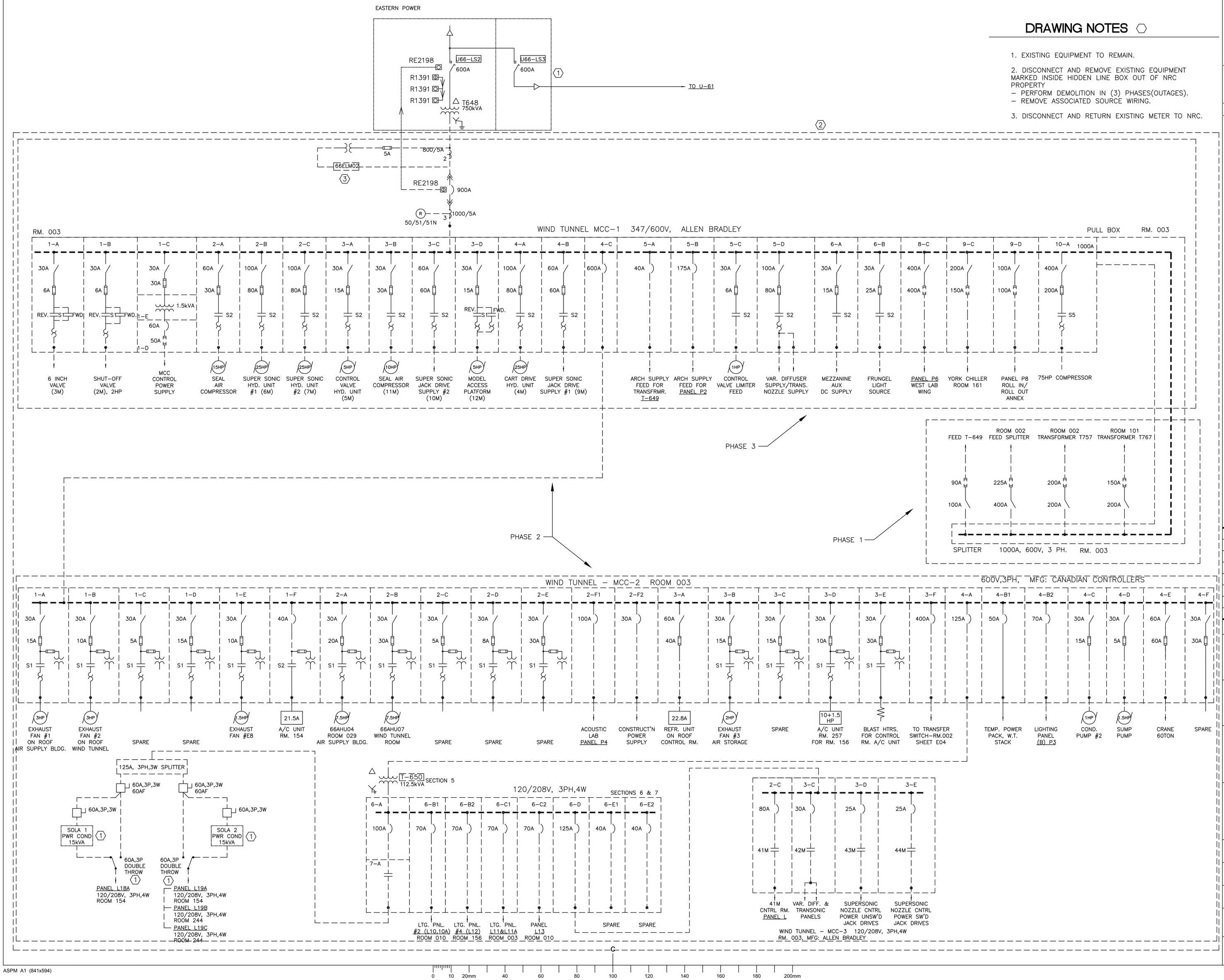

DRAWING NOTES

1. EXISTING EQUIPMENT TO REMAIN.
2. DISCONNECT AND REMOVE EXISTING EQUIPMENT MARKED INSIDE HIDDEN LINE BOX OUT OF NRC PROPERTY
   - PERFORM DEMOLITION IN (3) PHASES(OUTAGES).
   - REMOVE ASSOCIATED SOURCE WIRING.
3. DISCONNECT AND RETURN EXISTING METER TO NRC.

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E MAKE GOOD ALL SURFACES AFFECTED BY THIS WORK.
F FILL ALL HOLES, PATCH & PAINT ALL SURFACES IN CONTRACT AREA. COLOUR SCHEME TO MATCH EXISTING.
G REMOVE MEANS REMOVE AND DISPOSE OF OFF SITE UNLESS OTHERWISE NOTED.
H PROVIDE LABELS TO NEW DEVICES TO INDICATE POWER SOURCE. UPDATE PANEL SCHEDULES AFTER JOB COMPLETION.
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P VERIFY PHASING AND ROTATION, MATCH THE EXISTING SYSTEM.
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0	OCT/24 2016	ISSUED FOR TENDER	KXL

Date Printed DD MM YYYY — Date imprimée

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C Drawing no. dessin no.

project / projet
BUILDING U66
ROOM 003 ELECTRICAL UPGRADE

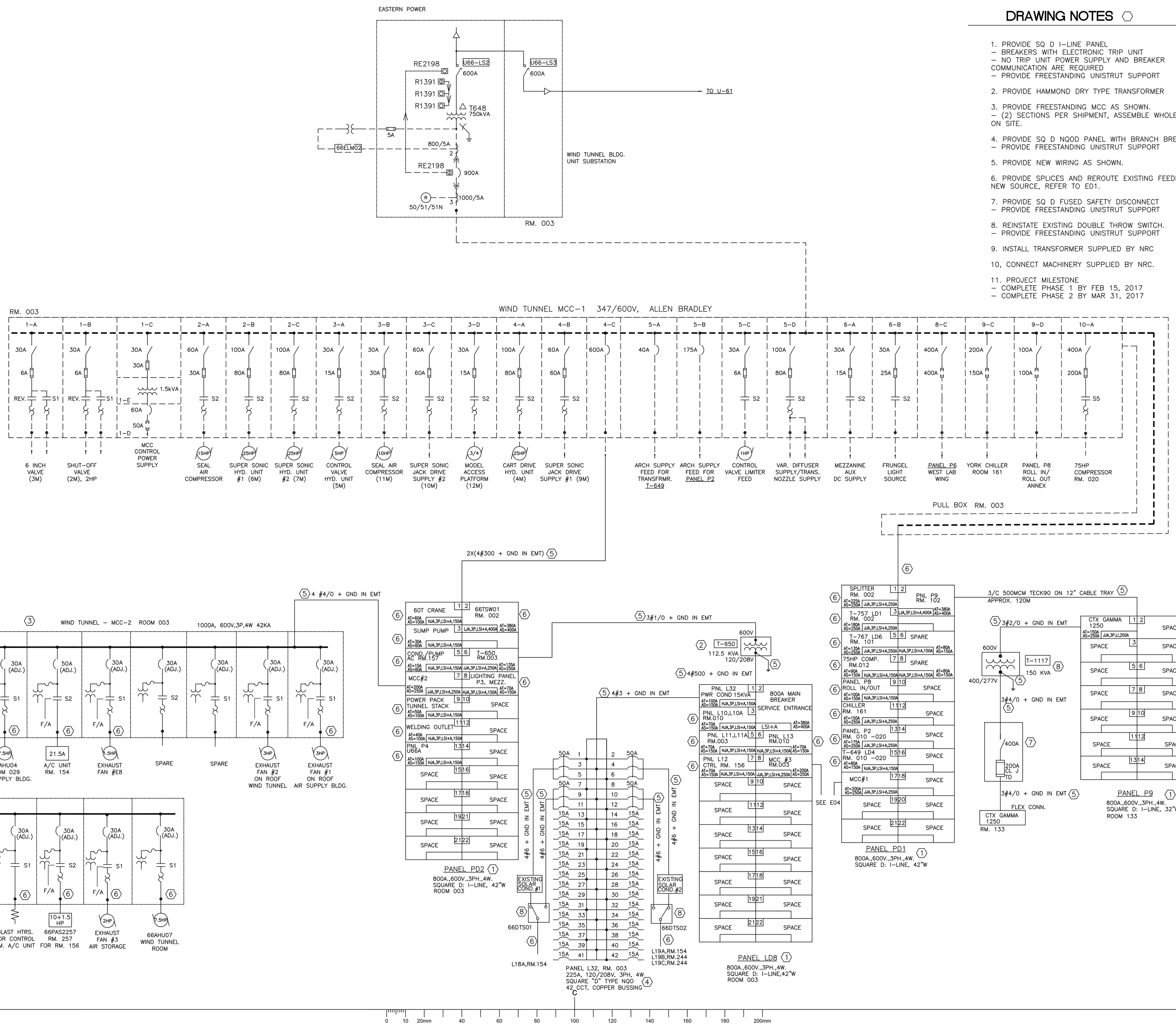
UPLANDS ROAD CAMPUS

drawing / dessin
EXISTING SINGLE LINE

designed / conçu	KXL	date / date	OCT/2016
drawn / dessiné	KXL	scale / échelle	NTS
checked / vérifié	KXL	sheet / feuille	E01 of/de E10
approved / approuvé	DL	W.O.no.	A1-006434-01
dwg.no. / dessin no.	5280-E01	D.T.no.	

ASPM A1 (841x594)

0 10 20mm 40 60 80 100 120 140 160 180 200mm



DRAWING NOTES

1. PROVIDE SQ D I-LINE PANEL
   - BREAKERS WITH ELECTRONIC TRIP UNIT
   - NO TRIP UNIT POWER SUPPLY AND BREAKER COMMUNICATION ARE REQUIRED.
   - PROVIDE FREESTANDING UNISTRUT SUPPORT
2. PROVIDE HAMMOND DRY TYPE TRANSFORMER
3. PROVIDE FREESTANDING MCC AS SHOWN.
   - (2) SECTIONS PER SHIPMENT, ASSEMBLE WHOLE UNIT ON SITE.
4. PROVIDE SQ D NQOD PANEL WITH BRANCH BREAKERS.
   - PROVIDE FREESTANDING UNISTRUT SUPPORT
5. PROVIDE NEW WIRING AS SHOWN.
6. PROVIDE SPLICES AND REROUTE EXISTING FEEDER TO NEW SOURCE, REFER TO E01.
7. PROVIDE SQ D FUSED SAFETY DISCONNECT
   - PROVIDE FREESTANDING UNISTRUT SUPPORT
8. REINSTATE EXISTING DOUBLE THROW SWITCH.
   - PROVIDE FREESTANDING UNISTRUT SUPPORT
9. INSTALL TRANSFORMER SUPPLIED BY NRC
10. CONNECT MACHINERY SUPPLIED BY NRC.
11. PROJECT MILESTONE
    - COMPLETE PHASE 1 BY FEB 15, 2017
    - COMPLETE PHASE 2 BY MAR 31, 2017

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project / projet
BUILDING U66
ROOM 003 ELECTRICAL UPGRADE

UPLANDS ROAD CAMPUS

drawing / dessin
SINGLE LINE DIAGRAM
PHASE 1 AND PHASE 2

designed / conçu	date / date
KXL	OCT/2016
drawn / dessiné	scale / échelle
KXL	NTS
checked / vérifié	sheet / feuille
KXL	E02 of/de E10
approved / approuvé	W.O.no. / D.T.no.
DL	A1-006434-01

dwg.no. / dessin no.
5280-E02

ASPM A1 (841x594)

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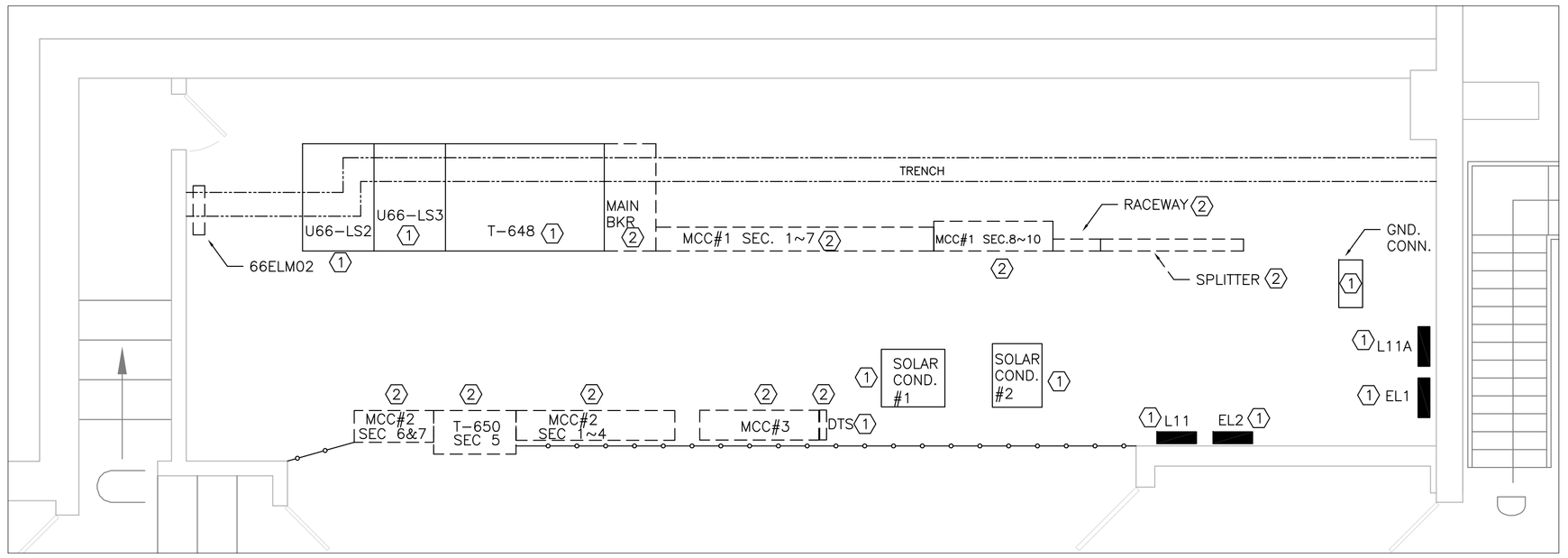
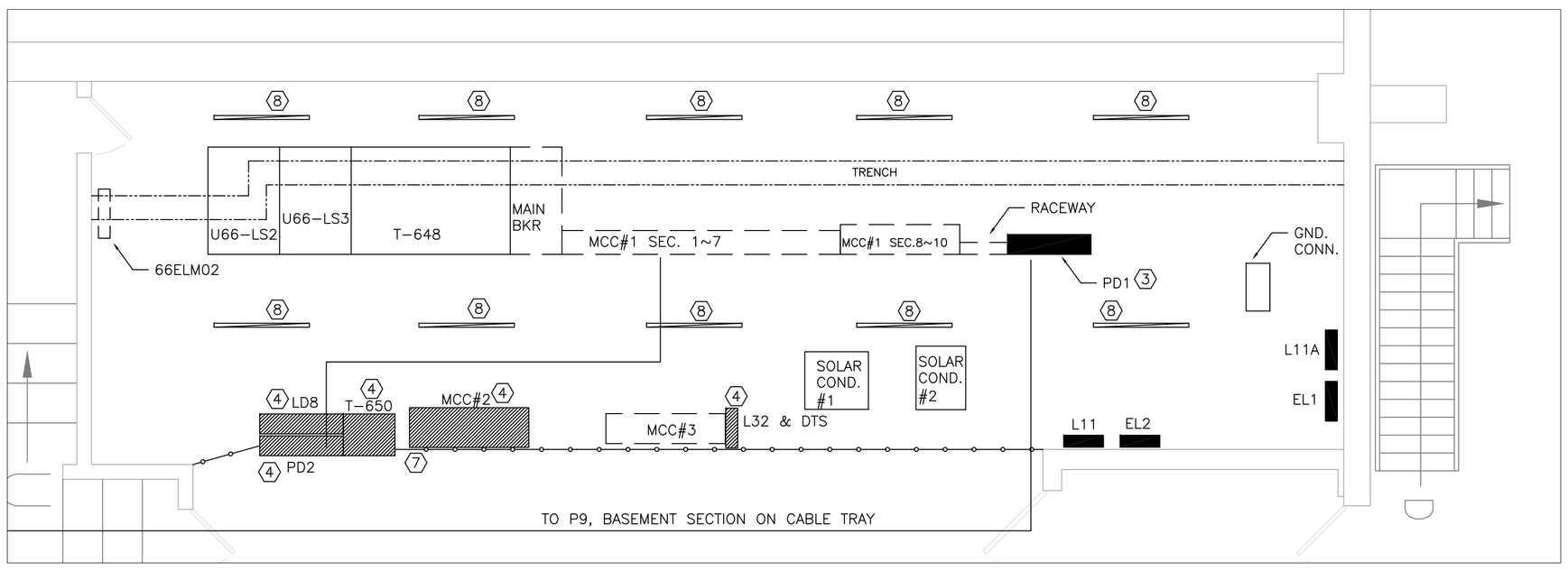


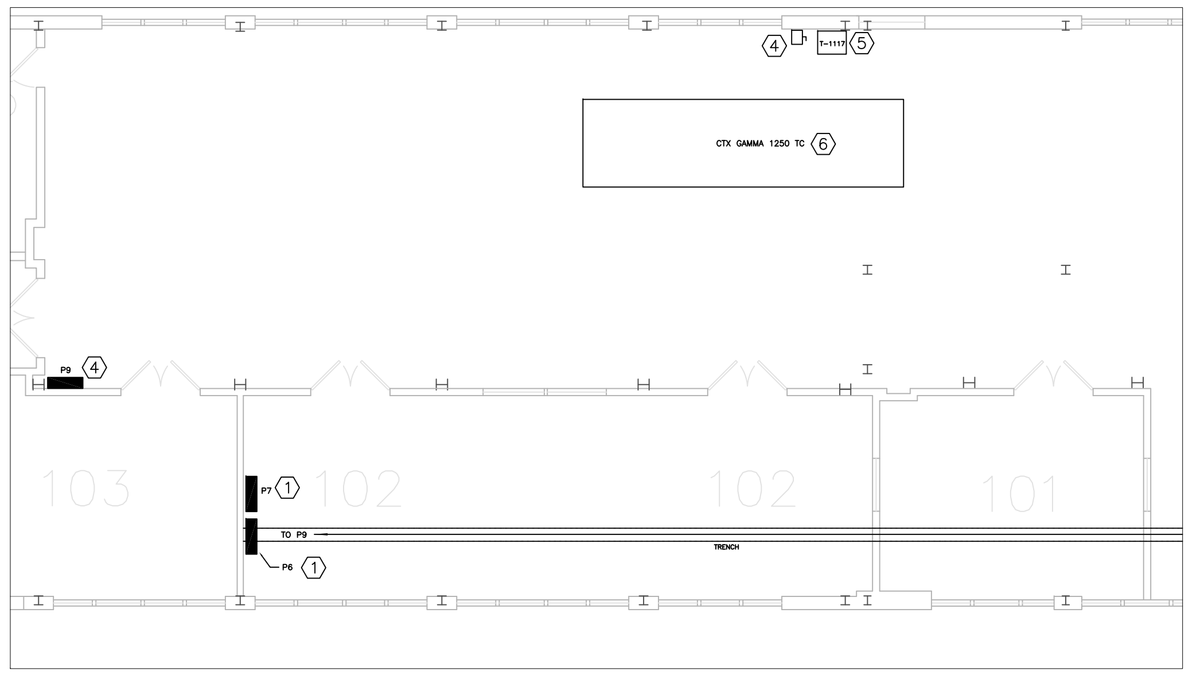
1 / E03 EXISTING RM. 003 LAYOUT

SCALE: 1:50



2 / E03 RM. 003 PH1 & PH2 LAYOUT

SCALE: 1:50



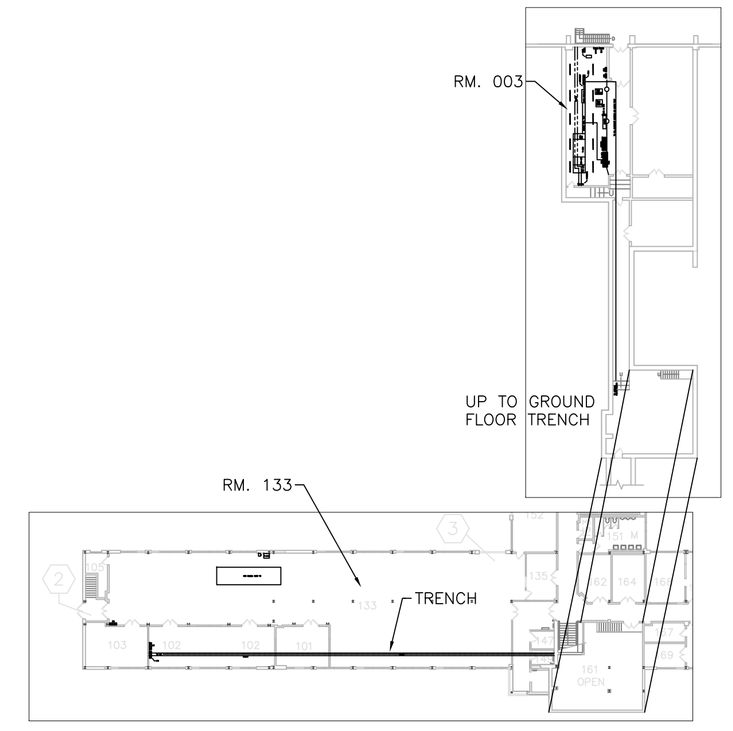
3 / E03 RM. 003 PH1 LAYOUT

SCALE: 1:50

DRAWING NOTES

X

1. EXISTING EQUIPMENT TO REMAIN.
2. EXISTING EQUIPMENT TO BE DEMOLISHED.
3. NEW EQUIPMENT PROVIDED IN PHASE 1.
4. NEW EQUIPMENT PROVIDED IN PHASE 2.
5. EQUIPMENT SUPPLIED TO BE INSTALLED IN PHASE 1.
6. MACHINARY SUPPLIED BY NRC TO BE CONNECTED.
7. REBUILD EXISTING FENCE AS PER NEW LAYOUT.
8. REPLACE EXISTING FLUORESCENT LIGHTING FIXTURE WITH NEW LED FIXTURE, QTY:10
   – PHILLIPS FLUXSTREAM LINEAR LIGHT, CAT: LF-4-39-40-U-DZT



4 / E03 PARTIAL BASEMENT AND GROUND FLOOR PLAN

SCALE: 1:500

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project / projet
BUILDING U66
ROOM 003 ELECTRICAL UPGRADE

UPLANDS ROAD CAMPUS

drawing / dessin
FLOOR PLAN AND EQUIPMENT LAYOUT

designed / conçu: KXL	date / date: OCT/2016
drawn / dessiné: KXL	scale / échelle: AS NOTED
checked / vérifié: KXL	sheet / feuille: E03 of/de E10
approved / approuvé: DL	W.O.no.: A1-006434-01
dwg.no.: 5280-E03	D.T.no. / dessin no.

