ENGINE CONTROL PANEL

CM 20/30 SERIES

USER'S MANUAL

PINE s.r.l.
SISTEMI ELETTRONICI

INDEX

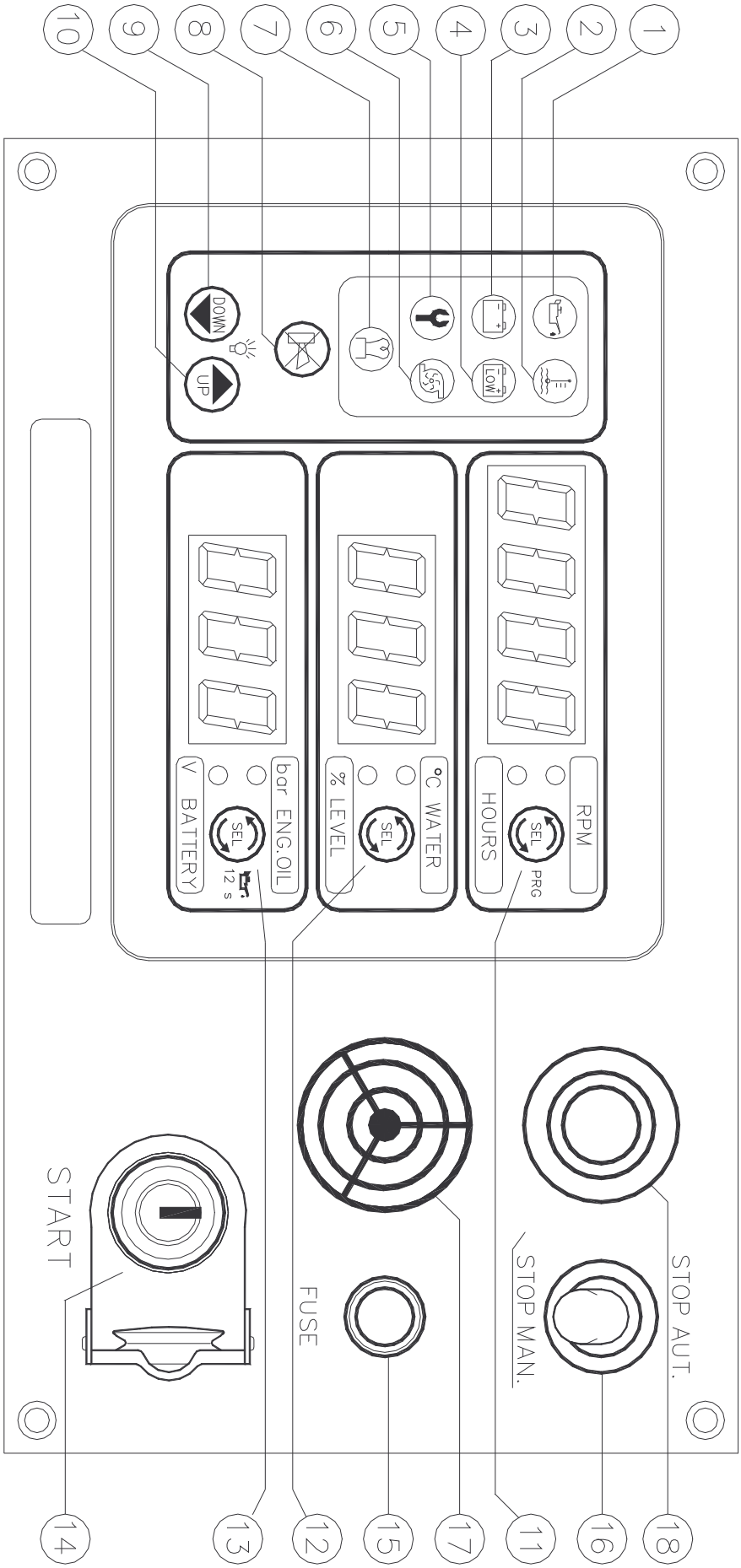


Fig. 1 - CM20/30 panel

1. INTRODUCTION

CM20/30 is an engine control panel based on microprocessor.
It reads common commercial signals. On request it can be adapted to any kind of transducer.

2. INSTALLATION

CM20 and CM30 series engine control panels must be placed on the pilot bridge of ship or alternatively, on a board protecting the back from water. D6 drawing indicates cutting for a correct assembly.
It is recomended to add a seal on the cutting edge to protect the panel from water.
Lock it with the supplied screws.

The connection to the engine is obtained by coupling panel connector with engine connector.
Electrical schemes are on D3 drawing and connector numbering is on D1 drawings.
If panel is not supplied with electric wiring, see D1, D2 and D3 drawings.

ALARMS AND AUTOMATIC STOP TEST

It is possible to test correct working of alarms (that are not normally active in a regularly running engine) by connecting the alarm contacts to negative pole of Battery on the engine side.
If panel is set for automatic stop it is possible to test this function simulating an alarm when the engine is running; the switch (16) must be on the STOP AUT position.

It is advisable to test all the alarms.

