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SIMARK MASTER DRAWING INDEX

CUSTOMER NAME:

SALES ORDER ID:

PRODUCT LINE PRODUCT PART NUMBER

UNIVERSITY OF COLORADO

SO-141228

SFC EFOY SCL-EFOY-NOAA-4060P-2400D-24-M60-2-XX

**Simark Controls Ltd.**

**10509 - 46 Street S.E. Calgary, Alberta, Canada T2C 5C2**

**Ph: (403) 236-0580, Toll Free: 1-800-565-7431 Fax: (403) 279-6553, Internet: www.simark.com**

B

**SFC ENERGY GROUP**

1

TOTAL QTY: CUSTOMER PO#:

1001046028

INDEX REVISION NUMBER

REV#

REVISION TITLE ISSUED FOR CONSTRUCTION

REV DATE 18 SEP 2018

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SHEET

DRAWING TYPE 1

SIMARK MASTER DRAWING INDEX

BILL OF MATERIALS - B1

LAMACOID SCHEDULE - L1 EFOY BOX MECHANICAL LAYOUT - M1 EFOY BOX MECHANICAL LAYOUT - M2

EFOY BOX MECHANICAL LAYOUT - M3 METHANOL FUEL BOX MECHANICAL LAYOUT - M4 METHANOL FUEL CONNECTION MECHANICAL LAYOUT - M5

EFOY BOX EXTERNAL WIND SHIELD LAYOUT - MG COMBINER BOX MECHANICAL LAYOUT – M7

TERMINAL RAIL DETAIL - T1 ELECTRICAL SCHEMATIC - El

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CHECKED SEP 1 8 2018

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REVISIONS

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FOR USE IN GENERAL PURPOSE AREA

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18 SEP 2018

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18 SEP 2018

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ENG-DRW ISO 9001

**SFC ENERGY GROUP**

CLIENT:

UNIVERSITY OF COLORADO

VI NOWO-31181

TITLE:

SIMARK CONTROLS EFOY PROENERGYBOX 4060P FUEL CELL SYSTEM

SO No.

SO-141228

SCL-EFOY-NDAA-4060P-2400D-24-M60-2-XX

141228-1

DWG NL

SHEET:

1

OF

12

SIMARK MASTER DRAWING INDEX

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NOQTY PART NO.

30 7 1020300000 (31) 1 1010300000

32) - - (33) - - (34) 14 1020100000 (35) 2 1010100000 (36) 3 1050000000 (37) LOT 1052260000 (38) -

12 1880430000 2 1880450000 4 3835600000

4 1631930000 (43) 4 1631930000

SCL

(45) 1

BILL OF MATERIALS NOQTY PART NO.

DESCRIPTION

LOC. 1 X 1 AL 4028-2105 EFOY PELICAN HARDIGG CASE 43"x31"x28" -40°C N3R SCL (2) 1 2335.25-PC-MP-LID CUSTOM MOUNTING PLATE (LID) 35.25"X23.5"/2.5"X0.1" SCL (3) 1 1207-PC-MP CUSTOM MOUNTING PLATE 12"X7"X0.1"

SCL 4) 1 AGP-0905

CUSTOM GLAND PLATE, 9"x5"X0.1"

SCL 5X 1 FUEL LINE PLATE CUSTOM EFOY FUEL LINE PLATE WITH CUTOUT

SCL K6 1 KEL-QTA 50 B ICOTEK PLUGGABLE ENTRY FRAME, IP54

SCL 7) 1 QIZ

ICOTEK GROMMET 7mm

SCL NOTE 18) 4 QTB

ICOTEK GROMMET BLANK COVER

SCL K9) 1 151 000 223 EFOY PRO 2400 DUO FUEL CELL 110W

SCL (9) 1 (C/W ITEM #1) EFOY OPERATING PANEL OP2

SCL 9B) 1 C/W ITEM #1) EFOY MOUNTING PLATE

SCL 9C) 1 (C/W ITEM #1) EFOY EXHAUST TUBE

SCL 1 (C/W ITEM #1) EFOY FUEL LINES

SCL 2 151 003 011 EFOY M28 CARTRIDGE ADAPTER US

SCL K11 - -

SCL 2 NEMA 4X HOOD ACE INTAKE/EXHAUST COVER N4X SS W/BAFFLES SCL 1 109E5724H502 SANYO DENKI 24VDC, 6" FAN, 226CEM, 0.58A

SCL (14) 2 09650-F/45 Q-TECH 6" PLASTIC GRILL C/W FILTER

SCL

SCL (15) 1 KM172

SANYO DENKI 6" METAL FINGER GUARD

SCL 16 i 101147.9-00

STEGO N/O (COOLING) COMPACT THERMOSTAT (°C) SCL K17) - -

SCL (18) 1 HEAT TRACE BRACKET ACE EFOY EXHAUST ANGLED PIPE W/ HOLDING PLATE SCL 19 1 KHL243-001CS-ES HEAT-LINE HEAT TRACE 3W/FT 24VDC-1FT, NO BOOT SCL 20) 1 01146.9-00

STEGO N/C CHEATING) COMPACT THERMOSTAT (°C) SCL (21) - -

SCL 22) i TS-MPPT-60 TS SOLAR SYSTEM CONTROLLER 60A 12/24/48VDC SCL 23) 1 MNEPV-60 MIDNITE 60A SOLAR MINIATURE CIRCUIT BREAKER SCL 24) 2 PIMB1PC63 I LOVATO SERIES MINIATURE BREAKER 63A 72VDC SCL 25 1 P1MB1PC10 LOVATO SERIES MINIATURE BREAKER 10A 72VDC

72 .

