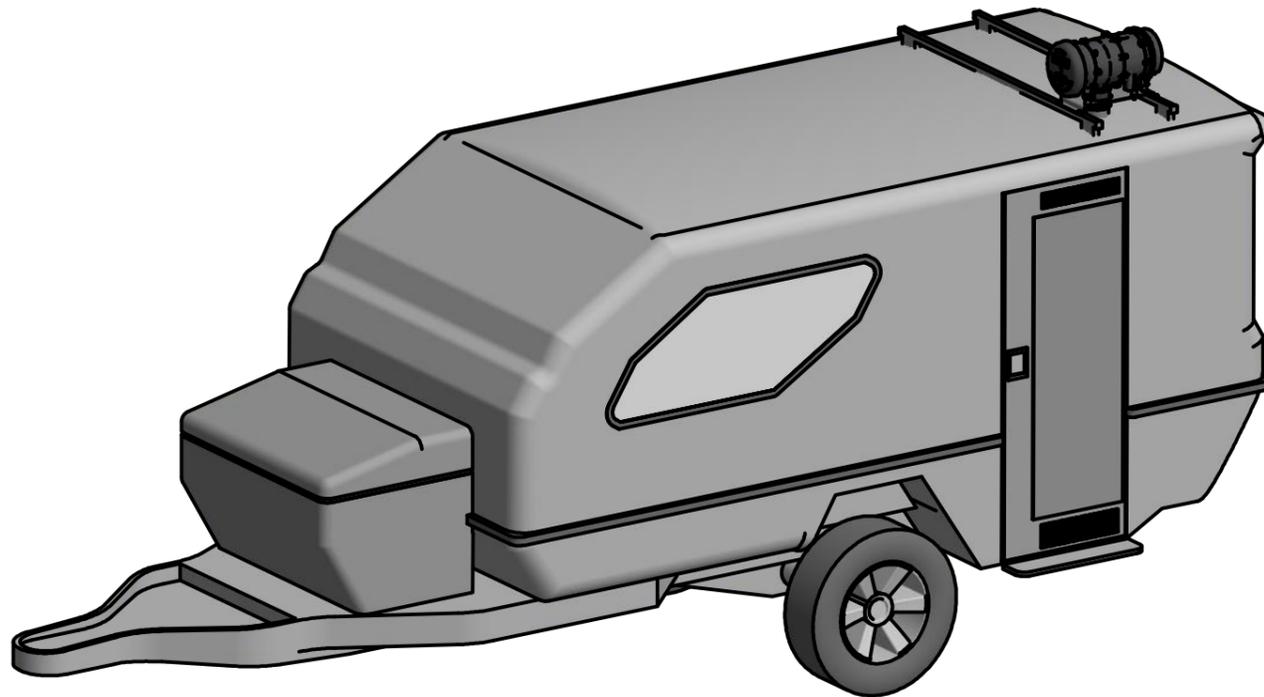




RESPA CF QUALITY CABIN ENVIRONMENTAL AIR UNIT FOR CARAVAN, CAMPER, RV



The following design concept is for a basic RESPA CF (12vdc or 24vdc - please specify when ordering) External Air Filtration and Cab Pressuriser Kit for a Recreational Camper, Caravan, RV.

The System arrangement consists of:

- a) External Air- RESPA CF Unit: for Precleaning, Filtration and Pressurisation of the Cabin. This unit Precleans the External Air (>96% of debris is returned to the external environment), provides Filtered "Fresh Air" and Air Flow to pressurise the Cabin.
- b) The following drawings provide for general components for mounting and ducting of the kit and is in 3 configurations being:
 Configuration A - solid ducting components via the ceiling
 Configuration B - solid ducting components via the side-wall of the cabin.
 Configuration C - solid ducting components via toolbox mounting
- c) Optional ICPSensor (In- Cabin Pressure Sensors) is to monitor the Cabin Pressure and Alarm if the Cabin Pressure drops below the set- point threshold. Audible and visual alarms are provided to indicate that the Cabin sealing has been compromised but primarily to indicate that the External Filter Element of the RESPA CF has become loaded, air flow has diminished and so the Filter Element requires replacement.

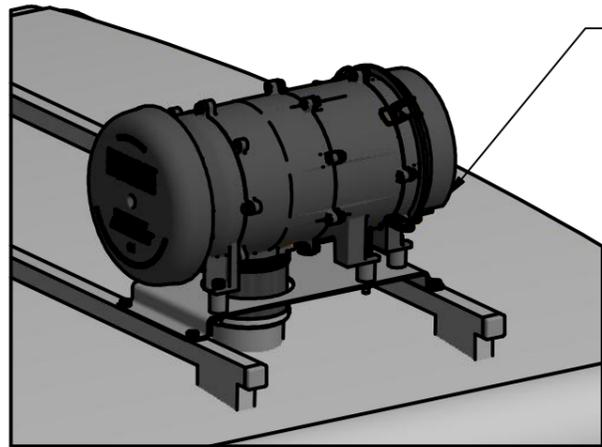
The Objectives of the technology is to provide:

- **Pressurisation cabin and to filter incoming air by removing contamination that can affect the internals of the cabin such as clothing, electrical components, bedding etc.**
- **Extension of Filter Element up to 1,000 hours.**
- **Protection and extension of HVAC Service Life and functionality.**

Special Notes:

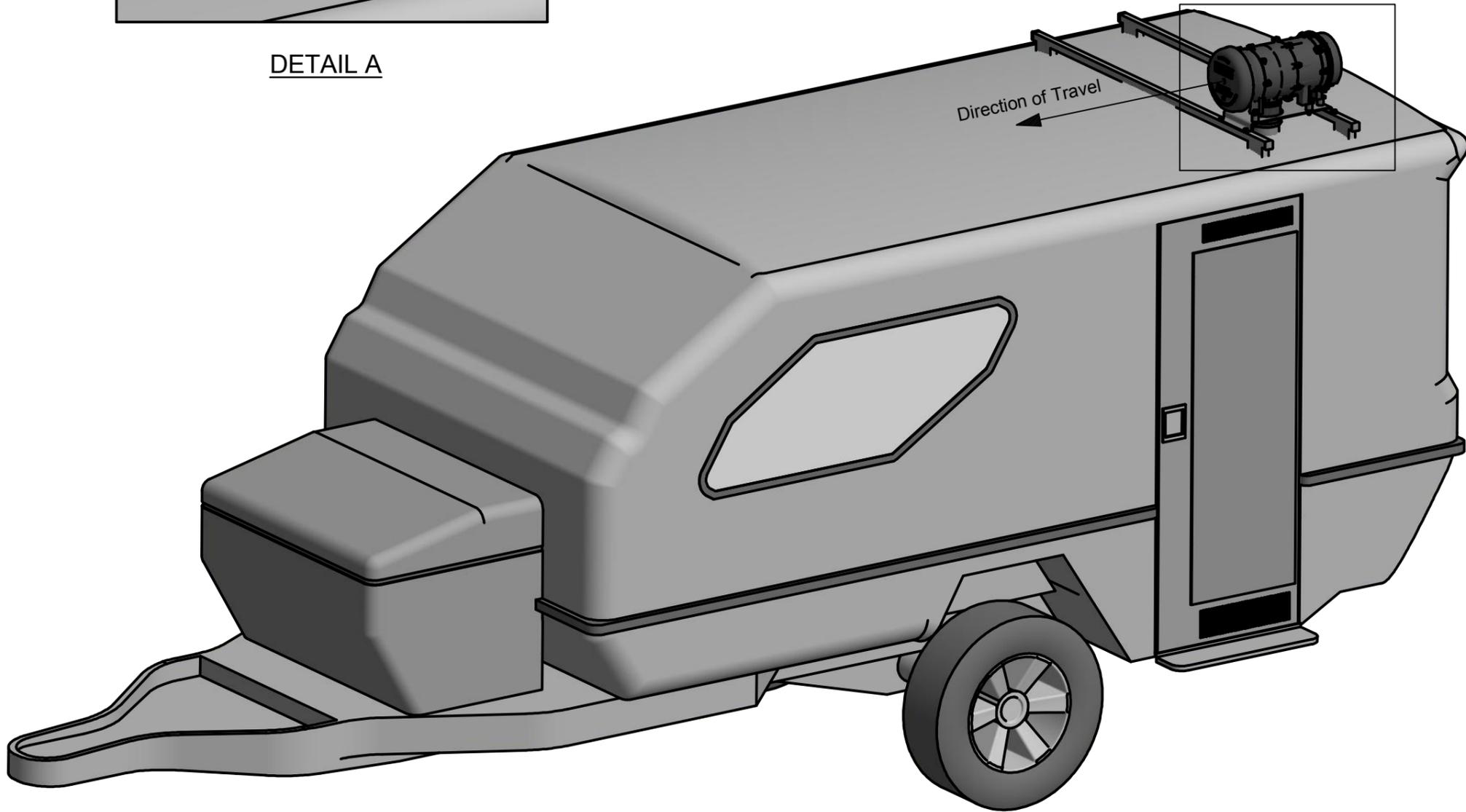
- **Cabin Pressurisation/Sealing** - To ensure cabin pressurisation so as to prevent entry of dust, cabin sealing needs to be prepared before travelling. Ensure that all potential air leaks are sealed such as external vents (eg. gas, refrigerator, etc), sink and shower drains (secure plugs), windows, doors, hatches, air conditioning external air vents etc. Please note to check filter element to ensure correct air flow and cabin pressurisation before traveling.
- **Respa Power/Connection** - Note the power requirements for the Respa (12vdc) unit requires a minimum of 12 amp power supply to ensure correct operation. It is recommended that a switch be installed so as to power the Respa unit only during vehicle travel to pressurise/filter cabin and avoid battery depletion. The Respa unit contains a DC motor and so correct positive/negative wire connections are required to ensure correct rotation of fan and respective performance and operation. Refer to Sheet 08.
- **Prechecks before Travel** - Ensure sealing as above, Respa unit is powered and that filter element is not blocked.
- **Filter Replacement** - Replace filter element of the Respa unit after a maximum of 1,000 operating hours. Please consider that a loaded/blocked filter will restrict or prevent air flow to the cabin and as such reduce or negate cabin pressurisation.
- **Respa Position** - The Respa unit can be mounted in any orientation except with the rain cover/air inlet in an inverted vertical position (avoid rain cover filling with water). The recommended positioning of the Respa is to place the unit with the rain cover/air inlet in the direction of vehicle travel as depicted in drawing.
- **Filter Element / Pre cleaner ejection ports** - So as to avoid negating the precleaner function and forcing of water into the Respa always ensure that the filter element ejection ports are positioned in the downward direction (when horizontally mounted) and opposite to direction of vehicle travel (when vertically mounted)

