CROWN Boiler Co.

D E S I G N E D T O L E A D

BWC Series

Service Supplement for BWC Series Boilers Equipped with Type III MCBA

WARNING

IMPROPER SETTING OF PARAMETERS CAN CAUSE UNRELIABLE OR UNSAFE OPERATION, RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY, OR LOSS OF LIFE:

• CHANGING PARAMETERS SHOULD ONLY BE ATTEMPTED BY A PROFESSIONAL HEATING SERVICE TECHNICIAN.
• DO NOT CHANGE ANY PARAMETERS NOT DESCRIBED IN THIS MANUAL WITHOUT FIRST CONSULTING THE FACTORY.
• AFTER CHANGING ANY PARAMETERS, CAREFULLY CONFIRM PROPER BOILER OPERATION BEFORE LEAVING THE INSTALLATION SITE.
• THIS MANUAL IS INTENDED AS A SUPPLEMENT, NOT A REPLACEMENT, FOR THE INSTALLATION MANUAL SUPPLIED WITH THE BOILER. SEE THE INSTALLATION MANUAL FOR IMPORTANT INFORMATION NOT SHOWN IN THIS MANUAL.

CROWN Boiler Co.

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I Boiler Operating Parameters

A. Overview

All BWC Series boilers are equipped with a microprocessor-based Honeywell control module called a " MCBA". This control manages all boiler functions including flame supervision and modulation. A total of 46 field adjustable parameters are stored in the memory of this control. These parameters determine the exact operation of the MCBA under different conditions.

Crown has tried to program parameters into the MCBA at the factory that will result in satisfactory operation under most conditions. Because all systems are different, however, there are a few situations where boiler operation may be enhanced by adjusting a few of these parameters in the field. Part I of this manual describes the parameters that may be changed and the method for changing them.

Parameters are numbered from "1" to "42-2". Parameters 1-4 are accessible by anyone. Parameters 5 through 42-2 may only be accessed by entering an access code. Parameters may be changed by either of two methods:

1) Using the keypad on the boiler

2) Using the GCI PC Interface Kit (PN 249905) available from Crown Boiler Company.

In addition to being used to change parameters, both the key pad and the GCI Interface can be used to obtain information about the boiler's current status and operating history. For more information on this see Section E or Part II for using the keypad and the GCI Interface respectively.

WARNING

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- CHANGING PARAMETERS SHOULD ONLY BE ATTEMPTED BY A PROFESSIONAL HEATING SERVICE TECHNICIAN.
- DO NOT CHANGE ANY PARAMETERS NOT DESCRIBED IN THIS MANUAL WITHOUT FIRST CONSULTING THE FACTORY.
- BEFORE MAKING CHANGES, IT IS RECOMMENDED THAT INITIAL VALUES OF PARAMETERS BE RECORDED SO THAT THEY CAN BE RESTORED IF OPERATION OF THE BOILER IS NOT AS ANTICIPATED.
- AFTER CHANGING ANY PARAMETERS, CAREFULLY CONFIRM PROPER BOILER OPERATION BEFORE LEAVING THE INSTALLATION SITE.

B. Entering the Access Code

Note: If access to only Parameters 1-4 is desired you do not need to enter the access code. Skip to Section (C).

Using the Boiler Keypad

1) With the boiler running, toggle the Mode key until you reach the (STBY) Standby mode.

2) Depress and hold the Step key and then quickly depress and hold the Mode key for 2 – 5 seconds until the display reads (CODE). Release the Mode key, then the Step key. The display should show a 'C' followed by a random two digit number.

3) Use the + or – keys to scroll to the number 05.

4) Press the Store key momentarily and watch for the display to blink twice. If the access code has been successfully

entered, the menu tree will be expanded to include the items shown inside the dashed lines in Figure 1.1. Access to parameters 5 - 42 will be possible by following the instructions in Section C. After 15 minutes have passed without any keys being pressed, access to the expanded menu will end and the access code will need to be reentered to regain access to parameters 5-42.

Using the GCI PC Interface

1) If not already done connect GCI PC interface, and install the Gascom software as described in Part III of this manual.

2) Open the Gascom software.

3) Click on the Gascom menu at the top left corner of the screen

4) Click on "Configuration". The Gascom configuration window will open.

5) Enter 05 in the Access Code field and click OK

C. Changing Parameters

Using the Boiler Keypad

1) Toggle the Mode key until you reach (PARA) Parameter mode.

2) Press the Step key to scroll through the parameters until you reach the desired parameter number.

3) Use the + or – key to scroll to the desired parameter setting.

4) Press the Store key momentarily and watch for the display to blink once. The parameter setting has now stored its new value.