SCL

SCL (26) 1 7914760001 WEIDMULLER SPARE FUSE STORAGE BOX

SCL

TT1

146 LOT

+++1000+mi

CONSUMABLE PARTS

DESCRIPTION

LOC WEID WDU 10 FEED TERMINAL 600V, 65A, #18-#6 SCL WEID WPE 10 GROUND TERMINAL #16-#6 ENCLOSED) SCL

SCL

SCL WEID WDU 4 FEED TERMINAL 600V, 35A, #26-#10

SCL WEID WPE 4 GROUND TERMINAL #26-10 ZENCLOSED) SCL WEIDMULLER WAP 2.5 - 10 END PLATE (1.5MM)

SCL WEIDMULLER WQV 6/10 SCREWABLE JUMPER

SCL

SCL WEID WSI 4/2 FUSE TERMINAL 300V, 15A #30-#10 SCL WEID WAP WSI 4/2 FUSE TRMNL, END PLATE (2.5MM SCL WEIDMULLER EW 35 END BRACKET

SCL WEIDMULLER SCHT 5S TERMINAL MARKER

SCL WEIDMULLER TAG CARRIER PROTECTIVE STRIP

SCL SIMARK CONTROLS STICKER

SCL TS35 SLOTTED DIN RAIL

SCL MECH. LUG [2] 2/0 - 14AWG

SCL FUSE 1.25"x0.25" FAST ACTING GLASS 250V 2A

SCL FUSE 1.25" x0.25" FAST ACTING GLASS 250V 4A

SCL FUSE 1.25"0.25" FAST ACTING GLASS 250V 6A

SCL FUSE 1.25"x0.25" FAST ACTING GLASS 250V 15A SCL

SCL ALUMINUM NEUTRAL BAR

SCL SCREWS FOR NEUTRAL BAR (N8020)

SCL IBOCO WIREDUCT C/W COVER LT. GRAY

SCL CUSTOM INTERIOR CASE FRAME (1.577"x1,577") (14',1") SCL CUSTOM INTERIOR CASE FRAME (0.75"x1.577") (37") SCL 2-HOLE GUSSETED INSIDE CORNER BRACKET FOR TSLOT SCL 2-HOLE STRAIGHT FLAT PLATE FOR TSLOT

SCL 2" INSULATION

SCL 1“ INSULATION

SCL RED BATTERY SAFETY COVERS FOR EV12A-A <#4-6) SCL BLK BATTERY SAFETY COVERS FOR EV12A-A (#4-6) SCL

(47) LOT = (48) 8 - (49) 5 -

(51) 3

MECH. LUGU 46.25" FAST ACTING GLAS

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NOTE 2

50) 4

(52) -

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-

LOT N8020

LOT E199 55LOT T1E-1530-G 56 LOT 10-040 157)LOT 10-016 58 15 20-4040 159 2 22-140 K60 LOT CUSTOM (61)LOT CUSTOM (62) 2 84-9139 (63) 2 84-9138

SOLD SEPARATELY - FIELD INSTALLED - BILL OF MATERIALS NOQTY PART NO.

DESCRIPTION K701 4 150 905 100 EFOY FUEL CARTRIDGE M28 US K71) 5 150 905 099 | EFOY FUEL CARTRIDGE M10 US (72) 2. EV12A-A

DISCOVER EV TRACTION AGM BATTERY 12V 156AH

LOC. SCL SCL SCL

NOTE

DESCRIPTION

916

FIELD WIREWAY INTERNAL WIREWAY

NOTES:

EFOY SERIAL NUMBER

PANEL SERIAL NUMBER

WO-31181-1

1. QUANTITY 1 OF ITEM QTB IS PROVIDED AS A BLANK COVER FOR WHEN THE MT60 FUEL CARTRIDGES

ARE NOT EXTERNALLY ATTACHED TO EFOY FUEL LINES. ITEM QTB IS KEPT IN THE SPARE FUSE BOX. QUANTITY OF 3 EXTRA SPARES OF ITEM QTB ARE PROVIDED AND KEPT IN THE SPARE FUSE BOX.

**E**

2. QUANTITY OF 2 SPARE FUSES, KEPT IN THE SPARE FUSE BOX ARE PROVIDED PER EACH FUSE SIZE

AS SPARE. QUANTITY OF SPARE FUSES ARE INCLUDED IN THE BILL OF A MATERIAL QUANTITIES.

CHECKED SEP 1 8 2018 NA

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NOTES

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SCL-EFOY-NOAA-4060P-2400D-24-M60-2-XX

BILL OF MATERIALS - B1

DWG. NO.

141228-1

| SHEET

2

OF

12

***4***

5

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**UTION**

**Δ ATTENTION**

ACAUTION

B

**MAKE SURE THAT THE EFOY DOES**

**NOT EXCEED MAXIMUM INQUINATION INUNATIONAL CONTINUAL: 15 de TEMPORARY 10 MINUTES)**

**DISCONNECT EFOY FUEL CART BEFORE MOVING THE EFOY FUEL CART FROM THE CABINET**

**ENSURE TO DISENGAGE CONNECTOR. FAILURE TO DO SO MAY RESULT IN PHYSICAL DAMAGE**

**TO THE EFOY EQUIPMENT**

**HEAT TRACE TEMPERATURE SETTING ENSURE HEAT TRACE THERMOSTAT IS SET FOR S DEG. CELOUS**

**INGINATION ALONG QUADRATURE AXIS CONTINUAL 20 de**

33 CECECOMOOWDK3| alwWRRRRRAP

NOQTY PART NO. 1 NO

TEXT KA) 4" X 0.75" B-L/W-B

4" X 0.75" B-L/W-B 4" X 0.75" B-L/W-B 4" X 0.75" B-L/W-B 4" X 0.75" B-L/W-B 4" X 0.75" B-L/W-B 4" x 2" B-L/W-B

4" x 2" B-L/W-B KID 4\* X 2\* B-L/M-B

J 1" X 4" B-L/W-B KK 3" X 4" B-L/Y-B KL 3" X 4" B-L/Y-B KM 1" X 4" B-L/W-B

N 4.5" X 5.5" B-L/W-B

LAMACOID SCHEDULE

DESCRIPTION

LAMACOID DESCRIPTION EFOY EXHAUST AIR INTAKE EXHAUST AIR DC IN - SOLAR

OLAR DC OUT - LOAD EFOY FUEL LINES HEAT TRACE TEMPERATURE SETTING WARNING DISCONNECT EFOY FUEL CART WARNING INCLINATION WARNING |CSA FUSE REPLACE WARNING (STR-F001)

