

ENGINE CONTROL PANEL

CM 40
Series

USER'S MANUAL

 **PINE** *s.r.l.*
SISTEMI ELETTRONICI

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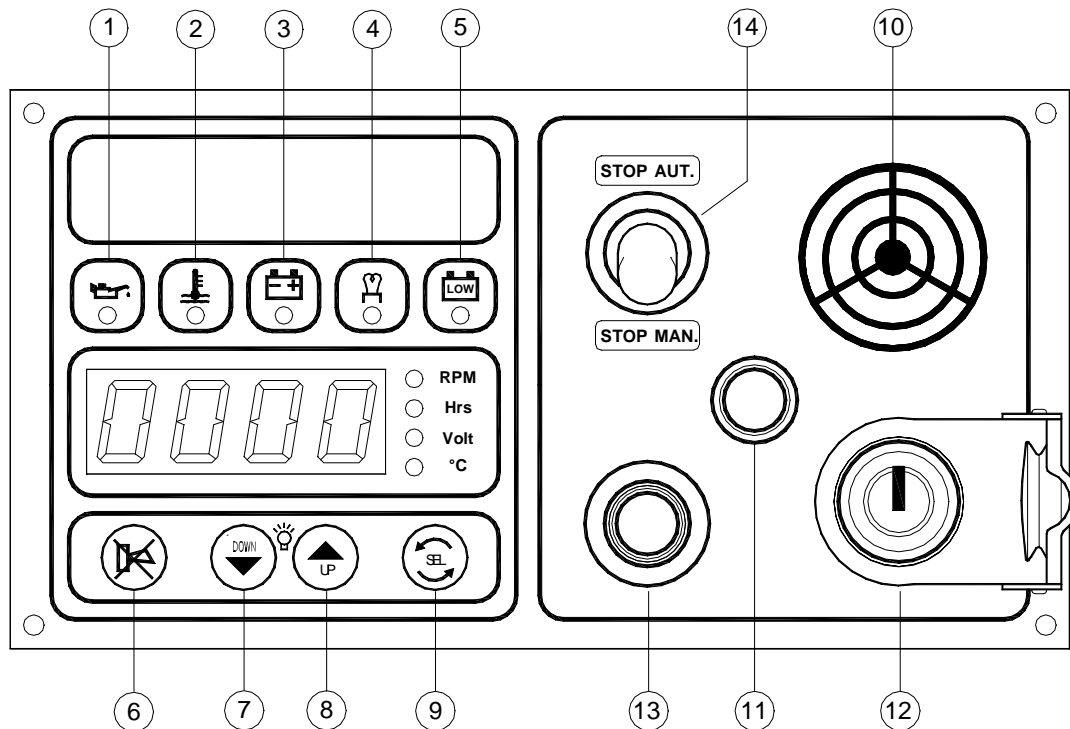


Fig. 1 - CM40 panel

1. INTRODUCTION

CM40 is a totally programmable engine control panel controlled by a microprocessor. A polycarbonate front mounted on an aluminium support protects control and visualization parts.

The engine control panel can work in two situations: with human supervision or without human supervision.

Several settings (set-up) could be changed to suit the engine control better.

CM40 can stop the engine automatically. If panel is equipped with automatic engine stop, then this function is always active for both low oil pressure alarm and high water temperature alarm. The automatic engine stop can be removed for the over speed alarm.

When engine revolutions get over the alarm threshold (**SrPn** code in the engine control panel set-up), an over speed alarm occurs.

For applications with human supervision, the automatic engine stop function could be deactivated by a toggle switch placed in the panel front. This switch bypasses the stop relay contacts.

On request connection wiring for any kind of engine plant, extension wires and engine relays box could be supplied.

2. INSTALLATION

CM40 series engine control panels must be placed on the ship pilot bridge or alternatively, on a dashboard protecting the back against water. **D4** drawing shows cutting for a correct assembly.

It is advised to add a seal on the cutting edge to protect the panel against water. Lock it by the screws supplied.

If CM40 has been supplied with its metallic box, then the metallic box must be fixed by its shock absorbers. **D5** drawing shows cutting and size for a correct assembly.

To end the installation, plug the panel connector to the engine plant connector. **D2** drawing shows both electrical schemes and connectors numbering.

