CONTENTS

INTRODUCTION

The PCC 100/200 Calibrator/Controller accepts commands from either the front panel, a serial link, or IEEE488 to measure or control pressures.

The calibrator operates in one of two major modes, Local and Remote. In the Local mode, the calibrator accepts commands from the front panel keypad and outputs data to the front panel display. In the Remote Mode, the calibrator accepts commands and outputs data over the RS-232 serial communication link or an optional IEEE488 connection. The front panel keypad is disabled while the PCC 100/200 is in the remote mode.

Switching between modes is performed locally by pressing the REMOTE key or remotely by issuing the LOCAL command. This is further discussed later in this chapter.

The PCC 100/200 Controller/Calibrator may only be configured while in remote mode operation. This is discussed later in the chapter.

LOCAL MODE

This section describes operation from the front panel. During Local Mode operation, no communication is possible over the serial or parallel links. The Local Mode supports most, but not all, of the commonly used commands.

DISPLAY

The front panel display consists of a 2 row by 20 column vacuum fluorescent display. Each row on the display performs certain functions.

The top row of the display:

1) Flashes the software version number upon power up.
2) Displays "REMOTE MODE" when in Remote Mode.
3) Displays the command either currently executing or just previously executed when in local mode.

The second line of the display:

1) Stages the command being entered prior to execution.
2) Continually displays pressure when commanded.
3) Displays error message(s) when required.

KEYPAD

The front panel keypad is used for entering commands for local operation and supports most commonly used commands. Each key function is described in the table below:

KEY NAME	KEY DESCRIPTION	NOTES
EC	Energize Closure command.	Only responds when the cursor is in the first column
YES	**Yes** argument to EC command.	Only responds after the EC button is pushed.
NO	**No** argument to EC command.	Only responds after the EC button is pushed.
READ PRESS	Read Pressure command.	Only responds when the cursor is in the first column
SPACE	Causes cursor to move one position to the right.	Only responds after the EC or GO PRESS button is pushed
BACK SPACE	Causes cursor to move one position to the left.	Only responds after the EC or GO PRESS button is pushed.
GO PRESS	Go Pressure command.	Only responds when the cursor is in the first column.
ZERO	Zero command - Vents Pressure	Only responds when the cursor is in the first column.
RESET	Initialize Calibrator command.	Only responds when the cursor is in the first column.
ENTER	Executes the command displayed on the staging line.	Always active.
0 - 9 Function 1	Display one of 10 pre-programmed commands.	Only responds when the cursor is in the first column.
0 - 9 Function 2	Argument data entry.	Only responds after the EC or GO PRESS button is pushed.
DECIMAL POINT	Argument data entry.	Only responds after the GO PRESS button is pushed.
UP ARROW Function 1	Scrolls up through pre-programmed commands.	Only responds when the cursor is in the first column.
DOWN ARROW Function 1	Scrolls down through pre-programmed commands.	Only responds when the cursor is in the first column.
UP ARROW Function 2	Increments the digit under the cursor.	Only responds after the EC or GO PRESS button is pushed.
DOWN ARROW Function 2	Decrements the digit under the cursor.	Only responds after the EC or GO PRESS button is pushed.
REMOTE Function 1	Remote command.	Switches to the remote mode from the local mode.
REMOTE Function 2	Local command.	Switches to the local mode from the remote mode.
MINUS SIGN	Clears staged command.	Always active.

LOCAL FUNCTIONS

This section describes the local mode functions and the steps necessary to perform these functions using the front panel keypad.

ENERGIZE CLOSURE

The PCC 100 contains 7 electronically switched circuits referred to as closure circuits. Two of these, 1 and 2, control internal solenoid valves. Four, numbered nine through twelve, are brought out through a back panel connector.

The PCC 200 contains 12 electronically switched circuits referred to as closure circuits. Eight of these, 1 through 8, control internal solenoid valves. Four, numbered Nine through twelve, are brought out through a back panel connector.

