Whirlpool undercounter ice maker troubleshooting

The inevitable problems and how to fix it themselves or know what your maintenance technician should do, where to find the parts and how much they should pay for the detailed instructions below for troubleshooting, diagnosis and repair written by a fan and aficionado of these machines. My last update to this page was October, 2019. Do-it-yourself parts and post-in services I suggest below are currently available; I'm still active in this business. The under-counter Whirlpool ice machine is a standalone $2000 device that makes gourmet clear ice like a wet bar. It has been labelled and sold by the KitchenAid, GE (General Electric), Sub Zero, Scottish, Viking, Estate, GM/Frigidaire, Maytag, Amana, Roper, Inglis, Ross Temp, Marvel and Sears Kenmore brands, and has similar quality and specifications under the counter to Jenn-Air 50 lb/day ice machines currently sold. This luxury ice cream shouldn't be confused with the usual ice maker that is part fridge-freezer; former excellent engine makes crystal clear, tasteless, ice cubes. The fridge-freezer ice maker produces a cloudy ice stiff hole flavor, usually in bizarre crescent shape, and stuck together. The ice machine product is a clear, clean, tasteless ice cube that is luxuriously wet and loose, like a handful of flawless diamonds picked out of a mountain source. Owning this machine once in your life will ruin you, like so many of my correspondents who say they'll never return to the ice in the fridge again. Among the material joys and comforts of life, small cubes are both innocent and enduring. In addition to this delicious indulgence, I also remain an excellent source of controlled cold plate cooling necessary for the operation of an even greater luxury, home soda fountain (see my page on the home carbonation device). On this page, however, we are concerned only about ice and how to keep the machine running. This residential ice wall creates 8 x 7 x 1/2 inch plates of ice recirculating water over a metal evapost plate with a chilled R-134a cooler (or R-12 before the early 1990s; this basic machine design goes back to the 1950s). When the ice sheet reaches its finished thickness, the thermostat triggers a cleaning cycle that turns the cooler back to heat the evaporic test plate until the ice sheet slides into the cutter grid. The cutter grille consists of nickel-chromium (Nichrome is one of the brands) resistance wire, which is heated by a low voltage electric current. The ice sheet rests on heated wires and wires slice through the plate, first in one direction on top of the layer of wires, then perpendicular towards the bottom layer, yielding cubes of ice that fall into the insulated ice supply bin. The original machines are produced in an 18-inch width with a standard 34.5-inch all-counter height. Since 1999 15-inch is also available. The only part of this machine that cools is the steaming plate at the top of the machine where the ice forms. Unlike a regular refrigerator-freezer, the ice container is insulated only insulated. The indoor air is not in the refrigerator and the temperature never drops below freezing temperatures. This bin is more or less like a portable ice chest, but a built-in closet. This is an important principle of wet ice machines. The cubes remain open and are always slowly melting, so the machine runs to make the new ice keep the trash full and make up the ice for you to return to use. I got to know these machines pretty well over the last 24 years. In 1995 I moved into a home equipped with one, and learned about this unusual device while doing my repairs. Finally, I became an important part of my home's carbonization and soda fountain efforts (see link above). Then in 2002, I ended up owning a truckload of them, after I went to a bankruptcy auction for the infamous Enron accounting firm, Arthur Andersen, where I was looking forward to buying various assets from my computer business. Their corporate skyscraper suites were furnished with a large amount of these machines, recently purchased. Although I wanted to buy one as a spare, the auctioneer abruptly demanded to sell them all in one lot. Sure, no one else at the commercial equipment auction wanted such a haul, but I saw an opportunity, knew what I was dealing with, and took them all for 5 cents on the dollar. I made a beautiful profit from reselling them once-at-a-time on eBay (sorry, they're all gone now), but in the process I had to become an expert in diagnosing and correcting them using my background in the engineering profession. This field experience gave a definitive demonstration of what were the most common repair problems that led me to create this website for the benefit of fellow ice machine owners. Having maintained this website for a few years, I have responded personally to thousands of other ice machine owners, and reviewed (or at least consulted) all repair problems presented by these machines. Below you'll find accumulated wisdom for diagnosing and repairing procedures, getting original parts, improvising ersatz parts and dealing with hired maintenance technicians. Photos here show my personal unit taken in 1997, model EC5100XFB0. Essentially an identical machine has been sold for years and years under a variety of brands, model numbers and styles of decor. Other than the change away from the R-12 refrigerant R-134a around 1992, and the change in electromechanical control of computer electronics around 2002, the principles, components and physical arrangement have been the same for decades. An excellent source of information, including parts diagrams, parts catalog and prices, is available partselect.com and sears.com, even if they are not a place to buy parts. You can enter your specific model number and compare repair-related parts with mine. Similar models include: ACS50 ACS501 ACS502 CCS51AEL CECS2AE1 CHCS51AE1 CSWE1 CSW1AE CSW1AE1B5 CSW45 CSW45PA1B0 (Scotsman) EC5100 EC5100XEB0 EC5100XEB1 EC5100XEN0 EC5100XEN1 EC5100XEW0 EC5100XEW1 EC5100XFB0 EC5100XFB1 EC5100XFN0 EC5100XFN1 EC5100XFW0 EC5100XFW1 EC5100XL EC5100XP EC5100XT EC5100XT1 EC510BXD0 EC510NXD0 EC510WXD0 EC510WXE0 ECB5100XFB EHC511 EUC050A1 ZDI15 ZDI15CBB GI1500PHB0 GI1500PHB3 GI1500PHB6 GI1500PHW0 GI1500PHW3 GI1500XH GI1500XHB0 GI1500XHB1 GI1500XHB2 GI1500XHB3 GI1500XHN0 GI1500XHN1 GI1500XHN2 GI1500XHN3 GI1500XHS0 GI1500XHS1 GI1500XHS2 GI1500XHS3 GI1500XHT1 GI1500XHT2 GI1500XHT3 GI1500XHW0 GI1500XHW1 GI1500XHW2 GI1500XHW3 GI1500XHW7 GI15NDXTB GI15NDXTS GI15NDXXS GI15NFLTS0 GI15NFRTB0 GI15NFRTB1 GI15NFRTB2 GI15NFRTB3 GI15NFRTB4 IACS501 IACS50E1 IM30 JEAC501 JEAC50SL0 JEAC50SL1 JEACS50SL0 JEACS50SL1 JLAIC5053 JT051CAE1612 JT051CAE2511 JT051CAE2512 JVGC535A0 JVGC535A1 JVGC535W2 KUIA15NLH KUIA15NRH KUIA15NRHS9 KUIA15PLL KUIA15PRL KUIA15RRL KUIA18NNJ KUIA18NNJS5 KUIA18PNL KUIA18PNLS1 KUIC15 KUIC15NRTS0 KUIC18 KUIS155H KUIS155HLS3 KUIS155HRS3 KUIS15NNZW0 KUIS15NNZB0 KUIS15NRH KUIS15PRH KUIS185FBS0 KUIS185J KUIS185JSS0 KUIS185JWH2 KUIS18NNJ KUIS18NNJW5 KUIS18NNTW1 KUIS18PNJ KUIV18NNM MA15CL MIM1555ZRS0 ML15CL ML15CLG ML15CP ML15CPG O53CAE1610 O53CAE1612 RC-50-SC (Ross Temp) VUIM153DRSS (Viking Range Corporation) ZD115CBBE ZDIC150EBB ZDIS150 ZDIS150WBB ZDIS150WSS ZDIS150WWW ZDIS15CSS (GE Monogram) 198.887482 106.86482690 106.86482691 198.8814831 3KUIS185V0 235S0 501-ISC (SubZero) JIM1550ARW JIM158XBRS JIM158XBRSO (Jenn-Air) My trusty unit is still after all these years. I have had: repair the grid several times, replace the catch thermostat with an electronic timer, replace the water solenoid valve, and recharge the appliance with refrigerant. The basic cooling mechanism is very durable and reliable. The other owners of these machines still have 30-year-old specimens. Before you go into ordering expensive parts, or rashly throwing a failed unit, see if my information below can't help you diagnose and repair problems economically. Let's discuss the three most common issues that probably brought you here. After that, we detailed the universe's rarer problems. As wonderful as this machine performs, there are three chronic problems with Whirlpool's otherwise excellent design resulting in very costly repair calls, usually after only a few years of continuous operation: a fairly thin wire cutter grid breaks. The result is that slabs of ice back up the machine and no ice cubes are cut to get into the supply bin. In 2002, the use of electromechanical controls for the 2002 and 2003 and 2003 operations is based on the information on the evapolt plate cracks and breaks open as the water has repeatedly infiltrated and the water has expanded in cold melting cycles. The thermostat no longer recognizes the actual temperature of the evapo vapor and takes longer to start the harvest cycle. The recurrent cycles of icing are slowly pressed into the bracket, keeping the capillary tube away from the evapolt plate and beyond. Harvest intervals become longer and longer, despite the thickness setting manually, which should shorten the cycle. Finally, the machine does not trigger a catch cycle at all, and one thick plate of ice sits on a evapoon plate, never cleaned up, and no ice is produced in the supply bin. The solenoid valve, which controls the flow of water into the reservoir, fails in two ways. First, it may not completely shut down, resulting in a continuous handful of warm water reservoirs that first slow down ice production, and eventually stop ice production completely if it gets bad enough. Secondly, it may not open completely or at all, so the reservoir will never fill, and only produce thin ice plates or no ice at all. Not only do these issues indicate a house call device service, but these service calls can be very expensive. Ice machines are relatively rare items and expertise to diagnose and improve them tends to command premium prices, as is the manufacturer's only source of parts. Typically, you'll probably get someone who might know how to fix a common refrigerator, but don't understand ice machines well enough to diagnose their unique problems. If you're like me, you may find that you can do a costly repair yourself, at minimal cost. What you need is some data and diagnostic analysis, which is why I wrote this website. Some of the improvements I describe may be beyond your abilities, but even if you're not do-it-yourself'er, you can make this information a sure diagnosis for yourself. At the very least, you will be able to criticize whether a maintenance technician will give you the right diagnosis and a fair price for repairs. In a gloomy case, if your machine isn't worth repairing, you can decide to do so without having to pay for the service call. I have published this information as part of my machine shop pages because these fixes have to do with the metal itself (nickel-chromium wire, solder), or parts or suppliers closely related to metalwork, although there is no actual mechanical involved. Understanding an item through maintenance guides Before you diagnose or fix a problem, you can explore some of the service manuals I've collected over the years. Different manuals cover different designs and models from the 1970s to the present day, so choose the manual (manuals) for the type of machine you have. If you are not sure what is closest, KAR Manuals are the best technical guides as they cover all the technical details and diagnostic procedures of the basic Whirlpool machine, which all brands (Whirlpool, KitchenAid, GE Monogram, Jenn-Air, Maytag, etc.) are actually built. Service and Wiring Sheet 2180831 (46KB PDF file) describes newer versions of older electromechanical controls (EC5100 series, which were produced until about 1999 and sold by dealers within a few years there). Tech Sheet 758860-E and 758846-C (167KB PDF file) describe the earliest models. The earliest models used a spring clip type cutter network, as described below and described in the Whirlpool repair parts list of EC5100XP models. A later version of the machine introduced in 1999 uses an electronic circuit board instead of electromechanical controls; this was a profound change in design that needs to be considered for diagnosis and troubleshooting. Almost all working machines today have this electronic design. The work of electromechanical machines is becoming rare as they age the necessary repairs, usually demanding orphaned parts such as thermostats that are difficult to find. A newer version of the electronically controlled Whirlpool (and KitchenAid branded) machine (2007 and after) is described in Service and Wiring Sheet 2324311C. The first version of the electronic control models (since 1999) was described by the service and wiring page 2217233-REL and 2217235-REL (224KB PDF file). A newer version (2005), which appears to have the same information is service and wiring page 2313728-REL. The GE Monogram series (ZDIS150) is similar to technical datasheet 162D9144P005 (part numbers 2217278 or 31-51316-1) and the Technical Service Guide (part number 31-9196, March 2010) for all ZDIS150 models (including ZDIS150WSS, ZDIS150WBB, ZDIS150WWW; these three-letter suff characters in the ZDIS150 model code simply show white, black or stainless color score). This GE branded machine looks like it's actually made by Whirlpool. These manuals are well written but not as comprehensive as KitchenAid's KAR manuals, so it may be necessary to examine both of them in order to gain full understanding. If you have newer electronic controls, read the basic section of the maintenance guide for the whirlpool GI1500 series ice machine (384KB PDF file, 34-pp) that contain wiring diagrams. The theory of operation and troubleshooting information is worth reading to understand older models as well. See also some diagrams. The manuals include KitchenAid brand versions of the Whirlpool machine. There is also an user manual and a maintenance manual. KitchenAid models are marked as KUIS155 and KUIS185 with stethixes variations finish style. The different versions of the Steering Committee of the Electronic Steering Committee (part numbers 2185947, 6100499, 2304016) have slightly different run the sequence chart [1-page PDF file]. Whirlpool instruction sheet 4388700 Rev. A 4/04 (see document [2-page PDF file]) that details the update for electronic verification issued in 2004. The older PC on board was Whirlpool part number 2185947. The updated boards are whirlpool part numbers 6100499 and last 2304016. The update improves the cycle timing and diagnostics of the jax and provides flashing LED problem codes when the controller detects errors on the machine. The latest version of Whirlpool 2304016 differs from the Whirlpool 6100499 by adding a number of intelligent functions: a delay of 30 seconds for the initial shortening before the compressor, minimum /maximum freezing time 15-25 minutes, 1 minute maximum water filling time, forced 25-minute freezing with a 4-minute harvest timed cycle, when you disconnect the steamer thermistor, force thermistor to open, force thermistor with flashing LED, if the thermistor-controlled harvest exceeds 16 minutes, forced standing with a one-second flashing LED, if the bin thermistor fails, and diagnostic flash codes are created during operation during operation (see manual details). So the detected errors in these later models include too long a harvest cycle and a failed bin or evapost thermistor. See also my detailed parts of the diagrams and catalog of older electromechanical machines and compare them to your unit. KitchenAid KAR-19 Technical Education Work Assistance 4317408 Document [5 MB PDF File, 74 Pages], for the 2007 Design version of KitchenAid branded machines made from Whirlpool. This is a training guide for maintenance technicians working with bench machines. Much of this simply repeats what is in the user manual specific to this model, but there are detailed procedures for replacing all the components of the general machine. An older version of this manual of design years 1999-2007 is a KitchenAid KAR-14 technical education work aid 4317339 document [large 60 MB PDF file, 80 pages]. Find your KitchenAid model design year by the ninth letter of the model number: H=1999, J=2000, K=2001, L=2002, M=2003, S=2006, T=2007 (etc.). The production year can be found in the second letter of the serial number: M=2002, P=2003, R=2004, T=2006, U=2007 (etc.); the third and fourth digits indicate the production week. The corresponding Whirlpool model numbers in the 2007 design update appear to be the GI15NFRTB pattern. (The main function introduced newly introduced into the 2007 design was the drain pump water level sensor in the water tank; it allows the control plate to exert powered control on both the filling and draining reservoir, thereby improving the reservoir's water freshness, reducing the amount of water needed to fill, and detecting mechanical problems with filling and draining. The filling valve also measures the flow rate of incoming water, which includes its own complex circuit plate. The harvest probably triggers not only the vaporist teism, but also the low water reservoir. While this newer gadgets improve performance and efficiency, it makes more things maybe go wrong, makes it harder to diagnose and repair, and requires expensive manufacturer-specific parts to replace something that can't.) In 2007 and later, Whirlpool or KitchenAid machines come with two short service documents tucked into the chassis: KitchenAid KUIC18PNTS2 Diagnostic Procedure and KitchenAid W10217947A Service Sheet. Some IFS18 units come with the Whirlpool W10206442E Service and Wiring Sheet. Jenn-Air JIM158XBRS Models Service and Wiring Sheet. Marvel IM30 service datasheet [PDF file, 2 pages] and service manual [PDF file, 35 pages]. This model is not a Whirlpool type, but similar in principle, good guidance theory and diagnosis of service data and manual. The Embraco Compressor Application Manual (search below [google.com]) is an excellent reference to the testing, diagnosis and repair of the machine's refrigeration compressor. W10492485 service and wiring page [1.3MB PDF file, 5 pages]. This is the Maytag MIM1555ZRS0 model, which appears to be Whirlpool guts maytag label and cabinet. This page also applies to KitchenAid KUIS15NNZW0 and KUIS15NNZB0 models. The design includes four electronic sensors to confuse the driver (and you) if they fail: three controllers (evapost, bin, unit) and the tank water level sensor. If you should come across additional documents from these machines, please send them to me by email here. Repairing the Ice Cutter Grid If your cutter grid breaks, the replacement part (326566 Grid Assembly) will cost you $224.75 from Whirlpool (2008 pricing), perhaps in addition to the service call cost if you don't diagnose the problem yourself. However, it is a simple problem to diagnose, and perhaps even fully repair, itself. The defect is repairable by replacing about 18 feet of certain gauge and nickel-chromium wire alloy. New mesh wire set: I keep bulk tender for this wire hand, U.S.