

Target Range

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------|
| 1.3 | 31 | 38 | 46 | 54 | 62 | 69 | 77 | 85 | 92 | 100 | 108 | 115 | 123 | 131 | 138 | 146 | 154 | 162 | 169 | 177 | 185 | 192 | 200 | 208 | 85 mph |
| 1.2 | 33 | 42 | 50 | 58 | 67 | 75 | 83 | 92 | 100 | 108 | 117 | 125 | 133 | 142 | 150 | 158 | 167 | 175 | 183 | 192 | 200 | 208 | 217 | 225 | 75 mph |
| 1 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 65 mph |
| 0 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 26 | 28 | 31 | 34 | 37 | 40 | 43 | 47 | 51 | 55 | 60 | 65 | 71 | 78 | 86 | |
| 10 | 5 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 22 | 24 | 26 | 29 | 32 | 35 | 38 | 41 | 45 | 49 | 53 | 58 | 63 | 70 | 77 | 85 | |
| 20 | 4 | 5 | 7 | 9 | 11 | 13 | 15 | 18 | 20 | 22 | 25 | 27 | 30 | 33 | 36 | 39 | 43 | 47 | 51 | 56 | 62 | 68 | 75 | 83 | |
| 30 | 2 | 4 | 6 | 7 | 9 | 11 | 14 | 16 | 18 | 20 | 23 | 25 | 28 | 31 | 34 | 38 | 41 | 45 | 50 | 54 | 60 | 66 | 73 | 81 | |
| 40 | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 19 | 21 | 24 | 26 | 29 | 32 | 36 | 39 | 43 | 48 | 53 | 58 | 64 | 71 | 79 | |
| 50 | (2) | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 17 | 19 | 22 | 24 | 27 | 31 | 34 | 38 | 42 | 46 | 51 | 56 | 62 | 69 | 77 | |
| 60 | (4) | (2) | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 15 | 17 | 20 | 23 | 26 | 29 | 32 | 36 | 40 | 44 | 49 | 54 | 60 | 67 | 75 | |
| 70 | (6) | (4) | (2) | 0 | 2 | 4 | 6 | 8 | 11 | 13 | 15 | 18 | 21 | 24 | 27 | 30 | 34 | 38 | 42 | 47 | 52 | 59 | 65 | 74 | |
| 80 | (8) | (6) | (4) | (2) | 0 | 2 | 4 | 6 | 9 | 11 | 13 | 16 | 19 | 22 | 25 | 28 | 32 | 36 | 40 | 45 | 50 | 57 | 64 | 72 | |
| 90 | (10) | (8) | (6) | (4) | (2) | 0 | 2 | 4 | 7 | 9 | 11 | 14 | 17 | 20 | 23 | 26 | 30 | 34 | 38 | 43 | 48 | 55 | 61 | 70 | |
| 100 | (12) | (10) | (8) | (6) | (4) | (2) | 0 | 2 | 4 | 7 | 9 | 12 | 15 | 18 | 21 | 24 | 28 | 32 | 36 | 41 | 46 | 52 | 59 | 67 | |
| 110 | (14) | (12) | (10) | (8) | (6) | (4) | (2) | 0 | 2 | 5 | 7 | 10 | 12 | 15 | 18 | 22 | 26 | 29 | 34 | 39 | 44 | 50 | 57 | 65 | |
| 120 | (16) | (14) | (12) | (11) | (9) | (7) | (4) | (2) | 0 | 2 | 5 | 7 | 10 | 13 | 16 | 20 | 23 | 27 | 32 | 36 | 42 | 48 | 55 | 63 | |
| 130 | (19) | (17) | (15) | (13) | (11) | (9) | (7) | (5) | (2) | 0 | 2 | 5 | 8 | 11 | 14 | 17 | 21 | 25 | 29 | 34 | 40 | 46 | 53 | 61 | |