ASPM A1 (841x594)

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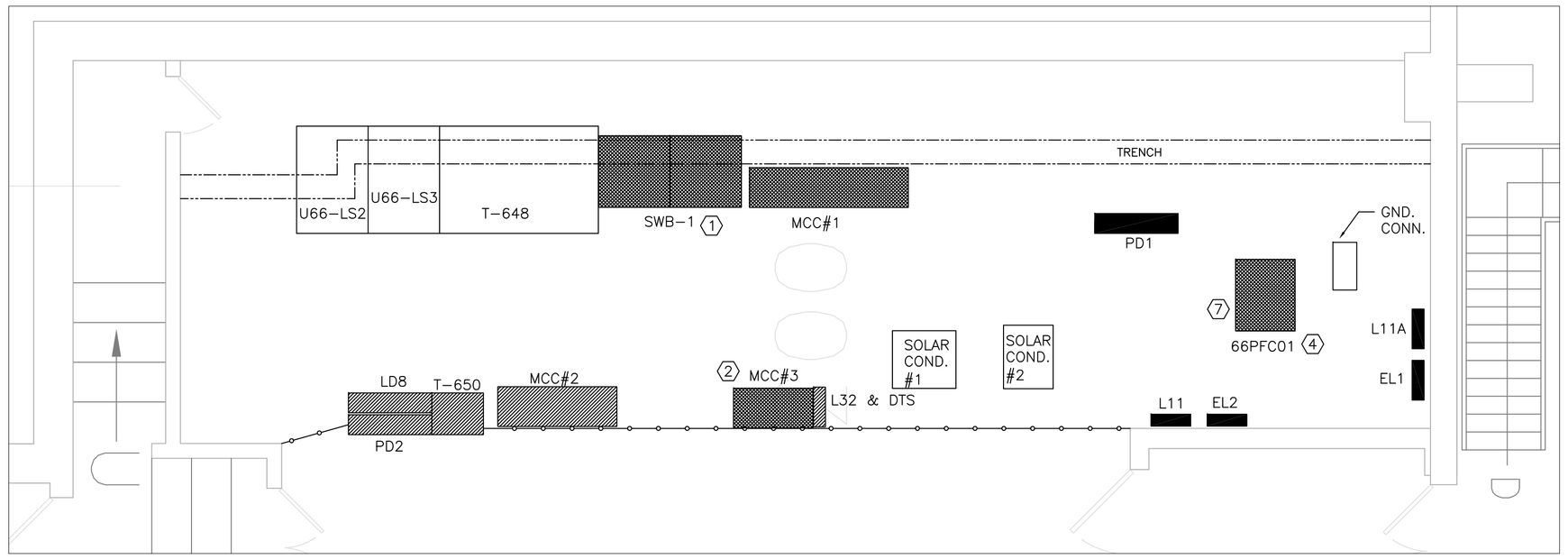
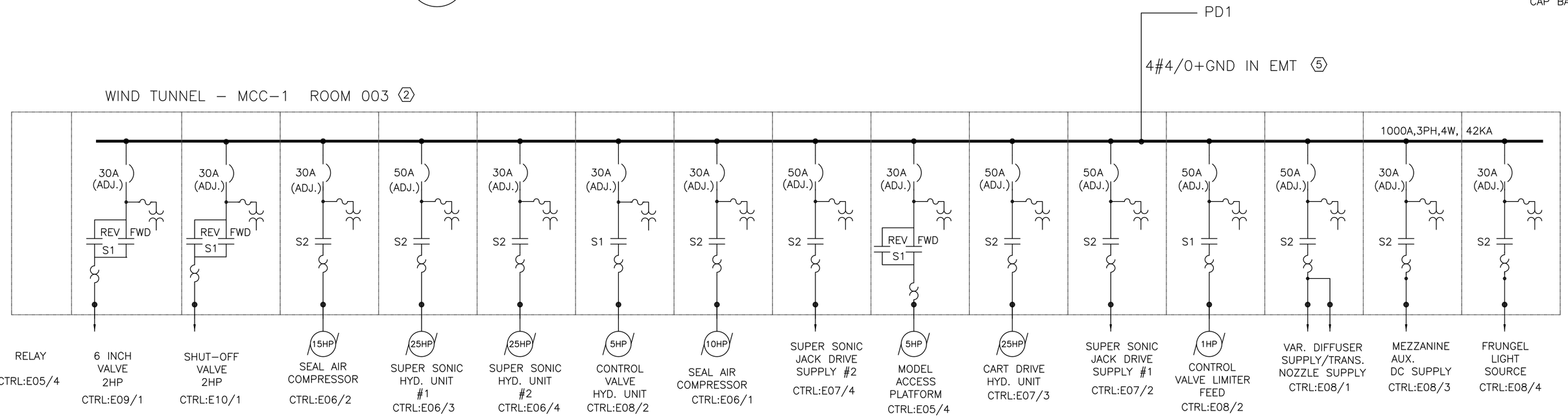
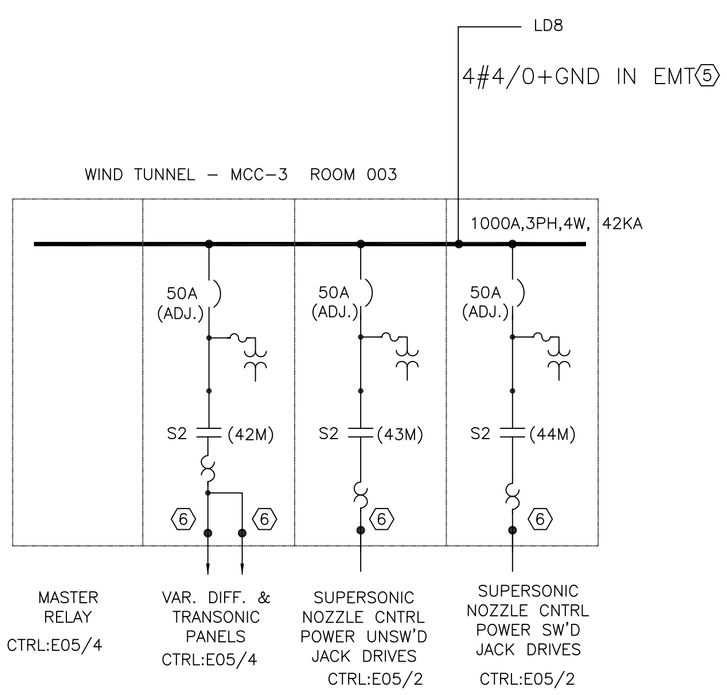
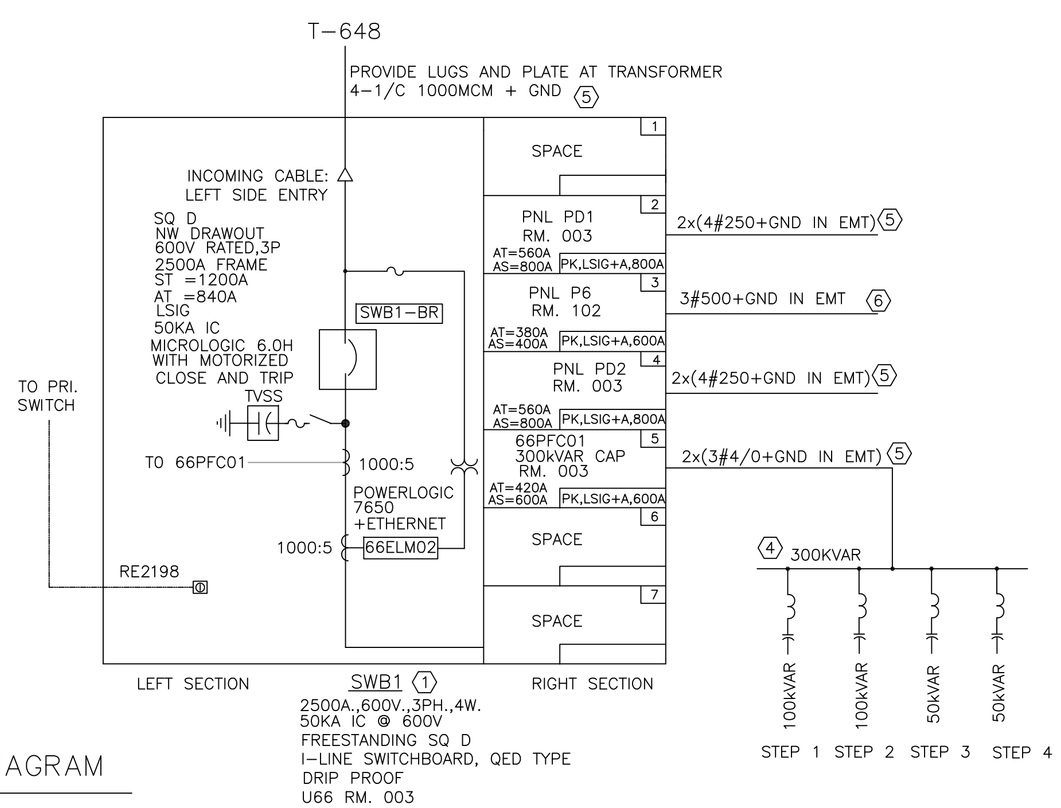


1 / E04 RM. 003 PH.3 LAYOUT

SCALE: 1:50

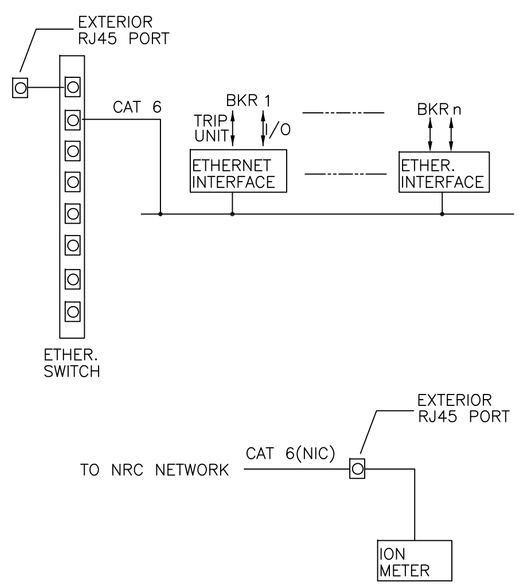






2 / E04 PH.3 SINGLE LINE DIAGRAM

SCALE:



3 / E04 SWB1 NETWORK CONNECTION

SCALE:

DRAWING NOTES ⬡

1. PROVIDE NEW FREESTANDING 600V SWITCHBOARD IN PHASE 3
   – SQ D QED SWITCHBOARD
   – MAIN BREAKER AND BRANCH BREAKER TO HAVE SHUNT CLOSE AND OPEN COIL CONTROL THROUGH TCP/IP COMMUNICATION FROM PLC. PRE–WIRED ETHERNET INTERFACE TO EACH BREAKER. PROVIDE ONE ETHERNET PORT TO BE ACCESSIBLE FROM EXTERIOR SURFACE.
   – ON BOARD METER SHOULD BE WIRED WITH SEPARATE ETHERNET PORT TO BE ACCESSIBLE FROM EXTERIOR SURFACE.
   – PROVIDE TVSS.
   – MAXIMUM ONE SECTION THROUGH EXISTING PASSAGE, ASSEMBLE BOTH SECTIONS ON SITE.
   – KIRK KEY ON MAIN BREAKER SECTION TO MATCH EXISTING.
2. PROVIDE FREESTANDING MCC IN PHASE 3.
   – (2) SECTIONS PER SHIPMENT, ASSEMBLE WHOLE UNIT ON SITE.
3. BLANK
4. PROVIDE AUTOMATIC DETUNED POWER FACTOR CORRECTION CAPACITOR BANK
   – PROVIDE CT AT MAIN SOURCE AND #10 WIRING TO UNIT PER MANUFACTURER INSTRUCTION.
5. PROVIDE NEW WIRING AS SHOWN.
6. PROVIDE SPLICES AND REROUTE EXISTING FEEDER TO NEW SOURCE, REFER TO E01.
7. RELOCATE EXISTING CONDUIT INTERFERE WITH NEW CAP BANK

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project / projet
BUILDING U66
ROOM 033 ELECTRICAL UPGRADE

UPLANDS ROAD CAMPUS

drawing / dessin
PHASE 3 SINGLE LINE DIAGRAM AND RM. 033 EQUIPMENT LAYOUT

designed / conçu	date / date
KXL	OCT/2016
drawn / dessiné	scale / échelle
KXL	AS NOTES
checked / vérifié	sheet / feuille
KXL	E04 of/de E10
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DL	A1-006434-01

dwg.no. / dessin no.
5280-E04

ASPM A1 (841x594)

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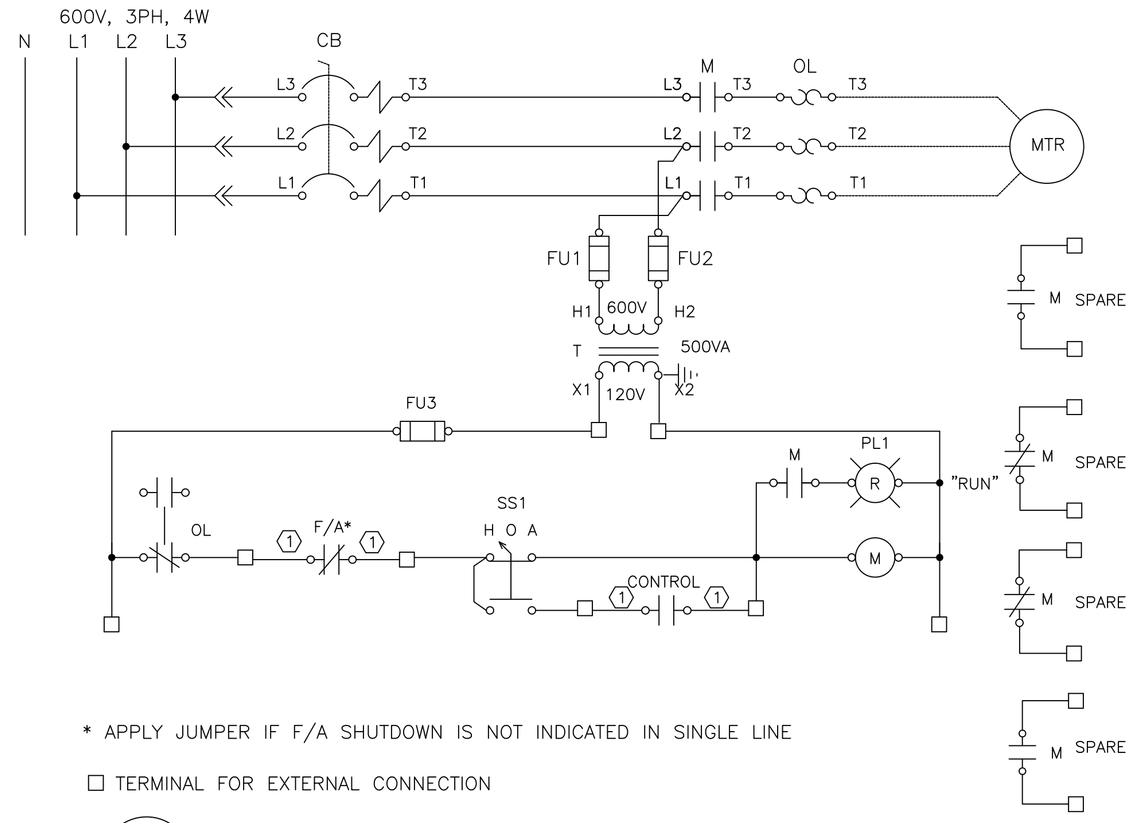
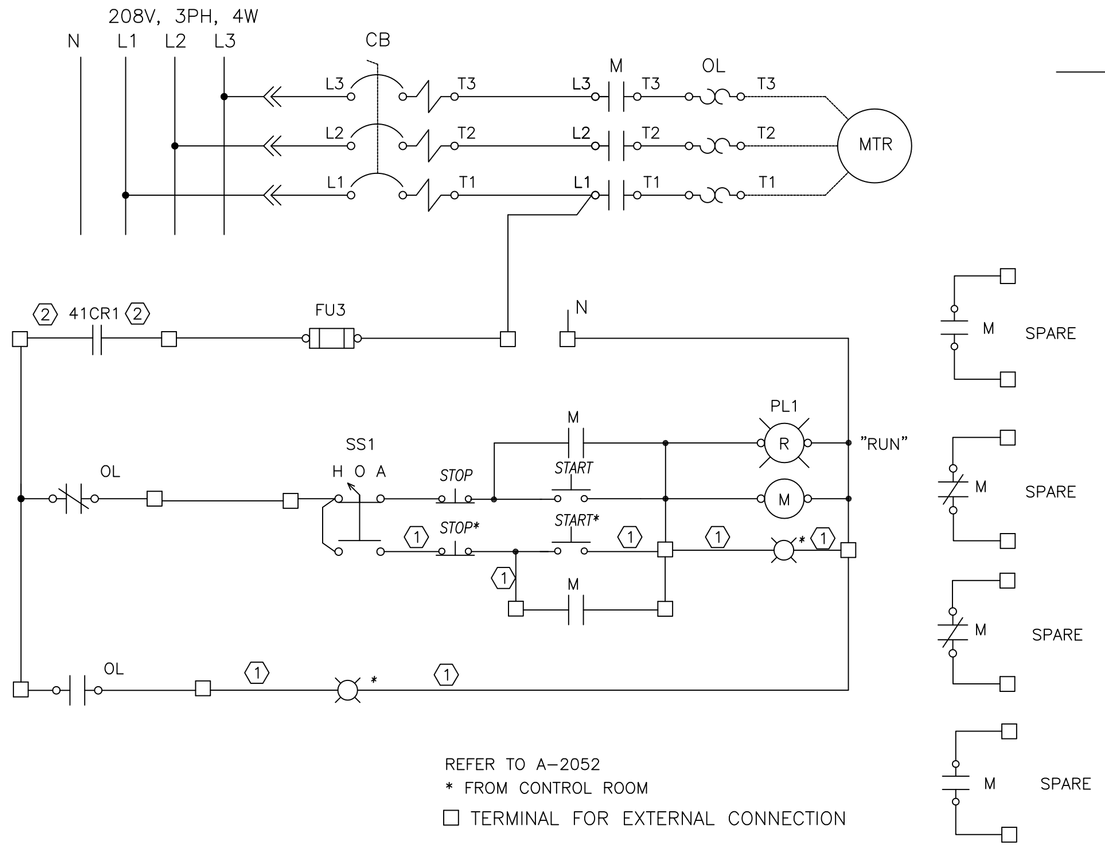


* APPLY JUMPER IF F/A SHUTDOWN IS NOT INDICATED IN SINGLE LINE

☐ TERMINAL FOR EXTERNAL CONNECTION

1 / E05 TYPICAL MCC #2 CONTROL CIRCUIT

SCALE:



REFER TO A–2052

* FROM CONTROL ROOM

☐ TERMINAL FOR EXTERNAL CONNECTION

3 / E05 MCC #3 42M CONTROL CIRCUIT

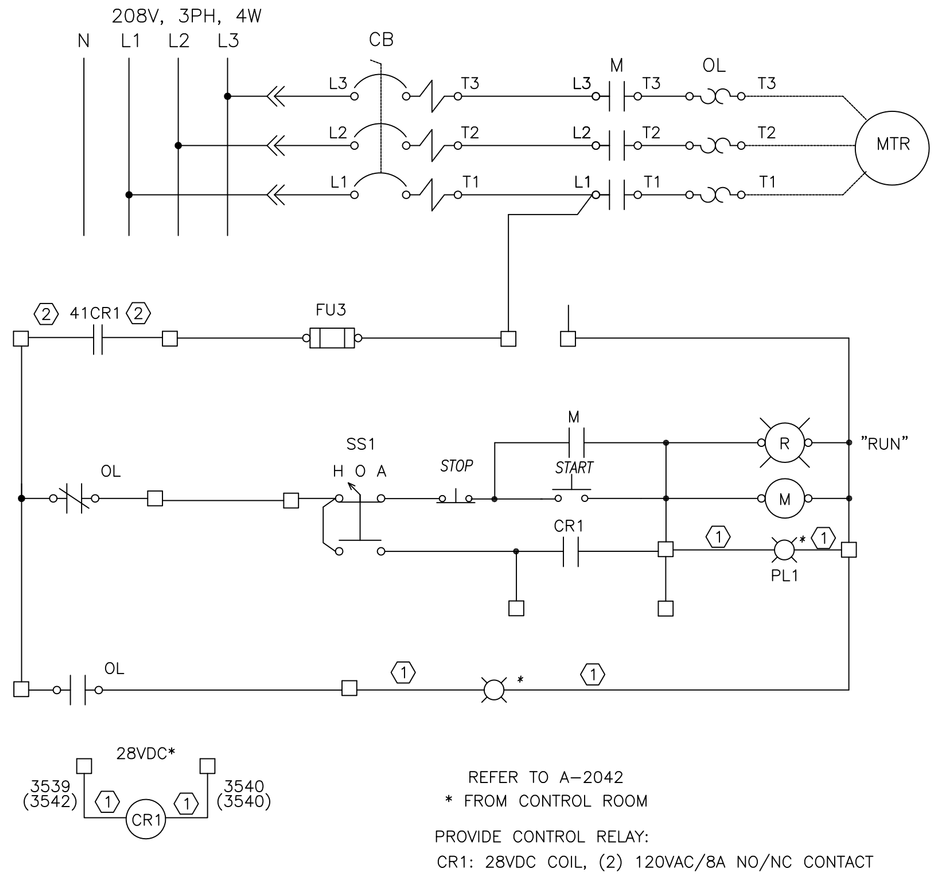
SCALE:

DRAWING NOTES ⬡

1. CONTRACTOR TO IDENTIFY EXISTING CONTROL WIRES TO MCC. PROVIDE SPLICES AND RECONNECT EIXSTING CONTROL WIRES, COORDINATE WITH NRC OPERATION FOR INSTALLATION AND COMMISSION.

2. PROVIDE NEW CONTROL WIRING, REFER TO E05/4

3. REPLACE EXISTING CONTACTORS IN VARIABLE DIFFUSER SUPPLY PANEL.
   - PROVIDE NEW CONTACTORS AS FOLLOWS:
     21M: NEMA 0
     22M, NEMA 0
     23M: NEMA 2
     25M: NEMA 2
   - RECONNECT EXISTING WIRING.
   - REFER TO A–2061



REFER TO A–2042

* FROM CONTROL ROOM

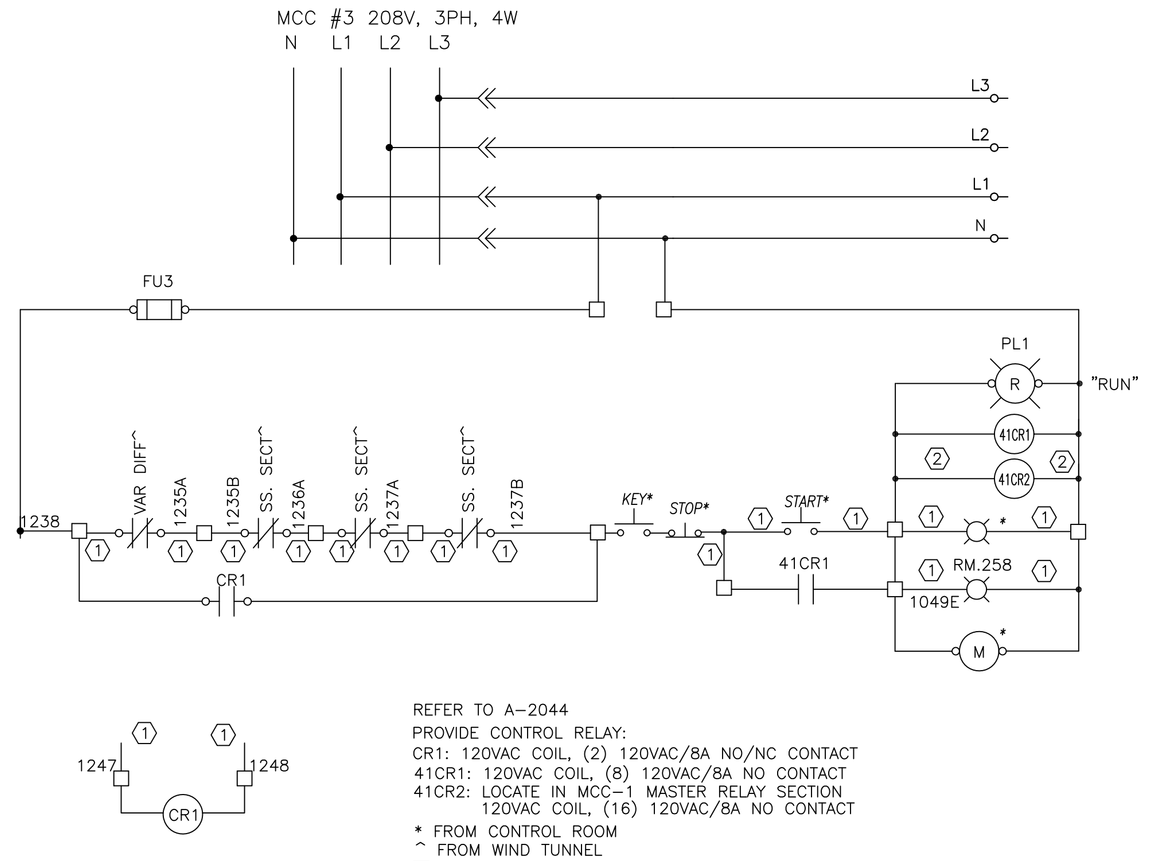
PROVIDE CONTROL RELAY:

CR1: 28VDC COIL, (2) 120VAC/8A NO/NC CONTACT

☐ TERMINAL FOR EXTERNAL CONNECTION

2 / E05 MCC #3 43M(44M) CONTROL CIRCUIT

SCALE:



REFER TO A–2044

PROVIDE CONTROL RELAY:

CR1: 120VAC COIL, (2) 120VAC/8A NO/NC CONTACT

41CR1: 120VAC COIL, (8) 120VAC/8A NO CONTACT

41CR2: LOCATE IN MCC–1 MASTER RELAY SECTION
120VAC COIL, (16) 120VAC/8A NO CONTACT

* FROM CONTROL ROOM

^ FROM WIND TUNNEL

☐ TERMINAL FOR EXTERNAL CONNECTION

4 / E05 MCC #3/MCC#1 MASTER RELAY

SCALE:

National Research Council Canada | Conseil national de recherches Canada

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0	OCT/24 2016	ISSUED FOR TENDER	KXL

Date Printed DD MM YYYY | Date imprimée

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A Detail no. No. du détail
B Location drawing no. sur dessin no.
C Drawing no. dessin no.

project / projet

BUILDING U66
ROOM 003 ELECTRICAL UPGRADE

UPLANDS ROAD CAMPUS

drawing / dessin

MCC CONTROL CIRCUIT SHEET 1

designed / conçu: KXL	date / date: OCT/2016
drawn / dessiné: KXL	scale / échelle: NTS
checked / vérifié: KXL	sheet / feuille: E05 of/de E10
approved / approuvé: DL	W.O.no.: A1-006434-01 / D.T.no.

dwg.no. / dessin no.: 5280-E05

ASPM A1 (841x594)

