

REVISION PAGE

Rev. #4 - ERF - 4-14-75

Section III-B Deleted "Consult Code for other types". and added "For other types of wire, size conduit so that combined cross sectional area of conductors does not exceed 28% cross sectional area of conduit".

Revised table #101 on page 5

This specification now complies with 1975 National Electrical Code.

Added Section VII.

Added Page #10.

Rev. #5 - 5-25-76 - RFH

Reissued on new form.

Rev. #6 - 9-8-76

088 part numbers in sample list of materials replaced by 091 conversion numbers.

P. 7 - Item 406 on sample B/M was P/N 000-054-939, Sta-kon #B14-8.

Added note to Title Block on all pages: "Class I, Group D, Division 2, Meets 1975 National Electrical Code".

Rev. #7 - JRM - 6/6/77

I. A.1 - Deleted explosion proof & added approved.

I. C.3 & I.C.4 - Added 6" requirement

I.D.1 - Added unions as a requirement

II.B.2 - Added last sentence

III.A - Re-arranged paragraph and added I-1/2" requirement

III.C - Added last sentence

VI.C - Deleted paragraph

Table #101 - Added note

Page 7 - Added union

Page 9 - Completely revised wiring diagram sample

Page 11 - Added new page

Page 8 - Item #408 was 000-094-344

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- D. Conduit fittings**
- Fittings between a seal and the device it is sealing against shall be Grouse-Hinds series EL, ET, UN explosion proof or equal. A union shall be provided next to a switch, solenoid, etc., to insure removability.
 - Junction or outlet boxes such as Grouse-Hinds series GVA are not permitted between a seal and the device it is sealing against.
 - Fittings outside the sealed area shall be Obound type with gasket and cover, Grouse-Hinds form 7, series LB, LT, LR, LBL, LBR, TA, T, TB, X or equal. Series UN, LBY, or equal may also be used where required.

- Wiring done on the console base will terminate at a terminal box mounted on that base which is at least 6" above base floor.
- Wiring done on the compressor base will terminate at a terminal box mounted on that base which is at least 6" above the I-beam or soleplate.
- Wiring done on a free standing panel will terminate at a terminal box mounted on that panel.
- Connection for customer electrical conduit run into box shall be called out as an equivalent hole diameter large enough for the conduit size (to be performed by CUSTOMER).

- C. Terminal Boxes**
- Shall be of the NEMA 4 type enclosure or equivalent; Hoffman or equal. The Dresser shop will drill a 3/32" drain hole in the bottom at assembly.
 - Hoffman type JS mounting straps or equal shall be used for mounting terminals.
 - Wiring done on the console base will terminate at a terminal box mounted on that base which is at least 6" above base floor.

- B. Without make or break contacts**
- Those instruments which do not incorporate make or break, or sliding contacts, shall be oil tight, NEMA 4, or equivalent.

- A. With make or break contacts**
- Switches, relays, annunciators, etc. which incorporate contacts for make or break, or sliding, shall be approved for Class I, Group D, area.

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II. Sealing

A. Sealing Compound

1. Shall be used only in fittings designed for that purpose; such as Crouse-Hinds series GVA, EYS, or equal.
2. Shall be Chitco #A4 or equal.
3. Minimum thickness shall not be less than the trade size of the conduit, and in no case less than 5/8 inch.
4. Shall be poured in field by customer, not in Clark shop.

B. Seals

1. Seals shall be Crouse-Hinds series GVA, EYS explosion proof or equal.
2. Seals shall be located in each conduit run entering an enclosure for switches, circuit breakers, fuses, relays, resistors or other devices which may produce arcs, sparks, or high temperature. Seals shall be placed as close as practical and in no case more than 18 inches from such enclosures. There shall be no terminal or junction box or similar enclosure in the conduit run between the sealing fitting and the device enclosure. Conduit fittings approved for Class I locations (explosion proof) would not be classed as enclosures when not larger than the trade size of the conduit. Where two or more enclosures for which seals are required are connected by nipples or runs not more than 36 inches long, a single seal in the nipple connection or run of conduit would be sufficient if located not more than 18" from each enclosure. Conduit seals are not required for devices having integral enclosure seals.
3. Splices shall not be made in fittings intended only for sealing with compound nor shall fittings with splices be filled with compound.

III. Conduit

- A. Shall be threaded, rigid, metal with 5 threads fully engaged. Material shall be aluminum or zinc coated steel, inside and outside. Conduit shall be run at least 1-1/2" above deck.
- B. Size in inches for a specified number of conductors and wire gage size per Table #101. Table is based on THWN wire. For other types of wire, size conduit so that combined cross sectional area of conductors does not exceed 28% cross sectional area of conduit.

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- B. Number of wires in specified conduit size and specified wire gage per Table #101. Table is based on THWN wire. Consult code for other types.
- C. Wire insulation color code.
1. For AC Circuits, black wire shall be used to a resistance and white wire after said resistance; such as solenoid.
 2. For AC Circuits, black wire shall be used to and from an interrupted circuit; such as a switch.
 3. For DC Circuits, blue wire shall be used to a resistance and red wire after said resistance; such as a solenoid.
 4. For DC Circuits, blue wire shall be used to and from an interrupted circuit; such as a switch.
- D. Wire runs in a terminal box consisting of two or more wires shall use nylon cable ties approximately every 12" length; Thomas & Betts or equal.
- E. AC & DC current wires may be in the same terminal box, but shall not be in the same conduit.
- F. AC & DC current wires shall be on separate terminal strips.
- G. AC & DC current wires shall not be wired in same terminal box with RTD's, thermocouples, or vibration instruments.
- H. For interrupted circuits such as two halves of a console, all conduit shall be laid. If the terminal box and instruments are not located on the same console half, wire the instrument terminals and run the wire to the edge of the console where it shall be rolled with positive identification of each conductor. The wiring shall be connected to the terminal box at final assembly of the console halves in the field.
- V. Motors
- Not covered under this specification.
- VI. Wiring Diagram
- A. Schematic type as standard (see example).
 - B. Diagram Bill of Materials included (see example).

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NOTE: For instrument extension cable conduit sizes, see applicable table in this specification.