DISCONNECT SWITCH (ENG) (LAM-D009) DISCONNECT SWITCH (FRE) (LAM-D010) EFOY REPLACE BATTERIES WARNING (STICKER) EFOY HYBRID SYSTEM DO'S & DON'TS (STICKER)

**REFER TO CONTROL DIAGRAM FOR FUSE TYPE AND RATINGS REPLACE FUSED WITH FUSES OF SAME TYPE AND RATING**

**(OR EQUIVILENT)**

**UTION!**

**ATTENTION!**

***B***

**RISK OF ELECTRIC SHOCK - MORE THAN ONE DISCONNECT SWITCH**

MAY BE REQUIRED TO DE-ENERGIZE THE EQUIPMENT

BEFORE SERVICING.

RISQUE D'ÉLECTROCUTION - PLUS D'UN SECTIONNEUR PEUT ÊTRE NÉCESSAIRE DE METTRE HORS TENSION LE MATÉRIEL AVANT

L'ENTRETIEN.

**REPLAGE BATTERIES WITH BATTERIES OF SAME TYPE AND RATING**

**(OREQUIVALENT)**

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EFOY EXHAUST 01

**SIMARK CONTROLS**

AIR INTAKE

0

EXHAUST AIR

**EFOY**

0

**EFOY Hybrid System Do's & Don'ts!**

S

COMARKS

*E*

D DC IN - SOLAR

O

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0

DC OUT - LOAD

0

**INSTALLATON \* DO NOT place objects in front of the EFOY Pro fuel cell's air**

**intake or outlet**

O EFOY FUEL LINES 0

NOTE: TO BE SECURED TO THE OUTSIDE OF THE PRO ENERGY BOX BY HARDWARE.

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OPERATION \* DO NOT let the EFOY Pro fuel cell run out of fuel (risk of freezing) \* DO NOT switch the system to manual mode - always keep the

system in automatic mode \* DO NOT cut the connection to the battery bank

DO re-warm the EFOY Pro fuel cell back to room temperature for 24h before attempting to re-start IF it was exposed to freezing temperatures for an extended period of time and was not running in anti-freeze mode (due to a system error) DO set the system to use any partially full EFOY fuel cartridges first before using a full EFOY fuel cartridge DO use EFOY fuel cartridge sensor for early warning of low fuel levels to ensure system always has fuel available

EFOY PRO ENERGY BOX - DISCLAIMERS

TEMPERATURE SPECIFICATION: EFOY PRO ENERGY BOX IS DESIGNED TO OPERATE TO -40°C. EFOY WILL UTILIZE ANTIFREEZE MODE FOR TEMPERATURE CONTROL OF EFDY FUEL STACK, FUEL CONSUMPTION AND MAINTENANCE OF FUEL SHALL BE MAINTAINED DURING ALL SEASONS TO PREVENT DAMAGE TO THE FUEL CELL. SEE EFOY MANUAL FOR FURTHER DETAIL.

**\* DO NOT transport the EFOY Pro fuel cell in temperatures below**

+3 °C (+3B "F) unless It Is In operation (anti-freeze mode) \* DO NOT add additional panels or batteries to the system without consulting Simark Controls Ltd. (vald warranty)

**DO refer to detailed installation instructions in the manual DO remove the red cap from the exhaust hose DO connect the isolated exhaust hose DO ensure the exhaust hose is routed down and outside the shortest way possible DO ensure the exhaust hoge is not kinked or crushed DO ensure the space below the exhaust hose is clear of all debris so there is nothing for ice to build up on DO maintain a minimum distance of 5 cm around the EFOY Pro fuel cell to allow for proper air Intake DO keep the fuel cartridge connections clean and free of particles and pollution DO ensure that the voltage settings on the charge controller are within the acceptable threshold (manual) DO start a test cycle to ensure the system is functioning properly once installation is complete (manual) DO ensure the enclosure is securely shut and sealed prior to leaving the installation site**

RE-FUELING \* DO NOT install 2 half empty EFOY fuel cartridges when re-fueling.

always ensure there is 1 full cartridge installed

\* DO NOT cut the connection to the battery bank

EXHAUST TUBE EFOY EXHAUST TUBE CANNOT BE EXPOSED TO ICE BUILD UP. PRE ENERGY BOX SHOULD BE MOUNTED AT HEIGHT TO PREVENT ICE BUILD UP ON EXHAUST TUBE.

VENTING EFOY INTAKE AND EXHAUST VENTS CANNOT BE BLOCKED OR RESTRICTED. PRD ENERGY BOX MUST BE MOUNTED TO PREVENT BLOCKAGE OR RESTRICTIONS TI VENTING, INTAKE AIR FILTERS SHOULD BE CLEANED ON A REGULAR BASIS.

