# UNDERGROUND SERVICE CABLES

| DRAWING NUMBER | SHT. | DRAWING TITLE | DWG REV. | BOM REV. |
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| **B-22-00** | **1 – 3** | **GENERAL INFORMATION** | **0** | **-** |
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| **B-22-05** | **1 – 2** | **SECONDARY CONDUCTOR SELECTION** | **B** | **-** |
| **B-22-10** | **1 – 1** | **SINGLE PHASE SECONDARY VOLTAGE DROPS AT 4% FOR RUD ONLY** | **A** | **-** |
| **B-22-11** | **1 – 1** | **SECONDARY M-302 CABLE AMPACITIES** | **0** | **-** |
| **B-22-15** | **1 – 3** | **OILFIELD SECONDARY MOTOR STARTS** | **0** | **-** |
| **B-22-16** | **1 – 1** | **VOLTAGE DROP (1%) CHART 240V SINGLE PHASE** | **0** | **-** |
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| **B-22-18** | **1 – 1** | **VOLTAGE DROP (1%) CHART 208V THREE PHASE** | **0** | **-** |
| **B-22-19** | **1 – 1** | **VOLTAGE DROP (1%) CHART 240V THREE PHASE** | **0** | **-** |
| **B-22-20** | **1 – 1** | **VOLTAGE DROP (1%) CHART 480V THREE PHASE** | **0** | **-** |
| **B-22-21** | **1 – 1** | **VOLTAGE DROP (1%) CHART 600V THREE PHASE** | **0** | **-** |

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| | | **2017-05-03** | |

DATE OF ISSUE: 2017/05/03 | DRAWING NO: **B-22-INDEX** | **SHEET 1 of 1** | REV. **G**

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# UNDERGROUND SERVICE CABLE

1. A VOLTAGE DROP TABLE AND VOLTAGE DROP CURVES ARE INCLUDED IN THIS SECTION FOR SERVICE VOLTAGES, SINGLE PHASE AND THREE PHASE. FOR THE MAXIMUM ALLOWABLE AMPACITY REFER TO DWG. B–22–11.

2. THE FOLLOWING ASSUMPTIONS HAVE BEEN USED FOR DEVELOPING THE VOLTAGE DROP CURVES FOR DWGS. B–22–16 TO B–22–21.

   A) FOR 2 X #4 CONDUCTOR ALL RETURN CURRENT IS IN THE NEUTRAL (2 X #4 IS ON DWG. B–22–16).

   B) LOAD POWER FACTOR FOR SINGLE PHASE AND THREE PHASE CIRCUITS IS 0.90.

   C) FOR SINGLE PHASE 3 WIRE CIRCUITS THE NEUTRAL RETURN CURRENT IS ZERO.

   D) FOR THREE PHASE 4 WIRE CIRCUITS ASSUME BALANCED LOAD (NO NEUTRAL RETURN).

   E) ALL VALUES ARE BASED ON THE TOTAL LOAD BEING AT THE END OF THE RUN.

   F) FOR 2 X #4 CONDUCTOR THE VOLTAGE DROP IS BASED ON LINE TO NEUTRAL (L–N) VOLTAGE OF 120V (DRAWING B–22–16).

   G) FOR ALL OTHER VOLTAGE SYSTEMS AND CONDUCTORS THE VOLTAGE DROP IS BASED ON THE LINE TO LINE (L–L) VOLTAGE.

   H) CURVES BASED ON CABLE IMPEDANCE AT 75 DEGREES C.

   I) THE CURVES ARE CALCULATED FOR 90% POWER FACTOR BUT MAY ALSO BE USED FOR 80% AND 100%. THE VALUES FOR 80% AND 100% POWER FACTOR WILL BE WITHIN 10% OF THE VALUES GIVEN IN THE CURVES.

3. ALL CURVES ARE BASED ON 1% VOLTAGE DROP. FOR VOLTAGE DROPS OTHER THAN 1%, WITH CORRESPONDING DISTANCES FOR A GIVEN CONDUCTOR AND CIRCUIT VOLTAGE, THE FOLLOWING RELATIONSHIPS CAN BE USED:

## FOR A FIXED LOAD

DISTANCE FOR NEW % VD = (DISTANCE FOR 1% VD) x (NEW % VD)

## FOR A FIXED DISTANCE

LOAD FOR NEW % VD = (LOAD FOR 1% VD) x (NEW % VD)

## EXAMPLES

EXAMPLE #1

120/240V 1ph 3W SERVICE USING 1/0 AL, 24kV.A LOAD.
WHAT MAXIMUM DISTANCE CAN THE RUN BE IF 3.5% VOLTAGE DROP IS ACCEPTABLE?

SOLUTION: USING DRAWING B–22–16 MOVE ALONG THE HORIZONTAL AXIS FINDING 100A (24kV.A). MOVE UP THE CURVE FOR THE 1/0 AL. READ TO THE LEFT TO FIND 18.5 METRES FOR 1% VD.

DISTANCE FOR 3.5% VD = (18.5M) x (3.5) = 65M

A 65 METRE RUN WOULD RESULT IN A 3.5% LINE TO LINE VOLTAGE DROP.

EXAMPLE #2

120/240V 1ph 3W SERVICE USING 1/0 AL, 25 METRES LONG.
WHAT MAXIMUM DISTANCE CAN THE RUN BE IF 3.5% VOLTAGE DROP IS ACCEPTABLE?

SOLUTION: USING DRAWING B–22–16 MOVE ALONG THE VERTICAL AXIS FINDING 25 METRES. MOVE HORIZONTALLY TO INTERCEPT THE CURVE FOR 1/0 AL. READ DOWN TO FIND 75A LOAD FOR 1% VD.

LOAD FOR 3.5% VD = (75A) x (3.5) = 263A

NOTE THAT 263A IS BEYOND THE CURRENT RATING OF 1/0 AL AS SHOWN BY THE VERTICAL LINE AT 235A. THEREFORE THE ANSWER IN THE THIS CASE IS 235A LIMITED BY THE THERMAL LIMIT, NOT VOLTAGE DROP.

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# VOLTAGE DROP TABLE FOR USC–75 UNDERGROUND CABLE

| | VOLTAGE DROP (VOLTS) PER 1000A.m | | | | | |
|---|---|---|---|---|---|---|
| | SINGLE PHASE LINE TO NEUTRAL OR LINE TO LINE | | | THREE PHASE LINE TO LINE | | |
| CABLE | 80% P.F. | 90% P.F. | 100% P.F. | 80% P.F. | 90% P.F. | 100% P.F. |
| #4 AL | 2.9584 | 3.2634 | 3.4946 | ---- | ---- | ---- |
| #2 AL | 1.8117 | 1.9846 | 2.0966 | 1.5780 | 1.7252 | 1.8157 |
| 1/0 AL | 1.1815 | 1.2785 | 1.3180 | 1.0322 | 1.1138 | 1.1414 |
| 4/0 AL | 0.6462 | 0.6794 | 0.6584 | 0.7982 | 0.5949 | 0.5702 |
| 350 AL | 0.4325 | 0.4415 | 0.3992 | 0.3847 | 0.3897 | 0.3457 |
| 500 AL | 0.3346 | 0.3325 | 0.2804 | 0.2988 | 0.2945 | 0.2428 |

SOURCE: CANADA WIRE AND CABLE

TO DETERMINE VOLTAGE DROP, TAKE THE CIRCUIT LENGTH (IN METRES), MULTIPLY IT BY THE EXPECTED MAXIMUM CURRENT (IN AMPERES), DIVIDE BY 1000, THEN MULTIPLY THIS BY THE APPROPRIATE FACTOR IN THE ABOVE TABLE. THE RESULT WILL BE THE EXPECTED VOLTAGE DROP (IN VOLTS). TO DETERMINE THE % VOLTAGE DROP, DIVIDE THE VOLTAGE DROP BY THE APPROPRIATE VOLTAGE. (SEE EXAMPLES)

THIS TABLE IS BASED ON ALUMINUM CONDUCTOR IMPEDANCES AT A TEMPERATURE OF 75 DEG. C.

EXAMPLES

1. 120/240V RESIDENTIAL SERVICE, 100 AMP MAIN, 50M OF 1/0 AL 1 PH
   WHAT IS THE % VOLTAGE DROP FOR 240V?

   ASSUME 90% P.F. FOR RESIDENTIAL SERVICES. THEREFORE 100 x 50/1000 = 5.0
   FROM THE TABLE FOR SINGLE PHASE 1/0 AL 90% P.F., THE FACTOR IS 1.2785.
   THE VOLTAGE DROP = 5.0 x 1.2785 = 6.4 VOLTS. THE PERCENT VOLTAGE DROP
   = 6.4V/240V = 2.7%

2. 347/600V THREE PHASE COMMERCIAL SERVICE, EXPECTED PEAK CURRENT 300 AMP,
   80% P.F., BALANCED LOAD, 75M OF 500 KCMIL AL 3PH. WHAT IS % VOLTAGE DROP
   FOR 600V?

