stabilisation of the vehicle. Example of using the levers **CD** and the lever **C**:
  - extension of the outrigger support n **1**
    - activate the lever **CD** n **1** in the direction of **E**.
    - by keeping activated the lever **CD** n **1**, activate the lever **C** in the opposite direction.

fig. 10a

fig. 11

- descent of the outrigger ram n 1
  - activate the lever **CD** n **1** in the direction of **S**.
  - by keeping activated the lever **CD** n **1**, activate the lever **C** in the opposite direction.

(!) 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 of the support if it's supplied with extra double extension beams). (Fig. 11).

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.

(!) ATTENTION (!)

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

To operate the crane controls, after having completed the stabilisation manoeuvres,
- Position lever **D** of oil diverter (- **E/S**) on .
- Position selector (-**E/S**) of the push-button panel on .

Manoeuvres for re-entry of the crane outriggers and supplementary outriggers within the overall vehicle width after crane use.

- Repeat by reversing the sequence of the operations effected for the stabilisation of the vehicle.

(!) ATTENTION (!)

Keep hands clear of automatic stop device of the outrigger supports (Fig. 10).

(!) Always check that the outrigger supports, once in their rest position, are locked in their seat by the safety devices, so as to assure the impossibility of accidental movement. (Fig. 10).

G2.2.2 Crane with hydraulic tiltable supports (WITH CHAIN) for outrigger rams:

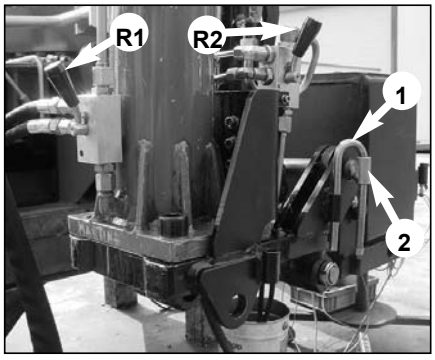


fig. 12

(!) ATTENTION (!)

Be very careful during vehicle stabilization operation; make sure that there are no obstacles preventing the rotation of the rams **and that no one is or transits in close proximity of the working area of the outriggers.**

- Disengage the locking devices of the outrigger supports by putting the levers **A** from the position of the fig. 10 to the one of the fig. 10a.

- Position lever **D** of oil diverter (-**E/S**) on **E/S**.

- Position selector (-**E/S**) of the push-button panel on **E/S**.

- By using the levers **CD**, the lever **C** and the valve taps, extend the outrigger supports, rotate the outrigger rams putting in a working condition and lower them till the complete stabilisation of the vehicle.

Example of using the levers **CD**, the lever **C** and the valve tap on the outrigger and the valve tap on the control ram for the tiltable support:
- **extension of the outrigger support n°1**
  - activate the lever **CD** n 1 in the direction of **E**;
  - by keeping activated the lever **CD** n 1, activate the lever **C** in the opposite direction.

- **rotation of the outrigger ram n°1 from the rest position (fig. 12) to the working condition (fig. 14)**
  - make sure that the tap **R1** of the valve of the outrigger ram **S1** is closed (for the closed or opened position see fig. 13);
  - open the tap **R2** of the valve of the control ram for the tiltable support;
  - to remove the pin **2** proceed as follows:
    - activate the lever **CD** n 1 in the direction of **S**;
    - by keeping activated the lever **CD** n 1, activate the lever **C** in the opposite direction to control the rotation and take the ram **S1** to its rest position so that the pin **2** is extractable;
    - lift the parking pin **1** (safety) until it is released and remove from its seat the pin **2;**
  - to rotate the outrigger ram **S1** proceed as follows:
    - activate the lever **CD** n 1 in the direction of **S**;
    - by keeping activated the lever **CD** n 1, activate the lever **C** in the opposite direction till the requested extension of the outrigger ram **S1**.

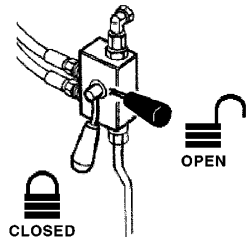


fig. 13

!!! ATTENTION !!!

Make sure that no one is or transits in close proximity of the working area of the outriggers.

- manually complete the rotation by positioning the ram vertically, insert the pin **2** in its new seat and lock it with the parking pin **1** (safety);
- close the tap **R2** of the valve of the control ram for the tiltable support

(!) The locking pin 2 is constructed from special material
- do not replace it with a non original part
- your security depends on it

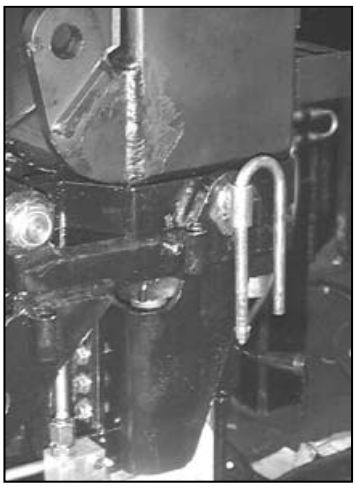


fig. 14

- **descent of the outrigger ram n°1**
  - open the tap **R1** of the valve of the outrigger ram **S1;**
  - activate the lever **CD** n 1 in the direction of **S**;
  - by keeping activated the lever **CD** n 1 activate the lever **C** in the opposite direction till the requested extension of the outrigger ram **S1;**
  - close the tap **R1** of the valve of the outrigger ram **S1**.

(!) 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 of the support if it's supplied with extra double extension beams). (Fig. 11).

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.

(!) ATTENTION (!)

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

To operate the crane controls, after having completed the stabilisation manoeuvres,
- Position lever **D** of oil diverter (⚲ -**E/S**) on ⚲ .
- Position selector (⚲ -**E/S**) of the push-button panel on ⚲ .

Manoeuvres for re-entry of the crane outriggers and supplementary outriggers within the overall vehicle width after crane use.

- Repeat by inverting the sequence of the operations effected for the stabilization of the vehicle.

(!) ATTENTION (!)

Keep hands clear of automatic stop device of the outrigger supports. (Fig. 10).

(!) Always check that the outrigger supports, once in their rest position, are locked in their seat by the safety devices, so as to assure the impossibility of accidental movement. (Fig. 10).

G2.2.3 Crane with hydraulic tiltable supports (SLEW RING) for outrigger rams:

(!) ATTENTION (!)

Be very careful during vehicle stabilization operation; make sure that there are no obstacles preventing the rotation of the rams **and that no one is or transits in close proximity of the working area of the outriggers.**

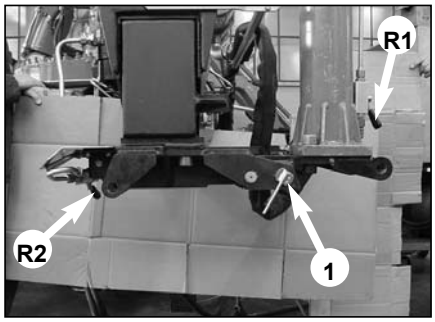


fig. 15

- Disengage the locking devices of the outrigger supports by putting the levers **A** from the position of the fig. 10 to the one of the fig. 10a.

- Position lever **D** of oil diverter (-**E/S**) on **E/S**.

- Position selector (-**E/S**) of the push-button panel on **E/S**.

- By using the levers **CD**, the lever **C** and the valve taps, extend the outrigger supports, rotate the outrigger rams putting in a working condition and lower them till the complete stabilisation of the vehicle.

Example of using the levers **CD**, the lever **C** and the valve tap on the outrigger and the valve tap on the control ram for the tiltable support:

- **extension of the outrigger support n°1**
  - activate the lever **CD** n **1** in the direction of **E**;
  - by keeping activated the lever **CD** n **1**, activate the lever **C** in the opposite direction.

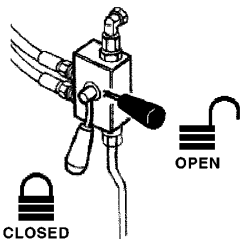


fig. 13

- **rotation of the outrigger ram n°1 from the rest position (fig. 15) to the working condition (fig. 16)**
  - make sure that the tap **R1** of the valve of the outrigger ram **S1** is closed (for the closed or opened position see fig. 13);
  - open the tap **R2** of the valve of the control ram for the tiltable support;
  - to remove the pin **2** proceed as follows:
    - activate the lever **CD** n **1** in the direction of **S**;
    - by keeping activated the lever **CD** n **1**, activate the lever **C** in the opposite direction to control the rotation and take the ram **S1** to its rest position so that the pin **1** is extractable;
    - remove the check pin and the locking pin **1** from their seats**;**
  - to rotate the outrigger ram **S1** proceed as follows:
    - activate the lever **CD** n **1** in the direction of **S**;
    - by keeping activated the lever **CD** n **1**, activate the lever **C** in the opposite direction to control the rotation and take the ram **S1** to its work condition.

!!! ATTENTION !!!

Make sure that no one is or transits in close proximity of the working area of the outriggers.

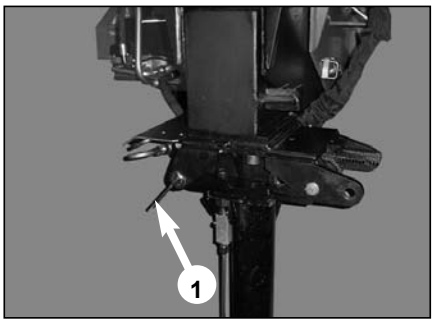


fig. 16

- insert the pin **1** in its new seat and lock it with the check pin;
- close the tap **R2** of the valve of the control ram for the tiltable support;

(!) The locking pin 1 is constructed from special material
- do not replace it with a non original part
- your security depends on it

- **descent of the outrigger ram n°1**
  - open the tap **R1** of the valve of the outrigger ram **S1;**
  - activate the lever **CD** n **1** in the direction of **S**;
  - by keeping activated the lever **CD** n **1** activate the lever **C** in the opposite direction till the requested extension of the outrigger ram **S1;**
  - close the tap **R1** of the valve of the outrigger ram **S1**.

(!) 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 of the support if it's supplied with extra double extension beams). (Fig. 11).

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.

(!) ATTENTION (!)

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

To operate the crane controls, after having completed the stabilisation manoeuvres,
- Position lever **D** of oil diverter (-**E/S**) on .
- Position selector (-**E/S**) of the push-button panel on .

Manoeuvres for re-entry of the crane outriggers and supplementary outriggers within the overall vehicle width after crane use.

- Repeat by inverting the sequence of the operations effected for the stabilization of the vehicle.

(!) WARNING (!)

Keep hands clear of automatic stop device of the outrigger supports. (Fig. 10).

(!) Always check that the outrigger supports, once in their rest position, are locked in their seat by the safety devices, so as to assure the impossibility of accidental movement. (Fig. 10).

H0 CONTROLS TO OPERATE THE CRANE

fig. 17

(!) WARNING (!)

Before operating the crane it is compulsory to set the outriggers. (Plate DE2327 fig. 17)

Radio remote control

The crane and hydraulic implements can be operated through proportional radio remote control subjugate to a distributore which the manual order is to be used only in case of emergency.

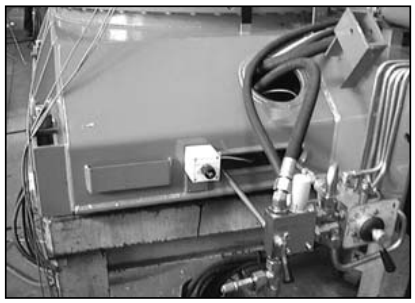


fig. 18

Display on the push-button panel of the radio remote control

- When you start the radio remote control (fig. 8a), the pressure in the inner, outer ram and the jib and the percentage of load on the winch are displayed.
  In relation to the view chosen like standard, when you start the radio remote control the pressure values are displayed in:
  - "bar" if on the display, on the left of the values, no symbol is present.
  - "daPsi" if on the display, on the left of the values, the symbol * is present.

- By pushing the button [+ %] the percentage values of pressure in the inner, outer ram and the jib and the percentage of load on the winch are displayed.
  By pushing a second time the button [+ %] the pressure values in the inner, outer and jib rams movement in the measurement unit non standard and the percentage of load on the winch are displayed.
  By pushing again the button [+ %] you return to the initial display.

- For the use of the control button [− ⏲] see Par. M0.0.

- By pushing the button [INDEX] one or more times you return to the initial display (view of the pressure values).

- For the meaning of other messages see Par. H1.5.0 "Diagnostic"

Tele-radio remote control

The radio remote control, in the case of a discharged battery or in the presence of interference in the radio transmission, or use of the crane in situations where the transmission by radio is forbidden, it is easily transformed to cable remote control using a connecting cable.

Activation of the tele-radio remote control

- Connect by cable the remote control to the socket fixed on the base of the crane (fig. 18)

(!) WARNING (!)

First read the instructions given in the User's Manual supplied by the Manufacturer before using the remote control to avoid improper use.

The plates shown on the side of each push-button panel lever of the radio remote control and on each lever on the emergency control, determine the operation of the levers in relation to the movement of the crane.

(!) ATTENTION (!)

The sequence of the plates placed on the crane controls may be different.

Make sure that the lever you are going to operate correspond to the control you selected.

(!) 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.

