Part # F200054

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INTRODUCTION

The purpose of this document is to provide a quick reference guide for the AACC 2000 preferred. The preferred version is configured for the most common applications of the carbon controller. This document explains the simple steps needed to wire and operate the controller. Also the most common configuration changes are explained.

FEATURES

The AACC 2000 preferred is pre-configured with two control contacts for gas and air solenoids and a 4 to 20 ma analog output for gas control.

A 4-20 ma analog output for retransmission of 0 to 2% carbon.

Three alarm contacts are pre-configured for carbon deviation (+/- .1%), 1400 deg F minimum temperature, and sensor break/probe fault. The contacts are normally closed when there is no alarm condition.

Probe maintenance features are preset for typical applications.

The RS-485 port is preset for MSI communications at 1200 baud.
WIRING

Refer to the main AACC 2000 manual for EMC and safety requirements when wiring to the instrument. Figure 1 shows the terminal assignments as setup by the factory.

Connect the probe thermocouple to the V+ and V- terminals using the proper extension wire. The thermocouple type preset for the AACC 2000 is type S.

Connect the probe millivolts to terminals 6C (+) and 6B (-). Do not remove the wires that are already on the instrument for the probe impedance test. These wires connect terminals 5D to 6C, terminals 6D to JE, and terminals 5C to JD.

Wire the alarm contacts as desired.

Connect the control outputs for the appropriate devices.

Connect the 4 - 20 ma % carbon retransmission signal from terminals 3A (+) and 3B (-) to the recording device.

Connect the burn-off contact to the burn-off solenoid.

Connect AC power, 100 - 240 VAC, to the live, neutral and ground terminals.
Figure 1 Signal Assignments
OPERATION

KEY DESCRIPTION
The four rectangular buttons at the bottom of the instrument are used to view or enter data into the instrument. The left most button with a picture of a sheet of paper with the corner bent over is the page key. The next button with the circular arrow is the scroll key. The third button with a triangle pointing down is the down arrow key. the fourth or right most button with the triangle pointing up is the up arrow key.

There are two small round buttons just above the rectangular buttons. The left one is the auto/man button and the right one is the probe care button.

AUTO/MAN
To switch the controller from automatic (auto) to manual (man) or manual to automatic, press the auto/man button until the appropriate beacon is lit.

SETPOINT
When the controller is in auto mode the setpoint can be changed by depressing the up or down arrow keys until the lower display shows the desired value.

PROBE CARE
A probe care cycle can be started by pressing the run/hold button. This will run a probe impedance test followed by a probe burn-off. To start just an impedance test or just a burn-off, press the page key until the Care List is displayed, then press the scroll key once. Then use the arrow keys to select imp for impedance test or burn for burn-off.
COMMUNICATIONS ADDRESS
The AACC 2000 is preset for MSI communications at 1200 baud. To set the instrument address, press the page key until CMS List is displayed. Press the scroll key once and then use the arrow keys to set the desired address.

ALARM SETPOINTS
Alarm setpoints can be changed from the alarm list. Press the page key several times until AL List is displayed. Press the scroll key until 1dEv or 3FL.1 is displayed. The 1dEv is the process deviation alarm setpoint and the 3FL.1 is the minimum temperature alarm setpoint. The setpoints are changed by using the arrow keys.

ALARM DISPLAY
A sensor break alarm is displayed by a flashing S.br in the upper display. This indicates that the probe thermocouple connection is open. The process deviation alarm (1dEv), minimum temperature alarm (3FL.1), and probe fault (PFLt) alarms show up flashing in the lower display.

ALARM ACKNOWLEDGE
The sensor break, process deviation alarm (1dEv), and the minimum temperature alarm (3FL.1) can not be acknowledged. They will clear by themselves when the alarm condition goes away. The probe fault, PFLt, alarm is acknowledged by pressing the page and scroll keys together.
INSTRUMENT CONFIGURATION

Configuration mode is used to change items that are usually set once for a specific application. When the instrument is in configuration mode, all contacts open and the analog outputs go to zero.

To enter configuration mode, press the page key several times until ACCS List appears. Press the scroll key once and then use the arrow keys to set the level 1 (access) password. Press the scroll key once and then use the arrow keys to select conF. Press the scroll key once and then use the arrow keys to enter the level 2 (conf) password. Press the scroll key once and the instrument is now in configuration mode.

To exit configuration mode, press the page key several times until exit appears in the upper display. Press the up arrow key once to show yes in the lower display. The instrument will reset, perform its power up sequence, and then enter the normal operating mode.