ALARMS AND AUTOMATIC ENGINE STOP TEST

To test the correct working of alarms (inactive in a regularly running engine), connect the alarm contact to the negative pole of Battery on the engine side.

To test the over speed alarm in safety, set up a very low value for the engine revolutions alarm threshold (**SrPn** code in engine control panel set-up), then simulate an over speed situation by increasing the engine revolutions until they get over the alarm threshold value.

If the panel is equipped with automatic stop, the alarm test will stop the engine.

Note: for the automatic engine stop test, the switch (14) must be in STOP AUT position.

It is advised to test alarms periodically

3. ALARMS, SIGNALING AND COMMANDS

With reference to figure 1.

1	Low oil pressure lamp	Alarm
2	High water temperature lamp	Alarm
3	Generator (battery charge) lamp	Signalling
4	Preheating/on-off input lamp	Signalling/Alarm
5	Low battery voltage lamp	Signalling
6	Mute button	Mutes the buzzer
7	DOWN button	Decreases the display luminosity
8	UP button	Increases the display luminosity
9	SEL button	Changes the display visualization in the following order: rpm/working hours/battery voltage/water temperature
10	Buzzer	
11	Fuse	
12	Ignition-switch key	Turns panel on and starts engine
13	Engine stop button	Stops engine
14	Automatic engine stop switch Note: the switch is present on panels with automatic engine stop only	<ul style="list-style-type: none"> • STOP AUT position: automatic engine stop is active • STOP MAN position: automatic engine stop is closed down

When an over speed alarm happens, display indicates **Giri** instead of the engine revolutions reading.

Alarm activates both buzzer and automatic engine stop (if panel is equipped with the automatic engine stop function).

Signalling is only a visual notice.

4. **GENERAL FEATURES**

- Four readings on LED display with dimmer:

RPM	Engine revolution
Hrs	Working hours
Volt	Battery voltage
°C	Water temperature

- 5 warning lamps
- Mute button
- Ignition key, fuse, buzzer
- 12 V - 24 V power supply
- Size: 183.0 x 98.0 mm

On request:

- Automatic engine stop
- Any other reading instead of water temperature
- Stop button and automatic engine stop toggle switch
- Complete preheating management
- Remote buzzer muting

5. **TURNING ON PANEL AND STARTING ENGINE**

- A lamp test is executed for about one second.
- Low oil pressure lamp (1) and generator lamp (3) light up.
- Buzzer turns on due to low oil pressure alarm.
- (Only for engine with preheating) Start the engine when preheating lamp (4) turns off.
- As soon as the engine starts, alarms will be reset and buzzer will be muted automatically.

6. **STOPPING ENGINE BY REMOVING CURRENT (Electrically fuel shut-off)**

To stop the engine, turn the panel off by its key. If panel is equipped with a engine stop button (13), hold it pushed until the engine stops.

7. **STOPPING ENGINE BY SENDING CURRENT (Stop solenoid)**

When the panel is on, hold the engine stop button (13) pushed until the engine stops.

8. **AUTOMATIC ENGINE STOP (Only for panel equipped)**

The panel stops the engine in the following cases:

- Low oil pressure alarm
- High water temperature alarm
- Over speed

The automatic stop is active only when the switch (14) is in STOP AUT position.

When the switch (14) is in STOP MAN position, engine can be stopped manually only.

It is advisable to turn the switch (14) in the STOP MAN position if the engine automatic stop can cause a worse damage than letting the engine run.

9. **RPRE CONTACT FUNCTIONS**

The **RPRE** contact (see **D3** drawing) has the following functions:

- ▷ **PREHEATING** → (Menu: **SEt → InG → PrEr**)
The panel manages automatically the preheating sequence (preheating time depends on engine temperature, see technical features). **RPRE** contact must be connected to a relay module as shown in the **D3** drawing (relay module is supplied only on request). Engine starting may be done after the preheating lamp (4) turns off.
- ▷ **REMOTE MUTING** → (Menu: **Set → InG → trEn**)
RPRE acts as the remote muting input. The contact is active when connected to negative pole of the battery. One or more remote muting buttons can be placed anywhere; they must be in bridging connection. This is useful when an engine is controlled from several stations (see **D3** drawing).
Lamp (4) and buzzer are not used.
- ▷ **ON-OFF ALARM INPUT** → (Menu: **Set → InG → ALL**)
RPRE acts as an on-off input. The contact is active when connected to the negative pole of the battery.
In case of alarm condition, lamp (4) and buzzer go on.
- ▷ **WARNING LAMP** → (Menu: **Set → InG → SPIA**)
RPRE acts as an on-off input. The contact is active when connected to the negative pole of the battery.
In case of alarm condition, lamp (4) goes on.