The user can manually control each of these closure circuits using the EC command.
To execute this command:

1) Press the EC key.
2) Press any number key 0 through 12 to enter the closure number desired.
3) Press either the YES or NO key to energize or de-energize the closure.
4) Press the ENTER key to execute the command

READ PRESSURE

This command continuously displays the current pressure in the chosen pressure units.

To execute this command:

1) Press the READ PRESS key
2) Press the ENTER key to execute the command.
3) Pressing any key will stop the display of pressure and place the cursor in column one. This indicates that the calibrator is ready to accept another command.

GO PRESSURE

This command causes the calibrator to output and control the indicated pressure. The pressure is displayed continuously.

To execute this command:

1) Press the GO PRESS key.
2) The desired pressure value may be entered by one of two ways:
    a) Use the number keys and decimal point to enter the pressure desired.
    b) Press the UP ARROW or DOWN ARROW to increment or decrement the digit under the cursor. The cursor may be moved to the right or left by pressing the SPACE or BACK SPACE keys.
3) Press the ENTER key to execute the command.
4) Pressing any key will stop the display of pressure and place the cursor in column one. This indicates that the calibrator is ready to accept another command.

ZERO PRESSURE

This command causes the calibrator to vent the input/output pressure to the Line Vent fitting on the rear panel and continuously display the pressure. Barometric Pressure will be displayed if the Line Vent is connected to, or is open to, Atmospheric Pressure, and the calibrator is set to display absolute pressures.

To execute this command:

1) Press the ZERO key.
2) Press the ENTER key.
3) Pressing any key will stop the display of pressure and place the cursor in column one. This indicates that the calibrator is ready to accept another command.

RESET CALIBRATOR

This command resets the calibrator to its power up state.

To execute this command:

1) Press the RESET key.
2) Press the ENTER key.

NOTE: This command should not be used to obtain a zero reading. It is possible to trap some small pressure using this command if the output of the calibrator is not open to atmosphere.

REMOTE / LOCAL TOGGLE SWITCH

This command causes the calibrator to switch between Local Mode and Remote Mode.

To execute this command when the calibrator is in Local Mode:

1) Press the REMOTE key.
2) Press ENTER key.

The calibrator will display REMOTE MODE on line one of the display. No local cursor is displayed and a prompt is issued over the serial link indicating that it is ready to accept a command remotely.

To execute this command when the calibrator is in Remote Mode:

1) Press the REMOTE key.

The calibrator will display the cursor on line two indicating that the calibrator can accept commands locally.

PRE-PROGRAMMED COMMANDS

The calibrator can execute any one of ten pre-programmed commands. These commands are accessed by pressing one of the number keys (0 through 9) when the cursor is in the first column. Additionally, the user may scroll through the pre-programmed commands by pressing the UP ARROW or DOWN ARROW when the cursor is in the first column. Each command is displayed on the staging line.

After the command is displayed on the staging line, it is executed by pressing ENTER key or cleared by pressing the MINUS key.

Programming the pre-programmed commands is only possible through the Remote Mode and is covered in that section.

REMOTE MODE

In the Remote Mode, the calibrator can accept commands and transmit data via an RS-232 serial communications link or an IEEE-488 parallel communications link. All commands are transferred in 8 bit standard ASCII code with no parity. Commands are not case sensitive. The local display only shows REMOTE MODE on line one when in the Remote Mode. Typically, the serial link is connected to a terminal, computer running a communication software, such as Procomm, or a computer controlling a test or calibration.

The calibrator can execute all commands in the Remote Mode. The commands are grouped into the following three groups: 1) control, 2) configuration, and 3) diagnostics. The following section describes each command by these three groups.

In all cases the calibrator will transmit a prompt ">" indicating that it is ready to accept a new command.

NOTE: The calibrator cannot be switched to or from the remote mode using an external source. It may only be switched using the REMOTE key on the front panel keypad. For more information, refer to the REMOTE/LOCAL toggle switch section on page 2-6.

CONTROL COMMAND GROUP

The control command group specifies a pressure or pressures, reads a pressure, or sets closure circuits. Each command is defined below:

READ PRESSURE

SYNTAX: RP [/C] <ENTER>
C - causes continuous display of the pressure.

