



HJM Electronics

Instrumentation for the Water-Treatment Industry

Tel: +27+ (0)11 452-2066 E-mail: info@hjmelectronics.co.za

Model 22 BOILER CONDUCTIVITY CONTROLLER.



GENERAL DESCRIPTION.

The Model 22 Boiler Controller is a single-channel, micro-processor based EC (Electrical Conductivity) controller.

The signal from the electrode is optically isolated before it is sent to the micro-processor behind the front panel. The micro-processor controls all the output- as well as programming- and set-up functions.

This arrangement eliminates ground-loop and signal feed-back errors.

Three push-buttons on the front panel allow for the easy programming of the controller.

The EC reading is displayed on the top line of the LCD display

The set-point is displayed on the bottom line of the LCD display.

A light-sensor controls the backlight of the display.

The control range is from 100- 5000 μ S/cm.

The output relay has a N/O and N/C change-over contacts.

The "BLEED" option is used to switch a solenoid valve to limit the conductivity in the boiler and works on a high going EC. This is the normal default setting.

The "DOSE" option is used to dose a chemical product and to maintain a certain conductivity. It works on a low going EC.



HJM Electronics

Instrumentation for the Water-Treatment Industry

Tel:+27+ (0)11 452-2066 E-mail: info@hjmelectronics.co.za

MODEL 22 BOILER CONDUCTIVITY CONTROLLER.

STANDARD SPECIFICATIONS: (SN1001 up)

Power input:	200-240 Vac
Power consumption:	10VA max.
Instrument Fuse:	100mA (250mA maximum).
Output Fuse:	5A (10A maximum).
Range:	100-5000 $\mu\text{S/cm}$.
Resolution:	+/- 100 $\mu\text{S/cm}$.
INTERLOCK:	Used for remotely switching controller on or off.
Accuracy:	+/- 100 $\mu\text{S/cm}$ (after calibration)
Display:	2 x 16 characters LCD module with backlight. The backlight options are: " Ambient ". "Always OFF" "Always ON"
μ Processor:	Microchip PIC18F4523 or PIC18F4525.
Firmware:	Versions 22E07 and up.
"Clock Run" light:	Flashing green LED. Indicates that the μ Processor is running.
EC input:	Electrically isolated.
Setpoint:	200-5000 $\mu\text{S/cm}$.
Hysteresis:	100-500 $\mu\text{S/cm}$.
"Setpoint Exceeded" light:	Amber LED.
"Setpoint Output:	N/O relay contact, 2A into resistive load. Suppressed with 47 R and 0.047 μF .
Sample "On" time:	On timer settings: 10, 20, 30 Seconds, 1, 2, 5, 10, 60 Minutes.
"Sample On Time" light:	Red LED.
"Off" time:	Off timer setting: 1, 2, 4, 8, 15, 30 , 60, 120, 240 Minutes.
"Relay Output" light:	Red LED.
Relay Output	N/O + N/C changeover relay contact, 2A into resistive load. Suppressed with 47 R and 0.047 μF .
"Output Test" function:	Relay output is energized for the duration of the "On time".
Probe signal mode:	"Always On": Probe signal is always switched on. "Output Relay": Probe signal is only on when Relay Output is on.
"Probe Signal" light:	Green LED.
4-20mA OUTPUT:	ISOLATED. Accuracy: +/- 0.1mA. Maximum load=600 Ohms. Range: 0-5000$\mu\text{S/cm}$.
Enclosure:	Polycarbonate, light grey colour with clear hinged lid. 2 point wall mounting.. Protection: IP 65. Size: 230 x 185 x 117 mm. (240 x 235 x 120 including cable glands and brackets) Mounting holes distance: 205mm.
Weight:	1.67Kg.
Front label:	White with black engraving.
Recommended Probe:	"TARGET" CE-4M Boiler Probe. 250 deg. C, 20 Kg/cm max. M18x1.5 thread.
Probe holder	1/2" BSP bronze Y-strainer with screen removed an M18 thread.

FACTORY DEFAULT SETTINGS:

SETPOINT:	4000 $\mu\text{S/cm}$
Control Type:	BLEED.
On Period:	30 seconds
Off Period:	30 Minutes.
Hysteresis:	100 $\mu\text{S/cm}$



HJM Electronics

Instrumentation for the Water-Treatment Industry

Tel:+27+ (0)11 452-2066 E-mail: info@hjmelectronics.co.za

MODEL 22 BOILER CONDUCTIVITY CONTROLLER.