LINEAR PUSH-BUTTON PANEL SCANRECO

ACCESSORY CONTROLS **CRANE CONTROLS**

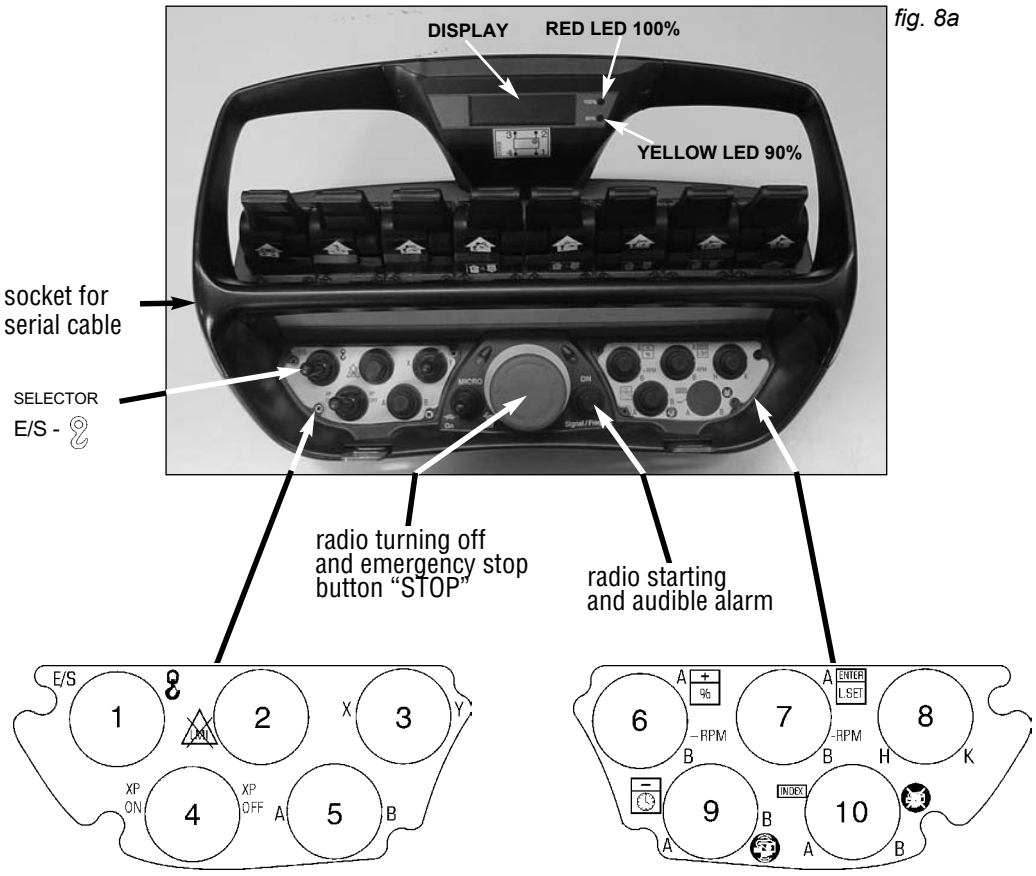


fig. 8a

E/S 1 — selector for the use of the outriggers (E/S) or of the crane ( )

2 — exclusion push-button for the lifting moment limiting device

X 3 Y — switching of the selector for the use of the 9°/10° function

XP ON 4 XP OFF — selector for the use of the crane standard or XP

A 5 B — selector for the use of the right control panel in configuration A or B

A % 6 RPM B = control button = GAS +

A ENTER L.SET 7 RPM B = control button = GAS -

8 H K = free

control button = 9 A B = starting the engine

control button = INDEX 10 A B = turning off the engine

Functions of the controls on the push-button panel of the transmitting-console

PUSH-BUTTON PANEL SCANRECO WITH JOY-STICK

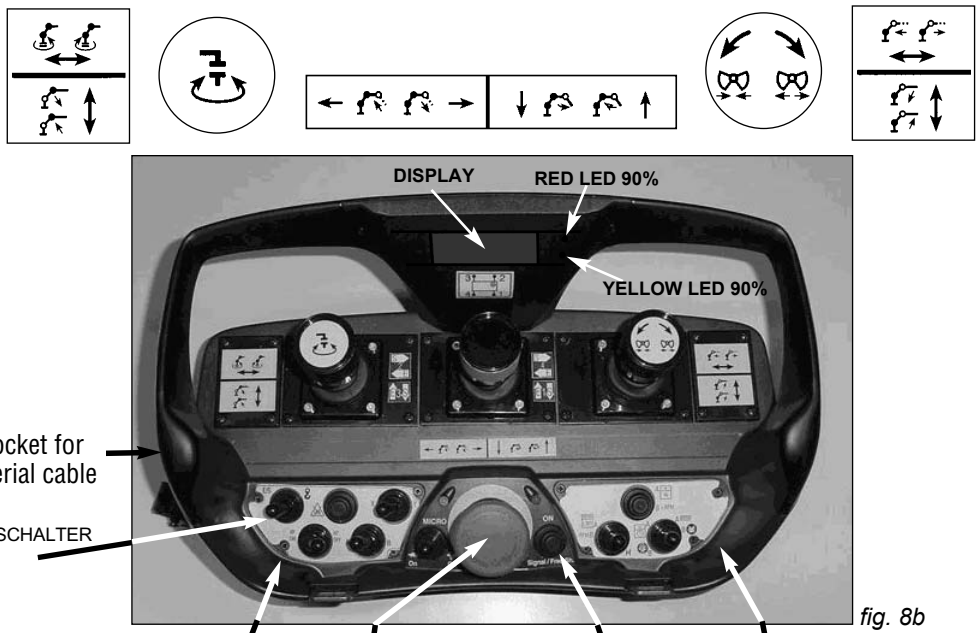
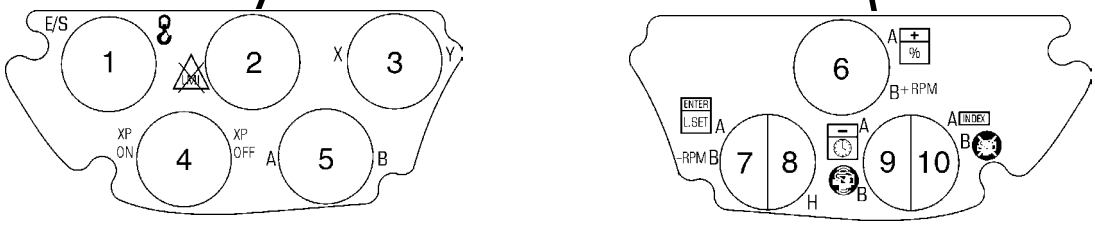


fig. 8b

Ausschalter des Senders und NOT-AUS-SCHALTER

Einschalter des Senders und Hupe



E/S 1 — selector for the use of the outriggers (E/S) or of the crane ( )

2 — exclusion push-button for the lifting moment limiting device

X 3 Y — switching of the selector for the use of the 9°/10° function

XP ON 4 XP OFF — selector for the use of the crane standard or XP

A 5 B — selector for the use of the right control panel in configuration A or B

6 — A (+ %) = control button; B + RPM = GAS +

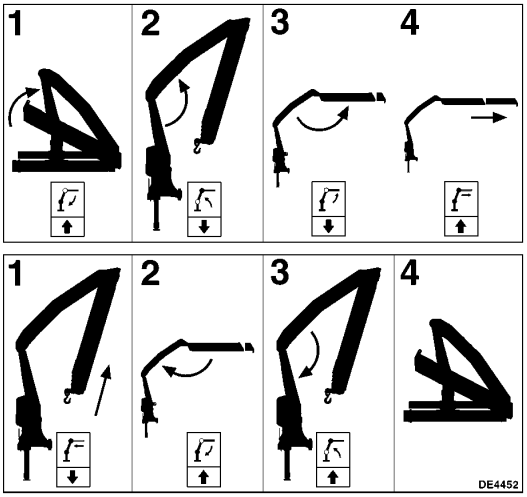
selector (enter) for control = ENTER L.SET A; GAS - = -RPM B — 7

8 H = free

selector (various times) for control = A; starting the engine = B — 9

10 — A INDEX = selector (index-return) for control; B = turning off the engine

H0.1 Manoeuvres to unfold the crane into a working condition

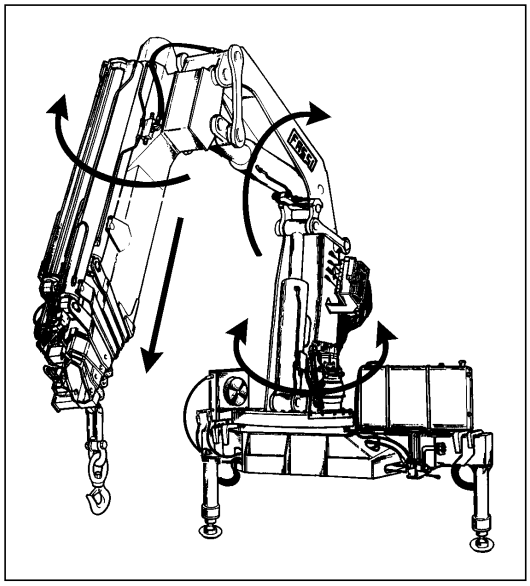


The plate DE4452 indicates the sequence of the manoeuvres to be carried out to unfold and to fold the crane.

- Engage the power take off.
- Stabilize the vehicle (see details on Paragraph G2 “Manoeuvres and controls to stabilize the vehicle”).

By operating the corresponding levers:
- make sure that the extension booms and the outer ram are closed;
- lift the inner boom over the horizontal line;
- open the outer boom to the “horizontal” position;
- position the hook on the vertical line above the load.

H0.2 Manoeuvres to fold the crane into the rest condition (see plate DE4452)



By operating the corresponding levers:
- fold the extension booms to their stroke end;
- lift the inner boom to its stroke end;
- fold the outer boom to its stroke end;
- rotate the crane until the arrows coincide (on the base and on the slew ring);
- fold the inner boom to its stroke end; the rest locating pin locates into its seat;
- re-position the outriggers to within the overall vehicle width as described on Paragraph G2.

H1 MANOEUVRES OF THE CRANE LOADS

(!) Before manoeuvering 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 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.

On the crane has been installed an electronic system to automatically control the maximum speed for moving the booms in relation to the load applied. With low loads, the control system allows the use of the nominal capacity of the pump, while the oil capacity available for the moving, is automatically and progressively reduced, at the increased loads.
The manoeuvres affected by this system are:
- rotation
- lift and descent of the inner boom
- lift and descent of the outer boom
- exit of the extension booms of the crane
- lift and descent of the jib (when fitted)
- exit of the extension booms of the jib (when fitted)

Lifting moment limiting device
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 weight of the load to be lifted (**kg**) by its distance (**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.

H1.1 "Electronic" lifting moment limiting device

This device utilises an electro-hydraulic system managed by an electronic logic that prevents any operation tending to cause an increase in the pressure induced by the load in the lifting rams (inner, outer rams of the crane and of the hydraulic extension, if fitted), up to the critical values. These values, which are not exceedable, determine the intervention levels and provide the data for setting the device.

The pressure values detected in the lifting rams are turned into electric signals by the transducers, and sent to the electronic logic of the device which determines the locking or unlocking of the controls concerned, according to the horizontal position of the crane outer boom (mercury level switch); only the controls allowing a reduction of the overload are enabled, while those increasing it are disabled.

The device features an electro-hydraulic control that does not allow the set value to be exceed, by deactivating the controls (levers in neutral position) commanded by the limiting device. When the controls are released (levers in neutral position) it's this electronic logic that handles which manoeuvres are disabled, according to the position of the crane outer boom and in overload condition, by sending electric signals to special micro-switches placed on the elements of the distributor.

(!) ATTENTION (!)

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.

H1.2 Control panel

The control devices are insered in the push-button panel of the radio remote control.
For the picture list of the push-button panel of the radio see "Controls to operate the crane".

If the warning light over the on radio button comes on, it confirms that the control unit has been activated.

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

If during operation the yellow led placed on the side of the display comes on, 90% of the rated capacity has been reached.

If during operation the red led placed on the side of the display comes on, the activation value of the lifting moment limiting device has been reached.

Visual indicator yellow/red light

The control unit was up to 90% loading a graduated band of led lights to show the increased load, upon reach 90% a yellow led will be illuminated, upon reaching 100% and activation of the lifting moment limiting device a red led will be illuminated. The visual indicator located on the crane is shown in fig. 19.

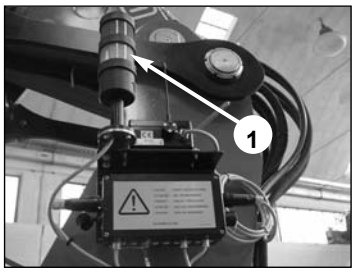


fig. 19

Any hidden danger situation for persons must be audibly warned by pressing the push button of the audible alarm (on radio and audible alarm push button).

When there are serious, imminent and dangerous conditions for persons and things during load handling, operate on the emergency **STOP** button, which isolates all crane functions and activate the intermittent audible alarm push button.

Manoeuvres of the crane

Fig. 20-20a illustrate the configurations of the crane (and of the eventual hydraulic extension) with the manoeuvres allowed and not allowed by the device, in connection with the horizontal position of the crane and extension outer booms.

(!) ATTENTION (!)

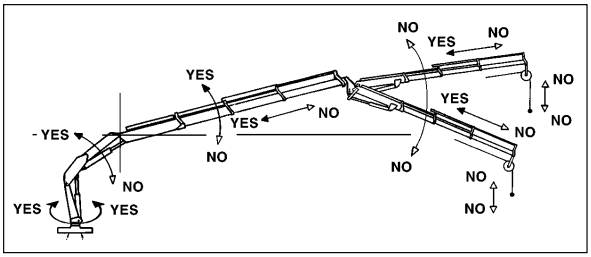
In the overload condition, if you simultaneously effect one permitted and one non permitted manoeuvre you haven't movement.
In the overload condition, before effecting a permitted manoeuvre, it is necessary to return all the levers to the neutral position.

(!) ATTENTION (!)

During load handling with the crane and with the crane and hydraulic jib, in vertical configuration or close, the operator must strictly refer to the loads indicated on the capacity plates since the limiting device shows to be not particularly sensitive with vertical lifts.

Crane with activated limiting device by the intervention of the crane or the hydraulic jib (overload condition) and with outer boom of the crane above the horizontal line fig. 20

fig. 20



Manoeuvres not allowed:
- Inner boom descent
- Outer boom descent
- Extension of the crane extension boom sections (*)
- Lift and descent of the hydraulic jib
- Extension of the extension booms section of the jib
- Winch rope lift
- Movement of the hydraulic accessories (**)

NOTES: (*) If the overload condition has been activated by the hydraulic extension, the extension of the crane boom sections is permitted.
(**) It is permitted only when coupled with permitted manoeuvres.

Manoeuvres allowed: all the manoeuvres that bring the load closer to the column and therefore the overload
- Rotation in both directions
- Inner boom lift
- Outer boom lift
- Re-entry of the crane extension boom sections
- Re-entry of the jib extension boom sections
- Winch rope descent

Crane with activated limiting device by the intervention of the crane or the hydraulic jib (overload condition) and with outer boom of the crane under the horizontal line fig. 20a

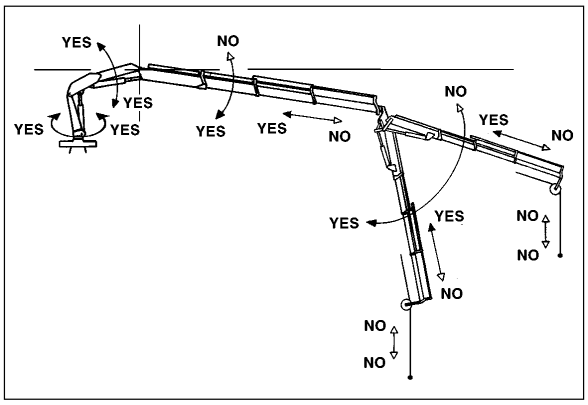


fig. 20a

Manoeuvres not allowed:
- Inner boom lift
- Outer boom lift
- Extension of the crane extension boom sections (*)
- Lift of the hydraulic jib
- Extension of the extension booms section of the jib
- Winch rope lift
- Movement of the hydraulic accessories (**)

NOTES: (*) If the overload condition has been activated by the hydraulic extension, the extension of the crane boom sections is permitted.
(**) It is permitted only when coupled with permitted manoeuvres.

Manoeuvres allowed: all the manoeuvres that bring the load closer to the column and therefore the overload
- Rotation in both directions
- Inner boom descent
- Outer boom descent
- Re-entry of the crane extension boom sections
- Descent of the hydraulic jib
- Re-entry of the extension booms section of the jib
- Winch rope descent

Crane with activated limiting device (overload condition) by the intervention of the load limiter of the winch

Manoeuvres allowed:
- Rotation in both directions
- Re-entry of the crane extension boom sections
- Re-entry of the jib extension boom sections
- Winch rope descent

Manoeuvres not allowed:
- all other movements

Crane without load applied and activated limiting device
The limiting device may intervene also during loadless crane operation following a pressure peak provoked by the attainment of the stroke end of the lifting ram at high speed. In this condition, reactivation of the crane commands by performing one of the manoeuvres is allowed by the system.
If the limiting device intervenes when both the lifting rams are open and at stroke end, and the crane extension booms are fully folded, it is not possible to reactivate the commands, since the permitted manoeuvres (arm lifting and extension fully retracted) cannot be carried out, because of the actual configuration of the crane (outer boom above the horizontal). The device, in this case, allows the descent manoeuvres since it verifies the it was a peak pressure inside the lifting rams; the crane being loadless, thus these manoeuvres will be allowed.

