Scotsman®

CM^3 Control System Update
Technical Review
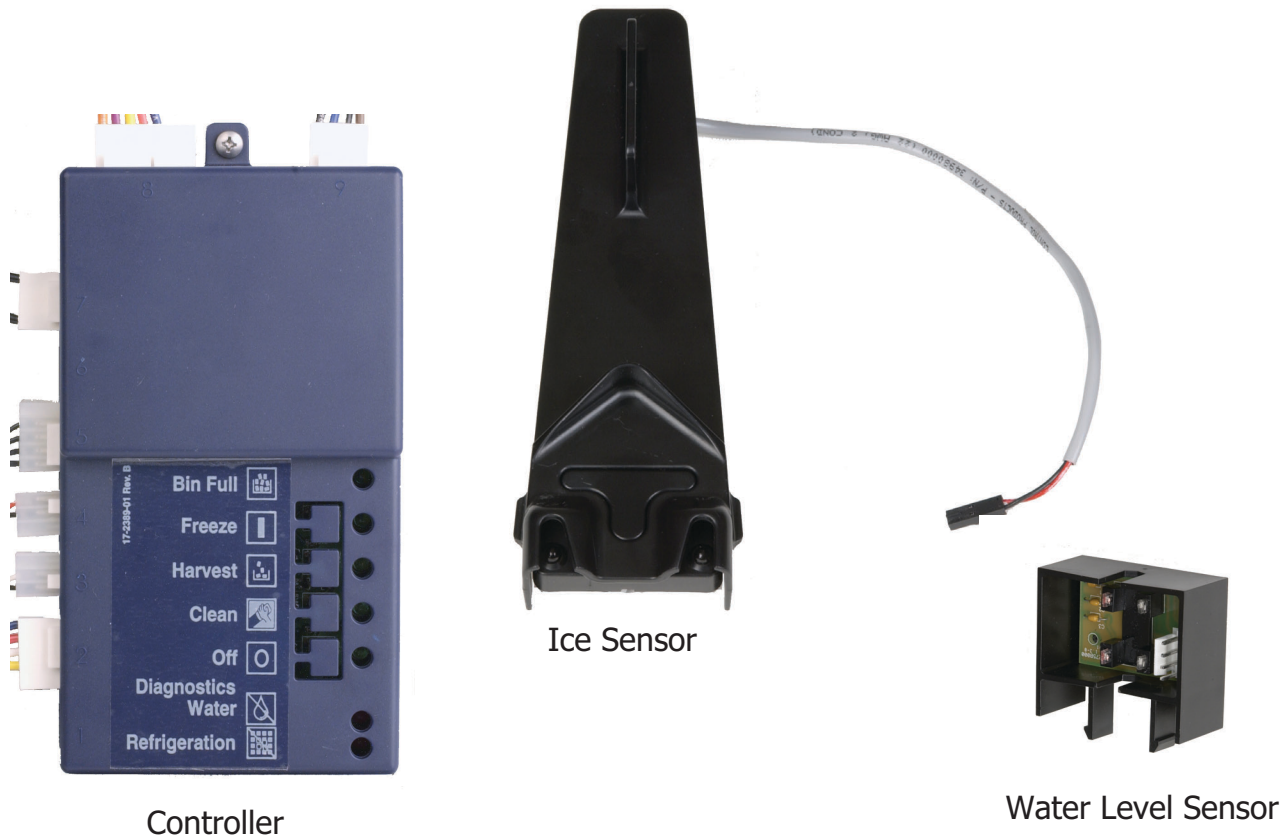
CM³ Control System Update

Scotsman's field proven CM³ control system has been continuously improved and upgraded since its introduction in 1996. The latest change to this control system, which operates all of Scotsman's modular cubers as well as the undercounter SCE275, is easily the largest.

What's New?

The controller, the ice sensors and the water level sensor are **all new**.

Ice Sensor

Water Level Sensor

Controller

Beginning with the controller, the most visible change is its container - its blue. The color change will make it easier to tell the new controller from the old one, which was black. The other changes are all under the cover - changes to make diagnostics easier and other improvements to make service simpler.