3. GENERAL FEATURES

- 6 measurements led displayed in three rows
  - 1st ROW: RPM / Working hours
  - 2nd ROW: Water Temperature / Level
  - 3rd ROW: Oil Pressure (or Oil Temperature) / Battery Voltage
- 7 warning lamps for signalings and alarms
- 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 CM20 series – 12 / 24 Vcc for CM30 series
- Dimensions: 243.0 x 135.5 mm

On request:

- Connection of two panel in parallel (“Master-Slave” configuration)
- Set of pre-alarm and alarm thresholds in any measurement
- Maintenance or oil-change management (by settable timer)
- Overspeed alarm
- Remote silencing key (CM30 series only)

4. ALARMS, SIGNALING AND COMMANDS (ref. to fig. 1)

1 - LOW OIL PRESSURE warning lamp	ON/OFF ALARM
2 - HIGH WATER TEMPERATURE warning lamp	ON/OFF ALARM
3 - ALTERNATOR (BATT. CHAR.) warning lamp	SIGNALING
4 - LOW BATTERY VOLTAGE warning lamp	SIGNALING
5 - ALARM 2 warning lamp (CM30 only)	ON/OFF ALARM
6 - ALARM 1 warning lamp	ON/OFF ALARM
7 - PREHEATING warning lamp	SIGNALING

8 - SILENCE KEY
9 - DECREASES DISPLAY LUMINOSITY
10 - INCREASES DISPLAY LUMINOSITY
11 - Selects alternatively visualization of ENGINE RPM / WORKING HOURS
12 - Selects alternatively visualization of WATER TEMPERATURE / LEVEL
13 - Selects alternatively visualization of OIL PRESSURE / BATTERY VOLTAGE
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 SWITCHING ON AND ENGINE STARTING

- One-second “Lamp-Test” is executed
- **Low Oil Pressure** warning lamp (1) and **Alternator** warning lamp (3) are on
- Buzzer, meaning low oil pressure, is on
- If needed, wait for preheating time before engine ignition
- Engine starting involves buzzer turning off (it can be reactivated when a new alarm is on)

6. ENGINE STOP BY CURRENT REMOVING

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 CURRENT SENDING

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

8. AUTOMATIC STOP

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

- Low oil pressure alarm actived - warning lamp (1) on
- High water temperature alarm actived - warning lamp (2) on
- Overspeed alarm actived - RPM value blinking

Panel can perform the engine automatic stop if switch (16) is on STOP AUT position.
On STOP MAN position, engine can be manually stopped only.

STOP MAN position is recommended when stopping the engine can make a greater damage than leaving it running.

9. PREHEATING

This function is active only if **RL1** is connected to **P12** as shown in D5 drawings.
Preheating warning lamp (7) is turned on for a time depending on engine water temperature.
In absence of water temperature transducer or if this is disconnected, preheating time is always 20 seconds (see Cap. 17, "Technical specifications").

Post-heating: after preheating lamp is off, heating plugs are power supplied for further 5 secs.

Engine ignition: heating plugs are power supplied for the whole operation plus 5 secs.

10. RPM CALIBRATION

The measurement of RPM must be adjusted during installation to adapt it to the number of pulses coming from alternator "W" contact or from other magnetic transducers.

1 Start up the engine and hold it at a stable number of RPM (for example at 1,000 RPM)
2 Measure true RPM value by a **precision revolution counter**
3 Press key (11) for 6-7 seconds; buzzer will produce a "beep"
4 **Without releasing key** (11), adjust the measure pressing keys (9) and (10) to respectively decrease or increase the visualized RPM
5 Once the right measure is reached, release key (11) to store in memory this calibration

If necessary, these operation can be performed again.

Alternatively, knowing the impulse number per engine revolution (or the number of teeth of the crown wheel), please repeat the operations shown before changing point 4 as following:

4a **Withou releasing key (11), press key (8)** and adjust the measure by key (9) and (10) to respectively increase or decrease the impulse number per engine revolution.

Note: if panel is supplied with a Pine pick-up adaptor, the impulse number is given dividing the number of teeth of the crown wheel by 16.

11. ADJUSTEMENT OF ENGINE WORKING HOURS

This operation must be done when **engine is not running**.

- Switch on the panel keeping key (8) pressed
- **Without releasing the key**, change the engine working hours using keys (9) and (10)
- Releasing key (8), the new value will be stored in memory

12. LEVEL TRANSDUCER CALIBRATION

Note: display must visualize the measure to calibrate.

Low level calibration (0%)

- Move the transducer to the min level position and wait for a stable reading
- Keep key (9) and key (13) pressed
- After 20 seconds, buzzer will produce a "beep": 0% level is stored

Max level calibration (100%)

- Move the transducer to the max level position and wait for a stable reading
- Keep key (10) and (13) pressed
- After 20 seconds, buzzer will produce a "beep": 100% level is stored

Warning: if display visualizes "**Err**", move the transducer to a mid position storing it as max. Then restart from low level calibration. "**Err**" also indicates a transducer damage.

13. ANOMALIES IN THE ENGINE ELECTRICAL ASSEMBLY

IMPORTANT: Low Oil Pressure (1) alarm
When engine is not running, warning lamp (1) and acoustic alarm are activated.
If not, PRESSURE SWITCH IS DAMAGED OR ITS WIRE IS DISCONNECTED.

RPM measurement

- Connecting wire to alternator or to transducer is interrupted: RPM remains at 0000 value.

Water (Oil) temperature measurement

- Connecting wire or transducer is interrupted: visualization disappears from display
- In case of short circuit to the negative pole of Battery, the **EEE** message appears.

Oil pressure measurement

- Connecting wire or transducer is interrupted: visualization disappears from display
- In case of short circuit to the negative pole of Battery, **EEE** is displayed for Veglia transducer, **00.0** for VDO transducer.

Level measurement

- Connecting wire or transducer is interrupted: visualization disappears from display
- In case of damage or bad calibration: **Err** is displayed.

