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# Computing Electrical Service Needs for Your Farm

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Electric service capacity refers to the size of conductors and main disconnect necessary to serve a given load. On farms, there is usually some type of central service from which individual buildings and other loads are supplied.

See the typical conductor sizing charts. They indicate conductor sizes necessary to limit voltage drop over long distances.

## Main Service

The main service is often on a pole centrally located for the various individual loads, but it may be on a building. The main service capacity depends on the size of the various loads to be served and the distances involved. Consult with your electricity power supplier when locating and sizing the main service or when you have questions about electrical service.

The National Electrical Code provides the following method for computing the size of the main service:

individual loads computed according to the National Electrical Code	percent of demand
largest load	100
second largest load	75
third largest load	65
remaining loads	50

To this total load, add the load of the farm dwelling unit computed according to the National Electrical Code.

## Residential Service

The size of the service panel, main disconnect, and service entrance conductors for the farm residence is affected mainly by the size and number of major appliances and the type of heating equipment.

A 100-ampere service will supply most existing homes having an electric range, water heater, clothes dryer, and other usual electrical equipment. When elec-

tric heat is used, the service needs to be larger, usually 200 amperes or more.

The National Electrical Code gives a method for computing service entrance capacity. The electric power supplier or an electrician should be consulted to determine the size to install in either new or remodeled homes. UMC Guide 1760, *Computing Electrical Service Needs for Your Home*, gives details for computing residential service capacity.

## Farm Buildings and Specific Loads

Each farm building or specific load such as a crop dryer needs individual consideration in determining capacity and service equipment features.

A chart (below) from the National Electrical Code for computing the load in a given situation takes into consideration the requirements for starting motors as well as whether equipment is likely to operate simultaneously.

method for computing farm loads (other than dwelling unit)	
ampere load at 230 volts	percent of demand
loads expected to operate at the same time (without diversity), but not less than 125 percent full-load current of the largest motor and not less than the first 60 amperes of load	100
next 60 amperes of all other loads	50
remainder of other loads	25

The Agricultural Wiring Handbook, published by the Food and Energy Council, Inc., gives wiring recommendations for many specific types of buildings. You may purchase the handbook from the Food and Energy Council, Inc., 909 University Avenue, Columbia, MO 65201.

# Conductor Sizing Charts

## Minimum Allowable Size of Conductor

## Copper up to 400 Amperes, 230-240 Volts, Single Phase, Based on 3% Voltage Drop

Load in Amps	Minimum Allowable Size of Conductor			Length of Run in Feet																				
	In Cable, Conduit, Earth		Overhead in Air*	Compare size shown below with size shown to left of double line. Use the larger size.																				
	Types R, T, TW	Types RH, RHW, THW	Bare & Covered Conductors	50	60	75	100	125	150	175	200	225	250	300	350	400	450	500	550	600	650	700	800	900
5	12	12	10	12	12	12	12	12	12	12	12	12	12	12	12	10	10	10	10	10	8	8	8	8
7	12	12	10	12	12	12	12	12	12	12	12	12	12	12	10	10	10	10	10	8	8	8	8	6
10	12	12	10	12	12	12	12	12	12	12	12	12	10	10	10	8	8	8	8	6	6	6	6	4
15	12	12	10	12	12	12	12	12	10	10	10	10	8	8	8	6	6	6	6	4	4	4	4	3
20	12	12	10	12	12	12	10	10	8	8	8	8	6	6	6	4	4	4	4	4	4	3	3	2
25	10	10	10	10	10	10	8	8	8	8	6	6	6	6	4	4	4	4	3	3	2	2	1	1
30	10	10	10	10	10	10	8	8	8	8	6	6	6	6	4	4	4	3	3	2	2	1	1	0
35	8	8	10	8	8	8	8	8	6	6	6	6	6	4	4	3	3	2	2	2	1	1	0	0
40	8	8	10	8	8	8	8	6	6	6	6	6	4	4	3	3	2	2	2	1	1	0	0	0
45	6	8	10	8	8	8	6	6	6	6	6	4	4	4	3	2	2	1	1	1	0	0	0	0
50	6	6	10	8	8	8	6	6	6	6	4	4	4	3	2	2	1	1	1	0	0	0	0	0
60	4	6	8	6	6	6	4	4	4	4	4	3	2	2	1	1	0	0	0	0	0	0	0	4/0
70	4	4	8	6	6	6	4	4	4	3	3	2	2	1	0	0	0	0	0	0	0	0	0	250
80	2	4	6	6	6	4	4	4	3	3	2	2	1	0	0	0	0	0	0	0	0	0	0	250
90	2	3	6	6	4	4	4	3	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	300
100	1	3	6	6	4	4	3	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	350
115	0	2	4	6	6	4	3	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	350
130	0	1	4	6	4	4	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	400
150	0	0	2	6	4	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	500
175	4/0	0	2	6	4	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	600
200	250	0	1	4	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	700
225	300	4/0	0	4	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	700
250	350	250	0	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	800
275	400	300	0	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	900
300	500	350	0	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1M
325	600	400	4/0	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1M
350	600	500	4/0	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1M
375	700	500	250	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1M
400	750	600	250	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1M