Rev	Date	Changes	Client/Description:	Designed by	Checked by	Approved by	Date	Date	Scale
A	23/5/16	For information only	Caravan Single Respa CF Mounting Kit	S.Braun	P.Woodford	P.Woodford	9/09/2016	1/03/2016	N.T.S.
B	9/9/16	Added Special notes and changed Title text	*DESIGN REGISTRATION PENDING* This drawing is copyright protected. No part of this drawing in any form or means is to be replaced, stored by retrieval system, transmitted or used by third parties without the written permission of LSM Technologies Pty Ltd	Ph: 07 3725 8100 Fax: 07 3725 8199 16 Bluestone Circuit Seventeen Mile Rocks QLD 4073 http://www.lsmtechnologies.com.au/					
C	20/9/16	Amended Notes & added direction/port detail							
						Caravan Single Respa Assembly - Title Page			
						Drawing Number	Revision	Sheet	
						03-03-0333- Caravan Single Respa Kit	C	1 / 8	



DETAIL A

Ensure that filter element precleaner ejection ports are positioned downwards



DETAIL A

Direction of Travel



RESPA CF UNIT MOUNTED ON ROOF



RESPA CF UNIT MOUNTED ON ROOF



RESPA CF AIR INLET

CONFIGURATION 'A' - RESPA ASSEMBLY

Rev	Date	Changes
A	23/5/16	For information only
B	9/9/16	Added Special notes and changed Title text
C	20/9/16	Amended Notes & added direction/port detail

Client/Description:
Caravan Single Respa CF Mounting Kit

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Designed by
S.Braun

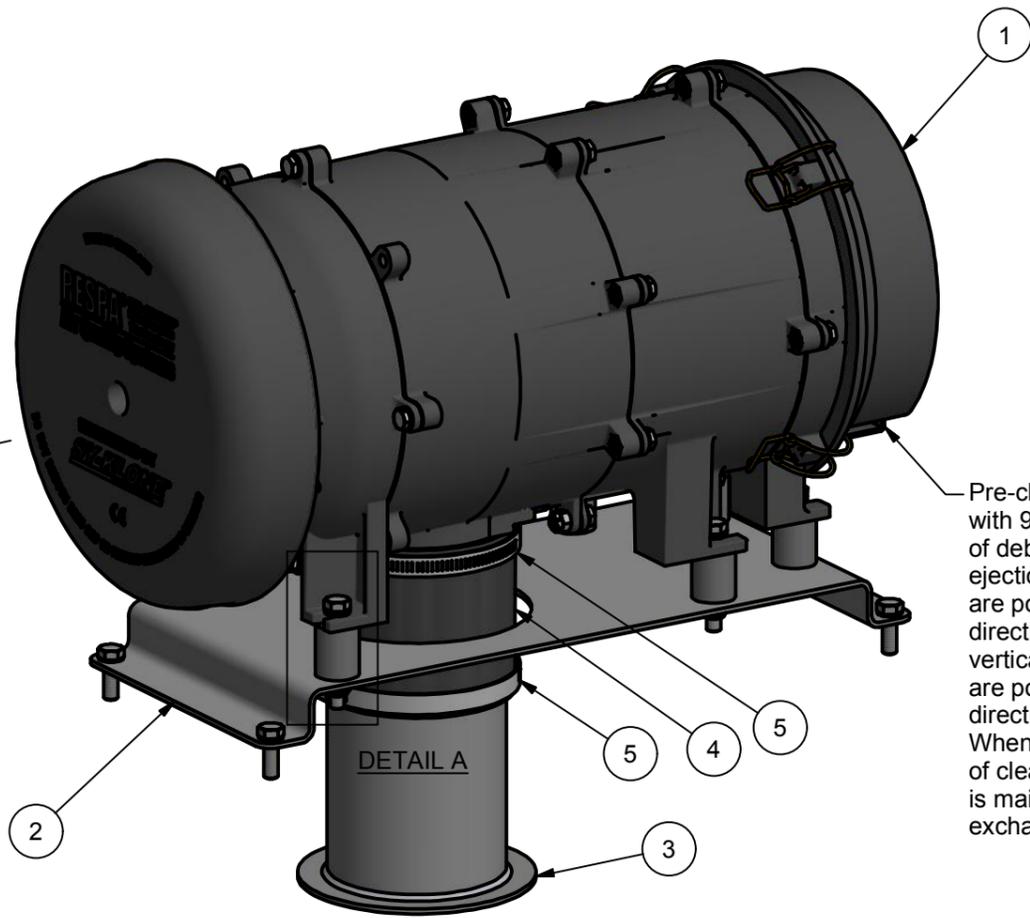
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Checked by
P.Woodford

Ph: 07 3725 8100
Fax: 07 3725 8199
16 Bluestone Circuit
Seventeen Mile Rocks QLD 4073
<http://www.lsmtechnologies.com.au/>

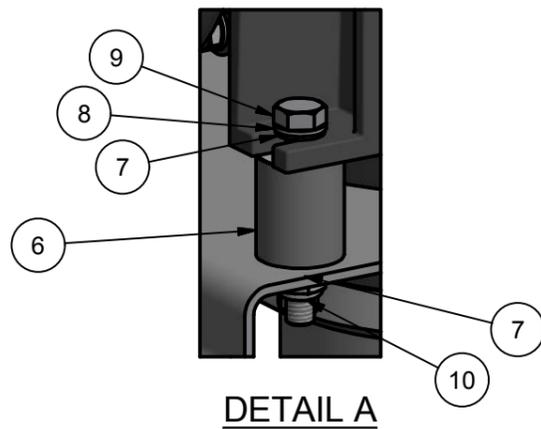
Approved by	Date	Date	Scale
P.Woodford	9/09/2016	1/03/2016	N.T.S.
Caravan Single Respa Assembly - Isometric View of Configuration A			
Drawing Number	Revision	Sheet	
03-03-0333- Caravan Single Respa Kit	C	2 / 8	

Direction of Travel

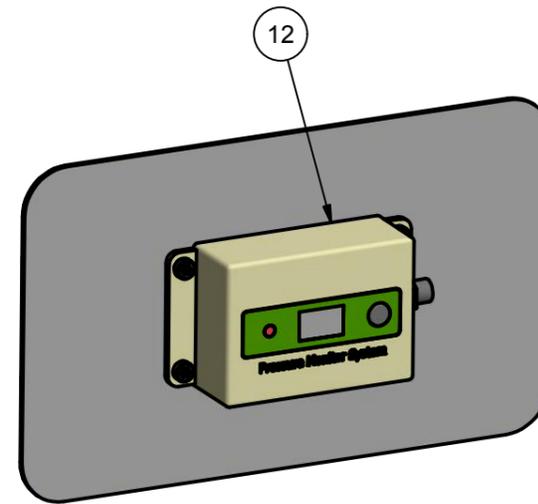


Pre-cleaner ejection ports of filter with 98% preclearing efficiency of debris. Please note - ensure ejection slots of filter element are pointed in the downward direction if positioned in the vertical position ensure ejection are positioned opposite to the direction of travel. When mounting ensure that 160mm of clearance from the Respa filter end is maintained so as to facilitate filter exchange.