14. SWITCHED-ON PANEL SIGNALING

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

15. CONTROL BY TWO PANELS

In order to perform the engine control by two panels, the followings are necessary:

- a normal panel named "**Host**"
- a panel arranged for this application named "**Slave**"

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

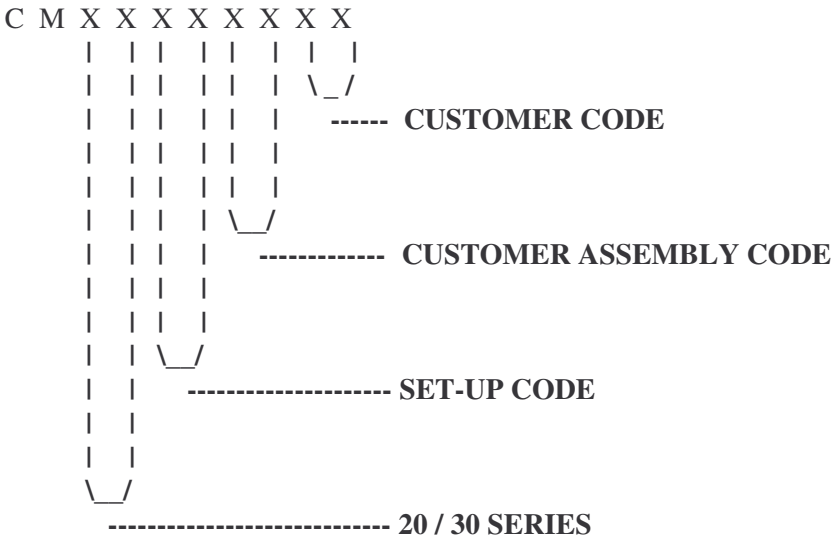
Engine stop by current removing:

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

Enine stop by current sending:

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

16. CODE DESCRIPTION



17. TECHNICAL SPECIFICATIONS

<table>
<tr><td colspan="2">POWER SUPPLY</td><td>CM20
12 Vcc (min 6V, max 15V)</td><td>CM30
12/24Vcc (min 10, max 30V)</td></tr>
<tr><td colspan="2">POWER CONSUMPTION</td><td colspan="2">Less than 6 Watt</td></tr>
<tr><td colspan="2">PROTECTIONS</td><td colspan="2">Polarity inversion, Battery disconnecting extravoltage (not repeatitive)</td></tr>
<tr><td colspan="2">WORKING TEMPERATURE</td><td colspan="2">- 10 °C / + 60 °C</td></tr>
<tr><td colspan="2">STORAGE TEMPERATURE</td><td colspan="2">- 30 °C / + 70 °C</td></tr>
<tr><td colspan="2">VISUALIZATION</td><td colspan="2">3 rows display and variable luminous intensity</td></tr>
<tr><td colspan="2">WARNING LAMP</td><td colspan="2">Low Oil Pressure (BPO)
High Water Temperature (ATA)
Alternator (D+)
Low Battery
Alarm 1 (AL1)
Alarm 2 (AL2 – CM30 only)
Preheating</td></tr>
<tr><td colspan="2">ACOUSTIC INDICATION</td><td colspan="2">Buzzer 5 – 30 Vcc</td></tr>
<tr><td colspan="2">PREHEATING TIME
(ref. to engine water temperature)</td><td colspan="2">0 °C 15 seconds
20 °C 10 seconds
40 °C 7 seconds
>50 °C 0 seconds
-- 20 seconds (without control or negative temp.)</td></tr>
<tr><td rowspan="12">TRANSDUCER TYPE</td><td rowspan="3">ENGINE REVOLUTION</td><td colspan="2">Alternator “W” contact</td></tr>
<tr><td>Pick-up on crown wheel</td><td>(by Pine adaptor)</td></tr>
<tr><td>Proximy swich</td><td>(on request)</td></tr>
<tr><td rowspan="4">WATER (OIL) TEMPERATURE</td><td colspan="2">VDO 40 – 120 °C</td></tr>
<tr><td colspan="2">Veglia 40 – 120 °C</td></tr>
<tr><td>Jaeger 40 – 120 °C</td><td>(on request)</td></tr>
<tr><td>0 – 20 mA or 4 – 20 mA</td><td>(on request)</td></tr>
<tr><td rowspan="6">OIL PRESSURE</td><td colspan="2">VDO 0 – 10 bar</td></tr>
<tr><td>VDO 0 – 25 bar</td><td>(on request)</td></tr>
<tr><td colspan="2">Veglia 0 – 10 bar</td></tr>
<tr><td>Jaeger 0 – 10 bar</td><td>(on request)</td></tr>
<tr><td>Jaeger 0 – 25 bar</td><td>(on request)</td></tr>
<tr><td>0 – 20 mA or 4 – 20 mA</td><td>(on request)</td></tr>
<tr><td>LEVEL</td><td colspan="2">Resistor type</td></tr>
<tr><td colspan="4">Note: for other type of transducer, please call PINE s.r.l.</td></tr>
</table>

18. CONFORMALITY DECLARATION

CE

Manufactures declares that the engine control panel of series CM02/CM30 is in conformity at European requisition of electromagnetic compatibility and of security with directives 73/23/EEC, 89/336/EEC, 92/31/EEC, 93/68/EEC and 93/97/EEC and EN60945 directives.