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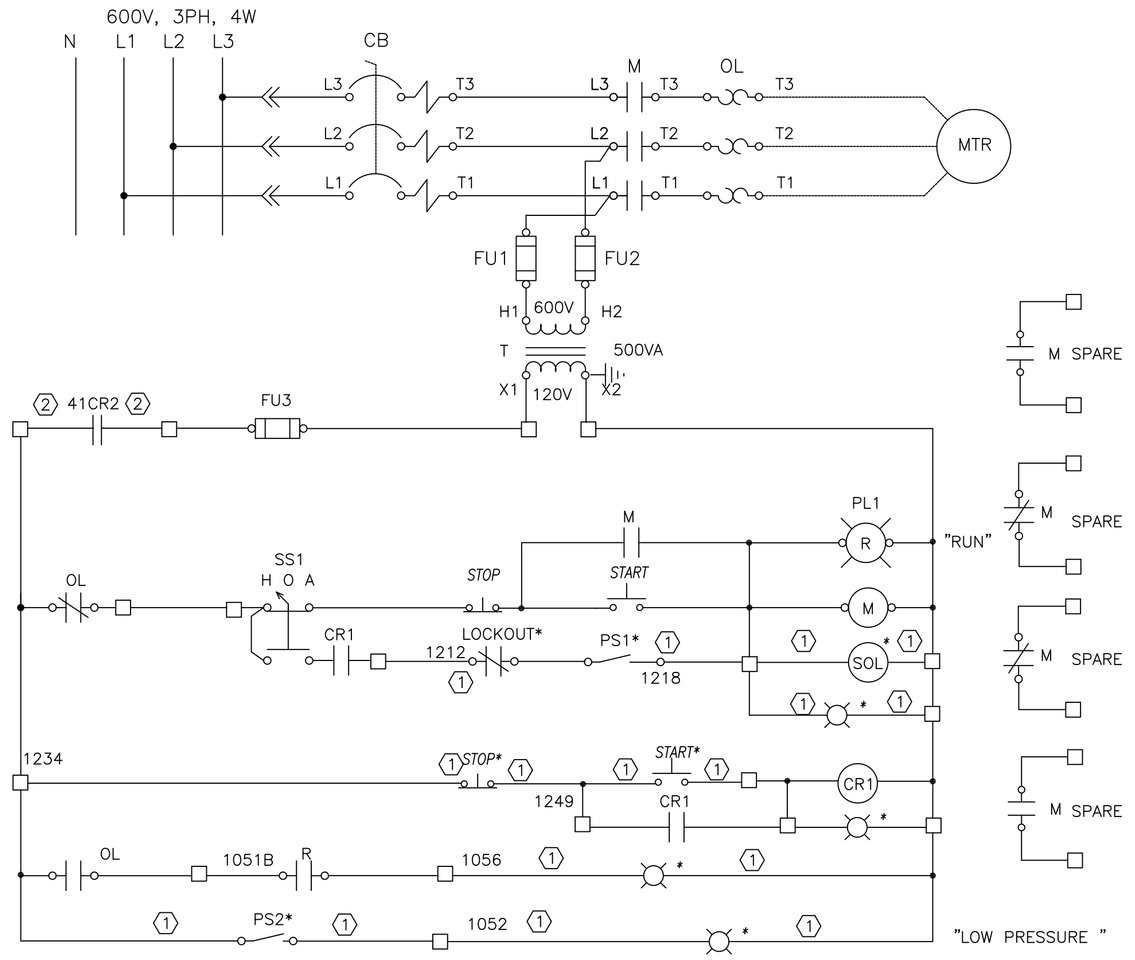
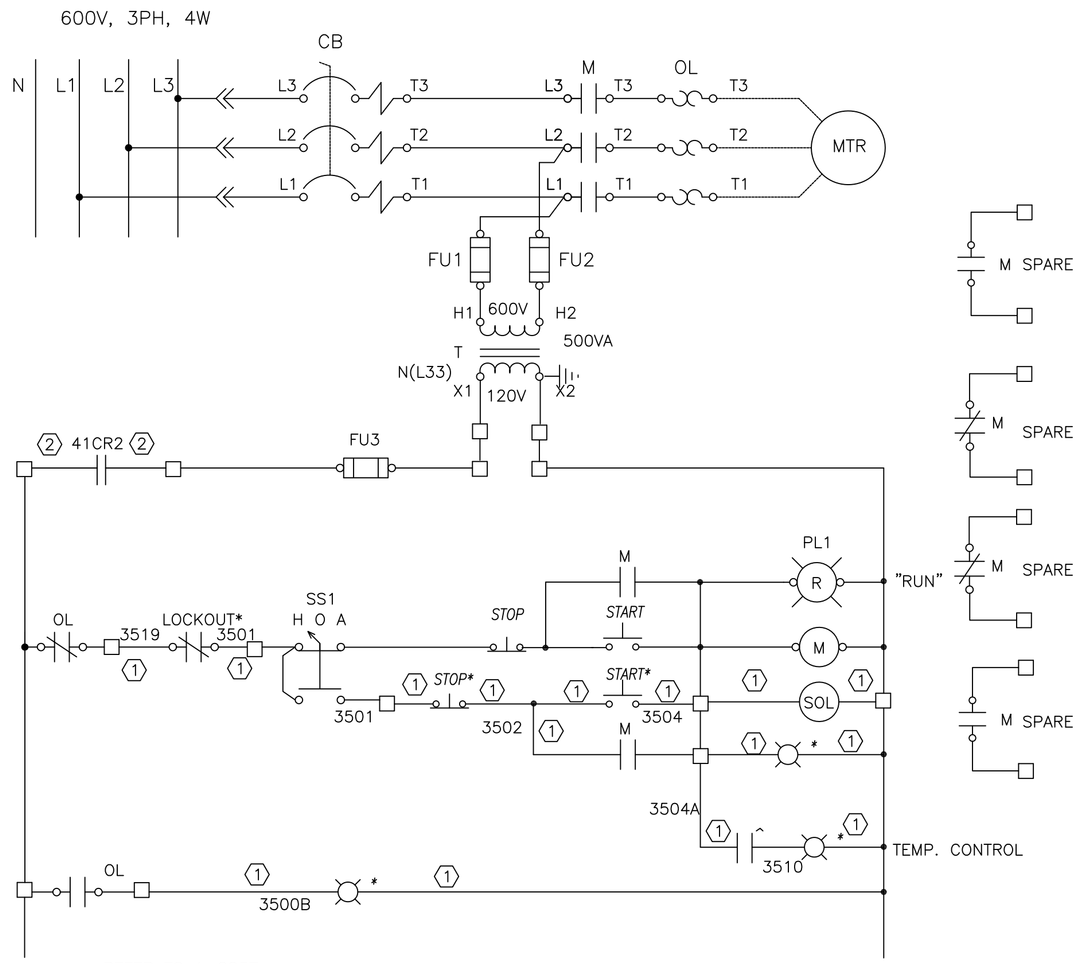


REFER TO A–2045
PROVIDE CONTROL RELAY:
CR1: 120VAC COIL, (4) 120VAC/8A NO CONTACT

* FROM COMPRESSOR ☐ TERMINAL FOR EXTERNAL CONNECTION

1 / E06 MCC #1 10HP SEAL AIR COMPRESSOR

SCALE:

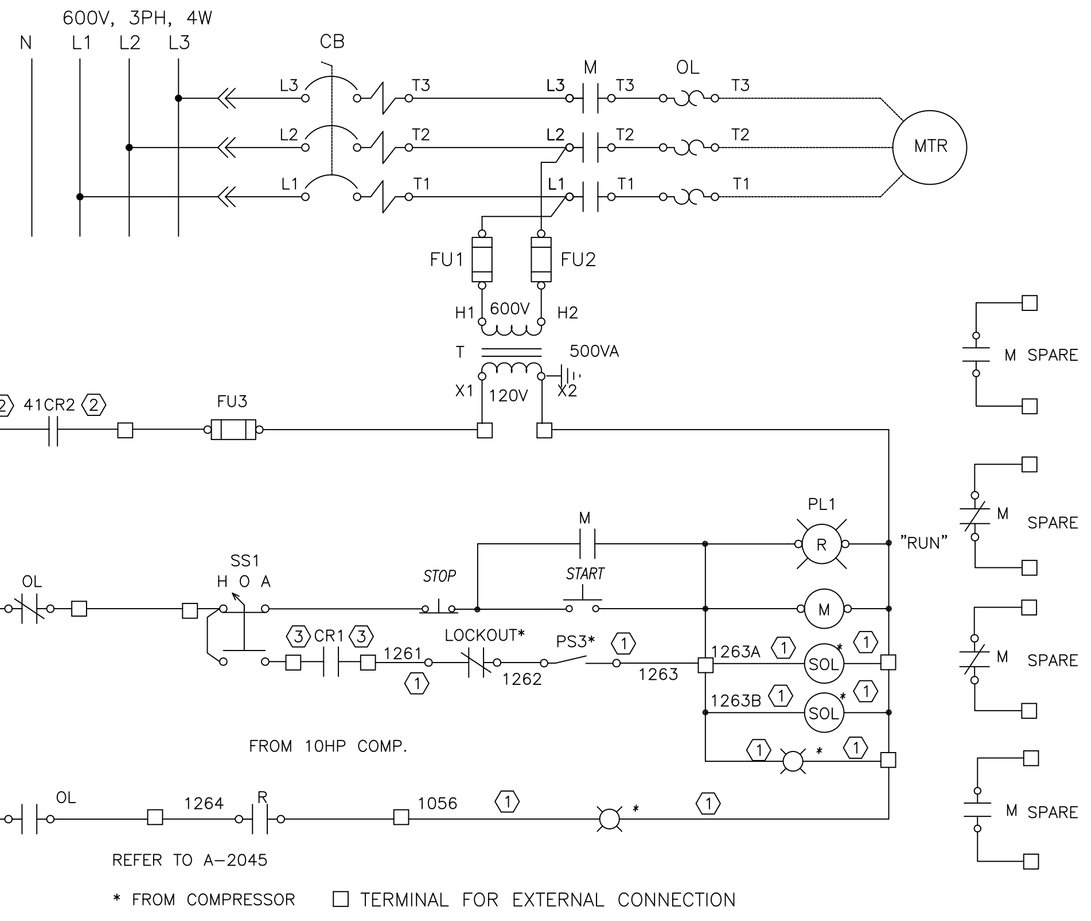


REFER TO A–2037

* FROM CONTROL ROOM
^ FROM HYDRAULIC UNIT ☐ TERMINAL FOR EXTERNAL CONNECTION

3 / E06 MCC #1 SUPERSONIC HYDRAULIC UNIT #1

SCALE:

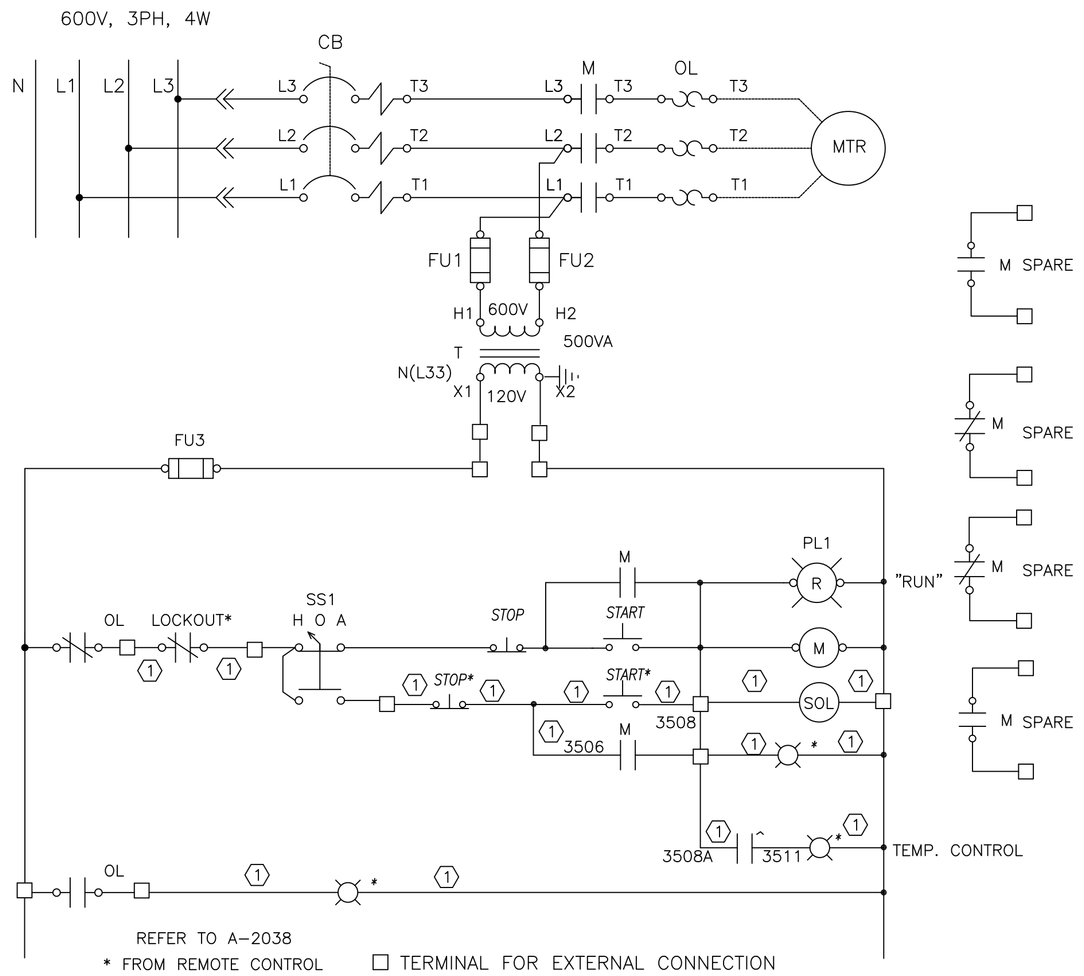


REFER TO A–2045

* FROM COMPRESSOR ☐ TERMINAL FOR EXTERNAL CONNECTION

2 / E06 MCC #1 15HP SEAL AIR COMPRESSOR

SCALE:



* FROM REMOTE CONTROL ☐ TERMINAL FOR EXTERNAL CONNECTION

4 / E06 MCC #1 SUPERSONIC HYDRAULIC UNIT #2

SCALE: C

DRAWING NOTES

1. CONTRACTOR TO IDENTIFY EXISTING CONTROL WIRES TO MCC. PROVIDE SPLICES AND RECONNECT EIXSTING CONTROL WIRES, COORDINATE WITH NRC OPERATION FOR INSTALLATION AND COMMISSION.

2. PROVIDE NEW CONTROL WIRING, REFER TO E05/4.

3. NEW INTERCONNECTION FROM E06/1.

National Research Council Canada / Conseil national de recherches Canada
Administrative Services and Property Management Branch / Division des services administratifs et gestion de l'immobilier

NRC · CNRC

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project / projet
BUILDING U66
ROOM 003 ELECTRICAL UPGRADE

UPLANDS ROAD CAMPUS

drawing / dessin
MCC CONTROL CIRCUIT SHEET 2

designed / conçu: KXL	date: OCT/2016
drawn / dessiné: KXL	scale / échelle: NTS
checked / vérifié: KXL	sheet / feuille: E06 of/de E10
approved / approuvé: DL	W.O.no.: A1-006434-01
dwg.no.: 5280-E06	dessin no.

ASPM A1 (841x594)

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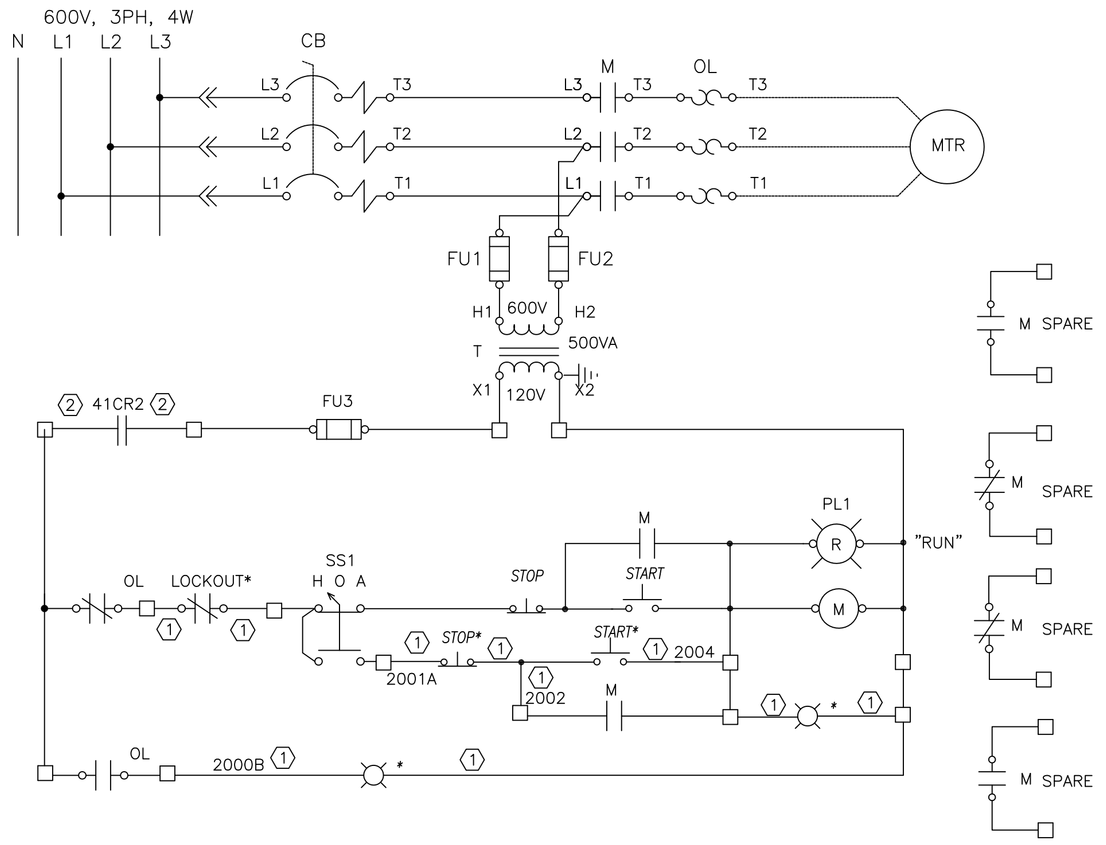
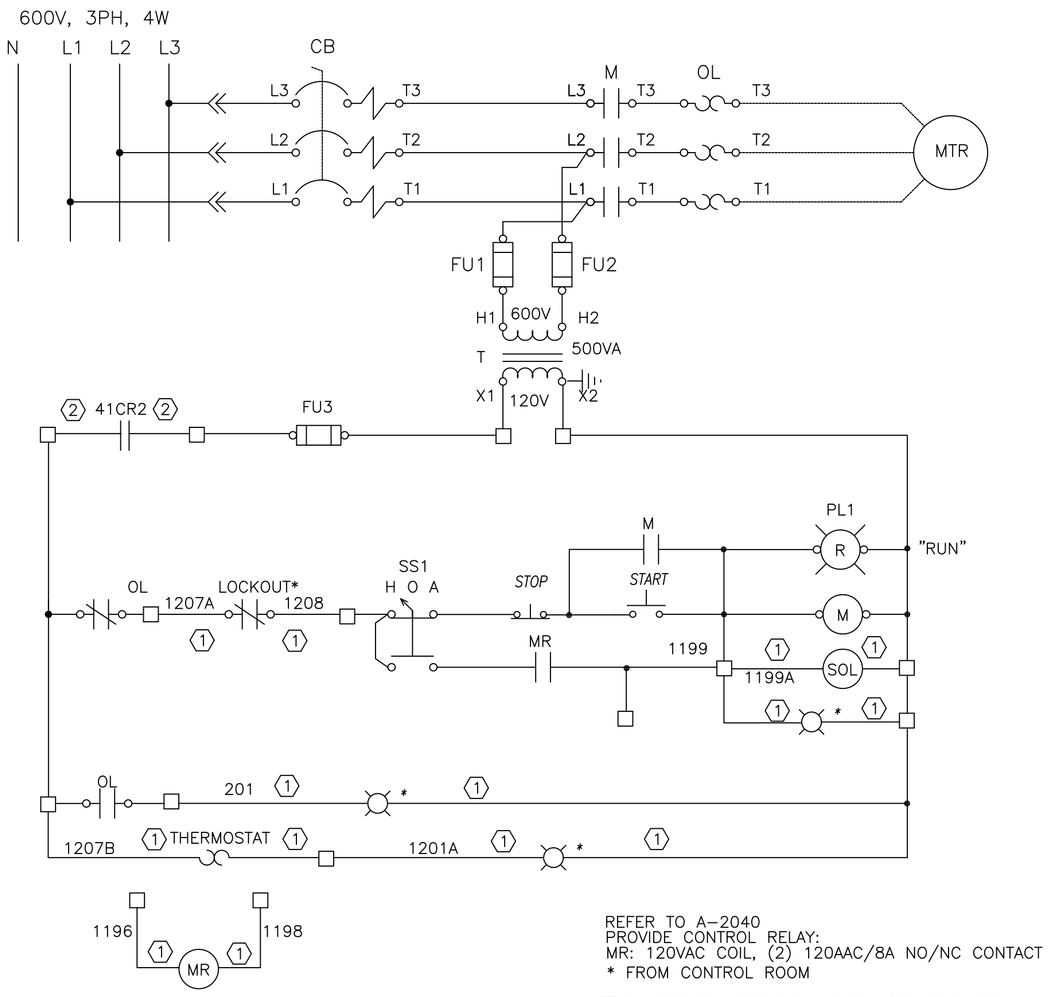


1 / E07 MCC #1 CONTROL VALVE HYDRAULIC UNIT

SCALE:



3 / E07 MCC #1 CART DRIVE HYDRAULIC UNIT

SCALE:

DRAWING NOTES

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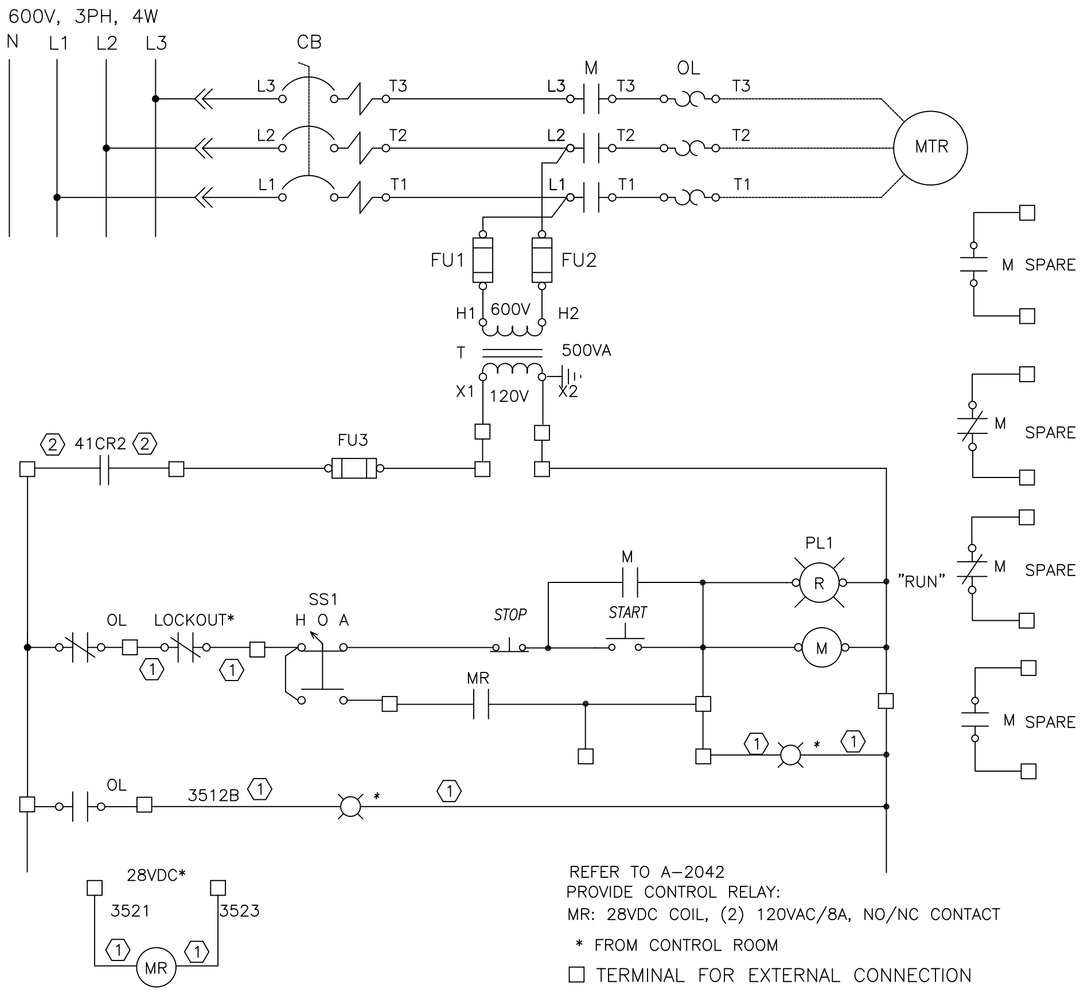
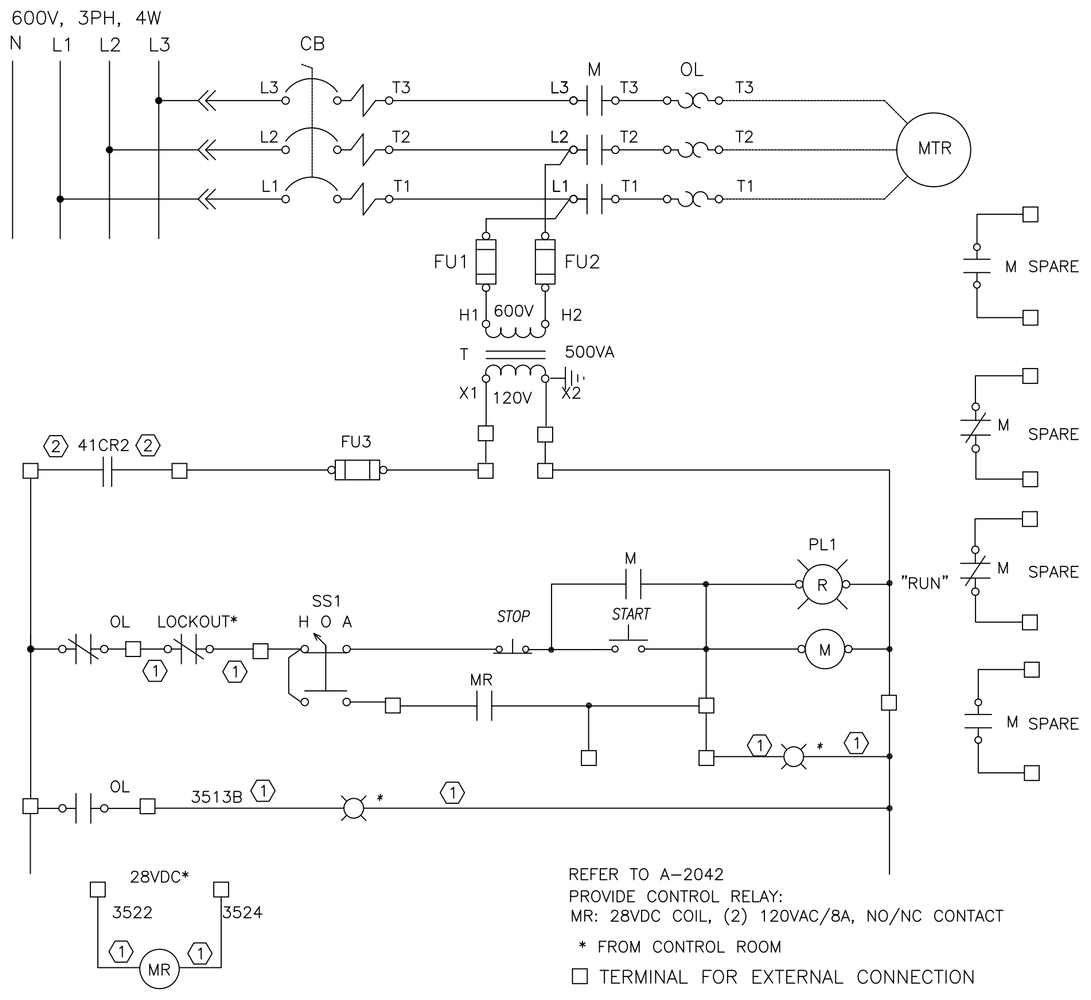