The items below will give a list name (i.e. inst ConF) and a header for the parameter to be changed. To change the parameter, enter configuration and then press the page key until the list name is displayed. Press the scroll key until the upper display shows the parameter header. Use the arrow keys to select the desired parameter value. When finished, either exit configuration mode or continue to another parameter.

TEMPERATURE UNITS

The temperature unit are under the PV ConF list as parameter unit. Choices are deg C, deg F, deg K or none.
THERMOCOUPLE TYPE
The thermocouple type is under the iP Conf list as parameter inPt. There are many choices but the most common would be S.tc, r.tc, k.tc, or b.tc for type S, R, K, or B thermocouples respectively.

COMMUNICATIONS
Communications setups are under the HA ConF list. The most common parameter to change is the bAud parameter which sets the communications baud rate. Choices are 1200, 2400, 4800, 9600, and 19.20 (k). To select Modbus communications mode, change the Func parameter to mod, the prty parameter to none, the rES parameter to FuLL, and dELy to yes. For Marathon Monitors block mode set the Func parameter to mAr, the prty parameter to EvEn, and dELy to no.

ANALOG OUTPUT 1
Setup parameters for analog output 1 are under the 2A ConF list. The standard setups are the Func parameter is OP.1, the VAL.L parameter is 0, the VAL.H parameter is 100, the unit parameter is mA, the Out.L parameter is 4.0, and the Out.H parameter is 20.0. Therefore, the output provides a 4-20 mA signal for controlling enriching gas. To change the output for dilution air, then set the Func parameter to OP.2. To use the analog output to handle both dilution air and enriching gas, set the Func parameter to OP and the VAL.L to -100. The output would then produce 4 mA when full (100%) dilution air is requested and 20 mA when full (100%) enriching gas is requested. This analog output could also be used to retransmit temperature (IP.1) or millivolts (IP.2).
ANALOG OUTPUT 2
Setup parameters for analog output 2 are under the 3A ConF list. The standard setups are the Func parameter is PV, the VAL.L parameter is 0, the VAL.H parameter is 2, the unit parameter is mA, the Out.L parameter is 4.0, and the Out.H parameter is 20.0. This analog output could also be used to retransmit temperature (IP.1) or millivolts (IP.2).

OTHER PARAMETERS
Other configuration parameters can be changed in a similar manner. Please refer to the configuration section in the main manual for all the options.
### FACTORY PARAMETER SETUPS

* = instrument set the value

#### Home list
- **Process Variable**: *
- **Target Setpoint**: 0
- **Auto/Manual Mode**: \textit{M-a} \textit{man}
- **Output power**: \textit{OP} *
- **Reference Number**: \textit{rEF} 0

#### Probe List
- **Process Factor**: PF 150
- **Milivolt Offset**: OFFS 0
- **H-CO Compensation**: H-CO 20
- **Probe Temperature**: Ptc *
- **Probe Millivolts**: Pmv *
- **Auxilliary Input**: Axin *
  - (hide)

#### Care List
- **Care**: \textit{CArE} OFF
- **Measured Recovery Time**: \textit{prt.r} *
- **Temperature Minimum**: tmin OFF
- **Probe Test Interval**: Pt i OFF
- **Maximum Impedance**: imPH 20
- **Probe Test Recovery Time**: Ptrt 30
- **Burn Off Time**: bot 60
- **Burn Off Recovery Time**: bort 30
- **Final Delay**: FdE 5
- **Impedence Result**: Imp.r *

#### User List
- **Number 1**: \textit{n1} 0
- **Number 2**: \textit{n2} 0
- **Number 3**: \textit{n3} 0
- **Number 4**: \textit{n4} 0
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Number 5 \( n_5 \) 0
Number 6 \( n_6 \) 0
Number 7 \( n_7 \) 0
Number 8 \( n_8 \) 0
Number 9 \( n_9 \) 0
Number 10 \( n_{10} \) 0
Number 11 \( n_{11} \) 0
Number 12 \( n_{12} \) 0
Number 13 \( n_{13} \) 0
Number 14 \( n_{14} \) 0
Number 15 \( n_{15} \) 0

**Alarm List**

- **Alarm 1 Setpoint**: 1--- 0.1
- **Alarm 3 Setpoint**: 3--- 1400
- **Alarm 1 Hysteresis**: HY1 1 (hide)
- **Alarm 2 Hysteresis**: HY2 na (hide)
- **Alarm 3 Hysteresis**: HY3 1 (hide)
- **Alarm 4 Hysteresis**: HY4 na (hide)
- **Loop Break Time**: Lbt OFF (hide)
- **Enable Diagnostic Messages**: diAG NO (hide)