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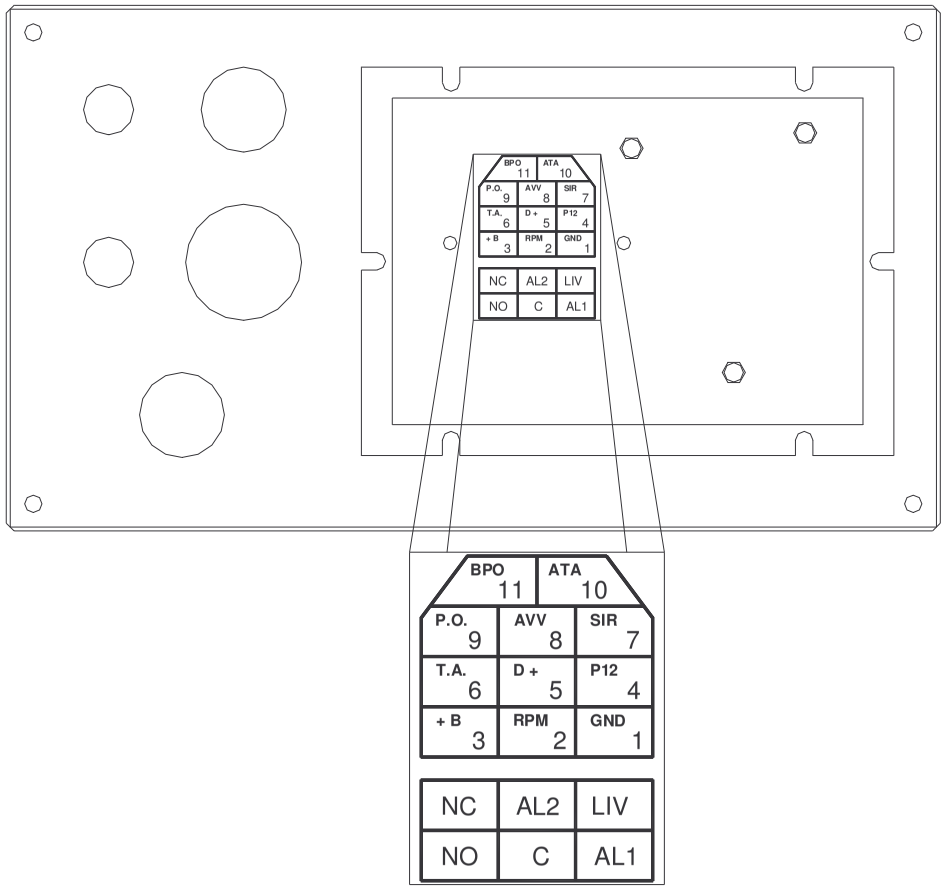
SERIE CM20/30 :
CM20/30 SERIES :

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 CM30 (ATTIVO AL NEGATIVO BATTERIA) *ALARM 2 – CM30 ONLY (ACTIVE TO NEGATIVE POLE OF BATTERY)*

