

SERVICE DROPS

DRAWING NUMBER	SHT.	DRAWING TITLE	DWG REV.	BOM REV.
A-22-00	1 – 3	GENERAL INFORMATION	0	0
A-22-01	1 – 1	LOAD VS CIRCUIT LENGTH 240 V SINGLE PHASE	0	0
A-22-02	1 – 1	LOAD VS CIRCUIT LENGTH 480 V SINGLE PHASE	0	0
A-22-03	1 – 1	LOAD VS CIRCUIT LENGTH 208 V THREE PHASE	0	0
A-22-04	1 – 1	LOAD VS CIRCUIT LENGTH 240 V THREE PHASE	0	0
A-22-05	1 – 1	LOAD VS CIRCUIT LENGTH 480 V THREE PHASE	0	0
A-22-06	1 – 1	LOAD VS CIRCUIT LENGTH 600 V THREE PHASE	0	0
A-22-07	1 – 2	TRIPLEX AND QUADRUPLIX STANDARD RESIDENTIAL SERVICE	C	A
A-22-08	1 – 2	MID SPAN TAP RESIDENTIAL SERVICE	A	A

SaskPower - DISTRIBUTION STANDARDS

APPROVAL	DESIGN CHK	DRN. DCD	INDEX	
L. MOEN	D. DONAIS	CHKD.		
		2018-06-04		
DATE OF ISSUE: 2018-06-07		DRAWING NO: A-22-INDEX	SHEET 1 of 1	REV. E

SERVICE DROPS

1. CURVES REPRESENTING LOAD VERSUS (VS) CIRCUIT LENGTH ARE INCLUDED IN THIS SECTION FOR SERVICE VOLTAGES, SINGLE AND THREE PHASE.

2. THE FOLLOWING ASSUMPTIONS HAVE BEEN USED FOR DEVELOPING THE VOLTAGE DROP CURVES FOR DRAWINGS A-22-01 TO A-22-06.
 - a) FOR DUPLEX (DX) CONDUCTOR ALL RETURN CURRENT IS IN THE ACSR NEUTRAL. (#6 DX IS ON DWG. A-22-01).
 - b) LOAD POWER FACTOR FOR 1Ø CIRCUITS 0.98
3Ø CIRCUITS 0.90
 - c) FOR 1Ø 3 WIRE CIRCUITS THE NEUTRAL RETURN CURRENT IS 10 % OF THE PHASE CURRENT AT A GIVEN LOAD.
 - d) FOR 3Ø 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 DX CONDUCTOR THE VOLTAGE DROP IS BASED ON LINE TO NEUTRAL (L-N) VOLTAGE (120 V). FOR ALL OTHER VOLTAGE SYSTEMS AND CONDUCTORS THE VOLTAGE DROP IS BASED ON LINE TO LINE (L-L) VOLTAGE.

EXAMPLES: - DROP BASED ON 240 V FOR 120/240 V 1Ø 3 W AND FOR 240 V 3Ø 4W.
 - DROP BASED ON 480 V FOR 240/480 V 1Ø 3 W AND 277/480 V 3Ø 4 W.

3. ALL CURVES ARE BASED ON 2 % VOLTAGE DROP. FOR VOLTAGE DROPS OTHER THAN 2 % AND CORRESPONDING DISTANCES FOR A GIVEN CONDUCTOR AND CIRCUIT VOLTAGE, THE FOLLOWING RELATIONSHIPS CAN BE USED.

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DRN. <i>DK</i>	DESIGN CHK.	SAFETY APP.	APPROVAL	GENERAL INFORMATION	
CHKD. <i>FTK</i>					
DATE 87-01-12	DATE	DATE	DATE		
DATE OF ISSUE 87-02-01			DRAWING NO. A-22-00		SHEET 1 of 3
					REV. 0

FOR A FIXED LOAD

$$\text{DISTANCE ALLOWABLE FOR NEW VD} = (\text{DISTANCE ALLOWABLE FOR 2 \% VD}) \times \left(\frac{\text{NEW VD}}{2 \%} \right)$$

FOR A FIXED DISTANCE

$$\text{ALLOWABLE LOAD FOR NEW VD} = (\text{ALLOWABLE LOAD FOR 2 \% VD}) \times \left(\frac{\text{NEW VD}}{2 \%} \right)$$

WHERE VD = PERCENT VOLTAGE DROP

EXAMPLESEXAMPLE #1

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

SOLUTION: USE DWG A-22-01. ALONG THE HORIZONTAL AXIS FIND 24 KVA (100 A), MOVE VERTICALLY TO INTERCEPT THE CURVE FOR THE 1/0 AL TX, READ ACROSS TO THE LEFT TO FIND 33.5 METRES FOR 2 % VD.

$$\text{DISTANCE FOR 3.5 \% VD} = (33.5\text{m}) \times \left(\frac{3.5 \%}{2 \%} \right) = 58.6\text{m}$$

A 59 m RUN WOULD RESULT IN A 3.5 % LINE TO LINE VOLTAGE DROP.

EXAMPLE #2

120/240 V 1Ø 3 W SERVICE USING 1/0 AL TX, 30 METRES LONG.
WHAT MAXIMUM LOAD CAN BE SERVED IF A 3.5 % VOLTAGE DROP IS ACCEPTABLE ?

SOLUTION: USE DWG A-22-01. ALONG THE VERTICAL AXIS FIND 30 METRES, MOVE HORIZONTALLY TO INTERCEPT THE CURVE FOR 1/0 AL TX, READ DOWN TO FIND 110 A (26.4 KVA) LOAD FOR 2 % VD.

$$\text{LOAD FOR 3.5 \% VD} = (110 \text{ A}) \times \left(\frac{3.5 \%}{2 \%} \right) = 192.5 \text{ A}$$

NOTE THAT 192.5 A IS BEYOND THE CURRENT RATING OF 1/0 AL TX AS SHOWN BY THE VERTICAL LINE AT 169 A. THEREFORE THE ANSWER IN THIS CASE IS 169 A, LIMITED BY THE THERMAL LIMIT, NOT VOLTAGE DROP.