5) When using the keypad, all parameters show up on the boiler display as two-digit numbers. This creates the following special situations:

   a) Two parameters are required to define some of the fan speeds. For example, the maximum CH fan speed is defined by Parameters 13 and 14; Parameter 13 defines the "thousands" and "hundreds" places and Parameter 14 defines the "tens" and "ones" places. The ignition fan speed is only adjustable in increments of hundreds, so only one parameter (19) is required to define it. **IMPORTANT: Field adjustment of fan speeds is not recommended.**

   b) In some cases one two digit number defines two separate parameters. For example, if Parameter 34 is viewed on the boiler display, the "tens place" is Parameter 34-1 (default value is 0) and the "ones place" is Parameter 34-2 (default value is also 0). As viewed on the boiler display, the factory set Parameter 34 will therefore appear as "00". If Parameter 34-2 is changed to accept a 0-10VDC reading from an AM-4 (see Section D), Parameter 34 will then read "04" as viewed on the boiler display.

Using the GCI PC Interface

1) If not already done connect GCI PC interface, and install the Gascom software as described in Part II of this manual and open the Gascom software.

2) Click on the "Parameters" menu on the top of the screen.

3) Click on "Read from MCBA". After a few seconds, a list of parameters and their settings will appear on the screen. Parameters which are not accessible are grayed out. If the access code has not been entered in the configuration screen, this will include Parameters 5 - 42. Parameters 43 and above are always grayed out because they are inaccessible in the field.

4) Double-click on the desired parameter. A window will open with either a field or a pull down list of options will appear. Enter or select the desired value for the parameter.

5) Click OK.

6) Repeat Steps (3) - (5) to change any other desired parameters.

FIGURE 1.1: EXPANDED MENU TREE

USE **MODE** KEY TO TOGGLE BETWEEN MODES

(Mode returns to Standby from other modes if no key is pressed for 20 min.)

| STANDBY MODE (StbY) | PARAMETER MODE (PArA) | INFORMATION MODE (INFO) |

STANDBY MODE (StbY)

Use of Keys	Duration	Result	Display Example
+	Short	Shows supply set point when responding to call for heat (Note 1)	c 180
+	Long	Turn heating on/off	c OFF
-	Short	Shows domestic hot water reference set point (Note 2)	d 134
-	Long	Turn domestic hot water on/off	d OFF
+ and MODE	Long	Hold burner in high fire (Note 3)	H 180
- and MODE	Long	Hold burner in low fire (Note 3)	L 180
+ and -	Long	Deactivate forced high or low firing	0 180
STEP and MODE	Long (Note 6)	Activates CODE MODE (See Below)	C __

CODE MODE (COdE)

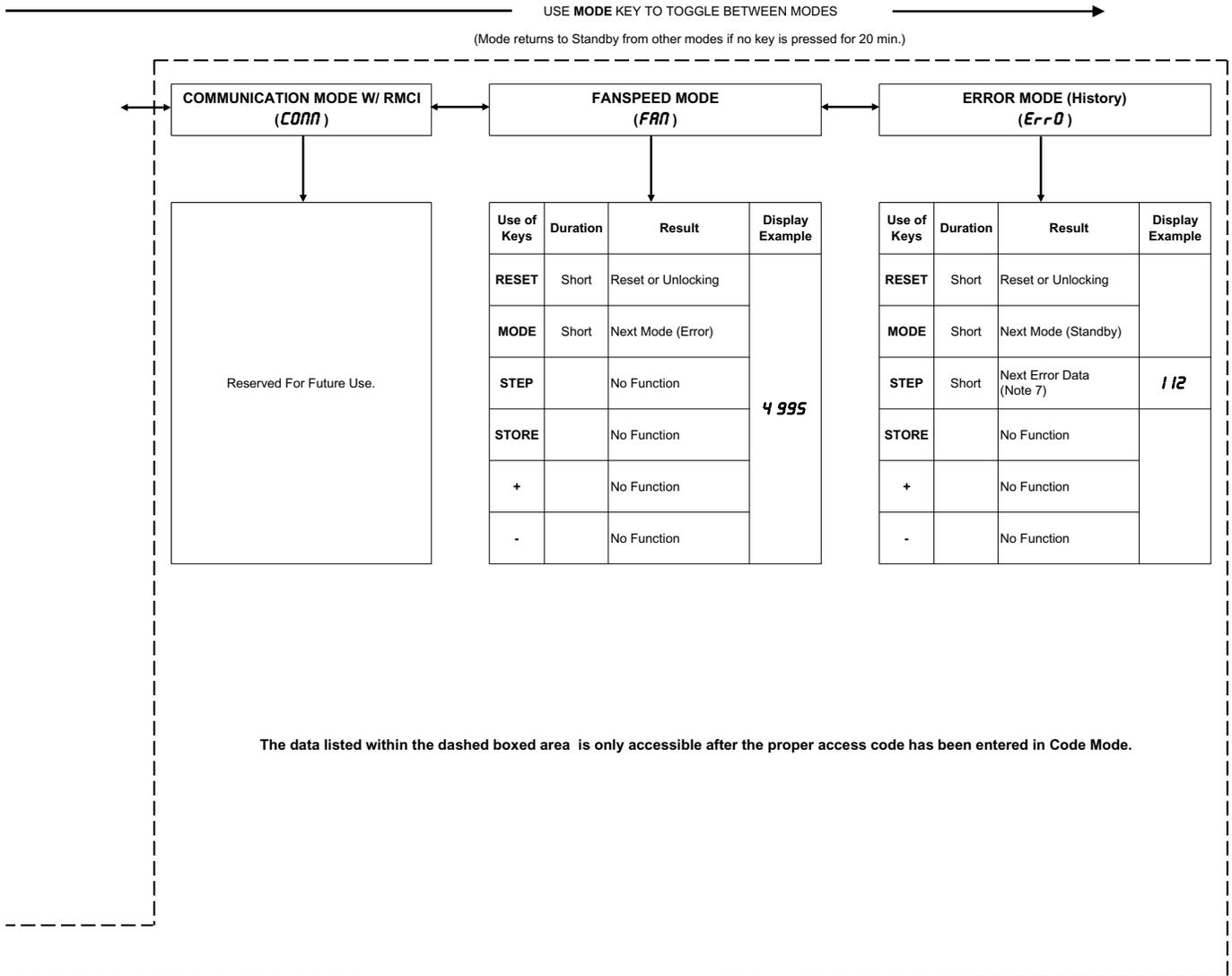| Use of Keys	Duration	Result	Display Example
RESET	Short	Reset or Unlocking	
MODE	Short	Next Mode (Standby)	StbY
STEP		No Function	
STORE	Short	Enter Code	C 88
+	Short	Increase Code	C 89
-	Short	Decrease Code	C 87
+	Continuous	Fast Increase Code	C 95
-	Continuous	Fast Decrease Code	C 81

