

Valid for models:

PM 48522 SP - PM 48522 SP C  
PM 48523 SP - PM 48523 SP C  
PM 48524 SP - PM 48524 SP C  
PM 48525 SP - PM 48525 SP C  
PM 48526 SP - PM 48526 SP C  
PM 48527 SP - PM 48527 SP C  
PM 48528 SP - PM 48528 SP C  
PM 48529 SP - PM 48529 SP C

## **SERIE 48.5 SP**

- G140 -

### **INSTRUCTION AND WARNINGS**

Valid with the serial number

**G.140.0001**

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**Original instructions in English**



|          |                                                                |            |
|----------|----------------------------------------------------------------|------------|
| <b>1</b> | <b>General information .....</b>                               | <b>1.1</b> |
| 1.1      | - Purpose of the manual .....                                  | 1.1        |
| 1.2      | - Manufacturer's details and machine identification data ..... | 1.1        |
| 1.3      | - Symbology .....                                              | 1.2        |
| 1.4      | - Technical service .....                                      | 1.3        |
| 1.5      | - Enclosed documentation.....                                  | 1.3        |
| 1.6      | - Disclaimer .....                                             | 1.3        |
| <b>2</b> | <b>Technical information.....</b>                              | <b>2.1</b> |
| 2.1      | - Description of the crane .....                               | 2.1        |
| 2.1.1    | - Basic crane main parts.....                                  | 2.1        |
| 2.2      | - Conditions of use .....                                      | 2.4        |
| 2.2.1    | - Designated use .....                                         | 2.4        |
| 2.2.2    | - Inadmissible uses.....                                       | 2.4        |
| 2.3      | - Control and limiting devices .....                           | 2.5        |
| 2.3.1    | - Functional control unit.....                                 | 2.5        |
| 2.3.2    | - Rotation locking and limiting device .....                   | 2.5        |
| 2.3.3    | - Load support valves.....                                     | 2.6        |
| 2.3.4    | - Pressure sensors .....                                       | 2.6        |
| 2.3.5    | - Outrigger arm extension lock valve.....                      | 2.6        |
| 2.3.6    | - Stabiliser valve .....                                       | 2.7        |
| 2.3.7    | - Emergency stop device.....                                   | 2.7        |
| 2.3.8    | - Tilt sensor.....                                             | 2.7        |
| 2.3.9    | - Signal lights.....                                           | 2.8        |
| 2.3.10   | - Stabilisation controller.....                                | 2.9        |
| 2.3.11   | - Locking devices for transit on the roads.....                | 2.10       |
| 2.3.12   | - Control devices for transit on roads .....                   | 2.10       |
| 2.4      | - Safety recommendations and information.....                  | 2.11       |
| 2.5      | - Accessories.....                                             | 2.15       |
| 2.5.1    | - Additional crossmember.....                                  | 2.15       |
| 2.5.2    | - Manual extensions .....                                      | 2.17       |
| 2.5.3    | - Jibs.....                                                    | 2.18       |
| 2.5.4    | - Overhead manoeuvring post.....                               | 2.22       |
| 2.5.5    | - Winch.....                                                   | 2.23       |
| 2.5.6    | - Lifting tackle .....                                         | 2.27       |
| 2.6      | - Noise level.....                                             | 2.30       |

|          |                                                             |            |
|----------|-------------------------------------------------------------|------------|
| 2.7      | - Vibrations .....                                          | 2.30       |
| 2.8      | - Gas emissions.....                                        | 2.30       |
| 2.9      | - Electromagnetic compatibility.....                        | 2.30       |
| 2.10     | - Residual dangers .....                                    | 2.30       |
| <b>3</b> | <b>Safety .....</b>                                         | <b>3.1</b> |
| 3.1      | - Safety regulations .....                                  | 3.1        |
| 3.2      | - Operator's qualifications and behaviour.....              | 3.8        |
| <b>4</b> | <b>Handling, lifting and fitting.....</b>                   | <b>4.1</b> |
| 4.1      | - Handling and lifting.....                                 | 4.1        |
| 4.1.1    | - Lifting the crane with a hook .....                       | 4.2        |
| 4.1.2    | - Locking devices.....                                      | 4.2        |
| 4.2      | - Storage.....                                              | 4.3        |
| 4.3      | - Fitting .....                                             | 4.3        |
| 4.4      | - Fitting the manual extension .....                        | 4.4        |
| 4.5      | - Fitting the hook.....                                     | 4.5        |
| 4.6      | - Fitting the jib.....                                      | 4.6        |
| 4.7      | - Tackle installation.....                                  | 4.8        |
| 4.7.1    | - Fitting the tackle on the crane .....                     | 4.8        |
| 4.7.2    | - Fitting the tackle on the jib (J810.20 - J610.20) .....   | 4.10       |
| 4.7.3    | - Fitting the tackle on the jib (J1410.20 - J1210.20) ..... | 4.11       |
| <b>5</b> | <b>Information about adjustments .....</b>                  | <b>5.1</b> |
| <b>6</b> | <b>Usage instructions.....</b>                              | <b>6.1</b> |
| 6.1      | - Controls.....                                             | 6.1        |
| 6.1.1    | - Control posts on board the machine .....                  | 6.1        |
| 6.1.2    | - Crane control symbols .....                               | 6.2        |
| 6.1.3    | - Controls and signals/gauges located in the truck cab..... | 6.3        |
| 6.1.4    | - PM panel for per driver's cab .....                       | 6.4        |
| 6.2      | - Radio control .....                                       | 6.5        |
| 6.2.1    | - SCANRECO radio control .....                              | 6.5        |
| 6.2.2    | - HETRONIC radio control.....                               | 6.12       |
| 6.2.3    | - Radio control operation check.....                        | 6.18       |
| 6.2.4    | - Radio control stop due to power failure.....              | 6.18       |
| 6.2.5    | - Radio control maintenance .....                           | 6.18       |
| 6.3      | - Functioning control unit.....                             | 6.19       |

|                                                                                               |      |
|-----------------------------------------------------------------------------------------------|------|
| 6.3.1 - Functioning control unit controls and indicators (Power Tronic Advance +) .....       | 6.19 |
| 6.3.2 - Information and alarm messages.....                                                   | 6.23 |
| 6.4 - Work sectors .....                                                                      | 6.31 |
| 6.4.1 - Electrical and mechanical rotation control devices .....                              | 6.32 |
| 6.4.2 - Stabilisation control device (TYPE 1).....                                            | 6.33 |
| 6.4.3 - Stabilisation control device (TYPE 2).....                                            | 6.34 |
| 6.4.4 - Stabilisation control device (TYPE 3).....                                            | 6.35 |
| 6.4.5 - Stabilisation control device (TYPE 4).....                                            | 6.37 |
| 6.4.6 - Stabilisation control device (TYPE 5).....                                            | 6.39 |
| 6.5 - Crane stabilisation.....                                                                | 6.41 |
| 6.5.1 - Stabilisation procedure.....                                                          | 6.41 |
| 6.5.2 - Stabilisation using the controls on board the machine - Three lever distributor ..... | 6.43 |
| 6.5.3 - Stabilisation using the controls on board the machine - Four lever distributor .....  | 6.44 |
| 6.5.4 - Stabilisation controls with "MCS" keyboard.....                                       | 6.45 |
| 6.5.5 - Stabilisation controls with transmitter unit.....                                     | 6.49 |
| 6.5.6 - Adjustable outrigger rotation mode .....                                              | 6.50 |
| 6.6 - Working position of the crane.....                                                      | 6.51 |
| 6.6.1 - Working position of the jib .....                                                     | 6.52 |
| 6.7 - Checking the efficiency of the control and limiting devices.....                        | 6.52 |
| 6.7.1 - Checking the emergency stop button.....                                               | 6.52 |
| 6.7.2 - Checking the rotation limiter (fig. 6.7.1) .....                                      | 6.53 |
| 6.7.3 - Checking the rotation block (fig. 6.7.1).....                                         | 6.53 |
| 6.7.4 - Checking the rotation limiter with stabilisation control device .....                 | 6.53 |
| 6.7.5 - Checking the load maintenance valve .....                                             | 6.54 |
| 6.8 - Lifting and moving the load .....                                                       | 6.54 |
| 6.9 - Crane resting position .....                                                            | 6.57 |
| 6.9.1 - Crane resting position with jib .....                                                 | 6.58 |
| 6.10 - Crane destabilisation and circulation on the roads .....                               | 6.59 |
| 6.10.1 - Crane destabilisation.....                                                           | 6.59 |
| 6.10.2 - Circulation on the roads .....                                                       | 6.59 |
| 6.11 - Lock situations and manoeuvres permitted.....                                          | 6.60 |
| 6.11.1 - Resetting the functioning using the "3-30" system.....                               | 6.64 |
| 6.11.2 - Winch lock.....                                                                      | 6.65 |
| 6.11.3 - Crane rotation lock.....                                                             | 6.65 |
| 6.12 - Failure situations .....                                                               | 6.65 |

|                                                                                      |            |
|--------------------------------------------------------------------------------------|------------|
| 6.12.1 - Quick Reset / Restart .....                                                 | 6.65       |
| 6.12.2 - Radio control transmission failure / error .....                            | 6.65       |
| 6.13 - Radio control/CAN-BUS network failure and electrical-electronic failure ..... | 6.67       |
| 6.13.1 - Closing the crane in case of mains failure .....                            | 6.67       |
| 6.13.2 - Closing the crane in case of electrical-electronic failure .....            | 6.68       |
| 6.13.3 - Closing the outriggers .....                                                | 6.69       |
| 6.14 - Sensor exclusion during malfunction .....                                     | 6.70       |
| 6.15 - Use of the manual extension load limiter .....                                | 6.71       |
| <b>7 Maintenance .....</b>                                                           | <b>7.1</b> |
| 7.1 - Regular checks .....                                                           | 7.1        |
| 7.2 - Checking the condition of the hoses .....                                      | 7.2        |
| 7.3 - Checking the hosing guards.....                                                | 7.2        |
| 7.4 - Checking for oil leaks from the hydraulic system.....                          | 7.3        |
| 7.5 - Checking the oil level in the rotation reduction gears.....                    | 7.3        |
| 7.6 - Checking the hydraulic oil level.....                                          | 7.4        |
| 7.7 - Structure inspection .....                                                     | 7.4        |
| 7.8 - Pulley check.....                                                              | 7.4        |
| 7.9 - Cable check .....                                                              | 7.5        |
| 7.10 - Cable lubrication .....                                                       | 7.5        |
| 7.11 - Checking the pin locks .....                                                  | 7.5        |
| 7.12 - Checking the anchorage stay rods.....                                         | 7.6        |
| 7.13 - Checking the jack sliding blocks .....                                        | 7.6        |
| 7.14 - Checking the supplementary crossmember.....                                   | 7.6        |
| 7.15 - Filters .....                                                                 | 7.7        |
| 7.16 - Lubrication of the crane arms and stabilisers.....                            | 7.7        |
| 7.17 - Cleaning the machine .....                                                    | 7.8        |
| 7.18 - Long periods of machine inactivity .....                                      | 7.8        |
| 7.19 - Starting the machine up again .....                                           | 7.8        |
| 7.20 - Scrapping and disposal.....                                                   | 7.8        |
| 7.21 - Oils and lubricants.....                                                      | 7.9        |
| 7.21.1 - Lubricant comparison table .....                                            | 7.9        |
| 7.22 - Greasing and lubrication diagrams .....                                       | 7.10       |
| <b>8 Fault, cause, remedy.....</b>                                                   | <b>8.1</b> |
| <b>9 Spare part replacement .....</b>                                                | <b>9.1</b> |

|                                                               |                                         |            |
|---------------------------------------------------------------|-----------------------------------------|------------|
| 9.1                                                           | - Hose replacement .....                | 9.1        |
| 9.2                                                           | - Fuse replacement .....                | 9.1        |
| 9.2.1                                                         | - Connector block fuse replacement..... | 9.1        |
| 9.2.2                                                         | - Radio receiver fuse replacement ..... | 9.2        |
| 9.3                                                           | - Filters replacement.....              | 9.2        |
| 9.3.1                                                         | - Replacing the exhaust filter.....     | 9.2        |
| 9.3.2                                                         | - Delivery filter replacement .....     | 9.3        |
| <b>Enclosures</b>                                             | .....                                   | <b>A.1</b> |
| - Overall dimensions .....                                    |                                         | A.1        |
| - Overall dimensions of standard basic machine with jib ..... |                                         | A.2        |
| - Overall dimensions - Working positions .....                |                                         | A.3        |
| - Specifications and performances PM 48522 SP C.....          |                                         | A.4        |
| - Capacities diagram PM 48522 SP C.....                       |                                         | A.5        |
| - Specifications and performances PM 48523 SP C.....          |                                         | A.6        |
| - Capacities diagram PM 48523 SP C.....                       |                                         | A.7        |
| - Specifications and performances PM 48524 SP C.....          |                                         | A.8        |
| - Capacities diagram PM 48524 SP C.....                       |                                         | A.9        |
| - Specifications and performances PM 48525 SP C.....          |                                         | A.10       |
| - Capacities diagram PM 48525 SP C.....                       |                                         | A.11       |
| - Specifications and performances PM 48526 SP C.....          |                                         | A.12       |
| - Capacities diagram PM 48526 SP C.....                       |                                         | A.13       |
| - Specifications and performances PM 48527 SP C.....          |                                         | A.14       |
| - Capacities diagram PM 48527 SP C.....                       |                                         | A.15       |
| - Specifications and performances PM 48528 SP C.....          |                                         | A.16       |
| - Capacities diagram PM 48528 SP C.....                       |                                         | A.17       |
| - Specifications and performances PM 48529 SP C.....          |                                         | A.18       |
| - Capacities diagram PM 48529 SP C.....                       |                                         | A.19       |
| - Specifications and performances PM 48522 SP .....           |                                         | A.20       |
| - Capacities diagram PM 48522 SP.....                         |                                         | A.21       |
| - Specifications and performances PM 48523 SP .....           |                                         | A.22       |
| - Capacities diagram PM 48523 SP.....                         |                                         | A.23       |
| - Specifications and performances PM 48524 SP .....           |                                         | A.24       |
| - Capacities diagram PM 48524 SP.....                         |                                         | A.25       |
| - Specifications and performances PM 48525 SP .....           |                                         | A.26       |
| - Capacities diagram PM 48525 SP.....                         |                                         | A.27       |

|                                                                                            |      |
|--------------------------------------------------------------------------------------------|------|
| - Specifications and performances PM 48525 SP - with jib J1214.20 .....                    | A.28 |
| - Capacities diagram PM 48525 SP - with jib J1214.20.....                                  | A.29 |
| - Specifications and performances PM 48525 SP - with jib J1215.20 .....                    | A.30 |
| - Capacities diagram PM 48525 SP - with jib J1215.20.....                                  | A.31 |
| - Specifications and performances PM 48525 SP - with jib J1216.20 .....                    | A.32 |
| - Capacities diagram PM 48525 SP - with jib J1216.20.....                                  | A.33 |
| - Specifications and performances PM 48526 SP .....                                        | A.34 |
| - Capacities diagram PM 48526 SP.....                                                      | A.35 |
| - Specifications and performances PM 48526 SP - with jib J1214.20 .....                    | A.36 |
| - Capacities diagram PM 48526 SP - with jib J1214.20.....                                  | A.37 |
| - Specifications and performances PM 48526 SP - with jib J1215.20 .....                    | A.38 |
| - Capacities diagram PM 48526 SP - with jib J1215.20.....                                  | A.39 |
| - Specifications and performances PM 48526 SP - with jib J1216.20 .....                    | A.40 |
| - Capacities diagram PM 48526 SP - with jib J1216.20.....                                  | A.41 |
| - Specifications and performances PM 48527 SP .....                                        | A.42 |
| - Capacities diagram PM 48527 SP.....                                                      | A.43 |
| - Specifications and performances PM 48527 SP - with jib J813.20 .....                     | A.44 |
| - Capacities diagram PM 48527 SP - with jib J813.20.....                                   | A.45 |
| - Specifications and performances PM 48527 SP - with jib J814.20 .....                     | A.46 |
| - Capacities diagram PM 48527 SP - with jib J814.20.....                                   | A.47 |
| - Specifications and performances PM 48527 SP - with jib J815.20 .....                     | A.48 |
| - Capacities diagram PM 48527 SP - with jib J815.20.....                                   | A.49 |
| - Specifications and performances PM 48528 SP .....                                        | A.50 |
| - Capacities diagram PM 48528 SP.....                                                      | A.51 |
| - Specifications and performances PM 48528 SP - with jib J612.20 .....                     | A.52 |
| - Capacities diagram PM 48528 SP - with jib J612.20.....                                   | A.53 |
| - Specifications and performances PM 48528 SP - with jib J613.20 .....                     | A.54 |
| - Capacities diagram PM 48528 SP - with jib J613.20.....                                   | A.55 |
| - Specifications and performances PM 48528 SP - with jib J614.20 .....                     | A.56 |
| - Capacities diagram PM 48528 SP - with jib J614.20.....                                   | A.57 |
| - Specifications and performances PM 48529 SP .....                                        | A.58 |
| - Capacities diagram PM 48529 SP.....                                                      | A.59 |
| - “CE” declaration of conformity of the machine .....                                      | A.60 |
| - Register of the periodic technical inspections of the control and limiting devices ..... | A.61 |
| - EXTRAORDINARY MAINTENANCE check register.....                                            | A.66 |



|                                                   |      |
|---------------------------------------------------|------|
| - CABLES AND CHAINS quarterly check register..... | A.72 |
| - Maintenance intervention confirmation.....      | A.77 |



# 1 General information

## 1.1 - Purpose of the manual

The instructions manual contains information which is essential for the correct use of the crane (1) (hereinafter also referred to as the machine).

Its purpose is to inform the operator (2) of the instructions to follow and the fundamental criteria to apply in all machine use or maintenance operations.

Before starting up the machine for the first time, the operator must have read and understood the instructions contained in this manual, in particular those highlighted with the various symbols.

The manual is an integral part of the machine and must be kept, for future reference, until the machine is scrapped.

If the machine is resold, the seller is bound to provide the new owner with the manual.

The information contained herein is arranged in chapters, in a sequential order according to subject matter.

The indexes, both alphabetic or analytic, allow the user to refer to the different subjects quickly and easily.

The original instructions are supplied by the manufacturer in english language.

To fulfil legal or commercial requirements, the original instructions may be supplied by the manufacturer in other languages.

It is strictly forbidden to use the manual for anything other than the machine's use and maintenance.

## 1.2 - Manufacturer's details and machine identification data

### - Manufacturer's details

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fax. + 39 059 936800  
e-mail: info@pm-group.eu

(1) The term "crane" refers to the trade name given to the machine (from the crane series) stated on the title page.

(2) The term "operator(s)" refers to the person(s) possessing the necessary expertise to use, inspect and carry out routine maintenance on the machine.

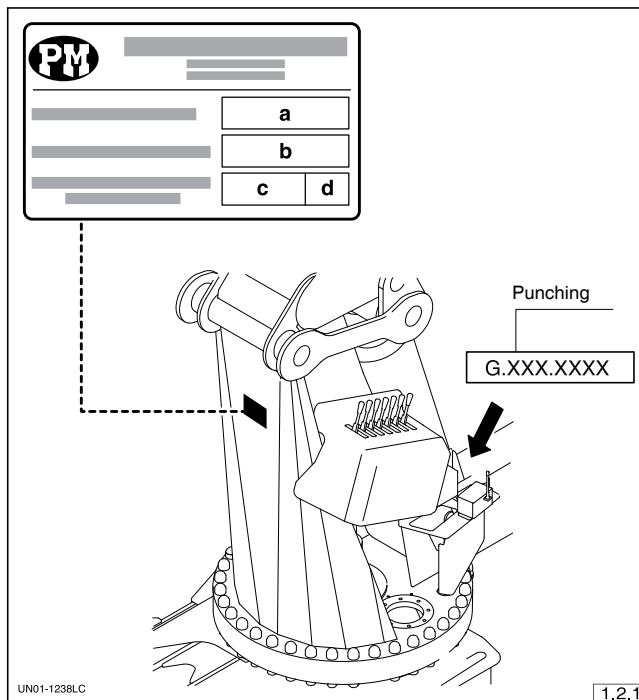
1.1

1

GENERAL INFORMATION

01-GB-A1-350CM

## - Machine identification data



### Plate details

- a** = Crane model
- b** = Serial number
- c** = Year of manufacture
- d** = Conformity "CE" stamp

1.2

## 1.3 - Symbology

The symbols used in this manual are intended to highlight potentially hazardous operations.

To guarantee safe working conditions, the instructions highlighted by these symbols must always be followed.



### HAZARD !

This indicates information or procedures which, if not complied with exactly, cause death or serious injuries.



### WARNING !

This indicates information or procedures which, if not complied with exactly, could cause death or serious injuries.



### CAUTION !

This indicates information or procedures which, if not complied with exactly, could cause slight injuries or damage to the machine.



### Information

This indicates useful and important information or procedures.

**WARNING !**

***For the sake of clarity when outlining procedures to carry out, some illustrations show the machine with the guards, casings or panels removed.***

***Never use the machine without all the casings and guards in place.***

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## **1.4 - Technical service**

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Technical service requests must be addressed to the manufacturer's Technical Assistance Service (T.A.S.) or to the nearest Authorised Workshop.

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## **1.5 - Enclosed documentation**

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- "EC" conformity declaration
- Warranty booklet
- Machine certificate of origin (only for markets requiring it).

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## **1.6 - Disclaimer**

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The manufacturer cannot be held responsible for any occurrence arising from the following:

- total or partial failure to comply with instructions herein;
- misuse of the machine;
- unauthorised alterations or work carried out on the machine;
- failure to comply with the highway code and regulations concerning transportation when moving the machine from one site to another;
- lack of maintenance;
- use of non-original spare parts or those which are not designed specifically for the model;
- exceptional weather conditions.

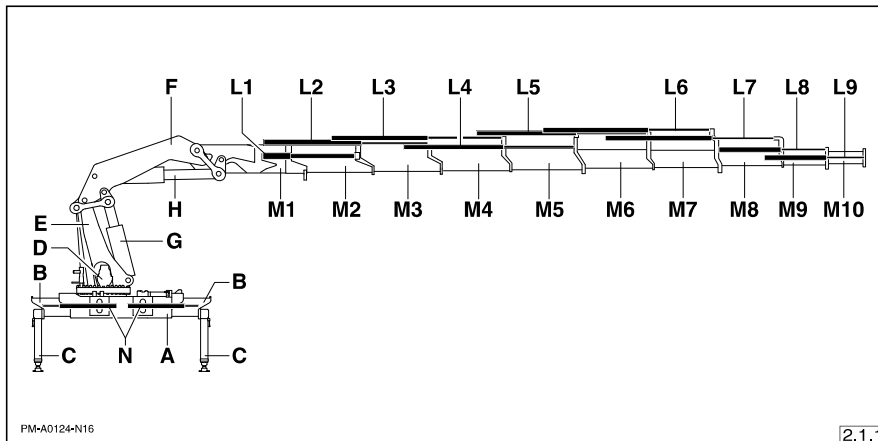


## 2 Technical information

### 2.1 - Description of the crane

The crane is composed of a base inside which there is a rotating column with a system of articulated arms at its end. The crane is driven by hydraulic energy generated by a motor and a pump. This crane series is available in various models, which differ mostly in the number of extendable arms. There is also the C version, which has a shorter secondary arm.

#### 2.1.1 - Basic crane main parts



## Key to the main parts

| Ref. | Part                        | 48522 SP<br>48522 SP C | 48523 SP<br>48523 SP C | 48524 SP<br>48524 SP C | 48525 SP<br>48525 SP C | 48526 SP<br>48526 SP C | 48527 SP<br>48527 SP C | 48528 SP<br>48528 SP C | 48529 SP<br>48529 SP C |
|------|-----------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| A    | Base                        | •                      | •                      | •                      | •                      | •                      | •                      | •                      | •                      |
| B    | Stabiliser arm              | •                      | •                      | •                      | •                      | •                      | •                      | •                      | •                      |
| C    | Stabiliser jack             | •                      | •                      | •                      | •                      | •                      | •                      | •                      | •                      |
| D    | Rotation jack               | •                      | •                      | •                      | •                      | •                      | •                      | •                      | •                      |
| E    | Column                      | •                      | •                      | •                      | •                      | •                      | •                      | •                      | •                      |
| F    | Main arm                    | •                      | •                      | •                      | •                      | •                      | •                      | •                      | •                      |
| G    | Main jack                   | •                      | •                      | •                      | •                      | •                      | •                      | •                      | •                      |
| H    | Secondary jack              | •                      | •                      | •                      | •                      | •                      | •                      | •                      | •                      |
| L1   | 1st arm extension jack      | •                      | •                      | •                      | •                      | •                      | •                      | •                      | •                      |
| L2   | 2nd arm extension jack      | •                      | •                      | •                      | •                      | •                      | •                      | •                      | •                      |
| L3   | 3rd arm extension jack      |                        | •                      | •                      | •                      | •                      | •                      | •                      | •                      |
| L4   | 4th arm extension jack      |                        |                        | •                      | •                      | •                      | •                      | •                      | •                      |
| L5   | 5th arm extension jack      |                        |                        |                        | •                      | •                      | •                      | •                      | •                      |
| L6   | 6th arm extension jack      |                        |                        |                        |                        | •                      | •                      | •                      | •                      |
| L7   | 7th arm extension jack      |                        |                        |                        |                        |                        | •                      | •                      | •                      |
| L8   | 8th arm extension jack      |                        |                        |                        |                        |                        |                        | •                      | •                      |
| L9   | 9th arm extension jack      |                        |                        |                        |                        |                        |                        | •                      | •                      |
| M1   | Secondary arm               | •                      | •                      | •                      | •                      | •                      | •                      | •                      | •                      |
| M2   | 1st hydraulic extension arm | •                      | •                      | •                      | •                      | •                      | •                      | •                      | •                      |
| M3   | 2nd hydraulic extension arm | •                      | •                      | •                      | •                      | •                      | •                      | •                      | •                      |
| M4   | 3rd hydraulic extension arm |                        | •                      | •                      | •                      | •                      | •                      | •                      | •                      |
| M5   | 4th hydraulic extension arm |                        |                        | •                      | •                      | •                      | •                      | •                      | •                      |
| M6   | 5th hydraulic extension arm |                        |                        |                        | •                      | •                      | •                      | •                      | •                      |
| M7   | 6th hydraulic extension arm |                        |                        |                        |                        | •                      | •                      | •                      | •                      |
| M8   | 7th hydraulic extension arm |                        |                        |                        |                        |                        | •                      | •                      | •                      |

## 2.2



| Ref. | Part                          | 48522 SP<br>48522 SP C | 48523 SP<br>48523 SP C | 48524 SP<br>48524 SP C | 48525 SP<br>48525 SP C | 48526 SP<br>48526 SP C | 48527 SP<br>48527 SP C | 48528 SP<br>48528 SP C | 48529 SP<br>48529 SP C |
|------|-------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| M9   | 8th hydraulic extension arm   |                        |                        |                        |                        |                        |                        | •                      | •                      |
| M10  | 9th hydraulic extension arm   |                        |                        |                        |                        |                        |                        | •                      | •                      |
| N    | Stabiliser arm extension jack | •                      | •                      | •                      | •                      | •                      | •                      | •                      | •                      |

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## 2.2 - Conditions of use

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### 2.2.1 - Designated use

The crane is designed for the vertical lifting, handling and positioning of free loads (3), in compliance with the values given in the capacities diagram and handling speeds not exceeding the maximum prescribed limits (see specifications).

The cranes are designed in compliance with harmonised standard EN 12999, class H1-B3, which provides for non-continuous use, with a hook, for a maximum of 400 lifting cycles per week and a load equalling 3/4 of the load indicated in the relative diagram.

To use the machine with loads other than those for which it is designed, it is the user's responsibility to first contact an authorised workshop to check whether a downgrade is necessary.

(3) The term "free load" means loads whose movement is not limited.

### 2.4

### 2.2.2 - Inadmissible uses

**It is forbidden** to use the machine in areas where there is a risk of fires or explosions.

**It is forbidden** to use the crane to pull out poles, uproot trees and lift fixed loads.

**It is forbidden** to use the machine to lift people, with the exception of cases in which the crane is fitted with a specially designed operator's platform approved by the manufacturer.

**It is forbidden** to use the crane with fixed load-hoisting accessories such as hooks, bucket, grabs etc unless the accessories are authorised by the manufacturer.

**It is forbidden** to use the machine as a recovery means for towing broken-down vehicles.

**It is forbidden** to drag or push loads.

Before performing a rotation manoeuvre, the load must be lifted off the ground.

**It is forbidden** to lift the base truck with the stabilisers to change the tyres.

**It is forbidden** to lift the base truck with the stabilisers in order to move the vehicle if stuck in areas of loose ground.

**It is forbidden** to fit removable clamping accessories such as jibs, manual extensions etc if they are not approved by the manufacturer or they are not designed specifically for the model in question.

## 2.3 - Control and limiting devices



### HAZARD !

***On no account must you tamper with the control and limiting devices.***



### Information

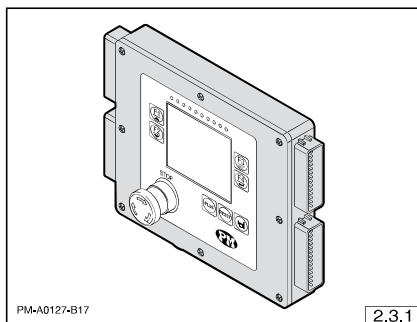
*The control and limiting devices for the accessories are outlined in the section describing each accessory.*

- the jib momentum limiting device;
- the rotation limiting device.

The functional control unit:

- checks the delivery pressure in the primary and secondary jack;
- checks that the control and limiting devices work properly;
- indicates the machine's operating status and any malfunctions;

### 2.3.1 - Functional control unit



2.3.1

The functional control unit features:

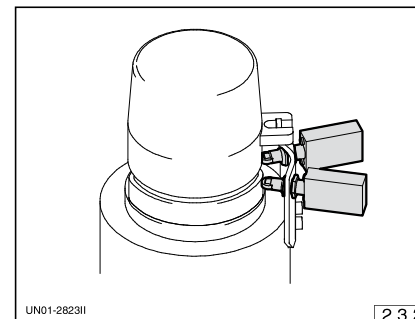
- the crane momentum limiting device;



### Information

*The momentum limiter does not relieve the operator of liability if the maximum loads allowed are intentionally exceeded.*

### 2.3.2 - Rotation locking and limiting device



2.3.2

#### - Rotation limiting device

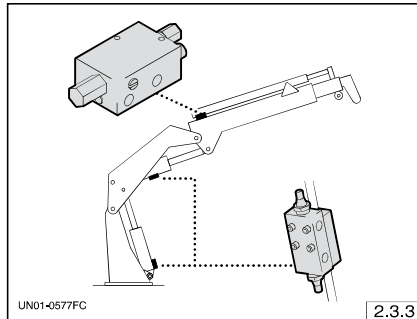
The rotation limiting device stops the crane rotating when it reaches the area in which the stability, with that particular load, is at risk.