Use panel set-up for choosing the proper function of the **RPRE**.

10. **NOT TO FORGET THE PANEL ON**

An acoustic signalling occurs when engine has not run for about twenty seconds, but panel is still on. This is useful to avoid forgetting the panel on.

The acoustic signalling is intermittent 'beep'. Either starting the engine or turning the panel off, buzzer will be muted.

This function can be activated/deactivated using the **qAcc** options in panel set-up.

11. RPM CALIBRATION

The RPM calibration must be done during panel installation to adapt the reading to the number of pulses coming from the alternator “W” contact, or from other transducer. The number of pulses for every engine revolution is called **ratio** (it is a two decimal digit precision number).

Calibration could be done in following ways:

1. **Without knowing the ratio.**

It is possible to set correct RPM ratio indirectly, adjusting the RPM reading by comparison with a precision revolution counter.

While engine is running, enter in panel set-up, select **rPn** and adjust the RPM reading as the value supplied by a precision revolution counter.

Calibration must be checked (and eventually adjusted again) in the whole engine revolution range.

2. **Knowing the ratio.**

Enter in panel set-up, select **rAP** and adjust the ratio value. During this setting engine may be running or not.

On request the panel could be supplied with a default **rAP** adjustment.

See section 13 for detailed information about set-up

12. ALARMS AND ENGINE SAFETY

CM40 can work in two different ways.

- With engine without human supervision where it is important to know the event that has stopped the engine.

- With engine with human supervision where panel has or not automatic engine stop. or has this function not enable temporarily.

1. **Engine without human supervision.** Choose the **SEt → MArr → On** option in the panel set-up.

When the first **alarm** that generates automatic stop happens: the engine stops – the related warning lamp blinks – the buzzer turns on.

Warning lamps related to the other alarms remain on without blinking.

Pushing the muting button (6), the buzzer turns off but lamps don't change their state.

The only blinking lamp indicates the alarm that has caused the engine stop.

All alarms will be reset by turning the panel off or restarting the engine.

2. **Engine with human supervision.** Choose the **SEt → MArr → OFF** option in the panel set-up.

In this case all alarms have the same behaviour: related warning lamp blinks – buzzer turns on. For alarms that generate automatic stop, the engine stops only if the automatic stop is active, according to switch (14) position.

Pushing the muting button (6), the buzzer turns off and every lamp remains lit (no blinking) until the alarm condition remains.

All alarms will be reset by turning the panel off or restarting the engine. Every alarm will be reset after both muting button has been pushed and alarm condition has been removed.

13. PANEL SET-UP

To enter in panel set-up, push the SEL button (9) for about seven seconds until buzzer gives out a “beep”. The display indicates **SEt**.

In panel set-up, panel buttons have the following functions.

SEL button (9) → Selects a menu item
UP (8) and **DOWN** (9) buttons → Moves between menu items, changes value
Muting button (6) → Saves changes and exits from set-up

Push the silence button (6) one or more time to exit from panel set-up.

CAUTION

In set-up mode, if any buttons has not been pushed for more than 60 seconds, panel will exit from set-up mode without saving changes.