2 / E07 MCC #1 SUPERSONIC JACK DRIVE NO.1

SCALE:



4 / E07 MCC #1 SUPERSONIC JACK DRIVE NO. 2

SCALE:

National Research Council Canada
Conseil national de recherches Canada
Administrative Services and Property Management Branch
Division des services administratifs et gestion de l'immobilier

NRC · CNRC

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project / projet
BUILDING U66
ROOM 003 ELECTRICAL UPGRADE

UPLANDS ROAD CAMPUS

drawing / dessin
MCC CONTROL CIRCUIT SHEET 3

designed / conçu	date / date
KXL	OCT/2016
drawn / dessiné	scale / échelle
KXL	NTS
checked / vérifié	sheet / feuille
KXL	E07 of/de E10
approved / approuvé	W.O.no. / D.T.no.
DL	A1-006434-01

dwg.no. / dessin no.
5280-E07

ASPM A1 (841x594)

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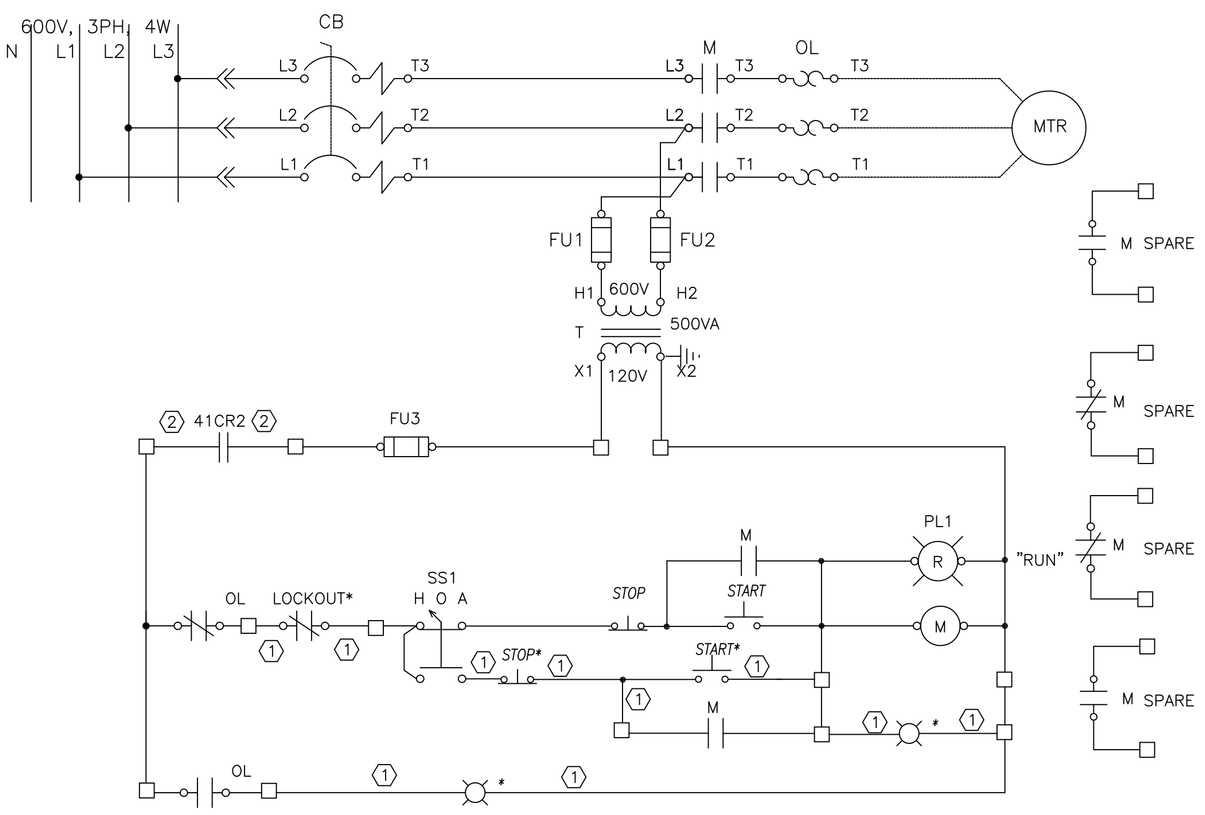


* FROM CONTROL ROOM

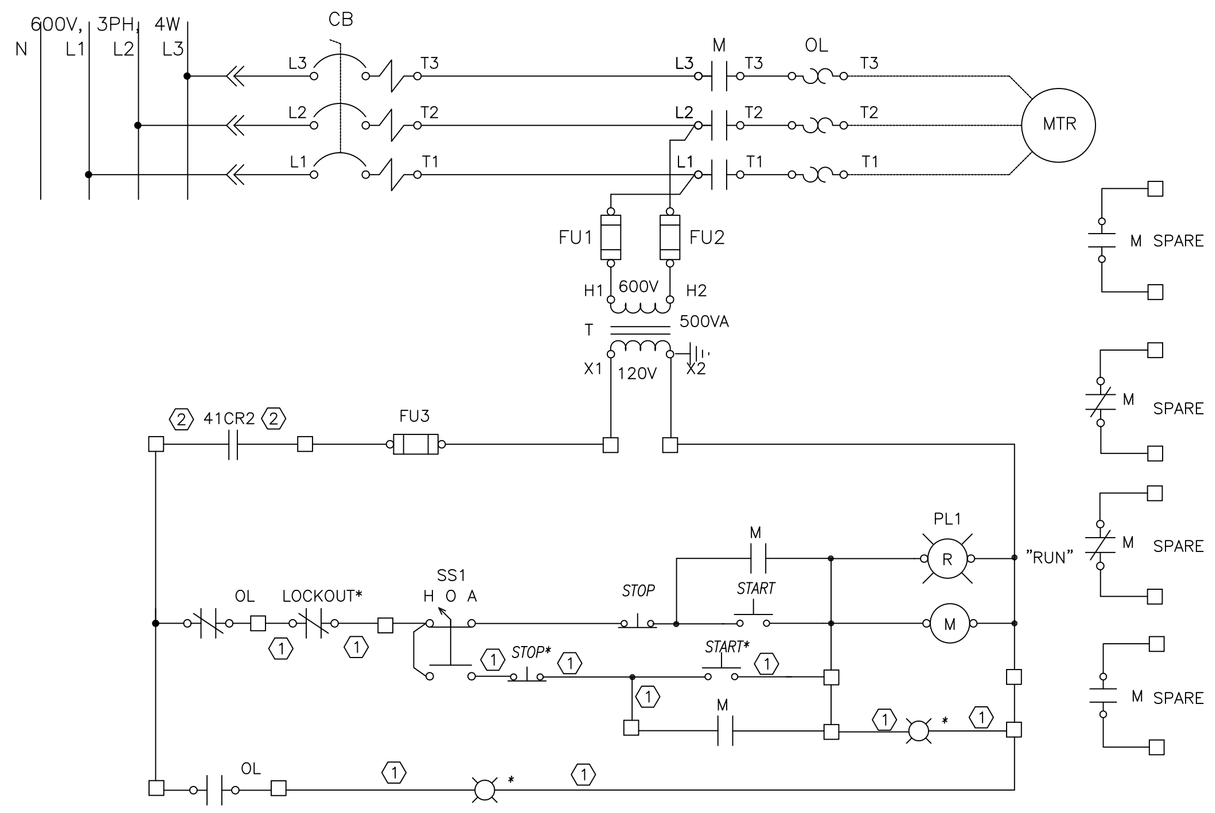
REFER TO A–2052

* FROM CONTROL ROOM

☐ TERMINAL FOR EXTERNAL CONNECTION

1 / E08 MCC #1 VARIABLE DIFFUSER/TRANS. NOZZLE SUPPLY

SCALE:

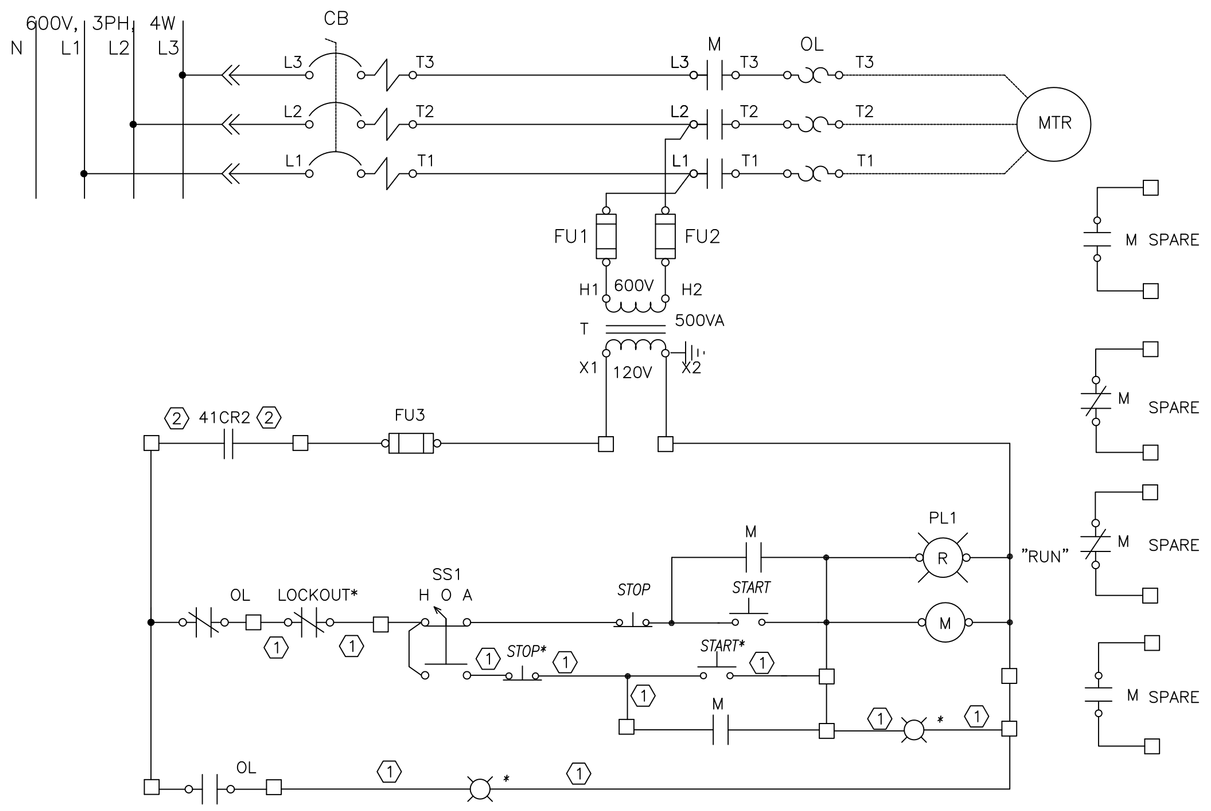


* FROM CONTROL ROOM

☐ TERMINAL FOR EXTERNAL CONNECTION

3 / E08 MCC #1 MEZZ. DC AUXILIARY SUPPLY

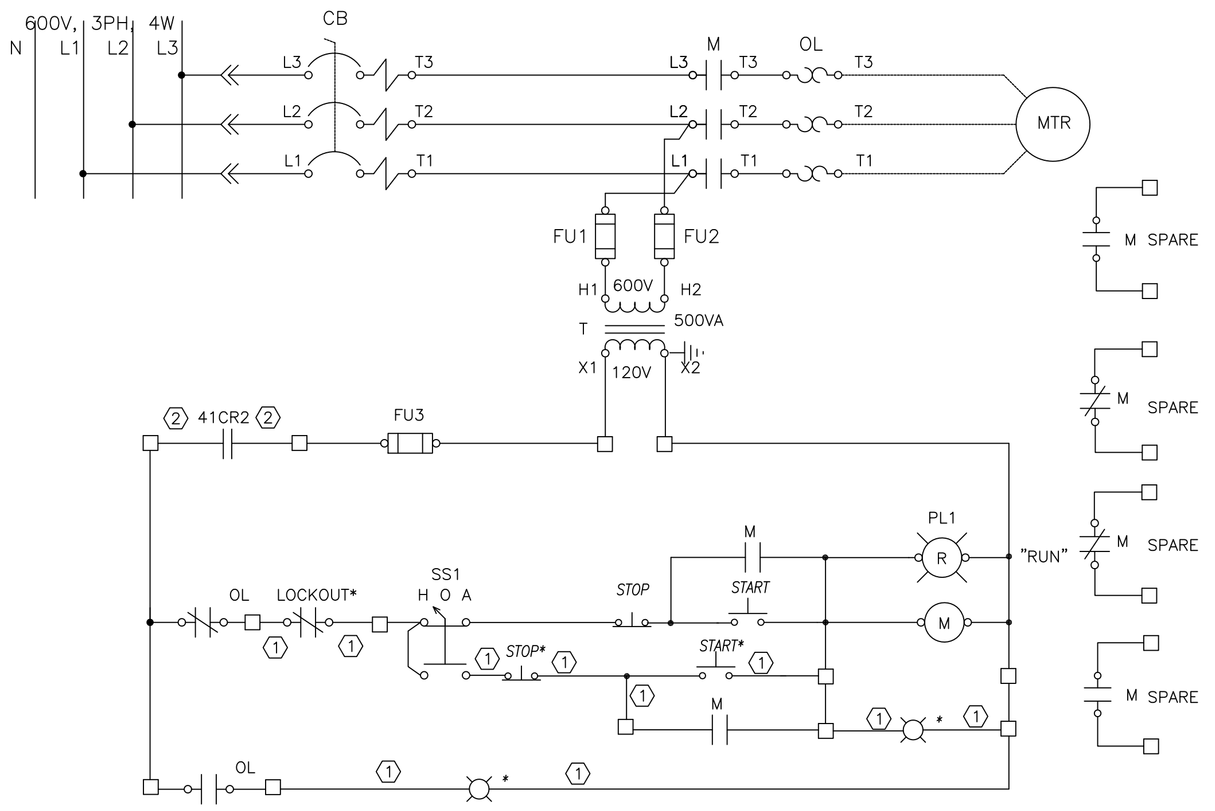
SCALE:



* FROM CONTROL ROOM ☐ TERMINAL FOR EXTERNAL CONNECTION

2 / E08 MCC #1 CONTROL VALVE LIMITER FEED

SCALE:



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4 / E08 MCC #1 FRUNGEL LIGIHT SOURCE

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project / projet
BUILDING U66
ROOM 003 ELECTRICAL UPGRADE

UPLANDS ROAD CAMPUS

drawing / dessin
MCC CONTROL CIRCUIT SHEET 4

designed / conçu	date / date
KXL	OCT/2016
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KXL	E08 of/de E10
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5280-E08

ASPM A1 (841x594)

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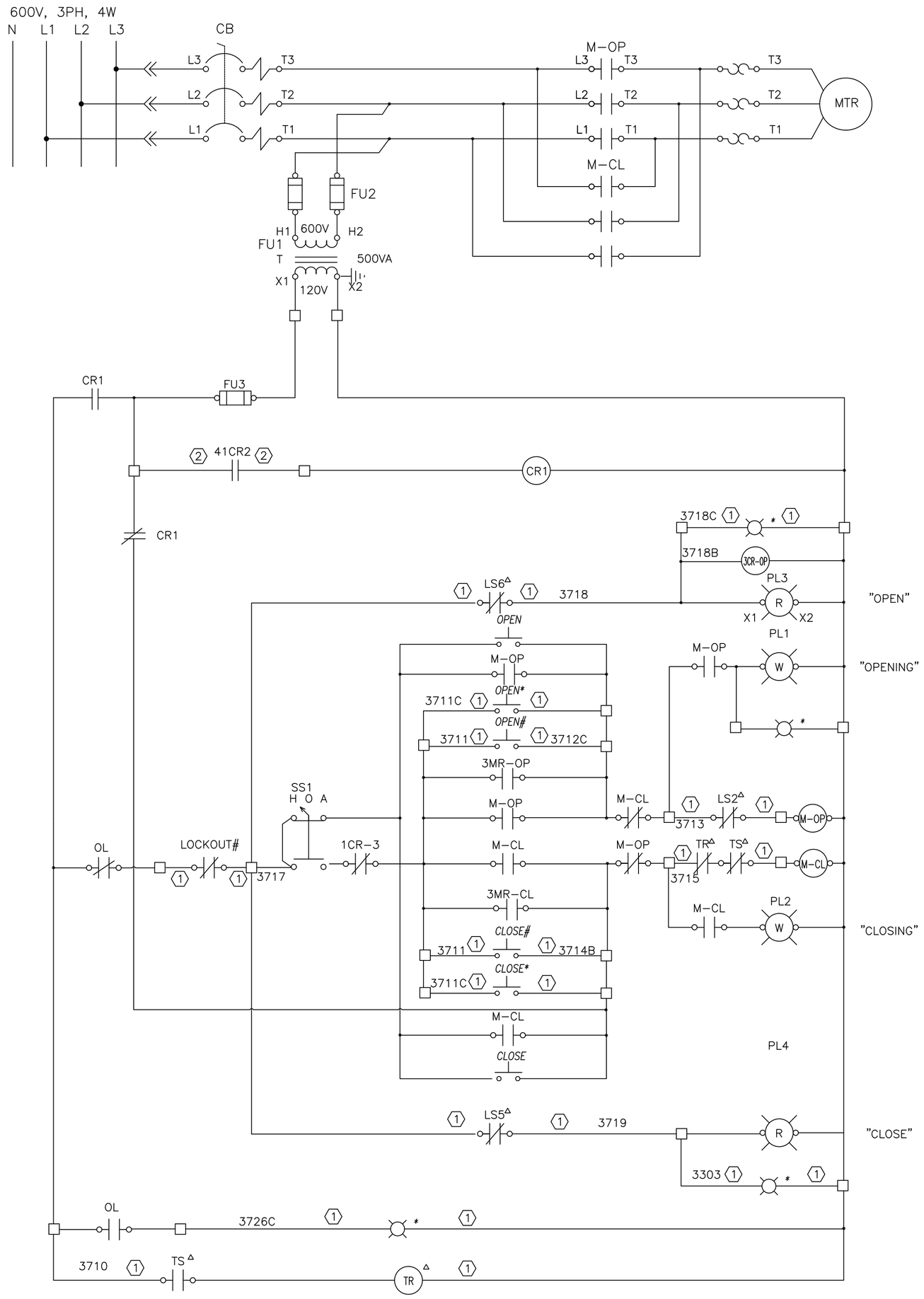
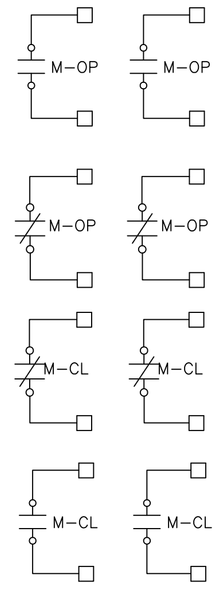
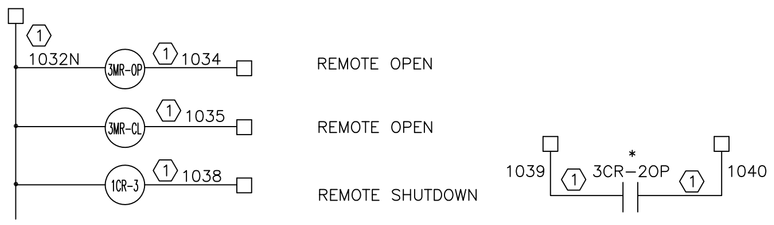
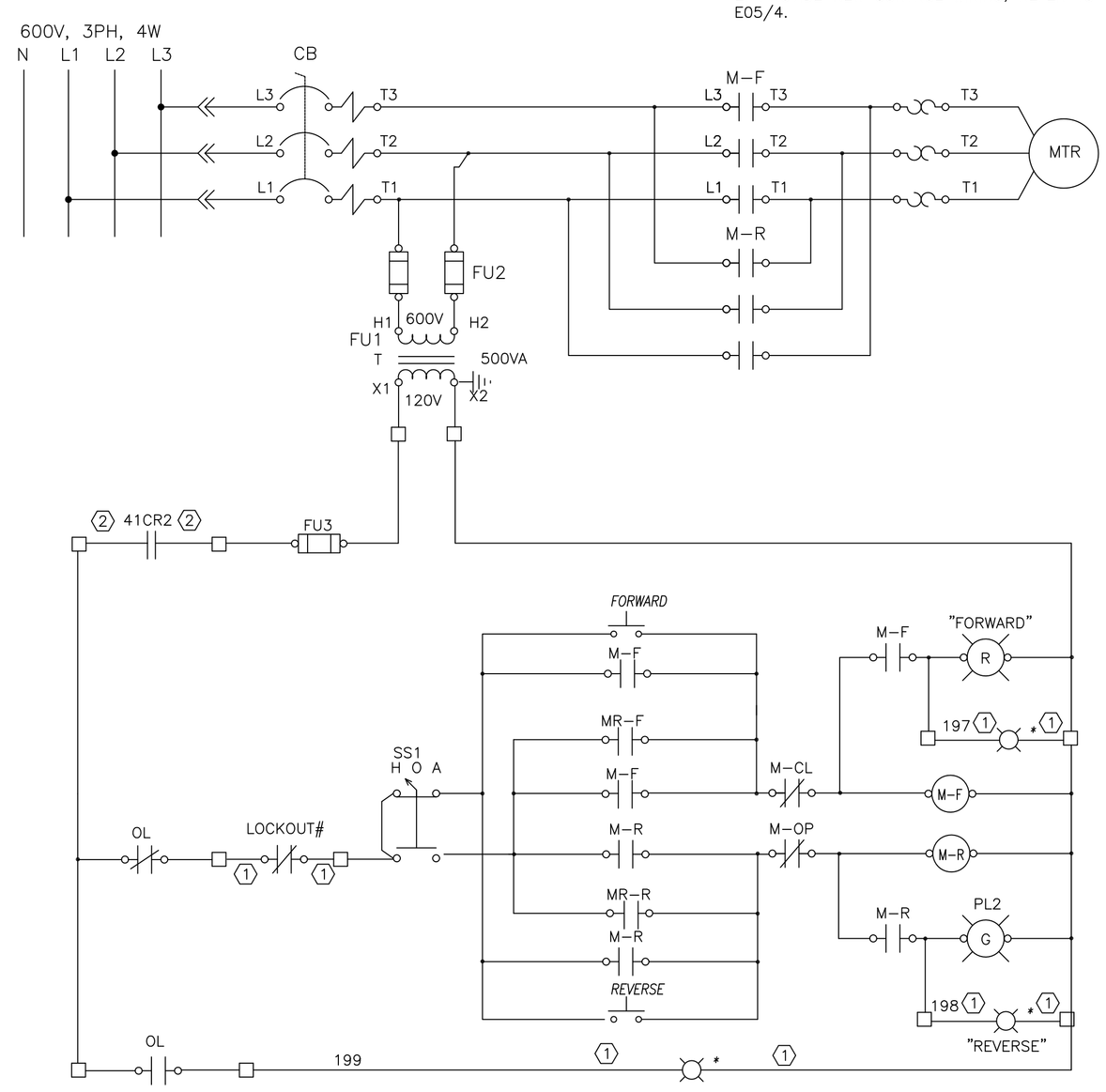


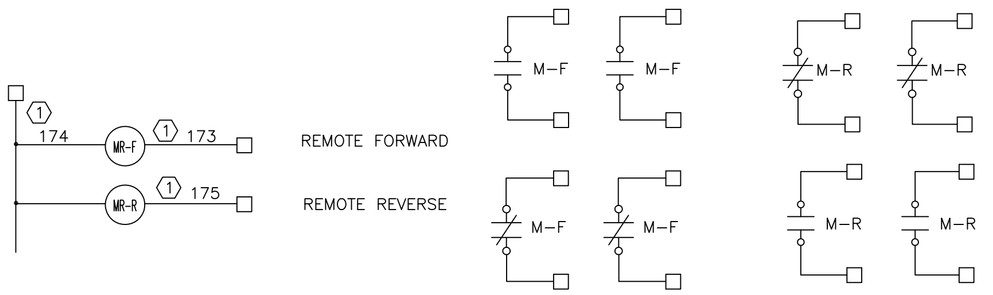




REFER TO A-2036
* FROM CONTROL ROOM
Δ FROM VALVE LIMIT SWITCH
FROM VALVE OPERATOR
☐ TERMINAL FOR EXTERNAL CONNECTION
PROVIDE CONTROL RELAY:
3MR-OP,3MR-CL,1CR-3,CR1,3CR-2OP:
120VAC COIL , (2) 120VAC/8A,NO/NC CONTACT

1 / E09 MCC#1 6 INCH VALVE
SCALE:





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FROM VALVE OPERATOR
☐ TERMINAL FOR EXTERNAL CONNECTION
PROVIDE CONTROL RELAY:
MR-F,MR-R:
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2 / E09 MCC#1 MODEL ACCESS PLATFORM
SCALE:

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N CONTRACTOR TO VERIFY INTEGRITY OF EXISTING RACEWAY BY PULLING A BRUSH AND MANDREL BEFORE WIRING.
O ALWAYS PERFORM SCAN BEFORE CORE DRILL.
P VERIFY PHASING AND ROTATION, MATCH THE EXISTING SYSTEM.
Q CONTRACTOR IS RESPONSIBLE FOR REPAIR OF ANY DAMAGES TO ANY EXISTING BUILDING COMPONENT CAUSED BY CONSTRUCTION ACTIVITIES.

