ENGINE CONTROL PANEL

CM02
Series

USER'S MANUAL

PINE

INDEX

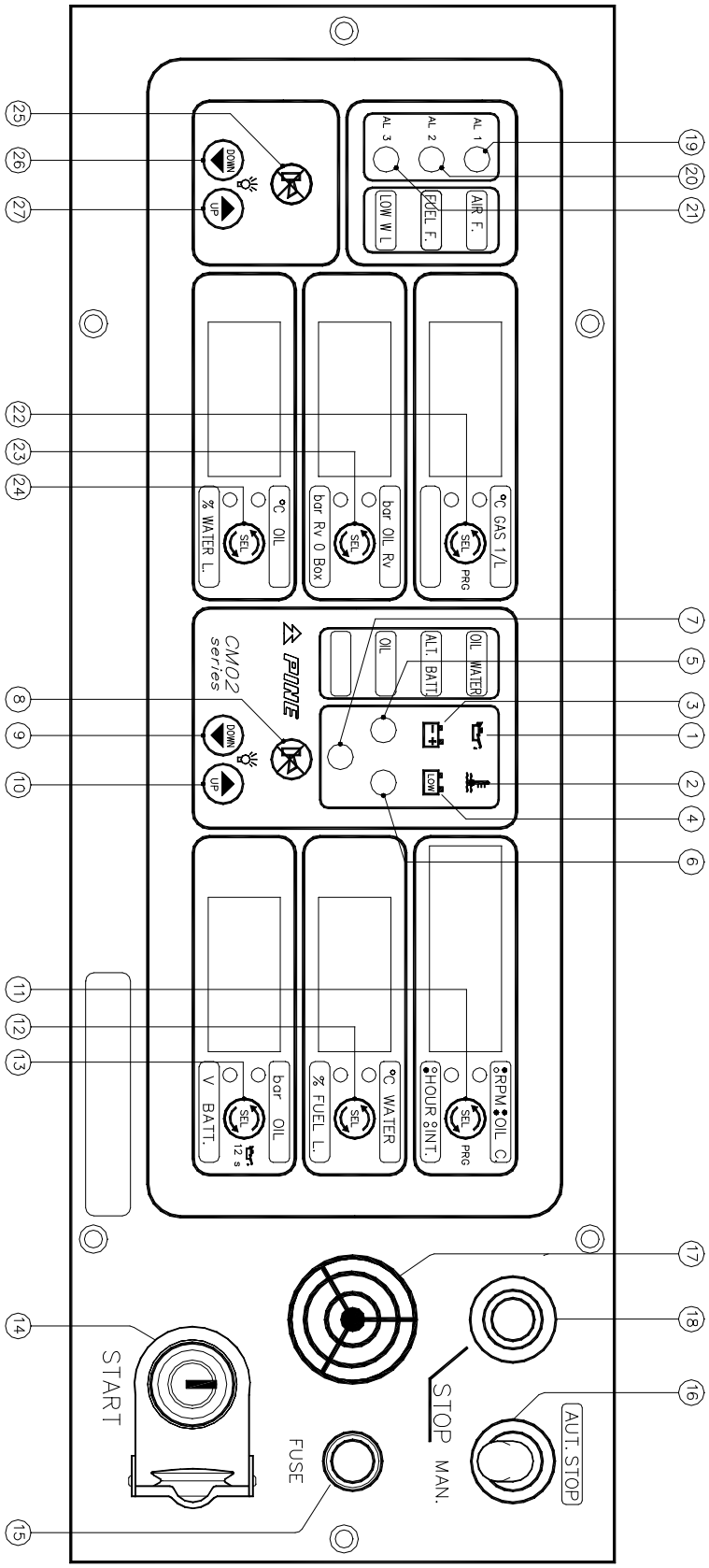

AL 1
AL 2
AL 3
AIR F.
EXCEL F.
LOW W L
DOWN
UP
°C GAS 1/L
bar OIL Rv
bar Rv 0 Box
°C OIL
% WATER L.
PRG
SEL
CM02
series
PINE
OIL WATER
ALT. BATT.
OIL
LOW
RPM OIL C.
HOUR INT.
°C WATER
% FUEL L.
bar OIL
V BATT.
12 s
START
STOP MAN.
AUT. STOP
FUSE

Fig. 1 - CM02

INTRODUCTION

CM02 is a totally programmable engine control panel controlled by a microprocessor.
A polycarbonate front mounted on an aluminium support protects control and visualization part.
Two independent electronic control units assure reliability and safety giving at the same time modularity to the product.

The technology used here is the same as the one that has given very good results in the CM20/30 series engine control panels.

All functions performed by CM02 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.

CM02 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.

1. INSTALLATION

CM02 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 D3 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 D2 drawing, connector numbering in D1 drawing.
If no wiring has been supplied, see D1, D2 drawings for proper connection.

ON/OFF alarms are activated when the relating signals are connected to the battery negative pole.

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.

2. GENERAL FEATURES

- Visualization of 14 measurements on 6 rows with LED display
- Measurement of one or two temperatures of exhaust gas
- timer for maintenance interventions / oil change
- signal and alarm warning lamps
- high luminosity display with dimmer
- compatibility with any type of transducer
- possibility of connecting more panels in parallel (master + slave)
- pre-alarm and alarm thresholds programmable on any measurement
- acoustic signal and automatic stop disactivated by set-up
- alarm silencing keys (mute)
- automatic stop function disactivated from panel
- input for remote silencing
- labels to personalize measurements
- supplied with: key, fuse, buzzer, stop button, man/aut stop switch (if not otherwise required)
- supply: universal 12/24 Vcc
- size: 388 x 136 mm

CONFIGURATION EXAMPLE

Right-side readings :

1st right row:	engine revolutions - working hours- left time to next oil change/maintenance - interval between oil changes / maintenance
2nd right row:	water temperature - level
3rd right row:	oil pressure - battery

Right-side alarms and signals

- low oil pressure signal
- alternator signal
- maintenance / oil change signal
- pre-heating signal
- high water temperature signal
- low battery signal
- sea water port

Left side readings

1st left row:	left exhaust gas temperature - left turbine pressure
2nd left row:	right exhaust gas temperature - right turbine pressure
3rd left row:	gear box oil pressure - gear box oil temperature

Left side alarms and signals

- air filter blockage (AL1)
- water inside fuel oil filters (AL2)
- low fresh-water level (AL3)

3. 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 alarm.

4. ENGINE STOP BY REMOVING CURRENT (IGNITION KEY)

Engine is stopped by switching off the panel using its key (14).

5. ENGINE STOP BY SENDING CURRENT

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

6. 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.

7. 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.

8. ALARMS, SIGNALS AND COMMANDS (Fig.1: CM02)

RIGHT PANEL

1 - LOW OIL PRESSURE warning lamp — ON/OFF ALARM
2 - HIGH WATER TEMPERATURE warning lamp — ON/OFF ALARM
3 - ALTERNATOR warning lamp — SIGNAL
4 - LOW BATTERY warning lamp / AL2 ALARM — SIGNAL / ON/OFF ALARM
5 - MAINTENANCE / OIL CHANGE warning lamp — SIGNAL
6 – AL1 warning lamp (generic alarm) — ON/OFF ALARM
7 - PRE-HEATING warning lamp / AL3 ALARM — SIGNAL / ON/OFF ALARM
8 - SILENCING KEY ON ALARM CONDITIONS CONCERNING THE RIGHT PANEL
9 - DECREASES RIGHT PANEL DISPLAY LUMINOSITY
10 - INCREASES RIGHT PANEL DISPLAY LUMINOSITY
11 - CYCLIC VISUALIZATION OF THE 4 FUNCTIONS (RPM – HOURS – MAINT. – INT.)
12 - VISUALIZATION OF THE CENTRAL DISPLAY'S MEASUREMENT
13 - VISUALIZATION OF THE LAST DISPLAY'S MEASUREMENT
14 - KEY FOR PANEL SWITCH-ON AND ENGINE IGNITION
15 - FUSE
16 - PRESENT ON PANELS WITH AUTOMATIC STOP ONLY:

IT ACTIVATES / DISACTIVATES ENGINE AUTOMATIC STOP:

in STOP AUT. position the panel can stop the engine automatically

in STOP MAN. position engine can be stopped only manually

17 - BUZZER
18 - STOP-BUTTON TO STOP ENGINE. It works only if panel is on.

