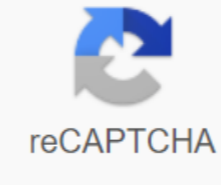




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Wiring diagram automotive pdf

Dan has been a licensed electrician at the travel level for about 17 years. He has extensive experience in most areas of electrical trade. Applications of 4-way switches 4-way switches are always wired in combination with two 3-way switches. This means that every time you find a 4-way switch, there will also be two 3-way switches that control the same lighting fixture. 4-way switches are used only if there are 3 or more light switches that control one lighting fixture. Additional lighting fixtures do not require additional switches, as long as they are designed for all that are turned on at the same time. Each such lighting circuit will include two 3-way switches and one or more 4-way switches (the number of 4-way switches that can be used in this switching configuration is unlimited). Since 3-way switches will always be present, you should understand how to connect a 3-way switch before trying to understand and use a 4-way switch. If you're doing more than just replacing a faulty 4-way switch, check the link on how to connect the 3-way switch before continuing; will open in a new window that will return the reader here when it is closed. If on the other hand you are simply replacing the 4-way switch on an existing circuit, the next section will take care of this simpler task. 4-Way SwitchBack side of the 4-way switch. There are 4 places to finish the wire, plus a green screw at the top of the switch for a green or bare ground wire. This switch has screws on the sides as well as holes on the back. Non-contact voltage detector from AmazonPresents 4-Way SwitchBe commating your task by turning off the power supply. Make sure the power is turned off before continuing. Turn on the light and turn off the switches, or remove the fuses one at a time until the light goes out. It's a good idea to apply a piece of tape to the circuit breaker holder; the other person, trying to turn the circuit back on to restore the lights in another room, will realize that there is a reason why it is turned off and does not turn it back when working on the track. Remove the two screws in the lid and set them aside with the cover. There are two more screws fixing the switch in place; unscrew them and set them aside. Use your ears at the top and bottom to gently pull the switch out of the electric box, taking care not to touch the wires on the sides. Good electrical safety practices dictate here that the voltmeter be used for double checking whether the circuit is actually switched off; use a non-contact voltage detector or voltmeter with one probe for each side terminal (one at a time), while the other is touched to a green ground bolt near one end of the switch. maybe you turned off the wrong switch, the light bulb could burn out when you were away in the switch panel or someone else could turn it on. Make sure that the circuit is before continuing or touching the bare wire. There are four wires that are terminated (attached to) a 4-way switch, plus a green or bare grounded wire. In almost any case, these wires will enter the wall box in 2 separate cables. These cables will probably contain at least one more cable, but these additional wires are simply connected in the wall box and do not end with a switch; there is no reason to disturb them at all unless you just want to check if the connections are hard. Remove the wires from their ends on the switch. If the wires are under the side screws, loosen the screws (they cannot be completely removed) and bend the wire from under the screw. If the wires are pushed into a small hole on the back of the switch, insert a small screwdriver or other tool into the slot next to them; this releases the spring tension and removes the wires from the hold. Occasionally they are frozen in place after years of use; if this happens, cut off the cable as close as possible to the switch and cut off about 1/2 of the insulation from the end of the cable for use with the new switch. Fold the wires that were on top of the switch up and out of the box, and the wires that were at the bottom down and out of the box. It will be a reminder of where to be completed on the new switch, but if you are concerned and can not tell where they are going, find where each wire comes from. Although there may be two multi-wire cables in the box that enter through the same hole in the electrical box, there are two wires in each cable that go to the switch. Two wires from one cable will end up with two screws (it does not matter which of the two upper screws is used for which wire) and two of the other cable will end up on the bottom two screws. The last wire will be green or, more often, completely bare insulation. This wire passes to the green screw at the end of the switch and it is a grounding wire. Modern electrical codes require this wire at each switch, but older houses may not have it; if it is missing in the box, just leave the green screw empty. Although it is quick and easy to simply push the wires into the new switch, and most electricians do this to save time, it is better to put them under the screws, because the springs in the holes will loosen over the years and make a weak connection. Using needle nose pliers or other tools, bend the bare end of the wire into a small circle, loosen the screws as far as they go, and work the wire under the head of the screw and around the screw clockwise (if placed backwards, the screw will tend to break the wire and may come from the screw). Firmly tighten the screw and repeat for each wire. End the grounding wire on the screw if there is a grounding wire in the