TERMINAL CONNECTIONS:

220V INPUT:

- 10 = E (Earth) input. (linked to 16 = E (Earth) output).
- 11 = N (Neutral) input. (linked to 17 = N (Neutral) output).
- 12 = L (Live) input.

ON/OFF SWITCH.

Used for remotely switching controller on or off. Must be linked if not used!

13 + 14 = ON/OFF SWITCH.

220V OUTPUT:

- 15 = L (Live) output.
- 16 = E (Earth) output. (linked to 10 = E (Earth) input)
- 17 = N (Neutral) output. (linked to 11 = N (Neutral) input)

OUT1 RELAY:

- 18 = N/O, Relay output (L2).
- 19 = C, Relay common (L1). Link to 15 for 220V output.
- 20 = N/C, Relay output (L3).

BOILER PROBE CONNECTIONS:

- 1 = E Boiler probe= CE-4M (PROBE BODY)
- 2 = 2 Boiler probe= CE-4M (CENTRE PIN)
- 3 = NOT USED (Temperature compensation)
- 4 = NOT USED (Temperature compensation)

4-20 mA SIGNAL.

The isolated 4-20mA signal can be used as a recording signal.

It operates over a 0-fulscale range.

- 8 = - 4-20 mA output.
- 9 = + 4-20 mA output.



HJM Electronics

Instrumentation for the Water-Treatment Industry

Tel:+27+ (0)11 452-2066 E-mail: info@hjmelectronics.co.za

MODEL 22 BOILER CONDUCTIVITY CONTROLLER.

IMPORTANT: Before calibrating make sure that the probe has been installed as per drawing!

CALIBRATION:

Use a portable conductivity meter and measure a sample of the boiler water.

Press the **UP/DOWN** buttons until the following screen appears:

CALIBRATION ==>
Press SET

Pressing '**SET**' moves you to the next setting screen.

CALIBRATION(SET)
EC= XXX

Pressing '**SET**' moves you to the next setting screen.

SET Calibration
EC= XXX XX %

'**UP**' and '**DOWN**' adjusts the EC value in steps of 100 μ S/cm with the % change indicated. Press '**SET**' again to accept the setting.

SETPOINT ADJUSTMENT:

Press the **UP/DOWN** buttons until the following screen appears:

SETPOINT
EC = XXX μ S/cm

Pressing '**SET**' moves you to the next setting screen.

SET Setpoint
EC = XXXX μ S/cm

'**UP**' and '**DOWN**' adjusts the setpoint. Setting will change in steps of 100 μ S/cm. Press '**SET**' again to accept the setting.

Output Test function:

Press the **UP/DOWN** buttons until the following screen appears:

Output Test
SET to Turn On

Pressing '**SET**' switches on the Relay Output for the duration of the "ON Time" and changes the screen.

Output Test
SET to Turn Off

Pressing '**SET**' toggles the Output Test On/Off.

Pressing '**UP**' or '**DOWN**' advances to the next setting.

CONTROL TYPE:

Press the **UP/DOWN** buttons until the following screen appears:

CONTROL TYPE
Bleed (SET)

Pressing '**SET**' toggles between '**BLEED**' and '**DOSE**' control mode.

Pressing '**DOWN**' advances to the next setting.

MODEL 22 BOILER CONDUCTIVITY CONTROLLER.

PROBE SIGNAL MODE:

Press the **UP/DOWN** buttons until the following screen appears:

Probe Sig. Mode
Always On

Pressing **'SET'** to change between **"Always On"** / **"Output Relay"** function.
Pressing **'UP'** or **'DOWN'** advances to the next setting.

SET HYSTERESIS:

Press the **UP/DOWN** buttons until the following screen appears:

Hysteresis
EC= XXX

Pressing **'SET'** moves you to the next setting screen.

Set Hysteresis
EC= XXX XX %

Pressing **'UP'** and **'DOWN'** adjusts the value in steps of 100 μ S/cm.
Press **'SET'** to accept and save the setting.
Pressing **'UP'** or **'DOWN'** advances to the next setting.

ON PERIOD:

Press the **UP/DOWN** buttons until the following screen appears:

ON PERIOD
Period = xx Sec

Pressing **'SET'** moves you to the next setting screen.

SET On Period
Period = xxSec

Pressing **'UP'** and **'DOWN'** adjusts the value. The default setting is 30 seconds.
Press **'SET'** to accept and save the setting.
Pressing **'UP'** or **'DOWN'** advances to the next setting.

OFF PERIOD:

Press the **UP/DOWN** buttons until the following screen appears:

OFF PERIOD
Period = xx Sec

Pressing **'SET'** moves you to the next setting screen.

