

ENGINE CONTROL PANEL

**CM2A/3A
SERIES**

USER'S MANUAL

 **PINE** *s.r.l.*

SISTEMI ELETTRONICI

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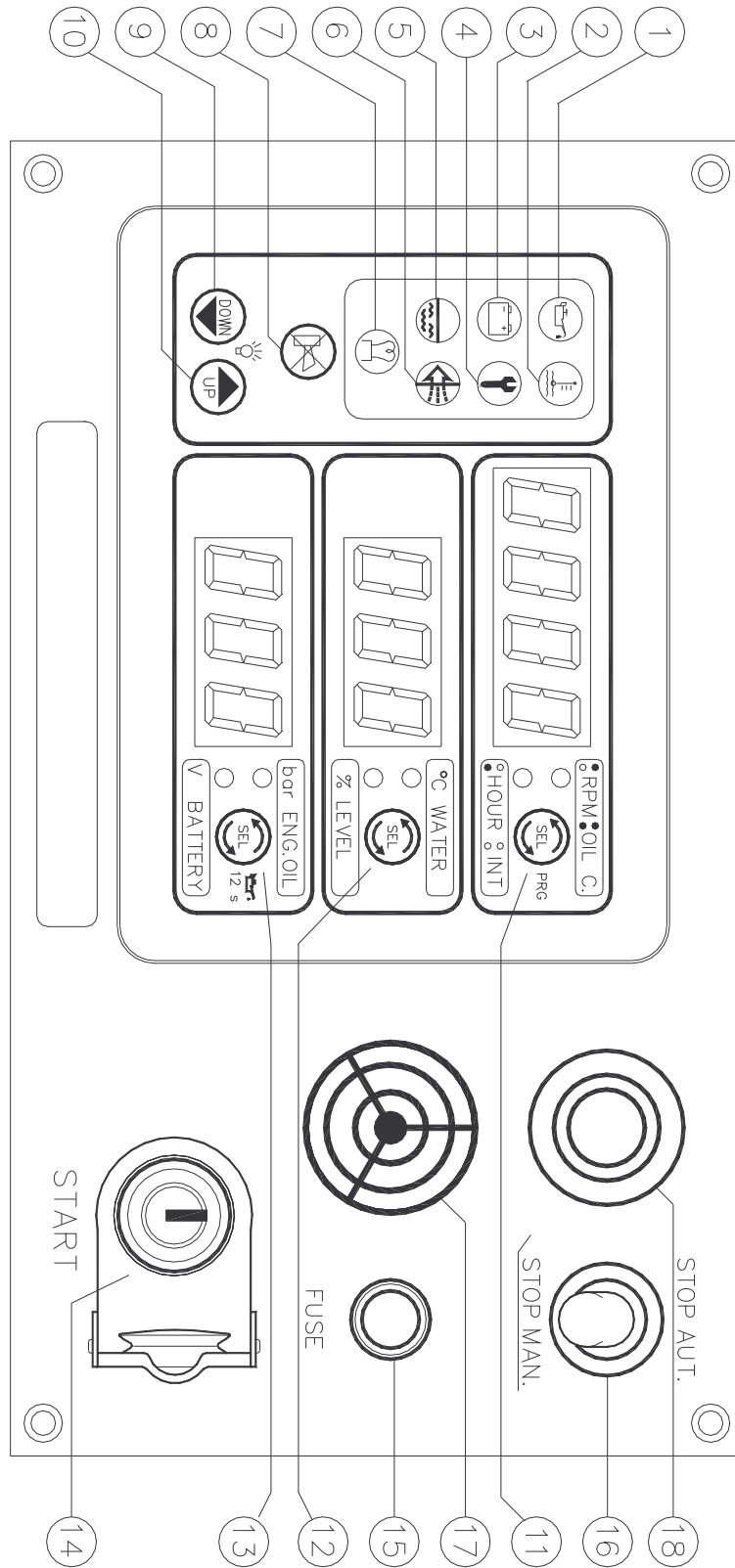


Fig. 1 - CM2A/3A panel

1. INTRODUCTION

CM2A/3A is a engine control panel based on microprocessor.

A polycarbonate front mounted on an aluminium support protects control and visualization part.

All functions performed by panel are intuitive and simple: the measurement and alarm set is also as simple and immediate.

It is possible to set up **two thresholds** for each measurement acquired by transducers: a **pre-alarm** one (So1) and an **alarm** one (So2).

Pre-alarm condition concerning the first threshold activates either a luminous signal only or both luminous and acoustic signal (as from set-up); alarm condition concerning the second threshold activates luminous and acoustic signal and automatic stop.

Pre-alarm and alarm conditions can be delayed up to 240 seconds to avoid false alarms.

ON/OFF alarms can be: luminous only, luminous and acoustic, luminous and acoustic with automatic stop; their intervention can be delayed up to 240 seconds.

The automatic stop function of any kind of alarm can be excluded from set-up.

On the front panel there is a switch that activates / disactivates automatic stop by acting directly on the engine wiring.

CM2A/3A reads signals coming from the most commonly available transducers; on request it can be adapted to any kind of transducer.

On request wiring is supplied for any type of engine and connecting extension, and in case, the engine relay box.

2. INSTALLATION

CM2A/3A series engine control panels must be placed on the ship pilot bridge or on a board protecting the back against water. Cutting for a proper assembly is shown in D6 drawing.

It is recommended to insert a seal on the cutting edge to protect the panel against water. Fix it with the screws supplied.

Engine connection is obtained by coupling panel connectors to the ones on the engine side.

Wiring diagram is shown in D3 drawing, connector numbering in D1 drawing.

If no wiring has been supplied, see D1, D2 and D3 drawings for proper connection.

ALARM AND AUTOMATIC STOP TEST

It is possible to test the correct working of alarms (inactive when engine is regularly running) by simulating their activation, that is, by connecting the relating wire to the negative pole of battery.

If the panel is set for automatic stop, it is possible to test this function simulating an alarm when engine is running; the switch (16) must be in STOP AUT position.

You need a transducer simulator to test set-up alarm conditions.

It is advisable to test all alarms.

3. GENERAL FEATURES

- 6 measurements led displayed in three rows
- 7 warning lamps for signalings and alarms
- Set of pre-alarm and alarm thresholds in any measurement
- Acoustic alarm and key to silence it
- Variable luminous intensity
- Automatic stop function with possibility of excluding it by switch (16) in STOP MAN
- Power supply: 12 Vcc for CM2A series – 12 / 24 Vcc for CM3A series
- Dimensions: 243.0 x 135.5 mm

On request:

- Connection of two panel in parallel (“Master-Slave” configuration)
- Maintenance or oil-change management (by settable timer)
- Overspeed alarm
- Remote silencing key (CM3A series only)

4. ALARMS, SIGNALS AND COMMANDS (Fig.1: CM2A/3A)

1 - LOW OIL PRESSURE warning lamp	ON/OFF ALARM
2 - HIGH WATER TEMPERATURE warning lamp	ON/OFF ALARM
3 - ALTERNATOR (Charger) warning lamp	SIGNALING
4 - MAINTENANCE / OIL CHANGE warning lamp	SIGNALING
5 - ALARM 2 warning lamp	ON/OFF ALARM
6 - ALARM 1 warning lamp	ON/OFF ALARM
7 - PREHEATING / ALARM 3 warning lamp	SIGNALING / ON-OFF ALARM
8 - SILENCE KEY	
9 - DECREASES DISPLAY LUMINOSITY	
10 - INCREASES DISPLAY LUMINOSITY	
11 - SELECTS VISUALIZATION ON FIRST DISPLAY	
12 - SELECTS VISUALIZATION ON SECOND DISPLAY	
13 - SELECTS VISUALIZATION ON THIRD DISPLAY	
14 - KEY FOR SWITCHING ON PANEL AND STARTING ENGINE	
15 - FUSE	
16 - ACTIVATES / DISACTIVATES ENGINE AUTOMATIC STOP	
17 - BUZZER	
18 - PUSH-BUTTON FOR ENGINE STOP (panel must be on to perform stop operation)	

Each ON/OFF ALARM activates buzzer (acoustic alarm) and warning lamp. SIGNALING is a luminous warning only.