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DRN. DK	DESIGN CHK.	SAFETY APP.	APPROVAL	GENERAL INFORMATION	
CHKD. FTK					
DATE 87-01-12	DATE	DATE	DATE		
DATE OF ISSUE	87-02-01	DRAWING NO.	A-22-00	SHEET 2 of 3	REV. 0

EXAMPLE #3

480 V 3Ø 3 W SERVICE 75 KVA, 1.5 % ALLOWABLE VOLTAGE DROP.
 WHAT MAXIMUM DISTANCE COULD BE RUN WITH EACH AVAILABLE
 OVERHEAD QUADRAPLEX (QX) CONDUCTOR ?

SOLUTION: USE DWG A-22-05. ALONG THE HORIZONTAL AXIS FIND
 75 KVA, MOVE VERTICALLY TO INTERCEPT THE CURVE FOR
 #2 AL QX AT 107m AND 1/0 AL QX AT 160m AT 2 % VD.
 (3/0 AL QX IS OFF SCALE).

FOR #2 AL QX

$$\text{MAX. DISTANCE AT 1.5 \% VD} = (107\text{m}) \times \left(\frac{1.5 \%}{2 \%} \right) = 80.25\text{m}$$

FOR 1/0 AL QX

$$\text{MAX. DISTANCE AT 1.5 \% VD} = (160\text{m}) \times \left(\frac{1.5 \%}{2 \%} \right) = 120\text{m}$$

EXAMPLE #4

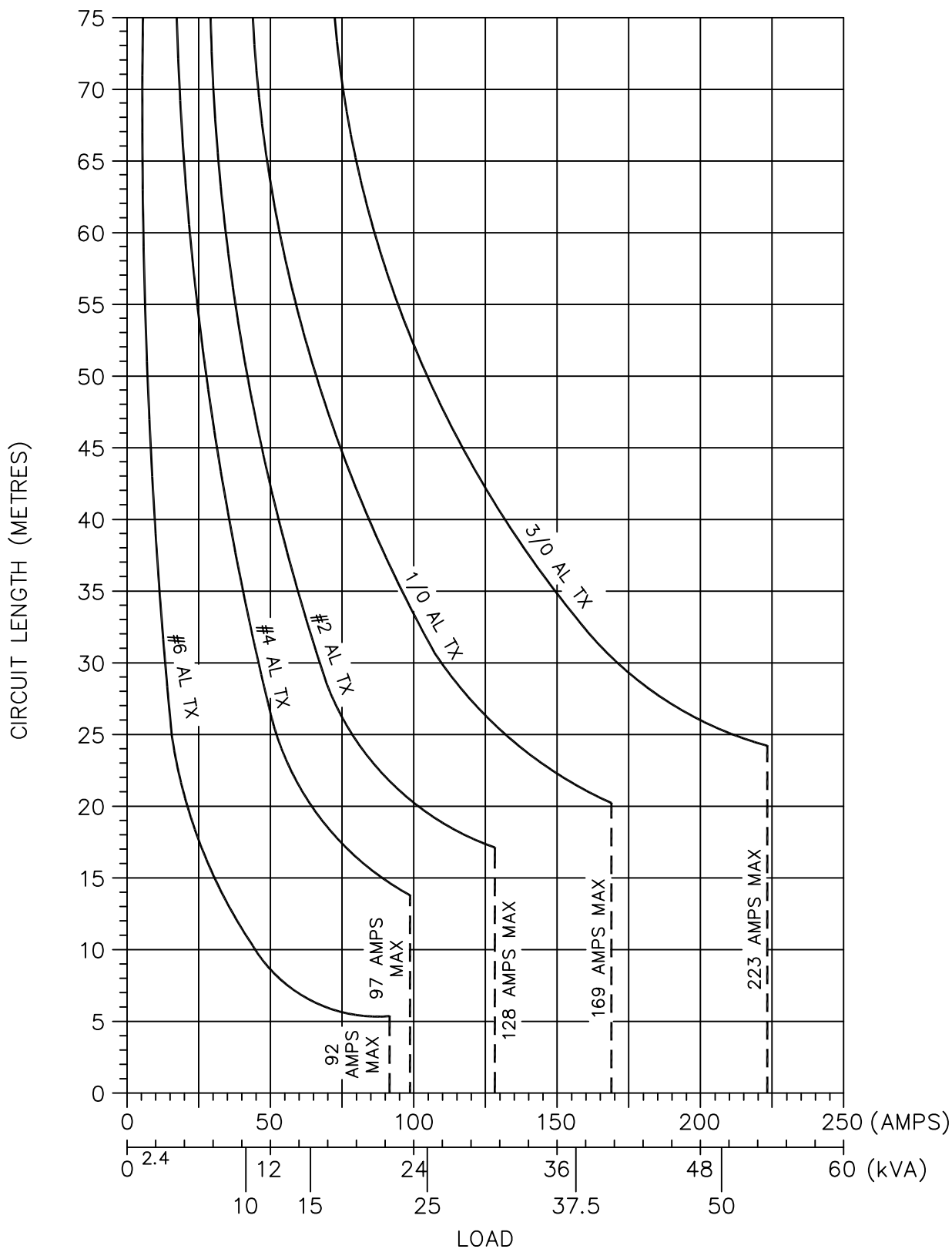
WHAT LOAD COULD BE CARRIED ON EACH AVAILABLE OVERHEAD CONDUCTOR
 FOR A DISTANCE OF 100m AT 240 V 3Ø, WITH 2 % ALLOWABLE VD.

SOLUTION: USE DWG A-22-04. ALONG THE VERTICAL AXIS FIND 100m,
 MOVE ACROSS HORIZONTALLY TO EACH CURVE AND
 READ DOWN VERTICALLY TO THE LOAD AXIS.

