

Be28 User's Manual

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Warranty

Bernini Design SRL (hereinafter "BD") warrants that Be28 shall be free from defect in material or workmanship for a period of 3 years from the BD delivery date. BD shall, at its option, repair or replace the product without charge. BD shall return the Be28 to the buyer with the Default parameters at no extra charge. The buyer shall furnish sufficient information on any alleged defects in the product, so as to enable BD to determine their cause and existence. If the Be28 is not defective, or the product is defective for reason other than covered by this warranty, the buyer will be charged accordingly. This warranty shall not apply if the Be28 has not been used in accordance with the User Manual and other operating instruction, particularly if any defects are caused by misuse, improper repair attempts, negligence in use or handling.

This equipment complies with the EMC protection requirements

WARNING!! High voltage is present inside the Be28. To avoid electric-shock hazard, operating personnel must not remove the protective cover. Do not disconnect the grounding connection. The Be28 can start the engine at anytime. Do not work on equipment, which is controlled by the Be28. When servicing the engine, disconnect the battery and battery charger. We recommend that warning signs be placed on equipment indicating the above.



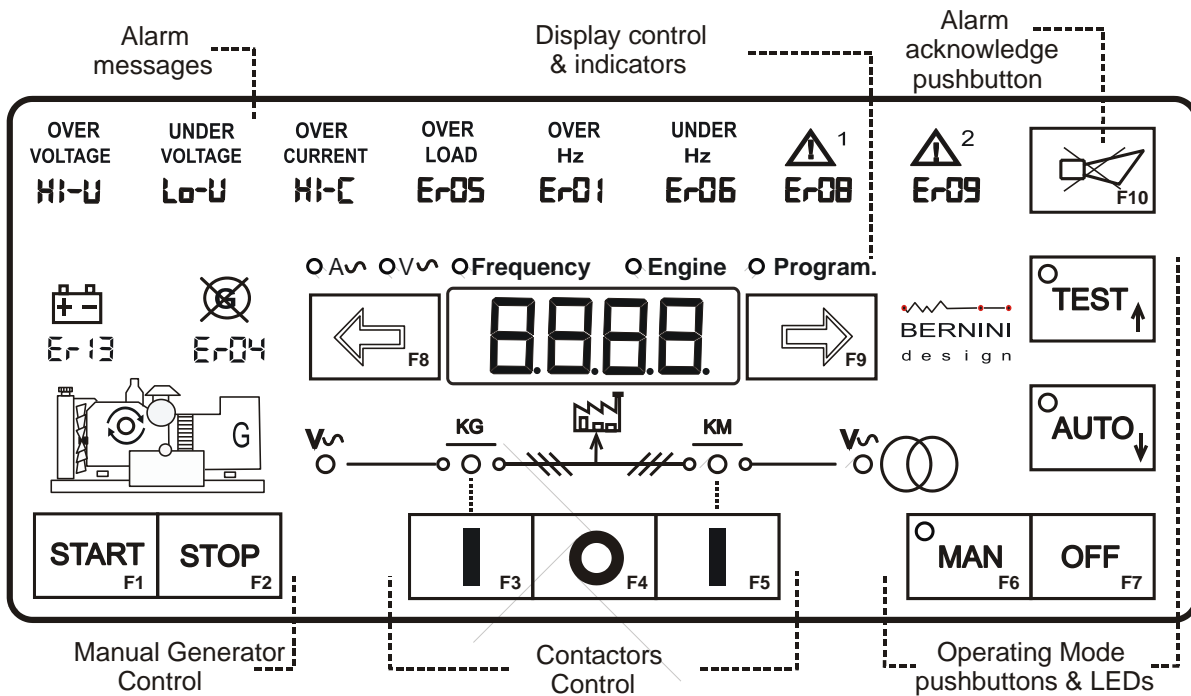
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Section 1.0 Introduction

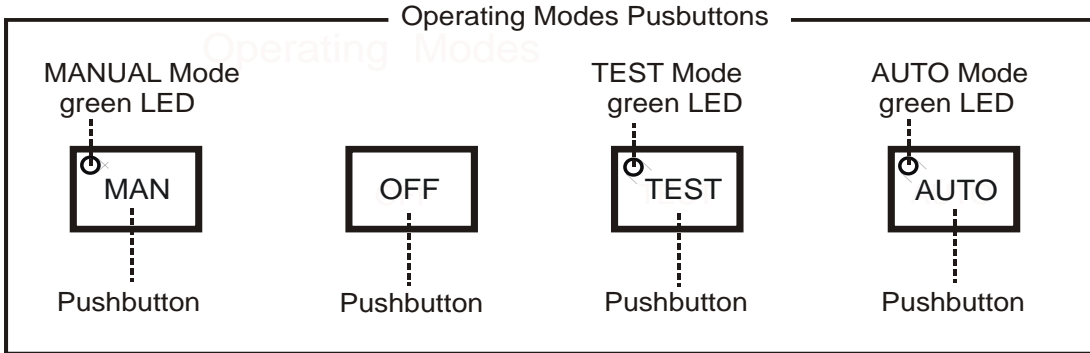
The Be28 integrates a 3-Phase Automatic Transfer Switch controller. The Be28 provides visual indication by means of LEDs and Display for the most important Electrical parameters, Alarms and Status of the contactors. It features OFF-MAN-AUTO & TEST mode of operation and provides a RS485 interface for remote control & monitoring. Figure 1 presents the panel layout.