-made, top quality. I'm sending you 20 feet of the right wire in a first-class post for $26. Ships to the U.S. and international addresses. Orders are processed from income on the same or the next day. It is the same wire that is used in all brands and models from the 1970s until now, and replaces the wire Whirlpool restore kits 370853, 4387020 and 2185611; and GE Monogram kits WR29X10075, WR02X12734 and WR02X12735; competitive prices for these kits are upwards of $80. To order, see the detailed order form. You can also order a bulk delivery of 100 feet, which is a sufficient way to repair, for $80. Newer network connector set: A newer type of connector is used on the left These connectors rarely fail, but when they do, they are almost impossible to find. The nylon casing on the left is used in the grid itself and on the right is the shell used on top of the machine chassis. The network uses a plug casing with the tank pins and the chassis uses the socket with plug-in pins. You can also see one press pin for each shell. I stock these items with a complete replacement kit consisting of one for each shell and two for each press pin. With this kit, you can replace the network connector, the computer's mas like a connector, or both. Order here. Parent type network connector: Use this newer type connector set to replace both sides of the older black rubber 2-pronged network connector because the older connector is no longer available. This connector is what we use to renovate older networks with the failed old connector. Step-by-step guide: See my replacement instructions for ice machine network connectors. My cutter network has two levels, one that cuts north-south and the other that cuts east-west; all of these are about 8 feet of wire, creating 10 ohms of resistance. These two are wired in parallel to create about 5 ohms of resistance. You can check the resistance to the exact volt-ohmmeter, and measure the wire diameter of the micrometer or calipers to make sure you have a similar design. Email readers on this page confirm that this grid design and wire type are the same in all brands and models. There are two ways to distance the grid wires that correspond to the cubelet (3/4 inch square cubes) versus the cube (1-1/4 inch square cubes) the size of the ice, although I've never seen anything but a 3/4 inch version. There are some models, a low-voltage transformer that powers the cutter grid also powers the trash light. In recent designs, the transformer also supplies low-voltage power with an electronic control. Grid variations: Three different grid designs have been used in the history of these machines: a stainless steel frame with four black plastic insulator strips, one over each of the four sides. Look at the photo. Black molded rubber electric plug with two brass branches. It is the most common network type of electromechanical machines, and the easiest to repair. It interweads the spring-clip type of grid (hard repaired) described next; the two networks are identical in shape and power connections and differ only in the way in which the obstacle wire is segmented and completed. Uses four long black bars, one on each side. The resistance wire runs in the style of the stomach, bends around U-rotating insulators and ends up under the screws attached to the ends of the insulator. The upper cutting layer offers 10 parallel obstacle wire runs and the bottom layer 9 runs. Displays the 4th diagram of the original parts of The Whirlpool. Whirlpool supplied this network as part of the numbers 2174861, WH2174861, 2174752 or 563887, all of which appear to be identical and interchangeable. This network was produced in the 1990s. This grid is no longer produced and is not available as a new replacement from any of the brands that used it. Stainless steel frame U-shaped spring staples and small black plastic insulators at the end of each stretch looped-end wire. The top cutting layer has 10 wire segments and there are 9 segments on the ground floor, each with two loop segments that make a total of 38 power line contact points (!) and 4 sprung connecting finishers, making 42 points individually vulnerable to corrosion and malfunction. Black molded rubber electric plug with two brass branches (same as the previous type). Check the spring grid photo to see if you have it. This type of network is less common today, which is the oldest. Spring clamp and wire segments are difficult to repair, there are numerous black plastic insulator pieces, one at both ends of each wire segment, instead of insulator strips. This grid can be replaced with a better insulator-strip design. Whirlpool part numbers 758470 (3/4 inch square cubes, most common size) and 758,469 (larger standard cubes, rarely used). This network was produced in the 1970s. Spring-clip networks are no longer produced or available as a new total replacement part of any brand that used it. Wire segments, clamps or connectors (or recommended if) are also not available. If it is necessary to repair the network of spring clips, the only practical method is to remove and discard all spring clip equipment by keeping the original stainless steel frame with new plastic insulation parts and a standard resistance wire on the gastric road. Stainless frame clear plastic insulator strip on both sides, white nylon electric plug (see above) with two tinted containers (used in newer Whirlpool, KitchenAid, SubZero, GE Monogram and other models, easy to repair) (photo, if new, photo of a well-used grid shows troublesome lime wrappers). Sold in various numbers, including: Whirlpool 1173209, 2185614, 2217280, 2313601, 2313637, AP3859445, PS988982 and W10218012; GE Monogram WR29X10016 and WR29X10073. This network has been manufactured since 2000 and is still the current type of sold new machines today. It is available to new spare parts distributors, which can be found in web-searching whirlpool and part of the numbers above. The only design weakness of this generally improved grid design is that clear plastic insulators are pulled from the tension-stretched wire and the termination of screw thread commitments, and these mechanical stress points can break when plastic becomes old and brittle. The plastic used in polycarbonate is durable, but polycarbonate happens to be acidic. the manufacturer advises you to clean the machine frequently with acid, but this is a long-term consequence of weakening plastic insulators where they become fragile and fail, where the wires or screws attach. Despite the difference in design, these different grid designs use the same type and total length resistance wire, and they all cut an 8 8 inch plate of ice into 110 individual cubes. Given that the machine is capable of producing about 2 or 3 boards per hour, it can therefore produce 5-8,000 cubes per day. The trash can has about two days of production, which makes up to 16,000 cubes waiting to be made. There's a lot of cubes! Removing the old broken wire: To restring the cord, first remove the cutter mesh from the ice machine by removing the two screws that hold the net in the bin and disconnecting the two-pronged low-voltage power plug. You can test the machine by keeping it running when the network is removed. Without a lattice machine should make ice slabs that drop in the trash and break. You can let a network repair work when you're done repairing a network. Remove the plastic bezel from the net by sliding it away while slinging up to hold it in place. The obstacle cord is drawn in two directions, each with a separate circuit; the two are parallel to the conventional insulated tin copper wire with a 2-strand wire. Probably only the upper level of the grid wire is broken, and you can limit your repair to one edition because the upper cord breaks the repetitive effect of an ice plate coming out of the vapor; the lower level very rarely breaks because it does not get such an effect. The ends of the wire are attached to the screws of stainless steel. These screws have a Torx T20 head, so you need a Torx driver to loosen and tighten them (if desperate you can grab a screw head with pliers). The loosening of these screws will set the wires a little loose. I spin the old broken wire back and forth from the pattern through the edges of the plastic insulators. The insulators shall be recorded on the metal frame only by wire voltage, so that the insulators come loose from the metal frame when the wire has come loose; to reassemble the orientation of the insulators. This is a good time to clean the lattice acid cleaner if it has lime coverage or other debris. Installing a new wire: Installing a new wire requires skillful manipulation, but the process is not too difficult to cultivate techniques that I now explain. Wrangling the stiff wire is a romantic piece of forging craftsmanship that has been largely forgotten in the modern era. Rediscovering forgotten secrets will reward you with the ability to economically repair the ice sheet grille if necessary. My share of re-found was inspired by my observations A curious genius in my college residence who practiced the art of restring wooden squash racquets as a lucrative gig business. The necessary tools are: Torx T20 screwdriver for screws for wire terminals, benchvis, hardened wire cutters and locking tongs (Throw Handles). You apply the locking tongs to the free end of the cord to give the end of the cord a signal. This handle allows you to stretch the wire tightly down your path. If you don't have locking tongs, you can improvise the handle wire by turning the free end of the wire onto the screwdriver shaft. First, you must repair the grid frame in a secure operating holder, such as a bench. Rigidly fastening the grille bench throw is necessary. Fixturing leaves both hands free with two hands for the stretching task, and you can apply a constant tension that neatly stretches and strums the wire into the net path. If you don't have all these tools available, you can improvise some of these other tools you can have on hand. The use of conventional electric cord cutters (intended for use with copper wire) causes a nickname on the sharp edge of the cutting blades when using them to cut a hard nickel chromium resistance wire. Use a hardened type of wire cutter if it exists, such as aviation cuts, or else be willing to suffer the nickname of your usual cutters. A C-clamp and wooden shims against the work desk surface can be a poor man's bench throw to keep the net in the comer while you're working on it. If you do not have a Torx screwdriver, you can use the usual tongs to carefully twist the screw head. These screws require little torque, as they are thread-forming types that go into the plastic material of the insulators. Before replacing the network wire, you must check the grid for other possible problems. In some cases, the grid may be broken or there may be no parts in addition to the broken obstacle wire. You can replace the missing Torx screw with #10 metal screw cut 3/8 inch length. A failed or missing connector can improve the replacement plugs I propose above. Damaged or missing insulators require maintenance of postal repair (see above) because the parts of the original manufacturer have been completed and are no longer available in any other way. The design of the net is based on a snake wire that passes through black plastic issifiers. In the case of rare specimens, this plastic is found to be white and that all subsequent electronic models are always clear and open instead of threaded through. Assembly of parts (stainless steel frame, plastic insulators and taut wire) holds together the wire voltage itself. Check the length of the removed wire (before it breaks); it's usually 8 feet 3 inches. Unspool slightly longer piece of new wire (I use 9 feet), making sure not to abruptly while you release the loose spiral delivery from your inevitably spring tangle. If you bought your new wire from me, you should have got one 20-foot-long one that can comfortably just be cut in half. Fold it into a 9 or 10 foot cut wire itself in a half to find your approximate center. Don't actually sharply bend the middle, but instead form a side loop there around your finger. Cut the ends through the insulator's middle hump, which is opposite the insulator holding the connector screws. Cut these two loose ends according to the rest of the gastric pattern until you reach the end with the screws on the connector (not unlike tying the shoe to an un-crossed pattern). You should have at least several inches of extra wire on the last connecting screw at both ends; if not, even move the cord to the ends. Once the open wire is threaded into place, start its tight fastening technique. First, take one loose end of the wire and wrap it clockwise around the connector with a screw half or three-quarters of a rotation with the loop connector above it, and tighten the screw with the Torx driver. Next, using your fingers, starting from the same screwed-down end, stretch the wire tight over the net opening in one direction, and again reversing in the next direction, hand-over-hand, until you reach the other end, and have taken up all the sluggish you can. At this stage, it is not necessary to hold the wire very tightly; just enough to keep the wire sagging and straighten all the kinks is enough. Use your fingers for this purpose; do not use tongs or other tools that may damage or otherwise damage the wire during manipulation. Now here's a secret technique to get a tight wire across the grid: wrap the loose end around your still loose connection screw one quarter of a turn, and maintain the constant voltage of the loose end when you repeatedly pluck the spans of the wire from the end to disconnect (energized) to the end. By plucking I mean that you pull another span from the pinned to finally tighten the first span, then take a slack second span pulling the third, then the third from the fourth, and so on until the slack is pulled from the net by the loose end of continuous tension. This constant tension could also give another person that will help you with a pair of vise-grip pliers at the end of the wire, or weight a few pounds as well as added, but you must have both hands free to pluck. Repeat plucking a few times until the strings are moderately tight, moderate, such as playing on a low note when you pluck them like a guitar string, not so tight as to distort the grid frame out of its rectangular form. After this step you can strum from the attached end of the loose end to tighten the segments even further, strumming from one side while maintaining tension of the open wire tip with the other hand. Continuous means that you cannot let the voltage remain behind even for a moment until the other free end is around and its fixing screw wrapped under the head and has finally tightened the screw to lock the wire under stress. Before the last voltage, if the cord is mounted over the length of this circuit, carefully check each wire bends over plastic insulators to make sure that the wire is correctly pointing over the radius bends down the insulators. Make sure that no part of the cord is in the wrong place on the insulators. Also check that plastic insulators are caught in their proper seating metal grid frame. Now you must coordinate a number of finishes deftly at once: (1) firming wire pliers like the handle, (2) strumming the wire to remove all slacks and spread the voltage evenly along the snake's path, (3) packing the wire around the screw, and (4) tightening the screw to lock the wire in place under the voltage. You must maintain a constant voltage with the free end of the wire, plucking tension throughout the wiring until you have finished stretching the free end around the screw in the terminal and locking the voltage by tightening the screw. If you allow the cord to loosen before locking, you must reverse and repeat the finishing step. These finishing steps are like a simple musical recital that succeeds only when each note is correctly played in the correct order. At least your piano teacher isn't there to trick you into it. Watch out, yips. The goal is only to have the wire tight enough not to sag. Once you've pulled all the slack out and strummed the wire segments all tight, fasten the loose end by wrapping the wire clockwise around the second connector screw like the first and tightening the screw, all the while maintaining the tension until the second screw is set and the wire is locked in its final energized state. Trim the excess cord on the screws where the cord is wrapped around the screw, careful not to install the part. The taut wire can still be very light with oddities left over the entire grid frame. These little oddities don't interfere with proper cutting of the grid. You can straighten the kinks stroking them against the side of the wooden jab or pencil. Do not pinch wire extending from metal pliers to straighten the kinks; this mar wire and create a weak spot where a future break may occur. Test and reinstall the network from the circum wires: Re-mount the plastic bezel with the device and test the network by connecting it to the ice machine before installing it. For testing, place the cords against the dry hand palm while the ice machine is running and the network is connected; the wires should a little but clearly warm if not the ice plate is in the grid. Once tested, you can restart the network into the machine. At the next harvest, observe that the lattice takes about 10 minutes to cut the plate of ice into cubes. Get your plastic insulator grid repair: If you want me to repair your faulty plastic insulator grid for you, you can send me your broken unit and add a watch for $135, or order an online credit card. See packing instructions, shipping address and online ordering here or use the buttons on the right. The price includes forwarding; only U.S. addresses. The turnaround in this repair is 1 week after we get our broken unit. Remember that you can still make uncut ice sheets while you are waiting for repair; see the cutter network below is actually optional. Click here to buy a plastic insulator grid repair service now. Send your spring-clip grid repair: If you have a faulty spring clip grid, you can send me your broken unit and add a watch for $190, or order an online credit card. See packing instructions, shipping address and online ordering here or use the buttons on the right. The price includes forwarding; only U.S. addresses. We will remove all the parts of the problem spring clip and replace them with plastic insulators and a completely new wire. The turnaround in this repair is 1 week after we get our broken unit. Remember that you can still make uncut ice sheets while you are waiting for repair; see the cutter network below is actually optional. Click here to buy a spring clip grid upgrade and repair service now. Complete network assembly: If you want to buy a full cutter grid set, check my ordering page for availability and price items I've renovated. You can also order a grid plastic panel