ZAPI® S.p.A.

ELECTRONIC • OLEODYNAMIC • INDUSTRIAL EQUIPMENTS CONSTRUCTION
Via Parma, 59 – 42028 – POVIGLIO (RE) – ITALY
Tel +39 0522 960050 (r.a.) – Fax +39 0522 960259
e-mail: zapi@zapispa.it – web: www.zapispa.it

EN

FREE VERSION

User Manual

CONSOLE ULTRA

NOTES LEGEND

The symbol aboard is used inside this publication to indicate an annotation or a suggestion you should pay attention.

The symbol aboard is used inside this publication to indicate an action or a characteristic very important as for security. Pay special attention to the annotations pointed out with this symbol.

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1 ZAPI CONSOLE DESCRIPTION

1.1 Connection to controller

The console is normally connected to the controller by a Molex Spox connector. But there are some controllers that don't have the Molex Spox connector.
In some cases it is necessary just an adapter to connect the console to the controller.
The adapter is a Molex Minifit Connector 8 pins Female (code C12414) in the case of:

- AC-3 (Minifit connectors version)
- AC-4 (Minifit connectors version)
- SICOS
- MHYRIO FLASH

or a Molex Minifit Connector 6 pins Female (code C12359) in the case of:

- COMBI SEM
- SEM1 CAN (Minifit connectors version)
- MPB.

In other controllers the console must be connected cabling the pins of the console connector to the pins of the controller connector; this is the case of:

- AC-3 (Amp Saab 42 poles connector version)
- AC-4 (Amp Saab 42 poles connector version)
- COMBIAC1.

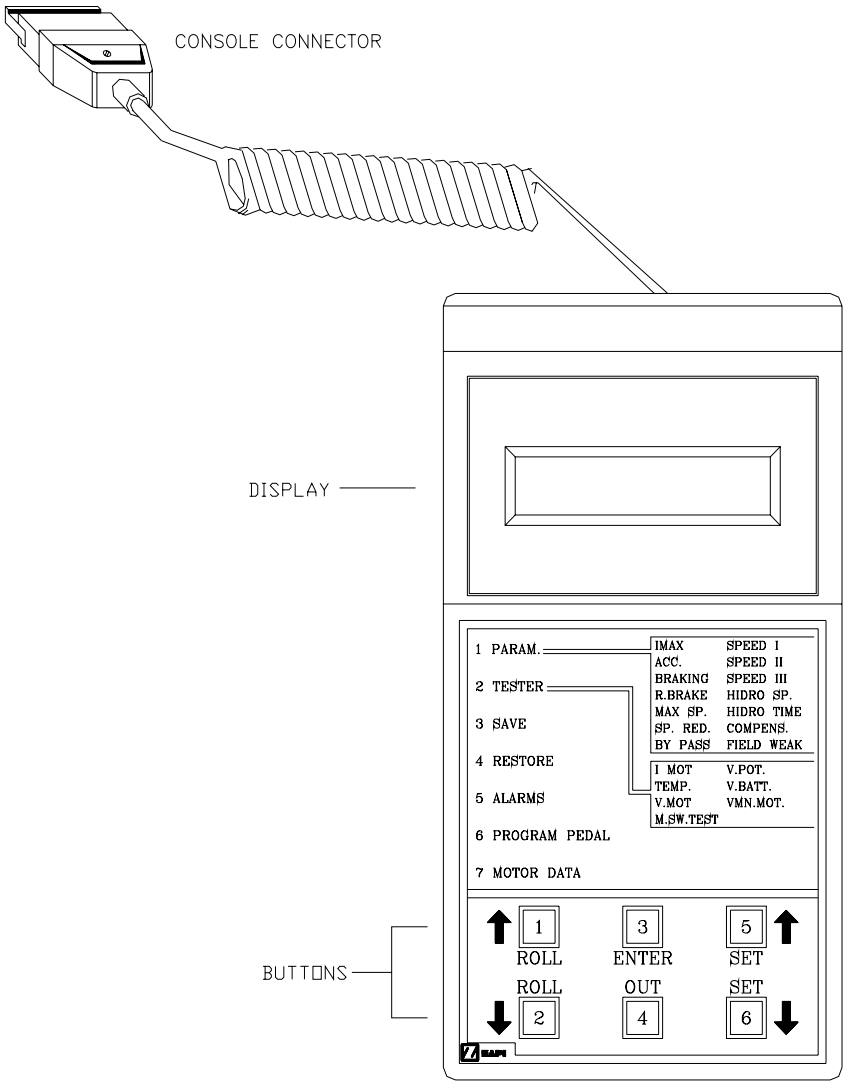
There are also some controllers that cannot be connected to the console; this is the case of:

- AC-3 (Amp Saab 29 poles connector version)
- AC-4 (Amp Saab 29 poles connector version)
- HVC
- SMART ANTENNA.

In this last case it is possible to communicate with the console via CAN-BUS.

1.2 Keyboard

Description of key functions:



Key 1	ROLL UP	It allows selection of an option or the next menu item.
Key 2	ROLL DOWN	It allows selection of an option or the previous menu item.
Key 3	ENTER	It allows confirmation of selected options.
Key 4	OUT	It allows exit from a menu.
Key 5	SET UP	It allows an increase in the parameters.
Key 6	SET DOWN	It allows a reduction in the parameters.

1.3 Display

When switched on, the console displays for a moment the following message:

ZAPI CONSOLE V 0.0

where V 0.0 is the console program release number.
This message is suddenly followed by a message informing about the controller which the console is connected to.
Example:

CONNECT TO: AC2T2D ZP1.13

where

AC0T2BE	is the controller model
ZP	is the Manufacturer's name
1.13	is the program release number

Then, if no alarms or errors are present, a set of information related to the controller is displayed, namely:

1) Controller model
2) Manufacturer's name
3) Program release version
4) Voltage
5) Current
6) Hour meter value.

Example:

AC2T2D ZP1.13 48V 350A 00000

where

AC2T2D	is the controller model
ZP	is the Manufacturer's name
1.13	is the program release number
48V	is the controller voltage
350A	is the controller current
00000	is the hour meter value.

If an alarm is present when you connect the console, the display doesn't show the set of information related to the controller as described above.
To display the model and the software release of the controller it is necessary to repeat some times the console reset procedure, which is described in the next paragraph.

1.4 Console reset procedure

To reset the connection between controller and console it is necessary to simultaneously press key 2 (ROLL DOWN), 4 (OUT) and 6 (SET DOWN). In this way it is possible to restart the console and display the software version of the consol and the controller.

1.5 General description of functions

1) **PARAM.**
   The controller parameters can be displayed and programmed via the keyboard thereby allowing to set the controller easily.
2) **TESTER**
   It allows to display the state of the controller analogue and digital values and thereby have a useful tool for the analysis of controller operation and external cables.
3) **SAVE**
   It allows to store all values relating to the parameters and the controller hardware configuration into the console with a program which can be selected from the keyboard.
4) **RESTORE**
   It allows to program a controller with the parameters contained in a program generated by a SAVE.
5) **ALARMS**
   The console has the possibility to read the last five alarm messages stored in the controller and displayed together with the time of occurrence, the number of times the alarm was sent and the controller temperature at the time of the alarm.
6) **PROGRAM PEDAL**
   It allows to program the accelerator maximum stroke.
7) **MOTOR DATA**
   This function allows the engineer to record the motor's electrical parameters in the controller memory; the characteristics memorized vary between motors and are used during reversal, allowing more efficient control of the motor current.
   This procedure requires an input of answers to questions displayed on the console, automatically leaving "motor data" routine upon completion.

2 DESCRIPTION OF THE CONFIG MENU

Using the CONFIG MENU of the programming console, the user can configure the controller.
Simultaneously pressing ROLL UP (No. 1) and SET UP (No.5) for approximately 1 sec you enter the CONFIG MENU which consists of the following functions:

1) SET MODEL
2) SET OPTIONS
3) ADJUSTMENTS.