PARAMETER MODE (PArA)

Parameter	Description	Possible Settings (Note 4)	STEP	+	-	STORE
1	DHW reference set point (Note 2)	68°F - 144°F (Default Setting 135°F)	Toggle Between Parameters	Increases Setting	Decreases Setting	Saves new setting to MCBA. Display will Flash when STORE is released indicating that change has been made
2	DHW Zone	0 = Off				
		1 = On				
		2 = Off + continuous pump				
		3 = On + continuous pump				
3	Heat Zone	0 = Off				
		1 = On				
		2 = Off + continuous pump				
		3 = On + continuous pump				
4	Supply set point when responding to call for heat	68°F - 190°F (Default Setting 180°F)				
5 thru 42	See Table 2.1 for description and possible settings					

Use of Keys column header for Parameter Mode: STEP, +, -, STORE

INFORMATION MODE (INFO)

Step #	Value	Display Example	STEP	+	-	STORE
1	Supply water temperature	1.170	Toggle Between Steps 1 - A	Not Used	Not Used	Not Used
2	Return water temperature	2.135				
3	Reserved for Future Use	3.-22				
4	Outdoor sensor temp., if used (Note 5)	4.-22				
5	Flue gas temperature	5.165				
6	Supply water set point temperature	6.180				
7	Rate of change in supply water temperature °F/sec	7. 0 0				
8	Rate of change in return water temperature °F/sec	8. 0 0				
9	Reserved for Future Use	9. 0 0				
A	Reserved for Future Use	A. -22				

1) If outdoor sensor is connected, this temperature is the supply temperature setpoint when the outdoor temperature is 0°F.

2) "Domestic water reference set point" + 45°F = boiler supply set point when boiler is responding to a call for domestic hot water (default = 180°F).

3) Boiler will automatically resume modulation after 15 minutes.

4) Factory default settings are shown in bold.

5) If no outdoor sensor is connected, display reads "4.-22".

6) Depress and hold the **STEP** key and then quickly depress and hold the **MODE** key to activate **CODE MODE**. **CODE MODE** is active when the display shows a 'C' followed by a 2 digit random number.

7) Displays the last six error codes (1-6) beginning with the most recent error.

7) After all parameters have been changed, click on the "Parameters" menu at the top of the screen and then click on "Write to MCBA". After a few seconds, the display on the boiler will blink. This indicates that the parameters are written to the control and are in effect.

FIGURE 1.1: EXPANDED MENU TREE (cont.)

USE **MODE** KEY TO TOGGLE BETWEEN MODES

(Mode returns to Standby from other modes if no key is pressed for 20 min.)

COMMUNICATION MODE W/ RMCI (*CONN*)	FANSPEED MODE (*FAN*)	ERROR MODE (History) (*ErrO*)

COMMUNICATION MODE W/ RMCI (CONN)

Reserved For Future Use.