RETURNS: *pressure units*
pressure - is the current calibrator pressure.
units - is the chosen pressure units.

DESCRIPTION: Transmits the current pressure in the user chosen units. If the /C option is used the pressure is continuously displayed until an <ESC> character is received by the calibrator.
When pre-programmed, this command must be entered as:

READ PRESSURE

GO PRESSURE

SYNTAX: GP *pressure* <ENTER>
pressure - is the desired pressure in the user chosen units.

RETURNS: Nothing

DESCRIPTION: Causes the calibrator to produce the desired pressure. The solenoids are set according to the SCGP Configuration Variable. The rate of pressure change is determined by the setting of the RATE Configuration Variable.
For more information on Configuration Variables see the chapter on Configuration Commands.
When pre-programmed, this command must be entered as:

GO PRESS pressure

RESET CALIBRATOR

SYNTAX: IC <ENTER>

RETURNS: Nothing

DESCRIPTION: Places the calibrator in a power up state.
The pressure set point is set to zero and the solenoids are set according to the SCIC Configuration Variable. For more information on Configuration Variables see the chapter on Configuration Commands. This command may not vent the calibrator output pressure. Only the ZO command vents the calibrator.
When pre-programmed, this command must be entered as:

INITIALIZE CAL

ZERO PRESSURE

SYNTAX: ZO <ENTER>
RETURNS: Nothing
DESCRIPTION: The sensor is vented to Line Vent. The solenoids are set according to the SCZO Configuration Variable. For more information on Configuration Variables see the chapter on Configuration Commands.
When pre-programmed, this command must be entered as:

ZERO PRESSURE

ENERGIZE CLOSURE

SYNTAX: EC *channel state* <ENTER>
channel - is the closure number ranging from 1 to12.
state - is either Y for on or N for off.
RETURNS: Nothing
DESCRIPTION: Sets the electronic switch channel specified, to either on or off. No other channel is affected.
When pre-programmed, this command must be entered as:

EC channel state

CYCLE PRESSURE

SYNTAX: CYC *reference*
reference - is a cycle reference number from 0 to 4
RETURNS: *pressure units*
: : : :
pressure units
pressure - current pressure
units - pressure units
DESCRIPTION: The cycle command causes the output pressure to sequence through a series of predefined pressure values. The current pressure is continuously displayed. Sending <ESC> to the calibrator will abort the cycling. Between each pressure point the rate of pressure change is determined by the RATE Configuration Variable.
The pressure values, time at each pressure and number of cycles are defined for each cycle by Configuration Variables. See the section on Configuration Variables for more information.
When pre-programmed, this command must be entered as:

CYC reference

CONFIGURE COMMAND GROUP

The configure command group contains the variables required to set up the calibrator. These variables may only be set while in the remote mode. After a Configuration Variable is set it can be saved, thus retaining the configuration after power is removed.
Two internal jumpers, accessible only by removing the main circuit board, control the saving and updating of Configuration Variables. When a jumper is installed between pins 13-14, the user may save Configuration Variables with the SAVE command. With this jumper removed, no changes are allowed. When a jumper is installed between pins 11-12, the Configuration Variable data is copied to RAM at power up and is usable. With this jumper removed, zeros are copied into RAM for all Configuration Variables. The location of the jumpers is shown in Figure 16 of the Installation Section. There are only three configuration commands: SET, SHOW, and SAVE.

SET CONFIGURATION VARIABLE

SYNTAX: SET *name value* <ENTER>
name - is the name of the configuration variable
value - is the value of the configuration variable

RETURNS: Nothing

DESCRIPTION: The SET command sets the named Configuration Variable to the value specified.
When pre-programmed, this command must be entered as:
SET name value

SHOW CONFIGURATION VARIABLES

SYNTAX: SHOW *groupcode* <ENTER>
groupcode - is the name of the configuration group displayed.