**\* DO NOT delay during an EFOY fuel cartridge exchange - max 10 minutes (risk of freezing)**

**\* DO NOT use any other methanol (void warranty)**

**DO ensure there is at least 1 fuil EFOY fuel cartridge connected to the system when refueling for proper measurement of remaining fuel levels DO check the exhaust hose to ensure it is free of debris and remove**

any ice/debris build up below DO keep the fuel cartridge connections clean and free of particles and pollution DO confirm error warning '22' by pressing the 'ok' button after the cartridge exchange is complete

E EXPOSED TO FREEZING TEMPERATURES

MOUNTING OF PRO ENERGY BOX:

THE PRO ENERGY BOX HAS NO PROVISIONS FOR TIE DOWNS. SECURING PRO ENERGY BOX SHALL BE THE RESPONSIBILITY OF OTHERS

DO re-warm the EFOY Pro fuel cell back to room temperature for

**24h before attempting to start the system If it was exposed to freezing temperatures for an extended period of time and was not running (risk of damage to the power stack)**

BATTERIES BATTERIES ARE INSTALLED BY OTHERS. THE TYPE OF BATTERY AND CONDITION OF BATTERIES CAN IMPACT THE DPERATING CONDITIONS FOR THE EFOY FUEL CELL, FUEL CONSUMPTION MAY BE INCREASED IF BATTERIES ARE IN POOR CONDITION. ENSURE BATTERIES ARE IN NEW CONDITION AND BATTERY SIZING IS WITHIN SPECIFICATION OF EFOY.

**For any EFOY Hybrid system questions please read the user manual or contact the Simark Controls Service Department at (403) 236-0580**

SOLAR SYSTEMS SOLAR SYSTEMS ARE THE RESPONSIBILITY OF OTHERS. PROPER SIZING OF SOLAR SYSTEMS FOR THE APPLICATION LOADS AND SITE CONDITIONS IS IMPERATIVE. IMPROPER SOLAR SYSTEM SIZING CAN IMPACT EFOY OPERATION HOURS AND FUEL CONSUMPTION.

CHECKED SEP 1 8 2018/A

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DATE

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ENG-DRW ISO 9001

**SFC ENERGY GROUP**

CLIENT:

UNIVERSITY OF COLORADO

VI No.

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TITLE:

SO NO.

SO-141228

SIMARK CONTROLS EFOY PROENERGYBOX 4060P FUEL CELL SYSTEM

SCL-EFOY-NOAA-4060P-2400D-24-M60-2-XX

LAMACOID SCHEDULE - L1

DWG. NO.

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141228-1 3 OF 12

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**MICO**

BauPa

Boot

31.00" [787mm]

**B**

**PIDID**

**UFO INIIT SLOUP**

35.25" [895mm]

2

**LATZ-40-000**

**SIMARKO**

B

174"

la

17"

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*444*

TYP.

- E

67"

11.50" [292mm]

**ACTION**

**AMOR!**

**LUID**

HOOD EXHAUST FAN DETAIL

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EFOY BOX TOP EXTERIOR VIEW

EFOY BOX FRONT EXTERIOR VIEW

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Bape

4"

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EXTERIOR

GBW

1

EXTERIOR (HOLDING PLATE)

(FRONT VIEW

8.50" [216mm]

A-117"

SFRONT VIEW)

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**• BOTEHF**

**INTERIOR**

**DORNOVNO**

DOUTLOAD 1

. PCN QUR

INTERIOR

EXTERIOR

56

INTERIOR CHEAT TRACE VIEW

(SIDE VIEW

**0**

**0**

8.00" [203mm]

4.00" [102mm]

EXTERIOR (HOLDING PLATE)

(TOP VIEW)

NUT

**E**

SECTION E-E

EFOY BOX BACK EXTERIOR VIEW

EXHAUST AIR

AIR INTAKE <FILTERED)

| <FILTERED) EFOY BOX FRONT EXTERIOR VIEW WITH INTERIOR OF HOOD AND PIPE

HEAT TRACE BRACKET (CUSTOM ACE EFOY EXHAUST ANGLED PIPE

WITH HOLDING PLATE DETAILY

NTS

CHECKED SEP 1 8 2018 My L\_\_

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DATE

REVISIONS

**BY**

CHK'D APP'D

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NOTES

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ENG-DRW ISO 9001

**SFC ENERGY GROUP**

CLIENT:

UNIVERSITY OF COLORADO

WD NO

W3-31181

TITLE:

SO-141228

141228-1

SIMARK CONTROLS EFOY PROENERGYBOX 4060P FUEL CELL SYSTEM

SCL-EFOY-NOAA-4060P-24001–24-M60-2-xx

EFOY BOX MECHANICAL LAYOUT - M1

***6***

7

SHEET:

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OF

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2.00" [51mm]

2.00" (51mm]

35,25"

35.38" [899mm]

HEAT TRACE CONFIGURATION

[895mm]

2.00" [51mm]

BACK

EXHAUST TUBE COPPER MATERIAL

**3/8" DIAMETER**

3/8° DIAMETER (0.032' WALL THICKNESS) TIP IS ANGLED FOR DRIP

- GREY FOAM INSULATION

HOSE AND CLAMP OVER 1/2" INSULATION -

FOIL TAPE

COPPER TUBING IZTELTTIZZZZZZTRATITTTTTTTTTZTZEL

ZZZZZZZZZZZZZ

ZZZZZZZZZZZZZZZ

FLEXIBLE EXHAUST TUBE - CABLE SPLICE CONTAINED IN ASSEMBLY

TO EFOY UNIT

HEAT TRACE 3W/FT-12VDC or 24VDC (EXTEND BEYOND TUBE)

**DC WIREWAY**

**AT OP**

WIRE PIGTAIL(S) XX AWG 3 CONDUCTOR, + - GND

TO TERMINAL STRIP

NTS

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**DC WIREWAY**

23.38" [594mm]

23.25" [591mm]

**OF**

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DC WIREWAY

MOUNTING PLATE | DC OUT - LOAD

boy

MOUNTING PLATE

LID

**DC WIREWAY-T1E-1530-G**

FIELD WIREWAY)

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II.I)

55DC WIREWAY

**STUD**

2.00 [51mm]

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**BIDEOS ニニニニニニニニコ**

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FRONT

2' INSULATION CDOT-HATCHED)

**II**

SECTION A-A

LDC IN - SOLAR

TERMINAL RAIL

ENCLOSURE

**WELD**

DC OUT - LOAD TERMINAL RAIL

SECTION B-B

NTS

NTS

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1.00" [25mm]

NTS

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GLAND PLATE DIMENSIONS

SUB

2.00" [51mm]

VIRUSILICIES

23.37\* [594mm]

3.00" [76mm]

M28

M28

M28

**0**

7.00" [178mm]

:

**0**

9.00" [229mm]

**0**

1,00" [25mm]

5.00" [127mm)!