FANSPEED MODE (FAN)

Use of Keys	Duration	Result	Display Example
RESET	Short	Reset or Unlocking	
MODE	Short	Next Mode (Error)	
STEP		No Function	*4 995*
STORE		No Function	
+		No Function	
-		No Function	

ERROR MODE (History) (ErrO)

Use of Keys	Duration	Result	Display Example
RESET	Short	Reset or Unlocking	
MODE	Short	Next Mode (Standby)	
STEP	Short	Next Error Data (Note 7)	*I I2*
STORE		No Function	
+		No Function	
-		No Function	

The data listed within the dashed boxed area is only accessible after the proper access code has been entered in Code Mode.

D. Field Adjustable Parameters

Table 1.3 is a list of the parameters that can be adjusted in the field. **Although it is physically possible to adjust all of these parameters, the parameters that are shaded gray should not need to be adjusted in the field**. In the event that these parameters are changed by accident, they may be restored to their original factory values by referring to Appendix A at the back of this manual.

A description of the parameters for which field adjustment is permitted is also included in Table 1.3. The three tasks that will require changing of these parameters include:

1) <u>Adjusting the target boiler supply temperature when responding to call from an indirect water heater</u> - The default IWH target supply temperature is 180F. Since most indirect water heaters have ratings based on 180F boiler supply temperature, it should rarely be necessary to adjust this parameter.

2) <u>Changing the boiler water reset curve</u> - When an outdoor temperature sensor is connected to a BWC Series boiler, the MCBA will adjust the target boiler supply temperature based on outdoor temperature when the boiler is responding to a call for central heat. Figure 1.2 is a graph showing the target boiler supply temperature as a function of outdoor temperature. The curve shown in Figure 1.2 is that obtained with the factory set parameters. The shape of this curve may be changed by changing Parameters 4, 5, 6, and 7 as shown in Figure 1.2. Refer to Part I Section C for the procedure to change parameters.

If the outdoor sensor is not connected to the boiler, the target supply temperature is always defined by Parameter 4 when the boiler is responding to a call for central heat, regardless of the outdoor temperature. In this case, the settings of Parameters 5, 6, and 7 are meaningless.

3) <u>Allowing the boiler to accept an input from an AM-4 module</u> - In some applications (particularly multiple boiler installations) it may be desirable to allow an external control to directly manage modulation of the boiler. The optional AM-4 module kit available from Crown permits the BWC to be modulated using a 0-10VDC signal supplied by an external control (for more information on this, refer to the installation instructions supplied with the AM-4 kit).

In order for the boiler to accept the 0-10VDC signal, Parameter 34-2 must be changed from "0" ("Room Thermostat") to "4" ("0-10V Analog on AM-4: Capacity"). Once this parameter is changed, the boiler will ignore any call from a thermostat connected across terminals 1 and 2 on the boiler. It will continue to respond to calls from the indirect water heater thermostat.

Although Parameters 2 and 3 should be left at the factory settings of "ON", it is relatively easy to change them by accident (pushing and holding the "+" or "-" key while the boiler is in standby mode will change them). If the boiler does not respond to a call from one or both thermostats, verify that Parameters 2 and 3 are both "ON".
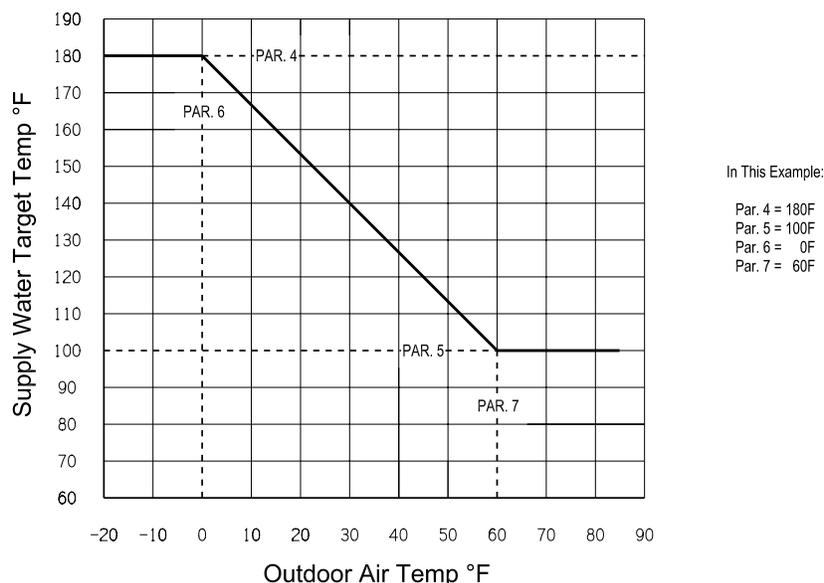