LEFT PANEL

19 - AL1 warning lamp (generic alarm) — ON/OFF ALARM
20 - AL2 warning lamp (generic alarm) — ON/OFF ALARM
21 - AL3 warning lamp (generic alarm) — ON/OFF ALARM
22 - VISUALIZATION OF THE FIRST DISPLAY'S MEASUREMENT
23 - VISUALIZATION OF THE CENTRAL DISPLAY'S MEASUREMENT
24 - VISUALIZATION OF THE LAST DISPLAY'S MEASUREMENT
25 - SILENCING KEY ON ALARM CONDITIONS CONCERNING THE LEFT PANEL

26 - DECREASES LEFT PANEL DISPLAY LUMINOSITY

27 - INCREASES LEFT PANEL DISPLAY LUMINOSITY

Alarm can also activates buzzer and automatic stop (depending on set-up).
Signal is a luminous warning only.

9. PRE-HEATING

Pre-heating function is activated only if pre-heating relay is connected to **P12** (4) .
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 **28** 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. OPERATION

User chooses which measurement to visualize acting on keys (11),(12),(13),(22),(23) and (24).
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 varied by keys (9) (10) for right panel, by key (26) (27) for left panel.
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).

11. ALARM CONDITONS

Alarms can be of two types:
- alarms coming from transducer readings concerning thresholds adjusted during set-up.
- ON/OFF alarms coming from alarm-contacts (e.g. low oil pressure switch)

Available options for alarms from transducer readings:

So1	**pre-alarm** threshold
bon/boF	acoustic signal on So1 on/off
So2	always active **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 longer than delay time, there will be a **threshold-1 pre-alarm condition.**
If that happens also for 90°C, there will be a **threshold-2 alarm condition.**

WARNING
In the case of **pressure measurements, alarm threshold will be lower than the pre-alarm one.** (see chap.12 “Management of alarms coming from readings”)

Available options for ON/OFF alarms:

AAL/AAH/nu	active low alarm / active high alarm / not used
bon/boF	acoustic on/off signal
Mon/MoF	on/off alarm memory
AOn/AOF	on/off automatic stop
rit	alarm delay; alarm contact must remain ON for the same time as **rit** or longer to be recognized as alarm condition.

For further information see chap. 13 ”ON/OFF alarms management”.

12. 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 set in set up.

Silencing the buzzer (from key or remote) resets alarm memory (pre-alarm recognized), while blinking continues until pre-alarm condition ending.

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

- blinking disappears if silencing had been previously activated
- blinking remains and buzzer keeps on if pre-alarm has not been muted (i.e. recognized)
- blinking disappears and buzzer is deactivated as soon as silencing is performed.

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 set 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 recognized), while blinking continues until alarm condition ending.

On threshold-2 alarm condition ending (So2)

- blinking disappears if muting had been previously activated
- blinking and buzzer keep on if threshold-2 alarm has not been silenced (i.e. recognized)
- blinking disappears and buzzer stops as soon as silencing is performed.

Every new pre-alarm and alarm conditions will reactivate the whole procedure.
During set-up, it is possible to exclude any of the two thresholds by raising their value until **ESC** appears on display.

13. 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 OCCOURS
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 ON/OFF alarm memory (alarm recognized), while blinking continues until ON/OFF alarm condition ending.

ON/OFF alarm condition ending

- blink disappears and LED goes off if muting had been previously activated
- blink and buzzer keep on if alarm had not been muted
- blink and buzzer goes off as soon as muting is activated.

14. OTHER SIGNALS (RIGHT PANEL ONLY).

- **Alternator warning lamp** (3)
  It is on when alternator is not excited and is not charging batteries.

- **Low battery warning lamp** (4)
  In this version it isn't used because battery voltage is shown on the display 3rd row and if it goes below the nominal value for a time longer than 20 seconds, the low battery signal is activated by the LED blinking and by the blinking of the row too, if battery voltage is being visualized.

- **Maintenance / Oil change** (5)
  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.

15. MAINTENANCE / OIL CHANGE

On the first row above, the right panel visualizes, besides RPM and working hours, time left to maintenance or oil change (MAINT. / OIL C.) as well as 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 performed the maintenance / oil change, 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 (5) will stop blinking.

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

16. PANEL SET-UP

Set-up allows to:

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

17. LEFT PANEL SET-UP

LEFT PANEL CM3B

KEYS	FUNCTION
(22) (23) (24)	Choose measurements to be changed and confirm new calibrations
(26) (27)	Move among the main-menu rows / Change values
(25)	Go to main-menu / Exit from set-up storing new data if user is in main-menu

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 (22) until buzzer produces a beep.

MAIN MENU

is displayed on the three rows:

P r n - 1st ROW - key (22) to enter **"Parameter programming"**
t A r - 2nd ROW - key (23) to enter **"Transducer calibration"**
O P t - 3rd ROW - key (24) to enter **"Options"**

P r n - PARAMETER PROGRAMMING

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

2) By pressing keys (26) and (27), user can choose on which measurement to change values. **SEt** changes position and LED shows the selected measurement;
3) Press key on the right side of **SEt** for analogs, and **AL1**, **AL2** or **AL3** for ON/OFF alarms, to go ahead in the parameter selection menu.
4) Once the parameter has been chosen, press keys (26) and (27) 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 2). Once all necessary changes have been performed, exit from set-up in the proper way to store new data.
5) User can properly exit from procedure at any step of set-up and at any moment, by pressing key (25) 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.

LEFT PANEL INPUT CODE TABLE

Input will be associated to the row being programmed: this allows the user to visualize the signal coming from an input in the chosen row avoiding modifications to cable.

Codes displayed after **SEt**:

A i 0	- measurement connected to Ai0 is visualized	(contact n.5)
A i 1	- measurement connected to Ai1 is visualized	(contact n.6)
A i 2	- measurement connected to Ai2 is visualized	(contact n.7)
A i 3	- measurement connected to Ai3 is visualized	(contact n.8)
G S n	- measurement connected to TC1 is visualized	(contact n.11)
G d S	- measurement connected to TC2 is visualized	(contact n.10)
n u	- not used (row will remain off)	

NOTE : For contact numeration see D1 drawing.

Use keys (26) (27) to move around codes and the key on the right-hand side to confirm.

Left panel transducers selection code table

User can choose sensor/transducer type used with an analog input (Ai0, Ai1, Ai2, Ai3, TC1, TC2) . If a transducer different from the programmed one is erroneously connected to input, the value will be misread and visualization will have no sense.