Temporised exclusion device of the lifting moment limiting device
The activation of the exclusion device is permitted when the limiting device is activated and only in the case when it is impossible to carry out any of the allowed manoeuvres. This generally occurs when handling heavy and bulky loads, with the outer boom above the horizontal and the extension boom sections almost retracted.

(!) ATTENTION (!)
The activation of the exclusion system for the lifting moment limiting device can ONLY be operated when the extension booms of the crane and of the hydraulic jib (when fitted) are fully retracted.

The activation of the exclusion system reduces the movement speed to the minimum value.
The activation button of the excluding device, **only in the case of the crane,** are to be activated as follows:
- retract the crane extension booms until stroke end and momentarily pressurise;
- maintain the command for the **extension boom of the crane** until the mark LMI displays on the push-button panel;
- continue to keep the command for the extension booms of the crane press the **exclusion device button**, the mark ELMI displays;
- release the lever commanding the extension booms.

The permitted manoeuvre is the descent of the outer boom of the crane in order to bring it under the horizontal line; remember that you have at your disposal **five (5)** seconds from the command operation to carry out the descent.
After such period of time, wait at least **one (1)** minute in order to be allowed to carry out the manoeuvre once again.

The activation buttons of the excluding device, **in the case of the hydraulic jib,** are to be activated as follows:
- retract the extension booms of the jib until stroke end and momentarily pressurise;
- maintain the command for the **extension boom of the jib** until the mark LMI displays on the push-button panel;
- release the lever commanding the extension booms of the jib, the mark LMI disappears;
- retract the extension booms of the crane until stroke end and momentarily pressurise;
- maintain the command for the extension boom of the crane until the mark LMI displays on the push-button panel;
- continue to keep the command for the extension booms of the crane press the exclusion device button, the mark ELMI displays;
- release the lever commanding the extension booms of the crane.

The only permitted manoeuvres are the descent of the hydraulic jib and the descent of the outer boom. As first you must lower he hydraulic jib in order to bring it under the horizontal line, then, if it is necessary, lower the outer boom; remember that you have at your disposal **five (5)** seconds from the command operation to carry out the descent.
After such period of time, wait at least **one (1)** minute in order to be allowed to carry out the manoeuvre once again.

(!) ATTENTION (!)

Activation of the exclusion device of the lifting moment limiting device.

When the operator uses this device, it means that he wishes to override the lifting moment lifting device in order to make some manoeuvres (which would be impossible with the device active) that bring the moment to within the maximum level, but involve an overload condition. In such an emergency condition (where the lifting moment limiting device has been disabled), the operator, who is the main responsible for the machine safety, must:

- **carefully consider the manoeuvres required to return to normal working conditions;**
- **calmly and carefully assess the type and scale of the hazards arising from these manoeuvres and the possible reaction of the crane (tipping over, frame overload, uncontrolled fall of the load due to a hydraulic system overload etc.);**
- **make all movements as slowly as possible to reduce the dynamic overload to the minimum.**

H1.3 Lifting moment limiting device for two working sectors (optional)

In case of one sector of the working area with reduced stability of the vehicle (e.g. sector in front of vehicle cab) the limiting device can be provided with a special function which allows to operate with a reduction of the intervention level. The reduction of the intervention level reduces the crane capacity values and this reduction value is defined in the vehicle stability calculation. Consequently the working area is divided in one sector (e.g. body side) where the crane works according to the capacity plate values and another sector (e.g. cab side) where it works with reduced capacity values. The device has consequently two intervention levels which are activated in relation to the sector of the crane working area always securing the vehicle stability.

(!) ATTENTION (!)

If the rotation stops by going through the working zone where the crane can operate according to the capacity plate values to the one where it can operate according to the reduced values, it means that one of the following conditions is reached:

- rotation of a load bigger than the one admitted in the reduced sector defined in the vehicle stability calculation;
- rotation without load applied but with (at least) one of the inner, outer rams of the crane or the jib (if fitted) extended and pressurised at the stroke end.

The following manoeuvres are allowed:

- the opposite rotation
- the manoeuvres allowed by the limiting device in relation to the position of the outer boom (positioned over or under the horizontal line).

H1.4 Rotation limiting device

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. (Warning: persist in the operation!)

When exceeding the “safe area” the rotation limiting device only allowing:

- the opposite rotation
- the manoeuvres allowed by the limiting device in relation to the position of the outer boom (positioned over or under the horizontal line).

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.

(!) ATTENTION (!)

Always check carefully that the vehicle is perfectly stable, paying special attention to the area immediately in front of the driver’s cabin as this is usually less stable.

H1.5 DEVICE XP

This device can be activated only through the push-butoon panel of the radio remote control, see Par. H0 “Controls to operate the crane”.

The XP device works on the principle of an increase in the lifting capacity of the crane with a reduction in the dynamic effect achieved with a reduction in the speed of certain movements.

The XP device can be used, not just to increase the capacity crane:
- but to exploit the reduction in the speed when moving a load that must be positioned with precision.
- and to exploit the variation in the lifting moment limiting device adjustment parameters to exit from a critical situation when moving the load (overcoming of the 90% or intervention of the lifting moment limiting device).

(!) ATTENTION (!)

The rating plates relevant to the XP device are marked F700XP.

H1.5.1 Activation and instructions for use of the XP/V device

SCANRECO RADIO REMOTE CONTROL

fig. 20b

You operate the XP device only from the console of the radio remote control by using the appropriate selector. (fig. 20b).

Scanreco radio remote control

You operate on the XP/ON-XP/OFF selector (fig. 20b) on the XP/ON position.

The activation of the XP device is indicated with the mark XP displayed up on the right of the control panel.

(!) WARNING (!)

It is recommended to release the crane controls (levers of the control console in neutral position) before activating or desactivating the **XP** device because of the variation of speed is considerable and immediate; carefully operate the controls.

See paragraph H0 of the F600 USE AND MAINTENANCE MANUAL for details of “Controls to operate the crane”
See paragraphes H1 of the F600 USE AND MAINTENANCE MANUAL for details of “Lifting moment limiting device”

The activation of the XP device on cranes with free rotation or with rotation limiting device produces:
- an increase in the capacity of the crane
- a reduction in the speed of rotation without increasing the torque
- a reduction in the speed of lifting and lowing the inner boom, outer boom and of the jib boom (when fitted)
- speed of the extension booms, bucket and the rotator.
- allows normal speed and lifting capacity of the winch.

The activation of the XP device on cranes with lifting moment limiting device for two sectors produces:

- in the “stable” zone working area, the same effect for crane with free rotation
- in the “unstable” zone working area, a reduction in the speed without the increase in capacity.

Activation of the XP device when the 90% of the capacity has been reached

- the yellow light on the "led" band of the push-button panel goes off
- allowing the manoeuvres that increase the lifting moment, you then have the repeat of the yellow "led" band and red "led" band of the warning lights again.

Activation of the XP device after the lifting moment limiting device block

A) The block continues:
  - the crane must be reset

B) The red "led" band of the warning light switches off and the yellow "led" band of the warning light usually comes on.
  - the crane controls are enabled. Acting with the manoeuvres that increase the lifting moment, you get the yellow and red warning lights again.

H1.6 In the case of the appearance of the signal "ALARM" on the display of the push-button panel or in case of an electrical failure.

In these cases, because of a fault, shown in the system, the crane is not functional any more. The checks that the operator can effect to reactivate the crane functions are the following:

- in case of an electrical failure check the connection of the feeding cables to the battery;
- in case of the appearance of the signal "ALARM" on the display of the push-button panel see Par. H1.5.0 and check if the fault can be resolved by the operator.

If the fault cannot be resolved, you must immediately go to a FASSI **authorised Center** after bringing the crane to its the rest position in relation to the conditions explained in the following paragraphes.

H1.6.0 Diagnostic (Alarms/Input/Output) LME vers. 4-5

All the eventual problems that the electronic device can have are shown on the display of the radio remote control transmitter and they create the stop of all crane functions. The visualisation of the alrm must be reset pushing the button l.m.l.d. exclusion on the main box control panel, which bring again the display in the original screen showing the pressures only if the problem has been solved. As consequence of this, when appear an alarm signal it is necessary to solve the problem because only in this case will be possible to reset the display and reactivate the crane working.

ALARM CODES:

01 - electronic card alarm
02 - inner ram transducer alarm
04 - outer ram transducer alarm
06 - jib articulating ram transducer alarm
08 - proximity sensor alarm (central one off)
09 - proximity (lateral one off)
10 - mercury sensor level alarm (connector disconnected)
11 - mercury sensor level alarm (sensor defect)
12 - winch alarm
14 - microswitch on the inner ram distributor segment alarm
15 - microswitch on the outer ram distributor segment alarm
16 - microswitch on the jib articulating ram distributor segment alarm
17 - microswitch on the extension rams distributor segment alarm
18 - microswitch on the jib extension rams distributor segment alarm
19 - microswitch on the winch distributor segment alarm
20 - microswitch on the rotation distributor segment alarm
21 - 10A fuse alarm (fuse inside the main control panel protecting the emergency circuit)
22 - winch stroke end device alarm
30 - inconsistency of the rotation lever movement alarm
31 - inconsistency of the inner ram lever movement alarm
32 - inconsistency of the outer ram lever movement alarm
33 - inconsistency of the crane extension ram lever movement alarm
34 - inconsistency of the jib articulating ram lever movement alarm
35 - inconsistency of the jib extension ram lever movement alarm
36 - inconsistency of the winch lever movement alarm
40 - CAN-BUS reading alarm on unit FX003
41 - CAN-BUS reading alarm on unit FX004
42 - CAN-BUS reading alarm on radio remote receiver unit

MESSAGES	**EXPLANATION**
"WINCH OFF"	- information for the activation of the winch up or down.
"WINCH CAL.ERROR"	- flashing warning (10 seconds each minute); it appears when the maximum detection of the winch adjustment with load is exceeded.
"STOP BOOM OUT"	- warning for the interruption of the extension boom exit because of a sudden variation of the cable tension.
"STOP JIB 25 "	- warning of not permitted activation of the lifting functions because of the activation of the maximum vertical operativity of the jib when it is complete with the 25 angle increasing.
"PLE"	- activation of the speed reduction for the use of the access platform.

What to do in case of alarm

CODE	REMEDY
01	Take off the tension to the system and take on again the tension. If the problem remains, take off the tension to the system again, take on the tension and wait 12 minutes (12 minutes waiting time is a compulsory condition and needs to be checked with a watch), take off the tension to the system again, take on again the tension. If the problem remains, you must immediately go to a FASSI **authorised Center**.
02	Check the connector of the pressure transducer. If the problem remains, you must immediately go to a FASSI **authorised Center**.
04	See code 02.
06	See code 02.
08	Check if the red light on the proximity sensor is off and verify if the metallic band is rightly positioned.
09	See code 08.
10	Check that the connector of the mercury sensor level is not damage. If the problem remains, you must immediately go to a FASSI **authorised Center**.
11	You must immediately go to a FASSI **authorised Center**.
12	See code 11.
14	See code 11.
15	See code 11.
16	See code 11.
17	See code 11.
18	See code 11.
19	See code 11.
20	See code 11.
21	Replace the 10A fuse at the nearest workshop after removing the carter and the cover of the main panel FX000. (See electric schematic Par. T0)
22	See code 11.
30	See code 11.
31	See code 11.
32	See code 11.
33	See code 11.
34	See code 11.
35	See code 11.
36	See code 11.
40	See code 11.
41	See code 11.
42	See code 11.

MESSAGES	REMEDY
"WINCH OFF"	Place the distributor bank lever controlling the winch in neutral position.
"WINCH CAL.ERROR"	See code 11.
"STOP BOOM OUT"	Place the distributor bank lever controlling the extension booms in neutral position. If the warning appears when the winch cable lifting stroke end is not reached, place in any case the lever in neutral position and then restart to operate.
"STOP BOOM UP"	Lifting functions not available; are authorized only descent functions.

To verify the right working of the differents input it is possible to use the display in the "INPUT" menu.

H1.6.1 Temporary OVERIDE-REACTIVATION for the crane functions in case of the appearance of the signal "ALARM" on the display of the push-button panel

Note: If the alarm doesn't involve components which control the distributor, it is possible to re-close the crane using the push-button panel of the radio remote control.

(!) ATTENTION (!)

These manoeuvres can be effected where the lifting moment limiting device has been disabled, and then can involve an overload condition. In such an emergency condition, the operator, who is responsible for the machine safety, must:

- **carefully consider the manoeuvres required to return to normal working conditions: it is however compulsory to effect the re-entry of the extension booms at first,**
- **calmly and carefully assess the type and scale of the hazards arising from these manoeuvres and the possible reaction of the crane (tipping over, frame overload, uncontrolled fall of the load due to a hydraulic system overload etc.);**
- **make all movements as slowly as possible to reduce the dynamic overload to the minimum.**

Reactivation of the crane functions using the push-button panel of the radio:
Keeping pressed the exclusion push-button ( ) of the limiting device on the push-button panel, operate on the lever of the movement to be effected.

After such emergency operations and prior to re-use of the crane, you must immediately go to a FASSI authorised Center for reactivation of the crane functions and re-sealing of the device.

(!) Interferences with the valves or removal of the lead seal release the FASSI GRU IDRAULICHE from any responsibility and invalidate the warranty.

H1.6.2 Temporary OVERIDE-REACTIVATION for the crane functions in case of an electrical failure, out of order of the radio remote control, or of the appearance of the signal "ALARM" on the display of the push-button panel (in this case, we cannot reactivate the crane functions).

On the distributor it has been installed an **emergency lever** to be used in the event of a black-out, electrical or hydraulic malfunctions. Only In these situations it is permitted to remove the lead seal placed on the tap lever and place it in the closed position.

For the access to the tap lever remove the cover 1 (fig. 21) placed under the protection guard of the distributor by unscrewing the two fixing screws (10 mm hexagonal spanner).

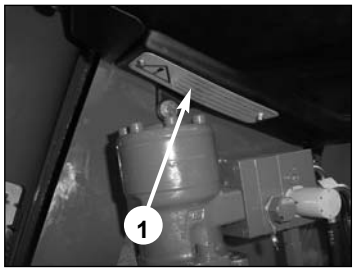


fig. 21

(!) When the electric power is restablished, remember to put the lever in the opened position.

(!) ATTENTION (!)

Activation of the emergency lever.

This activation prevents the operation of the lifting moment limiting device, consequently, the operation under such conditions can involve an overload condition. In such an emergency condition (where the lifting moment limiting device has been disabled), the operator, who is responsible for the machine safety, must:

- **carefully consider the manoeuvres required to return to normal working conditions: it is however compulsory to effect the re-entry of the extension booms at first,**

- **calmly and carefully assess the type and scale of the hazards arising from these manoeuvres and the possible reaction of the crane (tipping over, frame overload, uncontrolled fall of the load due to a hydraulic system overload etc.);**
- **make all movements as slowly as possible to reduce the dynamic overload to the minimum.**

After such emergency operations and prior to re-use of the crane, you must immediately go to a FASSI authorised Center for testing the structure and re-sealing of the device.

(!) Interferences with the valves or removal of the lead seal release the FASSI GRU IDRAULICHE from any responsibility and invalidate the warranty.