E

SECTION C-C

**E**

FRONT INTERIOR VIEW (LID SHOWN AS DETACHED)

SECTION D-D CHECKED SEP 1 8 2018 7

NTS

NO.

*NO.*

DATE

REVISIONS

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SO No.

SD-141228

SCL-EFOY-NOAA-4060P-2400D-24-M60-2-XX

EFOY BOX MECHANICAL LAYOUT - M2

DWG. NO.

SHEET

141228-1 5 OF 12

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LEFT SIDE

FRONT

RIGHT SIDE

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BOTTOM

RIGHT SIDE

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—1772

1474"

TOP VIEW FRAME DIMENSIONS

NTS

FRONT VIEW FRAME DIMENSIONS

NTS

**-**

**-**

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RIGHT SIDE

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FRONT LEFT FRAME VIEW SISOMETRIC VIEW)

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FRONT LEFT FRAME VIEW

KISOMETRIC VIEW). (WITH MOUNTING PLATES)

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LEFT SIDE

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LEFT SIDE

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CHECKED SEP 1 8 2018

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DATE

REVISIONS

BY CHK'D APP'D KS | MS PDT

DATE APP D 18 SEP 2018

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FOR USE IN GENERAL PURPOSE AREA

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18 SEP 2018

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ISO 9001

**Simark Controls Ltd.**

**10509 - 46 Street S.E.**

**SFC ENERGY GROUP**

**Calgary, Alberta, Canada T2C 5C2**

**Ph: (403) 236-0580, Toll Free: 1-800-565-7431**

**Fax: (403) 279-6553, Internet: www.simark.com CLIENT**

UNIVERSITY OF COLORADO

WONG

WO-31181

TITLE:

SO No.

S8–141228

SIMARK CONTROLS EFOY PROENERGYBOX 4060P FUEL CELL SYSTEM

SCL-EFOY-NOAA-4060P-2400D-24-M60-2-XX

EFOY BOX MECHANICAL LAYOUT - M3

DWG. NO.

SHEET:

141228-1 6 OF 12

+

30.00" [762mm]

19.00" [483mm]

50mm Ø CUTOUT

85

-

NOTE 16

2

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**DANGER**

**DANGER**

32.00" [813mm]

27.00" (686mm]

**ODMsh**

SIMARK 88

HOOK FOR EFOY STRAP

**IPC INITY TOUR 1-800-585-7491**

**MI**

80

ANGLED

BRACKET FOR CATCH STOPPER

E REMOVABLE - FILTER

METHANOL FUEL BOX FRONT VIEW WITHOUT DOOR

MPLABLE FOR ONE THAT WHERE

HOOK FOR EFOY STRAP

METHANOL FUEL BOX

FRONT VIEW

INTEGRATED LOUVER WITH REMOVABLE FILTER RATED NUR

METHANOL FUEL BOX

BACK VIEW

SECTION E-E

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METHANOL FUEL BOX - BILL OF MATERIALS

DESCRIPTION ICOTEK PLUGGABLE ENTRY FRAME ICOTEK GROMMET 7mm ICOTEK GROMMET BLANK COVER

LA LUI A LA

NOQTY PART NO. (6) 2 KEL-QTA 50 B (7) 2 QIZ (8) 2 ОТВ

LIC, SCL SCL SCL

**DANGER**

31.00" [787mm]

øst.

**Q**

MOUNTING

HOLE

**CABINET CONTIENT MÉTHANOL UQUIDE ET VAPEUR INFLAMMABLES.**

**ASSUREZ-VOUS PAS D'OBSTRUCTION À LA VENTILATION**

-

METHANOL FUEL BOX - SOLD SEPARATELY NOQTY PART NO.

DESCRIPTION 85) 1 323017-2-MT60 ALLIED NUR DUAL MT60 BOX, 32" x 30"W x 17"] 86 1 <C/W ITEM #85) INTEGRATED LOUVER WITH REMOVABLE FILTER, N3R

2 150 905 124 EFOY FUEL CARTRIDGE MT60

-

ILOC. SCL SCL SCL

-

17.00" [432mm]

**DANGER**

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PART NO.

METHANOL FUEL BOX - CONSUMABLE PARTS

DESCRIPTION SIMARK CONTROLS STICKER

NOQTY 188)

LOC.

-

**CABINET CONTAINS METHANOL. FLAMMABLE LIQUID AND VAPOR. ENSURE NO OBSTRUCTION TO**

**VENTING**

-

SCL

LAMACOID DETAIL

NOQTY NO

P 3" X Q) 3" X

LAMACOID SCHEDULE

DESCRIPTION

LAMACOID DESCRIPTION METHANOL FUEL WARNING (LAM-G003XENG) METHANOL FUEL WARNING (LAM-G004XFRE)

CHECKED SEP 1 8 2018

SECTION F-E

PART NO.

TEXT 4" B-L/Y-B 4" B-L/Y-B

E

NOTES:

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NOTES

DATE

REVISIONS

NO.

