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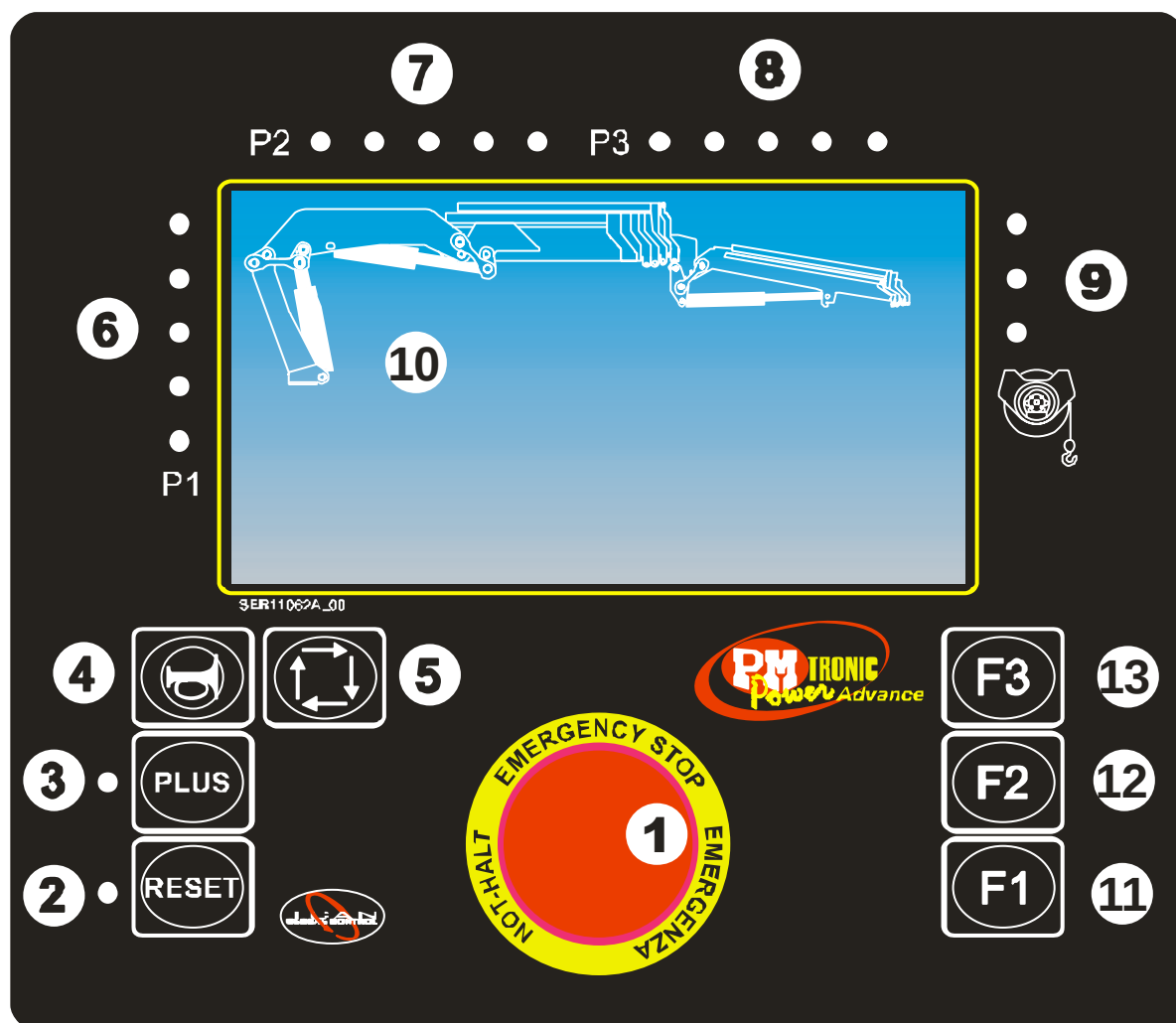


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PM GROUP SPA reserves the right to make technical modifications without giving prior notice.
For further information concerning installation, please contact our Technical Service Department (SAT).

1 Description

1.1 Main Panel



LEGEND

1. Emergency Stop
2. RESET Key + LED
3. PLUS Key + LED
4. Key of the Horn Truck
5. TEST/SCROLL key
6. Column cylinder LED Bar
7. Main boom cylinder LED bar
8. Jib cylinder LED bar
9. Winch LED bar
10. Display
11. FUNCTION key
12. FUNCTION key
13. FUNCTION key