Figure 1: Front Panel layout



Section 2.0 Mode of operation

A mode of operation is selected via pushbutton and indicated by means of a green LED:



Every time the power supply is switched on, the Be28 returns to the “AUTO” operating mode, if the BE28 was in TEST or AUTO prior to power down. In the other cases, the Be28 will enter the OFF mode.

2.1 OFF mode

Push the [OFF] pushbutton to enter the OFF mode. OFF mode clears the fault alarms. The Display and LEDs are turned off and a dot on the display will blink slowly. Push one of the pushbuttons on the front panel to energize the display. The display will turn off automatically after a few minutes.

2.2 MANUAL mode

The MANUAL mode allows you to manual control the Engine and Contactors.

Manual Engine Control	Instructions
	<p>Push the [MAN] pushbutton to select the MANUAL mode. Push the [START] pushbutton until engine starts; the display indicates the message [!!!] during the preheat and the message [. . .] during the starting attempts.</p> <p>When the engine is running, the green LED turns on. To stop the engine, push the [STOP] pushbutton until the [StOP] message appears on the display.</p>

To control manually the contactors follow the instructions:

Contactors Control Panel	Instructions
	<p>Select the MANUAL mode, start the engine (see above) and wait for voltage generator presence.</p> <p>Push the [I] (KG) pushbutton to close the contactor of the Generator. To transfer the Load to Mains, push the [I] (KM) pushbutton (the [KG] will open). To open a Contactor, push the [O] pushbutton.</p>



!! WARNING !!

LINE VOLTAGE IS EXPOSED WITHIN THE Be28, THE LOAD OR ANCILLARY CIRCUITRY EVEN WHEN THE GREEN LEDs ARE TOTALLY OFF

2.3 AUTO mode

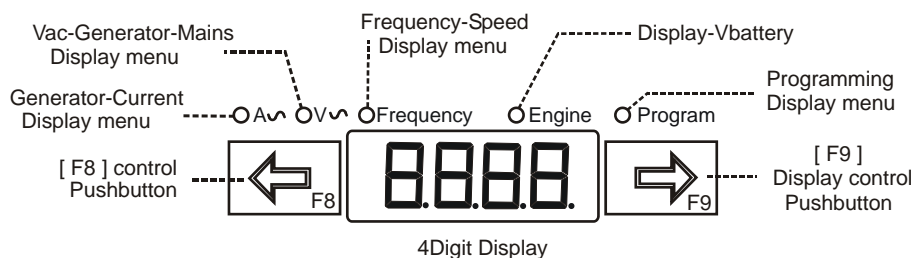
Push the [AUTO] pushbutton until the green LED 'AUTO' illuminates. The engine starts when the Be28 detects a Mains failure. The contactor of the MAINS (KM) opens after a delay. After the warm-up time, if the Voltage and Frequency are within the settings, the contactor of the Generator (KG) will close. If the Mains restores, the KG will open. The KM will close following a programmable changeover timing. The engine will stop after a cooling down time. If the engine shuts down, the KM closes only if the Mains is within the programmed settings. In AUTO mode, the Be28 can start and stop the engine according to programmable inputs also.

2.4 TEST mode

Push the [TEST] pushbutton until the green LED illuminates. The Be28 starts the engine and could transfer the load to the Generator according to the settings of the panel manufacturer. To stop the engine, select the AUTO mode (if the Mains is present) or stop the engine in MANUAL mode. If you push the [STOP] pushbutton when the Be28 is in AUTO or TEST, the [Er.09] will energize. To clear the alarm, select the OFF mode (section 7.0).

Section 3.0 Display measurements

The Be28 features a 4 Digit display, two pushbuttons and 5 yellow Leds as indicated below.



Use [←F8] and [F9→] to select a menu. Use [ACK-F10] (see the layout in section 1.0) to display the name of the function present on the display. The OFF mode shuts down the display and turns on the dot on the right side of it. Push a button to turn on the panel. The following table lists the functions of the display (see next page)