FOR #2 AL QX : 48 A (20 KVA)
 FOR 1/0 AL QX : 75 A (31KVA)
 FOR 3/0 AL QX : 115 A (48KVA)

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DRN. DK	DESIGN CHK.	SAFETY APP.	APPROVAL	GENERAL INFORMATION	
CHKD. FTK					
DATE 87-01-12	DATE	DATE	DATE		
DATE OF ISSUE	87-02-01	DRAWING NO.	A-22-00	SHEET 3 of 3	REV. 0

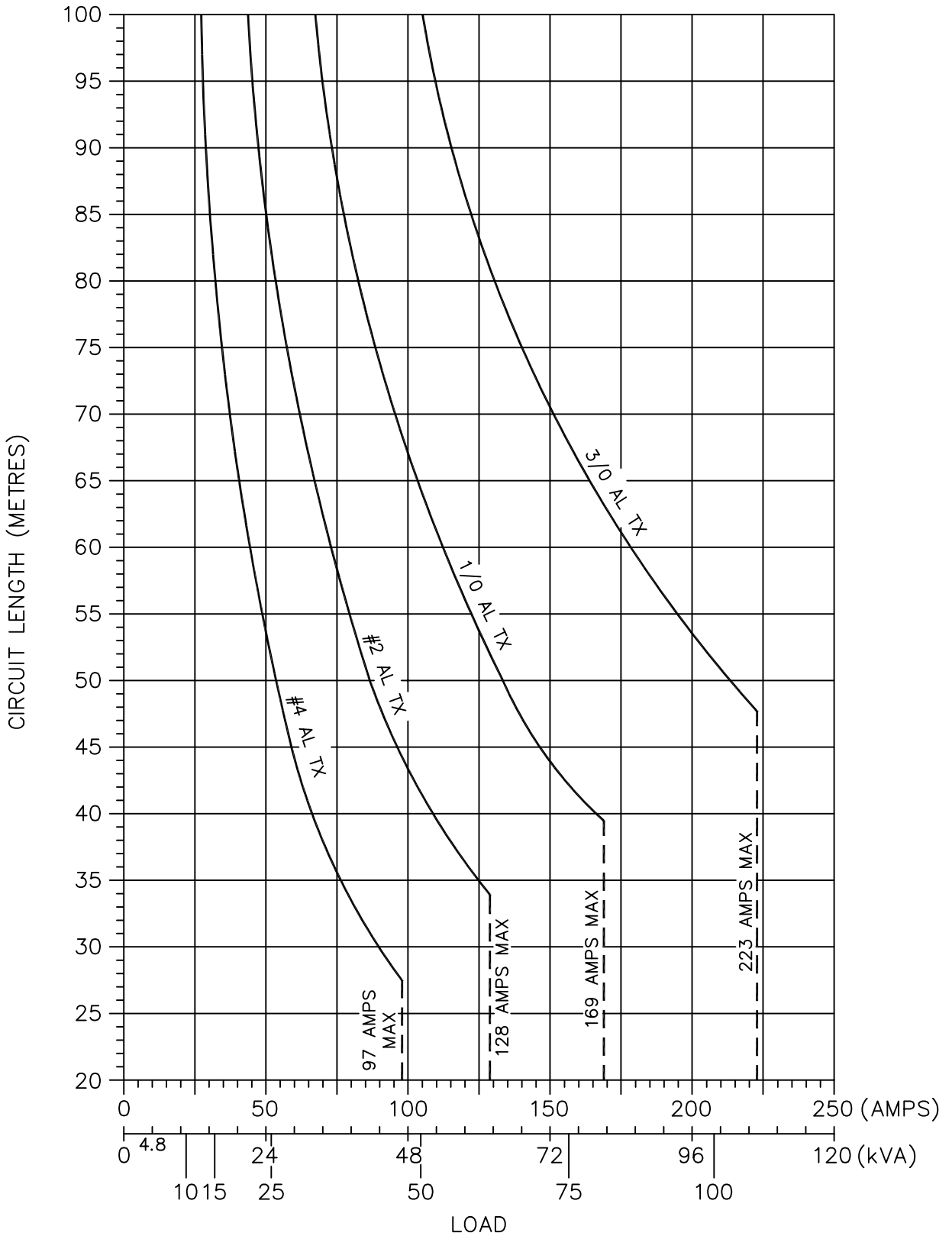


NOTE:

1. FOR 120/240 V 1Ø 3W CIRCUITS, BASED ON 2 % VOLTAGE DROP WITH ENTIRE LOAD AT END OF RUN. EXCEPT CURVE FOR #6 AL DX, WHICH IS FOR 120V 1Ø 2W, 2 % VOLTAGE DROP.
2. MAXIMUM ALLOWABLE CONDUCTOR AMPACITY INDICATED BY VERTICAL LINES.
3. SEE DWG. A-22-00 FOR EXAMPLES.

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DRN. DK	DESIGN CHK.	SAFETY APP.	APPROVAL	LOAD VS CIRCUIT LENGTH 240 V SINGLE PHASE
CHKD. FTK				
DATE 87-01-13	DATE	DATE	DATE	
DATE OF ISSUE 87-02-01	DRAWING NO. A-22-01		SHEET 1 of 1	REV. 0

