

Provisional Application for Patent Cover Sheet

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c)

Inventor(s)

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City

State

Country i

Dean

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US

All Inventors Must Be Listed – Additional Inventor Information blocks may be generated within this form by selecting the **Add** button.

Add

Title of Invention

IN LINE FUSE ASSEMBLY

Attorney Docket Number (if applicable)

SHOALS-22

Correspondence Address

Direct all correspondence to (select one):

☒ The address corresponding to Customer Number

☐ Firm or Individual Name

Customer Number

57825

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.

☐ Yes, the name of the U.S. Government agency and the Government contract number are:

Entity Status

Applicant claims small entity status under 37 CFR 1.27

- ☒ Yes, applicant qualifies for small entity status under 37 CFR 1.27
☐ No

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Signature

Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/Carla L Gannon/			Date (YYYY-MM-DD)	2013-06-03
First Name	Carla	Last Name	Gannon	Registration Number (If appropriate)	56358

This collection of information is required by 37 CFR 1.51. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **This form can only be used when in conjunction with EFS-Web. If this form is mailed to the USPTO, it may cause delays in handling the provisional application.**

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IN LINE FUSE ASSEMBLY

BACKGROUND OF THE INVENTION

5

The present invention relates to an in line connector fuse, and more specifically, to a connector fuse with the wire attached directly to the fuse and then over molded in two processes with plastic materials to provide electrical insulation and physical protection.

10

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of an embodiment of the device, depicting wire attached at each end of the connector fuse;

15

FIG. 2 is a perspective view of another embodiment of the device, depicting the connector fuse assembled into the middle of the harness with a wire coming out both ends of the over molded fuse, depicting wire welded to each end of the fuse;

FIG. 3 is a perspective view of the attachment wire in FIG. 2;

20

FIG. 4 is a perspective view of another embodiment of the device, depicting dual connectors on each end of the fuse assembly to attach the wire to the fuse and an existing harness;

FIG. 5 is a perspective view of attachment wire of FIG. 4;

FIG. 6 is a perspective view of the in harness fuse assembly in the undermold state;

25

FIG. 7 is another perspective view of the in harness fuse assembly in the completed overmold state;

FIG. 8 is a perspective view of a dual connector embodiment of the fuse assembly in the undermold state;

30

FIG. 9 is a perspective view of a dual connector embodiment of the fuse assembly in the completed overmold state;

FIG. 10 is another perspective view of a dual connector embodiment of the fuse assembly;

FIG. 11 is another perspective view of a dual connector embodiment of the device, depicted with a female fused connector;

5 FIG. 12 is another perspective view of a dual connector embodiment of the device, depicted with a male fused connector;

DETAILED DESCRIPTION OF THE INVENTION

10 The following detailed description is of the best currently contemplated modes of carrying out exemplary embodiments of the invention. The description is not to be taken in a limiting sense, but is made merely for the purpose of illustrating the general principles of the invention, since the scope of the invention is best defined by the appended claims.

15 The following structure numbers shall apply to the following structures among the various FIGS.:

- 1 – Fuse;
- 2 – wire; and
- 20 3 – Socket harness.

25 Broadly, the assembly for the fuse has the fuse with the wire attached directly to the fuse and then over molded in two processes with plastic materials to provide electrical insulation and physical protection. There are several different versions which allow for different applications.

30 Referring to FIG. 1, the connector fuse can be assembled into the harness at the connector. As also shown in FIG. 11 and FIG. 12, there will be a male or female connector on one end and a wire on the other end of the over molded fuse. This will allow for each branch of the harness to be fused at the solar panel.

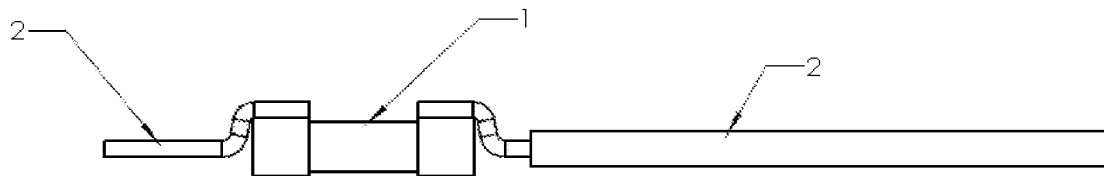
As shown best in FIG. 2, the In Harness fuse can also be assembled into the middle of the harness with a wire coming out both ends of the over molded fuse. This will move the fuse away from the connector and allow for
5 the trunk of the harness to be fused.