In case of an electrical failure, all the control levers of the push-button panel of the radio-remote and the emergency control cannot be used and then, it is necessary operate directly the distributor (fig. 22).

For the access to the distributor remove the cover 2 (fig. 22) by unscrewing the five fixing screws.

The column controls must only be used in an emergency and only to bring the crane to its rest position.
Be very careful at the manoeuvre of rotation because of the residual danger of crushing.
During emergency manoeuvres, the operator, when it is possible should be assisted by a second trained person who can intervene if necessary (Eg.: positioning the lever D of the deviator (- E/S) on E/S, by using then the deviator crane-outriggers like interruption control of emergency.

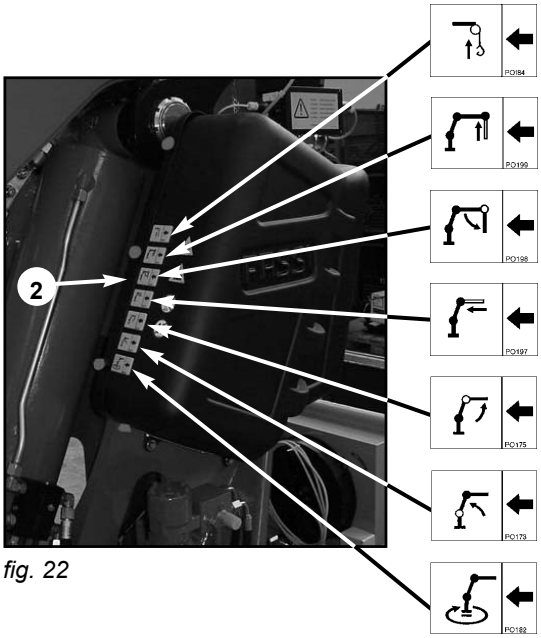


fig. 22

(!) ATTENTION (!)
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.

(!) CAUTION DANGER (!)

On the outer boom there is a mercury capsule (mercury level switch) duly protected and provided with the following warning stickers.
Mercury is extremely toxic. In case of replacement and/or scrapping, dispose of or recycle the capsule containing mercury with maximum care, and in accordance with the national regulations in force.

(!) ATTENTION (!)
Do not walk on the lever guards of the lifting moment limiting device positioned on the distributors or electric control panels. DE1679

Do not use water to estinguish fire! DE1680

DE1679

DE1680

L0 USE OF IMPLEMENTS

The crane, in load condition H1B3, can be provided with implements such as:

- Manual extensions
- Winches
- Hydraulic extensions
- Personnel baskets
- Clam 'shell buckets
- Augers

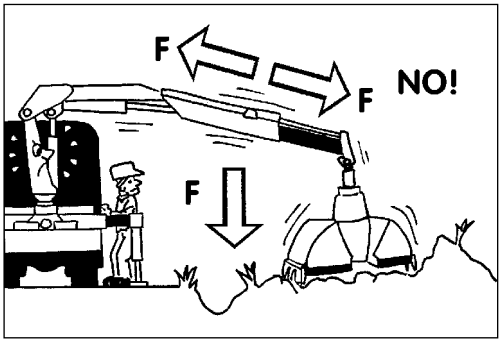
(!) When using an implement it is always necessary to check that its weight, dimension and capacity is matched to the crane performances.
For further information please refer to **FASSI GRU IDRAULICHE**

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 and prior to use of the crane it has to be tested and inspected in accordance with the local legal requirements.

(!) In case of implements on the load or the truck body it is necessary to check they are locked to assure the impossibility of accidental movements.

(!) The crane can operate, intermittently and not continuously, with lifting devices other than the hook, only on loose and light materials (not on scrap iron).
The dimensions and the capacity of the implements must be proportioned with crane performances.



(!) WARNING (!)
CRUSHING (F) OR PUSH (F) MANOEUVRES ARE NOT PERMITTED.

L0.1 Hydraulic connections for implements - supplementary hoses.

(!) WARNING (!)

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 or unusual overload with implement itself could occur.

NOTE
When using coupling unions it is necessary to verify that there is no trace of soil, curt etc. on the unions and inside the seats so as to avoid the oil contamination and consequently wear the tightening " surface of unions or ram seals.

L1 MANUAL EXTENSIONS

These are additional extensions, which are placed in the hydraulic extensions of the crane and of the hydraulic jib and secured by locking pins.
Manual extensions have a maximum capacity independent from the crane configuration as shown on the capacity plates.

(!) WARNING (!)

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

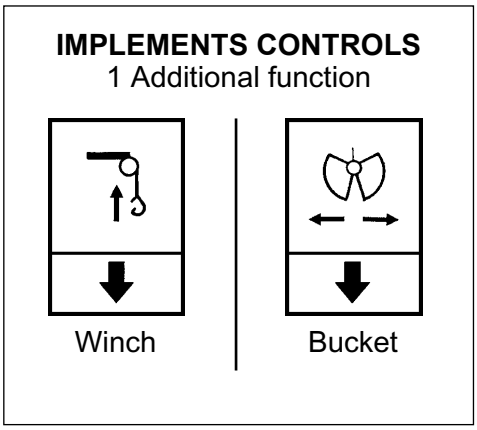
Before lifting the load make sure that its weight does not exceed the capacity indicated on the capacity plate.
Manual extensions can be extracted from the rest position and be operative, once the security pins have been removed, with the outer boom in sliding position.

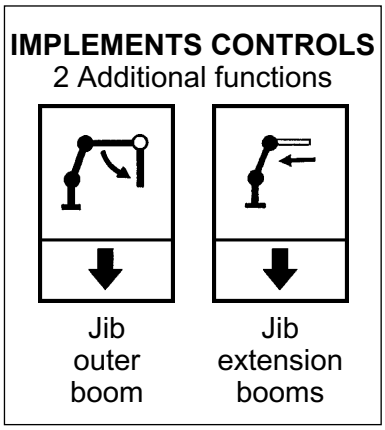
(!) ATTENTION (!)

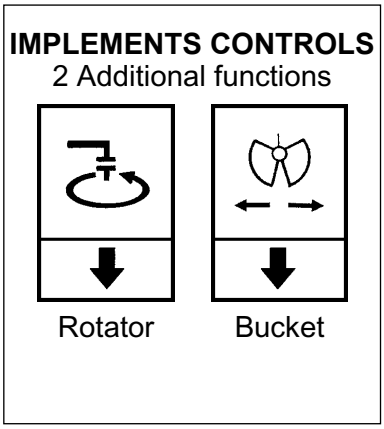
- Do not stand in front of stabilisers during operation!
  Operate from a lateral position in respect of the extension movement of the manual extensions; operation from the frontal position is dangerous.
- Verify that the area is suitable for this operation and there are no unauthorized persons in the 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.
- When manual extensions are in place, fit the locking pins and secure them with the check pins to prevent accidental escape.

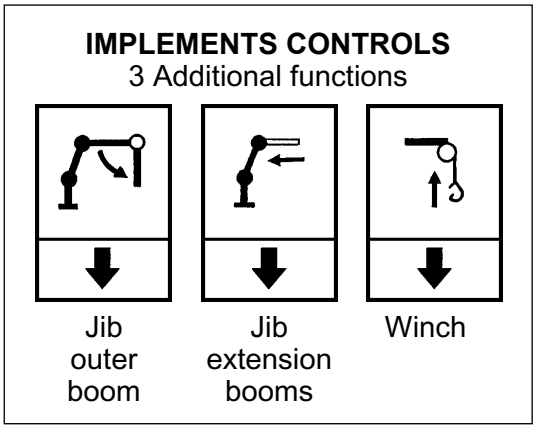
(!) Always remember that when operating with implements, their tare weight must be deducted from the capacity of the crane.

L2 CONTROLS TO OPERATE THE HYDRAULIC IMPLEMENTS OF THE CRANE









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

(!) ATTENTION (!)

The sequence of the plates placed on the crane controls may be different.

Make sure that the lever you are going to operate correspond to the control you selected.

L3 WINCH

The winch is made of a drum that can rotate by means of a hydraulic motor, on a structure fixed on the crane. The rotation of the drum on which the cable winds is achieved by a hydraulic motor controlled by a safety check valve connected to the crane circuit. A parking brake integrated to the motoreducer group hold the load in position when the winch control lever is in neutral position.

Nomenclature of winch unit (fig. 23)

Pos. Description
1. Winch
2. Cable
3. Fixed pulley
4. Balance weight
5. Hook
6. Transmission pulley
7. Block (double-triple.... line)

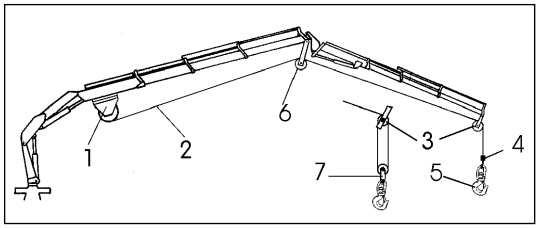


fig. 23

(!) WARNING (!)

Check the condition of wire rope.

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

Do not rotate the crane before the load is lifted. Lift the load vertically using the cable and not the boom in order to avoid swinging the load. With the suspended load rotate slowly and with care checking the stability of the vehicle.

L3.1 Winch for crane

The identification data and the essential characteristics are marked on a plate fixed by the manufacturer and used for the CE mark (fig. 24) which testifies its conformity to the Machine Directive (D.M.)

fig. 24

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

(!) 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.

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

L3.1.1 Winches equipped with an electric stroke end device

Winches are equipped with a stroke end device that in the lifting or in the booms extension rams exit prevents the cable hook or the block from hitting the fixed pulley, and in the unwinding keeps at least **three (3)** turns of the cable wound around the winch drum, tripping either device disactivates the relevant controls.
To reactivate the controls the winch control lever must be activated controlling:
- the descent if the device operation is happened in the lifting or in exit with the booms extension rams;
- the lifting if the operation is happened in the unwinding of the same one.

It is recommended to avoid working with the cable hook or the block too close to the pulley structure; the activation of the device could provoque dangerous swinging.

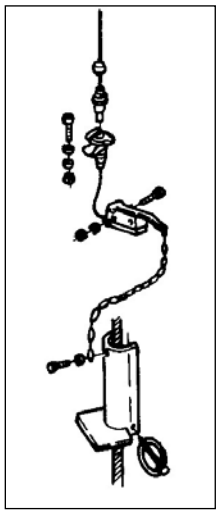


fig. 25

The pulley structure is provided with a group with microswitch (fig. 23) whose lever is kept in position by a balance weight (sliding on the cable); the cable hook or the block lift the balance weight thus releasing the lever becomes impossible with the consequent disactivation of the controls. Please note that each movement of the crane resulting in the exclusion of the balance weight action, engenders the disactivation of the controls.

Folding the crane in rest position
- 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.
- 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; this operation gets active all crane controls to complete the rest position operations.
- Withdraw the cable from the pulleys, then remove them from the crane (reposition the pins and the security pins)
- Operate the ascent of the winch in order to wind the cable onto the winch drum, always keeping the cable in tension, using the cable layer to rewind the cable without overlaping.
- Hook the thimble to a support apt to keep the cable sufficiently taut.

Rotating support for winch.
On cranes fitted with hydraulic extension, in some cases the winch is mounted on a rotating support to reduce the overall dimensions; to put the winch to the rest position, operate as following:
- to position the outer boom vertically.
- to withdraw the security pin, the screw nut and the locking pin from the supports. The pin should be withdraw easily and without putting up resistance; if so the winch support is not enough vertical with consequent dangerous rotation of the group when the pin is finally removed. Then position the crane outer boom in vertical position, and try to withdraw the security pin once again.
- Rotate the winch support until it reaches its new position,
- Insert the locking pin, the screw nut and the security pin.

To put the crane in working position it is necessary to carry out the operations in reverse.

Rotate the winch support with extreme care in order not to damage the hoses and electric components.

To put the crane in working position see Paragraph H0.2.

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

L3.1.2 Winches equipped with a mechanical stroke end device

The mechanical stroke end device combined with the winch limiter prevents the hook bracket (or pulley/snatch block) from hitting the fixed pulley when lifting or when extending the extension booms, and thus from damaging the cable.

When the winch limiter is activated, all the crane functions are disabled.
Manoeuvres allowed:
- Rotation in both directions
- Re-entry of the crane extension boom sections
- Re-entry of the extension booms sections of the jib
- Winch rope descent

Manoeuvres not allowed:
- all other movements

When unwinding, an electric device maintains at least **three (3)** turns of the lifting cable wound around the winch drum on activation the following controls are desactivated.
Manoeuvres not allowed:
- Winch rope descent

Manoeuvres allowed:
- all other movements

(!) ATTENTION (!)

Limit the exit speed of the extension rams when, during the lifting, the hook bracket (or pulley/snatch block) is next to the fixed pulley, in order to avoid unnecessary stress to the cable.

(!) ATTENTION (!)

When the hook bracket (or pulley/snatch block, in case of double or triple line) and the fixed pulley are very close, and the operator needs to manoeuvre in their proximity (i.e. operations like load hook-up, arms folding, etc), we recommend to always stand side on with respect to the pulley plan (never in front or at the back) and to operate the crane at a low speed, since the contact (especially without load) can result in rapid and violent rotations of the hook group (from the fig. 26 to the fig. 27).

fig. 26

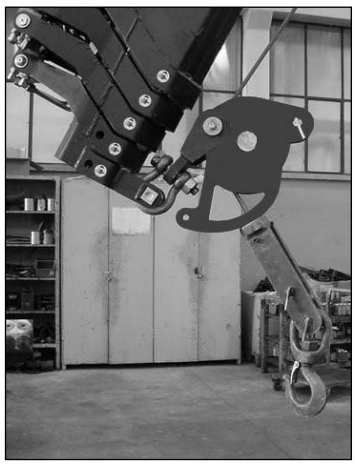
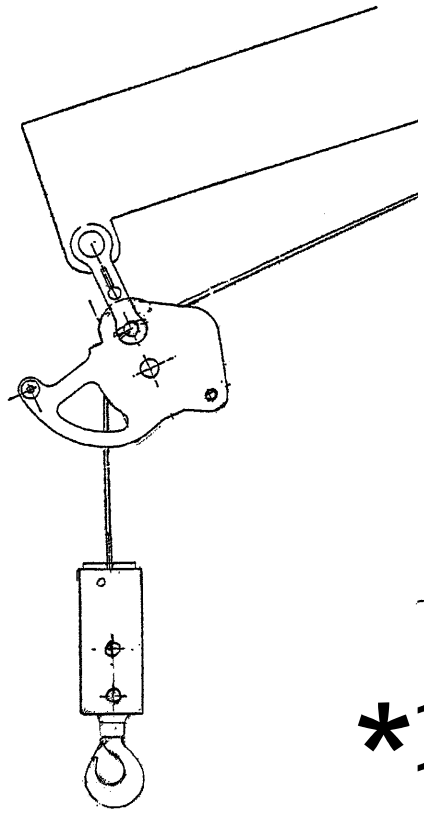
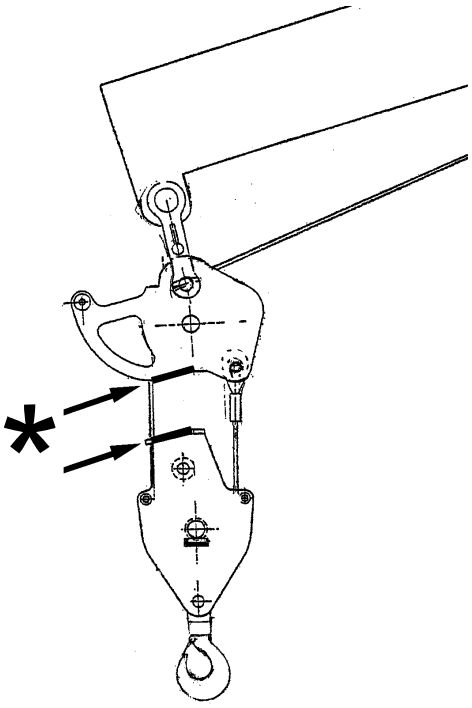