SIZE WIRE	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	3-1/2
14 AWG	9	17	27	48	65	108	154		
12 AWG	7	12	20	35	48	80	114	176	
10 AWG	4	8	13	22	31	51	72	112	150

TABLE #101
 MAXIMUM NUMBER OF THWN CONDUCTORS IN TRADE SIZES OF CONDUIT

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Size of Conduit (Inches)	Radius of Bend (Inches)
1/2	4
3/4	5
1	6
1-1/4	8
1-1/2	10
2	12
2-1/2	15
3	18
3-1/2	21
4	24

TABLE #102

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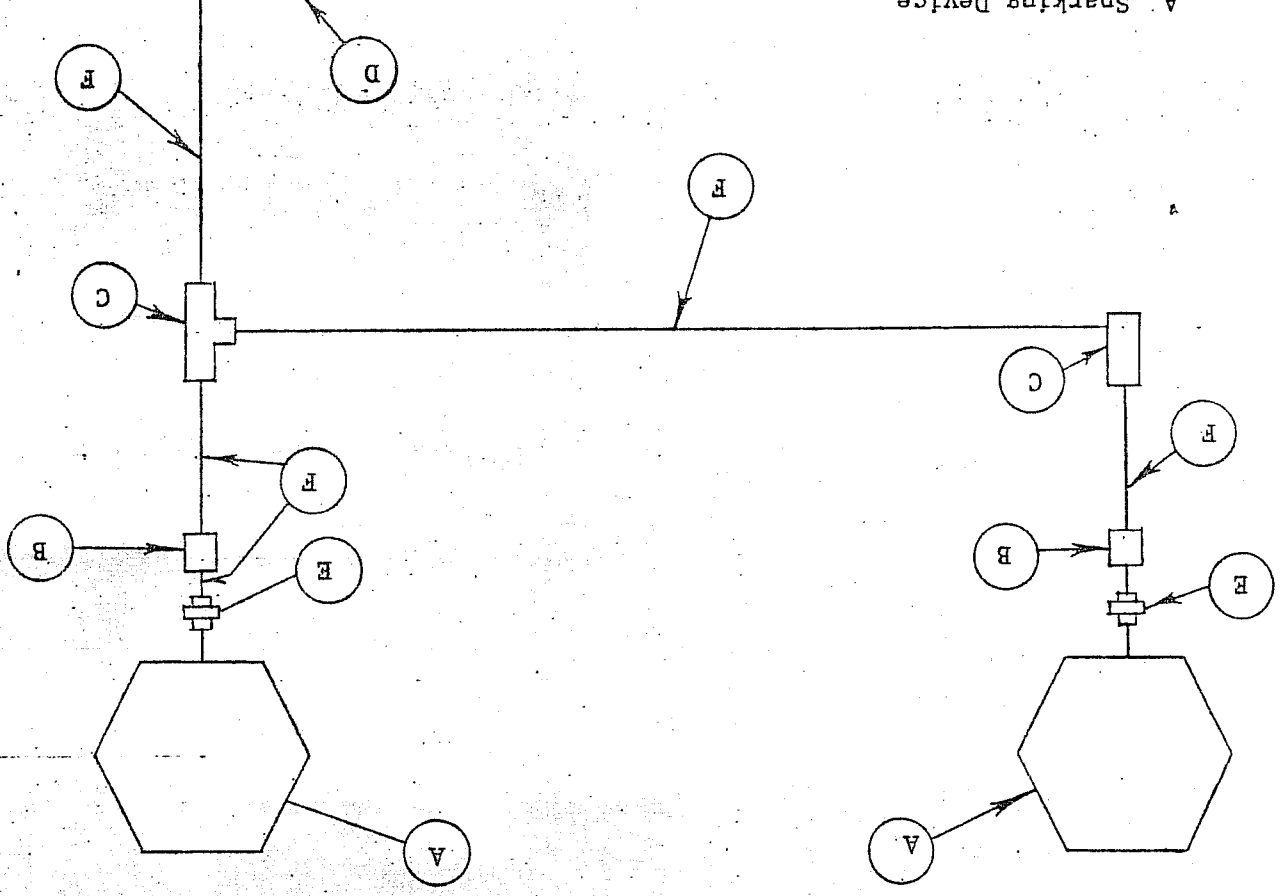
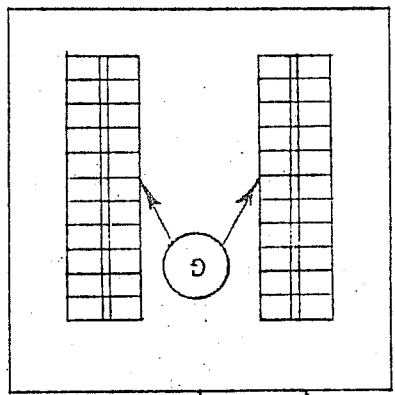
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- A. Sparking Device
- B. Seal
- C. Oround fittings for pull
- D. Terminal Box
- E. Union Fitting
- F. Wire in Rigid Conduit
- G. Terminal Strip



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LIST OF MATERIAL

LINE NO.	ITEM	PART NUMBERS BY LEVEL	WORK AREA	QTY.	LN MS	ID	DESCRIPTION	MATERIAL	SOURCE CODE
1	401	160 1137, 066		1			Terminal Box - Hoffman #A1008NE 10"x8"x4" complete with #A1008 JS mounting straps, REHA4.		
2									
3									
4	402	100 094, 213		20			Terminal Strips - Buchanan #535 tubular clamp block two rows of ten blocks each		
5									
6									
7	403	000 094, 212		2			Terminal Strip End Piece - Buchanan #530 each strip.		
8									
9									
10	404	091 611, 151		100 ft.			Wire - #14 AWG. THHN stranded copper with black insulation		
11									
12	405	091 611, 152		20 ft.			Wire - #14 AWG. THHN stranded copper with white insulation		
13									
14	406	000 094, 320		14			Terminal Lugs - Ring tongue type Amer. Pancoor 3190		
15									
16	407	000 094, 322		1 card			Wire Markers - Brady 0-49 numbers		
17									
18	408	000 094, 321		5			Cable Straps - Ty-rap T&B		
19									
20									
21									

SAMPLE

4112-059-01

ASSEMBLY NO.

LIST NO.

LIST PAGE NO.

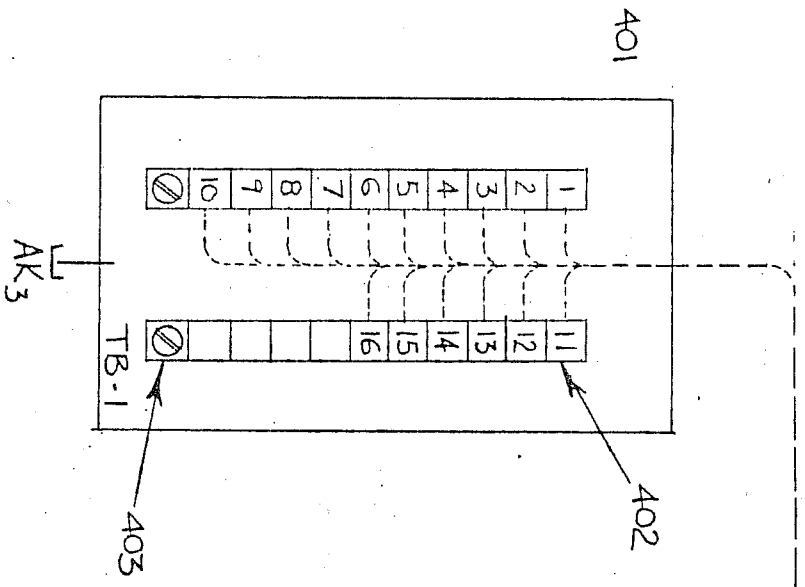
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 DRESSER INDUSTRIES INC.
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L.O. CONSOLE SWITCH WIRING																
REF. DRG #	XXX-XXX SHEET # 1															
ITEM N°	102	105	110	111	112	115	117	120								
CONTACT	C	NO	C	NO	C	NO	C	NO	C	NO						
WIRE N°	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16



404
 405
 406
 407
 408

- NOTES:
1. FOR CUSTOMER CONNECTION DESCRIPTION SEE DRG. # XXX-XXX-XXX.
 2. DRESSER CLARK WIRING -----
 3. CONTACTS SHOWN IN SHELF POSITION
 4. CONDUIT SEALING COMPOUND TO BE POURED IN FIELD.
 5. WIRE PER CLASS X, GROUP X, DIV. X.