Work may only be carried out in that area if the load is reduced (in relation to the nominal capacity) (see "Work sectors").

#### - Rotation lock device

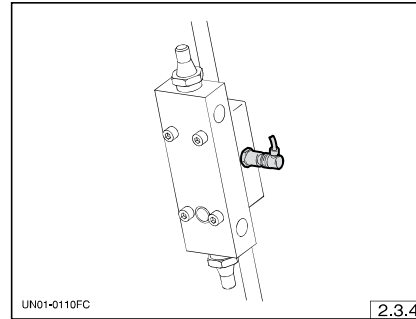
The device prevents the crane being operated in the area where the stability of the outfitting is at risk (see "Work sectors").

### 2.3.3 - Load support valves



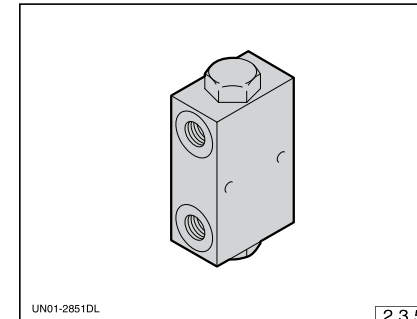
The valves prevent the loads dropping unexpectedly to the ground as a result of a broken line or a sudden pump failure.

### 2.3.4 - Pressure sensors



The sensors are located on the load support valves on the secondary jack and the main jack. These signal the pressure of the jacks to the functional control unit to prevent the handling of loads greater than the limit foreseen.

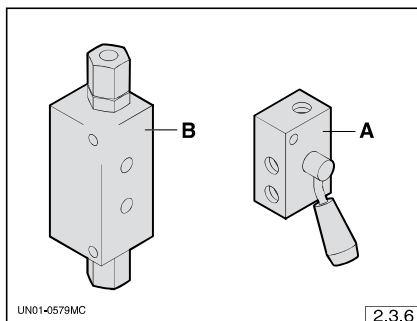
### 2.3.5 - Outrigger arm extension lock valve



The valve locks the outrigger arm extension jack (in the position it is at that moment) in case of rupture of a hose or due to the sudden lack of supply of oil to the jack.

## 2.6

### 2.3.6 - Stabiliser valve

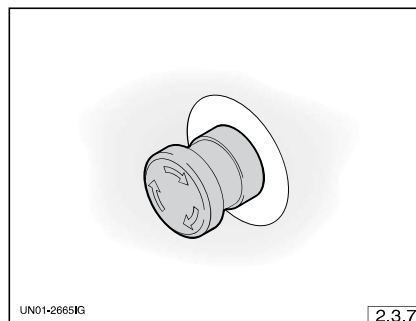


Alternatively, two types of valve can be fitted on the outriggers.

- A** - Lock-out valve with cock
- B** - Lock-out valve

The valve locks the stabiliser jack (in the position it is in at that precise moment) in the event of a broken line or that the oil delivered to the jack is suddenly cut off.

### 2.3.7 - Emergency stop device



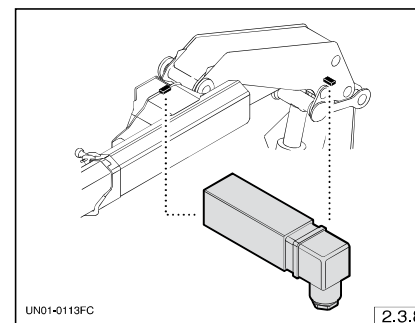
Use the device to stop all the crane's movements in the event of an emergency. Rotate the button to activate the crane.



**WARNING !**

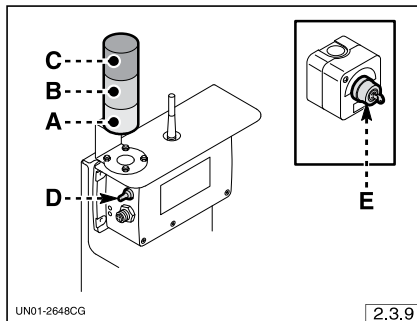
***Ensure the hazardous conditions cannot persist before releasing the button.***

### 2.3.8 - Tilt sensor



The sensor informs the functional control unit of the angle of the main arm and of the secondary arm in relation to the horizontal axis so that the controls used to move the crane safely can be enabled.

### 2.3.9 - Signal lights



**A) Green light** (if featured).

This signals that the receiver unit has been activated (see "Radio control"):

- with selector "D" in "REMOTE" position for radio controls "SCAN-RECO";
- with switch "E" in "Radio" position for radio control "HETRONIC".

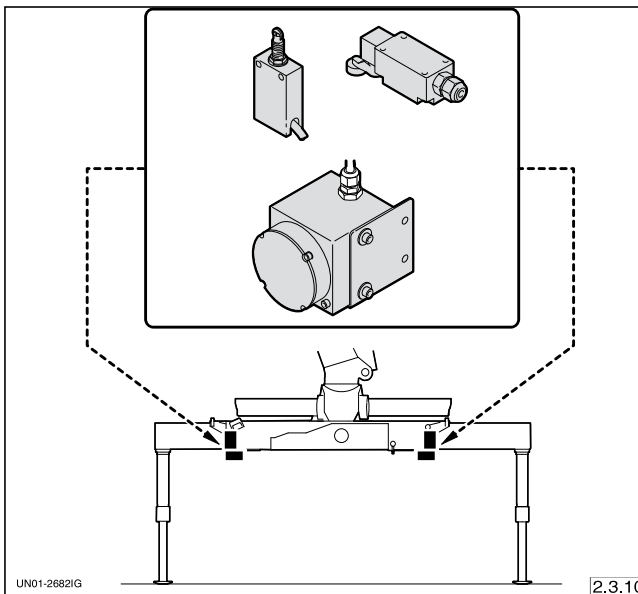
**B) Orange light.**

This signals that 90% of the load that can be lifted is reached.

**C) Red light.**

This signals that 100% of the load that can be lifted is reached.

### 2.3.10- Stabilisation controller



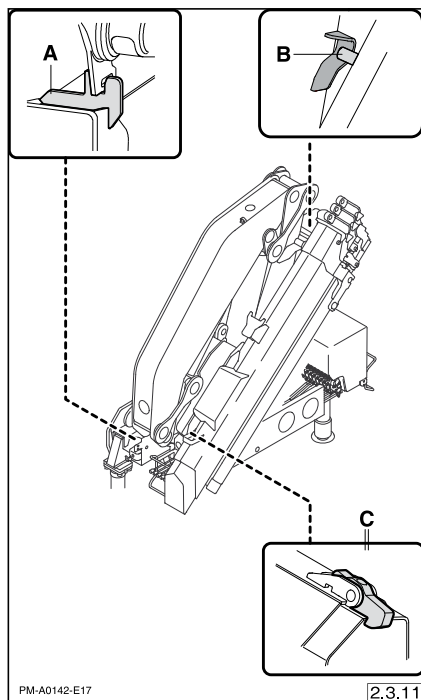
#### Information

*If featured, the device is also installed on the supplementary crossmember.*

The device consists of microswitches and sensors that signal the position of the jacks and the outrigger arms to the functional control unit in order to ensure safe operation.

- These detect when the outrigger jacks are resting properly on the ground.
- These detect the extension of the outriggers; if they are not completely extended the crane may operate with reduced lifting capacity.

### 2.3.11- Locking devices for transit on the roads



The devices keep the crane within the vehicle's profile when travelling on public roads.

Remove the locking device before operating the crane

- A)** Crane rotation locking device.
- B)** Arm pack extension lock device (version C).
- C)** Arm pack locking device (version C).

### 2.3.12- Control devices for transit on roads

The devices check that the crane is within the outer profile of the vehicle in order to be allowed to transit on roads.

The following devices activate the signal lights and/or acoustic signals in the driver's cab:

- outriggers arms closure control device;
- crane height control device.



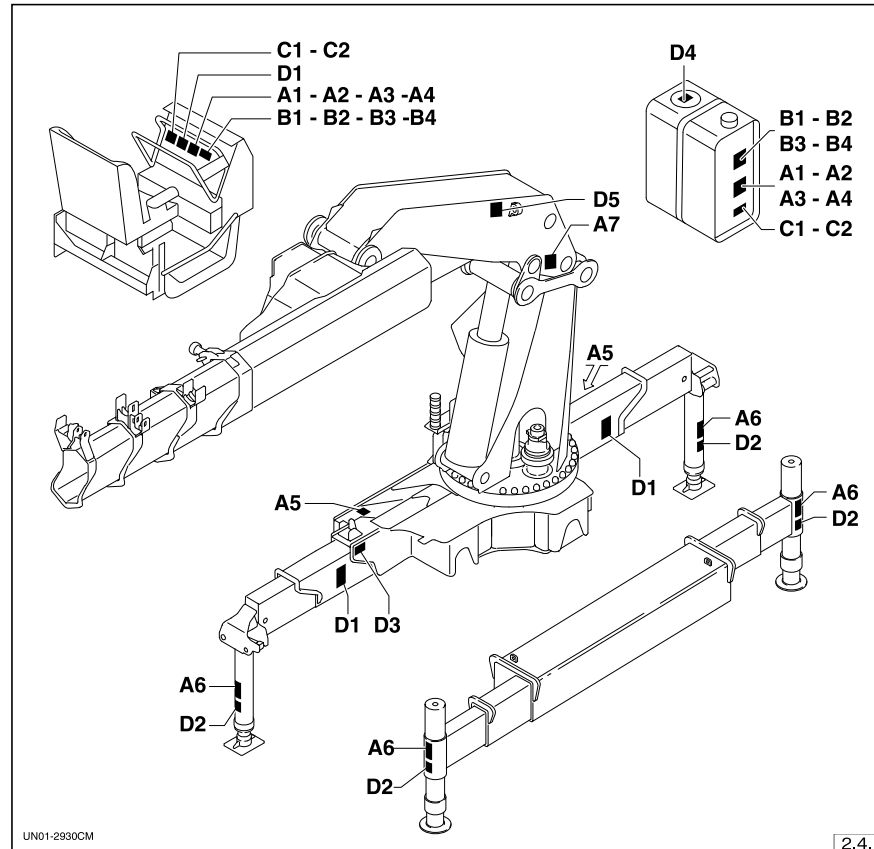
## 2.4 - Safety recommendations and information



### WARNING !

*Always comply with the safety recommendations on the plates.*

*Check that the plates are always present and legible; if not replace them with new ones in the same position.*



2.11

## - Hazards signs



**A1 = Risk of electric shocks (\*).**  
Always keep a safe distance from electricity lines.



**A2 = Risk from overhanging loads (\*).**  
Take care not to walk or stand under overhanging loads.



**A3 = Dangerous manoeuvre signal (\*).**  
Operate the crane so that it opens and closes on the opposite side to the trajectory travelled by the main arm.



**A4 = Obstacle risk signal (\*).**  
Watch out for max. admitted heights when travelling on public roads.



**A5 = Risk of falls.**  
Slippery surface, take care.



**A6 = Risk of crushing.**  
Lower limbs could be crushed by stabiliser jacks when in use, take care.



**A7 = Risk of lacerations signal.**  
This indicates a risk of lacerations to the hands caused by moving parts.

## - Prohibition signs



**B1 = No entry (\*\*).**  
It is forbidden to both move around and stop in the crane's operating range.



**B2 = Prohibited use (\*\*).**  
It is forbidden for unauthorised persons to use the machine.



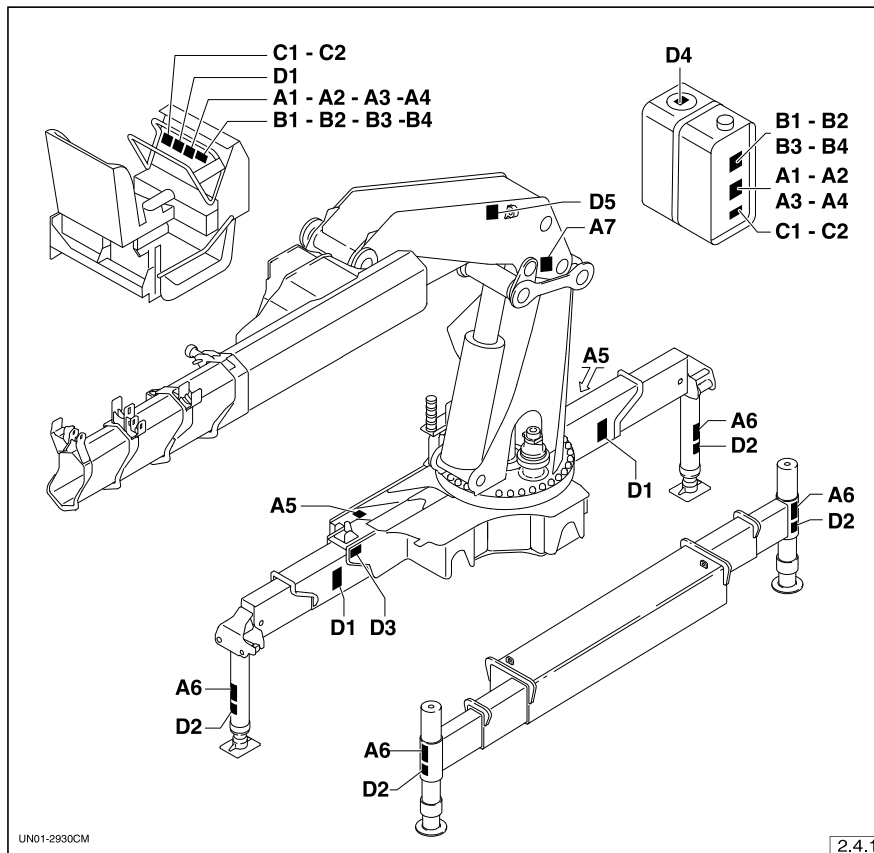
**B3 = No water jets (\*\*).**  
It is forbidden to use pressurised water on the electrical components.



**B4 = Prohibited use (\*\*).**  
Use of the machine is prohibited if the stabilisers have not been positioned correctly.

(\*) Signals grouped together on one plate.

(\*\*) Signals grouped together on one plate.



## - Obligation signs



**C1 = Instruction Manual plate (\*\*\*)**.

This indicates that the operator must read the instruction manual carefully before using the machine.

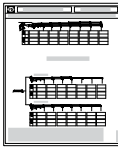


**C2 = Individual safety gear plate (\*\*\*)**.

This indicates that the user is under obligation to wear the safety helmet when operating the machine.

(\*\*\*) Signals grouped together on one plate.

## - Information signs



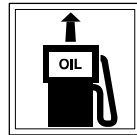
**D1 = Capacities diagram plate.**  
Indicates the performance limits of the machine and any accessories fitted.



**D2 = Max. stabiliser pressure signal.**  
Shows the maximum force that the crane exerts on the ground



**D3 = Power takeoff plate.**  
Reminds the operator to switch off the power takeoff during transfers.



**D4 = Oil tank plate.**  
Indicates the hydraulic oil tank.

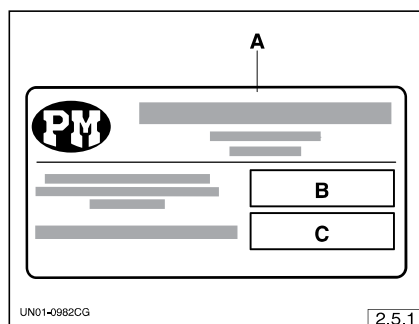


**D5 = Hoisting points plate.**  
Indicates the hoisting hooks attachment points.

## 2.5 - Accessories

### 2.5.1 - Additional crossmember

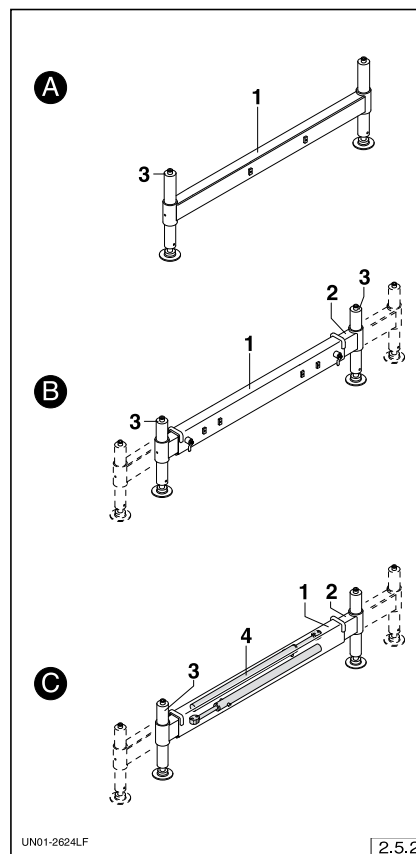
#### - Identification detail



- A) Manufacturer code
- B) Supplementary crossbeam model
- C) Serial number

#### - General description

The additional crossmember is only fitted when the crane's stabiliser jacks alone cannot guarantee the crane/truck unit's stability.



#### - Main parts

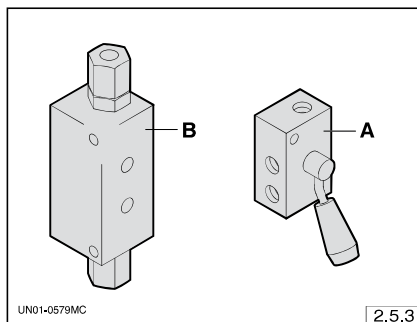
- 1 - Crossbeam
- 2 - Extendable stabiliser arm
- 3 - Stabiliser jack
- 4 - Stabiliser arms extension jack

#### - Installable crossbeams

- A - Fixed crossbeam
- B - Crossbeam with manually extended outriggers arms
- C - Crossbeam with hydraulically extended outriggers arms

## - Locking devices

### Stabiliser valve



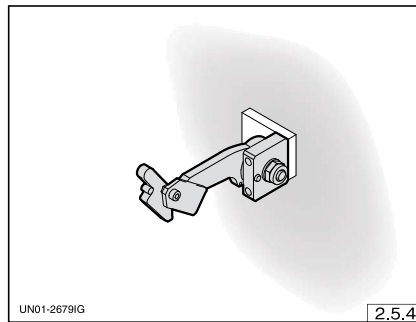
Alternatively, two types of valve can be fitted on the outriggers.

**A)** Lock-out valve with cock

**B)** Lock-out valve

The valve locks the stabiliser jack (in the position it is in at that precise moment) in the event of a broken line or that the oil delivered to the jack is suddenly cut off.

### Locking devices for transit on roads

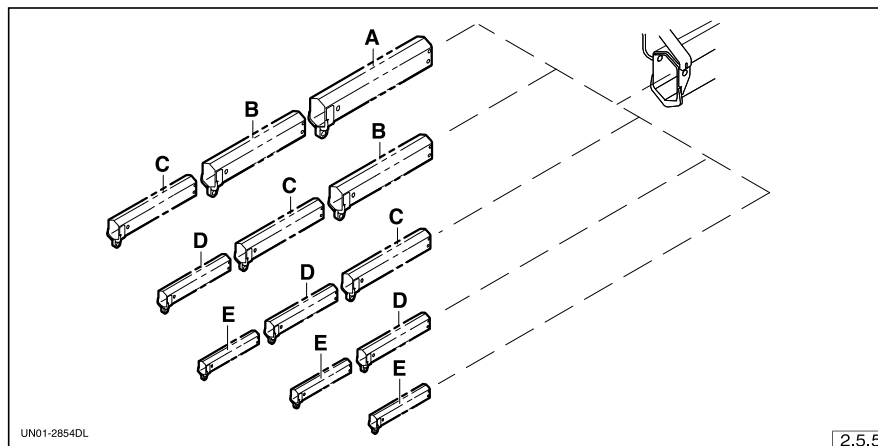


These prevent the supplementary arms extending accidentally when the vehicle is in transit.

The devices must be manually disconnected before extending the outrigger arms; closure is automatic once the arms are retracted.

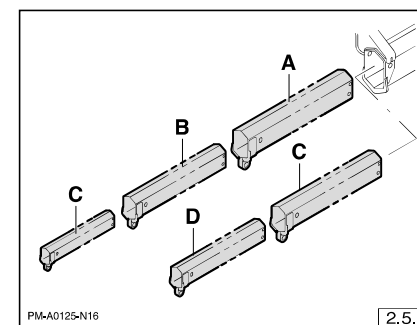
## 2.5.2 - Manual extensions

### Manual extensions on basic machine



| Pos. | Model                  |                        |                        |                        |                        | Weight<br>kg (lbs) |
|------|------------------------|------------------------|------------------------|------------------------|------------------------|--------------------|
|      | 48524 SP<br>48524 SP C | 48525 SP<br>48525 SP C | 48526 SP<br>48526 SP C | 48527 SP<br>48527 SP C | 48528 SP<br>48528 SP C |                    |
| A    | •                      | -                      | -                      | -                      | -                      | 155 (345)          |
| B    | •                      | •                      | -                      | -                      | -                      | 145 (320)          |
| C    | •                      | •                      | •                      | -                      | -                      | 130 (290)          |
| D    | •                      | •                      | •                      | •                      | -                      | 115 (255)          |
| E    | -                      | •                      | •                      | •                      | •                      | 100 (225)          |

### Manual extensions on jib



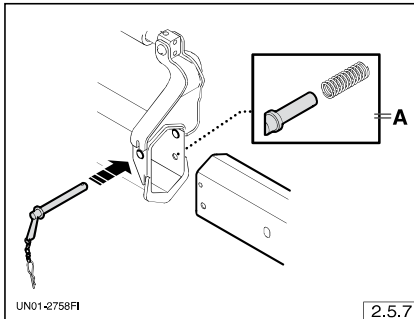
| Model                  | A          | B          | C          | D          |
|------------------------|------------|------------|------------|------------|
| J 1414.20<br>J 1214.20 | •          | •          | •          |            |
| J 1415.20<br>J 1215.20 |            | •          | •          |            |
| J 1416.20<br>J 1216.20 |            |            | •          | •          |
| Weight kg<br>(lbs)     | 40<br>(90) | 35<br>(80) | 25<br>(60) | 20<br>(45) |

| Model              | A          | B          |
|--------------------|------------|------------|
| J 814.20           | •          | •          |
| J 815.20           |            | •          |
| J 614.20           |            | •          |
| Weight kg<br>(lbs) | 30<br>(70) | 25<br>(60) |

2.17

## - Locking and limiting devices

### Safety pin



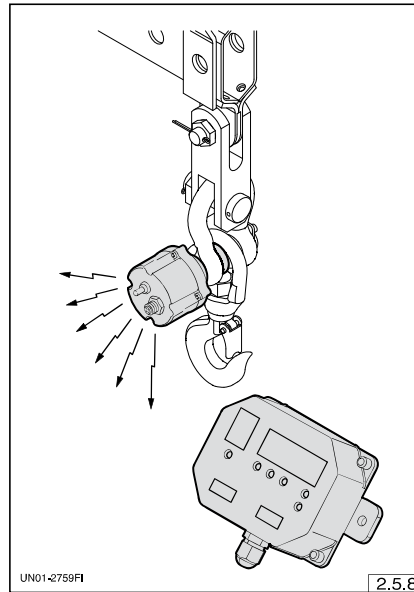
Device "A" prevents the extension dropping to the ground accidentally during its extension.



### WARNING !

**The device is not scaled to withstand hoisting loads, therefore each extension must be locked in position (extended or retracted) with the relative safety pin.**

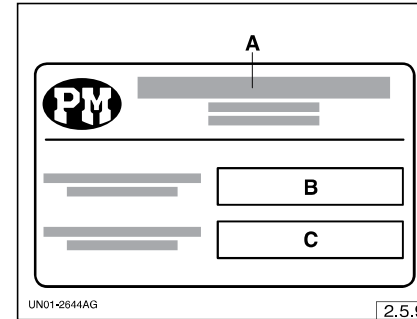
### Manual extension load limiting device



This prevents manual extension overloading (see para. "Use of the manual extension load limiter").

## 2.5.3 - Jibs

### - Identification details



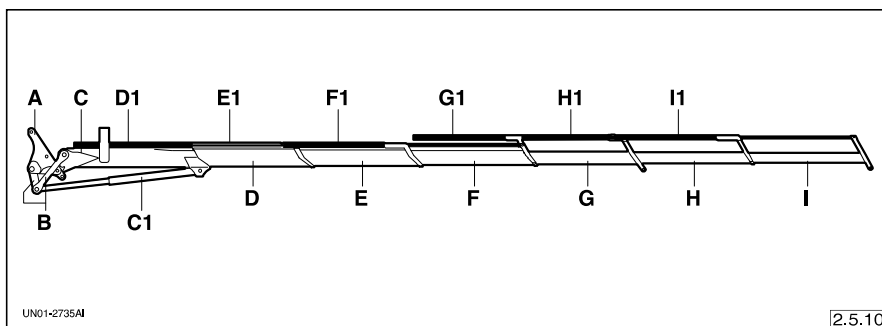
- A) Manufacturer's details
- B) Jib model
- C) Serial number

### - General description

The jib is fitted on the crane's last hydraulic extension arm for the purposes of placing loads whose positioning requires both depth and height.



## - Main parts



### Key to main parts

| Pos. | Part                               | J 1213.20 | J 1414.20<br>J 1214.20 | J 1415.20<br>J 1215.20 | J 1416.20<br>J 1216.20 | J 812.20<br>J 612.20 | J 813.20<br>J 613.20 | J 814.20<br>J 614.20 | J 815.20 |
|------|------------------------------------|-----------|------------------------|------------------------|------------------------|----------------------|----------------------|----------------------|----------|
| A    | Tooth                              | •         | •                      | •                      | •                      | •                    | •                    | •                    | •        |
| B    | Connecting rods                    | •         | •                      | •                      | •                      | •                    | •                    | •                    | •        |
| C    | Articulated arm                    | •         | •                      | •                      | •                      | •                    | •                    | •                    | •        |
| C1   | Articulation jack                  | •         | •                      | •                      | •                      | •                    | •                    | •                    | •        |
| D    | First arm hydraulic extension      | •         | •                      | •                      | •                      | •                    | •                    | •                    | •        |
| D1   | First arm extension jack           | •         | •                      | •                      | •                      | •                    | •                    | •                    | •        |
| E    | Second arm hydraulic extension     | •         | •                      | •                      | •                      | •                    | •                    | •                    | •        |
| E1   | Second arm extension jack          | •         | •                      | •                      | •                      | •                    | •                    | •                    | •        |
| F    | Third arm hydraulic extension      | •         | •                      | •                      | •                      | •                    | •                    | •                    | •        |
| F1   | Third arm extension jack           | •         | •                      | •                      | •                      | •                    | •                    | •                    | •        |
| G    | Fourth arm hydraulic extension     |           | •                      | •                      | •                      |                      | •                    | •                    | •        |
| G1   | Fourth arm extension jack          |           | •                      | •                      | •                      |                      | •                    | •                    | •        |
| H    | Fifth arm with hydraulic extension |           |                        | •                      | •                      |                      |                      |                      | •        |
| H1   | Fifth arm extension jack           |           |                        | •                      | •                      |                      |                      |                      | •        |
| I    | Sixth arm with hydraulic extension |           |                        |                        | •                      |                      |                      |                      |          |
| I1   | Sixth arm extension jack           |           |                        |                        | •                      |                      |                      |                      |          |

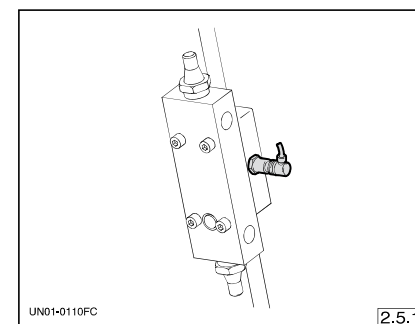
- Jibs that can be fitted

| Jib model | Machine model<br>Jib Weight - kg (lbs) |                |                |               |               |
|-----------|----------------------------------------|----------------|----------------|---------------|---------------|
|           | 48524 SP                               | 48525 SP       | 48526 SP       | 48527 SP      | 48528 SP      |
| J 612.20  |                                        |                |                |               | 475<br>(1050) |
| J 613.20  |                                        |                |                |               | 525<br>(1160) |
| J 614.20  |                                        |                |                |               | 585<br>(1290) |
| J 812.20  | -                                      | -              | -              | 485<br>(1070) |               |
| J 813.20  | -                                      | -              | -              | 555<br>(1225) |               |
| J 814.20  | -                                      | -              | -              | 615<br>(1360) |               |
| J 815.20  | -                                      | -              | -              | 670<br>(1480) |               |
| J 1213.20 |                                        | 890<br>(1965)  | 865<br>(1910)  |               |               |
| J 1214.20 |                                        | 1000<br>(2205) | 995<br>(2195)  |               |               |
| J 1215.20 |                                        | 1070<br>(2360) | 1065<br>(2350) |               |               |
| J 1216.20 |                                        | 1145<br>(2525) | 1140<br>(2515) |               |               |
| J 1414.20 | 1025<br>(2260)                         |                |                | -             | -             |
| J 1415.20 | 1095<br>(2415)                         |                |                | -             | -             |
| J 1416.20 | 1170<br>(2580)                         |                |                | -             | -             |

2.20

- Locking and limiting devices

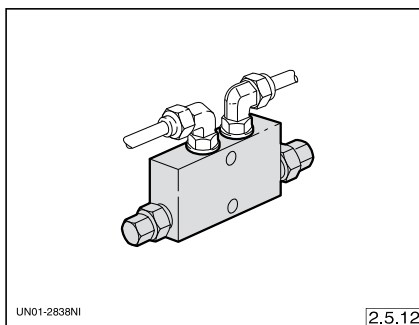
Pressure sensors



The sensors are located on the load support valves on the secondary jack and the main jack.

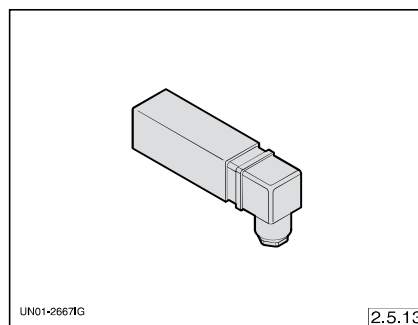
These signal the pressure of the jacks to the functional control unit to prevent the handling of loads greater than the limit foreseen.

### Load support valves



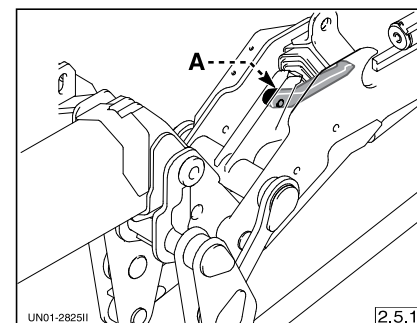
The valves prevent the loads dropping to the ground unexpectedly as a result of a broken line or a sudden pump failure.