Conductors in overhead spans must be at least No. 10 for spans up to 50 feet and No. 8 for longer spans. See NEC, Sec. 225-6 (a). See Note 3 of NEC "Notes to Tables 310-16 through 310-19".

## Minimum Allowable Size of Conductor

## Aluminum up to 400 Amperes, 230-240 Volts, Single Phase, Based on 3% Voltage Drop

Load in Amps	Minimum Allowable Size of Conductor			Length of Run in Feet																				
	In Cable, Conduit, Earth		Overhead in Air*	Compare size shown below with size shown to left of double line. Use the larger size.																				
	Types R, T, TW	Types RH, RHW, THW	Bare & Covered Conductors Single Triplex	50	60	75	100	125	150	175	200	225	250	300	350	400	450	500	550	600	650	700	800	900
5	12	12	10	12	12	12	12	12	12	12	12	12	12	10	10	10	8	8	8	8	8	6	6	6
7	12	12	10	12	12	12	12	12	12	12	12	12	10	10	10	8	8	8	8	6	6	6	6	4
10	12	12	10	12	12	12	12	12	10	10	10	10	8	8	8	6	6	6	6	4	4	4	4	3
15	12	12	10	12	12	12	10	10	8	8	8	8	6	6	6	4	4	4	4	4	3	3	2	1
20	10	10	10	12	12	10	8	8	8	6	6	6	6	4	4	4	3	3	2	2	2	1	1	0
25	10	10	10	10	10	10	8	8	8	6	6	6	6	4	4	3	3	2	2	2	1	1	0	0
30	8	8	10	10	10	8	8	6	6	6	6	6	4	4	3	3	2	2	1	1	0	0	0	0
35	6	8	10	10	10	8	6	6	6	6	4	4	4	3	3	2	1	1	0	0	0	0	0	4/0
40	6	8	10	10	8	8	6	6	6	4	4	4	3	3	2	1	1	0	0	0	0	0	0	4/0
45	4	6	10	8	8	8	6	4	4	4	3	3	2	2	1	0	0	0	0	0	0	0	0	250
50	4	6	8	8	8	6	6	4	4	3	3	2	2	1	0	0	0	0	0	0	0	0	0	250
60	2	4	6	6	6	4	4	3	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0	300
70	2	2(a)	6	6	6	4	3	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	350
80	1	2(a)	6	6	6	4	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	400
90	0	2(a)	4	6	6	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	500
100	0	1(a)	4	6	4	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	500
115	0	0(a)	2	4	4	4	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	600
130	0	00(a)	2	4	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	700
150	4/0	000(a)	1	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	750
175	300	4/0(a)	0	3	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	900
200	350	250	0	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	900
225	400	300	0	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1M
250	500	350	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1M
275	600	500	4/0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1M
300	700	500	250	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1M
325	800	600	300	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1M
350	900	700	300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1M
375	1M	700	350	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1M
400		900	350	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1M

Conductors in overhead spans must be at least No. 10 for spans up to 50 feet and No. 8 for longer spans. See NEC, Sec. 225-6 (a). See Note 3 of NEC "Notes to Tables 310-16 through 310-19".

Charts are from the *Agricultural Wiring Handbook*, courtesy of the Food and Energy Council.

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