Figure 1.2 Adjusting Boiler Water Reset curve

Table 1.3: Parameter Descriptions

PAR NO.	DESCRIPTION	PURPOSE
1	T3set DHW	Factory set to 134F. This value plus 46F equals the target supply water temperature when the boiler responds to a call from the indirect water heater thermostat. With 134F factory setting, target supply temperature is 180F when boiler is responding to a call for DHW.
2	DHW system	Factory set to "ON". Field change not recommended.
3	CH system	Factory set to "ON". Field change not recommended.
4	T1top CH Mode	Maximum target supply water temperature when boiler is responding to a call for central heating. When the outdoor air sensor is connected, this is the maximum supply water temperature on the reset curve (see Figure 1.2). Note: Settings higher than 180F increase the risk of nuisance safety limit activation (b19 errors). Factory set to 180F.
5	T1foot CH Mode	When the outdoor sensor is connected, T1foot is the minimum supply water temperature (see Figure 1.2). Factory set to 100F.
6	T4 minimum	Outdoor temperature at and below which the boiler will operate at the maximum target supply water temperature (T1top). See Figure 1.2. Factory set to 0F.
7	T4 maximum	Outdoor temperature at and above which the boiler will operate at the minimum target supply water temperature (T1 foot). See Figure 1.2. Factory set to 60F.
8	T4 frost protection	
9	T4 correction	
10	Tblocking	
11	Booster time	
12	Tparallel shift	
13/14	Maximum fanspeed CH	
15/16	Maximum fanspeed DHW	
17/18	Minimum fanspeed	
19	Ignition fanspeed	Field Change Not Recommended
20	CH postpump time	
21	DHW postpump time	
22	CH modulation hysteresis on	
23	CH modulation hysteresis off	
24	DHW modulation hysteresis on	
25	DHW modulation hysteresis off	
26	DHW detection hysteresis on	
27	DHW detection hysteresis off	
28	CH blocking time	
29	DHW blocking time	
30	DHW -> CH blocking time	
31	Modulate back difference T1 - T2	Field Change Not Recommended
32	RMCI Address	
33	Tplus: Setvalue addition for DHW	
34-1	2nd CH-Circuit (1st digit)	
34-2	CH Type (2nd digit)	This parameter determines what device initiates a call for heat. The factory setting is "0" ("Room Thermostat" when selected using Gascom). If an AM-4 module is used for external modulation, this parameter is changed to "4" ("0-10V Analog on AM-4: Capacity" when using Gascom). When this parameter is set to "4", it ignores any call for heat from a thermostat connected to the boiler and instead responds to 0-10VDC signal connected to the AM-4 (also see AM-4 instructions).
35-1	DHW 3-wayvalve or pump	
35-2	DHW-type (2nd digit)	
36	Manual fanspeed	
37-1	PWM-pump level (1st digit)	
37-2	PWM-pump level (2nd digit)	
38	Tset hold boiler warm	Field Change Not Recommended
39	Ttop for 2nd CH circuit	
40	Tfoot for 2nd CH circuit	
41	Thysteresis for 2nd CH circuit	
42-1	Pump settings for CH and DHW	
42-2	Minimum Off Cycle (2nd digit)	

E. Communication, Fan Speed and Error Modes

In addition to providing access to all field adjustable parameters, entering the access code also provides access to three additional mode menus using the boiler keypad. These are shown in Figure 1.1:

1) Communication Mode - This mode does not currently have any function.

2) Fan Speed Mode - Allows the user to view the blower fan speed (firing rate is determined by fan speed).

3) Error Mode - Pressing STEP while in Error mode allows the user to see the six most recent error codes.