Display Function	Display indications (*)	Pushbutton(s)	Menu & Led indicator	
Current of the Generator (0 up to 1000A)	[A XXX] Ampere L1 [- XXX] Ampere L2 [_ XXX] Ampere L3	[←F8] or [F9→]	Aac menu	Yellow
	[A - G]	[ACK-F10]		
Voltage of the Generator (60V up to 998V)	[G XXX] Volt L1-L2 [- XXX] Volt L2-L3 [_ XXX] Volt L1-L3	[←F8] or [F9→]	Vac menu	Yellow
	[U - G]	[ACK-F10]		
Voltage of the Mains (60V up to 998V). When Mains is simulated, the display indicates the message [U-on]. (contact your panel manufacturer for details)	[n XXX] (V R-S) [- XXX] (V S-T) [_ XXX] (V T-R)	[←F8] or [F9→]		
	[U -on]	[ACK-F10]		
Generator Frequency (20Hz up to 70Hz)	[G XXX] Hz	[←F8] or [F9→]	Hz/RPM menu	Yellow
	[H - G]	[ACK-F10]		
Mains Frequency (20Hz up to 70Hz)	[n XXX] Hz	[←F8] or [F9→]		
	[H - n]	[ACK-F10]		
	[SPd]	[ACK-F10]		
Battery Voltage (5,5 Vdc up to 36Vdc)	[b XX.X] Vdc	[←F8] or [F9→]	Engine	Yellow
	[batt]	[ACK-F10]		
Charger Voltage (3.0 Vdc up to 36Vdc)	[c XX.X] Vdc	[←F8] or [F9→]		
	[Char.]	[ACK-F10]		

(*)NOTE: X indicates a numerical digit; if the measurement is not available the display will indicate [- - -]

Section 4.0 Display messages

The Be28 shows alarms (table 4.10) and messages (table 4.20). The presence of alarms is indicated by the blinking message [ALAr.]. Push the [→F9] pushbuttons to display the alarms one by one. Push the [←F8] pushbutton to display additional information about the alarm. Push [ACK-F10] to silence the HORN (if provided).

Table 4.10: Alarm messages

(!!!) NOTE: consult always your supplier or the user manual of the engine. A short description of the alarms is indicated below.

Display	Description of the Alarm	Display	Description of the Alarm
[Er.01]	Over Frequency Shutdown (!!!)	[Er. 13]	Battery Voltage Warning (!!!)
[Er.03]	Remote LOCK Shutdown.	[Hi-C]	Over Current Shutdown or Warning. (ooo)
[Er.04]	Alternator Failure Shutdown (!!!)	[Hi-U]	Over Voltage / Under Voltage Shutdown (ooo) Normally these alarms protect your Generator. Consult your supplier for further details.
[Er.05]	Overload Warning or Shutdown (ooo)	[Lo-U]	
[Er.06]		[InP.1]	
[Er.07]	Under Frequency Shutdown (ooo)	[InP.2]	
[Er.08]	Fail To STOP Shutdown (!!!)	[InP.3]	
[Er.09]	Emergency Shutdown. (Wait for the end of the Emergency condition before starting the engine).	[InP.4]	
[Er.09]	Emergency Shutdown from the Front Panel. (Cancel the Alarm and restart the engine).	[Er.11]	Fail To START Shutdown (!!!)

(ooo) NOTE: verify if you are Overloading the Generator: consult an electrician.

4.20 Miscellaneous messages

[rEst]	The Be28 is counting the rest time between the starting attempts	[. . . .]	The Be28 is cranking the engine.
[n-on]	MAINS simulated via an external switch.		
[' ' ' ']	The Be28 is performing the pre-glow.	[tEst]	The Be28 is in Test mode.
[StoP]	The Be28 is stopping the engine.	[- - - -]	Measurement out of range or disabled.
[U-uP]	Warm up time of the engine before closing the contactor of the generator.	[CoolL]	The engine is running off load for cooling.
[dEL]	Delay time before cranking.		

Section 5.0 LED indicators

To test the LEDs and DISPLAY push the [OFF] pushbutton; the display turns off. Push and hold the [←F8] and [F9→] pushbuttons simultaneously. The LEDs and DISPLAYs remain energised as long as the pushbuttons are pressed and held together.

Section 6.0 LOG Events

To have access to the LOG events follow the instructions:

- Push the [OFF] button.
- Push and hold the [STOP] button until the message [Hist.] appears on display (approx. 10 seconds).
- Release the [STOP] button.
- Using [←F8] and [F9→] you can browse the events E01 up to E100.
- Push the [STOP] button to display the code of the EVENT (see table 4.10 for the meaning of the codes). The message [----] indicates 'No Event' in the memory.
- To quit the LOG EVENTS push the [OFF] button.

Section 7.0 - Alarms, Warnings and Shutdowns

The Be28 features Shutdowns (the engine stops) and Warnings (the engine will continue to run) and provides:

- A**) - a general indication of alarm presence by means of the message [ALAr.] on the display
- B**) - symbols and ideograms on the front panel to indicate alarms (see Figure 1, section 1)
- C**) - display messages indicating warnings and shutdowns (see Table 4.10)
- D**) - a pushbutton to silence the Horn ([ACK-F10])

To silence the HORN (if provided by your Panel manufacturer), push the [ACK-F10] pushbutton.

To display details about the alarm, push the [←F8] pushbutton. To clear the alarm from the panel, remove the cause of the alarm and then press the [OFF] pushbutton. The Table 4.10 in section 4.0 indicates all alarms.

!!! WARNING !!! In case of Alarm consult always your supplier or the user manual of the engine

!! WARNING !!

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8.0 - Panel & Gen-set Builders Notes