No.	Date	Revision	By: Par:
0	OCT/24 2016	ISSUED FOR TENDER	KXL

Date Printed DD MM YYYY — Date imprimée

- Verify all dimensions and site conditions and be responsible for same
- Vérifier toutes les dimensions et l'etat des liéux et en assumer la responsabilité

A Detail no. No. du détail
B Location drawing no. sur dessin no.
C Drawing no. dessin no.

project / projet
BUILDING U66
ROOM 003 ELECTRICAL UPGRADE

UPLANDS ROAD CAMPUS

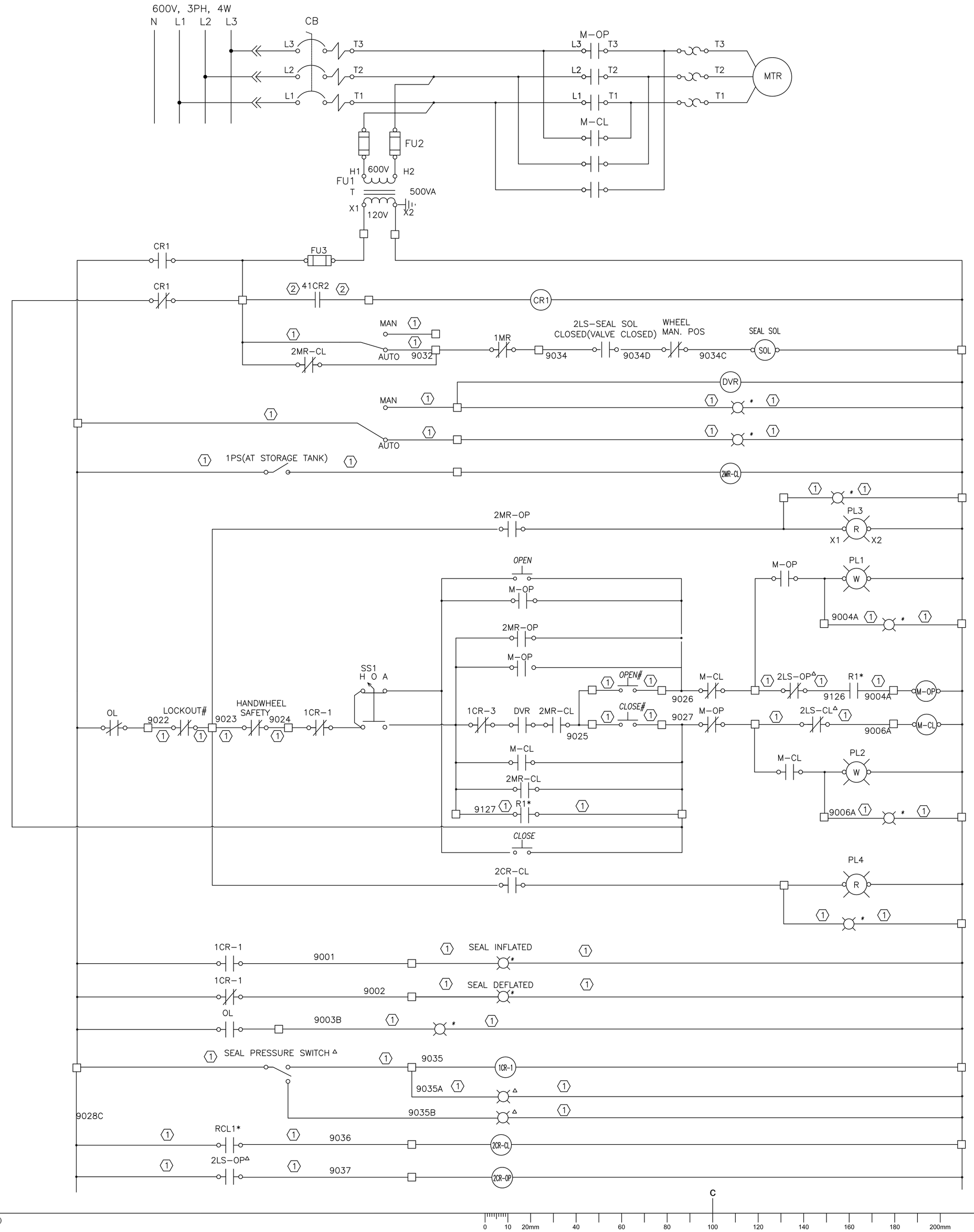
drawing / dessin
MCC CONTROL CIRCUIT SHEET 5

designed / conçu: KXL	date / date: OCT/2016
drawn / dessiné: KXL	scale / échelle: NTS
checked / vérifié: KXL	sheet / feuille: E09 of/de E10
approved / approuvé: DL	W.O.no.: A1-006434-01 — D.T.no.

dwg.no. / dessin no.: **5280-E09**

ASPM A1 (841x594)

C
0 10 20mm 40 60 80 100 120 140 160 180 200mm



REFER TO A-2036
* FROM CONTROL ROOM
△ FROM VALVE LIMIT SWITCH
FROM VALVE OPERATOR
☐ TERMINAL FOR EXTERNAL CONNECTION

PROVIDE CONTROL RELAY:
CR1,1CR-3,1MR,2MR-OP,2MR-CL,
1CR-2,DVR,2CR-CL,2CR-OP,1CR-1:
120VAC COIL , (2) 120VAC/8A NO/NC CONTACT

1 / E10 MCC#1 SHUT OFF VALVE
SCALE:

DRAWING NOTES

1. CONTRACTOR TO IDENTIFY EXISTING CONTROL WIRES TO MCC. PROVIDE SPLICES AND RECONNECT EIXSTING CONTROL WIRES, COORDINATE WITH NRC OPERATION FOR INSTALLATION AND COMMISSION.

2. PROVIDE NEW CONTROL WIRING, REFER TO E05/4.

GENERAL NOTES

A READ THIS DRAWING IN CONJUNCTION WITH ARCHITECTURAL AND MECHANICAL DRAWINGS AND SPECIFICATIONS.
B CONTRACTORS TO CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO DEMOLITION OR CONSTRUCTION AND REPORT ANY ERRORS OR OMISSIONS TO NRC DEPARTMENTAL REPRESENTATIVE.
C CONTRACTORS MUST VISIT THE SITE & FULLY FAMILIARIZE THEMSELVES WITH THE SCOPE OF THE WORK.
D PREVENT THE SPREAD OF DUST & DEBRIS BEYOND THE WORK AREA AND CLEAN ALL SURFACES AT COMPLETION.
E MAKE GOOD ALL SURFACES AFFECTED BY THIS WORK.
F FILL ALL HOLES, PATCH & PAINT ALL SURFACES IN CONTRACT AREA. COLOUR SCHEME TO MATCH EXISTING.
G REMOVE MEANS REMOVE AND DISPOSE OF OFF SITE UNLESS OTHERWISE NOTED.
H PROVIDE LABELS TO NEW DEVICES TO INDICATE POWER SOURCE. UPDATE PANEL SCHEDULES AFTER JOB COMPLETION.
I THE WORD "PROVIDE" MEANS SUPPLY, INSTALL, CONNECT AND TEST.
J THE WORD "WIRING" MEANS WIRES/CABLE AND RACEWAY.
K ALL WIRE TO BE IN EMT UNLESS OTHERWISE NOTED.
L COORDINATE ALL SHUTDOWNS WITH THE NRC DEPARTMENTAL REPRESENTATIVE.OUTAGE IS ONLY SCHEDULED DURING WEEKEND OR AFTER HOUR, UNLESS OTHERWISE SPECIFIED BY NRC REPRESENTATIVE
– ANY WEEKEND OUTAGE MUST BE CARRIED BETWEEN FRIDAY 1800 AND MONDAY 0300
– ANY AFTER HOUR OUTAGE MUST BE CARRIED BETWEEN SAME DAY 1800 AND NEXT DAY 0300
– ALL LOADS TO BE RESUMED AT THE END OF OUTAGE
M TO USE NRC OWNED CRANE ON SITE, CONTRACTOR IS REQUIRED TO PROVIDE OWN CERTIFIED CRANE OPERATOR, AND CERTIFY THE CRANE BEFORE AND AFTER EACH OPERATION. AS ALTERNATIVE, CONTRACTOR CAN BRING OWN CRANE.
N CONTRACTOR TO VERIFY INTEGRITY OF EXISTING RACEWAY BY PULLING A BRUSH AND MANDREL BEFORE WIRING.
O ALWAYS PERFORM SCAN BEFORE CORE DRILL.
P VERIFY PHASING AND ROTATION, MATCH THE EXISTING SYSTEM.
Q CONTRACTOR IS RESPONSIBLE FOR REPAIR OF ANY DAMAGES TO ANY EXISTING BUILDING COMPONENT CAUSED BY CONSTRUCTION ACTIVITIES.

No.	Date	Revision	By: Par:
0	OCT/24 2016	ISSUED FOR TENDER	KXL

Date Printed DD MM YYYY — Date imprimée

- Verify all dimensions and site conditions and be responsible for same
- Vérifier toutes les dimensions et l'etat des liéux et en assumer la responsabilité

A Detail no. No. du détail
B Location drawing no. sur dessin no.
C Drawing no. dessin no.

project / projet
BUILDING U66
ROOM 003 ELECTRICAL UPGRADE

UPLANDS ROAD CAMPUS

drawing / dessin
MCC CONTROL CIRCUIT SHEET 6

designed / conçu	date / date
KXL	OCT/2016
drawn / dessiné	scale / échelle
KXL	NTS
checked / vérifié	sheet / feuille
KXL	E10 of/de E10
approved / approuvé	W.O.no. / D.T.no.
DL	A1-006434-01

dwg.no. / dessin no.
5280-E10

ASPM A1 (841x594)

TS	CLOSING TORQUE LIMIT SWITCH
LS1	LIMIT SWITCH- OPENS WHEN VALVE CLOSED
LS2	LIMIT SWITCH- OPENS WHEN VALVE OPEN
LS5	LIMIT SWITCH-CLOSES WHEN VALVE OPEN
LS6	LIMIT SWITCH-CLOSES WHEN VALVE CLOSED
LS8	LIMIT SWITCH-CLOSES WHEN VALVE CLOSED
TR	TS AUX RELAY
3M	REVERSING STARTER AB 706 SIZE 1
3MR	DOUBLE VOLTAGE RELAY
3CR	AUX RELAY
OL	OVERLOAD RELAY HEATERS A-B N-4(0.7A)
ICR-3	AUX LOCKOUT RELAY

15A
575 V
3 PH
3M-OP
OL
T1 3727
T2 3728
T3 3729
1/2 H.P. VALVE MOTOR
3M-CL

115V. CONTROL POWER AHEAD OF 41M 115V CONTROL VALVE WILL CLOSE IF 41M FAILS

115V 1233
R2
3M O.L.
3726B
3-1
3726C
3M OVERLOAD
N 1190
3710
CLOSE
3709
3-6
OPENING
3724C
CONT. RM AUX PANEL
3711C
OPEN
T.D. ON OPEN
TDR
ICR-3
D.S.
5A
3-13
LOGKOUT STOP
3720
3717C
JUMPER
3717B
3M O.L.
3-3
3-5
3M-OP
3712C
3713C
3M-CL
3M-OP
LS2
3713
1190N
LS8
N.C.
1190N
3710B
3MR-OP
3712B
TDR(INST. CLOSE)
3-7
CLOSE
3711
3714
3714B
3724B
CONT. RM PANEL 2
3711C
3714C
3M-OP
3M-CL
3-19
TR
TS
3715
3715B
N
1190N
3-8
CLOSING
3723C
1190N
3710B
3M-CL
3714B
3710C
3MR-CL
3710
TR
TS
3710
OPEN
LSI
NC
1190N
3722
PNL 2
CLOSED
3717
13
LS5
3719
15
3-15
3303
LS6
14
3718
3-14
3718C
OPENED
3718B
3CR-20P
3CR-20P
3-16
105
1040
3-17
104
1039
TERMINAL IDENTIFICATION
IN LOAD CENTER
IN PANEL No. 1
TO VALVE OPERATOR SWITCHES IN CONTROL ROOM
90
1034
3-11
3MR-OP
1032N
DV RELAY
2-16
150
1035
3-12
3MR-CL
1032N
DV RELAY
56
1038
2-?
ICR-3

TDR
3745
1190
FED FROM 41M SQ'D" PNL - PNL 14 CKT 6

PANEL No 1
3300
3301
3302
3303
3304B
1034
1035
1039
1040
90
150
104
105
14-S-010
14-S-014
LOAD CENTER
3300
3302
3301
3303
3304B
1034
1035
1039
1040
3-6
3-8
3-14
3-15
2-1
3-11
3-12
3-17
3-16
SPARE

PUSHBUTTON STN AT VALVE OPERATOR
12
3722
OPEN
3
3711
4
3712
STOP
13
3720
2
CLOSE
7
3709
3719
3714
CONNECT WIRE DIRECTLY TO TERMINAL OF LSI
1190N
10
12
3722
5
10
2
3713
1190N
LS1
C NO NC
LS2
NC NO C
3717
13
15
3719
3718
14
13
3717
LS5
C NO NC
NC NO C
6
5
LS8
NC NO C
10
1190N
3715
TR
COIL
NC
NO
11
TS
2
3710
3710
3711
3712
3713
3714
3715
1190N
3717
3718
3719
A
B
C
D
E
F
19-S-047
12 #12 CONTROL CABLE (2 SPARES)
CONTROL COMPARTMENT ON VALVE OPERATOR
TERMINAL STRIPS IN RELAY CUBICLE
3710D
3711D
3726D
3713D
3714D
3712D
3720D
3717D
3718D
3719D
3723D
3724D
AUX PANEL CONTROL ROOM
19-S-049
3710D
3711D
3726D
3713D
3714D
3712D
3720D
3717D
3718D
3719D
3723D
3724D
PNL #2 CONTROL ROOM
840-S-61
3718C
3711C
3726C
3713C
3714C
3712C
3720C
3717C
3718C
3719C
3723C
3724C

1/2 H.P. MOTOR
19-S-039
4 #12
3727
3728
3729
3-T1
3-T2
3-T3
GROUND

A-2036 JAN 17/61 REDRAWN

WO 65-46-156

REVISIONS			
NO.	DATE	CHANGE	BY
1	31/5/67	REVISED "CLOSE" PILOT RETURN CIRCUIT	PR
2	14-7-67	ADDED LS8, REVISED WIRE NUMBERING	PR
3	20-12-68	MINOR CORRECTIONS	PR
4	9-12-74	ADDED TDR & R2	BRC

NATIONAL RESEARCH COUNCIL
PLANT ENGINEERING SERVICES
OTTAWA CANADA

DATE: JAN 23/67
DESIGNED BY
DRAWN BY: PR
CHECKED BY
APPROVED BY

TITLE: N.A.E. BLDG 66 WIND TUNNEL BUILDING ELECTRICAL SCHEMATIC - CONTROL & STARTER FOR 6" VALVE OPERATOR

SCALE

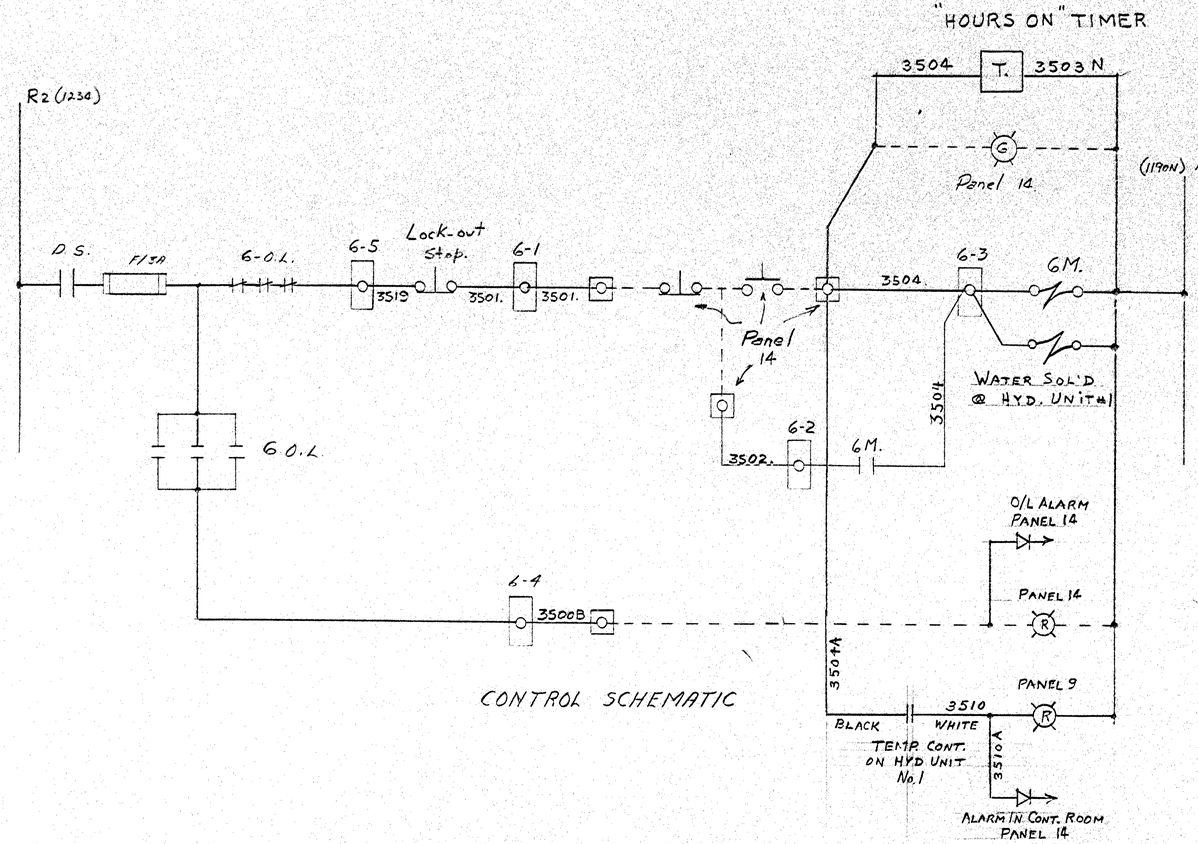
DWG. NO. A-2036

A-2036

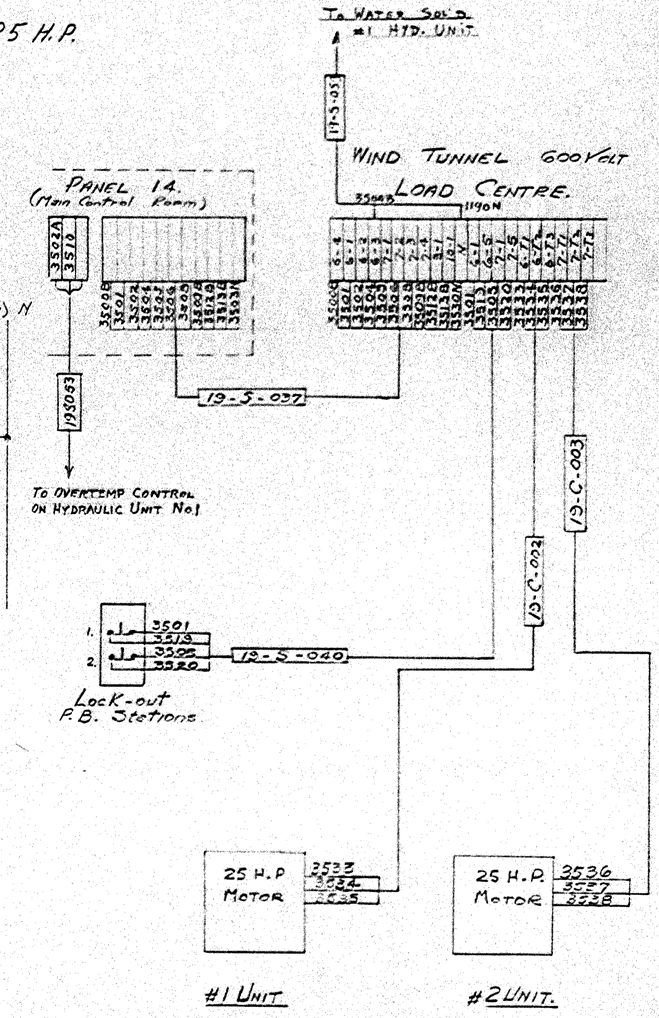
H.O. 1000H

SUPERSONIC NOZZLE HYD. UNIT No. 1 25 H.P.

CIRCUIT No. 6



CONTROL SCHEMATIC



TERMINAL & CABLE INTERCONNECTIONS

REVISIONS			
NO.	DATE	CHANGE	BY
1	9/5/67	ADDED HOURS ON TIMER	PR
2	15/3/68	ADDED Pilot & DIODES	PR
3	20/1/70	" WATER SOL'D	PR

NATIONAL RESEARCH COUNCIL
PLANT ENGINEERING SERVICES
OTTAWA CANADA

DATE JAN 10/61
DESIGNED BY
DRAWN BY B. SMILEY
CHECKED BY
APPROVED BY

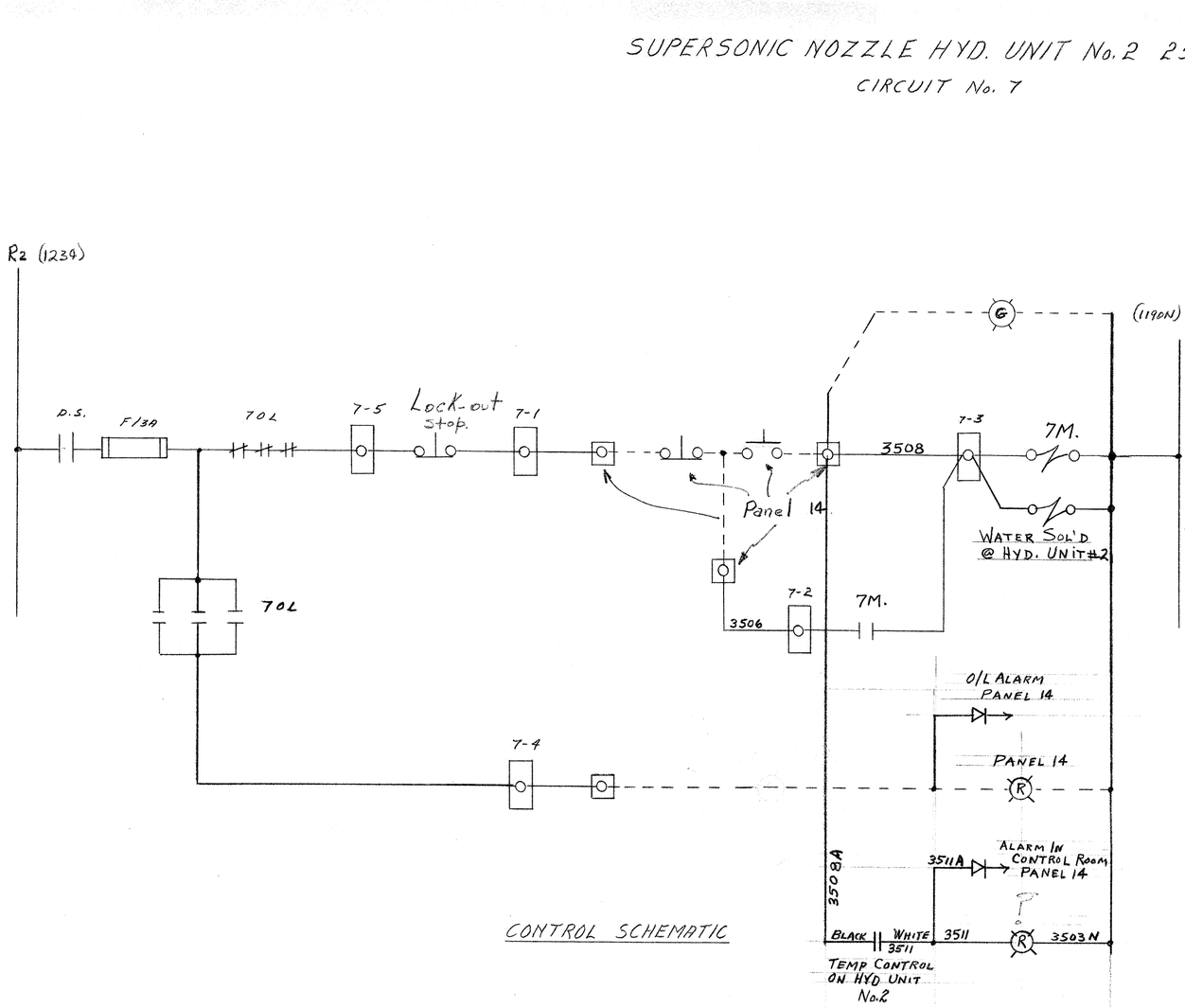
TITLE
N.A.E. BLDG. #66
WIND TUNNEL BLDG. 600 V LOAD CENTRE
SCHEMATIC
CABLE TERMINATIONS & INTERCONNECTIONS
FOR SUPERSONIC NOZZLE HYD. UNIT #1

SCALE N.T.S.