| 140 | (21) | (19) | (17) | (15) | (13) | (11) | (9) | (7) | (5) | (2) | 0 | 3 | 5 | 8 | 11 | 15 | 18 | 22 | 27 | 32 | 37 | 43 | 50 | 58 | |
| 150 | (24) | (22) | (20) | (18) | (16) | (14) | (12) | (10) | (7) | (5) | (3) | 0 | 3 | 6 | 9 | 12 | 16 | 20 | 24 | 29 | 34 | 41 | 48 | 56 | |
| 160 | (26) | (24) | (23) | (21) | (19) | (17) | (15) | (12) | (10) | (8) | (5) | (3) | 0 | 3 | 6 | 9 | 13 | 17 | 21 | 26 | 32 | 38 | 45 | 53 | |
| 170 | (29) | (27) | (26) | (24) | (22) | (20) | (18) | (15) | (13) | (11) | (8) | (6) | (3) | 0 | 3 | 7 | 10 | 14 | 19 | 23 | 29 | 35 | 42 | 50 | |
| 180 | (32) | (31) | (29) | (27) | (25) | (23) | (21) | (18) | (16) | (14) | (11) | (9) | (6) | (3) | 0 | 3 | 7 | 11 | 15 | 20 | 26 | 32 | 39 | 47 | |
| 190 | (36) | (34) | (32) | (30) | (28) | (26) | (24) | (22) | (20) | (17) | (15) | (12) | (9) | (7) | (3) | 0 | 4 | 8 | 12 | 17 | 22 | 28 | 35 | 43 | |
| 200 | (39) | (38) | (36) | (34) | (32) | (30) | (28) | (26) | (23) | (21) | (18) | (16) | (13) | (10) | (7) | (4) | 0 | 4 | 8 | 13 | 19 | 25 | 32 | 40 | |
| 210 | (43) | (42) | (40) | (38) | (36) | (34) | (32) | (29) | (27) | (25) | (22) | (20) | (17) | (14) | (11) | (8) | (4) | 0 | 4 | 9 | 15 | 21 | 28 | 36 | |
| 220 | (48) | (46) | (44) | (42) | (40) | (38) | (36) | (34) | (32) | (29) | (27) | (24) | (21) | (19) | (15) | (12) | (8) | (4) | 0 | 5 | 10 | 16 | 23 | 31 | |
| 230 | (53) | (51) | (49) | (47) | (45) | (43) | (41) | (39) | (36) | (34) | (32) | (29) | (26) | (23) | (20) | (17) | (13) | (9) | (5) | 0 | 5 | 12 | 19 | 27 | |
| 240 | (58) | (56) | (54) | (52) | (50) | (48) | (46) | (44) | (42) | (40) | (37) | (34) | (32) | (29) | (26) | (22) | (19) | (15) | (10) | (5) | 0 | 6 | 13 | 21 | |
| 250 | (64) | (62) | (60) | (59) | (57) | (55) | (52) | (50) | (48) | (46) | (43) | (41) | (38) | (35) | (32) | (28) | (25) | (21) | (16) | (12) | (6) | 0 | 7 | 15 | |
| 260 | (71) | (69) | (67) | (65) | (64) | (61) | (59) | (57) | (55) | (53) | (50) | (48) | (45) | (42) | (39) | (35) | (32) | (28) | (23) | (19) | (13) | (7) | 0 | 8 | |
| 270 | (79) | (77) | (75) | (74) | (72) | (70) | (67) | (65) | (63) | (61) | (58) | (56) | (53) | (50) | (47) | (43) | (40) | (36) | (31) | (27) | (21) | (15) | (8) | 0 | |