SAMPLE

B/M # XXX-XXX-XXX

WIRING DIAGRAM
DRESSER CLARK DIV.
CLEAN, N.Y., U.S.A.
DRG. # XXX-XXX

VII. GROUNDING

A. All exposed, non-current-carrying metal parts of fixed equipment shall be grounded.

B. The path to ground from equipment and enclosures shall be permanent and continuous and shall have ample ampacity to safely conduct any currents liable to be imposed on it.

C. Equipment secured to and in contact with a grounded structure shall be deemed to be grounded.

D. The use of threaded couplings and threaded bosses on enclosures with joints made up tight where rigid conduit is used shall be deemed to insure continuity of ground.

E. Where a non-conductive protective coating such as paint or enamel is used on equipment, conduit, couplings, or fittings, such coatings shall be removed as required to ensure a good electrical connection.

F. Where grounding cannot be assured by use of "C", "D", & "E" above, a bonding jumper shall be used. This bonding jumper shall be connected from the equipment in question to the main frame or other grounded portion of the equipment.

G. Each individual piece of fixed equipment shall be provided with a grounding lug attached to the equipment frame for field connection of grounding-wire. This equipment grounding lug shall be sized as follows:

Ampacity of Largest service conductor or equivalent of Multiple Conductors	Conductor - AWG
100 or less	8
101 to 125	6
126 to 165	4
166 to 260	2
261 to 355	0
356 to 475	00
over 475	000

100 or less	8
101 to 125	6
126 to 165	4
166 to 260	2
261 to 355	0
356 to 475	00
over 475	000

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PROXIMATOR, RTD, AND THERMOCOUPLE WIRING

A. Terminal boxes, proximator boxes, conduit, and fittings shall follow the same rules as dictated by this specification for terminal board wiring, i.e.; explosion proof for division 1 areas and non-explosion proof for division 2 areas.

B. Separate terminal boxes and conduit shall be used for each different type of instrument, i.e.; one box for RTD's, one for T/C's, and one for proximator wiring.

C. The following table indicates the maximum number of extension cables to be used in conduit for terminal board wiring. Extension cables of part numbers other than those shown must be recalculated and a new table generated. The table is based on approximately 28% conduit fill. One extension cable is used per one instrument, i.e.; three thermocouples require three cables.

MAX. NUMBER OF EXTENSION CABLES IN TRADE SIZE CONDUIT		CABLE
1/2	3/4	1
1	1-1/4	1-1/2
2	2	2-1/2
3		3
2	4	6
11	15	24
35		54
RTD AND PROXIMATOR EXTENSION CABLE #091-611-360		
THERMOCOUPLE EXTENSION CABLE #091-612-104 #091-612-105 #091-612-106 #091-612-107		

D. RTD & T/C lead wires coming out of the compressor casing shall terminate in a terminal head (ref dwg. #464-698 typical) immediately adjacent to the compressor case. The terminal head will be located at an elevation above the compressor centerline. Excess lead wires will be cut off to suit at installation.

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I. Enclosures

A. With make or break contacts

1. Switches, relays, annunciators, etc. which incorporate contacts for make or break, or sliding, shall be approved for Class I, Group D areas.

B. Without make or break contacts

1. Those instruments which do not incorporate make or break, or sliding contacts, shall also be approved for Class I, Group D areas.

C. Terminal Boxes

1. Shall be of the NEMA 7 type enclosure; Killark series SWBC, Crouse-Hinds series EJB, GUB or equal.

2. Hoffman Type JS mounting straps or equal shall be used for mounting terminals where possible.

3. Wiring done on the console base will terminate at a terminal box mounted on that base which is at least 6" above base floor.

4. Wiring done on the compressor base will terminate at a terminal box mounted on that base which is at least 6" above the I-beam or soleplate.

5. Wiring done on a free standing panel will terminate at a terminal box mounted on that panel.

6. Connection for customer electrical conduit run shall be plugged in Dresser Clark Shop with Crouse-Hinds recessed PLG1 thru PLG6 or equal plugs.

D. Conduit Fittings

1. Fittings between a seal and the device it is sealing against shall be Crouse-Hinds series ET, FT, UN explosion proof or equal. A union shall be provided next to a switch, solenoid, etc. to insure removability.

2. Junction or outlet boxes such as Crouse-Hinds series GUA are not permitted between a seal and the device it is sealing against.

3. Fittings outside the sealed area shall be Crouse-Hinds series UN, LBY, GUA explosion proof or equal.

II. Sealing

A. Sealing Compound

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1. Shall be used only in fittings designed for that purpose; such as Crouse-Hinds series GVA, EYS or equal.

2. Shall be Chitco #A4 or equal.

3. Minimum thickness shall not be less than the trade size of the conduit, and in no case less than 5/8 inch.

4. Shall be poured in field by customer, not in Dresser Clark Shop.

B. Seals

1. Seals shall be located in each conduit run entering an enclosure for switches, circuit breakers, fuses, relays, resistors, terminals, or other devices which may produce arcs, sparks, or high temperature. Seals shall be placed as close as practical and in no case more than 18 inches from such enclosures. There shall be no terminal or junction box or similar enclosure in the conduit run between the sealing fitting and the device enclosure. Conduit fittings approved for Class I locations (explosion proof) would not be classed as enclosures when not larger than the trade size of the conduit. Where two or more enclosures for which seals are required are connected by nipples or runs not more than 36 inches long, a single seal in the nipple connection or run of conduit would be sufficient if located not more than 18" from each enclosure. Conduit seals are not required for devices having integral enclosure seals.

2. Seals shall not be made in fittings intended only for sealing with compound not shall fittings with splices be filled with compound.

III. Conduits

A. Shall be threaded, rigid, metal with 5 threads fully engaged. Material shall be aluminum or zinc coated steel, inside and outside. Conduit shall be run at least 1-1/2" above deck.

B. Size in inches for a specified number of conductors and wire gage size per Table #101. Table is based on THWN wire. For other types of wire, size conduit so that combined cross sectional area of conductors does not exceed 28% cross sectional area of conduit.