CONFIGURATION 'A' - RESPA ASSEMBLY



DETAIL A



ICPS MOUNTED INSIDE CABIN
(Optional)



FILTER ELEMENT EXTERNAL AIR
(part number LSM-PFPFEFF008-SYK)

PARTS LIST			
ITEM	DESCRIPTION	QTY	PART NUMBER
2	Respa Mounting Plate	1	03-03-0044- Respa Plate
3	Single Respa Layout Spigot with Mesh	1	03-03-0334- Single Respa Spigot
4	4inch Black Silicon Straight	1	LSM-982400-OTH
5	Clamp Norma 90mm-110mm	2	LSM-ADP-004-CLP-SYK
6	Cylinder Rubber Mount CF/CFX	6	LSM-RMT-002-SYK
7	Body Washer 5/16 x 5/8 x 18G Z/P	16	BIL-507080016-OTH
8	Spring Washer	6	DIN 128 - A8
9	Bolt Hex M8x20x8.8	6	DIN933-M8X20-8.8
10	Nut- Nyloc Hex Plated M8	6	DIN985-M8-6-VOG
12	In Cabin Pressure Sensor - Monitor LED	1	LSM-PS-936-00124-SYK

Respa CF (1)	
Description	Part No.
RESPA-CF >H13+ Vortex HyperFlow 12 volt- No ICPS	LSM-PFP-REV0027-SYK
RESPA-CF M16+ External Air- 12 Volt- No ICPS Monitor	LSM-PFP-REV0011-SYK
RESPA-CF >H13+ Vortex HyperFlow 24 volt- No ICPS	LSM-PFP-REV0021-SYK
RESPA-CF M16+ External Air- 24 Volt- No ICPS Monitor	LSM-PFP-REV0012-SYK

Rev	Date	Changes
A	23/5/16	For information only
B	9/9/16	Added Special notes and changed Title text
C	20/9/16	Amended Notes & added direction/port detail

Client/Description:
Caravan Single Respa CF Mounting Kit

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Designed by
S.Braun

Checked by
P.Woodford

Approved by
P.Woodford

Date
9/09/2016

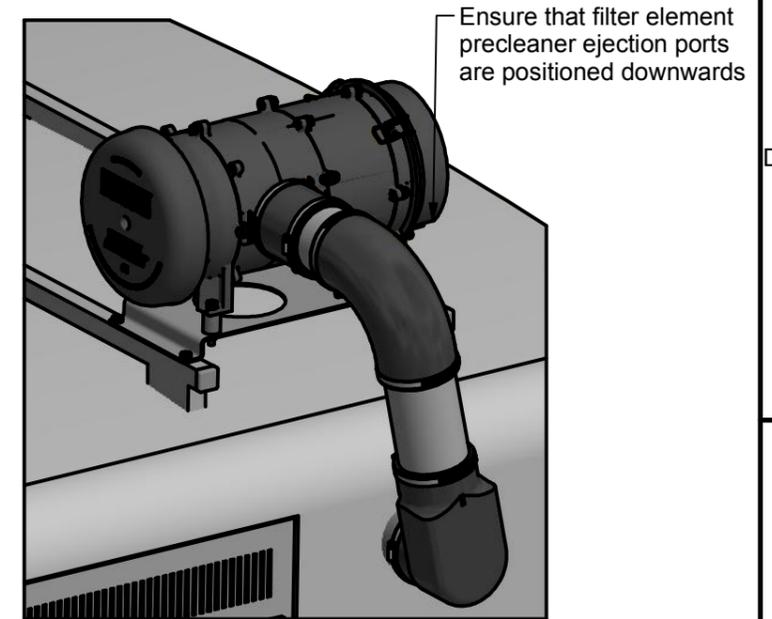
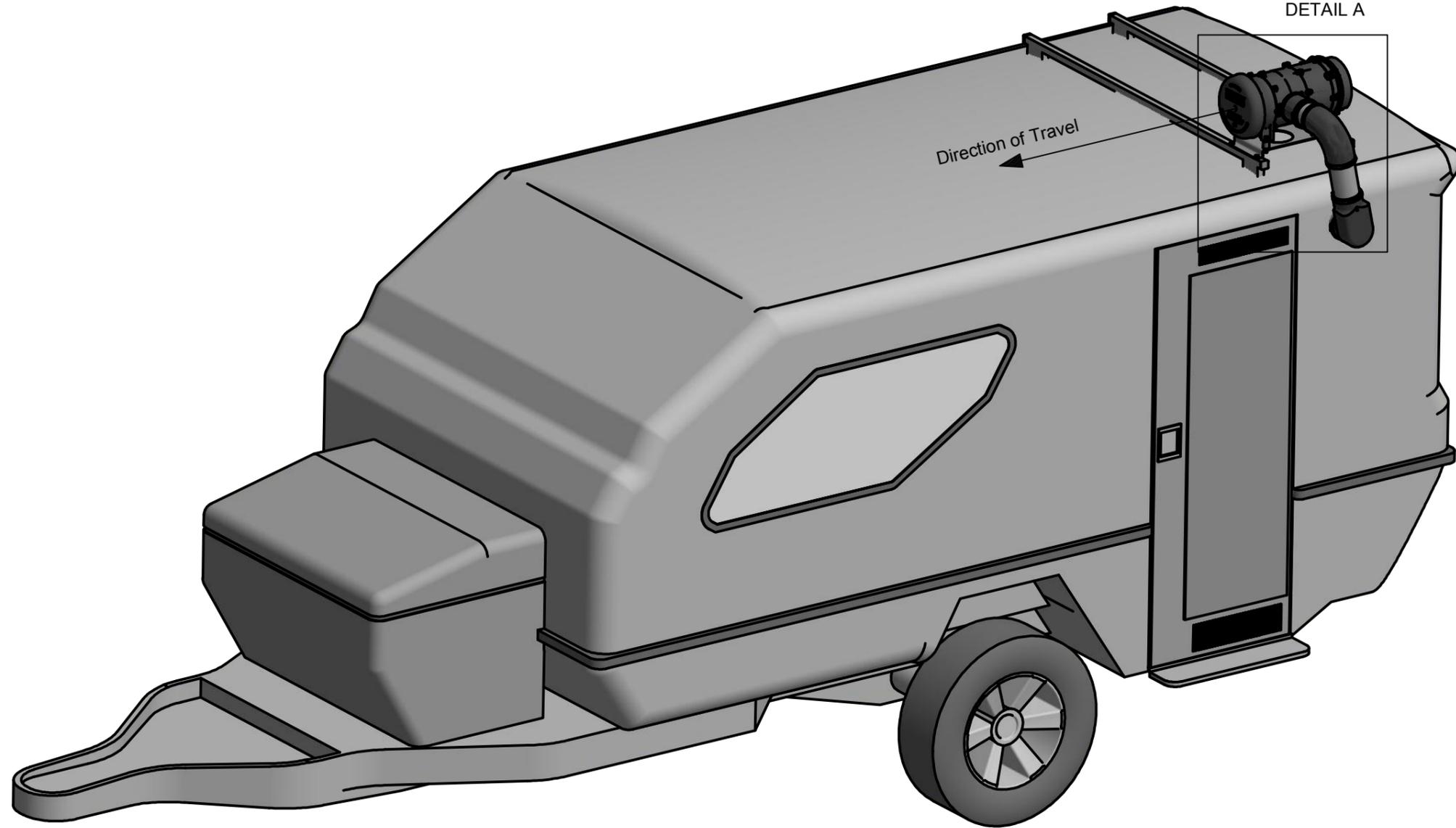
Date
1/03/2016

Scale
N.T.S.

Ph: 07 3725 8100
Fax: 07 3725 8199
16 Bluestone Circuit
Seventeen Mile Rocks QLD 4073
<http://www.lsmtechnologies.com.au/>