The controller changes include:

- **Program Code Display** - each Scotsman cuber has its own program that allows the controller to optimize operation. The code, displayed at start up, confirms that the correct program for the model is being used.
- **Last Error Code Recall** - the ability to display errors that the controller may have stored in memory, making diagnostics easier.
- **Single Service Controller** - a universal replacement part that can replace any existing controller. The correct program for the machine is selected at the time of service by rotary switch.

These three items will be covered in the next few pages.

Program Code Display

Controllers operate a machine according to the instructions, or program, that resides in their internal memory. Each model cuber operates just a bit differently, so to optimize them for maximum efficiency individual models have different programs, called EEPROM (**e**lectrically **e**rasable **p**rogrammable **r**ead-**o**nly **m**emory) values.

The new "blue box" controllers display a code at power-up that indicates which program is being used. To see the code:

- First, the controller must be switched Off and then the power disconnected.
- Then, when power is reconnected, all lights flash to confirm proper hardware function.
- After that, the two red diagnostic lights will blink together and the program code (specific green lights) will be displayed. This display continues for twenty seconds.
- After the program code display, the Bin Full and Off lights will be on, the Bin Full light will go out after a few seconds, leaving the Off light on. Pushing and releasing the Freeze button at this point will restart the ice machine.

Controller Program ID Table:

Green Lights Displayed when Red Lights Blink	Controller Programmed for Model
None	CME256, CME560, CME656
Clean	CME806
Harvest	CME1056A, CME1056R
Clean and Harvest	CME1056W
Freeze	CME1356, CME1656
Freeze and Clean	CME1856, CME2006
Freeze and Harvest	CME306
Freeze, Harvest and Clean	CME456
Bin Full	SCE275
Bin Full and Clean	European Model CM450SL
Bin Full and Harvest	CME810
Bin Full, Harvest and Clean	CME686

Power Up   **Program ID**   **Almost Ready**   **Ready to Start**
                      (CME1056W shown)

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Last Error Recall

When the controller encounters a condition in the operation of the ice machine that may be an indicator of a problem, such as a very long freeze time, it displays a problem code with the Diagnostic Indicator Lights. However, if the user resets the controller to get back in operation, the code is no longer displayed, and with the black controllers, it could not be recalled.

That has changed with the blue controller. The last two error codes, if any exist, can be recalled.

To recall the last error codes:

1. Switch the unit Off by holding the Off button in for longer than 3 seconds.

2. Hold the Off button down again until the Purge Setting indicators (Green Lights) are on.

3. Push and release the Harvest button.

- The last error code (if any) will be displayed and the purge setting code will disappear.

Hold for Access

4. Push the Harvest button again and the second-to-last error code AND the Bin Full light will be displayed. Only two error codes are available for display.

- If no error code exists, no code will be displayed and there will be NO LIGHTS showing.
- Pushing Harvest again will toggle back to the last error code and the bin full light will go out.
- Pushing it again will toggle back to the second-to-last error code and also switch on the Bin Full light.

5. To return from the display of the last error, do nothing for 60 seconds or push and hold the Off button until the off light glows.

Push for Code

- After returning from the display of the last error (Off light is on), the machine may be returned to the ice making process by pushing and releasing the Freeze button.

Error Code Display
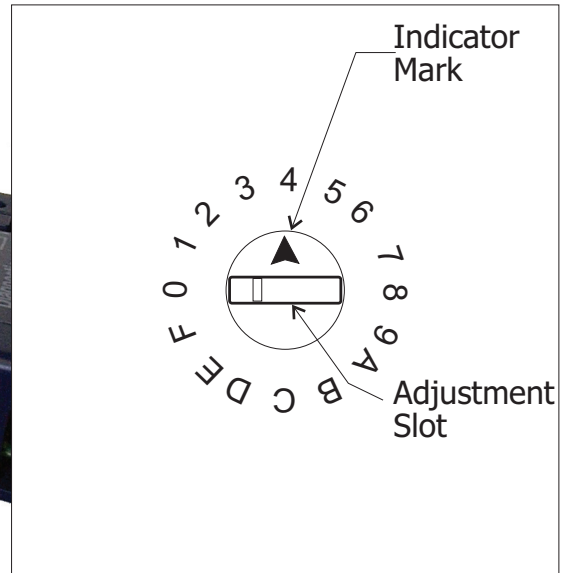
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Single Service Controller

Each model ice machine requires its own program in order to optimize performance. The black box controllers carry a single program for a specific model.