C. Support

1. Conduit shall be supported and fastened within 3 feet of each fitting, conduit box, or terminal box and supported every 10 feet thereafter.

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- B. Number of wires in specified conduit size and specified wire gage per Table #101. Table is based on THWN wire. Consult code for other types.
4. Wire markers for positive identification of connection points:- Brady or equal.
 - c. Spade tongue type approved for other applications, if needed.
 - b. Ring tongue type recommended for connections on switch.
 - a. Thomas & Betts 'STA-KON' or equal.
3. Terminal lugs.
 - c. Spare terminal points equal to 20% of total points used.
 - b. Maximum of two wires per terminal screw.
 - a. Buchanan MD or equal.
 2. Terminal strips.
 1. Wire shall be #10, #12, or #14 AWG, stranded, 600 volt, thermoplastic insulation. U. L. Specification, THWN or equal.
- A. Equipment

IV. Wiring

- D. Radii of conduit bends shall be equal or greater than those indicated in Table #102.
 - E. A single run of conduit between fittings and/or conduit boxes shall not contain more than the equivalent of 4 quarter bends (360° total).
 - F. All cut ends of conduits shall be reamed to remove rough edges.
 - G. Where conduit enters a box or other fitting, a bushing shall be provided to protect the wire from abrasion unless the design of the box or fitting is such to afford equivalent protection. Conduit shall enter a terminal box from the side or bottom only.
2. Not from piping.
 3. Not welded to any structure.

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C. Wire insulation color code.

1. For AC circuits, black wire shall be used to a resistance and white wire after said resistance; such as a solenoid.

2. For AC circuits, black wire shall be used to and from an interrupted circuit; such as a switch.

3. For DC circuits, blue wire shall be used to a resistance and red wire after said resistance; such as a solenoid.

4. For DC circuits, blue wire shall be used to and from an interrupted circuit; such as a switch.

D. Wire runs in a terminal box consisting of two or more wires shall use nylon cable ties approximately every 12" length; Thomas & Betts or equal.

E. AC & DC current wires may be in the same terminal box, but shall not be in the same conduit.

F. AC & DC current wires shall be on separate terminal strips.

G. AC & DC current wires shall not be wired in the same terminal box with RTD's, thermocouples, or vibration instruments.

H. For interrupted circuits such as two halves of a console, all conduit shall be laid. If the terminal box and instruments are not located on the same console half, wire the instrument terminals and run the wire to the edge of the console where it shall be rolled with positive identification of each conductor. The wiring shall be connected to the terminal box at final assembly of the console halves in the field.

V. Motors

Not covered under this specification.

VI. Wiring Diagram

A. Schematic type as standard (see example)

B. Diagram Bill of Materials included (see example).

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003-024-001		ELECTRICAL AND WIRING CLASS I, GROUP D, DIVISION 1 MEETS 1975 NATIONAL ELECTRICAL CODE	
DRESSER CLARK DIV. DRESSER INDUSTRIES INC. CLEAN, NEW YORK		TITLE	
STANDARD SPECIFICATIONS		7-21-72	
		APPROVED BY JRM	
		ISSUE DATE	
		REVISION NO. 5	
		REVISED BY	
		APPROVED BY JRM	
		ISSUE DATE	
		PREPARED BY	

NOTE: For instrument extension cable conduit sizes, see applicable table in this specification

TABLE #101									
MAXIMUM NUMBER OF THWN CONDUCTORS IN TRADE SIZES OF CONDUITS									
SIZE WIRE	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	3-1/2
14 AWG	9	17	27	48	65	108	154		
12 AWG	7	12	20	35	48	80	114	176	
10 AWG	4	8	13	22	31	51	72	112	150

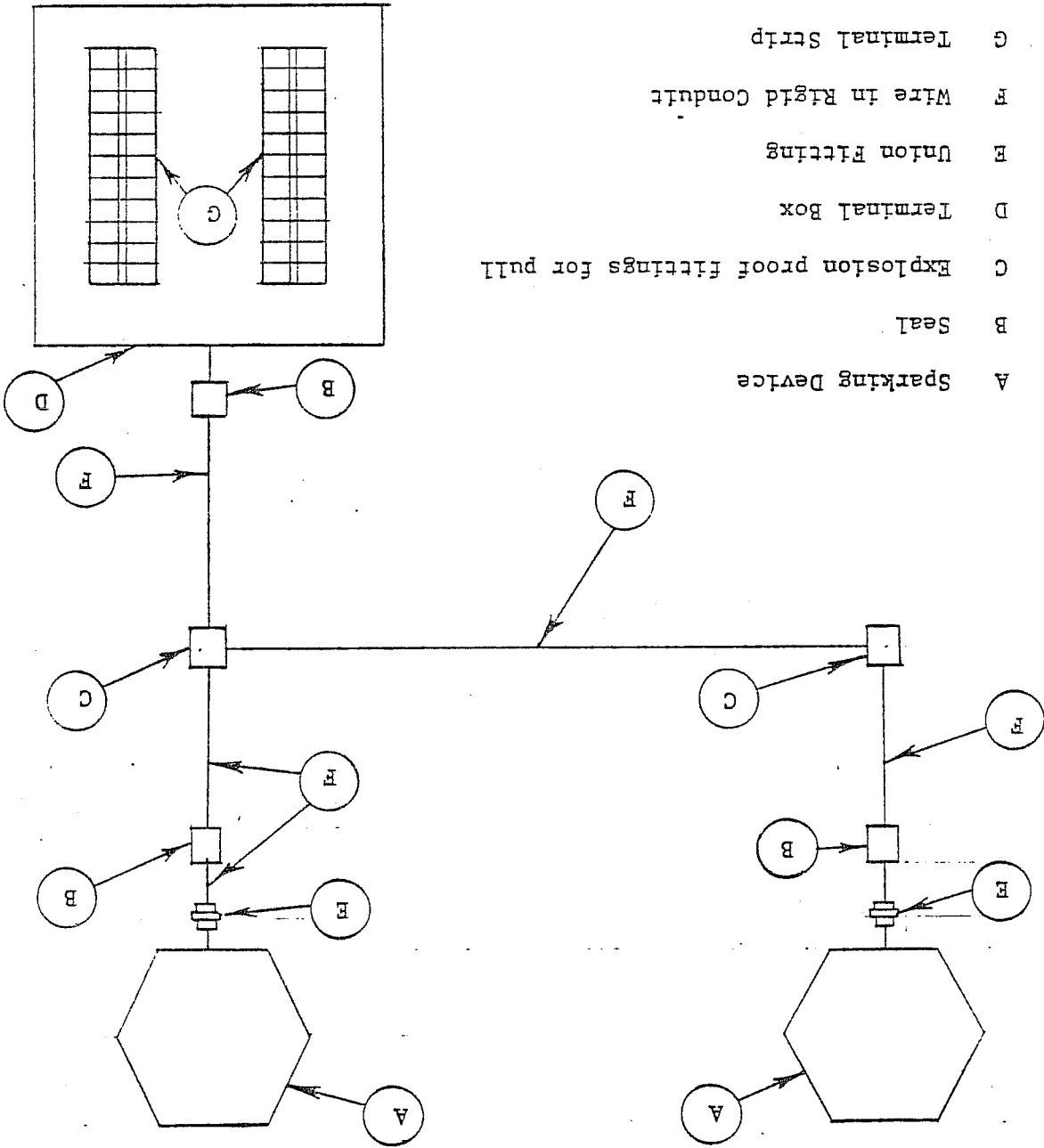
DRESSER CLARK DIV. DRESSER INDUSTRIES INC. CLEAN, NEW YORK	003-024-001	ELECTRICAL AND WIRING CLASS I, GROUP D, DIVISION 1 MEETS 1975 NATIONAL ELECTRICAL CODE	ISSUE DATE	5-5-77
			APPROVED BY	JRM
DRESSER CLARK DIV. DRESSER INDUSTRIES INC. CLEAN, NEW YORK	003-024-001	ELECTRICAL AND WIRING CLASS I, GROUP D, DIVISION 1 MEETS 1975 NATIONAL ELECTRICAL CODE	REVISION NO.	5
			ISSUE DATE	7-21-72
			APPROVED BY	JRM
			PREPARED BY	
PAGE 6 OF 11		(OLD #451-061-741)		