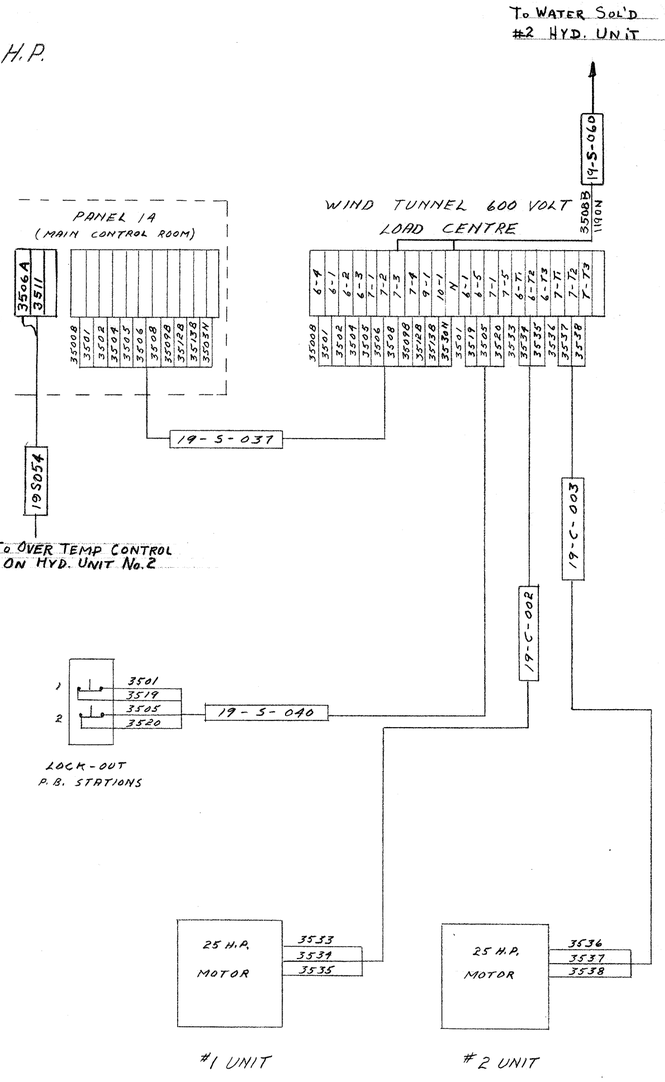
DWG. NO. A-2037

SUPERSONIC NOZZLE HYD. UNIT No. 2 25 H.P.

CIRCUIT No. 7



CONTROL SCHEMATIC



TERMINAL & CABLE INTERCONNECTIONS

REVISIONS			
NO.	DATE	CHANGE	BY
1	15/3/68	ADDED PILOT & DIODES	PR
2	20/1/70	✓ WATER SOL'D	RB

NATIONAL RESEARCH COUNCIL

PLANT ENGINEERING SERVICES

OTTAWA CANADA

DATE: JAN 10/61

DESIGNED BY

DRAWN BY: B. SMILEY

CHECKED BY: JMR

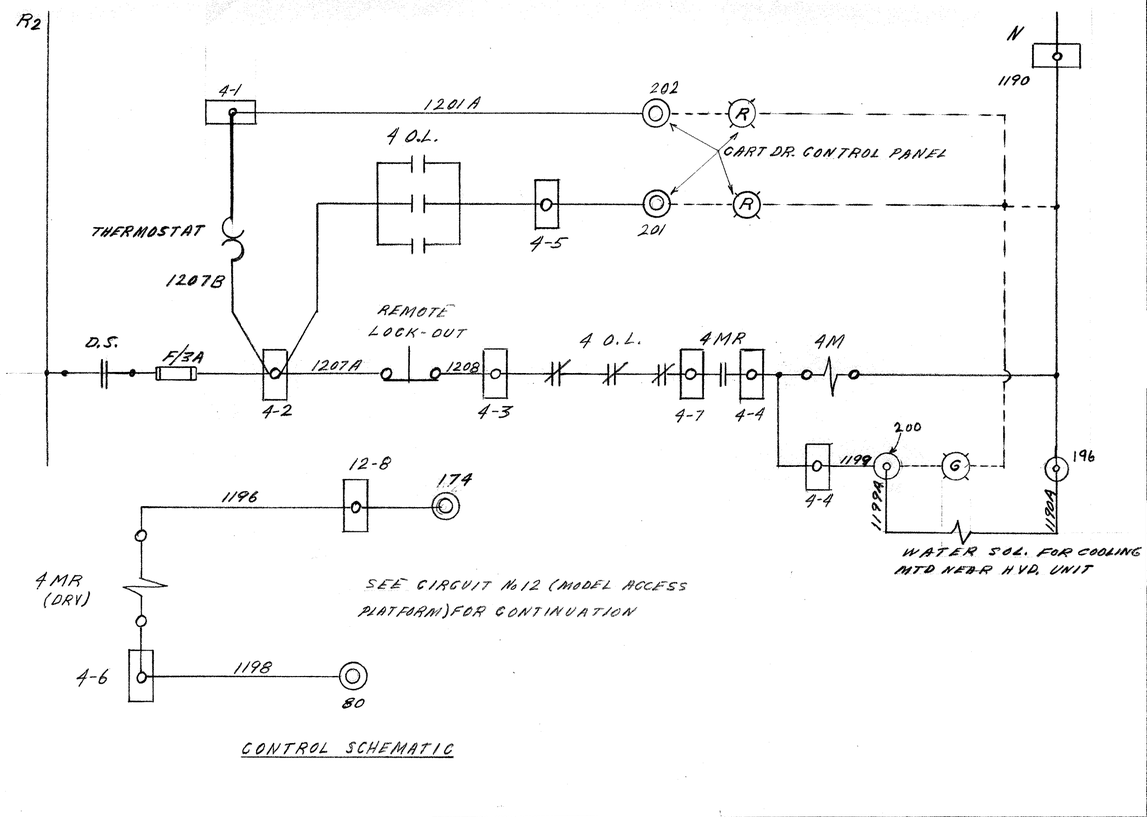
APPROVED BY: JMR

TITLE: N.A.E. BLDG. #66
WIND TUNNEL BLDG. 600 V LOAD CENTRE
SCHEMATIC
CABLE TERMINATIONS & INTERCONNECTIONS
FOR SUPERSONIC NOZZLE HYD. UNIT #2

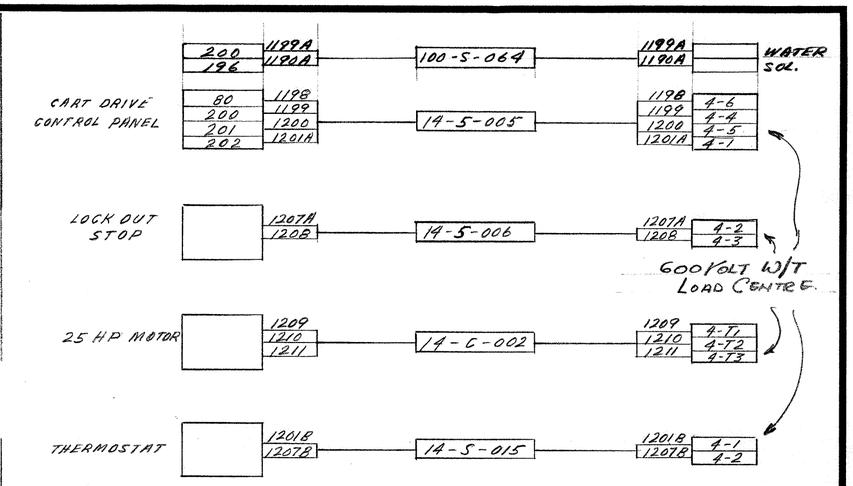
SCALE: N.T.S.

DWG. NO.: A-2038

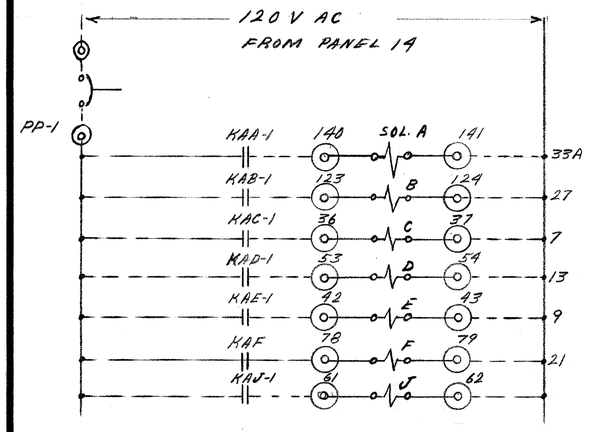
A2038



CONTROL SCHEMATIC



TERMINAL & CABLE INTERCONNECTIONS



CART DRIVE SOLENOIDS

SOL A - VARIABLE DIFFUSER OUT (RETRACT)

B - " " IN (EXTEND)

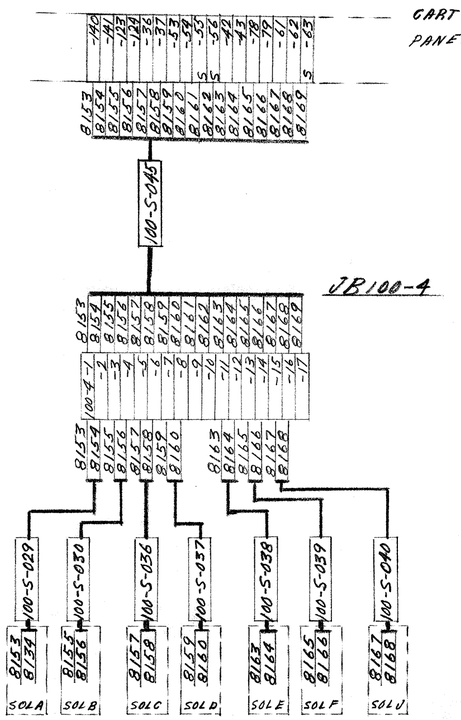
C - TRANSONIC SECTION IN

D - " " OUT

E - SUPERSONIC LOCKS OUT (UNLATCH)

F - " " " IN (LATCH)

J - VARIABLE DIFFUSER AXIAL SPEED REDUCTION



REVISIONS			
NO.	DATE	CHANGE	BY
1	27/6/63	WATER SOL. ADDED	M.G.

NATIONAL RESEARCH COUNCIL
PLANT ENGINEERING SERVICES
OTTAWA CANADA

DATE 13 SEPT 61
DESIGNED BY
DRAWN BY M. GUERIN
CHECKED BY
APPROVED BY

TITLE
NAE BLDG #66
CABLE TERMINATIONS & INTERCONNECTIONS FOR CART DRIVE HYDRAULIC UNIT 25HP

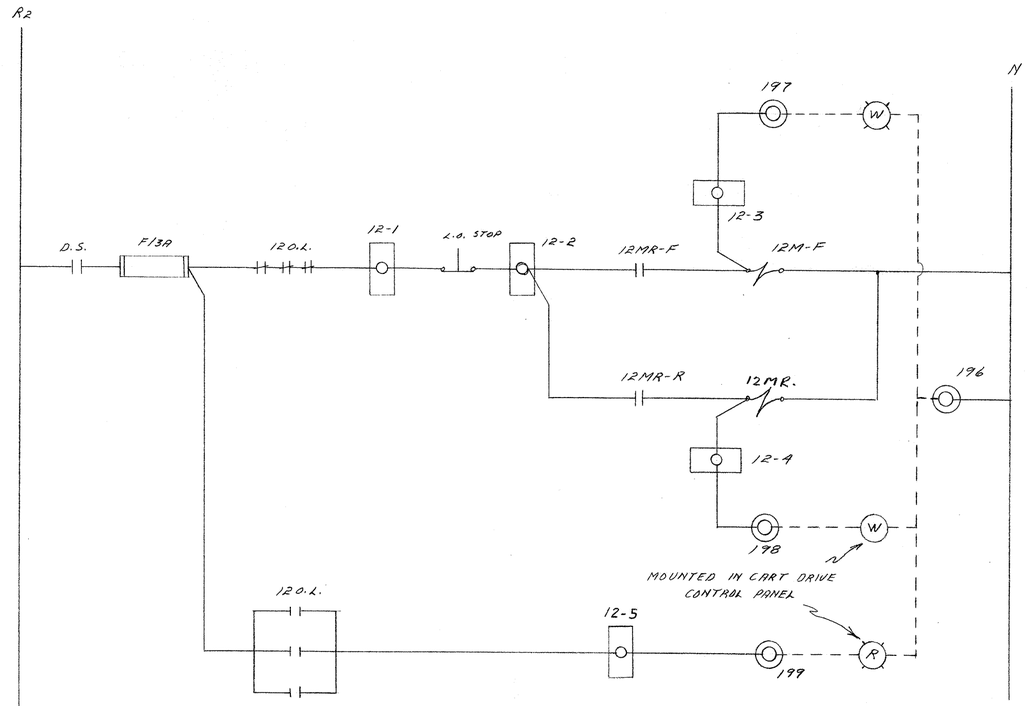
SCALE NTS

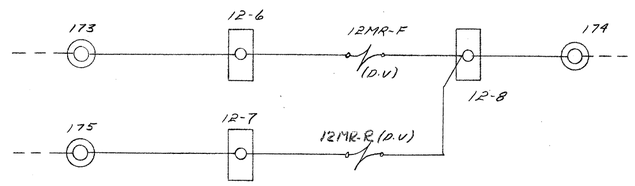
DWG. NO. A-2040

A2040

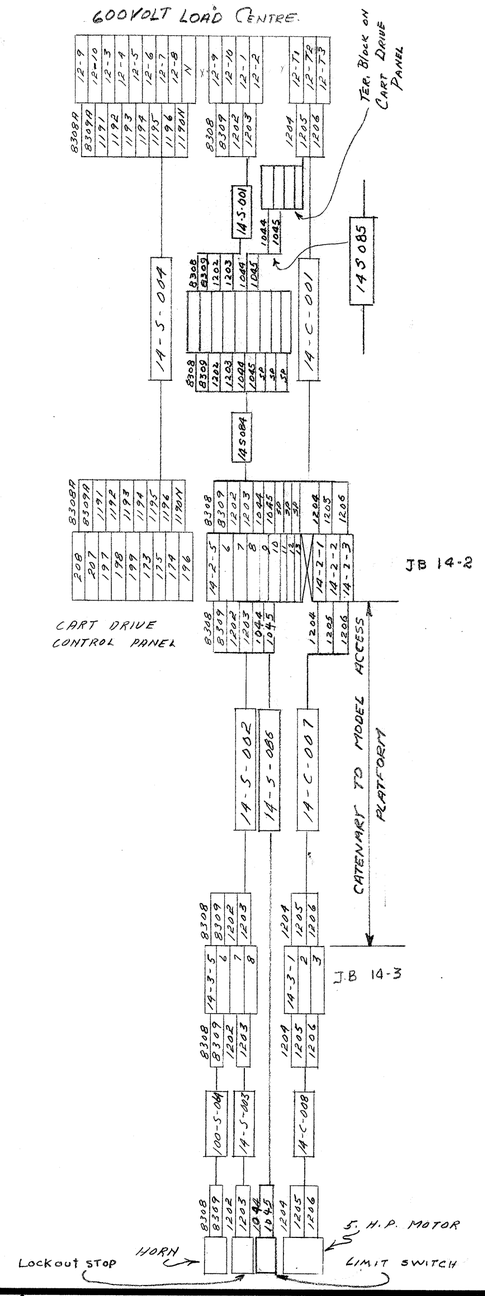
MODEL ACCESS PLATFORM (5 H.P.)

CIRCUIT # 12





CIRCUIT TO CART DRIVE CONTROL PANEL



REVISIONS			
NO.	DATE	CHANGE	BY
1	14/2/61	ADDED LIM. SW. & CABLE	

NATIONAL RESEARCH COUNCIL

PLANT ENGINEERING SERVICES

OTTAWA CANADA

DATE: JAN 9 '60

DESIGNED BY

DRAWN BY: B. SMILEY

CHECKED BY

APPROVED BY

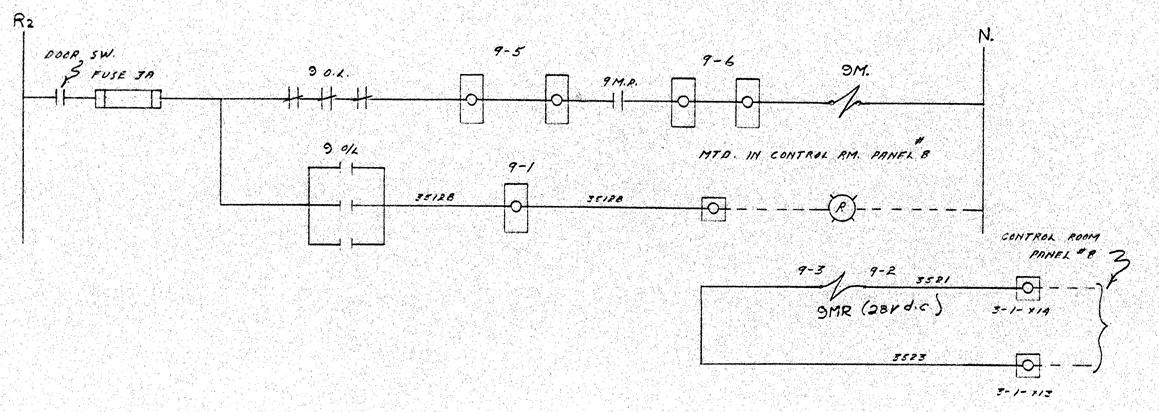
TITLE: N.A.E. BLDG. #66
WIND TUNNEL BLDG 600 V. LOAD CENTRE
SCHEMATIC
CABLE TERMINATIONS & INTERCONNECTIONS
FOR MODEL ACCESS PLATFORM

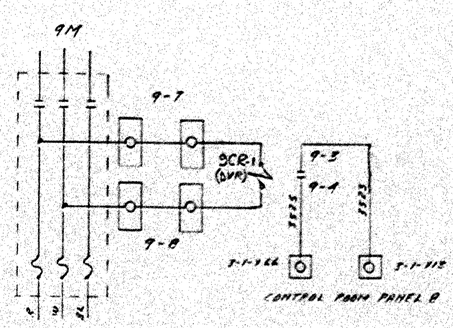
SCALE: N.T.S.

DWG. NO.: A-2041

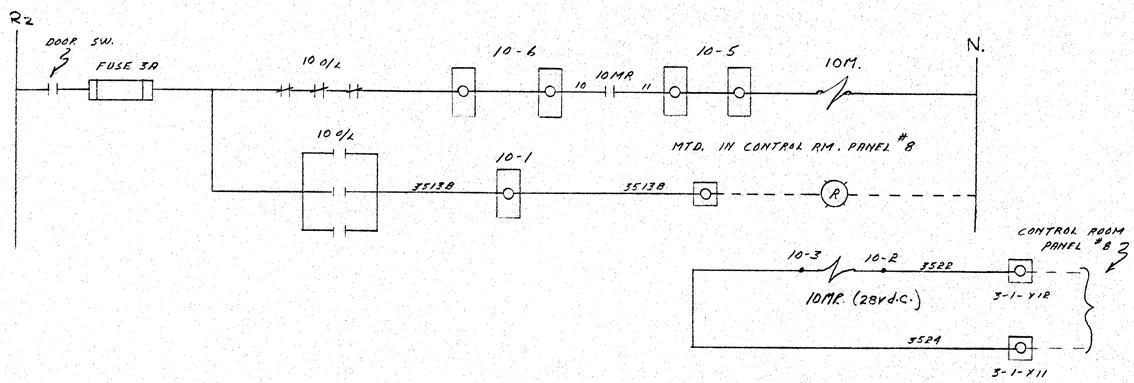
A2041

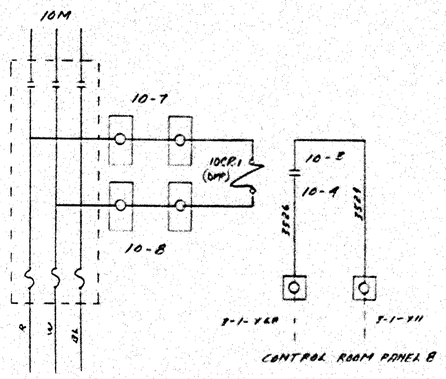
600 VOLT
SUPERSONIC JACK DRIVE SUPPLY No. 1
CIRCUIT No. 9



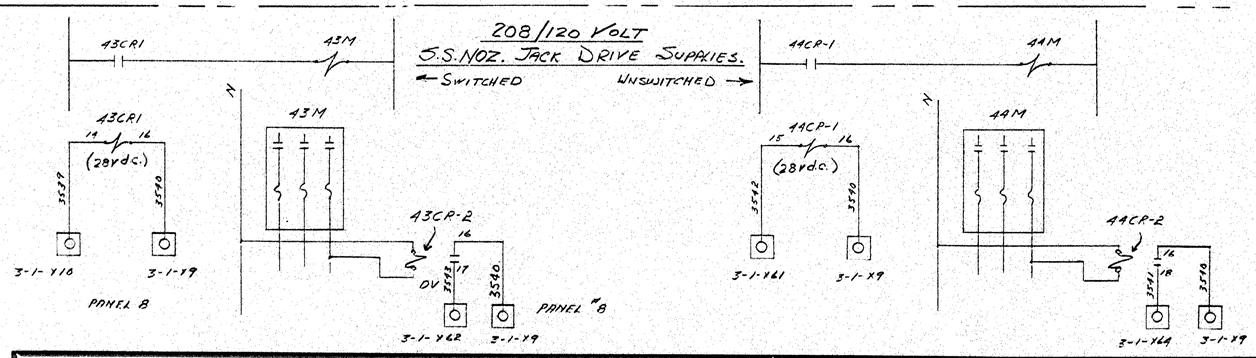


600 VOLT
SUPERSONIC JACK DRIVE SUPPLY No. 2
CIRCUIT No. 10





208/120 VOLT
S.S.NOZ. JACK DRIVE SUPPLIES.
← SWITCHED UNSWITCHED →



REFER TO DWG. A-2043 FOR INTERCONNECTIONS

REVISIONS			
NO.	DATE	CHANGE	BY

NATIONAL RESEARCH COUNCIL
PLANT ENGINEERING SERVICES
OTTAWA CANADA

DATE: JAN 10/61
DESIGNED BY
DRAWN BY: B. SMILEY
CHECKED BY
APPROVED BY

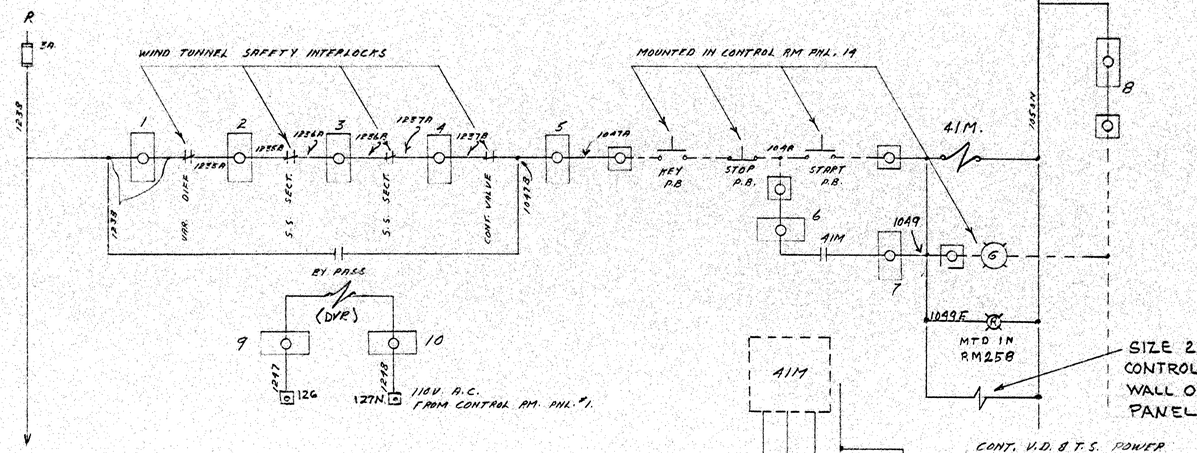
TITLE:
N.A.E. BLDG. #66
WIND TUNNEL BLDG. LOAD CENTRES
SCHEMATIC
FOR 600VOLT & 120/208 VOLT
SUPERSONIC JACK DRIVE POWER SUPPLIES

SCALE: N.T.S.

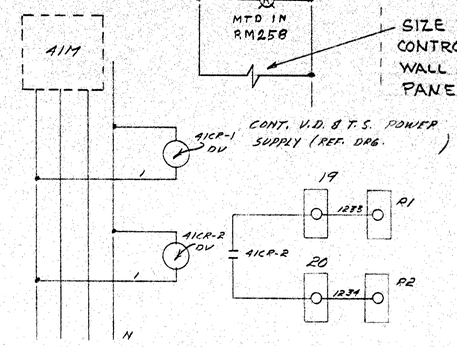
DWG. NO.: A-2042.