for a premium (usually you just go to the old panel onto the new grid, but sometimes the grid and panel are lost). Repair or upgrade variation of the old spring clip type cutter network: a much older design of the cutter network was used until 1995. In the older style, short resistance wire segments are used, held in place (and electrically connected) by individual stainless steel U-shaped spring clips and poles pressed against small plastic insulators. It was a nightmare design that involves 128 small parts, all blocking and keeping in place the spring force. Instead of two wire lengths, there were 19 segments chained through 38 spring electrical point contact. Each segment consists of a short length wire ending in a meadow of about 3/32 inch diameter, a length of about 9 inches from the middle of the meadow. For some unknown reason, the upper and lower grid layers use slightly different segment lengths. If any of the 38 electric contact points are slightly disturbed (e.g. lime to inhibit electrical contact), the resulting increased resistance creates a hot spot, which tends to further worsen contact. When this process begins, localized heat tends to soften with a small plastic insulator. Then spring force squid and remolds plastic, causing spring forces to relax and contact to worsen, reinforcing the problem. Sooner or later each spring, the clip grid develops this spiral of poor performance and gradual failure. Even if the problem is just a broken wire, repair is difficult because spring clips to make assembly with four hands work requires special tools. Medieval harpsichord resting is an easier task. Even if you do not skillfully identify the failed segment and successfully repair it, it is likely that the second segment will soon fail well, rendering repairs useless in the long run. Wire segments have long been disconnected from Whirlpool; instead, we use a custom winding mosaic button to prepare them from a stock resistance wire or to supply stocked Parts of Whirlpool from the nets we have upgraded. I do not recommend repair the test versus get rid of the clips upgrade, but I suggest a set of 3 of these segments for $26 if you want to heroically repair the spring clip grid itself (formerly known as Whirlpool part number 588109). Although the spring clip networks have limited service life, upgrades are available. Instead of improving them, what I recommend is to upgrade the old spring clip networks to the improved all-insulator format. It provides a reliable and restringable grid that should last longer than the rest of the machine. Fortunately, Whirlpool used the same stainless steel frame in the spring clip grid as an advanced all-insulator type. This allowed the spring clip to be dismantled to the frame and rebuilt with newer all-insulator parts. After Whirlpool completed four plastic parts specifically needed to be upgraded (about 2010), some years could not be restored, the only option was to buy a fairly high priced new network. But then these networks themselves were stopped; they soon became scarce, costly and ultimately unavailable. A few years before 2018 many machines, still running well differently, became unusable due only to the failed grid. From 2018 I have custom-fabricating an advanced plastic insulator kit to upgrade spring clip grids with an easily repairable and rugged design. I make these parts strong for Delrin in my CNC machine shop. This kit replaces insulators that have been unavailable since Whirlpool discontinued them a few years ago. If you have a spring clip grid in need of repair, please use the button in the previous section (to send the network rewire) to send it to me with this custom restore and rewire. If you just want to order an insulator set and wire to restore the spring clip grid itself, please do the same and send me a separate note indicating your request to send only a spare parts set. Basically, strip down to the old grid with a bare stainless steel frame, and re-assemble the new wire and insulators, reusing the old plug (or optionally upgrade the plug too). The result works reliably and is conveniently maintained. I've also been able to upgrade rare old networks from producers like Marvel, which used Whirlpool spring clips in various geometries that differ from the Whirlpool standard. These network types were also used in many major commercial machines still in use. CNC manufacturing of these parts allows us to easily make them to match the different lattice spacing and sizes. If you have a valuable old machine that needs a grid upgrade, email me the pictures that you're facing, so I can't answer if it's feasible in this design, and I don't cite what it would cost. Click here to buy older types of wire segments now. Transformer cutter Lattice electromechanical machines: the only low-voltage circuit of older electromechanical machines was the ice cutting grid (and the lamp inside, if equipped with this function). The compressor and control worked at 120 VAC, and would continue to operate despite the failure of the low voltage transformer. If the transformer fails, the machine would still make ice boards and catch them properly, but the network will not heat up. The ice sheets would then pile up in the net because they would not be cut or dropped into the bin. The correct diagnosis of such a situation must be tested by the failure of the grid itself, compared to connections, versus transformer failure. If the transformer (or connection) has not been successful, the voltage finder will not show a multi-meter voltage when the network is removed, while the network will be removing the low voltage power, while approximately 9 VAC would be expected. To remove the network and measure the obstacle over the branches of the cuttings for several metres, read about 4 or 5 ohms. One of the reasons for the traforikke is the inadvertent short circuit of the network circuit (e.g. without touching the network frame from a broken mains cord); this usually causes the transformer to overheat and fail. Sometimes transformers just fail inexplicably. The original transformer of older electromechanical machines is no longer made and does not appear to be available from Whirlpool. The stock generic unit made by Hammond, their part number 166L8 (8.5 VAC centre off, 2 amps), which is sold in digikey.com as part of the number HM510-ND, is an appropriate replacement. You can order HM510-ND online digikey.com for about $22 plus $10 shipping (in 2018 pricing). You also need two for every 3/16-inch and 1/4-inch man disconnects (digikey.com 94807-01 and 94811-01 respectively) to match the original plugs of the machine, or you can easily glue it directly. A 1/4-inch size loose is a widely used standard, but a 3/16-inch size loose is unlikely to be found in hardware stores. Hammond's section provides five lead wires: two are black (primary) and connect to 120 VAC lines; two are solid green (secondary) and connect the network connector. The fifth wire, which is green with a yellow tracking device, is a central tap that is not used or connected in this application; instead, it must be folded together, cover with heat-shrinking pipes to avoid inadvertent contact, and use cable ties to tuck it away. If you diagnose a failed transformer in newer electronic machines, these parts should still be available and you should use the original replacements. Transformer newer electronic machines mandate not only grid, but also input DC power supply to electronic PC board control and interior lamp(s). Some versions have two separate transformers for these two circuits. Network life: How long should the network last? Not as long as you think. These things break because a heavy plate of ice falls on top of the grid layer every time the unit goes through the catch cycle. Over the years, my network seems to have been running a typical 50,000 cycles before it breaks. Given that the unit could run 50 cycles a day, which may be less than 3 years. (But it also has 25 tons of ice, about half a truckload.) Your network will of course last longer if your machine only works intermittently, but while the machine itself can last for decades, the network will not be without the occasional small restring repair. The network wire that we deliver above is a little heavier than the original, and thus tends to last much longer. Harvest Thermostat solder Mannetor Attachment Older design of this machine, which was used for electromechanical controls, including the saw thermostat on the evapost plate, which clicks on and off the ice plate temperature. If your machine uses newer electronic controls, you have an electronicist over an electromechanical thermostat on a vaporist and this section does not apply. The evapolt plate in the upper area of the ice machine circulates a hermetically sealed refrigerant (R-134a recently or R-12 in very old machines) which boils away to carry the heat from the jet running over the plate, which will gradually build up the ice sheet. The upper part of the evapost plate where the ice forms is smooth. The bottom is a complex thing that includes refrigerant line connections and a bracket and clamp with a cleaning thermostat. Full assembly (327,505 vapors for $266.02) is the only replacement part available at Whirlpool, but the old part can likely be repaired. To diagnose a problem, it helps to understand the principles on which the machine makes ice. The working machine is always in one of two modes, (cooling the plate) or cleaning (heating the plate). The capillary tube senses the temperature of the evapolt, which triggers two driving events in the machine, depending on the state of the machinery and the temperature reaches a level well below or above freezing point: in the ice-making state, when the temperature of the steamboard drops below the inter-freezing point (which is determined by the thickness of the front panel), the device switches to cleaning state, reversing the cooling and thus heating the plate so that the ice sheet melteds slightly and slides off the cutter. During cleaning, the water valve opens to fill the recirculation tank and rinses the used water through overflow drain while the recirculation pump stops. (The freezing process removes minerals from water-deposited ice, and aggregates them into used reservoir water, which requires rinsing otherwise minerals in the concentrate reservoir.) When the temperature of the evapoltplate rises above the freezing point (the ice plate has slipped off the plate and the rotary cooling continues to heat the plate), the harvest state is stopped and the appliance switches back to ice making. The water filling valve closes, the recirculation pump starts and the refrigeration unit switches back to cool the plate. The capillary tube holding bracket and clamp is about 1 wide 4 long. The bracket is solder in front of the steamer plate and the smaller mounting plate is with a screw pole and nut. This creates a strong thermal connection between the capillary tube and the bottom of the evaporic system plate; inside the tube, the liquid swells and contracts the perceived temperature. The tube transmits it to the expansion/contraction pressure front panel thickness adjustment thermostat, where the pressure triggers the switch which adjusts the cooling shut-off and shut-off against cleaning. A few inches capillary tube should also be solder on the lower front lip of the evaporic plate. This helps it quickly perceive the rising temperature during the harvest cycle, which should stop as soon as the ice slips out. The failure of the bracket solder joint occurs due to repeated cycling sub-freezing cooling to make ice versus over freezing melting to harvest ice. The area is always wet, and the solder joint is usually small pockets or bubbles, which when wet freezes and becomes slightly larger due to the expansion of ice. Each cold-molten cycle increases the error slightly, and eventually it grows into a large fracture, such as breaking the mountain stone for years in winter/summer cycles. If you suspect you have problems with the broken joint of the solder, you can check the joint line by removing the You can recognize the bracket because it's the only point nearby with a screw post and a nut. If the solders joint does not appear intact at the entire length, but it seems cracked or slightly separated, then this is a problem, but perhaps not very poorly (yet). If the joint is mostly cracked, so you can wiwile the bracket; or if the bracket has completely loosened the plate and is held only by a capillary tube, then you have a definite problem that needs to be corrected. It's hard to look directly at the bracket without pulling the steamer's plate out, which is a big job. You should be able to blindly feel around the front or behind the bracket, move it with your fingers, and find it moving compared to the evapost plate. Indeed, if the solder joints have almost completely failed, the bracket could fall off immediately with this manipulation. While I used to recommend a severe repair of the resoldering bracket, you may want to consider re-locating the bracket set that Whirlpool introduced in 2006 to solve this problem. Repairing the resolder of this bracket is a bit tricky. First, you must remove the cutter grille (remove two thumb screws), container bucket (remove two thumbscrews) and recirculation pump (remove three acorn nuts from the back wall, loosen the recirculation tube on top of the evaporic plate). Your design may vary slightly, but so far these steps should not be too difficult. The first difficult step is to get the evapost plate out of the interior trash when it is still connected to the refrigeration system. Remove the two thumb screws that hold the plate in place. Make sure that the plate is free of fasteners, but held in place by 1/4 refrigerant tubes and 1/16 capillary tubes made of copper tubes, perhaps tinned, somewhat flexible. Now you must manipulate the plate out of the trash, bending the refrigerant pipes, so that the plate will swing through the door so that it presents the bottom plate upwards. While copper tubes can't take much of this kind of bending, and you should be careful not to gift them, they can take a few rounds of this type of manipulation before they work hard enough to crack. If you should crack refrigerant line pipes, you will hear the visceral sound of pressurized refrigerant gas escaping, perhaps some strenuous oil. If the refrigerant is frictionless as a cold liquid spray, stay away from it (dispensing R-134a may cause frostbite in contact with the skin). If the leakage is not too close to the plastic tray, it may be possible to repair it with a soldering patch or repair device, but this requires the evacuation and loading of a refrigeration system outside the scope of this document. Otherwise, it is necessary to replace the evapost plate unit, which may cost more than the value of the corrected system. Assuming you have a basic Plate front upwards, and clear trash, and there is no cracked pipe, you can better control the condition of the thermostat capillary bracket and watering the joint. If it really shows fatigue or failure, then you must repair the joint. Good soldering practice is important here. Clean the area as well as you can first with a wire brush and apply a generous amount of non-acid flow. Heat it quickly (the pencil torch is marginally effective; I use turbo-torch to get a lot of heat) and feed and wipe lead-free solder. Apply and return flame cycles to keep the area a little above the watering free current temperature, and keep the minimum necessary to get a good joint. Don't worry about solder splashes or stains falling over the plate; They'll finally clean up, even if they get into the reservoir later. Watering or brazing in a charged refrigerant system is not usually feasible. Liquid refrigerant and oil should have been collected on the bottom of the appliance, not on the evapost plate, so that watering the adjacent surface with the refrigerant circuit does not require the evacuation of the appliance. You will not release the pressurized joint or installation, but the mechanical fixing of the bracket. If you can do this quickly and at low temperatures, you can assume that heat damage in the residual oil or refrigerant area is not enough to damage the function of the refrigeration unit. The ideal technique would be to add repair the installation process to the pipe compressor, evacuate the refrigerant, rinse the oil, charge inert gas, watering, evacuating and rechargeing the refrigerant system, but this may not be practical. If you have a good solder repair, and the part has cooled, you can roll back the disassembly, starting by manipulating the evapost plate back into position at the top of the back of the bin. Replace the circulating pump and hose, reservoir bucket and cutter lattice. Before replacing the bucket and grille, you can start the device and feel the steamer plate with your hand to see if you still have cooling work. The new solders joint should last at least years. A recurrence of this problem does not seem inevitable because there is a cold-thaw cycle and how it repeatedly implements the destructive force of any wet salmon or void joint. After this repair is made and the appliance is operated, you will find stray watering and related debris fragments in the reservoir or ice reservoir. Of course you have used unleaded solder, so that's not a problem. You can be told by the repair service that it is brazed joint, which is impossible to repair. Refrigeration technicians like to have a lot of joints because it's much stronger than watering and part of their technical training and equipment. After checking and repairing 8 devices, it is clear that the The joint is made in the factory with the usual low temperature soft solder, which is quite possible to fully improve. The hard part is getting the assembly out of the ice cap without cracking the connected pipes. Someone sent me to announce that he had repaired the feather attachment epoxytsement instead of watering, which can be done inside the trash can without the difficulty of extracting the evapoon assembly. While the thermal intersection can't be quite as good through epoxy versus solder, it's probably enough to work, maybe a little temperature shift thickness control. Stainless steel ties well epoxy, but make sure the metal is cleaned, warm and dry before trying it. Harvest Thermostat adjustment If your ice thickness control doesn't respond properly but your sensing bracket appears to be properly in place, it is possible the thickness control thermostat itself is simply drifted out of calibration and just needs adjustment. It's a simple repair, assuming you ruled out an open bracket first. Remove the rosette from the front by exposing some small adjustment screws when adjusting the thickness of the cut-out and cut-out temperature setting points. You can spin these adjustments. The cut-out screw determines the colder temperature of the harvest trigger, the