### Tilt sensor



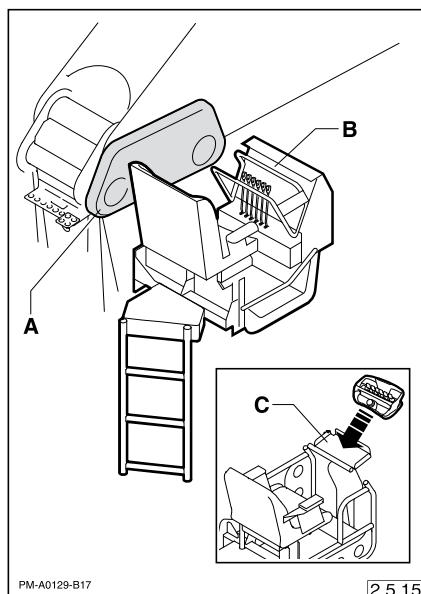
The sensor informs the functional control unit of the angle of the jib in relation to the horizontal axis so that the controls used to move the crane safely can be enabled.

### Anti-extension device for jib arms



This prevents the jib arms extending accidentally when the vehicle is in transit.

## 2.5.4 - Overhead manoeuvring post



### - Guards

**A** - Anti-cutting guard

### - Safety regulations

Access to the seat in the overhead manoeuvring post is only permitted via the ladder provided for the purpose.

### - Control station types:

**B** - With hydraulic distributor

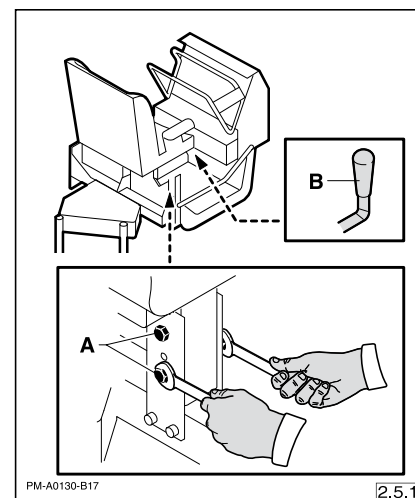
**C** - With radio-control control panel

### - Access to the top control position



**WARNING !**

*Use the special ladder to reach the control positions.  
Do not hold onto controls or flexible piping but use the special handles and handrails foreseen for this purpose.  
Always keep the control position and access ladders free from oil, mud, grease, snow and ice.*



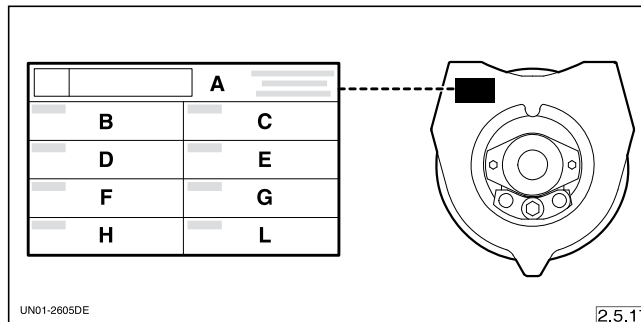
Before operating the machine adjust the seat for maximum personal comfort and better control of the crane.

- Adjust seat height by moving screws "A" into the holes positioned at different heights and at the same time move the seat.
- Adjust the seat horizontally using lever "B" and check that it remains locked in the selected position.

### 2.5.5 - Winch

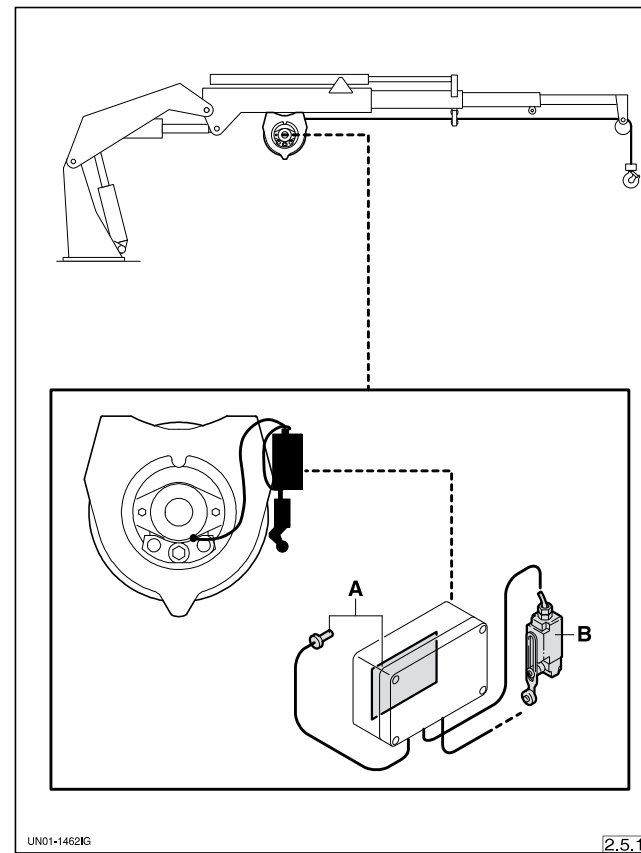
The winch is composed of a drum, driven by a hydraulic motor, around which the load lifting cable is wound. At the end of the last extendable arm there is a lifting tackle fitted.

#### - Identification details



- A) Manufacturer details
- B) Winch model
- C) Identification code
- D) Serial number
- E) Year of manufacture
- F) Maximum capacity
- G) Maximum speed
- H) Maximum pull
- L) Maximum pressure (bar)

#### - Locking and limiting devices



#### A) Momentum limiter

This is comprised of a pressure sensor and a circuit board.

It stops the machine when:

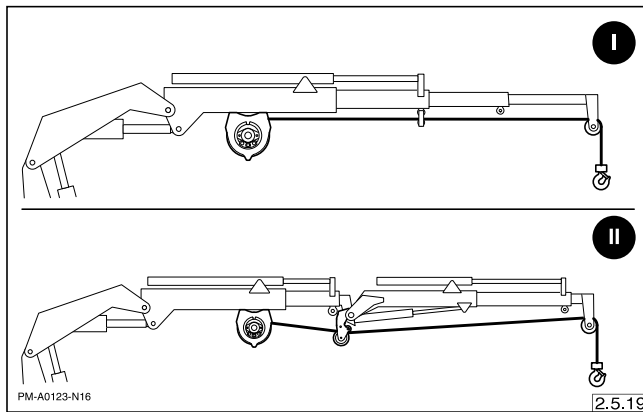
the lifted load exceeds the maximum;

the lower block reaches the upper stroke limit switch.

#### B) Down stroke limit switch

The limit switch stops the load travelling downwards to prevent the cable on the drum unwinding fully.

#### - Assembly type



#### Winches installable on the standard machine and on the standard machine with the jib

| Crane mode | Winch model (I) |     |
|------------|-----------------|-----|
|            | TC2             | TC3 |
| PM 48.5 SP | •               | •   |

| Jib model | Winch model (II) |  |
|-----------|------------------|--|
|           | TC2L             |  |
| J 1414.20 | •                |  |
| J 1415.20 | •                |  |
| J 1416.20 | •                |  |
| J 1213.20 | •                |  |
| J 1214.20 | •                |  |
| J 1215.20 | •                |  |
| J 1216.20 | •                |  |
| J 812.20  | •                |  |
| J 813.20  | •                |  |
| J 814.20  | •                |  |
| J 815.20  | •                |  |
| J 612.20  | •                |  |
| J 613.20  | •                |  |
| J 614.20  | •                |  |

## - Specifications

### Winch model ..... TC2

Cable diameter = .....ø mm 10 .....in. 0,39"  
 Minimum cable breaking load = .....kN 95,4 .....lbs 21447  
 Maximum cable length = .....m 60 .....ft 200  
 Maximum cable pull  
 load (last layer) = .....kN 18 .....lbs 4047  
 Maximum cable speed = .....m/min 52 .....ft/min. 170  
 Weight = .....kg 75 .....lbs 170  
 Weight with cable = .....kg 105 .....lbs 235  
 Mechanism class according to  
 UNI ISO 4301/1 .....M3

### Winch model ..... TC2L

Cable diameter = .....ø mm 10 .....in. 0,39"  
 Minimum cable breaking load = .....kN 95,4 .....lbs 21447  
 Maximum cable length = .....m 69 .....ft 200  
 Maximum cable pull  
 load (last layer) = .....kN 18 .....lbs 4047  
 Maximum cable speed = .....m/min 52 .....ft/min. 170  
 Weight = .....kg 95 .....lbs 210  
 Weight with cable = .....kg 130 .....lbs 290  
 Mechanism class according to  
 UNI ISO 4301/1 .....M3

### Winch model ..... TC3

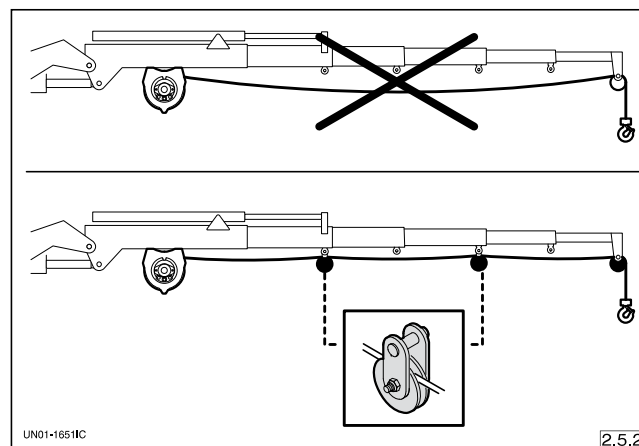
Cable diameter = .....ø mm 14 .....in. 0,55"  
 Minimum cable breaking load = .....kN 151 .....lbs 33946  
 Maximum cable length = .....m 65 .....ft 213  
 Maximum cable pull  
 load (last layer) = .....kN 30 .....lbs 6744  
 Maximum cable speed = .....m/min 59 .....ft/min. 194  
 Weight = .....kg 170 .....lbs 375  
 Weight with cable = .....kg 230 .....lbs 510  
 Mechanism class according to  
 UNI ISO 4301/1 .....M3

## - Use of the winch



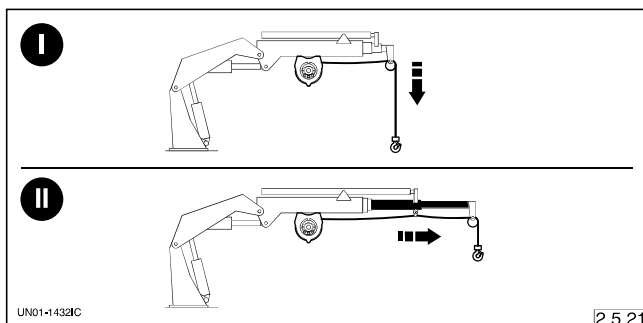
### CAUTION !

*The section of cable between the winch and the block must remain in contact with the arms. If this is not the case, fit the driving pulley (see "Tackle installation").*



### HAZARD !

*It is forbidden to lift objects at an angle.*



To prevent further damage to the cable, the hook must be lowered before the arm is extended.



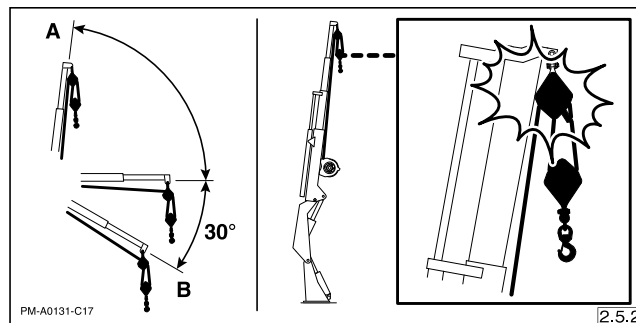
**CAUTION !**

***Do not use the winch when the crane arms are fully closed. To wind the cable around the winch drum properly, extend at least two arms.***



**CAUTION !**

***During the winding/unwinding operations check that the cable is always taut, so that it positions itself correctly on the winch drum.***



Use the winch only in the area included between the maximum angle "A" and the minimum angle "B".



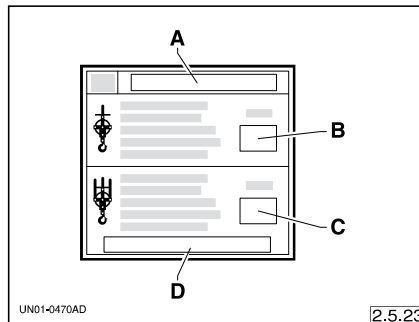
**WARNING !**

***In order not to damage the machine, avoid contact between upper block and the arms when the latter are vertically tilted.***



## 2.5.6 - Lifting tackle

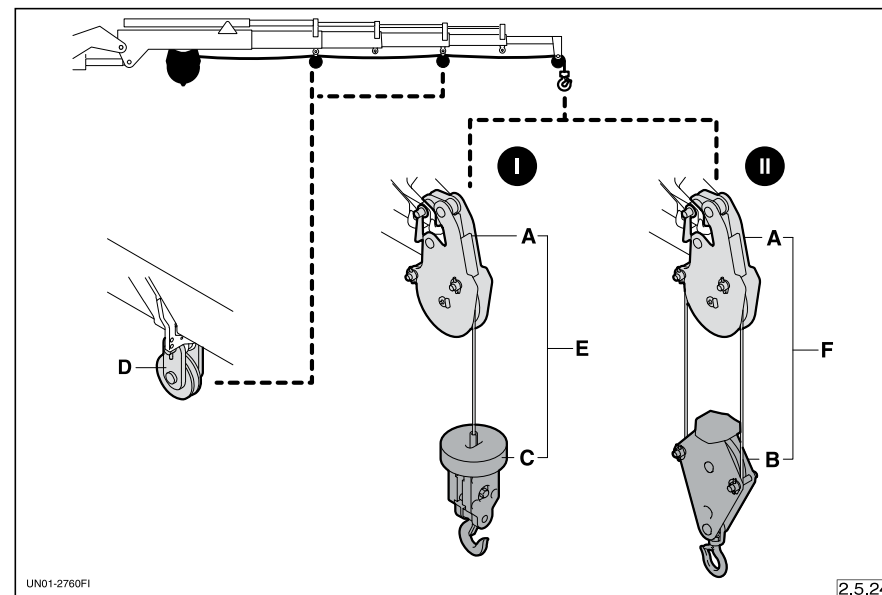
### - Identification details



The tackle is composed of a system of pulleys located at the end of the last arm.

- A)** Manufacturer details
- B)** Tackle capacity with direct pull (kg/lb)
- C)** Tackle capacity with double pull (kg/lb)
- D)** Cable diameter

### - Tackle types for each crane



- I)** Tackle with direct pull for crane
- II)** Tackle with double pull for crane
- A)** Upper block
- B)** Lower block for double pull line on crane
- C)** Lower block for single pull on crane
- D)** Driving pulley
- E)** Full tackle for single pull line on crane
- F)** Full tackle for double pull on crane

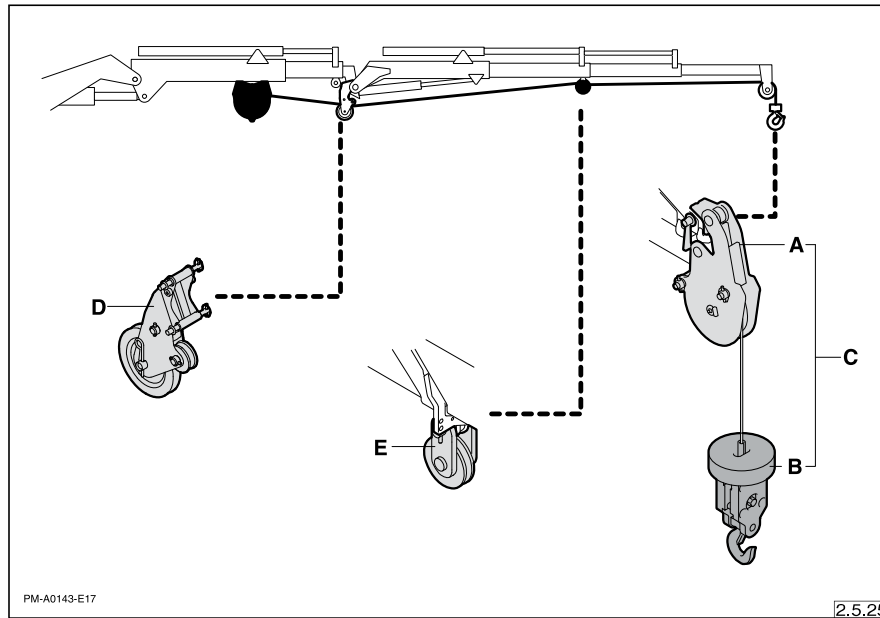
### Crane tackle weights

| 58,5 SP | Part (kg - lbs) |             |            |          |              |              |
|---------|-----------------|-------------|------------|----------|--------------|--------------|
|         | A               | B           | C          | D        | E            | F            |
| TC2     | 30<br>(67)      | 20<br>(45)  | 25<br>(56) | 4<br>(9) | 55<br>(122)  | 50<br>(111)  |
| TC3     | 55<br>(122)     | 65<br>(144) | 50<br>(11) | 4<br>(9) | 105<br>(232) | 120<br>(265) |

2.27

## - Tackle types on jib (J810.20 - J610.20)

Winch fitted on standard machine



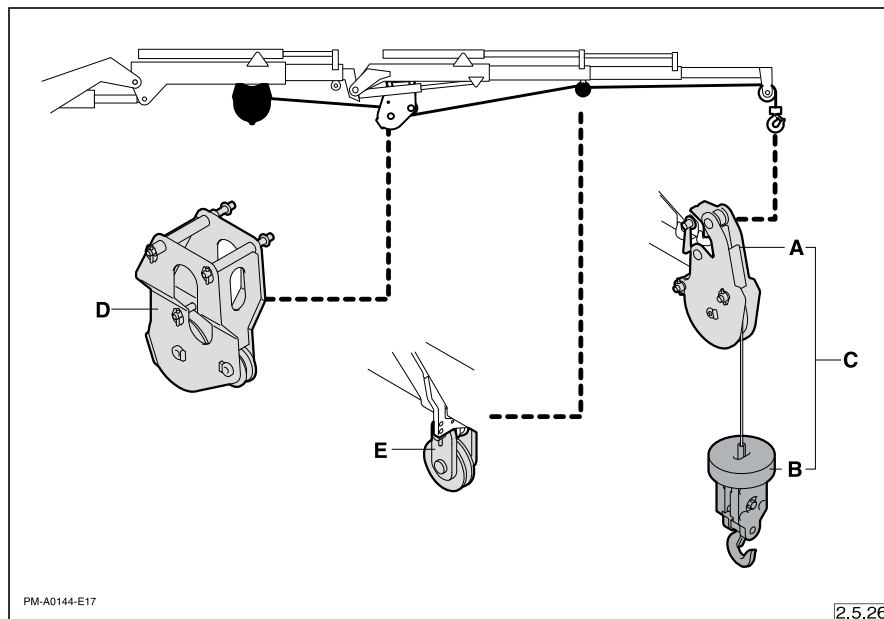
- A) Arm
- B) Upper block
- C) Lower block
- D) Complete tackle for direct pull
- E) Joint driving pulley
- F) Driving pulley on jib

## Tackle weights on jib

| Jib model | Part (kg - lbs) |      |       |      |      |
|-----------|-----------------|------|-------|------|------|
|           | A               | B    | C     | D    | E    |
| J 812.20  |                 |      |       |      |      |
| J 813.20  |                 |      |       |      |      |
| J 814.20  |                 |      |       |      |      |
| J 815.20  | 30              | 25   | 55    | 15   | 4    |
| J 612.20  | (67)            | (56) | (122) | (34) | (35) |
| J 613.20  |                 |      |       |      |      |
| J 614.20  |                 |      |       |      |      |

## - Tackle types on jib (J1410.20 - J1210.20)

Winch fitted on standard machine



- A)** Arm
- B)** Upper block
- C)** Lower block
- D)** Complete tackle for direct pull
- E)** Joint driving pulley
- F)** Driving pulley on jib

## Tackle weights on jib

| Jib model | Part (kg - lbs) |            |             |            |           |
|-----------|-----------------|------------|-------------|------------|-----------|
|           | A               | B          | C           | D          | E         |
| J 1414.20 |                 |            |             |            |           |
| J 1415.20 |                 |            |             |            |           |
| J 1416.20 |                 |            |             |            |           |
| J 1213.20 | 30<br>(67)      | 25<br>(56) | 55<br>(122) | 20<br>(45) | 4<br>(35) |
| J 1214.20 |                 |            |             |            |           |
| J 1215.20 |                 |            |             |            |           |
| J 1216.20 |                 |            |             |            |           |

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## 2.6 - Noise level

---

Tests carried out have measured a sound pressure level below 70 Db(A).

The tests have been carried out without considering the power source (vehicle's engine) as it is not part of the supply.

The installer should ask the truck's manufacturer for information about the noise level and transfer the said information to the operator.

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## 2.7 - Vibrations

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Vibration effects on the operator are considered not significant as the machine is used for short periods of time.

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## 2.8 - Gas emissions

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- Gases produced by the combustion of the fuel used by the truck endothermic engine.
- Fuel vapours emitted during refuelling.

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## 2.9 - Electromagnetic compatibility

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All the machine's components subject to the European directives 95/54/CEE (and subsequent modifications) and 2004/108/CE on electromagnetic compatibility conform to the aforesaid directives.

### 2.30

---

## 2.10- Residual dangers

---

### ***Dangers of a mechanical nature.***

Contact with the articulated parts of the machine could result in limbs being crushed or lacerated.

### ***Dangers of thermal nature.***

Contact with the machine's hot parts could result in burns.

### ***Fire hazard.***

Fuel leaking from the tank, during use or when refilling, can create a fire hazard.

### ***Risk of fluid ejection at high pressure.***

The breakage of a pipe or blow-by under oil pressure could create risk of lesions and skin infections.

### ***Risk of slipping and falling.***

Oil, grease, snow and ice on the entrance steps of the maneuvering stations and on the work platform floor can cause the operator to slip and fall.

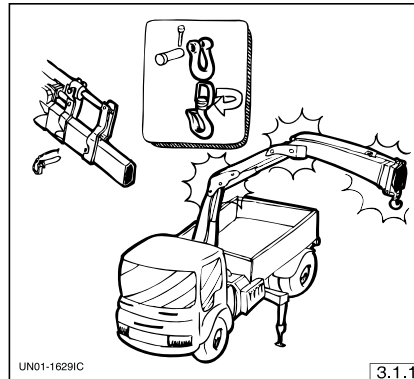
## 3 Safety

### 3.1 - Safety regulations



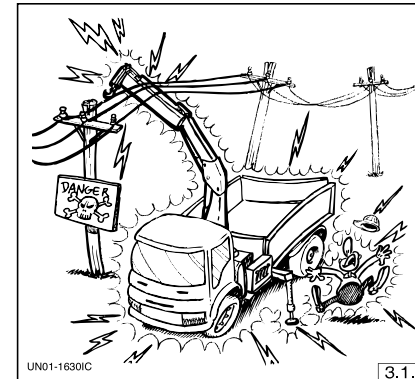
#### WARNING !

*Read the instructions contained in this manual carefully, in particular those concerning safety and the signs affixed to the machine.*



#### Before operating the crane

- ◆ Check the degree of wear of the accessories' lock pins;
- ◆ make sure the hook is fitted with a nut and that it rotates freely without excess play;
- ◆ make sure the hook is fitted with the safety device to prevent cables being released accidentally and that the said safety device is intact;
- ◆ carefully check the load harnesses and the chains, cables and straps are in good condition and that they are suitable for the load to be lifted;
- ◆ make sure the hoses are in good condition and that no oil leaks are present.



#### HAZARD !

***Do not operate the machine in the vicinity of power lines.***

To operate the crane in the vicinity of power lines, always refer to your superiors or the competent authority for special instructions.

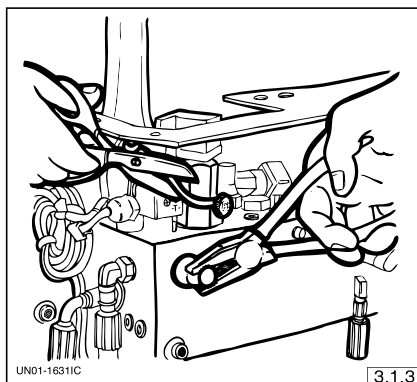
Obtain clear instructions regarding the way in which the work must be carried out. Said procedures must be studied for each particular situation and complied with exactly.

When carrying out maintenance work on power lines, you are advised to connect the metal parts on the vehicle to the earth, observing the relative regulations in force.

3.1

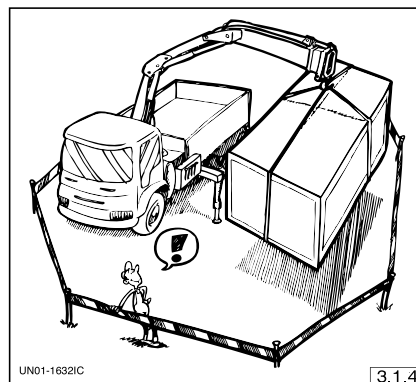
3

SAFETY



**WARNING !**

***Do not remove the lead seals on the valves.***



Cordon off the work area to prevent access by unauthorised persons. The operator must ensure no-one stops or moves around in the work area.

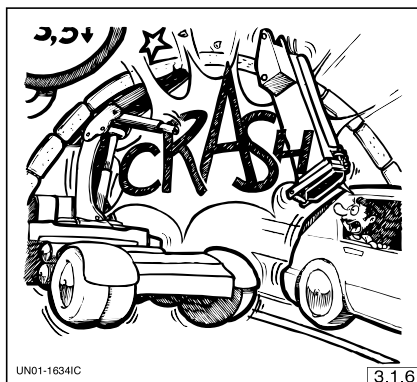


**HAZARD !**

***It is strictly forbidden to move the load over the vehicle's manoeuvring area.***

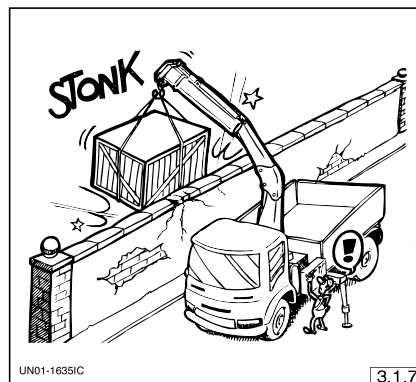
When this is unavoidable, operate the machine using the controls on the opposite side, assisted by other personnel on the ground to perform the necessary manoeuvres, or use suitable accessories provided for this purpose, such as:

- remote controls
- raised seat
- raised control station.

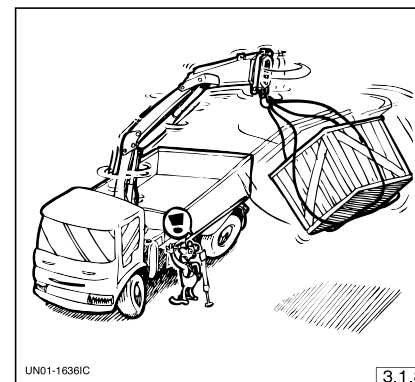


#### WARNING !

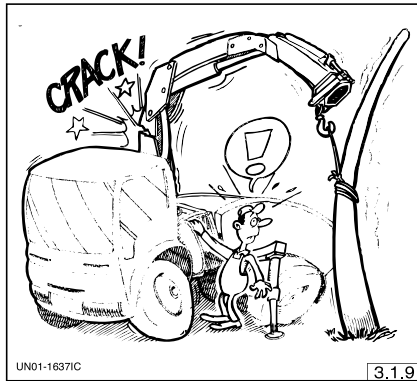
***Always follow the Highway Code, in particular with regards to height limit signs.***



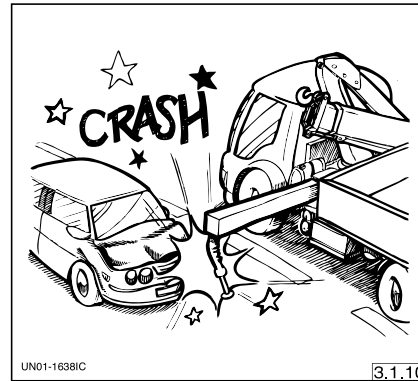
Do not operate the crane in poor visibility conditions. The operator must always have a perfect view of the work area.



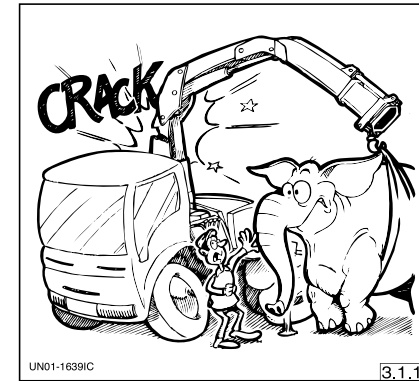
Use short harnesses and operate the levers smoothly and gently to prevent the load swinging dangerously.



Do not use the crane to remove poles, uproot trees or lift fixed loads.



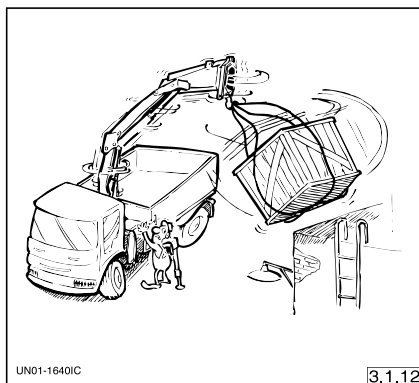
**! WARNING !**  
*Before driving the vehicle, ensure all the lock devices are engaged.*



**! WARNING !**  
*Never lift loads exceeding the limits stipulated in the loads diagrams.*

Make sure the loads are less than those indicated on the diagrams in relation to the outreach.





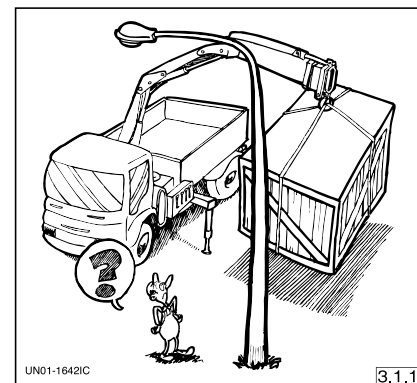
**HAZARD !**

*Never swing the load to place it beyond the permitted outreach indicated in the load diagram.*



**WARNING !**

*Never drag loads, lift them upwards.*

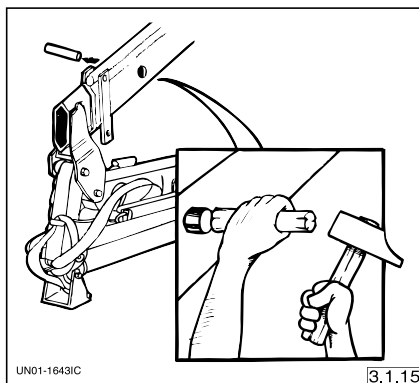


**WARNING !**

*In the presence of objects obstructing the crane's range of action, take precautions to prevent collisions.*

**3**

**SAFETY**



**WARNING !**

*When fitting and removing the accessories' lock pins, use equipment made of soft materials to prevent the risk of being hit by flying splinters caused by the striking of the tool.*



**WARNING !**

*Never use the crane during a storm.*



**HAZARD !**

*It is forbidden to operate the crane when the wind reaches a speed of 10.8 m/s (grade 6 on the Beaufort scale).*

To calculate the wind speed, please refer to the table below.