   300 x 75/1000 = 22.5. FROM TABLE FOR THREE PHASE 500 KCMIL AL 80% P.F.
   THE FACTOR IS 0.2988. THE VOLTAGE DROP = 22.5 x 0.2988 = 6.7 VOLTS (LINE TO LINE).
   THE PERCENTAGE VOLTAGE DROP = 6.7V/600V = 1.1%.

3. 347/600 V THREE PHASE TRANSFORMER SUPPLYING A 347 V SINGLE PHASE (LINE TO NEUTRAL)
   LOAD, EXPECTED CURRENT 200 AMP AT 100% P.F., 200M OF 350KCMIL AL 1PH.
   WHAT IS % VOLTAGE DROP?

   200 x 200/1000 = 40. FROM THE TABLE FOR SINGLE PHASE 350 KCMIL AL AT 100% P.F.,
   THE FACTOR IS 0.3992. THE VOLTAGE DROP IS 40 x 0.3992 = 16 VOLTS (LINE TO NEUTRAL).
   THE PERCENTAGE VOLTAGE DROP IS 6.7V/347V = 4.6%

# MAXIMUM UNDERGROUND SERVICE DISTANCE

**SINGLE PHASE SERVICE**

| ENTRANCE SIZE | WIRE SIZE | AMPACITY (A) | 120/240V (m) | 240/480V (m) |
|---|---|---|---|---|
| 100A | #2 AL | 150 | 60 | 121 |
| | 1/0 AL | 200 | 94 | 188 |
| | 4/0 AL | 305 | 177 | 353 |
| | 350 MCM * | 420 | 272 | 543 |
| | 500 MCM * | 520 | 361 | 722 |
| 200A | 1/0 AL | 200 | 47 | 94 |
| | 4/0 AL | 305 | 88 | 176 |
| | 350 MCM * | 420 | 136 | 271 |
| | 500 MCM * | 520 | 181 | 361 |
| 400A | 350 MCM | 420 | 68 | 136 |
| | 2 x 4/0 AL | 488 | 88 | 176 |
| | 500 MCM | 520 | 90 | 180 |
| 600A | 2 x 350 MCM | 672 | 91 | 181 |
| | 2 x 500 MCM | 832 | 120 | 241 |
| 800A | 2 x 500 MCM | 832 | 90 | 180 |
| | 3 x 500 MCM | 1092 | 135 | 271 |

**THREE PHASE SERVICE**

| ENTRANCE SIZE | WIRE SIZE | AMPACITY (A) | 120/208V (m) | 277/480V (m) | 347/600V (m) |
|---|---|---|---|---|---|
| 100A | #2 AL | 135 | 60 | 139 | 174 |
| | 1/0 AL | 180 | 96 | 216 | 269 |
| | 4/0 AL | 265 | 175 | 403 | 504 |
| | 350 MCM | 365 | 267 | 616 | 770 |
| | 500 MCM | 445 | 353 | 815 | 1019 |
| 200A | 4/0 AL | 265 | 87 | 202 | 252 |
| | 350 MCM | 365 | 133 | 308 | 385 |
| | 500 MCM | 445 | 177 | 408 | 509 |
| 400A | 500 MCM | 445 | 88 | 204 | 255 |
| 600A | 2 x 350 MCM | 584 | 89 | 205 | 257 |
| | 2 x 500 MCM | 712 | 118 | 272 | 340 |
| 800A | 3 x 500 MCM | 935 | 132 | 306 | 382 |
| 640A (SEE NOTE 3) | 2 x 500 MCM | 712 | 110 | 255 | 318 |

BOTH TABLES BASED ON:
5% VOLTAGE DROP, 75°C MAXIMUM CONDUCTOR TEMPERATURE, CABLES TOUCHING, BALANCED LOAD, DEPTH OF BURIAL 0.6m, SOIL THERMAL RESISTIVITY 90°C-cm/W. DIRECT BURIED, 100% LF (LOAD FACTOR) BASED ON 8 TO 24 HOUR CONTINUOUS LOAD, 90% POWER FACTOR, ENTRANCE LOADED TO 100% OF RATED ENTRANCE SIZE. SERVICE DISTANCE IS FROM TRANSFORMER TERMINALS TO CUSTOMER CONNECTION POINT.

NOTE:

1. *- REQUIRES A LARGER SPLITTER ON CUSTOMERS ENTRANCE.
2. FOR OIL FIELD INSTALLATIONS, OR OTHER CABLE COMBINATIONS, CONTACT DISTRIBUTION ENGINEERING.
3. WHERE CABLE AMPACITY IS LESS THAN THE ENTRANCE SIZE, THE BREAKER SHALL BE SIZED AT OR BELOW THE ALLOWABLE CABLE AMPACITY TO AVOID DAMAGING THE CABLES. (FOR EXAMPLE: AN 800A SERVICE ENTRANCE WITH AN 80% RATED BREAKER HAS A TRIP SETTING OF 640A. IN THIS SCENARIO, 2 RUNS OF 500MCM MAY BE CHOSEN.)
   FOR EASE OF CALCULATIONS, THE ENTRANCE SIZE AMPACITY IS USED TO DETERMINE THE MINIMUM CONDUCTOR SIZE AND MAXIMUM RUN LENGTHS IN THE TABLES, WHICH WOULD BE WORST CASE. WHERE POSSIBLE, THE CONDUCTOR SIZES LISTED IN THE TABLES SHALL BE USED.
4. FOR CABLE AMPACITIES IN DUCT, REFER TO B-22-11.

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# UNDERGROUND SECONDARY CONDUCTOR SELECTION

| DESCRIPTION | CODE NUMBER |
|---|---|
| **600V SERVICE ENTRANCE CONCENTRIC NEUTRAL OVERALL JACKET** | |
| 1 x #8 Cu – 1 x #8 Cu NEUTRAL | 2–92–78 |
| 2 x #2 Cu – 1 x #4 Cu NEUTRAL | 2–92–86 |
| 2 x 1/0 AL – 1 x #4 Cu NEUTRAL | 2–92–87 |
| 2 x 1/0 Cu – 1 x #4 Cu NEUTRAL | 2–92–93 |
| **600V TWU SINGLE CONDUCTOR** | |
| #6 CU | 2–95–XX |
| #4 CU | 2–95–XX |
| #2 CU | 2–95–XX |
| 1/0 CU | 2–96–XX |
| 3/0 CU | 2–96–39 |
| 4/0 CU | 2–96–41 |
| **600V SINGLE CONDUCTOR WITH PVC JACKET** | |
| 350 kcmil AL (USE WITH 2–96–46 FOR 3Ø) | 2–93–35 |
| 500 kcmil AL (USE WITH 2–96–48 FOR 3Ø) | 2–93–50 |
| **600V TRIPLEX CABLE** | |
| 2 x 4/0 AL – 1 x 2/0 AL | 2–96–44 |
| 2 x 350 kcmil AL – 1 x 3/0 AL | 2–96–46 |
| 2 x 500 kcmil AL – 1 x 4/0 AL | 2–96–48 |
| **1000 V XLPE Cu CONCENTRIC NEUTRAL PVC JACKET** | |
| 3 x 1/0 AL | 2–92–79 |
| 2 x 3/0 AL | 2–92–80 |
| 3 x 3/0 AL | 2–92–81 |
| 2 x 500 kcmil AL | 2–92–82 |
| 3 x 500 kcmil AL | 2–92–83 |

FOR SPLICING SEE B–36–XX

FOR AMPACITY SEE C–26–04

FOR MAINTENANCE ONLY

SCALE: N.T.S. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED

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# SECONDARY USC–75 CONDUCTOR SELECTION

ALL SECONDARY CONDUCTORS NOW IN USE ARE TO BE ELECTRIC UTILITY GRADE USC–75 CABLES WHICH ARE 600 VOLT, COMPACT ALUMINUM CONDUCTORS, RATED 75 DEGREE C, WITH FULL SIZE NEUTRALS.

INSULATION IS POLYETHYLENE (PE), CROSS–LINKED PLOYETHYLENE (XLPE), OR ETHYLENE RUBBER (EP), WITH A JACKET OF POLYVINYL CHLORIDE (PVC) OVER EACH INDIVIDUALLY INSULATED CONDUCTOR.