As shown in FIG. 4, the Dual Connector fuse can also be assembled so that there is a connector on both ends of the fuse assembly. This would allow the fuse to be assembled onto existing harnesses or allow for the
10 fuse assembly to be replaced in a harness by cutting the fuse assembly out of the harness and replacing it with a connector and then plugging this assembly into the harness.

Specifications of certain structures and components of the present
15 invention have been established in the process of developing and perfecting prototypes and working models. These specifications are set forth for purposes of describing an embodiment, and setting forth the best mode, but should not be construed as teaching the only possible embodiment. Rather, it should be understood that all specifications, unless otherwise stated or contrary to common
20 sense, are +/- 10%. It should also be understood that ranges of values set forth inherently include those values, as well as all increments between.

What is claimed is:

1. An in line connector fuse including:
 - A) a fuse;
 - B) a wire attached directly to said fuse; and
 - C) an overmolding surrounding said fuse.



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	HP 10MXXX	1000V PV FUSE	1
2	PV WIRE	PV WIRE	AR

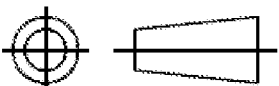
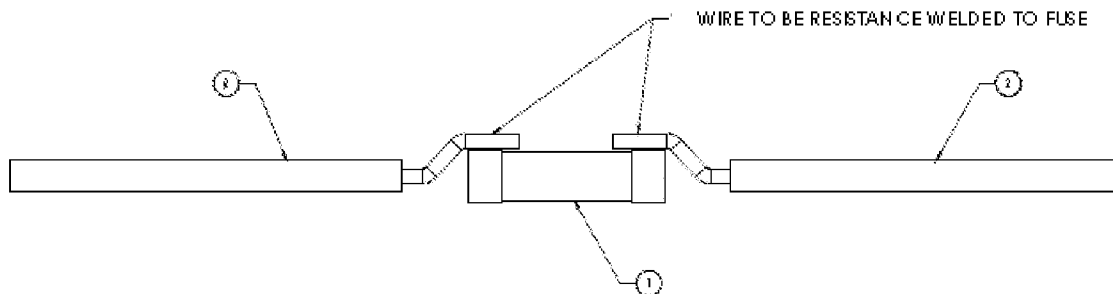
MATERIAL / FINISH		 SOLIDWORKS COMPUTER GENERATED CHANGE RESTRICTED		
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DRAWN BY	DATE	TITLE: WIRE VIEW FOR CONNECTOR ILF ASSEMBLY		
	12/11/2012			
CHECKED BY	DATE			
-		SIZE	DWG NO.	REV.
ENGINEER	DATE	B	OEM-0525	-01
DRAWING PRINTED ON: 5/30/2013		SCALE: 1:2	DO NOT SCALE DRAWING	SHEET 1 OF 1