RIF. FILE / *FILE REF.* :	DATA / *DATE* :	SCALA / *SCALE* :	DESCRIZIONE / *DESCRIPTION* :	DISEGNATO / *DESIGNED* :	
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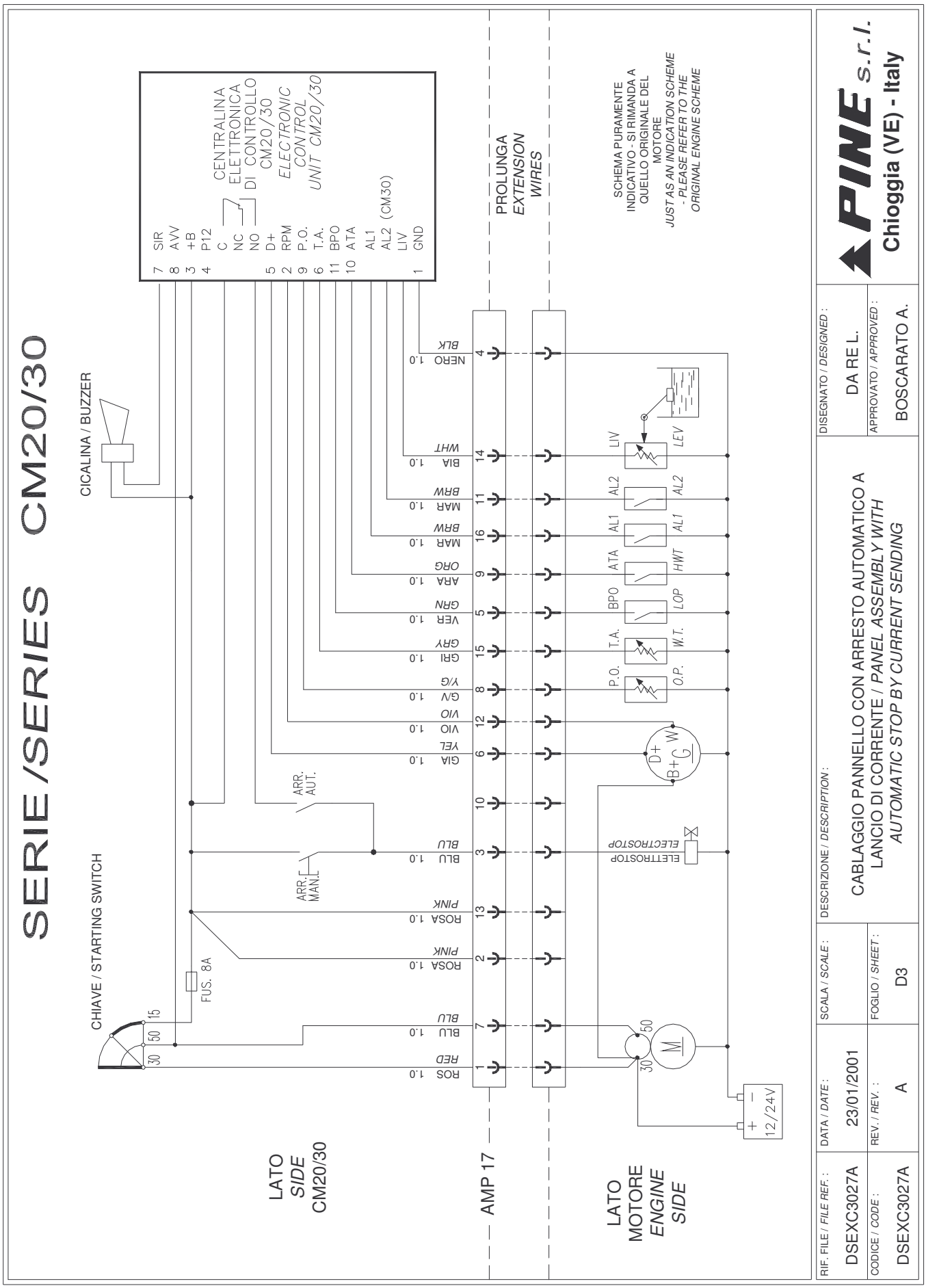
SERIE /SERIES CM20/30
CENTRALINA ELETTRONICA DI CONTROLLO CM20/30 ELECTRONIC CONTROL UNIT CM20/30
7 SIR
8 AVV
3 +B
4 P12
C
NC
NO
5 D+
2 RPM
9 P.O.
6 T.A.
11 BPO
10 ATA
AL1
AL2 (CM30)
LIV
1 GND
PROLUNGA EXTENSION WIRES
SCHEMA PURAMENTE INDICATIVO - SI RIMANDA A QUELLO ORIGINALE DEL MOTORE
JUST AS AN INDICATION SCHEME - PLEASE REFER TO THE ORIGINAL ENGINE SCHEME
CICALINA / BUZZER
CHIAVE / STARTING SWITCH
FUS. 8A
ARR. AUT.
ARR. MAN.
ELETTROSTOP
ELECTROSTOP
LEV
LIV
AL2
AL1
HWT
LOP
W.T.
O.P.
P.O.
T.A.
BPO
ATA
D+
B+
W
G
M
50
30
12/24V
AMP 17
LATO SIDE CM20/30
LATO MOTORE ENGINE SIDE
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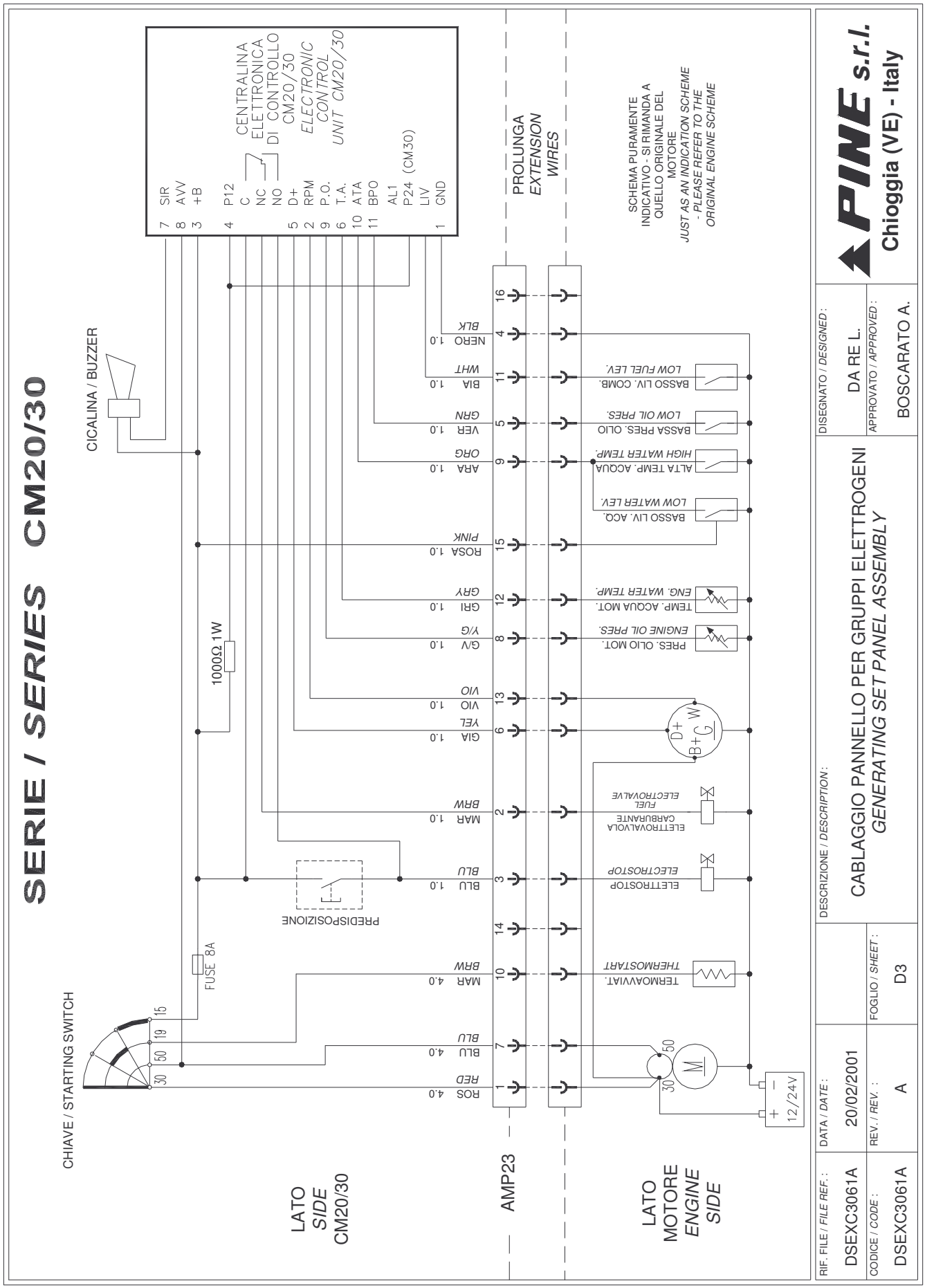
DISEGNATO / DESIGNED : DA RE L.
CODICE / CODE : DSEXC3027A
REV. / REV. : A
FOGLIO / SHEET : D3
APPROVATO / APPROVED : BOSCARATO A.
PINE s.r.l.
Chioggia (VE) - Italy