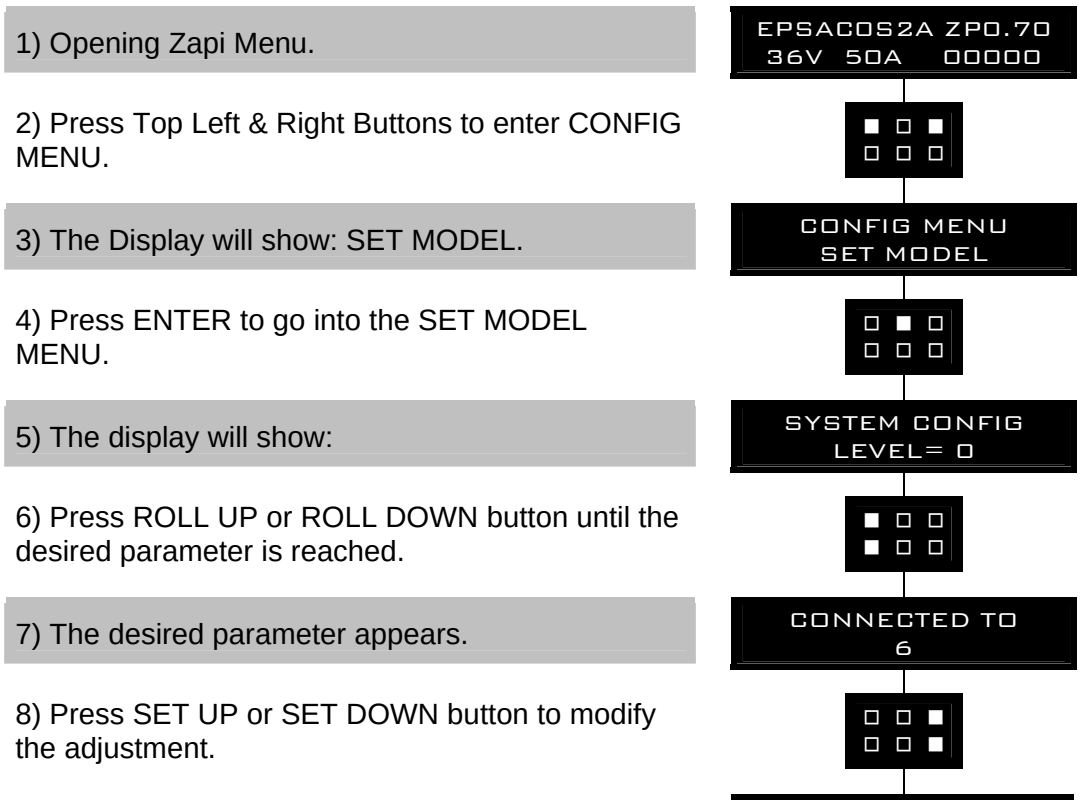
2.1 Description of SET MODEL menu

When you enter the SET MODEL menu the display shows the name of the first parameter with the corresponding value.
Example:

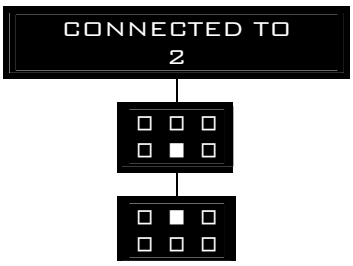
SYSTEM CONFIG LEVEL = 0

Pressing the ROLL UP (No. 1) and ROLL DOWN (No. 2) keys you can scroll the parameters while with the SET UP (No. 5) and SET DOWN (No. 6) keys you can change the value.
The UP key allows you to increase the level while by pressing the DOWN key you decrease the level.
Pressing the OUT key (No. 4) you return to the config menu.

Flow chart showing an example of how to make changes to SET MODEL Menu.



9) The Display will show the new value.



10) Press OUT.

11) Press ENTER to confirm.

12) Repeat the same from 5 to 10 points for the other adjustments.