CONTROL RM. PANELS POWER SUPPLY

CIRCUIT #41

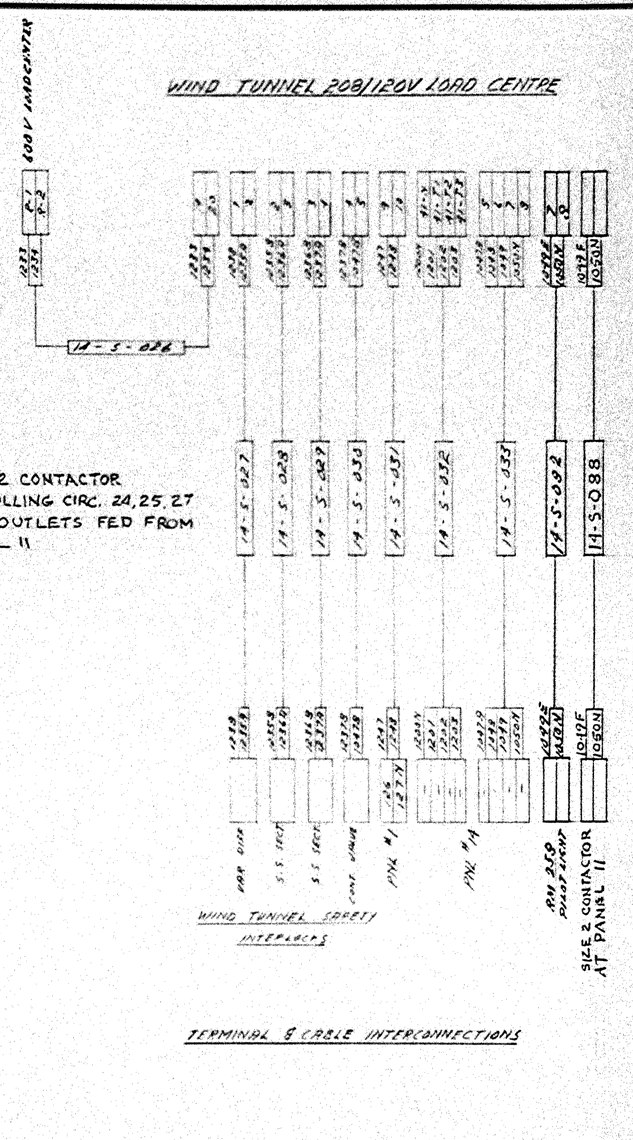


SIZE 2 CONTACTOR CONTROLLING CIRC. 24, 25, 27 WALL OUTLETS FED FROM PANEL 11



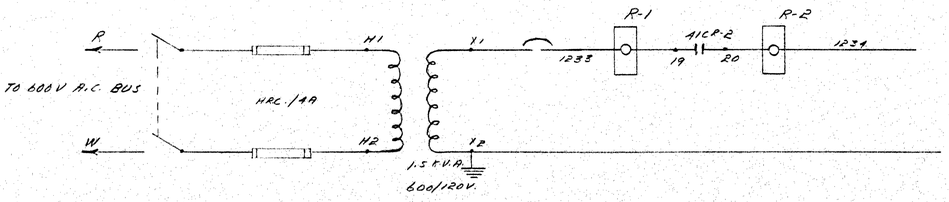
CIRCUIT #41 CONT. RM. PNLS. POWER SUPPLY

WIND TUNNEL 208/120V LOAD CENTRE



TERMINAL & CABLE INTERCONNECTIONS

CONTROL POWER FOR 600V. WIND TUNNEL LOAD CENTRE



REVISIONS			
NO.	DATE	CHANGE	BY
1	24/5/74	AMBER PILOT LIGHT	M.G.
2	9-12-74	ADDED SIZE 2 CONTACTOR AT PANEL 11	BRC

NATIONAL RESEARCH COUNCIL
PLANT ENGINEERING SERVICES
OTTAWA CANADA

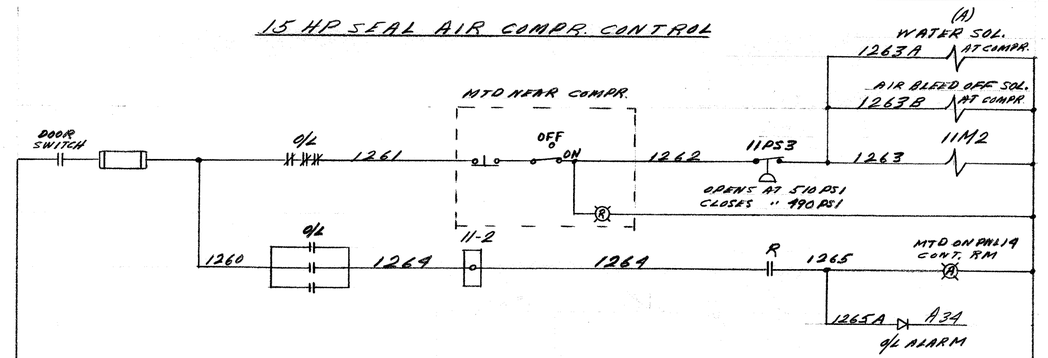
DATE: JAN 19/61
DESIGNED BY:
DRAWN BY: B. SMILEY
CHECKED BY:
APPROVED BY: M.K.

TITLE: N.A.E. BLDG. #66
WIND TUNNEL BLDG. LOAD CENTRES
SCHEMATIC, CABLE TERMINATIONS & INTERCONNECTIONS FOR MAIN CONTROL ROOM POWER SUPPLY & CONTROL POWER FOR 600V W/T LOAD CENTRE

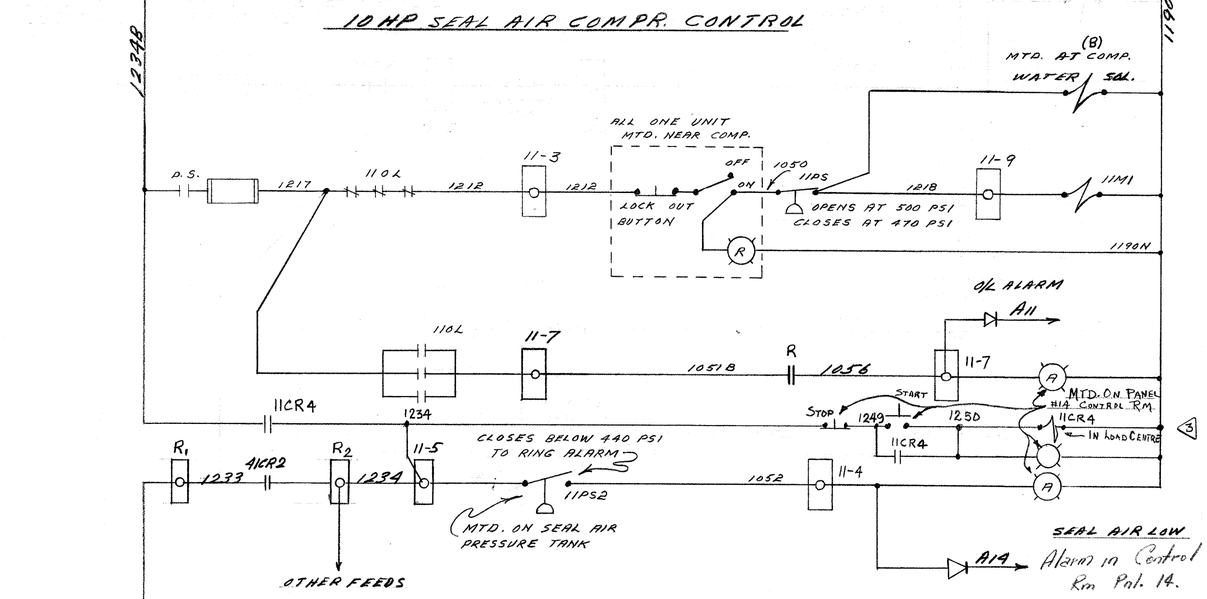
SCALE: N.T.S.

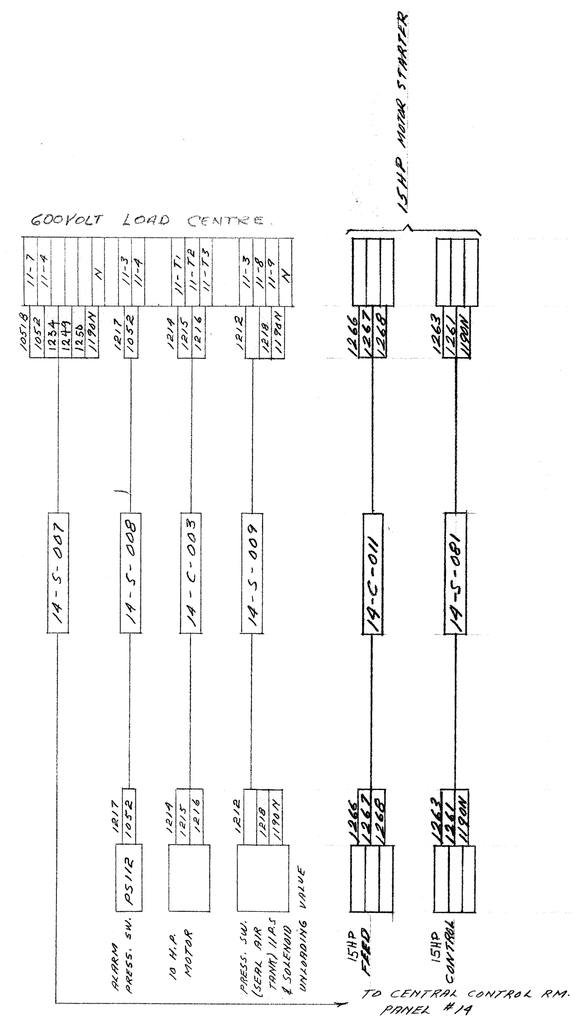
DWG. NO. A-2044

15 HP SEAL AIR COMPR. CONTROL



10 HP SEAL AIR COMPR. CONTROL





1049 — 1050N

MOUNTED ON PNL 19 IN CONTROL RM
CONNECTED ACROSS 41M RELAY COIL
REF. TO DWG A-2099

REVISIONS			
NO.	DATE	CHANGE	BY
1	12/14/62	GENERAL REVISION	B.S.
2	27/6/63	15HP COMPR. ADDED	M.G.
3	2/12/64	11CR4 & START. STOP P.B ADDED	B

NATIONAL RESEARCH COUNCIL

PLANT ENGINEERING SERVICES

OTTAWA CANADA

DATE: JAN 10/61

DESIGNED BY

DRAWN BY: B. SMILEY

CHECKED BY

APPROVED BY

TITLE

N.A.E. BLDG #66

WIND TUNNEL BLDG. LOAD CENTRE

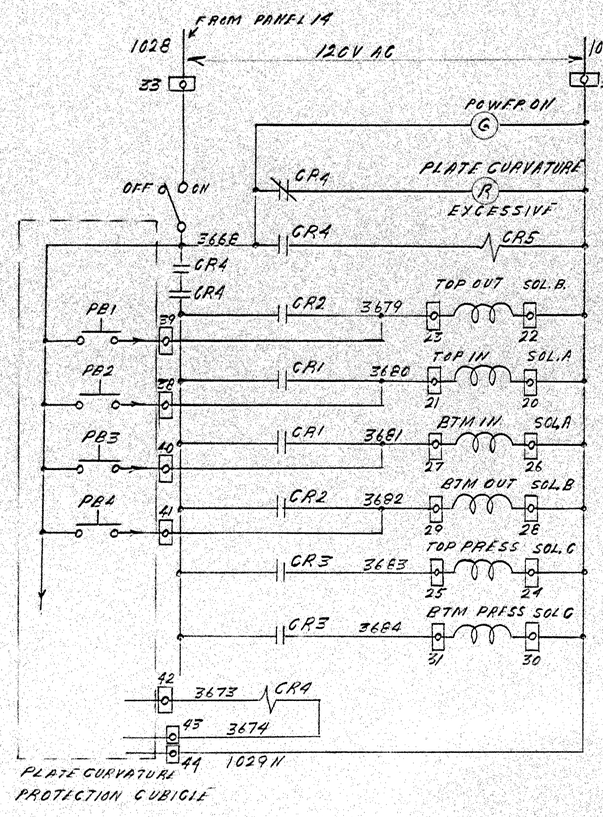
SCHEMATIC

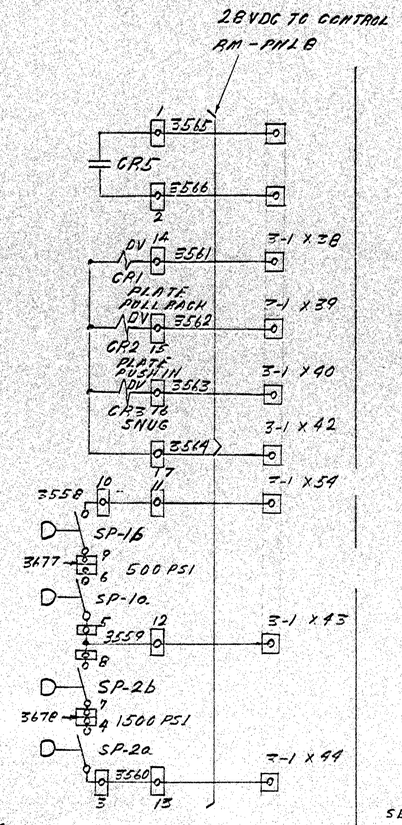
CABLE TERMINATIONS & INTERCONNECTIONS FOR SEAL AIR COMPRESSOR (10HP & 15HP)

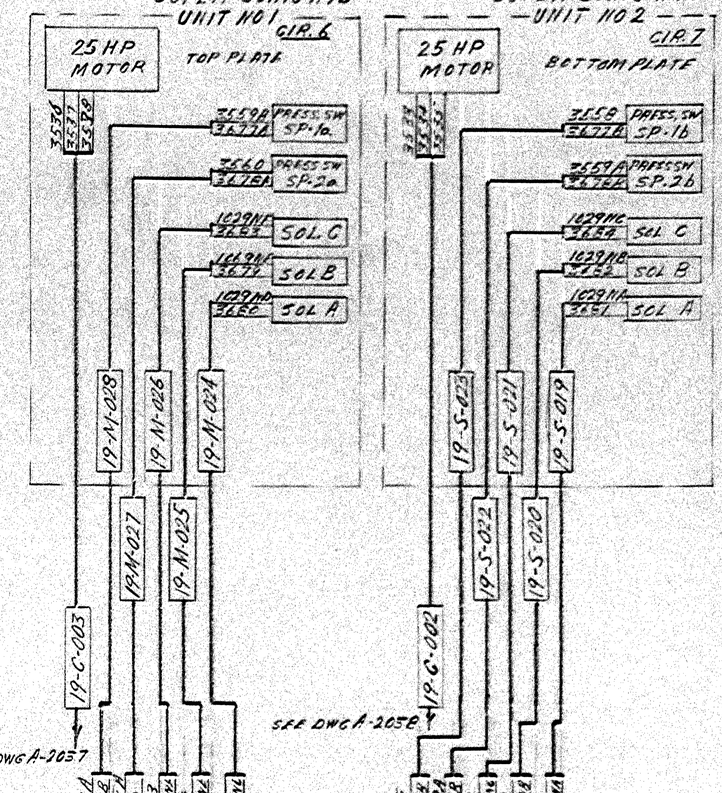
SCALE: N. T. S.

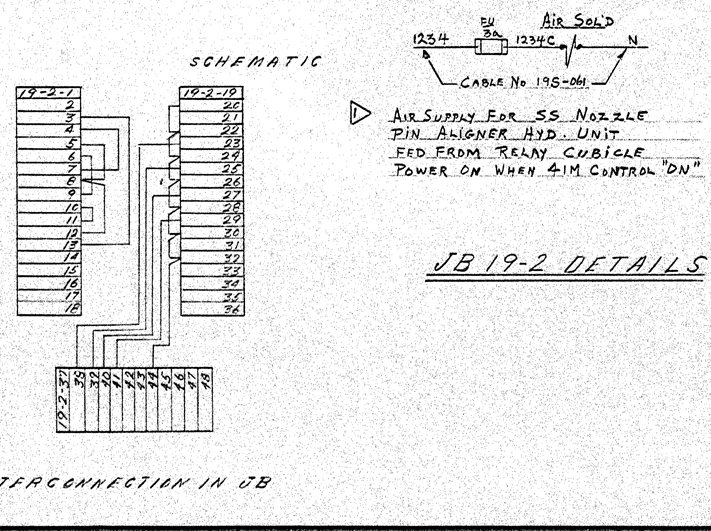
DWG. NO.: A-2045

A2045









REVISIONS			
NO.	DATE	CHANGE	BY
1	20/1/70	ADDED Air Sol'd CONTROL	CRJ

NATIONAL RESEARCH COUNCIL
PLANT ENGINEERING SERVICES
OTTAWA CANADA

DATE: SEPT 11, 61
DESIGNED BY
DRAWN BY M. GUERIN
CHECKED BY
APPROVED BY

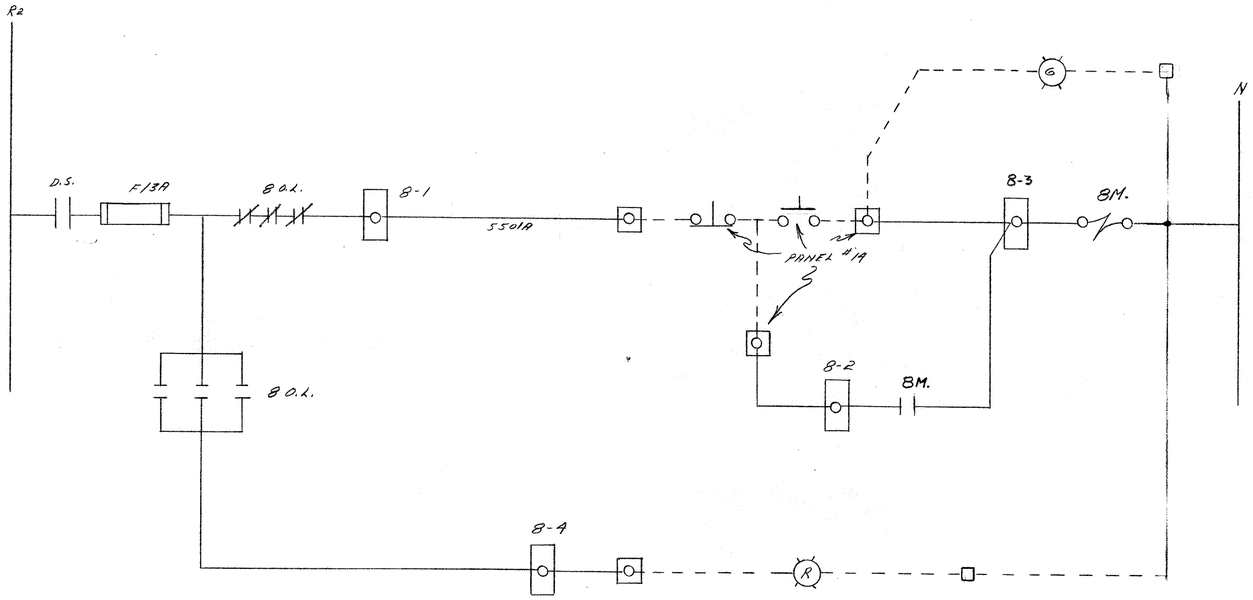
TITLE: NAE BLDG #66 — SUPERSONIC NOZZLE PLATE CONTROL TERMINAL & CABLE INTERCONNECTION — JB 19-2 DETAILS - SCHEMATIC.

SCALE:

DWG. NO. A-2046

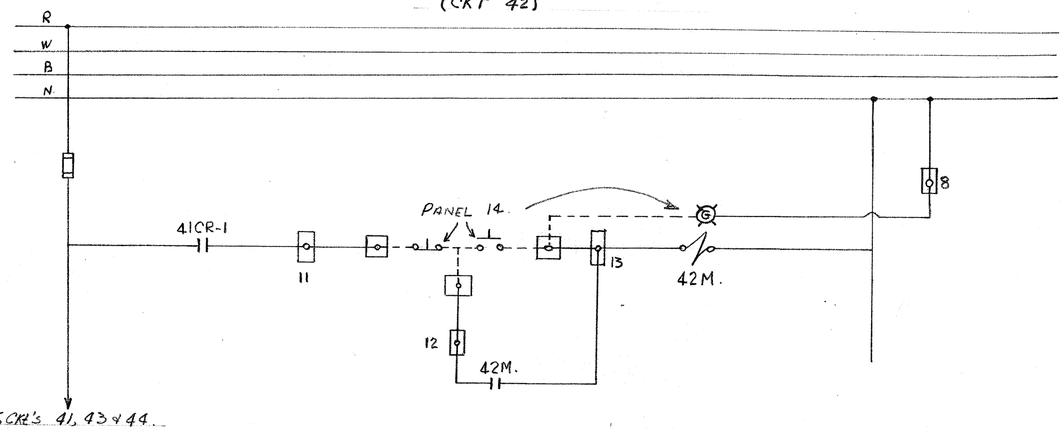
600 VOLT POWER SUPPLY VARIABLE DIFFUSER & TRANSONIC NOZZLE SUB STATIONS.

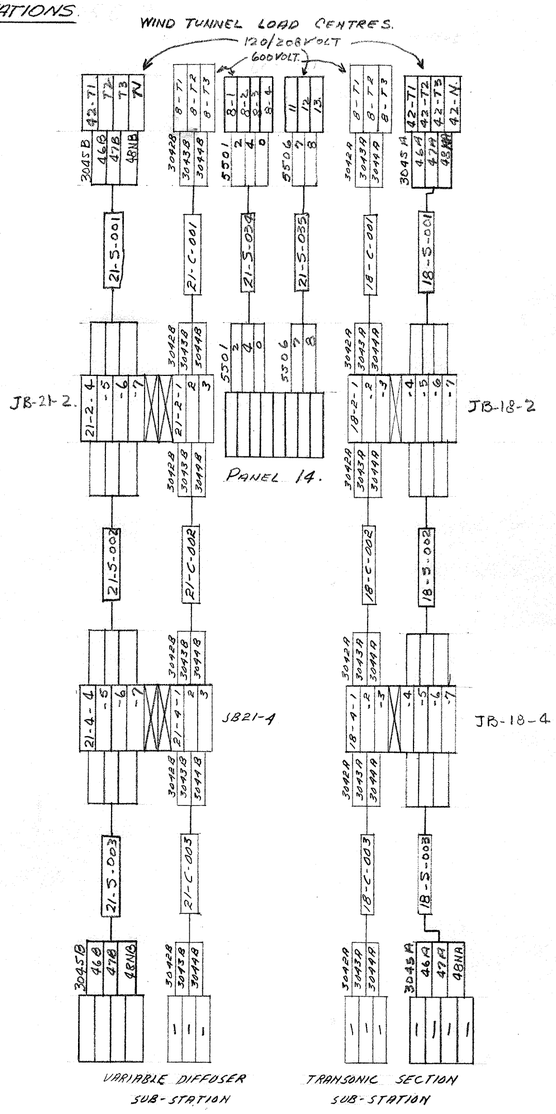
CIRCUIT No. 8



120/208V. POWER SUPPLIES for VAR. DIFF & TRAN. SECT'N SUB STATIONS.

(CKT 42)





REVISIONS			
NO.	DATE	CHANGE	BY

NATIONAL RESEARCH COUNCIL

PLANT ENGINEERING SERVICES

OTTAWA CANADA

DATE: JAN 10/61

DESIGNED BY

DRAWN BY: B. SMILEY

CHECKED BY

APPROVED BY: MM

TITLE: N.A.E. BLDG. #66

WIND TUNNEL BLDG. 600V LOAD CENTRE

SCHEMATIC

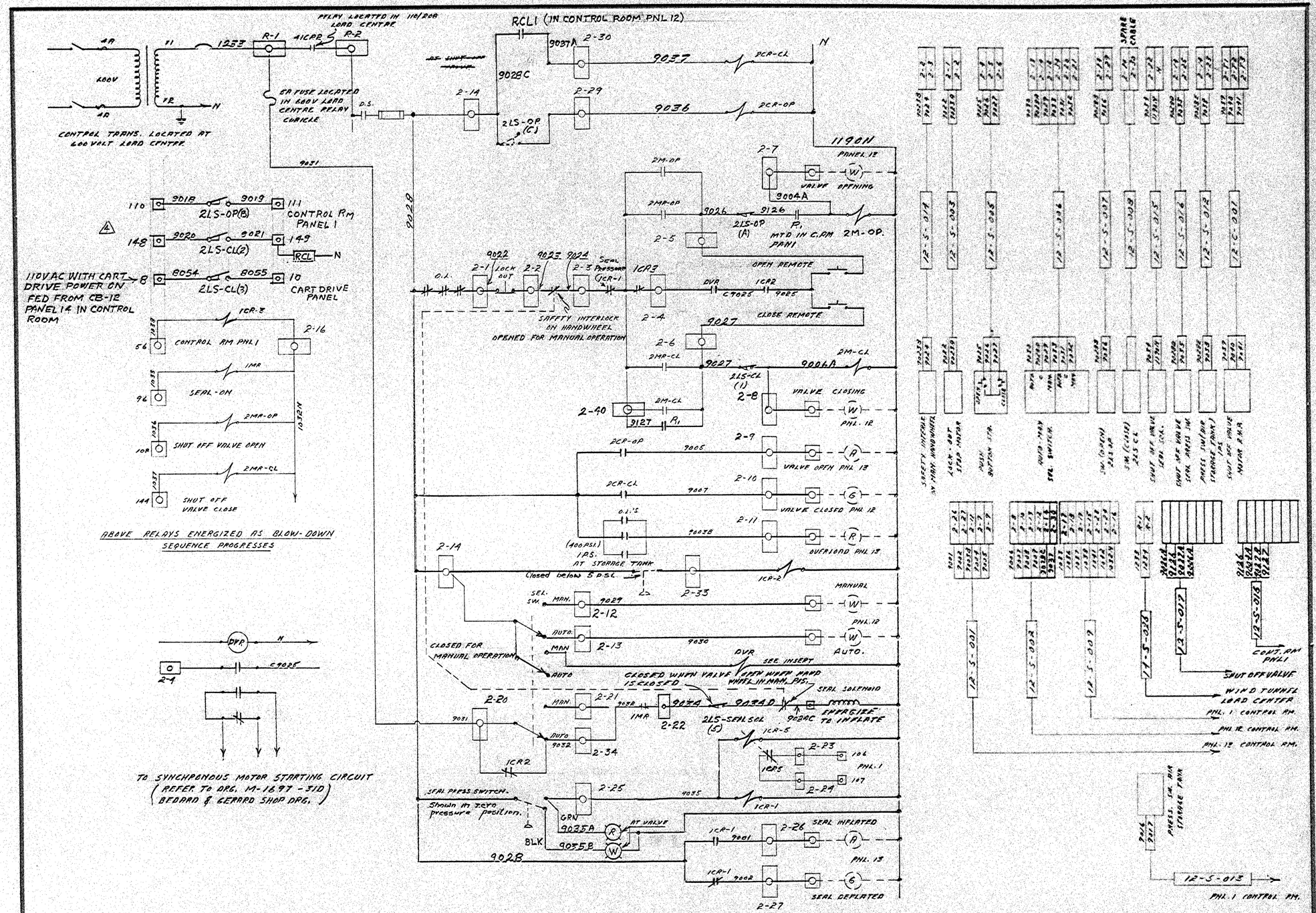
CABLE TERMINATIONS & INTERCONNECTIONS

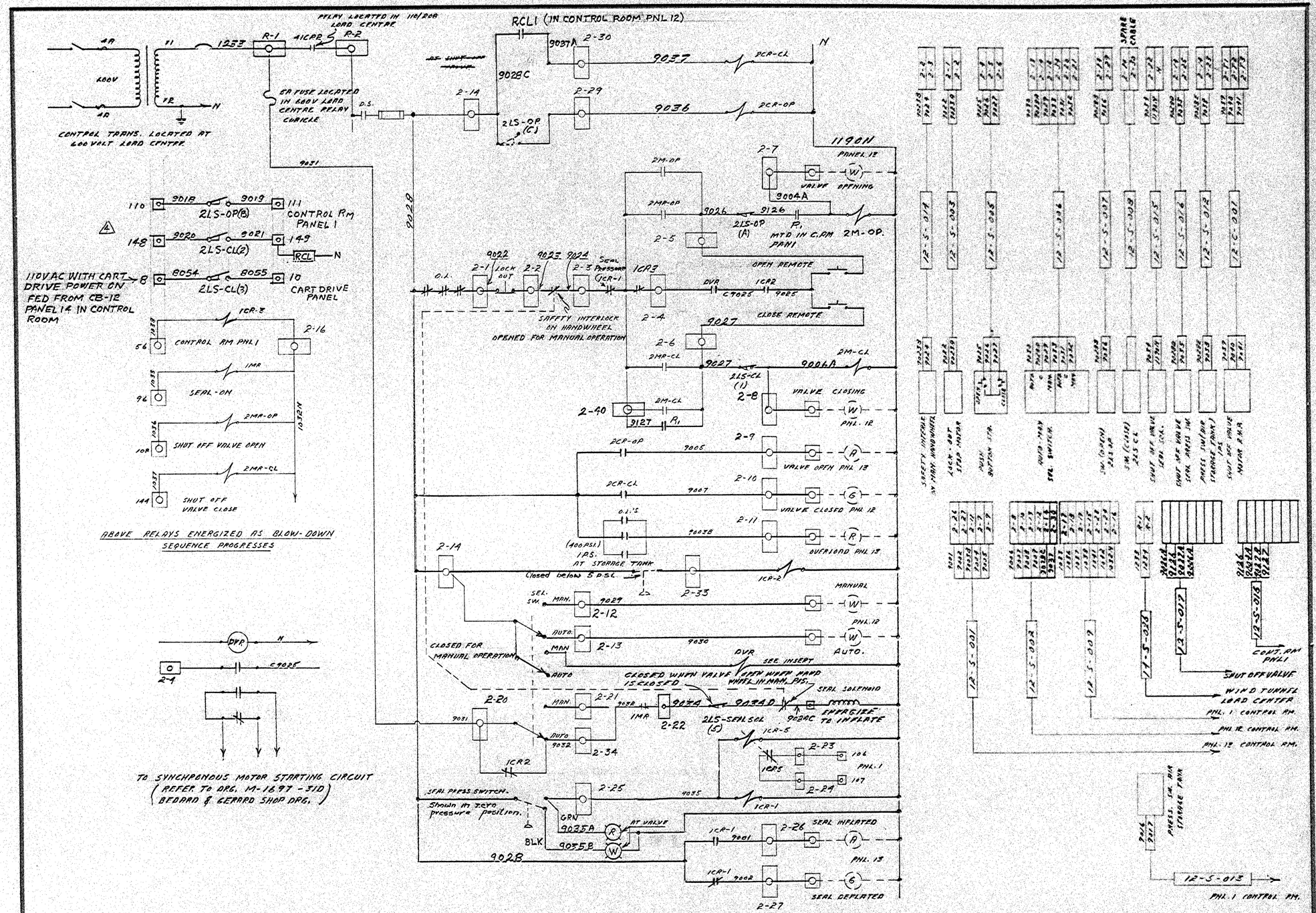
for VAR. DIFF. & TRANS. SECTION POWER SUPPLIES.