TABLE #102

RADII OF CONDUIT BENDS

Size of Conduit (Inches)	Radius of Bend (Inches)
1/2	4
3/4	5
1	6
1-1/4	8
1-1/2	10
2	12
2-1/2	15
3	18
3-1/2	21
4	24

PAGE 7 of 11		(OLD #451-061-741)	
003-024-001		MEETS 1975 NATIONAL ELECTRICAL CODE	
DRESSER CLARK DIV. DRESSER INDUSTRIES INC. CLEAN, NEW YORK		ELECTRICAL AND WIRING CLASS I, GROUP D, DIVISION 1	
TITLE		ISSUE DATE	6-6-77
STANDARD SPECIFICATIONS		APPROVED BY	JBN
		REVISION NO.	5
		ISSUE DATE	2-7-69
		APPROVED BY	RJ
		PREPARED BY	SLR



LIST OF MATERIAL

LINE NO.	ITEM	PART NUMBERS BY LEVEL	WORK AREA	QTY.	UNIT	ID	LAST REV. NO.	DATE	DESCRIPTION	MATERIAL	EQUIP. CODE	SHEET NO.		ASSEMBLY NO.	ASSEMBLY NO.
												CON'D ON SHEET	1		
1	401			1					Terminal Box - with mounting straps						
2															
3															
4	402	100 1094 213		20					Terminal Strips - Buchanan #535 tubular clamp block two rows of ten blocks each						
5															
6															
7	403	00010941212		2					Terminal Strip End Piece - Buchanan #530 one at end of each strip.						
8															
9															
10	404	091 611 151		100 ft.					Wire - #14 AWG. THHN stranded copper with black insulation						
11															
12	405	091 611 152		approx. 20 ft					Wire - #14 AWG. THHN stranded copper with white insulation						
13															
14	406	0001094 120		14					Terminal Lugs - Ring tongue type Amer. Pincer 3190						
15															
16	407	00010941221		1 card					Wire Markers - Brady Q-49 numbers						
17															
18	408	00010941221		5					Cable Straps - Ty-rap T&D						
19															
20															
21															

SAMPLE

PREPARED BY	JRM	ISSUE DATE	7-2-72
APPROVED BY	JRM	ISSUE DATE	6-6-77
REVISION NO.	5	APPROVED BY	JRM
TITLE	STANDARD SPECIFICATIONS	REVISOR	JRM
ELECTRICAL AND WIRING CLASS I, GROUP D, DIVISION 1 MEETS 1975 NATIONAL ELECTRICAL CODE		REVISION NO.	5
DRESSER CLARK DIV. DRESSER INDUSTRIES INC. CLEAN, NEW YORK		ISSUE DATE	6-6-77
PAGE 8 OF 11		ISSUE DATE	6-6-77

F412-039-01

ASSEMBLY NO.

LIST NO.

LIST PAGE NO.

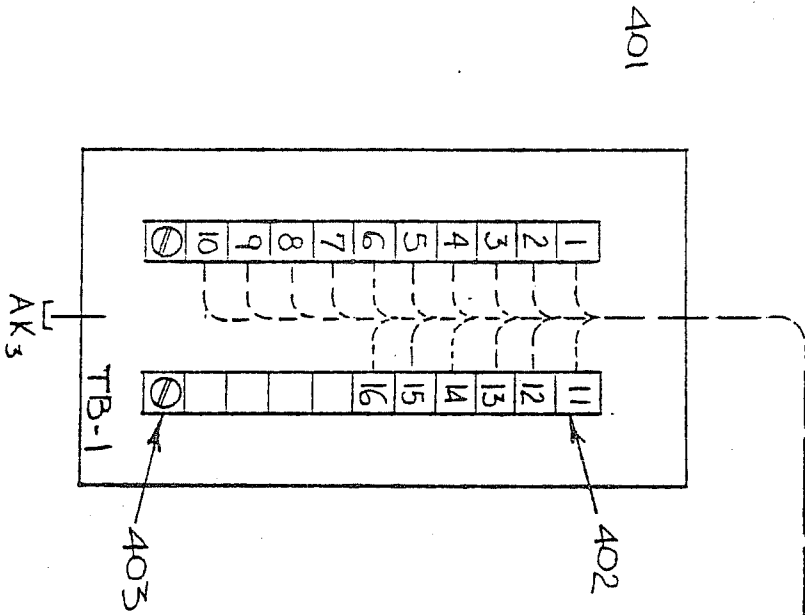
ISSUE DATE	6-6-77
APPROVED BY	JRM
REVISED BY	
REVISION NO.	5
ISSUE DATE	7-21-72
APPROVED BY	JRM
PREPARED BY	

TITLE
ELECTRICAL AND WIRING
CLASS I, GROUP D, DIVISION 1
MEETS 1975 NATIONAL ELECTRICAL CODE

STANDARD SPECIFICATIONS
DRESSER CLARK DIV.
DRESSER INDUSTRIES INC.
OLEAN, NEW YORK

003-024-001

L.O. CONSOLE SWITCH WIRING																
REF. DRG. # XXX-XXX SHEET # 1																
ITEM NO	102	105	110	111	112	115	117	120								
CONTACT	C NO	C NO	C NC	C NC	C NO	C NC	C NC	C NC	C NC	C NC	C NC	C NC	C NC	C NC	C NC	
WIRE NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16



- 404
- 405
- 406
- 407
- 408

NOTES:

- 1) FOR CUSTOMER CONNECTION DESCRIPTION SEE DWG. # XXX-XXX-XXX
- 2) DRESSER CLARK WIRING -----
- 3) CONTACTS SHOWN IN SHEET POSITION
- 4) CONDUIT SEALING COMPOUND TO BE POURD IN FIELD
- 5) WIRE PER CLASS X, GROUP X, DIV. X

— SAMPLE —

R/M # XXX-XXX-XXX

WIRING DIAGRAM
DRESSER CLARK DIV.
OLEAN, N.Y., U.S.A.
DWG. # XXX-XXX

VII. GROUNDING

A. All exposed, non-current-carrying metal parts of fixed equipment shall be grounded.

B. The path to ground from equipment and enclosures shall be permanent and continuous and shall have ample ampacity to safely conduct any currents liable to be imposed on it.