**- Beaufort scale -**

| Wind force                                                                          |                         | Wind speed       |                               | Effect of the wind on land                                                     |                                                                                    |
|-------------------------------------------------------------------------------------|-------------------------|------------------|-------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Beaufort number                                                                     | Description of the wind | m/s              | Km/h (Mp/h)                   |                                                                                |                                                                                    |
| 0                                                                                   | Calm                    | from 0 to 0,2    | 1 (0)                         | Calm, smoke rises straight up                                                  |                                                                                    |
| 1                                                                                   | Light air               | from 0,3 to 1,5  | from 1 to 5 (from 1 to 3)     | Wind direction indicated by the movement of smoke only, not by the weathervane |                                                                                    |
| 2                                                                                   | Light breeze            | from 1,6 to 3,3  | from 6 to 11 (from 4 to 7)    | Wind can be felt on the face, leaves rustle, weathervane moves                 |                                                                                    |
| 3                                                                                   | Gentle breeze           | from 3,4 to 5,4  | from 12 to 19 (from 8 to 12)  | Leaves and small branches move, pennants unfold                                |                                                                                    |
| 4                                                                                   | Moderate breeze         | from 5,5 to 7,9  | from 20 to 28 (from 13 to 18) | Wind lifts dust and loose paper, moves branches and thin poles                 |                                                                                    |
| 5                                                                                   | Fresh breeze            | from 8,0 to 10,7 | from 29 to 38 (from 19 to 25) | Small broadleaves begin to wave, slight foam appears on lakes                  |                                                                                    |
| HAZARD !                                                                            | 6                       | Strong breeze    | from 10,8 to 13,8             | from 39 to 49 (from 25 to 31)                                                  | Poles move greatly, whistling along telephone lines, use of umbrellas is difficult |
|                                                                                     | 7                       | Near gale        | from 13,9 to 17,1             | from 50 to 61 (from 32 to 38)                                                  | All the trees move, it is very difficult to move against the wind                  |
|                                                                                     | 8                       | Gale             | from 17,2 to 20,7             | from 62 to 74 (from 39 to 46)                                                  | Tree branches are broken, walking in the open air is particularly difficult        |
|                                                                                     | 9                       | Strong gale      | from 20,8 to 24,4             | from 75 to 88 (from 47 to 55)                                                  | Slight damage to houses (chimney pots and roof tiles are blown off)                |
|  | 10                      | Storm            | from 24,5 to 28,4             | from 89 to 102 (from 56 to 64)                                                 | Trees are uprooted, considerable damage to houses                                  |

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## 3.2 - Operator's qualifications and behaviour

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The use of the crane is restricted solely to personnel meeting the following minimum requirements:

- ◆ specifically employed personnel;
- ◆ apprentices under direct supervision of the specifically employed personnel;
- ◆ staff members employed for the machine's maintenance and testing (when their skills are required);
- ◆ crane inspectors.

Only the persons listed above may access the crane's work area, and only for the purpose of fulfilling their functions. In any case, they must always advise the operator or person in charge of their presence.

### - Operator's qualifications

To operate the crane, the following requirements must be met:

- ◆ possession of the necessary psychophysical qualities to ensure the operator is neither a risk to himself or to others;
- ◆ ability to understand the descriptions and illustrations in the instructions manual (including the figures and diagrams contained therein) and the symbols and instructions on the plates affixed to the machine;
- ◆ familiarity with and ability to implement the emergency procedures;
- ◆ ability to operate the machine as a whole, together with any accessories applied;
- ◆ experience of the applicable safety regulations.

### - Operator's behaviour

The operator must not:

- ◆ engage in any other activity which may distract him while operating the crane;
- ◆ operate the machine in a state of drunkenness or when under the influence of drugs which may reduce either physical or mental abilities;
- ◆ leave the crane unattended with the load hanging;
- ◆ use the machine in the event of malfunctions.

## 4 Handling, lifting and fitting

### 4.1 - Handling and lifting



#### WARNING !

*Always use lifting means which are suitable for the load to be lifted and handled.*

*Chains and cables must always be in good condition, never worn or frayed as this would seriously prejudice the operators' safety.*

*Always keep the load as low as possible when moving to guarantee better stability and visibility.*

*Always work with great care and carry out very slow manoeuvres for the safety of the operators present and to safeguard the good working condition of the crane.*



#### WARNING !

*If the crane is used without the locking devices (e.g. wooden beams, threaded bars, tie rods, screws, pins, etc.) the machine may overturn.*

They type of packing must be chosen according to the means of transport and the destination of the goods.

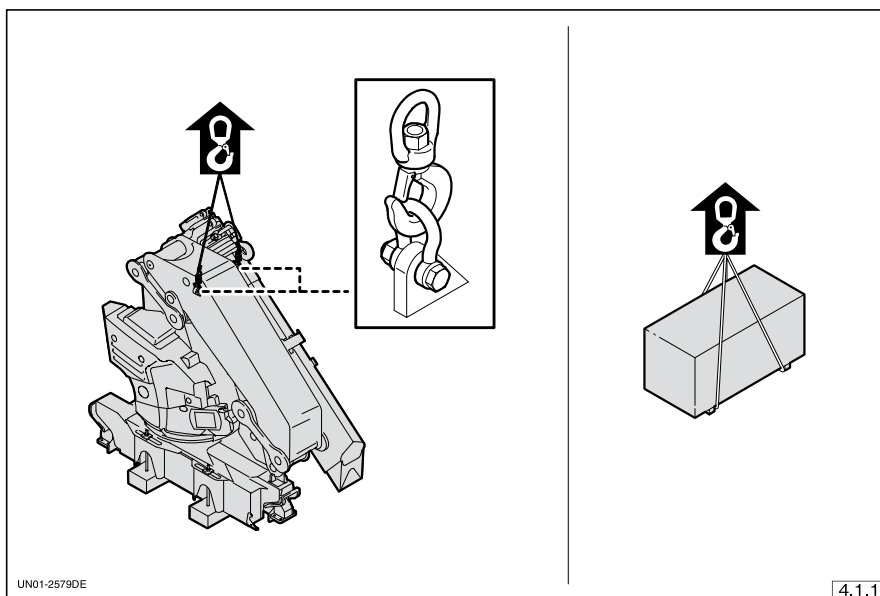
The crane is normally dispatched placed on two wooden beams with the stabilisers facing upwards or disassembled and placed in a box with the equipment used to fit the crane on the base truck.

The wooden beams must be removed during the installation of the crane on a truck.

For packaging which differs from that shown in the manual, follow the instructions and the symbols applied to the packing itself.

Before lifting the crane always check the weight on the technical information sheets.

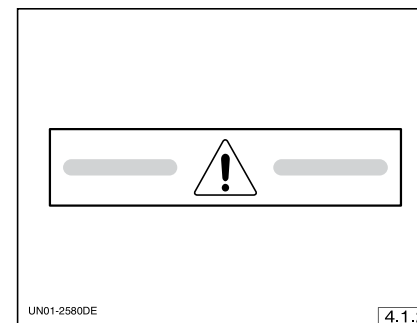
#### 4.1.1 - Lifting the crane with a hook



Lift the crane using the special lifting points positioned on the main arm of the crane. If the crane is fitted with accessories such as antenna, winch, manual extensions, etc., the barycentre of the machine will be different each time. When lifting from above pay attention to the crane swinging movement as the lifting point is never perfectly barycentric.

#### 4.1.2 - Locking devices

PM cranes are fitted with locking devices to avoid hazardous situations during handling of the machine (e.g.: arm pack or swinging support lock) highlighted with the following sticker (fig. 4.1.2).



#### 4.2

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## 4.2 - Storage

---

Normally, the crane accessories and other equipment supplied are dispatched wrapped in a protective sheet which must be removed before they are fitted.

However, in the event of long periods during which the unit will be not be used, provide a suitable cover and store it indoors to protect it from the weather.

The storage area must not be excessively damp or dusty. The room temperature must be between -20 °C (-4 °F) and +70 °C (+158 °F) with a maximum humidity level of 90%, with no condensation.

---

## 4.3 - Fitting

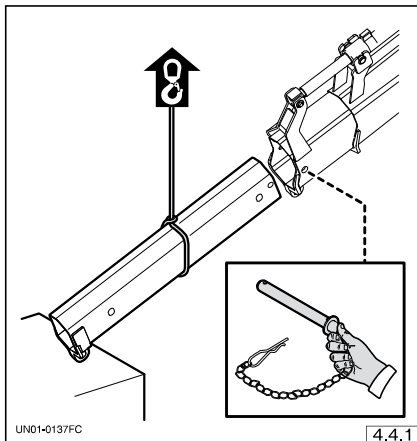
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The installation of the crane on the vehicle and the inspections following installation required by the local regulations in force in each country must be carried out carefully following the information contained in the "Instruction and warnings manual for the installation of the crane on a truck" written by the company PM Group S.p.A. All necessary information, including the "Instruction and warnings manual for the installation of the crane on a truck" is supplied to the crane owner only upon request sent by email to:

**info@pm-group.eu**

The fitting and any alterations to the vehicle required must comply with the regulations issued by the vehicle's manufacturer.

## 4.4 - Fitting the manual extension



### WARNING !

***The manual extensions must be fitted and removed one at a time in a sequential order.***

***After assembly, check that the locking device prevents the extension from moving out in an uncontrolled manner.***

Proceed as outlined below.

- 1 - According to its weight, harness the extension with suitable lifting means and rest it on a stable surface.
- 2 - Slide out the arms and insert the extension and so the pin holes are aligned.
- 3 - Lock the extension into position (open or closed) using the special pin and safety lock pin.

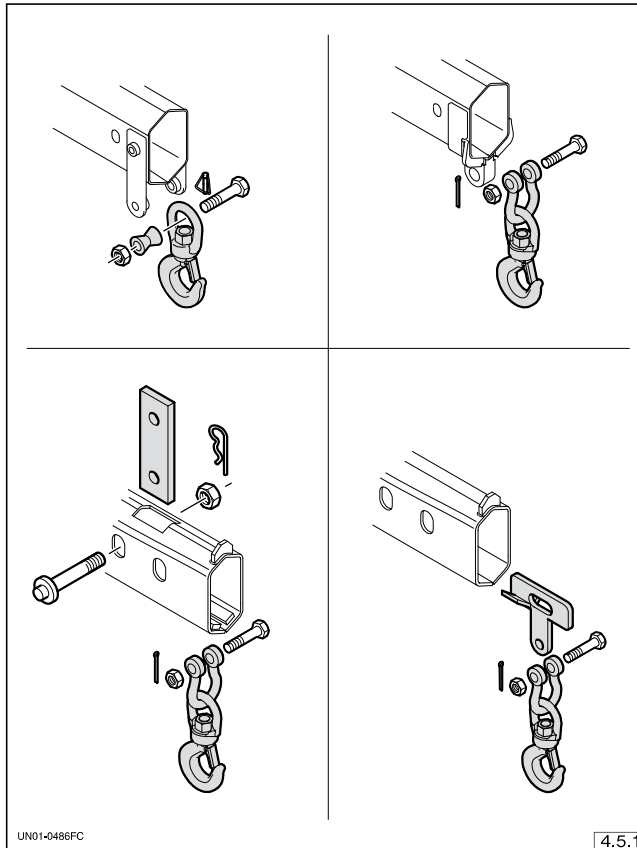
To disassemble the extension, proceed as described for the assembly but in the reverse order.

Whenever possible, keep the arm pack angled towards the ground.



## 4.5 - Fitting the hook

### Assembly type



**WARNING !**

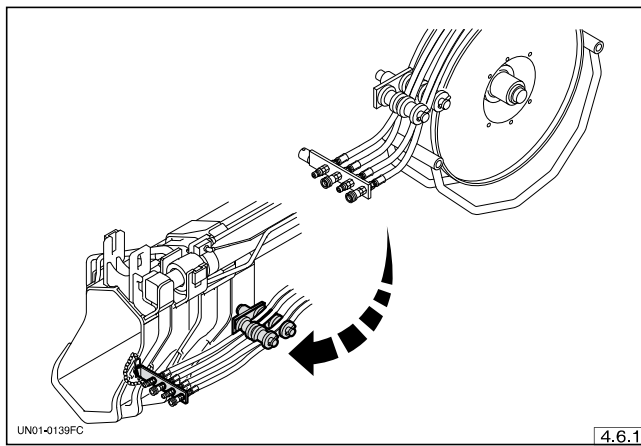
*The hook must only be mounted on the last crane arm or extended manual extension*

## 4.6 - Fitting the jib

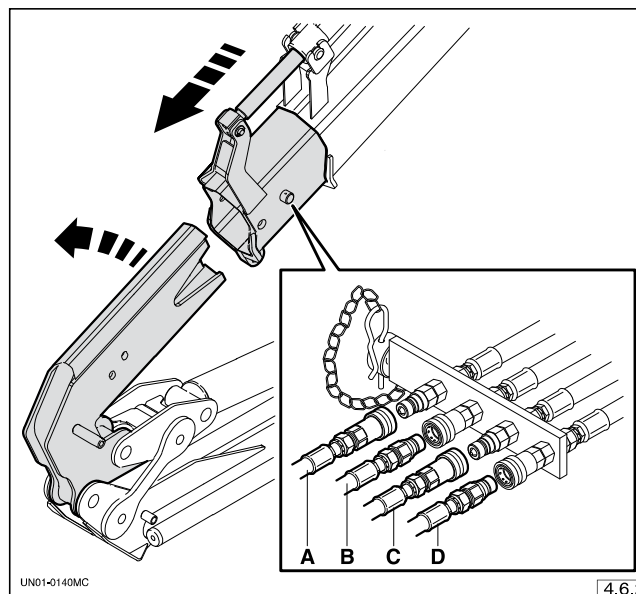


### WARNING !

*To prevent the risk of the unit overturning, ensure the extension is always stable, resting on the ground or on suitable supports.*



For the cranes equipped with a hose reel, fit the quick coupling mount at the end of the last arm and the pipe track on the main arm.



Proceed as outlined below.

- 1 - Place the jib on the ground; if the crane is equipped with a winch, place it safely on suitable supports.
- 2 - Extend the arms until they are near the tooth.
- 3 - Connect the hoses to the unions in the following order:
  - A - articulated arm opening
  - B - articulated arm closing
  - C - arms jack extension
  - D - arms jack retraction

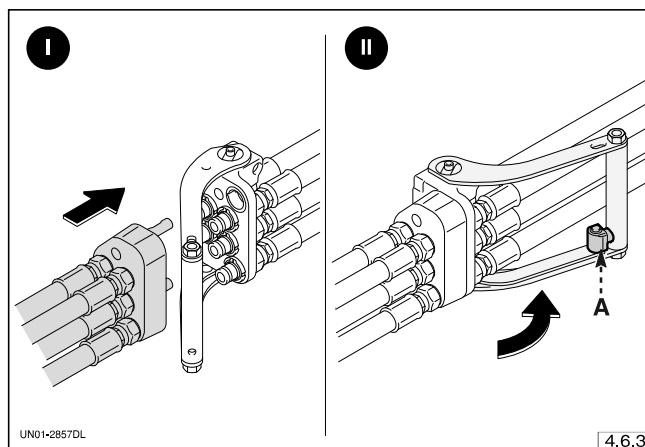
- 4 - Open the articulated joint jack to align the tooth with the crane.
- 5 - Extend the crane arms to introduce the tooth and lock it with the special pin and safety lock pin.



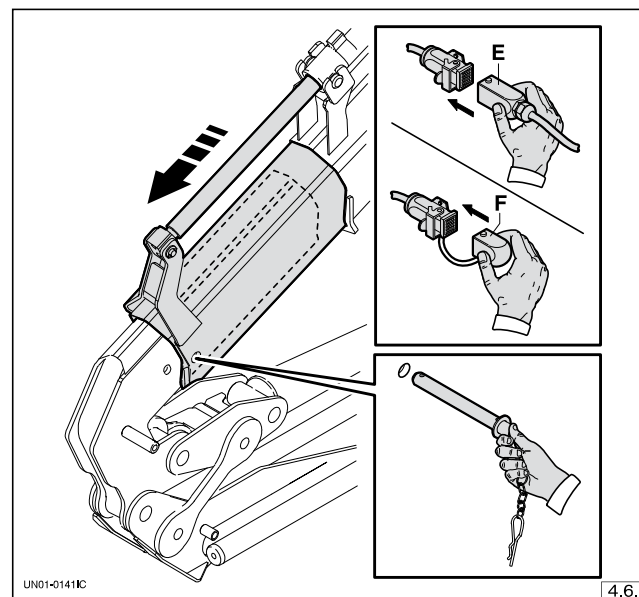
#### Information

*In the crane with the pipe track, connect the hoses from the jib in the same order as the crane with the hose reel.*

#### - Quick coupling device



- 1) Connect the two parts of the device;
- 2) press the button "A" and turn the lever until the locking position is reached.



If the extension is fitted with a momentum limiting device, connect the electrical pin "E".

#### - Jib removal

For the disassembly, proceed as for the assembly but in the reverse order.

Connect the pin to terminal "F" to be able to use the crane without the jib.

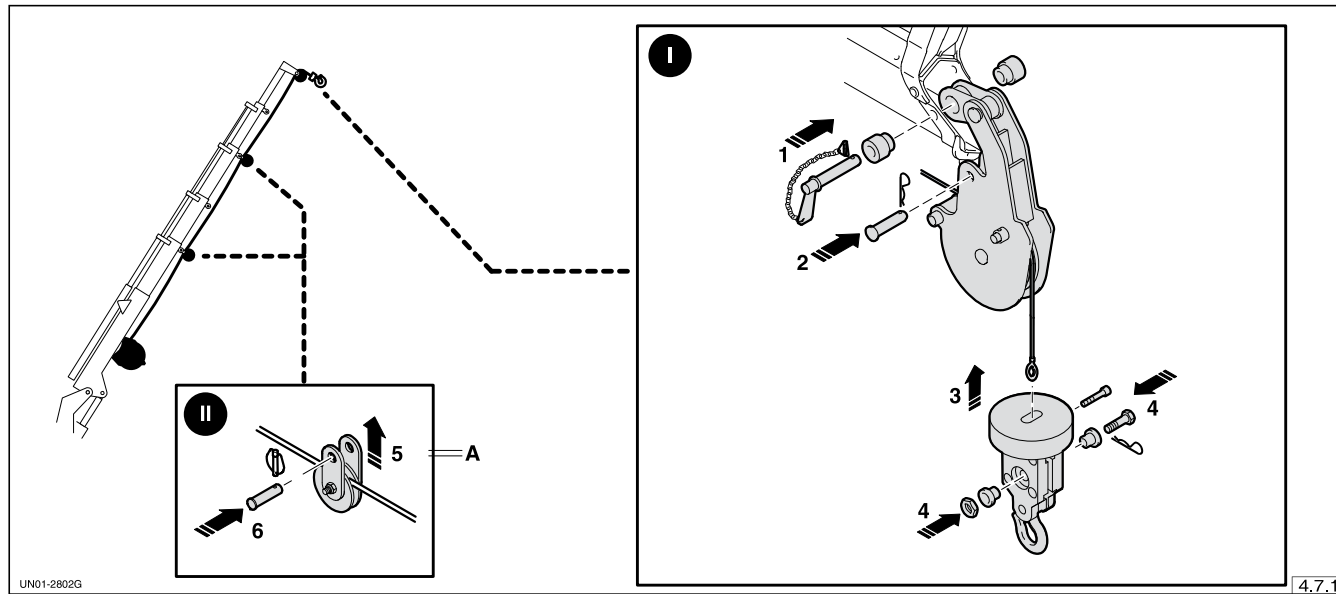
4.7

## 4.7 - Tackle installation

### 4.7.1 - Fitting the tackle on the crane

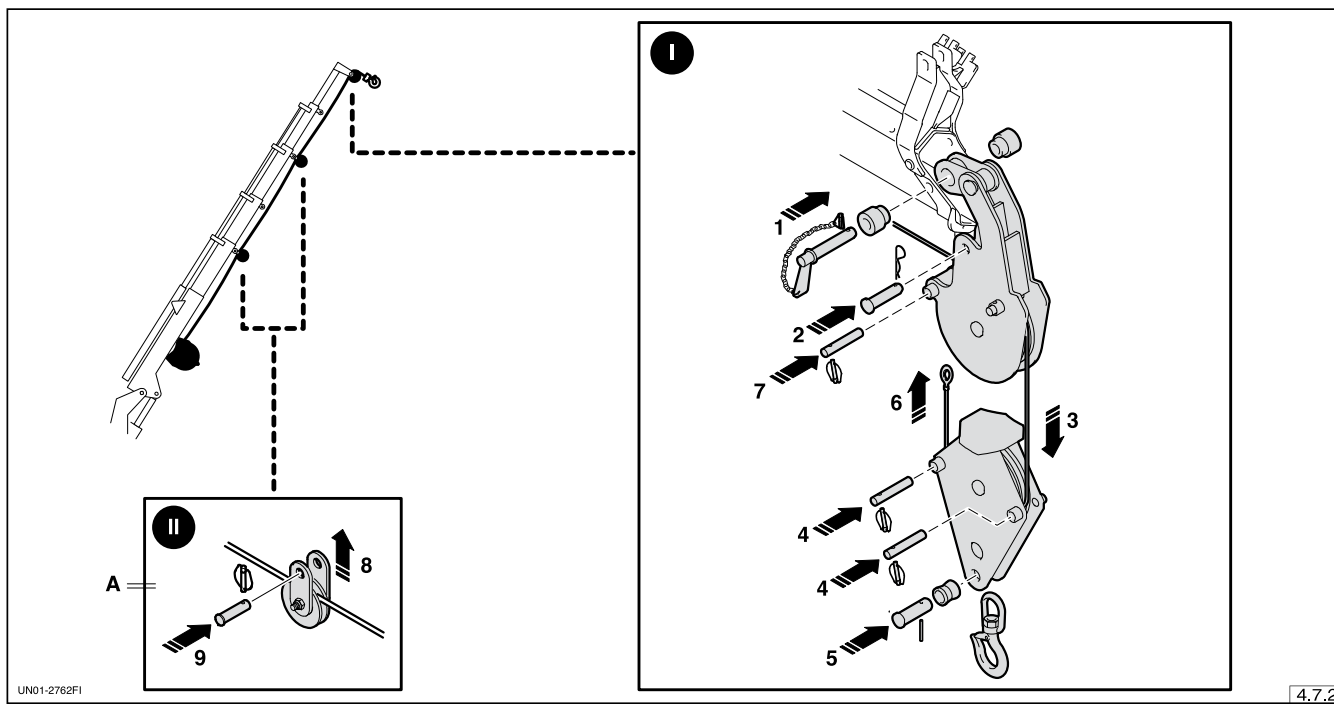
Fit the pulley "A" to support the cable if there are long sections between the winch and the block.

#### - Assembly sequence for tackle with direct pull



A = driving pulley

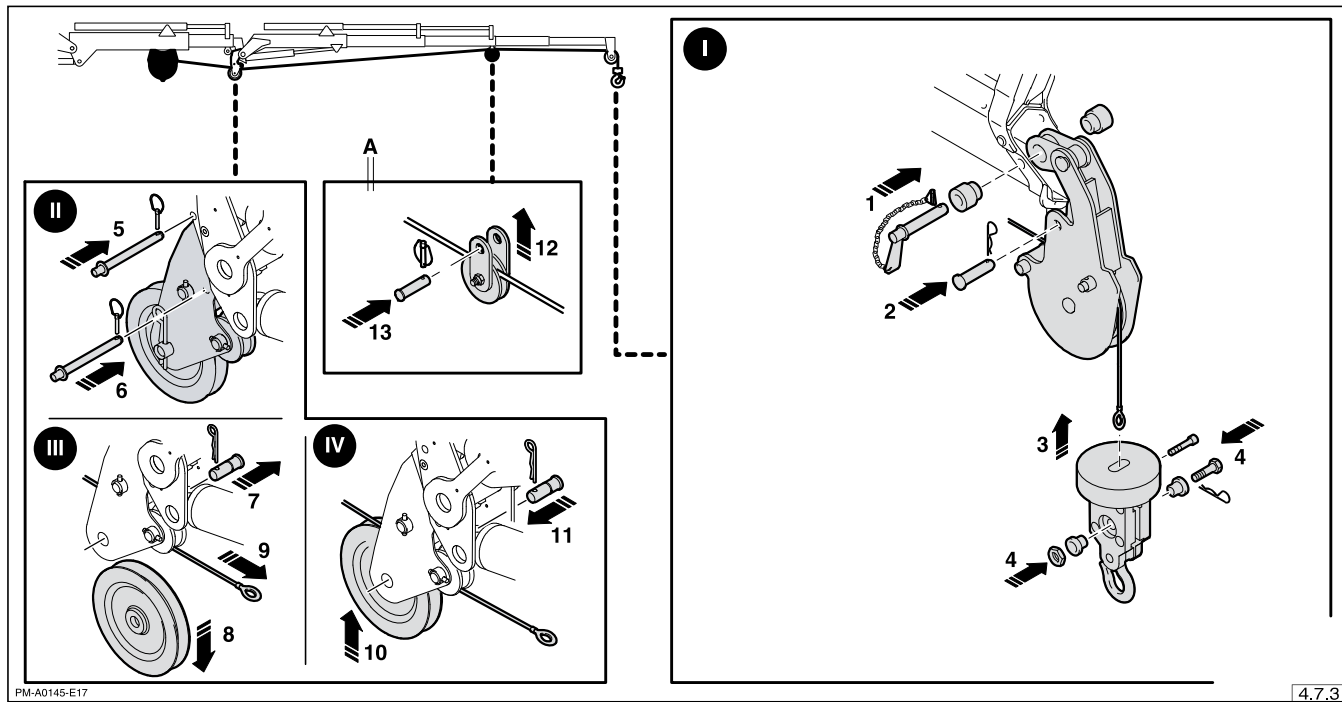
- Assembly sequence for tackle with double pull



A = driving pulley

#### 4.7.2 - Fitting the tackle on the jib (J810.20 - J610.20)

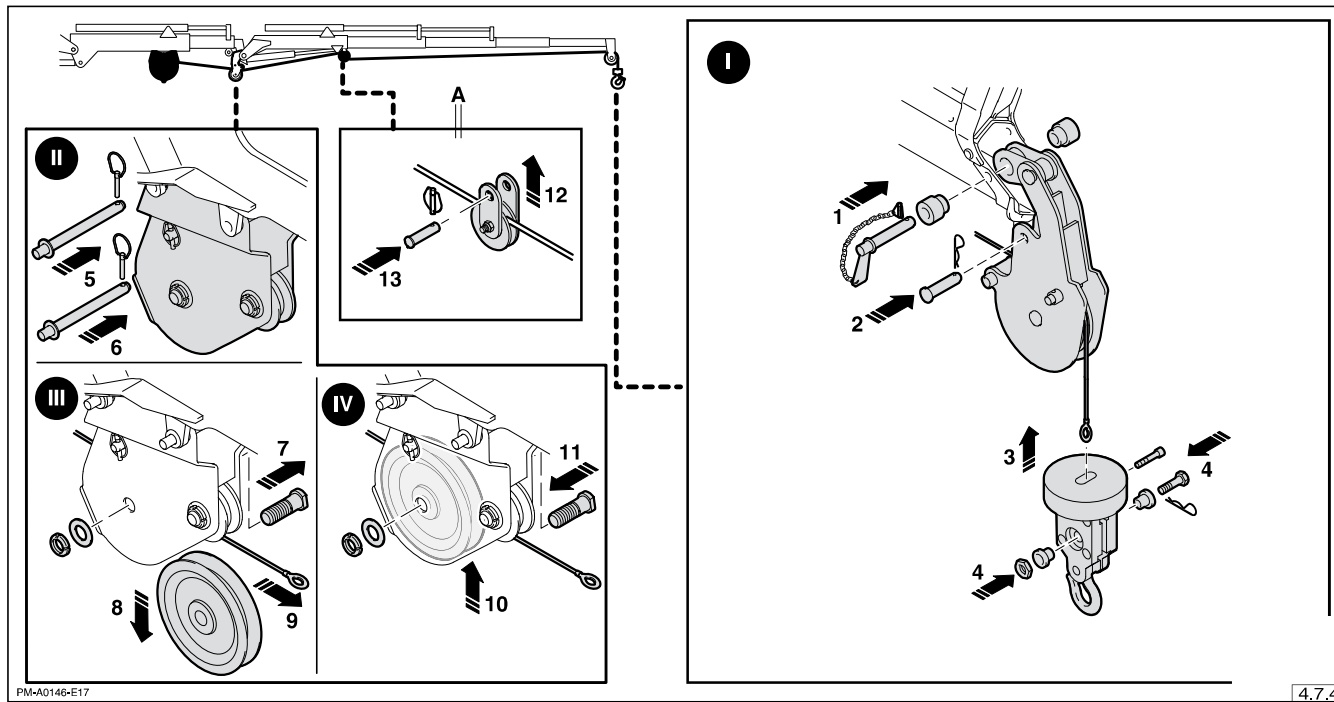
- Assembly sequence for tackle with direct pull (winch on standard crane)



A = driving pulley

#### 4.7.3 - Fitting the tackle on the jib (J1410.20 - J1210.20)

- Assembly sequence for tackle with direct pull (winch on standard crane)



A = driving pulley





## **5** Information about adjustments

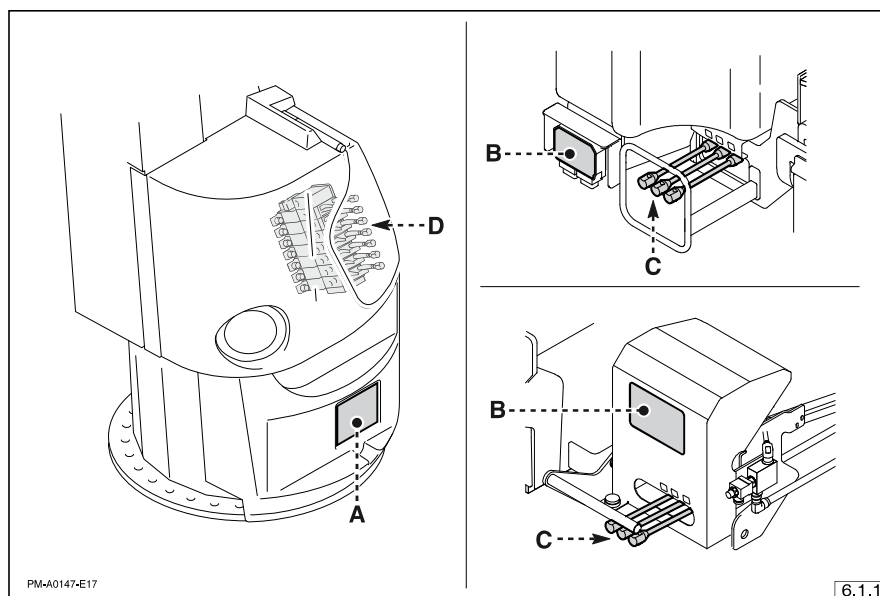
All adjustments must be performed by an authorised workshop.