RETURNS: *varname value*
: : : : : :
varname value
varname - is the name of the variable
value - is the value assigned to that variable

DESCRIPTION: This command displays all of the Configuration Variables within the group specified. Valid groups are as follows:

GROUP CODE	GROUP FUNCTION
C	Configuration Group
D	Discrete Closure Group
S	Sensor Group (PCC100 Only)
H	Sensor Group -High Range(PCC200 Only)
L	Sensor Group -Low Range(PCC200 Only)
T	Tune Group
P	Pre-program Group
0	Cycle 0 Group
1	Cycle 1 Group
2	Cycle 2 Group
3	Cycle 3 Group
4	Cycle 4 Group

The list of Configuration Variables, shown below, is arranged by the above groups.
This command is NOT available for pre-programming.

SAVE CONFIGURATION VARIABLES

SYNTAX: SAVE <ENTER>
RETURNS: Nothing
DESCRIPTION: This command causes the calibrator to retain, after power down, all of the changed values entered by the SET command. Any changes not saved will be lost at power down.
When pre-programmed, this command must be entered as:

SAVE

CONFIGURATION VARIABLES

The following lists all of the Configuration Variables used by the calibrator. The left column gives the variable name and the right column supplies more detailed information.

CONFIGURE GROUP

The following Configuration Variables are members of the configure group. The C argument is used to display these variables via the SHOW command.

ECHO ECHO SERIAL LINK CHARACTERS

When set to 0, the calibrator DOES NOT echo characters received back over the serial link. When set to 1, the calibrator DOES echo characters received back over the serial link.

LOCAL LOCAL MODE ON POWER UP

When set to 0, the calibrator powers up in Remote Mode. When set to 1, the calibrator powers up in Local Mode.

SIGN SIGN ON OVER SERIAL LINK

When set to 0, a sign on message IS NOT sent over the serial link. When set to 1, a sign on message IS sent over the serial link. This only applies when Remote Mode is selected on power up. A prompt is always transmitted when powering up in Remote Mode.

UNITS PRESSURE UNITS

Sets the pressure units. The following lists the value entered and the corresponding units:

VALUE	UNITS
PSI	psi
ATM	atm
BAR	bar
CMHG	cm Hg
CMH2O	cm H_2O
DECIBAR	decibar
FTH2O	ft H_2O
GCM2	g/cm^2
INHG	in Hg @ 0°C
INH2O	in H_2O @ 4°C
KNM2	kN/m^2
KGM2	kg/m^2
KGCM2	kg/cm^2
KPA	kPa
KIPIN2	kip/in^2
MPA	MPa
MBAR	millibar
MH2O	mH_2O
MMHG	mm Hg
NM2	N/m^2
NCM2	N/cm^2
OZIN2	oz/in^2
OZFT2	oz/ft^2
PA	Pa
PSF	lb/ft^2
TORR	torr
USER	User chosen value (see USRCVT)

All PCC 100/200 Calibrator/Controllers are shipped with the UNITS value set for PSIA. The pressure UNITS selected is immediately applied. It may be entered as a pre-programmed command. It will not be made permanent unless a SAVE command is issued.
When the pressure units are changed, the following parameters are automatically updated to reflect the new pressure units: RANGE(PCC100), RANGEL(PCC200), RANGEH(PCC200), RATE, and CYCLE POINTS.
The following is **NOT** updated: All arguements of GO PRESSURE in pre-programmed commands.

CONFIG GENERAL CALIBRATOR CONFIGURATION

CONFIG must be set to a value of 1 to 4 to reflect the type(s) of secondary standard transducers installed by the following:

1 - a temperature compensated Digiquartz® transducer.
2 - a non-temperature compensated Digiquartz® transducer.
3 - a temperature compensated Digiquartz® transducer high range and a non-temperature compensated Digiquartz® transducer low range.
4 - a non-temperature compensated Digiquartz® transducer low range and a temperature compensated Digiquartz® transducer high range.

Settings 1 and 2 are specific to the PCC100, Settings 3 and 4 are specific to the PCC200.

USRCVT USER CONVERSION FACTOR

If the user desires to work in a pressure unit other than the ones provided by the UNITS Configuration Variable, they may provide their own. The calibrator functions internally in psi. The conversion factor entered is the amount of user chosen units in one psi.