SERIE / SERIES CM20/30
CENTRALINA ELETTRONICA DI CONTROLLO CM20/30 ELECTRONIC CONTROL UNIT CM20/30
7 SIR
8 AVV
3 +B
4 P12
C
NC
NO
5 D+
2 RPM
9 P.O.
6 T.A.
10 ATA
11 BPO
AL1
P24 (CM30)
LIV
1 GND
PROLUNGA EXTENSION WIRES
SCHEMA PURAMENTE INDICATIVO - SI RIMANDA A QUELLO ORIGINALE DEL MOTORE
JUST AS AN INDICATION SCHEME - PLEASE REFER TO THE ORIGINAL ENGINE SCHEME
CICALINA / BUZZER
1000Ω 1W
FUSE 8A
PREDISPOSIZIONE
CHIAVE / STARTING SWITCH
AMP23
LATO SIDE CM20/30
LATO MOTORE ENGINE SIDE
NERO 1.0 BLK
BIA 1.0 WHT
VER 1.0 GRN
ARA 1.0 ORG
ROSA 1.0 PINK
GRI 1.0 GRY
G/V 1.0 V/G
VIO 1.0 VIO
GIA 1.0 YEL
MAR 4.0 BRW
BLU 1.0 BLU
MAR 1.0 BRW
BLU 4.0 BLU
ROS 4.0 RED
BASSO LIV. COMB. LOW FUEL LEV.
BASSA PRES. OLIO LOW OIL PRES.
ALTA TEMP. ACQUA HIGH WATER TEMP.
BASSO LIV. ACQ. LOW WATER LEV.
TEMP. ACQUA MOT. ENG. WATER TEMP.
PRES. OLIO MOT. ENGINE OIL PRES.
ELETTROSTOP ELECTROSTOP
ELETTROVALVOLA CARBURANTE FUEL ELECTROVALVE
TERMOAVVIAT. THERMOSTART
D+
B+ C W
M
30 50
12/24V
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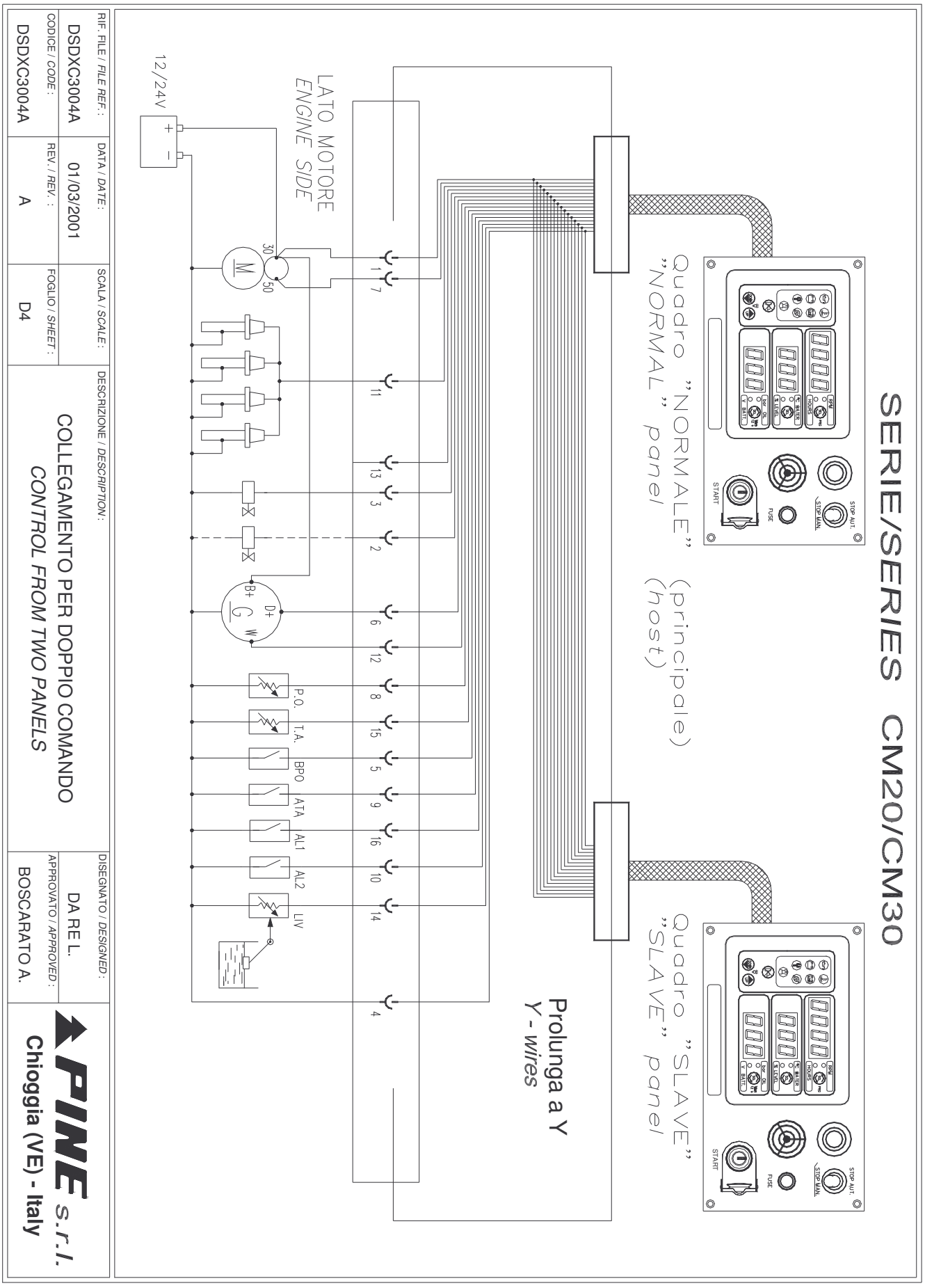
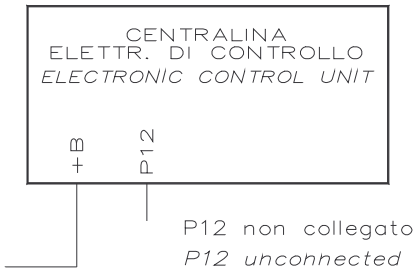
CABLAGGIO PANNELLO PER GRUPPI ELETTROGENI
GENERATING SET PANEL ASSEMBLY
DISEGNATO / DESIGNED: DA RE L.
APPROVATO / APPROVED: BOSCARATO A.
PINE s.r.l.
Chioggia (VE) - Italy