1.2 Satellite

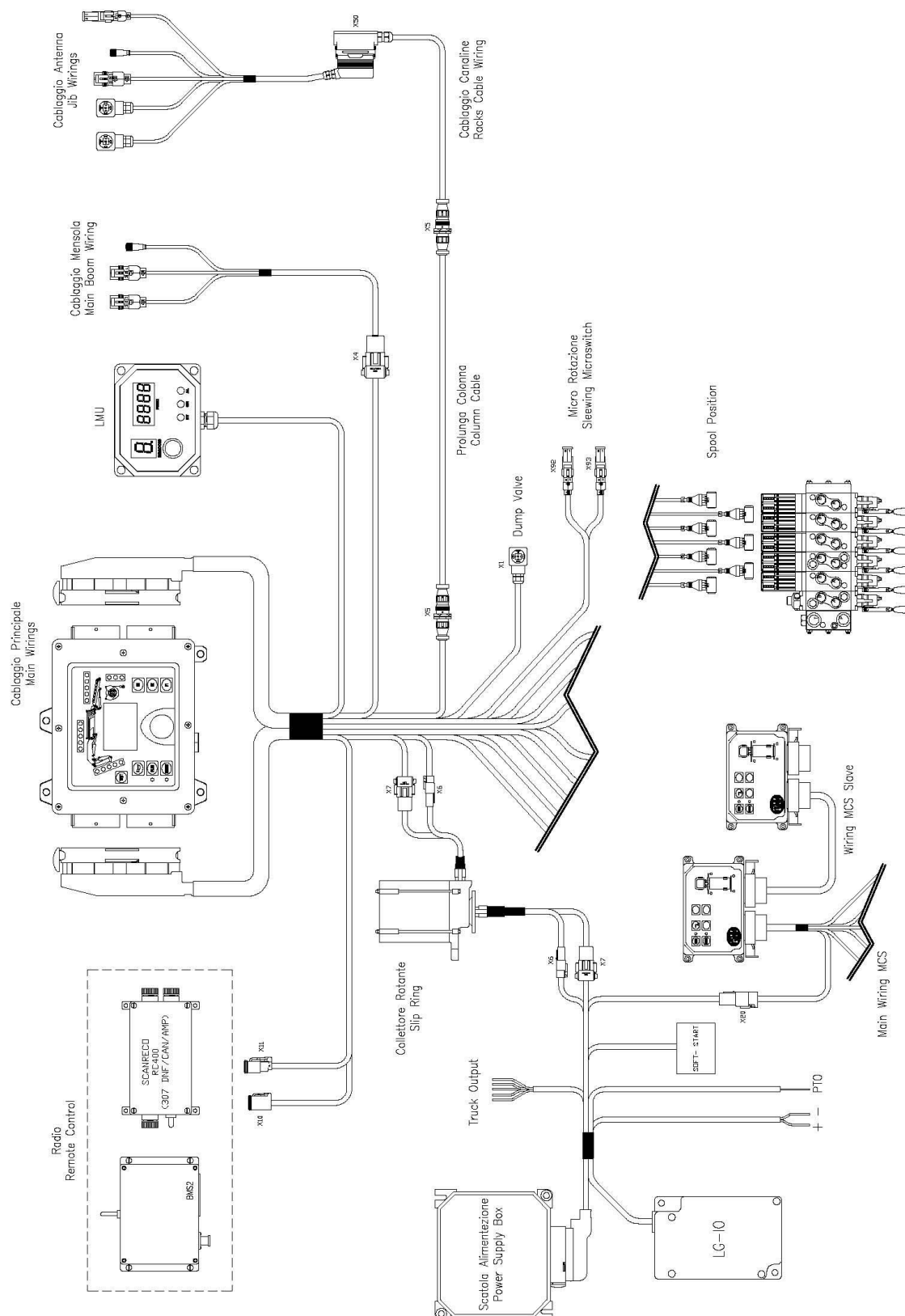
This unit replicates all the functions of the main panel.





2 The System Components

Layout





2.1 Analogue Sensors

This type of sensor provides a proportional output.

2.1.1 Pressure transducers

Pressure transducers detect pressure given by the load in the lifting cylinders and produce an electrical signal related to the pressure.

Unlike pressure switches that provide an on-off signal, pressure transducers produce a proportional output signal. In particular, transducers for the new electronic system provide a signal with the following ratio:

0 ÷ 400 BAR

4 ÷ 20 mA

In this way, the component is constantly checked since the electronic control unit will provide an error message every time it receives a signal not within the specified range.

For instance, if the connection cable is interrupted, the control unit will no longer receive the minimum 4mA signal and will therefore signal a connection failure or improper operation of the transducer.

2.1.2 Angle Sensors

The angle sensors incorporated into the new system are also innovative with respect to the sensors used in older systems.

Like pressure sensors, new angle sensors do not provide an on-off signal but a proportional signal relating to the angle detected. The output signal is always power signal, with the following ratio:

-105° ÷ +105°

4 ÷ 20 mA

By using these sensors, the faults are monitored and the crane management is much more accurate, since the electronic control unit can always count on exact information about the crane position, thus enabling performance to be optimised and improved freedom of movement in blocking conditions.

2.1.3 Oil Temperature Sensor

This sensor measures the oil temperature in the hydraulic circuit in the discharge section. The sensor is resistive and has the following operating range:

-40° ÷ +150°



2.2 Digital Sensors

This category includes sensors providing an on/off output signal.

2.2.1 Spool Position Sensors on Control Valve Block (D.I.)

These sensors detect digitally (on/off) the activation of A or B inlet of the control valve block and therefore control the crane movements.

As far as the Danfoss control valve blocks are concerned, the spool position are built into the Radio module, whereas in all other control valve blocks, the sensors are in a separate module.

The control is active (NC) with levers in the idle position. In other words, the D.I. module provides two high output signals. Consequently, the electronic control unit will only accept one single direction given and therefore will signal an error if both manoeuvres are activated at the same time (e.g. rightward/leftward rotation).

Furthermore, when the system is turned on, the control unit will check the status of the levers and signal if a manoeuvre is already activated.

2.2.2 Rotation Proximity/MICROSWITCH Sensors

These sensors check the crane rotation and detect whether the downgraded area has been reached (e.g. area in front of the cabin) or whether the rotation is disabled.

Proximity sensors are PNP NC (proximity switches with a normally closed, positive output). This means that if the connection cable is accidentally interrupted, the control unit will automatically switch to a downgraded operation or will disable rotation.

2.3 Sensori CAN-Bus

This sensors are connected with the main unit with a CAN-Bus connection.

2.3.1 Outrigger Encoder

These sensors are used with the interlock type 5 system and they detect the length of each stabilizer. In this way the main unit is able to check the stability level and calculate the overload pressure.

2.3.2 Slewing Encoder

This sensor detect the rotation angle of the column with an accuracy of 1 degree.

PM standard angles are:

- 0° front area (crane over the cab)
- 90° right side area
- 180° rear area (crane over the body of the truck)
- 270° left side area



3 Operation

3.1 Start-Up

The Power Tronic system made a check control of all the components at the start-up, in order to check possible problems and further the position of the spools in order to verify the neutral position of the levers. Whenever the system finds one or more levers in an activated position, the error icon is displayed with the number of the item concerned. The crane remains locked until the error is solved.

To restart the system, disengage and then restart the PTO. As an alternative, you can do a quick reset of the system.

If the system does not detect any problems on sensors and connections, the start-up of the crane is allowed.

3.2 Use Selection

After the check control of the system, the operator is requested to select a crane mode. There are 3 different modes that be can be selected by means of the function keys, which are both on the Power Tronic unit and on remote control keyboard (when available) :

- **F1** Key Crane Use
- **F2** Key Supplementary Activation Use
- **F3** Key Man Basket Use (Option)

The crane mode cannot be changed during the operation, unless the PTO is switched off and on again. Moreover, if a mode is selected and the levers which are not suitable for such mode are operated, the crane is locked.