SSN SENSOR SERIAL NUMBER (PCC100 ONLY)

The serial number of the sensor is stored in this variable for reference only. The entry may be up to 19 alpha-numeric characters.

SSNL LOW RANGE SENSOR SERIAL NUMBER (PCC200 ONLY)

The serial number of the low range sensor is stored in this variable for reference only. The entry may be up to 19 alpha-numeric characters.

SSNH HIGH RANGE SENSOR SERIAL NUMBER (PCC200 ONLY)

The serial number of the high range sensor is stored in this variable for reference only. The entry may be up to 19 alpha-numeric characters.

CSN CALIBRATOR SERIAL NUMBER

The serial number of the calibrator is stored in this variable for reference only. The entry can be up to 19 alpha-numeric characters.

RANGE MAXIMUM SENSOR PRESSURE (PCC100 ONLY)

The nominal maximum value of the sensor is stored in this variable. This value must be entered to prevent over pressure of the sensor and provides information for other tests. This value must be entered in the units specified in the UNITS Configuration Variable. It will be updated automatically when the UNITS configuration variable is modified.

RANGEL MAXIMUM LOW RANGE SENSOR PRESSURE (PCC200 ONLY)

The nominal maximum value of the low range sensor is stored in this variable. This value must be entered to prevent over pressure of the sensor and provides information for other tests. This value must be entered in the units specified in the UNITS Configuration Variable. It will be updated automatically when the UNITS configuration variable is modified.

RANGEH MAXIMUM HIGH RANGE SENSOR PRESSURE (PCC200 ONLY)

The nominal maximum value of the high range sensor is stored in this variable. This value must be entered to prevent over pressure of the sensor and provides information for other tests. This value must be entered in the units specified in the UNITS Configuration Variable. It will be updated automatically when the UNITS configuration variable is modified.

MDATE MANUFACTURE DATE

The date the calibrator was manufactured is stored in this variable for reference only. The date can be up to 19 alpha-numeric characters.

RATE MAXIMUM ALLOWABLE PRESSURE RATE CHANGE

This variable is the maximum rate of change, in pressure units per second, in response to a pressure set point change. This variable should be adjusted to minimize overshoot. For example: if the UNITS Configuration Variable is set to psi and 2.5 was entered for rate, then the pressure would change at 2.5 psi per second in response to a set point change. This value should be set at no more than 10 percent of the maximum calibrator pressure. The smallest allowable value for RATE is 0.05 pressure units/second. It is recommended that the user make changes to this variable in small increments.
WARNING: The sensors may be damaged if RATE is set too high,

GAUGE DISPLAY PRESSURE UNITS IN GAUGE

When this variable is set to a non-zero value, the Calibrator will display the pressure units in gauge rather than absolute. A ZO command must be entered to establish a barometric pressure "baseline". The Calibrator will store the barometric pressure reading and subtract this value from all subsequent pressure readings before displaying the pressure value. A ZO command must be entered prior to all read pressure or go pressure commands in order to insure that the barometric pressure reading is not "stale".

XD SERIAL LINK TRANSMIT DELAY

When operating in Remote Mode, the calibrator can transmit data faster than some communication packages on the host computer can receive them. This causes the host computer's buffer to overflow. This variable inserts a delay between each output line transmitted. The value entered, must be an integer, and is multiplied by .02 to determine the actual delay. Typically a value of 3 provides sufficient delay.

DISCRETE GROUP

This group of Configuration Variables control the discrete closure circuits during each calibrator state. Each closure circuit could be either de-energized, not changed from previous state, or energized. By placing a 0, X or 1 respectively, each of the twelve closure circuits may be controlled. The discrete closures remain in the last state until a new state is entered. Closure circuit 1 is placed in the right most position and closure 12 to the left.

For example if solenoids 1 and 4 are to be on, 2 does not change and the remainder are to be off during the GO PRESS command the following would be the argument of the SCGP variable:

0000000010X1

The complete command entry is:

SET SCGP 0000000010X1

SCGP SET CLOSURE FOR GO PRESSURE (PCC100 ONLY)

This variable is used in the PCC 100 only. This variable controls the discrete closures during the GO PRESS command.