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NO. O

BY CHK'D APP'D | KS | MS PDT

DATE APP'D 18 SEP 2018

1. QUANTITY 2 OF ITEM QTB IS PROVIDED AS A BLANK COVER FOR WHEN THE MT60 FUEL CARTRIDGES

ARE NOT EXTERNALLY ATTACHED TO EFOY FUEL LINES. ITEM QTB IS KEPT IN THE SPARE FUSE BOX LOCATED INSIDE OF THE EFOY BOX.

**Simark Controls Ltd.**

**ENG-ORW 10509-46 Street S.E.**

**ISO 9001) Calgary, Alberta, Canada T2C 5C2 SFC ENERGY GROUP**

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CLIENT:

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WO NOWO-31181

TIILE

SIMARK CONTROLS EFOY PROENERGYBOX 4060P FUEL CELL SYSTEM

SO-141228

SCL-EFOY-NDAA-4060P-2400D-24-M60-2-XX

DWG. NO.

SHEET:

141228-1 7 OF 12

METHANOL FUEL BOX MECHANICAL LAYOUT - M4

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2.00" [51mm]

FUEL LINE PASS THROUGH

PELICAN

CASE WALL

EFOY FUEL LINES

FUEL LINE/

PLATE

lo EFOY FUEL LINES O

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FUEL LINE PLATE

EFOY FUEL LINE PLATE COMES WITH

EXTERIOR FUEL LINE PASS THROUGH PLUGGABLE ENTRY FRAME

FOR CONNECTION TO EFOY FUEL CARTRIDGES

EXTERNAL TO THE

PELICAN CASE. FUEL LINE CUTOUT

ICOTEK / THROUGH

GROMMET 7MM PELICAN CASE

ICOTEK PLUGGABLE WALL

ENTRY FRAME 50MM

0

SIDE VIEW

FRONT VIEW

7.50"

PELICAN CASE ELEVATION TO BE APPROXIMATELY 7.5" HIGHER THAN METHENOL FUEL BOX FOR FUEL LINE PASS THROUGH

-

FUEL LINE PLATE EFOY FUEL LINE PLATE AND PASS THROUGH DETAIL

METHENOL FUEL BOX MT60 CONNECTION

FRONT VIEW

NTS

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METHENOL FUEL BOX MT60 CONNECTION

TOP VIEW

METHENOL FUEL BOX M28 CONNECTION

TOP VIEW

METHENOL FUEL BOX M10 CONNECTION

TOP VIEW CHECKED SEP 1 8 2018 MA

NOTES

REVISIONS

NO. 0

NO. NO. 0

DATE

DATE 18 SEP 2018

BY CHK'D APP'D KSMS PDT

DATE APP'D 18 SEP 2018

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**SFC ENERGY GROUP**

CLIENT:

UNIVERSITY OF COLORADO

WO NO.

WO-31181

TITLE:

SIMARK CONTROLS EFOY PROENERGYBOX 4060P FUEL CELL SYSTEM

SO NO.

SO-141228

SCL-EFOY-NDAA-4060P-2400D-24-M60-2-XX METHANOL FUEL CONNECTION MECHANICAL LAYOUT - M5

DWG. NO.

SHEET:

141228-1 8 OF 12

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31.95" [812mm]

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op

1,50" [38mm]

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2.00" [51mm]

EFOY BOX SIDE EXTERIOR VIEW

EFOY BOX FRONT EXTERIOR VIEW

6.00"

.

[152mm]

SOLD SEPARATELY - BILL OF MATERIALS TY PART NO.

DESCRIPTION

LOC. (75) 1 EXTERNAL WIND SHIELD EXTERNAL WIND SHIELD FOR WATER VAPOUR EXHAUST PORT SCL

EFOY BOX TOP EXTERIOR VIEW

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10.00" [254mm]

OUTSIDE DIMENSION

32.25" [819mm]

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INSIDE DIMENSION

32.13" (816mm]

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18.00" [457 mm)

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10.00" [25,4mm]

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SIDE VIEW

FRONT VIEW

TOP VIEW

ISOMETRIC VIEW

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EXTERNAL WIND SHIELD DETAIL

CHECKED SEP 1 8 2018JA

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NO

NOTES

DATE

NO. 0

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BY | KS

CHK'D APP'D MS PDT

DATE APP'D 18 SEP 2018

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**ENG-DRW ISO 9001)**

**SFC ENERGY GROUP**

CLIENT:

UNIVERSITY OF COLORADO

WO NO.

WO-31181

TITLE:

Sa-141228

SIMARK CONTROLS EFOY PRDENERGYBOX 4060P FUEL CELL SYSTEM

SCL-EFOY-NDAA-4060P-2400D-24-M60-2-XX EFOY BOX EXTERNAL WIND SHIELD LAYOUT – M6

SO NO DWG. NO.

SHEET:

141228-1

9 OF 12

8

18

24.00" [610mm]

7.50 [191mm]

0.25' [6mm)

&

- LOAD BAR

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**OFFT OFF**

**204**

12,50 [318mm]

**B**

39.75" [1010mm]

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10.00' (254mm]

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SOLAR GROUND AND GROUND OUT

4,00\* (102mm)

MNPV6-DISCO INTERIOR MECHANICAL DETAIL

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MNPV6-DISCO MOUNTING DIMENSIONS

L

MNPV6-DISCO EXTERIOR MECHANICAL DETAIL

SOLAR PANEL INPUT CABLE

L

4.07" [103MM]

OOMOO

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SOLD SEPARATELY – FIELD INSTALLED - BILL OF MATERIALS NOQTY PART NO.