incision sets a warmer temperature to complete the harvest. Set the control (button) in the middle of the thickness range and wait for the ice to build a medium thickness, and then adjust the clipping screw until it starts the catch. These screws have several turns of adjustment, so you may have to turn them to 1/2 or full rotation before you see any difference in performance. When you make these adjustments, count the turns you apply to each screw by taking notes so that you can get its previous settings back if you're wrong. Even if the bigger problem is the loose evapo vaporr bracket, you can compensate for the degree by adjusting the cut setting point thickness control to warmer temperatures. But you have not fixed the problem in the long run, and thickness control is poorly sensitive because the thermostat does not have a solid thermal contact with the evaporic plate. Poor response can lead to harvest intervals that start too early, too early or inconsistently; and also during harvests that are too short or too long. If you want to adjust the yield thermostat to shorten the harvest time, remember that the harvest time is deliberately longer than the time needed to simply fill the reservoir. The reservoir is rinsed with a surplus of filling water, which then flows over to the drainpipe, so that the high mineral content of the old water is replaced by the new water. Correction of the solenoid valve As described above, the solenoid valve, which controls the incoming water flow, may fail in bulk or in a closed manner. That's the number of whirlpool. In my unit. This valve is located in the lower right front of the device, just inside the kick panel where the water connection is made. These valves are a common replacement item, and actually easy to remove and replace if you just want to pony up a new one. This same valve has probably used a lot of equipment as I've seen it in washing machines and dishwashers, so if you don't want to fuss together to rebuild, you can take it to the device parts counter and wait to find it, oh, $40.00, which is most likely about $39.99 more than it costs to fix it yourself. (I admit if now when I see someone throwing a dishwasher or fridge to curb the trash at night, I'm tempted to stop and look for a solenoid valve scrounge!) The failure of a 1-cent is more than the inevitable deterioration of a small rubber seal, which is a minor remedy. You can fix it faster than you even found a replacement. To remove and repair the valve, first remove the power (120 VAC power works on this solenoid). Turn off the water supply and disconnect the water connection and outlet connections with the solenoid valve. Remove the electrical plug. Remove the mounting bracket screw(s) by releasing the valve. Remove screws from the valve unit by observing the solenoid flask with a deep part containing a small rubber sealing plug (or its remnants). This rubber product is originally a disc about 1/8 diameter and 1/16 thick, stuffed break of the same size as the tip of the piston cylinder. The rubber may partially degrade or be absent at all. You can cut your replacement rubber piece quite easily. I made mine using a leather punch on a 1/16 thick sheet of rubber seal material. Normal Buna-N (nitrile rubber) material is good, as is available from plumbing suppliers, auto parts stores, or online Enco (such as p/n 240-2326). You can also take a common blender in the washing machine, and cut it with a razor sharp hobby knife with the right thickness and diameter. The exact disk shape is not critical; The important thing is that the exterior is flat and smooth, which can be ensured by using just the original flat surface faucet in the washing machine on that side. Reunited, again, enjoying the satisfaction of cleverly improvised, do-it-yourself success. Some service manuals refer to 0.31 gallons per minute of flow solenoid valve. This would be a good target flow to measure when testing the function of the valve when the piping is disconnected and the water flows into the bucket. Start the valve to loosen in a timed minute while catching the water bucket, and measure the water volume caught. It should be 0.31 gallons (40 ounces) or more. Testing of a closed solenoid valve: testing the solenoid valve for a jammed valve is not difficult. First, you realise that this valve only opens when the fan has stopped and the refrigeration unit has been turned back and slightly then. If the machine is switched off for a while and idling should not activate the water valve solenoid, it should simply cool down and, if there is water in the container, it will continue to apply the ice plate; if the container is empty, the evapost plate cools quickly and after a few minutes the harvest cycle starts, then only then the solenoid valve of the water should open. Once you have removed the reservoir from the bucket, you should be able to see the flow of water entering the unit, and even catch it in the bowl to measure the volume. The solenoid of the hot gas and the water valve solenoid are parallel, so if the device reverses and rapidly heats the evapost plate during harvesting, the controls are OK. The replacement of solenoid valves is carried out by a thermostat with a thickness regulator behind the rosette plate. Testing the closed-open solenoid valve: To test whether the solenoid valve is stuck open, even just a handful, you can remove the container from the bucket and see if the water flows into the supply pipe during the cooling part of the cycle. If you suspect that the stunt valve spoiling performance, you can turn off or disconnect your water supply completely (make sure you have a solid shutoff valve, not even allow a handful) at the end of the harvest, and see if the performance problem disappears for the rest of the cycle. Limited water flow testing: To measure how much makeup water your machine can hold up for each cycle, remove the container tray and try to drain the water during harvesting. This volume should be at least several changes in the reservoir volume of about 1/2 gallon (the plate itself has consumed about 18 ounces of water), so you should catch about a gallon or more during a 1- or 2-minute harvest. If the power pressure is OK, but the machine recognizes less water, then you must have some kind of restriction or too short harvest time. It can also benchtop-test the solenoid valve stuck open, closed, or limitations, removing it completely and activating it manually. The water inlet connects to a regular garden hose. For the electrical test, I put together a cheater AC plug and wire with a 1-ampline inline fuse and a women's shovel, and connected it to solenoid terminals applied to 120 VAC. Apply inlet pressure, and (keeping yourself dry) briefly insert the AC plug into the socket. Refrigerated Unit Charging This section is for technicians and advanced do-it-yourselfers with tools and knowledge to charge A/C and refrigeration systems. If you're not a do-it-yourselfer and want advice on hiring a technician offering expensive repairs, see my tips under diagnosing the poor results below. The performance requirements of the maintenance and wiring sheet show that the machine should harvest an average thickness (about 0,45) plate of ice every 18-22 minutes under favorable conditions (ambient temperature 70 °F and incoming water temp 60 °F). This production rate slows down for 30-38 minutes under unfavourable conditions (ambient temperature 100 °F and incoming water temp 80 °F). If production is slower, the reason may be an under-run cooling system. Refrigeration design is very sensitive to undercharging because (1) the refrigerant charge is so small to start with, just a few ounces, so a small leak can become a problem quickly, and (2) expansion controls capillary-pipe (no feedback, open loop control) instead of a puffer valve (closed loop feedback control). While this open chain sensitivity is a drawback that each leak deteriorates performance, it also makes the diagnosis of low refrigerant condition easier because decomposition is easy to track and detect. Another symptom of low reward is that slabs of ice are clearly thinner in the middle (not just wavy). The refrigerant circulates through the evapost plate with a rectangular spiral from the outer edge to the centre. When the refrigerant is a little low, it boils out and cools the edges well, but by the time it reaches around the middle, it's all evaporated, and there's no phase change available in the refrigerant flow chill in the middle of the area. Check out my tips below for diagnosing the poor results below. To load the system, you must first add an access device because the system shipped from the factory is a closed device. 1/4 OD copper process pipe comes out in front of the compressor, which factory was used to load the system, bruise out and brazed the stick. It's the suction side of the compressor. This process of the pipe is intended for installation of access to the installation should load never necessary. I used a 1/4 burned man schrader valve installation, which happens to be suitable for my refrigeration meters. A low-sided tube on the car side is more suitable. While watering or brazing the installation process of the pipe is the most reliable way to proceed, installing a clamp-on line-piercing valve [grainger.com example] is feasible and much easier. This is an advantage that requires no watering or brazing, instead of using mechanically compressed elastomer seals, but eventually leak when seals age. This line-piercing valve provides a 1/4 flare installation, to which you can add an adapter to the 1/4 flare R-134a low side quick connection installation. This adapter is available for a few dollars in car parts from Walmart (sold for modernization of R-12 car air conditioners). Then you can use the usual R-134a charging jars and gages from Walmart to add refrigerant, although you need to take care not to overcharging because the system contains less 1 pound refrigerant total. To add this to the installation, I followed these steps: File a light cut process pipe, a small triangular file or a piece of hacksaw blade, vent an existing refrigerant. A slight cut allows the refrigerant to escape slowly as a gas, leaving the oil behind the compressor. A faster outflow would have to vent some oil out of the mist, energized by liquid refrigerant. It is normal for a little oil to escape at the beginning, which was already in the process of pipe stub. Cut the pipe off, inside the press, using a tubes cutter to get a clean, square cut. Clean the oxide from the outer surface of the cut hose and the mating surface of the access device to prepare them for brazing or soldering. Apply a small amount of soldering flow to these surfaces if this is your custom. Use the Q tip and solvent to wipe the oil out of the tube. The pipe should be directed in some generally upward direction so that more oil does not get into it. Remove the valve stem from the schrader valve when installing access. It protects the rubber components of the stem from high temperature watering. You also don't want to seal the system during watering because it tends to accumulate pressure, which blows the mounting out of the end of the tube before the watering freezes. Water or water the access to the tube. I used a soft 50/50 lead/tin solder because the temperature is much lower than the brazing and the action is fast, minimizing oxidation inside the tubes. Lead is not important in the refrigeration chain as it does not come into contact with drinking water or ice. Watering provides a much stronger joint, at the risk of oxidizing the inside of the pipes and polluting the system. The soldering joint has been shown to be sufficient in this small piping and reduces the contamination of heat oxidation. I use a propane/air TurboTorch and insulation pad to get the joint up to the temperature and solder very quickly, with minimal heat loss to the rest of the system. TurboTorch runs out of a disposable propane cylinder like a normal Bernzomatic pencil torch, but produces a lot more heat power that is effective for tasks like this. Clean any luminous flux residues and insert the valve stem after cooling the soldering compound. If the valve is to close completely, it is not necessary if you apply the O-ring to cover the access port if you are not in service. Check the iodine cap and cap gasket after loading the machine with the soap bubble solution. Another method just is for you to watering or braze the installation onto the end of the pinch tube, and then open a pinch of a little pliers, or drill into a small hole. It's not as good a connection running as a vacuum, but it maintains the existing fee, is easier, and has an adequate measurement and loading system. After access to the is installed, you can add refrigerant meters, evacuate the system vacuum pump, and charge the R-134a refrigerant by weight. The required charge mass is indicated on the sequence number on the edge, which has been revealed when the door under the ice is opened; my system sets 6.75 oz. Weighing a fee is required to get this amount right within an ounce or two more and still. Loading tracking performance is possible, but takes a long time because you have to start with a minimum charge and follow several catch cycles by adding small amounts. Undercharging leads to ice plates being thin in the middle. Supercharging leads to the end of the icing cycle of the suction tube immediately before the harvest, where the pipe leaves the bin into the lower chamber (the refrigerant of the excess cold liquid does not evaporate to vaporize and trickle down into the tube). The timing of the cycle events in minutes, which begins with the start of the harvest, is thus: ICE MACHINE production cycle Past Time (mm:ss)(under typical conditions)Events 0:00 Start of harvest: the evapost thermostat senses its sub-freezing point and triggers hot gas recirculation to start the harvest of solenoid. The recirction of the hot gas heats the evapolt by melting the bottom of the ice sheet, which has so far been firmly frozen. Water solenoid with energy, sending fresh, room temperature tap water into the container, with an excessive overflow into the drain pipe, which directs the drain pipe downstream without rinsing and melting existing ice in the bin. Suction-side pressure rapidly rises from terminal 1 6 psig, to 60 to 100 psig, due to reversal. 1:00 Mid catch: The continued melting loosens the ice plate from the evapolt plate and the plate slips off onto the cutter lattice. The plate makes a thunk sound when it hits the lattice assembly and ends up resting on top grid wires. The evapost no longer has ice on it, so its temperature now rises above freezing as it flows through the rotary cooling unit. 2:00 End of harvest, liquid water cooling start: the evapost thermostat senses its above frosted cut-in setpoint, de-energizes hot-gas solenoid to restore cooling. The water reservoir is over freezing (now a mixture of previous chilled water and fresh room water, proportion depending on how long the harvest took) but begins to chills when it recirculats over the steamer plate. Suction-side pressure quickly drops in the 10-15 psig range, and continues to drop water chills. 7:00 Start of ice formation: water completely cooled to freezing point, and the ice begins to form at the edges of the evapost plate. The suction half-pressure in the refrigeration unit drops from 6 to 10 psig. 10:00 Ice builds thickness: The evapost plate is now completely covered with a thin layer of ice. The bottom of the evapost plate is well freezing, but not enough to trigger the harvest thermostat. Suction-half-pressure about 6 psig. 18:00-22:00 Harvest layoff: Ice is formed from a full-thickness plate on a vaporization plate. On top of the plate is covered with recirculating water and is a freezing temp. The lower plate and the lower half of the evaporic (capillary sensor tube thermostat) are well below freezing. When the ice thickens, the heat transfer slows down and the vapor test temperature gradually drops, eventually triggering the thermostat-setpoint and the cycle repeats. Suction-side pressure decreases by at least 1 to 6 psig, depending on the surrounding conditions. Note: it is not unusual for thicker cubes or older machines to take about 30 minutes per cycle; but nothing much longer than it is a poor drive that indicates the need for repairs. In the case of electromechanically operated machinery, the above timing is approximate, the actual harvest time depending on the return of the harvest thermostat to the warm temperature. On newer electronically controlled machines, the yield part of the cycle's hot gas lasts exactly two minutes, during which the reversing valve is always energized, but the water valve is opened only for the first minute for two minutes to rinse and fill the container. Electronic machines, when first turned on, also run an initial three-stage rinse in five minutes, consisting of two minutes of water intake without circulation, one minute of circulation without water consumption, and another two minutes of water consumption without circulation. Some of the latest electronic machines have a water level sensor container, and in this case the filling and rinsing time can vary exactly within one minute, depending on the water used for freezing and pressure-dependent flow of incoming water. The water level sensor reduces water consumption at the expense of additional complexity and potential for problems. If this sensor malfunctions of the kind that fill/flush is a little, ice production breaks down and/or the ice becomes cloudy and soft. If this one sensor is completely unable (stuck or turned off), the machine can perceive this condition and stop working completely and buy an expensive service call now the light lights up. Since the previously harvested plate is ready to cut the cubes some time before the next whiteboard is cleaned, it can take two full cycles, or about an hour, before the first cubes are dropped into the trash after the initial power-up. Be patient when the machine appears to be slowly producing after being turned off and drained of ice. A few more tips for this machine's recirculation pump problems: a common problem with the recirculation pump is having the bearings to stick to mild corrosion, keeping the pump engine from starting when the device is sitting idle for a long time. The solution is simple (if the device is turned on remove the reservoir from the trash, reach through the lower intake pump to feel the impeller, which spins the lower casing pump in the enclosure, and give the impeller a little push finger to break the bearings open. You should be able to feel the impeller turning freely. Since the replacement pump is absurdly overpriced, one would like the opportunity to use something improvised and cheaper. The smart recommendation, which has proven to be very effective, is to use a low-cost submersible aquarium pump to replace a failed stock circulator. You