5. PANEL SWITCH-ON AND ENGINE IGNITION

When panel is switched on:

- One-second lamp-test is executed
- Alternator (3) and Low Oil Pressure (1) warning lamps are on
- Buzzer is on because of low oil pressure
- If pre-heating is needed, engine ignition can be activated when warning lamp (7) is off
- At engine ignition the buzzer is automatically deactivated and it will be re-activated only by a pre-alarm or by an alarm.

6. ENGINE STOP BY REMOVING CURRENT (IGNITION KEY)

If panel hasn't a stop-push, engine can be stopped by turning off the panel by its key. Otherwise, press STOP-push (18) until the engine stops.
Panel **must be on**.

7. ENGINE STOP BY SENDING CURRENT

This operation is performed by pressing Stop button (18) until engine stops.
Panel **must be on**.

8. AUTOMATIC STOP

If panel has this option, it can stop engine in the following cases:

- an ON/OFF alarm previously set for automatic stop occurs
- an alarm condition concerning the second threshold occurs

Automatic stop is performed if switch (16) is in AUT STOP position.

In STOP MAN position engine can be manually stopped only.
STOP MAN position is recommended when stopping the engine could cause greater damage than leaving it running.

9. PRE-HEATING

Preheating function is activated only if preheating relay is connected to **P12** as shown in D5. Preheating warning lamp (7) is on for a time depending on the engine water temperature.

In absence of Water Temperature transducer or if it is disconnected, preheating time is fixed at 20 seconds.

After Heating : after warning lamp (7) if off, plugs are power supplied for further 5 seconds.

Engine Ignition: at every engine ignition heating plugs are power supplied for the whole operation plus 5 seconds.

10. PANEL-ON SIGNAL

An acoustic alarm is present to avoid leaving panel on. If engine is not running and the panel is on, buzzer produces an intermittent beep after 20 seconds. It can be stopped by engine ignition only.

11. OPERATION

User chooses which measurement to visualize acting on keys (11),(12),(13). LEDs on the right-side of display show the selected ones. **On the first row of right panel** the combination of LEDs on (see serigraphy aside) shows the chosen measurement among the available ones. Display goes back to **RPM visualization** automatically after 4 seconds.

Luminosity

Display luminosity can be adjusted by keys (9) (10).

When panel is switched on, luminosity will be:

- max if luminosity memory is off (**LoF** in set-up);
- the same as latest adjustment if memory is on (**Lon** in set-up).

12. ALARM CONDITONS

Alarms can be of two types:

- Alarms coming from transducer readings, related to the thresholds adjusted in set-up.
- ON/OFF alarms coming from alarm-contacts (e.g. low oil pressure switch)

Available options for alarms coming from transducer readings:

So1	pre-alarm threshold-1
bon/boF	acoustic signal on So1 on/off
So2	alarm threshold with automatic stop and acoustic signal
rit	alarm delay. Both pre-alarm and alarm must be active at the same time as rit or longer to be recognized as alarm conditions.

For example, if high water temperature pre-alarm is set at 80°C and alarm at 90°C, when water temperature rises over 80°C for a time longer than delay time, a **So1** threshold-1 **pre-alarm condition** will be generated.

If that happens also for 90°C, a **So2** threshold-2 **alarm condition** will be generated.

WARNING

In the case of **pressure measurements**, **alarm threshold will be lower than the pre-alarm one** (see chap.13 “Management of alarms coming from readings”).

Available options for ON/OFF alarms:

AAL/AAH/nu	alarm - active at a low voltage / active at a high voltage / not used
bon/boF	acoustic signaling enabled / disabled
AOn/AOF	automatic stop enabled / disabled
Mon/MoF	alarm memory enabled / disabled (AL only)
rit	alarm delay. Alarm contact must remain ON for the same time as rit or for a longer time to be recognized as alarm condition.

Note: The “AAL/AAH/nu” option is available only in the predisposed panels.
If not predisposed, all the ON/OFF alarms are active a low voltage.

13. MANAGEMENT OF ALARMS FROM READINGS

Threshold-1 pre-alarm condition (So1)

- it is stored
- activates a single blinking (●○●○●○●○...):
 - of display if alarm measurement is being visualized;
 - of relating LED if the other measurement is being visualized.
- activates buzzer if enabled in set up.

Silencing the buzzer (from key or remote) resets pre-alarm memory (pre-alarm acknowledged); display or led blink till pre-alarm condition continues.

On threshold-1 pre-alarm condition ending (So1)

- blinking ends if silencing button was previously pushed (pre-alarm condition acknowledged);
- blinking and acoustic signaling continues if pre-alarm is not acknowledged ;
- blinking ends and buzzer is muted as soon as silencing button is pushed (pre-alarm condition acknowledged);.

Threshold-2 alarm condition (So2)

- it is stored
- activates a double blinking (●○●○●○●○●○●○...):
 - of display if alarm measurement is being visualized;
 - of relating LED if the other measurement is being visualized.
- activates buzzer if enabled in set-up
- activates engine automatic stop (which can be excluded by switch (16))

Silencing the buzzer (from key or remote) resets alarm memory (alarm acknowledged); display or led blink till pre-alarm condition continues.

On threshold-2 alarm condition ending (So2)

- blinking ends if silencing button was previously pushed (alarm condition acknowledged);
- blinking and acoustic signaling continues if alarm is not acknowledged ;
- blinking ends and buzzer is muted as soon as silencing button is pushed (alarm condition acknowledged);.

Any new pre-alarm or alarm condition will restart the procedure of alarm management. During set-up, it is possible to exclude any of the two thresholds by raising their value until **ESC** appears on display.

14. ON/OFF ALARMS MANAGEMENT

ON/OFF alarm management is based on set-up options as described in the following scheme:

BUZZER	AUT. STOP	MEMORY	WHEN A ON/OFF ALARM OCCURS
Off	Off	Off	Alarm LED goes on
Off	Off	On	Alarm LED goes on; after the rit delay time alarm is memorized and the Alarm LED indicates a single blink.
Off	On	Off	Alarm LED goes on; after the rit delay time the Alarm LED indicates a double blink and automatic stop is activated.
Off	On	On	Alarm LED goes on; after the rit delay time alarm is memorized, the alarm led indicates a double blink and automatic stop is activated.
On	Off	Off	Alarm LED goes on and after the rit delay time the buzzer is activated.
On	Off	On	Alarm LED goes on; after the rit delay time the buzzer is activated, the Alarm LED indicates a single blink and the alarm is memorized.
On	On	Off	Alarm LED goes on; after the rit delay time buzzer is activated, the Alarm LED indicates a double blink and automatic stop is activated.
On	On	On	Alarm LED goes on; after the rit delay time buzzer is activated, the Alarm LED indicates a single blink, alarm is memorized and automatic stop is activated.

Silencing the buzzer (from key or remote) resets alarm memory (alarm acknowledged); led blinks till ON/OFF alarm condition continues.

ON/OFF alarm condition ending

- blinking ends if silencing button was previously pushed (alarm condition acknowledged);
- blinking and acoustic signaling continues if alarm is not acknowledged ;
- blinking ends and buzzer is muted as soon as silencing button is pushed (alarm condition acknowledged);.