It is possible to choose among the following sensor/transducer types:

For Ai0, Ai1, Ai2, Ai3:

°C	(temperature)
bAr	(pressure)
Liv	(level)
t42	(temperature 4-20 mA)
P42	(pressure 4-20 mA)
G42	(generic 4-20 mA)

For GSn, GdS (exhaust gas temperature left e right):

J	(thermocouple J type)
C	(thermocouple K type)

For the first three, beside type it is necessary to choose the make and the out of range too:

□ °C (temperature)	b A r (pressure)	L i u (level)
1 2 0 VDO 120 ºC	□ d 2 VDO 2 bar	L - r resistive sensor
1 5 0 VDO 150 ºC	□ d 5 VDO 5 bar	L - I current sensor
u E G Veglia 120 ºC	d 1 0 VDO 10 bar	
J A E Jaeger 120 ºC	d 2 5 VDO 25 bar	
C A t Caterpillar 150 ºC	C 1 0 Caterpillar 10 bar	
M P Y Murphy 130 ºC	C 2 5 Caterpillar 25 bar	
b d n Baudouin 150°C	□ G 8 Veglia 8 bar	
	□ Y 2 Murphy 2 bar	
	□ Y 5 Murphy 5 bar	
	□ Y 7 Murphy 7 bar	
	Y 2 5 Murphy 25 bar	
	J 1 0 Jaeger 10 bar	
	J 2 5 Jaeger 25 bar	
	b 1 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 (26) (27) to move around codes and the key on the right-hand side to confirm.

□ t 4 - x x x Temperature at 4 mA	t 2 0 - x x x Temperature at 20 mA
□ P 4 - x x x Pressure at 4 mA	P 2 0 - x x x Pressure at 20 mA
□ G 4 - x x x Value at 4 mA	G 2 0 - x x x Value at 20 mA

Use keys (26) and (27) to set the values and the key on the right-hand side to confirm.

Left panel alarm conditions setting code table

S o 1 - x x x	Pre-alarm value (threshold-1 alarm)
b o n / b o F	Activates/deactivates acoustic signal for threshold-1 alarm
S o 2 - x x x	Threshold-2 alarm value
r i t - x x x	Delay time (0 – 240 sec.) for both alarm conditions

Values are set by keys (26) and (27).
To exclude any threshold, value must be increased until **E S C** appears on display.

Left panel ON/OFF alarm setting code table

These codes appear after **AL1**, **AL2**, **AL3**:

AAL / **AAH** / **nu**	Active low alarm / Active high alarm / Not used
bon / **boF**	Activates / deactivates acoustic signal
Aon / **AoF**	Activates / deactivates automatic stop
Mon / **MoF**	Activates / deactivates alarm memory
rit - xxx	Delay time (0 – 240 sec.)

tAr - TRANSDUCER CALIBRATION

The following menu is shown:

tCP	Thermocouples measure calibration
Liu	Level calibration (access denied if no inputs are set for this transducer)
tGr	Analog measurements calibration

By the proper key, choose either **tCP**, **Liu** or **tGr**. Proceed confirming options in the same way.

tCP Display shows:

GSn	Set options for input contact n°11
GdS	Set options for input contact n°10
J	J type thermocouple
C	K type thermocouple
xxx	Amplitude coefficient (min 000 max 999, default 500)
xxx	Read temperature
xxx	**G S n** / **G d S**, depending on the measure being calibrated

Keys (26) and (27) change amplitude coefficient (and consequently temperature) so that eventual errors can be corrected. Default coefficient is **500** and must be changed in case of real necessity and after checking there are no errors or damages in cables.

Liu Display shows:

Liu	Level measure is being calibrated
xxx	Level measure read by transducer expressed in “%”

Min calibration

1m - set transducer on **min** position and wait for reading stabilization;

2m - press key (26) 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 (27) 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 storing it as max. Then proceed as point 1m.

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

In **"Master-Slave"** configuration, min calibration must be set on "Slave" right after it has been set on "Master". The same is for max.

t G r Display shows:

t A r Showing that measure related to the led turned on can be calibrated

or

- - - Showing that measure related to the led turned on can't be calibrated

By keys (26) and (27) user chooses the measurement to be calibrated. **tAr** position and the led turned on show the selected measurement.

If **- - -** appears it means that the measurement can't be calibrated because it has been set as not used (**nu**) or as level measurement (**Liu)** or as thermocouple measurement (**GdS GSn**) so there are other calibration procedures.
By key near **tAr** user confirms chooses and enters in calibration sub-menu: on the first row appears the measurement unit, on the second the transducer code, and on the third the calibration coefficient expressed in "%".

Example:

b A r Measurement to be calibrated is a pressure

d 2 A transducer VDO 2 bar is relatedd to the measurement

1 0 0 Shows the value (in %) of the calibration coefficient.

With keys (26) e (27) calibration coefficient can be changed from 50% to 150%.

Usually calibration coefficient is factory pre-set at 100% for all the analog measurements.

O P t - **OPTIONS**

Displays show the options:

□ x x x	**Lon** or **LoF**, by pressing key (22)
x x x	**ton** or **toF**, by pressing key (23)
□ □ □	

Lon / **LoF** : Luminosity intensity memory is activated / deactivated
ton / **toF** : Activates / deactivates Remote Silencing

Press key (25) in order to return to the previous menu.

Press twice key (25) in order to exit setup saving current settings.

18. RIGHT PANEL SET-UP

RIGHT PANEL CM3A

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)	Go to main-menu / Exit from set-up storing new data if user is in main-menu

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, transducers and 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.

2) 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.
3) 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.
4) 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.
5) 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.

Selection code table of right panel transducers and inputs.

1st ROW : codes displayed after SEt:

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

□ S E t	x x x x	Engine running hours
□ S E t	x x x x	Remaining hours to maintenance / oil change
□ S E t	x x x x	Interval (hours) between maintenance / oil changes

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

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 - corresponds contact LIV**
- **at 3nd ROW - LED above - corresponds contact 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 move around codes and the key on the right-hand side to confirm.
The first three, need also to choose the make and the out of range value too:

□ °C (conctact n.6)	b A r (conctact n.9)	L i u (LIV conctact)
1 2 0 VDO 120 ºC	□ d 2 VDO 2 bar	L - r resistive sensor
1 5 0 VDO 150 ºC	□ d 5 VDO 5 bar	L - I current sensor
u E G Veglia 120 ºC	d 1 0 VDO 10 bar	
J A E Jaeger 120 ºC	d 2 5 VDO 25 bar	
C A t Caterpillar 150 ºC	C 1 0 Caterpillar 10 bar	
M P Y Murphy 130 ºC	C 2 5 Caterpillar 25 bar	
b d n Baudouin 150°C	□ G 8 Veglia 8 bar	
	□ Y 2 Murphy 2 bar	
	□ Y 5 Murphy 5 bar	
	□ Y 7 Murphy 7 bar	
	Y 2 5 Murphy 25 bar	
	J 1 0 Jaeger 10 bar	
	J 2 5 Jaeger 25 bar	
	b 1 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 move around codes and the key on the right-hand side to confirm.

□ t 4 - x x x Temperature at 4 mA	t 2 0 - x x x Temperature at 20 mA
□ P 4 - x x x Pressure at 4 mA	P 2 0 - x x x Pressure at 20 mA
□ G 4 - x x x Value at 4 mA	G 2 0 - x x x Value at 20 mA

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

Right panel alarm conditions setting code table

After the choice of the transducer's type, display shows:

S o 1 - x x x	Pre-alarm value (threshold-1 alarm))
b o n / b o F	Activates/deactivates acoustic signal for threshold-1 alarm
S o 2 - x x x	Threshold-2 alarm value
r i t - x x x	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.