## 6 Usage instructions

### 6.1 - Controls

#### 6.1.1 - Control posts on board the machine



#### **i** Information

According to the equipment fitted on the crane the control devices and/or commands of the control posts on board may vary.

#### Key

- A - Power Tronic panel
- B - "MCS" panel
- C - Outriggers controls distributor
- D - Crane control distributor (this control position must only be used in case of failure)

#### **i** Information

The use of the crane controls on board the machine disables the PLUS function.

### 6.1.2 - Crane control symbols



Clockwise rotation.



Lower main arm.



Lower secondary arm.



Arm extension.



Lower jib.



Jib arm extension.



Lower winch cable.



Rotator clockwise rotation.



Grab opening.



Outriggers activation.

#### - Multiple activation device controls



Jib arm extension / Open grab.



Lower jib / lower winch cable.

#### - Outrigger distributor controls



Jack extension or retraction control selection.



Enable outrigger or supplementary crossmember outrigger arm.



Enable crane outrigger or outrigger arm.

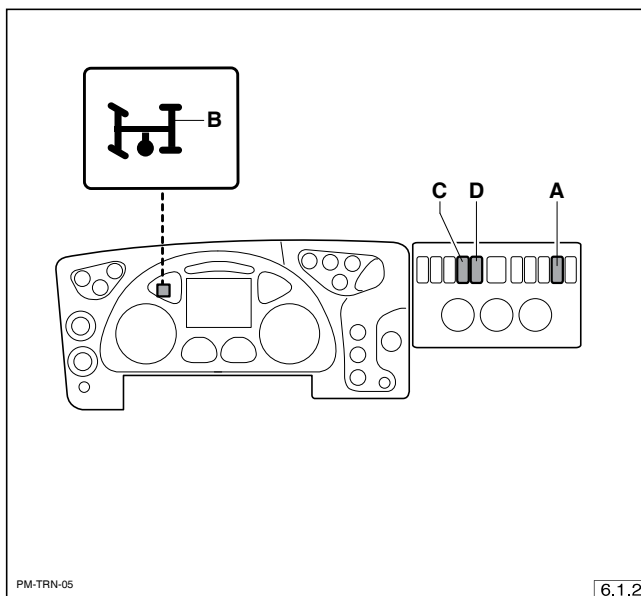


#### Information

*The plates on the control protective casing show just one movement of the crane, which is carried out by moving the lever in the direction of the arrow. For the opposite movement, move the lever in the opposite direction to the arrow.*

### 6.1.3 - Controls and signals/gauges located in the truck cab

Controls, signal lights and warning buzzers that may be installed in the truck cab are listed below; the figure and position of the controls and signals/gauges are indicative.



#### A - PTO switch

This engages and disengages the PTO.

#### B - Signal light

When lit, this shows the power take-off (PTO) is engaged.

#### C - Signal light

When lit, this shows that the outriggers are not in the correct resting position. The buzzer will sound when the signal lights light up.

#### D - Signal light

When lit, this shows that the crane is not in the correct resting position. The buzzer will sound when the signal lights light up.



#### Information

*For all other vehicle controls and signals/gauges, please refer to the instructions provided by the vehicle's manufacturer.*

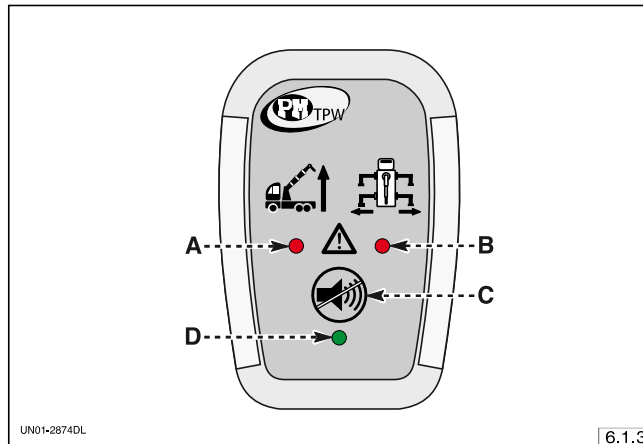


#### Information

*In some cases a control to temporarily disable the warning buzzer can be installed.*

#### 6.1.4 - PM panel for per driver's cab

PM supplies a panel to be installed in the cab, which is designed for the following indicators.



##### **A - Red signal light**

When lit, this shows that the crane is not in the correct resting position. The buzzer will sound when the signal lights light up.

##### **B - Red signal light**

When lit, this shows that the outriggers are not in the correct resting position. The buzzer will sound when the signal lights light up.

##### **C - Button to temporarily disable the warning buzzer**

##### **D - Green signal light**

This signals that the system is running

## 6.2 - Radio control

The radio control is composed of a portable transmitter unit for the operator and a receiver unit installed on-board the machine.

### - Safety precautions

- Do not operate the radio control if it is damaged or malfunctioning.
- Before using the radio control, check that the batteries are charged.
- Do not leave the remote control unattended; otherwise the crane may be used by unauthorised persons.
- Keep under constant control:
  - work area;
  - load trajectory;
  - indicator light on-board the machine or the incremental bar on the radio control, which show the lifting of 90% or 100% of the load.
- Do not clean the remote control with a pressurised water jet or immerse it in water or any other type of liquid.
- Do not position the load manually.

### 6.2.1 - SCANRECO radio control

#### - Technical data

- Power voltage: 7,2 Volts
- Battery: rechargeable "Scanreco".
- Working range including obstacles: 100 m (ft 328).
- Protection grade: IP65.

### Battery

The effective duration of a battery is approx. 8 hours. The intermittent switching on three times of a buzzer and the intermittent switching on of the indicator light "M", indicate that the battery is nearly flat.



#### Information

*Only replace the battery when the flashing "M" indicator light switches off.*

### Battery charger

Charge voltage of the battery charger supplied: 11 Vcc - 30 Vcc.

The recharging time of a completely flat battery varies from 12 to 14 hours.

### Battery charger indicator lights

- The red indicator light signals the presence of electricity supply to the charger.
- When the green indicator light is on, the battery is being recharged.

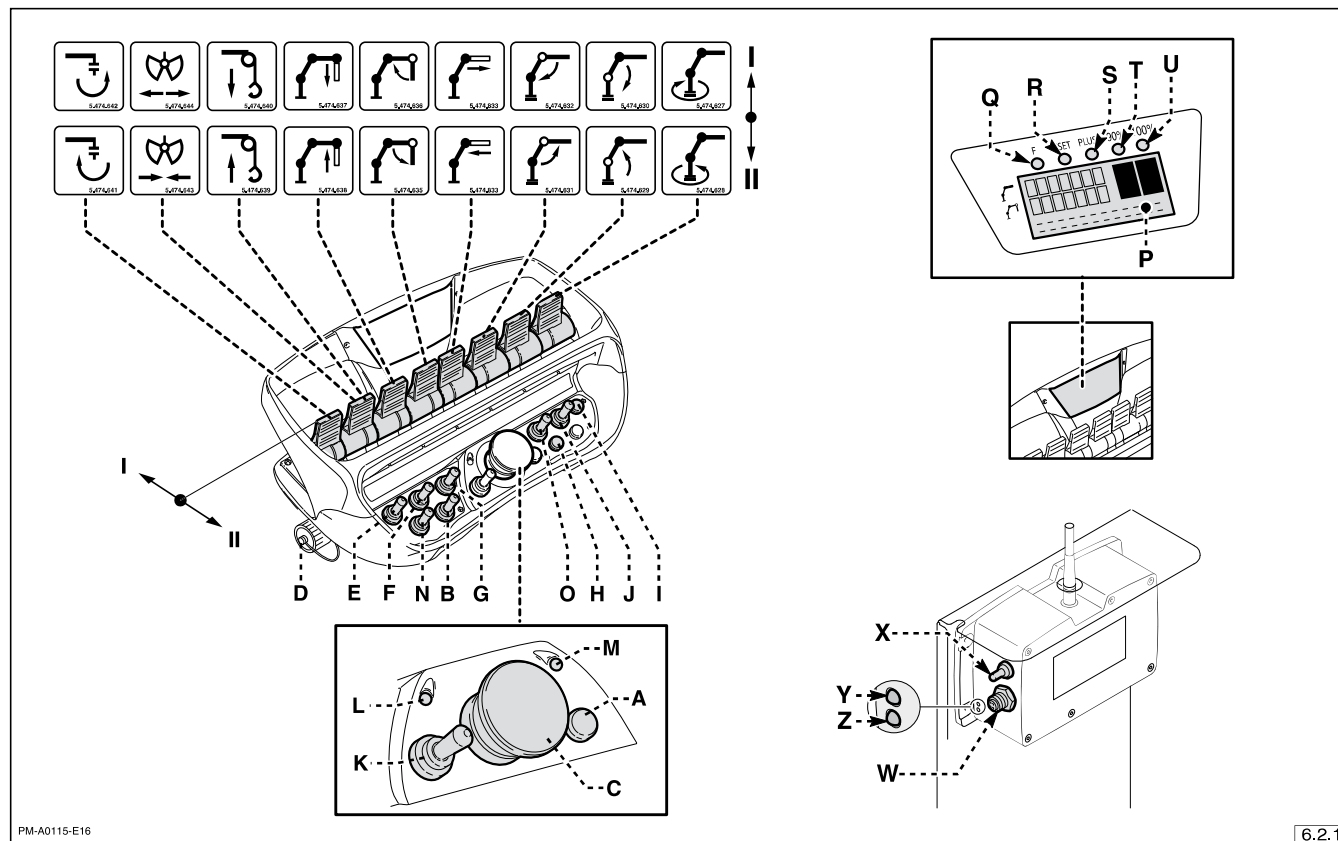


#### Information

*The fig. 6.2.1 and 6.2.2 simbology illustrated controls order can be on request inverted.*

## - Controls

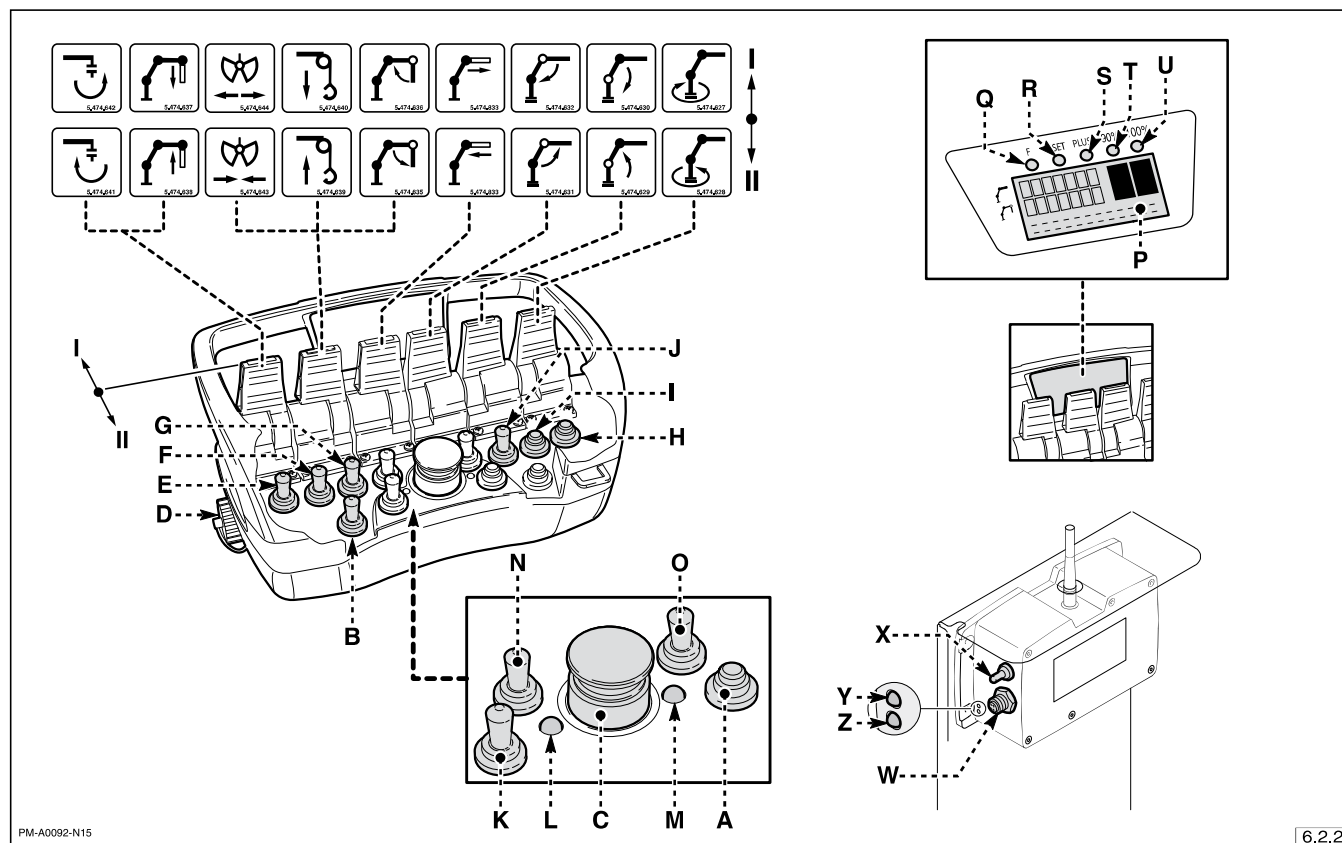
### Scanreco Maxi radio control



6.2.1



## Scanreco Mini radio control



PM-A0092-N15

6.2.2

**A - Switching on the transmitter unit**

The button has two functions:

- I) radio control ON;
- II) buzzer.

**B - Control commutation switch**

This enables the stabilisation controls or those used for load handling.

**C - Emergency stop button**

See "Control and limiting devices".

**D - Cable connector**

Connection for use of the transmitter as a cable control.

**E - "RPM" activation**

Flick the switch to place the engine rpm in automatic or manual mode.

**F - Start-up/stop**

Flick the switch to start up or stop the vehicle engine.

**G - Accelerator**

Flick the switch to vary the engine rpm of the vehicle. It only works with switch "E" in manual.

**H - "Plus" reset button**

The "PLUS" device automatically reduces the working speed and increases the lifting capacity when, due to the effect of the load in relation to the arm, the pressure reaches the calibration value of the device.

Push briefly to deactivate the "PLUS" device and put the crane back into the normal functioning mode.

It is only possible to carry out the operation when indicator "R" and indicator of the functioning control unit are illuminated with a fixed light.

**I - "Reset" button**

The button, used in combination with each single load lowering control command, moves the crane from a blocked situation in which all the controls are inhibited (see function reset with "3-30").

**J - "F3/T" function switch**

- Move to the left to enable or disable the optional "F3" command;
- move to the right "T" to scroll the display pages.

**K - Speed switch**

The switch activates and deactivates the functioning speed of the crane.

Press repeatedly.

Each time it is pressed corresponds to

a different crane speed.

Up to five different speeds are possible. The speed chosen is indicated by the number of flashes of the indicator light "L".

Flick the switch once only (in the OFF direction) to reset the normal functioning speed.

**L - Indicator light**

Green.

When on, it indicates the different functioning speeds of the crane (see speed switch).

**M - Indicator light**

Red.

When on, it indicates that the transmitter unit is switched on.

**N - "F+" function switch**

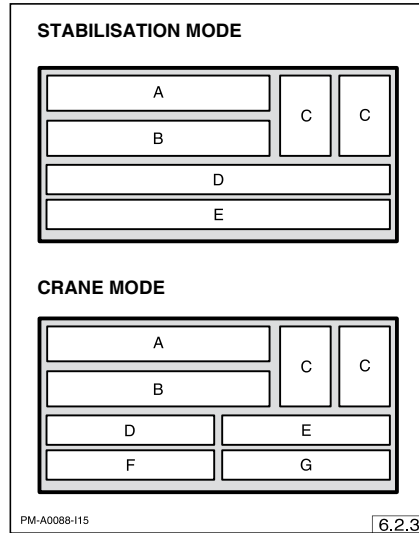
Activate to enable or disable the optional "F+" function.

**O - "F1" and "F2" functions switch**

Activate to enable or disable the optional "F1" or "F2" functions.

## P - Display

The display shows the machine status and operating mode information; the upper part of the display is fixed while the lower part changes according to the operating mode (stabilisation or crane, switch "B") and the page number displayed (switch "J").



### Key

|   |                                                                                |
|---|--------------------------------------------------------------------------------|
| A | Incremental bar of the load percentage bearing on the main and secondary jacks |
| B | Incremental bar of the load percentage bearing on the jib joint jack           |
| C | Information and alarm icons                                                    |

### - STABILISATION MODE

#### Key

|   |                                                   |
|---|---------------------------------------------------|
| D | Number of the joystick of reference               |
| E | Manoeuvre allowed using the joystick of reference |

### - CRANE MODE

#### Key to page 1

|   |                         |
|---|-------------------------|
| D | Main jack pressure      |
| E | Secondary jack pressure |
| F | Main arm angle          |
| G | Secondary arm angle     |

#### Key to page 2

|   |                                                              |
|---|--------------------------------------------------------------|
| D | Jib joint jack pressure                                      |
| E | Oil temperature                                              |
| F | Jib angle                                                    |
| G | DV from radio (0 = no 1 = yes)<br>EV active (0 = no 1 = yes) |

### Key to page 3

|   |                                                                            |
|---|----------------------------------------------------------------------------|
| D | Extension percentage of the crane's right hand outrigger arm               |
| E | Extension percentage of the crane's left hand outrigger arm                |
| F | Crane right hand outrigger jack<br>OK - stabilised<br>NOK - not stabilised |
| G | Crane left hand outrigger jack<br>OK - stabilised<br>NOK - not stabilised  |

### Key to page 4

|   |                                                                                                       |
|---|-------------------------------------------------------------------------------------------------------|
| D | Extension percentage of the right hand outrigger arm of the supplementary crossmember                 |
| E | Extension percentage of the left hand outrigger arm of the supplementary crossmember                  |
| F | Right hand outrigger jack of the supplementary crossmember<br>OK - stabilised<br>NOK - not stabilised |
| G | Left hand outrigger jack of the supplementary crossmember<br>OK - stabilised<br>NOK - not stabilised  |

### Key to page 5

|   |                                           |
|---|-------------------------------------------|
| D | Last alarm codes (see the alarm messages) |
| E |                                           |
| F |                                           |
| G |                                           |

**Q - Indicator light**

Green.

When it is switched on it means that the function to exclude the winch is active, see “Additional functions from the transmitter –Winch exclusion”.

**R - Indicator light**

Yellow.

When on, it indicates that the “3-30” system is functioning to lower the load to the ground.

**S - Indicator light**

Yellow.

When on:

- with an intermittent light, it indicates that the crane functioning is in the “PLUS” mode;
- with a fixed light, it indicates that the crane functioning is in the “PLUS” mode, but with the possibility of deactivating it and returning to the normal mode.

**T - Indicator light**

Yellow.

When on, it indicates that 90% of the load that can be lifted with the winch has been reached.

**U - Indicator light**

Red.

When on, it indicates that 100% of the load that can be lifted with the winch has been reached.

**W -Cable connector**

Connection for use of the transmitter as a cable control.

**X - Three stable position switch**

This switches on and off the receiver unit.

REMOTE position: the receiver unit is on.

OFF position: the receiver unit is off.

MANUAL position: the receiver unit is on and the transmitter unit is by-passed.

**Y - (DV) signal light**

This indicates the state of operation of the wireless control.

**Z - (Status) signal light**

This indicates the state of operation of the wireless control.

**- Signal light signals ("Y" and "Z")**

*System on and transmitter unit off*

| Position selector “X” | Signal lights on     |
|-----------------------|----------------------|
| REMOTE                | “Status” (red light) |
| MANUAL                | “DV” (red light)     |

*System on and transmitter unit on*

| Position selector “X”                             | Signal lights on                           |
|---------------------------------------------------|--------------------------------------------|
| REMOTE (no button is pressed on transmitter unit) | “Status” (green light)                     |
| REMOTE (a button is pressed on transmitter unit)  | “Status” (green light)<br>“DV” (red light) |

**- Switching on the radio control**

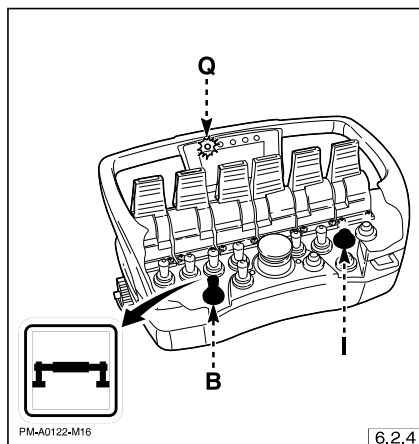
- Press button “A”, fig. 6.2.1 and 6.2.2.

**- Switching off the radio control**

- Press button “C”, fig. 6.2.1 and 6.2.2.

## - Supplementary transmitter unit functions

### Winch shut-off



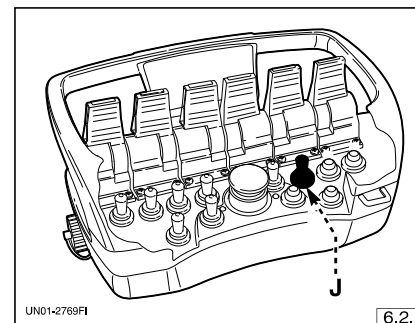
- 1 - Move the switch "B" to "stabilisation" position;
- 2 - To enable the winch press and hold the button "I" ("Reset" button, at least 5 seconds) until the green signal light "Q" switches on.  
To disable the winch press and hold the button "I" ("Reset" button, at least 5 seconds) until the green signal light "Q" switches off.
- 3 - Move the switch "B" to "crane" position.



#### Information

The icon of the disabled (or blocked) winch only appears on the display of the functional control unit, see "Information messages".

### Work light



Move the switch "J" to position "F3" to switch the work light (when featured) on or off.

## 6.2.2 - HETRONIC radio control

### - Technical data

- Power voltage: 3 (V)
- Batteries:
  - Rechargeable with Ni-Mh or Ni-Cd accumulators, 3,9 Volts;
  - Stylus/miniature type alkaline 2x1,5 Volts or 3x1,5 Volts.
- Working range including obstacles: 100 m (ft 328).
- Protection grade: IP65.

The radio control features two devices that are automatically activated in the following cases:

- if the work area is disturbed by a signal which effects the radio control's frequency range;
- the radio control is out of the transmitting unit's range.

In this case, the radio control switches to emergency mode and stops the crane operating.

### Battery



#### Information

*Use alkaline batteries only.  
The power supplied by zinc-carbon batteries is insufficient.*

### Battery charger

Charge voltage of the battery charger supplied: 12 (Vcc) / 24 (Vcc).

### Battery charger indicator lights

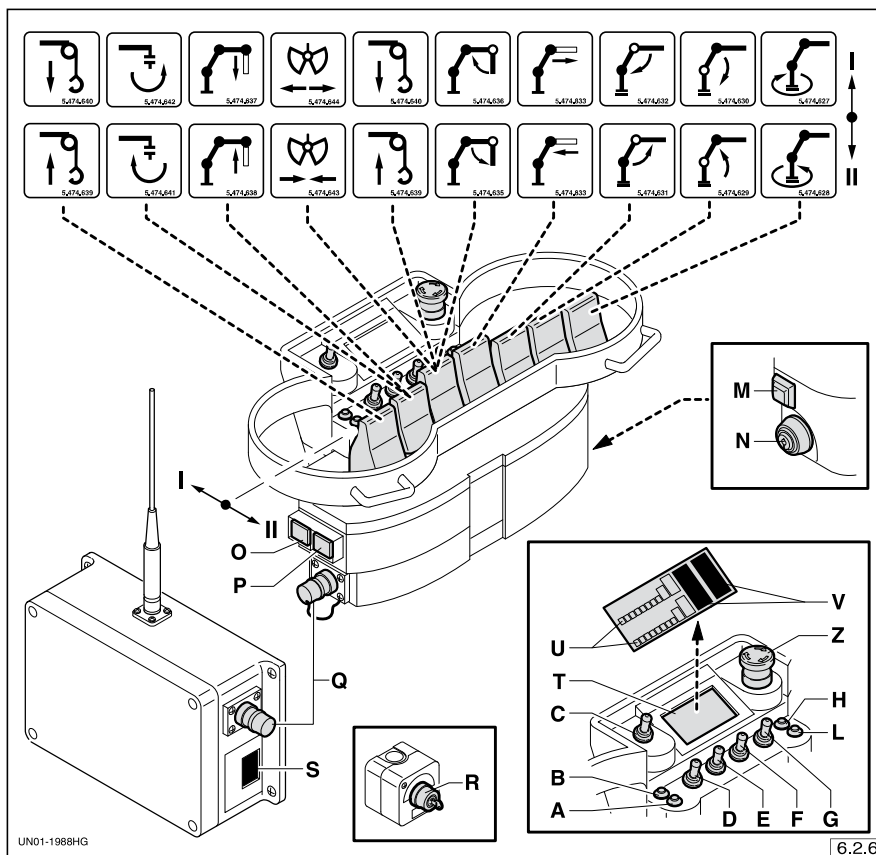
- When the signal light is switched on, this means the battery charger is live.
- When charging, the signal light should always remain on.
- As soon as the battery charging is complete, the signal light will flash.

### - Controls



#### Information

*The fig. 6.2.6 symbology illustrated controls order can be on request inverted.*



#### A - Indicator light

Yellow.

When on, it indicates that 90% of the load that can be lifted with the winch has been reached.

#### B - Indicator light

Red.

When on, it indicates that 100% of the load that can be lifted with the winch has been reached.

#### C - Control commutation switch

This enables the stabilisation controls or those used for load handling.

#### D - Switch ("RPM + / RPM -")

Flick the switch to vary the engine rpm of the vehicle.

#### E - Speed / "F3" function key switch

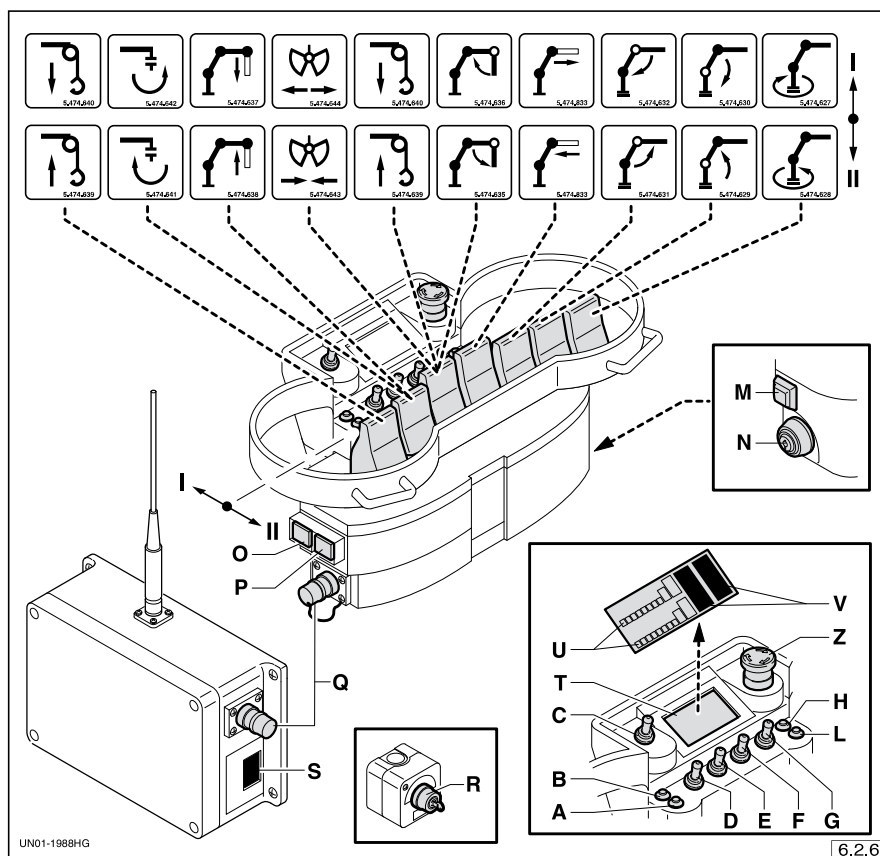
Activate to enable or disable the crane operating speed or the optional "F3" function key.

#### F - Start / stop switch

Flick the switch to start up or stop the vehicle engine.

#### G - "F1" and "F2" functions switch

Activate to enable or disable the optional "F1" or "F2" functions.



### H - Indicator light

Yellow.

When on:

- with an intermittent light, it indicates that the crane functioning is in the "PLUS" mode;
- with a fixed light, it indicates that the crane functioning is in the "PLUS" mode, but with the possibility of deactivating it and returning to the normal mode.

### L - Indicator light

When on:

- with a green light, this shows the radio-control is operating normally;
- with a red light, this shows the transmitter unit batteries are flat.

### M - Remote control enable

The button has two functions:

- 1) enables the radio control operation;
- 2) sounds to alert the operator that the radio control is switched on.

### N - On switch

O = Transmitter unit is switched off

I = Transmitter unit is live

P = Programming accessible by specialised technical staff only.



### O - Multi-function button

The button has two functions:

- short press: enables / disables the "PLUS" device;
- long press: enables/disables the "Re-generative" device (increases speed with no load applied) when fitted.

### P - "Reset" button

The button, used in combination with each single load lowering control command, moves the crane from a blocked situation in which all the controls are inhibited (see function reset with "3-30").

### Q - Cable connector

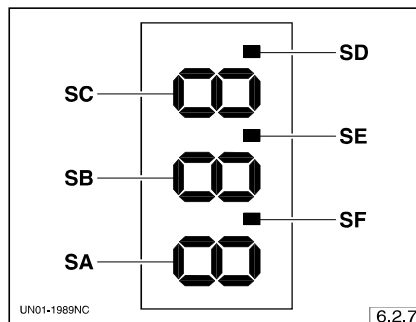
Connection for use of the transmitter as a cable control.