II GCI PC Interface

A. System Requirements

The GCI Interface requires a PC computer running a Windows 98/NT/2000 or XP operating system. In addition, the PC must have an open serial port.
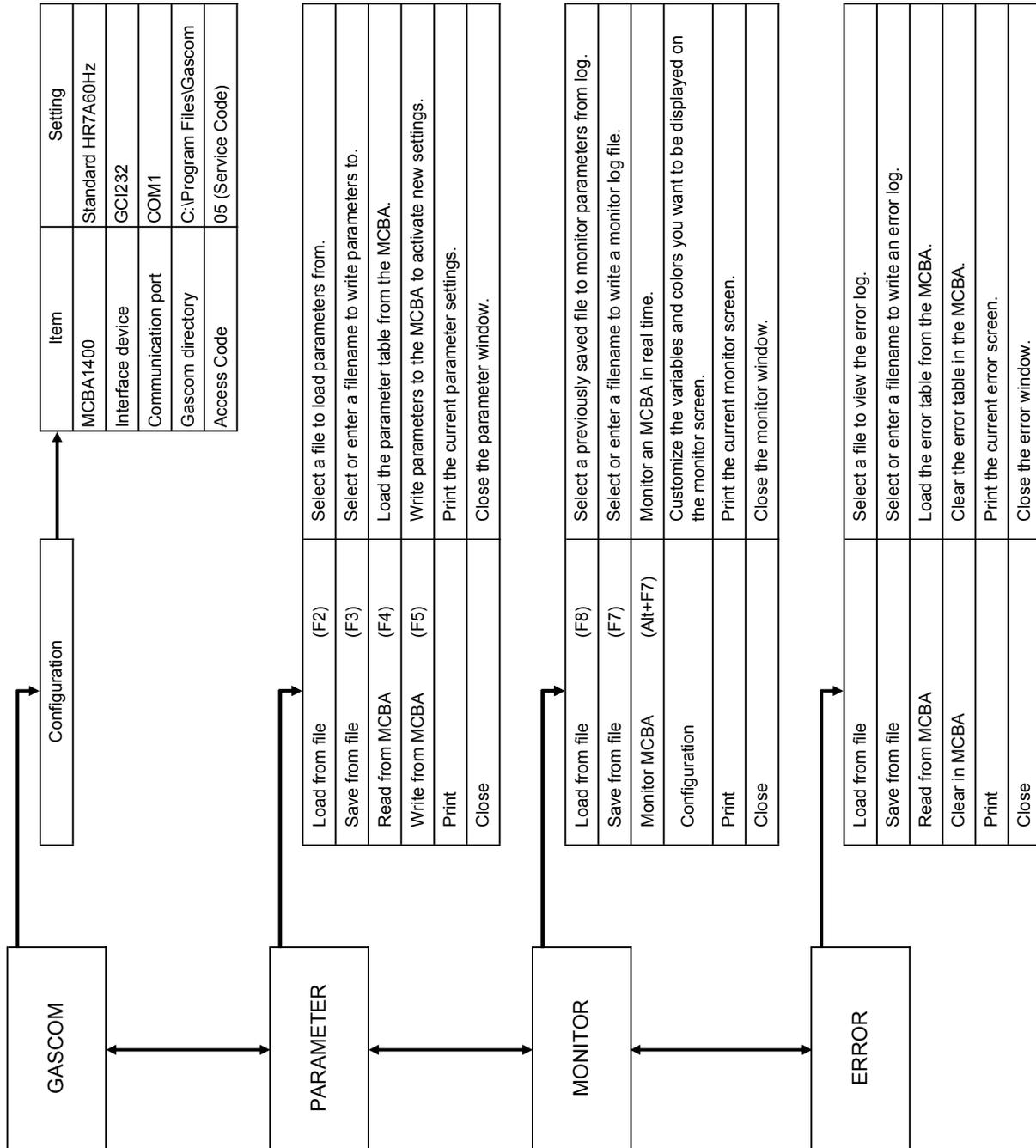
B. Connecting Hardware

1) Connect the serial cable from the GCI to the computer.

2) Plug in the GCI

3) Open the lower front jacket panel. Loosen the screws holding the control cover and swing down the control cover so that the control compartment is open.

4) Connect the ribbon cable from the GCI into the open receptacle on the MCBA next to the ribbon cable from the boiler display/keypad (Figure 3.1).

C. Installing Gascom

1) Gascom is the software for the GCI-PC interface. It must be installed on the PC in order to use the interface at all.

2) Insert the Gascom CD in your computer's CDROM drive and wait a few seconds for the software to prompt you to continue setup. Select "NEXT" to continue the installation. Follow the prompts to install the software. Crown highly recommends accepting the default directories recommended..

3) The last screen allows the user to select whether or not to restart the computer. The computer must be restarted prior to using the Gascom program.

4) Crown recommends the user register the software on the date of installation however registration is not required. Registration gives the user access to our technical support personnel online as well as information about software up-dates. To register the software click on the "**Gascom Online**" icon on the desk top and select "**Registration**". You will be asked to fill out a short form including your email address. Once the form is submitted a return email will be sent to you confirming the information you entered along with your registration number.

5) Open Gascom by selecting the "**Gascom 1.0**" icon on the desk top. Before using the program for the first time it must be configured properly to work with the BWC boiler and your computer. Go to the menu bar and select "**Gascom**" and then "**Configuration**". Refer to the menu tree shown in Figure 2.1.

    a)   From the drop down box labeled "**MCBA1400**" select the "**Standard HR7A60Hz**" option.

    b)   From the drop down box labeled "**Interface device**" select the "**CGI232**" option.

    c)   The "Communication port" setting is the serial port on the PC to which the GCI interface is connected. Most often this serial port will be "**COM1**".

    d)   The "Gascom Directory" field will contain the correct field and will not need to be changed as long as you accepted all of the default file locations during installation. Otherwise, you will need to locate the Gascom directory on your hard drive and enter the correct path name in this field.

    e)   If you wish to access Parameters 5 to 42 enter "**05**" in the "Access Code" field (the access code will need to be entered every time the Gascom program is reopened).