15. SIGNALINGS

- **Alternator warning lamp (3)**
It is on when alternator is not excited and is not charging batteries (low voltage detected).
- **Maintenance / Oil change (4)**
When it is time to maintain / change oil, warning lamp (5) starts blinking and buzzer is activated. Acoustic signal can be silenced, not luminous one. This procedure will be repeated at every new panel switch-on until maintenance or oil change is done (see chap. 16).
- **Pre-heating warning lamp (7)**
It is on during pre-heating

16. MAINTENANCE / OIL CHANGE

On the top row are visualized: RPM and working hours, the time left to maintenance or oil change (MAINT. / OIL C.), the time interval between every maintenance performance or oil change (INT.).

MAINT (or OIL C.) is a counter that decreases at each working hour until it signals that a maintenance / oil change is necessary.

Once these operations have been performed, a new count is necessary for next maintenance/oil change.

Press key (13) for at least 12 seconds (buzzer will produce a beep) to restore countdown (as shown in panel serigraphy). MAINT. / OIL C. warning lamp (4) will stop blinking.

Please make sure that MAINT. / OIL C. value is the same displayed by INT.

17. PANEL SET-UP

Set-up allows to:

- adapt panel to engine plant
- calibrate the measuring for a proper management of signals and alarms
- perform calibrations and adjustments for a correct reading of transducers.

KEYS	FUNCTION
(11) (12) (13)	Choose measurements to be changed and confirm new calibrations
(9) (10)	Move among the main-menu rows / Change values
(8)	Back to Main-menu / Exit from set-up storing new data

WARNING
 IF DURING SET-UP NO KEY IS PRESSED, AFTER 60 SECONDS AUTOMATIC EXIT FROM SET-UP WILL OCCUR AND MODIFICATIONS WILL NOT BE STORED.

SET-UP PROCEDURE

1- **Entering set-up:** press key (11) until buzzer produces a beep.

MAIN MENU

P r n - 1st ROW - key (11) to enter **“Parameter programing”**

t A r - 2nd ROW - key (12) to enter **“RPM – level - tAP time calibration”**

O P t - 3rd ROW - key (13) to enter **“options”**

(**tAP** = time to Stabilize Oil Pressure or time to declare engine running)

P r n - PARAMETER PROGRAMMING

S E t - On the first row **SEt** is displayed and the first LED above is on.

- 1) By pressing keys (9) and (10), user can choose on which measurement to change values. The position of **SEt** changes and LED shows the selected measure. In the same way **bPo, AtA, AL1, AL2, AL3, Gen** and LED shows the selected ON/OFF alarm.
- 2) The key on the right-hand side of **SEt** for analogs, and **bPo, AtA, AL1, AL2, AL3, Gen** for ON/OFF alarms, allow the user to go ahead in the value selection menu.
- 3) Once the parameter has been chosen, press keys (9) and (10) to change the value. Go ahead to the end until **SEt** appears again.
 Now the values of another measurement can be changed proceeding as from step 2.
 Once all necessary changes have been performed, exit from set-up in the proper way to store new data.
- 4) User can properly exit from procedure at any step of set-up and at any moment, by pressing key (8) once (if main-menu is visualized) or twice (if any sub-menu is displayed).

In case of **unwanted changes**, do not press any key for at least a minute: set-up exit is automatic and changes will not be stored.

TRANSDUCER AND INPUT SELECTION CODE TABLE

1st ROW : codes displayed after **SEt**.

S E t alarm conditions for engine revolutions (RPM) as described in the alarm condition setting code table

<input type="checkbox"/> S E t	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Engine running hours
<input type="checkbox"/> S E t	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Remaining hours to maintenance / oil change
<input type="checkbox"/> S E t	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Interval (hours) between maintenance / oil changes

Value are set by keys (9) and (10).

Note: maintenance / oil change is displayed only if **Oon** option was set in **OPt** menu.

2nd and 3rd ROWS : codes displayed after **SEt**.

Input contact is connected to panel at the row which is being programmed:

- At 2nd row - LED above - corresponds contact n° 6
- At 2nd row - LED below - “ “ n° LIV
- At 3rd row - LED above - “ “ n° 9

User can to choose sensor/transducer type with the following options:

- ° C (temperature)
- b A r (pressure)
- L i v (level)
- t 4 2 (temperature 4-20 mA)
- P 4 2 (pressure 4-20 mA)
- G 4 2 (generic 4-20 mA)

b A t (Battery Voltage) – always in 3rd row - LED below

Use keys (9) and (10) to change the choice and press the key on the right-hand side to confirm.

Temperature, pressure and level need further choices, as follow.

- | | | |
|---|---|---|
| <input type="checkbox"/> <input type="checkbox"/> ° <input type="checkbox"/> C (contact n.6) | <input type="checkbox"/> b <input type="checkbox"/> A <input type="checkbox"/> r (contact n.9) | <input type="checkbox"/> L <input type="checkbox"/> i <input type="checkbox"/> u (LIV contact) |
| <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 0 VDO 120 °C | <input type="checkbox"/> <input type="checkbox"/> d <input type="checkbox"/> 2 VDO 2 bar | <input type="checkbox"/> L <input type="checkbox"/> - <input type="checkbox"/> r resistive sensor |
| <input type="checkbox"/> 1 <input type="checkbox"/> 5 <input type="checkbox"/> 0 VDO 150 °C | <input type="checkbox"/> <input type="checkbox"/> d <input type="checkbox"/> 5 VDO 5 bar | <input type="checkbox"/> L <input type="checkbox"/> - <input type="checkbox"/> I current sensor |
| <input type="checkbox"/> u <input type="checkbox"/> E <input type="checkbox"/> G Veglia 120 °C | <input type="checkbox"/> d <input type="checkbox"/> 1 <input type="checkbox"/> 0 VDO 10 bar | |
| <input type="checkbox"/> J <input type="checkbox"/> A <input type="checkbox"/> E Jaeger 120 °C | <input type="checkbox"/> d <input type="checkbox"/> 2 <input type="checkbox"/> 5 VDO 25 bar | |
| <input type="checkbox"/> C <input type="checkbox"/> A <input type="checkbox"/> t Caterpillar 150 °C | <input type="checkbox"/> C <input type="checkbox"/> 1 <input type="checkbox"/> 0 Caterpillar 10 bar | |
| <input type="checkbox"/> M <input type="checkbox"/> P <input type="checkbox"/> Y Murphy 130 °C | <input type="checkbox"/> C <input type="checkbox"/> 2 <input type="checkbox"/> 5 Caterpillar 25 bar | |
| <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> n Baudouin 150 °C | <input type="checkbox"/> <input type="checkbox"/> G <input type="checkbox"/> 8 Veglia 8 bar | |
| | <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> 2 Murphy 2 bar | |
| | <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> 5 Murphy 5 bar | |
| | <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> 7 Murphy 7 bar | |
| | <input type="checkbox"/> Y <input type="checkbox"/> 2 <input type="checkbox"/> 5 Murphy 25 bar | |
| | <input type="checkbox"/> J <input type="checkbox"/> 1 <input type="checkbox"/> 0 Jaeger 10 bar | |
| | <input type="checkbox"/> J <input type="checkbox"/> 2 <input type="checkbox"/> 5 Jaeger 25 bar | |
| | <input type="checkbox"/> b <input type="checkbox"/> 1 <input type="checkbox"/> 0 Baudouin 10 bar | |

The 4-20 mA transducers, need to set the alarm type (rising or falling), decimal point (if used or not) and the output at the extreme range values.

- A L H Rising alarm (Low-High) without decimal point
- A L .H Rising alarm (Low-High) with decimal point
- A H L Falling alarm (High-Low) without decimal point
- A H .L Falling alarm (High-Low) with decimal point

Use keys (9) and (10) to change the choice and press the key on the right-hand side to confirm.