SET OffPeriod
Period = xxSec

Pressing **'UP'** and **'DOWN'** adjusts the value. The default setting is 30 minutes.
Press **'SET'** to accept and save the setting.
Pressing **'UP'** or **'DOWN'** advances to the next setting.

MODEL 22 BOILER CONDUCTIVITY CONTROLLER.

LCD BACKLIGHT:

Press the **UP/DOWN** buttons until the following screen appears:

LCD BACKLIGHT
Ambient / OFF / ON

Pressing '**SET**' steps through the options:

AMBIENT - the LCD backlight is turned on if the ambient light level drops too low.

OFF - Always OFF.

ON - Always ON.

Pressing '**UP/DOWN**' advances to the next setting.

DEFAULT VALUES:

WARNING! THIS WILL RESET ALL SETTING TO FACTORY DEFAULT!

Press the **UP/DOWN** buttons until the following screen appears:

DEFAULT VALUES
PRESS SET (HOLD)

Press '**SET**' for 3 seconds to load the factory-set default values.

DEFAULT VALUES
HOLDING .. X Sec

Hold the '**SET**' button in until the countdown reaches 0.

PLEASE NOTE: Setting the default values will change ALL the settings to the factory-defaults!

Press the **UP/DOWN** buttons until the following screen appears:

LCD BACKLIGHT
Ambient / OFF / ON

Pressing '**SET**' steps through the options:

AMBIENT - the LCD backlight is turned on if the ambient light level drops too low.

OFF - Always OFF.

ON - Always ON.

Pressing '**UP/DOWN**' advances to the next setting.

FACTORY DEFAULT SETTINGS:

SETPOINT:	4000 μ S/cm
Control Type:	BLEED.
On Period:	30 seconds
Off Period:	30 Minutes.
Relay Function:	Bleed
Hysteresis:	100 μ S/cm

MODEL 22 BOILER CONDUCTIVITY CONTROLLER.

PRE-CALIBRATION AND TEST FUNCTION:

The Model22 can be pre-calibrated using the build-in test resistor.

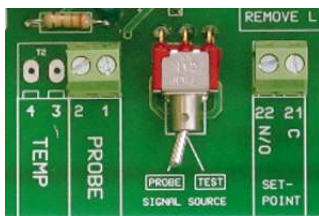
This function is used to check if the Model22 is working OK.

In the PROBE position the unit is connected to the CE-4M boiler conductivity probe.

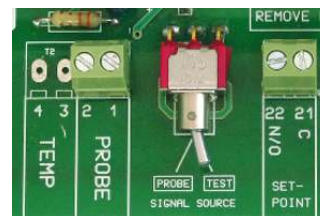
In the TEST position the unit is connected to the build-in test resistor.

To access this function remove the terminal cover and use the switch on the board.

It is located between the PROBE and SETPOINT terminals.



This is the NORMAL position.
The controller reads the signal from the CE-4M boiler conductivity probe.



This is the TEST position.
The controller reads the signal from the build-in test resistor.
Set calibration to read 2200 μ S/cm.

Do not forget to put the switch back into the NORMAL position!



HJM Electronics

Instrumentation for the Water-Treatment Industry

Tel: +27+ (0)11 452-2066 E-mail: info@hjmelectronics.co.za

MODEL 22 BOILER CONDUCTIVITY CONTROLLER.

TARGET CE-4M Boiler Conductivity Electrode.

Purpose and Application.

1 Monitoring of conductivity.

Timed monitoring of boiler water for increase in conductivity with the HJM Model22 Boiler Controller.

Monitoring of condensate returned to the boiler to detect any penetration of acids or alkali's etc.

Application mainly in steam boiler plants operating without constant supervision for condensate monitoring, as well as heating plants, paper and woodworking industries, catering, dye bath and water treatment plants

2 Automatic Boiler Blowdown.

Automatically controlled and intermittent blowdown to reduce wastage and increase operating safety with Model22 controller and suitably rated steam quality. Normally Closed solenoid valve or high pressure continuous blowdown valve

Design:

The electrode is supplied with 4mm 303 stainless steel tip. Standard tip length is 28mm and is screwed into an in-line 'Y' piece.

Wiring to the electrode is by a three pole connector.

Target Controls

targetsteam01@gmail.com

John Woodford 082 900-8977

Technical Data:

Standard connection M18,
3/8" available on request.

Max. Service Pressure:
25 Bar at 226° C.

Permissible conductivity range;
From 100 to 10000 µS/cm.