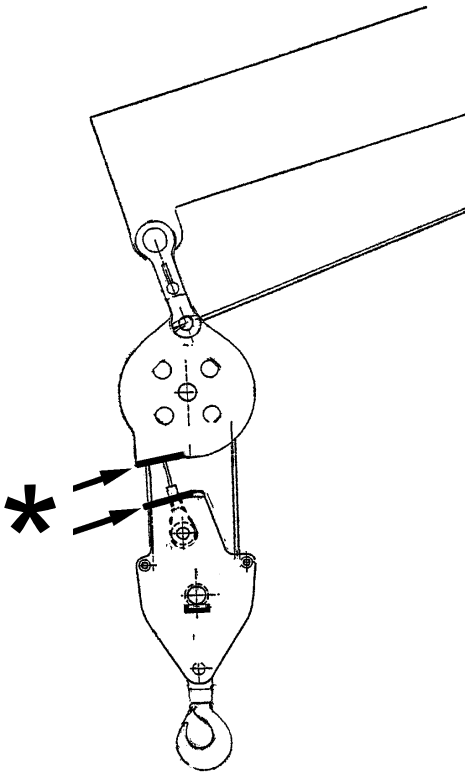
fig. 27



SINGLE LINE



DOUBLE LINE



TRIPLE LINE

* **CORRECT POSITION FOR THE PULLEY AND THE PULLEY BLOCK**

L4 HYDRAULIC JIBS

The hydraulic jibs, foldable behind the cab, are additional booms, with articulation and with one or more extension booms to be fitted to the last extension boom of the crane; on request the manual extensions can be installed on the extension booms of the jib.

Hydraulic jibs							
Extension type	Weight=kg	Manual	Weight=kg	Manual	Weight=kg	Manual	Weight=kg
L314	800	----------		PL31	32	QL31	22
L604	1200	PL60	54	QL60	39	RL60	31

NOTE
The weights reported in the table are indicative and can vary in relation to the fittings.

The jibs are fitted by means of the insertion of the extension connecting boom into the crane extension boom; the fixing to the crane is obtained through locking pins. The hydraulic connection to the supplementary functions of the crane, is through quick couplings.

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

(!) ATTENTION (!)
The loads shown on the capacity plates which concern the configuration of the crane with hydraulic jib, refer to the hydraulic jib and consequently they are the same whether the crane has its extension booms retracted or extended.

(!) Warnings and norms for manual extensions are indicated at Paragraph L1.

(!) ATTENTION (!)
It is recommended to employ lifting means adequate to the weight of the load and radius of the extensions; during this operation the operator is responsible for the machine safety.
The slings or the cables used for handling the load should have the adequate capacity and length; try to avoid the load overturning by having one length passed through itself and the other one through the hook.

L4.1 Identification of the hydraulic jib

The model, the version of the crane, the year of construction and the serial number are stamped on the hydraulic jib (fig. 28) in the following sequence:

L102*03*001
A B C

A = model
B = year of construction
C = serial number

L4.2 Nomenclature of the hydraulic jib

Pos. Description

1. Connecting boom
2. Locking pins
3. Jib outer ram
4. Jib outer boom
5. Boom extension rams
6. Extension booms
7. Manual extension (on request)
8. Lifting hook

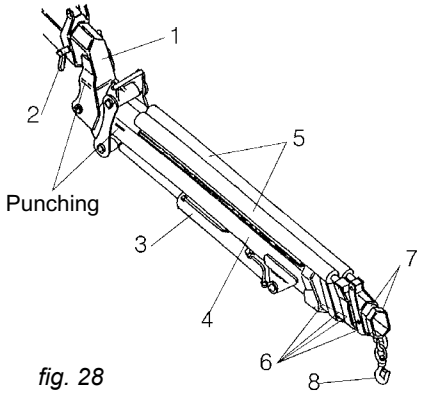


fig. 28

L4.3 Manoeuvres to unfold the jib in working condition

Operate as described to put the crane in working condition (paragraph H0.1).

By operating the corresponding levers:
- open the outer boom of the jib;
- extend the jib outer boom sliding sections;
- position the hook on the centerline of the load.

L4.4 Manoeuvres to fold the jib in rest condition

By operating the corresponding levers:
- re-enter the hydraulic sections of the jib and of the crane;
- lift the inner boom to its stroke end;
- re-enter the outer boom of the jib and of the crane to its stroke end;
- operate, as described, to fold the crane in rest position.

(!) WARNING (!)
Always check and record the overall height of the crane in the folded position or in laid position in the body or on the load.
Always respect and pay proper attention that the load and dimension limits are in conformity with the road regulations.

L4.5 Operations to remove the hydraulic jib from the crane

By operating the corresponding levers:
- re-enter the jib outer booms sliding sections to their stroke end;
- extend the crane outer ram to its stroke end;
- extend (of at least 1 - 1,5 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 screwing the locking pins;
- re-enter the outer booms sliding sections of the crane to free the first boom of the crane jib;
- disconnect the jib from the hydraulic circuit of the crane operating on the quick couplings.

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

L4.6 Operations to mount the hydraulic jib on the crane

By operating the corresponding levers:
- place the extension on the vehicle or on the ground in the direction of the movement of the extension booms;
- extend the crane outer ram to its stroke end and position the extension booms of the crane not too close to the first boom of the jib in order to allow the lining-up manoeuvres and the connection of the hoses;
- connect the jib hoses to the hydraulic plant through coupling unions, following indications of Paragraph L0.1, Hydraulic connections for implements - supplementary hoses;
- operate the outer ram of the jib and the inner ram of the crane in order to align the extension booms of the crane and the first boom of the jib thus allowing their connection;
- eventually repeat the previous operation until the fixing holes are aligned, working on the extension booms of the crane;
- insert the lock pin into the fixing holes and secure it with the check pin.

M0 MAINTENANCE INSTRUCTIONS

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

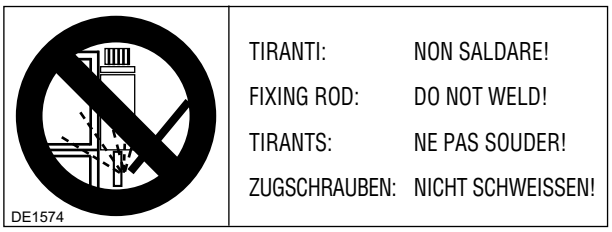
Good maintenance and proper use are imperative to maintain efficient use and guarantee the safety of the crane.

At least once a year you must take the crane to a **Fassi Service Center** for a check.

(!) 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.

Respect the information supplied for maintenance and technical assistance.

fig. 29



Any maintenance operation must be carried out with the crane power source turned off. (in case of fixed mounting with hydraulic power pack, the electric motor has to be 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 fixing rods of the crane (see plate DE1574 fig. 29)

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.

Do not use the high pressure washing on the controls (deviators, distributors, double controls, hand cable controls...), on the electronic components (boxes, control panels...), on the tanks.

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.

M0.0 Timer

The control panel of the "electronic" lifting moment limiting device, placed next to the distributor of the crane, features an alphernumeric readout for displaying the date, the activation time expressed in hours-minutes of the electric control panel (**"Partial Time"** and **"Total time"**) or the working time of the crane whilst being operated via the control levers (**"Work Time"**).

How to view the date and the time
Press button (clock/-) to have the current date visualized on display.

Partial time
How to view the partial time of the electric panel; which can be reset.
- Keep button pressed until you read **"Time"** on display.
- Press button until you see **"Partial time"**.
- Press button INDEX **(enter)** to view the time.

How to reset the "Partial time".
To start a new count perform the following:
- Keep button pressed until you read **"Time"** on display.
- Press button to read **"Partial time"** on the display
- Press button again to read **"Total time"** on the display.
- Press button again to read **"Work time"** on the display.
- Press button again to read **"Reset partial"** on the display.
- Press button INDEX **(enter)** to read **"Enter to confirm"** on the display.
- Press button INDEX **(enter)** again; the timer is reset and it will start recording again.

Total time
How to view the total activation time of the electric panel; this cannot be reset.
- Keep button pressed until you read **"Time"** on display **B**.
- Press button to read **"Partial time"** on the display.
- Press button again to read **"Total time"** on the display.
- Press button **(enter)** to visualize, for about 5 seconds, the total time expressed in hours and minutes.

Work time
How to view the work time which is the actual time recorded whilst a crane operating lever/function is being activated.
- Keep button pressed until you read **"Time"** on display **B**.
- Press button to read **"Partial time"** on the display.
- Press button again to read **"Total time"** on the display.
- Press button again to read **"Work time"** on the display.
- Press button **(enter)** to view, for about 5 seconds the work time of the crane expressed in hours and minutes.

M0.1 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 all the components of the hydraulic circuit for possible leaks.
- Check that the control and the oil diverter levers can easily be positioned; they must show no signs of forcing.
- Check the condition of shackles, hooks, wire ropes and any other lifting equipment.

M0.2 After the first 40 hours use

Check the tightening torque of the fixing rods of the crane (fig. 30).
See table at paragraph M0.4

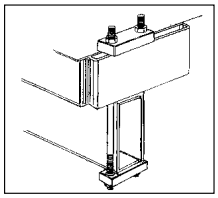


fig. 30

M0.3 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.

NOTE The filters of fibre or paper can not be cleaned, they must be replaced.

Cleaning of the wire mesh filter on the tank (oil return to the oil-tank) fig. 31.
- Unscrew the security bolts of the filter cover 1 and remove it.
- Extract the cartridge, clean by flushing with a non flammable, non corrosive and non toxic solvent (gas oil or other). Thoroughly dry the filter inside and out (do not use compressed air).
- Check if the cartridge has collapsed; if so, replace it!
- Remove the filter body 3 and clean it.
- Re-assemble the filter body and the cartridge: check the sealing of the 'O' ring 4-5-6; in case, replace it!

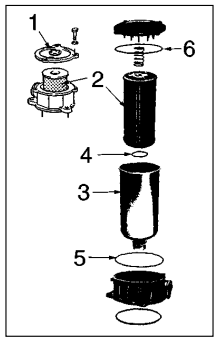


fig. 31

NOTE
Take care that no contaminated material passes into the tank.

Replacement of the filter on the delivery line (before the distributor) fig. 31.
- When the visual indicator becomes red, replace the cartridge.
- Unscrew with a suitable spanner the filter body (**1**) from the head (**2**).
- Remove the cartridge (**3**) and clean inside the holder (**1**).
- Insert a new cartridge and re-assemble the filter body into the head checking the seal (**4**).

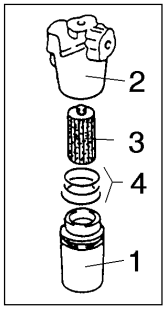


fig. 32

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. 32).

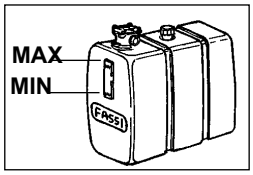


fig. 32

Top up using hydraulic oil with the same characteristics as those indicated in the table at paragraph N0.

(!) WARNING (!)

At low temperatures, the grease shall not crystallize or, to be more precise, shall not change its characteristics. At the effective operative temperature, the grease we recommend shall have a fluidity at least equal to rating **NLGI 0** or max. 1.

(!) WARNING (!)

Centralized lubrication shall not be used when room temperature is below -10°C / -20°C.

All the lubricators mounted on the crane are protected by a plastic cap so to avoid the oil contamination.

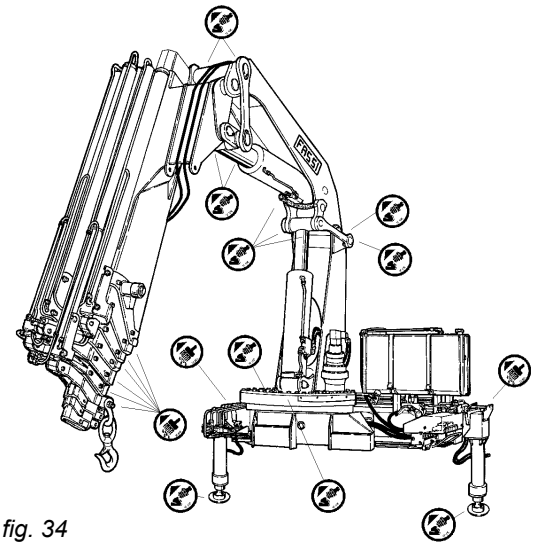


fig. 34

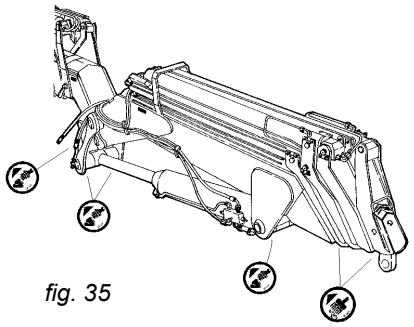


fig. 35

After every 100 working hours or more frequently in case of more intensive utilisation

Grease the slew gear to prevent friction during rotation and to ensure that it is stable by preventing water (corrosion protection) and contaminants from entering the bearings. For a better internal distribution of the grease it is advisable to rotate the crane and grease it in such a way as to see grease at the seals.
Use a grease with the same characteristics indicated in the table at Paragraph N0.

Grease the winch cable (if fitted) after having first cleaned the cable of any encrustation (grease mixed with sand, dust, dirt etc.) The lubricant used must guarantee a good level of penetration in order to lubricate both the inside and the outside of the cable.
Use a grease with the same characteristics indicated in the table at Paragraph N0.

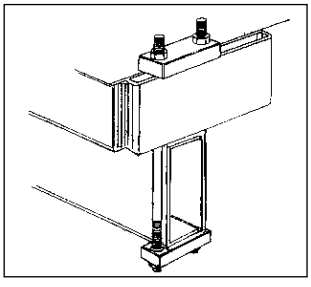
M0.4 After every 500 working hours

Check the tightening torque:

- of the fixing rods of the crane; consult the following table in order to find it's value according to the bolt diameter:

Table of the tightening torques of the fixing rods of the crane on the vehicle From "C0404 Kit for crane fixing".

D. Fixing rods	Tightening torque = Nm
M22x1,5	300
M24x2,0	400
M27x2,0	600
M30x2,0	471
M33x2,0	1200
M39x3,0	1800



- of the slew gear screws (bolts M20 Class 12.9 = 620 Nm)
- of the securing bolts for the ram pins and of all the other bolts and screws, where the tightening torque is not expressly indicated, consult the following table in order to find it's value according to the bolt diameter and class.

Table of the bolts tightening torque with average friction value (0,15) and average-good tightening accuracy (C).