THE JACKETS ARE COLOURED WHITE, BLACK, RED, AND BLUE IN THIS SEQUENCE DEPENDING WHETHER IT IS A 2, 3, OR 4 CONDUCTOR CABLE ASSEMBLY.

| APPLICATION | DESCRIPTION | CODE |
|---|---|---|
| | | |
| STREET LIGHTS | 2 x #4 | 2–94–51 |
| | | |
| RESIDENTIAL & FARM SERVICES | 3 x 1/0 | 2–94–64 |
| | 3 x 4/0 | 2–94–66 |
| | | |
| OILFIELD SERVICES | 3 x #2 | 2–94–62 |
| | 3 x 1/0 | 2–94–64 |
| | 3 x 4/0 | 2–94–66 |
| | 4 x #2 | 2–94–82 |
| | 4 x 1/0 | 2–94–84 |
| | 4 x 4/0 | 2–94–86 |
| | | |
| DISTRIBUTION (INCLUDES GENERAL & LONG SERVICES) | 3 x 4/0 | 2–94–66 |
| | 3 x 350 kcmil | 2–94–67 |
| | 3 x 500 kcmil | 2–94–68 |
| | 4 x 4/0 | 2–94–86 |
| | 4 x 350 kcmil | 2–94–87 |
| | 4 x 500 kcmil | 2–94–88 |

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| DATE OF ISSUE | | | DRAWING NO. B–22–05 SHEET 2 of 2 | REV. B |

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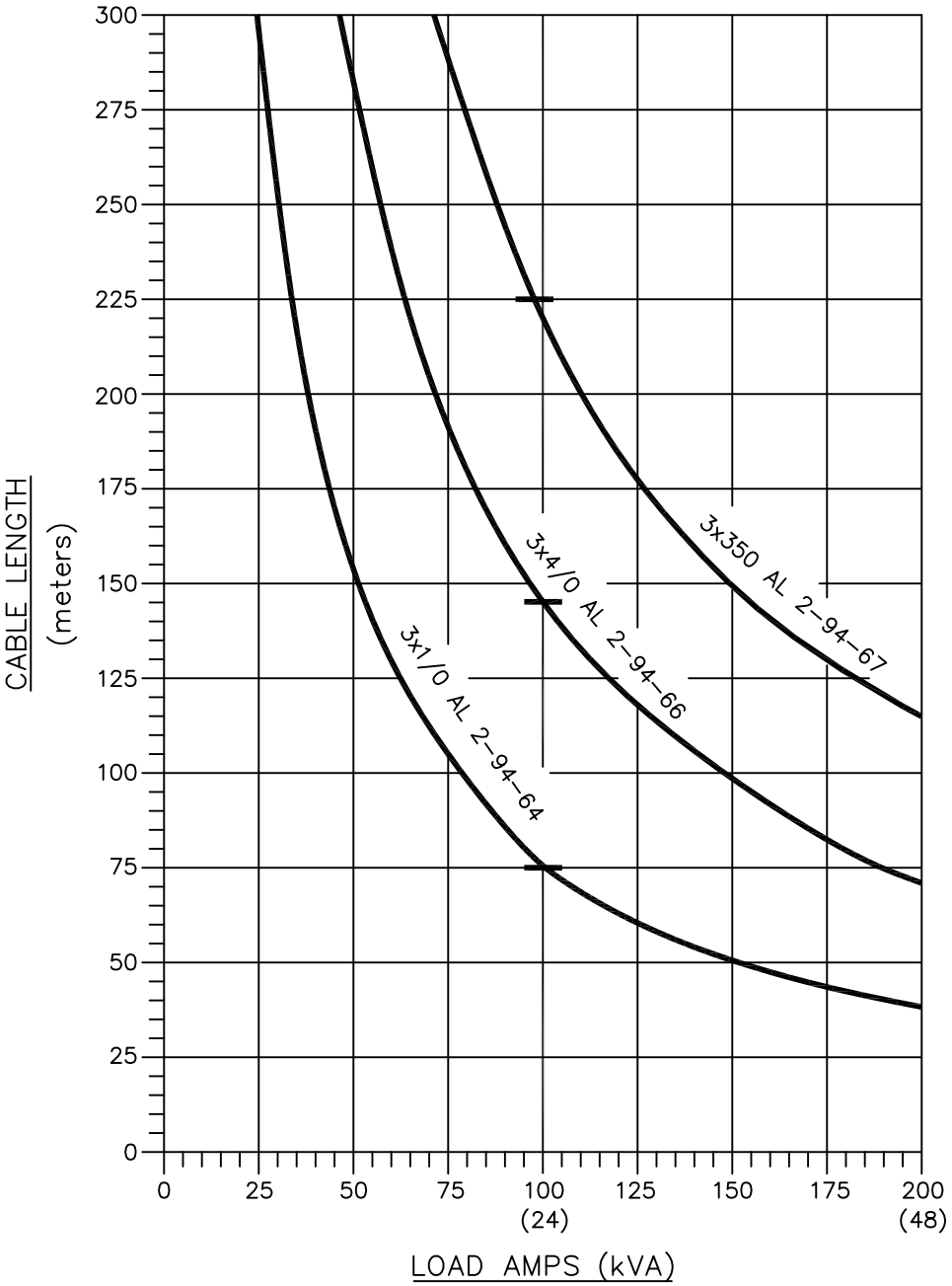
# MAXIMUM SECONDARY CABLE LENGTHS

PARAMETERS USED:
VOLTAGE DROP 4.0%
POWER FACTOR .90
240 V BASE
CONDUCTOR OPERATING TEMPERATURE 75°C

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| DRN. G. MAIER | DESIGN CHK. | SAFETY APP. | APPROVAL | SINGLE PHASE SECONDARY VOLTAGE DROPS AT 4.0% FOR RUD ONLY |
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# SECONDARY M-302 CABLE AMPACITIES

| CONDUCTOR CODE | DESCRIPTION | DIRECT BURIED** (10°C Ambient) | | DUCT BURIED** (10°C Ambient) | |
|---|---|---|---|---|---|
| | | Residential 75% LF Amps | Commercial 100% LF Amps | Residential 75% LF Amps | Commercial 100% LF Amps |
| **2-94-51** | **2 x #4** | **--** | **145** | **--** | **--** |
| **2-94-62** | **3 x #2** | **175** | **150** | **140** | **130** |
| **2-94-64** | **3 x 1/0** | **235** | **200** | **185** | **175** |
| **2-94-66** | **3 x 4/0** | **360** | **305** | **285** | **270** |
| **2-94-67** | **3 x 350** | **510** | **420** | **415** | **380** |
| **2-94-68** | **3 x 500** | **640** | **520** | **500** | **435** |
| **2-94-82** | **4 x #2** | **160** | **135** | **110** | **105** |
| **2-94-84** | **4 x 1/0** | **210** | **180** | **150** | **145** |
| **2-94-86** | **4 x 4/0** | **320** | **265** | **230** | **220** |
| **2-94-87** | **4 x 350** | **450** | **365** | **335** | **315** |
| **2-94-88** | **4 x 500** | **555** | **445** | **440** | **410** |

| CONDUCTOR CODE | DESCRIPTION | DUCT IN AIR (30°C Ambient) | | DUCT IN AIR*** (40°C Ambient) | |
|---|---|---|---|---|---|
| | | | Commercial 100% LF Amps | | Commercial 100% LF Amps |
| **2-94-51** | **2 x #4** | | **--** | | **--** |
| **2-94-62** | **3 x #2** | | **110** | | **95** |
| **2-94-64** | **3 x 1/0** | | **145** | | **130** |
| **2-94-66** | **3 x 4/0** | | **225** | | **200** |
| **2-94-67** | **3 x 350** | | **320** | | **280** |
| **2-94-68** | **3 x 500** | | **405** | | **355** |
| **2-94-82** | **4 x #2** | | **85** | | **75** |
| **2-94-84** | **4 x 1/0** | | **115*** | | **100*** |
| **2-94-86** | **4 x 4/0** | | **175*** | | **155*** |
| **2-94-87** | **4 x 350** | | **255*** | | **225*** |
| **2-94-88** | **4 x 500** | | **320*** | | **280*** |

**BASED ON:** **75°C max. conductor temperature, cables touching, balanced load; one conductor / phase; Depth of burial is 0.6m; soil thermal resistivity is 90°C-cm/w; FRE ducts 5" Dia.; 75% LF (Load Factor) based on typical residential load; 100% LF based on 8 to 24 hour continuous load.**

**NOTE: *** **These ampacities are based on 1 conductor / phase. For two conductors / phase, reduce ampacity to 80%. For 3 conductors / phase, reduce ampacity to 70%. Maximum number of cables for 5" duct is 2 conductors / phase for 500 kcmil & 3 conductors / phase for 350 kcmil.**

**NOTE: ** ** **For residential services, the portion of service located in duct in air on the riser pole and at the service entrance can be ignored because:**