### R - Receiver unit ON switch

Hand/Manual position = manual control function activated;

Radio position = radio-control function activated.

### S - Display



The display shows all the radio-control operation information.

- Alphanumeric fields

**SA:** shows which lever on the transmitter unit has been operated;

**SB:** only active during system programming carried out by specialised personnel;

**SC:** displays the radio-control operating status (see radio control operation status chart).

### T - Display

#### U - Incremental bars

Incremental bars for the load percentage on the main or secondary jack and jib joint.

#### V - Information and alarm message display

#### Z - Emergency stop button

See "Control and limiting devices".

- Radio control operation status chart

| Pos. | Code | Description                                                                                                                                             |
|------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| SA   | E    | Transmitter unit lever operating error.<br>Switch the transmitter unit off then on again; if the code is still displayed, operation is inhibited        |
|      | 1    | Joystick 1 operation                                                                                                                                    |
|      | 2    | Joystick 2 operation                                                                                                                                    |
|      | 3    | Joystick 3 operation                                                                                                                                    |
|      | 4    | Joystick 4 operation                                                                                                                                    |
|      | 5    | Joystick 5 operation                                                                                                                                    |
|      | 6    | Joystick 6 operation                                                                                                                                    |
|      | 7    | Joystick 7 operation                                                                                                                                    |
|      | 8    | Joystick 8 operation                                                                                                                                    |
| SB   |      | System codes: these are only displayed during system programming.<br>For use by specialised personnel only                                              |
| SC   | 0    | Radio-control activated: all manoeuvres are enabled.                                                                                                    |
|      | 1    | Receiver unit powered correctly.<br>Radio signal present but radio-control not yet active.                                                              |
|      | 2    | Emergency stop button pressed on transmitter unit.                                                                                                      |
|      | 3    | Warning message: insufficient radio signal reception.                                                                                                   |
|      | 4    | Receiver unit powered correctly but no radio signal:<br>- transmitter unit switched off;<br>- programming error (wrong radio channel or serial number). |

- Points:

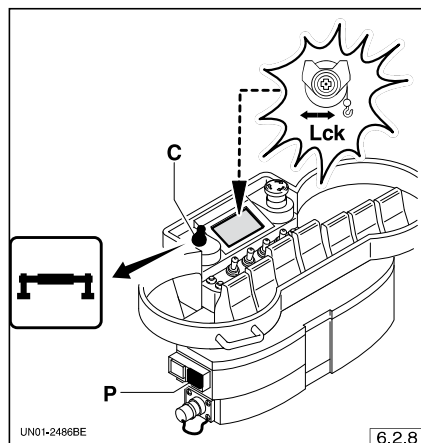
**SD:** flashing: correct radio signal reception.

**SE:** not active.

**SF:** flashing in conjunction with "SD":  
during programming stage only.

## - Supplementary transmitter unit functions

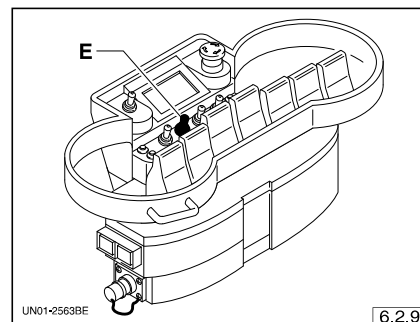
### Winch shut-off



To disable winch operation:

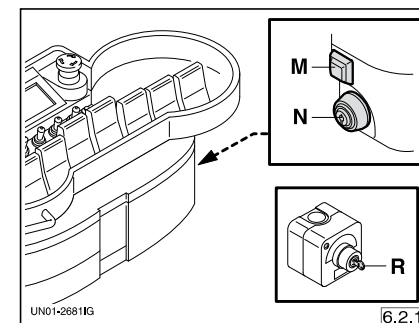
- 1 - press switch "C" to the "stabilisation" position;
- 2 - press the button "P" (Reset) until the "Winch lock" icon appears on the display.  
Quick-press button "P" quickly to reactivate the winch (the icon disappears).

### Work light



Press switch "E" in position "F3" to switch the work light (where featured) on or off.

## - Switching on the radio control



- Turn the key on the receiver unit ON switch "R" to the "RADIO" position.
- Turn the key on the transmitter unit ON switch "N" to the "I" position.
- Press button "M" to activate the transmitter / receiver unit functions.

## - Switching off the radio control

- Turn the key on the ON switch "N" on the transmitting unit to "0" position.
- Turn the key on the ON switch "R" on the receiver unit to "HAND / MANUAL" position.

### **6.2.3 - Radio control operation check**

Before starting to work:

- check the batteries are charged;
- check the radio control is in good condition;
- check the rubber guards around the levers are in good condition;
- check the receiving unit connections are in good condition;
- check the connection pins on the receiving unit are tightened properly.
- Checking emergency stop device operation.

Press emergency stop button, move the levers on the radio control in both directions and check that no crane manoeuvres are possible. Rotate the button to restore normal crane operation.

### **6.2.4 - Radio control stop due to power failure**

In the event that the "crane locks" due to a flat battery, proceed as follows:

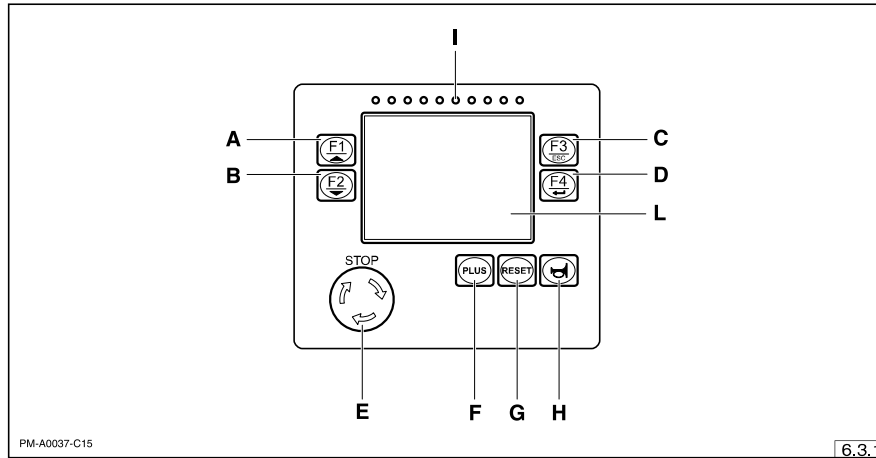
- I) switch off the transmitting unit
- II) replace the battery
- III) carry out the receiving unit start-up procedure.

### **6.2.5 - Radio control maintenance**

For radio control maintenance, please refer to the instructions contained in the instruction manual provided by the radio control's manufacturer.

## 6.3 - Functioning control unit

### 6.3.1 - Functioning control unit controls and indicators (Power Tronic Advance +)



#### A - "F1" Function key

- It enables or disables the selectable devices (see page 2 of the display) or the optional command "F1".
- Upon switching on the machine, it can be used to select the "crane with hook" operating mode.
- It can be used to scroll the information icons, alarms and items in the settings menu.

#### B - "F2" Function key

- It enables or disables the devices

that can be selected (see page 2 of the display) or the optional command "F2".

- Upon switching on the machine, it can be used to select the "crane with hydraulic tool" operating mode.
- It can be used to scroll the information icons, alarms and items in the settings menu.

#### C - "F3" Function key

- Press briefly to switch on or off the work light (if featured).

- It can be used to exit the menus.
- It shows the selectable devices (see page 2 of the display).

#### D - "F4" Function key

Press to access the settings menu of the control unit.

It can be used to scroll the information pages on the display

#### E - Emergency stop device

See "Control and limiting devices".

#### F - "PLUS" key

It has the same function as the "PLUS" key of the transmitter.

#### G - Reset key

It has the same function as the reset key of the transmitter.

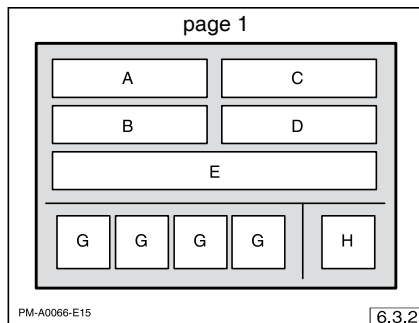
#### H - Audio warning device

#### I - Signal lights

They show the lifting capacity when the machine is operational.

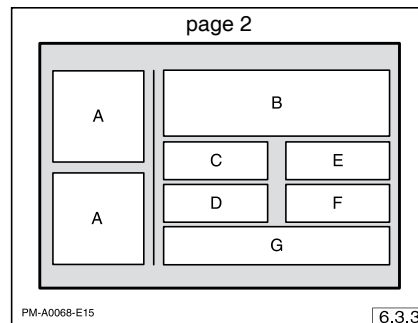
#### L - Display

The display shows, in sequence, the following information pages.



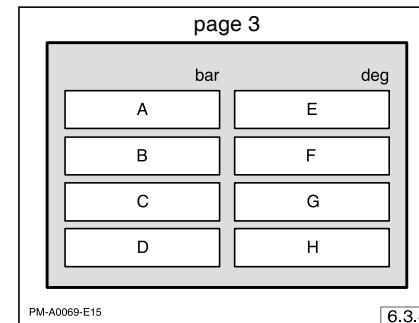
**Key to page 1**

|   |                                        |
|---|----------------------------------------|
| A | Main jack load percentage              |
| B | Secondary jack load percentage         |
| C | Load percentage of the jib joint jack  |
| D | Winch load percentage                  |
| E | Crane status information               |
| F | Speed reduction percentage             |
| G | Signal icon (see information messages) |
| H | Alarm icon                             |



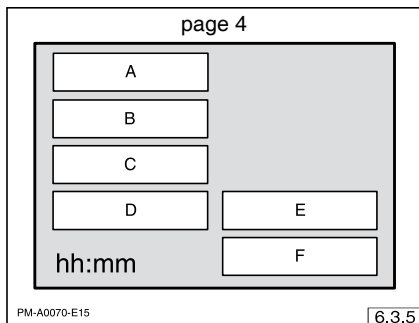
**Key to page 2**

|   |                                                                                                                                                     |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| A | Icons of the selectable devices. Use "F3" to scroll the devices and press the corresponding "F1" or "F2" key, at the side, to enable or disable it. |
| B | Highest load percentage between all the jacks                                                                                                       |
| C | Main jack load percentage                                                                                                                           |
| D | Secondary jack load percentage                                                                                                                      |
| E | Load percentage of the jib joint jack                                                                                                               |
| F | Winch load percentage                                                                                                                               |
| G | Crane status information                                                                                                                            |



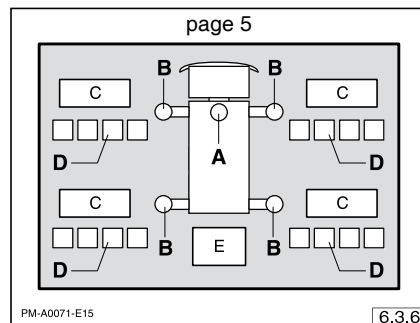
**Key to page 2**

|   |                                                         |
|---|---------------------------------------------------------|
| A | Main jack pressure                                      |
| B | Secondary jack pressure                                 |
| C | Pressure of the jib joint jack                          |
| D | LS pressure                                             |
| E | Main arm angle                                          |
| F | Secondary arm angle                                     |
| G | Jib angle                                               |
| H | Column rotation angle (zero is always on the truck cab) |



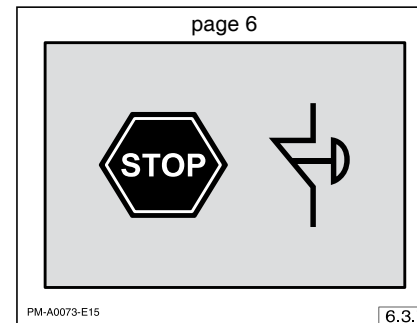
Key to page 4

|   |                                  |
|---|----------------------------------|
| A | Winch load percentage            |
| B | Oil temperature                  |
| C | Speed reduction percentage       |
| D | DV from radio (ON / OFF)         |
| E | Active solenoid valve (ON / OFF) |
| F | Hour meter                       |



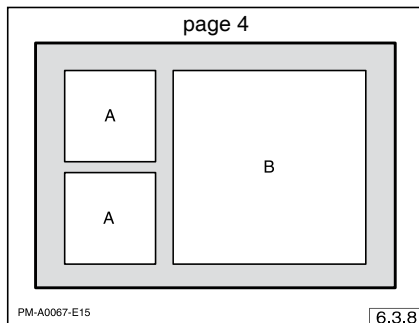
Key to page 5

|   |                                                                                                             |
|---|-------------------------------------------------------------------------------------------------------------|
| A | Stabilisation status signal<br>● machine stabilised<br>○ machine not stabilised                             |
| B | Outrigger jack signal<br>● outrigger on the ground<br>○ outrigger not on the ground                         |
| C | Value in percentage; this indicates the extension of the outrigger arms (crane and additional cross member) |
| D | Incremental bars; they indicate the extension of the outrigger arms (crane and additional cross member)     |
| E | Column rotation angle                                                                                       |



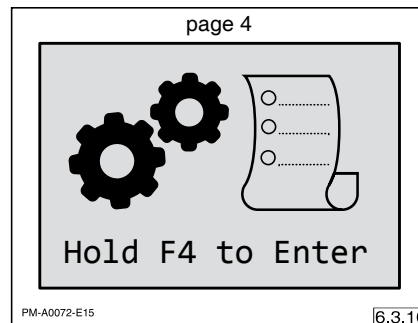
Key to page 6

This page only appears when the machine shuts down, for example when the emergency button is pressed.



Key to page 4

|   |             |
|---|-------------|
| A | Alarm icons |
| B | Error code  |



Key to page 4

Press and hold "F4" to enter the settings menu.

List of items included in the menu

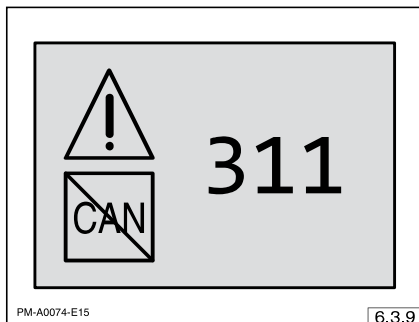
- USER: the parameters contained in this menu can be read and some can be changed by the user.

The parameters contained in the following menu cannot be changed by the user:

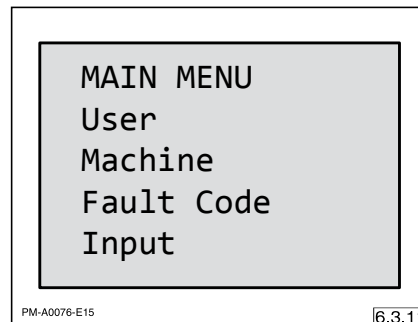
- MACHINE: machine display settings
- FAULT CODE: list of fault codes (see "Fault codes")
- INPUT: input status
- OUTPUT: output status
- SENSORS: sensor status
- MSG CAN BUS: communication network status

Press "F1" and "F2" to select the required option and press "F4" to confirm and access the menu of each item. Press "F3" to go back one level.

Example page



Example page



Description of the "USER" menu

The user may vary some of the following parameters:

- BRIGHTNESS
- CONTRAST
- LANGUAGE
- The DATE-TIME parameter is set on GMT (Greenwich meridian time) by the manufacturer and cannot be changed by the user.



## 6.3.2 - Information and alarm messages

### - Information messages

| Icon | Description                                |
|------|--------------------------------------------|
|      | Multiple activation functioning            |
|      | Use of the grab                            |
|      | Rotation block                             |
|      | Emergency button pressed                   |
|      | Active limited area                        |
|      | Jib not connected to the electrical system |
|      | Carry out maintenance                      |
|      | Heat exchanger fan in use                  |
|      | Reset: operates for 3 seconds              |
|      | Reset: does not operate for 30 seconds     |
|      | Set for the use of the crane               |
|      | Facility for use with outriggers           |
|      | Active "regenerative" function             |
|      | Activated PLE speed                        |

| Icon | Description                                                                                                 |
|------|-------------------------------------------------------------------------------------------------------------|
|      | Stabilized crane                                                                                            |
|      | Crane thrust control                                                                                        |
|      | Crane maximum lifting                                                                                       |
|      | Jib thrust control                                                                                          |
|      | Jib maximum lifting                                                                                         |
|      | MOD: translation mode<br>OK: winch in work position<br>NOK: winch not in work position<br>Lck: winch locked |
|      | Block lower limit                                                                                           |
|      | Block upper limit                                                                                           |
|      | Work light                                                                                                  |
|      | Vehicle engine off                                                                                          |
|      | Vehicle engine on                                                                                           |

| Icon | Description                    |
|------|--------------------------------|
|      | Oil temperature sensor error   |
|      | High hydraulic oil temperature |
|      | Low hydraulic oil temperature  |
|      | Overload of manual jibs        |
|      | Clogged filter                 |
|      | Active "PLUS" function         |
|      | Left hand side stabilised      |
|      | Right hand side stabilised     |
|      | Rear work area enabled         |

#### (\*) Icon

- The icon appears the first time with a numerical code:  
60 - carry out maintenance - 500 hours  
61 - carry out maintenance - 1000 hours  
Then the icon appears at machine start-up without numerical code, until the scheduled maintenance is carried out.

## - Alarm messages

### System errors

| Icon                                                                              | Code. | Description                            |
|-----------------------------------------------------------------------------------|-------|----------------------------------------|
|  | 111   | Saving parameters                      |
|  | 112   | Data exchange between the two channels |
|  | 113   | System check                           |
|  | 114   | Emergency solenoid valve               |

### Disconnected or short circuited sensor or calibration error

| Icon                                                                                | Code. | Description                          |
|-------------------------------------------------------------------------------------|-------|--------------------------------------|
|    | 121   | Distributor pressure switch (TP0)    |
|                                                                                     | 122   |                                      |
|                                                                                     | 123   |                                      |
|                                                                                     | 124   |                                      |
|   | 131   | Main jack pressure switch (TP1)      |
|                                                                                     | 132   |                                      |
|                                                                                     | 133   |                                      |
|                                                                                     | 134   |                                      |
|  | 141   | Secondary jack pressure switch (TP2) |
|                                                                                     | 142   |                                      |
|                                                                                     | 143   |                                      |
|                                                                                     | 144   |                                      |

| Icon                                                                                  | Code. | Description                                 |
|---------------------------------------------------------------------------------------|-------|---------------------------------------------|
|    | 151   | Jib joint jack pressure switch (TP3)        |
|                                                                                       | 152   |                                             |
|                                                                                       | 153   |                                             |
|                                                                                       | 154   |                                             |
|    | 161   | Main jack angular sensor (B1)               |
|                                                                                       | 162   |                                             |
|                                                                                       | 163   |                                             |
|                                                                                       | 164   |                                             |
|    | 171   | Secondary jack angular sensor (B2)          |
|                                                                                       | 172   |                                             |
|                                                                                       | 173   |                                             |
|                                                                                       | 174   |                                             |
|    | 181   | Jib joint jack angular sensor (B3)          |
|                                                                                       | 182   |                                             |
|                                                                                       | 183   |                                             |
|                                                                                       | 184   |                                             |
|    | 191   | Winch sensor                                |
|                                                                                       | 192   |                                             |
|                                                                                       | 193   |                                             |
|                                                                                       | 194   |                                             |
|  | 211   | Front RH outrigger arm extension sensor (A) |
|                                                                                       | 212   |                                             |
|                                                                                       | 213   |                                             |
|                                                                                       | 214   |                                             |
|  | 215   | Front RH outrigger arm extension sensor (B) |
|                                                                                       | 216   |                                             |
|                                                                                       | 217   |                                             |
|                                                                                       | 218   |                                             |

| <i>Icon</i>                                                                         | <i>Code.</i> | <i>Description</i>                          |
|-------------------------------------------------------------------------------------|--------------|---------------------------------------------|
|    | 221          | Front LH outrigger arm extension sensor (A) |
|                                                                                     | 222          |                                             |
|                                                                                     | 223          |                                             |
|                                                                                     | 224          |                                             |
|    | 225          | Front LH outrigger arm extension sensor (B) |
|                                                                                     | 226          |                                             |
|                                                                                     | 227          |                                             |
|                                                                                     | 228          |                                             |
|    | 231          | Rear RH outrigger arm extension sensor (A)  |
|                                                                                     | 232          |                                             |
|                                                                                     | 233          |                                             |
|                                                                                     | 234          |                                             |
|    | 235          | Rear RH outrigger arm extension sensor (B)  |
|                                                                                     | 236          |                                             |
|                                                                                     | 237          |                                             |
|                                                                                     | 238          |                                             |
|    | 241          | Rear LH outrigger arm extension sensor (A)  |
|                                                                                     | 242          |                                             |
|                                                                                     | 243          |                                             |
|                                                                                     | 244          |                                             |
|  | 245          | Rear LH outrigger arm extension sensor (B)  |
|                                                                                     | 246          |                                             |
|                                                                                     | 247          |                                             |
|                                                                                     | 248          |                                             |
|  | 251          | Rotation sensor (A)                         |
|                                                                                     | 252          |                                             |
|                                                                                     | 253          |                                             |
|                                                                                     | 254          |                                             |

| <i>Icon</i>                                                                         | <i>Code.</i> | <i>Description</i>                                |
|-------------------------------------------------------------------------------------|--------------|---------------------------------------------------|
|  | 255          | Rotation sensor (B)                               |
|                                                                                     | 256          |                                                   |
|                                                                                     | 257          |                                                   |
|                                                                                     | 258          |                                                   |
|  | 261          | Vehicle tilt sensor (X)                           |
|                                                                                     | 262          |                                                   |
|                                                                                     | 263          |                                                   |
|                                                                                     | 264          |                                                   |
|  | 271          | Vehicle tilt sensor (Y)                           |
|                                                                                     | 272          |                                                   |
|                                                                                     | 273          |                                                   |
|                                                                                     | 274          |                                                   |
|  | 281          | Oil temperature sensor                            |
|                                                                                     | 282          |                                                   |
|                                                                                     | 283          |                                                   |
|                                                                                     | 284          |                                                   |
|  | 291          | Jib joint jack pressure switch (TP3) (retraction) |
|                                                                                     | 292          |                                                   |
|                                                                                     | 293          |                                                   |
|                                                                                     | 294          |                                                   |

### ***CAN network failure***

| <i>Icon</i>                                                                         | <i>Code.</i> | <i>Description</i>                               |
|-------------------------------------------------------------------------------------|--------------|--------------------------------------------------|
|    | 311          | Front RH outrigger arm extension encoder failure |
|                                                                                     | 312          |                                                  |
|    | 313          | Front LH outrigger arm extension encoder failure |
|                                                                                     | 314          |                                                  |
|    | 315          | Rear RH outrigger arm extension encoder failure  |
|                                                                                     | 316          |                                                  |
|    | 317          | Rear LH outrigger arm extension encoder failure  |
|                                                                                     | 318          |                                                  |
|    | 321          | Rotation encoder failure                         |
|                                                                                     | 322          |                                                  |
|  | 323          | Vehicle tilt sensor failure                      |
|  | 324          | LG / IO control unit failure                     |
|  | 325          | Radio-control failure                            |
|                                                                                     | 326          |                                                  |
|                                                                                     | 327          |                                                  |

**6.26**

| <i>Icon</i>                                                                          | <i>Code.</i> | <i>Description</i>                                          |
|--------------------------------------------------------------------------------------|--------------|-------------------------------------------------------------|
|   | 328          | MCS control unit failure                                    |
|                                                                                      | 329          |                                                             |
|                                                                                      | 331          |                                                             |
|   | 332          | Power Tronic control unit failure                           |
|                                                                                      | 333          |                                                             |
|                                                                                      | 334          |                                                             |
|                                                                                      | 335          |                                                             |
|   | 336          | Power Tronic control unit failure (Slave)                   |
|                                                                                      | 337          |                                                             |
|   | 341          | Power Tronic control unit failure (additional control unit) |
|                                                                                      | 342          |                                                             |
|                                                                                      | 343          |                                                             |
|                                                                                      | 344          |                                                             |
|   | 345          | Power Tronic control unit failure (additional control unit) |
|                                                                                      | 346          |                                                             |
|                                                                                      | 347          |                                                             |
|                                                                                      | 348          |                                                             |
|  | 350          | Power Tronic control unit failure (vehicle tilt sensor)     |
|                                                                                      | 351          |                                                             |
|                                                                                      | 352          |                                                             |
|                                                                                      | 353          |                                                             |

### Sensor malfunction

| Icon                                                                                | Code. | Description                                  |
|-------------------------------------------------------------------------------------|-------|----------------------------------------------|
|    | 411   | Front RH outrigger arm extension encoder     |
|    | 412   | Front LH outrigger arm extension encoder     |
|    | 413   | Rear RH outrigger arm extension encoder      |
|    | 414   | Rear LH outrigger arm extension encoder      |
|    | 415   | Rotation encoder                             |
|   | 416   | Front RH outrigger jack on the ground sensor |
|  | 417   | Front LH outrigger jack on the ground sensor |
|  | 418   | Rear RH outrigger jack on the ground sensor  |
|  | 419   | Rear LH outrigger jack on the ground sensor  |
|  | 421   | Micro rotation (Interlock 3 and 4)           |

| Icon                                                                                | Code. | Description                |
|-------------------------------------------------------------------------------------|-------|----------------------------|
|  | 425   | Main arm angle sensor      |
|  | 426   | Secondary arm angle sensor |
|  | 427   | Jib arm angle sensor       |
|  | 430   | Vehicle tilt sensor (X)    |
|  | 431   | Vehicle tilt sensor (Y)    |

### ***Distributor electric module malfunction***

| <b><i>Icon</i></b>                                                                | <b><i>Code.</i></b> | <b><i>Description</i></b> |
|-----------------------------------------------------------------------------------|---------------------|---------------------------|
|  | 511                 | Rotation control          |
|                                                                                   | 512                 | Main jack control         |
|                                                                                   | 513                 | Secondary jack control    |
|                                                                                   | 514                 | Arm jacks control         |
|                                                                                   | 515                 | Jib joint jack control    |
|                                                                                   | 516                 | Jib arm jacks control     |
|                                                                                   | 517                 | Winch control             |

| <b><i>Icon</i></b>                                                                  | <b><i>Code.</i></b> | <b><i>Description</i></b>                |
|-------------------------------------------------------------------------------------|---------------------|------------------------------------------|
|  | da 521<br>a 535     | Active position of distributor lever     |
|                                                                                     | 521                 | Rotation control lever (clockwise)       |
|                                                                                     | 522                 | Rotation control lever (anticlockwise)   |
|                                                                                     | 523                 | Main jack control lever (up)             |
|                                                                                     | 524                 | Main jack control lever (down)           |
|                                                                                     | 525                 | Secondary jack control lever (up)        |
|                                                                                     | 526                 | Secondary jack control lever (down)      |
|                                                                                     | 527                 | Arm jacks control lever (retraction)     |
|                                                                                     | 528                 | Arm jacks control lever (extension)      |
|                                                                                     | 529                 | Jib joint jack control lever (up)        |
|                                                                                     | 531                 | Jib joint jack control lever (down)      |
|                                                                                     | 532                 | Jib arm jacks control lever (retraction) |
|                                                                                     | 533                 | Jib arm jacks control lever (extension)  |
|                                                                                     | 534                 | Winch control lever (up)                 |
|                                                                                     | 535                 | Winch control lever (down)               |

**Supplementary crossmember**  
**Disconnected or short circuited sensor or calibration error**

| Icon                                                                                | Code. | Description                                               |
|-------------------------------------------------------------------------------------|-------|-----------------------------------------------------------|
|    | 611   | Front RH outrigger arm extension jack pressure switch     |
|                                                                                     | 612   |                                                           |
|                                                                                     | 613   |                                                           |
|                                                                                     | 614   |                                                           |
|    | 621   | Rear RH outrigger arm extension jack pressure switch      |
|                                                                                     | 622   |                                                           |
|                                                                                     | 623   |                                                           |
|                                                                                     | 624   |                                                           |
|    | 631   | Rear LH outrigger arm extension jack pressure switch      |
|                                                                                     | 632   |                                                           |
|                                                                                     | 633   |                                                           |
|                                                                                     | 634   |                                                           |
|    | 641   | Front LH outrigger arm extension jack pressure switch     |
|                                                                                     | 642   |                                                           |
|                                                                                     | 643   |                                                           |
|                                                                                     | 644   |                                                           |
|   | 651   | Outrigger arm extension jack pressure switch (retraction) |
|                                                                                     | 652   |                                                           |
|                                                                                     | 653   |                                                           |
|                                                                                     | 654   |                                                           |
|  | 661   | Front outrigger jack pressure switch (extension)          |
|                                                                                     | 662   |                                                           |
|                                                                                     | 663   |                                                           |
|                                                                                     | 664   |                                                           |

| Icon                                                                                | Code. | Description                                       |
|-------------------------------------------------------------------------------------|-------|---------------------------------------------------|
|  | 671   | Front outrigger jack pressure switch (retraction) |
|                                                                                     | 672   |                                                   |
|                                                                                     | 673   |                                                   |
|                                                                                     | 674   |                                                   |

**Disconnected or short circuited sensor or calibration error**

| Icon                                                                                | Code. | Description                        |
|-------------------------------------------------------------------------------------|-------|------------------------------------|
|  | 801   | Main jack angular sensor (B1)      |
|                                                                                     | 802   |                                    |
|                                                                                     | 803   |                                    |
|                                                                                     | 804   |                                    |
|  | 811   | Secondary jack angular sensor (B2) |
|                                                                                     | 812   |                                    |
|                                                                                     | 813   |                                    |
|                                                                                     | 814   |                                    |
|  | 821   | Jib joint jack angular sensor (B3) |
|                                                                                     | 822   |                                    |
|                                                                                     | 823   |                                    |
|                                                                                     | 824   |                                    |

### ***CAN network failure***

| <i>Icon</i>                                                                       | <i>Code.</i> | <i>Description</i>                                      |
|-----------------------------------------------------------------------------------|--------------|---------------------------------------------------------|
|  | 831          | Power Tronic control unit failure (vehicle tilt sensor) |
|                                                                                   | 832          |                                                         |
|                                                                                   | 833          |                                                         |
|                                                                                   | 834          |                                                         |

### ***System errors- slave control unit***

| <i>Icon</i>                                                                       | <i>Code.</i> | <i>Description</i>                     |
|-----------------------------------------------------------------------------------|--------------|----------------------------------------|
|  | 911          | Saving parameters                      |
|  | 912          | Data exchange between the two channels |
|  | 913          | System check                           |

### ***CAN network failure***

| <i>Icon</i>                                                                         | <i>Code.</i> | <i>Description</i>                                          |
|-------------------------------------------------------------------------------------|--------------|-------------------------------------------------------------|
|  | 921          | Power Tronic control unit failure (additional control unit) |
|                                                                                     | 922          |                                                             |
|                                                                                     | 923          |                                                             |
|                                                                                     | 924          |                                                             |



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## 6.4 - Work sectors

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Different devices to check the work sectors can be installed to guarantee the stability of the equipment.