plug the pump directly to the bottom of the reservoir trash and improvise some pipes to connect the evapost to the waterfall hose to it. Aquarium stores usually sell a variety of plastic fittings to make such an adjustment. You plugged the power cord into the power lines of the backup pump. (It works on machines that use 120 volts of AC current for the pump. Some machines use 12 volts of DC, in which case instead of an aquarium pump, you must look for a suitable immersive 12 volt DC pond pump or submersible non-automatic boat bilge pump.) Useful readers have reported success with the Harbor Freight 200 GPH immersing fountain pump at 68,372 (priced at $13 in 2015). Outdated items include mini hand immersion pump 41287 from Harbor Freight, flow adjustment set to about half, and model 45305. Others have tried a very small 45303 66 GPH pump ($8, may no longer be available), which comes with a 1/2 pipes adapter that fits the iced pipes directly unchanged, but reports differ on whether the current is sufficient for efficient ice production. Another reader reported the success of using the $15 Petco Profile Powerhead 600 aquarium pump. He used two adapters for Homer Depot (3/8-fine-flare-to-1/2-female-tube, 1/2 male tube with 5/8 ID hose cream. Watts parts A-179 and A-493) to connect the pump output to the waterfall pipes. Pump suctionops will fit it at the bottom of the reservoir. Remove the old pump and bracket and use the boiler-free screws to close unused holes in the container. Grainger sells a number of low-cost split 115-volt replacements, with their share numbers 4NY28 ($51) and 2P794 ($70). Although they look similar to the Whirlpool type, several people who have tried them wrote to me to tell me that these two pumps are larger reservoirs for commercial machines, and do not fit in the smaller Whirlpool iced reservoir. See also this Little Giant model RIM-U iced replacement recycling pump, which is a direct replacement for the original manufacturer's Grainger item. If the circulation pump is noisy or seized, it is likely to be just worn out or rusty bearings. Stainless motor bearings are a strange blend of metric-inch sizes, but easily replaced when you find them. Size is reputable 22mm OD, 1/4 ID and 7mm thick, with two rubber seals similar to metric bearing (easy to find), but unusual inch-sized ID (hard to find). One source is Peer 627-4-2RS (directory); the other is mroass.net. This part number indicates a standard 627 meter bearing (22mm OD x 7mm ID x 7mm T) modified with a smaller 1/4-inch aperture (4) rather than 7mm and two rubber shields (2RS). A smart machinist could make a 1/4 x 7mm towing to match the impeller shaft with a common 627 bearings. You can also perform a Google search for 627-4-2RS with a partial number to find ready-made suppliers. Another inexpensive option for Whirlpool or KitchenAid models is to replace the recirculation pump engine, which is actually cheap (about $20 in 2011) with the Broan AP3159953 engine. Look for this part now: AP3159953. This method requires some simple disassembly, including removing the shaft of the new engine and replacing it with the original shaft. If the old shaft has deteriorated and you need to use a new shaft, use foil or other material to shim the new shaft until it to fit the old impeller (the new shaft length is the same as the original). Replace the new body using the original casing and bearing support. The new engine may have different mounting shavings, which requires drilling new holes on the mounting plate. The cutter network is actually optional: If you want to maximize ice production but don't need cubes, remove and remove the cutter network. Or if your network has failed and you expect or push for repairs, removing the grid and crop-cut boards is also convenient. Without the network in place, ready ice sheets drop into the trash, where they usually break several ingic pieces. You can slap them back with a spoon to easily crack these handy pieces. Indeed, hand-cracked ice can be an extra-gourmet style to offer your guests! The cutter lattice uses heated wires to melt through the ice, resulting in the loss of some ice. Even when cutting, light added heat to the grid (it's always turned on) slightly increase the melting of diced ice in the trash. Opening the bottom for better heat transfer: removing the lower front cover significantly improves efficiency and production speed by improving airflow through the condenser heat exchanger. This makes the device noisy and reveals the lower component section. Operating costs: Running this machine can be expensive. It's quite effective at making ice, but ice is thermodynamically expensive to make. In addition, the cutter grid melts away some of what is done, and the ice and the pump continuously run by the water drain, so if it works continuously, with typical power prices of $.10/kilowatt-hour, it costs about $1/day to run. Even if the ice is not in use, the appliance still has to run for about 1/2 of the time to keep up with the melting. Thus, the device is a luxury household because most of the $200 or so annual energy costs are spent simply by holding a melting ice reserve. Turn on your fridge-freezer icemaker: If you use it to ice your household ice source, it will save a fair bit of work cycle in your fridge-freezer by turning off your automatic ice maker. A lot of runtime in a standard refrigerator is actually caused by a heat pump out of the freeze water icemaker. This happens even if you do not use refrigerator ice; especially in the cold-free refrigerator-freezer, the ice is slowly lost in the sublimation that consumes energy, and then deposits such as cold must be melted, which also consumes energy. Our icemaker wastes energy because it uses regular icemaker makes an expensive trip through the system, only to disappear into space in the air water steam (where you have to pay again, dehumid it with your air conditioning!). So iced energy costs are somewhat offset by energy savings not working in your fridge as much, and also wear the fridge. Our fridge runs significantly less with the icemaker off. Throttling production: Most households don't use anything like the 50 pounds per day ice power of this machine. You can cut the leaves of styrene foam (from building a tender or cheap ice chest) lining the inside of the ice bin and reduce trash capacity. This reduces energy consumption (the bin is slightly better insulated and the bin volume is smaller, so it fills up and spaces earlier). Of course, you have less ice in reserve, so you wouldn't want to do it until the big party. Noise: If you find a unit too noisy in your kitchen or wet bar, you can put it on a timer that works for it, say, at night when you're ding on the other side of the house, or if you're out of the house at work. Most households don't need a full power unit potentially running 24 hours/day and can be about 8 hours using reserve for the rest of the day. Use a timer rated for a 1/3 (or more) horsepower, such as an inter-earth HB31R timer (15 amp-engine engines), as most timers are rated only for lamps. Cloudy ice: The cloudy ice in the newly installed machine is usually due to too much mineral content (hardness) in the water supply. If you have cloudy cubes, you can test this problem by closing the water supply, emptying the reservoir, and filling it manually with bottled water for a cycle or two. If you have had a machine producing clear ice, but the ice becomes cloudy, the problem is likely that the incoming water is too heavy. Cloudy ice can be a bizarre result of limiting incoming water flow, although the water supply is itself OK. The failure process is this: during the filling cycle, the inbound water valve should open long enough to significantly overfill the overflow into the drain pipe and out of the machine. It rinses enough fresh water through the container to dilute the minerals which concentrate in unfro00 water in unfro000 water during the freezing process. If the water supply is somehow limited, it can fill the reservoir, but just enough not to overflow, and each cycle results in more and more mineral concentrations being maintained. Finally, the concentration increases enough to cloud the ice. You don't even need bottled water to test this diagnosis; just try to rinse the reservoir well with tap water, assuming that your tap water isn't super-heavy, and see if you'll have a significantly clearer plate in that cycle; if so, you may have insufficient inlet water flow and you should check the valve as described above. Another strange reason for cloudy ice is possible if you supply water iced water softener or water conditioner device that uses salt. Various problems, such as faulty regeneration of cycling valves with salt-charged water softener, can inject a dose of salt accidentally into your house's water lines. A little salt in your water supply, maybe not even enough flavor, gives cloudy, soft ice. It is best to avoid this potential problem of piping without softening the water supply, if possible, your machine. Acid cleansing solutions: instructions for cleaning the trash door iced ie indicate using citric acid or phosphoric acid solution (6 ounces dry powder with 1/2 gallon of water) to remove brown, crust mineral deposits (lime), which tend to accumulate in the water recirculating parts of the unit (container bin, evapost plate, and nearby). Each moderately strong organic acid, including sulfamaoric and glycolic acids, is suitable for the same concentration. For example, you can use cR brand acid cleaner Jelmar, which is widely available and relatively inexpensive; different MSDS references list sulfamic, glycol (a.k.a. hydroxyacetic acid or hydroxyacetic acid), and citric acids as its ingredients. Home Depot sells the ZEP store brand version by gallon. Home Depot has also sold a phosphoric acid cleanser called Aqua Mix. The cheapest and most convenient source of phosphoric acid is hidden in paint shops as a generic product for rust conversion, such as gallon imines, which are added to make all look like a complex product, not just diluted raw materials. These are all nickel safe acids; it is that they do not corrode nickel platinum vapour or nickel-chromium shaft wire. Full strength household vinegar works well, but with a weak 5 percent concentration, it takes much longer to loosen the rugged mineral deposits and your iced ie smells like salad. Poor performance diagnosis: A common problem is a unit that still makes ice but does badly by making only thin plates or taking no longer 1/2 hour to complete 1/2 inch thick plate. You can get some cubes dropping into the trash, but they're not produced fast enough to fill the trash for a day or two (or it is the usual melting of ice is running in production). (If your system doesn't produce ice and doesn't grind at all, see Diagnose zero performance below.) The first thing to check is that the dust capacitor at the bottom of the unit does not limit the airflow. This may seem obvious, and we've all heard advice to clean the fridge rolls, but it's easy to forget and happens faster than in the fridge. Heat exchanger rollers and fins are very tightly spaced, and usually build a mat of dust within a few months. The best way to clean them is by gently using a vacuum cleaner and a narrow tool for sucking dust on the mat. Observe to avoid bending fins. Consider starting the machine when the lower panel has been removed to improve airflow and heat rejection, at least for temporary diagnosis. I've heard of at least one case where a technician service call because of poor performance said the machine was outside repair and should be replaced when in fact all that was wrong was the accumulation of dust capacitor that the owner later diagnosed and fixed himself. Fast No-Tools Test Basic Refrigeration Performance: Here's a quick test of basic cooling performance: First, turn the machine off and remove the grille and set it aside. Empty the reservoir by removing the drain cap, and then re-install the cap. Turn on the machine and see if the (dry) evapo vapor is freezing cold and cold in a few minutes. (Resist the temptation to put your tongue on this freezing plate because it stick there, like a pump handle in winter.) The fuel supply should not run into the machine or be deceived during cycle cooling. After the evapost cools sufficiently, turn on the water supply and let the machine fill the container. Wait for the catch to finally and the cooling start again. The water in the container should now flow over the pump circulating by the vapor plate. Start the timer to find out how many minutes have passed since the cooling started. After about 5 minutes, the flowing water should cool cold and the ice should form on the evapost. You can reach to feel the plate surface at your fingertips to observe the beginning of ice formation; it can be difficult to see clear ice when it first forms under a sheet of flowing water. After 16 to 20 minutes, the plate should be fully formed (1/2 inch thick) and the catch should start. A machine with slightly degraded performance (e.g. low refrigerant or capacitor rollers) can take 30-40 minutes to stop building a whole plate of ice. Something much more indicates a significant performance problem. If the ice plate forms, but the harvest does not start, you may need to simply adjust the ice thickness control or recalibrate the harvest thermostat; or you may have an open fastening or outright failure to harvest the thermostat, as described elsewhere on this page. One reason for poor results in warm water leaking constantly leaking solenoid in these valves. You can repeat the test above, but disconnect the water supply from the machine immediately after filling it and start to cool down. Poor performance may be due to a slow refrigerant leakage resulting in a low refrigerant charge. Fortunately, low pay is usually easy to diagnose without tools just timing how long it takes the plate to grow to 1/2 inch thickness in the above procedure, and ruling out that you don't have hot water leaking constantly. The pattern of ice at the beginning of freezing is also a diagnostic indicator of refrigerant shortage. The very first freezing ice should appear with a square spiral pattern that follows the refrigerant tube path over the evapost plate (you can see this spiral path by checking the steamer bottom with a mirror). If the plate forms only outside the coil, and the plate does not form in the middle area versus the perimeter, or forms much thinner or much later in the middle compared to the perimeter, then there is likely to be a very common problem with the leaking refrigerant system with a low-charge refrigerant. This partial spiral pattern occurs because the liquid refrigerant flows first from the outside of the coil, and the low-charging condition of the refrigerant bolts out before it reaches the center of the evapost. Uneven ice formation can also result from uneven water flow over the evapoon, for example, if the flow of water is somewhat blocked by debris. Uneven ice from this condition should be distinguished from the low refrigerant, because (1) you can visually check the flow of water over the evapost system to check that it is homogeneous, and (2) the uneven ice pattern does not match the spiral geometry of the evapost refrigerant circuit. Water flow problems tend to cause a streak of thin ice, while low refrigerant causes symmetrical quartz shape thinning in the middle of the ice. Another way to diagnose low pay is to connect the service gages to the system and compare the pressure specifications on the e-wand wiring page. Having done so several times, I have discovered that simply looking at the formation of ice, as described in the previous paragraph, is the best estimate for refrigerant. The correct pressure values differ too much in the surrounding conditions and in the low charge diagnostics. Indeed, the only sure way to find out if you have the right reward is to evacuate and accurately consider-in full charging, while checking that you don't have gross leaks that lose a significant refrigerant while it takes a cooling performance assessment. In previous calls, you may have had an access device (also called a charging port or a service port) into the compressor process pipe. I have never heard of one being installed in the factory; instead, the process pipe (stub copper pipes near the compressor) is scratched shut and watered after the refrigerant charge is first installed in the factory. (So it saves the factory 25 cents for a small brass installation that would just as easily be watered there.) If you already have access to the refrigeration installation, you may be able to add refrigerant yourself using a car air conditioner charging kit and 12-ounce cans of R-134a from a Wal-Mart or car parts store, assuming that your unit contains an R-134a refrigerant (items made around 1993 or later) and not the R-12 (circa 1992 or earlier). The above instructions for a properly loading device require more tools and techniques than a random do-it-yourselfer can bring to bear, but if you are in the mood to tweak, you can try just injecting what you think is an ounce or so refrigerant at once to see if performance improves a bit (watch the steamboard spiral as I describe above, several cycles). It may be all you need to get your unit back to peak performance, and if your leak is slow, this repair can last quite some time before another schprtiz is needed. The typical total fee is only 6.75 ounces of R-134a (about half a jar of car parts in the store), so don't glue it to the schprtizing method. An ounce or two should make a big difference to a slow leaker that was cooling at all. If you call a maintenance technician with a poor performance complaint, the technician may diagnose (or simply assume) in the case of a refrigerant leak and/or low charge, which the technician may then recommend paying a very high price to replace large components such as a vapost or compressor. Some technicians are highly qualified diagnocans, in which case you have a good chance of getting the right repair job at the first try. Others aren't as qualified, and just work down the list of expensive repair options that they're trained to accomplish, continuing that random odds (or profitability if you seem to have deep in need of good fling). In such cases I would recommend that before the operator's costly removal and replacement operation, that technician first simply install the charging port and charge the unit back with proper performance, which installation and loading should not cost much. This also allows the technician to measure the using collector gases (see the service sheet above for pressure specifications), i.e. whether the refrigeration system is performing poorly due to low refrigerant. If this fresh charging leaks quickly, then the technician should have a leak detector device to detect the leak; location of quick leaks is easy. If the fresh charge only leaks slowly (within months