3.3 First Movement Allowed

In order to avoid any problems regarding leaking inside the main boom cylinder caused by long parking time of the crane, a system has been installed that checks the position of the booms by the angle sensors. For this reason **the first movement allowed is the main boom down** for at least 1 second.



3.4 Emergency Stop



The Emergency Stop control stops all crane movements and puts the delivery of oil to the pump in discharge condition. When the emergency pushbutton is released, the electronic control unit checks the restarting conditions and makes sure that the control valve block levers are in neutral position. If there aren't any anomalous conditions, the control unit enables crane operation. If the electronic control unit detects a dangerous condition (e.g. a continuously activated manoeuvre), it will wait for safe operating conditions to be resumed before enabling movement.

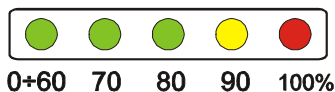
3.5 Load Limiting Device

The operation of the load limiting device can be thus summarised: the pressure given by the load is detected by the pressure transducers (column, main boom and jib). When a load limit threshold is reached, the crane is blocked. On the basis of the position of the booms, detected by the angle sensors, and the movements of the same, detected by spool position sensors, the control unit will only enable manoeuvres that allow the load to approach the crane column axis.

The diagram below, provided in the Movements allowed section, describes the manoeuvres that can be performed when the crane is blocked.

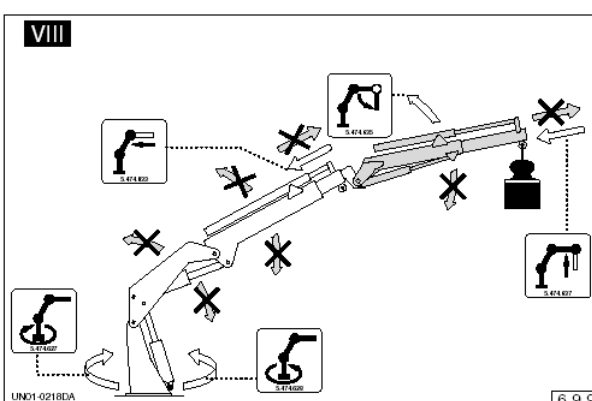
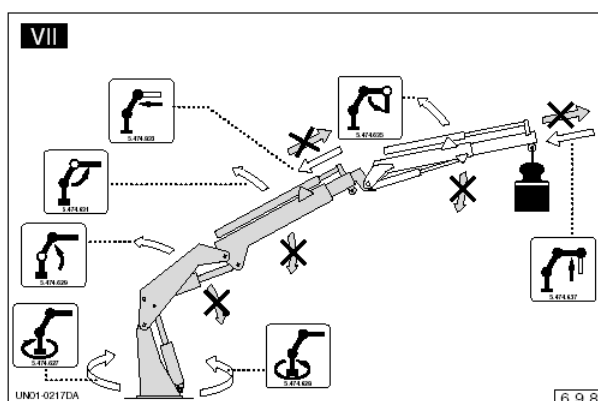
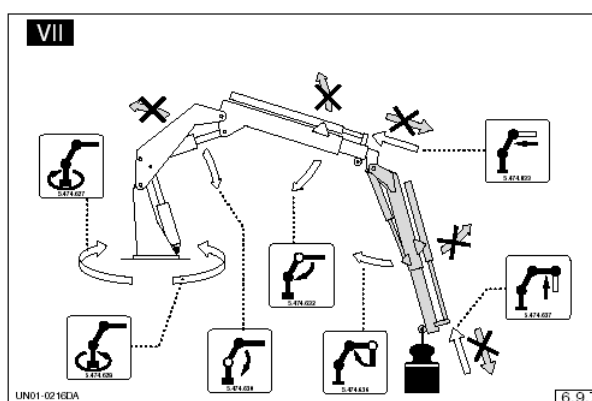
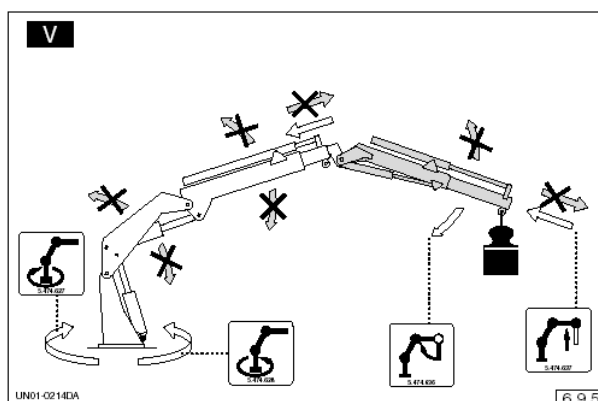
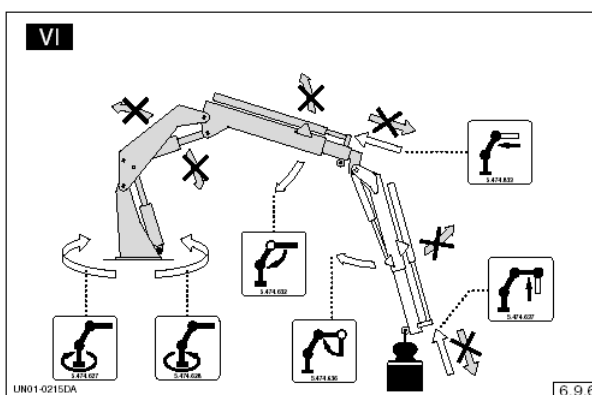
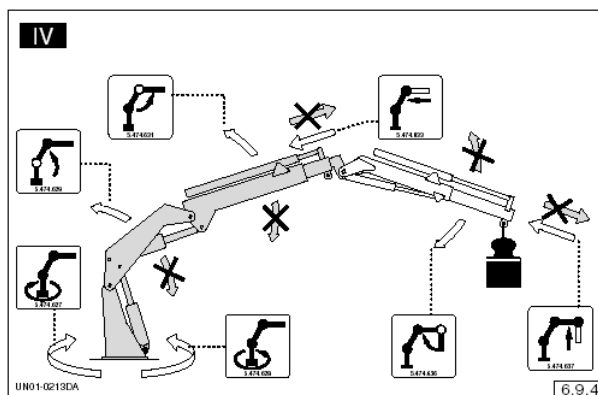
LED bars are provided to signal load increases.