Caravan Single Respa Assembly - Layout and Parts Breakdown of Configuration A

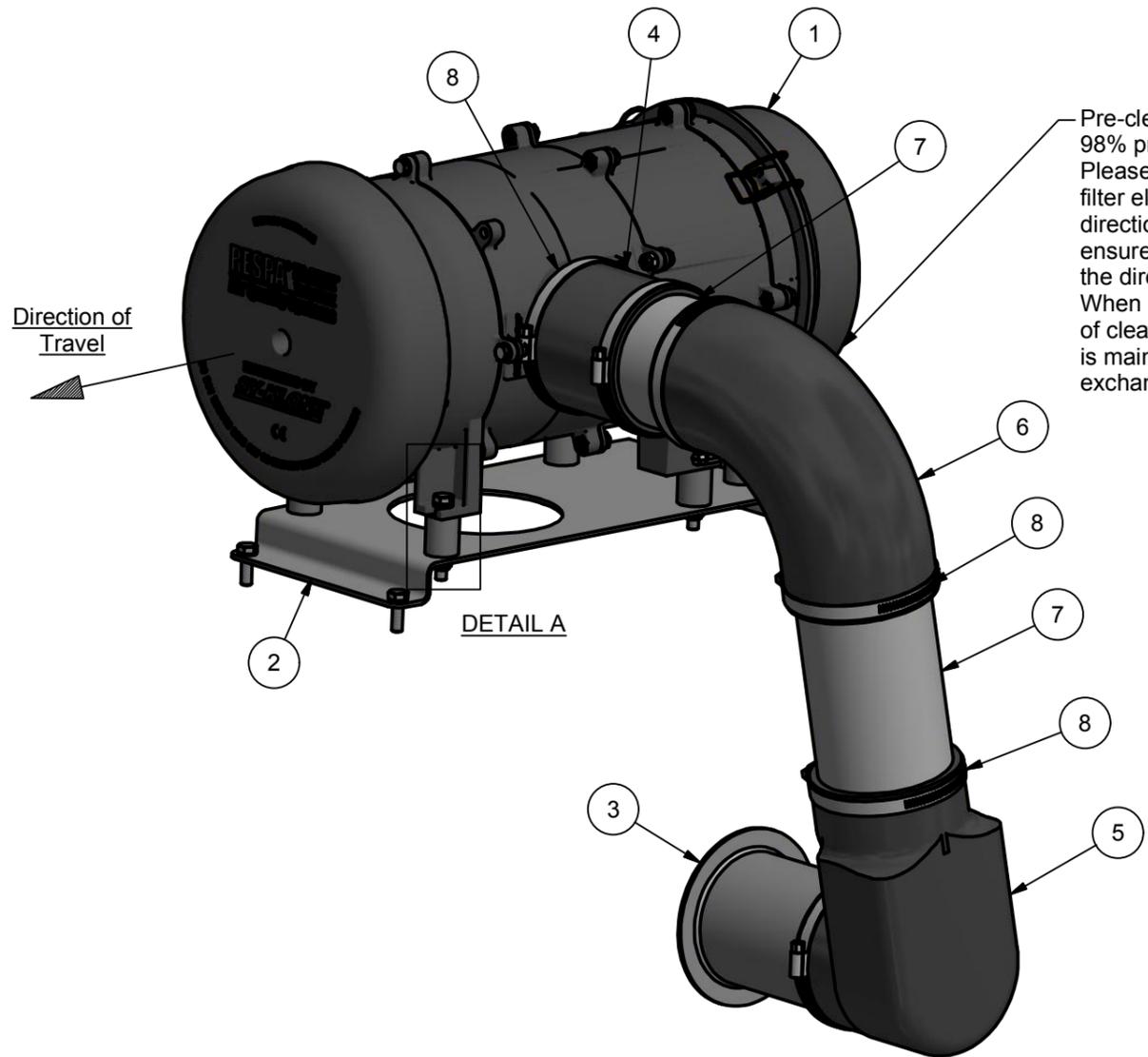
Drawing Number	Revision	Sheet
03-03-0333- Caravan Single Respa Kit	C	3 / 8



DETAIL A

CONFIGURATION 'B' - RESPA ASSEMBLY

Rev	Date	Changes	Client/Description:	Designed by	Checked by	Approved by	Date	Date	Scale
A	23/5/16	For information only	Caravan Single Respa CF Mounting Kit	S.Braun	P.Woodford	P.Woodford	9/09/2016	1/03/2016	N.T.S.
B	9/9/16	Added Special notes and changed Title text	'DESIGN REGISTRATION PENDING' This drawing is copyright protected. No part of this drawing in any form or means is to be replaced, stored by retrieval system, transmitted or used by third parties without the written permission of LSM Technologies Pty Ltd		Ph: 07 3725 8100 Fax: 07 3725 8199 16 Bluestone Circuit Seventeen Mile Rocks QLD 4073 http://www.lsmtechnologies.com.au/	Caravan Single Respa Assembly - Isometric View of Configuration B			
C	20/9/16	Amended Notes & added direction/port detail							Drawing Number 03-03-0333- Caravan Single Respa Kit

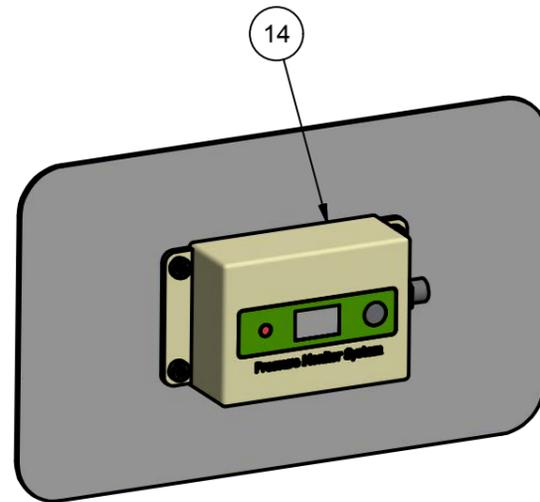
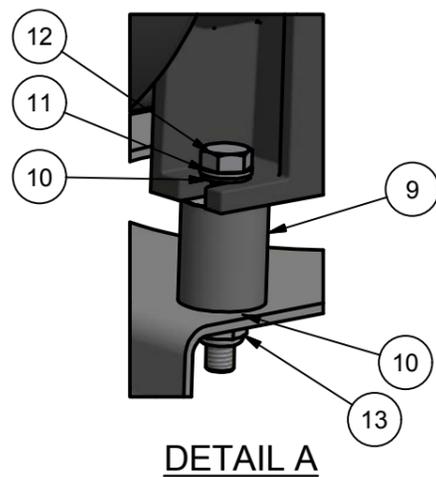


Pre-cleaner ejection ports of filter with 98% preclearing efficiency of debris. Please note - ensure ejection slots of filter element are pointed in the downward direction if positioned in the vertical position ensure ejection are positioned opposite to the direction of travel
When mounting ensure that 160mm of clearance from the Respa filter end is maintained so as to facilitate filter exchange.

PARTS LIST			
ITEM	DESCRIPTION	QTY	PART NUMBER
2	Respa Mounting Plate	1	03-03-0044- Respa Plate
3	Single Respa Layout Spigot with Mesh	1	03-03-0334- Single Respa Spigot
4	4inch Black Silicon Straight	1	LSM-982400-OTH
5	4inch 90deg Cobra	1	BIR-P600326-OTH
6	90deg Rubber Elbow 102mm	1	LSM-3316568S-SYK
7	4 Inch Aluminium Tube PC - per metre	1m	LSM-BYN999-SYK
8	Clamp Norma 90mm-110mm	6	LSM-ADP-004-CLP-SYK
9	Cylinder Rubber Mount CF/CFX	6	LSM-RMT-002-SYK
10	Body Washer 5/16 x 5/8 x 18G Z/P	16	BIL-507080016-OTH
11	Spring Washer	6	DIN 128 - A8
12	Bolt Hex M8x20x8.8	6	DIN933-M8X20-8.8
13	Nut- Nyloc Hex Plated M8	6	DIN985-M8-6-VOG
14	In Cabin Pressure Sensor - Monitor LED	1	LSM-PS-936-00124-SYK

Respa CF (1)	
Description	Part No.
RESPA-CF >H13+ Vortex HyperFlow 12 volt- No ICPS	LSM-PFP-REV0027-SYK
RESPA-CF M16+ External Air- 12 Volt- No ICPS Monitor	LSM-PFP-REV0011-SYK
RESPA-CF >H13+ Vortex HyperFlow 24 volt- No ICPS	LSM-PFP-REV0021-SYK
RESPA-CF M16+ External Air- 24 Volt- No ICPS Monitor	LSM-PFP-REV0012-SYK

CONFIGURATION 'B' - RESPA ASSEMBLY



ICPS MOUNTED INSIDE CABIN
(Optional)



FILTER ELEMENT EXTERNAL AIR
(part number LSM-PFPFEFF008-SYK)

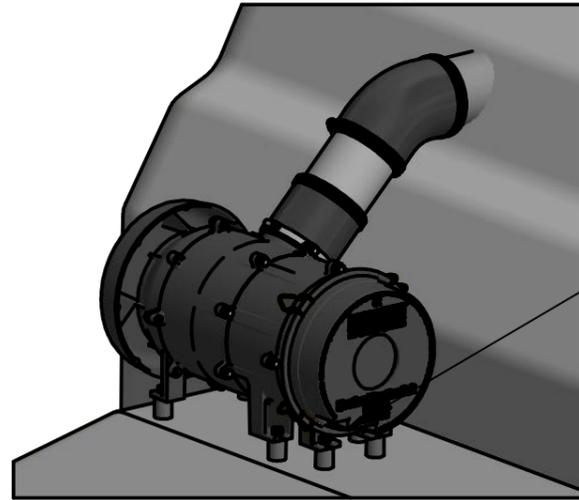
Rev	Date	Changes
A	23/5/16	For information only
B	9/9/16	Added Special notes and changed Title text
C	20/9/16	Amended Notes & added direction/port detail