2.2 Description of SET OPTIONS menu

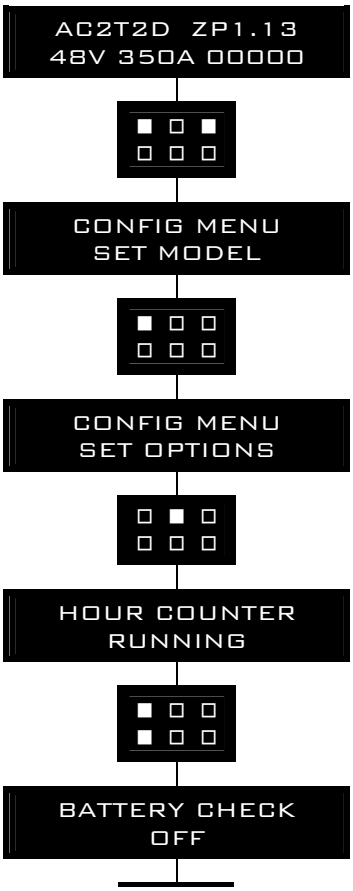
When you enter the SET OPTIONS menu the display shows the name of the first parameter with the corresponding option.
Example:

HOUR COUNTER RUNNING

Pressing the ROLL UP (No. 1) and ROLL DOWN (No. 2) keys you can scroll the parameters while with the SET UP (No. 5) and SET DOWN (No. 6) keys you can change the option.
Pressing the OUT key (No. 4) you return to the config menu.

Flow chart showing an example of how to make changes to SET OPTIONS Menu.

1) Opening Zapi Menu.



2) Press Top Left & Right Buttons to enter SET Menu.

3) The Display will show: SET MODEL.

4) Press ROLL UP or ROLL DOWN button until SET MODEL Menu appears.

5) SET OPTIONS appears on the display.

6) Press ENTER to go into the SET MODEL Menu.

7) The display will show the first OPTION.

8) Press ROLL UP or ROLL DOWN button until desired OPTION appears.

9) Desired OPTION appears.

10) Press SET UP or SET DOWN button in order to modify the changes.

11) New OPTION appears.

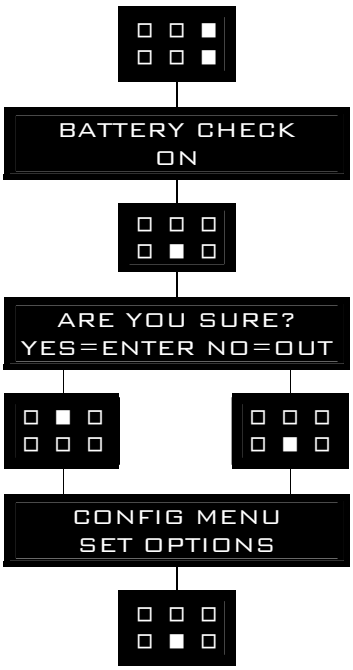
12) Press OUT to exit the Menu.

13) Confirmation request appears.

14) Press ENTER to accept the changes, or press OUT if you do not accept the changes.

15) SET OPTIONS Menu appears.

16) Press OUT again. Display now shows the Opening Zapi Menu.



2.3 Description of ADJUSTMENTS menu

When you enter the ADJUSTMENTS menu the display shows the name of the first parameter with the corresponding value.
Example:

SET BATTERY TYPE 48V

Pressing the ROLL UP (No. 1) and ROLL DOWN (No. 2) keys you can scroll the parameters while with the SET UP (No. 5) and SET DOWN (No. 6) keys you can change the value.
Pressing the OUT key (No. 4) you return to the config menu.

Flow chart showing an example of how to make changes to ADJUSTMENTS Menu.

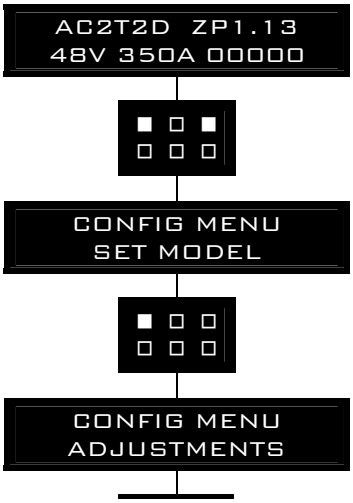
1) Opening Zapi Menu.

2) Press Top Left & Right Buttons to enter CONFIG Menu.

3) The display will show: SET MODEL.