**Autotune List**

- **Autotune Enable**: tunE OFF
- **Automatic Manual Reset Calculation**: Adc MAN

**PID List**

- **Current PID Set**: Set Pid.1
- **Proportional Band PID1**: Pb 1
- **Integral Time PID1**: ti OFF
- **Derivative Time PID1**: td OFF
- **Manual Reset**: rES 0

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<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
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<tr>
<td>Cutback High</td>
<td>Hcb</td>
<td>Auto (hide)</td>
</tr>
<tr>
<td>Cutback Low PID1</td>
<td>Lcb</td>
<td>Auto (hide)</td>
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<tr>
<td>Relative cool gain set 1</td>
<td>rELC</td>
<td>1 (hide)</td>
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<tr>
<td>Proportional Band PID2</td>
<td>Pb2</td>
<td>1</td>
</tr>
<tr>
<td>Integral Time PID2</td>
<td>ti2</td>
<td>OFF</td>
</tr>
<tr>
<td>Derivative Time PID2</td>
<td>td2</td>
<td>OFF</td>
</tr>
<tr>
<td>Manual Reset PID2</td>
<td>rES2</td>
<td>0</td>
</tr>
<tr>
<td>Cutback High PID2</td>
<td>Hcb2</td>
<td>Auto (hide)</td>
</tr>
<tr>
<td>Cutback Low PID2</td>
<td>Lcb2</td>
<td>Auto (hide)</td>
</tr>
<tr>
<td>Relative cool gain set 2</td>
<td>rEL.2</td>
<td>1 (hide)</td>
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**Setpoint List**

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<th>Description</th>
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<tr>
<td>Setpoint Select</td>
<td>SSEL</td>
<td>SP 1</td>
</tr>
<tr>
<td>Setpoint 1</td>
<td>SP1</td>
<td>0</td>
</tr>
<tr>
<td>Setpoint 2</td>
<td>Sp2</td>
<td>0</td>
</tr>
<tr>
<td>Setpoint Low Limit</td>
<td>SPL</td>
<td>0 (hide)</td>
</tr>
<tr>
<td>Setpoint High Limit</td>
<td>SPH</td>
<td>2 (hide)</td>
</tr>
<tr>
<td>Setpoint 2 Low Limit</td>
<td>SP2.L</td>
<td>0 (hide)</td>
</tr>
<tr>
<td>Setpoint 2 High Limit</td>
<td>SP2.H</td>
<td>2 (hide)</td>
</tr>
<tr>
<td>Setpoint Rate Limit</td>
<td>Sprr</td>
<td>OFF (hide)</td>
</tr>
<tr>
<td>Holdback Type</td>
<td>Hb.tY</td>
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**Input List**

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<tr>
<td>Filter 1</td>
<td>FiLt</td>
<td>OFF</td>
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<tr>
<td>Filter 3</td>
<td>FLT3</td>
<td>OFF</td>
</tr>
<tr>
<td>Simple offset 1</td>
<td>OFS.1</td>
<td>0</td>
</tr>
<tr>
<td>ADC millivolts 1</td>
<td>mv.1</td>
<td>*</td>
</tr>
<tr>
<td>ADC millivolts 2</td>
<td>mv.2</td>
<td>*</td>
</tr>
<tr>
<td>CJC Temperature</td>
<td>CJC.1</td>
<td>*</td>
</tr>
<tr>
<td>IP1 linearized value</td>
<td>L1.1</td>
<td>*</td>
</tr>
<tr>
<td>IP3 linearized value</td>
<td>L1.3</td>
<td>*</td>
</tr>
<tr>
<td>Current input used for pv</td>
<td>PV.SL</td>
<td>*</td>
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**Output**

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<tr>
<th>Parameter</th>
<th>Default Value</th>
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<tr>
<th>List</th>
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<tbody>
<tr>
<td>Low Power Limit</td>
<td>OP.Lo</td>
</tr>
<tr>
<td>High Power Limit</td>
<td>OP.Hi</td>
</tr>
<tr>
<td>Output Rate Limit</td>
<td>Prr</td>
</tr>
<tr>
<td>Cycle time OP1</td>
<td>CYC.1</td>
</tr>
<tr>
<td>OP1 Minimum On Time</td>
<td>ont.1</td>
</tr>
<tr>
<td>Cycle time OP2</td>
<td>CYC.2</td>
</tr>
<tr>
<td>OP2 Minimum On time</td>
<td>ont.2</td>
</tr>
<tr>
<td>Deadband</td>
<td>db</td>
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<tr>
<td>Sensor Break Output Power</td>
<td>Sb.OP</td>
</tr>
</tbody>
</table>