### Information

*Machines fitted with the Power Tronic Advance control panel can perform small manoeuvres near the column axis, for example opening and closing the crane even when the outrigger jacks are not resting on the ground.*

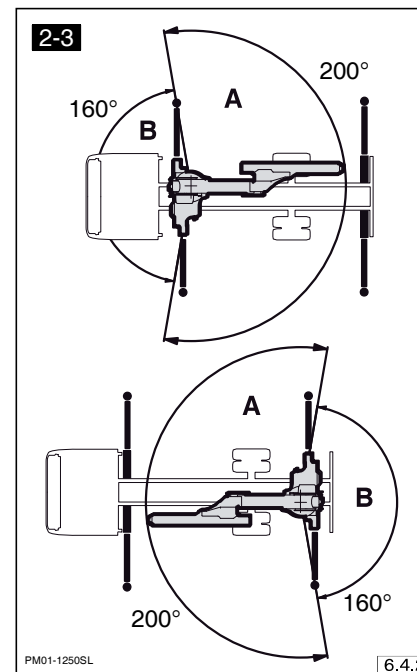
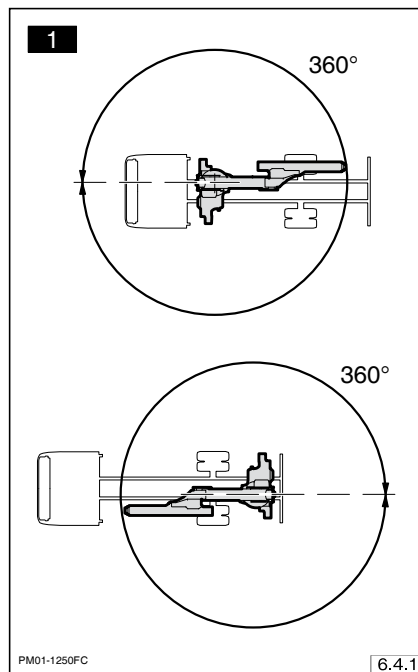


### Information

*The values of the angles that determine the work sectors and the outrigger extension percentages are indicative; they may vary according to the crane and type of equipment.*

### 6.4.1 - Electrical and mechanical rotation control devices

- 1) At 360° with a nominal capacity (\*) (fig. 6.4.1).
- 2) With a nominal capacity (\*) in sector "A" (200°) but without the possibility of rotation in sector "B" (160°) (fig. 6.4.2).
- 3) With a nominal capacity (\*) in sector "A" (200°) and a reduction in capacity in sector "B" (\*\*) (160°) (fig. 6.4.2).



(\*) nominal capacity = max. load permitted in relation to a certain configuration (see "Capacity diagram").

(\*\*) with a crane behind the truck bed, in some cases, the same load capacity of the sector "A" can be applied to sector "B".

#### 6.4.2 - Stabilisation control device (TYPE 1)

This device makes it possible to work with two sectors (A - B).

- **Sector A** (rated load capacity) (\*)  
outriggers arms fully extended and outrigger jacks resting correctly on the ground.
- **Sector B** (reduced load capacity) (\*\*)  
outrigger jacks resting correctly on the ground.

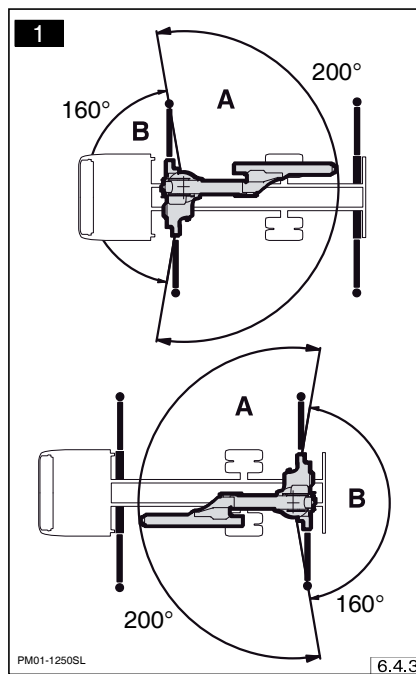


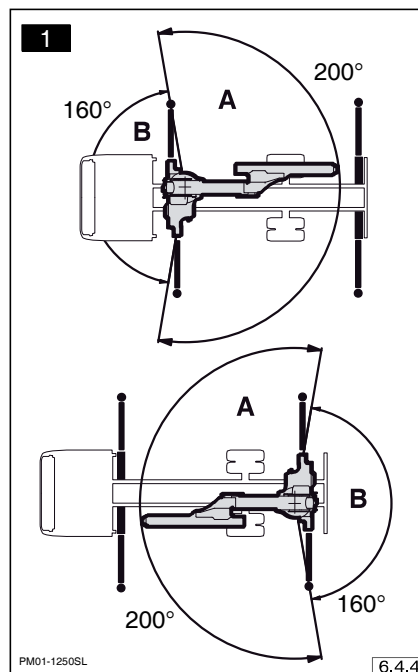
Fig. 1: outriggers arms fully extended.

(\*) Nominal capacity = max. load permitted in relation to a certain configuration (see "Capacity diagram").  
(\*\*) The sector "B" can be disabled according to the type of equipment. With a crane behind the truck bed, in some cases, the same load capacity of the sector "A" can be applied to sector "B".

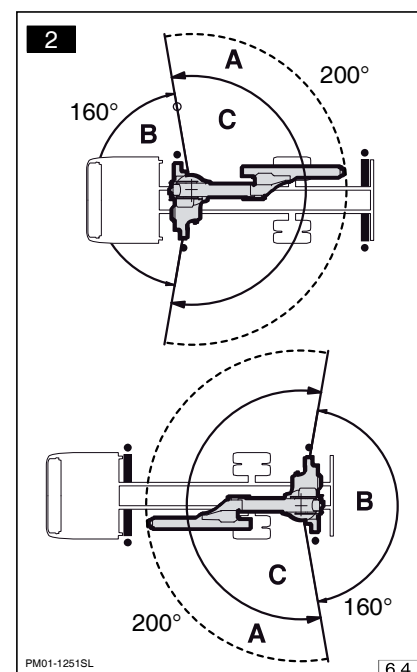
### 6.4.3 - Stabilisation control device (TYPE 2)

This device makes it possible to work with 3 sectors (A - B - C).

- **Sector A** (rated load capacity) (\*) outriggers arms fully extended and outrigger jacks resting correctly on the ground.
- **Sector B** (reduced load capacity) (\*\*) outrigger jacks resting correctly on the ground.
- **Sector C** (reduced load capacity) outriggers arms not fully extended and stabiliser jacks resting correctly on the ground.



**Fig. 1:** outriggers arms fully extended.



**Fig. 2:** outriggers arms not fully extended.

(\*) Nominal capacity = max. load permitted in relation to a certain configuration (see "Capacity diagram").

(\*\*) The sector "B" can be disabled according to the type of equipment. With a crane behind the truck bed, in some cases, the same load capacity of the sector "A" can be applied to sector "B".

#### 6.4.4 - Stabilisation control device (TYPE 3)

This device makes it possible to work with 3 sectors (A - B - C) differentiating the right side and the left side.

- **Sector A** (rated load capacity) (\*) outriggers arms fully extended and outrigger jacks resting correctly on the ground.



#### Information

With this type of device there is a sector "A", rated load capacity, where only the outrigger jacks are resting correctly on the ground (fig. 4).

- **Sector B** (reduced load capacity) (\*\*) outrigger jacks resting correctly on the ground.
- **Sector C** (reduced load capacity) outriggers arms not fully extended and stabiliser jacks resting correctly on the ground.

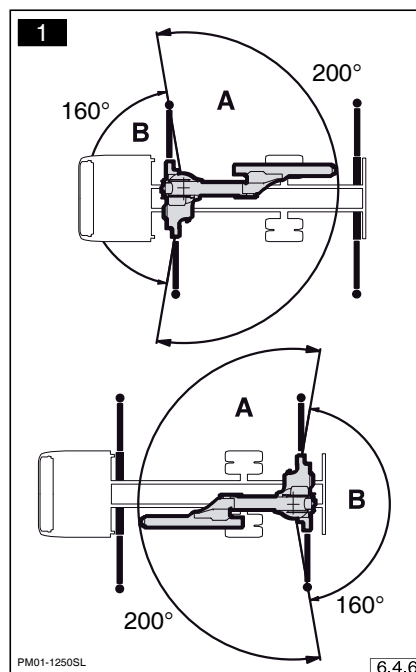


Fig. 1: outriggers arms fully extended.

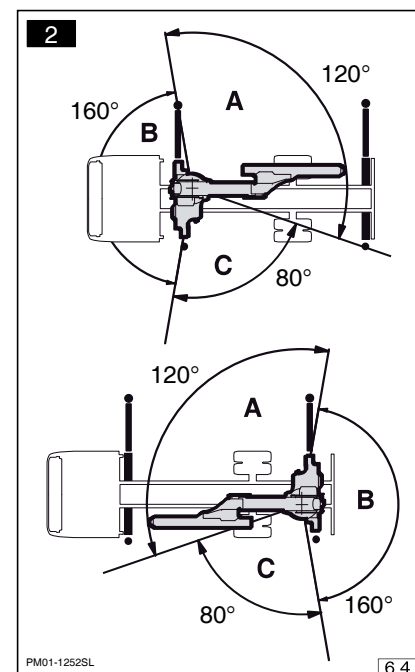
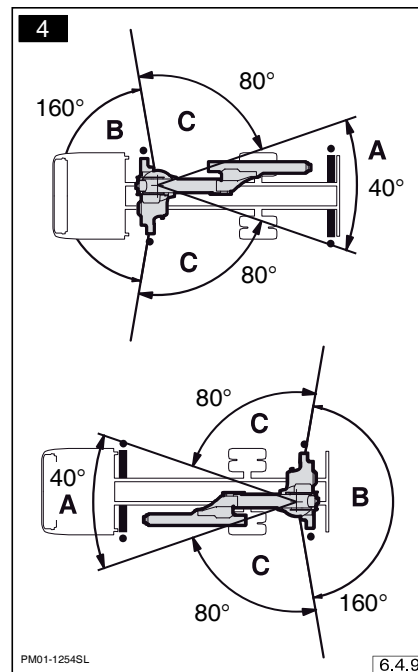
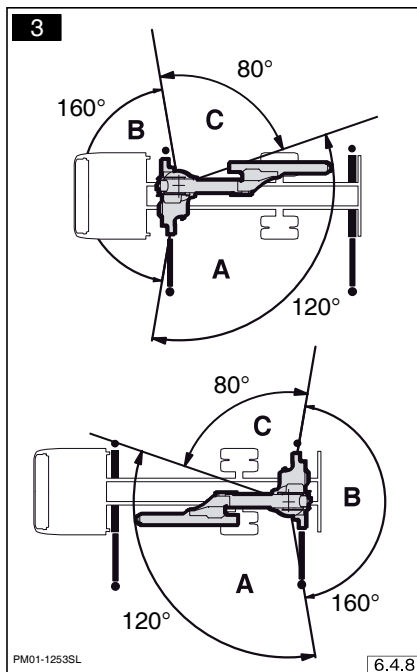


Fig. 2: outriggers arms not fully extended.

(\*) Nominal capacity = max. load permitted in relation to a certain configuration (see "Capacity diagram").

(\*\*) The sector "B" can be disabled according to the type of equipment. With a crane behind the truck bed, in some cases, the same load capacity of the sector "A" can be applied to sector "B".



**Fig. 3 - 4:** outriggers arms not fully extended.

### 6.4.5 - Stabilisation control device (TYPE 4)

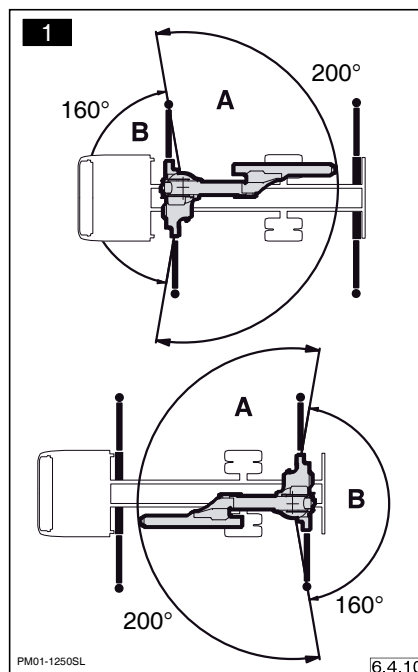
This device makes it possible to work with 4 sectors (A - B - C - D) differentiating the right side and the left side, and also differentiating the position of the outriggers arms in two intervals.

- **Sector A** (rated load capacity) (\*) outriggers arms fully extended and outrigger jacks resting correctly on the ground.

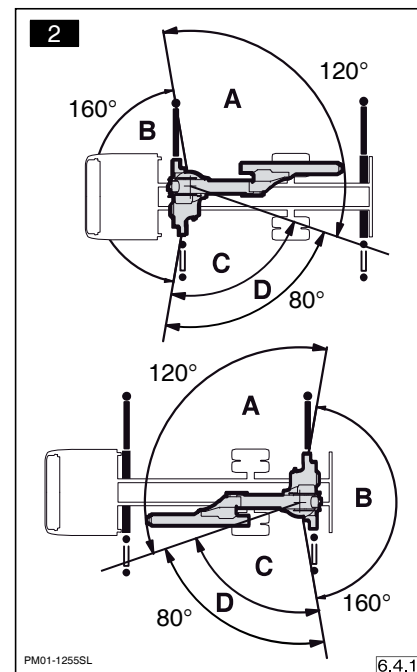
#### **i** Information

With this type of device there is a sector "A", rated load capacity, where only the outrigger jacks are resting correctly on the ground (fig. 4).

- **Sector B** (reduced load capacity) (\*\*) outrigger jacks resting correctly on the ground.
- **Sector C** (reduced load capacity) outrigger jacks resting correctly on the ground and at least one outrigger arm with an extension of about less than 50% compared to the maximum extension.



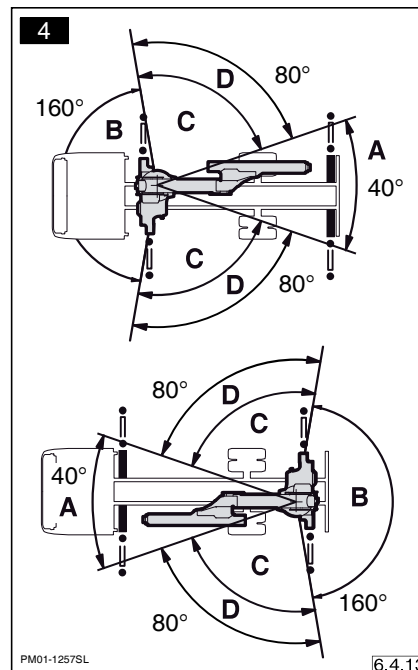
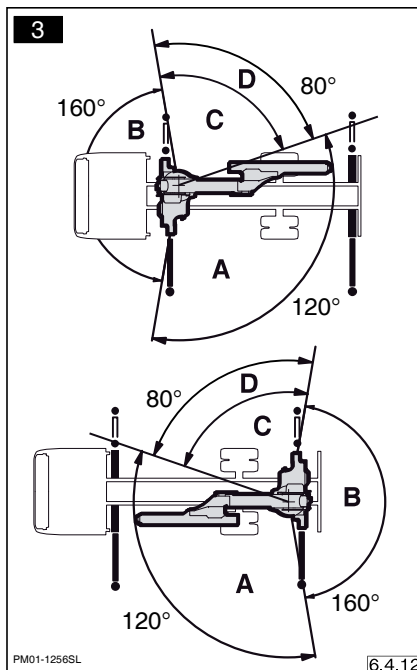
**Fig. 1:** outriggers arms fully extended.



**Fig. 2:** outriggers arms not fully extended.

(\*) Nominal capacity = max. load permitted in relation to a certain configuration (see "Capacity diagram").

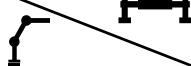
(\*\*) The sector "B" can be disabled according to the type of equipment. With a crane behind the truck bed, in some cases, the same load capacity of the sector "A" can be applied to sector "B".



- **Sector D** (reduced load capacity)  
outrigger jacks resting correctly on the ground and both outriggers arms with an extension of about more than 50% compared to the maximum extension, but not fully extended.

**Fig. 3 - 4:** outriggers arms not fully extended.

- **Stabilisation combinations between crane and additional cross member**

|  | 0% - 49% | 50% - 99% | 100% |
|-------------------------------------------------------------------------------------|----------|-----------|------|
| 0% - 49 %                                                                           | C        | C         | C    |
| 50% - 99%                                                                           | C        | D         | D    |
| 100%                                                                                | C        | D         | A    |



### 6.4.6 - Stabilisation control device (TYPE 5)

This device makes it possible to work with 6 sectors (A - B - C1 - C2 - C3 - C4) differentiating the right side and the left side, and also differentiating the position of the outriggers arms in 4 intervals for the crane and 3 intervals for the supplementary crossmember.

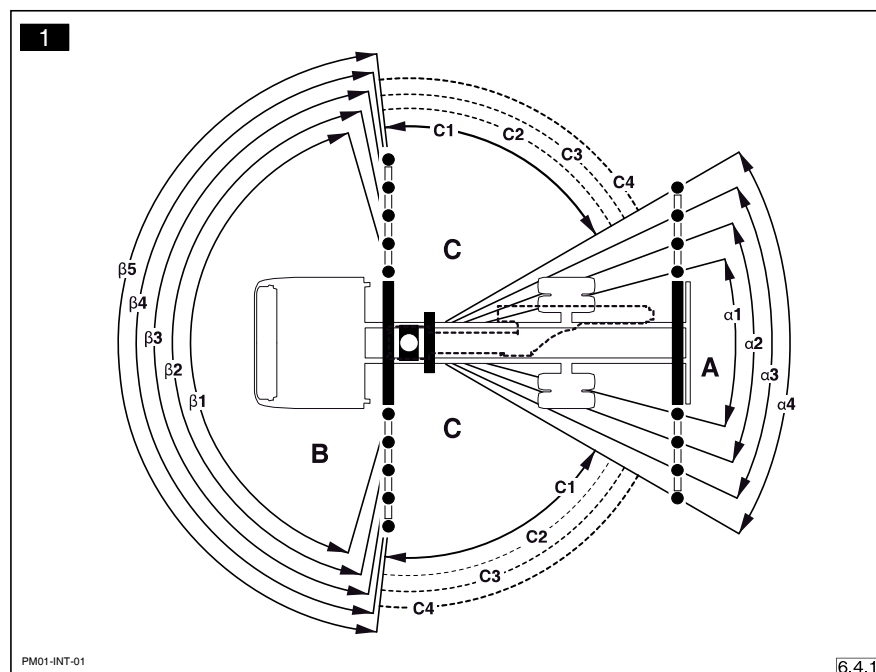
- **Sector A** (rated load capacity) (\*)  
outriggers arms fully extended and outrigger jacks resting correctly on the ground.



#### Information

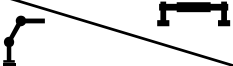
With this type of device there is a sector "A", rated load capacity, where only the outrigger jacks are resting correctly on the ground (fig. 1).

- **Sector B** (reduced load capacity) (\*\*)  
outrigger jacks resting correctly on the ground.
- **Sectors C1, C2, C3, C4** (reduced load capacity)  
outrigger jacks resting correctly on the ground and outriggers arms extended as shown in the table.



(\*) Nominal capacity = max. load permitted in relation to a certain configuration (see "Capacity diagram").  
(\*\*) The sector "B" can be disabled according to the type of equipment. With a crane behind the truck bed, in some cases, the same load capacity of the sector "A" can be applied to sector "B".

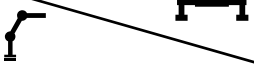
- Stabilisation combinations between crane with 4 intervals and additional cross member with 1 interval

|  |           | $\alpha 1$ | $\alpha 2$ |
|-----------------------------------------------------------------------------------|-----------|------------|------------|
|                                                                                   |           | 0% - 99%   | 100%       |
| $\beta 1$                                                                         | 0% - 24 % | C1         | C1         |
| $\beta 2$                                                                         | 25% - 49% | C2         | C2         |
| $\beta 3$                                                                         | 50% - 74% | C3         | C3         |
| $\beta 4$                                                                         | 75% - 99% | C4         | C4         |
| $\beta 5$                                                                         | 100%      | C4         | A          |

- Stabilisation combinations between crane with 4 intervals and additional cross member with 2 intervals

|  |           | $\alpha 1$ | $\alpha 2$ | $\alpha 3$ |
|-------------------------------------------------------------------------------------|-----------|------------|------------|------------|
|                                                                                     |           | 0% - 49%   | 50% - 99%  | 100%       |
| $\beta 1$                                                                           | 0% - 24 % | C1         | C1         | C1         |
| $\beta 2$                                                                           | 25% - 49% | C2         | C2         | C2         |
| $\beta 3$                                                                           | 50% - 74% | C2         | C3         | C3         |
| $\beta 4$                                                                           | 75% - 99% | C2         | C3         | C4         |
| $\beta 5$                                                                           | 100%      | C2         | C3         | A          |

- Stabilisation combinations between crane with 4 intervals and additional cross member with 4 intervals

|  |           | $\alpha 1$ | $\alpha 2$ | $\alpha 3$ | $\alpha 4$ | $\alpha 5$ |
|-----------------------------------------------------------------------------------|-----------|------------|------------|------------|------------|------------|
|                                                                                   |           | 0% - 24%   | 25% - 49%  | 50% - 74%  | 75% - 99%  | 100%       |
| $\beta 1$                                                                         | 0% - 24 % | C1         | C1         | C1         | C1         | C1         |
| $\beta 2$                                                                         | 25% - 49% | C1         | C2         | C2         | C2         | C2         |
| $\beta 3$                                                                         | 50% - 74% | C1         | C2         | C3         | C3         | C3         |
| $\beta 4$                                                                         | 75% - 99% | C1         | C2         | C3         | C4         | C4         |
| $\beta 5$                                                                         | 100%      | C1         | C2         | C3         | C4         | A          |

( $\alpha$ ) sector width given by the extension of the supplementary crossmember outriggers arms.

( $\beta$ ) sector width given by the extension of the crane outriggers arms.

6.40

## 6.5 - Crane stabilisation

### 6.5.1 - Stabilisation procedure



**HAZARD !**

*The operator must know the maximum load that the stabiliser will apply to the ground (see "Enclosures") and must ensure that the ground consistency can guarantee the stability of the vehicle.*

*On ground that is not very solid, place the raised support plates or a hard wooden board of a suitable size between the stabiliser and the ground. Stabilise the machine by unloading the weight of the vehicle from the suspension without lifting the wheels off the ground, as this would cancel out the elastic effect of the suspension, causing it to tip over.*

*Check the correct levelling using the spirit level (fig. 6.5.3), which must be flat (0°) with a maximum tolerance of +/-1°.*



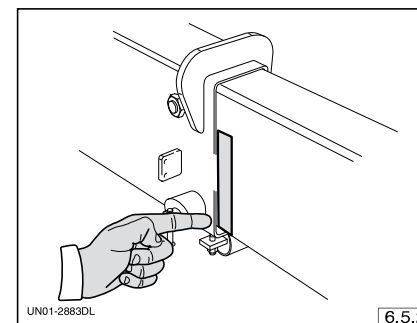
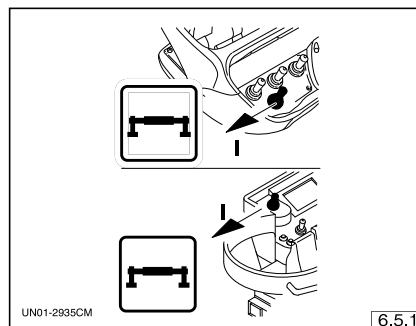
**CAUTION !**

*Before using the controls for the stabilisation, deactivate all the locking devices.*

- 1 –Lock the vehicle with the parking brake and place the chocks against the wheels.
- 2 –Place the gear in neutral, start the engine following the vehicle manufacturer's instructions, press the clutch and engage the PTO using the control in the driver's cab (fig. 6.1.1), the orange signal light on the dashboard should switch on, then gradually release the clutch pedal.
- 3 –Select the machine operating mode:
  - operation with load lifting hook (F1);
  - operation of a hydraulic tool (F2) (orange peel and clamshell grabs, etc).

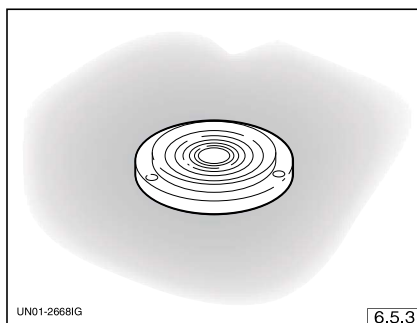
The functional control unit will initialise the software and check the status of the devices connected: carry out the stabilisation if there are no error or alarm messages, excluding those related to the outriggers when they are not on the ground.

- 4 –Check that the outrigger control on the radio control or functional control unit is in the "enable outriggers" position fig. 6.5.1.
- 5 –Release the locking devices and extend the outrigger arms according to the load to be lifted and the space around the vehicle (see section "Work sectors and crane performance").



mance” and “Load diagram”). When possible, extend the outrigger arms completely: maximum extension is signalled by the yellow signal light (fig. 6.5.2).

- 6 –Open the taps of the lock valves and extend the outrigger jacks, releasing the weight of the truck from the suspensions, without lifting the wheels off the ground as this cancels the elastic effect of the suspensions, which could make the assembly overturn.
- 7 –Check the spirit level (fig. 6.5.3) to make sure it is level ( $0^\circ$ ) with maximum tolerance of  $\pm 1^\circ$ .



6.42

If necessary, adjust the single outrigger jacks until level. Once you have completed the operation close all the taps of the lock valves of the outrigger jacks.



#### Information

*In order to keep the pressures inside the stabilisation circuit balanced, we suggest that you always carry out an extension manoeuvre at the end.*



#### Information

*If the outrigger jacks are not all completely on the ground, the crane cannot be opened from its resting position.*



#### Information

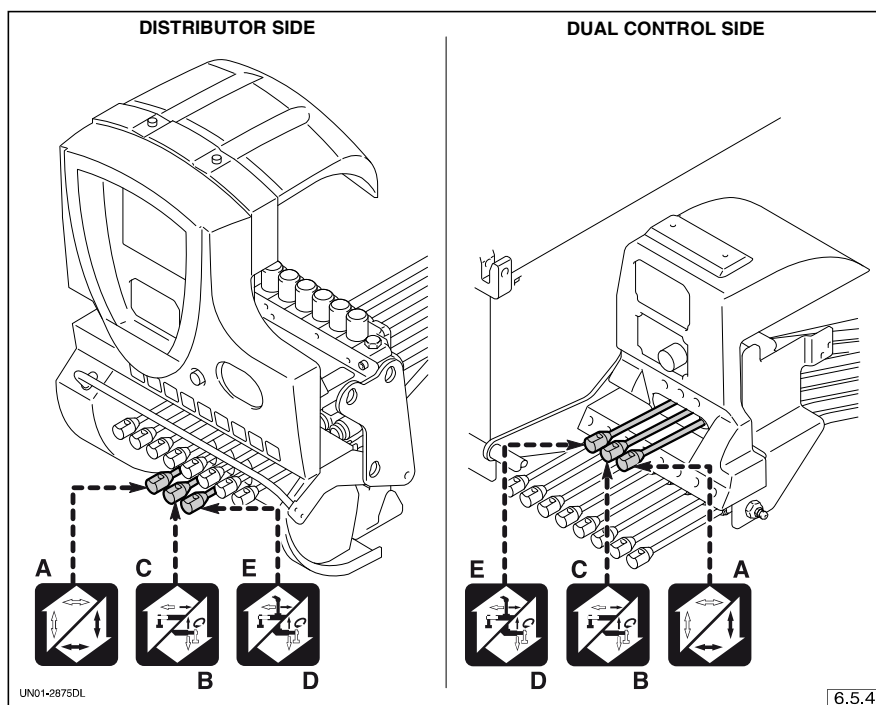
*The crane cannot be used until the operation mode is selected.*

*It is only possible to use the crane when the oil temperature is higher than the preset minimum.*

*In cold climates, allow the pump to run for a few minutes before manoeuvring the crane to ensure the hydraulic oil reaches the operating temperature.*

*Check the oil temperature in the functional control unit.*

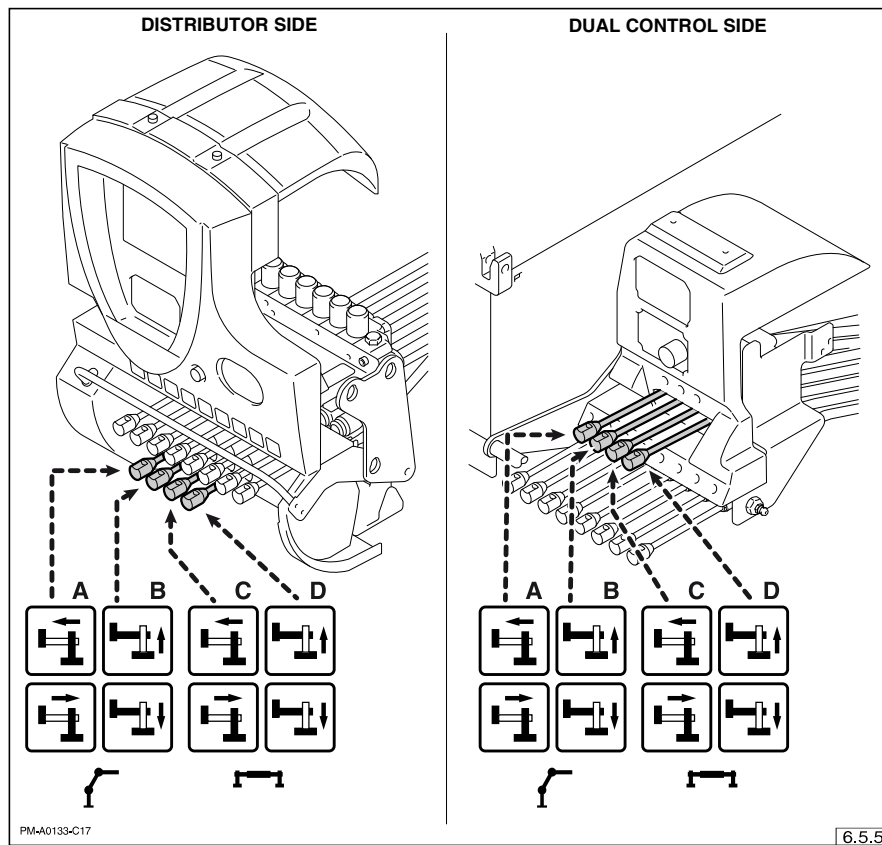
### 6.5.2 - Stabilisation using the controls on board the machine - Three lever distributor



- A** - Control activation
- B** - Enable rotation, extension and retraction of outrigger jack on supplementary crossmember
- C** - Enable extension and retraction of outrigger arm on supplementary crossmember

- D** - Enable rotation, extension and retraction of crane outrigger jack
- E** - Enable extension and retraction of crane outrigger arms.