SCGPL SET CLOSURE FOR LOW RANGE GO PRESSURE (PCC200 ONLY)

This variable controls the discrete closures during the GO PRESS command when a low pressure arguement is used.

SCGPH SET CLOSURE FOR HIGH RANGE GO PRESSURE (PCC200 ONLY)

This variable controls the discrete closures during the GO PRESS command when a high pressure arguement is used..

SCGPO SET CLOSURE FOR GO PRESSURE OVERRIDE (PCC200 ONLY)

This variable controls the discrete closures when the calibrator is commanded to a pressure best measured by the low range sensor immediately after having been commanded to a pressure in the high range. This variable is not used if a SCZO is issued between the commands.

SCLPO SET CLOSURE FOR LOW PRESSURE OVERRIDE (PCC200 ONLY)

This variable controls the discrete closures during a low pressure override(LPO). An LPO occurs when a command is issued to use the low range sensor while the pressure is still too high. This setting overrides all other discrete settings.

SCIC SET CLOSURE FOR INITIALIZE CALIBRATOR

This variable controls the discrete closures during the INITIALIZE CALIBRATOR (RESET) command.

SCZO SET CLOSURE FOR ZERO PRESS

This variable controls the discrete closures during the ZERO command.

SCPU SET CLOSURE FOR POWER UP

This variable controls the discrete closures at power up.

SENSOR GROUP

This group of Configuration Variables set the sensor coefficients used by the calibrator to convert the frequency output from the sensor to a pressure reading. The PCC100 and PCC 200 have different methods for displaying the configuration variables. The PCC 100 uses SHOW S. The PCC 200 uses SHOW L and SHOW H

PCC 100

The S argument is used to display these variables via the SHOW command.

TEMPERATURE COMPENSATED DIGIQUARTZ® COEFFICIENTS

U0,Y1,Y2,Y3,C1,C2,C3,D1,D2,T1,T2,T3,T4,T5

These coefficients are used by the temperature compensated Digiquartz® pressure standard. They are only used if the CONFIG variable is set to 1. The values are obtained from the Digiquartz calibration sheet. Please note that the U0 coefficient is referred to as X0 on the calibration sheet.

NON-TEMPERATURE COMPENSATED DIGIQUARTZ® COEFFICIENTS

T0,CI,DI

These coefficients are used by the non-temperature compensated Digiquartz® pressure standard. They are only used if the CONFIG variables is set to 2. The values are obtained from the Digiquartz calibration sheet. Please note that the CI and DI coefficients are referred to on the data sheets as C and D respectively.

PCC 200

The L argument is used to display these variables via the SHOW command.

TEMPERATURE COMPENSATED LOW RANGE DIGIQUARTZ® COEFFICIENTS

LU0,LY1,LY2,LY3,LC1,LC2,LC3,LD1,LD2,LT1,LT2,LT3,LT4,LT5

These coefficients are used by the temperature compensated low range Digiquartz® pressure standard. They are only used if the CONFIG variable is set to 1 or 4. The values are obtained from the Digiquartz calibration sheet. Please note that the U0 coefficient is referred to as X0 on the calibration sheet.

NON-TEMPERATURE COMPENSATED LOW RANGE DIGIQUARTZ® COEFFICIENTS

LT0,LCI,LDI

These coefficients are used by the non-temperature compensated low range Digiquartz® pressure standard. They are only used if the CONFIG variables is set to 2 or 3. The values are obtained from the Digiquartz calibration sheet. Please note that the LCI and LDI coefficients are referred to on the data sheets as C and D respectively.

The H argument is used to display these variables via the SHOW command.

TEMPERATURE COMPENSATED HIGH RANGE DIGIQUARTZ® COEFFICIENTS

HU0,HY1,HY2,HY3,HC1,HC2,HC3,HD1,HD2,HT1,HT2,HT3,HT4,HT5

These coefficients are used by the temperature compensated high range Digiquartz® pressure standard. They are only used if the CONFIG variable is set to 1 or 3. The values are obtained from the Digiquartz calibration sheet. Please note that the U0 coefficient is referred to as X0 on the calibration sheet.