FIG. 1



2	PV WIRE	PV WIRE		AR
1	HP10MXX	1000V PV FUSE	MERSEN	1
ITEM NO.	PART NUMBER	DESCRIPTION	VENDOR	QTY

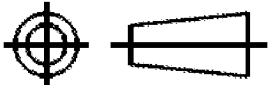
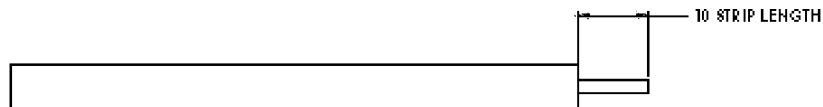
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 THIRD ANGLE PROJECTION		 SHOALS TECHNOLOGIES GROUP CONSULTING, DESIGN AND MANUFACTURING PORTLAND, TENNESSEE 37148 THE INFORMATION CONTAINED ON THIS DRAWING IS THE SOLE PROPERTY OF SHOALS TECHNOLOGIES GROUP. USE OF THIS DOCUMENT IS RESERVED EXCLUSIVELY FOR SHOALS TECHNOLOGIES GROUP. REPRODUCTION OR DISTRIBUTION OF THIS DRAWING IN WHOLE OR IN PART IS FORBIDDEN WITHOUT THE EXPRESS WRITTEN CONSENT OF SHOALS TECHNOLOGIES GROUP.	
DRAWN BY D. MICHAEL	DATE 04-10-13	TITLE: VISUAL OF WIRE ASSY	
CHECKED BY -	DATE -	SIZE: DWG NO. HAR-0525	
DESIGNED BY -	DATE -	REV. -01	
DRAWING PRINTED ON: 5/10/2013		SCALE: 2:1	DO NOT SCALE DRAWING
		SHEET 1 OF 1	

FIG. 2



2	PV WIRE	PV WIRE		AP
1	HPT0400X	1000V PV FUSE	MERSEN	1
ITEM NO.	PART NUMBER	DESCRIPTION	VENDOR	QTY

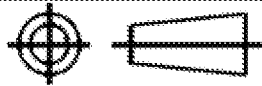
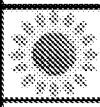
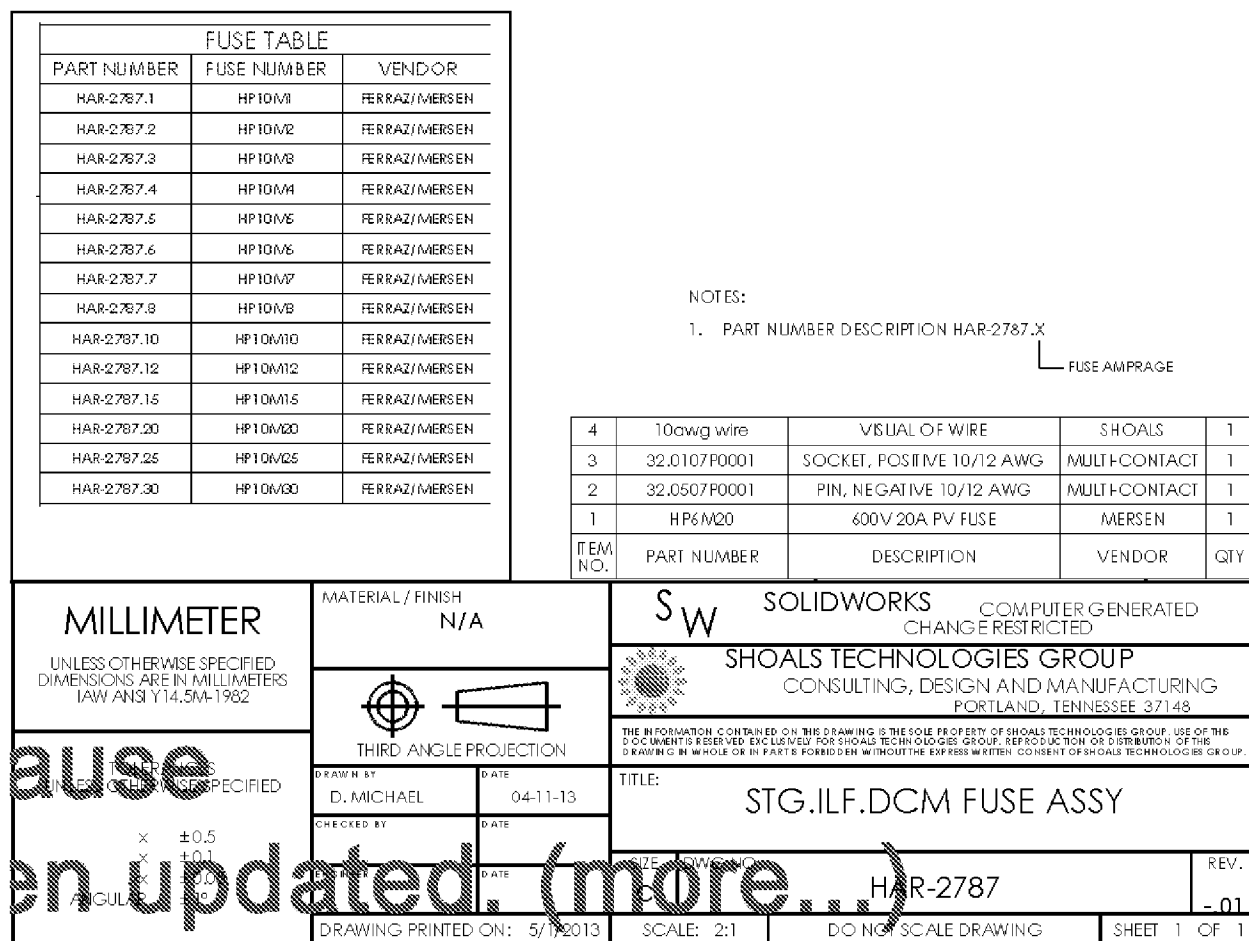
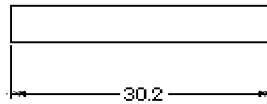
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DESIGNED BY D. MICHAEL	DATE 04-10-13	TITLE VISUAL OF WIRE ASSY	
CHECKED BY -	DATE -	REV. -	
DRAWING PRINTED ON: 6/10/2013		SCALE: 2:1	DO NOT SCALE DRAWING
SHEET 1 OF 1		HAR-0525	