**a) The actual air temperature during winter peak will be much less than +10°C (about -20°C), which will cool the cables in air more than cables underground.**

**b) The summer peak loads are typically only 70% of winter peak, and the ratings for the cables in duct in air are normally 70-75% of the direct buried rating.**

**NOTE: *** ** **The 40°C ambient should only be used for installations where it is expected that the ambient temperature will exceed 30°C for extended periods of time.**

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| DATE OF ISSUE: **93-01-01** | DRAWING NO: B-22-11 | SHEET 1 of 1 | REV. **0** |
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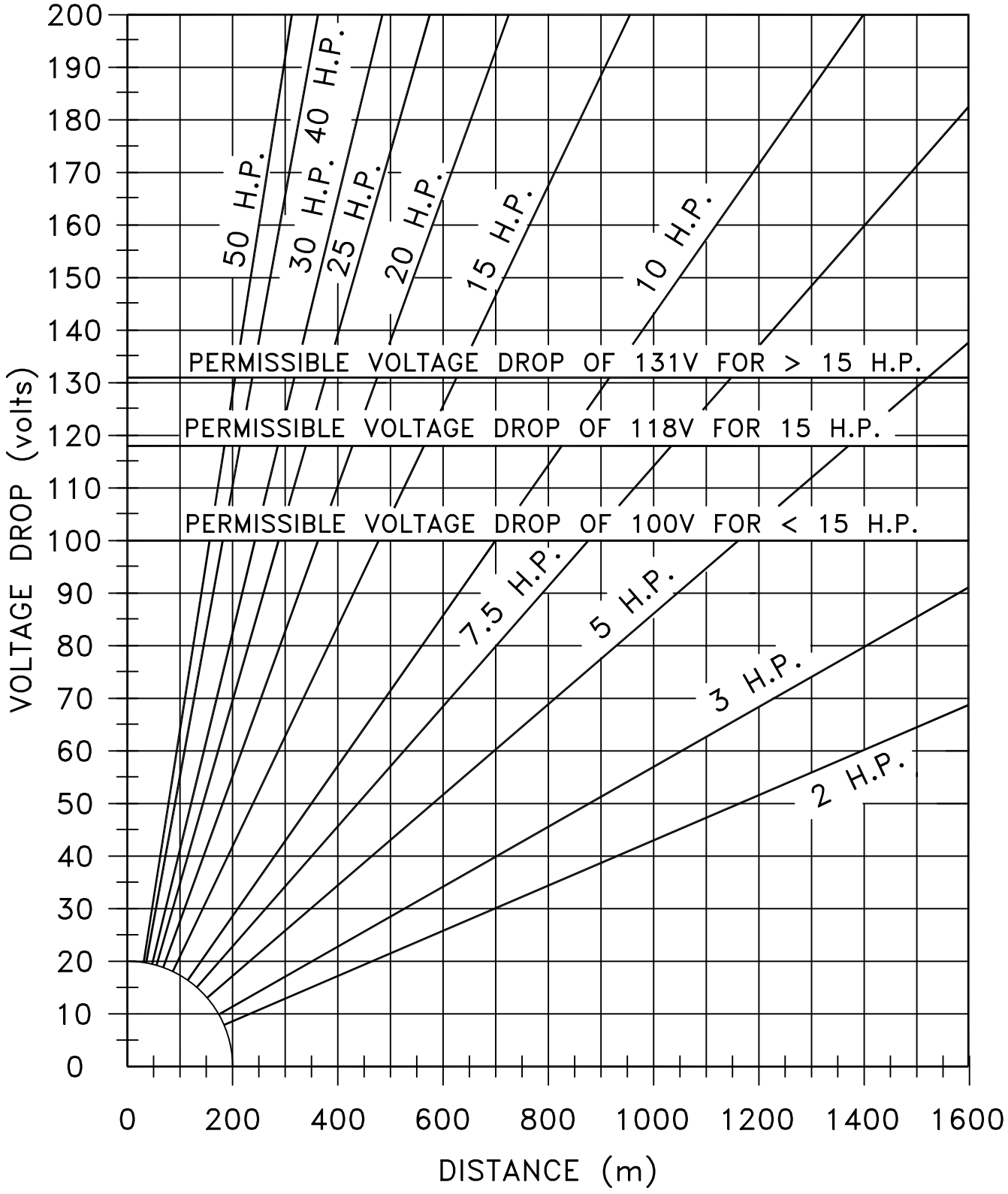
# THREE PHASE MOTOR STARTS WITH 3 X #2 AL (USEI–90)

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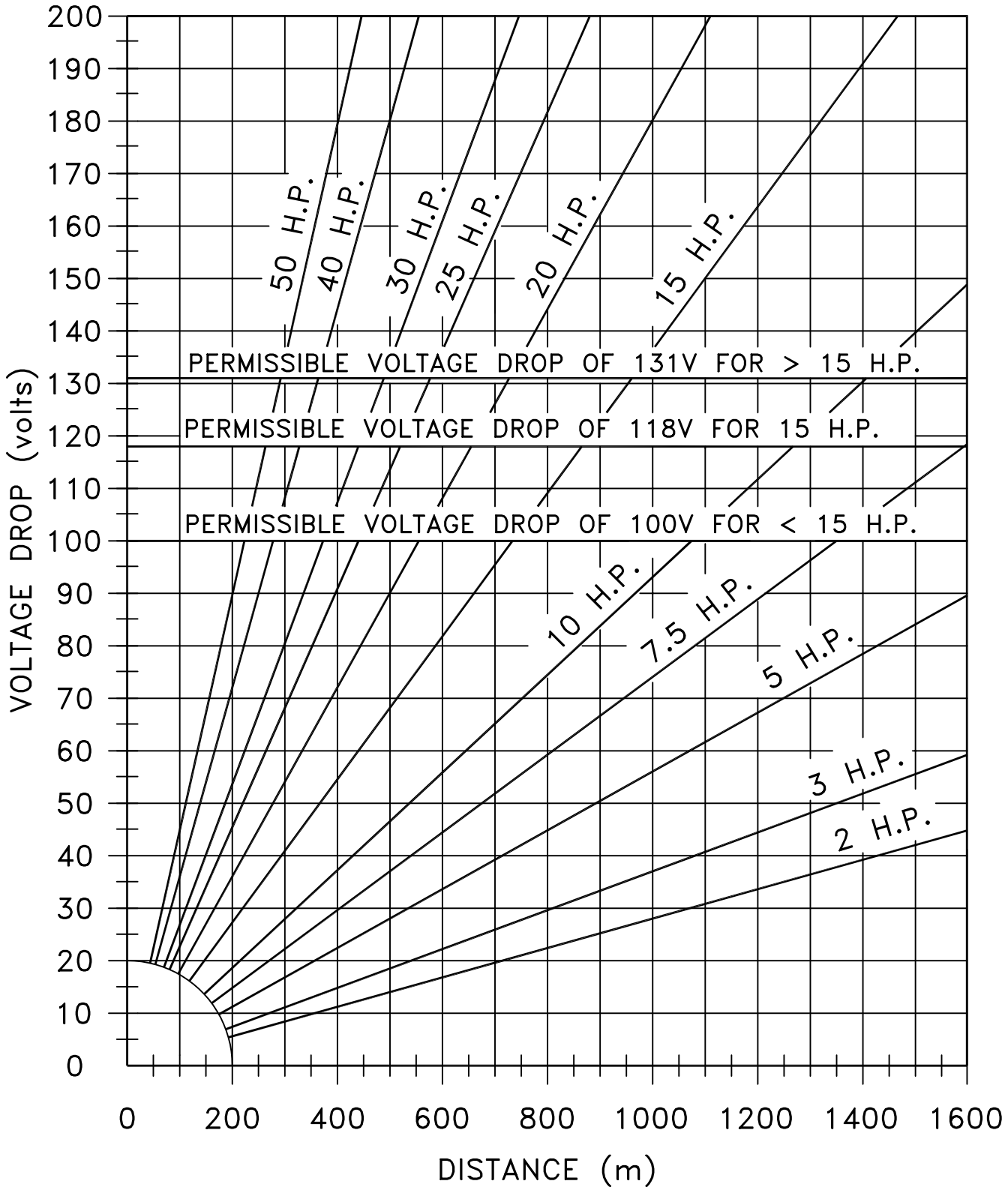
| DATE OF ISSUE | | DRAWING NO. B–22–15 | SHEET 1 OF 3 | REV. 0 |

# THREE PHASE MOTOR STARTS WITH 3 X 1/0 AL (USEI-90)

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| DATE OF ISSUE | | DRAWING NO. B-22-15 | SHEET 2 OF 3 | REV. 0 |