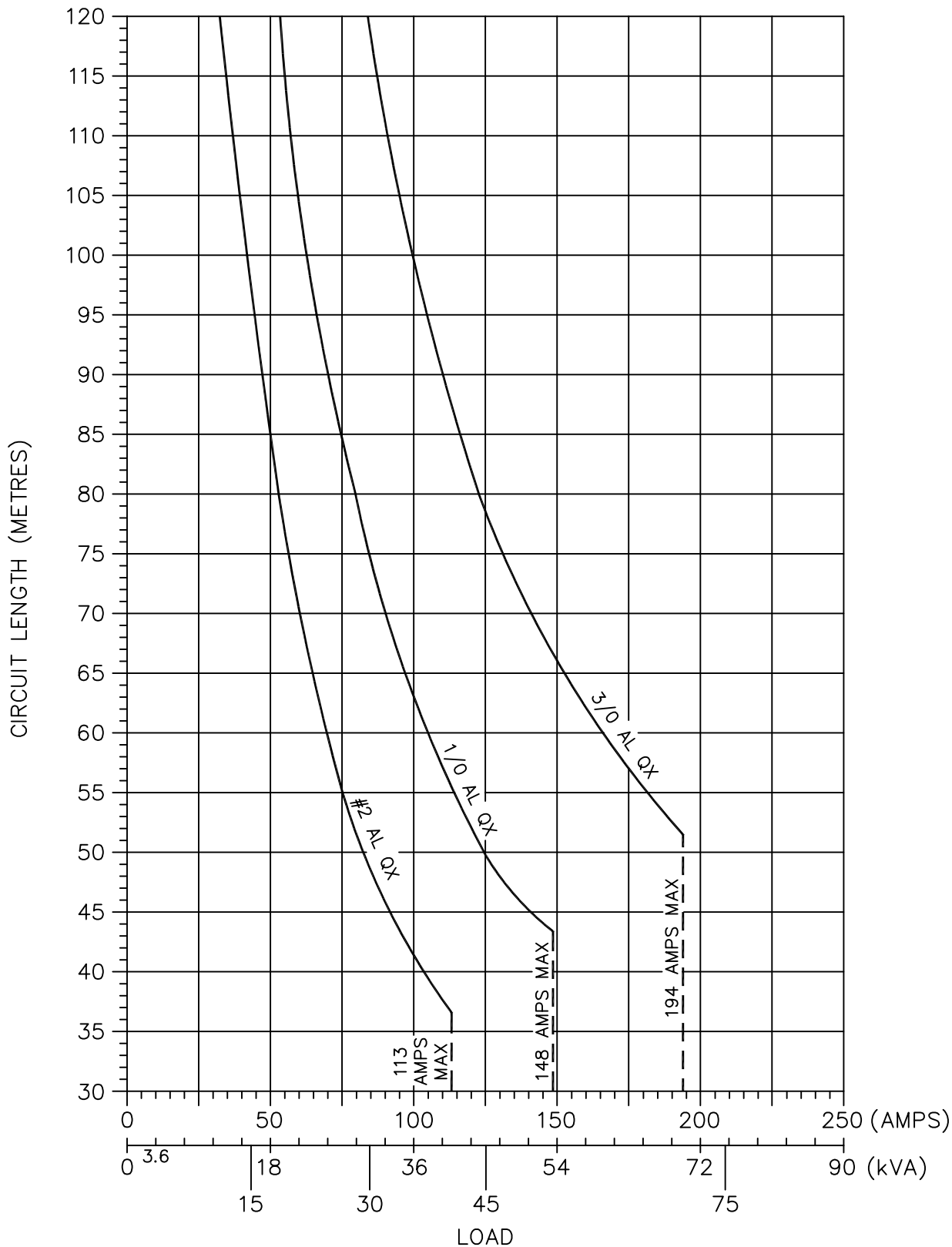


NOTE:

1. FOR 240/480 V 1Ø 3W CIRCUITS, BASED ON 2 % VOLTAGE DROP WITH ENTIRE LOAD AT END OF RUN.
2. MAXIMUM ALLOWABLE CONDUCTOR AMPACITY INDICATED BY VERTICAL LINES.
3. SEE DWG. A-22-00 FOR EXAMPLES.

SASKATCHEWAN POWER CORP. - DISTRIBUTION ENGINEERING STANDARDS

DRN. DK	DESIGN CHK.	SAFETY APP.	APPROVAL	LOAD VS CIRCUIT LENGTH 480 V SINGLE PHASE
CHKD. FTK				
DATE 87-01-13	DATE	DATE	DATE	
DATE OF ISSUE 87-02-01	DRAWING NO. A-22-02		SHEET 1 of 1	REV. 0

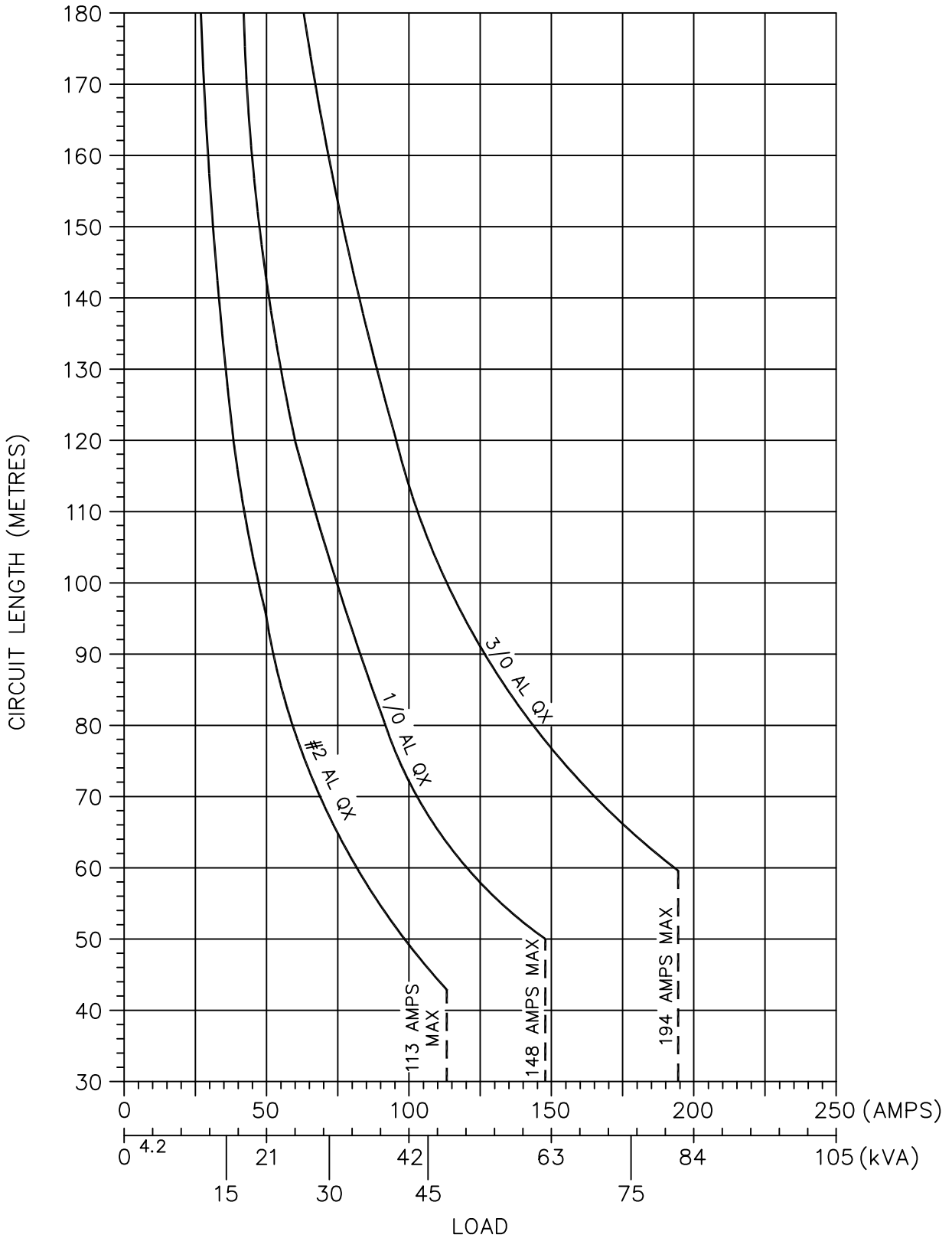


NOTE:

1. FOR 120/208 V 3Ø 4W CIRCUITS, BASED ON 2 % VOLTAGE DROP WITH ENTIRE LOAD AT END OF RUN.
2. MAXIMUM ALLOWABLE CONDUCTOR AMPACITY INDICATED BY VERTICAL LINES.
3. SEE DWG. A-22-00 FOR EXAMPLES.

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DRN. DK	DESIGN CHK.	SAFETY APP.	APPROVAL	LOAD VS CIRCUIT LENGTH 208 V THREE PHASE
CHKD. FTK				
DATE 87-01-13	DATE	DATE	DATE	
DATE OF ISSUE 87-02-01	DRAWING NO. A-22-03		SHEET 1 of 1	REV. 0

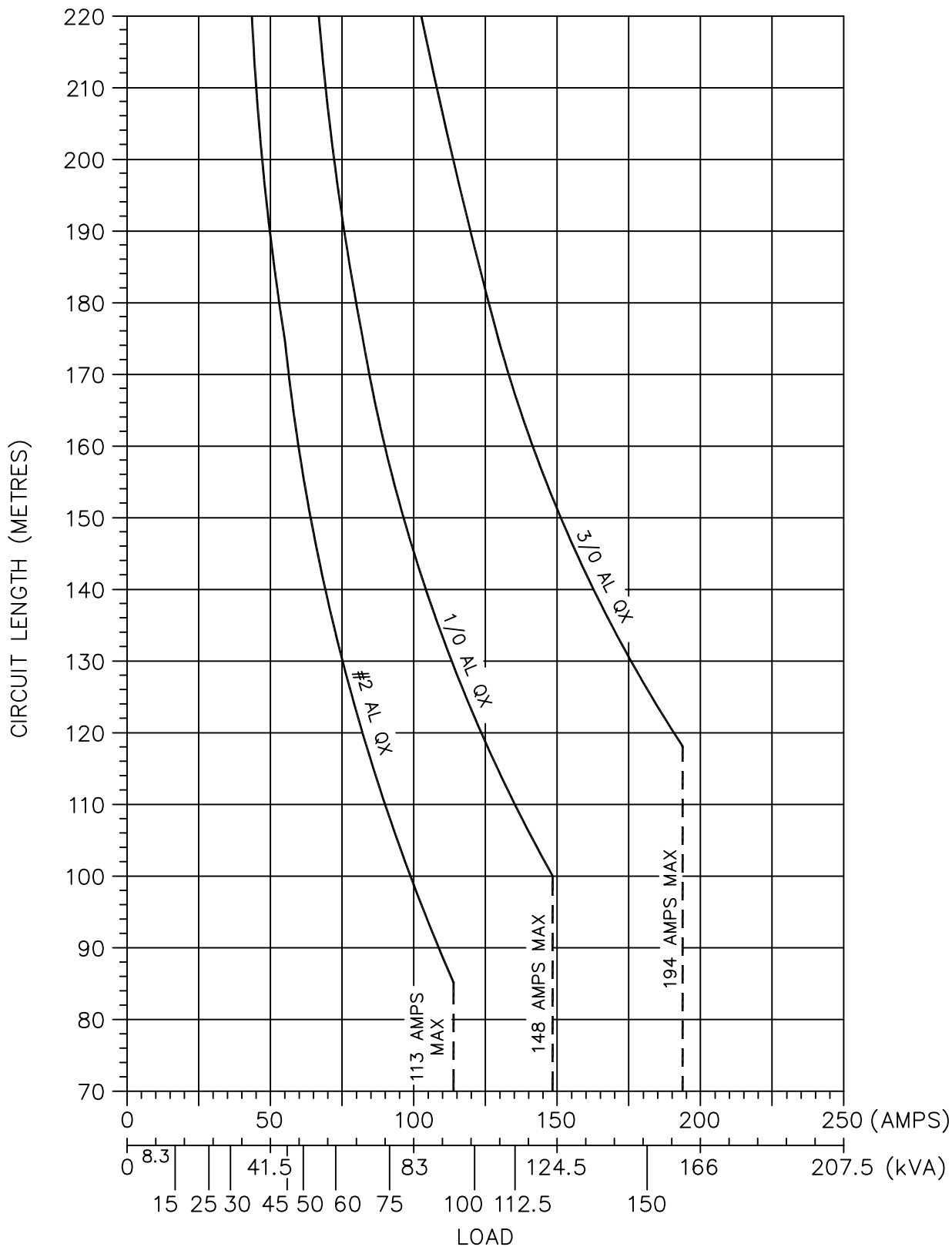


NOTE:

1. FOR 120/240 V 3Ø 4W CIRCUITS, BASED ON 2 % VOLTAGE DROP WITH ENTIRE LOAD AT END OF RUN.
2. MAXIMUM ALLOWABLE CONDUCTOR AMPACITY INDICATED BY VERTICAL LINES.
3. SEE DWG. A-22-00 FOR EXAMPLES.