Client/Description:
Caravan Single Respa CF Mounting Kit

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Designed by S.Braun	Checked by P.Woodford	Approved by P.Woodford	Date 9/09/2016	Date 1/03/2016	Scale N.T.S.
		Caravan Single Respa Assembly - Layout and Parts Breakdown of Configuration B			
Ph: 07 3725 8100 Fax: 07 3725 8199 16 Bluestone Circuit Seventeen Mile Rocks QLD 4073 http://www.lsmtechnologies.com.au/		Drawing Number 03-03-0333- Caravan Single Respa Kit	Revision C	Sheet 5 / 8	



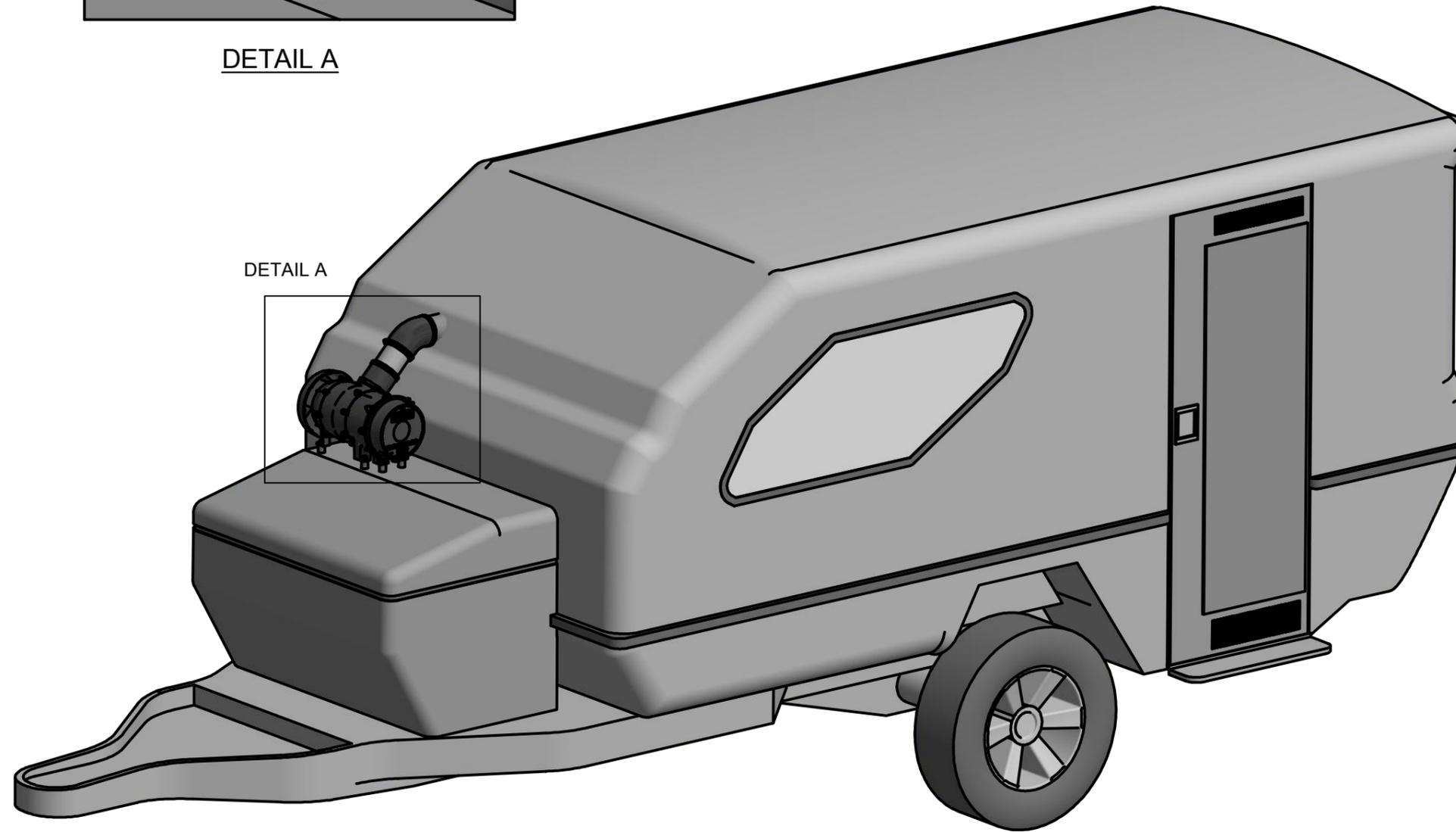
DETAIL A



RESPA CF UNIT MOUNTED ON TOOL BOX



RESPA CF UNIT MOUNTED ON TOOL BOX

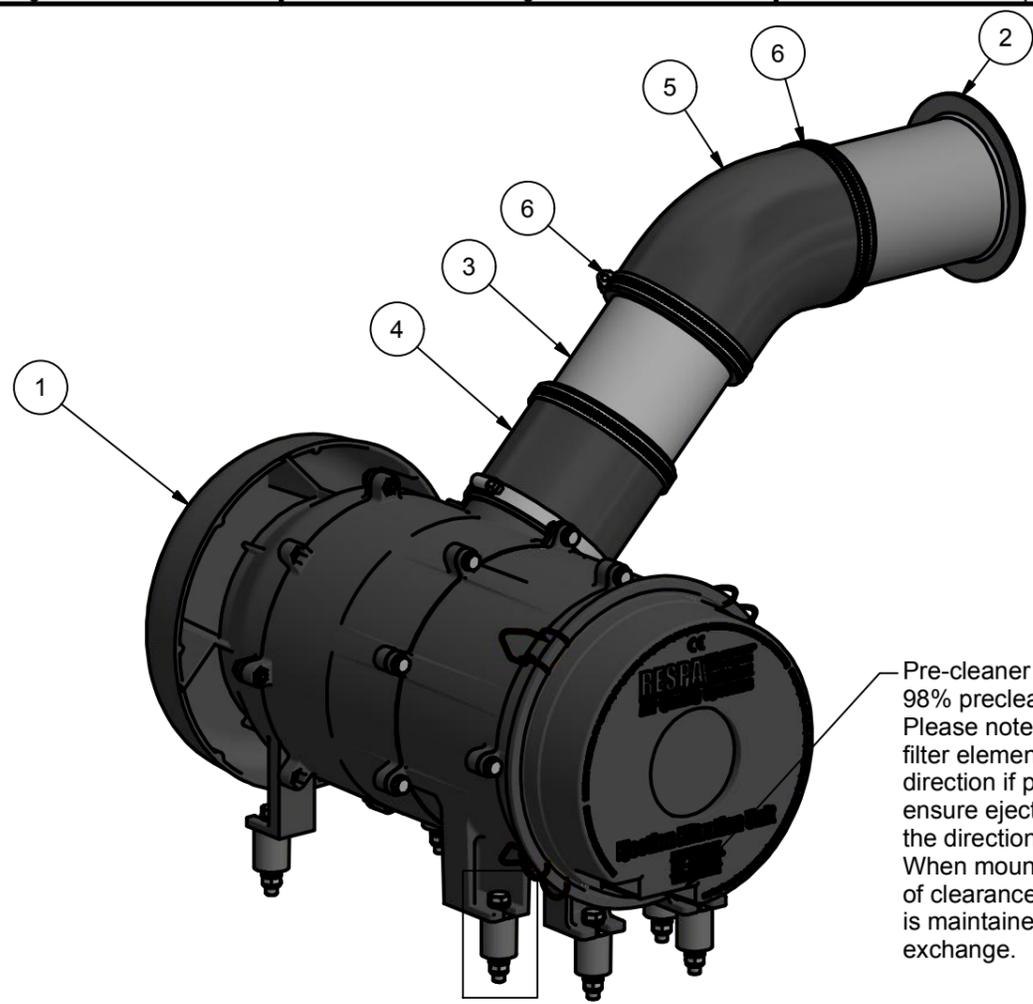


CONFIGURATION 'C' - RESPA ASSEMBLY



RESPA CF AIR INLET

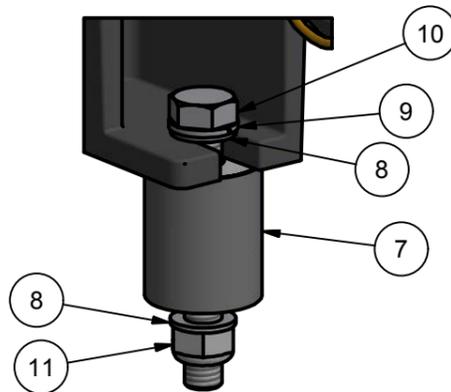
Rev	Date	Changes	Client/Description:	Designed by	Checked by	Approved by	Date	Date	Scale
A	23/5/16	For information only	Caravan Single Respa CF Mounting Kit	S.Braun	P.Woodford	P.Woodford	9/09/2016	1/03/2016	N.T.S.
B	9/9/16	Added Special notes and changed Title text	'DESIGN REGISTRATION PENDING' This drawing is copyright protected. No part of this drawing in any form or means is to be replaced, stored by retrieval system, transmitted or used by third parties without the written permission of LSM Technologies Pty Ltd		Ph: 07 3725 8100 Fax: 07 3725 8199 16 Bluestone Circuit Seventeen Mile Rocks QLD 4073 http://www.lsmtechnologies.com.au/	Caravan Single Respa Assembly - Isometric View of Configuration C			
C	20/9/16	Amended Notes & added direction/port detail							
									Drawing Number 03-03-0333- Caravan Single Respa Kit