Max. temperature at terminal plug:
60° C

Electrical connection:
Three pole plug and base with
PG- gland.

Approx. Mass:
0.45 kg.

Important Notes.

Cable required for wiring:
Minimum size = 2x 1.5mm²
Max. cable length: 100m

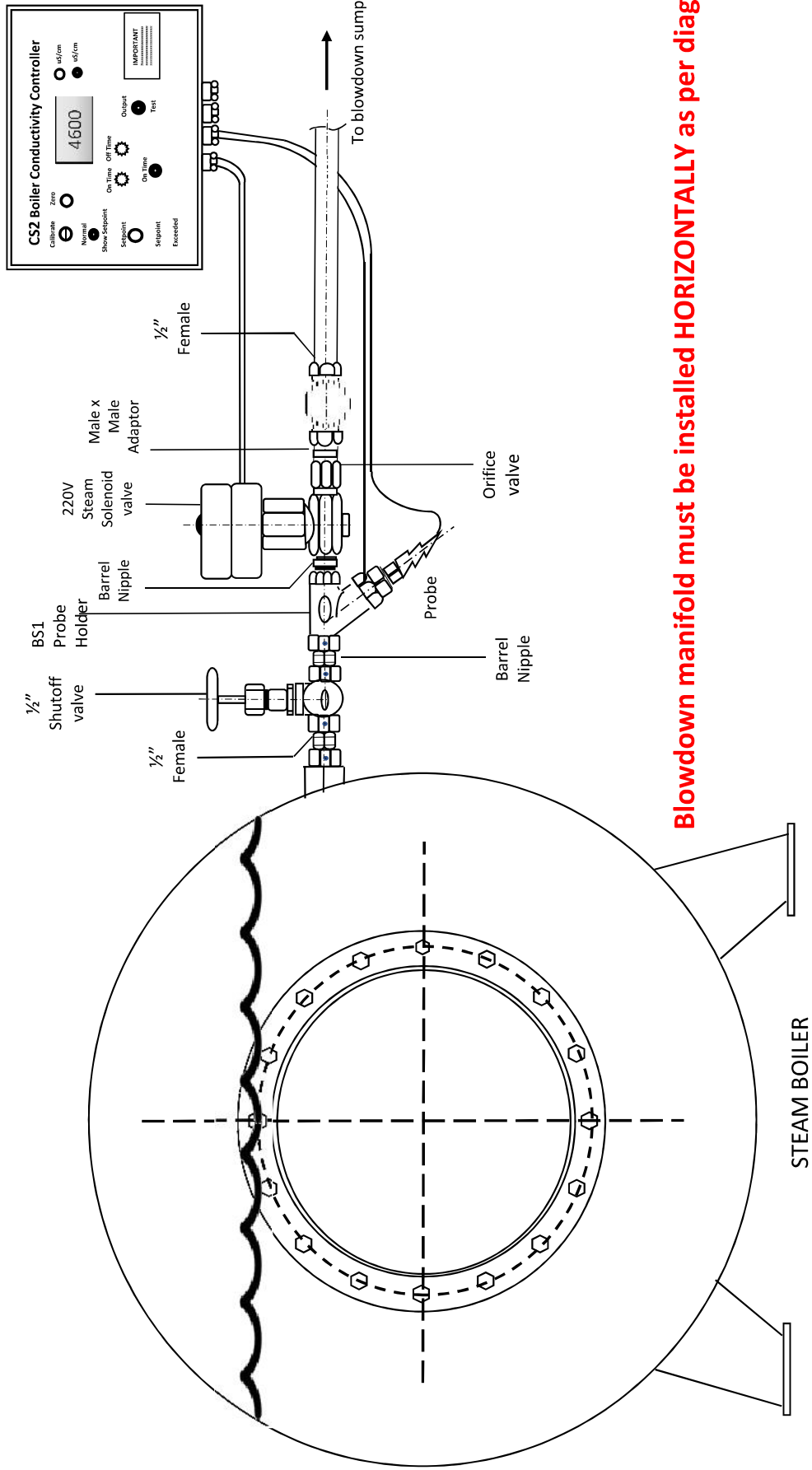
The Conductivity control electrode should be installed vertically in the in-line 'Y' piece. When mounting the electrode into steam or pressurized hot water boilers, the relevant regulations have to be considered.

Associated Equipment:

Model 22 Boiler Controller.



CS2 CONDUCTIVITY BLOWDOWN INSTALLATION



Blowdown manifold must be installed HORIZONTALLY as per diagram