From ... "ELEMENTS DE FIXATION - ASSEMBLAGES VISSES" (AFNOR E 25-030 1984)

Diameter Bolt = D	Class 8.8 Torque = Nm	Class 10.9 Torque = Nm	Class 12.9 Torque = Nm
3	1,06	1,56	1,83
4	2,44	3,58	4,19
5	4,83	7,10	8,30
6	8,30	12,30	14,30
8	20	29	35
10	40	59	69
12	69	102	119
14	111	163	191
16	173	255	298
18	239	352	412
20	339	499	584
22	466	685	802
24	584	858	1004
27	865	1271	1487
30	1173	1723	2016
33	1594	2342	2740
36	2046	3006	3517
39	2658	3905	4570

Check the rotation control motoreducer oil level. Fig. ...
- Remove the bleed plug (**1**) using a 22 mm Allen wrench.
- Remove the plug (**2**) using an 8 mm Allen wrench and the O-ring.
- Top up, if necessary, with the same type of oil as indicated in the table at Paragraph N0 via the mouth (bleed plug).
- The correct level is reached when oil starts to escape from the threaded hole in plug (**2**).
- Check the state of wear of the O-rings (replace if necessary) and then return the plugs. The lubrication oil can be drained completely by removing plug (**3**) using an 8 mm Allen wrench.

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.

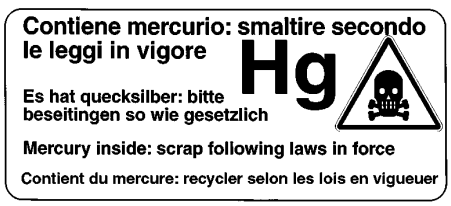
Clean the air filter placed in the top of the oil tank filter cap.

Completely replace the hydraulic oil and the filter cartridges.

(!) The waste oil and the filter cartridges MUST be disposed of by authorized persons.

(!) CAUTION DANGER (!)

On the outer boom there is a mercury capsule (mercury level switch) duly protected and provided with the following warning stickers.



MERCURY IS EXTREMELY TOXIC. IN CASE OF REPLACEMENT AND/OR SCRAPPING, DISPOSE OF OR RECYCLE THE CAPSULE CONTAINING MERCURY WITH MAXIMUM CARE, AND IN ACCORDANCE WITH THE NATIONAL REGULATIONS IN FORCE.

After every working year

Perform: Washing, Function Testing, Testing according to the capacity plates
Check: Identification plates, Capacity plates

Checklist in accordance with ISO 9927-1

Element	Checks to be carried out:
Subframe Structure and fixing rods	Tightening torque of the fixing rods, wear and any deformation, actions
Base Rack group, compensator	Lubrication, tightening torque of the rods, wear and any deformation, actions
Outriggers Supports, rams, base plates safety catches, hoses	Greasing of extension supports, oil-leaks, wear, actions, inspection of hoses
Rotation cylinders Cylinders, pistons, seals,	Oil-leaks, chromium plating, any deformation, inspection of hoses
Column Inner boom connection, outrigger connection, pins, bushes	Lubrication, wear and any deformation, actions
Inner boom Pins, outrigger connections	Lubrication, wear and any deformation, actions
Inner ram Cylinder, rod, piston, seals, hoses	Oil-leaks, chromium plating, any deformation, inspection of hoses
Outer boom Pins, outrigger connections	Lubrication, wear and any deformation, actions
Outer ram Cylinder, rod, piston, seals, hoses	Oil-leaks, chromium plating, strains, inspection of hoses
Extension booms Guide shoes, pins, outrigger connections	Lubrication, wear and any deformation, actions
Extension rams Cylinder, rod, piston, seals, hoses	Oil-leaks, chromium plating, any deformation, inspection of hoses
Hydraulic jib Booms, pins, outrigger connections	Lubrication, wear and any deformation, actions
Rams (hydraulic jib): Cylinder, rod, piston, seals, hoses	Oil-leaks, chromium plating, any deformation, inspection of hoses
Winch Torque limiter, brake, rope slide guide, cable, stroke end, pulleis	Lubrication, wear and any deformation, actions

Distributors, deviators, valves Control levers, forks, joints, fixing screws, lead seals	Checking of the pressure, oil-leaks, wear and any deformation, actions,
Lifting moment limiting device Valves, pressure switches, electrovalves	Checking of the pressure, oil-leaks
Power take-off, pump, oil-tank Filters, hoses	Pump capacity, checking of the pressure, oil change, replacement of filters, inspection of hoses
Oil-pressure system Hoses, hose protection devices	Checking of the pressure, oil-leaks, inspection of hoses
Implements for lifting Hooks, chains, cables, slings	Safety check, wear and any deformation, actions,
Implements Wallboard forks, buckets, rotators	Oil-leaks, wear and any deformation, actions, inspection of hoses
Seat, third control station Frame, fixing screws	Access inspection, wear and any deformation, strains
Tele(radio)remote control	Test

M0.6 Complete overhaul of the crane is required when 10.000 working hours or 10 years' life are reached - i.e.:

When one of the limits indicated hereunder is reached:

10.000 working hours, (i.e.: 10 years, 50 weeks a year, 20 hours a week, or 5 years, 50 weeks a year, 40 hours a week)

or

10 years' life of the crane,

a complete overhaul with in-depth structural inspection of the crane must be carried out by the Manufacturer or by an authorised service centre.

N0 TABLE OF HYDRAULIC OIL AND LUBRICANTS CHARACTERISTICS

HYDRAULIC OIL WITH HIGH VISCOSITY: ISO-L-HV		
Minimal external temperature:	maximal oil temperature:	Gradation
-35 C	+45 C	ISO VG 32
-20 C	+75 C	ISO VG 46

HYDRAULIC OIL WEAR RESISTANT: ISO-L-HM		
Minimal external temperature:	maximal oil temperature:	Gradation
-10 C	+60 C	ISO VG 32
+ 0 C	+75 C	ISO VG 46
+ 5 C	+85 C	ISO VG 68
+10 C	+90 C	ISO VG 100

GREASE
Consistency: NLGI BEACON EP 2 - BEACON 3

GREASE (for slew ring)
-30 C up to +130 C EP2 Gradation All grease used must be free from acid and resin, not hydroscopic and long-life such as BP GREASE LTX-EP2 or ELF EPEXA 2 or ESSO BEACON EP2 or SIMILARI.

HYDRAULIC OIL FOR MOTOREDUCER
Classification ISO-L-CC Gradation EP ISO-VG 150

LUBRICATING OIL (for winch cable)
The most suitable here is a general-purpose lubricating oil with about SAE 30 viscosity. A lubricating oil containing non-stick additives is recommended if the cables are expected to move quickly through the pulleys. BRILUBE 50 (BRITISH ROPES - BRINDON)

(!) WARNING (!)
Don’t use greases with solid particles as “Bisulphide of Molybdenum”.

P0 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.

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

(!) ATTENTION (!)

In the event that the crane ceases to operate and the code "alarm" with a number appears on the Display B. Call your **FASSI authorised service centre** reporting the Alarm number with the crane model and serial numbers. If the fault cannot be cleared follow the procedure in the chapter "Controls to operate the crane" and overide the dump valve EVI.
THIS IS ONLY A TEMPORARY ACTION FOR EMERGENCIES, the crane should be taken to a **FASSI service centre** for repair as soon as possible.

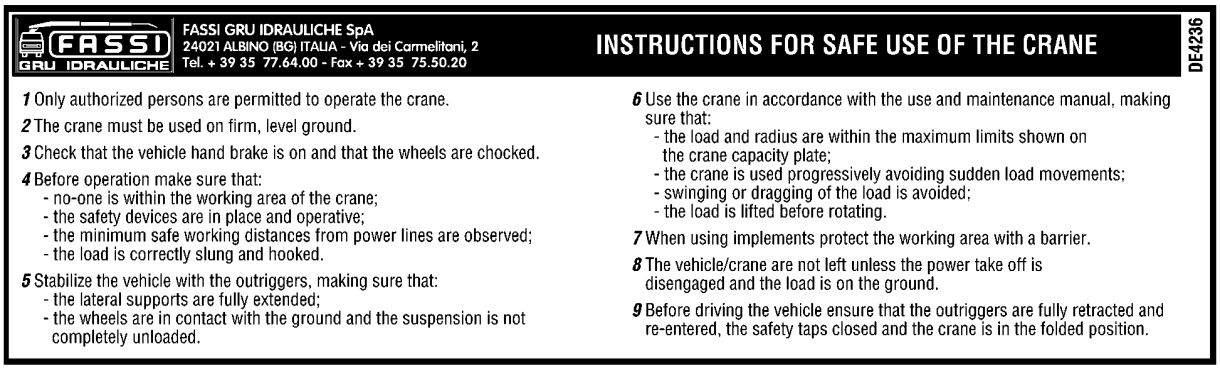
TO OPERATE THE CRANE FOR TOO LONGER PERIOD WITH THE OVERIDE ACTIVATED MAY INVALIDATE THE CRANE WARRANTY.

P0.1 Operations which can be carried out by the user

FAULTS	CAUSE	REMEDIES
The crane does not rotate properly	Vehicle non in level position Lack of lubrication	Stabilize the vehicle Grease the slew ring and the pinion gear-slew ring group
The extension booms do not completely extend or work jerkily	Lack of lubrication of the guide shoes	Grease the guide shoes
Crane controls are not active	Lack of electric energy Winch end stroke active The rotation limiting device is activated	Check the fuse, the battery and electric circuit See L3.1 See H1.7
Vibrations in crane operations	Shortage of oil Obstructed filters	Check the level and top up if necessary Clean or replace the filter cartridge
Noteable decrease in movement speed	Obstructed filters	Clean or replace the filter cartridge

P0.2 Operations to be carried out by an authorized service center.

FAULTS	CAUSE	REMEDIES
The crane does not lift the loads indicated on the capacity plate	Non efficiency of the pump	Replace the pump
	(main pressure or auxiliary) valves not properly adjusted, or worn	Check the pressure, adjust the valves or replace them!
	Ram seals are not properly fitted	Replace the seals
A boom of the crane does not hold up the load and visually lowers	The safety check valve the ram is open	Replace the valve
	Oil leaks inside the ram	Defective seals, replace them!
The crane does not rotate properly	Valve controlling the rotation not adjusted	Adjust the valve
	Wear of the slew ring	Check the slew ring wear, replace if necessary
	Wear of the motoreducer group	Check the motore-ducer group wear, replace if necessary
The extension booms do not completely extend or work jerkily	Wear of guide shoes	Check the guide shoes wear, replace if necessary
Vibrations in crane operations	Non efficient pump	Check the pump
Noteable decrease in movement speed	Non efficient pump	Check the pump



FASSI GRU IDRAULICHE
FASSI GRU IDRAULICHE SpA
24021 ALBINO (BG) ITALIA - Via dei Carmelitani, 2
Tel. + 39 35 77.64.00 - Fax + 39 35 75.50.20

INSTRUCTIONS FOR SAFE USE OF THE CRANE

DE4236

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.

6 Use the crane in accordance with the use and maintenance manual, making sure that:
- the load and radius 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 4236
Instruction plate and safety norms

FASSI GRU IDRAULICHE

ATTENZIONE: PRIMA DI AZIONARE LA GRU E' OBBLIGATORIO METTERE IN OPERA GLI STABILIZZATORI.

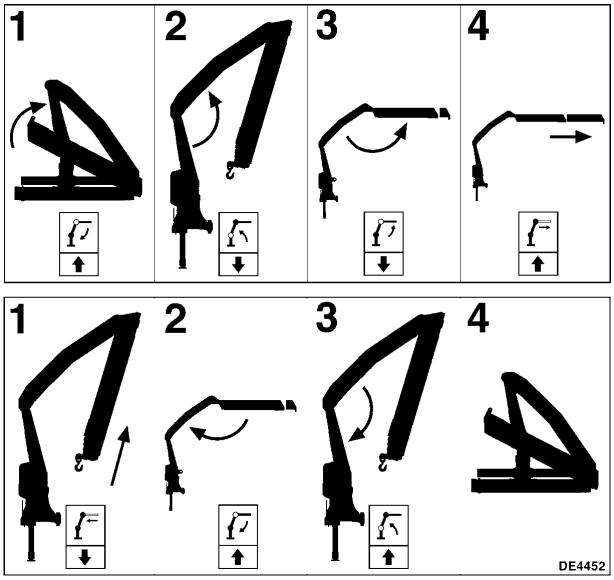
WARNING: BEFORE OPERATING THE CRANE IT IS COMPULSORY TO EXTEND THE OUTRIGGERS.

ATTENTION: AVANT D'UTILISER LA GRUE IL EST OBLIGATOIRE DE METTRE EN FONCTION LES STABILISATEURS.

ACHTUNG: VOR INBETRIEBNAHME DES KRANS MUESSEN DIE ABSTUETZUNGEN AUSGEFAHREN.

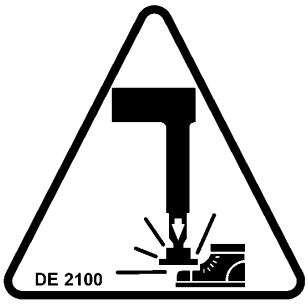
DE2327

DE 2327
Warning plate to stabilize the vehicle before using the crane

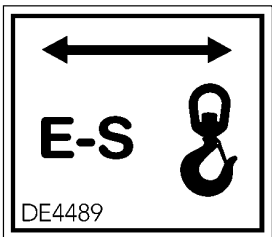


DE 4452
Instruction plate to fold the crane into the rest condition

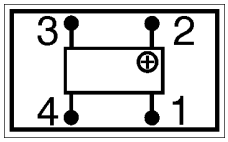
DE 4491
Do not operate from the frontal position, to extend the outrigger supports



DE 2100
Danger plate for crushing of lower limbs



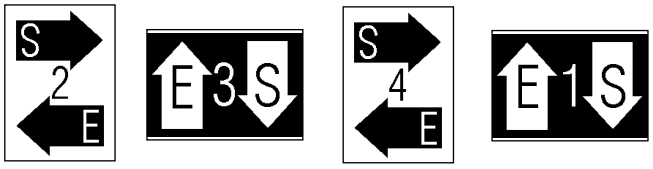
DE 4489
Oil-diverter control plate



Instruction plates
to stabilize the vehicle

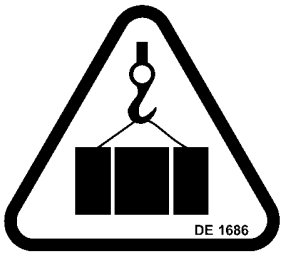
LEVERS CD **LEVER C**

LEVERS CD



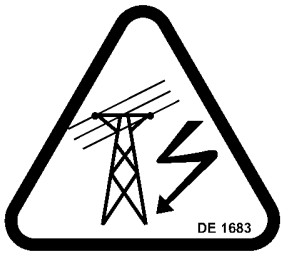
DE 1681
Greasing points with brush

DE 1682
Greasing points at pressure



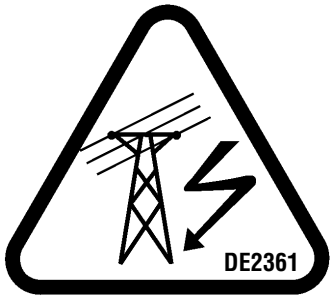
DE 1686

Do not walk or stop under a suspended load



DE 1683

Do not operate in proximity of electric high-tension lines



DE 2361

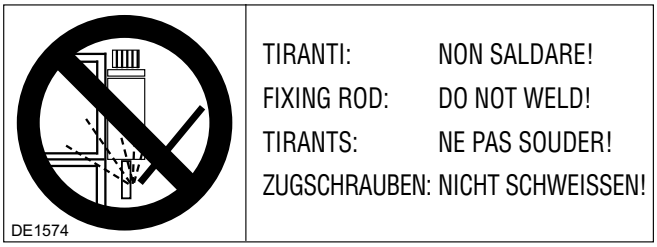
Do not operate in proximity of electric high-tension lines

DE 1679

Do not walk on...