FIG. 3





ITEM 4
CUT AND STRIPPED

FUSE TABLE		
PART NUMBER	FUSE NUMBER	VENDOR
HAR-2787.1	HP10A4	REKAZI/AMERSEN
HAR-2787.2	HP10A5	REKAZI/AMERSEN
HAR-2787.3	HP10A6	REKAZI/AMERSEN
HAR-2787.4	HP10A6	REKAZI/AMERSEN
HAR-2787.5	HP10A6	REKAZI/AMERSEN
HAR-2787.6	HP10A6	REKAZI/AMERSEN
HAR-2787.7	HP10A9	REKAZI/AMERSEN
HAR-2787.8	HP10A8	REKAZI/AMERSEN
HAR-2787.10	HP10A10	REKAZI/AMERSEN
HAR-2787.12	WP10A55	REKAZI/AMERSEN
HAR-2787.15	WP10A55	REKAZI/AMERSEN
HAR-2787.20	WP10A50	REKAZI/AMERSEN
HAR-2787.25	WP10A55	REKAZI/AMERSEN
HAR-2787.30	WP10A50	REKAZI/AMERSEN

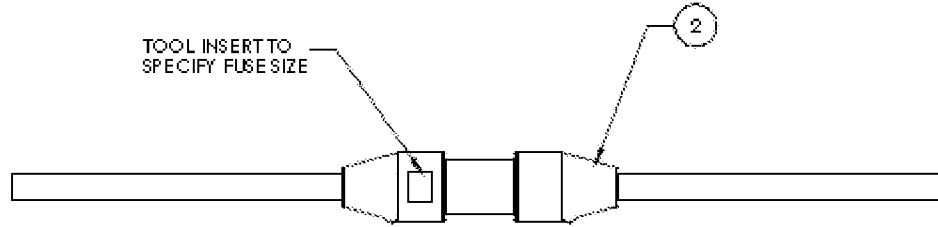
NOTES:
1. PART NUMBER DESCRIPTION HAR-2787.2

4	100mg wire	VEEVAL OF WIRE	SKOALE	1
3	22.0107P001	SOCKET, POSITIVE 10/12 AWG	MULTI-CONTACT	1
5	25.0507P001	FIN, NEGATIVE 10/12 AWG	MULTI-CONTACT	1
1	HP10A50	600V 25A PV FUSE	AMERSEN	1

ITEM NO.	PART NUMBER	DESCRIPTION	VENDOR	QTY
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MILLIMETER UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN MILLIMETERS (INCHES Y 16.2541 INCH)	MATERIAL / FINISH N/A	SOLIDWORKS COMPUTER GENERATED CHARGE RESTRICTED
THIRD ANGLE PROJECTION	DATE 04-11-13	STG.ILF.DCM FUSE ASSY
REV. -01	HAR-2787	
DRAWING PRINTED ON: 5/1/2013	SCALE: 2:1	DON'T SCALE DRAWING
SHEET 1 OF 1		