- | | |
|---|---|
| <input type="checkbox"/> <input type="checkbox"/> t <input type="checkbox"/> 4 - <input type="checkbox"/> x <input type="checkbox"/> x <input type="checkbox"/> x Temperature at 4 mA | <input type="checkbox"/> <input type="checkbox"/> t <input type="checkbox"/> 2 <input type="checkbox"/> 0 - <input type="checkbox"/> x <input type="checkbox"/> x <input type="checkbox"/> x Temperature at 20 mA |
| <input type="checkbox"/> <input type="checkbox"/> P <input type="checkbox"/> 4 - <input type="checkbox"/> x <input type="checkbox"/> x <input type="checkbox"/> x Pressure at 4 mA | <input type="checkbox"/> <input type="checkbox"/> P <input type="checkbox"/> 2 <input type="checkbox"/> 0 - <input type="checkbox"/> x <input type="checkbox"/> x <input type="checkbox"/> x Pressure at 20 mA |
| <input type="checkbox"/> <input type="checkbox"/> G <input type="checkbox"/> 4 - <input type="checkbox"/> x <input type="checkbox"/> x <input type="checkbox"/> x Value at 4 mA | <input type="checkbox"/> <input type="checkbox"/> G <input type="checkbox"/> 2 <input type="checkbox"/> 0 - <input type="checkbox"/> x <input type="checkbox"/> x <input type="checkbox"/> x Value at 20 mA |

Keys (9) (10) change the values and the key on the right-hand side confirms the setting.

ALARM CONDITIONS SETTING CODE TABLE

Codes displayed after choosing transducer type:

S o 1 - <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Pre-alarm value (threshold-1 alarm))
b o n / b o F	Activates/deactivates acoustic signal for threshold-1 alarm
S o 2 - <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Threshold-2 alarm value
r i t - <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Delay time for both alarm conditions.

Values are set by keys (9) and (10).
To exclude any threshold, value must be increased until **ESC** appears on display.

ON/OFF ALARM SETTING CODE TABLE

These codes appear after **bPO AtA A L1 AL2 AL3 GEn**:

A A L / A A H / <input type="checkbox"/> n u	Active low alarm / Active high alarm / Not used
b o n / b o F	Activates / deactivates acoustic signal
A o n / A o F	Activates / deactivates automatic stop
M o n / M o F	Activates / deactivates alarm memory
r i t - <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Delay time (0-240 s)

Note: The “AAL/AAH/nu” option is available only in the predisposed panels.
If not predisposed, all the ON/OFF alarms are active low.

t A r - **RPM, LEVEL AND TIME tAP CALIBRATION**

Display shows:

r A P	RPM calibration (or ratio)
t A P	Time to Stabilize Oil Pressure or time to declare engine running
L i u	Level calibration (access denied if no inputs are assigned to a level transducer)

Choose by pressing the key on the right-hand side of the display.

r A P	Displays show:
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	engine revolutions (RPM) or ratio
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	rPn or rAP by pressing key (12)
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	r1 or r10 by pressing key (13)

Note: **ratio** means number of pulses for every engine revolution.

If ratio is known, select the **rAP** visualization by key (12) and set the **rAP** value by pressing keys (9) and (10).

If ratio is unknown, select the visualization of RPM pressing key (12) (**rPn**); using a precision revolution counter read the real RPM value and set the same value on panel by pressing keys (9) and (10).

By key (13) choose revolution counter resolution: 1 or 10 revolutions/minute (**r1** or **r10**).

t A P

x x x x

Displays show:

Time to Stabilize Oil Pressure (0-240 sec) pre-set to 7sec.

L i u

L i u

t A r

S E t

Displays show:

Level measure is being calibrated

Min and max level calibration expressed in “%”

Relate min and max level to the read voltage

Select **tAr** or **SEt** by the key near the display and go ahead

Level can be calibrated (**tAr**) by acting directly on the transducer or, if calibration is known, by relating to max and min level the voltage values (from 0 to 254) read on the reference calibration by selecting **SEt**.

t A r

L i u

x x x

Displays show:

Level measure is being calibrated

Transducer level reading (in %)

Min calibration

- 1m - set transducer on **min** position and wait for reading stabilization;
- 2m - press key (9) until a beep will indicate that min level has been stored: **000%** will be displayed. **Err** appears if min has been erroneously set at the same value as max. In this case, set max first.

Max calibration

- 1M - set transducer on **max** position and wait for reading stabilization;
- 2M - press key (10) until a beep will indicate that max level has been stored: **100%** will be displayed. **Err** appears if both max and min are at the same value. In this case, set min first.

In case **Err** appears during min setting and it is impossible to set max, the transducer must be set on an intermediate position memorizing it as max. Then proceed as point 1m).

Err indicates also a malfunction of the transducer or its connection (see chap. 19).

In **master-slave** configuration, min calibration must be set on slave after it has been set on master. The same for max calibration.

<p>S E t</p> <p>L 1 0 0</p> <p><input type="checkbox"/> L 0</p>	<p>Displays show:</p> <p>Association read voltage– max level</p> <p>Association read voltage – min level</p> <p>Choose L100 or L0 and go ahead</p>
<p>L 1 0 0</p> <p><input type="checkbox"/> x x x</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<p>Displays show:</p> <p>Voltage value (0-254) corresponding to maximum level (100%)</p>
<p><input type="checkbox"/> L 0</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p><input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/></p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<p>Displays show:</p> <p>Voltage value (0-254) corresponding to minimum level (0%)</p>

ATTENTION: Voltage values L100 e L0 must be on the range 0 - 254 and their difference must be greater than 10 otherwise **Err** will appear. L100 can be greater or lower than L0 according to the transducer feature.
 Level always need minimum and maximum setting through **tAr** or **SEt**.

O P t - OPTIONS

menu displays:

O P 1 First options group
O P 2 Second option group
 Choose by pressing the key on the right-hand side of the display and go ahead

<p>O P 1</p> <p><input type="checkbox"/> x x x</p> <p><input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/></p> <p><input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/></p>	<p>Displays show the first options group:</p> <p>Pon or PoF, by pressing key (11)</p> <p>Oon or OoF, by pressing key (12)</p> <p>12 or 24, by pressing key (13)</p>
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Pon / PoF : Activates / deactivates Pre-Heating function
Oon / OoF : Activates / deactivates maintenance / oil change counter
12 / 24 : 12 V or 24 V power supply

<p>O P 2</p> <p><input type="checkbox"/> x x x</p> <p><input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/></p> <p><input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/></p>	<p>Displays show the second options group:</p> <p>Lon or LoF, by pressing key (11)</p> <p>qon or qoF, by pressing key (12)</p> <p>ton or toF, by pressing key (13)</p>
--	--

Lon / LoF : Luminosity level memory is activated / deactivated
qon / qoF : Panel-on signaling activated / deactivated
ton / toF : Remote Silencing activated / deactivated

Press key (8) in order to return to the previous menu.

Press twice key (8) in order to exit setup saving current settings.

18. ENGINE PLANT ANOMALIES

IMPORTANT

When engine is not running, warning lamp (1) and buzzer are activated, otherwise
LOW OIL PRESSURE SWITCH IS DAMAGED OR ITS WIRE DISCONNECTED.

RPM measurement:

- If connecting wire to W alternator or to transducer is interrupted (or alternator is not excited), RPM display remains at “0000” value.

Oil pressure measurement:

A) **Veglia, Murphy, Jaeger, Baudouin** transducers:

- if connecting wire or transducer is interrupted its visualization disappears from display.
- in case of short-circuit to negative pole of Battery, the measure remains at **EEE**.

B) **VDO and Caterpillar** transducer:

- if connecting wire or transducer is interrupted its visualization disappears from display.
- in case of short-circuit to negative pole of Battery, the measure remains at **“00.0”**.