Right panel ON/OFF alarm setting code table

These codes appear after **bPO AtA A L**1 **AL2 AL3 GEn:**

AAL / **AAH** / **nu**	Active low alarm / Active high alarm / Not used
bon / **boF**	Activates / deactivates acoustic signal
Aon / **AoF**	Activates / deactivates automatic stop
Mon / **MoF**	Activates / deactivates alarm memory
rit - xxx	Delay time (0-240 s)

tAr - RPM, LEVEL AND TIME tAP CALIBRATION

Display shows:

rAP	RPM calibration (or ratio)
tAP	Time to Stabilize Oil Pressure or time to declare engine running
Liu	Level calibration (access denied if no inputs are set for this transducer)

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

rAP Displays show:

xxxx	engine revolutions (RPM) or ratio
xxx	**rPn** or **rAP** by pressing key (12)
xxx	**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 pressing keys (9) and (10).
- If ratio is unknown, select the visualization of RPM pressing key (12) (**rPn**) and by a precision revolutions counter, set pressing keys (9) and (10).

By key (12) choose if display RPM or Ratio.
By key (13) choose revolution counter resolution: 1 or 10 revolutions/minute (**r1** or **r10**).

tAP Displays show:

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

Liu Displays show:

Liu	Level measure is being calibrated
tAr	Min and max level calibration expressed in “%”
SEt	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 (as in plants equal), by relating to max and min level the voltage values (from 0 to 254) read on the reference plant by selecting **SEt**.

t A r	Displays show:
L i u	Level measure is being calibrated
x x x	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 right after it has been set on master. The same is for max.

In a "**Master-Slave**" configuration, minimum calibration must be set on the "Slave" as soon as it has been set on the "Master"; the same for maximum calibration.

S E t	Displays show:
L 1 0 0	Association read voltage– max level
L 0	Association read voltage – min level
	Choose **L100** or **L0** and go ahead
L 1 0 0	Displays show:
x x x	Voltage value (0-254) corresponding to
	maximum level (100%)

L 0	Displays show:
x x x	Voltage value (0-254) corresponding to
	minimum level (0%)

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 so that any type of transducer can be managed. Initial setting: L100 = 120 and L0 = 12.
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

O P 1	Displays show the first options group:
x x x	**Pon** or **PoF**, by pressing key (11)
x x x	**Oon** or **OoF**, by pressing key (12)
x x x	**12** or **24**, by pressing key (13)

Pon / **PoF** : Activates / deactivates Pre-Heating function
Oon / OoF : Activates / deactivates maintenance / oil change counter
12 / **24** : Panel with 12 or 24 V power supply

O P 2	Displays show the second options group:
x x x	**Lon** or **LoF**, by pressing key (11)
x x x	**qon** or **qoF**, by pressing key (12)
x x x	**ton** or **toF**, by pressing key (13)

Lon / **LoF** : Luminosity intensity memory is activated / deactivated
qon / **qoF** : Switch-on panel signal activated / deactivated
ton / **toF** : Activates / deactivates Remote Silencing

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

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

19. ENGINE PLANT ANOMALIES

IMPORTANT
When engine is not running, warning lamp (1) and buzzer are activated.
If not, 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**”.

20. CONTROL BY TWO PANELS

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

- a normal panel named **"Host**"
- 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 removing current:

- **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 "Host" only. In case of erroneous switching-on of both panels, see manual stop instruction.

Engine stop by sending current:

- **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 "Host only".

21. REMOTE SILENCING

In a Master-Slave configuration, buzzer must be silenced by the panel's key where the alarm comes from.
Sometimes this could be uncomfortable, expecially if panels are installed far one from each other.
For this reason, an optional input could be supplied as "remote silencing input", active if connected to the negative pole of Battery.
User just has to install one push-button on the preferred place, and connect it to all the "remote silencing" input of the panels.

22. CONFORMITY DECLARATION

CE

Manufactures declares that the engine control panel of series CM02 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, 93/97/EEC and EN60945 directives.

23. TECHNICAL SPECIFICATIONS

POWER SUPPLY		Universal 12/24 Vcc (from 10 up to 30 V)			
POWER CONSUMPTION		Less than 10 W			
PROTECTIONS		Against polarity inversion and battery extra voltage (not repetitive)			
TEMPERATURE		WORKING: -10 +60 °C		STORAGE: -30 +80 °C	
VISUALIZATION		6 high brightness LED displays rows (dimmerable)			
SIGNALLINGS	WARNING LAMP	LEFT PANEL 3 Alarms	AL1	RIGHT PANEL 7 Alarms	low oil pressure
					high water temperature
			AL2		alternator
					low battery
			AL3		maintenance / oil change
					Al
					pre-heating
	ACOUSTIC INDICATION	Buzzer			
PRE-HEATING TIMES		0 °C 15 secs.			
		20 °C 10 secs.			
		40 °C 7 secs.			
		>50 °C 0 secs.			
		-- If water transducer is short-circuited or for negative temperatures 20 secs			
INPUTS		see connecting wire in D2 and D3 drawings			
TRANSDUCER TYPES		RPM		Alternator “W” contact	
				Proximity switch	
				Pick-Up on crown wheel (plus Pine adapter)	
		GAS TEMPERATURE		J type thermocouple	
				K type thermocouple	
		WATER TEMPERATURE		VDO 40 - 120 °C	
				VDO 50 - 150 °C	
				Veglia 40 - 120 °C	
				Jaeger 40 - 120 °C	
				Caterpillar 0 - 150 °C	
				Murphy 0 - 130 °C	
				4 - 20 mA	
		OIL PRESSURE		VDO 0 - 2 bar	
				VDO 0 - 5 bar	
				VDO 0 - 10 bar	
				VDO 0 - 25 bar	
				Veglia 0 - 8 bar	
				Jaeger 0 - 10 bar	
				Jaeger 0 - 25 bar	
				Murphy 0 - 2 bar	
				Murphy 0 - 5 bar	
				Murphy 0 - 7 bar	
				Murphy 0 - 25 bar	
				Catterpillar 0 - 10 bar	
				Catterpillar 0 - 25 bar	
				4 - 20 mA	
		LEVEL		Resistive	
				Capacitive	
		GENERIC MEASUREMENT		4 - 20 mA	

MEASURE PRECISIONS (sensors / transmitters not included):

RPM: ± 0,5% ± 1DGT TEMPERATURE: ± 2% ± 1DGT
PRESSURE: ± 2% ± 1DGT LEVEL: ± 2% ± 1DGT

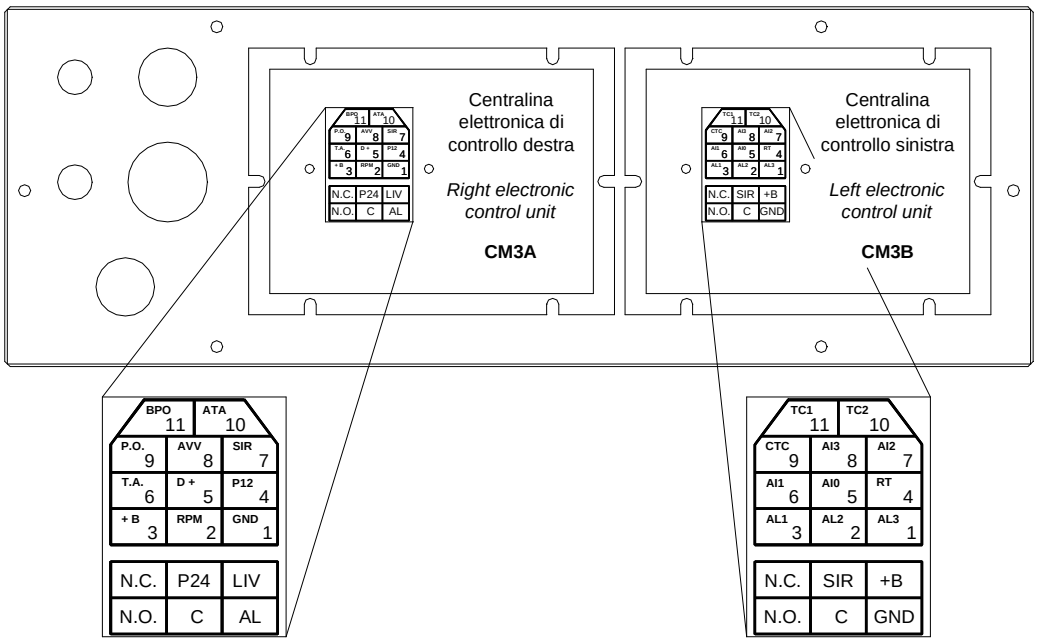
in a range from 10% to 90% of transducers range.