DETAIL A

CONFIGURATION 'C' - RESPA ASSEMBLY

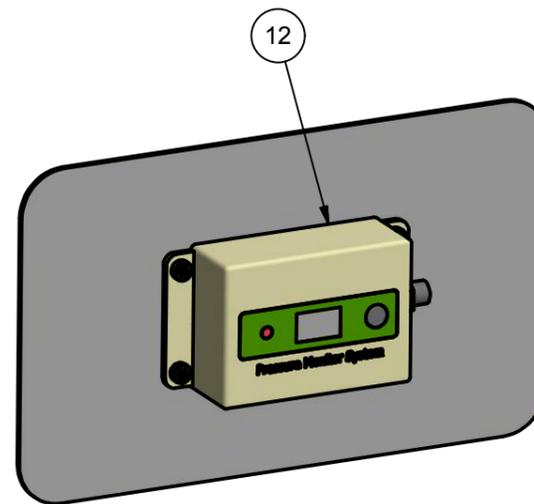
Pre-cleaner ejection ports of filter with 98% preclearing efficiency of debris. Please note - ensure ejection slots of filter element are pointed in the downward direction if positioned in the vertical position ensure ejection are positioned opposite to the direction of travel.
When mounting ensure that 160mm of clearance from the Respa filter end is maintained so as to facilitate filter exchange.



DETAIL A

PARTS LIST			
ITEM	DESCRIPTION	QTY	PART NUMBER
2	Single Respa Layout Spigot with Mesh	1	03-03-0334- Single Respa Spigot
3	4 Inch Aluminium Tube PC - per metre	1	LSM-BYN999-SYK
4	4inch Black Silicon Straight	1	LSM-982400-OTH
5	45deg Rubber Elbow 102mm	1	LSM-3316581S-SYK
6	Clamp Norma 90mm-110mm	4	LSM-ADP-004-CLP-SYK
7	Cylinder Rubber Mount CF/CFX	6	LSM-RMT-002-SYK
8	Body Washer 5/16 x 5/8 x 18G Z/P	12	BIL-507080016-OTH
9	Spring Washer	6	DIN 128 - A8
10	Bolt Hex M8x20x8.8	6	DIN933-M8X20-8.8
11	Nut- Nyloc Hex Plated M8	6	DIN985-M8-6-VOG
12	In Cabin Pressure Sensor - Monitor LED	1	LSM-PS-936-00124-SYK

Respa CF (1)	
Description	Part No.
RESPA-CF >H13+ Vortex HyperFlow 12 volt- No ICPS	LSM-PFP-REV0027-SYK
RESPA-CF M16+ External Air- 12 Volt- No ICPS Monitor	LSM-PFP-REV0011-SYK
RESPA-CF >H13+ Vortex HyperFlow 24 volt- No ICPS	LSM-PFP-REV0021-SYK
RESPA-CF M16+ External Air- 24 Volt- No ICPS Monitor	LSM-PFP-REV0012-SYK



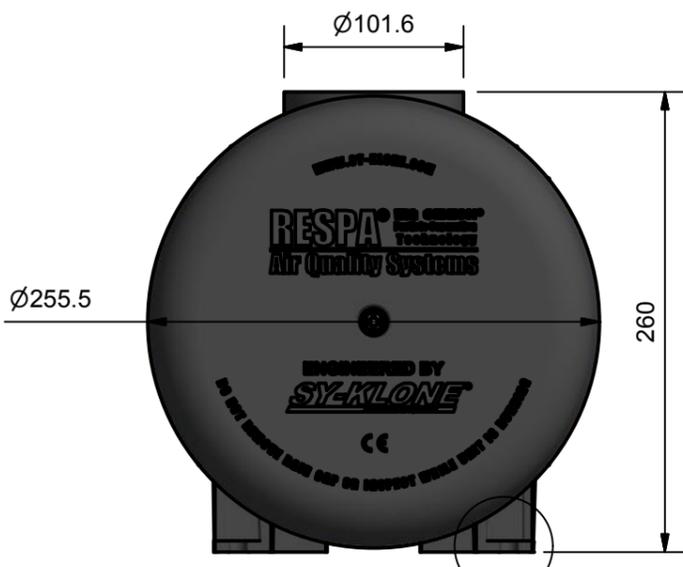
ICPS MOUNTED INSIDE CABIN
(Optional)



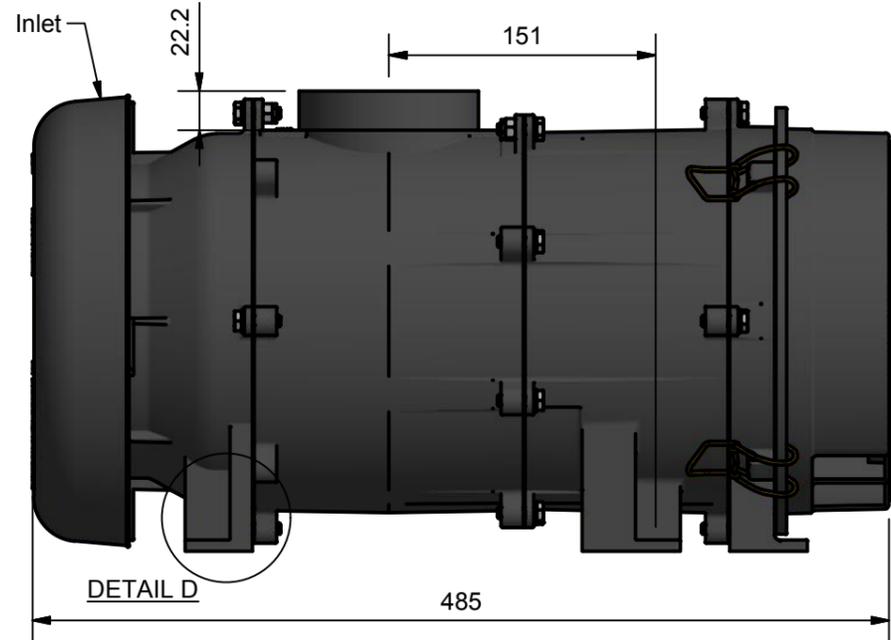
FILTER ELEMENT EXTERNAL AIR
(part number LSM-PFPFEFF008-SYK)

Rev	Date	Changes	Client/Description:	Designed by	Checked by	Approved by	Date	Date	Scale
A	23/5/16	For information only	Caravan Single Respa CF Mounting Kit	S.Braun	P.Woodford	P.Woodford	9/09/2016	1/03/2016	N.T.S.
B	9/9/16	Added Special notes and changed Title text	'DESIGN REGISTRATION PENDING' This drawing is copyright protected. No part of this drawing in any form or means is to be replaced, stored by retrieval system, transmitted or used by third parties without the written permission of LSM Technologies Pty Ltd		Ph: 07 3725 8100 Fax: 07 3725 8199 16 Bluestone Circuit Seventeen Mile Rocks QLD 4073 http://www.lsmtechnologies.com.au/	Caravan Single Respa Assembly - Layout and Parts Breakdown of Configuration C			
C	20/9/16	Amended Notes & added direction/port detail							

It is recommended that RESPA(TM) Units are not to be rigid mounted especially in conditions where excess vibration or movement is experienced. The Vibration Isolation Mounting Feet Kit (03-03-0002- Rubber Mount) is to be used to absorb small displacement and vibration as well as thermal expansion of components so as to avoid excessive preloading / damage to connection outlets

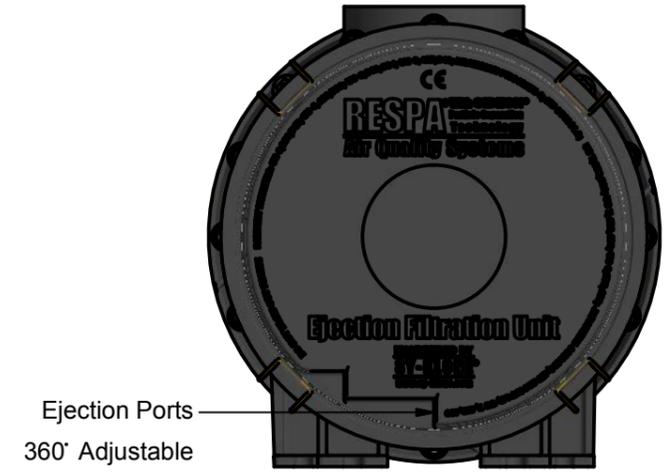


FRONT VIEW

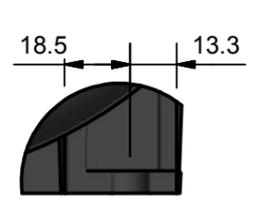


SIDE VIEW

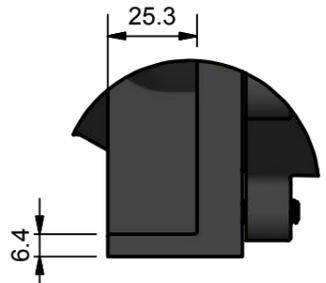
Note: Chose >H13 Hepa or Merv16+ Filter Elements