Temperature measurement:

- if connecting wire or transducer is interrupted its visualization disappears from display.
- in case of short-circuit to negative pole of Battery, the **“EEE”** message appears.

Level measurement:

- if connecting wire or transducer is interrupted its visualization disappears from display.
- in case of short-circuit to negative pole of Battery, the measure remains at **“000”**.

19. CONTROL BY TWO PANELS

In order to perform the engine control by two panels, you need:

- a normal panel named “**Master**”
- a panel arranged for this application named “**Slave**”

Switching-on one panel involves switching on of the other, therefore **panel switch-on, engine ignition, and engine stop must be activated from one panel only.**

Engine stop by current removing:

- **Manual stop** is executed by turning off rotating key on the same panel used for engine ignition. If erroneously both panels are switched on, stopping engine from one panel only will not be possible. Engine will be stopped when both keys are turned to off position.
- (if present) **Automatic stop** is always active even if both panels are switched-on from “Slave”. STOP MAN/AUT switch (16) is present on “Master” only. In case of erroneous switching-on of both panels, see manual stop instruction.

Engine stop by current sending:

- **Manual stop** can be performed from both panels.
- (if present) **Automatic stop** is active even if panels are switched-on from “Slave”. STOP MAN/AUT switch (16) is present on “Master only”.

20. REMOTE SILENCING

In master-slave configuration, buzzer must be silenced by the panel which generated the alarm. This kind of operation could be difficult if panels are installed far one to the other.

CM2A/3A has a “remote silencing” option, activated connecting the input to the negative pole of Battery.

User will install a push-button in the place preferred and connect it to Master and Slave “remote silencing” inputs (**AL2**).

21. CONFORMALITY DECLARATION



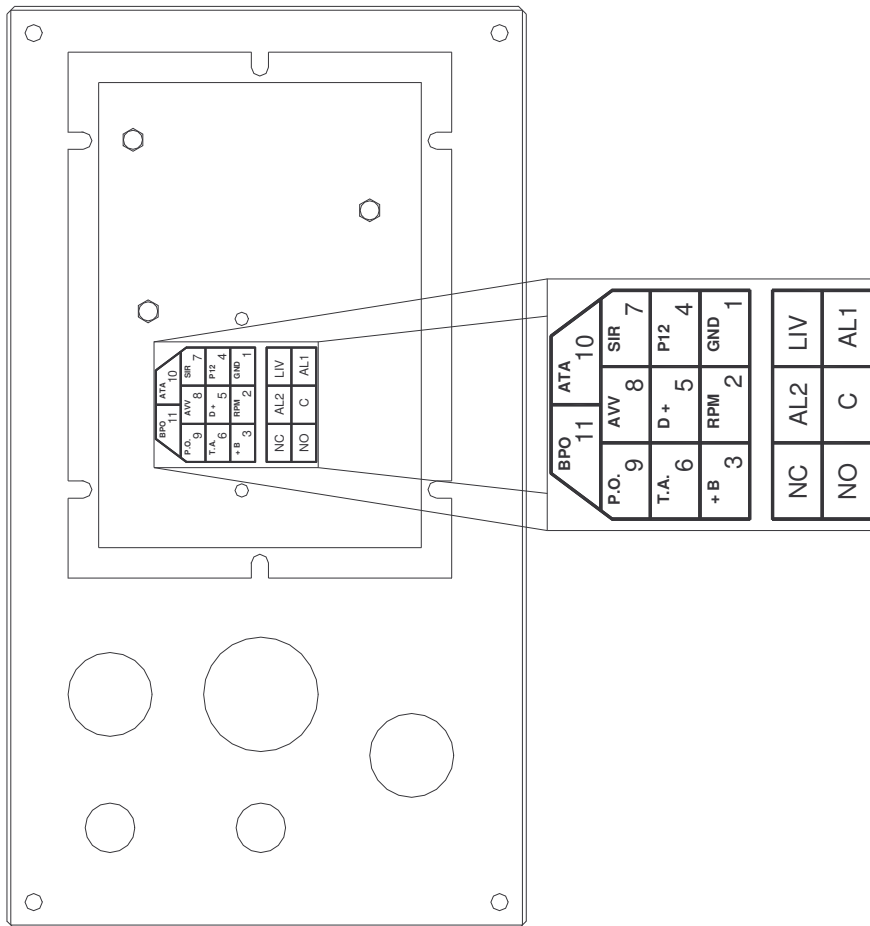
Manufactures declares that the engine control panel of series CM2A/CM3A is in conformity at European requirement of electromagnetic compatibility and of safety with directives 73/23/EEC, 89/336/EEC, 92/31/EEC, 93/68/EEC and 93/97/EEC and EN60945 directives.

22. TECHNICAL SPECIFICATIONS

POWER SUPPLY	CM2A 12 Vcc (min 6V, max 15V)	CM3A 12/24Vcc (min 10V,max 30V)
POWER CONSUMPTION	Less than 6 Watt	
PROTECTIONS	Polarity inversion, Battery disconnecting extravoltage (not repetitive)	
WORKING TEMPERATURE	WORKING : -10 +60 °C	STORAGE TEMPERATURE : -30 +80 °C
VISUALIZATION	3 rows display and variable luminous intensity	
WARNING	LAMP	low oil pressure lamp alternator lamp Alarm lamp 2 (AL2) Alarm lamp 3 (AL3) / Preheating
	ACOUSTIC	high water temperature lamp maintenance / oil change Alarm lamp 1 (AL1) Buzzer 5 – 30 Vcc
PREHEATING TIME (ref. to engine water temperature)	0 °C 15 seconds	
	20 °C 10 seconds	
	40 °C 7 seconds	
	>50 °C 0 seconds	
	-- 20 seconds (without control or negative temp.)	
TRANSDUCER TYPE	ENGINE REVOLUTION	Alternator "W" contact
		Proximity swich (on request)
		Pick-up on crown wheel (by Pine adaptor)
	WATER (OIL) TEMPERATURE	VDO 40 - 120 °C
		VDO 40 - 150 °C
		Veglia 40 - 120 °C
		Jaeger 40 - 120 °C
		Caterpillar 40 – 150 °C
		Murphy 40 - 130 °C
		Baudouin 40 – 150 °C
		4 - 20 mA
	OIL PRESSURE	VDO 0 - 2 bar
		VDO 0 - 5 bar
		VDO 0 - 10 bar
		VDO 0 - 25 bar
		Caterpillar 0 - 10 bar
		Caterpillar 0 - 25 bar
		Veglia 0 - 8 bar
		Murphy 0 - 2 bar
		Murphy 0 - 5 bar
		Murphy 0 - 7 bar
		Murphy 0 - 25 bar
		Jaeger 0 - 10 bar
		Jaeger 0 - 25 bar
		Baudouin 0 - 10 bar
		4 – 20 mA
	LEVEL	Resistor type
		Current output type
GENERIC	4 – 20 mA	
MEASURE PRECISIONS (sensors / transmitters not included):		
RPM:	± 0,5% ± 1DGT	TEMPERATURE: ± 2% ± 1DGT
PRESSURE:	± 2% ± 1DGT	LEVEL: ± 2% ± 1DGT
in a range from 10% to 90% of transducers range.		
For other transducer type please contact PINE s.r.l.		