or years), I can pick up from time to time, using tiny increments from the author-134k kit until the performance returns. There are only a few ounces of refrigerant in the refrigeration unit. Without sure locating the leak and its speed leakage, it is foolish to start replacing expensive components. But many waiters recommend it at a very high price, high enough that the technician can easily keep replacing things until the leak is fixed by accident. This is the kind of sales trick designed to confuse you with the appearance of a lot of technical activities when in fact you probe your price point. The protection of this tactic is (1) to recognize it, and (2) show the right alternative to a leak diagnosis. Sometimes the technician doesn't know what the problem is. The arrival of a solid diagnosis can be expensive, and you wouldn't be willing to pay a fair price if it were available. Or the technician may have to simply remove and replace the artist instead of the correct diagnose. If he gets his OK enough money to replace all the works if necessary, then he can blindly go for it in one piece at a time until it works again. Your best protection against this type of gouge is to examine this page carefully so that you can diagnose your machine yourself, or at least you can diagnose hired diagnostics. Another poor drive where the machine cycles the schedule, but i never seem to perform, see the item waterlogged insulation below. Diagnosing zero performance: Maybe you acquired an old unit or trying to start one that hasn't been used for a while. You connect it, cross your fingers, and turn it on. The fan's running, but nothing's freezing. What could be wrong? The first thing to check is to remove the cutter from the grid, and feel the vaporr plate with your hand to see if it gets at least a little chilled. If you don't feel any cooling at all, but the fan is running down, it's a problem either with the cooling system itself, or in control. Most often no cooling at all is due to a completely leaked-out refrigerant for a slow leak. To do this, you need to install an access device (see above) and test/load gages. Less likely options for cooling at all are: saw thermostat stuck in saw mode (try adjusting the in-and-out screws control behind the rosette plate), compressor to start control stuck (relay near connections to compressor housing), reversing or its control stuck upside down (remove the machine, then cheat the connector backlink 120 VAC to see if you hear the valve clicking) or downright a failed compressor (a closed unit that will be much replaced). Blue-green corrosion vaporist: There are nickel-plated brass components of a vaporist that can produce some blue-green corrosion. This corrosion does not indicate a leak in the refrigerant. This usually stems from the use of acid cleaners that are incompletely rinsed. This type of corrosion is a metal salt that you should scrub because it is unhealthy (not to mention bad tasting) to consume. Cutter network problems: In addition to the broken network wire (which can be fixed or have me fixed, see above), a failed transformer, broken wire, or a bad connection causes the network to stop cutting, so slabs of ice back up the machine and you can't stay in the trash. If you suspect any network problem, you can convince yourself that ice production is OK just by removing the grid from the total machine. The stock transformer offers 9.5 volts of AC, which provides about 2.1 amps cubelett (3/4) lattice or 1.2 amps cube (1-1/4) grid. Since the network is two sides, one for each direction, the flow through any resistance wire segment is about 1 amp. The grid consists of 19 wire segments about 9 inches long each, totaling 171 inches of active wire. At 1.05 ohm/foot, each side should have about 7.5 omelet resistance, which 9.5 volts AC disperse about 12 watts, or 24 watts on both sides. This corresponds to about 1.7 watts of heat in the leg of the mesh wire. Starting from 1-2 watts per foot on the resistance wire is a good rule of thumb for effective slow ice cutting. If your transformer has failed, Whirlpool doesn't seem to be offering replacements. The manufacturer of this part (Electro Technology, Inc.) [dead link] is probably no longer in business. To order a suitable replacement, see above. Splicing cutter nets don't work: If you have a broken resistance wire cutter in the net, you might think you could just sediating a short piece of wire to fix it. It doesn't work because the glued sections don't cut the ice (they don't warm up along the thicker glued part, and are mechanically rough instead of smooth continuous wire), causing the ice sheet to hang up the cutter and eventually back up and jam the machine. The correct repair is to rewire the grid to the new wire segment (see above). Ratting and/or ice boards that are backed up above the cutter network: A common problem is that the machine stays in the cooling part of the cycle for a long time by making a ratting or parachuting sound with jams on top of the cutter grid and evapost plate. The first thing to check is the cutter grid itself: the wires are not broken, so the upper and lower array wires are warm to touch, and no (lime accumulation) wires. Another easy way to test the grid is to loosen and remove the grid from the total out of the machine, and to launch the machine without grid assembly, letting the machine catch full uncut slabs of ice in the trash for a few cycles. If it works, but replacing the network will cause the machine to become clogging with ice panels again, you will have a problem with the network's heating wires or the mechanical track to the network. Here's a close-up photo of some heavy calcification (lime buildup) wires on the ice cutter grid. This ltification was thick enough and far enough above the wires that the machine jamed up and started lowering a little more than an hour after it turned on. Thanks to the deposits, part of the plate was insulated from heated wires and was not cut. Thus, part of the plate would have remained on this part of the grid by the time the next plate was cleaned up, and the new plate would have to rest higher on top of this ice ice. When the third plate began to slide off the steamboard, it was stopped from the remnants of the first and second plates. When the water pump began recirculating for the fourth plate, the water ran over the third plate and into the trash, eventually depleting the reservoir to the point where the pump inlet began to air and turned into a chug chug sound. The citation of the lattice wire shall not be cleaned to the container by acid cleaning and cleaning cycle, as the cleaner does not flow into the net. Indeed, the weaker acids safe mechanism does not remove this stuff from the net at all. One simply is to remove the network machine and pinch off the lime wrappers with some pliers. They are relatively soft and fall apart, as shown above the photo, where the wire is open. The complex finger shape is a type of dendrite that natural mineral deposits tend to form. The forms are actually miniature stalagmites, where mineral-rich used water reservoirs are sprayed onto a warm grid of wires and evaporated, leaving a bit of a deposit behind each cycle, which eventually develops into bizarre encrustations. Some machines develop them in elaborate shapes, some smooth shapes, and most have nothing like it at all. Maybe it has to do with the degree of hardness of the water supply and the calcium minerals varieties in hardness. To get the idea of a scale close-up photo, consider that the open wire is about 1/40th inch thick, and the distance between the grid wires is 3/4 inches. Only a small area around the back of the network was affected in the way shown in this photo across the grid (KitchenAid type grid), but it was enough to block the machine. Pastel blue-green color is likely due to acid cleaners dissolving trace amounts of nickel and copper stainless steel. When the cutter lattice is running (the wires are warm and not calcified), the usual reason for backing up the slabs of ice is mechanical obstruction or mechanical incompatibility that prevents slabs from slipping downhill and dropping properly onto the net when cleaned. Why rattle, fall or march? This sound is a circulating pump tank ventilation. When a harvested plate of jam halfway through your journey down the cutter grid, when cooling starts again with water recirculating, the stuck plate tends to interrupt the flow of recirculating water so that the water flows into the trash and shrinks the reservoir. Soon the water level will fall enough in the reservoir to recycle pump vents, it is, driven into the air instead of water. The water stops moving through the ventilated pump, and the water above the pump passes back to the container by gravity, re-watering the pump and ending the ventilation. Thus, the circulator pump is alternating between pumping and ventilation about once a second, making some kind of cyclical grinding or moaning noise. With interference from the reservoir and backup of old ice, you usually end up with a very thick plate of ice vapor plate that is in place clogged with ice below, the machine will trigger the catch in vain from time to time. The solution is to first remove the cutter grid and clear out the secured ice, and then diagnose and correct the underlying problem. If you have confirmed the cutter lattice is intact, has a clean lime buildup, and is heating, you should look for mechanical obstacles or deviations. The problem may be simply the accumulation of minerals in rough water on the side of the evapost plate; a routine acid purification procedure (see above) or its sweeping with acid and scrubbing pad, should remove the build-up and repair it. Another reason is that the upper lip of the plastic reservoir in the trash can be distorted over time so that it projects up the path of harvested ice, causing harvested slabs of jam, perhaps intermittently. The solution is to remove the reservoir from the trash and trim the back to the lip slightly. Inconsistencies in problems can also appear as the evapolyl plate has moved out of its proper installation, or the recirculation tubes have come loose and get stuck on the frozen plate. The dampening noise without clogged slabs is due to insufficient water for other causes of the reservoir. Possible causes to diagnose in this case include: Incoming water pressure is too low or off. Inbound water pipe piping is limited. The reservoir bath is cracked or otherwise leaky. The reciculating tube leaks and flows water outside the bath. The reservoir bath or evapost has come loose and out of alignment, flowing recirculating water flowing into the ice bin. The Commission has the bottom of the reservoir is open, leaky or dropped out. The harvest time too short does not fully fill the reservoir. The water body is too close to the steamboard to the pipe tank. The pipes freeze after several cycles and prevents freshwater from entering. If you only occasionally get gurgling fat on an ice plate, maybe stuck in a road cutter grid, water runs over it and into the trash, you may have an intermittent harvest thermostat problem. If the thermostat sticks to the cycle, the plate is never cleaned up, the cooling continues, and you get symptoms just listed as a result. The push for thickness regulation releases the thermostat and starts harvesting, which should solve the problem. Make sure that each harvested ice sheet makes it all the way down onto the net and doesn't hang up on being plump. You can also just turn off the machine for a few hours or overnight; the upper part of the ice works to melt away, and you have to reset the system. The need for this happens to my machine a couple of times a year. Lost or damaged rubber stopper or cap at the base of the container container: the rubber stopper (or plastic cap, such as a bottle cap, in later models) must not leak at the bottom of the container. While you can order overpriced replacement spare parts suppliers, Lowe's sells rubber caps out of its specialty drawers hardware aisle. Measure the diameter of the hole in the container. Caps sizes are marked with diameter fat and lean ends of the cone; you want to cap these two diameters, which extend to the diameter of the hole. I found the standard #2 the size of the rubber cap was the right fit. In a pinch you can improvise carving a wine bottle cap (cheap stuff tends to be hard plastic foam caps that work best for that). Use a sewing needle and floss to improvise the holder's lanyard if you're worried about losing the loose plug in the ice bin. A little aluminum cooling duct tape, Kapton electronic tape, or even cheap duct tape, stuck inside a dried reservoir, would work temporarily (or even for a long time) if you can't get hold of the cap or cap part for a while. Unfortunately, the soda bottle cap is oh-so-close, but a no-go replacement fit cap with a button to use in newer model reservoirs, so you have to pay $20 for the factory share. The factory calls it a nut, not a cork that makes a serious money item. So don't lose your nuts. Testing and replacement of the evapost thermostat with a switch and timer(this Part applies to older machines with electromechanical controls and not to newer electronic controls.) The evapost thermostat is a common emergency toteep in older machines because the parentheses problem is described in detail above or the control failure itself. Since this thermostat is simply the temperature controlled switch and electrical connections are easily accessible, you can temporarily replace the thermostat switch manually with a push-button to test the function of the machine and diagnose the thermostatic control problem. You can replace the thermostat with a timer to eliminate thermostat-related problems. Thermostat control is what is attached to the thickness control button behind the rosette plate. Three 1/4-inch quick-flow wires, which are the SPDT(single pole double-throw) switch, are attached to the thermostat control body. From this thermostat, the capillary tube flows back into the bracket attached to the bottom of the evapost, where the tube senses the vapour temperature remotely and closes the thermostat switch to the capillary tube by expanding and contraction the liquid medium. To diagnose a thermostat problem, you can temporarily replace the SPDT button or switch switch to the thermostat. Once the switch is installed, you can manually adjust the device in freezing mode versus harvest mode. This replacement is easy when you get the switch from 1/4-inch quick-disconnect lugs like car parts store. Access the old lie and wires, removing the two screws that hold the plastic rosette cover, and then the two screws that hold the metal bracket, holding all the controls. Switch connections are BLK = common, ORG = usually closed, BLU = usually open (check your schemas for the service pages linked above). In this way, connecting the push-button triggers the machine in freezing mode, pressing and holding the button for about 2 minutes, turns the system around and opens the water valve to fill the reservoir. If you annoyingly stand to press this button on time, you should be able to run cycles and make ice Since around 2018, electromechanical thermostats are rare or unavailable spare parts. I recommend that if you have this predicament, and are able to replace the thermostat with an industrial timer, making the machine run a fixed schedule of timed cycles, instead of the machine trying to sense the temperature (and thus thickness) of the ice sheet. A timed method makes it easier and more reliable to function. You can also adjust the timer settings by manually adjusting the length of the cycles to match the state of the machine and the surrounding environment, so that it creates an ice plate of optimal thickness. The most direct way to make this timer modification is to use the available industrial control timer. These are small modules that provide SPDT switch contacts that turn on and off according to the scheduled cycle of your option, which you set manually by using dials or buttons in an item. Suitable items are Peltec 102 (about $100) and Altec ATS-C120 (Digikey 1920-1411-ND, $70). You're a fan of exotic danger and thrills, you can try the adventure using cheap import mimics the venerable Omron DH48S-S ($10) as competently (and indecently) through AvE. You may need to improvise cabling and external space to connect them to the ice screen, since larger versions do not fit the space available by removing the thermostat module. As an electronic project, a hand-held vehicle can also be considered a hand-held vehicle. In 2009, five years after I watered the evapoon bracket in 2004 to fix it, as described above, the thermostat broke again, and I do not want to go through that disassembly and watering clean-up to re-install the replacement part. Now the machine had been running almost continuously all these years, so I imagine that the solder joint must have been frozen and melted 50,000 times (5 years of time 365 days/ year times 48 cycles/ day times 1/2 duty-cycle), so it's not surprising that the joint failed again. Instead of repairing the feather, I replaced the thermostat and capillary tube with a low voltage relay switch run by a 555 timer circuit, with a total cost of about $10 for electronic parts. The timer just stimulates the relay for 2 minutes every half hour. This timed control releases thermostat control and capillary pipe bracket together (and related problems), Although the timer does not compensate as a thermostat for control variations in ambient air and water temperature, if the machine otherwise works properly, the half-hour cycle is a good compromise. Ice cubes just get a little thicker or thinner depending on the surrounding conditions. If you are an electronics enthusiast, you can use the 555 circuit parameters I calculated to be suitable during the 28-minute freezing time and 2-minute harvest time: R1 = 470K, R2 = 39K, C1 = 4700UFD. See the schematic diagram of this timing app [PDF file] from Mimi's book. The miniature SPDT relay suitable for compressor load is omron G5SB-14-DC12 (p/n Z1642 digikey.com). Vaporizer thermostat functions (as shown in service page schematic and found in my unit) switch terminals and wire colors are: vaporizer thermostat wiring SPDT Switch replacement steamerThermostatTerminal function WireColor ReplacementSPDTSwitchTerminal #1 Run (to capacitor fan) Orange Usually closed #2 Incoming AC line voltage (from trash thermostat) Black #3 Harvest (hot gas and water-valve solenoids) Blue Normally open You can glue onto the network transformer low voltage AC with rectifier and capacitor to provide a 14VDC power timer. Although it was a science-fair project to collect, replacement thermostats can be very difficult to find, and it was worth the effort, especially after I shopped for a new machine and found that they now cost $1,400. This improvised timer and relay circuit is bare bone control. My ideas this