DE 1680

Do not use water to estinguish fire

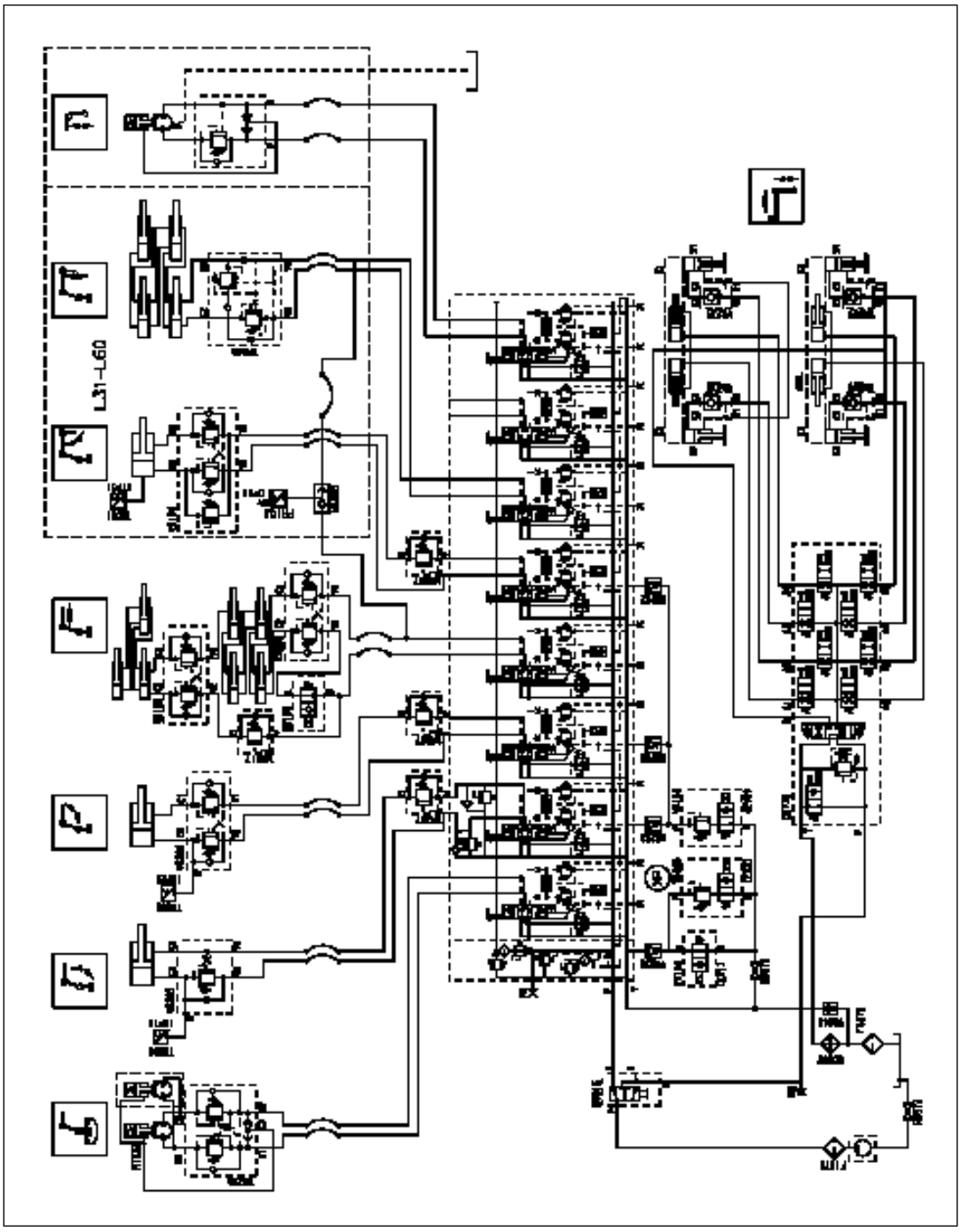


DE 1574

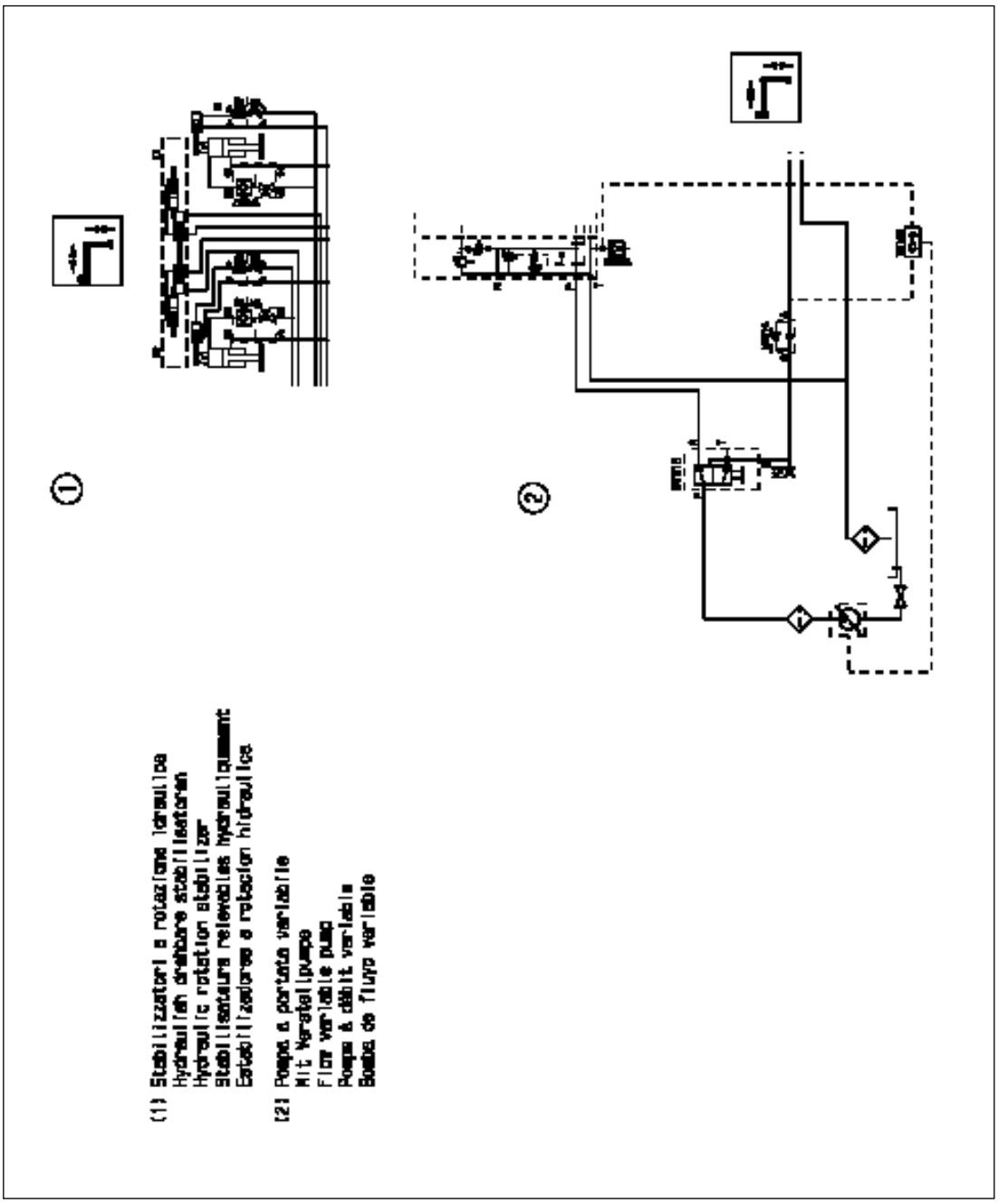
Do not weld the fixing rods

S0 HYDRAULIC SCHEMATICS

Hydraulic schematic for crane - Danfoss distributor - “electronic” lifting moment limiting device



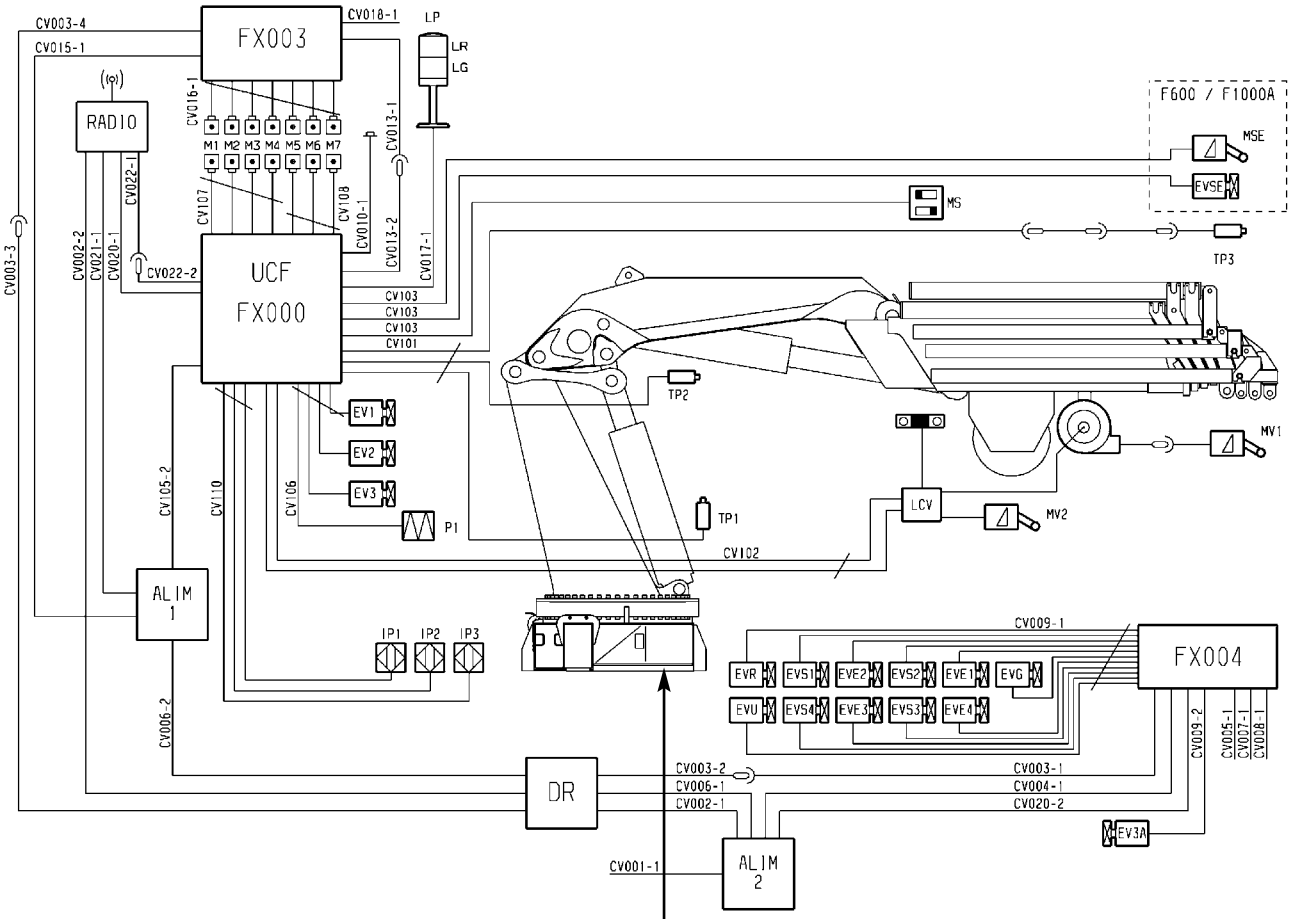
CODE	DESCRIPTION
DI776	DISTRIBUTOR
DV015	DEVIATOR
EV124	ELECTROVALVE
EV128	ELECTROVALVE
FI776	FILTER
FI870	FILTER
M1/M2	GAUGE QUICK CONNECTION
MT133	MOTOREDUCER
PR103	PRESSURE SWITCH
RU977	FAUCET
RU978	FAUCET
SC002	OIL COOLER (HEAT EXCHANGER)
TR001	PRESSURE TRANSDUCER
VA148	ELECTRIC MAIN WITH BY PASS VALVE
VA185	SELECTOR VALVE
VA194	DOUBLE EFFECT BLOCK VALVE
VA203	SIMPLE EFFECT BLOCK VALVE
VA204	DOUBLE EFFECT BLOCK VALVE
VA205	DOUBLE EFFECT BLOCK VALVE
VA217	SEQUENCE VALVE
VA227	SEQUENCE VALVE
VA232	UNIDIRECTIONAL VALVE
VA239	SIMPLE EFFECT BLOCK VALVE
VA246	REGENERATIVE VALVE
VA249	UNIDIRECTIONAL VALVE
VA256	OIL FLOW REGULATOR VALVE FOR ROTATION CYLINDER



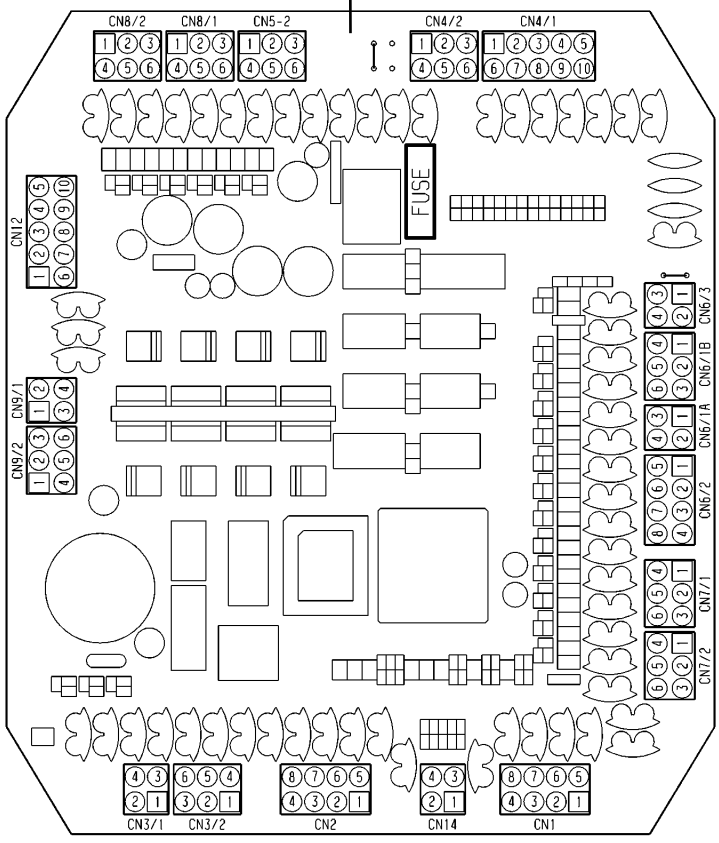
CODE	*DESCRIPTION*
DV015	DEVIATOR
VA175	BLOCK VALVE + FAUCET
VA185	SELECTOR VALVE
VA187	BLOCK VALVE + FAUCET
VA215	OIL FLOW CHECK VALVE
VA232	UNIDIRECTIONAL VALVE