Current Range

Estimated minutes remaining

$$T = 44 \tan(R \cdot 1.1/270)$$

44.0 0.00

Tesla Model S - Supercharger Table

Using the Tesla Supercharger Network to Plan a Road Trip

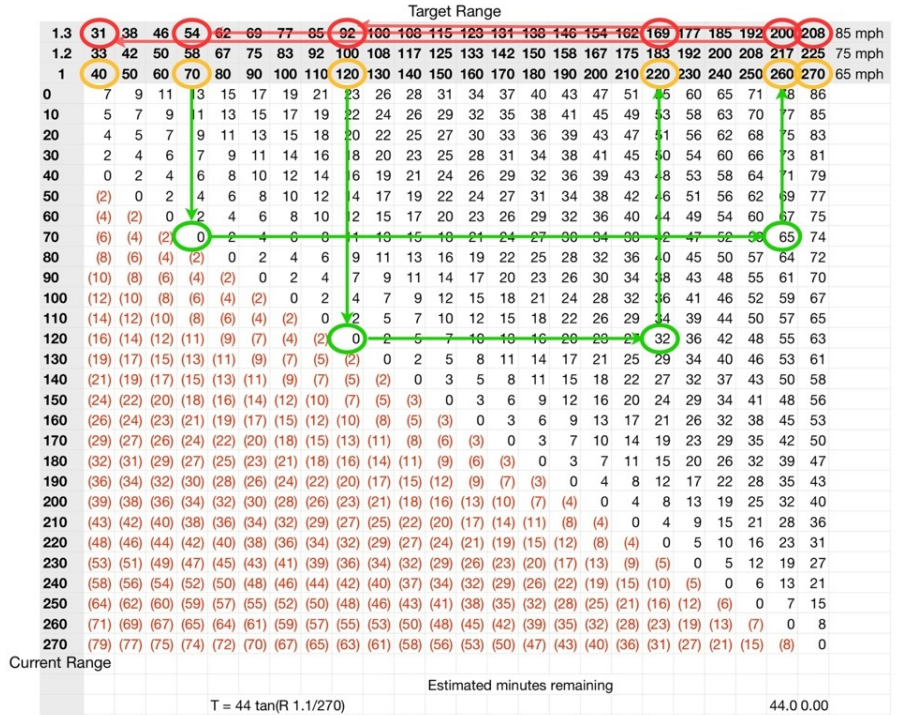
When using the Tesla Model S to drive beyond its range on a single charge, the Tesla Supercharger network is a must. However, without knowing how much time the Supercharger needs to charge a Model S, it is difficult to know if the trip is compatible with other needs, like bathroom breaks and lunch for the kids. This chart is meant to help fill in that missing information.

How To Use This Table

Sample Supercharger Table Usage

Let's say one is planning a road trip from Orange County to San Francisco. It's about 116 miles for the first leg to Tejon Ranch, then another 116 miles from Tejon to Harris Ranch, then 173 miles from Harris Ranch to San Francisco's east bay. Can we predict how much time we need at each Supercharger?

| Time | Event | Range Remaining | Distance this Leg |
|----------|---------------|-----------------|-------------------|
| 7:30 am | Depart Home | 270 | 0 |
| 9:26 am | Arrive Tejon | 120 | 116 |
| 9:58 am | Depart Tejon | 220 | 0 |
| 12:14 pm | Arrive Harris | 70 | 116 |
| 1:19 pm | Depart Harris | 260 | 0 |
| 4:12 pm | Arrive SFEB | 40 | 173 |



One leg of driving, represented by a red arrow on the table, is followed by a charging session, shown as a green arrow. Each driving/charging cycle forms a loop on this table, so a long road trip will execute multiple loops.

This example starts at maximum charge (270), starting with the yellow circle in the upper right of the table. Driving consumes the remaining range, but we estimate consumption with a factor of 1.3 (the equivalent of driving at 85 mph on flat instead of the 65 mph assumed in the EPA-rated range) as a substantial safety margin in case of traffic, hills, or wind. The horizontal "1.3" row makes it easy to find that the remaining range will be 120 in Tejon. Then charging begins, and 32 minutes is plenty to charge enough to reach Harris Ranch with 70 miles of range remaining. At Harris Ranch we take a leisurely 65-minute lunch to charge to 260 miles of range, enough to reach the SF east bay with 40 rated miles remaining (skipping Gilroy).

Once one "plays" with the table enough, one can begin to see it doesn't always make sense to charge to 100% while enroute because the Superchargers charge quite slowly near "full". So a short stop in Tejon is more than enough to get to Harris, where a one-hour+ lunch is ideal for comfortable family driving.

Your Mileage May Vary

This table was constructed by driving a discharged Performance 85 kWh Model S to the Hawthorne Supercharger (90 kW at the time), taking measurements every five minutes until it was full. After some curve-fitting (a Physics Ph.D. comes in handy), a formula was determined to generate this table, inspired by PADI diving tables, useful for predicting the charging rate of this Model S from one state of its battery to another.

This chart probably applicable only to the Performance 85 Model S. It would be interesting to perform the same experiment with the 85 and 60 kWh Model S and construct similar tables.