FIG. 5



PART IN THE UNDERMOLD STATE

FUSE TABLE		
PART NUMBER	FUSE NUMBER	VENDOR
STG.ILF2.1	HP10M1	FERR.AZ/MERSEN
STG.ILF2.2	HP10M2	FERR.AZ/MERSEN
STG.ILF2.3	HP10M3	FERR.AZ/MERSEN
STG.ILF2.4	HP10M4	FERR.AZ/MERSEN
STG.ILF2.5	HP10M5	FERR.AZ/MERSEN
STG.ILF2.6	HP10M6	FERR.AZ/MERSEN
STG.ILF2.7	HP10M7	FERR.AZ/MERSEN
STG.ILF2.8	HP10M8	FERR.AZ/MERSEN
STG.ILF2.10	HP10M10	FERR.AZ/MERSEN
STG.ILF2.12	HP10M12	FERR.AZ/MERSEN
STG.ILF2.15	HP10M15	FERR.AZ/MERSEN
STG.ILF2.20	HP10M20	FERR.AZ/MERSEN
STG.ILF2.25	HP10M25	FERR.AZ/MERSEN

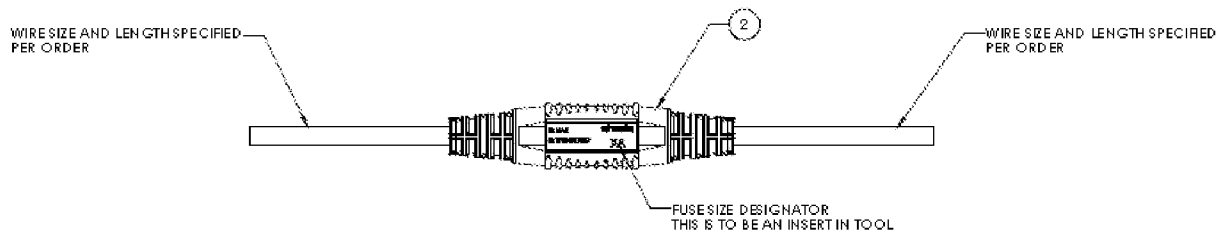
NOTES:

- CAD DATA TO BE USES TO DESIGN MOLD FOR BOTH UNDERMOLD AND OVERMOLD.
- ALL TEXT TO BE AND INSERT IN THE TOOL.
- MATERIAL: ITEM 2 ZYRON 540Z
ITEM 3 XXXXX

ITEM NO.	PART NUMBER	DESCRIPTION	Vendor	QTY
2	PL-0526	STG.ILF2 OVERMOLD	SHOALS	1
1	PL-0527	STG.ILF2 UNDERMOLD	SHOALS	1

MILLIMETER UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN MILLIMETERS (AWG/ANSI 14.5M-1982)		MATERIAL / FINISH N/A	S W SOLIDWORKS COMPUTER GENERATED CHANGE RESTRICTED	
THIRD ANGLE PROJECTION		SHOALS TECHNOLOGIES GROUP CONSULTING, DESIGN AND MANUFACTURING PORTLAND, TENNESSEE 37148		
DRAWN BY D. MICHAEL		DATE 12/11/2012		TITLE STG.ILF2
CHECKED BY -		DATE -		REV. -01
DRAWING PRINTED ON: 4/11/2013		SCALE: 1:1		DO NOT SCALE DRAWING
				SHEET 1 OF 1