SET-UP TABLE

	Menu	Options	Description	Default	
Set	r P n	0000 - 9999	Engine revolution (for rpm calibration using a precision revolution counter)		
	r A P	00.01-99.99	Ratio = number of pulse for every engine revolution	20.00	
	O r E	0000 - 9999	Working hours	0000	
	S r P n	0000 - 9999	Over speed alarm threshold: over 9999 display shows ESC (no over speed alarm)	ESC	
	t E m P	u E G5		VEGLIA temperature transducer (Master*)	
		u d O5		VDO temperature transducer (Master*)	UdO5
		d A E5		Daewoo temperature transducer (Master*)	
		u E G2		VEGLIA temperature transducer (Slave*)	
		u d O2		VDO temperature transducer (Slave*)	
		SGS 5			
	b A t t	12		12 V power supply	12
		24		24 V power supply	
	I n g	P r E r		Input (contact n. 4) used for preheating	
		t r E n		Input (contact n. 4) used as remote muting	
		ALL		Input (contact n. 4) used as on-off alarm	ALL
		SPIA		Input (contact n. 4) used as visual notification only	
	M A r r	On		(for engine without human supervision) records and shows the alarm that has stopped the engine	On
		OFF		(for engine with human supervision) doesn't record the alarm that has stopped the engine	
	q A c c	On		Sound notification when panel is forgotten on	On
		OFF		No sound notification when panel is forgotten on	

Default values could be customized on request.

* See section 15 form Master/Slave details.

14. TROUBLESHOOTING

CAUTION

When panel is switched on but engine is not running, low oil pressure lamp (1) and buzzer (10) turn on. Otherwise, pressure switch is damaged or its wire is disconnected.

RPM reading (when engine runs):

- In case of damage or disconnection to RPM reading system, display will indicate **0000**.
- If **Out** appears, it means a RPM value greater than 9999.

Temperature reading:

- If temperature goes below zero, display will indicate **- 0**.
- If either connection or transducer are interrupted, display will indicate **OPEn**.
- If either connection or transducer are short circuited to the negative pole of the battery, display will indicate **EEE**.

15. ENGINE CONTROL BY TWO OR MORE STATIONS

In order to perform the engine control by more than one panel, you need the following equipment.

- A normal panel called "**Master**"
- One or more panels arranged for this application called "**Slave**"

Note: switching on one of the panels involves switching on the others, therefore: panels switching on - engine starting - engine stopping - must be done by the same panel.

Stopping engine by removing current (electrically fuel shut-off)

- **Manual engine stop.** If more panels have been switched on by mistake, engine will stop only if all ignition-switch keys (12) are in off position.
- **Automatic engine stop** (only for panels equipped). Only the **Master** panel is equipped with the automatic stop function and, if necessary, with **STOP MAN/AUT** switch (14). The automatic stop will be possible if the **Master** panel is the only with both ignition-switch key (12) in on position and switch (14) in **STOP AUT** position. If any other ignition-switch key is in on position, automatic stop will not be possible.

Stopping engine by sending current (stop solenoid)

- **Manual engine stop.** Engine can be stopped from any panels.
- **Automatic engine stop** (only for panels equipped). Only the **Master** panel is equipped with the automatic stop function and, if necessary, with **STOP MAN/AUT** switch (14). Automatic stop is always active. If **Master** has switch (14), it must be in **STOP AUT** position.

16. TECHNICAL SPECIFICATIONS

	12 V version (CM41)	24 V version (CM42)
Power supply	12Vcc min 7V, max 15V	24Vcc min 10V, max 32V
Power consumption	Less than 4W	
Protections	Polarity inversion, battery disconnecting extravoltage (not repetitive)	
Working temperature	-10 °C / +60 °C	
Storage temperature	-30 °C / +70 °C	
Visualization	1 row LED display	
Warning lamps	High water temperature Low oil pressure Generator Preheating/on-off input Low battery voltage	
Acoustic notification	Buzzer 5 – 30 Vcc	
Inputs	2 analogical inputs and 6 on-off inputs	
Outputs (on request)	Automatic engine stop Preheating	
RPM reading	Alternator "W" contact	
Temperature reading *	Veglia 40/120 °C VDO 40/120 °C Daewoo	
Preheating time vs. temperature	0 °C - 15 seconds	
	20 °C - 10 seconds	
	40 °C - 7 seconds	
	>50 °C - 0 seconds	
	< 0 °C - 20 seconds	
Damaged or no temperature reading -		
MEASUREMENT ACCURACY (excluding senders/transducers accuracy)		
RPM:	± 0,5% ± 1DGT	
TEMPERATURE:	± 2% ± 1DGT	
Valid from 10% to 90% of senders/transducers range		