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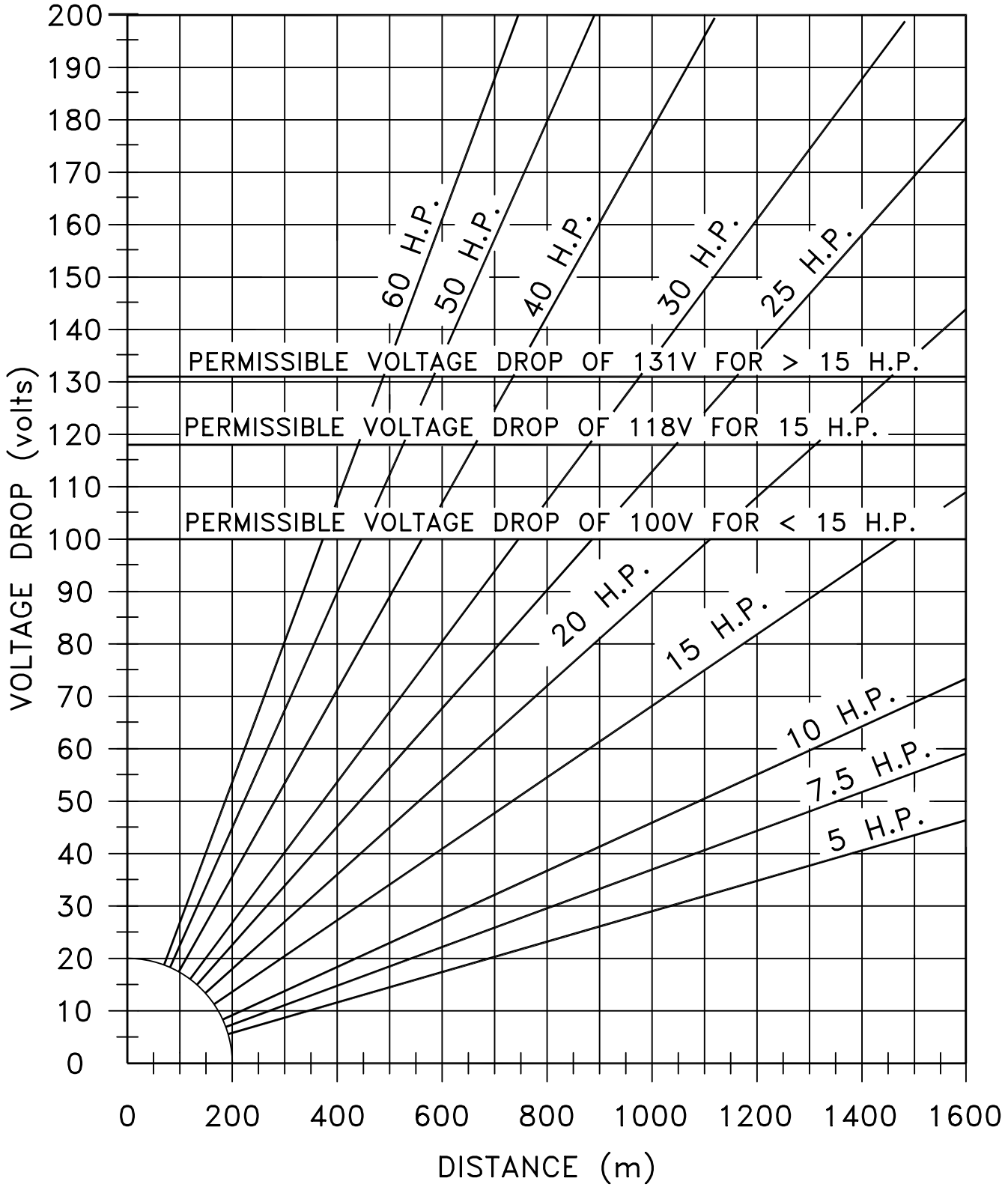
# THREE PHASE MOTOR STARTS WITH 3 X 4/0 AL (USEI–90)

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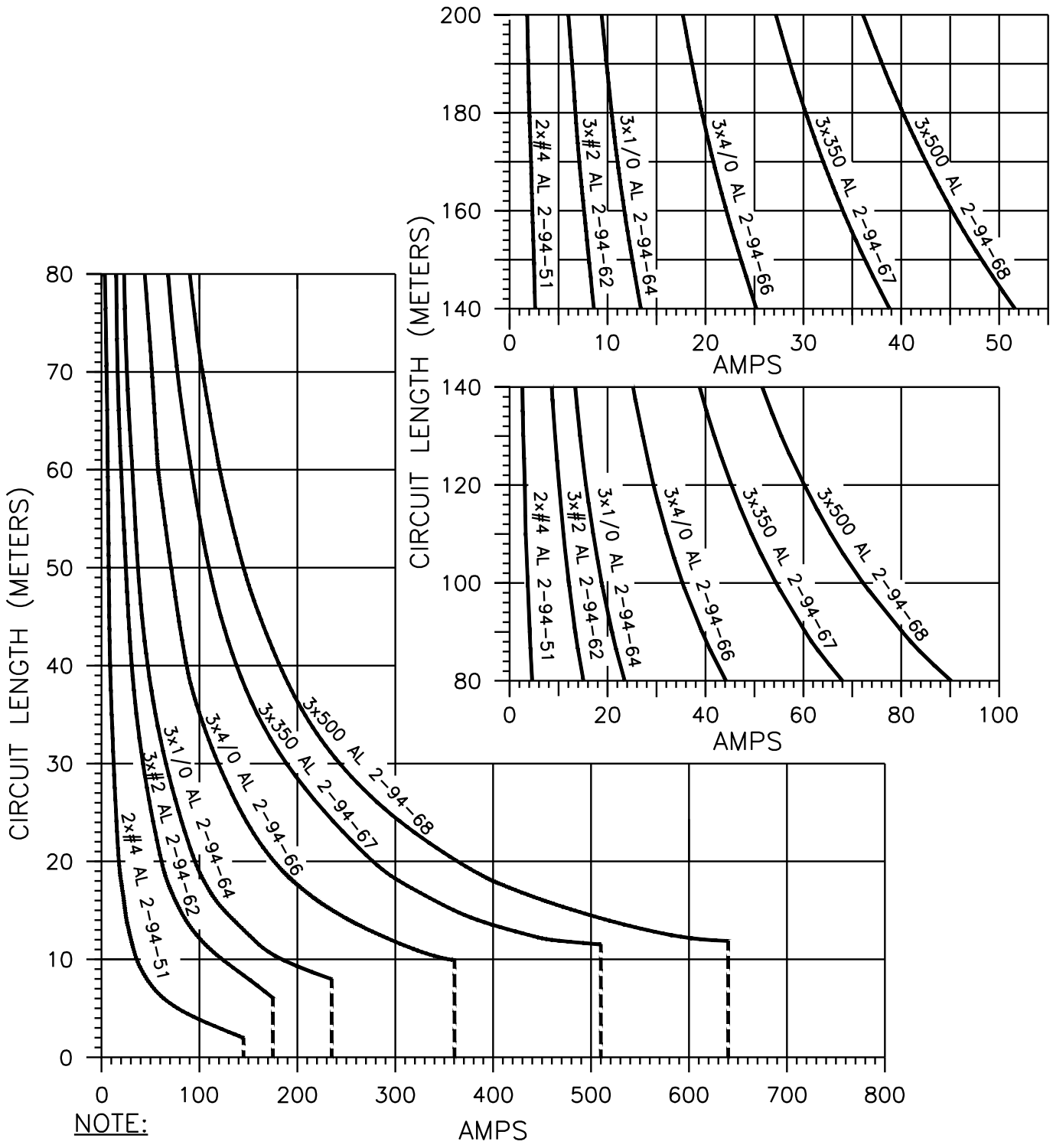


NOTE:

1. CURVES ARE FOR 120/240 1ø 3W CIRCUITS BASED ON 1% VOLTAGE DROP ON 240V BASE EXCEPT FOR #4 AL WHICH IS BASED ON 1% DROP ON 120V BASE.
2. MAXIMUM ALLOWABLE AMPACITY IS INDICATED BY THE VERTICAL DASHED LINE AND IS BASED ON 10°C EARTH AMBIENT, DIRECT BURIED, 75°C CONDUCTOR TEMPERATURE, AND 75% LOAD FACTOR. FOR DIFFERENT INSTALLATIONS, REFER TO DWG. C-26-04.13 TO OBTAIN THE APPROPRIATE MAXIMUM AMPACITY.
3. CURVES ARE CALCULATED FOR 90% P.F. BUT MAY ALSO BE USED FOR 80% P.F. AND 100% P.F.
4. SEE DWG. B-22-00 FOR EXAMPLES.