Each bar is composed of five LEDs that switch on according to the following diagram:



The diagram below refers only to the operating mode of the crane (standard, Plus, downgraded) and to the calibration of the limiting device - not to the capacity of the crane.

3.5.1 Movements allowed in Overload Condition



3.6 Maximum overload

The **Power TRONIC Advance** has a pressure limit to prevent the structural damages of the crane. If the overload pressure is higher than 120% of the normal overload pressure, all the movement are locked. The only way to move the crane is to use the Reset function.

3.7 Pressure Planes Control

The Power Tronic controls different locking thresholds for control peak loads of boom extension cylinders. It is activated when a specific angle of inclination of the Boom Unit is exceeded (this angle varies depending on the model/configuration of the crane).

This function applies both to Boom Units and to Jib Booms (if these are fitted). The control of the latter has priority over control over the standard crane, in other words, if the crane is fitted with a jib, the control of peak loads will be performed on the jib and not on the crane.

3.7.1 Operation of the Crane Pressure Planes

This function is activated if the value of A2 (Boom pack angle) is between “120)START ANGLE CRANE VERTICAL CONTROL” and “121)STOP ANGLE CRANE VERTICAL CONTROL”.

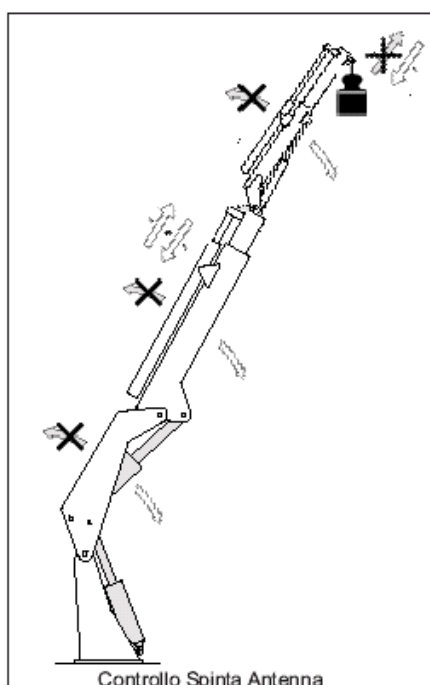
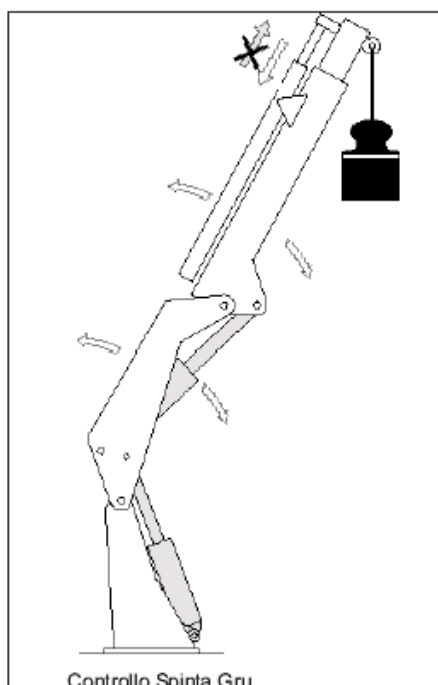
If the pressure is greater than the limit value of pressure ,calculated in real time by the system, the boom extension will not be allowed.

The pressure limit is a value between “122)START PRESSURE CRANE VERTICAL CONTROL” and “123)STOP PRESSURE CRANE VERTICAL CONTROL”.

3.7.2 Operation of the Jib Pressure Planes

In this case, the control differs slightly from that of the crane.

- Case 1 → If A3 (Jib Angle) is higher than “125)START ANGLE JIB VERTICAL CONTROL” and P3 is higher than “128)STOP PRESSURE JIB VERTICAL CONTROL”, all Column/Main Boom/Jib Articulation/Jib Extension are not allowed;
- Case 2 → If A3 is higher than “125)START ANGLE JIB VERTICAL CONTROL”, P3 is lower than “128)STOP PRESSURE JIB VERTICAL CONTROL” and higher than 2127)START PRESSURE JIB VERTICAL CONTROL”, only Jib Extension manoeuvre is not allowed.





3.8 Inclination Control

The Power Tronic performs a control on two working angles, which limit vertically the crane and/or Jib, if this is fitted.

3.8.1 Vertical Crane Control



By measuring the angle of the Crane Boom Unit, the controls activated when the angle (A2) reaches the maximum threshold established by the Angle 04 parameter.

The control is signalled by means of the corresponding icon.

3.8.2 Vertical Jib Control



This control is similar to the Vertical Crane Control, but with some differences concerning the angle checked, which is the A3 (Jib Angle). The control is activated when a specific angle is reached "131)JIB MAX ANGLE".

The control is signalled by means of the corresponding icon.

4 Plus



This key controls the PLUS function on cranes featuring this device.

Thanks to the reduction of dynamic loads, the PLUS function increases the crane performance.

The PLUS can be controlled in two ways:

1. **PLUS in semi-automatic mode:** the Power Tronic activates this function automatically, when it reaches a pressure threshold. Therefore all manoeuvres which can determine a dynamic stress are slowed down roughly by 75%, thus enabling the crane to handle heavier loads. The PLUS is manually disengaged, therefore even if the pressure goes below the PLUS activation threshold, the manoeuvres used are still slowed down. It is the operator's task to disengage this function manually by pushing the PLUS key on the Power Tronic main panel or on the satellite units and/or on the remote control keyboard, if present.
2. **PLUS in manual mode:** the operator decides when to activate PLUS by pressing the key; if the crane reaches the threshold of pressure limit, you can manually activate the PLUS and then the pressure threshold is raised so the crane can lift heavier loads; in order to guarantee safe working conditions, when PLUS is activated, manoeuvres are performed at a speed that is approximately 75% lower than normal.
PLUS is also manually deactivated, so is the operator that decide when to deactivate it pressing the PLUS key.
N.B. if the pressure remains over the "not in PLUS" maximum threshold (LED/yellow light blinking), you can't deactivate the PLUS. To deactivate it is necessary to go down this pressure threshold and then to press the PLUS key.

The PLUS mode is signalled by a yellow lamp, a light turret and the LEDs on the main panel, satellite unit and remote control.