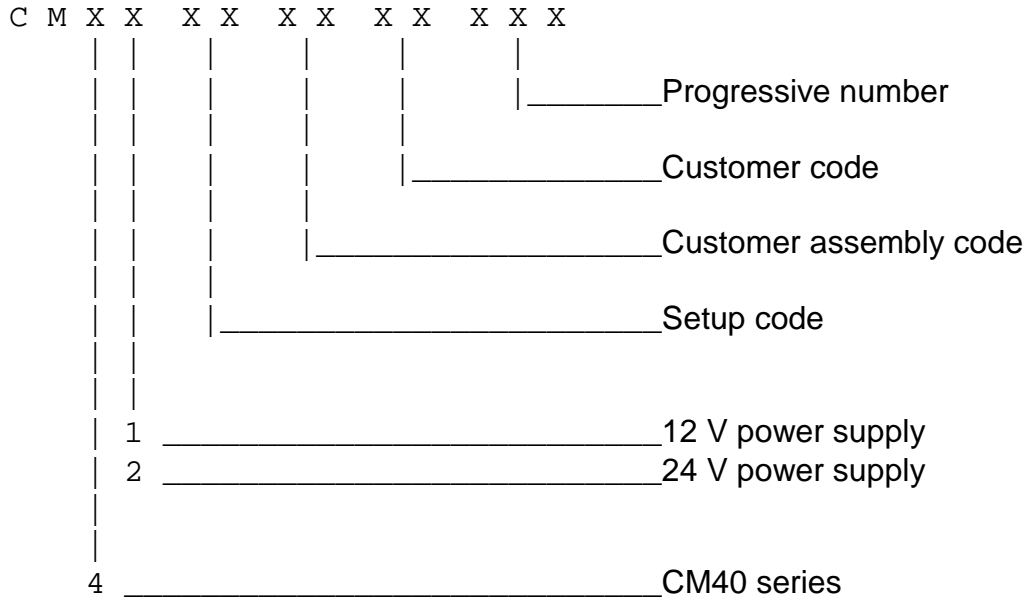
* For other transducer type, please contact PINE S.r.l.

17. DECLARATION OF CONFORMITY

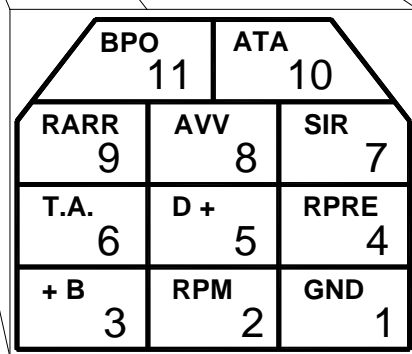
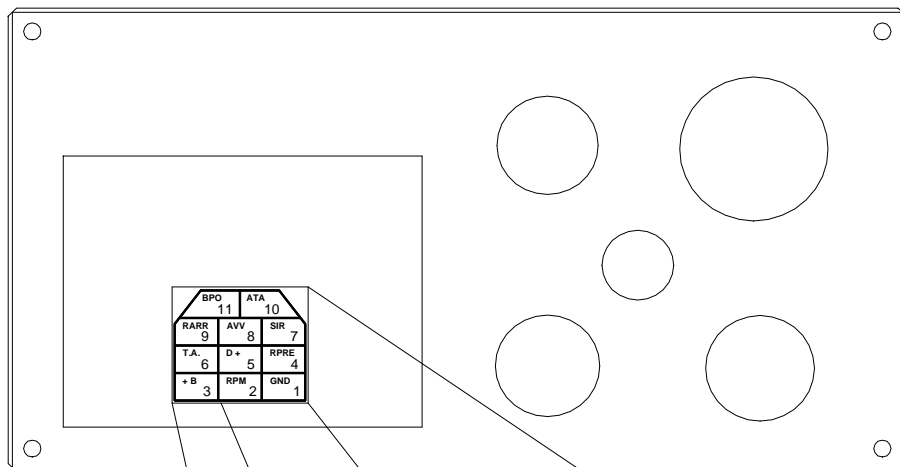


Manufactures declares that the engine control panel of series CM40 is in conformity at European requisition of electromagnetic compatibility and of safety with directives 73/23/EEC, 89/336/EEC, 92/31/EEC, 93/68/EEC and 93/97/EEC.