SCALE: N.T.S. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED

| SaskPower – DISTRIBUTION STANDARDS | | | |
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| APPROVAL<br>M. ERETH | DESIGN CHK.<br>A. UHREN | DRN. DC<br>CHKD. | VOLTAGE DROP (1ø) CHART<br>240V SINGLE PHASE |
| | | 2013-02-11 | |
| DATE OF ISSUE | | DRAWING NO. B-22-16 SHEET 1 of 1 | REV. 0 |

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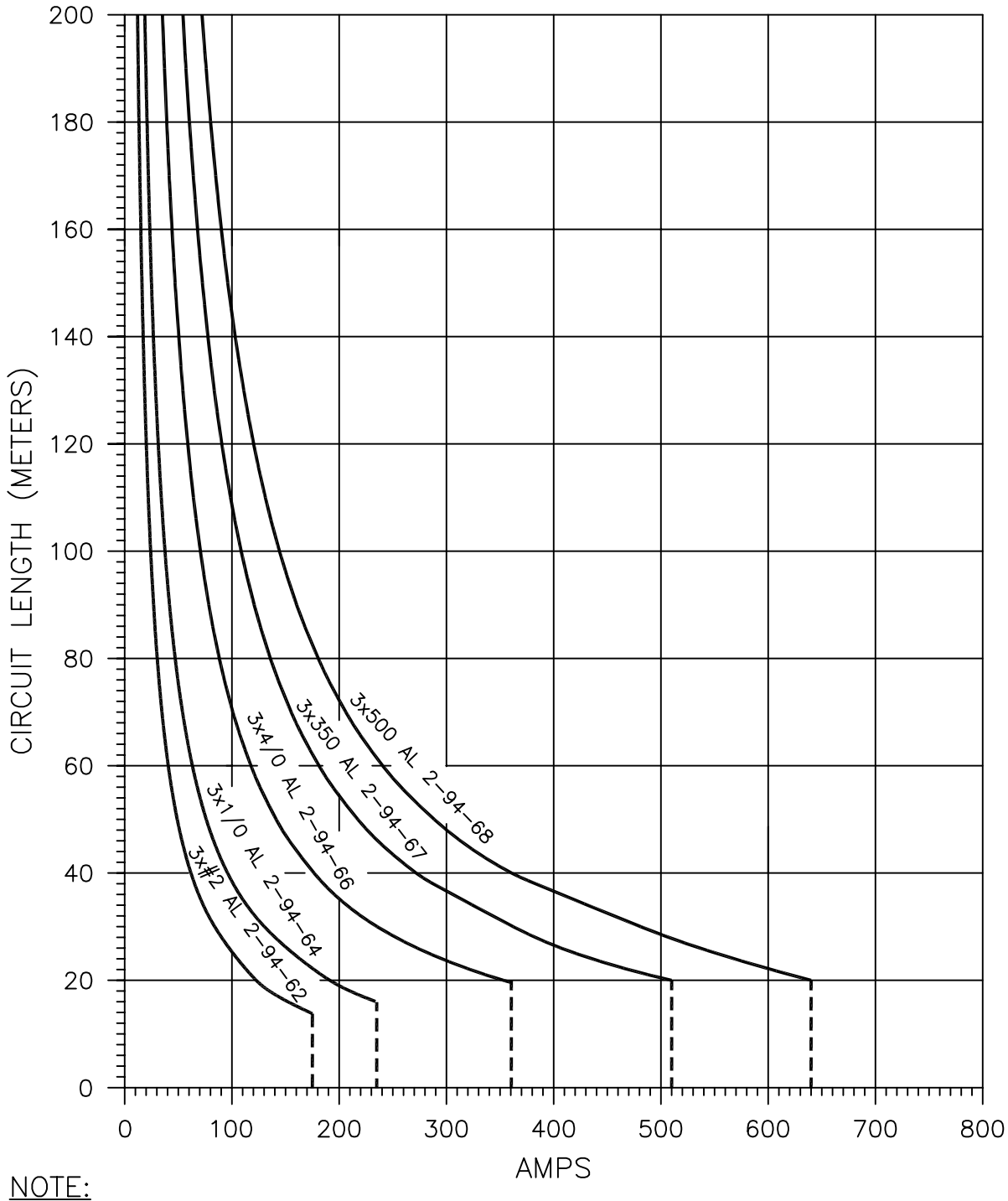


NOTE:

1. CURVES ARE FOR 480 1ø 3W CIRCUITS BASED ON 1% VOLTAGE DROP ON 480V BASE.
2. MAXIMUM ALLOWABLE AMPACITY IS INDICATED BY THE VERTICAL DASHED LINE AND IS BASED ON 10°C EARTH AMBIENT, DIRECT BURIED, 75°C CONDUCTOR TEMPERATURE, AND 75% LOAD FACTOR. FOR DIFFERENT INSTALLATIONS, REFER TO DWG. C-26-04.13 TO OBTAIN THE APPROPRIATE MAXIMUM AMPACITY.
3. CURVES ARE CALCULATED FOR 90% P.F. BUT MAY ALSO BE USED FOR 80% P.F. AND 100% P.F.
4. SEE DWG. B-22-00 FOR EXAMPLES.

SCALE: N.T.S. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED

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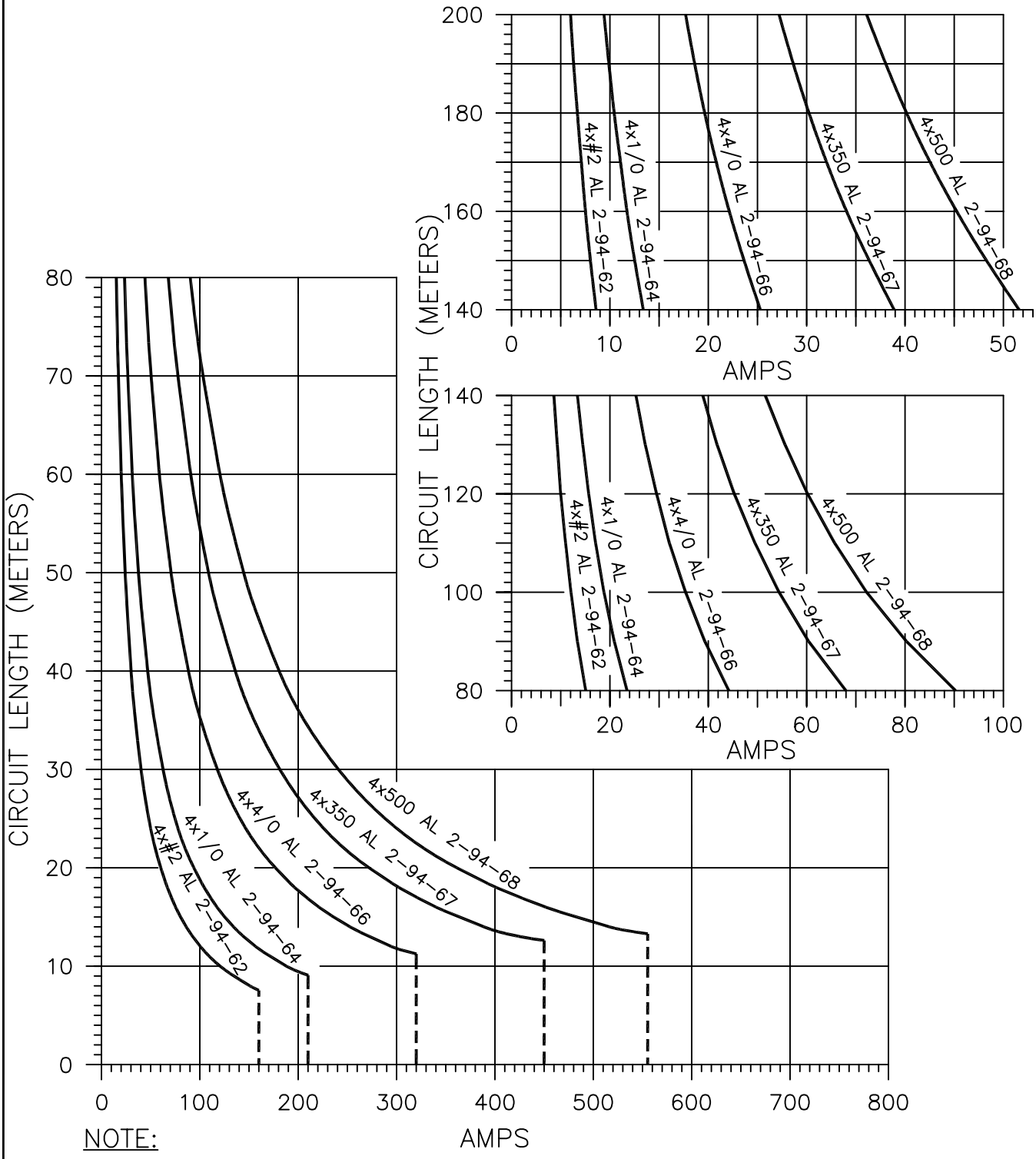
| | | | | |
|---|---|---|---|---|
| DRN. M.T.S. | DESIGN CHK. | SAFETY APP. | APPROVAL | VOLTAGE DROP (1%) CHART 480V SINGLE PHASE |
| CHKD. | | | | |
| DATE 93-07-12 | DATE | DATE | DATE | |
| DATE OF ISSUE | | DRAWING NO. B-22-17 | SHEET 1 OF 1 | REV. 0 |