For other transducer type please contact PINE s.r.l.

RIF. FILE / *FILE REF.* : DSDXC0201A
CODICE / *CODE* : DSDXC0201A
DATA / *DATE* : 01/06/2000
REV. / *REV.* : A
SCALA / *SCALE* :
FOGLIO / *SHEET* : D1
DESCRIZIONE / *DESCRIPTION* : CONNETTORI CENTRALINE ELETTRONICHE DI CONTROLLO *ELECTRONIC CONTROL UNITS CONNECTORS*
DISEGNATO / *DESIGNED* : DA RE L.
APPROVATO / *APPROVED* : BOSCARATO A.

PINE s.r.l.
Chioggia (VE) - Italy

SERIE CM02 : VISTA POSTERIORE
CM02 SERIES : BACK VIEW



BPO 11	ATA 10	
P.O. 9	AVV 8	SIR 7
T.A. 6	D + 5	P12 4
+ B 3	RPM 2	GND 1
N.C.	P24	LIV
N.O.	C	AL

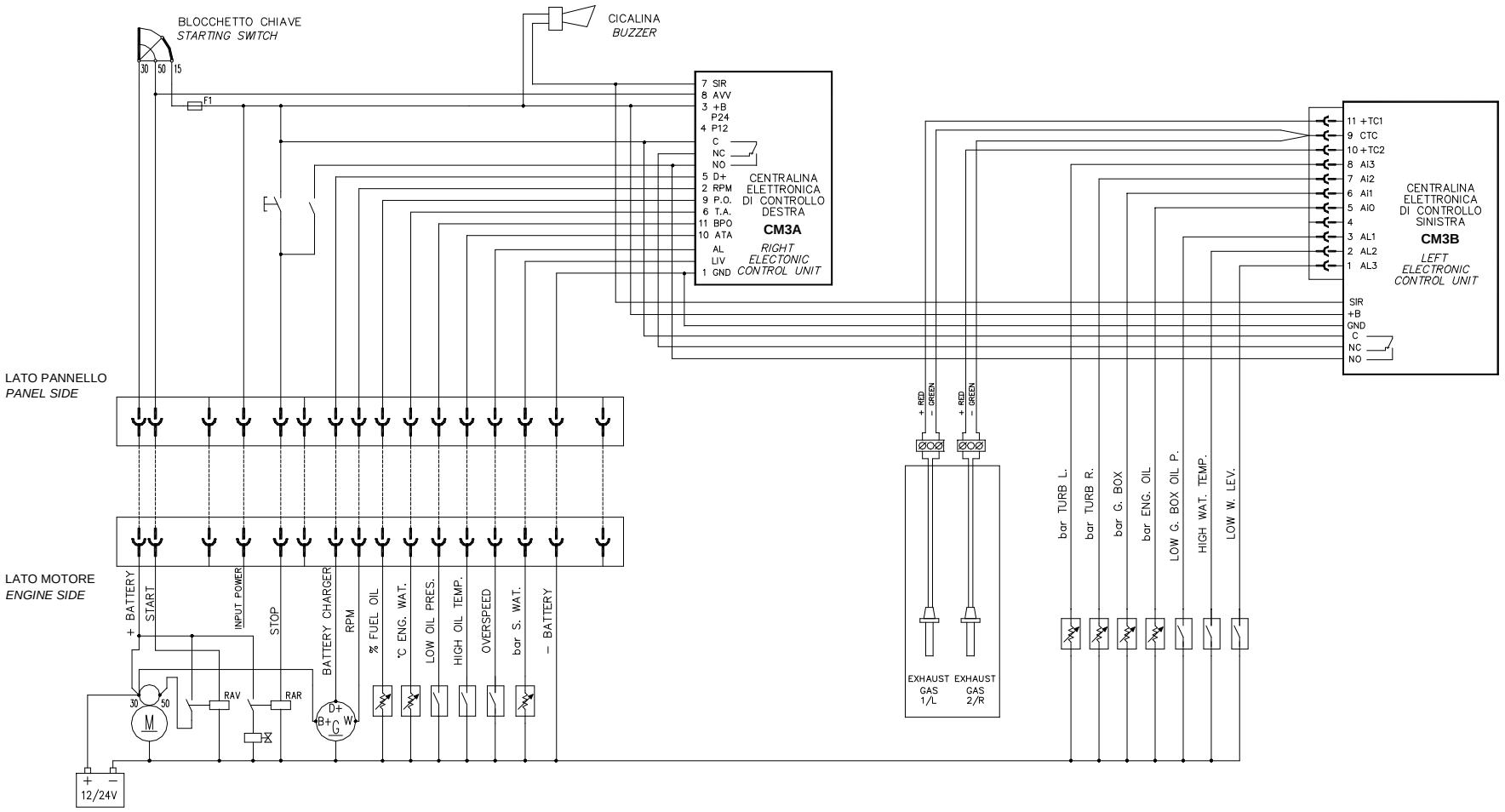
TC1 11	TC2 10	
CTC 9	AI3 8	AI2 7
AI1 6	AI0 5	RT 4
AL1 3	AL2 2	AL3 1
N.C.	SIR	+B
N.O.	C	GND

LEGENDA

BPO	- ALLARME BASSA PRESSIONE OLIO
ATA	- ALLARME ALTA TEMPERATURA ACQUA
P.O.	- LETTURA PRESSIONE OLIO
AVV	- AVVIAMENTO
SIR	- COMANDO ALLARME SONORO
T.A.	- LETTURA TEMPERATURA ACQUA
D+	- D+ (SPIA ALTERNATORE)
P12	- COLLEGAMENTO RELE' PRERISCALDO 12V
+B	- POSITIVO BATTERIA
RPM	- LETTURA GIRI MOTORE
GND	- NEGATIVO BATTERIA
C	- COMUNE CONTATTI RELE' (SOLO CON ARRESTO AUTOMATICO)
NC	- CONTATTO RELE' NORMALMENTE CHIUSO (SOLO CON ARRESTO AUTOMATICO)
NO	- CONTATTO RELE' NORMALMENTE APERTO (SOLO CON ARRESTO AUTOMATICO)
P24	- COLLEGAMENTO RELE' PRERISCALDO 24V (SOLO SERIE CM30)
LIV	- LIVELLO (PUO' ESSERE LETTURA O SOLO SEGNALAZIONE BASSO LIVELLO)
AL	- ALLARME GENERICO (ATTIVO AL NEGATIVO BATTERIA)