18. CODE DESCRIPTION



SERIE CM40 : VISTA POSTERIORE
CM40 SERIES : BACK VIEW

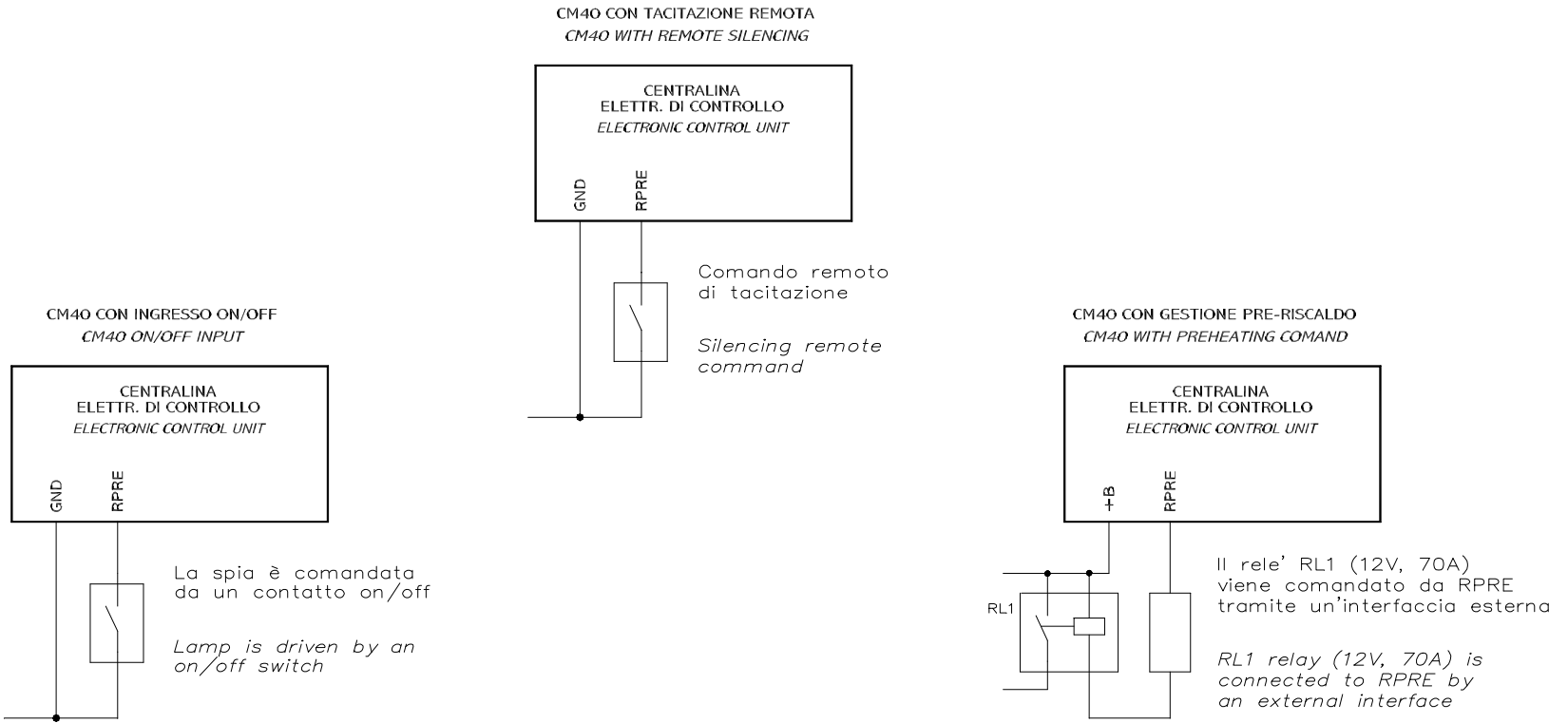


LEGENDA / LEGEND

- BPO** ALLARME BASSA PRESSIONE OLIO
LOW OIL PRESSURE ALARM
- ATA** ALLARME ALTA TEMPERATURA ACQUA
HIGH WATER TEMPERATURE ALARM
- RARR** COMANDO ARRESTO AUTOMATICO
AUTOMATIC STOP COMMAND
- 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
- RPRE** PRE-RISCALDO/TAC. REMOTA/ALLARME ON-OFF
PREHEATING/REMOTE SILENCING/ON-OFF INPUT
- +B** POSITIVO BATTERIA
POSITIVE POLE OF POWER SUPPLY
- RPM** LETTURA GIRI MOTORE
REVOLUTION SIGNAL
- GND** NEGATIVO BATTERIA
NEGATIVE POLE OF POWER SUPPLY