**SERIE CM2A/3A :
CM2A/3A SERIES :**

**VISTA POSTERIORE
BACK VIEW**



LEGENDA / LEGEND

- BPO ALLARME BASSA PRESSIONE OLIO
LOW OIL PRESSURE ALARM
- ATA ALLARME ALTA TEMPERATURA ACQUA
HIGH WATER TEMPERATURE ALARM
- P.O. LETTURA PRESSIONE OLIO
OIL PRESSURE SIGNAL
- AVV AVVIAMENTO
STARTING
- SIR COMANDO ALLARME SONORO (POLO NEGATIVO DEL BUZZER)
ACOUSTIC ALARM (NEGATIVE POLE OF BUZZER)
- T.A. LETTURA TEMPERATURA ACQUA
WATER TEMPERATURE SIGNAL
- D+ D+ (SPIA ALTERNATORE)
BATTERY CHARGING SIGNAL
- P12 COLLEGAMENTO RELE' PRE-RISCALDO
PREHEATING RELAY CONNECTION
- +B POSITIVO BATTERIA
POSITIVE POLE OF POWER SUPPLY
- RPM LETTURA GIRI MOTORE
REVOLUTION SIGNAL
- GND NEGATIVO BATTERIA
NEGATIVE POLE OF POWER SUPPLY
- C COMUNE CONTATTI RELE' (SOLO CON ARRESTO AUTOMATICO)
RELAY COMMON CONTACT (ONLY FOR AUTOMATIC STOP)
- NC CONTATTO RELE' NORMALMENTE CHIUSO (SOLO CON ARRESTO AUT.)
NORMALLY CLOSE CONTACT (ONLY FOR AUTOMATIC STOP)
- NO CONTATTO RELE' NORMALMENTE APERTO (SOLO CON ARRESTO AUT.)
NORMALLY OPEN CONTACT (ONLY FOR AUTOMATIC STOP)
- LIV LETTURA LIVELLO
LEVEL SIGNAL
- AL1 ALLARME 1 (ATTIVO AL NEGATIVO BATTERIA)
ALARM 1 (ACTIVE TO NEGATIVE POLE OF BATTERY)
- AL2 ALLARME 2 - SOLO CM3A (ATTIVO AL NEGATIVO BATTERIA)
ALARM 2 - CM3A ONLY (ACTIVE TO NEGATIVE POLE OF BATTERY)

RIF. FILE / FILE REF. : DSDXC3A01A

DATA / DATE : 01/03/2001

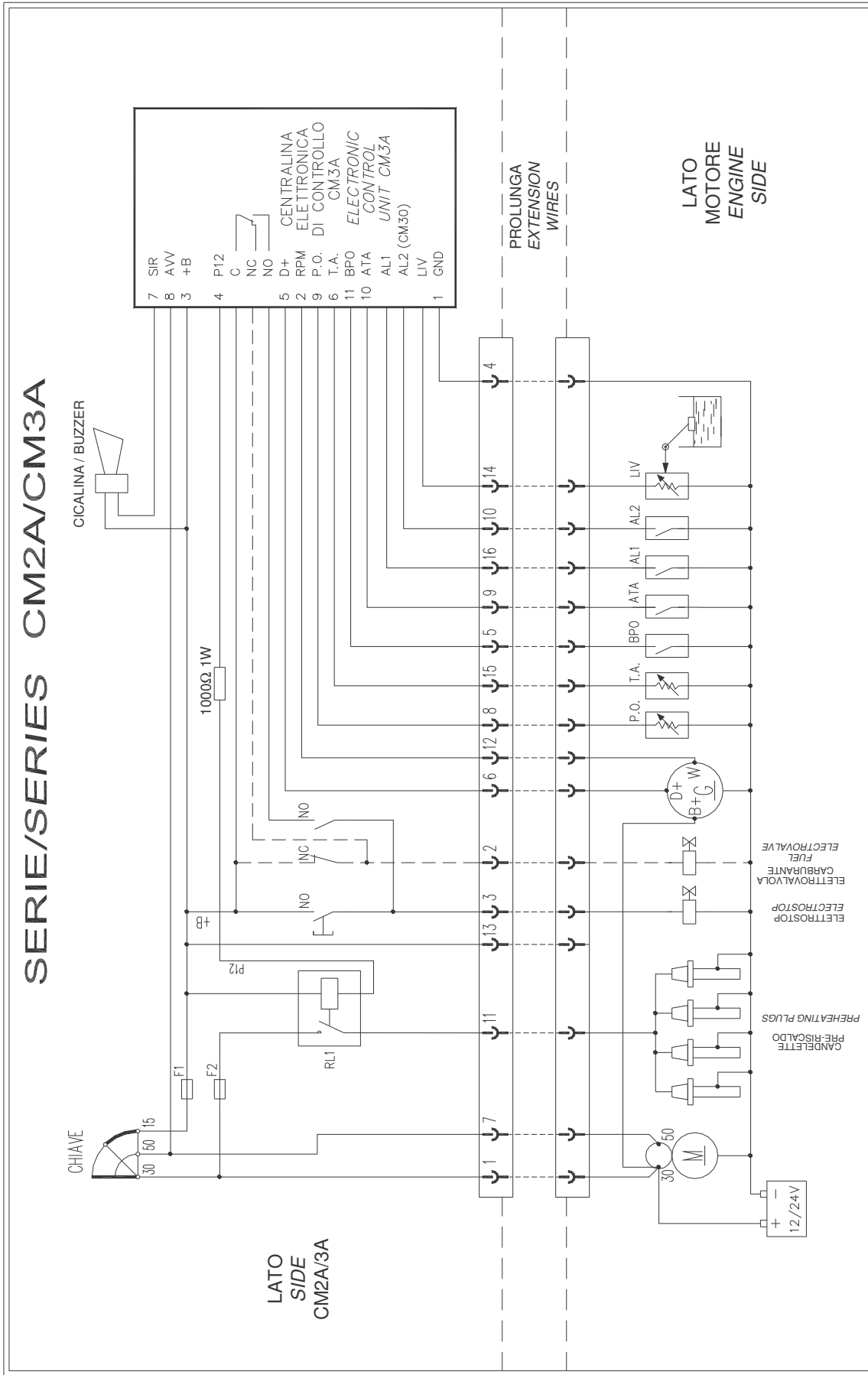
SCALA / SCALE : A

DESCRIZIONE / DESCRIPTION : CONNETTORI CENTRALINA
ELETTRONICA DI CONTROLLO
ELECTRONIC CONTROL UNIT CONNECTORS

DA RE L.
APPROVATO / APPROVED : PADOAN M.