CONNECT GCI RIBBON CABLE
TO X7 OR X8 RECEPTACLE
(WHICHEVER IS OPEN)
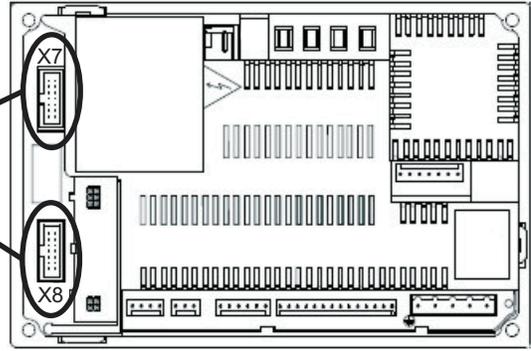
Figure 3.1: GCI Ribbon Cable Receptical on MCBA

FIGURE 3.2: GASCOM SOFTWARE v1.0 MENU TREE

GASCOM → Configuration

Item	Setting
MCBA1400	Standard HR7A60Hz
Interface device	GCI232
Communication port	COM1
Gascom directory	C:\Program Files\Gascom
Access Code	05 (Service Code)

PARAMETER

Load from file	(F2)	Select a file to load parameters from.
Save from file	(F3)	Select or enter a filename to write parameters to.
Read from MCBA	(F4)	Load the parameter table from the MCBA.
Write from MCBA	(F5)	Write parameters to the MCBA to activate new settings.
Print		Print the current parameter settings.
Close		Close the parameter window.

MONITOR

Load from file	(F8)	Select a previously saved file to monitor parameters from log.
Save from file	(F7)	Select or enter a filename to write a monitor log file.
Monitor MCBA	(Alt+F7)	Monitor an MCBA in real time.
Configuration		Customize the variables and colors you want to be displayed on the monitor screen.
Print		Print the current monitor screen.
Close		Close the monitor window.

ERROR

Load from file	Select a file to view the error log.
Save from file	Select or enter a filename to write an error log.
Read from MCBA	Load the error table from the MCBA.
Clear in MCBA	Clear the error table in the MCBA.
Print	Print the current error screen.
Close	Close the error window.

Note: You can switch between menus by using the 'F6' key.

D. Changing The MCBA Parameters With Gascom

   See Part I of this manual for instructions on changing parameters to the MCBA, not just the ones which were modified.

E. Using Gascom To Monitor The MCBA

   From the Monitor Menu select "Monitor MCBA". This will bring up a window which plots the following information:

1) Temperatures:

   Flow - Actual boiler supply temperature
   Return - Actual Boiler return temperature
   Outdoor - Temperature being read by outdoor sensor if it is connected. If it is not, temperature reading is "-22".
   Fluegas - Flue gas temperature
   Set - Target boiler supply temperature

2) Status:

   Room - Room thermostat ("1" = Calling, "0" = Not Calling)
   Hotwater - Indirect water heater thermostat ("1" = Calling, "0" = Not Calling)
   Pump - Heating circulator ("1" = On, "0" = Off)
   Air-switch - Status of air pressure switch ("1" = Closed, "0" = Open)
   Gaspressure - This is actually the status of the high limit ("1" = Closed, "0" = Open)
   GasValve - Status of gas valve ("1" = Open , "0" = Closed)
   Flame - Shows whether the MCBA detects the presence of the burner flame ("1" = Flame, "0" = No Flame)
   DHW Pump - Indirect water heater circulator ("1" = On, "0" = Off)

3) RPM:

   Fan - Actual speed of fan
   Set - Target speed of fan.

F. Reading The MCBA Error Log

1)   The MCBA keeps a log of the last six error codes. To view these error codes select "Read from MCBA" from the Error Menu.

2)   This data can be saved as a file to disk by selecting "Save to file" from the Error Menu or printed by selecting "Print" from the same menu.

3)   Error codes can also be removed from the memory of the MCBA by selecting "Clear in MCBA" from the Error Menu.

III COMPONENT TEST PROCEDURES

A. Flame Signal Check

1) The flame signal can be checked between terminal number 9 on the low voltage terminal strip and ground. A good signal reading should be 6 VDC or greater.

2) If the signal is lower than 6 VDC, check the continuity of the ground wire between the ignitor and the junction box. If the ground wire is suspect replace the ground wire.

3) If the ground wire is in good condition, remove the ignitor and inspect the ceramic insulator for cracks. If none are found sand off any oxide deposits which formed on the electrode. If the insulator is cracked or the electrode cannot be properly cleaned, replace the ignitor. When replacing the ignitor be sure to replace the ignitor gasket as well.

4) Other problems that can cause a low flame signal include:

   • An improperly adjusted throttle (confirm that the CO_2 is within the limits shown in the installation manual).
   • Fouling of the burner (remove the burner and clean with compressed air).
   • Low inlet gas pressure (verify that gas pressure is within the limits shown on the rating plate).
   • Grounded 24VAC or sensor wiring (this problem will result in no flame voltage reading, but will normally not result in an E02 error because there is still adequate flame current).