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DRN. DK	DESIGN CHK.	SAFETY APP.	APPROVAL	LOAD VS CIRCUIT LENGTH 240 V THREE PHASE
CHKD. FTK				
DATE 87-01-13	DATE	DATE	DATE	
DATE OF ISSUE 87-02-01	DRAWING NO. A-22-04		SHEET 1 of 1	REV. 0

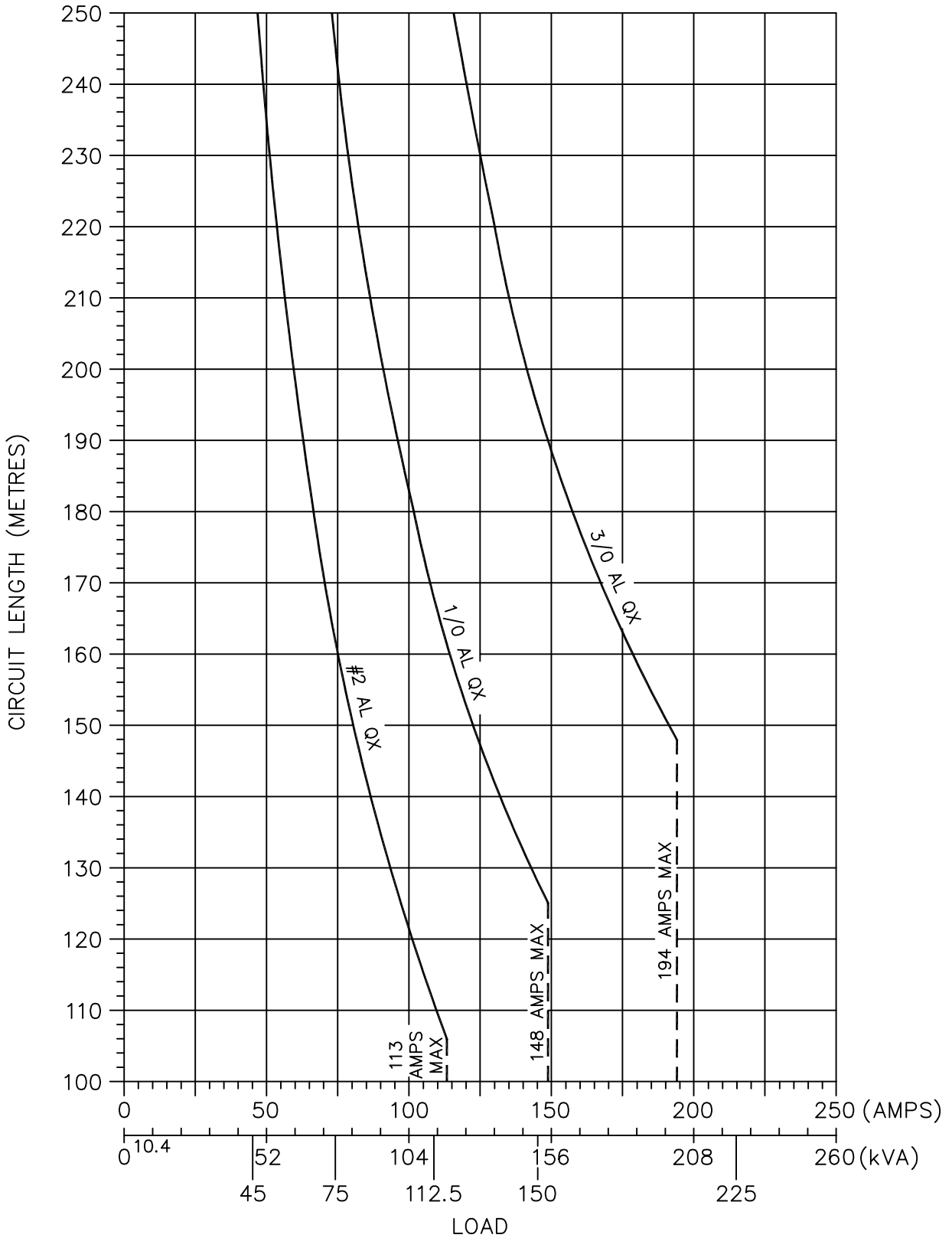


NOTE:

1. FOR 480 V 3Ø 3W AND 277/480 V 3Ø 4W CIRCUITS. BASED ON 2 % VOLTAGE DROP WITH ENTIRE LOAD AT END OF RUN.
2. MAXIMUM ALLOWABLE CONDUCTOR AMPACITY INDICATED BY VERTICAL LINES.
3. SEE DWG. A-22-00 FOR EXAMPLES.

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DRN. <i>DK</i>	DESIGN CHK.	SAFETY APP.	APPROVAL	LOAD VS CIRCUIT LENGTH 480 V THREE PHASE
CHKD. <i>FTK</i>				
DATE 87-01-13	DATE	DATE	DATE	
DATE OF ISSUE 87-02-01	DRAWING NO. A-22-05		SHEET 1 of 1	REV. 0



NOTE:

1. FOR 600 V 3Ø 3W AND 347/600 V 3Ø 4W CIRCUITS. BASED ON 2 % VOLTAGE DROP WITH ENTIRE LOAD AT END OF RUN.
2. MAXIMUM ALLOWABLE CONDUCTOR AMPACITY INDICATED BY VERTICAL LINES.
3. SEE DWG. A-22-00 FOR EXAMPLES.

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DRN. DK	DESIGN CHK.	SAFETY APP.	APPROVAL	LOAD VS CIRCUIT LENGTH 600 V THREE PHASE
CHKD. FTK				
DATE 87-01-13	DATE	DATE	DATE	
DATE OF ISSUE 87-02-01	DRAWING NO. A-22-06		SHEET 1 of 1	REV. 0