### 6.5.3 - Stabilisation using the controls on board the machine - Four lever distributor



- A** - extension/retraction - crane outriggers arms
- B** - extension/retraction - crane outriggers jacks
- C** - extension/retraction - supplementary crossbeam outriggers arms
- D** - extension/retraction - supplementary crossbeam outriggers jacks

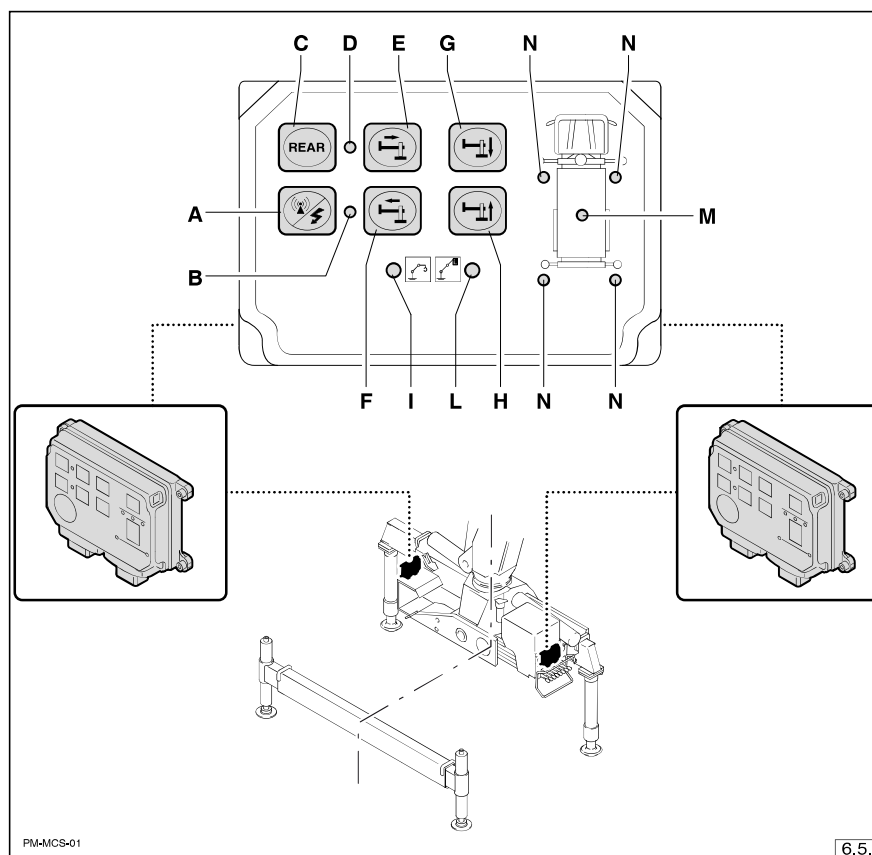
### 6.5.4 - Stabilisation controls with "MCS" keyboard

The stabilisation procedure can be carried out using the two "MCS" membrane keyboards, one on each side of the crane (fig. 6.6.6) or using the transmitter (fig. 6.6.7).

To control the stabilisation using the "MCS" keyboard, you must enable the controls from the transmitter (see – Stabilisation controls with transmitter) or from the functional control unit:

- Scroll the pages (F4) up to "page 2".
- Scroll the selectable devices up to the enable outriggers icon ( ).
- Press the key next to the icon (F1 or F2).
- Scroll the pages (F4) up to "page 5" and carry out the stabilisation.
- Once you have completed the operation, disable the outriggers on "page 2".

Each keyboard only controls the outrigger arms and jacks (crane and additional cross member) on the side on which it is positioned.



**A - Activation button for transmitter unit controls**

The stabilisation must be performed using the transmitter unit within three seconds, otherwise the keyboard controls are re-enabled.

**B - Red signal light**

ON = transmitter unit controls active; OFF = keyboard controls active.

**C - Supplementary crossbeam/crane outriggers selection button**

**D - Red signal light**

When lit, it signals that the outriggers of the supplementary crossbeam have been selected; when switched off those of the crane have been selected.

**E - Outrigger arm extension**

**F - Outrigger arm retraction**

**G - Outrigger jack extension**

**H - Outrigger jack retraction**

**I - Green signal light**

- **When lit permanently** it signals that the system is in crane mode.
- **When lit with flashing light** it signals a system failure.
- **Off** it signals that the system is not powered.

**L - Green signal light**

When lit permanently, it signals that the system is in “PLE” mode (function not active).

**M - Green signal light**

It signals the following machine stabilisation situations:

- **light off:** this means the machine is not stabilised;
- **flashing light:** this means the machine is operating in a work sector with reduced load capacity (see work sectors B - C - D);
- **light on constantly:** this means the machine is operating in a work sector with rated load capacity (see work sector A).

**N - Green signal light.**

This signals the status of the arms and outrigger jacks. The LEDs light up and switch off according to a specific logic depending on the stabilisation control installed on the crane.



#### Stabilisation control device (TYPE 1 and 2)

|                     |                                                                                                                           |
|---------------------|---------------------------------------------------------------------------------------------------------------------------|
| light off           | this means the outrigger arm is closed or partially extended and the outrigger jack is not resting properly on the ground |
| slow flash          | this means the outrigger arm is closed or partially extended and the outrigger jack is resting properly on the ground     |
| quick flash         | this means the outrigger arm is fully extended and the outrigger jack is not resting properly on the ground               |
| light on constantly | this means the outrigger arm is fully extended and the outrigger jack is resting properly on the ground                   |

#### Stabilisation control device (TYPE 3)

The lighting up sequence of the LEDs follows the status of the outrigger jack, then after about 4 seconds the flashing light cycle shows the status of the outrigger arms extension.

##### - Outrigger jack status

|                     |                                                                 |
|---------------------|-----------------------------------------------------------------|
| light off           | this mean the outrigger jack closed                             |
| light on constantly | this means the outrigger jack is resting properly on the ground |

##### - Outrigger arm extension status

|                     |                                                                                                         |
|---------------------|---------------------------------------------------------------------------------------------------------|
| light off           | this means the outrigger arm is closed                                                                  |
| 5 flashes           | this means the outrigger arm extension is 100% of the maximum extension                                 |
| light on constantly | this means the outrigger arm is fully extended and the outrigger jack is resting properly on the ground |

#### Stabilisation control device (TYPE 4)

The lighting up sequence of the LEDs follows the status of the outrigger jack, then after about 4 seconds the flashing light cycle shows the status of the outrigger arms extension.

##### - Outrigger jack status

|                     |                                                                 |
|---------------------|-----------------------------------------------------------------|
| light off           | this mean the outrigger jack closed                             |
| light on constantly | this means the outrigger jack is resting properly on the ground |

##### - Outrigger arm extension status

|                     |                                                                                                         |
|---------------------|---------------------------------------------------------------------------------------------------------|
| light off           | this means the outrigger arm extension is between 0% and 49% of the maximum extension                   |
| 3 flashes           | this means the outrigger arm extension is between 50% and 99% of the maximum extension                  |
| 5 flashes           | this means the outrigger arm extension is 100% of the maximum extension                                 |
| light on constantly | this means the outrigger arm is fully extended and the outrigger jack is resting properly on the ground |

### Stabilisation control device (TYPE 5)

The lighting up sequence of the LEDs follows the status of the outrigger jack, then after about 4 seconds the flashing light cycle shows the status of the outrigger arms extension. The flashing light cycle is different for the crane and the supplementary crossmember.

#### - Outrigger jack status

|                     |                                                                 |
|---------------------|-----------------------------------------------------------------|
| light off           | this mean the outrigger jack closed                             |
| light on constantly | this means the outrigger jack is resting properly on the ground |

#### - Outrigger arm extension status

|                     |                                                                                                         |
|---------------------|---------------------------------------------------------------------------------------------------------|
| light off           | this means the outrigger arm extension is between 0% and 24% of the maximum extension                   |
| 2 flashes           | this means the outrigger arm extension is between 25% and 49% of the maximum extension                  |
| 3 flashes           | this means the outrigger arm extension is between 50% and 74% of the maximum extension                  |
| 4 flashes           | this means the outrigger arm extension is between 75% and 99% of the maximum extension                  |
| 5 flashes           | this means the outrigger arm extension is 100% of the maximum extension                                 |
| light on constantly | this means the outrigger arm is fully extended and the outrigger jack is resting properly on the ground |

### **i** Information

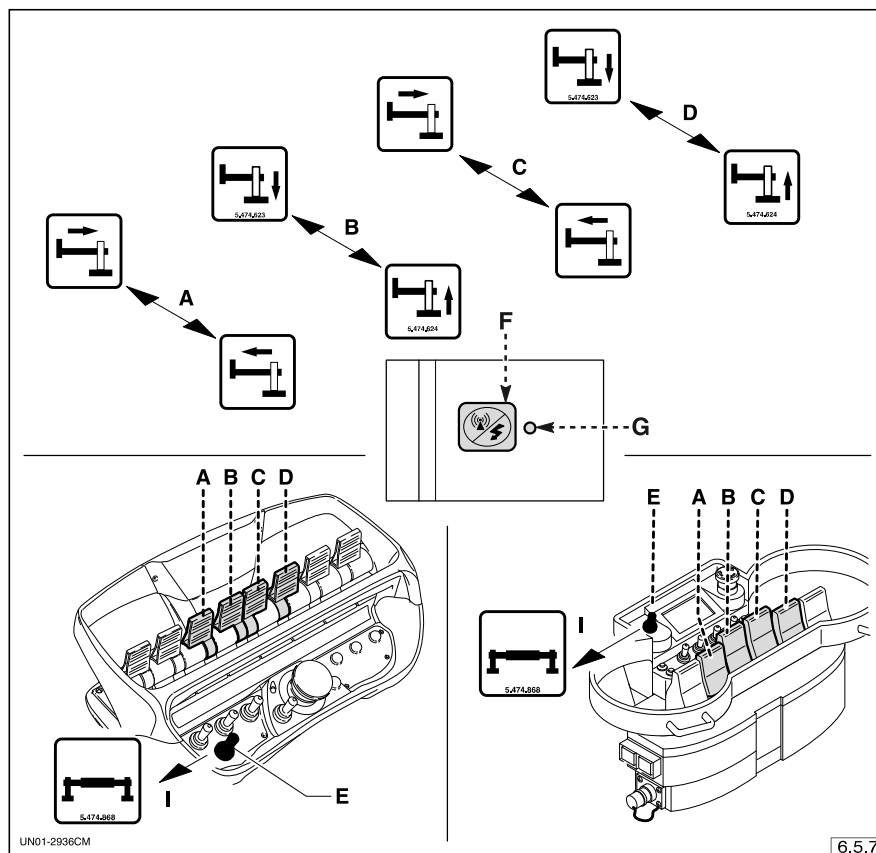
*When the signal lights "B" and "D" start flashing at the same time during a stabilisation command (in "MCS" or "Radio" mode), it means that the functional control unit is inhibiting the stabilisation/destabilisation of the crane for safety reasons.*

*Check that the control parameters "P1" (1) and "A1" (2) are below the safety values (usually "P1" < 100 bar and "A1" < 0°, i.e. crane without load or open below the correct horizontal position).*

(1) P1 = main jack pressure

(2) A1 = main arm angle

## 6.5.5 - Stabilisation controls with transmitter unit



Enable the control of the outriggers on the transmitter using switch "E" (pos. I). Press button "F" on the MCS keyboard on the side on which you wish to operate; signal light "G" will light up. Use the levers on the control panel to stabilise the machine.

- A - (E1-E4) extension-retraction crane outrigger arms
- B - (S1-S4) extension-retraction crane outrigger jacks
- C - (E2-E3) extension-retraction additional cross member outrigger arms
- D - (S2-S3) extension-retraction additional cross member outrigger jacks
- E - Control switch over switch  
This enables the stabilisation controls (pos. I).

The transmitter display will show the joysticks (J1, J2, J3, etc.) and their function.

- Right side

|    |    |    |    |    |    |
|----|----|----|----|----|----|
| J1 | J2 | J3 | J4 | J5 | J6 |
| XX | E1 | S1 | E2 | S2 | XX |

- Left side

|    |    |    |    |    |    |
|----|----|----|----|----|----|
| J1 | J2 | J3 | J4 | J5 | J6 |
| XX | E4 | S4 | E3 | S3 | XX |

### 6.5.6 - Adjustable outrigger rotation mode



#### CAUTION !

*Extend the stabiliser arms until allowing the free rotation of the stabiliser jack into the vertical position.*

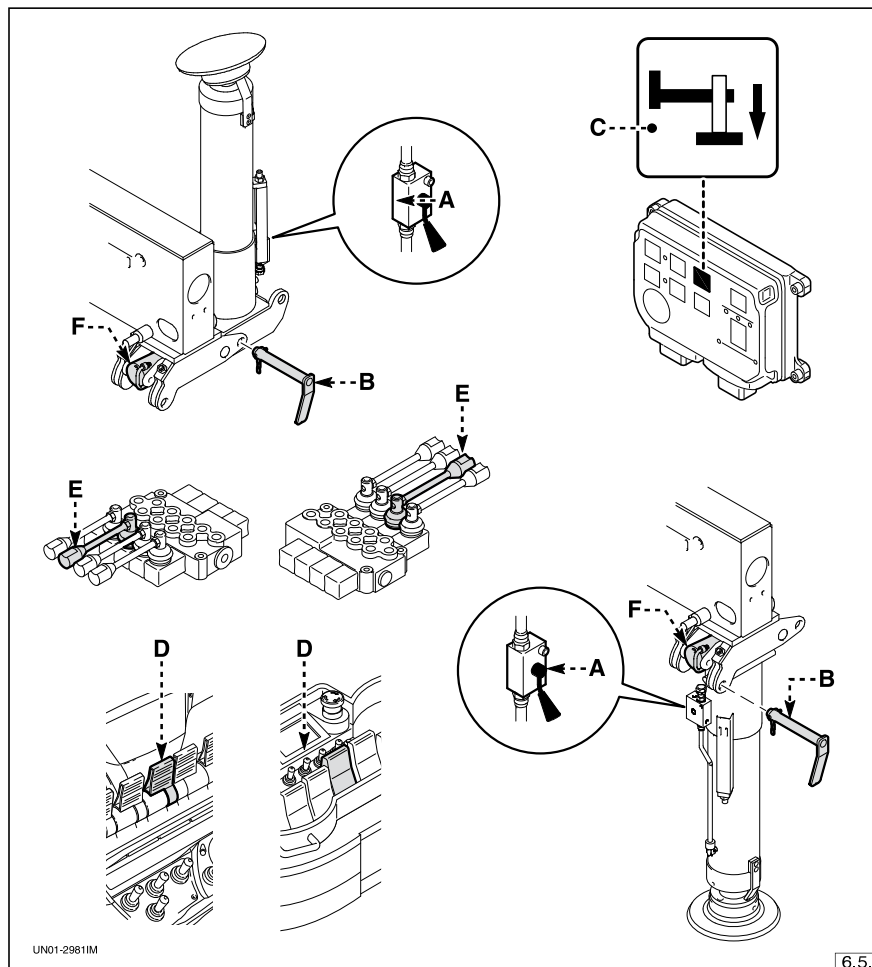


#### HAZARD !

*Be very careful as to the trajectory of the outrigger jack during rotation, to avoid collisions and damage to people and objects.*

- 1 - Close the locking device "A".
- 2 - Remove the pin "B" and the relative safety plug.
- 3 - Push button "C" on keyboard MCS or the lever "D" on the transmitter or the levers "E" to distributors until the end of the rotating cylinder stroke "F".
- 4 - Insert the pin "B" and the relative safety plug.
- 5 - Open the locking device "A".

To place the stabiliser in the resting position, carry out the start-up operations in reverse order.



## 6.6 - Working position of the crane



### CAUTION !

***Before starting any manoeuvres remove the locking devices that lock the crane in position during road transit.***

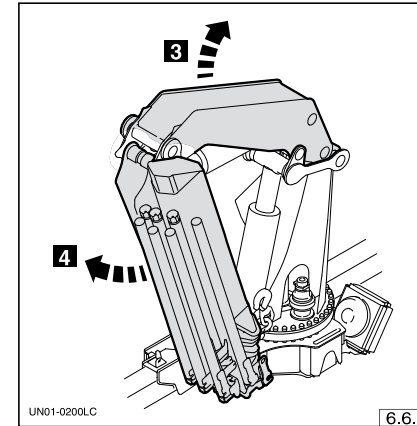
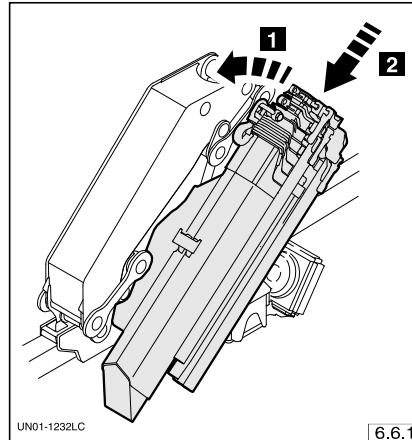
Before moving the crane, carefully read the section on "Safety" and the stabilisation instructions.

Check that the battery is charged and the radio control functions properly.



### WARNING !

***All crane opening and closing manoeuvres must be performed very slowly, taking into account the spaces occupied by moving parts.***

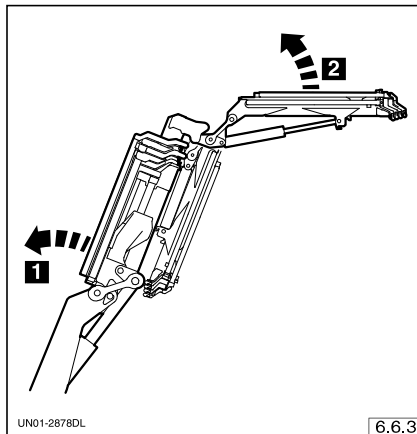


To place the crane into the working position, carry out the following manoeuvres:

- 1 - close the secondary jack to the end stroke;
- 2 - close the arm jacks at stroke limit, without forcing the manoeuvre;
- 3 - open the main jack;
- 4 - open the secondary jack.

The main and secondary jacks must be open enough to allow the free rotation of the crane.

### 6.6.1 - Working position of the jib



To place the jib into the working position, carry out the following manoeuvres.

Carry out the crane opening manoeuvre described in para. "Working position of the crane".

- 1 - Open the secondary jack to allow the rotation of the jib.
- 2 - Open the articulation jack.

## 6.7 - Checking the efficiency of the control and limiting devices

On start-up, the function control device carries out a self-diagnosis (of the existing crane configuration) to check for any malfunctions. The anomalies are shown on the control unit (see "Information and alarm messages") and on the radio control unit display if present.

### 6.7.1 - Checking the emergency stop button



**WARNING !**

***Check all the emergency stop buttons individually.***

Conduct a test with the crane open and unloaded.

- 1) Press the emergency button.
- 2) Move the control levers in both directions and check that no crane manoeuvres are possible.
- 3) Turn the button to reset the crane functioning.

### 6.7.2 - Checking the rotation limiter (fig. 6.7.1)

Carry out the check with a load that is higher than what is permitted for that certain sector.

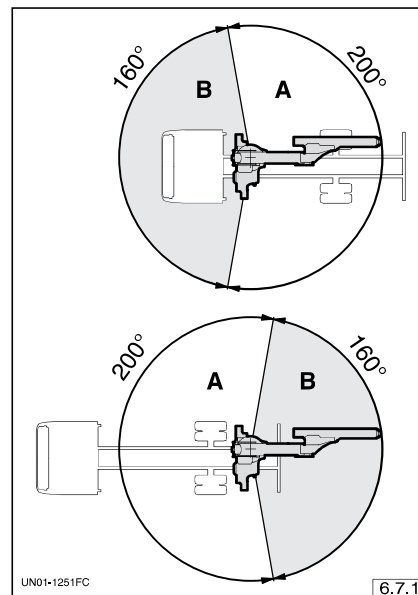
The permitted load value is provided by the authorised service centre that performed the installation and checked the stability of the assembly.

- 1) Turn the crane clockwise and anti-clockwise to check that the device prevents the rotation of the crane into sector "B".

### 6.7.3 - Checking the rotation block (fig. 6.7.1)

Carry out the check with the crane open and without a load.

- 1) Turn the crane clockwise and anti-clockwise to check that the device prevents the rotation of the crane into sector "B".

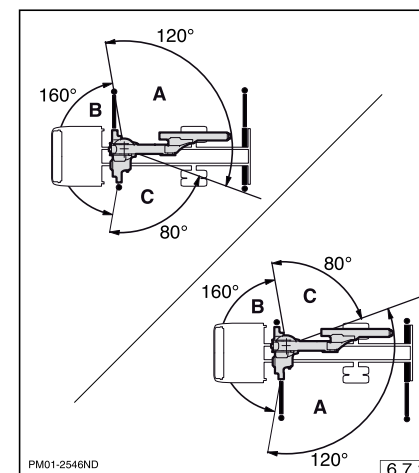


### 6.7.4 - Checking the rotation limiter with stabilisation control device

Carry out the test, starting from sector "A" on the right, with a load exceeding the permissible load for work sectors "B" and "C" at a certain distance (see capacities diagram).

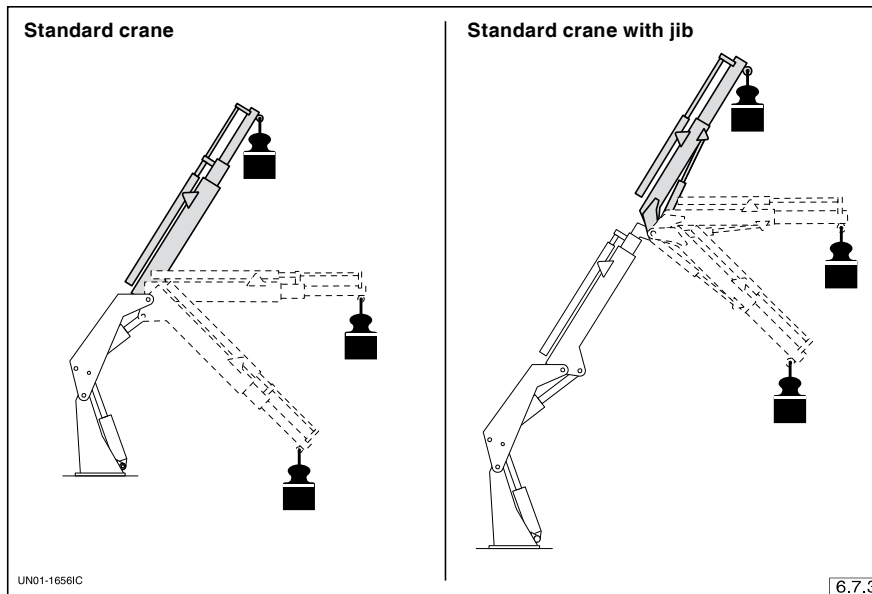
- 1) Stabilise the machine.
- 2) Turn the crane clockwise and anti-clockwise to make sure the devices prevent crane rotation in the sectors that are off-limits, i.e. "B" and "C", fig. 6.7.2).

Repeat the test, starting from sector "A" on the left.



6.53

### 6.7.5 - Checking the load maintenance valve



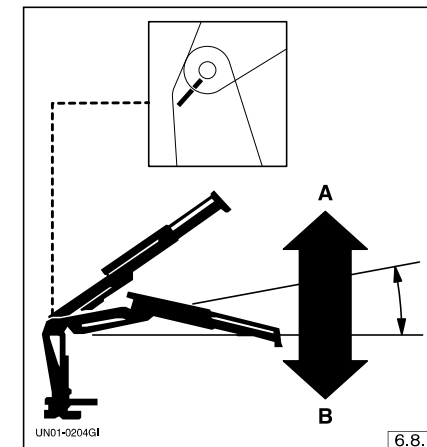
Carry out the check with a medium load.

- 1) Position the crane as shown in fig. 6.7.3.
- 2) Deactivate the power takeoff.
- 3) Remove the pressure from the system by moving the distributor lever a few times.
- 4) Wait for a short time to check that the load does not lower.

6.54

### 6.8 - Lifting and moving the load

#### - Lifting the load



To lift large loads that require the full power of the crane, work as follows.

#### Zone "A":

- move mainly the main jack.

#### Zone "B":

- use mainly the secondary jack and the arm extension jacks.



Maximum lifting capacity is achieved with the main arm at an angle of 20° above the horizontal, as shown in the capacities diagrams.

The value of this angle (A1) can be seen on the display of the functional control unit or of the transmitter unit; otherwise, it can be obtained by making the two references on the column and on the main arm coincide.

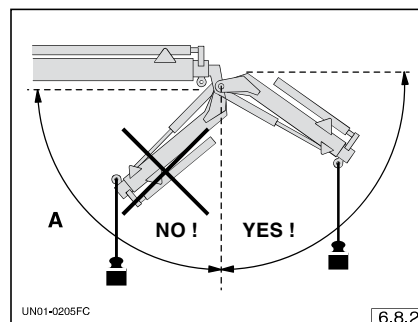
To speed up the loading/unloading operations, it is preferable to use the main and secondary jack, rather than the arm extension jacks.

#### - Moving the load with the jib



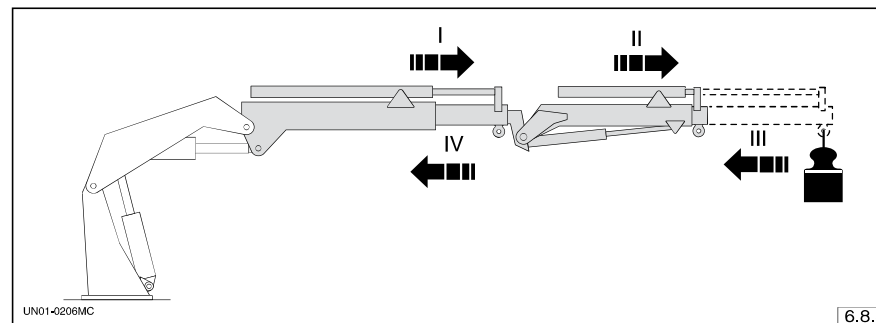
**WARNING !**

*It is prohibited to move loads in the negative sector "A" (see fig. 6.8.2).*



The appropriate manoeuvres to transfer the load (crane and jib arms horizontally), fig. 6.8.3, are:

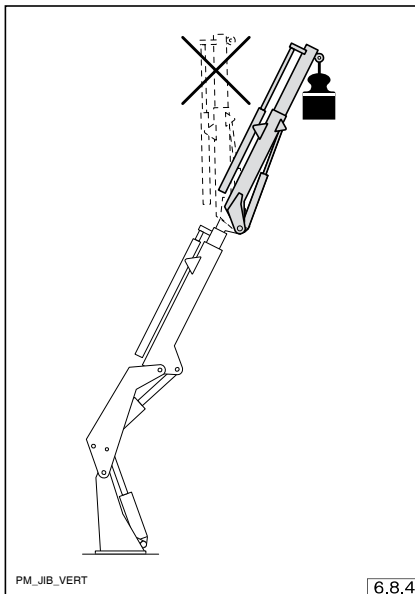
- 1 - first extend the crane arms and then the jib arms;
- 2 - retract the jib arms and then the crane arms.



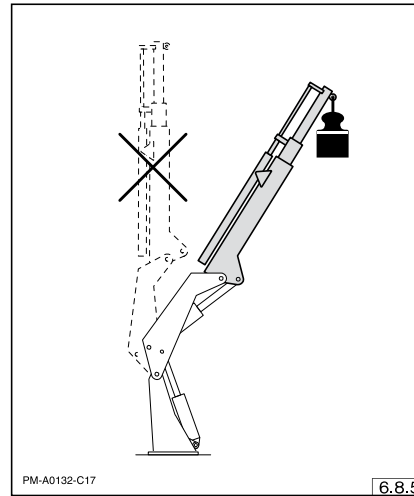
6.55

**WARNING !**

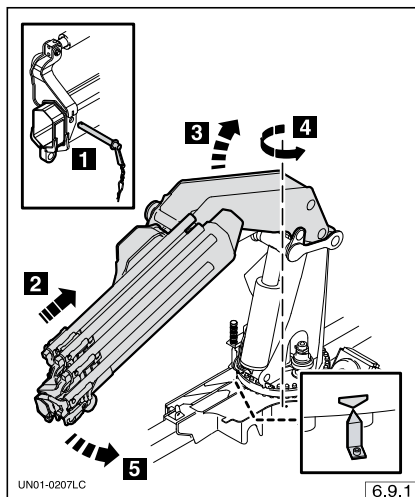
*The crane must not be positioned vertically when the joint jack of the jib is completely open. Align the jib with the crane's arm pack before starting.*

**HAZARD !**

*In the case of cranes with hydraulic moment limiter never position the machine completely in vertical position; as it is not fitted with electronic devices to control the angles, the operator has the task of preventing the crane from reaching an incorrect position, which could lead to the arm pack tipping over backwards.*

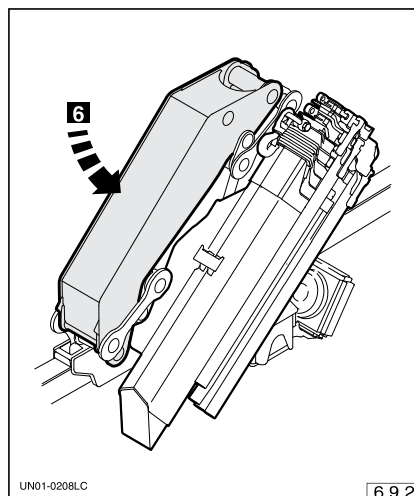


## 6.9 - Crane resting position



**HAZARD !**

*To avoid the risk of accidents, manoeuvre the crane from the opposite side to the main arm closing.*



To place the crane in the resting position, carry out the following manoeuvres (fig. 6.9.1 and 6.9.2).

- 1 - Retract the manual extensions and lock them with the pin and safety plug in the minimum outreach position.
- 2 - Retract the crane arms.
- 3 - Open the main jack.
- 4 - Turn the crane until it fits the reference points located on the column and base.
- 5 - Close the secondary jack.
- 6 - For C versions:
  - Close the main jack until the arm pack is horizontal.
  - Extend the arm pack to allow the locking device "C" to hook onto the secondary arm.
  - Close the arm extension jacks at stroke limit, without forcing the manoeuvre.
- 7 - Close the main jack making sure that the main arm of the crane fits into the special anti-rotation supports.