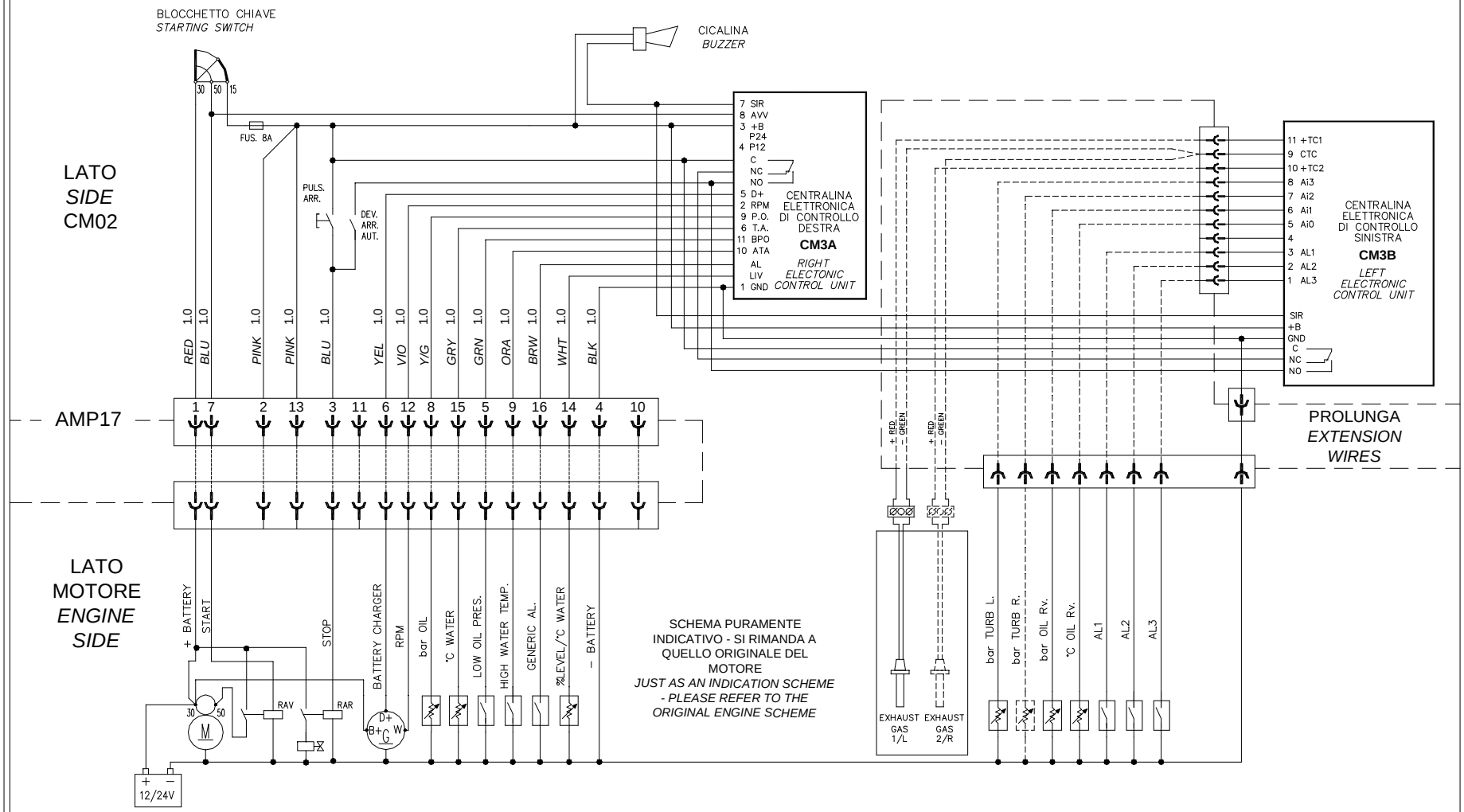
TC1	- TEMPERATURA GAS 1 / SINISTRA
TC2	- TEMPERATURA GAS 2 / DESTRA
CTC	- COMUNE TERMOCOPPIE
Ai3	- INGRESSO ANALOGICO 3
Ai2	- INGRESSO ANALOGICO 2
Ai1	- INGRESSO ANALOGICO 1
Ai0	- INGRESSO ANALOGICO 0
RT	- TACITAZIONE REMOTA
AL1	- ALLARME GENERICO 1
AL2	- ALLARME GENERICO 2
AL3	- ALLARME GENERICO 3
C	- COMUNE CONTATTI RELE' (SOLO CON ARRESTO AUTOMATICO)
NC	- CONTATTO RELE' NORMALMENTE CHIUSO (SOLO CON ARRESTO AUTOMATICO)
NO	- CONTATTO RELE' NORMALMENTE APERTO (SOLO CON ARRESTO AUTOMATICO)
SIR	- COMANDO ALLARME SONORO (POLO NEGATIVO DEL BUZZER
+B	- POSITIVO BATTERIA
GND	- NEGATIVO BATTERIA

SERIE CM02 / *CM02 SERIES*



RIF. FILE / *FILE REF.* :	DATA / *DATE* :	SCALA / *SCALE* :	DESCRIZIONE / *DESCRIPTION* :	DISEGNATO / *DESIGNED* :	
DSDXC0202A	01/06/2000		ESEMPIO DI CABLAGGIO *ASSEMBLY EXAMPLE*	DA RE L.	PINE s.r.l. Chioggia (VE) - Italy
CODICE / *CODE* :	REV. / *REV.* :	FOGLIO / *SHEET* :		APPROVATO / *APPROVED* :	
DSDXC0202A	A	D2		BOSCARATO A.	