SPC/AUTODRAFT




NOTE:

1. CURVES ARE FOR 120/208 Y 3ø 4W CIRCUITS BASED ON 1% VOLTAGE DROP ON 208V BASE.
2. MAXIMUM ALLOWABLE AMPACITY IS INDICATED BY THE VERTICAL DASHED LINE AND IS BASED ON 10°C EARTH AMBIENT, DIRECT BURIED, 75°C CONDUCTOR TEMPERATURE, AND 75% LOAD FACTOR. FOR DIFFERENT INSTALLATIONS, REFER TO DWG. C-26-04.13 TO OBTAIN THE APPROPRIATE MAXIMUM AMPACITY.
3. CURVES ARE CALCULATED FOR 90% P.F. BUT MAY ALSO BE USED FOR 80% P.F. AND 100% P.F.
4. SEE DWG. B-22-00 FOR EXAMPLES.

SCALE: N.T.S. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED

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| DRN. M.T.S. | DESIGN CHK. | SAFETY APP. | APPROVAL | VOLTAGE DROP (1%) CHART 208V THREE PHASE |
|---|---|---|---|---|
| CHKD. | | | | |
| DATE | DATE | DATE | DATE | |
| DATE OF ISSUE | | DRAWING NO. B-22-18 | SHEET 1 OF 1 | REV. 0 |

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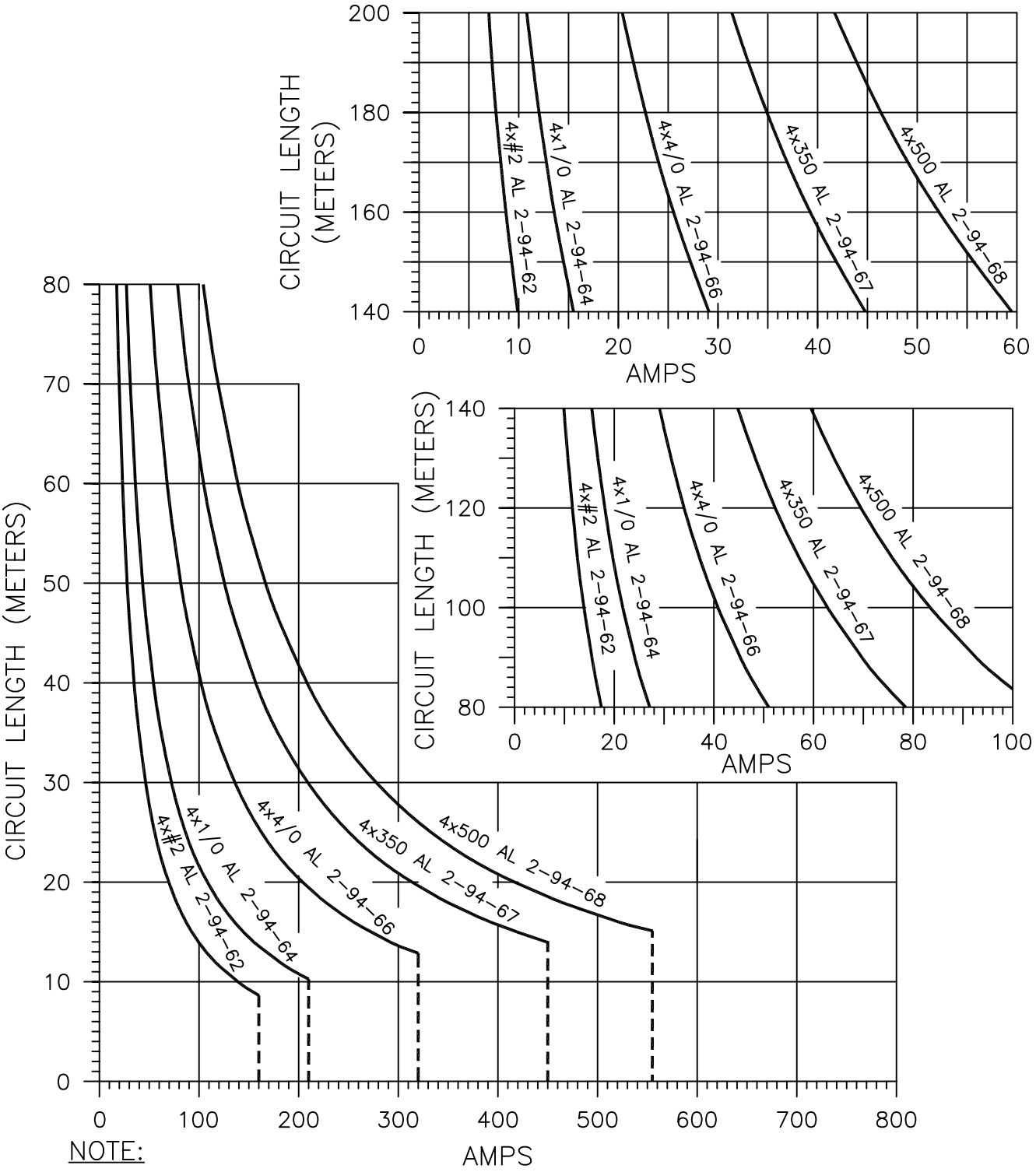


NOTE:

1. CURVES ARE FOR 240 3ø 4W CIRCUITS BASED ON 1% VOLTAGE DROP ON 240V BASE.
2. MAXIMUM ALLOWABLE AMPACITY IS INDICATED BY THE VERTICAL DASHED LINE AND IS BASED ON 10°C EARTH AMBIENT, DIRECT BURIED, 75°C CONDUCTOR TEMPERATURE, AND 75% LOAD FACTOR. FOR DIFFERENT INSTALLATIONS, REFER TO DWG. C-26-04.13 TO OBTAIN THE APPROPRIATE MAXIMUM AMPACITY.
3. CURVES ARE CALCULATED FOR 90% P.F. BUT MAY ALSO BE USED FOR 80% P.F. AND 100% P.F.
4. SEE DWG. B-22-00 FOR EXAMPLES.