Concerning the Plus mode there are 3 different possibility:

Key LED switch OFF → PLUS OFF

Key LED BLINKING → PLUS ON and necessary (not disengaging)

Key LED switch ON → PLUS ON but not necessary (disengaging)

5 Reset

Is possible to use this function if the overloading remains even when the allowed movements have been performed.

Activation procedures:

- Pressing the "RESET" key; the corresponding LED switches on and the following icon appears on the display: .
- Performing a lowering movement (column, main boom, jib);
- If the overload is over, the crane will resume "normal" operation;
- If the overload is not over, any manoeuvre will be disabled for 30 seconds; the LED flash will indicate the wait time and the display will be showing .

5.1 Quick Reset

This function allows to reset temporary errors that can be notice by the Power Tronic system.

You can activate the Quick Reset by pressing the RESET keys on the central unit or radio control.

If the icon/code of error is not signalled anymore, you can take back the normal operation.

If the warning remains you must disengage and then restart the PTO.

6 Horn



If the corresponding output is connected, this key activates the truck horn to signal dangerous situations to persons that may be standing in the crane's operating radius, in conformity with EN12999.

7 Derating Area



This device enables crane operation at a reduced performance in the area in front of the truck cabin. If during the rotation, the crane enters the derating area with a load higher than what set, the crane is locked and the opposite manoeuvre can be performed in order to go back to the non-derating area. On the contrary, if the crane reaches the limit load once in the derating area, the manoeuvres which reduce the boom out will be available.

The default settings on the derating area are as follows:

AREA 180°

CAPACITY 50%

NOTE: The stability control in this area must be performed by the installer.

8 Electrical Rotation Lock



This device blocks the crane rotation in specific areas (e.g. front area). Therefore, once this area is set, the rotation in this area is not allowed.

9 Temperature Control



By means of the oil temperature sensor, the electronic control unit automatically controls:

- Crane operating range;
- Heat exchanger.

The temperature range allows to set limits for minimum and maximum temperature for crane use, thus protecting the hydraulic components.

The heat exchanger is started and stopped by the electronic card. It is hence possible to set intervention values.



10 Winch

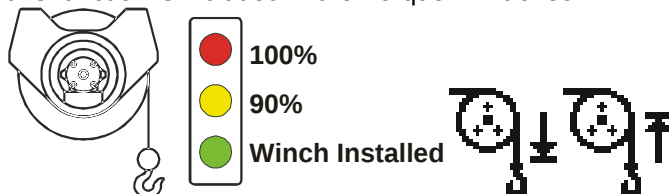
PM Power Tronic systems interface directly with the tow limiting devices of winches, to enable a more effective use of these accessories thanks also to the possibility to configure installation (on a crane or on a jib) and to automatically control the limit switches.

10.1 STD Winch

This control implies the acquisition of digital ON/OFF signals for:

- 90%
- 100%
- Downstroke Limit Switch

In some applications, the Upstroke Limit Switch Signal check is also envisaged. In all remaining cases, this function is included in the Torque Limit check.



10.2 Analogue Winch

This function allows for configuration of winches of the latest generation, e.g. Rotzler. The input signal is analogue (4÷20 mA), which means that it allows for differentiated management of the winch's performances. In other words, its lifting capacity will be the maximum allowed by the working configuration of the crane.

Management of the downstroke limit switch does not vary with respect to the standard version.

10.2.1 Displacement of the Winch

This winch must be displaced toward the outside to allow the closing of the jib. An electric motor is installed on the support plate of the winch to displace it. The winch can work only when it is in axis with the booms.

To move the winch using the Power Tronic unit, hold down the F3 key to obtain the authorisation to move and at the same time press F1 or F2 to move it rightwards or leftwards. As an alternative, you can use the Scanreco/Hetronic radio control: press the outrigger button, hold down F1 to obtain the authorisation to move and use the fifth joystick.

N.B. The displacement is only possible if the load percentage of the winch is lower than 15%.



Not Ok (Winch not in axis with the booms)

Nok



Ok (Winch ready to work)

Ok

10.3 Locking the winch

With this function, you can lock operation of the winch when it is not used. Press the outrigger button on the Scanreco/Hetronic radio control and hold the RESET key down for a few seconds until the 'winch locked' icon appears on the display. To disengage the winch, repeat the same operation.



Locked Winch

Lck

11 Optional

11.1 Mechanical Extensions



Since it is interfaced with the LMU, the load limiting device enables control over the mechanical extensions. For instance, when the LMU detects overloading of a mechanical extension, it will enable only load lowering manoeuvres, which prevent dangerous situations.

11.2 Work lamp

The work lamp can be installed on the crane's and/or jib's boom unit. It consists of a halogen lamp that is extremely handy when using the crane at night or in conditions of poor visibility.

To turn the lamp on/off from the control unit, press the F3 key; from the Scanreco radio control, hold the F1 key down for a few seconds; from the Hetronic radio control, press F3.

11.3 Multiple Activation



The key **F1** engages/disengages the multiple activation valve, if present on the crane. The corresponding icon appears on the display.

11.4 Regenerative Valve



The key **F2** engages/disengages the regenerative valve if present on the crane. The corresponding icon appears on the display.

When the crane is working in PLUS mode, the regenerative valve is automatically switched OFF.

11.5 Bucket use



If the crane is fitted with an accessory, by activating this function, the crane performance will be automatically adapted to the new use. If you attempt to use the accessory without activating this operating mode, the crane will be blocked and you will need to activate it to continue using your crane.

12 Can-Bus System

Description

The CAN-BUS technology, on which the new electronic control unit is based, is an important innovation offering many possibilities for expansion and interfacing with other devices (e.g. radio control systems of the latest generation).

The CAN-BUS (Controller Area Network) is a data communication system for real-time applications. It was developed in 1986 by Bosch upon the request of Mercedes to enable communication of devices fitted to cars and trucks (ABS, ESP, Air Conditioning Control, central lock, etc.) and to reduce the amount of wiring needed for connection.

Advantages of the CAN system:

- Transmission rate 1Mbit/sec;
- Suitable for use in troublesome environments;
- Automatic error detection;
- Reduced wiring.

These features make the system ideal for use on cranes.