design includes: (1) resetting the timer when the tray thermostat turns off, so that the ice-making does not restart in the middle of the scheduled cycle, (2) push buttons for manual start or end of the harvest (3), lamps showing the status of the control, (4) separate water valve and harvest timers and controls to limit filling to 1 minute and clean up for at least 2 minutes, as is done with newer electronically controlled machines, instead of the water valve and the hot gas solenoids connected in parallel to the same control. Lost calibration of ins and out clips of the evapost thermostat(s): (This section applies to older machines with electromechanical controls, not to newer electronic controls.) The evapost has screws to adjust the inlet and cut-out temperature. Normally, the control does not indicate the polarity of these adjusts, i.e. what option these screws make the corresponding settings warmer or colder. Several independent adaptations require a little procedure to derive polarity. The new control piece should contain a datasheet describing the calibration process. If you don't have this information or try to recalibrating the old control, you'll need to analyze the behavior to learn the polarity of cut-in and cut-out adjustments. If you have an open control unit (out of the machine), you can characterize it as follows: Form a bowl of warm water and a bowl of sub-freezing slurry (crushed ice with salt, or crushed ice with non-toxic antifreeze), set the melted versus subfrosted temperature of the thermostat probe. Form a network diagram of 25 tests, which combines 5 possible sample sets in each adjustment screw. Use each adjustment screw to determine how much the screw adjusts. The trial settings should cover this range, starting completely counterclockwise, then 25 percent clockwise, 50 percent clockwise, 75 percent clockwise and full-clock. For some network cells, adjust the screws to the sample combination and test the consistency of the control in the open or closed part, with the probe inserted into warm and cold bowls accordingly. Save these two results to the grid cell. Repeat for all 25 grid cells. Once you've completed the chart, analyze the results to determine the polarity of the cut adjustment (clockwise adjustment makes it warmer compared to colder) and cut-outs (as well). The area of the network with control contacts for warm temp and which is open for subfreerping should indicate the appropriate start-up settings for the adjustment screws. Install the control and monitor some cycles to adjust the incision and clipping swabs for the correct cycle time. To re-calibrate the control unit during installation in the machine, start by checking the consistency of the control contacts with the warm machine and the two adjustment screws four extreme adjustment combinations. The closed-continuity combination(s) is the candidate(s) for the initial adjustment. Set the adjustment to such a candidate, start the machine, and wait for the plate to freeze. Cut back screw from its extreme settings to harvesting. Wait one or two for a suitable harvest time and a rebound screw until the cooling starts. Note the polarity of these adjustments, i.e. which led to each adjustment screw turning makes the action warmer or colder. Note also the number of revolutions in all adjustment ranges. These notes will help you fine-tune settings now and in the future. I've heard that some controls only have one screw to adjust. In this case, the range between the in-cut and the cut-out shall not be adjustable, only the temperature limits, if applicable. Then, the recalibration procedure is a subset above. Bin fills up water or sewers slowly: If you have a water collection in your ice can, you can woefully conclude that your drainage connection is clogged, and that you're going to have a tear machine out of the counter to get the drain piping. It might not be that bad. Unlike the usual sink drain, slow runoff is not usually caused by a household drain line or trap being clogged. This is usually caused by pieces of debris that have fallen into the trash and collected in a small drain sump and drain the passage behind the plastic ice bin. Because people are bending over to reach the trash can, all sorts of things can fall and get lost in the ice, and eventually it works its way down and back to the drain. I found out (the hard way) that 6mm toy airsoft BB's is the perfect plug to fit the drain pass at the bin sump. The problem with this clogging diagnosis is that it can be difficult to control the drain passage behind the trash. It's not hard when you get behind and disconnect the drain hose, but it's an undercounter installation, it requires tearing out the machine cabinet. Short of that flashlight and control mirror will help you check the back inside the trash, and loose items in the sump can often be simply vacuumed out. But if you have something jammed with a narrow passage at the bottom of the sump, something that fits tightly (like my experience with a plastic BB), then you have to get back to the machine, remove the drain hose and sound the passage, from the outside, with a rigid wire to clear out the trouble. You should not ignore the water collection in the trash because you will be able to overflow and flood your hands if the solenoid valve should remain open. Capacitor fan does not work from time to time: If you have electronic controls, the fan has its own relay on the computer table. So if the fan fails intermittently, the error may be wiring or controls. Connect the test lamp to the fan wires to distinguish the fan itself vs. wiring or controls, and wait until the error appears to diagnose an intermittent cause. The shaft bearings fan can get a little malfunctioning up and the fan does not start sometimes because the initial torque is very low. If an error appears, make sure you can't spin the fan blade manually to get it started. This requires the replacement of the fan motor because cheap bronze sleeve bearings are not usable. The capacitor fan makes a loud buzzing noise: a capacitor fan, found at the bottom of the unit, circulates space air over the capacitor coil and exhausts warm air. The rotating fan blade is surrounded by a rather thin folded fiberboard shroud that can distort shape, such as age or get wet. The shroud can be contacted by the fan blade and make a loud buzz. The solution is simply to adjust the shroud or trim it back so that it does not touch the moving fan. It can be hard to reach if you don't have access to the back of the unit. Another fan shroud solution is a handmade replacement sheet of rigid, thin plastic. The appropriate material is cleverly hidden to hide your local building supply retailer's 2 x 4' drop-in panels with fluorescent lights. Mark Egan is generously sourced and helped with this EC5100 fan shroud drawing [20 KB PDF file, 1 page] which gives the pattern you cut and fold. The UL-listed aluminum foil tape, which is designed to withstand hot and tell-tale conditions, is suitable for foldable and corroboated folded construction, and can be found in the same building as tender. Waterlogged insulation: I've heard reports that some machines develop waterlogged insulation. A dry fiberglass blanket and a steam barrier around the trash can are essential for good performance. When this insulation gets wet, it no longer insulates; the ice produced will be produced quickly. This is a harmful problem because insulation may never dry: lack of insulation can cause the temperature of the outer surfaces to fall below the surrounding dew point, so that moisture constantly condenses outside the machine, keeping it wet indefinitely. The initial causes of this type of insulation failure include plumbing leaks (the machine itself, or possibly other equipment near the cabinet), a cracked trash can leaking water from molten ice and a separate deck or steam barrier that allows water to be condensed outside the trash. Testing failed insulation requires that you just feel it manually moisture. Repairs are to fix the main problem and close the machine long enough to dry out from the outside thoroughly. Moral: keep the deck snug and steam barrier intact. Later put the insulation in sealed plastic bags to prevent it development of the disease. These pillows insulation then stuff gaps between plastic trash and metal cabinets. Ice melting splashing water: In addition to failed insulation, another problem can cause your precious ice to melt too quickly in the trash, namely that warm water is splashing out on the top of the device and down onto your ready-made ice cubes. Another sign of this problem is that the cubes get rocky or honeycombed in texture after sitting in the trash for a while. This is difficult to detect when the mesh is in place because splashing water tends to just drip down slowly like a normal drip from a cutting plate into cubes. So remove the net and start the machine, then shine the flashlight on the top of the bin to see if you have a very fine rain splashing out of the top of the apparatus. One of the reasons for this splash is the underground water dispenser in the pipe sections, which causes the circulation water to be sprayed too vigorously against the top of the evapolt. In this case, the minerals must be taken care of by acid cleaning. One would hope that it will work, because removing this pipe for the service is difficult. Dripping water under the machine: Several problems can cause water to slowly drip into the bottom of the machine. You can test the cracked trash or drain problem by turning the machine out and emptying it, removing the drain, and filling the trash with water to see if it drips or not. You can also attempt to search for stray water on the water recirculation circuit because it would be a drip or not a drip machine running or not (you may have broken, displaced or cracked part of the recirculation path). Another option is missing or watery insulation under the base, resulting in condensation outside the bin (see above). There may usually be some condensation of refrigeration back pipes, but it does drip that fast. Evaporation mounting kit: (This part applies to older electromechanical controls and not to newer electronic controls.) An email from a correspondent writes that Whirlpool came out in January 2006 with a vaporshee feather repair kit (part number 8201758). It came out of its Service Pointer Bulletin R8178560, January 2006. I hope this will help you or others to fix this failure. Another correspondent reports that the bracket is the same shape and size as the original bracket and is held by a evapost against a support (about 1 wide and shaped like a V) that is mounted over a heat exchanger pipe. ... It seems that a person could clean an old feather and work out their own method of wedging it with a vapor. It includes the Whirlpool Guidance Page For Steamer Bracket Re-Location [424 KB pdf file] and reports the price is about $30 (try online sources or local equipment parts retailers). Being that it's only a small, V-shaped clip the hole in it, I would recommend improvising something with some thin stainless steel to save yourself $30 (and save having to look for space at this point). You can find suitable material for a cheap kitchen tool that can cut tin cuts, and then punch or drill a hole into it. In fact, a polyethylene plastic clip that you can cut yourself into something heavy like an empty detergent bottle can even work as well as something for that purpose. The photos on the Instructions page make it clear what type of wedging activity you are trying to create. I'm a little suspicious of this set and how it wedges the clip against the heat exchanger tube; it looks like chafe soft metal tubes hard stainless clip under a normal vibration machine, and it I expect soon to cause a catastrophic refrigerant leak. Or perhaps in practice he keeps up the fine; I have no experience with this stunt. I think we should be encouraged that Whirlpool, after so many years, won't force you to buy a whole vaporr to fix an open solder joint. The lost overflow pipe can spoil ice production: I've explained how during the harvest cycle excess tap water flows into the reservoir to flush out concentrated minerals from used water. The polyethylene tube normally feeds warm water from the overflow outlet into the drain oil at the back of the bin. This pipe can be accidentally knocked out. Being polyethylene, it can become brittle within a few years and crack into pieces. This simple piece of pipes may not seem like an important component to worry about. But without it, the warm overflow will run over ice already delivered to the trash, melting some harvested cubes and ruining its ice production. So make sure this pipe is in place. Drainage and drainage pump problems: Standard installation of this type of ice si stick assumes that you have a house drain connection either on the floor or lower on the wall compared to the bottom of the ice bin. It maintains a downhill path of ice melting to run north of the ice bin, out of the machine, and down the house drain. If your free connection to the house drain is above the level of the bottom of the ice, then there is an uphill path to the melting drain, which requires an extra pump to remove it. Some residential ice machines sold today have drain pumps built into standard equipment, but it did not feature electromechanical Whirlpool models. Extra pump uphill drainage is usually optional for a sump pump that is installed in the bottom of the rear ice wall. These pumps are quite expensive when purchased by a device parts dealer, but they are nothing more than what is usually sold as a low-cost air conditioner condensate pump, such as the Grainger item 2P350 ($46 2006), which is the Little Giant brand (Website), model VCMA-15ULS, HVAC removal pump. Home Depot (search for condensate) listed the Flotec model fpcp-20ULST condensate pump for $53 in 2006. Such mechanisms consist of a plastic box the size of a shoebox, which acts as an oil box for incoming drainage water, with the float valve sensing the water level as an oil bath and activating a small pump to occasionally empty the sump when it fills up. Another Little Giant model is the VCMA-20ULS, which offers 20 foot lift power instead of 15 feet, although lift power is not relevant to this application. Comparable pump models are fed by Beckett (CB151UL or CB201UL) or Hartell (KT-15X-1UL or KT-20X-1UL). All of them are suitable for ice machine drainage. Note that the drain pump is not usually configured to interrupt the water supply of the solenoid valve when the pump is not working, or if another drainage problem occurs so that the sump level overflows. Therefore, face a slow but mysterious water leak one day if your mortal drain pump fails, so you should plan the installation accordingly. This is, consider installing a pump to facilitate easy control and service access. If you can, also arrange things so leaking water does not damage anything that is expensive to fix. While I've seen them installed in a hollow volume at the bottom of the ice cap, it makes more sense to run a trash drain next to the cabinet, where the pump is more open to control and service. You still have to obey the law of gravity by putting the pump lower than the bottom of the bin drain. Since these pumps and sewers all end up developing problems, you don't want to have to pull a heavy machine with great difficulty with built-in cabinets for their maintenance. Some drain pumps provide an overflow locking switch that turns off the ice screen when the sump fills with water due to a failed pump or clogged drain. This is something to consider troubleshooting if you have an intermittent or otherwise unexplained problem with your computer, such as accidentally switching off and back on to power-sufes (e.g. 5-minute flush of electronically controlled models). This overflow switch is a feature that should save you from flooding the floor; Don't let him trick you into thinking your machine has failed. Unlike air conditioning condensate, ice melt water is not contaminated with much dust to support microbial growth, and draining lines usually clog up over time with algae as can happen in air conditioners. So you don't have to worry about cleaning them periodically as you need air conditioning. This applies to both gravity and pumping. If you experience a clogged drain, see discussion bin fills up with water or sewers slowly above other possible causes. Diagnosing and repairing fan problems: fan refrigeration assembly the lower space of the machine moves a small amount of air through the machine to cool the coil and exhaust heat of the machinery capacitor. If this fan closes the moving air, the compressor will work, but the machine will not produce ice. When air convection flows from the exhaust of some heat slowly, it can produce ice very slowly in hot air percolating slowly from the bottom of the machine. If the compressor overheats, the overload switch may cause it to shut down until it cools down. If you find that the fan does not work, if you expect it, you have to diagnose between the possibilities that (1) the machine is wrongly stuck in the opposite part of the cycle (hot gas heating evapost to clean up the ice plate), if the fan should not be working, but the compressor does not, which means that you have a control problem, may not be a failed fan, or (2) the machine is actually cooling part of the cycle, the compressor is running, but the fan does not pass the air due to the problem, not the fan itself or its wiring or control system. If you diagnose that you are in another case (the actual fan problem) you need to diagnose whether the ventilator itself has failed, versus its wiring and control. You can try to reach the machine (of course, if it is turned off) and feel when the fan blade becomes free; fans of ice machines do not seem often unable, but I know that window conditioner, that a similar type of fan can stick bearings that keep the engine from starting. Another thing to check is that a paper shroud or any foreign object is not just blocking a fan with a blade turning. As a last test, you can get the fan from the hot wire to see if it works, either by observing the wire diagram back to the control unit or by cutting and splicing into the wires of the fan itself. The room is very narrow and the fan is difficult to reach, but replacing it is harder and you have to be sure that the fan itself has a problem. Another diagnostic trick, if you suspect a fan just doesn't work when it should, is to improvise some kind of airflow over a capacitor to spiral another small fan, some flex duct air-mover fan, big shop VAC sucking exhaust side capacitor, etc. You don't have to do the perfect job of this as long as some air moves over the capacitor and out of the machine. It doesn't take much air moves to prove that the cooler works and makes ice when the problem is just a dead fan. Replacing the fan is difficult because the narrow space