box. Insert switch switch in the box, carefully folding the wires. Try to hold all the wires behind the switch, not next to it. Attach the switch with the two supplied screws, transform the cover with the same screws you saved carefully, and ready.3-Way and 4-Way Switch Wiring Diagrams3-way switch diagramSame, but with added 4-way switch. Wiring of the new 4-way switchNa the risk of re-use, make sure that the power is turned off before making any connections to the existing circuit. While some of the work will be done with wires that may not yet be carrying power, there must come a time when connections are made to what can be hot wires, be absolutely sure that the circuit is dead. For those readers who install a brand new circuit and are not familiar with physically getting the wire from one place to another, the article about adding an outlet contains valuable tips and instructions for the process. The process of dragging wire through walls, ceilings and attics is the same, whether for lights or sockets. The two above electrical diagrams have a 3-way switch configuration and the same basic configuration with a 4-way light switch. While the physical location of the 4-way switch can be anywhere, the electrical location of the switch is always between two 3-way switches. If additional 4-way switches are needed, they will also switch between 3-way switches. Electrically, 3-way switches are always the first and last in the switch line. If you do not know the 3-way switches, the link given at the top can be valuable and reading is suggested. While other methods of physically obtaining the necessary wires for each switch are possible (see article on three-way switch wires), the National Electrical Code of 2011, Article 404.2.C, has been amended to require a neutral (white) cable at any switching point, whether it is actually used or not. In general, the above scheme is most often used and is a good guide to wiring the new circuit of the 4-fold switch. When wiring in a 4-way switch, this is best described as simply cutting two travel wires (two wires that pass between two 3-way switches and end on each switch) and placing two wires from one switch on the top two terminals of the 4-way switch, placing the other two wires from the second switch on the two lower terminals. The first of the two diagrams comes directly from the article referenced above; the second is only the same extended diagram to allow you to add a 4-way switch to the center. Each of the diagrams in the switch article can be treated in the same way; just add a 4-way switch between the other two and finish the travel wires in the 4-way switch, making sure it's neutral in each box. Be careful here, some of these diagrams make it almost impossible to have a neutral cord in the box and have been included people working in older homes. The new job, as opposed to simply replacing the switch, must have a neutral cable in each distribution box. Any additional wires passing between the two switches (usually one more wire) are simply combined into a 4-way switch box to continue uninterrupted. Make sure that the green or bare grounded wire is always pigtailed and terminated on all switches. The diagram shown here uses a two-wire Romex cable (black and white wires) to power the first switch. From there, 3 wired cables (black, white and red) are used between the switches, and the final 2-wire cable goes from the last switch to the lighting fixture. As you can see, neutral from the power supply in the cable simply passes through each electrical box, connecting if necessary and ends up in a lighting fixture; thus, the NEC code is satisfied with the neutral in each field. After completing the wires on the individual switches, the first, 3-way, switch has a black power wire in terminated on the common terminal (the screw is slightly different color from the two travel screws) and two traveler wires (black and red with 3-wire cable) on the other two terminals. Plus, of course, the wire grounded; The grounded wires are pigtailed on each switch and terminated on the green screw grounding switch. White neutral wires from both cables are connected to the wire nut; insulation of the last 1/2 tape and turn on the wire nut. Tug tight on each wire, holding the nut in the other hand; if it's going to fall apart much better that it does it now rather than later, back in the box where you can't see it. The second (4-way) switch has two travel wires (black and red) with the first switch terminated into two upper terminals, and two wires (again black and red) from the final (3-way) switch completed at the bottom two terminals. Plus the ground. While neutral wire is again simply connected straight to the wire nut. The last (3-way) switch has two travelers with 4-way completed at travel terminals and a black leg switch with a lighting fixture on the common terminal. Finish the grounding wire and weave the neutral wires again without breaking them anywhere. The last word of caution: when purchasing switches, make sure that the switch strength is evaluated at least as much as the switch that turns off the power to the circuit you are working on. The 20 A switch can be used on a 15 A circuit, but never place the 15 A switch in a 20 A circuit; the current NEC code requires that each grounded. Similarly, each new wire used must correspond to the existing wire size. Circuit 20 A requires a 12-gauge cable (12-2 or 12-3), while a 15-A circuit can use a 14-gauge cable (14-2 or 14-3). 