C. Equipment secured to and in contact with a grounded structure shall be deemed to be grounded.

D. The use of threaded couplings and threaded bosses on enclosures with joints made up tight where rigid conduit is used shall be deemed to insure continuity of ground.

E. Where a non-conductive coating such as paint or enamel is used on equipment, conduit, couplings, or fittings, such coatings shall be removed as required to ensure a good electrical connection.

F. Where grounding cannot be assured by use of "C", "D", & "E" above, a bonding jumper shall be used. This bonding jumper shall be connected from the equipment in question to the main frame or other grounded portion of equipment.

G. Each individual piece of fixed equipment shall be provided with a grounding lug attached to the equipment frame for field connection of grounding wire. This equipment grounding lug shall be sized as follows:

100 or less	8
101 to 125	6
126 to 165	4
166 to 260	2
261 to 355	0
356 to 475	00
over 475	000

Ampacity of Largest service conductor or equivalent of Multiple Conductors

Size of Copper Grounding Conductor - AWG

STANDARD

SPECIFICATIONS

TITLE

ELECTRICAL AND WIRING

CLASS I, GROUP D, DIVISION 1

MEETS 1975 NATIONAL ELECTRICAL CODE

PREPARED BY

APPROVED BY ERF

ISSUE DATE 4/4/75

REVISION NO. 5

REVISED BY

APPROVED BY JRM

ISSUE DATE 6/5/77

This contract specification contains the following deviations and/or additions to
 Clark Specification Drawing No. 003-024-001
 condensed

title Wiring, Class 1, Group D, Division 1

This Contract Specification is to be used only for Contract 21069 A,B,C

Issued by Systems Engineer E. J. Pikujski

Paragraph II.A.4. Add: A sufficient quantity of sealant shall be shipped
 with the equipment for field installation.

Paragraph III.B. & IV.B. Change second sentence to read:

"Table is based on THWN and/or FEP wire".

Paragraph IV.A.1 Change to read: Wire shall be #10, #12, or #14 AWG,
 stranded, 600 volt, teflon insulation.
 U.L. spec. FEP or equal (for -65°C
 service)

Table 101 Change heading to read:

"Maximum number of THWN or FEP conductors in trade sizes of
 conduits".

Page 7 Add union between seal and junction box.

Add: Paragraph IV - I: All wiring, excluding wiring devices (switches,
 transmitters, etc.), must have a continuity check
 with a reading of one (1) Meg-ohm minimum.

DRESSER CLARK DIV.	CONTRACT	SPECIFICATIONS	PREPARED BY	EJP
			APPROVED BY	
DRESSER INDUSTRIES INC.	WIRING	TITLE	REVISION NO.	1
			REVISED BY	EJP
CLEAN, NEW YORK	Class 1, Group D, Division 1	ISSUE DATE	10-29-79	
		APPROVED BY		
003-024-006			ISSUE DATE	5-31-79
			APPROVED BY	
PAGE 1 of 1				

DRESSER CLARK DIV. DRESSER INDUSTRIES INC. CLEAN, NEW YORK	003-027-001	NEMA 4 & NEMA 12 ELECTRICAL & WIRING SPECIFICATION	ISSUE DATE	
			APPROVED BY	
DRESSER CLARK DIV. DRESSER INDUSTRIES INC. CLEAN, NEW YORK	003-027-001	NEMA 4 & NEMA 12 ELECTRICAL & WIRING SPECIFICATION	REVISION NO.	1
			ISSUE DATE	
DRESSER CLARK DIV. DRESSER INDUSTRIES INC. CLEAN, NEW YORK	003-027-001	NEMA 4 & NEMA 12 ELECTRICAL & WIRING SPECIFICATION	APPROVED BY	
			PREPARED BY	

III. WIRING

A. Equipment

1. Wire shall be #10, #12, or #14 AWG, stranded, 600 volt, thermoplastic insulation. U. L. Specification, THWN or equal.
2. Terminal strips
 - a. Buchanan MD or equal
 - b. Maximum of two wires per terminal screw
 - c. Spare terminal points equal to 20% of total points used.
 3. Terminal lugs
 - a. Thomas & Betts 'STA-KON' or equal
 - b. Ring tongue type recommended for connections on switches.

B. Connections

1. Pipe thread sealing compound shall be used at all threaded connections. Compound shall be applied to the male thread only.
2. Where a conduit enters a terminal box or enclosure, a conduit hub or equivalent provision for water tight or oil tight connection shall be made. (Hoffman Gasketed Hubs are acceptable).
3. Where a conduit enters a box or other fitting, a bushing shall be provided to protect the wire from abrasion unless the design of the box or fitting is such to afford equivalent protection.
4. Where a conduit enters a terminal box or enclosure, a conduit hub or equivalent provision for water tight or oil tight connection shall be made. (Hoffman Gasketed Hubs are acceptable).
5. All cut ends of conduits shall be reamed to remove rough edges.
6. In a single run of conduit between fittings and/or conduit boxes shall not contain more than the equivalent of four quarter bends (360 degrees total).
7. Radii of conduit bends shall be equal or greater than those indicated in Table #102.
8. Not welded to any structure.
 1. Conduit shall be supported and fastened within three feet of each fitting, conduit box, or terminal box and supported every ten feet thereafter.
 2. Not from piping.
 3. Not welded to any structure.

DRESSER CLARK DIV.
DRESSER INDUSTRIES INC.
CLEAN, NEW YORK

STANDARD
SPECIFICATIONS

TITLE

ELECTRICAL & WIRING
SPECIFICATION

NEMA 4 & NEMA 12

PREPARED BY	
APPROVED BY	
ISSUE DATE	
REVISION NO.	1
REVISED BY	
APPROVED BY	
ISSUE DATE	

VI. WIRING DIAGRAM

Not covered under this specification.