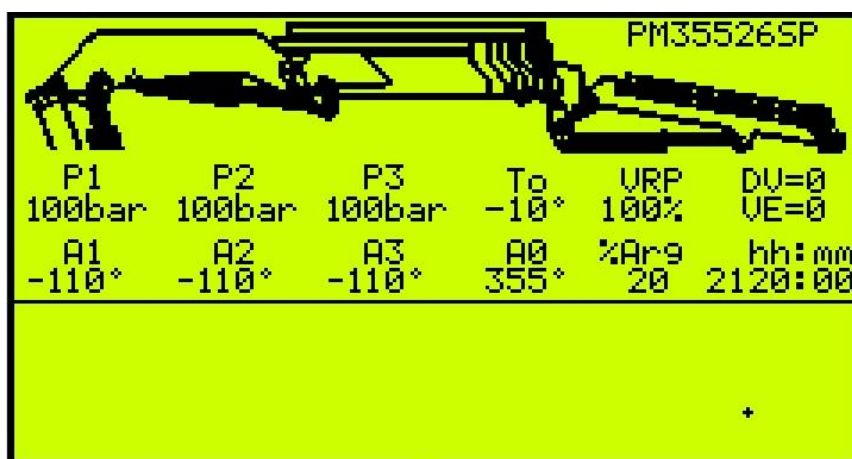
13 Display

In the **Power TRONIC Advance** system, particular attention has been paid to the user interface that not only features LED bars, signalling the load increases on the crane booms, but also an exhaustive graphic display with the exclusive **USER-FRIENDLY SYSTEM**. This means that icons and messages are used to give information about operation and faults, which makes the system ideal even for less expert users.

INTERACTIVE WINDOWS

The Display constantly provides information about the status of the system. Use the Test Button to scroll pages from 1 to 3.

13.1 Page 1 - Main Page



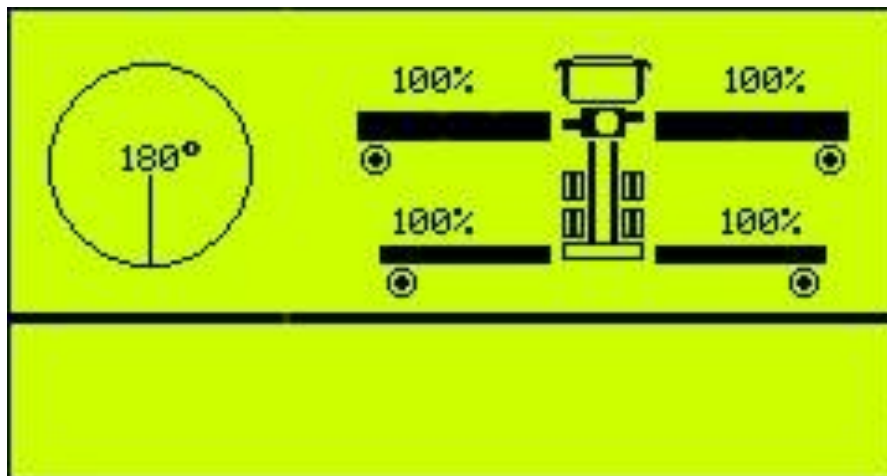
In the main page are displayed the measurement of each sensor.

P1	Main Cylinder Pressure
P2	Second Cylinder Pressure
P3	Fly Jib Cylinder Pressure (if jib installed)
A1	Main Boom Angle
A2	Boom Pack Angle
A3	Fly Jib Angle (if jib installed)
T0	Oil Temperature
A0	Slewing angle
VRP	Speed reduction %
%Arg	Winch torque limit % (if winch installed)
DV	DV signal from remote control
VE	Dump Valve power supply
hh:mm	Partial hour meter



13.2 Page 2 – Outrigger status

In the right side of the display are shown the outriggers status; to the left is shown the slewing angle.



13.3 Page 3 – System informations

In this page are indicated:

- the lifetime hours of the crane;
- the loader version;
- the firmware version;
- the PLC software version;
- last 6 events recorded on the black box.

14 Icons

14.1 Status Icons

The status messages are information about crane operation; for instance, the display will signal if the crane is operating in a limited area or if a winch limit switch has been activated. These messages are called “status” messages because they do not signal errors. They are displayed below:

	Winch Downstroke Limit Switch		Rotation Disabled
	Winch Upstroke Limit Switch		De-Rating Area
	Crane Thrust Area		Emergency Button Pressed
	Jib Thrust Area		Regenerative Valve
	Crane Maximum Angle		Overloaded Mechanical Extension
	Jib Maximum Angle		Use of the Platform
	Outrigger Use by Radio Activated		Radiator Running
	Jib Disconnected		Reset Activated (5 sec.)
	Crane Stabilized		Reset in Stand-by (30 sec.)
	Service		Displacement/Locked Winch
	Multiple Activation		
	Use of a Bucket		

These messages relate to crane operation and will result in a manoeuvre procedure (e.g. if a winch downstroke limit switch is activated, the control unit will only allow manoeuvres that enable this condition to be quitted).



14.2 Alarm Icons

Alarm messages give 'real time' information about faults of the systems or its sensors. Each message is associated to an icon and to an alphanumeric code that identifies the component causing the alarm. For instance, if a pressure sensor is malfunctioning, the icon will signal the transducer error condition, while the alphanumeric code will indicate which transducer is malfunctioning.

Unlike status messages and on the basis of their seriousness, alarm messages can downgrade crane performance or disable operation.

The alarm icons are:



Spool Position Control Valve Block K.O.