4) Press ROLL UP or ROLL DOWN button until ADJUSTMENTS Menu appears.

5) ADJUSTMENTS appears on the display.



6) Press ENTER to go into the ADJUSTMENTS Menu.

7) The display will show SET BATTERY TYPE.

8) Press ROLL UP or ROLL DOWN button until the desired parameter is reached.

9) The desired parameter appears.

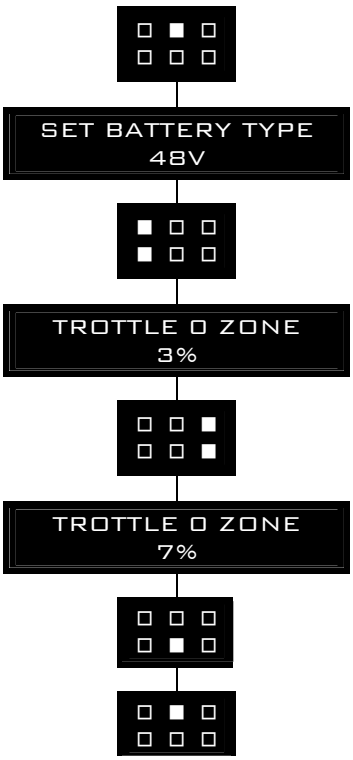
10) Press SET UP or SET DOWN button to modify the adjustment.

11) The display will show the new adjustment.

12) Press OUT.

13) Press ENTER to confirm.

14) Repeat the same from 5 to 12 points for the other adjustments.



3 DESCRIPTION OF THE MAIN MENU

Pressing the ENTER key you enter the MAIN MENU which consists of the following functions:

1) PARAMETER CHANGE
2) TESTER
3) SAVE PARAMETER
4) RESTORE PARAMETER
5) ALARMS
6) PROGRAM VACC
7) MOTOR DATA.

Pressing the ROLL UP (No. 1) and ROLL DOWN (No. 2) keys you can scroll the functions while with the ENTER key (No. 3) you can confirm the selected function.
Selecting OUT (key No. 4) you return to the main menu.

3.1 Description of PARAMETER CHANGE menu

Parameter modification can be made directly by ZAPI on customer specifications, or by the customer, making the adjustments using the programming console.
When you enter the PARAMETER CHANGE menu the display shows the name of the first programmable parameter with the corresponding value.
Example:

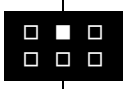
ACCELER. DELAY LEVEL = 4

Pressing the ROLL UP (No. 1) and ROLL DOWN (No. 2) keys you can scroll the parameters while with the SET UP (No. 5) and SET DOWN (No. 6) keys you can change the levels.
The UP key allows you to increase the level while by pressing the DOWN key you decrease the level.
Pressing the OUT key (No. 4) you return to the main menu.

Flow Chart showing an example of how to make Programme changes using Digital Console fitted with Eprom CK ULTRA.

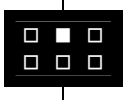
1) Opening Zapi Display.

2) Press ENTER to go into the General Menu.



3) The Display will show:

4) Press ENTER to go into the Parameter Change facility.



5) The Display will show the first parameter.

6) Press either ROLL UP and ROLL DOWN to display the next parameter.

7) The names of the Parameters appear on the Display.

8) When the desired Parameter appears, the Display will show a Level Number that will be Between 0 and 9. Press either SET UP (Top Right) or SET DOWN (Bottom Right) buttons to change the Level value.

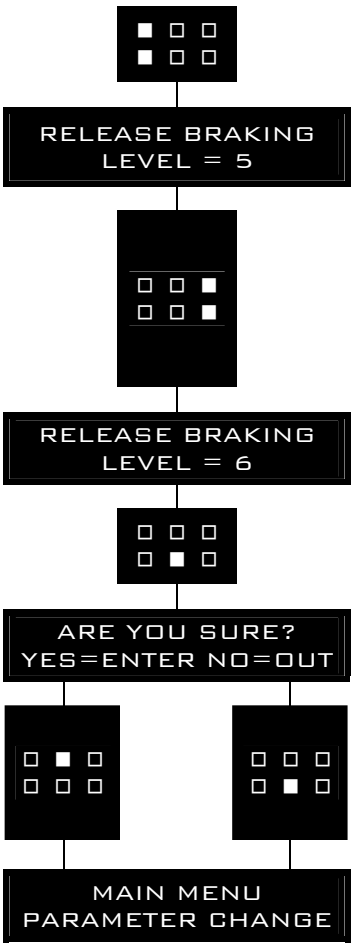
9) The Display will show the New Level.