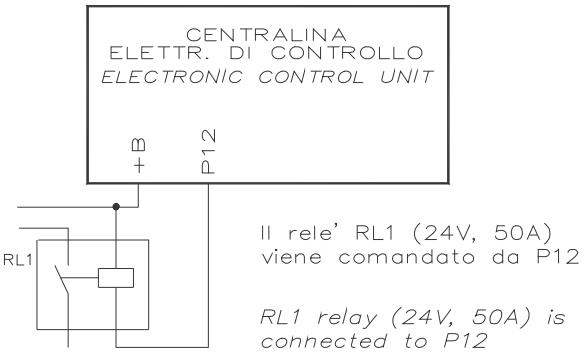

SERIE/SERIES CM20/CM30
Quadro "NORMALE" "NORMAL" panel
(principale) (host)
Quadro "SLAVE" "SLAVE" panel
Prolunga a Y
Y - wires
LATO MOTORE
ENGINE SIDE
12/24V
30
50
M
B+
D+
C
W
P.O.
T.A.
BPO
ATA
AL1
AL2
LIV
START
STOP MAN.
STOP AUT.
FUSE
RIF. FILE / FILE REF.: DSDXC3004A
DATA / DATE: 01/03/2001
SCALA / SCALE:
DESCRIZIONE / DESCRIPTION: COLLEGAMENTO PER DOPPIO COMANDO
CONTROL FROM TWO PANELS
DISEGNATO / DESIGNED: DA RE L.
CODICE / CODE: DSDXC3004A
REV. / REV.: A
FOGLIO / SHEET: D4
APPROVATO / APPROVED: BOSCARATO A.
PINE s.r.l.
Chioggia (VE) - Italy

SERIE/*SERIES* CM2A/CM3A

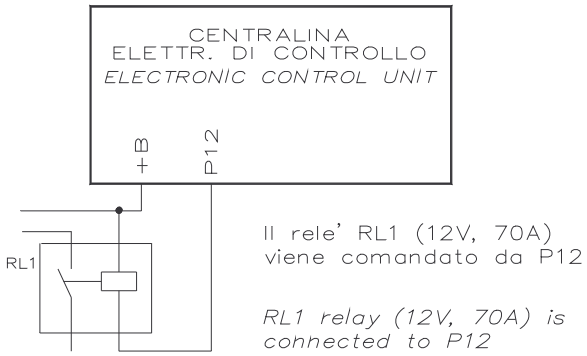
QUADRO SENZA PRE–RISCALDO
PANEL WITHOUT PREHEATING



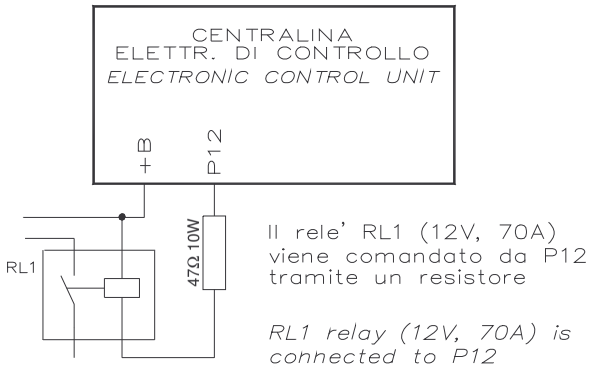
24V CON PRE–RISCALDO
24V WITH PREHEATING