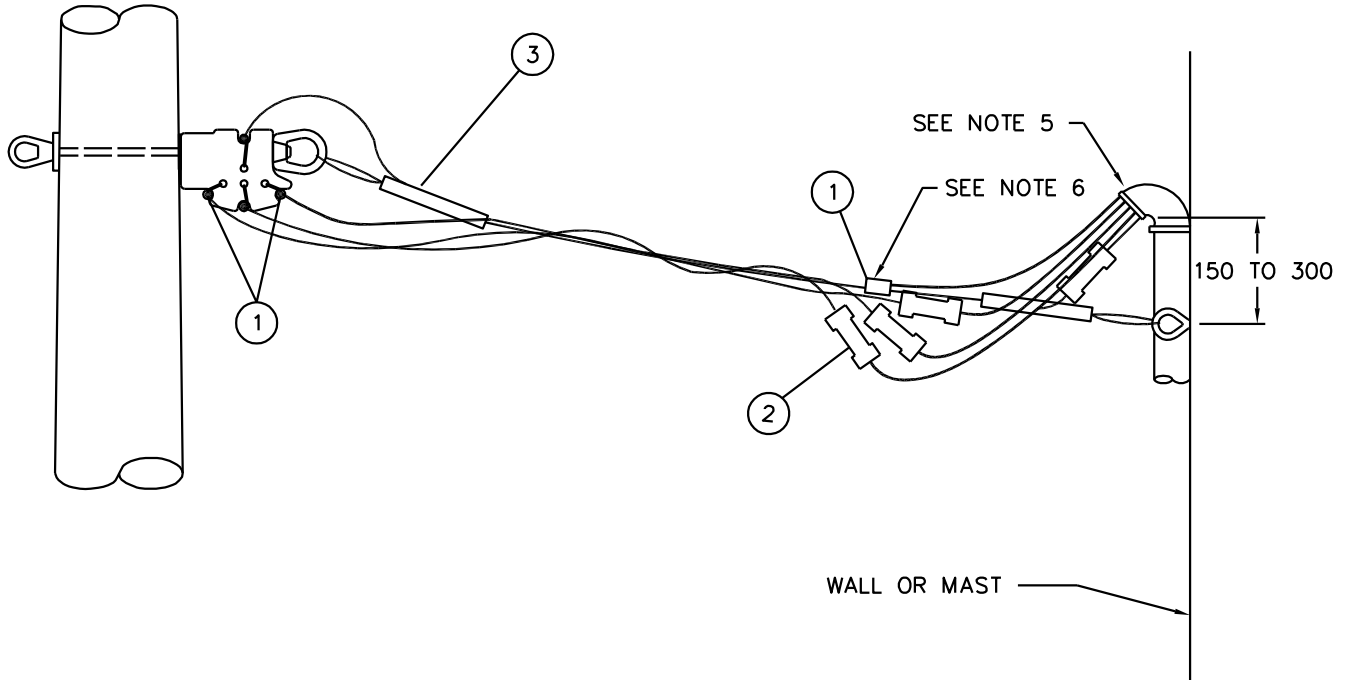
BILL OF MATERIAL

ITEM NO.	CODE NO.	QUANTITY		DESCRIPTION
		A	B	
1	5-09-XX	5	4	CONNECTOR-COMPRESSION (SIZE TO SUIT-SEE NOTE 1)
2	5-11-XX	4	3	CONNECTOR-INSULINK (SIZE TO SUIT - SEE NOTE 1)
3	5-12-XX	2	2	DEADEND-(SIZE TO SUIT - SEE NOTE 1)
<p>NOTE:</p> <p>1. REFER TO SECTION A-36 FOR CONNECTOR SIZE AND APPLICATION.</p>				

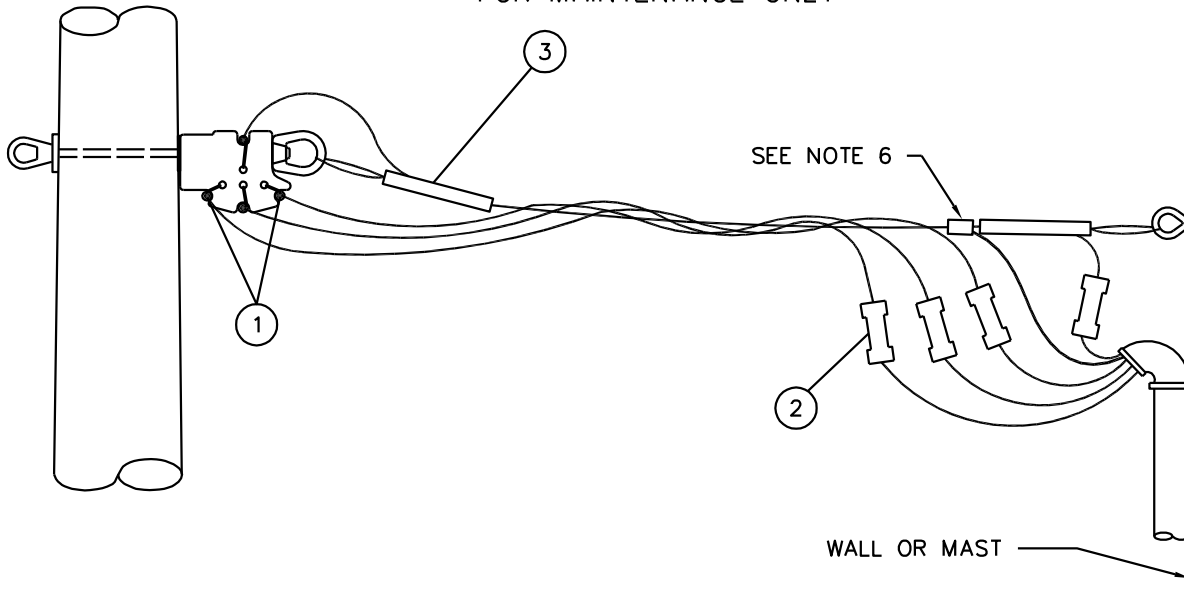
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APPROVAL	DESIGN CHK	DRN. QS	TRIPLEX AND QUADRUPLIX STANDARD RESIDENTIAL SERVICE
L.MOEN	Q.SUN	CHKD.	
		2018-05-29	
DATE OF ISSUE	2018-06-07	DRAWING NO: A-22-07	SHEET 1 OF 2 REV. A

NEW CONSTRUCTION



FOR MAINTENANCE ONLY



NOTE:

1. REFER TO SECTION C-24-02 FOR SERVICE CLEARANCE REQUIREMENT.
2. CRIMPITS ARE TO BE TAPED.
3. SEE SECTION A-36 FOR INSULINK AND CRIMPIT SELECTION.
4. STAGGER INSULINKS.
5. WEATHER HEAD MUST BE WITHIN 150-300mm ABOVE ANCHOR BOLT AS PER CEC RULE 6-116.
6. CUSTOMER GROUND CONDUCTORS EXITING THE WEATHER HEAD SHALL USE A CRIMPIT TO CONNECT TO THE TRIPLEX/QUADRUPLEX NEUTRAL.