T0 ELECTRIC SCHEMATICS

Electric schematic for crane - printed electric card



N	DESCRIPTION
ALIM1	SHUNT BOX ON THE COLUMN
ALIM2	SHUNT BOX ON THE BASE AND CONNECTORS FOR DANFOSS MODULUS
DR	ELECTRIC ROTATING DISTRIBUTOR FOR EMERGENCY
EV1	ELECTROVALVE FOR CRANE BLOCK
EV2	ELECTROVALVE FOR LIFTING MOMENT LIMITING DEVICE OF THE TWO WORKING ZONES
EV3	XP ELECTROVALVE
EV3A	ELECTROVALVE FOR ELECTRIC DEVIATOR CRANE/OUTRIGGERS
EVE1/2/3/4	EXTENSION ELECTROVALVE
EVG	GENERAL ELECTROVALVE FOR OUTRIGGER DISTRIBUTOR
EVR	RE-ENTRY ELECTROVALVE OUTRIGGERS/EXTENSIONS
EVS1/2/3/4	OUTRIGGER ELECTROVALVE
EVSE	SEQUENCE ELECTROVALVE
EVU	EXIT ELECTROVALVE OUTRIGGERS/EXTENSIONS
FX003	DANFOSS CONTROL UNIT
FX004	OUTRIGGER CONTROL UNIT
IP1/2/3	PROXIMITY MICROSWITCH FOR ROTATION CONTROL
LCV	WINCH LOAD LIMITING DEVICE
LG	90% LOAD YELLOW WARNING LIGHT
LP	ADDITIONAL FLASHING
LR	ACTIVATION OF OVERLOAD BLOCK RED WARNING LIGHT
M1/.../M7	MICROSWITCH ON THE DISTRIBUTOR
MS	MERCURY LEVEL SENSOR ON THE OUTER BOOM
MSE	SEQUENCE MICROSWITCH
MV1	PULLEY MICROSWITCH FOR WINCH (FITTED ONLY ON THE ELECTRIC STROKE END)
MV2	DRUM MICROSWITCH WINCH
P1	PRESSURE SWITCH FOR THE RE-ENTRY OF THE EXTENSION BOOMS
RADIO	RADIO REMOTE CONTROL
TP1	PRESSURE TRANSDUCER FOR INNER RAM
TP2	PRESSURE TRANSDUCER FOR OUTER RAM
TP3	PRESSURE TRANSDUCER FOR THE JIB RAM
UCF	GENERAL CONTROL PANEL

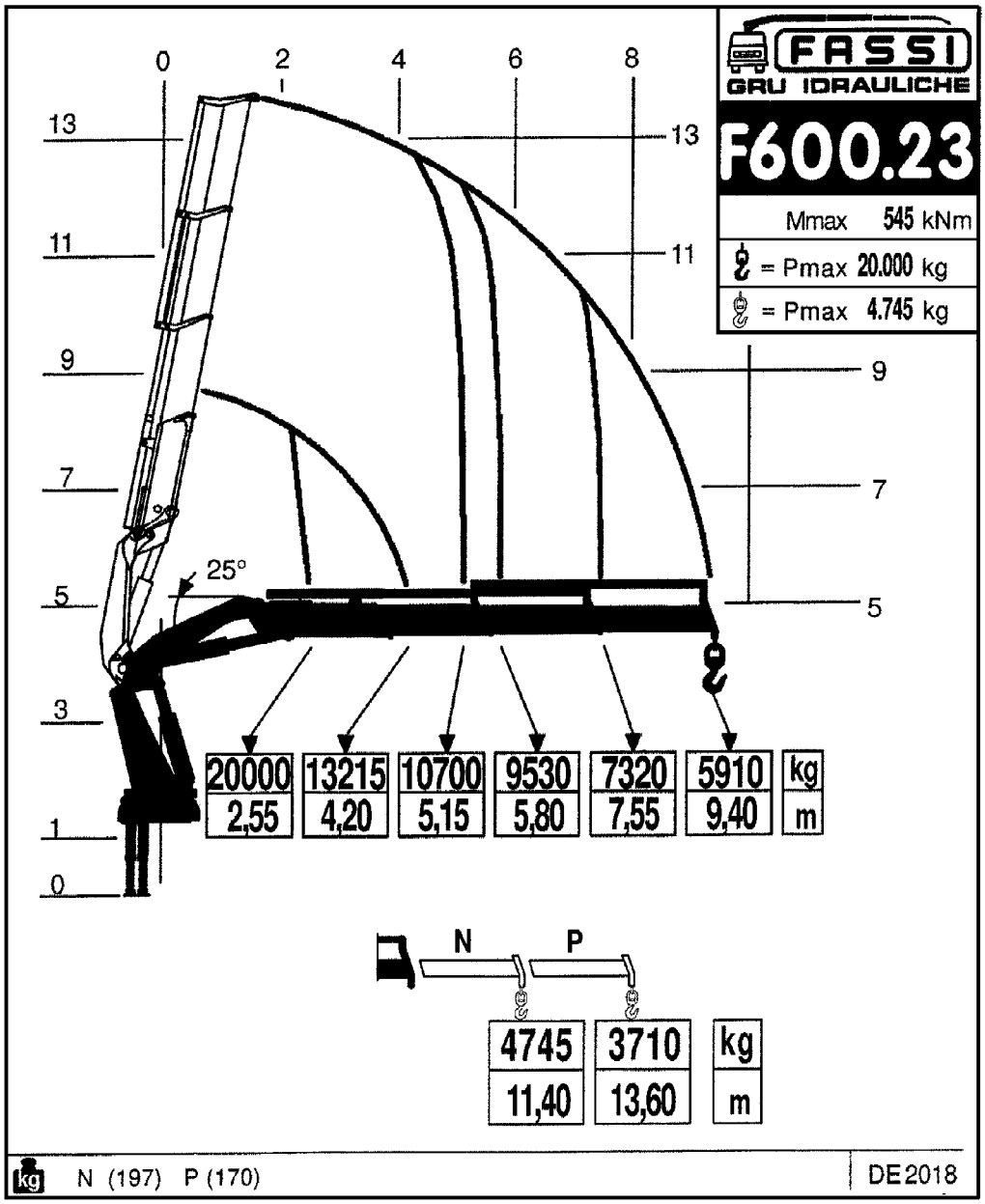


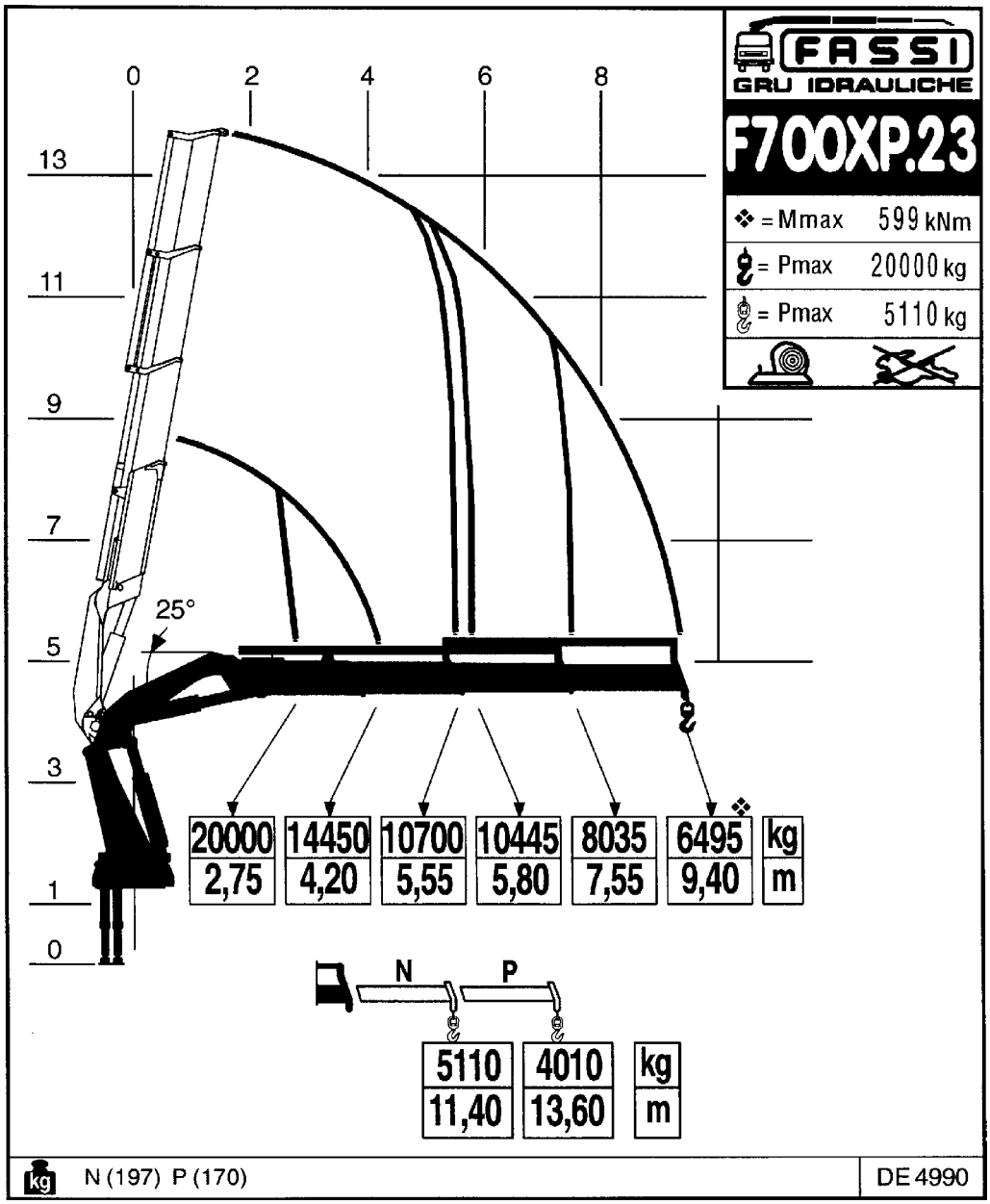
V0 TARGHE DI PORTATA E CURVE DI CARICO

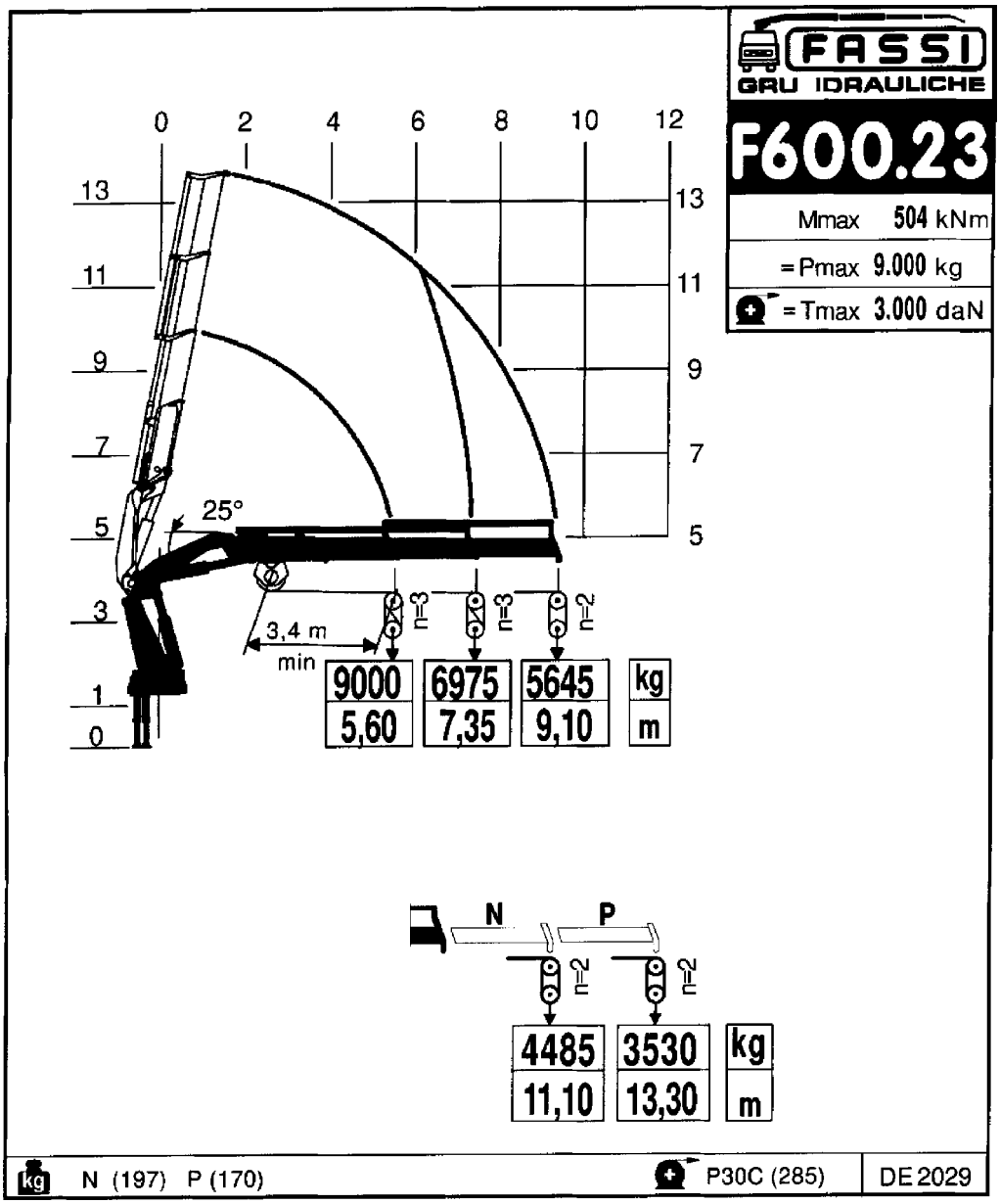
Le targhe rappresentate fanno riferimento a portate nominali di progetto.

(!) AVVERTENZA (!)

In caso di declassamento o di riduzione parziale delle portate (es. settore davanti cabina del veicolo) le targhe da utilizzare devono essere quelle definite al collaudo finale di stabilità.




FASSI
GRU IDRAULICHE
F700XP.23
= Mmax 599 kNm
= Pmax 20000 kg
= Pmax 5110 kg
0
2
4
6
8
13
11
9
7
5
3
1
0
25°
20000 14450 10700 10445 8035 6495 kg
2,75 4,20 5,55 5,80 7,55 9,40 m
N
P
5110 4010 kg
11,40 13,60 m
N (197) P (170)
DE 4990


FASSI
GRU IDRAULICHE
F600.23
Mmax 504 kNm
= Pmax 9.000 kg
= Tmax 3.000 daN
0 2 4 6 8 10 12
13 11 9 7 5 3 1 0
25°
3,4 m
min
n=3
n=3
n=2
9000 6975 5645 kg
5,60 7,35 9,10 m
N P
n=2
n=2
4485 3530 kg
11,10 13,30 m
N (197) P (170)
P30C (285)
DE 2029