12V CON PRE–RISCALDO
12V WITH PREHEATING



24V CON PRE–RISCALDO
24V WITH PREHEATING



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CODICE / *CODE* :	REV. / *REV.* :	FOGLIO / *SHEET* :		APPROVATO / *APPROVED* :	
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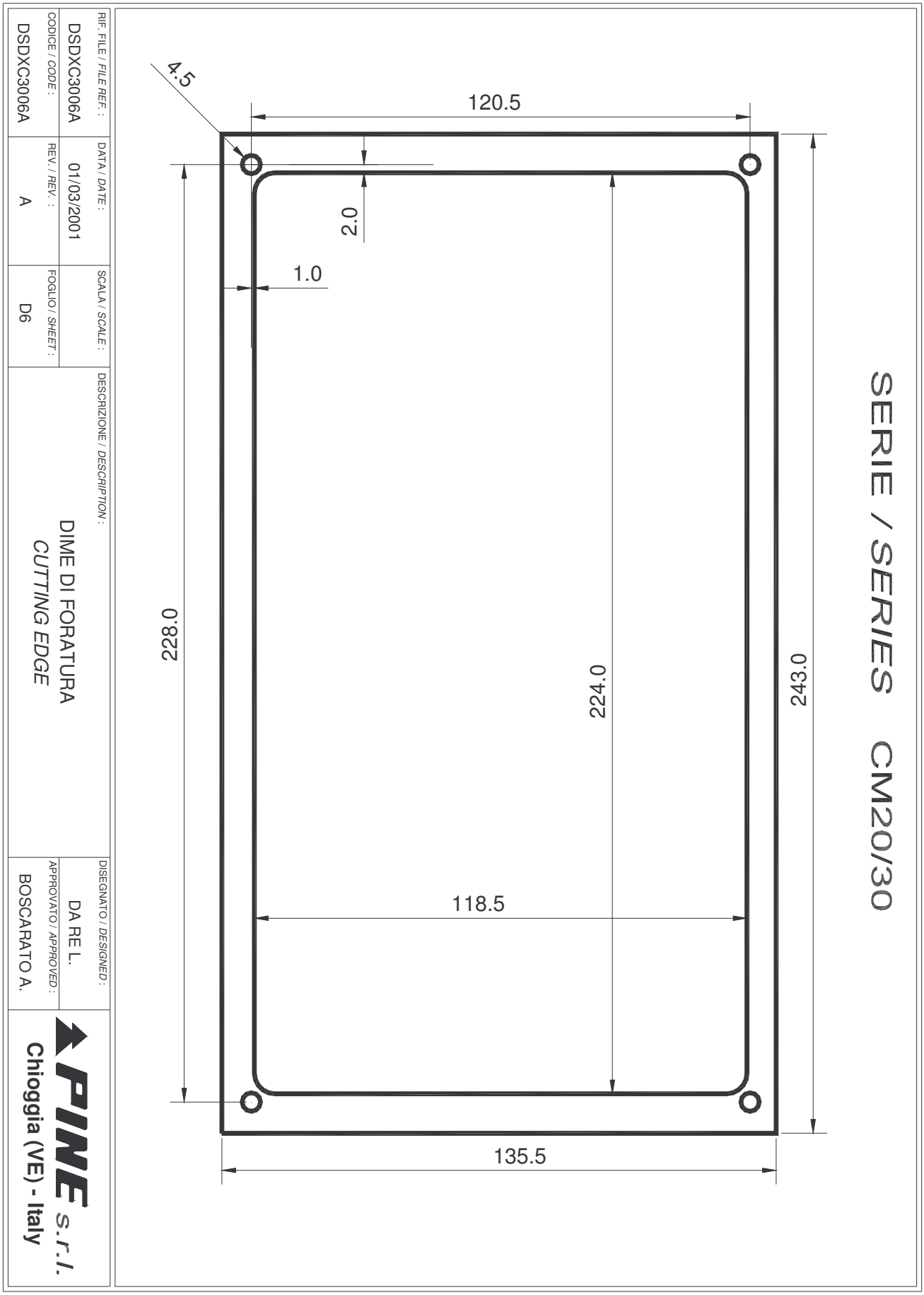
SERIE / SERIES CM20/30
4.5
120.5
2.0
1.0
228.0
224.0
243.0
118.5
135.5
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DSDXC3006A
CODICE / CODE :
DSDXC3006A
DATA / DATE :
01/03/2001
REV. / REV. :
A
SCALA / SCALE :
FOGLIO / SHEET :
D6
DESCRIZIONE / DESCRIPTION :
DIME DI FORATURA
CUTTING EDGE
DISEGNATO / DESIGNED :
DA RE L.
APPROVATO / APPROVED :
BOSCARATO A.
PINE s.r.l.
Chioggia (VE) - Italy

PINE s.r.l.
SISTEMI ELETTRONICI
Via Centro, 49 - Frazione S.Pietro - 30014 Cavarzere (VE) - Italy
Tel / Fax +39.0426.35.70.41
www.pinesrl.com info@pinesrl.com