10) When you are satisfied with the results of the changes you have made, press OUT.

11) The Display asks “ARE YOU SURE?”.

12) Press ENTER to accept the changes, or press OUT if you do not wish to accept the changes and wish to make further modifications to the parameters.

13) The Display will show:



3.2 Description of TESTER menu

The most important input or output signals can be measured in real time using the TESTER function of the console. The Console acts as a multimeter able to read voltage, current and temperature.
When you enter the TESTER menu the display shows the name of the first parameter with the corresponding value.
Example:

MOTOR VOLTAGE …%

Pressing the ROLL UP (No. 1) and ROLL DOWN (No. 2) keys you can scroll all the signals available on the controller connectors.
Pressing the OUT key you can return to the main menu.
Remember it is not possible to make any changes using TESTER. All you can do is measure as if you were using a pre-connected multimeter.

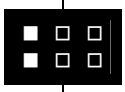
Flow Chart showing an example of how to use the TESTER function of the Digital Console.

1) Opening Zapi Display.

2) Press ENTER to go into the General menu.

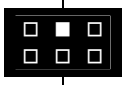
3) The Display will show:

4) Press ROLL UP or ROLL DOWN button until TESTER MENU appears on the display.

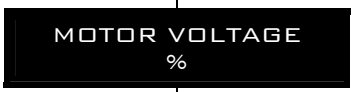


5) The Display shows:

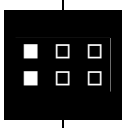
6) Press ENTER to go into the TESTER function.



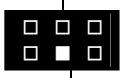
7) The first variable to be tested is shown on the Display.



8) Press either ROLL UP or ROLL DOWN buttons until your desired variable for measurement appears on the Display.

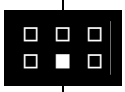


9) When you have finished, press OUT.



10) The Display shows:

11) Press OUT again and return to Opening Zapi Display.



3.3 Description of SAVE menu

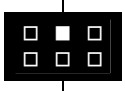
The SAVE function allows the operator to transmit the Parameter values and Configuration data of the controller into the Console memory. It is possible to load 16 different programmes.
The information saved in the Console memory can then be reloaded into another controller using the RESTORE function.
The data that is available via the SAVE function is as follows:

- all parameter values (PARAMETER CHANGE)
- options (SET. OPTIONS)
- the level of the battery (ADJUST BATTERY).

Flow Chart showing an example of how to use the SAVE function of the Digital Console.

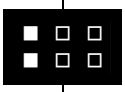
1) Opening Zapi Display.

2) Press ENTER to go into the General menu.



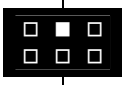
3) The Display will show:

4) Press ROLL UP or ROLL DOWN button until SAVE PARAM. appears on the display.



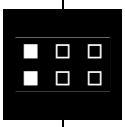
5) The Display will show:

6) Press ENTER to go into the SAVE function.



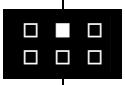
7) If this facility has been used before, the type of inverter data stored appears on the top Main with a 2 digit reference.

8) Keep pressing either ROLL UP or ROLL DOWN keys until the second Main indicates a FREE storage facility.



9) The Display will show:

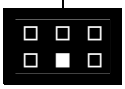
10) Press ENTER to commence SAVE routine.



11) You can see the items that are being stored whilst the SAVE routine is happening.

12) When finished, the Console shows:

13) Press OUT to return to the Opening Zapi Display.



3.4 Description of RESTORE menu

The RESTORE PARAM. function allows transfer of the Console's stored data into the memory of the controller. This is achieved in a fast and easy way using the method previously used with the SAVE PARAM. function.
The data that is available via the RESTORE PARAM. function is as follows:

- all parameter values (PARAMETER CHANGE)
- options (SET OPTIONS)
- the level of the battery (ADJUST BATTERY).