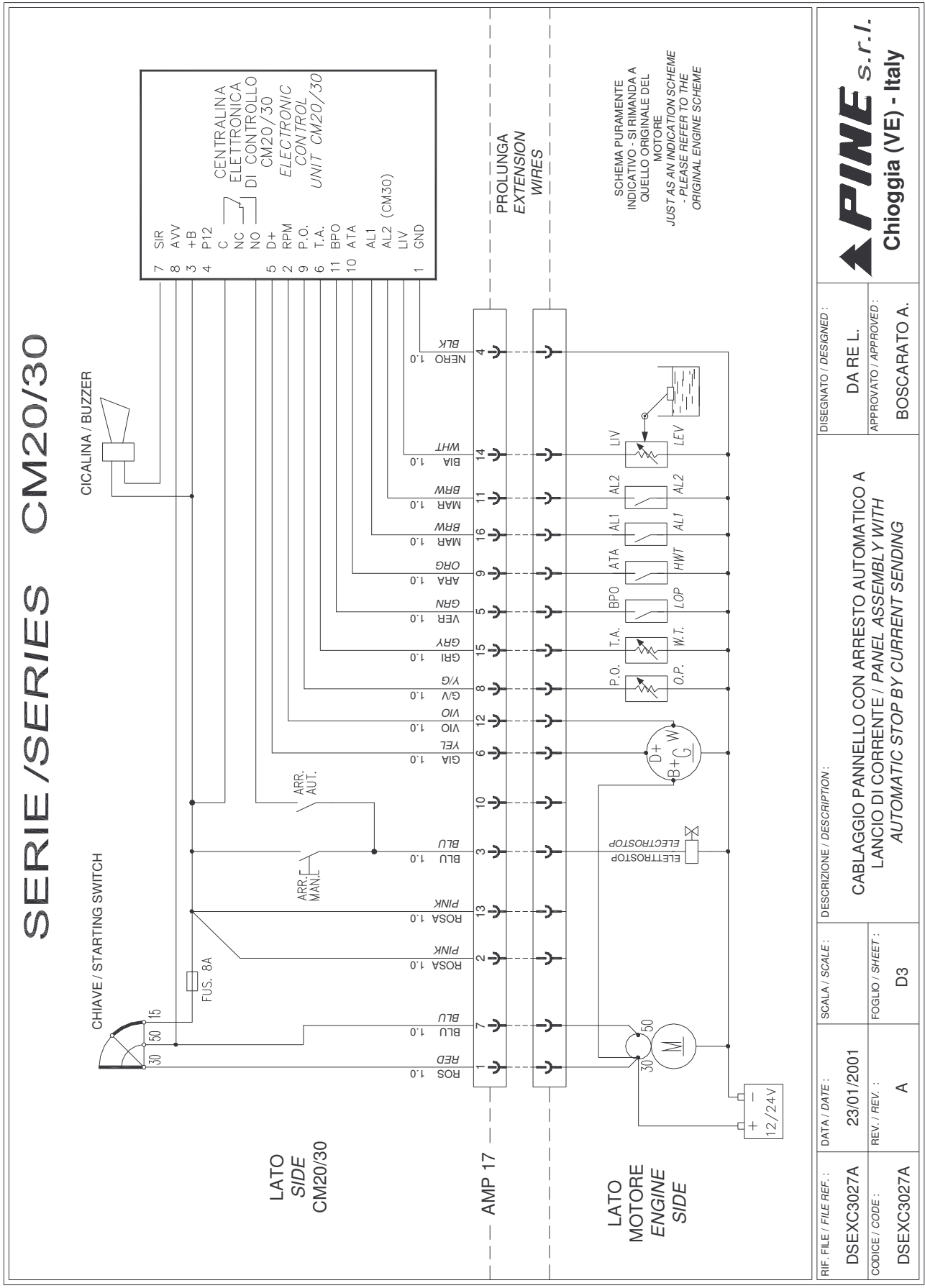
DESIGNATO / DESIGNED :





RIF. FILE / FILE REF. : DSDXC3A02A CODICE / CODE : DSDXC3A02A	DATA / DATE : 01/03/2001 REV. / REV. : A	SCALA / SCALE : FOGLIO / SHEET : D2	DESCRIZIONE / DESCRIPTION : ESEMPIO DI CABLAGGIO CON PRERISCALDO E ARRESTO AUTOMATICO ASSEMBLY EXAMPLE WITH PREHEATING AND AUTOMATIC STOP	DISEGNATO / DESIGNED : DA RE L. APPROVATO / APPROVED : PADOAN M.
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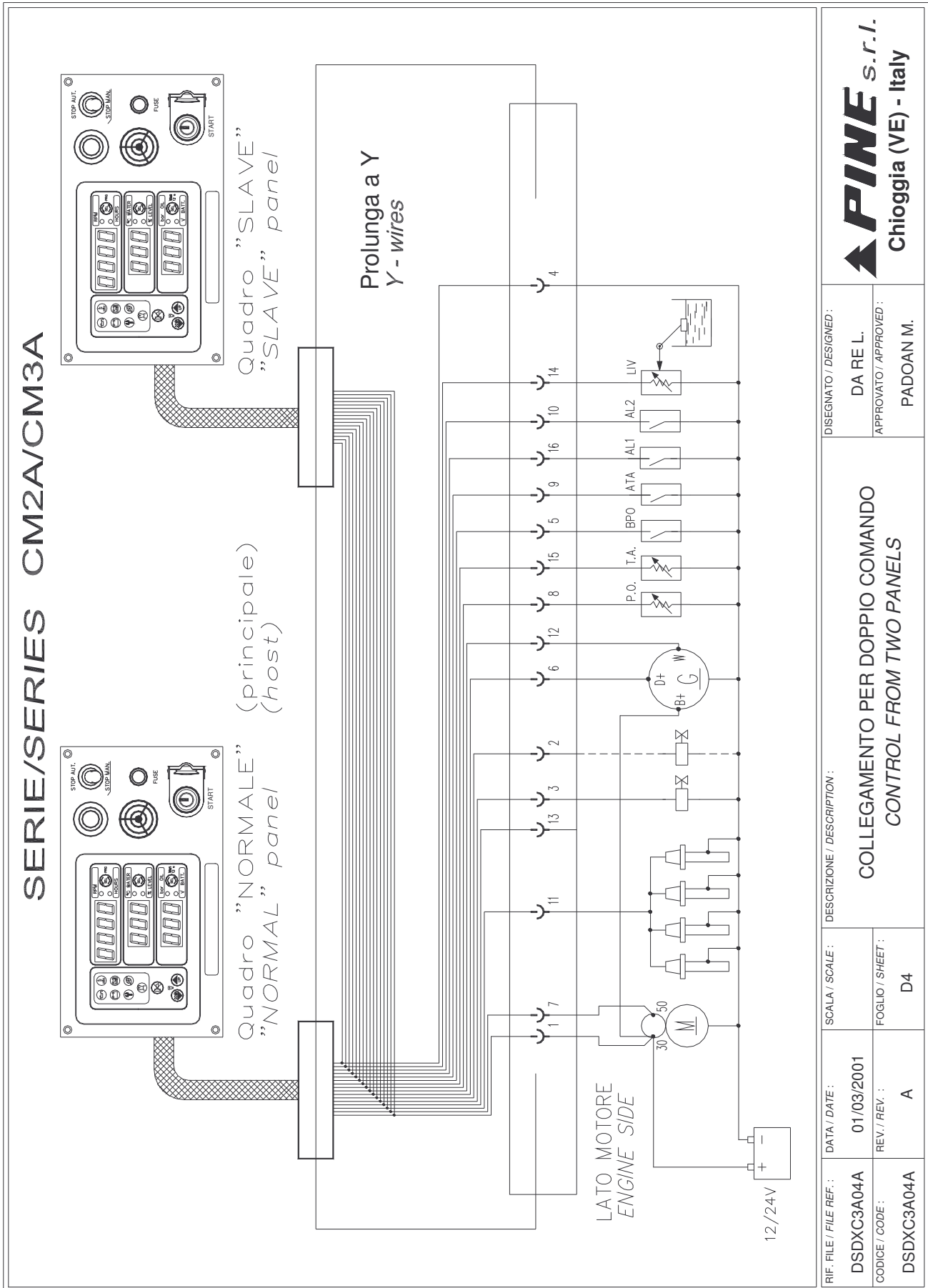




DA RE L.
 APPROVATO / APPROVED:
 BOSCARATO A.