Alarm/General Error



CAN Error



High/Low Oil Temperature



Oil Filter Clogged

14.3 Icons Messages

Lck	- Locked (Locked Winch)
Nok	- Not Ok (Agreement denied)
Ok	- Ok



15 Error Codes

ICON	ERROR CODE	BB CODE	DESCRIPTION
	01	1	- Clogged Filter
	02	2	- High Oil Temperature
	03	3	- Low Oil Temperature
-	04	4	- Overloaded Column Cylinder (Crane Blocked)
-	04B	124	- Overloaded Main Boom Cylinder (Crane Blocked)
-	05	5	- Overloaded Jib Cylinder (Jib Blocked)
-	06	6	- Overloaded Winch
	07	7	- Element 1 NOK (activated in both directions A/B)
	08	8	- Element 2 NOK (activated in both directions A/B)
	09	9	- Element 3 NOK (activated in both directions A/B)
	10	10	- Element 4 NOK (activated in both directions A/B)
	11	11	- Element 5 NOK (activated in both directions A/B)
	12	12	- Element 6 NOK (activated in both directions A/B)
	13	13	- Element 7 NOK (activated in both directions A/B)
	14A	14	- Element 1 dir. A
	14B	134	- Element 1 dir. B Levers not in idle position when system on
	15A	15	- Element 2 dir. A Levers not in idle position when system on
	15B	135	- Element 2 dir. B Levers not in idle position when system on
	16A	16	- Element 3 dir. A Levers not in idle position when system on
	16B	136	- Element 3 dir. B Levers not in idle position when system on
	17A	17	- Element 4 dir. A Levers not in idle position when system on
	17B	137	- Element 4 dir. B Levers not in idle position when system on
	18A	18	- Element 5 dir. A Levers not in idle position when system on
	18B	138	- Element 5 dir. B Levers not in idle position when system on
	19A	19	- Element 6 dir. A Levers not in idle position when system on
	19B	139	- Element 6 dir. B Levers not in idle position when system on
	20A	20	- Element 7 dir. A Levers not in idle position when system on
	20B	140	- Element 7 dir. B Levers not in idle position when system on
	21	21	- Crane not stabilised (where the accessory is fitted)
	22	22	- Mechanical extension alarm (where the accessory is fitted)



ICON	ERROR CODE	BB CODE	DESCRIPTION
	23A	23	- Main Boom Angle Sensor NOK (Disconnected)
	23B	143	- Main Boom Angle Sensor NOK (Short-circuited)
	24A	24	- Boom Angle Sensor NOK (Disconnected)
	24B	144	- Boom Angle Sensor NOK (Short-circuited)
	25A	25	- Jib Angle Sensor NOK (Disconnected)
	25B	145	- Jib Angle Sensor NOK (Short-circuited)
	26	26	- Oil Temperature Sensor NOK
	27A	27	- Column Pressure Transducer NOK (Disconnected)
	27B	147	- Column Pressure Transducer NOK (Short-circuited)
	28A	28	- Main Boom Pressure Transducer NOK (Disconnected)
	28B	148	- Main Boom Pressure Transducer NOK (Short-circuited)
	29A	29	- Jib Pressure Transducer NOK (Disconnected)
	29B	149	- Jib Pressure Transducer NOK (Short-circuited)
	30A	30	- Emergency Solenoid Valve Disconnected
	30B	150	- Emergency Solenoid Valve Short-circuited
	31A	31	- Solenoid Regeneration Valve Disconnected
	31B	151	- Solenoid Regeneration Valve Short-circuited
	32A	32	- Multiple Activation Solenoid Valve Disconnected
	32B	152	- Multiple Activation Solenoid Valve Short-circuited
	33	33	- Winch Downstroke Limit Switch Activated
	34	34	- Winch Upstroke Limit Switch Activated
-	35	35	- Use of Accessory Not Allowed
-	36	36	- Crane with Bucket Blocked (accessory)
	37A	37	- Rotation Solenoid Valve Disconnected
	37B	157	- Rotation Solenoid Valve Short-circuited
	38A	38	- Reduced Capacity Solenoid Valve Disconnected
	38B	158	- Reduced Capacity Solenoid Valve Short-circuited (B)
	39A	39	- Spare Solenoid Valve Disconnected
	39B	159	- Spare Solenoid Valve Short-circuited
-	40	40	- Crane in Limited Area Blocked
	41A	41	- Solenoid Valve Spare 2 Disconnected
	41B	161	- Solenoid Valve Spare 2 Short-circuited
	42A	42	- Analogue Winch Sensor NOK (disconnected)
	42B	162	- Analogue Winch Sensor NOK (short-circuited)
	43A	43	- Lower Block Threshold of Top Roller
	43B	163	- Upper Block Threshold of Top Roller
	44A	44	- Solenoid Valve Spare 3 Disconnected
	44B	164	- Solenoid Valve Spare 3 Short-circuited



ICON	ERROR CODE	BB CODE	DESCRIPTION
	45	45	- CAN Network NOK
	46	46	- Radio CAN NOK
	47	47	- CAN LG/IO NOK
	48	48	- CAN LG/satellite NOK
	49	49	- CAN MCS NOK
	49B	169	- CAN MCS SLAVE NOK
-	50	50	- Tester access
	51	51	- Encoder Position 1 NOK
	52	52	- Encoder Position 2 NOK
	53	53	- Encoder Position 3 NOK
	54	54	- Encoder Position 4 NOK
	55	55	- Inclination sensor X/Y NOK
	60	60	- Routine Maintenance Not Performed
	61	61	- Extra-duty Maintenance Not Performed
-	62	62	- Routine Maintenance Performed
-	63	63	- Extra-duty Maintenance Performed
	64A	64	- LG-SAT not found
	64B	184	- LG-SAT not setted
-	65	65	- Incorrect Shut-down Procedure
	66A	66	- Interlock 3-4 slewing microswitches disconnected
	66B	186	- Slewing Encoder NOK
-	70	70	- Pressure Peak on Column Cylinder
-	71	71	- Pressure Peak on Main Boom Cylinder
-	72	72	- Pressure Peak on Jib Cylinder
-	73	73	- Use of RESET function
-	74	74	- Column Max Pressure Limit exceeded
-	75	75	- Improper Crane Operation
-	76	76	- Reset Use in Emergency
	77	77	- Motor Start Output Short-circuited
	78	78	- Motor Stop Output Short-circuited
	79	79	- Winch Translation Output DX Short-circuited
	80	80	- Winch Translation Output SX Short-circuited
	81	81	- Horn Output Short-circuited
	82	82	- Auto-RPM Output Short-circuited
	83A	83	- Right Outrigger Piston Pressure Transducer NOK Disconnected
	83B	203	- Right Outrigger Piston Pressure Transducer NOK Short-circuited
	84A	84	- Right Outrigger Rod Pressure Transducer NOK Disconnected
	84B	204	- Right Outrigger Rod Pressure Transducer NOK Short-circuited
	85A	85	- Left Outrigger Piston Pressure Transducer NOK Disconnected
	85B	205	- Left Outrigger Piston Pressure Transducer NOK Short-circuited
	86A	86	- Left Outrigger Rod Pressure Transducer NOK Disconnected
	86B	206	- Left Outrigger Rod Pressure Transducer NOK Short-circuited
	102	102	- Download
	103	103	- Black Box Deleted



16 Black Box

Inside the POWER TRONIC there is a storage device called the BLACK-BOX where all the data processed by the microprocessor are stored.