ATTENTION: When the RESTORE operation is made, all data in the controller memory will be written over and replace with data being restored.

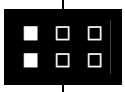
Flow Chart showing an example of how to use the RESTORE function of the Digital Console.

1) Opening Zapi Display.

2) Press ENTER to go into the General menu.

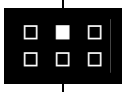
3) The Display will show:

4) Press ROLL UP or ROLL DOWN button until RESTORE PARAM. appears on the Display.



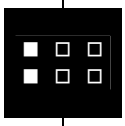
5) The Display will show:

6) Press ENTER to go into the RESTORE PARAM. Function.



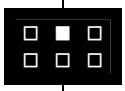
7) The Display shows the type of Model stored, with a Code Number.

8) Keep pressing either ROLL UP and ROLL DOWN buttons until the desired model appears on the Display.



9) The Display will show:

10) Press ENTER to commence the Restore operation.



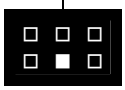
11) The Display will ask “ARE YOU SURE?”.

12) Press ENTER for YES, or OUT for No.

13) You can see the items that are being stored in the inverter memory whilst the RESTORE routine is happening.

14) When it is finished the Console displays:

15) Press OUT to return to the Opening Zapi Display.



3.5 Description of ALARMS menu

When you enter the ALARMS menu the display shows the first alarm stored in the controller memory.
Items remembered relative to each Alarm are: the code of the alarm, the number of times the particular Alarm occurred, the Hour Meter count, and the controller temperature.
This function permits a deeper diagnosis of problems as the recent history can now be accessed.
Pressing the ROLL UP (No. 1) and ROLL DOWN keys (No. 2) you can scroll the

last 5 alarms which have been sent.
Example:

CODE 00005 #02 20°C

where
CODE is the code of the alarm
00005 is the Hour Meter count at which the alarm was sent
#02 is the number of times that the alarm was sent
20°C is the temperature in degrees centigrade at the time of the alarm.
If the display shows

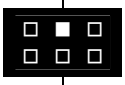
ALARM NULL

then no alarm has been stored in the controller.
By selecting the OUT key (No. 4) you return to the main menu.

Flow Chart showing an example of how to use the ALARMS function via the Digital Console.

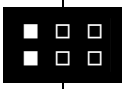
1) Opening Zapi Display.

2) Press ENTER to go into the General menu.



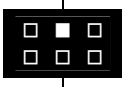
3) The Display will show:

4) Press ROLL UP or ROLL DOWN button until PARAMETER CHANGE appears on the display.



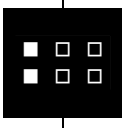
5) The Display will show:

6) Press ENTER to go into the ALARMS function.



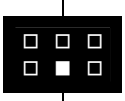
7) The Display will show the most recent Alarm.

8) Each press of the ROLL UP button brings up following Alarms. Pressing ROLL DOWN returns to the most recent.



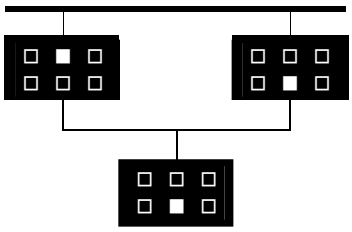
9) If no Alarm has occurred, the Display will show: ALARM NULL.

10) When you have finished looking at the Alarms, press OUT to exit the ALARMS menu.



11) The Display will ask “CLEAR LOGBOOK?”.

12) Press ENTER for yes, or OUT for NO.