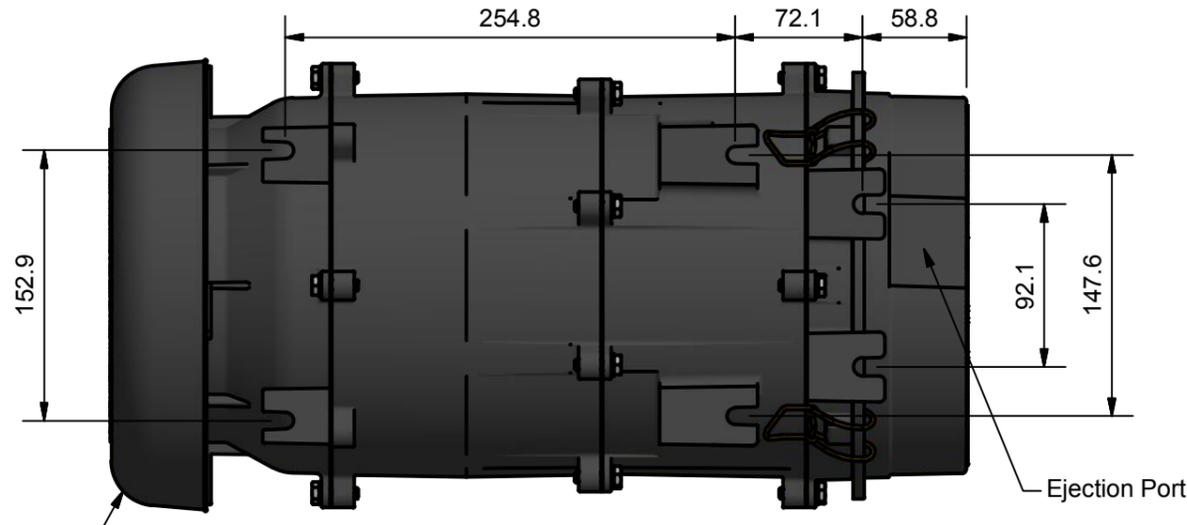
REAR VIEW



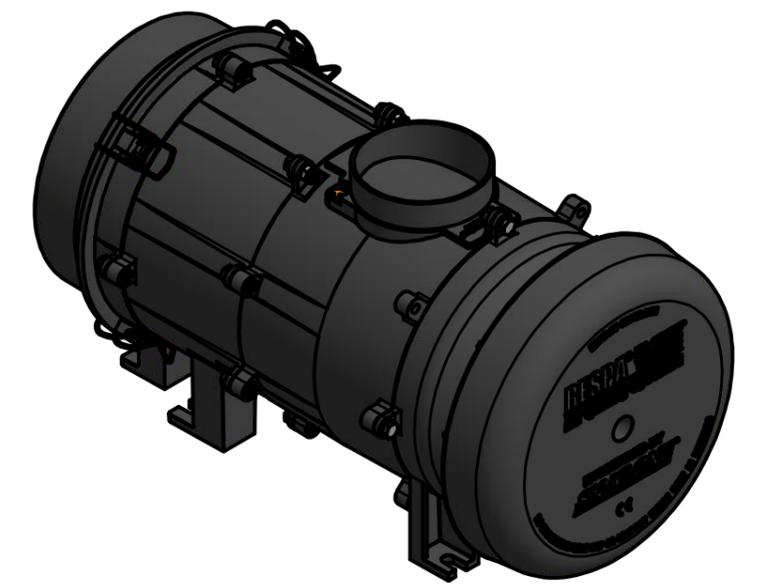
DETAIL C (1:2)



DETAIL D (1:2)



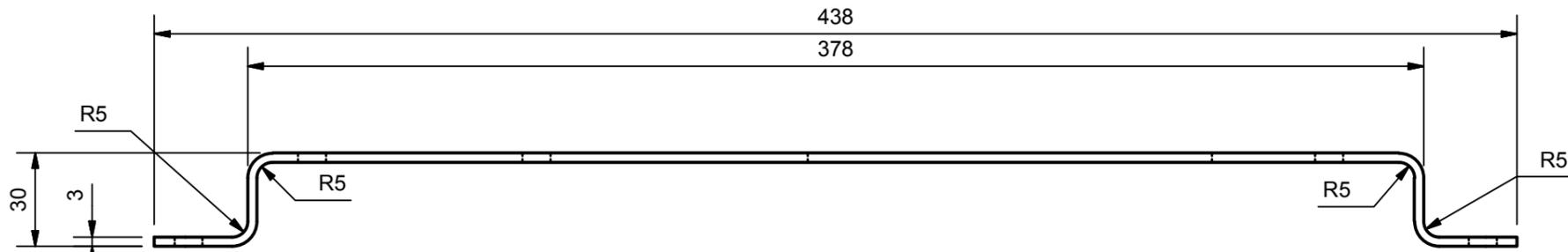
BOTTOM VIEW



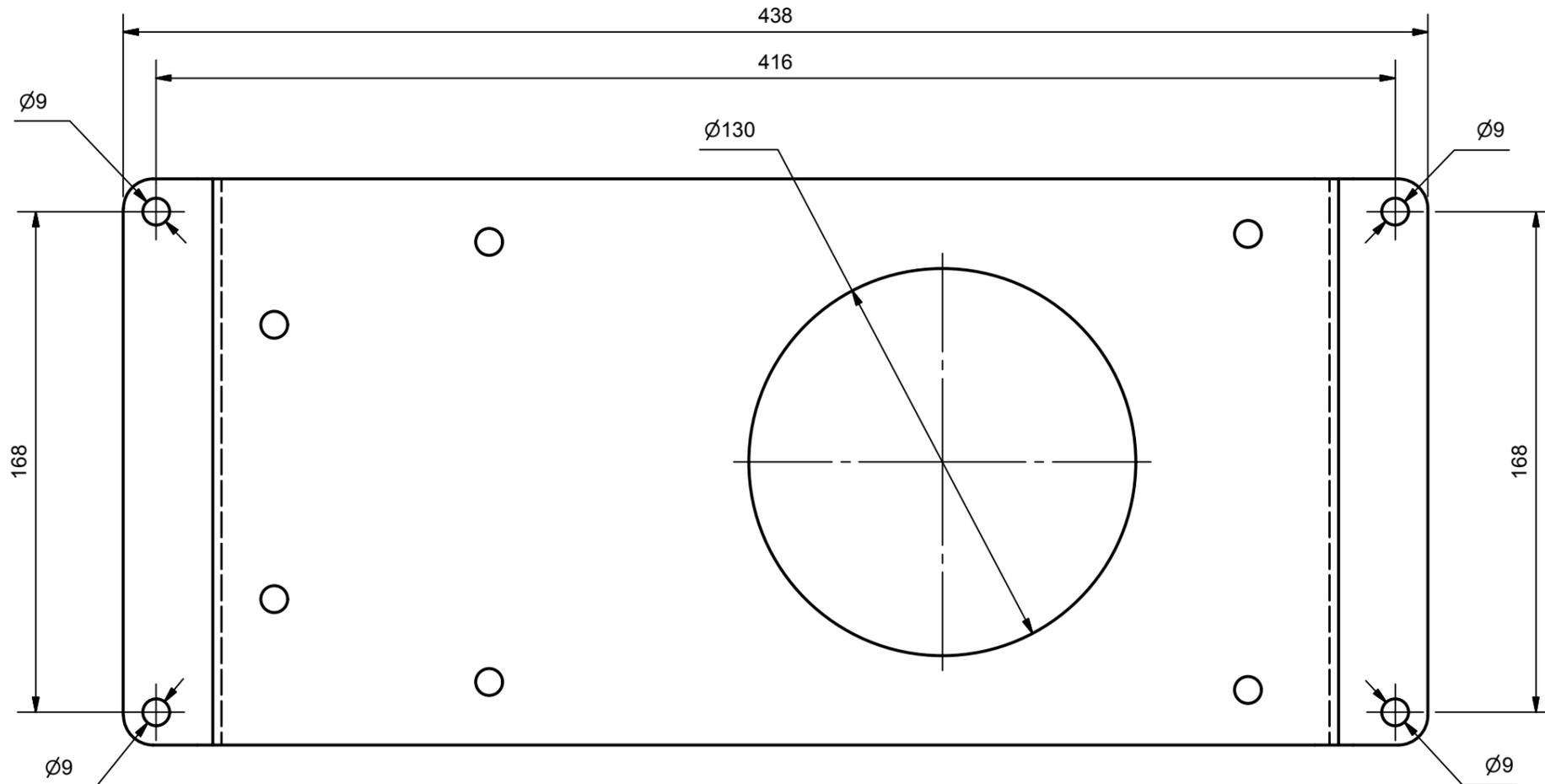
ISOMETRIC VIEW

- Notes:
1. Operating Voltage select 24VDC or 12VDC
 2. 24VDC - 12 amp Start / 6 amp Constant
12VDC - 24 amp Start / 12 amp Constant
 3. Operating current 6 Amps @ 24V
 4. Wiring - 16 AWG. 16 IN. 1406 MM ileads
 5. Connector None
 6. Weight 4.5kg
 7. Material Engineering Polymer
 8. Filter requires approximately 160 mm of clearance for removal
 9. Ensure correct positive/negative wires are connected correctly for correct rotation of fan and respective precleaning and positive airflow to the cabin.