V. MOTORS

- A. Schematic type as standard (see example).
- H. For interrupted circuits such as two halves of a console, all conduit shall be run. If the terminal box and instruments are not located on the same console half, wire the instrument terminals and run the wire to the edge of the console where it shall be rolled with positive identification of each conductor. The wiring shall be connected to the terminal box at final assembly of the console halves in the field.
- G. AC & DC current wires shall not be wired in same terminal box with RTD's, thermocouples, or vibration instruments.
- F. AC & DC current wires shall be on separate terminal strips.
- E. AC & DC current wires may be in the same terminal box, but shall not be in the same conduit.
- D. Wire runs in a terminal box consisting of two or more wires shall use nylon cable ties approximately every 12" length; Thomas & Betts or equal.
- 6. White - Grounded circuit conductor.
- 5. Green - Equipment grounding conductors.
- 4. Yellow - Interlock control circuits wired from an external power source.
- 3. Blue - DC control circuits.
- 2. Red - AC Control circuits.
- 1. Black - Line, load, and control circuits at line voltage, AC or DC.
- C. Wire insulation color code.
- B. Number of wires in specified conduit size and specified wire gage per Table #101. Table is based on THWN wire. Consult code for other types.
- 4. Wire markers for positive identification of connection points; Brady or equal.
- c. Spade tongue type approved for other applications, if needed.

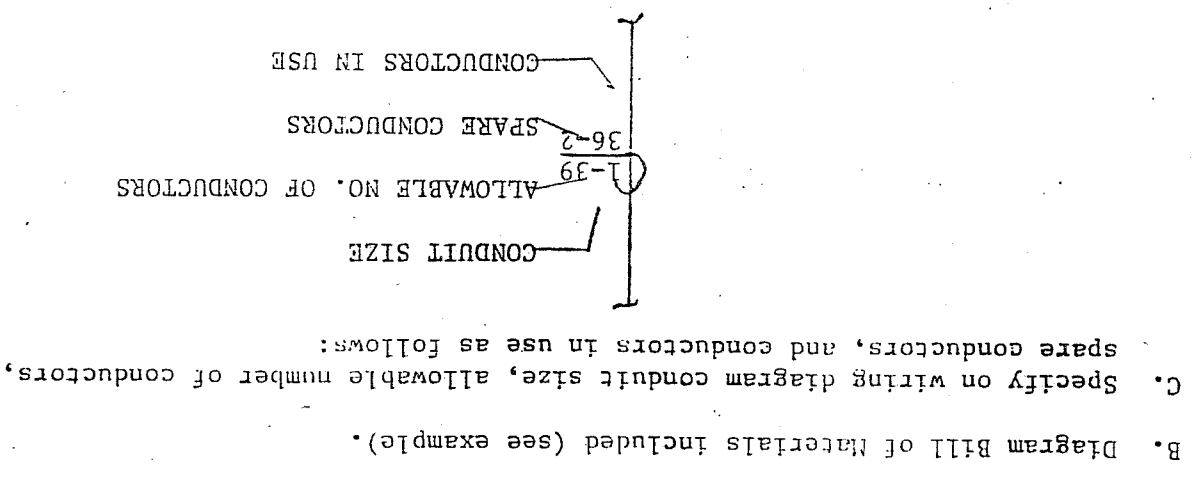
DRESSER CLARK DIV. DRESSER INDUSTRIES INC. CLEAN, NEW YORK		STANDARD SPECIFICATIONS	TITLE ELECTRICAL & WIRING SPECIFICATION NEMA 4 & NEMA 12	ISSUE DATE	
003-027-001				APPROVED BY	
DRESSER CLARK DIV. DRESSER INDUSTRIES INC. CLEAN, NEW YORK		STANDARD SPECIFICATIONS	TITLE ELECTRICAL & WIRING SPECIFICATION NEMA 4 & NEMA 12	ISSUE DATE	
003-027-001				APPROVED BY	
DRESSER CLARK DIV. DRESSER INDUSTRIES INC. CLEAN, NEW YORK		STANDARD SPECIFICATIONS	TITLE ELECTRICAL & WIRING SPECIFICATION NEMA 4 & NEMA 12	ISSUE DATE	
003-027-001				APPROVED BY	
DRESSER CLARK DIV. DRESSER INDUSTRIES INC. CLEAN, NEW YORK		STANDARD SPECIFICATIONS	TITLE ELECTRICAL & WIRING SPECIFICATION NEMA 4 & NEMA 12	ISSUE DATE	
003-027-001				APPROVED BY	

*For areas not requiring water resistant or water tight wiring NEMA 12 shall be substituted for NEMA 4.

TABLE #101

MAXIMUM NUMBER OF THWN CONDUCTORS IN TRADE SIZES OF CONDUIT

SIZE WIRE	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3
10 AWG	6	11	18	32	44	73	104	160
12 AWG	10	18	29	51	70	114	164	--
14 AWG	13	24	39	69	94	154	--	--



- B. Diagram Bill of Materials included (see example).
- C. Specify on wiring diagram conduit size, allowable number of conductors, spare conductors, and conductors in use as follows:

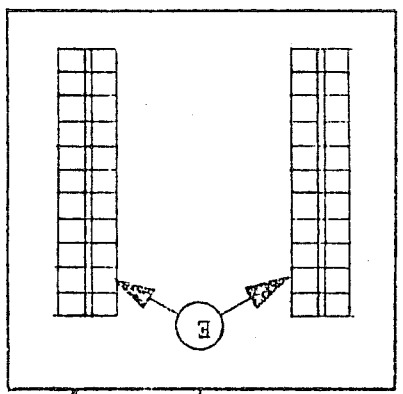
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			APPROVED BY	
DRESSER CLARK DIV. DRESSER INDUSTRIES INC. CLEAN, NEW YORK	STANDARD SPECIFICATIONS	TITLE ELECTRICAL & WIRING SPECIFICATION NEMA 4 & NEMA 12	REVISION NO.	1
			ISSUE DATE	
DRESSER CLARK DIV. DRESSER INDUSTRIES INC. CLEAN, NEW YORK		003-027-001		PAGE 5 OF 8

Size of Conduit (Inches)	Radius of Bend (Inches)
1/2	4
3/4	5
1	6
1-1/4	8
1-1/2	10
2	12
2-1/2	15
3	18
3-1/2	21
4	24