DESCRIZIONE / DESCRIPTION:
CABLAGGIO PANNELLO CON ARRESTO AUTOMATICO A LANCIO DI CORRENTE / PANEL ASSEMBLY WITH AUTOMATIC STOP BY CURRENT SENDING

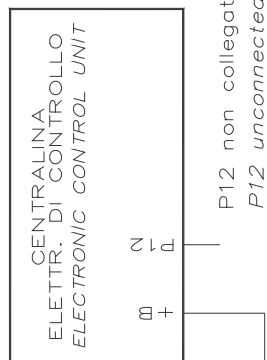
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CODICE / CODE : DSEX3027A	REV. / REV. : A		



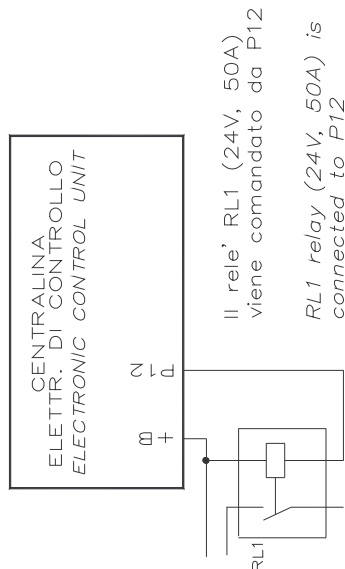
RIF. FILE / FILE REF. : DSDXC3A04A CODICE / CODE : DSDXC3A04A	DATA / DATE : 01/03/2001 REV. / REV. : A	DESCRIZIONE / DESCRIPTION : COLLEGAMENTO PER DOPPIO COMANDO CONTROL FROM TWO PANELS	<div style="text-align: center;"> PINE S.r.l. Chioggia (VE) - Italy </div>
DISEGNATO / DESIGNED : DA RE L. APPROVATO / APPROVED : PADOAN M.		SCALA / SCALE : FOGLIO / SHEET : D4	

SERIE/SERIES CM2A/CM3A

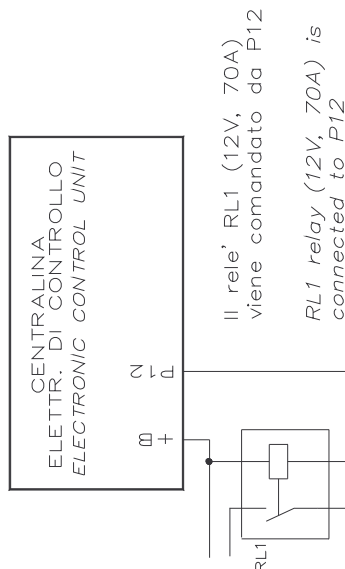
QUADRO SENZA PRE-RISCALDO
 PANEL WITHOUT PREHEATING



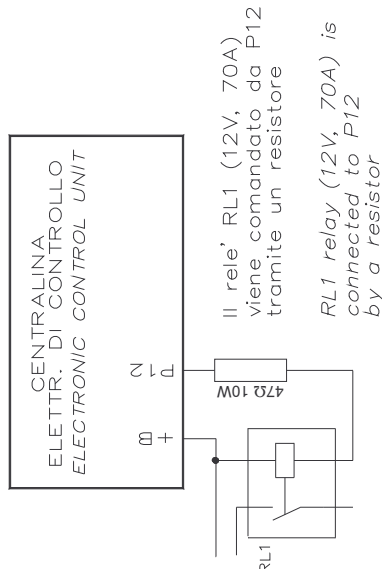
24V CON PRE-RISCALDO
 24V WITH PREHEATING



12V CON PRE-RISCALDO
 12V WITH PREHEATING



24V CON PRE-RISCALDO
 24V WITH PREHEATING



RIF. FILE / FILE REF.:
 DSDXC3A05A
 CODICE / CODE:
 DSDXC3A05A

DATA / DATE:
 01/03/2001
 REV. / REV. :
 A

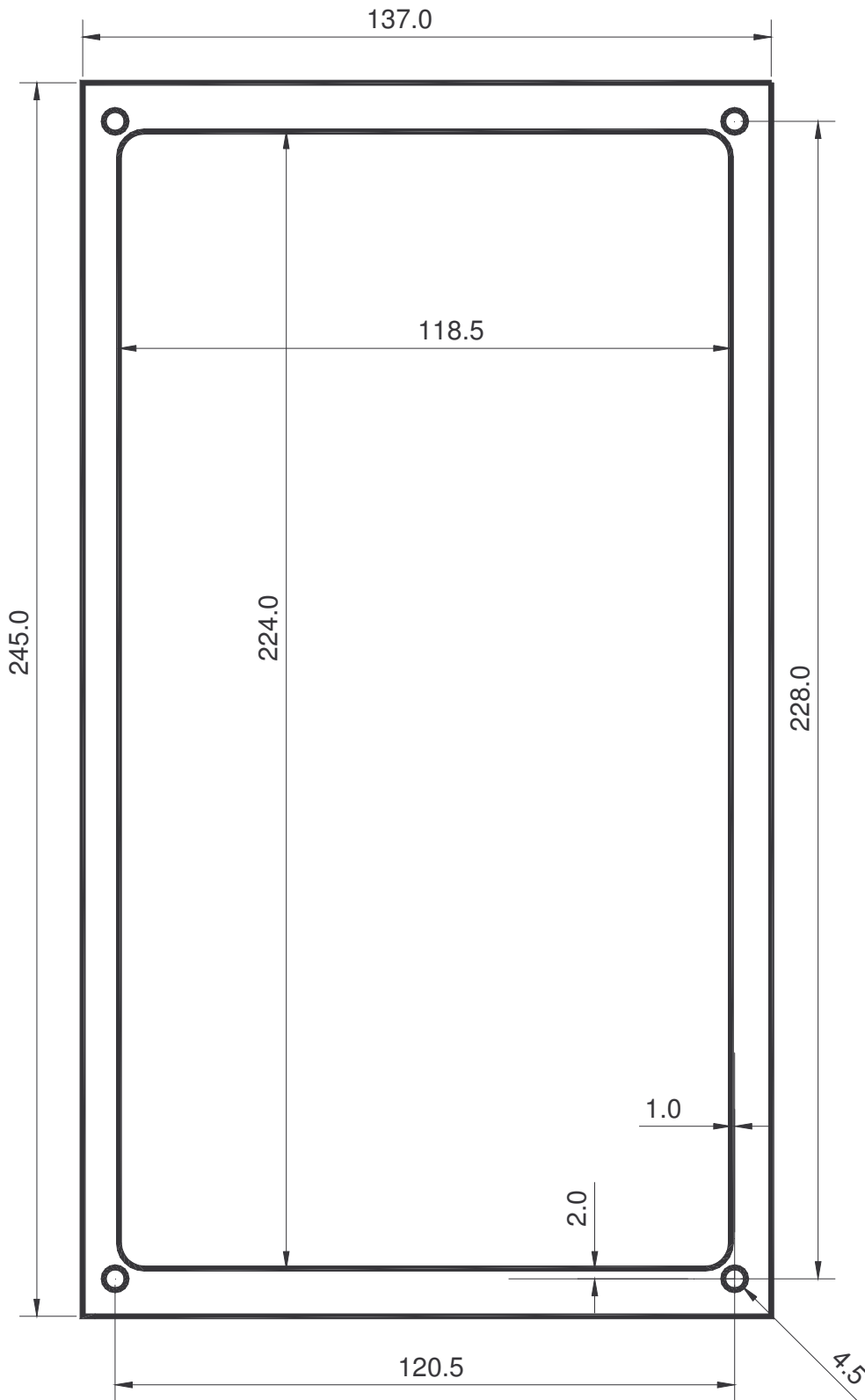
SCALA / SCALE:
 FOGLIO / SHEET :
 D5

DESCRIZIONE / DESCRIPTION:
 GESTIONE PRE-RISCALDO
 PRE-HEATING MANAGEMENT

DISEGNATO / DESIGNED:
 DA RE L.
 APPROVATO / APPROVED:
 PADOAN M.



SERIE / SERIES CM2A/3A



RIF. FILE / FILE REF. : DSDXC3A06A	DATA / DATE : 01/03/2001	SCALA / SCALE : D6	DESCRIZIONE / DESCRIPTION : DIME DI FORATURA CUTTING EDGE PROFONDITA' = 110mm	DISEGNATO / DESIGNED : DA RE L.	 <p>PINE S.r.l. Chioggia (VE) - Italy</p>
CODICE / CODE : DSDXC3A06A	REV. / REV. : A	FOLGIO / SHEET : D6		APPROVATO / APPROVED : PADOAN M.	

SET-UP