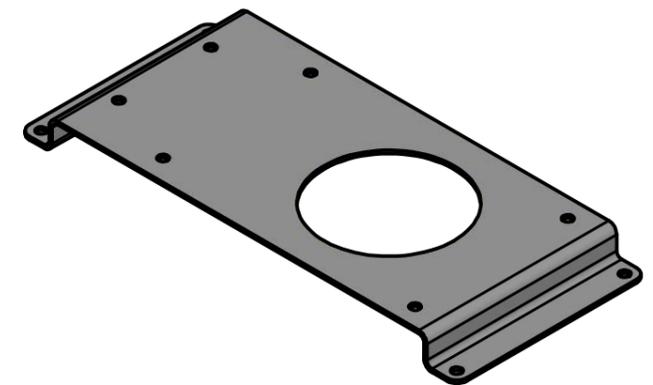
Rev	Date	Changes	Client/Description:	Designed by	Checked by	Approved by	Date	Date	Scale
A	23/5/16	For information only	Caravan Single Respa CF Mounting Kit	S.Braun	P.Woodford	P.Woodford	9/09/2016	1/03/2016	1:4
B	9/9/16	Added Special notes and changed Title text	'DESIGN REGISTRATION PENDING' This drawing is copyright protected. No part of this drawing in any form or means is to be replaced, stored by retrieval system, transmitted or used by third parties without the written permission of LSM Technologies Pty Ltd	LSM TECHNOLOGIES	Ph: 07 3725 8100 Fax: 07 3725 8199 16 Bluestone Circuit Seventeen Mile Rocks QLD 4073 http://www.lsmtechnologies.com.au/	Caravan Single Respa Assembly - Respa CF Dimensions			
C	20/9/16	Amended Notes & added direction/port detail							
						Drawing Number	Revision	Sheet	
						03-03-0333- Caravan Single Respa Kit	C	8 / 8	



SIDE VIEW OF FOLDED PLATE



TOP VIEW OF FOLDED PLATE

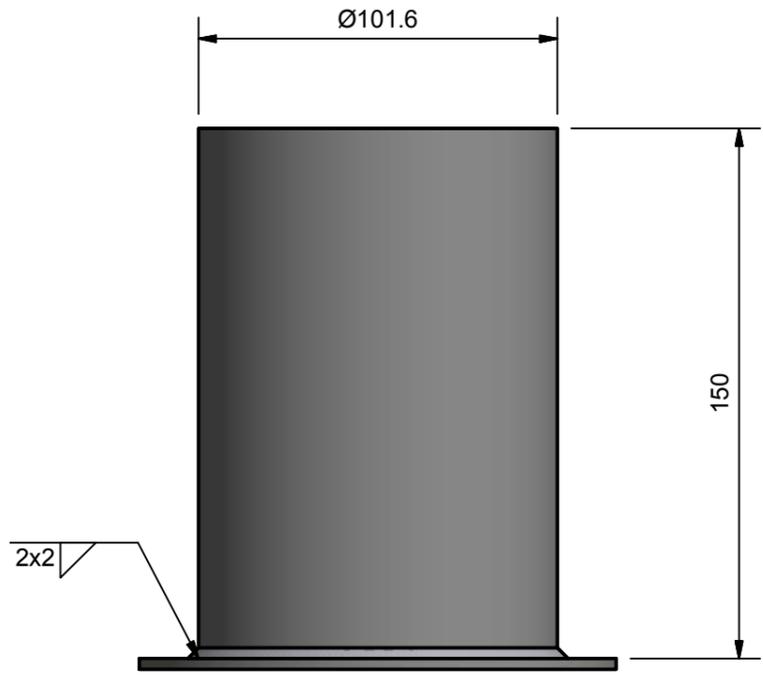


ISOMETRIC VIEW
(Not to Scale)

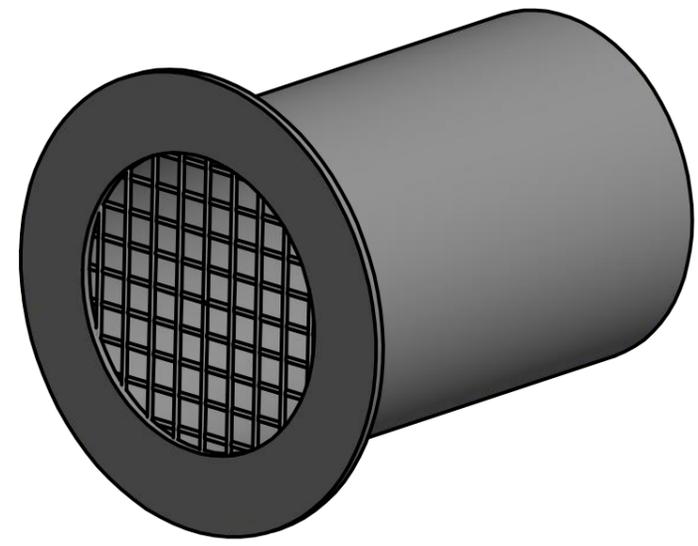
Notes:

1. To be made out of 3mm 'Mild Steel'
2. To be powdercoated in 'Komatsu Ebony Grey'
3. All dimensions are in Millimeters

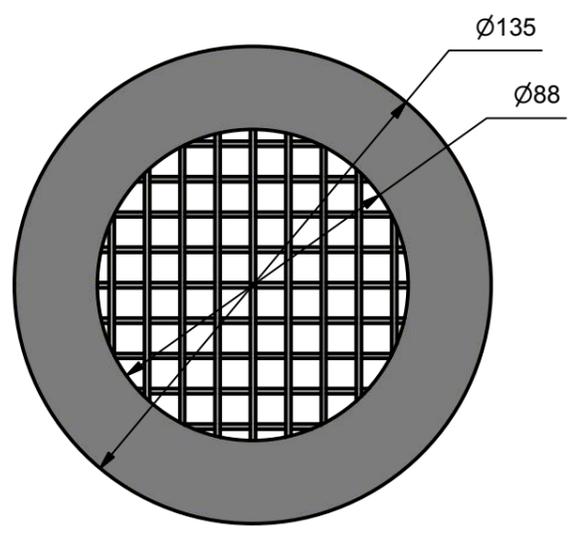
Client/Description RESPA CF/CFX Mounting Plate Generic Powdercoated	Designed by S.Braun	Checked by P.Woodford	Approved by P.Woodford	Date 20/01/2014	Date 10/10/2013	Scale 1:2
	This drawing is copyright protected. No part of this drawing in any form or means is to be replaced, stored by retrieval system, transmitted or used by third parties without the written permission of LSM Technologies Pty Ltd				Ph: 07 3725 8100 Fax: 07 3725 8199 16 Bluestone Circuit Seventeen Mile Rocks QLD 4073 http://www.lsmtechnologies.com.au/	
RESPA CF/CFX Mounting Plate Generic Powdercoated			Drawing Number 03-03-0044- Respa Plate	Revision A	Sheet 1 / 1	



TOP VIEW OF COMPLETE SPIGOT



ISOMETRIC VIEW OF COMPLETE SPIGOT
(Not to Scale)



FRONT VIEW OF COMPLETE SPIGOT

Notes:

- 1. To be made out of 'Mild Steel'
- 2. To be powdercoated in 'Komatsu Ebony Grey'
- 3. All dimensions are in Millimeters

Rev	Date	Changes	Client/Description:	Designed by	Checked by	Approved by	Date	Date	Scale
A	20/5/16	For Manufacture	Spigot for Single Respa Configuration for an Excavator	S.Braun	P.Woodford	P.Woodford	20/05/2016	6/04/2016	1:2
			'DESIGN REGISTRATION PENDING'	 Ph: 07 3725 8100 Fax: 07 3725 8199 16 Bluestone Circuit Seventeen Mile Rocks QLD 4073 http://www.lsmtechnologies.com.au/		Single Respa Layout Spigot - Layout and Weld Details			
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						Drawing Number		Revision	Sheet
						03-03-0334- Single Respa Spigot w- mesh		A	2 / 2