14-meter wire is easier to use and cheaper, cheaper, if you are connected to a 20 A circuit, you need to use a 12 gauge cable. This article is accurate and faithful to the best knowledge of the author. The Content is for informational or entertainment purposes only and does not replace personal advice or professional advice on business, financial, legal or technical matters. Questions & AnswersQuestion: I have three switch boxes connected to three wired cables in the middle box has a two-wire cable to the light. The power source is located in one of the terminal switch boxes. Do you and how do I connect the wires to this four-way switch? Answer: This is possible, although it will not meet the current code. Black power goes to the common first three-way with black and red will be travel terminals. White is intertwined for neutral (white) power supply with wire nut. Always make sure that the bases are connected to the braid to the switch. In the middle box, with a four-way switch, black and red from the first box goes to the two terminals with black and red, going to the third box to the other two terminals. White neutral is intertwined to white to light. In the third box, black and red are travelers with white will be common. It becomes a leg switch, hot when the light is on and should be colored something other than white. The other end of this white leg switch, in the center field, must be colored (magic marker, black tape, some way to indicate that it is not neutral) and weld in black going to light. The current code requires a neutral switch in each field and you won't have it in the third field, so it won't match the code in most locations. Question: I have a switch that has 2, 3-way and 1, 4-way switches. I want to install a clock in the wall, what should I do? Answer: Three-way clocks are available from Amazon or other suppliers. Many of them require a neutral conductor, so make sure it's available before you buy. Question: We have an overhead LED light bedroom that came out the other night. He flickered once after a few minutes and then he was again. Three switches in the bathroom right next to the bedroom also did not work when the light in the bedroom stopped working. We tried to install a new container for light switches and still nothing works. What can happen here? Answer: It may just be guessing that so far, but I suspect there is a poor connection from anywhere where the power comes from - probably another bedroom. Check for power anywhere on the switches. If not, open the lighting fixture boxes (you probably need to remove the fixtures) and check there. If you find power anywhere, try to figure out how it happens to the switches and make sure there are no bad connections. If you do not anywhere any power, it means that the switch is tumbled or lost in another room. Repeat the process for other switches or devices anywhere on this circuit.© circuit.© Dan HarmonCommentsDan Harmon (author) from Boise, Idaho on August 3, 2017: The only time I had LEDs light up without a switch on was to use it with an electronic dimmer. However, the wire installed next to another wire will give you some tension. Millivots are all I've ever seen, except for ballast fluorescent light, though. Don on August 3, 2017:I have 3 separate lights that are supplied from the same circuit. Two lights are switched using two three-way switches. One has three switches, two three roads & one four roads. Light with three switches & one other light switched to two three has low voltage @ light when the light is off, they have about 38 V present in the light. The last light in the circuit has a zero voltage @ light when it is off. I had an electrician here to investigate & said it's common to have voltage present when switches are off. Please note that one of the lights powered by two three-way switches has zero voltage @ light. He told me that light without voltage @ it with switch on is rare. We turned on all the LED lights & after dark the lights light up poorly with these two lights only. Where does the voltage come from? Dan Harmon (author) from Boise, Idaho on July 4, 2017:Sounds like you've lost your connection after adding new lights. Check all connections again and make sure something doesn't work out of the wire nut. If you want the switches to control the new lights, they should be tied to the same wires that were in the old light. Brian Eagan on June 30, 2017: Can y'all help me with a 4 way switch problem? I have a looped switch fixture with 3 switches after power supply first (old style I know) and I added 4 additional lighting fixtures off HOT and Neutral on the first device - and now only 2 of the 3 switches can control the lights - the third switch has absolutely no AC it will be at all - really a head scratcher for me - I checked all my connections - each of y'all have an idea for my problem? Dan Harmon (author) of Boise, Idaho on June 21, 2017: Look for loose connections, switched off circuit breakers and light bulbs burned out. Test with a meter that you have power on each switch, considering that the previous switches are on (test, flip switches and retest because there is no real enabled). And finally, check again if everything is properly connected - it's really easy to mis-wire somewhere in the set of 3 and 4-way switches. Andy on June 21, 2017: How do you do it and wired up exactly as stated and the switches still won't work any other suggestiondan Harmon (author) from Boise, Idaho on May 23, 2011:I never thought about it, but yes, the logic of a 4-different switching system would be a great way to start learning about control and logic circuits. Teresa Schultz from East London, South Africa on May 23, 2011:Confusing to me but it would come in handy to show my boys when they learned about electrical circuits and switches at school last year! Good info, and nicely explained. Explained.

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