Only the PM Service personnel is authorised to examine the Black-Box data storage device.

Besides the Black Box records any accesses to the system that have changed the functional parameters.

17 Service

The Power Tronic calculates automatically the time when the service is due.

When the service is due, the corresponding icon is on.

IMPORTANT: if the switched icon is not associated to a number, it means that this is just a reminder for the operator, no reset is due and the visual signalisation disappears after 5 resets of the PTO.

On the contrary, the scheduled service is signalled by the icon and its corresponding code; in this case a reset must be performed.

The service time intervals vary according to the crane model. For more information, refer to the Operations and Maintenance Manual.



18 Input/Output Diagnostic Mode

With **Power Tronic Advance** is possible to check electrical faults using the diagnostic mode.
This mode show the status of digital and analogic inputs and outputs.

To enter in this function press both F3 and Plus
Scroll the pages with the scroll key.
To exit press both F3 and Reset.

Page1

DIGITAL INPUT

INPUT	PIN	DESCRIZIONE
IND00	CN1 PIN 32	IND SPARE
IND01	CN1 PIN 12	IND SPARE
IND02	CN1 PIN 16	IND SPARE
IND03	CN1 PIN 44	IND SPARE
IND04	CN1 PIN 18	IND SPARE
IND05	CN1 PIN 47	RADIO RESET
IND06	CN1 PIN 20	RADIO DV
IND07	CN1 PIN 48	RADIO ON
IND08	CN1 PIN 21	RADIO SPARE
IND09	CN1 PIN 49	RADIO AM
IND10	CN1 PIN 22	RADIO RIG
IND11	CN1 PIN 52	IND SPARE
IND12	CN2 PIN 03	LEVER 1B
IND13	CN2 PIN 31	LEVER 4A
IND14	CN2 PIN 04	LEVER 1A
IND15	CN2 PIN 32	LEVER 5B
IND16	CN2 PIN 05	LEVER 2B
IND17	CN2 PIN 33	LEVER 5A
IND18	CN2 PIN 06	LEVER 2A
IND19	CN2 PIN 34	LEVER 6B
IND20	CN2 PIN 07	LEVER 3B
IND21	CN2 PIN 35	LEVER 6A
IND21	CN2 PIN 40	SW2
IND22	CN2 PIN 08	LEVER 3A
IND23	CN2 PIN 36	LEVER 7B
IND24	CN2 PIN 09	LEVER 4B
IND25	CN2 PIN 37	LEVER 7A
IND26	CN2 PIN 16	SW1
IND27	CN2 PIN 44	DOWN EDSTROKE WINCH
IND28	CN2 PIN 17	SW4
IND29	CN2 PIN 45	MICRO AREA DX - SW22
IND30	CN2 PIN 18	FINECORSA ROTAZ. DX / CHECK ROT. INTERLOCK 5
IND31	CN2 PIN 46	PLE
IND32	CN2 PIN 19	FINECORSA ROTAZIONE SX
IND33	CN2 PIN 47	LMU
IND34	CN2 PIN 20	MICRO AREA SX - SW23
IND35	CN2 PIN 48	SW0 / MICRO INTERLOCK 1
IND36	CN2 PIN 21	SW5 / 100% WINCH
IND37	CN2 PIN 49	SW3
IND38	CN2 PIN 22	SW6 / 90% WINCH
IND39	CN2 PIN 50	MICRO OUTRIGGER LEVER - SW24
IND40	CN2 PIN 23	SW7 / UP ENDSTROKE WINCH
IND41	CN2 PIN 51	TRASLA ARGANO OK / PRES. OPER. POSTO IN PIEDI
IND42	CN2 PIN 52	TRASLA ARGANO NOK / FC ROTAZ. POSTO IN PIEDI



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ANALOG INPUT

INPUT	PIN	DESCRIZIONE
INA00	CN2 PIN 10	ANGLE A3
INA01	CN2 PIN 11	ANALOG WINCH
INA02	CN2 PIN 12	ANALOG SPARE
INA03	CN2 PIN 13	PRESSURE P2
INA04	CN2 PIN 14	ANGLE A1
INA05	CN2 PIN 42	PRESSURE P1
INA06	CN2 PIN 15	PRESSURE P3
INA07	CN2 PIN 43	ANGLE A2

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DIGITAL OUTPUT

OUTPUT	PIN	DESCRIZIONE
OUT00	CN1 PIN 30	OUT 90%
OUT01	CN1 PIN 31	OUT 100%
OUT02	CN1 PIN 34	OUT RADIO ON
OUT03	CN1 PIN 07	CLACSON
OUT04	CN1 PIN 08	OUT LUCE PLUS
OUT05	CN1 PIN 36	GRU CHIUSA
OUT06	CN1 PIN 09	TRASLA ARGANO DX
OUT07	CN1 PIN 10	STOP
OUT08	CN1 PIN 38	TRASLA ARGANO SX
OUT09	CN1 PIN 11	WORK LAMP JIB
OUT10	CN1 PIN 41	RADIO PLE
OUT11	CN1 PIN 14	OIL COOLER
OUT12	CN1 PIN 43	RADIO PLUS
OUT13	CN2 PIN 26/53	+ SENSOR
OUT14	CN2 PIN 54	+ SENSOR JIB
OUT15	CN2 PIN 27/55	+ SENSOR GRU
OUT16	CN1 PIN 05	WORK LAMP CRANE
OUT17	CN1 PIN 37	EV. OUTRIGGER
OUT18	CN1 PIN 06	EV. RID.PORT.
OUT19	CN1 PIN 35	EV. SLEWING
OUT20	CN1 PIN 40	EV. AM 2
OUT21	CN1 PIN 39	EV. AM 1
OUT22	CN1 PIN 33	EV. REGENERATIVE
OUT23	CN1 PIN 13	EV. DUMP VALVE

Page 4
CAN 1 – NETWORK MAP (NOT USED)

Page 5
CAN 2 – NETWORK MAP (NOT USED)