DESCRIPTION

LOC. 90) 1 MNPV6-DISCO MIDNITE 6 CIRCUIT DISCONNECT SWITCH/COMBINER BOX SCL 91) 1 MN-LA-300 MIDNITE LIGHTNING ARRESTOR 300VDC

SCL MNEPV-20

MIDNITE 20 AMP BREAKER FOR CIRCUIT BOX

SCL 93) 2 13010

MC-4 CONNECTOR

SCL 94 2 LG395N2W-A5 SHARP SOLAR PANEL, 235W, 8.59A, 24VDC

W. 8.59A. 24VDC

SCL

**E**

**E**

MNPV6-DISCO KNOCKOUT DETAILS

CHECKED SEP 1 8 2018 74

ND.

NO.

REVISIONS

DATE APP D

NOTES FOR USE IN GENERAL PURPOSE AREA

DATE 18 SEP 2018

BY CHK'D APP'D KSMS PDT

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UNIVERSITY OF COLORADO

VI NOWO-31181

TITLE:

SIMARK CONTROLS EFOY PROENERGYBOX 4060P FUEL CELL SYSTEM

SO NO.

SO-141228

SCL-EFOY-NOAA-4060P-2400D-24-M60-2-XX

DWG NO. SHEET:

8

141228-1 10 OF 12

COMBINER BOX MECHANICAL LAYOUT - M7

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DC OUT - LOAD

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**EFOY**

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WSI 4/2

**WDU**

EW 35

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**VAP VSI 1/2**

EW 35

BRK1 60A

BRK2 63A

BRK3 63A

WSI 4/2

BRK4 10A

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WSI 4/2

WSI 472

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DC IN - SOLAR TERMINAL RAIL

DC OUT - LOAD TERMINAL RAIL

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NOTE 1 NOTE 2

Weidmuller

EW 35

O se na U177

UO se na UL17

NOTES

E

1. TOTAL QUANTITY 6 OF ITEM QTB IS PROVIDED AS A BLANK COVER FOR WHEN THE MT60 FUEL CARTRIDGES

ARE NOT EXTERNALLY ATTACHED TO EFOY FUEL LINES. ITEM QTB IS KEPT IN THE SPARE FUSE BOX.

2. QUANTITY OF 2 SPARE FUSES, KEPT IN THE SPARE FUSE BOX ARE PROVIDED PER EACH FUSE SIZE

AS SPARE. QUANTITY OF SPARE FUSES ARE INCLUDED IN THE BILL OF A MATERIAL QUANTITIES.

SPARE FUSE BOX /QTB GROMMET HOLDER TERMINAL RAIL

CHECKED SEP 1 8 2018 my

ND.

NO.

DATE

REVISIONS

BY

CHK'D APP'D

DATE APP'D

NOTES

FOR USE IN GENERAL PURPOSE AREA

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ISO 9001

**SFC ENERGY GROUP**

UNIVERSITY OF COLORADO

WO NO.

WO-31181

CLIENT: TITLE:

SO NO

SO-141228

SIMARK CONTROLS EFOY PROENERGYBOX 4060P FUEL CELL SYSTEM

SCL-EFOY-NDAA-4060P-2400D-24-M60-2-XX

TERMINAL RAIL DETAIL - T1

6

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DWG. NO.

141228-1

SHEET:

11 OF

12

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LEGEND

**DESCRIPTION FIELD WIRING PANEL WIRING PANEL WIRING**

**-**

DIP-SWITCH-SETTINGS

LG395N2W-A5 SOLAR PANEL 395W 9.83A

LG395N2W-A5 SOLAR PANEL 395W 9.83A

O

BREAKER TERMINAL

**0001**

1001

EFOY PRO 2400 DUO

**CABLE W/ EFDY**

**-**

FUSE TERMINAL

**EFDY**

EFOY

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**F1**

**PANEL TERMINAL**

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CONTINUED TO DISTRIBUTION (+V DC)

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FIELD INSTALLED

**SENSE+**

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**MC-4 CABLE (EXTERIOR)**

COMPONET TERMINAL

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061

SENSE

Restore 001 Broken Cam

CONTINUED TO DISTRIBUTION (+VDC) CONTINUED TO DISTRIBUTION (VDC)

-

**WIRE TAG**

**-**

0003

**MC-4 CONNECT**

**(EXTERIOR**

1003

ETHERNET SECURITY BATTERY EQUALIZATION BATTERY CHARGE ALGORITHM

SYSTEM VOLTAGE CONTROL MODE

**0016**

CONTINUED TO DISTRIBUTION (-VDC)

**SENSE**

GROUND TERMINAL

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**MC-4 CABLE (EXTERIR)**

& 16-

-\_FIELD\_INSTALLED

FIELD INSTALLED

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**TEMPERATURE**

**SWITCH**

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**0004**

**1004**

\*REFER TO TS-60 MANUAL FOR DETAILED SETTINGS

NOTE DURING SETUP & PROGRAMMING

CLIP VOLTAGE AT 29V DC

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**1005**

**0015**

**#6**

CONTINUED TO DISTRIBUTION (+VDC)

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**CHRG+**

CHARGE

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1006

0017)

**owo RESISTOR**

**WIRE SPECIFICATION**

TAGS CLR AWG-TEW SLR+ RED

**SLR- BLK #6 F-BAT+,BRK2+ RED #6 BRK3+,BATT+ RED #6 F-BAT-BATT- BLK #6**

**JBAT RED #6 SENSE+.CHRG+ RED #14 SENSE-CHRG BLK 14 LOAD+,BRK4+ RED #14**

**LOAD BLK #14 FOX),FNCX) RED #14 THX),FAN RED #14**

COM BLK

CONTINUED TO DISTRIBUTION (-VDC)