B. NTC Temperature Sensors

1) The supply, return, flue, and outdoor reset sensors used on the BWC are of the resistance type.

2) The Table 3.1 shows the range of resistance values for these sensors at various temperatures.

Sensor Resistance Values			
Temperature (°F)	Minimum Value (Ohms)	Nominal Value (Ohms)	Maximum Value (Ohms)
0	82304	89767	97227
5	71959	78310	84663
10	62144	67449	72755
15	53074	57443	61814
20	46557	50262	53966
25	40650	43770	46890
30	35665	38312	40960
32	33669	36129	38590
35	31370	33622	35874
40	27543	29443	31340
45	24387	26028	27670
50	21422	22804	24187
55	19107	20301	21494
60	16887	17906	18925
65	15073	15948	16823
68	13981	14773	15566
70	13407	14157	14908
75	11970	12616	13262
80	10710	11268	11826
85	9571	10048	10524
90	8611	9026	9441
95	7699	8054	8409
100	6965	7275	7585
105	6259	6526	6794
110	5668	5899	6129
115	5118	5319	5519
120	4636	4810	4984
125	4208	4359	4510
130	3815	3945	4074
135	3479	3591	3703
140	3155	3252	3350
145	2880	2974	3067
150	2617	2705	2793
155	2391	2475	2559
160	2181	2261	2340
165	1993	2069	2146
170	1825	1898	1971
175	1670	1739	1808
180	1519	1600	1682
185	1406	1467	1529
190	1297	1355	1414
195	1192	1247	1302
200	1100	1153	1205
205	1014	1064	1114
210	937	984	1032
212	906	952	999

Table 3.1: NTC Sensor Resistance Values

APPENDIX A. Factory Parameter Settings

PAR NO.	DESCRIPTION	Factory setting					
		BWC070	BWC090	BWC120	BWC150	BWC225EN	BWC225EL
1	T3set DHW	134	134	134	134	134	134
2	DHW system	1 (On)					
3	CH system	1 (On)					
4	T1top CH Mode	180	180	180	180	180	180
5	T1foot CH Mode	100	100	100	100	100	100
6	T4 minimum	0	0	0	0	0	0
7	T4 maximum	60	60	60	60	60	60
8	T4 frost protection	-22	-22	-22	-22	-22	-22
9	T4 correction	0	0	0	0	0	0
10	Tblocking	32	32	32	32	32	32
11	Booster time	0	0	0	0	0	0
12	Tparallel shift	0	0	0	0	0	0
13/14*	Maximum fanspeed CH	4000	5000	5000	5000	5200	5000
15/16*	Maximum fanspeed DHW	4000	5000	5000	5000	5200	5000
17/18*	Minimum fanspeed	2200	2200	2200	1900	1800	1800
19	Ignition fanspeed	3000	3000	3000	3000	2500	3500
20	CH postpump time	0	0	0	0	0	0
21	DHW postpump time	10.2	10.2	10.2	10.2	10.2	10.2
22	CH modulation hysteresis on	10	10	10	10	10	10
23	CH modulation hysteresis off	6	6	6	2	2	2
24	DHW modulation hysteresis on	10	10	10	10	10	10
25	DHW modulation hysteresis off	6	6	6	2	2	2
26	DHW detection hysteresis on	-8	-8	-8	-8	-8	-8
27	DHW detection hysteresis off	10	10	10	10	10	10
28	CH blocking time	0	0	0	0	0	0
29	DHW blocking time	0	0	0	0	0	0
30	DHW -> CH blocking time	0	0	0	0	0	0
31	Modulate back difference T1 - T2	54	54	54	44	44	44
32	RMCI Address	-1	-1	-1	-1	-1	-1
33	Tplus: Setvalue addition for DHW	46	46	46	46	46	46
34-1	2nd CH-Circuit (1st digit)	0 (2nd Heating Circuit Off)					
34-2	CH Type (2nd digit)	0 (Room Thermostat)					
35-1	DHW 3-wayvalve or pump (1st digit)	1 (Hot Water Pump)					
35-2	DHW-type (2nd digit)	3 (Storage Tank without NTC3)					
36	Manual fanspeed	-1	-1	-1	-1	-1	-1
37-1	PWM-pump level (1st digit)	4	4	4	4	4	4
37-2	PWM-pump level (2nd digit)	1	1	1	1	1	1
38	Tset hold boiler warm	36	36	36	36	36	36
39	Ttop for 2nd CH circuit	176	176	176	176	176	176
40	Tfoot for 2nd CH circuit	68	68	68	68	68	68
41	Thysteresis for 2nd CH circuit	10	10	10	10	10	10
42-1	Pump settings for CH and DHW	0 (CH Normal Pump)					
42-2	Minimum Off Cycle (2nd digit)	0 (Not Active)					

* First parameter defines "Thousands" and "Hundreds" places. Second parameter defines "Tens" and "Ones" places

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