SERIE / *SERIES* CM02



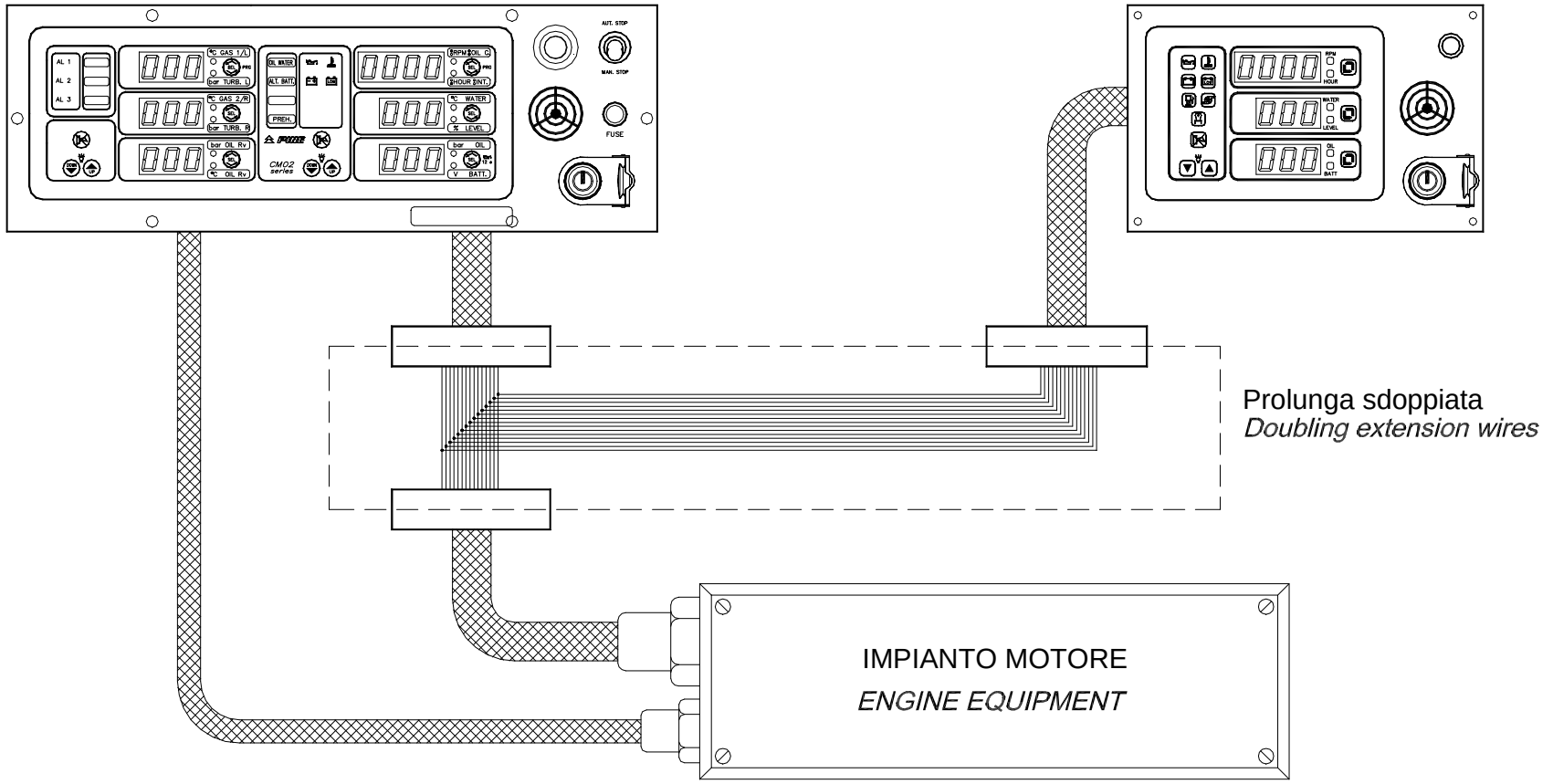
RIF. FILE / *FILE REF.* :	DATA / *DATE* :		DESCRIZIONE / *DESCRIPTION* :	DISEGNATO / *DESIGNED* :	
DSEXC021PA	26/04/2001		CABLAGGIO PANELLO *PANEL ASSEMBLY*	DA RE L.	**PINE s.r.l.** **Chioggia (VE) - Italy**
CODICE / *CODE* :	REV. / *REV.* :	FOGLIO / *SHEET* :		APPROVATO / *APPROVED* :	
DSEXC021PA	A	D3		BOSCARATO A.	

SERIE CM02 / *CM02 SERIES*

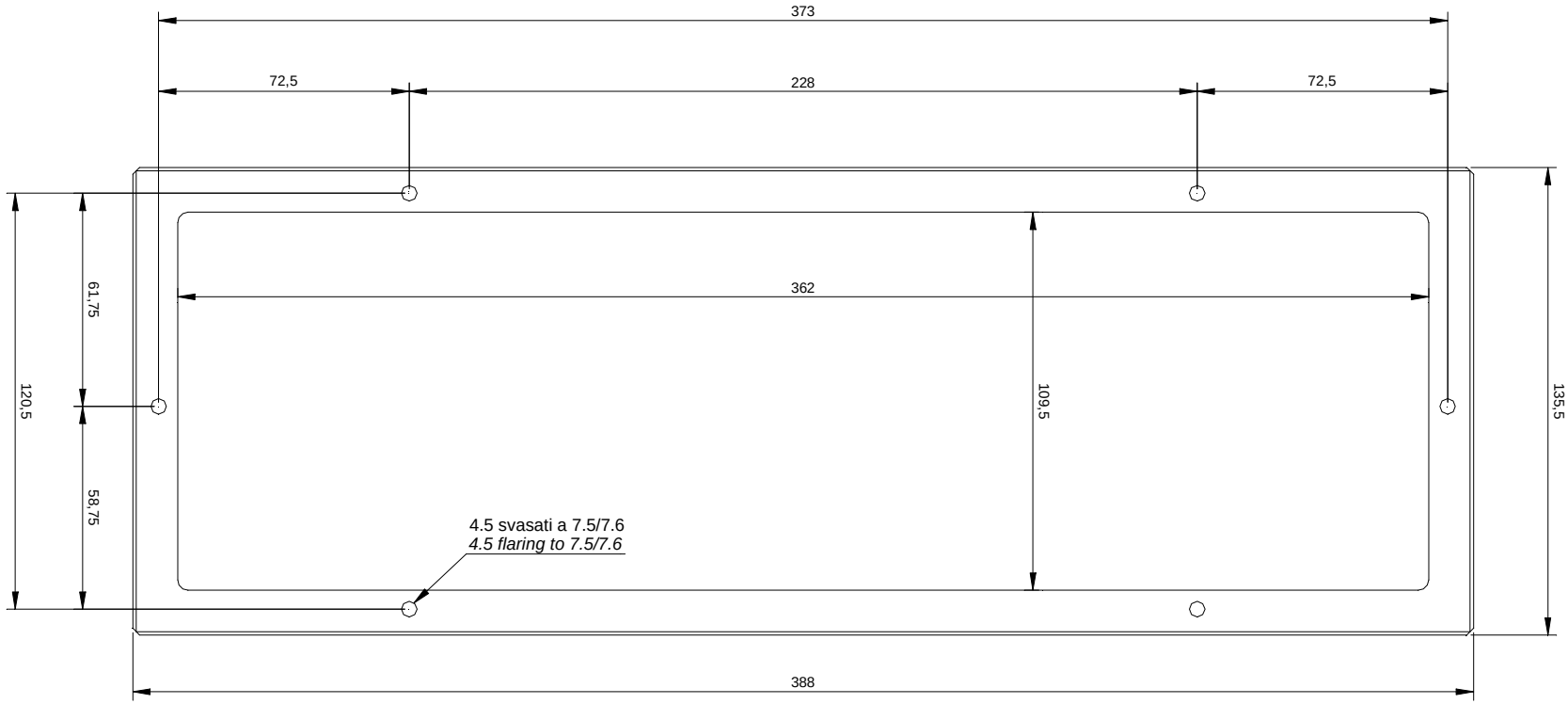
Versione "NORMALE" (principale)
"NORMAL" version (host)