SCALE: N.T.S. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED

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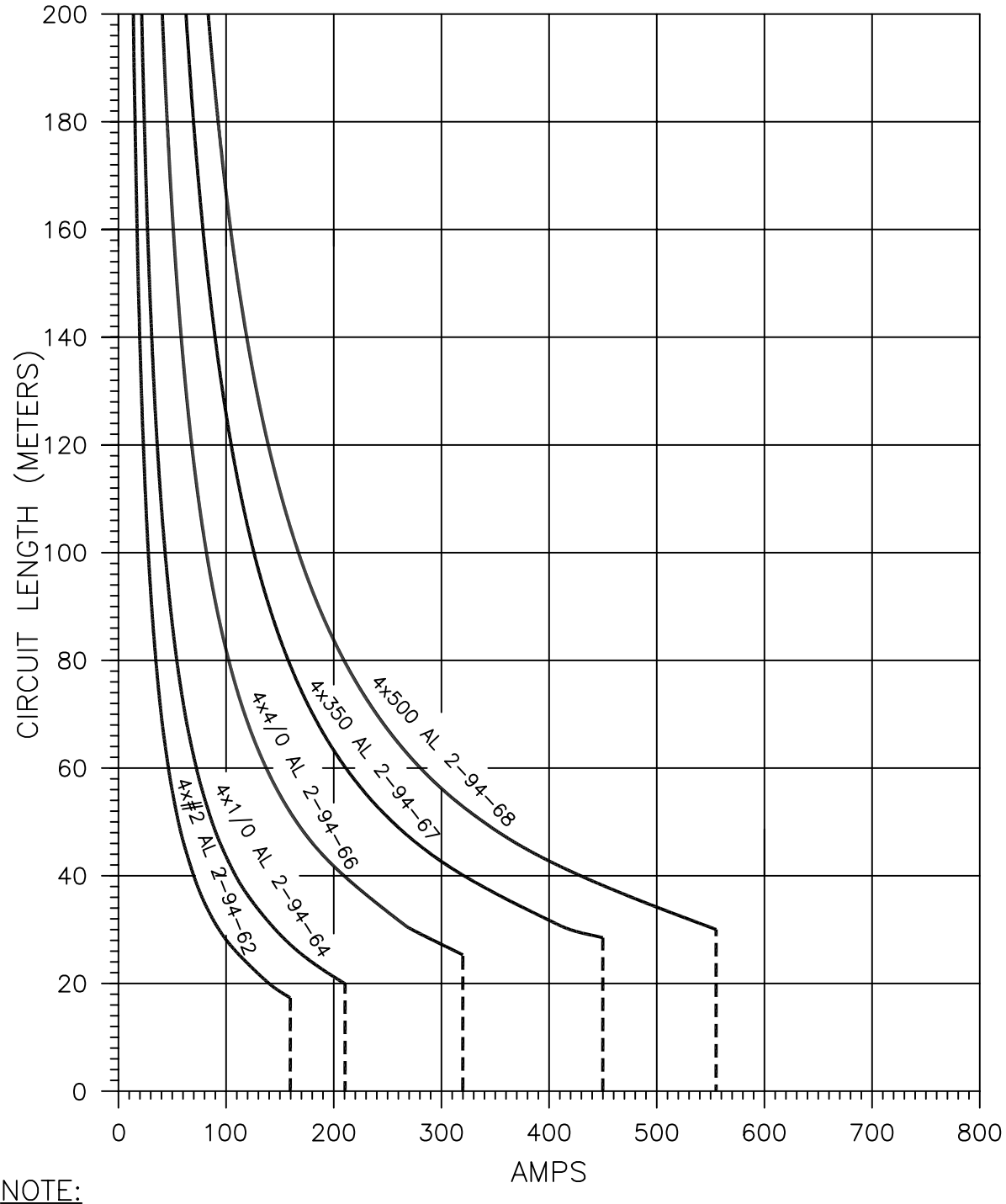
|---|---|---|---|---|
| DRN. M.T.S. | DESIGN CHK. | SAFETY APP. | APPROVAL | VOLTAGE DROP (1%) CHART 240V THREE PHASE |
| CHKD. | | | | |
| DATE | DATE | DATE | DATE | |
| DATE OF ISSUE | | DRAWING NO. B-22-19 | SHEET 1 OF 1 | REV. 0 |

SPC/AUTODRAFT




NOTE:

1. CURVES ARE FOR 480 3ø 3W AND 277/480 Y 3ø 4W CIRCUITS BASED ON 1% VOLTAGE DROP ON 480V BASE.
2. MAXIMUM ALLOWABLE AMPACITY IS INDICATED BY THE VERTICAL DASHED LINE AND IS BASED ON 10°C EARTH AMBIENT, DIRECT BURIED, 75°C CONDUCTOR TEMPERATURE, AND 75% LOAD FACTOR. FOR DIFFERENT INSTALLATIONS, REFER TO DWG. C-26-04.13 TO OBTAIN THE APPROPRIATE MAXIMUM AMPACITY.
3. CURVES ARE CALCULATED FOR 90% P.F. BUT MAY ALSO BE USED FOR 80% P.F. AND 100% P.F.
4. SEE DWG. B-22-00 FOR EXAMPLES.

SCALE: N.T.S. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED

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| | | | | |
|---|---|---|---|---|
| DRN. M.T.S. | DESIGN CHK. | SAFETY APP. | APPROVAL | VOLTAGE DROP (1%) CHART 480V THREE PHASE |
| CHKD. | | | | |
| DATE 93-07-14 | DATE | DATE | DATE | |
| DATE OF ISSUE | | DRAWING NO. B-22-20 | SHEET 1 OF 1 | REV. 0 |

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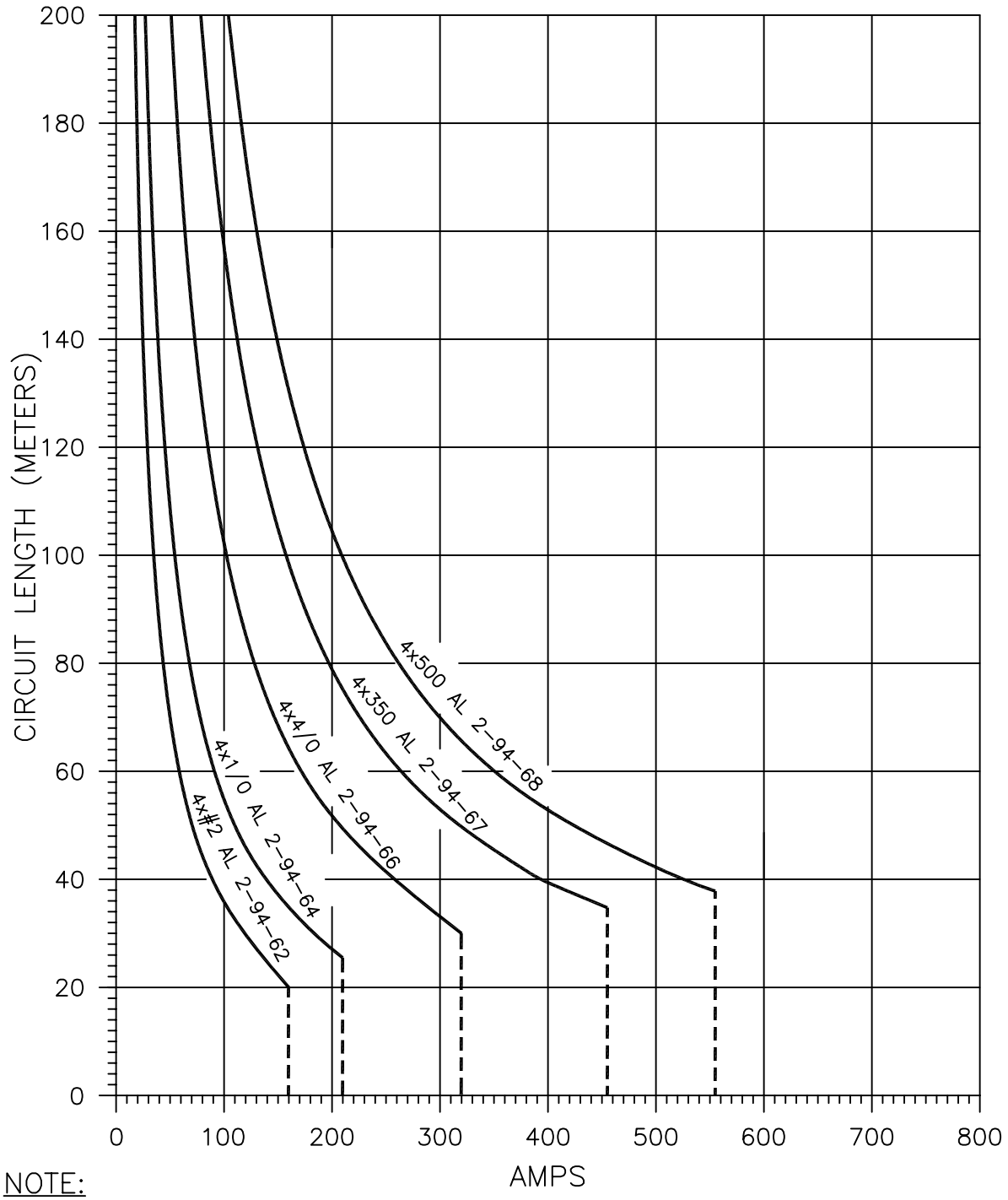


NOTE:

1. CURVES ARE FOR 600 3ø 3W AND 347/600 Y 3ø 4W CIRCUITS BASED ON 1% VOLTAGE DROP ON 600V BASE.
2. MAXIMUM ALLOWABLE AMPACITY IS INDICATED BY THE VERTICAL DASHED LINE AND IS BASED ON 10°C EARTH AMBIENT, DIRECT BURIED, 75°C CONDUCTOR TEMPERATURE, AND 75% LOAD FACTOR. FOR DIFFERENT INSTALLATIONS, REFER TO DWG. C-26-04.13 TO OBTAIN THE APPROPRIATE MAXIMUM AMPACITY.
3. CURVES ARE CALCULATED FOR 90% P.F. BUT MAY ALSO BE USED FOR 80% P.F. AND 100% P.F.
4. SEE DWG. B-22-00 FOR EXAMPLES.

SCALE: N.T.S. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED

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|---|---|---|---|---|
| DRN. M.T.S. | DESIGN CHK. | SAFETY APP. | APPROVAL | VOLTAGE DROP (1%) CHART 600V THREE PHASE |
| CHKD. | | | | |
| DATE 93-07-20 | DATE | DATE | DATE | |
| DATE OF ISSUE | | DRAWING NO. B-22-21 | SHEET 1 OF 1 | REV. 0 |