Comms List

| Comms Address | Addr | 1 |

Info List

| Hide |

Inst Conf

| Function: O2, %C, Dewpoint, Redox | Zr.Fn | Carb |
| Control Type | Ctrl | Pid |
| Instrument type: Monitor/Controller | tYPE | Ctrl |
| Control Action | Act | REV |
| Type of cooling | COOL | lin |
| Control Time Units | ti.td | Sec |
| Style | dtYP | PV |
| Manual Key Enable | m-A | EnAb |
| Run hold button | r-h | EnAb |
| Power feedback | PwrF | OFF |
| Feedforward Type | Fwd.t | nonE |
| Sensor Break Action | Sbr.t | Sb.OP |
| Forced manual output | FOP | no |
| BCD Input Function | bcd | nonE |
### Gain Scheduling

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<th>Gain Scheduling</th>
<th>Gsch</th>
<th>no</th>
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### PV Conf

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<tr>
<th>Instrument Units</th>
<th>unit</th>
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<tr>
<td>Display Resolution</td>
<td>dEc.P</td>
<td>nn.nn</td>
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<tr>
<td>Range low</td>
<td>rnG.L</td>
<td>0</td>
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<tr>
<td>Range High</td>
<td>rnG.H</td>
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### IP Conf

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<tr>
<th>Linearisation type</th>
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<tr>
<td>CJC Type</td>
<td>CJC</td>
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<tr>
<td>Sensor break Impedance</td>
<td>imP</td>
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### SP Conf

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<td>Remote Tracking Configuration</td>
<td>rm.tr</td>
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<tr>
<td>manual track Configuration</td>
<td>m.tr</td>
<td>OFF</td>
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<td>SRL rate units</td>
<td>rmP.U</td>
<td>PSEC</td>
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<td>Remote Setpoint Configuration</td>
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### Alarm Conf

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<tr>
<td>Alarm 1 Latch</td>
<td>Ltch</td>
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<tr>
<td>Alarm 1 Block</td>
<td>bLoc</td>
<td>NO</td>
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<tr>
<td>Alarm 2 Type</td>
<td>AL2</td>
<td>OFF</td>
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<tr>
<td>Alarm 2 Latch</td>
<td>Ltch</td>
<td>NO</td>
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<tr>
<td>Alarm 2 Block</td>
<td>bLoc</td>
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<tr>
<td>Alarm 3 Type</td>
<td>AL3</td>
<td>FL.1</td>
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<td>Parameter</td>
<td>Value 1</td>
<td>Value 2</td>
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<td>----------------------------------</td>
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<tr>
<td>Alarm 4 Type</td>
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<td>Func</td>
<td>CArE</td>
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<td><strong>LB Conf</strong></td>
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<td>Logic Input B Ident</td>
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<td>burn</td>
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<td><strong>AA Conf</strong></td>
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<td>Fixed Module AA Ident</td>
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<td>Fixed Module AA Slot Function</td>
<td>Func</td>
<td>dIG</td>
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<td>Summary OP AA invert</td>
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<td>Module 1A High Value</td>
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<td>Out.L</td>
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Module 4A Conf
- Module 4A Identi
- Module 4A Slot Function: Func dlG
- Summary OP 4A Invert: SEnS inv
- Summary OP 4A configuration: 3FL.1

Module 4C Conf
- Module 4C Identi
- Module 4C Slot Function: Func dlG
- Summary OP 4C Invert: SEnS inv
- Summary OP 4C configuration: Sbr/PFLt/V FLt

Module 5A Conf
- Module 5A Identi
- Module 5A Slot Function: Func dlG
- Summary OP 5A Invert: SEnS nor
- Summary OP 5A configuration: burn/Veri

Module 5C Conf
- Module 5C Identi
- Module 5C Slot Function: Func dlG
- Summary OP 5A Invert: SEnS nor
- Summary OP 5A configuration: burn/Veri
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**Module 6A Conf**

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**CAL Conf**

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<td>High point for Input 1</td>
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<tr>
<td>Offset high for input 1</td>
<td>OF1.H</td>
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**PASS Conf**

| Access Mode User | ACC.P | 1 |
| Password         | cnF.P | 2 |

AACC 2000 Carbon Controller

Jan. 27, 1999
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