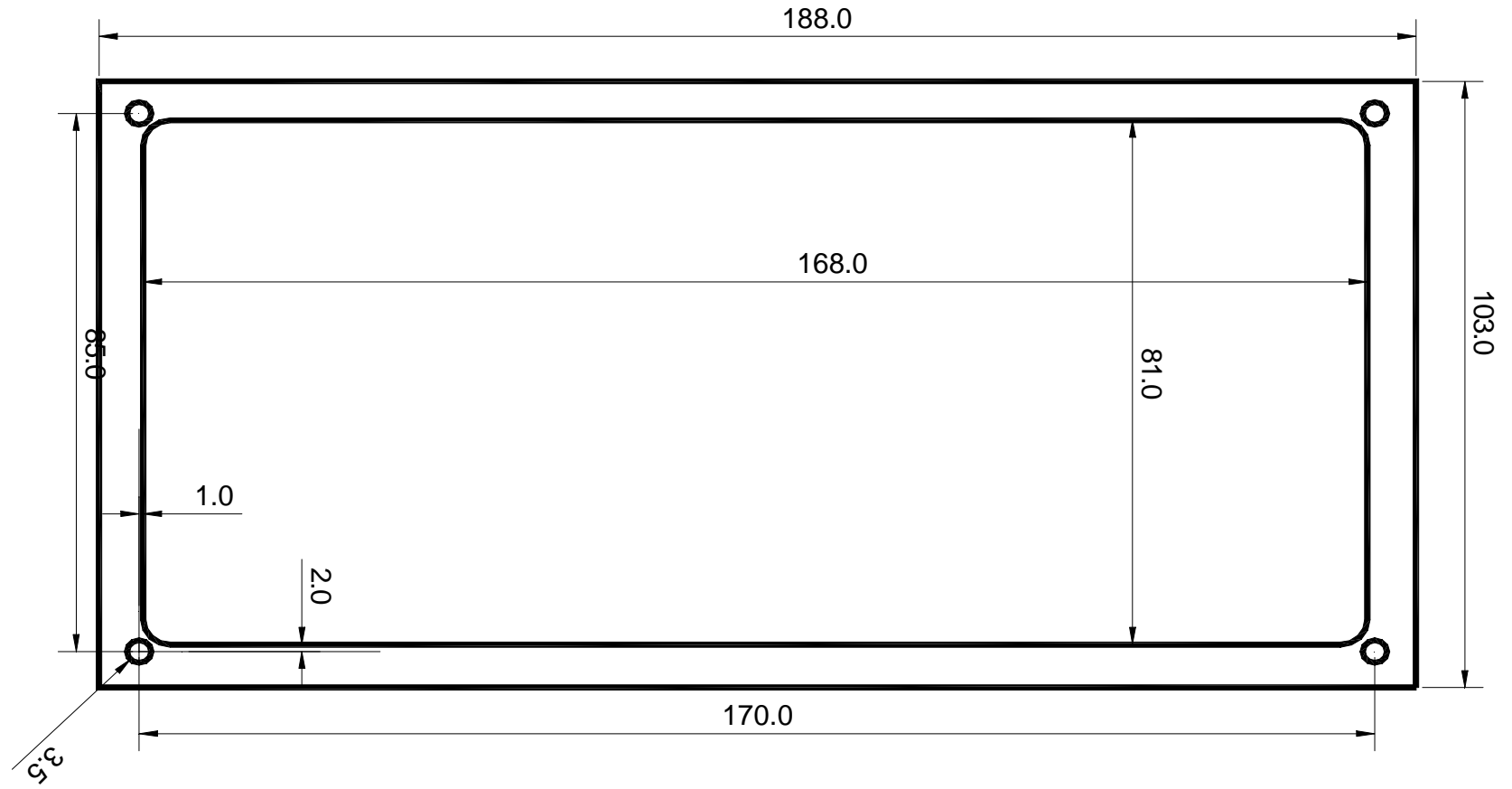
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CODICE / CODE : DSDXC40D1A	REV. / REV. : A	FOGLIO / SHEET : D1		APPROVATO / APPROVED : BOSCARATO A.	