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

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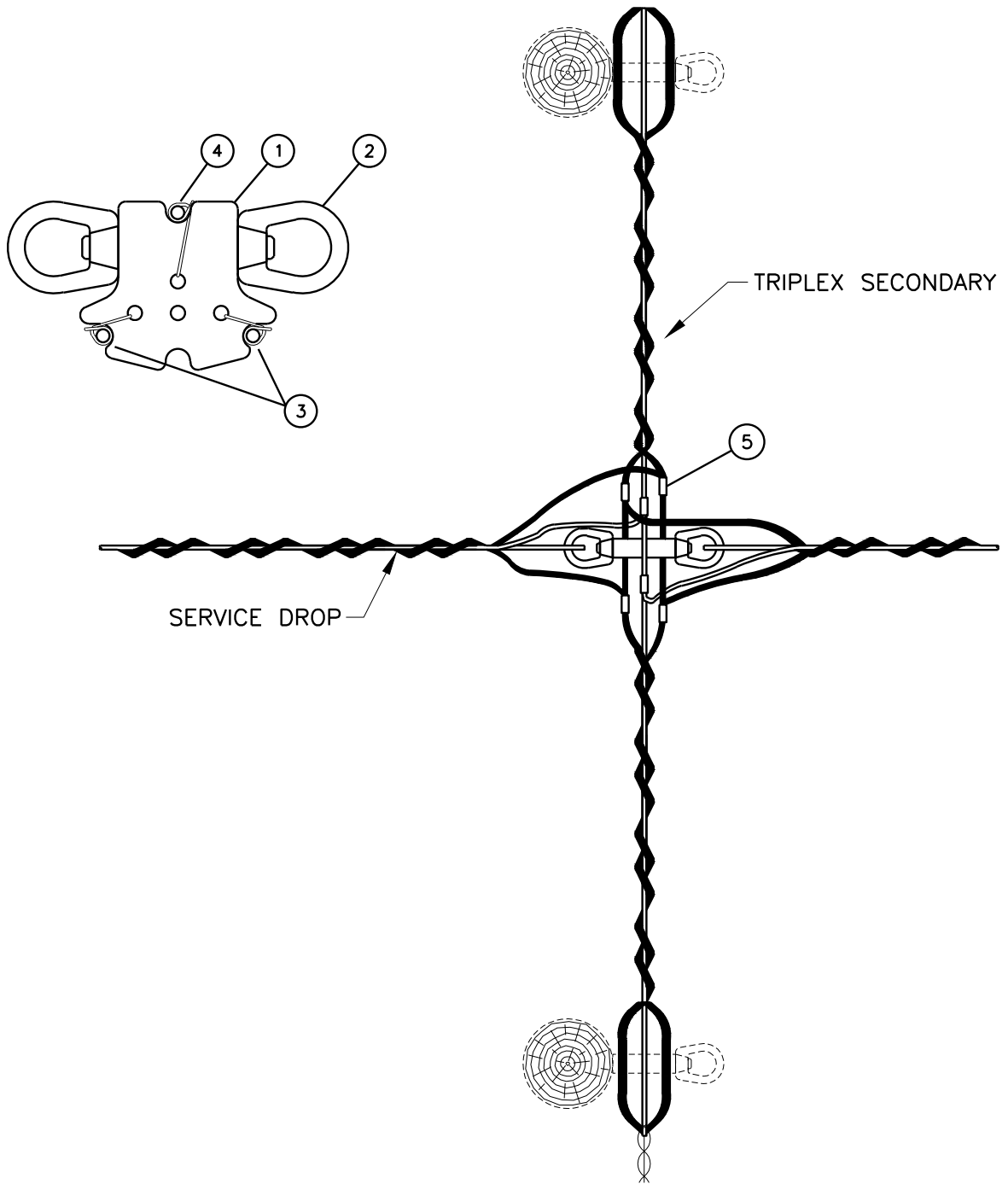
APPROVAL L.MOEN	DESIGN CHK. L.MOEN	DRN. E.GOTANA CHKD.	TRIPLEX AND QUADRUPLEX STANDARD RESIDENTIAL SERVICE
		2018-03-28	
DATE OF ISSUE	2018-06-07	DRAWING NO. A-22-07	SHEET 2 of 2
			REV. C

BILL OF MATERIAL

ITEM NO.	CODE NO.	QUANTITY	DESCRIPTION
1	1 21 04	1	BRACKET SPREADER
2	1 50 00	1	NUT EYE - 5/8"
3	2 84 08	0.9m	WIRE - #8 COPPER SOLID
4	2 97 04	0.5m	WIRE - #4 AL SOLID
5	5 09 XX	6	CONNECTOR - COMPRESSION (SIZE TO SUIT)
			<p>NOTE:</p> <p>1. USE ONE EYE NUT FROM SPREADER BRACKET (1 21 04).</p> <p>2. BOLT FROM SPREADER BRACKET (1 21 04) IS TO BE CUT TO FIT APPLICATION.</p>

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APPROVAL M. ERETH	DESIGN CHK L. BAILEY	DRN. CHKD. 2014-06-18	MID SPAN TAP RESIDENTIAL SERVICE
DATE OF ISSUE: 2014/11/17		DRAWING NO: A-22-08	



NOTE:

1. RESIDENTIAL APPLICATIONS ONLY.
2. USE AS ALTERNATIVE WHEN CONNECTION TO POLE NOT POSSIBLE. CONNECTION TO SECONDARY MUST ALLOW BUCKET TRUCK ACCESS.
3. WHENEVER POSSIBLE, BALANCE SIDE PULL BY INSTALLING OPPOSING SERVICES.
4. 30m OR LESS SERVICE LENGTH.

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

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APPROVAL M.ERETH	DESIGN CHK. L.BAILEY	DRN. A.GATZKE CHKD. 2014-06-06	MID SPAN TAP RESIDENTIAL SERVICE
DATE OF ISSUE	2014/11/17	DRAWING NO. A-22-08	SHEET 2 of 2 REV. A