The blue box controller will still be programmed individually for use in original equipment. However, the blue controller used for service replacement contains all of the programs and will be able to replace ANY existing controller by simply looking up a designation for the model in a table on the back of the controller, also seen below, and then rotating a selector switch to that designation. The switch's position selects the program for the model indicated.

Service Controller Selector Switch

Switch Detail, shown set to CME1356 or CME1656

Program Selection Table

For Model	Set Switch To
CME256, CME506, CME656	0
CME806	1
CME1056A, CME1056R	2
CME1056W	3
CME1356, CME1656	4
CME1856W, CME2006R	5
CME306	6
CME456	7
SCE275	8
EUROPEAN MODEL CM450SL	9
CME810	A
CME686	B
NOT USED AT THIS TIME	C thru F

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Ice Sensors

The ice sensors perform two main functions: Sensing bin full/not full and ice released during harvest. The new sensors perform the same function in about the same way as the prior sensors, but are different in appearance

The change in how the sensors look is more than cosmetic. The changes were purposeful and will result in improved performance.

Photo-eye Alignment Boss

Water Drain Slot

Photo-eye

Photo-Eye Mount

Photo eye mount is removable from the sensor housing.

- Allows easier cleaning
- Nothing between sensor and ice
- Alignment boss ensures accurate aiming

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Ice Sensor - Service

1

Push in on alignment boss to release sensor mount.

2

Clean sensors with soft cloth or cotton swab dipped in diluted ice machine cleaner.

3

Route wire down and then up to from drip loop.

Route wire under clip and push sensor mount into place until alignment boss snaps into place.
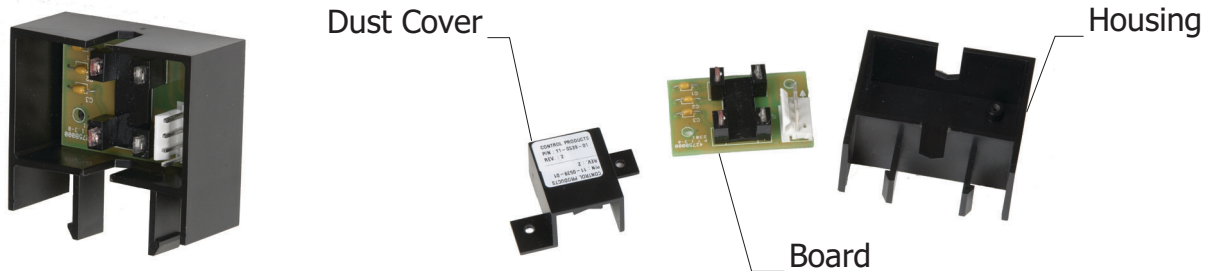

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Be sure wire is routed inside the back part of the sensor housing.

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Water Level Sensor

The new water level sensor features an alignment feature that promotes proper re-assembly after it has been taken apart for cleaning.

Dust Cover

Housing

Board

Questions and Answers:

Q: Are all of the new parts interchangeable with the prior components?

A: Yes, any of the new parts can be used on older production units.

Q. I have prior parts in stock. Can they be used on machines with the new system?

A. Yes for ice sensors and water level sensors. No for controllers. Ice machines built with the new ice sensors must use a blue controller.

Q. Do I have to change the entire system when replacing parts?

A. No, each part can be used individually just like the prior parts.

Q. Are there any differences in operation or diagnosis?

A. Yes, there are some minor changes.

- The Bin Full Light is temporarily ON after the EEPROM code display at power up.
- The Bin Full Light does not blink when a hand or something is stationary between sensors – moving the blockage will cause it to blink.
- The Bin Full Light does not go out if ice sensors are too close together (out of the machine).
- If ice sensors are blocked for 5 seconds the Bin Full light will go directly from Off to On; the prior control showed 20 seconds of blinking before registering a bin full.
- Bin full light switches on after 5 seconds of the thermostat being closed and goes off when the thermostat is open – unless the compressor has been in operation, then it stays on for 4 minutes after compressor shut off (like the prior control).
- The Harvest light is On during Harvest during a restart after a power interruption. The prior control blinked the Freeze light during all parts of the power interruption restart.
- Water Level Sensor test has new values for use with this controller -see Service Bulletin PS-2-2002.
- The ice sensor go/no-go test has been changed to work with this controller - see PS-2-2002.