SERIE CM30 / *CM30 SERIES*

Versione "SLAVE"
"SLAVE" version

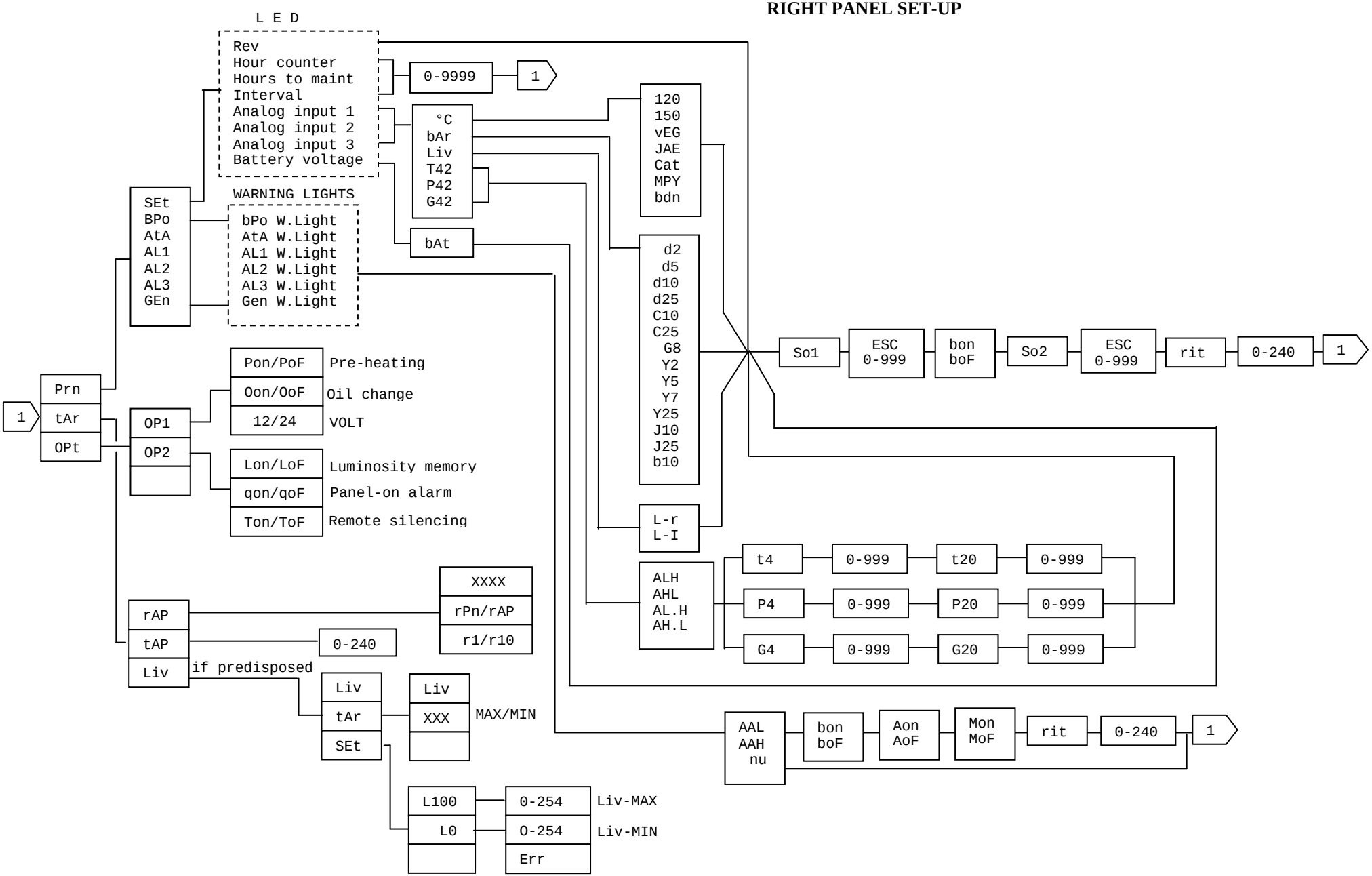


RIF. FILE / *FILE REF.* :	DATA / *DATE* :	SCALA / *SCALE* :	DESCRIZIONE / *DESCRIPTION* :	DISEGNATO / *DESIGNED* :	
DSDXC0204A	01/06/2000	1:1	COLLEGAMENTO PER DOPPIO COMANDO *CONTROL FROM TWO PANELS*	DA RE L.	PINE s.r.l. Chioggia (VE) - Italy
CODICE / *CODE* :	REV. / *REV.* :	FOGLIO / *SHEET* :		APPROVATO / *APPROVED* :	
DSDXC0204A	A	D4		BOSCARATO A.	

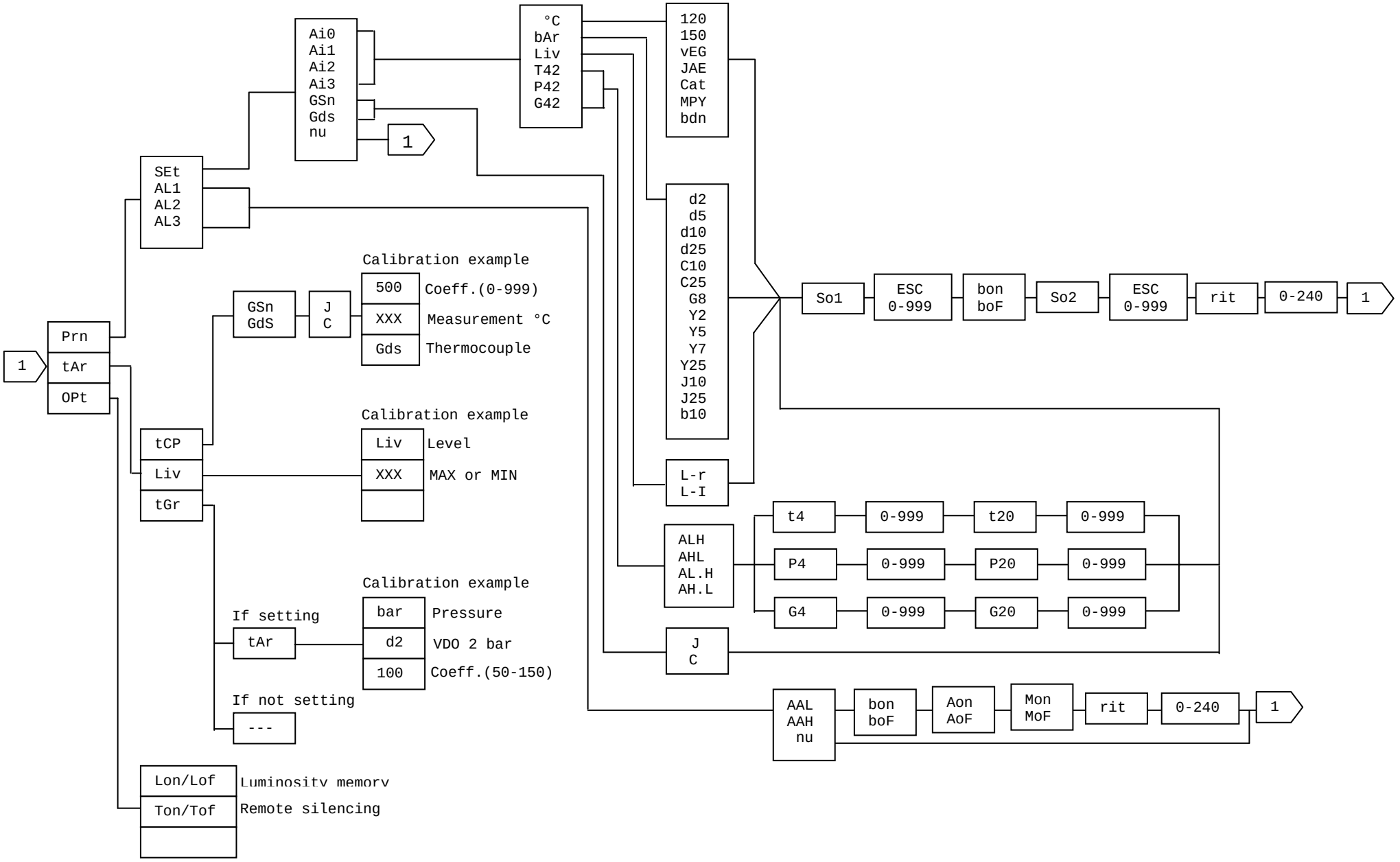


RIF. FILE / *FILE REF.* :	DATA / *DATE* :	SCALA / *SCALE* :	DESCRIZIONE / *DESCRIPTION* :	DISEGNATO / *DESIGNED* :	
DSDXC0205A	01/06/2000		DIMA DI FORATURA	DA RE L.	PINE s.r.l.
CODICE / *CODE* :	REV. / *REV.* :	FOGLIO / *SHEET* :	*CUTTING EDGE*	APPROVATO / *APPROVED* :	Chioggia (VE) - Italy
DSDXC0205A	A	D5		BOSCARATO A.	

RIGHT PANEL SET-UP



LEFT PANEL SET-UP



PINE S.r.l.

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