NON-TEMPERATURE COMPENSATED HIGH RANGE DIGIQUARTZ® COEFFICIENTS

HT0,HCI,HDI

These coefficients are used by the non-temperature compensated high range Digiquartz® pressure standard. They are only used if the CONFIG variables is set to 2 or 4. The values are obtained from the Digiquartz calibration sheet. Please note that the HCI and HDI coefficients are referred to on the data sheets as C and D respectively.

TUNE GROUP

This group of Configuration Variables control the servo loop. These variables are factory set and normally do not require changing. Selecting values for these variables is beyond the scope of this manual.

The T argument is used to display these variables via the SHOW command.

B	SET POINT CHANGE GAIN MULTIPLIER
N	HIGH FREQUENCY TIME CONSTANT
K	PROPORTIONAL CONTROL LOOP GAIN
TI	INTEGRAL GAIN
TD	DERIVATIVE GAIN
TT	ANTI-WINDUP GAIN

PRE-PROGRAM GROUP

This group of Configuration Variables sets pre-programmed command 0 through 9.

Ppn PRE-PROGRAMMED COMMAND (where n is 0 through 9)

The argument to this variable is any valid command available for pre-programming. Any of the 10 (0 through 9) possible pre-programmed variables may be set in this manner. For example if a GO PRESS 24.56 is desired to be assigned to button 1 on the front panel, the following would be entered:

SET PP1 GO PRESS 24.56 <ENTER>

CYCLE GROUP

This group of Configuration Variables sets the parameters for cycle commands 0 through 4. The n character is replaced by the numbers 0,1,2,3,or 4 corresponding to each of the cycle reference number 0 through 4. A total of 20 cycle pressures may be configured. This permits a full 10 point calibration from zero to full scale and back to zero. In all cases if the pressure value entered is negative that pressure point is skipped.

CnP00	First pressure point
CnP01	Second pressure point
CnP02	Third pressure point
CnP03	Fourth pressure point
CnP04	Fifth pressure point
CnP05	Sixth pressure point
CnP06	Seventh pressure point
CnP07	Eighth pressure point
CnP08	Ninth pressure point
CnP09	Tenth pressure point
CnP10	Eleventh pressure point
CnP11	Twelvth pressure point
CnP12	Thirteenth pressure point
CnP13	Fourteenth pressure point
CnP14	Fiftteenth pressure point
CnP15	Sixteenth pressure point
CnP16	Seventeenth pressure point
CnP17	Eighteenth pressure point
CnP18	Ninteenth pressure point
CnP19	Twentieth pressure point
CnDT	Delay time between pressures in seconds. This is not a dwell time. If the user wishes to dwell at a point, this value must be zero. When this value is zero, the calibrator will dwell at each point until an ENTER command is issued
CnCY	Number of times to repeat the cycle - maximum number is 32767

DIAGNOSTIC COMMANDS

This group of commands help the user evaluate system and calibrator problems.

DISPLAY MEMORY

SYNTAX: DMEM *seg offset* [/B/W/U/S/I/L/F/C] <ENTER>

seg is the segment portion of the memory location. It must be a 16 bit hexadecimal value.

offset is the offset portion of the memory location. It must be a 16 bit hexadecimal value..

[/B/W/U/S/I/L/F/C] The format of the displayed memory location.

- B hexadecimal byte
- W hexadecimal word
- U hexadecimal long
- S decimal byte
- I decimal integer
- L decimal long
- F float
- C character

RETURNS: *seg*:*offset*=*data*

seg - is the segment specified in the command

offset - is the offset specified in the command

data - is the data at the specified memory location

DESCRIPTION: This command continuously displays the data at the memory location specified. The data is displayed until an <ESC> character is received. Knowledge of the 80186 memory structure is required to effectively use this command.

This command is not available for pre-programming.

SET MEMORY

SYNTAX: SMEM *seg offset* [/B/W/U/S/I/L/F/C] <ENTER>

seg is the segment portion of the memory location. It must be a 16 bit hexadecimal value.

offset is the offset portion of the memory location. It must be a 16 bit hexadecimal value.

data is the data to be placed in the specified memory location.