FIG. 6



PART IN COMPLETED STATE

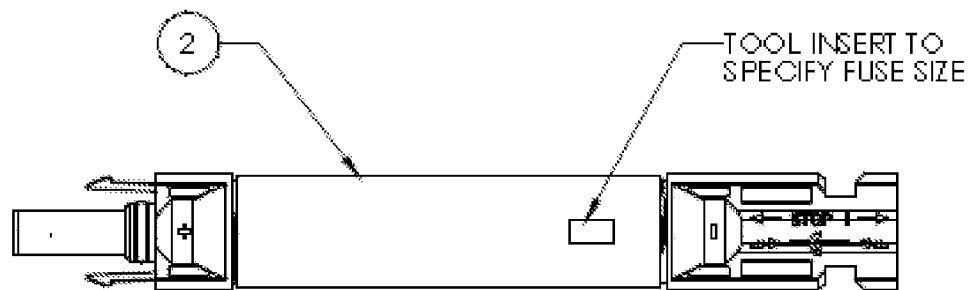
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STG.JLP2.97	NP10097	FEELER/MESEN
STG.JLP2.98	NP10098	FEELER/MESEN
STG.JLP2.99	NP10099	FEELER/MESEN
STG.JLP2.100	NP10100	FEELER/MESEN

NOTES:

1. CAD DATA TO BE USES TO DESIGN MOLD FOR BOTH UNDERMOLD AND OVERMOLD.
2. ALL TEXT TO BE AND INSERT IN THE TOOL.
3. MATERIAL: ITEM 2 ZYRON540Z
ITEM 3 XXXXX

2	PL-0626	STG.JLP2 OVERMOLD	SHOALS	1
1	PL-0627	STG.JLP2 UNDERMOLD	SHOALS	1
ITEM NO.	PART NUMBER	DESCRIPTION	Vendor	QTY
MILLIMETER THIRD ANGLE PROJECTION SOLIDWORKS COMPILED GENERATED CHANGEREQUIRED SHOALS TECHNOLOGIES GROUP CONSULTING, DESIGN AND MANUFACTURING PORTLAND, TENNESSEE 37148 STG.JLP2 STG.JLP2 DRAWING PRINTED ON: 4/1/2013 SCALE: 1:1 DO NOT SCALE DRAWING SHEET 1 OF 1				

FIG. 7



PART IN THE UNDERMOLD STATE

ASSEMBLY TABLE	
ASSEMBLY PART NUMBER	HARNES SUB-ASSY NUMBER
STG.JLF.D CM.1	HAR-278 7.1
STG.JLF.D CM.2	HAR-278 7.2
STG.JLF.D CM.3	HAR-278 7.3
STG.JLF.D CM.4	HAR-278 7.4
STG.JLF.D CM.5	HAR-278 7.5
STG.JLF.D CM.6	HAR-278 7.6
STG.JLF.D CM.7	HAR-278 7.7
STG.JLF.D CM.8	HAR-278 7.8
STG.JLF.D CM.10	HAR-278 7.10
STG.JLF.D CM.12	HAR-278 7.12
STG.JLF.D CM.15	HAR-278 7.15
STG.JLF.D CM.20	HAR-278 7.20
STG.JLF.D CM.25	HAR-278 7.25
STG.JLF.D CM.30	HAR-278 7.30

NOTES:

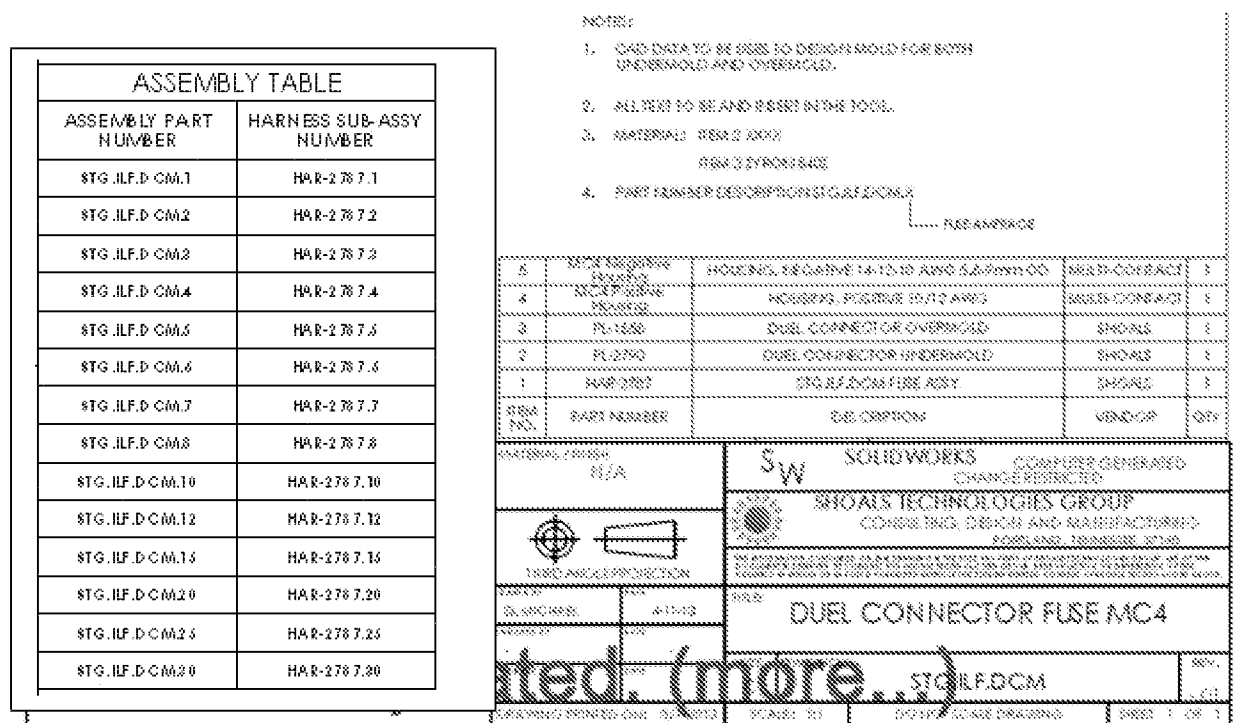
- CAD DATA TO BE USES TO DESIGN MOLD FOR BOTH UNDERMOLD AND OVERMOLD.
- ALL TEXT TO BE AND INSERT IN THE TOOL.
- MATERIAL: ITEM 2 XXXX
ITEM 3 ZYRON 540Z
- PART NUMBER DESCRIPTION STG.JLF.DCM.X
FUSE AMPRAGE

ITEM NO.	PART NUMBER	DESCRIPTION	VENDOR	QTY
5	MC4 Negative Housing	HOUSING, NEGATIVE 14-12-10 AWG 5.5-9mm OD	MULTI-CONTACT	1
4	MC4 Positive Housing	HOUSING, POSITIVE 10/12 AWG	MULTI-CONTACT	1
3	PL-1555	DUEL CONNECTOR OVERMOLD	SHOALS	1
2	PL-2790	DUEL CONNECTOR UNDERMOLD	SHOALS	1
1	HAR-2787	STG.JLF.DCM FUSE ASSY	SHOALS	1

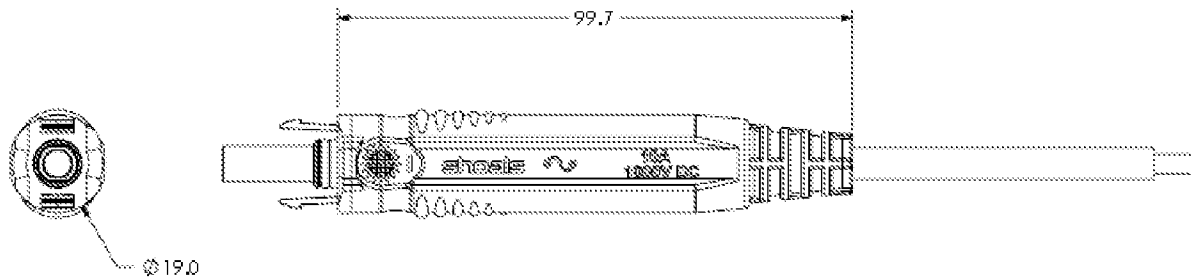
MATERIAL / FINISH N/A		SOLIDWORKS COMPUTER GENERATED CHANGE RESTRICTED	
THIRD ANGLE PROJECTION		SHOALS TECHNOLOGIES GROUP CONSULTING, DESIGN AND MANUFACTURING PORTLAND, TENNESSEE 37148 THE INFORMATION CONTAINED ON THIS DRAWING IS THE SOLE PROPERTY OF SHOALS TECHNOLOGIES GROUP. NO PART OF THIS DOCUMENT IS TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE EXPRESS WRITTEN CONSENT OF SHOALS TECHNOLOGIES GROUP.	
DRAWN BY D. MICHAEL CHECKED BY - DATE 4-11-13	TITLE DUEL CONNECTOR FUSE MC4 SIZE DRAWING STG.JLF.DCM	REV. -01	