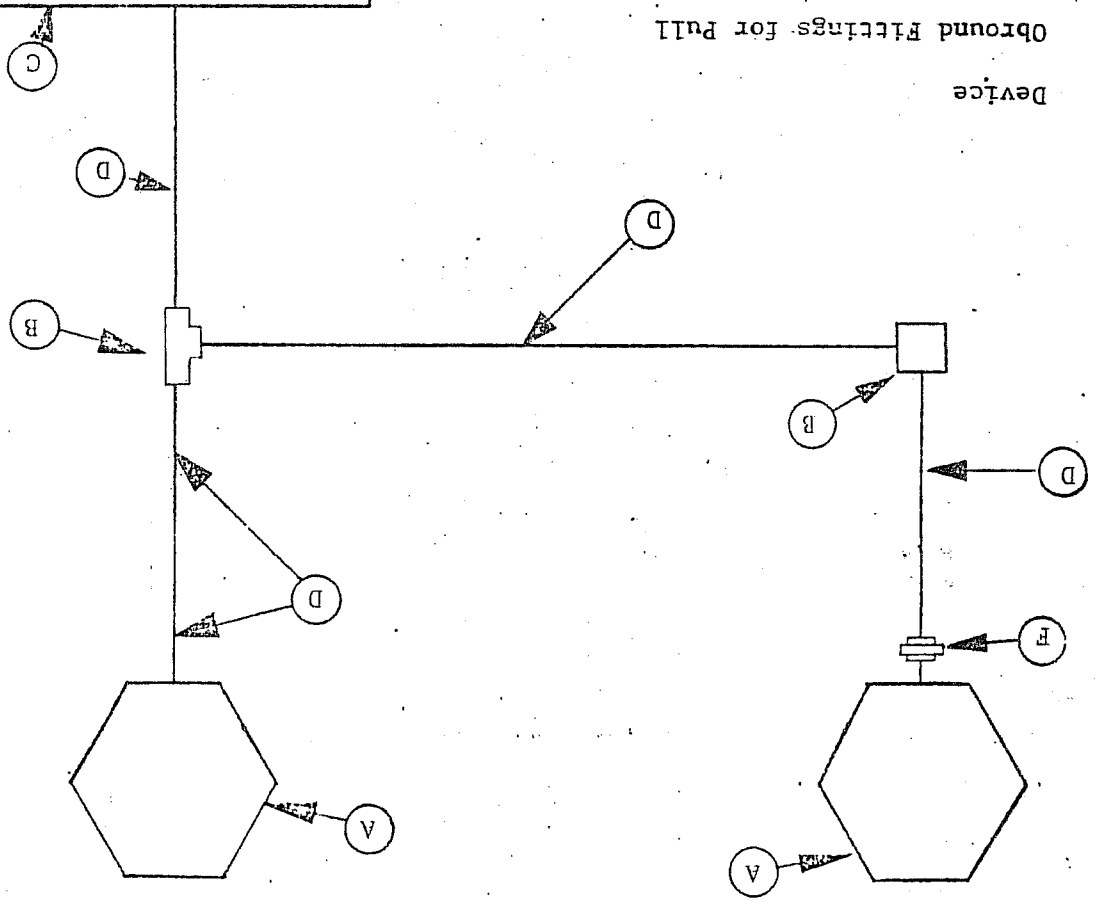
TABLE #102
RADI OF CONDUIT BENDS

DRESSER CLARK DIV. DRESSER INDUSTRIES INC. OLEAN, NEW YORK	TITLE ELECTRICAL & WIRING SPECIFICATION NEMA 4 & NEMA 12	ISSUE DATE	
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003-027-001		REVISION NO.	1
PAGE 6 OF 8		ISSUE DATE	
		APPROVED BY	
		PREPARED BY	

STANDARD SPECIFICATIONS



- A Device
- B Oround Fittings for Pull
- C Terminal Box - NEMA 4*
- D Wire in Rigid Conduit
- E Terminal Strip
- F Union fitting, approved if needed



PREPARED BY	
APPROVED BY	
ISSUE DATE	
REVISION NO.	1
REVISED BY	
APPROVED BY	
ISSUE DATE	

ELECTRICAL & WIRING SPECIFICATION NEMA 4 & NEMA 12

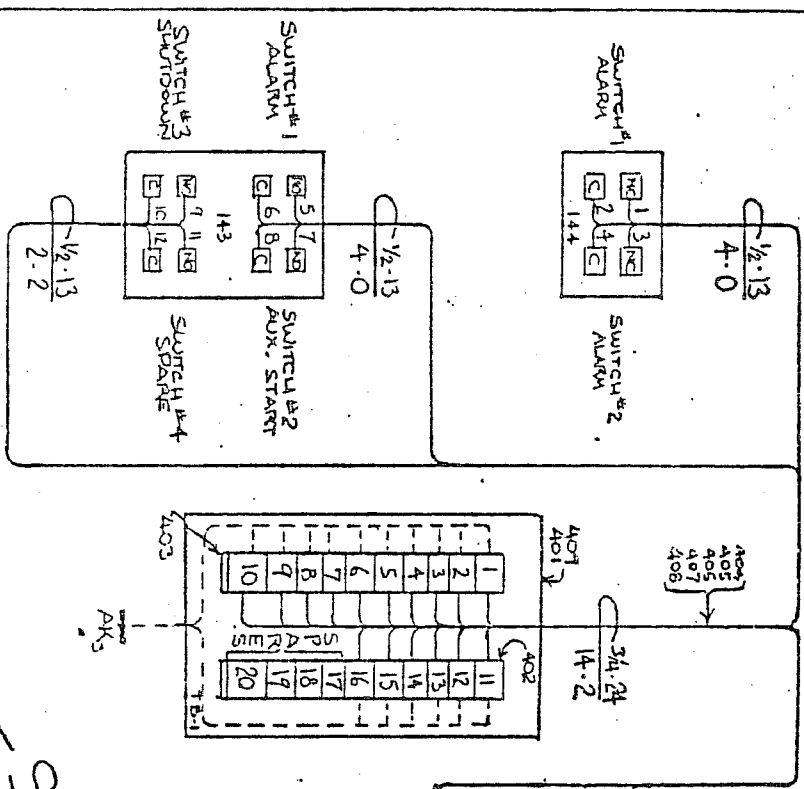
TITLE

STANDARD SPECIFICATIONS

DRESSER CLARK DIV.
DRESSER INDUSTRIES INC.
CLEAN, NEW YORK

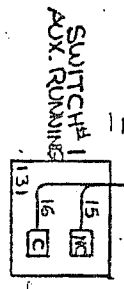
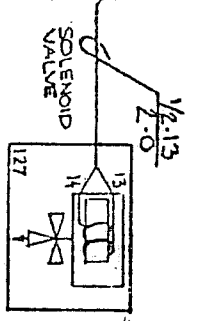
003-027-001

PAGE 8 OF 8



CONSOLE PACKAGE

SAMPLE



- NOTES:
- FOR CUST. CONN. LETTER DESCR. SEE DRG. NO
 - FOR MATL SEE DETACHED L/W DRG. NO
 - CUST. WIRING - - - -
 - CLARK WIRING - - - -
 - WIRING SHOWN IS WHEN INST. IS IN SHELF POSITION (NO FORCE ACTING ON ACTUATING MECHANISM.)
 - SEALING COMPOUND WILL NOT BE POURED IN SHOP (FIELD POURED)
 - CONDUIT SIZE ALLOWABLE NO OF CONDUCTORS SPARE CONDR IN USE

WIRING DIAGRAM

DRESSER CLARK DIV.
DRESSER IND. INC.
CLEAN, N.Y. USA.