SERIE/SERIES CM40



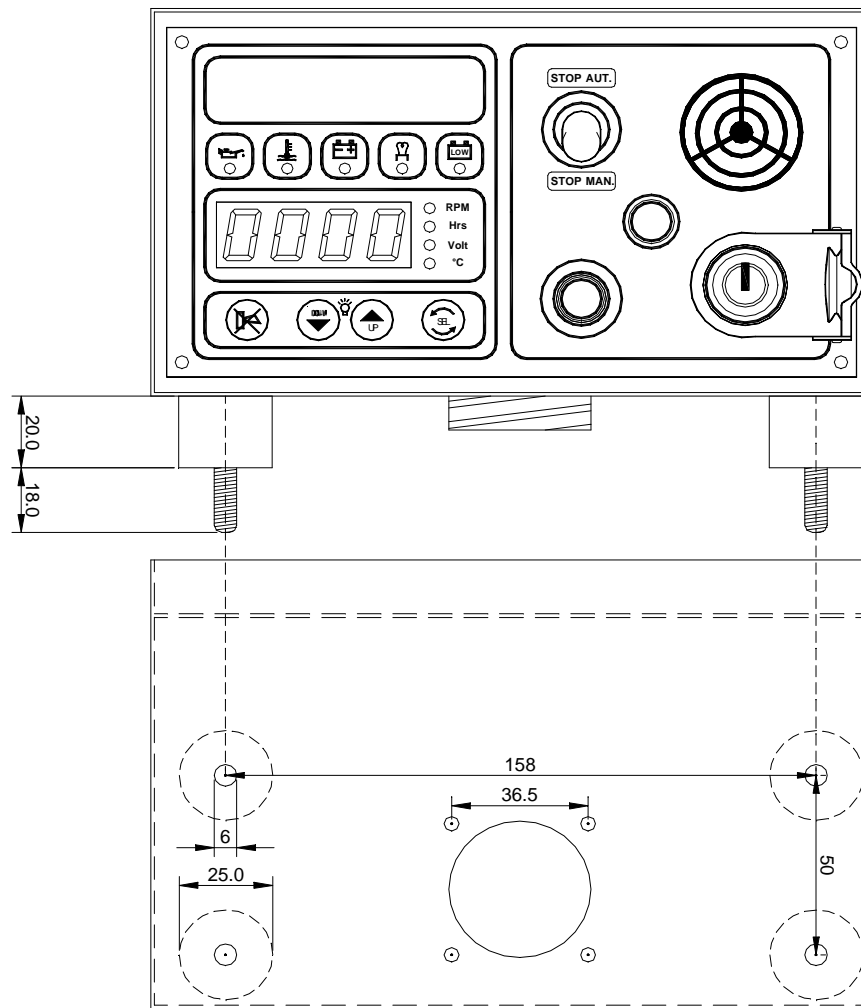
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DSDXC40D3A	A	D3		BOSCARATO A.	

SERIE / SERIES CM40



- 14 -

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DSDXC40D4A	24/09/2001		<p>DIME DI FORATURA CUTTING EDGE</p>	DA RE L.	
CODICE / CODE :	REV. / REV. :	FOGLIO / SHEET :			APPROVATO / APPROVED :
DSDXC40D4A	A	D4		BOSCARATO A.	



RIF. FILE / FILE REF. :	DATA / DATE :		DESCRIZIONE / DESCRIPTION :	DISEGNATO / DESIGNED :	 Chioggia (VE) - Italy
DSDXC40D5A	24/09/2001		SERIE / SERIES CM40	DA RE L.	
CODICE / CODE :	REV. / REV. :	FOGLIO / SHEET :	DIMA DI FORATURA PER CONTENITORE INDUSTRIALE CUTTING EDGE FOR INDUSTRIAL BOX	APPROVATO / APPROVED :	
DSDXC40D5A	A	D5		BOSCARATO A.	

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