and compressor are on the way. The entire lower refrigeration unit is designed to slip out of a sheet metal base if you need to replace or work with it. The fan cannot be removed directly from the machine because it is in a box with other components and sheet metal. However, there is sufficient in a copper tube connecting the compressor and the evapost to remove these objects or the base of the entire lower unit, and gently manipulate them to remove and replace the fan. One correspondent recommends that you replace the fan easily as follows: Remove the capacitor spiral and capillary tube brace-holding screws to the chassis; Move the capacitor spiral slightly to the side. Use a 7/16-inch socket with a long extension to remove the engine mount screws; Push the capacitor spiral over the right and twist the motor out with this fastening. I agree that this manipulation seems plausible, although I have not tried it myself. Another way to remove the fan is to get a fan from the side or behind the unit. You need to cut part out of the sheet metal side or back to get it. If the machine is installed under kitchen cabinets, you won't have those sides anyway. Water condenses and drips from the drainage line: Since the drain pipe contains chilled water, it can condense moisture outside the line and drip water when the drain pipe flows through a damp room, for example through the floor to the basement. The best solution for what I know is that this problem is a spiral-wrap drain line with No Drip brand tape made by Mortite. It has a thick, sticky-gooey wrap that insulates well enough to prevent condensation, and stands up to moisture without breaking down or losing its insulating properties. The putty-like consistency of this stuff allows you to mash and mold this steam-tight jacket after wrapping it in a spiral around the tube. Sold at Home Depot or Lowes with air conditioning mechanical items. Air conditioning installers use it to isolate condensate lines, so you can also find it as a utility supplier. You can also find insulation wraps made of foam, cap, or sponge gum, but this old-fashioned mortite stuff is my choice of price and efficiency. Similar things are sold by Presstite Permagum and Virginia KMP sealing compound. Sanitation issues: Sometimes I get inquiries about the sanitary aspects of ice machines. You heard a bad ad about the contamination of the restaurant's ice sauce. This should never be an issue for a household machine if you just avoid contaminants in the trash. The crystalline process that forms ice sorts the water clean of dissolved or particulate pollutants. Water molecules lose their heat fusion and stick chilled ice to the surface of the laminate on the surface of the plate; something else, but the water tends to just keep washing by. This selective melting of water molecules by its very nature avoids entraining microbes into ice. Ice clarity is proof of its purity. Even if the container water is not sterile, the ice itself is, or very nearly so. Persistent freezing temperatures inhibit microbial growth, reservoir water supply does not contain nutrients to support microbial growth, and urban water should have enough chlorine or chlorination as a detergent to kill light microbial contamination and keep the water sterile. Since the ice in the bin has been completely replaced at least every few days (by melting, if not in use), all dirt, dust or other pollutants in the bin tend to wash quickly or work along the bottom of the bin towards the drain. So you can be sure that your ice starts clean, and if you don't mistake the trash, your supply of ice in the trash should be clean. Replacement of the lamp: later models of the machine have an internal lamp adjustable with a door switch. It is similar to a 12 VDC car type socket and lamp. If your old lamp or socket does corrosion, instead of paying $100 for a Whirlpool item, you can glue an LED, like a 12VDC LED accessory lamp to the car parts store. Boat stores (West Marine, Boater's World, Bass Pro Shops, etc.) also have waterproof 12VDC LED accessories used for improvisation. Replacing the evapost with electronic models: KitchenAid and other electronic models, see instructions on replacing the evapost helped by Brian Christal. How much water goes into the sewer, how much ice? Over comcalculally, we calculated that each crop produced 18 ounces of ice and admitted to rinsing about a gallon of water and filling the reservoir per cycle. At the maximum output (a 30-minute harvest cycle over 24 hours equals about 48 cycles per day), this means that the machine uses about 50 gallons of water per day to produce 50 pounds of ice. About 44 of these 50 gallons go straight down to the drain during harvest flushing. This is overhead demineralizing water through freezing to get clear ice. For typical household users, a significant portion of the remaining 6 gallons worth of ice ends up melting and going down the drain, too. This is an overhead of convenience having ready ice supply in humid conditions. If water protection is critical, it could capture (clean) waste water through a condensate pump for other purposes (such as irrigation), and could store ready-made ice in the freezer so it didn't melt. Note that the restaurant's ice machines work on similar principles, waste a lot of water. Diagnosing flashing lights and shutdowns with electronic controls. Later models of electronic controls, including KitchenAid models, can flash some simple encoded messages and close when the control board detects the problem. When operating normally, when the machine switches off and flashes the LED lamp on/off in half a second, it indicates that the harvest lasted more than 16 minutes. This is usually due to a faulty evapo vaporization or connection, although this may be caused by a problem with hot gas reversing the valve or its control. Flashing one second indicates that bin thermistor or its connection is invalid. Additional diagnostic codes are available when you turn on the device's clean cycle by pressing the CLEAN button: the first thing the steering stick does for a clean cycle is to test thermistores for the correct connection and durability, and if a faulty control board is found, the LED board flashes twice for a faulty bin thermistler and/or 5 times for a faulty evapost. If you disconnect one or both of the termistors completely, you should follow these flash codes even at the beginning of a clean cycle. Note that these codes were programmed as part of a newer version of the Electronic Steering Committee first released in 2004, so that you may or may not have this feature in your unit (see item check which version in the list below). Other features of the newer version include: a 15-minute minimum and a 25-minute maximum cooling time to prevent plates from being too thin or thick. After 25 minutes, the device forces the prey regardless of the sensitivity of the the termist. If you have poor refrigeration performance, this therefore causes thin syllables to clean up. Fill the time to a 1-minute maximum to reduce the use of water and prevent the valve from being stuck in open condition by malfunctioning the evapost or reversing valve. This means that if you have a water supply restriction, you may get cloudy ice or chug-chugging from inadequate filling. If the evapost is disconnected or gives faulty readings, a 25-minute freeze and a 4-minute catch in reserve. Maximum 16-minute harvest before the evapost malfunction shuts down. This means that you can clean up exactly one plate when the machine closes. Thermistor control the beginning of a clean cycle instead of the end (and presumably you can use it to check which version you have). The diagnostic clean cycle begins with both freezing and recirculation pumping instead of just freezing to prevent the adherence to the old plate vaporization and causing a clogged plate during the cleaning cycle. (you can use it to check which version you have, the old version of clean cycle diagnostics will first run cooling without recirculation for 30 seconds). A minimum harvest time of 2 minutes, with the vapour sharpener temperature sensor assessed at the 2-minute mark, not continuously from the start of the harvest. This prevents some marginalristotes from causing shutdown, at the expense of less frequent cycles and thus reducing performance. The above list was based on the Whirlpool Instructions page 4388700 Rev A 6/04 (see this document). Keep in mind the following points when diagnosing these flashing error codes: the vaporizing thermistor may have failed or may be irregularly reactive. You can disconnect the thermistor and restart your computer to see if the device is running correctly in scheduled mode. You can also remove and test a torgier with an ohm meter for the correct durability values at different temperatures, as explained in the instructions for use. Also bin thermistor. The device probably won't work on it because it can lead to overflowing the trash and pouring ice out on the floor. You can cheat bin thermistor with a 10K ohm or 22K ohm (or aboutabouts) resistor (like Radio Shack). This is a cheap way to test that machine works when bin thermistor is suspected because replacing thermistor is expensive. White plastic connections or the technical es of these two termacitors may also fail or become intermittent. When equipped with a drain sump pump, the overflow interlock switch can intermittently shut the machine out when there is slow drainage or failure of the pump. What if the circulation pump bracket comes loose in peeled ings: In older machines you may find that the failed pump has also come loose with a rusty mounting bracket. Although you can replace the pump, brackets are not found in the finished replacement part. What to do? You need to take the initiative to improvise this type of repair with your mechanical skills. It's not that hard. One has to cancel the habit of assuming that fixing something is necessarily a matter of finding just the part you need. Often you can improve things to better yourself with a little ingenuity. Note: This is actually good advice on many things in life, and an article of faith in my do-it-yourself credo. Women find that this fearless live an attractive man; Chicks are digging guys who can fix things. Your ability to understand secular technical theories suggests that you can understand the secrets of femininity. If you replace the expensive Whirlpool brand pump with a cheap aquarium pump as described above, you don't need a feather at all because the new small pump will just sit at the bottom of the reservoir bin. You have saved some $$$$ as well as fixed two problems. Or zoom in and tap the old hardware peeled holes with a larger thread size to attach the old bracket with larger screws again. Or drill through the back wall and put some nuts and bolts through to keep the old feather and pump. Or cut/drill/tap a new feather with a bit of aluminum or stainless steel (like onlinemetals.com, or maybe just taken from an old cookie sheet or kitchen tool). To improvise this type of feather, another method is to see a block of high density polyethylene (HDPE) into a specific size of bulk material. HDPE is easy to see manually, and drill to get self-copable stainless screws. This material is cleverly hidden to hide the clipboard in the kitchen of your local retailer. Or search for HDPE or UHMW onlinemetals.com. Typical malfunctions of the PC (printed circuit board): printed circuit board (PC plate) (see close-up photo) a newer electronic control is a typical cause of failure, often due to a frustratingly intermittent malfunction type. Several people have been so kind as to send me their failed desks for post-mortem analysis, and what I've often diagnosed is just that i watered the joint cracked print traces. It's easy to fix something more than a touch of soldering, which improves this costly replacement part. Look carefully under magnification at solder joints relays, especially the compressor relay, which handles the most power. If you wiwile these components you may discover a broken or cracked iodine. Relays click and bounce on each action, handle a lot of watts, and experience a wide temperature gauge that makes solder connections vulnerable to failure. Cracked joint can make and break contact to make a failure intermittently. Removing the computer table for inspection is a chord job, but it may appear to be the cause of a control problem that is not caused by a failed sensor or wiring. Relays themselves can fail, in this case a cheap replacement for the Omron G5LE-1A4-DC9 (for example, from mouser.com). The compressor relay is Potter and Brumfield T9AS1D12-9, available digikey.com. Diagnosing intermittent problems: intermittent malfunctions are always more severe because diagnostic tests can be misleading if they are not performed during a malfunction. Since diagnostic measurements must be made in the event of failure. you have to sit back and wait patiently for the event. On an ice loop that takes 20 or 30 minutes per cycle, it can involve a lot of patience. In this situation, I would combine the indicator light or other visible test measurement readings and I would expect to see it if an error occurs while continuing another nearby pastime. Or maybe run a long video recording machine showing the test indicator, and then rewind to witness the actual failure, after-the-fact. You can also use a data logging voltmeter that connects to a computer that may even have been cheaply at Radio Shack these days to make a quantitative time-domain recording. How effective is cleaning: Cleaning functions are more of a hoax. The accumulation of lime occurs exactly where the retsirculating water does not go, which means that the cleaning solution does not go there either. You can't wish there was anything to be done to get it really cleaned up. It does not appeal to the device client if there is a magic button that is designed to do cleaning for you. If you have mold-looking residues or pipes, it is possible that Whirlpool has used tubes of plasticizers that support microbial growth, which I have seen in other contexts, and the growth is infused with plastic itself and never truly clean, although it is encapsulated in a way that this is not a real problem. The only way Clean these machines are hand-brush and disassembly, very labor intensive, and replacing pipes or other infected components. Lye's solution does better when cleaning mold or other organic residues, rather than the mineral resources that are best cleaned with acid. It's better to pretend it's not there and not look inside it. The retsirculating water itself tends to rinse everything clean that it touches. Mothballing: To switch off the machine for an extended period of time, first turn off the power. Close the water supply shut-off valve. Pull the plug out of the bottom of the reservoir to suck out the water and dry the rest of the machine according to comfort and leave the door open for at least a few days so that the inside dries out thoroughly. Otherwise, the bin inside is wet and warm and can be bouncing. If it has deteriorated, you may need to replace the rubber stopper of the container. To start working again, turn on the water supply, check that there are any leaks. This is a good time to remove the grid and reservoir trash, and acid to clean them manually if you are so inclined. Turn on the machine. It should cycle and start dropping ice cubes in 45 minutes or less. The first cycle or two worth of ice should be discarded when the ice has been collected during drying, which has been shot down. Shipping these ice machines: Someone wrote me a question: I have one of these items I'm going to sell on eBay. Would you tell me some good or bad experiences you might have had if you knew one of them? I replied as follows: I bought boxes (26 x 20 x 30, 275 lb test, double wall) to suit them. Each, I cut a plywood base panel that just fits inside the bottom of the box, and bolted down to a unit centered on that and hot glued to the plywood panel box. I also built gussets to match and strengthen the side and corners of the machine box, cutting more wavy cardboard and assembling more hot glue. Quite costly and time-consuming, but well done, I thought. I ship them on the ground using [a certain transmitter known as overnight air transport] the cheapest way. They completely lost one unit and admitted it. It took me hours and hours of stupid paperwork to pay for the insurance claim. It's hardly worth the recovery. They ruined the second unit, and I never learned how. It arrived untouched, but the refrigerant leaked and the oil was staining the box. The shipment was received by the consignee without any indication of the damage. The recipient then paid the equipment service to come out and diagnose the device and tried to obtain a claim for damages from [the carrier] for the repair assessment, but withdrew after submitting bureaucratic challenges. Most units arrived OK. But these two were nightmares. Maybe UPS or DHL would have done better than [carrier]. Or even LTL truck merchandise. So if you want Ship one, be ready to take the woodworking and craft project box it properly, and prepare yourself for disappointment despite at your best. The Scotsman: The Scotsman is a staid of the old American brand of ice machines. Their website contains a page where you can download instructions. Models start with CS are household units. The CSWE1 model appears to be a rebranded Whirlpool unit and a downloadable user manual (15-page PDF file) may be of interest to anyone on the Whirlpool machine. Do not know many other brands and models: If your unit has another make or model that does not resemble the Whirlpool made items shown in the parts of the charts above, then I do not have much advice for you other than the general principles above. Chinese manufacturers like Haier seem to be importing large quantities of residential ice machines at a price much less than Whirlpool ever charged (for example, a search for an iced home depot, although it seems to have disappeared sometime in 2008), but I have yet to check these models enough to have a conscious opinion of their quality. Disclaimer: I operate independently of the manufacturers and trademark owners mentioned above (Whirlpool, KitchenAid, etc.). I refer to these brands only to help you identify these machines, understand their different characteristics and technical principles, diagnose their problems, and inform you of the compatibility of my parts and services with other products. I have no business relations with these producers and I will not receive any compensation from them. Bene diagnoscitur, Bene curatur. -Latin proverb Translation: Good diagnosis, good repair. Do you have a comment or question about my ice-free repair? Do you have to thank me for saving your precious ice machine from a garbage heap? Send me: kinch@truetex.com Richard J. Kinch Back to the machine store page Back to homepage First edition: 2004 2004