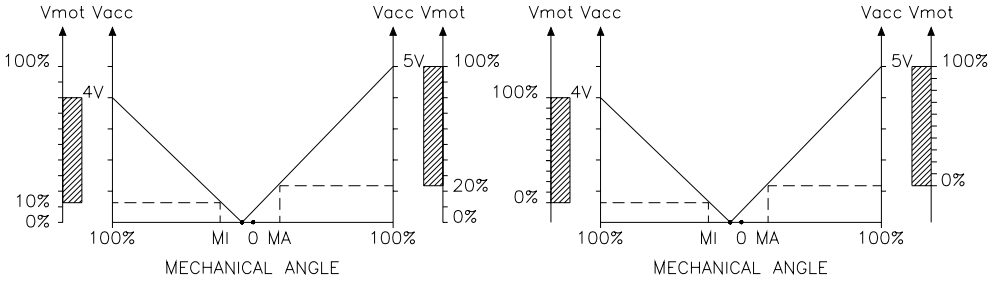


13) Press OUT to return to the Opening Zapi Display.

3.6 Description of PROGRAM VACC menu

The Procedure for automatic potentiometer signal acquisition is carried out using the Console.
The PROGRAM VACC function enables adjustment of the minimum and maximum useful signal level, in either direction. This function is unique when it is necessary to compensate for asymmetry with the mechanical elements associated with the potentiometer, especially relating to the minimum level.

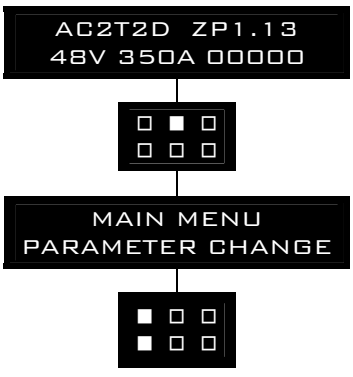
The two graphs show the output voltage from a non-calibrated potentiometer with respect to the mechanical “zero” of the control lever. MI and MA indicate the point where the direction switches close. 0 represents the mechanical zero of the rotation.
The Left Hand graph shows the relationship of the motor voltage without signal acquisition being made. The Right Hand Graph shows the same relationship after signal acquisition of the potentiometer.



This function looks for and remembers the minimum and maximum potentiometer wiper voltage over the full mechanical range of the pedal.
The operation is performed by operating the pedal after entering the PROGRAM VACC function.

Flow Chart showing an example of how to use the PROGRAM VACC function of the Digital Console.

1) Opening Zapi Display.



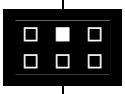
2) Press ENTER to go into the General Menu.

3) The Display will show:

4) Press ROLL UP or ROLL DOWN button until PROGRAM VACC appears on the display.

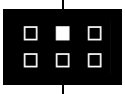
5) The Display will show:

6) Press ENTER to go into the PROGRAM VACC routine.



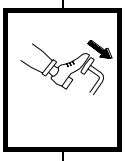
7) The Display will show the minimum and maximum values of potentiometer wiper output. Both directions can be shown.

8) Press ENTER to clear these values. Display will show 0.0.



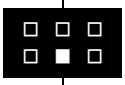
9) Select Forward Direction, close any interlock switches that may be in the system.

10) Slowly depress the accelerator pedal (or tiller butterfly) to its maximum value. The new minimum and maximum voltages will be displayed on the Console plus an arrow indicating the direction.



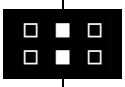
11) Select the Reverse Direction and repeat Item 10.

12) When finished, press OUT.



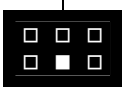
13) The Display will ask: “ARE YOU SURE?”.

14) Press ENTER for yes, or OUT for NO.



15) When finished, the Console shows:

16) Press OUT again to return to the Opening Zapi Menu.



3.7 Description of MOTOR DATA menu

This menu is present only in some choppers; in the modern controllers it is not available.
When entering this menu the display shows:

BLOCK MOTOR PLEASE

The console display requires that the operator stops the motor from rotating.
If ENTER (No. 3) is pressed the display shows:

SELECT FORWARD DIRECTION

The console display requires that the operator selects the forward direction.
If you press ENTER (key No. 3) the display shows:

ARE YOU SURE?

By pressing ENTER (key No. 3) again the display shows:

WAIT!

If all console instructions have been accurately followed the motor parameters are calculated and stored into the controller memory.
At the end of processing the program returns to the main menu.
The above procedure can be interrupted at any time returning to the main menu by simply pressing the OUT key.