SCALE: N.T.S.

DWG. NO.: A-2052

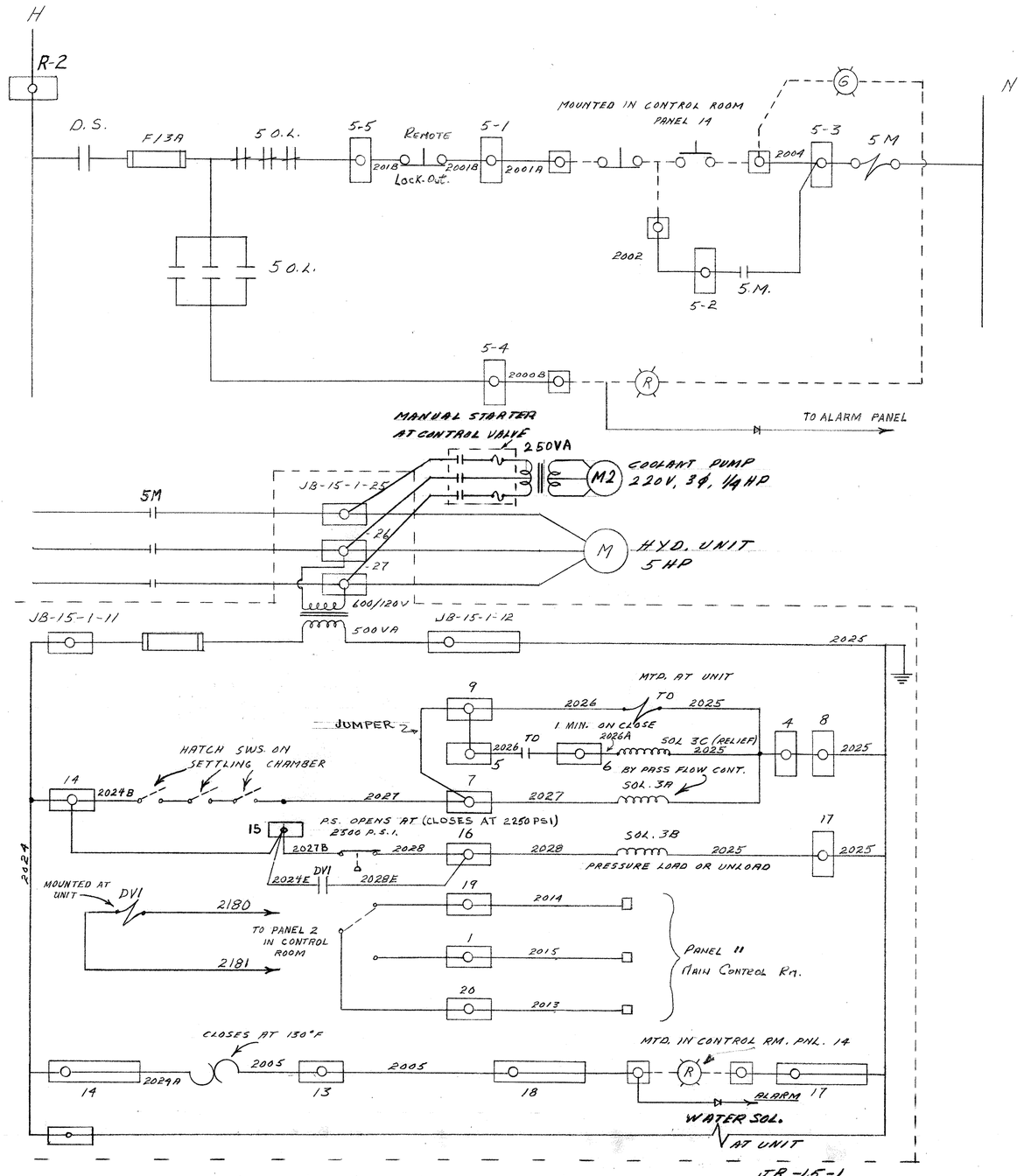
A2052

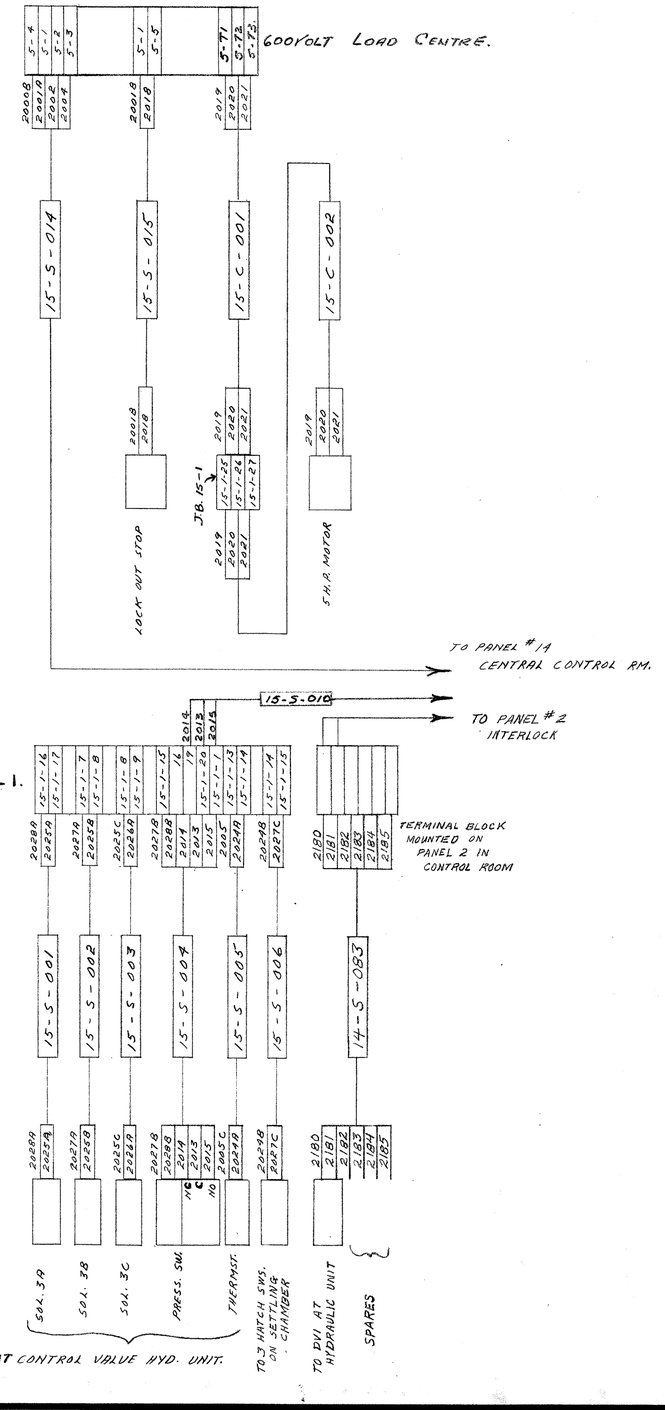

RELAY LOCATED IN 110/208 LOAD CENTRE
R.C.L.1 (IN CONTROL ROOM PNL 12)
4R
600V
4R
11
1253
R-1
41CR
R-2
N
CONTROL TRANS. LOCATED AT 600 VOLT LOAD CENTRE
6A FUSE LOCATED IN 600V LOAD CENTRE RELAY CUBICLE
D.S.
9028C
9037A
2-30
9037
2CR-CL
2-14
2-29
9036
2CR-OP
2LS-OP (C)
11901N
PANEL 12
2M-OP
2-7
(W)
VALVE OPENING
9004A
2MR-OP
9026
9126
2LS-OP (A)
P1
MTD IN C.P.M. PANI
2M-OP.
2-5
OPEN REMOTE
9022
9023
9024
2-1
2-2
2-3
SEAL PRESSURE OCR-1
1CR3
0.1
DVR
1CR2
C9025
9025
CLOSE REMOTE
2-4
SAFETY INTERLOCK ON HANDWHEEL OPENED FOR MANUAL OPERATION
9027
2-6
2MR-CL
2M-CL
2LS-CL (1)
2-8
VALVE CLOSING
2-40
9127
P1
PNL. 12
2-9
2CR-OP
9005
VALVE OPEN PNL 13
2-10
2CR-CL
9007
VALVE CLOSED PNL 12
0.1.S
(400 PSI.) I.P.S. AT STORAGE TANK
9003B
2-11
OVERLOAD PNL 13
2-19
Closed below 5 P.S.I.
2-33
1CR-2
SEL. SW.
MAN.
9029
2-12
MANUAL
PNL. 12
AUTO.
9030
2-13
AUTO.
CLOSED FOR MANUAL OPERATION
DVR
SEE INSERT
CLOSED WHEN VALVE IS CLOSED
OPEN WHEN HAND WHEEL IN MAN. POS.
SEAL SOLENOID
2-20
2-21
9032
9034
9034D
9034C
ENERGIZE TO INFLATE
2-22
2LS-SEAL SOL (5)
1MR
2-34
1CR-5
2-23
106
PNL. 1
1CR5
107
2-24
1CR2
2-25
9035
1CR-1
SEAL PRESS SWITCH.
Shown in zero pressure position.
GRN
9035A
BLK
9035B
AT VALVE
2-26
SEAL INFLATED
PNL. 13
1CR-1
9001
9002
2-27
SEAL DEFLATED
9028
1CR-3
2-16
56
CONTROL RM PNL 1
1MR
96
SEAL-ON
2MR-OP
1032N
104
SHUT OFF VALVE OPEN
2MR-CL
144
SHUT OFF VALVE CLOSE
ABOVE RELAYS ENERGIZED AS BLOW-DOWN SEQUENCE PROGRESSES
110
9018
9019
111
2LS-OP(B)
CONTROL RM PANEL 1
148
9020
9021
149
2LS-CL(2)
RCL
N
110VAC WITH CART DRIVE POWER ON FED FROM CB-12 PANEL 14 IN CONTROL ROOM
8
8054
8055
10
2LS-CL(3)
CART DRIVE PANEL
DVR
N
C9025
2-4
TO SYNCHRONOUS MOTOR STARTING CIRCUIT (REFER TO DRG. M-16.97-310 BEDARD & GERARD SHOP DRG.
SPARE CABLE
SPARE
SPARE
SPAR


RELAY LOCATED IN 110/208 LOAD CENTRE
R.C.L.1 (IN CONTROL ROOM PNL 12)
4R
600V
4R
11
1253
R-1
41CR
R-2
N
CONTROL TRANS. LOCATED AT 600 VOLT LOAD CENTRE
6A FUSE LOCATED IN 600V LOAD CENTRE RELAY CUBICLE
D.S.
9028C
9037A
2-30
9037
2CR-CL
2-14
2-29
9036
2CR-OP
2LS-OP (C)
11901N
PANEL 12
2M-OP
2-7
(W)
VALVE OPENING
9004A
2MR-OP
9026
9126
2LS-OP (A)
P1
MTD IN C.P.M. PANI
2M-OP.
2-5
OPEN REMOTE
9022
9023
9024
2-1
2-2
2-3
SEAL PRESSURE OCR-1
1CR3
0.1
DVR
1CR2
C9025
9025
CLOSE REMOTE
2-4
SAFETY INTERLOCK ON HANDWHEEL OPENED FOR MANUAL OPERATION
9027
2-6
2MR-CL
2M-CL
2LS-CL (1)
2-8
VALVE CLOSING
2-40
9127
P1
PNL. 12
2-9
2CR-OP
9005
VALVE OPEN PNL 13
2-10
2CR-CL
9007
VALVE CLOSED PNL 12
0.1.S
(400 PSI.) I.P.S. AT STORAGE TANK
9003B
2-11
OVERLOAD PNL 13
2-19
Closed below 5 P.S.I.
2-33
1CR-2
SEL. SW.
MAN.
9029
2-12
MANUAL
PNL. 12
AUTO.
9030
2-13
AUTO.
CLOSED FOR MANUAL OPERATION
DVR
SEE INSERT
CLOSED WHEN VALVE IS CLOSED
OPEN WHEN HAND WHEEL IN MAN. POS.
SEAL SOLENOID
2-20
2-21
9032
9034
9034D
9034C
ENERGIZE TO INFLATE
2-22
2LS-SEAL SOL (5)
1MR
2-34
1CR-5
2-23
106
PNL. 1
1CR5
107
2-24
1CR2
2-25
9035
1CR-1
SEAL PRESS SWITCH.
Shown in zero pressure position.
GRN
9035A
BLK
9035B
AT VALVE
2-26
SEAL INFLATED
PNL. 13
1CR-1
9001
9002
2-27
SEAL DEFLATED
9028
1CR-3
2-16
56
CONTROL RM PNL 1
1MR
96
SEAL-ON
2MR-OP
1032N
104
SHUT OFF VALVE OPEN
2MR-CL
144
SHUT OFF VALVE CLOSE
ABOVE RELAYS ENERGIZED AS BLOW-DOWN SEQUENCE PROGRESSES
110
9018
9019
111
2LS-OP(B)
CONTROL RM PANEL 1
148
9020
9021
149
2LS-CL(2)
RCL
N
110VAC WITH CART DRIVE POWER ON FED FROM CB-12 PANEL 14 IN CONTROL ROOM
8
8054
8055
10
2LS-CL(3)
CART DRIVE PANEL
DVR
N
C9025
2-4
TO SYNCHRONOUS MOTOR STARTING CIRCUIT (REFER TO DRG. M-16.97-310 BEDARD & GERARD SHOP DRG.
SPARE CABLE
SPARE
SPARE
SPAR

CONTROL VALVE HYDRAULIC UNIT 5 H.P.

CIRCUIT No. 5





REVISIONS			
NO.	DATE	CHANGE	BY
1	12/10/62	GENERAL REVISION	B.S.
2	1/11/62	WIRE #ID DELETED	RB
3	2/6/63	COOLANT PUMP ADDED	M.G
4	22/4/65	ADDED RELAY DVI AND CABLE 14-5-083	F.M.
5	10-12-74	REMOVED CONTROL VALVE "MAN-AUTO" SW	BRC

NATIONAL RESEARCH COUNCIL
PLANT ENGINEERING SERVICES
OTTAWA CANADA

DATE JAN 10/61
DESIGNED BY
DRAWN BY B. SMILEY
CHECKED BY
APPROVED BY

TITLE
N.A.E. BLDG. #66
WIND TUNNEL BLDG. LOAD CENTRE
SCHEMATIC
CABLE TERMINATIONS & INTERCONNECTIONS
FOR CONTROL VALVE HYD. UNIT

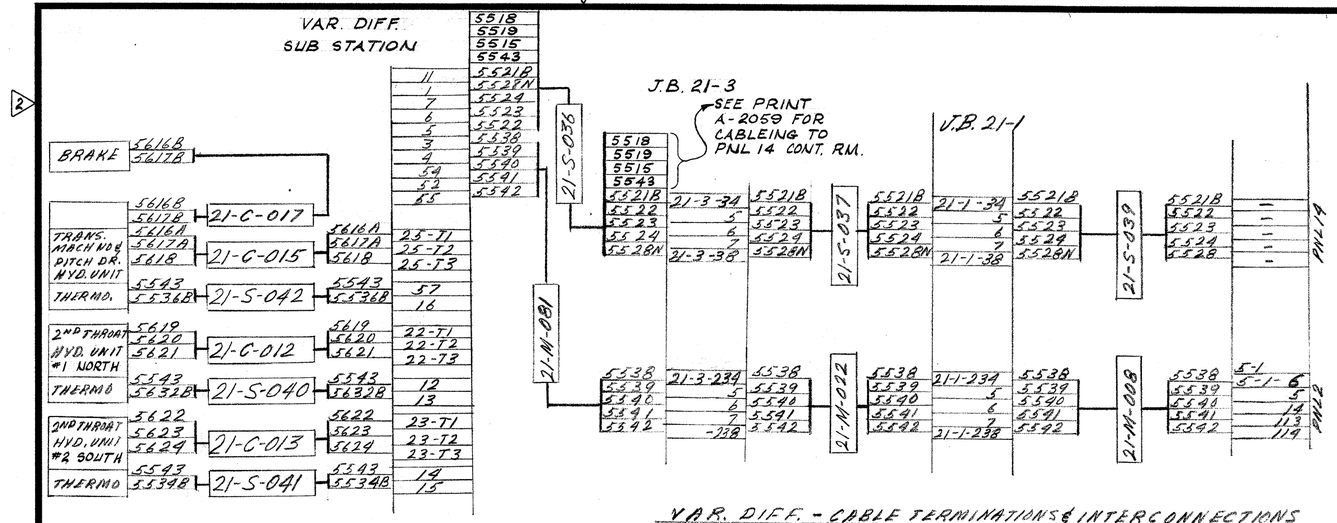
SCALE N.T.S.

DWG. NO. A-2058

A-2058

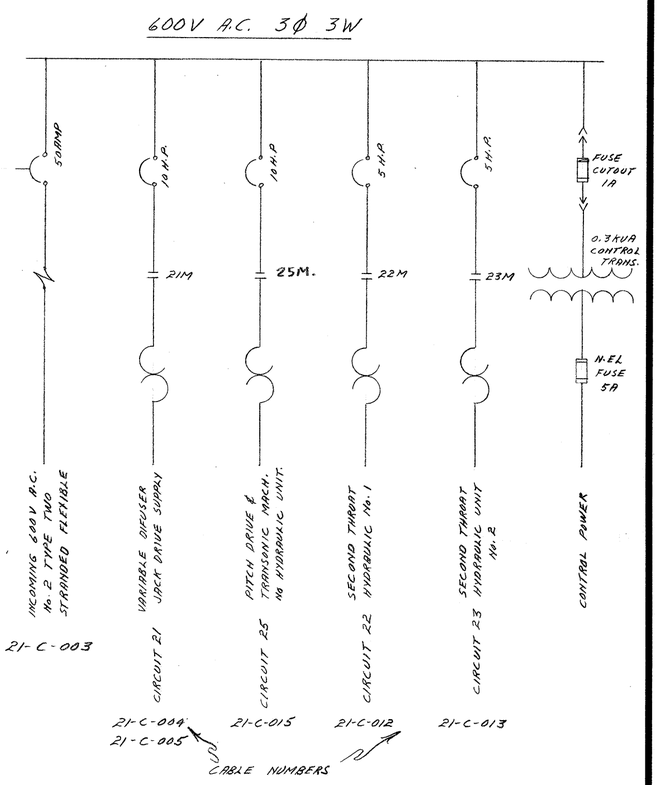
5 4

VAR. DIFF. SUB STATION



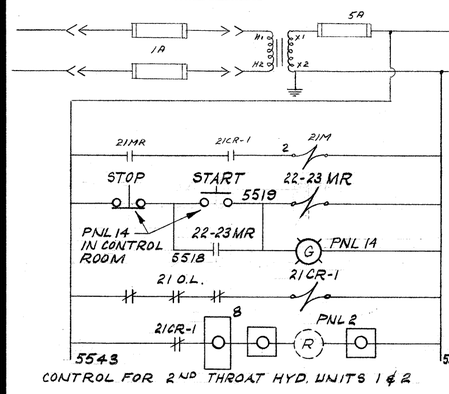
VAR. DIFF. - CABLE TERMINATIONS & INTERCONNECTIONS

600V A.C. 3Ø 3W



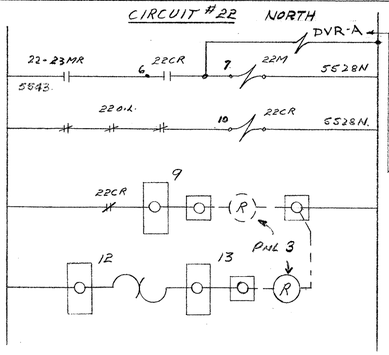
VARIABLE DIFF. JACK DRIVE SUPPLY

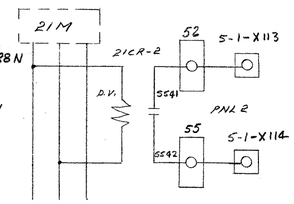
CIRCUIT #21



VARIABLE DIFF. SEC. THROAT HYD UNIT #1

CIRCUIT #22 NORTH



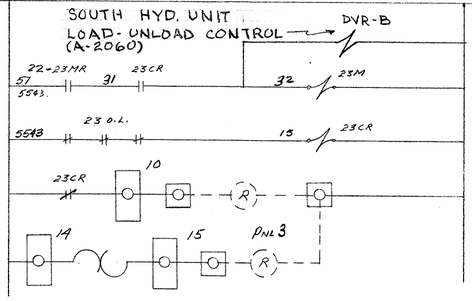


VARIABLE DIFF. JACK DRIVE SUPPLY POWER CHECK

DVR-A- NORTH HYD. UNIT LOAD-UNLOAD CONTROL (A-2060)

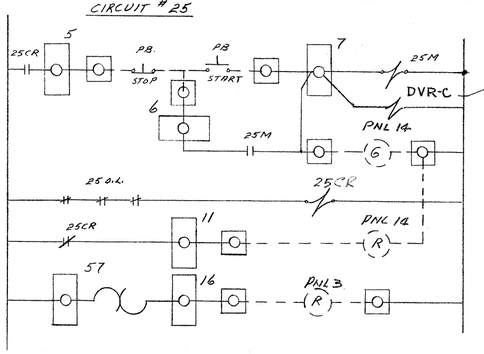
VARIABLE DIFF. SEC. THROAT HYD. UNIT No. 2

CIRCUIT #23 SOUTH



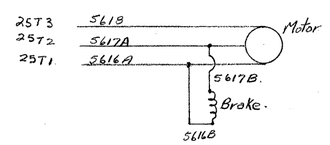
PITCH DRIVE & TRANS. MACH NO. HYD. UNIT

CIRCUIT #25



LOAD-UNLOAD CONTROL (A-2060)

TOP & BOTTOM ENTRY FLAP BRAKE



RE DWG A-2052 & A-20 FOR ADDITIONAL VAR. DIFF. 600V CABLE TERMINATIONS & INTERCONNECTIONS

REVISIONS			
NO.	DATE	CHANGE	BY
1	24/6/8	UP DATED	M.G.
2	DEC. 70	GENERAL REVISIONS - ADDED 2ND THROAT CONT.	R.H.
3	12-1-72	REMOVED OIL COOLANT PUMP	B.R.C.
4	7-5-75	ADDED DVR-A-B-C	BRC

NATIONAL RESEARCH COUNCIL
PLANT ENGINEERING SERVICES
OTTAWA CANADA

DATE: JAN 20/61
DESIGNED BY:
DRAWN BY: B. SMILEY
CHECKED BY:
APPROVED BY: MLC

TITLE: N.A.E. BLDG. #66
VARIABLE DIFFUSER 600V SUB-STATION
ONE LINE & SCHEMATIC DIAGRAMS & CABLE TERMINATIONS & INTERCONNECTIONS

SCALE: N.T.S.
DWG. NO.: A-2061

A-2067