**CHRG**

**—**

SOLAR CONTROLLER

**TS-MPPT-60**

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**1**

*W17 MI1*

1007

MNPV6-DISCO

MIDNITE COMBINER BOX & DISCONNECT SWITCH

**DC IN - SOLAR)**

**BRKI MNEPV-60**

**#14**

REMOTE CONTROL

MN-LA-300

**MIDNITE LIGHTNING ARRESTOR**

300V

**ARRAY**

0008

REMOTE RJ-45

.com

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**SLR+**

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EFOY - DATA INTERFACE PINOUT |

RJ-45

**0009**

**COMMON**

1009

**DATA RJ-45**

**SLR**

MOUNTED KEYPAD INSIDE PELICAN CASE (MOUNTS PROVIDED)

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0010

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- Porte De

FIELD INSTALLED

1010

PIN 11 DUO CART SWITCH (DCS1) PIN 21 RS232 RxD (RECEIVE) PIN 31 RS232 TXD (TRANSMIT) PIN 41 GROUND PIN 5 + BATTERY VOLTAGE PIN 61 INPUT FUEL CARTRIDGE SENSOR (FSI) PIN 71 INPUT REMOTE-ON CONTACT PIN 81 PARALLEL/HYBRID OPERATION CONTROL

**BATTERY**

**BRK PIMBIPC63**

**DC PUT - LOAD**

**BRK4 PINB1PC10**

BATTERY

**BRK2 P1MBIPC63**

**A 63A**

Rennes Poland

Porte

0011

**1011**

een

2018

**EV12-A**

JBAT II 5/16

**12V**

5/16 EV12-A

CONTINUED TO DISTRIBUTION (24VDC)

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**F-BAT+**

**BRK2+**

**BRK3+**

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**63A**

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**BATT+**

**BATT+**

**10A**

**LOAD+**

**LOAD**

BATTERIES ARE FIELD INSTALLED AND WIRED BY OTHERS. SIMARK TD PROVIDE BATTERY WIRES WITH 516 CRIMP LUGS. C/W BATTERY SAFETY COVERS.

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**BRK4+**

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NEGATIVE

*41016A*

**0012**

**1012**

**F-BAT**

**BATT**

50PL 12V

5/16\*

**ROUND W/ CRIMP LUG**

**FAN**

**EXHAUST FAN**

COM

**F3**

**COOLING-TH1**

0013

**1013**

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+

E FAN

109E5724H502 (24VDC, 226CFM, 0.58A) THERMOSTAT SET AT 30°C

**2A**

**FAN**

**REM.TEMP**

**EFOY HEAT TRACE**

**F4**

EFOY HEAT TRACE

**HEATING-TH2**

Megama Te

CONTINUED TO EFOY SENSE (+VDC)

0014

**1002**

Como

**1014**

KHL243-001CS-ES

(3 WATT, 24VDC @ 1', NO BOOT) THERMOSTAT SET AT 5C

**SENSE+**

**ZA**

**TH4**

js is es 2,5

**F5**

0015

0 LA 1

1005

F5 (6A) SPARE FUSE

CONTINUED TO EFOY CHARGE (+VDC)

**1015**

**CHRG+**

**GA**

**SENSE**

**1003**

CONTINUED TO EFOY SENSE (VDC)

**F6 (6A) SPARE FUSE**

0016

1016

**SENSE**

0017

F7 (4A) SPARE FUSE

METER

O

CONTINUED TO EFOY CHARGE (-VDC)

1017

**CHRG**

**4A**

**F8**

0018

Rinne

**1016**

1016

ENET

CONTINUED TO TB-LOAD (+VDC)

F8 (4A) SPARE FUSE

CONTINUED TO TB-LOAD (+VDC)

1018

**LDAD+**

**4A**

**1016**

CONTINUED TO TB-LOAD (-VDC)

F9 (4A) SPARE FUSE

0019

**RS-232**

**1019**

**LOAD**

F10

**F10 (2A)**

SPARE FUSE

0020

RS-485

**1020**

**2A**

NOTES:

**Fli**

NOTE 1: CAUTION - THE DATA INTERFACE CANNOT BE CONNECTED DIRECTLY TO A PC. THE INTERFACE ADAPTER IS

REQUIRED. CONNECTING THE EFOY DIRECTLY TO A COMPUTER CAN DAMAGE BOTH DEVICES

F11 (2A) SPARE FUSE

**0021**

**1021**

**ZA**

**F12**

NOTE 2: LOAD IS CONNECTED DIRECTLY TO BATTERY POWER. BATTERIES COULD BE DEEP DISCHARGED IF LOAD IS

CONTINUALLY CONNECTED WHEN POWER GENERATION COMPONENTS ARE NOT OPERATING CORRECTLY OR ARE DISCONNECTED.

CHECKED SEP 1 8 2018 1

F12 (2A) SPARE FUSE

E

SAPUOSE

0022

**1022**

**2A**

**GND**

ND,

NOTES

*NO.*

DATE DATE

NO.

0

REVISIONS ISSUED FOR CONSTRUCTION

BY CHK'D APP'D KSMS PDT

DATE APP'D 18 SEP 2018

0

FOR USE IN GENERAL PURPOSE AREA

18 SEP 2018

SIMARK

**Simark Controls Ltd.**

**10509 - 46 Street S.E. Calgary, Alberta, Canada T2C 5C?**

**Ph: (403) 236-0580, Toll Free: 1-800-565-7431 Fax: (403) 279-6553, Internet: www.simark.com**

ENG-DRW ISO 9001)

SERENED

**D**

CLIENT:

UNIVERSITY OF COLORADO

WO-31181

TITLE:

SIMARK CONTROLS EFOY PROENERGYBDX 4060P FUEL CELL SYSTEM

SO-141228

SCL-EFOY-NBAA-4060P-2400D-24-M60-2-XX ELECTRICAL SCHEMATIC - E1

my

DWG. NO. SHEET:

141228-1 12 OF 12

**8**