[/B/W/U/S/I/L/F/C] The format of the displayed memory location.

- B - hexadecimal byte
- W - hexadecimal word
- U - hexadecimal long
- S - decimal byte
- I - decimal integer
- L - decimal long
- F - float
- C - character

RETURNS: Nothing

DESCRIPTION: This command sets the memory location to the data specified. Knowledge of the 80186 memory structure is required to effectively use this command.

This command is not available for pre-programming.

DISPLAY PORT

SYNTAX: DPORT *port* [/B/W] <ENTER>

port - is the port address entered in hexadecimal.
[/B/W] - is the optional size of the memory location.
B - hexadecimal byte
W - hexadecimal word

RETURNS: *port* = *data*

port - is the port address specified in the command
data - is the hexadecimal data at the port address specified

DESCRIPTION: This command continuously displays the data at the port addressed specified. The data continues to scroll until a <ESC> character is received.
This command is not available for pre-programming.

SET PORT

SYNTAX: SPORT *port data* [/B/W] <ENTER>

port - is the port address specified in the command
data - is the hexadecimal data at the port address specified
[/B/W] - is the optional size of the memory location.
B - hexadecimal byte
W - hexadecimal word

RETURNS: Nothing

DESCRIPTION: This command sets the data at the port address specified.
There is no guarantee that the data entered will remain unaltered. In some cases the program will immediately overwrite the data entered.
This command is not available for pre-programming.

ERASE FAULTS

SYNTAX: EFLT <ENTER>

RETURNS: Nothing

DESCRIPTION: This command erases any faults that have accumulated since power up or the last EFLT command.
This command is not available for pre-programming.

DISPLAY FAULTS

SYNTAX: DFLT <ENTER>

RETURNS: FAULT LIST

description LIMIT = *limit* COUNTS = *occurrences*
: : : : : : : : : : : : :
description LIMIT = *limit* COUNTS = *occurrences*
END OF FAULT LIST

description is a description of the fault
limit is the number of times the fault may occur before being considered.
occurrences is the number of times the fault has occurred.

DESCRIPTION: This command displays the list of current faults if any exist.
This command is not available for pre-programming.

READ DIGIQUARTZ FREQUENCY

SYNTAX: RF [/C] <ENTER>
C - causes continuous display

RETURNS: **PCC100**
PRES PERIOD (μsec) *freq* TEMP PERIOD (μsec) *freq*
freq - is the frequency output of the Digiquartz® transducer
PCC200
PRES PERIOD (μsec) *freq* TEMP PERIOD (μsec) *freq* PRES PERIOD (μsec) *freq* TEMP PERIOD (μsec) *freq*
freq - is the frequency output of the Digiquartz® transducer

DESCRIPTION: This command displays the pressure and temperature period of the Digiquartz® transducer. When the /C option is used, the values are continuously displayed until an <ESC> character is received.
This command is not available for pre-programming.

SYSTEM LEAK TEST

SYNTAX: LEAK <ENTER>

RETURNS: *pressure units*
: : : : :
pressure units
pressure - is the current pressure
units - is the pressure units

DESCRIPTION: This command executes an automatic leak test on the system. The test is executed as follows:
1) The pressure is set to 50% of full scale.
2) The pressure is trapped by closing solenoid 1
3) The pressure is continuously displayed on the screen.
If the pressure displayed falls at a fast rate the system has a leak.
To quit the test send an <ESC> character to the calibrator.
When pre-programmed this command must be entered as:
LEAK

TUNE

SYNTAX: TUNE [/Z/U]
Z - writes FFFF in hexadecimal to the servo D/A converter.
U - updates servo control variables

RETURNS: Nothing

DESCRIPTION: When the Z option is used, this command disengages the control loop and outputs FFFF to the servo D/A. This allows zero setting of the servo trim pot. When the U option is used, this command updates various control parameters for the servo control loop. This is required after changing any of the Configuration Variables in the Tune Group.