DRAWING PRINTED ON: 5/19/2013 SCALE: 1:1 DO NOT SCALE DRAWING SHEET 1 OF 1

FIG. 8



Voltage, LLC
EX1021-17



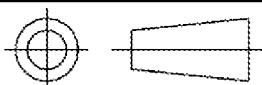
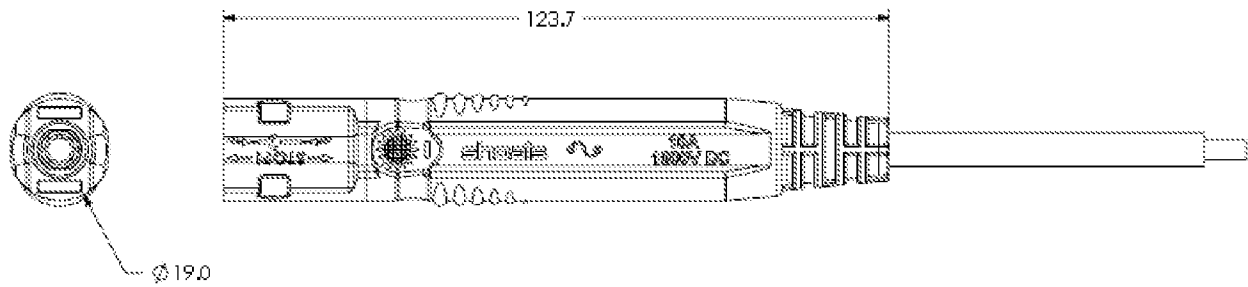
MATERIAL / FINISH N/A		 SOLIDWORKS		COMPUTER GENERATED CHANGE RESTRICTED
 THIRD ANGLE PROJECTION		 SHOALS TECHNOLOGIES GROUP CONSULTING, DESIGN AND MANUFACTURING PORTLAND, TENNESSEE 37148		
		THE INFORMATION CONTAINED ON THIS DRAWING IS THE SOLE PROPERTY OF SHOALS TECHNOLOGIES GROUP. USE OF THIS DOCUMENT IS RESERVED EXCLUSIVELY FOR SHOALS TECHNOLOGIES GROUP. REPRODUCTION OR DISTRIBUTION OF THIS DRAWING IN WHOLE OR IN PART IS FORBIDDEN WITHOUT THE EXPRESS WRITTEN CONSENT OF SHOALS TECHNOLOGIES GROUP.		
DRAWN BY D. MICHAEL	DATE 7-23-12	TITLE: FEMALE FUSED CONNECTOR		
CHECKED BY -	DATE -	SIZE A	DWG NO. Fused Connector Assy	REV. A
DRAWING PRINTED ON: 7/23/2012		SCALE: 1:1	DO NOT SCALE DRAWING	SHEET 2 OF 2

FIG. 11



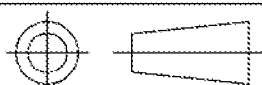
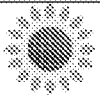
MATERIAL / FINISH N/A		 SOLIDWORKS		COMPUTER GENERATED CHANGE RESTRICTED
 THIRD ANGLE PROJECTION		 SHOALS TECHNOLOGIES GROUP CONSULTING, DESIGN AND MANUFACTURING PORTLAND, TENNESSEE 37148		
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DRAWN BY D. MICHAEL	DATE 7-23-12	TITLE: MALE FUSED CONNECTOR		
CHECKED BY -	DATE -	SIZE A	DWG NO. Fused Connector Assy	REV. A
ENGINEER -	DATE -			
DRAWING PRINTED ON: 7/23/2012		SCALE: 1:1	DO NOT SCALE DRAWING	SHEET 1 OF 2

FIG. 12